

Created for:

A DAY IN THE LIFE OF THE  
HUDSON RIVER

An Educational Program of the  
Hudson River Estuary Program  
of the NYS DEC

in collaboration with Lamont-  
Doherty Earth Observatory

Stuyvesant

Frank Nitsche, Lamont-Doherty Earth  
Observatory of Columbia University

# Hudson River Benthic Mapping Project

---

- o Mapping Benthic Habitats
- o Identifying Sites of Sediment Deposition and Erosion
- o Understanding changes and related processes

## Collaboration:

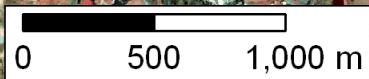
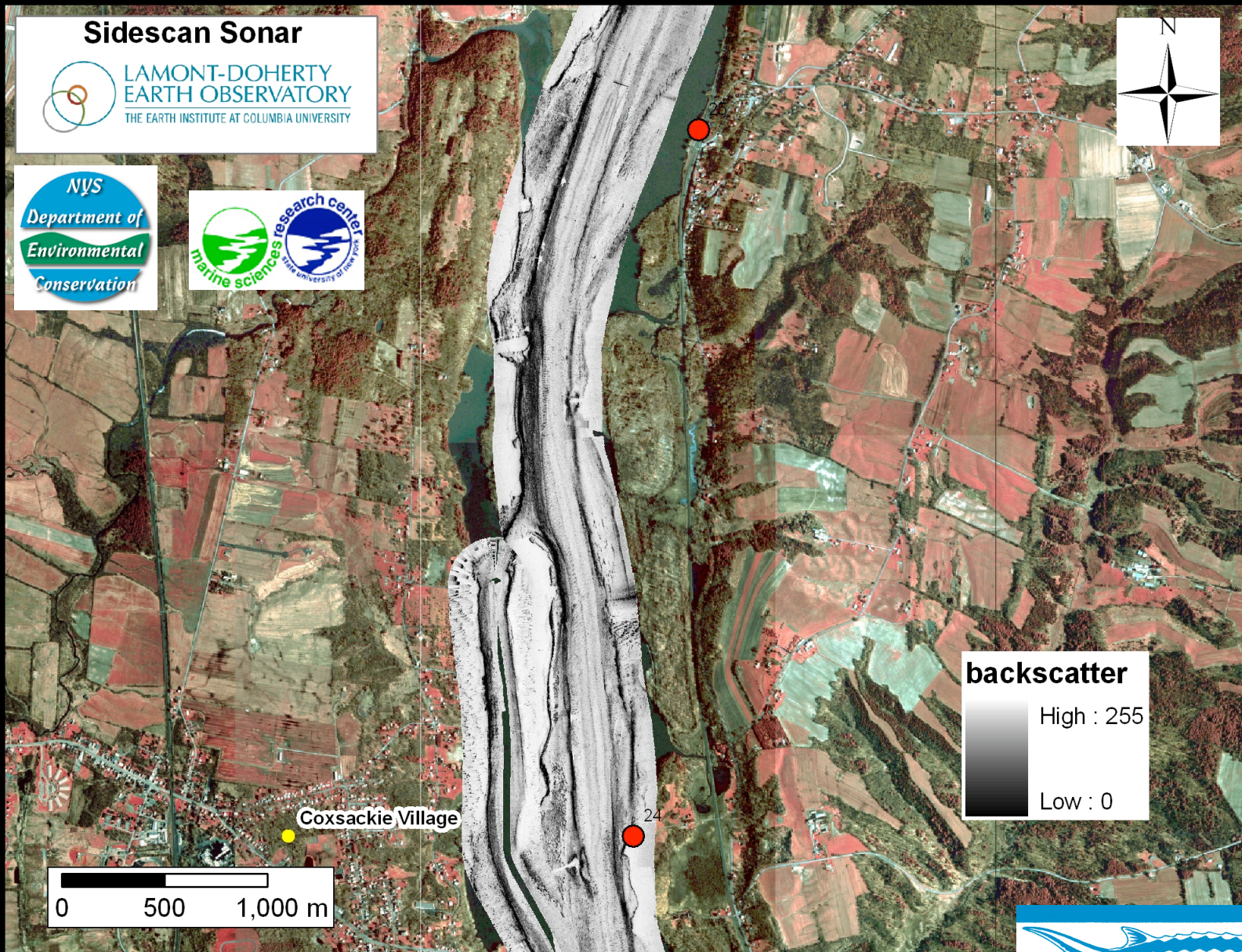
- Lamont-Doherty Earth Observatory
- State Univ. of New York - Stony Brooks
- Institute of Ecosystem Studies
- New York State Department of Environmental Conservation



