

The City of Sequim
Clallam County Fire District #3
Community Emergency Response Team

CERT Communications Plan

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INTRODUCTION

This plan will describe how the City of Sequim and Clallam County Fire District 3 (CCFD3) will implement effective command and control communications among authorized, volunteer emergency workers participating in local Community Emergency Response Team (CERT) operations in a disaster scenario, when normal commercial communications are likely to have failed.

This plan is a subset of the Sequim Operational Area (SOA) Communication Plan which established the communications plan for the entire SOA for Command, Law enforcement, Fire, EMS, Public Works, and other agencies in the time of disaster. SOA is defined as the geographical area of Mores Creek on the west, The Strait of Juan de Fuca to the north, west side of Discovery Bay on the east and the Olympic National Park on the south, cover over 142 square miles.

As such, this is an emergency Communications Plan. It is intended to be used when normal communications are unavailable or inconvenient. If the cellular phone system is working and if the 911 system is working, CERT volunteers should use their phones to alert the appropriate authorities. CERT volunteers may also practice and refine their emergency radio communications skills during authorized disaster training events.

COMMUNICATION PLAN OUTLINE

To be effective contributors within the context of a major disaster, CERT volunteers will need to be well versed in both the means and the context of emergency communications protocols. This plan will discuss the structure of the Command & Control system that is being established to ensure the use of clear and efficient communications among the various levels of CERT responsibility. This plan will also provide an orientation to the different kinds of radio and communications equipment that CCFD3 is currently deploying among its local CERT organizations. Finally, this plan will offer a reminder to all CERT volunteers how best to communicate essential information to those who need it during an emergency situation using transmissions that are brief, clear, and effective.

DISCLAIMER

This plan contains only advisory material. While this plan conveys information that is believed to represent the current best practices for volunteer emergency communications in our local area, it is not itself a formal code or regulation.

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Communications Structure / Chain of Command

The CERT communications structure envisions a chain of command system that contains and limits communications exchanges to those most needing to hear what's being said. This architecture is designed to minimize the likelihood of over-burdening or flooding a communications channel with too many transmissions. Short-distance communications should employ low power radios so that the channel remains relatively clear and available for other users some distance away. Longer distance communications need more powerful radios that transmit on a separate channel. Administrative or command communications are, again, to be conducted on yet another separate channel to preserve clear air so that local operations can proceed most effectively.

Members

CERT Members - provide an enormous strategic advantage to any community's emergency response efforts. When present in sufficient numbers and equipped with proper skills and safety training, CERT Members can significantly augment First Responder effectiveness by communicating timely, eye-witness ground-truth reports on the disaster situations in their areas of operation. CERT Members are typically assigned to squads of five to nine volunteers each. Each member needs to carry a personal radio in order to maintain operational contact with other squad members and their Squad Leader. CERT Members who have become familiar with their radios and basic communication protocols will be able to coordinate their squad's search & rescue, first aid and logistical operations with much greater effectiveness. CERT Member communications are operationally expected to be conducted among proximate radios located only a short distance away, perhaps only a few hundred yards at most.

Squad Leaders

Squad Leaders - need to maintain two channels of communication. Their first responsibility is to direct and coordinate the operational activities of the close-by CERT Members within their squad. Their second responsibility is to provide on-going situational awareness reports and support requests to their Team Captain, who may not be nearby. This CCFD3 communications architecture would therefore expect each Squad Leader to operate on two frequencies, one for their squad and another for the captain. This would be accomplished by asking Squad Leaders to carry two radios.

Team Captains

Team Captains - need to maintain continuous contact with their squad leaders but also with the Division Chief who is monitoring the operational activities of several teams. Team Captains will forward their team requests and situational reports to the Division Chief, who may be located at an Incident Command Post several miles away, thus requiring the Team Captain to use a somewhat more powerful radio transmitter.

Division Chiefs

Division Chiefs - are responsible for ensuring that each CERT Team Captain receives the support that he/she needs in order to effectively perform the team's operational mission. Division Chiefs are also responsible for keeping emergency managers at the Emergency Coordination Center (ECC) regularly informed of the progress that the CERT teams are making within each of their operational areas. Administrative communications such as these will most likely be transmitted over long distances via a command channel used among the Division Chiefs and the ECC. Division Chiefs must therefore monitor the Team Captains' frequency on one radio, but a second radio must also be in place to support their ECC communications.

