Addressing Climate Vulnerability in the NY-NJ Harbor Estuary

Robert Pirani
NY-NJ Harbor & Estuary Program
Hudson River Foundation
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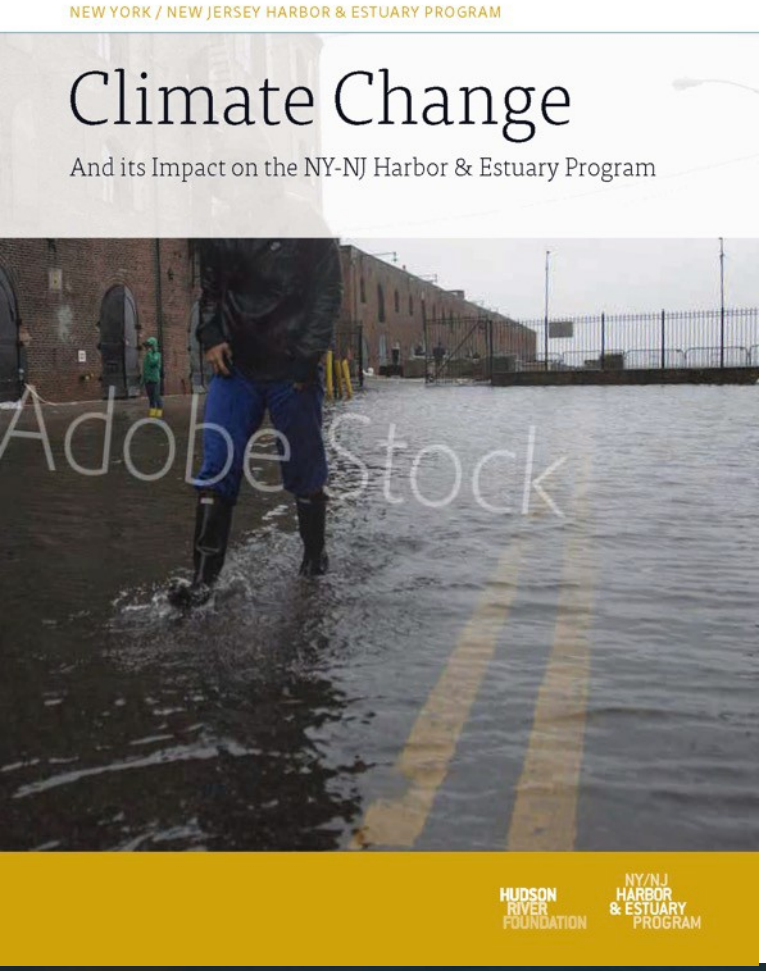
NY-NJ HEP CLIMATE VULNERABILITY ASSESSMENT