# Sidescan Sonar

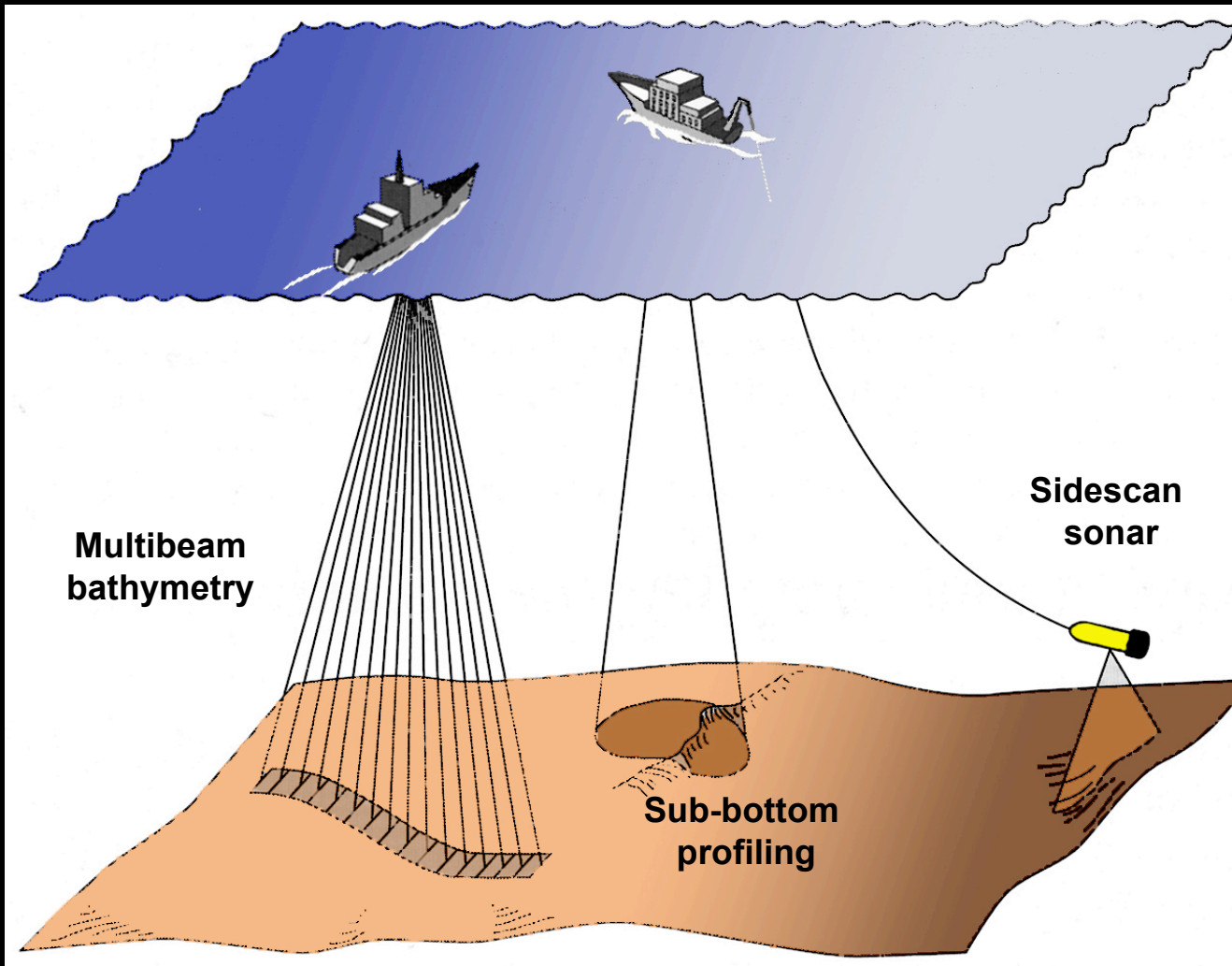


LAMONT-DOHERTY  
EARTH OBSERVATORY  
THE EARTH INSTITUTE AT COLUMBIA UNIVERSITY

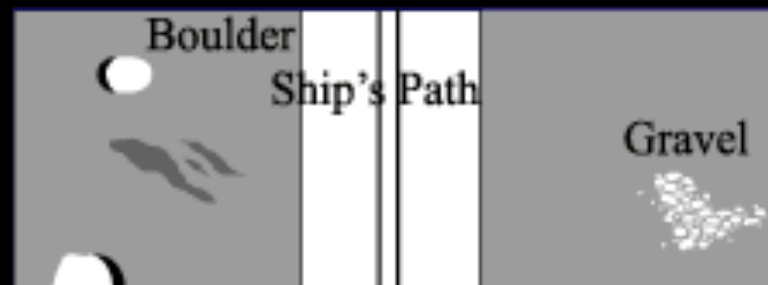
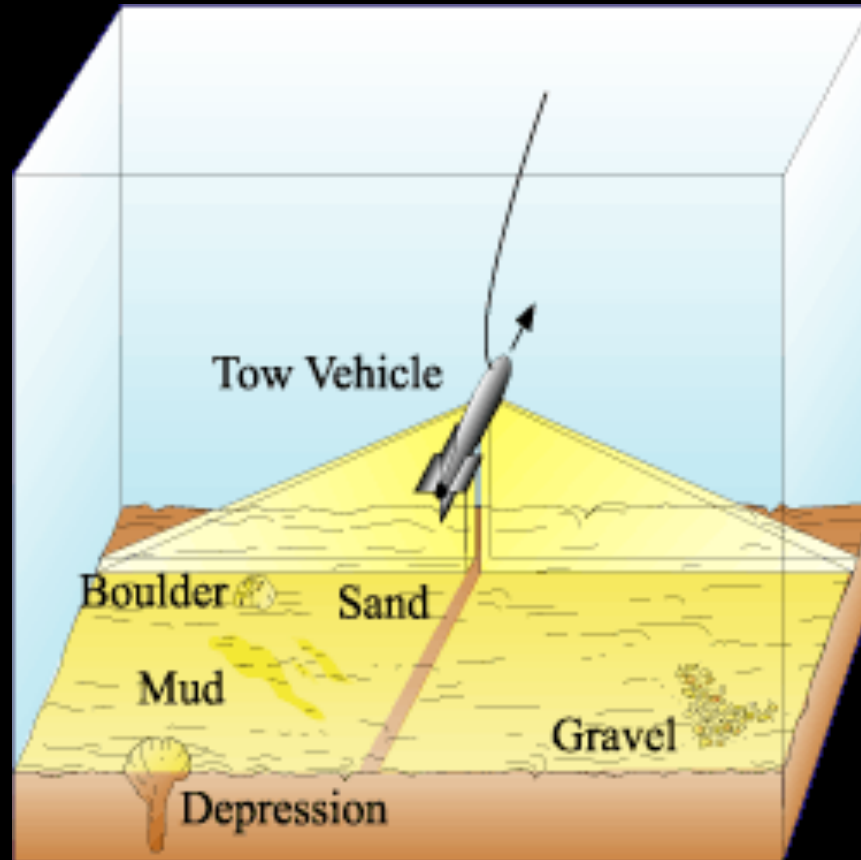