Emergency Coordination Center

The Emergency Coordination Center must support and integrate the on-going emergency operations of various government agencies and First Responder authorities. The ECC is a combined effort of the City of Sequim, Sequim Police Department and Clallam County Fire District 3. The ECC works in support of the Clallam County Emergency Operations Center (EOC) under the Clallam County Emergency Management Plan, and is activated to serve the Operational Area from Deer Park Road to the Eastern Clallam County Boundary. Consistent with the guidelines provided by the National Incident Management System, the ECC will operate multiple communications systems. Should normal telephone and cell services become unavailable, alternate communications systems at the ECC will include FRS, GMRS, Amateur (HAM) radio, Satellite Communications and Mesh Network connectivity.

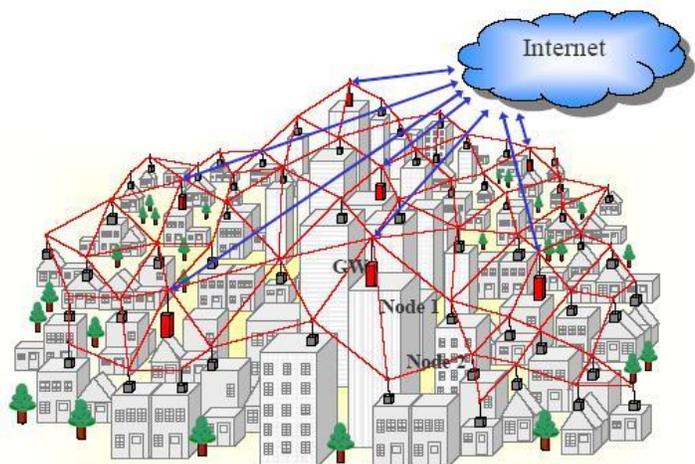
System Architecture

CERT Area Charts

During the summer of 2020, CERT volunteers conducted “hear-ability” surveys of many of the CCFD3 operational areas of responsibility in order to determine what sorts of radio transmissions could be sent and received with respect to the local terrain or other physical obstructions present on the Olympic Peninsula. The results of those surveys were recorded on digital maps and stored within CCFD3’s Geographic Information System (GIS) database. It is further anticipated that each Team Captain will be equipped with a laptop that will contain the most current GIS maps for his/her area of operational responsibility, thus making it possible to conduct mobile emergency operations without requiring access to the internet

Mesh-Network

In addition, a “Mesh-Network” is in development to connect the CERT teams to their Incident Command Centers and the Emergency Coordination Center. The mesh network is essentially a Wide Area Network (WAN) that uses amateur radio networking frequencies (AREDN *Amateur Radio Emergency Data Network*). When operational, the Mesh- Network will enhance CERT communications by means of a radio-based, private internet featuring Voice over Internet Protocol (VoIP) telephone, email, and texting capabilities. Such a system will significantly augment the ability of emergency response teams to communicate quickly and accurately within their respective chains of command.

