

New York University, Wagner Graduate School of Public Service  
UPRL-GP.2645 Planning for Emergencies and Disasters Spring 2015 Tuesdays, 4:55-6:35 PM  
GCASL 365  
Professor Rae Zimmerman (rae.zimmerman@nyu.edu)

## **COURSE SUMMARY AND OUTLINE**

**(Posted January 25, 2015. Please watch for updates)**

Summary Course Description and Objectives. The consequences of disastrous events are escalating in many ways, for example, in terms of lives lost, injuries, economic costs, adverse social conditions, and environmental destruction. Although the emergency field has a long history, it is undergoing radical transformations given the global scale of emergencies and their impacts requiring coordinated action and sharing of information and services. The rapidity of action required when an emergency arises poses unique challenges to traditional planning and the provision of public services. The course theme is what specific actions are transferrable across communities and different hazards to promote resilience.

This course provides students with the capacity to develop planning and public service approaches to understand, diagnose and address causes, consequences, and mitigation and adaptation measures for a variety of emergencies and disasters. These events include natural hazards (such as earthquakes, volcanic eruptions, tsunamis, hurricanes, floods, and temperature extremes), accidents, terrorism and other extreme events such as climate change and environmental catastrophes that are either rapid or slow moving with often devastating impacts on social structures and the built and natural environments. To address these issues, the course draws upon environmental and land use planning, the spatial representation of hazard areas, hazard index construction, and statistical analysis of databases and risk management to gain an understanding of, reduce, respond, and adapt to disaster consequences. Students will learn effective resource allocation strategies, social justice policies, and innovative technological, environmental and social approaches for disaster mitigation, preparedness, response, and recovery. The course also includes knowledge of social and individual behaviors that are a foundation for understanding how people act in disasters, how behavioral changes may save lives and property, and how communication of risks at every stage – before, during and after disasters – occurs. Students will have the opportunity in some cases to meet professionals in emergency planning and response fields in public services, social and health services, security, and the environment. The course draws extensively on case material designed for the course.

### Summary Outline of Course Topics:

- The human experience of disaster
- Crisis perceptions and communications
- Types of events generating emergencies, including: weather emergencies (hurricanes, floods, heat, snow and ice storms); environmental disasters (toxic releases, health risks); environmental extremes (climate change); terrorist threats/attacks; bioterrorism; technological accidents and their intersection with health, safety and the environment (e.g., bridge collapses and train accidents); communicable diseases; pandemics.
- Methods for measurement and spatial location of occurrences and consequences
- Interpretation of trends and patterns for frequency, severity, and impacts of consequences
- How cities cope with disaster and build resiliency for prevention and recovery
- Social equity reflected in community vulnerability and the ability to recover
- Social support systems and institutions (and finance) for disaster response and recovery

## Summary Outline and Course Requirements

### Course Outline

#### I. Introduction to the Evolution and Management of Disasters

1. The Language of Disasters: Concepts Measuring Abrupt Change, and Vulnerabilities
2. Approaches to Measuring and Analyzing Disasters for Strategic Choices to Reduce Vulnerability and Social Inequities: the Emergency and Disaster Management Framework and How to Recognize Extremes

#### II. Applying the Risk Assessment Framework: Threat and Hazard Probabilities, Vulnerability and Consequences

3. Understanding and Measuring Threats and Hazards: Natural Hazards
4. Understanding and Measuring Threats and Hazards: Climate Change
5. Understanding and Measuring Threats and Hazards: Accidents and Terrorism
6. Assessing and Managing Consequences: Securing Critical Public Services I
7. Assessing and Managing Consequences: Securing Critical Public Services II

No Class (Spring Break)

#### III. Social/Psychological Dimensions for All Stages of Disaster Management

8. Impacts on Social Networks, Social Justice and the Economy
9. Attitudes and Perceptions in the Context of Emergencies
10. Communication in Emergencies and Disasters

#### IV. Mitigation/Prevention, Preparedness, Response, and Recovery/Rebuilding; Planning and Institution Building: Common Themes Across Different Hazards

11. Response
12. Recovery and Rebuilding for Adaptation, Preparedness, Prevention and Mitigation
13. Engaging Institutions: Dilemmas, Issues and Solutions

#### V. Course Synopsis

14. Integration of Course Themes and Discussion of Student Papers

**Selected Readings** (only required books are listed below; in addition, articles are provided for each class in the full-length syllabus)

- R. D. Bullard and B. Wright. *Race, Place and Environmental Justice after Hurricane Katrina*. Boulder, CO: Westview Press, 2009.
- J. Defede. *The Day the World Came to Town. 9/11 in Gander, Newfoundland*. NY: Harper, 2002.
- B. D. Phillips. *Disaster Recovery*. Boca Raton, FL: CRC Press/Taylor & Francis, 2009.
- H. Rodriguez, E. L. Quarantelli, and R. R. Dynes, *Handbook of Disaster Research*, New York, NY: Springer, 2007. (abbreviated below as “Handbook”)
- H.V. Savitch. *Cities in a Time of Terror. Space, Territory, and Local Resilience*. Armonk, NY: M.E. Sharpe, 2008.
- K. M. Simmons and D. Sutter. *Economic and Societal Impacts of Tornadoes*. Boston, MA: American Meteorological Society, 2011.
- K. Tierney. *The Social Roots of Risk. Producing disasters, promoting resilience*. Stanford, CA: Stanford U. Press, 2014.

A few guest speakers are invited who provide important front line perspectives, and include emergency managers in emergency response and planning agencies, transportation and utility organizations, and risk insurance firms.

## Course Instructions, Requirements, Lectures, and Readings (\*Please Check for Updates)

### GENERAL READINGS

Note: Only books are listed in this section. Other readings are listed under each lecture. Most required books below are read in their entirety. Assigned sections are under each lecture. Required books are available at NYU's Professional Bookstore and at Bobst Library (reserve).

