CHAPTER 9

Communication

New here? Ready, Set, Ready is a 10-minute starting point: an honest assessment, one gap closed for real, then a map for using the rest of this site. Once something's actually happened, Surviving picks up where this chapter leaves off, organized by chronology instead of category. Curious how Tier, Stage, and Phase relate? See the Glossary.

Why This Category Matters

When normal networks are congested or down, the household that can still reach the outside world, and coordinate internally, makes better decisions than one that’s cut off. Communication is ranked lower in this manual’s priority order than water, medical care, or shelter because a household can survive days without it; but every other chapter depends on it working eventually, whether that’s calling for help, coordinating a neighborhood watch rotation, or reaching an out-of-state contact to say everyone is safe.

This chapter escalates faster in technical complexity than the others: Tier 2 already assumes an FCC license, and Tier 3 assumes amateur radio licensing and real radio-operating skill. That’s intentional. Unlike food storage or first aid, radio communication has hard legal and technical floors that can’t be worked around with money or effort alone. Build the skills, not just the gear.

Plain-Language Glossary

WEA: Wireless Emergency Alert, the automatic loud-tone alert on modern cell phones. NOAA radio / SAME: a dedicated weather-alert radio that tone-triggers for your specific county. FRS vs. GMRS: FRS is license-free, low-power, short-range; GMRS is the licensed step up with more power and range, and is the radio type this chapter builds around. HAM (amateur radio): a separate, more advanced licensed radio service with far greater range and technical capability than GMRS. HF/VHF/UHF: radio frequency bands. HF travels farthest (regional to global) but needs the most skill/equipment; VHF/UHF are shorter-range but simpler (this is what GMRS uses). LoRa/Meshtastic: a low-power, unlicensed radio technology that automatically relays text messages between small devices. NVIS: an HF antenna technique that bounces signal off the atmosphere for regional coverage, useful specifically because it works well in mountainous terrain. ARES/RACES: volunteer amateur radio emergency-response organizations that already exist in most Utah counties. Refer back to this box any time an unfamiliar term shows up below.

If You're Starting From Zero

This chapter has a lot of moving pieces, but the value is front-loaded: the cheapest, simplest steps matter the most. In order of priority: (1) Make the contact cards and agree on an out-of-state contact and two meeting places; this costs nothing but time. (2) Buy a NOAA weather radio and a couple of power banks; inexpensive, no license needed, useful in almost any emergency. (3) If budget allows for one radio purchase, a pair of GMRS handhelds plus the family license is the single best next step before considering HAM radio. It’s inexpensive, legal, and covers the whole household. Everything past that (HAM licensing, HF radio, mesh networks) is real value for a long-duration or community-scale scenario, but it’s an if-and-when investment, not a starting point.

Tier 1: Short-to-Medium Term (Hours – 14 Days)

Goal: *Maintain contact using standard networks and prepare for congestion. Focus on low-bandwidth methods (texting) and official alerts.*

Tier 1 assumes cell networks are still standing but overloaded: voice calls fail to connect while texts eventually queue through. The goal is using the infrastructure that still exists as efficiently as possible, plus falling back to non-digital methods (paper maps, memorized numbers) the moment it doesn’t.

Skills to Build

- **SMS Protocol:** Default to text over voice during any disaster. Texts use a fraction of the bandwidth and queue for delivery instead of simply failing when towers are saturated, which is exactly what happens in the first hours after a major event.
- **Contact Memorization:** Know at least two or three key phone numbers without pulling them from a digital contact list; a dead or lost phone shouldn't mean losing the ability to reach anyone.
- **Alert Monitoring:** Understand IPAWS (the Integrated Public Alert & Warning System), FEMA's umbrella system that pushes the same official alert out through three channels at once: Wireless Emergency Alerts (the loud, distinct tone on modern cell phones, based on location, and one of the few things that still gets through even when networks are too congested for calls/texts), the Emergency Alert System or EAS (the familiar tone that interrupts AM/FM/satellite radio and broadcast/cable/satellite TV), and NOAA Weather Radio's tone alerts. All three are automatic and require no signup. Know how to receive at least two of them, since any single channel can fail (a dead phone defeats WEA, no power defeats a plugged-in TV for EAS).
- **Local Emergency Notification Registration:** Separately from IPAWS, register for your county's own opt-in alert system. This is where local, non-federal notices (evacuation orders, local road closures, local water issues) actually get sent, and it requires signing up in advance. Weber, Davis, Box Elder, Morgan, Cache, and Rich counties currently use Everbridge (replacing the older CodeRED system in 2024); Salt Lake County residents should check with Salt Lake Valley Emergency Communications Center (vecc911.org) or their specific city, since Salt Lake County's system differs from the northern-county Everbridge rollout. Whatever your county uses, confirm directly; these systems and their names change.
- **Map Reading:** Practice navigating Northern Utah with a paper map before GPS is unavailable. Road numbering, canyon names, and county boundaries aren't intuitive if you've only ever followed a blue dot.