# Acoustic Surveying

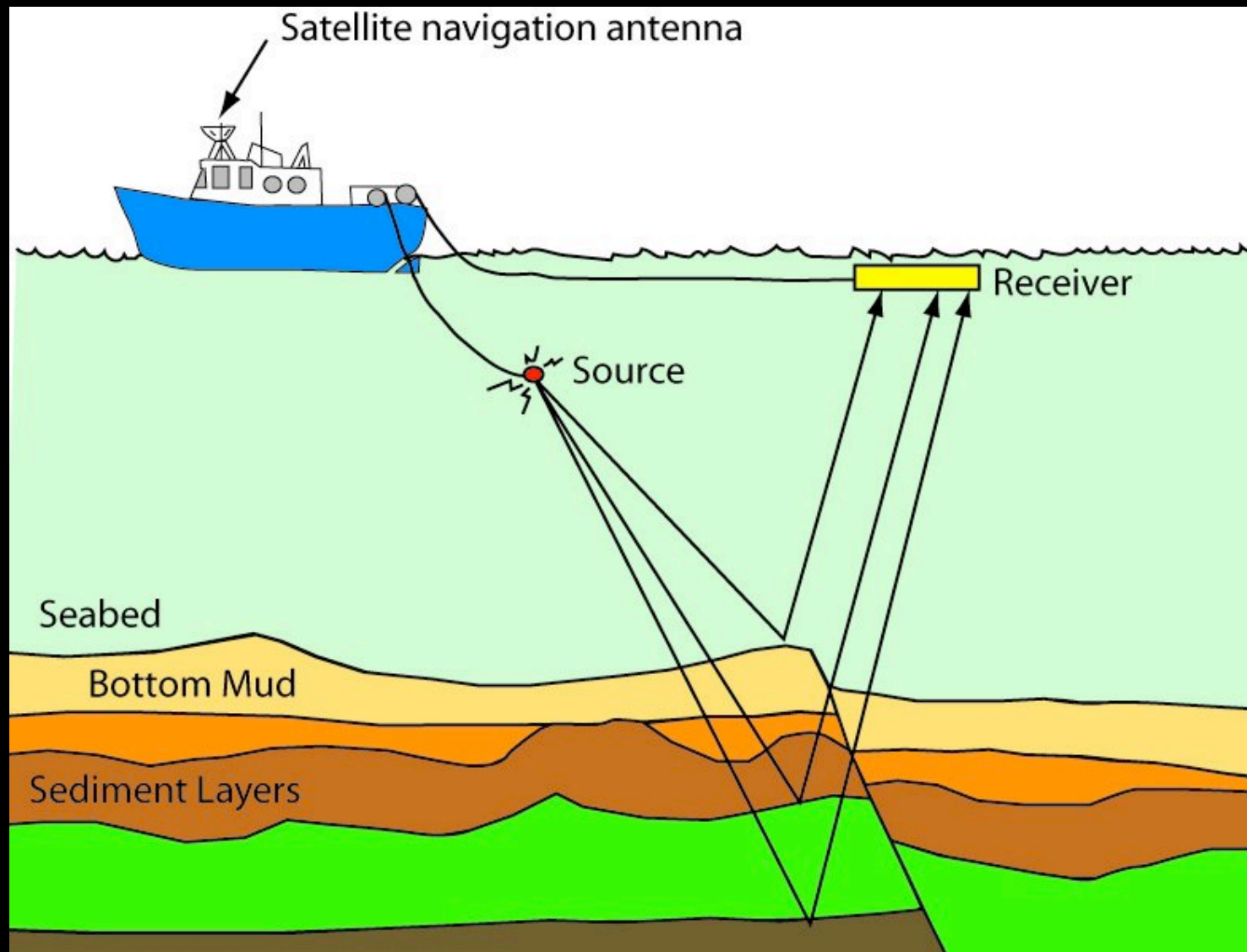
---



# Sidescan Sonar

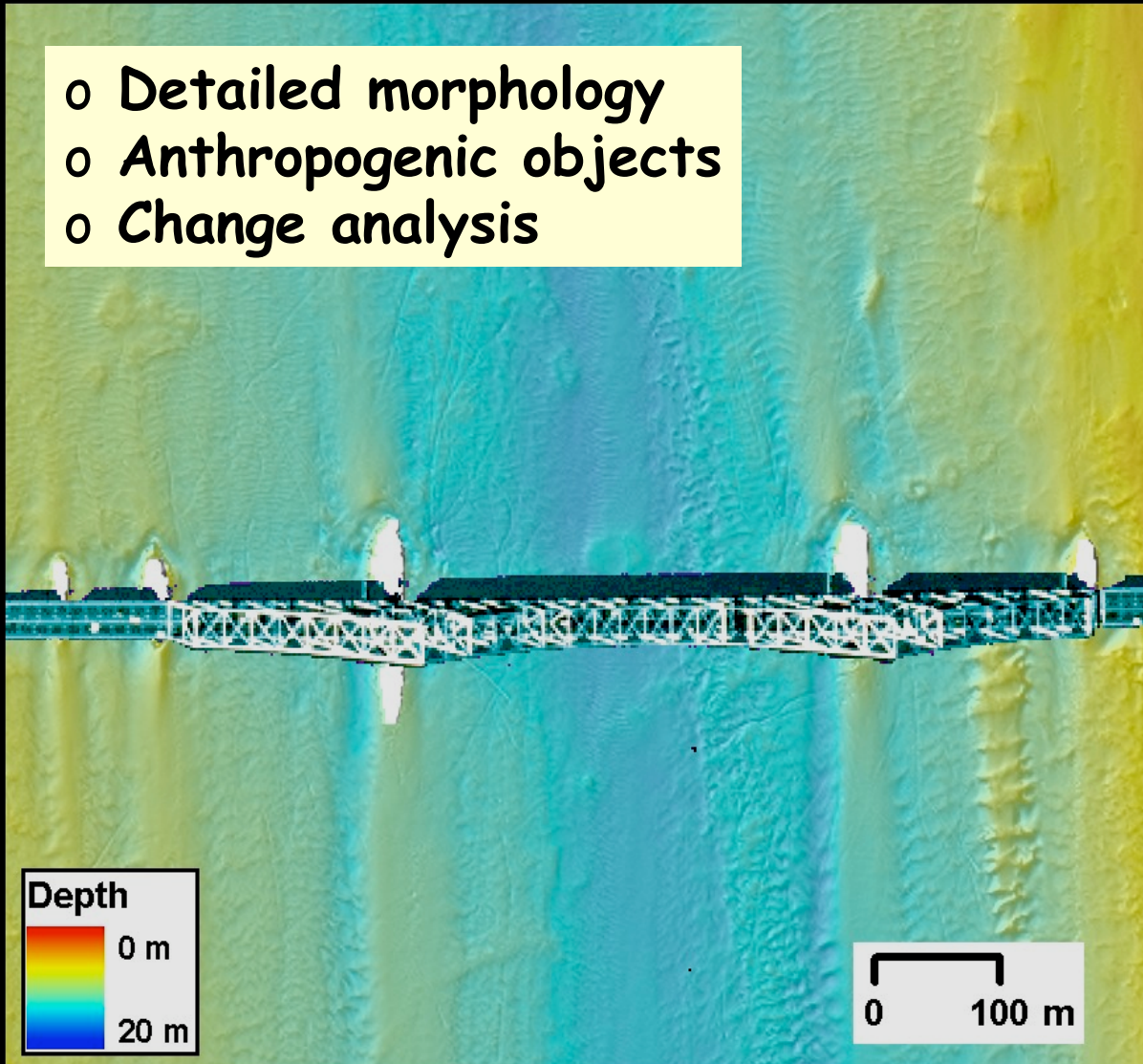


# Sub-Bottom Profiling



# Multibeam Bathymetry: Details

- o Detailed morphology
- o Anthropogenic objects
- o Change analysis



Tappan Zee Bridge



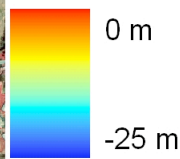
# Bathymetry



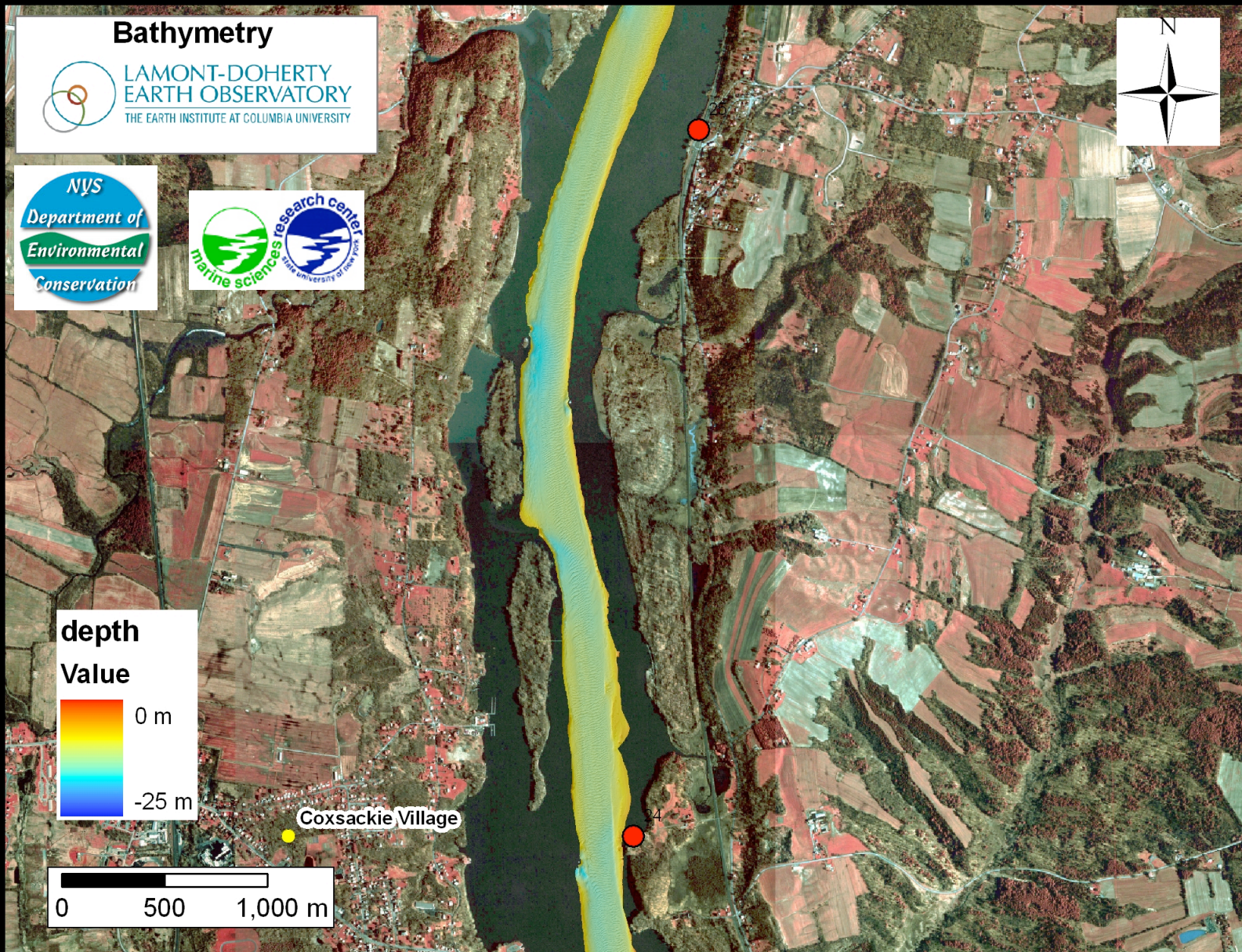
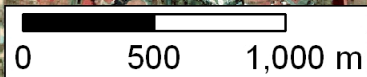
LAMONT-DOHERTY  
EARTH OBSERVATORY  
THE EARTH INSTITUTE AT COLUMBIA UNIVERSITY