#### Major Readings (Selected Sections Required):

Robert D. Bullard and Beverly Wright. *Race, Place and Environmental Justice after Hurricane Katrina*. Boulder, CO: Westview Press, 2009.

Jim Defede. *The Day the World Came to Town. 9/11 in Gander, Newfoundland*. New York: Harper, 2002.

Brenda D. Phillips. *Disaster Recovery*. Boca Raton, FL: CRC Press/Taylor & Francis, 2009.

Havidan Rodriguez, Enrico L. Quarantelli, and Russell R. Dynes. *Handbook of Disaster Research*, New York, NY: Springer, 2007. (abbreviated below as "Handbook")

H.V. Savitch. *Cities in a Time of Terror. Space, Territory, and Local Resilience*. Armonk, NY: M.E. Sharpe, 2008.

Kevin M. Simmons and Daniel Sutter. *Economic and Societal Impacts of Tornadoes*. Boston, MA: American Meteorological Society, 2011.

K. Tierney. *The Social Roots of Risk. Producing disasters, promoting resilience*. Stanford, CA: Stanford U. Press, 2014.

#### Optional:

Joe Flood. *The Fires*. New York, NY: Riverhead Books, 2010.

Rae Zimmerman. *Transport, the Environment and Security*. Edward Elgar, 2012.

Optional Book References are also on reserve in Bobst Library.

#### SPECIAL REFERENCE MATERIAL (NYU Classes)

Note: An NYU Classes site contains required course readings, assignments, and other materials. Students are required to access NYU Classes. Some key NYU Classes materials are:

1. Schedule of Assignments and Assignment Instructions (under "Assignments" section)
2. Course readings and lecture materials that can be posted on NYU Classes
3. Selected Case Fact Sheets (including Hurricane Sandy); Case List (used course-wide for class discussion and assignments, located in "Syllabus folder" in "Course Documents" section)
4. Supplemental Information: Occasional material for databases, map links and additional references (some optional) for lectures and assignments.

#### INSTRUCTIONS FOR OBTAINING COURSE READINGS

The location of each reading listed under the lectures is indicated next to each reading as follows:

NYU Classes: Available on the course NYU Classes site (please be sure you are registered)

Bookstore: Books available for purchase from the NYU Professional Bookstore, 726 Broadway

Internet: Available on the internet using the link provided

Library Online (mostly journal articles): Articles downloadable from NYU's library – Go to library.nyu.edu. Click e-journals, enter journal name; Unique Copy Center availability

Library Reserve: Material is on reserve at Bobst Library (primarily books)

Course grading criteria: Short Assignments: 30% (15% per assignment), Mid-Term Paper: 30%, Final Paper and Class Discussion: 30%, Class Participation: 10% (discussion questions, etc.).

Academic Code: Students are required to comply with the Wagner Academic Code located on the course NYU Classes site and at <http://wagner.nyu.edu/students/policies/>.

## TOPICS AND DETAILED READINGS

Note: Readings listed are required unless indicated otherwise. These are generally very short readings. Choices are given. Timing of lectures may vary slightly given the availability of the few guest speakers who are specialists in the emergency planning areas covered in the course. Check for updates. Summary slide presentations will be available for each class.

### **Part I. Introduction to the Evolution and Management of Disasters**

Introduction to the concepts of emergencies and disasters, types of disasters, how events evolve into and become disasters from the commonplace to the extreme; disaster precursors and warnings, ways of measuring trends in the frequency of such events, and the mitigation, response, recovery stages in disaster planning and management.

#### **1. January 27.** The Language of Disasters: Concepts, Measuring Abrupt Change/Vulnerabilities

Examples of types of events generating fundamental dilemmas and emergencies are introduced as real events, lessons learned and future directions and the strategies needed to plan for and manage them. Events are drawn from bioterrorism; weather emergencies (hurricanes, floods, heat, snow and ice storms); environmental extremes (climate change); terrorist threats/attacks; technological accidents; communicable diseases and pandemics. Course objectives and background are introduced in terms of how to:

- Identify inflection points, i.e., be able to identify when natural conditions become emergencies or disasters and the policy debates surrounding them
- Develop action timing, e.g., conditions for immediate action to save lives and resources
- Begin to use and interpret data to discern trends and patterns for the frequency, severity, and impacts of the consequences of natural hazards, terrorism, accidents, and other extreme events to measure hazard and its uncertainties as a basis for decision-making.
- Obtain insights into the dynamic interrelationships among constantly changing physical environments, disaster events, and social and demographic characteristics.
- Develop strategies that provide choices and approaches for decision-making
- Population and development dynamics of disasters; Population and economic activity movements toward hazards; introduction to issues of social equity and vulnerability.

#### ***Definitions and Characteristics of Disasters and Related Concepts***

Bookstore: H. Rodriguez, E. L. Quarantelli, and R. R. Dynes, Handbook of Disaster Research, New York, NY: Springer, 2007. (abbreviated below as “Handbook”), pp. 8-11 (“The Hazards-Disaster Tradition”); pp. 43-44 (“The Nature of Crises”)

Bookstore: B. Phillips, Disaster Recovery, p. 19.

Bookstore: H.V. Savitch, Cities in a Time of Terror, pp. 3-5.

#### ***Overview of Disaster Management Stages*** (to be revisited throughout the term)

Bookstore: B. Phillips, Disaster Recovery, pp. 19-21.

#### ***Social Construction and Perspectives on Disasters***

Bookstore: K. Tierney, The Social Roots of Risk, Chapters 2 and 3 (skim only; revisited later)

NYU Classes: Wilson & Fischetti (2010) Coastal Populations, patterns and trends.

#### ***Introduction to Selected Disaster Patterns and Trends***

Internet and NYU Classes: UNISDR (2013) 2012 Disasters in Numbers, 2 pp.

