

EMERGENCY RADIO COVERAGE GAPS IMPACTING MONTEREY COUNTY FIRE AGENCIES



Fire at Big Sur January 23, 2022
Source: Brock Bradford, Big Sur Photography.

SUMMARY

Challenging terrain, funding limitations, and delayed adoption of new technology have led to inadequate and inconsistent radio communications for the fire districts serving unincorporated areas of Monterey County. As a result, residents and emergency responders face the risk of experiencing communication failures during life-saving and property-protecting emergencies.

Emergency communication systems are supported by the Monterey County Information and Technology Department (ITD). The ITD's Next Generation Radio Network (NGEN) initiative has begun testing new technology solutions but lacks sufficient funding to fully implement them.

The rugged terrain in Monterey County creates radio communication dead zones (areas with no coverage) and zones with weak or limited coverage. However, advancements in cell phone technology, low-orbit satellites, and modern multifunctional (analog, digital, LTE, and Wi-Fi) durable radios have the potential to eliminate these communication gaps.

Implementation of these solutions will be challenging for local fire districts. The County Fire Districts' primary source of funding is their allocation of the property taxes collected under State Assembly Bill 8. These revenues were severely affected by Proposition 13, passed in 1978, which limited property tax reassessments primarily to the time of property sales. The County has not identified a dedicated funding mechanism specifically for radio modernization in unincorporated fire districts.

The Civil Grand Jury (CGJ) recommends that the Monterey County Board of Supervisors (BOS) take the necessary actions to fund and implement the communication upgrades required to eliminate the emergency radio communication "dead zones" in Monterey County. This includes ensuring that all fire districts have radios compatible with the County's emergency communication system.

BACKGROUND

The Civil Grand Jury (CGJ) has an longstanding interest in fire safety and radio communication. In reviewing the issue, the CGJ found that it had been addressed in prior Civil Grand Jury reports as well as in the 2020 Local Agency Formation Commission (LAFCO) study: "Special Districts Providing Fire Protection and Emergency Medical Services in Unincorporated Monterey County." This report focuses on several key findings from those earlier efforts.

The Origins of Fire Districts

The earliest records of fire outbreaks in Monterey County date back to the 1870s, when settlers began populating the area. Initially, residents were primarily responsible for fighting fires. However, in 1934, a local agricultural advocacy group requested the establishment of fire protection services to protect local farms. Since then, there has been a history of fire district creation, mergers, and separations, resulting in the current system of 11 fire districts covering unincorporated Monterey County and the Monterey Regional Airport. See Table 1 for a list of these districts. While most municipalities have their own fire departments, two volunteer-based fire districts, Mid-Coast and Big Sur Brigades, have also been established. Additionally, portions of Monterey County receive fire suppression services from federal and state agencies. In total, 18 fire suppression agencies provide services to 31 areas or communities throughout the County. All agencies participate in mutual aid agreements. For a comprehensive list, see Appendix A.

The Local Agency Formation Commission (LAFCO) is an agency that coordinates logical and timely changes to local government boundaries, including annexations and detachments of territory, the incorporation of cities, and the formation, consolidation, merger, or dissolution of special districts. LAFCO currently has influence over 11 of the unincorporated fire districts.

Fire protection services in unincorporated Monterey County are provided by multiple independent special districts. Each district has its own governance authority and funding allocation, which complicates countywide planning and contributes to uneven adoption of radio communication technology. These unincorporated districts, listed in Table 1, cover approximately 958,000 acres, or 45.6%, of the County's total 2.4 million acres. The remaining approximately 1.4 million acres are covered by municipal fire departments, the California Department of Forestry and Fire Protection (CalFire), and the Federal Government, including the former Fort Ord, Fort Hunter Liggett, Los Padres National Forest, and Ventana Wilderness Area. See Figure 1 for coverage by each fire district.

