PUBLIC DRAFT

MONTEREY COUNTY

Community Climate Action and Adaptation Plan

MARCH 2026



Monterey County Community Climate Action and Adaptation Plan

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This Community Climate Action and Adaptation Plan (CCAAP) articulates broad policy objectives and potential options to achieve equitable climate action. The CCAAP does not approve, fund, mandate, or authorize implementation of any specific projects or programs. Nor does it require that any program or strategy be applied to any current or future development project. Proposed strategies and actions may require additional public review, review by the Board of Supervisors, and/or environmental review under the California Environmental Quality Act.

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List of Abbreviations

°F	degrees Fahrenheit
2017 Scoping Plan	California's 2017 Climate Change Scoping Plan
2020 MCAP	2020 Municipal Climate Action Plan
2022 Scoping Plan	2022 Scoping Plan for Achieving Carbon Neutrality
2030 MCAP	2030 Municipal Climate Action Plan
30x30	Pathways to 30x30 California
3CE	Central Coast Community Energy
AB	Assembly Bill
AEEC	Alternative Energy and Environment Committee
AMBAG	Association of Monterey Bay Area Governments
APG	Adaptation Planning Guide
BAU	business-as-usual
CAL FIRE	California Department of Forestry and Fire Protection
Cal OES	California Governor's Office of Emergency Services
Cal/OSHA	California Division of Occupational Safety and Health
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CBO	community-based organization
CCAAP	Community Climate Action and Adaptation Plan
CCR	California Code of Regulations
CH_4	methane
Climate Smart Strategy	The Natural and Working Lands Climate Smart Strategy
Climate Study	Monterey Bay Natural and Working Lands Climate Mitigation and Resiliency Study
Climate Targets	California's Nature-Based Solutions Climate Target
CO_2	carbon dioxide

CO_2e	carbon dioxide equivalent
Community Protocol	U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions
County	County of Monterey
C-PACE	commercial property assessed clean energy
EIR	Environmental Impact Report
EPA	U.S. Environmental Protection Agency
ESF	Elkhorn Slough Foundation
ESRI	Environmental Systems Research Institute, Inc.
EV	electric vehicle
EVSE	electric vehicle supply equipment
FEED	Farmer Education and Enterprise Development
FHSZ	Fire Hazard Severity Zone
FRAP	Fire and Resource Assessment Program
GHG	greenhouse gas
GIS	geographic information systems
GWP	global warming potential
ICLEI	ICLEI–Local Governments for Sustainability
IGLA	Intergovernmental and Legislative Affairs Office
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
KPI	key performance indicator
LLCP	long-lived climate pollutant
LPSCFC	Los Padres Strategic Community Fuelbreak Collaborative Project
MBACJC	Monterey Bay Area Climate Justice Collaborative
MBARD	Monterey Bay Air Resources District
MBCAAN	Monterey Bay Climate Adaptation Action Network
MCWRA	Monterey County Water Resources Agency

MJHMP	Multi-Jurisdictional Hazard Mitigation Plan
MMT	million metric tons
MTC	metric tons of carbon
$MTCO_2e$	metric tons of carbon dioxide equivalent
N_2O	nitrous oxide
NBS	nature-based solutions
NDC	Nationally Determined Contribution
NLA	no local action
NWL	natural and working lands
PG&E	Pacific Gas and Electric Company
$PM_{2.5}$	fine particulate matter
PSPS	Public Safety Power Shutoff
RCP	Representative Concentration Pathway
SB	Senate Bill
SCADA	Supervisory Control and Data Acquisition
SLCP	short-lived climate pollutant
SSURGO	U.S. Department of Agriculture Natural Resources Conservation Service's Soil Survey Geographic Database
TAMC	Transportation Agency for Monterey County
UCCE	University of California Cooperative Extension
VA	Vulnerability Assessment
VMT	vehicle miles traveled
WUI	wildland-urban interface
ZEV	zero-emission vehicles

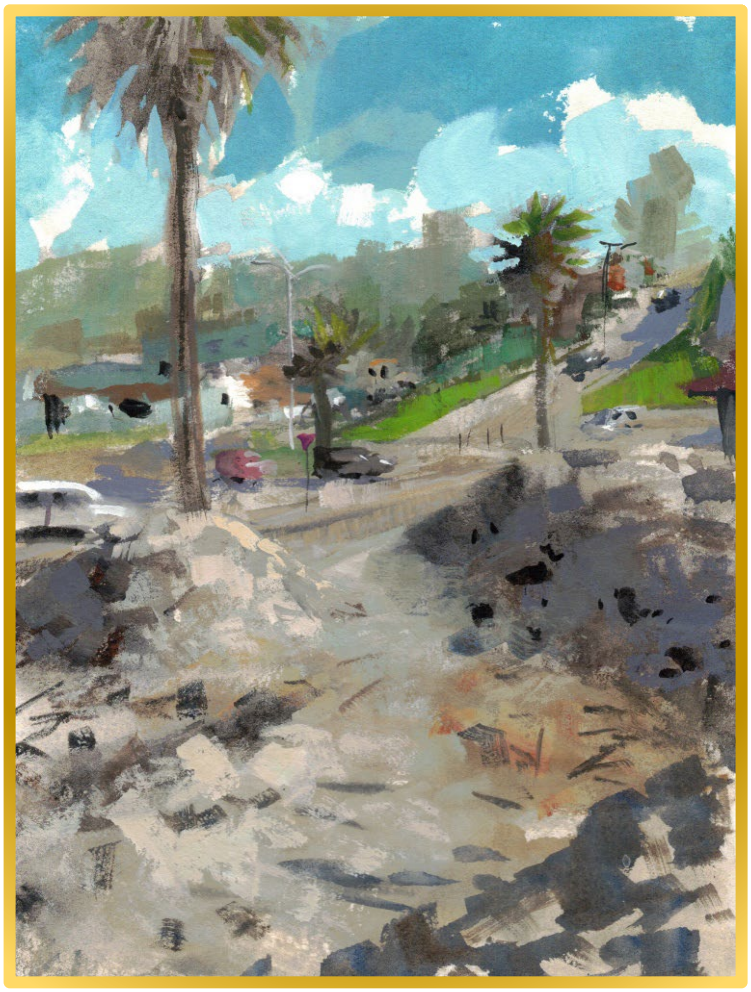
Between the CCAAP chapters are paintings by Taylor Seamount, an artist based in the Monterey Bay Area. These depictions of our current and future state provide inspiration for what is possible when collective climate action is taken. The County of Monterey thanks Taylor for sharing her work as part of the CCAAP. All statements are the artist's vision and are not official statements of the County of Monterey.



About the Artist

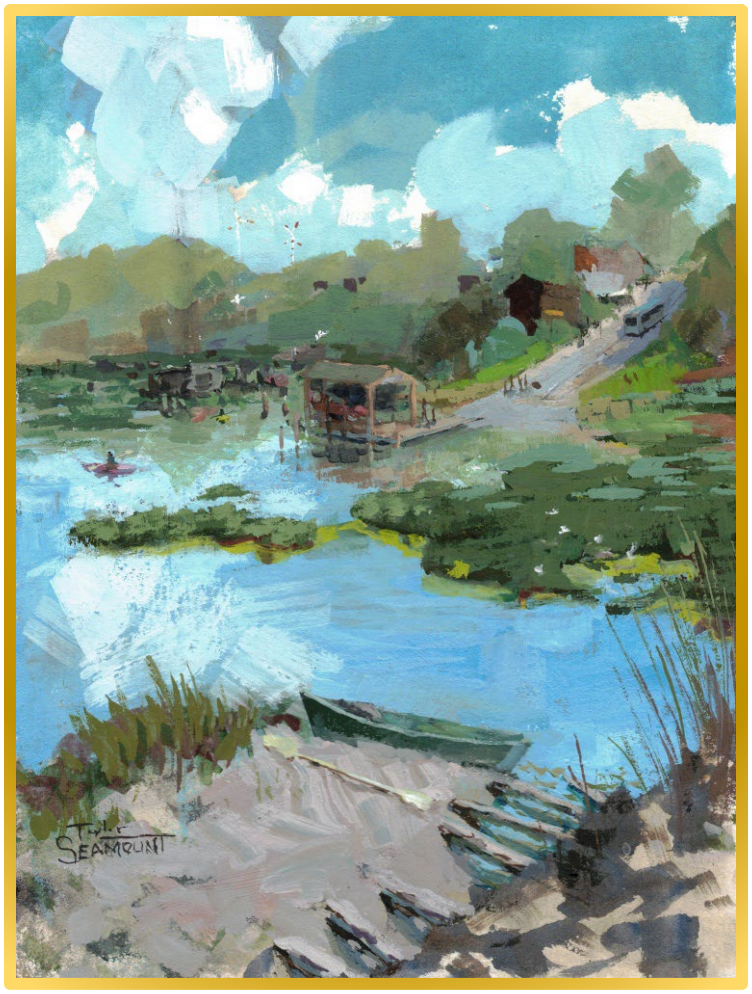
Taylor Seamount is an artist working in the genre *Solarpunk*, which envisions a regenerative future interconnected with community and nature. Her work explores *Solarpunk* themes on a local level, highlighting the potential for positive transformation within her Santa Cruz County community and projecting those possibilities into the future. *En plein air* (on site), she paints scenes of environmental distress – such as congested freeways or neighborhoods recovering from floods. Back in the studio, she reimagines these scenes infused with tangible solutions, often shaped by collaboration with local activists and experts.

Aptos Slough



Present: Sand scraped out of the Rio Del Mar flats following the 2023 winter floods. What we call "Rio Del Mar" was **once a rich estuary tended by the Awaswas people**. In 1922, a developer purchased the land and filled the lagoon with a demolished adjoining hill. The subdivision was marketed as prime beachfront property, but the area has been prone to frequent flooding ever since.

Painted *en plein air*.



Future: Aptos Slough (Aptos meaning "the people" in Awaswas) is restored and tended by local residents. Salmon have returned to Aptos Creek. A pier leads to a library for water sports and fishing gear. Resources previously spent sustaining precarious coastal properties are redirected to support denser populations inland. **The wetland absorbs the impact of severe weather due to climate change.**



CHAPTER 1. Introduction

Spanning California's central coast from Pfeiffer Big Sur State Park to the agricultural lands of the Salinas Valley—often called the "Salad Bowl of the World"—Monterey County boasts a unique and vital connection to its environment. Located south of the San Francisco Bay Area, about 45 miles from San Jose and 120 miles from San Francisco, Monterey County covers approximately 3,350 square miles. Its economy is largely driven by tourism along the coast and agriculture in the Salinas Valley, which runs through the heart of the county. Monterey County is the fourth-largest agricultural producer in California and has the state's longest coastline, attracting over 3 million visitors annually.

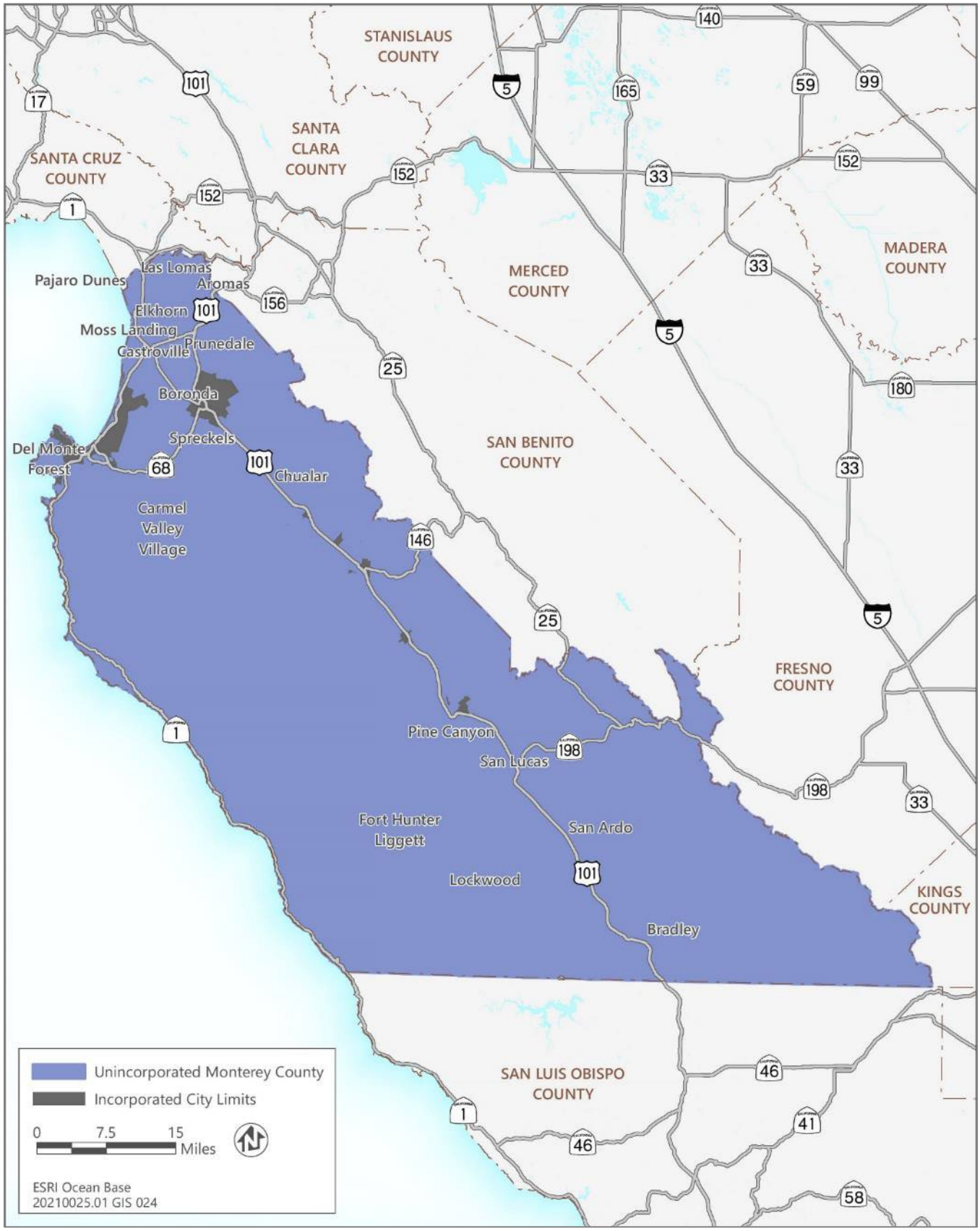
With its world-class outdoor recreational amenities and significant agricultural output, Monterey County depends heavily on its natural environment. However, the growing impacts of climate change pose serious threats to the quality of life and economic wellbeing of its communities.

In response, the County of Monterey has developed the Community Climate Action and Adaptation Plan (CCAAP) – a comprehensive roadmap designed to confront these challenges. The CCAAP aims to reduce local greenhouse gas (GHG) emissions, bolster resilience to climate impacts, and implement strategies for better natural resource management. The CCAAP includes locally tailored strategies and actions that not only reduce GHG emissions and enhance climate resilience but also improve the overall quality of life for residents, workers, and visitors.

Greenhouse gases are chemical compounds in the Earth's atmosphere that trap heat and contribute to global warming and climate change.

Note that in this CCAAP, "County" refers to the County of Monterey as a local government agency, while "county" refers to the entire geographic area of unincorporated Monterey County. While incorporated cities have the authority to create their own climate plans, the CCAAP specifically applies to unincorporated county areas. However, since the County manages regional assets such as farmland, coastline, and waste systems, its climate action and adaptation efforts will provide benefits to residents, workers, and visitors across all jurisdictions. Figure 1.1 illustrates the unincorporated county boundaries, highlighting the areas under County jurisdiction.

Figure 1.1 Unincorporated Monterey County Boundary



Sources: Data downloaded from the County of Monterey in 2022; adapted by Ascent in 2024.

PURPOSE AND GOALS

The County has developed this CCAAP to establish and achieve GHG emissions reduction targets, thereby minimizing contributions to climate change (mitigation), while simultaneously building community resilience to climate impacts (adaptation). The plan outlines equitable, achievable, and implementable actions designed to benefit all residents, workers, and visitors to Monterey County. The intent of the CCAAP is to:



- clearly explain Monterey County's climate challenges and the opportunities and obstacles it faces in meeting ambitious GHG reduction goals,
- serve as a framework to connect the County's existing and evolving sustainability initiatives, strategies, and plans with the broader community's goals,
- establish a set of feasible, cost-effective, equitable, and multi-benefit climate action and adaptation strategies, along with implementation plans and metrics to measure progress, and
- effectively engage and activate residents, businesses, and institutions in positive actions that deliver tangible benefits.

Climate mitigation reduces greenhouse gas emissions to limit the causes of climate change.

Climate adaptation prepares communities for and responds to the impacts of climate change.

Climate resilience is the ability of people, communities, and ecosystems to prepare for, respond to, and recover from climate impacts.

Climate action and adaptation planning is a methodical, multi-step process requiring technical analysis and strategic foresight. The County's CCAAP development follows a framework that includes assessing current GHG emissions and climate vulnerabilities, projecting future scenarios and impacts, and identifying strategies to reduce GHG emissions and strengthen community resilience to climate-related hazards. The climate change mitigation and adaptation planning processes are illustrated in Figure 1.2.

The CCAAP also includes an implementation strategy that will serve as a resource and guide for the County's Intergovernmental and Legislative Affairs Office, the lead department responsible for implementing the CCAAP. The implementation strategy focuses on activities that the County can meaningfully control that will provide numerous benefits throughout Monterey County. Estimated near-term costs for implementing the CCAAP from 2026 to 2030 are also outlined in the implementation strategy.

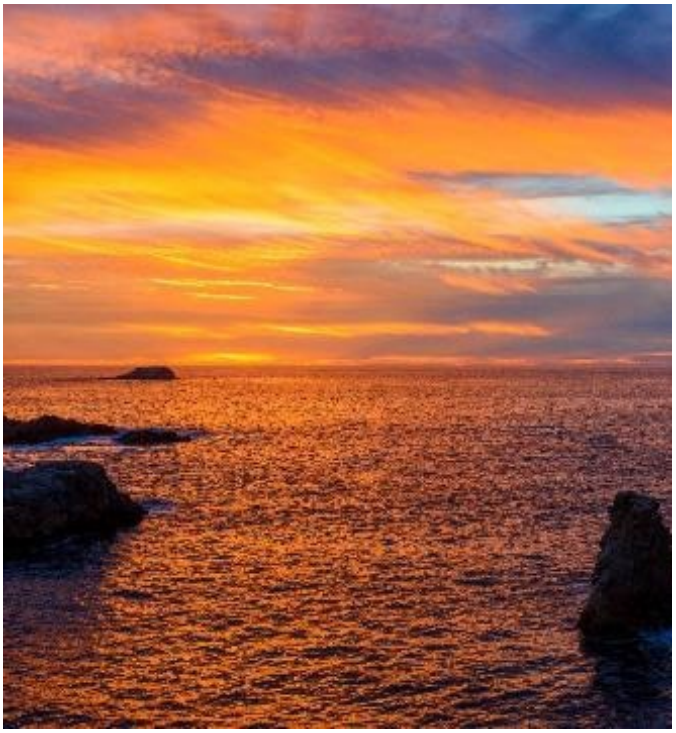
Figure 1.2 Climate Change Mitigation and Adaptation Planning Processes



As part of CCAAP implementation, climate action and adaptation actions will be continuously tracked and monitored to ensure progress toward achieving the County's GHG reduction targets and building climate resilience. Ongoing community engagement will be central to the success of this process.

The CCAAP will serve as a living document, requiring periodic updates. These updates will include, but are not limited to, reporting on implementation status, conducting revisions to the GHG emissions inventory and vulnerability assessment, and adjusting climate action and climate adaptation strategies and actions as necessary. This approach will ensure that the CCAAP remains effective and continues to support the County in addressing climate change equitably and efficiently.

In parallel with the development of the CCAAP, the County is developing the 2030 Municipal Climate Action Plan (2030 MCAP) that specifically focuses on reducing GHG emissions from County government operations, facilities, and services. This complementary plan demonstrates the County's commitment to leading by example in addressing climate change while improving operational efficiency.



Why is the CCAAP Important?

The science is clear, and the consensus is overwhelming—climate change is real and human activities are driving it (Figure 1.3). This reality highlights why the CCAAP is essential for Monterey County's future. With intensifying climate impacts across California, the CCAAP presents an opportunity to develop a science-based plan that guides efforts to reduce GHG emissions and prepare communities to be resilient and sustainable for the future.

The primary focus of the CCAAP is to reduce GHG emissions and strengthen community resilience to climate change impacts in the unincorporated areas of Monterey County. Moreover, its equity-focused implementation will also generate a range of environmental, economic, and social benefits beyond climate mitigation and adaptation. These include improvements in local air quality, water supply, the creation of green jobs, cost savings, public health gains, and enhanced mobility options, which will help guide equity-centered decisions on how the County prioritizes implementation of the actions included in the CCAAP. For example, reducing wildfire hazards and GHG emissions will lower harmful air pollutants, leading to cleaner air and better public health outcomes.

LEARN MORE ABOUT CLIMATE CHANGE

Scripps Institution of Oceanography: Climate Change in California

California Environmental Protection Agency: Climate Dashboard

California Natural Resources Agency: Building Climate Resilience

California Department of Public Health: Climate Change and Heath Equity

Figure 1.3 Climate Change Facts



By emphasizing equity in its development and implementation, the CCAAP acknowledges that while climate change impacts are serious, they don't affect all communities equally. The CCAAP aims to uplift all communities, with special attention to vulnerable populations disproportionately impacted by climate impacts. For example, a well-designed CCAAP can prioritize resilience-building projects in disadvantaged communities, such as installing cooling infrastructure and establishing emergency shelters. Additionally, successful implementation of the CCAAP will improve both physical and mental wellbeing, enhancing the overall quality of life for the community.

The CCAAP also embodies hope through action. The CCAAP will enhance the county's resilience to climate-related shocks and stresses while fostering a sense of empowerment and unity through climate action efforts. Climate actions, such as adopting innovative technologies or promoting sustainable business practices, position the County to support the local workforce, create new economic opportunities, and lead in climate adaptation and sustainable development. Through this plan, the County demonstrates that by acknowledging the reality of climate change and taking decisive action collectively, a more resilient and sustainable future is possible for all county residents.

SUMMARY OF THE CCAAP PROCESS

The County's desire to develop the CCAAP and 2030 MCAP as parallel efforts is driven by the Final Environmental Impact Report (EIR) for the County's 2010 General Plan, which includes Mitigation Measure CC-1a for Policy OS-10.11. This measure requires the development of a GHG reduction plan with a target to reduce emissions by 15 percent below 2005 levels by 2020. Mitigation Measure CC-1a requires the establishment of a countywide GHG inventory for a 2005-baseline year, a business-as-usual forecast for community and municipal operations emissions, a 2030 reduction goal, the identification and quantification of GHG reduction measures, and an implementation plan. It also specifies preparing an inventory of carbon sequestration in agricultural soils and crops. At the time of the 2010 General Plan adoption, the County appropriately worded Policy OS-10.11 to mirror language accepted by the State Attorney General in litigation against San Bernardino County, reflecting best practices at the time. The County has been proactive in seeking to amend this policy to align timelines and targets with current guidance from the state by removing specific target years. The amendment retains the County's overall commitment to reduce GHGs while providing flexibility in future target years.



In recent years, Monterey County has been implementing targeted initiatives and building the foundation for local climate action. In 2020, the County relaunched its Sustainability Program, aimed at preserving and restoring environmental resources in ways that support residents' wellbeing while enhancing the county's key economic sectors: tourism and agriculture. To lead these efforts, the County hired a Sustainability Program Manager, responsible for managing the development of both the CCAAP and the 2030 MCAP.

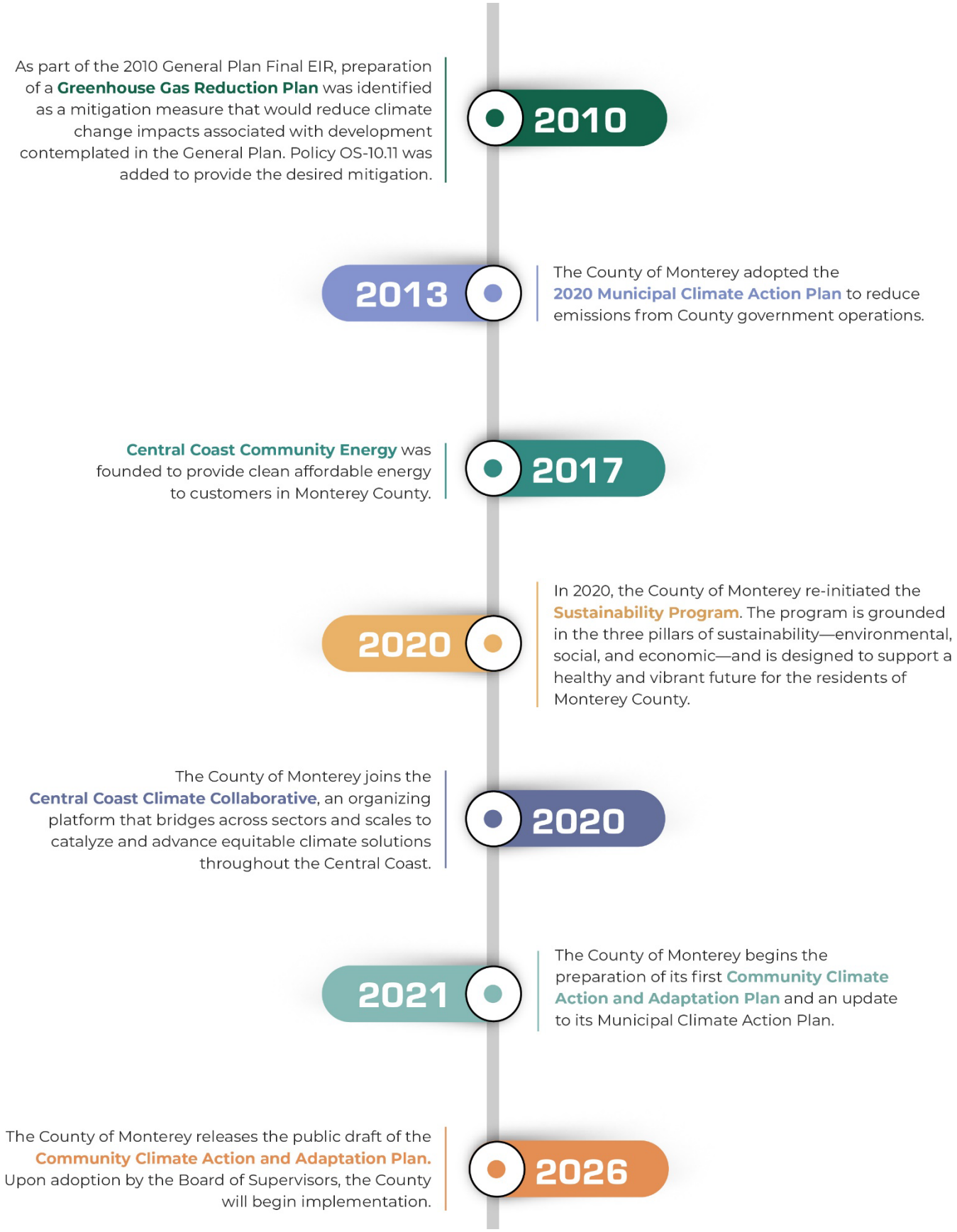
In addition, the County established the Alternative Energy and Environment Committee (AEEC), which collaborates with County staff to develop policy and program recommendations for the Board of Supervisors, focusing on long-term environmental sustainability. Throughout the development of the CCAAP and 2030 MCAP, the County implemented a comprehensive community engagement strategy. This strategy was designed to empower the community and reaffirm the County's commitment to climate action and adaptation.

The County is also a member of the Central Coast Community Energy (3CE), a community choice energy program serving Monterey and other Central Coast counties. 3CE supplies renewable electricity to residents and businesses, giving local communities control over energy procurement while working to reduce GHG emissions through clean energy programs.

At the municipal level, the County adopted its 2020 MCAP in 2013 and has since implemented GHG reduction actions aimed at lowering emissions from County operations. Simultaneously, the County has partnered with the Association of Monterey Bay Area Governments (AMBAG) to conduct GHG emissions inventories. These efforts build on the County's progress with the 2020 MCAP and pave the way for deeper GHG reductions in County operations and the wider community.

Both the CCAAP and 2030 MCAP aim to fulfill Mitigation Measure CC-1a for Policy OS-10.11, as outlined in the Final EIR for the County's 2010 General Plan. The CCAAP not only articulates the climate challenges Monterey County faces but also identifies the opportunities and obstacles in achieving GHG reduction goals. With substantial yet attainable emissions reduction targets for 2030 and 2045, aligned with state legislation, the CCAAP and 2030 MCAP provide a clear roadmap for the County to meet its climate action and adaptation objectives. Figure 1.4 provides a timeline of local efforts taken from 2010 to 2021 prior to the development of the CCAAP.

Figure 1.4 Local Efforts Timeline



CCAAP Development

The development of the CCAAP and the 2030 MCAP began in May 2021. The project entered its education and visioning phase during the summer of 2021 and continued through the spring of 2022. During this period, a variety of public outreach and engagement activities were conducted, including focus group meetings and community workshops, to gather input from communities.

From the spring of 2022 through the fall of 2024, climate action and adaptation strategies were developed and prioritized, with additional public outreach and engagement efforts to gather feedback on these strategies. The public review draft version of the CCAAP was made available on [PUBLIC RELEASE DATE PENDING], and is expected to be considered by the Board of Supervisors for adoption in spring 2026.

The project timeline for the CCAAP and 2030 MCAP development is shown in Figure 1.5.

Figure 1.5 CCAAP and 2030 MCAP Project Timeline



CCAAP: Community Climate Action and Adaptation Plan **2030 MCAP:** 2030 Municipal Climate Action Plan

Co-Benefits



While the CCAAP is focused on reducing GHG emissions and addressing climate vulnerabilities in the community, implementing the plan will also generate numerous "co-benefits" for residents, workers, and visitors. Co-benefits are the additional positive outcomes from GHG mitigation and climate adaptation that extend beyond environmental improvements to enhance the quality of life, economic vitality, and social equity across the county.

The CCAAP identifies eight co-benefits that will result from GHG mitigation and climate adaptation strategy implementation. These co-benefits reflect the community's values and priorities, ensuring that climate actions deliver multiple advantages to Monterey County residents, workers, and visitors. Figure 1.6 highlights these co-benefits, with more detailed descriptions shared below.

- **Benefits to Low-Income Residents:** Enhances living conditions and reduces costs for low-income residents by increasing building energy efficiency, weatherization, and access to clean energy technologies.
- **Equity:** Ensures fair distribution of benefits and reduces burdens across all communities, focusing on supporting disadvantaged and vulnerable populations for a more inclusive Monterey County.
- **Air Pollution Prevention:** Lowers harmful air pollutants by reducing fossil fuel use and enhancing transportation options, leading to cleaner air and improved respiratory health.
- **Health and Wellbeing:** Improves physical and mental health through better air quality, increased green spaces, active transportation access, and reduced exposure to climate-related health risks.
- **Reliability:** Increases resilience of essential services and infrastructure, securing consistent access to power, water, and critical resources during climate-related challenges.

- **Community Prioritization:** Ensures that climate actions reflect the priorities and needs of Monterey County residents, fostering community support and engagement.
- **Job Development:** Generates local employment in clean energy, green building, and climate adaptation sectors, providing training and economic diversification.

Figure 1.6 Co-Benefits



- **Resource Preservation:** Conserves Monterey County's natural resources—water, agricultural lands, coastal areas, and open spaces—to support future generations.

Community Engagement Processes



Monterey County recognizes that a single entity cannot achieve effective climate action alone; it requires active and ongoing collaboration among residents, workers, businesses, community organizations, local governments, and other agencies and entities. To ensure the CCAAP reflects the diverse needs and priorities of the community, the County has engaged a wide range of community members throughout the plan's development process. A list of community organizations engaged during the CCAAP development process is shown in Figure 1.7.

The engagement efforts gathered valuable insights and feedback to strengthen the CCAAP's strategies and actions. The County conducted outreach through various online and in-person engagement forums, reaching subject matter experts, community leaders, elected officials, and residents across the county. This comprehensive approach to community engagement has allowed for incorporating local knowledge, concerns, and ideas into the planning process, ensuring that the CCAAP is rooted in the real needs and aspirations of Monterey County's diverse population. The following section outlines these engagement efforts in more detail. Additional engagment details are presented in Figure 1.8.

Figure 1.7 Community Organizations



Figure 1.8 CCAAP Outreach



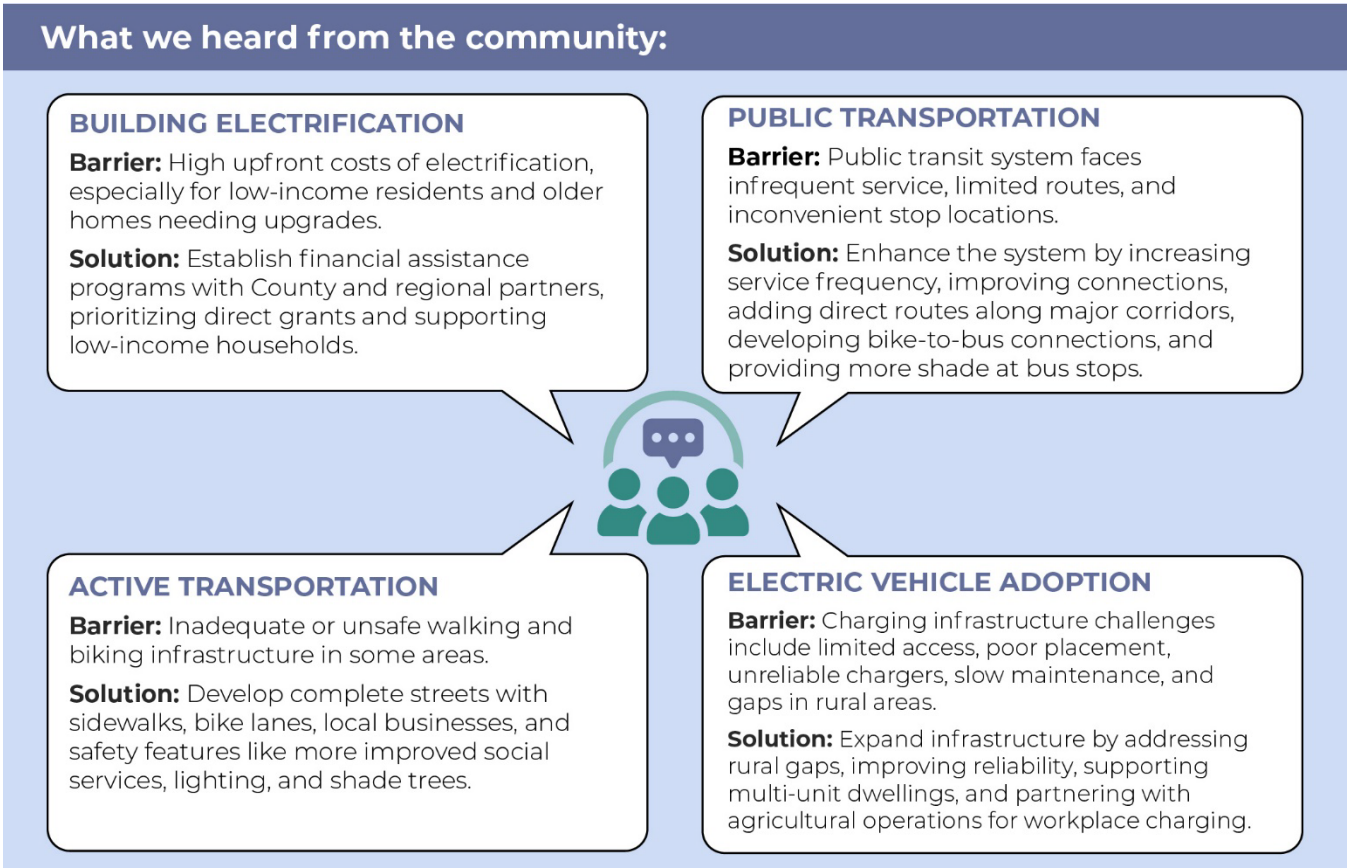
COMMUNITY WORKSHOPS

Community workshops played a crucial role in the development of the CCAAP, providing opportunities to inform, consult, and collaborate with Monterey County residents. These workshops featured presentations by the project team, question and answer sessions, trainings, and facilitated group activities. They also presented key project information and gathered input on community priorities, climate action and adaptation strategies, and implementation programs.

Three workshops were held during the plan's development, offering opportunities for input from interested parties across the county. The first community workshop was held online on November 16, 2021, introducing the CCAAP and soliciting initial ideas. The second workshop, held in person on September 29, 2022, at the Marina Library, built upon the first session and delved deeper into proposed strategies, asking attendees to prioritize ideas for implementation. The third and final workshop occurred online on December 4, 2024. This workshop revisited information covered in previous workshops and provided updates on the CCAAP's progress. It offered insights into the plan's development and provided a

platform for community members to share new thoughts on local climate action since the last workshop. All workshops allowed participants to engage with County staff and share the priorities they wanted to see reflected in the CCAAP. Feedback from all workshops was used to validate input received from other engagement efforts and technical analysis. General feedback from the third workshop is documented in Figure 1.9.

Figure 1.9 What We Heard



ONLINE ENGAGEMENT

Ensuring information was accessible for those interested in learning about the project was an essential part of the CCAAP development process. A project website served as a central hub for engagement, providing project information, contact details, and surveys to gather feedback. One survey focused on identifying potential barriers for residents to take action in their daily lives, helping identify challenges to address within the CCAAP. The website also featured information and recordings from all engagement events, allowing those unable to attend in person to review the materials at their leisure. Additional resources, such as fact sheets, were available to inform the community.

Beyond the project website, additional online avenues were used to broaden participation and gather diverse perspectives. Regular email updates kept interested parties informed about project progress and upcoming opportunities for involvement. Creative engagement methods were also employed, including virtual platforms like Consider.it, which presented potential actions for the CCAAP and allowed participants to prioritize those actions, and Social Pinpoint, to a simulation tool that evaluated all proposed CCAAP strategies that would result in GHG emissions reductions.

FOCUS GROUPS

The County conducted targeted focus groups with the business and agriculture sectors to ensure representation in the planning process. The agriculture focus group was designed to gather feedback on challenges the agricultural community faces in light of climate impacts and to identify opportunities for the County to support this integral part of the county's identity, economy, and culture. The business sector focus group acted as an innovation generator and connected the County's existing business initiatives with the plan's goals and strategies. Business participants also discussed past pitfalls or barriers to achieving climate action goals and shared the solutions.

SECTOR WORKING GROUPS

Sector working groups contributed to the development of targeted strategies for the CCAAP. These groups, including members with relevant industry experience and technical expertise, focused on specific areas such as energy, buildings, transportation, agriculture, and waste. They assisted County staff in developing and refining strategies and actions to support the County's sustainability goals. These groups helped bridge perspectives between the public and private sectors by offering insights into sector-specific challenges and historical context. This collaborative effort aimed to ensure that the CCAAP's strategies were informed by sector-specific knowledge while considering practical implementation aspects.

YOUTH COUNCIL AND EQUITY PANEL

The CCAAP development process included input from youth and equity-focused groups to broaden the perspectives considered in the plan. The Youth Council meeting several times throughout the process provided a platform for students to share their input and vision for Monterey County in 2030, giving voice to the community's future leaders. Complementing this, the Equity Panel helped consider the equity implications of strategies before their adoption and throughout implementation. The panel addressed reflective questions and principles to guide the County's analysis. Input from both the Youth Council and Equity Panel was evaluated alongside feedback received from other outreach events, contributing to the overall engagement process and helping to shape the CCAAP. The Monterey County Health Department is establishing a youth program that expands opportunities for civic engagement and shared decision making, empowering young people to address issues that affect them directly. The youth program serves as an advisory group to ensure youth voices are included into systems and strategies in Monterey County, which can include the implementation of the CCAAP. This Monterey County Health Department youth initiative aims to advance health equity by centering the lived experiences and priorities of young people.

MONTEREY BAY AREA CLIMATE JUSTICE COLLABORATIVE

The Monterey Bay Area Climate Justice Collaborative (MBACJC) partnered with the County to gather feedback from climate-vulnerable communities during the CCAAP development process. Through hosting presentations and facilitating engagement, MBACJC ensured the plan addresses the needs of disadvantaged communities. As partners, they will continue to build capacity in disproportionately impacted communities, increase investments where most needed, and support climate initiatives that advance their vision of health and community wellbeing for all residents.

PUBLIC HEARINGS AND ELECTED BODIES

Throughout the development of the CCAAP, the County engaged in public hearings and elected body consultations. These public hearings and elected body engagements were conducted in open settings, ensuring transparency and additional opportunities for community input throughout the process. These hearings occurred during every project phase. The Monterey County Board of Supervisors provided recommendations throughout the CCAAP development process.

The AEEC served as a primary advisory body throughout the development of the CCAAP. Composed of two rotating County Supervisors, the AEEC provided valuable input on the project's vision, outreach coordination, and technical analysis results. The AEEC also played a key role in guiding sustainability, climate action and adaptation strategies. The meetings covered many topics, including buildings and energy, land use, transportation, water, waste, and agriculture. AEEC meetings also included periods for public comment, ensuring community input was considered at the advisory level.

CCAAP ORGANIZATION



This CCAAP is organized into eight chapters. Chapter 2 presents the background of climate change science, local climate impacts, and existing legislation and efforts aimed at addressing climate change. The unincorporated county's GHG emissions inventory, forecast of future GHG emissions, and GHG reduction targets are included in Chapter 3. Chapter 4 addresses natural and working lands in Monterey County and summarizes the results of a carbon stock analysis, including both existing carbon stock inventory and forecasted future carbon stock values. Chapter 5 presents an overview of the climate adaptation planning process and a summary of the climate vulnerability assessment. Chapter 6 lays out the climate action and adaptation strategies and actions proposed for the County to reach its GHG reduction targets and enhance climate resilience. Chapter 7 provides a framework for implementing and monitoring the CCAAP, including the results of the prioritization exercise and near-term cost analysis, as well as implementation details to guide County staff. Last, Chapter 8 compiles the works cited to develop this CCAAP.



Redwood Highrise



Future: Dotted throughout a valley in the wild-urban interface of the Santa Cruz Mountains, are pods of high-rise buildings, blending homes, businesses, and community spaces. Tile mosaic murals lend the buildings extra protection against stray embers from regular controlled burns on the forest floor. Between the structures, rows of hydroponic crops hang, while pumpkin vines climb sculptural trellises. Wildlife moves freely among the human infrastructure.

The community manages and harvests the forest's mushrooms, deer, salmon and herbs in a way that honors Indigenous people's knowledge and access to the land. Accessible walking paths meander through the valley, supplemented by a gondola system for transporting goods and passengers between pods. Select redwoods have been nurtured back to an old growth state, sequestering carbon and fostering a cool, wet micro-climate. The community's decision to structure their forest home vertically mirrors the epiphyte ecosystem on the redwood canopy.



CHAPTER 2. Background

CLIMATE CHANGE SCIENCE

The greenhouse effect, illustrated in Figure 2.1 below, is a natural process that insulates the Earth and helps regulate its temperature. After absorbing sunlight, the Earth emits heat in the form of infrared radiation (i.e., heat). This radiation is then absorbed by naturally occurring gases called greenhouse gases (GHGs). These gases mainly consist of methane (CH_4), carbon dioxide (CO_2), water vapor, and nitrous oxide (N_2O). These GHGs act as an effective global insulator by absorbing some of the infrared radiation that is emitted by Earth and re-emitting it back down toward the planet. As it naturally is, the greenhouse effect keeps temperatures on Earth conducive to life as we know it.

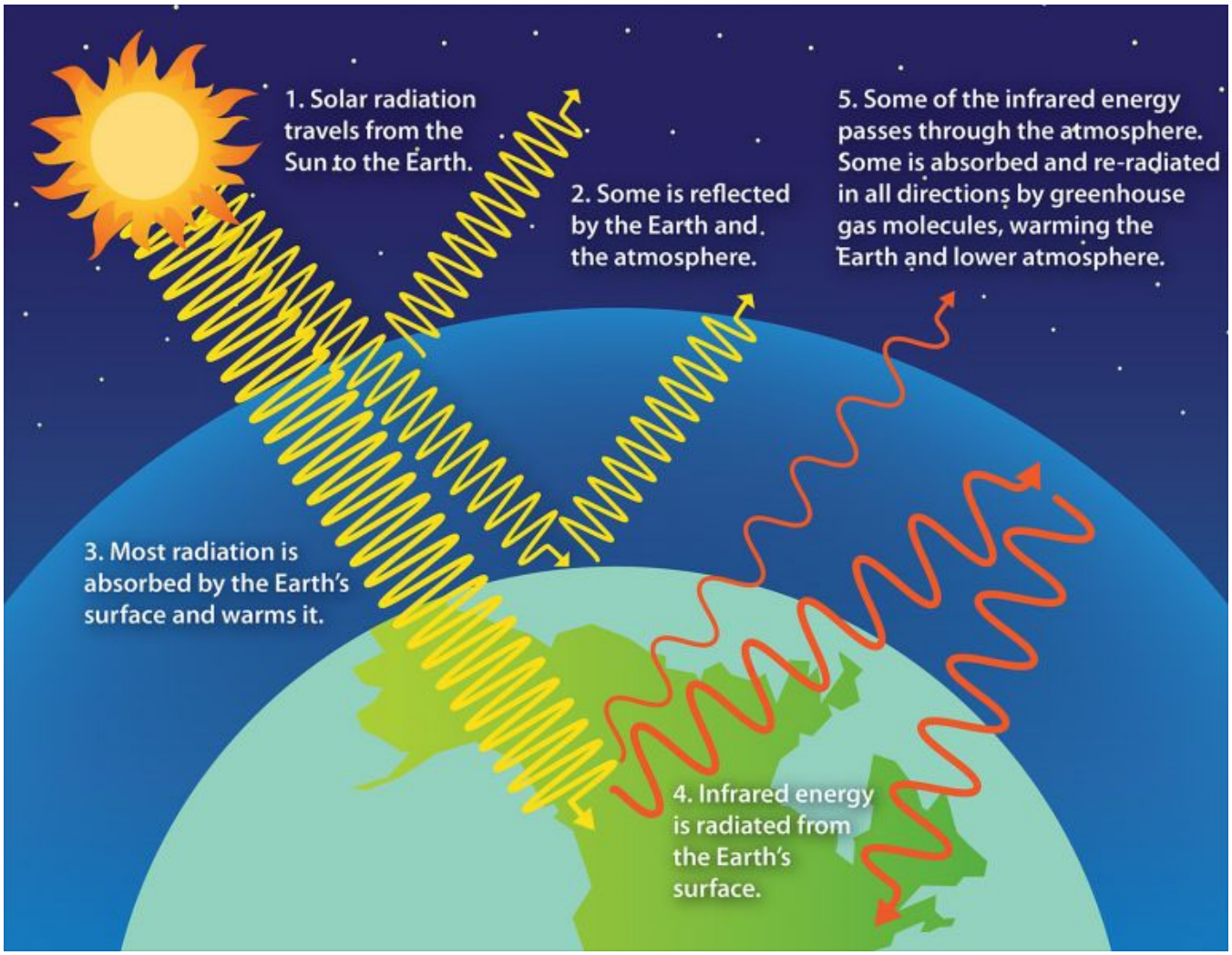
While the greenhouse effect is essential for supporting life on Earth, it is also causing the planet's climate to warm at an unprecedented rate. GHGs from the combustion of fossil fuels and other human-caused activities have been released into the atmosphere at an increasingly accelerated rate since the 19th century, which has intensified the greenhouse effect. In the Intergovernmental Panel on Climate Change's (IPCC's) Sixth Assessment Report, human activities are estimated to have caused over 2 degrees Fahrenheit (°F) of warming across the globe compared to pre-industrial era levels (i.e., before the year 1900), and the global average temperature is expected to increase by up to approximately 8 °F by the end of the 21st century unless additional efforts to reduce GHG emissions are made (Smith et al. 2021).

Human activities are estimated to have caused over 2°F of warming across the globe compared pre-industrial era levels (Smith et al. 2021).

The impact of the increased greenhouse effect is known as global climate change, which is the driver behind changes in more extreme weather patterns, an increase in sea level, rapid melting of polar ice caps, and other impacts on the environment and humans. The Sixth Assessment Report contains the IPCC's strongest warnings to date on the impacts of climate change, highlighting key insights into the importance of global climate "tipping

points" or thresholds (e.g., global temperatures) that, when exceeded, can result in large changes in the state of the climate system leading to a rapid series of cascading events with vast repercussions.

Figure 2.1 The Greenhouse Effect



Source: University of California Museum of Paleontology 2025.

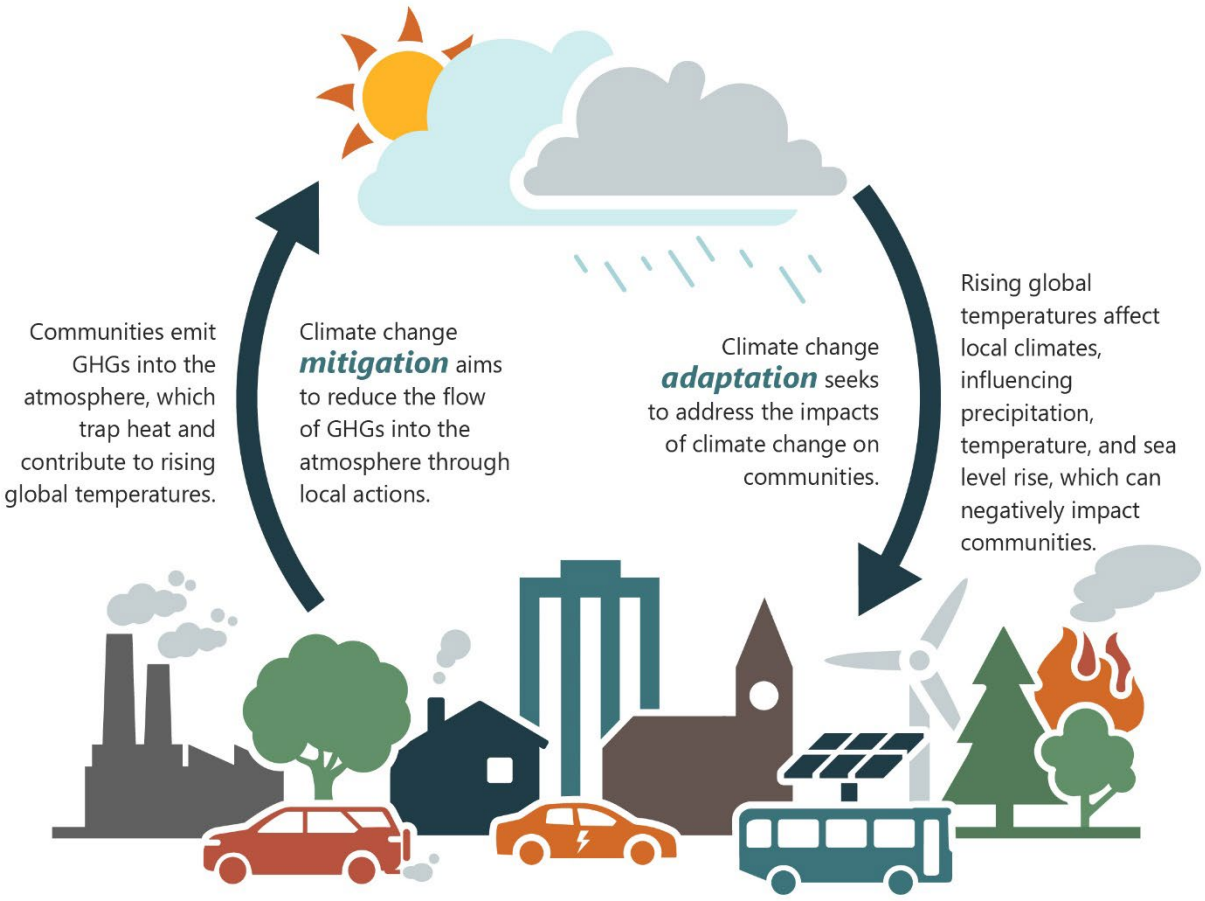
Climate Change Mitigation and Adaptation

Addressing and planning for climate change requires an integrated approach that targets both the sources and impacts.

- Efforts that focus on reducing the sources of climate change are commonly known as climate change mitigation or GHG reduction. The focus of climate change mitigation planning is to reduce communities' generation of GHG emissions and minimize contributions to climate change.
- Climate adaptation or climate resilience efforts are those that serve to prepare for and reduce harm from future effects of a changing climate. Climate adaptation planning aims to enhance the resilience of communities to climate change impacts by analyzing the climate-related vulnerabilities specific to a jurisdiction and developing strategies to respond to and prepare for impacts.

Figure 2.2 illustrates the relationship between these two facets of climate change planning. State law requires communities to address climate change mitigation in local planning and environmental review processes and climate adaptation in local long-range planning processes, such as general plans (Cal OES 2020).

Figure 2.2 Relationship Between Climate Mitigation and Adaptation



Source: Cal OES 2020; adapted by Ascent in 2025.

Climate change planning includes both mitigation and adaptation. Although mitigation and adaptation are often separate planning efforts, it is important to consider both components within the overall climate change planning process. Many initiatives that focus on climate mitigation include co-benefits for adaptation, and vice versa. For example, renewable energy installations combined with battery storage systems will reduce reliance on fossil fuel-generated grid electricity and reduce GHG emissions, but it will also improve energy independence and resilience in the face of climate hazards that threaten energy infrastructure. Consequently, this effort would yield both mitigation and adaptation benefits. Additionally, increasing urban tree canopy will not only help to combat extreme heat events and decrease risks to humans of heat-related illnesses, but it will also cool nearby buildings and thereby reduce GHG emissions through energy savings. These interrelationships have informed the approach of integrating climate change mitigation and adaptation within the climate action planning process. Recognizing the importance and benefits of this relationship, the County of Monterey's Community Climate Action and Adaptation Plan (CCAAP) focuses on both mitigation and adaptation to address climate change.

Note that in this CCAAP, "County" refers to the County of Monterey as a local government agency, while "county" refers to the entire geographic area of unincorporated Monterey County.

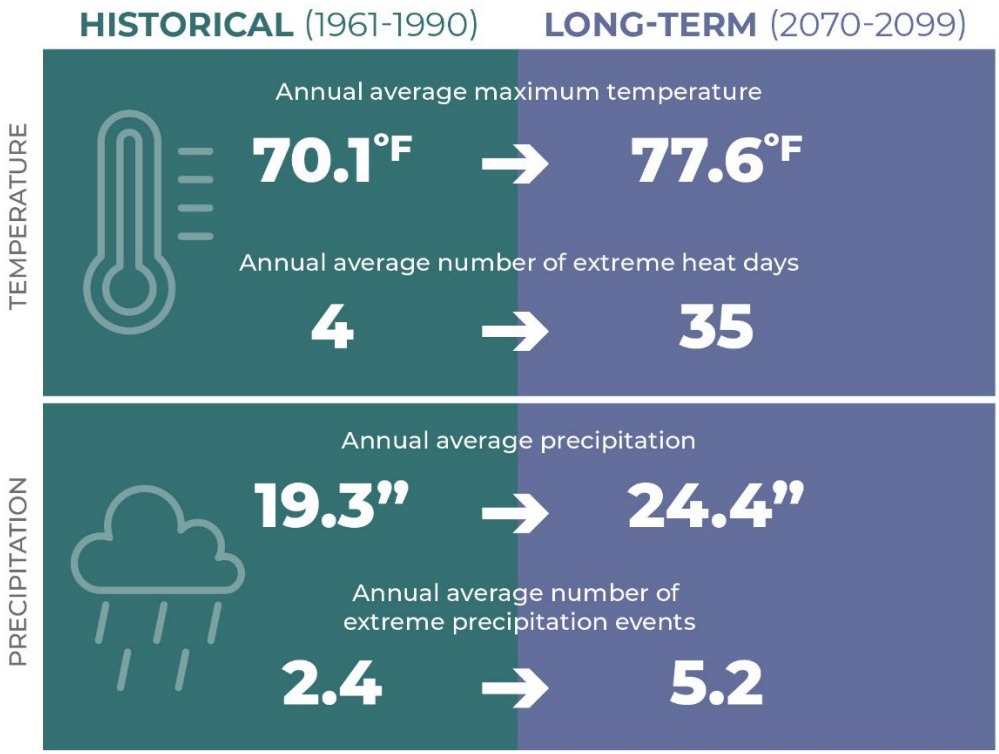
LOCAL CLIMATE CHANGE IMPACTS



Like many areas of California, Monterey County is increasingly experiencing the local impacts of climate change. At the first community workshop for the CCAAP, held in November 2021, a survey of 95 respondents revealed that the top climate-related concerns were drought and water supplies (48%) and wildfires and wildfire smoke (38%). Other climate-related concerns included extreme heat and heat waves (6%), other impacts (6%), and storm events and flooding (2%). For additional detailed information on how climate change is impacting Monterey County, refer to Appendix B.

One pressing concern is extreme weather events' rising frequency and intensity. The county has experienced more severe flooding during winter and rainy seasons, particularly in low-lying coastal areas and river valleys. These events can overwhelm infrastructure, damage property, and disrupt daily life. Historical flood events have caused significant damage, and climate projections suggest these risks will increase. Conversely, prolonged heat waves have become more common, especially in inland regions like the Salinas Valley, posing severe health risks to vulnerable populations, including agricultural workers, seniors, young children, and those with pre-existing medical conditions. The number of extreme heat days is projected to increase significantly by the end of the century. Figure 2.3 below shows the historical and predicted long-term annual average maximum temperature, annual average number of extreme heat days, annual average precipitation, and annual average number of extreme precipitation events of the county. Chapter 5 of the CCAAP and Appendix B discuss these effects and impacts of climate change in more detail.

Figure 2.3 Monterey County Temperature and Precipitation-Related Climate Change Effects



Source: CEC 2022a, 2022b, 2022c; developed by Ascent in 2024.

Monterey County also faces more frequent and severe droughts, leading to water supply challenges. Droughts present uncertainties for the county's agricultural sector, a cornerstone of the local economy, and communities. For example, water scarcity issues due to drought conditions can impact crop production, stress native vegetation, and increase reliance on already strained groundwater resources. The Salinas Valley is particularly vulnerable to these changes, potentially affecting food production and the livelihoods of agricultural workers. Drought conditions can also increase soil salinity and land subsidence, further complicating farming practices and water management efforts.

Diverse ecosystems, from coastal habitats to inland forests, are also stressed by increased wildfire risk. The region has already faced wildfires, and this risk is expected to grow as climate change creates more favorable conditions for ignition. Even when wildfires occur in distant parts of the state, Monterey County communities can still be affected by smoke and degraded air quality, which can trigger respiratory issues and worsen existing health problems, disproportionately impacting sensitive groups. The county's unique landscapes, including iconic redwood forests and chaparral ecosystems, are at risk from these intensifying wildfire impacts. This increased wildfire risk threatens lives, property, and natural resources, particularly in areas where development meets wildlands, known as the wildland-urban interface.



With its extensive coastline, Monterey County is also vulnerable to sea level rise and coastal erosion. These impacts threaten natural habitats, beaches, coastal infrastructure, and communities. Storm surges and higher sea levels can lead to more severe flooding and accelerated erosion of coastal bluffs. Additionally, ocean temperature and chemistry changes disrupt marine ecosystems, affecting fishing and coastal tourism. Many coastal communities in Monterey County are at risk from sea level rise, coastal flooding, and inundation projected to occur through the end of the century. This vulnerability affects both residents and critical infrastructure along the coastline. Addressing these risks will require thoughtful long-term planning and robust adaptation strategies to protect the unique character of Monterey County's shoreline communities.

The local climate impacts in Monterey County are not isolated, but interconnected, impacting communities, the economy, and the natural environment. For instance, drought conditions can exacerbate wildfire risks, while sea level rise can compound flooding during extreme precipitation events. These compounding effects highlight the complexity of climate change impacts on the region. Addressing these impacts requires a comprehensive strategy encompassing both climate change mitigation and adaptation efforts. The CCAAP presents an opportunity to protect the region's unique landscapes, vibrant communities, and diverse economy in the face of ongoing climate change, ensuring a resilient and sustainable future.

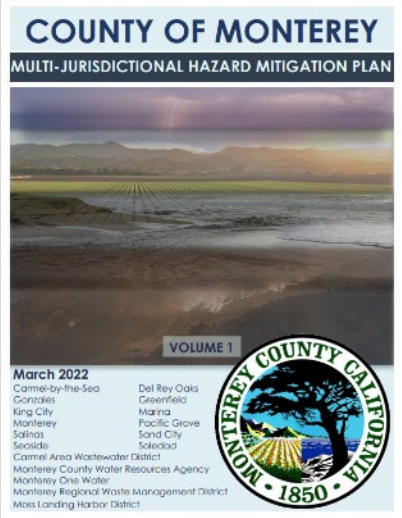
REGULATORY BACKGROUND

In response to the increase in human-caused GHG emissions and the threat of global climate change, federal, state, regional, and local governments and other agencies have already taken several steps to reduce GHG emissions and build resilience to climate change impacts. These efforts, and the legislative background summarized in the following sections, provide important policy direction and context for this CCAAP. Additional details about state legislation that influences the CCAAP can be found in Appendix G.

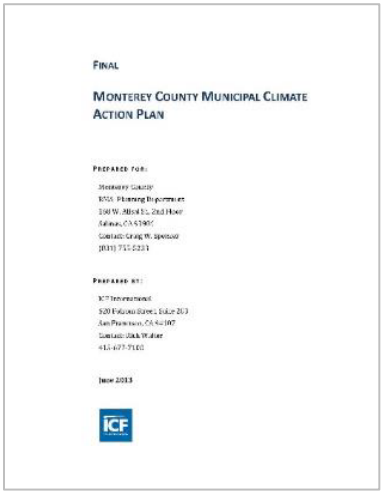
LOCAL CLIMATE PLANNING EFFORTS

Prior to developing the CCAAP, Monterey County and regional agencies have established various plans and policies that address climate change mitigation and adaptation. The following section summarizes key local and regional planning documents that provide important context and foundation for the CCAAP.

Monterey County Multi-Jurisdictional Hazard Mitigation Plan



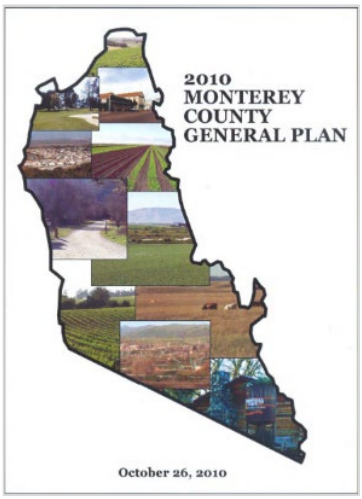
The Monterey County Office of Emergency Services updated its Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) in 2022. The MJHMP aims to reduce losses resulting from natural disasters by providing hazard mitigation. Hazard mitigation is the use of sustained, long-term actions to reduce the loss of life, personal injury, and property damage that can result from a disaster. The MJHMP is intended to enhance public awareness and understanding, create a decision tool for management, promote compliance with state and federal program requirements, enhance local policies for hazard mitigation, provide inter-jurisdictional coordination of mitigation-related programming, and achieve regulatory compliance. It includes an assessment of risk and vulnerability associated with hazards, including agricultural emergencies, coastal erosion, dam and levee failure, drought, earthquake, flooding, hazardous materials incidents, human-caused hazards, public health hazards, severe weather, slope failure, tsunami, utility interruption, wildfire, and climate change. The MJHMP was used as a critical resource to develop the climate adaptation portion of this CCAAP.



Monterey County Municipal Climate Action Plan

In 2013, the County adopted its 2020 Municipal Climate Action Plan (2020 MCAP), which was developed to serve as a roadmap for meeting a GHG emissions reduction target of 15 percent below the 2005 baseline emissions by 2020. The 2020 MCAP provides a description of the steps being taken by the County to reduce GHG emissions associated with its municipal operations (i.e., the County's day-to-day activities in providing services to Monterey residents and businesses). The 2020 MCAP included a GHG emissions inventory and forecasted emissions for 2020. The 2020 MCAP also identified strategies and measures for reducing local GHG emissions, as well as an implementation strategy.

2010 Monterey County General Plan



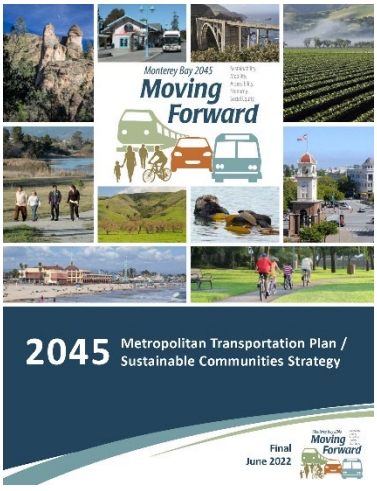
Monterey County updated its 2006 General Plan in 2010, which contains policy changes that are based upon the recommendations of the Planning Commission and the direction of the Board of Supervisors. The General Plan serves as the foundation for most County regulatory documents and addresses land use, circulation, conservation and open space, safety, public services, agriculture, economic development, and housing. The General Plan also includes various area plans for specific areas. In addition, as mentioned in Chapter 1, both the CCAAP and 2030 MCAP aim to fulfill Mitigation Measure CC-1a for Policy OS-10.11, as outlined in the Final Environmental Impact Report for the County's 2010 General Plan.



2022-2045 Monterey County Regional Transportation Plan

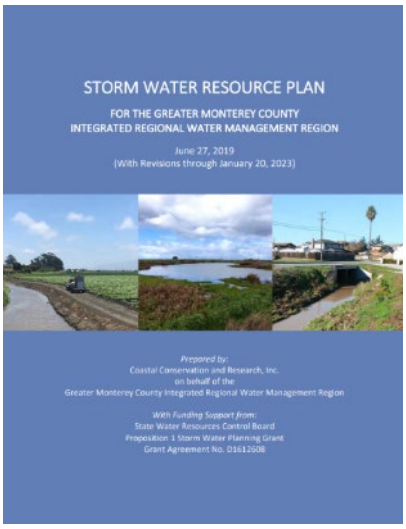
The Transportation Agency for Monterey County, in collaboration with the Association of Monterey Bay Area Governments (AMBAG), prepared the Regional Transportation Plan to develop and maintain a multimodal transportation system that enhances mobility, safety, access, environmental quality, and economic activities in the county. It is a 22-year blueprint for meeting the county's transportation challenges and goals through the year 2045. The Regional Transportation Plan addresses a strategic expansion of the county's transportation network, supportive of mobility improvements to bus transit, rail, highway safety, active transportation, as well as local street and road projects.

Metropolitan Transportation Plan/Sustainable Communities Strategy

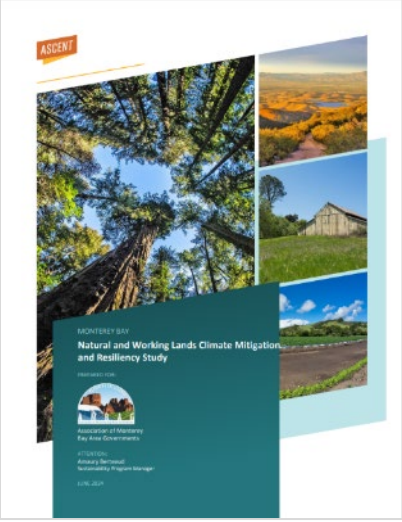


AMBAG, as the Metropolitan Planning Organization for the Monterey Bay Area, is required to prepare a long-range transportation plan every four years, pursuant to federal and state law. The Metropolitan Transportation Plan (MTP) maintains the region's eligibility for federal transportation assistance and the Sustainable Communities Strategy (SCS) demonstrates how land use and transportation measures will be used to meet the region's GHG reduction targets established by the California Air Resources Board under Senate Bill 375 (2008). The most recently adopted version of the MTP/SCS evaluates regional transportation needs through 2045, which will achieve a 6 percent per capita reduction in transportation-related GHG emissions by 2045 (AMBAG 2022: ES-7).

Stormwater Resource Plan for the Greater Monterey County Integrated Regional Water Management Region



This plan was prepared for the Greater Monterey County Integrated Regional Water Management Region and was approved in 2019. The purpose of the plan is to promote stormwater management implementation projects that provide regionally optimized benefits of increased water supply, improved water quality, better flood protection, enhanced environmental quality, and greater community opportunity. Climate change is widely considered in developing stormwater management objectives, as well as relevant strategies and implementation projects, in this plan.



Monterey Bay Natural and Working Lands Climate Mitigation and Resiliency Study

AMBAG's Monterey Bay Natural and Working Lands Climate Mitigation and Resiliency Study offers a comprehensive analysis of carbon stocks in Monterey, San Benito, and Santa Cruz counties, featuring detailed inventories by jurisdiction and future carbon forecasts. Through extensive regional research and engagement with local organizations and subject matter experts, the study developed strategies for urban forests, conservation areas, and agricultural lands that align with the California Air Resources Board's *2022 Scoping Plan for Achieving Carbon Neutrality*. The plan aims to integrate natural and working lands into long-term climate planning, empowering local jurisdictions to implement carbon mitigation strategies and enhance climate resilience across the Monterey Bay Area.

Sycamore Stewards



Present: Volunteers monitor sycamore tree growth and remove invasive annual grasses at the Pueblo Day Use Area in Santa Teresa County Park. To the right, a burn scar marks the site of a recent controlled burn. Pre-colonization, frequent cultural burns by Indigenous experts would have kept the grasslands diverse and healthy.

Painted *en plein air*.



Future: The goals of the stewardship have come to fruition. People enjoy the thick shade of mature trees. In the afternoons, the sounds of birthday parties ring through the hills where elk graze and grassland birds forage. The **native grassland has been restored** to 80% native species, thriving as an integral part of the ecosystem once again.



CHAPTER 3. Greenhouse Gas Emissions Inventory, Forecasts, and Targets

HUMAN-CAUSED GREENHOUSE GAS EMISSIONS

This chapter summarizes the accounting of greenhouse gas (GHG) emissions generated by human activities present within unincorporated Monterey County. The accounting of GHG emissions uses a "production-based" approach. A "production-based" GHG inventory identifies the sources, activities, and sectors that are producing emissions and the relative contribution of each. In addition to describing the county's baseline GHG emission levels in 2019, known as the 2019 community GHG emissions inventory, this chapter also presents the anticipated increase in emissions if no local actions are taken through the year 2045. Finally, this chapter establishes targets for reducing emissions consistent with statewide GHG emissions reduction targets and goals for the years 2030, 2040, and 2045. Note that in this chapter, "County" refers to the County of Monterey as a local government agency, while "county" refers to the entire geographic area of unincorporated Monterey County.

To develop and implement the Monterey County Community Climate Action and Adaptation Plan (CCAAP) in a way that will effectively reduce GHG emissions, the County first gained a comprehensive understanding of emissions that are generated by activities within their jurisdiction. GHG emissions inventories not only serve to provide this knowledge, but they also act as a basis for measuring progress and provide agencies with a framework to track emissions over time and assess the effectiveness of CCAAP implementation.

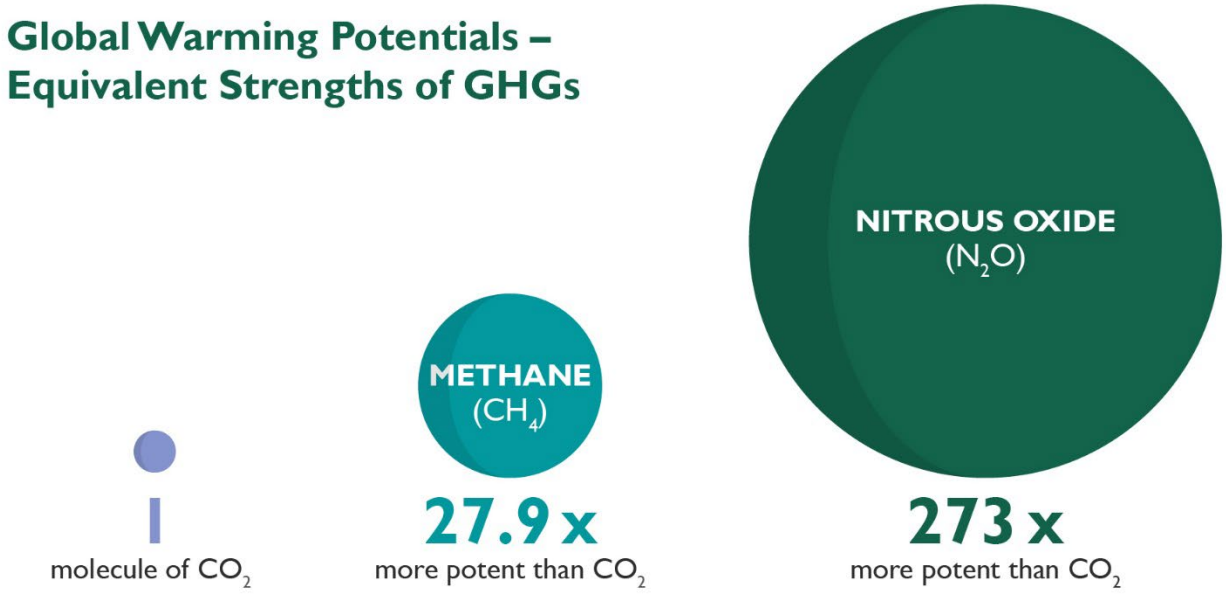
Baseline Inventory

The 2019 community GHG emissions inventory provides a detailed accounting of the sources and quantities of GHG emissions generated from activities by residents and businesses within the unincorporated county. The GHG emissions inventory was prepared using ICLEI–Local Governments for Sustainability's (ICLEI's) July 2019 publication *U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* (Community

Protocol), Version 1.2 for local-scale accounting of emissions (ICLEI 2019). This protocol reflects refinements in the planning process that have resulted from research in the field and shared knowledge from local governments engaged in climate action planning. State agencies, such as the Governor's Office of Land Use and Climate Innovation and the California Air Resources Board (CARB), recommend that GHG emission inventories be prepared according to the Community Protocol guidelines.

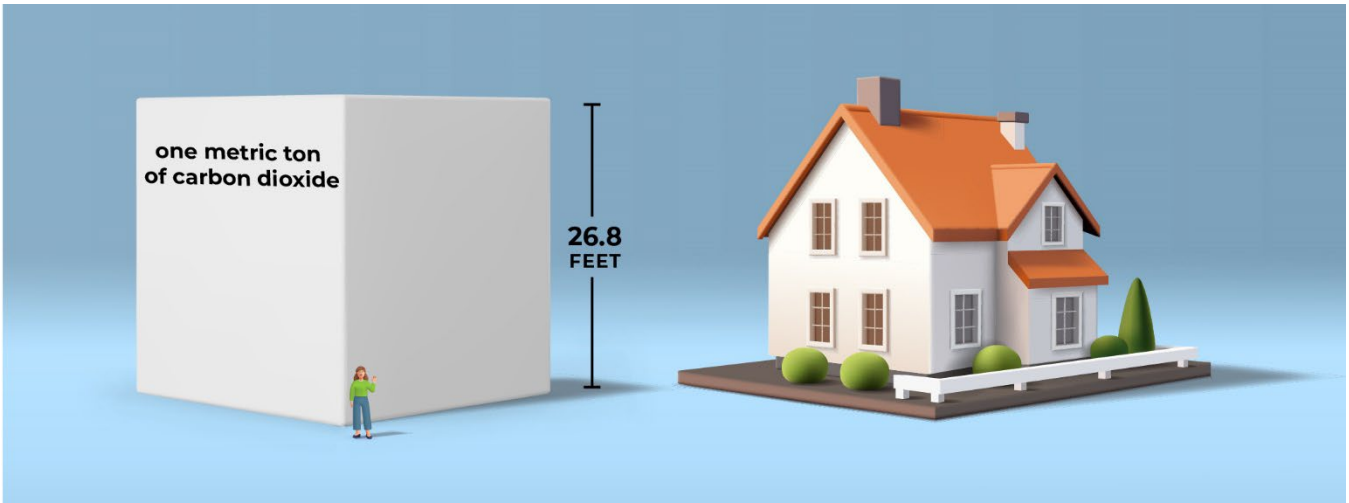
In the GHG emissions inventory, three primary GHGs are quantified: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Each GHG affects the atmosphere differently, so emissions of these gases are converted to a comparable unit by multiplying each non-CO_2 gas by their global warming potential (GWP), enabling the reporting of emission in terms of carbon dioxide equivalent (CO_2e). This conversion allows consideration of all gases in comparable terms and makes it easier to communicate how various sources and types of GHG emissions contribute to climate change. Figure 3.1 illustrates the GWPs of CH_4 and N_2O in Earth's atmosphere compared to CO_2. Emissions are reported in metric tons of CO_2e ($MTCO_2e$), the standard measurement for the amounts of GHG emissions created and released into the atmosphere. GWP values for CH_4 and N_2O included in the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report were used for calculating emissions estimates (Smith et al. 2021).

Figure 3.1 Global Warming Potential



In addition, Figure 3.2 demonstrates the approximate volume of one $MTCO_2e$, equivalent to a standard two-story house.

Figure 3.2 One Metric Ton of Carbon Dioxide Demonstration



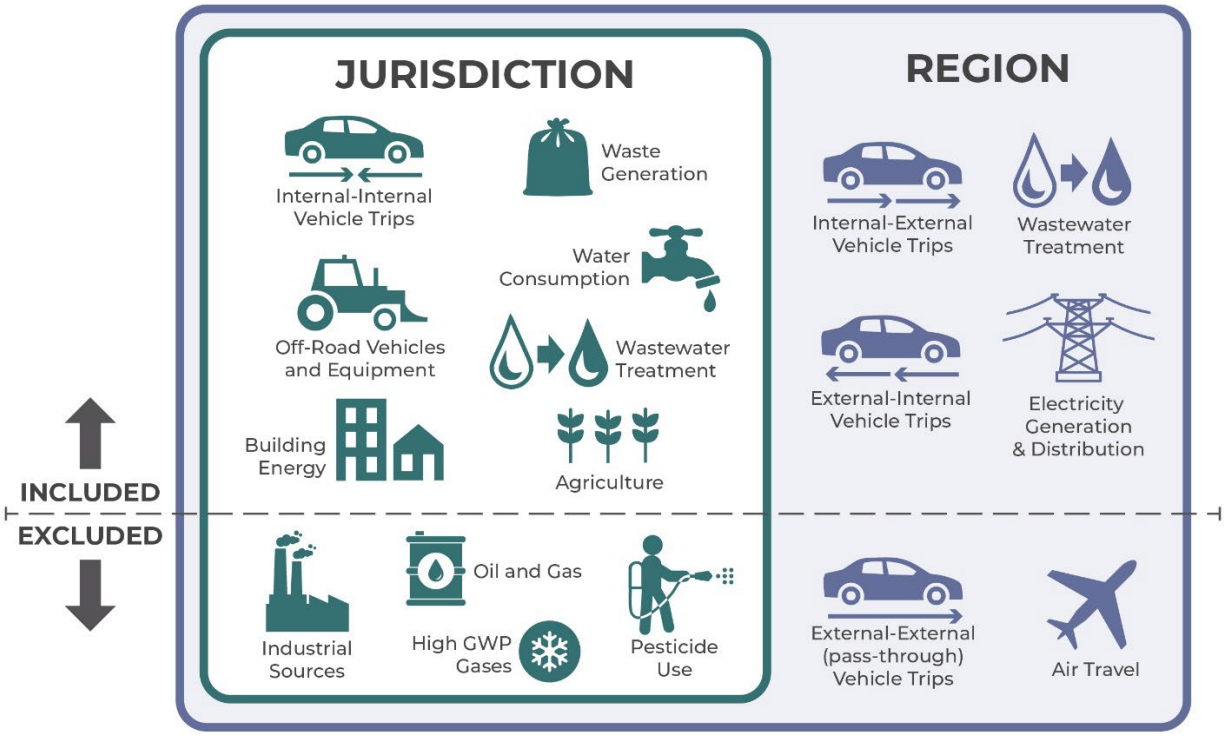
The 2019 community GHG emissions inventory estimates the unincorporated county's GHG emissions in seven sectors: building energy (including both residential and nonresidential buildings), on-road transportation, off-road vehicles and equipment, solid waste, water supply, wastewater treatment, and agriculture. Table 3.1 provides descriptions for each GHG emissions sector. Additional information about the GHG emissions inventory can be found in Appendix A.

Table 3.1 Greenhouse Gas Emission Sectors

Emission Sectors	Description
Building Energy	Building energy emissions are associated with the consumption of electricity and methane gas, as well as diesel, liquid propane gas, and methane gas consumed in backup generators within the unincorporated county.
On-Road Transportation	On-road transportation emissions are associated with vehicle miles traveled (VMT) by vehicles registered in the unincorporated county.
Off-Road Vehicles and Equipment	Off-road emissions are associated with off-road vehicles and equipment used within the unincorporated county.
Solid Waste	Solid waste emissions are associated with the decomposition of waste generated within the unincorporated county.
Water Supply	Water emissions are associated with electricity used to treat and convey water in the unincorporated county.
Wastewater Treatment	Wastewater treatment emissions are associated with wastewater generated within the incorporated county.
Agriculture	Agriculture is associated with enteric fermentation and manure management from livestock management, fertilizer application, agricultural equipment, and open burning.

The 2019 community GHG emissions inventory does not include GHG emissions generated from activities located within the unincorporated county boundary but outside of the County's jurisdiction, as the County does not have operational control, regulatory authority, or significant influence over these emissions sources. For example, industrial facilities are regulated by the state's Cap-and-Trade program and oil and gas extraction activities are regulated by the state's Methane Regulation and are therefore not included in the inventory. Figure 3.3 depicts the emissions sources that are included and provides examples of emissions sources that are excluded from the 2019 community GHG emissions inventory, indicating which are generated within the jurisdiction and within the region. For more information regarding these stationary sources of GHG emissions not included in the inventory, please see Appendix A.

Figure 3.3 Emissions Sources Included and Excluded from the 2019 Monterey County Community Greenhouse Gas Emissions Inventory



The 2019 community GHG emissions inventory estimated that 1,235,855 $MTCO_2e$ were generated within the unincorporated county, as shown in Table 3.2. Emissions from on-road transportation, which includes emissions from fossil fuel combustion (e.g., gasoline and diesel) in vehicles, accounted for approximately 39 percent of emissions. The second largest sector, agriculture, contributed 32 percent of GHG emissions in 2019, and nonresidential building energy generated 14 percent of the county's emissions. Residential building energy and solid waste accounted for 7 and 6 percent, respectively, and off-road vehicles and equipment accounted for 1 percent. Wastewater treatment accounted for 1 percent of the total emissions and water supply emissions are included in the residential and nonresidential building energy sectors. Water is shown in Figure 3.4 as 0 percent. Table 3.2 and Figure 3.4 present the 2019 community GHG emissions inventory and a breakdown of emissions by sector.

Table 3.2 2019 Monterey County Community Greenhouse Gas Emissions Inventory

Sector	GHG Emissions ($MTCO_2e$)	Percent of Total
Nonresidential Building Energy	170,639	14%
Residential Building Energy	81,750	7%
On-Road Transportation	479,174	39%
Off-Road Vehicles and Equipment	17,616	1%
Solid Waste	69,724	6%
Water Supply[1]	0	0%
Wastewater Treatment	15,586	1%
Agriculture	401,367	32%
Total	**1,235,855**	**100**

Notes: Totals may not sum exactly due to independent rounding. GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide.

[1] Water supply emissions are estimated to be 0 $MTCO_2e$ because electricity consumption associated with extraction, conveyance, treatment, and distribution are captured in the building energy sectors (both residential and nonresidential).

Figure 3.4 2019 Monterey County Community Greenhouse Gas Emissions Inventory

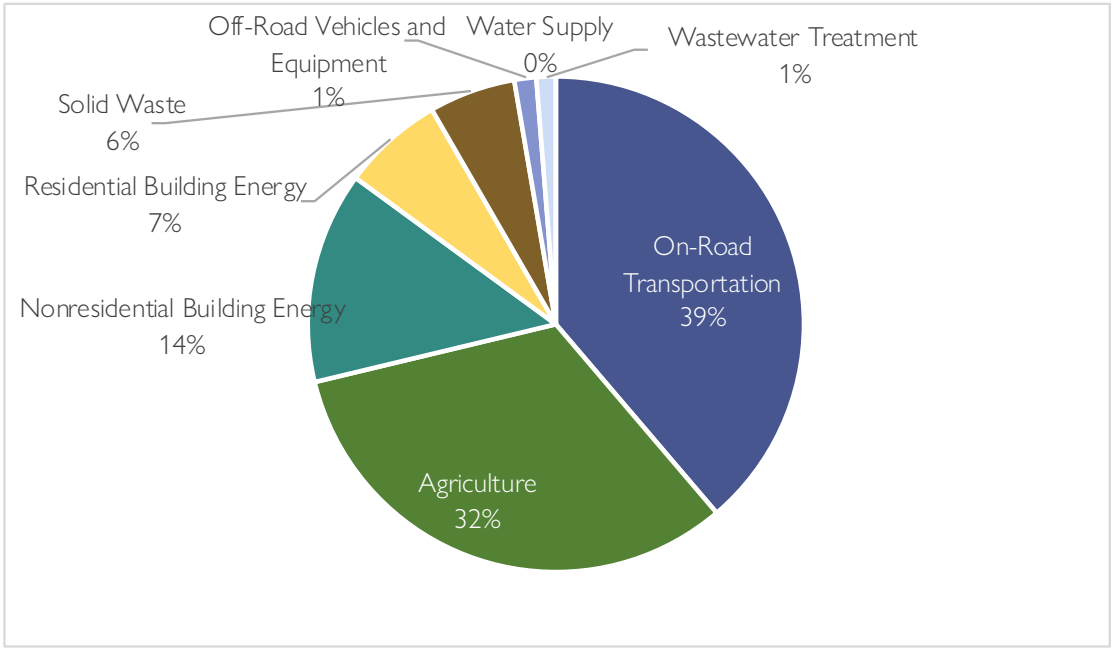
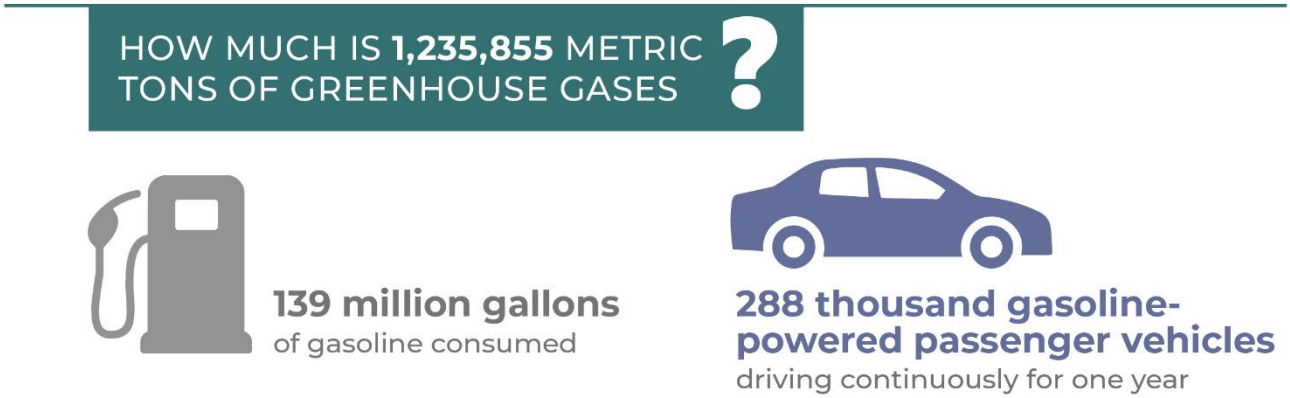


Figure 3.5 provides context for the 2019 community GHG emissions inventory of approximately 1,235,855 $MTCO_2e$. To put total emissions in more relatable terms, this is the equivalent of 288,270 gasoline-powered passenger vehicles driven for 1 year or over 139 million gallons of gasoline consumed (EPA 2024).

Figure 3.5 Equivalencies of the 2019 Monterey County Community Greenhouse Gas Emissions Inventory



Source: EPA 2024.

For detailed information on data, methods, and assumptions used to calculate the 2019 community GHG emissions inventory, refer to Appendix A.

Stories of Sustainability

EVs for Everyone

Drivers in Monterey County are going electric thanks to a little help from the EVs for Everyone program. A program of Ecology Action, EVs for Everyone provides free *education* on topics like charging station locations and EV financial analysis, understanding available state and local incentives, and language services. They also host *workshops* and staff booths at local fairs and farmers markets, all designed to highlight the financial and environmental benefits of going electric.

Maybe most helpful is the hands-on support EVs for Everyone offers. Get matched with an advisor, get assistance in person or virtually, and get help applying for grants and rebates, all designed to find the right EV for your budget and lifestyle.

With all this support, it's easy to pick the right EV for you. Given that transportation is one of the largest contributors to climate change, EVs for Everyone plays an important role in achieving Monterey County's climate goals.

Understanding Other GHG Accounting Methods: GWP Star (GWP*)

Background

Global warming potential (GWP) measures the heat GHGs trap in the atmosphere over a specific period, relative to carbon dioxide (CO_2), allowing for comparison of warming impacts across gases by converting them into carbon dioxide equivalent (CO_2e) values. GWP has been the standard metric for calculating GHG equivalencies since 1990, forming the foundation for GHG accounting protocols. While GWP enables the conversion of various GHGs into CO_2e values, it has been critiqued for its limitations in reflecting differences in the warming potentials of long-lived climate pollutants (LLCPs), like CO_2, which accumulates over centuries, and short-lived climate pollutants (SLCPs), like methane, which dissipates in roughly 10 years (Cain et al. 2019). This has led to concerns about an overestimation of SLCP-related warming. In recent years, an alternative metric, GWP Star (GWP*), was proposed to represent the relative warming contributions of LLCPs and SLCPs over time (Allen et al. 2018).

What is GWP*?

GWP* is an alternative GHG accounting method designed to represent the relative warming contributions of LLCPs, like CO_2, and SLCPs like methane. While conventional GWP methods treat all GHGs as pollutants that accumulate in the atmosphere, GWP* intends to differentiate between LLCPs (e.g., CO_2) and SLCPs (e.g., methane). Under the GWP method, all GHGs are treated as stocks that build up over time, whereas the GWP* method considers SLCPs as flows that remain stable as long as they are removed from the atmosphere at the same rate at which they are emitted. GWP* aims to provide a representation of how different GHGs affect temperature change over time by accounting for both current emissions and the decay of past emissions (Meinshausen and Nicholls 2022). This distinction between LLCPs and SLCPs offers a more nuanced view of how various GHGs contribute to global temperature changes.

Limitations of GWP*

While GWP* provides valuable insights into temperature impacts over time, it is important to recognize its limitations. When applied to single-year emissions inventories, GWP* can produce misleading results regarding the warming contributions of current SLCPs like methane. This issue stems from the mathematical framework of GWP*, which can yield negative warming values for sectors with declining methane emissions, even though any new GHGs emitted contributes to atmospheric warming (Meinshausen and Nicholls 2022). Consequently, GWP* calculations may suggest that a sector is improving when, in reality, its emissions still have a warming effect. Such misleading results could undermine legal frameworks that rely on stable and reliable metrics for measuring climate impacts. Additionally, GWP* tends to favor established animal agriculture sectors experiencing a gradual decline in output. In contrast, newer, developing sectors with increasing output are disadvantaged. This can create an uneven playing field in how different sectors are perceived and regulated based on their emissions.

Why Conventional GWP is Generally Used?

Conventional GWP is the cornerstone of GHG accounting frameworks at the state, national, and international levels. It important to note that this approach accounts for the warming potential of different gases over time; for instance, non-fossil methane has a GWP of 27.2 over 100 years (GWP100) but a significantly higher value of 80.8 over 20 years (GWP20). Therefore, conventional GWP still provides insight into the warming potential of various GHG over different timeframes. Additionally, the GWP methodology offers a straightforward and widely understood framework for policy development and implementation across sectors. By maintaining consistency with established state and federal GHG accounting protocols, local climate action planning can stay aligned with broader climate policy frameworks and reduction targets.

The insights provided by using the GWP* method remain valuable for understanding how different GHGs contribute to warming over time and for analyzing pre-industrial emission flows. While conventional GWP methodologies are commonly used for GHG inventories, the scientific insights from GWP* can help inform the development of reduction strategies and their long-term temperature impacts. The ongoing discussion around GWP* underscores the complexity of GHG accounting and the need to consider multiple perspectives when conducting climate action planning. As climate science evolves, these conversations will enhance the understanding of GHG impacts and engage communities in efforts that improve inventory practices.

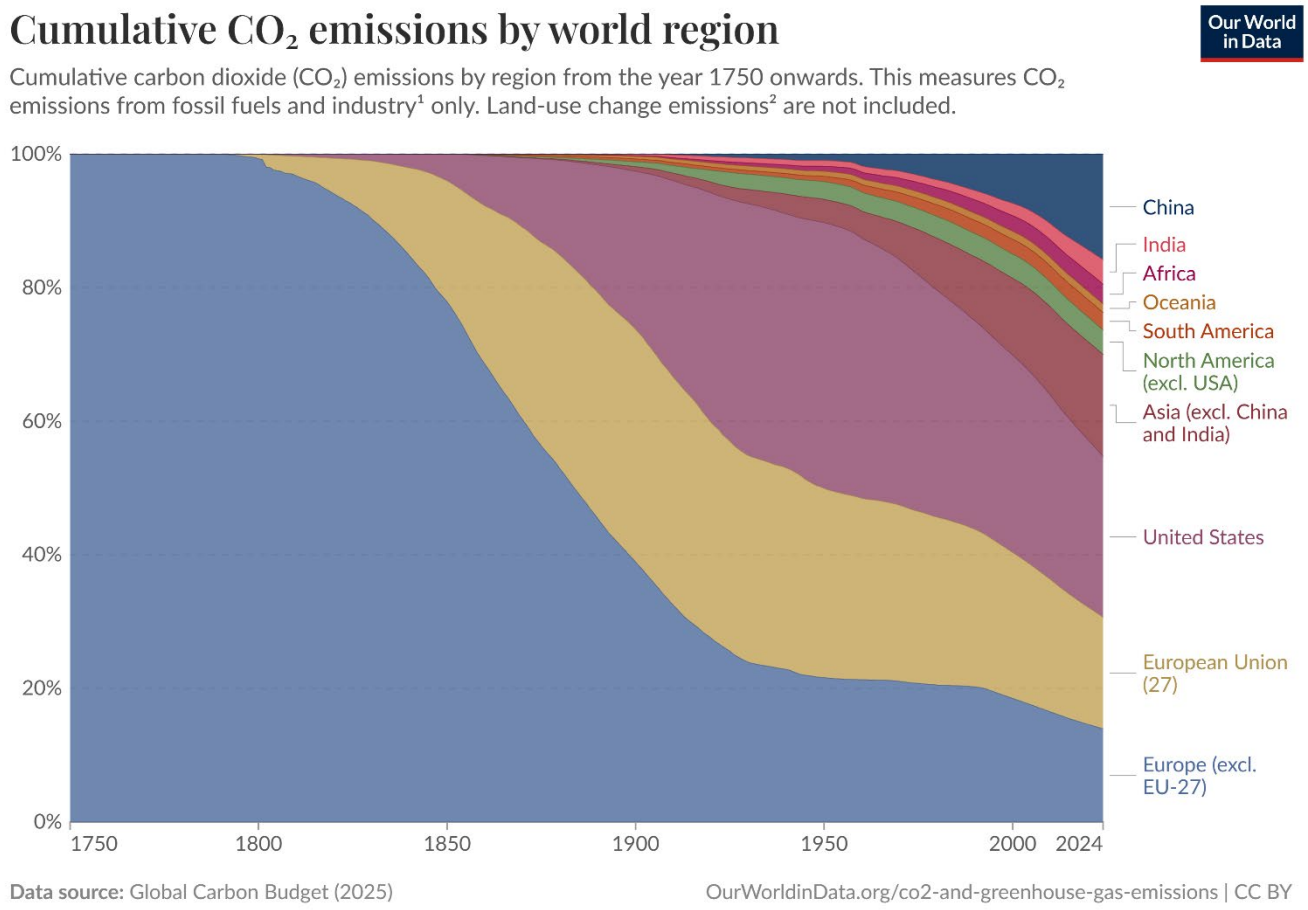
Local Action, Global Context

Climate actions the County takes play an important role in reducing global GHG emissions. Global emissions reduction goals are based on the latest climate science, which informs Nationally Determined Contributions (NDCs) for countries. States in turn develop their own emissions reduction targets based on climate science and political feasibility. NDCs and state targets are all dependent on local action to achieve success.

It's also beneficial to consider cumulative historical emissions for climate action planning. For example, the US is responsible for 25 percent of all historical global emissions, more than any other country and almost twice as much as the second-highest emitting country (China at 12.7 percent of cumulative historical emissions). Given our historical role in accelerating climate change, the economic benefits we have gained from the burning of fossil fuels, and the disproportionate burden of climate emergencies that fall on developing countries and low-income populations, it can be argued we have a moral imperative to reduce our emissions. Historical cumulative emissions are shown by country/region in Figure 3.6.

By reducing emissions being generated within Monterey County, we can support state, national, and global targets and do our part to reverse our historical contributions to climate change.

Figure 3.6 Cumulative Carbon Dioxide Emissions by World Region



1. Fossil CO_2 emissions This refers to the carbon dioxide released when burning fossil fuels or from certain industrial activities.
Burning fossil fuels — coal, oil, and gas — produces CO_2 during transport (cars, trucks, planes), electricity generation, heating, and energy use in industry. This also includes flaring, which is the burning of extra gas during oil and gas extraction.
Some industrial processes also release CO_2. This happens especially in cement and steel production, where chemical reactions (unrelated to burning fuel) produce carbon dioxide.
These figures don't include CO_2 emissions from changes in land use, like deforestation or reforestation.

2. Land-use change emissions Land-use change emissions are the carbon dioxide (CO_2) released or removed when land use changes.
They mostly come from deforestation, forest degradation, turning forests or other ecosystems into cropland or pasture, and draining peatlands.
When vegetation is cleared or burned, the carbon stored in plants and soil is released as CO_2.
Land-use change can also remove CO_2 from the atmosphere when vegetation grows back, for example, when forests regrow. This can lead to negative emissions in the data.
In scientific and policy discussions, these emissions are sometimes grouped under the broader term "LULUCF" (land use, land-use change, and forestry).
These estimates are uncertain because they depend on limited data and assumptions about land cover, how much carbon is stored in ecosystems, and how land is managed.
They are separate from fossil CO_2 emissions from burning fossil fuels and certain industrial processes.

Source: Calculated by Our World in Data based on data from the Global Carbon Project.

Emissions Forecasts

GHG emissions forecasts provide a modeled estimate of future GHG levels based on the continuation of trends in the unincorporated county's population, employment, and land use change(s). The forecasts also account for known regulatory actions by state and federal agencies (i.e., "legislative" actions) that are expected to reduce future emissions. These forecasts provide insights into the scale of local reductions needed to achieve GHG emissions reduction targets after accounting for anticipated reductions from legislative actions.

The CCAAP includes two forecast scenarios: a "business-as-usual" (BAU) scenario, and a "no local action" (NLA) scenario. The BAU scenario uses a variety of scaling factors for each sector (or activities that occur within the sector[s]) in the county and assumes no additional state or federal actions will occur after 2019 (the baseline inventory year). For the NLA scenario, the BAU forecast is "adjusted" to account for the effects of state and federal laws and regulatory requirements on the county's forecasted emissions. The forecasts estimate emissions for the years 2030, 2040, and 2045 and align with the state's GHG emissions reduction target years established in key legislation and policies, including Senate Bill 32 and Assembly Bill 1279, and the horizon of the County's General Plan (i.e., 2040).

Business-as-Usual Scenario: Projects future emissions assuming no additional actions to reduce GHGs.

No Local Action Scenario: Projects future emissions, factoring in expected reductions from existing regulatory actions.

BUSINESS-AS-USUAL FORECAST

The BAU forecasts estimate GHG emissions based on an assessment of how emissions from community activities will change over time without federal, state, regional, or local action. The BAU forecasts account for future population and employment changes. Table 3.3 shows that, based on 2019 GHG emissions levels, the BAU forecasts estimate that annual GHG emissions in the county will increase by 2, 3, and 4 percent by 2030, 2040, and 2045 respectively. This projected increase in BAU emissions is driven by anticipated growth in demographics and vehicle activity within the county.

While a more realistic scenario for future GHG emissions is provided with the community NLA forecasts, the BAU forecasts provide the basis for understanding the GHG impact solely due to growth in the unincorporated county.

Table 3.3 Monterey County Community GHG Emissions Forecasts – Business-as-Usual Scenario ($MTCO_2e$)

Sector	2019	2030	2040	2045
On-Road Transportation	479,174	496,378	502,583	505,615
Agriculture	401,367	400,677	400,049	399,735
Nonresidential Building Energy	170,639	176,863	182,159	185,029
Residential Building Energy	81,750	84,659	84,890	84,928
Solid Waste	69,724	72,227	73,130	73,571
Off-Road Vehicles and Equipment	17,616	18,252	18,611	18,798
Wastewater Treatment	15,586	16,146	16,348	16,446
Water Supply	0	0	0	0
Total	**1,235,855**	**1,265,202**	**1,277,769**	**1,284,123**
Percent Change from 2019 Levels	—	*2%*	*3%*	*4%*

Notes: Total may not sum exactly due to independent rounding. GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

NO LOCAL ACTION FORECAST

The NLA emissions forecast evaluates how the county's GHG emissions would change over time accounting for legislative actions at the federal and state levels, such as regulatory requirements to increase vehicle fuel efficiency. These forecasts provide the County with a more comprehensive understanding of future community emissions to assist with the prioritization of emissions reduction strategies developed to meet GHG targets. A summary of the legislative reductions applied is provided in Table 3.4.

Table 3.4 Legislative Reductions Summary

Source	Legislative Reduction	Description	Sectors Applied
Regional	Central Coast Community Energy 100 Percent Renewable Electricity	Establishes a target for Central Coast Community Energy to supply 100 percent renewable electricity by 2030.	Building Energy
Regional	Order R3-2021-0040 (Agricultural Order 4.0)	Mandates limits in nitrogen discharge from croplands.	Agriculture
State	Renewable Energy and Zero-Carbon Electricity Requirements (SB 100 and SB 1020)	Requires California energy utilities to procure 90 percent of electricity from renewable and zero-carbon sources by 2035, 95 percent by 2040, and 100 percent by 2045.	Building Energy
State	California's Building Energy Efficiency Standards (2019 and 2022 Title 24, Part 6)	Requires all new buildings in California to comply with energy efficiency standards established by CEC. Accounts for the energy efficiency gains in new residential and nonresidential buildings.	Building Energy
State	Advanced Clean Car I Regulations	Establishes GHG emission reduction standards for model years 2017 through 2025 that are more stringent than federal CAFE standards.	On-Road Vehicles
State	Advanced Clean Cars II Regulations[1]	Establishes a target for all new passenger cars, trucks, and SUVs sold in California to be 100 percent zero-emission vehicles by 2035.	On-Road Vehicles
State	Advanced Clean Fleets[1]	Starting in 2036, all medium and heavy-duty trucks sold in California must be zero emissions with limited exceptions. In addition to this sales mandate, fleet owners must also purchase electric trucks on an accelerated timeline.	On-Road Vehicles
State	Truck and Bus Regulation	Requires diesel trucks and buses that operate in California to be upgraded to reduce GHG emissions.	On-Road Vehicles
Federal	Fuel Efficiency Standards for Medium- and Heavy-Duty Vehicles	Establishes fuel efficiency standards for medium- and heavy-duty engines and vehicles.	On-Road Vehicles
Federal	EPA Off-Road Compression-Ignition Engine Standards	Establishes standards for phasing of EPA diesel engine tiers for off-road compression-ignition equipment.	Off-Road Vehicles and Equipment

Notes: [1] As of June 2025, the US Congress voted to limit California's authority to regulate vehicle emissions under existing programs provided through a waiver of the Clean Air Act. California is challenging the legality of this vote and given the pending litigation, the assumption of these programs remains for the purpose of the Monterey County Community Climate Action and Adaptation Plan. CAFE = Corporate Average Fuel Economy; CEC = California Energy Commission; EPA = US Environmental Protection Agency; GHG = greenhouse gas; SUV = sports utility vehicle; SB = Senate Bill.

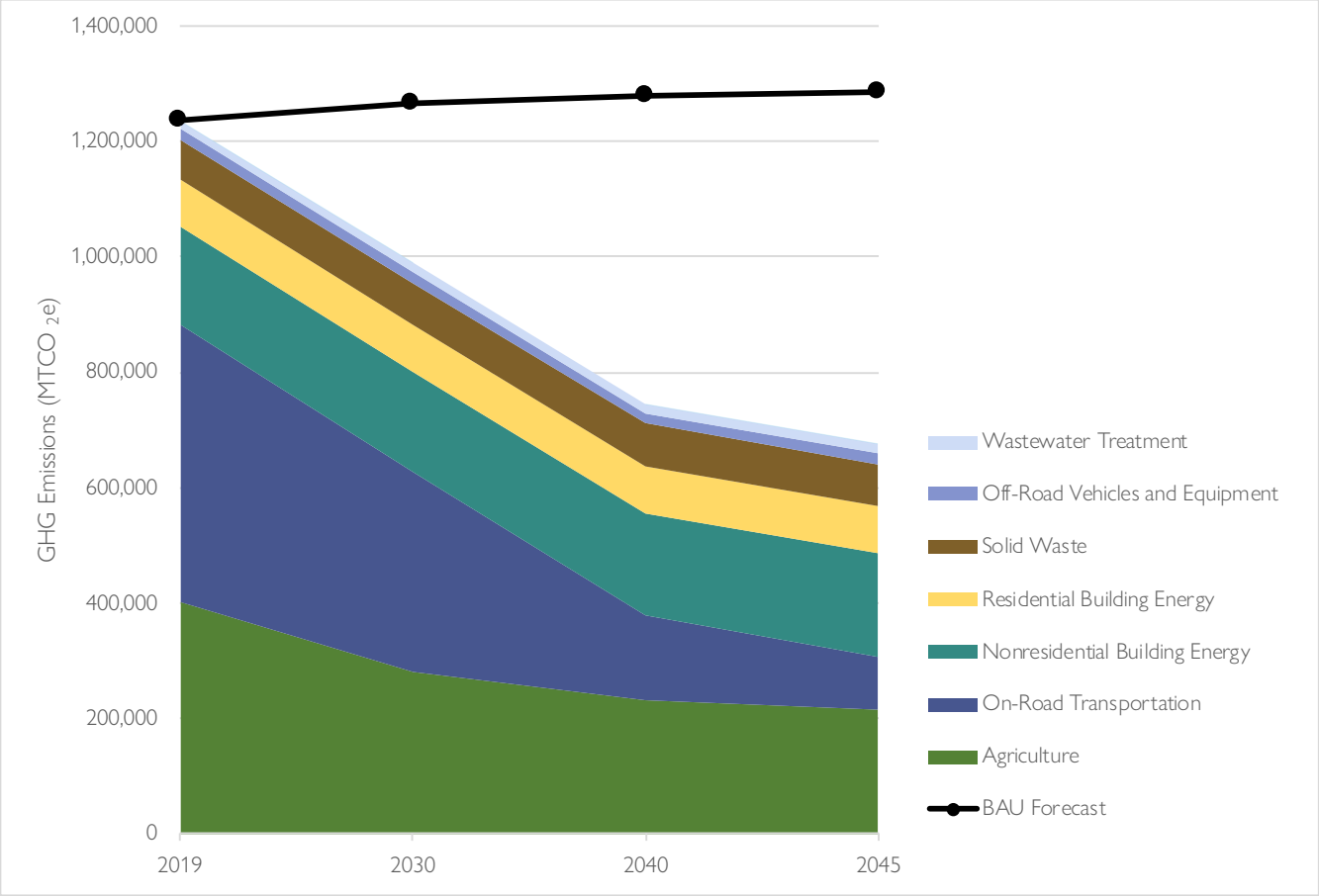
As shown below in Table 3.5 and Figure 3.7, the community NLA emissions would decrease by approximately 20 percent between 2019 and 2030. The community NLA emissions would further decrease by around 40 and 45 percent by 2040 and 2045 respectively, compared to 2019 values. Figure 3.6 also shows the community NLA emissions as stacked color wedges, together with the emissions trend that would occur without anticipated legislative reductions, accounting only for population, employment, and VMT changes (i.e., BAU emissions), shown as the black dotted line. Without the legislative reductions, emissions would be approximately 90 percent higher in 2045 compared to the NLA forecast.

Table 3.5 Monterey County Community GHG Emissions Forecasts – No Local Action Scenario ($MTCO_2e$)

Sector	2019	2030	2040	2045
On-Road Transportation	479,174	345,851	148,346	89,993
Agriculture	401,367	282,191	230,921	216,519
Nonresidential Building Energy	170,639	172,243	176,783	179,224
Residential Building Energy	81,750	82,403	81,993	81,567
Solid Waste	69,724	72,227	73,130	73,571
Off-Road Vehicles and Equipment	17,616	18,148	18,515	18,692
Wastewater Treatment	15,586	16,146	16,348	16,446
Water Supply	0	0	0	0
Total	**1,235,855**	**989,209**	**746,036**	**676,013**
Percent Change from 2019 Levels	—	*-20%*	*-40%*	*-45%*

Notes: Total may not sum exactly due to independent rounding. NLA: no-local-action; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Figure 3.7 Monterey County Community GHG Emissions Forecasts – No Local Action Scenario



Notes: BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Reduction Targets

As directed in Senate Bill 32 and Assembly Bill 1279, the state aims to reduce annual GHG emissions to:

- 40 percent below 1990 levels by 2030;
- 85 percent of human-caused emissions below 1990 levels by 2045; and
- Net zero emissions by 2045.

The County aims to reduce community emissions in proportion to the state's targets and goals. Community emissions levels from 1990 are not available, which is the case for most local jurisdictions in California. Thus, community GHG emissions reduction targets for the County's CCAAP were developed relative to the 2019 community GHG emissions inventory, consistent with guidance provided by CARB, which were 1,235,855 $MTCO_2e$.

California's 2017 Climate Change Scoping Plan (2017 Scoping Plan) and the *2022 Scoping Plan for Achieving Carbon Neutrality* (2022 Scoping Plan) were reviewed to calculate the community GHG emissions reduction targets for the county. Further understanding was also developed regarding activities occurring within the county, including those where the County has direct or indirect jurisdiction over that generate emissions and contribute to reductions. Based on the review, the County has direct or indirect jurisdiction over five of the eight emissions sectors defined by the state: agriculture, residential and commercial, electric power, recycling and waste, and transportation. The County has limited influence over high GWP gases and industrial activities (e.g., industrial production and processes). The County also has limited ability to influence Cap-and-Trade facilities' GHG emissions. Therefore, by excluding these sectors, community GHG emissions reduction targets have been established in proportion with statewide reductions for all sectors relevant to County jurisdiction to the extent feasible using available data. This target-setting approach is consistent with the California Supreme Court decision in *Center for Biological Diversity v. California Department of Fish and Wildlife and Newhall Land and Farming (2015) 62 Cal.4th 204*, which determined that the approach of assessing a project's consistency with statewide emissions reduction goals must include a "reasoned explanation based on substantial evidence" that links the project's emissions to the statewide GHG emissions reduction goals. Refer to Appendix A for further details on the methodology to develop the County's GHG emissions reduction targets.

Consistent with state targets and goals and considering relevant emissions sectors, the County's community GHG emissions reduction targets are as follows:

- 2030 target: 28 percent below 2019 levels (895,223 $MTCO_2e$);
- 2040 target: 66 percent below 2019 levels (416,425 $MTCO_2e$); and
- 2045 target: 86 percent below 2019 levels (177,026 $MTCO_2e$).

Table 3.6 below summarizes the County's community NLA forecast and GHG emissions reduction targets for 2030, 2040, and 2045.

Table 3.6 Monterey County Community NLA GHG Forecast and GHG Emissions Reduction Targets Below 2019 Levels ($MTCO_2e$)

Source	2019	2030	2040	2045
Monterey County Community Emissions and NLA Forecast	1,235,855	989,209	746,036	676,013
Monterey County Community Target Percent Reduction Below 2019 Levels	—	28%	66%	86%
Monterey County Community Target Annual Emissions	—	895,223	416,425	177,026
Reduction from 2019 Needed to Meet Target	—	340,632	819,430	1,058,829
Reduction from NLA Needed to Meet Target	—	93,986	329,611	498,987

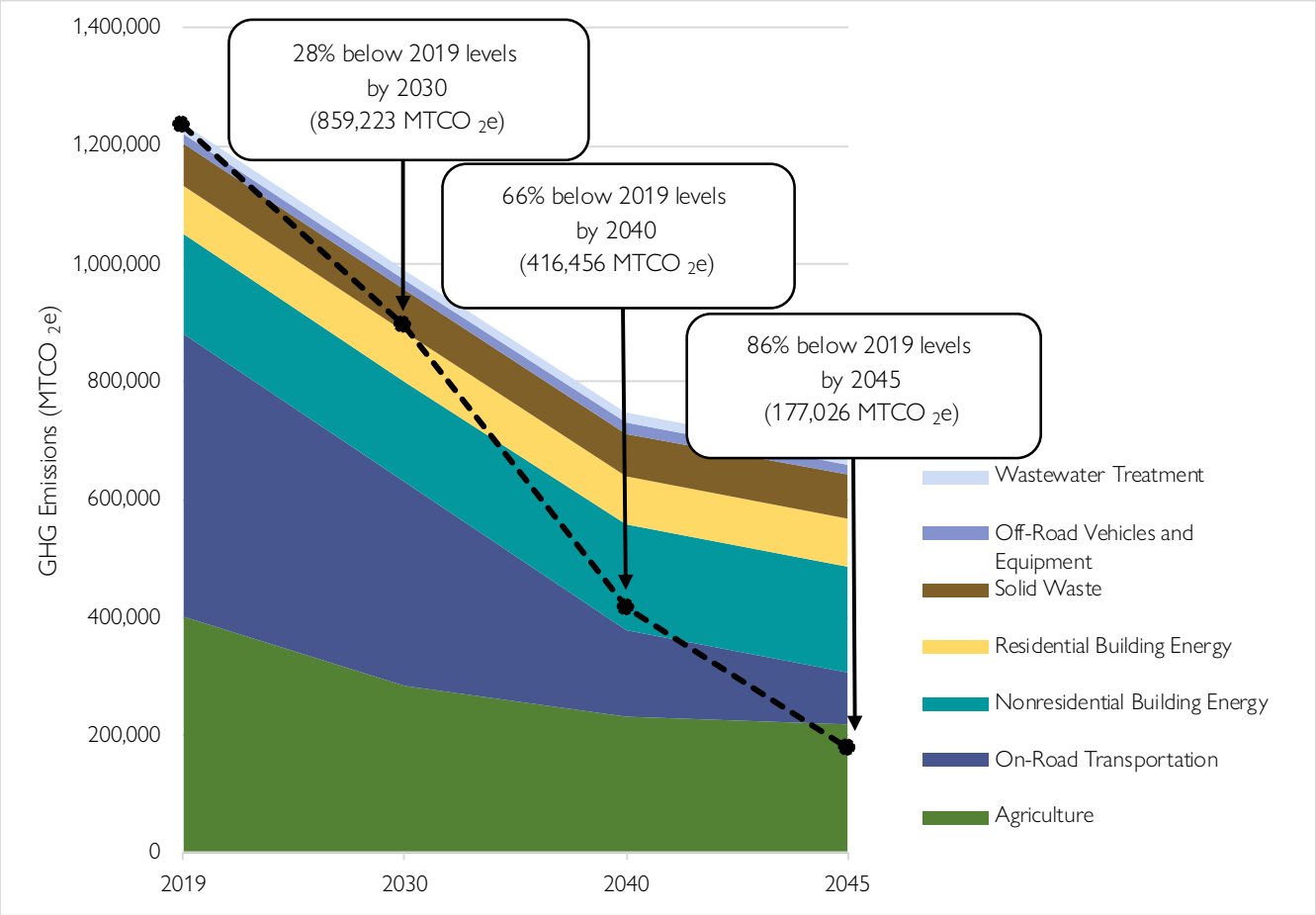
Notes: GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent; NLA = no local action.

Sources: CARB 2017, 2022a.

Local Emissions Gap

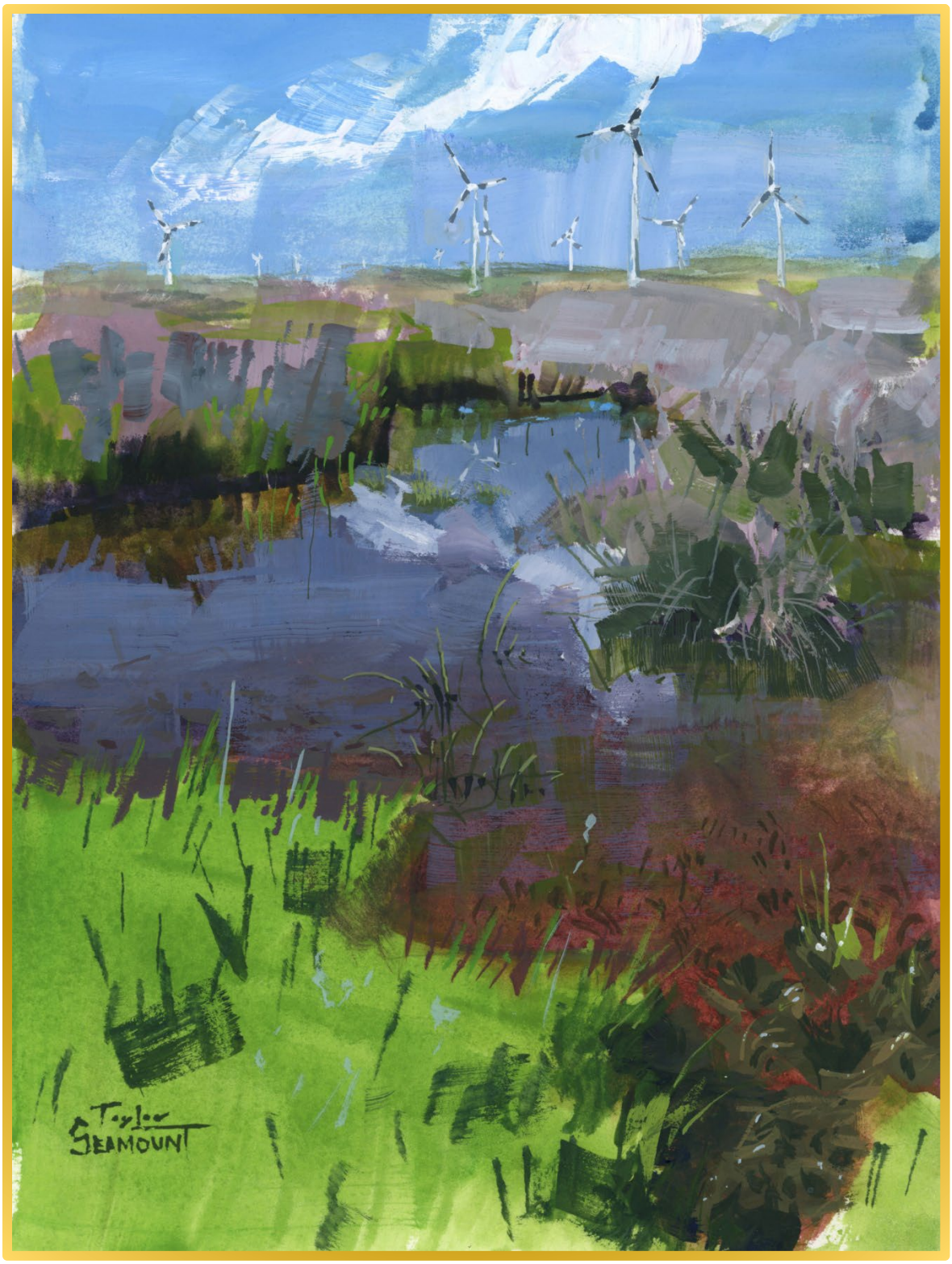
Figure 3.8 depicts the community NLA forecast by sector, as distinguished by colored wedges, and the County's community emissions reduction targets relative to the 2019 emissions inventory. The space between the trajectory of the black line (i.e., targets) and the top of the colored wedges (i.e., forecasted emissions) represents the "gap" in emissions that will need to be addressed through local actions for the County to meet its community GHG emissions reduction targets. As shown via the gaps, substantial reductions need to be achieved even after legislative reductions are applied.

Figure 3.8 Monterey County Community NLA GHG Forecasts and GHG Emissions Reduction Targets Below 2019 Levels



Notes: GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent; NLA = no local action.

Windmills in the Ephemeral Wetland



Future: The coexistence of green energy generation and thriving ecosystems are widespread. The windmills are marked with black stripes to help migrating birds identify and avoid them.

Painted *en plein air* with *Solarpunk* elements added in studio.



CHAPTER 4. Natural and Working Lands

Monterey County's natural and working lands are assets that provide numerous ecological, economic, and social benefits to the region. The region encompasses forests, grasslands, wetlands, agricultural areas, and other undeveloped lands important for carbon sequestration and storage. In addition to their climate mitigation potential, natural and working lands offer recreational amenities, support diverse wildlife habitats, and include fertile agricultural lands that contribute significantly to local and national food production. This chapter explores nature-based solutions, the importance of natural and working lands as an essential component in reducing emissions, estimates carbon held in these lands at present and in the future, and identifies local actions and activities to support healthy natural and working lands.

Note that in this chapter, "County" refers to the County of Monterey as a local government agency, while "county" refers to the entire geographic area of unincorporated Monterey County.

OVERVIEW

California has established ambitious targets and initiatives to restore and conserve natural and working lands, recognizing their role in carbon sequestration and climate resilience. These efforts combine state-level policies and programs to provide frameworks for local jurisdictions to develop and implement nature-based solutions and understand carbon sequestration on natural and working lands.

For Monterey County, with its diverse landscape of natural and working lands, these state actions offer guidance for developing locally appropriate climate actions that align with state objectives while also delivering multiple environmental and community benefits. The following section outlines key state initiatives that inform the County's approach to nature-based solutions and assessing carbon stored in natural and working lands.

STATE ACTIONS FOR NATURAL AND WORKING LANDS

2022 Scoping Plan for Achieving Carbon Neutrality

The California Air Resources Board's (CARB's) *2022 Scoping Plan for Achieving Carbon Neutrality* (2022 Scoping Plan) highlights that reducing greenhouse gas (GHG) emissions from and increasing sequestration on natural and working lands is essential to the state's long term climate change strategy (CARB 2022b). The 2022 Scoping Plan incorporates natural and working lands modeling for the first time, using the 2018 statewide carbon stock inventory to model future scenarios based on a range of investments in land management actions. The inventory is based on the Intergovernmental Panel on Climate Change's methods for tracking ecosystem carbon stocks, aligning with similar inventories completed at the national and subnational levels (CARB 2022b: 59).

The modeling conducted by CARB for the 2022 Scoping Plan shows that natural and working lands have been a source of emissions in recent years and are expected to continue to be an emissions source until California's forests reach a healthy state, reversing misguided fire suppression management over the past century (CARB 2022b: 6). The 2022 Scoping Plan models future carbon stocks under a business-as-usual scenario, indicating no new actions are taken to support natural and working lands, and four alternative scenarios, with varying scales of land management. Of the four alternative scenarios modeled, scenario 3 was deemed to provide the best ability for carbon sequestration over the long term due to sustainable land management and was selected as the Scoping Plan scenario. This scenario reduces catastrophic wildfire risk, increases soil health, and considers the nature-based solutions outlined in other state documents.

The 2022 Scoping Plan sets a target to drive land management action on natural and working land: no more than 4 percent carbon stock losses below 2014 levels by 2045 (CARB 2022b: 247). The Scoping Plan scenario aims to achieve this target through the variety of land management practices at the pace and scale modeled.

Nature-Based Solutions Climate Targets

California advanced climate action with Assembly Bill 1757 (2022), which set new requirements for state agencies to address climate change through nature-based solutions. Under this legislation, the California Natural Resources Agency established specific, measurable targets for nature-based climate solutions through 2045 in coordination with other state agencies.

California's Nature-Based Solutions Climate Targets (NBS Climate Targets) presents specific information and details on approaches for carbon sequestration and GHG emissions reductions across the state's natural and working lands. Targets were developed using multiple models, best-available data, and expert guidance to determine the most effective approaches for building resilience and conserving carbon stocks. It is a cross-sector approach to protecting and enhancing carbon stocks, with progress to be measured and reported every two years.

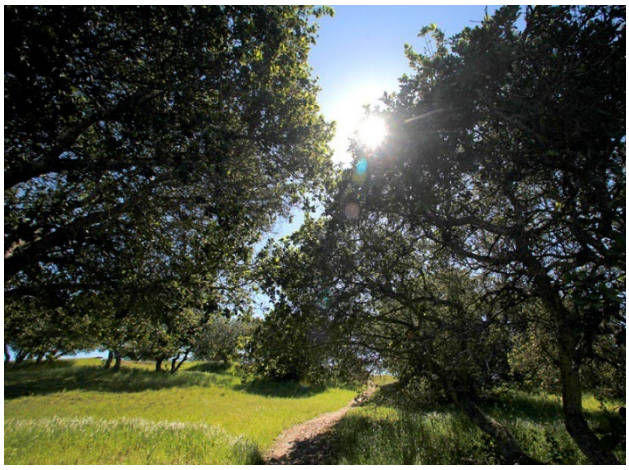


These targets provide guidance for developing climate initiatives across the county. NBS Climate Targets help the County align local

nature-based solutions with state objectives while maintaining flexibility for regional implementation. These targets also aim to engage multiple parties, including federal, tribal, state, and local governments, private landowners, community groups, and other interested parties, to ensure that the County's nature-based climate initiatives build on community knowledge and proven practices.

Pathways to 30x30 California

Pathways to 30x30 California (30x30) provides a roadmap for conserving 30 percent of the state's land and coastal waters by 2030. This initiative aims to accelerate conservation efforts, protect biodiversity, improve equitable access to natural areas, and build climate resilience. The strategy recognizes natural and working lands as critical components of the state's climate solutions, setting state targets for conservation actions that also address biodiversity loss and climate change through nature-based solutions.



For Monterey County, 30x30 guides expanding conservation efforts in alignment with state objectives. The county's diverse ecosystems and natural lands make it essential to help California meet its conservation targets. Aligning with 30x30 state priorities positions the County to receive technical and funding support, helping the County advance local climate and conservation goals through nature-based solutions. Additionally, integrating 30x30 priorities emphasizes the importance of conservation actions that also offer multiple benefits to the region like food security, economic growth, and access to nature.

Natural and Working Lands Climate Smart Strategy

The Natural and Working Lands Climate Smart Strategy (NWL Climate Strategy) is California's comprehensive plan to leverage natural and working landscapes to address climate change. This strategy provides guidance for climate-smart land management practices across forests, wetlands, farms, rangelands, urban green spaces, and specific land cover types. It details priority actions focused on protecting biodiversity, enhancing carbon storage, and building climate resilience while also expanding on soil conservation practices, improved forest health initiatives, wetland restoration, and urban greening projects. The NWL Climate Strategy identifies opportunities and challenges for implementing these practices locally and provides guidelines to support regional climate goals across California's diverse landscapes.

The NWL Climate Strategy supports locally appropriate climate initiatives that strengthen Monterey County's capacity to implement climate solutions across its diverse landscapes. Its emphasis on regional implementation directly informs the County's climate planning efforts by providing technical guidance on carbon measurement, implementation strategies, and monitoring frameworks to equip the County with tools to develop informed actions.

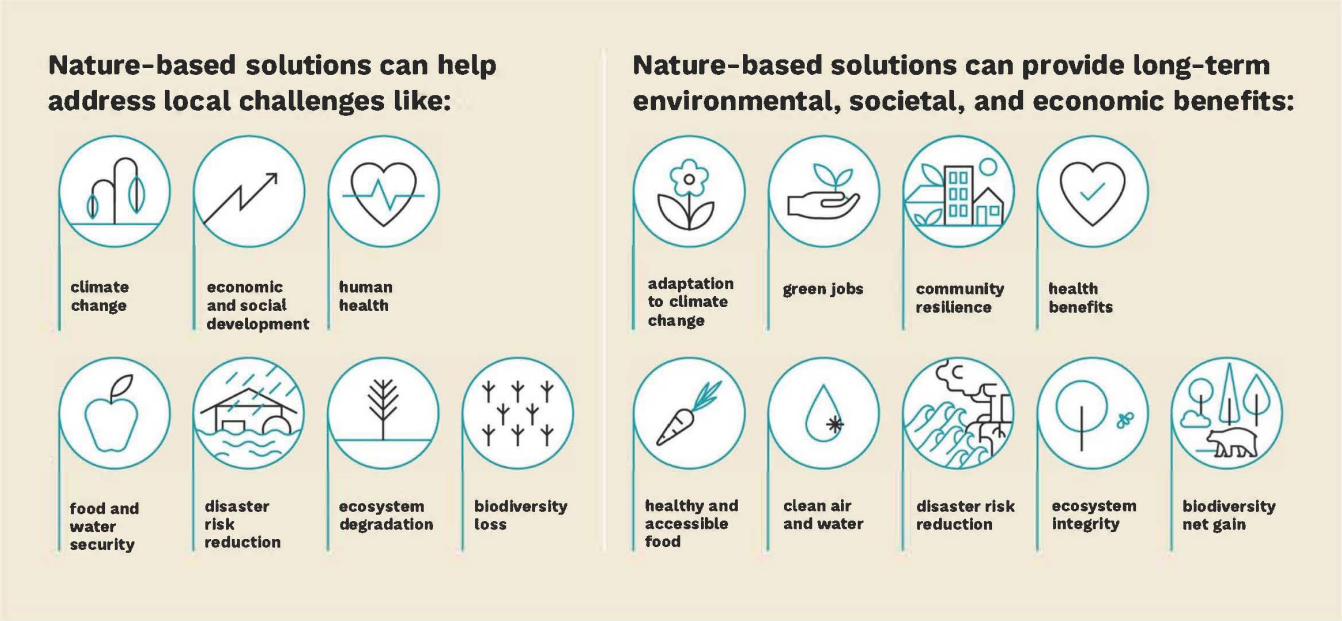
BENEFITS OF NATURE-BASED SOLUTIONS

Thoughtful planning and stewardship of natural and working lands can provide a wide range of benefits to communities. Many of these strategies are considered nature-based solutions. Nature-based solutions are strategies that protect, restore, or manage ecosystems to address environmental challenges and provide benefits like enhanced biodiversity and climate resilience. For example, restoring wetlands can reduce flood risk while also enhancing water quality and providing improved wildlife habitat. Moreover, when protected and well managed, natural and working lands are dynamic systems that strengthen local economies through sustainable agriculture and tourism while providing community health benefits through improved air quality and reduced urban heat island effects.

Natural and working lands can also create buffers that protect communities from environmental hazards while providing ecological services. For example, careful stewardship of forests and rangelands can reduce wildfire intensity and spread near communities, while wetlands and agricultural lands protect against coastal flooding and naturally manage stormwater flows. The cultural value of these lands is also important, offering spaces for outdoor recreation and education while preserving areas of historical or tribal significance. Moreover, when planned and managed intentionally and thoughtfully, natural and working lands can promote equity by expanding access to green spaces in underserved areas, creating local green jobs, and ensuring that environmental benefits reach communities that have historically faced disproportionate environmental and climate challenges.

The benefits nature-based solutions provide are highlighted in Figure 4.1.

Figure 4.1 Nature-Based Solution Benefits



Source: IUCN 2025.

ESTIMATING CARBON HELD IN NATURAL AND WORKING LANDS

Key Terms

Aboveground carbon: The carbon stored in vegetation above the soil surface, including trees, shrubs, and other plants.

Belowground carbon: The carbon stored in soil, plant roots, and underground organic matter.

Carbon pools: A system which has the capacity to store or release carbon.

Carbon sequestration: The process of capturing and storing carbon dioxide from the atmosphere in plants, soil, and other natural systems.

Carbon stock: The total amount of carbon stored in a defined area or ecosystem at a specific point in time.

Natural lands: Lands made up of native ecosystems, like forests, grasslands, deserts, riparian systems, and wetlands.

Nature-based solutions: Strategies that protect, restore, or manage ecosystems to address environmental challenges and provide benefits like enhanced biodiversity and climate resilience.

Working lands: Lands used for economic purposes like farming, grazing, or timber production.

This section explains how carbon storage is measured, why annual sequestration varies, and how this framework is applied to Monterey County's natural and working lands.

Carbon sequestration is a natural process where plants, animals, and ecosystems absorb carbon dioxide (CO_2) from the atmosphere and store it in various forms, such as biomass, vegetation, soils, wood, and aquatic environments. Simply put, it is nature's way of capturing and storing CO_2 over time. Through photosynthesis, plants take in CO_2 and use it for growth, locking the carbon in their structures. When plants shed leaves or die, this carbon-rich material becomes part of the soil, where it can be stored for long periods in carbon pools. Natural and working lands like forests, grasslands, and wetlands excel at storing carbon, making the conservation and restoration of these lands essential in combating climate change. Over time, the carbon captured through natural processes contributes to the total amount of carbon stored in an ecosystem, also known as its carbon stock.

Land Cover Definitions

The following land cover types represent the distinct landscapes of Monterey County that were assessed to evaluate current and future carbon stocks:

Forest: Natural and managed areas dominated by trees, ranging from coastal to inland forests, with multiple layers of vegetation including trees of different ages and sizes.

Fresh marsh: Freshwater wetland areas where plants grow in saturated soils, typically occurring in floodplains and along waterways with year-round or seasonal flooding.

Oak woodland: Areas characterized by oak trees with varying density, creating distinctive landscapes where trees are mixed with grass and other vegetation.

Developed land: Human-built areas including cities, neighborhoods, roads, and associated green spaces like urban forests, parks, and other managed vegetation.

Cropland: Agricultural lands used to grow annual food and fiber crops that are replanted each year, managed through regular cultivation and irrigation.

Orchards/vineyards: Agricultural lands dedicated to permanent tree crops and grapevines, characterized by organized planting patterns and long-term management.

Shrubland: Areas covered by woody plants shorter than trees, including chaparral and coastal scrub communities adapted to California's climate.

Grassland: Open areas dominated by grasses and other non-woody plants, occurring naturally or managed for grazing.

Wetland: Areas where land meets water, including coastal marshes and seagrass beds, characterized by plants adapted to regular flooding.

Unknown: Areas where land cover type cannot be determined due to data limitations, mixed land uses, or other classification challenges.

Barren: Areas with very little or no plant growth due to environmental conditions, including beaches, dunes, and exposed rock.

Water: Bodies of water including rivers, streams, lakes, and coastal waters that support various aquatic ecosystems.

Carbon Stock vs. Carbon Sequestration

When discussing the ability of natural and working lands to store carbon, two related but distinct metrics are often used: carbon stock and carbon sequestration.

Carbon stock refers to the total amount of carbon stored in natural and working lands at a specific point in time—similar to your bank account balance on a given day. It is measured in units of mass (tons of carbon).

Carbon sequestration is the rate at which carbon is removed from the atmosphere and stored in these systems—like regular deposits into your account over a period of time. It is measured as a rate (tons of carbon per year).

While both concepts are important, long-term climate planning requires a clear understanding of how they differ and how they behave over time.

Why Annual Carbon Sequestration Fluctuates

Carbon sequestration rates vary widely depending on weather, land management practices, and natural disturbances like drought or wildfire. These rates are not constant across ecosystems or over time. Young or recovering ecosystems often sequester carbon rapidly, while mature ecosystems tend to reach equilibrium, accumulating carbon more slowly.

As a result, sequestration does not increase in a linear, predictable fashion year over year. As described by the Marin Carbon Project:

> *"Actual sequestration of CO_2 in response to management interventions and conservation practices are not expected to be linear over time, and are expected to vary annually… Terrestrial carbon sequestration resulting from each practice tends to increase cumulatively to maturity and then tends to decline, though remaining net positive relative to baseline conditions for many years" (Marin Carbon Project 2018: 54).*

This variability makes annual sequestration an unreliable measure for understanding whether lands are truly gaining or losing carbon over time. Figures 4.2, 4.3, and 4.4 illustrate CARB's statewide annual carbon sequestration modeled under the Scoping Plan scenario for all natural and working lands combined, as well as separately for forests and shrublands and agricultural lands, respectively.

Statewide Annual Carbon Sequestration

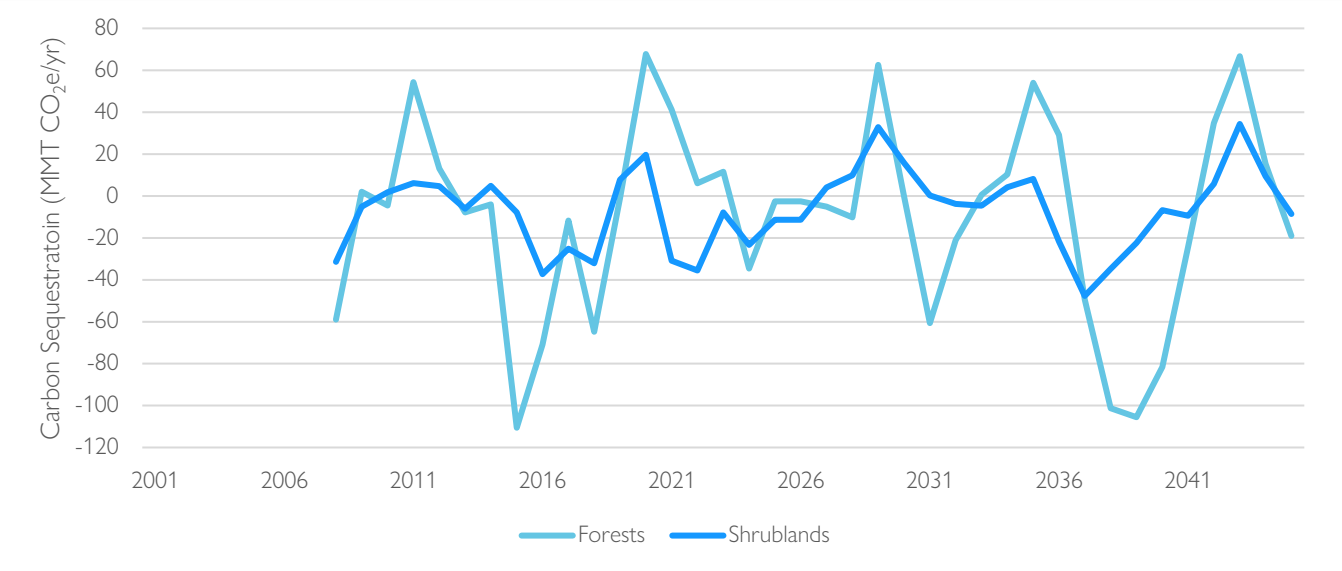
Figure 4.2 Annual Carbon Sequestration on All Natural and Working Lands (Statewide): Scoping Plan Scenario



Notes: MMT CO_2e/yr = million metric tons of carbon dioxide equivalent per year.

Source: CARB 2022c.

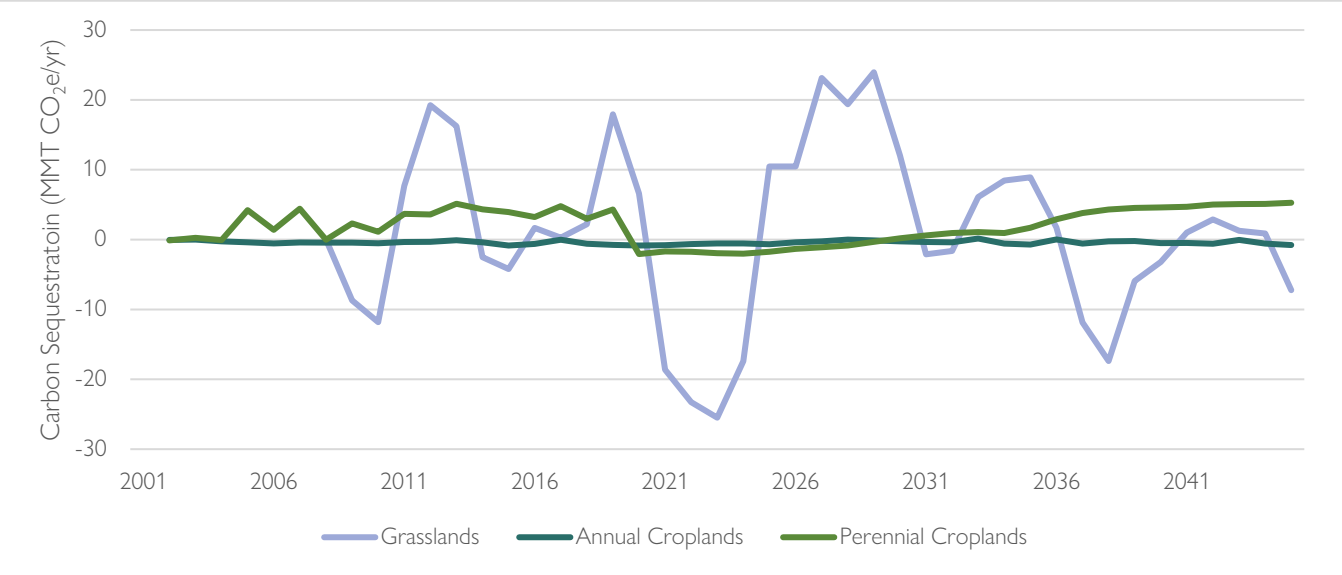
Figure 4.3 Annual Carbon Sequestration in Forests and Shrublands (Statewide): Scoping Plan Scenario



Notes: MMT CO_2e/year = million metric tons of carbon dioxide equivalent per year.

Source: CARB 2022c.

Figure 4.4 Annual Carbon Sequestration in Agricultural Lands (Statewide): Scoping Plan Scenario



Notes: MMT CO_2e/yr = million metric tons of carbon dioxide equivalent per year.

Source: CARB 2022c.

What This Means for Land Management

The annual carbon sequestration figures shown above help illustrate why natural and working lands climate planning cannot rely on year-to-year sequestration rates alone.

Across all natural and working lands statewide, annual carbon sequestration fluctuates widely from one year to the next—even under the Scoping Plan scenario, which assumes sustained investment in climate-smart land management. Some years show strong carbon uptake, while others show net carbon losses. These swings reflect changing climate conditions and natural disturbances rather than short-term changes in land management.

Figure 4.3 shows the greatest year-to-year variability. This is especially important because forests and shrublands together contain the majority of California's ecosystem carbon. According to the 2022 Scoping Plan, these land cover types store most of the state's carbon because they cover much of California's landscape and have the highest carbon density of any land cover type. In contrast, all other land categories combined make up more than 35 percent of California's land area but hold only about 15 percent of total carbon stocks (CARB 2022b: 57).

Because forests and shrublands store so much carbon, large carbon losses can occur in individual years due to wildfire, drought, or vegetation mortality. Figure 4.3 shows that these lands can act as a carbon sink in some years and a carbon source in others, even when long-term management is improving ecosystem health and resilience. This means that a single year of high sequestration does not necessarily indicate lasting climate benefits, just as a single year of carbon loss does not mean that land management efforts are failing.

In Figure 4.4, agricultural lands show smaller year-to-year variability than forests and shrublands, but annual sequestration rates still vary over time. Crop cycles, weather conditions, and management practices all influence how much carbon is stored or released in a given year. While climate-smart agricultural practices contribute to long-term carbon storage, their annual impact is not constant or predictable.

Taken together, Figures 4.2, 4.3, and 4.4 show that annual sequestration rates are highly variable and do not consistently reflect long-term progress. What matters for climate planning is whether land management actions

are maintaining or increasing total carbon stored over time, despite these annual ups and downs. Recognizing this, the State has adopted a planning approach that emphasizes long-term changes in carbon stored in lands.

Why the State Focuses on Carbon Stocks

CARB reached this same conclusion in its 2022 Scoping Plan. For the first time, the 2022 Scoping Plan used a statewide inventory of carbon stored on natural and working lands to model future climate scenarios.

CARB found that the amount of carbon absorbed or released by these lands can vary greatly from year to year due to climate conditions and disturbances. As a result, looking only at short-term sequestration rates can give a misleading picture of progress. CARB explains:

> *"[Natural and working lands] sinks and sources are highly variable from year to year, and short time frames do not adequately demonstrate the impact that climate and management are having on ecosystems. For the purposes of climate planning, therefore, it is best to focus on carbon stock changes over longer periods rather than focusing on sequestration or emissions on shorter time frames." (CARB 2022b: 91)*

In other words, lands can be pulling carbon out of the atmosphere in a given year but still lose carbon overall if losses from wildfire, drought, or land conversion outweigh the gains.

Because climate impacts and land management actions can take decades to fully affect ecosystems, CARB emphasizes the importance of tracking long-term trends in stored carbon:

> *"Because [natural and working lands] processes fluctuate year to year and because it can sometimes take decades for climate action to fully impact carbon in [natural and working lands], it is important to consider the statewide, long-term trends of carbon stock change" (CARB 2022b: 246).*

Monterey County's Approach

This CCAAP follows the same logic as the 2022 Scoping Plan. While natural and working lands in the county do absorb carbon each year, annual sequestration rates are not included in the County's GHG inventory due to differences in how ecosystem carbon and emissions are calculated.

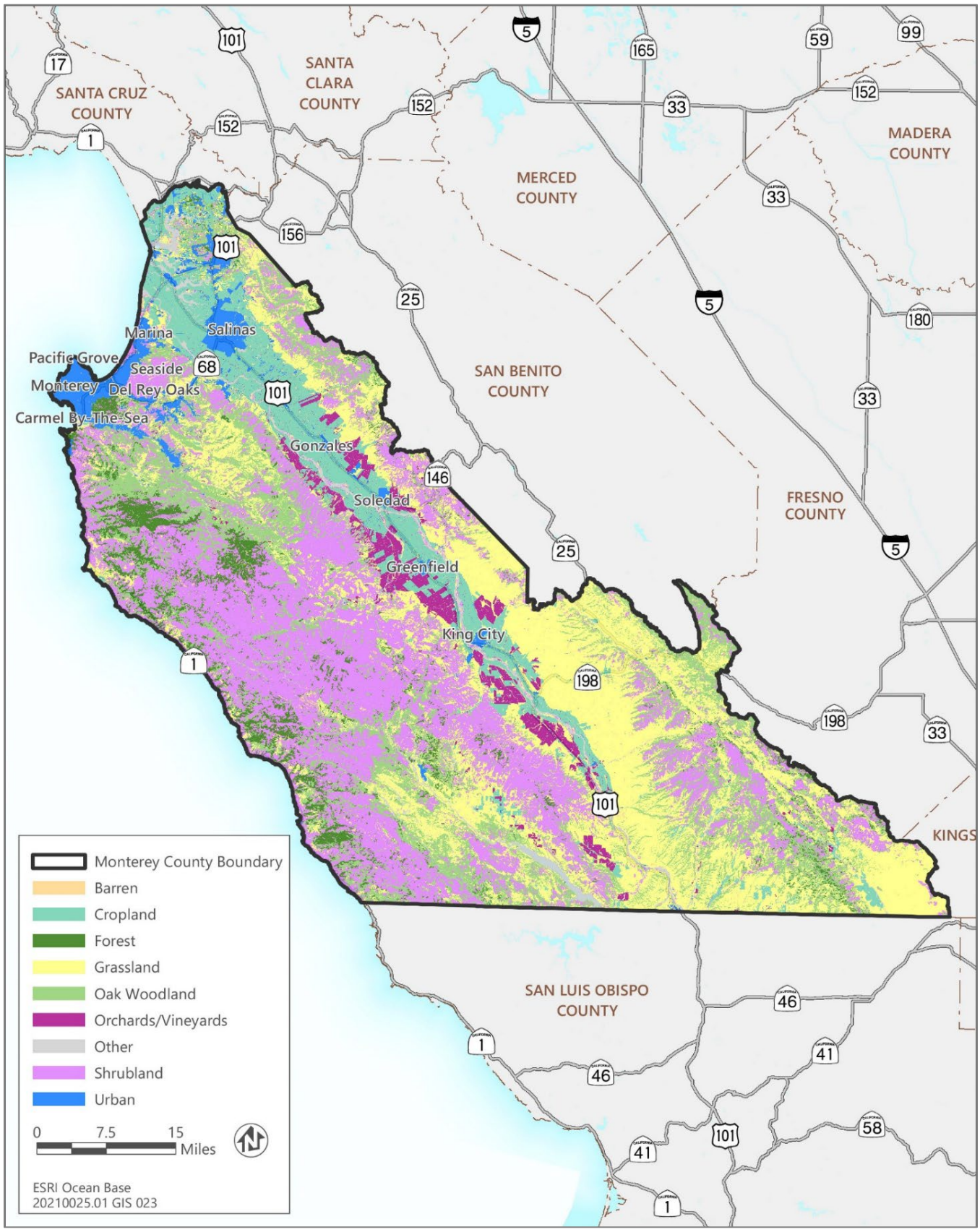
Instead, the County evaluates carbon stored on natural and working lands to reflect their long-term role in climate goals. This approach focuses on whether these lands are maintaining or increasing their stored carbon over time, which is more meaningful for climate planning than short-term sequestration rates.

By emphasizing changes in carbon stocks, the CCAAP aligns its natural and working lands strategy with CARB's scientifically grounded approach and better captures the lasting climate benefits of protecting and managing its natural and working lands.

Land Cover Types in Monterey County

Changes in the land cover types directly impact the amount of carbon stored in Monterey County. When natural lands are converted into urban developments, the land's ability to capture and store carbon decreases. Conversely, reforesting barren or unproductive lands can increase the land's capacity to absorb carbon from the atmosphere. This complex relationship between land and carbon highlights the need for careful planning. Minimizing losses to existing carbon stocks is important while also seeking opportunities to preserve and enhance natural and working lands. Doing so will help maintain, and potentially enhance, the carbon stock in natural and working lands. Evaluating carbon stocks and sequestration opportunities is typically done by land cover type. In Monterey County, the land covers represented are shown in Figure 4.5.

Figure 4.5 Monterey County Land Cover Types

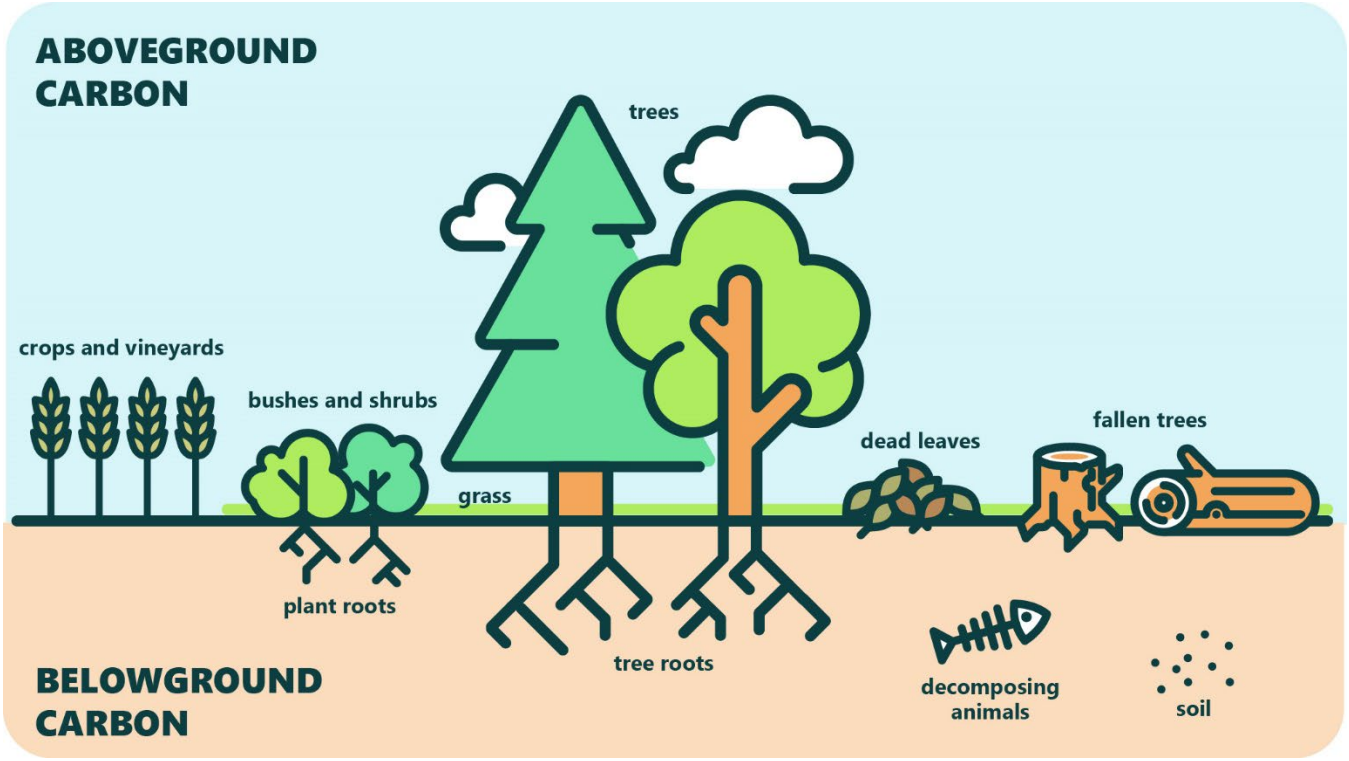


Source: Adapted by Ascent in 2024.

ASSESSING CARBON STOCKS

To accurately assess carbon stocks, it is essential to examine both aboveground and belowground carbon pools. Aboveground carbon is found in living woody biomass (e.g., trunks and branches), herbaceous vegetation, and dead organic matter, such as leaf litter and fallen trees. Belowground carbon is held in plant roots and soil organic matter, which is a mixture of decomposed plant and animal tissue, minerals, and microbes. The carbon in these pools varies across ecosystems, influencing their overall sequestration capacity. Figure 4.6 highlights the types of sources that make up aboveground and belowground carbon pools. Understanding these distinctions is important for developing effective strategies to manage, protect, and enhance carbon stored in natural and working lands with the greatest potential.

Figure 4.6 Aboveground and Belowground Carbon Pools



Carbon Stock Inventory

An inventory of existing carbon stored in vegetation (aboveground) and soils (belowground) on natural and working lands in unincorporated Monterey County was conducted using a geographic information systems (GIS)-based analysis and provided by the Association of Monterey Bay Area Government's (AMBAG's) Monterey Bay Natural and Working Lands Climate Mitigation and Resiliency Study (Climate Study). The data sources used to complete the analysis included the following:

- U.S. Department of Agriculture Natural Resources Conservation Service's Soil Survey Geographic Database,
- California Department of Forestry and Fire Protection's Fire and Resource Assessment Program vegetation data layer,
- California Department of Water Resources' statewide crop mapping, and
- U.S. Fish and Wildlife Service's National Wetlands Inventory.

The combination of these data sources was used to develop the carbon stock inventory, which calculates carbon stock based on land cover type, as illustrated in Figure 4.5. Additional information on the GIS-based analysis and methodology from the Climate Study can be found in Appendix D.

The modeling for unincorporated Monterey County showed a total carbon stock of approximately 66.4 million metric tons of carbon (MMT C), with about 48 MMT C stored belowground and about 18.3 MMT C stored aboveground across various land cover types. The land cover types with the highest total carbon stock were grassland and shrubland storing about 17.7 and 17.3 MMT C, respectively, followed by oak woodland with 13.3 MMT C.