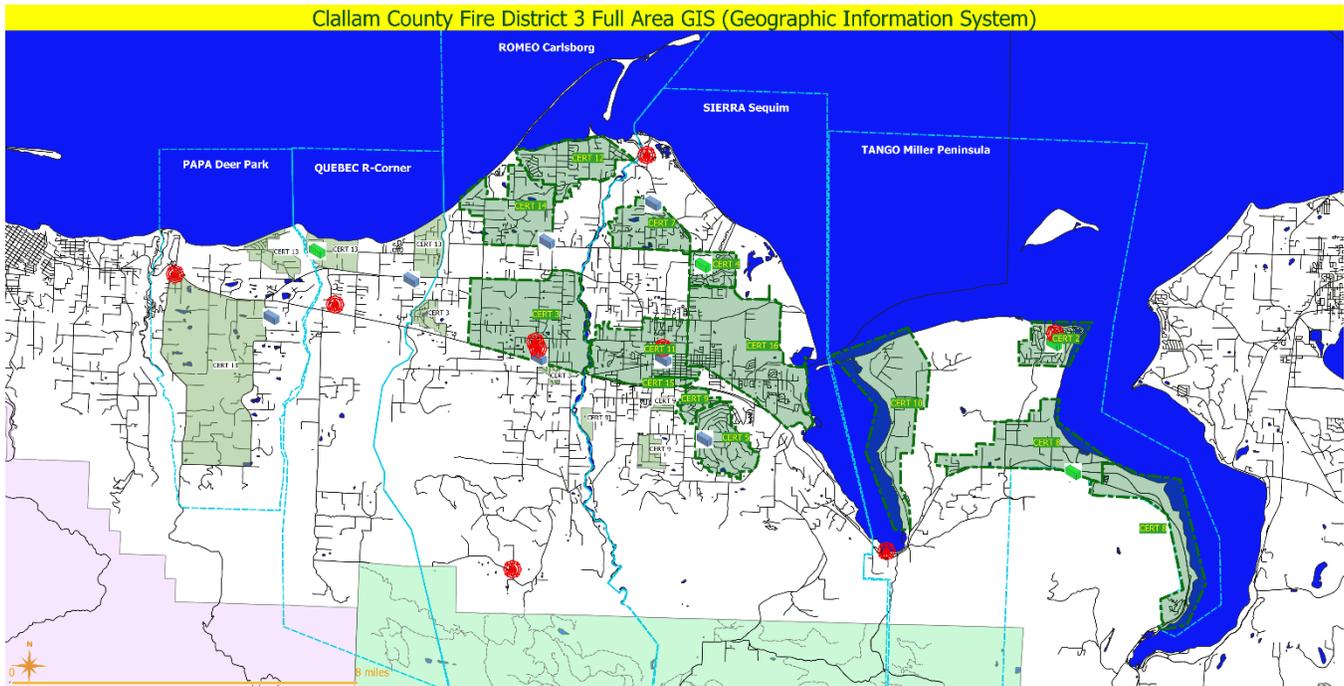


Example of Mesh Network Nodes

Forward Operating Bases

The CCFD3 Communications architecture also envisions a system of pre-positioned communications gear located at a number of “Forward Operating Bases (FOBs)” strategically established at locations within each CERT team’s area of operational responsibility. Ideally, these operating bases would consist of some sort of storage structure, like a metal shipping container, that would permit long-term food and tool storage, all-weather shelter, and auxiliary power supplies to enable both local and long-range communications capabilities.

- ✓  **Conex_Box_Installed**
- ✓  **Connex_Box_Proposed**
- ✓  **Fire_Stations**



Communications Equipment

Communications Radios

CCFD3 recommends the use of three principal radio models for CERT volunteers who will use Family Radio Service (FRS) and General Mobile Radio Service (GMRS) frequencies to coordinate CERT operations during times of disaster emergencies. All three recommended radio models are functionally compatible with each other, but differ with respect to purchase cost (which is important to our volunteers’ budgets) and in the amount of signal strength they can transmit, which is important for carrying a clear signal over the desired distances. They are the:

--Retevis RT-628 (1 watt FRS/GMRS hand-held radio)



--Retevis RT-27 (2 watt FRS/GMRS hand-held radio)



--Midland MXT-105 (5 watt micro-mobile GMRS radio w/enhanced antenna)



As a matter of CERT policy and for personal safety, every CERT participant must have immediate access to emergency radio communications, as the next section on CERT radio employment will describe.

CERT Radio Employment

CERT Members - will operate at the tactical level, which means they will form the squads that respond to the people and hazards on the ground during times of disaster. Their communications will be squad-focused, transmitted over a relatively short distance, and used as a means to coordinate their squad operations as they interact with and respond to their squad leader. In short, CERT members only need to talk to each other and to their squad leader. Consequently, CERT Members will only require a short-range tactical radio, the RT-628 or its equivalent, to conduct their squad's emergency operations on FRS channel 5.