depth  
Value

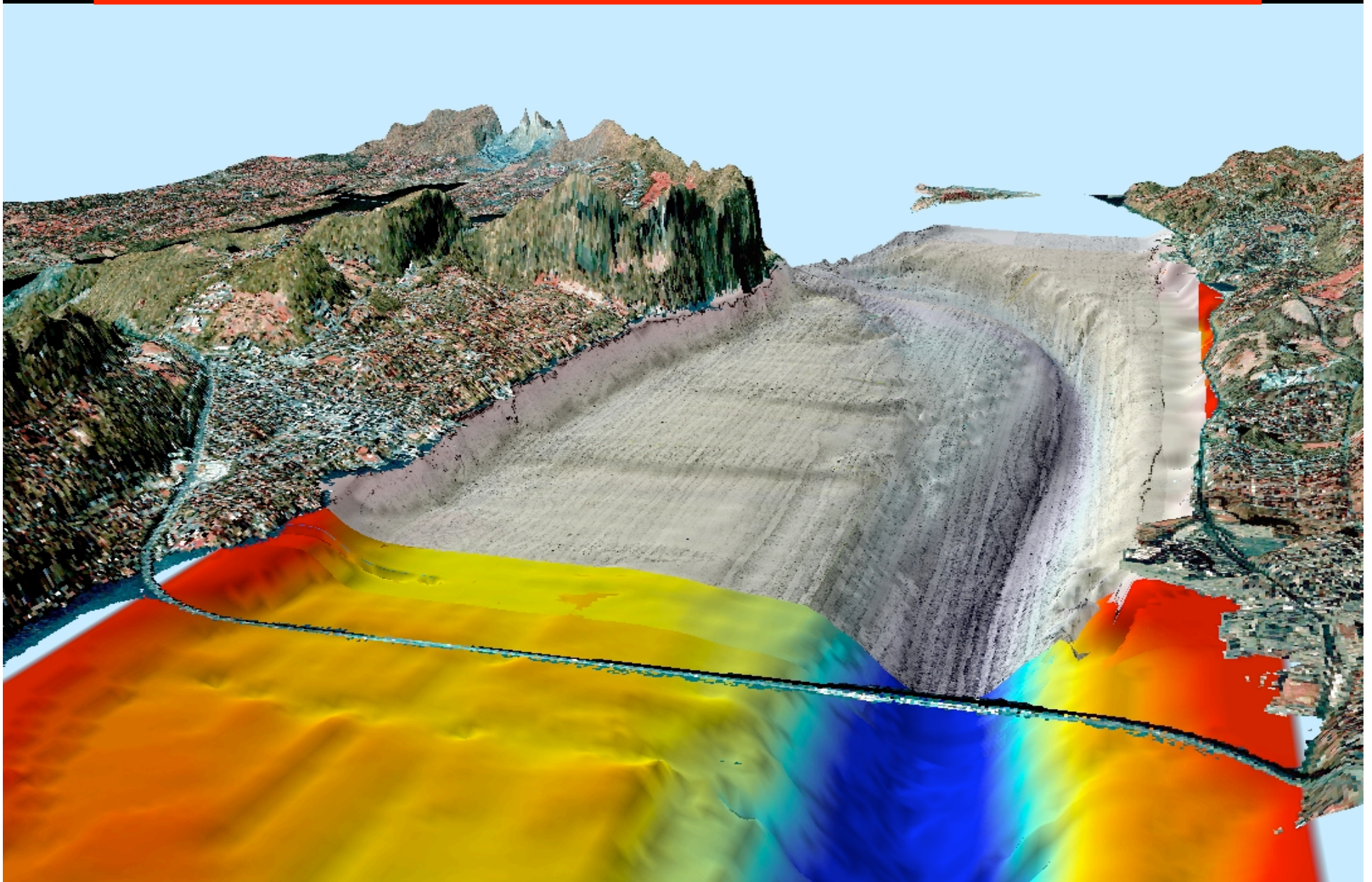


Coxsackie Village





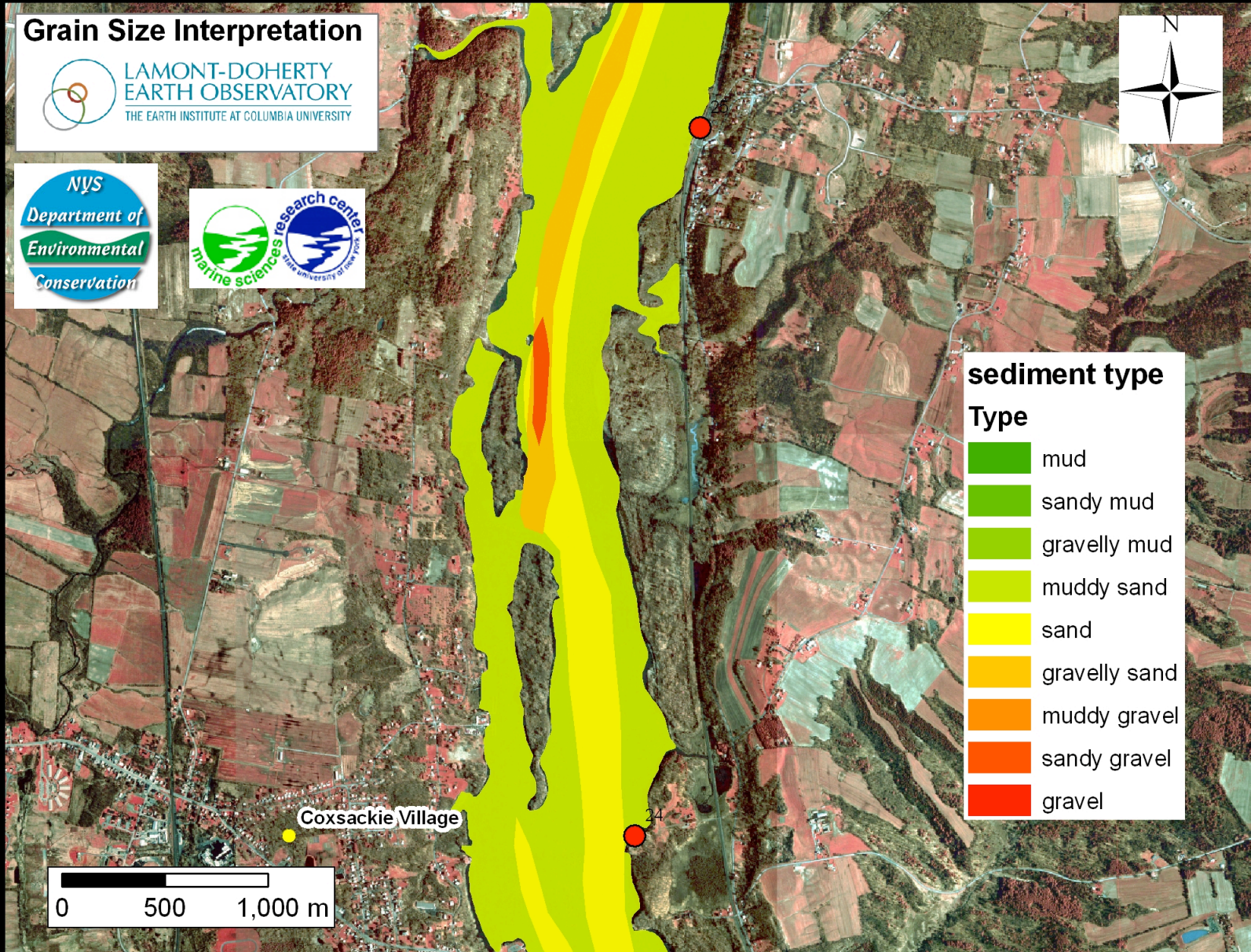
# 3D-Visualisation



# Grain Size Interpretation



LAMONT-DOHERTY  
EARTH OBSERVATORY  
THE EARTH INSTITUTE AT COLUMBIA UNIVERSITY



## sediment type

### Type

-  mud
-  sandy mud
-  gravelly mud
-  muddy sand
-  sand
-  gravelly sand
-  muddy gravel
-  sandy gravel
-  gravel