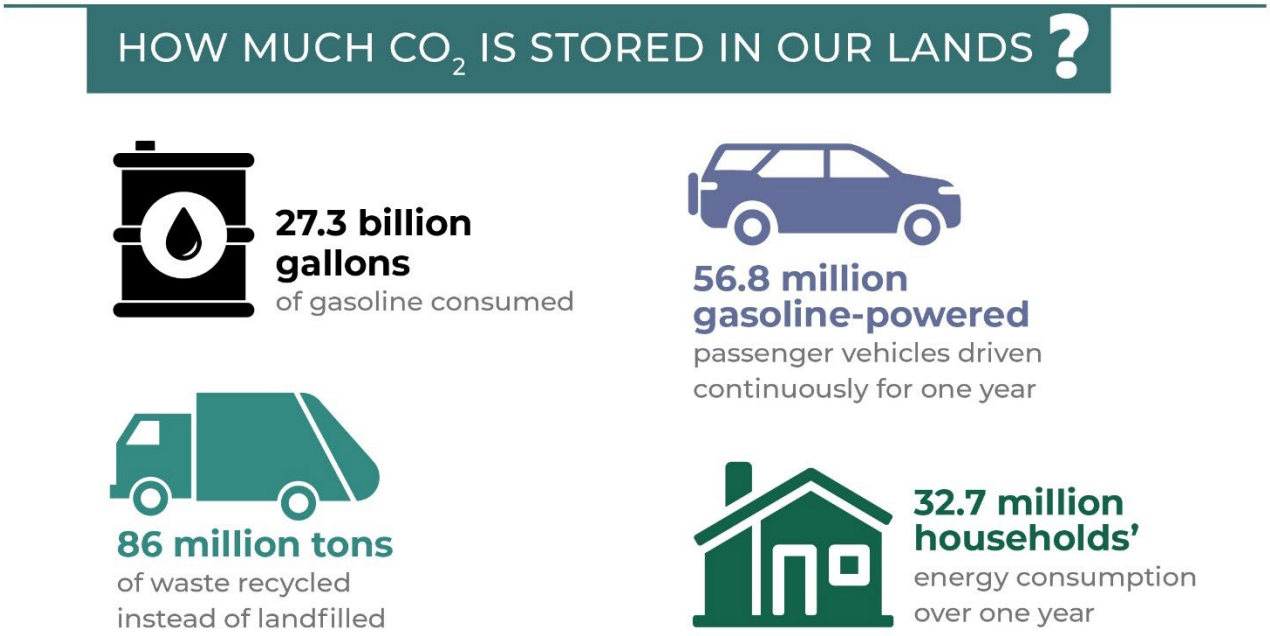
Table 4.1 shows the total acreage and baseline carbon stock in the unincorporated county for the year 2019, including both aboveground and belowground carbon. Figure 4.7 translates the total carbon stock into relatable equivalencies, while Figure 4.8 illustrates the carbon stock distribution across the seven land cover types with the highest totals, highlighting aboveground and belowground carbon for each.

Table 4.1 Estimated Acreage and Carbon Stock in Unincorporated Monterey County in 2019

Land Cover Type	Acres	Belowground Carbon (MMT C)	Aboveground Carbon (MMT C)	Total Carbon (MMT C)
Forest	99,893	2.3	5.6	7.9
Fresh marsh	42,019	0.8	0.7	1.5
Oak woodland	387,919	9.7	3.6	13.3
Developed land	42,643	1.1	0.2	1.4
Cropland	179,415	4.8	0.2	5
Orchards/vineyards	60,122	1.5	0.2	1.7
Shrubland	618,330	10.4	6.8	17.3
Grassland	607,505	16.8	0.9	17.7
Wetland	16,069	0.3	0.1	0.4
Unknown	42	<0.01	0	<0.01
Barren	10,785	0.2	0	0.2
Water	9,415	<0.01	0	<0.01
Total	**2,074,157**	**48**	**18.3**	**66.4**

Notes: MMT C = million metric tons of carbon. Totals may not sum exactly due to independent rounding.

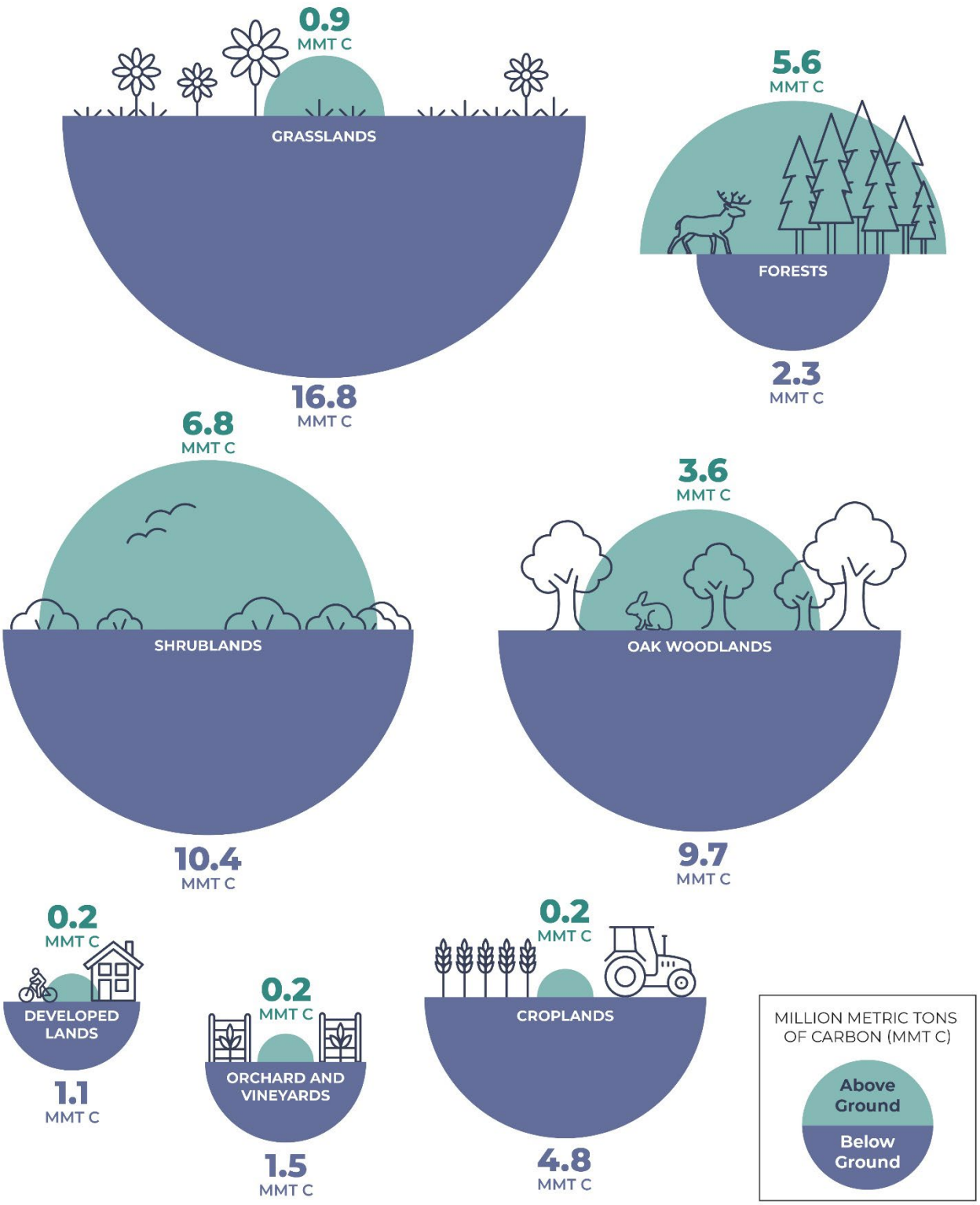
Figure 4.7 Equivalencies of the Carbon Stock in Unincorporated Monterey County in 2019



Source: EPA 2025.



Figure 4.8 Aboveground and Belowground Carbon Stock by Land Cover Type in Unincorporated Monterey County



Carbon Stock Forecasts



Understanding the future of carbon stocks in Monterey County's natural and working lands is crucial for effective climate action planning. To achieve this, the methodology used in the AMBAG Climate Study was applied to forecast carbon stock for unincorporated Monterey County, which is based on the natural and working lands modeling conducted by CARB for the 2022 Scoping Plan. This approach projected potential changes in carbon stock through 2045, providing valuable insights for long-term planning and policy decisions presented in the CCAAP. While locally specific data on climate change impacts on existing carbon stocks is currently limited, these forecasts provide a foundation for understanding future trends. By examining these scenarios, decision-makers can better prepare for possible futures and develop targeted strategies to enhance carbon sequestration in the county's natural and working lands.

The analysis focuses on two forecast scenarios: the business-as-usual (BAU) scenario and the Scoping Plan scenario. The BAU scenario assumes land management practices observed from 2001 through 2014 continue through 2045. This period reflects the most recent carbon stock data available before any new land and crop management actions were taken, making it a strong baseline for conservation and restoration effects on carbon stock. In contrast, the Scoping Plan scenario assumes that land restoration and management activities are prioritized and scaled, resulting in better maintenance of carbon stocks compared to the BAU scenario. These scenarios were used because Monterey County-specific data is currently unavailable to account for the potential impacts of climate change on the existing carbon stock. Table 4.2 shows the scale of land management actions included in the Scoping Plan scenario at both statewide and unincorporated county levels. For more details on the analysis and methodology used to calculate forecasts for both scenarios, refer to Appendix D.

Table 4.2 Scoping Plan Scenario Land Management Actions Prorated to Unincorporated Monterey County

Land Management Actions	Level of Action	
	Statewide	Unincorporated Monterey County
Forest, shrubland, and grassland fuel reduction and restoration	2.34 million acres (total) 325,000 acres per year	35,000 acres per year
Regenerative agriculture and cropland conversion	151,986 acres per year	3,800 acres per year
Urban forest investment	$8.4 billion per year	1,254 trees planted per year
Defensible space establishment in wildland-urban interface	50,000 properties per year	130 properties per year
Wetland restoration	60,000 acres (total)	2,000 acres (total by 2045)
Desert conservation	15,000 acres per year	16 acres per year

FORECAST RESULTS FOR ALL LAND COVERS

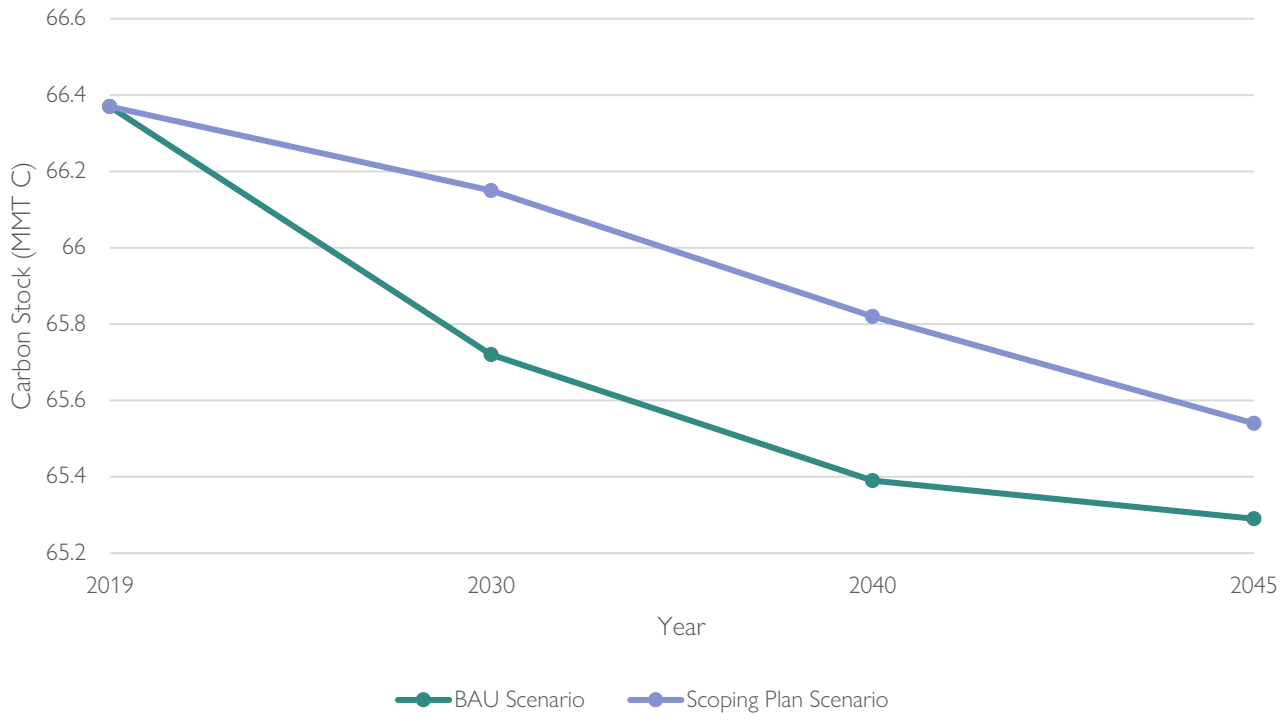
> *What does losing 1.3% of our carbon stock look like?*
>
> It is equivalent to releasing 2.5 times the greenhouse gas emissions generated by unincorporated Monterey County in a single year.

The results of both forecast scenarios with all land covers included show an overall decline in total carbon stored. Figure 4.9 summarizes the trend in carbon stocks in unincorporated Monterey County. From 2019 to 2045, carbon stocks are projected to decrease from approximately 66.4 MMT C to 65.3 MMT C in the BAU scenario, and to 65.5 MMT C in the Scoping Plan scenario. This represents an overall decline of carbon stocks by 1.6 percent and 1.3 percent in the BAU and Scoping Plan scenarios, respectively. While a carbon loss of just over 1.3 percent sounds relatively small, this would be equivalent to about 3 million metric tons of carbon dioxide equivalent released into the atmosphere, 2.5 times the unincorporated county's GHG emissions inventory for 2019.

The total carbon stock losses modeled under the Scoping Plan scenario are less than those under the BAU scenario, which accounts for the benefits of the significant investments to scale up land management activities that promote carbon sequestration under the Scoping Plan scenario. However, not all land cover types show declines over time. Understanding each land cover's forecast provides valuable insight into where efforts should be focused to protect carbon stocks and how climate impacts such as catastrophic wildfires affect various land covers. The following sections evaluate the forecasts of the land covers with the largest amount of stored carbon: forests, oak woodlands, grasslands, shrublands, and croplands, which each tell a different story.

Additional details about management activities, carbon values, and forecasted results can be found in Appendix D.

Figure 4.9 Unincorporated Monterey County Carbon Stock Forecasts under BAU and Scoping Plan Scenarios



Notes: BAU = business-as-usual; MMT C = million metric tons of carbon.

FORESTS AND OAK WOODLANDS



Forests and oak woodlands are among the most iconic and multifunctional landscapes in Monterey County, shaping the county's identity, economy, and ecological resilience. From the redwood forests of Big Sur to the expansive oak woodlands that support grazing, wildlife movement, and scenic open space, these landscapes provide a wide range of benefits. They protect watersheds and water quality, support biodiversity, reduce erosion on steep terrain, and sustain recreation and tourism that are central to local and regional economies. Forests and oak woodlands also hold deep cultural significance, including long-standing tribal stewardship practices that continue to inform land management today.

These benefits are reflected in the carbon stock inventory. In unincorporated Monterey County, forests and oak woodlands together store approximately 21.2 MMT C, representing about one-third of total ecosystem carbon stock. Forests are especially carbon-dense per acre and hold a large share of their carbon aboveground in trees and woody biomass, while oak woodlands store most of their carbon belowground in soils, making them a more durable long-term reservoir. This combination of high carbon density and landscape scale makes forests and oak woodlands essential to the county's overall carbon balance.

The forecast charts indicate that, even with increased investment under the Scoping Plan scenario, carbon stocks in both forests and oak woodlands are expected to decline modestly by 2045, reflecting increasing climate stress, drought, and wildfire risk. Importantly, the Scoping Plan trajectory shows smaller losses than the BAU scenario, indicating that sustained investment in forest health and resilience meaningfully reduces the risk of large carbon losses and ecosystem degradation. In this context, Scoping Plan–level action should be understood as a strategy to protect the many benefits forests and oak woodlands already provide, rather than as a mechanism for large net carbon gains.

CCAAP Actions for Forests and Oak Woodlands

Action NWL-2.1: Funding for a publicly owned forest lands restoration plan; pg. 6-20.

Action NWL-2.2: A local tribe designed Traditional Ecological Knowledge cultural burning program; pg. 6-20.

Action NWL-2.3: Developing a formal framework for native peoples' participation in county climate efforts: pg. 6-20.

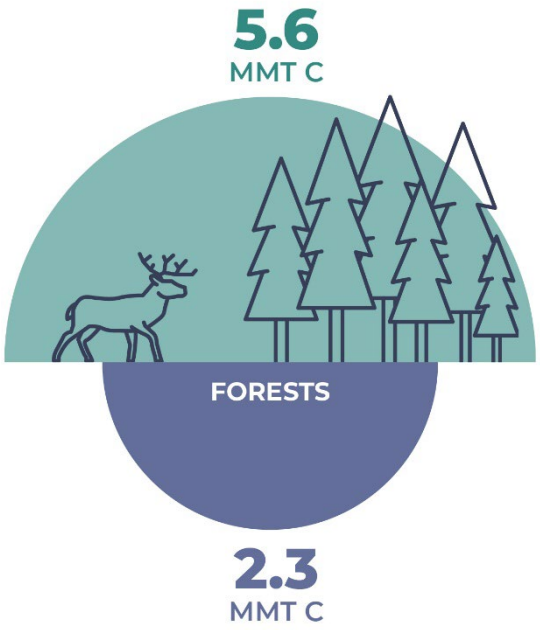
Action NWL-2.4: Funding to implement fuel reduction activities; pg. 6-20.

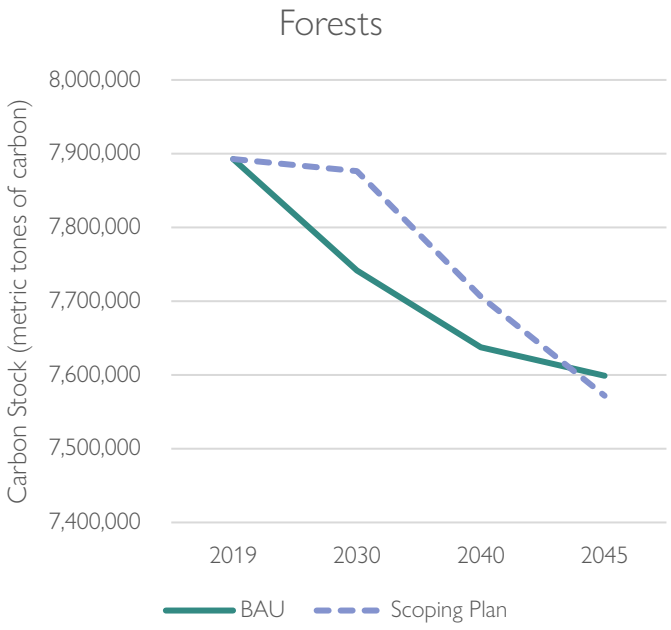
Action NWL-2.5: Coordinate a regional initiative for oak woodland restoration in areas affected by Sudden Oak Death; pg. 6-21.

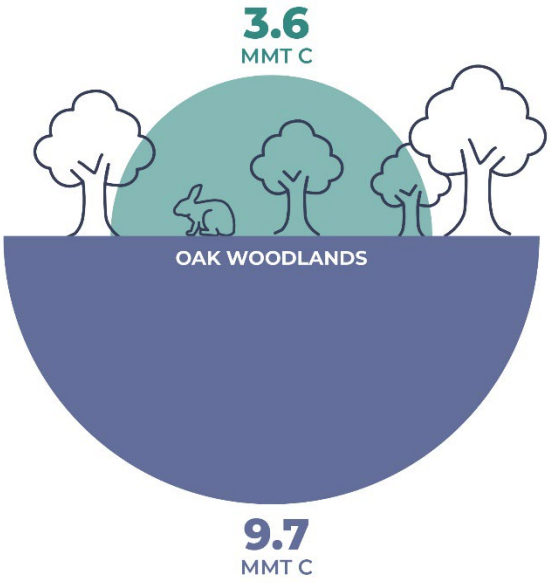
Action NWL-2.6: Establish a coordinated detection and management system focused on protecting forests from pests and diseases; pg. 6-21

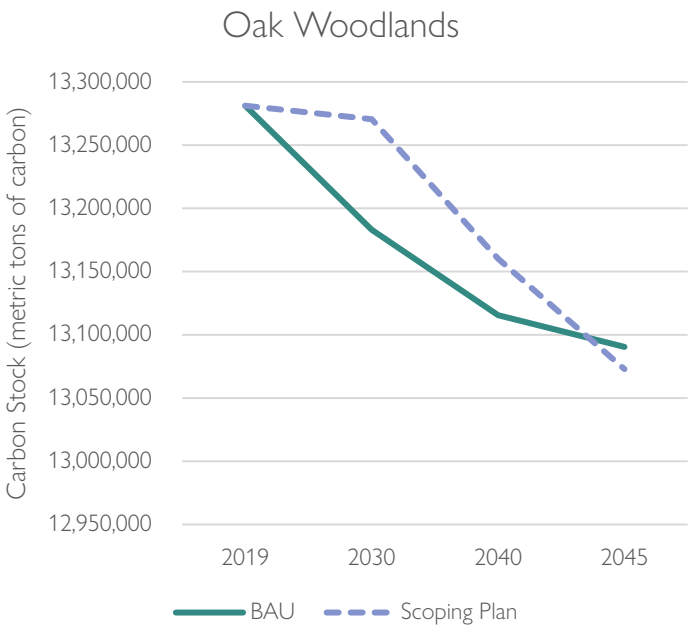
Action NWL-2.7: Sustainable management and utilization of forest biomass generated from fuel reduction and forest health projects; pg. 6-21.

Action NWL-2.8: Updated Monterey County Community Wildfire Protection Plan in partnership with the Fire Safe Council for Monterey County; pg. 6-21









The table that follows identifies locally appropriate forest and oak woodland management practices—such as fuels management, prescribed and cultural burning, and restoration—that are aligned with state climate-smart priorities and designed to maintain ecosystem health, reduce disturbance risk, and safeguard existing carbon stocks and co-benefits over the long term.

Table 4.3 Nature-Based Solutions for Forests and Oak Woodlands

Action	Definition
Prescribed Burning	Pre-planned fire ignited to achieve land management objectives such as reducing catastrophic wildfire risk and improving ecosystem function.
Cultural Burning	Low-intensity, tribally led burning to reduce overstocked vegetation and support cultural resources and land stewardship traditions.
Forest Thinning/ Vegetation Management	Proactive vegetation management (including thinning) to reduce catastrophic wildfire risk and increase resilience; thinning can be paired with prescribed/cultural fire.
Managed Natural Fire	Allowing naturally ignited fire to play an ecological role under controlled conditions to support healthier fire regimes and reduce fuel buildup.
Mastication	Mechanical mowing/chipping of vegetation into smaller pieces to break up fuels and reduce fire spread (ladder fuels) and create defensible areas.
Biological/Chemical Treatments	Vegetation treatments to address weeds, pests, or disease (biological controls or carefully applied chemicals) to support overall forest health.
Clearcutting/Fire Breaks	Targeted clearing (often for fire breaks) to stop or slow wildfire spread; in this context, clearcutting typically refers to strategically located breaks.
Harvesting	Removing trees/biomass when data or objectives indicate harvest; can overlap with thinning; reduces stand density and potential fire spread when designed for forest health outcomes.
Other Mechanical Treatments	Mechanical treatments not described above, such as removing branches and scattering them on the forest floor (a practice called "lop and scatter"), which lowers the risk of fire spreading tree-to-tree.
Post-Wildfire Reforestation	Active reforestation after severe wildfire or where natural regeneration is limited, helping avoid long-term conversion from forest to shrubland and supporting watershed function.
Riparian Forest Protection	Protecting and restoring riparian forests to enhance carbon storage, biodiversity, and wildlife movement corridors, while supporting water and habitat function.
Forest Biomass Utilization	Using woody residues from forest health work for beneficial end uses (including biochar) to support soil health on agricultural lands.

Stories of Sustainability

Little Sur River Conservation Project

The Little Sur River Conservation Project protects one of the Central Coast's most pristine coastal watersheds while returning ancestral lands to the Esselen Tribe of Monterey County. Led by Western Rivers Conservancy, the project has conserved key properties along the Little Sur River and conveyed them to the Tribe for permanent stewardship, restoring Indigenous care of lands that had been disconnected for generations.

Flowing from the Santa Lucia Mountains to the Pacific Ocean, the Little Sur River provides critical habitat for threatened steelhead and other sensitive species. Protecting these lands safeguards water quality, riparian forests, and wildlife habitat while strengthening climate resilience through intact landscapes and natural river processes. By pairing conservation with Tribal land return, the project demonstrates how climate resilience, ecosystem health, and cultural restoration can advance together.

GRASSLANDS



Grasslands are a defining element of unincorporated Monterey County's working landscapes and rural character. These open rangelands support grazing operations, wildlife habitat, water infiltration, and expansive scenic vistas that contribute to the county's identity and sense of place. Grasslands also provide important ecological services by supporting pollinators, reducing erosion, and maintaining large, contiguous open spaces.

From a carbon perspective, grasslands play a uniquely important role because most of their carbon is stored belowground in soils rather than in visible vegetation. The carbon stock inventory shows that grasslands store approximately 17.7 MMT C, accounting for about 27 percent of the unincorporated county's total carbon stock, despite having relatively low aboveground biomass. This soil-based carbon is particularly durable when grasslands remain intact and are managed to maintain soil cover and root systems.

The forecast chart shows that grassland carbon stocks are among the most stable of all land cover types, with the Scoping Plan scenario projecting a slight increase in total carbon by 2045. While the magnitude of this change is modest, it is significant given the scale of grasslands and the durability of soil carbon. The results suggest that sustained investment in climate-smart grazing and soil-health practices can help maintain and incrementally strengthen one of the county's largest and most resilient carbon reservoirs.

CCAAP Actions for Grasslands

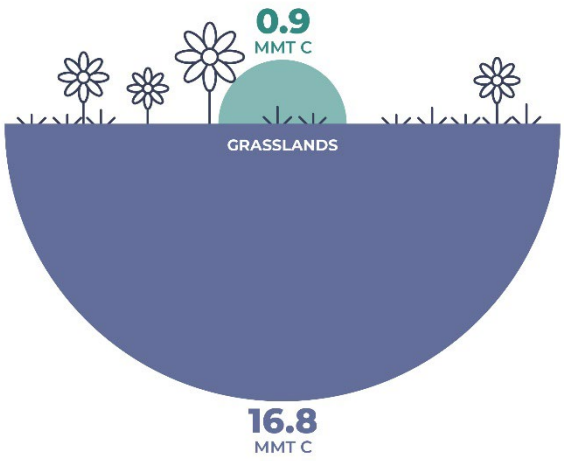
Action NWL-3.1: Develop a countywide healthy soils strategy to improve soil carbon storage, water infiltration, and long-term rangeland resilience through climate-smart agricultural practices; pg. 6-22.

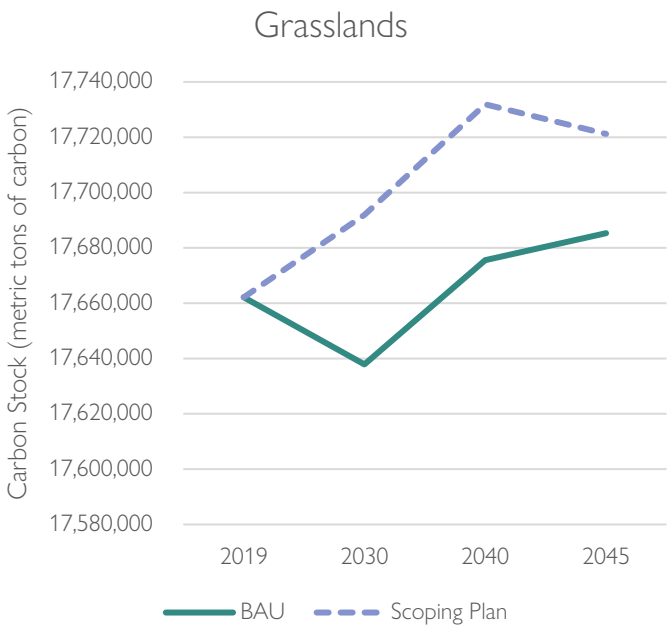
Action NWL-3.2: Provide funding and technical assistance to support the development and implementation of carbon farm plans that increase soil carbon and ecosystem function on grazing lands; pg. 6-22.

Action NWL-3.3: Work with University of California Cooperative Extension and ranchers to improve soil conditions, increase water-holding capacity, and reduce invasive species through improved grazing and pasture management; pg. 6-22.

Action NWL-3.4: Acquire, lease, or establish easements to protect productive grazing lands from conversion, maintaining long-term soil carbon stocks and open space; pg. 6-22.

Action NWL-3.5: Support funding and implementation of fuel reduction activities, including prescribed burning, where appropriate on grasslands to reduce wildfire risk and protect soil carbon; pg. 6-20.





The land management actions summarized in the table below reflect this role. They focus on rangeland stewardship and soil health strategies that maintain grassland productivity and ecological function while supporting the long-term stability shown in the Scoping Plan forecast.

Table 4.4 Nature-Based Solutions for Grasslands

Action	Definition
Grazing Management	Managing where/when livestock graze to allow grasses to "rest," maintain soil cover, reduce erosion, and support long-lived vegetation and soil carbon.
Silvopasture	Integrating trees with pastureland to improve nutrient cycling and reduce erosion while maintaining working lands productivity.
Compost Application	Applying compost to grazed or degraded grasslands to enhance soil carbon, improve vegetation, and support water quality/availability.
Native Grassland Restoration	Establishing deep-rooted, high-quality grasses and restoring native grasslands to improve carbon storage, biodiversity, and connectivity.
Riparian Restoration in Rangelands	Restoring riparian functions (often via planting and soil/erosion measures) to improve water quality, habitat, and ecosystem function in grazing landscapes.
Grassland Conservation	Protecting grasslands from conversion to development or more intensive land uses to maintain soil carbon and ecosystem services.

SHRUBLANDS



Shrublands, including chaparral and coastal scrub communities, are a dominant feature of Monterey County's hillsides, interior ranges, and coastal bluffs. These landscapes are foundational to the county's biodiversity, supporting plant and animal species adapted to wildfire and drought, and they contribute strongly to scenic quality and outdoor recreation opportunities. Shrublands also play an important role in stabilizing soils, supporting watershed functions, and maintaining ecological connectivity across rugged terrain.

The carbon stock inventory highlights the significance of shrublands as a major component of the county's carbon landscape. Shrublands store approximately 17.3 MMT C, representing about 26 percent of total carbon stock in unincorporated Monterey County. Unlike grasslands, shrublands store carbon in both aboveground woody vegetation and belowground soils, which increases their total contribution but also makes them more vulnerable to disturbance-driven carbon losses.

Forecast results indicate that shrubland carbon stocks are expected to decline over time, even under the Scoping Plan scenario, reflecting heightened sensitivity to wildfire and climate stress. However, the Scoping Plan trajectory shows reduced losses compared to BAU, suggesting that strategic investments in land management can slow degradation and avoid permanent carbon loss. In practical terms, these results emphasize the importance of protecting shrublands from conversion and managing fire risk in ways that maintain ecosystem integrity.

CCAAP Actions for Shrublands

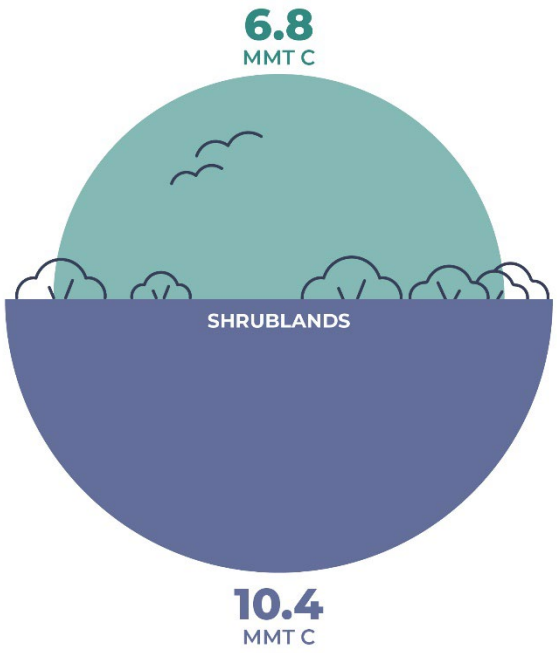
Action NWL-2.4: Seek funding and support implementation of fuel reduction activities, including prescribed burning, to reduce wildfire severity and long-term carbon loss in shrubland systems; pg. 6-20.

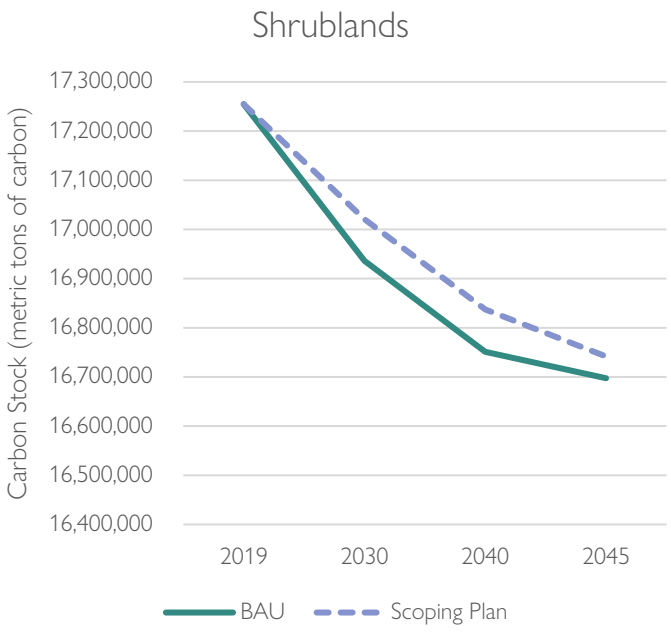
Action NWL-2.2: Work with local tribes to design and implement a Traditional Ecological Knowledge–based cultural burning program to restore fire-adapted shrubland ecosystems and reduce catastrophic wildfire risk; pg. 6-20.

Action NWL-2.3: Develop a formal framework for Native peoples' participation in County climate and land stewardship efforts, supporting culturally informed shrubland management; pg. 6-20.

Action NWL-2.6: Establish a coordinated detection and management system to protect shrublands and adjacent ecosystems from pests and disease that can exacerbate carbon loss following disturbance; pg. 6-21.

Action NWL-2.8: Update the Monterey County Community Wildfire Protection Plan in partnership with the Fire Safe Council to reduce wildfire risk across shrubland-dominated landscapes; pg. 6-21.





The table below outlines shrubland-appropriate management practices that align with this interpretation of the forecast—prioritizing avoided conversion, targeted fuels management, and restoration to reduce long-term carbon loss while maintaining the multiple ecosystem services shrublands provide.

Table 4.5 Nature-Based Solutions for Shrublands

Action	Definition
Shrubland Conservation	Preventing development and land cover conversion to avoid permanent carbon loss and maintain habitat connectivity and resilience.
Shrubland Restoration	Restoring degraded shrublands to increase connectivity, enhance resilience, and maintain carbon on the landscape.
Buffer Zones	Managing vegetation near communities and transportation/utility corridors to reduce wildfire risk while protecting ecological health.
Managed Grazing	Targeted grazing used as a carbon-neutral fuels management approach to maintain fuel breaks and manage transition zones.
Prescribed Burning	Pre-planned fire to reduce fuel loads and lower catastrophic wildfire risk (used where appropriate for shrubland ecology and safety).
Cultural Burning	Tribally led low-intensity fire that supports ecological goals and cultural resource stewardship.
Mastication	Chipping/mowing to reduce ladder fuels and break up fuel continuity to slow wildfire spread.
Invasive Species Removal	Removing invasive vegetation and restoring habitat to support biodiversity, nutrient cycling, and conditions that support stable carbon storage.

CROPLANDS, ORCHARDS, AND VINEYARDS



Agricultural lands are central to Monterey County's economy, global significance, and community identity. The Salinas Valley and surrounding agricultural regions are among the most productive in the world, supporting food security, local employment, and a strong network of farming and processing businesses. These working landscapes also contribute cultural value and scenic character while offering opportunities to integrate climate solutions into productive land use.

In unincorporated Monterey County, croplands store approximately 5 MMT C, while orchards and vineyards store about 1.7 MMT C. Although these totals are smaller than those of grasslands or shrublands, agricultural carbon is largely stored belowground in soils, where management practices can actively influence carbon levels. This makes agricultural lands one of the few land cover types where carbon stocks can be intentionally increased while maintaining economic productivity.

The forecast charts reflect this opportunity. Under the Scoping Plan scenario, croplands show stabilization and modest increases in carbon stocks through 2045, indicating that the assumed level of investment in climate-smart agricultural practices is sufficient to change long-term trends. Orchards and vineyards show increases under both scenarios, reflecting the durability of perennial woody biomass. Together, these results suggest that agricultural lands are a key area where investment can reinforce both climate mitigation and economic resilience.

CCAAP Actions for Croplands, Orchards, and Vineyards

Action NWL-3.1: Developing a healthy soils strategy for Monterey County; pg. 6-22.

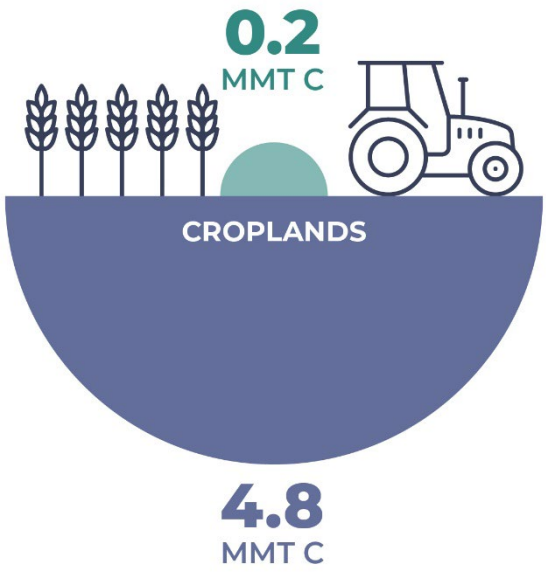
Action NWL-3.2: Funding and providing technical assistance to Monterey County carbon farm plans; pg. 6-22.

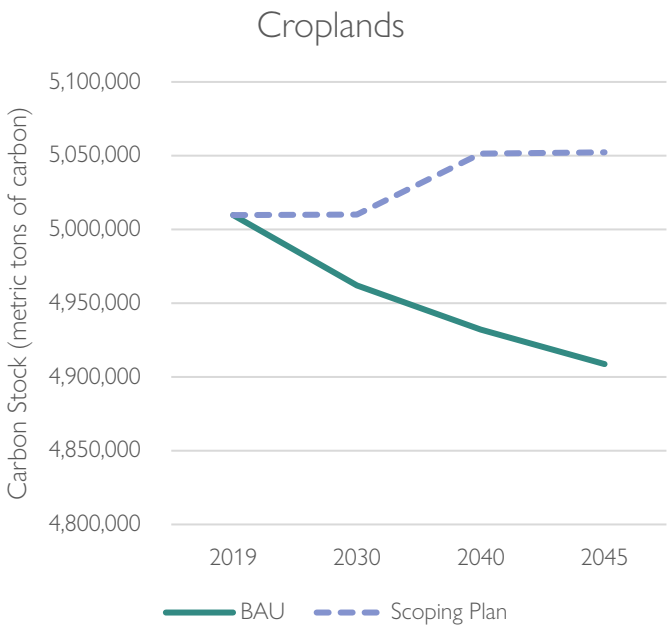
Action NWL-3.3: Improve soil conditions, water holding capacity, and minimize weed invasions with UCCE and ranchers; pg. 6-22.

Action NWL-3.4: Acquire, lease, or establish easements to protect productive agricultural or grazing lands; pg. 6-22.

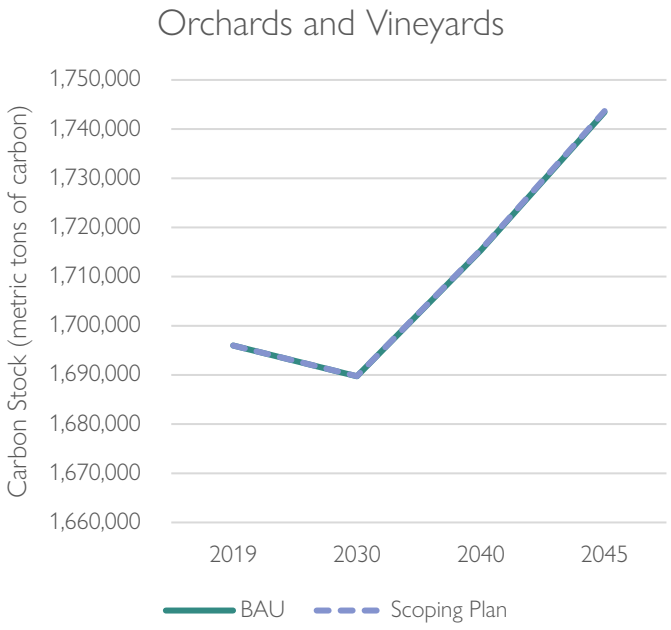
Action NWL-3.5: Reduce fertilizer application consistent with Ag Order 4.0; pg. 6-22.











The table that follows presents locally relevant agricultural management practices—drawn from state climate-smart strategies and regional experience—that support soil health, protect working lands from conversion, and align with the trajectories shown in the Scoping Plan forecast.

Table 4.6 Nature-Based Solutions for Croplands, Orchards, and Vineyards

Action	Definition
Compost/Biochar Amendment	Adding compost or biochar to improve soil organic matter and microbial activity, supporting plant growth and soil carbon retention.
Transition to Organic Farming	Shifts to soil-health-supporting practices (e.g., rotations, reduced tillage, natural pest control) that can improve resilience and soil carbon outcomes.
Cover Crops	Crops grown to cover soil (not harvested for sale) to reduce erosion and support beneficial soil organisms, improving soil health and carbon storage.
Reduced Tillage	Reducing soil disturbance to avoid releasing soil carbon to the atmosphere and maintain soil structure and biology.
Hedgerows/ Windbreaks/ Shelterbelts	Linear plantings that reduce wind erosion and carbon loss and can support habitat and beneficial insects.
Cropland Conservation	Protecting productive agricultural lands from conversion to development to avoid soil disturbance and associated emissions.
Riparian Forest Buffers	Planting trees between crops and waterways helps control runoff of nutrients, pesticides, and animal waste. It also stabilizes the soil.
Retain Crop Residue	Keeping crop residues on fields to protect soils and contribute organic matter that supports soil carbon storage.
Integrated Pest Management	Pest management that leverages natural pest-predator dynamics and reduces reliance on harmful pesticides, supporting above- and belowground biodiversity.
Grass Filter Strips	Vegetated strips that reduce erosion and intercept runoff, supporting soil stability and water quality.
Whole Orchard Recycling/Mulching	Managing orchard biomass in ways that return organic material to soils and support circular economy approaches.
Repurpose Retired/Fallowed Cropland	Converting retired lands to uses that provide environmental benefits (e.g., carbon storage, habitat, reduced dust, floodwater capture).

Stories of Sustainability

Biochar Pilot Project

ReGen Monterey has partnered with the Sitos Group, a California-based clean technology startup, to produce biochar from agricultural and forestry waste. Oasis Vineyard, managed by Monterey Pacific, Inc., is located in the Salinas Valley. The soils are sandy and irrigation needs are high. Like much of California in recent years, the vineyard has experienced prolonged drought periods, and the owners wanted to see if biochar could save water and not adversely impact grape quality.

In 2016, an 8-acre biochar field trial was established to evaluate how biochar and compost treatments impact soil water potential, vine growth and harvest yields. Treatments included a control (no compost, no biochar), compost (15 tons compost, no biochar), biochar (no compost, 10 tons biochar) and biochar and compost (15 tons compost, 10 tons biochar). Each ½ acre plot was replicated four times. The biochar cost $200 per ton and was purchased from Pacific Biochar Benefit Corporation. The amendment treatments were trenched directly into the prepared planting row prior to planting Pinot Noir vines.

The first three years of the trial found significant increases in yield, with the biochar treatment resulting in more than 40 percent increase over the control. The compost and biochar treatments produced an average of more than 30 percent yield increase over the control. Compared to compost alone, biochar plus compost treatments improved water use efficiency, vine growth and harvest yields (number of clusters). Biochar treatments showed no adverse impacts on wine quality as quantified by grape sugar content, color and flavor. A 2019 progress report showed that the return on investment from adding the biochar was paid off with increased yields at the first harvest (additional revenue of $2,600 per acre in the first two producing years), with higher profit expected for the life of the vines. The trial found that about 2.5 metric tons of CO_2 was sequestered per dry ton of biochar applied to the field.



Source: Sitos Group.

DEVELOPED LANDS

Developed lands are where Monterey County residents live, work, and gather, and they strongly influence quality of life, public health, and climate exposure. In unincorporated areas, developed lands include residential communities, transportation corridors, and commercial areas, as well as parks, street trees, and community green spaces. While these areas have lower overall carbon storage than natural or working lands, they offer critical opportunities to deliver climate benefits directly to people.

One of the most significant climate impacts in developed areas is the urban heat island effect—the tendency for developed landscapes to be warmer than surrounding natural or rural areas, particularly during evening and nighttime hours. Buildings, roads, and other impervious surfaces absorb and retain heat more efficiently than vegetation, while the relative absence of tree canopy and open soil reduces cooling from shade and evapotranspiration. As illustrated in Figure 4.10, temperatures are typically higher in more intensively developed areas than in less disturbed landscapes, increasing energy demand for cooling and elevating health risks during extreme heat events, particularly for older adults, outdoor workers, and households without adequate cooling.

CCAAP Actions for Developed Lands

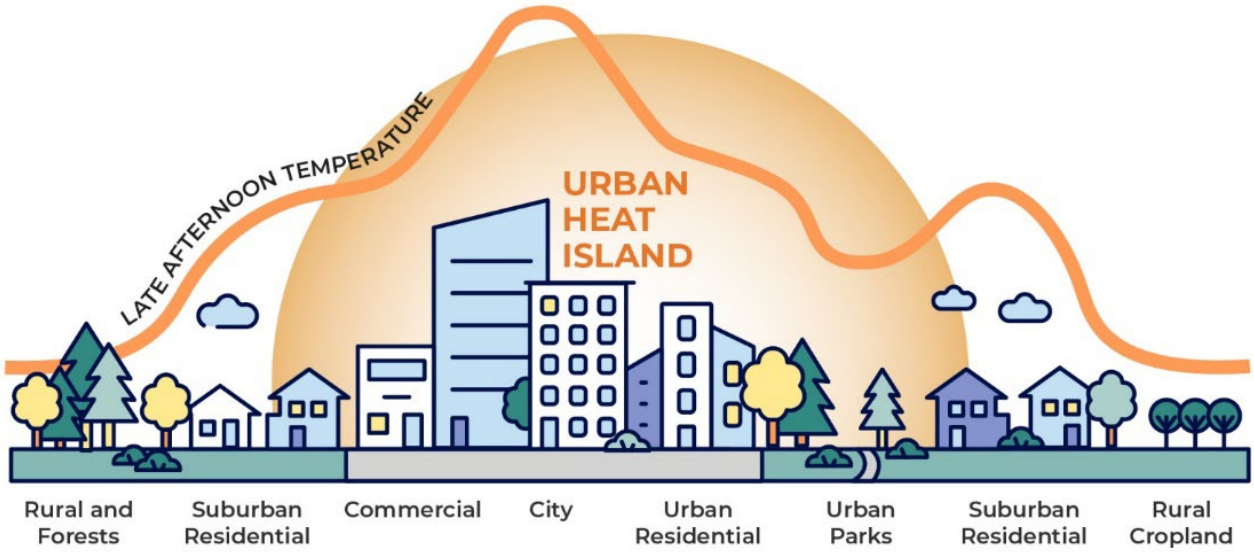
Action NWL-4.1: Seek funding to prepare community-specific forest management plans focused on expanding tree canopy in residential and non-residential areas to reduce urban heat and increase carbon storage; pg. 6-23.

Action NWL-4.2: Fund and implement an urban greening program to expand tree canopy, plant native and drought-tolerant vegetation, and establish community green spaces, with a focus on climate-vulnerable communities; pg. 6-23.

Action NWL-4.3: Develop a countywide tree adoption program that engages residents and businesses in planting and maintaining trees in public spaces; pg. 6-23.

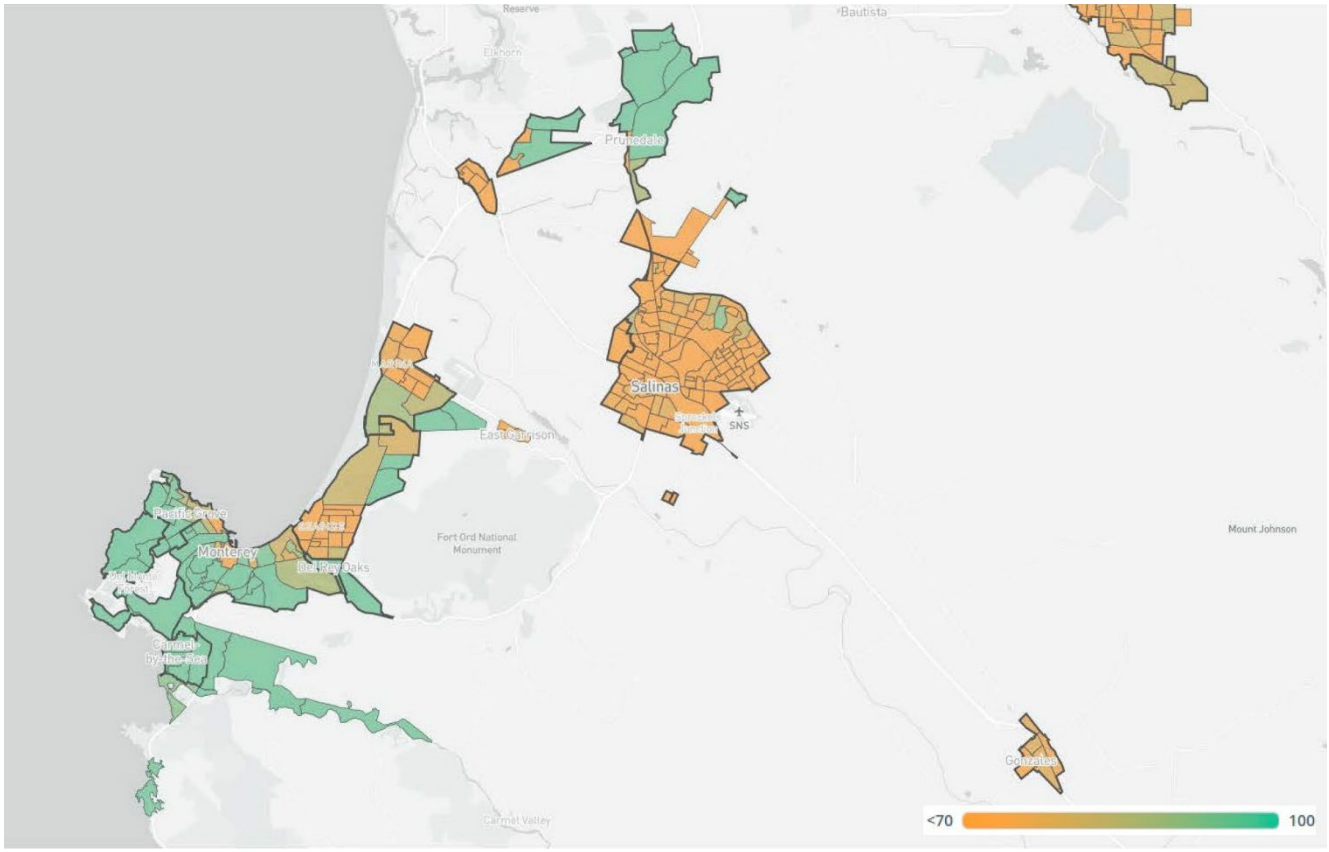
Action NWL-4.5: Identify and incorporate green infrastructure opportunities into stormwater and roadway capital improvement projects to reduce heat, manage runoff, and enhance urban ecosystem function; pg. 6-23.

Figure 4.10 Urban Heat Island Effect



Urban vegetation plays an important role in counteracting these effects. Trees and other green infrastructure reduce ambient temperatures through shading and evapotranspiration, improve air quality, manage stormwater, and provide social and psychological benefits associated with access to green space. These benefits are not always distributed equitably. The Tree Equity Score, developed by American Forests, provides a spatial framework for evaluating how tree canopy distribution aligns with climate exposure, population vulnerability, and socioeconomic factors. As shown in Figure 4.11, Tree Equity Scores are currently available only for urban census-defined areas, which limits coverage in unincorporated Monterey County; however, the available data indicate clear disparities. Census block groups near Salinas, Seaside, and East Garrison show lower scores—indicating a higher priority for tree planting—while areas near the Monterey Peninsula and Prunedale show higher scores, reflecting greater existing canopy cover. These patterns highlight opportunities to target urban greening investments where they can deliver the greatest equity and health benefits.

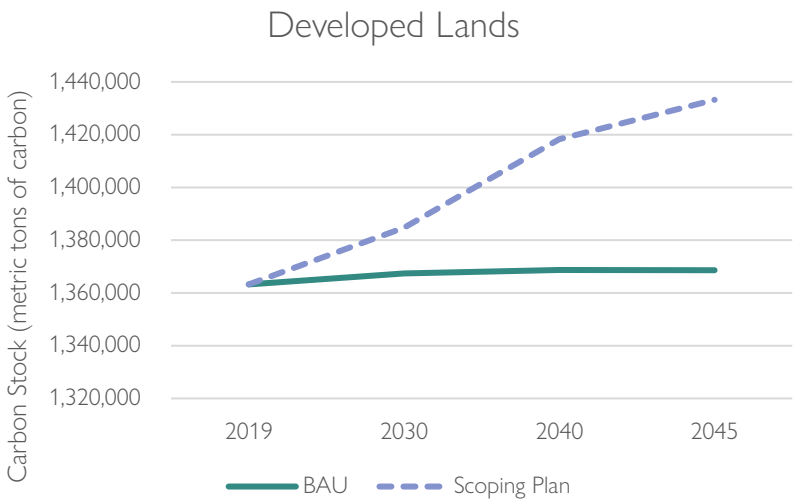
Figure 4.11 Monterey County Tree Equity Score



Source: American Forests 2025.

From a carbon perspective, developed lands store approximately 1.4 MMT C, representing about 2 percent of total carbon stock in unincorporated Monterey County. Most of this carbon is stored below ground in soils, with a smaller portion held in urban trees and vegetation. While this share is modest compared to other land cover types, the carbon forecast shows that developed lands are one of the few categories where carbon stocks increase meaningfully under the Scoping Plan scenario, reflecting sustained investment in urban trees and green infrastructure. By 2045, the Scoping Plan scenario shows higher carbon stocks than the BAU trajectory, underscoring the role that urban greening plays in both mitigation and adaptation.





The table below outlines developed-land management practices—such as urban forestry, stormwater green infrastructure, and community greening—that align with these forecasted trends and support the multiple benefits these landscapes provide.

Table 4.7 Nature-Based Solutions for Developed Lands

Action	Definition
Urban Forest Investment	Expanding and maintaining tree canopy and green space to increase carbon storage and reduce energy needed for cooling.
Wildland-Urban Interface Defensible Space	Involves removing fuel and making structures more fire-resistant in parcels at risk of wildfire (i.e., lands that are situated between wildfire-prone natural lands and areas of development). This reduces the risk of property destruction and spreading wildfire.
Green Schoolyards	Converting school grounds into shaded, vegetated spaces that reduce heat and increase green cover and community benefits.
Tree-Shaded Sidewalks/Bike Lanes	Street-tree planting and shade infrastructure that reduce urban heat and improve comfort for active transportation.
Raingardens/Bioswales/ Bioretention	Vegetated stormwater features that slow and treat runoff, improving water quality and adding green space.
Community Composting	Composting programs that reduce waste and support soil health in urban landscapes and gardens.
Community Gardens	Local food production and green space that can build soil health, improve access to nature, and strengthen community resilience.
Drought-Tolerant/ Native Landscaping	Replacing turf and water-intensive landscaping with locally appropriate, climate-adapted vegetation; can include mulch/compost use.
Recycled Water for Landscaping	Using recycled water where feasible to sustain urban trees and parks under drought conditions.
Wildland-Urban Interface Defensible Space	Removing fuels and improving structural fire resistance in high-risk areas between development and wildlands to reduce wildfire impacts.

WETLANDS AND WATER



Wetlands, riparian corridors, and other water-associated ecosystems are among Monterey County's most valuable natural systems despite their limited geographic extent. Areas such as coastal marshes, estuarine systems, and river floodplains provide essential benefits, including flood protection, water quality improvement, habitat for fish and birds, and recreational opportunities that support tourism and community well-being. Wetlands also play a critical role in climate adaptation by buffering communities from flooding and sea-level rise.

Although wetlands occupy relatively little land area, they store carbon very efficiently. The inventory estimates that fresh marshes and wetlands together store about 1.9 MMT C, much of it belowground in saturated soils where carbon can persist for long periods. Because these systems can release carbon rapidly if degraded or converted, their protection is disproportionately important for maintaining long-term carbon stocks.



CCAAP Actions for Wetlands and Water

Action NWL-1.1: Support restoration of degraded coastal wetlands and salt marshes in priority areas (e.g., Elkhorn Slough) to enhance carbon sequestration, habitat, and climate resilience; pg. 6-19.

Action NWL-1.2: Support development of a regional approach to aquatic and blue carbon sequestration in the Monterey Bay in collaboration with regional partners; pg. 6-19.

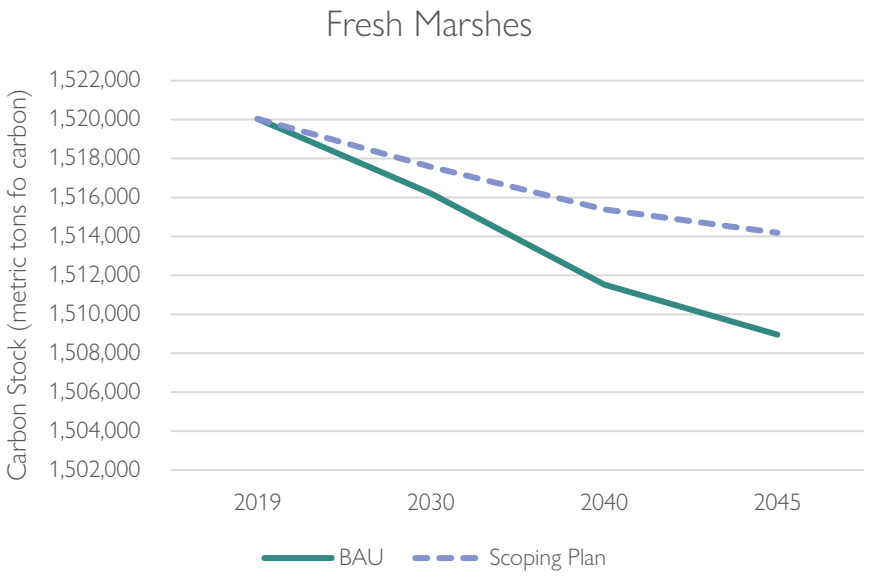
Action NWL-1.3: Continue implementation of the Salinas River Stream Management Program to enhance riparian corridors and watershed function; pg. 6-19.

Action NWL-1.4: Protect and preserve existing intact wetland and riparian habitats consistent with the Monterey County Regional Conservation Investment Strategy; pg. 6-19.

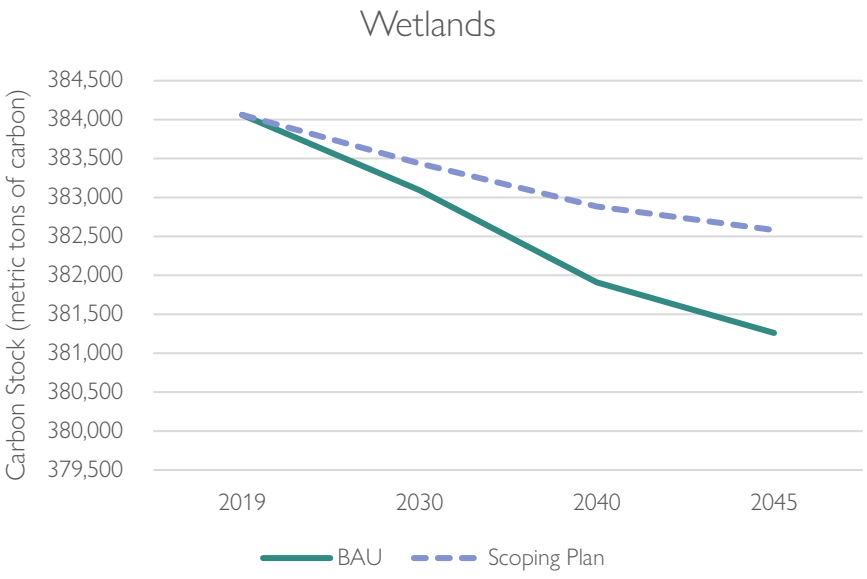
Action ADPT-4.2: Expand floodplain restoration in the Salinas River watershed to improve natural flood mitigation, water quality, and ecosystem resilience; pg. 6-32.

Forecast results show slight declines under both scenarios, but with reduced losses under the Scoping Plan Scenario, indicating that restoration and protection efforts help slow carbon loss and maintain ecosystem function. In this context, Scoping Plan investments act primarily as risk-avoidance and protection strategies, ensuring that high-value wetland systems continue to deliver multiple benefits into the future.









The table below summarizes wetland and water-related management actions—such as wetland restoration, riparian restoration, and habitat protection—that align with state climate-smart priorities and the stabilizing role suggested by the forecast.

Table 4.8 Nature-Based Solutions for Wetlands and Water

Action	Definition
Riparian Forest Buffers	Planting trees between croplands and waterways to reduce runoff, stabilize banks, and support soil/vegetation carbon.
Riparian Restoration	Re-establishing riparian functions via planting and soil amendments (e.g., compost/mulch) to restore ecosystem function.
Wetland Restoration	Re-planting wetland vegetation or re-flooding subsided areas to increase soil carbon storage and reduce methane emissions under certain conditions.
Habitat Restoration and Invasive Species Removal	Removing invasives and restoring habitat to support biodiversity and ecosystem function that sustains carbon storage.
Living Shorelines	Using natural materials and vegetation to stabilize shorelines, protect wetlands, improve water quality, and provide habitat while supporting carbon storage.
Coastal Wetland Enhancement	Restoring/enhancing coastal wetlands and conserving inland migration space so wetlands can persist as sea levels rise.
Constructed Wetlands	Nature-based water treatment systems that can provide habitat and recreation/education opportunities while supporting ecosystem function.

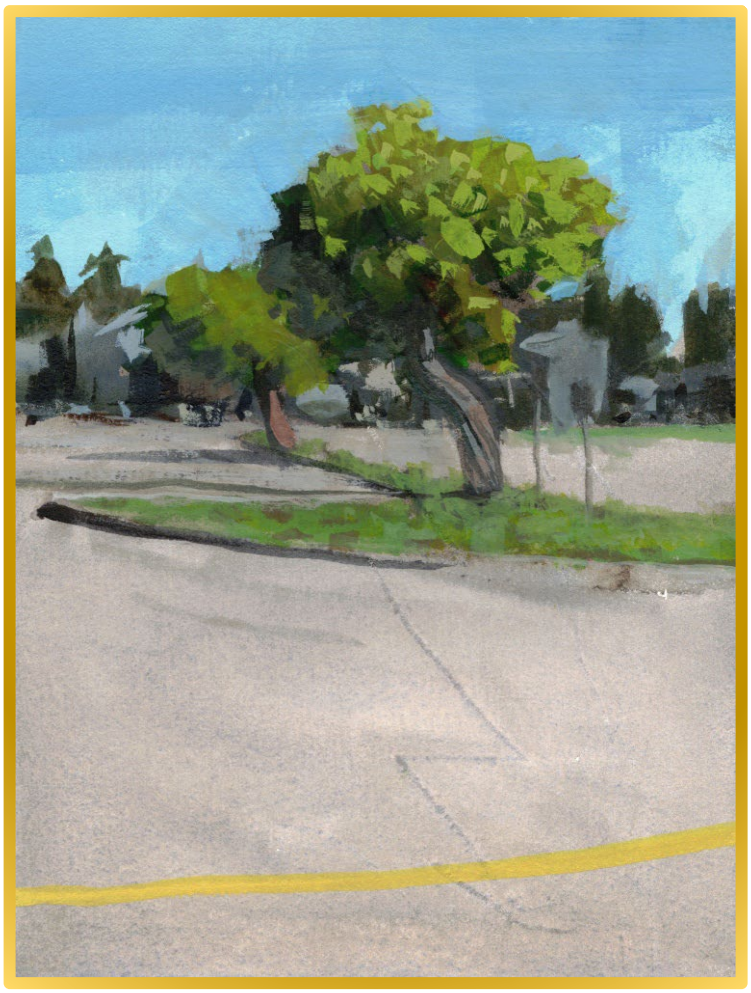
Stories of Sustainability

Carmel River FREE Project

The Carmel River FREE Project—Floodplain Restoration and Environmental Enhancement—is a landmark nature-based solution led by Big Sur Land Trust in partnership with the County of Monterey. The project restores the lower Carmel River's historic floodplain, allowing high flows to safely spread across the landscape instead of flooding nearby homes and businesses.

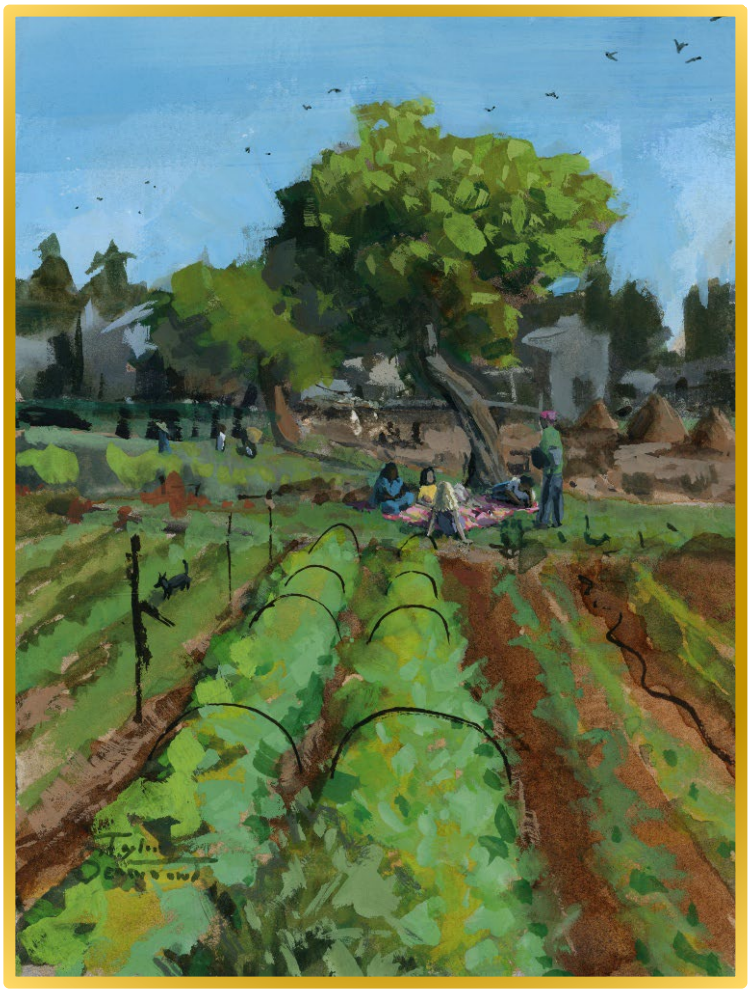
By reconnecting wetlands and riparian habitat, the project reduces flood risk while improving water quality, groundwater recharge, and habitat for fish and wildlife. As climate change brings more intense storms, Carmel River FREE shows how restoring natural systems can protect communities and strengthen long-term resilience—working with the river rather than against it.

Seacliff Community Garden



Present: The sparsely used upper parking lot at Seacliff State Beach. The concrete inhibits groundwater recharge, prevents carbon sequestration, and increases the likelihood of flooding.

Painted *en plein air*.



Future: Seacliff residents have replaced the parking lot with a community permaculture garden and composting center. In an unstable climate, the garden promotes community resilience and happiness, in addition to **absorbing excess carbon and water**. Abundant public transit has made sprawling parking lots obsolete.



CHAPTER 5. Climate Adaptation and Resilience

This chapter describes the context of climate change adaptation and resilience for Monterey County. It outlines the climate change adaptation planning process; summarizes the county's exposure to existing climate change effects, sensitivity to these effects and potential climate-related impacts, and the County's existing adaptive capacity to address these impacts. This chapter serves as a summary of Monterey County's Climate Change Vulnerability Assessment (VA), which was developed in preparation for the Monterey County Community Climate Action and Adaptation Plan (CCAAP). The VA, which includes additional information, data, and methodologies, can be found in Appendix B.

Note that in this chapter, "County" (capitalized) refers to the County of Monterey as a local government agency, while "county" (lowercase) refers to the entire geographic area of the unincorporated Monterey County.

Climate adaptation is action taken to prepare communities for and respond to the impacts of climate change.

Climate resilience is the ability to anticipate, prepare for, and respond to hazardous events, trends, or disturbances related to climate.

OVERVIEW

Climate change impacts are already occurring at global, regional, and local scales and will continue to intensify in Monterey County. The primary effects of climate change evaluated in the VA include increased temperatures, changes in precipitation patterns, and sea level rise. These primary climate change effects are projected to amplify risks from secondary climate change impacts, including wildfires, extreme heat events, extreme precipitation and flooding, and drought. While these climate change impacts have historically occurred across the county and surrounding regions, their frequency, intensity, and/or duration will increase due to climate change.

The impact of these climate change effects will vary across the county due to differences in physical, social, and economic characteristics.



While it remains imperative that global greenhouse gas (GHG) emissions be reduced to combat climate change, it is equally important for communities to prepare for the impacts of climate change and improve resilience through adaptation planning. Regional and local efforts are essential in building climate resilience—the capacity of a community to prepare for disruptions, recover from shocks and stresses, and adapt and grow from a disruptive experience related to climate-related challenges. These efforts can lead to a greater understanding of localized climate change effects and a better sense of strategies to minimize their impacts. In many instances, there are already plans, policies, and programs in place at the local and regional levels that address existing climate change effects. Sometimes these may be sufficient enough to address existing climate change effects. In other cases, significant gaps may exist, and therefore, new and revised plans, policies, and programs will be needed. This CCAAP aims to identify and address those gaps.

Adaptation Planning Process

The adaptation planning process aims to strengthen community resilience to climate change impacts. A resilient community is one that is prepared for current and future climate change effects and can minimize disruption when these impacts occur. Resilient communities can recover from climate change effects more quickly and rebuild in ways that enhance their future adaptive capacity.

To assist local governments with adaptation planning, the California Governor's Office of Emergency Services (Cal OES) developed the California Adaptation Planning Guide (APG), which provides communities with vulnerability assessment and adaptation planning guidance. Last updated in June 2020, the APG includes a step-by-step process that communities may use to help plan for the impacts of climate change. The APG provides a framework for communities to identify potential climate change effects and important physical, social, and natural assets (e.g. critical facilities, disadvantaged communities, critical habitats); create adaptation strategies to address the impacts of climate change effects; and develop a monitoring and implementation framework for climate change adaptation. The APG served as the primary guidance document for preparing the adaptation components of this CCAAP (Cal OES 2020).

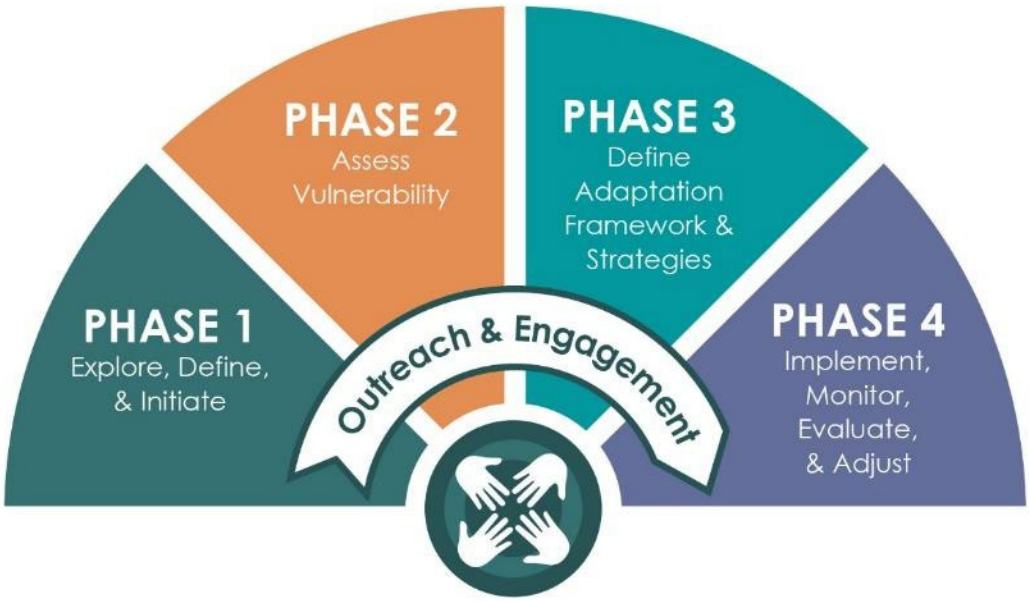
The APG includes a four-phase process, illustrated in Figure 5.1, which allows communities to assess their specific climate vulnerabilities and informs strategies for communities to reduce risk and prepare for current and future impacts of climate change effects.

- Phase 1, "Explore, Define, and Initiate," includes scoping and defining the adaptation planning effort. This involves identifying key interested parties, potential climate change effects, and important populations and assets in the community.

- **Phase 2, "Assess Vulnerability,"** includes an analysis of the potential impacts and adaptive capacity associated with climate change effects to determine the vulnerability of populations and community assets. The vulnerability assessment is composed of four steps: exposure, sensitivity and potential impacts, adaptive capacity, and vulnerability scoring.
- **Phase 3, "Define Adaptation Framework and Strategies,"** focuses on developing adaptation strategies to address the risks posed by climate change effects based on the results of the vulnerability assessment.
- In **Phase 4, "Implement, Monitor, Evaluate, and Adjust,"** the adaptation framework is implemented, consistently monitored and evaluated, and adjusted based on continual learning, feedback, or triggers.

The following sections provide an overview and summary of the County's VA, which was used to develop adaptation and resilience strategies for the CCAAP, presented in Chapter 6.

Figure 5.1 Adaptation Planning Process



Source: Cal OES 2020.

Vulnerability Assessment Process

The County's VA provides a comprehensive analysis of community vulnerabilities to climate change. It identifies and characterizes projected climate change effects that are anticipated to impact the community. Following Phase 2 of the APG, the VA identifies and characterizes projected climate impacts and addresses four key questions:

- **Exposure:** what climate change effects will the county experience?
- **Sensitivity and Potential Impacts:** what aspects of the community (i.e., populations, built environment, community functions) will be affected? How will climate change affect the points of sensitivity?
- **Adaptive Capacity:** what is currently being done and what ability does the County have to address the impacts?
- **Vulnerability Scoring:** how vulnerable is the county to each climate change effect?

The VA was conducted according to APG guidance using the steps outlined above. For the exposure analysis, potential climate impacts were assessed using Cal-Adapt—a climate modeling tool developed by the California Energy Commission and the University of California, Berkeley that uses downscaled global climate model data. Two future emissions scenarios, known as Representative Concentration Pathways (RCPs), were used in the VA: the RCP 8.5 scenario, which represents a higher GHG emissions scenario, and the RCP 4.5 scenario, which represents a lower GHG emissions scenario. The geographic boundary of the county was used as the study area for this analysis of climate change effects. However, because there are significant variations between coastal areas and inland areas of the county in terms of temperature and precipitation, the specific analyses related to temperature and precipitation also include two representative areas of the unincorporated county to display these variations: 1) Big Sur Census Tract 6053011502 (coastal), which encompasses Big Sur and other nearby coastal areas, and 2) San Ardo (inland). It should be noted that the data presented for Big Sur Census Tract 6053011502 and San Ardo are specific to their boundaries and are not meant to be applied broadly to coastal and inland areas of the county, but rather, to serve as a general example as to how differences in temperature and precipitation might vary between coastal and inland areas. Other coastal and inland boundaries in the county might display slightly different data, but the general nature of the data is representative.



Climate change effects were evaluated for changes to occur by near term (current–2050), midterm (2040–2069), and long term (2070–2099) timescales. The exposure analysis evaluated three primary climate change effects or direct impacts of climate changes: increased temperatures, changes in precipitation patterns, and sea level rise. Secondary climate change effects, which can result from indirect effects that result from primary effects, can include public health issues, increased wildfire risk, ecosystem disruptions, and economic loss.

In addition to Cal-Adapt, several existing resources were reviewed to obtain information about the impacts of climate change effects. Data from *California's Fourth Climate Change Assessment* (LCI et al. 2018a) and the *Central Coast Region Report* (LCI et al. 2018b), along with additional resources (see Appendix B), were reviewed to assess the various potential climate change effects and associated impacts within the county. The climate impacts identified in these resources aligned with projections from the Cal-Adapt modeling tool.

SUMMARY OF CLIMATE CHANGE EFFECTS

The VA was prepared to help the County identify the most urgent climate vulnerabilities in the community that should be prioritized during the adaptation strategy development process. The results also informed the prioritization of the strategy implementation. The full VA, including detailed data, additional information, and references, can be found in Appendix B.

Exposure and Sensitivity Analysis Summary

The following sections summarize the projected exposures and their impact on the county's populations, built environment, and community functions. Populations include residents, visitors, and segments of the population that are particularly vulnerable to climate change effects, such as children, pregnant people, the elderly, communities of color, linguistically isolated communities, individuals experiencing homelessness, low-income individuals, individuals with access and functional needs, workers in vulnerable occupations, and those with preexisting health issues, among others.

Three primary factors contribute to wildfire behavior: topography, fuel, and weather.

The built environment consists of a set of assets that are essential to the health and welfare of residents and visitors, particularly during and after climate change-related effects. This ranges from residential and commercial buildings to an array of critical infrastructure, including, but not limited to, essential facilities (e.g., fire stations, medical facilities, schools), transportation infrastructure (e.g., roadways, bridges, railroads), and utility infrastructure (e.g., energy, communications, water and wastewater).

Community functions are the resources, assets, operations, economic sectors, and services that are created or influenced by the interaction between populations and the built environment. These functions are essential to public health and welfare, enabling day-to-day activities to continue in the county. Priority community functions include agriculture, livestock, and forestry; tourism and recreation; transportation and mobility; essential services (e.g., grocery stores); ecological functions; emergency services; and energy delivery and other utility (e.g., communications) operations.

INCREASED WILDFIRE RISK

Historically, wildfire is a frequent occurrence within the Central Coast region, including in the county (LCI et al. 2018b). Climate change is expected to increase wildfire risk, as it will create conditions more favorable for wildfire ignition and spread (e.g., increased temperatures, prolonged droughts, drier fuels). Table 5.1 compares historical data along with future projections of the average annual area burned by wildfire in the county. As shown, the county is expected to see an increase of 3,000 to 5,000-acres across all timescales compared to the historical baseline of 21,392 average annual acres burned (CEC 2022d).

Table 5.1 Changes in Average Annual Area Burned

Annual Averages	Modeled[1] Historical (1961-1990)	Near Term[2] (Current-2050)	Midterm[2] (2040-2069)	Long Term (2070-2099)	
				RCP 4.5	RCP 8.5
Monterey County					
Area Burned and Change from Historical (acres)	21,392	25,332 (+3,940)	25,891 (+4,499)	25,780 (+4,388)	24,720 (+3,328)

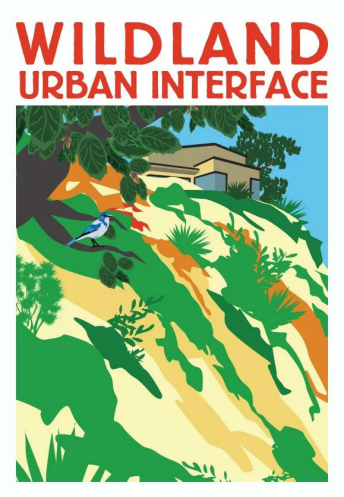
Note: RCP = Representative Concentration Pathway.

[1] Observed historical average annual area burned data were not available from Cal-Adapt; the modeled historical average annual area burned data under RCP 4.5 was available and used as proxy data.

[2] Projections for the near term and midterm timescales are based on RCP 8.5.

Source: CEC 2022d.

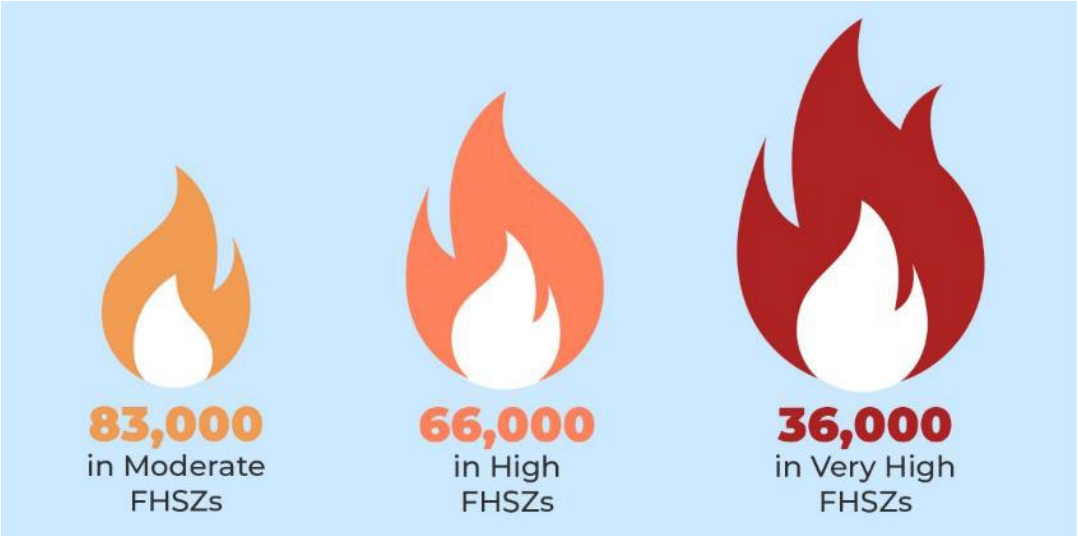
The wildland urban interface (WUI) is the area where human development and undeveloped wildland meet and is a common area that experiences wildfires.



Source: Theodore Payne Foundation for Wild Flowers & Native Plants.

Climate change is increasing wildfire risks that can severely affect populations, the built environment, and community functions, both directly and indirectly. In overlapping areas of the wildland-urban interface (WUI) in the county, where dense vegetation borders development, CAL FIRE has designated "Moderate," "High," and "Very High"). There are approximately 185,000 unincorporated county residents residing within these fire hazard severity zones (FHSZs) that are at risk of being directly affected by wildfire—almost 83,000 within the "Moderate" FHSZ, almost 66,000 within the "High" FHSZ, and almost 36,000 within the "Very High" FHSZ (County of Monterey 2022a), as shown in Figure 5.2. Direct exposure to wildfires can lead to burns resulting in severe injuries or death. In addition to the potential impacts associated with direct exposure to wildfires, smoke and air pollution also create severe heath hazards for popualtions. Wildfires can create hazardous conditions for populations even after they are suppressed. Most notably, destructive debris flows triggered by intense precipitation are one of the most dangerous post-fire hazards, and the risk of debris flows is directly correlated with the degree of vegetation loss and soil exposure after a wildfire (USGS 2018). Overall, the entire population of the county is vulnerable to the impacts of wildfire. However, vulnerable populations, such as children, the elderly, pregnant people, low-income populations, linguistically isolated populations, people with cardiovascular disease, those working in specific occupations (e.g., first responders, agricultural workers), and those living in isolated locations, among others, are at greater risk of the adverse impacts associated with wildfires (EPA 2021; County of Monterey 2022b).

Figure 5.2 Number of County Residents in Fire Hazard Severity Zones



Note: FHSZ = fire hazard severity zone.

Regarding the built environment, thousands of residential structures in the county lie within a "Moderate," "High," or "Very High" FHSZ with an estimated total value of over $26 billion (County of Monterey 2022a). Much of the county's critical infrastructure also lies within FHSZs, including fire stations, medical facilities, schools, water and wastewater facilities, and government facilities, among others (County of Monterey 2022b). Critical infrastructure such as wood frame transmissions poles are especially vulnerable during wildfire events, which can affect energy production and distribution through loss of efficiency, generating capacity, and disruption or destruction of power lines (CDPH 2017). Wildfires may also impact transportation infrastructure in the county. While roads, roadways, and bridges themselves typically sustain minimal to moderate damage during wildfire events, except in extreme scenarios, wildfires can create conditions that promote the obstruction of these assets through fallen trees, downed power lines, and other debris (County of Monterey 2022b). This is particularly concerning for residents who are isolated from the rest of the county. In addition to the obstruction of these assets, the cracking and degradation of pavement due to sustained heat exposure is another risk related to wildfires.

There is an estimated total value of over $26 billion in residential structures that lie within Monterey County's Fire Hazard Severity Zones.

The increased risk of wildfire through the end of the century has the potential to impact or disrupt an array of the county's community functions. In anticipation of heightened wildfire risk, the Pacific Gas and Electric Company (PG&E) may shut off power to electrical grids to reduce the chance of accidental fire ignition in high fire threat areas, which are known as Public Safety Power Shutoff (PSPS) events. While PSPS events are meant to prevent the ignition of potentially widespread, devastating wildfires, vulnerable populations without alternate power options (e.g., low-income individuals) may be adversely impacted by these shut offs. Additionally, wildfire-induced loss of power affecting fire stations, police stations, and emergency dispatch and medical services, not necessarily due to a planned PSPS event, could negatively impact emergency dispatching, communications, and response capabilities, especially when coupled with evacuation-related traffic congestion (County of Monterey 2019). Wildfires can also cause severe economic impacts on the county, most notably on the county's prominent tourism and agricultural sectors.

INCREASED TEMPERATURES AND EXTREME HEAT

In Monterey County, the average annual maximum temperature is projected to rise between 4.8 and 7.5 °F by the end of the century, depending on GHG emissions generated globally, with the average annual minimum temperature following a similar trend. Both coastal and inland areas of the county are projected to see an increase in average annual maximum and minimum temperature. For example, Big Sur Census Tract 6053011502, which serves as a coastal representation, is expected to have between a 4.6 and 7.2 °F increase in average annual maximum temperature by the end of the century from its historical baseline temperature of 63.9 °F. Additionally, San Ardo, which serves as an inland representation, is expected to see an increase between 5.4 and 8.1 °F in average annual maximum temperature by the end of the century from its historical baseline temperature of 77.2 °F (CEC 2022a). Though Big Sur Census Tract 6053011502 and San Ardo have similar projected increases in temperature, their historical baseline temperatures are very different, so San Ardo has been and will continue to be significantly warmer than Big Sur Census Tract 6053011502. This can be applied more broadly to inland and coastal areas of the county. Table 5.2 displays historical data and future projections for increased temperatures across each timescale in Big Sur Census Tract 6053011502 and San Ardo, along with Monterey County as a whole. Figure 5.3 shows the changes in annual average maximum temperature in the county.

Table 5.2 Changes in Average Annual Temperature

Annual Averages	Historical (1961-1990)	Near Term[1] (Current-2050)	Midterm[1] (2040-2069)	Long Term (2070-2099)	
				RCP 4.5	RCP 8.5
Monterey County					
Maximum Temperature and Change from Historical (°F)	70.1	73.1 (+3.0)	74.9 (+4.8)	74.9 (+4.8)	77.6 (+7.5)
Minimum Temperature and Change from Historical (°F)	41.5	44.7 (+3.2)	46.3 (+4.8)	46.3 (+4.8)	49.3 (+7.8)
Big Sur Census Tract 6053011502 (Coastal Representation)[2]					
Maximum Temperature and Change from Historical (°F)	63.9	66.8 (+2.9)	68.4 (+4.5)	68.5 (+4.6)	71.1 (+7.2)
Minimum Temperature and Change from Historical (°F)	40.0	42.9 (+2.9)	44.3 (+4.3)	44.4 (+4.4)	47.4 (+7.4)
San Ardo (Inland Representation)[3]					
Maximum Temperature and Change from Historical (°F)	77.2	80.8 (+3.6)	82.6 (+5.4)	82.6 (+5.4)	85.3 (+8.1)
Minimum Temperature and Change from Historical (°F)	44.2	47.6 (+3.4)	49.1 (+4.9)	49.0 (+4.8)	52.0 (+7.8)

Notes: °F = degrees Fahrenheit; RCP = Representative Concentration Pathway.

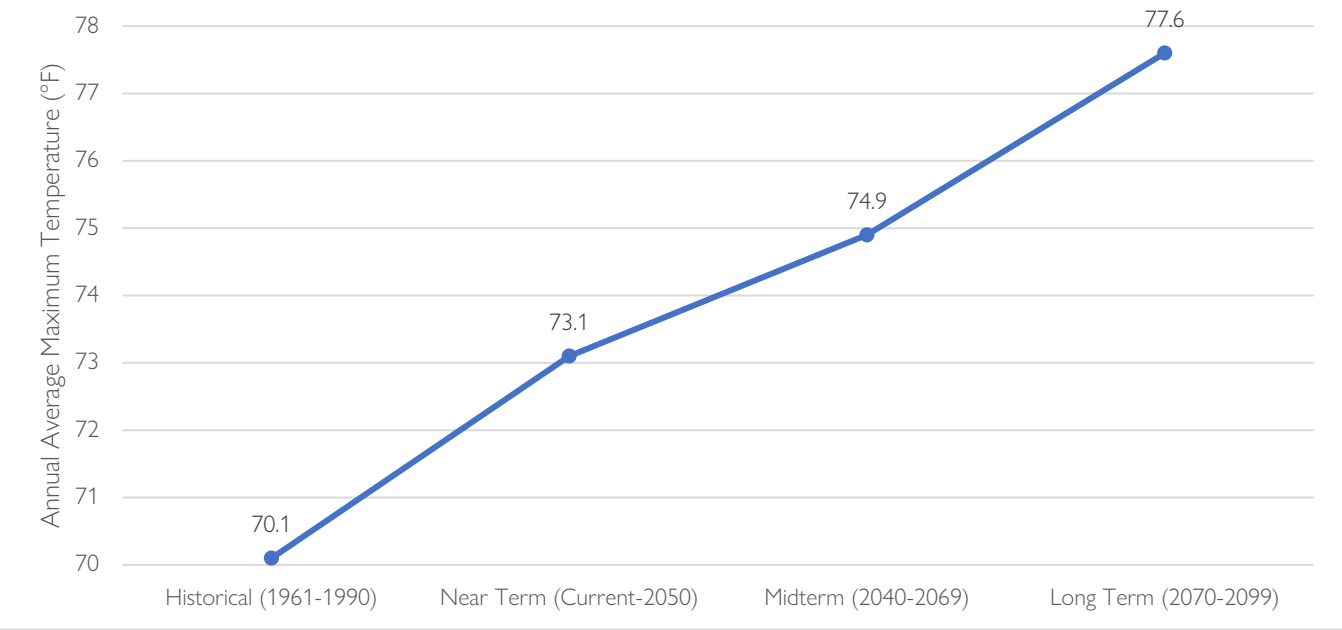
1 Projections for the near term and midterm timescales are based on RCP 8.5.

2 Though data for Big Sur Census Tract 6053011502 are meant to serve as a representation for coastal areas across the county, actual data for other coastal areas may vary.

3 Though data for San Ardo are meant to serve as a representation for inland areas across the county, actual data for other inland areas may vary.

Source: CEC 2022a.

Figure 5.3 Changes in Annual Average Maximum Temperature (°F) in Monterey County



Notes: °F = degrees Fahrenheit; RCP = Representative Concentration Pathway. Projections for the near term and midterm timescales are based on RCP 8.5.

Source: CEC 2022a.

Increased temperatures, a primary climate change effect, will lead to increases in extreme heat events, a secondary climate change effect. Extreme heat events refer to the number of extreme heat days, heat waves, and the number of days in the longest stretch of consecutive extreme heat days, which are all projected to increase substantially through the end of the century. For the county as a whole, an extreme heat day is defined as a day when the maximum temperature exceeds the extreme heat threshold of 92.5 °F. However, this threshold is unique to every location, and the more localized locations of Census Tract 6053011502 and San Ardo have lower and higher extreme heat thresholds, respectively. Heat waves refer to a period of four or more consecutive extreme heat days, based on the extreme heat threshold for the area being analyzed. Table 5.3 displays historical data and future projections for extreme heat events across each timescale through the end of the century for Big Sur Census Tract 6053011502, San Ardo, and the county, along with their associated extreme heat thresholds (CEC 2022b). Figure 5.4 shows the changes in annual number of extreme heat days in Monterey County.

Table 5.3 Changes in Extreme Heat Events

Annual Averages	Historical (1961-1990)	Near Term[1] (Current-2050)	Midterm[1] (2040-2069)	Long Term (2070-2099)	
				RCP 4.5	RCP 8.5
Monterey County / Extreme Heat Threshold = 92.5 °F					
Number of Extreme Heat Days	4.4	13.2	19.6	19.4	35.4
Number of Heat Waves[2]	0.1	1.2	2.4	2.3	5.1
Number of Days in Longest Stretch of Consecutive Extreme Heat Days	2.1	4.5	6.1	5.8	10.0
Big Sur Census Tract 6053011502 (Coastal Representation)[3] / Extreme Heat Threshold = 86.5 °F					
Number of Extreme Heat Days	4.4	7.4	11.0	11.3	20.3
Number of Heat Waves[2]	0.2	0.5	0.8	0.8	2.0
Number of Days in Longest Stretch of Consecutive Extreme Heat Days	2.3	3.1	3.9	3.7	5.8
San Ardo (Inland Representation)[4] / Extreme Heat Threshold = 104.3 °F					
Number of Extreme Heat Days	4.3	12.9	20.2	19.4	34.5
Number of Heat Waves[2]	0.2	1.2	2.4	2.1	5.0
Number of Days in Longest Stretch of Consecutive Extreme Heat Days	2.1	4.5	6.3	5.7	9.9

Notes: °F = degrees Fahrenheit; RCP = Representative Concentration Pathway.

1 Projections for the near term and midterm timescales are based on RCP 8.5.

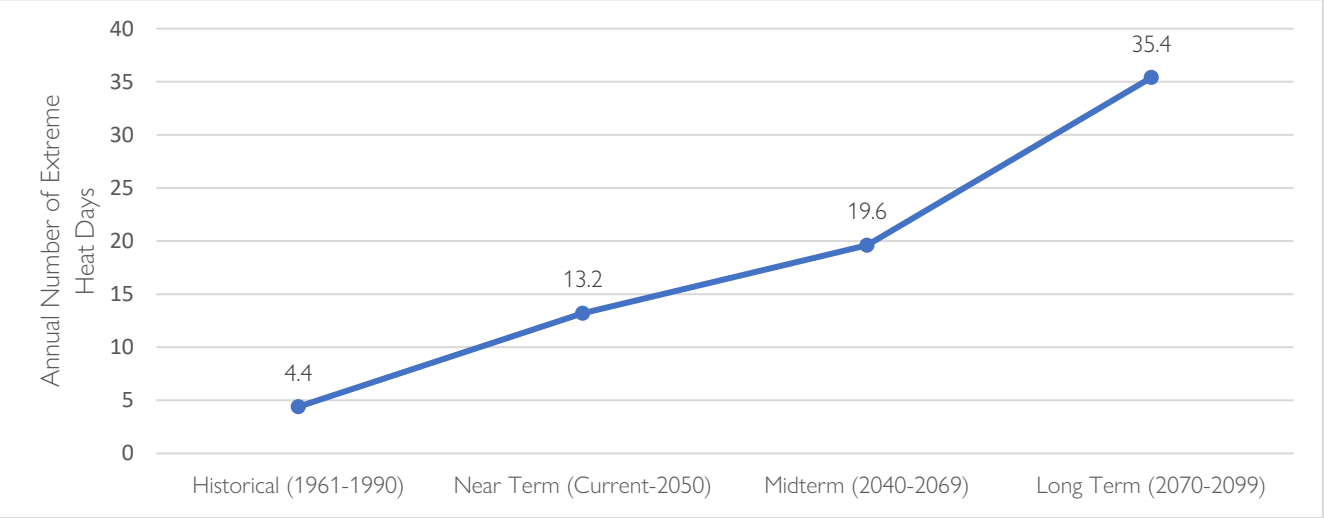
2 A heat wave is characterized as a period of sustained extreme heat and is defined by Cal-Adapt as four or more consecutive extreme heat days.

3 Though data for Big Sur Census Tract 6053011502 are meant to serve as a representation for coastal areas across the county, actual data for other coastal areas may vary.

4 Though data for San Ardo are meant to serve as a representation for inland areas across the county, actual data for other inland areas may vary.

Source: CEC 2022b.

Figure 5.4 Changes in Annual Number of Extreme Heat Days[1] in Monterey County



Notes: °F = degrees Fahrenheit; RCP = Representative Concentration Pathway. Projections displayed in this figure are based on RCP 8.5.

[1] The extreme heat threshold for Monterey County is 86.5 °F.

Source: CEC 2022b.

Coastal areas of the county are typically much cooler than inland areas. Because of that, their extreme heat thresholds are also lower.

Increased temperatures and extreme heat exacerbated by climate change are among the primary health concerns in the county. The entire population of the county will be exposed to increased temperatures and extreme heat, and the potential impacts associated with it may be more pronounced for low-income, historically disadvantaged, and other vulnerable communities. Increased temperatures that manifest in sustained periods of extreme heat can directly impact the county's populations through heat stroke and other heat-related illnesses of varying severity. This can increase the risk of cardiovascular disease, respiratory disease, kidney failure, and preterm births, and can exacerbate other pre-existing conditions in vulnerable populations (CDPH 2017; LAO 2022). These conditions are especially worrisome for those who have poor housing insulation and ventilation, lack of air conditioning, and limited access to healthcare, among other barriers. Increased temperatures and extreme heat may also heighten allergies and intensify the photochemical reactions that produce smog, ground-level ozone, and fine particulate matter ($PM_{2.5}$), which can be detrimental to human health (CDPH 2017). Additionally, people who work long hours outdoors, such as those working in the county's prominent agricultural sector and transportation maintenance, among others, are at heightened risk from increased temperatures and extreme heat (Caltrans 2019; LCI et al. 2018b). Though adjusted schedules (e.g., early mornings, late nights) can potentially reduce exposure to increased temperatures and extreme heat for those who work outdoors, these adjustments may result in sacrifices in other areas for these individuals (e.g., spending time with family).

Increased temperatures and extreme heat events are likely to affect the county's built environment primarily through changes in energy use (e.g., increased cooling costs), and will have disproportionate impacts on individuals residing in units without air conditioning. Transportation systems will also be affected, as transportation infrastructure is designed and constructed to withstand specific variabilities in weather and temperature based on historical climate trends for each climate region. The performance of transportation infrastructure may begin to decline when the severity of extreme heat periods exceeds historical ranges. For example, extreme heat could cause pavement discontinuities and deformation, increase the risk of buckling in highways and railroad tracks, and cause premature deterioration of transportation infrastructure, thereby decreasing transportation safety and creating higher maintenance costs (Caltrans 2019; LCI et al. 2018b).

Community functions may also be at risk from increased temperatures and extreme heat. Similar to and interconnected with increased wildfire risk, increased temperatures and extreme heat can trigger a PSPS event by PG&E, which can adversely affect vulnerable populations without alternate power options and potentially disrupt emergency dispatching, communications, and response capabilities (County of Monterey 2019). Agriculture in the county could be significantly impacted by extreme heat, especially when coupled with drought. Higher temperatures can lead to increased evaporation rates of surface water and increased evapotranspiration in plants, resulting in decreased soil moisture content and increased irrigation demands. Warmer temperatures may increase algae growth in the Carmel and Salinas rivers, as well as in the Nacimiento and San Antonio reservoirs. Low water levels in rivers and reservoirs, combined with the presence of algae, can interrupt water delivery services during peak demand, affecting the ability of water agencies to provide a reliable supply of healthy, clean drinking water, or lead to increases in groundwater pumping that further exacerbates groundwater overdraft. Overdrafting could lead to increased seawater intrusion, which, in turn, would further degrade water quality (MPWMD 2019). Furthermore, because large portions of the county have historically temperate climates, increased temperatures and extreme heat may require residents, schools, businesses, and other entities to consider installing air conditioning systems and remodeling outdoor facilities (e.g., playgrounds) with more heat-resistant materials, though there may be funding and affordability barriers in doing so (LAO 2022).

EXTREME PRECIPITATION AND FLOODING

In Monterey County, average annual precipitation is projected to rise between 1.9 and 5.1 inches by the end of the century depending on GHG emissions. Both coastal and inland areas of the county are projected to see an increase in average annual precipitation. For example, Big Sur Census Tract 6053011502, which serves as a coastal representation, is expected to have between a 2.5 and 7.8-inch increase in average annual precipitation by the end of the century from its historical baseline of 33.3 inches. Additionally, San Ardo, which serves as an inland representation, is expected to see an increase between 0.4 and 2.5 inches in average annual precipitation by the end of the century from its historical baseline of 11.8 inches (CEC 2022a). Though Big Sur Census Tract 6053011502 and San Ardo are both projected to see increases in precipitation, Big Sur Census Tract 6053011502 is expected to have a greater increase, which is notable because its historical baseline is already over 20 inches higher than the historical baseline for San Ardo. These findings are consistent with the fact that coastal areas of the county, in general, have historically received more precipitation than inland areas, a trend that will continue to intensify in the future. Table 5.4 displays historical data and future projections for increased precipitation across each timescale in Big Sur Census Tract 6053011502 and San Ardo, along with the county as a whole.

Stories of Sustainability

Pajaro River Widening Project

The Pajaro River Widening Project is a major flood-risk-reduction effort designed to protect the Pajaro Valley community while restoring more natural river function. Led by the Pajaro Regional Flood Management Agency, the project widens sections of the Pajaro River to increase flood capacity and reduce the chance of catastrophic levee failure during major storm events.

By giving the river more room to safely convey floodwaters, the project lowers flood risk for homes, farms, and critical infrastructure while supporting habitat, sediment transport, and long-term climate resilience. As storms become more intense with climate change, the Pajaro River Widening Project demonstrates how large-scale infrastructure improvements can work hand-in-hand with natural river processes to protect communities and landscapes.

Table 5.4 Changes in Average Annual Precipitation

Annual Averages	Historical (1961-1990)	Near Term[1] (Current-2050)	Midterm[1] (2040-2069)	Long Term (2070-2099)	
				RCP 4.5	RCP 8.5
Monterey County					
Precipitation and Change from Historical (inches)	19.3	21.8 (+2.5)	21.4 (+2.1)	21.2 (+1.9)	24.4 (+5.1)
Big Sur Census Tract 6053011502 (Coastal Representation)[2]					
Precipitation and Change from Historical (inches)	33.3	36.1 (+2.8)	36.0 (+2.7)	35.8 (+2.5)	41.1 (+7.8)
San Ardo (Inland Representation)[3]					
Precipitation and Change from Historical (inches)	11.8	12.8 (+1.0)	12.4 (+0.6)	12.2 (+0.4)	14.3 (+2.5)

Note: RCP = Representative Concentration Pathway.

1 Projections for the near term and midterm timescales are based on RCP 8.5.

2 Though data for Big Sur Census Tract 6053011502 are meant to serve as a representation for coastal areas across the county, actual data for other coastal areas may vary.

3 Though data for San Ardo are meant to serve as a representation for inland areas across the county, actual data for other inland areas may vary.

Source: CEC 2022a.

Changes in precipitation patterns, a primary climate change effect, will lead to changes in extreme precipitation events, a secondary climate change effect. Consistent with the projected increase in average annual precipitation in the county, the number of annual extreme precipitation events is also projected to rise. For the region, the threshold for an extreme precipitation event is 1.1 inches over a two-day period. However, similar to extreme heat thresholds, extreme precipitation thresholds are unique to every location, and the more localized areas of Big Sur Census Tract 6053011502 and San Ardo have higher and lower extreme precipitation thresholds, respectively. Table 5.5 displays historical data and future projections for extreme precipitation events across each timescale through the end of the century for Big Sur Census Tract 6053011502, San Ardo, and the entire county with their associated extreme precipitation thresholds (CEC 2022c).

Coastal areas of the county typically receive more precipitation than more inland areas. Because of that, and similar to extreme heat, extreme precipitation thresholds vary by location within the county.

The populations that will likely be most directly affected by extreme precipitation and flooding in the county are those who reside in the county's 100- and 500-year floodplains, where over 48,000 and 33,000 unincorporated county residents reside, respectively (County of Monterey 2022a). Separate from but related to the populations residing in floodplains are the populations at direct risk of coastal flooding and inundation resulting from sea level rise. Depending on the amount of sea level rise through the end of the century—with scenarios considering increases from approximately 10 and 78 inches—between approximately 2,800 and 7,300 unincorporated county residents live in direct risk and exposure to coastal flooding and inundation (County of Monterey 2022a). Depending on the severity of any flooding event, there is the potential for populations to be displaced and for people to lose their homes and livelihoods, in addition to the risk of injuries and even death. Flooding resulting in overflow of sewage systems may create conditions that promote water- and food-borne diseases, which can severely impact human health (CDPH 2017). Although all residents and visitors of the county may be sensitive to extreme precipitation and flooding, vulnerable populations will likely face disproportionate negative impacts. People experiencing homelessness may have

limited access to warning messages and other pertinent information from the County and other public health and safety agencies, in addition to lacking adequate shelter and protection from these events. The elderly and individuals with access and functional needs may also face these challenges and are likely to have limited mobility and ability to react to and prepare for these events.

Table 5.5 Changes in Extreme Precipitation Events

Annual Averages	Historical (1961-1990)	Near Term[1] (Current-2050)	Midterm[1] (2040-2069)	Long Term (2070-2099)	
				RCP 4.5	RCP 8.5
Monterey County / Extreme Precipitation Threshold = 1.1 inches over a two-day period					
Number of Extreme Precipitation Events and Change from Historical	2.4	3.3 (+0.9)	3.7 (+1.3)	3.5 (+1.1)	5.2 (+2.8)
Big Sur Census Tract 6053011502 (Coastal Representation)[2] / Extreme Precipitation Threshold = 1.8 inches over a two-day period					
Number of Extreme Precipitation Events and Change from Historical	2.0	2.6 (+0.6)	3.0 (+1.0)	2.9 (+0.9)	4.4 (+2.4)
San Ardo (Inland Representation)[3] / Extreme Precipitation Threshold = 1.0 inches over a two-day period					
Number of Extreme Precipitation Events and Change from Historical	1.0	1.0 (+ 0.0)	1.3 (+0.3)	1.0 (+0.0)	2.1 (+1.1)

Note: RCP = Representative Concentration Pathway.

1 Projections for the near term and midterm timescales are based on RCP 8.5.

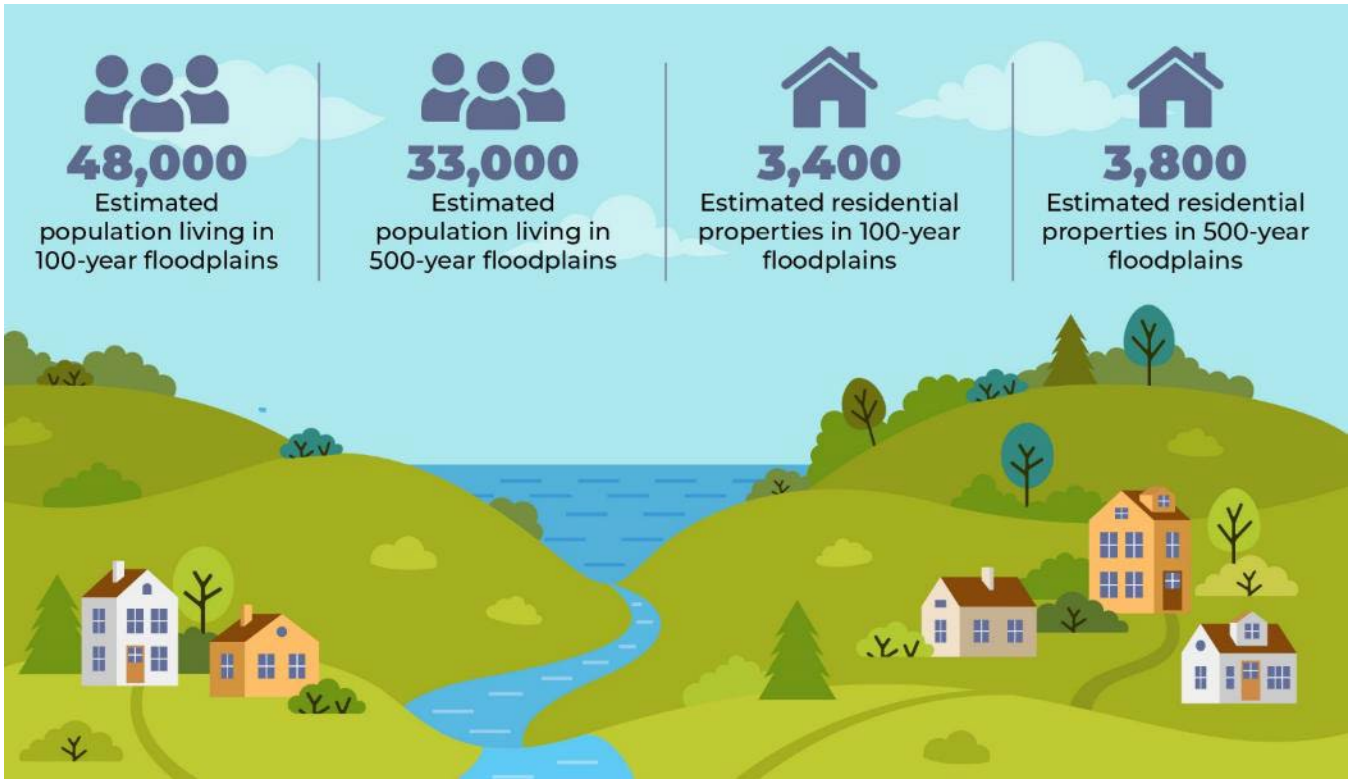
2 Though data for Big Sur Census Tract 6053011502 are meant to serve as a representation for coastal areas across the county, actual data for other coastal areas may vary.

3 Though data for San Ardo are meant to serve as a representation for inland areas across the county, actual data for other inland areas may vary.

Source: CEC 2022c.

Extreme precipitation and flooding in the county can severely impact or disrupt the county's built environment. Regarding residential property in the unincorporated areas of the county, over 7,200 residential properties lie directly within the county's floodplains—over 3,400 in the 100-year floodplain, and an additional 3,800 in the 500-year floodplain—with a collective estimated value of almost $5 billion (County of Monterey 2022a). Additionally, the residential property within floodplains is the residential property at direct risk of coastal flooding and inundation resulting from sea level rise. Depending on the amount of sea level rise through the end of the century—with scenarios considering sea level rise from approximately 10 and 78 inches—approximately 200 to 500 residential structures in unincorporated areas of the county are at direct risk and exposure of coastal flooding and inundation (County of Monterey 2022a). Apart from residential property, much of the county's critical infrastructure is at direct risk from flooding (i.e., existing within a floodplain or identified as being exposed to sea level rise-induced coastal inundation). The county's transportation infrastructure (e.g., roads, bridges) has also proven to be at direct risk of extreme precipitation and flooding. Flooding can cause underground utilities, along with water and sewer systems, to be damaged, or to be adversely affected via high inflow and infiltration. If drainage systems or culverts are backed up by floodwaters, pronounced localized flooding can occur (County of Monterey 2022b). Seawater backflow resulting from coastal flooding can impair coastal sanitation drainage systems during flood events, requiring costly upgrades and alterations (LCI et al. 2018b). Floodwaters may infiltrate drinking water supplies, causing contamination. Furthermore, facilities that store, manufacture, process, or use hazardous materials could be damaged during flooding events. If damaged, these facilities or containers holding these materials could release chemicals that are carcinogenic, or otherwise detrimental to human health and the environment (County of Monterey 2022b). Figure 5.5 summarizes the county's vulnerability against flood hazards.

Figure 5.5 Monterey County Flood Hazard Vulnerability



Heightened extreme precipitation and flooding can impact a wide array of community functions. Flooding events can result in the closure of businesses and government facilities, disruption of communications, utilities (e.g., water, sewage) and related delivery of services, excessive expenditures for emergency response, and general disruption of the normal functions of the county can result in severe economic losses, especially in locations that directly experience flooding (e.g., floodplains) (County of Monterey 2022b). The tourism sector can be adversely affected by major flood events, as popular destinations, such as beaches and recreational areas, tend to overlap with the county's floodplains and areas prone to sea level rise and coastal inundation. The agricultural sector is also at increased risk of flooding induced by extreme precipitation and sea level rise. Large amounts of agricultural land in the Salinas Valley are below sea level, and if floodwaters infiltrate this land, they can destroy crops and other agricultural products. Severe flooding and coastal inundation can also impact commercial fisheries through the destruction of or limited access to harbors and other related infrastructure (County of Monterey 2022b).

Stories of Sustainability

Climate Resilience Regional Challenge

In July 2024, the Monterey Bay Area was awarded $71 million in grant funding from NOAA to support flood and wildfire risk reduction, local workforce development, and climate adaptation capacity building. The award is part of a competitive $575 million funding opportunity through the Inflation Reduction Act. Led by the California Marine Sanctuary Foundation, the grant will seek to increase equity and inclusion through its planning efforts.

Part of the funding will be used to help local state colleges and universities develop programs to train young adults to enter this workforce. The Monterey Bay Climate Adaptation Action Network will also be formed to coordinate the efforts and incorporate representation from tribes and disadvantaged communities.

Projects will prioritize nature-based approaches and be supported by indigenous knowledge. Flood risk strategies will be designed to strengthen shorelines and restore or expand floodplains and salt marshes, and the goal of the wildfire risk strategies is to reduce wildfire risk for 120,000-plus Monterey County residents. Together, these projects will help protect and restore Monterey County's natural environment and increase its resilience to climate change.

DROUGHT AND WATER SUPPLY



Due to climate change, the county and California face a highly variable climate that is susceptible to prolonged periods of drought, and recent research suggests that extended drought occurrences (i.e., "mega-droughts") could become more pervasive in future decades (CEC 2022e). While this may seem contradictory to the projections that the county is expected to see more precipitation and extreme precipitation events on an annual basis, this can be explained by changing precipitation patterns. Specifically, overall precipitation variability will increase significantly. In other words, the county may experience years of unusually heavy rainfall followed by years of extreme drought. Although the actual occurrence and duration of droughts are difficult to predict, the region is expected to experience extended drought periods, and without effective adaptation actions or initiatives, future droughts will challenge the management of the Central Coast region's already-stressed water supplies, inclusive of the county (LCI et al. 2018b).

Regarding water resources, the county's water supplies are entirely dependent on local sources, such as groundwater and surface water from watersheds, as the county is isolated from state and federal water supplies. The Monterey County Water Resources Agency (MCWRA) manages two large reservoirs, the San Antonio and the Nacimiento. The Monterey Peninsula depends on two water sources, including the Carmel River, which drains a 255 square-mile watershed and runs 36 miles from its source in the Santa Lucia mountains to the sea, and the Seaside Basin, which is recharged by local rain (County of Monterey 2022b). In rural areas of the county, groundwater is the major source of water for residents, with the exception of: (1) residents along the coast

near Big Sur, who depend entirely on surface water and shallow wells for their water supply; and (2) residents in an area near Greenfield in the Salinas Valley, who have a diversion from the Arroyo Seco River (County of Monterey 2022b).

All county residents are vulnerable to prolonged drought impacts, though these effects often occur indirectly. The health and safety consequences of drought include problems related to low water flows, poor water quality, and dust linked to drought (County of Monterey 2022b). Water shortages during periods of drought can limit access to safe and affordable water, with disproportionate impacts on low-income individuals and communities already burdened with environmental pollution (County of Monterey 2022a). Drought can lead to disruptions or shortages in food and water supply, increased costs, and the spread of food- and water-borne diseases, potentially leading to hunger and malnutrition among the county's vulnerable populations (CDPH 2017). Additionally, drought can increase soil erosion and risk of wildfire, resulting in degraded air quality, which causes respiratory health problems and likely increases in patient volumes at local hospitals and health clinics.

While drought does not directly impact Monterey County's built environment significantly, it can trigger several serious secondary effects. For example, heavy precipitation following periods of drought can cause intense flooding, debris flows, landslides, and mudslides, all of which threaten the county's built environment (County of Monterey 2022b). Moreover, excessive groundwater extraction during droughts can lead to lands subsidence which can compromise the integrity of the county's transportation infrastructure (e.g., roadways, railroads). Drought conditions can also increase wildfire risk, impacting residential property, critical infrastructure, and other built assets. Lower stream flow and reservoir levels can also lead to a decrease in available hydropower for the MCWRA, while higher salinity in source water resulting from drought may increase the energy required for water treatment (MPWMD 2019).



Drought most significantly impacts Monterey County's community functions, particularly its vital agricultural sector. The sector's vulnerability stems primarily from water availability for crop irrigation. Since irrigated agriculture produces most of the harvested crops across the Central Coast region, reduced water availability combined with extreme heat could greatly reduce crop yields and overall production (County of Monterey 2022b; LCI et al. 2018b). In the Salinas Valley, agricultural operations rely on groundwater recharge by the Salinas River, which receives water from the Nacimiento and San Antonio reservoirs controlled by the MCWRA (County of Monterey 2022b). In addition to agriculture, drought impacts affect local businesses and economic sectors. The most vulnerable industries are those directly dependent on water such as power plants, oil refineries, forestry, and fisheries (County of Monterey 2022b). During drought periods, water-use restrictions can also severely impact smaller-scale businesses that provide water-related services, like power-washing. Additionally, drought-related increases in production costs, particularly agricultural and energy products, can potentially discourage and reduce discretionary consumer spending in other industries, such as entertainment, dining, and retail (MPWMD 2019). Tourism, which generates over $2.3 billion in annual revenue for the county, is particularly vulnerable to drought conditions. Local scenery and tourist attractions can become less appealing or inaccessible due to soil erosion or algal blooms. These drought-induced economic disruptions can trigger broader impacts, including unemployment, increased risk for financial institutions, capital shortfalls, and loss of tax revenue (County of Monterey 2022b). Furthermore, drought can cause adverse environmental effects.

SUMMARY OF SENSITIVITY AND POTENTIAL IMPACTS

Based on guidance from the APG, potential impacts from each climate change effect are rated on a qualitative scale of "Low," "Medium," and "High." A description of each qualitative rating for potential impacts is provided in Table 5.6.

Table 5.6 Potential Impact Scoring

Score	Potential Impact Scoring Description
Low	Impact is unlikely based on projected exposure; would result in minor consequences to public health, safety, and/or other metrics of concern.
Medium	Impact is somewhat likely based on projected exposure; would result in some consequences to public health, safety, and/or other metrics of concern.
High	Impact is highly likely based on projected exposure; would result in substantial consequences to public health, safety, and/or other metrics of concern.

Source: Cal OES 2020.

The climate change effects anticipated to impact the county are ranked for a potential impact score in Table 5.7. This evaluation is based on the exposure analysis and analysis of sensitivities and impacts.

Table 5.7 Potential Impact Summary for Monterey County

Climate Change Effect	Potential Impact Score
Increased Wildfire Risk	High
Increased Temperatures and Extreme Heat	Medium/High
Extreme Precipitation and Flooding	Medium/High
Drought and Water Supply	High

Adaptive Capacity

The third step of the vulnerability assessment process evaluates the county's adaptive capacity to address climate change impacts. In the context of climate adaptation, adaptive capacity measures a community's current and future ability to address the impacts of climate change effects, particularly regarding its population, built environment, and community functions.

The County's adaptive capacity to address climate change impacts can be assessed through its current policies, plans, programs, and resources, along with those of relevant regional and state agencies and organizations. This review reveals how effectively the county can reduce climate vulnerabilities and implement adaptation strategies. Table 5.8 shows a summary of existing plans and reports that contribute to the County's adaptive capacity to address the anticipated impacts of climate change effects.

> Adaptive capacity is the combination of the strengths, attributes, and resources available to an individual, community, society, or organization that can be used to prepare for and undertake actions to reduce adverse impacts [or] moderate harm or [to] exploit beneficial opportunities (Cal OES 2020).

Table 5.8 Summary of Existing Plans and Reports

Plan or Report	Climate Change Effect			
	Increased Wildfire Risk	Increased Temperatures and Extreme Heat	Extreme Precipitation and Flooding	Drought and Water Supply
California's Fourth Climate Change Assessment, Central Coast Region Report	✓	✓	✓	✓
Caltrans Climate Change Vulnerability Assessments, District 5 Technical Report	✓	✓	✓	
Central Coast Highway 1 Climate Resiliency Study			✓	
Climate Change and Health Profile Report, Monterey County	✓	✓	✓	✓
Monterey County Community Resilience Plan	✓	✓	✓	✓
Monterey County Community Wildfire Protection Plan	✓			
Monterey County Emergency Operations Plan[1]	✓	✓	✓	✓
Monterey County Floodplain Management Plan[1]			✓	
Monterey County Groundwater Management Plan				✓
Monterey County Multi-Jurisdictional Hazard Mitigation Plan	✓	✓	✓	✓
Monterey County Operational Area Coastal Incident Response Plan			✓	
Monterey County Winter Storm Response Plan			✓	
Monterey One Water Climate Action and Adaptation Plan	✓	✓	✓	✓
North Monterey County Drought Contingency Plan	✓			✓
Salinas Valley Groundwater Basin 180/400-Foot Aquifer Subbasin Groundwater Sustainability Plan				✓
Unit Strategic Fire Plan, San Benito-Monterey	✓			

[1] For this summary, the Monterey County Emergency Operations Plan and Monterey County Multi-Jurisdictional Hazard Mitigation Plan are inclusive of their corresponding base plans, along with all associated annexes/volumes.

The County has already taken a number of actions to address climate change impacts on its communities. The *Monterey County Multi-Jurisdictional Hazard Mitigation Plan* (MJHMP) acts as the foundation for assessing and addressing county hazards, including those intensified by climate change, while strengthening overall community resilience. Beyond the MJHMP, the County maintains several additional adaptive efforts in place to address climate change effects. A snapshot of some of these efforts are provided below.

The County has established comprehensive strategies to address various climate-related challenges. For wildfire risk management, the *Unit Strategic Fire Plan, San Benito-Monterey* and the *Monterey County Community Wildfire Protection Plan* outline key risk reduction strategies. The County also maintains specific plans for care and shelter, electrical power disruption, and evacuation and transportation related to wildfires and other hazards. These plans serve as annexes to the *Monterey County Emergency Operations Plan*. To combat rising temperatures and extreme heat, the *Monterey County Community Resilience Plan* promotes building modifications that reduce such

risks, including the development of heat-resistant buildings through initiatives such as adding canopy covers, vegetation, and rain gardens in surrounding areas, which is intended to be led by the County's Housing and Community Development Department. The County's websites also provide comprehensive resources about extreme heat, including information on heat stroke individual preparation and response strategies, and links to external sources. For managing extreme precipitation and flooding, the County relies on multiple strategic documents, including the *Monterey County Floodplain Management Plan*, the *Monterey County Winter Storm Response Plan*, the *Monterey County Operational Area Coastal Incident Response Plan*, and the *Storm Water Resource Plan for the Greater Monterey County Integrated Regional Water Management Region*, among others. Drought and water supply management is guided by the *North Monterey County Drought Contingency Plan*, the *Salinas Valley Groundwater Basin 180/400-Foot Aquifer Subbasin Groundwater Sustainability Plan*, and the *Monterey County Groundwater Management Plan*. Additional plans, policies, programs, and resources that serve to address climate change effects in the county, are detailed in the VA that was conducted for the CCAAP, found in Appendix B.

SUMMARY OF ADAPTIVE CAPACITY

Based on a combination of the adaptation initiatives outlined in existing documents and resources and additional adaptive efforts that have been pursued (see Appendix B for details), the County's adaptive capacity for each climate change effect can be scored "Low," "Medium," or "High." A "High" adaptive capacity indicates that sufficient measures are already in place to address the points of sensitivity and impacts associated with climate change, while a "Low" score indicates a community is unprepared and requires major changes to address climate change effects. Table 5.9 provides detailed descriptions of these adaptive capacity scores.

Table 5.9 Adaptive Capacity Scoring

Score	Adaptive Capacity Scoring Description
Low	The County lacks capacity to manage climate change effect; major changes would be required.
Medium	The County has some capacity to manage climate change effect; some changes would be required.
High	The County has high capacity to manage climate change effect; minimal to no changes are required.

Source: Cal OES 2020.

Table 5.10 summarizes the County's adaptive capacity regarding each climate change effect. Like the potential impacts scoring evaluation, the scoring of adaptive capacity allows the County to understand priority areas where there are gaps in preparing for and adapting to climate change.

Table 5.10 Adaptive Capacity Summary for Monterey County

Climate Change Effect	Adaptive Capacity Score
Increased Wildfire Risk	Medium
Increased Temperatures and Extreme Heat	Low
Extreme Precipitation and Flooding	Medium
Drought and Water Supply	High

Vulnerability Scoring

The final step in the vulnerability assessment process is to characterize the vulnerability to each climate change effect. This assessment evaluates the magnitude of risk and potential impacts on populations, the built environment, and community functions, while considering current adaptive capacity to mitigate these impacts. By evaluating both potential impacts and adaptive capacity scores, the County can determine an overall vulnerability score for each climate change effect. These scores help identify which effects pose the greatest threats and should be prioritized in future planning. Table 5.11 presents the rubric used to determine overall vulnerability scores based on the ratings for potential impacts and adaptive capacity.

Table 5.11 Vulnerability Scoring

Vulnerability Score				
Adaptive Capacity	Low	3	4	5
	Medium	2	3	4
	High	1	2	3
		Low	Medium	High
		Potential Impacts		

Source: Cal OES 2020.

Table 5.12 below presents vulnerability scores for each climate change effect. Increased temperatures and extreme heat received the highest vulnerability score of 4-5, indicating these impacts should be a very high priority for the County. Wildfire risk scored a 4, also requiring prioritization in the County's adaptation and planning-related efforts. These two climate change effects could potentially have significant impacts on the county's populations, built environment, and community functions in the near-term to midterm, and although a variety of adaptive efforts are already in place, the magnitude of risks posed by these hazards contributes to high vulnerability in the county. Extreme precipitation and flooding received a vulnerability score of 3-4. This climate change effect is concerning because flooding in the county can come from multiple sources, including storms and extreme precipitation events, along with sea level rise and coastal inundation. Drought and water supply challenges received a vulnerability score of 3. While current measures adequately address existing conditions, the potentially severe impacts associated with the county's agricultural sector and other economic functions necessitate additional adaptation and resilience planning for the future.

Table 5.12 Vulnerability Scoring Summary for Monterey County

Climate Change Effect	Adaptive Capacity	Potential Impact	Vulnerability
Increased Wildfire Risk	Medium	High	4
Increased Temperatures and Extreme Heat	Low	Medium/High	4-5
Extreme Precipitation and Flooding	Medium	Medium/High	3-4
Drought and Water Supply	High	High	3

Youth Center



Future: A thriving **youth center** has taken form in this refurbished Victorian house. Young visitors access mental health, spiritual, and vocational guidance, as well as mediation support interwoven with the community. Ceanothus blooms in front of the house attracting monarch butterflies. The roof is thatched in tule as a green building practice and to honor local Indigenous knowledge.

A grandmother is there harvesting oranges with her grandson preparing to make a group dinner. Nearby, a boy monitors solar panels as a part of an engineering project. In the foreground, a grinding stone sits beside a milpa of corn, beans, and squash just beginning to sprout.

Dreamed in collaboration with Edgar Ibarra, of **MILPA Collective** and is inspired by MILPA's intention to create a Less Restrictive Program (LRP) for incarcerated youth.



CHAPTER 6. Climate Action and Adaptation Strategies

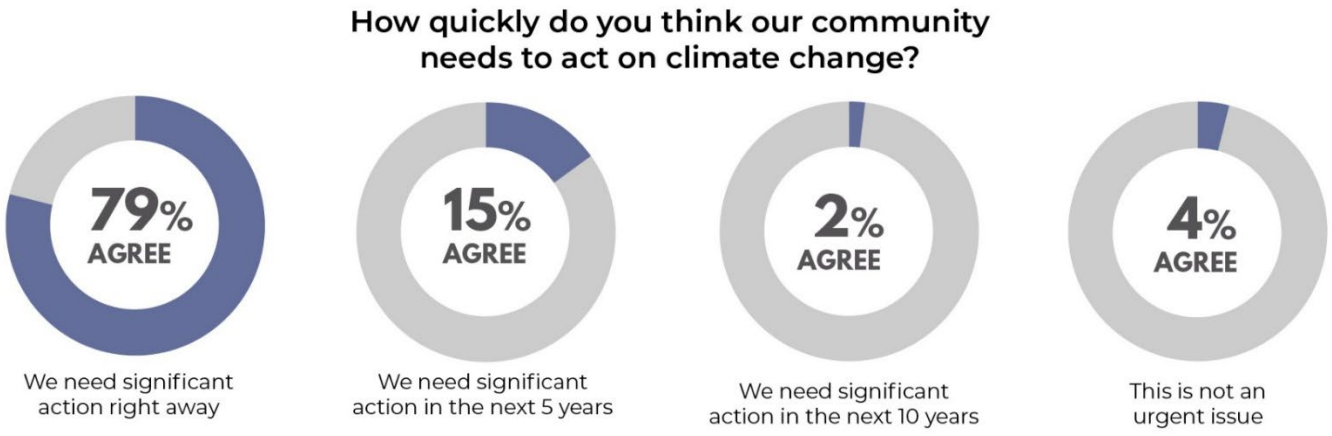
OVERVIEW

This chapter outlines strategies and actions Monterey County will implement to reduce communitywide greenhouse gas (GHG) emissions and adapt to various climate change effects. The GHG reduction strategies and actions are designed to achieve the reduction targets established for the County, which are discussed in Chapter 3 of the Community Climate Action and Adaptation Plan (CCAAP). The suite of GHG reduction strategies and actions proposed in this chapter would set the County on course to meet its GHG emissions reduction target for 2030 and demonstrate progress towards achieving the 2040 and 2045 reduction targets. Adaptation strategies and actions are largely informed by the findings of the Climate Change Vulnerability Assessment, which was conducted for the CCAAP and summarized in Chapter 5 of the CCAAP.

The strategies and actions set forth in this chapter are proposed and may need additional approval by the Board of Supervisors and/or appropriate level of environmental review under the California Environmental Quality Act. The CCAAP does not approve, fund, mandate, or authorize implementation of any specific projects or programs.

Figure 6.1 below shows the responses received during a community workshop organized for the CCAAP development regarding the question: How quickly do you think our community needs to act on climate change? As shown in the figure, the majority of respondents believe significant action is needed right away.

Figure 6.1 Community Perceptions on Climate Action



DETAILED GREENHOUSE GAS EMISSIONS REDUCTION STRATEGIES AND ACTIONS

Additional GHG reductions are needed beyond those expected through regulatory or legislative actions to achieve the community GHG emissions reduction targets for 2030, 2040, and 2045. The project team worked with County staff, sector working groups, and community members to develop and refine the GHG reduction strategies and actions. The suite of strategies presented in this chapter have been analyzed for their potential to reduce GHG emissions and meet the County's targets.

Based on the analysis conducted, the County has quantified the potential emissions reductions to determine if the strategies collectively bridge the emissions "gap" between the no local action forecast and target levels (shown in Figure 3.8 of Chapter 3). The suite of strategies will yield total GHG emissions reductions of 238,486 metric tons of carbon dioxide equivalent ($MTCO_2e$) in 2030; 330,636 $MTCO_2e$ in 2040; and 341,796 $MTCO_2e$ in 2045. When compared to the reductions needed to meet the established targets, Monterey County is projected to exceed both the 2030 and 2040 targets but fall short of meeting the long-term 2045 target, shown in Table 6.1. Additional information on strategy-specific reductions and other related quantification can be found in Appendix A.

Table 6.1 Monterey County Community Gap Analysis

	2030	2040	2045
Total Reductions from Strategies ($MTCO_2e$)	238,486	330,636	341,796
Reduction Needed to Meet Target	93,986	329,611	498,987
Target Percent Reduction Below 2019 Levels	28%	66%	86%
Target Met?	Yes	Yes	No
Remaining Gap to Target	-144,500	-1,025	157,192

Notes: $MTCO_2e$ = metric tons of carbon dioxide equivalent.

While not all strategies can be quantified, they still remain valuable contributors to the County's climate action and adaptation efforts. The quantifiable GHG reductions come primarily from the building energy, on-road transportation, and solid waste sectors. Importantly, avoided carbon loss through sequestration activities on

natural and working lands has been included in the analysis to show the relative contribution and importance of climate-smart land management practices.

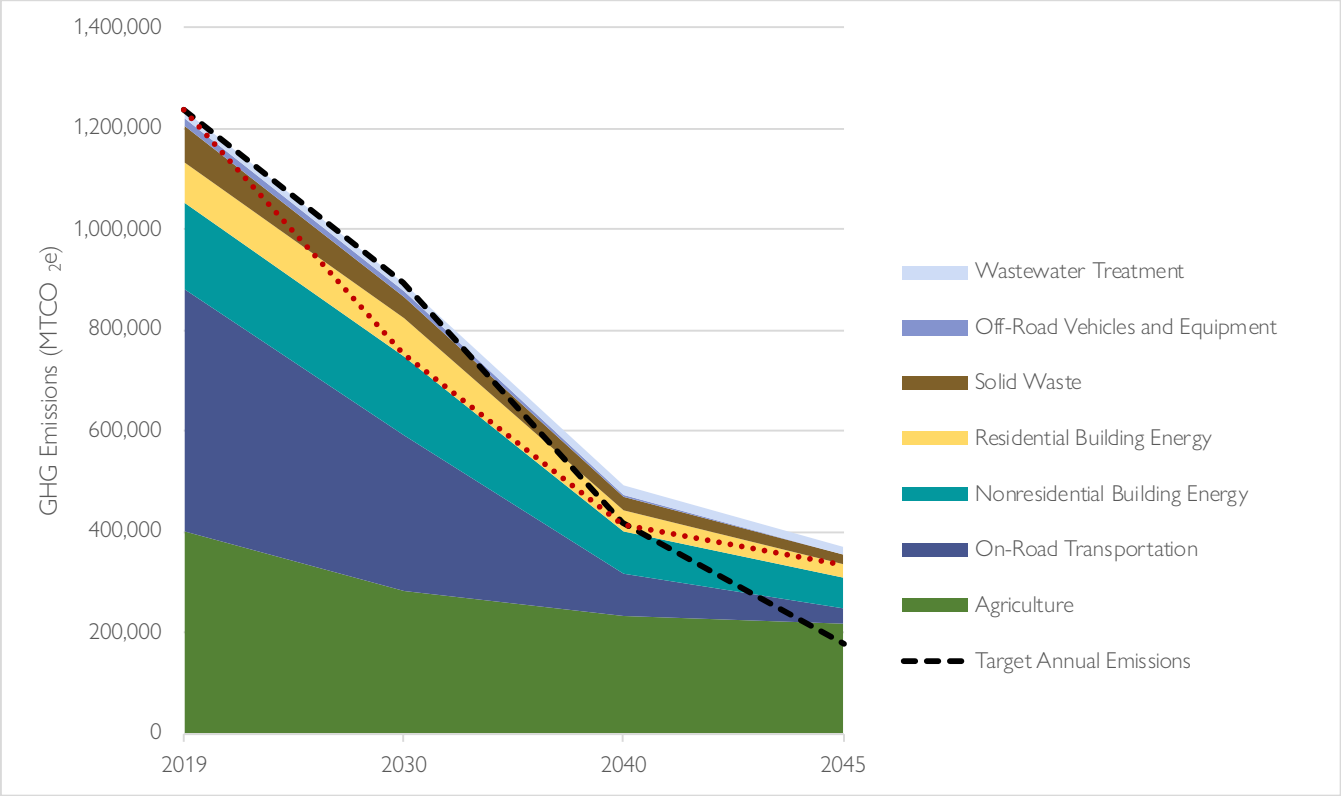
The gap analysis confirms that the strategies described in this chapter provide the County with a viable pathway to meet its climate goals of 28 percent reduction in 2030 and 66 percent reduction in 2040. Through aggressive electrification of buildings and vehicles and increased composting of food and yard waste, much of the emissions from buildings, on-road transportation, and solid waste can be limited by 2045. Residual emissions are expected from methane gas use in buildings as well as fossil fuel-powered vehicles that have not yet been retired and replaced with zero-emission alternatives.

The largest source of emissions in 2045 is anticipated to come from agricultural operations, primarily associated with grazing livestock. The County recognizes the incredible value that agricultural operations have on the local and statewide economy, as well as the benefits it brings to the wellbeing of residents. Additionally, livestock in the county are primarily grassfed, which has a lower emissions rate than livestock managed in concentrated animal feeding operations. Further emissions reductions are difficult to achieve through operational changes. Instead, the County will continue to seek opportunities to maintain carbon held in natural and working lands to meet its long-term GHG reduction target. This includes monitoring statewide carbon stock data as the California Air Resources Board continues to publish updates to its carbon stock inventory (with the 2022 inventory published in February 2026).

Figure 6.2 shows the GHG reductions from each sector through implementing the CCAAP strategies. Because the carbon stock analysis conducted for the unincorporated county (provided in Chapter 4) is not displayed as an annual rate (unlike GHG emissions), the anticipated carbon sequestered and stored due to the level of action contemplated in the 2022 Scoping Plan is shown as a dotted red line over the colored wedges for the emissions sector. By taking meaningful action on climate-smart land management, carbon stock loss can be avoided (refer to Table 4.2 in Chapter 4). The associated carbon sequestered through these actions over the CCAAP's planning horizon has been quantified and additional information can be found in Appendix D.

The strategies presented below are organized under categories that generally align with the emissions sectors, including building energy (including residential and nonresidential building energy use), on-road transportation, off-road vehicles and equipment, solid waste, water and wastewater, and natural and working lands (which aligns with agriculture emissions from the inventory as well as the carbon stock estimates in Chapter 4). Each category includes one or more broad strategies to reduce emissions, such as energy efficiency, clean energy, and waste diversion. Objectives are included under each strategy, which are more specific expressions of the strategies. GHG emissions reduction potential in $MTCO_2e$ was quantified for strategies wherever supporting data and reasonable assumptions were available for calculations. In addition, the objectives of the strategies will be realized through one or more actions that the County and its partners can implement to reduce GHG emissions.

Figure 6.2 Monterey County Community Gap Analysis



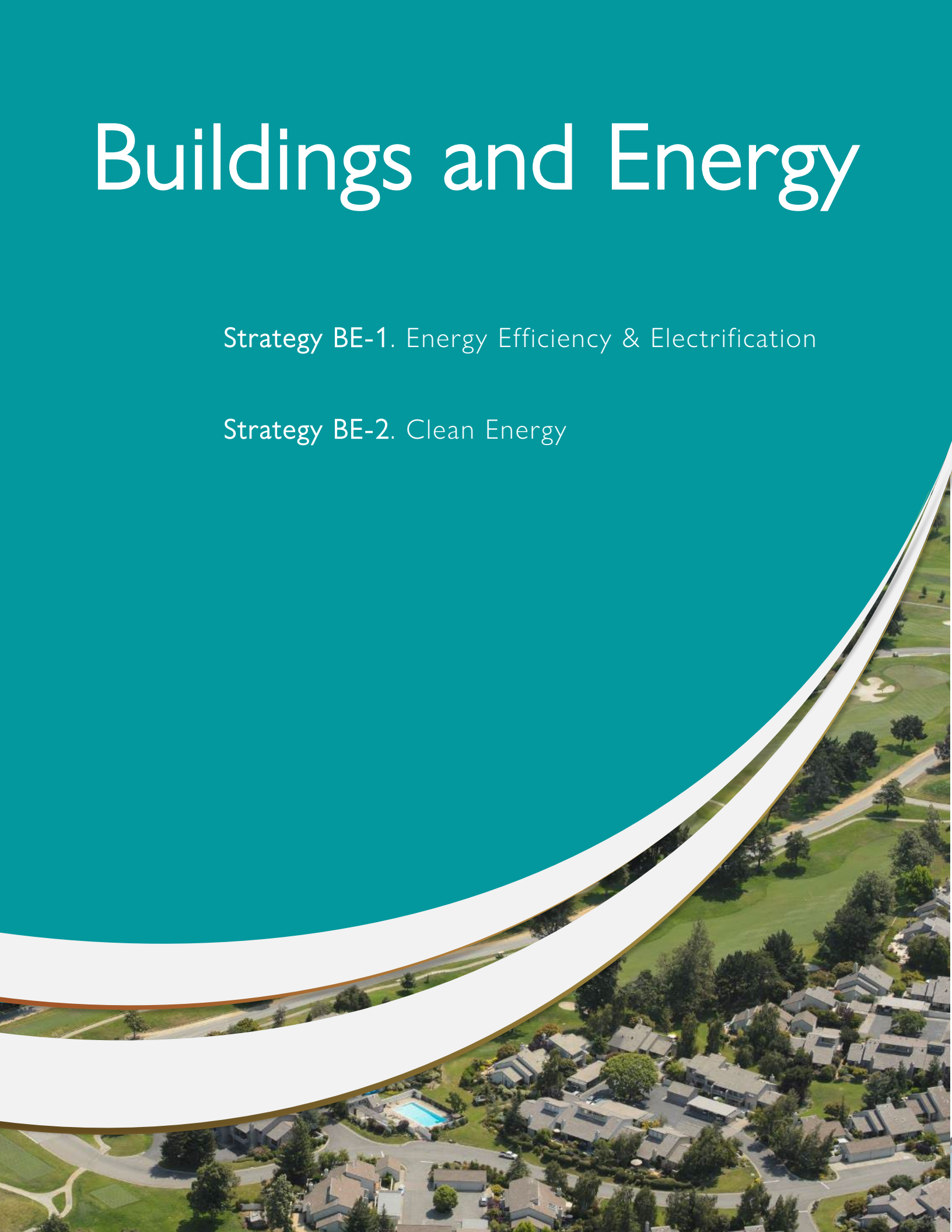
Notes: GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Implementing GHG emissions reduction strategies and actions in the various emission sectors will enable the County to achieve measurable reductions in future community GHG emissions and benefit all residents, workers, and visitors of Monterey County. While these strategies and actions primarily focus on GHG emissions reduction, many will deliver multiple co-benefits including improved equity, air quality prevention, health and wellbeing, reliability, and resource preservation (as detailed in Chapter 1).

Buildings and Energy

Strategy BE-1. Energy Efficiency & Electrification

Strategy BE-2. Clean Energy



STRATEGY BE-1.
ENERGY EFFICIENCY & ELECTRIFICATION

Reduction Potential ($MTCO_2e$)

23,998 by 2030

132,339 by 2040

172,480 by 2045

Objectives

Increase energy efficiency in existing and new residential and nonresidential buildings.

By 2030:

Existing buildings: 10% of residential and 8% of nonresidential square footage fully electrified

New buildings: 90% of residential and nonresidential fully electrified

By 2040:

Existing buildings: 50% of residential and nonresidential building square footage fully electrified

New buildings: 95% of residential and nonresidential fully electrified

By 2045:

Existing buildings: 65% of residential and nonresidential square footage fully electrified

New buildings: 95% of residential and nonresidential fully electrified





Energy efficiency and electrification are effective climate action strategies because they save money, reduce GHG emissions, and enhance energy resilience. Energy efficiency measures lower overall energy consumption and reduce reliance on fossil fuels. Transitioning from fossil fuel-powered systems to electric alternatives allows energy to come from renewable sources, further decarbonizing energy use. In addition, improved energy efficiency lowers energy costs for households and businesses, while electrification reduces dependence on volatile fossil fuel markets. Moreover, electrification helps enhance energy grid resilience by making the grid more flexible and efficient, and less dependent on fossil fuels, while enabling the integration of distributed energy resources like solar panels, batteries, and bi-directional EV chargers. Using these resources, residents and businesses can increase their energy independence and resiliency by not losing power during a power outage.

IMPLEMENTATION ACTIONS

Action BE-1.1: Adopt a building electrification ordinance for new and existing residential buildings based on cost-effectiveness studies, stakeholder outreach, and California Energy Commission approval. The ordinance will be written such that existing residential buildings' modeled energy efficiency must achieve half of the maximum cost-effective retrofit measures score at time-of-retrofit by 2030, and the maximum cost-effective retrofit measures score by 2045.

Action BE-1.2-a: Develop a nonresidential buildings decarbonization strategy and implement a building performance standard that requires all existing buildings to reduce non-electricity-related emissions by 10 percent by 2033, and by 20 percent by 2045, with analysis of the existing building stock in the county. As part of this effort, encourage small (i.e., less than 50,000 square feet) commercial and small multifamily residential (i.e., less than 17 units) building owners to track and report their annual energy usage through a benchmarking tool (e.g., ENERGY STAR® Portfolio Manager).

Action BE-1.2-b: Determine retrofit compliance triggers based on square footage and one additional metric such as time of equipment replacement, percent of existing floor area, building permit valuation, and project valuation.

Action BE-1.3-a: Implement and staff a building performance standards program that:

- proactively engages with and enrolls nonresidential building owners and operators into a building performance standards program,
- develops a mechanism for building owners and operators to report energy use and emissions data,
- develops and distributes information on how to measure performance, maintain compliance, and reduce energy use and GHG emissions,
- enforces compliance with the building performance standards program, and
- compiles and reports data on the building performance standards program for CCAAP monitoring, such as number of buildings enrolled in the program and GHG reductions achieved.

Action BE-1.3-b: Develop a tracking system for the types of measures implemented to maximize energy efficiency and decarbonization, energy efficiency upgrades, or pre-wiring completed by applicants pursuant to reach code requirements for existing buildings (developed under Action BE-1.1).

Action BE-1.4-a: Adopt by ordinance a new building reach code based on cost-effectiveness studies, stakeholder outreach, and California Energy Commission approval that must be met by all residential and nonresidential new construction and major renovations.

Action BE-1.4-b: Conduct outreach to building industry members, contractors, residents, businesses, and other interest groups to present any proposed reach code and solicit feedback.

Action BE-1.4-c: Conduct training for County permitting staff to understand the reach code requirements for new and existing buildings and how compliance will be demonstrated.

Action BE-1.5: Partner with 3CE to establish a program that connects owners and occupants of residential and nonresidential buildings to existing energy audit and weatherization programs (e.g., California's Low-Income Weatherization Program) and resources, and additionally, helps to determine eligibility.

Action BE-1.6: Provide instant permitting of code-compliant residential rooftop solar through use of software such as Solara+.

Action BE-1.7: Explore additional opportunities for streamlining permitting of residential electrification projects.

Action BE-1.8: Work with utility providers to initiate a mobile home park utility conversion program that allows mobile home park and manufactured housing communities the opportunity to replace master-metered/sub-metered or non-sub metered electric and gas distribution systems with direct service.

Action BE-1.9: In coordination with regional partners, scope and develop a grant application for residential building electrification and efficiency across the county to demonstrate resiliency, cost-savings, and emissions reductions and reduce barriers to building electrification. This project should prioritize low-income residents in various communities. Staff will engage with regional partners including the Regional Climate Project Working Group, 3CE, Central Coast Energy Services, and the Central California Rural Regional Energy Network.

STRATEGY BE-2. CLEAN ENERGY

Reduction Potential ($MTCO_2e$)

1,203 by 2030

668 by 2040

0 by 2045

Objectives

Maximize reliable, emissions-free energy generation, transmission, and storage locally.

Annually by 2030:

100% of electricity is carbon-free



Clean and renewable energy sources generate electricity without burning fossil fuels, significantly lowering GHG emissions. Expanding clean energy also decreases reliance on fossil fuels, reducing market volatility and enhancing energy independence. Moreover, clean energy eliminates air pollutants associated with fossil fuel combustion, reducing respiratory illnesses and improving overall air quality. Promoting clean energy can boost the local economy by creating new green jobs.

IMPLEMENTATION ACTIONS

Action BE-2.1: Support and coordinate with 3CE in executing its commitment to meet 100 percent of its electricity demand through clean and renewable resources by 2030 by identifying sites for renewable energy generation at County-owned properties and other potential sites throughout the county, and by continuing efforts to streamline the permitting of residential and nonresidential rooftop solar photovoltaic or other renewable energy and battery storage projects.

Action BE-2.2: Partner with 3CE to promote and expand upon their Electrify Your Home program, which bundles various residential energy efficiency upgrades (e.g., heating and cooling systems, heat pump water heaters) to deliver more savings, comfort, and rebate options.

Action BE-2.3: Amend the County's Zoning and Coastal Zoning Ordinances to require parking lots for new nonresidential development projects, with floor area greater than 50,000 square feet, to include solar canopies.

Action BE-2.4: Conduct a study and prepare a publicly available assessment of suitable undeveloped lands near electrical transmission and distribution lines that serve as priority areas for the development of utility-scale solar energy generation and storage projects. If suitable locations are identified, the County shall establish a new zone, if necessary, called a Renewable Energy Priority Zone, for these sites in the County's Zoning and Coastal Zoning Ordinances.

Action BE-2.5: Encourage public service facilities such as schools, hospitals, and community centers to develop renewable microgrids.

Action BE-2.6: Collaborate with PG&E as they strategically decommission methane gas pipelines in areas where electrification has been or could be implemented.

Action BE-2.7: Explore the option of a final phase-out date for non-industrial methane gas procurement, infrastructure deployment, and use in unincorporated Monterey County.

Action BE-2.8: Collaborate with PG&E as they modernize the electrical grid for variable and distributed power by upgrading transformers, lines, and other power equipment; and support regional coordination efforts that help to accelerate this transition.

Action BE-2.9: Evaluate the potential for agrivoltaics at wineries and other agricultural lands and ensure the County's Zoning and Coastal Zoning Ordinances allow for such uses.

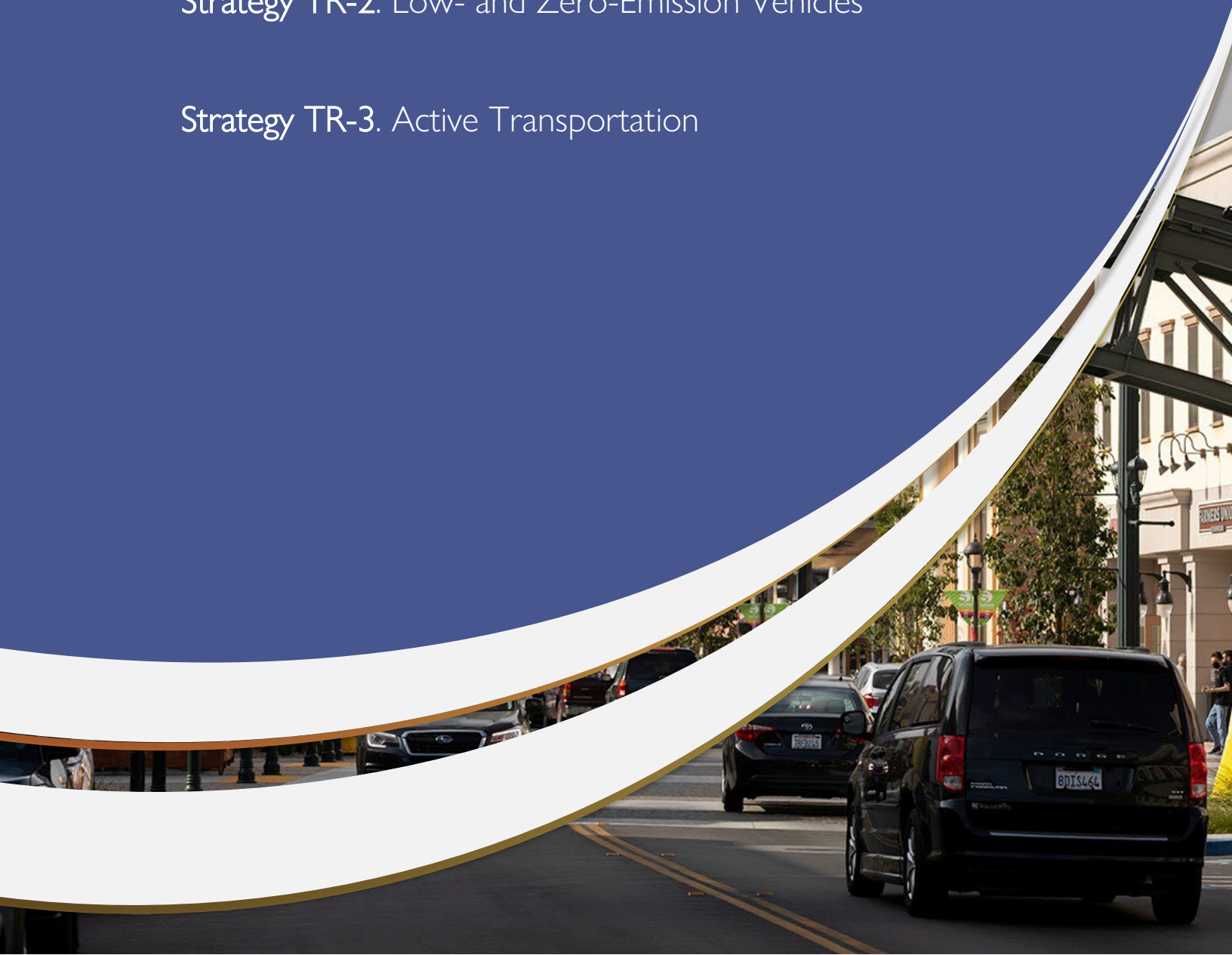


On-Road Transportation

Strategy TR-1. Sustainable Transportation and Land Use Planning

Strategy TR-2. Low- and Zero-Emission Vehicles

Strategy TR-3. Active Transportation



STRATEGY TR-1. SUSTAINABLE TRANSPORTATION AND LAND USE PLANNING

Reduction Potential ($MTCO_2e$)

22,216 by 2030
19,973 by 2040
10,557 by 2045

Objectives

Reduce passenger vehicle miles traveled through transit-oriented, mixed-use, and compact development and accessible, reliable, frequent, and convenient transit.

By 2030:
7.5% reduction in annual passenger VMT below 2019 levels

By 2040:
22.7% reduction in annual passenger VMT below 2019 levels

By 2045:
30% reduction in annual passenger VMT below 2019 levels



Promoting sustainable transportation planning helps decrease reliance on fossil fuel-powered vehicles, cutting GHG emissions and air pollution. Land use planning that helps build compact and walkable communities enhances the use of sustainable transportation, reduces sprawl and promotes more efficient land use. Moreover, sustainable transportation and land use planning reduces traffic congestion and improves air quality, which leads to greener, healthier communities with an improved quality of life.

IMPLEMENTATION ACTIONS

Action TR-1.1: Collaborate with cities, transit providers, and employers to provide local community shuttles or circulators that serve transit-oriented development, high-quality transit stops, and neighborhood commercial centers, providing an incentive for residents and employees to make trips using transit.

Action TR-1.2: Promote the regional vanpool program to provide vans and organize traditional vanpools and vanpools serving agricultural workers in rural areas.

Action TR-1.3: Coordinate with transit providers to improve the local transit system by increasing reliability and accessibility by adding amenities such as seating, lighting, tree cover, bike storage, and real-time arrival information displays. Extend service hours and routes to better serve residential areas, trip-chaining, employment centers, and popular destinations, with a focus on "Transportation-Based Priority Populations" as identified by California Department of Transportation (Caltrans)' Transportation Equity Index.

Action TR-1.4: Continue to implement the actions identified in the Monterey County Broadband Strategic Plan to allow for remote work that reduces the need for commuting.

