

# Emergency Management Threats and Hazards: Water

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## 2 Emergency Management 101

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# 2 Emergency Management 101

Thousands have lived without love, not one without water.

**W. H. Auden, poet, from “First Things First”<sup>1</sup>**

Experienced emergency managers can probably skip reading this entire chapter. However, reading this chapter when a threat is looming on the horizon – or to be able to refer to this section when there is a need to explain to other non-emergency management professionals the “science” behind some of the work that Emergency Management does may be worthwhile. There are international concepts in the book as well, so there may be some missions or courses of action which have been performed more effectively in the past, in other jurisdictions elsewhere. This part of the book is where the level-setting, overuse of acronyms, and emergency management mantras and dictums will be shared. And as the book was written in 2023–2024, some of these will probably become outdated in the future. There may also be undiscovered good ideas for writing grant applications,<sup>2</sup> meeting compliance requirements for risk analysis or hazard mitigation planning,<sup>3</sup> or fact-based explanations to leadership as to why the Emergency Management team needs more staff,<sup>4</sup> due to climate change or other new threats. The overall goal for this book is to help communities become more resilient against threats and hazards to and from water, through the effective use of full cycle, all hazards Emergency Management.

## **THREATS VERSUS HAZARDS**

Think of threats and hazards, like causes and effects. The threat is what has happened (or could happen), and the hazard is the adverse impact to people, places, and things that are important to us. People determine if it is a hazard. Some threats have some obvious-to-the-public hazards, such as tornadoes, wildfires, or tropical storms. Other threats are not as clear, such as an atmospheric river or global terrorism. Hurricanes, wildfires, earthquakes, and many other threats can become complex in their hazards, very quickly.

Threats are manifestations of risks. Many of them can be managed, mitigated against, etc. before they become hazards to populations. Risk factors covered in this book, originated by Harold D. Lasswell in 1936, expanded on by Peter M. Sandman to add outrage<sup>5</sup> as a factor, form a risk matrix, which help guide jurisdictions on allocating resources and problem-solving activities.

Extreme weather events, critical change to Earth systems (a new entrant this year), and biodiversity loss and ecosystem collapse are the top three long-term risks featured in the (World Economic Forum's) Global Risks Report<sup>6</sup> in 2024. They are interrelated and mutually reinforcing. Abrupt and irreversible changes to Earth systems lead to more extreme weather events and risk collapses in ecosystems that are not well-adapted to new climates. The priority solution is faster emissions reduction and credible steps by all actors in our economic system to accelerate the speed and scale of a clean transition.

Reducing human emissions is the swiftest lever to postpone or avoid critical changes to Earth systems. Once a climate tipping points has been reached, Earth's natural systems reinforce changes and so delaying these for as long as possible will give our civilization time to develop appropriate adaptation and resilience strategies.

Here then lies the second priority for addressing systemic collapse from environmental risk – effectively adapting to coming changes. As sea levels rise, an ecosystem of interconnected solutions is needed to address threats to human life, landscapes and property.

**(World Economic Forum, 2024, p. 1)<sup>7</sup>**

This book is organized with the threats first and then the possible hazards next. This part covers a number of basic concepts of Emergency Management: The 5W1H methodology<sup>8</sup> of “Who”, “What”, “When”, “Why”, and “How”. The last “W” the “Where” is fluid (sorry for the pun), it is wherever the hazards occur or will occur. The book will also briefly highlight critical aspects of Emergency Management which needs whole community and whole of government attention. These are the threats and hazards – and adverse impacts – for which emergency managers are typically *responsible* for, in most cases, but higher levels of government and society itself, needs to be held *accountable*.

If Emergency Management is a new concept, this is a good chapter to start reading this book. For both academics (and those students who are studying Emergency Management, Disaster Management, Crisis Management, etc.) and practitioners who are new to the profession, this chapter will provide the U.S. models, policies, practices, etc. in effect in 2024. If located in a different country, the Emergency Management construct will be different. In the book, there will be case examples from around the world and recommendations but based primarily on the U.S. models.

Emergency Management is the operationalization of Risk Management, Consequence Management, Crisis Management, etc. It is performed before, during, and after incidents – generated by hazards from threats – occur. Emergency Management is further organized into branches or sections, which while in use during the Response phase, should also be staffed and allocated resources in the disaster phases which occur before and afterward. The problems which are solved can be modeled using an agile project management structure, which is also one which

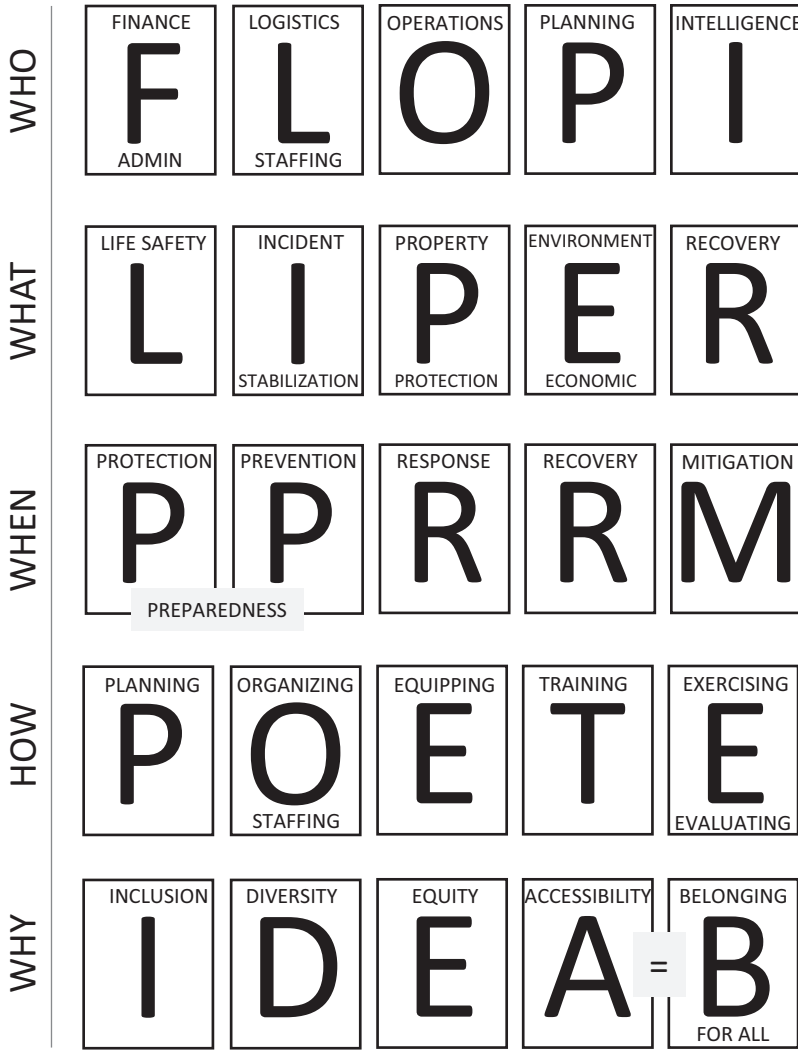


FIGURE 2.1 Key emergency management acronyms and mantras.

Source: © Barton Dunant. Used with permission.

continuously improves itself through planning, organizing, equipping, training, and exercising.

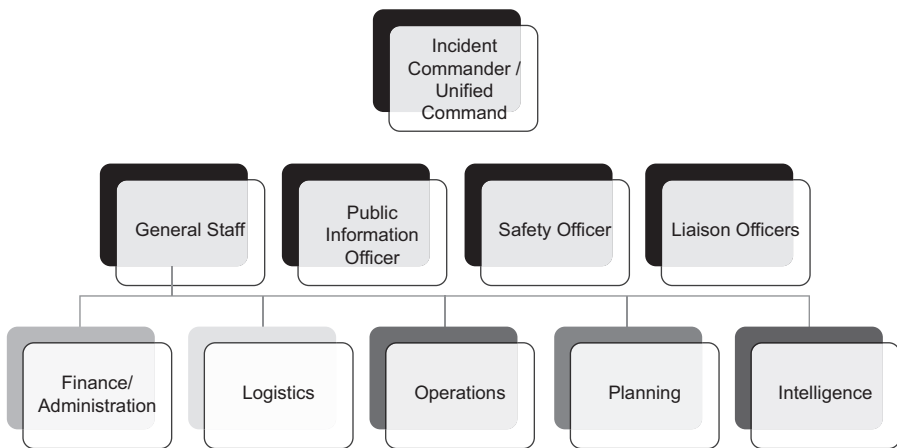
Emergency Management in the United States has a number of five letter mantras, which are the “who, what, when, how, and why” of what needs to be performed, associated with threats and hazards. Figure 2.1 has them all in one infographic, and this chapter will detail each row. In this chapter, both commonly used acronyms and commonly used protocols, procedures, U.S. Federal doctrine, etc. will be introduced. Those acronyms can also be found in the Index.

## 2.1 WHO

Response staffing can come from within an Emergency Management organization, other local (same or above) jurisdictions as part of a memorandum of agreement/ understanding, or even from other jurisdictions via an Emergency Management Assistance Compact (EMAC)<sup>9</sup> request from one governor to another. See below for more information on EMAC.

And note that Liaison Officers or LNOs can be from other government agencies, corporations (such as commercial water treatment facilities), and even non-governmental organizations (NGOs), such as the American Red Cross. More on the U.S.-based ICS system, below.

How many people does it take to provide emergency management services? That depends on whether it is considered steady-state work (Preparedness/Protection/Prevention and Mitigation) or disaster state work (Response and Recovery). For steady-state work, most jurisdictions have a small cadre of staff – and many have additional volunteers and part-time designated staff – who perform Emergency Management work. The disaster state work is primarily considered the purview of Emergency Services (police, fire, medical, public health, public works, etc.) but in larger scale incidents is supported and supplemented with additional staff – especially to fulfill the non-operational branches/sections of the incident command system constructed for this incident. This can be from mutual aid from other jurisdictions, partners who provide additional staff, national guard units, etc. The size and scope of how much staff is “deployed” or dedicated to an incident has been defined to five types by FEMA, as shown in Table 2.1.



**FIGURE 2.2** U.S. National Incident Management System/Incident Command System chart, including Intelligence.

Source: © Barton Dunant. Used with permission.

