

Session 2

Comparison of Disaster and Catastrophe Response Planning

Objectives:

2.1 Describe differences between response planning for disasters and catastrophes

2.2 Describe past and future catastrophes

2.3 Describe new considerations for catastrophe response planning

Principles of Disaster Response Planning-1

- Hazard, risk and vulnerability analysis: assumes hazards are in local proximity and can be assessed.
- Resource assessment: assumes resources will be available
- Assumes jurisdictional authorities and their incident management system will remain viable.

Principles of Disaster Response Planning - 2

- Agencies generally plan separately.
- Most jurisdictions assume an all-hazards general operations plan, complemented by scenario-based annexes.
 - Class exercise: list steps taken and content included to complete an all-hazards EOP
- Test and exercise the plans!

Catastrophe Response Planning - 1

- Hazards may or may not be ones that have local proximity or history.
- Some of the most powerful events may have a relatively slow onset.
 - Sea level rise
 - Potential loss of Lake Meade

Catastrophe Response Planning - 2

- Resource assessment cannot be based on any single jurisdiction.
- Jurisdictional incident management systems will be overwhelmed in most types of catastrophic events.
- Planning based on single agencies will not be adequate for catastrophes.

Catastrophe Response Planning - 3

- Planning will need to consider or incorporate methods of integrating international response agencies.
- Scenario-based planning preferred over all-hazards.
 - Events too big for a single jurisdiction.
 - Events may not have physical boundaries (i.e. pandemics)
 - Events may be unique: no previous experience

Catastrophe Response Planning - 4

- Plan exercising is as important as in disaster response planning, but much more complicated.
- Much larger role for science, because future catastrophes may result from phenomena with which modern humankind has little experience (i.e. many of the sequelae of global climate change).

Student Exercise 2-1

- Assume Lake Meade goes dry in 2021 due to climate change and prolonged drought in the Colorado Basin area. About 22 million people in some 3 states depend on water from that one source for survival. How should emergency managers in Las Vegas prepare to respond?

Session 2-2

Past and Future Catastrophes: Their Etiologies and Challenges

- Learning Objectives

2.2a Describe at least two past catastrophes, their causes and course of events.

2.2b Describe at least two potential future catastrophes, their causes and the challenges they would likely bring.

Middle Ages Black Plague

- Situation: A massive change in world trade patterns coupled with an over-populated Europe suffering from 50 years of famine. Famine was partially due to rapid climate change toward colder, less predictable weather. A new microbe, *yersinia pestis* entered Europe at this time via ships from Asia, via fleas on ship-board rats.

Middle Ages Black Plague - 2

- The resulting disease came to be called the “Black Plague” because of the dark color people took as they died.
- Medicine at that time did not understand the disease and was of no help.
- 40% of Europe died in the first 4 years; by 1430 over 70% of Europeans had disappeared.

Middle Ages Black Plague - 3

- Late during this period governments started to take some responsible action, mostly imposition of quarantines.
- Some communities in England and Ireland practiced “social distancing” with positive results.

Little Ice Age in Europe

- Situation: From roughly 1300 to 1850 the climate in the Northern Hemisphere became significantly colder, with 3 minima: 1650, 1770 and 1850.
- Crop-dependent populations hungered and starved.
- Famine decimated Scandinavian population in Greenland

Little Ice Age in Europe - 2

- >50% of Icelanders died of hunger.
- Major crop failures led to significant die-offs in parts of Europe and North America.
- Year without a summer: 1816 in North America and Europe. Ice observed as far south as Pennsylvania in July and August. In Europe > 200,000 died of starvation and hypothermia.

Little Ice Age in Europe - 3

- Classroom discussion: What could European and North American governments and other organizations have done to decrease the suffering and deaths in 1816?

Irish Potato Famine

- Situation: A combination of English land grabs of Irish farmland, the virtually complete dependence of a huge percentage of the Irish population on potatoes as their base foodstock, and the accidental importation of a rapidly spreading fungus (or blight) left vast hunger, starvation, disease and death in Ireland.

Irish Potato Famine - 2

- The blight and crop failure became evident in 1845.
- The British response was confused: First they provided some imported Indian corn, but then stopped and assumed a laissez-faire approach, believing things would sort themselves out.

Irish Potato Famine - 3

- The British army actually escorted shipments of Irish-grown wheat and oats out of Ireland so that British investors would not lose their profits, while Irish peasants died by the thousands.
- The winter of 1846-47 was one of the coldest in recorded history, in a country where winter temperatures are usually mild.

Irish Potato Famine - 4

- Out-migration became one of few options available to Irish peasants, hundreds of thousands of whom migrated to the U.S. and Canada, and later Australia. About 20% of immigrants died while underway.
- Three years into the blight the Irish continued to plant potatoes as their primary survival crop.

Irish Potato Famine - 5

- Death toll estimates run from 775,000 to 1,500,000 (1845-51) and it is estimated that another 1.5 million emigrated to North America and Australia during that time period.
- Class discussion topic: How did government decisions worsen the situation? What good and poor decisions were made by the affected population?