[http://www.preventionweb.net/files/31685\\_factsheet2012.pdf](http://www.preventionweb.net/files/31685_factsheet2012.pdf)

Internet and NYU Classes: List of weather disasters, 1980-2014 at (interactive)

<http://www.ncdc.noaa.gov/billions/events>; <http://www.ncdc.noaa.gov/billions/events.pdf>

Optional references:

Internet and NYU Classes: U.S. Census (2011) Population Distribution and Change 2000-10

Internet: D. Guha-Sapir, P. Hoyois, and R. Below (2013) Annual Disaster Statistical Review 2012, Brussels, Belgium: Centre for Research on the Epidemiology of Disasters (CRED), pp. 35-38. [http://reliefweb.int/sites/reliefweb.int/files/resources/ADSR\\_2012.pdf](http://reliefweb.int/sites/reliefweb.int/files/resources/ADSR_2012.pdf)

Internet: FEMA 2014 Federal Disaster Declarations <http://www.fema.gov/news/disasters.fema>;  
Preliminary assessments <https://www.fema.gov/preliminary-damage-assessment-reports>  
(skim just to obtain familiarity with the site which is updated continually)

**2. February 3.** Approaches to Measuring and Analyzing Disasters for Strategic Choices to Reduce Vulnerability and Social Inequities: the Emergency and Disaster Management Framework and How to Recognize Extremes

Introduction to the emergency planning and management frameworks encompassing mitigation/prevention, preparedness, response and recovery; choices that individuals and decision-makers face, and risk and decision-making approaches to make those choices. Areas (to be applied throughout the course) include: (1) Source reduction (2) Reducing vulnerabilities and social inequity (3) Coping and adaptation (4) Risk acceptance (5) Resource Allocation Decision-making. Measurement concepts and strategies include resilience and robustness. Data collection and analysis methods and techniques; mapping and interpretation are covered that address associations among people, places and hazards.

Introduction to cross-cutting cases of extreme events used throughout the course, for example, Information for Hurricane Sandy, Hurricane Irene, the December 2010 Blizzard in NYC, BP Oil Spill, the Minnesota Bridge Collapse, Loma Prieta earthquake San Francisco, Haiti Earthquake, and others. Selected case readings have been provided in NYU Classes.

***Introduction to Risk Concepts and Applications***

Optional:

Library Online: M. Scheffer, Carpenter, S. R., Lenton, T. M., Bascompte, J., Brock, W., Dakos, V., van de Koppel, J., van de Leemput, I. A., Levin, S. A., van Nes, E. H., Pascual, M., & Vandermeer, J. (2012). Anticipating critical transitions. *Science*, 338(6105), 344-348. doi: 10.1126/science.1225244

Internet: World Economic Forum (2015) Global Risks 2015 Tenth Edition, Cologny/Geneva Switzerland: WEF. [http://opim.wharton.upenn.edu/risk/library/Global\\_Risks\\_2015.pdf](http://opim.wharton.upenn.edu/risk/library/Global_Risks_2015.pdf).

***Resilience***

Library Online: Alexander, D. E. (2013). Resilience and disaster risk reduction: An etymological journey. *Natural Hazards and Earth System Sciences*, 13, 2707-2716. doi:10.5194/nhess-13-2707-2013

Internet: The National Academies, Committee on Increasing National Resilience to Hazards and Disasters, Committee on Science, Engineering, and Public Policy (2012). *Disaster resilience: A national imperative*. Washington, DC: The National Academies Press. (Skim only)

Library Online: Vale, L. J. (2014). The politics of resilient cities: Whose resilience and whose city? *Building Research & Information*, 42(2), 191-201. doi: 10.1080/09613218.2014.850602

Optional:

Library Online: S.L. Cutter, L. Barnes, M. Berry, C. Burton, E. Evans, E. Tate, and J. Webb (2008) "A Place Based Model for Understanding Community Resilience to Natural Disasters," *Global Environmental Change* 18(4): 598-606.

Library Online: C. Folke (2006) "Resilience: The emergence of a perspective for social-ecological systems analyses," *Global Environmental Change*, 16, 253-267.

***Index Construction***

Bookstore: H.V. Savitch, *Cities in a Time of Terror*, pp. 14-25.

Hazardous indexes compared (class distribution and NYU Classes power point slides)

***Spatial Analysis and Mapping and Other Visualization Tools for Disaster Patterns and Trends***

Bookstore: D.S.K. Thomas, K. Ertugay, and S. Kemeç, "The Role of Geographic Information Systems/Remote Sensing in Disaster Management," (part), Handbook, pp. 83-91

Internet (with sign in) and Library Online: K.A. Borden, M.C. Schmidlein, C.T. Emrich, W.W. Piegorsch, and S.L. Cutter (2007) "Vulnerability of U.S. Cities to Environmental Hazards," *Journal of Homeland Security and Emergency Management*, 4 (2), Article 5, pp. 1-21.

Available at: <http://www.bepress.com/jhsem/vol4/iss2/5>. DOI: 10.2202/1547-7355.1279

Bookstore: R. A. Stallings, "Methodological Issues," (part) Handbook, pp. 55-69

***Risk Analysis*** [NYU Classes power point slides]

***Introduction to Gander, Newfoundland, September 11, 2001***

Bookstore: J. Defede, *The Day the World Came to Town*, pp. 1-7.

Optional:

Bookstore: H.V. Savitch, *Cities in a Time of Terror*, pp. 67-119 (skim; revisited later).

Internet (with sign in): National Research Council (2011) *Tsunami Warning and Preparedness*, Available from the National Academy Press online download, pp. 53-71 (skim)  
[http://www.nap.edu/catalog.php?record\\_id=12628](http://www.nap.edu/catalog.php?record_id=12628)

**Part II. Applying the Risk Framework: Threat and Hazard Probabilities, Vulnerability and Consequences**

Statistics and spatial delineation are used as approaches to identify and assess the risks of emergencies and planning options over the course of mitigation, preparedness, response, and recovery at different stages in risk evaluations. These stages are: Threat and Hazard Probabilities, Vulnerability, Exposure and Consequences in a Disaster Context.