**TABLE 2.1****U.S. Federal Incident Types**

<b>Incident Type</b>	<b>Description</b>
Type 5	<ul style="list-style-type: none"> <li>• The incident can be handled with one or two single resources with up to six personnel.</li> <li>• Command and General Staff positions (other than the Incident Commander) are not activated.</li> <li>• No written Incident Action Plan (IAP) is required.</li> <li>• The incident is contained within the first operational period and often within an hour to a few hours after resources arrive on scene.</li> <li>• Examples include a vehicle fire, an injured person, or a police traffic stop.</li> </ul>
Type 4	<ul style="list-style-type: none"> <li>• Command staff and general staff functions are activated only if needed.</li> <li>• Several resources are required to mitigate the incident, including a Task Force or Strike Team.</li> <li>• The incident is usually limited to one operational period in the control phase.</li> <li>• The agency administrator may have briefings, and ensure the complexity analysis and delegation of authority are updated.</li> <li>• No written Incident Action Plan (IAP) is required but a documented operational briefing will be completed for all incoming resources.</li> <li>• The role of the agency administrator includes operational plans, including objectives and priorities.</li> </ul>
Type 3	<ul style="list-style-type: none"> <li>• When capabilities exceed initial attack, the appropriate ICS positions should be added to match the complexity of the incident.</li> <li>• Some or all of the Command and General Staff positions may be activated, as well as the Division/Group Supervisor and/or Unit Leader level positions.</li> <li>• A Type 3 Incident Management Team (IMT) or incident command organization manages initial action incidents with a significant number of resources, an extended attack incident until containment/control is achieved, or an expanding incident until transition to a Type 1 or 2 IMT.</li> <li>• The incident may extend into multiple operational periods.</li> <li>• A written IAP may be required for each operational period.</li> </ul>
Type 2	<ul style="list-style-type: none"> <li>• This type of incident extends beyond the capabilities for local control and is expected to go into multiple operational periods. A Type 2 incident may require the response of resources out of area, including regional and/or national resources, to effectively manage the operations, command, and general staffing.</li> <li>• Most or all of the Command and General Staff positions are filled.</li> <li>• A written IAP is required for each operational period.</li> <li>• Many of the functional units are needed and staffed.</li> <li>• Operations personnel normally do not exceed 200 per operational period and total incident personnel do not exceed 500 (guidelines only).</li> <li>• The agency administrator is responsible for the incident complexity analysis, agency administrator briefings, and the written delegation of authority.</li> </ul>

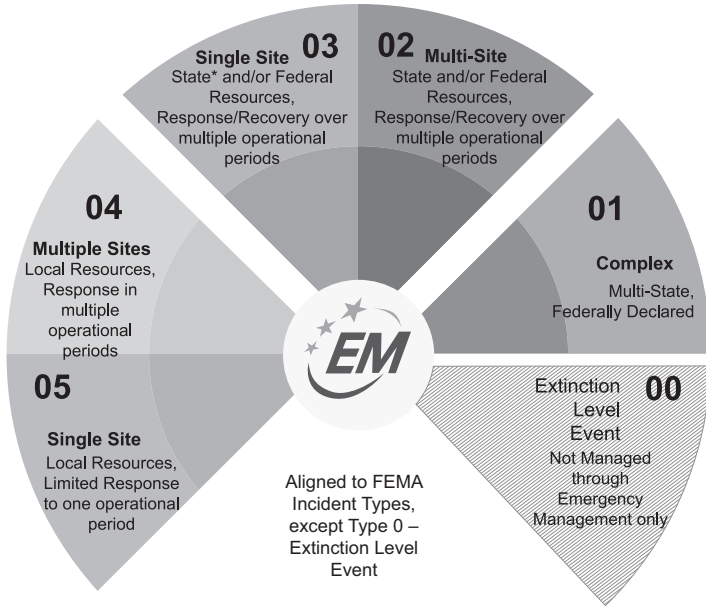
**TABLE 2.1 (Continued)**  
**U.S. Federal Incident Types**

<b>Incident Type</b>	<b>Description</b>
Type 1	<ul style="list-style-type: none"><li>• This type of incident is the most complex, requiring national resources to safely and effectively manage and operate.</li><li>• All Command and General Staff positions are activated.</li><li>• Operations personnel often exceed 500 per operational period and total personnel will usually exceed 1,000.</li><li>• Branches need to be established.</li><li>• The agency administrator will have briefings, and ensure that the complexity analysis and delegation of authority are updated.</li><li>• Use of resource advisors at the incident base is recommended.</li><li>• There is a high impact on the local jurisdiction, requiring additional staff for office administrative and support functions.</li></ul>

Source: FEMA. (2019). *IS-0200.c Basic Incident Command System for Initial Response*. FEMA. See [https://emilms.fema.gov/is\\_0200c/groups/518.html](https://emilms.fema.gov/is_0200c/groups/518.html)

**WHEN TO USE AN ICS: BENEATH AND BEYOND**

It’s been said that “all disasters start and end locally” and this is also applicable to staffing for incidents of any scale. The more the resources needed – especially from beyond a single jurisdiction – the higher the level of typing for an incident. FEMA starts their credentialing, training, and experience monitoring/evaluating at the Type 3 level, but that does not mean that local responders to Type 4- and Type 5-level incidents should not have the credentialing training and experience monitoring for a higher level. An ICS can be used on a Type 4 or Type 5 incident – in some jurisdictions, it is required. In all cases, the benefits of using an ICS – including Incident Management System benefits such as span of control, unity of effort,<sup>10</sup> unified command, flexibility, and scalability – can benefit any single jurisdiction. Emergency managers should always consider the “what-if” the incident escalates – and how they need staffing to support additional needs and courses of action. Some incidents appear to be only responded to by a single emergency services response group or type, but the reality is that all incidents have emergency management components to them such as additional resource request processes, common operating picture, interoperability, planning, operational coordination, public information and warning, and emergency management intelligence. It is very apparent to a professional emergency manager when an incident is managed by a single emergency services group who does not have an Incident Command System in place. Any group who believes that ICS is “beneath them” on incidents usually results in ineffective protection of life safety, maintenance of incident stability, protection of assets and property, care for the environment, and/or the successful transition to Recovery.



\* State wording represents U.S. State, Territory, or Tribal Entity level jurisdiction.

**FIGURE 2.3** Incident Types.

Source: © Barton Dunant. Used with permission.

And there should be one more level – a Type 0 for extinction level event. Emergency managers need to understand there is a limit to the extremes of what types of incidents can be managed solely through Emergency Management. See Figure 2.3 for a more complete version of Incident Types.

Emergency management has as one of its standards to “ratchet up and down” the resource support needed, based on the incident type. For example, when a Type 4 incident is still scaling up – meaning not yet under control or expanding – additional resources should be requested as if the incident could grow to a Type 3. While COVID-19 may have started in the United States as a small outbreak in Washington state on January 20, 2020, it expanded exponentially across the entire country in a matter of weeks. And at the same time, the virus spread worldwide. The size and scope moved the incident typing off the scale; there were no additional resources available anywhere, nor was there proper planning in place for this level of incident. There are hazards and threats for which emergency management cannot plan, organize, equip, train, and exercise because they are too complex. One way to quantify them is to describe them as Type 0 – Extinction Level Events.



When the phrase “Extinction-Level Event” is mentioned, thoughts turn towards world-changing events – such as asteroid strikes, nuclear war, and even climate change/global warming. None of those tragedies have their response and recovery missions coordinated through their national emergency management process. There is a cap to the maximum of maximums of the capabilities and capacities for national and jurisdictional emergency management agencies and departments – as well as the concepts of the Incident Command System within the field of emergency management itself. When a disaster expands beyond the capability of the internal sub-jurisdictions within a nation, that jurisdiction usually requests assistance upward, all the way to the national level for support. When the nation itself needs support beyond its own capabilities, it can choose to reach out to partner nations, intergovernmental organizations, or non-governmental organizations for additional support (i.e., NATO, the United Nations, the Red Cross/Red Crescent National Societies across the globe, etc.). When all the nations are impacted at the same time by the same incident – and there is no one unimpacted left to help – that constitutes a worldwide catastrophe. Can any such incident be managed within a single nation’s borders? Maybe, but not by or through emergency management, since the decisions about all aspects of the disaster phase cycle missions of Preparedness/Prevention/Protection, Response, Recovery, and Mitigation are a matter of national security and economic development.

(Prasad, 2023, p. 1)<sup>11</sup>

## 2.2 WHAT

A full-cycle emergency manager must look at the totality of the incident, not just the Response aspects. Emergency Services<sup>12</sup> can (and should) focus on the first three letters of the acronym “LIP”, which represent Life Safety, Incident Stabilization, and Property/Asset Protection (or conservation). Holistic Response (covering more than just what impacts people), Recovery and Mitigation work adds the last two letters of ‘Environmental/Economic Resilience’ and transition to Recovery, to round out the full acronym of LIPER: life safety, incident stabilization, property/asset protection, environmental/economic resilience, and recovery initiatives.

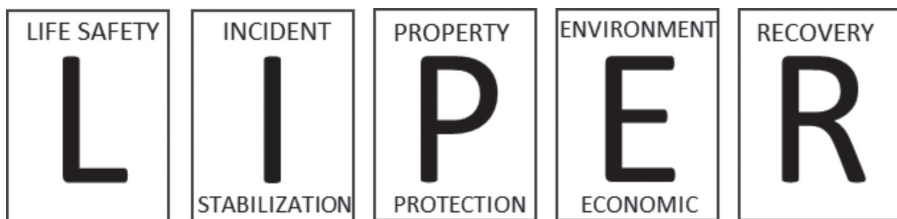


FIGURE 2.4 LIPER

### **THE LIPER, WATER UTILITIES, AND HOSPITALS AROUND PORTLAND, OR**

The Multi-Agency Coordination System (MACS) is where this work happens in the Portland Metro Area. The MACS allows every agency to maintain their individual command and control, based on their legal authorities, but allows for coordination and prioritization as needed to ensure common good. The water system pumps water up a hill – under a lake – to three of the major medical facilities (including a Level 1 Trauma Center) serving Portland. Portland Water Bureau also serves many other small communities from the Bull Run Reservoir (on best days).

The MACS have a broader picture of the needs of multiple communities – and multiple sectors within each community. Utilizing the LIPER and the Community Lifelines, the Portland Metro Area gets everyone on the same page. For example, the MACS system has been extremely helpful in healthcare coordination through their healthcare coalition.<sup>13</sup> This allows healthcare facilities to understand the reality of restoration time frames and what it means for hospital services, after a water-related (or any other) disaster or incident. Restoration of water service to hospitals is more encompassing than just drinking water. It includes clinical water for steam sterilization, medication management and compounding, ultrafiltrations, etc. The water use audit tool from the CDC<sup>14</sup> is one aspect of Preparedness which hospitals can use to advise local Emergency Management groups of their potential water consumption rates (well beyond the Joint Commission’s 72-hour water storage rule).<sup>15</sup> Until a hospital can articulate what water is needed for each clinical service line it has, it cannot self-prioritize how to discontinue services. Thus, the work of the healthcare coalition is to prioritize its own facilities for water restoration or temporary service to ensure equity across the healthcare system in a large urban metropolitan area, such as Portland. Water providers should not be performing that service prioritization, they should be determining their capacity to process the restorations based on what the healthcare community – through the MACS – tells them. And the MACS can help where ethical decision-making may come in between water providers. For example, eliminating competition for scarce resources (like staffing, specialized filters, pipe fittings, valves, etc.).

**B. McGinnis, personal communication, December 21, 2023**

These strategic objectives are codified in the U.S. National Preparedness Goal,<sup>16</sup> as mission areas and core capabilities. The five mission U.S. national areas are Prevention, Protection, Mitigation, Response, and Recovery. The 32 core capabilities can be found in Figure 2.5.