0 500 1,000 m

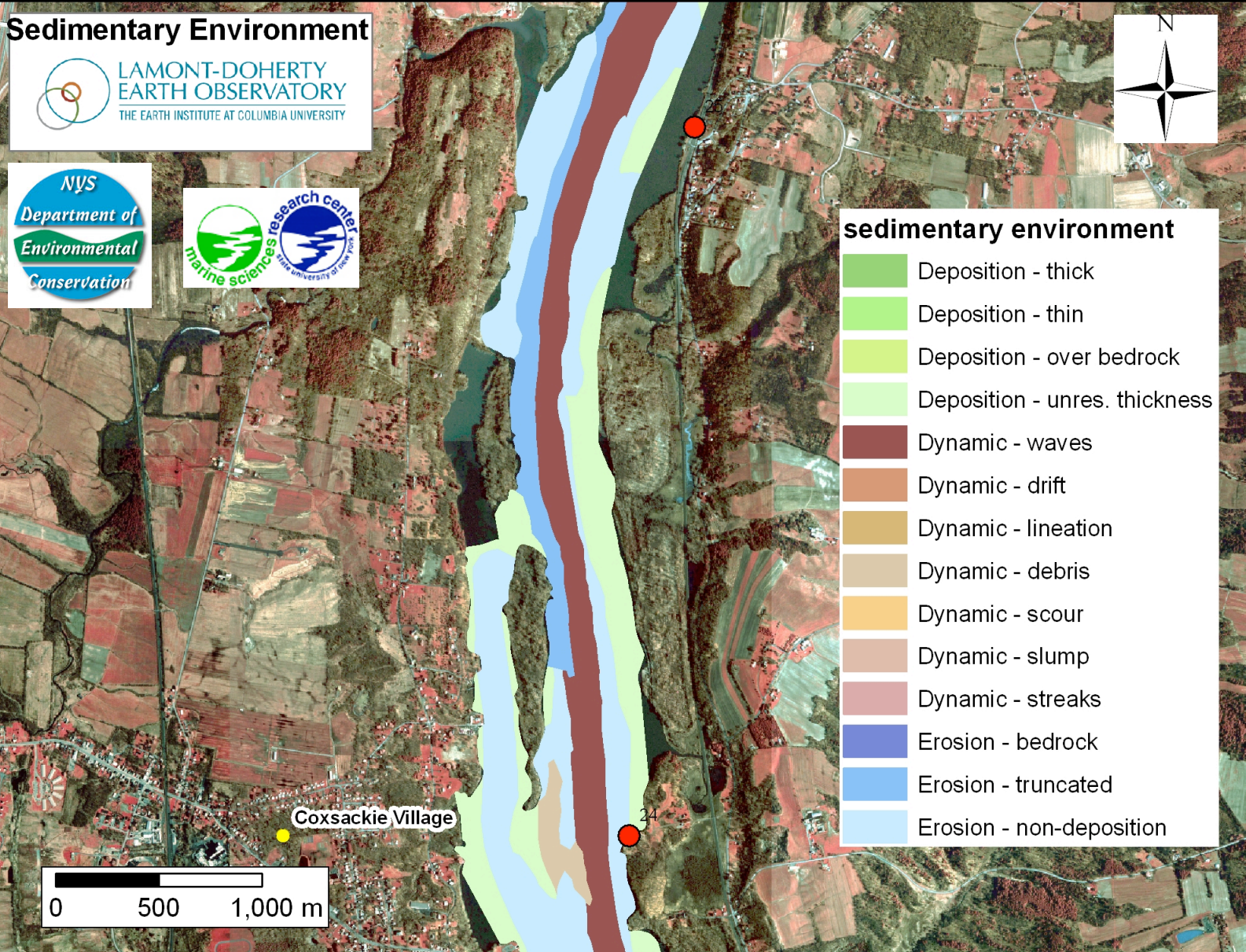
Coxsackie Village

24

# Sedimentary Environment



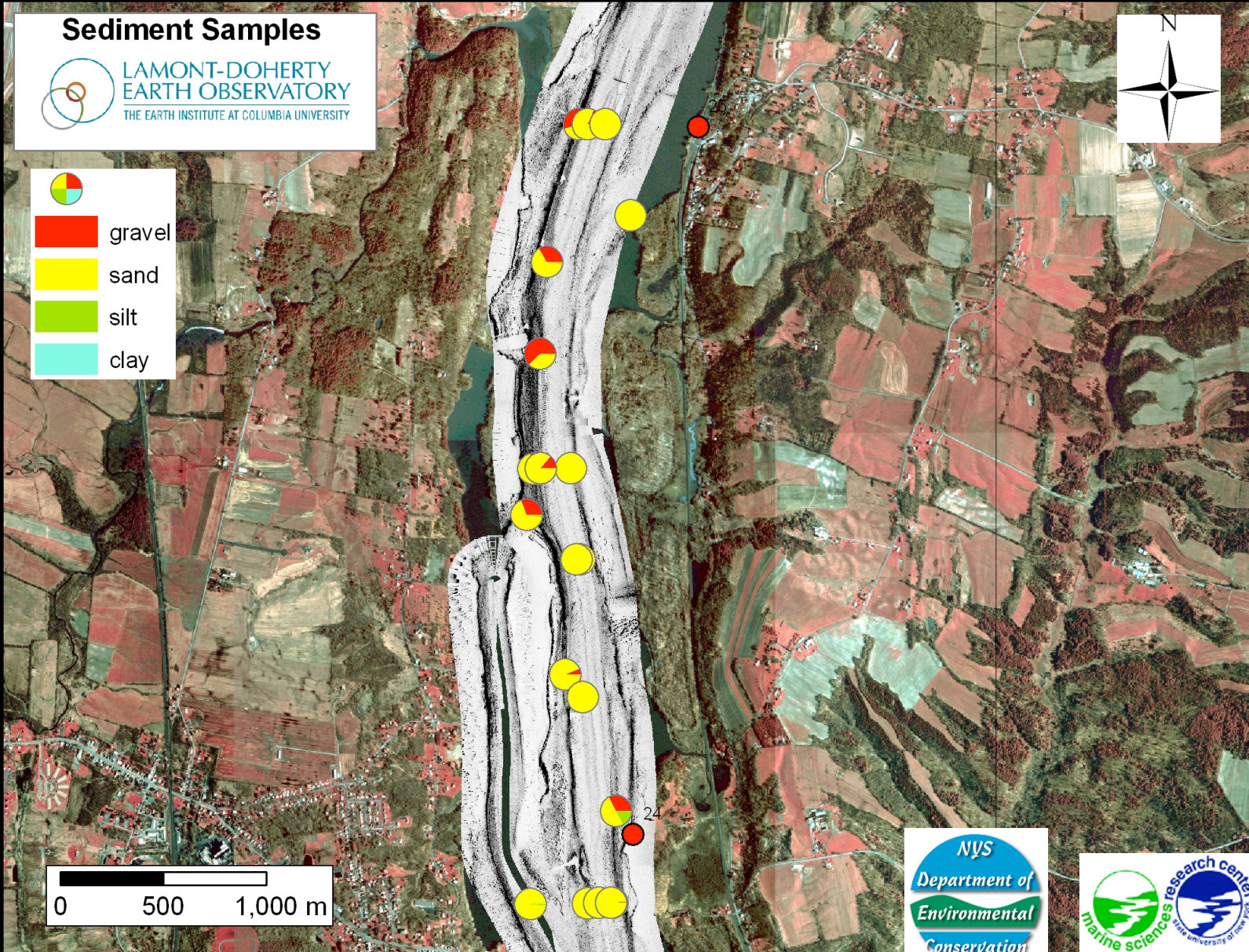
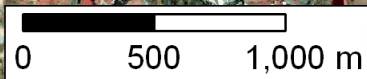
LAMONT-DOHERTY  
EARTH OBSERVATORY  
THE EARTH INSTITUTE AT COLUMBIA UNIVERSITY



