

## Public Service

# Using GMRS and FRS for Emergency Communications

*After losing his home to the Tubbs Fire in Northern California, Bob Dozor, K3FUL, was recruited by the Sebastopol Neighborhood Communications Unit (SNCU) in 2017 for emergency communications work. In this month's column, he talks about how Sonoma County has developed robust networks of Family Radio Service (FRS) and General Mobile Radio Service (GMRS) radios for citizens to communicate with hams who participate with Emergency Operations Centers (EOCs).*

Northern California, beset by extreme drought, has been burning. Sonoma County is 1,768 square miles, and since 2017, has experienced 3 consecutive years of summer fires and evacuations. 2021 was better, but severe drought persisted in 2022.

Each summer, local fire departments, the California Department of Forestry and Fire Protection, and local government emergency services management teams have been proactively and responsively improving our collective preparedness. Last year, Sonoma County Radio Amateurs (SCRA) established the Neighborhood Communications Committee as a forum for ham radio operators to work together with their neighbors. The contributions of the Sonoma County Transportation and Public Works, or TPW (now known as Sonoma Public Infrastructure), as well as Sonoma County's Department of Emergency Management and Auxiliary Communications Service (ACS), have fueled the growth of FRS, GMRS, and local ham networks.

### Understanding FRS and GMRS

Use of FRS and GMRS for neighborhood communication was proposed by the Community Emergency Response Team (CERT). CERT was developed and implemented by the Los Angeles Fire Department in 1985, and has been active in Sonoma County for more than 10 years. CERT hams have been advancing the use of FRS and GMRS in the county since then. A number of other neighborhood preparedness groups are adopting the idea and implementing it throughout the county by providing walkie-talkie classes and convening walkie-talkie networks.

FRS is the foundation of the neighborhood communication model because it's inexpensive, with radios costing as little as \$12 each (and

there's no license fee). FRS is limited to 2 W and poorly performing rubber duck antennas. Their restricted performance limits interference, making them an asset, and they're sufficient for many neighborhoods.

The spectrum for FRS and GMRS is 462 – 467 MHz or 65 centimeters. FM is the only mode allowed by the FCC. Hams who are familiar with UHF operation will be comfortable using a GMRS handheld with duplex capability, which behaves just like a UHF handheld transceiver.

FRS radios don't support repeater functionality, while GMRS radios have eight additional duplex repeater channels. GMRS is allowed up to 50 W on channels 15 – 22, as well as the eight duplex channels. It's limited to 5 W on lower-power channels, such as 1 – 7, and 0.5 W on chan-

**Table 1 — GMRS Repeaters in Sonoma County (as of February 2023)**

Area	Repeater	Tag	RX Freq.	TX Freq.	TX CTSS	RX CTSS	Channel	Online
Coastal Hills	Fort Ross	FR RPT	462.575	467.575	173.8	192.8	16	Yes
Coastal Hills	Timber Cove	TC RPT	462.575	467.575	167.9	192.8	16	Yes
Coastal Hills	Muniz	MZ RPT	462.575	467.575	162.2	192.8	16	Yes
Cazadero	Wildwood	WW RPT	462.600	467.600	173.8	192.8	17	Yes
Cazadero	Mohrhardt	MH RPT	462.600	467.600	167.9	192.8	17	Yes
Cazadero	Teravana	TV RPT	462.600	467.600	162.2	192.8	17	No
Cazadero	Sheridan	SHERID	462.600	467.600	156.7	192.8	17	Yes
Lower Russian River	Overlook	OL RPT	462.625	467.625	173.8	192.8	18	Yes
Lower Russian River	Siri	SI RPT	462.625	467.625	167.9	192.8	18	No
Lower Russian River	Mt. Jackson	MTJKSN	462.625	467.625	162.2	192.8	18	No
Occidental	Fitz Joy	FJ RPT	462.650	467.650	173.8	192.8	19	Yes
North County	Shellenger	SH RPT	462.700	467.700	173.8	192.8	21	Yes
North County	Ida Clayton	SIC RPT	462.700	467.700	167.9	192.8	21	No
North County	Hilltop	FITCH	462.700	467.700	162.2	192.8	21	Yes
East County	Los Alamos	ALAMOS	462.725	467.725	156.7	192.8	22	Yes
W SR	SIMPLEX (delay)		462.725		No tone	No tone	22	Yes

nels 8 – 14. GMRS handhelds cost \$30 – \$175 and typically run 5 W, and one can (and should) put improved antennas on them. GMRS mobile radios cost \$125 – \$350. Higher-power portable and mobile radios often don't include 0.5 W channels 1 – 7. GMRS doesn't require an exam for a license; however, a family license costs \$35 (as of April 2022) and lasts 10 years.

Cost matters when trying to implement a community-wide alternative to cell phones. Significant topographic and demographic diversity drives decisions regarding the use of FRS or GMRS in each neighborhood.

## Field Use

The SNCU divided its town into four quadrants and found usable FRS communication in each zone. In all four zones, SNCU established a hub with an assigned GMRS operator (communicating with FRS neighbors' walkie-talkies), a ham (communicating with the EOC), a scribe, and a CERT leader. The Incident Commander at the EOC also communicates with these hubs. EOC messages include announcements about evacuations and directions to CERT volunteers. Messages from the hubs include requests for emergency vehicles and other urgent needs in the community.

Currently, there are at least 16 GMRS repeaters functioning in Sonoma County (see Table 1). One of the most recently activated repeaters is at a tower located at an elevation of 1,983 feet. It was installed as a joint production between TPW, Northern Sonoma County CERT, and the Asti-Cloverdale Citizens Organized to Prepare for Emergencies. More GMRS projects are in the works.