CERT Squad Leaders - need to be able to talk to their squad members, of course, but they also need to be able to report the status of their squad's operations to the CERT Captain. The CERT Captain may be monitoring the work of several squads, and may not be located nearby. CERT Squad Leaders will therefore require a second radio, an RT-27 or its equivalent, to carry a longer-range signal to the CERT Captain on FRS channel 6.

CERT Captains - need to stay in constant touch with their team's Squad Leaders, but they also need to be able to report their team's status to the Division Chief. Captains will use a Midland MXT-105 on channel 7 and an enhanced antenna to remain in communication with their Division Chief and on channel 6 to communicate with their squad leaders.

CERT Division Chiefs - will interact with their teams' Captains on FRS channel 7, but will also need to communicate over several miles to the Sequim Emergency Coordination Center (ECC). Division Chiefs will use a Midland MXT-105 and an enhanced antenna to reach the Sequim ECC. They will communicate with the ECC and Captains on FRS channel 7.

Amateur (HAM) Radio Environment

Amateur radio (HAM) technology has become very inexpensive in recent years and many very useful hand-held HAM radios are available on the market. CERTs are encouraged (but not required) to obtain a HAM license from the FCC by passing a HAM technician examination. Obtaining a HAM license will provide a CERT volunteer with a better operational understanding of the possibilities and limitations of our local radio environment. CCFD3 will use FRS and/or GMRS radios for primary communications. Volunteer HAM operators assigned to CERT will provide the first backup as well as additional capabilities as needed during an event. CCFD3 acknowledges that the Amateur Radio Emergency Service (ARES) does plan to support county-level emergency operations communications, but ARES does not have a structural interface with CERT's command and control communications.

Licensing Requirements

The RT-628 and equivalent FRS radios do not require any FCC license to operate. They are relatively low-power, short-range radios that are more than adequate for CERT Members' tactical communications.

FRS and GMRS radios share the same frequency band (462-467 MHz). The frequencies are pre-programmed into 22 channels. Channels 1-7 have a power restriction of 5 watts. Channels 8-14 have a power restriction of .5 watts. Channels 15-22 are allowed up to 50 watts of power. FRS (Family Radio Service) radios may only transmit up to 2 watts or less of power.

One of the recommended radios, the MXT-105, is capable of transmitting at GMRS power levels. Federal Communications Commission regulations require that persons transmitting at GMRS power levels must have purchased a current license to do so. GMRS licenses do not require a test, but users must establish an account with the FCC and pay a licensing fee (currently \$70) for a ten-year license that also permits immediate family members to use the radio. Users are also assigned an FCC call-sign that must be used. See link: (<https://www.law.cornell.edu/cfr/text/47/95.1751>) All this can be accomplished on-line with the FCC.

Amateur (HAM) radio licenses do require applicants to pass an examination and pay a fee. Successful completion of the exam results in an FCC-approved operator license and a call sign. There are three classes of HAM licenses: Technician, General, and Amateur Extra. There is no longer any requirement to know Morse code. At the outset, a Technician license allows the user to transmit on all HAM-approved VHF and UHF frequencies and also a few HF frequencies. License testing is conducted once or twice a year by local HAM clubs under FCC auspices. While it is certainly encouraged, having a HAM license is not a necessity in the CCFD3 CERT Program.

It is unfortunately the case that some purchase and use low-cost HAM radios to transmit on FRS and/or GMRS frequencies. For example, a Baofeng UV-5R can be set to a "low power" output of 2 watts, which can simulate an FRS radio output. Such transmissions are not legal, and therefore cannot be sanctioned by the CCFD3 CERT program. See FCC notice: https://transition.fcc.gov/Daily_Releases/Daily_Business/2016/db0526/DA-16-588A1.pdf According to the FCC, a radio must be type accepted to legally use a specific frequency range, and the Baofengs have no type acceptance for FRS or GMRS frequency transmissions.

The FCC does authorize organizational licenses for official government communications. For example, fire, police and public service providers all have radio dispatch systems that occupy a portion of the radio frequency spectrum, but individuals working within such organizations may not have or need an individual license. Regardless of this, as currently conceived, CERT volunteers will not have any operational access to Fire Department radio frequencies.

The FCC’s rules and regulations are located in Title 47 of the Code of Federal Regulations (CFR).

