Hunter College - CUNY
Dept. of Geography & Environmental Science
GEOG 101 Lecture Presentation Summary
Spring 2021

***NOTE**: In the absence of face-to-face lecturing and explanation of the material presented in the lecture slides, I will summarize the content of each lecture presentation stressing the concepts and interrelationships that are essential to an introductory geography course.*

If, after viewing the lecture presentation, the imbedded short videos and hot links to articles, and after reading this summary, you have any questions, would like to contribute a comment or two, need clarification by other examples or would like additional information on the topic, please do not hesitate to email me at agrande@hunter.cuny.edu.

LECTURE 17: Human Impact and Natural Hazards

- The focus of Lecture 17: Earth Habitat: Human Impact and Natural Process (Hazards) is a real "people and their environment topic". It is a combination of (1) the impact of people on the environment, (2) how natural processes affect people, (3) how a natural process becomes a hazard when people are adversely affected, and (4) how people try to either alter or stop the process (usually with limited or no success).

- **Slide 3. Natural Processes and Humans.** Here we set the scene of people interacting with nature. When a natural process is extremely destructive to life and property, it is called a natural disaster.

- **Slide 4. Natural Hazards.** This map is from *Goode's World Atlas* and shows the natural hazards found in North America. The atlas has a similar map for each of the continents. North America has the greatest variety of natural hazards of any continent. Look at the list. It includes things we would not think about including permafrost, sea fog, drifting icebergs and desertification. **The *Titanic* was sunk by a drifting iceberg.**

- **Slides 5-6: Natural Processes/ Natural Hazards.** Statistics of deaths caused by natural hazards over the last 100 years are presented. When students are asked for the #1 killer, drought is never mentioned. We need to be aware of the processes to be able to defend ourselves against them since we cannot prevent a natural process from occurring.

- **Slides 7: Natural Disasters:** As previously mentioned, a natural disaster is an extreme natural hazard. Examples of extreme natural hazards are shown ***(play the short videos from the NYTimes library to see real instances of destruction caused by them).***

- **Slides 8-10: Sites and Costs of Natural Disasters.** These slides show areas of the US that are susceptible to disasters and place a dollar value on the damage caused by US disasters in 2017. ***This is from a study published in 2018.***

- **Slides 11-16: Human Impact.** These slides look at the impact people have had on earth environment and how the works of people can be considered a "hazard to na-

ture". Take the time review the videos and articles behind the hot links on the slides.

- **Slides 11-12**. Impact of people on nature.
- **Slide 13:** These two short videos discuss **human impact and the greenhouse effect** and the **greenhouse effect and climate change**, two very relevant topics.
- **Slide 14:** This is from a study of the 1993 Great Flood on the Mississippi-Missouri River System. This was supposed be the "100-year flood", which means such an event can be expected once every 100 years. Prior to this time there had been periodic flooding. However, the "100- year flood" has since occurred several times since 1993 and the levees have been built higher and reinforced in some places.
    - As the St Louis Metropolitan Area expanded in the 20th century on the flood plain and into farmland, floods occurred more often and became more destructive to human property. Local officials called on the Federal government "to do something" to prevent costly flooding along the rivers. The US Army Corps of Engineers was instructed to remediate the situation: to construct levees and other flood control devices. The two images show before and after situations. Levees are mounds of compacted dirt that parallel a waterway. Because of the expense, only vital areas are protected by hardened (faced with clay/stone/concrete) levees. *View the first 9 minutes of the PBS documentary. If you can, view the 27-minute broadcast. At Minute 22 there is talk about moving a town to a higher elevation to avoid future flooding.*
- **Slides 15-16: Levee Building at St. Louis.** These illustrations are from an article that appeared in *National Geographic* that reported on the flood and its aftermath. The diagrams, combined with a bit of basic understanding of fluid dynamics, vividly show the impact of human interference on the flow of river water. The levees defeat the purpose of a flood plain. ***(Why is it called a flood plain and how is it formed? Doh!)***
    - The levees **(A)** constructed to protect St. Louis and East St. Louis constricted the flow of the Mississippi River, raised the level of the water and increased the speed of water flowing past these urban areas. Compare the unaltered state diagram to levee-protected urban areas. The constriction allowed water to back up, flooding upstream areas **(B).** The constriction funnels the water passing St. Louis, raising its level and increasing its speed. The higher, faster moving water is a more powerful erosional agent. Downstream **(C),** it breaches unprotected levees and erodes river banks putting more towns (and people) in danger.

