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# The Emergency Services Sector

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# DSC3554: Critical Infrastructure and Risk

# February 16, 2025

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Abstract

Critical Infrastructure can be vulnerable to all different kinds of attacks or disasters, both natural and man-made. The Emergency Services Sector, specifically, is no different in having vulnerabilities as well. The difference in this sector of our critical infrastructure is that all other infrastructure relies on the Emergency Services Sector to not only respond to their needs, but to also help mitigate and prepare for disasters that may happen. The best way to mitigate disasters is to be ready for anything to happen at any time. The Emergency Services Sector not only must plan and prepare for its own vulnerabilities, but also the vulnerabilities of all other sectors of the nation’s critical infrastructure.

The Emergency Services Sector

When you think of everyday life, the nation’s critical infrastructure plays a large role in it. Public transportation, city and/or county utilities, emergency management and public safety, all these things and many more are part of the critical infrastructure of your community and nation. To help protect and look after our nations critical infrastructure there are specific sectors in the United States govenrment, holding the responsibilities of each of the different critical infrastructures. Within those Critical Infrastructure Sectors, lays the Emergency Services Sector. The Emergency Services Sector of our nation’s critical infrastructure is the specific section that focuses on public safety and emergency management “The Emergency Services Sector (ESS) maintains public safety and security, performs lifesaving operations, protects property and the environment, and assists communities impacted by disasters” (*Emergency Services Sector | Cybersecurity and Infrastructure Security Agency CISA*, n.d.). Police officers, firefighters, EMTs and paramedics, doctors and nurses, county workers, and many more, all these citizens work in the Emergency Management Sector of our critical infrastructure. Since the critical infrastructure to a city is key for the everyday norm, it makes it a highly vulnerable to attack “provide a reliable flow of products and services essential to the defense and economic security as a whole” (Moteff & Parfomak, 2004, p.4). There are specific vulnerabilities in each sector and subsector that need to be prepared for and prevented when possible. Not only is the Emergency Services Sector need to prepare and mitigate its own vulnerabilities, the Emergency Services Sector also is the sector of critical infrastructure that is there to prepare for and respond to other infrastructures in their times of need or vulnerabilities. The responsibility to protect all critical infrastructures does not fall on the Emergency Services Sector, but the preparation, mitigation, response, and recovery does.

**Emergency Management Cycle**

The emergency management cycle is a non-stop cycle that highlights all stages of emergency management. There are four phases of the emergency management cycle, mitigation, preparedness, response, and recovery. With this being a non-stop cycle, that means that everyone and everywhere is currently in one of these steps “As a cyclical process, it is never complete. Recovery, even from the smallest incidents, can inform prevention and mitigation” (*Emergency Management Cycle | Conservation Center for Art & Historic Artifacts*, 2024). Most places are consistently in the mitigation and preparedness phases. Those phases are usually before a disaster strikes. The third and fourth stages start after a disaster has occurred. Mitigation is essentially the efforts made to make the emergency less drastic than possible, it tries to neutralize the potential disasters “prevent an emergency, reduce the chance of an emergency happening, or reduce the damaging effects of unavoidable emergencies” (Johnson & Ortmeier, 2017, p. 203). Preparedness is the stage that puts into action all the planning and mitigation “include plans or preparations made to save lives and to help response and rescue operations” (Johnson & Ortmeier, 2017, p. 203). The city and response personnel spend their time making sure they are ready for the next stage, response. Response is focused on addressing the short- and long-term effects “involves actions or activities taken during an incident” (Johnson & Ortmeier, 2017, p. 204). The final stage is recovery, which focuses on restoring the critical and essential infrastructure of the area where the disaster happened “those actions taken after an event occurs in an effort to return to a normal state” (Johnson & Ortmeier, 2017, p. 204). Every subsector of the Emergency Service Sector is also in a stage of the emergency management cycle which helps protect and prevent vulnerabilities in them.

**Emergency Management**

The Emergency Management subsector is focused on the emergencies or disasters that are risks for the area. This subsector can be local, state, and federal level. Emergency management is focused on planning, preparation, mitigation, response, and recovery of all types of threats. Threats can be of natural origins like hurricanes or can be man-made like terror attacks. From minor earthquakes hitting California to major fires blazing though whole towns, the Emergency Management subsector has the responsibilities to mitigate, prepare, respond, and recover all these types of events. Beginning with routine emergencies, most of the time, these are taken care of by the local level response teams “the emergency management cadre includes firefighters, police officers, and emergency medical technicians, supported by hospital emergency departments, public and private utility response teams, and other local government departments that address isolated needs” (Bullock et al., 2016, p. 230). The Emergency Management cycle is critical to this subsector. This entire subsector focuses on the vulnerabilities of all the sectors of critical infrastructure. The emergency management subsector is what every other critical infrastructure sector relies upon to be prepared and be able to respond to threats and attacks. To accomplish this task, in place are the National Incident Management System (NIMS) and the National Response Framework (NRF). These two systems have created a guide and outline, so that all levels of government can be both prepared and ready with the next steps when disaster strikes.