**Table 1. Fire Districts Covering
Unincorporated Areas of Monterey County**

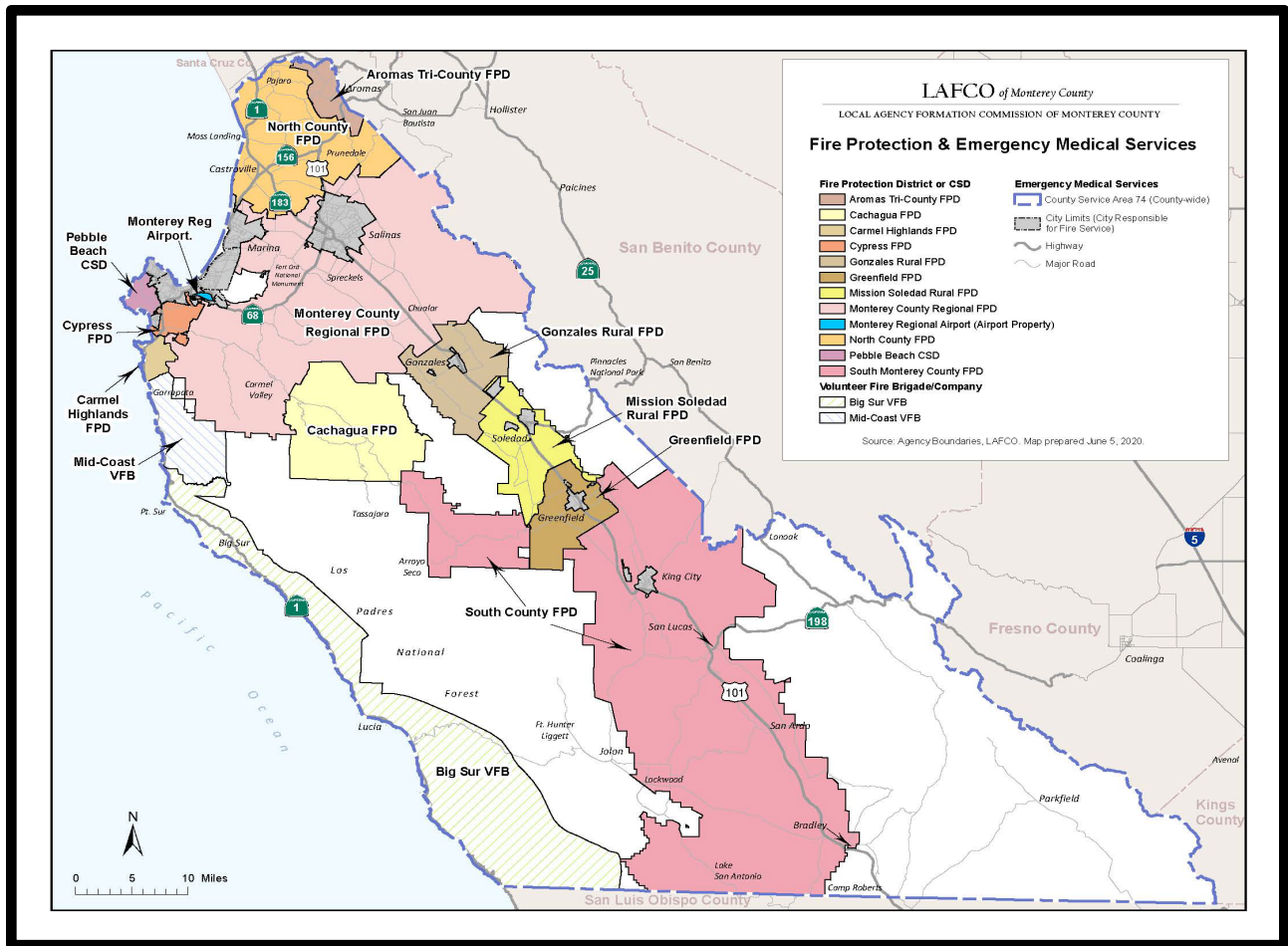
Airport District
Monterey Peninsula Airport District
Fire Districts
Aromas Tri-County Fire Protection District
Cachagua Fire Protection District
Carmel Highlands Fire Protection District
Cypress Fire Protection District
Gonzales Rural Fire Protection District
Greenfield Fire Protection District
Mission-Soledad Rural Fire Protection District
North County Fire Protection District
Monterey County Regional Fire Protection District
South Monterey County Fire Protection District

On June 22, 2020, LAFCO of Monterey County released a study titled "Special Districts Providing Fire Protection and Emergency Medical Services in Unincorporated Monterey County." In this study, LAFCO identified 20 key findings across 14 fire districts and brigades (Appendix B). The CGJ focused on two of these findings, as worded in the LAFCO report:

- 1. Public Safety radio infrastructure costs have become overwhelming due, in part, to the advent of digital radios. Radio equipment life expectancy has been reduced, and coverage diminished due to the limited range of digital radios (compared to analog radios). The costs have risen sharply (LAFCO Finding #19).*

2. Agencies have struggled with financial sustainability largely because of a funding model based primarily on property tax, which has proven inadequate to support operations (LAFCO Finding #6).

Figure 1: The physical area covered by each of the fire districts within Monterey County



Source: LAFCO report dated June 20, 2020.

Emergency Communication Oversight: Next Generation Radio Network (NGEN)

Monterey County's Information Technology Department (ITD) supports the radio equipment necessary for successful emergency communication between all cities and unincorporated areas of Monterey County. In collaboration with County-wide contributors, the ITD also developed the NGEN (Next Generation Radio Network)

strategic plan, which outlines a proposed path to maintain and improve emergency communication. A Consolidated Dispatch Center, 9-1-1, serves as a single communications center for the County's cities and unincorporated areas. This dispatch center, developed in the late 1970's and located in Salinas, was recognized as the first wide area consolidated 9-1-1 system in the nation.

Types of Radio Communication and Promising Technologies

There are several different types of communication devices:

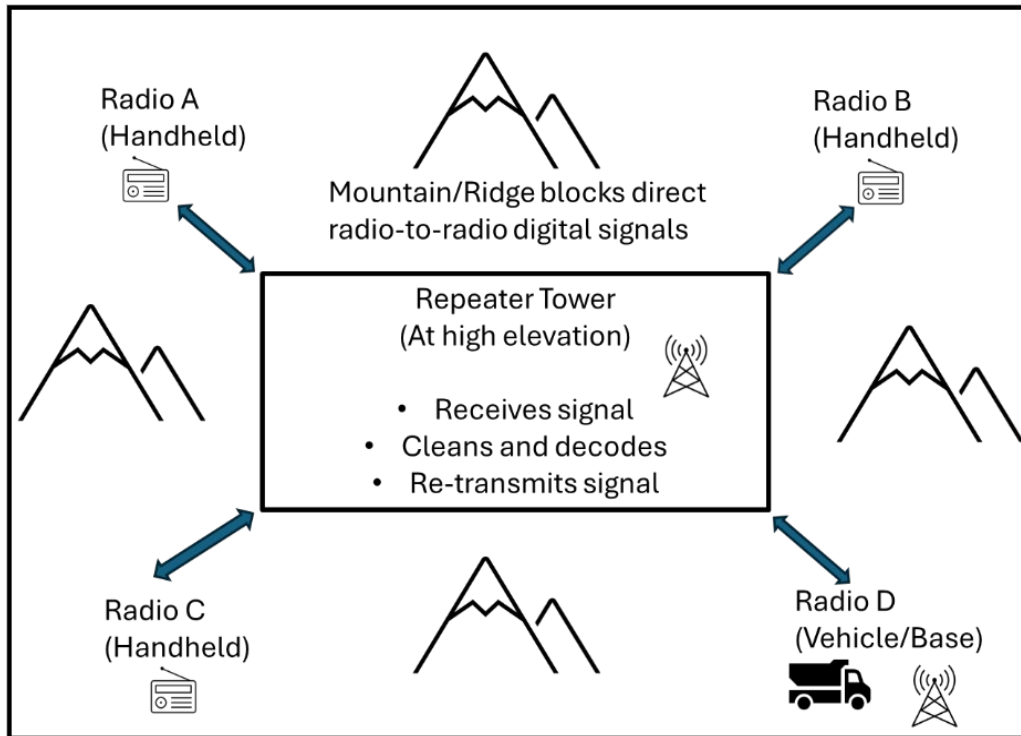
1. Analog radios are a simple, more affordable, and traditional way of transmitting audio signals that work well in mountainous areas but are more prone to static.
2. Digital radios are the newer counterpart to analog radio. using a digital format to transmit audio signals. They offer a wider range of channels and provide clearer communication, but are limited to line-of-sight situations or to areas with repeater towers.
3. Cellular radios work like cell phone technology and rely on satellites such as Starlink. This is a newer and more expensive technology.