Action TR-1.5: Implement the policies and programs of the 2023-2031 Housing Element to rezone for higher density development and promote affordable, mixed-use development in Community Areas and Rural Centers near activity centers and transit routes.

Action TR-1.6: Develop and encourage opportunities to upgrade roadways in compact areas to complete streets, using the Monterey Bay Area Complete Streets Guidebook to reduce emissions and improve walkability and pedestrian safety.

Action TR-1.7: Consider including complete street scoping in routine roadway maintenance and County capital improvement processes. Collaborate with TAMC, Caltrans, MST, and cities to integrate complete street scoping into capital processes throughout the county and to consider funding mechanisms for this action.

Action TR-1.8: Consider establishing "climate hazard overlay zones" whereby additional layers of zoning standards would be applied to defined geographical areas that have been identified as being more vulnerable to future flooding, erosion, landslides, wildfire, or severe storm/high wind events, regardless of the underlying base zoning district.

Action TR-1.9: Implement the necessary infrastructure upgrades and develop programs for EV car sharing, active transportation, mobility device sharing, and improved transit based on the results of Zero Emissions Shared Mobility Study.

Transportation Safety & Economic Freedom

Transportation choices affect more than just our carbon footprint—they impact our safety and financial wellbeing. In 2021 alone, 2,370 people in Monterey County were killed or injured in vehicle crashes. Our most vulnerable residents face the greatest risk: Monterey County ranked worst among all California counties for crashes involving pedestrians under age 15, and ninth worst for crashes involving people over 65 (OTS 2025). Creating safer streets through improved infrastructure for walking, biking, and public transit can protect our children, seniors, and all community members.

The financial burden of car dependency is substantial. The average household in Monterey County spends over 15 percent of their income on transportation costs each year (DataShare Monterey County 2025). While owning and operating a vehicle costs approximately $12,000 annually (AAA 2023), alternatives offer significant savings: a monthly bus pass costs just $70 ($840 per year), and an electric bike represents a one-time investment of around $1,500. By expanding access to affordable transportation options like public transit, bike lanes, and pedestrian infrastructure, we can help families keep more money in their pockets while reducing emissions and improving safety for everyone.



Source: Go831!.

STRATEGY TR-2. LOW- AND ZERO-EMISSION VEHICLES

Reduction Potential ($MTCO_2e$)

13,463 by 2030
43,948 by 2040
48.250 by 2045

Objectives

Seek funding to transition to low- and zero-emission vehicles.

By 2030:
20% of light-duty vehicles are EVs or PHEVs
10% of heavy-duty vehicles are EVs

By 2040:
70% of light-duty vehicles are EVs or PHEVs
70% of heavy-duty vehicles are EVs

By 2045
90% of light-duty vehicles are EVs or PHEVs
90% of heavy-duty vehicles are EVs



Promoting low- and zero-emission vehicles (ZEV) reduces GHG emissions from transportation and improves air quality by reducing smog and pollutants from fossil fuel combustion in neighborhoods. Widespread ZEV adoption decreases the region's reliance on fossil fuels and enhances the region's energy security. Moreover, electric vehicles (EVs) offer lower maintenance costs due to simpler engine designs and have lower fuel costs compared to gasoline, further increasing their economic advantage.

IMPLEMENTATION ACTIONS

Action TR-2.1: Adopt electric vehicle (EV) charging infrastructure reach codes to meet CALGreen Tier 1 standards for each triennial California Green Building Standards cycle for residential and nonresidential EV charging.

Action TR-2.2: Collaborate with 3CE and electric vehicle supply equipment (EVSE) companies to establish fast-charging mobility hubs at publicly accessible sites that support tenants of multifamily properties.

Action TR-2.3: Prioritize the installation of EVSE at the identified top locations in the unincorporated county provided in the Central Coast Zero Emission Vehicle Strategy.

Action TR-2.4: Implement the recommendations included in the forthcoming Monterey Bay Electric Vehicle Climate Adaptation and Resiliency Framework to install EV chargers in high impact and low-risk areas with a focus on making EV chargers more accessible to underserved areas.

Action TR-2.5: Coordinate with 3CE to deploy EVSE along major transportation corridors to support medium- and heavy-duty EV charging.

Action TR-2.6: Develop a permit checklist to install EVSE within the public right-of-way by 2029, pursuant to Assembly Bill 2427 (2024).

Action TR-2.7: Explore EV car-sharing programs to offer accessible and affordable EV mobility options, particularly located at multifamily residential buildings.

Action TR-2.8: Consider an ordinance restricting or prohibiting new gasoline service stations.

STRATEGY TR-3. ACTIVE TRANSPORTATION

Reduction Potential ($MTCO_2e$)

Included in Strategy TR-1

Objectives

Make walking and biking safe and accessible for people of all ages and abilities.



Promoting active transportation (e.g., walking, biking, other non-motorized modes) reduces GHG emissions by decreasing reliance on fossil fuel-powered vehicles, improves air quality, and enhances public health through increased physical activity. Active transportation also reduces traffic congestion and supports compact and walkable communities. Moreover, active transportation investments are particularly crucial for residents living in underserved communities, as they tend to have limited access to vehicles and have higher walking, biking, and transit mode shares.

IMPLEMENTATION ACTIONS

Action TR-3.1: Partner with Transportation Agency for Monterey County (TAMC) to implement the Monterey County Active Transportation Plan to enhance and expand bicycle and pedestrian infrastructure and networks.

Action TR-3.2: Partner with TAMC and cities to implement the Monterey County Regional Vision Zero Action Plan to improve the safety of all roadway users.

Action TR-3.3: Pursue funding to provide incentives for residents to purchase or lease e-bikes and other micromobility devices.

Action TR-3.4: Work with existing multifamily building owners and require new multifamily developments to install e-bike charging and secure bicycle parking in multifamily residential developments.

Stories of Sustainability

Safe Routes to School

Safe Routes to Schools, a program of the Transportation Agency for Monterey County, provides approximately $665,000 per year to local schools and communities in the form of tools, programming, and resources to improve traffic safety. The program supports *fun-filled classroom and outdoor activities* encouraging families to safely carpool, walk, bike, skateboard, and scoot to school.

Not only do these programs promote safety, but they also help increase healthy lifestyles and reduce greenhouse gas emissions. By shifting from driving to walking or biking, families get more exercise and breath cleaner air. Less cars on the road means fewer emissions. Win-win-win!

Off-Road Vehicles and Equipment

Strategy OR-1. Electrification and Clean Alternatives



STRATEGY OR-1. ELECTRIFICATION & CLEAN ALTERNATIVES

Reduction Potential ($MTCO_2e$)

5,958 by 2030
11,812 by 2040
19,261 by 2045

Objectives

Reduce construction-related emissions and transition to zero-emission equipment.

By 2030:

Renewable diesel: 50% of construction equipment

Electric: 2% of construction equipment, 12% of landscaping equipment, 12% of recreational boats, and 5% of agricultural equipment and irrigation pumps

By 2040:

Renewable diesel: 75% of construction equipment

Electric: 15% of construction equipment, 85% of landscaping equipment, 75% of recreational boats, and 10% of agricultural equipment and irrigation pumps

By 2045:

Renewable diesel: 80% of construction equipment

Electric: 19% of construction equipment, 100% of landscaping equipment, 100% of recreational boats, 20% of agricultural equipment and irrigation pumps





Similar to the benefits of GHG reduction strategies developed for on-road transportation, using electric and clean alternatives for off-road vehicles and equipment reduces GHG emissions, minimizes diesel and gasoline combustion-related air pollution, and decreases reliance on fossil fuels. Electrifying construction, agricultural, and industrial equipment improves energy efficiency and enhances worker and community health by reducing harmful air and noise pollution.

IMPLEMENTATION ACTIONS

Action OR-1.1: Work with MBARD to encourage all discretionary construction projects to use renewable diesel in diesel-powered construction equipment.

Action OR-1.2: Work with MBARD to discourage the use of fossil fuel-powered generators at construction sites in all new discretionary projects.

Action OR-1.3: Adopt an ordinance that would require the use of zero-emission landscaping equipment for equipment up to 25 horsepower by 2030.

Action OR-1.4: Partner with Monterey Bay Air Resources District and marinas to reduce idling at docks through highly visible signage.

Action OR-1.5: Partner with cities and marinas to install electric charging stations for boats at harbors throughout the county.

Action OR-1.6: Promote 3CE's Ag Electrification Program to replace fossil fuel-powered agricultural equipment with all-electric alternatives. Seek funding opportunities to provide clean backup power supplies.

Solid Waste

Strategy SW-1. Waste Diversion



STRATEGY SW-1. WASTE DIVERSION

Reduction Potential ($MTCO_2e$)

28,891 by 2030
46,803 by 2040
55,914 by 2045

Objectives

Increase organic waste diversion.

By 2030:
75% of waste diverted from landfills

By 2040:
85% of waste diverted from landfills

By 2045:
90% of waste diverted from landfills





Organic waste, which can include things like yard trimmings, food scraps, and paper, contributes to GHG emissions through its decomposition in landfills, which releases methane, which is 30 times more potent than CO_2. By diverting or reducing the disposal of organic waste before it reaches the landfill, the amount of methane produced by landfills can be reduced. In addition, the County will implement food recovery programs. By rescuing surplus food and redistributing it to those in need, food recovery programs lower the emissions intensity of food production, conserve resources like water and energy, and promote food security while reducing overall waste generation.

IMPLEMENTATION ACTIONS

Action SW-1.1: Contractually require annual reporting from the Food Bank for Monterey County in future agreements with Monterey County to ensure baseline and ongoing tonnage data for Senate Bill (SB) 1383 is appropriately and consistently tracked and reported, and member data is verified as additive to or inclusive of Food Bank data.

Action SW-1.2: Consider developing a countywide program to coordinate food rescue and distribution in collaboration with local jurisdictions. The program should provide resources to potential food donors and education to ensure increased compliance with organic waste diversion goals.

Action SW-1.3: Conduct an annual survey of all food rescue organizations and services with a refined and more comprehensive set of survey questions, and more clearly defined terms for consistency in data reported.

Action SW-1.4: Develop a methodology for converting average square footage of storage space types to average weight of edible food, and/or explore opportunities for the acquisition of onsite scales, training for weight estimation, or material characterization studies for edible food recovery facilities.

Action SW-1.5: Develop and pilot a solid waste diversion program in coordination with local partners and the Health Department to eliminate single-use products through dishwashing and reusable adoption. This program should aim to demonstrate success for festival and event use cases before scaling to larger use cases. Future use cases to be considered by the program include institutions with high volumes of food service, restaurants, etc.

Action SW-1.6: Promote materials reuse and sharing through outreach and education, community tool libraries, maker spaces, fix-it clinics, and material swaps.



Water and Wastewater

Strategy WA-1. Water Conservation



STRATEGY WA-1. WATER CONSERVATION

Reduction Potential ($MTCO_2e$)

123 by 2030

67 by 2040

0 by 2045

Objectives

Reduce building and landscaping water use and increase recycled water for irrigation.

By 2030:

25% reduction in residential consumption
31% reduction in nonresidential consumption
25% reduction in consumption for existing irrigation
60% reduction in consumption for new irrigation

By 2040:

30% reduction in residential consumption
36% reduction in nonresidential consumption
30% reduction in consumption for existing irrigation
70% reduction in consumption for new irrigation

By 2045:

35% reduction in residential consumption
41% reduction in nonresidential consumption
35% reduction in consumption for existing irrigation
75% reduction in consumption for new irrigation



Water conservation reduces energy required for water treatment, distribution, and heating, thereby lowering GHG emissions from water use-related energy sources that are fossil fuel-based. In addition, water conservation efforts such as promoting the use of recycled water helps conserve freshwater resources, supports sustainable groundwater management, and reduces strain on water supplies that are already impacted by climate change, and therefore enhances the county's drought resilience.

IMPLEMENTATION ACTIONS

Action WA-1.1: Regularly review and update the County's Water Conservation Ordinance (Monterey County Code of Ordinances, Chapter 15.12) and water conservation measures to be consistent with current best management practices and ensure effective and ongoing conservation efforts.

Action WA-1.2: Consider water efficiency standards for new construction that achieve water-neutral development for projects expected to exceed the historical water use of a parcel.

Action WA-1.3: Continue to assess and manage distribution system losses through efforts including replacing existing meters with smart meters, implementing a Supervisory Control and Data Acquisition (SCADA) system, replacing selected water pipe with upgraded design criteria to withstand seismic events, and maintaining an active cathodic protection system.

Action WA-1.4: Adopt a drought-ready ordinance to require grey water readiness in new residential construction and major renovations.

Action WA-1.5: Incentivize residential and nonresidential development to convert lawns to a healthy habitat with native and drought-tolerant species that use water-efficient irrigation equipment through the creation of rebate programs.

Action WA-1.6: Explore the establishment of a cost-sharing program that reduces upfront expenses for farmers adopting water-saving irrigation technologies (e.g., drip irrigation, soil moisture sensors, remote irrigation management systems), prioritizing small and medium-sized farms. Coordinate training sessions with local agricultural groups to demonstrate how to install and maintain these systems effectively.

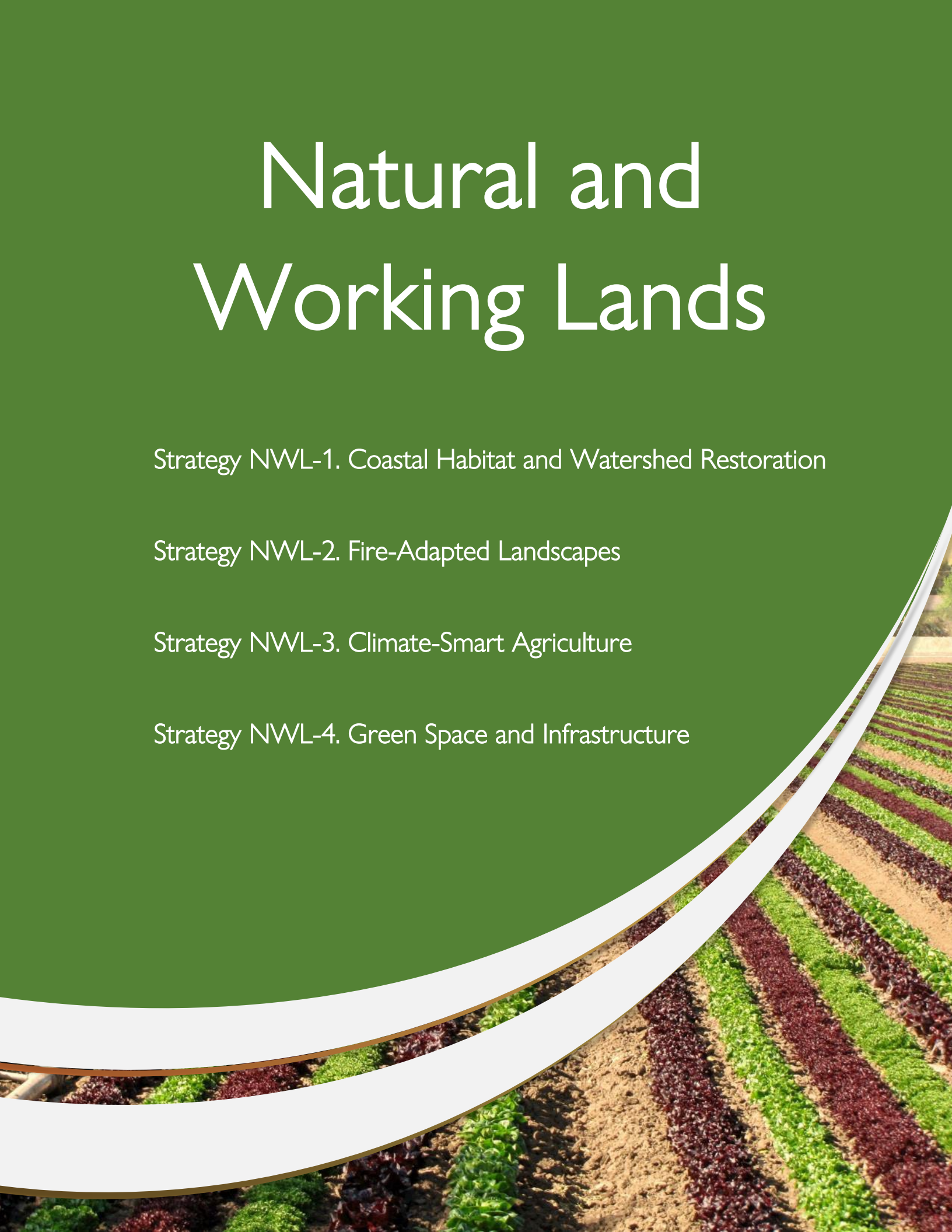
Natural and Working Lands

Strategy NWL-1. Coastal Habitat and Watershed Restoration

Strategy NWL-2. Fire-Adapted Landscapes

Strategy NWL-3. Climate-Smart Agriculture

Strategy NWL-4. Green Space and Infrastructure



STRATEGY NWL-1.
COASTAL HABITAT AND WATERSHED RESTORATION

Reduction Potential
Included in strategy total

Objectives
Conserve, restore, and protect coastal wetlands, seagrass beds, and freshwater wetlands.

By 2045:
2,050 acres of wetland restored



Restoring coastal habitat and wetlands can significantly enhance carbon sequestration through the preservation and expansion of ecosystems like salt marshes, mangroves, and seagrass meadows. These ecosystems play a crucial role in capturing and storing carbon dioxide (CO_2).

IMPLEMENTATION ACTIONS

Action NWL-1.1: Support efforts to restore degraded coastal wetlands and salt marshes in priority areas (e.g., Elkhorn Slough), which may include assessing current site conditions to identify the most viable restoration opportunities, developing restoration plans with ecological specialists, and prioritizing activities like invasive species removal, sediment management, and re-establishing native vegetation.

Action NWL-1.2: Support the development of a regional approach to aquatic sequestration in the Monterey Bay in collaboration with regional groups involved in blue carbon ecosystems.

Action NWL-1.3: Continue to implement the Salinas River Stream Management Program to enhance riparian corridors within the Salinas River watershed.

Action NWL-1.4: Protect and preserve existing intact habitats and resources, consistent with the Monterey County Regional Conservation Investment Strategy objectives and applicable General Plan implementation activities.

Stories of Sustainability

Elkhorn Slough Foundation

The Elkhorn Slough Foundation (ESF) protects and restores more than 4,200 acres, which serves as a habitat for a diverse population of birds, plants, marine mammals, and fish. ESF works with students, families, and volunteers to create welcoming spaces for community relationship building through a variety of programs.

Nosotros Nos Curamos or "Together We Heal" is a family engagement program for the community of Las Lomas, an underserved community adjacent to Elkhorn Slough. This program focuses on mental and physical health through learning about native plants and plant medicine and supporting restoration efforts. Other programs managed by ESF include an outdoor classroom for elementary school students and Slough Crew, the Environmental Club at North Monterey County High School in Castroville, which engages participants in restoration projects and outdoor recreation.

STRATEGY NWL-2. FIRE-ADAPTED LANDSCAPES

Reduction Potential

Included in strategy total

Objectives

Practice climate-smart management of ecosystems
to enhance resilience and reduce wildfire risk.

Annually by 2030:
34,828 acres of fuel reduction and restoration



Healthy, resilient, and fire-adapted landscapes and ecosystems allow vegetation to grow and capture CO_2 through photosynthesis, and therefore, enhance carbon sequestration potential. Climate-smart management of fire-adapted landscapes can also prevent forest degradation caused by wildfires, disease outbreaks, and drought-induced die-offs, which can release stored carbon. Moreover, strategically managing vegetation, using fire-resistant plant species and maintaining defensible space, helps lower fuel loads and improves long-term landscape resilience to increasing wildfire risks due to climate change.

IMPLEMENTATION ACTIONS

Action NWL-2.1: Seek funding for and prepare a restoration plan for publicly owned forest lands within the county. This plan should identify degraded or understocked forest areas for restoration, develop site-specific planting guidelines, and prioritize native, drought-resistant tree species. Implementation of the plan should include a phased planting schedule, starting with pilot sites in fire-affected or soil-eroded regions, and establishing an annual review and monitoring process to assess growth and carbon capture.

Action NWL-2.2: Work with local tribes to design a cultural burning program that incorporates Traditional Ecological Knowledge to reduce wildfire risk, manage fuel loads, and restore ecosystems, particularly in oak woodlands. Through the program, support/coordinate regulatory approvals, provide training and equipment for tribe-led burns, and host regular public information sessions to educate residents about cultural burns and their ecological benefits.

Action NWL-2.3: Work with local tribes to acknowledge the importance of traditional knowledge and native peoples' interconnection with historic ecological health and future restoration efforts. Develop a formal framework for native peoples' participation in climate efforts in the county.

Action NWL-2.4: Work with land managers to seek funding and implement fuel reduction activities including prescribed burning.

Action NWL-2.5: Work with land managers to coordinate a regional initiative for oak woodland restoration in areas affected by Sudden Oak Death (i.e., *Phytophthora ramorum*), development impacts, and climate stressors. Identify priority restoration sites, support the development of a local native oak nursery, and offer technical and financial assistance to landowners.

Action NWL-2.6: Explore the establishment of a coordinated detection and management system focused on protecting forests from pests and diseases (e.g., bark beetles, pitch canker). This may include various elements, such as implementing a network of seasonal monitoring plots across key forest areas, deploying digital survey tools for real-time pest reporting, developing an online mapping platform to track infestations, training field crews in identification and treatment protocols, and providing cost-sharing to assist with implementing control measures (e.g., tree removal, proper wood disposal).

Action NWL-2.7: Support the sustainable management and utilization of forest biomass generated from fuel reduction and forest health projects (e.g., biochar to improve soil health) by preparing formal guidance, reducing barriers (e.g., streamlined permitting), coordinating transportation logistics, exploring incentives, and offering technical assistance to navigate potential regulatory requirements.

Action NWL-2.8: In partnership with the Fire Safe Council for Monterey County, prepare an update to the Monterey County Community Wildfire Protection Plan to enable federal funds for wildfire preparation work in the county.



STRATEGY NWL-3. CLIMATE-SMART AGRICULTURE

Reduction Potential

Included in strategy total

Objectives

Practice climate-smart agriculture to preserve natural and working lands, prevent food loss, and reduce waste emissions.

Support conversion of conventional practices to organic practices.

Annually by 2030:

3,832 acres of regenerative agricultural practices and cropland conservation



Climate-smart agriculture increases carbon sequestration potential in soils and vegetation while reducing GHG emissions through sustainable practices. It minimizes reliance on synthetic fertilizers, lowering GHG emissions from their production and application, and improves efficiency across the food supply chain by optimizing harvesting and storage techniques to prevent food loss and reduce waste-related emissions.

IMPLEMENTATION ACTIONS

Action NWL-3.1: Develop a healthy soils strategy for Monterey County to support agriculture, address carbon sequestration, and increase water capture. The strategy should include tracking mechanisms for healthy soil practices, identification of resources for organic agriculture conversion, opportunities to develop a carbon sequestration market, and measures to conserve existing cropland throughout the county.

Action NWL-3.2: Pursue funding and provide technical assistance to support the development and implementation of carbon farm plans and healthy soils strategies in Monterey County.

Action NWL-3.3: Work with University of California Cooperative Extension (UCCE) and ranchers to measure residual dry matter on annual pastures to improve soil conditions, increase water holding capacity, and minimize invasion of weedy plants.

Action NWL-3.4: Work with TAMC, Resource Conservation District of Monterey County, land trusts/conservancies, UCCE, and landowners to acquire, lease, or establish easements to protect productive agricultural or grazing lands.

Action NWL-3.5: Work with farmers to reduce fertilizer application consistent with the requirements of the Central Coast Regional Water Quality Control Board's Ag Order 4.0.

Action NWL-3.6: Partner with neighboring counties and resource conservation districts to prepare a feasibility study to explore the development of community compost banks. The study could include an assessment of organic waste availability, market demand for compost, potential cost savings, infrastructure needs, and potential contamination challenges.

STRATEGY NWL-4. GREEN SPACE AND INFRASTRUCTURE

Reduction Potential ($MTCO_2e$)

222 by 2030
666 by 2040
888 by 2045

Objectives

Expand green spaces, utilize green infrastructure and nature-based solutions, and invest in local parks.

Annually by 2030:
108 acres of urban tree cover conserved
218 acres of urban vegetation planted
1,254 trees planted in urban areas



Green spaces and vegetation absorb CO_2 through photosynthesis, storing carbon in plants and soils. Expanding green infrastructure helps mitigate urban heat island effect, reducing cooling demands and associated emissions from electricity generation. In addition, nature-based solutions, including expanding green infrastructure, improve water management, support soil restoration, and increase carbon sequestration potential.

IMPLEMENTATION ACTIONS

Action NWL-4.1: Seek funding for and prepare community-specific forest management plans that focus on expanding tree canopies in residential and nonresidential areas to provide cooling benefits. Identify high priority areas that are currently underserved by street trees and trees within public spaces.

Action NWL-4.2: Seek funding for and implement an urban greening program to expand tree canopies, establish tree line buffers, plant native and drought-tolerant vegetation, and establish community gardens in developed areas of the unincorporated county and in partnership with local cities, focusing on climate-vulnerable and underserved communities.

Action NWL-4.3: Develop and implement—in partnership with cities—a countywide tree adoption program, where residents and local businesses can sponsor and be recognized (e.g., through on-site signage/plaques, County's website and social media platforms) for the planting and maintenance of trees in public spaces. Offer a variety of sponsorship levels and options (e.g., single tree, group of trees, entire planting area), where sponsorship fees can cover both: (1) the costs of purchasing, planting, and maintaining the trees for a specified period (e.g., 3-5 years); and (2) a dedicated endowment fund, where a portion of the sponsorship fees can be reinvested to support long-term program maintenance.

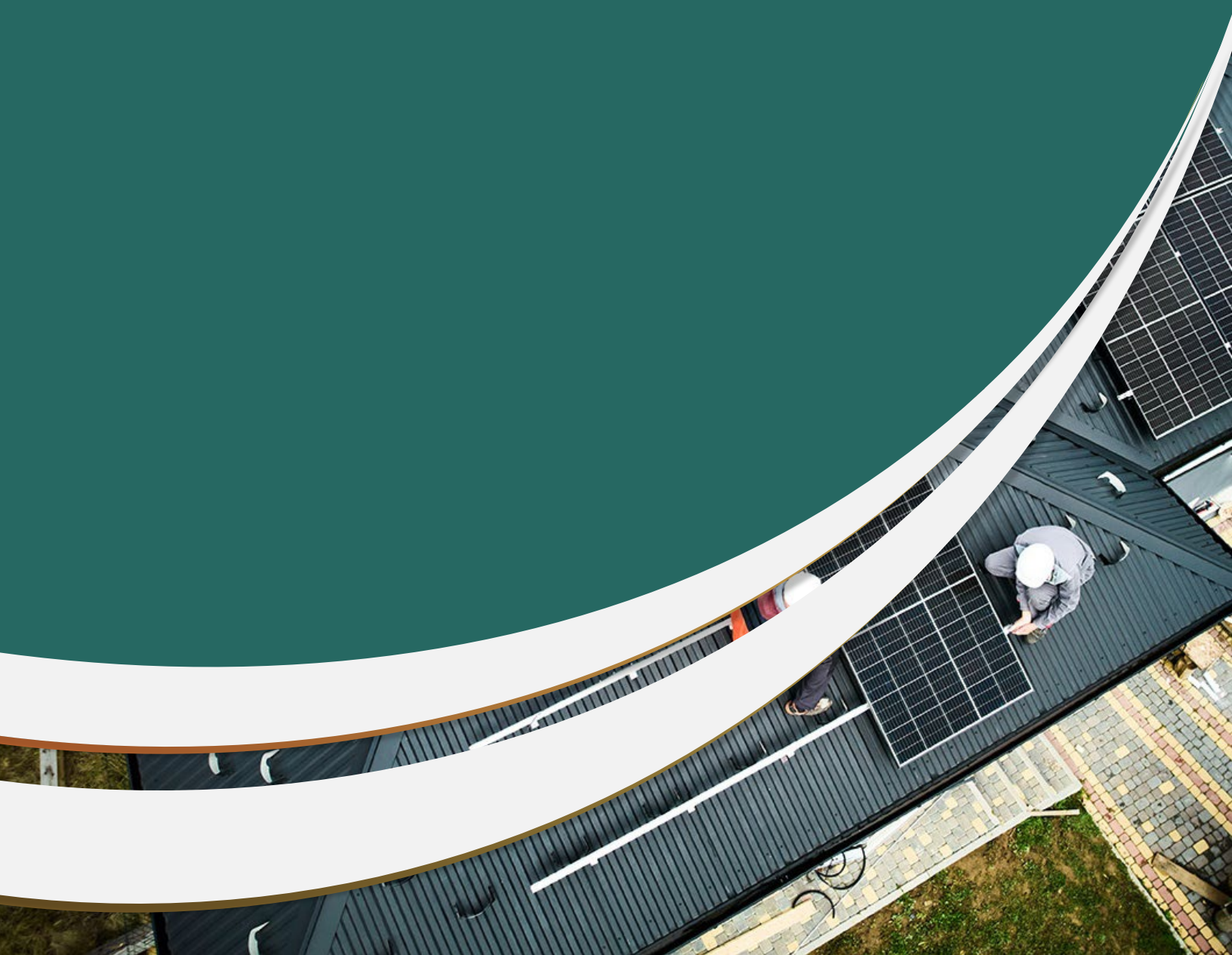
Action NWL-4.4: Support Monterey Peninsula Regional Park District with implementing its strategic plan to adapt to climate impacts, conserve land, and engage communities.

Action NWL-4.5: Identify and incorporate green infrastructure opportunities when considering capital improvements to stormwater treatment and roadway improvements.

Action NWL-4.6: Work with Caltrans and community-based organizations (CBOs) to execute Adopt a Highway agreements for litter removal, tree planting and vegetation management for every mile of state highway located in developed areas of the unincorporated county.

Green Economy

Strategy GE-1 Green Businesses and Jobs



STRATEGY GE-1. GREEN BUSINESSES AND JOBS

Reduction Potential

N/A

Objectives

Support a local economy that fosters a just transition towards environmental sustainability.



Promoting green businesses and jobs drives economic growth while reducing GHG emissions by prioritizing clean energy, resource efficiency, and sustainable practices. Green industries support the transition to a low-carbon economy; create employment in the renewable energy, energy efficiency, and sustainable agriculture fields; and encourage innovation in climate-friendly technologies. In addition, investing in green jobs helps reduce the county's overall reliance on fossil fuels and accelerate the adoption of climate solutions across various sectors.

IMPLEMENTATION ACTIONS

Action GE-1.1: Support workforce development for electrification and building energy efficiency projects. Partner with regional energy agencies to support contractor training and resident education on electric appliances and their installation and maintenance.

Action GE-1.2: Increase the number of certified green businesses each year in partnership with the Monterey Bay Area Green Business Program and recognize and promote current participants.

Action GE-1.3: Collaborate with See Monterey and cities to increase public awareness of sustainable infrastructure benefits and the contribution of nature-based solutions to tourism-based businesses that rely on healthy natural and working lands (e.g., wine, recreation, and hospitality industries).

Action GE-1.4: Support the development of new markets and products that offer climate-smart and climate-friendly solutions for local use (e.g., biochar production).

Action GE-1.5: Develop an economic development strategy that guides future economic growth toward climate-adapted industries and business practices, leveraging existing partnerships and collaboratives as appropriate (e.g., Monterey Bay Economic Partnership). The strategy will identify priority areas for development that minimize exposure to climate risks, create incentives for businesses that incorporate climate resilience measures, establish guidelines for climate-smart industrial and commercial development, and help businesses identify and reduce climate-related vulnerabilities in their operations and supply chains.

Stories of Sustainability

ALBA (Agriculture and Land-Based Training Association)

Founded in 2001, Salinas-based ALBA provides hands-on *opportunities for low-income field laborers to gain skills and experience*, with the ultimate goal of helping them own their own farm. ALBA's five-year Farmer Education and Enterprise Development (FEED) project offers a year of classroom training followed by four years in the field at ALBA's 100-acre training farm, learning organic practices as well as the business side of owning a farm.

In any given year, ALBA leases over 80 acres of farmland to 36-40 start-up organic farms. According to ALBA's 20 Year Impact Assessment Brief, 77 graduates are currently operating their own farms. Of those, 90% are organic. This not only improves opportunities and equity in Monterey County, but it also increases the availability of local, organic food to the public.

DETAILED CLIMATE ADAPTATION STRATEGIES AND ACTIONS

As discussed in Chapters 1 and 4 of the CCAAP, climate change adaptation planning aims to enhance the climate resilience of communities by analyzing Monterey County-specific climate change effects and developing strategies to respond to and prepare for current and future impacts from climate change effects. Improving community resilience in the context of climate change can encompass a broad array of strategies. Climate adaptation strategies and actions developed for the CCAAP are presented below and are generally organized by climate change effects: wildfire, extreme heat, flooding and sea level rise, as well as drought. The multi-hazard mitigation strategy below targets all of these climate change effects. Similar to the GHG emissions reduction strategies listed above, objectives are also included under each strategy.

Implementing adaptation strategies and actions is essential for fostering a resilient and sustainable future for the county with intensifying climate change effects across California. Similar to GHG emissions reduction strategies and actions, adaptation strategies and actions can also generate a range of environmental, economic, and social co-benefits beyond just climate adaptation, such as cleaner air, lower harmful air pollutants, and supporting disadvantaged communities and vulnerable populations for a more inclusive Monterey County (as detailed in Chapter 1).



Adaptation

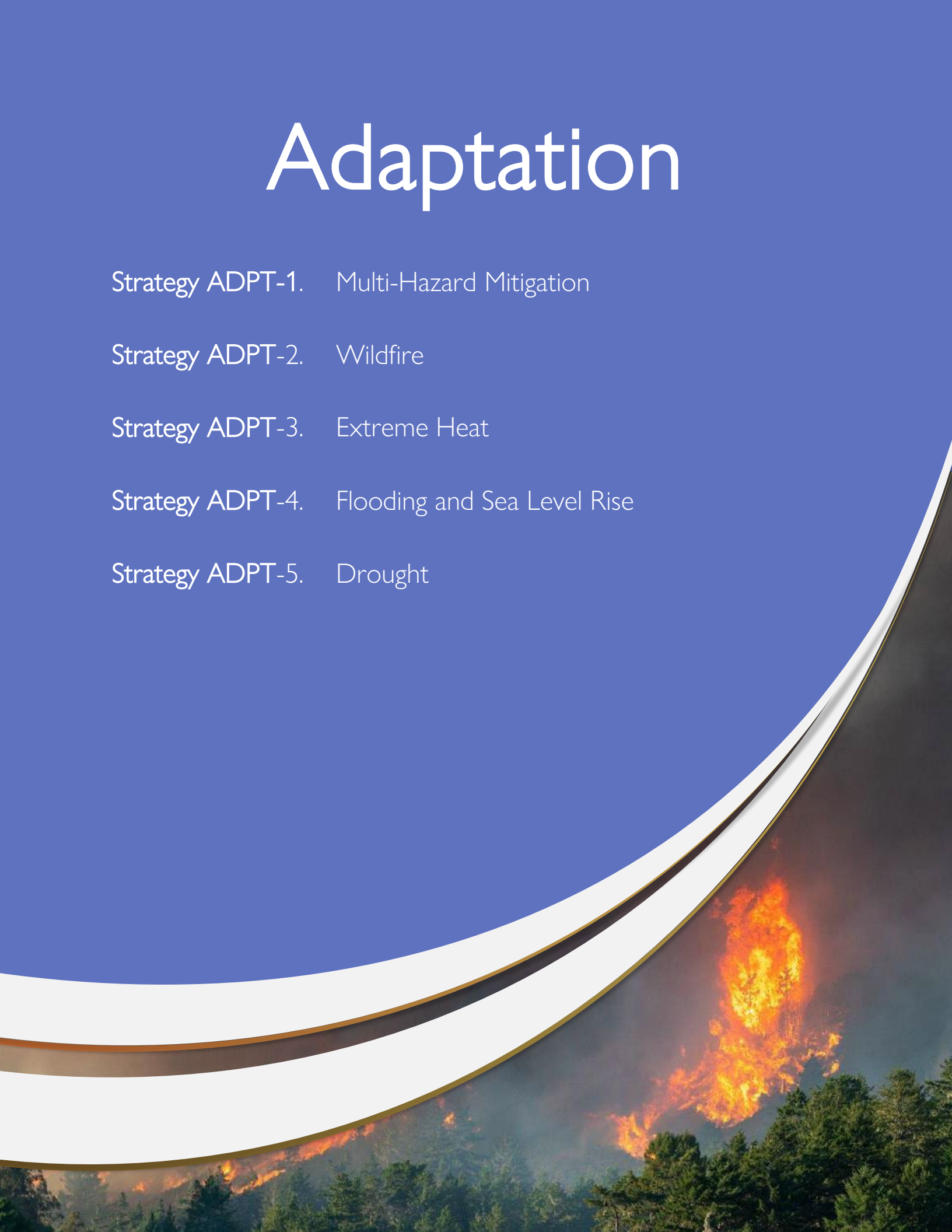
Strategy ADPT-1. Multi-Hazard Mitigation

Strategy ADPT-2. Wildfire

Strategy ADPT-3. Extreme Heat

Strategy ADPT-4. Flooding and Sea Level Rise

Strategy ADPT-5. Drought



STRATEGY ADPT-1. MULTI-HAZARD MITIGATION

Objectives

Ensure that climate adaptation actions holistically address hazards and risks throughout the county.



Addressing multiple climate hazards simultaneously can enhance efficiency and create co-benefits across sectors. These strategies help maximize impact and resource efficiency while increasing the county's resilience to climate change. Multi-hazard mitigation strategies also ensure that climate adaptation benefits all sectors (e.g., energy, transportation, housing) while addressing social equity and environmental justice. In addition, multi-hazard approaches create holistic and long-term solutions that strengthen the county's climate resilience at the system level.

IMPLEMENTATION ACTIONS

Action ADPT-1.1: Continue to support the widespread adoption of "Alert Monterey County"—the official emergency alert and warning system for all jurisdictions in the county—to ensure that all residents are informed before, during, and after a climate hazard event (among other emergencies). Expand existing public outreach efforts through: (1) targeted enrollment campaigns at community events, healthcare facilities, and schools; (2) automatic enrollment for County services recipients; and (3) partnerships with CBOs for door-to-door outreach in historically underserved areas. Low-tech backup notification systems may also be considered and established as part of this initiative.

Action ADPT-1.2: Support the public health sector's capacity to address climate change as a public health crisis through a twofold approach of: (1) increasing the collection, analysis, and reporting of data on climate-related health impacts; and (2) prioritizing health equity resources for communities facing disproportionate health impacts from climate change. This may include coordinating with appropriate state and federal agencies (e.g., California Department of Public Health, California Office of Environmental Health Hazard Assessment, Centers for Disease Control and Prevention) and other local partners to collect relevant data and develop dashboards that will help inform resource allocation and targeted interventions and support grassroots health equity initiatives.

Action ADPT-1.3: Develop a countywide network of resilience hubs to enhance community resilience. These hubs—which will feature solar microgrids (where feasible and where funding allows)—will be housed in accessible public facilities, such as libraries, community centers, and schools, and will serve as multi-purpose sites offering year-round support services (e.g., health screenings, food distribution) and critical resources during emergencies exacerbated by climate change. The County encourages force multiplication and unity of effort through collaboration with partners and local entities (e.g., health care centers, CBOs, faith-based organizations) to support hubs and offer services tailored to each community's needs. To leverage funding, technical support, and best practices, the resilience hub network should draw upon existing resources where feasible (e.g., Strategic Growth Council's Community Resilience Centers program).

Action ADPT-1.4: Enhance local food security through an array of efforts, such as providing coordination support to connect local agricultural producers with food banks and pantries, developing a countywide food recovery program and working group to oversee compliance with SB 1383, and providing transportation assistance to help residents access farmers' markets and food distribution networks.

Action ADPT-1.5: Adopt and require the use of a resilient buildings checklist for new construction and major renovations. The checklist should consider utilizing, at a minimum the following conditions:

- Firesafe: building materials, location, and egress routes that consider potential fire risks, evacuation options, and offer a buffer to any wildlands urban interface. These can align with IBHS' Wildfire Prepared Home designation.
- Air quality: integrated air filtration systems and solutions to provide healthy indoor air quality during smoky periods.
- Smart location of equipment that leaves roofs available for solar and puts equipment out of any potential flood or other hazard areas.
- Water: support water quality, water safety, and water efficiency, along with approaches to access water during a disaster.
- Require the use of electric heat pumps to provide heating and cooling to residents to combat rising temperatures.
- Support non-mechanical cooling approaches such as passive house building, cool roofs, and tree shading.
- Sea level rise and flooding: do not incentivize projects that are located in a Federal Emergency Management Agency flood zone.
- Multi-benefit energy and resilience measures including solar and storage enabling the building to operate off the grid during power outages and address the needs of residents (such as communications, medical needs, and refrigeration).
- Minimum temperature factor at doors, windows, and thermal bridges. This factor ensures an absence of condensation and prevents mold and mildew that can lead to long term building damage.
- Anti-displacement measures that will help to ensure the project does not displace low-income residents from the neighborhood due to increased rental prices.

Action ADPT-1.6: Partner with TAMC to implement the North Monterey County Regional Transportation Vulnerability Assessment recommendations as well as subsequent regional transportation vulnerability assessment recommendations.

Stories of Sustainability

Monterey Bay Climate Adaptation Action Network

Funded by a Climate Resilience Regional Challenge grant from the National Oceanic and Atmospheric Administration, the Monterey Bay Climate Adaptation Action Network (MBCAAN) was launched in 2025. MBCAAN will coordinate and plan for future adaptation and resilience actions in the Monterey Bay region and act as a forum for planning and information sharing to ensure the coordinated, integrated implementation of climate adaptation activities.

MBCAAN will provide broad and inclusive participation of local and regional governments, researchers, NGOs, business groups, community groups, and other stakeholders around the Monterey Bay Area to ensure inclusive decision-making and the equitable development of climate resilience policies and adaptation actions. MBCAAN members will work together to create a comprehensive Regional Resilience Plan, identify project needs, develop projects, and pursue grants.

STRATEGY ADPT-2. WILDFIRE

Objectives

Reduce wildfire risk and support fire-adapted communities.





As discussed in Chapter 5, Climate Adaptation and Resilience, wildfire is a frequent hazard in the county that is only expected to worsen as climate change increases the likelihood of ignition and rapid fire spread. The growing wildfire threat poses severe risks to public safety, infrastructure, and essential community functions. Direct wildfire exposure can cause serious injuries, fatalities, and extensive property damage. Additionally, wildfire smoke and air pollution significantly impact public health, increasing respiratory illnesses and other health complications. Moreover, even after a wildfire is contained, post-fire hazards such as debris flows triggered by intense rainfall can create life-threatening conditions, further endangering communities and infrastructure.

IMPLEMENTATION ACTIONS

Action ADPT-2.1: Coordinate with MBARD and other local and regional agencies and organizations to develop and implement a suite of measures focused on protecting residents from wildfire smoke, including: (1) the widespread awareness and adoption of mobile applications (e.g., Smoke Spotter, AirNow), which can help populations prepare for wildfire smoke events; (2) the development of a program to subsidize and provide free residential air filtration/purification devices to renters and homeowners; among others; and (3) providing formal recommendations and incentives that encourage local businesses and other indoor community gathering places to serve as an impromptu, adaptable, accessible network for clean air centers during hazardous wildfire smoke events.

Action ADPT-2.2: Collaboratively develop and implement a wildfire-resilient agriculture program that includes: (1) technical assistance for creating agricultural buffer zones that serve both fire protection and productive farming purposes; (2) cost-sharing for installation of agricultural-grade sprinkler systems that can be activated for ember protection; and (3) guidance on fire-resistant crop selection and field pattern design for properties in high-risk areas.

Action ADPT-2.3: In partnership with the Fire Safe Council for Monterey County, launch a home hardening program for existing homes—including mobile homes and manufactured housing—in high-risk areas that provides comprehensive assessments, offers grants for home hardening improvements (e.g., ember-resistant vents, noncombustible gutter covers, enclosed eaves), and provides additional financial assistance and resources for low-income homeowners.

Action ADPT-2.4: Collaborate with the California Department of Forestry and Fire Protection (CAL FIRE) and the Fire Safe Council for Monterey County to support and expand the number of Firewise USA® recognized communities across the county. Support may come in the form of building community awareness through outreach and education, providing direct support through technical assistance, offering financial support and incentives, coordinating with local fire agencies, and monitoring and reporting progress.

Action ADPT-2.5: Explore the collaborative development and implementation of a "smart" wildfire detection network by conducting a comprehensive feasibility study that evaluates technical requirements, cost considerations, and implementation challenges. The study would assess the viability of integrating various technologies (e.g., solar-powered thermal imaging cameras with Artificial Intelligence capabilities, remote weather stations, soil moisture sensors) into a centralized early warning system. Additionally, it would identify potential funding sources, evaluate infrastructure needs, determine maintenance requirements, analyze cost-benefit ratios, and develop strategies to address technical barriers. Based on the feasibility study findings, develop a phased implementation plan that prioritizes deployment in high-risk areas and establishes clear protocols for data management, system maintenance, and emergency response integration.

Action ADPT-2.6: Serve as a coordinating entity for partners (e.g., CAL FIRE, Fire Safe Council for Monterey County) to further enhance the reach and effectiveness of their existing wildfire preparedness and wildfire risk reduction programs and resources. This may include integrating program materials into County mailings, providing dedicated space in County facilities for in-person events or workshops, and actively promoting initiatives through all County communication channels.

Stories of Sustainability

Los Padres Strategic Community Fuelbreak Collaborative Project

The Los Padres Strategic Community Fuelbreak Collaborative Project (LPSCFC) is a collaborative grant project that is implementing fuels reduction work across the Big Sur and Carmel Valley regions. The Resource Conservation District of Monterey County is leading the project through the support of a CAL FIRE grant of $4.8 million.

LPSCFC covers approximately 403 acres across Carmel Valley to re-establish and strengthen strategic fuelbreaks in the Carmel Valley region, help implement community fuels treatments in critical neighborhoods and also to help assess the feasibility of new emergency egress areas.

STRATEGY ADPT-3. EXTREME HEAT

Objectives

Prepare for and reduce heat-related impacts to communities throughout the county.



Both coastal and inland areas of the county are projected to experience rising average temperatures and more frequent extreme heat events through the end of the century. These climate-driven temperature increases pose significant public health risks, including heat stroke, heat-related illnesses, and the worsening of pre-existing conditions in vulnerable populations. Moreover, prolonged extreme heat events will impact the county's built environment by increasing demand for cooling and disproportionately affecting residents without air conditioning.

IMPLEMENTATION ACTIONS

Action ADPT-3.1: Launch a pilot program to install cool (i.e., high albedo) pavement in heat-vulnerable neighborhoods across the county, focusing on areas with high pedestrian traffic, low tree canopy, and significant exposure to the urban heat island effect. Partner with technical experts on cool pavement materials and performance monitoring, and collaborate with local public health agencies to identify and prioritize locations based on heat vulnerability. Assuming positive pilot outcomes and community buy-in, develop a phased expansion plan for cool pavement installation, prioritizing areas that would benefit most from reduced surface temperatures.

Action ADPT-3.2: Develop a countywide program to support and oversee employer compliance with the California Division of Occupational Safety and Health (Cal/OSHA)'s heat illness prevention standards for both indoor (i.e., California Code of Regulations (CCR) Title 8, Section 3396) and outdoor (i.e., CCR Title 8, Section 3395) workplaces. This program will include education and training opportunities for employers and employees on heat safety regulations, onsite inspections during extreme heat events, and guidance for workers to report employer non-compliance. Additionally, the program will provide resources, technical assistance, and incentives to employers for implementing enhanced heat protection measures that go beyond Cal/OSHA standards.

Action ADPT-3.3: Evaluate and consider establishing requirements for the use of heat mitigation measures in the public realm, particularly in common community gathering spaces (e.g., playgrounds, parks) and along transit corridors. Requirements may include the incorporation of: (1) building design features (e.g., varied building heights; setbacks from sidewalks; vertical and horizontal shade features); (2) cooling materials, treatments, and coatings (e.g., for rooftops); (3) multiple layers of shading to maximize coverage throughout the day; (4) street trees and landscaping; and (5) public amenities, such as drinking fountains and water mister/spray areas; among others.

Action ADPT-3.4: Create a "Cool Buddy" program that recruits and trains community volunteers to support neighborhood resilience during extreme heat events. Volunteers will be trained to: (1) recognize signs of heat stroke and other heat-related illnesses; (2) identify and check in on heat-vulnerable neighbors (e.g., seniors, low-income residents, those without adequate cooling resources); (3) connect vulnerable residents with local resources, such as transportation to cooling centers and community health services. The program will work with neighborhood groups, community emergency response teams (CERT), and CBOs to strengthen local networks, allowing neighborhoods to coordinate volunteers and support systems.

STRATEGY ADPT-4. FLOODING AND SEA LEVEL RISE

Objectives

Prepare for and reduce flooding and sea level rise impacts throughout the county.



The county is expected to experience more frequent extreme precipitation and flooding events due to climate change, posing risks to populations, properties and critical facilities in floodplains. Severe flooding can lead to displacement, loss of homes and livelihoods, injuries and fatalities. Additionally, floodwaters can damage infrastructure, overwhelm drainage systems, and increase inflow and infiltration in critical facilities. Moreover, spatial analysis of sea level rise data indicates that portions of the county are directly vulnerable to coastal flooding and inundation. Seawater backflow resulting from coastal flooding can impair coastal sanitation drainage systems, necessitating costly upgrades and modifications.

IMPLEMENTATION ACTIONS

Action ADPT-4.1: Evaluate the creation of a managed retreat program for homes and critical assets (e.g., infrastructure) at risk of repeated damage due to sea level rise, flooding, and other climate hazards to allow for natural modification of the landscape and reduction in risk to property and life. The program would identify financial support mechanisms and include standards that determine when homes or assets should be relocated, modified, or removed.

Action ADPT-4.2: Coordinate with conservation organizations and local landowners to expand floodplain restoration in the Salinas River watershed, improving natural flood mitigation by increasing water absorption, restoring native vegetation, and creating wildlife habitat. Focus restoration efforts on high-risk flood zones to reduce downstream flood impacts in agricultural and residential areas.

Action ADPT-4.3: Evaluate the need for more stringent minimum standards for flood protection and resilience, notably for new construction and major renovations. Specific considerations should include floor elevations, flood-resistant materials, and improved drainage systems (among others), and additionally, potential incentives for exceeding minimum standards. Depending on the outcomes of the evaluation, incorporate new standards by ordinance.

Action ADPT-4.4: Develop an outreach and assistance program to connect property owners in flood-prone areas of the county with existing regional, state, and federal programs that provide funding and technical assistance for flood resilience improvements. The County will work with local CBOs to raise awareness and offer application assistance, prioritizing low-income residents and small businesses.

Action ADPT-4.5: Collaborate with Caltrans to develop an implementation plan to address the risks of sea level rise, coastal erosion, and storm surge along Highway 1, informed by existing studies and resources (e.g., Central Coast Highway 1 Climate Resiliency Study). The plan will prioritize projects that balance infrastructure resilience, environmental sustainability, and scenic preservation, and additionally, will engage communities along Highway 1 in implementation discussions to align each project with local needs.

STRATEGY ADPT-5. DROUGHT

Objectives

Prepare for and adapt to more frequent drought conditions throughout the county.





Extended droughts are expected to become more frequent in the coming decades, further straining the Central Coast region's already limited water supply, including Monterey County's. All residents face potential drought-related impacts, such as reduced water availability, declining water quality, and increased dust pollution. Water shortages may disproportionately affect low-income communities, limiting access to safe and affordable water, especially in areas already burdened by environmental pollution. Moreover, while drought has minimal direct effects on the built environment, it can lead to severe secondary hazards, including heightened wildfire risk and increased susceptibility to landslides and mudslides following heavy rainfall.

This strategy also aligns with Strategy WA-1: Water Conservation. As mentioned previously, water conservation reduces strain on water supplies and improves the county's drought resilience.

IMPLEMENTATION ACTIONS

Action ADPT-5.1: In partnership with water and wastewater service providers, upgrade water and wastewater infrastructure throughout the county to adapt to future potential climate-driven changes in water quality and availability, which may include deepening intake systems to accommodate lower water levels, implementing advanced filtration technologies to address increased contaminant levels, and expanding storage capacity to ensure water supply during periods of drought. Prioritize upgrades in areas with aging infrastructure.

Implementation and Monitoring

Strategy IM-1. Education, Outreach, and Coordination

Strategy IM-2. Public Participation and Engagement

Strategy IM -3. Climate Tracking and Budgeting

Strategy IM-4. Funding and Financing



STRATEGY IM-1.
EDUCATION, OUTREACH, AND COORDINATION

Reduction Potential

N/A

Objectives

Continue to provide education and outreach to the Monterey County community on how to support climate action locally and coordinate with essential partners for successful implementation.



Education, outreach, and coordination are essential for advancing climate action and adaptation by raising awareness, fostering collaboration, and driving meaningful behavior change. Education equips individuals, businesses, and governments with the knowledge to understand causes, impacts, and solutions to climate change, enabling informed decision-making. Outreach encourages the adoption of sustainable practices such as waste reduction, energy conservation, and clean transportation while promoting proactive climate preparedness. Moreover, effective coordination among governments, regional agencies, community organizations, and businesses supports comprehensive and cohesive climate solutions.

IMPLEMENTATION ACTIONS

Action IM-1.1: Develop a building electrification outreach program that provides education strategies that enable and encourage energy conservation and gas-to-electric conversions in residential and commercial buildings for space and water heating, and planning for equipment replacement before failure occurs due to emergencies. Develop and/or share existing online educational materials targeted toward building owners and tenants that are hosted on the County's website on energy efficiency and building electrification; including training, fact sheets, information on available incentives, video tutorials, and links to existing content (such as The Switch is On). In addition, video tutorials can explain to building owners how to enroll in real-time energy use monitoring tools to track energy use compared to historic levels and within the community through the EnergyStarђ Portfolio Manager, or other tools offered by third-party providers. The educational materials will also be provided as part of routine regulatory processes, such as applying for or renewing licenses or permits. The building electrification outreach program will coordinate with local jurisdictions and agencies to share resources and problem solve across jurisdictions.

Action IM-1.2: In partnership with TAMC, develop a transportation outreach program that provides education strategies that enable and encourage residents to engage in mode shifts (e.g., carpooling, walking, biking), transit, and vehicle electrification. Develop and/or share existing online educational materials targeted toward residents and businesses that are hosted on the County's website on reducing vehicle trips and transportation electrification; including training, fact sheets, information on available incentives, video tutorials, and links to partner organizations. The transportation outreach program will coordinate with local jurisdictions and agencies to share resources and problem solve across jurisdictions.

Action IM-1.3: Promote incentive programs to encourage residents and business owners to convert or replace their fossil fuel-powered gardening equipment, such as lawnmowers, leaf blowers, and hedge trimmers, with electric alternatives.

Action IM-1.4: Promote incentives available through California Air Resources Board (i.e., Carl Moyer Program), Monterey Bay Air Resources District (MBARD) (i.e., FARMER Program), and others to switch agricultural equipment and irrigation pumps with the U.S. Environmental Protection Agency's Tier 4 Final-rated equipment.

Action IM-1.5: Raise public awareness of the public health impacts of climate change through partnerships with local hospitals, public health institutions, and other social service organizations.

Action IM-1.6: Collaborate with local tribes to establish training opportunities (e.g., workshops) for youth and community members to learn about traditional land stewardship practices, such as cultural burning, plant management, and ecosystem care. Training opportunities will be co-developed with tribal leaders and aim to integrate Traditional Ecological Knowledge into broader County conservation programs.

Stories of Sustainability

Pajaro Photovoice Project

The Pajaro Photovoice Project provides a platform for residents of Pajaro to *share stories about the real-world impacts of climate change* on their lives. The program was developed in partnership with Regeneración, Ecology Action, UC Santa Cruz and others, and was partially funded by the Employee Conservation Action Fund of the Monterey Bay Aquarium and Monterey Bay Aquarium Research Institute. Five Pajaro residents used their photojournalism skills to document their experiences with climate change, and photographs were displayed at Somos Café in Watsonville.

By sharing lived experiences, projects like this not only highlight the need for climate action but also help bring people's stories to a wider audience.



STRATEGY IM-2.
PUBLIC PARTICIPATION AND ENGAGEMENT

Reduction Potential

N/A

Objectives

Create meaningful opportunities for continued public participation in implementing climate solutions.



Engaging community members fosters a sense of ownership over climate initiatives, encouraging long-term support and participation. Their firsthand insights into community-specific issues and needs help tailor climate solutions to be practical and relevant. Moreover, open dialogue between policymakers and community members builds trust and accountability, strengthening implementation efforts. In addition, meaningful participation amplifies the voices of marginalized and vulnerable groups, ensuring equitable solutions that address those most affected by climate change.

IMPLEMENTATION ACTIONS

Action IM-2.1: Establish a standing role for the County's Alternative Energy & Environment Committee (AEEC) to advise the Board of Supervisors on climate action planning, CCAAP strategy implementation, and related topics (e.g., environmental justice).

Action IM-2.2: Implement a coordinated climate action and resilience outreach and education initiative that leverages the Resilient Monterey County campaign and platform as a primary digital resource hub. The initiative may include seasonal hazard awareness campaigns, collaborative community workshops (in partnership with CBOs, schools, etc.), a climate ambassador program that trains local volunteers to serve as community educators, and promotion of local CERT programs.

Action IM-2.3: Formalize a network of partners, including businesses, community organizations, and volunteers to support CCAAP implementation. Collaborate with groups such as the County Health Department to establish a youth program to ensure youth voices are included in County systems and strategies.

Stories of Sustainability

Resilient Monterey County

Resilient Monterey County helps support *everyday actions* residents can take to make their home or business more resilient to climate change. Covering areas such as transportation, energy, water, and waste reduction, Resilient Monterey County provides tips and suggestions on everything from adjusting the thermostat to installing rain catchers to shopping more sustainably. They also offer options for renters, who may not have control over what appliances or building systems are in place.

Resilient Monterey County is a great resource for helping residents understand, "what can I do to help create a resilient future?"

RESILIENT MONTEREY COUNTY
EVERYDAY OPPORTUNITIES FOR LOCAL CLIMATE ACTION

STRATEGY IM-3.
CLIMATE TRACKING AND BUDGETING

Reduction Potential
N/A

Objectives
Provide accountability and transparency in implementing the CCAAP and commit resources to ensuring its success.

Climate tracking and budgeting ensure accountability and optimize resource allocation for effective climate resilience improvements. Tracking GHG emissions, adaptation efforts, and climate investments provides clear data on progress toward climate goals and fosters public trust. A structured budget helps prioritize high-impact actions, ensuring funding is directed where it is most effective. In addition, monitoring expenditures and performance allows the County to adjust strategies, avoiding wasted resources and improving long-term financial planning.

IMPLEMENTATION ACTIONS

Action IM-3.1: In consultation with the AEEC, prepare annual public reports on CCAAP implementation and monitoring results and present the reports to the Board of Supervisors. Every three years, prepare GHG inventory updates and every five years, prepare and present a more detailed progress report to the Board of Supervisors.

Action IM-3.2: Prepare and present to the Board of Supervisors a proposed budget and staffing plan (including qualified technical consultants) to implement the CCAAP, and update the budget and staffing plan each year.

Action IM-3.3: Establish and track metrics to monitor progress of CCAAP goals and report data through an online platform, such as a digital portal or dashboard on the County's website.



STRATEGY IM-4. FUNDING AND FINANCING

Reduction Potential
N/A

Objectives
Seek funding and financing solutions to implement the CCAAP.

Seeking funding and financing solutions for the CCAAP ensures the resources needed to effectively implement and sustain climate initiatives. Many climate strategies require significant upfront investments, and financing mechanisms help distribute costs, making projects more feasible. Leveraging grants, public-private partnerships, and innovative funding sources maximizes efficiency, directing resources toward high-impact climate actions. Additionally, sustainable funding sources and flexible financing solutions provide long-term support for monitoring, maintenance, and adaptation, ensuring climate strategies remain responsive to evolving climate risks.

IMPLEMENTATION ACTIONS

Action IM-4.1: Develop a revolving loan fund to provide low-interest loans to residents to cover the time-of-replacement/emergency replacement of water heaters and/or HVAC units with electric options with program prioritization for low-income residents.

Action IM-4.2: Partner with 3CE to explore offering on-bill financing or pay-as-you-save programs specifically for building electrification and energy affordability projects.

Action IM-4.3: Serve as a coordinating entity in supporting and accelerating forest health services and forest restoration projects across the county by: (1) establishing a fund that provides grants and low-interest loans to landowners and organizations implementing projects; (2) partnering with local financial institutions to leverage additional capital through innovative financing tools (e.g., environmental impact bonds); (3) providing technical assistance to help implementing entities access and combine various funding sources effectively; and (4) procuring equipment and renting it to landowners to implement projects.

Action IM-4.4: Establish a dedicated public works special fund to support the implementation of CCAAP capital projects. Such projects may include repairing and/or fortifying critical infrastructure owned and/or managed by the County, advancing urban forestry, and creating safe streets. The fund will serve as a committed reserve that cannot be reappropriated for other purposes without approval by the Board of Supervisors. An interdepartmental team will develop strategies for seeding the fund (e.g., annual budget allocation, municipal bond measure) and will establish criteria and processes for accessing the fund.

Action IM-4.5: Coordinate with other jurisdictions and partners within the county to explore the establishment of a countywide Climate Resilience District—in line with SB 852—to finance, plan, implement, and manage climate adaptation and mitigation projects and programs throughout Monterey County and across jurisdictional boundaries. The district will serve as a coordinating entity to leverage funding opportunities, facilitate multi-benefit projects, and ensure equitable distribution of adaptation investments.

Action IM-4.6: Establish policy and procedures for the creation of a Carbon Reduction Fund to invest in municipal energy efficiency, community climate action, and carbon reduction projects.

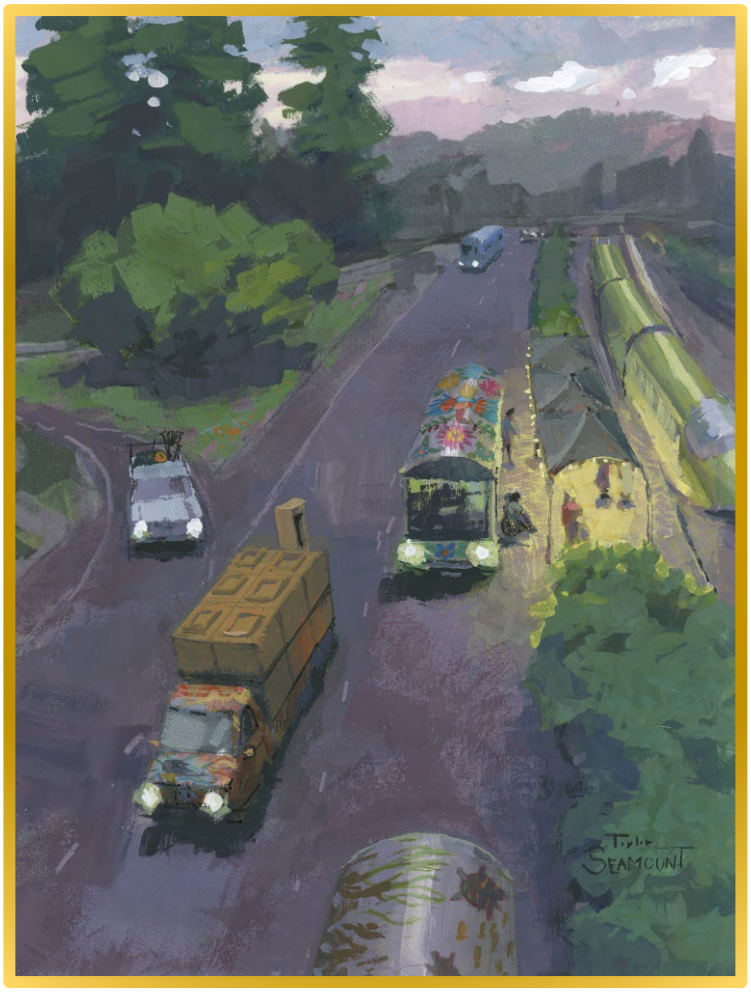
Action IM-4.7: Explore the creation of a County-administered green bank to invest in clean energy and energy efficiency.

Traffic Rebellion



Present: Evening traffic on Hwy 1, painted from the Morrissey Blvd overpass.

Painted *en plein air*.



Future: The Coastwinds **High-Speed Rail runs along the center divider** beside a transfer station connecting to the prolific local bus network. A row of native trees divides the road from the rail. The community has phased out personal vehicles in favor of efficient public transit. Buses and utility vehicles are adorned with murals by local artists.



CHAPTER 7. Implementation and Monitoring

INTRODUCTION

This chapter outlines the County of Monterey's (County's) approach to implementing the strategies and actions of the Community Climate Action and Adaptation Plan (CCAAP). It also details the process for assessing and monitoring progress to ensure the CCAAP effectively reduces greenhouse gas (GHG) emissions and enhances resilience to climate change impacts.

The implementation actions set forth in this chapter are proposals, not commitments to any specific action or proposal. The CCAAP does not approve, fund, mandate, or authorize implementation of any specific projects or programs. Proposed strategies and actions may require additional public review, review by the Board of Supervisors, and/or environmental review under the California Environmental Quality Act.

IMPLEMENTATION STRATEGY

The County is committed to the successful implementation of the climate adaptation and GHG reduction strategies outlined in Chapter 6. This will require a diverse range of implementing actions led by various County departments and in close collaboration with local partners. These County actions include:

- developing and enforcing new regulations,
- developing new programs and/or enhancing existing programs,
- obtaining grant funding,
- promoting incentives and identifying financing support,
- conducting feasibility studies,
- forming partnerships or collaborating with other government agencies and community organizations,

- conducting ongoing community education and engagement,
- integrating opportunites to track progress, and
- promoting equity and prioritizing the needs of underserved communities.

Effective implementation of the CCAAP will require ongoing management and oversight. Ensuring that the actions identified result in emissions reductions and resilience improvements is central to the success of the CCAAP. Achieving these goals will require investments and long-term commitments from the County. The success of CCAAP implementation will also depend on the meaningful and equitable inclusion of residents, businesses, organizations, and other partners across the region, priortizing communities most vulnerable to the impacts of climate change.

The County developed a prioritization matrix to determine which CCAAP actions could be implemented in the near term, evaluating each action to generate a prioritization score based on various criteria. These criteria included GHG reduction potential, climate resilience potential, cost effectiveness, technological feasibility, consistency with current County policies or ordinances, jurisdictional control/ease of implementation, timeframe of implementation, the level of community support, and associated co-benefits. Each of these criteria is described in further detail in Appendix E.

NEAR-TERM ACTIONS

Identifying near-term actions helps guide implementation efforts, ensuring that departments and organizations can effectively focus time and resources. Near-term priority actions are identified based on the prioritization methodology in Appendix E. Actions qualify as near-term if they scored 19 or higher (out of 25 points) or recommended to start implementation by 2030. Table 7.3 lists all near-term actions in order of their recommended implementation year, starting with those designated for ongoing implementation, along with the implementing department and partner organizations. County departments will lead implementation, with specific departments responsible for key actions based on roles and responsibilities. Regional and state agencies will provide support, offering resources, technical assistance, and, in some cases, shared implementation cost and authority where jurisdictional responsibilities overlap. Community organizations may also provide specific expertise but are not expected to provide financial support towards effective implementation of CCAAP actions.

County Department Roles

The Intergovernmental and Legislative Affairs Office's (IGLA's) Sustainability Program will be the lead department for implementing the CCAAP, providing overall coordination, tracking progress, and ensuring accountability for climate actions. Each near-term action specifies the County department responsible for its implementation based on regulatory authority and operational responsibilities. Departments will integrate actions into existing workflows, allocate staff resources, and collaborate with IGLA to monitor progress. Interdepartmental collaboration will be crucial, as many climate actions require multi-disciplinary approaches and cross-sector input in order to be implemented successfully. Table 7.1 lists all responsible County departments and their abbreviated titles.

Table 7.1 Abbreviations for County Departments Used in the Climate Action Strategies Matrix

Abbreviation Used	County Department Name
ACO	Agricultural Commissioner's Office
CAO	County Administrative Office
DEM	Department of Emergency Management
ED	Economic Development
HCD	Housing and Community Development Department
HD	Health Department
IGLA	Intergovernmental and Legislative Affairs Office
IT	Information Technology
MCFL	Monterey County Free Libraries
MCWRA	Monterey County Water Resources Agency
Natividad	Natividad Medical Center
PWFP	Public Works, Facilities and Parks Department
SS	Social Services

Partner Organization Roles

Successful implementation of the CCAAP depends on collaboration with the County's network of partner organizations that bring specialized expertise, community connections, and, in some cases, shared authority to the process. Regional agencies such as the Association of Monterey Bay Area Governments (AMBAG) and the Monterey Bay Air Resources District have overlapping regulatory responsibilities, enabling them to play a critical role in implementing climate actions that require coordination across shared jurisdictions. Partners like community-based organizations, environmental groups, business associations, educational institutions, and tribal governments offer necessary support by contributing local knowledge, fostering strong community ties, and ensuring that initiatives align with the region's unique needs and priorities. Collaboration was essential in shaping the CCAAP and will continue to be critical for its implementation. Partner organization involvement fosters accountability and ensures that climate actions remain responsive to the needs and priorities of the community. Table 7.2 lists all supporting partner organizations and their abbreviations.

Table 7.2 Abbreviations for Partner Organizations supporting Climate Action Strategies Matrix

Abbreviation Used	Partner Organization Name
3CE	Central Coast Community Energy
AMBAG	Association of Monterey Bay Area Governments
CAL FIRE	California Department of Forestry and Fire Protection
Cal OES	California Governor's Office of Emergency Services
Cal/OSHA	California Division of Occupational Safety and Health
Caltrans	California Department of Transportation
CCR-REN	Central California Rural Regional Energy Network
CDC	Centers for Disease Control and Prevention
CDFW	California Department of Fish and Wildlife
CDPH	California Department of Public Health
CHMP	Community Hospital of Monterey Peninsula
CSUMB	California State University, Monterey Bay
FEMA	Federal Emergency Management Agency
GSFA	Golden State Finance Authority
MBARD	Monterey Bay Air Resources District
MBEP	Monterey Bay Economic Partnership
MCOE	Monterey County Office of Education
MCRFD	Monterey County Regional Fire District
MPRPD	Monterey Peninsula Regional Park District
MST	Monterey-Salinas Transit
NOAA	National Oceanic and Atmospheric Administration
OEHHA	California Office of Environmental Health Hazard Assessment
PG&E	Pacific Gas and Electric Company
RCDMC	Resource Conservation District of Monterey County
SGC	California Strategic Growth Council
TAMC	Transportation Agency for Monterey County
UCCE	University of California Cooperative Extension
USACE	US Army Corps of Engineers
USGBC	US Green Building Council

Table 7.3 Near-Term Climate Action and Adaptation Actions

Action Number	Action	Implementing Department(s)	Partner Organization(s)
Ongoing			
BE-2.1	Support and coordinate with 3CE in executing its commitment to meet 100 percent of its electricity demand through clean and renewable resources by 2030 by identifying sites for renewable energy generation at County-owned properties and other potential sites throughout the county, and by continuing efforts to streamline the permitting of residential and nonresidential rooftop solar photovoltaic or other renewable energy and battery storage projects.	IGLA	3CE
BE-2.2	Partner with 3CE to promote and expand upon their Electrify Your Home program, which bundles various residential energy efficiency upgrades (e.g., heating and cooling systems, heat pump water heaters) to deliver more savings, comfort, and rebate options.	IGLA	3CE
BE-2.5	Encourage public service facilities such as schools, hospitals, and community centers to develop renewable microgrids.	IGLA, PWFP	MCOE
BE-2.6	Collaborate with PG&E as they strategically decommission methane gas pipelines in areas where electrification has been or could be implemented.	IGLA	PG&E
BE-2.8	Collaborate with PG&E as they modernize the electrical grid for variable and distributed power by upgrading transformers, lines, and other power equipment; and support regional coordination efforts that help to accelerate this transition.	IGLA	PG&E
TR-1.1	Collaborate with cities, transit providers, and employers to provide local community shuttles or circulators that serve transit-oriented development, high-quality transit stops, and neighborhood commercial centers, providing an incentive for residents and employees to make trips using transit.	ED, IGLA	Cities, MBEP, AMBAG, TAMC, MST
TR-1.2	Promote the regional vanpool program to provide vans and organize traditional vanpools and vanpools serving agricultural workers in rural areas.	IGLA	MST, Caltrans
TR-1.3	Coordinate with transit providers to improve the local transit system by increasing reliability and accessibility as well as by adding amenities such as seating, lighting, tree cover, bike storage, and real-time arrival information displays. Extend service hours and routes to better serve residential areas, employment centers, and popular destinations, with a focus on "Transportation-Based Priority Populations" as identified by Caltrans' Transportation Equity Index.	IGLA	TAMC, MST
TR-1.4	Continue to implement the actions identified in the Monterey County Broadband Strategic Plan to allow for remote work that reduces the need for commuting.	ED, IGLA, IT	GSFA, MCOE, MBEP

Table 7.3 Near-Term Climate Action and Adaptation Actions

Action Number	Action	Implementing Department(s)	Partner Organization(s)
TR-1.5	Implement the policies and programs of the 2023-2031 Housing Element to rezone for higher density development and promote affordable, mixed-use development in Community Areas and Rural Centers near activity centers and transit routes.	HCD, IGLA	N/A
TR-1.6	Encourage opportunities to upgrade roadways in compact areas to complete streets, using the Monterey Bay Area Complete Streets Guidebook.	IGLA, PWFP	TAMC
TR-3.1	Partner with TAMC to implement the Monterey County Active Transportation Plan to enhance and expand bicycle and pedestrian infrastructure and networks.	IGLA, PWFP	TAMC
TR-3.2	Partner with TAMC and cities to implement the Monterey County Regional Vision Zero Action Plan to improve the safety of all roadway users.	IGLA, PWFP	TAMC, Cities
OR-1.6	Promote 3CE's Ag Electrification Program to replace fossil fuel-powered agricultural equipment with all-electric alternatives. Seek funding opportunities to provide clean backup power supplies.	ACO, ED, IGLA	3CE, Monterey County Farm Bureau
SW-1.6	Promote materials reuse and sharing through outreach and education, community tool libraries, maker spaces, fix-it clinics, and material swaps.	HD, IGLA, MCFL	Cities, SVR
WA-1.1	Regularly review and update the County's Water Conservation Ordinance (Monterey County Code of Ordinances, Chapter 15.12) and water conservation measures to be consistent with current best management practices and ensure effective and ongoing conservation efforts.	IGLA, MCWRA	Water providers
WA-1.3	Continue to assess and manage distribution system losses through efforts including replacing existing meters with smart meters, implementing a Supervisory Control and Data Acquisition (SCADA) system, replacing selected water pipe with upgraded design criteria to withstand seismic events, and maintaining an active cathodic protection system.	IGLA, MCWRA	Water providers
WA-1.5	Incentivize residential and nonresidential development to convert lawns to a healthy habitat with native and drought-tolerant species that use water-efficient irrigation equipment through the creation of rebate programs.	IGA, MCWRA	Water providers
NWL-1.3	Continue to implement the Salinas River Stream Management Program to enhance riparian corridors within the Salinas River watershed.	IGLA, MCWRA	RCDMC

Table 7.3 Near-Term Climate Action and Adaptation Actions

Action Number	Action	Implementing Department(s)	Partner Organization(s)
NWL-1.4	Protect and preserve existing intact habitats and resources, consistent with Monterey County Regional Conservation Investment Strategy objectives and applicable General Plan implementation activities.	ACO, HCD, IGLA	TAMC, AMBAG, RCDMC, UCCE, CDFW
NWL-3.4	Work with TAMC, RCD, land trusts/conservancies, UCCE, and landowners to acquire, lease, or establish easements to protect productive agricultural or grazing lands.	ACO, HCD, IGLA	Land trusts, TAMC, RCDMC, UCCE
NWL-3.5	Work with farmers to reduce fertilizer application consistent with the requirements of the Central Coast Regional Water Quality Control Board's Ag Order 4.0.	ACO, IGLA, MCWRA	CCRWQCB, UCCE, RCDMC
NWL-4.4	Support Monterey Peninsula Regional Park District with implementing its strategic plan to adapt to climate impacts, conserve land, and engage communities.	HCD, IGLA, PWFP	MPRPD
NWL-4.5	Identify and incorporate green infrastructure opportunities when considering capital improvements to stormwater treatment and roadway improvements.	IGLA, PWFP	N/A
NWL-4.6	Work with Caltrans and CBOs to execute Adopt a Highway agreements for litter removal, tree planting and vegetation management for every mile of state highway located in developed areas of the unincorporated county.	IGLA, PWFP	CBOs, Caltrans
GE-1.1	Support workforce development for electrification and building energy efficiency projects. Partner with regional energy agencies to support contractor training and resident education on electric appliances and their installation and maintenance.	ED, IGLA	MBEP, CCR REN, 3CE
GE-1.2	Increase the number of certified green businesses each year in partnership with the Monterey Bay Area Green Business Program recognize and promote current participants.	IGLA	California Green Business Network
GE-1.3	Collaborate with See Monterey and cities to increase public awareness of sustainable infrastructure benefits and the contribution of nature-based solutions to tourism-based businesses that rely on healthy natural and working lands (e.g., wine, recreation, and hospitality industries).	ED, IGLA	See Monterey, Cities
GE-1.4	Support the development of new markets and products that offer climate-smart and climate-friendly solutions for local use (e.g., biochar production).	ACO, ED, IGLA	Industry groups, UCCE, RCDMC

Table 7.3 Near-Term Climate Action and Adaptation Actions

Action Number	Action	Implementing Department(s)	Partner Organization(s)
ADPT-1.2	Support the public health sector's capacity to address climate change as a public health crisis through a twofold approach of: (1) increasing the collection, analysis, and reporting of data on climate-related health impacts; and (2) prioritizing health equity resources for communities facing disproportionate health impacts from climate change. This may include coordinating with appropriate state and federal agencies (e.g., CDPH, OEHHA, CDC) and other local partners to collect relevant data and develop dashboards that will help inform resource allocation and targeted interventions and support grassroots health equity initiatives.	HD, IGLA, Natividad	CHMP
ADPT-1.4	Enhance local food security through an array of efforts, such as providing coordination support to connect local agricultural producers with food banks and pantries, developing a countywide food recovery program and working group to oversee compliance with SB 1383, and providing transportation assistance to help residents access farmers' markets and food distribution networks.	ACO, HD, IGLA	Food Bank for Monterey County, Monterey County Farm Bureau
ADPT-4.2	Coordinate with conservation organizations and local landowners to expand floodplain restoration in the Salinas River watershed, improving natural flood mitigation by increasing water absorption, restoring native vegetation, and creating wildlife habitat. Focus restoration efforts on high-risk flood zones to reduce downstream flood impacts in agricultural and residential areas.	HCD, IGLA, MCWRA	RCDMC, UCCE
ADPT-4.5	Collaborate with Caltrans and TAMC to develop an implementation plan to address the risks of sea-level rise, coastal erosion, and storm surge along Highway 1, informed by existing studies and resources (e.g., Central Coast Highway 1 Climate Resiliency Study). The plan will prioritize projects that balance infrastructure resilience, environmental sustainability, and scenic preservation, and additionally, will engage communities along Highway 1 in implementation discussions to align each project with local needs.	DEM, IGLA	Caltrans, TAMC, MST, AMBAG, California State Coastal Conservancy
ADPT-5.1	In partnership with water and wastewater service providers, upgrade water and wastewater infrastructure throughout the county to adapt to future potential climate-driven changes in water quality and availability, which may include deepening intake systems to accommodate lower water levels, implementing advanced filtration technologies to address increased contaminant levels, and expanding storage capacity to ensure water supply during periods of drought. Prioritize upgrades in areas with aging infrastructure.	IGLA, MCWRA	Water providers
IM-1.3	Promote incentive programs to encourage residents and business owners to convert or replace their fossil fuel-powered gardening equipment, such as lawnmowers, leaf blowers, and hedge trimmers, with electric alternatives.	IGLA	MBARD

Table 7.3 Near-Term Climate Action and Adaptation Actions

Action Number	Action	Implementing Department(s)	Partner Organization(s)
IM-1.4	Promote incentives available through CARB (i.e., Carl Moyer Program), MBARD (i.e., FARMER Program), and others to switch agricultural equipment and irrigation pumps with EPA Tier 4 Final-rated equipment.	ACO, IGLA	MBARD, UCCE, Farm Bureau, RCDMC
IM-1.5	Raise public awareness of the public health impacts of climate change through partnerships with local hospitals, public health institutions, and other social service organizations.	HD, IGLA, Natividad, SS	Local hospitals, public health institutions, CBOs
2026			
BE-1.4-a	Adopt by ordinance a new building reach code based on cost-effectiveness studies, stakeholder outreach, and California Energy Commission approval that must be met by all residential and nonresidential new construction and major renovations.	ED, HCD, IGLA	N/A
BE-1.4-b	Conduct outreach to building industry members, contractors, residents, businesses, and other interest groups to present any proposed reach code and solicit feedback.	ED, HCD, IGLA	CBOs, MBEP, Realtors
BE-1.4-c	Conduct training for County permitting staff to understand the reach code requirements for new and existing buildings and how compliance will be demonstrated.	ED, HCD, IGLA	N/A
BE-1.9	In coordination with regional partners, scope and develop a grant application for residential building electrification and efficiency across the county to demonstrate resiliency, cost-savings, and emissions reductions and reduce barriers to building electrification. This project should prioritize low-income residents in various communities. Staff will engage with regional partners including the Regional Climate Project Working Group, 3CE, Central Coast Energy Services, and the Central California Rural Regional Energy Network.	HCD, IGLA, PWFP, DEM	3CE, PG&E, USGBC
TR-2.1	Adopt electric vehicle (EV) charging infrastructure reach codes to meet CALGreen Tier 1 standards for each triennial California Green Building Standards cycle for residential and nonresidential EV charging.	HCD, IGLA	3CE
TR-2.3	Prioritize the installation of EVSE at the identified top locations in the unincorporated county provided in the Central Coast Zero Emission Vehicle Strategy.	IGLA	3CE, Caltrans
TR-3.3	Pursue funding to provide incentives for residents to purchase or lease e-bikes and other micromobility devices.	IGLA	MBARD

Table 7.3 Near-Term Climate Action and Adaptation Actions

Action Number	Action	Implementing Department(s)	Partner Organization(s)
SW-1.1	Contractually require annual reporting from the Food Bank for Monterey County in future agreements with Monterey County to ensure baseline and ongoing tonnage data for SB 1383 is appropriately and consistently tracked and reported, and member data is verified as additive to or inclusive of Food Bank data.	HD, IGLA	Food Bank for Monterey County
SW-1.3	Conduct an annual survey of all food rescue organizations and services with a refined and more comprehensive set of survey questions, and more clearly defined terms for consistency in data reported.	HD, IGLA	Food rescue organizations
SW-1.5	Develop and pilot a solid waste diversion program in coordination with local partners and the Health Department to eliminate single-use products through dishwashing and reusable adoption. This program should aim to demonstrate success for festival and event use cases before scaling to larger use cases. Future use cases to be considered by the program include institutions with high volumes of food service, restaurants, etc.	HD, IGLA	PWFP
NWL-3.2	Pursue funding and provide technical assistance to support the development and implementation of carbon farm plans and healthy soils strategies in Monterey County.	ACO, IGLA	RCDMC, NRCS, CDFA, UCCE
ADPT-1.1	Continue to support the widespread adoption of "Alert Monterey County"—the official emergency alert and warning system for all jurisdictions in the county—to ensure that all residents are informed before, during, and after a climate hazard event (among other emergencies). Expand existing public outreach efforts through: (1) targeted enrollment campaigns at community events, healthcare facilities, and schools; (2) automatic enrollment for County services recipients; and (3) partnerships with CBOs for door-to-door outreach in historically underserved areas. Low-tech backup notification systems may also be considered and established as part of this initiative.	DEM, IGLA, IT	CBOs

Table 7.3 Near-Term Climate Action and Adaptation Actions

Action Number	Action	Implementing Department(s)	Partner Organization(s)
ADPT-1.5	Adopt and require the use of a resilient buildings checklist for new construction and major renovations. The checklist should consider utilizing, at a minimum the following conditions: ▸ Firesafe: building materials, location, and egress routes that consider potential fire risks, evacuation options, and offer a buffer to any wildlands urban interface. These can align with IBHS' Wildfire Prepared Home designation. ▸ Air quality: integrated air filtration systems and solutions to provide healthy indoor air quality during smoky periods. ▸ Smart location of equipment that leaves roofs available for solar and puts equipment out of any potential flood or other hazard areas. ▸ Water: support water quality, water safety, and water efficiency, along with approaches to access water during a disaster. ▸ Require the use of electric heat pumps to provide heating and cooling to residents to combat rising temperatures. ▸ Support non-mechanical cooling approaches such as passive house building, cool roofs, and tree shading. ▸ Sea level rise and flooding: do not incentivize projects that are located in a Federal Emergency Management Agency flood zone. ▸ Multi-benefit energy and resilience measures including solar and storage enabling the building to operate off the grid during power outages and address the needs of residents (such as communications, medical needs, and refrigeration). ▸ Minimum temperature factor at doors, windows, and thermal bridges. This factor ensures an absence of condensation and prevents mold and mildew that can lead to long term building damage. ▸ Anti-displacement measures that will help to ensure the project does not displace low-income residents from the neighborhood due to increased rental prices.	HCD, IGLA	N/A

Table 7.3 Near-Term Climate Action and Adaptation Actions

Action Number	Action	Implementing Department(s)	Partner Organization(s)
IM-1.1	Develop a building electrification outreach program that provides education strategies that enable and encourage energy conservation and gas-to-electric conversions in residential and commercial buildings for space and water heating, and planning for equipment replacement before failure occurs due to emergencies. Develop and/or share existing online educational materials targeted toward building owners and tenants that are hosted on the County's website on energy efficiency and building electrification; including training, fact sheets, information on available incentives, video tutorials, and links to existing content (such as The Switch is On). In addition, video tutorials can explain to building owners how to enroll in real-time energy use monitoring tools to track energy use compared to historic levels and within the community through the EnergyStarђ Portfolio Manager, or other tools offered by third-party providers. The educational materials will also be provided as part of routine regulatory processes, such as applying for or renewing licenses or permits. The building electrification outreach program will coordinate with local jurisdictions and agencies to share resources and problem solve across jurisdictions.	IGLA	Ecology Action, AMBAG
IM-1.2	In partnership with TAMC, develop a transportation outreach program that provides education strategies that enable and encourage residents to engage in mode shifts (e.g., carpooling, walking, biking), transit, and vehicle electrification. Develop and/or share existing online educational materials targeted toward residents and businesses that are hosted on the County's website on reducing vehicle trips and transportation electrification; including training, fact sheets, information on available incentives, video tutorials, and links to partner organizations. The transportation outreach program will coordinate with local jurisdictions and agencies to share resources and problem solve across jurisdictions.	IGLA	TAMC, MST, 3CE, AMBAG, MBARD
IM-2.1	Establish a standing role for the County's Alternative Energy & Environment Committee (AEEC) to advise the Board of Supervisors on climate action planning, CCAAP strategy implementation, and related topics (e.g., environmental justice).	IGLA	N/A
IM-2.2	Implement a coordinated climate action and resilience outreach and education initiative that leverages the Resilient Monterey County campaign and platform as a primary digital resource hub. The initiative may include seasonal hazard awareness campaigns, collaborative community workshops (in partnership with CBOs, schools, etc.), a climate ambassador program that trains local volunteers to serve as community educators, and promotion of local CERT programs.	DEM, IGLA	Ecology Action
IM-2.3	Formalize a network of partners, including businesses, community organizations, and volunteers to support CCAAP implementation. Collaborate with groups such as the County Health Department to establish a youth program to ensure youth voices are included in County systems and strategies.	IGLA	MBEP, CBOs

Table 7.3 Near-Term Climate Action and Adaptation Actions

Action Number	Action	Implementing Department(s)	Partner Organization(s)
IM-3.1	In consultation with the AEEC, prepare annual public reports on CCAAP implementation and monitoring results and present the reports to the Board of Supervisors. Every three years, prepare GHG inventory updates and every five years, prepare and present a more detailed progress report to the Board of Supervisors.	IGLA	AMBAG
IM-3.2	Prepare and present to the Board of Supervisors a proposed budget and staffing plan (including qualified technical consultants) to implement the CCAAP, and update the budget and staffing plan each year.	CAO, IGLA	N/A
IM-3.3	Establish and track metrics to monitor progress of CCAAP goals and report data through an online platform, such as a digital portal or dashboard on the County's website.	IGLA	N/A
IM-4.2	Partner with 3CE to explore offering on-bill financing or pay-as-you-save programs specifically for building electrification and energy affordability projects.	IGLA	3CE
2027			
BE-1.2-a	Develop a nonresidential buildings decarbonization strategy and implement a building performance standard that requires all existing buildings to reduce non-electricity-related emissions by 10 percent by 2033, and by 20 percent by 2045, with analysis of the existing building stock in the county. As part of this effort, encourage small (i.e., less than 50,000 square feet) commercial and small multifamily residential (i.e., less than 17 units) building owners to track and report their annual energy usage through a benchmarking tool (e.g., ENERGY STAR® Portfolio Manager).	HCD, IGLA	3CE
BE-1.2-b	Determine retrofit compliance triggers based on square footage and one additional metric such as time of equipment replacement, percent of existing floor area, building permit valuation, and project valuation.	HCD, IGLA	N/A
TR-1.9	Implement the necessary infrastructure upgrades and develop programs for EV car sharing, active transportation, mobility device sharing, and improved transit based on the results of Zero Emissions Shared Mobility Study.	IGLA	AMBAG, TAMC, MST
TR-3.4	Work with existing multifamily building owners and require new multifamily developments to install e-bike charging and secure bicycle parking in multifamily residential developments.	HCD, IGLA	Multifamily building owners and developers

Table 7.3 Near-Term Climate Action and Adaptation Actions

Action Number	Action	Implementing Department(s)	Partner Organization(s)
NWL-4.1	Seek funding for and prepare community-specific forest management plans that focus on expanding tree canopies in residential and nonresidential areas to provide cooling benefits. Identify high priority areas that are currently underserved by street trees and trees within public spaces.	HCD, IGLA, PWFP	CBOs
NWL-4.2	Seek funding for and implement an urban greening program to expand tree canopies, establish tree line buffers, plant native and drought-tolerant vegetation, and establish community gardens in developed areas of the unincorporated county, focusing on climate-vulnerable and underserved communities.	HCD, IGLA, PWFP	RCDMC, CBOs
IM-1.6	Collaborate with local tribes to establish training opportunities (e.g., workshops) for youth and community members to learn about traditional land stewardship practices, such as cultural burning, plant management, and ecosystem care. Training opportunities will be co-developed with tribal leaders and aim to integrate Traditional Ecological Knowledge into broader County conservation programs.	IGLA	Tribes, UCCE, RCDMC
2028			
BE-1.5	Partner with 3CE to establish a program that connects owners and occupants of residential and nonresidential buildings to existing energy audit and weatherization programs (e.g., California's Low-Income Weatherization Program) and resources, and additionally, helps to determine eligibility.	ED, IGLA	3CE
BE-1.7	Explore additional opportunities for streamlining permitting of residential electrification projects.	HCD, IGLA	N/A
TR-2.4	Implement the recommendations included in the forthcoming Monterey Bay Electric Vehicle Climate Adaptation and Resiliency Framework to install EV chargers in high impact and low-risk areas with a focus on making EV chargers more accessible to underserved areas.	IGLA	AMBAG, Ecology Action
TR-2.6	Develop a permit checklist to install EVSE within the public right-of-way by 2029, pursuant to Assembly Bill 2427 (2024).	HCD, IGLA	N/A
SW-1.2	Consider developing a countywide program to coordinate food rescue and distribution in collaboration with local jurisdictions. The program should provide resources to potential food donors and education in order to ensure increased compliance with organic waste diversion goals.	HD, IGLA	Cities, Food rescue organizations
NWL-3.1	Develop a healthy soils strategy for Monterey County to support agriculture, address carbon sequestration, and increase water capture. The strategy should include tracking mechanisms for healthy soil practices, identification of resources for organic agriculture conversion, opportunities to develop a carbon sequestration market, and measures to conserve existing cropland throughout the county.	ACO, IGLA	RCDMC, UCCE, NRCS

Table 7.3 Near-Term Climate Action and Adaptation Actions

Action Number	Action	Implementing Department(s)	Partner Organization(s)
ADPT-2.6	Serve as a coordinating entity for partners (e.g., CAL FIRE, Fire Safe Council for Monterey County) to further enhance the reach and effectiveness of their existing wildfire preparedness and wildfire risk reduction programs and resources. This may include integrating program materials into County mailings, providing dedicated space in County facilities for in-person events or workshops, and actively promoting initiatives through all County communication channels.	DEM, IGLA	CAL FIRE, FSCFMC, MCRFD
ADPT-4.4	Develop an outreach and assistance program to connect property owners in flood-prone areas of the county with existing regional, state, and federal programs that provide funding and technical assistance for flood resilience improvements. The County will work with local CBOs to raise awareness and offer application assistance, prioritizing low-income residents and small businesses.	DEM, HCD, IGLA	CBOs
2029			
BE-1.1	Adopt a building electrification ordinance for new and existing residential buildings based on cost-effectiveness studies, stakeholder outreach, and California Energy Commission approval. The ordinance will be written such that existing residential buildings' modeled energy efficiency must achieve half of the maximum cost-effective retrofit measures score at time-of-retrofit by 2030, and the maximum cost-effective retrofit measures score by 2045.	HCD, IGLA	3CE
OR-1.3	Adopt an ordinance that would require the use of zero-emission landscaping equipment for equipment up to 25 horsepower by 2030.	HCD, IGLA	N/A
NWL-2.2	Work with local tribes to design a cultural burning program that incorporates Traditional Ecological Knowledge to reduce wildfire risk, manage fuel loads, and restore ecosystems, particularly in oak woodlands. Through the program, support/coordinate regulatory approvals, provide training and equipment for tribe-led burns, and host regular public information sessions to educate residents about cultural burns and their ecological benefits.	HCD, IGLA	Tribes, CCPBA, UCCE
NWL-3.6	Partner with neighboring counties and resource conservation districts to prepare a feasibility study to explore the development of community compost banks. The study could include an assessment of organic waste availability, market demand for compost, potential cost savings, infrastructure needs, and potential contamination challenges.	IGLA	AMBAG, RCDMC

Table 7.3 Near-Term Climate Action and Adaptation Actions

Action Number	Action	Implementing Department(s)	Partner Organization(s)
IM-4.4	Establish a dedicated public works special fund to support the implementation of CCAAP capital projects. Such projects may include repairing and/or fortifying critical infrastructure owned and/or managed by the County, advancing urban forestry, and creating safe streets. The fund will serve as a committed reserve that cannot be reappropriated for other purposes without approval by the Board of Supervisors. An interdepartmental team will develop strategies for seeding the fund (e.g., annual budget allocation, municipal bond measure) and will establish criteria and processes for accessing the fund.	CAO, IGLA, PWFP	N/A
IM-4.5	Coordinate with other jurisdictions and partners within the county to explore the establishment of a countywide Climate Resilience District—in line with SB 852—to finance, plan, implement, and manage climate adaptation and mitigation projects and programs throughout Monterey County and across jurisdictional boundaries. The district will serve as a coordinating entity to leverage funding opportunities, facilitate multi-benefit projects, and ensure equitable distribution of adaptation investments.	CAO, DEM, HCD, IGLA, PWFP	AMBAG, RCDMC, Cities
IM-4.6	Establish policy and procedures for the creation of a Carbon Reduction Fund to invest in municipal energy efficiency, community climate action, and carbon reduction projects.	CAO, HCD, IGLA, PWFP	AMBAG, MBEP
IM-4.7	Explore the creation of a County-administered green bank to invest in clean energy and energy efficiency.	CAO, HCD, IGLA, PWFP	AMBAG, MBEP
2030			
IM-4.1	Develop a revolving loan fund to provide low-interest loans to residents to cover the time-of-replacement/emergency replacement of water heaters and/or HVAC units with electric options with program prioritization for low-income residents.	CAO, IGLA	3CE
IM-4.3	Serve as a coordinating entity in supporting and accelerating forest health services and forest restoration projects across the county by: (1) establishing a fund that provides grants and low-interest loans to landowners and organizations implementing projects; (2) partnering with local financial institutions to leverage additional capital through innovative financing tools (e.g., environmental impact bonds); (3) providing technical assistance to help implementing entities access and combine various funding sources effectively; and (4) procuring equipment and renting it to landowners to implement projects.	IGLA, PWFP	RCDMC, UCCE, CAL FIRE, USFS, California State Parks

NEAR-TERM ACTION IMPLEMENTATION AND FUNDING

Implementation Cost

Implementation of the CCAAP involves three primary types of County costs: staffing (FTE), capital costs, and other costs. Implementing the CCAAP's near-term actions will require an average of 12.5 FTEs and $16.7 million per year between 2026-2030. This includes roughly $2 million per year for staffing costs, $9.1 million per year for capital investments such as electric vehicle charging stations and transit improvements, and $5.6 million per year for other costs, including materials, programs, and consultant services.

The three types of implementation costs are defined as follows:

- **Staff costs (FTE):** Costs of County staff to manage the workload from CCAAP implementation.
- **Capital costs:** Investments in physical infrastructure expressed in total dollars across a five-year period, such as electric vehicle chargers, sidewalks, and bicycle lanes.
- **Other costs:** Non-capital expenses, including hiring consultants, purchasing materials (e.g., compost, trees), and funding subsidy programs that support CCAAP implementation.

Table 7.4 outlines the estimated implementation costs for near-term actions. Additional details can be found in Appendix F.

Funding and Financing

The County will pursue various funding and financing opportunities to ensure successful CCAAP implementation while maintaining fiscal responsibility. The County has identified potential funding sources, including grants, utility incentives, green banks, municipal bonds, energy equipment leases, on-bill loan programs, commercial property assessed clean energy (C-PACE) programs, and revolving loan funds, to support clean energy and sustainability projects. A list of potential funding sources and finance mechanisms can be found in Appendix F.

Table 7.4 Implementation Cost and Funding Sources for Near-Term Climate Action and Adaptation Actions

Action Number	Action	Additional Implementation Costs			
		FTE	Capital	Other	Total
Ongoing					
BE-2.1	Support and coordinate with 3CE in executing its commitment to meet 100 percent of its electricity demand through clean and renewable resources by 2030 by identifying sites for renewable energy generation at County-owned properties and other potential sites throughout the county, and by continuing efforts to streamline the permitting of residential and nonresidential rooftop solar photovoltaic or other renewable energy and battery storage projects.	$81,407	N/A	N/A	$81,407
BE-2.2	Partner with 3CE to promote and expand upon their Electrify Your Home program, which bundles various residential energy efficiency upgrades (e.g., heating and cooling systems, heat pump water heaters) to deliver more savings, comfort, and rebate options.	$81,407	N/A	N/A	$81,407
BE-2.5	Encourage public service facilities such as schools, hospitals, and community centers to develop renewable microgrids.	$81,407	N/A	N/A	$81,407
BE-2.6	Collaborate with PG&E as they strategically decommission methane gas pipelines in areas where electrification has been or could be implemented.	$81,407	N/A	N/A	$81,407
BE-2.8	Collaborate with PG&E as they modernize the electrical grid for variable and distributed power by upgrading transformers, lines, and other power equipment; and support regional coordination efforts that help to accelerate this transition.	$81,407	N/A	N/A	$81,407
TR-1.1	Collaborate with cities, transit providers, and employers to provide local community shuttles or circulators that serve transit-oriented development, high-quality transit stops, and neighborhood commercial centers, providing an incentive for residents and employees to make trips using transit.	$81,407	TBD	TBD	$81,407
TR-1.2	Promote the regional vanpool program to provide vans and organize traditional vanpools and vanpools serving agricultural workers in rural areas.	$81,407	TBD	TBD	$81,407
TR-1.3	Coordinate with transit providers to improve the local transit system by increasing reliability and accessibility by adding amenities such as seating, lighting, tree cover, bike storage, and real-time arrival information displays. Extend service hours and routes to better serve residential areas, trip-chaining, employment centers, and popular destinations, with a focus on "Transportation-Based Priority Populations" as identified by California Department of Transportation (Caltrans)' Transportation Equity Index.	$81,407	$5,978,004	$23,589,626	$29,649,038

Table 7.4 Implementation Cost and Funding Sources for Near-Term Climate Action and Adaptation Actions

Action Number	Action	Additional Implementation Costs			
		FTE	Capital	Other	Total
TR-1.4	Continue to implement the actions identified in the Monterey County Broadband Strategic Plan to allow for remote work that reduces the need for commuting.	$81,407	N/A	N/A	$81,407
TR-1.5	Implement the policies and programs of the 2023-2031 Housing Element to rezone for higher density development and promote affordable, mixed-use development in Community Areas and Rural Centers near activity centers and transit routes.	$203,518	N/A	N/A	$203,518
TR-1.6	Encourage opportunities to upgrade roadways in compact areas to complete streets, using the Monterey Bay Area Complete Streets Guidebook.	$81,407	N/A	N/A	$81,407
TR-3.1	Partner with TAMC to implement the Monterey County Active Transportation Plan to enhance and expand bicycle and pedestrian infrastructure and networks.	$81,407	N/A	N/A	$81,407
TR-3.2	Partner with TAMC and cities to implement the Monterey County Regional Vision Zero Action Plan to improve the safety of all roadway users.	$81,407	N/A	N/A	$81,407
OR-1.6	Promote 3CE's Ag Electrification Program to replace fossil fuel-powered agricultural equipment with all-electric alternatives. Seek funding opportunities to provide clean backup power supplies.	$81,407	N/A	N/A	$81,407
SW-1.6	Promote materials reuse and sharing through outreach and education, community tool libraries, maker spaces, fix-it clinics, and material swaps.	$81,407	N/A	N/A	$81,407
WA-1.1	Regularly review and update the County's Water Conservation Ordinance (Monterey County Code of Ordinances, Chapter 15.12) and water conservation measures to be consistent with current best management practices and ensure effective and ongoing conservation efforts.	$81,407	N/A	N/A	$81,407
WA-1.3	Continue to assess and manage distribution system losses through efforts including replacing existing meters with smart meters, implementing a Supervisory Control and Data Acquisition (SCADA) system, replacing selected water pipe with upgraded design criteria to withstand seismic events, and maintaining an active cathodic protection system.	$203,518	TBD	TBD	$203,518
WA-1.5	Incentivize residential and nonresidential development to convert lawns to a healthy habitat with native and drought-tolerant species that use water-efficient irrigation equipment through the creation of rebate programs.	$81,407	N/A	$546,841	$628,248

Table 7.4 Implementation Cost and Funding Sources for Near-Term Climate Action and Adaptation Actions

Action Number	Action	Additional Implementation Costs			
		FTE	Capital	Other	Total
NWL-1.3	Continue to implement the Salinas River Stream Management Program to enhance riparian corridors within the Salinas River watershed.	$81,407	TBD	TBD	$81,407
NWL-1.4	Protect and preserve existing intact habitats and resources, consistent with Monterey County Regional Conservation Investment Strategy objectives and applicable General Plan implementation activities.	$81,407	TBD	TBD	$81,407
NWL-3.4	Work with TAMC, RCD, land trusts/conservancies, UCCE, and landowners to acquire, lease, or establish easements to protect productive agricultural or grazing lands.	$81,407	TBD	TBD	$81,407
NWL-3.5	Work with farmers to reduce fertilizer application consistent with the requirements of the Central Coast Regional Water Quality Control Board's Ag Order 4.0.	$50,280	N/A	N/A	$50,280
NWL-4.4	Support Monterey Peninsula Regional Park District with implementing its strategic plan to adapt to climate impacts, conserve land, and engage communities.	$81,407	TBD	TBD	$81,407
NWL-4.5	Identify and incorporate green infrastructure opportunities when considering capital improvements to stormwater treatment and roadway improvements.	$81,407	TBD	TBD	$81,407
NWL-4.6	Work with Caltrans and CBOs to execute Adopt a Highway agreements for litter removal, tree planting and vegetation management for every mile of state highway located in developed areas of the unincorporated county.	$81,407	TBD	TBD	$81,407
GE-1.1	Support workforce development for electrification and building energy efficiency projects. Partner with regional energy agencies to support contractor training and resident education on electric appliances and their installation and maintenance.	$81,407	TBD	TBD	$81,407
GE-1.2	Increase the number of certified green businesses each year in partnership with the Monterey Bay Area Green Business Program recognize and promote current participants.	$81,407	N/A	N/A	$81,407
GE-1.3	Collaborate with See Monterey and cities to increase public awareness of sustainable infrastructure benefits and the contribution of nature-based solutions to tourism-based businesses that rely on healthy natural and working lands (e.g., wine, recreation, and hospitality industries).	$81,407	N/A	N/A	$81,407
GE-1.4	Support the development of new markets and products that offer climate-smart and climate-friendly solutions for local use (e.g., biochar production).	$203,518	TBD	TBD	$203,518

Table 7.4 Implementation Cost and Funding Sources for Near-Term Climate Action and Adaptation Actions

Action Number	Action	Additional Implementation Costs			
		FTE	Capital	Other	Total
ADPT-1.2	Support the public health sector's capacity to address climate change as a public health crisis through a twofold approach of: (1) increasing the collection, analysis, and reporting of data on climate-related health impacts; and (2) prioritizing health equity resources for communities facing disproportionate health impacts from climate change. This may include coordinating with appropriate state and federal agencies (e.g., CDPH, OEHHA, CDC) and other local partners to collect relevant data and develop dashboards that will help inform resource allocation and targeted interventions and support grassroots health equity initiatives.	$203,518	TBD	TBD	$203,518
ADPT-1.4	Enhance local food security through an array of efforts, such as providing coordination support to connect local agricultural producers with food banks and pantries, developing a countywide food recovery program and working group to oversee compliance with SB 1383, and providing transportation assistance to help residents access farmers' markets and food distribution networks.	$814,071	N/A	TBD	$814,071
ADPT-4.2	Coordinate with conservation organizations and local landowners to expand floodplain restoration in the Salinas River watershed, improving natural flood mitigation by increasing water absorption, restoring native vegetation, and creating wildlife habitat. Focus restoration efforts on high-risk flood zones to reduce downstream flood impacts in agricultural and residential areas.	$81,407	TBD	TBD	$81,407
ADPT-4.5	Collaborate with Caltrans and TAMC to develop an implementation plan to address the risks of sea-level rise, coastal erosion, and storm surge along Highway 1, informed by existing studies and resources (e.g., Central Coast Highway 1 Climate Resiliency Study). The plan will prioritize projects that balance infrastructure resilience, environmental sustainability, and scenic preservation, and additionally, will engage communities along Highway 1 in implementation discussions to align each project with local needs.	$81,407	TBD	TBD	$81,407
ADPT-5.1	In partnership with water and wastewater service providers, upgrade water and wastewater infrastructure throughout the county to adapt to future potential climate-driven changes in water quality and availability, which may include deepening intake systems to accommodate lower water levels, implementing advanced filtration technologies to address increased contaminant levels, and expanding storage capacity to ensure water supply during periods of drought. Prioritize upgrades in areas with aging infrastructure.	$814,071	TBD	TBD	$814,071

Table 7.4 Implementation Cost and Funding Sources for Near-Term Climate Action and Adaptation Actions

Action Number	Action	Additional Implementation Costs			
		FTE	Capital	Other	Total
IM-1.3	Promote incentive programs to encourage residents and business owners to convert or replace their fossil fuel-powered gardening equipment, such as lawnmowers, leaf blowers, and hedge trimmers, with electric alternatives.	$81,407	N/A	N/A	$81,407
IM-1.4	Promote incentives available through CARB (i.e., Carl Moyer Program), MBARD (i.e., FARMER Program), and others to switch agricultural equipment and irrigation pumps with EPA Tier 4 Final-rated equipment.	$81,407	TBD	TBD	$81,407
IM-1.5	Raise public awareness of the public health impacts of climate change through partnerships with local hospitals, public health institutions, and other social service organizations.	$81,407	N/A	TBD	$81,407
2026					
BE-1.4-a	Adopt by ordinance a new building reach code based on cost-effectiveness studies, stakeholder outreach, and California Energy Commission approval that must be met by all residential and nonresidential new construction and major renovations.	$38,334	N/A	$328,105	$366,438
BE-1.4-b	Conduct outreach to building industry members, contractors, residents, businesses, and other interest groups to present any proposed reach code and solicit feedback.	$15,333	N/A	$328,105	$343,438
BE-1.4-c	Conduct training for County permitting staff to understand the reach code requirements for new and existing buildings and how compliance will be demonstrated.	$47,394	N/A	$328,105	$375,499
BE-1.9	In coordination with regional partners, scope and develop a grant application for residential building electrification and efficiency across the county to demonstrate resiliency, cost-savings, and emissions reductions and reduce barriers to building electrification. This project should prioritize low-income residents in various communities. Staff will engage with regional partners including the Regional Climate Project Working Group, 3CE, Central Coast Energy Services, and the Central California Rural Regional Energy Network.	$15,333	N/A	TBD	$15,333
TR-2.1	Adopt electric vehicle (EV) charging infrastructure reach codes to meet CALGreen Tier 1 standards for each triennial California Green Building Standards cycle for residential and nonresidential EV charging.	$79,002	N/A	$328,105	$407,106
TR-2.3	Prioritize the installation of EVSE at the identified top locations in the unincorporated county provided in the Central Coast Zero Emission Vehicle Strategy.	$203,518	$39,282,799	N/A	$39,486,316

Table 7.4 Implementation Cost and Funding Sources for Near-Term Climate Action and Adaptation Actions

Action Number	Action	Additional Implementation Costs			
		FTE	Capital	Other	Total
TR-3.3	Pursue funding to provide incentives for residents to purchase or lease e-bikes and other micromobility devices.	$81,407	N/A	TBD	$81,407
SW-1.1	Contractually require annual reporting from the Food Bank for Monterey County in future agreements with Monterey County to ensure baseline and ongoing tonnage data for SB 1383 is appropriately and consistently tracked and reported, and member data is verified as additive to or inclusive of Food Bank data.	$40,704	N/A	N/A	$40,704
SW-1.3	Conduct an annual survey of all food rescue organizations and services with a refined and more comprehensive set of survey questions, and more clearly defined terms for consistency in data reported.	$40,704	N/A	N/A	$40,704
SW-1.5	Develop and pilot a solid waste diversion program in coordination with local partners and the Health Department to eliminate single-use products through dishwashing and reusable adoption. This program should aim to demonstrate success for festival and event use cases before scaling to larger use cases. Future use cases to be considered by the program include institutions with high volumes of food service, restaurants, etc.	$104,407	N/A	TBD	$104,407
NWL-3.2	Pursue funding and provide technical assistance to support the development and implementation of carbon farm plans and healthy soils strategies in Monterey County.	$407,036	N/A	N/A	$407,036
ADPT-1.1	Continue to support the widespread adoption of "Alert Monterey County"—the official emergency alert and warning system for all jurisdictions in the county—to ensure that all residents are informed before, during, and after a climate hazard event (among other emergencies). Expand existing public outreach efforts through: (1) targeted enrollment campaigns at community events, healthcare facilities, and schools; (2) automatic enrollment for County services recipients; and (3) partnerships with CBOs for door-to-door outreach in historically underserved areas. Low-tech backup notification systems may also be considered and established as part of this initiative.	$81,407	TBD	TBD	$81,407

Table 7.4 Implementation Cost and Funding Sources for Near-Term Climate Action and Adaptation Actions

Action Number	Action	Additional Implementation Costs			
		FTE	Capital	Other	Total
ADPT-1.5	Adopt and require the use of a resilient buildings checklist for new construction and major renovations. The checklist should consider utilizing, at a minimum the following conditions: ▸ Firesafe: building materials, location, and egress routes that consider potential fire risks, evacuation options, and offer a buffer to any wildlands urban interface. These can align with IBHS' Wildfire Prepared Home designation. ▸ Air quality: integrated air filtration systems and solutions to provide healthy indoor air quality during smoky periods. ▸ Smart location of equipment that leaves roofs available for solar and puts equipment out of any potential flood or other hazard areas. ▸ Water: support water quality, water safety, and water efficiency, along with approaches to access water during a disaster. ▸ Require the use of electric heat pumps to provide heating and cooling to residents to combat rising temperatures. ▸ Support non-mechanical cooling approaches such as passive house building, cool roofs, and tree shading. ▸ Sea level rise and flooding: do not incentivize projects that are located in a Federal Emergency Management Agency flood zone. ▸ Multi-benefit energy and resilience measures including solar and storage enabling the building to operate off the grid during power outages and address the needs of residents (such as communications, medical needs, and refrigeration). ▸ Minimum temperature factor at doors, windows, and thermal bridges. This factor ensures an absence of condensation and prevents mold and mildew that can lead to long term building damage. ▸ Anti-displacement measures that will help to ensure the project does not displace low-income residents from the neighborhood due to increased rental prices.	$104,407	N/A	$328,105	$432,512

Table 7.4 Implementation Cost and Funding Sources for Near-Term Climate Action and Adaptation Actions

Action Number	Action	Additional Implementation Costs			
		FTE	Capital	Other	Total
IM-1.1	Develop a building electrification outreach program that provides education strategies that enable and encourage energy conservation and gas-to-electric conversions in residential and commercial buildings for space and water heating, and planning for equipment replacement before failure occurs due to emergencies. Develop and/or share existing online educational materials targeted toward building owners and tenants that are hosted on the County's website on energy efficiency and building electrification; including training, fact sheets, information on available incentives, video tutorials, and links to existing content (such as The Switch is On). In addition, video tutorials can explain to building owners how to enroll in real-time energy use monitoring tools to track energy use compared to historic levels and within the community through the EnergyStarђ Portfolio Manager, or other tools offered by third-party providers. The educational materials will also be provided as part of routine regulatory processes, such as applying for or renewing licenses or permits. The building electrification outreach program will coordinate with local jurisdictions and agencies to share resources and problem solve across jurisdictions.	$203,518	N/A	N/A	$203,518
IM-1.2	In partnership with TAMC, develop a transportation outreach program that provides education strategies that enable and encourage residents to engage in mode shifts (e.g., carpooling, walking, biking), transit, and vehicle electrification. Develop and/or share existing online educational materials targeted toward residents and businesses that are hosted on the County's website on reducing vehicle trips and transportation electrification; including training, fact sheets, information on available incentives, video tutorials, and links to partner organizations. The transportation outreach program will coordinate with local jurisdictions and agencies to share resources and problem solve across jurisdictions.	$203,518	N/A	N/A	$203,518
IM-2.1	Establish a standing role for the County's Alternative Energy & Environment Committee (AEEC) to advise the Board of Supervisors on climate action planning, CCAAP strategy implementation, and related topics (e.g., environmental justice).	$81,407	N/A	N/A	$81,407
IM-2.2	Implement a coordinated climate action and resilience outreach and education initiative that leverages the Resilient Monterey County campaign and platform as a primary digital resource hub. The initiative may include seasonal hazard awareness campaigns, collaborative community workshops (in partnership with CBOs, schools, etc.), a climate ambassador program that trains local volunteers to serve as community educators, and promotion of local CERT programs.	$203,518	N/A	N/A	$203,518

Table 7.4 Implementation Cost and Funding Sources for Near-Term Climate Action and Adaptation Actions

Action Number	Action	Additional Implementation Costs			
		FTE	Capital	Other	Total
IM-2.3	Formalize a network of partners, including businesses, community organizations, and volunteers to support CCAAP implementation. Collaborate with groups such as the County Health Department to establish a youth program to ensure youth voices are included in County systems and strategies.	$81,407	N/A	N/A	$81,407
IM-3.1	In consultation with the AEEC, prepare annual public reports on CCAAP implementation and monitoring results and present the reports to the Board of Supervisors. Every three years, prepare GHG inventory updates and every five years, prepare and present a more detailed progress report to the Board of Supervisors.	$104,407	N/A	$524,036	$628,444
IM-3.2	Prepare and present to the Board of Supervisors a proposed budget and staffing plan (including qualified technical consultants) to implement the CCAAP, and update the budget and staffing plan each year.	$81,407	N/A	N/A	$81,407
IM-3.3	Establish and track metrics to monitor progress of CCAAP goals and report data through an online platform, such as a digital portal or dashboard on the County's website.	$104,407	N/A	$95,884	$200,291
IM-4.2	Partner with 3CE to explore offering on-bill financing or pay-as-you-save programs specifically for building electrification and energy affordability projects.	$15,333	N/A	N/A	$15,333
2027					
BE-1.2-a	Develop a nonresidential buildings decarbonization strategy and implement a building performance standard that requires all existing buildings to reduce non-electricity-related emissions by 10 percent by 2033, and by 20 percent by 2045, with analysis of the existing building stock in the county. As part of this effort, encourage small (i.e., less than 50,000 square feet) commercial and small multifamily residential (i.e., less than 17 units) building owners to track and report their annual energy usage through a benchmarking tool (e.g., ENERGY STAR® Portfolio Manager).	$320,606	N/A	$266,305	$586,911
BE-1.2-b	Determine retrofit compliance triggers based on square footage and one additional metric such as time of equipment replacement, percent of existing floor area, building permit valuation, and project valuation.	$32,061	N/A	$266,305	$298,365

Table 7.4 Implementation Cost and Funding Sources for Near-Term Climate Action and Adaptation Actions

Action Number	Action	Additional Implementation Costs			
		FTE	Capital	Other	Total
TR-1.9	Implement the necessary infrastructure upgrades and develop programs for EV car sharing, active transportation, mobility device sharing, and improved transit based on the results of Zero Emissions Shared Mobility Study.	$165,184	TBD	TBD	$165,184
TR-3.4	Work with existing multifamily building owners and require new multifamily developments to install e-bike charging and secure bicycle parking in multifamily residential developments.	$66,074	N/A	$266,305	$332,378
NWL-4.1	Seek funding for and prepare community-specific forest management plans that focus on expanding tree canopies in residential and nonresidential areas to provide cooling benefits. Identify high priority areas that are currently underserved by street trees and trees within public spaces.	$330,369	N/A	$53,045	$383,414
NWL-4.2	Seek funding for and implement an urban greening program to expand tree canopies, establish tree line buffers, plant native and drought-tolerant vegetation, and establish community gardens in developed areas of the unincorporated county and in partnership with local cities, focusing on climate-vulnerable and underserved communities.	$165,184	N/A	$221,920	$387,105
IM-1.6	Collaborate with local tribes to establish training opportunities (e.g., workshops) for youth and community members to learn about traditional land stewardship practices, such as cultural burning, plant management, and ecosystem care. Training opportunities will be co-developed with tribal leaders and aim to integrate Traditional Ecological Knowledge into broader County conservation programs.	$66,074	TBD	TBD	$66,074
2028					
BE-1.5	Partner with 3CE to establish a program that connects owners and occupants of residential and nonresidential buildings to existing energy audit and weatherization programs (e.g., California's Low-Income Weatherization Program) and resources, and additionally, helps to determine eligibility.	$50,280	TBD	TBD	$50,280
BE-1.7	Explore additional opportunities for streamlining permitting of residential electrification projects.	$50,280	N/A	N/A	$50,280

Table 7.4 Implementation Cost and Funding Sources for Near-Term Climate Action and Adaptation Actions

Action Number	Action	Additional Implementation Costs			
		FTE	Capital	Other	Total
TR-2.4	Implement the recommendations included in the forthcoming Monterey Bay Electric Vehicle Climate Adaptation and Resiliency Framework to install EV chargers in high impact and low-risk areas with a focus on making EV chargers more accessible to underserved areas.	$125,701	TBD	TBD	$125,701
TR-2.6	Develop a permit checklist to install EVSE within the public right-of-way by 2029, pursuant to Assembly Bill 2427 (2024).	$16,267	N/A	$202,651	$218,918
SW-1.2	Consider developing a countywide program to coordinate food rescue and distribution in collaboration with local jurisdictions. The program should provide resources to potential food donors and education in order to ensure increased compliance with organic waste diversion goals.	$50,280	N/A	TBD	$50,280
NWL-3.1	Develop a healthy soils strategy for Monterey County to support agriculture, address carbon sequestration, and increase water capture. The strategy should include tracking mechanisms for healthy soil practices, identification of resources for organic agriculture conversion, opportunities to develop a carbon sequestration market, and measures to conserve existing cropland throughout the county.	$416,514	N/A	$54,636	$471,150
ADPT-2.6	Serve as a coordinating entity for partners (e.g., CAL FIRE, Fire Safe Council for Monterey County) to further enhance the reach and effectiveness of their existing wildfire preparedness and wildfire risk reduction programs and resources. This may include integrating program materials into County mailings, providing dedicated space in County facilities for in-person events or workshops, and actively promoting initiatives through all County communication channels.	$50,280	TBD	TBD	$50,280
ADPT-4.4	Develop an outreach and assistance program to connect property owners in flood-prone areas of the county with existing regional, state, and federal programs that provide funding and technical assistance for flood resilience improvements. The County will work with local CBOs to raise awareness and offer application assistance, prioritizing low-income residents and small businesses.	$125,701	N/A	N/A	$125,701

Table 7.4 Implementation Cost and Funding Sources for Near-Term Climate Action and Adaptation Actions

Action Number	Action	Additional Implementation Costs			
		FTE	Capital	Other	Total
2029					
BE-1.1	Adopt a building electrification ordinance for new and existing residential buildings based on cost-effectiveness studies, stakeholder outreach, and California Energy Commission approval. The ordinance will be written such that existing residential buildings' modeled energy efficiency must achieve half of the maximum cost-effective retrofit measures score at time-of-retrofit by 2030, and the maximum cost-effective retrofit measures score by 2045.	$83,776	N/A	$137,087	$220,863
OR-1.3	Adopt an ordinance that would require the use of zero-emission landscaping equipment for equipment up to 25 horsepower by 2030.	$85,033	N/A	$137,087	$222,120
NWL-2.2	Work with local tribes to design a cultural burning program that incorporates Traditional Ecological Knowledge to reduce wildfire risk, manage fuel loads, and restore ecosystems, particularly in oak woodlands. Through the program, support/coordinate regulatory approvals, provide training and equipment for tribe-led burns, and host regular public information sessions to educate residents about cultural burns and their ecological benefits.	$34,013	TBD	TBD	$34,013
NWL-3.6	Partner with neighboring counties and resource conservation districts to prepare a feasibility study to explore the development of community compost banks. The study could include an assessment of organic waste availability, market demand for compost, potential cost savings, infrastructure needs, and potential contamination challenges.	$170,066	N/A	N/A	$170,066
IM-4.4	Establish a dedicated public works special fund to support the implementation of CCAAP capital projects. Such projects may include repairing and/or fortifying critical infrastructure owned and/or managed by the County, advancing urban forestry, and creating safe streets. The fund will serve as a committed reserve that cannot be reappropriated for other purposes without approval by the Board of Supervisors. An interdepartmental team will develop strategies for seeding the fund (e.g., annual budget allocation, municipal bond measure) and will establish criteria and processes for accessing the fund.	$59,146	N/A	N/A	$59,146

Table 7.4 Implementation Cost and Funding Sources for Near-Term Climate Action and Adaptation Actions

Action Number	Action	Additional Implementation Costs			
		FTE	Capital	Other	Total
IM-4.5	Coordinate with other jurisdictions and partners within the county to explore the establishment of a countywide Climate Resilience District—in line with SB 852—to finance, plan, implement, and manage climate adaptation and mitigation projects and programs throughout Monterey County and across jurisdictional boundaries. The district will serve as a coordinating entity to leverage funding opportunities, facilitate multi-benefit projects, and ensure equitable distribution of adaptation investments.	$126,921	N/A	TBD	$126,921
IM-4.6	Establish policy and procedures for the creation of a Carbon Reduction Fund to invest in municipal energy efficiency, community climate action, and carbon reduction projects.	$126,921	N/A	N/A	$126,921
IM-4.7	Explore the creation of a County-administered green bank to invest in clean energy and energy efficiency.	$126,921	N/A	N/A	$126,921
2030					
IM-4.1	Develop a revolving loan fund to provide low-interest loans to residents to cover the time-of-replacement/emergency replacement of water heaters and/or HVAC units with electric options with program prioritization for low-income residents.	$43,145	N/A	N/A	$43,145
IM-4.3	Serve as a coordinating entity in supporting and accelerating forest health services and forest restoration projects across the county by: (1) establishing a fund that provides grants and low-interest loans to landowners and organizations implementing projects; (2) partnering with local financial institutions to leverage additional capital through innovative financing tools (e.g., environmental impact bonds); (3) providing technical assistance to help implementing entities access and combine various funding sources effectively; and (4) procuring equipment and renting it to landowners to implement projects.	$43,145	N/A	N/A	$43,145

MONITORING AND REPORTING

The County will regularly track the status of CCAAP strategies and actions, monitoring and reporting their effectiveness in achieving GHG reductions and adaptation outcomes. These efforts will ensure the County actively evaluates and communicates the CCAAP's progress toward meeting its GHG emission reduction targets. Additionally, monitoring and reporting are critical for guiding future updates, which is discussed further in the CCAAP Updates section of this chapter.

Monitoring

The County's monitoring efforts for the CCAAP will include tracking the status of implementation of each strategy and associated actions, as well as tracking the performance of each strategy based on data collection.

- Implementation Status: County staff will track the status of strategies and specific actions annually and present them to the Board of Supervisors. These reports will outline the progress of the implementation and outcomes of the CCAAP. Staff will also work with all County departments to develop an implementation budget and staffing plan to identify and allocate sufficient resources, ensuring accountability and timely progress toward achieving CCAAP goals.
- Performance Monitoring: County staff will monitor the effectiveness of all CCAAP strategies based on specific tracking metrics or key performance indicators (KPIs) that are closely aligned with the objectives established for each climate action strategy as presented in Chapter 6.

Table 7.5 outlines the KPIs for 2030 and 2045, which will be monitored for each. Unless otherwise specified, data will be collected at least annually for each set of KPIs, and results will be included in the annual monitoring report. Additional details on KPI development and their connection to the GHG reduction quantification of strategies are provided in Appendix A.

Reporting

The County will evaluate CCAAP performance through both annual reports and a comprehensive five-year progress report, which will be presented to the Board of Supervisors and shared publicly. Climate criteria and metrics will be integrated into the reporting process to track efforts, projects, and programs aligned with CCAAP strategy objectives. Metrics will also be shared, ensuring transparent access to performance updates and data. Regular reporting of these metrics will enable the County to assess the effectiveness of strategies and make necessary adjustments to achieve desired outcomes.

These reports aim to track the implementation progress and performance of the CCAAP and identify where further efforts and additional resources may be needed to ensure effective implementation. The first annual CCAAP monitoring report will be issued in 2027, approximately one year after the anticipated approval of the CCAAP. The annual CCAAP monitoring reports will be published annually thereafter and will include the status of each strategy and its associated implementing actions, as well as the latest data on strategy performance based on the metrics and KPIs identified in the monitoring discussion above. A more detailed report will be conducted five years after the CCAAP adoption to review progress over a longer timeline and provide better insights for updating the CCAAP.

The County will integrate reporting on CCAAP implementation progress in historically underserved communities in the annual report to ensure environmental justice and equity components are included in the reporting process.

The County will continue its public outreach for the CCAAP, ensuring that County departments, local partners, and the general public are informed on the progress and effectiveness of each strategy.

CCAAP UPDATES

The County will update the CCAAP to ensure it remains an effective tool for addressing climate change and enhancing climate resilience. These updates will be guided by the monitoring and reporting activities described above. Through annual reports, the County will assess implementation progress by reviewing active and ongoing actions, identifying successes and challenges, and determining where adjustments may be needed to improve strategy effectiveness.

A more comprehensive report and CCAAP update is recommended to be prepared approximately five years after CCAAP adoption to assess strategies and actions more thoroughly. This effort may include new GHG inventories and forecasts conducted by AMBAG, the removal of completed actions, and new or revised strategies to ensure alignment with current County goals. The County will continue collaborating with local organizations and agencies throughout this process while maintaining strong community engagement to share report findings and gather public feedback. This collaborative approach will help ensure the CCAAP remains transparent, inclusive, and responsive to evolving community needs.

ONGOING ENGAGEMENT

Continued community engagement and active participation are essential for successfully implementing the CCAAP. As the County implements and monitors CCAAP actions, collaboration with residents, businesses, community organizations, tribes, property owners, and local, regional, and state agencies will help guide strategy implementation and advance CCAAP objectives. While some actions will be led solely by the County, many will require partnerships and ongoing collaboration. Wherever possible, the County will empower residents—especially those in climate-vulnerable and underserved communities—to shape the design and implementation of strategies and actions through a participatory process.

Education and awareness will help ensure all communities have the knowledge and tools to contribute to sustainable solutions and support implementation. To achieve this, Strategy IM-1: Education, Outreach, and Coordination will develop comprehensive outreach programs covering electrification, sustainable transportation, and other climate action efforts. The strategy outlines the County's commitment to providing bilingual educational materials and resources on available incentives to help residents and businesses adopt environmentally friendly practices, such as transitioning to electric appliances or gardening equipment. It also promotes regional and local collaboration by raising awareness of climate-related health impacts through partnerships with public health institutions and working with local partners, including tribes, to integrate traditional land stewardship practices into conservation efforts.

Successful implementation of the CCAAP requires formal structures and processes that enable meaningful avenues for community participation and collaborative decision-making. A standing role will be created for the County's Alternative Energy & Environment Committee (AEEC) to advise the Board of Supervisors on climate action planning, CCAAP strategy implementation, and related topics, such as environmental justice. The AEEC will also advise on the preparation of annual public reports on the results of CCAAP implementation, providing recommendations for adjustments and improvements over time. Moreover, the County aims to continue developing a strong network of local partners and organizations to support ongoing CCAAP implementation efforts. To establish these foundations, this strategy will also promote climate action and resilience outreach through the Resilient Monterey County campaign platform, incorporating digital outreach, awareness campaigns,

community workshops, and opportunities to train volunteers as community educators to support and get feedback during the implementation phase.

Following CCAAP adoption, addressing climate inequities through meaningful, ongoing engagement with Monterey County's underserved communities will continue to be a priority. Many of the County's most climate-vulnerable residents, including farmworkers, low-income households, and rural communities, face barriers to participation, such as limited access to technology, language barriers, and competing economic pressures. To ensure a more equitable implementation process, the County is committed to overcoming these challenges by providing accessible engagement opportunities, multilingual resources, and culturally relevant outreach.



Table 7.5 Community Climate Action and Adaptation Strategies Performance Monitoring Matrix

Strategy Number	Strategy Title	Objective	2030 Target Indicator	2045 Target Indicator
BE-1	Energy Efficiency and Electrification	Increase energy efficiency in existing and new residential and nonresidential buildings.	▶ 10% of existing residential and 8% of existing nonresidential building square footage fully electrified	▶ 65% of existing residential and 65% of existing nonresidential building square footage fully electrified
			▶ 90% of new residential and 90% of new nonresidential fully electrified	▶ 95% of new residential and 95% of new nonresidential fully electrified
BE-2	Clean Energy	Maximize reliable, emissions-free energy generation, transmission, and storage locally.	▶ 100% of electricity is carbon-free	▶ 100% of electricity is carbon-free
TR-1	Sustainable Transportation and Land Use Planning	Reduce passenger vehicle miles traveled through transit-oriented, mixed-use, and compact development and accessible, reliable, and convenient transit.	▶ 7.5% reduction in annual passenger VMT below 2019 levels	▶ 30% reduction in annual passenger VMT below 2019 levels
TR-2	Low- and Zero-Emission Vehicles	Transition to low- and zero-emission vehicles.	▶ 20% of light-duty vehicles are EVs or PHEVs	▶ 90% of light-duty vehicles are EVs or PHEVs
			▶ 10% of heavy-duty vehicles are EVs	▶ 90% of heavy-duty vehicles are EVs
TR-3	Active Transportation	Make walking and biking safe and accessible for people of all ages and abilities.	▶ No target identified	▶ No target identified
OR-1	Electrification and Clean Alternatives	Reduce construction-related emissions and transition to zero-emission equipment.	▶ 50% of construction equipment uses renewable diesel	▶ 80% of construction equipment uses renewable diesel
			▶ 2% of construction equipment is electric	▶ 19% of construction equipment is electric
			▶ 12% of landscaping equipment is electric	▶ 100% of landscaping equipment is electric
			▶ 12% of recreational boats are electric	▶ 100% of recreational boats are electric
			▶ 5% of agricultural equipment and irrigation pumps are electric	▶ 20% of agricultural equipment and irrigation pumps are electric

Table 7.5 Community Climate Action and Adaptation Strategies Performance Monitoring Matrix

Strategy Number	Strategy Title	Objective	2030 Target Indicator	2045 Target Indicator
SW-1	Waste Diversion	Increase organic waste diversion.	▶ 75% of waste diverted from landfills	▶ 90% of waste diverted from landfills
WA-1	Water Conservation	Reduce building and landscaping water use and increase recycled water for irrigation.	▶ 25% reduction in residential water consumption	▶ 35% reduction in residential water consumption
			▶ 31% reduction in nonresidential water consumption	▶ 41% reduction in nonresidential water consumption
			▶ 25% reduction in water consumption for existing irrigation	▶ 35% reduction in water consumption for existing irrigation
			▶ 60% reduction in water consumption for new irrigation	▶ 75% reduction in water consumption for new irrigation
NWL-1	Coastal Habitat and Watershed Restoration	Conserve, restore, and protect coastal wetlands, seagrass beds, and freshwater wetlands.	▶ acres of wetlands conserved each year	▶ acres of wetlands conserved each year
			▶ acres of wetlands restored each year	▶ acres of wetlands restored each year
NWL-2	Fire-Adapted Landscapes	Practice climate-smart management of forests that enhances resilience.	▶ acres of fuel reduction activities per year	▶ acres of fuel reduction activities per year
			▶ acres of oak woodland re-establishment per year	▶ acres of oak woodland re-establishment per year
			▶ acres of forest conservation per year	▶ acres of forest conservation per year
NWL-3	Climate-Smart Agriculture	Practice climate-smart agriculture that preserves and enhances natural and working lands.	▶ acres of healthy soil practices per year	▶ acres of healthy soil practices per year
			▶ acres of grassland conserved per year	▶ acres of grassland conserved per year
NWL-4	Green Space and Infrastructure	Expand green spaces, utilize green infrastructure and nature-based solutions, and invest in local parks.	▶ 108 acres of urban tree cover conserved per year	▶ 108 acres of urban tree cover conserved per year
			▶ 218 acres of urban vegetation planted per year	▶ 218 acres of urban vegetation planted per year
			▶ 1,254 trees planted in urban areas per year	▶ 1,254 trees planted in urban areas per year

Table 7.5 Community Climate Action and Adaptation Strategies Performance Monitoring Matrix

Strategy Number	Strategy Title	Objective	2030 Target Indicator	2045 Target Indicator
GE-1	Green Businesses and Jobs	Support a local economy that fosters a just transition towards environmental sustainability.	▶ No target identified	▶ No target identified
IM-1	Education, Outreach, and Coordination	Continue to provide education and outreach to the Monterey County community on how to support climate action locally and coordinate with essential partners for successful implementation.	▶ Target to be identified with further County coordination	▶ Target to be identified with further County coordination
IM-2	Public Participation and Engagement	Create meaningful opportunities for continued public participation in implementing climate solutions.	▶ Target to be identified with further County coordination	▶ Target to be identified with further County coordination
IM-3	Climate Tracking and Budgeting	Provide accountability and transparency in implementing the CCAAP and commit resources to ensuring its success.	▶ Sustainability Program has adequate staff capacity to implement and coordinate CCAAP strategies.	▶ No target identified
IM-4	Funding and Financing	Seek funding and financing solutions to implement the CCAAP.	▶ Target to be identified with further County coordination	▶ Target to be identified with further County coordination
ADPT-1	Cross-Cutting	Ensure that climate adaptation actions holistically address hazards and risks throughout the county.	▶ No target identified	▶ No target identified
ADPT-2	Wildfire	Reduce wildfire risk and support fire-adapted communities.	▶ 69 acres of defensible space established in WUI each year	▶ 69 acres of defensible space established in WUI each year
ADPT-3	Extreme Heat	Prepare for and reduce heat-related impacts to communities throughout the county.	▶ No target identified	▶ No target identified

Table 7.5 Community Climate Action and Adaptation Strategies Performance Monitoring Matrix

Strategy Number	Strategy Title	Objective	2030 Target Indicator	2045 Target Indicator
ADPT-4	Flooding and Sea-Level Rise	Prepare for and reduce flooding and sea-level rise impacts throughout the county.	▶ No target identified	▶ No target identified
ADPT-5	Drought	Prepare for and adapt to more frequent drought conditions throughout the county.	▶ No target identified	▶ No target identified

Solarpunk Farms



"Solar Punk Farms is a climate hub focused on bioregional regeneration. We engage the queer community, youth, and all others who want to help create a more ecologically minded civilization. Through science, art, collaboration and revelry – we aim to make the sustainable revolution seem irresistible by inviting others to experience what a life based on pro-climate values looks, smells, tastes and feels like."

Painted *en plein air*.



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Glossary

100-Year Floodplain: Areas with a 1% annual chance of flooding as determined by the Federal Emergency Management Agency (FEMA).

500-Year Floodplain: Areas with a 0.2% annual chance of flooding as determined by FEMA.

Aboveground carbon: The carbon stored in vegetation above the soil surface, including trees, shrubs, and other plants.

Active transportation: Walking, biking, other non-motorized modes of transport.

Adaptive capacity: The combination of the strengths, attributes, and resources available to an individual, community, society, or organization that can be used to prepare for and undertake actions to reduce adverse impacts or moderate harm or to exploit beneficial opportunities.

Albedo: A fraction of light that is reflected by a body or surface.

Anthropogenic: Originating from human activities.

Barren: Areas with very little or no plant growth due to environmental conditions, including beaches, dunes, and exposed rock.

Baseline: A calculated level of annual emissions against which future inventories can be compared.

Belowground carbon: The carbon stored in soil, plant roots, and underground organic matter.

Biochar: A charcoal-like substance created by heating wood byproducts in a low-oxygen environment that can sequester carbon and improve soil health.

Business-as-usual (BAU) greenhouse gas (GHG) emissions forecast scenario: Regarding GHG emissions forecasts, a BAU scenario is based on a continuation of current trends in activity and does not account for GHG emissions reductions resulting from laws and regulations adopted by local, regional, state, or federal agencies.

Cal-Adapt: A climate modeling tool developed by the California Energy Commission and the University of California, Berkeley that uses downscaled global climate model data.

California Environmental Quality Act (CEQA): A statute that generally requires state and local government agencies to inform decision makers and the public about the potential environmental impacts of proposed projects, and to mitigate significant environmental impacts to the extent feasible.

California Green Building Standards Code (CALGreen): A mandatory green building standards code that aims to improve public health, safety, and general welfare through enhanced design and construction of buildings that reduce negative impacts and promote those principles that have positive environmental impact and encourage sustainable construction practices.

Carbon capture and storage: A process that captures GHG emissions for reuse or storage and that prevents them from entering the atmosphere.

Carbon dioxide equivalent (CO_2e): A way to measure and equalize the different warming potencies of different GHGs. Measuring emissions in terms of CO_2e helps to normalize all GHG emissions to CO_2, which is the most prevalent GHG emitted by human activities and has a global warming potential (GWP) value of 1.

Carbon neutrality: All GHG emissions emitted into the atmosphere balanced in equal measure by GHGs that are removed from the atmosphere, either through carbon sinks (i.e., natural or anthropogenic systems that absorb or hold more carbon than they emit) or carbon capture and storage. (See also "Net Zero GHG Emissions").

Carbon pools: A system which has the capacity to store or release carbon.

Carbon sequestration: The process of capturing and storing carbon dioxide from the atmosphere in plants, soil, and other natural systems.

Carbon stock: The total amount of carbon stored in a defined area or ecosystem at a specific point in time.

Climate action/mitigation: Reduction or removal of GHG emissions from the atmosphere to prevent the planet from warming to more extreme temperatures.

Climate adaptation: Actions taken to prepare communities for and respond to the impacts of climate change.

Climate change effect (primary and secondary): A climate change effect is any consequence, generally a negative one, that is caused by climate change. The Community Climate Action and Adaptation Plan (CCAAP) evaluates primary climate change effects including increased temperatures, changes in precipitation patterns, and sea level rise, as well as secondary climate change effects including wildfires, extreme heat events, extreme precipitation and flooding, and drought. Secondary climate change effects are the indirect consequences of primary climate change effects on ecosystems and human systems.

Climate Change Scoping Plan: The State of California's climate action plan, which is designed to provide a statewide strategy for achieving the GHG reduction targets established in (Assembly Bill) AB 32 and subsequent laws.

Climate Change Vulnerability Assessment: This assessment is designed to provide communities with a localized assessment of climate change effects and their impacts, including projection data, as well as the technical support to undertake climate planning and priority-project identification.

Climate hazard: The result from climate effects, like extreme weather or natural disasters.

Climate hazard overlay zone: Additional layers of zoning standards applied to defined geographical areas that have been identified as being more vulnerable to future flooding, erosion, landslides, wildfire, or severe storm/high wind events, regardless of the underlying base zoning district.

Climate impacts: Climate impacts are caused by climate hazards, this includes things such as public health effects, structural damage, ecosystem degradation, water quality, and smoke and ash.

Climate resilience: The ability of people, communities, and ecosystems to prepare for, respond to, and recover from climate impacts.

Climate-smart: An integrated approach to planning and management that focuses on mitigating the impacts of climate change through GHG emissions reductions as well as adapting to the effects of climate change while at the same time enhancing economic development, ecological preservation, and social wellbeing.

Community functions: The resources, assets, operations, economic sectors, and services that are created or influenced by the interaction between populations and the built environment.

Composting: A process by which organic materials such as yard waste, grass, tree trimmings, fruit, and sometimes meat products and sewage sludge are converted to fertilizer through controlled decomposition.

Coastal inundation: A climate hazard that refers to the flooding of coastal areas due to sea level rise.

Co-benefits: Co-benefits are the additional positive outcomes from GHG mitigation and climate adaptation that extend beyond environmental improvements to enhance the quality of life, economic vitality, and social equity across the county.

Conservation: The protection of natural resources through management and restoration.

Cool pavement: Higher albedo paving materials that reflect more solar energy, enhance water evaporation, or have been otherwise modified to reduce both surface and ambient air temperatures.

Critical habitats: Areas that support the conservation of endangered or threatened species under the Endangered Species Act.

Critical infrastructure: This includes fire stations, medical facilities, schools, water and wastewater facilities, and government facilities, among others.

Cropland: Agricultural lands used to grow annual food and fiber crops that are replanted each year, managed through regular cultivation and irrigation.

Decarbonization: The reduction or elimination of carbon dioxide emissions from a process such as manufacturing or the production of energy.

Developed land: Human-built areas including cities, neighborhoods, roads, and associated green spaces like urban forests, parks, and other managed vegetation.

Disadvantaged communities: Communities that have suffered from historical disinvestment and environmental injustice and are among the most vulnerable to the impacts of climate change. According to state law, definitional criteria may include either of the following: (a) areas that are disproportionately affected by environmental pollution and other hazards that can lead to negative health effects, exposure, or environmental degradation, or (b) areas with concentrations of people that are of low income, high unemployment, low levels of homeownership, high rent burden, sensitive populations, or low levels of educational attainment (CA Health and Safety Code, Section 39711).

Disproportionate impact: Causing more intense or frequent impacts to certain places, people, or assets.

Downscaled global climate model data: Large-scale global climate model data that is translated to a smaller spatial scale, allowing for the data to be more useful in local and regional contexts.

Drought: A deficiency of precipitation over an extended period of time, typically resulting in issues with water supply and/or quality.

Electrification: The process of replacing systems that use fossil fuels (e.g., coal, oil, natural gas) with ones that use electricity as a source of power.

Electric vehicles: Vehicles that rely on battery power to charge electric motors.

Emissions sector: The activity that creates GHG emissions, regardless of the policy topic it falls under. Emissions sectors demonstrate the types of emissions-generating activities that are being affected through the CCAAP strategies and actions.

Energy storage: The capture of energy produced at one time (e.g., high production with low demand) so that it can be used at another time (e.g., low production with high demand). Building more energy storage allows renewable energy sources to power more of the electric grid.

Equity: In the context of this CCAAP, the term equity means ensuring fair distribution of benefits and reducing burdens across all communities, focusing on supporting disadvantaged and vulnerable populations for a more inclusive Monterey County.

Evapotranspiration: The movement of water between the land and atmosphere via evaporation (water absorbed into the atmosphere) and transpiration (water released by plants that is absorbed by the atmosphere).

Extreme heat day: Defined as a day when the maximum temperature exceeds the local extreme heat threshold.

Forest: Natural and managed areas dominated by trees, ranging from coastal to inland forests, with multiple layers of vegetation including trees of different ages and sizes.

Fossil fuels: Carbon-based fuels formed from decomposed plants and animals over millions of years, including oil, coal, and natural gas, which release greenhouse gases when burned for energy.

Fine particulate matter: A mixture of solid and aerosol particles that are 2.5 microns or less in diameter, typically resulting from the combustion of gasoline, oil, diesel fuel, or wood.

Fresh marsh: Freshwater wetland areas where plants grow in saturated soils, typically occurring in floodplains and along waterways with year-round or seasonal flooding.

General Plan: A mandatory local government plan in California that serves as a blueprint for local land use and meeting the community's long-term vision for the future.

Grassland: Open areas dominated by grasses and other non-woody plants, occurring naturally or managed for grazing.

Greenhouse effect: A warming of Earth's surface and atmosphere caused by the presence of greenhouse gases. This greenhouse effect has been enhanced by human activities.

Greenhouse gas: GHGs are chemical compounds in the Earth's atmosphere that trap heat and contribute to global warming and climate change.

Greenhouse gas inventory: A list of emission sources and the associated emissions quantified using standardized methods.

Greenhouse gas reduction target: A goal of reducing GHG emissions by a certain amount by a specified point in time; typically reflected as a percent reduction from a historic baseline by a certain year.

Green infrastructure: The use of nature to provide services such as shade, stormwater retention, and air filtration. Common elements of green infrastructure are trees, bioswales, community gardens, and parks.

Green jobs: Jobs that produce goods or include services that benefit the environment or conserve natural resources.

Greywater: Greywater is water collected from sinks (excluding the kitchen sink), showers, bathtubs and/or washing machines that can be used for landscape irrigation or toilet flushing. Greywater does not include wastewater from kitchen sinks or dishwashers.

Global warming potential: The relative potency of various GHGs when compared to carbon dioxide.

Global warming potential star: A modified metric that accounts for the temperature impacts of short-lived climate pollutants like methane by considering both the rate of emission changes and cumulative emissions over time.

Hazard mitigation: The use of sustained, long-term actions to reduce the loss of life, personal injury, and property damage that can result from a disaster.

Healthy soils: Agricultural soils managed to improve water retention, carbon sequestration, and biodiversity through practices like cover cropping, reduced tillage, and compost application.

Heating, ventilation, and air conditioning systems: The system that controls thermal comfort and indoor air quality within buildings using heating, ventilation, and air conditioning equipment.

Heat wave: A period of four or more consecutive extreme heat days, based on the extreme heat threshold for the area being analyzed.

Heavy-duty vehicles: A vehicle with a gross vehicle weight rating greater than 26,000 pounds. Includes weight classes 7 and 8.

Home hardening: Actions that help protect a home against wildfire, such as vegetation management and resilient building materials.

Intergovernmental Panel on Climate Change (IPCC): The IPCC is the United Nations' authority on the science of climate change. This panel is made up of global experts on climate science. They create assessments on the state of knowledge surrounding climate change. These assessments are meant to inform policymakers of climate change implications, risks, and adaptation and mitigation options.

Invasive species: An invasive species is an introduced, nonnative organism (disease, parasite, plant, or animal) that begins to spread or expand its range from the site of its original introduction and that has the potential to cause harm to the environment, the economy, or to human health.

Key performance indicator: A quantified measure of progress toward an objective.

Local emissions gap: The difference between projected greenhouse gas emissions under current local policies and the emissions reductions needed to meet Monterey County's climate targets.

Long-lived climate pollutants: Pollutants that accumulate over centuries.

Medium-duty vehicle: Vehicles with a gross vehicle weight rating between 10,001 – 26,000 pounds. Includes weight classes 3, 4, 5, and 6.

Methane: A potent greenhouse gas with a larger warming potential of carbon dioxide over 20 years, generated when organic waste decomposes anaerobically in landfills.

Microgrid: A local electrical grid with defined electrical boundaries, acting as a single and controllable entity, and with the ability to operate both grid-connected and independently.

Micromobility: Any small, low-speed, human- or electric-powered transportation device, including bicycles, scooters, electric-assist bicycles, electric scooters (e-scooters), and other small, lightweight, wheeled conveyances.

Mobility hub: Places in a community that bring together public transit, bike share, car share and other ways for people to get where they want to go without a private vehicle.

Nationally Determined Contributions: The commitments from nations under the Paris Agreement to reduce their GHG emissions.

Nature-based solutions: Strategies that protect, restore, or manage ecosystems to address environmental challenges and provide benefits like enhanced biodiversity and climate resilience.

Natural lands: Lands made up of native ecosystems, like forests, grasslands, deserts, riparian systems, and wetlands.

Net zero GHG emissions: Removing an equal amount of GHGs from the atmosphere as they are released into it. AB 1279 sets California on a path to net zero GHG emissions by 2045. While similar to carbon neutrality, net zero GHG emissions apply to all GHGs emitted into the atmosphere.

No-local-action GHG emissions forecast scenario: An assessment of how emissions generated will change over time considering legislative and regulatory actions that are already being implemented at the state and federal levels.

Oak woodland: Areas characterized by oak trees with varying density, creating distinctive landscapes where trees are mixed with grass and other vegetation.

Off-road equipment: Any non-stationary device powered by an internal combustion engine or electric motor used primarily off roadways, such as those used for agricultural, landscaping or construction purposes.

Orchards/vineyards: Agricultural lands dedicated to permanent tree crops and grapevines, characterized by organized planting patterns and long-term management.

Organic waste: Solid waste containing material originating from living organisms and their metabolic waste products, including but not limited to food, green waste, landscape and pruning waste, applicable textiles and carpets, wood, lumber, fiber, manure, biosolids, digestate and sludges.

Passive cooling: A design approach that focuses on heat gain control and heat dissipation in a building to improve the indoor thermal comfort with low or no energy consumption.

Photovoltaic: Materials and devices convert sunlight into electrical energy.

Potential climate change impacts: How a system may be affected by exposure to climate change effects.

Production-based GHG inventory: An inventory that identifies the sources, activities, and sectors that are producing these emissions and the relative contribution of each.

Renewable Energy: Energy produced from fuel sources that produce very small or no quantities of GHG emissions and are produced from renewable resources (e.g., solar, wind, tidal, and biogas).

Representative Concentration Pathways (RCPs): Climate change scenarios to project future GHG concentrations. RCPs are used to model how human activities may affect climate change.

Resilience hub: A community-serving facility augmented to support residents and coordinate resource distribution and services before, during, or after a natural hazard event.

Restoration: Assisting in the recovery of ecosystems that have been degraded or destroyed, as well as conserving the ecosystems that are still intact.

Sensitivity: The degree to which a system would be affected by exposure to climate change effects.

Shock: Highly unexpected events that cause welfare losses.

Short-lived climate pollutants: Pollutants that dissipate in roughly 10 years.

Shrubland: Areas covered by woody plants shorter than trees, including chaparral and coastal scrub communities adapting to California's climate.

Solid waste: Any garbage or refuse, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, resulting from industrial, commercial, mining, and agricultural operations, and from community activities.

Stressor: Stressors, like pathogens or water stress, are dynamics that impair or comprise the function or productivity of the system.

Traditional ecological knowledge: The on-going accumulation of knowledge, practice and belief about relationships between living beings in a specific ecosystem that is acquired by indigenous people over hundreds or thousands of years through direct contact with the environment, handed down through generations, and used for life-sustaining ways.

Transit: The movement of people or goods typically via public transportation.

Transit-oriented development: The development of housing, commercial space, services, and job opportunities near public transit nodes.

Unknown: Areas where land cover type cannot be determined due to data limitations, mixed land uses, or other classification challenges.

Urban heat island effect: A phenomenon whereby urban areas experience higher air temperatures than surrounding non-urban areas due to dense concentrations of pavement, buildings, and other surfaces that absorb and retain heat. Trees, green roofs, and vegetation can help reduce the urban heat island effect by shading building surfaces, deflecting radiation from the sun, and releasing moisture into the atmosphere.

Vehicle miles traveled: A measure of how much motor vehicle activity occurs on the roadway network in total miles traveled over a given period of time, and it is a key input into measuring GHG emissions from motor vehicles broadly at various scales.

Vulnerability: The degree to which populations, built environment, and community functions are susceptible to harm from exposure to climate change effects and from the absence of adaptive capacity.

Vulnerability assessment: A comprehensive analysis of exposure, sensitivity, potential impacts, and adaptive capacity to determine the vulnerability of populations, built environment, and community functions to climate change effects.

Vulnerable populations: Some population groups are more vulnerable to disasters due to characteristics such as age, gender and sexual identities, race, culture, religion, disability, socio-economic status, geographical location, or migration status.

Water: Bodies of water including rivers, streams, lakes, and coastal waters that support various aquatic ecosystems.

Water efficiency: Using less water via technologies and conscientious actions to achieve the same task.

Wetland: Areas where land meets water, including coastal marshes and seagrass beds, characterized by plants adapted to regular flooding.

Wildland-urban interface: The transitional area between development and unoccupied or wildland.

Working lands: Lands used for economic purposes like farming, grazing, or timber production.

Zero-emission vehicle: Any vehicle that produces zero GHG emissions in its day-to-day operations.

Appendix A

Greenhouse Gas Technical Materials

October 2024









DRAFT GREENHOUSE GAS EMISSIONS INVENTORY REPORT

Monterey County

Community Climate Action and Adaptation Plan

Prepared for:

Final Greenhouse Gas Emissions Inventory Report for the Monterey County Community Climate Action and Adaptation Plan

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LIST OF ABBREVIATIONS

2030 MCAP	2030 Municipal Climate Action Plan
3CE	Central Coast Community Energy
ACO	Agricultural Commissioner's Office
ADC	alternative daily cover
AMBAG	Association of Monterey Bay Area Governments
CalRecycle	California Department of Resources Recycling and Recovery
CAP	climate action plan
Cap-and-Trade	California Greenhouse Gas Cap-and-Trade Program
CARB	California Air Resources Board
CCAAP	Community Climate Action and Adaptation Plan
CDFA	California Department of Food and Agriculture
CDPR	California Department of Pesticide Regulation
CEC	California Energy Commission
CH_4	methane
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
Community Protocol	*U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions*
County	County of Monterey
county	unincorporated Monterey County
CPUC	California Public Utilities Commissions
eGRID	Emissions & Generation Resource Integrated Database
EMFAC2021	EMissions FACtor model
EPA	U.S. Environmental Protection Agency
GHG	greenhouse gas
GWP	global warming potential
ICLEI	ICLEI - Local Governments for Sustainability
IPCC	Intergovernmental Panel on Climate Change
kBTU	kilo British thermal unit
kWh/AF	kilowatt-hours per acre-foot
lb/kBTU	pounds per kilo British thermal unit
lb/MWh	pounds per megawatt-hour
lb/therm	pounds per therm
LFG	landfill gas
LPG	liquid propane gas

M1W	Monterey One Water
MBARD	Monterey Bay Air Resources District
MCWRA	Monterey County Water Resources Agency
Methane Regulation	Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities
MSW	municipal solid waste
$MTCO_2e$	metric tons of carbon dioxide equivalent
MWh	megawatt-hour
N_2O	nitrous oxide
NWCG	National Wildfire Coordinating Group
OPR	Governor's Office of Planning and Research
PG&E	Pacific Gas and Electric Company
RTAC	Regional Targets Advisory Committee
RTDM	Regional Transportation Demand Model
SB	Senate Bill
TCR	The Climate Registry
USDA	U.S. Department of Agriculture
VMT	vehicle miles traveled
WWTP	wastewater treatment plant

1 INTRODUCTION

1.1 PROJECT OVERVIEW

The County of Monterey (County) is developing its Community Climate Action and Adaptation Plan (CCAAP) to reduce greenhouse gas (GHG) emissions within the unincorporated county (county). The County is also updating its Municipal Climate Action Plan for 2030 (2030 MCAP) to reduce GHG emissions associated with local government operations. These efforts are driven by Mitigation Measure CC-1a included in the County's 2010 General Plan Final Environmental Impact Report, which requires the County to develop a GHG Reduction Plan (or climate action plan [CAP]). Measure CC-1a also requires the establishment of an updated baseline GHG emissions inventory for community and municipal operations emissions, a business-as-usual forecast of GHG emissions, and a 2030 reduction goal, along with the identification and quantification of GHG reduction measures and an implementation plan. The CCAAP and 2030 MCAP are intended to align with the requirements of the County's 2010 General Plan, as well as State goals, and will serve to reduce GHG emissions for target years 2030 and 2045. The long-term target year of 2045 was chosen to align with the statewide carbon neutrality goal expressed in Assembly Bill 1279.

