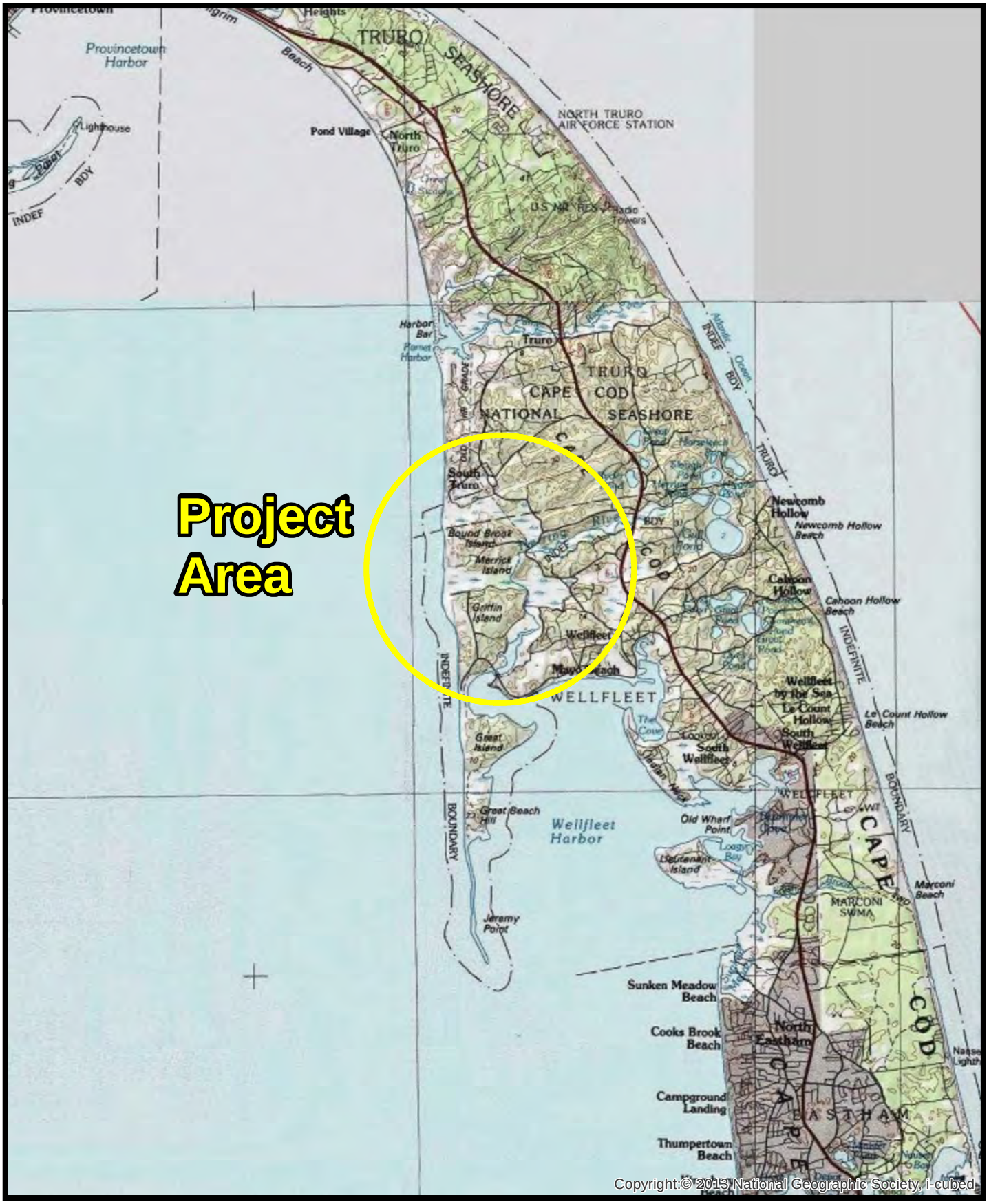


Louis Berger

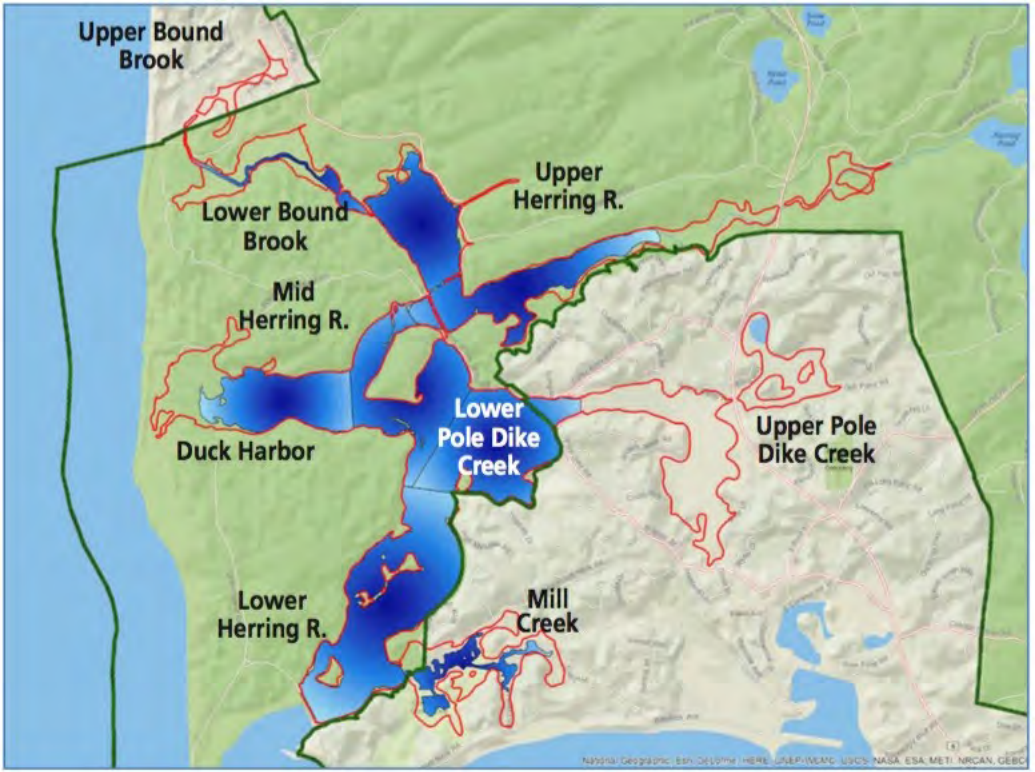
Friends of Herring River
Wellfleet and Truro, Massachusetts

