My thoughts on communications when the repeater systems are down

Communications in the PAW are going to be critical to the success and safety of a community. There are quite a few non-repeater-based communications systems that can be used if/when local repeaters go down due to whatever circumstance. Some of the over-the-air electronic signal systems can only be used beyond their intended uses if the situation is one in which rule-of-law is no longer in effect, and radio communications rules can be sidestepped in order to get needed communications through. There are also several non-radio methods that can be used that do not rely on electricity or electronic devices, though the electronic and electrical methods, and radios are the most efficient, by far. Some of the non-radio methods are more secure than others, though by using fairly simple codes, if needed, all can be made secure from casual listeners/readers/watchers. Some are one way only, and others can be one-way or two-way, or available to a group.

Some radio communications methods not dependent on established repeaters:
While many repeater systems are high-reliability systems with decent backup power systems, everything is fallible. We do, however, have alternatives to these oft-used systems. They are quick and easy, and give very wide area coverage considering the VHF and UHF bands in which they operate. When they are down, for whatever reason, however, a person and especially a group needs reliable methods with which to communicate among its members, and with the rest of the community.

Many people already regularly use the simplex frequencies set aside for communications between stations that do not need to go through a repeater or set of repeaters in order to have reliable, understandable communications between two or more stations some distance from one another. Each Amateur Radio Band, and each of the special service bands have designated Simplex Calling Frequencies (or channels) assigned, which stations can monitor, and upon hearing another station, can then communicate another separate simplex frequency to which they can both go to continue communications without tying up the Calling frequency.

This applies to the Amateur VHF and UHF bands, of course, but also to the HF, MW, and LF frequency bands Amateurs regularly use. While some of the bands

are not all that useful for short-range communications (beyond line-of-sight to ten miles or so), they can often be used at very-low-power for line-of-sight and slightly beyond communication if no other good options are available.

There are plenty of other options for the shorter distances that repeaters are often used to cover with inexpensive, low to moderate power VHF and UHF radios. Mostly using the same bands, but not in the sections of those bands set for Amateur Radio Operations.

FRS – Family Radio Service (a UHF band); GMRS – General Mobile Radio Service (a UHF band), MURS – Multiple Use Radio Service (a VHF band), and CB – Citizens' Band (an HF band) are all systems capable of providing communications during many emergency situations, whether or not the Amateur Radio Service repeaters are up. They are especially important for those that tend to rely on Amateur radios for their communication.

If a group sets up a plan with a set of protocols that can be followed by those within the group, with provisions to communicate in other ways with those not in the group, reliable communications can still be maintained, no matter what the condition and operating status of any repeater system might be.

There are many other radio services in many different bands that might be used, such as the VHF and HF air bands, the maritime VHF and HF bands, and various VHF, UHF, and HF Land Mobile (business band) service bands, during disasters and situations when the Amateur Radio repeaters that most preppers generally use are not available to them. However, these can be pretty tricky to use without getting into subsequent trouble when things return to normal. And most things that preppers will deal with that can cause normal communications to go down, will be fairly temporary. So, I suggest that if one has an interest in any of these systems, then pursue the interest, but do not think that it will be a reliable way to communicate with other preppers that do not already share that interest and operate legally now.

However, there is one system that might be of use to a group that is not spread out too much, or that has more than one person willing to invest just a bit of money and time to acquire the right equipment. This is to set up so the group can use their own repeater when the regular systems are down.

Now, a group can easily set up the same types of repeaters that are in use now, with expensive equipment mounted on mountain peaks or on top of very tall buildings, or on very tall privately owned tower. It is expensive, and there must be people willing to set it up, maintain it, and regularly test it. This is much to ask of individuals within a group.

The alternative I have chosen, though certainly not legal to use now, WHICH I DO NOT DO, I would be willing to set up and use in an obviously long-term situation where there is not, and will not be, rule-of-law for such things, is not too expensive and is relatively easy to set up and use.

The system does not have nearly the range of the repeater systems we currently use, however, with proper antenna placement, this DIY repeater system using inexpensive Baofeng handheld radios and a repeater cable, can, with good remote antenna placement, cover a few square mile area that group members can access and communicate with each other using the same techniques now in use.