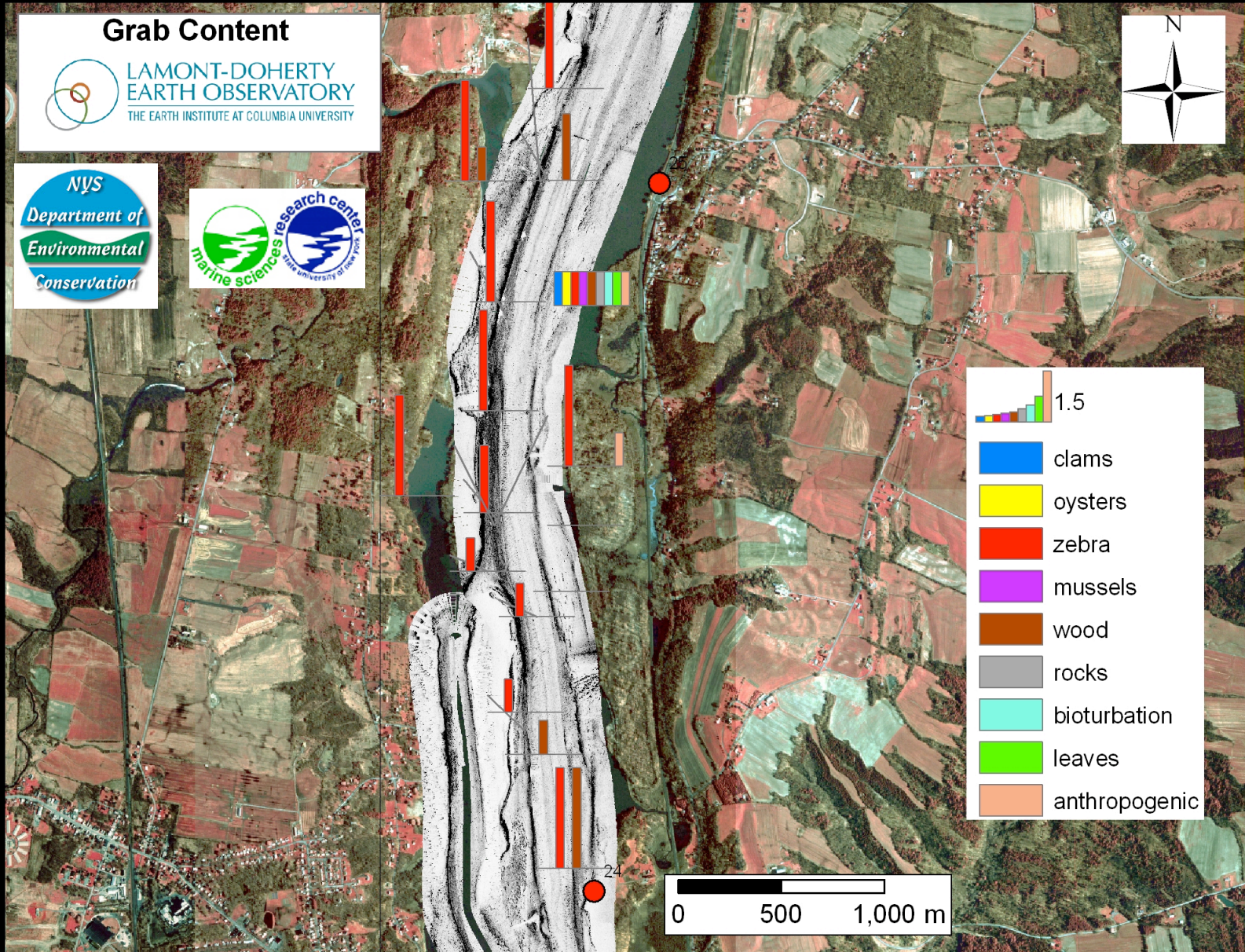
## sedimentary environment

- Deposition - thick
- Deposition - thin
- Deposition - over bedrock
- Deposition - unres. thickness
- Dynamic - waves
- Dynamic - drift
- Dynamic - lineation
- Dynamic - debris
- Dynamic - scour
- Dynamic - slump
- Dynamic - streaks
- Erosion - bedrock
- Erosion - truncated
- Erosion - non-deposition

# Sediment Samples



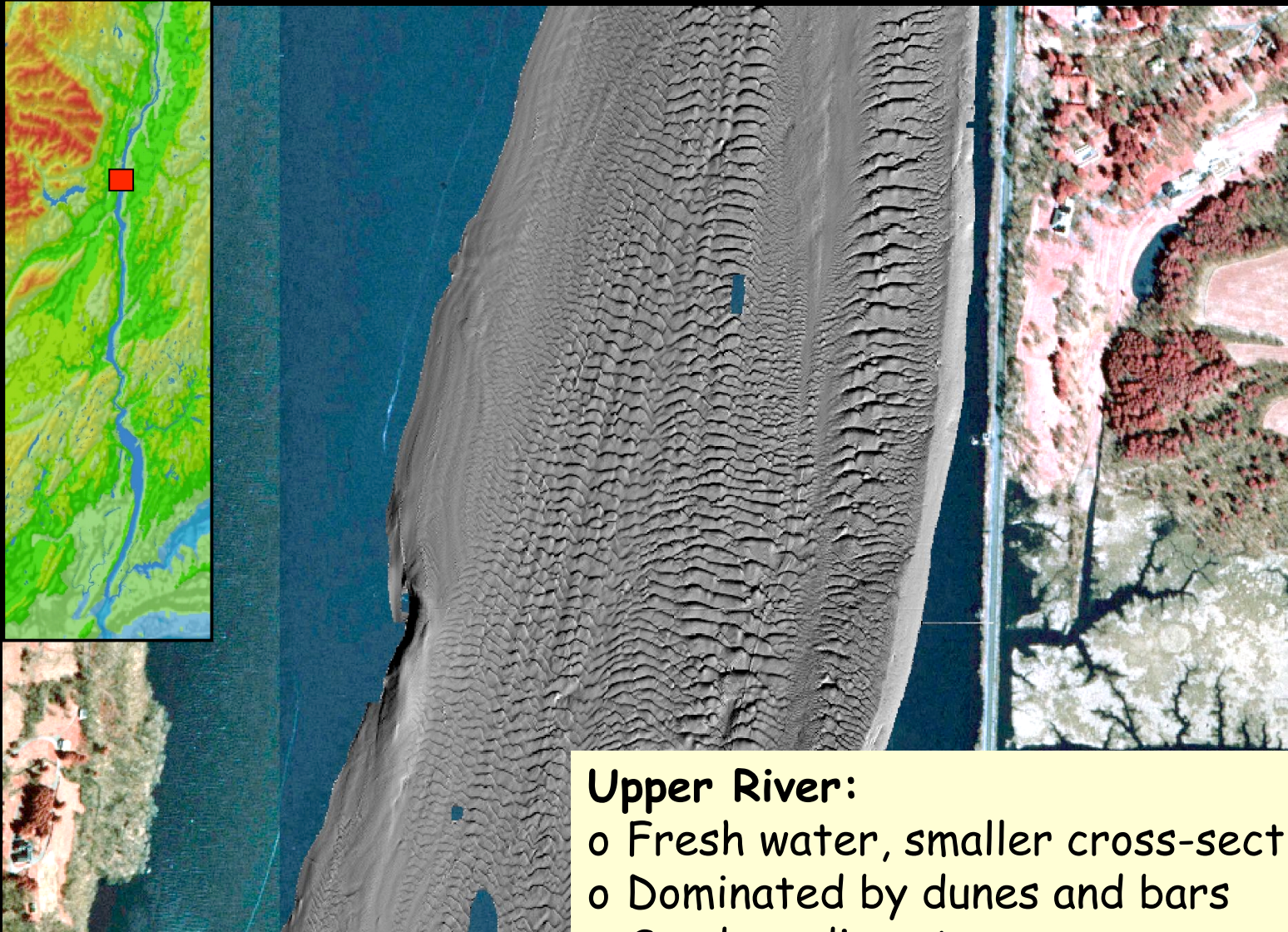
# Grab Content





LAMONT-DOHERTY  
EARTH OBSERVATORY  
OF COLUMBIA UNIVERSITY

# Sediment Dunes in Catskills



## Upper River:

- o Fresh water, smaller cross-section
- o Dominated by dunes and bars
- o Sandy sediments