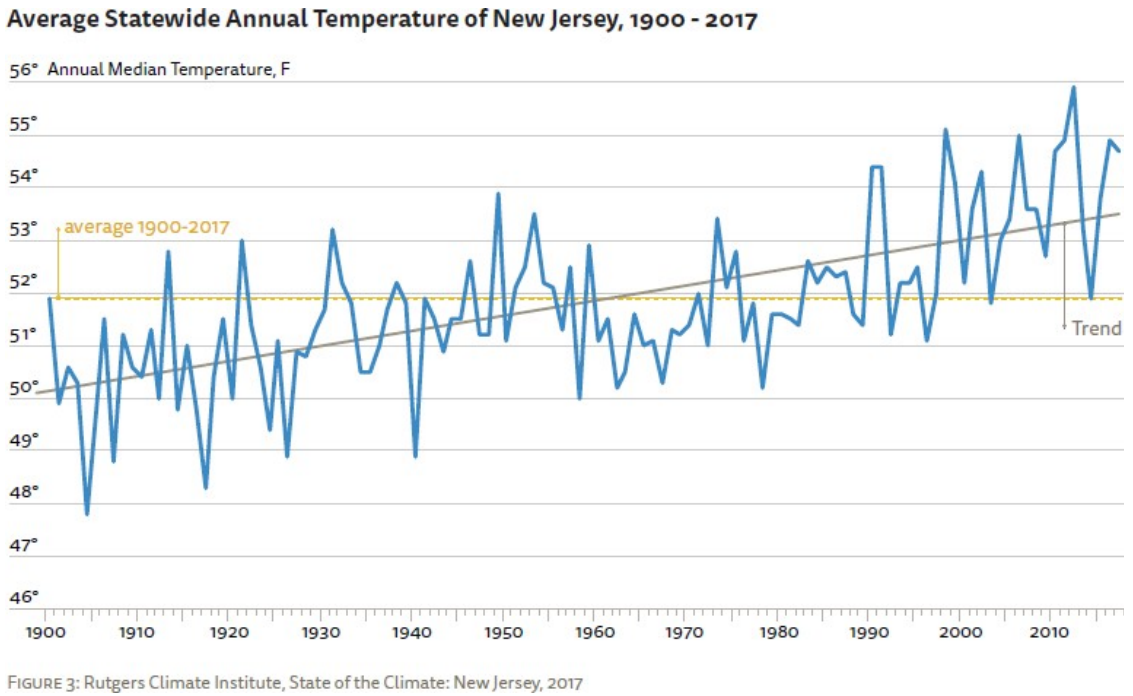


FIGURE 3: Rutgers Climate Institute, State of the Climate: New Jersey, 2017

Three Key Risks

- **Maladaptive human responses to climate change can impair water quality, damage habitat, and reduce public access**
- Sea level rise will reduce wetland and other coastal habitat
- Increases in temperature may exacerbate dissolved oxygen problems (and otherwise impact estuarine ecology)

MEASURING SUCCESS: MONITORING NATURAL & NATURE-BASED SHORELINES IN NEW YORK STATE

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SCAPE

NEW YORK STATE OF OPPORTUNITY. Department of Environmental Conservation

NYC Parks

cbi Consensus Building Institute

New York - New Jersey Harbor & Estuary Program www.harborestuary.org

Brooklyn College The City University of New York

Sea Grant New York

ARCADIS

New York State Water Resources Institute Cornell University

Photos: NYC Parks and NYS DEC


beach dune
rip-rap sill shoreline
bio enhanced concrete unit
bulkhead
salt marsh/emergent wetland
constructed dune
reef balls
revetment
shellbag: bed/reef
living shoreline
bio enhanced concrete units
groin/jetty
Natural Features
Nature-Based Features
Ecologically-Enhanced Hard Structural Features
Hard Structural Features