Prevention	Protection	Mitigation	Response	Recovery
<b>Planning</b>				
<b>Public Information and Warning</b>				
<b>Operational Coordination</b>				
<b>Intelligence and Information Sharing</b>		<b>Community Resilience</b>  <b>Long-term Vulnerability Reduction</b>  <b>Risk and Disaster Resilience Assessment</b>  <b>Threats and Hazards Identification</b>	<b>Infrastructure Systems</b>	
<b>Interdiction and Disruption</b>			<b>Critical Transportation</b> <b>Environmental Response/Health and Safety</b> <b>Fatality Management Services</b> <b>Fire Management and Suppression</b> <b>Logistics and Supply Chain Management</b> <b>Mass Care Services</b> <b>Mass Search and Rescue Operations</b> <b>On-scene Security, Protection, and Law Enforcement</b> <b>Operational Communications</b> <b>Public Health, Healthcare, and Emergency Medical Services</b> <b>Situational Assessment</b>	<b>Economic Recovery</b> <b>Health and Social Services</b> <b>Housing</b> <b>Natural and Cultural Resources</b>
<b>Screening, Search, and Detection</b>				
<b>Forensics and Attribution</b>	<b>Access Control and Identity Verification</b> <b>Cybersecurity</b> <b>Physical Protective Measures</b> <b>Risk Management for Protection Programs and Activities</b> <b>Supply Chain Integrity and Security</b>			

**FIGURE 2.5** Core capabilities and mission areas infographic.

Source: FEMA. (2015). *National Preparedness Goal Second Edition*. U.S. Department of Homeland Security. See [www.fema.gov/sites/default/files/2020-06/national\\_preparedness\\_goal\\_2nd\\_edition.pdf](http://www.fema.gov/sites/default/files/2020-06/national_preparedness_goal_2nd_edition.pdf), p. 3.

While any threat or hazard can impact all or some of the core capabilities of a jurisdiction, for **water-related threats and hazards**, the following will most likely be adversely affected:

*Mitigation:* Community Resilience.

*Response:* Environmental Response/Health and Safety, Fire Management and Suppression, Public Health, Healthcare, and Emergency Medical Services.

*Recovery:* Natural and Cultural Resources.

This can be one major difference between Emergency Services/Emergency Responders and emergency managers. Emergency managers facilitate the prioritization of the LIPER – as shown in Figure 2.4 – against the mission areas and the core capabilities, in support of partners – including Emergency Services/Emergency Responders – and other groups. Emergency Management provides the full disaster phase cycle wrap-around support for all of the groups supporting Core Capabilities, across the Mission areas.

### 2.2.1 CHRONIC, SYSTEMIC, AND ENDEMIC DISASTERS

There are disasters which are beyond the scope of Emergency Management. As noted above, Extinction Level Events (Type 0) certainly require more ownership and collaboration above what only Emergency Management can provide. The same is true for continual, long-term disasters which are defined as chronic, systemic, and endemic – even when coupled<sup>17</sup> with disasters for which Emergency Management is in command. Disasters such as the opioid crisis in the United States and elsewhere, poverty, racism, refugee migration, etc. all fit into this grouping of disasters for which an Emergency Management command and control will not work effectively and may even harm critical aspects the LIPER. In the same way, Prasad (2023) noted that the global COVID-19 pandemic was beyond the capabilities of national Emergency Management's control; chronic, systemic, and endemic disasters have the same reasoning:

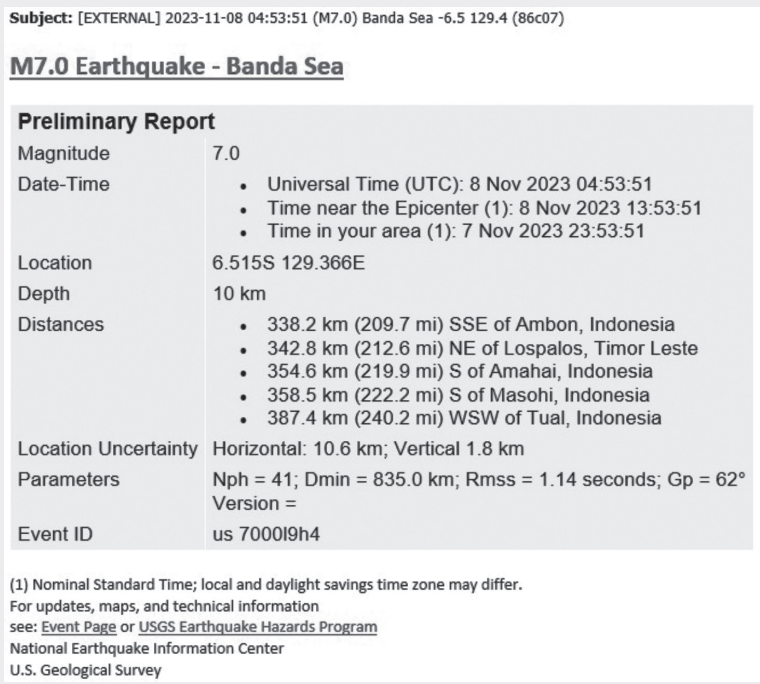
- Emergency management practice is jurisdictionally bound and generally follows a “bottom-up” approach, with resources for unmet needs coming from a higher level.
- The size and scope of the management system for any disaster response and recovery efforts are limited. At some point, the response efforts must become a whole-of-government approach, and therefore change management systems, because whole governments operate under a political management system instead of the ad hoc temporary structure of an emergency management system.
- Emergency management applies a straight-line approach to disasters, in a cyclical pattern. Even if there is an overlap between adjacent disaster cycle phases, they generally occur in order.
- Emergency management follows a unity of effort model; everyone in the response and recovery Incident Command System (ICS) is working toward the same goals and the same end-state.
- Emergency management – through any ICS in any country – is organized differently than the steady-state political-oriented governmental day-to-day operations. COVID-19, like any worldwide impacting incident, turned those systems upside-down. The ICS organizational branches of Command, Intelligence, Finance/Administration, Logistics, Operations, and Planning for every level of government were significantly impeded during COVID-19 (Prasad, 2023, p. 1).<sup>18</sup>

### WHEN THREATS DO NOT GENERATE HAZARDS

And just because something is a threat does not automatically mean that it has hazards. There are causal and correlative connections between threats and hazards, but not always certainty. Wildfires occur all over the world in places where there are no people, no infrastructure, no real adverse impacts. That does not turn those incidents into disasters. Tropical storms spin up and then fizzle out, without ever making landfall or even impacting shipping lanes. Even earthquakes can have this lack of hazard impact, as shown in Figure 2.6.

A 7.0 magnitude earthquake is considered “major”.<sup>19</sup> This one was in the ocean, off the coast of Indonesia. Open-source media indicated it was *actually* two earthquakes (averaging about 7.0 each), in an area approximately 255 km (158 miles) from the nearest island. No tsunami warning and no apparent damage to any infrastructure.<sup>20</sup> This same level of earthquake devastated Haiti in 2010. It is not the earthquake threat which generates a disaster, but rather the ways communities are adversely impacted by its hazards.

And while Emergency Management in the United States, through the National Preparedness Goal, has major mission areas of Protection and



**FIGURE 2.6** Screenshot of an alert sent by the U.S. National Geological Survey, for a 7.0 magnitude earthquake in the Banda Sea.

Source: Accessed August 11, 2023, from the author’s e-mail account.

Prevention (typically utilized against human-made threats, such as terrorism), the causality associated with the Threats from water may not be capable of elimination through Mitigation (FEMA, 2015). On the other hand, Hazards can be mitigated against.

### 2.3 WHEN

In the United States, the current Federal model for the Disaster Phase Cycle is described as a linear one, from the Federal Emergency Management Agency’s (FEMA’s) National Disaster Recovery Framework (NDRF), as shown in Figure 2.7.

The worldwide SARS-CoV-2 coronavirus pandemic which started in late 2019 has turned this model “inside out” – no longer will phases only follow one another, but incidents themselves (or other incidents in the same jurisdiction, impacting the same Emergency Management teams) can occur over longer timespans and even at the same time, in more of a spiral, three-dimensional model, shown in Figure 2.8.

This book will provide an overall disaster readiness (or resiliency) view, in order to identify actions and activities necessary to protect and preserve life safety (and other elements of the LIPER), regardless of where a community is in the disaster phase cycle. Rather than looking at only a piece of the phases, it might be better to have a lens which can view more than one mission at a time, as in Figure 2.9.

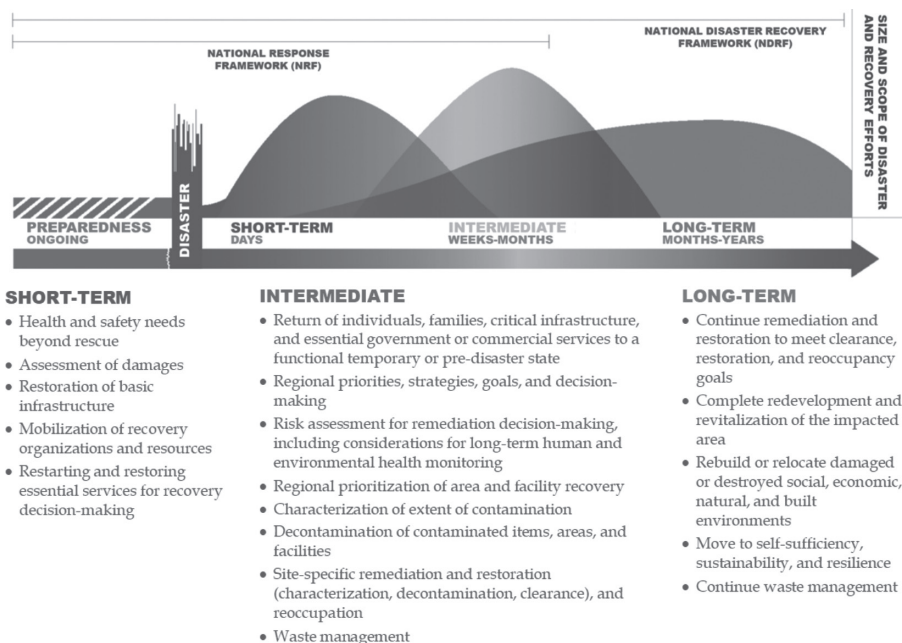
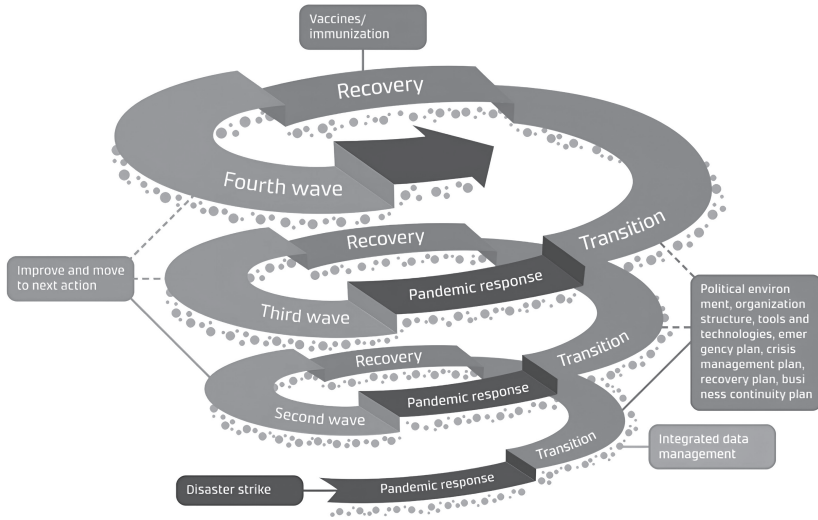


FIGURE 2.7 NDRF Disaster Continuum.