A mix of digital and analog radio devices is currently used by all fire districts, departments, and agencies in Monterey County. Wireless radio devices are currently being tested but are not available to all fire districts.

Cell Towers and Repeaters

A network of towers located in strategic points throughout the County supports digital radio communications for both fire and police agencies. These towers occupy high points and are designed to receive and retransmit line-of-sight communications across the County, including microwave and digital signals. The installation of towers and repeaters is very costly, as repeaters are typically situated on peaks with no road access amid steep terrain. Figure 2 shows how repeater towers function.

Figure 2: Repeater towers are required at high elevations for digital communication to be effective in highly varied terrain

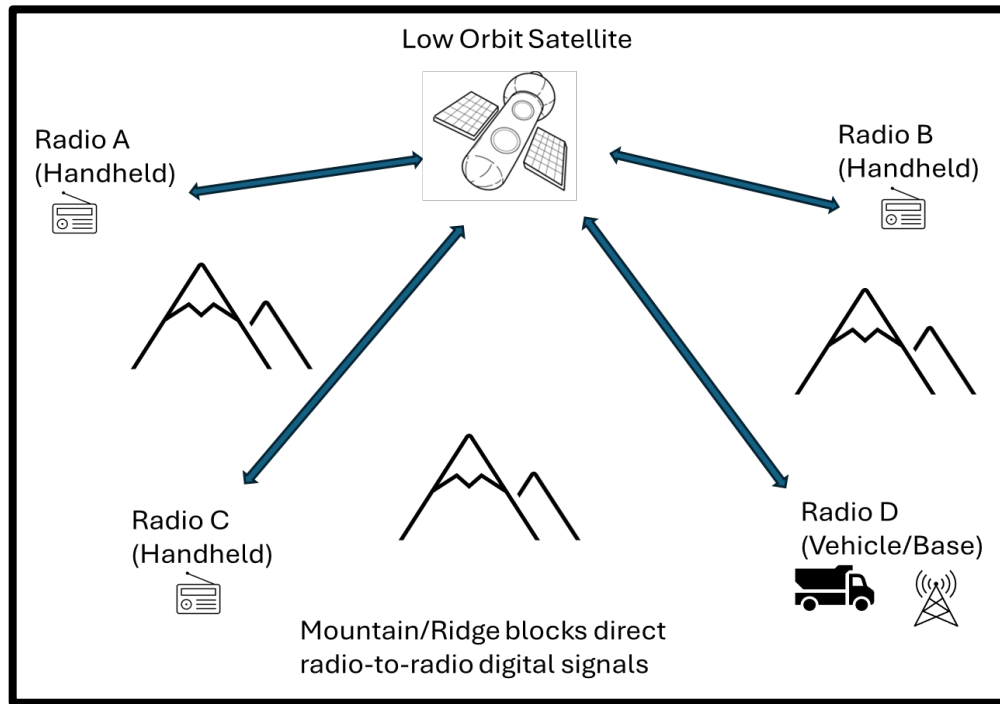


Source: Diagram by Civil Grand Juror.

Wireless Transmission: LTE and Wi-Fi

With the recent advances in technology, the most promising radio communication methods currently available use wireless data transmission for fast mobile internet, known as LTE (Long-Term Evolution), in conjunction with Wi-Fi. This combination allows certain portable radios to connect to cellular data for voice communication. Notably, this technology is faster than standard digital communications and uses low-orbit satellites, such as Starlink, thereby reducing or eliminating the need for additional cell towers. Figure 3 shows how radio communication operates with LTE and Wi-Fi in diverse terrains. Specific radios are required to support LTE and Wi-Fi, while maintaining compatibility with analog and digital. Additionally, there is a monthly fee associated with using LTE and Wi-Fi services.

Figure 3: Satellites are used to support LTE and Wi-Fi communications in areas of a highly varied terrain