1.2 INVENTORY PURPOSE AND DESCRIPTION

The first step in the climate action planning process is to develop a GHG emissions inventory, which is a snapshot of the GHG emissions associated with a jurisdiction in a given year. The purpose of an inventory is to:

- establish a baseline against which future emissions levels and future reduction targets can be measured,
- understand the sectors and sources generating GHG emissions and their relative contribution to total emissions, and
- monitor progress towards achievement of GHG reduction targets.

Preparing a GHG emissions inventory is a critical step in climate action planning. To develop and implement a CAP that will effectively reduce GHG emissions, local governments must first have a comprehensive understanding of the emissions that are generated by activities within their jurisdictions. GHG emissions inventories not only serve to provide this knowledge, but they also act as the basis for measuring progress and provide agencies with a framework to track emissions over time and assess the effectiveness of CAP implementation. Additionally, local governments often prepare inventories to exhibit accountability and leadership, motivate community action, and demonstrate compliance with regulations.

A GHG emissions inventory estimates emissions generated within a defined geographic boundary during a single year. It identifies the sectors, sources, and activities that are producing these emissions and the relative contribution of each, while also providing a baseline used to forecast emissions trends into the future. This information is used to set reduction targets that are consistent with State objectives and then to create solutions for reducing GHG emissions locally through the creation of a CAP.

1.3 COUNTY INVENTORY BACKGROUND

The County's metropolitan planning organization, the Association of Monterey Bay Area Governments (AMBAG), regularly provides GHG emissions inventories to the jurisdictions within its service territory. AMBAG completed an emissions inventory for the unincorporated county for 2019, the year for which the most recent data were available at the time this analysis was conducted. While AMBAG's inventory generally follows industry standards and best practices for GHG inventorying, an evaluation of AMBAG's 2019 inventory revealed methodologies and assumptions that needed to be refined to use the 2019 inventory as the basis for the County's CCAAP. These refinements include the following:

- updated global warming potential (GWP) values;

- updated on-road transportation data and emissions;
- revised emissions factors for electricity supplied by Pacific Gas & Electric Company (PG&E); and
- the inclusion of off-road vehicles and equipment emissions, additional wastewater treatment-related emissions, and additional agriculture-related emissions.

This first phase in preparation of the CCAAP involved evaluating AMBAG's 2019 community GHG emissions inventory for the unincorporated county and revising the 2019 community inventory to be consistent with recommended protocols. This report describes protocols, methods, and other considerations for preparing a GHG emissions inventory; discusses associated methods, assumptions, emissions factors, and data sources; provides an evaluation of the 2019 community GHG emissions inventory prepared by AMBAG; and presents the results of the revised 2019 community inventory. This GHG emissions inventory provides a foundation for the subsequent phases of the CCAAP development processes, including forecasting future emissions, setting GHG emissions reduction targets, developing GHG emissions reduction measures, and creating an implementation plan that will help the County achieve identified targets.

1.4 ORGANIZATION OF THIS REPORT

This report consists of three main parts:

- Section 2: Inventory Overview outlines considerations for preparing a community GHG emissions inventory, summarizes industry-leading protocols and methods for inventories, discusses inventory boundaries, and describes the emissions sectors and sources that are included and excluded in the County's 2019 community GHG emissions inventory.
- Section 3: Data, Methods, and Assumptions describes the data, methods, and assumptions used in the County's 2019 community inventory and presents GHG emissions estimates by sector, including new methods and emissions sources recommended by GHG inventory protocols but not previously included in prior inventories.
- Section 4: Summary of Inventory Results presents the results of the 2019 community GHG emissions inventory for each sector and source.

1.5 UPDATES SINCE PREVIOUS INVENTORY PUBLICATIONS

Since previous unincorporated Monterey County emissions inventories were published on the County's Konveio website, several updates were made based on comments received. These updates are described in more detail in the following sections and are related to the following specific sources: livestock operations on agricultural lands (see Section 3.4.9), fertilizer application on agricultural lands (see Section 3.4.9), pesticide application on agricultural lands (see Section 3.4.10), and vehicle miles traveled associated with residents, employees, and visitors of the unincorporated county (see Section 3.4.4). All other data, methods, and assumptions remain the same since the August 2022 publication.

2 INVENTORY OVERVIEW

2.1 CONSIDERATIONS FOR DEVELOPING AN INVENTORY

Nations, states, local jurisdictions, public agencies, and corporations estimate GHG emissions for different purposes. Several general approaches exist to quantify GHG emissions, and the method chosen by governments or private entities is driven by the purpose for developing an inventory. State, federal, and international agencies have developed industry protocols and recommendations for local governments preparing GHG emissions inventories at the community level.

The traditional GHG emissions inventory used by local governments in the climate action planning process, known as a "production-based" inventory, estimates GHG emissions generated by activities occurring within a defined boundary during a single year. This has become the standard approach recommended by industry protocols and includes emissions that are generated from community activities that occur within the jurisdictional boundary of the agency/entity, such as those emitted from natural gas furnaces used for heating buildings throughout a community. It also includes certain "trans-boundary" emissions that are associated with activities occurring within the inventory's boundary but are released into the atmosphere outside of the boundary. For example, electricity emissions in a production-based inventory are attributed to a community based on electricity consumption within the inventory boundary, even if the electricity was generated and produced GHG emissions outside of the inventory boundary. More information regarding considerations for preparing production-based inventories is included in Sections 2.2 through 2.4.

In addition to traditional production-based emissions inventories, corporations, local governments, and other entities may prepare a "consumption-based" emissions inventory. A consumption-based emissions inventory includes the total lifecycle GHG emissions generated by the production, shipping, use, and disposal of goods and services consumed by residents of a community within a given year. For example, for transportation GHG emissions, this approach includes the emissions embedded in motor vehicle production, emissions from shipping the vehicle to the consumer, emissions from producing and refining fuel used in the vehicle, emissions from the combustion of the fuel used in the vehicle, and the emissions resulting from the ultimate disposal of the vehicle.

The production-based approach was chosen for the County's community GHG emissions inventory, which is the focus of this report. This is consistent with recommendations and guidance from industry protocols (described further below), as well as State agencies, including the California Air Resources Board (CARB) and the Governor's Office of Planning and Research (OPR). Production-based inventories provide local governments with the information needed to develop effective climate action policy within their communities; because of this, the production-based inventory method is the most common approach taken by local governments across California and nation.

2.1.1 General Plan Consistency

In the 2010 Monterey County General Plan Final Environmental Impact Report, preparation of a GHG Reduction Plan was identified as a mitigation measure that would reduce climate change impacts associated with development contemplated in the General Plan. Policy OS-10.11 was added to provide the desired mitigation and updated in 2020 to reflect the latest State targets and advancements in climate action planning.

Included in Policy OS-10.11 are minimum requirements for the CCAAP, which state that the CCAAP shall: "Establish a current inventory of GHG emissions in the County of Monterey including but not limited to residential, commercial, industrial, and agricultural emissions" (County of Monterey 2020).

The inventory presented in the report includes all of the required sectors that meet the objectives of Policy OS-10.11.

2.2 PROTOCOLS AND METHODOLOGIES

2.2.1 U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions

Several inventory protocols have been developed to provide guidance for communities and local governments to account for emissions accurately and consistently. ICLEI – Local Governments for Sustainability (ICLEI) develops protocols for local-scale accounting of emissions that have become the industry standard for local governments developing GHG emissions inventories. The most recent guidance for community-scale emissions inventories is ICLEI's July 2019 publication *U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* (Community Protocol), Version 1.2 (ICLEI 2019). State agencies, including CARB and OPR, recommend that jurisdictions prepare community GHG emissions inventories using the guidelines included in the Community Protocol (CARB 2017:100; OPR 2017:226).

The Community Protocol identifies six principles for GHG accounting and reporting. These principles were adapted from internationally recognized sources and were used to guide the development of the Community Protocol. ICLEI recommends that local governments consider the principles when preparing an inventory. The GHG accounting and reporting principles are summarized below.

- Relevance, Including Policy Relevance, and Utility for Users: The ultimate objective and intent of an inventory should be considered during the inventory development process. Inventories should be organized in a way that is understandable and useful for policy makers and the public while appropriately reflecting community GHG emissions and enabling the evaluation of emissions trends over time.
- Accuracy: The use of GHG emissions accounting methods that are expected to systematically under- or over-estimate emissions should be avoided. Decisionmakers should be able to take action with reasonable assurance as to the integrity of emissions estimates.
- Completeness: Community GHG emissions inventories should be as comprehensive as possible and include all emissions associated with the community, as well as community GHG emissions "sinks" (i.e., the opposite of an emissions source; any reservoir, natural or otherwise, that accumulates and stores GHG emissions)[1].
- Measurability: Methods used to quantify GHG emissions should be readily available, adequately substantiated and of known quality, and updated regularly as established methods evolve.
- Consistency and Comparability: Community inventories should consistently use preferred, established methods to enable tracking of emissions over time, evaluation of reduction measures effectiveness, and comparison between communities. Alternative methods should be documented and disclosed.
- Transparency: All relevant data sources, methods, and assumptions should be disclosed and described to allow for future review and replication. Similarly, all relevant issues should be documented and addressed coherently.

Consistent with these recommendations as well as industry standards and best practices, the County's community GHG emissions inventory primarily follows methodologies provided by the Community Protocol. However, additional established methods were used for selected GHG emissions sources where the Community Protocol does not provide guidance, or where updated methods have been established that improve the accuracy of emissions estimates. Table 1 below (on page 8) provides a summary of places in which alternate methods were used. This approach is consistent with guidance from the Community Protocol: "Protocol estimation methods must be used in Protocol-compliant inventories except where the user identifies and documents another method that is likely to better satisfy the Protocol reporting principles" (ICLEI 2019:20-21). The following sections describe additional methods used for estimating GHG emissions in the county.

[1] The County's GHG emissions sinks include carbon stored in soil and vegetation in agricultural and natural lands. An estimate of carbon stock within the unincorporated county is part of a separate technical memorandum and will be published with the CCAAP.

2.2.2 California Air Resources Board Methods

Each year, CARB develops and publishes the California GHG Emission Inventory for emissions statewide in California. CARB follows Intergovernmental Panel on Climate Change (IPCC) guidelines for national reporting, and its overarching approach and many of its methods align with the Community Protocol. As climate change science and GHG emissions accounting practices have evolved, CARB has implemented additional methodologies for certain emissions sectors and sources that are not included in the Community Protocol.

The County aims to align with CARB's inventory as much as possible. Consistency with the State's methodologies and approaches will be beneficial for upcoming phases of the CCAAP development process, including estimating projected GHG emissions in the future (i.e., forecasting emissions), setting GHG emissions reduction targets, and measuring progress towards established targets.

The County's inventory utilizes methods provided by CARB and the California GHG Emission Inventory for several emissions sectors and sources. For example, although the Community Protocol recommends using the U.S. Environmental Protection Agency's (EPA's) NONROAD model, emissions from off-road vehicles and equipment in the county were obtained from CARB's OFFROAD models, which provide more geographically specific emissions estimates for California using the best available data.

2.2.3 Alternative Methods

Although nearly all emissions calculations relied on protocols and methods from the Community Protocol and CARB, some emissions estimates were prepared using alternative methodologies from established sources. This approach was only taken when methods were not provided by the Community Protocol or CARB, which aligns with Community Protocol guidance. For example, GHG emissions from open burning (i.e., the burning of vegetative material), were estimated using methodologies and emissions factors from the National Wildfire Coordinating Group (NWCG)'s *Smoke Management Guide for Prescribed Fire* (NWCG 2018). This sector was included because of the County's ability to have authority or significant influence over this sector. This is discussed in more detail in Section 2.3.2 below.

2.3 EMISSIONS SECTORS AND SOURCES

There are several approaches for categorizing and grouping GHG emissions in community inventories. Generally, GHG emissions are organized into emissions sectors, which frequently include agriculture, building energy, transportation, solid waste, water, and wastewater. Sometimes these sectors are subcategorized further, such as residential building energy and nonresidential building energy, and sectors may also be combined, such as water and wastewater. The purpose of categorizing GHG emissions into broad sectors is to provide local governments and the public with a useful organization of community emissions. Importantly, GHG emissions sectors may not align directly with economic sectors (e.g., hospitality), but there may be overlaps for some communities.

Within GHG emissions sectors, emissions are generated in a variety of ways. Motor vehicles burn fossil fuels and emit GHGs directly into the atmosphere; the electricity used in homes and businesses produces indirect emissions from power plants; and solid waste that ends up in landfills breaks down and releases GHG emissions over time. The Community Protocol organizes different types of community GHG emissions into two general categories:

- GHG emissions **sources** are those that release emissions directly into the atmosphere as a result of any physical process that occurs within the jurisdictional boundary of the inventory. Natural gas combustion for heating in homes and diesel fuel combustion in motor vehicles within the community are examples of GHG emissions sources.
- GHG emissions **activities** are those that release emissions into the atmosphere either directly or indirectly as a result of the use of energy, materials, and/or services within the community. For example, GHG emissions from a community's electricity use are accounted for and considered GHG emissions activities, even if the burning of fossil fuels to generate the electricity occurred and produced emissions outside of the inventory boundary.

For the sake of clarity, this report uses "GHG emissions sources" to represent both direct in-boundary emissions *sources* as well as indirect emissions that are produced out-of-boundary as a result of *activities* that occur within the community. The GHG emissions sources in the County's community inventory are organized under seven sectors: building energy (residential and nonresidential), on-road transportation, off-road vehicles and equipment, solid waste, water supply, wastewater treatment, and agriculture.

Figure 1 depicts how sectors, sources, and activities are considered and categorized in the County's inventory.

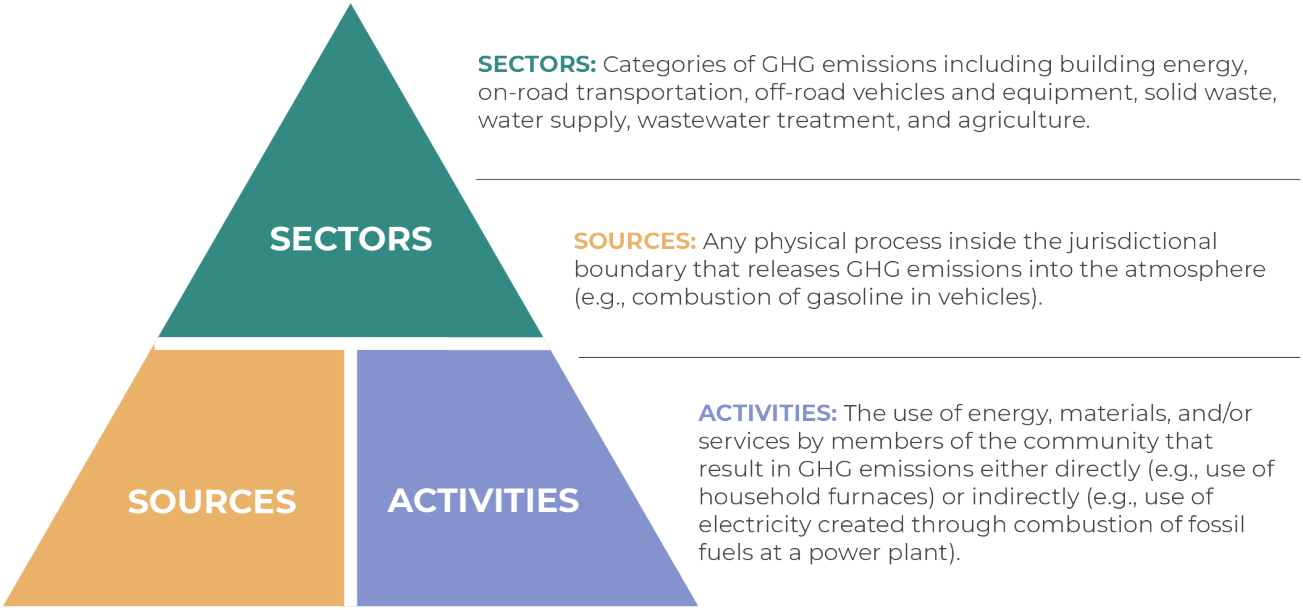


Figure 1 Emissions Sectors, Sources, and Activities Hierarchy

2.3.1 Community Protocol-Compliant Sources

When developing a community inventory, it is important for local governments to determine what will be included in the inventory scope. This may be influenced by factors such as the purpose and intended narrative of the inventory, the reporting framework that will be used, and the GHG emissions sources present in the community. While local governments have some flexibility in determining an inventory's scope, the Community Protocol requires the inclusion of a minimum of five emissions sources in community inventories:

1. Use of electricity by the community.
2. Use of fuel in residential and commercial stationary combustion equipment.
3. On-road passenger and freight motor vehicle travel.
4. Use of energy in potable water and wastewater treatment and distribution.
5. Generation of solid waste by the community.

The Community Protocol strongly encourages local governments to include other emissions-generating sources in accounting and reporting as well. For the County, this includes the four emissions sectors required by Policy OS-10.11 of the General Plan: residential, commercial, industrial, and agricultural emissions. Considerations for including additional sources are outlined in the following section.

2.3.2 Additional Sources

Many local governments go beyond the minimum requirements of the Community Protocol. For example, many community inventories in California account for GHG emissions from off-road vehicles and equipment. Communities that have agricultural land uses also commonly include agriculture-related emissions in inventories.

Beyond the five emissions sources required by the Community Protocol, the additional GHG emissions sources included in a community inventory are determined by the jurisdiction conducting the inventory. The Community Protocol recommends the Local Government Significant Influence reporting framework, where local governments account for all emissions sources over which they have authority or significant influence. This approach benefits the overall climate action planning process because it emphasizes the emissions sources that the local government has the greatest ability to address (ICLEI 2019:29). For example, because California's local air districts regulate permits issued for open burning, the County decided to include emissions from open burning in the CCAAP's inventory. Conversely, because the County has limited control over the waste that is generated by other communities but is disposed at landfills within the unincorporated county, imported waste-related emissions are excluded from the County's inventory.

2.4 BOUNDARIES

The scope and boundary chosen for estimating GHG emissions may vary depending on the focus and/or intent of the inventory. For example, while corporate inventories use the concept of ownership to guide GHG emissions accounting—where emissions generated by all sources and activities owned by the entity are accounted for, regardless of where emissions are produced—community-scale inventories serve to convey information about emissions associated with politically-defined communities (ICLEI 2019:12).

As described in the previous sections, production-based community inventories include emissions that are produced within a community's geographic boundary as well as those that are produced outside the boundary but result from activities within the community. Inventories following the Community Protocol are required to include several emissions sources; however, certain emissions sources that are located within the inventory boundary may be excluded from a community inventory. The following section outlines considerations and the decision-making framework for determining what GHG emissions sources are included or excluded from an inventory.

2.4.1 County Inventory Boundary

The CCAAP aims to reduce GHG emissions from sources within the unincorporated county for which the County has regulatory authority or significant influence. Importantly, the CCAAP will not apply to incorporated places within the county. Because of this, the County's inventory only includes emissions generated from sources and activities occurring within the boundaries of the unincorporated county; it does not account for GHG emissions generated from activities occurring outside of the County's jurisdiction, as the County does not have operational control of or authority over these emissions sources. Therefore, GHG emissions generated from activities within incorporated places (e.g., City of Salinas) or lands owned and/or managed by State and federal agencies (e.g., Federal Responsibility Areas) are excluded from the inventory.

Additionally, the County's community inventory does not account for embedded or lifecycle GHG emissions. The County's inventory evaluates emissions using the production-based approach; therefore, the County's inventory does not consider the upstream emissions generated by the consumption of goods and services within the community.

The GHG emissions sectors and sources included and excluded in the County's 2019 community inventory are presented in Table 1 below. Additionally, Table 1 identifies the protocol that provided the methodology for estimating GHG emissions from each emissions source. Emissions sources that identify multiple protocols used a combination of data and methods from multiple protocols. Fertilizer application and off-road vehicles and equipment calculations used methods consistent with IPCC and the Community Protocol but substituted California-specific data obtained from CARB for less geographically specific data provided by the protocols.

Table 1 2019 Monterey County Summary of Sectors and Sources

Sector/Source	Included	Excluded	Protocol(s)
Agriculture			
Livestock Management – Enteric Fermentation	Emissions from enteric fermentation from livestock within the county		ICLEI
Livestock Management – Manure Management	Emissions associated with manure management practices within the county		ICLEI
Fertilizer Application	Emissions associated with fertilizer use within the county		CARB/IPCC
Agricultural Equipment - Off-Road Vehicles and Equipment	Emissions from agricultural off-road vehicles and equipment within the county		ICLEI/CARB
Agricultural Equipment – Irrigation Pumps	Emissions from diesel fuel use for irrigation pumps within the county		CARB
Open Burning	Emissions from open burning of vegetative matter within the county		NWCG
On-Road Transportation			
On-Road Transportation[1]	Emissions from all vehicle miles traveled (VMT) associated with vehicles registered in the unincorporated county	Emissions from VMT associated with vehicles registered outside the unincorporated county, even if the vehicle is driven within the unincorporated county	CARB
Building Energy			
Electricity	Emissions associated with all electricity consumed within the unincorporated county		ICLEI
Natural Gas	Emissions from natural gas consumed within the unincorporated county		ICLEI
Backup Generators	Emissions from diesel, liquid propane gas, and natural gas consumed in backup generators within the unincorporated county		ICLEI
Solid Waste			
Community-Generated Solid Waste	Emissions from all waste generated within the unincorporated county	Emissions from waste generated outside of the county but disposed of within the county	ICLEI
Off-Road Vehicles and Equipment			
Off-Road Vehicles and Equipment	Emissions from off-road vehicles and equipment within the unincorporated county		ICLEI/CARB

Sector/Source	Included	Excluded	Protocol(s)
Wastewater Treatment			
Wastewater Treatment	Emissions associated with wastewater generated within the unincorporated county	Emissions from wastewater generated outside of the county but treated within the county	ICLEI
Water Supply			
Water Supply	Emissions associated with water use within the unincorporated county		ICLEI

Notes: CARB = California Air Resources Board; ICLEI = ICLEI – Local Governments for Sustainability; IPCC = Intergovernmental Panel on Climate Change; NWCG = National Wildfire Coordinating Group; VMT = vehicle miles traveled.

[1] A more detailed description of the methodology used to estimate on-road transportation emissions is included in Section 3.4.4.

Source: Compiled by Ascent Environmental in 2024.

3 DATA, METHODS, AND ASSUMPTIONS

3.1 OVERVIEW OF ACTIVITY DATA AND EMISSIONS FACTORS

The basic calculation for estimating GHG emissions involves two primary inputs: activity data and emissions factors. Activity data refers to the relevant measurement of a community's activity resulting in emissions, and emissions factors represent the amount of a GHG emitted on a per unit of activity basis. Emissions factors are applied to activity data (i.e., the two values are multiplied together) to estimate GHG emissions. For example, in the residential energy sector, activity data of annual community electricity consumption in megawatt-hours (MWh) is multiplied by an emissions factor in pounds of GHG per MWh, which results in a pounds of GHG emissions value. This calculation-based methodology is used for estimating emissions from most sources in the County's inventory. An overview of activity data and emissions factors for each emissions source, along with data sources, is shown in Table 2. Detailed methods are described in the following sections.

Table 2 2019 Monterey County Summary of Activity Data and Emissions Factors

Sector/Source	Input Type	Description and Data Sources
Agriculture		
Livestock Management	Activity data	Livestock population data from the County of Monterey Agricultural Commissioner's Office's 2019 Crop Report and U.S. Department of Agriculture's 2017 Census of Agriculture, supplemented by information from local stakeholders and University of California, Agriculture and Natural Resources
	Emissions factor	Livestock-specific emissions factors from CARB
Fertilizer Application	Activity data	Fertilizer application data from the Central Coast Regional Water Quality Control Board
	Emissions factor	Organic and synthetic fertilizer emissions factors from CARB
Agricultural Equipment - Off-Road Vehicles and Equipment	Activity data	Off-road vehicles and equipment activity data and emissions factors from CARB
	Emissions factor	
Agricultural Equipment – Irrigation Pumps	Activity data	Diesel-powered irrigation pumps data from Monterey Bay Air Resources District (MBARD)
	Emissions factor	Monterey County region-specific average emissions factor from CARB
Open Burning	Activity data	Open burning data from MBARD
	Emissions factor	Average emissions factors from NWCG
On-Road Transportation		
On-Road Transportation[1]	Activity data	Vehicle miles traveled data for Monterey County from CARB's EMission FACtor (EMFAC) model, prorated to unincorporated area only based on its share of households
	Emissions factor	Monterey County-specific emissions factors from CARB
Building Energy		
Electricity	Activity data	Electricity consumption data from Pacific Gas and Electric Company (PG&E) and Central Coast Community Energy (3CE)
	Emissions factor	Utility-specific emissions factors from 3CE, The Climate Registry (TCR), and EPA
Natural Gas	Activity data	Natural gas consumption data from PG&E and California Energy Commission
	Emissions factor	Average emissions factors from TCR
Backup Generators	Activity data	Fuel consumption data from MBARD
	Emissions factor	Average emissions factors from TCR

Sector/Source	Input Type	Description and Data Sources
Solid Waste		
Community-Generated Solid Waste	Activity data	Waste disposal data from the California Department of Resources Recycling and Recovery
	Emissions factor	Mixed municipal solid waste emissions factor from EPA
Off-Road Vehicles and Equipment		
Off-Road Vehicles and Equipment	Activity data	Off-road vehicles and equipment activity and emissions factors data from CARB
	Emissions factor	
Wastewater Treatment		
Wastewater Treatment	Activity data	Wastewater generation and process-related data from Monterey One Water (M1W) and the County
	Emissions factor	Emissions factors based on treatment processes from M1W and ICLEI
Water Supply		
Water Supply	Activity data	Water consumption data from Monterey County Water Resources Agency Energy intensity factors from California Public Utilities Commission
	Emissions factor	

Notes: 3CE = Central Coast Community Energy; AMBAG = Association of Monterey Bay Area Governments; CARB = California Air Resources Board; EPA = U.S. Environmental Protection Agency; ICLEI = ICLEI – Local Governments for Sustainability; IPCC = Intergovernmental Panel on Climate Change; M1W = Monterey One Water; MBARD = Monterey Bay Air Resources District; NWCG = National Wildfire Coordinating Group; PG&E = Pacific Gas and Electric Company; TCR = The Climate Registry.

[1] A more detailed description of the methodology used to estimate on-road transportation emissions is included in Section 3.4.4.

Source: Compiled by Ascent Environmental in 2024.

3.2 GLOBAL WARMING POTENTIALS AND EMISSIONS UNITS

GHG emissions other than carbon dioxide (CO_2) generally have a stronger insulating effect and thus, a greater ability to warm the Earth's atmosphere through the greenhouse effect. This effect is measured in terms of a pollutant's Global Warming Potential (GWP). CO_2 has a GWP factor of one while all other GHGs have GWP factors measured in multiples of one relative to the GWP of CO_2. This conversion of non-CO_2 gases to one unit enables the reporting of all emissions in terms of carbon dioxide equivalent (CO_2e), which allows for the consideration of all gases in comparable terms and makes it easier to communicate how various sources and types of GHG emissions contribute to climate change. The standard unit for reporting emissions is metric tons of carbon dioxide equivalent ($MTCO_2e$).

Consistent with the best available science, these inventories use GWP factors published in the Sixth Assessment Report from IPCC, where methane (CH_4) and nitrous oxide (N_2O) have GWP factors of 27.9 and 273, respectively (IPCC 2021). These values represent the GWP of GHG on a 100-year time horizon. This means that CH_4 is approximately 28 times stronger than CO_2 and N_2O is 273 times stronger than CO_2 in their potential to warm Earth's atmosphere over the course of 100 years. The use of 100-year GWP values is consistent with CARB methods and reflects the long-term planning horizon of the CCAAP.

3.3 DATA QUALITY AND ACCURACY

When preparing a GHG emissions inventory, the goal is to use the best available data and methodologies to develop the most accurate picture of a community's emissions. However, some degree of inaccuracy is inherent to all inventories. As described by the Community Protocol, "While no community inventory is fully comprehensive (some emissions cannot be estimated due to a lack of valid methods, a lack of emissions data, or for other reasons), community inventories often aim to provide as complete a picture of GHG emissions associated with a community as is feasible" (ICLEI 2019:12). The accuracy of a GHG emissions inventory is primarily dependent on activity data (e.g., tons of solid waste generated by a community), emissions factors (e.g., grams of CO_2 per vehicle mile traveled [VMT]

in a county), and scaling factors (e.g., percentage of county-level off-road vehicles and equipment emissions attributed to a local jurisdiction).

Development of the County's GHG emissions inventory was a robust and comprehensive process rooted in industry standards and best practices, and it included extensive research and consultation with County staff and departments, regional and State agencies and organizations, and community stakeholders to ensure data was as accurate as feasible. The County recognizes that even though its inventory is consistent with all protocols previously discussed and the data used are as accurate as feasible, perfect precision in emissions estimates will never be possible. The following are some assumptions that were made due to the unavailability of data:

- Electricity consumption by electricity utility. Assumptions regarding electricity consumption by provider were made based on the availability of data from utilities. It was assumed that all nonresidential and Direct Access electricity was supplied by Central Coast Community Energy (3CE).
- Nonresidential natural gas consumption. A complete dataset for nonresidential natural gas usage in 2019 was not available from PG&E. Average annual change in countywide nonresidential natural gas consumption, including incorporated places, was used to estimate nonresidential natural gas usage in the unincorporated county.
- On-road transportation emissions. The preferred methodology for estimating on-road transportation emissions was not feasible due to lack of data availability. An alternative methodology was required to estimate emissions from VMT for the on-road transportation sector. Refer to Section 3.4.4, "On-Road Transportation," for additional information.
- Open burning activity data. Open burning data for the county was obtained from Monterey Bay Air District (MBARD). However, MBARD was not able to provide a complete dataset of all tons of vegetative matter burned within the county; some burn operations were excluded and not accounted for in emissions estimates.
- Water and wastewater activity data. Data for water consumption within the unincorporated county were limited. Approximate total water supply was obtained from the Monterey County Water Resources Agency (MCWRA) and verified through County sources, and it was assumed that all water used within the unincorporated county was extracted, conveyed, treated, and distributed within the unincorporated county. Additionally, water consumption electricity usage could not be differentiated by use type; therefore, water supply emissions were assumed to be captured entirely within the building energy sector, which accounts for all electricity consumption. Similarly, wastewater-related data was limited. It was assumed that Monterey One Water (M1W) was the only centralized wastewater treatment plant (WWTP) serving the unincorporated county and that onsite septic systems served the rest of the community.
- Agriculture data granularity. Much of the data used to calculate agriculture-related GHG emissions are specific to the unincorporated county and were obtained from local sources. For example, cattle population data for the unincorporated county were derived using data from the County of Monterey Agricultural Commissioner's Office (ACO) combined with information from local stakeholders and University of California, Agriculture and Natural Resources (UCANR). However, some of the agricultural data used for emissions calculations were aggregated at the regional level. For example, agricultural off-road vehicles and equipment data were obtained from CARB, and these data were provided for the entire county (i.e., including incorporated places). For data that were provided for the entire county, it was assumed that all agricultural operations countywide occurred in the unincorporated county. Refer to Section 3.4.9, "Agriculture," for additional information.
- Scaling factors used to attribute emissions to the unincorporated county level. Certain emissions sectors use data that are not specific to the unincorporated county but the county as a whole (including incorporated places), and scaling factors were used to apportion data to the unincorporated county. For example, emissions data for off-road vehicles and equipment, obtained from CARB's OFFROAD models, are provided for the entire county (including incorporated cities). Population, employment, and service population factors (i.e., the proportion of the unincorporated county compared to the entire county) were used to scale county-level data to the unincorporated area. Additionally, agricultural data were obtained for the entire county, and it was assumed that all agricultural land in the county is located in the unincorporated county.

3.4 COMMUNITY INVENTORY DATA AND ASSUMPTIONS

3.4.1 Sector-Specific Assumptions and Methods

The following sections describe in detail the methods, data, and assumptions that were used in estimating the county's community GHG emissions in 2019. Population and employment data were used to scale activity levels for certain emissions sources and sectors. Population and employment data for 2019 were obtained from AMBAG's 2022 Final Regional Growth Forecasts, which were developed for AMBAG's 2045 Metropolitan Transportation Plan/Sustainable Communities Strategy (AMBAG 2020).

The list below summarizes this information at a high level for each sector.

- **Building Energy:** Annual electricity and natural gas usage data for the county were provided by PG&E and 3CE, and additional natural gas usage data was obtained from the California Energy Commission (CEC). Utility emissions factors were provided by 3CE, The Climate Registry (TCR), and EPA (see Table 3 below). Annual nonresidential backup generator usage was provided by MBARD. Emissions factors for nonresidential backup generator fuels were obtained from TCR.
- **On-Road Transportation:** For the on-road transportation sector, annual VMT at the entire county level were obtained from the 2021 EMissions FACtor (EMFAC2021) model, CARB's statewide mobile source emissions inventory model. Countywide VMT (including incorporated cities) was scaled to the unincorporated county using the proportion of households within the unincorporated county compared to the county as a whole (explained further in Section 3.4.4, "On-Road Transportation"). Vehicle emissions factors were derived from the EMFAC2021 model.
- **Off-Road Vehicles and Equipment**: Off-road vehicles and equipment emissions were estimated from CARB's OFFROAD2007 and OFFROAD2021 models and scaled by population, employment, or service population (i.e., the sum of population and employment) depending on the equipment type.
- **Solid Waste:** Emissions associated with waste generated by residents and businesses in the county were estimated using disposal data available from the California Department of Resources Recycling and Recovery (CalRecycle) for landfills receiving waste from the county. Landfill gas (LFG) collection information was available from EPA.
- **Water Supply:** Using guidance provided by ICLEI, water supply emissions were estimated using approximate water consumption volumes obtained from MCWRA in combination with region-specific energy intensity factors obtained from the California Public Utilities Commissions (CPUC).
- **Wastewater Treatment:** Emissions from wastewater treatment depend on the types of treatment processes and equipment that centralized WWTPs use. Emissions in this sector are also generated from onsite wastewater treatment systems, or septic systems. Data regarding treatment processes, population served, digester gas combustion, and daily nitrogen load were obtained from M1W to estimate emissions from centralized WWTPs. Population data for calculating emissions from septic systems was estimated using M1W service population data combined with population data from AMBAG.
- **Agriculture**: Emissions associated with the agriculture sector result from livestock management, fertilizer application, open burning, and operation of agricultural equipment. Agriculture emissions were estimated using data available from the County, UCANR, CARB, California Department of Food and Agriculture (CDFA), the Central Coast Regional Water Quality Control Board, U.S. Department of Agriculture (USDA), and MBARD.

3.4.2 Utility Emissions Factors

Emissions of CO_2, CH_4, and N_2O per MWh of electricity or therm of natural gas can vary by location and from year to year depending on several factors. Utility-specific emissions factors were obtained and used throughout the 2019 inventories to estimate GHG emissions from electricity and natural gas consumption. Sources for electricity and natural gas emissions factors are shown below.

- **Electricity:** Utility electricity emissions factors for CO_2, CH_4, and N_2O were obtained from 3CE, TCR, and EPA's Emissions & Generation Resource Integrated Database (eGRID). 3CE provided a CO_2 emissions factor for 2019, and the CO_2 emissions factor for PG&E in 2019 was interpolated using PG&E's 2018 CO_2 emissions factor obtained from TCR's 2020 Default Emission Factors and the requirements of the Renewables Portfolio Standard included in Senate Bill (SB) 100 (TCR 2020)[2]. California-specific emissions factors for CH_4 and N_2O obtained from eGRID2019 were used for PG&E (EPA 2021). For 3CE, these emissions factors were adjusted using additional data available from eGRID2019 to account for the specific energy resources used in 3CE's energy generation portfolio.
- **Natural Gas:** Utility natural gas emissions factors for CO_2, CH_4, and N_2O were obtained from TCR's 2020 Default Emission Factors (TCR 2020).

Specific utility emissions factors used in the inventory calculations are shown below in Tables 3 and 4. Emissions factors are shown in standards units for electricity (pounds of GHG per MWh) and natural gas (pounds per therm). Emissions factors are also presented in pounds of GHG per kilo British thermal unit (kBTU) to enable a comparison between energy types in similar terms.

Table 3 2019 Monterey County Electricity Emissions Factors

Provider	Pollutant	Emissions Factor (lb/MWh)	Emissions Factor (lb/kBTU)
3CE	CO_2	9.99	0.0029
	CH_4	0.028	0.0000081
	N_2O	0.0036	0.0000011
PG&E	CO_2	198.65	0.0528
	CH_4	0.033	0.0000097
	N_2O	0.004	0.0000012

Notes: 3CE = Central Coast Community Energy; CH_4 = methane; CO_2 = carbon dioxide; kBTU = kilo British thermal unit; lb = pounds; MWh = megawatt-hours; N_2O = nitrous oxide; PG&E = Pacific Gas and Electric Company.

Source: Utility emissions factors provided by 3CE, TCR, and EPA. Compiled by Ascent Environmental in 2022.

Table 4 2019 Monterey County Natural Gas Emissions Factors

Provider	Pollutant	Emissions Factor (lb/therm)	Emissions Factor (lb/kBTU)
PG&E	CO_2	11.7	0.117
	CH_4	0.00104	0.0000104
	N_2O	0.0000220	0.0000002

Notes: CH_4 = methane; CO_2 = carbon dioxide; kBTU = kilo British thermal unit; lb = pounds; MWh = megawatt-hours; N_2O = nitrous oxide; PG&E = Pacific Gas and Electric Company.

Source: Utility emissions factors provided by TCR. Compiled by Ascent Environmental in 2022.

3.4.3 Building Energy

Residential and nonresidential building energy use in the county resulted in approximately 252,388 $MTCO_2e$ in 2019. This sector generated approximately 20 percent of the county's emissions in 2019 and represents the third-largest emissions sector in the inventory. Most of these emissions were a result of natural gas combustion for heating and cooking in homes and businesses, while a small proportion of the county's building energy emissions were associated with electricity use, primarily for lighting and heating, ventilation, air conditioning, and cooling, and to power appliances, due to nearly-carbon-free electricity supplied by 3CE (see the residential energy section below for

[2] A third party-verified CO_2 emissions factor for PG&E in 2019 was not available at the time this analysis was conducted. Therefore, the 2019 emissions factor was interpolated using the third party-verified CO_2 emissions factor for 2018 and the requirements of the Renewables Portfolio Standard under SB 100.

additional information). A marginal amount of nonresidential building energy emissions was associated with the consumption of diesel, liquified petroleum gas (i.e., propane), and natural gas in backup generators.

Nonresidential natural gas use accounted for approximately 66 percent of the county's 2019 building energy emissions, and residential natural gas use accounted for approximately 32 percent. Electricity from both residential and nonresidential buildings accounted for approximately 2 percent of emissions from the building energy sector, and nonresidential backup generators accounted for less than 1 percent of emissions from the building sector in 2019. Annual electricity, natural gas, and backup generator usage and GHG emissions are shown in Table 5, and additional information regarding each emissions source and calculations are discussed below.

Table 5 2019 Monterey County Community Building Energy Use and GHG Emissions

Energy Type	Quantity	GHG Emissions
Electricity	**MWh**	**$MTCO_{2e}$**
Residential	196,520	2,137
Nonresidential	712,851	3,931
Electricity Total	*909,370*	*6,067*
Natural Gas	**therms**	**$MTCO_2e$**
Residential	14,959,603	79,613
Nonresidential	31,290,974	166,526
Natural Gas Total	*46,250,577*	*246,138*
Backup Generators	**NA**	**$MTCO_2e$**
Nonresidential	NA	183
Energy Combined	**NA**	**$MTCO_2e$**
Residential	NA	81,750
Nonresidential	NA	170,639
Total	**NA**	**252,388**

Notes: Totals in columns may not sum exactly due to independent rounding. GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent; MWh = megawatt-hours; NA = not applicable.

Source: Calculated conducted by Ascent Environmental in 2022.

RESIDENTIAL ENERGY

Residential energy emissions in the county result indirectly from electricity consumption and directly from onsite combustion of natural gas. 3CE and PG&E are the providers of residential energy in the county. 3CE is a community-owned community choice energy agency established to source clean and renewable electricity for Monterey, San Benito, Santa Cruz, San Luis Obispo, and Santa Barbara counties. It began providing clean, near-zero-emissions electricity to the county in 2018 and currently serves approximately 96 percent of residential and nonresidential accounts, while the remaining electricity accounts are served by PG&E. Because 3CE provides almost all of the grid-supplied electricity consumed within the county, its near-carbon-free electricity results in a minor amount of electricity-related GHG emissions. Residential natural gas in the county is provided by PG&E.

Annual residential electricity usage data in the county in MWh was obtained from PG&E and 3CE. To calculate the $MTCO_2e$ of residential electricity consumption, emissions factors (shown in Table 3) for CO_2, CH_4, and N_2O were applied to electricity consumption data. Figure 2 below shows a sample calculation for estimating CO_2 emissions from residential electricity supplied by 3CE.

$$3CE\ Residential\ CO_2\ Electricity\ Emissions\ (MTCO_2) = residential\ electricity\ use\ (MWh) * CO_2\ emissions\ factor\ \left(\frac{lb\ CO_2}{MWh}\right) * pounds\ to\ metric\ ton\ conversion\ factor\ \left(\frac{MT}{lb}\right)$$

$$3CE\ Residential\ CO_2\ Electricity\ Emissions\ (MTCO_2) = 183{,}798\ MWh * 9.99 \frac{lb\ CO_2}{MWh} * \frac{1\ MT}{2{,}204.62\ lb} = 833\ MTCO_2$$

Source: ICLEI 2019; calculations conducted by Ascent Environmental in 2022.

Figure 2 Sample Calculation for Estimating Carbon Dioxide Emissions from Residential Electricity

Annual residential natural gas consumption in therms was obtained from PG&E. CO_2, CH_4, and N_2O emissions factors for natural gas were applied to consumption data to estimate $MTCO_2e$ from residential natural gas usage. Figure 3 below shows a sample calculation for estimating CO_2e emissions from residential natural gas supplied by PG&E.

$$PG\&E\ Residential\ Natural\ Gas\ Emissions\ (MTCO_2e) = residential\ natural\ gas\ use\ (therms) * \left[\left(CO_2\ emissions\ factor\ \left(\frac{lb\ CO_2}{therm}\right) * CO_2\ GWP\right) + \left(CH_4\ emissions\ factor\ \left(\frac{lb\ CH_4}{therm}\right) * CH_4\ GWP\right) + \left(N_2O\ emissions\ factor\ \left(\frac{lb\ N_2O}{therm}\right) * N_2O\ GWP\right)\right] * pounds\ to\ metric\ ton\ conversion\ factor\ \left(\frac{MT}{lb}\right)$$

$$PG\&E\ Residential\ Natural\ Gas\ Emissions\ (MTCO_2e) = 14{,}959{,}603\ therms\ * \left[\left(11.7 \frac{lb\ CO_2}{therm} * 1\right) + \left(0.00104 \frac{lb\ CH_4}{therm} * 27.9\right) + \left(0.000022 \frac{lb\ N_2O}{therm} * 273\right)\right] * \frac{1\ MT}{2{,}204.62\ lb} = 79{,}613\ MTCO_2e$$

Source: ICLEI 2019; calculations conducted by Ascent Environmental in 2022.

Figure 3 Sample Calculation for Estimating Carbon Dioxide Equivalent Emissions from Residential Natural Gas

NONRESIDENTIAL ENERGY

Nonresidential energy emissions, which are generated by commercial and industrial uses, result indirectly from electricity consumption and directly from onsite combustion of natural gas. PG&E and 3CE provide nonresidential electricity in the county. Both PG&E and 3CE provided nonresidential electricity in 2019, with over 99 percent of nonresidential electricity being supplied by 3CE. Nonresidential natural gas in the county is provided by PG&E.

Annual nonresidential electricity usage data in MWh was obtained from PG&E and 3CE. Annual commercial natural gas consumption in therms was obtained from PG&E, but PG&E was unable to provide industrial natural gas usage due to the 15/15 Rule[3]. Countywide (including incorporated places) commercial and industrial natural gas consumption data for 2013 through 2019 were obtained from CEC, which were used to calculate the percent change in natural gas consumption for the entire county from 2013 to 2019. This change, calculated to be an increase of approximately 11 percent, was applied to commercial and industrial natural gas consumption data provided by PG&E for 2013, the most recent year for which both commercial and industrial natural gas consumption was reported. Emissions associated with nonresidential energy consumption were quantified using the same methods as described above for residential energy calculations.

Data for annual nonresidential backup generators were obtained from MBARD, expressed as gallons for diesel fuel and standard cubic feet for propane and natural gas. Emissions factors obtained from TCR were applied to fuel consumption data to estimate GHG emissions associated with nonresidential backup generator usage.

[3] The 15/15 Rule originates from a CPUC ruling in 1997 that enacted privacy standards for utilities to help ensure customer anonymity when energy data is released to third parties without customer consent. The 15/15 Rule requires that aggregated data include a minimum of 15 customers with no one customer's load exceeding 15 percent of the group's energy consumption.

3.4.4 On-Road Transportation

Based on modeling conducted, on-road transportation in the county resulted in approximately 479,174 $MTCO_2e$ in 2019, or 39 percent of the county's emissions in 2019. The on-road transportation sector represents the largest emissions sector in the county. Annual VMT and GHG emissions from on-road transportation are shown in Table 6. Additional details and calculation methodologies and assumptions are described below.

Table 6 2019 Monterey County Community On-Road Transportation VMT and GHG Emissions

Source	Annual VMT	GHG Emissions ($MTCO_2e$)
On-Road Transportation	1,050,848,408	479,174

Notes: GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent; VMT = vehicle miles traveled.

Source: Calculated conducted by Ascent Environmental in 2022.

On-road transportation emissions are primarily the result of the combustion of gasoline and diesel fuels in passenger vehicles (i.e., cars, light-duty trucks, and motorcycles), medium- and heavy-duty trucks, and other types of vehicles permitted to operate "on road." To a smaller degree, emissions from on-road electric vehicles also result from upstream electricity generation; these emissions are represented in annual electricity emissions in the county. Due to lack of available data, emissions from the combustion of natural gas and other non-electric alternative fuels in on-road vehicles were not included in the community inventory and are assumed to have minimal contribution to total emissions.

Updates Since January 2022 Inventory Publication

AMBAG is the metropolitan planning organization responsible for regional transportation planning in Monterey, San Benito, and Santa Cruz counties. AMBAG's Regional Travel Demand Model (RTDM) provides VMT estimates for the entire region and for each of the three counties. However, according to AMBAG, VMT data provided by the RTDM is not accurate at smaller geographic scales, including at the jurisdiction-specific level. As part of its services for local agencies, AMBAG produced a 2019 GHG emissions inventory for the unincorporated county, including a VMT estimate, which was used in the January 2022 inventory publication.

The VMT estimate used in the January 2022 publication was derived from Caltrans' Highway Performance Monitoring System, which reports the average daily VMT on roadways by jurisdiction. These data were scaled by countywide VMT from EMFAC2017 to the unincorporated area by multiplying the VMT by the daily VMT associated with the County's jurisdiction (excluding military, state, and federal jurisdictions) and divided by the total daily VMT in the entire county. This method likely undercounted VMT because it excluded travel on state highways associated with trips starting or ending in the unincorporated county.

For this final October 2024 inventory report, VMT estimates specific to the unincorporated county were not available despite updates to AMBAG's RTDM. Therefore, estimates for countywide VMT (including incorporated places) were obtained from CARB's EMFAC2021 model. Using household data from the California Department of Finance, countywide VMT data were scaled to the unincorporated county using the proportion of households within the unincorporated county compared to the county as a whole. While this accounting method is not consistent with the Regional Targets Advisory Committee (also known as "RTAC") origin-destination method established through SB 375 and CARB recommendations, it is consistent with AMBAG's current approach for estimating jurisdiction-specific VMT and was chosen as the best currently available methodology.

An overall emissions rate for countywide VMT was derived from EMFAC2021. EMFAC2021 was used to generate emission rates for the county for the calendar year 2019 with all vehicle classes, model years, speeds, and fuel types. The countywide $MTCO_2e$ per mile emissions factor was calculated based on the distribution of VMT for each vehicle class and its emissions factor. The equation for estimating on-road transportation emissions is shown in Figure 4.

$$On\text{-}Road\ Transportation\ Emissions\ (MTCO_2e) = countywide\ VMT * \left[\left(CO_2\ emissions\ factor\ \left(\frac{g\ CO_2}{mile}\right) * CO_2\ GWP\right) + \left(CH_4\ emissions\ factor\ \left(\frac{g\ CH_4}{mile}\right) * CH_4\ GWP\right) + \left(N_2O\ emissions\ factor\ \left(\frac{g\ N_2O}{mile}\right) * N_2O\ GWP\right)\right] * grams\ to\ metric\ ton\ conversion\ factor\ \left(\frac{MT}{g}\right)$$

$$On\text{-}Road\ Transportation\ Emissions\ (MTCO_2e) = 1{,}050{,}848{,}408\ miles * \left[\left(446.9\frac{g\ CO_2}{mile} * 1\right) + \left(0.0277\frac{g\ CH_4}{mile} * 27.9\right) + \left(0.0304\frac{g\ N_2O}{mile} * 273\right)\right] * \frac{1\ MT}{1{,}000{,}000\ g} = 479{,}174\ MTCO_2e$$

Source: ICLEI 2019; calculations conducted by Ascent Environmental in 2022.

Figure 4 Sample Calculation for Estimating Carbon Dioxide Equivalent Emissions from On-Road Transportation

3.4.5 Off-Road Vehicles and Equipment

Based on modeling conducted, off-road vehicles and equipment operating in the county emitted approximately 17,616 $MTCO_2e$ in 2019, or 1 percent of the 2019 inventory. The largest emissions-generating off-road categories include construction and mining equipment and commercial harbor craft. The estimated annual emissions and scaling factors used are presented in Table 7 by vehicles and equipment type. Additional details regarding calculation methods and assumptions are discussed below.

Table 7 2019 Monterey County Community Off-Road Vehicles and Equipment GHG Emissions and Scaling Method

Off-Road Vehicles and Equipment Type	GHG Emissions ($MTCO_2e$)	Scaling Method
Airport Ground Support	215	population
Commercial Harbor Craft	4,018	employment
Construction and Mining Equipment	5,136	service population
Entertainment Equipment	58	employment
Industrial Equipment	1,860	employment
Lawn and Garden Equipment	637	population
Light Commercial Equipment	1,466	employment
Pleasure Craft	1,206	population
Portable Equipment	622	employment
Railyard Operations	394	employment
Recreational Equipment	113	population
Transportation Refrigeration Units	1,891	service population
Total	**17,616**	NA

Notes: Totals may not sum exactly due to independent rounding. GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent; NA = not applicable.

Source: Calculated conducted by Ascent Environmental in 2022, based on modeling from CARB's OFFROAD2007 and OFFROAD2021.

Emissions from the off-road vehicles and equipment sector result from fuel combustion in off-road vehicles and equipment. Data associated with this sector were available from CARB's OFFROAD2007 and OFFROAD2021 models. These models provide emissions details at the state, air basin, or county level. Monterey County emissions data from OFFROAD2007 and OFFROAD2021, which include emissions from incorporated areas of the county, were apportioned to the unincorporated county using custom scaling factors depending on the off-road vehicle and equipment type. For example, due to the likely correlation between commercial activity and employment, the county's portion of emissions from light commercial equipment in the entire county is assumed to be proportional to the number of jobs in the unincorporated county as compared to the county as a whole.

OFFROAD2007 provides emissions details for all off-road vehicle and equipment types, but OFFROAD2021 only provides details for certain types of off-road vehicles and equipment that are relevant to the county (i.e., it does not include emissions estimates for all off-road vehicle and equipment types). CARB recommends using OFFROAD2007

where desired information is unavailable from the OFFROAD2021 model, so data from both models were used (CARB 2020a). Additionally, while OFFROAD2021 provides estimates of CO_2 emissions, it does not provide estimates for CH_4 and N_2O emissions. To estimate CH_4 and N_2O emissions from the vehicle and equipment types included in OFFROAD2021, ratios of CH_4 to CO_2 and N_2O to CO_2 were obtained from OFFROAD2007 and applied to CO_2 data from OFFROAD2021 to calculate CH_4 and N_2O emissions.

3.4.6 Solid Waste

Based on modeling conducted, the solid waste sector was responsible for approximately 69,724 $MTCO_2e$ in 2019, or 6 percent of community GHG emissions. Community-generated solid waste emissions are associated primarily with the decomposition of solid waste generated by the county in landfills, while a smaller proportion of emissions are produced by the decomposition of alternative daily cover (ADC) generated by the county. Table 8 summarizes emissions from the solid waste sector. Additional details regarding calculation methods and assumptions are discussed below.

Table 8 2019 Monterey County Community Solid Waste Quantity and GHG Emissions

Source	Quantity (tons)	GHG Emissions ($MTCO_2e$)
Community-Generated Solid Waste	185,115	69,724

Notes: Totals may not sum exactly due to independent rounding. GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Calculations conducted by Ascent Environmental in 2022.

COMMUNITY-GENERATED SOLID WASTE

CH_4 emissions generated by community-generated solid waste occur from the decay of landfill disposed waste generated annually by residences and businesses in the county. A total of 172,514 tons of landfilled waste was reported for the county in 2019. In addition to landfilled waste, communities send ADC to landfills. ADC is non-earthen material used to cover an active surface of a landfill at the end of each operating day to control for vectors, fires, odors, blowing litter, and scavenging. This material can include compost, construction and demolition waste, sludge, green material, shredded tires, spray-on cement, and fabric. Given that ADC can also include organic material, CH_4 emissions from landfills result from organic decomposition in both waste disposal and ADC. ADC from the county was reported to be 12,601 tons in 2019. Data for landfilled waste and ADC was obtained from CalRecycle (CalRecycle 2021).

The amount of CH_4 released from community-generated waste depends on the LFG management systems of the landfills at which the waste is disposed. Information regarding the use of an LFG capture system was available from EPA's Landfill Methane Outreach Program. All facilities included an LFG capture system; therefore, the default LFG collection efficiency of 0.75 was applied to adjust emissions estimates, as recommended by the Community Protocol. Default waste characterization emissions factors obtained from EPA were used in calculations. A sample calculation for estimating emissions from solid waste is shown in Figure 5.

$$Solid\ Waste\ Emissions\ (MTCO_2e) = quantity\ of\ community\text{-}generated\ solid\ waste\ and\ ADC\ (tons) * (1 - default\ LFG\ collection\ efficiency) * (1 - default\ oxidation\ rate) * CH_4\ emissions\ factor\ \left(\frac{MT\ CH_4}{ton}\right) * CH_4\ GWP$$

$$Solid\ Waste\ Emissions\ (MTCO_2e) = (172{,}514\ tons + 12{,}601\ tons) * (1 - 0.75) * (1 - 0.1) * 0.06 \frac{MTCH_4}{ton} * 27.9 = 69{,}724\ MTCO_2e$$

Source: ICLEI 2019; calculations conducted by Ascent Environmental in 2022.

Figure 5 Sample Calculation for Estimating Carbon Dioxide Equivalent Emissions from Solid Waste

3.4.7 Water Supply

Because all water is supplied from local sources within the county, it was assumed that all electricity usage associated with extracting, conveying, treating, and distributing water is captured in the building energy sector because these

activities occur within the county. As discussed in Section 3.3, data for water consumption was limited and electricity usage associated with water supply could not be broken down by use type. Therefore, based on modeling conducted, water supply emissions are incorporated in the residential and nonresidential electricity-related emissions presented in Table 5 above. GHG emissions associated with water supply occur from the indirect use of energy associated with water extraction, conveyance, treatment, and distribution to the point of use (e.g., residences, businesses). Table 9 presents water supply quantity by use type for the county in 2019.

Table 9 2019 Monterey County Community Water Supply Quantity and GHG Emissions

Source	Quantity (AF)	GHG Emissions ($MTCO_2e$)[1]
Residential and Nonresidential Water Supply	25,000	—
Agricultural Water Supply	475,000	—

Notes: AF = acre-feet; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

[1] Water supply emissions are captured in the building energy sector. Additional information regarding water supply emissions can be found in the section above this table and in Section 3.3, "Data Quality and Accuracy."

Source: Ascent Environmental 2022.

3.4.8 Wastewater Treatment

Based on modeling conducted, wastewater treatment resulted in GHG emissions of approximately 15,586 $MTCO_2e$, which represents 1 percent of total emissions. Septic systems accounted for approximately 72 percent of emissions from wastewater treatment, while centralized WWTPs make up the remaining 28 percent of emissions from this sector. Wastewater treatment emissions are summarized in Table 10, and additional details for this sector are included below.

Table 10 2019 Monterey County Wastewater Treatment GHG Emissions

Wastewater Treatment Type	GHG Emissions ($MTCO_2e$)
Centralized WWTPs	3,749
Septic Systems	11,837
Total	**15,586**

Notes: Totals may not sum exactly due to independent rounding. GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent; WWTP = wastewater treatment plant.

Source: Calculations conducted by Ascent Environmental in 2022.

SEPTIC SYSTEMS

Onsite septic systems are used to collect wastewater in rural areas of the county. These systems collect wastewater onsite in underground tanks, which create anaerobic conditions. Microorganisms biodegrade the soluble organic material found in waste, which results in fugitive CH_4 emissions. Consistent with the Community Protocol, wastewater discharge and treatment energy intensities associated with septic tanks and other onsite systems are assumed to be negligible.

CH_4 emissions from the septic systems in the county were calculated based on population served, using Equation WW.11(alt) of the Community Protocol. Direct data for the population served by septic systems in the county was unavailable. This population was estimated by calculating the difference between the county's total population and the population served by M1W's centralized WWTP, which was obtained from M1W. This method resulted in an estimate of 97,775 individuals in the county served by septic systems. Figure 6 below shows a sample calculation for estimating emissions from septic systems.

$$Septic\ Systems\ Emissions\ (MTCO_2e) = population\ served * daily\ biological\ oxygen\ demand\ load\ \left(\frac{kg\ BOD_5}{person}\right) * maximum\ CH_4\ producing\ capacity\ for\ domestic\ wastewater\ \left(\frac{kg\ CH_4}{kg\ BOD_5}\right) * CH_4\ correction\ factor * \ days\ to\ year\ conversion\ factor\ \left(\frac{days}{year}\right) * kilograms\ to\ metric\ ton\ conversion\ factor\ \left(\frac{MT}{kg}\right) * \ CH_4\ GWP$$

$$Septic\ Systems\ Emissions\ (MTCO_2e) = 97{,}775 * 0.09\frac{kg\ BOD_5}{person} * 0.6\frac{kg\ CH_4}{kg\ BOD_5} * 0.22 * \frac{365.25\ days}{1\ year} * \frac{1\ MT}{1{,}000kg} * 27.9 = 11{,}837\ MTCO_2e$$

Source: ICLEI 2019; calculations conducted by Ascent Environmental in 2022.

Figure 6 Sample Calculation for Estimating Carbon Dioxide Equivalent Emissions from Septic Systems

CENTRALIZED WWTPS

Emissions associated with the treatment of sewage are highly dependent on the processes and components used by specific WWTPs such as lagoons, nitrification or denitrification, and digester gas or combustion devices. There are several centralized wastewater treatment providers in the county, most of which are small-scale operations that serve a minimal number of residents and obtaining data for all facilities was not feasible. The largest wastewater provider, M1W, is a centralized WWTP that collects wastewater from customers' homes and businesses. Collected wastewater enters the regional sewer system, which is operated by M1W, and is then conveyed and pumped to the facility where it is treated before being safely reintroduced to the environment. Specific data regarding the type of WWTP and associated processes, population served, digester gas production, and daily nitrogen load were available from M1W. Due to lack of available data for the other providers and the minimal number of individuals served by these providers, it was assumed that all individuals served by centralized WWTPs were served by M1W.

Stationary CH_4 and N_2O emissions from the combustion of digester gas were calculated based on the volume of digester gas provided by M1W, using Community Protocol equation WW.1a and WW.2a, respectively. These equations contain factors for the fraction of CH_4 and N_2O in digester gas. A sample equation for estimating N_2O emissions from digester gas combustion is displayed in Figure 7. Emissions of CH_4 from digester combustion were calculated using the same equation but with a CH_4 emissions factor rather than an N_2O emissions factor.

$$Digester\ Gas\ Combustion\ N_2O\ Emissions\ (MTCO_2e) = daily\ digester\ gas\ combustion\ \left(\frac{scf}{day}\right) * fraction\ of\ CH_4\ in\ biogas * default\ BTU\ content\ of\ CH_4\ \left(\frac{BTU}{scf}\right) * BTU\ to\ MMBTU\ conversion\ factor\ \left(\frac{MMBTU}{BTU}\right) * N_2O\ emissions\ factor\ \left(\frac{kg\ N_2O}{MMBTU}\right) * kilograms\ to\ metric\ ton\ conversion\ factor\ \left(\frac{MT}{kg}\right) * days\ to\ year\ conversion\ factor\ \left(\frac{days}{year}\right) * \ N_2O\ GWP$$

$$Digester\ Gas\ Combustion\ N_2O\ Emissions\ (MTCO_2e) = 12{,}160\frac{scf}{day} * 0.60 * 1{,}028\frac{BTU}{scf} * \frac{1\ MMBTU}{10^6\ BTU} * \left(6.3 * 10^{-4}\ \frac{kg\ N_2O}{MMBTU}\right) * \frac{1\ MT}{1{,}000kg} * \frac{365.25\ days}{1\ year} * 273 = 0.5\ MTCO_2e$$

Source: ICLEI 2019; calculations conducted by Ascent Environmental in 2022.

Figure 7 Sample Calculation for Estimating Nitrous Oxide Emissions from Wastewater Treatment Digester Gas Combustion

Process CH_4 emissions from lagoons were calculated based on population data, using Community Protocol equation WW.6(alt) for anaerobic or facultative lagoons. Equation WW.6(alt) contains factors for the maximum CH_4 production capacity of domestic wastewater and a CH_4 correction factor for anaerobic systems. Process N_2O emissions were also

calculated based on population data, using Community Protocol WW.8 for WWTPs without nitrification or denitrification. These equations contain nitrogen loading factors and WWTP emission factors. Fugitive N_2O emissions from effluent discharge were calculated based on average daily nitrogen load data provided by M1W, using Community Protocol equation WW.12. A sample calculation for wastewater treatment process CH_4 emissions is shown in Figure 8. The equation for calculating both process and fugitive N_2O emissions follow the same principles but with different data inputs.

$$Process\ CH_4\ Emissions\ from\ Lagoons\ (MTCO_2e) = population\ served * commercial\ and\ industrial\ discharge\ factor * daily\ biological\ oxygen\ demand\ load\ \left(\frac{kg\ BOD_5}{person}\right) * (1 - fraction\ of\ BOD_5\ removed\ in\ primary\ treatment) * maximum\ CH_4\ producing\ capacity\ for\ domestic\ wastewater\ \left(\frac{kg\ CH_4}{kg\ BOD_5}\right) * CH_4\ correction\ factor * days\ to\ year\ conversion\ factor\ \left(\frac{days}{year}\right) * kilograms\ to\ metric\ ton\ conversion\ factor\ \left(\frac{MT}{kg}\right) *\ CH_4\ GWP$$

$$Process\ CH_4\ Emissions\ from\ Lagoons\ (MTCO_2e) = 8{,}422 * 1.25 * 0.09\frac{kg\ BOD_5}{person} * (1 - 0.325) * 0.6\frac{kg\ CH_4}{kg\ BOD_5} * 0.8 * \frac{365.25\ days}{1\ year} * \frac{1\ MT}{1{,}000kg} * 27.9 = 3{,}128\ MTCO_2e$$

Source: ICLEI 2019; calculations conducted by Ascent Environmental in 2022.

Figure 8 Sample Calculation for Estimating Process Methane Emissions from Wastewater Treatment Lagoons

Energy-related emissions result from the energy required for wastewater treatment operations, including the energy used in wastewater conveyance as well as energy used throughout wastewater treatment processes and to provide power to the M1W facility. However, because M1W is located within the county, it was assumed that energy-related emissions from wastewater treatment are captured in the buildings energy sector emissions estimates.

3.4.9 Agriculture

Based on modeling conducted, emissions from the agriculture sector accounted for approximately 401,367 $MTCO_2e$ in 2019, or 32 percent of the county's emissions. Emissions in this sector are generated from fertilizer application, livestock management, agricultural off-road vehicles and equipment, diesel-powered irrigation pumps, and open burning. The county's agriculture emissions in 2019 are summarized in Table 11, and additional details and information about this sector are included below.

Table 11 2019 Monterey County Agriculture GHG Emissions

Agricultural Activity	GHG Emissions ($MTCO_2e$)	Percent of Total Agriculture Emissions
Fertilizer Application	204,598	51%
Livestock Management	106,512	27%
Agricultural Off-Road Vehicles and Equipment	61,564	15%
Diesel-Powered Irrigation Pumps	27,866	7%
Open Burning	827	<1%
Water Supply	0[1]	0%
Total	**401,367**	**100%**

Notes: Totals may not sum exactly due to independent rounding. GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent; NA = not applicable.

[1] Because data were unavailable for electricity usage associated with agricultural water supply, water-related emissions in the agriculture sector are included in the building energy sector. See Section 3.3., "Data Quality and Accuracy" and Section 3.4.7, "Water Supply" for additional information.

Source: Calculations conducted by Ascent Environmental in 2024.

LIVESTOCK MANAGEMENT

Updates Since January 2022 Inventory Publication

Livestock produce CH_4 and N_2O emissions through enteric fermentation (a type of digestion process) and decomposition of manure produced by these animals. The Monterey County 2019 Crop Report provided initial estimates for total heads of pasture-raised cattle and calves as well as stocker cattle in the county, which were revised based on information from local ranchers and research conducted by UCANR (County of Monterey 2020). USDA's 2017 Census of Agriculture provided total heads of sheep and lambs, goats, hogs, poultry, and horses (USDA 2019). The County of Monterey ACO and UCANR confirmed livestock heads data used in this inventory. Average months per year that livestock reside in the county were provided by UCANR and local ranchers. Emissions factors for livestock were obtained from CARB's California GHG Emission Inventory (CARB 2021).

Livestock heads and months per year data are shown in Table 12 below, along with associated data sources.

Table 12 2019 Monterey County Livestock Heads and Months per Year Data and Sources

Livestock Type	Livestock Heads	Months per Year	Source
Calves	9,601	8.5	Monterey County 2019 Crop Report; County of Monterey ACO
Replacements (0-12 months)	1,694	12	Monterey County 2019 Crop Report; UCANR
Replacements (12-24 months)	1,694	12	Monterey County 2019 Crop Report; UCANR
Cattle	12,010	12	Monterey County 2019 Crop Report; County of Monterey ACO
Bulls	601	12	Monterey County 2019 Crop Report; UCANR
Stocker Cattle	60,400	7	Monterey County 2019 Crop Report; County of Monterey ACO
Sheep and Lambs	1,200	12	Monterey County 2019 Crop Report; County of Monterey ACO
Goats	912	12	USDA 2017 Census of Agriculture
Hogs	1,600	12	Monterey County 2019 Crop Report; County of Monterey ACO
Poultry	2,229	12	USDA 2017 Census of Agriculture
Horses	1,475	12	USDA 2017 Census of Agriculture

Notes: ACO = Agricultural Commissioner's Office; UCANR = University of California, Agriculture and Natural Resources; USDA = U.S. Department of Agriculture.

Source: Compiled by Ascent Environmental in 2022.

Livestock emissions factors for enteric fermentation and manure management are displayed in Table 13. Emissions factors were obtained from CARB's California GHG Emission Inventory. Data used to estimate emissions factors for calves, replacements, cattle, bulls, and stocker cattle only apply to pasture-raised livestock in California; data for dairy and feedlot livestock, and average emissions factors for larger geographic scales, were not used in calculations.

Table 13 2019 Monterey County Enteric Fermentation and Manure Management Emissions Factors

Livestock Type	Enteric Fermentation Emissions Factor (kg CH_4/head)	Manure Management Emissions Factor (kg CH_4/head)	Manure Management Emissions Factor (kg N_2O/head)
Calves	10.7	0.56	0
Replacements (0-12 months)	61.2	0.56	0
Replacements (12-24 months)	70.6	0.56	0
Cattle	95.4	3.2	0
Bulls	98.7	3.3	0
Stocker Cattle	59.5	1.9	0
Sheep and Lambs	8.0	0.70	0.40
Goats	5.0	0.37	0.37

Livestock Type	Enteric Fermentation Emissions Factor (kg CH_4/head)	Manure Management Emissions Factor (kg CH_4/head)	Manure Management Emissions Factor (kg N_2O/head)
Hogs	1.5	16.2	0.10
Poultry	0	0.10	0.02
Horses	18.0	3.3	1.3

Notes: CH_4 = methane; kg = kilogram; N_2O = nitrous oxide.

Source: Compiled by Ascent Environmental in 2022.

Figure 9 below illustrates an example calculation for estimating livestock management CH_4 emissions from stocker cattle. This equation was used to calculate livestock management emissions for all other livestock using data for heads, average months per year, and emissions factors specific to each livestock type.

$$Livestock\ Management\ CH_4\ Emissions\ from\ Stocker\ Cattle\ (MTCO_2e) = \left[\left(stocker\ cattle\ heads * \left(enteric\ fermentation\ CH_4\ emissions\ factor\ \left(\frac{kg\ CH_4}{head}\right) + manure\ management\ CH_4\ emissions\ factor\ \left(\frac{kg\ CH_4}{head}\right)\right) * CH_4\ GWP\right) + \left(stocker\ cattle\ heads * manure\ management\ N_2O\ emissions\ factor\ \left(\frac{kg\ N_2O}{head}\right) * N_2O\ GWP\right)\right] * average\ months\ per\ year\ \left(\frac{months}{year}\right) * kilogram\ to\ metric\ ton\ conversion\ factor\ \left(\frac{MT}{kg}\right)$$

$$Livestock\ Management\ CH_4\ Emissions\ from\ Stocker\ Cattle\ (MTCO_2e) = \left[\left(60{,}400\ heads * \left(59.5\ \frac{kg\ CH_4}{head} + 1.9\ \frac{kg\ CH_4}{head}\right) * 27.9\right) + \left(60{,}400\ heads * 0\ \frac{kg\ N_2O}{head} * 273\right)\right] * \frac{7\ months}{12\ months} * \frac{1\ MT}{1{,}000\ kg} = 60{,}403\ MTCO_2e$$

Source: CARB 2021; calculations conducted by Ascent Environmental in 2022.

Figure 9 Sample Calculation for Estimating Livestock Management Methane Emissions from Stocker Cattle

AGRICULTURAL EQUIPMENT

GHG emissions associated with agricultural off-road vehicles and equipment were obtained from CARB's OFFROAD2007 and OFFROAD2021 models, as discussed in Section 3.4.5, "Off-Road Vehicles and Equipment." Emissions estimates obtained from CARB were assumed to occur entirely within the unincorporated county.

Agricultural equipment emissions also include emissions from diesel-powered irrigation pumps. MBARD provided the number of pumps in the county, and GHG emissions were estimated using MBARD-specific emissions factors obtained from CARB (CARB 2006). Activity data and associated GHG emissions from agricultural equipment are included in Table 14.

Table 14 2019 Monterey County Agricultural Equipment Data and Sources

Equipment Type	Activity Data	GHG Emissions ($MTCO_2e$)	Source
Off-Road Agricultural Equipment	—[1]	61,564	CARB
Diesel-Powered Irrigation Pumps	446 pumps	27,866	County

Notes: CARB = California Air Resources Board; County = County of Monterey.

[1] Emissions from off-road agricultural equipment were obtained directly from CARB's OFFROAD2007 and OFFROAD2021 models; no activity data were used to calculate emissions estimates.

Source: Calculations conducted by Ascent Environmental in 2022.

A sample calculation for estimating emissions from diesel-powered irrigation pumps is displayed in Figure 10.

$$Diesel\text{-}Powered\ Irrigation\ Pump\ Emissions\ (MTCO_2e) = number\ of\ pumps * CO_2\ emissions\ factor\ \left(\frac{tons\ CO_2}{day*pump}\right) * days\ to\ year\ conversion\ factor\ \left(\frac{days}{year}\right) * tons\ to\ metric\ tons\ conversion\ factor\left(\frac{MT}{ton}\right)$$

$$Diesel\text{-}Powered\ Irrigation\ Pump\ Emissions\ (MTCO_2e) = 446\ pumps * 0.189\frac{tons\ CO_2}{day*pump} * \frac{365.25\ days}{1\ year} * \frac{0.907\ MT}{1\ ton} = 27{,}866\ MTCO_2e$$

Source: CARB 2006; calculations conducted by Ascent Environmental in 2022.

Figure 10 Sample Calculation for Estimating Carbon Dioxide Equivalent Emissions from Irrigation Pumps

FERTILIZER APPLICATION

The application of fertilizers and other soil amendments produces GHG emissions. Nitrogen fertilizers produce N_2O emissions, and application of lime produces emissions of CO_2. Emissions factors and quantification methods for GHG emissions associated with application of nitrogen and lime were obtained from CARB and IPCC, respectively (IPCC 2006). Data for fertilizer and lime application is presented in Table 15 below.

Updates Since August 2022 Inventory Publication

Synthetic and organic nitrogen applications were quantified using data from the Central Coast Regional Water Quality Control Board (2022), which documents the amount of nitrogen applied, by agricultural operation and crop, in the county in 2019. In total, these data show 71,610 tons of nitrogen applied. This represents an increase from the previous estimate, which was 21,516 tons of nitrogen applied. This previous estimate was based on 2019 crop acreage data for 51 distinct crops in the county; each crop's acreage was multiplied by an assumed nitrogen application rate (in pounds of nitrogen per acre) that were compiled from a literature review. The method used in this memorandum improves on the previous method; this is because the new method is based on recorded nitrogen application within the county, rather than the previous method which relied on estimates based on assumed application rates.

Data regarding tonnage of lime were obtained from CDFA's *2019 Fertilizer Tonnage Report* (CDFA 2019).

Table 15 2019 Monterey County Fertilizer and Lime Application Data and Sources

Application Type	Application Amount (tons)	Source
Organic Nitrogen (including urea)	5,551	Central Coast Regional Water Quality Control Board
Synthetic Nitrogen (including urea)	66,059	Central Coast Regional Water Quality Control Board
Lime	20,768	California Department of Food and Agriculture

Source: Compiled by Ascent Environmental in 2024.

Emissions factors and data sources for fertilizer and lime application are shown in Table 16.

Table 16 2019 Monterey County Fertilizer and Lime Application Emissions Factors and Sources

Application Type	Fertilizer Emissions Factor (g N_2O/ton N fertilizer)	Source	Lime Application Emissions Factor (g CO_2/ton Lime)	Source
Organic Nitrogen (including urea)	14,253	CARB	NA	NA
Synthetic Nitrogen (including urea)	9,688	CARB	NA	NA
Lime	NA	NA	398,886	IPCC

Notes: CARB = California Air Resources Board; CO_2 = carbon dioxide; g = grams; IPCC = Intergovernmental Panel on Climate Change; N = nitrogen; N_2O = nitrous oxide; NA = not applicable.

Source: Compiled by Ascent Environmental in 2022.

Figure 11 below shows a sample calculation for estimating emissions from synthetic fertilizer application. The same equation was used to estimate emissions from organic nitrogen fertilizer and lime application using application type-specific data and emissions factors.

$$Synthetic\ Nitrogen\ Fertilizer\ Application\ Emissions\ (MTCO_2e) = quantity\ of\ synthetic\ nitrogen\ fertilizer\ applied\ (tons) * N_2O\ emissions\ factor\ \left(\frac{g\ N_2O}{ton\ N\ fertilizer}\right) * grams\ to\ metric\ tons\ conversion\ factor\ \left(\frac{MT}{g}\right) * N_2O\ GWP$$

$$Synthetic\ Nitrogen\ Fertilizer\ Application\ Emissions\ (MTCO_2e) = 66{,}059\ tons * 9{,}688\frac{g\ N_2O}{ton\ N\ fertilizer} * \frac{1MT}{1{,}000{,}000g} * 273 = 174{,}713\ MTCO_2e$$

Source: CARB 2021; calculations conducted by Ascent Environmental in 2024.

Figure 11 Sample Calculation for Estimating Carbon Dioxide Equivalent Emissions from Fertilizer Application

OPEN BURNING

Open burning refers to agricultural and non-agricultural burning of vegetative matter, hazard reduction and ditch/road maintenance burning, and other burn activities that are permitted by MBARD. Tons of vegetative matter burned were obtained from MBARD, and CO_2 and CH_4 emissions factors were obtained from NWCG's *2018 Smoke Management Guide for Prescribed Fire* (NWCG 2018). It is important to note that MBARD was unable to provide a full dataset for all open burning operations, so emissions estimates for this source are likely underreported. Table 17 below shows data and emissions factors for open burning, including associated data sources.

Table 17 2019 Monterey County Open Burning Data, Emissions Factors, and Sources

Open Burning	Quantity (tons)	Source	CO_2 Emissions Factor (g CO_2/ton)	CH_4 Emissions Factor (g CH_4/ton)	Source
Vegetative Materials	497	MBARD	1,454,670	7,530	NWCG

Notes: CH_4 = methane; CO_2 = carbon dioxide; g = grams; MBARD = Monterey Bay Air Resources District; N_2O = nitrous oxide; NWCG = National Wildfire Coordinating Group.

Source: Compiled by Ascent Environmental in 2022.

A sample calculation for estimating open burning emissions is displayed in Figure 12.

$$Open\ Burning\ Emissions\ (MTCO_2e) = quantity\ of\ vegetative\ materials\ burned\ (tons) * \left[\left(CO_2\ emissions\ factor\ \left(\frac{g\ CO_2}{ton}\right) * CO_2\ GWP\right) + \left(CH_4\ emissions\ factor\ \left(\frac{g\ CH_4}{ton}\right) * CH_4\ GWP\right)\right] * grams\ to\ metric\ tons\ conversion\ factor\ \left(\frac{MT}{g}\right)$$

$$Open\ Burning\ Emissions\ (MTCO_2e) = 497\ tons * \left[\left(1{,}454{,}670\frac{g\ CO_2}{ton} * 1\right) + \left(7{,}530\frac{g\ CH_4}{ton} * 27.9\right)\right] * \frac{1MT}{1{,}000{,}000g} = 827\ MTCO_2e$$

Source: NWCG 2018; calculations conducted by Ascent Environmental in 2022.

Figure 12 Sample Calculation for Estimating Carbon Dioxide Equivalent Emissions from Open Burning

3.4.10 Additional Community Inventory Greenhouse Gas Emissions Sources

Additional GHG emissions sources were evaluated for the County's community inventory. Importantly, these sources are not included in the total community GHG emissions for the inventory and will not be considered in the CCAAP; however, they have been included in this report as informational items to provide additional context for

understanding emissions in the county. Details regarding GHG emissions from regulated stationary sources are discussed below.

PESTICIDE APPLICATION

Updates Since August 2022 Inventory Publication

Methyl bromide and sulfuryl fluoride are pesticides used for commodity fumigation and structural pest control, respectively. Data on the quantity of these pesticides applied in the county in 2019 was obtained from the California Department of Pesticide Regulation's (CDPR's) Pesticide Information Portal (CDPR 2024). These quantities were multiplied by their respective CARB emissions factors to calculate emissions for these sectors, as shown in Table 18 below. Pesticide-related emissions were not included in the previous publications of the unincorporated county GHG inventory. Pesticide use is regulated by CDPR and therefore, is not included in the unincorporated county's total GHG emissions. CDPR is responsible for reducing the emissions associated with the application of pesticides, including methyl bromide and sulfuryl fluoride. Emissions shown in Table 18 are informational only.

Table 18 2019 Monterey County Pesticide Application Data, Emissions Factors, and Sources

Pesticide	Quantity (metric tons)	Source	GWP	Source	GHG Emissions ($MTCO_2e$)
Methyl Bromide	1.073	CDPR	2.43	CARB	3
Sulfuryl Fluoride	19.015	CDPR	4,630	CARB	88,041

Notes: CARB = California Air Resources Board; CDPR = California Department of Pesticide Regulation; GHG = greenhouse gas; GWP = global warming potential; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Calculations conducted by Ascent Environmental in 2024.

REGULATED STATIONARY SOURCES

GHG emissions are generated from a variety of regulated stationary sources operating within the county. As shown in Table 18 below, many facilities include two types of GHG emissions estimates: those considered "Covered" and those considered "Non-Covered." "Covered" emissions are those that are regulated by CARB under the California Greenhouse Gas Cap-and-Trade Program (Cap-and-Trade). "Non-Covered" emissions are associated with the facilities regulated under Cap-and-Trade but are separate from the allowance budget. Cap-and-Trade establishes an aggregate GHG allowance budget on covered entities and provides a trading mechanism for compliance instruments (allowance or offset credit). Facilities regulated under Cap-and-Trade may purchase allowances to emit GHG emissions from facilities that reduce GHG emissions (e.g., solar farms) or sell emission offset credits to regulated facilities that need to reduce their emissions to meet CARB's industry-wide emissions cap. Currently, CARB gives such allowances to facilities that emit more than 25,000 $MTCO_2e$ per year. These entities primarily involve heavy industrial activities that consume large amounts of natural gas and are eligible purchasers of Cap-and-Trade emissions allowances because the facility emits more than 25,000 $MTCO_2e$ per year. Due to the involvement of many facilities located in the county in Cap-and-Trade, the State, and not the County, is responsible for reducing emissions from this sector. For the purposes of developing the community inventory, emissions associated with Cap-and-Trade covered facilities, including the non-covered emissions, are excluded.

Table 19 2019 Monterey County GHG Emissions from Regulated Stationary Sources

Facility Name	Industry Description	Covered GHG Emissions ($MTCO_2e$)	Non-Covered GHG Emissions ($MTCO_2e$)	Total GHG Emissions ($MTCO_2e$)
Aera Energy Coastal Basins	Crude Petroleum and Natural Gas Extraction	405,706	1,501	407,207
Chevron AAPG 740 Coastal Basin	Crude Petroleum and Natural Gas Extraction	229,859	2,128	231,988
Dynegy Moss Landing, LLC	Fossil Fuel Electric Power Generation	1,940,437	0	1,940,437
Eagle Petroleum - Lynch Canyon Field	Crude Petroleum and Natural Gas Extraction	27,871	409	28,280

Facility Name	Industry Description	Covered GHG Emissions ($MTCO_2e$)	Non-Covered GHG Emissions ($MTCO_2e$)	Total GHG Emissions ($MTCO_2e$)
Lhoist North America - Natividad Plant	Lime Manufacturing	82,662	13	82,675
Matsui Nursery, Inc.	Floriculture Production	0	12,803	12,803
Monterey Regional Waste Management District	Solid Waste Landfill	0	16,984	16,984
Salinas River Cogeneration Facility	Fossil Fuel Electric Power Generation	221,314	0	221,314
Total	**NA**	**2,907,849**	**33,838**	**2,941,688**

Notes: Totals may not sum exactly due to independent rounding. GHG = greenhouse gases; $MTCO_2e$ = metric tons of carbon dioxide equivalent; NA = not applicable.

Source: Data obtained from CARB; compiled by Ascent Environmental in 2022.

OIL AND GAS

Similar to the Cap-and-Trade covered facilities discussed above, the oil and gas sector is highly regulated by the State. The Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities (Methane Regulation) adopted by CARB in 2017 aims to reduce fugitive and vented emissions of methane from new and existing oil and gas facilities. The Methane Regulation established uniform control requirements for methane sources, including those from oil and gas facilities. Additionally, the County's GHG inventory follows the Community Protocol, which recommends that local agencies report on "GHG activities and sources over which [the] local government has significant influence" (ICLEI 2019:20). Because the County has limited authority over existing oil and well facilities, and the fact these facilities are highly regulated by the State, this sector is excluded from the inventory total. The data below is provided for informational purposes only. It should also be noted that there is likely overlap between the emissions data in this section and the stationary sources data presented in the previous section. Because the emissions estimates provided in this Oil and Gas section were calculated by the project team, they cannot be separated from the stationary source entities listed in Table 18 above. Regardless, both the stationary sources and oil and gas sectors will not be included in the countywide inventory nor will these sectors be included in the CCAAP due to the highly regulated nature of both sectors.

Based on modeling conducted, emissions from the oil and gas sector accounted for approximately 83,245 $MTCO_2e$ in 2019. Emissions from oil and gas are associated with the onsite combustion of fossil fuels (e.g., diesel, crude oil byproducts) as well as fugitive (i.e., "leaked") emissions resulting from the processing and extraction of oil and gas. Onsite fuel combustion accounted for approximately 20 percent of emissions from this sector, and fugitive emissions contributed approximately 80 percent of emissions. The county's oil and gas emissions in 2019 are summarized in Table 20, and additional details and information about this sector are included below.

Table 20 2019 Monterey County Oil and Gas GHG Emissions

Source	GHG Emissions ($MTCO_2e$)
Onsite Fuel Combustion	16,402
Fugitive Emissions	66,843
Total	**83,245**

Notes: Totals may not sum exactly due to independent rounding. $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Calculations conducted by Ascent Environmental in 2022.

Onsite Fuel Combustion

According to CARB, onsite fuel combustion emissions included in CARB's California GHG Emission Inventory consist of GHG emissions generated by equipment burning fuel for energy. To estimate the county's emissions from this sector, statewide oil and gas production data by county obtained from the California Department of Conservation were used to calculate the county's proportion of production for various types of oil and gas operations in the state. These proportions were applied to statewide oil and gas emissions data available from CARB's California GHG

Emission Inventory to scale emissions to the county. This inventory does not include emissions related to the combustion of products sold by the oil and gas producers, such as vehicular fuels or other petroleum products, nor does the inventory include supply chain-related emissions, such as the transport of oil via rail or maritime tankers.

Fugitive Emissions

Fugitive emissions, or unintentional releases of vapors to the atmosphere, from oil and gas operations are typically attributed to equipment leaks, process venting, evaporation losses, disposal of waste gas streams (e.g., by flaring), and accidents or equipment failures. Fugitive emissions were estimated using the same methods described above for onsite fuel combustion.

4 SUMMARY OF INVENTORY RESULTS

4.1 2019 COMMUNITY INVENTORY

Based on the modeling conducted, community activities in the county generated 1,235,855 $MTCO_2e$ in 2019. The largest emissions-generating sectors include on-road transportation, agriculture, and nonresidential building energy. The 2019 inventory will be the County's GHG emissions baseline for the CCAAP and will be used to forecast emissions and set emissions reductions targets. Table 21 and Figure 13 present the results of the County's 2019 community GHG emissions inventory by sector. Descriptions of each emissions sector, including key sources of emissions, are provided in further detail above in Section 3, "Data, Methods, and Assumptions."

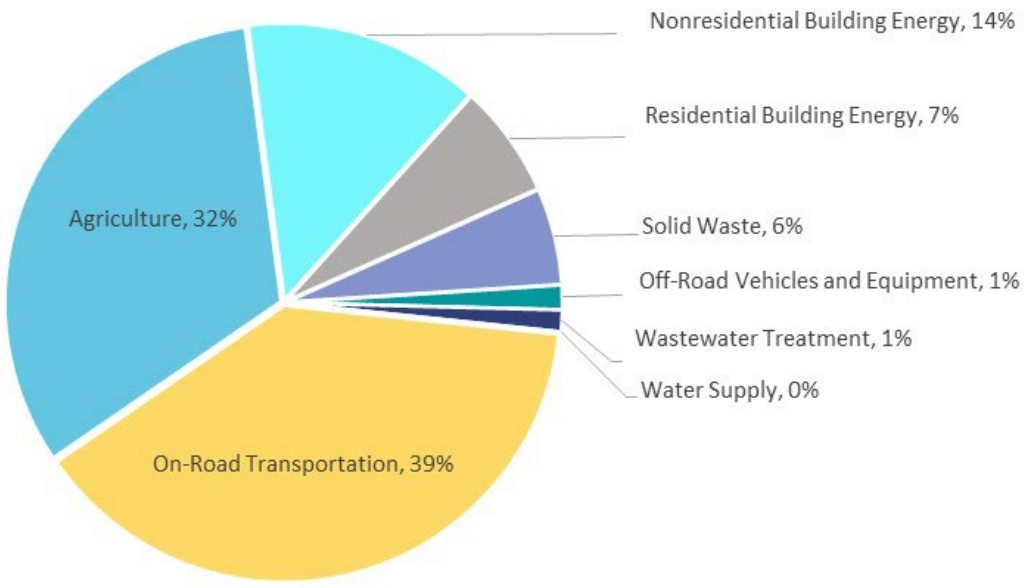
Table 21 2019 Monterey County Community GHG Emissions Inventory

Sector	GHG Emissions ($MTCO_2e$)	Percent of Total
On-Road Transportation	479,174	39%
Agriculture	401,367	32%
Nonresidential Building Energy	170,639	14%
Residential Building Energy	81,750	7%
Solid Waste	69,724	6%
Off-Road Vehicles and Equipment	17,616	1%
Wastewater Treatment	15,586	1%
Water Supply[1]	0	0%
Total	**1,235,855**	**100%**

Notes: Totals may not sum exactly due to independent rounding. GHG = greenhouse gases; $MTCO_2e$ = metric tons of carbon dioxide equivalent; NA = not applicable.

[1] Water supply emissions are estimated to be 0 $MTCO_2e$ because electricity consumption associated with extraction, conveyance, treatment, and distribution are captured in the building energy sectors (both residential and nonresidential).

Source: Calculated by Ascent Environmental in 2024.



Note: GHG = Greenhouse gas.
Source: Data modeled by Ascent in 2024.

Figure 13 2019 Monterey County Community GHG Emissions Inventory

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Memo

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Date: October 8, 2024

To: Cora Panturad (County of Monterey)

From: Hannah Kornfeld, Fred Hochberg, and Poonam Boparai (Ascent)

Subject: County of Monterey Community Climate Action and Adaptation Plan and 2030 Municipal Climate Action Plan: Greenhouse Gas Emissions Forecasts and Reduction Targets – Final Technical Memorandum

INTRODUCTION

The County of Monterey (County) is developing its Community Climate Action and Adaptation Plan (CCAAP) to reduce greenhouse gas (GHG) emissions within the unincorporated county (county). The County is also updating its Municipal Climate Action Plan for 2030 (2030 MCAP) to reduce GHG emissions associated with the County's government operations. These efforts are driven by Mitigation Measure CC-1a included in the County's 2010 General Plan Final Environmental Impact Report, which requires the County to develop a GHG Reduction Plan (or climate action plan [CAP]). The CCAAP and 2030 MCAP are intended to align with the requirements of the County's 2010 General Plan, as well as State mandates, and will serve to reduce GHG emissions for target years 2030, 2040, and 2045.

The County first completed a baseline inventory to estimate GHG emissions from community and municipal operations in 2019. The next step in this process is to forecast these GHG emissions and establish GHG emissions reduction targets and goals consistent with the State's adopted emissions reduction objectives. This technical memorandum provides the results of these forecasts as well as associated methods, assumptions, emissions factors, and data sources. It also presents the County's GHG reduction targets that have been developed in line with State targets and goals and discusses the methodology used to establish these targets. The GHG emissions forecasts and reduction targets will provide a foundation for the forthcoming steps of the County's climate action planning process, including the development and quantification of GHG emissions reduction measures and "gap analysis" evaluation (i.e., the calculated gap between the estimated GHG reductions from local action and the established targets).

ORGANIZATION OF THIS MEMORANDUM

This memorandum consists of three main parts:

- **Section 1: Summary of Inventory Results** presents an overview of the County's 2019 GHG emissions inventories for community and municipal operations.
- **Section 2: Greenhouse Gas Emissions Forecasts** summarizes the forecasted GHG emissions under "business-as-usual" (BAU) and legislative-adjusted BAU scenarios for years 2030, 2040, and 2045. The BAU scenario does not account for GHG emissions reductions resulting from policies and regulations adopted by local, regional, State, or federal agencies. A legislative-adjusted BAU scenario reflects policies and regulations enacted by regional, State, and federal agencies, without considering any additional local (County) actions to reduce GHG emissions.
- **Section 3: Reduction Targets** establishes GHG emissions reduction targets for years 2030, 2040, and 2045 based on statewide reduction targets from sectors relevant to the County's GHG inventory.

1 SUMMARY OF INVENTORY RESULTS

1.1 2019 COMMUNITY INVENTORY

Based on the modeling conducted, the community generated 1,235,855 metric tons of carbon dioxide equivalent ($MTCO_2e$) in 2019. The largest emissions-generating sectors include agriculture, on-road transportation, and nonresidential building energy. The 2019 inventory serves as the county's GHG emissions baseline for the CCAAP to forecast emissions and set emissions reductions targets. The year 2019 was chosen as the baseline because it is the year for which the most recent data were available. GHG emissions from stationary sources regulated by State and federal agencies (e.g., landfills, oil and gas operations) were evaluated for the 2019 inventory but were only included for informational purposes. Stationary source emissions are excluded from community inventory and forecast GHG emissions, as the County does not have the ability or authority to influence emissions from this sector because they are regulated by the State.

Table 1 and Figure 1 present the results of the County's 2019 community GHG emissions inventory by sector. A description of each emissions sector, including key sources of emissions, is provided in further detail in the *Final Greenhouse Gas Emissions Inventory Report for the Monterey County Community Climate Action and Adaptation Plan,* completed October 2024.

Table 1 2019 Monterey County Community GHG Emissions Inventory

Sector	GHG Emissions ($MTCO_2e$)	Percent of Total
On-Road Transportation	479,174	39%
Agriculture	401,367	32%
Nonresidential Building Energy	170,639	14%
Residential Building Energy	81,750	7%
Solid Waste	69,724	6%
Off-Road Vehicles and Equipment	17,616	1%
Wastewater Treatment	15,586	1%
Water Supply[1]	0	0%
Total	**1,235,855**	**100%**

Notes: Totals may not sum exactly due to independent rounding. GHG = greenhouse gases; $MTCO_2e$ = metric tons of carbon dioxide equivalent; NA = not applicable.

[1] Water supply emissions are estimated to be 0 $MTCO_2e$ because electricity consumption associated with extraction, conveyance, treatment, and distribution are captured in the building energy sectors (both residential and nonresidential).

Source: Analysis conducted by Ascent in 2024.

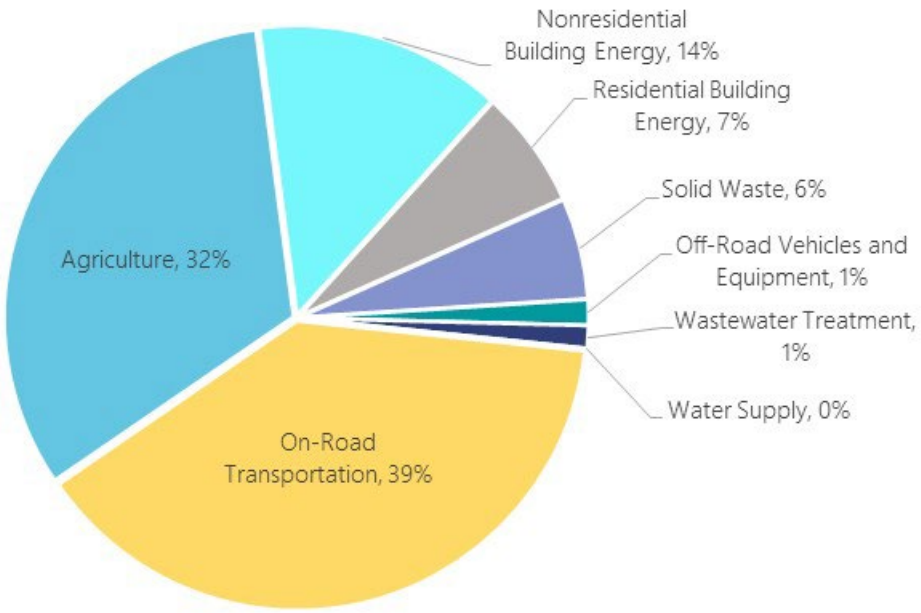


Figure 1 2019 Monterey County Community GHG Emissions Inventory

Note: Water supply emissions are captured in the residential and nonresidential building energy sectors.

Source: Data modeled by Ascent in 2024.

1.2 2019 MUNICIPAL OPERATIONS INVENTORY RESULTS

Based on the modeling conducted, the County's municipal operations generated approximately 28,634 $MTCO_2e$ in 2019. The employee commute, buildings and facilities, and vehicle fleet sectors generated nearly all municipal operations GHG emissions, accounting for approximately 97 percent of total emissions. The 2019 inventory serves as the municipal operations GHG emissions baseline for the 2030 MCAP to forecast emissions and set emissions reductions targets. Table 2 and Figure 2 present the results of the County's 2019 municipal operations GHG emissions inventory by sector, and a description of each emissions sector, including key sources of emissions, is provided in further detail in County of Monterey 2030 Municipal Climate Action Plan, Greenhouse Gas Emissions Inventories – Final Technical Memorandum, dated November 14, 2022.

Table 2 2019 County of Monterey Municipal Operations GHG Emissions Inventory

Sector	GHG Emissions ($MTCO_2e$)	Percent of Total
Employee Commute	14,501	51
Buildings and Facilities	8,075	28
Vehicle Fleet	5,072	18
Solid Waste	600	2
Wastewater Treatment	318	1
Water Supply	68	<1
Streetlights and Traffic Signals	1	<1
Total	**28,634**	**100**

Notes: Totals may not sum exactly due to independent rounding. GHG = greenhouse gases; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Analysis conducted by Ascent in 2024.

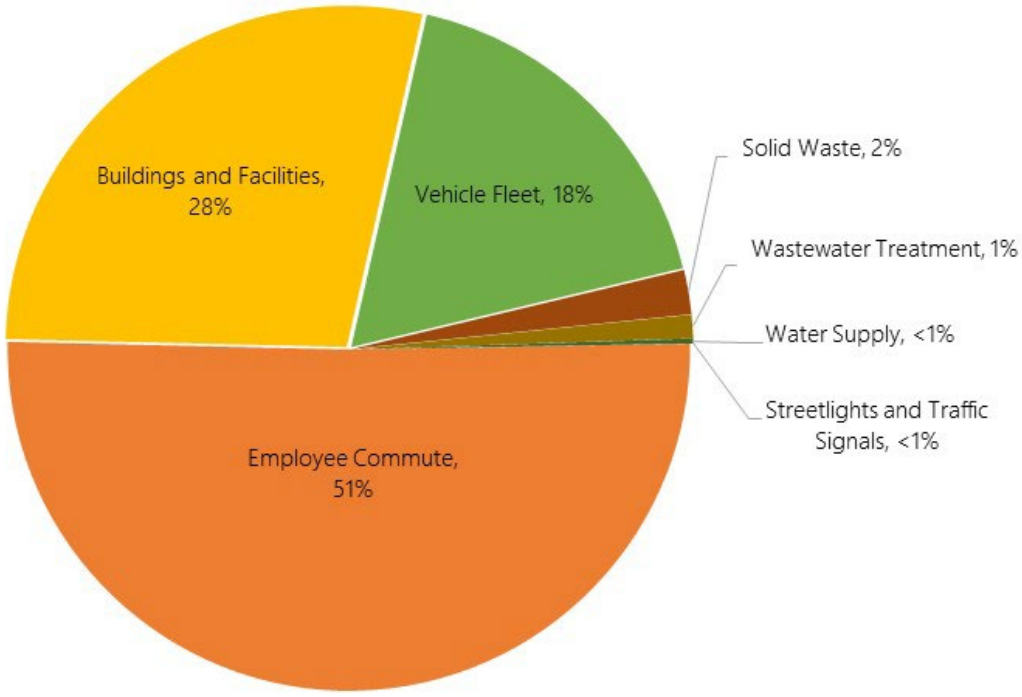


Figure 2 2019 County of Monterey Municipal Operations GHG Emissions Inventory
Note: GHG = Greenhouse gas.

Source: Data modeled by Ascent in 2024.

2 GREENHOUSE GAS EMISSIONS FORECASTS

2.1 COMMUNITY FORECAST RESULTS

The BAU GHG emissions forecasts provide an assessment of how emissions generated by community activities will change over time without further State, federal, or local action. In addition to accounting for the county's population, employment, and land use change(s) under a BAU scenario, an adjusted BAU forecast (i.e., the legislative-adjusted BAU forecast) was prepared, which includes adopted policies and regulations at the regional, State, and federal levels that would affect emissions without any local action, such as regulatory requirements to increase vehicle fuel efficiency and increase renewable energy sources in grid electricity portfolios. These forecasts provide the County with information needed to focus efforts on certain emissions sectors and sources that have the greatest opportunities for GHG emissions reductions. It is important to note that the legislative-adjusted BAU forecasts only account for emissions reductions associated with adopted policies and regulations; they do not account for goals established by regional, State, and federal agencies or executive orders outside of adopted legislation and regulations.

The GHG emissions forecasts for 2030, 2040, and 2045 described in this section are aligned with the State's GHG reduction target years established in key legislation and policies, including Senate Bill (SB) 32 and Assembly Bill (AB) 1279, as well as the horizon of the County's General Plan (i.e., 2040). The adopted statewide GHG reduction targets and goals are:

- 40 percent below 1990 levels by 2030 (SB 32);
- 85 percent reduction in anthropogenic emissions below 1990 levels by 2045; and
- Net zero emissions by 2045.

Community GHG emissions forecasts were based on projected changes in county demographics (i.e., population, employment, and service population) and land use between 2019 and 2045, as provided by the Association of Monterey Bay Area Governments (AMBAG) 2022 Final Regional Growth Forecasts (AMBAG 2020). Population and employment are expected to increase by 3.9 and 8.4 percent between 2019 and 2045, respectively, and service population is expected to increase approximately 5.5 percent. These growth factors were used to forecast emissions for 2030, 2040, and 2045 for most sectors in the inventory. Additional information regarding the growth factors used for each sector is included in the following sections.

AMBAG, the County's Metropolitan Planning Organization, was unable to provide annual vehicle miles traveled (VMT) growth projections for the forecast years, so annual VMT data for the 2019 baseline year were obtained from the California Air Resources Board's (CARB's) EMissions FACtor (EMFAC2021) model. Annual VMT in 2019 was scaled using projected growth in service population (i.e., the sum of population and employment) to estimate VMT for each forecast year. Service population and VMT are projected to increase by 5.5 percent between 2019 and 2045.

Table 3 shows anticipated growth in the county for the forecast years.

Table 3 Monterey County Community Demographic and Vehicle Miles Traveled Forecasts

Forecast Factor	2019	2030	2040	2045
Population	106,197	109,976	110,277	110,326
Employment	59,387	61,553	63,396	64,395
Annual VMT	1,050,848,408	1,088,578,572	1,102,185,091	1,108,836,038

Notes: VMT = vehicle miles traveled.

Source: AMBAG 2020; CARB 2022a.

Table 4 shows baseline emissions in 2019 and BAU emissions forecasts for 2030, 2040, and 2045.

Table 4 Monterey County Community GHG Emissions Inventory and BAU Forecasts ($MTCO_2e$)

Sector	2019	2030	2040	2045
On-Road Transportation	479,174	496,378	502,583	505,615
Agriculture	401,367	400,677	400,049	399,735
Nonresidential Building Energy	170,639	176,863	182,159	185,029
Residential Building Energy	81,750	84,659	84,890	84,928
Solid Waste	69,724	72,227	73,130	73,571
Off-Road Vehicles and Equipment	17,616	18,252	18,611	18,798
Wastewater Treatment	15,586	16,146	16,348	16,446
Water Supply	0	0	0	0
Total	**1,235,855**	**1,265,202**	**1,277,769**	**1,284,123**
Percent Change from 2019 Levels	—	*2%*	*3%*	*4%*

Notes: Total may not sum exactly due to independent rounding. BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Analysis conducted by Ascent in 2024.

Legislative-adjusted BAU emissions forecasts were prepared using the same demographic and VMT data that were used for the BAU forecasts, while accounting for regional, State, and federal policies and regulations that would affect local emissions. These forecasts provide the County with a more robust understanding of future community emissions to assist with the prioritization of emissions reduction measures developed to meet GHG targets. A summary of the legislative reductions applied is provided in Table 5.

Table 5 Legislative Reductions Summary

Source	Legislative Reduction	Description	Sectors Applied
Regional	Central Coast Community Energy 100 Percent Renewable Electricity	Establishes a target for Central Coast Community Energy to supply 100 percent renewable electricity by 2030.	Building Energy
Regional	Order R3-2021-0040 (Agricultural Order 4.0)	Mandates limits in nitrogen discharge from croplands.	Agriculture
State	Renewable Energy and Zero-Carbon Electricity Requirements (SB 100 and SB 1020)	Requires California energy utilities to procure 90 percent of electricity from renewable and zero-carbon sources by 2035, 95 percent by 2040, and 100 percent by 2045.	Building Energy
State	California's Building Energy Efficiency Standards (2019 and 2022 Title 24, Part 6)	Requires all new buildings in California to comply with energy efficiency standards established by CEC. Accounts for the energy efficiency gains in new residential and nonresidential buildings.	Building Energy
State	Advanced Clean Car I Regulations	Establishes GHG emission reduction standards for model years 2017 through 2025 that are more stringent than federal CAFE standards.	On-Road Vehicles
State	Advanced Clean Cars II Regulations	Establishes a target for all new passenger cars, trucks, and SUVs sold in California to be 100 percent zero-emission vehicles by 2035.	On-Road Vehicles
State	Advanced Clean Fleets	Starting in 2036, all medium and heavy-duty trucks sold in California must be zero emissions with limited exceptions. In addition to this sales mandate, fleet owners must also purchase electric trucks on an accelerated timeline.	On-Road Vehicles
State	Truck and Bus Regulation	Requires diesel trucks and buses that operate in California to be upgraded to reduce GHG emissions.	On-Road Vehicles
Federal	Fuel Efficiency Standards for Medium- and Heavy-Duty Vehicles	Establishes fuel efficiency standards for medium- and heavy-duty engines and vehicles.	On-Road Vehicles
Federal	EPA Off-Road Compression-Ignition Engine Standards	Establishes standards for phasing of EPA diesel engine tiers for off-road compression-ignition equipment.	Off-Road Vehicles and Equipment

Notes: CAFE = Corporate Average Fuel Economy; CEC = California Energy Commission; EPA = U.S. Environmental Protection Agency; GHG = greenhouse gas; SUV = sports utility vehicle; SB = Senate Bill.

Source: Compiled by Ascent in 2024.

The county's legislative-adjusted BAU emissions would decrease by approximately 20 percent between 2019 and 2030, as shown below in Table 6 and Figure 3. Figure 3 also shows the emissions trend that would occur without anticipated legislative reductions, accounting only for population, employment, and VMT changes (i.e., BAU emissions). Without the legislative reductions, emissions would be approximately 90 percent higher in 2045 compared to the legislative-adjusted BAU forecast. Emissions forecasts for each sector are discussed in detail in the following sections.

Table 6 Monterey County Community GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts ($MTCO_2e$)

Sector	2019	2030	2040	2045
On-Road Transportation	479,174	345,851	148,346	89,993
Agriculture	401,367	282,191	230,921	216,519
Nonresidential Building Energy	170,639	172,243	176,783	179,224
Residential Building Energy	81,750	82,403	81,993	81,567
Solid Waste	69,724	72,227	73,130	73,571
Off-Road Vehicles and Equipment	17,616	18,148	18,515	18,692
Wastewater Treatment	15,586	16,146	16,348	16,446
Water Supply	0	0	0	0
Total	**1,235,855**	**989,209**	**746,036**	**676,013**
Percent Change from 2019 Levels	—	*-20%*	*-40%*	*-45%*

Notes: Total may not sum exactly due to independent rounding. BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Analysis conducted by Ascent in 2024.

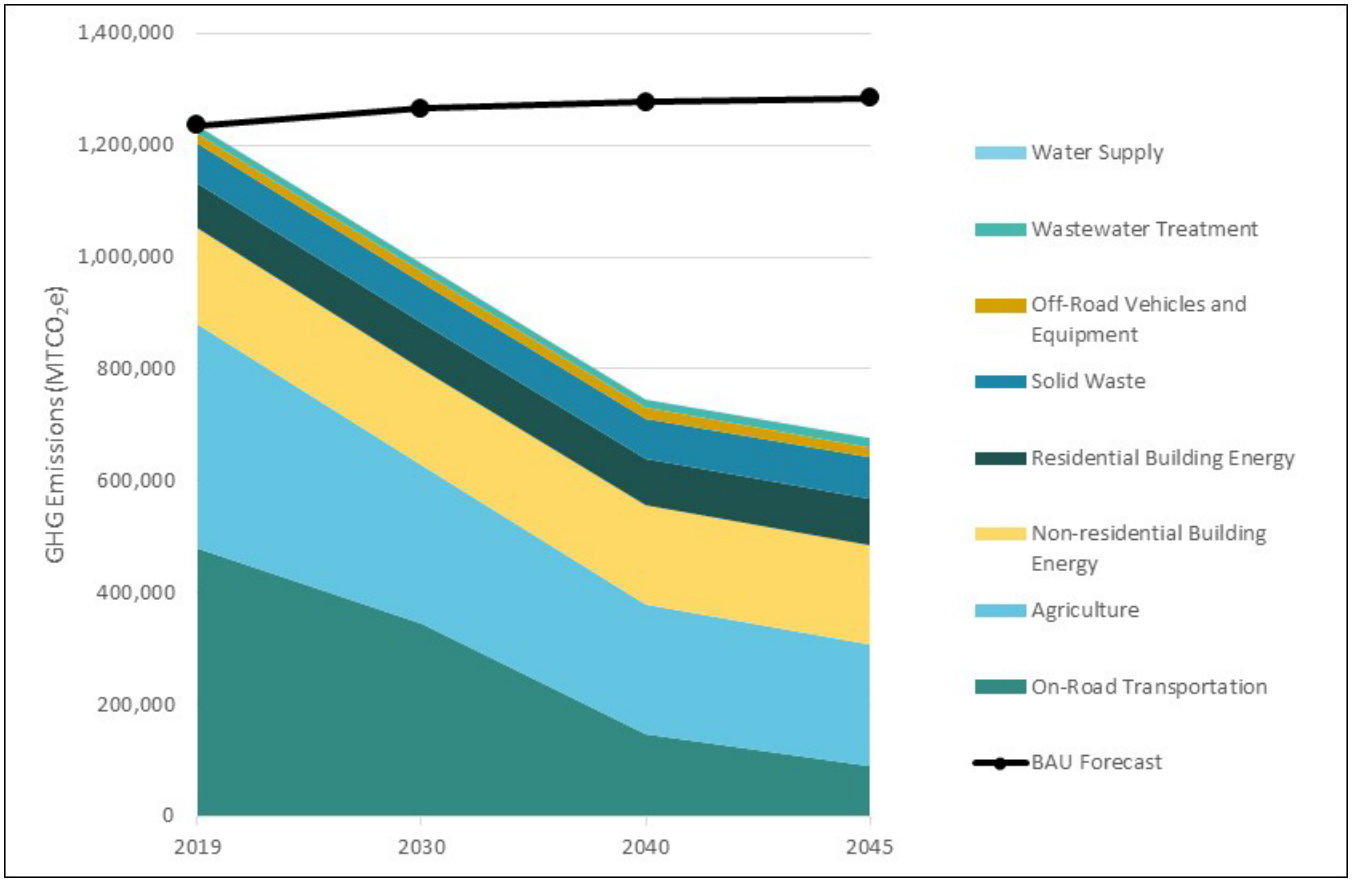


Figure 3 Monterey County Community GHG Emissions Inventory and Forecasts

Note: BAU = Business-as-usual; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Data modeled by Ascent in 2024.

2.1.1 Building Energy

BUILDING ENERGY ASSUMPTIONS

Building energy emissions in the county result directly from onsite combustion of natural gas and indirectly from electricity consumption. The combustion of fossil fuels (i.e., diesel, liquid propane gas [LPG], and natural gas) in backup generators also contributes to the county's building energy emissions. Central Coast Community Energy (3CE) and Pacific Gas and Electric Company (PG&E) are the providers of energy in the county. 3CE is a community-owned community choice energy agency established to source clean and renewable electricity for Monterey, San Benito, Santa Cruz, San Luis Obispo, and Santa Barbara counties. It began providing clean, near-zero-emissions electricity to the county in 2018 and currently serves approximately 96 percent of residential and nonresidential accounts, while the remaining electricity accounts are served by PG&E. Because 3CE provides almost all of the grid-supplied electricity consumed within the county, its near-carbon-free electricity results in a minor amount of electricity-related GHG emissions. Natural gas in the county is provided by PG&E.

Electricity Emissions Factors

PG&E's carbon dioxide (CO_2) emissions factor for 2019 was interpolated using the 2018 emissions factor provided by PG&E and a 2035 emissions factor based on California's Renewable Energy and Zero-Carbon Electricity Requirements, pursuant to SB 1020 (i.e., 90 percent GHG-free electricity by 2035). 3CE's emissions factor for CO_2 in 2019 was provided by 3CE. California-specific electricity emissions factors for methane (CH_4) and nitrous oxide (N_2O) obtained from the U.S. Environmental Protection Agency's (EPA's) Emissions & Generation Resource Integrated Database (eGRID) were used for PG&E (EPA 2021). For 3CE, these emissions factors were adjusted using additional data available from eGRID2019 to account for the specific energy resources used in 3CE's energy generation portfolio.

California utility providers, including PG&E, are required to achieve 90 percent GHG-free electricity by 2035, 95 percent by 2040, and 100 percent by 2045. PG&E's 2030 and 2040 emissions factors are 166.3 and 74.4 pounds of CO_2 per megawatt hour (lb CO_2/MWh), respectively. The GHG-free electricity requirements of SB 100 result in a 2045 emissions factor of 0 lb CO_2/MWh for PG&E. 3CE has adopted a target to provide carbon-free electricity by 2030; therefore, 3CE's emissions factor is 0 lb CO_2/MWh for 2030, 2040, and 2045. CH_4 and N_2O electricity emissions factors in future years are assumed to follow the same trends as the CO_2 emissions factors under the requirements of SB 1020.

Natural Gas Emissions Factors

Natural gas emissions are based on emissions factors obtained from The Climate Registry's (TCR's) 2021 Default Emission Factors, which are estimated to be 11.7 pounds of carbon dioxide equivalent per therm (lb CO_2e/therm) for stationary combustion in buildings and 11.6 lb CO_2e/therm for electricity generation in backup generators (TCR 2021). Emissions factors associated with natural gas combustion are not anticipated to change over time, as there are no legislative actions that would reduce the carbon intensity of natural gas.

Backup Generator Fuel Emissions Factors

Emissions from diesel and LPG fuel used to power backup generators are based on emissions factors obtained from TCR and are estimated to be 22.6 pounds of carbon dioxide equivalent per gallon (lb CO_2e/gal) and 0.3 lb CO2e/gal, respectively. These emissions factors are also not anticipated to change over time, as there are no legislative actions that would reduce the carbon intensity of diesel and LPG.

Energy Efficiency

Future energy use was adjusted to reflect increased emissions-intensity stringency under California's Building Energy Efficiency Standards (California Code of Regulations Title 24 Part 6, hereafter referred to as "Title 24"). Title 24 standards apply to new construction. The 2019 Title 24 standards apply to projects constructed after January 1, 2020,

and the 2022 Title 24 standards will apply after January 1, 2023. To estimate adjusted future energy consumption resulting from Title 24 requirements in new construction, electricity- and natural gas-specific adjustment factors were calculated using the difference in the average energy use in residential and nonresidential buildings between those built to 2019 Title 24 standards and those built to 2022 Title 24 standards. Adjustment factors were calculated using data available from the California Energy Commission (CEC) that were developed for the 2022 Title 24 standards. In addition to accounting for Title 24 requirements by land use type (i.e., residential and nonresidential), CEC also developed estimates for energy usage rates by climate zone, and the county's climate zones (Zones 3 and 4) were used for the residential buildings analysis. Climate zone-specific data for nonresidential buildings were unavailable; therefore, nonresidential adjustment factors relied on statewide averages.

The adjustment factors (specific to both building type and energy type) were applied to the BAU growth in energy use to estimate the energy consumption and associated GHG emissions of future development with legislative adjustments. The adjustment factors are shown in Table 7. They are presented in terms of the percent change in energy use for buildings built to the 2022 Title 24 standards compared to those built to 2019 Title 24 standards. Positive values indicate an anticipated increase in energy use, while negative values indicate an anticipated decrease in energy use. It is important to note that although average electricity use in new residential buildings is anticipated to rise (due to an increase in electric rather than natural gas appliances), emissions from new residential buildings are expected to be lower than they would be under 2019 Title 24 as a result of overall lower building emissions intensities (due to lower emissions factors associated with electricity compared to natural gas).

Table 7 Title 24 Building Energy Adjustment Factors for 2022 Standards Compared to 2019 Standards

Building Type	Electricity	Natural Gas
Residential Buildings	23%	-37%
Nonresidential Buildings	-10%	-11%

Source: Compiled by Ascent in 2024.

BUILDING ENERGY RESULTS

Emissions from future electricity, natural gas, and backup generator (i.e., natural gas, diesel, propane, and LPG) use were estimated by multiplying anticipated energy use by forecasted emissions factors. To estimate future energy use, energy consumption for each source was first scaled by the population or employment growth factors detailed in Table 2. Population growth was used to scale residential energy, and employment growth was used for nonresidential energy (including backup generators). Future energy use was adjusted to reflect increased emissions-intensity stringency under 2022 Title 24 standards, which are expected to achieve a reduction in emissions associated with new buildings. PG&E's electricity emissions factors were also adjusted to reflect the anticipated decline in the emissions intensity of grid-supplied electricity based on California's Renewable Energy and Zero-Carbon Electricity Requirements, pursuant to SB 100 and SB 1020. 3CE's electricity emissions factors are also anticipated to decline based on the utility's adopted target to achieve a carbon-free electricity supply by 2030. Natural gas, diesel, and LPG emissions factors were not adjusted, as the emissions intensity of these energy sources is anticipated to stay constant. The assumptions for future electricity emissions factors are described above. Table 8 below summarizes the scaling factors and legislative reductions used to forecast building energy use by energy type.

Table 8 Building Energy Emissions Forecast Methods by Energy Type

Energy Type	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
Electricity	Scaled by population growth for residential building energy; scaled by employment growth for nonresidential building energy.	Changes in average energy use in new construction from 2022 Title 24 compared to 2019 Title 24 applied to forecasted energy consumption. California Renewable Energy and Zero-Carbon Electricity Requirements (i.e., 90 percent GHG-free electricity by 2035, 95 percent by 2040, and 100 percent by 2045) applied to PG&E's electricity emissions factors. 3CE's adopted carbon-free by 2030 target was applied to 3CE's electricity emissions factors.
Natural Gas		
Backup Generators	Scaled by employment growth.	Changes in average energy use in new construction from 2022 Title 24 compared to 2019 Title 24 applied to forecasted energy consumption.

Notes: 3CE = Central Coast Community Energy; GHG = greenhouse gas; PG&E = Pacific Gas and Electric Company.

Source: Compiled by Ascent in 2024.

RESIDENTIAL BUILDING ENERGY

Between 2019 and 2030, electricity and natural gas emissions from residential buildings would increase by approximately 1 percent from 81,750 to 82,403 $MTCO_2e$, accounting for legislative adjustments and overall population growth of approximately 4 percent over the same time. Total residential building energy emissions are anticipated to decline after 2030 and would be slightly below 2019 levels in 2045. This projection reflects PG&E's compliance with SB 100 and SB 1020 requirements, 3CE's commitment to provide carbon-free electricity, and 2022 Title 24 standards for new buildings, despite an expected gradual increase in emissions from residential natural gas consumption due to population growth in the county. Table 9 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions from the residential building energy sector by energy type for 2030, 2040, and 2045.

Table 9 Residential Building Energy GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts ($MTCO_2e$)

Energy Type	2019	2030	2040	2045
Electricity	2,137	1,002	450	0
Natural Gas	79,613	81,401	81,544	81,567
Total	**81,750**	**82,403**	**81,993**	**81,567**

Notes: Totals may not sum exactly due to independent rounding. BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Analysis conducted by Ascent in 2024.

NONRESIDENTIAL BUILDING ENERGY

Between 2019 and 2030, electricity, natural gas, and backup generator emissions from nonresidential buildings would increase by approximately 1 percent from 170,639 to 172,243 $MTCO_2e$, accounting for legislative adjustments and overall employment growth of approximately 4 percent over the same time. Like the residential building energy sector, electricity GHG emissions are anticipated to decline while emissions from natural gas and backup generators are expected to increase. Reduced emissions from electricity would be offset by increased natural gas and backup generator emissions, and total nonresidential building energy emissions would rise through 2045. Table 10 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions for the nonresidential building energy sector by energy type for 2030, 2040, and 2045.

Table 10 Nonresidential Building Energy GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts ($MTCO_2e$)

Energy Type	2019	2030	2040	2045
Electricity	3,931	121	56	0
Natural Gas	166,526	171,933	176,533	179,026
Backup Generators	183	189	195	198
Total	**170,639**	**172,243**	**176,783**	**179,224**

Notes: Totals may not sum exactly due to independent rounding. BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Analysis conducted by Ascent in 2024.

2.1.2 On-Road Transportation

Between 2019 and 2030, GHG emissions from on-road vehicles would decrease by approximately 27 percent from 479,174 to 345,851 $MTCO_2e$, accounting for an increase in VMT of approximately 4 percent and future vehicle emissions factors modeled in CARB's EMFAC2021 model. With respect to the legislative adjustments, State and federal policies and regulations incorporated in the on-road transportation sector include the Pavley Clean Car Standards, Advanced Clean Cars I (ACC I) Regulations, and fuel efficiency standards for medium- and heavy-duty vehicles. These policies are included in EMFAC2021's emissions factor estimates and forecasts. It should be noted that the Low Carbon Fuel Standard was excluded in EMFAC2021 forecasts because the emissions benefits originate from upstream fuel production and do not directly reduce vehicle tailpipe emissions that affect the county's GHG emissions forecasts. Lastly, the effects of the Advanced Clean Cars II (ACC II) and Advanced Clean Fleets (ACF) regulations were incorporated in this forecast (see Table 5 for more detail on these regulations). Table 11 summarizes the scaling factor and legislative reductions used to forecast on-road transportation emissions.

Table 11 On-Road Transportation Emissions Forecast Methods

Source	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
On-Road Transportation	Scaled by service population.	EMFAC2021 forecasts vehicle fleet distributions by vehicle type and the emissions factors anticipated for each vehicle category based on both vehicle emissions testing and approved legislative reductions. EMFAC2021's forecasts incorporate the effects of the ACC I Regulations, federal CAFE standards, and fuel efficiency standards for medium- and heavy-duty vehicles, as well as truck and bus regulations. The requirements of ACC II Regulations and Advanced Clean Fleets (see Table 5) were also incorporated.

Notes: ACC = Advanced Clean Cars; CAFE = Corporate Average Fuel Economy; EMFAC2021 = California Air Resources Board's EMisson FACtor 2021 model.

Source: Compiled by Ascent in 2024.

Table 12 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions from on-road transportation for 2030, 2040, and 2045.

Table 12 On-Road Transportation GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts ($MTCO_2e$)

Source	2019	2030	2040	2045
On-Road Transportation	479,174	345,851	148,346	89,993

Notes: BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Analysis conducted by Ascent in 2024.

2.1.3 Off-Road Vehicles and Equipment

Between 2019 and 2030, emissions associated with off-road vehicles and equipment used in the county would increase by approximately 3 percent from 17,616 to 18,148 $MTCO_2e$, accounting for legislative adjustments and overall growth in various demographics. Emissions were obtained primarily from CARB's latest off-road emissions model, OFFROAD2021, as well as from CARB's OFFROAD2007 model. With respect to the legislative adjustments in the off-road vehicle sector, the OFFROAD2021 was used, which incorporates regulatory actions such as reformulated fuels and more stringent emissions standards. However, some off-road vehicle and equipment sources that are included in the OFFROAD2007 model are excluded from OFFROAD2021. For these sectors, emissions were obtained from OFFROAD2007. In addition, OFFROAD2021 provides CO_2 emissions but does not provide emissions from CH_4 and N_2O. Ratios of CH_4 and N_2O to CO_2 reported in OFFROAD2007 were calculated and applied to CO_2 data from OFFROAD2021 to calculate CH_4 and N_2O emissions, as recommended by CARB.

Monterey County-level emissions from off-road vehicles and equipment obtained from the OFFROAD models were scaled using changes in county-specific demographic factors. Table 13 summarizes the scaling factors and legislative reductions used to forecast off-road vehicle and equipment emissions.

Table 13 Off-Road Vehicles and Equipment Forecast Methods by Source

Source	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
Airport Ground Support	Population	OFFROAD2021 emissions factor considerations include EPA off-road compression-ignition engine standards implementation schedule.
Commercial Harbor Craft	Employment	
Construction and Mining	Service Population	
Entertainment Equipment	Employment	
Industrial Equipment	Employment	
Lawn and Garden Equipment	Population	
Light Commercial Equipment	Employment	
Pleasure Craft	Population	
Portable Equipment	Employment	
Railyard Operations	Employment	
Recreational Equipment	Population	
Transport Refrigeration Units	Service Population	

Notes: EPA = U.S. Environmental Protection Agency; OFFROAD2021 = California Air Resources Board's OFFROAD2021 model.

Source: Analysis conducted by Ascent in 2024.

Table 14 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions from the off-road vehicles and equipment sector for 2030, 2040, and 2045.

Table 14 Off-Road Vehicles and Equipment GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts ($MTCO_2e$)

Source	2019	2030	2040	2045
Airport Ground Support	215	223	224	224
Commercial Harbor Craft	4,018	4,162	4,287	4,354
Construction and Mining	5,136	5,344	5,416	5,449
Entertainment Equipment	58	60	62	63
Industrial Equipment	1,860	1,925	1,984	2,016
Lawn and Garden Equipment	637	659	661	662
Light Commercial Equipment	1,466	1,564	1,610	1,646
Pleasure Craft	1,206	1,248	1,252	1,252
Portable Equipment	622	645	664	674
Railyard Operations	394	409	421	428
Recreational Equipment	113	117	118	118
Transport Refrigeration Units	1,891	1,792	1,817	1,808
Total	**17,616**	**18,148**	**18,515**	**18,692**

Notes: Totals may not sum exactly due to independent rounding. BAU = business-as-usual; GHG = greenhouse gas; MTCO2e = metric tons of carbon dioxide equivalent.

Source: Analysis conducted by Ascent in 2024.

2.1.4 Solid Waste

Between 2019 and 2030, solid waste emissions generated from community activities in the county would increase by approximately 4 percent from 69,724 to 72,227 $MTCO_2e$, accounting for overall service population growth of approximately 4 percent over the same time. Solid waste sector emissions are associated with the decomposition of mixed municipal solid waste generated by the unincorporated county in landfills. No additional legislative reductions could be applied to this sector, so legislative-adjusted BAU emissions are equivalent to BAU emissions, which were scaled by service population growth within the city. Table 15 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions from the solid waste sector for 2030, 2040, and 2045.

Table 15 Solid Waste GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts ($MTCO_2e$)

Source	2019	2030	2040	2045
Community-Generated Solid Waste	69,724	72,227	73,130	73,571

Notes: BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Analysis conducted by Ascent in 2024.

2.1.5 Water Supply

Water supply emissions from community activities in the county would stay constant at 0 $MTCO_2e$ for all forecast years. It was assumed that all water used within the unincorporated county was extracted, conveyed, treated, and distributed within the unincorporated county. Additionally, electricity usage associated with water consumption could not be broken down by use type; therefore, water supply emissions were assumed to be captured entirely within the building energy sector, which accounts for all electricity consumption.

2.1.6 Wastewater Treatment

Between 2019 and 2030, community wastewater treatment emissions would increase by 4 percent from 15,586 to 16,146 $MTCO_2e$. This change reflects an increase in wastewater generation resulting from service population growth within the county of approximately 4 percent over the same time. No legislative reductions could be applied to this sector, so legislative-adjusted BAU emissions are equivalent to BAU emissions. Wastewater treatment-related emissions are generated from centralized wastewater treatment plants (WWTPs) and septic systems in the county. Table 16 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions from wastewater treatment sector for 2030, 2040, and 2045.

Table 16 Wastewater Treatment GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts ($MTCO_2e$)

Source	2019	2030	2040	2045
Centralized WWTPs	3,749	3,884	3,933	3,956
Septic Systems	11,837	12,262	12,415	12,490
Total	**15,586**	**16,146**	**16,348**	**16,446**

Notes: BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent; WWTP = wastewater treatment plant.

Source: Analysis conducted by Ascent in 2024.

2.1.7 Agriculture

Between 2019 and 2030, emissions from agriculture would decrease by approximately 30 percent from 401,367 to 282,191 $MTCO_2e$. This decline is chiefly due to reductions in emissions from fertilizer application in compliance with Agricultural Order 4.0 (officially titled Order R3-2021-0040, which was issued by the Central Coast Regional Water Quality Control Board in April 2021).

Agricultural Order 4.0 mandates limits in nitrogen discharge (defined as the quantity of nitrogen in fertilizer, compost, or irrigation water that is applied to crops, less nitrogen removed through harvest, sequestration, or other removal techniques) from croplands. These limits, which apply to the years 2023, 2025, 2027, 2031, 2036, 2041, and 2051, were used to interpolate limits for 2030, 2040, and 2045 to match the forecast years for this analysis. For purposes of quantifying GHG emissions, the interpolated 2030, 2040 and 2045 limits were then used to calculate a percent change in nitrogen application relative to the limit in the first Agricultural Order 4.0 compliance year of 2023, which was assumed to be a proxy for the amount of nitrogen discharge in the inventory year of 2019. This assumption was made because the data used to calculate nitrogen discharge was not available for the year 2019—while the inventory includes nitrogen added in applied fertilizer, it does not include nitrogen added from compost or irrigation water, nor does it contain information on the amount of nitrogen removed. Therefore, it was not possible to calculate a 2019 discharge value that would be comparable to the limits in Agricultural Order 4.0.

This calculation resulted in forecast emissions from nitrogen in fertilizer that were 45 percent and 16 percent of inventory levels in 2030 and 2045, respectively. These percentage values were applied to the inventory values to calculate legislative-adjusted emissions from fertilizer. Table 17 below shows this calculation in detail.

Table 17 Effects of Agricultural Order 4.0 on Greenhouse Gas Emissions from Nitrogen in Fertilizer

Year	Nitrogen discharge limit (pounds nitrogen / acre)	Percent of inventory level	Source
2023	500	100%	CCRWQCB 2021: 52
2025	400	80%	CCRWQCB 2021: 52
2027	300	60%	CCRWQCB 2021: 52
2030	225	45%	Interpolated

Year	Nitrogen discharge limit (pounds nitrogen / acre)	Percent of inventory level	Source
2031	200	40%	CCRWQCB 2021: 52
2036	150	30%	CCRWQCB 2021: 52
2040	110	22%	Interpolated
2041	100	20%	CCRWQCB 2021: 52
2045	80	16%	Interpolated
2051	50	10%	CCRWQCB 2021: 52

Notes: Agricultural Order 4.0 = Order R3-2021-0040; CCRWQCB = Central Coast Regional Water Quality Control Board.

Source: Analysis conducted by Ascent in 2024.

In addition to the reductions described above, for all agricultural sectors, emissions were scaled downwards by a marginal decrease (less than 1 percent). This is due to the decline in agricultural land use acres projected in the County's Agriculture Resources Element of the Draft Environmental Impact Report for the Monterey County 2007 General Plan (County of Monterey 2008). Additionally, for agricultural off-road vehicles and equipment emissions, reductions as forecasted by CARB's OFFROAD2007 and OFFROAD2021 models (explained further in Section 2.1.3) were incorporated; these reductions account for State and federal policies and regulations aimed at reducing emissions from these sources. Table 18 summarizes the scaling factor and legislative reductions used to forecast agriculture emissions, and Table 19 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions from agriculture for 2030, 2040, and 2045.

Table 18 Agriculture Forecast Methods by Source

Source	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
Livestock Management	Scaled by agricultural acres.	No legislative reductions applied.
Fertilizer Application		Applied reductions in fertilizer application due to Agricultural Order 4.0.
Irrigation Pumps		No legislative reductions applied.
Open Burning		No legislative reductions applied.
Agricultural Off-Road Vehicles and Equipment	Scaled by agricultural acres.	OFFROAD2021 emissions factor considerations include EPA off-road compression-ignition engine standards implementation schedule.

Notes: Agricultural Order 4.0 = Order R3-2021-0040; EPA = U.S. Environmental Protection Agency; OFFROAD2021 = California Air Resources Board's OFFROAD2021 model.

Source: Compiled by Ascent in 2024.

Table 19 Agriculture GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts ($MTCO_2e$)

Source	2019	2030	2040	2045
Livestock Management	106,512	106,329	106,162	106,079
Fertilizer Application	204,598	96,453	51,302	39,532
Agricultural Off-Road Vehicles and Equipment	61,564	50,766	44,858	42,332
Irrigation Pumps	27,866	27,818	27,775	27,753
Open Burning	827	826	825	824
Total	**401,367**	**282,191**	**230,921**	**216,519**

Notes: BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Analysis conducted by Ascent in 2024.

2.1.8 Discussion

As discussed above and shown in Table 6 and Figure 3, the community legislative-adjusted BAU emissions would decrease by approximately 20 percent between 2019 and 2030. On-road transportation is expected to represent the largest emissions-generating sector, accounting for approximately 35 percent of emissions in 2030, followed by the agriculture sector, which is expected to account for 29 percent of emissions. Nonresidential and residential building energy would account for 17 percent and 8 percent of community emissions in 2030, respectively.

While emissions from some sectors are expected to increase by 2030, emissions reductions in other sectors would offset these increases. The anticipated reductions would be achieved from several legislative actions, including:

- increased renewable and carbon-free sources in PG&E's electricity supply;
- carbon-free electricity supplied by 3CE by 2030;
- improved building emissions intensity through compliance with Title 24 standards;
- reductions in on-road vehicle emissions factors as forecasted in EMFAC2021;
- reductions in off-road vehicle and equipment emissions factors as forecasted in OFFROAD2021; and
- reductions in fertilizer application in compliance with Agricultural Order 4.0.

Despite growth in the county, currently adopted legislative actions are expected to result in a continued decline in emissions through 2045. Going forward, new legislative actions that would affect emissions may be adopted by regional, State, and federal agencies; however, because information regarding these regulatory changes is currently unknown, emissions reductions from future potential legislative actions are not quantified in this memorandum. Where new regulations or actions are imminent and reasonably foreseeable, they can be incorporated as complementary actions to locally based GHG reduction measures, as will be discussed in subsequent technical memoranda.

2.2 MUNICIPAL OPERATIONS FORECAST RESULTS

Municipal operations BAU forecasts were based on predicted growth in County employment between 2019 and 2045, which was estimated using the countywide employment growth factors obtained from AMBAG. Municipal employment is expected to increase by 8.4 percent between 2019 and 2045. Growth in municipal employment was the sole growth factor used to forecast BAU emissions for 2030, 2040, and 2045 for all sectors in the municipal operations inventory. Table 20 shows 2019 municipal employment and anticipated growth in municipal employment for the forecast years.

Table 20 County of Monterey Municipal Operations Demographic Forecasts

Forecast Factor	2019	2030	2040	2045
County Employment	5,308	5,501	5,666	5,755

Source: Compiled by Ascent in 2024.

Table 21 shows baseline emissions in 2019 and BAU emissions forecasts for 2030, 2040, and 2045.

Table 21 County of Monterey Municipal Operations GHG Emissions Inventory and BAU Forecasts ($MTCO_2e$)

Sector	2019	2030	2040	2045
Employee Commute	14,501	15,030	15,480	15,724
Buildings and Facilities	8,075	8,369	8,620	8,756
Vehicle Fleet	5,072	5,296	5,455	5,541
Solid Waste	600	622	640	650
Wastewater Treatment	318	329	339	345
Water Supply	68	70	72	74
Streetlights and Traffic Signals	1	1	1	1
Total	**28,634**	**29,718**	**30,608**	**31,090**

Notes: Total may not sum exactly due to independent rounding. BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Analysis conducted by Ascent in 2024.

Legislative-adjusted BAU emissions forecasts provide an assessment of how the County's municipal operations emissions would change over time without further action from the County. In addition to accounting for the County's municipal growth, the legislative-adjusted BAU forecast accounts for policies and regulations at the regional, State, and federal levels that would affect emissions, such as regulatory requirements to increase vehicle fuel efficiency and building energy efficiency. These forecasts provide the County with the information needed to focus efforts on certain municipal operations emissions sectors and sources that have the most GHG reduction opportunities. Annual municipal employment growth, described above, was the sole scaling factor applied to all sectors. A summary of legislative reductions applied is provided in Table 5.

Municipal operations legislative-adjusted BAU emissions would decrease by approximately 18 percent between 2019 and 2030, as shown in Table 22 and Figure 4. Figure 4 also shows the emissions trend that would occur without anticipated legislative reductions, accounting only for changes in municipal employment (i.e., BAU emissions). Without the legislative reductions, emissions would be approximately 27 percent higher in 2030 compared to the legislative-adjusted BAU forecast. Emissions forecasts for each sector are discussed in detail in the following sections.

Table 22 County of Monterey Municipal Operations GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts ($MTCO_2e$)

Sector	2019	2030	2040	2045
Employee Commute	14,501	10,247	4,254	2,412
Buildings and Facilities	8,075	7,987	7,535	7,094
Vehicle Fleet	5,072	4,158	3,772	3,727
Solid Waste	600	622	640	650
Wastewater Treatment	318	325	323	319
Water Supply	68	58	27	0
Streetlights and Traffic Signals	1	0	0	0
Total	**28,634**	**23,397**	**16,552**	**14,203**
Percent Change from 2019 Levels	—	*-18%*	*-42%*	*-50%*

Notes: Total may not sum exactly due to independent rounding. BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Analysis conducted by Ascent in 2024.

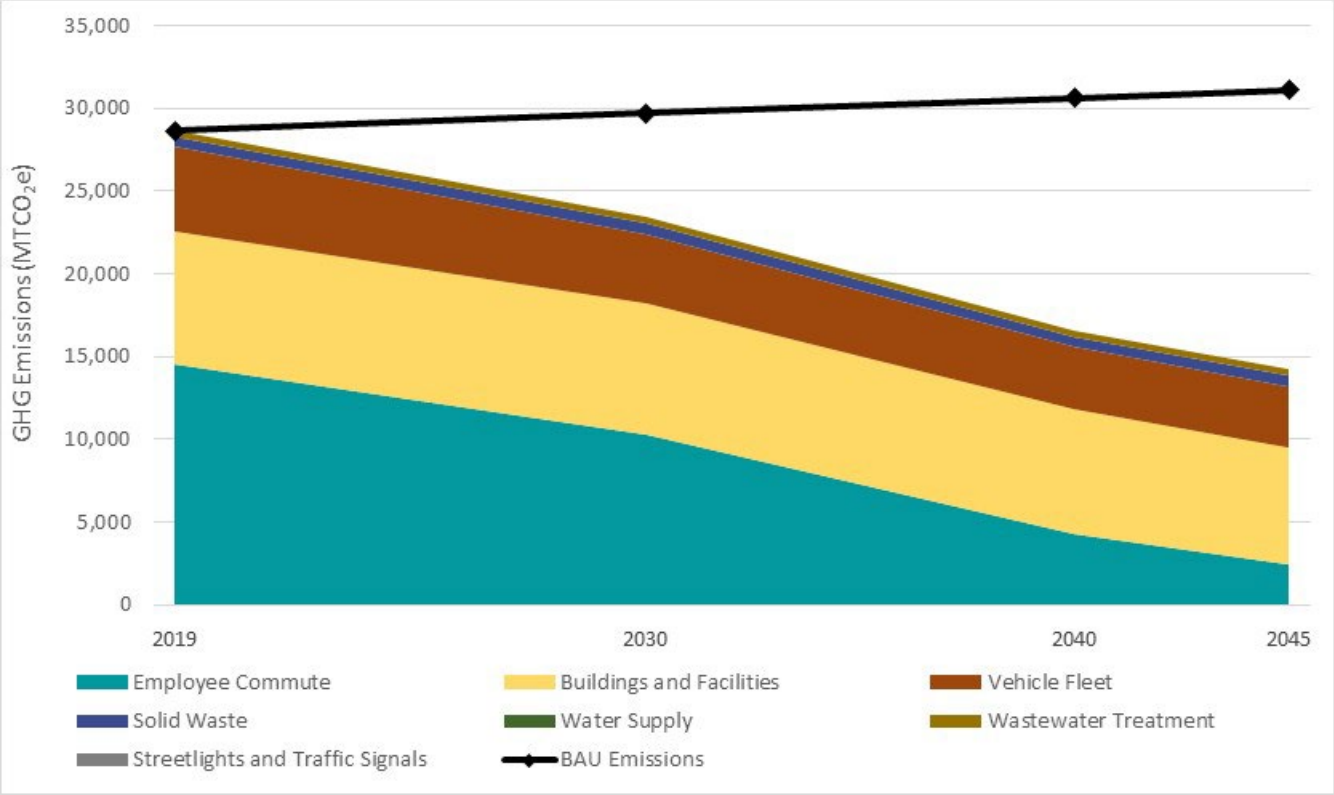


Figure 4 County of Monterey Municipal Operations GHG Emissions Inventory and Forecasts

Note: BAU = Business-as-usual; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Data modeled by Ascent in 2024.

2.2.1 Buildings and Facilities Energy

Emissions from future electricity, natural gas, and backup generator use in County buildings and facilities were estimated by multiplying anticipated energy use with forecasted emissions factors. Future energy use and emissions were forecasted using the same methodology and assumptions described in Section 2.1.1. Table 23 summarizes the legislative reductions used to forecast buildings and facilities emissions by energy type.

Table 23 Buildings and Facilities Energy Emissions Forecast Legislative Reductions by Energy Type

Energy Type	Applied Legislative Reductions
Electricity	Changes in average energy use in new construction from 2022 Title 24 compared to 2019 Title 24 applied to forecasted energy consumption. California Renewable Energy and Zero-Carbon Electricity Requirements (i.e., 90 percent GHG-free electricity by 2035, 95 percent by 2040, and 100 percent by 2045) applied to PG&E's electricity emissions factors. 3CE's adopted carbon-free by 2030 target was applied to 3CE's electricity emissions factors.
Natural Gas	
Backup Generators	Changes in average energy use in new construction from 2022 Title 24 compared to 2019 Title 24 applied to forecasted energy consumption.

Notes: 3CE = Central Coast Community Energy; GHG = greenhouse gas; PG&E = Pacific Gas and Electric Company.

Source: Compiled by Ascent in 2024.

Between 2019 and 2030, emissions from electricity, natural gas, and backup generators from municipal buildings and facilities would decrease by approximately 1 percent from 8,075 to 7,987 $MTCO_2e$, accounting for legislative adjustments and municipal growth. This change reflects increases in emissions from natural gas and backup generators combined with decreases in electricity emissions due to lower electricity emissions factors resulting from SB 100 and SB 1020 requirements and 3CE's carbon-free electricity target, as well as reduced emissions intensity of

buildings under 2022 Title 24. Table 24 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions for the municipal operations buildings and facilities energy sector by energy type for 2030, 2040, and 2045.

Table 24 Buildings and Facilities Energy GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts ($MTCO_2e$)

Energy Type	2019	2030	2040	2045
Electricity	1,484	1,178	541	0
Natural Gas	6,589	6,806	6,991	7,092
Backup Generators	2	2	3	3
Total	**8,075**	**7,987**	**7,535**	**7,094**

Notes: Totals may not sum exactly due to independent rounding. BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Analysis conducted by Ascent in 2024.

2.2.2 Streetlights and Traffic Signals

Between 2019 and 2030, emissions from streetlights and traffic signals would decrease from 1 to 0 $MTCO_2e$, accounting for legislative adjustments and municipal growth. This reflects lower electricity emissions factors related to California's Renewable Energy and Zero-Carbon Electricity Requirements, as well as 3CE's carbon-free electricity target. Table 25 summarizes the legislative reductions used to forecast streetlight and traffic signal emissions.

Table 25 Streetlights and Facilities Emissions Forecast Legislative Reductions

Source	Applied Legislative Reductions
Electricity	California Renewable Energy and Zero-Carbon Electricity Requirements (i.e., 90 percent GHG-free electricity by 2035, 95 percent by 2040, and 100 percent by 2045) applied to PG&E's electricity emissions factors. 3CE's adopted carbon-free by 2030 target was applied to 3CE's electricity emissions factors.

Notes: 3CE = Central Coast Community Energy; GHG = greenhouse gas; PG&E = Pacific Gas and Electric Company.

Source: Compiled by Ascent in 2024.

Table 26 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions for the streetlights and traffic signals sector for 2030, 2040, and 2045.

Table 26 Streetlights and Traffic Signals GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts ($MTCO_2e$)

Source	2019	2030	2040	2045
Streetlights and Traffic Signals	1	0	0	0

Notes: BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Analysis conducted by Ascent in 2024.

2.2.3 Employee Commute

Between 2019 and 2030, GHG emissions from employee commutes would decrease by approximately 19 percent from 14,501 to 10,247 $MTCO_2e$, accounting for future vehicle emissions factors modeled in CARB's EMFAC2021 model and municipal growth. It was assumed that employees that commute to work all use passenger vehicles. With respect to the legislative adjustments included in this forecast, State and federal policies and regulations incorporated in the employee commute sector include the Pavley Clean Car Standards and ACC Standards. These policies are already included in EMFAC2021's emissions factor estimates and forecasts. It should be noted that the Low Carbon Fuel Standard was excluded in EMFAC2021 forecasts because most of the emissions benefits originate from upstream fuel

production and do not directly reduce emissions in the County's municipal operations GHG emissions forecasts. The anticipated effects of ACC II Regulations were incorporated into the forecasts for 2040 and 2045. Table 27 summarizes the legislative reductions used to forecast employee commute emissions.

Table 27 Employee Commute Forecast Legislative Reductions

Source	Applied Legislative Reductions
Employee Commute	EMFAC2021 forecasts vehicle fleet distributions by vehicle type and the emissions factors anticipated for each vehicle category based on both vehicle emissions testing and approved legislative reductions. EMFAC2021's forecasts incorporate the effects of the ACC Standards and federal CAFE standards. The requirements of ACC II Regulations (i.e., all new passenger and light-duty vehicles sold in California will be zero-emission vehicles by 2035) were also incorporated.

Notes: ACC = Advanced Clean Cars; CAFE = Corporate Average Fuel Economy; EMFAC2021 = California Air Resources Board's EMisson FACtor 2021 model.

Source: Compiled by Ascent in 2024.

Table 28 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions from municipal employee commutes for 2030, 2040, and 2045.

Table 28 Employee Commute GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts ($MTCO_2e$)

Source	2019	2030	2040	2045
Employee Commute	14,501	10,247	4,254	2,412

Notes: BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Analysis conducted by Ascent in 2024.

2.2.4 Vehicle Fleet

Between 2019 and 2030, emissions associated with the County's municipal vehicle fleet would decrease by approximately 18 percent from 5,072 to 4,158 $MTCO_2e$, accounting for legislative adjustments and municipal growth. Because VMT data for on-road vehicles were unavailable, and usage hours and mileage data were unavailable for off-road vehicles and equipment, fuel consumption data provided by the County for gasoline, diesel, and biodiesel fuels were used to forecast emissions. Transportation fuels (i.e., gasoline, diesel, and biodiesel) emissions factors were obtained from TCR (TCR 2021). With respect to the legislative adjustments in the vehicle fleet sector, improvements in fuel efficiency reported by CARB's EMFAC2021 model and the anticipated increase in zero-emission vehicles after 2035, as described in Section 2.1.2, were applied to BAU emissions forecasts. Table 29 summarizes the legislative reductions used to forecast vehicle fleet emissions.

Table 29 Vehicle Fleet Forecast Legislative Reductions

Source	Applied Legislative Reductions
Vehicle Fleet	EMFAC2021 forecasts vehicle fleet distributions by vehicle type and the emissions factors anticipated for each vehicle category based on both vehicle emissions testing and approved legislative reductions. EMFAC2021's forecasts incorporate the effects of the ACC Standards and federal CAFE standards. The requirements of ACC II Regulations (i.e., all new passenger and light-duty vehicles sold in California will be zero-emission vehicles by 2035) were also incorporated.

Notes: ACC = Advanced Clean Cars; CAFE = Corporate Average Fuel Economy; EMFAC2021 = California Air Resources Board's EMisson FACtor 2021 model.

Source: Compiled by Ascent in 2024.

Table 30 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions from the vehicle fleet sector by fuel source for 2030, 2040, and 2045.

Table 30 Vehicle Fleet GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts ($MTCO_2e$)

Source	2019	2030	2040	2045
Gasoline	4,167	3,416	3,099	3,062
Diesel	897	735	667	659
Biodiesel	9	7	6	6
Total	**5,072**	**4,158**	**3,772**	**3,727**

Notes: Totals may not sum exactly due to independent rounding. BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Analysis conducted by Ascent in 2024.

2.2.5 Solid Waste

Between 2019 and 2030, municipal operations solid waste emissions would rise by approximately 4 percent from 600 to 622 $MTCO_2e$, accounting for municipal growth. No additional legislative reductions could be applied to this sector, so legislative-adjusted BAU emissions are equivalent to BAU emissions. Table 31 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions from the municipal operations solid waste sector for 2030, 2040, and 2045.

Table 31 Solid Waste GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts ($MTCO_2e$)

Source	2019	2030	2040	2045
Solid Waste	600	622	640	650

Notes: BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Analysis conducted by Ascent in 2024.

2.2.6 Water Supply

Between 2019 and 2030, emissions from water supplied for municipal operations would decrease by 15 percent from 68 to 58 $MTCO_2e$, accounting for legislative adjustments and municipal growth. GHG emissions from water supply result from electricity use, which was assumed to be provided by PG&E, associated with municipal operations water consumption as well as County-operated water systems. The decrease in emissions reflects lower PG&E electricity factors related to SB 1020 requirements, despite an increase in water consumption of approximately 4 percent. Table 32 summarizes the legislative reductions used to forecast water supply emissions.

Table 32 Water Supply Forecast Legislative Reductions

Source	Applied Legislative Reductions
Water Consumption	California Renewable Energy and Zero-Carbon Electricity Requirements (i.e., 90 percent GHG-free electricity by 2035, 95 percent by 2040, and 100 percent by 2045) applied to PG&E's electricity emissions factors.

Notes: GHG = greenhouse gas; PG&E = Pacific Gas and Electric Company.

Source: Compiled by Ascent in 2024.

Table 33 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions from municipal operations water supply for 2030, 2040, and 2045.

Table 33 Water Supply GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts ($MTCO_2e$)

Source	2019	2030	2040	2045
Water Supply	68	58	27	0

Notes: BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Analysis conducted by Ascent in 2024.

2.2.7 Wastewater Treatment

Between 2019 and 2030, wastewater treatment emissions from municipal operations would increase by approximately 2 percent from 318 to 325 $MTCO_2e$, accounting for legislative reductions and municipal growth. This reflects an increase in wastewater generation with lower electricity emissions factors for PG&E related to SB 100 and SB 1020. Although electricity factors are reduced through 2045, increases in natural gas usage and process and fugitive emissions resulting from wastewater collection and treatment would offset decreased electricity emissions. Table 34 summarizes the legislative reductions used to forecast emissions from municipal operations wastewater treatment.

Table 34 Wastewater Treatment Forecast Legislative Reductions

Source	Applied Legislative Reductions
Wastewater Treatment	California Renewable Energy and Zero-Carbon Electricity Requirements (i.e., 90 percent GHG-free electricity by 2035, 95 percent by 2040, and 100 percent by 2045) applied to PG&E's electricity emissions factors.

Notes: GHG = greenhouse gas; PG&E = Pacific Gas and Electric Company.

Source: Compiled by Ascent in 2024.

Table 35 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions from wastewater treatment for 2030, 2040, and 2045.

Table 35 Wastewater Treatment GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts ($MTCO_2e$)

Activity	2019	2030	2040	2045
Wastewater Treatment	318	325	323	319

Notes: BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Analysis conducted by Ascent in 2024.

2.3 DISCUSSION

As discussed above and shown in Table 22 and Figure 4, municipal operations legislative-adjusted BAU emissions would decrease by approximately 18 percent between 2019 and 2030. The employee commute sector is expected to be the largest contributor of municipal operations emissions in 2030, accounting for 44 percent of emissions. Buildings and facilities would account for 34 percent of emissions, and the County's vehicle fleet is expected to contribute 18 percent. Emissions from these three sectors are projected to decline by 2030, which is a result of reductions that would be achieved from numerous legislative actions, including:

- increased renewable and carbon-free sources in PG&E's electricity supply;
- carbon-free electricity supplied by 3CE by 2030;
- improved building emissions intensity through compliance with Title 24 standards;
- reductions in on-road vehicle emission factors forecasted in EMFAC2021.

Despite growth in the county, and without additional future legislative actions, emissions would continue to decline gradually though 2045. Going forward, new legislative actions that would affect emissions may be adopted by

regional, State, and federal agencies; however, because information regarding these regulatory changes is currently unknown, emissions reductions from future potential legislative actions are not quantified in this memorandum. Where new regulations or actions are imminent and reasonably foreseeable, they can be incorporated as complementary actions to locally based GHG reduction measures, as will be discussed in subsequent technical memoranda.

3 REDUCTION TARGETS

3.1 STATEWIDE GREENHOUSE GAS REDUCTION TARGETS AND GOALS

As directed in SB 32 and AB 1279, the State aims to reduce annual GHG emissions to:

40 percent below 1990 levels by 2030;
85 percent of anthropogenic emissions below 1990 levels by 2045; and
Net zero emissions by 2045.

The County aims to reduce community and municipal operations emissions in proportion to the State's targets and goals. Community emissions levels from 1990 are not available, which is the case for most local jurisdictions in California. Thus, community GHG reduction targets for the County's CCAAP were developed relative to the 2019 community emissions inventory, and municipal operations targets were developed relative to the 2019 municipal operations inventory, consistent with guidance provided by CARB. Community GHG emissions in 2019 were 1,235,855 $MTCO_2e$, and municipal operations emissions in 2019 were 28,634 $MTCO_2e$. The methodology used to calculate the County's emissions reduction targets is described below.

