

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](mailto:agrande@hunter.cuny.edu).*

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## LECTURE 15: Lithosphere 2

- The focus of Lecture 15 is **Landscape Development**. We will see how natural processes shape the earth's surface and create unique sets of characteristics.
- **Slide 3: Landforms + People = Land Use.** This is a prelude to Part III of the course as it introduces us to the relationship people have with the land and the decisions they have made over time. Last lecture we defined "topography" as the study of surface features. Topographic features are a result of the actions of geologic, atmospheric and hydrologic processes. These processes are constantly at work – sometimes subtly and sometimes drastically (i.e., natural hazards) – and therefore people need to be aware of them. A large area exhibiting similar physical characteristics is called a **topographic region**.
- **Slide 4: Landforms and Land Use.** The characteristics used to analyze a topographic region are shown. It is important to note that a topographic region does not present a unified (or cookie-cutter) appearance. Within each are subregions, areas having local features that are unique, as high points and low points and unique landforms, as hills, stream channels, basins and ridges, etc.
- **Slide 5: Topographic Regions.** Regions within regions within regions. (*Remember that from Part I of the course?*) The map of North America shows the continent's major regions. The satellite image shows the NYC metro area. The map (upper right) zooms in on NYC. The irregular glacier-formed terminal moraine and the flat outwash plain of Brooklyn and Queens are clearly visible.
- **Slide 6: Knowledge of Landforms.** When climate is added, the factors listed above become the basis of human land use decisions. The list here includes pertinent factors for knowing about their characteristics, especially when they may adversely affect people.
- **Slides 7-14: Physical Landscape Analysis.** These are the five physical factors that need to be addressed in any landscape analysis: elevation, relief, slope, valley shape and climate zones. **Slide 8** is a composite diagram of them.

- **Slides 9-13** focus on each individual factor. Elevation is the key because it influences the other 4 factors.
  - On **Slide 9**, the sign post markers show two extreme points in the US: a Rocky Mt. pass at 12,005 ft above sea level and a Death Valley location 200 ft below sea level.
  - **Slide 10** illustrates topographical relief which is the *vertical distance* between high and low points.
  - **Slide 11** shows the angle of slope which is *measured horizontally* between high and low points. The closer the points are to each other, the steeper the slope. A slope with a grade greater than 5% become difficult for people to use; a 10% grade is extremely difficult for people.
  - **Slide 12** focuses on valley shapes and their formation. The steeper the slope, the more forceful are running water and moving ice. Downcutting exceeds deposition. As slope lessens, running water and moving ice slow down. The valley widens as a faster rate than it deepens. Eventually deposition exceeds downcutting.
  - **Slide 13** illustrates vertical zonation of climate as influenced by changes in elevation. The diagram shows climate zones with associated flora and fauna in Latin America based on elevation. (*You are not responsible for the details shown in the Latin America diagram but review the vertical zonation section of the climate lecture.*)
  - **Slide 14** repeats Slide 8.
  
- **Slide 15: Generalized Landform Profiles.** This illustration is a generalized view of the profiles of the major landform regions: *mountains, plains, hills, plateaus* and *coastlines*. See that plateaus and coastlines each have two major subunits. Note how you can easily apply the 5 physical factors of the landscape analysis to the profiles (**slides 7-8**). Each has advantages and disadvantages for people and when climate is added, have influenced cultural development creating recognizable cultural landscapes. (More of this in Part III.)
  1. **Mountains:** high elevation, steep slopes with great topographic relief; pointed summits, narrow valleys; many climate zones; limited flat land so people concentrate in valleys. Hazards include isolation, severe weather, extreme cold, mass movements and flash floods.
  2. **Plains:** not totally flat, but a rolling surface with minimum relief and gentle slopes, wide valleys with thick soils and shallow rivers and a uniform climate. Hazards include unprotected openness, poor drainage, flooding.
  3. **Hills:** gentle to steep slopes with moderate relief, rounded to flat summits, variety of valley shapes on the wide side depending on the volume of river water; some vertical zonation of climate related to elevation; people concentrate in valleys but utilize the slopes. Hazards include moderate isolation, mass movements, flooding.
  4. **Plateaus:** high elevation areas with flat tops (low relief) and steep sides (high relief); tops have uniform climate conditions while climate zones are found on the sides. **Dissected plateaus (4b)** are cut by deep river valleys (high relief) and are more isolated than **tableland plateaus (4a)** whose tops (low relief) can be more easily used by people but lack river water. Hazards include isolation, mass movements, drought and extreme cold.
  5. **Coastlines:** areas of low elevation (sea level) and low relief where the continent meets the ocean. There are two major subgroups:
    - (5a) The **rocky coastline** with sea cliffs has higher relief, rugged shore with embayments, deep water to the land and a narrow to non-existent coastal plain (e.g., East Coast Maine to Massachusetts; West Coast Washington to Cali-

fornia). This is a difficult landscape for people because of such hazards as the rugged, rocky shore and steep slopes caused by wave erosion that are sometimes shrouded in fog.