If anyone is interested, I have an article that describes the other radio bands and systems that are available as mentioned above, that includes typical ranges and other information that could be useful. Just respond to this post and I will add another post to include that information.

Now, on to some non-radio, non-electronic communications methods that could prove useful to a group in the event the local VHF and UHF repeater system is down.

Some non-radio/non-electronic communications methods:

Sound Powered Phones: While technically I suppose this could be considered electronic, Sound Powered Phones are kind of in-between. Yes, they do have electronic circuitry inside to make them work, it is very simple and very reliable, and most do not require any type of power supply. Thus, the Sound Powered moniker.

There are some systems that do use a battery to work a simple ringer system so one knows when a call is coming in without constant monitoring of the line, and a few use a battery to drive the microphone and speaker elements to increase the range and reliability of the units. The main thing is that they are independent of any outside lines and power.

They all do need to be connected with a set of wires. These can often be fairly small gauge, and can be quite long, depending on the particular phones and the gauge of the wires, and how well insulated and installed those wires are.

Switchboard systems can be set up so all stations go to this point and then are connected by an operator to each other as needed; or a system can have every station connected to a single pair of wires in common; or multiple point-to-point systems can be used with messages being relayed to the next station after being received on the point-to-point system from the previous station.

These systems work best when set up by a group sharing common property, whether it be a rural area, or a large building or group of buildings in an urban or suburban area.

Even systems in good shape, from before WW II can be very effective. Modern versions using microelectronics can be quite sophisticated, though more susceptible to EMP if not protected, and use standard telephones, even old rotary versions in some cases.

Simple powered local site telephone system: Another partially electrical and/or electronic, but not over the air system. Standard telephones can be connected to a fairly simple local network, using some electronic devices available on-line. From very simple to actually pretty sophisticated, these systems can work quite well, though they are susceptible to EMP if not protected.

Telegraph system: Another wired system, but very simple. Does need a bit of power, more for longer distances. Batteries, with solar, generator, or crank re-charging, or as used originally, earth battery system, can be used for the longer distances. Mostly used with well known Morse Code dots and dashes (more appropriately dits and dahs), if there is much chance of someone tapping into the wires somewhere between the points that are supposed to be communicating with

each other, a code of ones' own making might need to be used to avoid anyone that does tap into the line from understanding what information that is being transmitted actually is. Still probably dits and dahs, at least of a fashion, there can be far more variations, and if one has working computers at each end of the line, very sophisticated codes can be created and sent, coded and decoded by the computer. And the computers can be very simple ones from the early days of home computers, to the single board computers now available for less than $50 each.

Body signals: If two or more people are within sight of each other, close enough to make out reasonably well different body positions at least, with the ability to see hand motions even better, pre-arranged information can be conveyed without sound. There are several 'standard' sets of hand signals for just about every type of situation. Making up some for a group will work, without giving anything away to anyone familiar with the standard ones. If the hands cannot be seen well enough, larger body motions can be used.

Messengers: travelling by several methods from foot to human powered conveyances to motorized transport on land, water, or air.

Couriers: Similar to messengers, except will be carrying documents or other items rather than just simple word-of-mouth or simple written messages.

Animal couriers: These can be problematical. Carrier pigeons, if well trained for the purpose can work very well, though are not absolute. They are trained to fly home from where they are, within the area in which they are trained. They are not a two-way communications system. Only one way. And if/when it becomes known that they are being used, every bird seen in the sky will be destroyed if possible. And they can be lost due to various natural dangers, including raptors and other predators, and weather factors.

Well trained dogs can be just about as effective, for shorter distances, for some messaging situations, but they are also at high risk. However, many can be trained to go to and from a small number of locations on command, unlike pigeons, but that depends on the specific animal. They can also usually carry much larger objects, as opposed to the small micro coded slips of paper pigeons usually carry.

Small pets, including a few rodent types, can be used to send messages through enclosed passages, such as pipes, HVAC conduits, and such, within buildings or between connected buildings, when using the passages as voice tubes is not viable.

Any messages sent by animal couriers of any type should be encoded and multiple forms of getting the message to the receiving party should also be used, if at all possible.