# Tappan Zee

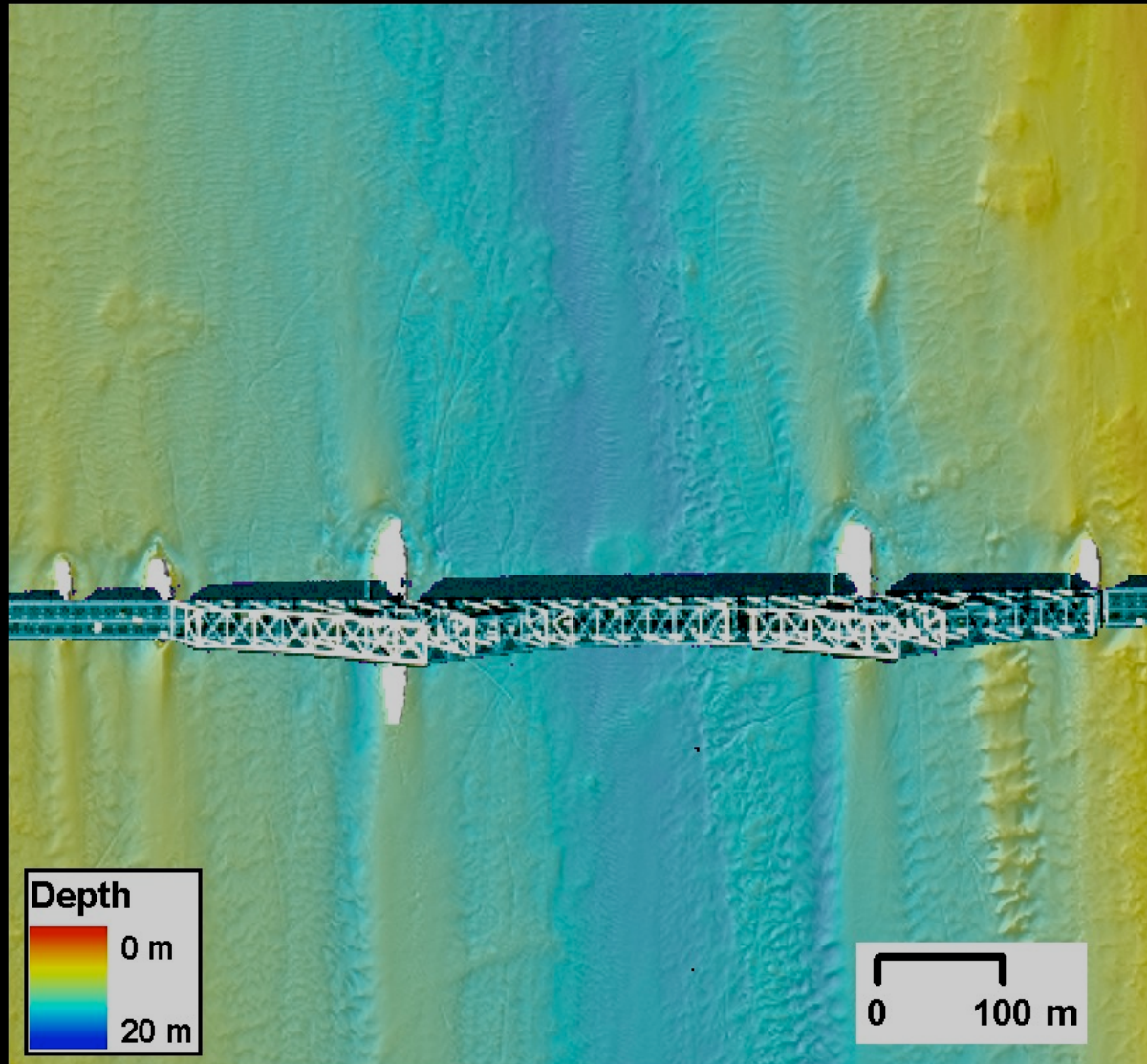
---





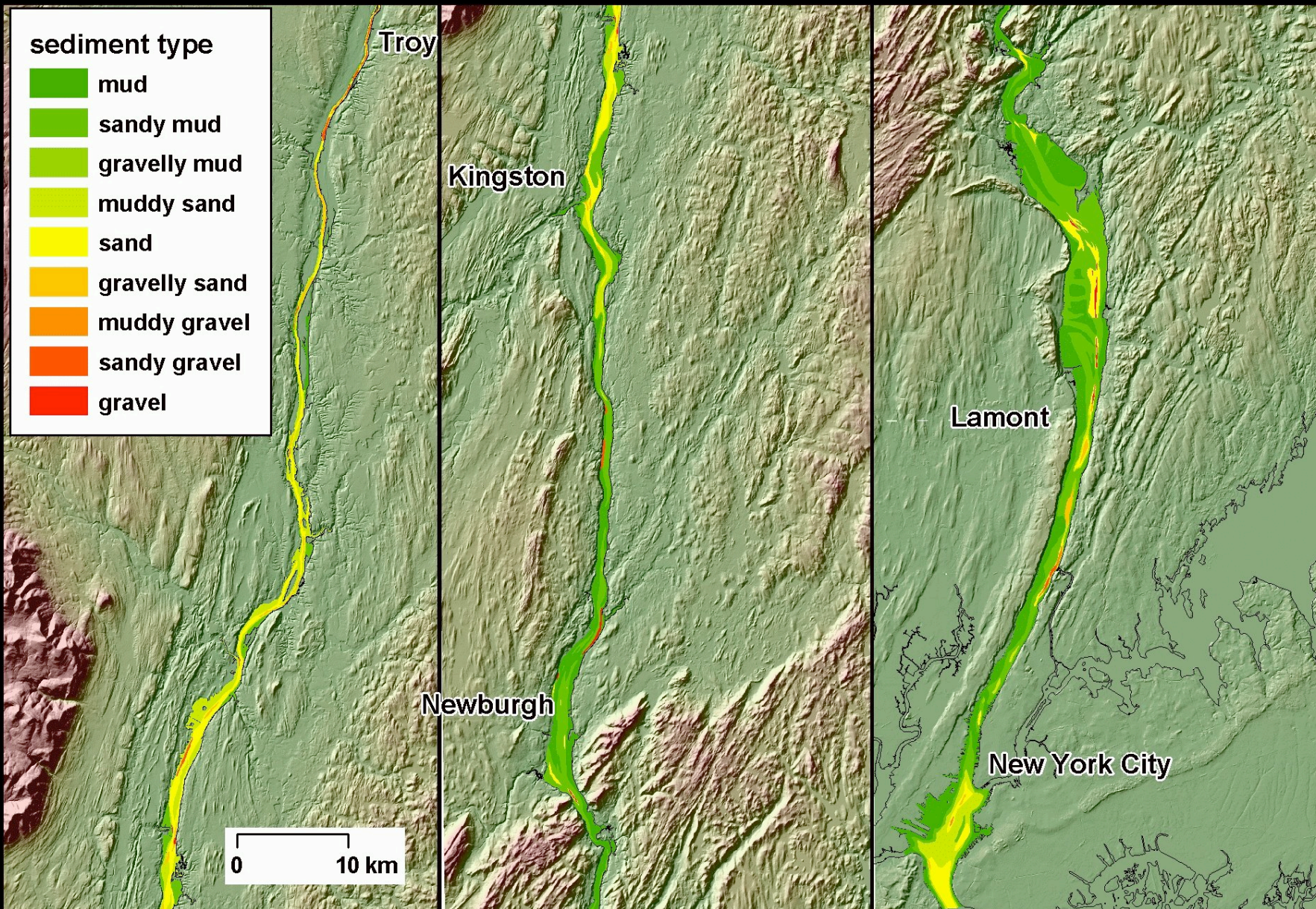
# Human Impact: Tappan Zee Bridge

---

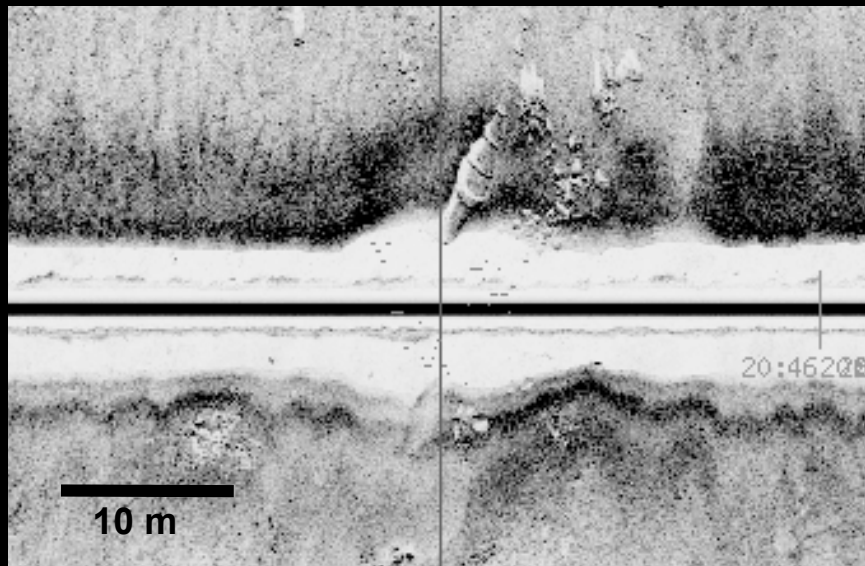
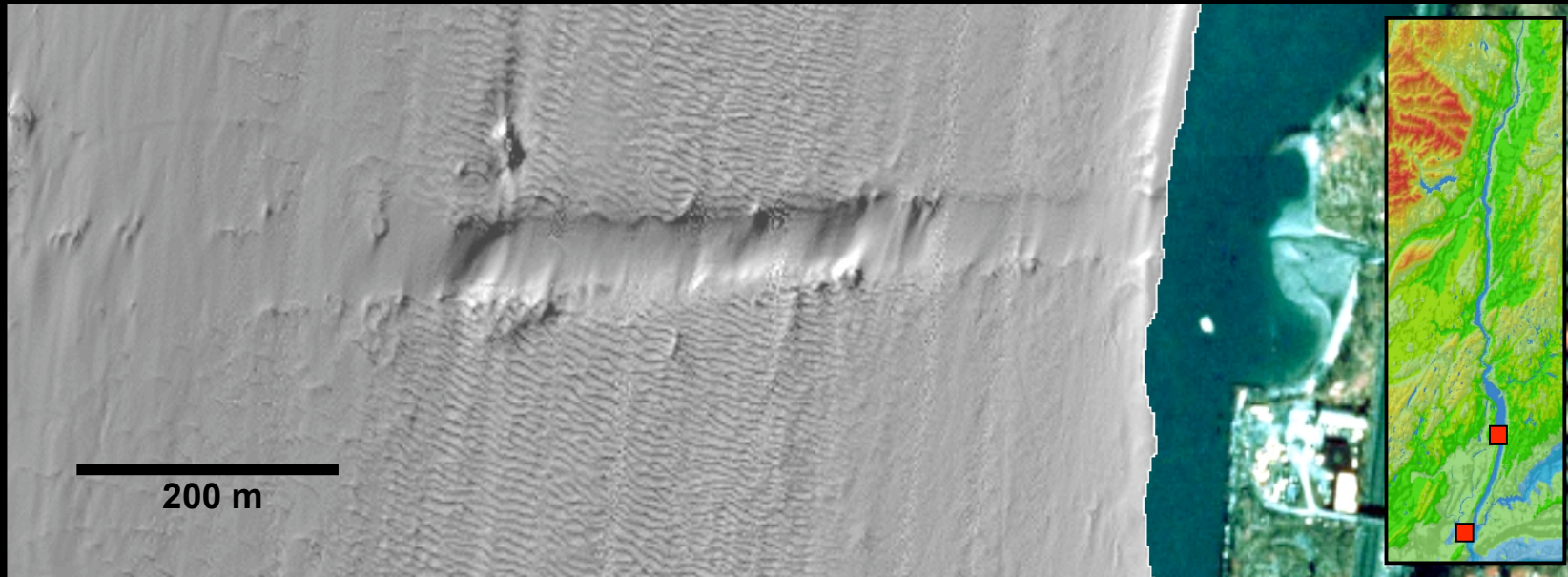


Tappan Zee Bridge