Frequency / Channel assignments

The table provided below lists the frequencies that CERT personnel may encounter.

<u>Use</u>	<u>Channel #</u>	<u>Frequency</u>	<u>FRS Power</u>	<u>GMRS Power</u>
<u>Tactical</u>	FRS 5	462.6625	2 watts	5 watts
<u>Command</u>	FRS 6	462.6875	2 watts	5 watts
<u>Division</u>	FRS 7	462.7125	2 watts	5 watts
<u>Tactical</u>	HAM	445.825		
<u>Command</u>	HAM	445.850		
<u>State VHF</u>	SAR 1	155.160		
<u>State VHF</u>	SAR 2	155.2425		
<u>State VHF</u>	SAR 3	155.3025		
<u>State VHF</u>	SAR 4	155.1675		
<u>State VHF</u>	SAR 5	155.1825		

Communications Protocols and Operations

*“People yakkity yak a streak and waste your time of day
 But Mister Ed will never speak unless he has something to say.”
 --Ray Evans & Jay Livingston*

In a regional disaster the radio airwaves will be saturated with voice traffic. To optimize the effectiveness of their own transmissions, CERT volunteers will need to learn and use good radio etiquette and follow standard communications protocols. The following guidance offers a summary of helpful tips that can minimize the confusion and frustration that can result from heavy radio traffic loads.

How important are communications protocols?

Any organized effort, be it a sporting event, a military operation or a CERT deployment, will be rendered less effective if the participants engage in unique, independent, nonstandard actions. People can and do choose to communicate in many different ways; some are easy to understand and others not so much. As CERT volunteers, we seek to achieve the greatest good for the greatest number by training and refining our team collaboration and communication skills so as to minimize the possibility of mutual confusion, delay or miscommunication. Our communications protocols (which are merely conventional ways of speaking) are not to be thought of as arbitrary rules that limit our communications options, but rather they’re the grease that can significantly speed up our data throughput. They work to optimize the total amount of information that a busy channel frequency can carry.

Practice - Handheld radios can be very effective if used properly, but they can also consume time and resources

(radio spectrum) if used improperly. The best way to learn how to use a portable radio is to use it. The more you use it, following the conventions suggested below, the more efficient and effective you will be in the performance of your CERT mission.

How to Talk on the Radio

It may sound odd to be coached on how to speak, but these are helpful tips nevertheless:

Listen - Before you speak, listen to your channel. Think about what you are hearing. Is the channel clear? If it's busy, don't interrupt.

Think - Have a good idea of what needs to be said *before* you key the microphone. You are using a shared resource and no one else can use it while you are transmitting, regardless of how important their message is. Most important transmissions can be made in 15 words or less. Think about what you need to communicate and decide how to say it clearly in the shortest message practical.

Speak - Be clear, using a normal voice. Do not SHOUT! Speak simply, briefly and to the point. Radio conversations need to be kept short. Hold the radio four or five inches from your mouth and talk across the radio, not directly into it.

Wait - Un-key the microphone and wait a bit for a response to your call. Avoid making rapid repetitions of calls.

Reply - Reply promptly to the response. Other callers may be waiting to use the channel.

What Needs to be Said?

Content is Essential - Until we understand the basics of a situation we are not in a position to communicate usefully. Without useful information, your listeners cannot help you. Your assessment of a situation or incident may have to serve as the eyes and ears of your team members and leaders. It is therefore very important to be very observant and report only factual information about what you see in your size up of the situation or incident at hand. Good radio reporting will answer the "What / When / Who / Where / How" kinds of questions.

Be Objective - There's a qualitative difference between a report that says, "I think the house may be on fire." and a report that says, "I can see a fire in the house." The first statement is a guess; the second statement is a factual report. Don't guess – find out. Report only what you can see and what you understand is actually happening at your incident.

Be Methodical - Observe, think, and organize your facts to create your concise message, and then transmit your brief and factually accurate information to those who need to receive it. Make a quick note to yourself about the times and contents of your radio reports to assist your after-action documentation.