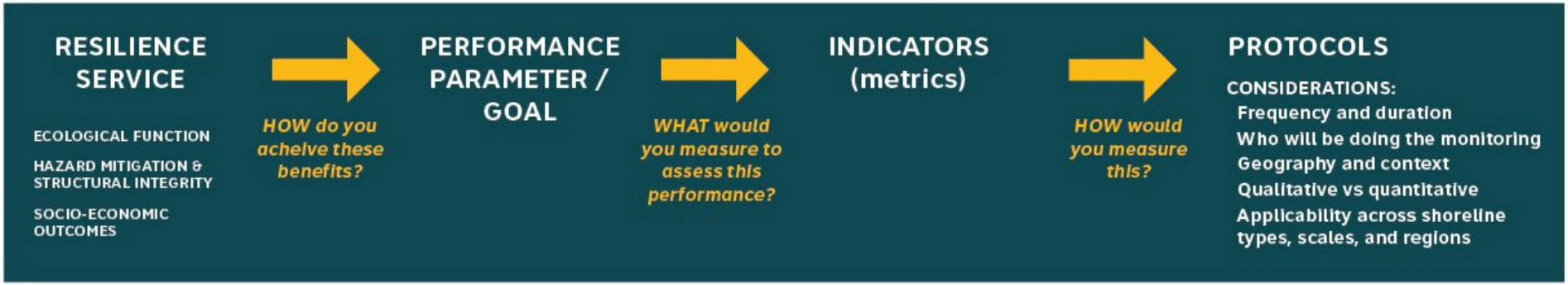
Project Objectives

A. Identify key performance and resiliency benefits of NNBFs through a stakeholder-driven process.

B. Develop standardized protocols to generate better comparative data across the diverse shorelines of New York State.

C. Help decision makers determine whether benefits are realized at shoreline sites.

The Monitoring Framework

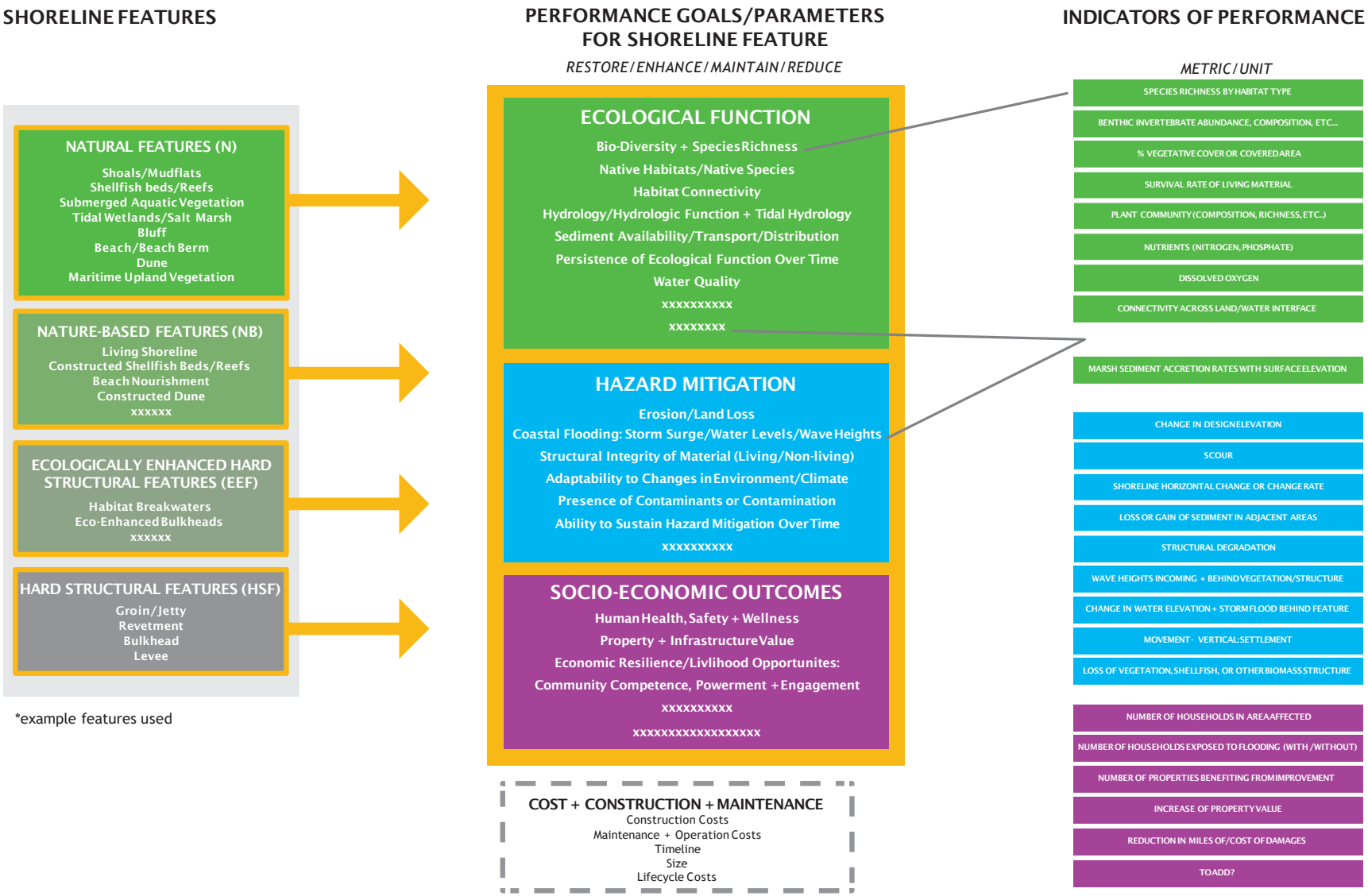


How do you achieve these benefits?