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Tech & Equipment

- **Cell Phones with Offline Maps:** Pre-load offline map areas (Google Maps' "Download Area" feature or equivalent) for your home region; this works without any signal at all once downloaded. Free.
- **Power Banks:** 20,000+ mAh capacity, enough for multiple full recharges without grid power. Roughly $25–50 each; prices vary and change, treat this as a rough planning range, not a quote.
- **NOAA Weather Radio:** Battery or hand-crank model with tone-alert functionality, shared with the Energy & Heat and Security & Self-Defense chapters' equipment lists; one unit covers all three. Roughly $20–40. See the Family Communication Plan & Emergency Radio skill guide for how to program it.
- **Solar Charger:** A foldable panel for recharging power banks and phones directly from sunlight, extending the useful life of Tier 1 battery stock indefinitely. Roughly $30–70 for a basic panel.

Materials & Supplies

Item	Quantity / Spec	Notes
Contact cards	Laminated, wallet-sized, one per person	Out-of-state contact info plus two meeting places: one near home for a sudden local event, one outside the immediate area in case the neighborhood itself is inaccessible. See the Family Communication Plan skill guide for building the full plan.
Physical maps	Utah state + specific county (Davis, Salt Lake, Weber, etc.)	Paper, not a phone screen; useless once the battery dies.
Writing tools	Waterproof notepad + pens	For logging messages, leaving notes for other household members, or tracking radio traffic.
Charging cables	Spare USB-C/Lightning, stored separately from phones	A single lost or damaged cable shouldn't strand every device in the house.

The Out-of-State Contact Trick

After a regional disaster, local phone circuits are often the most congested, but a long-distance call can sometimes get through when a local one can't, because it doesn't compete for the same saturated local towers. Designate one out-of-state relative or friend as the household's single point of contact: everyone calls or texts that one number to check in, and that person relays status between separated family members. Put that number on every contact card.

School and Workplace Reunification

The two-meeting-point plan above assumes the household is together or can travel freely; it doesn't cover the specific, common scenario of a disaster hitting during school or work hours, with the family physically separated across different institutions. Every school has its own emergency reunification procedure (often a specific, controlled release process, not just "come pick up your kid"); know it in advance by asking the school directly, rather than assuming you can just show up. Confirm who besides the parents is authorized for pickup, since that list may need updating. Do the same for any workplace emergency plan for adults in the household. Build this into the household's plan explicitly: if a disaster hits during school/work hours, what does each family member actually do, and where does everyone end up. This is a harder problem than the general meeting-point plan and deserves its own specific answer.

Quick Checklist

- [ ] Text-first habit understood by every household member
- [ ] 2-3 key phone numbers memorized by each person, not just stored digitally
- [ ] Offline map areas downloaded to every phone
- [ ] NOAA weather radio with tone alert in the kit
- [ ] Registered for your county's opt-in emergency notification system (Everbridge for Weber/Davis/Box Elder/Morgan/Cache/Rich; check directly for Salt Lake County and others)
- [ ] Each child's school reunification procedure known in advance, including current authorized-pickup list
- [ ] Workplace emergency plans known for every working adult in the household

- [ ] Laminated contact cards made, including out-of-state contact and two meeting places
- [ ] Paper maps of Utah and home county on hand
- [ ] Waterproof notepad and pens, spare charging cables stored separately from devices
- [ ] Practiced: every household member can recite the out-of-state contact number from memory

Tier 2: Extended (2 Weeks – 3 Months)

Goal: *Establish local coordination and outside contact when cell towers are down or congested indefinitely.*

Tier 2 assumes cell infrastructure can no longer be relied on at all. Communication shifts to radio, which means it also shifts to being a licensed, regulated activity. Getting licensed before it's needed isn't optional here; unlike most of this manual, using this equipment without the license is a legal violation, not just a skills gap.