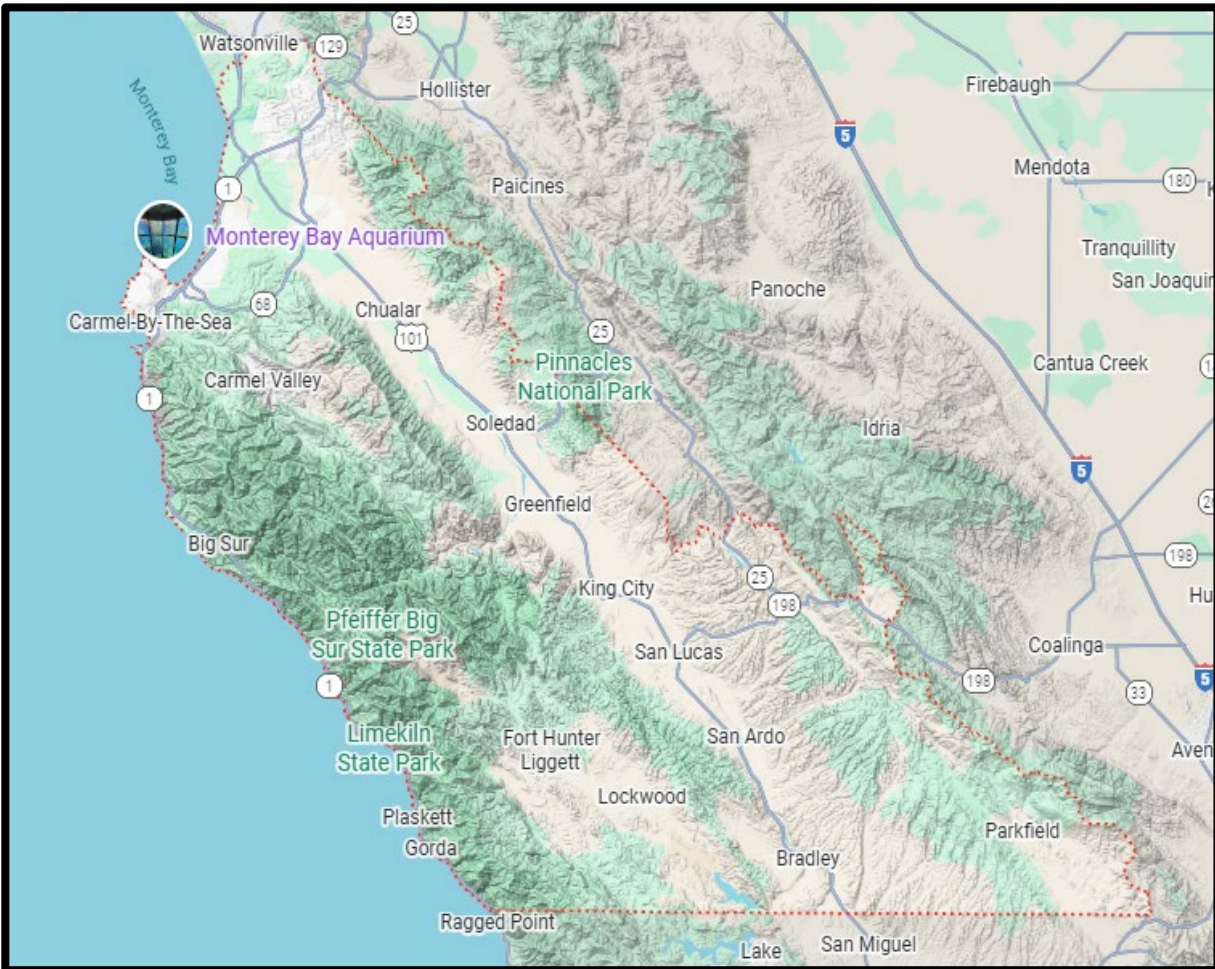


Source: Diagram by Civil Grand Juror.

Topography

Monterey County's vast size and rugged topography pose significant challenges to public safety communication systems. With a population of roughly 425,000, the County spans more than two million acres of scenic central coastal lands, ranging from sea level to over 5,800 feet in elevation (see Figure 4). Approximately 185,000 acres of the County are designated military lands, and approximately 470,000 acres are in the Los Padres National Forest and Ventana Wilderness Area. This highlights the importance of communication not only among County fire agencies but also with the Federal and State fire agencies.

Figure 4: Map of Monterey County (outlined by the red dotted line) showing large variation in terrain throughout the County



Source: Map Data: © 2026 Google (<https://www.google.com/maps/>: accessed January 2026).

The Increasing Fire Threat

The County's fire suppression strategies have become more complex over the years, while the number of fires has continued to rise. Factors, such as changes in the environment, vegetation, a warmer and drier climate, and a tendency toward drought, make Monterey County highly susceptible to wildfires. CalFire has designated Monterey County as a high to very high fire-hazard severity zone. Meanwhile, the departure of major fire insurance companies is leaving homeowners without adequate coverage options. In Monterey County alone, over 500,000 acres burned between 2000 and 2022.



**Sunset over Monterey Bay obscured by smoke from the Dolan Fire
in Big Sur, CA, August 20, 2020**

Source: Civil Grand Juror.

METHODOLOGY

The Civil Grand Jury (CGJ) investigated the effectiveness and interoperability of radios across the various fire departments and districts in Monterey County. This was accomplished by visiting several County offices and departments involved in ensuring effective communication 24 hours per day, including during an emergency.

The CGJ also interviewed representatives from state, county, and city fire departments and districts about the effectiveness of radio communications. Jurors interviewed county representatives familiar with radio technology and communication constraints in Monterey County.

Additionally, the CGJ requested, received, and analyzed relevant documentation on the effectiveness and interoperability of radio technology used for fire emergency response

across Monterey County, including maps showing the effectiveness of various communication types across the County.

DISCUSSION

Known Radio Coverage Gaps

All interviewees acknowledged that portions of Monterey County are radio dead zones. Some of these areas result from the County's rugged terrain, while others are caused by buildings with thick and heavy walls that prevent radio signals from penetrating. In November 2023, the most prevalent areas with limited coverage were identified as follows:

- County-wide coverage inside buildings
- Outdoor areas: North Salinas, Bolsa Knolls, Prunedale, Pajaro, San Benancio, Carmel Valley Village, Green Bridge, King City, Bryson, San Ardo Oil Field, Bitterwater/HWY 25 Road, and the Big Sur area.

The CGJ was provided with information highlighting outdoor areas with no or limited radio coverage, depending on the type of communication (analog vs. digital) in use. The CGJ analyzed this information to categorize the communication transmission data (see Appendix C). For digital coverage, the metric measured the bit-error (BER) rate of transference, which measures the success rate of a transmitted digital communication stream. Analog radio performance was measured in decibel milliwatts (dBm), a unit that reflects signal power. The results of this analysis are shown in Table 2.