Location is Important - Refer to street addresses as you report your observations. The CCFD3 Global Information System (GIS) database contains detailed maps of each CERT team's operational area. Team Captains will have these maps already downloaded onto their laptop computers, so that in the event of a disaster emergency the maps will be available for team use. The GIS maps contain and show numeric FEMA search grid designations that can be used to describe the precise location of a particular operational activity or problem event. When Search & Rescue squad members do not have immediate access to the Captain's laptop and the current GIS maps, an acceptable alternative method for describing locations would be to use street addresses. When attempting to describe a location that does not have an address, use an offset address to describe the location, such as, "We are 300 yards to the west of 1734 Woodcock."

Simple Call Signs: Use descriptive tactical call signs. The best radio calls and responses use a "TO / FROM" format, sometimes characterized as a "Hey you, this is me" format. For example, a searcher may transmit,

“Three Alpha Leader, this is Three Alpha Search 1.” The Alpha Squad Leader would then reply, “Three Alpha Search 1, this is Three Alpha Leader; go ahead.” Everyone who hears the transmission would understand that Search pair #1, belonging to the Alpha Squad in CERT 3 is speaking with their Alpha Squad Leader. Keeping the titles short speeds up the dialog. This Plan recommends using call signs that indicate the CERT team number, Squad (phonetic) letter, and function or title, in that order. Sometimes it is helpful, when assignments change regularly, to write down one’s own current call sign to avoid confusion.

No Privacy - Handheld radios are shared communication devices. None of the available frequencies are private; they are shared “party lines.” Lots of users use the same frequencies and everyone is listening to what you say. Never transmit personal information or other personally identifying information unless it’s yours to give away. Never use full names and never reveal victims’ names.

Listen to the pros - Listening to live radio traffic is a good way to learn how to use a radio. Get a scanner or a scanner app for your smart phone and listen to First Responder radio communications. Hear how they communicate, how they size up situations, how they ask for resources, and how they give regular updates.

Equipment Tips

Microphone Use - Hand-held radios feature a “push-to-talk” (PTT) button that keys the microphone. When the PTT button is depressed, the radio is transmitting a signal, and no other signal can be transmitted on that channel. The cleared channel is ready for your message but, by preventing others from using the channel, you may be perceived as “walking over” their own attempts to transmit. Keep your transmissions brief. When keying your mike, remember to:

- Push to talk *before* you start to talk, otherwise your initial words won’t be transmitted;
- Keep the radio/mike near your mouth (2 to 5 inches), not out at arm’s length;
- Talk past the mike, not into the mike; this improves clarity of the transmitted signal;
- For clarity’s sake, hold still while transmitting;
- For clarity’s sake, avoid noisy environments; background noise becomes signal noise;
- Un-key the mike *after* you finish speaking, otherwise your closing words will be clipped off, remember that, until you let go of the PTT button, no one else can reply.

Keep it Close - Keep your radio up closer to your ear so you can actually hear someone when they call you. Clip it to your shirt or jacket. Use an earpiece if one is available.

Radio Positioning - Handheld radios need to ‘see’ the other radio – you may need to find higher ground and get away from concrete and steel whenever possible for good communications. You may not be able to contact someone if you are standing on the street, but you might be able to reach them if you stand on something higher.

No Privacy Tones - Do not use tone or privacy codes for emergency communications. You need to hear everything on your emergency channel. Set your FRS radio to ‘no tone’ or ‘0 (Zero) tone’, so that you can hear all the traffic on that frequency and not miss traffic intended for you or traffic that may carry information useful to you.

Accidental transmission - Be careful where you put your radio. Don’t put it in a position where the transmit switch can be pressed accidentally – like on your belt. A continuously keyed radio takes over the frequency and no one else can use it.

Power - Check your radio occasionally. If you haven’t heard a transmission for a while, make sure your batteries are still charged. Out of consideration for others, always use the lowest transmission power setting feasible.

Radio Terminology

Phonetic Alphabet - In a busy and noisy environment, it is often difficult to communicate certain names or place names clearly without spelling them out. Even then, background noise can interfere with differentiating letters such as “B”, “C”, “D” or “E”. The military adopted a standard phonetic alphabet that, since WWII, has become a NATO standard and is used worldwide in aviation and among First Responders. This plan recommends that all CERT volunteers learn and use this alphabet when spelling over the radio. Do not invent your own words, as this can quickly add to the confusion of the listener.