Source: FEMA. (2016). *National Disaster Recovery Framework*. FEMA. See [www.fema.gov/emergency-managers/practitioners/national-disaster-recovery-framework](http://www.fema.gov/emergency-managers/practitioners/national-disaster-recovery-framework)



**FIGURE 2.8** Spiral view of the COVID-19 disaster phase cycle.

Source: Fakhruddin, B., Blanchard, K., & Ragupathy, D. (2020). Are We There Yet? The Transition from Response to Recovery for the Covid-19 Pandemic. *Progress in Disaster Science*, 7, 100102. <https://doi.org/10.1016/j.pdisas.2020.100102>. See [www.sciencedirect.com/science/article/pii/S2590061720300399](http://www.sciencedirect.com/science/article/pii/S2590061720300399). CC BY-NC.



**FIGURE 2.9** A representation of the four disaster phases aligned to the five U.S. mission areas.

Source: © Barton Dunant. Used with permission.



## 2.4 HOW



The POETE process is a continuous improvement project management tool, which can be used by any organization to help solve problems in (as in “before, during, and after”) disasters, as well as for day-to-day operations. Commonly used in Emergency Management as part of the Comprehensive Preparedness Guide (CPG) 201 annual review process,<sup>21</sup> the POETE process can also be applied in non-Emergency Management project management/problem-solving.<sup>22</sup> The acronym represents Planning, Organizing (aka staffing), Equipping, Training, and Exercising – and can be applied on an all-hazards/all-threats basis for emergencies, disasters, and more:

*Planning:* It is the process of developing and implementing plans, in any organization – including continuity plans, contingency plans, emergency action plans, etc. To paraphrase U.S. President Dwight Eisenhower,<sup>23</sup> “Plans are not as valuable as is the Planning process”. And of course, there is the classic:<sup>24</sup> “If you fail to plan, you plan to fail”. This collaborative process of planning should result in new or modified plans, but there is value in the networking, the understanding of the capabilities and capacities of others, and your own internal organization’s needs for cross-walking one set of plans with others.

*Organizing:* It is defining who does what in your plans, as well as who designed what in your plans. And who their backups are. This is usually more position-driven than name-driven (i.e., the press secretary will become the public information officer during the response operations, rather than “Sam is the public information officer”). This way the plans do not need to be updated as frequently as staff may change. This step also helps “right-size” the various roles needed for supporting steady-state and disaster state operations and needed continuity roles. In other words, it helps identify when some is assigned more than one hat to wear at the same time.

*Equipping:* It is the logistical tools (sites, systems, supplies, stuff) needed by the staff to support the work in the plans. This should also include contingency equipment (or upgrades to existing tools) needed at continuity sites when the threat dictates an evacuation from the primary site(s). In other words, if you use a fax machine for your day-to-day work, and must relocate to a hotel conference room to work, can you get a fax machine there? Or maybe your work cell phone does not have its “hotspot” activated for budgetary reasons, but during a disaster that feature could be turned on to allow you to work from home or on the road.



### **CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN**

Emergency managers – especially those with homeland security or law-enforcement backgrounds/education – may have heard of the term Crime Prevention through Environmental Design, or CPTED. Much<sup>25</sup> of CPTED is the physical elements used to “harden” a target, such as building or critical infrastructure site.<sup>26</sup> What can be put in place to help protect against the adverse impacts of a terrorist attack, will also work against accidental mishaps as well. If emergency managers take an all-hazards approach (rather than just focusing on terrorism, per se), the elements of CPTED can be applied more holistically and collaboratively.

For example, adding bollards and high-earth berms around a water pump facility will help thwart a vehicle ramming attack on that site. It will also prevent someone from having a medical emergency in their vehicle and accidentally driving into the water pump facility. On the other hand, if the CPTED elements are not implemented collaboratively with other elements of public safety (such as fire suppression), then the all-hazards approach will not be met. If the water pump facility – or the water system’s building next to it – is inaccessible to the fire department because of excessive CPTED elements – and there is a fire – it may not be suppressed.

*Training:* It is just that the training needed by the staff – using the equipment – to support the work is defined in the plans. If you are the press secretary, have you had crisis communications training? Do you know how to operate in a Joint Information Center (JIC), where you may not be the biggest fish in the pond? Training is also where emergency managers and others get to collaborate, coordinate, cooperate, and even communicate with our partners, suppliers, stakeholders, etc. Training together is a great opportunity to network and learn the capabilities and capacities of others, as well. “Train like you fight, fight like you train”.<sup>27</sup>

Emergency managers have ample opportunity to train and educate themselves – both before they start their careers and through continuing educational opportunities. Regardless of whether one is a full-time paid or part-time volunteer, the needs of the profession demand constant and cyclical training. In the United States, water-related threats and hazards training<sup>28</sup> – along with overall all-hazards, full disaster phase cycle training – is available through the states (including free course offerings, such as MGT-343 Disaster Management for Water and Wastewater Utilities<sup>29</sup> from the National Domestic Preparedness Consortium – [ndpc.us](http://ndpc.us)) and at the federal level (FEMA – [training.fema.gov](http://training.fema.gov)). Emergency Management training is also available from non-governmental organizations, such as the American Red Cross. Worldwide, the World Health Organization has online training classes and curriculums available at [openwho.org](http://openwho.org).

*Exercising:* This is the step in the process which puts all of the other steps together – practicing what is in the plan, by the people designated in the plan (and

their backups), using both primary and secondary equipment, and the training they have already received beforehand. Another key element of Emergency Management exercising is the after-action review/improvement plan process, which is the feedback loop for changes needed (to the plans, organization, equipment, training, and even future exercises, as determined by those who participated in the exercise(s) themselves).

In the United States, the U.S. Department of Homeland Security (USDHS) created a common platform and training for developing and implementing exercises, called the Homeland Security Exercise and Evaluation Program (HSEEP).<sup>30</sup> Emergency Management groups across all organizations, organization types, etc. should utilize the HSEEP modeling for collaborative and coordinated exercise development and execution.

### **WHAT EMERGENCY MANAGEMENT NEEDS THE PUBLIC TO DO, IN THE RESPONSE PHASE**

1. Follow the directions given by local emergency management officials.
2. Help themselves and their neighbors, as much as they can.
3. Think Life Safety First.
  - a. *Shelter-in-Place*: This means staying where you are and not evacuating. And the “you” described can mean you and your family, your coworkers, your pets, your personal care assistant, etc. You still get to be you – and please take into consideration all the unique aspects of you not mentioned specifically. Sheltering-in-Place could mean moving to a safer room in the building or a safer location in the complex or on the campus – but generally this is an easier decision where and when to go, when you have your own existing POETE process for this action. For evacuating, Planning means having a plan as to where you would go to shelter-in-place, knowing what you would need there for an extended stay perhaps, and how you would communicate with others if circumstances of the emergency change (for the better or worse). Organization means knowing who is doing what – who may be needed to help you shelter-in-place and then get you back to “normal”. Equipment is the stuff you need to shelter-in-place. Emergency managers call this a “Stay Box”. This is a container which can hold everything from shelf-stable food/pet food, medicine, battery-powered cell chargers, a flashlight, potable water, a change of clothes, sleeping bag, whatever. And this is stuff you need to have everywhere you might shelter-in-place, not just at home. So, you will need multiple stay boxes. Training is the process of reviewing the plan, asking questions, taking classes, and attending seminars on personal preparedness and asking questions of your leadership at work about emergency preparedness and

response. And finally, Exercising is the practice, practice, practice that everyone needs to do for emergency action planning. Practice your plan, practice using your equipment, practice with others, and practice some “what-ifs” from your training.

- b. *Evacuate*: Evacuation means leaving where you are now, and not sheltering-in-place. It could mean evacuating the entire building, complex, or campus – or just evacuating to a safer place within the site where you reside. For that high-rise building fire, residents on the upper floors may evacuate to a different floor which has more fire protection and/or access to a fire stairwell, for example. Residents with mobility concerns may evacuate to what’s called an Area of Refuge, which is a meeting spot for residents to be further evacuated by the fire department. The building may have a designated Emergency Assembly Point outside, for people to meet for accountability (where officials help make sure everyone has safely evacuated the building). And there is a POETE process for Evacuations. It is going to sound somewhat familiar to Sheltering-in-Place. Planning means having a plan as to where you would go now and the “what-ifs” for *if* you are able to return or not, knowing what you might need while you wait at the Emergency Assembly Point, and how you would communicate with others if circumstances of the emergency change (for better or worse). Organization means knowing who is doing what – who may be needed to help you evacuate and then get you back to “normal”. Equipment, as mentioned before, is the stuff you need to evacuate. “Need” is the operative word. Emergency managers call this a “Go Bag”. This can hold everything from food, medicine, battery-powered cell charger, electric wheelchair charging devices, flashlight, small amount of drinking water, glow stick, whatever. And as with the Stay Box, you need a Go Bag in different places, too. A handbag or backpack you carry with you everywhere will do. Training is the process of reviewing the plan, asking questions, taking classes, and attending seminars on personal preparedness and asking questions of your leadership at work about emergency preparedness and response. And finally Exercising is the practice, practice, practice that everyone needs to do for emergency action planning. Practice your plan, practice using your equipment, practice with others, and practice some “what-ifs” from your training. Note that the steps and actions for Evacuations should sound familiar to those for Sheltering-In-Place. Emergency managers designed this to be similar, for muscle-memory and consistency. There is a lot of preparation work involved for both, but it will be worth it. The point is to act on your plan, and not to panic.
- c. *Both or One, Then the Other*: This is the case where different sets of directions from Emergency Management apply to different

geographic areas of a jurisdiction. For example, it may be a storm which requires coastal evacuation, but sheltering-in-place, elsewhere. It may also mean for your family to evacuate first, then to shelter-in-place elsewhere, such as what is typically the directions from Emergency Management for tropical storm impacts. It can also be a situation where you shelter-in-place, and then evacuate when it is safer to do so (Prasad, n.d., p. 1).<sup>31</sup>

**2.4.1 EMERGENCY SUPPORT FUNCTIONS**

At the U.S. Federal level (and for most U.S. states/territories), the standardized Emergency Support Functions (ESFs) are the major components of the National Response Framework,<sup>32</sup> and are shown in Table 2.2. Governmental organizations are aligned as leads to these various ESFs. For example, the U.S. Department of Health and Human Services is the lead for ESF#8, as is most state departments of health. Table 2.2 also shows some examples of supporting actions or capabilities related to Public Health. In Chapter 3, the ESF specifics associated with water-related threats will be highlighted.

