Class 14a: Natural hazards

- Vulnerability and disaster
- Geologic events
- Climatic events

Natural hazards and disasters

- Natural disaster: damage to life or property
- Natural hazard: risk of natural disaster
- Combination of physical and human geography
- Droughts, floods, hurricanes, earthquakes, volcanoes

Natural hazards and disasters

- Trigger events are natural
- But “disasters” are man-made
- Humans can increase *risk*
  - Building on a hillside
- Or increase *vulnerability*
  - Building in a floodplain

Four types of impacts

- Direct damage
- Emergency response hampered
- Short-term service interruptions
- Long-term economic loss

1906 San Francisco Earthquake

- Sunday 5 A.M.; 40 seconds; 8.2 magnitude
- 3000 dead; 3/5 of housing, all of CBD
- Multiple, interrelated hazards
  - Earthquake led to fire
- Failure of “lifelines”
  - Water mains and tanks ruptured

1906 San Francisco Earthquake

- Learning from mistakes
  - Structural damage → stronger codes
  - Larger water supply (Hetch Hetchy)
- Or not!
  - Reservoir on fault line
  - Fire debris became Marina District

1989 Loma Prieta Earthquake

- Weekday, 5 P.M; 15 sec.; 7.1 magnitude
- 62 dead; 12,000 homeless; $6 billion
- Interrelated hazards
  - Worst damage on fill from 1906
- Failure of lifelines (Bay Bridge)

Natural hazards and disasters

- Most deaths in poor countries
- Squatter settlements, unclaimed land
- Few warning systems, evacuation plans
- Few building codes
- Deliberate risks

Hurricane Jeanne (2004)

- 2,000 dead in Haiti; 12 in Dominican Rep.
- Haiti is 98% deforested
- Very poor, very high birth rates
- French land system: land divided by heirs
- 71% of fuel from charcoal (wood)
- No early warning system

Natural hazards and disasters

- Most property damage in rich countries
- Loss of life avoided
- Prime real estate often disaster-prone
- More reporting, reimbursement
- “Solutions” may give false sense of security

1991 East Bay Hills Fire

- Oct. 20: 25 dead, 2,700 homes, $1.5 billion, 5,100 homeless: 9 hours
- Risk factors
  - Vegetation (flammable eucalypts)
  - Fire suppression policy
  - Wood houses, decks
  - Narrow, winding roads

1991 East Bay Hills Fire

- Interrelated hazards: drought, fire
- Failure of lifelines: narrow roads, incompatible fire equipment
- Rebuilt immediately (high property values)
- But with vegetation, material restrictions

Four stages of response

- Preparation and readiness
- Emergency response
- Recovery (short- and long-term)
- Mitigation

Types of mitigation

- Warning systems, evacuation planning
- Building regulations
- Land use planning and land acquisition
- Education
- Habitat protection/restoration