- **Slides 17: Analyzing Change and Dealing with It.** The Wildlife Conservation Society along with Elemental Solutions-Caribbean teamed up to assess habitats around the Caribbean with a "protect-repair-restore" mission. The diagram using St. Barthelemy's environment as an example, summarizes how we can study any area of the world. **1. Identify the problem: threats. 2. Assess the situation: impact. 3. Give advice and set priorities: recommendations.** Look closely at the diagram

and all its parts. See how things are interrelated as, for example, wastewater from land affects the life of a coral reef and how a good communication strategy can persuade land-based polluters that it is their interest – tourist income – not to cause the reefs to degenerate and die.

- **Slides 18-35: Natural Processes/Natural Hazards.** The remaining slides are examples of natural processes turning into natural hazards or disasters *(or at least inconveniencing people and damaging their works).* ***View the short videos.***
    - **Slide 18: Hurricane.** Tropical cyclones or hurricanes are extreme atmospheric events fueled by warm ocean water. Massive in size with sustained winds starting at 74 mph that can exceed 155 mph, they push a wall of water in front of them which devastates low-lying areas. Watch all the video links.
    - **Slide 19**: **Urban Flood Risk**. These maps show areas with high-risk potential for flooding during a severe storm in three cities.
    - **Slide 20: Flooding a Houston Suburb**. The Barker Reservoir outside of Houston is normally a dry place. It was built to protect Houston from flood waters. Housing was allowed inside its boundaries outside of previous high-water levels. However, with Hurricane Harvey, those levels were exceeded and neighborhoods were flooded. Water had to be released from the reservoir and wound up flooding parts of Houston anyway. ***Read the NYTimes article and view the interactive map.***
    - **Slide 21: Tornado.** This is an extreme wind event that is usually short-lived and has a limited area of destruction.
    - **Slide 22-23: Volcanic Eruption.** Volcanic eruptions are hardly ever a surprise, especially in populated areas where they are usually monitored. The Mt. St. Helens video shows the force of such an eruption. The volcano did not blow its top. The point of weakness was its side and the blast zone was horizontal not vertical. If the southwest side blew instead of the northeast side, the city of Portland, Oregon would have been devastated. Recent eruptions in Iceland, Italy, Hawaii and Japan are shown.
    - **Slide 24: River Flooding.** A river overflows when water volume exceeds channel capacity. The reason could be too much rain, quickly melting snow, a combination of the two, and/or decreased lag time due to urbanization (paved surfaces and storm sewers quickly send runoff to rivers). When people alter river channels and their floodplain, flooding is more likely to occur.
    - **Slide 25: River Ice Jams.** In cold winter areas ice collects in rivers (and along lake shores) and damages shoreline features as docks, bridges and retaining walls. The ice blocks (or jams) the flow of river water causing it to back up and flooding areas upstream. If the jams break up too quickly, they cause flash flooding downstream.
    - **Slide 26: Drought.** Life on earth is water dependent and droughts kill the most people each year. The photo at upper right shows the drop in lake level (light colored rock); the water should be at the tree root level. The bottom right shows a Palm Springs, CA community built in the desert and dependent on water. The **drought monitor web site** gives current and past conditions in the US. ***You can play with the variables.***

- **Slide 27: Earthquake Damage 1.** View the video of what you can expect to experience during an earthquake when inside a building. Most people are killed by collapsing buildings not the shake of an earthquake.
- **Slide 28: Earthquake Damage 2.** Proper building construction should make a building tilt in a worse-case scenario, not collapse.
- **Slide 29: Tsunami.** Watch the dramatic March, 2011 video of the largest tsunami ever to hit Japan, breaching the 18-foot-tall protective sea wall and killing more than 28,000 people.
- **Slide 30: Coastal Storms 1.** The sand on this island was once at the level of the first floor of these Westhampton Beach, NY houses; waves washed away the sand exposing building foundation pilings. **Review "Coasts In Crisis" from Lecture 15.**
- **Slide 31: Coastal Storms 2.** Located on a rocky, cliffed coastline, Plum Island, MA is buffeted by huge waves. Notice the houses in the two photos.
- **Slide 32**: **Barrier Island Alteration.** A survey using LIDAR measured elevation changes and the image shows before and after views of Hatteras Island, NC after a coastal storm when the island was leveled and breached by waves.
- **Slides 33-34: Beach Erosion.** Rising sea level and increased wave action naturally erode sandy coastlines. Sandy barrier beach islands are not permanent geological features and people should consider them as temporary landforms before investing money on the construction of buildings, roads and other infrastructure.
- **Slide 35: Coastal Landslide.** When slopes are eroded by water and/or soaked by rain, they can no longer support the weight of rock and soil and slide down under the force of gravity.

- **SLIDE 36: NEXT – Earth Resources**