While not an ESF, educational and childcare facilities will be adversely affected as well, by any threats or hazards, not just water-related ones. A shortage of childcare facilities may mean emergency responders are impacted as well. If those responders

Federal Emergency Support Functions (ESFs)				
#1 - Transportation	#2 - Communications	#3 - Public Works and Engineering	#4 - Firefighting	#5 - Information and Planning
#6 - Mass Care, Emergency Assistance, Temporary Housing, and Human Services	#7 - Logistics	#8 - Public Health and Medical Services	#9 - Search and Rescue	#10 - Oil and Hazardous Materials Response
#11 - Agriculture and Natural Resources	#12 - Energy	#13 - Public Safety and Security	#14 - Cross-Sector Business and Infrastructure	#15 - External Affairs
Federal Recovery Support Functions (RSFs)				
Economic		Health & Social Services		Community Assistance
Infrastructure Systems		Housing Recovery		Natural & Cultural Resources

**FIGURE 2.10** The U.S. Federal-level Emergency Support Functions and the Recovery Support Functions.

Source: Barton Dunant.

**TABLE 2.2**  
**U.S. Federal-Level Emergency Support Functions**

<b>Emergency Support Function (ESF)</b>	<b>Example Supporting Actions or Capabilities Related to Public Health and Healthcare</b>
#1 – Transportation	Coordinate the opening of roads and manage aviation airspace for access to health and medical facilities or services.
#2 – Communications	Provide and enable contingency communications required at health and medical facilities.
#3 – Public Works and Engineering	Install generators and provide other temporary emergency power sources for health and medical facilities.
#4 – Firefighting	Coordinates federal firefighting activities and supports resource requests for public health and medical facilities and teams.
#5 – Information and Planning	Develop coordinated interagency crisis action plans addressing health and medical issues.
#6 – Mass Care, Emergency Assistance, Temporary Housing, and Human Services	Integrate voluntary agency and other partner support, including other federal agencies and the private sector, to resource health and medical services and supplies.
#7 – Logistics	Provide logistics support for moving meals, water, or other commodities.
#8 – Public Health and Medical Services	Provide health and medical support to communities, and coordinate across capabilities of partner agencies.
#9 – Search and Rescue	Conduct initial health and medical needs assessments.
#10 – Oil and Hazardous Materials Response	Monitor air quality near health and medical facilities in close proximity to the incident area.
#11 – Agriculture and Natural Resources	Coordinate with health and medical entities to address incidents of zoonotic disease.
#12 – Energy	Coordinate power restoration efforts for health and medical facilities or power-dependent medical populations.
#13 – Public Safety and Security	Provide public safety needed security at health and medical facilities or mobile teams delivering services.
#14 – Cross-Sector Business and Infrastructure	Be informed of and assess cascading impacts of health or medical infrastructure or service disruptions, and deconflict or prioritize cross-sector requirements.
#15 – External Affairs	Conduct public messaging on the status of available health and medical services or public health risks.

*Source:* FEMA (2019b, pp. 21–22). FEMA. (2019a). *National Response Framework*. U.S. Department of Homeland Security. See [www.fema.gov/sites/default/files/2020-04/NRF\\_FINALApproved\\_2011028.pdf](http://www.fema.gov/sites/default/files/2020-04/NRF_FINALApproved_2011028.pdf)

have unmet childcare needs, they may not deploy, call out, etc. to take care of their families. This can be the case for all types of threats and hazards, regardless of whether there are evacuations or sheltering-in-place. Many jurisdictions utilize educational facilities for Response missions – if those sites do not have their own – or alternative methods – for supporting themselves for water quality and quantity

threats, they may become unavailable/unusable for any other ESF’s use – especially ESF #6 – Mass Care.

**2.4.2 RECOVERY SUPPORT FUNCTIONS**

Recovery Support Functions (RSFs) are similar in structure and guidance modules, as the ESFs. The U.S. Federal Government first published the *National Disaster Recovery Framework*<sup>33</sup> in 2011, after more than two years of building the framework through a national stakeholder process:

This framework provides the following guidance to recovery leaders and stakeholders:

- Identifying guiding principles for achieving successful recovery.
- Outlining pre- and post-disaster roles and responsibilities for recovery stakeholders and recommending leadership roles across all levels of government.
- Describing how the whole community will build, sustain, and coordinate the delivery of the Recovery core capabilities.
- Explaining the relationship between Recovery and the other mission areas (Prevention, Protection, Mitigation, and Response).
- Promoting inclusive and equitable coordination, planning, and information-sharing processes.
- Encouraging the whole community to leverage opportunities to increase resilience and incorporate climate adaptation and mitigation measures pre- and post-disaster, such as continuity planning and land use and environmental regulations.
- Identifying scalable and adaptable organizations for coordinating recovery.
- Describing key factors, activities, and considerations for pre- and post-disaster recovery planning.
- Ensuring recovery resources are sourced from a wide range of whole community partners, including individuals and voluntary, nonprofit, philanthropic, and private sector and governmental agencies and organizations.

(USDHS, 2016, p. 2)<sup>34</sup>

The six U.S. Federal level RSFs are shown in Table 2.3. As with the ESFs, each U.S. state or territory can align their Recovery work differently, if they want to. Chapter 3 will have more specifics on the impacts of water-related threats on the RSFs. The chapters in Parts 3 and 4 will also have specifics for each hazard type.

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**TABLE 2.3**  
**Federal Recovery Support Functions (RSFs)**

Economic	Health and Social Services	Community Assistance
Infrastructure Systems	Housing	Natural and Cultural Resources

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Since the Recovery Support Functions have coordinating, primary, and supporting agencies both inside and outside of the U.S. Federal Government, FEMA created a Recovery Support Function Leadership Group:

The Recovery Support Function Leadership Group (RSFLG) is made up of multiple departments and agencies across the federal government that work together to help communities recover from a disaster. The RSFLG allows federal agencies to coordinate disaster recovery work under the National Disaster Recovery Framework (NDRF) across the six Recovery Support Functions in order to provide communities with unified federal assistance as quickly and effectively as possible.

(FEMA, 2022b, p. 1)<sup>35</sup>

The Recovery Support Functions directly align to U.S. Federal-Level Recovery and Other Core Capabilities of Planning, Public Information and Warning, Operational Coordination, **Economic Recovery, Health and Social Services, Housing, Infrastructure Systems, and Natural and Cultural Resources.**<sup>36</sup>

### 2.4.3 COMMUNITY LIFELINES

In the United States, FEMA established a collection of essential elements of information, to enable the continuous operation of critical government and business functions, and which are essential to human health and safety, economic security, or both. In August 2023, FEMA updated their list of Community Lifelines (CLs) to break out Potable Water Systems and Wastewater Systems into its own Lifeline.<sup>37</sup>



FIGURE 2.11 FEMA’s Community Lifelines, Version 2.1.

Source: © Barton Dunant. Used with permission.

Lifelines are the most fundamental services in the community that, when stabilized, enable all other aspects of society to function.

- FEMA has developed a construct<sup>38</sup> for objectives-based response that prioritizes the rapid stabilization of Community Lifelines after a disaster.
- The integrated network of assets, services, and capabilities that provide lifeline services are used day-to-day to support the recurring needs of the community and enable all other aspects of society to function.
- When disrupted, decisive intervention (e.g., rapid re-establishment or employment of contingency response solutions) is required to stabilize the incident.

**Safety and Security (Law Enforcement/Security, Fire Service, Search and Rescue, Government Service, Community Safety):** Human-made incidents will always have an intelligence/investigation aspect. There should always be a concern for a nexus to terrorism<sup>39</sup> and this can have multinational impacts as well. Law Enforcement and Security will also be tasked with protective missions during the Response phase.

**Food, Hydration, Shelter (Food, Hydration, Shelter, Agriculture):** People may evacuate their homes, even days after the incident. They may also need assistance with Food and Hydration as they shelter-in-place (i.e., stay at home or work).

**Health and Medical (Medical Care, Public Health, Patient Movement, Medical Supply Chain, Fatality Management):** Every incident, emergency, or disaster has a public health impact. Restoring the full- or near-functional capability of health and medical care is paramount to a community.

**Energy (Power Grid, Fuel):** All of the other Community Lifelines are in some way connected to this one. Energy produces electricity for consumer, industrial, and other organizational use. We are a global set of societies very dependent on continuous electricity supply.

**Communications (Infrastructure, Responder Communications, Alerts Warnings and Messages, Finance, 911 and Dispatch):** The systems, staffing, and crisis communications messaging are all part of this CL.

**Transportation (Highway/Roadway/Motor Vehicle, Mass Transit, Railway, Aviation, Maritime):** The ability to move goods, services, people, etc. needs to be restored after a disaster.

**Hazardous Material (Facilities, HAZMAT, Pollutants, Contaminants):** The cleanup of any hazardous materials is a critical component to the LIPER for an impacted community.

**Water Systems (Potable Water Infrastructure, Wastewater Management):** This new CL is also one which applies to all of the others. No potable water, no community. This book will cover this CL in much more detail and focus.

And the ESFs, RSFs, and CLs are all interconnected. Adverse impacts to one can and will impact others. These are all complex adaptive systems,<sup>40</sup> which require emergency managers **consistently and constantly review** their plans, organization, equipment, training, and exercises (the POETE), for all hazards and threats – including water-related ones.



### WHOLE COMMUNITY AND WHOLE-OF-GOVERNMENT FUNDING

As noted previously, the phrase “Whole Community” appears more and more in Emergency Management doctrine, as it is one of the U.S. Federal level’s guiding principles. It can represent two things, as the U.S. Federal level:

1. Involving different people in the development of the national Emergency Management doctrine
2. Ensuring their roles and responsibilities are reflected in the content of the materials produced at the national level

Whole Community and Whole-of-Government includes

- Individuals and families, including those with disabilities and access/functional needs (DAFN)
- Businesses
- Faith-based and community organizations
- Nonprofit groups
- Schools and academia
- Media outlets
- All levels of government, including state, local, tribal, territorial, and federal partners

While many human-made hazards – such as water contamination – will not qualify for federal financial assistance through FEMA and the NDRF, there are other aspects of U.S. Federal laws which may provide financial help to states, local governments, tribal entities,<sup>41</sup> and territories:



**FIGURE 2.12** Whole community relationships.

Source: FEMA. (2022a). *E0237: Planning Process Theory and Application Student Manual*. FEMA.

This Framework is not intended to alter or impede the ability of any local, regional/metropolitan, state, tribal, territorial, insular area, or Federal government department or agency to carry out its authorities or to comply with applicable laws, executive orders, and directives. Instead, it requires the whole community to coordinate or integrate individual authorities and missions. As the NDRF applies to all incidents, its structures and procedures apply equally to incidents where Federal support to local, regional/metropolitan, state, tribal, territorial, and insular area governments is coordinated under the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), and to incidents where Federal departments and agencies exercise other authorities and responsibilities outside the Stafford Act. After the 2010 Deepwater Horizon oil spill, for example, Federal response and support was managed pursuant to the Oil Pollution Act. Other statutes such as the Homeland Security Act, Small Business Act, the Farm Bill, and the Public Health Service Act authorize substantive Federal assistance in response to certain types of incidents. The costs of direct Federal recovery support will continue to be borne by agencies using appropriations made for such purposes, except for those expenses authorized for reimbursement under the Stafford Act or as otherwise provided by law. When recovery requirements extend over long periods of time, steady state programs may be leveraged to support recovery efforts (FEMA, 2016a, p. 3).<sup>42</sup>

## 2.5 WHY

Why do emergency managers and Emergency Management exist? The long answer to these questions can be found in other books<sup>43</sup> and higher education programs.<sup>44</sup> The shorter answer may be as simple as “because it is needed”. Our steady-state governmental, non-government, and corporate models of management systems have different goals and results than what is needed by communities before, during, and after a disaster state, when hazards result from threats. Emergency Management from SLTTs will need to comply with their jurisdiction’s laws, policies, procedures, etc. They will also need to meet or exceed the federal standards from multiple agencies and departments. And sometimes, these guardrails and courses of action will conflict with one set of doctrines versus another. At the U.S. Federal Level, FEMA has provided some guidance on “rightsizing” the THIRA/SPR and Natural Hazard Mitigation Plan<sup>45</sup> work together, as shown in both Table 2.4 and Figure 2.11. The goal is to maximize the efforts undertaken by emergency managers toward Mitigation, so that it covers as many compliance requirements as possible.