Skills to Build

- **Radio Protocol:** Use clear, plain speech and call signs rather than "10-codes." 10-codes vary by agency and jurisdiction and cause real confusion between different groups, which is exactly why professional emergency response shifted to plain-language protocols years ago.
- **GMRS Licensing:** Get the FCC GMRS license (a flat $35 fee, no test required, valid for 10 years, and it covers your entire immediate family under one license) before you need the radios, not after. Apply directly at the FCC's Universal Licensing System (wireless.fcc.gov); the whole application takes about 15 minutes online and the license is typically issued within a couple of weeks. This is the same license referenced in the Security & Self-Defense chapter's Tier 2 equipment. See the Family Communication Plan & Emergency Radio skill guide for how to choose between GMRS and ham radio.
- **Satellite Messaging:** Practice composing short, information-dense messages; satellite devices charge per message or have limited data budgets, and battery life is precious in the field.
- **Net Operations:** Participate in scheduled radio "check-in" windows rather than leaving a channel open continuously. This saves battery on every radio in the network and keeps the channel clear for actual emergencies.

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Tech & Equipment

- **GMRS Radios:** Handhelds (up to 5W) for individuals, mobile/base units (up to 50W, but only on the main repeater-capable channels; other channels are limited to 5W or less) for a vehicle or home base station, all covered under the single family GMRS license above. Roughly $30–60 per handheld, $100–250 for a mobile/base unit.
- **Satellite Messenger:** Devices like a Garmin inReach or Zoleo for two-way global text messaging with no cell coverage required: the single most reliable way to reach the outside world from a dead zone. Roughly $300–450 for the device, plus a monthly or annual subscription (roughly $15–50/month depending on plan); the subscription is the real ongoing cost to budget for, not just the hardware.
- **HAM Scanner:** A receive-only scanner to monitor local emergency responder traffic (ARES/RACES nets, fire/EMS dispatch). Listening requires no license at all, only transmitting does, so this is a zero-barrier way to gain situational awareness even before anyone in the household is licensed. Roughly $30–150 depending on capability.
- **Repeater Antenna:** An external antenna on a GMRS base station extends effective neighborhood range well beyond a handheld's built-in antenna. Roughly $40–150 depending on type and mount.

Materials & Supplies

Item	Quantity / Spec	Notes
Subscription plans	Active satellite device service	Or, at minimum, documented knowledge of how to activate one on short notice.
Code phrases	Pre-agreed family status codes	E.g., “Code Green” = all safe, “Code Red” = evacuate. Short, unambiguous, agreed on in advance.
Batteries	Bulk AA/AAA supply	For radios and flashlights; see the Energy & Heat chapter's note on not mixing battery ages/chemistries in the same device.
Frequency list	Printed local GMRS repeater + HAM net frequencies	A phone-stored list is useless the moment the phone dies; print it.

Northern Utah Note

Utah’s mountainous terrain blocks VHF/UHF line-of-sight signal constantly; a canyon or ridge that separates two households can kill a direct GMRS signal that would carry for miles on flat ground. This is exactly the problem Tier 3’s NVIS antenna technique below is built to solve, and it’s worth understanding now that terrain, not just distance, is the real constraint on radio range along the Wasatch Front.

Quick Checklist

- [ ] GMRS license obtained (covers the whole family)
- [ ] Handheld + mobile/base GMRS radios acquired and programmed
- [ ] Satellite messenger with active or activatable subscription
- [ ] HAM scanner for monitoring emergency traffic (no license needed to listen)
- [ ] Family code phrases agreed on and memorized
- [ ] Printed frequency list stored with the radio gear
- [ ] Bulk battery supply stocked
- [ ] Practiced: household has run at least one scheduled radio check-in/net

Tier 3: Permanent (Indefinite)

Goal: Long-range intelligence gathering and decentralized local networking without any infrastructure.

Tier 3 assumes no cell towers, no internet, and no satellite subscription billing infrastructure to rely on. This is full amateur ("ham") radio territory: real licensing, real operating skill, and equipment capable of both regional and global reach without any commercial network underneath it.