In summary, analog radio communication covers more of the County than digital, but its quality is inferior. Audio signal strength can steadily degrade, making it much noisier.

Table 2: NGEN Digital and Analog Radio Performance

Transmission Categories	Digital Radio Coverage	Analog Overlay Radio Coverage
A stable and clean connection, with few if any errors and strong audio.	56% of Monterey County land. (BER > 0.0)	72% of Monterey County land. (< 0 dBm)
A weak or unstable connection. Static, muting, hissing, loss of connection or multiple errors.	2% of Monterey County land. (BER > 4.0)	10% of Monterey County land. (< 100 dBm)
No connection. The radio receiver cannot lock on the signal or decode the data at all.	42% of Monterey County land. (No transmission)	18% of Monterey County land. (No transmission)

Increasing the number of repeater towers could greatly enhance coverage, but the locations where these towers would be most effective generally lack access roads or platforms for installation, driving the cost of installing a single tower to over \$1 million. Multiple towers would be required to eliminate these dead zones, but the County currently lacks the funding to support this solution.

The overall area of Monterey County covered by both analog and digital communication is 73.3% per ITD. This is estimated to include 99.5% of the County’s population. However, the low-population areas that are not covered by analog or digital communication remain at risk of wildfires and other emergencies that require urgent communication and response.

Operational Effects on Firefighters

The CGJ found that the types of radios used vary by fire district and department. Some rely on analog equipment, while others use digital or a combination of both. Further, emergency personnel must know the specific frequency their radio must transmit on, which requires a manual reset depending on their location in the County and the type of

communication being used. This knowledge is inherently understood and applied by long-term firefighters who have adopted a “make it work” approach. However, for new personnel or those traveling outside of their usual district, this can lead to delays in communication or even complete breakdowns, potentially putting lives and property at risk.

Actions Taken by Monterey County

1. *Development of Next Generation Radio Network (NGEN)*

Monterey County’s ongoing NGEN project was created to enhance the reliability of the emergency communication network and address the gaps in radio coverage throughout the County.

The NGEN Executive Board is responsible for making recommendations regarding the cost, nature, and scope of the public-safety radio communications services provided to their organizations. The NGEN budget may be supplemented to address specific needs such as purchasing special or upgraded equipment, replacing failed equipment, purchasing system software and hardware, and upgrading physical communications sites. This NGEN Board recommends equitable apportionment and cost-sharing methods for such special costs among the parties, including the County and the emergency response agencies that use their services.

The NGEN Operations Board makes operational policy recommendations to the NGEN Executive Board based on reports from the County Radio Manager, or other County staff, on all policy matters pertaining to budget, personnel, equipment, operations, or fiscal issues that could affect costs to agencies and parties.

2. *Investment in Infrastructure*

Monterey County ITD, under the oversight of the NGEN Executive Board, has made a significant investment to modernize and upgrade the backbone of the County’s Information Technology infrastructure. This upgrade aims to enhance communication coverage and ensure real-time failover and backup of the NGEN operations in case of a

single system fail or a power outage. A portion of this investment is shown in the photograph below.

Under an agreement between the NGEN Executive Board and the fire departments and districts, Monterey County is responsible for funding and implementing all centralized infrastructure required to ensure effective communication throughout the County. The fire departments and districts, in turn, have agreements with the County to reimburse it for the use of their 9-1-1 services and the maintenance of the NGEN infrastructure. However, each fire department and district must purchase its own radios in accordance with the standards established by the NGEN Executive Board. Improvements made through the NGEN project can only be realized if the respective fire districts and departments can afford the required upgrades, such as radios.

Status of Current Equipment in Relation to Dead Zones

The NGEN Project, in collaboration with commercial entities, has explored alternatives to eliminate the remaining dead zones in radio coverage. The most promising solution appears to be the LTE/Wi-Fi and low-orbit satellite solution. Limited pilot testing indicates that LTE-based solutions may significantly reduce coverage gaps across the County. However, these solutions have not yet been deployed at scale. The CGJ found that most radios currently in use throughout the County support only analog and digital signals, so most fire districts would need to update their radios to incorporate additional LTE and Wi-Fi technology.

Required Standards for Equipment

All portable radios purchased must meet the fire radio standards outlined in Project 25 (P25). P25 is a suite of standards that enable interoperability among digital two-way land mobile radio communications products developed for public safety professionals. It was established in October 1989 by a coalition of the Association of Public Safety Communications Officials-International and the National Association of State



Tower in Salinas with various affixed communication Devices that are directed to the various communication towers throughout Monterey County

Source: Civil Grand Juror.

Telecommunications Directors to address vendor incompatibility issues from the 1980s to support digital/analog mixed modes. Radios also must meet the new National Fire Protection Association (NFPA) 18002 standard for fire service performance.

The P25 standard focuses on ensuring that different radio brands work together, handle analog/digital modes, and feature rugged designs with enhanced audio for noisy fire environments.

The portable radio NGEN is currently testing and recommending is the Motorola APX NEXT All-Band P25 Smart Radio. The radio is estimated to cost \$12,000 per unit. Considering that each fire department or district maintains multiple radio sets, the total cost becomes substantial and unsupported by funding. This makes it challenging to meet current radio requirements. The photo below shows a similar model.