Signal flags: Hand held, either standard or custom designs. Including marine signal flags. And even a simple flag, on a flag pole, can be raised and lowered in specific patterns, much like a semaphore works, to transmit information.

Semaphore: pole, vehicle, or building mounted with direct hand control, mechanical or electrical remote control.

Panel/area signals: Use of cloth or panels made from other materials can be used, much like the standard set of panels packed in military survival kits and can be effective. If larger versions are used, they can be seen from further away. And not just from airplanes. If they are laid out on sloped ground or held up by supports, they can be seen from others that are high enough. Custom panels can be made, varied by color and/or shape, to provide specific information.

Signal mirror: simple hand held mirror, as well as actual signal mirrors that can be aimed a bit better.

Heliograph: A signal mirror in a device that can be aimed, with a shutter to be able to do controlled flashes of light. Works only when at least some sun is available, or can use an artificial source of light to produce a form of a blinker light, such as candles, battery flashlights, chemical lights, even lasers. Laser versions can be aimed very precisely, and will not be visible very far off the center line, unless debris is in the air, or fog is between the two points. If equipped with an IR laser and IR goggles, they can be even more clandestine.

Blinker light: Can be a battery-operated portable light with trigger or other shutter control used for signaling. Can also use non-electrical sources of light.

As with heliographs, other sources of light can be used. Candles, battery flashlights, chemical lights, even lasers.

Alpenhorns/bicycle horns/trumpets/didgeridoos: Can be air powered, breath powered, or electrically powered. Musical instruments, toy music makers, commercial devices also fall into this group. Make up your own alphabet or word language, as many of the current standard forms, such as Morse Code, do not lend themselves to use with these instruments.

Bullroarer/rhombus/turndun: From the ancient versions to the modern Australian version, in various tonal designs, these can be used for fairly long-distance comms. With the same proviso of creating your own language with which to 'speak' with these instruments.

Drums: The classic 'primitive comms'. Can actually be very sophisticated. From toy tom-toms to massive deep base drums that can signal over vast distances. Every culture had their own set of sounds that meant specific things.

Yodeling: Another ancient form of long-distance human produced sound communication. Can be simple to complex, depending on the skills of the communicators using the method. Most effective in mountainous regions as the sound can be channeled through canyons and valleys, between mountains and ridges, and as the voice will echo very well, can be bounced off obstructions to essentially turn corners and to extend the range.

Whistles: Like horns and trumpets, can be powered by various means, and can be cheap toys to sophisticated commercial versions.

Bells: From simple toy triangle or bike bell, to jingle bells to cow bells to dinner bell triangles to drum set cymbals. As with drums, can be used to convey fairly sophisticated sets of information.

Megaphone: Primarily the unpowered, simple cone shaped type sometimes still used by cheerleaders, can be used to project one's voice, and can often be used in conjunction with some of the other devices that use sound to both direct the sound further, and if steps are taken to shield the device in other directions, limit the area in which the sounds will be heard.

Tin can & string phone: Do not discount this children's fun device. It can be a viable communications device in some instances. Just stay aware of the limitations of how the string must be kept clear of anything that will touch it and dampen the vibrations it carries from one can to the other.

Voice tube: Can be highly effective for point to point comms. And can often be very unobtrusive or camouflaged as simple piping. Using a reverse megaphone on the ends will increase the volume, as well as help shield the talker's voice. And other sound devices can be used if talking is not the best option. Depending on the complexity of the tube configuration, conduit snakes can be used in the tubes to push/pull small message containers through.

Vacuum tube systems: Not electrical vacuum tubes. If one can salvage or buy ahead of time, one of the vacuum tube systems that used to be common at some banks for their drive-throughs, and in-house at many businesses for internal communications, mail, and small package delivery; a system can be rigged to use them, if the power for the vacuum pump is available. Not all that viable of a system in many cases, however, it might be possible to use the system, sans the vacuum part, by stringing cord or cable through the tubing and pull the containers back and forth. Or, since air pressure is easier DIY than vacuum, the system might be rigged to use air pressure from each end to send the containers back and forth.