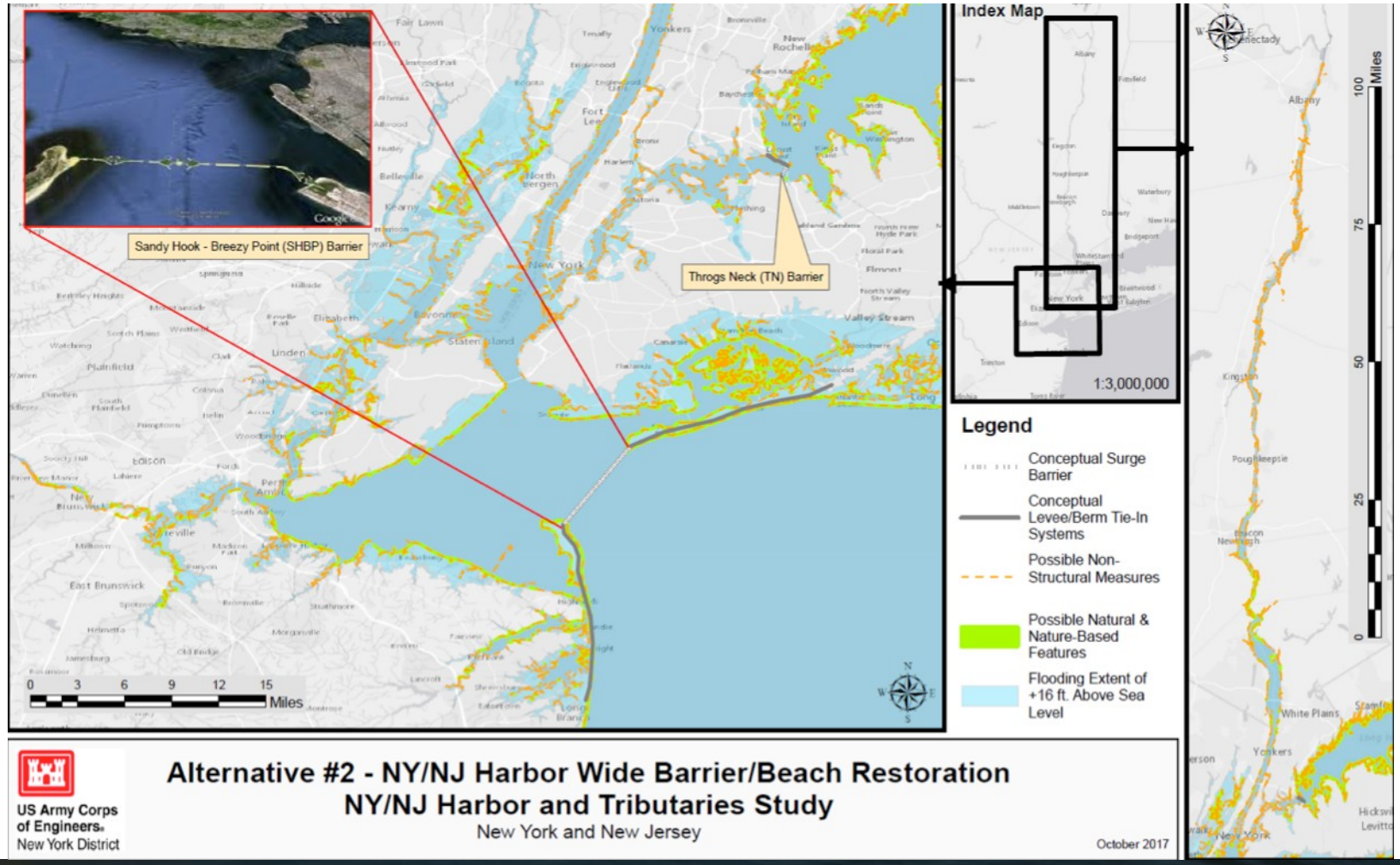
What would you measure / observe to assess this performance?

How would you go about measuring / observing / documenting this?

