

## PART II: People and their Physical Environment

- ✓ I. Introduction to the Physical Environment
- ✓ II. Earth-Sun Relationship
- ✓ III. Earth Systems
- ✓ A. The Hydrosphere: Oceans
- ✓ B. The Atmosphere: Weather and Climate
- ✓ C. The Lithosphere: Geologic Influences
- IV. Earth Habitat**
  - ✓ A. Biosphere
  - ✓ B. Natural Controls and Cycles
  - **C. Human Impact**
  - **D. Natural Hazards**
    - E. Earth Resources

## GEOG 101 Part II People and their Physical Environment

# 17: Earth Habitat

### Human Impact and Natural Processes (aka Hazards)

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Lecture design, content and presentation GAF 0321  
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## Natural Processes and Humans

❖ Throughout human history, people have had to **cope with** their surroundings (natural landscapes) and **deal with** natural processes.

➤ Natural processes that are **detrimental** to the lives and works of people are called **"hazards."**

Despite of our technological advancements, **we cannot control the natural processes that adversely affect us** and we will continue to be subservient to those forces.

✓ That is why when a natural process happens, we deem the process "bad" and "harmful," and label it a **NATURAL HAZARD.**

When it is extremely destructive and deadly, it is termed a **NATURAL DISASTER.**

## NATURAL PROCESS/ NATURAL HAZARD

- They are atmospheric, geologic and oceanic in nature.
  - The list is long.
- Every continent has them.
- Possesses become **hazards** when **people** are **adversely affected** by them.



Natural process + people = natural hazard.

## NATURAL PROCESS/NATURAL HAZARD

❖ **We must be knowledgeable about natural processes and we must learn to live with the "hazards."**

- ✓ Learn to avoid them
- ✓ Have selective land use
- ✓ Predict their occurrences
- ✓ Develop technology to protect ourselves
- ✓ Try to prevent them from becoming disasters

## NATURAL PROCESS/NATURAL HAZARD

**The leading natural processes that are killers of people over the last 100 years are ... ?**

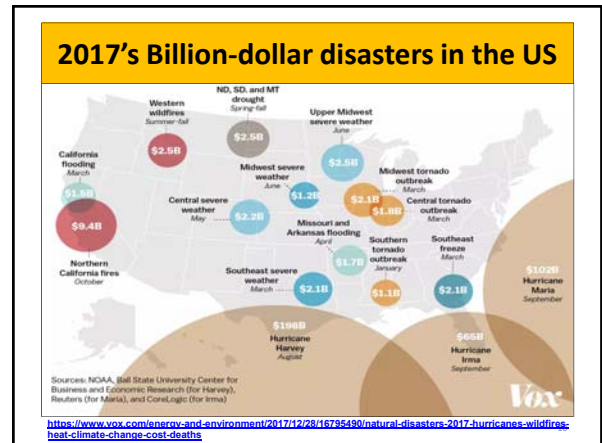
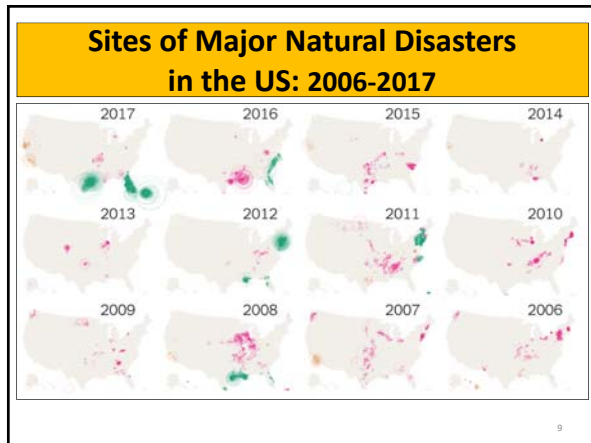
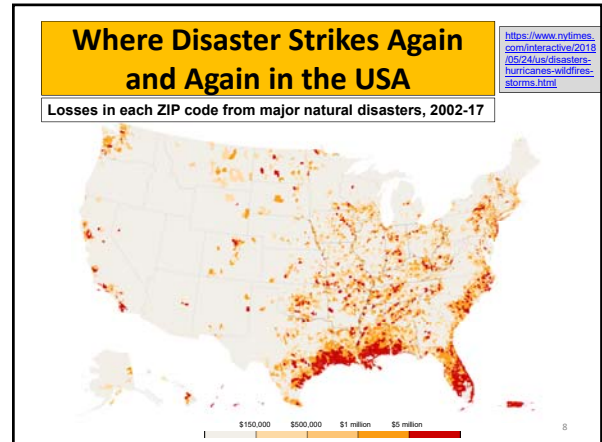
1. drought (10 million people)
2. floods (6.8 mil)
3. earthquakes (1.8 mil)
4. wind (1.2 mil)
5. volcanoes (0.9 mil)
6. mass movements – land and snow (0.5 mil)