**3. February 10.** Understanding and Measuring Threats and Hazards: Natural Hazards

The origins, characteristics, trends and measures for threats and hazards for different types of "natural" disasters: Natural Hazards (weather extremes focusing on hurricanes, extreme temperatures, and flooding; geophysical events, including earthquakes, tsunamis, volcanoes). Recent cases include the Japan Earthquake and Tsunami (March 11, 2010); Tornado episodes in Tuscaloosa, AL and Joplin, MO; northeastern U.S. snowstorms (2010-2011); Hurricane Irene.

General references for types of natural hazards

Bookstore: B. Phillips, pp. 11-15.

Bookstore: Bourque et al. "Morbidity and Mortality Associated with Disasters" in Handbook, pp. 97-107 (part of the chapter).

## References for natural hazard definitions, patterns and trends

### ***Extreme Weather Events***

#### (i) Hurricanes

NYU Classes: The Saffir-Simpson Hurricane Wind Scale (and supplement), The Saffir-Simpson Team (T. Schott, C. Landsea, G. Hafele, J. Lorens, A. Taylor, H. Thurm, B. Ward, M. Willis, and W. Zaleski), National Weather Service, National Hurricane Center

Internet and NYU Classes: Blake, E.S and E.J. Gibney (August 2011) “The Deadliest, Costliest, and Most Intense United States Tropical Cyclones from 1851 to 2010” (and other frequently requested hurricane facts), NOAA Technical Memorandum NWS NHC-6, available at <http://www.nhc.noaa.gov/pdf/nws-nhc-6.pdf>.

#### (ii) Tornadoes

Internet and NYU Classes: Tornado Climatology Summary

<http://www.ncdc.noaa.gov/oa/climate/severeweather/tornadoes.html#history>

<http://www.ncdc.noaa.gov/climate-information/extreme-events/us-tornado-climatology/trends>

Bookstore: K. M. Simmons and D. Sutter. Economic and Societal Impacts of Tornadoes. Boston, MA: American Meteorological Society, 2011, pp. 9-44 (skim)

#### (iii) Record High Temperatures, Heat Waves and Drought

Internet and NYU Classes: U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Climatic Data Center (January 2014), State of the Climate: Global Analysis for Annual 2013, published online December 2013, retrieved on January 23, 2014 from <http://www.ncdc.noaa.gov/sotc/global/2013/13>. Patterns/trends through 2014 (class).

### ***Geophysical and Related Hazards***

#### (i) Earthquakes

Internet and NYU Classes: K. M. Shedlock & L. C. Pakiser, “Earthquakes,” in particular sections entitled, “How Earthquakes Happen” (<http://pubs.usgs.gov/gip/earthq1/how.html>) and U.S. G.S. “Measuring Earthquakes” (<http://pubs.usgs.gov/gip/earthq1/measure.html>) General site: <http://pubs.usgs.gov/gip/earthq1/>

#### (ii) Tsunamis

NYU Classes: National Science and Technology Council, Subcommittee on Disaster Reduction (circa 2005) Science and Technology Lessons Learned from the December 26, 2004 Indian Ocean Disaster Interim Report of the Subcommittee on Disaster Reduction. 7 pages.

#### (iii) Volcanoes

Library Online: D.K. Chester, M. Degg, A.M. Duncan, J.E. Guest (September 2000) “The increasing exposure of cities to the effects of volcanic eruptions: a global survey,” Global Environmental Change Part B: Environmental Hazards, 2 (3), Pages 89-103.

## **4. February 17. Understanding and Measuring Threats and Hazards: Climate Change**

Climate change is introduced as a threat to the ecology and the environment.

Characteristics of climate change and its potential for disaster are evaluated. Major themes emphasized are sea level rise and rapid ice melt (with other extreme events covered in Class 3).

**\*\*Short Assignment 1 due before class\*\***

### ***Major National Assessments Released 2013 and 2014***

National Climate Assessment (U.S. Global Change Research Program)

Internet and NYU Classes: Walsh, J., et al. (2014) Ch. 2: Our Changing Climate. Climate Change Impacts in the United States: The Third National Climate Assessment, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 19-67. doi:10.7930/J0KW5CXT. pp. 19-67.

#### Optional:

State of the Climate (NOAA)

Internet and NYU Classes: Blunden, J., and D. S. Arndt, Eds., 2014: State of the Climate in 2013. Bull. Amer. Meteor. Soc., 95 (7), S1–S257.

[http://www2.ametsoc.org/ams/index.cfm/publications/bulletin-of-the-american-meteorological-society-bams/bams-state-of-the-climate-2013/?utm\\_source=pr&utm\\_medium=pcon&&utm\\_campaign=stateofclimate2013](http://www2.ametsoc.org/ams/index.cfm/publications/bulletin-of-the-american-meteorological-society-bams/bams-state-of-the-climate-2013/?utm_source=pr&utm_medium=pcon&&utm_campaign=stateofclimate2013)

International Panel on Climate Change (IPCC)

Internet and NYU Classes: IPCC WGII AR5 Climate Change (2014) Impacts, Adaptation, and Vulnerability Summary for Policymakers [https://ipcc-wg2.gov/AR5/images/uploads/IPCC\\_WG2AR5\\_SPM\\_Approved.pdf](https://ipcc-wg2.gov/AR5/images/uploads/IPCC_WG2AR5_SPM_Approved.pdf)

Pew Research Center

Doherty, C., Tyson, A. and Dimock, M. (January 27, 2014) Deficit Reduction Declines as Policy Priority, Washington, DC: Pew Research Center for The People and The Press, <http://www.people-press.org/files/legacy-pdf/01-27-14%20Policy%20Priorities%20Release%202.pdf>

### ***Sea Level Rise Associated with Climate Change***

Library Online: R.J. Nicholls and A. Cazenave (2010) “Sea-Level Rise and Its Impact on Coastal Zones,” Science, 328, June 18, pp. 1517-1520.