3.2 CALIFORNIA'S CLIMATE CHANGE SCOPING PLANS AND 2019 GHG INVENTORY

California's 2017 Climate Change Scoping Plan (2017 Scoping Plan) and the *2022 Scoping Plan for Achieving Carbon Neutrality* (2022 Scoping Plan) reports statewide GHG emissions for eight sectors: agriculture, residential and commercial, electric power, high global warming potential (GWP) gases, industrial, recycling and waste, transportation, and cap-and-trade (CARB 2017; CARB 2022b). CARB's California GHG Emission Inventory for 2019 also reports statewide GHG emissions for these eight sectors (CARB 2021). For each sector, the 2017 Scoping Plan reports the 1990 emissions levels and reductions needed by 2030 for the State to achieve the SB 32 target of reducing statewide emissions to 40 percent below 1990 levels. The 2022 Scoping Plan includes the range of reductions needed for each sector by 2045 to for the State to achieve the AB 1279 target of reducing statewide emissions to 85 percent below 1990 levels. CARB also estimates the GHG emissions removed through carbon dioxide removal technologies and natural and working lands net sinks to achieve net zero emissions by 2045, pursuant to AB 1279.

Chapter 5, "Challenge Accepted," of the 2022 Scoping Plan provides the following guidance to local agencies seeking to adopt GHG reduction targets in climate action planning efforts: although net zero targets can often be valuable and achievable, and mitigation is important, targets need to be considered in the larger context of these goals. This all means any GHG targets on a local scale should take into consideration the actions and outcomes included in the 2022 Scoping Plan. Jurisdictions considering "net zero" targets should carefully consider the implications such targets may have on emissions in neighboring communities and the ability of the state to meet our collective targets" (CARB 2022b: 269). However, not all emissions sector reductions can be achieved at the local level because local agencies often do not have jurisdiction over the emissions sectors included in the statewide inventory used to develop the statewide targets.

The statewide targets account for all emissions sectors in the State's GHG emissions inventory, statewide population forecasts for 2030 and 2045, and all statewide reductions necessary to achieve the statewide targets under SB 32 and AB 1279 in all sectors. The targets reported in the 2017 Scoping Plan and the 2022 Scoping Plan are framed as targets that must be met on a statewide basis; however, this does not mean that the statewide sector targets must be applied uniformly to every local jurisdiction.

3.3 COMMUNITY GREENHOUSE GAS EMISSIONS REDUCTION TARGETS

Based on a review of the 2017 Scoping Plan, the 2022 Scoping Plan, and an understanding of activities occurring within the county, the County has direct or indirect jurisdiction over activities that generate emissions and contribute to reductions in five of the eight emissions sectors included in the 2017 Scoping Plan and the 2022 Scoping Plan: agriculture, residential and commercial, electric power, recycling and waste, and transportation. The County has limited influence over high GWP gases, and industrial activities (e.g., industrial production and processes) in the county are limited. Lastly, while facilities regulated under Cap-and-Trade do exist within county boundaries, the State is responsible for achieving emissions reductions from these sources, and the County has limited ability to influence Cap-and-Trade facilities' GHG emissions. Therefore, by excluding these sectors under this approach, community GHG reduction targets have been established in proportion with statewide reductions for all sectors relevant to County jurisdiction to the extent feasible using available data. This target setting approach is consistent with the California Supreme Court decision in *Center for Biological Diversity v. California Department of Fish and Wildlife and Newhall Land and Farming (2015) 62 Cal.4th 204*, which determined that the approach of assessing a project's consistency with statewide emissions reduction goals must include a "reasoned explanation based on substantial evidence" that links the project's emission to the statewide GHG reduction goals.

The first step in determining community targets under this approach is to compare the State's GHG inventories for 1990 and 2019 (i.e., the County's baseline inventory year) for the five relevant sectors. All sectors that were included in the 2017 Scoping Plan and the 2022 Scoping Plan are shown below in Table 36 for 1990, 2019, 2030, and 2045. According to the inventories available from CARB, statewide emissions from the relevant sectors were approximately 337 million $MTCO_2e$ ($MMTCO_2e$) in 1990 and 309 $MMTCO_2e$ in 2019 (CARB 2021). Thus, 2019 statewide emissions were approximately 28 $MMTCO_2e$ (8 percent) lower than the 1990 level and the State's 2020 GHG target (i.e., reduce emissions to 1990 levels by 2020).

Table 36 2017 Scoping Plan and 2022 Scoping Plan Estimated Change in Emissions by Sector ($MMTCO_2e$)

GHG Emissions by Sector	1990	2019	2030[1]	2045[2]
Agriculture	26	32	27	15
Residential and Commercial	44	44	32	4
Electric Power	108	59	39	9
High GWP	3	21	12	9
Industrial	98	88	68	12
Recycling and Waste	7	9	10	8
Transportation	152	166	116	8
Cap-and-Trade	NA	NA	-44	0
Total	**438**	**418**	**260**	**66**
Adjusted Total (Excludes High GWP, Industrial, and Cap-and-Trade Sectors)	*337*	*309*	*224*	*44*

Notes: GHG = greenhouse gas; GWP = global warming potential; $MMTCO_2e$ = million metric tons of carbon dioxide equivalent; NA = not applicable.

[1] 2030 emissions by sector are provided in the 2017 Scoping Plan, consistent with the 40% reduction target set forth in SB 32.

[2] 2045 emissions by sector are provided in the 2022 Scoping Plan, consistent with the 85% reduction in anthropogenic emissions target set forth in AB 1279.

Sources: CARB 2022c; CARB 2021; CARB 2017.

It is important to note that the 2022 Scoping Plan includes estimated changes in net emissions for the natural and working lands sector (i.e., carbon sequestration) and carbon dioxide removal technologies.

According to the 2017 Scoping Plan, statewide emissions from the sectors relevant to the County's inventory must be reduced to 224 $MMTCO_2e$ by 2030 for the State to achieve its 2030 goal. This represents an emissions reduction of approximately 85 $MMTCO_2e$, or 28 percent, by 2030, relative to 2019 levels of 309 $MMTCO_2e$. According to the 2022 Scoping Plan, statewide emissions from the sectors relevant to the County's inventory must be reduced to 44 $MMTCO_2e$, an emissions reduction of approximately 265 $MMTCO_2e$, or 86 percent, by 2045, relative to 2019 levels of 309 $MMTCO_2e$. An interim 2040 target was also established based on interpolation between the 2030 and 2045 targets. Therefore, consistent with State targets and goals and considering relevant emissions sectors, the County's community GHG reduction targets are as follows:

- 2030 target: 28 percent below 2019 levels (895,223 $MTCO_2e$);
- 2040 target: 66 percent below 2019 levels (416,425 $MTCO_2e$); and
- 2045 target: 86 percent below 2019 levels (177,026 $MTCO_2e$).

Table 37 shows how the County's targets were derived based on adjusted statewide GHG emissions data and projections and summarizes the County's legislative-adjusted BAU forecasts and targets for 2030, 2040, and 2045.

Table 37 Statewide and Monterey County Community Legislative-Adjusted BAU Forecasts and GHG Emissions Reduction Targets Below 2019 Levels

Source	2019	2030	2040	2045
Scoping Plan Emissions Limit ($MMTCO_2e$)	418	260[2]	135[3]	66[4]
Adjusted Scoping Plan Emissions Limit[1] ($MMTCO_2e$)	NA	224[2]	104[3]	44[4]
Statewide Target Percent Reduction from 2019 Levels	NA	28%	66%	86%
Monterey County Community Emissions and Legislative-Adjusted BAU Forecast ($MTCO_2e$)	1,235,855	989,209	746,036	676,013
Monterey County Community Target Percent Reduction Below 2019 Levels	—	28%	66%	86%
Monterey County Community Target Annual Emissions ($MTCO_2e$)	—	895,223	416,425	177,026
Reduction from 2019 Needed to Meet Target ($MTCO_2e$)	—	340,632	819,430	1,058,829
Reduction from Legislative-Adjusted BAU Needed to Meet Target ($MTCO_2e$)	—	93,986	329,611	498,987

Notes: BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent; $MMTCO_2e$ = million metric tons of carbon dioxide equivalent; NA = not available.

[1] Excludes high GWP, industrial, and cap-and-trade sectors because they are not relevant to the County's inventory.

[2] 2030 emissions by sector are provided in the 2017 Scoping Plan, consistent with the 40% reduction target set forth in SB 32.

[3] 2040 emissions are interpolated between 2030 and 2045 emissions limits from the 2017 Scoping Plan and 2022 Scoping Plan, respectively.

[4] 2045 emissions by sector are provided in the 2022 Scoping Plan, consistent with the 85% reduction in anthropogenic emissions target set forth in AB 1279.

Sources: CARB 2022c; CARB 2017; Analysis conducted by Ascent in 2024.

Figure 5 depicts the community legislative-adjusted BAU forecasts by sector, as distinguished by colored wedges, and the County's community emissions reduction targets relative to the 2019 emissions inventory. The space between the trajectory of the black line (i.e., targets) and the top of the colored wedges (i.e., forecasted emissions) represents the "gap" in emissions that will need to be addressed through local actions for the County to meet its community GHG reduction targets.

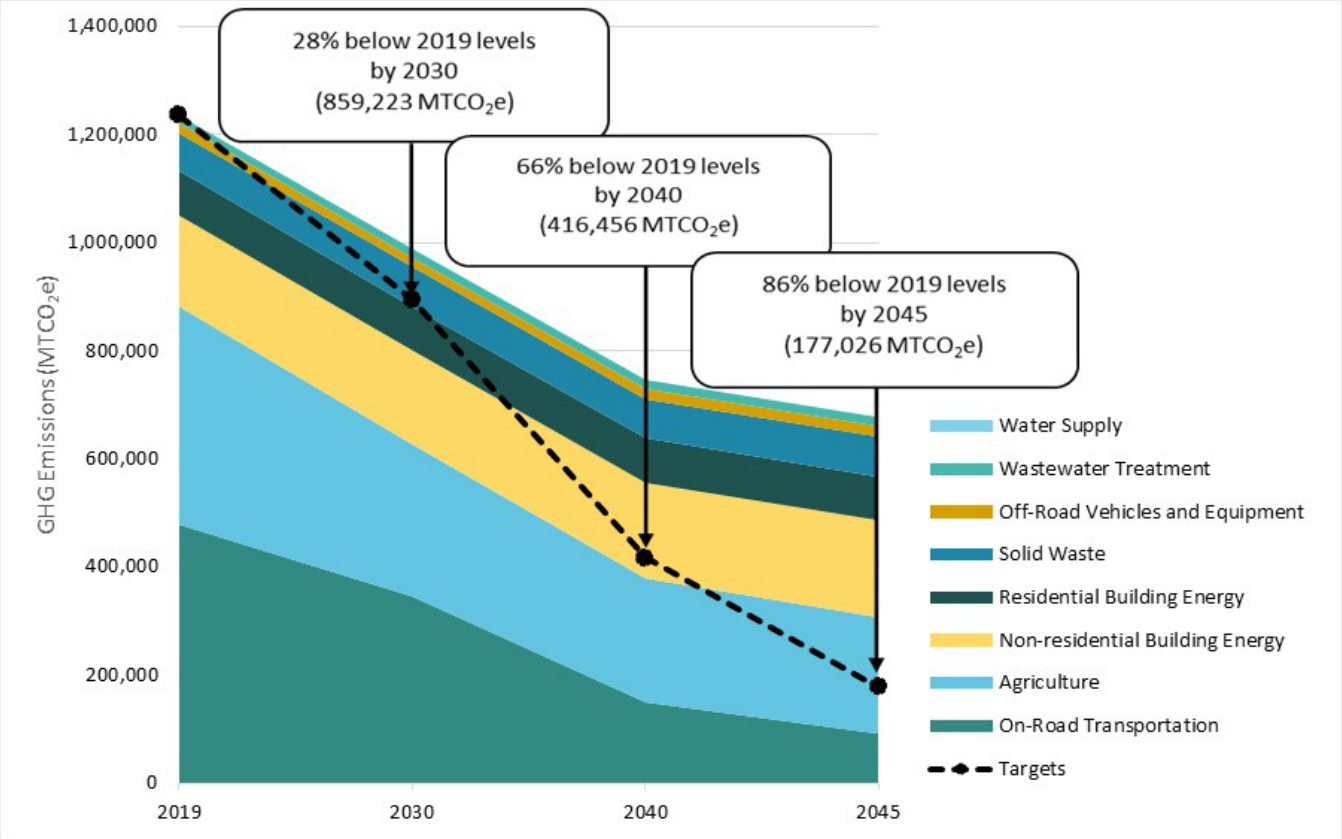


Figure 5 Monterey County Community Legislative-Adjusted BAU Forecasts and GHG Emissions Reduction Targets Below 2019 Levels

Note: BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Data modeled by Ascent in 2024.

3.4 MUNICIPAL OPERATIONS GREENHOUSE GAS EMISSIONS REDUCTION TARGETS

The County aims to reduce its municipal operations emissions in proportion to the State's targets and goals (outlined in in the beginning of Section 3). Like most local public agencies in California, municipal operations emissions levels for 1990 are not available, so GHG reduction targets for the County's municipal operations were developed relative to the County's municipal operations 2019 emissions inventory, consistent with CARB guidance. The methodology used to calculate the County's municipal operations emissions reduction targets for 2030, 2040, and 2045 is consistent with the methodology used to calculate community targets described in Sections 3.2 and 3.3.

Municipal operations GHG emissions in 2019 were 28,634 $MTCO_2e$. Therefore, the County's municipal operations GHG reduction targets are as follows, consistent with State targets and goals:

- 2030 target: 29 percent below 2019 levels (20,213 $MTCO_2e$);
- 2040 target: 69 percent below 2019 levels (8,766 MTCO2e); and
- 2045 target: 90 percent below 2019 levels (2,993 $MTCO_2e$).

These targets, along with the legislative-adjusted BAU forecasts and estimated emissions reductions required to achieve the targets, are summarized in Table 38.

Table 38 County of Monterey Municipal Operations Legislative-Adjusted BAU Forecasts and GHG Emissions Reduction Targets Below 2019 Levels

Source	2019	2030	2040	2045
Scoping Plan Emissions Limit ($MMTCO_2e$)	418	260[2]	135[3]	66[4]
Adjusted Scoping Plan Emissions Limit[1] ($MMTCO_2e$)	NA	197[2]	85[3]	29[4]
Statewide Target Percent Reduction from 2019 Levels	NA	29%	69%	90%
Municipal Operations Emissions and Legislative-Adjusted BAU Forecast ($MTCO_2e$)	28,634	23,397	16,552	14,203
Municipal Operations Target Percent Reduction Below 2019 Levels	—	29%	69%	90%
Municipal Operation Target Annual Emissions ($MTCO_2e$)	—	20,312	8,766	2,993
Reduction from 2019 Needed to Meet Target ($MTCO_2e$)	—	8,322	19,868	25,641
Reduction from Legislative-Adjusted BAU Needed to Meet Target ($MTCO_2e$)	—	3,084	7,786	11,210

Notes: BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent; $MMTCO_2e$ = million metric tons of carbon dioxide equivalent; NA = not available.

[1] Excludes agriculture, high GWP, industrial, and cap-and-trade sectors because they are not relevant to the County's municipal operations inventory.

[2] 2030 emissions by sector are provided in the 2017 Scoping Plan, consistent with the 40% reduction target set forth in SB 32.

[3] 2040 emissions are interpolated between 2030 and 2045 emissions limits from the 2017 Scoping Plan and 2022 Scoping Plan, respectively.

[4] 2045 emissions by sector are provided in the 2022 Scoping Plan, consistent with the 85% reduction in anthropogenic emissions target set forth in AB 1279.

Sources: CARB 2022c; CARB 2017; Analysis conducted by Ascent in 2024.

Figure 6 depicts the municipal operations legislative-adjusted BAU forecasts by sector, as distinguished by colored wedges, and the County's municipal operations emissions reduction targets relative to the 2019 emissions inventory. The space between the trajectory of the black line (i.e., targets) and the top of the colored wedges (i.e., forecasted emissions) represents the gap in emissions that will need to be addressed through local actions for the County to meet its municipal operations GHG reduction targets.

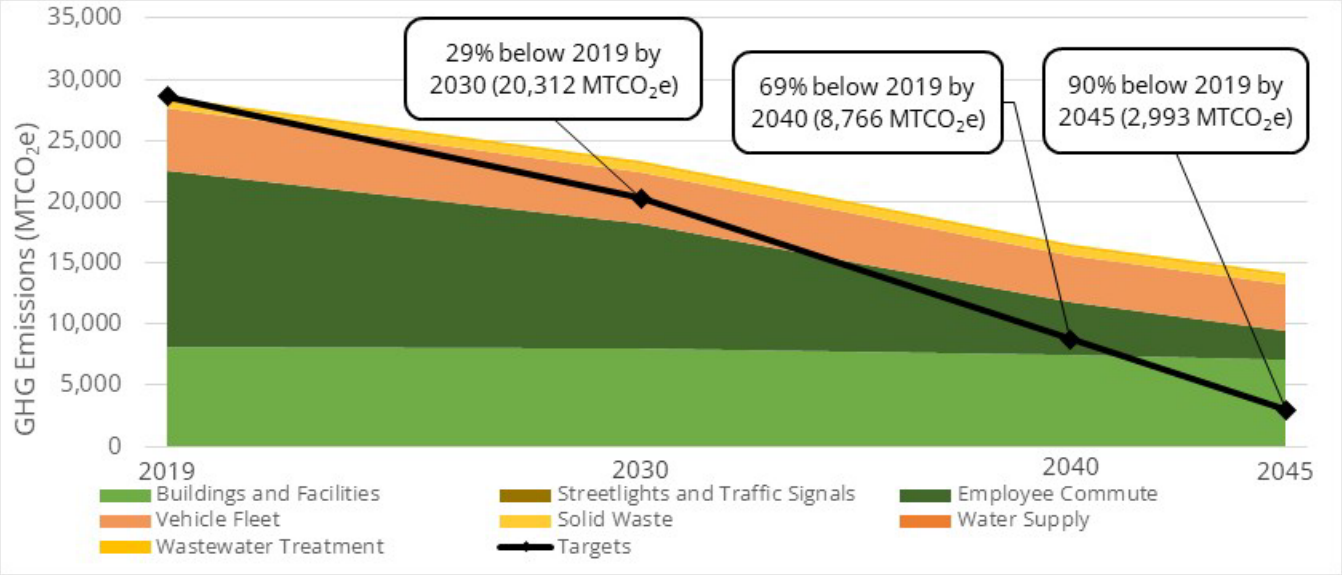


Figure 6 County of Monterey Municipal Operations Legislative-Adjusted BAU Forecasts and GHG Emissions Reduction Targets Below 2019 Levels

Notes: BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Data modeled by Ascent in 2024.

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GHG Forecast Activity Data

Business-as-Usual Forecast

Table 1 Community BAU Growth Scaling Methods by Emissions Sector for Community Forecast

Sector	Sub-Sector	Activity Growth Method
Building Energy	Nonresidential	Employment
	Residential	Population
	Backup Generator	Employment
On-Road	Countywide	Service Population
	Airport Ground Support	Population
	Commercial Harbor Craft	Employment
	Construction and Mining	Service Population
	Entertainment Equipment	Employment
	Industrial Equipment	Employment
	Lawn and Garden Equipment	Population
	Light Commercial Equipment	Employment
	Pleasure Craft	Population
	Portable Equipment	Employment
	Railyard Operations	Employment
	Recreational Equipment	Population
	Transport Refrigeration Units	Service Population
Solid Waste	Waste Generation	Service Population
Wastewater Treatment	Septic System	Service Population
	Waste Water Treatment Plant (WWTP)	Service Population
Agriculture	Fertilizer Application	Agricultural Acres
	Irrigation Pumps	Agricultural Acres
	Livestock	Agricultural Acres
	Open Burning	Agricultural Acres
	Pesticide Application (including fumigation)	Agricultural Acres
Water	NA	Service Population

Notes: BAU = business-as-usual; NA = not applicable.

Source: Compiled by Ascent in 2024.

Table 2 Community BAU Activity Data Forecast by Emissions Sector

Sector	Source	Quantity Type	Quantity Units	Quantity			
				2019	2030	2040	2045
Building Energy	Residential	Electricity	kWh	196,519,533	203,512,643	204,069,649	204,160,325
	Nonresidential	Electricity	kWh	712,850,612	738,852,636	760,975,122	772,966,638
	Electricity Total		kWh	*909,370,145*	*942,365,279*	*965,044,772*	*977,126,963*
	Residential	Natural Gas	therms	14,959,603	15,491,938	15,534,338	15,541,241
	Nonresidential	Natural Gas	therms	31,290,974	32,432,348	33,403,427	33,929,801
	Natural Gas Total		therms	*46,250,577*	*47,924,285*	*48,937,765*	*49,471,042*
	Backup Generators (Nonresidential)	Diesel	gal	16,536	17,139	17,652	17,930
	Backup Generators (Nonresidential)	Natural Gas	scf	7,585	7,861	8,097	8,224
	Backup Generators (Nonresidential)	LPG	scf	81,409	84,379	86,905	88,274
On-Road Transportation	Countywide EMFAC	Annual VMT	miles	1,050,848,408	1,088,578,572	1,102,185,091	1,108,836,038
Off-Road Vehicles and Equipment [1]	NA	NA	NA	NA	NA	NA	NA
Solid Waste	Community-Generated Solid Waste Disposed Inside Jurisdiction	Waste	tons	176,402	182,736	185,020	186,136
	Community-Generated Solid Waste Disposed Outside Jurisdiction	Waste	tons	8,713	9,026	9,139	9,194
	Total	Waste	tons	185,115	191,762	194,159	195,330
Water Supply	Residential and Nonresidential Water Supply	Water	AF	475,000	492,055	498,205	501,211
	Agricultural Water Supply	Water	AF	25,000	25,898	26,221	26,380
	Total	Water	AF	500,000	517,952	524,426	527,591
Wastewater Treatment [2]	NA	NA	NA	NA	NA	NA	NA
Agriculture	Bulls	Heads	NA	601	599	599	598
	Calves	Heads	NA	9,601	9,585	9,570	9,562
	Cattle	Heads	NA	12,010	11,989	11,971	11,961
	Goats	Heads	NA	912	910	909	908
	Hogs	Heads	NA	1,600	1,597	1,595	1,593
	Horses	Heads	NA	1,475	1,472	1,470	1,469
	Poultry	Heads	NA	2,229	2,225	2,222	2,220
	Replacements (0-12 months)	Heads	NA	1,694	1,691	1,689	1,687

Sector	Source	Quantity Type	Quantity Units	Quantity			
				2019	2030	2040	2045
Agriculture (cont'd)	Replacements (12-24 months)	Heads	NA	1,694	1,691	1,689	1,687
	Sheep and Lambs	Heads	NA	1,200	1,198	1,196	1,195
	Stockers	Heads	NA	60,400	60,296	60,202	60,154
	Lime	Fertilizer Application	tons	20,768	20,732	20,700	20,684
	Nitrogen - Organic	Fertilizer Application	tons	5,551	5,542	5,533	5,529
	Nitrogen - Synthetic	Fertilizer Application	tons	66,059	65,945	65,841	65,790
	Diesel Irrigation Pumps	Irrigation Pumps	number of pumps	446	445	445	444
	All Vegetative Burning	Open Burning	tons	497	496	495	495
	Methyl Bromide (CH3Br)	Pesticide Application (including fumigation)	pounds	2,365	2,360	2,357	2,355
	Sulfuryl Fluoride (SO2F2)	Pesticide Application (including fumigation)	pounds	41,922	41,850	41,784	41,751

Notes: BAU = business-as-usual; gal = gallon; kWh = kilowatt-hours; NA = not applicable; VMT = vehicle miles traveled.

[1] Activity data has not been scaled for Off-Road Vehicles and Equipment. CARB's 2021 OFFROAD model was used to estimate emissions forecasts.

[2] Activity data has not been scaled for Wastewater Treatment. Forecast emissions are estimated by scaling 2019 inventory emissions directly.

Source: Data modeled by Ascent in 2024.

Legislative-Adjusted Business-as-Usual Forecast

Forecast methods for each individual sector are described in the *County of Monterey Community Climate Action and Adaptation Plan and 2030 Municipal Climate Action Plan: Greenhouse Gas Emissions Forecasts and Reduction Targets – Final Technical Memorandum*. Forecasted activity data are shown in Table 3.

Table 3 Community Legislative-Adjusted BAU Activity Data Forecast by Emissions Sector Affected by Legislative Reductions

Sector	Source	Quantity Type	Quantity Units	Quantity			
				2019	2030	2040	2045
Building Energy	Residential	Electricity	kWh	196,519,533	205,122,433	205,807,660	205,919,208
	Nonresidential	Electricity	kWh	712,850,612	736,372,112	756,384,171	767,231,729
	Electricity Total		kWh	*909,370,145*	*941,494,545*	*962,191,831*	*973,150,937*
	Residential	Natural Gas	therms	14,959,603	15,295,675	15,322,444	15,326,801
	Nonresidential	Natural Gas	therms	31,290,974	32,306,954	33,171,347	33,639,893
	Natural Gas Total		therms	*46,250,577*	*47,602,629*	*48,493,791*	*48,966,694*
	Backup Generators (Nonresidential)	Diesel	gal	16,536	17,139	17,652	17,930
	Backup Generators (Nonresidential)	Natural Gas	scf	7,585	7,861	8,097	8,224
	Backup Generators (Nonresidential)	LPG	scf	81,409	84,379	86,905	88,274
On-Road Transportation	Countywide EMFAC	Annual VMT	miles	1,050,848,408	1,088,578,572	1,102,185,091	1,108,836,038
Off-Road Vehicles and Equipment [1]	NA	NA	NA	NA	NA	NA	NA
Solid Waste	Community-Generated Solid Waste Disposed Inside Jurisdiction	Waste	tons	176,402	182,736	185,020	186,136
	Community-Generated Solid Waste Disposed Outside Jurisdiction	Waste	tons	8,713	9,026	9,139	9,194
	Total	Waste	tons	185,115	191,762	194,159	195,330
Water Supply	Residential and Nonresidential Water Supply	Water	AF	475,000	492,055	498,205	501,211
	Agricultural Water Supply	Water	AF	25,000	25,898	26,221	26,380
	Total	Water	AF	500,000	517,952	524,426	527,591
Wastewater Treatment [2]	NA	NA	NA	NA	NA	NA	NA
Agriculture	Bulls	Heads	NA	601	599	599	598
	Calves	Heads	NA	9,601	9,585	9,570	9,562
	Cattle	Heads	NA	12,010	11,989	11,971	11,961
	Goats	Heads	NA	912	910	909	908

Sector	Source	Quantity Type	Quantity Units	Quantity			
				2019	2030	2040	2045
Agriculture (cont'd)	Hogs	Heads	NA	1,600	1,597	1,595	1,593
	Horses	Heads	NA	1,475	1,472	1,470	1,469
	Poultry	Heads	NA	2,229	2,225	2,222	2,220
	Replacements (0-12 months)	Heads	NA	1,694	1,691	1,689	1,687
	Replacements (12-24 months)	Heads	NA	1,694	1,691	1,689	1,687
	Sheep and Lambs	Heads	NA	1,200	1,198	1,196	1,195
	Stockers	Heads	NA	60,400	60,296	60,202	60,154
	Lime	Fertilizer Application	tons	20,768	20,732	20,700	20,684
	Nitrogen - Organic	Fertilizer Application	tons	5,551	2,494	1,217	885
	Nitrogen - Synthetic	Fertilizer Application	tons	66,059	29,673	14,484	10,526
	Diesel Irrigation Pumps	Irrigation Pumps	number of pumps	446	445	445	444
	All Vegetative Burning	Open Burning	tons	497	496	495	495
	Methyl Bromide (CH3Br)	Pesticide Application (including fumigation)	pounds	2,365	2,360	2,357	2,355
	Sulfuryl Fluoride (SO2F2)	Pesticide Application (including fumigation)	pounds	41,922	41,850	41,784	41,751

Notes: BAU = business-as-usual; gal = gallon; kWh = kilowatt-hours; LPG = liquid propane gas.

[1] Activity data has not been scaled for Off-Road Vehicles and Equipment. CARB's 2021 OFFROAD model was used to estimate emissions forecasts.

[2] Activity data has not been scaled for Wastewater Treatment. Forecast emissions are estimated by scaling 2021 inventory emissions directly.

Data modeled by Ascent in 2024.

Memo

2054 University Ave, Suite 400
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Date: February 26, 2026

To: Cora Panturad (County of Monterey)

From: Hannah Kornfeld, Fred Hochberg, John Steponick, and Poonam Boparai (Ascent)

Subject: County of Monterey Community Climate Action and Adaptation: Greenhouse Gas Reduction and Adaptation Strategies – Final Technical Memorandum

1 INTRODUCTION

This technical memorandum outlines greenhouse gas (GHG) reduction and adaptation strategies and actions and summarizes the draft results of the quantitative "gap analysis" process for the County of Monterey's (County's) Community Climate Action and Adaptation Plan (CCAAP). The adaptation strategies and actions, presented in Section 3, are largely informed by the findings of the *Climate Change Vulnerability Assessment*, which was conducted for the CCAAP. The purpose of the gap analysis is to confirm and quantify the suite of GHG reduction strategies that would set the County on course to meet its GHG reduction targets for 2030, 2040, and 2045 for both the community and municipal operations. The gap analysis considers several steps in the climate action planning process, which are listed below and addressed in subsequent sections.

1. Summary of the 2030, 2040, and 2045 GHG emissions forecasts (per "County of Monterey Community Climate Action and Adaptation Plan and 2030 Municipal Climate Action Plan: Greenhouse Gas Emissions Forecasts and Reduction Targets – Final Technical Memorandum" dated October 8, 2024, referred to hereafter as "Forecast Memo");
2. Summary of the 2030, 2040, and 2045 GHG emissions reduction targets (per the Forecast Memo); and
3. Quantification of GHG emissions reduction strategies and evaluation of the calculated gap between the estimated GHG reductions and the recommended targets, the primary focus of this technical memorandum.

2 STRATEGIES AND ACTIONS

2.1 GREENHOUSE GAS EMISSIONS REDUCTION STRATEGIES

Based on the results of the Forecast Memo, additional GHG reductions are needed to achieve the community emissions reduction targets for 2030, 2040, and 2045. Ascent worked with County staff, sector working groups, and members of the public to develop a draft list of GHG reduction strategies and actions.

The strategies presented below are organized under categories that generally align with the emissions sectors included: building energy (including residential and nonresidential building energy use), on-road transportation, off-road vehicles and equipment, solid waste, water and wastewater, and natural and working lands (which aligns with agriculture emissions from the inventory). Each category includes one or more broad strategies to reduce emissions,

such as energy efficiency, renewable energy, and waste diversion. Objectives are included under each strategy, which are more specific expressions of the strategies. Metrics are provided for strategies that are quantified to help the County meet its reduction targets. These include performance indicators by which progress can be tracked and monitored for implementation. The proposed strategies will be realized through one or more actions that the County can implement to reduce GHG emissions.

GHG reductions associated with these strategies were calculated in a stepwise manner for the years of 2030, 2040, and 2045. In other words, GHG reductions (in metric tons of carbon dioxide equivalent [$MTCO_2e$]) are assessed during a snapshot in time in years 2030, 2040, and 2045. Strategies are quantified for a single year rather than adding cumulative reductions from prior years, which aligns with the methodology used to derive the County's GHG reduction targets and aligns with the California Governor's Office of Land Use and Climate Innovation General Plan Guidelines. Importantly, GHG emissions reductions were quantified for strategies wherever supporting data and reasonable assumptions were available to support calculations. Certain strategies identified by County staff and Ascent were not quantifiable because of lack of available data or quantification methods but would still be expected to reduce GHG emissions. These strategies are listed in this technical memorandum and will be discussed qualitatively in the CCAAP and 2030 MCAP. They can be monitored for potential quantification opportunities in the future if data and/or quantification methods become available.

Estimates of GHG emissions reductions, along with an estimated emissions "gap" (i.e., the difference between the effective GHG reductions required to meet the targets and the total GHG reductions), are summarized in Table 1 below and illustrated in Figure 1 in Section 2.1.7. Descriptions of the strategies are provided in the following sections. Detailed strategy calculations and assumptions supporting the GHG reduction estimates are provided in Attachment A.

2.2 ADAPTATION STRATEGIES

Climate change adaptation planning aims to enhance the resilience of communities to climate change impacts through analyzing jurisdiction-specific climate-related vulnerabilities and developing strategies to respond to and prepare for current and future impacts. Improving community resilience in the context of climate change can encompass a broad array of strategies. As such, the adaptation strategies and actions developed for the CCAAP are presented in the table below and organized by climate hazard, which includes wildfire, extreme heat, sea level rise and flooding, drought, and cross-cutting strategies.

Table 1 Community GHG Emissions Reduction Strategies

Strategy Number	Strategy Name	Objective	GHG Reductions ($MTCO_2e$)		
			2030	2040	2045
Buildings and Energy (BE)					
BE-1	Energy Efficiency and Electrification	Increase energy efficiency and electrification in existing and new residential and nonresidential buildings.	23,998	132,339	172,480
BE-2	Clean Energy	Maximize reliable, emissions-free energy generation, transmission, and storage locally.	1,203	668	0
		Buildings and Energy Subtotal	**25,201**	**133,007**	**172,480**
On-Road Transportation (TR)					
TR-1	Sustainable Transportation and Land Use Planning	Reduce passenger vehicle miles traveled through transit-oriented, mixed-use, compact development and accessible, reliable, frequent, and convenient transit.	22,216	19,973	10,557
TR-2	Low- and Zero-Emission Vehicles	Seek funding to transition to low- and zero-emission vehicles.	13,463	43,948	48,250
TR-3	Active Transportation	Make walking and biking safe and accessible for people of all ages and abilities.[1]	N/A	N/A	N/A
		On-Road Transportation Subtotal	**35,679**	**63,921**	**58,807**
Off-Road Vehicles and Equipment (OR)					
OR-1	Electrification and Clean Alternatives	Reduce construction-related emissions and transition to zero-emission equipment.	5,958	11,812	19,261
		Off-Road Vehicles and Equipment Subtotal	**5,958**	**11,812**	**19,261**
Solid Waste (SW)					
SW-1	Waste Diversion	Increase organic waste diversion.	28,891	46,803	55,914
		Solid Waste Subtotal	**28,891**	**46,803**	**55,914**
Water and Wastewater (WA)					
WA-1	Water Conservation	Reduce building and landscaping water use and increase recycled water for irrigation.	123	67	0
		Water and Wastewater Subtotal	**123**	**67**	**0**
Natural and Working Lands (NWL)[2]					
NWL-1	Coastal Habitat and Watershed Restoration	Conserve, restore, and protect coastal wetlands, seagrass beds, and freshwater wetlands.[2]	142,633	75,026	35,333
NWL-2	Fire-Adapted Landscapes	Practice climate-smart management of ecosystems that enhances resilience.[2]			
NWL-3	Climate-Smart Agriculture	Practice climate-smart agriculture that preserves and enhances natural and working lands.[2]			
NWL-4	Green Space and Infrastructure	Expand green space, utilize green infrastructure and nature-based solutions, and invest in local parks.			
		Natural and Working Lands Subtotal	**142,633**	**75,026**	**35,333**
Green Economy (GE)					
GE-1	Green Businesses and Jobs	Support a local economy that fosters a just transition towards environmental sustainability.	N/A	N/A	N/A
		Green Economy Subtotal	**N/A**	**N/A**	**N/A**

Strategy Number	Strategy Name	Objective	GHG Reductions ($MTCO_2e$)		
			2030	2040	2045
Implementation and Monitoring (IM)					
IM-1	Education, Outreach, and Coordination	Continue to provide education and outreach to the Monterey County community on how to support climate action locally and coordinate with essential partners for successful implementation.	N/A	N/A	N/A
IM-2	Public Participation and Engagement	Create meaningful opportunities for continued public participation in implementing climate solutions.	N/A	N/A	N/A
IM-3	Climate Tracking and Budgeting	Provide accountability and transparency in implementing the CCAAP and commit resources to ensuring its success.	N/A	N/A	N/A
IM-4	Funding and Financing	Seek funding and financing solutions to implement the CCAAP.			
		Implementation and Monitoring Subtotal	**N/A**	**N/A**	**N/A**
Adaptation (ADPT)					
ADPT-1	Cross-Cutting	Ensure that climate adaptation actions holistically address hazards and risks throughout the county.	N/A	N/A	N/A
ADPT-2	Wildfire	Reduce wildfire risk and support fire-adapted communities.	N/A	N/A	N/A
ADPT-3	Extreme Heat	Prepare for and reduce heat-related impacts to communities throughout the county.	N/A	N/A	N/A
ADPT-4	Flooding and Sea Level Rise	Prepare for and reduce flooding and sea level risk impacts throughout the county.	N/A	N/A	N/A
ADPT-5	Drought	Prepare for and adapt to more frequent drought conditions throughout the county.	N/A	N/A	N/A
		Adaptation Subtotal	**N/A**	**N/A**	**N/A**
Total Reductions from Strategies			**238,486**	**330,636**	**341,796**
Reduction Needed to Meet Target			93,986	329,611	498,987
Target Met?			Yes	Yes	No
Remaining Gap to Target			-144,500	-1,025	157,192

Notes: Total may not sum exactly due to independent rounding. GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent; N/A = not applicable.

[1] Greenhouse gas reductions associated with bicycle and pedestrian infrastructure have been captured in the quantification of Strategy TR-3.

[2] Reductions shown are associated with carbon sequestered through land management activities on natural and working lands based on the Monterey County Carbon Stock Inventory and Forecast – Technical Memorandum, dated October 14, 2024.

Source: Calculations conducted by Ascent in 2026.

In the table below, all actions identify County departments responsible for implementation as well as partner organizations and agencies to facilitate successful implementation. Some department and organization names have been abbreviated in the table and are defined as follows:

County Departments

AC = Auditor-Controller

ACO = Agricultural Commissioner's Office

CAO = County Administrative Office

DEM = Department of Emergency Management

ED = Economic Development

HCD = Housing and Community Development Department

HD = Health Department

IGLA = Intergovernmental and Legislative Affairs Office

IT = Information Technology

MCFL = Monterey County Free Libraries

MCWRA = Monterey County Water Resources Agency

Natividad = Natividad Medical Center

PWFP = Public Works, Facilities and Parks Department

SS = Social Services

Partner Organizations and Agencies

3CE = Central Coast Community Energy

AMBAG = Association of Monterey Bay Area Governments

CAL FIRE = California Department of Forestry and Fire Protection

Cal OES = California Governor's Office of Emergency Services

Cal/OSHA = California Division of Occupational Safety and Health

Caltrans = California Department of Transportation

CalVans = California Vanpool Authority

CCPBA = Central Coast Prescribed Burn Association

CCR REN = Central California Rural Regional Energy Network

CDC = Centers for Disease Control and Prevention

CDFA = California Department of Food and Agriculture

CDFW = California Department of Fish and Wildlife

CDPH = California Department of Public Health

CHMP = Community Hospital of Monterey Peninsula

CSUMB = California State University, Monterey Bay

FEMA = Federal Emergency Management Agency

FSCFMC = Fire Safe Council for Monterey County

GSFA = Golden State Finance Authority

MBARD = Monterey Bay Air Resources District

MBEP = Monterey Bay Economic Partnership

MCOE = Monterey County Office of Education

MCRFD = Monterey County Regional Fire District

MPRPD = Monterey Peninsula Regional Park District

MST = Monterey-Salinas Transit

NOAA = National Oceanic and Atmospheric Administration

NRCS = US Department of Agriculture Natural Resources Conservation Service

OEHHA = California Office of Environmental Health Hazard Assessment

PG&E = Pacific Gas and Electric Company

RCDMC = Resource Conservation District of Monterey County

SGC = California Strategic Growth Council

SVR = Salinas Valley Recycles

TAMC = Transportation Agency for Monterey County

UCCE = University of California Cooperative Extension

USACE = US Army Corps of Engineers

USGBC = US Green Building Council

USFS = US Forest Service

Strategy, Objective, Action	Key Indicators	Implementing Department(s)	Agency and Organization Partners	Timing
Buildings and Energy (BE)				
Strategy BE-1: Energy Efficiency and Electrification Objective: Increase energy efficiency in existing and new residential and nonresidential buildings.	**2030**: ▶ 10% of existing residential and 8% of existing nonresidential building square footage fully electrified ▶ 90% of new residential and 90% of new nonresidential fully electrified **2040**: ▶ 50% of existing residential and 50% of existing nonresidential building square footage fully electrified ▶ 95% of new residential and 95% of new nonresidential fully electrified **2045**: ▶ 65% of existing residential and 65% of existing nonresidential building square footage fully electrified ▶ 95% of new residential and 95% of new nonresidential fully electrified	N/A		
Action BE-1.1: Adopt a building electrification ordinance for new and existing residential buildings based on cost-effectiveness studies, stakeholder outreach, and California Energy Commission approval. The ordinance will be written such that existing residential buildings' modeled energy efficiency must achieve half of the maximum cost-effective retrofit measures score at time-of-retrofit by 2030, and the maximum cost-effective retrofit measures score by 2045.		IGLA, HCD	3CE	2029
Action BE-1.2-a: Develop a nonresidential buildings decarbonization strategy and implement a building performance standard that requires all existing buildings to reduce non-electricity-related emissions by 10 percent by 2033, and by 20 percent by 2045, with analysis of the existing building stock in the county. As part of this effort, encourage small (i.e., less than 50,000 square feet) commercial and small multifamily residential (i.e., less than 17 units) building owners to track and report their annual energy usage through a benchmarking tool (e.g., ENERGY STAR® Portfolio Manager).		IGLA, HCD	3CE	2027
Action BE-1.2-b: Determine retrofit compliance triggers based on square footage and one additional metric such as time of equipment replacement, percent of existing floor area, building permit valuation, and project valuation.		IGLA, HCD	N/A	2027
Action BE-1.3-a: Implement and staff a building performance standards program that: ▶ proactively engages with and enrolls nonresidential building owners and operators into a building performance standards program, ▶ develops a mechanism for building owners and operators to report energy use and emissions data, ▶ develops and distributes information on how to measure performance, maintain compliance, and reduce energy use and GHG emissions, ▶ enforces compliance with the building performance standards program, and ▶ compiles and reports data on the building performance standards program for CCAAP monitoring, such as number of buildings enrolled in the program and GHG reductions achieved.		IGLA, HCD	CCR REN	2031
Action BE-1.3-b: Develop a tracking system for the types of measures implemented to maximize energy efficiency and decarbonization, energy efficiency upgrades, or pre-wiring completed by applicants pursuant to reach code requirements for existing buildings (developed under Action BE-1.1).		HCD, IGLA	N/A	2031
Action BE-1.4-a: Adopt by ordinance a new building reach code based on cost-effectiveness studies, stakeholder outreach, and California Energy Commission approval that must be met by all residential and nonresidential new construction and major renovations.		ED, HCD, IGLA	N/A	2026
Action BE-1.4-b: Conduct outreach to building industry members, contractors, residents, businesses, and other interest groups to present any proposed reach code and solicit feedback.		ED, HCD, IGLA	CBOs, MBEP, Realtors	2026 (Ongoing)
Action BE-1.4-c: Conduct training for County permitting staff to understand the reach code requirements for new and existing buildings and how compliance will be demonstrated.		ED, HCD, IGLA	N/A	2026 (Ongoing)
Action BE-1.5: Partner with 3CE to establish a program that connects owners and occupants of residential and nonresidential buildings to existing energy audit and weatherization programs (e.g., California's Low-Income Weatherization Program) and resources, and additionally, helps to determine eligibility.		IGLA, ED	3CE	2028
Action BE-1.6: Provide instant permitting of code-compliant residential rooftop solar through use of software such as SolarAPP+.		HCD, IGLA	N/A	2031
Action BE-1.7: Explore additional opportunities for streamlining permitting of residential electrification projects.		HCD, IGLA	N/A	2028
Action BE-1.8: Work with utility providers to initiate a mobile home park utility conversion program that allows mobile home park and manufactured housing communities the opportunity to replace master-metered/sub-metered or non-sub metered electric and gas distribution systems with direct service.		IGLA	3CE, PG&E	2031
Action BE-1.9: In coordination with regional partners, scope and develop a grant application for residential building electrification and efficiency across the county to demonstrate resiliency, cost-savings, and emissions reductions and reduce barriers to building electrification. This project should prioritize low-income residents in various communities. Staff will engage with regional partners including the Regional Climate Project Working Group, 3CE, Central Coast Energy Services, and the Central California Rural Regional Energy Network.		HCD, IGLA, PWFP, DEM	3CE, PG&E, USGBC	2026

Strategy, Objective, Action	Key Indicators	Implementing Department(s)	Agency and Organization Partners	Timing
Strategy BE-2: Clean Energy Objective: Maximize reliable, emissions-free energy generation, transmission, and storage locally.	**2030:** 100% of electricity is carbon-free **2040:** 100% of electricity is carbon-free **2045:** 100% of electricity is carbon-free	N/A		
Action BE-2.1: Support and coordinate with 3CE in executing its commitment to meet 100 percent of its electricity demand through clean and renewable resources by 2030 by identifying sites for renewable energy generation at County-owned properties and other potential sites throughout the county, and by continuing efforts to streamline the permitting of residential and nonresidential rooftop solar photovoltaic or other renewable energy and battery storage projects.		IGLA	3CE	Ongoing
Action BE-2.2: Partner with 3CE to promote and expand upon their Electrify Your Home program, which bundles various residential energy efficiency upgrades (e.g., heating and cooling systems, heat pump water heaters) to deliver more savings, comfort, and rebate options.		IGLA	3CE	Ongoing
Action BE-2.3: Amend the County's Zoning and Coastal Zoning Ordinances to require parking lots for new nonresidential development projects, with floor area greater than 50,000 square feet, to include solar canopies.		HCD, IGLA	N/A	2031
Action BE-2.4: Conduct a study and prepare a publicly available assessment of suitable undeveloped lands near electrical transmission and distribution lines that serve as priority areas for the development of utility-scale solar energy generation and storage projects. If suitable locations are identified, the County shall establish a new zone, if necessary, called a Renewable Energy Priority Zone, for these sites in the County's Zoning and Coastal Zoning Ordinances.		IGLA, HCD	3CE	2033
Action BE-2.5: Encourage public service facilities such as schools, hospitals, and community centers to develop renewable microgrids.		IGLA, PWFP	MCOE	Ongoing
Action BE-2.6: Collaborate with PG&E as they strategically decommission methane gas pipelines in areas where electrification has been or could be implemented.		IGLA	PG&E	Ongoing
Action BE-2.7: Explore the option of a final phase-out date for non-industrial natural gas procurement, infrastructure deployment, and use in unincorporated Monterey County.		IGLA	PG&E	2033
Action BE-2.8: Collaborate with PG&E as they modernize the electrical grid for variable and distributed power by upgrading transformers, lines, and other power equipment; and support regional coordination efforts that help to accelerate this transition.		IGLA	PG&E	Ongoing
Action BE-2.9: Evaluate the potential for agrivoltaics at wineries and other agricultural lands and ensure the County's Zoning and Coastal Zoning Ordinances allow for such uses.		HCD, ACO, IGLA	Monterey County Farm Bureau, Vintner's Association	2033
On-Road Transportation (TR)				
Strategy TR-1: Sustainable Transportation and Land Use Planning Objective: Reduce passenger vehicle miles traveled through transit-oriented, mixed-use, and compact development and accessible, reliable, frequent, and convenient transit.	**2030:** 7.5% reduction in annual passenger VMT below 2019 levels **2040:** 22.7% reduction in annual passenger VMT below 2019 levels **2045:** 30% reduction in annual passenger VMT below 2019 levels	N/A		
Action TR-1.1: Collaborate with cities, transit providers, and employers to provide local community shuttles or circulators that serve transit-oriented development, high-quality transit stops, and neighborhood commercial centers, providing an incentive for residents and employees to make trips using transit.		IGLA, ED	Cities, MBEP, AMBAG, TAMC, MST	Ongoing
Action TR-1.2: Promote the regional vanpool program to provide vans and organize traditional vanpools and vanpools serving agricultural workers in rural areas.		IGLA	MST, CalVans	Ongoing
Action TR-1.3: Coordinate with transit providers to improve the local transit system by increasing reliability and accessibility by adding amenities such as seating, lighting, tree cover, bike storage, and real-time arrival information displays. Extend service hours and routes to better serve residential areas, trip-chaining, employment centers, and popular destinations, with a focus on "Transportation-Based Priority Populations" as identified by California Department of Transportation (Caltrans)' Transportation Equity Index.		IGLA	TAMC, MST	Ongoing
Action TR-1.4: Continue to implement the actions identified in the Monterey County Broadband Strategic Plan to allow for remote work that reduces the need for commuting.		IT, ED, IGLA	GSFA, MCOE, MBEP	Ongoing
Action TR-1.5: Implement the policies and programs of the 2023-2031 Housing Element to rezone for higher density development and promote affordable, mixed-use development in Community Areas and Rural Centers near activity centers and transit routes.		HCD, IGLA	N/A	Ongoing
Action TR-1.6: Develop and encourage opportunities to upgrade roadways in compact areas to complete streets, using the Monterey Bay Area Complete Streets Guidebook to reduce emissions and improve walkability and pedestrian safety.		PWFP, IGLA	TAMC	Ongoing
Action TR-1.7: Consider including complete street scoping in routine roadway maintenance and County capital improvement processes. Collaborate with TAMC, Caltrans, MST, and cities to integrate complete street scoping into capital processes throughout the county and to consider funding mechanisms for this action.		IGLA, PWFP	TAMC, Caltrans, MST, Cities	2031
Action TR-1.8: Consider establishing "climate hazard overlay zones" whereby additional layers of zoning standards would be applied to defined geographical areas that have been identified as being more vulnerable to future flooding, erosion, landslides, wildfire, or severe storm/high wind events, regardless of the underlying base zoning district.		HCD, IGLA	N/A	2031
Action TR-1.9: Implement the necessary infrastructure upgrades and develop programs for EV car sharing, active transportation, mobility device sharing, and improved transit based on the results of Zero Emissions Shared Mobility Study.		IGLA	AMBAG, TAMC, MST	2027

Strategy, Objective, Action	Key Indicators	Implementing Department(s)	Agency and Organization Partners	Timing
Strategy TR-2: Low- and Zero-Emission Vehicles Objective: Seek funding to transition to low- and zero-emission vehicles.	**2030:** ▶ 20% of light-duty vehicles are EVs or PHEVs ▶ 10% of heavy-duty vehicles are EVs **2040:** ▶ 70% of light-duty vehicles are EVs or PHEVs ▶ 70% of heavy-duty vehicles are EVs **2045:** ▶ 90% of light-duty vehicles are EVs or PHEVs ▶ 90% of heavy-duty vehicles are EVs	N/A		
Action TR-2.1: Adopt electric vehicle (EV) charging infrastructure reach codes to meet CALGreen Tier 1 standards for each triennial California Green Building Standards cycle for residential and nonresidential EV charging.		IGLA, HCD	3CE	2026 (Ongoing)
Action TR-2.2: Collaborate with 3CE and electric vehicle supply equipment (EVSE) companies to establish fast-charging mobility hubs at publicly accessible sites that support tenants of multifamily properties.		IGLA	3CE	2031 (Ongoing)
Action TR-2.3: Prioritize the installation of EVSE at the identified top locations in the unincorporated county provided in the Central Coast Zero Emission Vehicle Strategy.		IGLA	3CE, Caltrans	2026 (Ongoing)
Action TR-2.4: Implement the recommendations included in the forthcoming Monterey Bay Electric Vehicle Climate Adaptation and Resiliency Framework to install EV chargers in high impact and low-risk areas with a focus on making EV chargers more accessible to underserved areas.		IGLA	AMBAG, Ecology Action	2028 (Ongoing)
Action TR-2.5: Coordinate with 3CE to deploy EVSE along major transportation corridors to support medium- and heavy-duty EV charging.		IGLA	3CE	2033 (Ongoing)
Action TR-2.6: Develop a permit checklist to install EVSE within the public right-of-way by 2029, pursuant to Assembly Bill 2427 (2024).		HCD, IGLA	N/A	2028
Action TR-2.7: Explore EV car-sharing programs to offer accessible and affordable EV mobility options, particularly located at multifamily residential buildings.		IGLA	AMBAG, MBARD	2031
Action TR-2.8: Consider an ordinance restricting or prohibiting new gasoline service stations.		HCD, IGLA	N/A	2034
Strategy TR-3: Active Transportation Objective: Make walking and biking safe and accessible for people of all ages and abilities.	N/A	N/A		
Action TR-3.1: Partner with TAMC to implement the Monterey County Active Transportation Plan to enhance and expand bicycle and pedestrian infrastructure and networks.		PWFP, IGLA	TAMC	Ongoing
Action TR-3.2: Partner with TAMC and cities to implement the Monterey County Regional Vision Zero Action Plan to improve the safety of all roadway users.		PWFP, IGLA	TAMC, Cities	Ongoing
Action TR-3.3: Pursue funding to provide incentives for residents to purchase or lease e-bikes and other micromobility devices.		IGLA	MBARD	2026 (Ongoing)
Action TR-3.4: Work with existing multifamily building owners and require new multifamily developments to install e-bike charging and secure bicycle parking in multifamily residential developments.		IGLA, HCD	Multifamily building owners and developers	2027 (Ongoing)

Strategy, Objective, Action	Key Indicators	Implementing Department(s)	Agency and Organization Partners	Timing
Off-Road Vehicles and Equipment (OR)				
Strategy OR-1: Electrification and Clean Alternatives Objective: Reduce construction-related emissions and transition to zero-emission equipment.	**2030:** ▶ 50% of construction equipment uses renewable diesel ▶ 2% of construction equipment is electric ▶ 12% of landscaping equipment is electric ▶ 12% of recreational boats are electric ▶ 5% of agricultural equipment and irrigation pumps are electric **2040:** ▶ 75% of construction equipment uses renewable diesel ▶ 15% of construction equipment is electric ▶ 85% of landscaping equipment is electric ▶ 75% of recreational boats are electric ▶ 10% of agricultural equipment and irrigation pumps are electric **2045:** ▶ 80% of construction equipment uses renewable diesel ▶ 19% of construction equipment is electric ▶ 100% of landscaping equipment is electric ▶ 100% of recreational boats are electric ▶ 20% of agricultural equipment and irrigation pumps are electric	N/A		
Action OR-1.1: Work with MBARD to encourage all discretionary construction projects to use renewable diesel in diesel-powered construction equipment.		HCD, IGLA	MBARD	2031
Action OR-1.2: Work with MBARD to discourage the use of fossil fuel-powered generators at construction sites in all new discretionary projects.		HCD, IGLA	MBARD	2031
Action OR-1.3: Adopt an ordinance that would require the use of zero-emission landscaping equipment for equipment up to 25 horsepower by 2030.		HCD, IGLA	N/A	2029
Action OR-1.4: Partner with Monterey Bay Air Resources District and marinas to reduce idling at docks through highly visible signage.		MCWRA, IGLA	MBARD, marinas	2032
Action OR-1.5: Partner with cities and marinas to install electric charging stations for boats at harbors throughout the county.		MCWRA, IGLA	Cities, marinas	2034 (Ongoing)
Action OR-1.6: Promote 3CE's Ag Electrification Program to replace fossil fuel-powered agricultural equipment with all-electric alternatives. Seek funding opportunities to provide clean backup power supplies.		ACO, ED, IGLA	3CE, Monterey County Farm Bureau	Ongoing
Solid Waste (SW)				
Strategy SW-1: Waste Diversion Objective: Increase organic waste diversion.	**2030:** 75% of waste diverted from landfills **2040:** 85% of waste diverted from landfills **2045:** 90% of waste diverted from landfills	N/A		
Action SW-1.1: Contractually require annual reporting from the Food Bank for Monterey County in future agreements with Monterey County to ensure baseline and ongoing tonnage data for SB 1383 is appropriately and consistently tracked and reported, and member data is verified as additive to or inclusive of Food Bank data.		HD, IGLA	Food Bank for Monterey County	2026 (Ongoing)
Action SW-1.2: Consider developing a countywide program to coordinate food rescue and distribution in collaboration with local jurisdictions. The program should provide resources to potential food donors and education in order to ensure increased compliance with organic waste diversion goals.		HD, IGLA	Cities, food rescue organizations	2028
Action SW-1.3: Conduct an annual survey of all food rescue organizations and services with a refined and more comprehensive set of survey questions, and more clearly defined terms for consistency in data reported.		HD, IGLA	Food rescue organizations	2026 (Ongoing)
Action SW-1.4: Develop a methodology for converting average square footage of storage space types to average weight of edible food, and/or explore opportunities for the acquisition of onsite scales, training for weight estimation, or material characterization studies for edible food recovery facilities.		HD, IGLA	Food rescue organizations	2031

Strategy, Objective, Action	Key Indicators	Implementing Department(s)	Agency and Organization Partners	Timing
Action SW-1.5: Develop and pilot a solid waste diversion program in coordination with local partners and the Health Department to eliminate single-use products through dishwashing and reusable adoption. This program should aim to demonstrate success for festival and event use cases before scaling to larger use cases. Future use cases to be considered by the program include institutions with high volumes of food service, restaurants, etc.		HD, PWFP, IGLA	N/A	2026
Action SW-1.6: Promote materials reuse and sharing through outreach and education, community tool libraries, maker spaces, fix-it clinics, and material swaps.		HD, MCFL, IGLA	Cities, SVR	Ongoing
Water and Wastewater (WA)				
Strategy WA-1: Water Conservation Objective: Reduce building and landscaping water use and increase recycled water for irrigation.	**2030:** ▶ 25% reduction in residential water consumption ▶ 31% reduction in nonresidential water consumption ▶ 25% reduction in water consumption for existing irrigation ▶ 60% reduction in water consumption for new irrigation **2040:** ▶ 30% reduction in residential water consumption ▶ 36% reduction in nonresidential water consumption ▶ 30% reduction in water consumption for existing irrigation ▶ 70% reduction in water consumption for new irrigation **2045:** ▶ 35% reduction in residential water consumption ▶ 41% reduction in nonresidential water consumption ▶ 35% reduction in water consumption for existing irrigation ▶ 75% reduction in water consumption for new irrigation	N/A		
Action WA-1.1: Regularly review and update the County's Water Conservation Ordinance (Monterey County Code of Ordinances, Chapter 15.12) and water conservation measures to be consistent with current best management practices and ensure effective and ongoing conservation efforts.		MCWRA, IGLA	Water providers	Ongoing
Action WA-1.2: Consider water efficiency standards for new construction that achieve water-neutral development for projects expected to exceed the historical water use of a parcel.		HCD, IGLA	N/A	2033
Action WA-1.3: Continue to assess and manage distribution system losses through efforts including replacing existing meters with smart meters, implementing a Supervisory Control and Data Acquisition (SCADA) system, replacing selected water pipe with upgraded design criteria to withstand seismic events, and maintaining an active cathodic protection system.		MCWRA, IGLA	Water providers	Ongoing
Action WA-1.4: Adopt a drought-ready ordinance to require greywater readiness in new residential construction and major renovations.		HCD, HD, IGLA	Water providers	2031
Action WA-1.5: Incentivize residential and nonresidential development to convert lawns to a healthy habitat with native and drought-tolerant species that use water-efficient irrigation equipment through the creation of rebate programs.		MCWRA, IGLA	Water providers	Ongoing
Action WA-1.6: Explore the establishment of a cost-sharing program that reduces upfront expenses for farmers adopting water-saving irrigation technologies (e.g., drip irrigation, soil moisture sensors, remote irrigation management systems), prioritizing small and medium-sized farms. Coordinate training sessions with local agricultural groups to demonstrate how to install and maintain these systems effectively.		MCWRA, IGLA	UCCE, RCDMC	2032
Natural and Working Lands (NWL)				
Strategy NWL-1: Coastal Habitat and Watershed Restoration Objective: Conserve, restore, and protect coastal wetlands, seagrass beds, and freshwater wetlands.	N/A	N/A		
Action NWL-1.1: Support efforts to restore degraded coastal wetlands and salt marshes in priority areas (e.g., Elkhorn Slough), which may include assessing current site conditions to identify the most viable restoration opportunities, developing restoration plans with ecological specialists, and prioritizing activities like invasive species removal, sediment management, and re-establishing native vegetation.		IGLA	MPRPD, Elkhorn Slough Foundation, The Nature Conservancy, California State Coastal Conservancy, CDFW	2033 (Ongoing)
Action NWL-1.2: Support the development of a regional approach to aquatic sequestration in the Monterey Bay in collaboration with regional groups involved in blue carbon ecosystems.		IGLA	Monterey Bay Aquarium, Cities, academic institutions, California State Coastal Conservancy, CDFW, NOAA	2034 (Ongoing)

Strategy, Objective, Action	Key Indicators	Implementing Department(s)	Agency and Organization Partners	Timing
Action NWL-1.3: Continue to implement the Salinas River Stream Management Program to enhance riparian corridors within the Salinas River watershed.		MCWRA, IGLA	RCDMC	Ongoing
Action NWL-1.4: Protect and preserve existing intact habitats and resources, consistent with Monterey County Regional Conservation Investment Strategy objectives and applicable General Plan implementation activities.		IGLA, ACO, HCD	TAMC, AMBAG, RCDMC, UCCE, CDFW	Ongoing
Strategy NWL-2: Fire-Adapted Landscapes Objective: Practice climate-smart management of ecosystems that enhances resilience.	**2030-2045:** 34,282 acres per year of fuel reduction and restoration	N/A		
Action NWL-2.1: Seek funding for and prepare a restoration plan for publicly owned forest lands within the county. This plan should identify degraded or understocked forest areas for restoration, develop site-specific planting guidelines, and prioritize native, drought-resistant tree species. Implementation of the plan should include a phased planting schedule, starting with pilot sites in fire-affected or soil-eroded regions, and establishing an annual review and monitoring process to assess growth and carbon capture.		PWFP, HCD, IGLA	RCDMC, MPRPD, USFS, California State Parks	2031
Action NWL-2.2: Work with local tribes to design a cultural burning program that incorporates Traditional Ecological Knowledge to reduce wildfire risk, manage fuel loads, and restore ecosystems, particularly in oak woodlands. Through the program, support/coordinate regulatory approvals, provide training and equipment for tribe-led burns, and host regular public information sessions to educate residents about cultural burns and their ecological benefits.		IGLA, HCD	Tribes, CCPBA, UCCE	2029 (Ongoing)
Action NWL-2.3: Work with local tribes to acknowledge the importance of traditional knowledge and native peoples' interconnection with historic ecological health and future restoration efforts. Develop a formal framework for native peoples' participation in climate efforts in the county.		IGLA, HCD	Tribes, CCPBA, RCDMC, NRCS	2031
Action NWL-2.4: Work with land managers to seek funding and implement fuel reduction activities including prescribed burning.		IGLA	CCPBA, UCCE	2031 (Ongoing)
Action NWL-2.5: Work with land managers to coordinate a regional initiative for oak woodland restoration in areas affected by Sudden Oak Death (i.e., phytophthora ramorum), development impacts, and climate stressors. Identify priority restoration sites, support the development of a local native oak nursery, and offer technical and financial assistance to landowners.		PWFP, IGLA, ACO	RCDMC, UCCE, land trusts	2031 (Ongoing)
Action NWL-2.6: Explore the establishment of a coordinated detection and management system focused on protecting forests from pests and diseases (e.g., bark beetles, pitch canker). This may include various elements, such as implementing a network of seasonal monitoring plots across key forest areas, deploying digital survey tools for real-time pest reporting, developing an online mapping platform to track infestations, training field crews in identification and treatment protocols, and providing cost-sharing to assist with implementing control measures (e.g., tree removal, proper wood disposal).		PWFP, IGLA, ACO	MPRPD, RCDMC, CCPBA, CDFW	2031
Action NWL-2.7: Support the sustainable management and utilization of forest biomass generated from fuel reduction and forest health projects (e.g., biochar to improve soil health) by preparing formal guidance, reducing barriers (e.g., streamlined permitting), coordinating transportation logistics, exploring incentives, and offering technical assistance to navigate potential regulatory requirements.		IGLA	AMBAG, RCDMC	2032 (Ongoing)
Action NWL-2.8: In partnership with the Fire Safe Council for Monterey County, prepare an update to the Monterey County Community Wildfire Protection Plan to enable federal funds for wildfire preparation work in the county.		IGLA, PWFP, HCD	FSCFMC	2031
Strategy NWL-3: Climate-Smart Agriculture Objective: Practice climate-smart agriculture that preserves and enhances natural and working lands.	**2030-2045:** 3,832 acres per year of regenerative agricultural practices and cropland conservation	N/A		
Action NWL-3.1: Develop a healthy soils strategy for Monterey County to support agriculture, address carbon sequestration, and increase water capture. The strategy should include tracking mechanisms for healthy soil practices, identification of resources for organic agriculture conversion, opportunities to develop a carbon sequestration market, and measures to conserve existing cropland throughout the county.		ACO, IGLA	RCDMC, UCCE, NRCS	2028
Action NWL-3.2: Pursue funding and provide technical assistance to support the development and implementation of carbon farm plans and healthy soils strategies in Monterey County.		ACO, IGLA	RCDMC, NRCS, CDFA, UCCE	2026 (Ongoing)
Action NWL-3.3: Work with UCCE and ranchers to measure residual dry matter on annual pastures to improve soil conditions, increase water holding capacity, and minimize invasion of weedy plants.		ACO, IGLA	UCCE, Cattlemen's Association	2033 (Ongoing)
Action NWL-3.4: Work with TAMC, RCD, land trusts/conservancies, UCCE, and landowners to acquire, lease, or establish easements to protect productive agricultural or grazing lands.		ACO, HCD, IGLA	Land trusts, TAMC, RCDMC, UCCE	Ongoing
Action NWL-3.5: Work with farmers to reduce fertilizer application consistent with the requirements of the Central Coast Regional Water Quality Control Board's Ag Order 4.0.		ACO, MCWRA, IGLA	CCRWQCB, UCCE, RCDMC	Ongoing

Strategy, Objective, Action	Key Indicators	Implementing Department(s)	Agency and Organization Partners	Timing
Action NWL-3.6: Partner with neighboring counties and resource conservation districts to prepare a feasibility study to explore the development of community compost banks. The study could include an assessment of organic waste availability, market demand for compost, potential cost savings, infrastructure needs, and potential contamination challenges.		HD, IGLA	ReGen Monterey, SVR, neighboring counties, RCDMC, UCCE	2029
Strategy NWL-4: Green Space and Infrastructure Objective: Expand green spaces, utilize green infrastructure and nature-based solutions, and invest in local parks.	**2030:** ▶ 108 acres of urban tree cover conserved per year ▶ 218 acres of urban vegetation planted per year ▶ 1,254 trees planted in urban areas per year **2038:** ▶ 108 acres of urban tree cover conserved per year ▶ 218 acres of urban vegetation planted per year ▶ 1,254 trees planted in urban areas per year **2045:** ▶ 108 acres of urban tree cover conserved per year ▶ 218 acres of urban vegetation planted per year ▶ 1,254 trees planted in urban areas per year	N/A		
Action NWL-4.1: Seek funding for and prepare community-specific forest management plans that focus on expanding tree canopies in residential and nonresidential areas to provide cooling benefits. Identify high priority areas that are currently underserved by street trees and trees within public spaces.		PWFP, HCD, IGLA	CBOs	2027 (Ongoing)
Action NWL-4.2: Seek funding for and implement an urban greening program to expand tree canopies, establish tree line buffers, plant native and drought-tolerant vegetation, and establish community gardens in developed areas of the unincorporated county and in partnership with local cities, focusing on climate-vulnerable and underserved communities.		PWFP, HCD, IGLA	RCDMC, CBOs	2027 (Ongoing)
Action NWL-4.3: Develop and implement—in partnership with cities—a countywide tree adoption program, where residents and local businesses can sponsor and be recognized (e.g., through on-site signage/plaques, County's website and social media platforms) for the planting and maintenance of trees in public spaces. Offer a variety of sponsorship levels and options (e.g., single tree, group of trees, entire planting area), where sponsorship fees can cover both: (1) the costs of purchasing, planting, and maintaining the trees for a specified period (e.g., 3-5 years); and (2) a dedicated endowment fund, where a portion of the sponsorship fees can be reinvested to support long-term program maintenance.		PWFP, CAO, HCD, IGLA	Cities	2031 (Ongoing)
Action NWL-4.4: Support Monterey Peninsula Regional Park District with implementing its strategic plan to adapt to climate impacts, conserve land, and engage communities.		PWFP, HCD, IGLA	MPRPD	Ongoing
Action NWL-4.5: Identify and incorporate green infrastructure opportunities when considering capital improvements to stormwater treatment and roadway improvements.		PWFP, IGLA	N/A	Ongoing
Action NWL-4.6: Work with Caltrans and CBOs to execute Adopt a Highway agreements for litter removal, tree planting and vegetation management for every mile of state highway located in developed areas of the unincorporated county.		PWFP, IGLA	CBOs, Caltrans	Ongoing
Green Economy				
Strategy GE-1: Green Businesses and Jobs Objective: Support a local economy that fosters a just transition towards environmental sustainability.	N/A	N/A		
Action GE-1.1: Support workforce development for electrification and building energy efficiency projects. Partner with regional energy agencies to support contractor training and resident education on electric appliances and their installation and maintenance.		ED, IGLA	MBEP, CCR REN, 3CE	Ongoing
Action GE-1.2: Increase the number of certified green businesses each year in partnership with the Monterey Bay Area Green Business Program recognize and promote current participants.		IGLA	California Green Business Network	Ongoing
Action GE-1.3: Collaborate with See Monterey and cities to increase public awareness of sustainable infrastructure benefits and the contribution of nature-based solutions to tourism-based businesses that rely on healthy natural and working lands (e.g., wine, recreation, and hospitality industries).		ED, IGLA	See Monterey, Cities	Ongoing
Action GE-1.4: Support the development of new markets and products that offer climate-smart and climate-friendly solutions for local use (e.g., biochar production).		ED, ACO, IGLA	Industry groups, UCCE, RCDMC	Ongoing
Action GE-1.5: Develop an economic development strategy that guides future economic growth toward climate-adapted industries and business practices, leveraging existing partnerships and collaboratives as appropriate (e.g., Monterey Bay Economic Partnership). The strategy will identify priority areas for development that minimize exposure to climate risks, create incentives for businesses that incorporate climate resilience measures, establish guidelines for climate-smart industrial and commercial development, and help businesses identify and reduce climate-related vulnerabilities in their operations and supply chains.		ED, IGLA	MBEP, California Green Business Network	2034

Strategy, Objective, Action	Key Indicators	Implementing Department(s)	Agency and Organization Partners	Timing
Adaptation (ADPT)				
Strategy ADPT-1: Cross-Cutting Objective: Ensure that climate adaptation actions holistically address hazards and risks throughout the county.	N/A	N/A		
Action ADPT-1.1: Continue to support the widespread adoption of "Alert Monterey County"—the official emergency alert and warning system for all jurisdictions in the county—to ensure that all residents are informed before, during, and after a climate hazard event (among other emergencies). Expand existing public outreach efforts through: (1) targeted enrollment campaigns at community events, healthcare facilities, and schools; (2) automatic enrollment for County services recipients; and (3) partnerships with CBOs for door-to-door outreach in historically underserved areas. Low-tech backup notification systems may also be considered and established as part of this initiative.		DEM, IT, IGLA	CBOs	2026 (Ongoing)
Action ADPT-1.2: Support the public health sector's capacity to address climate change as a public health crisis through a twofold approach of: (1) increasing the collection, analysis, and reporting of data on climate-related health impacts; and (2) prioritizing health equity resources for communities facing disproportionate health impacts from climate change. This may include coordinating with appropriate state and federal agencies (e.g., CDPH, OEHHA, CDC) and other local partners to collect relevant data and develop dashboards that will help inform resource allocation and targeted interventions and support grassroots health equity initiatives.		HD, Natividad, IGLA	CHMP	Ongoing
Action ADPT-1.3: Develop a countywide network of resilience hubs to enhance community resilience. These hubs—which will feature solar microgrids (where feasible and where funding allows)—will be housed in accessible public facilities, such as libraries, community centers, and schools, and will serve as multi-purpose sites offering year-round support services (e.g., health screenings, food distribution) and critical resources during emergencies exacerbated by climate change. The County encourages force multiplication and unity of effort through collaboration with partners and local entities (e.g., health care centers, CBOs, faith-based organizations) to support hubs and offer services tailored to each community's needs. To leverage funding, technical support, and best practices, the resilience hub network should draw upon existing resources where feasible (e.g., Strategic Growth Council's Community Resilience Centers program).		HD, DEM, IGLA	RCPWG, CCR REN, CBOs	2031 (Ongoing)
Action ADPT-1.4: Enhance local food security through an array of efforts, such as providing coordination support to connect local agricultural producers with food banks and pantries, developing a countywide food recovery program and working group to oversee compliance with SB 1383, and providing transportation assistance to help residents access farmers' markets and food distribution networks.		ACO, HD, IGLA	Food Bank for Monterey County, Monterey County Farm Bureau	Ongoing
Action ADPT-1.5: Adopt and require the use of a resilient buildings checklist for new construction and major renovations. The checklist should consider utilizing, at a minimum the following conditions: ▶ Firesafe: Building materials, location, and egress routes that consider potential fire risks, evacuation options, and offer a buffer to any wildlands urban interface (WUI). These can align with IBHS' Wildfire Prepared Home designation. ▶ Air quality: Integrated air filtration systems and solutions to provide healthy indoor air quality during smoky periods. ▶ Smart location of equipment that leaves roofs available for solar and puts equipment out of any potential flood or other hazard areas. ▶ Water: Support water quality, water safety, and water efficiency, along with approaches to access water during a disaster. ▶ Require the use of electric heat pumps to provide heating and cooling to residents to combat rising temperatures. ▶ Support non-mechanical cooling approaches such as passive house building, cool roofs, and tree shading. ▶ Sea level rise and flooding: do not incentivize projects that are located in a FEMA flood zone. ▶ Multi-benefit energy and resilience measures including solar and storage enabling the building to operate off the grid during power outages and address the needs of residents (such as communications, medical needs, and refrigeration). ▶ Minimum temperature factor at doors, windows, and thermal bridges. This factor ensures and absence of condensation and prevents mold and mildew that can lead to long term building damage. ▶ Anti-displacement measures that will help to ensure the project does not displace low-income residents from the neighborhood due to increased rental prices.		HCD, IGLA	N/A	2026
Action ADPT-1.6: Partner with TAMC to implement the North Monterey County Regional Transportation Vulnerability Assessment recommendations as well as subsequent regional transportation vulnerability assessment recommendations.		PWFP, IGLA	TAMC	2032 (Ongoing)
Strategy ADPT-2: Wildfire Objective: Reduce wildfire risk and support fire-adapted communities.	**2030-2045:** 69 acres of defensible space established in WUI each year	N/A		
Action ADPT-2.1: Coordinate with MBARD and other local and regional agencies and organizations to develop and implement a suite of measures focused on protecting residents from wildfire smoke, including: (1) the widespread awareness and adoption of mobile applications (e.g., Smoke Spotter, AirNow), which can help populations prepare for wildfire smoke events; (2) the development of a program to subsidize and provide free residential air filtration/purification devices to renters and homeowners; among others; and (3) providing formal recommendations and incentives that encourage local businesses and other indoor community gathering places to serve as an impromptu, adaptable, accessible network for clean air centers during hazardous wildfire smoke events.		HD, DEM, PWFP, IGLA	MBARD, Cities	2031 (Ongoing)

Strategy, Objective, Action	Key Indicators	Implementing Department(s)	Agency and Organization Partners	Timing
Action ADPT-2.2: Collaboratively develop and implement a wildfire-resilient agriculture program that includes: (1) technical assistance for creating agricultural buffer zones that serve both fire protection and productive farming purposes; (2) cost-sharing for installation of agricultural-grade sprinkler systems that can be activated for ember protection; and (3) guidance on fire-resistant crop selection and field pattern design for properties in high-risk areas.		ACO, IGLA	UCCE, RCDMC, FSCFMC, Monterey County Farm Bureau	2033 (Ongoing)
Action ADPT-2.3: In partnership with the Fire Safe Council for Monterey County, launch a home hardening program for existing homes—including mobile homes and manufactured housing—in high-risk areas that provides comprehensive assessments, offers grants for home hardening improvements (e.g., ember-resistant vents, noncombustible gutter covers, enclosed eaves), and provides additional financial assistance and resources for low-income homeowners.		HCD, IGLA	FSCFMC, Center for Community Advocacy	2031
Action ADPT-2.4: Collaborate with CAL FIRE and the Fire Safe Council for Monterey County to support and expand the number of Firewise USA® recognized communities across the county. Support may come in the form of building community awareness through outreach and education, providing direct support through technical assistance, offering financial support and incentives, coordinating with local fire agencies, and monitoring and reporting progress.		DEM, IGLA	CAL FIRE, FSCFMC	2031
Action ADPT-2.5: Explore the collaborative development and implementation of a "smart" wildfire detection network by conducting a comprehensive feasibility study that evaluates technical requirements, cost considerations, and implementation challenges. The study would assess the viability of integrating various technologies (e.g., solar-powered thermal imaging cameras with AI capabilities, remote weather stations, soil moisture sensors) into a centralized early warning system. Additionally, it would identify potential funding sources, evaluate infrastructure needs, determine maintenance requirements, analyze cost-benefit ratios, and develop strategies to address technical barriers. Based on the feasibility study findings, develop a phased implementation plan that prioritizes deployment in high-risk areas and establishes clear protocols for data management, system maintenance, and emergency response integration.		DEM, IT, IGLA	CAL FIRE, FSCFMC, RCDMC, USFS	2032
Action ADPT-2.6: Serve as a coordinating entity for partners (e.g., CAL FIRE, Fire Safe Council for Monterey County) to further enhance the reach and effectiveness of their existing wildfire preparedness and wildfire risk reduction programs and resources. This may include integrating program materials into County mailings, providing dedicated space in County facilities for in-person events or workshops, and actively promoting initiatives through all County communication channels.		DEM, IGLA	CAL FIRE, FSCFMC, MCRFD	2028
Strategy ADPT-3: Extreme Heat Objective: Prepare for and reduce heat-related impacts to communities throughout the county.	N/A	N/A		
Action ADPT-3.1: Launch a pilot program to install cool (i.e., high albedo) pavement in heat-vulnerable neighborhoods across the county, focusing on areas with high pedestrian traffic, low tree canopy, and significant exposure to the urban heat island effect. Partner with technical experts on cool pavement materials and performance monitoring, and collaborate with local public health agencies to identify and prioritize locations based on heat vulnerability. Assuming positive pilot outcomes and community buy-in, develop a phased expansion plan for cool pavement installation, prioritizing areas that would benefit most from reduced surface temperatures.		PWFP, HD, IGLA	Technical experts, Caltrans	2031
Action ADPT-3.2: Develop a countywide program to support and oversee employer compliance with Cal/OSHA's heat illness prevention standards for both indoor (i.e., CCR Title 8, Section 3396) and outdoor (i.e., CCR Title 8, Section 3395) workplaces. This program will include education and training opportunities for employers and employees on heat safety regulations, onsite inspections during extreme heat events, and guidance for workers to report employer non-compliance. Additionally, the program will provide resources, technical assistance, and incentives to employers for implementing enhanced heat protection measures that go beyond Cal/OSHA standards.		HD, ACO, DEM, IGLA	Cal/OSHA, CDPH	2031
Action ADPT-3.3: Evaluate and consider establishing requirements for the use of heat mitigation measures in the public realm, particularly in common community gathering spaces (e.g., playgrounds, parks) and along transit corridors. Requirements may include the incorporation of: (1) building design features (e.g., varied building heights; setbacks from sidewalks; vertical and horizontal shade features); (2) cooling materials, treatments, and coatings (e.g., for rooftops); (3) multiple layers of shading to maximize coverage throughout the day; (4) street trees and landscaping; and (5) public amenities, such as drinking fountains and water mister/spray areas; among others.		PWFP, HCD, IGLA	N/A	2031
Action ADPT-3.4: Create a "Cool Buddy" program that recruits and trains community volunteers to support neighborhood resilience during extreme heat events. Volunteers will be trained to: (1) recognize signs of heat stroke and other heat-related illnesses; (2) identify and check in on heat-vulnerable neighbors (e.g., seniors, low-income residents, those without adequate cooling resources); (3) connect vulnerable residents with local resources, such as transportation to cooling centers and community health services. The program will work with neighborhood groups, community emergency response teams (CERT), and CBOs to strengthen local networks, allowing neighborhoods to coordinate volunteers and support systems.		HD, DEM, SS, IGLA	CBOs	2031
Strategy ADPT-4: Flooding and Sea Level Rise Objective: Prepare for and reduce flooding and sea level rise impacts throughout the county.	N/A	N/A		
Action ADPT-4.1: Evaluate the creation of a managed retreat program for homes and critical assets (e.g., infrastructure) at risk of repeated damage due to sea level rise, flooding, and other climate hazards to allow for natural modification of the landscape and reduction in risk to property and life. The program would identify financial support mechanisms and include standards that determine when homes or assets should be relocated, modified, or removed.		DEM, HCD, IGLA	Caltrans, FEMA, USACE, California State Coastal Conservancy	2032

Strategy, Objective, Action	Key Indicators	Implementing Department(s)	Agency and Organization Partners	Timing
Action ADPT-4.2: Coordinate with conservation organizations and local landowners to expand floodplain restoration in the Salinas River watershed, improving natural flood mitigation by increasing water absorption, restoring native vegetation, and creating wildlife habitat. Focus restoration efforts on high-risk flood zones to reduce downstream flood impacts in agricultural and residential areas.		MCWRA, HCD, IGLA	RCDMC, UCCE	Ongoing
Action ADPT-4.3: Evaluate the need for more stringent minimum standards for flood protection and resilience, notably for new construction and major renovations. Specific considerations should include floor elevations, flood-resistant materials, and improved drainage systems (among others), and additionally, potential incentives for exceeding minimum standards. Depending on the outcomes of the evaluation, incorporate new standards by ordinance.		HCD, IGLA	N/A	2031
Action ADPT-4.4: Develop an outreach and assistance program to connect property owners in flood-prone areas of the county with existing regional, state, and federal programs that provide funding and technical assistance for flood resilience improvements. The County will work with local CBOs to raise awareness and offer application assistance, prioritizing low-income residents and small businesses.		DEM, HCD, IGLA	CBOs	2028
Action ADPT-4.5: Collaborate with Caltrans and TAMC to develop an implementation plan to address the risks of sea-level rise, coastal erosion, and storm surge along Highway 1, informed by existing studies and resources (e.g., *Central Coast Highway 1 Climate Resiliency Study*). The plan will prioritize projects that balance infrastructure resilience, environmental sustainability, and scenic preservation, and additionally, will engage communities along Highway 1 in implementation discussions to align each project with local needs.		DEM, IGLA	Caltrans, TAMC, MST, AMBAG, California State Coastal Conservancy	Ongoing
Strategy ADPT-5: Drought Objective: Prepare for and adapt to more frequent drought conditions throughout the county.	N/A	N/A		
Action ADPT-5.1: In partnership with water and wastewater service providers, upgrade water and wastewater infrastructure throughout the county to adapt to future potential climate-driven changes in water quality and availability, which may include deepening intake systems to accommodate lower water levels, implementing advanced filtration technologies to address increased contaminant levels, and expanding storage capacity to ensure water supply during periods of drought. Prioritize upgrades in areas with aging infrastructure.		MCWRA, IGLA	Water providers	Ongoing
Implementation and Monitoring (IM)				
Strategy IM-1: Education, Outreach, and Coordination Objective: Continue to provide education and outreach to the Monterey County community on how to support climate action locally and coordinate with essential partners for successful implementation.	N/A	N/A		
Action IM-1.1: Develop a building electrification outreach program that provides education strategies that enable and encourage energy conservation and gas-to-electric conversions in residential and commercial buildings for space and water heating, and planning for equipment replacement before failure occurs due to emergencies. Develop and/or share existing online educational materials targeted toward building owners and tenants that are hosted on the County's website on energy efficiency and building electrification; including training, fact sheets, information on available incentives, video tutorials, and links to existing content (such as The Switch is On). In addition, video tutorials can explain to building owners how to enroll in real-time energy use monitoring tools to track energy use compared to historic levels and within the community through the EnergyStar™ Portfolio Manager, or other tools offered by third-party providers. The educational materials will also be provided as part of routine regulatory processes, such as applying for or renewing licenses or permits. The building electrification outreach program will coordinate with local jurisdictions and agencies to share resources and problem solve across jurisdictions..		IGLA	Ecology Action, AMBAG	2026 (Ongoing)
Action IM-1.2: In partnership with TAMC, develop a transportation outreach program that provides education strategies that enable and encourage residents to engage in mode shifts (e.g., carpooling, walking, biking), transit, and vehicle electrification. Develop and/or share existing online educational materials targeted toward residents and businesses that are hosted on the County's website on reducing vehicle trips and transportation electrification; including training, fact sheets, information on available incentives, video tutorials, and links to partner organizations. The transportation outreach program will coordinate with local jurisdictions and agencies to share resources and problem solve across jurisdictions..		IGLA	TAMC, MST, 3CE, AMBAG, MBARD	2026 (Ongoing)
Action IM-1.3: Promote incentive programs to encourage residents and business owners to convert or replace their fossil fuel-powered gardening equipment, such as lawnmowers, leaf blowers, and hedge trimmers, with electric alternatives.		IGLA	MBARD	Ongoing
Action IM-1.4: Promote incentives available through CARB (i.e., Carl Moyer Program), MBARD (i.e., FARMER Program), and others to switch agricultural equipment and irrigation pumps with EPA Tier 4 Final-rated equipment.		ACO, IGLA	MBARD, UCCE, Monterey County Farm Bureau, RCDMC	Ongoing
Action IM-1.5: Raise public awareness of the public health impacts of climate change through partnerships with local hospitals, public health institutions, and other social service organizations.		HD, Natividad, SS, IGLA	Local hospitals, public health institutions, CBOs	Ongoing
Action IM-1.6: Collaborate with local tribes to establish training opportunities (e.g., workshops) for youth and community members to learn about traditional land stewardship practices, such as cultural burning, plant management, and ecosystem care. Training opportunities will be co-developed with tribal leaders and aim to integrate Traditional Ecological Knowledge into broader County conservation programs.		IGLA	Tribes, UCCE, RCDMC	2027 (Ongoing)
Strategy IM-2: Public Participation and Engagement Objective: Create meaningful opportunities for continued public participation in implementing climate solutions.	N/A	N/A		

Strategy, Objective, Action	Key Indicators	Implementing Department(s)	Agency and Organization Partners	Timing
Action IM-2.1: Establish a standing role for the County's Alternative Energy & Environment Committee (AEEC) to advise the Board of Supervisors on climate action planning, CCAAP strategy implementation, and related topics (e.g., environmental justice).		IGLA	N/A	2026 (Ongoing)
Action IM-2.2: Implement a coordinated climate action and resilience outreach and education initiative that leverages the Resilient Monterey County campaign and platform as a primary digital resource hub. The initiative may include seasonal hazard awareness campaigns, collaborative community workshops (in partnership with CBOs, schools, etc.), a climate ambassador program that trains local volunteers to serve as community educators, and promotion of local CERT programs.		IGLA, DEM	Ecology Action	2026 (Ongoing)
Action IM-2.3: Formalize a network of partners, including businesses, community organizations, and volunteers to support CCAAP implementation. Collaborate with groups such as the County Health Department to establish a youth program to ensure youth voices are included in County systems and strategies.		IGLA	MBEP, CBOs	2026 (Ongoing)
Strategy IM-3: Climate Tracking and Budgeting Objective: Provide accountability and transparency in implementing the CCAAP and commit resources to ensuring its success.	N/A	N/A		
Action IM-3.1: In consultation with the AEEC, prepare annual public reports on CCAAP implementation and monitoring results and present the reports to the Board of Supervisors. Every three years, prepare GHG inventory updates and every five years, prepare and present a more detailed progress report to the Board of Supervisors.		IGLA	AMBAG	2026 (Ongoing)
Action IM-3.2: Prepare and present to the Board of Supervisors a proposed budget and staffing plan (including qualified technical consultants) to implement the CCAAP, and update the budget and staffing plan each year.		CAO, IGLA	N/A	2026 (Ongoing)
Action IM-3.3: Establish and track metrics to monitor progress of CCAAP goals and report data through an online platform, such as a digital portal or dashboard on the County's website.		IGLA	N/A	2026 (Ongoing)
Strategy IM-4: Funding and Financing Objective: Seek funding and financing solutions to implement the CCAAP.	N/A	N/A		
Action IM-4.1: Develop a revolving loan fund to provide low-interest loans to residents to cover the time-of-replacement/emergency replacement of water heaters and/or HVAC units with electric options with program prioritization for low-income residents.		IGLA, AC	3CE	2030
Action IM-4.2: Partner with 3CE to explore offering on-bill financing or pay-as-you-save programs specifically for building electrification and energy affordability projects.		IGLA	3CE	2026
Action IM-4.3: Serve as a coordinating entity in supporting and accelerating forest health services and forest restoration projects across the county by: (1) establishing a fund that provides grants and low-interest loans to landowners and organizations implementing projects; (2) partnering with local financial institutions to leverage additional capital through innovative financing tools (e.g., environmental impact bonds); (3) providing technical assistance to help implementing entities access and combine various funding sources effectively; and (4) procuring equipment and renting it to landowners to implement projects.		IGLA, PWFP	RCDMC, UCCE, CAL FIRE, USFS, California State Parks	2030
Action IM-4.4: Establish a dedicated public works special fund to support the implementation of CCAAP capital projects. Such projects may include repairing and/or fortifying critical infrastructure owned and/or managed by the County, advancing urban forestry, and creating safe streets. The fund will serve as a committed reserve that cannot be reappropriated for other purposes without approval by the Board of Supervisors. An interdepartmental team will develop strategies for seeding the fund (e.g., annual budget allocation, municipal bond measure) and will establish criteria and processes for accessing the fund.		PWFP, CAO, IGLA	N/A	2029
Action IM-4.5: Coordinate with other jurisdictions and partners within the county to explore the establishment of a countywide Climate Resilience District—in line with SB 852—to finance, plan, implement, and manage climate adaptation projects and programs throughout Monterey County and across jurisdictional boundaries. The district will serve as a coordinating entity to leverage funding opportunities, facilitate multi-benefit projects, and ensure equitable distribution of adaptation investments.		CAO, PWFP, DEM, HCD, IGLA	AMBAG, RCDMC, Cities	2029
Action IM-4.6: Establish policy and procedures for the creation of a Carbon Reduction Fund to invest in municipal energy efficiency, community climate action, and carbon reduction projects.		PWFP, CAO, HCD, IGLA	AMBAG, MBEP	2029
Action IM-4.7: Explore the creation of a County-administered green bank to invest in clean energy and energy efficiency.		PWFP, CAO, HCD, IGLA	AMBAG, MBEP	2029

2.2.1 Summary of Community Strategies

The total estimated GHG emissions reductions from all community measures quantified would be 238,486 $MTCO_2e$ in 2030; 330,636 $MTCO_2e$ in 2040; and 341,796 $MTCO_2e$ in 2045. This would result in total community GHG emissions of 750,723 $MTCO_2e$ in 2030; 415,400 $MTCO_2e$ in 2040; and 334,217 $MTCO_2e$ in 2045. The total estimated reductions from all proposed GHG reduction measures would be sufficient to meet the 2030 and 2040 targets, but not to meet the 2045 emission reduction target.

The scale of reductions required to achieve the 2045 target would require significant improvements in the availability and/or cost of near-zero- and zero-emission technologies, as well as potential increased reductions from ongoing State and federal legislative actions that are currently unknown. Progress toward meeting future targets that could be set by the State would be part of the ongoing monitoring and updates to the CCAAP as new legislation or future updates to the State's Climate Change Scoping Plan are adopted.

Figure 1 shows the GHG reductions achieved by the proposed measures, organized by the sectors used for the inventories and forecasts (note: the nonresidential and residential building energy sectors have been combined, as have the water supply and wastewater treatment sectors). It shows the County's communitywide emissions with GHG reduction measures and demonstrates progress toward 2030, 2040, and 2045 targets.

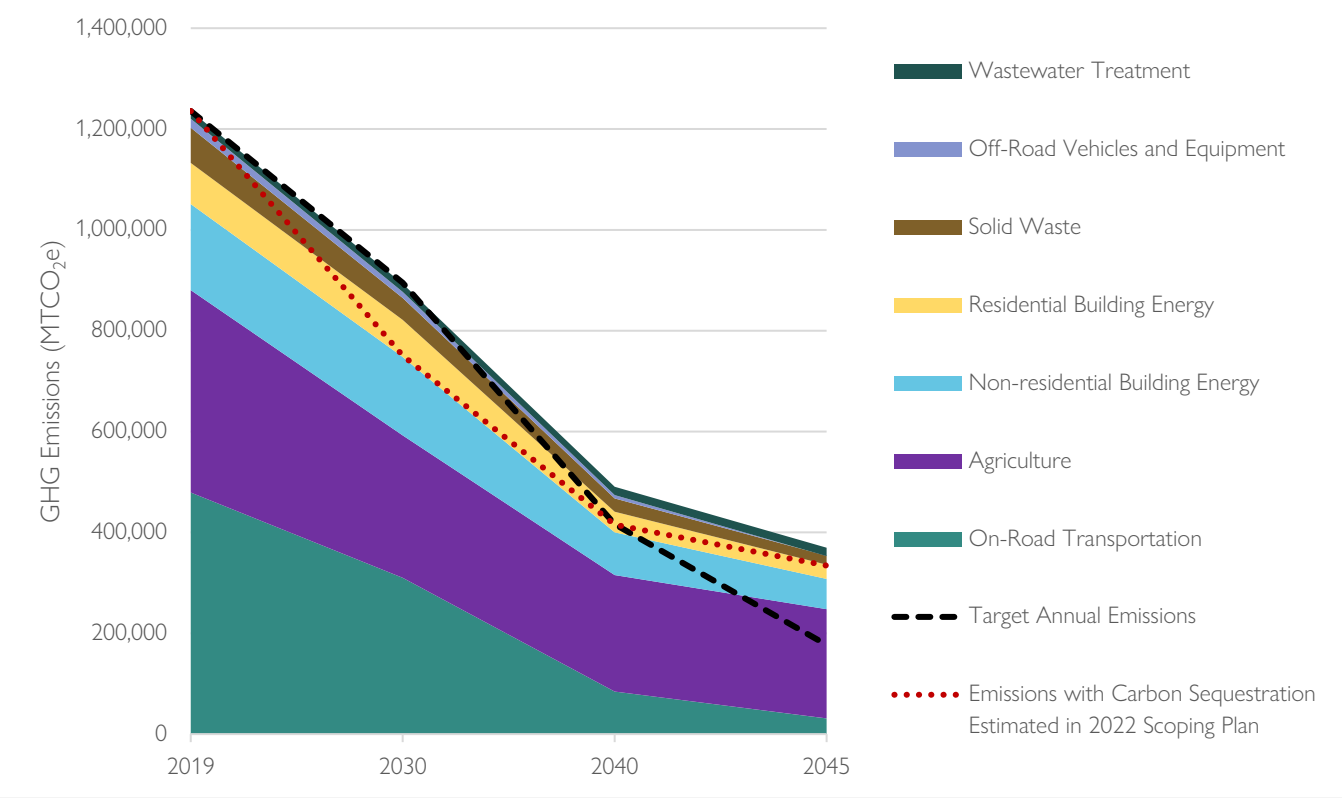


Figure 1 County of Monterey Community Legislative-Adjusted BAU Emissions Forecast by Sector with Implementation of Proposed GHG Reduction Measures and Emissions Reduction Targets: 2030, 2040 and 2045

ATTACHMENT A

Communitywide Greenhouse Gas Emissions Reduction Measures Quantification Sheet

Strategy/ Action ID	Strategy Title	Annual Emissions Reductions in 2030 (MTCO2e)	Annual Emissions Reductions in 2040 (MTCO2e)	Annual Emissions Reductions in 2045 (MTCO2e)
BE-1a	Increase energy efficiency and electrification in existing residential buildings.	8,060	40,341	52,488
BE-1b	Increase energy efficiency and electrification in existing nonresidential buildings.	13,586	85,004	110,599
BE-1c	Increase energy efficiency and electrification in new residential buildings.	584	753	775
BE-1d	Increase energy efficiency and electrification in new nonresidential buildings.	1,768	6,240	8,617
BE-2	Maximize reliable, emissions-free energy generation, transmission, and storage locally.	1,203	668	—
TR-1	Reduce passenger vehicle miles traveled through transit-oriented, mixed-use, compact development and accessible, reliable, and convenient transit.	22,216	19,973	10,557
TR-2	Transition to low- and zero-emission vehicles.	13,463	43,948	48,250
OR-1a	Reduce construction-related emissions.	1,809	3,056	3,330
OR-1b	Transition to zero-emission landscaping equipment.	79	562	662
OR-1c	Transition to zero-emission recreational boats.	149	938	1,252
OR-1d	Transition to zero-emission agricultural equipment	3,921	7,257	14,017
SW-1a	Increase Residential Waste Diversion	11,958	19,371	23,142
SW-1b	Increase Non-Residential Waste Diversion	16,933	27,432	32,772
WA-1a	Retrofit water fixtures to ultra-low-flow in residential buildings.	10	5	—
WA-1b	Retrofit water fixtures to ultra-low-flow in non-residential buildings.	6	3	—
WA-1c	Increase production and use of recycled water for irrigation.	108	59	—
	Combined NWL reductions from Scoping Plan Scenario analysis	142,633	75,026	35,333
	Total Reductions from All Strategies	**95,853**	**255,610**	**306,463**
	Legislative-Adjusted Business-As-Usual Emissions	989,209	746,036	676,013
	Target Emissions	895,223	416,425	177,026
	Reductions Needed to Meet Targets	93,986	329,611	498,987
	Emissions with measures excluding sequestration benefits	893,356	490,426	369,550
	Emissions with measures including sequestration benefits	750,723	415,400	334,217
	Emission Gap (with sequestration benefits)	(144,500)	(1,025)	157,192
	Target Met	Yes	Yes	No

BE-1

Increase energy efficiency and electrification in existing and new residential and nonresidential buildings

Percent reductions for existing and new buildings as of 2026	Units	2030	2040	2045
EXISTING BUILDINGS				
Emissions Reductions				
Target percent reductions: Residential Natural Gas	percent	10%	50%	65%
Target percent reductions: Non-Residential Natural Gas	percent	8%	50%	65%
Target percent reductions: Backup Generator Diesel	percent	8%	50%	65%
Target percent reductions: Backup Generator LPG	percent	8%	50%	65%
Target percent reductions: Backup Generator Natural Gas	percent	8%	50%	65%
Leg-adjusted forecast: Residential Natural Gas	therm	15,173,467	15,173,467	15,173,467
Leg-adjusted forecast: Non-Residential Natural Gas	therm	31,937,507	31,937,507	31,937,507
Leg-adjusted forecast: Backup Generator Diesel	gal	16,919	16,919	16,919
Leg-adjusted forecast: Backup Generator LPG	scf	83,299	83,299	83,299
Leg-adjusted forecast: Backup Generator Natural Gas	scf	7,761	7,761	7,761
EMISSIONS REDUCTIONS – NOT INCLUDING INCREASED ELECTRIC USAGE				
Residential emissions reductions from reduced fuel burn	$MTCO_2e$	8,075	40,375	52,488
Non-residential emissions reductions from reduced fuel burn	$MTCO_2e$	13,612	85,076	110,599
EMISSION REDUCTIONS – INLCUDING INCREASED ELECTRIC USAGE				
Assumed average efficiency of heat pump heating		300%	300%	300%
Average efficiency of natural gas (residential fuel)		88.0%	88.0%	88.0%
Weighted average efficiency of diesel, LPG, and natural gas (non-residential fuels)		87.8%	87.8%	87.8%
Ratio of heat pump efficiency to natural gas efficiency (residential fuels)		3.41	3.41	3.41
Ratio of heat pump efficiency to diesel / LPG / natural gas efficiency (nonresidential fuels)		3.42	3.42	3.42
Residential fuel savings	MWh	44,473	222,367	289,077
Non-residential fuel savings	MWh	74,948	468,422	608,949
Additional electricity needed for residential	MWh	13,046	65,228	84,796
Additional electricity needed for non-residential	MWh	21,930	137,063	178,181
Electricity emissions factor	$MTCO_2e$ / MWh	0.001192763	0.000525214	0
Additional emissions from residential electricity ($MTCO_2e$)	$MTCO_2e$	15.56	34.26	—
Additional emissions from non-residential electricity ($MTCO_2e$)	$MTCO_2e$	26.16	71.99	—
Residential reductions	$MTCO_2e$	8,060	40,341	52,488
Nonresidential reductions	$MTCO_2e$	13,586	85,004	110,599
Total GHG Reductions	**$MTCO_2e$**	**21,645.59**	**125,345.59**	**163,087.38**
Percent reductions for existing and new buildings as of 2026	Units	2030	2040	2045

Percent reductions for existing and new buildings as of 2026	Units	2030	2040	2045
NEW BUILDINGS				
Emissions Reductions				
Target percent reductions: Residential Natural Gas	percent	90%	95%	95%
Target percent reductions: Non-Residential Natural Gas	percent	90%	95%	95%
Target percent reductions: Backup Generator Diesel	percent	90%	95%	95%
Target percent reductions: Backup Generator LPG	percent	90%	95%	95%
Target percent reductions: Backup Generator Natural Gas	percent	90%	95%	95%
Leg-adjusted forecast: Residential Natural Gas	therm	122,208	148,977	153,334
Leg-adjusted forecast: Non-Residential Natural Gas	therm	369,447	1,233,841	1,702,386
Leg-adjusted forecast: Backup Generator Diesel	gal	219	732	1,011
Leg-adjusted forecast: Backup Generator LPG	scf	1,080	3,606	4,976
Leg-adjusted forecast: Backup Generator Natural Gas	scf	101	336	464
EMISSIONS REDUCTIONS – NOT INCLUDING INCREASED ELECTRIC USAGE				
Residential emissions reductions from reduced fuel burn	$MTCO_2e$	585	753	775
Non-residential emissions reductions from reduced fuel burn	$MTCO_2e$	1,772	6,246	8,617
EMISSION REDUCTIONS – INLCUDING INCREASED ELECTRIC USAGE				
Assumed average efficiency of heat pump heating		300%	300%	300%
Average efficiency of natural gas (residential fuel)		88.0%	88.0%	88.0%
Weighted average efficiency of diesel, LPG, and natural gas (non-residential fuels)		87.8%	87.8%	87.8%
Ratio of heat pump efficiency to natural gas efficiency (residential fuels)		3.41	3.41	3.41
Ratio of heat pump efficiency to diesel / LPG / natural gas efficiency (nonresidential fuels)		3.42	3.42	3.42
Residential fuel savings	MWh	3,224	4,148	4,270
Non-residential fuel savings	MWh	9,754	34,387	47,445
Additional electricity needed for residential	MWh	946	1,217	1,252
Additional electricity needed for non-residential	MWh	2,853	10,059	13,878
Electricity emissions factor	$MTCO_2e$ / MWh	0.001192763	0.000525214	0
Additional emissions from residential electricity ($MTCO_2e$)	$MTCO_2e$	1.13	0.64	—
Additional emissions from non-residential electricity ($MTCO_2e$)	$MTCO_2e$	3.40	5.28	—
Residential reductions	$MTCO_2e$	584	753	775
Nonresidential reductions	$MTCO_2e$	1,768	6,240	8,617
Total GHG Reductions	**$MTCO_2e$**	**2,353**	**6,993**	**9,393**

Notes: Calculations do not include major renovations.

Calculations for estimating effective efficiency of transition of residential buildings from fossil fuel infrastructure to electric

Fuel	Sector	Units	MWh per unit [1]	Fuel efficiency [2]	Emissions Factor ($MTCO_2e$/unit)	Res indicator	Non-res indicator
Natural Gas	Residential	therm	0.02931	88%	0.005321843	1	0
Natural Gas	Non-Residential	therm	0.02931	88%	0.005321843	0	1
Diesel	Backup Generator	gal	0.0407	40%	0.010228548	0	1
LPG	Backup Generator	scf	0.000778101	20%	0.000155776	0	1
Natural Gas	Backup Generator	scf	0.000302024	20%	5.47179E-05	0	1

Sources:

[1] convertunits.com

[2] https://portal.ct.gov/drs/publications/policy-statements/1992/ps-92-10-1#:~:text=1%20cubic%20foot%20propane%20%3D%200.0278,propane%20%3D%2035.97%20cubic%20feet%20propane

[3] https://www.ucdavis.edu/climate/blog/heat-pumps-hot-summers#:~:text=How%20efficient%20are%20heat%20pumps,one%20unit%20of%20electricity%20used.

[4] https://www.genpowerusa.com/blog/diesel-generator-vs-gas-generator-which-is-more-efficient/#:~:text=Typically%20a%20diesel%20generator%20will,units%20are%20delivered%20as%20output.

[5] https://learnmetrics.com/how-much-propane-do-generators-use-per-hour/#:~:text=Here%20are%20the%20outlined%20efficiencies%3A%2022.3%25%20propane%20efficiency,load.%2019.8%25%20propane%20efficiency%20at%2025%25%20rated%20load.

[6] https://www.generac.com/business/resources/fuel-options/natural-gas/performance/

BE-2

Maximize reliable, emissions-free energy generation, transmission, and storage locally

BE-2	2030	2040	2045
Leg-adjusted electricity emissions	1,122.98	505.36	—
Additional Emissions From BE-1.1 and BE-1.2	46.25	112.17	—
Additional Emissions From OR-1.1	0.22	0.72	—
Additional Emissions From OR-1.2	0.17	0.52	—
Additional Emissions From OR-1.3	0.32	0.88	—
Additional Emissions From TR-2.1	25.134	42.335	—
Additional Emissions from AG-3.1	7.878	6.412	—
GHG Reductions from Maximize reliable, emissions-free energy generation, transmission, and storage locally. ($MTCO_2e$)	**1,203**	**668**	—

TR-1

Reduce passenger vehicle miles traveled through transit-oriented, mixed use, compact development and accessible, reliable, and convenient transit.

Light-duty Vehicles	2030	2040	2045
Reduction in VMT	91,011,742	251,695,882	327,520,610
Vehicle emission Factor (g CO_2e per mi) - after implementation of TR-2.1	244	79	32
Emissions reductions ($MTCO_2e$)	22,216	19,973	10,557
Heavy-duty Vehicles	2030	2040	2045
Reduction in VMT	—	—	—
Vehicle emission Factor (g CO_2e per mi) - after implementation of TR-2.1	1010	273	99
Emissions reductions ($MTCO_2e$)	—	—	—
Total reductions (all vehicles) ($MTCO_2e$)	**22,216**	**19,973**	**10,557**

TR-2.1

Transportation and Land Use Measures

TRANSITION TO LOW-AND-ZERO-EMISSION VEHICLES	2030	2040	2045
Unincorporated Monterey County Population	109,976	110,277	110,326
Monterey County Population (entire County, includes incorporated areas)	467,068	483,884	491,443
Population ratio (Unincorporated County vs entire county)	23.5%	22.8%	22.4%
INSTALLED EV CHARGING STATIONS FOR LDVs			
EV Forecasts and Targets			
Number of Light-Duty Vehicles (Entire County)	316,219	337,658	346,513
Number of Light-Duty Vehicles (Unincorporated Only)	74,457	76,952	77,790
Number of EV/PHEV Light-Duty Vehicles (Entire County)	50,370	196,916	260,284
Number of EV/PHEV Light-Duty Vehicles (Unincorporated Only)	11,860	44,877	58,432
Percentage of Light-Duty Vehicles that are EV/PHEV	16%	58%	75%
Targeted EV/PHEV Pop percentage under TR-2.1	20%	70%	90%
Increased EV/PHEV Pop percentage under TR-2.1	4%	12%	15%
Targeted EV/PHEV Pop under TR-2.1 (Unincorporated Only)	14,891	53,866	70,011
Additional EV/PHEV Pop under TR-2.1 (Unincorporated Only)	3,031	8,989	11,579
EMFAC2021 EV:PHEV Ratio with ACC II adjustments	4.3	7.7	8.5
Additional EV Pop under TR-2.1	2,461	7,956	10,366
Additional PHEV Pop under TR-2.1	571	1,034	1,213
Additional GHG Emissions from EVs			
Average annual miles per EV (mi/vehicle)	16,497	14,847	13,991
New EV VMT under measure	40,594,613	118,120,233	145,028,644
Average Efficiency of EV LDV (kWh/100-mi)	38.61	38.61	38.61
Charged amount (kWh)	15,672,871	45,604,159	55,993,026
Charged amount (MWh)	15,673	45,604	55,993
Electricity emissions factor ($MTCO_2e$/MWh)	0.001	0.001	0.000

TRANSITION TO LOW-AND-ZERO-EMISSION VEHICLES	2030	2040	2045
Additional GHG emissions from EVs ($MTCO_2e$)	19	24	-
Additional GHG Emissions from PHEVs			
Average annual miles per PHEV (mi/vehicle)	15,770	14,083	13,313
New PHEV VMT under measure	8,998,674	14,560,117	16,150,660
Average emissions factor from PHEV (gCO_2e/mi)	122	116	117
Additional PHEV emissions under measure ($MTCO_2e$)	1,098	1,696	1,882
Emissions Avoided From Equivalent Gasoline/Diesel Vehicles			
Average emissions factor from Gasoline/Diesel mix (gCO_2e/mi)	315	301	302
Average annual miles per Gasoline/Diesel (mi/vehicle)	11,932	9,317	7,826
Reduced Gasoline/Diesel VMT (mi)	36,170,058	83,756,192	90,615,445
Reduced Gasoline/Diesel emissions under TR-2.1 ($MTCO_2e$)	11,382	25,250	27,353
TOTAL EMISSION REDUCTIONS FROM INCREASED LDV EV/PHEV MIX (MTCO2e)	**10,266**	**23,530**	**25,471**
INSTALLED EV CHARGING STATIONS FOR MEDIUM AND HEAVY-DUTY VEHICLES			
State-level EV Forecasts and Targets	**2030**	**2040**	**2045**
Number of M/HD Vehicles (Entire County)	22,791	21,828	22,025
Number of M/HD Vehicles (Unincorporated Only)	5,366	4,975	4,944
Number of EV M/HD Vehicles (Entire County)	1,481	9,054	12,882
Number of EV M/HD Vehicles (Unincorporated Only)	349	2,063	2,892
Leg-adjusted percent heavy-duty EVs	6%	41%	58%
Target percent EVs	10%	70%	90%
Additional EV/PHEV Pop under TR-2.1	188	1,419	1,558
Additional GHG Emissions from EVs			
Average annual miles per EV (mi/vehicle)	25,882	22,487	20,747
New EVMT under measure	4,861,608	31,905,255	32,328,167
Average Efficiency of EV medium/heavy duty (kWh/100-mi)	111	110	109
Charged amount (kWh)	5,398,911	35,000,296	35,384,937
Charged amount (MWh)	5,399	35,000	35,385
Electricity emissions factor ($MTCO_2e$ /MWh) (SCE and OCPA weighted average)	0.001	0.001	0.000
Additional GHG emissions from EVs ($MTCO_2e$)	6	18	-
Emissions from Equivalent Gasoline/Diesel Vehicles			
Average emissions factor from Gasoline/Diesel mix (gCO_2e/mi)	1,176.92	1,157.55	1,186.33
Average annual miles per Gasoline/Diesel (mi/vehicle)	14,493	12,443	12,323
Reduced Gasoline/Diesel VMT (mi)	2,722,327	17,654,793	19,200,842
Reduced Gasoline/Diesel emissions under TR-2.1 ($MTCO_2e$)	3,204	20,436	22,779
Net GHG emissions avoided from increased MHDV EV chargers ($MTCO_2e$)	**3,198**	**20,418**	**22,779**
Net GHG emissions avoided from increased EV chargers ($MTCO_2e$)	**13,463**	**43,948**	**48,250**

Sources: [1] All vehicle data is based on EMFAC 2021 results for Monterey County, adjusted for Advanced Clean Cars II and Advanced Clean Fleets PHEV/ZEV requirements.

OR-1a

Reduce Construction-related Emissions

Electric Construction Equipment	2030	2040	2045
Construction emissions ($MTCO_2e$)	5,344	5,416	5,449
Target electrification rate for construction equipment	2%	15%	19%
GHG reductions from electric construction equipment ($MTCO_2e$)	**107**	**812**	**1035**
Alternatively Fueled Construction Equipment			
Construction emissions ($MTCO_2e$), after electrification	5,237	4,604	4,414
Target renewable diesel or other alternative fuels rate for construction equipment	50%	75%	80%
Fuel lifecycle GHG reduction [1]	65%	65%	65%
GHG reductions from alternatively fueled construction equipment ($MTCO_2e$)	**1702**	**2244**	**2295**
Additional emissions from electricity use			
Diesel Emission Factors ($MTCO_2e$ per gal)	0.01050	0.01050	0.01050
Reduced Diesel usage due to transition (gal)	10,183	77,409	98,643
kWh per diesel gallon equivalent [2]	37.6	37.6	37.6
Electricity required to charge transitioned construction equipment (kWh) [3]	180,369	1,371,143	1,747,260
Charged amount (MWh)	180	1,371	1,747
Electricity emissions factor ($MTCO_2e$/MWh)	0.0011928	0.0005252	—
Additional GHG emissions from transitioned construction equipment ($MTCO_2e$)	**0**	**1**	—
TOTAL EMISSIONS REDUCTIONS ($MTCO_2e$)	**1,809**	**3,056**	**3,330**

Sources:

[1] https://afdc.energy.gov/fuels/renewable-diesel

[2] https://grcc.us/measuring-fuels-understanding-and-using-gasoline-gallon-equivalents/

[3] https://www.nrdc.org/bio/madhur-boloor/electric-vehicle-basics#:~:text=Electric%20motors%20convert%20over%2085,for%20a%20gas%20combustion%20engine. Accounts for electric motor efficiency versus combustion engine efficiency.

OR-1b & OR-1c

Transition to Zero-Emission Landscaping Equipment and Recreational Boats

OB-1b Transition to Zero-Emission Landscaping	2030	2040	2045
Emissions ($MTCO_2e$)	659	661	662
Gallons of gasoline	72,733	72,932	72,964
Target electrification rate for equipment	12%	85%	100%
Reduced gallons of gasoline	8,728	61,992	72,964
Increased kWh [1] [2]	139,647	991,873	1,167,428
Increased MWh	140	992	1167
Electric emissions factor ($MTCO_2e$ /MWh)	0.0012	0.0005	0.0000
Increased electric emissions ($MTCO_2e$)	0	1	0
GHG reductions from electric construction equipment ($MTCO_2e$)	**79**	**562**	**662**

OB-1c Transition to Zero-Emission Recreational Boats	2030	2040	2045
Emissions ($MTCO_2e$)	1248	1252	1252
Gallons of gasoline	139,792	140,174	140,237
Target electrification rate for equipment	1248	1252	1252
Reduced gallons of gasoline	139,792	140,174	140,237
Increased kWh [1] [2]	1248	1252	1252
Increased MWh	139,792	140,174	140,237
Electric emissions factor ($MTCO_2e$ /MWh)	1248	1252	1252
Increased electric emissions ($MTCO_2e$)	139,792	140,174	140,237
GHG reductions from electric construction equipment ($MTCO_2e$)	**149**	**938**	**1252**

Sources:

[1] https://grcc.us/measuring-fuels-understanding-and-using-gasoline-gallon-equivalents/

[2] https://www.nrdc.org/bio/madhur-boloor/electric-vehicle-basics#:~:text=Electric%20motors%20convert%20over%2085,for%20a%20gas%20combustion%20engine. Accounts for electric motor efficiency versus combustion engine efficiency.

OR-1d

Transition to Zero-Emission Agricultural Equipment

OR-1d	2030	2040	2045
Percent of Ag Equipment (excluding irrigation pumps) to switch to Tier 4 [1]	0%	0%	0%
Emissions from Ag Equipment (excluding irrigation pumps) ($MTCO_2e$)	50,766	44,858	42,332
Average Fuel Economy Savings by Switching from Tier 2 to Tier 4 Final [1]	0%	0%	0%
Emissions reduced from Ag Equipment switching to Tier 4 (excluding irrigation pumps) ($MTCO_2e$)	—	—	—
Percent of remaining Ag Equipment (excluding irrigation pumps) to become electrified	5%	10%	20%
Emissions reduced from Ag Equipment becoming electrified (excluding irrigation pumps) ($MTCO_2e$)	**2,538**	**4,486**	**8,466**
Percent of irrigation pumps to become electrified	5%	10%	20%
Emissions from irrigation pumps ($MTCO_2e$)	27,818	27,775	27,753
Emissions reduced from irrigation pumps becoming electrified ($MTCO_2e$)	**1,391**	**2,777**	**5,551**
Reduced Diesel usage due to electrification (gal)	372,858	689,240	1,330,126
kWh per diesel gallon equivalent [2]	37.64	37.64	37.64
Electricity required for transitioned agricultural equipment (kWh) [3]	6,604,419	12,208,459	23,560,450
Charged amount (MWh)	6,604	12,208	23,560
Electricity emissions factor ($MTCO_2e$/MWh)	0.0011928	0.0005252	—
Increased electric emissions ($MTCO_2e$)	8	6	—
GHG emissions reduction from ag equipment and irrigation pumps ($MTCO_2e$)	**3,921**	**7,257**	**14,017**

Sources:

[1] Engines should already be Tier 4, per https://ww2.arb.ca.gov/resources/documents/non-road-diesel-engine-certification-tier-chart. Assuming zero reductions as a conservative estimate.

[2] https://grcc.us/measuring-fuels-understanding-and-using-gasoline-gallon-equivalents/

[3] https://www.nrdc.org/bio/madhur-boloor/electric-vehicle-basics#:~:text=Electric%20motors%20convert%20over%2085,for%20a%20gas%20combustion%20engine. Accounts for electric motor efficiency versus combustion engine efficiency.

SW-1a & SW-1b

Increase Residential and Non-Residential Waste Diversion

SW-1	2030	2040	2045
SW-1a: Increase Residential Waste Diversion			
Residential Inside Jurisdiction			
Legislative-adjusted Solid Waste Emissions	28,487	28,843	29,017
Legislative-adjusted diversion rate (percent)	58%	58%	58%
Target diversion rate under measure (percent)	75%	85%	90%
Legislative-adjusted landfill rate (percent)	42%	42%	42%
Target landfill rate under measure (percent)	25%	15%	10%
Solid Waste Emissions After Reduced Landfill Rate	17,092	10,383	6,964
Emissions Reductions (MTCO2e)	**11,395**	**18,459**	**22,053**
Reductions as percent of leg-adjusted emissions	40%	64%	76%
New landfill rate is this percent of old landfill rate	60%	36%	24%
Residential Outside Jurisdiction			
Legislative-adjusted Solid Waste Emissions	1,407	1,425	1,433
Legislative-adjusted diversion rate (percent)	58%	58%	58%
Target diversion rate under measure (percent)	75%	85%	90%
Legislative-adjusted landfill rate (percent)	42%	42%	42%
Target landfill rate under measure (percent)	25%	15%	10%
Solid Waste Emissions After Reduced Landfill Rate	844	513	344
Emissions Reductions ($MTCO_2e$)	**563**	**912**	**1,089**
Reductions as percent of leg-adjusted emissions	40%	64%	76%
New landfill rate is this percent of old landfill rate	60%	36%	24%
SW-1b: Increase Non-Residential Waste Diversion	2030	2040	2045
Non-Residential Inside Jurisdiction			
Legislative-adjusted Solid Waste Emissions	40,341	40,845	41,091
Legislative-adjusted diversion rate (percent)	58%	58%	58%
Target diversion rate under measure (percent)	75%	85%	90%
Legislative-adjusted landfill rate (percent)	42%	42%	42%
Target landfill rate under measure (percent)	25%	15%	10%
Solid Waste Emissions After Reduced Landfill Rate	24,204	14,704	9,862
Emissions Reductions ($MTCO_2e$)	**16,136**	**26,141**	**31,229**
Reductions as percent of leg-adjusted emissions	40%	64%	76%
New landfill rate is this percent of old landfill rate	60%	36%	24%
Non-Residential Outside Jurisdiction			
Legislative-adjusted Solid Waste Emissions	1,993	2,017	2,030
Legislative-adjusted diversion rate (percent)	58%	58%	58%
Target diversion rate under measure (percent)	75%	85%	90%

SW-1	2030	2040	2045
Legislative-adjusted landfill rate (percent)	42%	42%	42%
Target landfill rate under measure (percent)	25%	15%	10%
Solid Waste Emissions After Reduced Landfill Rate	1,196	726	487
Emissions Reductions ($MTCO_2e$)	**797**	**1,291**	**1,543**
Reductions as percent of leg-adjusted emissions	40%	64%	76%
New landfill rate is this percent of old landfill rate	60%	36%	24%

WA-1

Retrofit Water Fixtures to Ultra-Low-Flow in Residential, Non-Residential Buildings, and Increase Production and Use of Recycled Water For Irrigation

WA-1	2019	2030	2040	2045
Retrofit Water Fixtures to Ultra-Low-Flow in Residential Buildings				
Water use (AF / year)	23,800	24,655	24,963	25,113
Existing Development	23,800	23,800	23,800	23,800
New development	—	855	1,163	1,313
Target percent reduction in water usage under measure (existing development)	—	25%	30%	35%
Target percent reduction in water usage under measure (new development)	—	25%	30%	35%
Water reduction (AF/year)				
In existing development	—	5,950	7,140	8,330
In new development	—	214	349	460
Total water reduction ((AF/year)	—	6,164	7,489	8,790
MWh reduction	—	8,081	9,818	11,524
Electricity emissions factor ($MTCO_2e$ /MWh)	—	0.0011928	0.0005252	—
GHG reduction from reduced water usage ($MTCO_2e$)	—	**10**	**5**	—
Retrofit Water Fixtures to Ultra-Low-Flow in Non-Residential Buildings				
Water use (AF / year)	11,200	11,602	11,747	11,818
Existing Development	11,200	11,200	11,200	11,200
New development	—	402	547	618
Target percent reduction in water usage under measure (existing development)	—	31%	36%	41%
Target percent reduction in water usage under measure (new development)	—	31%	36%	41%
Water reduction (AF/year)				
In existing development	—	3,472	4,032	4,592
In new development	—	125	197	253
Total water reduction ((AF/year)	—	3,597	4,229	4,845
MWh reduction	—	4,715	5,544	6,353
Electricity emissions factor ($MTCO_2e$ /MWh)	—	0.0011928	0.0005252	—
GHG reduction from reduced water usage ($MTCO_2e$)	—	**6**	**3**	—

WA-1	2019	2030	2040	2045
Increase Production and Use of Recycled Water for Irrigation				
Water use (AF / year)	465,000	481,696	487,716	490,660
Existing Development	—	465,000	465,000	465,000
New development	—	16,696	22,716	25,660
Target percent reduction in water usage under measure (existing development)	—	25%	30%	35%
Target percent reduction in water usage under measure (new development)	—	60%	70%	75%
Water reduction (AF/year)				
In existing development	—	116,250	139,500	162,750
In new development	—	10,017	15,902	19,245
Total water reduction ((AF/year)	—	126,267	155,402	181,995
MWh reduction	—	90,540	111,431	130,499
Electricity emissions factor ($MTCO_2e$ /MWh)	—	0.0011928	0.0005252	—
GHG reduction from reduced water usage ($MTCO_2e$)	—	**108**	**59**	—

AG-1.5

Increase Tree Cover

AG-1.5	2030	2040	2045
Annual sequestration rate per tree ($MTCO_2$)	0.0354	0.0354	0.0354
Target: Number of net new trees planted each year	1,254	1,254	1,254
Number of years	5	15	20
Number of trees planted over period in active growing stage in inventory year	6,270	18,810	25,080
GHG emissions reduction from sequestration	**222**	**666**	**888**

Sources:

[1] CAPCOA, 2010. Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures.

[2] Greenhouse Gas Mitigation Measures Assuming Implementation begins in 2025

[3] Based on NBS Targets downscaled to Monterey County considering the last target year (2045)

Appendix B

Climate Change Vulnerability Assessment

Climate Change Vulnerability Assessment

for the

County of Monterey

Community Climate Action and Adaptation Plan

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LIST OF ABBREVIATIONS

°F	degrees Fahrenheit
APG	*California Adaptation Planning Guide*
BLM	Bureau of Land Management
CAL FIRE	California Department of Forestry and Fire Protection
Cal OES	California Governor's Office of Emergency Services
Caltrans	California Department of Transportation
CC Report	*California's Fourth Climate Change Assessment: Central Coast Region Report*
CCAAP	*Community Climate Action and Adaptation Plan*
CCH1 Study	*Central Coast Highway 1 Climate Resiliency Study*
CCHPR	*Climate Change And Health Profile Report*
CDPH	California Department of Public Health
CEC	California Energy Commission
Climate Assessment	*California's Fourth Climate Change Assessment*
CNRA	California Natural Resources Agency
county	Monterey County
County	Monterey County government
CWPP	*Community Wildfire Protection Plan*
DCP	*North Monterey County Drought Contingency Plan*
EOP	*Emergency Operations Plan*
FEMA	Federal Emergency Management Agency
FHSZ	Fire Hazard Severity Zone
FMP	*Floodplain Management Plan*
FRA	Federal Responsibility Area
GHG	greenhouse gas
GWMP	*Groundwater Management Plan*
GWSP	*Groundwater Sustainability Plan*
IPCC	Intergovernmental Panel on Climate Change
LRA	Local Responsibility Area
m	meters
M1WCAAP	*Monterey One Water Climate Action and Adaptation Plan*
MCOES	Monterey County Office of Emergency Services
MFSC	Monterey Fire Safe Council
MJHMP	*Multi-Jurisdictional Hazard Mitigation Plan*
MPWMD	Monterey Peninsula Water Management District

OPR	California Governor's Office of Planning and Research
$PM_{2.5}$	fine particulate matter
PSPS	Public Safety Power Shutoff
RCP	Representative Concentration Pathway
Safeguarding California	*Safeguarding California Plan: 2018 Update*
SHS	State Highway System
SRA	State Responsibility Area
Strategy	*California Climate Adaptation Strategy*
SVBGSA	Salinas Valley Basin Groundwater Sustainability Agency
SVI	Social Vulnerability Index
SWRP	*Storm Water Resource Plan*
USFS	US Forest Service
VA	vulnerability assessment
WUI	wildland-urban interface

1 INTRODUCTION

Climate change is projected to exacerbate the impacts of certain hazards that Monterey County (hereafter referred to as "county") is exposed to under current conditions. These hazards are wide-ranging, and while many of these hazards have historically posed a risk to the county, the frequency and intensity of these hazards will likely increase as a result of climate change. The Monterey County government (hereafter referred to as "County") has prepared this vulnerability assessment (VA) to identify and analyze climate change effects that will impact the county. The primary effects of climate change include increased temperatures, changes in precipitation patterns, and sea level rise. These effects are expected to heighten and exacerbate risks posed by secondary climate change effects, including wildfires, extreme heat events, extreme precipitation and flooding, and drought. The level of impact from these climate change effects will vary across the county due to variations in physical, social, and economic characteristics.

The ultimate goal of the adaptation planning process is to improve overall community resilience in the face of a changing climate. A resilient community is one that is more prepared for current and future hazardous conditions and experiences less societal disruption when disaster strikes. Resilient communities can better prepare for and recover from hazards with an understanding that the climate will continue to change.

The VA is the first step in the County's adaptation planning process and will serve to inform the development of adaptation strategies. The purpose of the VA is to analyze the county's exposure to existing hazards, to evaluate sensitivity to these hazards and identify potential climate-related impacts from these hazards, and to determine the County's existing capacity to prepare for and adapt to these impacts, known as adaptive capacity. The next step in the County's adaptation planning process will include the development of adaptation strategies. These strategies will be included in the County's *Community Climate Action and Adaptation Plan* (CCAAP) and General Plan Safety Element Update (Safety Element), which will provide the County with a roadmap to reduce its contributions to climate change while simultaneously preparing for its impacts.

1.1 CLIMATE CHANGE BACKGROUND

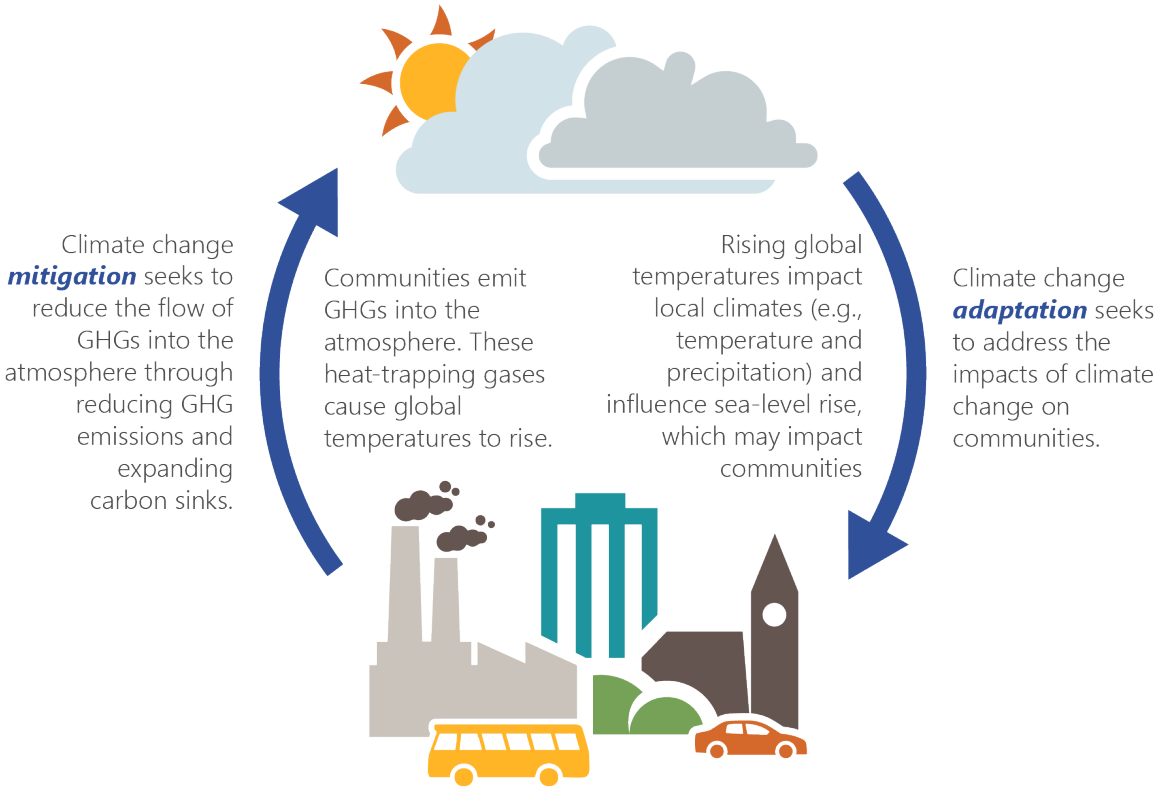
Since the beginning of the Industrial Revolution in the late 18th century, human activities—primarily the combustion of fossil fuels for electricity, heat, and transportation—have released an excessive amount of greenhouse gases (GHGs) into Earth's atmosphere. Significantly elevated levels of GHG emissions have intensified the greenhouse effect and have led to an unprecedented trend of human-caused (i.e., anthropogenic) warming of Earth's climate, among other climatic disruptions, known as climate change. There are many effects and associated impacts stemming from climate change that intersect with multiple facets of human society, and though it is a global issue, it is an issue that will be, and already is, experienced differently around the world. Over time, it has increasingly become a priority to address climate change at multiple scales as weather patterns become more extreme, temperatures continue to rise, and polar ice caps continue to melt.

The average global surface temperature is expected to increase approximately 8 degrees Fahrenheit (°F) by the end of the century unless additional efforts to reduce GHG emissions are made (IPCC 2021). Depending on future GHG emissions levels, annual average maximum daily temperatures in California are projected to increase between 4.4 °F and 5.8 °F by 2050 and by 5.6 °F to 8.8 °F by 2100 (Pierce et al. 2018, cited in OPR, CEC, and CNRA 2018a). Temperature changes in the Central Coast region are expected to be consistent with California as a whole, with projected increases between roughly 5 °F and 8 °F by the end of the century (OPR, CEC, and CNRA 2018b). The state and the county have already begun to experience extreme weather effects, the frequency and intensity of which have been worsened by climate change (OPR, CEC, and CNRA 2018a). Extreme weather effects such as precipitation volatility (i.e., dramatic changes over a short period of time), increased average temperatures, and increased frequency of extreme heat events have led to increases in the frequency and intensity of human health and safety hazards such as wildfires, droughts, and changes to water supply.

While it remains imperative to drastically reduce global GHG emissions, it is equally important for communities to engage in adaptation planning to prepare for and strengthen resilience to the adverse impacts of climate change. Local efforts are critical in building climate resilience—the capacity of a community to prepare for and withstand disruptions, to recover from shocks and stressors, and to adapt and grow from turbulent experiences related to climate change—and can lead to a greater understanding of climate risks and strategies to reduce their impacts. There are many plans, policies, and programs in place at the local and regional levels that address existing climate-related hazards. In some cases, these may be sufficient to address the potential for climate change to worsen existing hazards. In other cases, significant gaps exist, and new policies are needed. This VA intends to identify and address those gaps.

1.2 CLIMATE CHANGE MITIGATION AND ADAPTATION

Addressing climate change requires an integrated approach that targets both the sources of climate change and its effects. Targeting the sources of climate change is known as climate change mitigation and primarily involves reducing the flow of GHGs into the atmosphere. This can happen through the direct reduction of anthropogenic GHG emissions, or by enhancing carbon sinks (i.e., carbon sequestration), which capture and remove GHGs from the atmosphere, most notably carbon dioxide. The goal of climate change mitigation is to avoid significant human interference with the global climate, and the extent to which climate change mitigation efforts are implemented today will likely determine the severity of climate change and its effects in the future. However, even in a scenario where anthropogenic GHG emissions were drastically and instantaneously reduced today, Earth will still endure some degree of climate change and its associated effects. Adjusting to the effects of climate change that are already occurring and preparing for those that are anticipated to occur in the future is known as climate change adaptation. Climate change adaptation planning aims to enhance the resilience of communities to climate change impacts through analyzing jurisdiction-specific climate-related vulnerabilities and developing strategies to respond to and prepare for current and future impacts. Figure 1 illustrates the relationship between climate change mitigation and climate change adaptation.



Source: Cal OES 2020; adapted by Ascent Environmental in 2022.

Figure 1 Relationship between Climate Change Mitigation and Adaptation

Climate change mitigation and adaptation are both crucial components of comprehensive climate change planning. While mitigation and adaptation are often separate planning efforts, it is important to consider both components within the overall climate action planning process. Many initiatives that focus on climate mitigation and reducing GHG emissions support climate adaptation objectives, and vice versa. These are referred to as 'co-benefits.' For example, renewable energy installations combined with battery storage systems will reduce reliance on fossil fuel-generated grid electricity, but they will also improve energy independence and resilience in the face of hazards exacerbated by climate change that threaten energy infrastructure; thus, this initiative would yield adaptation benefits as well as GHG emissions reductions. Similarly, building energy efficiency improvements, such as improving insulation in a home or structure, will help to combat extreme heat events and decrease risks to humans of heat-related illnesses, but it will also reduce cooling demands and thus save energy, reducing (i.e., mitigating) GHG emissions associated with energy consumption. Combining climate mitigation and adaptation in the climate action planning process is becoming an increasingly common approach taken by jurisdictions to address climate change.

1.3 REGULATORY SETTING

State law requires communities to address climate change adaptation through several planning processes, such as the development of general plans (Cal OES 2020). Specifically, Senate Bill (SB) 379 requires all cities and counties to include climate adaptation and resiliency strategies in the next update of their general plans beginning January 1, 2017. The update must include:

A vulnerability assessment that identifies the risks that climate change poses to the local jurisdiction and the geographic areas at risk from climate change impacts;

A set of adaptation and resilience goals, policies, and objectives based on the information specified in the climate vulnerability assessment for the protection of the community; and

A set of feasible implementation measures designed to carry out the goals, policies, and objectives identified pursuant to the adaptation objectives.

Specifically, this VA satisfies the first requirement of SB 379 (i.e., vulnerability assessment), while the other two requirements (i.e., adaptation and resilience goals, and implementation measures) will be addressed later in CCAAP and Safety Element development.

1.4 GUIDANCE DOCUMENTS

Several key guidance documents and resources that were used to help develop the VA, developed by the State, are outlined in the following section.

1.4.1 California Adaptation Planning Guide

The most recent version of the *California Adaptation Planning Guide* (APG) was released in June 2020 and was prepared by the California Governor's Office of Emergency Services (Cal OES). This update builds upon the first iteration of the APG that was released in 2012, and reflects the latest best practices, integrates recent updates to State plans, policies, programs, and regulations, and ensures that communities have guidance on using the best available science and information. The purpose of the APG is to provide guidance to local governments for climate change adaptation and resiliency planning, primarily through a step-by-step process that communities can use to plan for the impacts of climate change. The APG is designed to be flexible and guide communities through an adaptation planning process that is best suited for their needs (Cal OES 2020).

1.4.2 California's Fourth Climate Change Assessment

The California Governor's Office of Planning and Research (OPR), the California Energy Commission (CEC), and the California Natural Resources Agency (CNRA) prepared *California's Fourth Climate Change Assessment* (Climate Assessment) in 2018. The Climate Assessment was designed to address critical information gaps that decision makers at the State, regional, and local levels need to close to protect and build the resilience of people, infrastructure, natural systems, working lands, and waterways to the impacts of climate change. The Climate Assessment also includes regional reports, which analyze and discuss the impacts to specific regions in the state, including *California's Fourth Climate Change Assessment: Central Coast Region Report* (CC Report), which encompasses the county. The Climate Assessment and CC Report are referenced throughout this VA to provide information regarding regional climate change impacts.

1.4.3 Safeguarding California Plan

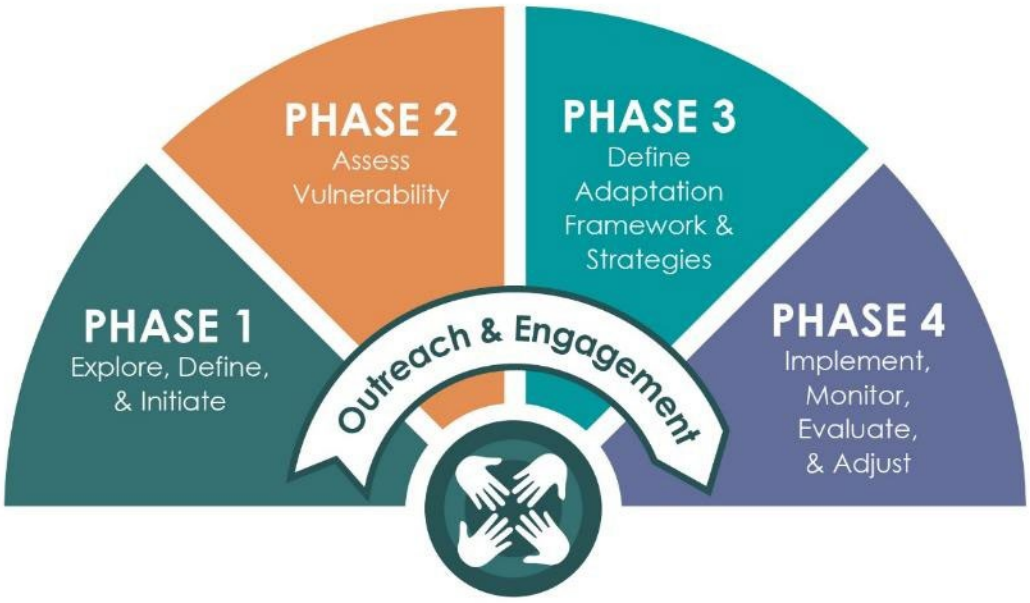
Alongside the update to the Climate Assessment, CNRA released the *Safeguarding California Plan: 2018 Update* (Safeguarding California), which serves as a roadmap for State government action to build climate change resilience. Safeguarding California provides a holistic overview of the State's current and planned efforts to address the ongoing and forthcoming impacts of climate change, and identifies actions the State will take to protect communities, infrastructure, services, and the natural environment from climate change.

1.4.4 California Climate Adaptation Strategy

Every 3 years, California is required to issue an updated statewide climate adaptation strategy. In April 2022, CNRA, in partnership with OPR's Integrated Climate Adaptation and Resiliency Program, officially released the *California Climate Adaptation Strategy* (Strategy), which serves as an update to Safeguarding California. The Strategy is organized around six outcome-based priorities and integrates key elements from numerous State plans and strategies, including statewide climate action plans, sector-based strategies, regionally focused strategies, and State stewardship plans. Each outcome-based priority consists of several unique goals, and each goal is comprised of specific climate actions that can be taken towards achieving that goal. The Strategy also identifies success metrics and an implementation timeline for each action within the strategy. The Strategy reflects the State's commitment to integrating climate resilience into the work of all State agencies, and this collective, statewide effort will ultimately support local communities.

1.5 ADAPTATION PLANNING PROCESS

The APG provides guidance for communities throughout the state in planning for and adapting to the impacts of climate change. The APG includes a four-phase process, illustrated in Figure 2 and discussed below, which allows communities to assess locally specific climate vulnerabilities and develop strategies to reduce climate change-related risks. This VA incorporates Phase 2, while Phases 3 and 4 will be addressed later in CCAAP and Safety Element development.



Source: Cal OES 2020; adapted by Ascent Environmental in 2022.

Figure 2 Adaptation Planning Process

Phase 1, "Explore, Define, and Initiate," includes scoping and defining the adaptation planning effort. Phase 1 also involves identifying key roles and stakeholders in the local government and throughout the community to contribute to the planning process. Potential climate change effects and important physical, social, and natural assets in the community are identified for further analysis.

Phase 2, "Assess Vulnerability," includes an analysis of potential climate change impacts and adaptive capacity to determine the vulnerability of populations, built environment, and community functions. The vulnerability assessment is composed of four steps: exposure, sensitivities and potential impacts, adaptive capacity, and vulnerability scoring. Phase 2 also integrates stakeholder and public input to provide a comprehensive assessment of the community's sensitivity to climate change and its ability to adapt.

Phase 3, "Define Adaptation Framework and Strategies," focuses on creating an adaptation framework and developing adaptation strategies based on the results of the vulnerability assessment. Adaptation strategies identify how the community will address the potential for harm based on the community's resources, goals, values, needs, and regional context. Community input is needed to prioritize adaptation strategies, identify co-benefits of strategies, and determine implementation steps.

In **Phase 4, "Implement, Monitor, Evaluate, and Adjust,"** the adaptation framework is implemented, consistently monitored and evaluated, and adjusted based on continual learning, feedback, and/or triggers.

2 VULNERABILITY ASSESSMENT

This section provides a comprehensive assessment of the county's vulnerabilities to climate change. It identifies and characterizes the climate change effects and other related hazards that are anticipated to impact the county. The VA follows the process outlined in Phase 2 of the APG and is composed of the following four steps:

Exposure: The purpose of this step is to understand existing hazards within the county and how changes in climate variables (e.g., average temperature, precipitation) are projected to influence these hazards. Existing hazards that are likely to be exacerbated by the effects of climate change are identified and described, based on historical data from sources such as the County's *Multi-Jurisdictional Hazard Mitigation Plan* (MJHMP). Climate projection data are used to

develop forecasts for how existing hazards are expected to change within various timescales, including the near-term (Current-2050), midterm (2040-2069), and long-term (2070-2099).

Sensitivity and Potential Impacts: This step identifies the population groups and community assets that are sensitive to localized climate impacts. Hazards influenced by climate change (e.g., flooding, wildfire) are generally projected to increase in severity, and additionally, climate change may generate new impacts that communities have not experienced historically. Using historical data, research from regional and State reports on climate impacts, and input from stakeholders, this step seeks to assess the degree of sensitivity of the populations and assets based on the potential impacts of each exposure. Key populations and assets identified in the county are organized into three overarching categories: populations, built environment, and community functions. Each hazard included in the VA is analyzed and assigned a potential impact score using the criteria in Table 1.

Table 1 Potential Impact Scoring

Score	Potential Impact Scoring Description
Low	Impact is unlikely based on projected exposure; would result in minor consequences to public health, safety, and/or other metrics of concern.
Medium	Impact is somewhat likely based on projected exposure; would result in some consequences to public health, safety, and/or other metrics of concern.
High	Impact is highly likely based on projected exposure; would result in substantial consequences to public health, safety, and/or other metrics of concern.

Source: Cal OES 2020.

Adaptive Capacity: The purpose of this step is to identify the County's current capacity to address future climate impacts, referred to as adaptive capacity. The County, partner agencies, and regional organizations have already taken steps to build resilience and protect sensitive populations and assets from existing hazards. The ability of the County to adapt to each of the identified climate impacts is determined through a review of existing plans, policies, and programs, and through stakeholder engagement. Adaptive capacity scoring is described in Table 2. A summary of partner agencies and regional organizations and their climate adaptation-related work is included in Section 2.3, "Adaptive Capacity."

Table 2 Adaptive Capacity Scoring

Score	Adaptive Capacity Scoring Description
Low	The County lacks capacity to manage climate change effect; major changes would be required.
Medium	The County has some capacity to manage climate change effect; some changes would be required.
High	The County has high capacity to manage climate change effect; minimal to no changes are required.

Source: Cal OES 2020.

Vulnerability Scoring: This step characterizes the County's vulnerability to each climate change effect. Vulnerability scores are based on several factors including the severity of projected climate impacts, how sensitive certain populations and assets are to anticipated climate impacts, and whether sufficient adaptive capacity exists to manage future climate impacts. Higher vulnerability scores (5 being the highest) indicate that a climate change effect should be prioritized earlier than those with lower scores (1 being the lowest). This scoring helps the County understand which climate vulnerabilities are most urgent and should be prioritized during the adaptation strategy development process. Table 3 presents the rubric used to determine the overall vulnerability scores, which is derived from ratings for potential impacts and adaptive capacity.

Table 3 Vulnerability Scoring

		Vulnerability Score		
Potential Impacts	High	3	4	5
	Medium	2	3	4
	Low	1	2	3

	High	Medium	Low
	Adaptive Capacity		

Source: Cal OES 2020.

2.1 EXPOSURE

This section includes the exposure analysis, which relies on existing planning documents and resources to understand the county's current hazards, and climate modeling to identify how these hazards are projected to change in the future. To better contextualize the county's exposure to these hazards, an overview of the county is presented first.

2.1.1 Monterey County Overview

Monterey County is located in the Central Coast region of California, and in terms of proximity to major cities, it is about 110 miles south of San Francisco and 320 miles north of Los Angeles. It is bounded by Santa Cruz County to the north, San Benito, Fresno, and King Counties to the east, San Luis Obispo County to the south, and the Pacific Ocean to the west. The county is one of the largest in the state, covering over 3,700 square miles, of which 13 percent is water, and nearly 100 miles of majestic coastline—the most of any county in the state—which includes Big Sur, the Monterey Peninsula, and the Monterey Bay. Elevation within the county ranges from sea level to 5,862 feet at Junipero Serra Peak, which is located 12 miles inland in the Santa Lucia mountain range. This mountain range is one of two major northwest-southeast mountain ranges in the county, with the other being the Gabilan mountain range along the eastern border of the county. Both mountain ranges are encompassed within the larger Pacific Coast Range, and between the two mountain ranges lies the agriculturally rich Salinas Valley, also known as the "Salad Bowl of the World." The Salinas River flows through the valley and is the largest river in the Central Coast region. The county includes 12 incorporated cities and 16 unincorporated areas, though the focus of this VA is on the unincorporated areas of the county. There are two major north-south highways within the county, with Highway 1 offering scenic views of the California coast, and Highway 101 bisecting the county, providing access to the Salinas Valley and the Monterey Peninsula (County of Monterey 2022a).

The climate in the county is considered "Mediterranean," which is associated with historically dry summers, rainy winters, and moderate temperatures throughout the year. Precipitation in the county mainly falls between November and April, and there are large variations in rainfall between coastal and inland areas, as well as from a year-to-year standpoint (County of Monterey 2022a). Regarding the county's economy, agriculture is the largest sector in terms of output and employment, and is the third largest agricultural county in the state. Tourism is the next largest sector of the county's economy, where nearly 4.6 million visitors are drawn to the county on an annual basis, followed by government (County of Monterey 2022b).

2.1.2 Existing Hazards

The MJHMP, the County's *Emergency Operations Plan* (EOP), and an array of additional plans and sources provide a comprehensive understanding of natural and anthropogenic hazards that have historically threatened the county. Acknowledging the existence of this wide array of hazards, for the purpose of this VA, the focus will be on hazards that may be exacerbated by climate change. Some of the hazards linked to climate change that these documents evaluate include coastal erosion, drought, flooding, severe weather, and wildfire. The following sections discuss these existing hazards as evaluated by the County, drawing from other sources as needed, and are presented alphabetically—the order in which they are presented is not determined by level of importance, severity, or otherwise.

COASTAL EROSION

Erosion, in general, is referred to by the EOP as "a process that involves the wearing away, transportation, and movement of land" (County of Monterey 2020). Coastal erosion is defined by the MJHMP as "the natural geological process resulting in loss of sand, sediment, vegetation, or soil on beaches, dunes, bluffs, or cliffs along the coast"

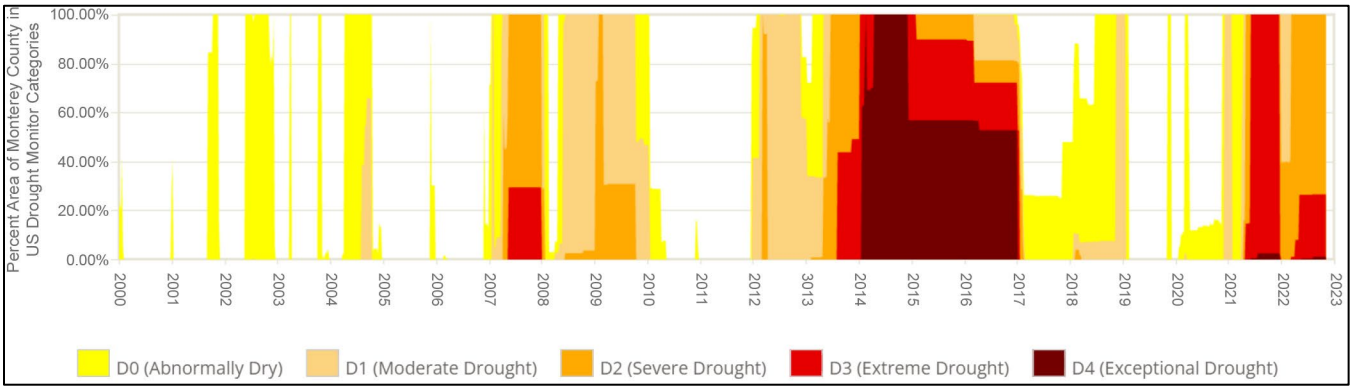
(County of Monterey 2022a). Coastal erosion is a natural process, but its effects can be exacerbated by human activity. It can take place both gradually over time, caused by multiyear impacts and longer-term changes such as sea level rise, lack of sediment supply, subsidence, or human factors such as the construction of shore protection structures, and rapidly, as with landslides or severe storms. Coastal erosion within the county has primarily occurred during periods of intense wave action coinciding with high tides and coastal storms, and average rates of historic beach and cliff erosion, along with shoreline retreat, are expected to accelerate in future years, largely as a result of sea level rise. However, future erosion rates are difficult to project due to variable processes and uncertainty in sea level rise projections (County of Monterey 2022a).

Coastal erosion can cause an array secondary effects and impacts. For example, erosion can destabilize roads, structures, and utility lines along the coast. Additionally, it can cause damage to rivers or streams, potentially harming water quality, fisheries, and spawning habitat. It can also exacerbate the risk of landslides in certain areas, as well as flood risk by destroying important coastal dunes and cliffs, which can provide key flood control benefits (County of Monterey 2022a).

DROUGHT

According to the MJHMP, drought refers to a "significant decrease in water supply relative to what is typical in a given location," and is defined by the EOP as a "natural climatic condition caused by an extended period of limited rainfall beyond that which occurs naturally in a broad geographic area" (County of Monterey 2020, 2022a). As identified in the MJHMP, droughts are often classified as one of four types: meteorological, agricultural, hydrological, and socioeconomic. Meteorological droughts are related to the level of dryness when compared to an average/normal amount of precipitation over a given period of time. Agricultural droughts relate common characteristics of drought to their specific agricultural-related impacts (e.g., when the amount of moisture in soil does not meet the demands of a particular crop). Hydrological droughts are directly related to the effect of precipitation shortfalls on water supplies, both surface and groundwater. Lastly, socioeconomic drought is the result of water shortages that adversely affect people and limit the ability to supply water-dependent products in local and regional markets (County of Monterey 2022a).

Overall, the frequency and severity of droughts can vary. According to historical data prepared by the National Drought Mitigation Center, the county has experienced some level of drought in almost every year of the 21st century thus far (2022). Figure 3 displays a time series of the percent area of the county classified within the five US Drought Monitor categories (i.e., D0, D1, D2, D3, and D4) since 2000. As displayed in the figure, the period from roughly 2012 to 2016 was a period of intense and prolonged drought, with much of the county experiencing multiple years of exceptional drought (i.e., D4). The drought during this period was one of the most severe droughts on record and it affected the entire state to the point where Governor Brown declared a statewide drought emergency in 2014, which was not lifted until 2017. The severity of any drought is dependent on the degree of moisture deficiency, the duration, and the size of the affected area (County of Monterey 2022a, 2022c).



Source: NDMC 2022.

Figure 3 Percent Area of Monterey County in US Drought Monitor Categories Time Series

Drought has proven to have an array of adverse impacts on the county, ranging from public health and safety impacts to economic and environmental impacts, and according to the MJHMP and the County's *Community Resilience Plan*, drought is the "highest hazard risk" (County of Monterey 2022d). Drought impacts increase with the length of a drought, and the magnitude of these impacts are correlated directly with groundwater supplies, reservoir storage, and development densities. Additionally, drought often exacerbates, or is often accompanied by, an array of other hazards, including extreme heat, seawater intrusion, wildfire, and debris flows (County of Monterey 2022a, 2022c).

FLOODING

The MJHMP and EOP define a flood as "the accumulation of water where usually none occurs or the overflow of excess water from a stream, river, lake, reservoir, or coastal body of water onto adjacent floodplains" (County of Monterey 2020, 2022a). There are four types of flooding that occur within the county: riverine flooding, coastal flooding, flash flooding, and stormwater runoff flooding. Riverine flooding is overbank flooding of rivers and streams, and typically result from large-scale weather systems that generate prolonged rainfall over a wide geographic area. Coastal flooding, also known as tidal flooding, is characterized by inundation of normally dry lands by bay waters, often caused by extreme high tide events (i.e., king tide) that result in shallow flooding of low-lying coastal areas. Coastal flooding is typically associated with storms originating in the Pacific Ocean and are most common between November and February of each year. Flash flooding is defined by the National Weather Service as a rapid and extreme flow of high water into a normally dry area, or a rapid water level rise in a stream or creek above a predetermined flood level, and often occur with little to no warning, typically beginning within six hours of the rain event that causes them. Lastly, because urban storm drainpipes and pump stations have a limited capacity, stormwater runoff flooding happens when prolonged heavy rainfall contributes to a large volume of runoff resulting in high peak flows of moderate duration. These events most frequently occur in flat areas and in urbanized settings with large, impermeable surfaces (County of Monterey 2022a). Based on these types of flooding that occur in the county, the areas that are at highest risk, inherently, are the valleys, areas adjacent to rivers, the sloughs, and low-lying coastal areas (County of Monterey 2022d).