Alpha	Bravo	Charlie	Delta	Echo	Foxtrot	Golf	Hotel	India	Juliet
Kilo	Lima	Mike	November	Oscar	Papa	Quebec	Romeo	Sierra	Tango
Uniform	Victor	Whiskey	X-Ray	Yankee	Zulu				

Standard Terms - For brevity’s sake, experienced users employ standard radio expressions. These terms are a form of jargon, it’s true, but they’re short and sweet and communicate effectively. They’re listed here for your information and eventual use in your own transmissions.

Term	Meaning	Term	Meaning
Acknowledged	Received message	Over	I await your reply
Affirmative	Yes, that’s right	Radio Check	How well do you hear my signal?
Break-Break	I must interrupt your conversation	Relay to []	Please pass this message onward to someone I cannot reach from here
Correction	I said that wrong and I’ll correct it now	Roger	Agree and will comply
I Say Again	I need to repeat this	Say Again	Please repeat your last transmission
I Spell Phonetic	I’ll spell the word using the NATO phonetic alphabet	This is []	Identifying transmission source
Negative	No, that’s not right	Wait	Pause the conversation
Out	I end this conversation	Wilco	Will comply

Emergency Traffic: Emergency traffic during an emergency “event” can be defined when responders need immediate access to or from an area that likely will result in the rescue of a life or lives. Regardless of its origin, Emergency Traffic always has priority. If you have an emergency transmission to make, let the other operators on the frequency know by stating “Break-Break. This is (call sign) and I have emergency traffic”.

Documentation

The Communications Log is CERT Form #6. It corresponds to Incident Command System Form 309. It is there to help emergency workers and emergency managers reconstruct the sequence of messages and instructions, viewed in the context of an after-action review of the disaster event or incident, that contributed to the results of the participants’ combined efforts. In the urgency and confusion of a true emergency response, it would be easy to skip past the Communications Log, but an accurate log can provide an important means to help every organization analyze their response performance and discover ways to improve their emergency processes.

The log merely asks for four data points: (1) Time of the communication; (2) Source; (3) Recipient; and (4)

Message content. A CERT Captain may appoint a scribe to keep such records on behalf of the Team, or the Captain may keep a notepad handy to jot a timeline of instructions both given and received. Not every conversation warrants an entry, but guidance and command directions that commit resources into action will be of lasting interest and should be captured in the log.

Division Channel (GMRS Channel 7) Priorities

The Command Channels are divided into two levels these are FRS/GMRS Channel 6 (Command) for communication between Squad leaders and Captains and FRS/GMRS Channel 7 (Division) for communication between Captains and Above for contact priorities see the chart in the Appendix at the link below.

Division Channel Priorities

CHANNEL 7 Priorities

Team	1st	2nd	3rd
CERT 2	BELL HILL	CERT 10	CERT 4
CERT 3	CARLSBORG	SEQUIM	BELL HILL
CERT 4	SEQUIM	BELL HILL	CARLSBORG*
CERT 5	SEQUIM	CARLSBORG	CARLSBORG*
CERT 7	SEQUIM	BELL HILL	CARLSBORG*
CERT 8	BELL HILL	CERT 2	CERT 10
CERT 9	SEQUIM	BELL HILL	CARLSBORG
CERT 10	SEQUIM	BELL HILL	CERT 4
CERT 11	SEQUIM	BELL HILL	CARLBORG
CERT 12	CARLSBORG	SEQUIM	BELL HILL
CERT 13 R Corner	CARLSBORG	SEQUIM	BELL HILL
CERT 13 Deer Park	R CORNER	CARLSBORG	BELL HILL
CERT 14	CARLSBORG	SEQUIM	BELL HILL
Command			
Division Sequim	ECC	CARLSBORG	BELL HILL
Division Carlsborg	ECC	SEQUIM	BELL HILL
BELL HILL	ECC	SEQUIM	CARLSBORG
ECC	BELL HILL	SEQUIM	CARLSBORG

-----End of Communications Plan -----