Skills to Build

- **HAM Radio Licensing:** Pass the Technician exam (opens VHF/UHF and limited HF privileges) and ideally the General exam (opens most HF bands); both are administered regularly and don't require Morse code today, unlike decades past. Do this well before Tier 3 conditions arrive; it's not learnable from a book in a crisis. See the Ham Radio Licensing & Off-Grid Mesh Networking skill guide for the exact exam format, fees, and how it compares to GMRS.
- **NVIS Antenna Setup:** Configure a Near Vertical Incidence Skywave antenna, a technique that bounces HF signal nearly straight up and back down, ideal for regional (roughly 0–300 mile) coverage in exactly the kind of mountainous terrain that blocks normal line-of-sight radio along the Wasatch Front. See the Ham Radio Licensing & Off-Grid Mesh Networking skill guide for the actual antenna setup.
- **Mesh Network Maintenance:** Learn to troubleshoot LoRa/Meshtastic nodes and their solar power supplies. These are simple devices, but a dead node with a dead battery is a hole in the network's coverage until someone finds and fixes it. See the Ham Radio Licensing & Off-Grid Mesh Networking skill guide for the Meshtastic setup this builds on.
- **Morse Code (CW):** Basic proficiency lets a signal too weak for voice still get through. CW remains the most bandwidth-efficient mode in amateur radio, useful when conditions are marginal and every other method has failed.

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Tech & Equipment

- **HF Transceiver:** A shortwave radio capable of global communication via ionospheric skip, the only equipment in this chapter that can reach beyond regional range with no repeater or satellite infrastructure at all. A capable new unit typically runs roughly $600–1,500+; used gear from licensed operators can cost meaningfully less.
- **Meshtastic Nodes:** LoRa devices (e.g., Heltec V3, RAK WisBlock) for encrypted, offline local text messaging that automatically relays between nodes. No license required for this specific use case, since it operates on unlicensed ISM bands. Roughly $30–80 per node; inexpensive enough to deploy several. See the Ham Radio Licensing & Off-Grid Mesh Networking skill guide for setup.
- **High-Gain Antennas:** Long-wire or dipole antennas for HF; a Yagi for directional VHF/UHF work. A basic wire/dipole antenna can be built for well under $100; commercial directional antennas run higher.
- **Solar Power Station:** A dedicated, high-wattage solar array to keep a radio “shack” powered continuously; cross-reference the Energy & Heat chapter’s Tier 3 off-grid solar guidance for sizing.

Materials & Supplies

Item	Quantity / Spec	Notes
Technical manuals	Radio repair, antenna theory, electronics schematics	Physical books, the same principle as the Medical Care chapter's medical library.
Spare parts	Fuses, diodes, capacitors, coaxial cable, and tubes if applicable	A stock of basic spare electronic components lets minor equipment failures get fixed rather than ending the household's radio capability entirely.
Encryption keys	Printed pre-shared keys for Meshtastic channels	Share only with trusted community members; treat these like a physical key, not a password to type from memory under stress.
Signal mirrors & whistles	Analog backup signaling	No battery, no license, no electronics to fail: the simplest possible fallback for line-of-sight or audible signaling.

EMP Resistance: A Real but Overstated Claim

Vacuum-tube electronics are genuinely more physically robust against an electromagnetic pulse than typical modern solid-state gear, and a fully tube-based radio system can survive an EMP that would damage ordinary electronics. But treat this as a minor, nuanced factor rather than a prepping strategy on its own: a complete tube-based station is large, power-hungry, and inefficient compared to solid-state radios, tube gear is increasingly hard to source and maintain, and much of the popular “tubes survive EMP” claim traces back to an old, partly-debunked Cold War narrative rather than rigorous testing. If EMP resilience genuinely matters to your plan, a small Faraday-caged spare radio (a basic handheld stored in a sealed metal container, disconnected from any antenna) is a simpler and more practical safeguard than building around tube technology.

Legal Note: Transmitting Without a License

The FCC permits unlicensed radio transmission in a genuine emergency involving immediate danger to life or property (47 CFR 97.405), but exactly as in the Security & Self-Defense chapter’s HF discussion, the right plan is getting licensed and trained now, not relying on that exception. A licensed, practiced operator communicates far more effectively under real pressure than someone transmitting for the first time in a crisis.

Quick Checklist

- [ ] At least one household member holds a Technician or General HAM license
- [ ] NVIS-capable HF antenna set up and tested
- [ ] Meshtastic (or equivalent LoRa mesh) nodes deployed and solar-powered
- [ ] Basic CW (Morse code) proficiency in at least one operator
- [ ] HF transceiver and high-gain antennas installed
- [ ] Technical manuals and spare radio parts on hand; a Faraday-caged backup handheld if EMP is a concern
- [ ] Meshtastic channel encryption keys printed and distributed to trusted contacts only
- [ ] Signal mirror and whistle in every go-bag as a no-power fallback
- [ ] Practiced: made actual contact with a station beyond line-of-sight range using Tier 3 gear

Tier 4: Sustainable Community

Goal: Build a redundant, distributed community communication network so no single operator, device, or point of failure silences the whole group.