Key to all of this is a better understanding, awareness, and, most importantly, **integration** of the concept of **belonging**. Emergency managers do the right things for the communities they serve, based on the LIPER as overarching priorities for missions and core capabilities. The best professional emergency managers and Emergency Management teams know and are already engaged with the varying demographics of their communities. This is a Whole Community approach.

**TABLE 2.4**  
**Aligning Mitigation Planning and Thira/Spr Processes.**

Mitigation Planning Process	Unified Approach	THIRA-SPR Process
Mitigation Planning Step 1: Organize the Planning Process and Resources	Step 1: Involvement Across the Planning Area	Involve the Whole Community throughout each step of the THIRA/SPR process
Mitigation Planning Step 2: Assess Risks	Step 2: Threat and Hazard Identification	THIRA Step 1: Identify the Threats and Hazards of Concern
	Step 3: Risk Assessment	THIRA Step 2: Give the Threats and Hazards Context
Mitigation Planning Step 3: Develop a Mitigation Strategy	Step 4: Develop Capability Targets	THIRA Step 3: Establish Capability Targets
	Step 5: Identify Gaps	THIRA Step 3: Establish Capability Targets
	Step 6: Develop, Prioritize, and Operationalize Strategies	SPR Step 2: Identify and Address Capability Gaps
Mitigation Planning Step 4: Adopt and Implement the Plan	Step 7: Monitor and Adjust	THIRA/SPR Process

Source: FEMA. (2020). *FEMA Job Aid Increasing Resilience Using THIRA/SPR and Mitigation Planning*. FEMA. See [www.fema.gov/sites/default/files/2020-09/fema\\_thira-hmp\\_jobaid.pdf](http://www.fema.gov/sites/default/files/2020-09/fema_thira-hmp_jobaid.pdf)

**WHAT DOES WHOLE COMMUNITY REALLY MEAN?**

As of 2011, FEMA has taken a Whole Community approach to their POETE for major incidents and disasters.

A Whole Community approach attempts to engage the full capacity of the private and nonprofit sectors, including businesses, faith-based and disability organizations, and the general public, in conjunction with the participation of local, tribal, state, territorial, and Federal governmental partners. This engagement means different things to different groups. In an all-hazards environment, individuals and institutions will make different decisions on how to prepare for and respond to threats and hazards; therefore, a community’s level of preparedness will vary. The challenge for those engaged in emergency management is to understand how to work with the diversity of groups and organizations and the policies and practices that emerge from them in an effort to improve the ability of local residents to prevent, protect against, mitigate, respond to, and recover from any type of threat or hazard effectively.

**Whole Community is a philosophical approach in how to conduct the business of emergency management.**

Benefits include:

- Shared understanding of community needs and capabilities
- Greater empowerment and integration of resources from across the community

- Stronger social infrastructure
- Establishment of relationships that facilitate more effective prevention, protection, mitigation, response, and recovery activities
- Increased individual and collective preparedness
- Greater resiliency at both the community and national levels (FEMA, 2011, p. 3).<sup>46</sup>

The Whole Community approach is not infallible. If performed in an incomplete or discriminatory manner (for example, specifically – if not overtly and deliberately – excluding one group or another in the process), or if governmental officials believe that disaster Readiness in their jurisdictions can *organically be organized* by these various community groups themselves, **it will fail**. McKinney (2018) describes this mistake *by government to assume* Whole Community Readiness as a myth:

And, like all myths, the Whole Community myth contains a grain of truth, because there are plenty of people working to be ready for disasters. It’s just that the idea that it is happening spontaneously everywhere, in an organized way, to increase our collective resilience is a fiction. It is classic muddled thinking to say that everybody is doing something, since it is the same thing as saying that nobody is.

(McKinney, 2018, p. 39)<sup>47</sup>

### 2.5.1 INCLUSION, DIVERSITY, EQUITY, AND ACCESSIBILITY



Source: Barton Dunant. © 2024. Used with permission.

In fact, in a best-case scenario, they themselves represent the communities they serve. They understand the different needs of their stakeholders, including those who are very dissimilar from any preconceptions of “the norm”. This can all be performed through IDEA=B™: Inclusion, Diversity, Equity, and Accessibility equals a strong state of Belonging. In 2021, U.S. President Joseph Biden issued an *Executive Order*,<sup>48</sup> applicable to all Federal executive offices and departments, which had easy and yet strong definitions for the following:

*Inclusion:* The recognition, appreciation, and use of the talents and skills of employees of all backgrounds.

*Diversity:* Means the practice of including the many communities, identities, races, ethnicities, backgrounds, abilities, cultures, and beliefs of the American people, including underserved communities.

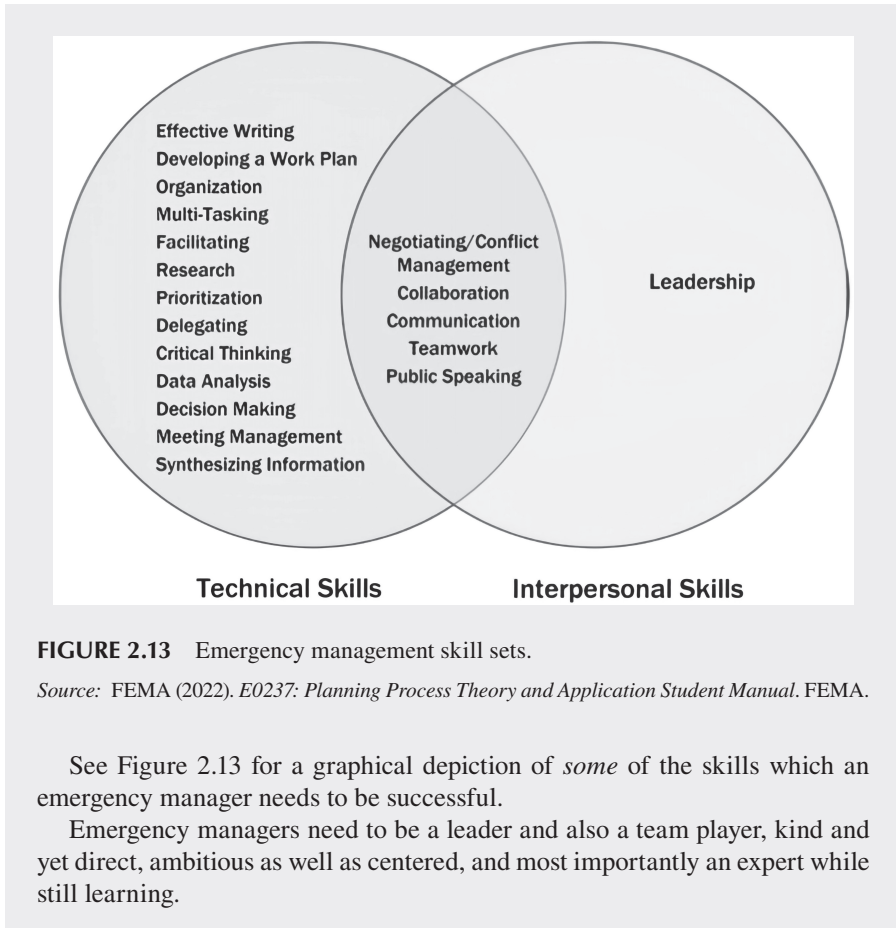
*Equity:* The consistent and systematic fair, just, and impartial treatment of all individuals, including individuals who belong to underserved communities that have been denied such treatment.

*Accessibility:* The design, construction, development, and maintenance of facilities, information and communication technology, programs, and services so that all people, including people with disabilities, can fully and independently use them. Accessibility includes the provision of accommodations and modifications to ensure equal access to employment and participation in activities for people with disabilities, the reduction or elimination of physical and attitudinal barriers to equitable opportunities, a commitment to ensuring that people with disabilities can independently access every outward-facing and internal activity or electronic space, and the pursuit of best practices such as universal design (FEMA, 2023, p. 3).<sup>49</sup>

Putting all four of these aspects together equals a greater sense of **Belonging**, when staff, partners, stakeholders, and the public are equitably treated, respected, and provided services fairly.

*Belonging:* Emergency Management has a distinct operational opportunity and mandate to **be kind**. Kind to our coworkers, partners, and the public served. Kind to animals and the environment. Kind to a community's needs, as they deem as priorities. This is not only because in many cases it is required by law, but it is always the right thing to do.

Emergency Management should be viewed as one of many types of management techniques, styles, and/or systems. From a business school perspective, think of the various models such as “Management by Walking Around” and “Total Quality Management”, as well as process improvement programs<sup>50</sup> such as “Six Sigma” and “Agile”. Emergency Management is a blend of art and science and requires *meta-leadership* skills – the ability to drive results from those whom you have no power over, or even a presumed leadership position.<sup>51</sup> Organizations who have an emergency management component – such as governments – typically operate “day-to-day” using one of the traditional management techniques, styles, and/or systems. When they go into “disaster mode” (in government-speak, when changes in the command and control in a jurisdiction can be legally modified, based on emergency management laws and usually an emergency declaration by an authority having jurisdiction), they need to switch management and leadership roles (and many times rules) and may even delegate roles and responsibilities to others. The need to break the siloes of operations that may exist, even if they are “silos of excellence”.<sup>52</sup> The CEO (or elected municipal leader) is rarely the Incident Commander. And emergency managers become resource wizards – of what has been described as the 4 S’s of Logistics: Space (or Sites), Staff, Stuff, and Systems.<sup>53</sup>



## 2.5.2 INTERNATIONAL ASPECTS OF EMERGENCY MANAGEMENT

### 2.5.2.1 Incident Command Systems

In the United Kingdom, these Emergency Management actions may be performed by a Strategic Co-ordinating Group (SCG) under the Joint Doctrine's Interoperability Framework.<sup>54</sup> In Qatar, various elements may be distributed through departments of the National Command Centre,<sup>55</sup> such as finance/logistics elements through the Administrative Affairs Department and others through the Central Operations Department. Emergency Management Intelligence may be curated and distributed through the Technical Affairs Department.

New Zealand's Coordinated Incident Management System<sup>56</sup> and the Australasian Inter-service Incident Management System (AIIMS)<sup>57</sup> both are similar to the US' NIMS. In New Zealand, there are branches for Control, Safety, Intelligence, Planning, Operations, Logistics, Public Information Management, Welfare and Recovery (in Response). In Australia, it may be very dependent on which agency is the primary responder, as to how the incident command system is organized.