## Necessary Adjustments

SNCU originally used FRS radios at their hubs, but with further testing, have migrated to GMRS radios in simplex mode (no repeaters serve Sebastopol yet). With better antennas and higher power, the quality of communication to and from the hubs improved significantly, but at a greater cost. FRS and GMRS use the same frequencies and are in-teroperable on the 22 simplex channels.

The hub model described for Sebastopol doesn't work in topographically challenging areas of the county, where mountains and peaks over 2,000 feet are common. The Coastal Hills Radio Group operates with GMRS and ham radio; they have five GMRS repeaters, along with many ham radio operators and two robust amateur radio repeaters. They hold a weekly GMRS net, where more than 60 people check in.

## A Plan for the Future

Our work is still cut out for us to extend and protect what has been established. SCRA's Neighborhood Communications Committee is at the forefront of this effort. Currently, there are 53 committee members, 30 hams, and 23 community members, including prominent local government officials, community leaders, and neighbors. Training people to effectively use walkie-talkies is our top priority. The committee is also intently focused on dealing with radio interference, particularly of the high repeaters. Ongoing field testing is important, as exponentially more radios are being put in place. Some neighborhoods will need to employ privacy tones. Agreements regarding repeater channels, especially high repeaters in neighboring counties, are in progress.

## Field Organization Reports

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### Public Service Honor Roll

This listing recognizes radio amateurs whose public service performance during the month indicated 70 or more points in six categories. Details on the program can be found at [www.arri.org/public-service-honor-roll](http://www.arri.org/public-service-honor-roll).

465 N9VC	167 W4CAC	125 KT5EM	AC8RV KL7RF KB8GUN KB8PGW K8ED K3YAK KA2HZP K3FAZ K1CFI N1LAH KC1HHO	85 WB8SIQ WB3FTQ
455 WA3EZN	165 KO4KUS	123 K8MDA	84 WB4ZDU KB9GO WA1LPM	
430 AD8CM	164 KB5PGY	120 WA4VGZ KY2D WA1URS WC4FSU K3JL W2AH KA9QWC	98 KT4WX W1INC	83 AJ7B AA3N W4TTO
412 KE8BYC	160 W4CMH AC8NP W4DNA	158 KD2QAR	119 WW3S	82 K4NWX KA2GQQ
360 KE4ANW	155 KV8Z	117 W3YVQ	97 KB3MXK KC8YVF WV5Q	80 KR4ST KB4OLY
275 N5MKY	150 KC9FXE N4CNX	116 KR4PI	95 K1HEJ	78 W4NHO N2TSO N3RB W5XX W9BGI
270 ND8W	149 WM2C	112 KD2LPM	94 W2ARP	77 KA9IKK K3EAM K2MTG
260 KD8UUB	146 W5WMC	111 KC3MAL WD8USA	93 N1PZP	75 WB8RGE K4FHR W7MIN
255 W7EES	145 KO4OL N8SY N1ILZ	110 AD4DO KM4WHO KD0HHN NW3X KC8WH KE4RS KB2QO K1UAF N1IQI WZ0C W1RVY KA9MZJ	91 WB2VUF	74 N3RPB KE8DON K8RDN
235 K7OED KT2D	140 WB9WKO W2PAX KY2MMM K0RCJ WB9QPM	109 KC8T	90 KC9UC KT5SR KF7GC WA3QPX W8GSR K8KRA N8MRS WX2DX W4EDN W4KX KC1KVY AB9ZA	73 W8IM
230 KK4PUX	138 KB3YRU	105 N3GE	89 KB1TCE W9GRG	71 W2OOD K1XFC KB0DTI
210 WM5N	134 KB8RCR	102 K5OB	88 KG5AOP WB8R	70 K6RAU
209 W9EEU	130 AG9G K9LJU N2JBA K4IWW WK4WC KW1U	100 NX9K W1KX KZ8Q WB4RJW		
200 N2LC	129 N2DW			

The following stations qualified for PSHR in previous months, but were not acknowledged in this column yet: (June) KK4PUX 230, A19F 145, WB9QPM 140, W4CAC 118, KA9MZJ 110, N3SW 90. (May) KK4PUX 215, W4CAC, A19F 150, WB9QPM 140, KA9MZJ 110, KC3MAL 97, N3SW 90.

### Section Traffic Manager Reports

The following Section Traffic Managers reported: AR, AZ, CT, DE, EMA, ENY, EPA, GA, IL, IN, KS, KY, LA, MDC, ME, MI, MO, MS, NC, ND, NE, NFL, NH, NLI, NNJ, NNY, OH, OR, RI, SD, SFL, SJV, SNJ, STX, TN, VA, WCF, WI, WMA, WPA, WWA, WY.

### Section Emergency Coordinator Reports

The following Section Emergency Coordinators reported: AR, CT, ENY, EPA, EWA, GA, ID, IN, MDC, MI, MO, MS, ND, NFL, NLI, NNJ, NV, PAC, SDG, SNJ, STX, VA, VI, WCF, WMA, WPA, WTX.

### Brass Pounders League

The BPL is open to all amateurs in the US, Canada, and US possessions who report to their SMs a total of 500 or more points or a sum of 100 or more origination and delivery points for any calendar month. Messages must be handled on amateur radio frequencies within 48 hours of receipt in standard ARRL radiogram format. Call signs of qualifiers and their monthly BPL total points follow.

NX9K 1,593, KY2D 1,067, W2AH 885, WB9WKO 860.

W2AH qualified for BPL in these previous months, but was not acknowledged in this column yet. (June) 1,087. (May) 1,013. (Apr.) 1,215. (Mar.) 1,388. (Feb.) 1,397. (Jan.) 1,293. (Dec. 2022) 1,208. (Nov.) 962. (Oct.) 1,291. (Sept.) 569.