Lecture Notes: Disaster Vulnerability and Resilience

Session 5
Lecturer: Rutherford H. Platt, University of Massachusetts, Amherst.

Learning from Disasters: The Synergy of Law and Geography
This lecture was prepared for the University of San Diego School of Law "A Nation on Edge" series.

Introduction

I. The Fire of London
   a. London in the Elizabethan era, ca. 1580
      i. The quintessential medieval London
      ii. Built of wood, densely built up in walled area
      iii. Very little sanitation or access to fresh water or water for firefighting
   b. 1665 Plague
      i. Swept through the city, killed thousands of people
      ii. Tremendous, reeling disaster
   c. 1666 Fire
      i. Hit the city in September, after heavy drought and accompanied by strong winds
      ii. Most damage was within the Roman walls in the core of the city.
      iii. London's response marked the beginning of the enlightened approach of learning from disasters in the Western world.
         1. Act for Rebuilding London, 1667
            a. Leading citizens approach King to learn from disaster and prevent future occurrences.
            b. King Charles issues a Royal Proclamation on September 13, 1666
            c. Act is based on this Proclamation
         2. Details addressed:
            a. Exterior materials
            b. Width of streets
            c. Overhangs banned
            d. Area along Thames opened for access
            e. Hazardous materials banned from central city
            f. Provision to pay owners whose land could not be rebuilt because land was needed for widening streets, etc.

The Land Use and Society Model

I. 3 Sets of Spatial Data:
   a. Physical Environment
      i. Land
      ii. Water
      iii. Climate
      iv. Biodiversity
   b. Legal/Political Authorities
      i. Spatial jurisdictions overlie physical environment
      ii. Private ownership
      iii. Court system
      iv. Social context also impacts geospatial data
         1. Economics
         2. Technology
         3. ?
         4. ?
   c. Human Landscapes
      i. Resulting pattern of land uses for rural/urban purposes, whatever imprint humans make on the physical environment
      ii. Result from the collective impact of land-use decisions that determine how we use land and water.

II. Natural Disasters
   a. Definition: Catastrophic events that result from the interaction of natural hazards and human presence.
      i. Capricious Natural Hazards – Climate Based
         1. These are not place-specific, though they may be regionally specific.
      ii. Place-selective Natural Hazards – Geology Based
         1. Types:
            a. Earthquakes
            b. Floods – riverine, coastal, dam-breaks
            c. Coastal Erosion
            d. Landslides, mudslides,
            e. Tsunamis
            f. Volcanoes
         2. These are not completely site-specific; many places may be vulnerable to hazards, though the people are not as conscious of it (i.e. Connecticut River Bed Fault line).
      iii. Example: Local public-help (San Francisco)
         1. In the early 20th century, the U.S. Government relied mostly on individual and local self-help response to disasters, not much government involvement.
         2. City officials immediately refer to San Francisco Earthquake and Fire of 1906 as the "San Francisco Fire"

a. They want to minimize the probability that it might recur.

3. Societal response to fire: develop new external fresh water supply
    a. Reached across Central Valley to Sierra Nevada in Hechechee Valley to build dam and aqueduct (Gifford Pinchot: need to use public resources for the greatest good for the greatest number of people).
    b. John Muir objects to plan due to his devotion to wilderness (founded Sierra Club), lost battle.

iv. Example: Individual self-help. (1889 Brighton Beach Hotel)
1. The Hotel was owned by a railroad company, which responded to the natural hazard on its own.
2. Railroad laid out tracks, elevated hotel, hitched locomotives with cables, and hauled it inland.

v. Example: Federal public-help (1927 Lower-Mississippi Flood)
1. Landmark Event in Federal Policy (marks turning point from self-help model to federal-help model)
2. Alternative to building flood-control structures proposed in National Resources Board: Harland Barrows: "cultural engineering," concept not appealing to the main stream.

Hazard Mitigation versus the Takings Issue

I. Police Power
   a. The power of Government to establish rules for private behavior
   b. No compensation is available to the private party: there is an issue of whether it is justified or not.

II. Holmes Formulation (source of "the Takings Issue")
   a. The word "Taking" comes from the 5th Amendment which says, "nor shall private property be taken for public use without just compensation."
   b. In Holmes Formulation, decision states that regulation might amount to a "taking" if it goes too far.
   c. How does harm to be prevented weigh against the loss of private owners to do as they wish?

III. Structural Flood Control
   a. Little was done about flood-plain zoning through the 1950s
   b. Rivers being channeled, lined with levees, (e.g. the Salt River and the Los Angeles River) creating ugly, utilitarian rivers
   c. Gilbert White challenges the structural approach to floods in his dissertation; he and colleagues determine that flood-control projects cause more high-level damage than if the projects did not exist.