Flooding is a dangerous hazard that has adversely impacted the county in the past and will likely continue to do so in the future. They have the ability to directly affect populations, property, critical facilities and other infrastructure, the environment, and the economy. Within the county, both 100-year floodplains and 500-year floodplains exist. A 100-year floodplain is one that has a 1 percent chance (i.e., a 1-in-100 chance) of experiencing a flood in any given year, whereas a 500-year floodplain is one that has a 0.2 percent chance (i.e., a 1-in-500 chance) of experiencing a flood in any given year. Figure 4 displays where the 100- and 500-year floodplains are located within the county. Roughly 230 square miles of the county's total area, more than 7 percent of the county, is encompassed by these floodplains, and more than 10 percent of the county's unincorporated population resides in these areas. Additionally, almost 3,500 residential buildings, 440 nonresidential buildings, and 11 critical facilities lie within the county's floodplains, along with over 40 miles of highway, 15 miles of railway, and over 80 bridges (County of Monterey 2019a). From 1953 to 2021, the county experienced a total of 28 hazard events resulting in Major Disaster Declarations, five of which were flooding events (FEMA 2021). For context, a Major Disaster Declaration is any major disaster resulting from a natural event that the President of the US determines has caused damage of such severity that it is beyond the combined capabilities of State and local governments to respond to. Major Disaster Declarations provide a wide range of Federal assistance programs for individuals and public infrastructure, including funds for both emergency and permanent work. Figure 6 displays the types of each of these 28 Major Disaster Declarations the county has endured. Recently, and most notably, the county experienced a series of flooding events in January and February of 2017 caused by atmospheric rivers, which caused widespread damage throughout the county, including an estimated $52 million in damages to roads within the county (County of Monterey 2022a).



Source: Data downloaded from FEMA in 2021.

Figure 4 Monterey County Floodplains

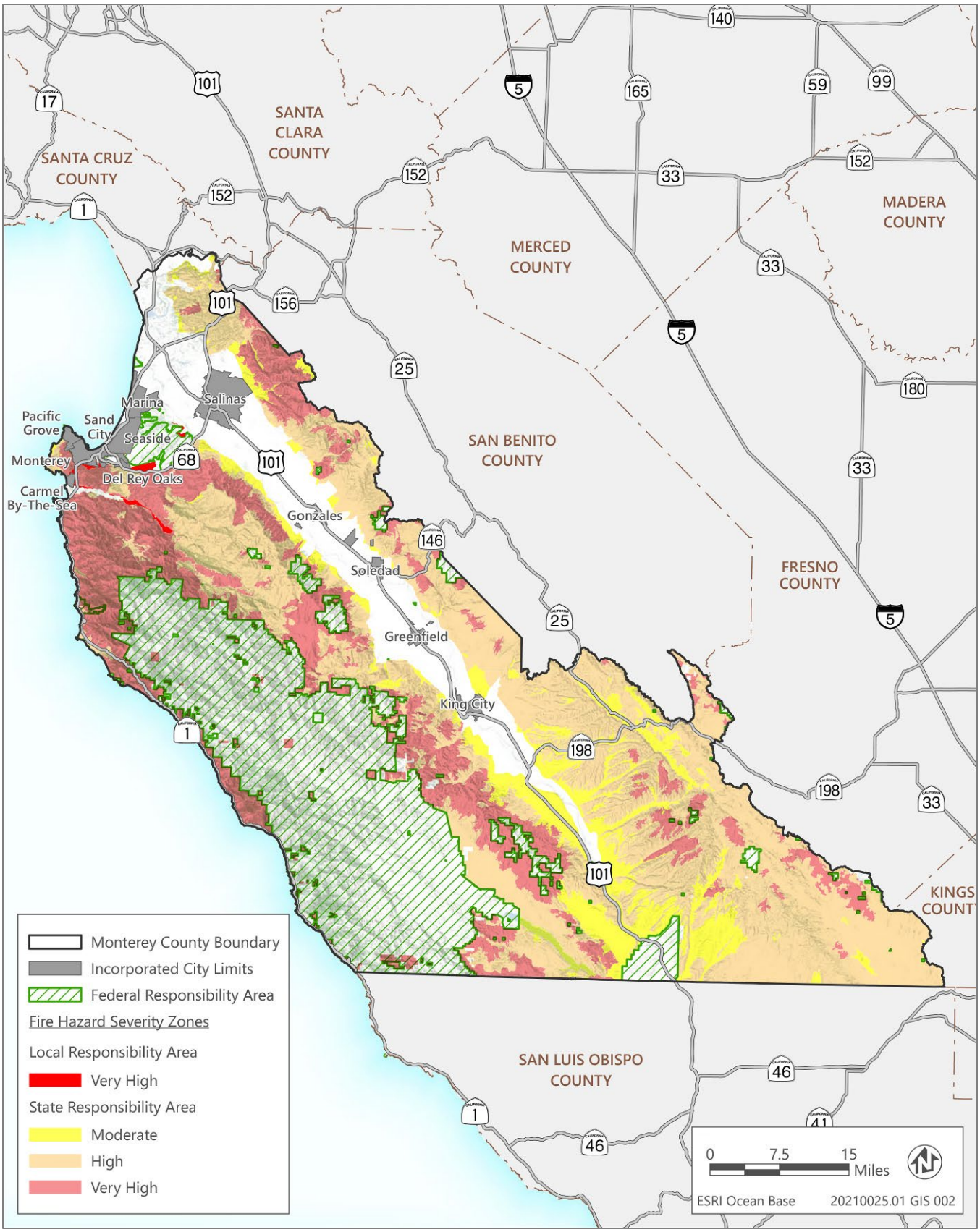
SEVERE WEATHER

Severe weather is an intrinsically broad hazard and encompasses several types of severe weather events. According to the MJHMP, severe weather refers to "any dangerous meteorological phenomena with the potential to cause damage, serious social disruption, or loss of human life" (County of Monterey 2022a). Generally, severe weather can be categorized into two groups: general severe weather, which includes systems that form over wide geographic areas, and localized severe weather, which include systems with a more limited geographic area. Of the broad array of severe weather events that are encompassed within this hazard, there are four types that most commonly impact the county: severe winter storms, extreme cold and freeze, windstorms, and extreme heat. Severe winter storms in the county primarily consist of heavy rain events, but are sometimes accompanied by thunderstorms, high winds, dense fog, hail, and freeze events. Extreme cold and freeze refers to a particularly cold spell of weather where the temperature drops below 32 °F. Windstorms are typically short-duration events involving straight-line winds or gusts of over 50 miles per hour, strong enough to cause property damage. Lastly, extreme heat refers to the unexpected, unusual, or unseasonably hot temperatures that can create dangerous situations (County of Monterey 2022a).

Of the four most common types of severe weather events in the county, the ones that are most likely to be exacerbated by climate change are severe winter storms and extreme heat. The occurrence of severe winter storms in the county are largely influenced by both "El Niño," which is the warm phase of the El Niño-Southern Oscillation ocean-atmosphere system, along with atmospheric rivers. El Niño is a climate pattern that occurs every few years and brings above-average precipitation to many states, especially California. Atmospheric rivers are long, narrow regions in the atmosphere that transport most of the water vapor carried away from the tropics, which are often released in the form of rain across the county, along with the state as a whole. Higher annual precipitation in the county has historically occurred along the coast near Big Sur, in the Del Monte Forest, and in the hills above the Salinas Valley, and these areas may be more likely to experience heavy rain during a severe winter storm. Proximity to extreme heat in the county varies depending on location and elevation. Historically, coastal temperatures are lower, while inland and higher elevation areas experience a greater range of temperatures, including extreme heat (County of Monterey 2022a). Both severe winter storms and extreme heat, along with severe weather in general, have proven to have adverse impacts throughout the county, specifically on populations, property, critical facilities and infrastructure, the environment, and the economy.

WILDFIRE

The MJHMP defines a wildfire as "any uncontrolled fire occurring on undeveloped land that requires fire suppression," and can be anthropogenic or caused by natural events, such as lightning (County of Monterey 2022a, 2022e). There are three primary factors that significantly contribute to wildfire behavior: topography, fuel, and weather. Topography influences wildfire behavior through slope—as slope increases, the rate of fire spread also increases. Additionally, slopes facing the south are subject to more solar radiation, typically making them drier and intensifying wildfire behavior. The most significant topographic variation is found in the eastern and western portions of the county, which are characterized by steep slopes, deep canyons, and narrow valleys. Fuel refers to vegetation, and the type and condition of vegetation plays a major role in the occurrence and spread of wildfires. Certain types of plants, and dense or overgrown vegetation, are more susceptible to burning and/or increase the amount of combustible material available to fuel wildfires. Lastly, the most variable factor influencing wildfire behavior is weather. Weather components, such as temperature, relative humidity, wind, and lightning can affect wildfire ignition and spread. Within the county, the intersection of marine and land air masses over uneven topography is extremely common and can significantly exacerbate wildfire behavior (County of Monterey 2022a, 2022e). Fire Hazard Severity Zones (FHSZs), which are designated by the California Department of Forestry and Fire Protection (CAL FIRE), represent zones in the county with varying degrees of fire hazard, ranging from "Moderate," "High," and "Very High," and are based on the factors presented above (i.e., topography, fuel, weather). Figure 5 displays FHSZs in the county.



Source: Data downloaded from CAL FIRE in 2022.

Figure 5 Monterey County Fire Hazard Severity Zones

There are many entities that have responsibility for wildfire protection within any jurisdiction, ranging from local and tribal organizations all the way to Federal organizations. To address wildfire jurisdictional responsibilities, the State Legislature has designated Local Responsibility Areas (LRAs), State Responsibility Areas (SRAs), and Federal Responsibility Areas (FRAs), which are all prevalent in the county. FRAs encompass fire-prone wildland areas that are owned or managed by a Federal agency, which in the county include the US Forest Service (USFS), National Park Service, Department of Defense, US Bureau of Land Management (BLM), and the California National Guard. SRAs include land in the state where CAL FIRE has legal and financial responsibility for wildfire protection, which includes forested lands, but does not include incorporated cities or Federal lands. LRAs include land in cities, cultivated agricultural lands, and other lands that otherwise do not meet the criteria for SRAs or FRAs (County of Monterey 2022a, 2022e).

Wildfires have proven to be costly and have put many elements of the county at risk, including human lives, property, rivers and watersheds, open space, timber, recreation, wildlife habitats, historic and cultural assets, scenic assets, and local economies, among others. Of the 28 hazard events resulting in Major Disaster Declarations the county has experienced from 1953 to 2021, 7 of them were wildfire events, which are displayed in Figure 6 alongside the other types of Major Disaster Declarations the county has experienced (FEMA 2021). For example, in July of 2016, the county endured the Soberanes Fire, which was caused by an illegal campfire in Garrapata State Park. At the time, it was the costliest wildfire to suppress in US history, amounting to roughly $260 million and burning over 132,000 acres (County of Monterey 2022a, 2022e).



Note: Drought disasters are typically designated by the US Department of Agriculture, and thus, are rarely captured in Major Disaster Declarations.

Source: FEMA 2021.

Figure 6 Types of Major Disaster Declarations (Federal) in Monterey County from 1953-2021

2.1.3 Climate Change Effects

Climate change effects are categorized as primary (direct) and secondary (indirect). Primary effects are those that are caused by the initial impacts of increased GHG emissions, from which secondary effects result. The primary climate change effects analyzed for the county include increased temperatures, changes in precipitation patterns, and sea level rise. The secondary climate change effects, which can occur because of individual changes or a combination of changes in the primary climate change effects, include increased wildfire risk, increased frequency of extreme heat events, extreme precipitation and flooding, and drought and water supply.

Though the precise extent of future climate change effects is uncertain, historical climate data and forecasted GHG emissions can be used to project climate change effects through near-term (Current-2050), midterm (2040-2069), and long-term (2070-2099) timescales, unless noted otherwise for individual climate change effects. The time periods are established as 30-year time intervals to gather accurate data on average changes in the climate, which is typically measured over 30-year periods or longer. This results in overlap among some time periods. Due to annual fluctuations in climate variables, climate data on shorter periods may be less accurate and not reflect long-term averages (NOAA 2020). To assess potential effects from climate change, the APG recommends using Cal-Adapt, a tool developed by the CEC and the University of California, Berkeley Geospatial Innovation Facility that uses global climate simulation model data to identify how climate change might affect various geographies in California. Cal-Adapt addresses the uncertainty in future GHG emissions by using Representative Concentration Pathways (RCPs) developed by the Intergovernmental Panel on Climate Change (IPCC). These RCPs depict two future emissions scenarios. RCP 4.5 represents a lower emissions scenario in which GHG emissions continue to rise through 2040 and then decrease to below 1990 levels by the end of the century. RCP 8.5 represents a high emissions scenario, or business-as-usual scenario, where GHG emissions continue to increase through the end of the century. As recommended by the APG, this VA evaluates near-term and midterm climate change effects and their associated impacts under the high emissions scenario, as this takes a conservative approach and assumes a worst-case scenario. Additionally, changes in climate variables for these timescales are similar under both the low and high emissions scenarios. Because long-term global GHG emissions trends are less certain and climate impacts vary more considerably between scenarios, a discussion of both the low and high emissions scenarios is included for this timescale (OPR, CEC, and CNRA 2018a).

Cal-Adapt downscales global climate models to local and regional resolutions using the Localized Constructed Analogs statistical technique. Four of the models included have been selected by California's Climate Action Team Research Working Group as priority models for research contributing to the Climate Assessment. The first model, CanESM2, represents an "average" simulation. The second model, CNRM-CM5, represents a "cooler/wetter" simulation. The third model, HadGEM2-ES, represents a "warmer/drier" simulation. The fourth model, MIROC5, represents a "dissimilar" simulation that is most unlike the other three to produce maximal coverage of possible future climate conditions. To analyze climate projections for the county, the average of the downscaled data provided by these four models were used. The boundaries of the study area for this analysis are the geographic boundaries of the county. It is important to note that although incorporated areas of the county are included within this boundary, their inclusion does not affect the overall results of the analysis because the climate data associated with these small geographic regions are nearly identical to the data associated with the surrounding study area.

PRIMARY CLIMATE CHANGE EFFECTS

Increased Temperatures

According to Cal-Adapt, the historic (1961-1990) average annual maximum temperature for the county is 69.8 °F, and the historic average annual minimum temperature is 41.6 °F. As shown in Table 4, both are projected to increase throughout the century. The average annual maximum temperature in the county is projected to increase to 73.1 °F in the near-term and 74.9 °F in the midterm under RCP 8.5. The average annual maximum temperature is projected to increase to 74.9 °F and 77.6 °F in the long-term under RCPs 4.5 and 8.5, respectively. The average annual minimum temperature in the county is projected to increase to 44.7 °F in the near-term and 46.3 °F in the midterm under RCP 8.5. The average annual minimum temperature is projected to increase to 46.3 °F and 49.3 °F in the long-term under

RCPs 4.5 and 8.5, respectively (CEC 2022a). Increased temperatures in the county will likely influence secondary climate change effects, including increased wildfire risk, extreme heat events, and drought and water supply.

Table 4 Changes in Average Annual Temperature in Monterey County

Average Annual Temperature	Historic Average Annual Temperature (1961-1990)	Near-Term[1] (Current-2050)	Midterm[1] (2040-2069)	Long-Term (2070-2099)	
				RCP 4.5	RCP 8.5
Maximum Temperature (ºF)	70.1	73.1	74.9	74.9	77.6
Maximum Temperature Difference from Historic (ºF)	N/A	+3.0	+4.8	+4.8	+7.5
Minimum Temperature (ºF)	41.5	44.7	46.3	46.3	49.3
Minimum Temperature Difference from Historic (ºF)	N/A	+3.2	+4.8	+4.8	+7.8

Notes: ºF = degrees Fahrenheit; N/A = not applicable; RCP = Representative Concentration Pathway.

[1] Projections for the near-term and midterm timescales are based on RCP 8.5.

Source: CEC 2022a.

Acknowledging the above temperature projections for the county as a whole, it should be noted that local temperatures vary throughout the county, with the most significant variations found between coastal areas and inland areas. Coastal areas are generally cooler than inland areas, though both coastal areas and inland areas are projected to see temperature increases because of climate change. To represent these variations, two unincorporated areas of the county were chosen for analysis: 1) Census Tract 6053011502 (coastal), which encompasses Big Sur and other nearby coastal areas, and 2) San Ardo (inland). Data for Census Tract 6053011502 and San Ardo are presented below in Tables 5 and 6. Notably, San Ardo is projected to see greater increases in temperature across all timescales compared to Census Tract 6053011502, despite its historic average annual temperature (77.2 °F) already over 13 °F greater than Census Tract 6053011502's (63.9 °F).

Table 5 Changes in Average Annual Temperature in Census Tract 6053011502 (Coastal Representation)

Average Annual Temperature	Historic Average Annual Temperature (1961-1990)	Near-Term[1] (Current-2050)	Midterm[1] (2040-2069)	Long-Term (2070-2099)	
				RCP 4.5	RCP 8.5
Maximum Temperature (ºF)	63.9	66.8	68.4	68.5	71.1
Maximum Temperature Difference from Historic (ºF)	N/A	+2.9	+4.5	+4.6	+7.2
Minimum Temperature (ºF)	40.0	42.9	44.3	44.4	47.4
Minimum Temperature Difference from Historic (ºF)	N/A	+2.9	+4.3	+4.4	+7.4

Notes: ºF = degrees Fahrenheit; N/A = not applicable; RCP = Representative Concentration Pathway.

[1] Projections for the near-term and midterm timescales are based on RCP 8.5.

Source: CEC 2022a.

Table 6 Changes in Average Annual Temperature in San Ardo (Inland Representation)

Average Annual Temperature	Historic Average Annual Temperature (1961-1990)	Near-Term[1] (Current-2050)	Midterm[1] (2040-2069)	Long-Term (2070-2099)	
				RCP 4.5	RCP 8.5
Maximum Temperature (ºF)	77.2	80.8	82.6	82.6	85.3
Maximum Temperature Difference from Historic (ºF)	N/A	+3.6	+5.4	+5.4	+8.1
Minimum Temperature (ºF)	44.2	47.6	49.1	49.0	52.0
Minimum Temperature Difference from Historic (ºF)	N/A	+3.4	+4.9	+4.8	+7.8

Notes: ºF = degrees Fahrenheit; N/A = not applicable; RCP = Representative Concentration Pathway.

[1] Projections for the near-term and midterm timescales are based on RCP 8.5.

Source: CEC 2022a.

Figure 7 geographically shows the projected change in average annual maximum temperature in the county in the near-term and midterm periods under RCP 8.5 and average annual maximum temperature in the long-term under both emissions scenarios. As shown in the figure, average annual maximum temperature is expected to rise through the long-term under both emissions scenarios, and varies throughout the county, with the most significant temperature increases in the southeastern portion of the county. It should be noted that the near-term (2022-2051) and midterm (2035-2064) timescales in the figure slightly differ from the near-term and midterm timescales that have already been defined (Current-2050 and 2040-2069, respectively) due to the nature of the data available from Cal-Adapt.

Changes in Precipitation Patterns

According to Cal-Adapt, the historic average annual precipitation in the county is 19.3 inches. As shown in Table 7, the average annual precipitation in the county is projected to increase to 21.8 inches in the near-term and 21.4 inches in the midterm under RCP 8.5. In the long-term, average annual precipitation is expected to increase to 21.2 inches under RCP 4.5, and 24.4 inches under RCP 8.5 (CEC 2022a).

Table 7 Changes in Average Annual Precipitation in Monterey County

Average Annual Precipitation	Historic Average Annual Precipitation (1961-1990)	Near-Term[1] (Current-2050)	Midterm[1] (2040-2069)	Long-Term (2070-2099)	
				RCP 4.5	RCP 8.5
Average Annual Precipitation (inches)	19.3	21.8	21.4	21.2	24.4
Average Annual Precipitation Difference from Historic (inches)	N/A	+2.5	+2.1	+1.9	+5.1

Notes: N/A = not applicable; RCP = Representative Concentration Pathway.

[1] Projections for the near-term and midterm timescales are based on RCP 8.5.

Source: CEC 2022a.

It should be noted and emphasized that annual average precipitation varies depending on location within the county. For example, and most notably, coastal areas of the county generally receive significantly more precipitation than inland locations, such as the Salinas Valley (OPR, CEC, and CNRA 2018b). To represent these variations, the same two unincorporated areas of the county chosen to represent differences in average annual temperature between coastal and inland areas, Census Tract 6053011502 (coastal) and San Ardo (inland), were chosen for this analysis. Average annual precipitation data for Census Tract 6053011502 and San Ardo are presented below in Tables 8 and 9. Notably, while both locations are projected to see increases in precipitation, Census Tract 6053011502 is projected to see greater increases in precipitation across all timescales compared to San Ardo, despite its historic average annual precipitation (33.3 inches) already over 21 inches greater than San Ardo's (11.8 inches).

Table 8 Changes in Average Annual Precipitation in Census Tract 6053011502 (Coastal Representation)

Average Annual Precipitation	Historic Average Annual Precipitation (1961-1990)	Near-Term[1] (Current-2050)	Midterm[1] (2040-2069)	Long-Term (2070-2099)	
				RCP 4.5	RCP 8.5
Average Annual Precipitation (inches)	33.3	36.1	36.0	35.8	41.1
Average Annual Precipitation Difference from Historic (inches)	N/A	+2.8	+2.7	+2.5	+7.8

Notes: N/A = not applicable; RCP = Representative Concentration Pathway.

[1] Projections for the near-term and midterm timescales are based on RCP 8.5.

Source: CEC 2022a.

Table 9 Changes in Average Annual Precipitation in San Ardo (Inland Representation)

Average Annual Precipitation	Historic Average Annual Precipitation (1961-1990)	Near-Term[1] (Current-2050)	Midterm[1] (2040-2069)	Long-Term (2070-2099)	
				RCP 4.5	RCP 8.5
Average Annual Precipitation (inches)	11.8	12.8	12.4	12.2	14.3
Average Annual Precipitation Difference from Historic (inches)	N/A	+1.0	+0.6	+0.4	+2.5

Notes: N/A = not applicable; RCP = Representative Concentration Pathway.

[1] Projections for the near-term and midterm timescales are based on RCP 8.5.

Source: CEC 2022a.

While average annual precipitation throughout the county is projected to trend upward in future years, including both coastal and inland areas, overall precipitation patterns are also projected to change, with precipitation variability expected to increase substantially across the Central Coast region over time, inclusive of the county. More specifically, periods of precipitation are projected to be wetter, but on an annual basis, there will likely be fewer total days with precipitation. Further, climate projections show a likely increase in extreme dry events, which may result in severe and prolonged drought (OPR, CEC, and CNRA 2018b). Overall, the projected increase in average annual precipitation and changes in precipitation patterns through the end of the century will likely influence secondary climate change effects, including increased wildfire risk, extreme precipitation and flooding, and drought and water supply.

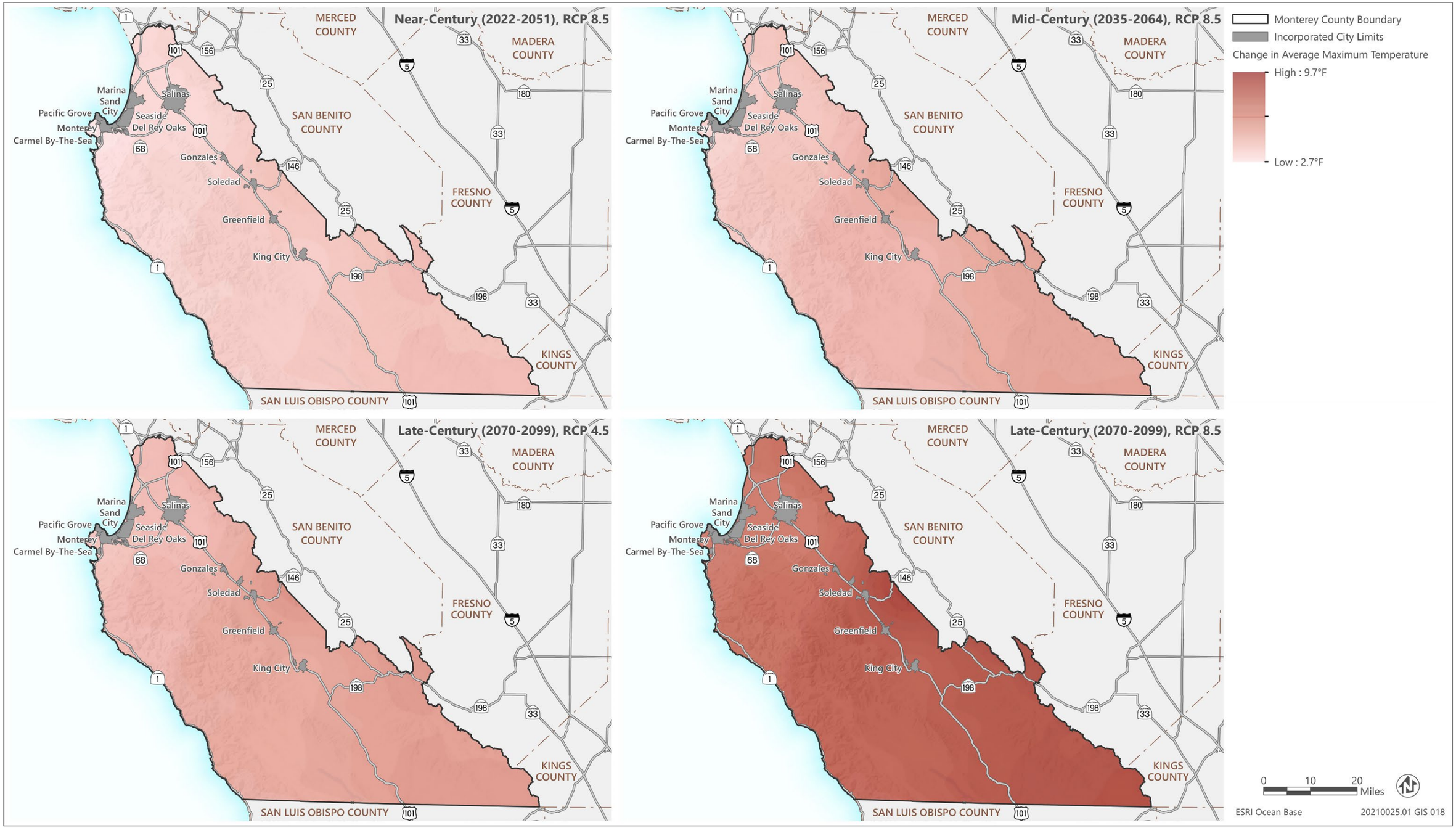
Figure 8 geographically shows the projected change in average annual precipitation in the county in the midterm under RCP 8.5 and the long-term under both emissions scenarios. As shown in the figure, despite the overall projected increase of average annual precipitation in the county, the change in average annual precipitation varies throughout the county. Notably, the coastal areas of the county, such as Census Tract 6053011502, are projected to receive the greatest increase in average annual precipitation, while more inland areas, such as the southeastern portion of the county, may not see much change in annual average precipitation, or even a slight decrease. It should be noted that because of the nature of the data available from Cal-Adapt, near-term projections were not included in the figure, and the midterm timescale in the figure (2035-2064) slightly differs from the midterm timescale that has already been defined (2040-2069).

Sea Level Rise

Cal-Adapt provides probabilistic sea level rise projections for both RCPs 4.5 and 8.5, which incorporate estimates of components that contribute to global and regional sea level rise (e.g., thermal expansion of seawater, glacier ice melt, glacial isostatic adjustments, etc.). The sea level rise projections for RCP 8.5 also incorporate relatively recent scientific findings on the potential for rapid demise of the West Antarctic Ice Sheet, which could dramatically accelerate sea level rise in the latter decades of this century. The probabilistic framework is helpful because despite substantial advances in the science of sea level rise, significant uncertainty remains in mid- and late-century projections of sea levels. Probabilistic sea level rise projections provide a range of possible outcomes in a framework that enables

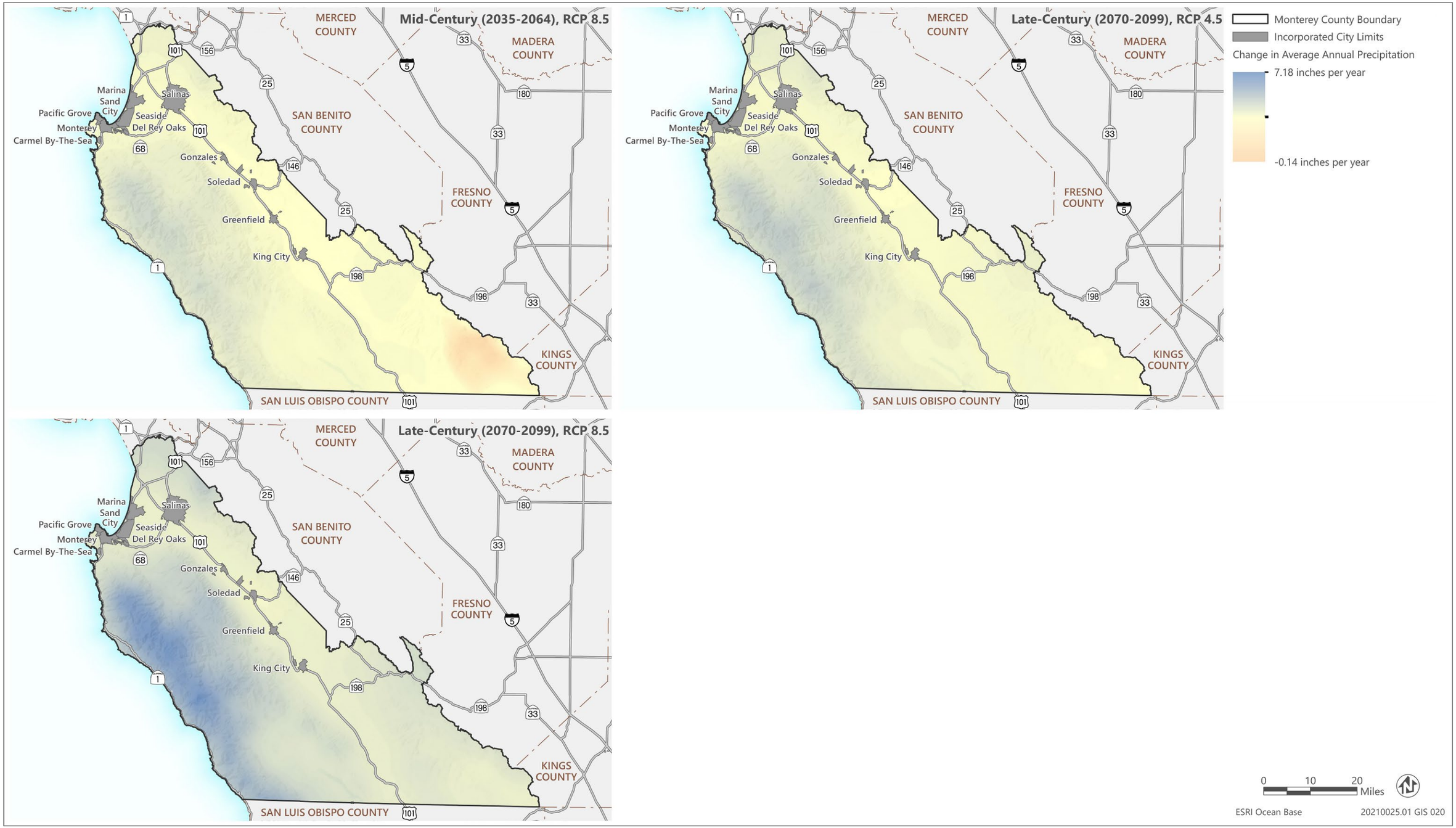
decision-makers to choose a number that is appropriate for their level of risk tolerance. Sea level rise scenarios presented in Cal-Adapt include the 50th percentile (middle estimate), 95th percentile (high estimate), and 99.9th percentile (extreme estimate) (CEC 2022b).

According to Cal-Adapt, the historic maximum sea level at the Monterey tide gauge station is 63 inches. The Monterey tide gauge station was chosen for this analysis as it is the closest of 11 gauge stations across the state in proximity to the county as a whole, and thus would provide the most relevant projections. Figure 9 displays the projected fraction of the year that sea level would be over the historic maximum sea level at the Monterey tide gauge station under RCP 8.5 and each of the above noted sea level rise scenarios. As shown, it takes until roughly mid-century for each sea level rise scenario to start showing significant differences. The purpose of this analysis is not to project when and how much sea levels will rise, but rather, to emphasize that sea levels are rising and should be planned for accordingly. Sea level rise will influence flooding, one of the secondary climate change effects identified in this VA, but it is worth noting that it also increases the risk of other hazards such as coastal erosion, seawater intrusion, shoreline retreat, and wetland loss (County of Monterey 2022a).



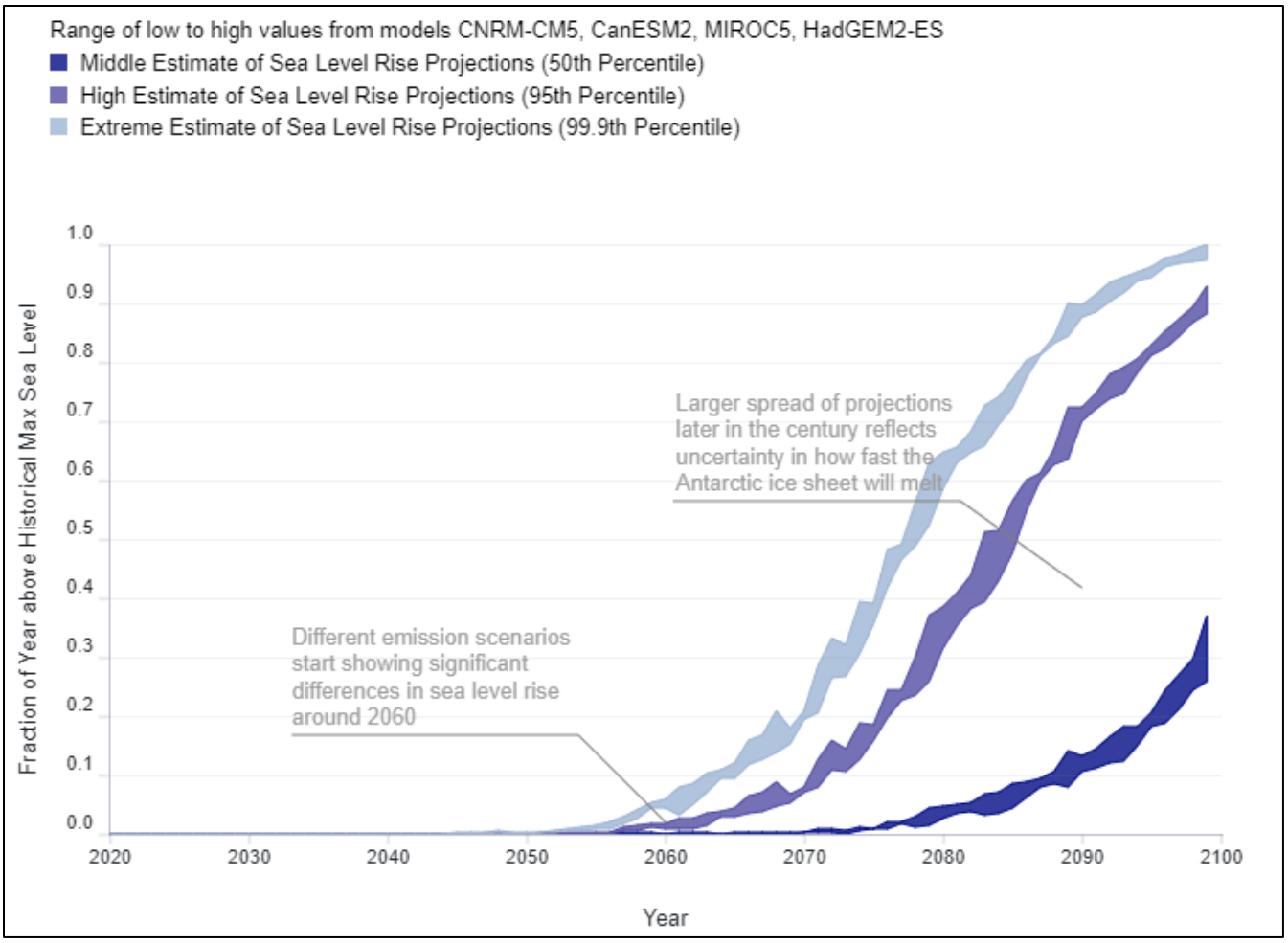
Source: Data downloaded from Cal-Adapt in 2022.

Figure 7 Change in Average Annual Maximum Temperature through 2099 in Monterey County



Source: Data downloaded from Cal-Adapt in 2022.

Figure 8 Change in Average Annual Precipitation through 2099 in Monterey County



Source: CEC 2022b.

Figure 9 Projected Fraction of Year with Sea Level Above Historic Maximum at the Monterey Tide Gauge Station, RCP 8.5

SECONDARY CLIMATE CHANGE EFFECTS

Increased Wildfire Risk

Historically, wildfire is a frequent occurrence within the Central Coast region, including the county (OPR, CEC, and CNRA 2018b). Climate change is expected to increase wildfire risk even further, as it will create conditions more favorable for wildfire ignition and spread (e.g., increased temperatures, prolonged droughts, drier fuels). Using a statistical model based on historical data of climate, vegetation, population density, and large (i.e., greater than 988 acres) fire history, Cal-Adapt provides projections for future annual mean hectares (which were then converted to acres for this analysis) that are anticipated to burn within the county when wildfires do occur. Cal-Adapt does not account for current or planned wildfire management projects. Table 10 displays the projected change in average annual area burned within the county under RCP 8.5 for the near-term and midterm timescales, and under both emissions scenarios, RCPs 4.5 and 8.5, for the long-term timescale. The modeled historic average annual area burned in the county is 21,392 acres. The average annual area burned in the county is projected to increase to 25,332 acres in the near-term and 25,891 acres in the midterm under RCP 8.5. The average annual area burned is projected to increase to 25,780 acres in the long-term under RCP 4.5, and 24,720 acres in the long-term under RCP 8.5. As a worst-case scenario, the county has the potential to experience 37,629 acres in average annual area burned in the long-term under RCP 8.5 (CEC 2022c). While the worst-case scenario is unlikely to happen, it is important to consider for adaptation planning purposes.

Table 10 Changes in Average Annual Area Burned in Monterey County

Average Annual Area Burned	Modeled[1] Historic Average Annual Area Burned (1961-1990)	Near-Term[2] (Current-2050)	Midterm[2] (2040-2069)	Long-Term (2070-2099)		
				RCP 4.5	RCP 8.5	RCP 8.5 Maximum[3]
Average Annual Area Burned (acres)	21,392	25,332	25,891	25,780	24,720	37,629
Average Annual Area Burned Difference from Historic (acres)	N/A	+3,940	+4,499	+4,388	+3,328	+16,237

Notes: N/A = not applicable; RCP = Representative Concentration Pathway.

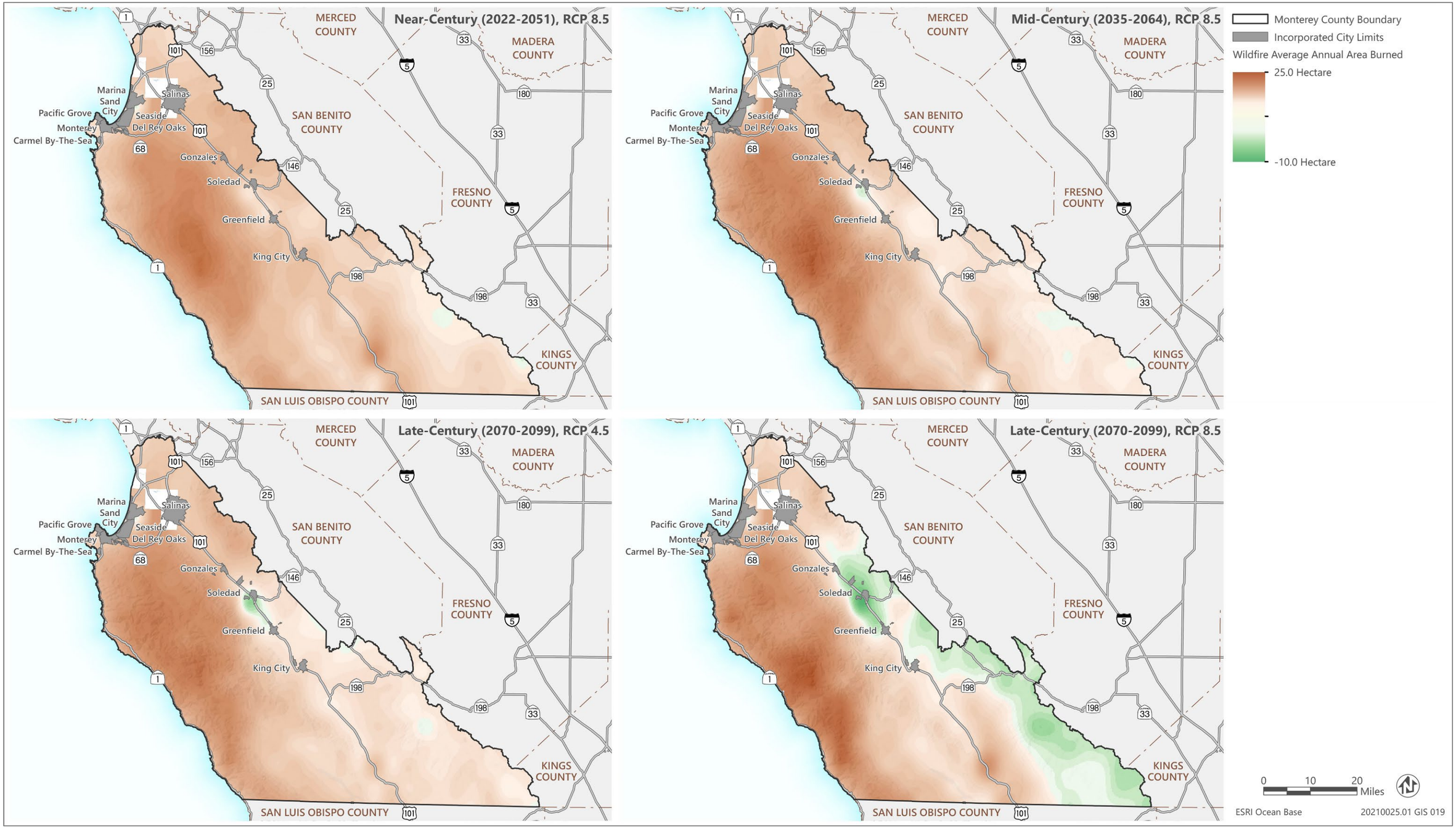
[1] Observed historical average annual area burned data were not available from Cal-Adapt; the modeled historical average annual area burned data under RCP 4.5 was available and used as proxy data.

[2] Projections for the near-term and midterm timescales are based on RCP 8.5.

[3] "RCP 8.5 Maximum" refers to the maximum modeled value (i.e., worst-case scenario) within the long-term timescale under RCP 8.5.

Source: CEC 2022c.

Figure 10 geographically shows the projected change in average annual area burned in the county in the near-term and midterm under RCP 8.5 and in the long-term under both emissions scenarios. As shown in the figure, despite the overall projected increase of average annual area burned in the county, the change in average annual area burned varies throughout the county. Notably, the coastal areas of the county are projected to receive the greatest increase in average annual area burned, while more inland areas, such as the southeastern portion of the county, may not see much change in annual average area burned, or even a slight decrease, as displayed in the figure. It should be noted that the near-term (2022-2051) and midterm (2035-2064) timescales in Figure 10 slightly differ from the near-term and midterm timescales that have already been defined (Current-2050 and 2040-2069, respectively) due to the nature of the data available from Cal-Adapt.



Source: Data downloaded from Cal-Adapt in 2022.

Figure 10 Change in Average Annual Area Burned through 2099 in Monterey County

Increased Frequency of Extreme Heat Events

The Cal-Adapt tool provides estimates of future instances of extreme heat events. Extreme heat events include extreme heat days and heat waves. Cal-Adapt defines an extreme heat day as a day when the daily maximum temperature exceeds the 98th historical percentile of daily maximum temperatures based on observed data from 1961 to 1990 between the months of April and October. Heat waves are characterized as periods of sustained extreme heat and are defined by Cal-Adapt as four or more consecutive extreme heat days.

Extreme heat day thresholds vary significantly for different portions of the county due to various geographic, topographic, and climatological factors. Because extreme heat thresholds vary, most notably between coastal and inland areas of the county, and similar to previous analyses, two unincorporated areas of the county were chosen to represent differences in extreme heat events between coastal and inland areas, Census Tract 6053011502 (coastal) and San Ardo (inland). Per Cal-Adapt, the default extreme heat threshold for Census Tract 6053011502 is 86.5 °F, meaning 98 percent of all recorded temperatures between the months of April and October from 1961 to 1990 were below 86.5 °F. Historically, Census Tract 6053011502 experienced an average of 4.4 extreme heat days and 0.2 heat waves per year from 1961 to 1990. As a result of rising temperatures from climate change, Census Tract 6053011502 is projected to experience 7.4 extreme heat days and 0.5 heat waves annually in the near-term, and 11.0 extreme heat days and 0.8 heat waves annually in the midterm under RCP 8.5. In the long-term, Census Tract 6053011502 is projected to experience 11.3 extreme heat days and 0.8 heat waves annually under RCP 4.5, and 20.3 extreme heat days and 2.0 heat waves annually under RCP 8.5. As a worst-case scenario, Census Tract 6053011502 has the potential to experience a maximum of 74.0 extreme heat days and 13.0 heat waves per year in the long-term under RCP 8.5 (CEC 2022d). While the worst-case scenario is unlikely to happen, it is important to consider for adaptation planning purposes. In addition to the increasing number of extreme heat days and heat waves on an annual basis, the length of consecutive extreme heat days is also projected to increase through the end of the century. Table 11 below displays the changes in extreme heat events in Census Tract 6053011502 (CEC 2022d).

Table 11 Changes in Extreme Heat Events in Census Tract 6053011502 (Coastal Representation)

Annual Averages	Historic Annual Averages (1961-1990)	Near-Term[1] (Current-2050)	Midterm[1] (2040-2069)	Long-Term (2070-2099)		
				RCP 4.5	RCP 8.5	RCP 8.5 Maximum[2]
Number of Extreme Heat Days[3]	4.4	7.4	11.0	11.3	20.3	74.0
Number of Heat Waves[4]	0.2	0.5	0.8	0.8	2.0	13.0
Number of Days in Longest Stretch of Consecutive Extreme Heat Days	2.3	3.1	3.9	3.7	5.8	19.0

Note: RCP = Representative Concentration Pathway.

[1] Projections for the near-term and midterm timescales are based on RCP 8.5.

[2] "RCP 8.5 Maximum" refers to the maximum modeled value (i.e., worst-case scenario) within the long-term timescale under RCP 8.5.

[3] The threshold for an extreme heat day in Census Tract 6053011502 is 86.5 °F.

[4] A heat wave is characterized as a period of sustained extreme heat and is defined by Cal-Adapt as four or more consecutive extreme heat days.

Source: CEC 2022d.

Per Cal-Adapt, the default extreme heat threshold for San Ardo is 104.3 °F, meaning 98 percent of all recorded temperatures between the months of April and October from 1961 to 1990 were below 104.3 °F. Historically, San Ardo experienced an average of 4.3 extreme heat days and 0.2 heat waves per year from 1961 to 1990. As a result of rising temperatures from climate change, San Ardo is projected to experience 12.9 extreme heat days and 1.2 heat waves annually in the near-term, and 20.2 extreme heat days and 2.4 heat waves annually in the midterm under RCP 8.5. In the long-term, San Ardo is projected to experience 19.4 extreme heat days and 2.1 heat waves annually under RCP 4.5, and 34.5 extreme heat days and 5.0 heat waves annually under RCP 8.5. As a worst-case scenario, San Ardo has the potential to experience a maximum of 84.0 extreme heat days and 18.0 heat waves per year in the long-term under RCP 8.5 (CEC 2022d). While the worst-case scenario is unlikely to happen, it is important to consider for adaptation planning purposes. In addition to the increasing number of extreme heat days and heat waves on an annual basis, the length of consecutive extreme heat days is also projected to increase through the end of the century. Table 12 below displays the changes in extreme heat events in San Ardo (CEC 2022d).

Table 12 Changes in Extreme Heat Events in San Ardo (Inland Representation)

Annual Averages	Historic Annual Averages (1961-1990)	Near-Term[1] (Current-2050)	Midterm[1] (2040-2069)	Long-Term (2070-2099)		
				RCP 4.5	RCP 8.5	RCP 8.5 Maximum[2]
Number of Extreme Heat Days[3]	4.3	12.9	20.2	19.4	34.5	84.0
Number of Heat Waves[4]	0.2	1.2	2.4	2.1	5.0	18.0
Number of Days in Longest Stretch of Consecutive Extreme Heat Days	2.1	4.5	6.3	5.7	9.9	39.0

Note: RCP = Representative Concentration Pathway.

[1] Projections for the near-term and midterm timescales are based on RCP 8.5.

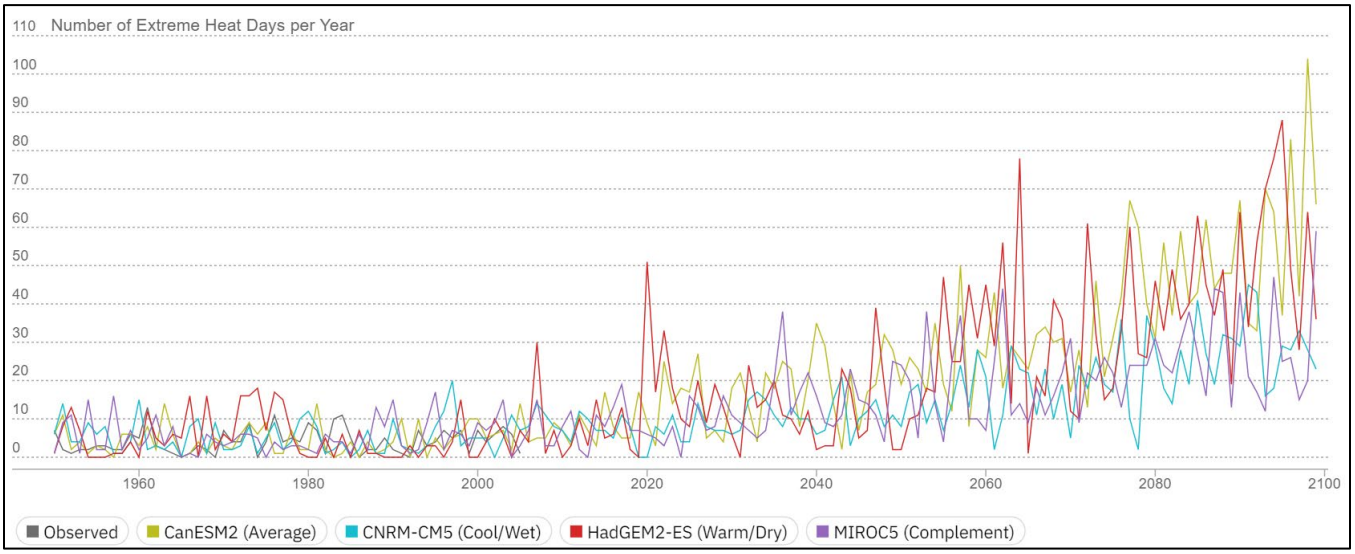
[2] "RCP 8.5 Maximum" refers to the maximum modeled value (i.e., worst-case scenario) within the long-term timescale under RCP 8.5.

[3] The threshold for an extreme heat day in San Ardo is 104.3 °F.

[4] A heat wave is characterized as a period of sustained extreme heat and is defined by Cal-Adapt as four or more consecutive extreme heat days.

Source: CEC 2022d.

While both Census Tract 6053011502 and San Ardo are projected to see increases in extreme heat events, it should be noted that San Ardo is projected to experience greater increases, despite its temperature threshold for extreme heat being much higher than Census Tract 6053011502's. San Ardo and Census Tract 6053011502 only serve as samples of the variations between inland areas and coastal areas of the unincorporated county, respectively, and do not necessarily represent the entire inland and coastal areas. However, the extreme heat event projections for each provide insights as to the general differences in extreme heat and how it may be felt differently throughout the county. Figure 11 provides a visual representation of the county-level projected increase in the annual number of extreme heat days through the end of the century, and it should be noted that the extreme heat threshold for the county as a whole is 92.5 °F, which is higher than the localized threshold for Census Tract 6053011502 (i.e., 86.5 °F), but lower than the localized threshold for San Ardo (i.e., 104.3 °F).



Source: CEC 2022d.

Figure 11 Projected Increase in Extreme Heat Days through 2099 in Monterey County

Extreme Precipitation and Flooding

In the Cal-Adapt tool, extreme precipitation events are defined as events where 2-day precipitation totals are above an extreme threshold (i.e., days having precipitation at or exceeding the 95th percentile). Similar to extreme heat thresholds, extreme precipitation thresholds vary significantly for different portions of the county due to various geographic, topographic, and climatological factors. Because extreme precipitation thresholds vary, most notably

between coastal and inland areas of the county, and similar to previous analyses, two unincorporated areas of the county were chosen to represent differences in extreme precipitation events between coastal and inland areas, Census Tract 6053011502 (coastal) and San Ardo (inland). Per Cal-Adapt, the default extreme precipitation event threshold for Census Tract 6053011502 is 1.8 inches. Under this threshold, Census Tract 6053011502 has historically experienced an average of 2.0 extreme precipitation events per year from 1961 to 1990. Under RCP 8.5, Census Tract 6053011502 is expected to experience 2.6 extreme precipitation events per year in the near-term and 3.0 extreme precipitation events per year in the midterm. In the long-term, Census Tract 6053011502 is projected to experience 2.9 extreme precipitation events per year under RCP 4.5, and 4.4 extreme precipitation events per year under RCP 8.5. Additionally, as a worst-case scenario, there is the potential to have as many as 15 extreme precipitation events per year in the long-term under RCP 8.5. Changes in the number of extreme precipitation events in Census Tract 6053011502 are shown in Table 13 (CEC 2022e).

Table 13 Changes in Extreme Precipitation Events in Census Tract 6053011502 (Coastal Representation)

Average Annual Number of Extreme Precipitation Events[1]	Historic Average Annual Extreme Precipitation Events (1961-1990)	Near-Term[2] (Current-2050)	Midterm[2] (2040-2069)	Long-Term (2070-2099)		
				RCP 4.5	RCP 8.5	RCP 8.5 Maximum[3]
Average Annual Number of Extreme Precipitation Events	2.0	2.6	3.0	2.9	4.4	15
Average Annual Number of Extreme Precipitation Events Difference from Historic	N/A	+0.6	+1.0	+0.9	+2.4	+13.0

Notes: N/A = not applicable; RCP = Representative Concentration Pathway.

[1] The threshold for an extreme precipitation event in Census Tract 6053011502 is 1.8 inches of precipitation over a 2-day period.

[2] Projections for the near-term and midterm timescales are based on RCP 8.5.

[3] "RCP 8.5 Maximum" refers to the maximum modeled value (i.e., worst-case scenario) within the long-term timescale under RCP 8.5.

Source: CEC 2022e.

Per Cal-Adapt, the default extreme precipitation event threshold for San Ardo is 1.0 inches. Under this threshold, San Ardo has historically experienced an average of 1.0 extreme precipitation events per year from 1961 to 1990. Under RCP 8.5, San Ardo is expected to experience 1.0 extreme precipitation events per year in the near-term and 1.3 extreme precipitation events per year in the midterm. In the long-term, San Ardo is projected to experience 1.0 extreme precipitation events per year under RCP 4.5, and 2.1 extreme precipitation events per year under RCP 8.5. Additionally, as a worst-case scenario, there is the potential to have as many as 9 extreme precipitation events per year in the long-term under RCP 8.5. Changes in the number of extreme precipitation events in San Ardo are shown in Table 14 (CEC 2022e).

Table 14 Changes in Extreme Precipitation Events in San Ardo (Inland Representation)

Average Annual Number of Extreme Precipitation Events[1]	Historic Average Annual Extreme Precipitation Events (1961-1990)	Near-Term[2] (Current-2050)	Midterm[2] (2040-2069)	Long-Term (2070-2099)		
				RCP 4.5	RCP 8.5	RCP 8.5 Maximum[3]
Average Annual Number of Extreme Precipitation Events	1.0	1.0	1.3	1.0	2.1	9.0
Average Annual Number of Extreme Precipitation Events Difference from Historic	N/A	+0.0	+0.3	+0.0	+1.1	+8.0

Notes: N/A = not applicable; RCP = Representative Concentration Pathway.

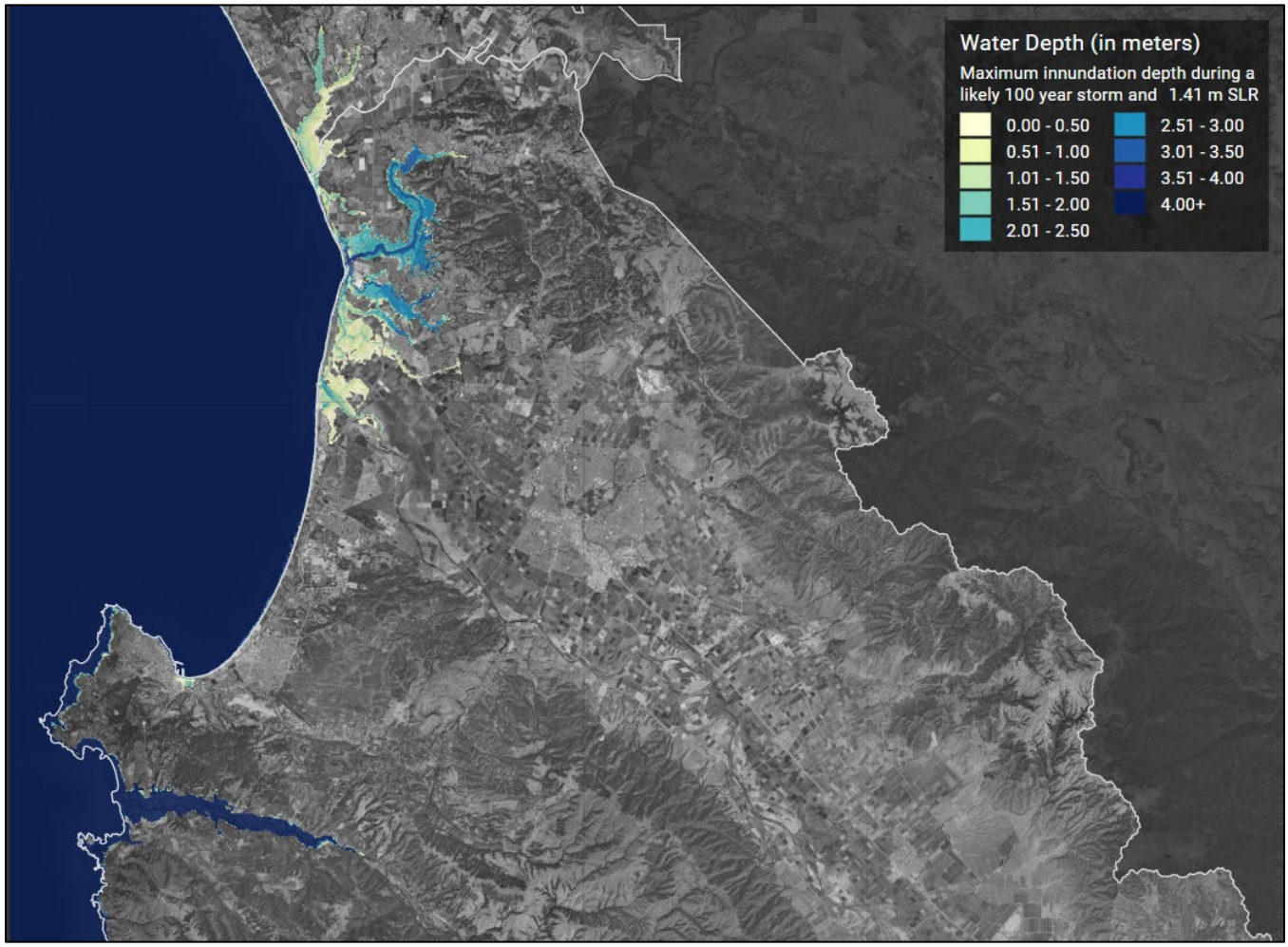
[1] The threshold for an extreme precipitation event in San Ardo is 1.0 inches of precipitation over a 2-day period.

[2] Projections for the near-term and midterm timescales are based on RCP 8.5.

[3] "RCP 8.5 Maximum" refers to the maximum modeled value (i.e., worst-case scenario) within the long-term timescale under RCP 8.5.

Source: CEC 2022e.

Though both Tables 13 and 14 display a general increase in the average annual number of extreme precipitations events through the end of the century for both Census Tract 6053011502 and San Ardo, which is also true for the county as a whole, it is important to note that the quantity of extreme precipitation events within the county may vary considerably from year-to-year due to California's highly variable climate setting. Additionally, as the climate continues to warm, atmospheric rivers, responsible for many of the extreme precipitation events across the state, will carry more moisture and may make extreme precipitation events more severe (Polade et al. 2017). As the potential for more extreme precipitation events to occur on an annual basis increases through the end of the century, the county may also experience an increase in the frequency and intensity of flood events. Though the occurrence of extreme precipitation events is a major source of flooding in the county, and will increasingly be so in the future, it is not the only source. Sea level rise, one of the primary climate change effects, is another major source of flooding in the county, as rising seas will put new areas at risk of flooding, but also increase the likelihood and intensity of floods in areas already at risk (County of Monterey 2022a). Figure 12 shows the projected maximum inundation depth in the northern half of the county during a likely 100-year storm event and sea level rise of 1.41 meters (m), the maximum sea level rise scenario that Cal-Adapt offers. As shown, the areas around Moss Landing and the Carmel River in the northern and western ends of the county, respectively, are the areas likely to be most affected in this scenario, as they already experience some level of inundation. It should be clearly noted that this figure is not representative of the entire area of the county that is prone to flooding and is only representative of areas of the county that could be inundated by sea level rise of 1.41 m, as many other areas of the county are prone to flooding not related to sea level rise. Figure 4, discussed previously, provides a better understanding of areas of the county that are particularly at risk from flooding, as a whole.



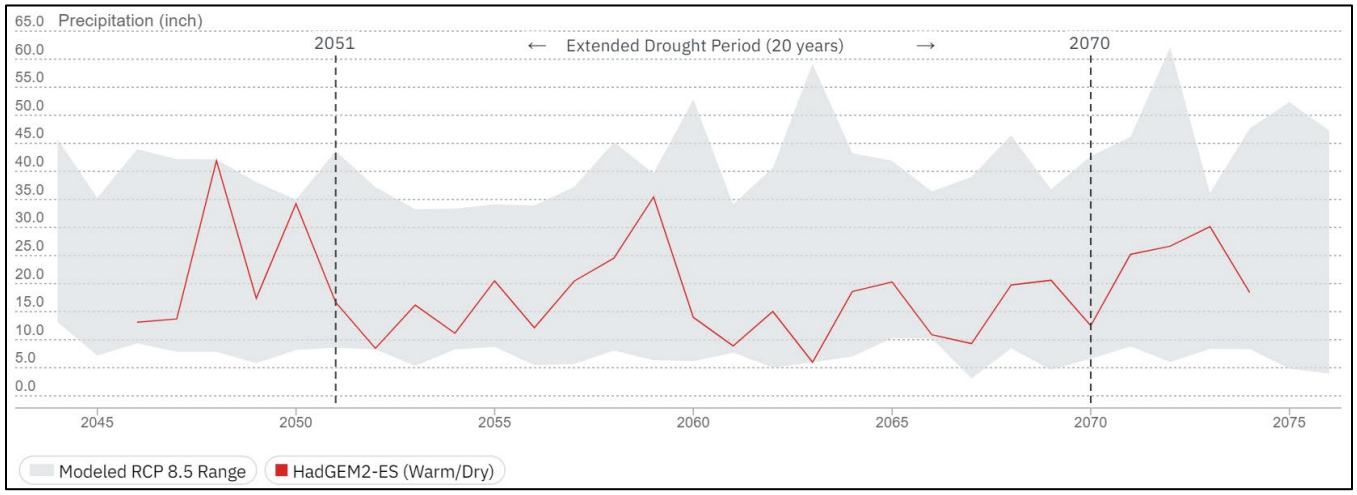
Source: CEC 2022f.

Figure 12 Maximum Inundation Depth during a 100-year Storm with Sea Level Rise of 1.41 m in Monterey County

Drought and Water Supply

As shown in Tables 7, 8, and 9 above, under both emissions scenarios, RCPs 4.5 and 8.5, the county is expected to experience overall increases in average annual precipitation through the long-term. However, in addition to these slight increases in average annual precipitation, overall precipitation patterns are projected to change, with precipitation variability expected to increase substantially. The county and state have a highly variable climate that is susceptible to prolonged periods of drought, and recent research suggests that extended drought occurrences (i.e., a "mega-drought") could become more pervasive in future decades (CEC 2022g).

Cal-Adapt uses data to simulate an extended drought scenario for all of California from 2051 to 2070 under RCP 8.5 and using the HadGEM2-ES model. As shown in Table 7, the county's observed historic (1961-1990) average annual precipitation is 19.3 inches. Under the anticipated drought scenario between 2051 and 2070, the county's average annual precipitation would decrease to 16.1 inches, as shown in Figure 13 (CEC 2022g). The county is predicted to experience extended drought periods like this as a result of climate change, and without effective adaptation actions or initiatives, future droughts will challenge the management of the Central Coast region's already-stressed water supplies, inclusive of the county (OPR, CEC, and CNRA 2018b). For more specific context, the county's water supplies are solely dependent on its local water resources, such as groundwater and surface water from watersheds, as the county is isolated from State and Federal water supplies. The Monterey County Water Resources Agency (MCWRA) manages two large reservoirs, the San Antonio and the Nacimiento. The Monterey Peninsula depends on two water sources, including the Carmel River, which drains a 255 square-mile watershed and runs 36 miles from its source in the Santa Lucia mountains to the sea, and the Seaside Basin, which is recharged by local rain (County of Monterey 2022a). Within more rural areas of the county, especially in unincorporated areas of the county, groundwater is the major source of water for residents aside from residents along the coast near Big Sur, who depend entirely on surface water and shallow wells for their water supply, and residents in an area near Greenfield in the Salinas Valley, who have a diversion from the Arroyo Seco River (County of Monterey 2022a).



Source: CEC 2022g.

Figure 13 Average Annual Precipitation Projections During an Extended Drought Scenario in Monterey County between 2051 and 2070

2.2 SENSITIVITY AND POTENTIAL IMPACTS

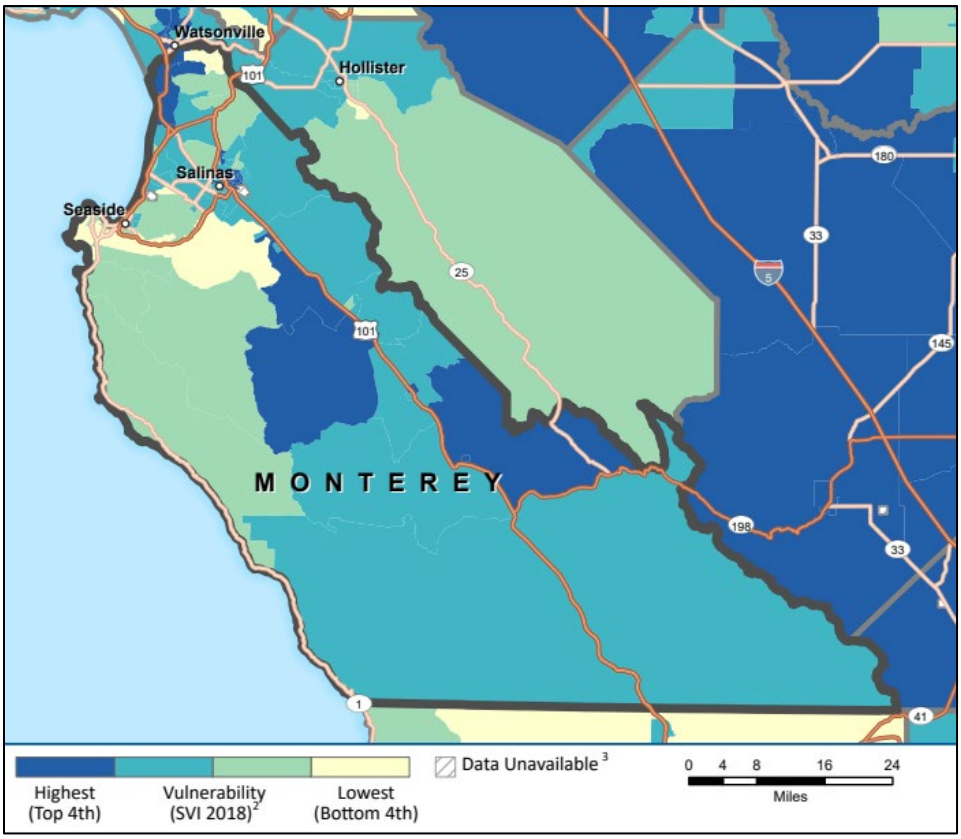
The second step of the VA process is conducting the sensitivity analysis and the analysis of potential impacts. The varying effects of climate change will impact the county differently, such that some population groups and assets will be affected more severely than others. The first objective of this step is to identify which populations and assets may be sensitive to climate change effects. The second step is to determine the specific potential impacts that those populations and assets may face as a result of those climate change effects. Key populations and assets identified in the county are organized into the following overarching categories: populations, built environment, and community functions. These categories are described in more detail below.

The climate change effects analyzed in this section include increased wildfire risk, increased temperatures and extreme heat, extreme precipitation and flooding, and drought and water supply. Though each of these climate change effects are analyzed separately, inherent overlap does exist, and as such, some of the sensitivities and potential impacts that are discussed may be similar across multiple climate change effects. Climate change exposures at the local scale are inherently uncertain, but the potential ways in which climate change could impact specific populations and community assets within the county are identified and discussed.

2.2.1 Populations

While all persons in the county will experience impacts from climate change, some populations are more vulnerable to climate impacts due to a variety of factors. Vulnerable populations are those that "experience heightened risk and increased sensitivity to climate change and have less capacity and fewer resources to cope with, adapt to, or recover from climate impacts" (OPR 2018). These disproportionate effects are caused by physical, social, political, and economic factors, which are exacerbated by climate impacts. Some of these factors include race, class, sexual orientation and identification, national origin, and income inequality, among others (OPR 2018). These factors can often be the result of historic inequitable planning processes (Lynn et al. 2011).

Within the county, there exists an array of populations vulnerable to the effects of climate change. The Social Vulnerability Index (SVI), developed by the Centers for Disease Control and Prevention, is a tool intended to assist local planners in better preparing for and responding to hazards by identifying and mapping areas where populations are most likely to need support before, during, and after a hazardous event, including those linked to or exacerbated by climate change. The SVI groups 15 distinct census-derived factors (e.g., poverty, lack of vehicle access, crowded housing) into four themes (i.e., socioeconomic status, household composition/disability, race/ethnicity/language, housing type/transportation) that summarize the extent to which an area is socially vulnerable to hazards. Figure 14 displays the county's SVI, and as shown, the most vulnerable populations are near the center of the county in or near the Salinas Valley along Highway 101, though vulnerable populations do exist in every part of the county (CDC 2018). Specific vulnerable populations in the county include, but are not limited to, children, pregnant women, the elderly, communities of color, linguistically isolated communities, individuals experiencing homelessness, low-income individuals, individuals with access and functional needs, workers in vulnerable occupations, and those with preexisting health issues. Though vulnerable populations do not represent the majority of the county's total population, it is important to plan for all groups that, for one reason or another, lack available resources or capacity to react or adapt to the impacts of climate change.



Source: CDC 2018.

Figure 14 Monterey County Social Vulnerability Index

2.2.2 Built Environment

The built environment in the county consists of a set of assets that are essential to the health and welfare of residents and visitors and are especially important during and following hazard events linked to or exacerbated by climate change. This ranges from residential and commercial buildings to an array of critical infrastructure, including, but not limited to, essential facilities (e.g., fire stations, medical facilities, schools, etc.), transportation infrastructure (e.g., roadways, bridges, railroads), and utility infrastructure (i.e., energy, communications, and water and wastewater). The MJHMP defines critical infrastructure as "a structure or other improvement that, because of its function, size, service area, or uniqueness, has the potential to cause disruption of vital socioeconomic activities if it is destroyed, damaged, or functionally impaired" (County of Monterey 2022a).

2.2.3 Community Functions

Community functions are the resources, assets, operations, economic sectors, and services that are created or influenced by the interaction between populations and the built environment and allow day-to-day activities to continue in the county. The priority community functions that have been identified include agriculture, livestock, and forestry; tourism and recreation; transportation and mobility; essential services (e.g., grocery stores); ecological functions; emergency services; and energy delivery and other utility (e.g., communications) operations. Increases in the frequency and/or severity of hazards linked to climate change will likely cause environmental, economic, and social impacts across these community functions, which are crucial to the integrity and resiliency of the county.

2.2.4 Sensitivity Analysis

INCREASED WILDFIRE RISK

Under RCP 8.5, the average annual area burned in the county is projected to rise by approximately 4,000 acres in the near-term and 4,500 acres in the midterm when compared to the historic (1961-1990) average annual area burned. In the long-term, the average annual area burned is projected to increase by approximately 4,400 acres and 3,300 acres under both emissions scenarios, RCPs 4.5 and 8.5, respectively. As a worst-case scenario, the average annual area burned in the county has the potential to experience an increase of approximately 16,200 acres in the long-term under RCP 8.5 (CEC 2022c). Regardless of the level of future GHG emissions, wildfire risk within the county is projected to increase as a result of climate change.

Populations

Overlapping with the wildland-urban interface (WUI) areas of the county, or areas where there is the potential for significant damage and adverse impacts because of dense vegetation being directly adjacent to development, exists "Moderate," "High," and "Very High" FHSZs, as determined by CAL FIRE. There are approximately 185,000 unincorporated county residents residing within these FHSZs that are at risk of being directly affected by wildfire—almost 83,000 within the "Moderate" FHSZ, almost 66,000 within the "High" FHSZ, and almost 36,000 within the "Very High" FHSZ—most of which are in SRAs or FRAs (County of Monterey 2022f). Direct exposure to wildfires can lead to burns resulting in severe injuries or death.

In addition to the potential impacts associated with direct exposure to wildfires, there also exists indirect impacts like smoke and air pollution, which can be a severe health hazard. Smoke generated by wildfire contains visible and invisible emissions comprising of particulate matter (e.g., soot, tar), gases (e.g., carbon monoxide, carbon dioxide, nitrogen oxides), and toxins (e.g., formaldehyde, benzene), and inhalation of smoke can potentially lead to injuries or death (County of Monterey 2022a). Further, wildfire-linked air pollution resulting in degraded air quality can result in cognitive impairment, premature births, and eye and respiratory illnesses, and can exacerbate other pre-existing conditions such as asthma, allergies, chronic obstructive pulmonary disease, and other cardiovascular and respiratory diseases (LAO 2022; CDPH 2017).

Wildfires can also create hazardous conditions even after they are suppressed. Most notably, destructive debris flows triggered by intense precipitation are one of the most dangerous post-fire hazards, and the risk of debris flows is directly correlated with the degree of vegetation loss and soil exposure after a wildfire (USGS 2018). Post-wildfire debris flows can adversely impact many facets of the county, but the deadly impact it can have on human lives is perhaps the most notable. The county is projected to have an increase in average annual area burned through the end of the century as a result of wildfire, and because debris flows in the county are primarily associated with wildfire burn scars, there may be an increase in intensity and frequency of deadly debris flows.

Overall, the entire population of the county is vulnerable to the impacts of wildfire, both directly and indirectly, which may be exacerbated because of climate change. However, populations that are especially vulnerable to the impacts of wildfire are largely based on occupation and location. First responders can be directly exposed to wildfire during fire suppression activities. Agricultural workers are particularly vulnerable to wildfire impacts because of the potential degradation of transportation infrastructure, the increased exposure to wildfire smoke while working outdoors, and the direct economic effects on the agricultural industry from wildfires. Additionally, residents residing in more rural areas of the county, such as the coast near Big Sur, are isolated from most of the county, and it is possible that these residents could become trapped without the option to evacuate during a wildfire, forcing them to shelter in place (County of Monterey 2022a). Individuals with access and functional needs and those with certain medical issues residing in healthcare facilities are also inherently vulnerable during wildfires resulting in evacuations (County of Monterey 2021). Other vulnerable populations to wildfire impacts include children, the elderly, pregnant women, low-income populations, linguistically isolated populations, people with cardiovascular disease, and people with asthma or other respiratory diseases (EPA 2021).

Built Environment

Increased wildfire risk in the county poses significant threats to the county's built environment, especially at the intersection of WUI areas and the county's FHSZs. Regarding residential property in the unincorporated areas of the county, over 28,000 structures lie directly within an FHSZ—over 14,000 in the "Moderate" FHSZ, almost 10,000 in the "High" FHSZ, and almost 4,500 in the "Very High" FHSZ—with a collective estimated value of over $26 billion (County of Monterey 2022f). Additionally, much of the county's critical infrastructure lies within these FHSZs, including fire stations, medical facilities, schools, water and wastewater facilities, government facilities, communication facilities, bridges, and many miles of roadway and railroads (County of Monterey 2022a). Critical infrastructure made of wood frame construction are especially vulnerable during wildfire events. Energy production and distribution are also threatened by wildfires through loss of efficiency, generating capacity, and disruption or destruction of power lines, which are often associated with transmission poles made of wood (CDPH 2017).

Wildfires may also impact transportation infrastructure in the county. While roads, roadways, and bridges themselves typically sustain minimal to moderate damage during wildfire events, except in extreme scenarios, wildfires do create conditions that promote the obstruction of these assets through fallen trees, downed power lines, and other debris (County of Monterey 2022a). This is particularly concerning for residents that are isolated from the rest of the county. In addition to obstruction of these assets, the cracking and degradation of pavement due to sustained heat exposure is another risk related to wildfires.

Community Functions

The increased risk of wildfire through the end of the century has the potential to impact or disrupt an array of the county's community functions. In smaller-scale periods during, or in anticipation of, heightened wildfire risk, the county's electrical service provider, Pacific Gas and Electric Company (PG&E), has shown in the past, and has stated that continuing into the future, they may shut off power to electrical grids to reduce the chance of accidental fire ignition in high fire threat areas. These are known as Public Safety Power Shutoff (PSPS) events, and when these happen, power will remain out for as long as extreme and dangerous conditions pose a potential fire risk and until PG&E can inspect and repair power lines and equipment. Once PG&E deems it safe to do so, power will be systematically restored (County of Monterey 2019b). While PSPS events are meant to prevent the ignition of potentially widespread, devastating wildfires, vulnerable populations without alternate power options (e.g., low-income individuals) may be adversely impacted by the PSPS event itself. Similarly, wildfire-induced loss of power affecting fire stations, police stations, and emergency dispatch and medical services, but not necessarily a purposive PSPS event, could diminish emergency dispatching, communications, and response capabilities, especially when coupled with evacuation-related traffic congestion (County of Monterey 2019b).

Wildfires can also have severe economic and related impacts on the county. At a basic level, wildfires include the cost of fire suppression and disruptions to consumption and production of local goods and services. The county's vital tourism sector is especially vulnerable to increased wildfire risk. For example, Big Sur, a major tourist destination in the county, was directly and heavily impacted by several major wildfires, including the Basin Complex Fires in 2008, the Pfeiffer Fire in 2013, the Soberanes Fire in 2016, and the Dolan Fire in 2020. Laguna Seca Recreational Area, which includes campgrounds, a shooting range, and the popular WeatherTech Raceway that hosts multiple races every year, is located in an area of heightened wildfire risk. Overall, active wildfires and the increased risk of wildfires can diminish the desirability of heavily trafficked tourist destinations and can cause closures of recreation areas, which, in turn, may negatively impact local businesses (e.g., hotels, restaurants, for-profit transportation services) that are important contributors to the local economy (County of Monterey 2022a; MPWMD 2019). Agriculture, another key economic sector in the county, is also vulnerable to increased wildfire risk. Irrigation systems, equipment, crops, livestock, and stored commodities can all be lost during a wildfire, and wildfires can also diminish soil quality, which could reduce the viability of local agriculture. Wildfire smoke can also have negative impacts on crops, as smoke can lead to less sunlight reaching crops, causing them to develop more slowly and contributing higher disease loads. Exposure to wildfires, wildfire smoke, and post-wildfire erosion, debris flows, and flooding can also adversely affect watersheds, specifically, their functioning and associated ecosystem services (e.g., water quantity, water quality) (County of Monterey 2022a).

INCREASED TEMPERATURES AND EXTREME HEAT

Under RCP 8.5, the average annual maximum temperature in the county as a whole is projected to rise approximately 3 °F in the near-term and almost 5 °F in the midterm. In the long-term, the average annual maximum temperature is projected to increase by approximately 5 °F to 8 °F under both emissions scenarios, RCPs 4.5 and 8.5, respectively (CEC 2022a). Increased temperatures will likely lead to secondary climate change effects including increases in the frequency, intensity, and duration of extreme heat events in the county. As discussed previously, the average number of extreme heat days and heat waves are projected to increase substantially in the midterm and in the long-term, with the greater number of extreme heat days and heat waves associated with RCP 8.5 (CEC 2022d). The potential impacts associated with increased temperatures and extreme heat are discussed below.

Populations

Increased temperatures and extreme heat exacerbated by climate change are one of the primary health concerns in the county, and the entire population of the county will be exposed to this climate change effect. Across the state, with no exception to the Central Coast and the county, extreme heat ranks amongst the deadliest of all hazards (CNRA 2022). Increased temperatures that manifest in sustained periods of extreme heat can directly impact the county's populations through heat stroke and other heat-related illnesses of varying severity, and can increase the risk of cardiovascular disease, respiratory disease, kidney failure, and preterm births (CDPH 2017; LAO 2022). Non-fatal heat stroke, specifically, can result in severe mental status changes, seizures, loss of consciousness, and abnormal cardiac rhythm (Cal EPA and CDPH 2013). Additionally, extreme heat can exacerbate other pre-existing conditions in certain vulnerable populations, such as the medically fragile and chronically ill. Increased temperatures and extreme heat may also heighten allergies and intensify the photochemical reactions that produce smog, ground-level ozone, and fine particulate matter ($PM_{2.5}$), which can be detrimental to human health (CDPH 2017).

In more densely populated areas of the county, increased temperatures and extreme heat can contribute to the urban heat island effect, which makes these areas comparatively hotter than surrounding areas due to the higher density of heat-absorbing structures and lack of green space. In addition to the heightened temperatures in these areas, the urban heat island effect creates conditions more conducive to the production of smog, ground-level ozone, and $PM_{2.5}$ (OPR, CEC, and CNRA 2018b). Heat-related deaths in more densely populated areas are projected to at least double by mid-century (CNRA 2022). It should be noted, however, that the urban heat island effect is not a major issue in unincorporated areas of the county due to sparse development. While there are other regions of the state that are comparatively hotter than the county as a whole, it has been estimated that heat-related illness and mortality may be higher in cooler regions of the state because they are less acclimated and prepared for extreme heat, including the coastal areas of the county (LAO 2022). Air conditioning can alleviate some of the discomfort felt during periods of extreme heat and lower the risk of mortality, but many coastal areas across the Central Coast region, inclusive of the county, lack air conditioning due to historically lower temperatures (OPR, CEC, and CNRA 2018b). These areas that lack air conditioning, especially those that are more rural, may have limited access to cooling centers available for use by residents.

Overall, when it comes to increased temperatures and extreme heat, vulnerable populations will likely experience the worst impacts, as heat-related risk is associated with physical, social, political, and economic factors. Children, the elderly, pregnant women, and people with chronic illness can be especially sensitive to heat exposure. Combining these characteristics and existing health inequities with additional factors, such as poverty, linguistic isolation, housing insecurity, and the legacy of historic redlining policies, can put individuals at disproportionately high risk of heat-related illness and death (CNRA 2022). Additionally, people that work long hours outdoors, such as those working in the county's prominent agricultural sector and transportation maintenance, among others, are at heightened exposure and risk to increased temperatures and extreme heat (Caltrans 2019; OPR CEC, and CNRA 2018b). Though adjusted schedules (e.g., early mornings, late nights) can potentially reduce the level of exposure to increased temperatures and extreme heat for those who work outdoors, it may result in sacrifices in other areas for these individuals (e.g., spending time with family).

Built Environment

Increased temperatures and extreme heat events are likely to affect the county's built environment primarily through changes in energy use, as well as disproportionate impacts on individuals residing in units that do not have air conditioning. Cal-Adapt provides data on the shifts in Cooling Degree Days and Heating Degree Days, which are measurements used to assess the energy demand needed for cooling and heating buildings in different climate zones throughout California. A "degree day" does not equate to a single day of the year, but rather compares the average outdoor temperatures recorded for a location to the standard temperature of 65 °F, which is the assumed temperature that does not require heating or cooling to be comfortable. For example, if the average temperature for a day is 80 °F, the day has 15 Cooling Degree Days (80 – 65 = 15). Degree days are used in the State's Title 24 Building Energy Efficiency Standards to help design the energy demand needed for heating and cooling in the various climate zones throughout the state. To illustrate how climate change is likely to affect energy demand for heating and cooling in the future, Table 15 includes the relative shift in Cooling Degree Days and Heating Degree Days in the county through 2099. As displayed, the county is projected to have significant decreases in Heating Degree Days and significant increases in Cooling Degree Days through the end of the century, most notably with a 536 percent increase in Cooling Degree Days in the long-term under RCP 8.5 (CEC 2022h). These projections for the county correlate to an overall significant increase in cooling costs through the end of the century, with a slight decrease in heating costs.

Table 15 Changes in Heating and Cooling Degree Days in Monterey County

Annual Averages	Historic Annual Averages (1961-1990)	Near-Term[1] (Current-2050)	Midterm[1] (2040-2069)	Long-Term (2070-2099)	
				RCP 4.5	RCP 8.5
Number of Heating Degree Days	3,551	2,715	2,337	2,333	1,762
Percent Change in Heating Degree Days from Historic (%)	N/A	-23.5	-34.2	-34.3	-50.4
Number of Cooling Degree Days	187	502	728	719	1,190
Percent Change in Cooling Degree Days from Historic (%)	N/A	+168.6	+289.2	+284.5	+536

Notes: N/A = not applicable; RCP = Representative Concentration Pathway.

[1] Projections for the near-term and midterm timescales are based on RCP 8.5.

Source: CEC 2022h.

In addition to the impacts of increased temperatures and extreme heat on buildings and energy use, transportation systems will also be affected. Transportation infrastructure is designed and constructed to withstand certain variabilities in weather and temperature based on observations of historical weather trends for specific climate regions. The performance of transportation infrastructure may begin to decline when the severity of extreme heat periods exceeds historical ranges. For example, extreme heat could cause pavement discontinuities and deformation, will increase the risk of buckling of highways and railroad tracks, and may cause premature deterioration of transportation infrastructure, decreasing transportation safety and creating higher maintenance costs (Caltrans 2019; OPR, CEC, and CNRA 2018b). Air conditioning units in buses are placed under increased stress and risk of failure when maximum daily temperatures reach 100 °F, which is a temperature threshold certain areas of the county will more frequently exceed over time (Cambridge Systematics 2015). Further, while bridges are designed to expand during periods of extreme heat, projected increases in extreme heat events could go beyond design criteria, resulting in cracking and crushing of the roadway deck, as well as increased maintenance costs (Transportation Research Board 2008).

Community Functions

Increased temperatures and extreme heat may pose increase the risks to the county's community functions. Similar to and interconnected with increased wildfire risk, increased temperatures and extreme heat can trigger a PSPS event by PG&E, which can adversely affect vulnerable populations without alternate power options and could potentially disrupt emergency dispatching, communications, and response capabilities (County of Monterey 2019b). Agriculture in the county could be significantly impacted by extreme heat, especially when coupled with drought. Higher

temperatures can lead to increased evaporation rates of surface water and increased evapotranspiration in plants, resulting in decreased soil moisture content and increased demand for irrigation. Warmer temperatures may increase algae growth in the Carmel and Salinas rivers, as well as in the Nacimiento and San Antonio reservoirs. Low water levels in rivers and reservoirs combined with the presence of algae can interrupt water delivery services during peak demand, affecting the ability of water agencies to provide a reliable supply of healthy, clean drinking water, or increase groundwater pumping that further exacerbates groundwater overdraft. Overdrafting could lead to increased seawater intrusion, which, in turn, would further degrade water quality (MPWMD 2019). Additionally, because large portions of the county have historically temperate climates, increased temperatures and extreme heat could result in many residences, schools, and businesses adding air conditioning systems and remodeling any outdoor facilities (e.g., playgrounds) with more heat-resistant materials (LAO 2022).

EXTREME PRECIPITATION AND FLOODING

The average number of annual extreme precipitation events throughout the county is projected to increase through the end of the century, with the most significant projected increases in coastal areas, such as Census Tract 6053011502. While it is uncertain exactly how climate change will affect flooding events in the county and the region and to what extent, it reasonable to assume that an average annual increase in extreme precipitation events, coupled with sea level rise, will likely lead to an increase in the frequency and intensity of flood events, which could result in adverse impacts to the county's populations, built environment, and community functions.

Populations

The populations that will likely be most directly affected by extreme precipitation and flooding in the county are those that reside in the county's 100- and 500-year floodplains, where over 48,000 and 33,000 unincorporated county residents reside in each, respectively (County of Monterey 2022f). Additionally, related but separate from the county's populations that reside in floodplains are the populations that are at direct risk of coastal flooding and inundation resulting from sea level rise. Depending on the amount of sea level rise through the end of the century, with scenarios considering sea level rise from anywhere between roughly 10 and 78 inches, there are between approximately 2,800 and 7,300 unincorporated county residents living in areas at direct risk and exposure of coastal flooding and inundation (County of Monterey 2022f). Notably, those residing in the northern portion of the county near Moss Landing and Elkhorn Slough are at particularly high risk. Depending on the severity of any flooding event, there is the potential for populations to be displaced and for people to lose their homes and livelihoods, in addition to the risk of injuries and even death. Flooding resulting in overflow of sewage systems may create conditions that promote water- and food-borne diseases, which can severely impact human health (CDPH 2017).

Although all residents and visitors of the county may be sensitive to extreme precipitation and flooding, vulnerable population groups will likely face disproportionate negative impacts. In addition to lacking adequate shelter and protection from these events, individuals experiencing homelessness may have limited access to warning messages and other pertinent information from the County and other public health and safety agencies. The elderly and individuals with access and functional needs may also face these challenges and are likely to have limited mobility and ability to react to and prepare for these events. Other vulnerable populations to extreme precipitation and flooding in the county include low-income individuals, communities of color, linguistically isolated communities, and children.

Built Environment

Extreme precipitation and flooding in the county can severely impact or disrupt the county's built environment. Regarding residential property in the unincorporated areas of the county, over 7,200 structures lie directly within the county's floodplains—over 3,400 in the 100-year floodplain, and an additional 3,800 in the 500-year floodplain—with a collective estimated value of almost $5 billion (County of Monterey 2022f). Additionally, related but separate from the residential property in the county that lies directly within floodplains is the residential property that is at direct risk of coastal flooding and inundation resulting from sea level rise. Depending on the amount of sea level rise through the end of the century, with scenarios considering sea level rise from anywhere between roughly 10 and 78 inches, there are approximately 200 to 500 residential structures in unincorporated areas of the county at direct risk and

exposure of coastal flooding and inundation (County of Monterey 2022f). Apart from residential property, much of the county's critical infrastructure is at direct risk from flooding (i.e., existing within a floodplain or identified as being exposed to sea level rise-induced coastal inundation).

The county's transportation infrastructure has proven to be at direct risk of extreme precipitation and flooding, and that risk is projected to increase because of climate change. Often times, extreme precipitation events are followed by flash floods, landslides, mudslides, and debris flows. These hazards have significantly impacted roadways within the county, and have caused large traffic buildups. For example, in February 2017, heavy rains triggered a landslide that damaged Pfeiffer Canyon Bridge along Highway 1 beyond repair, and cut off access to Big Sur, a major tourist destination, from both directions. A $24 million emergency project was required to replace the previous two-column bridge with a single-span steel girder structure (Caltrans 2019). In general, bridges and certain roadways often provide the only ingress and egress to some neighborhoods. If bridges, roadways, and railroads are blocked or damaged because of flooding, it can isolate and prevent access to residents throughout the county, including for emergency service providers needing to get to vulnerable populations or to make repairs (County of Monterey 2022a). Sea level rise, and more specifically, coastal flooding and storm surge, can dramatically affect transportation routes and the integrity of existing transportation fortifications, which will likely become increasingly inadequate. In Elkhorn Slough, coastal flooding is already common and slows, or even stops, train traffic at times. Additionally, local bus routes and bus stops can be directly affected (OPR, CEC, and CNRA 2018b). Transportation infrastructure, along with other critical facilities (e.g., electric distribution lines, pipelines, public buildings, etc.), are also at direct risk of flooding-induced scouring, which is the removal of sediment, such as sand and gravel, caused by swiftly moving water and compromising the integrity of a structure. The projected increases in annual precipitation will increase the vulnerability of these structures in the future (Monterey One Water 2021).

There are many additional adverse impacts associated with extreme precipitation and flooding on the county's built environment. Flooding can cause underground utilities, along with water and sewer systems, to be damaged, or otherwise adversely affected via high inflow and infiltration. If drainage systems or culverts are backed up by floodwaters, pronounced localized flooding can occur (County of Monterey 2022a). Sea water backflow resulting from coastal flooding can impair coastal sanitation drainage systems during flood events, requiring costly upgrades and alterations (OPR, CEC, and CNRA 2018b). Floodwaters may infiltrate drinking water supplies, causing contamination. Additionally, facilities that are known to manufacture, process, store, or use hazardous materials could be damaged during flooding events. If damaged, these facilities, or containers holding these materials, could release chemicals that are carcinogenic, or otherwise detrimental to human health and the environment (County of Monterey 2022a).

Community Functions

Heighted extreme precipitation and flooding can result in impacts to a wide array of community functions. Flooding events resulting in the closure of businesses and government facilities, disruption of communications, utilities (e.g., water, sewage), and related delivery of services, excessive expenditures for emergency response, and general disruption of the normal functions of the county can result in severe economic losses, especially in locations that directly experience flooding (e.g., floodplains) (County of Monterey 2022a). The tourism sector can be adversely affected by major flood events as popular destinations, such as beaches and recreational areas, tend to overlap with the county's floodplains and areas that are prone to sea level rise and coastal inundation. Specifically, regarding beaches, access points may become hard to reach or inaccessible, which could increase the risk of injuries for those that choose to take on the risk. The agricultural sector is also at increased risk of flooding induced by extreme precipitation and sea level rise. Large amounts of agricultural land in the Salinas Valley are below sea level and if floodwaters infiltrate this land, they can result in the destruction of crops and other agricultural products. Severe flooding and coastal inundation can also impact commercial fisheries through the destruction or inaccessibility of harbors and other related infrastructure (County of Monterey 2022a).

The county can also experience environmental impacts as a result of extreme precipitation and flooding. Migrating fish can potentially wash into roads or over dikes into flooded fields during flood events. Pollution from roads, such as oil, and hazardous materials can wash into rivers and streams, potentially resulting in ecosystem degradation. Pollution and hazardous materials can also settle into soils after periods of drought, polluting them for agricultural uses. Human development, such as bridge abutments, levees, and logjams from timber harvesting can increase

stream bank erosion during flooding events, causing rivers and streams to migrate into unnatural courses (County of Monterey 2022a).

DROUGHT AND WATER SUPPLY

Increased average temperatures and abnormally dry years have previously affected water supplies in the region and will continue to occur in the future, though the exact timing and duration of droughts are difficult to predict. However, assuming that droughts are a hazard that the county will continue to face and will likely be exacerbated because of climate change, their potential impacts on the county's populations, built environment, and community functions still need to be considered, especially since the county's water supplies are solely dependent on its local water resources, as the county is isolated from State and Federal water supplies.

Populations

The entire population of the county is vulnerable to prolonged drought periods and may be affected in a variety of ways, primarily indirectly. Drought can affect health and safety, including health problems related to low water flows, poor water quality, or dust linked to drought (County of Monterey 2022a). Water shortages during periods of drought can affect access to safe and relatively affordable water, with especially substantial impacts on low-income individuals and communities otherwise burdened with environmental pollution (County of Monterey 2022f). Drought can lead to disruptions or shortages in food and water supply, increased costs, and the promotion of food- and water-borne diseases, which, in turn, could lead to hunger and malnutrition among particularly vulnerable populations in the county (CDPH 2017). Additionally, drought leading to increased soil erosion and risk of wildfire can lead to degraded air quality, causing respiratory health problems and likely increasing the number of patients at local hospitals and health clinics. Mental health issues can also be prevalent during periods of drought-induced water shortages, as a lack of water can contribute to higher stress and anxiety levels (MPWMD 2019).

Built Environment

The built environment in the county will not experience substantial direct impacts associated with drought. However, prolonged drought conditions in the future have the potential to cause secondary impacts. For example, heavy precipitation following periods of drought can cause intense flooding, debris flows, landslides, and mudslides, which pose risks to the county's built environment (County of Monterey 2022a). Additionally, the integrity of the county's transportation infrastructure (e.g., roadways, railroads) may be affected by groundwater overextraction during times of drought. Drought-induced wildfires can also affect residential property, critical infrastructure, and other aspects of the county's built environment. Lower stream flow and reservoir levels can lead to a decrease in available hydropower for the MCWRA, while higher salinity in source water resulting from drought may increase the energy required for water treatment (MPWMD 2019).

Community Functions

Perhaps the most significant potential impacts of drought on the county will be on its wide array of community functions. For one, the county's agricultural sector is especially vulnerable to drought conditions, with the most notable consequences directly related to water availability for crop irrigation. Irrigated agriculture produces most of the harvested crops across the Central Coast region, and a decrease in water availability could greatly reduce crop yields and overall levels of production, especially when coupled with extreme heat (County of Monterey 2022a; OPR, CEC, and CNRA 2018b). For context, and specifically in the Salinas Valley, water for agriculture is made available from groundwater sources that are recharged by the Salinas River, which relies on water released from the Nacimiento and San Antonio reservoirs controlled by the MCWRA (County of Monterey 2022a). Additionally, during drought conditions, soil salinity can increase because there is less water available to leach salts from the soil, which can significantly decrease agricultural production since many crops are sensitive to salinity levels. Higher soil erosion exacerbated by drought can also decrease agricultural production, resulting from agricultural lands becoming less fertile. Particularly dry soil conditions resulting from low stream flow and groundwater levels can increase the risk of wildfires, another threat to agricultural production. All of the above factors can lead to higher consumer costs for

agricultural products, loss of jobs, loss of income for the supply chain, and can enhance regional food security issues (MPWMD 2019; OPR, CEC, and CNRA 2018b).

In addition to agriculture, drought may affect other local businesses and economic sectors, both directly and indirectly. The most significant economic impacts will likely be on industries that use or depend on water for their business or sector (e.g., power plants, oil refineries, forestry, fisheries, etc.) (County of Monterey 2022a). Any water-use restrictions during times of drought can directly impact smaller-scale businesses that provide water-related services (e.g., power-washing). Essential product costs that increase because of drought (e.g., agricultural and energy products) can potentially discourage and reduce discretionary consumer spending in other industries, such as entertainment, dining, and retail (MPWMD 2019). One of the primary economic sectors in the county, tourism, which generates over $2.3 billion in annual revenue, can be drastically affected by drought, as local scenery and tourist attractions can become less desirable or inaccessible (e.g., through soil erosion, algal blooms). Recreational activities, strongly interconnected with tourism in the county, can be diminished as a loss of aquatic species, lower stream flows, increased evapotranspiration, and reduced reservoir and lake levels flows lead to less fishing, boating, kayaking, and hiking, among other activities. Any declines in tourism can directly impact traffic at hotels, restaurants, and across the hospitality sector as a whole (MPWMD 2019). Overall shifts in the county's economic sectors as a result of drought can lead to unemployment, increased risk for financial institutions, capital shortfalls, and loss of tax revenue (County of Monterey 2022a).

Drought can also result in adverse environmental effects. Some effects are short-term, where conditions quickly return to normal following a drought, but others can be long-term, lingering for long periods of time or even becoming permanent. For example, wildlife habitat may be degraded as a result of drought through the loss of wetlands, lakes, and vegetation, but many species will eventually recover. However, the drought-induced degradation of landscape quality, including high levels of soil erosion, may lead to a more permanent loss of biological productivity (County of Monterey 2022a). Additionally, drought can trigger holistic ecosystem impacts and system failures. Low streamflow, higher temperatures, and degraded water quality during times of drought can affect aquatic ecosystems, as well as terrestrial wildlife that rely on surface water, floodplains, wetlands, marshes, and surrounding soil and vegetation. Pollutants discharged to the Salinas River (e.g., agricultural and urban stormwater runoff), for example, may cause serious impacts in downstream environments, including critical habitat for steelhead, and reduced surface flows due to drought have the potential to increase the concentration of these pollutant loads (MPWMD 2019).

2.2.5 Summary of Sensitivity and Potential Impacts

Based on guidance from the APG, potential impacts from each climate change effect are rated on a qualitative scale of Low, Medium, or High. A description of each qualitative rating for potential impacts is provided in Table 1 at the beginning of Section 2, which is also repeated in Table 16 below.

Table 16 Potential Impact Scoring

Score	Potential Impact Scoring Description
Low	Impact is unlikely based on projected exposure; would result in minor consequences to public health, safety, and/or other metrics of concern.
Medium	Impact is somewhat likely based on projected exposure; would result in some consequences to public health, safety, and/or other metrics of concern.
High	Impact is highly likely based on projected exposure; would result in substantial consequences to public health, safety, and/or other metrics of concern.

Source: Cal OES 2020.

The potential impacts rating for each climate change effect that is anticipated to impact the county is shown in Table 17. This evaluation is based on the exposure analysis and analysis of sensitivities and impacts discussed in the previous sections.

Table 17 Potential Impacts Summary

Climate Change Effect	Potential Impacts Rating
Increased Wildfire Risk	High
Increased Temperatures and Extreme Heat	Medium/High
Extreme Precipitation and Flooding	Medium/High
Drought and Water Supply	High

Source: Ascent Environmental 2022.

2.3 ADAPTIVE CAPACITY

The third step in the VA process is to evaluate the adaptive capacity of the populations, built environment, and community functions to adjust to climate change effects and their associated potential impacts. Adaptive capacity refers to a community's current and future ability to address climate-related impacts. A review of the County's existing policies, plans, programs, and resources, as well as those from relevant regional and State agencies and organizations, informed this assessment of the County's current ability to minimize vulnerability to hazards and adapt to climate change over the long-term. While there is some level of existing adaptive capacity, these efforts do not comprehensively identify all of the strategies and actions that will need to be implemented by the County and other agencies to adequately address the full scope and magnitude of potential impacts from climate change. Climate change will increase the frequency and severity of some hazards in the future, requiring updates to emergency response and land use planning, new policies and programs, and new strategic partnerships.

2.3.1 Existing, State, Regional, and Local Planning Efforts

This section summarizes current State, regional, and local planning efforts that address climate-related hazards. It should be noted that though this section is comprehensive, it is not all-encompassing, as additional policies, plans, programs, and resources may be available that address climate-related hazards within the county. This section serves as a high-level overview, and the planning efforts that are reviewed and summarized are arranged alphabetically.

CALIFORNIA'S FOURTH CLIMATE CHANGE ASSESSMENT, CENTRAL COAST REGION REPORT

As described in Section 1.4.2, "California's Fourth Climate Change Assessment," the CC Report, published in September 2018, is one of a series of nine regional climate vulnerability assessments in California that provide an overview of region-specific climate science and anticipated climate-related changes, specific strategies to adapt to climate impacts, and key research gaps needed to safeguard the region from climate change. The CC Report breaks down regional vulnerability by ecosystems and biodiversity, water resources, and communities and provides adaptation strategies applicable to the county (OPR, CEC, and CNRA 2018b).

CALTRANS CLIMATE CHANGE VULNERABILITY ASSESSMENTS, DISTRICT 5 TECHNICAL REPORT

The *Caltrans Climate Change Vulnerability Assessments, District 5 Technical Report* (District 5 Report), written in 2019, was developed for the California Department of Transportation (Caltrans) and summarizes the climate change-specific vulnerabilities of the portion of the State Highway System (SHS) located in Caltrans District 5, which encompasses the county. The report is divided into sections by climate stressor (e.g., wildfire, temperature, precipitation) and each section presents how that climate stressor is changing, the data used to assess SHS vulnerabilities from that stressor, and the methodology for how that data was developed. Additionally, the District 5

Report outlines a recommended framework for prioritizing projects that might be considered by Caltrans in the future (Caltrans 2019).

CENTRAL COAST HIGHWAY 1 CLIMATE RESILIENCY STUDY

The *Central Coast Highway 1 Climate Resiliency Study* (CCH1 Study), developed by the Association of Monterey Bay Area Governments (AMBAG) in 2020, is a report on climate change adaptation planning for Highway 1 and the railway through Elkhorn Slough and surrounding ecology. The CCH1 Study seeks to answer the following question: "[w]hat transportation improvements and nature-based strategies will work in tandem to simultaneously enhance ecological and transportation resilience through the Elkhorn Slough area under future conditions… through the end of the century?" (AMBAG 2020). It also seeks to integrate regional development and adoption of natural infrastructure and transportation planning.

CLIMATE CHANGE AND HEALTH PROFILE REPORT, MONTEREY COUNTY

Primarily produced by the California Department of Public Health (CDPH), the County *Climate Change And Health Profile Report* (CCHPR) seeks to provide a county-level summary of information on current and projected risks from climate change and potential health impacts. The CCHPR represents a synthesis of information on climate change and health for communities based on recently published reports of State agencies and other public data. It is part of a suite of tools that is being developed by CDPH to support local, regional, and statewide efforts in the public health sector to build healthy, equitable, resilient, and adaptive communities ready to meet the challenges of climate change (CDPH 2017).

MONTEREY COUNTY COMMUNITY RESILIENCE PLAN

The County's Community Resilience Plan serves as a "guide for making our community more resilient, by bringing the whole community together to better understand our shared risks and capabilities during disasters and how we can become stronger, smarter, and more capable of handling any hardship that comes our way" (County of Monterey 2022d). The Community Resilience Plan reviews county demographics, regions, history, and hazard risk, inclusive of hazards exacerbated by climate change, and provides an overview of challenges, strengths, projects, and recommendations for fostering county-wide resilience to disasters.

MONTEREY COUNTY COMMUNITY WILDFIRE PROTECTION PLAN

The County's *Community Wildfire Protection Plan* (CWPP) was developed by the Monterey Fire Safe Council (MFSC) with input from CAL FIRE, USFS, BLM, and other stakeholders, including community members, forest and rangeland property owners, and local fire agencies within SRAs. The CWPP is intended to serve as an advisory plan to guide wildfire prevention and preparation activities throughout the county, subject to compliance with all other applicable local, State, and Federal laws and regulations (MFSC 2016).

MONTEREY COUNTY EMERGENCY OPERATIONS PLAN

In an emergency or disaster, the Monterey County Office of Emergency Services (MCOES) organizes, manages, and executes emergency actions necessary to protect lives, property, and the environment. To respond effectively to all types of emergencies, MCOES maintains the EOP on behalf of the operational area. The intent of the plan is to provide an overview of emergency management processes for responding to an incident and to deliver a high-level introduction to concepts of operation regarding emergencies. It also provides an overview of the MCOES organization, policies, and approach to emergency management and what is required to mitigate any significant emergency or disaster. The EOP is based on the foundation of the California Emergency Management System, the National Incident Management System, and the principles of the National Response Framework, National Preparedness Goal, and National Recovery Framework (County of Monterey 2020).

MONTEREY COUNTY FLOODPLAIN MANAGEMENT PLAN

The County's *Floodplain Management Plan* (FMP) is intended to meet the requirement for continued participation in the Federal Emergency Management Agency's (FEMA's) National Flood Insurance Program Community Rating System. Developed by the MCWRA, the FMP assesses the flooding hazards within unincorporated areas of the county, summarizes the County's floodplain management program strategy, provides information on flooding sources affecting Repetitive Loss areas within the county, describes current flood mitigation strategies, and presents an implementation plan for flood hazard reduction. The FMP was prepared with input from county residents and with support from Cal OES and FEMA (County of Monterey 2014).

MONTEREY COUNTY GROUNDWATER MANAGEMENT PLAN

The purpose of the County's *Groundwater Management Plan* (GWMP), prepared by the MCWRA in 2006, is to provide a comprehensive overview of the Salinas Valley Groundwater Basin (SVGB) and to recommend various management strategies for the basin. While this edition of the GWMP focuses on the SVGB, the MCWRA is responsible for the management of the water resources for the entire county. The creation of the GWMP was directly influenced by the adoption of the State's Groundwater Management Act, which passed in 1992, providing local agencies the authority to prepare groundwater management plans and encouraging local agencies to work cooperatively to manage groundwater resources within their jurisdictions and groundwater basins (County of Monterey 2006).

MONTEREY COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

The MJHMP was prepared in coordination with FEMA and Cal OES to ensure that it meets all applicable Federal and State requirements. The current version represents the third iteration of the document that was originally established and adopted in 2007. The guiding principle of the MJHMP is to "reduce the risk to life and property in [the] county in an efficient and effective manner by decreasing the long-term vulnerability from hazards through coordinated planning, partnerships, capacity building, and implementation of effective risk reduction measures," and addresses a wide range of hazards, both natural and anthropogenic (County of Monterey 2022a). The MJHMP geographically covers the entire area of the county, including unincorporated areas of the county, 12 incorporated municipalities, and five special districts (i.e., participating jurisdictions).

MONTEREY COUNTY OPERATIONAL AREA COASTAL INCIDENT RESPONSE PLAN

The County's *Operational Area Coastal Incident Response Plan*, approved in 2018, serves to identify and establish procedures and policies to coordinate the management of emergencies within the many bodies of water in the county, and additionally, it functions as a guide and informational document for the entire county's coastline. The County defines a coastal incident as "any emergency incident involving the assisting of a person or persons within the Coastal Zone in [the] [c]ounty that requires a coordinated response, rescue, and/or the special capabilities of multiple agencies to resolve the situation" (County of Monterey 2018). The primary hazard addressed in the Operational Area Coastal Incident Response Plan related to this VA is flooding.

MONTEREY COUNTY WINTER STORM RESPONSE PLAN

The County's *Winter Storm Response Plan*, adopted in 2019 and serving an annex to the EOP, outlines the County's planned response to flood emergencies in or affecting the county. The purpose of the plan is to provide information, policies, and procedures that will guide and assist the County in efficiently dealing with winter storm and flood emergencies. The plan addresses flood preparedness, levee patrol, flood fight, evacuation procedures, floodwater removal, and other related subjects (County of Monterey 2019a).

MONTEREY ONE WATER CLIMATE ACTION AND ADAPTATION PLAN

The *Monterey One Water Climate Action and Adaptation Plan* (M1WCAAP), prepared in 2021, serves as Monterey One Water's commitment to providing safe and resilient water solutions that reduce GHG emissions and enhancing community resilience towards vulnerabilities posed by climate change. Monterey One Water is the primary sewer treatment provider servicing the northern part of the county, and its service area covers more than 250,000 residents and almost 7,000 businesses. The goal of the M1WCAAP is to develop policies, programs, and measures to reduce reliance on fossil fuels with co-benefits of decreased GHG emissions, long-term cost savings, and building resiliency into Monterey One Water facilities and operations as a result of climate change-induced sea level rise, flooding, extreme heat, wildfires, and other risks (Monterey One Water 2021).

NORTH MONTEREY COUNTY DROUGHT CONTINGENCY PLAN

The *North Monterey County Drought Contingency Plan* (DCP), prepared by the Monterey Peninsula Water Management District (MPWMD) in 2019, addresses six drought contingency planning elements, including drought monitoring, vulnerability assessment, mitigation actions, response actions, operational administrative framework, and plan development and update. The DCP area covers the northern portion of the county and includes part of the Salinas Valley from the southern edge of the City of Salinas to the Pacific Ocean, the western portion of the Carmel Valley, and the urbanized Monterey Peninsula area between the two valleys (MPWMD 2019). Though the DCP does not cover the entire county, it is still an important planning document that addresses drought in unincorporated areas of the county.

SALINAS VALLEY GROUNDWATER BASIN 180/400-FOOT AQUIFER SUBBASIN GROUNDWATER SUSTAINABILITY PLAN

The *Salinas Valley Groundwater Basin 180/400-Foot Aquifer Subbasin Groundwater Sustainability Plan* (GWSP), developed by the Salinas Valley Basin Groundwater Sustainability Agency (SVBGSA) in 2020, was created in response to the passing of the State's Sustainable Groundwater Management Act in 2014, which requires that medium- and high-priority groundwater basins and subbasins develop groundwater sustainability plans that outline how they will achieve groundwater sustainability in 20 years, and maintain sustainability for an additional 30 years (SVBGSA 2020).

UNIT STRATEGIC FIRE PLAN, SAN BENITO-MONTEREY

The *Unit Strategic Fire Plan, San Benito-Monterey*, last updated in 2020, serves as the roadmap for reducing wildfire risk within the San Benito-Monterey Unit, which encompasses over 3 million acres, of which 2.1 million acres are SRAs. The Unit Strategic Fire Plan seeks to reduce firefighting costs and property losses, increase firefighter safety, and to contribute to ecosystem health. The San Benito-Monterey Unit management intends to support the Unit Strategic Fire Plan and make it successful by meeting the following objectives: collect, analyze, and prepare data to assess communities at risk and in need of fuel reduction or other projects; work with grant writers and stakeholders to secure funds to implement projects; utilize CAL FIRE personnel and resources in conjunction with other public and private efforts to assist with the project work on the ground; and educate the public on fire prevention and incorporating fire resistant landscaping and construction to their property, as well as hazardous fuel reduction to keep their lives, homes, property, and natural resources safe from catastrophic wildfires (CAL FIRE 2020).

SUMMARY OF EXISTING PLANS AND REPORTS

Table 18 identifies the specific climate change effects covered under each of the plans and reports presented above. As shown in the table, multiple planning efforts address the climate-related impacts that are expected to affect the county. Most of the policies provided in existing plans are broad-based strategies to reduce risk from climate change. Thus, it is important to note that an emphasis on specific and targeted policies should continue to be developed to improve the resilience of the most vulnerable populations and assets in the county.

Table 18 Summary of Existing Plans and Reports

Plan or Report	Prepared By	Climate Change Effects			
		Increased Wildfire Risk	Increased Temperatures and Extreme Heat	Extreme Precipitation and Flooding	Drought and Water Supply
California's Fourth Climate Change Assessment, Central Coast Region Report	OPR, CEC, and CNRA	✓	✓	✓	✓
Caltrans Climate Change Vulnerability Assessments, District 5 Technical Report	Caltrans	✓	✓	✓	
Central Coast Highway 1 Climate Resiliency Study	AMBAG			✓	
Climate Change and Health Profile Report, Monterey County	CDPH	✓	✓	✓	✓
Monterey County Community Resilience Plan	County of Monterey	✓	✓	✓	✓
Monterey County Community Wildfire Protection Plan	MFSC	✓			
Monterey County Emergency Operations Plan[1]	County of Monterey	✓	✓	✓	✓
Monterey County Floodplain Management Plan	MCWRA			✓	
Monterey County Groundwater Management Plan	MCWRA				✓
Monterey County Multi-Jurisdictional Hazard Mitigation Plan[1]	County of Monterey	✓	✓	✓	✓
Monterey County Operational Area Coastal Incident Response Plan	County of Monterey			✓	
Monterey County Winter Storm Response Plan	County of Monterey			✓	
Monterey One Water Climate Action and Adaptation Plan	Monterey One Water	✓	✓	✓	✓
North Monterey County Drought Contingency Plan	MPWMD	✓			✓
Salinas Valley Groundwater Basin 180/400-Foot Aquifer Subbasin Groundwater Sustainability Plan	SVBGSA				✓
Unit Strategic Fire Plan, San Benito-Monterey	CAL FIRE	✓			

Notes: AMBAG = Association of Monterey Bay Area Governments; CAL FIRE = California Department of Forestry and Fire Protection; CDPH = California Department of Public Health; Caltrans = California Department of Transportation; CEC = California Energy Commission; CNRA = California Natural Resources Agency; MCWRA = Monterey County Water Resources Agency; MFSC = Monterey Fire Safe Council; MPWMD = Monterey Peninsula Water Management District; OPR = California Governor's Office of Planning and Research; SVBGSA = Salinas Valley Basin Groundwater Sustainability Agency.

[1] For this summary, the Emergency Operations Plan and Multi-Jurisdictional Hazard Mitigation Plan are inclusive of their corresponding base plans, along with all associated annexes/volumes.

Source: Ascent Environmental 2022.

The following sections, organized by climate change effect, describe current adaptive efforts in place to address the impacts of climate change, but it should be noted that they may not represent the entirety of adaptive efforts. These evaluations serve to analyze and ultimately score adaptive capacity related to each climate change effect. Based on a combination of the adaptation initiatives outlined in the documents described above and additional adaptive efforts that have been pursued, the county's adaptive capacity for each climate change effect can be rated Low, Medium, or High. High adaptive capacity indicates that sufficient measures are already in place to address the points of sensitivity and impacts associated with climate change, while a low rating indicates a community is unprepared and requires major changes to address hazards. Adaptive capacity ratings are defined previously in Table 2.

2.3.2 Adaptive Efforts Related to Increased Wildfire Risk

Fueled by climate change, increased wildfire risk through the end of the century threatens nearly all of the county's residents and visitors, buildings and infrastructure, and community functions. One of the primary documents that highlight efforts to reduce the risk of wildfire in the county is the Unit Strategic Fire Plan, where the two primary pre-wildfire management strategies within the San Benito-Monterey Unit's jurisdiction include fire prevention and law enforcement, along with vegetation management. Encompassed within fire prevention and law enforcement are engineering and structure ignitability standards (e.g., all new construction must be held to the Chapters 7 and 7A of the California Building Code to reduce the risk of wildfire) and information and education campaigns (e.g., large wildfire prevention signs placed in strategic locations, public information officer available at all times). San Benito-Monterey Unit administers an active Vegetation Management Program that seeks to reintroduce fire to the landscape, restoring aspects of historic fire regimes, and to reduce flammable vegetation that may contribute to large, damaging wildfires and high suppression costs through prescribed burning and mechanical treatment (CAL FIRE 2020). Other entities aside from San Benito-Monterey Unit are also engaged in similar work related to fire prevention and conducting defensible space inspections, among other activities, including the Resources Conservation District of Monterey County

In addition to the county's adaptive efforts underscored in the Unit Strategic Fire Plan, the CWPP serves as another important document underscoring a broad array of wildfire hazard reduction measures, strategies and action plans, and recommendations for the future, and takes climate change into account. Some of the wildfire hazard reduction measures include, but are not limited to, hazardous fuel reduction and fuelbreaks (e.g., access roads, defensible space fuel treatments), hazardous fuel treatments (e.g., vegetation thinning, tree removal, tree and shrub pruning, dead plant removal, mowing, fireline explosives), Community Fire Safe Prescriptions, and air quality goals. Recommendations for the future include specific recommendations to the Secretary of Agriculture, Secretary of the Interior, Congress, all Federal, State, and local regulatory agencies with jurisdiction in the county, CAL FIRE and other fire authorities, the County, and municipalities and districts within the county. The range of recommendations is broad, and include maintaining the Ventana and Bixby Mountain Fuelbreaks, which protect many at-risk communities in the county, funding emergency ingress and egress to the Los Padres National Forest, establishing an annual goal for hazardous fuel reduction work, considering the option of biomass for use of woody debris from fuel mitigation activities, and supporting Community Emergency Response Teams, among others (MFSC 2016). Further, the MFSC, which developed the CWPP, also serves to educate the public on wildfire danger and helps neighborhoods and communities apply for and receive wildfire fuel reduction grants by acting as a fiscal sponsor to receive and administer grant funds (County of Monterey 2022d).

The County also has plans in place for care and shelter, electrical power disruption, and evacuation and transportation related to wildfires and other hazards. Each of these plans serve as annexes to the EOP and highlight specific strategies, operations, and required coordination that should be adhered to, but also acknowledge existing limitations. The MCOES also provides a page on its website, which displays a daily briefing dashboard, including a wildfire event log, and an array of County and Federal emergency alert systems for use by residents and visitors (County of Monterey 2022g). These tools may better prepare populations during hazardous conditions, related to wildfires or otherwise. Additionally, as part of the County's Safety Element Update that is currently in process, SB 99 and Assembly Bill 747 require an evacuation route analysis to be conducted, which will help bolster the adaptive capacity of the county to wildfire events.

ADAPTIVE CAPACITY RATING: MEDIUM

The County has a wide range of robust plans, programs, and tools that are intended to reduce the risk of wildfires in the county from a variety of standpoints, including prevention, preparedness, response, and recovery. Additionally, the County acknowledges that climate change may increase the risk of wildfires in the future and has developed some plans accordingly. However, the potential impacts associated with wildfire in the context of climate change are severe, and there are certain limitations that are prevalent in existing plans, especially as it relates to particularly vulnerable populations and infrastructure. Additionally, some of the secondary impacts of wildfire, including wildfire

smoke, are not adequately addressed or mitigated against under existing plans and programs. Though the county is currently well-equipped to manage the direct impacts of wildfire, the secondary impacts should also be prioritized, and with a changing climate, the county's overall wildfire risk will be exacerbated in the future. Because of the reasons described, the adaptive capacity rating for increased wildfire risk is medium.

2.3.3 Adaptive Efforts Related to Increased Temperatures and Extreme Heat

During extreme heat days and waves in the summer months, there have previously been cooling centers established at several locations throughout the county for those seeking relief from the heat (Rubin 2020). Additionally, while PSPS events were identified as a potential impact, especially to vulnerable populations, they are also a necessary adaptive effort during periods of extreme heat and increased wildfire risk to reduce the risk of accidental wildfire ignition (County of Monterey 2019b). The Community Resilience Plan identifies six strategies for making the county more resilient and better able to address the unpredictable impacts of environmental, social, and economic shocks and stressors. One of the strategies is to encourage resilient households, and one of the goals within that strategy is to support building modifications that reduce hazard risk, including the development of heat-resistant buildings through initiatives such as adding canopy covers, vegetation, and rain gardens in surrounding areas. Over the next 5 years, the County's Housing and Community Development Department will take the lead on this by encouraging sustainable building development programs (County of Monterey 2022d).

In addition to the above adaptive efforts to increased temperatures and extreme heat, the County provides an array of resources across its websites that serve as reliable extreme heat-related information sources for residents and visitors, including information on heat stroke and other heat-related illnesses, how to prepare for and respond to extreme heat at the individual level, and a repository for an array of external sources. The MCOES website displays a daily briefing dashboard, which includes current weather warnings and watches and would encompass extreme heat, along with an array of County and Federal emergency alert systems for use by residents and visitors (County of Monterey 2022g). These tools may better prepare populations during hazardous conditions, related to extreme heat or otherwise. Further, the County has an active heat illness prevention program, which applies to all outdoor places of employment at those times when the environmental risk factors for heat illness are present, as outdoor jobs are increased risk of heat-related illnesses.

ADAPTIVE CAPACITY RATING: LOW

Many of the County's plans and programs acknowledge but do not prepare to address increased temperatures and extreme heat as a hazard that is likely going to be exacerbated by climate change. While a large portion of the county has a historically temperate climate (i.e., coastal regions), much of the county has experienced sustained periods of extreme heat in the past, and even those areas that have not had much direct experience with extreme heat are more likely to experience it in the future as a result of climate change. This is especially concerning for residents that do not have access to air conditioning or nearby cooling centers, along with buildings that will require increased cooling costs, vulnerable transportation infrastructure (such as railways), and the county's agricultural sector, including both workers and crops. Further action can be taken by the County and other jurisdictions within the county to match the projected scale and severity of increased temperatures and extreme heat in the context of climate change, as current adaptive efforts have been relatively limited. Additional efforts are needed to mitigate the potential impacts it may have on populations, the built environment, and community functions. For these reasons, the County's adaptive capacity rating for increased temperatures and extreme heat is low.

2.3.4 Adaptive Efforts Related to Extreme Precipitation and Flooding

Extreme precipitation and flooding in the county is projected to be exacerbated by climate change, especially when coupled with sea level rise, and past extreme precipitation and flooding events have proven to have severe impacts. The FMP serves as one of the County's foundational plans specifically dedicated to flooding, and presents current prevention measures (e.g., floodplain mapping, regulations, building codes, drainage system maintenance, etc.), along with six broad goals related to flood hazard mitigation and associated actions to achieve these goals in the future (County of Monterey 2014). Another foundational plan not previously identified is the *Storm Water Resource Plan* (SWRP), developed by the Greater Monterey County Integrated Regional Water Management Region. The purpose of the SWRP is to promote storm water management implementation projects that provide regionally optimized benefits of increased water supply, improved water quality, and better flood protection, among others (IRWMR 2019). The Winter Storm Response Plan, another foundational plan related to flooding, establishes the emergency management organization to respond to any flood emergency within the county; identifies policies, responsibilities, and procedures required to protect the health and safety of communities from the effects of flood emergencies; and establishes operational concepts and procedures associated with field response to flood emergencies and the recovery process. The Winter Storm Response Plan goes into specific adaptive efforts such as communications support (e.g., public alerting systems, local emergency communication systems, etc.), levee patrol, flood fighting, evacuation, and flood water removal (County of Monterey 2019a). The Operational Area Coastal Incident Response Plan also serves as a supplemental document that outlines the County's coastal incident response procedures, where a coastal incident is defined as "any emergency incident involving the assisting of a person or persons within the Coastal Zone in [the] [c]ounty that requires a coordinated response, rescue, and/or the special capabilities of multiple agencies in order to resolve the situation," which includes coastal flooding (County of Monterey 2018).

In addition to the adaptive efforts described above, the Community Resilience Plan outlines multiple strategies, including enhancing emergency services infrastructure, moving towards sustainability, encouraging resilient households, and creating healthy communities that underscore goals, initiatives, and actions that are specific to mitigating the impacts related to extreme precipitation and flooding. For example, one of the initiatives is to support adequate, accessible, and affordable insurance for all, where MCOES will support efforts by local leadership and insurance companies to create and expand discounted disaster insurance programs, including flood insurance, for low-income renters and property owners over the next 3 years (County of Monterey 2022d). Further, MCWRA, in conjunction with the Resource Conservation District of Monterey County and other organizations, has developed the Salinas River Stream Maintenance Program to minimize the risk of flooding to landowners along the Salinas River and to improve riparian habitat for wildlife. The Salinas River Stream Maintenance Program involves clearing vegetation, often invasive weeds, through mowing and smoothing or removing sediment to open and maintain secondary channels on the river floodplain (RCDMC 2022).

ADAPTIVE CAPACITY RATING: MEDIUM

The County has adequately assessed the risks of extreme precipitation and flood events. In general, the County has developed, adopted, and enforced several robust plans, policies, and programs (e.g., FMP, SWRP, Winter Storm Response Plan, Operational Area Coastal Incident Response Plan) that will serve to mitigate impacts associated with increased intensity and frequency of floods in the future, and substantial flood mitigation operations are currently in place. Additionally, the County has demonstrated its commitment to vulnerable communities threatened by flooding (e.g., low-income individuals) by outlining future initiatives in the Community Resilience Plan. Noting the County's current adaptive efforts and planned efforts in the future, the risk of flooding due to the increased frequency of extreme precipitation events, coupled with sea level rise, is high, and many of these efforts may require modification in the future as a result of climate change. The potential impacts of flooding through the end of the century on vulnerable populations, built infrastructure, and some community functions (e.g., agriculture) are severe. Because of

the reasons described, overall, the County's adaptive capacity rating associated with extreme precipitation and flooding is medium.

2.3.5 Adaptive Efforts Related to Drought and Water Supply

Past drought conditions in the county, especially more recent severe and prolonged droughts, have highlighted the importance for the County to prepare for future droughts exacerbated by climate change that will likely affect water supply availability and result in other cascading effects. One important document that highlights the County's preparations related to drought is the DCP. Though the DCP, prepared by MPWMD, does not cover the entire unincorporated area of the county, it still underscores an array of drought response actions that are taking place, or being planned for, in the county and region. Some of the actions that have already been enacted include the formation of water shortage contingency plans that are enacted by local water agencies, and media campaigns (e.g., MPWMD initiated a campaign in 2014 titled "Save Water – Go Blue," which featured messaging across all major media platforms, on yard signs, and through community events, which allowed residents and businesses in the MPWMD's jurisdiction to acquire water conservation kits). Additional actions that have previously been taken include interim water recycling, the creation of a drought task force, and a golf course superintendents voluntary program, which set irrigation limits on golf courses based on the expectation of reduced water supplies. Future actions that have been identified are largely centered on improved coordination between local and regional agencies, and clear, consistent messaging related to droughts (MPWMD 2019).

In addition to the actions identified in the DCP, the GWSP underscores how groundwater, one of the primary water sources in the county, can be sustainably managed over time, but also provides context on other items such as existing groundwater regulatory programs and plans, including the GWMP, past and current groundwater conditions (e.g., groundwater elevations, groundwater storage, seawater intrusion), and water budgets, among others. In the GWSP, all calculations used to estimate the sustainable yield and the minimum threshold for reduction in groundwater storage acknowledge and account for climate change, along with current land use and future growth and development. Further, the GWSP also identifies "management actions" that can be taken, which are "new or revised non-structural programs or policies that are intended to reduce or optimize local groundwater use," especially in the context of drought (SVBGSA 2020). Some of these management actions include outreach and education for agricultural best management practices, supporting and strengthening the County's restrictions on additional wells in deep aquifers, and establishing a seawater intrusion working group.

Aside from the DCP, GWSP, and GWMP, three of the primary plans that specifically address drought and the county's water supplies, the County is engaged in an array of other related efforts. One of these efforts, identified in the all-hazards focus of the Community Resilience Plan, is an initiative to support drought planning and preparedness, where over the next three years, MCOES will work with MCWRA to bolster this (County of Monterey 2022d). Additionally, the County provides an array of resources across its websites that serve as reliable drought and water supply-related information sources for residents and visitors and identify smaller-scale actions being taken or recommended by various County agencies (e.g., requiring that restaurant patrons ask for tap water instead of being served automatically, prioritizing housing and water systems complaints related to leaks and faulty plumbing). Further, there is an array of additional projects that are intended to address drought and longer-term sustainability of water supplies in the unincorporated county, including, but not limited to: 1) the Carmel Area Wastewater District/Pebble Beach Community Services District Reclamation Project, which provides treated wastewater to irrigate golf courses and open space areas in Pebble Beach, which frees up potable water previously used for irrigation (CAWD 2022); 2) the Pure Water Monterey Groundwater Replenishment Project, which is meant to replenish the Seaside Groundwater Basin with purified recycled water and reduce pumping from the over-drafted Salinas Valley Groundwater Basin by increasing recycled water production for food crop irrigation (EPA 2022); and 3) the Castroville Seawater Intrusion Project.

ADAPTIVE CAPACITY RATING: HIGH

The County understands the implications of drought on the county's water supplies and other associated impacts. The County's undertaking of the DCP, GWSP, GWMP, along with the Community Resilience Plan and other plans, projects, and programs, will assist the county in building resilience to future drought conditions. These plans, projects, and programs have taken necessary steps to mitigate the risk of inadequate water supplies, although it will be important for the County to continue and increasingly plan for drought, as drought is likely going to be exacerbated by climate change in the future. The potential impacts of drought, especially on populations and community functions, can be severe and long-lasting. However, because of the County's plans and programs already in place, along with its demonstrated understanding of measures, it can or should take in the future related to drought, the adaptive capacity rating for drought and water supply is high.

2.3.6 Summary of Adaptive Capacity

Based on guidance from the APG, adaptive capacity scoring is rated on a qualitative scale of Low, Medium, or High. A description of each qualitative rating for adaptive capacity is provided initially in Table 2 at the beginning of Section 2, which is also repeated in Table 19 below.

Table 19 Adaptive Capacity Scoring

Score	Adaptive Capacity Scoring Description
Low	The County lacks capacity to manage climate change effect; major changes would be required.
Medium	The County has some capacity to manage climate change effect; some changes would be required.
High	The County has high capacity to manage climate change effect; minimal to no changes are required.

Source: Cal OES 2020.

Table 20 summarizes the County's adaptive capacity regarding each climate change effect. Like the potential impacts rating evaluation, the scoring of adaptive capacity allows the County to better understand priority areas where there are gaps in preparing for and adapting to climate change.

Table 20 Adaptive Capacity Summary

Climate Change Effect	Adaptive Capacity Rating
Increased Wildfire Risk	Medium
Increased Temperatures and Extreme Heat	Low
Extreme Precipitation and Flooding	Medium
Drought and Water Supply	High

Source: Ascent Environmental 2022.

2.4 VULNERABILITY SCORING

The final step in the VA is to characterize the county's vulnerability to each climate change effect, which is based on the magnitude of risk to and potential impacts on populations, the built environment, and community functions, while considering the current adaptive capacity in place to mitigate these impacts. Based on the ratings of potential impacts and adaptive capacity, an overall vulnerability score on a scale of 1 to 5 can be determined for each climate change effect. As noted at the beginning of Section 2, higher vulnerability scores (5 being the highest) indicate that a climate change effect should be prioritized sooner than those with lower scores (1 being the lowest). This scoring can be used to inform the development and prioritization of adaptation strategies included in the CCAAP and Safety Element, and it can also help the County understand which effects pose the greatest threats and should be emphasized in future planning efforts. Table 3 in Section 2 presents the rubric used to determine overall vulnerability scores based on the ratings for potential impacts and adaptive capacity, but is also repeated in Table 21 below.

Table 21 Vulnerability Scoring

		Vulnerability Score		
Potential Impacts	High	3	4	5
	Medium	2	3	4
	Low	1	2	3
		High	Medium	Low
		Adaptive Capacity		

Source: Cal OES 2020.

Vulnerability scoring for each climate change effect identified and evaluated in Sections 2.1 through 2.3 is included in Table 22 below. The table shows that increased temperatures and extreme heat is assigned a vulnerability score of 4-5, which means it should be a very high priority for the County. Increased wildfire risk is assigned a vulnerability score of 4, which means it should also be prioritized in the County's adaptation and planning related efforts. These climate change effects could potentially have significant impacts on the county's populations, built environment, and community functions in the near-term to midterm, and although a variety of adaptive efforts related to both climate change effects are already in place, the magnitude or risks posed by these hazards contributes to high vulnerability in the county. Extreme precipitation and flooding is characterized as having a vulnerability score of 3-4. This climate change effect is concerning because flooding in the county can come from multiple sources, including storms and extreme precipitation events, along with sea level rise and coastal inundation. Drought and water supply is characterized as having a vulnerability rating of 3-4. This climate change effect is currently being addressed adequately based on existing conditions, but additional adaptation and resilience planning will be required in the future to mitigate impacts and protect the county.

Table 22 Vulnerability Summary

Climate Change Effect	Vulnerability Score		
	Adaptive Capacity	Potential Impact	Vulnerability
Increased Wildfire Risk	Medium	High	4
Increased Temperatures and Extreme Heat	Low	Medium/High	4-5
Extreme Precipitation and Flooding	Medium	Medium/High	3-4
Drought and Water Supply	High	High	3

Source: Ascent Environmental 2022.

2.5 CONCLUSION

The County, regional and State agencies, and other stakeholder groups have already implemented a variety of initiatives to address climate change in the county through existing plans, policies, programs, and actions. As climate change continues to exacerbate risks and impacts from wildfire, increased temperatures and extreme heat, extreme precipitation and flooding, and drought, it is critical that the County continues to develop and implement adaptation strategies to plan for and mitigate these risks. The County's CCAAP and Safety Element will include adaptation and resilience strategies and measures based on the findings of this report. These strategies will serve to address the climate-related hazards identified throughout the adaptation planning process and prioritize strategies that will be effective, feasible, cost-appropriate, and include co-benefits.

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Appendix C

Community Engagement

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Climate Action Barriers Survey

How do members of your household regularly get around Monterey County? Check all that apply.

- Driving: 45
- Carpooling: 5
- Taking public transportation: 4
- Walking: 22
- Biking, scootering, or mobility device: 12
- Other: 2

Does someone in your household drive children to school?

- Yes: 8 (17.4%)
- No: 38 (82.6%)

How much time does that person spend in pick up and drop off lines each week?

- Less than an hour: 5 (62.5%)
- 2–3 hours: 1 (12.5%)
- 8–10 hours: 2 (25%)

For members of your household, what are the barriers to using public transportation in Monterey County? (Check all that apply.)

- Buses are too infrequent, slow, or unreliable: 30
- The bus stop is too far or doesn't go where I need to go: 27
- Transit service doesn't run early or late enough: 15
- Waiting at the bus stop is uncomfortable: 15
- It isn't safe to walk to or from the bus: 13
- Other: 9

For members of your household, what are the most important considerations to using public transportation in Monterey County? (Check all that apply.)

- Not having to worry about parking: 25
- It's less expensive than owning a car: 15
- Other: 15
- It's an alternative to driving after drinking: 10
- It's inclusive of all community members (e.g., children and adolescents, elderly people, people with disabilities and their parents/caretakers): 10
- It's safer than being in a car: 8

For members of your household, what are the barriers to using active transportation (e.g., walking, biking, scootering) in Monterey County instead of driving? (Check all that apply.)

- Destinations are too far to walk or bike: 27
- Road safety, traffic speed, and dangerous drivers: 25
- Lack of protected bike lanes or crossings separated from vehicle traffic: 22
- I don't own a bike or scooter: 13
- Lack of end trip facilities like bike racks: 9
- Physical capabilities, such as mobility challenges or health concerns: 9

- I don't know how to ride a bike or scooter: 2
- Other: 5

For members of your household, what are the most important considerations to using active transportation modes in Monterey County? (Check all that apply.)

- It provides regular opportunities to get exercise: 31
- It provides regular opportunities to get fresh air, experience nature, and be outdoors: 28
- It's less expensive than owning a car: 19
- It provides more freedom for people who can't drive (e.g., children and adolescents, elderly people, people with disabilities and their parents/caretakers): 15
- Other: 12

For members of your household, what are the barriers to driving an electric vehicle? (Check all that apply.)

- Upfront cost: 28
- Access to charging at home: 24
- Driving range: 19
- Access to public or workplace charging: 17
- Towing capacity: 7
- None: 9
- Other: 10

For members of your household, what are the most important considerations to driving an electric vehicle? (Check all that apply.)

- Fuel savings and less maintenance costs: 28
- It's good for the planet: 24
- Cleaner air from tailpipe emissions: 23
- Home energy and battery options for resiliency: 12
- Other: 8

How much money does your household spend on transportation each month? (Consider fuel, monthly payment, maintenance, insurance, bus passes.)

- Less than $300: 12 (28.6%)
- $300–$500: 14 (33.3%)
- $501–$700: 8 (19%)
- $701–$900: 3 (7.1%)
- $901–$1,100: 1 (2.4%)
- $1,101–$1,300: 3 (7.1%)
- More than $1,300: 1 (2.4%)

What type of space heating system does your household use?

- Furnace: 23 (53.5%)
- Boiler: 6 (14%)
- Radiant heating: 5 (11.6%)
- Heat pump: 4 (9.3%)
- Wood or pellet heating: 3 (7%)
- Electric resistance: 2 (4.7%)

What type of water heating system does your household use?

- Conventional storage water heater: 31 (72.1%)
- Heat pump water heater: 6 (14%)
- Tankless or demand-type water heater: 5 (11.6%)
- Tankless coil and indirect water heater: 1 (2.3%)

What type of stove does your household use for cooking?

- Gas: 28 (62.2%)
- Electric: 13 (28.9%)
- Induction: 4 (8.9%)

For members of your household, what are the barriers to using electric or induction stoves? (Check all that apply.)

- Initial cost: 14
- Desire to use my methane gas stove when the power goes out: 11
- Preference for methane gas stoves: 11
- My household already uses an electric or induction stove: 9
- Other: 9
- My household rents and does not have purchasing power for appliances: 6
- Unfamiliar with electric technology: 5
- Unsure about operating costs: 3

What do you prefer about cooking with gas stoves? (Check all that apply.)

- Efficiency – 12 responses
- Cooking precision – 12 responses
- Cooking power – 12 responses
- Other – 2 responses

For members of your household, what are the most important considerations to upgrading to electric space and water heating systems? (Check all that apply.)

- It's good for the planet – 22 responses
- Improved air quality, less risk of asthma and respiratory illness symptoms – 16 responses
- Acute hazard reduction (explosions, gas leaks, fire risks) – 14 responses
- Long-term cost savings – 13 responses
- Other – 10 responses

How many people are in your household (including yourself)?

- 1 person – 6 responses (13%)
- 2 people – 23 responses (50%)
- 3 people – 9 responses (19.6%)
- 4 people – 2 responses (4.3%)
- 6 people – 3 responses (6.5%)
- 7 or more – 3 responses (6.5%)

Does your household rent or own your home?

- Rent – 14 responses (30.4%)
- Own – 32 responses (69.6%)

Where in Monterey County does your household reside?

- Monterey Peninsula – 24 responses (54.5%)
- Salinas – 9 responses (20.5%)
- North County – 5 responses (11.4%)
- Salinas Valley – 3 responses (6.8%)
- Carmel Highlands/Big Sur – 2 responses (4.5%)
- South County – 1 response (2.3%)

What is your annual household income?

- Under $50,000 – 3 responses (7.1%)
- $50,000–$75,000 – 4 responses (9.5%)
- $75,001–$100,000 – 9 responses (21.4%)
- $100,001–$150,000 – 14 responses (33.3%)
- $150,001–$200,000 – 5 responses (11.9%)
- Over $200,000 – 7 responses (16.7%)

What is your age?

- 18–24 – 1 response (2.2%)
- 25–34 – 8 responses (17.4%)
- 35–44 – 5 responses (10.9%)
- 45–54 – 7 responses (15.2%)
- 55–64 – 7 responses (15.2%)
- 65 and older – 18 responses (39.1%)

What is your gender?

- Female – 29 responses (63%)
- Male – 14 responses (30.4%)
- Non-binary – 1 response (2.2%)
- Prefer not to say – 2 responses (4.3%)

Which race or ethnicity best describes you?

- White/Caucasian – 33 responses (76.7%)
- Hispanic – 5 responses (11.6%)
- Multiple ethnicity/other – 4 responses (9.3%)
- Asian/Pacific Islander – 1 response (2.3%)

Encuesta Sobre Barreras a la Acción Climática

¿Cómo se desplazan usualmente los miembros de su hogar por el condado de Monterey? Marque todas las opciones que le correspondan.

- Conducir - 4
- Utilizar el transporte público - 1
- Caminar - 3

¿Alguien en su hogar lleva a los niños a la escuela en coche?

- Sí - 3 (60%)
- No - 2 (40%)

¿Cuánto tiempo pasa esa persona cada semana en las filas para entregar y recoger a los niños?

- Menos de una hora - 3 (100%)

Para los miembros de su hogar, ¿cuáles son los obstáculos para usar el transporte público en el condado de Monterey? Marque todas las que correspondan.

- Los autobuses son muy poco frecuentes, lentos o poco confiables - 1
- La parada del autobús está demasiado lejos o no va a donde necesito ir - 2
- No es seguro caminar hacia o desde el autobús - 3
- El servicio de transporte no funciona lo suficientemente temprano o tarde - 1
- Esperar en la parada del autobús es incómodo - 3

Para los miembros de su hogar, ¿cuáles son las consideraciones más importantes para usar el transporte público en el condado de Monterey? Marque todas las que correspondan.

- Es menos costoso que tener un automóvil - 4
- No tener que preocuparse por el estacionamiento - 3
- Es más seguro que estar en un automóvil - 2
- Es una alternativa para no conducir después de beber - 3
- Es inclusivo para todos los miembros de la comunidad (por ejemplo, niños y adolescentes, personas mayores, personas con discapacidades y sus padres/cuidadores) - 1

Para los miembros de su hogar, ¿cuáles son las barreras para usar el transporte activo (por ejemplo, caminar, andar en bicicleta, andar en patineta) en el condado de Monterey en lugar de conducir? Marque todas las opciones que correspondan.

- Seguridad vial, velocidad del tráfico y conductores peligrosos - 2
- Falta de carriles para bicicletas protegidos o cruces separados del tráfico vehicular - 3
- Los destinos están demasiado lejos para caminar o andar en bicicleta - 2

Para los miembros de su hogar, ¿cuáles son las consideraciones más importantes para usar los modos de transporte activo en el condado de Monterey? Marque todas las opciones que correspondan.

- Es menos costoso que tener un automóvil - 2
- Brinda oportunidades regulares para hacer ejercicio - 1
- Brinda oportunidades regulares para tomar aire fresco, experimentar la naturaleza y estar al aire libre - 2

- Brinda más libertad para las personas que no pueden conducir (por ejemplo, niños y adolescentes, personas mayores, personas con discapacidades y sus padres/cuidadores) - 1
- Otro - 1

Para los miembros de su hogar, ¿cuáles son las barreras para conducir un vehículo eléctrico? Marque todas las opciones que correspondan.

- Costo inicial - 3
- Acceso a la carga eléctrica en el hogar - 4
- Acceso a la carga eléctrica en lugares públicos o en el trabajo - 2
- Autonomía de conducción - 1
- Ninguno - 1

Para los miembros de su hogar, ¿cuáles son las consideraciones más importantes para conducir un vehículo eléctrico? Marque todas las opciones que correspondan.

- Ahorro de combustible y menores costos de mantenimiento - 3
- Es bueno para el planeta - 5
- Aire más limpio debido a las emisiones del tubo de escape - 4
- Opciones de energía y batería para el hogar para mayor resiliencia - 1

¿Cuánto dinero gasta su familia en transporte cada mes? Considere combustible, pago mensual, mantenimiento, seguro, pasajes de autobús.

- Menos de $300 - 2 (40%)
- $501-$700 - 1 (20%)
- $701-$900 - 1 (20%)
- $1,101-$1,300 - 1 (20%)

¿Qué tipo de sistema de calefacción utiliza su hogar?

- Resistencia eléctrica - 3 (75%)
- Calefacción radiante - 1 (25%)

¿Qué tipo de sistema de calentamiento de agua utiliza su hogar?

- Calentador de agua de almacenamiento convencional - 3 (100%)

¿Qué tipo de estufa utiliza su hogar para cocinar?

- Gas - 5 (100%)

Para los miembros de su hogar, ¿cuáles son las barreras para usar estufas eléctricas o de inducción? Marque todas las que correspondan.

- Costo inicial - 2
- No está seguro/a sobre los costos operativos - 1
- No está familiarizado/a con la tecnología eléctrica - 1
- Deseo usar mi estufa de gas metano cuando se corta la energía - 2
- Preferencia por estufas de gas metano - 1
- Rento mi casa y no tengo poder adquisitivo para electrodomésticos - 2

¿Qué prefiere de cocinar con estufas de gas? Marque todas las opciones que correspondan.

- Eficiencia - 1

Para los miembros de su hogar, ¿cuáles son las consideraciones más importantes para actualizar a sistemas eléctricos de calefacción de espacios y agua? Marque todas las opciones que correspondan.

- Mejor calidad del aire, menor riesgo de síntomas de asma y enfermedades respiratorias - 3
- Reducción de riesgos agudos como explosiones, fugas de gas y riesgos de incendio - 2
- Es bueno para el planeta - 1
- Ahorros de costos a largo plazo - 1

¿Cuántas personas hay en su hogar (incluido usted)?

- 1 - 1 (20%)
- 3 - 1 (20%)
- 4 - 1 (20%)
- 5 - 1 (20%)
- 6 - 1 (20%)

¿Alquila su casa o es propietario de su casa?

- Alquila - 4 (80%)
- Propietario - 1 (20%)

¿En qué parte del condado de Monterey reside su hogar?

- Condado Norte - 1 (33.3%)
- Salinas - 1 (33.3%)
- Condado Sur - 1 (33.3%)

¿Cuál es su ingreso familiar anual?

- Menos de $50,000 - 4 (80%)
- $50,000 - $75,000 - 1 (20%)

¿Cuál es su edad?

- 35-44 - 1 (20%)
- 45-54 - 2 (40%)
- 65 o mayor - 2 (40%)

¿Cuál es su género?

- Femenino - 4 (80%)
- Masculino - 1 (20%)

¿Qué raza o etnia lo describe mejor?

- Hispano - 5 (100%)

Community Vision Survey

How quickly do you think our community needs to act on climate change?

- We need significant action right away — 21 (95.5%)
- We need significant action in the next 5 years — 1 (4.5%)

What direct impacts from climate change are you most concerned about, if any? (select all that apply)

- Extreme Heat and Heat Waves — 15
- Wildfires and Wildfire Smoke — 19
- Storm Events and Flooding — 14
- Drought and Water Supplies — 20
- Sea Level Rise — 16
- Other — 5

How willing are you to change your way of life to incorporate climate-friendly actions?

- I'm already doing everything I can — 5 (22.7%)
- 100% on board, just tell me what to do — 14 (63.6%)
- I would consider it if it doesn't cost me more money or if there were financial incentives to do so — 3 (13.6%)

Climate Action Vision Board / Tablero de Ideas Para Acción Climática

The 2030 Climate Action Plan is looking for your ideas on how to reduce greenhouse gas emissions in Monterey County.

El Plan de Acción Climática de 2030 solicita tus ideas de cómo reducir las emisiones de gases de efecto invernadero en el Condado de Monterey.

- Buildings & Energy / Edificios y Energía
  - Improve energy efficiency in existing buildings.
  - Mejorar la eficiencia energética de los edificios existentes.
  - Provide incentives for retrofitting & electrification.
  - Proporcionar incentivos para la readaptación y la electrificación.
  - Fine oil companies big $$
  - Increase local renewable energy generation.
  - Aumentar la generación de energía local.
- Transportation & Land Use / Transportación y Uso del Suelo
  - Better bus transit service!!!
  - Stop cruise ships in the Bay.
  - Incentivar las viviendas asequibles y de uso mixto cerca del tránsito.
  - Incentivize affordable, mixed-use housing near transit.
  - Implement car-and ride-share programs.
  - Implementar programas de automóviles y viajes compartidos.
  - Instalar estaciones de carga para vehículos eléctricos.
  - Install Electric Vehicle (EV) charging stations.
- Water & Waste / Agua y Residuos
  - Reduce disposal of organics in landfills.
  - Reducir la eliminación de orgánicos en los vertederos.
  - Increase edible food recovery program for food insecurity.
  - Aumentar los programas de recuperación de alimentos comestibles para la inseguridad alimentaria.
  - Aumentar la producción de agua reciclada para riego.
  - Increase production of recycled water for irrigation.
- Agriculture / Agricultura
  - Preserve agricultural land.
  - Preservar las tierras agrícolas.
  - Recycled water for agriculture
  - Encouraging more solar panels that could drive some power for their irrigation systems.
  - Support small-scale and family farms.
  - Apoyar a las granjas familiares y de pequeña escala.

Buildings & Energy

Strategy	Number of Opinions	Priority Scale	Pros	Cons
Ensure grid reliability for future electrical demand	54	High	Decarbonizing transportation sector requires grid reliability Utilize batteries at the utility and private levels to support the grid Encourage the set up of micro grids and and encourage car battery hook up.	Grid reliability is the responsibility of utility providers; we should go back to woodstoves and karosene lamps reliability relies on supply, hydrocarbon based electrity is abundant and cheap
Provide educational resources for residents and businesses on energy efficiency and clean energy incentives	39	High	Educating residents helps them right-size their contributions to this effort and realize cost efficiencies and savings for themselves in the process Energy efficiency is a top priority and ccreating public awareness and education is important to its success Education is an excellent goal to help us achieve our energy goals must include how to move industry forward. Individual action and awareness will not sove the problem alone Education is an excellent goal to help us achieve our energy goals!	Education is a wonderful thing, if it is based in reality and not politicized.
Increase local renewable energy generation	50	High	transmission losses account for about 50% we would greatly benefit from local renewable energy generation by way of efficiency & it creates jobs/economic growth; The Salinas Valley has enormous potential wind resources; Windmills everywhere! Solar panels over every parking lot! The more renewable energy we have locally, the more energy independent we can be - keep that power money in Monterey!; Provide big $ incentives for residents and businesses to install solar, wind and batteries to support the grid but also insure against grid failure; Electrification only makes environmental sense as long as the energy is made from renewable resources; Also supported as a high priority by Climate Reality Project Silicon Valley, our neighbors to the north; Incentivizing is key- most small businesses and residents cannot afford to do this on their own. And who will manage this energy and how will it be divided; This study documents the benefits of local distributed energy and how it can support local electrification build out. This can develop clean energy jobs as energy is produced and distributed with investments in local communities. It is "resilient" esp if paired with microgrids --avoiding loss of energy efficiency and costs from transmissions lines (which is where utilities make their money)	This will change the landscape of our valley IE solar farms and windmills taking over our rolling hills, also possibility for environmental damage from windmills- due to bird strikes from windmills; more windmills more dead birds, is the Ventana wilderness society on board with this and condor protection. MC is unique in it scenic views; The premise, "renewable" is false.
Increase the use of renewable natural gas in industrial uses	39	Medium	None	Using renewable natural gas is still a carbon-emitting, combustible fuel source that pollutes the atmosphere. The supply is limited and should only be used if absolutely necessary;

Buildings & Energy

Strategy	Number of Opinions	Priority Scale	Pros	Cons
				Renewable natural gas is not renewable - it's a way of stalling structural changes in our energy systems and packaging a hydrocarbon, polluting fuel as "green," The only difference between "renewable natural gas" and "non-renewable" is how far down you need to go to get it; RNG is not only not carbon-neutral, but it cannot on its own meet natural gas requirements of industry, even when scaled. It promises alot, but delivers little; A nice idea, clean energy, but still a market based decision not to be made by bureaucrats.
Conduct workforce development to support electrification and energy efficiency projects	42	High	This is extremely important! We need apprenticeships for the construction trades. A very good example would be HVAC subcontractors getting well-versed on heat pump technology, Training contractors, subcontractors, planners and building officials in the ways of energy-efficiency, high-performance construction & building science has proven to be effective in other jurisdictions To get all the electrification we need done, and done quickly and cheaply, we need to start training more electricians NOW so they can start TOMORROW. No labor bottlenecks! Also supported as a high priority by Climate Reality Project Silicon Valley, our neighbors to the north	Not necessary; the market should decide.
Incentivize reduced electricity consumption	40	High	Incentivizing reduced electricity consumption should be the 1st step, ensuring energy-efficiency should be the 2nd step towards a clean energy transition The best way to incentivize reduced grid consumption is to incentivize local generation. County needs to push back on the current CPUC NEM3 proposal!	Incentivizing less electricity use is less important than the energy mix used to create electricity. Nagging people to reduce use is less useful than new renewable power sources. our priority should be to increase energy supply.
Install clean energy storage systems (e.g., batteries)	41	High	Wide scale use of clean energy storage systems will allow us to take renewable energy to a much larger scale & create more resiliency on the grid while allowing for V2G technology More energy storage, batteries or otherwise, will help smooth out renewable energy generation to use during times of peak use. Its best to always have back-up power. Critical for effective wind/solar use With the work going on at Moss Landing this seems like a nobrainer. Also supported as a high priority by Climate Reality Project Silicon Valley, our neighbors to the north	Batteries are not clean energy- unless the energy is coming from renewable resources this is really not helpful. Batteries use a lot of energy to build, they are not recyclable and have many heavy metals that are mined in third world countries batteries are an enviormental hazard, where are we to put the used ones. moss landing has had several fires and caused shelter in place orders. Only on an as needed basis; market based decision.