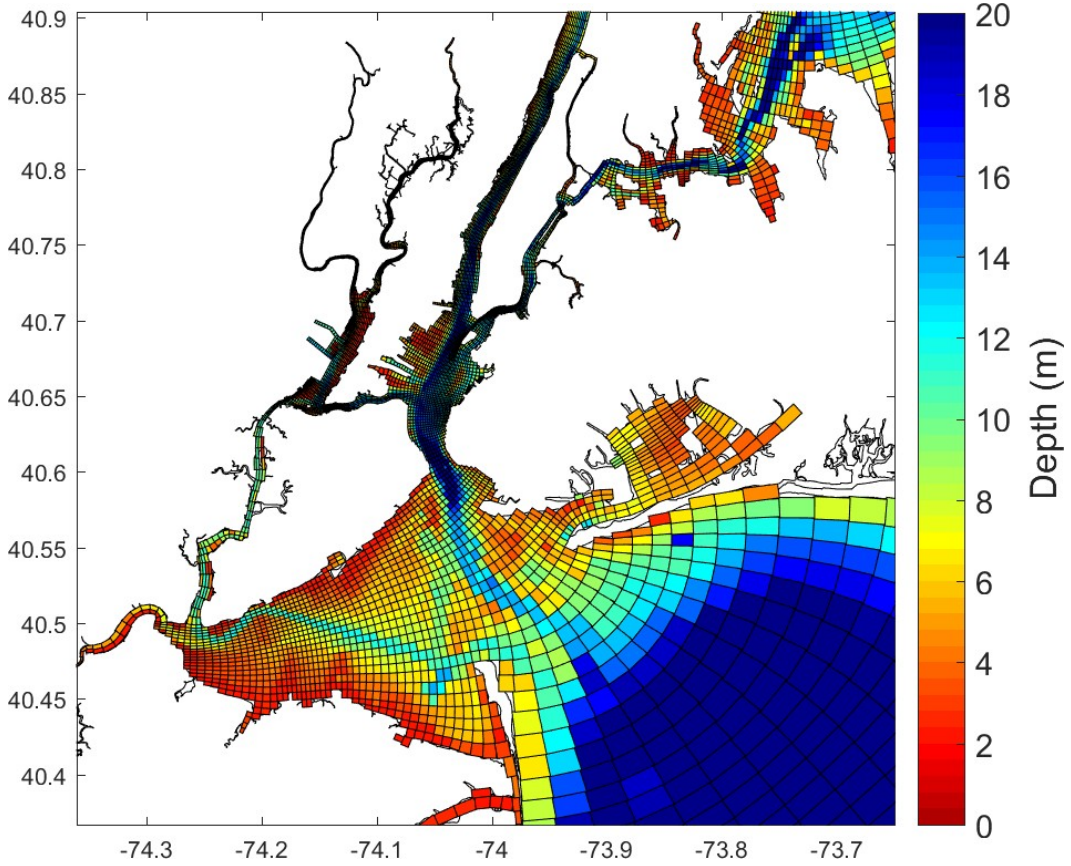
GOALS + METRICS



Preliminary Evaluation of Physical Influences of Storm Surge Barriers on the Hudson – Raritan Estuary