IV. Dunham's Rationale
   a. Dunham translates White's findings into legalese
   b. Argues that floodplain regulation under the police power is only constitutional as a means to 3 ends

i. Protect unwary investors and tenants,
ii. Protect owners of nearby property from increased flood levels, and
iii. Protect the public from the costs of emergency response and disaster relief.

c. Dedham case, which cites Dunham, becomes a precedent for other cases, including a California State Supreme Court case, which recognizes the geography of the situation and the need to restrict human presence to avoid further disasters.
d. Coastal Erosion:
    i. Lucas vs. South Carolina Coastal Council.
        1. What drives the process of building on sites under Coastal Erosion conditions?
            a. Building owners are eligible for the Federal flood insurance program
            b. Insurance premiums do not go up, homeowners are not dropped, in flood-insurance programs.
            c. Members of Congress from the state where the disaster occurred are eager to get as much for their constituents as possible.
                i. Politics of the program's administration makes it difficult for the Federal Government to establish new rules and put limits on how much risk it will cover.
        2. Supreme Court overturns California State Supreme Court decision.
    ii. Case Study: Fire Island ca. 1995.
        1. Island parallel to Long Island extending into the Atlantic Ocean
            a. Popular location for summer resorts for very wealthy people
            b. Construction right on the shoreline, dunes have almost disappeared.
        2. This is a known, certain loss: hurricanes, winter storms hit the shores regularly, and periodic pulses that destroy the dunes and the houses on or behind the dunes.
            a. Coastal land is vulnerable to cyclical weather patterns that constantly shift the conditions of shorelines.
            b. Climate change aggravates the already high risk of damage.
        3. Ash Wednesday Storm on Fire Island, 1962.
            a. Some houses rebuilt, many moved back
            b. No government regulations put restrictions on how close to the shoreline property owners can build
        4. Cases mostly depict wealthy property owners:
            a. Highest property values at risk

b. Very well-educated, should know better
c. No federal policies discourage their actions
d. Only represents about 10% of those covered by federal flood insurance
    i. A sizable percentage of all claims account for the wealthiest 10% of claimants.

V. Other societal structures exist that do not help mitigate disaster and distort the market process:
   a. Private industries are aligned on the side of the property owner:
      i. Lending Industry
      ii. Building Industry
      iii. Real Estate Industry
   b. An imbalance of power exists between government and private industries that encourage risky behavior on floodplains.
   c. People who are living on the floodplain because the property values are lower cannot get enough money for their property to allow them to move into a flood-safe area with higher property values.

VI. East Bay Hills Wildfires (1991)
   a. 3600 houses destroyed
   b. Water systems failed
   c. 25 fire departments arrived at the scene
   d. After the fire, huge structures built on steep slopes with Hayward Fault at the base, increase risk for heavy damage in the case of an earthquake/landslide.

Calibrating Federal Disaster Policies

I. Strategies of response:
   a. Control the Hazard
      i. Flood control projects (dams, levees, seawalls, etc.)
   b. Reduce Vulnerability
      i. Public information and warning
      ii. Building and land use regulation
      iii. Buy-out of threatened structures, etc.
   c. Shift Disaster Costs
      i. National Flood Insurance Program
      ii. SBA Disaster Loans
      iii. Disaster Assistance under Stafford Act

II. Federal Disaster Assistance (Stafford Act)
   a. Characteristics:
      i. Contingent on a Presidential Disaster Declaration for specified states and counties
         1. Definition of “major disaster” is political
         2. Threshold of damage

3. Geographic scope of the Declaration (# of states and counties included)
   ii. Limited as to scope of assistance
   iii. Limited federal funding
   iv. Should be supplementary to state and local capabilities
b. It can become an entitlement, a pork barrel, for communities experiencing hazards they can handle on their own.
c. Suggestion that it is making disasters worse (discourages localities to prepare for and be responsible for disaster).

III. National Flood Insurance Program
a. Mapping of flood hazard areas
b. Criteria for local floodplain management
   i. Has been weak in promoting non-compensatory floodplain zoning
c. Flood Insurance is provided that is not available through private insurance companies.
   i. Private companies do not have the reserves to cover losses in the case of a massive flood
   ii. Do not have the legal ability to prohibit people from building in high-risk locations.

IV. Policy Issues:
a. Coordination
b. Self Reliance: how much should we expect individuals, households, businesses, communities to bail themselves out?
c. Cost Sharing: how should the overall costs (primarily economic) be split between victims, private sector insurance and public sector.
d. Hazard Mitigation: what can we do to promote safer communities, reduce vulnerability
e. Repetitive Losses: many structures have many claims over their lifetime
f. Private Property Rights vs. Public Interest
g. Social Equity (amongst classes of victims): why do poor victims get so much less help and attention than wealthy victims and communities?

"Ecological Cities" –A New Perspective

I. Middle circle: the common vision of a more ecological and more humane environment, from central city to urban fringe
a. Each surrounding circle represents its own network that is working toward the shared vision.
   i. Many of the networks do not communicate/relate to one another at all.
b. Intention is to build areas of connectivity between networks that are working for the same goals but do not speak the same language.
c. Many people working for NGOs, non-profits, do not have time or money to go to conferences
d. Effort to put "do-ers" in touch with other "do-ers" to talk about the work they are doing and inspire each other.

II. Urban Ecological Services
    a. How natural systems contribute to life in cities as well as other habitats
III. Examples of work on small watersheds:
    a. Houston, TX Buffalo Bayou
    b. Milwaukee River Watershed: restored river bed from concrete channel to naturalized riverbed.
    c. Johnson Creek, Portland, OR: restoration plan
    d. Nine Mile Run Watershed in Pittsburgh
    e. Anacostia River Watershed in Washington, D.C. and Maryland