Funding Constraints on Eliminating Dead Zones

The unincorporated fire districts of Monterey County are limited not only by the rugged terrain but also by a lack of funding. Prior to the passage of Proposition 13 in 1978,



Motorola APX 8000XE radio

Source: Civil Grand Juror.

local governments were authorized to levy property taxes on individuals, which served as a source of funding for unincorporated fire districts. Since Proposition 13 was implemented, this funding source has been declining. Property values are now assessed only at the time of construction or resale. Under Proposition 13, changes in property values significantly affect property tax revenue. For example, the energy plant in Moss Landing is by far the largest taxpayer in the North County Fire Protection District. The reduction in the assessed value of the power plant from \$800,000 to \$400,000 in the early 2000s had a significant impact on special district funding earmarked to provide protection services to rural fire districts.

Property taxes, the primary funding source for most unincorporated fire districts in Monterey County, fall far short of covering all operational expenses. Consequently, some districts seek additional funding through special assessments, fees, or grants. The Monterey County Weekly (January 1-7, 2026) reported that the cities of Gonzales and Soledad were evaluating their respective communities' interest in supporting a parcel tax to bolster their fire departments' funding. Local citizens and their elected representatives lack the necessary fiscal authority to change the state allocation of property taxes to align with contemporary community priorities.

FINDINGS AND RECOMMENDATIONS

Finding (F1): Approximately 42% of Monterey County's geographic area lacks reliable digital radio coverage, and 18% lacks usable analog coverage, resulting in areas where first responders cannot reliably communicate during emergencies.

Recommendation (R1): The Monterey County Board of Supervisors (BOS) direct NGEN Executive Committee, in coordination with County ITD, to develop and submit a countywide implementation plan identifying the specific equipment upgrades, infrastructure needs, estimated costs, and timelines required to reduce or eliminate identified emergency communication dead zones by December 31, 2026.

Finding (F2): Some fire districts reported limited financial capacity to purchase and maintain radios capable of operating across all communication modes supported by

the County's emergency communication infrastructure, which compromises their ability to coordinate services with other agencies.

Recommendation (R2): The BOS direct the ITD to develop a feasibility analysis identifying available funding options to support fire district radio equipment upgrades and emergency communication infrastructure in unincorporated areas by March 31, 2027.

Finding (F3): Emergency responders in Monterey County must operate across multiple radio technologies and manually adjust communication modes depending on location, increasing operational complexity and the potential for communication delays during emergencies.

Recommendation (R3): The BOS direct the ITD to develop a framework to assist fire districts with limited financial capacity to obtain radios compatible with the County's emergency communication system by March 31, 2027.

REQUEST FOR RESPONSES

The following responses are required pursuant to Penal Code Sections 933 and 933.05:

Required Responses

The CGJ requires a response from the governing body below to the following findings and recommendations within 90 days.

Respondent	Findings	Recommendations
Monterey County Board of Supervisors	F1, F2, F3	R1, R2, R3

Invited Responses

The CGJ invites responses from the entities below to the following findings.

Respondent	Findings
ITD	F1, F2, F3
NGEN Executive Board	F1, F2, F3
LAFCO	F1, F2, F3

DISCLAIMER

Reports issued by the Grand Jury do not identify persons interviewed. Penal Code Section 929 requires that reports of the Civil Grand Jury not contain the name of any person or facts leading to the identity of any person who provides information to the Civil Grand Jury.

GLOSSARY & ACRONYMS

BER	Bit Error Rate
BOS	Monterey County Board of Supervisors
CGJ	Civil Grand Jury
dBm	Decibel milliwatts
ITD	Information Technology Department
LAFCO	Local Agency Formation Commission
LTE	Long Term Evolution
NGEN	Next Generation Radio System
NFPA	National Fire Protection Association
P25	Project 25

BIBLIOGRAPHY

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California's Forests and Rangelands 2017 Assessment (pgs100-106)

<https://ucanr.edu/sites/default/files/2020-02/320311.pdf>

Landwatch Monterey County

<https://landwatch.org/issues-actions/monterey-county/>

Fire Safety Council for Monterey County

<https://www.firesafemonterey.org/history-of-wildfire-in-monterey-county.html>

Fire History of Monterey County

<https://www.firesafemonterey.org/history-of-wildfire-in-monterey-county.html>

CalFire – California’s Forest and Rangelands 2017 Assessment

<https://34c031f8-c9fd-4018-8c5a-4159cdff6b0d-cdn-endpoint.azureedge.net/-/media/calfire-website/what-we-do/fire-resource-assessment-program---frap/assessment/forest-and-range-2017-assessment.pdf>

History of Monterey County Wildfire

<https://californialocal.com/localnews/monterey/ca/article/show/1147-monterey-county-fire-districts-explainer/>

History of Monterey County Wildfire

<https://www.firesafemonterey.org/mccwpp.html>

LAFCO of Monterey County

<https://www.countyofmonterey.gov/government/government-links/lafco>

LAFCO Report: “Special Districts Providing Fire Protection and Emergency Medical Services in Monterey County”, published 6/22/20

<https://www.countyofmonterey.gov/home/showpublisheddocument/94997/637305008665770000>

2021-2022 Monterey County Civil Grand Jury Report, “Consolidation of Two North Monterey County Fire Districts”

<https://www.monterey.courts.ca.gov/system/files/consolidation-two-north-mo-co-fire-districts-rpt.pdf>

Next Generation Radio Network (NGEN)

<https://www.countyofmonterey.gov/government/departments-i-z/information-technology/ngen>

Monterey County Weekly, January 1, 2026 “South County cities explore ways to get more funding for fire departments” by Celia Jimenez

https://www.montereycountynow.com/news/local_news/south-county-cities-explore-ways-to-get-more-funding-for-fire-departments/article_37b084e7-49ff-4f37-ab15-b549676d4691.html

KSBW Action News, January 9, 2026, “Soledad and Gonzales consider parcel tax to boost fire services” by Jazmon DeJarnette

[Soledad and Gonzales consider parcel tax to boost fire services](#)

KSBW Action News, January 9, 2026, “New Montage Health building installs radio system to eliminate dead zones” by Paul Dudley