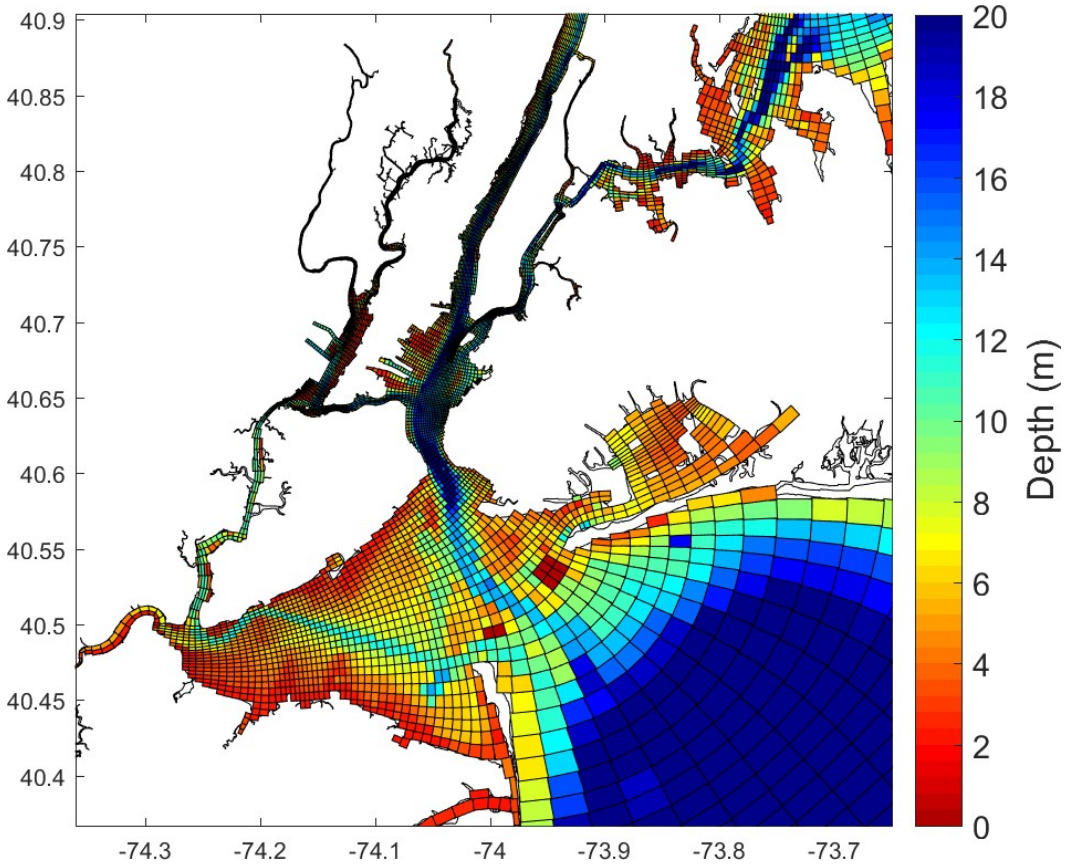
Control Grid



NYHOPS model grid/ domain

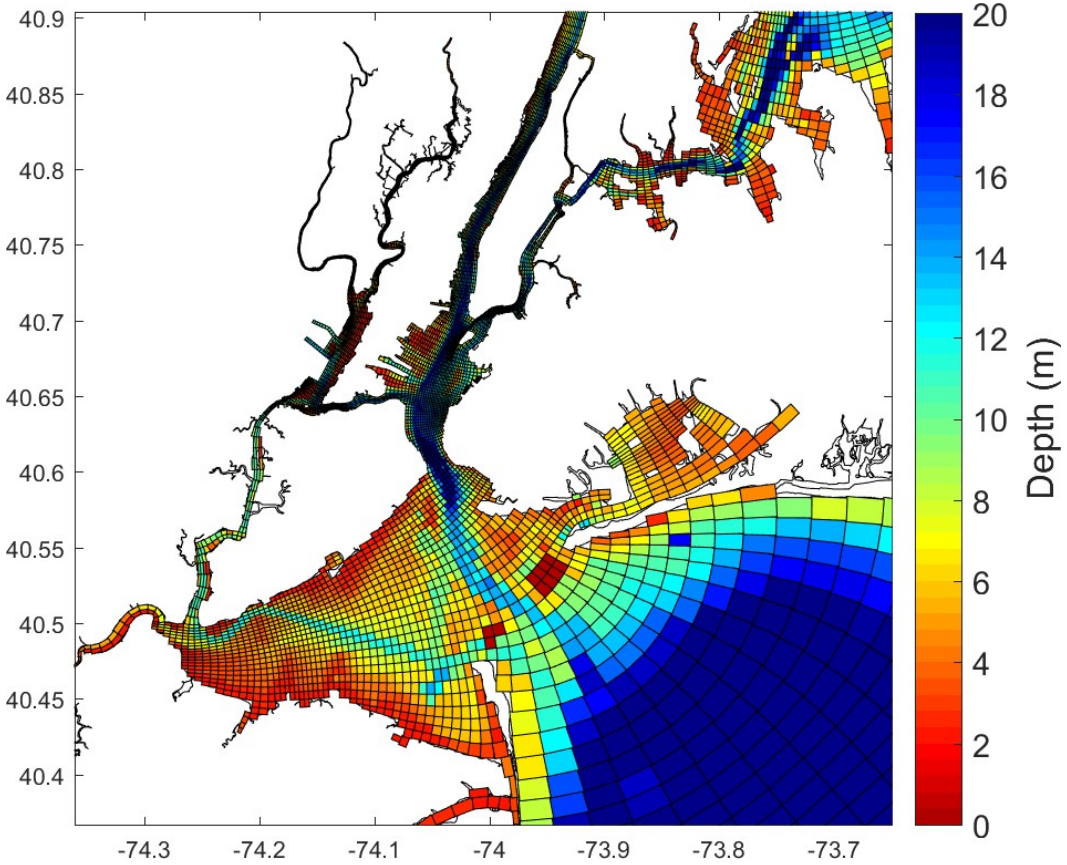
Total cross-sectional area at inlet between Rockaways and Sandy Hook in NYHOPS is 80000 m^2.