Library Online: S. Solomon, G-K Plattner, R. Knutti, and P. Friedlingstein (2009) “Irreversible climate change due to carbon dioxide emissions,” PNAS 106 (6), February 10, pp. 1704-1709.

### ***Rapid Ice Melt***

Library Online: Antarctic - J. L. Bamber, et al. (2009) “Reassessment of the Potential Sea-Level Rise from a Collapse of the West Antarctic Ice Sheet,” Science, 324, 901-903.

Internet and NYU Classes: Arctic - U.S. Congress, Congressional Research Service (March 30, 2010) Changes in the Arctic: Background and Issues for Congress, 68 pp. Read summary only; skim the rest. <http://fas.org/sgp/crs/misc/R41153.pdf>

### ***Emissions***

NYU Classes & Internet: U.S. Environmental Protection Agency (EPA) (2014) Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2012, Washington, DC: U.S. EPA, April 15, <http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2014-Main-Text.pdf>

***Adaptation Measures.*** Available as part of class presentation later in the semester.

#### Optional:

Internet (March 2014): National Academy of Sciences and The Royal Society (2014) Climate Change: Evidence and Choices, Washington, D.C.: NAP.

[http://www.nap.edu/catalog.php?record\\_id=18730&utm\\_medium=email&utm\\_source=National%20Academy%20of%20Engineering&utm\\_campaign=Spotlight+3-7-141&utm\\_content=&utm\\_term=](http://www.nap.edu/catalog.php?record_id=18730&utm_medium=email&utm_source=National%20Academy%20of%20Engineering&utm_campaign=Spotlight+3-7-141&utm_content=&utm_term=)



Internet and NYU Classes: T. R. Karl, J.M. Melillo and T.C. Peterson, eds. (2009) Global climate change impacts in the United States. Cambridge, MA: Cambridge University Press, executive summary and climate sections; skim as background for lectures.  
<http://downloads.globalchange.gov/usimpacts/pdfs/climate-impacts-report.pdf>

**5. February 24.** Understanding and Measuring Threats and Hazards: Accidents, Terrorism, Environmental (and Ecological) and Environmental Health Threats

### ***Accidents***

Case Examples Covered in Slide Presentations (no extra readings): Bridges (e.g., Mianus Bridge, CT; Minneapolis Bridge, MN; Schoharie Bridge, NY), rail transit, dams, chemical plants, pipelines, oil rigs (BP Oil Spill), oil tankers, electric power outages, nuclear power plants

### ***Environmental (and Ecological) and Environmental Health Disasters as Accidents***

Measuring diversity:

Library Online: S.H.M. Butchart, M. Walpole, B. Collen, et al. "Global Biodiversity: Indicators of Recent Declines," *Science*, 328, 2010, pp. 1164-1168.

Defining quarantine periods:

Library Online: C. Haas (October 14, 2014) On the Quarantine Period for Ebola Virus, *PLOS Currents Outbreaks*. 5 pp. <http://currents.plos.org/outbreaks/article/on-the-quarantine-period-for-ebola-virus/>

Measuring the occurrence of an outbreak:

Specific outbreaks, e.g., SARS, H1N1, H5N1 Covered in Class (no extra readings)

### **Optional:**

S. Harris Ali and R. Keil (2010) "Securitizing Networked Flows: Infectious Diseases and Airports," In Stephen Graham, ed. *Disrupted Cities. When Infrastructure Fails*. NY and London: Routledge, pp. 97-110. [2002-2003 SARS spread through airlines and airports.]

World Health Organization, Global Alert and Response, [www.who.int/csr/en/](http://www.who.int/csr/en/)

D. Brockmann and D. Helbing (December 13 2013) "The Hidden Geometry of Complex, Network-Driven Contagion Phenomena," *Science*, 342, pp. 1330-1331.

***Terrorism***, e.g., September 11, 2001 attacks in NYC; Madrid and London Rail Bombings.

Bookstore: H.V. Savitch, *Cities in a Time of Terror*, pp. 3-13; 26-43; 67-119.

Bookstore: W.L. Waugh, Jr., "Terrorism as Disaster," in *Handbook*, pp. 388-404.

**Optional:** Various references from the U.S. DHS "START" Center, U. of Maryland

**6. March 3.** Assessing and Managing Consequences: Securing Critical Public Services I

Consequences of terrorism, extreme weather events, and other hazards on public services. Guest Speaker (to be confirmed) from a government transportation and infrastructure authority.

### **Optional:**

Available for class: R. Zimmerman (September 2011) "Adaptability of Critical Infrastructure and the September 11, 2001 Attacks in New York City," *The CIP Report*, George Mason School of Law, Arlington, VA, 10 (3), pp. 10, 11, 30.

[http://tuscany.gmu.edu/centers/cip/cip.gmu.edu/wp-content/uploads/2013/06/CIPHS\\_TheCIPReport\\_September2011\\_9\\_11\\_10thAnniversary.pdf](http://tuscany.gmu.edu/centers/cip/cip.gmu.edu/wp-content/uploads/2013/06/CIPHS_TheCIPReport_September2011_9_11_10thAnniversary.pdf)

## **7. March 10.** Assessing and Managing Consequences: Securing Critical Public Services II

### **\*\*Midterm Due\*\***

Cases Covered in Slide Presentations (no extra readings) include: The NYC Snowstorm (December 26, 2010) – transportation and sanitation; NYC heat wave (summer 2011) – transit; Hurricanes 2004 and 2008; 2011 and 2012 – electric power.

Internet and NYU Classes (choice of two of four readings):

U.S. DOE (February 2009) Comparing the Impacts of the 2005 and 2008 Hurricanes on U.S. Energy Infrastructure, 48 pp. Selected sections.