Buildings & Energy

Strategy	Number of Opinions	Priority Scale	Pros	Cons
Conduct building energy efficiency improvements	39	High	The existing building stock will be in use for many years to come. However, older buildings are typically not energy efficient. Therefore, E-E improvements would be significant Links attached; Of course - Achievable and impactful improvements must be made. e.g. white-roofing, better insulation, improved glass. Supported as high priority by Climate Reality Silicon Valley	Which buildings? Public, commercial or residential? At whose expense? Will this be yet another audit for businesses? Who will run this program?
			Yes! Retrofits for energy efficiency are important for those buildings that are not easily or cost-effectively electrified. If they can't go electric, reducing gas is good.	Not necessary
				No one would intentionally build something that is energy inefficient.
Incentivize clean energy technologies (e.g., heat pumps, batteries)	44	High	Unfunded mandates disproportionately burden more disadvantaged populations. Providing incentives may help offset the cost, though still an advantage to wealthier residents.	Incentives do not alter reality. These decisions should be market based.
			Heat pump technology is superior in efficiency to any other way of heating water or space conditioning. Batteries are a big part of the clean energy transition on a large scale. Here's an article on new battery technology being implemented in California's Capitol, Sacramento.	The existing building stock will be in use for many years to come. However, older buildings are typically not energy efficient. Therefore, E-E improvements would be significant Links attached; Of course - Achievable and impactful improvements must be made. e.g. white-ro+F34ofing, better insulation, improved glass. Supported as high priority by Climate Reality Silicon Valley
			Electrification of existing infrastructure is not going to happen unless we provide enough $ incentive to make it a no-brainer when residents/landlords upgrade County programs can help bridge the gap between willpower and the pocketbook! Incentives to convert gas stoves, gas heaters, water heaters etc., are great ideas. Incentives can help change behavior Governing bodies must encourage, and mandate best decarbonization practices. Also supported as a high priority by Climate Reality Project Silicon Valley, our neighbors to the north	
Develop community microgrids	37	High	Community microgrids use local, renewable energy, provide energy storage, are able to "island" during power outages are more resilient and less vulnerable than one mono grid Microgrids powered by renewable energy and storage can help increase grid reliability, increase community-buy in, and achieve climate goals.	Who shall manage this? How will it be allocated? Who will pay for the management? Will it be equally distributed or only users will pay for it? A lot of big questions remain This should be a market based decision made by the energy suppliers.
			Also supported as a high priority by Climate Reality Project Silicon Valley, our neighbors to the north Also supported as a high priority by Climate Reality Project Silicon Valley, our neighbors to the north	How does this get paid for? Who manages it? Where are the microgrids going to be placed?

Buildings & Energy

Strategy	Number of Opinions	Priority Scale	Pros	Cons
Develop local renewable natural gas	41	Low	This should be a top priority because communities will ALWAYS need a back up plan to electricity. One long term black out will help others understand why you need plan B	Need to move away from the use of fossil fuels to stop greenhouse gas pollution. Using local renewable natural gas is still a carbon-emitting, combustible fuel source that pollutes the atmosphere.We need to transition away from all combustible fuel sources. RNG development will not have the economic, energy, or climate benefits. It is not carbon-neutral, and cannot meet community energy needs even when scaled up. Renewable" natural gas is not renewable - it's a way of stalling structural changes in our energy systems and packaging a hydrocarbon, polluting fuel as "green" A good idea. However, it should be a market driven decision.
Maximize participation with 3CE's clean electricity programs	35	High	Even though no one can ever guarantee specific clean electrons delivered to a customer, by participating in 3CE's "3C Prime" plan it supports 100% renewable energy (solar/wind) Links attatched The more people on 3CE, the more rebate and incentive programs for electrification, electric vehicles, etc., they are able to fund. They really are a gem that can spearhead change. 3CE= public agency w/ local representatives on brd & w/public input. It should aggressively promote clean energy, bldg electrification,EVs and target benefits for low income folks.	These type programs increase costs to everyone. Let the market decide.
Less crop planted.	38	Low	Consider this in a wider context of regenerative ag. I think that's probably the intention of the idea. Yes to changing our ag. practices in general. Plant fewer acres but increasing efficiency & yield. UCSC's Center for Agroecology/ CASFS can be a great resource for farmers.	Forcing fewer crops will be less politically palatable, while reducing carbon inputs to reduce costs is much more helpful and balances environmental and business interests. Plants help pull carbon dioxide out of the atmosphere- I think this strategy is very misinformed- we should be encouraging planting! Not a decision for the "Central Committee" an individual or company decision.
Perform building energy audits	37	None	I think this can be helpful to help set benchmarks and goals for building owners or tenets.; ; You have to measure in order to set priorities. But the audits must be efficient, agile affairs that get to good first-order approximations without undue delay and cost This is necessary in order to understand how much energy the building is using so that it can be improved. It's profound how much energy saving are possible by taking small steps. Link attatched	Audit fatigue is real. Yet another regulatory cost for businesses that will ultimately be passed onto consumers. all appliances sold have to be energy star rated as well as building codes and materials. More unnecessary expense.

Buildings & Energy

Strategy	Number of Opinions	Priority Scale	Pros	Cons
Adopt a benchmarking ordinance for energy and water use	37	None	Benchmarks are a useful and common tool to organizations can use to set goals and achieve them. Its hard to achieve something if you don't have a standard.; Benchmarks guide Improvement. The state and municipalities already employ benchmarking annually for energy and water, which leads to performance improvement when better understood. Link attatched; Agreed; Benchmarks guide improvement - if you don't know where you started, how do you determine where you want to go.; Metrics are important but so is agility. Roll this up into the audit framework and keep-it-simple. The "high nails" are going to stick up, and benchmark target can then be relative	Sounds like more audits which means higher costs for all. Be aware SGMA and CCWQCB is already involved in regards to water use- this will get very complicated. SGMA/GSAs are already discussing water use and regulation along with the CCWQCB for quality and use regulation.; Unnecessary and uninforceable.
Require all new buildings to be all-electric (i.e., no natural gas appliances)	53	Low	Do this, but provide generous incentives to developers to make it as cost neutral as possible. We need to electrify as soon as possible, and this is part of that effort.;; New buildings going up now or in the next few years with fossil fuel gas will essentially lock in carbon pollution for decades and retrofits are costly. Cheap alternatives exist. We need to do this asap and do this in a way that incentivizes it, so that it pencils out for all involved.	This is an absurd requirement that will negatively affect housing cost and supply As I mentioned above - start smaller and be agile. Don't try to take on an entire industry & revamp its core - way too resource intensive, a rathole. Add some modest incentives along with other incentive initiatives. Keep it simple. Make it cheaper for the builders and they'll do it. But the fight over a "requirement" will suck up lots of everyone's oxygen needed for other things. Requiring this will harm businesses and consumers. Better to incentivize maybe through lowering property taxes depending on the energy updates; this borders on insanity does not make economic sense.
Electrify renter-occupied buildings at major renovations	45	None	Neither renters nor landlords can do it alone - the County can help close the gap between costs and willpower, especially given the IRA's current programs. Help the willing do it!; We need to electrify as soon as possible. Make this cost neutral for renters by providing generous incentives for landlords. Absolutely! Renters and landlords cannot do this alone - government has to help nudge the transition. Reasonable electric retrofit incentives can go a long way toward affordability. An incentive program makes a lot of sense. Same as with the "require all new buildings" proposal, don't try to legislate - it'll never happen. Money talks	Why? Other forms of energy (gas) are clean and efficient. Not a decision for bureaucrats.
Require electrification at point-of-sale or major renovation for single-family residences	52	Low	We need to electrify as soon as possible. Make this cost neutral for buyers/sellers by providing generous $ incentives. Point of sale is a great time for renovations to occur, especially since there are so many great funding programs available via IRA. The County can help defray costs with incentive	The cost of this is so much more than most homesellers can afford Increases the cost of housing thereby disproportionately putting the cost of carbon reduction on working families and people on fixed income.

Buildings & Energy

Strategy	Number of Opinions	Priority Scale	Pros	Cons
				This is beyond preposterous. It will have a disasterous impact on housing cost and supply This is too much to put on sellers during a stressful time and too much for realtors to try to negotiate during a sale. Sacramento needs to stop trying to impose all of these impractical ideas on the populace it is suppose to serve. As I mentioned above - start smaller and be agile. Don't try to take on an entire industry - way too resource intensive, a rathole, and this proposal sounds DOA. Won't happen. - Provide incentives for behavior changes. The public sector has to be prepared to help pay for the changes we need. Money talks. Make it cheaper and they will come. Loan assistance? Grants? Sure. "Require" - never. With inflation at an all time high, California being the top state for high cost of living- especially here on the coast- this is a bad idea. Young people cannot afford to live here. Note that electricity is not renewable unless it is coming from a renewable resource
All building and energy strategy proposals for the CAP need an economic analysis and impact report conducted	7	High	None	None

Land Use and Transportation

Strategy	Number of Opinions	Priority Scale	Pros	Cons
Make the building permit process easier, cheaper and faster for: remodels, additions, ADU's and new construction	43	High	More right-sized housing solutions, improved housing availability and therefor affordability, means fewer commuters causing traffic and the resulting daily carbon emissions. Encourage higher density but create simple rules to ensure new ADUs and home construction are all-electric As long as this is paired with electrification requirements, I think it would have a good effect meeting climate change goals. Encourage high performance design and building for energy efficiency, indoor air quality, and resilience. Making it easier to build if you are building high performance is a great way to drive more high performance building. Do this for buildings that are energy efficient, all-electric, affordable and create the housing we need for our RHNA goals and that allow for high density infill development. This would encourage new market based development.	Does this CAP cover only unincorporated areas or more county-wide? Would increased density in unincorporated areas inadvertently increase too much building in rural areas?
Streamline accessory dwelling unit permitting	41	High	I'm generally pro, but I'm not certain I see the climate connection here... maybe with electrification requirements for new ADUs? It depends on how this would be implemented in some of the county's rural areas. If the ADU's purpose is to create more needed housing, then yes by all means speed that process up. Streamlining any permitting process would be an improvement. This absolutely needs to be done and what is the relationship with CO2 emissions?	I've heard that some ADU's are to extend square footage. For example to make a home office or art studio. ADU's for purposes other than housing should not get streamlined.
Improve broadband infrastructure to support working from home	37	High	We need this to not only be able to work from home, but to educate from home. Having reliable and safe access to broadband is a necessary tool for anyone in school/work at any age. In response to a con Comment: I strongly disagree. If people are able to work from home, they are not commuting. By not commuting to work, they are significantly minimizing their transportation GHG, which accounts for a strong 40% of the Mo Co GHG inventory.	Work from home policies are controlled by employers. Broadband infrastructure is a good thing but it is not relevant to climate and sustainability priorities Let the market decide.
Provide workforce housing near jobs	39	High	The county and its cities should buy existing underutilized potential housing and allow local workers to apply for subsidized rent to reduce traffic and transportation-related GHGs Given how large a percentage of our GHG comes from transport, reducing the required travel makes lots of sense. Yes high priority but only if housing near jobs doesn't cause inappropriate buYes high priority but only if housing near jobs doesn't cause inappropriate building on prime agricultural land or wooded rural areas. (Thinking about jobs in rural areas.)ilding on prime agricultural land or wooded rural areas. (Thinking about jobs in rural areas.) If done tastefully, this is a great solution to many commuting VMT's and the GHG's that accompany them. Very important to soundproof the units well & create privacy between them. Links provided there have been attempts to do this in Carmel Valley but it was shut down by NIMBY and they put in a park instead	My position is that smaller-scale, readily achieved goals should take priority. In the transportation category, improving public transit gives MUCH more bang for the buck. - The overhead of arranging land purchase, rent subsidies ... and who is going to move where? This is way too complex to ever get done. The only solutions in the transportation sector that will be achievable in the necessary time-frame involve more public transit, and electrification of same. Not necessary; the market will provide what is needed.
Incentivize affordable, mixed-use housing near transit	39	High	Supports transit usage which reduces GHG	Not necessary. If there is a demand, it will be filled.

Land Use and Transportation

Strategy	Number of Opinions	Priority Scale	Pros	Cons
			The SURF! Busway and BRT project further supports transit from Salinas, Marina, Seaside, Sand City and Monterey. Could not agree more! This will give people options when gas costs rise, and incentivize travel on cleaner public transport. Mixed use needs to be the way of the future. This has much more potential than the "relocate worker housing" proposal. Zoning regs and incentives for new projects, +10! Definitely for urban areas and towns. What would this look like in unincorporated parts of the county? Absolutely do this! This addresses several things at once: needed housing with less commuting no need for designated parking, walking friendly living is healthier for people/planet	How many people here took public transportation to work today? And I bet most of us won't. It's an idealized suggestion.
Install electric vehicle charging stations throughout the county, particularly near major transportation corridors	32	High	There is not enough fast charging infrastructure in the county and, with many new EV buyers, there are a lot of angry EV owners regretting their decision - thats bad news EV charging stations should not just be along corridors, but where people stop for a long time. Malls, movie theatres, restaurants, parking structures etc... Absolutely! This is what we need to transition to an electrified transportation sector and quick! We need EV infrastructure in many places, highways, downtown, parking lots, etc I support this and I wonder what the County's role is in this.	Let the market decide.
Revitalize rail options (e.g., Del Monte, Amtrak)	30	High	Bring back electric trolleys! Excellent idea to reduce long-distance travel via car, and potentially open up day trips from Bay area and tourist dollars! Yes please do this! I would love to see an equivalent of BART here. It would be used by locals and tourists. The tracks will need upgrading but they already exist. The average car on the road has 1 passenger in it. To be able to travel via electric rail would minimize traffic congestion & reduce GHGs in the worst emitting sector we have.	This would be great. I would love to take a quick train from here to Sac without getting on a bus. But what is the County's role? This would require HUGE effort & resources
Improve active (e.g., walking, biking) transportation options through improved infrastructure	34	High	Fill in gaps in walking and cycling infrastructure. - Better ADA access and better health outcomes Does this CAP cover unincorporated parts of the county only, or county-wide? Would love better cycling and walking lanes on county roads as well as urban streets. I give this only 50% because: to make an impact requires large scale changes to entrenched automobile corridors. It's good, but not very impactful Yes please! We need transportation infrastructure that can support cars, bicycles and pedestrians simultaneously. Links included	This should be a local community decision .
Implement complete streets in urbanized areas	22	High	Complete streets take into accout people rather than things. When done right, and in the appropriate places, these infrastructure improvements help kick-start economic vitality Important long term policy, permitting action. We need to redesign our urbanized areas to accommodate vehicle, bicycle and foot travel in a safe way. Planting trees along these corridors would have a double benefit	Often, the streets are too narrow for public transit buses to serve these areas. Complete streets are often narrow at 9' wide while public transit buses are 10'6" wide with mirrors. This creates a safety concern and conflict. Local community decision.
Improve public transit options	32	High	MST serves nearly the entire population of Monterey County. What does "improve options" mean? Do you mean that more people should ride the bus? Do you mean that there should be greater frequency of service? Do you mean that there is not enough coverage?	This should be a market based decision.

Land Use and Transportation

Strategy	Number of Opinions	Priority Scale	Pros	Cons
			Easy-to-use mass public transportation must be prioritized everywhere possible. Imagine a world where getting from home to a vibrant downtown or recreation area needs only a walk of a few blocks, a quick mobile phone payments, and then a quiet electric ride of 10 to 20 minutes. The United States in general is regressive and negligent in its implementation of mass transit as compared to many other industrialized countries. So much of the Mo Co Unincorporated area is not walking friendly. I'd love to see an electric rail system like BART. My Mom used to take the Del Monte Express to SF as a kid.	
Work with employers to provide workplace electric vehicle charging	30	High	The gas station chain model does not work for long-charging EVs. These need to be distributed at workplaces, restaurants, wherever people stop for an hour or more Employer locations are ideal for EV charging stations to incentivize EV use. If employer location also has solar or other renewable, its a win-win during the way. Absolutely! EV infrastructure at our workplaces and schools will enable and support the transition to an electrified transportation sector.	Decision made by individual or company.
Require or encourage employers to offer free transit passes for employees	29	Medium	YES, YES, YES!!! This would encourage people to get out of their car and reduce GHG significantly. 40% of GHG comes from the transportation sector. Public transit usage is one of the most impactful things a person can do to decrease their GHG emissions. Paired with public transit becoming electrified, I think this would be excellent! Yes, absolutely! This could have a significant impact on the commuters and the GHGs from them (biggest emitter). The business owners could write that off, so its a win/win/win	None
Initiate an electric car-share program	18	Medium	Yes! I see more shared cars on the roads, if they could be electric that would be ideal!	None
Improve car-share and ride-share options	21	Medium	There are already car share options through TAMC's GO831 program as well as MST's new vanpool program. Do you mean increase participation in these programs? If there could be specifically more electric car-share/ride-share options, that would be ideal.	None
Reduce parking requirements for new development in high-density areas	28	Medium	This would increase transit use and decrease dependence on the automobile. This is being implemented through State law beginning January 1, 2023. Now the public works and city leaders need to get behind this improvement. Yes! Parking lots are destructive, environmentally hostile, and reactionary. New construction must allot space for charging, solar generation, and shade - with parking for gasoline cars restricted Yes This results in more housing, less restrictions due to required parking spaces and more housing in high density areas that we so desperately need for the people/our RHNA goals.	None
Reduce equipment idling, particularly near schools, hospitals, and homes	21	Medium	Absolutely! This should be illegal	None
Use renewable diesel in construction equipment as a transition fuel	24	Medium	Do you mean bio-diesel? We simply have to move away from combustible fossil-fuels, period.	Renewable diesel would not meaningfully help us toward our climate goals. "Renewable diesel" is not compatible with GHG reduction goals. It's a) a marketing ploy so polluters can maintain business as usual, and b) it kicks the can down the road Makes no economic sense.
Transition to electric vehicles and alternatively fueled vehicles	33	High	Public transit operators are required to transition to zero-emissions vehicles by 2040.- This transition needs to come with funding and support by policy/procedure/ordinance to make it easier to implement charging infrastructure. Electric only, please. "Alternative fuels" are still hydrocarbons. Lobby the state to support electrification of transit, not send out gasoline rebates to the oil companies Yes! We need to for our GHG inventory and for the new laws going into effect. The MO Co's highest emitting sector is the transportation sector. Agreed that electric only is the way This is important - but what is the County's role?	Help provide options, but it is the individual or company that should decide.

Land Use and Transportation

Strategy	Number of Opinions	Priority Scale	Pros	Cons
Increase equitable access to transportation options	23	Medium	MST serves nearly the entire population of Monterey County in areas that are designated as disadvantaged communities. Big Sur comes to mind. Run that line year round, not just summer and have a few electric busses that service that route frequently esp during busy visitor times (almost year round) Link included There was a complaint on the Monterey Reddit that someone had to walk 30 minutes because their route was canceled. (I'm mentioning it to Carl.) But what is the County's role?	None
Provide educational resources on reducing transportation-generated emissions in multiple languages	21	Medium	People being climate-literate is an important part of carrying through a climate transition with community backing. Communication is where it ALL begins. By offering this resource I think we would get much better traction than if we don't. That goes for all topics, not just this particular one.	Remember Maslow's hierarchy of Needs in communication. If I have to work four jobs to pay for housing & feed my family - I don't care about the emissions my 1980 Camry produces.
Improve transportation options in Big Sur	22	Medium	MST had public transit service to Big Sur for many years but there were very few riders. It's a Good Thing, definitely. Electric tourist transit through the valley area - great idea! This needs to be advertised/supported by the tourism/hospitality industry. Maybe Big Sur business owners (as far south as Nepenthe) could incentivize people with discounts/vouchers. If promoted correctly, it could be offered as an eco-friendly way to visit the Big Sur coast without having to do the driving, putting a leisurely/luxurious spin on it as opposed to a low-income affiliation . People could imbibe in food and drink without having to worry about who's going to do the driving. I still think we need more pullouts and public restrooms along the way.	None
Transition to zero-emission landscaping equipment	27	High	Yes! My Mom lives in a retirement community & the grounds staff is CONSTANTLY using gas powered blowers it is so invasive! Using electric (and quieter) equipment would be best.	Economic decision
Transition to zero-emission recreational boats	28	Low	Absolutely! Not just for the GHG inventory but for the Monterey Bay National Marine Sanctuary and all of the critters in it.	Should be the individual or company decision.
Transition to zero-emission construction equipment	30	Medium	With the right incentives, Monterey County could lead the way in construction electrification, leading to a stimulus in the construction equipment market. Plus, fuel savings! We need to do this in every industry and sector in order to make the changes that we want to see.	Economic decision
Avoid road-widening projects	25	None	Road widening rarely reduces congestion: https://www.bloomberg.com/news/articles/2018-09-06/citylab-daily-why-widening-a-road-doesn-t-ease-traffic Road widening just perpetuates and even promotes the status quo - it's hardly a GHG mitigation to make room for more cars! Absolutely do not do this! Many studies prove that just exacerbates the problem, like the other comments reflect. Link included	None
Cover public parking lots with solar panels	22	High	We need energy-efficiency first, then we need to bring as much renewable energy onto the grid. I'd like to see EV charging stations and microgrid tech incorporated into this idea. This goes along with prioritizing the build out of local clean energy., and is one way to maximize our built environment with solar panels connected to battery storage.	PV panels are very high in embodied carbon. Recycled PV panels would be best. At what cost to taxpayers will this be? Best to cut another cost versus adding more for already stretched thin residents. Long term boondoggle.
All land use and transportation strategy proposals for the CAP need an economic analysis and impact report conducted	8	High	None	None
Ban the construction of gas stations	19	None	This would be wonderful!	This would be insane and economic suicide.
Limit private jet use in and out of County airports	25	None	None	Why? County airports are limited by their size already.

Resource Consumption

Strategy	Number of Opinions	Priority Scale	Pros	Cons
Increase production and use of recycled water for irrigation	33	High	None	Climate Action planning is not the place for water conservation matters. This is fine for residential landscaping or public landscape but this is a HUGE issue when we talk about irrigated lands/farming and food safety- refer to LGMA water metrics Be careful with health and safety issues where it involves any food irrigation.
Incentivize grey water plumbing retrofits	30	High	YES!!! Yes, this makes so much sense. We should be flushing the toilet and watering the landscaping with greywater.	This is not a Climate action. Water conservation issues are important, of course. This is not the place for considering them. agree this is not climate action. need to get the county to chnge the building codes for this I am unclear on how this reduces CO2. And I tried to do this years ago, and the City said no.
All Resource consumption Strategy Proposals for the CAP need an economic analysis and impact report conducted	8	High	None	None
Implement common sense practices to reduce water use.	11	High	This just makes good sense.	Ask the industry to use best practices but don't define what they are.
Implement drought-tolerant landscaping	29	High	Yes, we should already be doing this. Let's do more please. I thinks Beth's comments should be taken into consideration here. Keeping in mind Beth's comments: "Drought tolerant introduced plant species are good for water use but they are not always great for biodiversity because many big-box store drought-tolerant species are invasive and harm our California native species. Let's keep California looking like California while using less water and teach people about native California drought tolerant plants and where to get them."	What is the County's role? They should do in all of their landscaping, but what would they do for the rest of the unincorporated areas? (This doesn't apply to incorporated areas.)
Improve resiliency of water and waste management systems in the face of climate change	23	High	This would definitely be in our collective best interest.	Again - really important and how does it relate to CO2 emissions?
Incentivize alternative methods to capture water (e.g., rainwater catchment, fog catchers)	27	High	100% agree! We need to get creative and use all methods possible to help on this topic. Good old-fashioned rain barrels are great to put under downspouts or out in the open to collect water for use in the garden.	I agree this is important, and water districts are doing this - but it's not reducing Co2 emissions. Let me know if you can figure out the tie.
Provide green waste collection	23	High	The collection vehicles are often powered by natural gas. Make 'em electric! This needs to cover more than just green waste and be expanded to cover all industrially compostable materials (food stain paper and boxes, compostable plastics, etc.) Green waste collection is already provided in all of Monterey county. This will make a big difference. Food is the largest stream of materials in American trash. Once wasted food reaches landfills, it produces methane, a powerful greenhouse gas. I would like to see the ag business participate in this as well. Ideally salvageable food can be given to food insecure folks and the rest can be composted. We need to implement this on a commercial scale and ask restaurants to participate in this also. I believe that it will be mandatory that they comply within a certain time frame. Composting produces methane & carbon dioxide but less than landfills. Odor management is a challenge - ask Marina residents. This is already happening so what is County's role?	None
Reduce disposal of organics in landfills by providing education and outreach	21	Medium	Ed & Outreach is key to help with this behavior change I second the opinion that education & outreach is crucial in order to change minds & behavior on this point and many others.	None

Resource Consumption

Strategy	Number of Opinions	Priority Scale	Pros	Cons
Develop edible food recovery programs	24	Medium	Monterey County has a robust network of feeding organizations that could benefit from additional funding to expand their capacity to accept more food. I find it ironic that we have such a large agricultural sector, yet many field workers and others are often food insecure, there's got to be an effective way to close that gap. There already is a network within Ag. And the Health Dept wouldn't be happy if it was food recovery from restaurants. Talk with Environmental Health before you touch this.	None
Develop anaerobic digesters locally	18	Medium	This seems rather applicable to our county since we have such an agriculture-rich county.	Isn't this already at the MRWMD? They have a e “dry anaerobic digestor” that costs $1.6m. Do we need more and what the County's role be in this? Isn't it the waste districts?
Retrofit water fixtures to ultra-low-flow	19	Medium	This makes so much sense, to simply use the appropriate equipment to ensure efficiency. This should absolutely happen and is low-hanging fruit.	Love this. Did it at my house but what does this have to do with CO2 emissions?
Conduct workshops to change water and waste habits	21	Medium	In the 1970's - when I was a kid - I helped set up my home county's 1st recycling center. Education takes a LONG time. So incentives may work more quickly.	Education & outreach is key to all of this for behavior change, public buy in and adoption.
County should focus on internal practices (as Largest ER): Energy Retrofit Program Sustainable IT Greener Energy Supply Sustainable supplies Reduc ee travel & commute all public meetings accessible remotely	3	High	None	None
Water management is not direct enough a climate heating mitigation. Resource management should focus on reducing hydrocarbon use	11	Low	None	Water management that supports revegetation and restores wetlands is as important and will become an increasing priority for drawdown of CO2 as fossil fuels stop being burned Water conservation, efficiency and management is a climate mitigation & adaptation issue. Water conveyance is one of the largest daily energy users in the state, adding emissions

Agriculture and Carbon Sequestration

Strategy	Number of Opinions	Priority Scale	Pros	Cons
Reduce Ag water uses through innovation and education	4	High	None	Further water conservation innovation in the commercial/agricultural space could solve the regions groundwater issues at least in the medium term. Require less pumping & less GHG
Preserve agricultural lands in Monterey County	21	High	Ag land preservation requires building healthy soils that sequester carbon; however, some ag land should probably be restored to wetlands. By doing this we can sequester more carbon in the soil, which improves the water retention capacity. However I agree that some ag land should be restored to wetlands. I like eating from locally grown sources. We are privileged to live in this abundant community and should be supporting Ag continued growing here.	None
Preserve and conserve rangelands	19	High	Yes, I feel we should absolutely do this! The 30 by 2030 plan is in alignment with this as well. Grazing can be a critical fire prevention strategy. Wild fires are a significant source of CO2 emissions (plus so much more).	Not if it incentivizes and subsidizes the agricultural grazing
Provide consumer education on the benefits of locally produced food	24	High	So important teaching people about their carbon footprint when purchasing foreign grown product. Also learning what seasonality means for food- ag ed is great- support FFA and 4-H This would be really applicable considering that Mo Co grows so much locally produced food. I feel this would have several co-benefits: less carbon, stimulate local economy & more	None
Study the impacts compost application on rangelands	22	Medium	To study the impacts of this is important, but actually doing it is even more important!	Once again - what is the County's role in this?
Repurpose old mines for carbon sequestration or compressed-air storage	12	Medium	This is a longshot, long-term effort, and I'm on the fence. See other comments about staying agile, and pursuing short-term measurable results.	Waste of money.
Foster naturally occurring seedlings on rangeland to support tree growth	18	Medium	This might be beneficial if the naturally occurring seedlings are the types of trees that are desirable (drought tolerant, native, non-invasive) otherwise it might not be so good.	I disagree because wildland management is not within the County's preview except for County parks. Better is to support efforts in wildland management that sequester C02.
Implement prescribed grazing	15	Medium	It appears that this action item has many co-benefits.	Again - not within County's purview. Not that it's a bad idea - but what role does the County have in wild land mngt - other than parks?
Support local wineries to keep products local	15	Medium	Local vendors (wineries or otherwise) selling locally made products is so very good for so very many reasons. Supporting local is wonderful. And I wouldn't want anything to hinder free market sales (more than prohibition-based regulations already do).	This isn't a realistic endeavor if we are supporting local wineries in order to reduce transportation of product. There is demand where wine cannot be produced.
Improve rangeland resilience to drought and flooding	15	Medium	I feel this is really important and if we don't do it and soon, we will majorly regret it in hindsight.	What would be the County's role in this? And does science say it is needed? And what relationship does this have with Co2 emissions?
Apply compost on vineyards	17	Medium	Mulch or compost applied to vineyards or orchards can significantly reduce water usage on the crops Apply compost in all possible applications since the ROI on applying just a small amount of compost is HUGE! Soil building & water retention are just 2 of many co-benefits.	While this is a great practice it should not be mandated- every vineyard is different just like every farm is different- its possible to over apply nutrients This is happening. The County should not be prescribing industry practices. The industry & associate research entities should. Advocate for continued funding for CO2 negative pract
Reduce fertilizer demand through nutrient management (e.g., compost application, enhanced efficiency fertilizers)	23	High	Regenerative agriculture practices can reduce the inputs used in the fields and lead to richer soil without additives. Fertilizer use results in GHGs released into the atmosphere, Eutrophication of waterways that lead to dead zones and harmful algal blooms. Our Nat. Marine Sanc will benefit also	The county should not further complicate or mandate fertilizer use- it is already under the discretion of the CCWQCB which ALL farmers in Monterey County are subject to Again - it is not the County's role to develop industry practices. The County does not have that expertise. Incentivize industry best practices as a whole.
Support ecotourism in Monterey County	18	Medium	Considering that the transportation sector is responsible for at least 40% of the MO Co GHG's we should get our tourists into EVs & support ecotourisim in as many ways possible.	What would be the County's role in this?
Improve tillage management	18	High	If applied appropriately, this would be very beneficial.	Incentives are great- requirements are not. Vegetables grow different then soybeans or commodities where you see more no-till/where its easier to do. Not all plants grow the same Not within County's purview or qualifications to dictate industry practices. Provide incentives for broad-based practices. And support grant applications.

Agriculture and Carbon Sequestration

Strategy	Number of Opinions	Priority Scale	Pros	Cons
Apply compost on rangelands	15	High	The positive benefits for livestock and soils are well documented but the cost and application process may need to be incentivized Absolutely do this! The ROI on this action step is profound!	Again great practice- but should not be mandated- incentivizing is OK
Develop test fields for emerging practices and technologies	16	Medium	The county should help incentivize farmers to adopt or test regenerative agricultural practices. Can partner with CSUMB or local ag school to help promote regenerate practices. I agree with David P. It seems like there is a great opportunity between the strong presence of ag partnering with CSUMB or another local ag school to develop best practices!	The question is - is it duplicative to be doing research that CalPoly or Davis are already doing? I don't know.
Support decarbonization of wineries	21	High	We need to decarbonize everything and as fast as possible.	Not necessary
Lower the cost of land rental	16	Medium	Land rent has become outrageous- coupled with INSV and other soil borne diseases it is making the ground unproductive/lower in value- which land rents should reflect by going down. We need more farmers, esp young and diverse. A farmer can make a living providing local food security on a small holding; must be affordable and commitment to being organic.	What would be the County's role in this? And does science say it is needed? And what relationship does this have with Co2 emissions?
Install electric vehicle chargers at wineries	18	High	At a winery, EV infrastructure, set up as a microgrid could charge cars, transport vehicles & provide back up power that allows the winery to island from the grid during power outs I love this and it's already happening. What is the County's role?	None
Increase the use of cover crops, hedgerows, and windbreaks	23	High	These are great practices BUT we should not mandate them- many factors are calculated for this decision for each individual farm/block. Support RCDs to help with existing programs Regenerative farming best practices should be incorporated whenever possible.	None
Transition irrigation pumps and equipment/vehicles to electric or low-carbon alternatives	22	High	Let's absolutely do this! We need to decarbonize all fossil-fueled pumps, equipment, vehicles ASAP	Farming is extremely difficult right now and this would be very costly An economic decision, not political. Let the farmer decide. CCCE already has an incentive program for electrification. Let them manage this. Always ask - what is the County's role.
All agriculture and carbon sequestration strategy proposals for the CAP need an economic analysis and impact report conducted	8	High	None	None
Advocate for incentives and research funding to help businesses change practices.	2	High	None	None
Utilize waste biomass to produce energy and biochar, sequestering C long term and improving soil productivity	23	High	The true benefits of biochar come from significant reduction of GHG and, when buried in agricultural soils, long term carbon removal and storage. We should produce biochar in a closed system & expand federal incentives for use. Biochar is a sustainable product that may help decrease fertilizer use while reducing CO2. Lots of biomass available in our forests and parks that could be reduced through fuel reduction programs	This was mentioned above; see other comment Biochar will only be helpful if people actually adopt it as a practice. Switzerland and other European countries are using biomass to create and capture new energy! Make sure that there is no clearcutting justified for such a program. Better to leave trees where they fall. Provide information, options. we would need a biochar plant at $5-7 million and lots of interagency cooperation and CEQA/NEPA.
Support/subsidize conversion to organic farming/permaculture	26	High	This would create a positive domino affect on so many other aspects of this plan, not to mention our water. This is a very good idea, I fully support it. Support and expand organic farming practices to reduce GHG emissions from pesticide and fertilizer inputs and enhance best soil and cultivation practices.	Provide information, options; let the market decide. Organic is a box. Some things in nature are not good for soil - such as copper for powdery mildew. We need a healthier & broader frame. Regenerative. Permaculture is not applicable to the high-value crops we grow in Monterey County. Let the market decide on organic.
Incentivize or require no-till farming practices	19	High	We should absolutely be doing this at scale.	Incentives are great- requirements are not. Who shall implement this requirement? Vegetables grow different then soybeans or commodities where you see more no-till/its easier to do Provide information, options; let the farmer decide.

Agriculture and Carbon Sequestration

Strategy	Number of Opinions	Priority Scale	Pros	Cons
Eliminate any county subsidies or incentives for livestock farming and grazing	16	High	None	There are no subsidies for ranching- this is misinformation. And grazing has huge benefits for fire reduction- which we have all seen in this county- plus beef is delicious! exactly there are no subsidies for ranching, beef production in carbon neutral
Implement stricter requirements for livestock farming waste management	18	High	I would imagine that if the waste is managed correctly it can be reutilized. I agree that livestock manure is great for soil/compost, can help sequester carbon & water retention	Livestock manure is amazing for the soil and will ultimate help rangeland sequester more carbon. Chicken feces is also great fertilizer when properly processed Not necessary.
Require a gradually increasing percent of organic food procurement by public kitchens	9	None	I think this is a great idea!	Not necessary; no benefit. Again - organic is a box. That doesn't mean all-natural treatments are good for the soil. Regenerative is better.
Reduce Ag water uses through innovation and education	26	High	Education and research are great, but pumping aquifers happens because there's no reason NOT to just pump as much as one wants. Policies and regulatory change will have more impact ^^ I think this is a great comment. My limited understanding is that many of the policies need to change at the State level also, so Monterey County leadership could play a role in advocating for those state level changes. Further water conservation innovation in the commercial/agricultural space could solve the regions groundwater issues at least in the medium term. Require less pumping & less GHG Reducing water use in ag (and every other sector) is important and will require education and outreach.	Water conservation is not directly climate-impacting. However, ensuring only renewable power is used for the desal plant is important This is absolutely a climate impacting strategy as most alternatives to natural ground water (i.e. desal) are extremely energy GHG intensive as I think you point out. I don't believe "climate impacting" is a requirement for these proposals but rather strategies for climate impact solutions for which water conservation would be appropriate. Separate these 2. Educating public is distinct from encouraging & funding ideas for conservation. CDFA has funding. So the County can support applications to CDFA. The county should not further complicate water use which is already being worked on by SGMA, GSAs and the CCWQCB

Climate Adaptation

Strategy	Number of Opinions	Priority Scale	Pros	Cons
Prioritize the use of natural infrastructure in efforts to protect and restore watersheds, coasts, marine waters, and ecosystems	23	High	The more we can restore our wetlands the better, also marine tidal waters, expansion of MPAs and commercial kelp forestry. Nature-based solutions play a critical role in the economy, national security, human health, equity, and the fight against climate change.	None
Ensure continued public access to the coast in light of changing shoreline conditions and sea-level rise	20	Medium	It makes sense to not build structures along the coastline due to sea level rise. Planned retreat allows us to use the coastline for open, public use property and open space.	None
Enhance and protect the county's nature-based tourism economy	20	High	Protect indeed. That means protecting the image of Monterey as a climate and sustainability leader	None
Increase green space and infrastructure across climate-vulnerable and disadvantaged communities	23	High	Greenspace yes! Plantings yes! Everywhere, not just in disadvantaged areas, though they need it more. Not sure what the "infrastructure" portion of the heading means. Yes, increasing greenspace all over, but especially in the climate-vulnerable & DAC's is imperative.	None
Increase access to locally and traditionally grown food and produce in low-income communities	26	High	Our county grows so much food, but ironically many farmworkers and others are food insecure. There has to be a way to eloquently close that gap between food production and = access	how are you going to get this food if you get rid of cattle grazing and fallow the farming fields
Protect natural resources and agriculture from invasive species and pests whose impact changes spatially and temporally as a result of climate change	20	Medium	Pest prevention depends mainly on growing healthy plants in healthy soil ideally in mixed cropping systems. Transition to agroecology is the only way to mitigate pests.	None
Review and consider cost impacts on long term residences when planning. This is omitted in most proposals to review	14	Medium	Benefit-Cost Analysis with appropriate discount rates prove the long-term cost savings of climate change mitigation and adaptation strategies.	None
Increase the collection, analysis, and reporting of data on climate-related health impacts	21	Medium	Climate change is the greatest threat to human health in the world. We learned the important of protecting public health, doing health& equity info and using it to target actions Again, tie-in gets buy-in. The more that the general public learns about the relationship of climate change and health, the more constructive action we will see	We have seen holes and old data already being used in the CAP- this will not be helpful unless the CAP itself is up to date. Say no to more audits
Reduce the health impacts of wildfire smoke	19	Medium	We need to build structures to the Passive House standard which are resilient to toxic outdoor air quality such as smoke, power outages, and extreme temperature swings.	None
Increase the pace and scale of wildfire resilience and forest health projects	23	Medium	Wildfire is destructive in innumerable ways. Monterey County should update the Fire Safe Council charter and add support for its efforts in fuel reduction Invest mainly in defensible space. Chad Hansen's "Smokescreen" explains the false arguments re fuel reduction. Mitigating wildfires should NEVER be an excuse for clear-cutting.	None

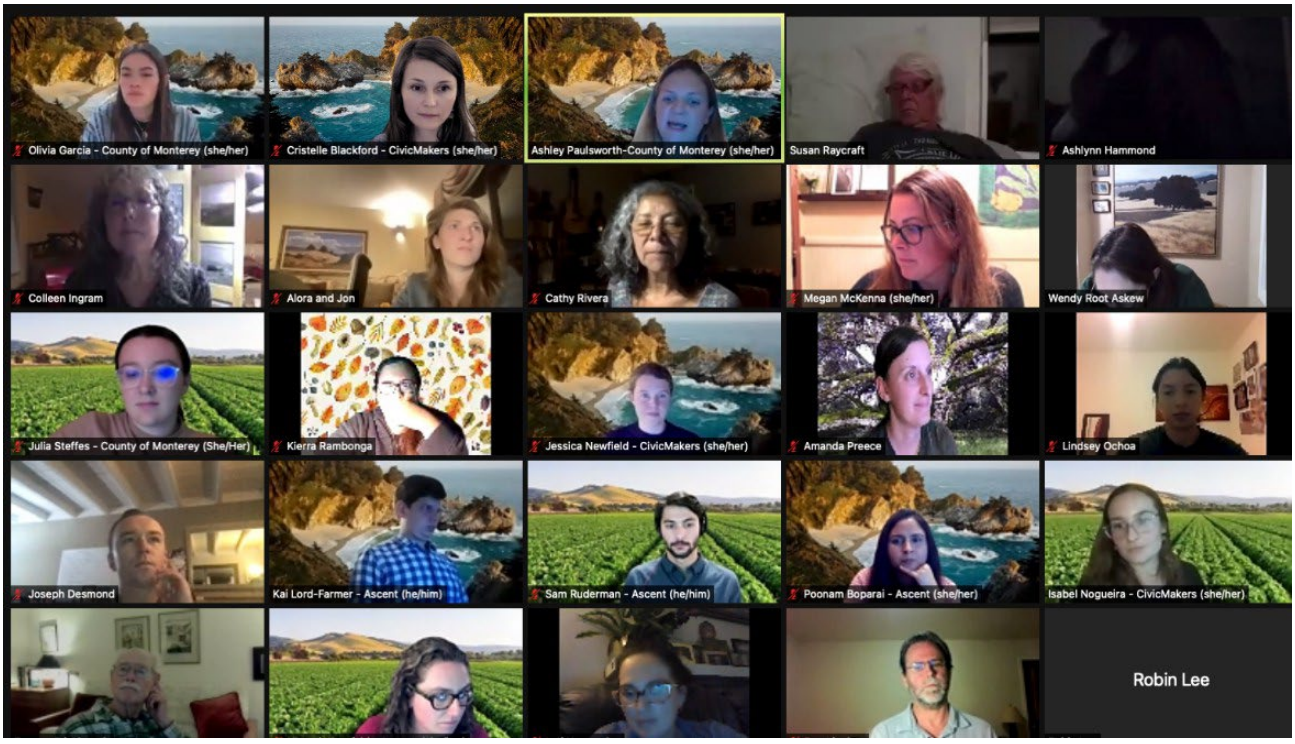
Climate Adaptation

Strategy	Number of Opinions	Priority Scale	Pros	Cons
			manage landscapes can be a benefit to all cattle grazing is one of these tools. we have one major fire in 100 years, it is all growing back to its original state This is a priority. Temperatures are climbing, droughts are intensifying, and wildfires are growing more destructive. Millions of people have moved into fire-prone areas.	
Establish community resilience hubs and more accessible cooling centers	20	Medium	This would be a good thing to do and of course the homeless population comes to mind strongly. We need more resources to handle that growing population.	Personally I feel that establishing cooling centers is acknowledging defeat in the climate fight.
All climate adaptation strategy proposals for the CAP need an economic analysis and impact report conducted	6	High	None	None
To adapt and mitigate: Plant. More. Trees.	14	High	Save more trees- make less laws. Laws and policy require tons of paper Better than just more trees is restoration and protection of urban forests with successional biodiversity modified by species selection for climate adaptation.	None
Support the public health sector's capacity to address climate impacts on populations	20	Medium	Climate change affects our health & safety, directly & indirectly, now & will be more of a threat in the future. Covid showed how important protecting *everyone's* health is.	None
Reduce and phase out oil and gas extraction in Monterey County	13	None	Burning fossil fuels must end ASAP. Start with no new drilling permits and closing idle & abandoned wells. Tax oil and gas production. In MO CO onsite fuel consumption accounted for about 20% of emissions from the oil/gas sector & fugitive emissions of that were 80% yet this sector is excluded from the inventory!	US government is asking Middle East regimes to produce more, so until we don't need it let's produce it here

County of Monterey
Community Climate Action and Adaptation Plan

Community Workshop 1
Summary Report

November 30, 2021



Prepared by civic makers

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Executive Summary

The purpose of this report is to aggregate and present key themes and topics from Monterey County's ("the County's") first Community Climate Action and Adaptation Plan (CCAAP) Community Workshop held from 6:00 p.m. -7:30 p.m. on November 16, 2021. The community input presented in this report will inform the vision for the County's Climate Action & Adaptation and begin to inform possible actions for the CCAAP. Lessons learned from the workshop will also serve to improve future community engagement efforts.

Agenda

The workshop agenda included:

1. Welcome and Introductions
2. Presentation
3. Discussion Activities (in breakout groups)
4. Next Steps and Upcoming Opportunities

Participants

Over 115 people registered for the workshop and 95 attended. Attendees were from various parts of Monterey County, including Carmel, Marina, Pacific Grove, Josselyn Canyon, Monterey, Salinas, Seaside, the Highlands, Greenfield, Carmel Valley, San Ardo, and Palo Colorado Canyon.

Key Takeaways

The following bullet lists and charts describe key takeaways from the workshop. Further details are provided in the Summary of Breakout Group Discussions section below.

Through the group discussions and polls we learned that:

- According to the community workshop participants, the **top five strengths of Monterey County** for advancing sustainability and climate adaptation are:
    - **Sustainable transportation**, including existing electric vehicle incentive programs and bike trails.
    - **Conservation**, including existing water conservation efforts, preservation of the Marina dunes, and habitat restoration in parks.
    - **Community engagement**, including public meetings to shape decision-making and community discussions, efforts to engage a broader range of people in decision-making and climate action, and community discussions with groups such as the Youth Commission on Climate Change.
    - **Sustainable policymaking,** such as local climate action plans, the development of Central Coast Community Energy, the community choice aggregator (CCA) to decrease

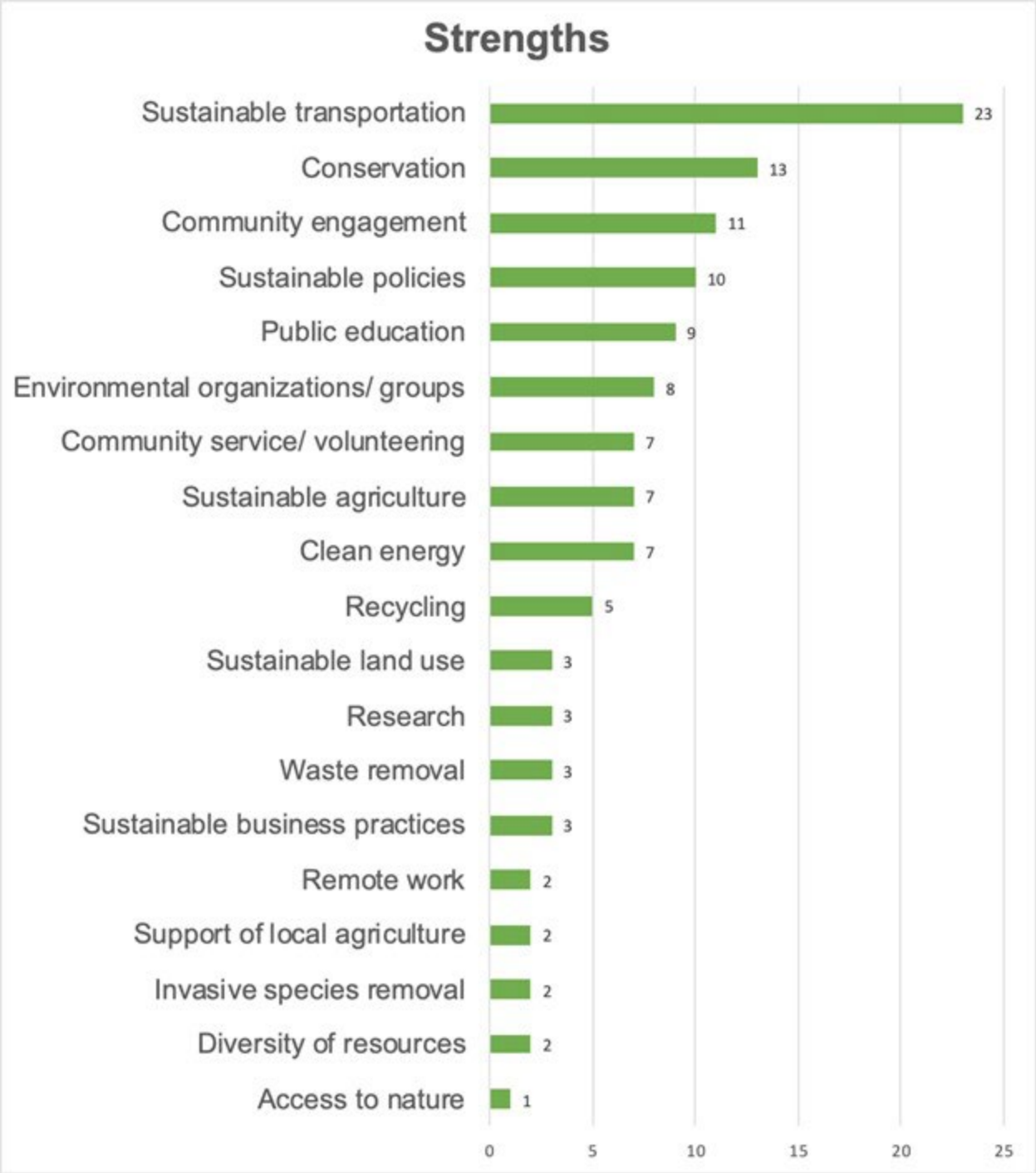
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costs and increase clean energy, plastic pollution ordinances, and the implementation of SB 1383 to advance sustainable waste management.

- **Public education** efforts in Monterey County, including improved communication to the greater public on climate change; raising awareness of air pollution, particulate matter, and its health impacts; advocacy for use of renewables/reusables; and youth leadership on climate education.
- The work of **environmental organizations** was also highlighted as a strength by participants. The organizations mentioned included:
  - Communities for Sustainable Monterey County, which has a local action group in most of the cities in the County
  - Return of the Natives
  - Initiatives by the Monterey Bay Economic Partnership in climate change, housing, and workforce development
  - California Marine Sanctuary
  - Seafood Watch Program
  - Environmental justice organizations such as Regeneracion and Ecology Action

A chart of all the strengths mentioned during the workshop is shown below.

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- According to the community workshop participants, the **top 5 challenges/barriers in Monterey County** to advancing sustainability and climate action are:
    - **Financial barriers**, including the high costs of installing solar panels and purchasing electric appliances and vehicles, a lack of affordable housing and its contribution to longer commute times, a lack of funding for ongoing land stewardship, a lack of financial incentives for private landowners to conserve land for carbon sequestration, and the inability of agricultural workers to afford a more sustainable lifestyle.
    - **Lack of education and outreach**, such as not knowing where or how to implement sustainable practices and a lack of understanding of climate-related issues. Regarding outreach, participants highlighted a lack of communication from the County on how to get involved and a lack of guidance from the State of California on waste and recycling.
    - **Lack of time** was highlighted as a major issue due to competing commitments, work schedules, and the high cost of rent, which leads to more work time to afford rent and less time for other activities.
    - **Equity challenges** such as language barriers, an exclusive culture around environmentalism, unequal access to resources in different parts of the county, and a lack of access to remote work in certain industries. An additional concern mentioned was that implementation of the climate action plan will be much harder in rural regions of South County, leading to disproportionately negative impacts in that region. Therefore, careful consideration should be given to differences within the County.
    - **Transportation challenges** included the unaffordability of electric cars, insufficient and slow public transit, a lack of electric vehicle (EV) charging stations, traffic, and roads being too dangerous for biking.

A chart of all the barriers mentioned during the workshop is shown below.

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- According to the community workshop participants, the **top 5 needs in Monterey County** to advance sustainability are:
    - **Education/information**, including education on various sustainability issues, such as sustainable waste management, sustainable products for homes and businesses, and education on the gravity of climate change. Participants also mentioned a need for greater guidance on how to convert to solar and electric energy and how they can have a larger impact at the local level. Finally, they expressed a need for multilingual education and facilitation on sustainability issues, easy access to information, and lectures from environmental professionals.
    - **Community engagement/ improved outreach** such as greater access to education and engagement of the public in local decision making. Participants suggested outreach could be improved by the use of more media such as TV and radio and the use of multiple languages in outreach. A need for direct action and support groups was also highlighted (such as groups to aid the elderly and others who may face challenges in engaging in activities to advance sustainability).
    - **Sustainable policies** such as streamlining of permits for solar energy and land restoration for carbon sequestration, penalties for noncompliance, greater guidance at the local and regional levels to help guide behavior, programs to streamline building electrification retrofits, and greater support from the county for efforts by Local Government Commission and other organizations to push the California Air Resources Board to conduct local GHG inventories for jurisdictions.
    - **Improved sustainable infrastructure,** including infrastructure that encourages walking and biking, protected bike lanes, increased public transit and frequency, EV charging stations, and a suggestion that all planning and development decisions should be viewed in light of climate change.
    - **Financial support,** including more grant funding and hiring more staff to support climate change efforts. Participants also suggested making EVs more affordable, creating financial incentives for bicycle usage, and making public transit free of charge a few days a week.

A chart of all the needs mentioned during the workshop is shown below.

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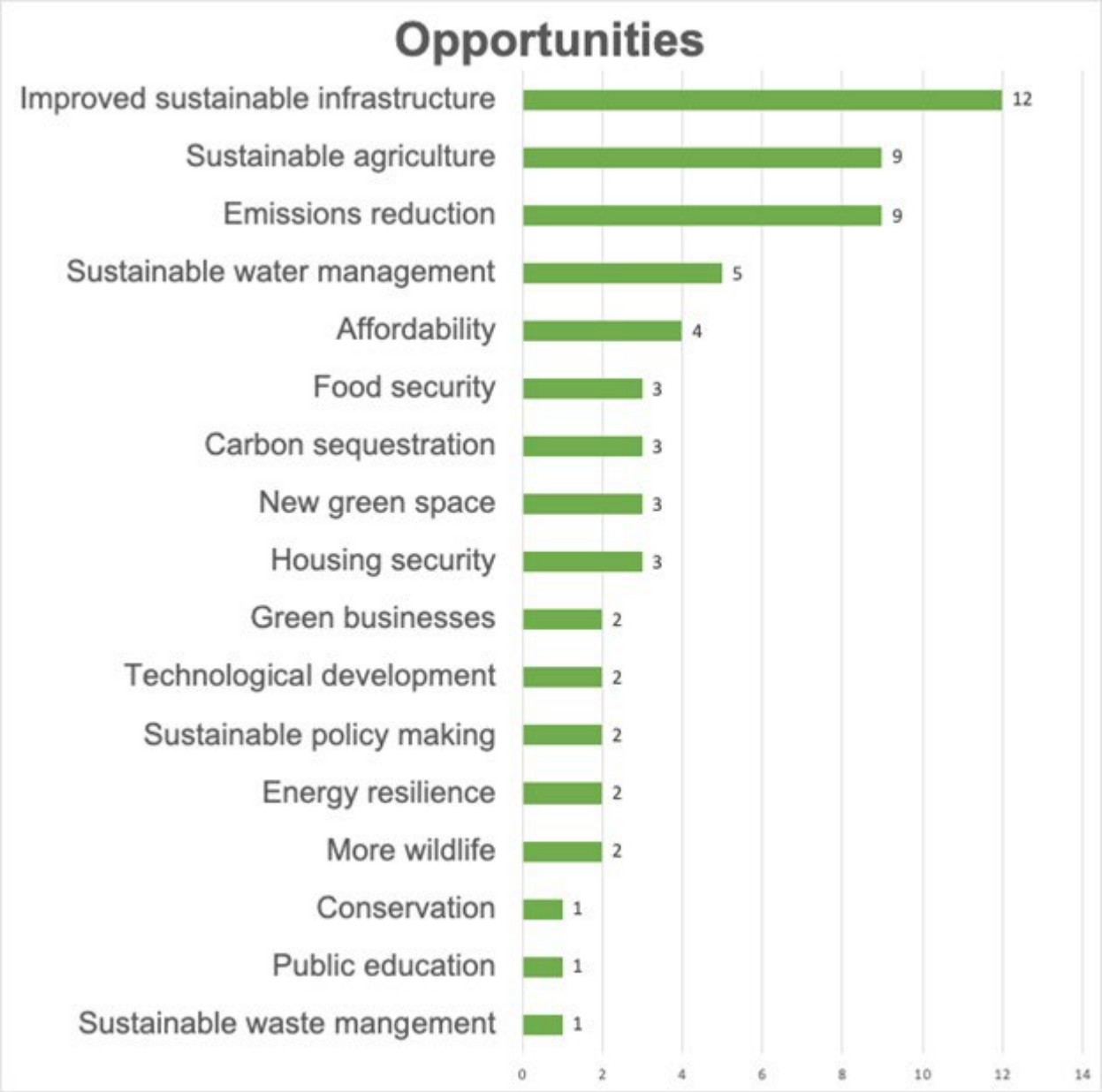


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- According to the community workshop participants, the **top 5 opportunities to advance sustainability in Monterey County** in the long-run are:
    - **Improved sustainable infrastructure**, including improved sustainable building practices, safe and walkable neighborhoods, more solar panels, a new light rail and/or electric trams to take passengers along Highway 101 and up to San Francisco, shifting city roads to avoid sea level rise destruction, and the construction of new roads and trails that are safe for bikers (including
    - e-bike trails that connect every city in Monterey).
    - **Sustainable/regenerative agriculture**, including Monterey County becoming the leader in regenerative agriculture and soil health and changing agricultural mindsets.
    - **Significant reduction in emissions**, driven in part by female leadership and collaboration among all 12 Monterey cities and healthy soil initiatives.
    - **Sustainable water management**, including enough clean water to share with neighboring counties and increased gray water practices.
    - **Affordability**, including affordable housing located close to jobs and EVs.

A chart of all the opportunities mentioned during the workshop is shown below.

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- According to the community workshop participants, the most concerning **impacts from climate change** are drought and water supplies (48%) and wildfires and wildfire smoke (38%).
    - What impacts from climate change are you most concerned about, if any?
        - Wildfires and wildfire smoke - 38%
        - Storm events and flooding - 2%
        - Other - 6%
        - Extreme heat and heat waves - 6%
        - Drought and water supplies - 48%
- According to the community workshop participants, **Monterey County must act on climate change within the following time frame:**
    - 79% believe we need significant action right away
    - 15% believe we need significant action in the next 5 years
    - 4% believe this is not an urgent issue
    - 2% believe we need significant action in the next 10 years

Summary of Outreach & Engagement

Outreach

The County conducted outreach to promote the community workshop via the following channels:

1. **Email**
    - County staff sent out a newsletter to the County Sustainability Program subscribers with information about the workshop.
    - County staff contacted a variety of non-profit and community-based organizations via email requesting assistance with cross-promotion of the community workshop
        - Organizations contacted include: Surfrider Foundation Monterey County, Blue Zones Project Monterey County, Return of the Natives (CSUMB), Monterey Peninsula College, Communities for Sustainable Monterey County, Big Sur Land Trust, Monterey Bay Aquarium etc.
2. **Press Release**
    - County staff worked with the County Communications Coordinator to draft a press release outlining workshop information and how to register.
    - County Communications Coordinator disseminated press release to media outlets

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3. **County Media Briefing**
    - County staff promoted the workshop at virtual weekly county media briefings
4. **County Public Events Calendar**
    - Posted workshop information and links to Eventbrites on the County public events calendar via the County website
5. **Monterey County Weekly Calendar**
    - Posted workshop information and links to Eventbrites to the Monterey County Weekly events calendar via the Monterey County Weekly website
6. **Printed Flyers**
    - County employees distributed printed flyers throughout the county - targeting places like community/recreation centers, libraries, coffee shops etc.
        - Flyers included:
            - Workshop information
            - Eventbrite QR codes and tiny URLs
            - Spanish translations
7. **Eventbrite (for RSVP)**
    - English version
    - Spanish version
8. **Social Media**
    - County social media accounts posted workshop information and links to Eventbrites
        - Posted on: Monterey County Facebook and Twitter pages, Monterey County Office of Emergency Services Facebook page
    - Cross-promoted through local non-profit and community-based organization social media posts including workshop information and links to Eventbrites
        - Cross promotion posts on: Surfrider Foundation Monterey County Instagram and Facebook page, Blue Zones Project Monterey County Instagram story, Return of the Natives Instagram story and Facebook page

Agenda

The community workshop followed this agenda:

1. **Welcome**
    - Agenda Overview
    - Project Team Introductions
    - Participant Introductions (in chat)
2. **Presentation**
    - Welcoming remarks from Supervisor Wendy Askew

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- Personal climate action story by high school student Hannah Shuh: “Why climate change matters & why local action makes a difference”
- Overview of Monterey County CCAAP
- Overview of Greenhouse Gas Inventory
- Questions & Answers

3. **Polls**
   Two polls were conducted at various points during the workshop with the following prompts:
   - “What impacts from climate change are you most concerned about, if any?
   - “How quickly do you think our community needs to act on climate change?”
4. **Discussion Activities (in Breakout Groups)**
   The group discussion consisted of 8 breakout groups discussions facilitated by staff members from Ascent Environmental and CivicMakers. Each breakout group had 4-8 participants. Participants provided answers to the discussion prompts on Jamboard and the facilitators recorded notes on the verbal discussions. The group discussions were based on the following prompts:
   - “What are people in Monterey County doing to further environmental sustainability and resilience?”
   - “In terms of environmental sustainability and climate resilience, what are the main barriers or challenges people here face to doing more for the environment locally?”
   - “What kinds of resources, support or guidance do people need to overcome these challenges?”
   - “What do you think are the biggest opportunities for the County?”

Data Synthesis

In this report we aggregated, anonymized, and synthesized participant views of barriers, needs, and opportunities from across breakout groups into key themes and insights. A detailed recap of the questions and comments shared during the workshop is included in the following section.

Summary of Workshop

Participants

Over 115 people registered for the workshop and 95 attended.

Attendees were from various parts of Monterey County including Carmel, Marina, Pacific Grove, Josselyn Canyon, Monterey, Salinas, Seaside, the Highlands, Greenfield, Carmel Valley, San Ardo, and Palo Colorado Canyon.

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Participants were affiliated with organizations such as Cal State Monterey Bay, TAMC, CSU Monterey, SAGE, Big Sur Land Trust, County of Monterey, Salinas Union High School District, Seaside Environmental Commission, Aera Energy, the California Marine Sanctuary, Communities for a Sustainable Monterey County, and Blue Zones Project, among others.

Questions and Answers

Following the presentation, attendees were invited to ask questions or share comments.

The project team received the following comments:

- A request for AEEC meeting information
- Desire to see more regenerative agricultural practices
- The only way to address transportation emissions is through land use practices that reduce travel-compact, higher density communities-e.g., oppose urban sprawl.
- There are ongoing research studies being done at the universities on reducing GHG emissions from agriculture
- A participant mentioned that their major concern for climate change is global migration and the housing /hunger crises that result.
- Participant mentioned that air pollution should be high on the list of concerns.

The project team responded to the following **questions**:

- Q: Is data for only unincorporated areas of the county?
  - A: Yes, the CCAAP is for the unincorporated county and the inventory covers activities only within the unincorporated areas.
- Q: Does the chart factor carbon sequestration on open land?
  - A: No, the inventory presented in this workshop includes emissions sources only. Emissions sinks, such as carbon sequestered by open space and agricultural lands, are currently being evaluated by the team.
- Q: Do transportation emissions include California emissions control?
  - A: Yes, the transportation emissions are derived using emissions factors specific to the vehicles driven in Monterey County as provided by the California Air Resources Board's Emissions Factor (EMFAC) 2021 model.
- Q: When will the inventory be finalized?
  - A: The inventory will be released for public review of the data, methods, and results in early January 2022. After public review, the project team will finalize the inventory.
- Q: Do we have GHG emissions inventory numbers for both unincorporated and incorporated areas combined? I think it would be interesting to compare.

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- A: This project is only focused on quantifying the greenhouse gas emissions associated with the unincorporated areas of the county. Several cities in Monterey County are conducting their own climate action planning efforts (Salinas and Carmel). Currently, there is no regional evaluation of all jurisdictions within Monterey County.

- Q: Does ag emissions include carbon dioxide released from plowing?
  - A: Agricultural emissions include emissions associated with specific crop types, including fertilizer application, farming equipment, open burning, irrigation pumps, and livestock management. Carbon dioxide emissions associated specifically with plowing have not been included due to lack of available data. We welcome any additional information to better inform this inventory. Please contact us at climate@co.monterey.ca.us.
- How will you reduce greenhouse gas emissions?
  - A: This will be the next phase of CCAAP development. We will use the inventory and emissions projections to help inform areas for reduction opportunities. Through our engagement process with sector working groups, we will develop preliminary strategies that will be shared at our next community workshop. We will also host opportunities for feedback and other strategy concepts through our website: www.montereyclimateaction.konveio.com.
- Q: Is on-road transportation the portion of travel that occurs in the unincorporated county, or is it the county's share of travel that starts or ends in the unincorporated county?
  - A: The on-road transportation sector uses vehicle miles traveled (VMT) that follows State guidance to be consistent with Senate Bill 375 (Sustainable Communities Strategies). The VMT attributable to unincorporated Monterey County includes 100% of trips that are fully within the unincorporated boundaries, 50% of trips that start outside the unincorporated county and end within the unincorporated county, 50% of trips that start inside the unincorporated county and end outside the unincorporated county, and none of the trips that pass through the unincorporated areas. For example, a car traveling between San Luis Obispo and San Francisco would not have any portion of its trip attributed to Monterey County. However, a car traveling from San Luis Obispo to Big Sur would have half of its trip attributed to Monterey County.
- Q: Would it make sense to work with these industries/businesses to better understand the calculations that makeup this inventory?
  - A: We will be releasing the technical memorandum with all of the data, methods, and results of the inventory. After releasing the memorandum, we will host a Q&A session to answer any questions. This document will be made available on our website for commenting: www.montereyclimateaction.konveio.com

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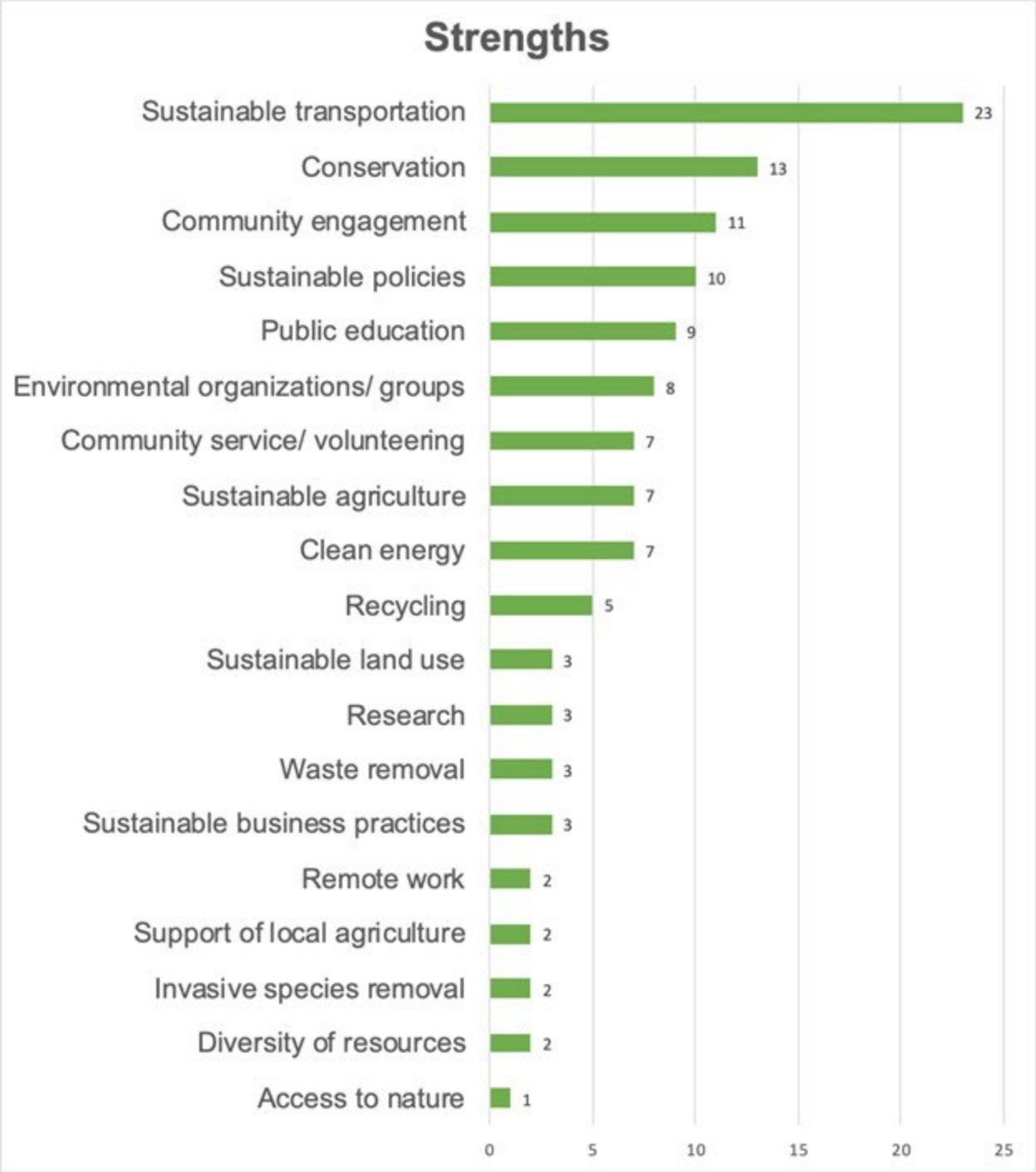
- Q: Some towns and cities in Monterey County are creating CAPs, what do we do with the towns and cities that are not prioritizing CAPs?
    - A: We hope this effort will inspire more regional action to combat climate change. We continue to work with all of the cities within Monterey County through our Multi-Jurisdiction Climate Action Council to discuss opportunities to take action even if it's not through a comprehensive effort such as developing a climate action plan.

Summary of Breakout Group Discussions

The group discussion consisted of 8 breakout groups discussions facilitated by staff members from Ascent Environmental and CivicMakers. Each breakout group had 4-7 participants. The following section provides more details on the discussion with bullets representing the themes, subthemes, and representative quotes across breakout groups.

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1. **“What are people in Monterey County doing to further environmental sustainability and resilience?”**



- Strengths regarding **sustainable transportation** included:
  - The implementation of new service & active transportation options
  - Greenways, such as Fort Ord Rec Trail and Greenway
  - Electric cars, including an EV incentive program

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    - Carpooling
    - Walking
    - Taking public transit, such as buses
    - Biking, including the use of electric bikes and subsidies for electric bikes such as the MBARD E-bike incentive program
- Strengths regarding **conservation** included:
    - Water conservation, including water signage on Highway 101 and the decline in use of water in both urban and rural areas
    - Preservation of the Marina dunes
    - Conservation of riparian corridors
    - Habitat restoration in parks
    - Conservation of working lands for ecological services they provide
- Strengths regarding **community engagement** included:
    - Having more people at the decision making table
    - Having public meetings to shape decision making
    - Community members attending local policy meetings
    - Community outreach, including discussions with the Youth Commission on Climate Change
- Strengths regarding sustainable policy decisions included:
    - The City of Soledad joining CCA to reduce costs and increase clean energy
    - Local governments developing climate action plans
    - Plastic pollution ordinances
    - The implementation of SB 1383
- Strengths regarding public education on sustainability included:
    - Sharing information on CSUMB campus
    - Advocacy for use of renewable/ reusables
    - Youth leadership on environmental education
    - Improved communication to the greater public on climate change, despite more resources being needed for this task
    - Awareness raising on air pollution, particulate matter, and health impacts

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- Local environmental groups and organizations included:
    - Communities for Sustainable Monterey County, which has a local action group in most of the cities in the County
    - Environmental Justice Organizations such as Regeneracion and Ecology Action
    - Seafood Watch Program
    - Pure Water Monterey
    - Monterey Bay Economic Partnership initiatives and their initiatives in climate change, housing, and workforce development
    - California Marine Sanctuary
    - Return of the Natives
- Strengths regarding **community service/ volunteering** included:
    - Tree planting
    - Community gardens such as those in Navidad Creek in Salinas
    - Sustainable activity on college campuses
    - Waste removal such as park and beach clean-ups
        - "I'm volunteering with Return of the Natives. We do education to the public on how to reduce pollution in their communities. We have done park and beach cleanups, removed invasive species, etc… having other people to depend on in order to attain these goals, it is easier to achieve what we set out to do. Working toward these goals together."
    - The ability of volunteering and community service activities to engage a diverse range of the community, from school children to retirees
- Strengths in **sustainable agriculture** included:
    - Healthy oil projects on rangelands and agricultural lands
    - California Sanctuary Foundation and collaborators trialing soil-biodegradable mulch for agriculture fields
    - Ranching operations maintaining ecosystem services such as fire fuel reduction, water filtration, and carbon sequestration from cover cropping, rangeland and covered ground
- Strengths regarding **clean energy** included:
    - Existing solar panels
    - Existing use of wind energy
- Strengths regarding **recycling** included:
    - California Marine Sanctuary's work with local growers on increasing recycling of plastics

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    - New recycling campaign efforts such as those on college campuses. For example, CSU Monterey Bay's decision to no longer utilize single-use plastics
- Strengths regarding **sustainable land use** included:
    - An increase in affordable housing in existing urban areas to increase density
    - The incorporation of restoration and sea level rise mitigation in coastal planning efforts
- Strengths regarding **green businesses** included:
    - Green business certifications
    - Businesses aligning with planetary wellbeing
- Strengths regarding **research** included:
    - A risk assessment of off-shore wind energy by the California Ocean Alliance and others
- **Waste removal**
- **Remote work** was highlighted as a strength since it can reduce commutes and emissions
- Strengths regarding the **support of local agriculture** included:
    - The purchase of foods produced locally
- **Removal of invasive species**
- Strengths regarding the **diversity of resources in Monterey County**:
    - A participant highlighted that Monterey County is a relatively wealthy county and was countered by another participant who commented on the County's large median income difference.
    - County's abundant land and natural resources
- **Access to nature**

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2. **"In terms of environmental sustainability and climate resilience, what are the main barriers or challenges people here face to doing more for the environment locally?"**



The following bullets represent the themes, subthemes and representative quotes across breakout groups:

- **Financial barriers** included:
    - Economic struggles and income barriers

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        - "Supporting awareness on climate action is important, but people are dealing with how to put food on the table and how to keep a roof over their heads. How do we balance wanting to address climate action while being equitable and balancing other issues. "
        - "Many people would like to buy an EV, but can't afford it, or can't afford to buy organic produce. How do we make these things more accessible? "
        - "Agricultural workers just don't have the time to learn or the resources and money to afford a more sustainable lifestyle"
    - High cost of installing solar panels
    - Regulation and price of permits to clean out stock pond
    - Cost of buying new equipment or vehicles, including electric cars still being unaffordable
    - While rebates from Central Coast Community Energy help, there are still barriers
    - Lack of affordable housing
    - Lack of local funding stream to support ongoing land stewardship
    - Lack of financial incentives for private landowners to conserve land for sequestration
- Barriers related to **lack of education and outreach** included:
    - Not knowing where to start
    - Lack of understanding of true costs of climate change to the economy and businesses
    - Lack of eco literacy
    - Lack of understanding of land challenges
    - Lack of educational resources for the community regarding climate change
    - Lack of educational resources on how to implement sustainable practices
    - Lack of communication from County on community events and how to get involved
        - Lack of state guidance on recycling and waste
        - Lack of promotion of current solutions such as information on how to transition to all-electric at home
- Barriers related **to a lack of time** included**:**
    - Competing commitments
    - Work schedules get in the way
    - Expensive area requires more work to afford rent, leading to less time to pursue outside activities
- **Equity challenges** included:
    - Language barriers

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        - Lack of resources in certain languages
        - Inability to adequately communicate with certain populations
    - Exclusive culture around environmentalism
    - Unequal access to resources in different parts of the county
    - Inability for many workers in the service industry to work remotely
    - Concerns that implementation of the Monterey Community Climate Action and Adaptation Plan will be much harder in rural regions of South County, leading to disproportionately negative impacts in that region.
- **Transportation challenges** included:
    - Roads feeling too dangerous to bike
    - Traffic
    - Electric cars still being unaffordable
    - Cultural barriers that stop people from using public transportation
    - Insufficient public transit
    - Lack of EV charging stations
        - Including for apartment dwellers
    - Driving is often faster than public transit
- **Motivation** challenges included:
    - Lack of motivation for correct sorting of materials
    - Difficulty of making lifestyle changes to address climate change
    - People not feeling directly affected by climate change
    - Apathy
    - Greed
    - People not knowing where to start and easily becoming overwhelmed
- **Infrastructure** challenges included:
    - Limited battery storage technology to support the expansion of solar panels
    - Difficulties faced by apartments dwellers in installing sustainable infrastructure including challenges with installing EV sustainers and solar panels since resident may not have control and split incentives exist
    - Electric grid insufficiency
    - Lack of infrastructure for walking, biking, and transit in unincorporated parts of Monterey County

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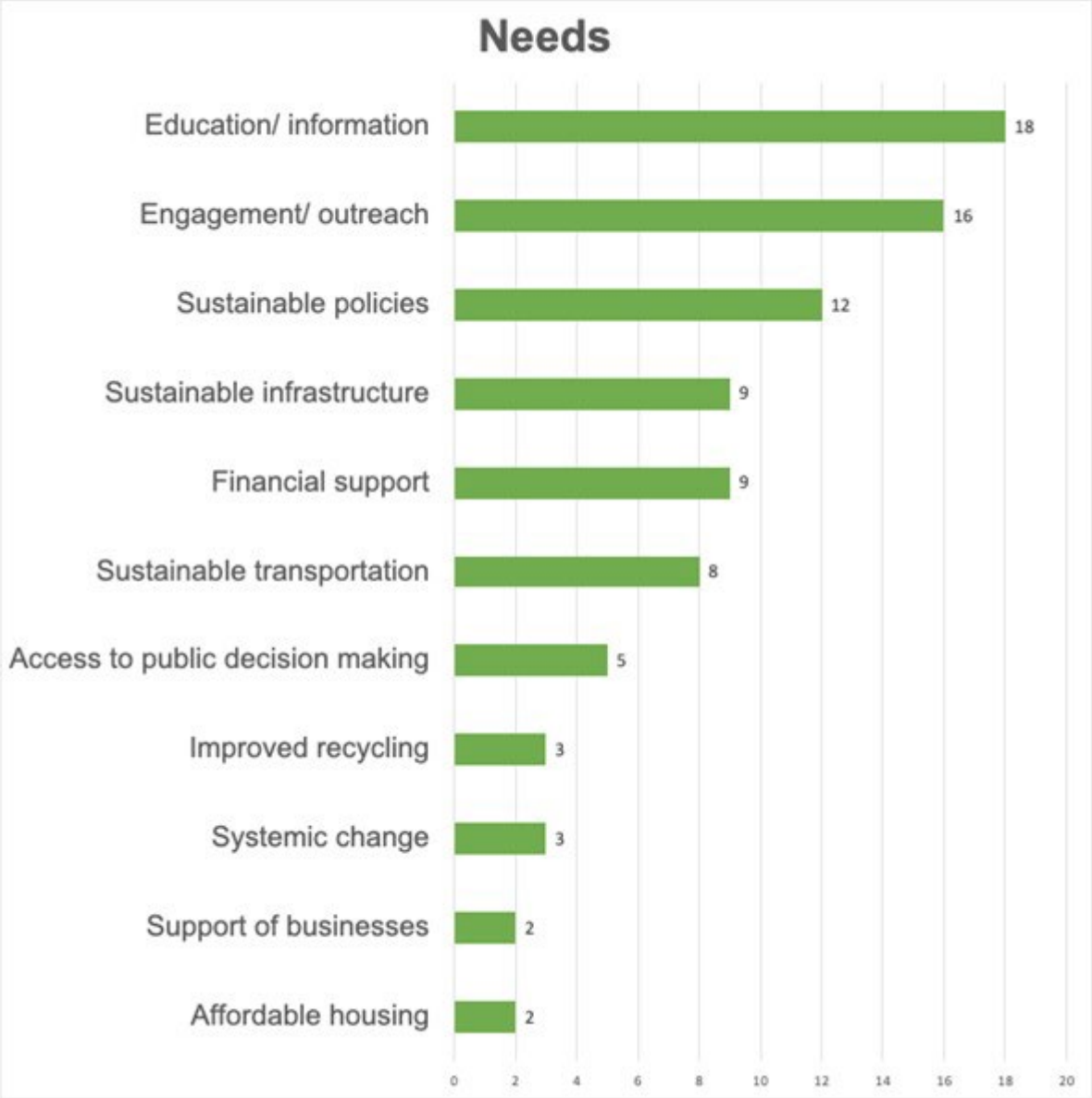
    - Not enough HVAC knowledge about heat pump installations
    - Insufficient public transportation including an inability to take a train to San Francisco or Santa Cruz
- **Housing challenges** included:
    - Housing costs
        - Lack of affordable housing in unincorporated parts of Monterey
    - Housing insecurity
    - Lack of balance between housing and jobs at local level
    - Distance of housing from work
        - Big challenge in rural communities
- **Waste management challenges** included:
    - Lack of proper recycling
    - Compostable waste goes to landfills
    - Hospitality industry conducive to excessive waste
- Comments related to a **need for systemic change** included:
    - The fact that change requires more than individual responsibility
    - Need for greater corporate and agricultural action to combat climate change
    - The need for less production of waste
    - Participant quote on the need for community and human centered design:
        - "This is about human-centered design. About creating a space where the person is at the center of it. Wrapped around that is our environment. Looking at it through a human-centered lens is the way forward."
- **Physical challenges** included:
    - Disabilities
    - Old age
    - Illness
- Challenges regarding **tourism** included:
    - The production of more waste
    - More transportation
    - Tourists less concerned with local environment since they don't live in the community
- **Conventional farming**

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- **Political barriers** included:
  - Polarization
  - Inability to agree on solutions
  - Political and bureaucratic systems being hard to change
- **Regulation barriers** included:
  - Audit fatigue
  - Permits and regulation challenges
  - Lack of state implementation/enforcement
- Challenges regarding **siloing** included:
  - Silos among groups working on environmental issues
- Short-term planning

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3. **"What kinds of resources, support or guidance do people need to overcome these challenges?"**



4. **The following bullets represent the themes, subthemes, and representative quotes across breakout groups:**

- Needs regarding **education and information** included:
  - Education on the gravity of the climate situation
  - Education on sustainable living
  - Education on how to install solar and go electric
  - Education on relationship between greenhouse gasses and consequences
  - Education on waste management

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- Education on how to have to have positive impact at local level
- Education on how to find sustainable products for home and business
- Multilingual education and facilitation
- Easy access to information
- Lectures from environmental professionals

- **Community engagement and outreach** needs included:
  - More access to education and local engagement in decision making
  - Participant quote on community access to decision making:
    - "All of us who cannot go into pocketbooks, need to have access to democratic decision making processes to make sure changes happen."
  - Better outreach methods such as outreach in multiple languages, gamification for kids, and use of more media such as radio and TV ads.
  - Communication and willingness to work with industry
  - Community leadership
  - Direct action
  - Support groups for neighborhood and community members as well as groups to aid the elderly and those cannot engage in sustainable activities themselves
- Needs regarding **sustainable policy making** included:
  - Penalties for noncompliance
  - Direction at local and regional level to help guide behavior
  - Simple mandates that do not alter daily routine
  - Local government stewardship against urban sprawl
  - Planning and development decisions to be viewed in light of climate change
  - Reduction or elimination of regulation around activities that have environmental benefit
  - Greater support from the county for efforts by Local Government Commission and other organizations to push the California Air Resources Board to conduct local GHG inventories for jurisdictions
  - County central resources hub for sustainability initiatives
  - Streamlining of permits, including permits to foster restoration for land to sequester carbon and solar permits
  - Programs to streamline building electrification retrofits including vetted contractors with negotiated rates and payment plans built into tax collection

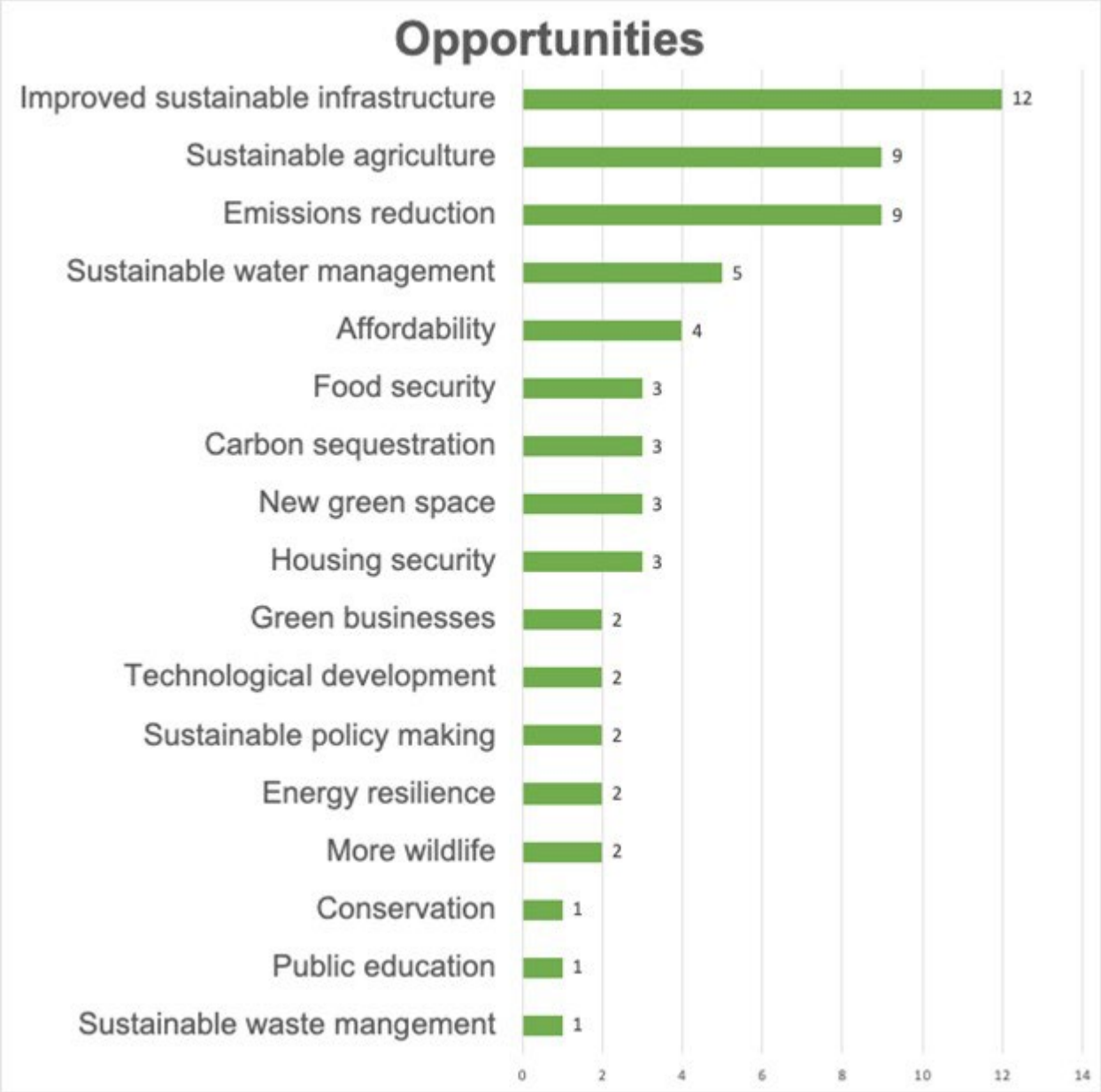
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- **Infrastructure** needs included:
  - Sustainable transportation funded by county or state, including increased public transit and frequency and infrastructure that encourages walking and biking.
  - Install EV charging stations
  - Sustainable development
    - "All decisions related to planning and development should be viewed in light of climate change"
- **Financial** needs included:
  - Grant funding
  - Hiring additional staff to support climate change efforts
  - Financial incentives
    - To help make electric vehicles affordable
    - To promote bicycle usage
    - Incentivize public transit use by making public transit be free of charge a few days a week
- **Access to public decision making**
  - Comments regarding the **need for systemic change** included:
  - Individual actions can only do so much
    - We need direction at the policy level. Local and regional governments need to enact policy that facilitates or regulates change (e.g., building code improvements)
    - Need to shift responsibility from consumers to corporations
    - Need to decrease consumerism
- **Recycling** needs included:
  - Alternative packaging
  - Reusable packaging vs. single use
  - Industrial food waste composting
- **Business** needs included:
  - Providing resources for telecommuting
  - Supporting small businesses
  - Education on waste and recycling
  - Education on where businesses can purchase sustainable products

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- **Affordable housing** needs included:
    - New all electric affordable housing close to jobs

5. "What do you think are the biggest opportunities for the County?"



The following bullets represent the themes, subthemes, and representative quotes across breakout groups:

- Opportunities regarding **improved Infrastructure** included:
    - Sustainable building practices

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    - Safe walkable neighborhoods
        - "The issues are all so intertwined. How can we construct our communities so that they get everything they need without traveling too far, their environment where they live is circular, and the stores around them are all giving back to the environment, creating more wildlife, etc..."
    - Solar panels outnumbering oil drills
    - New light rail to take passengers along Highway 101 and up to SF
    - Electric trams to replace gas powered vehicles on Highway 101
    - City roads along roadside shifted back to avoid destruction for sea level rise
    - New roads for bikers to ride in safety
    - Safe e-bike trails connect every city in Monterey
- Opportunities regarding **sustainable agriculture** included:
    - Monterey County becoming leading example in regenerative ag
    - Changing agricultural mindset
    - Regenerative farming practices being used across the board
    - Monterey County becoming leading example in soil health
- Opportunities regarding **emissions reduction** included:
    - Healthy soils to reduce emissions
    - Monterey County reaching 0 emissions
    - Female leadership driving collaboration among all 12 Monterey County cities to reduce emissions by 50% since 2020
- Opportunities regarding **sustainable water management** included:
    - Increasing gray water practices
    - Having enough clean water to share with neighboring counties
- Opportunities regarding **affordability** included:
    - Housing affordability/ security, including addressing relationship between housing insecurity and climate injustice
    - Food security, including through sustainable fishing in Monterey Bay and gleaning
    - Electric Vehicle affordability with electric cars becoming accessible for all incomes nationwide
- Opportunities regarding the creation of **new green spaces** included:
    - New parks and open spaces in Monterey County with most new greenspace in tree-sparse cities

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- Opportunities regarding **carbon sequestration** included:
  - Implementation of 100% regenerative agriculture
  - Preservation of 30% land for carbon sequestration, habitat, and temperature reduction conducted in partnership with the government
- Opportunities regarding **green businesses** included:
  - Green manufacturing and high paying jobs
- Technological development opportunities included:
  - Technological development in zero emissions initiatives
    - Developed by CSUMB
  - Moss Landing battery model for the world
- Opportunities regarding **sustainable policy making** included:
  - A new model resiliency plan that links public health and climate change
  - Having social and environmental justice be central to Monterey County's Climate Resiliency Plan (Community Climate Action and Adaptation Plan)
- **Energy resilience** opportunities included:
  - No more blackouts
- **More wildlife**
- **Conservation** opportunities included:
  - Monterey County conserving over 30% of land, surpassing state goals
- **Public education** opportunities included:
  - More Earth Day-type festivities to raise awareness
- **Sustainable waste management**

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Appendix

1. Outreach Collateral

- Social Media:



i.



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ii.

- Printed Flyer:



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2. Eventbrites





3. Deck

- Presentation from Community Workshop
- Recording of Community Workshop

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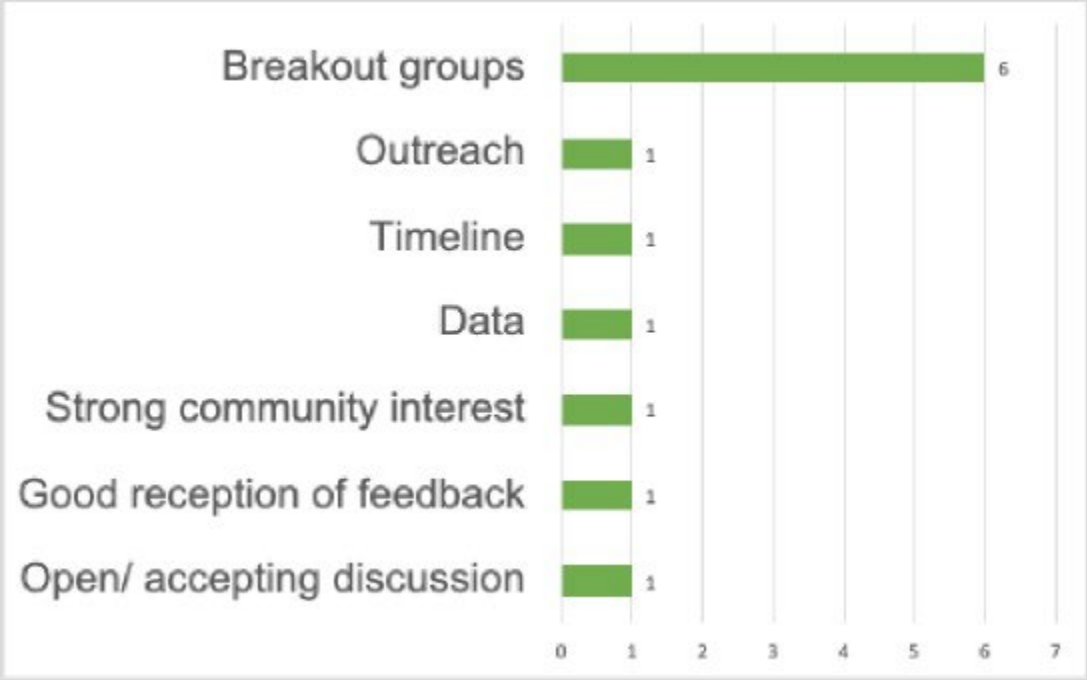
4. Satisfaction Survey Results

We received **13 participant responses** to the Community Workshop Feedback Survey. A summary of responses is provided below.

Question 1: How would you rate the workshop?



Question 2: What did you like about the workshop?

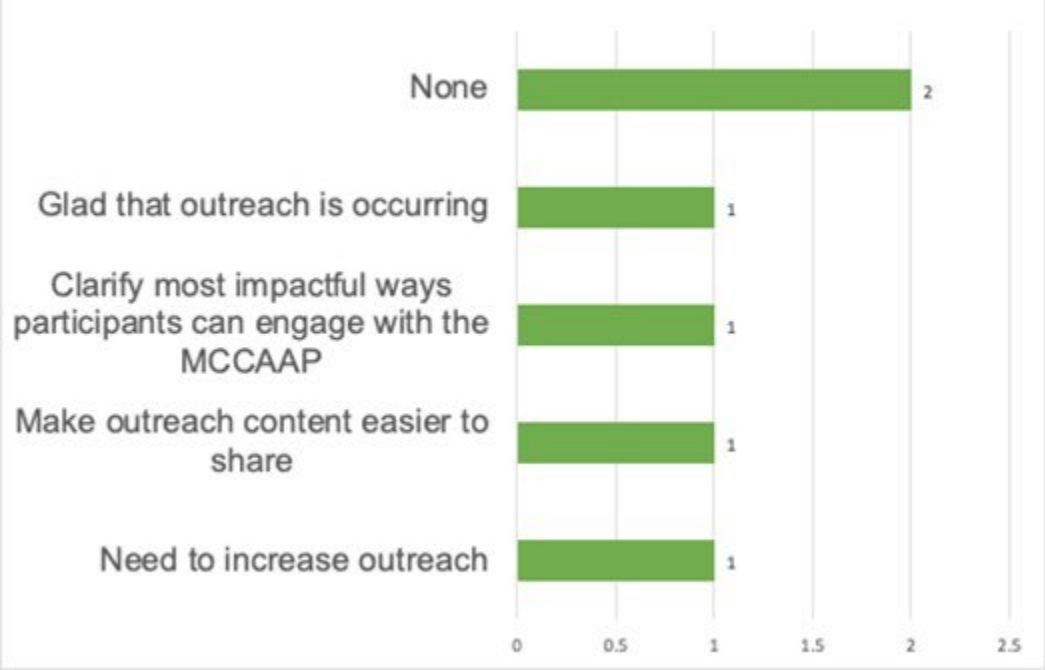


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Question 3: How could we improve the workshop?



Question 4: Is there anything else you would like to share?



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MONTEREY COUNTY CCAAP

Community Workshop 2 Summary

September 29, 2022 - 6:00-8:00pm

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Overview

The purpose of this summary is to aggregate and present key themes and topics from Monterey County's (County's) second Community Climate Action and Adaptation Plan (CCAAP) community workshop held from 6:00 p.m. to 8:00 p.m. on September 29, 2022, at the Marina Public Library.

The purpose of the workshop was to:

- Educate the community at large about climate change, the purpose of the CCAAP, and how they can be involved going forward;
- Understand where the community needs the most support in taking the potential actions that have been identified to date in the CCAAP development process (around the topic of adaptation, specifically);
- Source opportunity areas from the community for supporting residents, businesses, and visitors for taking climate action (existing community resources and initiatives); and
- Build lasting relationships with the community as co-owners of plan implementation.

The outcomes of the workshop included:

- Understanding community concerns and needs around primary topics that have arisen during prior engagements:
    - Drought
    - Wildfires
    - Ocean health / marine habitat
    - Flooding
- Collecting ideas for actions, opportunities, and resources to address the concerns, needs, or gaps most important to the community.

Breakout Groups

TOPIC: Ocean/Marine Health

Theme #1: Plastics, emissions & pollution

Concerns, Needs & Gaps

- Too much plastic; Overwhelming amount ending up in the oceans
- Acidification of the Ocean
- Fertilizers that leach from agriculture

Actions, Opportunities & Resources

- Political
    - Electric boats policy
    - More investment in biodegradable packaging; partner with existing business implementing new methods and best practices

    - More enforcement of littering around Elkhorn Slough jetties
    - Impost tax on single use containers/bags that goes towards ocean conservation
    - Idling laws, make more stringent
- Personal
    - Business respond through incentives
    - Support small, organic farmers
    - Support businesses modeling best practices for biodegradable packaging
    - More availability of bulk products & refillable containers

Theme #2: Habitat Degradation

Concerns, Needs & Gaps

- Sea level rise coupled with storm intensification
- Diminishing ecosystem health and wildlife populations
- Extreme ocean heat wastes → toxic algal blooms → lower oxygen
- Need robust/resilient populations of critters/kelp/wildlife in the ocean to weather the extreme events

Actions, Opportunities & Resources

- Political
    - Manage disturbances, conduct restoration (kelp project)
    - More land buffer zones near water (e.g., slough)
- Incentivize
    - Encouragements for farmers to use more natural resources / less fertilizers (https://www.urthagriculture.com/)
- Research
    - Planning for moving people & infrastructure uphill
    - Find studies for coastal erosion and longshore sediment transport

Theme #3: Communication/Education

Concerns, Needs & Gaps

- Need more communication & cooperation of diverse groups that use the bay: farmers, MBA, boat owners, etc.)
- Lack of education about reality of pollution in the ocean

Actions, Opportunities & Resources

- Marketing/branding
    - Publicize more (i.e., Noah's first flush data)
    - Strengthen visitor bureau's "visit responsibly campaign"
    - Eliminate "wrong choices" and educate on why
- Personal
    - Voting with your wallet - support sustainable businesses
    - Support power of community against big corporations

TOPIC: Flooding/SLR/Inundation

Theme #1: Beaches/Coast

Concerns, Needs & Gaps

- Software intrusion
- Sea walls / retreat

Actions, Opportunities & Resources

- Natural lands buffer
- Beach nourishment; ecosystem restoration
- Govt purchase of at-risk flooding zones (potential con: displacement)

Theme #2: Transportation & Buildings

Concerns, Needs & Gaps

- SLR modeling - concerns with variables
- Infrastructure: financing & community
- Del Monte development
- More frequent rains & floods (Pajero & Salinas Rivers)
- Roads, bike paths, railways, Highway 1

Actions, Opportunities & Resources

- Plan now
- Funding programs, adjust financial planning
- Planning & building for water/flooding (resilient architecture)
- Semi-permeable surfaces; rain capture & storage

Theme #3: Disaster

Concerns, Needs & Gaps

- Vulnerable groups: seniors, disability, unhoused, non/low english, migrants
- Highway 101 shutdown example
- Erosion: after fire; mudslides
- Tsunamis
- Sea level rise

Actions, Opportunities & Resources

- Evacuation plans/corridors
    - Multi-disaster plans
- Quicker restoration of utilities / emergency preparedness
- Carbon farming: erosion management
- First responder collaboration
- Community education, pre-organization

TOPIC: Drought

Theme #1: Quantity

Concerns, Needs & Gaps

- Wells going dry
- Saltwater intrusion
- Wasteful use

Actions, Opportunities & Resources

- Allow floodplains back to recharge groundwater
- Trenching around groundwells
- Education about water cycle
- Keeping moisture in soil:
    - Regenerative ag - no till / cover crops /compost
    - Increase soil organic matter
    - SB1383 connections

Theme #2: End Users

Concerns, Needs & Gaps

- 90% of water is used in agriculture

Actions, Opportunities & Resources

- Recycle wastewater
- Collaboration rather than competition - more stakeholder / communication meetings
- Encourage water conservation among all users

Theme #3: H20 Infrastructure

Concerns, Needs & Gaps

- N/A

Actions, Opportunities & Resources

- Rebuild/maintain dams 7 reservoirs
- Recycled water / capturing rainwater more effectively
- Grey water
- Desalination
- Swales, trenches
- Permeable surfaces/sidewalks
- Air capture of water

TOPIC: Wildfire

Theme #1: Fuel Management

Concerns, Needs & Gaps

- Fuel load - hot and fast burns
- Encroachment
- Fear of fighting fire w/ fire - public perception of controlled burns
- Biggest concerns is catastrophic fires - changes
- Misunderstanding about climate and fire - data shows historic wildfires are note related to warmer climate

Actions, Opportunities & Resources

- Management / Fuel reductions
    - Change federal policies re: fire & fuel loads
    - Goats!
    - Controlled burns
    - Learn from tribal wisdom
- Infrastructure hardening
    - Prevention on home areas
    - Preventive fire safety visits/audits by firefighters
    - Inmate crews to remove fire debris
- Increase state/federal funding to USFS + USFWS + local groups
- Correct messaging & education

Theme #2: Resources for Response

Concerns, Needs & Gaps

- Externalized forces
- Danger of geoengineering

Actions, Opportunities & Resources

- Organized arson investigations
- Monitor electrical grid systems for eco-terrorists
- Local emergency water storage with rainwater storage system

Theme #3: Damage & Recovery

Concerns, Needs & Gaps

- Knock-on effects of the fire - air quality, infrastructure damage, landslides, ecological loss
- Need to help victims recover
- Insurability and impact on cost of housing
- Home buybacks included in insurance for after a disaster

Actions, Opportunities & Resources

- Proactively protect infrastructure
- Identify community partners to assist in time of need (i.e. hotel rooms)
- Resources for home hardening and defensible space
- County leaders look at geoengineeringwatch.org and do something (talk to Governor, legislators)
- Better fire insurance availability at reasonable cost
- Destroyed homes and properties returned to County as potential space like a national park
- After a burn, use wildlife specialists to restore environments w/ local fauna

Poster Boards

Do you believe Monterey County is prepared for Climate Change?

What gives you hope?

- Increased community meetings and public attention
- Cross-sector collaboration and conversation
- SURF! Busway project and transit in general
- Lots of working lands for sequestration

What are some challenges Monterey faces in becoming sustainable/resilient?

- Need more community engagement + involvement in climate action
- Funding
- Support for transit in land use
- Strength of electrical grid
- Adequately accounting for GHG leaks (especially methane from oil & gas infrastructure)

Water & Waste

- Recycled water for agriculture
- Reduce use of plastic
- Aquifer replenishment, wastewater recycling, protect groundwater
- Encouraging more solar panels that could drive some power for their irrigation system
- Golf courses → waste of water
- Trash around town should be picked up more often
- Encourage low flow through rebate programs
- Trash cans and recycle bins available in town

- Provide workshops for residents to learn about grey water recycling options
- Eliminate/reduce methane from landfills and create/promote cattle ranching practices to reduce methane
- Encourage composting
- Maybe a tighter monitoring recycling waste at stores/institutions/offices
- Put out composting bins in addition to recycling trash
- Better public education - improve what goes where?
- Ban grass lawns, they just waste water
- Fine oil companies big $$
- Education on conservation of resources for residents and tourists

Buildings & Energy

- Renewable energy for housing and businesses
- Improve energy efficiency in existing buildings
- Stop construction projects in marina that emit terrible gas
- Poner mas panales solares a las casas
- Provide solar panels at colleges and schools
- Energy efficient windows, update HVAC
- Use electric cars at government offices
- Increase production of recycled water for irrigation
- Stop construction in Marina that destroys ecosystems and pushes out wildlife
- Encourage buildings to turn off the power used after certain hours
- Reduce the use of electricity

Transportation & Land Use

- Stop using airplanes
- Find ways to reduce cars on the roads
- Incentivize affordable mixed-use housing near transit
- Lots more charging stations for EVs
- More $$ to help with revamp housing to electricity and gas
- More affordable apartments within towns and near public transport
- Train from MRY to San Francisco / More public transport
- Better bus transit service
- Correct Fremont Street with Coastline bike path
- Bus times should leave in 30 or even 15 minute mark; 1 hour could be impractical
- E-bikes and bike lockers and work places
- We need a fast train from NY to FL to TX to NV to LA to SF to save gas/environment
- Bike racks near county/government buildings
- Better public transportation
- Bikes available to public with return stations (since we are a tourist area)

Agriculture

- Choose to eat less meat to use less water/land raising animals
- Less pesticides in the fields surrounding our town
- Growing produce
- Our food we grow, can it stay for our works? Let’s feed our people
- Plant more trees
- Don’t allow farmers to use water for so cheap, local crops for local people
- Agroforestry, carbon farming and more organic
- Preserve agricultural land
- Bring back the community garden! (Amen!!)
- Reduce use or eliminate use of fertilizer
- Promote to tilling method of farming
- Demand best practices for pesticide use

Monterey County Community Climate Action and Adaptation Plan Community Workshop Summary

Executive Summary

The County of Monterey held its third community workshop on the Monterey County Community Climate Action and Adaptation Plan (CCAAP) on December 4, 2024 via Zoom from 6:00 p.m. to 8:00 p.m. The workshop covered key topics related to the CCAAP's development and provided attendees with the opportunity to engage directly with the project team and offer feedback. The workshop began with a presentation that included an overview of the project, a summary of greenhouse gas (GHG) emissions generated in the unincorporated county, a review of significant opportunities for reducing GHG emissions, and a discussion of the benefits these opportunities could bring to Monterey County. After the presentation, a Q&A session was held to address questions and concerns. The workshop also provided live simultaneous Spanish interpretation and translated materials for Spanish-speaking attendees.

Participants then engaged in small group discussions on barriers and solutions to adopting sustainable practices, focusing on building electrification, reducing vehicle trips, and increasing electric vehicle (EV) adoption. After the breakout sessions, attendees reconvened for a demonstration of the Climate Action Simulator, a tool designed to help prioritize actions interested parties want to see implemented. The workshop concluded with an overview of the project's next steps and other opportunities for engagement.

This summary further details the information shared during the workshop and the feedback collected. Input from attendees will be used to refine strategy development and ensure actions align with community priorities.

Welcome, Introduction, and Agenda Review

The workshop began with brief instructions from Frida Blum, who served as the live Spanish interpreter, and Zoom navigation guidance from Luis Montes, Ascent's Outreach Specialist. Following this, Cora Panturad, the County's Interim Sustainability Program Manager, delivered welcome remarks, introduced the project management team, and provided an overview of the agenda.

Project Overview and Monterey County's Challenge

A summary of the CCAAP's purpose and progress to date was shared. This included key terms, a general description of what a climate action plan entails, clarification on climate mitigation and adaptation, the project schedule, and a summary of engagement efforts conducted to date.

Cora also presented an overview of the County's 2021 GHG emissions inventory, which detailed the percentage of emissions by sector. She emphasized the importance of local action in helping Monterey County meet its 2045 goals, highlighting the "challenge" that requires cross sector collaboration and support from interested parties, community groups, and organizations.

Three Big Opportunities

Building energy and transportation comprise 60 percent of the County's GHG inventory, presenting significant opportunities for reduction from these sectors. The workshop focused on efforts to electrify buildings, reduce vehicle trips, and increase EV adoption, as these strategies offer the greatest potential to lower GHG emissions. Each opportunity included a description and supporting details that outlined Monterey County's current status and highlighted the benefits these sustainable practices would bring to communities.

Two Slido (an online polling platform) questions accompanied each of the three opportunities, totaling six questions. These questions aimed to identify factors that could encourage people to adopt sustainable practices and barriers that might prevent their adoption. The responses provided valuable insights for the County, shedding light on the reasons behind people's decisions to adopt—or not adopt—actions that would reduce GHG emissions. The Slido questions also served as a precursor to the breakout group discussions, where participants had the opportunity to explore these topics in greater depth.

The responses to the six Slido Questions are pasted below:

Question 1: What is most important to you when considering switching to electric appliances in your home? Check all that apply.

Poll Option	Count	Percentage
Improved air quality, less risk of asthma and respiratory illness symptoms	22	56%
Long-term cost savings	28	72%
It's good for the planet	26	67%
Acute hazard reduction such as explosions, gas leaks, and fire risks	15	38%
Other	3	8%

Question 2: For members of your household, what are the barriers to using electric or induction stoves? Check all that apply.

Poll Option	Count	Percentage
Initial cost	23	61%
My household already uses an electric or induction stove	11	29%
My household rents and does not have purchasing power for appliances	10	26%
Unsure about operating costs	5	13%
Desire to use my methane gas stove when the power goes out	5	13%
Unfamiliar with electric technology	4	11%
Preference for methane gas stoves	4	11%
Other	2	5%

Question 3: What barriers prevent you from taking transit, walking, biking, or other non-vehicular modes to get to work, school, or errands? Check all that apply.

Poll Option	Count	Percentage
Service/infrastructure is inadequate (infrequent buses, lack of bike lanes, insufficient crossings)	23	74%
Distance is too far to destination	17	55%
Safety concerns (traffic, dangerous drivers, unsafe walking/transit stop conditions)	13	42%
Limited hours of operation or scheduling issues	12	39%
Lack of comfort or convenience (uncomfortable waiting areas, no bike racks)	7	23%
Physical limitations or health concerns	3	10%
Other	2	5%
Don't have necessary equipment	1	3%
Too expensive	1	3%

Question 4: For members of your household, what are the most important considerations when deciding to use public transportation or active transportation (walking, biking, scootering) in Monterey County? Check all that apply.

Poll Option	Count	Percentage
Health and exercise opportunities	24	69%
Avoiding parking hassles	20	57%
Safety considerations (reduced traffic, improved road conditions, protected lanes)	20	57%
Opportunities to get fresh air, experience nature, and be outdoors	15	43%
Cost savings compared to car ownership	14	40%
More freedom for people who can’t drive (e.g., children and adolescents, elderly people, people with disabilities and their parents/caretakers)	9	26%
Other	7	20%
Alternative to driving after drinking (if walking or taking public transit)	6	17%
Accessibility and inclusivity for all community members	3	9%

Question 5: For members of your household, what is the most important consideration to driving an electric vehicle?

Poll Option	Count	Percentage
Fuel savings and less maintenance costs	15	47%
It’s good for the planet	12	38%
Cleaner air from tailpipe emissions	2	6%
Other	2	6%
Home energy and battery options for resiliency	1	3%

Question 6: For members of your household, what are the most significant barriers to driving an electric vehicle?

Poll Option	Count	Percentage
Upfront cost	18	49%
Access to charging at home	8	22%
None	6	16%
Towing capacity	3	8%
Access to public or workplace charging	2	5%
Driving range	0	0%
Other	0	0%

Q&A

After the presentation, attendees had the opportunity to ask questions which were addressed by both Ascent and Monterey County staff. Ascent responded to technical inquiries, while County staff addressed questions related to local jurisdiction operations. Key themes and issues raised during this portion of the Q&A portion of the meeting include:

- Agricultural Concerns and Opportunities:
    - Role of soil and rangeland in carbon sequestration
    - Barriers limiting reduction in fertilizer use
    - Consideration of sequestration to offset agricultural emissions, particularly from livestock
    - County's potential role in promoting regenerative agriculture and agrivoltaics
- GHG Inventory Methodology:
    - Inclusion of carbon sequestration data across sectors
    - Absence of oil and gas emissions from the inventory
    - Methods for measuring and calculating emissions
    - Status of the public comment period for the GHG inventory
- Electric Infrastructure:
    - Adequacy of electrical production to meet increased demand
    - Grid capacity to support agricultural and industrial EV operations
    - Current proportion of electricity generated from fossil fuels
- Social Equity and Implementation:
    - Programs and initiatives to ensure working communities benefit from the energy transition
    - Potential for remote/hybrid work policies to reduce vehicle miles traveled
    - Integration of energy efficiency programs like weatherization and insulation in the CCAAP
- EV Adoption Concerns:
    - Expected battery lifespan and replacement costs
    - Higher insurance rates for electric vehicles
- CCAAP Development:
    - Availability of a draft report
    - Ensuring Board of Supervisors' approval reflects community interests rather than fossil fuel or large agricultural industry priorities

Barriers, Solutions, and Community Strengths Breakout Group Activity

The breakout group discussions provided a valuable opportunity to explore the three opportunities (i.e., electrify buildings, reduce vehicle trips, and increase EV adoption) covered during the presentation in greater depth and hear directly from attendees about what they consider community strengths in the unincorporated county. The activity acknowledged that adopting sustainable practices can present significant challenges, particularly for those constraints like financial concerns, lack of access to information and resources, or feeling hesitant to adopt new practices due to cultural considerations or a preference for familiar and established approaches.

Participants were divided into eight breakout groups to have more focused conversations with attendees. Seven breakout groups were conducted in English, with one was facilitated in Spanish to support attendees who required interpretation and translation services. A total of 30 minutes was allocated for the breakout group discussion, which focused on addressing the following questions:

- Barriers and Solutions
    - How can the County support you in overcoming challenges to adopt sustainable practices such as:
        - Electrifying homes and businesses
        - Reducing vehicle use
        - Switching to EVs
- Community Benefits and Strengths
    - Which aspects of your community matter most to you?

The key topics discussed in each breakout group are consolidated and summarized below:

<u>Electrifying Homes and Businesses</u>

Barriers

- Financial Concerns
    - The high upfront costs of electrification present a significant barrier, particularly affecting low-income residents, older homes requiring electrical upgrades, and renters. Property owners of rental units often cite these expenses as a primary reason for not upgrading, creating a challenging dynamic where renters interested in electrification have limited options.
    - Current reimbursement-based incentive programs are ineffective for many residents who cannot afford the initial investment, suggesting a need for direct grant programs and more accessible financing options.
    - Residents express concerns about increased electric bills and ongoing maintenance costs, especially in the context of older homes that may require extensive retrofitting beyond just appliance replacement.
- Technical and Infrastructure Barriers
    - Many existing properties face significant infrastructure challenges, including outdated electrical systems and homes not up to current building codes. This creates a compound problem where basic safety upgrades must be completed first before electrification efforts.
    - Multi-unit buildings face unique challenges requiring comprehensive solutions that address both individual unit needs and building-wide infrastructure.

    - Concerns about system reliability during power outages and the need for backup power solutions, particularly in areas prone to natural disasters or grid instability.
- Information and Education Gaps
    - Knowledge gaps exist across multiple groups, including homeowners, contractors, and property managers. This encompasses limited awareness of available programs, technical requirements, and economic benefits, with a particular barrier for non-English speaking communities who may be isolated from traditional information channels.
    - Many local contractors do not have experience with modern electric appliances and heat pump systems. This creates a bottleneck in implementation and can result in poor installation quality.
- Cultural and Behavioral Considerations
    - Strong cultural attachments to gas cooking, particularly in communities where traditional cooking methods are central to cultural practices, require sensitive and flexible approaches to electrification. Space heating and water heater conversions face less resistance and could serve as entry points for broader electrification efforts.
    - Residents express significant concern about reliability during emergencies, reflecting both practical considerations and deeper anxieties about energy independence and resilience.

Solutions

- Comprehensive Financial and Technical Support
    - Launch accessible financial assistance programs combining County resources with regional partnerships (e.g., AMBAG, MBARD), prioritizing direct grant programs over reimbursement models. Include specific provisions for renters and low-income households, with property tax incentives and split-incentive solutions for landlords and tenants.
    - Establish a contractor certification and training program in partnership with vocational schools to ensure quality installations and build workforce capacity. Implement standardized installation quality metrics and develop backup power solutions for vulnerable communities.
    - Create demonstration projects that showcase successful electrification in diverse settings, highlighting both residential and commercial applications to provide tangible examples of implementation.
- Community-Centered Education and Implementation
    - Implement a community-based outreach program employing trusted community messengers ("promotores de salud") to address linguistic and cultural barriers. Focus on multilingual materials and culturally appropriate communication channels.
    - Organize electrified home tours and showcase success stories from local businesses and residents, emphasizing practical benefits and return on investment to help overcome adoption hesitancy.
    - Develop clear guidance materials for end-of-life appliance replacement decisions, helping residents make informed choices at critical decision points.
- Implementation
    - Establish a policy framework that prioritizes systemic changes within the County's authority, focusing initially on space and water heating programs while developing longer-term solutions for cooking appliance transitions.

- Create clear jurisdictional coordination frameworks between County and city authorities to ensure consistent support and messaging across the region.
- Address equity concerns through robust renter protections and landlord requirements, while integrating electrification goals with broader urban planning objectives including density and walkability improvements.

Reduce Vehicle Use

Barriers

- Public Transit System Limitations
  - Current bus service faces multiple issues including infrequent service, limited routes, and inconvenient stop locations. This is particularly acute in areas like Pebble Beach, Carmel Valley, and Pajaro, where residents report significant service gaps.
  - Intercounty commuters face extremely long transit times compared to driving (e.g., Santa Cruz to Monterey taking 3 hours by transit versus 50 minutes by car), making public transit an impractical option for many workers.
  - The system lacks crucial connections, including north-south routes between Monterey and Salinas, and rail connections between Gilroy and Monterey County.
- Safety and Infrastructure Concerns
  - Personal safety at transit stops is a significant concern, especially for women and at stops located in Salinas. Other general safety issues include inadequate lighting, limited seating, and the proximity of stops to areas affected by homelessness and other public safety challenges.
  - Walking and bicycling infrastructure are inadequate in many areas, with specific challenges including:
    - Lack of separated bike lanes and protective barriers between vehicles and cyclists
    - Absence of sidewalks in some communities like Pajaro
    - Dangerous road conditions (e.g., windy streets in Pebble Beach)
    - Insufficient shade trees for pedestrian comfort
- Community Design and Access
  - Current community designs often prioritize car dependency, making it challenging to retrofit for public transit and active transportation.
  - Essential services are frequently located outside of walkable/bikeable range, forcing vehicle dependency for basic needs.
  - The tourism industry creates unique transportation demands and patterns that need to be addressed in planning.

Solutions

- Transit System Enhancements
  - Focus on:
    - Increasing service frequency on existing routes
    - Adding direct routes along major corridors (e.g., Highway 1)
    - Creating efficient connections between population centers
    - Developing park-and-ride facilities to support hybrid commute option

    - Modernize the transit fleet through electrification of both public buses and school buses, while ensuring appropriate vehicle sizes for different routes.
    - Develop integrated transit solutions including potential rail connections and innovative options like air taxis for specific routes.
- Safety
    - Implement comprehensive safety improvements at transit stops and along active transportation routes:
        - Install adequate lighting and seating at bus stops
        - Create separated bike lanes and protected cycling infrastructure
        - Develop complete streets with proper sidewalks and shade trees
        - Establish safe routes to schools and essential services
    - Address safety concerns:
        - Partner with social services to address homelessness near transit facilities
        - Coordinate with law enforcement for increased presence around transit stops, particularly during evening hours and in areas where women report feeling unsafe
        - Establish a community safety ambassador program
        - Install emergency call boxes
- Community Planning and Access
    - Integrate transportation planning with land use decisions to:
        - Support development of local essential services within walking/biking distance
        - Create complete neighborhoods that reduce car dependency
        - Ensure new developments incorporate transit-oriented design principles
    - Develop micro-mobility solutions including:
        - Electric bicycle programs, particularly for students
        - Last-mile connection services
        - Safe and convenient bike storage facilities
- Support Programs and Incentives
    - Create programs for:
        - Implement more opportunities for active transportation
        - School transportation electrification
        - Employer-supported telecommuting options
    - Reduce public transit costs to increase ridership, potentially following successful models from other cities like Nashville, TN
    - Establish clear metrics to track vehicle usage patterns and program effectiveness across different regions of the county

Adopting EVs

Barriers

- Financial and Economic Barriers
    - High initial purchase costs create significant barriers, particularly for:
        - Low-income households
        - Workers with long commutes (e.g., East County to Monterey)
        - Households with single vehicles or limited vehicle access

    - The intersection of housing affordability and vehicle costs creates compound challenges, as those most impacted by long commutes often have the least financial capacity to transition to EVs.
- Infrastructure and Technical Concerns
    - Charging infrastructure faces multiple challenges:
        - Limited availability for residents without home charging access
        - Poor placement of existing charging stations
        - Reliability issues with existing chargers and slow maintenance response
        - Particular gaps in rural areas, including ranches and farms
    - Specific concerns about EV performance and practicality:
        - Uncertainty about long-term reliability and maintenance
        - Questions about emergency resilience during power outages
        - Doubts about EV suitability for agricultural and ranching operations
        - Concerns about repair complexity and technician expertise
- Information and Education Gaps
    - Limited awareness about:
        - Available subsidies and financial assistance programs
        - Total cost of ownership benefits
        - Maintenance requirements and procedures
        - Environmental impact comparisons
    - Particular need for Spanish-language outreach and education
    - Lack of demonstration cases for specialized uses (e.g., agricultural applications)
- Other transportation EV issues
    - Environmental concerns about EV production impacts
    - Questions about emphasis on private vehicle ownership versus other providing other transportation solutions to reduce vehicle use instead.

Solutions

- Financial Support
    - Develop comprehensive financial assistance programs:
        - Standardized support across income levels
        - Low-interest financing options
        - Special programs for critical workforce sectors (e.g., hospitality workers)
        - Partnership with organizations like 3CE for enhanced rebate programs
    - Create targeted programs for multi-unit dwellings and rental properties
    - Establish clearer metrics for program effectiveness and equity
- Infrastructure Development
    - Implement strategic charging infrastructure expansion:
        - Focus on gaps in rural and agricultural areas
        - Enhance reliability through improved maintenance protocols
        - Create charging solutions for multi-unit dwellings
        - Partner with agricultural operations for workplace charging

    - Develop backup power solutions for charging during outages
    - Lead by example through County fleet electrification
- Education and Demonstration Programs
    - Create comprehensive outreach programs:
        - Multilingual education campaigns
        - Hands-on demonstration events
        - Partnership with successful programs like "EVs for Everyone"
        - Specific outreach to Spanish-speaking communities
    - Establish demonstration programs for specialized uses:
        - Agricultural and ranching applications
        - Fleet operations
        - Emergency response scenarios
- Provide comparative environmental impact information:
    - Lifecycle analysis of different vehicle options
    - Total cost of ownership calculations
    - Environmental benefits data
- Recommended strategies
    - Coordinate EV adoption strategies with:
        - Housing affordability initiatives
        - Workplace transportation programs
        - Regional transit planning
        - Zero waste and other environmental programs
    - Consider hybrid vehicle options as transition strategy

Community Benefits and Strengths

- Natural Environment and Open Spaces
    - Access to diverse natural spaces: coastal ecosystem, beaches, parks, rolling hills, and wild open spaces
    - Clean air and quiet environment, particularly valued by residents who travel alone
    - Well-maintained recreational infrastructure, including the Rec Trail and accessible beaches
- Social Connections and Community Support
    - Close-knit tri-county community where people frequently connect at work and social spaces
    - Active community support networks, demonstrated through examples like residents giving rides to seniors
- Established environmental organizations:
    - Climate Reality Project Monterey Chapter: connects the public to climate solutions and elected officials
    - Communities for Sustainable Monterey County: organizes local projects like trash pickup
    - Surfrider Foundation: focuses on nature-based solutions for sea level rise
- Community support organizations:
    - Mujeres en Accion: provides growth opportunities and information access for women
    - Rutas Seguras: addresses community transportation needs

- Agricultural Heritage and Food Systems
    - Valued local food production system
    - Strong agricultural community maintaining rural character
    - Connection between residents and food production workers
    - Multi-generational farming families maintaining agricultural traditions
    - Farmers markets and farm stands
- Government Response
    - Specific example of property tax reduction for resident who lost their home in a flood
    - Appreciative of the County's dedication to developing the CCAAP

Climate Action Simulator and Demonstration

After the breakout room discussion, Luis shared additional information about the Climate Action Simulator, an interactive tool that allows participants to step into the role of a climate action planner. The purpose of the activity is to support the County in prioritizing actions to achieve emissions reductions. Participants are encouraged to submit a scenario and a set of actions aimed at meeting the 2030 target by selecting various actions and adjusting their scale of GHG reduction to align with personal preferences. A demonstration was provided, along with an opportunity for questions to ensure clarity before sharing the activity with workshop attendees. The activity will remain open until January 6, 2025.

- The Climate Action Simulator can be accessed here: https://ascent.mysocialpinpoint.com/monterey-county-ccaap

Next Steps

Before concluding the workshop, Cora provided closing remarks and outlined the next steps in the CCAAP process. She emphasized two key opportunities for engagement and feedback: the Climate Action Simulator and the Barriers Survey. Both can be accessed on the project website and will be available until January 6, 2025. Additionally, the Alternative Energy and Environment Committee (AEEC) meeting will take place on December 17, 2024, covering the final GHG inventory. Attendees can also expect the Draft CCAAP for review in winter 2025, which will include a 60-day comment period and be publicly available for feedback on the project website.

All workshop registrants also received follow-up communications, which included copies of the PowerPoint presentation, links to the Climate Action Simulator and Barriers Survey, and additional information available on the project website.

Sector Working Group Meeting 1 Mural Board Results

- **Breakout Group 1**
  - Greenhouse Gas Reduction Strategies
    - Could Do
      - Add carpool lanes
      - Provide incentives for residents to make those changes
    - Should Do
      - Identify partnerships for on-road transportation sectors to share infrastructure (e.g. hydrogen fuel stations, electric charging stations for heavy duty vehicles)
      - Ensure the elderly are not forced to spend money to make changes to their residences
      - Improve transit options and bike lanes
      - Incentives or rebates for electrification in buildings (e.g. induction stoves, heat pumps)
      - Avoid PACE (energy)
      - Need softeners for tankless water heaters (well water)
    - Must Do
      - Adopt a Building Decarbonization Ordinance
      - Lighting upgrades or solar for buildings 5,000-25,000 sq ft
      - Create incentives for making changes
      - Work with Ag. companies to promote low carbon ag. (eg no till, low/no nitrogen fertilizers)
      - Use Passive house Building Codes
      - Provide support for building owners and managersProv
      - Ensure whatever solution is proposed is appropriate for the size of the emissions.
      - Develop water trading for ag
      - removing Organics out of the landfill in 2022
      - Develop carbon trading for ag
      - Use regenerative ag
      - Establish Renewable Heating and Cooling Policy
      - Ensure that decarbonization projects are voluntary for the lowest emitter
      - Create job housing balance to reduce commuting.
      - Track & share the cost effectiveness from energy savings for building efficiency measures
      - work
      - Increase land management to reduce fuel loads and emissions from wildfires
      - Adopt Complete Streets, Safe Routes to Schools, multi-modal forms of transit
      - Weatherization of existing buildings
      - Encourage
      - Education for homeowners
    - Top 5 Solutions
      1. Work with Ag. companies to promote low carbon ag. (eg no till, low/no nitrogen fertilizers)
      2. Create incentives for making changes
      3. Adopt a Building Decarbonization Ordinance (also capture existing buildings)
      4. Provide education, incentives & resources to encourage SMART (sustainable, affordable, affordable, resilient, transit-oriented) development
      5. Workforce development, support green economy and jobs

Breakout Group 2

- Greenhouse Gas Reduction Strategies
  - Could Do
    - Create an advisory council sharing sustainability practices for businesses to comply
  - Should Do
    - Increase quality and availability of public transportation to reduce use of personal vehicles
    - Engage the public on what a climate positive community should look like
    - Ensuring adaptation measures function effectively across the full range of climate scenarios
  - Must Do
    - Move to 100% renewable energy, including programs that make electrical vehicles more affordable and easier to access
    - Nature Based Solutions
    - Improve our use of innovation to mitigate emissions and ensure a healthy future for local communities
    - Focus on community awareness of transportation programs, sustainability initiatives and the general tool chest available for the public to mitigate their footprint & emissions
    - Building Electrification
    - Active transportation improvements
    - Car share programs
    - Implement community microgrid projects
  - Top 5 Solutions
    1. Focus regulatory or local changes towards improving innovation instead of conservation
    2. Strive for climate positive instead of just achieving carbon neutrality
    3. Consider the costs of disadvantaged communities as were creating new mandates and policies on adaptation

Breakout Group 3

- Greenhouse Gas Reduction Strategies
  - Could Do
    - N/A
  - Should Do
    - Weatherization programs for housing, especially in low income communities
    - Identify building codes and other methods to get existing and future parking for residential rental buildings to provide EV charging
    - apply compost on our farms and rangelands
    - work with ag incubators for efficiency and sequestration
    - carbon sequestration projects
    - transportation -- electric train?
    - Carbon Farm Planning
    - Electrify equipment
    - cheap electric cars
    - Establish a carbon fund to support in house municipal sustainability projects (see Santa Cruz example)
    - Deploy EVCS throughout the County
    - Focus on incentives, voluntary actions and removing hurdles, minimize regulations and mandates

- Must Do
    - Distributed clean energy
    - Improve clean energy public transportation options and availability
    - Electrify ridesharing
    - Reduce pesticides through policy?
    - Improve energy efficiency of our larger buildings
        - <--- including retrofits
    - remove food waste from the waste stream
    - Push transition to EVs
    - bike lanes for electric bikes
    - Need to look at transportation solutions through MST
    - Need to transition to EVs
    - Work with 3CE to provide programatic, financing and pricing strategies for the community to increase local solar generation (roof top, small and medium size)
    - anaerobic digester for food/organics compost
    - solar powered cars (no charger necessary)
    - affordable housing so people don't drive so far
- Top 5 Solutions
    1. Public transportation & transportation system improvements
    2. Affordable housing
    3. Vehicle electrification
    4. Sustainable agricultural practices
    5. Energy efficiency and clean energy
- Noncategorized Additional Notes
    - Livestock industry "neutral entity" - need to manage grass (first crop); rangelands
    - New Chevron Dept - Energy Transitions, investing in alt energy companies; reducing internal emissions
    - Development on the way; will lead to traffic and increased demand for vehicles

Sector Working Group: Agriculture & Sequestration Mural Board Results

Livestock

Instructions:

1. Brainstorm Agriculture & Sequestration Strategies
2. Identify Pros, Cons, and Opps

- Apply compost on rangelands, study compost application on rangelands
  - Positives:
    - Potential to hold more moisture
    - Improve forage production
    - May help sequester carbon
    - Healthy soils = healthy livestock
  - Considerations:
    - need to qualify compost
    - Quantity to implement at scale
    - Lack of understanding of impact on livestock
    - May need to be reapplied annually
  - Opportunities:
    - County Regen
    - Delivering services are CSC/NRCS
    - Resource Conservation Districts (RCDs)
    - Incentivize rangeland compost application
    - Grant funding through CDFA Healthy Soils
- Implement prescribed grazing
  - Positives:
    - Sequester carbon through managed grazing
    - can improve biodiversity & forage quality
    - Fire fuel reduction
    - Reduce GHG emissions
    - Reduce fertilizer use
  - Considerations:
    - Different level of oversight + planning required
    - Need to prepare ranchers for difficulties
    - NRCS funding is limited and competitive
  - Opportunities:
    - Already funded by NRCS
    - People have to have access to more livestock
    - Use technology for monitoring
    - Use solar canopies to provide shade to cattle and generate clean energy
- Promote resources through partnerships
  - Positives:
    - Multiple jurisdictions working together
    - Partner with local organizations
    - partner w/ RCDs and Central Coast Climate Collab
  - Considerations:
  - Opportunities:
    - Provide additional funding
- Transition irrigation pumps and equipment/vehicles to electric or low-carbon alternatives
  - Positives: None
  - Considerations:
    - need a back up if electric, what would that be?
    - Grid connections

    - Opportunities:

- Lower cost of land rental
    - Positives:
    - Considerations:
    - Opportunities:

- Test fields
    - Positives:
        - Use as model lands for grazing, sequestration, and research
    - Considerations:
        - Need funding partners, sites might not be large
    - Opportunities:
        - Experiment with new crops; have an example of performance?

- Improve resilience to drought and flooding
    - Positives:
        - CSUMB has researched fog capture
    - Considerations:
        - Loss of livestock due to drought
        - Large storms causing erosion, need to keep soil covered
        - Washouts of roads, need stream management
        - Fog collection project
    - Opportunities:
        - Prescribed grazing, moving cattle around could help
        - Reseed areas lacking cover

- Preserve rangelands/ranches
    - Positives:
        - Local economic benefits
    - Considerations:
    - Opportunities:
        - more carbon sinking opportunities

- Oak tree planting
    - Positives:
    - Considerations:
        - Oak seedlings, soil health, challenging with drought
        - Reseeding is expensive, lower success during long-term droughts
    - Opportunities:
        - Perennial grasses do well along coast
        - Foster seedlings to grow with proven techniques
        - Find occurring naturally on ranges, provide fencing to support their growth

Vines

Instructions:

1. Brainstorm Agriculture & Sequestration Strategies
2. Identify Pros, Cons, and Opps

- Apply compost on vineyards
    - Positives:
        - reduce need for synthetic fertilizer
    - Considerations:
        - Have flexibility in best practices – they should not be static
        - Fund, support, advocate for funding
    - Opportunities:
        - Support green industry coming to county – e.g., biochar
        - Support policy changes to remove barriers
        - work with USCC to establish compost quality regulations

- Ecotourism
    - Positives:
        - CA Wine Institute – CWSA, SIP
        - Certification expectations from large retailers (e.g., Walmart) and EU
        - insectary benefits
    - Considerations:
        - Keep strategies general and flexible – should not conflict with federal or state laws
        - Organics certification difficult for wineries
    - Opportunities:
        - Transport multiple people across wine corridor: wineries co-advertise "drop off all at same time" tour with smaller groups
        - Sustainable, regenerative terms
- Increase use of cover crops, hedgerows, windbreaks
    - Positives:
        - Can increase water retention and soil quality
    - Considerations:
    - Opportunities:
- Transition irrigation pumps and equipment/vehicles to electric or low-carbon alternatives
    - Positives:
        - Plan for ends of trips in Monterey
        - No TRUs typically at small wineries
        - PGE grid is not reliable. The more electrification infrastructure, the more we destabilize the grid.
        - Grapes use less water than other crops, lower fertilizer use as well
        - Electric pruning is being used
        - Segmented metering on parts of vineyards to calibrate water use
    - Considerations:
        - Advocate for statewide programs
        - Price of electric trucks – difficult to electrify existing fleet
        - Grapes have a time limit for shipping
        - Renting of electric equipment – not forklifts (used too frequently)
        - Bottling trucks – very expensive
        - PGE grid is not reliable. A crop cannot wait for the lines to be fixed, particularly during hot weather etc.
    - Opportunities:
        - Tractors
        - Haul trucks – grapes being transported to Napa
        - Haulers not located here primarily
        - 3CE blueprint for medium and heavy duty vehicles
        - County can help with electrifying pumps
        - Fossil fuels in tractors, pumps
        - Technology in water use
- EV charging at wineries
    - Positives:
        - Lots of funding and tax incentives to reduce EV & EVCS cost
    - Considerations:
        - Cost of EVs is a barrier
        - Not shipping raw materials or finished products in summer
        - Grape haulers need to use dirt roads frequently – limits size of trucks
    - Opportunities:
        - Is rail an alternative? May not meet timing requirements
        - The grid cannot sustain larger overall shift to EV.
        - Local solar/wind + EVs support grid and local resiliency

- Decarbonization of wineries
    - Positives:
    - Considerations:
        - PG&E net metering
        - Electrification across the board is expensive
        - Presses, big storage units. Wineries need to be kept cool.
    - Opportunities:
        - Alt energy sources – wind power
        - Electric forklifts
        - Agrophotovoltaics

- Support local wineries to keep products local
    - Positives:
        - Vineyards are very geo-specific
    - Considerations:
        - Higher concern with leakage of other crops
    - Opportunities:
        - County role in keeping ag local

Crops

Instructions:

1. Brainstorm Agriculture & Sequestration Strategies
2. Identify Pros, Cons, and Opps

- County Plan to preserve ag land
    - Positives:
        - Proposed Ag Mitigation Policy
        - support ag land and farmers/our main industry in the county
    - Considerations:
        - Proposed Ag Mitigation Policy
        - Ag mitigation policy will drive up the cost of housing, which will make it more difficult for farmworkers to rent.
        - Private property rights issue.
    - Opportunities:
        - Loss of ag jobs, loss of property tax values, loss of value-add to ancillary economy.

- Buyer Influence/Landlord Buy In
    - Positives:
        - Marketplace forces will drive sustainability practices
        - Buyers pay premium for incentivized practices
    - Considerations:
        - Absentee landlords
        - End-buyer market (Costco, groceries, etc): Willing to absorb increased costs?
        - how will this get passed onto the farmer?
    - Opportunities:
        - Large corporations may be required to post GHG emissions—this will be passed onto the farmer to complete (incentivize) premium price for growers?
        - Absentee landlords will not be interested in this as it will trigger rent reductions
            - this comes from the top-down approach possible property tax reduction

- Increase use of cover crops, hedgerows, windbreaks
    - Positives:
        - prevents erosion, absorbs N (nitrogen) in the winter, increase soil diversity
        - Improved soil health
    - Considerations:
        - Ag Order 4.0 Nitrogen requirements – available N: no credit for CC legumes
        - Gently increases food safety problems due to real fencing, squirrels, etc.
        - not feasible for every crop rotation or crop schedule

        - Increased water use
        - Hedgerows, windbreaks etc reduce available crop land; alters economics.
    - Opportunities:
        - Impact calculations
        - ARS – UCCE research
        - Carbon credit calculations
        - How do wind patterns move CO2 around? New opportunity for grant studies.
        - Available grants to help fund

- Transition irrigation pumps and equipment/vehicles to electric or low-carbon alternatives
    - Positives:
        - Perhaps highlights need for more viable kinds of energy sources — more reliable?
        - Subsidize EV for all farmworkers.
        - Light rail to all main farming areas to transport workers.
    - Considerations:
        - Due to PGE's mediocre grid and common brownouts, switching to electric pumps would reduce crop yield
        - If the grid has interruption, you see interruptions in your ability to irrigate
        - Where are these technologies — are they available and ready in supply?
        - Backup to electric grid reliability issues is on-site generators
        - Majority of electric supply still comes from fossil fuels, so this seems like a shell game
        - Consider if landlords are willing or want solar pumps/solar panels etc., would farmers want to or can put infrastructure on a property they do not own and could lose their contract for??
    - Opportunities:
        - Carl Moyer, FARMER, 3CE
        - Provides opportunity to upgrade systems with flow meters and get a better idea of flow at all times
        - More ag tech
        - Low carbon alternatives such as what? Windmills?
        - Current funding available from 3CE
        - Local solar/wind + EVs support grid and local resiliency

- Improve tillage management
    - Positives:
        - Technology will drive new innovations
        - Improved soil health
        - New technology and better implements for less passes
        - Money savings due to less fuel burned for passes
    - Considerations:
        - Slow down crop rotations
        - One-size fits all tillage recommendations cannot function in real world.
        - availability and affordability (new tech)
        - Ag community has always been innovative-minded. Doesn't need gov weighing in on this. More important for gov to stay out of the way. For example: see ag innovations in irrigation, harvesting, etc.
        - Better to let ag industry innovate naturally
        - Consideration of flexibility and not prescriptive measures, not one size fits all
    - Opportunities:
        - Impact calculators – value? which crops? research & info
        - Fed and state funding (climate smart ag fund)
        - Possible educational opportunities around new equipment and techniques, i.e. demo days with new electric tech, strategies

- Reduce fertilizer demand through nutrient management (e.g. compost application, enhanced efficiency fertilizers)
    - Positives:
        - Improved water quality
        - Fertilizer price has gone up ~200%, saves money to reduce inputs
        - Partner with local cattle to provide compost
    - Considerations:
        - Compost has food safety implications.
        - Agrinomics of crop production require N (nitrogen) use to produce a quality crop and yield.
        - Ag order 4.0 cross over on this already; important to note the need based on out soil/plant health (not blindly applying amendments)
        - Environnemental impact? Impact on yields/quality ?
    - Opportunities:
        - Environmental impact?
- Improved grid reliability to ensure stability
    - Positives:
        - Allows for more electrification
        - Microgrid and resiliency benefits
    - Considerations:
        - Lack of reliability limits conversion from current equipment
        - Alternative Power Generation (solar) is a land use issue
        - Most EV charging stations are still powered by fossil fuels… ZEV (zero emission vehicles) are only close to 0 if from wind, solar, or hydro or renewable source… not to mention the disposal of batteries and the heavy metals mined for it
    - Opportunities:
        - PG&E, 3CE
        - Solar implementation agrophotovoltaics
        - opportunity to build nuclear. Only reliable renewable that exists.
        - Local solar/ wind + EVs support grid and local resiliency
- Converting marginal/unproductive Ag land to Wetlands? (not proposed as strategy, just question to group)
    - Positives:
        - SGMA or Ag Order objectives, not clear if benefit for CAP
    - Considerations:
        - Costs
        - Loss of prime Ag production lands in a time of shrinking food supply chain
        - food safety and land owner buy in
    - Opportunities:
        - Some existing funds (SGMA)
        - Reduces property tax base of county, reduces jobs.
- Consumer Education
    - Positives:
        - educate consumers on agriculture, where their food comes from, how to buy season and local produce
    - Considerations:
        - how to get info out to people- school curriculum? community events? Cost? who tells our story is important
    - Opportunities:
        - Drive consumer demand to support CA/USA grown products to stop destroying amazon forest/supporting foreign growers/ countries

Sector Working Group: Building & Energy Mural Board Results

Exercise 1: Brainstorm Buildings & Energy Strategies

- Electricity
  - Improve energy efficiency in existing buildings
  - Maximize participation with 3CE
  - Perform home energy audits (831 Conserve could assist) for existing buildings
  - 3CE incentives for energy efficiency improvements for existing buildings
  - Ensure grid reliability for future demand
  - Reach code for energy efficiency/ high performance buildings
  - Incentivize heat pumps
  - Incentivize energy storage (batteries)
  - incentives for reduction, penalties for use during peak hours
- Natural Gas
  - Electrification at major renovation for renter-occupied buildings
  - Electrify existing buildings
  - Minimize fossil fuel use in new development
  - Increase use of renewable natural gas in industrial uses
  - Nonresidential gas conservation through partnerships with gas companies
  - Require electrification a point-of-sale or major renovation
  - Eliminate fossil fuel use in all res/nonres development by 2024 through adopting a reach code
  - Fuel switching where applicable for industrial uses (e.g., hydrogen)
  - Develop local renewable natural gas (through methane capture)
  - Consider the costs associated with point-of-sale retrofit requirements
  - Provide incentives for retrofitting & electrification
  - Consider implications for renters if renovation costs are passed along
  - work with existing large quantity NG consumers to ID opportunities and tailor incentive opportunities to small business
- Renewable Energy
  - Increase local renewable energy generation
  - Consider diversity of housing types and locations for community microgrids (how to make more feasible?)
  - Develop community microgrids
  - Install clean energy storage systems
  - county participation in several community microgrid projects to develop path to practice toolkit
  - solicit proposals for wind generation projects
- Other
  - Create and provide educational resources for residents and businesses on incentives available
  - Coordination and partnerships with other Monterey County jurisdictions for climate solutions
  - Develop benchmarking ordinance
  - AB 802 - building benchmarking requirements (could go more stringent than state requirements)
  - Benchmarking for energy use and water use

Exercise 2: Identify Buildings & Energy Pros, Cons, and Opps

- Adopt an all-electric reach code for new buildings by 2024
  - Positives:
    - Reduce the need for propane onsite which is a fire hazard
    - 59 Cities have adopted Reach Codes limiting natural gas; synergizes with housing planning efforts and other jurisdictions
    - Lower the most invasive emissions in this sector
    - Enforcing lowering GHG emissions in a very large way
    - New builds are required by code to be prewired for all electric so could be cheaper to build all electric to the code
  - Considerations:
    - even when the grid is out you should not light your stove so you cannot really rely on the natural gas source
    - Concentrate on efficiency
    - Concentrate on equity
    - Housing affordability is an issue
    - Many County homes are currently on propane/not connected to natural gas line
    - Affordability of ongoing costs of energy should be considered across the board
    - Grid stability needs to be considered at the same time.
    - General Preference for incentives to get across the finish line and empower them
  - Opportunities:
    - Consider a straight ban rather than a reach code
    - Alignment with RHNA cycle
    - Major health benefits
    - Avoid a climate crisis
    - It's cheaper to build electric first than to convert to electric later
    - Heat pumps are very efficient and you get triple benefit from cost, environment and efficiency
- Electrification of renter-occupied buildings at major renovations
  - Positives:
    - Many grants and incentives out there: TECH program, Federal Infrastructure bill, etc…
  - Considerations:
    - Housing affordability needs to be considered
    - Is there an income threshold; or a size of renovation impact
    - Consider rural homes and the grid reliability
    - Increased cost of housing = worse carbon emissions from commuters
  - Opportunities:
    - Some kind of rebate for owners to make it financially feasible
    - State Priority
    - Replace on burnout for cost effectiveness
    - High Percentage of renters
- Require electrification at point-of-sale or major renovation for single-family residences
  - Positives:
    - Opportunistic time to make big changes
  - Considerations:
    - Cost could be passed to renters
    - Housing affordability needs to be considered
    - Consider rural homes and grid reliability
    - Point of sale in particular should not be seen as opportune time for onerous requirements
  - Opportunities:
    - Funding here would be instrumental
    - Tariff on-bill financing- pay through bill
    - Electrify Monterey Bay $2M award for our region

- Develop local renewable natural gas
  - Positives:
    - If used in a local and small way, it can be a useful temporary fuel
  - Considerations:
    - This is still a combustible and should be used as a transitional step away from combustibles
  - Opportunities:
    - Fertilizer production requires NG for ammonia. Smaller time to be a benefit with capacity; could work with local landfill on this too
    - Work with Dairy farms— we may not have any of these
- Increase use of renewable natural gas in industrial uses
  - Positives:
  - Considerations:
    - We need to get away from combustibles
    - Only use where absolutely needed to minimize use and use this small resource wisely
    - I feel that we should not increase any kind of gas use.
  - Opportunities:
- Develop benchmarking ordinance for energy and water use
  - Positives:
  - Considerations:
    - Peninsula residents already some of the most efficient water users in nation
  - Opportunities:
    - Ensure we are taking a cross-sector approach (ex. Sonoma Clean Power)
    - grey water to flush toilets is possible here
- Develop community microgrids
  - Positives:
    - Resilience
    - Creates more grid stability
    - Reduces transmission losses by at least 50%
  - Considerations:
  - Opportunities:
    - More community awareness and connection
    - Absolutely replicable and easily able to be rolled out
- Ensure grid reliability for future demand
  - Positives:
    - Prepare us to accommodate the demand that electrification will require
    - Electrification turns buildings into grid assets
  - Considerations:
  - Opportunities:
    - Incorporate microgrids
    - Our region is developing multiple sources of renewable energy storage (ex. Vistra Battery Facility)
- Incentivize reduced electricity consumption (or penalize peak hour use)
  - Positives:
    - Renters can participate
  - Considerations:
    - You can only participate in one incentive program (can be confusing for consumers)
  - Opportunities:
    - Numerous utility and 3rd party programs incentivize this
    - Educational resources about demand-response programs/peak demand for consumers
    - Encourage community members to reduce energy use during times of peak demand
- Incentivize clean energy technologies (e.g., heat pumps, batteries)
  - Positives:
    - This is the way we as a nation are moving, we need to embrace this ASAP

        - Considerations:
            - We need more incentives for electric stoves
            - Consumer education is needed
        - Opportunities:
            - create an internship program to teach the next gen of HVAC
    - Building energy efficiency improvements
        - Positives:
            - This has to happen first
            - Our existing housing stock is by far the largest amount of housing that we are and will be using, so energy retrofits to our existing housing stock is imperative
        - Considerations:
            - Beware of rental audit requirements like SB 1026, makes harder to get rental housing
        - Opportunities:
            - Supporting workforce development and training for building retrofits
            - Create educational resources for community members surrounding energy improvements and electrification
            - This step will make A.11. of the other things easier to achieve and more importantly, it will reduce our GHG emissions majorly.
    - Workforce Development for Electrification/energy efficiency
        - Positives:
        - Considerations:
            - Designing programs with equity in mind (focus on disadvantaged workers)
        - Opportunities:
            - Apprenticeship program for HVAC people who know about heat pumps

Sector Working Group: Land Use & Transportation Mural Board Results

Exercise 1: Brainstorm Transportation & Land Use Strategies

- Reduce VMT
  - Incentivize affordable, mixed-use housing near transit
  - Improve public transit and active transportation options
  - Change land use laws (what can be built where - zoning)
  - Streamline County approval process for housing and mixed-use development near existing transit corridors
  - Implement car- and ride-share programs
  - Reduce parking requirements (incentivize transit-oriented development)
  - Encourage road diets that can accommodate buses but more comfortable for pedestrians/bikers
  - Improve bike infrastructure
  - Make ADU regulations easier
  - Make city centers pedestrian/bike only and connect with public transportation
  - Re-igniting the Del Monte Express
  - Parking cash-out for employees
  - Employers could be incentivized to offer free public transportation passes for employees
  - Multi-modal-mobility-as-a-service
  - More South County housing for South County residents who work locally
  - Shuttles for Big Sur to reduce vehicles on Highway 1 and parking
  - Promote Amtrak station in Salinas and link to other transportation modes
  - fund and revitalize rail options for passengers/goods whenever possible
- Electric and Alternative Vehicles
  - Invest in hydrogen fueling infrastructure for commercial vehicles
  - Transition to EVs and other clean-fuel vehicles
  - Install EV charging stations
  - Support biomass for advanced biofuels
  - Streamline permitting for EV charging (private commercial operations)
  - Electric car share (part of car-share program?)
  - Work with businesses for onsite EV chargers (particularly for renters who can't install chargers)
  - Reserve off-street parking for EVs only
  - Waste hauling vehicles & postal vehicles should be EV's. Internal combustion engine (ICE) vehicle emissions increase every time the vehicle begins to accelerate, because trash haulers and postal delivery vehicles are constantly coming to a stop & then accelerating again throughout their routes, they should be the first fleets to be transitioned away from ICE's.
  - offer development credits to projects that can incorporate EV infrastructure into design
  - We Need EV Charging Infrastructure throughout the county ASAP
  - engage caltrans to include ev resources in future transportation projects
- Off-Road
  - Transition to zero-emission construction and landscaping equipment and boats
  - Reduce equipment idling
  - Use renewable diesel in construction equipment as a transition fuel
  - incentivise upgrade of ag equipment
  - bilingual targeted outreach to small/ low income businesses using off road vegicles
  - county specific reward program for vehicle upgrade- broaden carl Moyer program/address gaps
- Other
  - Address housing affordability and increase new housing development
  - Provide workforce housing
  - Provide educational resources on reducing transportation emissions in different languages
  - Avoid/prohibit road widening projects
  - what does this do for equity concerns?
  - Increase coordination with regional partners for transit
  - Prohibit development on undeveloped lands (greenfields)
  - Seek grant funding from State to support EV adoption and e-bikes

- South county housing for south county residents who work locally
- Improve transportation options in Big Sur
- Improve broadband infrastructure to support working from home
- Be mindful of unintended consequences (equity concerns for lower income residents)
- Equitable access to transportation solutions
- Ecology Action has a lot of resources to help with EV adoption, utilize them please!
- (https://ecoact.org/about-us/community-engagement/electric-vehicles)
- 3CE also has great resources (https://3cenergy.org/transportation-programs/)
- I feel there is synergy and an opportunity between Joby Aviation's efforts & installing EV infrastructure. Please read article: https://www.jobyaviation.com/news/joby-aviation-announces-infrastructure-partnership/

Exercise 2: Identify Transportation & Land Use Pros, Cons, and Opps

- Incentivize affordable, mixed use housing near transit
  - Positives:
  - Considerations:
    - Difficult to execute; requires some coordination with cities and urban spaces
  - Opportunities:
    - County's RHNA allocation should focus on low-VMT areas
    - Preserve open space/ ag/greenfield spaces
- Improve public transit, car-share, ride-share, and active transportation options
  - Positives:
    - CAL Vans working closely with ag workers and employers already and provides the insurance and van (extremely cost effective)
  - Considerations:
    - Ride share can often cannibalize the public transit system
    - Issues with first mile/ last mile in rural parts of the County, pooling bike crates? A ride with a communal drop off spot
  - Opportunities:
    - EVs for car sharing program
    - On-demand rideshare programs to connect to transit
- Reduce parking requirements
  - Positives:
  - Considerations:
  - Opportunities:
    - Could be specific to areas slated for development (RHNA allocation)
- Provide workforce housing
  - Positives:
  - Considerations:
  - Opportunities:
- Transition to EVs and other clean-fuel vehicles
  - Positives:
    - Central Coast Zero Emissions Vehicles Strategy Report forthcoming- to identify gaps in infrastructure and aligning with the NEVI plan for federally designated corridors
    - Can be more cost effective and cost parity may be expected soon.
  - Considerations:
    - Availability of used EVs is still an issue and subsidies go mainly to the new cars
    - Limited hydrogen charging locally for heavy-duty vehicles
  - Opportunities:
    - Incentive-based workplace charging
    - Car dealership incentives for EVs, used EVs
    - New pathways for incentive distribution through IRA (pending approval)
    - 3CE incentive program
    - zoning for EV charging at commercial sites

        - curbside EV charging
- Support biomass for advanced biofuels
    - Positives:
    - Considerations:
        - Some Biofuels displace food and natural habitat
    - Opportunities:
        - Biofuels should be made from those things that are disposed of anyway
- Transition to zero-emission construction and landscaping equipment and boats
    - Positives:
    - Considerations:
    - Opportunities:
- Improve broadband infrastructure to support working from home
    - Positives:
    - Considerations:
        - Equipment can be a financial barrier for low-income communities
    - Opportunities:
        - South County/Big Sur communities do not have access currently
- Use renewable diesel in construction equipment as a transition fuel
    - Positives:
    - Considerations:
    - Opportunities:
- Improve accessory dwelling unit permitting
    - Positives:
    - Considerations:
    - Opportunities:
        - Evaluate Seaside's permit streamlining
- Improve Big Sur transportation options
    - Positives:
    - Considerations:
    - Opportunities:
- Improve active transportation options
    - Positives:
        - TAMC's safe Routes to School Plan
    - Considerations:
        - County is large, varied terrain, lacks appropriate markings for biking, Bike lanes exist in cities but connection outside cities is don't exist
    - Opportunities:
        - Partner with Caltrans to improve infrastructure

Sector Working Group: Water & Waste Mural Board Results

Exercise 1: Brainstorm Water & Waste Strategies

- Solid Waste
  - Reduce disposal of organics in landfill
  - Provide green waste collection
  - Alternative fuels for waste hauling (fleet with CNG)
  - Support repair and reuse programs
  - Increase methane recovery in landfills
  - Consumer marketing/outreach for green waste diversion
  - Offer smaller trash receptacles to encourage diversion and less waste generation
  - Decrease trash pickup to biweekly to reduce waste generation
  - Edible food recovery for food insecurity (Blue Zones)
  - Utilize apps to connect food waste/recovery
  - Incentivize restaurants to sell leftover food prior to closing
  - Provide food scrap collection pails for residents (in addition to outreach about availability)
  - Share info about food policies/ programs available
  - Connect food grown in residential gardens to food insecure residents
- Water
  - Water capture through fog catchers
  - Increase use of recycled water for irrigation
  - Retrofit water fixtures to ultra-low-flow
  - Implement drought-tolerant landscaping
  - Recycled water for golf course landscaping (done in Seaside)
  - Incentivize rainwater capture
  - Incentivize grey water toilet flushing plumbing retrofits
  - Monthly public lectures on native plants fby local CNPS member
  - Use recirculation pumps on all plumbing systems (residential, commercial, industrial and agricultural).
  - This needs to be called out in the design phase and implemented in the construction phase.
  - No golf courses should be allowed to use potable water for irrigation period!
  - "Hydropanels" (https://www.source.co/) should be used in tandem with "Fogcatchers" (https://csumb.edu/fernandezlab/fog-collection-project/)
- Wastewater
  - Increase production of recycled water for irrigation
  - Develop anaerobic digesters
- Other
  - Install more alternative fuel infrastructure to support alternative fleet vehicles
  - Integrated projects that increase resiliency of natural resources (across agencies)
  - Use Integrated Water Resource Management Group to assist with climate goals
  - Conduct workshops to change water/waste habits
  - PLASTIC! Very few types of plastic are able to be recycled in the MoCo, only #1,#2 & #5, all the others go into the landfill.
  - Plastic! Mo Co's waste stream study includes a lot of agricultural (unrecyclable) plastic
  - Plastic! Quite often plastic ends up in the ocean & our ag fields that are full of plastic are directly across the street from our precious marine sanctuary.