Regardless of **who** is performing the missions, they need to be performed. Regardless of who reports to whom throughout the disaster phase cycle, emergency managers recognize the important concepts of adaptability, scalability, and uniform technology. They also know the importance of *Management by Objectives*, *Functional Management Structures*, and the concept of *Span of Control*. It should be straightforward for a seasoned emergency management practitioner in any country, to find the right place for the right role to accomplish the missions needed.

### 2.5.2.2 Tropical Storm Naming Conventions

Where a severe tropical storm is located will determine what it is called. It is a “hurricane” if it is in the North Atlantic Ocean or the Northeast Pacific Ocean (i.e., both coasts of the United States). It is called a “cyclone” if it is found in the South Pacific Ocean and the Indian Ocean. It is also called a “typhoon” in the Northwest Pacific Ocean. See Figure 2.14. All these terms mean the same thing.

The World Meteorological Organization names tropical cyclones (storms) internationally. They produce lists of names for each of the ocean areas where tropical storms can occur. Their names are designed to be short in character length, easy to pronounce and communicate, be culturally appropriate in different languages, and unique in that the same names are not used in multiple regions in the same year.<sup>58</sup>

### 2.5.3 ESSENTIAL ELEMENTS OF INTELLIGENCE

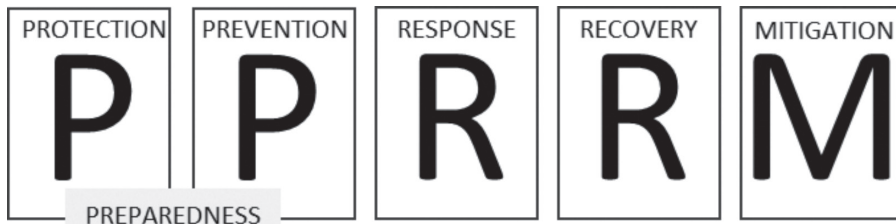
While most emergency managers will learn of the term “Essential Elements of Information”, this book will replace the word “Information” with the word “Intelligence”. It connotes a much deeper and broader understanding of the needs for Emergency Management. Knowing the name and telephone number of the Water Supply company is information. Knowing whether they are interconnected to other water systems now is intelligence. The Essential Elements of Intelligence (EEIs) can be directly correlated to the Community Lifelines, plus some communities may have additional ones such as political boundaries/cross-border relationships. How a jurisdiction interacts with a sovereign tribal nation which is geographically located in that jurisdiction should be an EEI for both groups’ emergency managers.



**FIGURE 2.14** Tropical storms 101.

Source: Humanitarian Coalition of Canada. (2023). *Crash Course: Tropical Storms 101*. Humanitarian Coalition. Accessed January 3, 2024. See [www.humanitariancoalition.ca/crash-course-tropical-storms-101](http://www.humanitariancoalition.ca/crash-course-tropical-storms-101). Used with permission.





#### 2.5.4 IMPACTS TO THE DISASTER PHASE CYCLES AND MISSION AREAS

Again, as noted previously, threats generate hazards. So, the reverse is true as well – if you can mitigate against the adverse impact of hazards consistently, you will also mitigate against a number of different threats, which generate those same or similar hazards. For example, creating alternative water treatment plants helps mitigate against both accidental and intentional threats to the community’s water supply systems. So does interconnecting one community’s water supply system to another’s. Will these actions solve all possible threats? Probably not – but the more layers, alternatives, backups, etc. a community has, the better.

For human-made water supply contamination, a significant water quality hazard, there are adverse impacts to all of the disaster phase cycles: before, during, and after. This is a way to describe overall community (and therefore individual) disaster readiness or resiliency. When communities are protecting against, preventing, preparing to respond to, recovering from, and mitigating against the adverse impacts of water-related threats and hazards, then the response to those adverse impacts is greatly reduced and/or more effective.

1. *Before the (next) Crisis Occurs (Preparedness/Protection/Prevention, Mitigation work):* Much of the work here by emergency managers is informative, through communications with industry, other governmental entities, and the public. The same type of messages to protect watersheds and waterways from pollution and abuse can be applied to multiple groups. For example, in the United States, their federal Environmental Protection Agency has a program on watershed protection<sup>59</sup> which includes training for emergency management and templated communications for communicators.
2. *During the incident (Response, interim Recovery):* Much of the work needed by emergency managers will be in support of the elements of that jurisdiction’s incident command system. Those are noted below. For many of these human-made water supply contamination, incidents will have significant hazards to life safety (and the other LIPER elements) of both responders and the public. Precautions must be taken to make sure that proper personal protection equipment (PPE) is utilized near contaminated areas and that health monitoring of responders is conducted during and after the incident is resolved. All incidents have a public health (Emergency Support Function #8) impact, including all of the water-related threats and hazards. A full list of example impacts of human-made water supply contamination on the ESFs and RSFs



are noted below. There may also be parallel or collaborative criminal investigation missions being conducted, which may be part of response and recovery work. Those will be noted in the Impacts to the Incident Management System(s) used in the impacted jurisdiction as well.

3. *After the incident Response has concluded or reverted back to steady-state management organization and away from emergency management (long-term Recovery, initial Mitigation planning):* This area of work for emergency managers can be the most arduous: The community needs are still excessive, but the spotlight and “attraction” by the non-impacted public, the media, politicians, etc. is significantly diminished. Writing grant applications for hazard mitigation grant funding,<sup>60</sup> balancing urban planning needs with environmental ones, coordinating with non-governmental organizations for individual assistance, and continued public health surveillance monitoring<sup>61</sup> any potential health concerns are just a few examples of the emergency management work needed in this disaster cycle phase. In the United States, work with federal agencies, such as FEMA and the U.S. Army Corps of Engineers (USACE).<sup>62</sup>

### 2.5.5 INCIDENT COMMAND SYSTEM

This book will use the U.S. NIMS Incident Command System model, shown in Figure 2.15 – with the formal addition of Emergency Management Intelligence – as the major groupings or categorization of elements of the incident command system:

- a. Incident/Unified Command: Commander’s Intent must incorporate the long-term view of problem-solving. And that view for Response missions must take into account environmental concerns along all of the Recovery Support Functions. For example, solutioning a bypass to a section of contaminated land in a riverbed by creating a new channel for the river water to flow around the contaminated area will require multiple entities and agencies to evaluate existing environmental concerns, economic impacts to the local jurisdiction of these changes, long-term testing of water quality, and more. Those decisions will undoubtedly have financial, staffing, and other impacts beyond those involved in the incident command system for this incident.

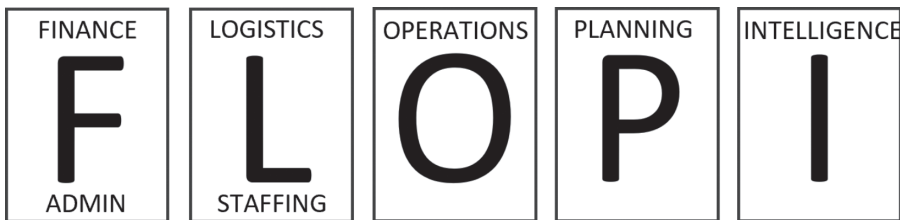


FIGURE 2.15 Major elements of the U.S. NIMS ICS model.

Source: Barton Dunant. Used with permission.



management because it can help to reduce the adverse impacts of disasters. By understanding what is happening and what is likely to happen, emergency managers can make better decisions about how to allocate resources and how to better protect people, places, and things.<sup>63</sup>

## 2.6 ARTIFICIAL INTELLIGENCE AND EMERGENCY MANAGEMENT

As of 2023, the concept of applying Artificial Intelligence (AI) to emergency management is novel. Emergency managers can start planning documents, threat assessments, grant application language, and more – all using (mostly free) web-based artificial intelligence systems to generate the words, from the vast resources worldwide, on the internet. All of this, of course, is subject to verification and validation by Emergency Management Intelligence analysis and curation.

AI can also be used to provide quicker, sometimes more profound, information for Emergency Management to use in making response decisions, but that needs to be carefully vetted and validated beforehand. For example, deciding to dispatch generators to a hospital versus a shelter, when both have life safety adverse impacts of not having electricity, may benefit from a faster and more complete risk analysis and assessment performed by a computer, but the decision to take one action over the other should be made by a responsible human.<sup>64</sup>

## 2.7 EMERGENCY MANAGEMENT ACCREDITATION PROGRAM

In the United States, governmental organizations<sup>65</sup> and jurisdictions – especially states – have the voluntary opportunity to present their overall Emergency Management program for accreditation by an independent organization:

The Emergency Management Accreditation Program (EMAP), as an independent non-profit organization, fosters excellence and accountability in Emergency Management and Homeland Security Programs by establishing credible standards applied in a peer-reviewed Assessment and Accreditation Process. With ongoing concerns about terrorism, pandemics, and catastrophic natural disasters, the nation's leaders and citizens acknowledge the need to strengthen emergency preparedness measures and response capabilities efficiently and effectively. The Emergency Management Standard by EMAP and the voluntary Assessment and Accreditation Process are intended to promote consistent quality in Emergency Management Programs, thus providing tangible benefits to the community and public infrastructure these Programs serve. Many Programs<sup>66</sup> utilize the Standards and the Assessment and Accreditation Process for strategic planning, improvement efforts, and resource allocations.

(EMAP, 2023, p. 4)<sup>67</sup>

EMAP has several standards, all of which must be met for accreditation. **Standard 4.5.3** – which addresses the Emergency Operations Plan – has areas which are impacted by and from water-related threats and hazards:

- 2: agriculture and natural resources
- 5: critical infrastructure and key resource restoration
- 12: energy and utility services

- 15: firefighting/fire protection
- 16: food, water, and commodities distribution
- 20: mass care and sheltering
- 23: private sector coordination
- 27: transportation systems and resources (navigable waterways count as a transportation systems resource)

There is obvious – and purposeful – alignment between the EMAP standards and the ESFs, RSFs, and CLs. Meeting all of the standards of EMAP is a high bar – and one which professional emergency managers in government organizations should seek to achieve.

## 2.8 EMERGENCY MANAGEMENT ASSISTANCE COMPACT

One tool in a U.S. state or territory’s Emergency Management toolbox for obtaining additional resources (people, systems, stuff, etc.) on any response is through mutual aid. Typically, one community has mutual aid agreements with its neighbors for Emergency Services (such as fire, police, emergency medical services, etc.). When states and territories need help themselves, before they ask FEMA (and sometimes at the same time), they can ask each other for mutual aid, through the Emergency Management Assistance Compact (EMAC):<sup>68</sup>

EMAC has been ratified by U.S. Congress (PL 104–321) and is law in all 50 states, the District of Columbia, Puerto Rico, Guam, the U.S. Virgin Islands, and the Northern Mariana Islands. EMAC’s Members can share resources from all disciplines, protect personnel who deploy, and be reimbursed for mission-related costs.

(EMAC, n.d., p. 1)<sup>69</sup>

EMAC legislation provides liability protection, compensation/reimbursement, workman’s compensation, and license reciprocity, among other features. A number of disciplines are covered by EMAC, including Animal Emergency, Emergency Medical Services, Fire and Hazardous Materials, Human Services, Incident Management, Law Enforcement, Mass Care, Public Health and Medical, National Guard, Public Works, Search and Rescue, and Telecommunicator Emergency Response.