Herring River Restoration Project

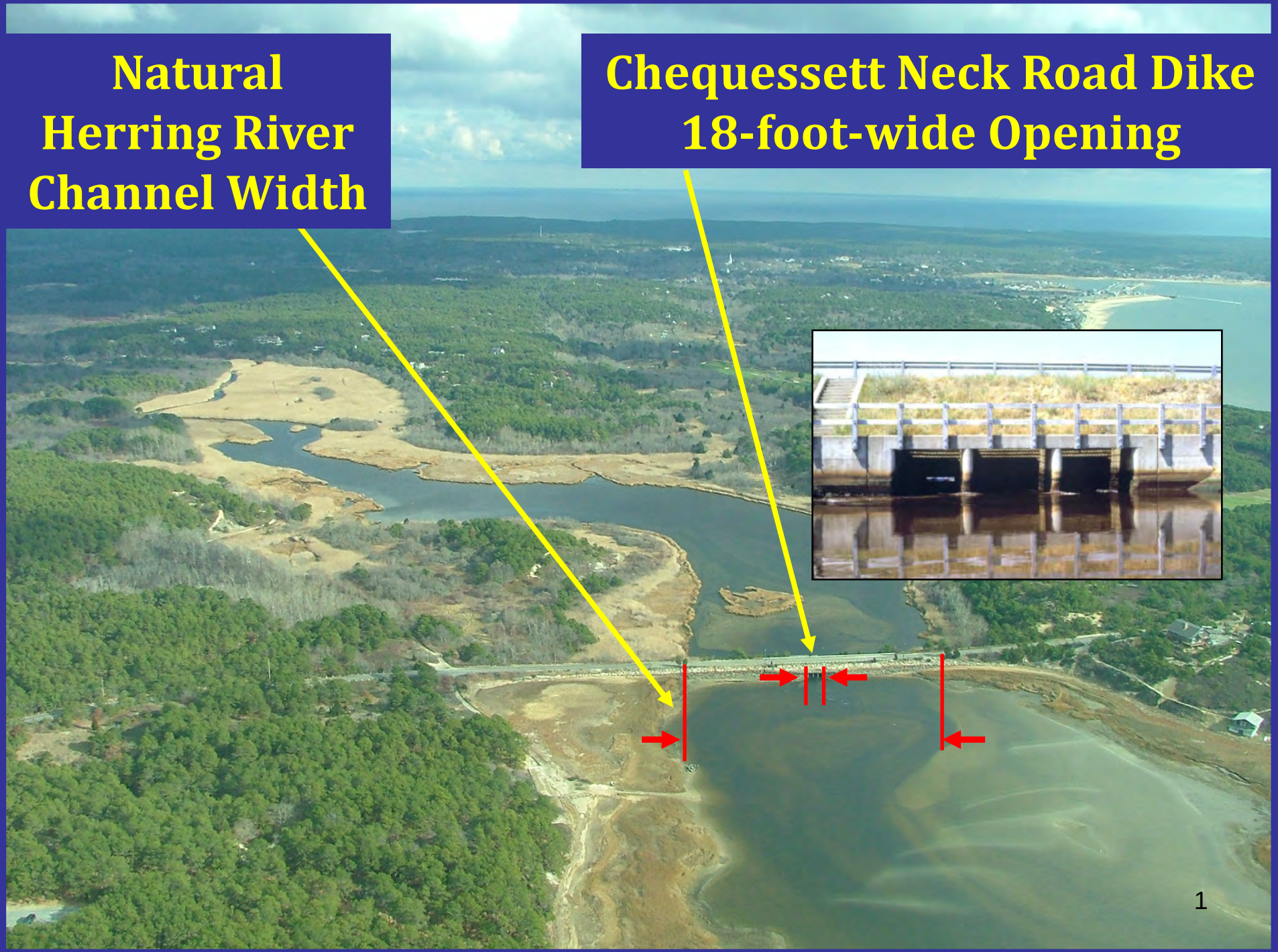
Locus Map

N W E S