**(5b) The sandy coastline** with barrier islands has low relief, a gentle sloping sandy shore, shallow water far from the shoreline and a wide coastal plain (e.g., East Coast from Cape Cod to Florida and Gulf Coast from Florida to Texas). This is a more inviting landscape for people, but hazards such as shallow water, sand bars, tidal marshland, storm surge flooding and fog may pose problems.

*See the **Landforms Characteristic Chart** in the Handouts Section of the Course Home Page for more details (esp. human interaction), and for an easier comparison.*

- **Slide 16: Landforms and Land Use.** Here are the **six human factors** needed to complete a land use analysis.
  - ✓ **1. Here we ask if the landform is a unifier or a barrier** to human interaction; can people move freely in the area and therefore interact and learn from each other.
  - ✓ **2. Does #1 foster assimilation or distinction?** Both have ramifications in cultural development and are studied in Cultural Geography. A unifying landscape, as a plain or the top of a large plateau, allows people to intermingle whereas a mountainous area or high plateau with very steep sides allows for isolation and creates uniqueness (language/religion/customs/political units).
  - ✓ **3. Here we evaluate** the ease of movement and the cost associated with providing for a **transportation and communication** infrastructure. Examples include the left behind areas, as the Tennessee “hillbilly country” of the early 20<sup>th</sup> century, and the cost comparison of building Interstate 64 across mountainous West Virginia as opposed to the much longer segment from Missouri across the Central Lowlands through Kentucky.
  - ✓ **4. Here we address population density.** People will concentrate where it is easier to interact with each other, where there is room to do so, and where an area can provide for their basic needs; this is a focus in Population Geography. Flat land is the easiest to use and with the right climate provides the most food. For example, mountains generally have an overall low population density but have high density in its valleys.
  - ✓ **5. Economic utilization.** It goes hand-in-hand with #3 and #4. Each of the landform regions provide people with the opportunity to use the land and its resources (don’t forget the role of climate as a variable). Whether the land is used to grow plants or to graze animals, whether or not the mineral resources are close to the surface and easy to mine, whether the area is appropriate for recreation (including its scenic value) and the type of recreation (camping, beaches, skiing, hot springs, etc.), all determines the types of industry that may develop and thrive in an area. This links to Economic Geography and Political Geography.
  - ✓ **6. Lastly, we need to look at hazards.** Natural processes can be hazardous to people as can the works of people. Earthquakes, flooding, landslides and other mass movements, volcanic eruptions, coastal storms, heavy rain or snow all can be detrimental to people living on certain landforms. Man-made hazards can include shoreline

alteration, river modification, improper road cuts, subsidence from pumping too much oil or water, draining wetlands, paving large areas, etc. In wartime, valleys and plains have been the routes of invading armies. Nazi Germany's invasion of France did not occur through their shared mountainous border but by way of Belgium and the Netherlands which are located on the flat coastal plain (check a map of Europe).

- **Slides 17-21** show examples of the five major landform regions. Note their different appearances. *Compare the photos to Slide 15.*
- **Slides 22-25: Coasts in Crisis.** This focuses on coastline issues. This is important to New Yorkers who live in a city of islands or near the shoreline.
- **Slide 22: Factors Affecting Coasts.** For a coastal area to maintain its integrity, a number of things have to happen at the same time. Sandy shorelines are more susceptible to change than are rocky shorelines. Geologically speaking sandy islands are temporary features (see inset maps on left and cross-section at bottom).
  - (1) There needs to be a steady supply of sediment which originates from erosion on land but is also redistributed by offshore water currents.
  - (2) Climate stability plays a role because conditions drive weather; severe weather increases erosion on land and churns up the sea creating larger waves and stronger currents.
  - (3) Waves are just one aspect of the natural processes that affect a coastline. Coastal processes also include currents, tides, storm surges and the amount of water discharged by rivers into the sea which includes sediment (see 1 above).
  - (4) Sea level is generally related to global climate change; locally it can be a result of subsidence or a tectonic process. Rise or fall in sea level exposes the shoreline to events that can drastically change its appearance. **(View the 2 min. video)**
  - (5) Human activities affect the shoreline by altering the movement of sediment both from inland sources and redistribution by longshore movements.
- **Slide 23: Coasts in Crisis Diagram.** This diagram shows the interrelationship between environmental processes and human activities described in Slide 22. **Note all the double-headed arrows except for climate, which is a one-way street.**
- **Slide 24: Mississippi Delta Islands.** This slide illustrates changes to islands off the Mississippi Delta in Louisiana after a major hurricane. This area is to the east of the map in Slide 22.
- **Slide 25: Long Shore Currents.** Review the longshore current diagram from the last lecture to refresh your memory of how coastal sediment is rearranged by water.
- **Slide 26: Next: The Biosphere and Earth Resources.**