

MIDTERM EXAM

FRIDAY, MARCH 16, 2018
SEE STUDY GUIDE

Part 1: Take-home portion (county comparative geography) is due no later than March 16.

Part 2: In-class portion deals with mapped information and essay topics from a choice.

1

10: Nature of New York's Water Resources

The Coastal Zone

Prof. Anthony Grande
Geography Dept.
Hunter College-CUNY

Spring 2018


Lecture design, content and presentation ©AFG 0318. Individual images and illustrations may be subject to prior copyright.

2

NYS Coastal Waters

❖ **NYS is the only state to border the Atlantic Ocean and the Great Lakes (Lakes Erie and Ontario).**

- Great Lakes shoreline: 577 linear miles
- Atlantic shoreline: 118 linear miles



Most of western NYS is part of the Great Lakes watershed.

3

NYS Coastal Waters

❖ **Long Island Sound and the lower Hudson River are estuaries** (arms of the ocean).

- The Hudson River is **tidal** to Albany.
- The lower Hudson River occupies a **fjord**.
(fjord = a glacier-deepened valley flooded by the ocean)

➤ **About 90% of the population of NYS lives within a short distance of the coastline.**

➤ **Both the DEC and DOS's Office of Planning and Development monitor use of the coastal zone.**

➤ **Interstate and international rules govern the use and water quality of the Great Lakes.**


- International Joint Commission on Shared Waters: <http://www.ijc.org/en/>
- Great Lakes Commission: <https://www.glc.org/>

<https://www.dec.ny.gov/lands/25562.html> DEC Great Lakes section

<https://www.dos.ny.gov/opd/> DOS Office of Planning & Development home page with links to coastal areas.

4

Coastal Zone Water Quality Issues



Water Quality Assessment of New York State 2016

Water Quality Assessment Categories

- Good
- Fair
- Not Known Impact
- Poor
- Unassessed

- Disposal of waste water and thermal water
- Preservation of wetlands
- Global warming-related issues
- Shoreline erosion control, including ice damage
- Flood control, esp. storm surge
- Fisheries
- Recreational use
- Commercial use
- Imposition of rules and regulations (cost/inconvenience)

Reminder:

✓ Land use and water quality within watersheds affect coastal areas.

5

Coastal Zone Management

❖ **NYS Coastal Zone Management Program** was developed to ensure people's appropriate use and protection of the state's coast and inland waterways.

Program includes:


- Fresh and salt water wetlands
- Fresh and salt water beach environments
- Salt water tidal ecological zones

- **NYS Office of Planning and Development** (470 page report) https://www.dos.ny.gov/opd/programs/pdfs/NY_CMP.pdf
- **"Making the Most of Your Waterfront"** (83 page booklet): http://www.dos.ny.gov/opd/programs/pdfs/ILWRP_guidebook.pdf
- **Great Lakes Environmental Assessment and Mapping (GLEAM) Project** <http://www.greatlakesmapping.org/home>

6

NYS Coastal Areas

The DOS divides NYS into 4 coastal areas:



1. Hudson River
2. New York City
3. Long Island
4. Great Lakes (including the St. Lawrence River)

7

NYS Coastal Policies

The DOS then divides the waterfront into **four groups** in its management of the coastal zone.

1. **Natural Waterfront**
2. **Working Waterfront**
3. **Developed Waterfront**
4. **Public Waterfront**

“The articulation of coastal policies are used to create and maintain clean, accessible and prosperous areas for present and future generations.”

8

Natural Waterfront

Areas where the shoreline has not be hardened (i.e., built up).



- Has a rich diversity of resources that support economic productivity.
- Areas that are a source of scenic beauty.
- Areas that provide recreational enjoyment.




Working Waterfront

Ports and harbors that have water-dependent uses.

- Areas that support businesses which require a water location to function (includes tourism) or harvest living or mineral resources from these waters.
- Agricultural uses that are influenced by the beneficial effects of a water body on climate.




Developed Waterfront

Areas with an altered coastline.

There are man-made structures present and the area has a history of waterfront use.

These include:

- industrial areas
- commercial areas
- recreational areas
- traditional harbors
- residential areas

11

Public Waterfront

Areas that offer a significant recreational resource.

These include:

- parks
- beaches
- historic sites
- any public access point





12

Great Lakes - St. Lawrence Watershed

New York State
Great Lakes Basin

<https://www.dec.ny.gov/lands/25562.html>: DEC Great Lakes section

13

DEC's Areas of Concern: Great Lakes Coastal Zone

<http://www.dec.ny.gov/lands/91213.html> for 2012 report.