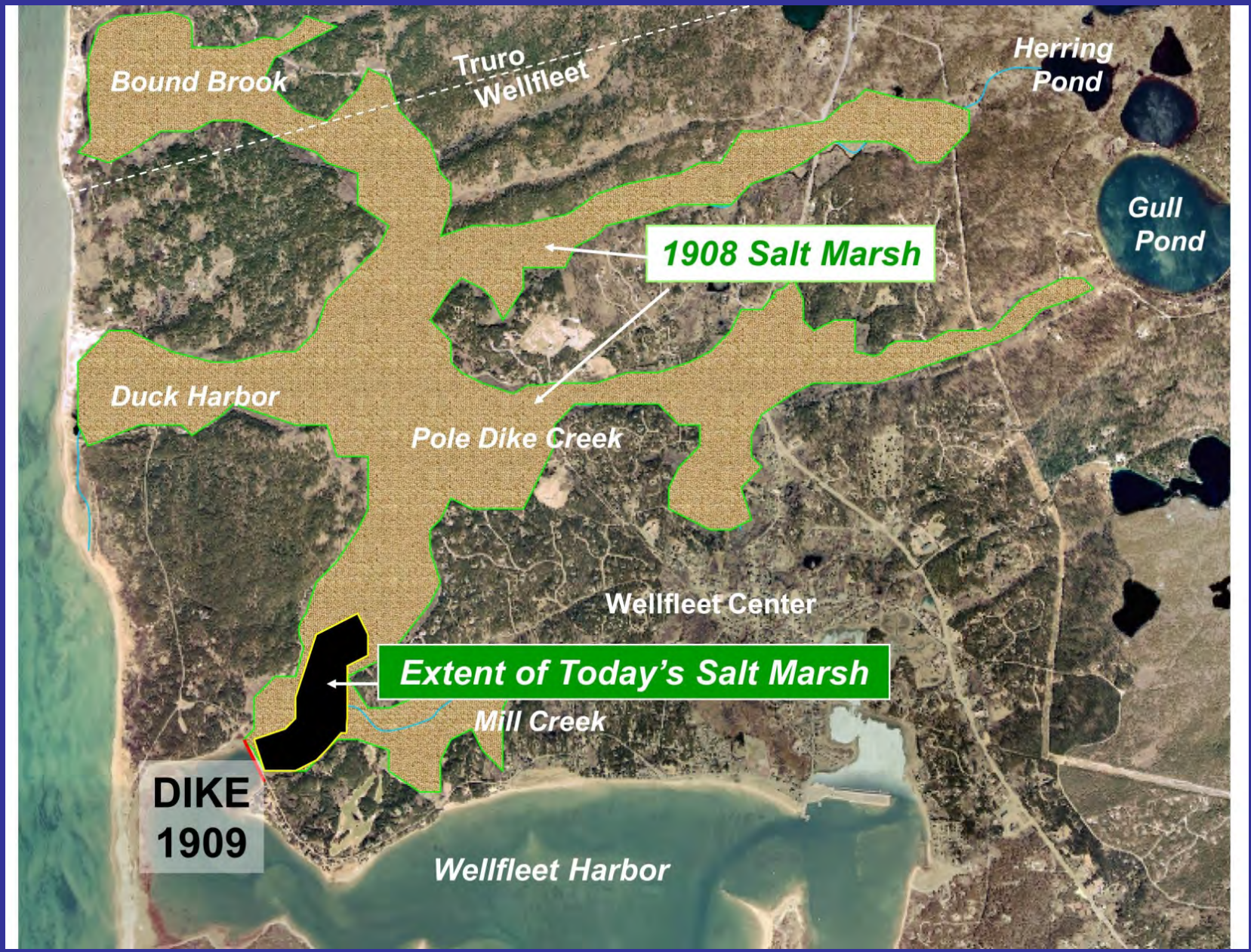
Source: ESRI	1 inch = 12,000 feet	April 2017