Exercise 2: Identify Water & Waste Pros, Cons, and Opps

- Reduce disposal of organics in landflls by providing green waste collection
  - Positives:
    - Organic compost is being used locally on ag fields
  - Considerations:
    - Making behavior changes is difficult; but can be more challenging for accessibility barrier
    - Food waste is more challenging than green waste for public; higher likelihood of contamination
    - Odors and vectors/pests

        - Opportunities:
            - Additional education and outreach needed to increase waste diversion
            - Provide organics recovery from waste stream through emerging technologies
    - Develop edible food recovery programs
        - Positives:
            - Grants available for food service orgs
            - Capacity study completed for County for food service orgs
        - Considerations:
            - Additional funding needed to expand the capacity of recovery programs
        - Opportunities:
            - Existing subgroup Countywide approach taken so far.
    - Increase methane recovery in landfills
        - Positives:
            - CA already has strict mandates for methane capture from landfills
            - Landfills in Monterey County already doing a good job with this
            - Advanced production of landfill gas already happening
        - Considerations:
        - Opportunities:
            - Program/funding for using methane gas for beneficial purposes
            - Blending with anaerobic digester gas to pump into gas lines
    - Increase production and use of recycled water for irrigation
        - Positives:
        - Considerations:
        - Opportunities:
    - Implement drought-tolerant landscaping
        - Positives:
        - Considerations:
        - Opportunities:
    - Incentivize alternative methods to capture water like rainwater catchment and fog catchers
        - Positives:
        - Considerations:
        - Opportunities:
    - Incentivize grey water plumbing retrofits
        - Positives:
        - Considerations:
        - Opportunities:
    - Retrofit water fixtures to ultra-low-flow
        - Positives:
        - Considerations:
        - Opportunities:
    - Conduct workshops to change water/waste habits
        - Positives:
            - SVR has been hosting composting workshops
            - ReGen Monterey hosting community learning events, events for schools
            - Community dropoff events hosted by Waste Management
        - Considerations:
        - Opportunities:
            - Partner with community groups, student groups (4H), chambers/rotaries
            - Distribute educational materials at existing programs
    - Develop anaerobic digesters
        - Positives:
            - Feasibility study was funded to evaluate potential for digesters
            - SB 54 - plastic disposal regulation

        - Considerations:
            - WWTPs in Monterey may not be large enough to support digesters
            - No energy value in compostable wear for ADs
        - Opportunities:
            - Potential for partnership with ReGen Monterey and Monterey One
            - New technologies may be able to make this more economic as they are more efficient
            - Compostable/bioplastic celly bag specific needs to breakdown
    - Behavior change around waste disposal
        - Positives:
            - lithium-ion battery/e-waste dropoff recycling event
        - Considerations:
            - Battery fires
        - Opportunities:
    - Improve Resiliency of water/waste management systems in the face of climate change
        - Positives:
            - Monterey One Water completed a CAP. Marina Coast Water District working on a CAP
        - Considerations:
            - Pump station and plant locations near coast (at risk of SLR)
            - Sewer infrastructure vulnerable to flooding
        - Opportunities:

Monterey County CCAAP Comment Forum Summary

January 13, 2025

This document summarizes community feedback collected through an open comment form conducted after the Monterey County Climate Action Simulator exercise. Residents were invited to share additional ideas for reducing greenhouse gas emissions and improving climate resilience in Monterey County. A total of 117 submissions were received during a five-week comment period from early December 4, 2025 to January 10, 2025.

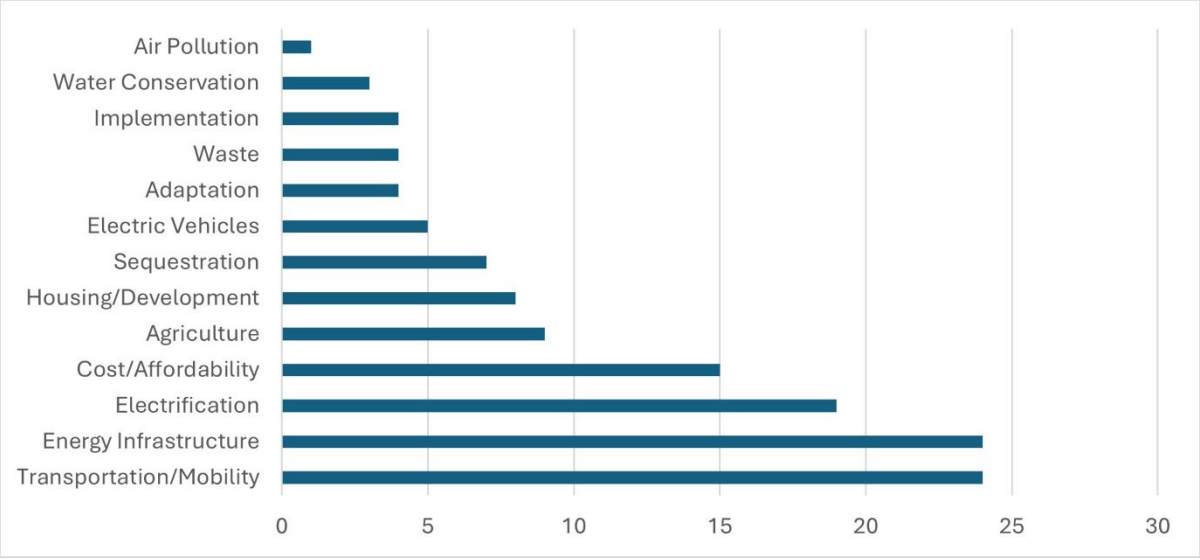
The feedback was analyzed to identify key themes, recommendations, and community sentiments to inform the County's climate action prioritization process. This analysis highlights areas of strong community interest, points of concern, and actionable opportunities to help integrate community sentiment and prioritize near-term actions within the County's Community Climate Action and Adaptation Plan (CCAAP). The following sections outline the key themes that emerged, focusing on the frequency of topics raised and the diversity of perspectives shared within each theme.

Top 6 Ideas

- Improve and expand public transit system, especially adding rail/bus connections between Monterey and Santa Cruz (21 mentions)
- Create more protected bike lanes and bicycle infrastructure throughout the county (16 mentions)
- Install more solar panels on buildings and parking lots with focus on adding storage capacity (12 mentions)
- Underground power lines to improve grid reliability and reduce outages (9 mentions)
- Plant more trees and expand urban tree canopy, especially in underserved areas (8 mentions)
- Build more dense, walkable housing near job centers to reduce commutes (8 mentions)

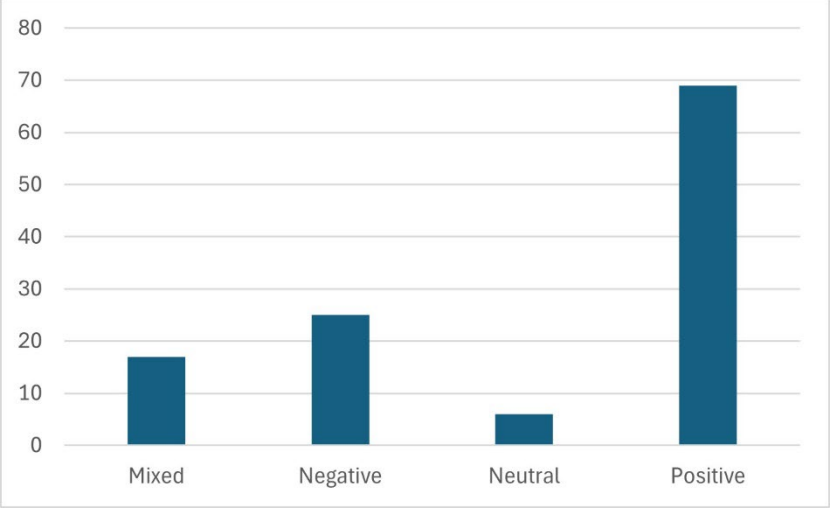
Comment Tags

The tags below were used to categorize the comments received.



Comment Sentiment

The following figure highlights the sentiment received. Positive comments indicate support for climate action and adaptation efforts. Negative comments reflect disapproval of climate action and adaptation efforts. Mixed comments include both support and concerns related to climate action. Neutral comments address unrelated topics or do not express a clear sentiment.



Common themes

Transportation & Mobility (48 total mentions)

- Strong advocacy for improved public transit connections, with many specifically calling for rail service or more frequent bus routes to reduce car dependency (15 mentions).
- Current bike infrastructure widely criticized as unsafe or inadequate, with multiple commenters pointing to Fremont Ave in Seaside as a particularly problematic example of poor bike lane design (12 mentions).
- Views on electric vehicle adoption sharply divided - supporters push for expanded charging infrastructure while critics raise concerns about grid capacity and battery production environmental impacts (14 mentions: 8 supportive, 6 critical).
- Rather than just electrifying current transportation patterns, residents want comprehensive mobility solutions that include improved walkability, bike infrastructure, and public transit (11 mentions).
- Multiple residents called for expanding bus service with more routes and increased frequency, particularly in underserved areas of the county (8 mentions).

Energy Infrastructure & Grid Reliability (42 total mentions)

- Recent power outages cited as evidence that the current electrical grid isn't robust enough to support increased electrification of buildings and vehicles (18 mentions).
- Significant interest in exploring microgrids and community-owned utilities as alternatives to PG&E, with some pointing to successful models in other communities (7 mentions).
- Undergrounding power lines received support as a way to improve grid reliability, though questions remain about cost allocation (6 mentions).
- Nuclear power advocacy appears in several comments as a recommended part of clean energy procurement (4 mentions).
- Questions about energy storage capacity and ability to manage intermittent renewable energy sources, with specific concerns about grid management (8 mentions).

Housing & Development (35 total mentions)

- Concerns that building electrification requirements will further increase housing costs in an already expensive market, potentially pricing out more residents (14 mentions).
- Support for dense, walkable development near job centers, noting that when workers can't afford to live near workplace, it increases both emissions and traffic (8 mentions).
- Some commenters suggest focusing electrification requirements on new construction rather than requiring costly retrofits of existing buildings (7 mentions).

- Support for mixed-use development that combines housing, retail, and office space to create more walkable communities (6 mentions).
- Calls for reforming parking requirements and other car-centric development rules that make housing more expensive and less environmentally friendly (5 mentions).

Agriculture & Land Use (31 total mentions)

- Interest in supporting regenerative agriculture practices, with several suggested incentives or education programs for farmers transitioning to these methods (8 mentions).
- Water use in agriculture generates substantial discussion, with debate over appropriate crops for the region and calls for improved irrigation efficiency (9 mentions).
- Animal agriculture emissions emerge as a contentious topic, with split views on reducing cattle farming versus maintaining current practices (6 mentions).
- Tree canopy expansion receives broad support, though some question relative impact compared to other initiatives (5 mentions).
- Suggestions for exploring soil carbon sequestration techniques and other agricultural practices that could help offset emissions (4 mentions).

Implementation Concerns (39 total mentions)

- Strong preference for voluntary adoption and incentive programs over mandates, with many arguing forced transitions will generate resistance (15 mentions).
- Cost concerns dominate many comments, with worry about impacts on lower-income residents and small businesses (12 mentions).
- Multiple commenters call for clearer metrics to measure success, sharing that without concrete goals, program effectiveness can't be evaluated (5 mentions).
- Some residents express concern about the timing and phasing of proposed changes, suggesting more gradual implementation (4 mentions).
- Equity considerations appear frequently, with calls to ensure climate actions don't disproportionately burden vulnerable populations (8 mentions).

Climate Science Views (28 total mentions)

- Comments reflect a wide spectrum of views on climate science, ranging from urgent crisis to questioning its existence (8 mentions).
- Several commenters question whether local actions can have meaningful impact given global emissions (6 mentions).
- Calls for more public education about climate science and solutions (4 mentions).
- Debate over the reliability of climate predictions and models, with varying views on scientific consensus (5 mentions).

Appendix D

Natural and Working Lands Technical Materials

Memo

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Date: October 17, 2024

To: Cora Panturad (County of Monterey)

From: Fred Hochberg, Hannah Kornfeld, and Poonam Boparai (Ascent)

Subject: County of Monterey Community Climate Action and Adaptation Plan, Carbon Stock Inventory and Forecast–Technical Memorandum

INTRODUCTION

This technical memorandum outlines the results of a carbon stock analysis that was prepared for the County of Monterey's Community Climate Action and Adaptation Plan (CCAAP). The analysis includes an inventory of existing 2019 carbon stock stored in natural (e.g., grasslands, forests, wetlands) and working (e.g., cropland) lands within the boundaries of unincorporated Monterey County (hereafter referred to as "unincorporated county") as of 2019. In addition, it includes forecasted carbon stock values for 2030, 2040, and 2045, presented in metric tons or million metric tons of carbon (MTC or MMTC, respectively). Under all forecast scenarios analyzed, carbon stock is anticipated to decrease over the coming decades in unincorporated Monterey County. The change in these carbon stock values (due to factors consisting of, but not limited to, natural carbon sequestration, human-caused disturbances, climate change, and wildfire) is used to calculate emissions rates (MTC per year) from these lands. These emissions rates are then converted to metric tons of carbon dioxide equivalent ($MTCO_2e$ per year) for comparability with the CCAAP's greenhouse gas emissions inventory and forecast.

ORGANIZATION OF THIS MEMORANDUM

This memorandum consists of four parts:

- Section 1: Overview of Carbon Storage provides information about the importance of carbon storage in natural and working lands (NWL) in climate mitigation and resiliency planning.
- Section 2: Statewide Carbon Stock Analysis calculates forecasted trends in statewide carbon stock (i.e., the quantity of carbon stored in NWL at a specified time) through 2045, based on modeling from the California Air Resources Board (CARB) performed as part of the development of the *2022 Scoping Plan for Achieving Carbon Neutrality* (2022 Scoping Plan).
- Section 3: Monterey County Carbon Stock Analysis applies the trends calculated in Section 2 to NWL within the boundaries of the unincorporated county and uses the results to calculate the unincorporated county's carbon stock and emissions rates.
- Section 4: Land Management Implications shows the approximate magnitude of actions in the unincorporated county that would be necessary to prevent carbon stock loss quantified in Section 3.

1 OVERVIEW OF CARBON STORAGE

Natural and working lands hold a prominent place in California's path toward carbon neutrality, and quantification of carbon storage is an evolving area. Understanding the magnitude and nature of existing and future carbon storage in NWL will be an important advancement in climate mitigation and resilience planning in the unincorporated county.

Land use changes have direct impacts on the amount of carbon that is stored within vegetation and soils in NWL. New development that converts grasslands, forests, shrublands, or other natural land cover to urban land reduces the amount of carbon that can be stored in these lands. Reforesting or afforesting barren, unproductive lands to preserve them from development will have the opposite effect, increasing carbon storage. This highlights the need for thoughtful land use planning that minimizes losses to current carbon storage and maximizes preservation and enhancements.

In April 2019, the state prepared the *Draft California 2030 Natural and Working Lands Climate Change Implementation Plan* (NWLIP). The objectives of the NWLIP are to integrate climate goals into state-funded NWL conservation, restoration, and management programs; enhance the resilience of NWL to climate impacts and ability to sequester carbon; and identify next steps to address policy challenges facing NWL (California Environmental Protection Agency et al. 2019). In October 2020, Governor Newsom signed Executive Order N-82-20, which set a target of conserving 30 percent of the state's lands by 2030. In December 2022, CARB released the 2022 Scoping Plan. This document lays out a roadmap for California to achieve carbon neutrality by 2045, stating that NWL should play "as robust a role as possible" in storing carbon (CARB 2022a: 1–2). California has also developed the *Natural and Working Lands Climate Smart Strategy*, which evaluates nature-based climate solutions, outlines regional opportunities for climate smart land management, and identifies options to track nature-based climate action and measure progress (California Natural Resources Agency 2022).

Monterey County reaps the benefits of its NWL through recreational amenities, wildlife habitat, and arable land that produces food that is distributed throughout the country. Farmers in Monterey County grow over 150 specialty crops and export about 400 billion pounds of produce from the Salinas Valley every year (County of Monterey 2019: 5). This memorandum provides a baseline estimate for the carbon already stored in the unincorporated county's vast NWL (as of the CCAAP inventory year of 2019), as well as an estimate of future carbon storage in 2030, 2040, and 2045. This analysis lays the groundwork for future development of strategies to enhance carbon storage through land management activities, such as land restoration, regenerative agriculture, and investment in urban forests.

2 STATEWIDE CARBON STOCK ANALYSIS

CARB's NWL carbon stock projections, which CARB created in support of the 2022 Scoping Plan described in Section 1, were used to calculate statewide carbon stock in the inventory and forecast years (CARB 2022b). The projections comprise five forecast scenarios of the quantity of statewide carbon stock for different land cover types. Each scenario differs in the type and extent of land management practices that it implements. All scenarios account for future climate change and forecasted extent of wildfires (CARB 2022c: 14-18 and 29-31). Of these five scenarios, the following two were selected for the analysis in this memo:

1) The business-as-usual (BAU) scenario assumes that the quantities of land management practices in place from 2001 through 2014 continue through 2045 (CARB 2022c: 15). CARB chose the 2001–2014 timeframe because 2014 represented the latest available carbon stock data before the California Climate Investments (which include land management actions such as conservation and land restoration; see CARB 2023: 34–35) were fully implemented on the landscape (CARB 2022c: 41–46). From 2001 to 2014, the Healthy Soils Program (which promotes regenerative agriculture and cropland conservation) did not exist (CARB 2022c: 15), so it was assumed that regenerative agriculture and cropland conservation were not performed on agricultural lands during this period.

Thus, the 2001–2014 period represents a baseline against which the carbon storage effects of additional land management actions can be measured.

2) The Scoping Plan scenario is the scenario that CARB selected to achieve carbon neutrality by 2045 in accordance with its mandate in Assembly Bill 1279, the California Climate Crisis Act (CARB 2022a: 5). The Scoping Plan scenario assumes that land restoration and the creation of climate-resilient carbon stocks is prioritized and thus increases the rate at which land management takes place relative to BAU. The increased land management is anticipated to, for example, reduce wildfire fuel availability, which will decrease wildfire severity and create more climate-resilient carbon stocks (CARB 2022c: 15–16).

Table 1 below summarizes the assumptions made for the different land management actions in the BAU and Scoping Plan scenarios.

Table 1 CARB NWL Scenarios in the 2022 Scoping Plan

Description of Land Management Action	BAU Scenario	Scoping Plan Scenario
Forest, shrubland, and grassland fuel reduction and restoration	248,115 acres per year	2,343,522 acres per year (approximately nine times BAU rate)
Regenerative agriculture and cropland conservation	None	151,986 acres per year
Urban forest investment	4.2 billion dollars per year	8.4 billion dollars per year (twice BAU rate)
Defensible space establishment in wildland-urban interface	None	50,000 properties per year
Delta wetland restoration	None	60,000 total acres by 2045
Desert conservation	None	15,000 acres per year

Notes: BAU = business-as-usual; CARB = California Air Resources Board; NWL = natural and working lands.

Sources: CARB 2022b, 2022c.

Carbon stock data from the BAU and Scoping Plan scenarios for the years 2009, 2019, 2030, 2040, and 2045 were used for this analysis. Emissions for the years 2019, 2030, 2040, and 2045 are quantified in the CCAAP, so it was complementary and necessary to include these years in this analysis. Although 2009 data was not used elsewhere in the CCAAP inventory and forecast, it was included to calculate a baseline rate of emissions from NWL over the period from 2009 to 2019 (the inventory year). Subsequent tables in this memo contain more details on the use of 2009 data.

Both the BAU and the Scoping Plan scenarios show substantial fluctuation in carbon stock from year to year that may not be indicative of overall long-term trends. For example, land may absorb carbon in one year and emit it in the next due to wildfire. Therefore, comparing any two individual years to calculate the trend in carbon stocks between them is misleading because it could be caused by short-term "noise" rather than real, long-term ecosystem dynamics or land management trends. To account for this phenomenon, data from the individual years of 2009, 2019, 2030, 2040, and 2045 were not used to calculate the percentage change in carbon stock. Instead, an average annual stock across the 10 years encompassing these individual years was used (i.e., 2004–2013 was used for 2009, 2014–2023 for 2019, 2025–2034 for 2030, 2035–2044 for 2040, and 2040–2049 for 2045). The exceptions to this approach were delta and desert lands, which do not have carbon stock data after 2045. Therefore, for these land cover types, only the year 2045 was used as an estimate of future carbon storage in that year, not an average from 2040 to 2049. Collectively, delta and desert land cover types account for only approximately 3 percent of the total carbon stock in the unincorporated county, so these missing data have a minimal impact on the overall result.

Table 2 below shows the results of this averaging calculation by each land cover type for which CARB presented data. From 2019 to 2045, total statewide carbon stock declines from approximately 3,054 MMTC to 2,944 MMTC (in the BAU forecast) or 2,955 MMTC (in the Scoping Plan forecast). This decline is likely due to a combination of the effects of historical land management practices, drought, extreme heat, and wildfire (CARB 2022a: 245).

Table 2 Statewide Carbon Stock by CARB Scenario (MMTC), 10-Year Average Method

Land Cover Type	Historical Data		BAU Forecast			Scoping Plan Forecast		
	2009	2019	2030	2040	2045	2030	2040	2045
Forests	1,291.3	1,250.3	1,216.5	1,193.2	1,184.6	1,246.6	1,208.6	1,178.5
Shrubs	659.8	636.4	606.7	589.5	584.5	614.6	597.5	588.6
Grasslands	120.4	125.7	122.2	127.7	129.1	130.1	135.9	134.4
Annual croplands	39.8	39.8	39.4	39.2	39.0	39.8	40.1	40.1
Perennial croplands	30.2	38.4	36.9	43.0	49.7	36.9	43.0	49.7
Delta	917.0	916.9	914.6	911.8	910.2	915.4	914.1	913.4
Wildland-urban interface	18.5	18.5	18.5	18.5	18.5	17.5	15.4	14.2
Urban forests	27.0	27.8	28.2	28.4	28.4	30.2	33.9	35.6
Deserts	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total	**3,104.0**	**3,053.8**	**2,983.0**	**2,951.2**	**2,943.9**	**3,031.1**	**2,988.7**	**2,954.6**

Notes: BAU = business-as-usual; CARB = California Air Resources Board; MMTC = million metric tons of carbon. Values presented are 10-year averages calculated using the 10 years encompassing the individual years presented.

Sources: CARB 2022b; data compiled and analyzed by Ascent in 2024.

Table 3 presents the same information in terms of percentage changes relative to 2019. A negative percentage change indicates that statewide carbon stock is expected to decrease relative to 2019 (i.e., carbon is emitted from the land into the atmosphere, and the land is a source of emissions); a positive change indicates that statewide carbon stock increases (plants use photosynthesis to draw carbon from the atmosphere into the land, and the land is a sink for emissions). Under both the BAU and Scoping Plan scenarios, NWL in total are net emitters of carbon in every forecast year.

Table 3 Statewide Percentage Change in Carbon Stock Relative to 2019

Land Cover Type	Historical Data		BAU Forecast			Scoping Plan Forecast		
	2009	2019	2030	2040	2045	2030	2040	2045
Forests	3.3%	0.0%	-2.7%	-4.6%	-5.3%	-0.3%	-3.3%	-5.7%
Shrubs	3.7%	0.0%	-4.7%	-7.4%	-8.2%	-3.4%	-6.1%	-7.5%
Grasslands	-4.2%	0.0%	-2.8%	1.6%	2.7%	3.5%	8.1%	6.9%
Annual croplands	0.1%	0.0%	-1.0%	-1.5%	-2.0%	0.0%	0.8%	0.8%
Perennial croplands	-21.2%	0.0%	-3.9%	12.0%	29.5%	-3.9%	12.1%	29.6%
Delta	0.0%	0.0%	-0.3%	-0.6%	-0.7%	-0.2%	-0.3%	-0.4%
Wildland-urban interface	0.0%	0.0%	0.0%	0.0%	0.0%	-5.2%	-16.6%	-22.9%
Urban forests	-2.9%	0.0%	1.7%	2.2%	2.2%	8.7%	22.2%	28.3%
Deserts	0.0%	0.0%	-0.1%	-0.2%	-0.2%	0.0%	-0.1%	-0.1%
Total	**1.6%**	**0.0%**	**-2.3%**	**-3.4%**	**-3.6%**	**-0.7%**	**-2.1%**	**-3.2%**

Notes: BAU = business-as-usual. Percent values are rounded to the nearest tenth of a percent; totals may not sum exactly due to independent rounding.

Sources: CARB 2022b; data compiled and analyzed by Ascent in 2024.

The following section shows how these statewide values in Table 3 were applied to lands in the unincorporated county.

3 MONTEREY COUNTY CARBON STOCK ANALYSIS

The data underlying the *Monterey Bay Natural and Working Lands Climate Mitigation and Resiliency Study – Carbon Stock Inventory Final Technical Memorandum* (Monterey Bay Carbon Stock Memo) was used as a starting point for future carbon stock estimates in the unincorporated county (see Association of Monterey Bay Area Governments [AMBAG] 2023). The method used for derivation of these data, including the underlying Geographic Information System (GIS) analysis, is described in that document and incorporated here by reference.

Table 4 below shows total acreage and baseline carbon stock in the unincorporated county in the CCAAP's inventory year of 2019. These data were assumed to be identical to the data for the unincorporated county used in the Monterey Bay Carbon Stock Memo (AMBAG 2023: 9), which used 2020 carbon stocks to represent existing conditions. The data include both carbon stored in the soil and aboveground carbon (i.e., carbon stored in vegetation) present in the unincorporated county boundaries.

Table 4 Estimated Acreage and Carbon Stock in Unincorporated Monterey County as of 2019

Land Cover Type	Acres	Soil Carbon (MTC)	Aboveground Carbon (MTC)	Total Carbon (MTC)
Forest	99,893	2,304,989	5,587,727	7,892,716
Fresh marsh	42,019	839,079	680,961	1,520,040
Oak woodland	387,919	9,653,895	3,627,257	13,281,153
Urban	42,643	1,115,654	247,585	1,363,239
Cropland	179,415	4,795,906	213,820	5,009,727
Orchards/vineyards	60,122	1,534,960	161,017	1,695,977
Shrubland	618,330	10,416,808	6,838,058	17,254,866
Grassland	607,505	16,801,646	860,471	17,662,117
Wetland	16,069	266,152	117,909	384,061
Unknown	42	761	0	761
Barren	10,785	224,237	0	224,237
Water	9,415	79,895	0	79,895
Total	**2,074,157**	**48,033,984**	**18,334,806**	**66,368,790**

Notes: MTC = metric tons of carbon. Totals may not sum exactly due to independent rounding.

Source: Data compiled and analyzed by Ascent in 2024.

To calculate 2009, 2019, 2030, 2040, and 2045 carbon stocks in the unincorporated county, the percentage changes shown in Table 3 were applied to the 2019 unincorporated county carbon estimates shown in Table 4. The following assumptions were made:

1) Because the land cover types in CARB and unincorporated county data did not exactly match, the nearest analogous land cover type was chosen to perform this calculation. For example, CARB had no specific carbon stock estimates for orchards and vineyards, so the rate of carbon stock change in perennial croplands from CARB data was assigned to the unincorporated county's orchards and vineyards as a proxy.
2) Carbon stock in barren lands, water, and unknown land types was assumed not to change over time due to the lack of aboveground carbon stock on these lands (see Table 4) and the absence of plants that could increase carbon stock through photosynthesis. Collectively, these lands represent less than 0.5 percent of total carbon stock within the unincorporated county, so the impact of this assumption on carbon stock projections is de minimis.

3) For aboveground carbon specifically, the stock for all land cover types except those listed in #2 above was assumed to sequester carbon at the rates shown in Table 3.

4) For soil carbon specifically, the stock was assumed to change for only two land cover types: annual croplands and delta wetlands. Soil carbon was assumed to remain the same for all other land cover types. This is because the CARB data only included soil carbon stock estimates for annual croplands and delta wetlands; it did not include soil carbon stock estimates for the rest of the land cover types (CARB 2022c: 7).

Table 5 below summarizes this methodology by land cover type. "No" means that carbon stock was assumed to stay the same in all inventory and forecast years; "yes" means that the carbon stock changed based on the values in Table 3.

Table 5 Methodology for Applying Carbon Stock Changes from 2022 Scoping Plan Data to Unincorporated Monterey County

Unincorporated County Land Cover Type	Corresponding CARB Land Cover Type	Change in Soil Carbon Stock, 2019–2045	Change in Aboveground Carbon Stock, 2019–2045
Forest	Forests	No	Yes
Fresh marsh	Delta	Yes	Yes
Oak woodland	Forests	No	Yes
Urban	Urban forests	No	Yes
Cropland	Annual croplands	Yes	Yes
Orchards/vineyards	Perennial croplands	No	Yes
Shrubland	Shrubs	No	Yes
Grassland	Grasslands	No	Yes
Wetland	Delta	Yes	Yes
Unknown	NA	No	No
Barren	NA	No	No
Water	NA	No	No

Notes: CARB = California Air Resources Board; NA = not applicable.

Source: Prepared by Ascent in 2024.

According to the methodology described, Table 6 below shows the resultant soil and aboveground carbon stock in the unincorporated county under both the BAU and Scoping Plan scenarios for 2009, 2019, 2030, 2040, and 2045.

Table 6 Current and Forecasted Carbon Stock in Unincorporated Monterey County (MMTC)

Land Cover Type	Soil										Aboveground									
	BAU Scenario					Scoping Plan Scenario					BAU Scenario					Scoping Plan Scenario				
	2009	2019	2030	2040	2045	2009	2019	2030	2040	2045	2009	2019	2030	2040	2045	2009	2019	2030	2040	2045
Forest	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	5.77	5.59	5.44	5.33	5.29	5.77	5.59	5.57	5.40	5.27
Fresh marsh	0.84	0.84	0.84	0.83	0.83	0.84	0.84	0.84	0.84	0.84	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
Oak woodland	9.65	9.65	9.65	9.65	9.65	9.65	9.65	9.65	9.65	9.65	3.75	3.63	3.53	3.46	3.44	3.75	3.63	3.62	3.51	3.42
Urban	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	0.24	0.25	0.25	0.25	0.25	0.24	0.25	0.27	0.30	0.32
Cropland	4.80	4.80	4.75	4.72	4.70	4.80	4.80	4.80	4.84	4.84	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.22	0.22
Orchards/vineyards	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	0.13	0.16	0.15	0.18	0.21	0.13	0.16	0.15	0.18	0.21
Shrubland	10.42	10.42	10.42	10.42	10.42	10.42	10.42	10.42	10.42	10.42	7.09	6.84	6.52	6.33	6.28	7.09	6.84	6.60	6.42	6.32
Grassland	16.80	16.80	16.80	16.80	16.80	16.80	16.80	16.80	16.80	16.80	0.82	0.86	0.84	0.87	0.88	0.82	0.86	0.89	0.93	0.92
Wetland	0.27	0.27	0.27	0.26	0.26	0.27	0.27	0.27	0.27	0.27	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Unknown	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barren	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**48.04**	**48.03**	**47.99**	**47.95**	**47.93**	**48.04**	**48.03**	**48.03**	**48.07**	**48.07**	**18.81**	**18.33**	**17.74**	**17.44**	**17.36**	**18.81**	**18.33**	**18.12**	**17.75**	**17.47**

Notes: BAU = business-as-usual; MMTC = million metric tons of carbon. Totals may not sum exactly due to independent rounding.

Source: Analysis conducted by Ascent in 2024.

Table 7 below aggregates the data in Table 6, summarizing the overall trend in carbon stock in the unincorporated county. From 2019 to 2045, carbon stock in the unincorporated county is expected to decrease from 66,368,790 MTC to 65,287,878 MTC (in the BAU scenario) and 65,538,424 MTC (in the Scoping Plan scenario). This represents a decline of 1.6 percent and 1.3 percent in these respective scenarios. These changes in carbon stock were, in turn, used to calculate the rate of emissions from NWL (i.e., carbon loss, expressed in MTC per year, equal to the change in C since 2019 divided by the number of years since 2019). These carbon loss values were translated to a carbon dioxide-equivalent (CO_2e) emissions rates by multiplying them by 3.67 (1 metric ton of C is equal to 3.67 $MTCO_2e$ because C weighs 12 grams per mole, and CO_2 weighs 44 grams per mole). Following the convention of the CCAAP inventory and forecast, a positive value for emissions means that the land would be a net source of carbon (i.e., a net emitter).

Table 7 Summary of Unincorporated Monterey County Carbon Stock and Emissions Rates

Year	BAU Scenario Carbon Stock (MTC)	Scoping Plan Scenario Carbon Stock (MTC)	BAU Scenario Emissions (MTC/year)	Scoping Plan Scenario Emissions (MTC/year)	BAU Scenario Emissions ($MTCO_2e$/year)	Scoping Plan Scenario Emissions ($MTCO_2e$/year)	Reductions From BAU in Scoping Plan Scenario ($MTCO_2e$/year)
2009	66,847,564	66,847,564	Not calculated	Not calculated	Not calculated	Not calculated	Not calculated
2019	66,368,790	66,368,790	47,877	47,877	175,551	175,551	0
2030	65,721,921	66,149,820	58,806	19,906	215,623	72,990	142,633
2040	65,394,329	65,824,023	46,403	25,941	170,144	95,118	75,026
2045	65,287,878	65,538,424	41,574	31,937	152,436	117,103	35,333

Notes: BAU = business-as-usual; MTC = million tons of carbon per year; $MTCO_2e$ = metric tons of carbon dioxide equivalent; NA = not applicable.

Source: Analysis conducted by Ascent in 2024.

NWL are net emitters in both scenarios (in 2045, approximately 152,000 $MTCO_2e$ per year in the BAU forecast and 117,000 $MTCO_2e$ per year in the Scoping Plan forecast). Implementing land management actions in the Scoping Plan scenario results in a reduction of approximately 35,000 $MTCO_2e$ per year, relative to BAU, as of 2045. The next section describes the specific land management actions that would cause this reduction in emissions.

4 LAND MANAGEMENT IMPLICATIONS

The 35,000 $MTCO_2e$ per year difference between the BAU and Scoping Plan scenario carbon stock values shown in Table 7 above is a result of different levels of land management activities taking place. Table 8 shows the approximate magnitude of land treatments in the unincorporated county that would be required to realize this reduction, calculated by prorating statewide quantities of land treatments under the Scoping Plan scenario to the unincorporated county. It is intended to approximate the actions needed to realize a reduction of 35,000 $MTCO_2e$ per year. It is not intended to model precise ecosystem carbon dynamics, map the effects of individual treatments to carbon reduction values, or provide a particular policy prescription.

Table 8 NWL Land Management Actions in Scoping Plan Scenario, Prorated to Unincorporated Monterey County Boundaries

Description of Land Management Action	Level of Action (Statewide)	Level of Action (Unincorporated Monterey County)	Methodology for Prorating Statewide Actions to Unincorporated Monterey County
Forest, shrubland, and grassland fuel reduction and restoration	2,343,522 acres per year total. Of these, 324,625 acres per year are in ecounits[1] relevant to the unincorporated county. Unincorporated county boundaries contain three of the 12 ecounits: (1) Central Coast Evergreen Forests; (2) Central Coast Wood, Shrub, and Grasslands; and (3) North-Central Coastal Forests. The level of action in the unincorporated county is based on data from CARB (2022b), mapped to the unincorporated county using EPA watershed location data (EPA 2024).	34,828 acres per year	The unincorporated county contains 10.73% of statewide land cover for Central Coast Evergreen Forests, Central Coast Wood, Shrub, and Grasslands, and North-Central Coastal Forests (CARB 2022b; EPA 2024). This percentage was used to prorate statewide treatments to the unincorporated county.
Regenerative agriculture and cropland conservation	151,986 acres per year	3,832 acres per year	The unincorporated county contains 2.52% of statewide agricultural land (based on data from AMBAG [2023] and CARB [2022a: 254]). Data on BAU agricultural treatments in the unincorporated county specifically are not available.
Urban forest investment	8.4 billion dollars per year (twice BAU rate)	Twice current unincorporated county levels	Same percentage increase assumed for both state and unincorporated county. Data on current urban forest investment in unincorporated county not available.
Defensible space establishment in wildland-urban interface	50,000 properties per year	134 properties per year	Based on population. The unincorporated county contained 0.27% of statewide population in 2019 (California Department of Finance 2024).
Delta wetland restoration	60,000 total acres by 2045	2,050 total acres by 2045	The unincorporated county contains 3.42% of statewide wetlands (based on data from AMBAG [2023] and CARB [2022a: 257]).
Desert conservation	15,000 acres per year	16 acres per year	The unincorporated county contains 0.11% of statewide deserts (based on data from AMBAG [2023] and CARB [2022a: 260]).

Notes: AMBAG = Association of Monterey Bay Area Governments; BAU = business-as-usual; CARB = California Air Resources Board; EPA = US Environmental Protection Agency; NWL = natural and working lands.

[1] The 2022 Scoping Plan natural and working lands modeling divides forest, shrubland, and grasslands into 12 "ecounits," or areas with similar ecology and vegetation cover.

Source: Prepared by Ascent in 2024.

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Appendix E

Prioritization Matrix

PRIORITIZATION EVALUATION FACTORS

The following prioritization evaluation factors were used to develop a prioritization score for all CCAAP actions. Summaries of the criteria scored are provided in Table 1.

The prioritization process acknowledges that climate strategies serve different purposes—some target emissions reduction, others focus on carbon sequestration, local economic benefits, or climate hazard mitigation. To fairly evaluate strategies based on their intended impact, the prioritization framework uses four equally weighted but distinct primary impact factors: GHG Reduction Potential, Carbon Sequestration Potential, Climate Hazard Reduction Potential, and Local Economy Benefit Potential. Each strategy is scored under the category that most closely aligns with its intended purpose or primary impact. For example, efforts to electrify buildings or reduce car use dependency help mitigate GHG emissions and were scored under GHG Reduction Potential due to their effectiveness at reducing GHG emissions. In contrast, initiatives to expand green infrastructure and restore coastal habitats were evaluated under Carbon Sequestration Potential due to their effectiveness in capturing and storing carbon. These scores are weighted higher than other criteria to emphasize prioritizing strategies with the greatest intended impact. This includes:

- GHG Reduction Potential evaluates each strategy based on Monterey County's GHG emissions reduction quantification analysis (see Appendix A for details). This factor was applied only to GHG mitigation-focused strategies where direct emission reduction was a primary objective. Strategies were assigned a score of 0, 4, 6, or 8, representing none, low, medium, or high GHG reduction potential, respectively. A score of 0 was given to strategies with unknown or no GHG gas reduction potential. Strategies expected to reduce community emissions by 0 to 2 percent in 2030 received a score of 4, those achieving a 3 to 5 percent reduction received a 6, and strategies exceeding 5 percent received an 8. Emissions reductions were assessed at the strategy level to account for the cumulative impact of multiple complementary actions, with the resulting score applied to each action within that strategy. Greenhouse Gas Reduction Potential was applied to all Building Energy, On-Road Transportation, Solid Waste, and Off-Road Transportation strategies, as these sectors primarily focus on reducing direct emissions through electrification, energy efficiency improvements, and methane reduction.
- Carbon Sequestration Potetnial measures a strategy's ability to remove and store carbon from the atmosphere through natural processes or engineered approaches. This factor was applied only to strategies where sequestration was a relevant outcome and was applied to all natural and working lands strategies. Strategies were scored on a 0, 4, 6, or 8 scale, representing none, low, medium, or high sequestration potential. A score of 0 was assigned to strategies with no measurable sequestration benefit or where the potential is unknown or unquantifiable. Strategies with minimal impact received a 4, those with moderate capabilities received a 6, and those demonstrating significant potential were scored an 8. Carbon Sequestration Potential was applied to all Natural and Working Lands strategies, as these focus on enhancing and protecting natural systems that capture and store carbon in soils, vegetation, and ecosystems.
- Climate Hazard Reduction Potential identifies how effectively strategies mitigate specific climate hazards facing Monterey County, as reflected in the action's vulnerability score. Higher vulnerability scores indicate areas where climate hazards pose a significant risk and present the greatest opportunity for hazard reduction. This factor was applied only to adaptation-focused strategies where hazard reduction was a primary objective. Strategies were assigned a score of 4, 6, or 8, representing low, medium, or high hazard reduction potential. A score of 4 was given to strategies addressing hazards with a vulnerability score of 3 or higher, a score of 6 was assigned to those addressing hazards with a vulnerability score of 4 or higher, and a score of 8 was given to strategies targeting hazards with the highest vulnerability score of 5. Climate Hazard Reduction Potential was applied to all Adaptation strategies, as these are specifically intended to reduce vulnerability to climate impacts such as extreme heat, flooding, and wildfire.

- Local Economy Benefit Potential assesses the extent to which strategies strengthen and diversify Monterey County's economy through direct and indirect economic impacts. This factor was applied only to strategies where economic benefit was a relevant outcome. Strategies were assigned a score of 0, 4, 6, or 8, representing none, low, medium, or high local economic benefit. A score of 0 was given to strategies that do not provide measurable local economic benefits or may have neutral economic impacts. Strategies providing minimal local economic benefits received a score of 4, those offering moderate economic advantages received a 6, and strategies delivering significant economic benefits received an 8. Local Economy Benefit Potential was applied to all Green Economy strategies because these focus on creating jobs, supporting local businesses, and developing economic resilience through climate-aligned initiatives and sustainable investments.

In addition to the four primary impact factors—GHG Reduction Potential, Carbon Sequestration Potential, Climate Hazard Reduction Potential, and Local Economy Benefit Potential—all actions were also scored using a consistent set of criteria and co-benefits. Each action was evaluated using the criteria described below to ensure prioritization also reflects climate impacts, local priorities, implementation feasibility, and benefits to the community. This includes:

- Climate Resilience Potential evaluates whether strategies promote climate adapatation or resilience of Monterey County, its communities, and ecosystems against climate-related disruptions. Strategies received a score of 0 if they had no clear impact on resilience and a score of 2 if they strengthened the County's ability to withstand climate-related challenges. This scoring reflects efforts to address Monterey County's climate vulnerabilities, which include wildfire and smoke, extreme heat, flooding and sea level rise, and drought impacts. For example, Action ADPT-3.1 scored a 2 because it supports using cool pavement and increased tree canopy cover in heat-vulnerable areas to reduce surface temperatures and mitigate the urban heat island effect. These efforts help the County's population and infrastrucutre better manage extreme heat impacts, a hazard that will continue to be exacerbated by climate change.
- Supported During Community Engagement reflects the level of community support and priority expressed during the CCAAP's engagement process. A score of 3 was assigned to actions identified as high-priority by community members throughout the engagement efforts. A score of 0 was given to actions that were not specifically raised as a high priority during the engagement. Actions received a score of -3 if they received unfavorable feedback. These scores were informed by extensive community input gathered through various engagement channels, including the Climate Action Simulator, online comment forms, consider.it workshop activities, focus group discussions, and other community engagement opportunities. Improving on-road transportation and mobility options throughout the County, whether through land-use planning, infrastructure improvements, or active transportation, emerged as an important priority for the community across various engagement efforts, and associated actions were given a score of 3.
- Current Policies considers whether existing Monterey County policies or ordinances are already in place to support the implementation of an action. Actions received a score of 2 if existing County policies or ordinances can facilitate the successful implementation of an action. Actions also received a score of 2 if other County initiatives (e.g., established programs) or State regulations can support implementation. A score of 0 was given if new policies or ordinances need to be developed to enable successful implementation. Actions received a score of -2 if existing county policies or ordinances prohibited the successful implementation of an action. For example, Action TR-3.2, which involves implementing the already approved Monterey County Regional Vision Zero Action Plan to enhance roadway safety, received a score of 2.
- County Role considers the County's authority and ability to implement and achieve the action's intended outcomes. A score of 2 was assigned where the County would be the primary actor with direct operational control and responsibility for implementation, requiring minimal reliance on other community actors. A score of 1 was assigned where the County would serve as a regulator with some operational control and responsibility and/or where achieving outcomes may require some reliance on other community actors. A score of 0 was assigned where the County would act as an influencer with limited operational control and where success would substantially rely upon voluntary participation or independent actions of other

community actors, with the County playing a supporting or influencing role. For example, NWL-4.4 will support the Monterey Peninsula Regional Park District in implementing its strategic plan. While the County can be supportive, it received a score of 0 because it does not oversee the plan's implementation.

- Implementation Timeline evaluates the time required to initiate an action, from the planning stages to the point where it can begin, though not necessarily be fully operational. Actions received a score of 2 if they could be initiated within 1 to 2 years, including those that involve encouraging or supporting initiatives due to ease of implementation. Action WA-1.4 to adopt a drought-ready ordinance to require greywater readiness in new residential buildings or major renovations received a 2 since the ordinance could be adopted as early as 2026. A score of 1 was assigned to actions that could be initiated within 3 to 5 years, including those requiring the development of programs, ordinances, or infrastructure. WA-1.6, on the other hand, would require developing a cost-sharing program for supporting upfront expenses for water-saving irrigation technology, which would take at least until 2029 to develop and receive a score of 1. Actions were scored 0 if initiation would take 6 or more years.
- Co-benefits considers benefits to low-income residents, improved equity, air pollution prevention, public health and well-being, increased reliability of critical infrastructure and services, job development, and resource preservation. Each co-benefit was scored on different scales. For example, equity was scored as either 0 or 2, receiving a 0 if the action did not enhance or advance equity or result in an equitable outcome and 2 if it did. Other co-benefits, such as air pollution prevention, public health and well-being, and reliability, were scored on a scale of -1 to 1.

Table 1 Summary of Prioritization Evaluation Factors for Actions

Evaluation Factors	Possible Scores by Evaluation Factor
Primary Impact Factors ▸ GHG Reduction Potential ▸ Carbon Sequestration Potential ▸ Climate Hazard Reduction Potential ▸ Local Economy Benefit Potential	0, 4, 6, or 8
Climate Resilience Potential	0 or 2
Residential & Businesses Financial Benefit	-2, 0, or 2
Technological Feasibility	-2, 0, or 2
Current Policies	-2, 0, or 2
County Role	0, 1, or 2
Prioritized by the Community	-3, 0, or 3
Implementation Timeframe	0, 1, or 2
Co-benefits ▸ Benefits to Low Income Residents ▸ Equity ▸ Air Pollution ▸ Public Health and Well-Being ▸ Reliability ▸ Job Development ▸ Resource Preservation	Score is specific to type of co-benefit 0 or 1 0 or 2 -1, 0, or 1 -1, 0, or 1 -1, 0, or 1 -1, 0, or 1 0 or 1
Highest Total Possible Score	*25*

Buildings and Energy (BE)

Strategy #	Strategy	Action #	Action	Implementing Department(s)	Agency and Organization Partners	Timing	Total Score	Co-Benefits: Benefits to Low Income Residents	Co-Benefits: Equity	Co-Benefits: Air Pollution Prevention	Co-Benefits: Health and Well Being	Co-Benefits: Reliability	Co-Benefits: Job Development	Co-Benefits: Resource Preservation	Co-Benefits Total	Prioritization Criteria: GHG Reduction Potential	Prioritization Criteria: Supported During Community Engagement	Prioritization Criteria: Current Policies	Prioritization Criteria: County Role	Prioritization Criteria: Implementation Timeframe	Prioritization Criteria Score
BE-1	Energy Efficiency and Electrification	BE-1.1	Adopt a building electrification ordinance for new and existing residentia buildings based on cost-effectiveness studies, stakeholder outreach, and California Energy Commission approval. The ordinance will be written suc that existing residential buildings' modeled energy efficiency must achieve half of the maximum cost-effective retrofit measures score at time-of-retrofit by 2030, and the maximum cost-effective retrofit measures score by 2045.	IGLA, HCD	3CE	2029	**22**	1	2	1	1	1	1	0	**7**	8	3	2	1	1	**15**
		BE-1.2-a	Develop a nonresidential buildings decarbonization strategy and implement a building performance standard that requires all existing buildings to reduce non-electricity-related emissions by 10 percent by 2033, and by 20 percent by 2045, with analysis of the existing building stock in the county. As part of this effort, encourage small (i.e., less than 50,000 square feet) commercial and small multifamily residential (i.e., less than 17 units) building owners to track and report their annual energy usage through a benchmarking tool (e.g., ENERGY STAR® Portfolio Manager).	IGLA, HCD	3CE	2027	**22**	1	2	1	1	1	1	0	**7**	8	3	0	2	2	**15**
		BE-1.2-b	Determine retrofit compliance triggers based on square footage and one additional metric such as time of equipment replacement, percent of existing floor area, building permit valuation, and project valuation.																		
		BE-1.3-a	Implement and staff a building performance standards program that: - proactively engages with and enrolls nonresidential building owners and operators into a building performance standards program, - develops a mechanism for building owners and operators to report energy use and emissions data, - develops and distributes information on how to measure performance, maintain compliance, and reduce energy use and GHG emissions, - enforces compliance with the building performance standards program, and - compiles and reports data on the building performance standards program for CCAAP monitoring, such as number of buildings enrolled in the program and GHG reductions achieved.	IGLA, HCD	CCR REN	2031	**18**	0	0	1	1	1	1	0	**4**	8	3	0	2	1	**14**
		BE-1.3-b	Develop a tracking system for the types of measures implemented to maximize energy efficiency and decarbonization, energy efficiency upgrades, or pre-wiring completed by applicants pursuant to reach code requirements for existing buildings (developed under Action BE-1.1).																		
		BE-1.4-a	Adopt by ordinance a new building reach code based on cos effectiveness studies, stakeholder outreach, and California Energy Commission approval that must be met by all residential and nonresidential new construction and major renovations	HCD, IGLA, ED	CBOs, MBEP, Realtors	2026 (Ongoing)	**21**	1	2	1	1	1	1	0	**7**	8	3	0	1	2	**14**
		BE-1.4-b	Conduct outreach to building industry members, contractors, residents businesses, and other interest groups to present any proposed reach code and solicit feedback.																		
		BE-1.4-c	Conduct training for County permitting staff to understand the reach cod requirements for new and existing buildings and how compliance will be demonstrated.																		
		BE-1.5	Partner with 3CE to establish a program that connects owners an occupants of residential and nonresidential buildings to existing energy audit and weatherization programs (e.g., California's Low-Income Weatherization Program) and resources, and additionally, helps to determine eligibility	IGLA, ED	3CE	2028	**19**	1	2	0	1	1	0	0	**5**	8	3	2	0	1	**14**
		BE-1.6	Provide instant permitting of code-compliant residential rooftop solar through use of software such as SolarAPP+.	HCD, IGLA	N/A	2031	**16**	0	0	0	0	0	1	0	**1**	8	3	0	2	2	**15**
		BE-1.7	Explore additional opportunities for streamlining permitting of residentia electrification projects.	HCD, IGLA	N/A	2028	**19**	0	0	1	1	0	0	0	**2**	8	3	2	2	2	**17**
		BE-1.8	Work with utility providers to initiate a mobile home park utility conversion program that allows mobile home park and manufactured housing communities the opportunity to replace master-metered/sub-metered or non-sub metered electric and gas distribution systems with direct service.	IGLA	3CE, PG&E	2031	**17**	1	2	0	1	1	0	0	**5**	8	3	0	0	1	**12**
		BE-1.9	In coordination with regional partners, scope and develop a grant application for residential building electrification and efficiency across the county to demonstrate resiliency, cost-savings, and emissions reductions and reduce barriers to building electrification. This project should prioritize low-income residents in various communities. Staff will engage with regional partners including the Regional Climate Project Working Group, 3CE, Central Coast Energy Services, and the Central California Rural Regional Energy Network.	HCD, IGLA, PWFP, DEM	3CE, PG&E, USGBC	2026	**18**	1	2	0	0	1	0	0	**4**	8	3	0	1	2	**14**
BE-2	Clean Energy	BE-2.1	Support and coordinate with 3CE in executing its commitment to meet 10 percent of its electricity demand through clean and renewable resources by 2030 by identifying sites for renewable energy generation at County-owne properties and other potential sites throughout the county, and by continuing efforts to streamline the permitting of residential and nonresidential rooftop solar photovoltaic or other renewable energy and battery storage projects.	IGLA	3CE	Ongoing	**17**	0	0	1	1	1	1	1	**5**	4	3	2	1	2	**12**
		BE-2.2	Partner with 3CE to promote and expand upon their Electrify Your Hom program, which bundles various residential energy efficiency upgrades (e.g., heating and cooling systems, heat pump water heaters) to deliver more savings, comfort, and rebate options.	IGLA	3CE	Ongoing	**18**	1	2	1	1	1	1	0	**7**	4	3	2	0	2	**11**
		BE-2.3	Amend the County's Zoning and Coastal Zoning Ordinances to requir parking lots for new nonresidential development projects, with floor area greater than 50,000 square feet, to include solar canopies	HCD, IGLA	N/A	2031	**16**	0	0	0	1	1	1	1	**4**	4	3	2	1	2	**12**
		BE-2.4	Conduct a study and prepare a publicly available assessment of suitabl undeveloped lands near electrical transmission and distribution lines that serve as priority areas for the development of utility-scale solar energy generation and storage projects. If suitable locations are identified, the County shall establish a new zone, if necessary, called a Renewable Energy Priority Zone, for these sites in the County's Zoning and Coastal Zoning Ordinances	IGLA, HCD	3CE	2033	**13**	0	0	1	0	1	1	0	**3**	4	3	0	2	1	**10**
		BE-2.5	Encourage public service facilities such as schools, hospitals, an community centers to develop renewable microgrids	IGLA, PWFP	MCOE	Ongoing	**15**	1	2	1	1	1	0	0	**6**	4	3	0	0	2	**9**
		BE-2.6	Collaborate with PG&E as they strategically decommission methane gas pipelines in areas where electrification has been or could be implemented.	IGLA	PG&E	Ongoing	**13**	0	0	1	1	1	0	1	**4**	4	3	2	0	0	**9**
		BE-2.7	Explore the option of a final phase-out date for non-industrial natural ga procurement, infrastructure deployment, and use in unincorporated Monterey County.	IGLA	PG&E	2033	**12**	0	0	1	1	0	0	1	**3**	4	3	0	2	0	**9**
		BE-2.8	Collaborate with PG&E as they modernize the electrical grid for variable and distributed power by upgrading transformers, lines, and other power equipment; and support regional coordination efforts that help to accelerate this transition	IGLA	PG&E	Ongoing	**9**	0	0	0	0	1	1	0	**2**	4	3	0	0	0	**7**
		BE-2.9	Evaluate the potential for agrivoltaics at wineries and other agricultural lands and ensure the County's Zoning and Coastal Zoning Ordinances allow for such uses.	HCD, ACO, IGLA	Monterey County Farm Bureau, Vintner's Association	2033	**11**	0	0	1	0	1	1	1	**4**	4	0	0	2	1	**7**

On-Road Transportation (TR)

Strategy #	Strategy	Action #	Action	Implementing Department(s)	Agency and Organization Partners	Timing	Total Score	Co-Benefits: Benefits to Low Income Residents	Co-Benefits: Equity	Co-Benefits: Air Pollution Prevention	Co-Benefits: Health and Well Being	Co-Benefits: Reliability	Co-Benefits: Job Development	Co-Benefits: Resource Preservation	Co-Benefits Total	Prioritization Criteria: GHG Reduction Potential	Prioritization Criteria: Supported During Community Engagement	Prioritization Criteria: Current Policies	Prioritization Criteria: County Role	Prioritization Criteria: Implementation Timeframe	Prioritization Criteria Score
TR-1	Sustainable Transportation and Land Use Planning	TR-1.1	Collaborate with cities, transit providers, and employers to provide local community shuttles or circulators that serve transit-oriented development, high-quality transit stops, and neighborhood commercial centers, providing an incentive for residents and employees to make trips using transit.	IGLA, ED	Cities, MBEP, AMBAG, TAMC, MST	Ongoing	**19**	1	2	1	1	1	1	0	**7**	8	3	0	0	1	**12**
		TR-1.2	Promote the regional vanpool program to provide vans and organize traditional vanpools and vanpools serving agricultural workers in rural areas.	IGLA	MST, CalVans	Ongoing	**19**	1	2	1	1	1	0	0	**6**	8	3	0	0	2	**13**
		TR-1.3	Coordinate with transit providers to improve the local transit system by increasing reliability and accessibility by adding amenities such as seating, lighting, tree cover, bike storage, and real-time arrival information displays. Extend service hours and routes to better serve residential areas, trip-chaining, employment centers, and popular destinations, with a focus on "Transportation-Based Priority Populations" as identified by California Department of Transportation (Caltrans)' Transportation Equity Index.	IGLA	TAMC, MST	Ongoing	**22**	1	2	1	1	1	1	0	**7**	8	3	2	1	1	**15**
		TR-1.4	Continue to implement the actions identified in the Monterey County Broadband Strategic Plan to allow for remote work that reduces the need for commuting.	IT, ED, IGLA	GSFA, MCOE, MBEP	Ongoing	**22**	1	2	1	1	1	0	0	**6**	8	3	2	1	2	**16**
		TR-1.5	Implement the policies and programs of the 2023-2031 Housing Element to rezone for higher density development and promote affordable, mixed-use development in Community Areas and Rural Centers near activity centers and transit routes.	HCD, IGLA	N/A	Ongoing	**24**	1	2	1	1	0	1	1	**7**	8	3	2	2	2	**17**
		TR-1.6	Develop and encourage opportunities to upgrade roadways in compact areas to complete streets, using the Monterey Bay Area Complete Streets Guidebook to reduce emissions and improve walkability and pedestrian safety.	PWFP, IGLA	TAMC	Ongoing	**20**	0	2	1	1	0	0	0	**4**	8	3	2	2	1	**16**
		TR-1.7	Consider including complete street scoping in routine roadway maintenance and County capital improvement processes. Collaborate with TAMC, Caltrans, MST, and cities to integrate complete street scoping into capital processes throughout the county and to consider funding mechanisms for this action.	IGLA, PWFP	TAMC, Caltrans, MST, Cities	2031	**18**	0	0	0	1	1	0	1	**3**	8	3	0	2	2	**15**
		TR-1.8	Consider establishing "climate hazard overlay zones" whereby additional layers of zoning standards would be applied to defined geographical areas that have been identified as being more vulnerable to future flooding, erosion, landslides, wildfire, or severe storm/high wind events, regardless of the underlying base zoning district.	HCD, IGLA	N/A	2031	**17**	1	2	0	1	1	0	1	**6**	8	0	0	2	1	**11**
		TR-1.9	Implement the necessary infrastructure upgrades and develop programs for EV car sharing, active transportation, mobility device sharing, and improved transit based on the results of Zero Emissions Shared Mobility Study.	IGLA	AMBAG, TAMC, MST	2027	**20**	1	2	1	1	1	1	0	**7**	8	3	0	1	1	**13**
TR-2	Low- and Zero-Emission Vehicles	TR-2.1	Adopt electric vehicle (EV) charging infrastructure reach codes to meet CALGreen Tier 1 standards for each triennial California Green Building Standards cycle for residential and nonresidential EV charging.	IGLA, HCD	3CE	2026 (Ongoing)	**23**	1	2	1	1	1	1	0	**7**	8	3	2	1	2	**16**
		TR-2.2	Collaborate with 3CE and electric vehicle supply equipment (EVSE) companies to establish fast-charging mobility hubs at publicly accessible sites that support tenants of multifamily properties.	IGLA	3CE	2031 (Ongoing)	**19**	1	2	1	1	1	1	0	**7**	8	3	0	0	1	**12**
		TR-2.3	Prioritize the installation of EVSE at the identified top locations in the unincorporated county provided in the Central Coast Zero Emission Vehicle Strategy.	IGLA	3CE, Caltrans	2026 (Ongoing)	**23**	1	2	1	1	1	1	0	**7**	8	3	2	1	2	**16**
		TR-2.4	Implement the recommendations included in the forthcoming Monterey Bay Electric Vehicle Climate Adaptation and Resiliency Framework to install EV chargers in high impact and low-risk areas with a focus on making EV chargers more accessible to underserved areas.	IGLA	AMBAG, Ecology Action	2028 (Ongoing)	**19**	1	2	1	0	1	1	0	**6**	8	3	0	1	1	**13**
		TR-2.5	Coordinate with 3CE to deploy EVSE along major transportation corridors to support medium- and heavy-duty EV charging.	IGLA	3CE	2033 (Ongoing)	**11**	0	0	1	0	1	1	0	**3**	8	0	0	0	0	**8**
		TR-2.6	Develop a permit checklist to install EVSE within the public right-of-way by 2029, pursuant to Assembly Bill 2427 (2024).	HCD, IGLA	N/A	2028	**18**	0	2	1	1	1	0	0	**5**	8	0	2	2	1	**13**
		TR-2.7	Explore EV car-sharing programs to offer accessible and affordable EV mobility options, particularly located at multifamily residential buildings.	IGLA	AMBAG, MBARD	2031	**20**	1	2	1	1	1	0	1	**7**	8	3	0	1	1	**13**
		TR-2.8	Consider an ordinance restricting or prohibiting new gasoline service stations.	HCD, IGLA	N/A	2034	**10**	0	0	1	0	0	-1	0	**0**	8	0	0	2	0	**10**
TR-3	Active Transportation	TR-3.1	Partner with Transportation Agency for Monterey County (TAMC) to implement the Monterey County Active Transportation Plan to enhance and expand bicycle and pedestrian infrastructure and networks.	PWFP, IGLA	TAMC	Ongoing	**23**	1	2	1	1	1	1	0	**7**	8	3	2	1	2	**16**
		TR-3.2	Partner with TAMC and cities to implement the Monterey County Regional Vision Zero Action Plan to improve the safety of all roadway users.	PWFP, IGLA	TAMC, Cities	Ongoing	**21**	0	2	0	1	1	1	0	**5**	8	3	2	1	2	**16**
		TR-3.3	Pursue funding to provide incentives for residents to purchase or lease e-bikes and other micromobility devices.	IGLA	MBARD	2026 (Ongoing)	**21**	1	2	1	1	1	0	0	**6**	8	3	0	2	2	**15**
		TR-3.4	Work with existing multifamily building owners and require new multifamily developments to install e-bike charging and secure bicycle parking in multifamily residential developments.	IGLA, HCD	Multifamily building owners and developers	2027 (Ongoing)	**21**	1	2	1	1	1	0	0	**6**	8	3	0	2	2	**15**

Off-Road Vehicles and Equipment (OR)

								Co-Benefits								Prioritization Criteria					
Strategy #	Strategy	Action #	Action	Implementing Department(s)	Agency and Organization Partners	Timing	Total Score	Benefits to Low Income Residents	Equity	Air Pollution Prevention	Health and Well Being	Reliability	Job Development	Resource Preservation	Co-Benefits Total	GHG Reduction Potential	Supported During Community Engagement	Current Policies	County Role	Implementation Timeframe	Prioritization Criteria Score
OR-1	Electrification and Clean Alternatives	OR-1.1	Work with MBARD to encourage all discretionary construction projects to use renewable diesel in diesel-powered construction equipment.	HCD, IGLA	MBARD	2031	**12**	0	0	0	0	0	0	1	**1**	8	0	0	1	2	**11**
		OR-1.2	Work with MBARD to discourage the use of fossil fuel-powered generators at construction sites in all new discretionary projects.	HCD, IGLA	MBARD	2031	**16**	0	2	1	1	0	0	1	**5**	8	0	0	1	2	**11**
		OR-1.3	Adopt an ordinance that would require the use of zero-emission landscaping equipment for equipment up to 25 horsepower by 2030.	HCD, IGLA	N/A	2029	**13**	0	0	1	1	0	0	1	**3**	8	0	0	1	1	**10**
		OR-1.4	Partner with Monterey Bay Air Resources District and marinas to reduce idling at docks through highly visible signage.	MCWRA, IGLA	MBARD, marinas	2032	**13**	0	2	1	1	0	0	1	**5**	8	0	0	0	0	**8**
		OR-1.5	Partner with cities and marinas to install electric charging stations for boats at harbors throughout the county.	MCWRA, IGLA	Cities, marinas	2034 (Ongoing)	**10**	0	0	1	0	0	0	1	**2**	8	0	0	0	0	**8**
		OR-1.6	Promote 3CE's Ag Electrification Program to replace fossil fuel-powered agricultural equipment with all-electric alternatives. Seek funding opportunities to provide clean backup power supplies.	ACO, ED, IGLA	3CE, Monterey County Farm Bureau	Ongoing	**17**	0	2	1	1	0	0	1	**5**	8	0	2	0	2	**12**

Solid Waste (SW)

Strategy #	Strategy	Action #	Action	Implementing Department(s)	Agency and Organization Partners	Timing	Co-Benefits								Prioritization Criteria					
							Total Score	Benefits to Low Income Residents	Equity	Air Pollution Prevention	Health and Well Being	Reliability	Job Development	Resource Preservation	Co-Benefits Total	GHG Reduction Potential	Supported During Community Engagement	Current Policies	County Role	Implementation Timeframe	Prioritization Criteria Score
SW-1	Waste Diversion	SW-1.1	Contractually require annual reporting from the Food Bank for Monterey County in future agreements with Monterey County to ensure baseline and ongoing tonnage data for SB 1383 is appropriately and consistently tracked and reported, and member data is verified as additive to or inclusive of Food Bank data.	HD, IGLA	Food Bank for Monterey County	2026 (Ongoing)	**22**	1	2	1	1	0	0	1	**6**	8	3	2	1	2	**16**
		SW-1.2	Consider developing a countywide program to coordinate food rescue and distribution in collaboration with local jurisdictions. The program should provide resources to potential food donors and education in order to ensure increased compliance with organic waste diversion goals.	HD, IGLA	Cities, food rescue organizations	2028	**19**	1	2	0	1	0	0	1	**5**	8	3	0	2	1	**14**
		SW-1.3	Conduct an annual survey of all food rescue organizations and services with a refined and more comprehensive set of survey questions, and more clearly defined terms for consistency in data reported.	HD, IGLA	Food rescue organizations	2026 (Ongoing)	**22**	1	2	0	1	0	0	1	**5**	8	3	2	2	2	**17**
		SW-1.4	Develop a methodology for converting average square footage of storage space types to average weight of edible food, and/or explore opportunities for the acquisition of onsite scales, training for weight estimation, or material characterization studies for edible food recovery facilities.	HD, IGLA	Food rescue organizations	2031	**19**	1	2	0	1	0	0	1	**5**	8	3	0	2	1	**14**
		SW-1.5	Develop and pilot a solid waste diversion program in coordination with local partners and the Health Department to eliminate single-use products through dishwashing and reusable adoption. This program should aim to demonstrate success for festival and event use cases before scaling to larger use cases. Future use cases to be considered by the program include institutions with high volumes of food service, restaurants, etc.	HD, IGLA	PWFP	2026	**17**	0	0	0	1	0	0	1	**2**	8	3	0	2	2	**15**
		SW-1.6	Promote materials reuse and sharing through outreach and education, community tool libraries, maker spaces, fix-it clinics, and material swaps.	HD, MCFL, IGLA	Cities, SVR	Ongoing	**20**	1	2	0	1	1	1	1	**7**	8	3	0	0	2	**13**

Water and Wastewater (WA)

Strategy #	Strategy	Action #	Action	Implementing Department(s)	Agency and Organization Partners	Timing	Co-Benefits: Total Score	Co-Benefits: Benefits to Low Income Residents	Co-Benefits: Equity	Co-Benefits: Air Pollution Prevention	Co-Benefits: Health and Well Being	Co-Benefits: Reliability	Co-Benefits: Job Development	Co-Benefits: Resource Preservation	Prioritization Criteria: Co-Benefits Total	Prioritization Criteria: GHG Reduction Potential	Prioritization Criteria: Supported During Community Engagement	Prioritization Criteria: Current Policies	Prioritization Criteria: County Role	Prioritization Criteria: Implementation Timeframe	Prioritization Criteria: Prioritization Criteria Score
WA-1	Water Conservation	WA-1.1	Regularly review and update the County's Water Conservation Ordinance (Monterey County Code of Ordinances, Chapter 15.12) and water conservation measures to be consistent with current best management practices and ensure effective and ongoing conservation efforts.	MCWRA, IGLA	Water providers	Ongoing	**16**	0	2	0	0	1	0	1	**4**	4	3	2	1	2	**12**
		WA-1.2	Consider water efficiency standards for new construction that achieve water-neutral development for projects expected to exceed the historical water use of a parcel.	HCD, IGLA	N/A	2033	**10**	0	0	0	0	1	0	1	**2**	4	3	0	1	0	**8**
		WA-1.3	Continue to assess and manage distribution system losses through efforts including replacing existing meters with smart meters, implementing a Supervisory Control and Data Acquisition (SCADA) system, replacing selected water pipe with upgraded design criteria to withstand seismic events, and maintaining an active cathodic protection system.	MCWRA, IGLA	Water providers	Ongoing	**15**	0	0	0	0	1	1	1	**3**	4	3	2	1	2	**12**
		WA-1.4	Adopt a drought-ready ordinance to require greywater readiness in new residential construction and major renovations.	HCD, HD, IGLA	Water providers	2031	**12**	0	0	0	0	1	1	1	**3**	4	3	0	1	1	**9**
		WA-1.5	Incentivize residential and nonresidential development to convert lawns to a healthy habitat with native and drought-tolerant species that use water-efficient irrigation equipment through the creation of rebate programs.	MCWRA, IGLA	Water providers	Ongoing	**17**	1	2	0	1	0	1	1	**6**	4	3	0	2	2	**11**
		WA-1.6	Explore the establishment of a cost-sharing program that reduces upfront expenses for farmers adopting water-saving irrigation technologies (e.g., drip irrigation, soil moisture sensors, remote irrigation management systems), prioritizing small and medium-sized farms. Coordinate training sessions with local agricultural groups to demonstrate how to install and maintain these systems effectively.	MCWRA, IGLA	UCCE, RCDMC	2032	**13**	0	2	0	0	1	1	1	**5**	4	3	0	1	0	**8**

Natural and Working Lands (NWL)

Strategy #	Strategy	Action #	Action	Implementing Department(s)	Agency and Organization Partners	Timing	Total Score	Co-Benefits							Co-Benefits Total	Prioritization Criteria					Prioritization Criteria Score
								Benefits to Low Income Residents	Equity	Air Pollution Prevention	Health and Well Being	Reliability	Job Development	Resource Preservation		Carbon Sequestration Potential	Supported During Community Engagement	Current Policies	County Role	Implementation Timeframe	
NWL-1	Coastal Habitat and Watershed Restoration	NWL-1.1	Support efforts to restore degraded coastal wetlands and salt marshes in priority areas (e.g., Elkhorn Slough), which may include assessing current site conditions to identify the most viable restoration opportunities, developing restoration plans with ecological specialists, and prioritizing activities like invasive species removal, sediment management, and re-establishing native vegetation.	IGLA	MPRPD, Elkhorn Slough Foundation, The Nature Conservancy, California State Coastal Conservancy, CDFW	2033 (Ongoing)	**9**	0	0	0	1	0	1	1	**3**	4	0	2	0	0	**6**
		NWL-1.2	Support the development of a regional approach to aquatic sequestration in the Monterey Bay in collaboration with regional groups involved in blue carbon ecosystems.	IGLA	Monterey Bay Aquarium, Cities, academic institutions, California State Coastal Conservancy, CDFW, NOAA	2034 (Ongoing)	**3**	0	0	0	1	0	1	1	**3**	0	0	0	0	0	**0**
		NWL-1.3	Continue to implement the Salinas River Stream Management Program to enhance riparian corridors within the Salinas River watershed.	MCWRA, IGLA	RCDMC	Ongoing	**11**	0	0	0	1	0	0	1	**2**	4	0	2	1	2	**9**
		NWL-1.4	Protect and preserve existing intact habitats and resources, consistent with Monterey County Regional Conservation Investment Strategy objectives and applicable General Plan implementation activities.	IGLA, ACO, HCD	TAMC, AMBAG, RCDMC, UCCE, CDFW	Ongoing	**11**	0	0	0	1	0	0	1	**2**	4	0	2	1	2	**9**
NWL-2	Fire-Adapted Landscapes	NWL-2.1	Seek funding for and prepare a restoration plan for publicly owned forest lands within the county This plan should identify degraded or understocked forest areas for restoration, develop site-specific planting guidelines, and prioritize native, drought-resistant tree species. Implementation of the plan should include a phased planting schedule, starting with pilot sites in fire-affected or soil-eroded regions, and establishing an annual review and monitoring process to assess growth and carbon capture.	PWFP, HCD, IGLA	RCDMC, MPRPD, USFS, California State Parks	2031	**18**	0	0	1	1	0	1	1	**4**	8	3	0	2	1	**14**
		NWL-2.2	Work with local tribes to design a cultural burning program that incorporates Traditional Ecological Knowledge to reduce wildfire risk, manage fuel loads, and restore ecosystems, particularly in oak woodlands. Through the program, support/coordinate regulatory approvals, provide training and equipment for tribe-led burns, and host regular public information sessions to educate residents about cultural burns and their ecological benefits.	IGLA, HCD	Tribes, CCPBA, UCCE	2029 (Ongoing)	**19**	0	2	1	1	0	1	1	**6**	8	3	0	1	1	**13**
		NWL-2.3	Work with local tribes to acknowledge the importance of traditional knowledge and native peoples' interconnection with historic ecological health and future restoration efforts. Develop a formal framework for native peoples' participation in climate efforts in the county.	IGLA, HCD	Tribes, CCPBA, RCDMC, NRCS	2031	**16**	0	2	0	1	0	0	1	**4**	6	3	0	1	2	**12**
		NWL-2.4	Work with land managers to seek funding and implement fuel reduction activities including prescribed burning.	IGLA	CCPBA, UCCE	2031 (Ongoing)	**16**	0	0	1	1	0	1	1	**4**	8	3	0	0	1	**12**
		NWL-2.5	Work with land managers to coordinate a regional initiative for oak woodland restoration in areas affected by Sudden Oak Death (i.e., phytophthora ramorum), development impacts, and climate stressors. Identify priority restoration sites, support the development of a local native oak nursery, and offer technical and financial assistance to landowners	PWFP, IGLA, ACO	RCDMC, UCCE, land trusts	2031 (Ongoing)	**13**	0	0	0	0	0	1	1	**2**	8	3	0	0	0	**11**
		NWL-2.6	Explore the establishment of a coordinated detection and management system focused or protecting forests from pests and diseases (e.g., bark beetles, pitch canker). This may include various elements, such as implementing a network of seasonal monitoring plots across key forest areas, deploying digital survey tools for real-time pest reporting, developing an online mapping platform to track infestations, training field crews in identification and treatment protocols, and providing cost-sharing to assist with implementing control measures (e.g., tree removal, proper wood disposal)	PWFP, IGLA, ACO	MPRPD, RCDMC, CCPBA, CDFW	2031	**15**	0	0	0	0	0	1	1	**2**	8	3	0	2	0	**13**
		NWL-2.7	Support the sustainable management and utilization of forest biomass generated from fue reduction and forest health projects (e.g., biochar to improve soil health) by preparing formal guidance, reducing barriers (e.g., streamlined permitting), coordinating transportation logistics, exploring incentives, and offering technical assistance to navigate potential regulatory requirements	IGLA	AMBAG, RCDMC	2032 (Ongoing)	**11**	0	0	0	0	0	1	1	**2**	4	3	0	2	0	**9**
		NWL-2.8	In partnership with the Fire Safe Council for Monterey County, prepare an update to the Monterey County Community Wildfire Protection Plan to enable federal funds for wildfire preparation work in the county.	IGLA, PWFP, HCD	FSCMC	2031	**16**	0	0	1	1	1	0	1	**4**	4	3	2	1	2	**12**
NWL-3	Climate-Smart Agriculture	NWL-3.1	Develop a healthy soils strategy for Monterey County to support agriculture, address carbon sequestration, and increase water capture. The strategy should include tracking mechanisms for healthy soil practices, identification of resources for organic agriculture conversion, opportunities to develop a carbon sequestration market, and measures to conserve existing cropland throughout the county	ACO, IGLA	RCDMC, UCCE, NRCS	2028	**20**	0	0	1	1	1	0	1	**4**	8	3	2	2	1	**16**
		NWL-3.2	Pursue funding and provide technical assistance to support the development and implementation of carbon farm plans and healthy soils strategies in Monterey County.	ACO, IGLA	RCDMC, NRCS, CDFA, UCCE	2026 (Ongoing)	**21**	0	2	1	0	1	1	1	**6**	8	3	0	2	2	**15**
		NWL-3.3	Work with UCCE and ranchers to measure residual dry matter on annual pastures to improve soil conditions, increase water holding capacity, and minimize invasion of weedy plants.	ACO, IGLA	UCCE, Cattlemen's Association	2033 (Ongoing)	**9**	0	0	0	0	1	0	1	**2**	4	3	0	0	0	**7**
		NWL-3.4	Work with TAMC, RCD, land trusts/conservancies, UCCE, and landowners to acquire, lease, or establish easements to protect productive agricultural or grazing lands.	ACO, HCD, IGLA	Land trusts, TAMC, RCDMC, UCCE	Ongoing	**15**	0	0	0	0	1	0	1	**2**	8	3	0	0	2	**13**
		NWL-3.5	Work with farmers to reduce fertilizer application consistent with the requirements of the Central Coast Regional Water Quality Control Board's Ag Order 4.0.	ACO, MCWRA, IGLA	CCRWQCB, UCCE, RCDMC	Ongoing	**19**	0	0	1	1	1	0	1	**4**	8	3	2	0	2	**15**
		NWL-3.6	Partner with neighboring counties and resource conservation districts to prepare a feasibility study to explore the development of community compost banks. The study could include an assessment of organic waste availability, market demand for compost, potential cost savings, infrastructure needs, and potential contamination challenges.	HD, IGLA	ReGen Monterey, SVR, neighboring counties, RCDMC, UCCE	2029	**21**	0	0	1	1	1	1	1	**5**	8	3	2	2	1	**16**

Natural and Working Lands (NWL)

Strategy #	Strategy	Action #	Action	Implementing Department(s)	Agency and Organization Partners	Timing	Total Score	Co-Benefits								Prioritization Criteria					
								Benefits to Low Income Residents	Equity	Air Pollution Prevention	Health and Well Being	Reliability	Job Development	Resource Preservation	Co-Benefits Total	Carbon Sequestration Potential	Supported During Community Engagement	Current Policies	County Role	Implementation Timeframe	Prioritization Criteria Score
NWL-4	Green Space and Infrastructure	NWL-4.1	Seek funding for and prepare community-specific forest management plans that focus on expanding tree canopies in residential and nonresidential areas to provide cooling benefits. Identify high priority areas that are currently underserved by street trees and trees within public spaces.	PWFP, HCD, IGLA	CBOs	2027 (Ongoing)	**22**	1	2	1	1	1	0	1	**7**	8	3	0	2	2	**15**
		NWL-4.2	Seek funding for and implement an urban greening program to expand tree canopies, establish tree line buffers, plant native and drought-tolerant vegetation, and establish community gardens in developed areas of the unincorporated county and in partnership with local cities, focusing on climate-vulnerable and underserved communities.	PWFP, HCD, IGLA	RCDMC, CBOs	2027 (Ongoing)	**23**	1	2	1	1	1	1	1	**8**	8	3	0	2	2	**15**
		NWL-4.3	Develop and implement—in partnership with cities—a countywide tree adoption program, where residents and local businesses can sponsor and be recognized (e.g., through on-site signage/plaques, County's website and social media platforms) for the planting and maintenance of trees in public spaces. Offer a variety of sponsorship levels and options (e.g., single tree, group of trees, entire planting area), where sponsorship fees can cover both: (1) the costs of purchasing, planting, and maintaining the trees for a specified period (e.g., 3-5 years); and (2) a dedicated endowment fund, where a portion of the sponsorship fees can be reinvested to support long-term program maintenance.	PWFP, CAO, HCD, IGLA	Cities	2031 (Ongoing)	**13**	0	2	0	1	0	0	1	**4**	4	3	0	2	0	**9**
		NWL-4.4	Support Monterey Peninsula Regional Park District with implementing its strategic plan to adapt to climate impacts, conserve land, and engage communities.	PWFP, HCD, IGLA	MPRPD	Ongoing	**11**	0	2	0	1	0	0	1	**4**	0	3	2	0	2	**7**
		NWL-4.5	Identify and incorporate green infrastructure opportunities when considering capital improvements to stormwater treatment and roadway improvements.	PWFP, IGLA	N/A	Ongoing	**15**	0	2	0	1	1	1	1	**6**	0	3	2	2	2	**9**
		NWL-4.6	Work with Caltrans and CBOs to execute Adopt a Highway agreements for litter removal, tree planting and vegetation management for every mile of state highway located in developed areas of the unincorporated county.	PWFP, IGLA	CBOs, Caltrans	Ongoing	**15**	0	0	1	1	0	1	1	**4**	4	3	2	0	2	**11**

Green Economy (GE)

Strategy #	Strategy	Action #	Action	Implementing Department(s)	Agency and Organization Partners	Timing	Co-Benefits: Total Score	Co-Benefits: Benefits to Low Income Residents	Co-Benefits: Equity	Co-Benefits: Air Pollution Prevention	Co-Benefits: Health and Well Being	Co-Benefits: Reliability	Co-Benefits: Job Development	Co-Benefits: Resource Preservation	Co-Benefits: Co-Benefits Total	Prioritization Criteria: Local Economy Benefit Potential	Prioritization Criteria: Supported During Community Engagement	Prioritization Criteria: Current Policies	Prioritization Criteria: County Role	Prioritization Criteria: Implementation Timeframe	Prioritization Criteria: Prioritization Criteria Score
GE-1	Green Businesses and Jobs	GE-1.1	Support workforce development for electrification and building energy efficiency projects. Partner with regional energy agencies to support contractor training and resident education on electric appliances and their installation and maintenance.	ED, IGLA	MBEP, CCR REN, 3CE	Ongoing	**22**	1	2	1	1	1	1	0	**7**	8	3	2	0	2	**15**
		GE-1.2	Increase the number of certified green businesses each year in partnership with the Monterey Bay Area Green Business Program recognize and promote current participants.	IGLA	California Green Business Network	Ongoing	**9**	0	0	0	0	0	0	0	**0**	4	3	0	0	2	**9**
		GE-1.3	Collaborate with See Monterey and cities to increase public awareness of sustainable infrastructure benefits and the contribution of nature-based solutions to tourism-based businesses that rely on healthy natural and working lands (e.g., wine, recreation, and hospitality industries).	ED, IGLA	See Monterey, Cities	Ongoing	**12**	0	0	0	1	0	0	0	**1**	4	3	2	0	2	**11**
		GE-1.4	Support the development of new markets and products that offer climate-smart and climate-friendly solutions for local use (e.g., biochar production).	ED, ACO, IGLA	Industry groups, UCCE, RCDMC	Ongoing	**12**	0	0	0	0	1	1	1	**3**	4	3	0	0	2	**9**
		GE-1.5	Develop an economic development strategy that guides future economic growth toward climate-adapted industries and business practices, leveraging existing partnerships and collaboratives as appropriate (e.g., Monterey Bay Economic Partnership). The strategy will identify priority areas for development that minimize exposure to climate risks, create incentives for businesses that incorporate climate resilience measures, establish guidelines for climate-smart industrial and commercial development, and help businesses identify and reduce climate-related vulnerabilities in their operations and supply chains.	ED, IGLA	MBEP, California Green Business Network	2034	**3**	0	0	0	0	0	1	0	**1**	0	0	0	2	0	**2**

Adaptation (ADPT)

Strategy #	Strategy	Action #	Action	Implementing Department(s)	Agency and Organization Partners	Timing	Co-Benefits								Prioritization Criteria					
							Total Score	Benefits to Low Income Residents	Equity	Air Pollution Prevention	Health and Well Being	Reliability	Job Development	Resource Preservation	Co-Benefits Total	Climate Hazard Reduction Potential	Supported During Community Engagement	Current Policies	County Role	Implementation Timeframe	Prioritization Criteria Score
ADPT-1	Cross-Cutting	ADPT-1.1	Continue to support the widespread adoption of “Alert Monterey County”—the official emergency alert and warning system for all jurisdictions in the county—to ensure that all residents are informed before, during, and after a climate hazard event (among other emergencies). Expand existing public outreach efforts through: (1) targeted enrollment campaigns at community events, healthcare facilities, and schools; (2) automatic enrollment for County services recipients; and (3) partnerships with CBOs for door-to-door outreach in historically underserved areas. Low-tech backup notification systems may also be considered and established as part of this initiative.	DEM, IT, IGLA	CBOs	2026 (Ongoing)	**19**	1	2	0	1	1	0	0	**5**	8	0	2	2	2	**14**
		ADPT-1.2	Support the public health sector’s capacity to address climate change as a public health crisis through a twofold approach of: (1) increasing the collection, analysis, and reporting of data on climate-related health impacts; and (2) prioritizing health equity resources for communities facing disproportionate health impacts from climate change. This may include coordinating with appropriate state and federal agencies (e.g., CDPH, OEHHA, CDC) and other local partners to collect relevant data and develop dashboards that will help inform resource allocation and targeted interventions and support grassroots health equity initiatives.	HD, Natividad, IGLA	CHMP	Ongoing	**18**	0	2	0	1	1	0	0	**4**	8	3	0	1	2	**14**
		ADPT-1.3	Develop a countywide network of resilience hubs to enhance community resilience. These hubs—which will feature solar microgrids (where feasible and where funding allows)—will be housed in accessible public facilities, such as libraries, community centers, and schools, and will serve as multi-purpose sites offering year-round support services (e.g., health screenings, food distribution) and critical resources during emergencies exacerbated by climate change. The County encourages force multiplication and unity of effort through collaboration with partners and local entities (e.g., health care centers, CBOs, faith-based organizations) to support hubs and offer services tailored to each community’s needs. To leverage funding, technical support, and best practices, the resilience hub network should draw upon existing resources where feasible (e.g., Strategic Growth Council’s Community Resilience Centers program).	HD, DEM, IGLA	RCPWG, CCR REN, CBOs	2031 (Ongoing)	**16**	1	2	1	1	1	0	0	**6**	8	0	0	1	1	**10**
		ADPT-1.4	Enhance local food security through an array of efforts, such as providing coordination support to connect local agricultural producers with food banks and pantries, developing a countywide food recovery program and working group to oversee compliance with SB 1383, and providing transportation assistance to help residents access farmers’ markets and food distribution networks.	ACO, HD, IGLA	Food Bank for Monterey County, Monterey County Farm Bureau	Ongoing	**24**	1	2	1	1	1	1	1	**8**	8	3	2	1	2	**16**
		ADPT-1.5	Adopt and require the use of a resilient buildings checklist for new construction and major renovations. The checklist should consider utilizing, at a minimum the following conditions: - Firesafe: Building materials, location, and egress routes that consider potential fire risks, evacuation options, and offer a buffer to any wildlands urban interface (WUI). These can align with IBHS' Wildfire Prepared Home designation. - Air quality: Integrated air filtration systems and solutions to provide healthy indoor air quality during smoky periods. - Smart location of equipment that leaves roofs available for solar and puts equipment out of any potential flood or other hazard areas. - Water: Support water quality, water safety, and water efficiency, along with approaches to access water during a disaster. -Require the use of electric heat pumps to provide heating and cooling to residents to combat rising temperatures. - Support non-mechanical cooling approaches such as passive house building, cool roofs, and tree shading. - Sea level rise and flooding: do not incentivize projects that are located in a FEMA flood zone. - Multi-benefit energy and resilience measures including solar and storage enabling the building to operate off the grid during power outages and address the needs of residents (such as communications, medical needs, and refrigeration). - Minimum temperature factor at doors, windows, and thermal bridges. This factor ensures and absence of condensation and prevents mold and mildew that can lead to long term building damage. - Anti-displacement measures that will help to ensure the project does not displace low-income residents from the neighborhood due to increased rental prices.	HCD, IGLA	N/A	2026	**21**	1	2	1	1	1	1	1	**8**	8	0	2	2	1	**13**
		ADPT-1.6	Partner with TAMC to implement the North Monterey County Regional Transportation Vulnerability Assessment recommendations as well as subsequent regional transportation vulnerability assessment recommendations.	PWFP, IGLA	TAMC	2032 (Ongoing)	**11**	0	0	0	0	1	1	0	**2**	6	0	2	1	0	**9**
ADPT-2	Wildfire	ADPT-2.1	Coordinate with MBARD and other local and regional agencies and organizations to develop and implement a suite of measures focused on protecting residents from wildfire smoke, including: (1) the widespread awareness and adoption of mobile applications (e.g., Smoke Spotter, AirNow), which can help populations prepare for wildfire smoke events; (2) the development of a program to subsidize and provide free residential air filtration/purification devices to renters and homeowners; among others; and (3) providing formal recommendations and incentives that encourage local businesses and other indoor community gathering places to serve as an impromptu, adaptable, accessible network for clean air centers during hazardous wildfire smoke events.	HD, DEM, PWFP, IGLA	MBARD, Cities	2031 (Ongoing)	**15**	1	2	0	1	1	0	0	**5**	6	3	0	0	1	**10**
		ADPT-2.2	Collaboratively develop and implement a wildfire-resilient agriculture program that includes: (1) technical assistance for creating agricultural buffer zones that serve both fire protection and productive farming purposes; (2) cost-sharing for installation of agricultural-grade sprinkler systems that can be activated for ember protection; and (3) guidance on fire-resistant crop selection and field pattern design for properties in high-risk areas.	ACO, IGLA	UCCE, RCDMC, FSCFMC, Monterey County Farm Bureau	2033 (Ongoing)	**10**	0	0	1	0	1	0	1	**3**	6	0	0	1	0	**7**
		ADPT-2.3	In partnership with the Fire Safe Council for Monterey County, launch a home hardening program for existing homes—including mobile homes and manufactured housing—in high-risk areas that provides comprehensive assessments, offers grants for home hardening improvements (e.g., ember-resistant vents, noncombustible gutter covers, enclosed eaves), and provides additional financial assistance and resources for low-income homeowners.	HCD, IGLA	FSCFMC, Center for Community Advocacy	2031	**18**	1	2	0	1	1	1	0	**6**	6	3	0	2	1	**12**

Adaptation (ADPT)

Strategy #	Strategy	Action #	Action	Implementing Department(s)	Agency and Organization Partners	Timing	Co-Benefits: Total Score	Benefits to Low Income Residents	Equity	Air Pollution Prevention	Health and Well Being	Reliability	Job Development	Resource Preservation	Co-Benefits Total	Prioritization Criteria: Climate Hazard Reduction Potential	Supported During Community Engagement	Current Policies	County Role	Implementation Timeframe	Prioritization Criteria Score
		ADPT-2.4	Collaborate with CAL FIRE and the Fire Safe Council for Monterey County to support and expand the number of Firewise USA® recognized communities across the county. Support may come in the form of building community awareness through outreach and education, providing direct support through technical assistance, offering financial support and incentives, coordinating with local fire agencies, and monitoring and reporting progress.	DEM, IGLA	CAL FIRE, FSCFMC	2031	**15**	0	0	0	1	1	0	1	**3**	6	3	2	0	1	**12**
		ADPT-2.5	Explore the collaborative development and implementation of a “smart” wildfire detection network by conducting a comprehensive feasibility study that evaluates technical requirements, cost considerations, and implementation challenges. The study would assess the viability of integrating various technologies (e.g., solar-powered thermal imaging cameras with AI capabilities, remote weather stations, soil moisture sensors) into a centralized early warning system. Additionally, it would identify potential funding sources, evaluate infrastructure needs, determine maintenance requirements, analyze cost-benefit ratios, and develop strategies to address technical barriers. Based on the feasibility study findings, develop a phased implementation plan that prioritizes deployment in high-risk areas and establishes clear protocols for data management, system maintenance, and emergency response integration.	DEM, IT, IGLA	CAL FIRE, FSCFMC, RCDMC, USFS	2032	**12**	0	0	1	1	0	0	1	**3**	6	3	0	0	0	**9**
		ADPT-2.6	Serve as a coordinating entity for partners (e.g., CAL FIRE, Fire Safe Council for Monterey County) to further enhance the reach and effectiveness of their existing wildfire preparedness and wildfire risk reduction programs and resources. This may include integrating program materials into County mailings, providing dedicated space in County facilities for in-person events or workshops, and actively promoting initiatives through all County communication channels.	DEM, IGLA	CAL FIRE, FSCFMC, MCRFD	2028	**19**	0	2	0	1	1	0	1	**5**	6	3	2	2	1	**14**
ADPT-3	Extreme Heat	ADPT-3.1	Launch a pilot program to install cool (i.e., high albedo) pavement in heat-vulnerable neighborhoods across the county, focusing on areas with high pedestrian traffic, low tree canopy, and significant exposure to the urban heat island effect. Partner with technical experts on cool pavement materials and performance monitoring, and collaborate with local public health agencies to identify and prioritize locations based on heat vulnerability. Assuming positive pilot outcomes and community buy-in, develop a phased expansion plan for cool pavement installation, prioritizing areas that would benefit most from reduced surface temperatures.	PWFP, HD, IGLA	Technical experts, Caltrans	2031	**14**	1	2	0	1	0	0	0	**4**	8	0	0	2	0	**10**
		ADPT-3.2	Develop a countywide program to support and oversee employer compliance with Cal/OSHA’s heat illness prevention standards for both indoor (i.e., CCR Title 8, Section 3396) and outdoor (i.e., CCR Title 8, Section 3395) workplaces. This program will include education and training opportunities for employers and employees on heat safety regulations, onsite inspections during extreme heat events, and guidance for workers to report employer non-compliance. Additionally, the program will provide resources, technical assistance, and incentives to employers for implementing enhanced heat protection measures that go beyond Cal/OSHA standards.	HD, ACO, DEM, IGLA	Cal/OSHA, CDPH	2031	**17**	0	2	0	1	0	1	0	**4**	8	0	2	2	1	**13**
		ADPT-3.3	Evaluate and consider establishing requirements for the use of heat mitigation measures in the public realm, particularly in common community gathering spaces (e.g., playgrounds, parks) and along transit corridors. Requirements may include the incorporation of: (1) building design features (e.g., varied building heights; setbacks from sidewalks; vertical and horizontal shade features); (2) cooling materials, treatments, and coatings (e.g., for rooftops); (3) multiple layers of shading to maximize coverage throughout the day; (4) street trees and landscaping; and (5) public amenities, such as drinking fountains and water mister/spray areas; among others.	PWFP, HCD, IGLA	N/A	2031	**15**	1	2	0	1	0	0	0	**4**	8	0	0	2	1	**11**
		ADPT-3.4	Create a “Cool Buddy” program that recruits and trains community volunteers to support neighborhood resilience during extreme heat events. Volunteers will be trained to: (1) recognize signs of heat stroke and other heat-related illnesses; (2) identify and check in on heat-vulnerable neighbors (e.g., seniors, low-income residents, those without adequate cooling resources); (3) connect vulnerable residents with local resources, such as transportation to cooling centers and community health services. The program will work with neighborhood groups, community emergency response teams (CERT), and CBOs to strengthen local networks, allowing neighborhoods to coordinate volunteers and support systems.	HD, DEM, SS, IGLA	CBOs	2031	**16**	1	2	0	1	1	0	0	**5**	8	0	0	2	1	**11**
ADPT-4	Flooding and Sea Level Rise	ADPT-4.1	Evaluate the creation of a managed retreat program for homes and critical assets (e.g., infrastructure) at risk of repeated damage due to sea-level rise, flooding, and other climate hazards to allow for natural modification of the landscape and reduction in risk to property and life. The program would identify financial support mechanisms and include standards that determine when homes or assets should be relocated, modified, or removed.	DEM, HCD, IGLA	Caltrans, FEMA, USACE, California State Coastal Conservancy	2032	**13**	0	0	0	1	1	0	1	**3**	6	3	0	1	0	**10**
		ADPT-4.2	Coordinate with conservation organizations and local landowners to expand floodplain restoration in the Salinas River watershed, improving natural flood mitigation by increasing water absorption, restoring native vegetation, and creating wildlife habitat. Focus restoration efforts on high-risk flood zones to reduce downstream flood impacts in agricultural and residential areas.	MCWRA, HCD, IGLA	RCDMC, UCCE	Ongoing	**18**	1	2	0	1	1	1	1	**7**	6	3	0	0	2	**11**
		ADPT-4.3	Evaluate the need for more stringent minimum standards for flood protection and resilience, notably for new construction and major renovations. Specific considerations should include floor elevations, flood-resistant materials, and improved drainage systems (among others), and additionally, potential incentives for exceeding minimum standards. Depending on the outcomes of the evaluation, incorporate new standards by ordinance.	HCD, IGLA	N/A	2031	**16**	0	0	0	1	1	0	0	**2**	6	3	2	2	1	**14**
		ADPT-4.4	Develop an outreach and assistance program to connect property owners in flood-prone areas of the county with existing regional, state, and federal programs that provide funding and technical assistance for flood resilience improvements. The County will work with local CBOs to raise awareness and offer application assistance, prioritizing low-income residents and small businesses.	DEM, HCD, IGLA	CBOs	2028	**21**	1	2	0	1	1	1	0	**6**	6	3	2	2	2	**15**
		ADPT-4.5	Collaborate with Caltrans and TAMC to develop an implementation plan to address the risks of sea-level rise, coastal erosion, and storm surge along Highway 1, informed by existing studies and resources (e.g., Central Coast Highway 1 Climate Resiliency Study). The plan will prioritize projects that balance infrastructure resilience, environmental sustainability, and scenic preservation, and additionally, will engage communities along Highway 1 in implementation discussions to align each project with local needs.	DEM, IGLA	Caltrans, TAMC, MST, AMBAG, California State Coastal Conservancy	Ongoing	**16**	0	0	0	0	1	1	1	**3**	6	3	2	0	2	**13**
ADPT-5	Drought	ADPT-5.1	In partnership with water and wastewater service providers, upgrade water and wastewater infrastructure throughout the county to adapt to future potential climate-driven changes in water quality and availability, which may include deepening intake systems to accommodate lower water levels, implementing advanced filtration technologies to address increased contaminant levels, and expanding storage capacity to ensure water supply during periods of drought. Prioritize upgrades in areas with aging infrastructure.	MCWRA, IGLA	Water providers	Ongoing	**15**	0	2	0	1	1	0	1	**5**	4	3	0	1	2	**10**

Implementation and Monitoring (IM)

Strategy #	Strategy	Action #	Action	Implementing Department(s)	Agency and Organization Partners	Timing	Co-Benefits								Prioritization Criteria							
							Total Score	Benefits to Low Income Residents	Equity	Air Pollution Prevention	Health and Well Being	Reliability	Job Development	Resource Preservation	Co-Benefits Total	GHG Reduction Potential	Climate Resilience Potential	Supported During Community Engagement	Current Policies	County Role	Implementation Timeframe	Prioritization Criteria Score
IM-1	Education, Outreach, and Coordination	IM-1.1	Develop a building electrification outreach program that provides education strategies that enable and encourage energy conservation and gas-to-electric conversions in residential and commercial buildings for space and water heating, and planning for equipment replacement before failure occurs due to emergencies. Develop and/or share existing online educational materials targeted toward building owners and tenants that are hosted on the County's website on energy efficiency and building electrification; including training, fact sheets, information on available incentives, video tutorials, and links to existing content (such as The Switch is On). In addition, video tutorials can explain to building owners how to enroll in real-time energy use monitoring tools to track energy use compared to historic levels and within the community through the EnergyStar™ Portfolio Manager, or other tools offered by third-party providers. The educational materials will also be provided as part of routine regulatory processes, such as applying for or renewing licenses or permits. The building electrification outreach program will coordinate with local jurisdictions and agencies to share resources and problem solve across iurisdictions.	IGLA	Ecology Action, AMBAG	2026 (Ongoing)	**17**	1	2	1	1	1	0	0	**6**	0	2	3	2	2	2	**11**
		IM-1.2	In partnership with TAMC, develop a transportation outreach program that provides education strategies that enable and encourage residents to engage in mode shifts (e.g., carpooling, walking, biking), transit, and vehicle electrification. Develop and/or share existing online educational materials targeted toward residents and businesses that are hosted on the County's website on reducing vehicle trips and transportation electrification; including training, fact sheets, information on available incentives, video tutorials, and links to partner organizations. The transportation outreach program will coordinate with local jurisdictions and agencies to share resources and problem solve across jurisdictions.	IGLA	TAMC, MST, 3CE, AMBAG, MBARD	2026 (Ongoing)	**16**	1	2	1	1	0	0	0	**5**	0	2	3	2	2	2	**11**
		IM-1.3	Promote incentive programs to encourage residents and business owners to convert or replace their fossil fuel-powered gardening equipment, such as lawnmowers, leaf blowers, and hedge trimmers, with electric alternatives.	IGLA	MBARD	Ongoing	**12**	1	2	1	1	0	0	0	**5**	0	0	3	2	0	2	**7**
		IM-1.4	Promote incentives available through CARB (i.e., Carl Moyer Program), MBARD (i.e., FARMER Program), and others to switch agricultural equipment and irrigation pumps with EPA Tier 4 Final-rated equipment.	ACO	MBARD, UCCE, Farm Bureau, RCDMC	Ongoing	**9**	0	0	1	0	0	0	1	**2**	0	0	3	2	0	2	**7**
		IM-1.5	Raise public awareness of the public health impacts of climate change through partnerships with local hospitals, public health institutions, and other social service organizations.	HD, Natividad, SS, IGLA	Local hospitals, public health institutions, CBOs	Ongoing	**15**	1	2	0	1	0	0	0	**4**	0	2	3	2	2	2	**11**
		IM-1.6	Collaborate with local tribes to establish training opportunities (e.g., workshops) for youth and community members to learn about traditional land stewardship practices, such as cultural burning, plant management, and ecosystem care. Training opportunities will be co-developed with tribal leaders and aim to integrate Traditional Ecological Knowledge into broader County conservation programs.	IGLA	Tribes, UCCE, RCDMC	2027 (Ongoing)	**11**	0	2	0	0	0	0	1	**3**	0	2	3	2	0	1	**8**
IM-2	Public Participation and Engagement	IM-2.1	Establish a standing role for the County's Alternative Energy & Environment Committee (AEEC) to advise the Board of Supervisors on climate action planning, CCAAP strategy implementation, and related topics (e.g., environmental justice).	IGLA	N/A	2026 (Ongoing)	**6**	0	0	0	0	0	0	0	**0**	0	0	0	2	2	2	**6**
		IM-2.2	Implement a coordinated climate action and resilience outreach and education initiative that leverages the Resilient Monterey County campaign and platform as a primary digital resource hub. The initiative may include seasonal hazard awareness campaigns, collaborative community workshops (in partnership with CBOs, schools, etc.), a climate ambassador program that trains local volunteers to serve as community educators, and promotion of local CERT programs.	IGLA, DEM	Ecology Action	2026 (Ongoing)	**13**	1	2	0	1	1	0	0	**5**	0	2	0	2	2	2	**8**
		IM-2.3	Formalize a network of partners, including businesses, community organizations, and volunteers to support CCAAP implementation. Collaborate with groups such as the County Health Department to establish a youth program to ensure youth voices are included in County systems and strategies.	IGLA	MBEP, CBOs	2026 (Ongoing)	**8**	0	2	0	0	0	0	0	**2**	0	0	0	2	2	2	**6**
IM-3	Climate Tracking and Budgeting	IM-3.1	In consultation with the AEEC, prepare annual public reports on CCAAP implementation and monitoring results and present the reports to the Board of Supervisors. Every three years, prepare GHG inventory updates and every five years, prepare and present a more detailed progress report to the Board of Supervisors.	IGLA	AMBAG	2026 (Ongoing)	**6**	0	0	0	0	0	0	0	**0**	0	0	0	2	2	2	**6**
		IM-3.2	Prepare and present to the Board of Supervisors a proposed budget and staffing plan (including qualified technical consultants) to implement the CCAAP, and update the budget and staffing plan each year.	CAO, IGLA	N/A	2026 (Ongoing)	**6**	0	0	0	0	0	0	0	**0**	0	0	0	2	2	2	**6**
		IM-3.3	Establish and track metrics to monitor progress of CCAAP goals and report data through an online platform, such as a digital portal or dashboard on the County's website.	IGLA	N/A	2026 (Ongoing)	**6**	0	0	0	0	0	0	0	**0**	0	0	0	2	2	2	**6**
IM-4	Funding and Financing	IM-4.1	Develop a revolving loan fund to provide low-interest loans to residents to cover the time-of-replacement/emergency replacement of water heaters and/or HVAC units with electric options with program prioritization for low-income residents.	IGLA, CAO	3CE	2030	**8**	1	2	0	0	0	0	0	**3**	0	0	0	2	2	1	**5**
		IM-4.2	Partner with 3CE to explore offering on-bill financing or pay-as-you-save programs specifically for building electrification and energy affordability projects.	IGLA	3CE	2026	**9**	1	2	0	0	0	0	0	**3**	0	0	0	2	2	2	**6**
		IM-4.3	Serve as a coordinating entity in supporting and accelerating forest health services and forest restoration projects across the county by: (1) establishing a fund that provides grants and low-interest loans to landowners and organizations implementing projects; (2) partnering with local financial institutions to leverage additional capital through innovative financing tools (e.g., environmental impact bonds); (3) providing technical assistance to help implementing entities access and combine various funding sources effectively; and (4) procuring equipment and renting it to landowners to implement projects.	IGLA, PWFP	RCDMC, UCCE, CAL FIRE, USFS, California State Parks	2030	**6**	0	0	1	0	0	0	1	**2**	0	0	0	2	2	0	**4**
		IM-4.4	Establish a dedicated public works special fund to support the implementation of CCAAP capital projects. Such projects may include repairing and/or fortifying critical infrastructure owned and/or managed by the County, advancing urban forestry, and creating safe streets. The fund will serve as a committed reserve that cannot be reappropriated for other purposes without approval by the Board of Supervisors. An interdepartmental team will develop strategies for seeding the fund (e.g., annual budget allocation, municipal bond measure) and will establish criteria and processes for accessing the fund.	PWFP, CAO, IGLA	N/A	2029	**6**	0	0	0	0	1	0	0	**1**	0	0	0	2	2	1	**5**
		IM-4.5	Coordinate with other jurisdictions and partners within the county to explore the establishment of a countywide Climate Resilience District—in line with SB 852—to finance, plan, implement, and manage climate adaptation projects and programs throughout Monterey County and across jurisdictional boundaries. The district will serve as a coordinating entity to leverage funding opportunities, facilitate multi-benefit projects, and ensure equitable distribution of adaptation investments.	CAO, PWFP, DEM, HCD, IGLA	AMBAG, RCDMC, Cities	2029	**8**	1	2	0	0	1	0	0	**4**	0	0	0	2	1	1	**4**
		IM-4.6	Establish policy and procedures for the creation of a Carbon Reduction Fund to invest in municipal energy efficiency, community climate action, and carbon reduction projects.	PWFP, CAO, HCD, IGLA	AMBAG, MBEP	2029	**5**	0	0	0	0	0	0	0	**0**	0	0	0	2	2	1	**5**
		IM-4.7	Explore the creation of a County-administered green bank to invest in clean energy and energy efficiency.	PWFP, CAO, HCD, IGLA	AMBAG, MBEP	2029	**5**	0	0	0	0	0	0	0	**0**	0	0	0	2	2	1	**5**

Monterey County CCAAP Actions | Scoring Rubric

Co-Benefit	Input	Description	Score
Benefits to Low Income Residents	Yes	This action benefits low-income residents, whether they rent or own, by providing cost savings from energy efficiency upgrades, improved transit and fuel options, and enhanced housing security.	1
	No	This action does not benefit low-income residents, whether they rent or own, by providing cost savings from energy efficiency upgrades, improved transit and fuel options, or enhanced housing security.	0
Equity	Yes	Successful implementation of this action would likely enhance equity or result in equitable outcomes on its own, such as by promoting social inclusion (e.g., addressing disparities, promoting greater access to resources), environmental justice (e.g., mitigating cumulative impacts from environmental stressors, fair distribution of environmental benefits), and economic empowerment.	2
	No	Successful implementation of this action would likely not enhance equity or result in equitable outcomes.	0
Air Pollution	Yes	This action minimizes local or regional criteria pollutant emissions at the location of implementation	1
	Maybe	This action does not impact local or regional criteria pollutant emissions OR don't know what impact this action has on local or regional criteria pollutant emissions at location of implementation.	0
	No	This action increases (either temporarily or permanently) local or regional criteria pollutant emissions.	-1
Health and Well-Being	Yes	Successful implementation of this action would likely result in direct public health benefits on its own.	1
	Maybe	Successful implementation of this action: (1) could potentially result in indirect public health benefits; and/or (2) would require subsequent actions to be taken by the County or various community actors to fully realize its potential public health benefits.	0
	No	Successful implementation of this action: (1) would likely not yield any public health benefits; or (2) could potentially negatively influence public health.	-1
Reliability	Yes	Action helps increase reliability of the electrical grid, transportation system, emergency response, etc.	1
	No	Action does not impact the reliability of the electrical grid, transportation system, emergency response, etc. OR don't know the impact on reliability.	0
Job Development	Yes	Action maximizes quality job creation in Monterey County.	1
	Maybe	Action does not influence job creation in Monterey County OR don't know what impact action will have on job creation in Monterey County.	0
	No	Action minimizes quality job creation in Monterey County.	-1
Resource Preservation	Yes	Action helps preserve greenspaces/prime habitat/biodiversity.	1
	No	Action does not impact greenspaces/prime habitat OR don't know what impact action will have on these resources/biodiversity.	0

Prioritization Criteria

Prioritization Criteria	Input	Description	Score
GHG Reduction Potential	High	The strategy within which the action is included has a high (over 5%) greenhouse gas emissions reduction potential.	8
	Medium	The strategy within which the action is included has a medium (between 3%-5%) greenhouse gas reduction potential.	6
	Low	The strategy within which the action is included has a small (between 0%-2%) greenhouse gas reduction potential.	4
	None	The strategy within which the action is included has an unknown or no greenhouse gas reduction potential.	0
Carbon Sequestration Potential	High	The strategy within which the action is included has a high carbon sequestration potential.	8
	Medium	The strategy within which the action is included has a medium carbon sequestration potential.	6
	Low	The strategy within which the action is included has a small carbon sequestration potential.	4
	None	The strategy within which the action is included has an unknown or no carbon sequestration potential.	0
Climate Hazard Reduction Potential	High	The strategy within which the action is included addresses climate hazards with a vulnerability score of 5.	8
	Medium	The strategy within which the action is included addresses climate hazards with a vulnerability score of 4 or greater.	6
	Low	The strategy within which the action is included addresses climate hazards with a vulnerability score of 3 or greater.	4
Local Economy Benefit Potential	High	The strategy within which the action is included provides significant local economic benefits.	8
	Medium	The strategy within which the action is included provides moderate local economic benefits.	6
	Low	The strategy within which the action is included provides minimal local economic benefits.	4
	None	The strategy within which the action is included does not provide local economic benefits.	0
Supported During Community Engagement	Yes	The strategy within which the action is included was considered important by community members during CCAAP engagement efforts.	3
	Maybe	The strategy within which the action is included was not considered important by community members during CCAAP engagement efforts.	0
	No	Action was not favored by community members during engagement.	-3
Current Policies	Yes	County policies currently exist that would allow for and facilitate successful implementation of this action.	2
	Maybe	County policies would need to be developed to help support successful implementation of this action.	0
	No	County policies currently exist that would prohibit successful implementation of this action.	-2
County Role	Actor	The County has direct operational control and primary responsibility for successfully implementing this action. Achieving the desired outcomes of this action would require minimal reliance on other community actors.	2
	Regulator	The County has some operational control and responsibility for successfully implementing this action and/or achieving the desired outcomes of this action may require some reliance on other community actors.	1
	Influencer	The County has limited operational control and responsibility for successfully implementing this action and/or achieving the desired outcomes of this action would substantially rely upon voluntary participation or independent actions of other community actors, with the County playing a supporting or influencing role.	0
Implementation Timeframe	1-2 Years	Action could be initiated in the next 1 to 2 years.	2
	3-5 Years	Action could be initiated in the next 3 to 5 years.	1
	6+ Years	Action could be initiated after 6+ years.	0
	Total Points		25

Note: Actual scoring conducted in accordance with this rubric was meant to be qualitative and was not based on comprehensive technical analysis. Rather, scoring was based on professional judgment, informed intuition, and strategic thinking at time of assessment, and should not be interpreted as definitive.

Appendix F

Implementation Cost Analysis

Memo

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Sacramento, CA 95814
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Date: March 3, 2026

To: Cora Panturad (County of Monterey)

From: Lisa Fenton, Hannah Kornfeld, and Poonam Boparai (Ascent)

Subject: Monterey County Community Climate Action and Adaptation Plan: Implementation Cost Analysis and Funding and Financing Technical Memorandum

1 EXECUTIVE SUMMARY

The County of Monterey government (County) is preparing its Community Climate Action and Adaptation Plan (CCAAP), intended to guide the County's sustainability and resilience objectives over the coming decades. This technical memorandum (memo) provides an overview of the estimated costs to implement the near-term CCAAP actions, including staffing costs, capital costs, and other costs such as materials and consultant fees, as well as potential funding sources and financing solutions available to the County. Some actions in the CCAAP will come at zero or minimal cost, some will have a positive long-term return on investment, and others will require the County to dedicate resources but will help reduce the cost of future climate disasters.

Often the challenges in implementing greenhouse gas (GHG) reduction and climate adaptation actions are financial. There are many tried-and-true funding sources and financing options that cities and counties leverage to implement climate-related projects including competitive state and federal grants and utility incentives. There are a variety of options that can be tailored to meet the County's specific needs. For example, many capital-intensive pilot projects are funded through state or federal grants, and grants can provide a good source of 'repayment-free' capital. It is important to note, however, that local governments must commit the resources to researching, tracking, and applying for grants to be successful. Additionally, establishing a green bank, which uses a combination of funding streams (e.g., ratepayer funds, private capital, state or federal funding) to help bridge the gap between public and private financing, could finance the local shift to renewable energy and increased energy efficiency. Local governments must consider whether they have the legislative authority to establish a green bank or if they can partner with an existing state-administered green bank.

Table 1 below summarizes the estimated costs to the County for CCAAP implementation over the next five years.

Table 1 CCAAP Implementation Cost Estimates by Type and Year

Cost Type	2026	2027	2028	2029	2030
FTE	$1,533,340	$1,721,481	$2,155,405	$2,479,773	$2,312,556
Capital	$8,525,079	$8,780,832	$9,044,256	$9,315,584	$9,595,052
Other	$4,906,714	$5,308,531	$5,970,442	$5,778,137	$6,038,427
Total Costs	**$14,965,133**	**$15,810,844**	**$17,170,103**	**$17,573,494**	**$17,946,034**

Notes: CCAAP = Community Climate Action and Adaptation Plan; FTE = full-time equivalent.

Source: Analysis conducted by Ascent in 2026.

When considering the costs associated with CCAAP implementation, it is also important to consider the cost of inaction. For example, in the US alone the health-related cost of fossil fuels and climate change exceeds $800 billion

per year (NRDC 2021). Potential costs include impacts on health and wellbeing, loss of biodiversity and natural environments, increased climate migration and associated conflict, decreases in productivity due to climate stressors, damage to physical assets, and disruptions to the global economy.

It is also important to consider the social cost of the GHGs we emit. GHG emissions impose costs on society ("social costs") beyond the county's borders, such as extreme weather, wildfires, flooding, and ecosystem disruption. Conversely, reducing GHG emissions has societal benefits. If implemented, the CCAAP's strategies will cumulatively reduce carbon dioxide emissions by approximately 2,846,000 metric tons from 2026-2045 (i.e., over 20 years), and methane emissions by 26,000 metric tons over the same period. This reduction has a present value of approximately $741 million of total societal benefits from 2026 to 2045 (US EPA 2024).

2 INTRODUCTION

This memo provides an overview of the findings from the implementation cost analysis for the CCAAP. The cost analysis is intended to estimate near-term (i.e., 2026 to 2030) County staffing requirements, capital expenses, and other costs necessary to implement the CCAAP's priority actions. It offers insights into the financial implications associated with GHG reduction and climate adaptation strategies and implementation actions.

Additionally, this memo includes a review of current funding and financing sources that can be used by the County to finance the implementation of GHG reduction and climate adaptation actions. This memo does not include annual cost savings for the County (e.g., through reduced municipal utility bills associated with more efficient buildings and vehicles), nor does it include costs or savings to the community (e.g., reduced utility bills through home electrification or fuel costs through vehicle electrification). Such costs were excluded due to lack of available data and assumptions.

Once estimated costs for CCAAP implementation are established, funding can be pursued, and costs can be built into the County's budgeting process. The County can increase its likelihood of fully implementing the CCAAP's actions by having a clear picture of estimated costs, diligently pursuing funding and financing options, and tracking performance metrics regularly.

3 METHODOLOGY

The implementation cost analysis was conducted through best practices research and a survey of cost estimates from other California counties. The following questions were considered when evaluating which costs were relevant to CCAAP implementation:

- What are the estimated staffing needs to implement the action?
- Will additional costs be incurred for implementation, including capital expenditures (e.g., vehicles, electric vehicles [EV] chargers) and non-personnel costs (e.g., consultants, compost purchases)?

The cost data were compiled for each near-term action, and data gaps were filled with reasonable estimates based on publicly available data. These costs are considered near-term and do not represent the full scope of costs of all actions included in the CCAAP.

The implementation cost analysis considers the incremental costs (i.e., any cost or investment associated with actions as a result of the CCAAP) incurred by the County for CCAAP implementation between 2026 and 2030. This analysis does not consider costs or cost savings for the community (such as for residents and businesses). Many actions are likely to result in net cost savings to the community, such as energy efficiency retrofits resulting in utility bill savings or charging vehicles with electricity instead of fueling them with gasoline, resulting in reduced fuel costs. This analysis also does not include annual cost savings to the County, which are likely to occur through similar strategies resulting in fuel cost savings or utility bill savings.

Implementing the CCAAP entails three types of County expenditures:

1. **Staffing costs.** Implementing CCAAP actions results in increased workload for the County, which necessitates hiring new County staff. Costs in this category are the incremental costs for staffing above currently budgeted levels, and are shown in the cost analysis in terms of full-time equivalents (FTEs).
2. **Capital costs.** Implementing the CCAAP actions results in new physical infrastructure (e.g., EV chargers, sidewalks, bicycle lanes). These are expressed annually and in total dollars across the five-year period.
3. **Other costs.** Implementing CCAAP actions results in non-capital expenses, such as hiring external consultants to complete a task or planting trees. These are also expressed annually and in total dollars across the five-year period.

4 COST ESTIMATES

This section presents the results of a cost analysis conducted to estimate the incremental costs that would be incurred by the County in implementing the CCAAP actions. Costs were estimated for salary and benefits, capital costs, and other costs which include materials and consultant fees. All costs assume a 3 percent inflation rate year over year. The cost analysis intends to provide transparency in the cost implications of specific CCAAP policy decisions and provide an additional decision-making tool on how the implementation of actions can be prioritized, based on the availability of funding and financing options.

This memorandum is intended to provide a high-level estimation of implementation costs for the five-year planning horizon. The implementation costs presented herein are subject to change and would need to be revisited and adjusted as the CCAAP is implemented.

4.1 FTE COSTS

For the five years between 2026-2030, implementing CCAAP actions will cost approximately $83.5 million, of which approximately $10.2 million are FTE costs, $45.3 million are capital costs, and $28 million are other costs. On an annual basis, this is equivalent to approximately $16.7 million per year and will require an average of 12.5 FTEs per year.

It was assumed that each FTE cost the equivalent of the average salary for a Management Analyst II and Management Analyst III position, which is the equivalent of approximately $149,000 per year, including salary and benefits.

Table 2 details the number of FTEs needed by year and implementing department. Table 3 details cost estimates by year and implementing department. The following estimates are intended to inform the County's decision-making; actual real-world costs may differ.

Table 2 FTE by Department

Department	2026	2027	2028	2029	2030
IGLA	6.48	7.47	9.20	10.17	8.97
HCD	0.28	0.27	0.43	0.52	0.44
ED	0.16	0.14	0.19	0.17	0.17
ACO	0.49	0.49	0.64	0.64	0.59
PWFP	0.10	0.12	0.12	0.33	0.27
CAO	0.02	0.02	0.02	0.23	0.25
HD	0.69	0.61	0.69	0.74	0.74
DEM	0.14	0.14	0.28	0.31	0.29
MCWRA	1.39	1.39	1.44	1.44	1.44
MCFL	0.02	0.02	0.02	0.02	0.02
Natividad	0.13	0.13	0.13	0.13	0.13
IT	0.09	0.09	0.09	0.09	0.09
SS	0.03	0.03	0.03	0.03	0.03
Total FTE	**10.00**	**10.90**	**13.25**	**14.80**	**13.40**

Notes: ACO = Agricultural Commissioner's Office; CAO = County Administrative Office; DEM = Department of Emergency Management; ED = Economic Development; FTE = full-time equivalent; HCD = Housing and Community Development Department; HD = Health Department; IGLA = Intergovernmental and Legislative Affairs Office; IT = Information Technology; MCFL = Monterey County Free Libraries; MCWRA = Monterey County Water Resources Agency; Natividad = Natividad Medical Center; PWFP = Public Works, Facilities and Parks Department; SS = Social Services.

Source: Analysis conducted by Ascent in 2026.

Table 3 FTE Cost by Department

Department	2026	2027	2028	2029	2030
IGLA	$993,605	$1,178,978	$1,495,770	$1,704,425	$1,547,601
HCD	$43,317	$42,642	$69,949	$87,686	$75,575
ED	$24,917	$22,506	$31,314	$28,065	$28,907
ACO	$75,134	$77,388	$103,703	$106,815	$101,390
PWFP	$14,567	$18,557	$19,114	$54,594	$46,237
CAO	$3,067	$3,159	$3,253	$38,258	$42,354
HD	$105,034	$96,340	$112,244	$123,989	$127,708
DEM	$21,467	$22,111	$44,735	$52,360	$50,695
MCWRA	$213,134	$219,528	$233,841	$240,856	$248,082
MCFL	$3,067	$3,159	$3,253	$3,351	$3,452
Natividad	$19,167	$19,742	$20,334	$20,944	$21,572
IT	$13,033	$13,424	$13,827	$14,242	$14,669
SS	$3,833	$3,948	$4,067	$4,189	$4,314
Total FTE Cost	**$1,533,340**	**$1,721,481**	**$2,155,405**	**$2,479,773**	**$2,312,556**

Notes: ACO = Agricultural Commissioner's Office; CAO = County Administrative Office; DEM = Department of Emergency Management; ED = Economic Development; FTE = full-time equivalent; HCD = Housing and Community Development Department; HD = Health Department; IGLA = Intergovernmental and Legislative Affairs Office; IT = Information Technology; MCFL = Monterey County Free Libraries; MCWRA = Monterey County Water Resources Agency; Natividad = Natividad Medical Center; PWFP = Public Works, Facilities and Parks Department; SS = Social Services.

Source: Analysis conducted by Ascent in 2026.

4.2 CAPITAL COSTS

Capital costs represent the cost of infrastructure such as sidewalks and bike lanes, transit stops, bike racks, and energy infrastructure. For the purposes of this analysis, capital costs correspond to physical assets and equipment with a useful life of five years or more. In this case, all capital costs associated with CCAAP implementation are for transportation projects such as improvements to the local transit system (e.g., adding amenities such as seating, lighting, tree cover, bike storage, and real-time arrival information displays) and installing electric vehicle supply equipment (EVSE). Table 4 details estimated capital costs for near-term actions.

Table 4 Capital Costs by Near-Term Action

Action	2026	2027	2028	2029	2030
TR-1.3 (Increase transit reliability)	$1,125,984	$1,159,764	$1,194,557	$1,230,394	$1,267,305
TR-2.3 (EVSE installation)	$7,399,095	$7,621,068	$7,849,700	$8,085,191	$8,327,746
Total Costs	**$8,525,079**	**$8,780,832**	**$9,044,256**	**$9,315,584**	**$9,595,052**

Notes: EVSE = electric vehicle supply equipment; TR = On-Road Transportation.

Source: Analysis conducted by Ascent in 2026.

4.3 OTHER COSTS

The Other Costs category includes all costs that are not classified as FTE or capital costs. These costs correspond to non-capital expenses (e.g., compost, trees, transit subsidy programs, and consultants). For some actions, the County may need to purchase supplies or materials, and for other actions the County may need to rely on consultants if they do not have the capacity or expertise to perform the work. Materials costs associated with outreach (e.g., organizing workshops, sending mailers) were assumed to be nominal and are not included in the analysis.

Table 5 shows the breakdown of other costs by County department.

Table 5 Other Costs by Department

Department	2026	2027	2028	2029	2030
IGLA	$4,669,814	$4,898,317	$5,524,245	$5,279,161	$5,524,482
HCD	$123,600	$258,152	$280,467	$356,411	$367,103
ED	$61,800	$63,654	$65,564	$67,531	$69,556
ACO	$0	$0	$27,318	$0	$0
PWFP	$0	$35,363	$18,212	$18,758	$19,321
MCWRA	$51,500	$53,045	$54,636	$56,275	$57,964
Total Cost	$4,906,714	$5,308,531	$5,970,442	$5,778,137	$6,038,427

Notes: ACO = Agricultural Commissioner's Office; ED = Economic Development; HCD = Housing and Community Development Department; IGLA = Intergovernmental and Legislative Affairs Office; MCWRA = Monterey County Water Resources Agency; PWFP = Public Works, Facilities and Parks Department.

Source: Analysis conducted by Ascent in 2026.

4.4 EV CHARGING REQUIREMENTS

Countywide, 1,579 public EV charging stations need to be installed by 2030 to support the transition to EVs. The number of new chargers are based on the Central Coast Zero Emission Vehicle Strategy, and the cost per charger is based on the particular charger type (e.g., L2, DC fast charger). Table 6 outlines the quantity and estimated cost of EV charging infrastructure.

Table 6 EV Charging Requirements and Cost Estimates

Charger Type	Existing Chargers[1] as of 2023	Total chargers needed[2] by 2030	New chargers Needed by 2030	Cost per Charger	Total Costs
Level 1 and Level 2 in multifamily dwellings	0	391	391	$3,933	$1,539,168
Level 2 public and workplace	111	996	885	$5,554	$4,917,929
DC Fast	28	59	31	$97,515	$3,032,776
Depot Chargers (up to 150 kW)	0	255	255	$97,515	$24,843,756
Public Chargers (350-1500 kW)	0	16	16	$97,515	$1,584,306
Total	**139**	**1,718**	**1,579**	**NA**	**$35,917,935**

Notes: DC = direct current; EV = electric vehicle; kW = kilowatt.

Source: Analysis conducted by Ascent in 2026 based on Nicholson 2019.

[1] Existing chargers is based on the Central Coast Zero Emission Vehicle Strategy (Santa Barbara County Association of Governments, the San Luis Obispo Council of Governments, and the Association of Monterey Bay Area Governments 2023:3). Data in this document does not include information on the number of chargers in multifamily dwellings specifically; it only states that there were 111 level 2 chargers in total (40 of which are Tesla Destination chargers and 71 Level 2 Chargers. These 111 chargers were assumed to be in the "public and workplace" category for the purposes of this calculation.

[2] Total chargers needed is based on the California Energy Commission's *Assembly Bill (AB) 2127 Electric Vehicle Charging Infrastructure Second Assessment* report (2023). This document contains charging targets by county, including cities and unincorporated areas. The targets were prorated to the unincorporated County only using a factor of 24 percent, which represents the unincorporated County's fraction of the entire Monterey County's population.

5 COST OF ACTION VS COST OF INACTION

Although estimates for the costs of inaction vary greatly, the Climate Policy Initiative estimates $1,266 trillion globally in social and economic costs under a business-as-usual scenario. Potential costs include impacts on health and wellbeing, loss of biodiversity and natural environments, increased climate migration and associated conflict, decreases in productivity due to climate stressors, damage to physical assets, and disruptions to the global economy. Globally, Gross Domestic Product (GDP) could drop by up to 22 percent cumulatively by the turn of the century (WEF 2024: 5) In California, a number of insurance companies have stopped writing new policies or have pulled out of the State's market entirely due to climate related natural disasters such as wildfire and the expensive costs to rebuild, resulting in the increased cost of homeowners insurance..

Studies have also shown that taking action on climate change can lead to long-term economic growth. According to the Global Turning Point Report published by Deloitte, taking action now could add a potential $43 trillion to the global economy between 2021 and 2070 (Deloitte 2022).

The County can have a more realistic view of future costs and prepare it to take advantage of future opportunities by accounting for the current and future impacts of climate change in financial decision making.

6 SOCIAL COST OF GREENHOUSE GASES

GHG emissions impose costs on society ("social costs"), such as extreme weather, wildfires, flooding, and ecosystem disruption. Conversely, reducing GHG emissions has societal benefits. To quantify the impact of these costs and benefits, the US Environmental Protection Agency (EPA) uses the Social Cost of Greenhouse Gases (SC-GHG) metric (EPA 2024).

The SC-GHG is measured in dollars and provides an indicator of the societal impact of emitting or preventing the emission of GHGs. SC-GHG is a "discounted" metric, meaning that costs and benefits of emitting or avoiding the emissions of GHGs are weighted more heavily if they occur sooner, and less heavily if they occur later. For example, assuming a 2 percent discount rate, 100 metric tons of avoided carbon dioxide emissions today is equivalent to 122 metric tons of avoided carbon dioxide emissions in 10 years or 149 metric tons of avoided carbon dioxide emissions in 20 years. All of these avoided emissions values are equivalent to 100 metric tons in terms of "present value"—i.e., how much these emissions would cost society if they occurred today.

Table 7 shows the societal benefits of implementing the CCAAP. If implemented, the CCAAP will cumulatively reduce carbon dioxide emissions by approximately 2,846,000 metric tons from 2026-2045 (i.e., over 20 years), and methane emissions by 26,000 metric tons over the same period. Methane emissions reductions are primarily due to the reduction in landfilled waste, per Action SW-1a and Action SW-1b. This reduction has a present value of approximately 741 million dollars' worth of total societal benefits from 2026 to 2045. On an annual basis, this is equivalent to 45 million dollars per year over the same period.

Table 7 Value of Emissions Reductions from CCAAP Strategies, Based on Social Cost of GHGs

	CO_2	CH_4	Total
Cumulative emissions reductions from strategies, 2026-2045 (metric tons of emissions)	2,820,000	26,000	2,846,000
Total present value of emissions reductions (millions of dollars)	$667	$74	$741
Annual value of reductions (millions of dollars per year)	$41	$5	$45

Notes: CCAAP = Community Climate Action and Adaptation Plan; CO_2 = carbon dioxide; CH_4 = methane; GHG = greenhouse gas.

Dollar values have been inflation-adjusted to the year 2023, which is the latest year of inflation data available (EPA 2024). This calculation assumes a 2 percent discount rate, which is the value recommended by the White House Council of Economic Advisors (2024).

Source: Analysis conducted by Ascent in 2026.

7 FUNDING & FINANCING STRATEGY

Often the challenges in implementing climate and resilience actions are financial. There are many tried-and-true funding sources and financing options that cities and counties leverage to implement clean energy and sustainability projects including competitive state and federal grants and utility incentives. There are a variety of options that can be tailored to meet the County's individual needs.

7.1 FUNDING SOURCES

Table 8 presents the results of a review conducted to identify potential sources for funding CCAAP implementation. This review is intended to provide an overview of the existing mechanisms that can support successful implementation of the CCAAP. These funding programs represent an extensive, but not exhaustive, snapshot of available programs at the time of the CCAAP's publication. The list will need to be updated periodically as grant periods expire and new programs come online.

Table 8 CCAAP Implementation Potential Funding Sources

Funding Source	Description	Funding Type	Issuing Entity
General Fund	Provides funding for the County's primary operating accounts, used to finance core functions like public safety, infrastructure, and community services, with revenues from taxes, fees, and other sources that aren't earmarked for specific purposes.	County	County
Other Funds	Financial resources that are earmarked and restricted for specific purposes, distinct from general revenue, and are used for things like specific programs or projects. Major funding categories include Special Revenue and Trust Funds, Capital Project Funds, Debt Service Funds, Special District/Agency Funds, Special District/Agency Funds, and Enterprise Funds.	County	County
Building Initiative for Low-Emissions Development (BUILD) Program	The BUILD Program is a residential building decarbonization program that provides incentives and technical assistance to support the adoption of advanced building design and all-electric technologies in new, low-income all-electric homes and multifamily buildings.	Incentives	CEC
Electric Program Investment Charge Program - EPIC | California Energy Commission	The EPIC Program funds clean energy research, demonstration and deployment projects that support energy policy goals and promote greater electricity reliability, lower costs, and increased safety.	Grants	CEC
California Air Resources Board (CARB) Carl Moyer Memorial Air Quality Standards Attainment Program	The Carl Moyer Program provides grant funds towards the replacement of old, high-polluting vehicles, engines, and equipment, with new technologies that are cleaner than required or earlier than required by rules and regulations.	Grants	CARB
CAL FIRE Urban and Community Forestry Grants	The program can fund municipal government to increase the long-term benefits trees provide, improve the public's understanding and appreciation of urban trees, and advance urban forest management and tree care.	Grants	CAL FIRE
California Department of Water Resources (DWR) Water Grant and Loans	CA DWR provides several grant and loan programs that support integrated watershed management. These funds can be used to address issues such as groundwater sustainability, drought, and water supply reliability. Programs include the Small Communities Drought Relief Program, the Riverine Stewardship Program, Delta Levees Special Flood Control Projects Program, and the LandFlex Program.	Grants/Loans	CA DWR
California Energy Commission 1 Percent Interest Rate Loans	The California Energy Commission offers 1 percent interest rate loans to local jurisdictions to fund projects with proven energy savings like streetlights and LED traffic signals, building insulation, and energy storage systems at municipal facilities.	Loans	CEC
CalRecycle Greenhouse Gas (GHG) Reduction Loan Program	The GHG Reduction loan program assists recycling manufacturers in financing machinery, equipment, and ancillary costs to site and expand in California.	Grants/Loans	CalRecycle
CalRecycle Local Enforcement Agency Grant Program	CalRecycle administers a non-competitive grant program to assist local enforcement agencies with their solid waste facilities permit and inspection program.	Non-competitive Grants	CalRecycle

Funding Source	Description	Funding Type	Issuing Entity
California Volkswagen Mitigation Trust	This mitigation plan includes a variety of grant categories available to replace diesel vehicles registered throughout the state of California by funding specified eligible actions for the heavy-duty sector, including on-road freight trucks, transit and shuttle buses, school buses, forklifts and port cargo handling equipment, commercial marine vessels, and freight switcher locomotives.	Grants	CARB
Caltrans Active Transportation Planning Program	This program provides competitive planning grants for jurisdictions working on planning projects to increase the proportion of trips accomplished by biking and walking and reduce community-wide vehicle miles traveled.	Grants	Caltrans
Caltrans Transportation Planning Grant Program	The Transportation Planning Grant Program provides competitive planning grants to help local jurisdictions in a variety of transportation planning efforts including development and implementation of regional transportation plans. The program also helps address multimodal transportation deficiencies with a focus on transit and support planning actions that advance climate adaptation efforts for local transportation systems.	Grants	Caltrans
Caltrans Sustainable Communities Program	Grants are for transportation planning activities such as planning for active transportation, safe routes to schools, transit services, vision zero, complete streets, freight corridors, social equity, integrated land use, and transportation planning.	Grants	Caltrans
Energy for All Program	Under the Energy for All Program, GRID Alternatives works with low-income homeowners to install no-cost rooftop solar panels and also provides installation services for affordable housing owners and developers.	Incentives	GRID Alternatives
Federal Transit Administration (FTA) Grant Programs (FTAGP)	FTA provides grants to public transit systems, including buses, subways, light rail, commuter rail, trolleys, and ferries. The program aims to improve economic development and ridership, foster multimodal connectivity and accessibility, improve transit access for pedestrian and bicycle traffic, and enable mixed-use development near transit stations.	Grants	US FTA
Healthy Soils Program (HSP)	The HSP has three components: the Incentives Program, the Demonstration Projects, and the Block Grant Pilot. The HSP Incentives Program provides financial assistance for the implementation of conservation management that improves soil health, sequesters carbon, and reduces GHG emissions.	Grants	CDFA
CDFA - Grant Programs	The CDFA provides various grant programs, including: -Fertilizer Research and Education Program: Funds research and education to advance the environmentally safe and agronomically sound use and handling of fertilizing materials. -Urban Agriculture Grant Program: Funds programs and projects that enhance the viability of urban agriculture in urban areas across the state of CA.	Grants	CDFA

Funding Source	Description	Funding Type	Issuing Entity
HUD Community Development Block Grant (CDBG)	CDBG Program provides annual grants to municipal governments to support community development activities to build stronger and more resilient communities. Activities may address needs such as infrastructure, economic development projects, public facilities installation, community centers, housing rehabilitation, public services, clearance/acquisition, microenterprise assistance, code enforcement, and homeowner assistance.	Grants	US HUD
Infrastructure State Revolving Fund (ISRF)	The California Infrastructure and Economic Development Bank provides loans to local governments for infrastructure and economic development. ISRF has financed projects such as city and county street highway improvements, wastewater treatment plant construction and upgrades, and educational and cultural facilities.	Loans	CA iBank
Low-Income Weatherization Program (LIWP)	LIWP provides low-income households with solar photovoltaic systems and energy efficiency upgrades at no cost to residents.	Incentives	CSD
Regional Resilience Planning and Implementation Grant Program (RRGP)	The RRGP program hosted by the Office of Land Use and Climate Innovation (LCI) funds local public entities that are planning and implementing projects that advance climate resilience and respond to the greatest climate risks in their regions including wildfires, rising sea levels, droughts, floods, increasing temperatures, and extreme heat events. The RRGP funds two project types: planning and implementation.	Grants	LCI
Senate Bill 1 Sea Level Rise Adaptation Planning Grant Program - California Ocean Protection Council	Provides funding to local and regional governments to develop sea level rise (SLR) adaptation plans and implementation projects.	Grants	CCI
SB 2 Planning Grant Program (SB2P)	This planning grant program provides financial and technical assistance to local governments to update planning documents and zoning ordinances, including general plans, community plans, specific plans, sustainable community strategies, and local coastal programs, to streamline housing production. The program does not use a competitive process to award funds.	Grants	HCD
3CE Residential Rebates & Incentives	3CE offers residential rebate and incentive programs including Electrify Your Home, Electrify Your Ride, New Construction Electrification Program, and Residential Battery Rebate Program.	Rebates/Incentives	3CE
3CE Commercial Rebates & Incentives	3CE offers commercial rebate and incentive programs including Electrify Your Ride and New Construction Electrification.	Rebates/Incentives	3CE
Ag Electrification Program - Central Coast Community Energy	The Ag Electrification Program provides rebates to Central Coast Community Energy (3CE) customers who replace fossil fuel powered agricultural equipment with new, all-electric equipment. Eligible equipment includes irrigation pumps, farm tools, utility vehicles, and other equipment. Programs include the Ag Electrification Program, the Electrify Your Ride Program, and the 3CE Electric Bus Program.	Rebates/Incentives	3CE
Rebates & Incentives | PG&E	List of energy rebates and incentives for homes and businesses.	Rebates/Incentives	PG&E

Funding Source	Description	Funding Type	Issuing Entity
Residential — Central California Rural Regional Energy Network	CCR REN's Commercial Energy Improvement Program (CEIP) helps small businesses in underserved communities access energy-saving and electrification solutions. Our goal is to help businesses cut energy use, lower costs, and reduce greenhouse gas emissions—all while improving comfort and operations. The program provides: Free technical support, Incentives, and Direct installation of energy-efficient upgrades	Incentives/Technical Support	CCR REN
Commercial — Central California Rural Regional Energy Network	Through a partnership with community-based nonprofit Rising Sun Center for Opportunity, CCR REN offers free, personalized equipment through the Climate Careers Green House Call program, making energy efficiency easy for rural homeowners and renters.	Incentives/Technical Support/Equipment	CCR REN
Grants & Incentives - Monterey Bay Air Resources District	The District administers a wide variety of grant programs to incentivize projects that clean our air and reduce health impacts. Funding is primarily focused on mobile source projects that reduce or eliminate pollution from cars, trucks, marine vessels, agricultural equipment, construction equipment and for projects that encourage the use of low emissions or zero emissions transportation such as vanpools and electric vehicle replacements.	Grants/Incentives	MBARD
Low Income Solar Programs	The California Public Utilities Commission (CPUC) and other agencies under the California state government offer programs that allow income-qualified residential customers to receive financial assistance on solar panel installations, battery installations, and energy efficiency efforts.	Incentives/Other	CPUC
Strategic Growth Council (SGC) Affordable Housing and Sustainable Communities (AHSC) Program	This program funds affordable infill housing and transportation projects that help to advance statewide climate and equity goals. Funds are available in the form of loans and/or grants in three kinds of project areas: Transit-Oriented Development Project Areas, Integrated Connectivity Project Areas, or Rural Innovation Project Areas.	Grants/Loans	SGC
SGC Transformative Climate Communities (TCC)	The TCC Program funds development and infrastructure projects that achieve major environmental, health, and economic benefits in California's most disadvantaged communities and empowers communities most impacted by pollution to choose the strategies and projects best suited to achieve their community vision.	Grants	SGC
Sustainable Transportation Equity Project (STEP)	The STEP program provides grants for a variety of clean transportation and supporting projects, such as public transit and shared mobility services, active transportation infrastructure, land use planning and housing policy, workforce development, and clean transportation planning and education. Funded projects work together within low-income and disadvantaged communities to increase transportation equity.	Grants	CARB

Funding Source	Description	Funding Type	Issuing Entity
California Natural Resources Agency Grant Programs	The California Natural Resources Agency Bonds and Grants unit administers various programs from grant guideline development through grant award, completion, and post-monitoring -Urban Greening Grant Program: Funds projects that reduce GHGs by sequestering carbon, decreasing energy consumption and reducing vehicle miles traveled, while establishing and enhancing parks and open space, using natural solutions to improve air and water quality and reducing energy consumption, and creating more walkable and bike-able trails. -Environmental Enhancement and Mitigation Program: Funds projects that contribute to mitigation of the environmental effects of transportation facilities. These include urban forestry projects designed to offset GHG emissions. -Urban Green Infrastructure Program: Funds multi-benefit green infrastructure investments in or benefitting disadvantaged or severely disadvantaged communities.	Grants	CNRA
The Environmental Quality Incentives Program (EQIP)	The program provides technical and financial assistance to agricultural producers and forest landowners to integrate conservation into working lands to address natural resource concerns. Technical assistance is provided at no cost while financial assistance is provided through competitive grants through Conservation Innovation Grants.	Grants	USDA

Notes: 3CE = Central Coast Community Energy; CA DWR = California Department of Water Resources; CAL FIRE = California Department of Forestry and Fire Protection; CalRecycle = California Department of Resources Recycling and Recovery; Caltrans = California Department of Transportation; CARB = California Air Resources Board; CCAAP = Community Climate Action and Adaptation Plan; CCI = California Climate Investments; CCR REN = Central California Rural Regional Energy Network; CDFA = California Department of Food and Agriculture; CEC = California Energy Commission; County = County of Monterey; CNRA = California Natural Resources Agency; CPUC = California Public Utilities Commission; CSD = California Department of Community Services and Development; GHG = greenhouse gas; HCD = California Department of Housing and Community Development; IRS = Internal Revenue Service; LCI = California Governor's Office of Land Use and Climate Innovation; MBARD = Monterey Bay Air Resources District; PG&E = Pacific Gas & Electric; SGC = Strategic Growth Council; US DOE = US Department of Energy; US EPA = US Environmental Protection Agency; US FTA = US Federal Transit Administration; US HUD = US Department of Housing and Urban Development; USDA = US Department of Agriculture.

Source: Compiled by Ascent in 2026.

Many capital-intensive pilot projects are funded through state or federal grants, and grants can provide 'repayment-free' capital for local governments, making them a strong option for the County.

Resources must be dedicated to researching, tracking, and applying for grants to be successful. Local governments can employ a full-time grant writer or allocate resources to contracting with a professional grant writer due to the significant time that is required to build partnerships, develop competitive grant proposals, and report on awarded grants. However, grant funding can be a great resource for implementing capital-intensive projects that may not be able to be funded through the County's operating budget or other means.

As Table 2 outlines above, there are a multitude of grants available for everything from pedestrian-friendly infrastructure to local microgrid deployment. Grants should be considered when the County plans to own the project at completion, when there is high upfront capital cost, when revenue generation is insufficient to cover costs or if there is no revenue generation from the project, and when there is strong alignment between the County and State's goals in sectors like transportation and natural and working lands. Grant availability and match with CCAAP actions are important considerations when deciding if and when to pursue grant funding.

7.2 FINANCING OPTIONS

Financing refers to the lending and/or borrowing of money to help pay for the CCAAP's implementation. Options such as loans, bonds, and other cost sharing mechanisms are designed to meet short-term capital needs based on the potential for payback (e.g., electricity savings from installing energy-efficient lighting). New and existing financing options can help the County and its residents secure capital for long-term investments in climate action and resilience.

Table 9 describes several common financing options used for climate action and resilience projects.

Table 9 CCAAP Implementation Financing Options

Financing Option	Description
Energy-efficient mortgages	Includes the cost of clean energy improvements, such as renewable energy and the installation of energy-efficient windows, into a single primary mortgage during the purchase or refinance of residential real estate.
Energy loans and credit enhancements	States, local governments, or utilities may leverage taxpayer or ratepayer funds to provide more favorable loan rates and terms than traditional financing to finance clean energy improvement. Credit-enhanced lending is a public-private partnership whereby governments use funds to encourage private lenders, or sponsors, to offer attractive loans to select markets.
Energy equipment leases	Consumers, organizations, and government agencies often use leases to stretch the payment for large clean energy investments over several years. High-efficiency heating, ventilation, and air conditioning (HVAC) equipment or solar photovoltaic panels are common investments that may be a good fit for leases.
Green banks	Green banks are public, quasi-public, or nonprofit financing entities that leverage public and private capital to pursue goals for clean energy projects that reduce emissions.
Municipal bonds and green bonds	State and local governments may issue bonds to finance capital improvement projects, including clean energy projects. Tax-exempt municipal bonds are issued for a specific public purchase and deliver cash interest payments to the bondholder. Green bonds are a bond instrument that use proceeds to finance or refinance environmental, water, or clean energy projects.

Financing Option	Description
On-bill loan programs	On-bill loan programs enable utility customers to borrow money for energy improvements, which generate energy savings and allow customers to pay back the investments over time through their utility bills.
Commercial property assessed clean energy	Property assessed clean energy (PACE) is a financing tool that allows property owners to finance the upfront cost for qualified energy, water, resilience, and public benefit projects with funding through a voluntary assessment on the property tax bill. Commercial PACE (C-PACE) programs are the most prevalent type of PACE policy and program in the US.
Revolving loan funds	Revolving loan funds use a source of capital, typically offered by a local or state government, to make direct loans to borrowers for clean energy projects.
Inclusive utility investments: tariffed on-bill programs	Tariffed on-bill programs, also referred to as inclusive utility investment programs, enable a utility to pay for cost-effective energy efficiency or other clean energy upgrades at a customer site. The utility recovers those costs through a fixed, site-specific charge on the customer's monthly utility bill that is less than the estimated savings from energy bill reductions.

Notes: CCAAP = Community Climate Action and Adaptation Plan; PACE = property assessed clean energy.

Source: Compiled by Ascent in 2026.

Of the financing tools available to the County, a green bank may be a strong option to finance CCAAP implementation. A green bank is a financing entity that is generally administered by a local or state agency or a nonprofit. They are community-based entities and are designed for community benefit. Some of the key features of green banks include:

- **Mission-driven:** Green banks are created to alleviate environmental or social harm, not just to pursue financial gains.
- **Sustainability-focused:** Green banks generally focus on clean energy and energy efficiency investments.
- **Leverage seed funding to attract private capital:** By providing different forms of supporting capital to help derisk investments, green banks make investments in projects for low- and middle-income households more attractive to banks and institutional investors.
- **Focus on bridging existing market gaps:** Green banks are generally formed to meet a specific need that is missing in the community.
- **Often focus on investments in low- and middle-income communities**: As part of green banks' broader mission, they often focus on alleviating climate injustice and overcoming financial barriers for low- and middle-income households.

Green banks have grown in popularity since 2011, when the Connecticut Green Bank was established to support clean energy and energy efficiency adoption in the state. The first national Green Bank, funded by a $5 billion grant from the National Clean Investment fund, was established in 2024 by the Coalition for Green Capital.

Green banks use a combination of funding streams (e.g., utility ratepayer funds, private capital, state or federal funding). The County could form, partner to form, or support the creation of a green bank to support CCAAP implementation and spur innovation. However, local governments must consider if they have the legislative authority to establish a green bank.

The steps to forming a green bank include:

1. **Explore partnership opportunities:** Potential County partners might include Bay Federal Credit Union, Beneficial State Bank, 3CE, impact investing firms, California Coastal Rural Development Corporation, and the Coalition for Green Capital.

2. **Secure a source of seed funding:** Seed funding can come from the County, a state agency, philanthropy, or another source. It is best practice to secure either a large upfront sum or an ongoing funding commitment in order to ensure the bank can meet lending demand.
3. **Determine lending parameters:** Program parameters such as eligible technologies, lending terms, key success metrics, and consumer protections must be agreed upon. Ideally such decisions are community-based and meet a specific market need.
4. **Design and launch the bank:** Next, the County would determine the bank's organizational structure, hire staff, rent office space, and select a board of directors.
5. **Evaluate program success and make any needed adjustments:** This is an ongoing process in which the County would measure program success, evaluate program against key success metrics, and make any necessary adjustments to the program over time.

8 LIMITATIONS

This cost analysis uses best available information, data, and methods to assume costs to the County to implement the CCAAP. Cost and staffing impact results should be considered estimations. The analysis relies on reasonable assumptions about the expected work to be performed because there is limited information about the specific tasks that would be required to implement CCAAP actions. Over time, specific tasks required to implement CCAAP actions will become clearer and considerations for how to coordinate and sequence activities can be made, which may also affect ultimate costs and staffing levels.

This analysis evaluates the County's implementation costs and staffing needs for the CCAAP's first five years, following adoption through 2030. Some CCAAP actions may be implemented and have costs beyond the scope of this initial cost analysis; these costs were not estimated. Cost estimates can be updated through the CCAAP monitoring update processes, and/or through the County's forecasting.

In many cases, GHG reduction and climate adaptation measures and associated implementing actions call for the continuation or expansion of programs and policies that already exist. Existing and expanded programs often incur less upfront costs to the County because they are supported by existing resources. This analysis does not account for current staff capacity or potential efficiencies that could be gained by consolidating similar tasks across existing work efforts.

Many actions involve associated activities by County residents, businesses, and developers that have private costs, such as buying an EV or installing new electric appliances in place of conventional appliances. These private costs were not considered in this analysis. Additionally, this analysis does not include cost savings for the same parties. Many actions are likely to result in net cost savings, such as energy retrofits which would result in utility bill savings or fueling vehicles with electricity instead of gasoline, which would reduce fuel costs.

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Appendix G

Relevant Climate Legislation

CALIFORNIA CLIMATE LEGISLATION

State climate regulations shape the development of Monterey County's Climate Action and Adaptation Plan (CCAAP). California has enacted extensive legislation targeting greenhouse gas mitigation and climate adaptation, providing guidance for local climate planning efforts. The following section outlines California's greenhouse gas reduction targets and climate adaptation requirements that provide the regulatory framework informing the development of the CCAAP.

Mitigation Legislation

EO S-3-05 was signed in 2005, which directed California to reduce statewide GHG emissions to 1990 levels by 2020 and 80 percent below 1990 levels by 2050. A year later, the Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32) was passed, establishing regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions. AB 32 put a cap on GHGs and set a target of reducing statewide emissions to 1990 levels by 2020. In 2008, the California Air Resources Board (CARB) developed the Climate Change Scoping Plan: A Framework for Change (2008 Scoping Plan) as part of its role in implementing AB 32 and EO S-3-05 (CARB 2008). The 2008 Scoping Plan, along with its update in 2014, described the approach California would take to reduce GHG emissions to achieve reduction targets and goals. In 2016, California achieved the AB 32 target of reducing GHG emissions to 1990 levels, four years ahead of schedule, based on its reported statewide 2016 inventory (CARB 2022). The annual statewide GHG inventories for 2017, 2018, 2019, and 2020 have shown that the state continues to achieve the AB 32 target.

In September 2016, Senate Bill (SB) 32 codified into statute the midterm 2030 target of 40 percent below 1990 levels by 2030. In November 2017, CARB published California's 2017 Climate Change Scoping Plan Update (2017 Scoping Plan) (CARB 2017), which lays out the framework for achieving the 2030 target as established in SB 32. The 2017 Scoping Plan identifies GHG reductions by emission sectors to achieve a statewide emissions level that is 40 percent below 1990 levels by 2030.

The California Climate Crisis Act (AB 1279), signed in September 2022, further established the State's GHG emissions reduction targets to 85 percent reduction in human caused emissions below 1990 levels by 2045 and carbon neutrality by 2045.

Pursuant to AB 1279, CARB's 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan) reports statewide GHG emissions for eight sectors: agriculture, residential and commercial, electric power, high global warming potential gases, industrial, recycling and waste, transportation, and Cap-and-Trade. The 2022 Scoping Plan reports the 1990 emission levels and ranges of reductions needed to meet the goals of AB 1279. The 2022 Scoping Plan provides the following guidance to local agencies seeking to adopt GHG reduction targets in climate action planning efforts: although net zero targets can often be valuable and achievable, and mitigation is important, targets need to be considered in the larger context of these goals (CARB 2022: 269).

Adaptation Legislation

In 2009, the State released its first climate adaptation strategy, *Safeguarding California.* The passing of AB 1482 in 2015 required the California Natural Resources Agency (CNRA) to update the State's climate adaptation strategy by July 1, 2017, and every 3 years thereafter. The most recent update of the strategy, which is now called the *Safeguarding California Plan,* contains implementation measures and specific actions and responsibilities for State agencies to carry out those policies. AB 1482 also required CNRA, in collaboration with the Strategic Growth Council, to oversee and coordinate these State agency adaptation actions.

SB 246, signed in 2015, directed the California Governor's Office of Planning and Research (OPR) to establish the Integrated Climate Adaptation and Resilience Program. The program has two components: the State Adaptation Clearinghouse and the Technical Advisory Council. The goal of these initiatives is to coordinate regional and local efforts with State climate adaptation strategies to improve resilience to the impacts of climate change across California. This bill also required OPR to review and update, as needed, the *California Adaptation Planning Guide*.

Also adopted in 2015, SB 379 requires cities and counties within California to integrate climate change vulnerability, adaptation strategies, and emergency response strategies into the safety element of their general plans. The bill requires the preparation of a vulnerability assessment, which must identify the risks from climate change impacts, using federal, state, regional, and local climate vulnerability documentation. Adaptation policies, goals, and objectives are to be developed based on findings from the vulnerability assessment, and jurisdictions are required to create a set of feasible implementation measures to reduce climate change impacts on new or proposed land uses. Lastly, SB 379 states that jurisdictions that have adopted a climate adaptation plan separate from the general plan may reference that document to comply with SB 379 requirements if such a plan fulfills commensurate goals and objectives and contains the information required pursuant to SB 379.

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