14

Hudson Basin and Estuary

The area from Albany to NYC is a tidal estuary.

https://www.dec.ny.gov/docs/remediation_hudson_pdf/hre_p2017report.pdf

<https://www.dec.ny.gov/lands/25606.html> Interactive Tour of Hudson

<https://www.dec.ny.gov/lands/4920.html> Hudson Estuary section

15

The Long Island Coastline

NORTH SHORE	SOUTH SHORE
<ol style="list-style-type: none"> 1. Rocky shoreline 2. Steep slopes; many embayments. 3. Water quality issues with Long Island Sound, and the numerous bays. 4. Endangered by sea level rise. 	<ol style="list-style-type: none"> 1. Sandy shoreline. 2. Gentle slope; barrier islands. 3. Water quality issues with Great South Bay and Jamaica Bay. 4. Endangered by pounding waves, storm surges and sea level rise.

16

Long Island Sound

Remember how LIS was formed?

Long Island Sound Study: <http://longislandsoundstudy.net>
 Living Treasures: Plants and Animals of LIS PDF - 123 pages
http://longislandsoundstudy.net/wp-content/uploads/2010/05/LivingTreasuresBlue_Full_Lores.pdf

17

Geography of LIS

- Its an estuary- 2nd largest on East Coast after Chesapeake Bay
- It was a river valley in pre-glacial times (sea level was lower).
- Meltwater filled the area behind the Harbor Hill moraine and created a freshwater lake as the glaciers retreated.
- After the lake drained away, ocean water flooded the area from the east as sea level rose.

- Today LIS stretches from **The Battery** (Manhattan) to **The Race** (islands between NY and RI).
- **The East River is a strait.** It did not exist as an outlet until the rising sea flowed over the western divide to connect LIS with NY Bay.

The Battery and East River

18

Geography of LIS

- It has 600 miles of coastline.
- There is no major river to flush it out.
- There is limited exchange of sea water at its the eastern end.
- Its eastern basin is saltier than its western basin.
- It is shallow (65-120 ft).

Place the Statue of Liberty on the floor of LIS and it would make a very good lighthouse.

19

LIS Watershed

- **Three states** (NY, CT, and RI) and **Quebec Province** are part of it.
- **20 million people** live in and around it.

1. Connecticut River
2. Housatonic River
3. Thames River

20

Problems

- **Shallow water with limited tidal and freshwater flushing.**
- Within one of the **most densely populated urban-industrialized areas** of the country.
- **Tidal wetlands have been lost to development** (filled in).

- **Has hypoxia** (low dissolved oxygen level from sewage and agricultural activities containing nitrogen).
- **Habitat degradation from pollution.**
- **Contaminated with toxic chemicals** (in bottom sediment) and **pathogens** (bacteria and viruses) in water.
- There is **floatable debris**.

This requires an interstate solution and cooperation.

21

Risk Assessment Interactive Map

NY Preliminary Coastal Inundation Risk Assessment

Hurricane Sandy Storm Surge Zone

<http://www.arcgis.com/home/webmap/viewer.html?webmap=82a2fa929168434dabb6a3970e1d38e0>