The 1918-19 Influenza Pandemic

- Situation: A strain of the A virus with which humans had no previous experience hit in three waves in 1918 and 1919 with rapid world-wide spread and cumulative mortality that is estimated by various sources to be in the 40-100 million range.
- Symptoms started like typical influenza but often rapidly progressed to severe pneumonia.

1918-19 Influenza Pandemic - 2

- Highest mortality: 20-40 year olds, which is highly unusual.
- WWI troop movements helped spread the virus.
- War-caused devastation, hunger and loss of resources contributed to poor outcome once the flu hit many populations.

1918-19 Influenza Pandemic - 3

- U.S. Experience:
 - Hospitals and clinics rapidly overwhelmed
 - Alternate care sites attempted, many stayed home
 - Many mortuaries overwhelmed
 - Many jurisdictions forbade public gatherings
 - Some towns attempted to forbid outsiders
 - >500,000 died in the U.S.

Hurricanes Katrina and Rita

- Situation: Two Category 5 (at one point) hurricanes hit the US Gulf Coast in 2005. The eye of Hurricane Katrina hit some 30 miles east of New Orleans, LA (NOLA) on 29 August, bringing with it a storm surge above 20 feet in many places. The morning after Katrina's landfall, several of the levees protecting below-sea level New Orleans failed, flooding the majority of the city and significant portions of surrounding suburbs. More than 1,500 people were killed as a result of the storm. Hurricane Rita followed on 24 September, making landfall on the Texas-Louisiana border, forcing the evacuation of much of the area around Houston and diverting resources from response to the needs of Katrina victims.

Katrina and Rita - 2

- Coastal areas were badly damaged in both storms, severely compromising physical and communications infrastructures.
- Hospitals and health care centers in NOLA were rendered unusable.

Katrina and Rita - 3

- Many in NOLA did not evacuate prior to Katrina and ended up being trapped in the city in increasingly desperate conditions.
- The NOLA city government was rendered incapable of mounting a coordinated response.
- State and federal responses to NOLA were disjointed, late, insufficient, and politically charged.

Katrina and Rita - 4

- Damage from the 2 storms was widespread throughout the Gulf Coast, leaving response resources extremely thin.
- The federal response did not follow its own planning documents.
- States of Texas and Mississippi had fairly well-coordinated responses; Louisiana did not, even into the recovery period.

Katrina and Rita - 5

- New Orleans' population one year after Katrina was about 40% of the pre-storm level; in early 2008 it was estimated at about 50%. It is clear that the long-term outmigration of more than 200,000 former inhabitants of the city is one of the effects of the storm.

Katrina and Rita - 6

- Classroom discussion: In what ways does the Hurricane Katrina experience push it into the category of a catastrophe? Why might you argue that it was not a catastrophe?

2.4 Potential Future Catastrophes

Sea Level Rise

- Situation: With global warming taking place, there is significant melt-off of arctic, Antarctic and terrestrial glaciers, with resulting waters going to the oceans. Estimates range between one and three meters sea-level rise in the next century, but current melt-offs are progressing much more quickly than any model had predicted.

Sea Level Rise - 2

- Low-lying countries: loss of heavily populated land (i.e. Netherlands, Florida, various island countries) or productive agricultural land (i.e. Bangladesh, India, U.S. Gulf Coast)
- Higher sea water will contaminate fresh ground water in many areas.

Sea Level Rise - 3

- Higher sea-level will accentuate the power of storm surges in low-lying areas, at a time when more powerful storms are predicted.
- Results: Massive migration, decrease in food production, increased vulnerability to hurricanes and other coastal storms.

Drought and Desertification

- Situation: A combination of global warming and poor land use practices is resulting in loss of overall fresh water available in some significant parts of the world, resulting in the loss of land capable of supporting either crops or natural vegetation. Without vegetation, land converts to desert.

Drought and Desertification - 2

- Major loss of agricultural lands in China and India, whose populations are already huge and getting larger.
- Loss of arable land in Africa and elsewhere leading to conflict and war.
- Predicted loss of Lake Meade, whose waters currently support about 22 million people in the American Southwest.

Drought and Desertification - 3

- Greater unpredictability of water availability in the American grain basket (upper Midwest), whose surpluses help feed much of the world.
- Loss of arable land results in increased hunger globally and significant population migrations.

Drought and Desertification - 4

- Classroom discussion topic: Sea level rise and drought/desertification will both likely result in massive population migrations. What roles might emergency management play in minimizing pain and tragedy when large populations relocate? What barriers will need to be addressed?

Global Pandemic

- Situation: A pathogenic virus or other microbe mutates (either naturally or by purposeful weaponization) and spreads out into a human population that has no natural immunity to it. There is a significant lag time between the spread of the disease and the ability of medical and pharmaceutical researchers to develop and produce enough vaccines or medicines to effectively counteract the microbe.