**Heat waves and cold spells are silent killers.**

## When Natural Processes turn into Disasters

**New York Times** video record of select natural disasters  
<https://www.nytimes.com/video/world/asia/100000006765350typhoon-hagibis-japan.html?searchResultPosition=3>

Firefighters Race to Contain Blazes Across State  
 What the California Fire Look Like Up Close and From the Sky  
 Kansas Fire Burns in Sevier County  
 Scenes of Destruction After Typhoon Hits Dallas  
 Scenes of Destruction as Typhoon Hagibis Strikes Japan  
 Tin Getting the Hell Out of Dodge? An Up-Close Look at the Southern California Fires  
 Inside Texas Streets Into Rivers in Eastern Texas  
 Powerful Tornado Hits Missouri Town  
 Scenes of Destruction After a Night of Storms in Missouri  
 Scenes of Destruction as Cyclone Fani Hits India  
 Scenes From Flooding in Thailand, Laos  
 Deadly Floods Displace Thousands in South Africa



## HUMAN IMPACT

➤ As natural processes affect people, the **actions of people impinge on nature** and can be disruptive to nature:

- pollution
- agricultural methods
- importing non-native plants, insects and animals
- killing/extinction of species

✓ People must be aware of their actions and anticipate the consequences.

✓ At the same time they must be cognizant on ways to protect the environment.

Farmer in India burning stalks after harvest.

<https://www.nytimes.com/2018/11/04/climate/invasive-grasses-wildfires.html>  
<https://www.nytimes.com/2018/11/04/climate/india-pollution-new-dehli.html>  
<https://www.climatecentral.org/>

## HUMAN IMPACT

Humans have had an impact on the natural environment from the beginning of their existence: harnessing fire and cutting down vegetation to create "clearings."

- We have interfered with natural cycles.
- We have disrupted natural controls.
- We have altered the equilibrium of some planetary sequences of events.
- We have had an adverse affect on animal habitats.
- We have intensified the forces driving natural occurrences.

## Focus of Human Impact

A major focus of human impact is the earth's ability to retain heat -- **Greenhouse Effect** -- and thus climate change.

This began with the Industrial Revolution and the use of coal to produce power.



<https://www.youtube.com/watch?v=6VUPIX7vEOM> Greenhouse Effect, 4 min  
[https://www.youtube.com/watch?v=G4H1N\\_vXBIA](https://www.youtube.com/watch?v=G4H1N_vXBIA) Climate Change and People, 4 min

13

## HUMAN IMPACT: Protecting an Area from Flooding

The junction of the Missouri and Mississippi Rivers is prone to flooding, a natural process.

"Great flood" of 1993 at St. Louis, Missouri. How did this happen?


NORMAL CONDITIONS

But people do not like to be flooded.

14

## HUMAN IMPACT

The building of levees to protect St. Louis, MO and East St. Louis, IL **increased flooding and flood damage** both upstream and downstream of the protected areas... including flooding areas behind broken levees!



Mississippi levees: canalizing with nature

**UNALTERED STATE**

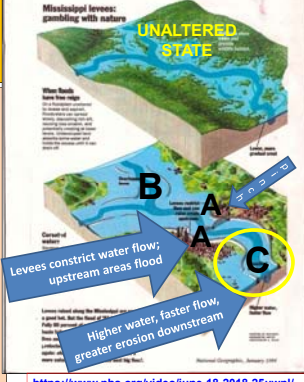
When floods come from above, the Mississippi is usually a gentle flow. But the flood of '93 beat the odds. Fully 90 percent of ground water on "levees" in the lower valley. 80-90 percent of ground water, cutting flow and back-up flooding under levees from Louisiana State and Texas. An old industry from major industries to small businesses all in one natural "habitat" from the world "big flow".

15

## HUMAN IMPACT

Levees (at A) constrict stream flow and prevent water from spreading laterally, so it **backs up** further upstream (at B).

The constricted stream channel **now accelerates** the flow of water moving past the protected areas. It creates a more powerful current downstream (at C), eroding levees and river banks.



Mississippi levees: canalizing with nature

**UNALTERED STATE**

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Levees constrict water flow; upstream areas flood

Higher water, faster flow, greater erosion downstream

<https://www.pbs.org/video/june-18-2018-25uwn/>  
27 min program: 1993 flood 25 years later

16

## Analyzing Change and Dealing with it


Threats to St-Barthélemy's Environment  
Causes, Impacts, and Possible Actions

1. ID the problem.

2. Assess the situation.

3. Give advice/ set priorities.

Recommendation and Key Priorities



WCS ES [www.wcs-es.com](http://www.wcs-es.com)

WCS and WWF have geographers on staff to help them study environmental change and educate the public.