Upper Bound Brook
Lower Bound Brook
Upper Herring R.
Mid Herring R.
Duck Harbor
Lower Pole Dike Creek
Upper Pole Dike Creek
Lower Herring R.
Mill Creek
Maximum extent of Phase 1 restoration (mean high water spring tides)
Project Area/Extent of Full Restoration pending future permits and landowner agreements
CCNS Boundary

Herring River Restoration Project Overview


Natural
Herring River
Channel Width
Chequessett Neck Road Dike
18-foot-wide Opening

HISTORIC MARSH VS. PRESENT DAY



On-Going Effects of Tidal Restriction

Fecal Coliform Bacteria Pollution = closed shellfish areas

Loss of Estuarine Productivity

RECENT DATA = COLLECTED AND ANALYZED THROUGH 2017 CONFIRM AND FURTHER SUBSTANTIATE THE DEGRADED CONDITION OF THE HERRING RIVER FLOODPLAIN

Degraded Habitat for River Herring; Acidification

Poor Water Quality / Low Dissolved Oxygen = Fish Kills

HERRING RIVER TODAY

- CNR dike designated point source for bacterial contamination – shellfish closures
- Classified as "impaired waters" under CWA standards (low pH, metals, path.)

- Marsh subsidence & acid sulfate soils –fish kills
- Loss of salt marsh – replaced by invasive species, loss of resiliency

Phragmites and other invasive species colonized the marshes within the Herring River estuary, replacing native vegetation. An approximately 40-acre stand of Phragmites that currently releases methane will die off when tidal excahnge is restored. An Invasive Species Control Plan will be prepared for submittal with the Wetlands Pritection Act applications.

Date & Time: Sat Apr 29 13:26:47 EDT 2017
Position: 19 N 411469 4644434
Altitude: 3m
Datum: NORTH AMERICAN 1983, CONUS
Azimuth/Bearing: 001° N01E 0018mils (True)
Zoom: 1X
HRVS-2017-DH-01

Invasive upland species colonized the former salt marsh. NPS will clear, burn or otherwise manage vegetation within the Seashore boundary prior to each incremental increase in tidal exchange, to ensure that conditions favor establishment of salt marsh vegetation when restored tidal flow reaches any given area.

Existing causeway across the marsh plain, including culvert at Herring River crossing, will be removed to eliminate a hydrologic restriction to restored tidal exchange.


Herring R. at High Toss Rd (South)

Blue Carbon in the Herring River: Can We Reduce Greenhouse Gas Emissions through Wetland Restoration?