Dumb waiters: These do not have to be vertical. Nor an actual dumb waiter. The principle, however, of a small box being hoisted/lowered or pulled back and forth horizontally, is valid in some situations, especially if larger items must be moved between areas where making space for humans to travel is not viable.

Flame devices: Flares, smoke signals, flaming arrows, signal fires, and such can be used. Until you run out of them, or the supplies to make them. Plus, the launched fire types can be a severe hazard in dry areas that can burn. However, they can be very effective, and if extensive supplies are laid in, or they are naturally renewable locally, they can actually be useful over much longer periods of time. And unlike what is usually seen in old western movies, there are several more ways to use signal fires/smoke signals than just puffs of smoke from a smoky fire covered and uncovered by a wet blanket. Arrangements of multiple

small smoky fires, colors of smoke created by adding natural chemicals to the fire, and just the location of single fires can all furnish specific information to those that know what each means.

Pyrotechnics: Besides the standard perimeter alarm systems using various ammunition types or other pyrotechnic devices, there are quite a few other ways to use pyrotechnics. Of course, three shots fired at very short intervals is one that most know. In addition, however, and much less expensive, is the use of things like various fireworks items. There is a huge variety of them available, and each one can have a specific meaning. And when it comes to the basic firecracker, how they are set off can provide various pieces of information. Individual, two, three or various other combinations set off in specific timed intervals can be very useful. Of course, these are consumables, and unless one can make their own, will eventually run out, or go bad if not stored correctly.

Sound cannon: Various types of sound cannons and other area bird denial devices can be used, though some consume quite a bit of whatever product they use to create the sound. I do not really consider these too useful, except for very serious situations when signaling long distance is needed.

Field signals: There are several 'standard' sets of signal types used in field work such as hiking, camping, patrolling, surveying, and such. Rock cairns; tree blazes; trail markers such as thumb tacks/push pins, colored yarn, warning tape, etc.; bent/broken branches; and several other methods can be used to provide much more information than what is usually provided by these methods. Simply set up your own definitions for each of the various standard versions.

Drops: Like some of the other methods listed, drops are not an immediate system, but fairly detailed, complex, or large quantity/large size types of information can be done with drops. The sender leaves the item(s) in a secure location that the recipient knows is a drop, and the recipient is either sent word by some other means, or checks the spot on some type of schedule (not one that can be recognized as a pattern), and picks up the item(s). Drops can be used in just about any area, from downtown in the largest mega-cities, to remote wilderness areas. They simply must be known by all that need to use them, chosen in a manner that makes them secure for those using them, and not likely to be discovered by others.

Broad signals: I consider these to be signals that can be seen and interpreted by those in the know, that are out in the open, but will not mean anything to anyone that is not in the know. Billboards can be a version. Not the actual display on the billboard, but some type of minor modification or addition, that can be looked for and discerned, but will not be noticed by anyone else, or if it is noticed, not given any sort of attention. Placement of specific objects in specific places. A towel draped over a balcony. A pulled shade on a specific window. Or a specific item in a specific window. The options are endless. Just use some imagination.

Water based signals: Many of the signaling systems listed here can be used on the water. However, there are several more specific to water. One is dye. Dumping various colors of dye in the water can mean specific things. Floating objects can be as well. In moving water, messages can be sent downstream in floating containers, or in containers suspended under a floating object. These require someone to be monitoring the water so they can retrieve the object, or there must be some type of automatic retrieval system.

Flying signals: Kites (different colors/styles/shapes) can be used to provide different types of information. Since they will be seen by many others, they are rather limited to use when kites are likely to be in the air normally. Helium balloons, of various colors and shapes, either freed or on a tether, can be used similarly, as long as helium is available, or a source of hydrogen is available, such as by electrolysis.

If need be, small hot air balloons can be made and used in a similar fashion. And the classic interpretation of an early use of hot air balloons, that of sending up observers and spotters in balloons, often just as an attack was about to commence, of 'When the balloon goes up,' could actually be one use of a small balloon.

I am sure there are other methods I have not considered, thought of, or remembered, so please add any that you might know or have thought of or created.

If anyone has any questions, feel free to ask.

Just my opinion.