<http://www.oe.netl.doe.gov/docs/HurricaneComp0508r2.pdf>

U. S. Department of Energy (2013) Comparing the Impacts of Northeast Hurricanes on Energy Infrastructure. [Online] Available from:

[http://energy.gov/sites/prod/files/2013/04/f0/Northeast%20Storm%20Comparison\\_FINAL\\_041513c.pdf](http://energy.gov/sites/prod/files/2013/04/f0/Northeast%20Storm%20Comparison_FINAL_041513c.pdf)

U.S. Department of Transportation, Federal Transit Administration (August 2011), Flooded Bus Barns and Buckled Rails: Public Transportation and Climate Change Adaptation, available at [http://www.fta.dot.gov/documents/FTA\\_0001\\_-Flooded\\_Bus\\_Barns\\_and\\_Buckled\\_Rails.pdf](http://www.fta.dot.gov/documents/FTA_0001_-Flooded_Bus_Barns_and_Buckled_Rails.pdf). Skim.

National Research Council (2014). An ecosystem services approach to assessing the impacts of the Deepwater Horizon oil spill in the Gulf of Mexico. Washington, DC: NAS.

### Optional:

Internet and NYU Classes: R. Zimmerman and C. Faris, “Infrastructure Impacts and Adaptation Challenges,” Chapter 4 in Climate Change Adaptation in New York City: Building a Risk Management Response, New York City Panel on Climate Change 2010 Report, edited by C. Rosenzweig and W. Solecki. For the New York City Climate Change Adaptation Task Force. Annals of the New York Academy of Sciences, 1196. New York, NY, NY Academy of Sciences, 2010, pp. 63-85. ISBN 978-1-57331-800-6.

<http://www3.interscience.wiley.com/cgi-bin/fulltext/123443062/PDFSTART>

Library Online: M. Leung, J. Lambert, A. Mosenthal (2004) “A risk-based approach to setting priorities in protecting bridges against terrorist attacks,” Risk Analysis, 24 (4), pp. 963-984.

## **March 17. No Class. Spring Break.**

### **Part III. Social/Psychological Dimensions of Disaster**

- Attitudinal research and risk perception as it affects human behavior in emergencies such as evacuation, compliance, and receptivity to communication
- How different disasters are ranked and prioritized by the public and decision-makers
- Factors that heighten concern: lack of control, uncertainty, newness, proximity, etc.
- Application of theory and methods for trust and risk communication to crisis situations for different audiences incorporating equity and hazard type
- Theoretical foundations for behavior and perception linkages, influence diagrams, social networks, mental models, cognitive processing will enrich this area

- The disaster attention cycle – when is the general public, lawmakers and funding streams most attentive and why. Information systems: warning centers

Examples of social-psychological, risk perception and risk communication aspects of cases and case types discussed are in the areas of the course themes of weather and geophysical events, industrial accidents, and terrorist attacks.

### **8. March 24.** Impacts on Social Networks, Social Justice and the Economy

Disasters disrupt social networks in ways that both destroy and recreate communities. Supply chain disruptions affect how people and goods movement react to massive shutdowns. The production and distribution of goods are becoming more and more concentrated which makes them vulnerable to disruptions. What are the options?

Bookstore: Jim Defede. *The Day the World Came to Town. 9/11 in Gander, Newfoundland.* New York: Harper 2002. (continued reading for Assignment 2).

Library Online: J. Park, P. Gordon, J. E. Moore II, and H. W. Richardson (2008) “The State-by-State Economic Impacts of the 2002 Shutdown of the Los Angeles-Long Beach Ports,” *Growth and Change*, 39 (4), December, pp. 548-572.

Bookstore: R.D. Bullard and B. Wright, “Race, Place, and the Environment in Post-Katrina New Orleans,” pp. 19-48. In: R. D. Bullard and B. Wright, *Race, Place and Environmental Justice after Hurricane Katrina.* Boulder, CO: Westview Press, 2009; R.D. Bullard, G. S. Johnson, and A.O. Torres, “Transportation matters: Stranded on the Side of the Road Before and After Disasters Strike,” pp. 63-86

Internet and NYU Classes: R. Zimmerman, C.E. Restrepo, B. Nagorsky, and A.M. Culpen (2007) “Vulnerability of the Elderly During Natural Hazard Events,” *Proceedings of the Hazards and Disasters Research Meeting*, Boulder, CO: Natural Hazards Center, July 11-12, 2007, pp. 38-40. [http://www.colorado.edu/hazards/workshop/hdrm\\_proceedings.pdf](http://www.colorado.edu/hazards/workshop/hdrm_proceedings.pdf)

Bookstore: B. Bolin, “Race, Class, Ethnicity, and Disaster Vulnerability,” *Handbook*, p.113-129.

Bookstore: Tierney, *The Social Roots of Risk.* Sections to be assigned.

#### Optional:

A. Fothergill, E.G.M. Maestas, and Darlington, J.D. (1999) “Race, ethnicity, and disasters in the United States: A review of the literature,” *Disasters* 23 (2), pp. 156-173.

A. Fothergill and L.A. Peek (2004) “Poverty and disasters in the United States: a review of recent sociological findings,” *Natural Hazards*, 32, 89-110.

### **9. March 31.** Attitudes and Perceptions in the Context of Emergencies

#### **\*\*Short Assignment 2 due before class\*\***

Library Online: M. K. Lindell, and S. N.Hwang (2008) “Households’ Perceived Personal Risk and Responses in a Multihazard Environment,” *Risk Analysis*, 28 (2), pp. 539-556.

Available for class: R. Zimmerman and M. Sherman (2011) “To Leave an Area After Disaster: How Evacuees from the WTC Buildings Left the WTC Area Following the Attacks,” *Risk Analysis*, 31 (5), pp. 787-804.

Bookstore: B. Phillips, *Disaster Recovery*, “Social Psychological Recovery,” pp. 291-331.

Bookstore: H.V.Savitch, *Cities in a Time of Terror*, pp. 44-63.