# Sediment Type / Grain Size

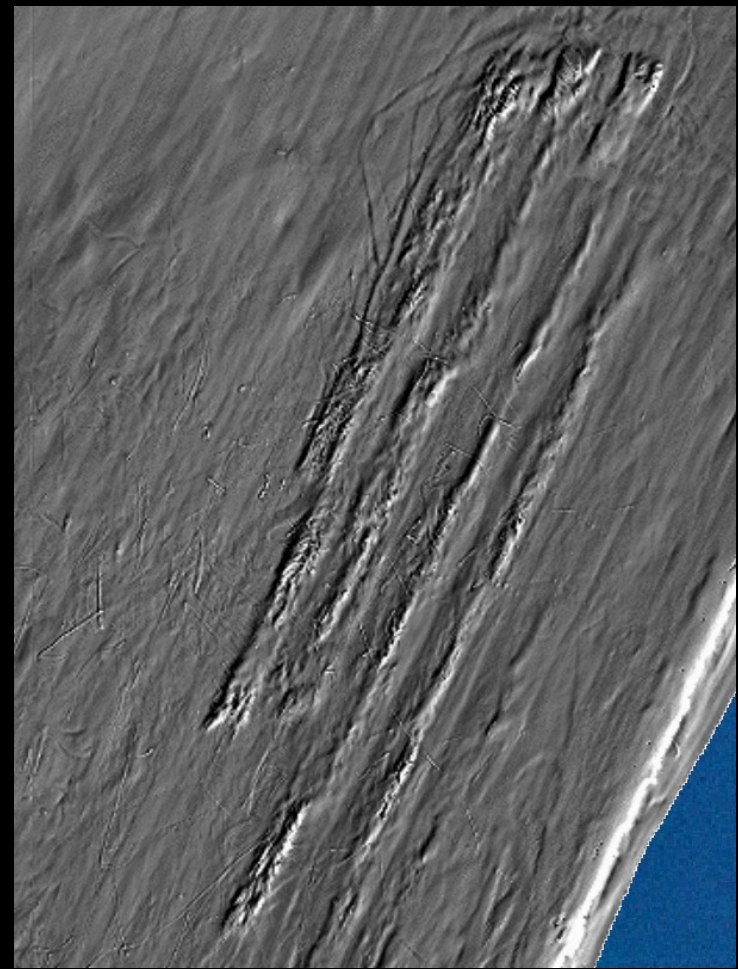
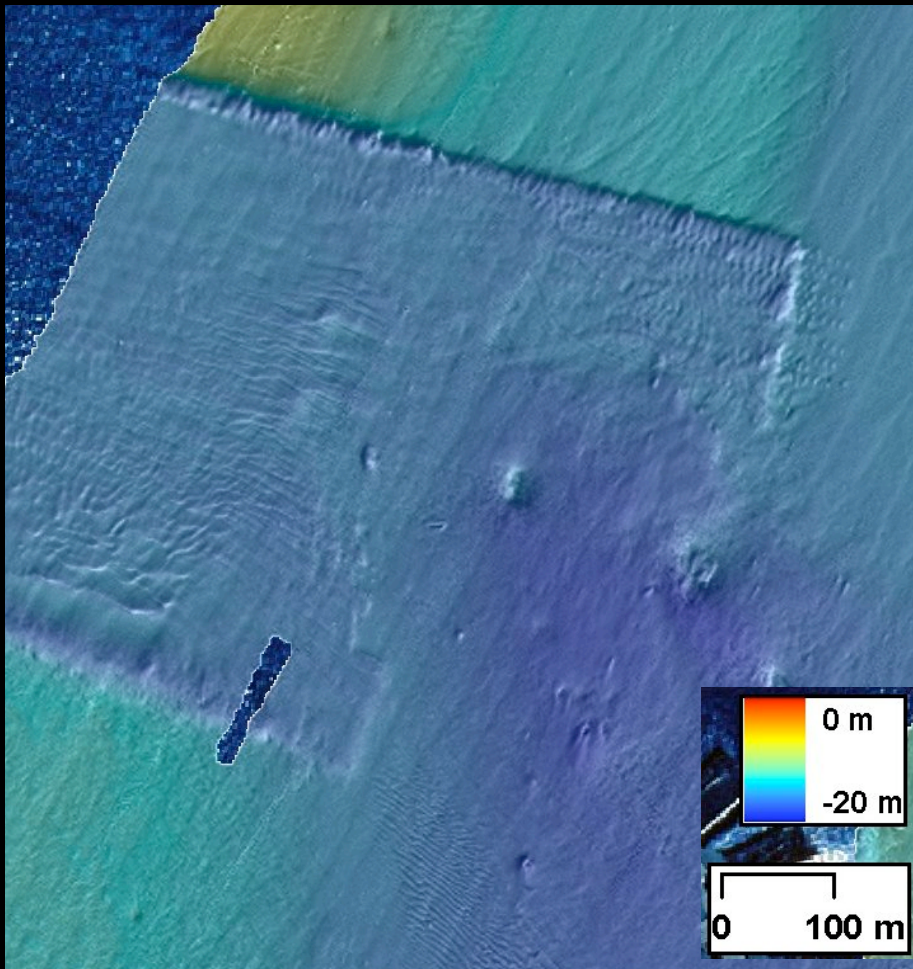


# Human Impact: Pipelines



Scour around pipelines

# Dredging: Examples New York Harbor



# How deep is the Hudson River?