A single household's Tier 3 radio setup is still one operator and one set of equipment; illness, equipment failure, or simply needing sleep creates a communication gap. Tier 4 spreads capability across a neighborhood: more licensed operators, shared infrastructure, and formal protocols so the network keeps functioning even when any single part of it doesn't.

Check what already exists before building anything: a county-affiliated ARES group or an existing repeater changes the real question from "build a network" to "join one and add real capacity to it." Where nothing exists yet, ask concretely how many households would actually participate and whether anyone is genuinely willing to site and maintain a repeater or node, not just own a radio, before committing to infrastructure that needs real, ongoing upkeep.

Skills to Build

- **Net Control Operations:** Train more than one person to run a scheduled, formal community radio net. Managing check-ins, prioritizing traffic, and keeping order on a shared channel during an actual emergency takes real practice, not just licensing.
- **Training More Licensed Operators:** Deliberately grow the number of licensed HAM operators in the community, the same redundancy principle as the medical-responder and repair-skill training in earlier chapters.
- **Message Relay / Traffic Handling:** Learn formal message-relay practice (the same tradition behind the real-world ARRL National Traffic System). Accurately passing a message between two parties who can't reach each other directly is a specific, practiced skill, not something that happens reliably by accident.
- **Mesh Network Expansion:** Extend Meshtastic (or equivalent) node coverage across the neighborhood so text relay capability doesn't depend on any single household's node staying powered.

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Tech & Equipment

- **Community Repeater:** A shared GMRS or HAM repeater on the highest available point serving the neighborhood, dramatically extending effective range for everyone connected to it.
- **Shared Mesh Backbone:** Multiple Meshtastic nodes deliberately positioned for coverage overlap, so losing any single node doesn't create a dead zone.
- **Community Net Control Station:** A well-equipped, well-powered base station designated (and backed up) as the primary net control point.
- **Redundant Power for Comm Infrastructure:** Shared solar/battery capacity dedicated to keeping the repeater and net control station powered; tie this into the Energy & Heat chapter's Tier 4 shared microgrid concept rather than building it separately.

Materials & Supplies

Item	Quantity / Spec	Notes
Shared frequency/protocol directory	Documented and distributed to every household	Everyone in the network needs the same reference, not just net control.
Spare radio equipment cache	Backup handhelds, batteries, antenna parts	Community-level reserve beyond what any single household stocks alone.
Printed community roster	Callsigns, frequencies, household assignments	Physical copies distributed across multiple households, the same redundancy principle as the medical reference library.

Northern Utah Note

Salt Lake, Davis, and Weber counties all have active, established ARES (Amateur Radio Emergency Service) groups: real, existing volunteer networks affiliated with county emergency management, not a hypothetical resource. Davis County's ARES group has a direct connection to this manual's Security & Self-Defense chapter: it was formed specifically in response to the 1983 flood that sent City Creek down State Street in Salt Lake City. Joining your county's ARES group now, rather than building a parallel network from scratch, is the fastest and most credible path to this tier.

Quick Checklist

- [ ] Multiple trained net control operators in the community
- [ ] More than one household has a licensed HAM operator
- [ ] Community repeater or shared mesh backbone established
- [ ] Shared frequency/protocol directory distributed to all participating households
- [ ] Spare radio equipment cache maintained at the community level
- [ ] Connected to (or actively building) a county ARES/RACES group
- [ ] Practiced: run a full community net with message relay/traffic handling exercised

At a Glance: Communication Across All Tiers

A single-page reference for planning purposes. This does not replace the detailed guidance above; use it to see how the plan scales, not as a standalone checklist.

Tier	Duration	Local Comms	Long-Range Comms
Tier 1	Hours – 14 days	Text messaging, in-person contact cards	Out-of-state contact via cell network
Tier 2	2 weeks – 3 months	GMRS radio (licensed)	Satellite messenger
Tier 3	Indefinite	Meshtastic/LoRa mesh network	HF radio (HAM licensed), NVIS
Tier 4	Sustainable community	Community repeater, shared mesh backbone	County ARES/RACES network