## HURRICANE

Wind, rain and storm surge

Hurricane damage categories: <https://www.nhc.noaa.gov/aboutghs.php>



Katrina 28 ft storm surge in Mississippi (2.6 min) <https://www.youtube.com/watch?v=qdBWIXNkxho>

Hurricane storm surge demo (1 min) <https://www.youtube.com/watch?v=b4ZhwBNTXk>

Hurricane Katrina, 2005

Severe weather ABC News coverage -- Hurricane Michael, 2018 <https://www.nytimes.com/interactive/2019/08/29/opinion/hurricane-dorian-forecast-map.html>

### Urban Flood Risk

**Flood risk in the NYC area**

**Flood risk in Houston, TX**

**Flood risk in Tampa, FL**

**Baton Rouge, LA flooding**

<https://youtu.be/v3FgAJUs8>

<https://www.click2houston.com/news/water-to-be-released-from-addicks-barker-reservoirs-2017-before-and-after-photos-houston-tx>

<https://www.nytimes.com/2020/08/26/us/new-orleans-nuns-hurricane-laura-flood.html?action=click&module=RelatedLinks&pg=ShareArticle>

**2020 New Orleans Flood Response**

19

### Flooding of a Houston Suburb during Hurricane Harvey

<https://www.nytimes.com/interactive/2018/03/22/us/houston-harvey-flooding-reservoir.html>

**Barker Reservoir** is a flood control project built to contain excess water, yet housing was allowed along the perimeter outside of "historic flood levels."

Houston

### TORNADO

<https://www.youtube.com/watch?v=7KDz6dGQ8RE>

3 min Birth of a Tornado

21

### VOLCANIC ERUPTION

Mt. St. Helens, Washington

**Before**

<https://www.youtube.com/watch?v=ihU6jmi6NY4>

Mt St Helens 1980 (2.5 min)

**After**

Iceland, March, 2021

<https://www.cnn.com/2021/04/06/world/gallery/iceland-volcano/index.html>

<https://www.vei.com/video/coland-volcano-erupts-fourth-time-4-10-2021>

<https://www.vei.com/news/erupts-comes-up-3-10-2021>

<https://www.vei.com/news/erupts-comes-up-3-10-2021>

<https://www.vei.com/news/erupts-comes-up-3-10-2021>

22

### Volcanic Eruptions

**Mt. Etna, Sicily**

March 2021

<https://www.cnn.com/videos/world/2021/02/17/etna-volcano-italy-erupts-10n-orig-sp.cnn> (1 min)

**Kilauea Volcano, Hawaii**

May 2018

**DEADLY ACID CLOUD RISES OVER HAWAII**

<https://www.youtube.com/watch?v=qNStQGBHeTI> (2 min)

<https://www.youtube.com/watch?v=cYht9nwwXY>

Pyroclastic flow, Mt. Unzen, Japan (1 min)

23

### RIVER FLOODING

<https://www.vox.com/energy-and-environment/2019/3/18/18271101/nebraska-flooding-photos>

Spring 2019 flooding in Nebraska: both a natural process and a natural hazard

24

### RIVER ICE JAMS

Related topic: heavy snowfall at Donner Pass  
<https://www.yahoo.com/news/snow-cornelius-shack-storm-nevada-23202463.html>

<https://www.3newsnow.com/news/local-news/warm-weather-melting-platte-river-ice-jam>

### DROUGHT

<http://droughtmonitor.unl.edu/>

### EARTHQUAKE DAMAGE

Taiwan earthquake 2018: panic and fear as first deadly quake hit Hualien

**A second earthquake** measuring 5.7 in magnitude hit Hualien almost 24 hours later

Hualien, Taiwan 2018 <https://www.youtube.com/watch?v=2EC83ngAFs> 1.5 min

### EARTHQUAKE DAMAGE

<https://www.youtube.com/watch?v=7he6c2Qy2s> 3 min

<https://www.youtube.com/watch?v=0Djg5ZFHq> 50 sec

<https://www.youtube.com/watch?v=V5qB1Ww6D4> 2.5 min

### TSUNAMI

Japan March, 2011

<https://www.youtube.com/watch?v=oWzdgBNhQU> Earthquake plus tsunami 3.5 min

### COASTAL STORMS

Review the "Coasts In Crisis" slides from Lecture 15

Breach of a barrier island by waves at Westhampton Beach, NY

### Plum Island, MA (March 2013)

31

### LIDAR Image of Barrier Island Breach Hatteras Island, NC, September 2003

32

### Beach Erosion

<https://www.nytimes.com/2021/03/14/climate/outer-banks-tax-climate-change.html>

*Tiny Town, Big Decision: What Are We Willing to Pay to Fight the Rising Sea?*  
On the Outer Banks, homeowners in Avon are confronting a tax increase of almost 50 percent to protect their homes, the only road into town, and perhaps the community's very existence.

33

### Avon, NC Losing Sand to the Sea

Even though most of the house have been elevated, what happens when there isn't any more dry land?

34

### Coastal Landslide

Norway, June, 2020

<https://kutv.com/news/nation-world/watch-powerful-landslide-sweeps-8-norwegian-homes-into-the-ocean> (2.5 min)

California, January, 2021

<https://www.youtube.com/watch?v=tbuqT-6MdkM&cc=56> (2 min)

35

### NEXT: Earth Resources

36