sECOM Case A: Porosity 80%

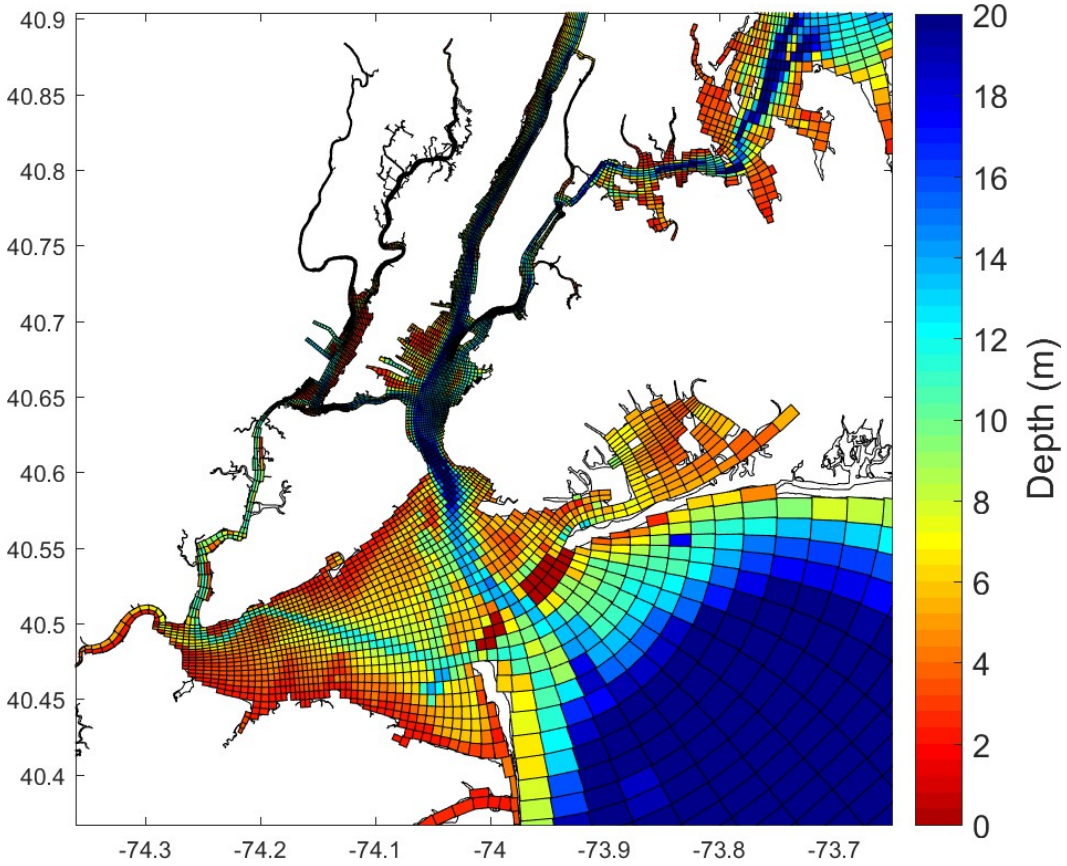


10m high blockages to cells in ungated, closed areas of barrier.