Library online: K. Weir (2015) Adapting to a warmer world. Psychologists can help people and communities prepare for the psychosocial effects of climate change. January 2015 Monitor on Psychology Vol. 46, No. 1 <http://www.apa.org/monitor/2015/01/adapting.aspx>

#### **10. April 7.** Communication in Emergencies and Disasters

Library Online: A. Nicol, C. Hurrell, W. McDowall, K. Bartlett, and N. Elmieh (2008)

“Communicating the Risks of a New, Emerging Pathogen: The Case of *Cryptococcus gatti*,”  
Risk Analysis, 28 (2), pp. 373-386.

Library Online: T. E. Drabek (1999) “Understanding Disaster Warning Responses,” The Social Science J., 36 (3), pp. 515-523.

Bookstore: J.H. Sorensen and B.V. Sorensen, “Community Processes: Warning and Evacuation,”  
in Handbook, pp. 183-199.

Bookstore: J. Scanlon, “Unwelcome Irritant of Useful Ally? The Mass Media in Emergencies,”  
in Handbook, pp. 413-429.

Bookstore: K. M. Simmons and D. Sutter (2011) Economic and Societal Impacts of Tornadoes.  
Boston, MA: American Meteorological Society, pp. 117-171, “Tornado Warnings.”

Case studies that address common language and criteria to portray pre- and post-disaster conditions and institutional mechanisms to support communications: Communication lessons from the NYC 2010 snowstorm; Joplin tornadoes; Gulf Oil spill; oil and natural gas pipeline accidents (to be made available separately and discussed in class).

#### **Part IV. Mitigation/Prevention, Preparedness, Response, and Recovery/Rebuilding; Planning and Institution Building: Common Themes Across Different Hazards**

Recapping the techniques and approaches earlier in the term with applications to stages of disaster planning; equity and justice issues across the stages

- Pre-Disaster Stages
  - Pre-disaster planning techniques: Review of mapping and building disaster scenarios spatially to identify risk-prone vulnerable areas.
  - Anticipating and measuring the potential for emergencies using risk and vulnerability assessment
  - Prevention strategies from technology to development and behavioral dimensions
- Preparedness for initial conditions: when the lights go out, the trains stop, traffic lights are disabled, transportation arteries are blocked, water and sewerage stop running, housing is destroyed
- Response: Ability and capacity of communities to accommodate emergency conditions – e.g., case histories - Gander, Newfoundland (overwhelming of public services on 9/11/01); Houston (post-Hurricane evacuation); Asian Tsunami (2004); northeastern U.S. Hurricanes Irene and Sandy.
- Evaluating alternatives and resource deployment: risk-benefit, risk-cost methods
- Post-disaster recovery

#### **11. April 14.** Response

**Short Assignment for discussion only (ungraded, no submission)**

Bookstore: J. Flood, *The Fires*, New York, NY: Riverhead Books, 2010 (available in the bookstore and library reserve).

***Shaping Cities to Identify and Resist Immediate Impacts of Terrorism***

Bookstore: H.V. Savitch, *Cities in a Time of Terror*, pp. 123-147.

***Rescue Operations***

Bookstore: M. Poteyeva et al. "Search and Rescue Activities in Disasters," in *Handbook*, pp. 200-216.

***Evacuation Planning***

Library Online: M. Dombroski, B. Fischhoff, P. Fischbeck (2008) "Predicting emergency evacuation and sheltering behavior: A structured analytical approach," *Risk Analysis*, 26(6), pp. 1675-1688.

Internet and NYU Classes: J.L. Renne, T.W. Sanchez, T. Litman (October 2008) *National Study on Carless and Special Needs Evacuation Planning: A Literature Review*, New Orleans, LA: UNO Transportation Center, available at:

<http://www.planning.uno.edu/docs/CarlessEvacuationPlanning.pdf>, Accessed: 3/26/10.

NYU Classes: FHWA evacuation case studies

***Surge Capacity***

Library Online: T. J. Scanlon (2003) "Helping the other victims of September 11: Gander uses multiple EOCs to deal with 38 diverted flights," *The Australian Journal of Emergency Management*, 18 (2).

Rereview J. Defede (2002) *The Day the World Came to Town. 9/11 in Gander, Newfoundland*. New York: Harper.

***Emergency Services***

Library Online: M. J. Trowbridge, M. J. Gurka, R. E. O'Connor (2009) "Urban Sprawl and Delayed Ambulance Arrival in the U.S.," *Am J Prev Med*, 37 (5), pp. 428-432.

**12. April 21.** Recovery and Rebuilding for Adaptation, Preparedness, Prevention and Mitigation  
Building and rebuilding community and physical environments in anticipation of prevention and overall disaster reduction, including enhancing resilience of individuals, communities, cities, regions and nations to withstand future disasters.

***General Readings***

Bookstore: B. Phillips, *Disaster Recovery*, sections to be assigned.

Bookstore: H.V. Savitch, *Cities in a Time of Terror*, pp. 148-174.

Optional/skim – Recent government documents – executive orders, programs and plans:

PPD-21; U.S. DHS (March 30, 2013) *National Preparedness Report (NPR)*

U.S. DHS (2013) *National Infrastructure Protection Plan (NIPP)*

***Housing and Community Rebuilding***

Bookstore: W.G. Peacock, N. Dash, and Y. Zhang, "Sheltering and Housing Recovery Following Disaster," in *Handbook*, pp. 258-274.

Bookstore: K. M. Simmons and D. Sutter. *Economic and Societal Impacts of Tornadoes*. Boston, MA: American Meteorological Society, 2011, pp. 173-212 "Sheltering from the Storm."

Library Online: W. Atkinson (December 2012) "Hunkering Down. Community safe rooms offer shelter from really big storms," *Planning*, pp. 20-25.

### Hurricane Katrina case

Bookstore: R. D. Bullard and B. Wright (2009) *Race, Place and Environmental Justice after Hurricane Katrina*. Boulder, CO: Westview. Read any two of the three chapters:

S.J. Webb, "Investing in Human Capital and Healthy Rebuilding in the Aftermath of Hurricane Katrina," pp. 139-152.