[New Montage Health building installs radio system to eliminate dead zones](#)

Agreement for NGEN Services and Governance

<https://monterey.legistar.com/View.ashx?M=F&ID=11881125&GUID=22DE70E0-655C-4FDF-8B1B-00D1970BC7C9>

“Measuring 9600-Baud Radio BER Performance” by John Bloom, KE3Z, March 1995

<https://www.n5dux.com/ham/files/pdf/Measuring%209600%20baud%20BER%20Performance.pdf>

“What Is dBm, and Why Does It Matter for Cell Phone Boosters” by Signal Boosters, November 7, 2025

<https://www.signalboosters.com/blog/what-is-dbm/#:~:text=%2D50%20to%20%2D70%20dBm:.weak%20or%20no%20usable%20signal>

The following documents were provided by the ITD for the CGJ's research:

Monterey County's Next Generation Radio System (NGEN) Coverage Maps (Analog, Digital, and LTE (mobile))

NGEN Mutual-aid and Interoperability Agency Radio Use Agreement

NGEN Radio System Access Administrative Policy (Version #5, Revision #1, July 24, 2025)

ITD (Innovate, Transform, Deliver) Division's "Infrastructure and Operations Strategic Plan (2024-2029)"

911 Services Agreement with the cities and fire districts of Monterey County, the Monterey Peninsula Airport District, and other miscellaneous agencies in Monterey County who receive 9-1-1 call taking, dispatching, and other related services from the Emergency Communications Department. (Approved May 12, 2020)

APPENDIX A

FIRE PROTECTION AGENCIES IN MONTEREY COUNTY

Aromas Tri-County Fire Protection Districts (U)

Big Sur Volunteer Fire Brigade (V)

CalFire (G) – also staffs:

- Cypress Fire Protection District (U)
- City of Soledad Fire Department (M)
- Mission-Soledad Rural Fire Protection District (U)
- Pebble Beach CSO (M)

Cachagua Fire Protection District (U)

Carmel Highlands Fire Protection District (U)

Fort Hunter Liggett Fire Department (G)

Gonzales Fire Department (M) – also staffs:

- Gonzales Rural Fire Protection District (U)

Greenfield Fire Protection District (U) – also staffs:

- Greenfield Fire Department (M)

King City Fire Department (M/V)

Marina Fire Department (M)

Mid-Coast Volunteer Fire Brigade (V)

Monterey County Regional Fire Protection District (U) -- also staffs:

- Spreckels Volunteer Fire Department (V)

Monterey Fire Department (M) -- also staffs:

- Pacific Grove Fire Department (M)
- Carmel-By-The-Sea (M)
- Sand City (M)
- Naval Postgraduate School (G)
- Monterey Peninsula (Regional) Airport District (U)

North County Fire Protection District (U)

Presidio of Monterey Fire Department (G)

Salinas Fire Department (M)

Seaside Fire Department (M) – also staffs:

- Del Rey Oaks (M)

South Monterey County Fire Protection District (U)

KEY:

U = Unincorporated Monterey County Fire District

V = Volunteer Fire Brigade

M = Municipal Fire Department

G = State or Federal Government Fire Agency

APPENDIX B

Fire Protection Districts Serving Unincorporated Areas of Monterey County

that LAFCO Reviewed in Its 2020 Report

Aromas Tri-County Fire Protection District

Big Sur Volunteer Fire Brigade

Cachagua Fire Protection District

Carmel Highlands Fire Protection District

Cypress Fire Protection District

Gonzales Rural Fire Protection District

Greenfield Fire Protection District

Mid-Coast Volunteer Fire Brigade

Mission Soledad Rural Fire Protection District

Monterey County Regional Fire Protection District

Monterey Peninsula Airport District

North County Fire Protection District of Monterey County

Pebble Beach Community Service District

South Monterey County Fire Protection District

APPENDIX C

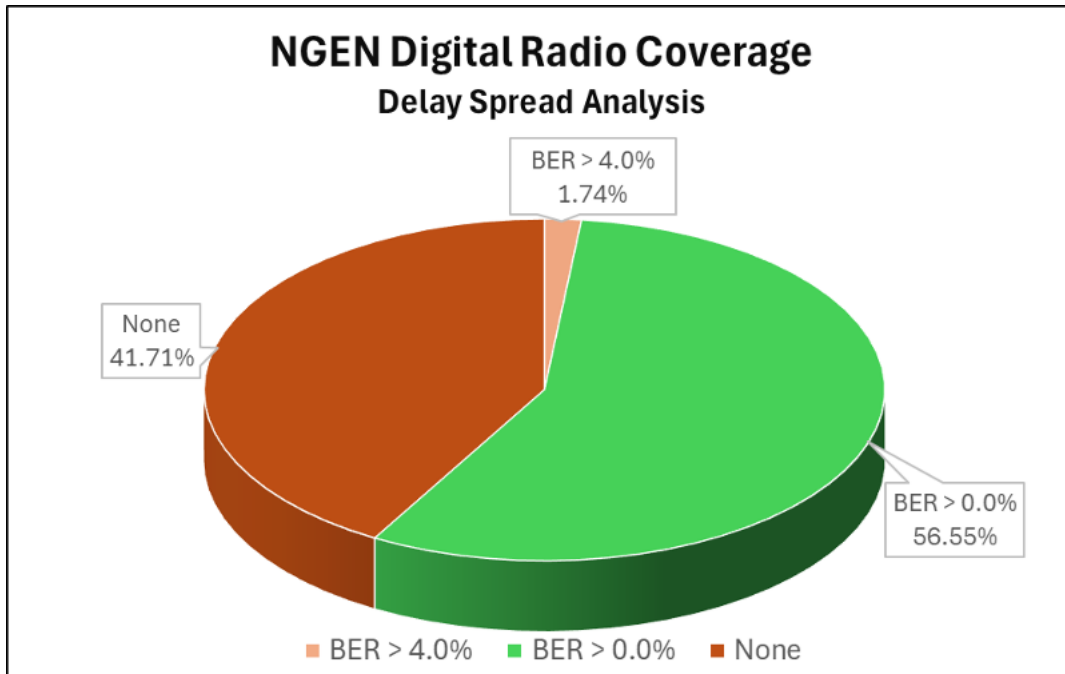
The following is an in-depth explanation of the methodology used in calculating the performance data shown in Table 2 on page 12.