22

NYC Metro Area Coastal Zone

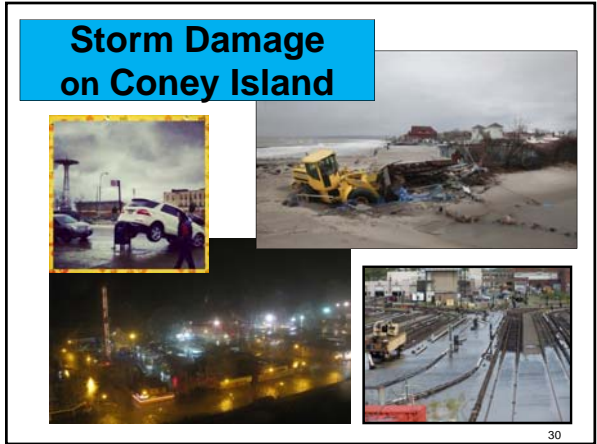
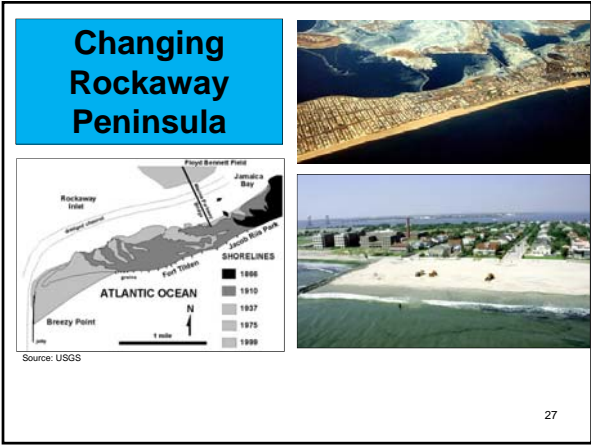
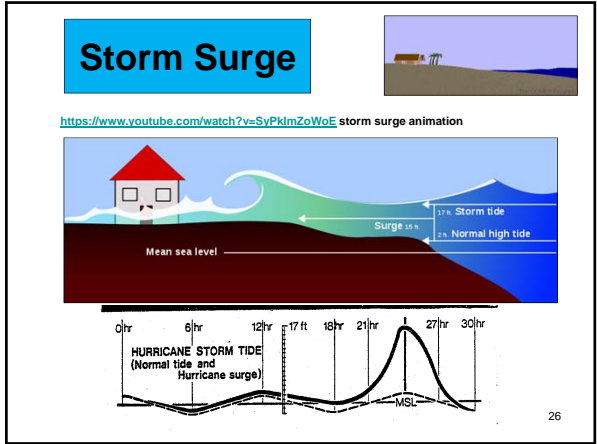
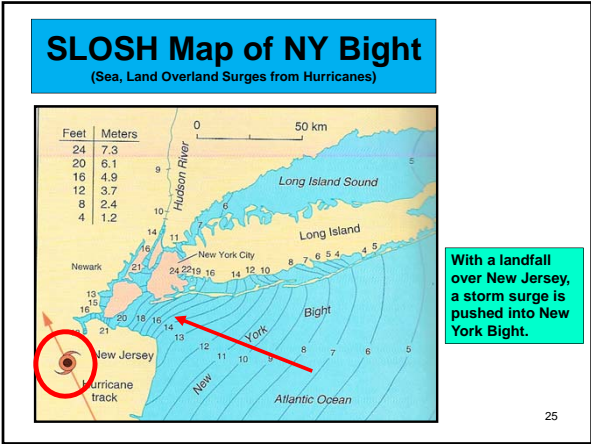
Staten Is Coney Is Rockaway Pen Long Beach Is Fire Island

23

Flooded Areas of NYC

Interactive flood map from NY Times (Nov. 21, 2012).
<http://www.nytimes.com/newsgraphics/2012/1120-sandy/survey-of-the-flooding-in-new-york-after-the-hurricane.html?hp&hp>

24





32

Dealing with Similar Storms

**Should people be allowed to rebuild?
Should electrical equipment be moved?
Should building codes be changed?
Should tunnels be able to be sealed?
Should power lines be buried?**

IMPACT OF A STORM				
Should people be allowed to rebuild?				
Should electrical equipment be moved?				
Should building codes be changed?				
Should tunnels be able to be sealed?				
Should power lines be buried?				
Ready for Another One?				
New Jersey and Long Island Sound: Should people be allowed to rebuild? Should electrical equipment be moved? Should building codes be changed? Should tunnels be able to be sealed? Should power lines be buried?	North, Middlesex, and Westchester Counties, N.Y.: Should people be allowed to rebuild? Should electrical equipment be moved? Should building codes be changed? Should tunnels be able to be sealed? Should power lines be buried?	Lower Manhattan: Should people be allowed to rebuild? Should electrical equipment be moved? Should building codes be changed? Should tunnels be able to be sealed? Should power lines be buried?	Subway, Commuter Railways, and Road Tunnels: Should people be allowed to rebuild? Should electrical equipment be moved? Should building codes be changed? Should tunnels be able to be sealed? Should power lines be buried?	Westchester County, N.Y.: Should people be allowed to rebuild? Should electrical equipment be moved? Should building codes be changed? Should tunnels be able to be sealed? Should power lines be buried?

33

MIDTERM EXAM

FRIDAY, MARCH 16, 2018
SEE STUDY GUIDE

Part 1: Take-home portion (county comparative geography) is due no later than March 16.

Part 2: In-class portion deals with mapped information and essay topics from a choice.

34