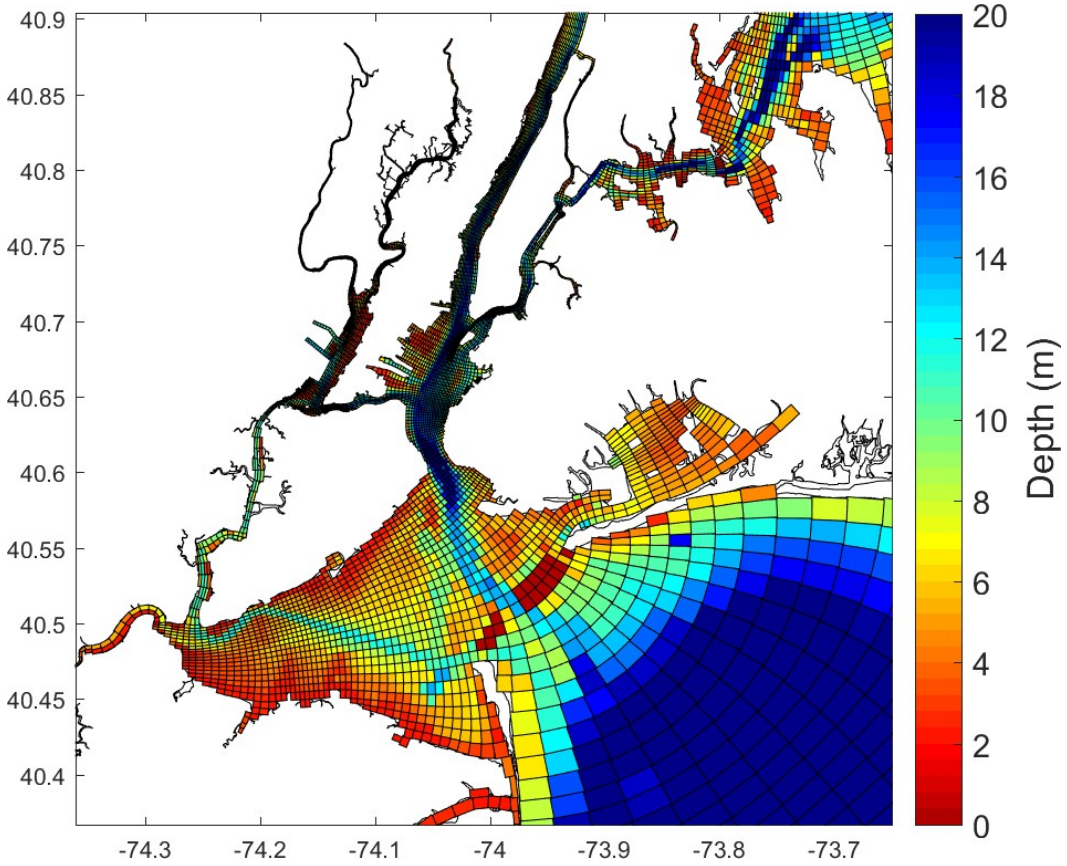
sECOM Case B: Porosity 62%



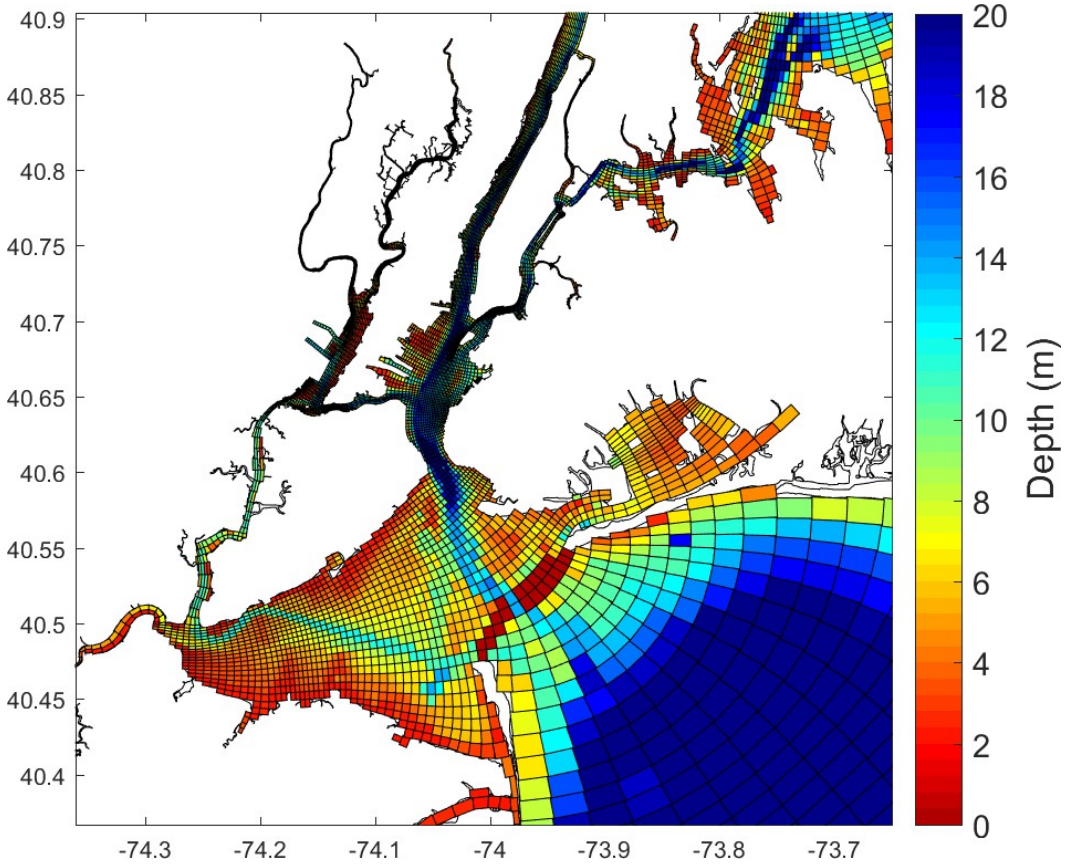
sECOM Case C: Porosity 44%



sECOM Case D: Porosity 34%



sECOM Case E: Porosity 15%



Conclusions and Future Study

- Lower porosity leads to:
  - Greater stratification and salt intrusion, likely due to weaker currents and mixing
  - Stratification increases – most prominent on spring tides
  - Salt intrusion variability is reduced
- A baseline for more in-depth physical studies or for interdisciplinary studies
  - Hudson River Fund Call for Proposals
  - **Oct 12 Seminar:** *Preliminary Evaluation of the Physical Influences of Storm Surge Barriers on the Hudson River Estuary - Philip M. Orton and David K. Ralston*

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