Jury members summarized the information from NGEN digital and analog coverage maps by converting the maps into the percentage of the county that was covered at each radio performance level. This was done by analyzing the colors of the maps, focusing on those areas that fall within the official Monterey County boundary, and grouping the coverage categories based on their visual color characteristics. Small labels and symbols embedded within coverage areas were treated as part of the surrounding coverage to avoid skewing results. Percentages represent the share of the county's total mapped area in each coverage category, excluding all areas outside the county boundary.

Chart 1 shows the NGEN digital radio performance in Monterey County. Digital radio performance here is measured by testing the bit-error rate (BER) that the radio provides under various conditions. BER is a straightforward metric that answers the question: "How many of the bits get through correctly when a data stream is passed through the system?" One can interpret this figure as follows:

- Green or "BER > 0.0%" indicates that while errors are present, they are very low. The radio's error correction is handling mistakes. Radio users would generally have a clean and stable connection. The user experiences normal operations. This is the experience in 56% of Monterey County.
- Orange or "BER > 4.0%" indicates that there are a high number of errors. Radio users would experience a large amount of static, stuttering, muting, and frequent loss of the connection. This is the experience in 2% of Monterey County.
- Brown or "None" indicates no coverage, as the radio receiver cannot lock onto the signal or decode data at all. This is the experience in 42% of Monterey County.

Chart 1: NGEN Digital Radio Coverage



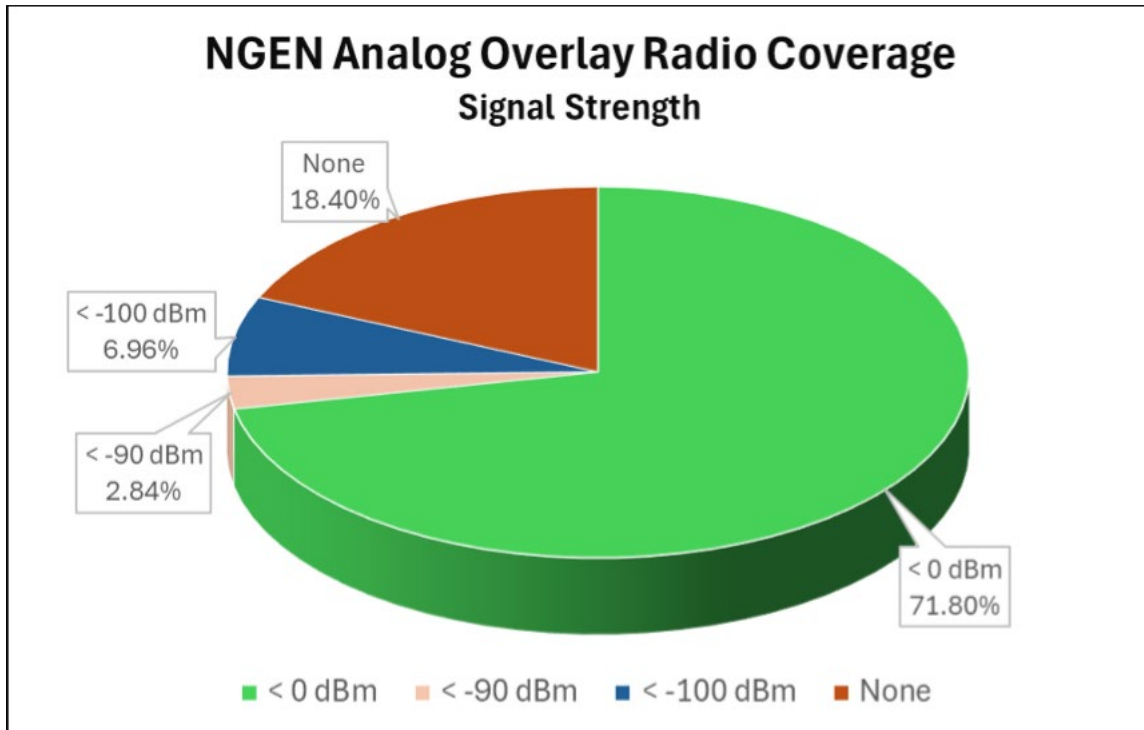
Source: Based on document from Monterey County ITD

Chart 2 shows the overlay of analog radio coverage. Analog radio performance was measured in decibel milliwatts (dBm). It expresses an absolute measurement of signal power. Signal strength usually ranges from -50 dBm (strong signal) to -120 dBm (weak to no signal). One can interpret this figure as follows:

- Green or “<0 dBm” indicates that there is a very strong signal. The radio’s communication would be clear, strong audio. This is the experience in 72% of Monterey County.
- Orange or “<-90 dBm” indicates that there is a weak, but potentially usable signal. Radio users are likely to experience noisy, hissy, or intermittently unintelligible communication. This is the experience in 3% of Monterey County.
- Blue or “<-100 dBm” indicates that there is a very weak signal. Radio users are likely to know that someone is trying to communicate with them, but what is being said cannot be discerned. This is the experience in 7% of Monterey County.

- Brown or “None” indicates no coverage as the radio receiver is not receiving a signal at all, even under ideal conditions. This is the experience in 18% of Monterey County.

Chart 2: Current NGEN Analog Overlay Radio Coverage



Source: Based on document from Monterey County ITD.