**Emergency Medical Services**

The emergency medical services (EMS) subsector is the pre-hospital medical help to citizens. Ambulances, emergency medical technicians, and paramedics are some of the more recognized staples of this subsector. Citizens call EMS for any type of emergency and problem that might arise. The main goal of the EMT and Paramedic is to keep the patient alive and bring them to the hospital where they can be better diagnosed and treated for their problems. EMS can do what is necessary to keep the pt stable long enough to get them to a doctor who can then treat the patient. The vulnerabilities to this subsector could be that during a disaster or emergency, there is an overwhelming volume of EMS needs that cannot be controlled by the city themselves. They would need to rely on state and federal assistance and help to be able to handle the mass amount of need. With the implementation of NIMS and the NRF there are steps in place to be able to request more help when needed, so the local system does not get overwhelmed. The emergency medical subsector is critical to response and recovery, so it must remain reliable during times of emergency.

**Fire and Rescue Services**

Along with EMS, the Fire and Rescue Services subsector responds to emergency calls and disasters as well. This subsector is more equipped to respond to all types of disasters and help mitigate the actual disaster versus patients or citizens, “such as earthquakes, floods, tornadoes, and hurricanes, as well as to man-made catastrophes, such as hazmat spills, arson, and terrorism, and perform fire suppression, fire prevention, hazardous materials control, emergency rescue” (*Emergency Services Sector | Cybersecurity and Infrastructure Security Agency CISA*, n.d.). Firefighters are specially trained to respond to building fires and know how to contain and eliminate them before spreading. Some of the numerous vulnerabilities that fire and rescue service can see are building not being built to code, faulty equipment or no equipment on site at the location of the disaster, and disruptions to other critical infrastructures like water and power lines. As time passes, and technology advances, more and more buildings will not be built to the new codes. That means that some cities may be more vulnerable to the dangers of fire, not because they were built illegally, but because they were built to past, outdated, codes. Knowing the age of the building in your city and being prepared to respond with that knowledge is key to successful responses to events.

**Law Enforcement**

The subsector of law enforcement, in our Emergency Services Sector, encapsulates all levels of governments police type agencies. Whether it is the city or county department, or the state troopers and above, all these employees are part of the critical infrastructure of the law enforcement. The law enforcement subsector is vulnerable to physical attacks as well as cyber threats or attacks. Organized crime, like terrorists, can pose a major threat to the law enforcement subsector as they can look to handicap the local law enforcement agencies so their plans can be easily accomplished. Local law enforcement is meant to help serve and protect, but some have bad stigmas. Lack of trust in the local law enforcement could also be a large unseen vulnerability, as some people might not be as open to potential dangers in their areas. They also may try to hide certain things from the law enforcement officers which can create a more hazardous environment during times of disasters.

**Public Works**

The public works subsector branches into all different aspects of the communities. From waste management to transportation, the public works subsector manages “Specialized capabilities frequently include construction management, facility management, solid waste management, transportation management, public utility management, and water and wastewater management” (*Emergency Services Sector - Public Works | CISA*, n.d.). As you can imagine, with management requirements in many different areas of the community, this specific subsector is extremely vulnerable to emergencies and attacks. This is a subsector that must be proactive in the risk assessment. There are too many different areas to be complacent and wait for something to happen. To better defend against vulnerabilities, they should employ a vulnerability assessment “The vulnerability assessment answers the basic question, “what can go wrong should the system be exposed to threats and hazards of concern?”” (Baker, 2005). Proactive is always better than reactive.

**Conclusion**

There will always be risks and vulnerabilities to everything in life. Critical infrastructure is very important to the day to day. Disruption in that can hurt economies and entire cities. The Emergency Services Sector plays a key role in preparing for, mitigating, responding to, and recovering from all types of disasters. This part of the critical infrastructure is demanded to be ready for anything, because of how important the other parts of the critical infrastructure are “Establishing the capability and capacity to identify, understand, and address such complex challenges and opportunities is the crux of risk management” (Beers & Department of Homeland Security, 2011). Other critical infrastructures are in place to maintain life as it is, and the Emergency Services Sector is there to maintain the critical infrastructures. Proactive risk and vulnerability assessment are vital to being prepared in times of disasters. All subsectors must be rehearsed and ready to respond when called upon. To protect the Emergency Services Sector, they themselves must be prepared for anything. Using the emergency management cycle, all subsectors of the Emergency Services Sector, can stand ready for when they are called to duty.

**References**

Beers, R. & Department of Homeland Security. (2011). *Risk Management Fundamentals*. https://www.dhs.gov/xlibrary/assets/rma-risk-management-fundamentals.pdf

Bullock, J., Haddow, G., & Coppola, D. P. (2016). *Introduction to emergency management*. Butterworth-Heinemann.

*Emergency Management cycle | Conservation Center for Art & Historic Artifacts. (2024, May 16). https://ccaha.org/resources/emergency-management-cycle*

*Emergency Services sector | Cybersecurity and Infrastructure Security Agency CISA*. (n.d.). https://www.cisa.gov/topics/critical-infrastructure-security-and-resilience/critical-infrastructure-sectors/emergency-services-sector

George H Baker. "A Vulnerability Assessment Methodology for Critical Infrastructure Sites" *DHS Symposium: R&D Partnerships in Homeland Security* (2005)  
Available at: http://works.bepress.com/george\_h\_baker/2/

Johnson, B., & Ortmeier, P. (2017). *Introduction to security: Operations and Management*.

Moteff, J. (2005, February) *Risk management and critical infrastructure protection: Assessing, integrating, and managing threats, vulnerabilities and consequences.* Library of Congress. Washington DC: Congressional Research Service.