## 2.9 DISASTERS AND CHILDREN

Unless someone like you cares a whole awful lot,  
Nothing is going to get better. It’s not.

**Dr. Seuss (Theodor Geisel)<sup>70</sup>**

And finally, for this overview of basic Emergency Management, a section on disasters and their adverse impacts on children. The adverse impacts which any disaster has on children must be considered by emergency managers holistically – across all the other dimensions of ESFs, RSFs, CLs, POETE, etc. In the same way that Emergency Management needs to create physical and emotional safe spaces for Belonging, additional spaces need to be designated for children and families with children.

### **THE DISASTER OF CHILDREN DROWNING**

In 2023, child drownings were still the leading cause of death in the United States for children ages 1–4.<sup>71</sup>

*Please let that sink in for a moment.*

It is certainly an open question as to whether emergency managers should get involved in the disaster cycle for drownings. There are pracademics<sup>72</sup> in Emergency Management, who make the case for direct engagement in the full spectrum of PPRRM<sup>73</sup> because this hazard fits much of the criteria of the scope of Emergency Management. Multiple agencies respond, including police, fire/EMS, hospitals, etc. Multiple agencies – including whole-community ones – support prevention and protection elements, such as teaching children how to swim and providing lifeguarding education for communities. And multiple organizations can collaborate, coordinate, cooperate, and communicate on mitigation strategies and courses of action to reduce this deadly threat.

If a life safety hazard exists in a community – especially one which adversely impacts socially vulnerable populations at a much higher level – emergency managers have a responsibility to be part of the solution.

In 2010, a National Commission on Children and Disasters was convened. Their report<sup>74</sup> to the President and Congress still has work to be done. FEMA and the Texas A&M Engineering Extension Service (TEEX)<sup>75</sup> both are working toward expanding an emergency manager’s knowledge into children and disaster issues, threats, hazards, critical infrastructure (i.e., childcare and educational facilities), etc., as part of deliberative planning.<sup>76</sup>

The points made about restoring those facilities alone, for first and emergency responders, should be a priority to sufficiently have the workforce needed to support the response and recovery from any disaster. The International Association of Emergency Managers – Children and Disasters Caucus is also working on a long-term project to amplify the disaster needs of infants, children, and young adults (from pre-K through college) to the same levels of Community Lifelines, Emergency Support Functions and/or Recovery Support Functions. Emergency managers need to consider their community’s children as unique and vital in many ways.

**(Prasad, 2021, p. 1)<sup>77</sup>**

And children with disabilities of any kind, connect these two global concerns together – the nearly exponential need to support children with disabilities<sup>78</sup> before, during, and after disasters. The U.S. Federal Laws which require an individualized educational program (IEP) for children with any type of disability – including cognitive, emotional, and behavioral ones – has had advocacy<sup>79</sup> made to extend these individualized services into emergency and disaster planning. The strong emergency manager will get ahead of this curve and collaborate with their local school district and others, to help ensure that all children are covered through the LIPER priorities.

All emergency managers should complete FEMA’s “Community Preparedness: *Integrating the Needs of Children*” workshop,<sup>80</sup> the online self-study IS-366A: Planning for the Needs of Children in Disasters<sup>81</sup> course from FEMA, and the MGT-439 Pediatric Disaster Response and Emergency Preparedness<sup>82</sup> course from TEEK, to have a more comprehensive understanding of the complexities involved with disasters adversely affecting children.



**FIGURE 2.16** Drawing by E.H. Shepard from *Winnie the Pooh*.

Source: Public domain.

**CHILDREN AND DISASTER: SPECIFIC REFERENCES/ADDITIONAL READING**

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**2.10 GENERAL EMERGENCY MANAGEMENT MAPPING AND TOOLS**

In Table 2.5, please find *some* of the general emergency management mapping and geospatial intelligence system (GIS) tools. This is not a comprehensive list, but rather a starting point for a new emergency manager. All these websites are free to access from the internet and are current as of publication date of this book. Some are governmental and some not. No endorsement or financial incentives were involved in providing this list. There are other sites which have subscription costs, require additional GIS software<sup>83</sup> and/or specialized governmental authorization (for example, the U.S. Homeland Infrastructure Foundation-Level Datasets<sup>84</sup> or DamWatch<sup>®</sup>,<sup>85</sup> from the U.S. Engineering Services, contracted by the USACE). Most Emergency Management organizations already have access to these. There are also additional water-related websites listed in Chapter 3.

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**TABLE 2.5**  
**General Emergency Management Mapping and Tools**

Title/Description	Sponsor/Description	Website Address
(CAMEO) Software Suite Computer-Aided Management of Emergency Operations	U.S. Environmental Protection Agency	<a href="http://www.epa.gov/cameo/">www.epa.gov/cameo/</a>
Climate Risk and Resilience Portal (ClimRR)	Center for Climate Resilience and Decision Science – Argonne National Laboratory	<a href="https://climrr.anl.gov/">https://climrr.anl.gov/</a>
Climate.gov	NOAA	<a href="http://www.climate.gov/">www.climate.gov/</a>

(Continued)

**TABLE 2.5 (Continued)****General Emergency Management Mapping and Tools**

<b>Title/Description</b>	<b>Sponsor/Description</b>	<b>Website Address</b>
Coastal Emergency Risks Assessment	University of Louisiana	<a href="https://coastalrisk.live/">https://coastalrisk.live/</a>
Coastal Flood Risk – Flooding Risk Mapping and Flood Insurance Maps	FEMA	<a href="http://www.fema.gov/flood-maps/coastal">www.fema.gov/flood-maps/coastal</a>
Current event maps of natural and man-made hazards	Radio Distress-Signaling and Infocommunications (RSOE)	<a href="https://rsoe-edis.org/eventMap">https://rsoe-edis.org/eventMap</a>
Dam Safety	Association of State Dam Safety Officials®	<a href="https://damsafety.org/">https://damsafety.org/</a>
Dam Alliance	US Society on Dams	<a href="https://www.usdams.org/">https://www.usdams.org/</a>
Fire and Smoke maps	The Gleaner	<a href="https://data.thegleaner.com/fires/">https://data.thegleaner.com/fires/</a>
Fire/Smoke/Air Quality Map	Interagency Wildland Fire Air Quality Response Program	<a href="https://fire.airnow.gov/">https://fire.airnow.gov/</a>
Flood Risk Communication Toolkit	FEMA	<a href="http://www.fema.gov/es/floodplain-management/manage-risk/communication-toolkit-community-officials">www.fema.gov/es/floodplain-management/manage-risk/communication-toolkit-community-officials</a>
Geospatial Resource Center	FEMA	<a href="https://gis-fema.hub.arcgis.com/">https://gis-fema.hub.arcgis.com/</a>
Hurricane Decision Support Tool – Hurrevac	National Hurricane Program	<a href="https://hvx.hurrevac.com/hvx/">https://hvx.hurrevac.com/hvx/</a>
Living Atlas	ESRI	<a href="https://livingatlas.arcgis.com/en/home/">https://livingatlas.arcgis.com/en/home/</a>
<i>Minimum Economic Recovery Standards (MERS) Interactive Handbook</i>	SPHERE	<a href="https://handbook.hspstandards.org/mers">https://handbook.hspstandards.org/mers</a>
National Drought Mitigation Center	University of Nebraska	<a href="https://drought.unl.edu/">https://drought.unl.edu/</a>
National Integrated Drought Information System	NOAA	<a href="http://www.drought.gov/">www.drought.gov/</a>
Natural Hazards Research Australia	Australian Government	<a href="http://www.naturalhazards.com.au/our-research-focus">www.naturalhazards.com.au/our-research-focus</a>
OnTheMap for Emergency Management – combined natural hazard modeling with demographics impacted	U.S. Census Bureau	<a href="https://onthemap.ces.census.gov/em/">https://onthemap.ces.census.gov/em/</a>
PrepToolkit and the National Preparedness System	FEMA	<a href="https://preptoolkit.fema.gov/">https://preptoolkit.fema.gov/</a>
Rainfall Totals	CoCoRaHS Mapping System	<a href="https://maps.cocorahs.org/">https://maps.cocorahs.org/</a>
Severe Weather	ESRI	<a href="http://www.esri.com/en-us/disaster-response/disasters/severe-weather">www.esri.com/en-us/disaster-response/disasters/severe-weather</a>
Social Vulnerability Index	U.S. Centers for Disease Control and Prevention	<a href="http://www.atsdr.cdc.gov/placeandhealth/svi">www.atsdr.cdc.gov/placeandhealth/svi</a>



**TABLE 2.5 (Continued)**  
**General Emergency Management Mapping and Tools**

Title/Description	Sponsor/Description	Website Address
Transit Security Report	Global Incidents Map	<a href="http://www.globalincidentmap.com/">www.globalincidentmap.com/</a>
U.S. Tornado Map – past 48 Hours	University of Michigan	<a href="https://tornadopaths.engin.umich.edu/">https://tornadopaths.engin.umich.edu/</a>
US Census Data	U.S. Census Bureau	<a href="https://data.census.gov/">https://data.census.gov/</a>
US Current Flooding Map – GIS version of flood gauges and other data points	ESRI	<a href="https://bit.ly/ESRI_US_FLOOD">https://bit.ly/ESRI_US_FLOOD</a>
US Flight Tracker and Weather Radar overlay	Flightaware	<a href="https://flightaware.com/live/">https://flightaware.com/live/</a>
US flight tracker, including cargo, small aircraft, military, and Helo operations	FlightTrader	<a href="http://www.flightradar24.com/">www.flightradar24.com/</a> 37.93,-84.83/9
US Medicare Electricity-Dependent Map	U.S. Health and Human Services	<a href="https://empowerprogram.hhs.gov/empowermap">https://empowerprogram.hhs.gov/empowermap</a>
Warn, Alert, and Response Network	Public Broadcasting System	<a href="https://warn.pbs.org/">https://warn.pbs.org/</a>
Water Forecast Services and Flood Inundation Maps – <i>experimental</i> collection	NWS	<a href="http://www.weather.gov/news/241101-national-water-prediction">www.weather.gov/news/241101-national-water-prediction</a>
Weather Radar	NWS	<a href="https://radar.weather.gov/">https://radar.weather.gov/</a>
Web Tools	U.S. Geological Survey	<a href="http://www.usgs.gov/products/web-tools">www.usgs.gov/products/web-tools</a>

**REFERENCES/ADDITIONAL READING**

Each chapter in the Hazards Parts 3, 4 and 5 will also have additional resources, references, and reading sections. Also, there are comprehensive footnotes throughout the book, which reference additional websites of interest for Emergency Managers.

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\* \* \* \*

Emergency managers should take any of the free American Red Cross disaster courses available, but they should especially take the Red Cross' "Everyone is Welcome" course on inclusion, diversity, equity, and accessibility. It is available for both Red Cross volunteers and community partners. The web self-study version is 20 minutes long, and the in-person course is 45 minutes in duration. Contact your local American Red Cross chapter for details, at [www.redcross.org](http://www.redcross.org).<sup>86</sup> There may be a similar course at other countries' Red Cross or Red Crescent Societies.<sup>87</sup>

## NOTES

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