Global Pandemic - 2

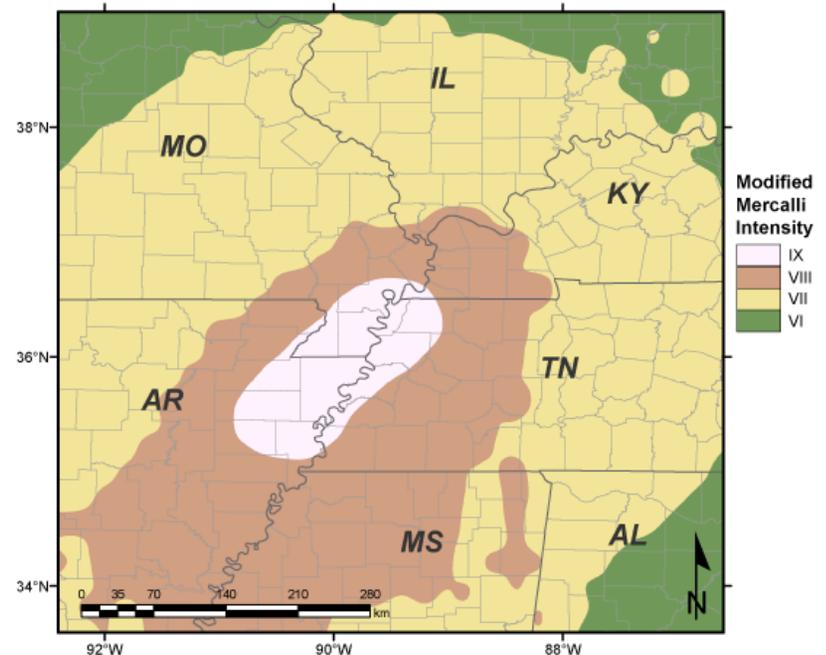
- Health care systems everywhere will be overwhelmed and rendered essentially useless for the majority of the sick.
- Essential functions, such as the delivery of foods and public security services may be significantly compromised.
- Normal commerce may slow to a crawl as people become ill or fear becoming infected.

Global Pandemic - 3

- Depending on the microbe and human responses, many millions or even billions could perish from the combined direct effects of the disease and indirect effects on the supply lines of human necessities.
- Classroom discussion: How do the work of emergency management and public health complement each other?

New Madrid Mega-Earthquake

- Situation: The New Madrid fault line along the Mississippi River repeats its 1811-1812 production of one or two Richter-level 8 earthquakes.



(Map courtesy of Central US Earthquake Consortium at www.cusec.org/S_zones/NMSZ/nsmz_home.htm)

New Madrid Mega-Earthquake - 2

- The region from Memphis TN to Illinois and from Arkansas to parts of the Eastern Seaboard would be affected.
- This area has very little anti-seismic construction, including transportation infrastructure, water, gas and electricity transmission, critical public buildings such as hospitals and fire stations, as well as private housing.

New Madrid Mega-Earthquake - 3

- A 5-7 state area would be affected; local mutual aid would not work.
- Bridges over the Mississippi River may be uncrossable for several hundred miles, for years.
- Transmission of natural gas, oil, and electricity to much of the East Coast would be affected, perhaps for many months.

New Madrid Mega-Earthquake - 4

- Deaths could be in the tens of thousands; injuries in the hundreds of thousands.
- Many places in the world depend on grains transported down the Mississippi River from the American Breadbasket.
- The sheer quantity of the damage would render impossible rapid reconstruction. Probable significant out-migration.

New Madrid Mega-Earthquake - 5

- Classroom discussion: What could or would emergency managers in one local jurisdiction, say, Memphis TN, do when faced with such a catastrophe?

2.5

Factors Common in Catastrophes

- Events involve many jurisdictions simultaneously
- Jurisdictions are unable to respond effectively alone, but the breadth of the event makes outside help difficult or impossible.
- Response demands outstrip the capabilities of traditional government leadership and resources.
- Many catastrophes do not have an extremely rapid onset.

Factors Common in Catastrophes - 2

- Many catastrophes' direct effects have long endurance, decades or even centuries.
- Mass migration is a common outcome of catastrophes.
- Many causes of both past and future catastrophes are outside of the current emergency management planning mentalities.

Factors Common in Catastrophes - 3

- The complicated etiologies of most causes of catastrophes require strong and sustained interaction between science and emergency management in order to provide any chance of successful mitigation or response planning.
- Poor government response can significantly enhance the peril (Ex: Irish Potato Famine).

2.6

Unit 2 Class Exercise

- Classroom exercise: Split the class into 2-4 work groups and have each work group choose a potential future catastrophe from the examples given in class or from the readings. Each group is to develop a list of the potential consequences and complications arising from the event, considering:

Class Exercise Questions

- a. Direct human consequences
- b. Immediate and long-term environmental consequences
- c. Long-term human consequences
- d. Complications that would arise when trying to respond to the event.

Each group then reports back to the full class