M. Khan, "The Color of Opportunity and the Future of New Orleans: Planning, Rebuilding, and Social Inclusion After Hurricane Katrina," pp. 205-228.

L.K. Bates and R. A. Green, "Housing Recovery in the Ninth Ward: Disparities in Policy, Process, and Prospects," pp. 229-248.

Library Online: R.B. Olshansky, L.A. Johnson, J. Horne & B. Nee (2008) "Planning for the rebuilding of New Orleans," *J. of the American Planning Association* 74 (3), pp. 273-287.

Optional Cases (references for class discussion):

### Hurricane Sandy case

Internet: NYS Rising community program plans and Rebuild by Design

Availability to be announced: J.L. Parker (2013) "Extreme Weather and its Consequences: Adaptation and Resilience are Needed to Address a Changing World (Part 1 of 2)" *Viewpoint, Environmental Law in New York*, 24 (8), pp. 111-120.

Availability to be announced: J.L. Parker (2013) "Extreme Weather and its Consequences: Adaptation and Resilience are Needed to Address a Changing World (Part 2 of 2)" *Viewpoint, Environmental Law in New York*, 24 (9), pp. 133-142.

### Haiti Earthquake case

UN (2014) *Haiti Humanitarian Action Plan 2014*

[https://docs.unocha.org/sites/dms/CAP/HAP\\_2014\\_Haiti.pdf](https://docs.unocha.org/sites/dms/CAP/HAP_2014_Haiti.pdf)

***Rebuilding Infrastructure*** (primarily terrorism, supplementing readings for lectures 6 and 7 for weather-related disasters and infrastructure) Read two of the four readings

Library Online: B.D. Taylor, C.N.Y Fink, and R. Liggett (July 2006) "Responding to Security Threats in the Post-9/11 Era - A Portrait of U.S. Urban Public Transit," *Public Works Management & Policy*, 11 (1), pp. 3-17.

Available for class: R. Zimmerman and J.S. Simonoff (2009) "Transportation Density and Opportunities for Expediting Recovery to Promote Security," *Journal of Applied Security Research*, 4, pp. 48-59.

Internet and NYU Classes: R. Zimmerman (2003) "Public Infrastructure Service Flexibility for Response and Recovery in the September 11th, 2001 Attacks at the World Trade Center," in *Natural Hazards Research & Applications Information Center, Public Entity Risk Institute, and Institute for Civil Infrastructure Systems (eds) Beyond September 11th: An Account of Post-Disaster Research*. Boulder, CO: University of Colorado, pp. 241-268.

[http://www.colorado.edu/hazards/publications/sp/sp39/sept11book\\_ch9\\_zimmerman.pdf](http://www.colorado.edu/hazards/publications/sp/sp39/sept11book_ch9_zimmerman.pdf)

Available for class: R. Zimmerman, "Planning Restoration of Vital Infrastructure Services Following Hurricane Sandy: Lessons Learned for Energy and Transportation," *J. Extreme Events*, Vol. 1, No. 2, August 2014.

<http://www.worldscientific.com/doi/pdf/10.1142/S2345737614500043>.

### ***Finance***

Library Online: A. Healy and N. Malhotra (2009) "Myopic Voters and Natural Disaster Policy," *American Political Science Review*," 103(3), pp. 387-406.

### **13. April 28.** Engaging Institutions: Dilemmas, Issues and Solutions

Normal institutional approaches often have gaps and are not flexible to adapt to emergencies. These cut across economics, laws and regulations, and organizational mechanisms to adapt to new issues, rapid resource assembly and coordination. This class covers representative theory and applications for institutional arrangements across the disaster planning and management spectrum; the economics of disasters; valuing lives in different disasters and places; and laws and regulations, such as emergency waivers/exemptions.

Bookstore: B. Phillips, Disaster Recovery, Chapter 11 “Public-Sector Recovery,” pp. 333-365.

Bookstore: Tierney, The Social Roots of Risk, Chapters 5 and 6

Available for Class: M. B. Gerrard (Spring 2006) “Emergency Exemptions from Environmental Laws After Disasters,” NR&E, pp. 10-14.

Bookstore: C. Perrow, “Disasters Ever More? Reducing U.S. Vulnerabilities,” in Handbook, pp. 521-533.

Library Online: S.M. Wheeler (2008) “State and Municipal Climate Change Plans: The First Generation,” J. of the American Planning Association, 74 (4), pp. 481-496.

Internet and NYU Classes: U.S. Department of Energy, Office of Inspector General, (January 2011) Improvements Needed in the Department’s Emergency Preparedness and Continuity of Operations Planning <http://ig.energy.gov/documents/IG-0845.pdf>

Library Online: L. Comfort (December 2007) “Crisis Management in Hindsight: Cognition, Communication, Coordination, and Control,” Public Administration Review 67:s1 (Special Issue), pp. 189-197.

Optional/skim – government documents:

U.S. DHS (2013) National Response Framework, 2<sup>nd</sup> edition, available at:  
[http://www.fema.gov/media-library-data/20130726-1914-25045-1246/final\\_national\\_response\\_framework\\_20130501.pdf](http://www.fema.gov/media-library-data/20130726-1914-25045-1246/final_national_response_framework_20130501.pdf)

Link to individual frameworks: <http://www.fema.gov/national-response-framework>

U.S. DHS (2011) National Preparedness Goal, available at:  
[http://www.fema.gov/media-library-data/20130726-1828-25045-9470/national\\_preparedness\\_goal\\_2011.pdf](http://www.fema.gov/media-library-data/20130726-1828-25045-9470/national_preparedness_goal_2011.pdf)

## **Part V. Course Synopsis**

### **14. May 5.** Integration of Course Themes and Discussion of Student Papers

**In-Class Discussion of Final Papers.** Students will be able to practice oral presentations, and participate in an interactive exchange with other students.

May 19. Exam Week. Submission of final paper. Continuation of paper discussions if needed. No in-class final.