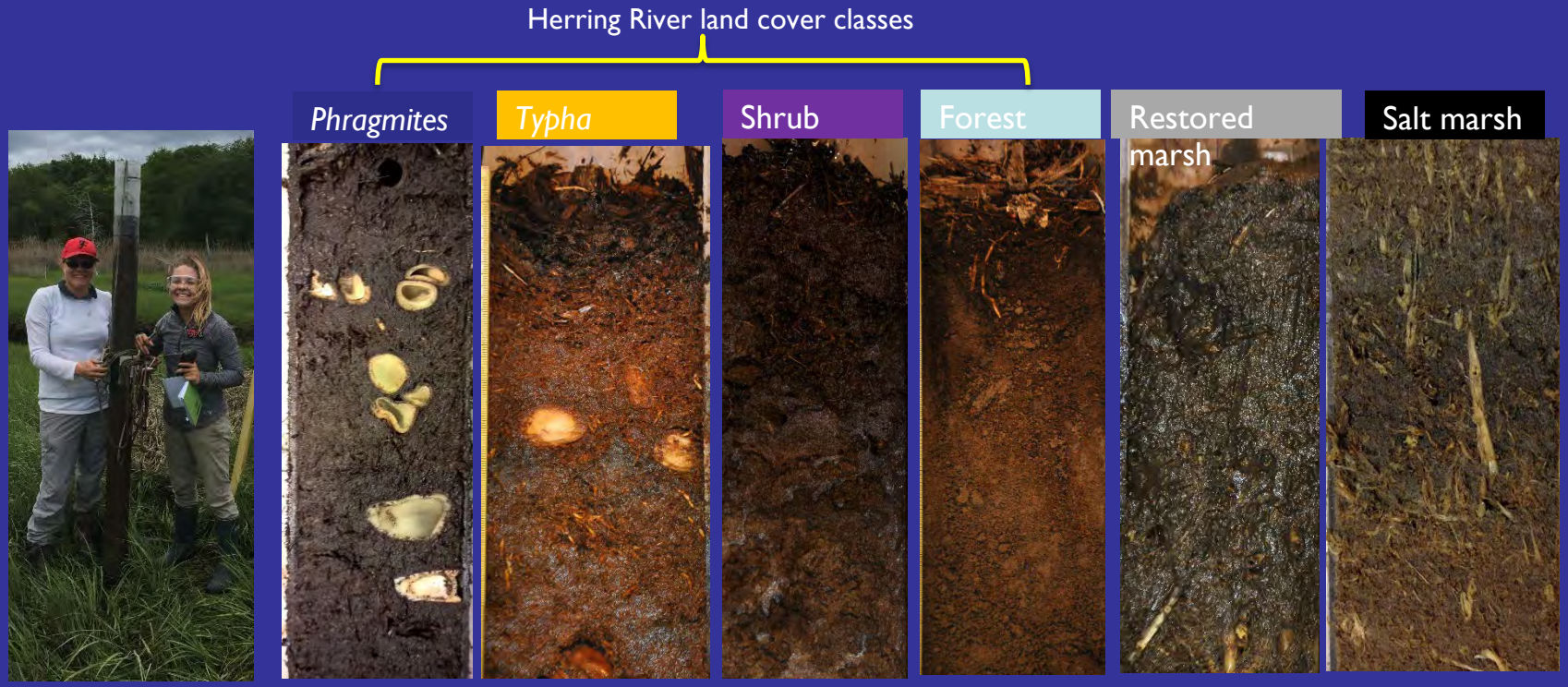
Kevin D. Kroeger
USGS Woods Hole Coastal & Marine Science Center

USGS science for a changing world

photo: S. Baldwin

Carbon burial rates and linkages to tidal hydrology and elevation in tidally restricted and unrestricted wetlands

Meagan Eagle Gonneea (USGS), Kevin D. Kroeger (USGS), Jim Tang (MBL), Faming Wang (MBL), Amanda C. Spivak (UGA) *USGS: Woods Hole Coastal & Marine Science Center, U.S. Geological Survey, Woods Hole, MA | MBL: Marine Biological Laboratory, Woods Hole, MA | UGA: University of Georgia, Athens, GA*



Cores (duplicate) were collected across natural, restricted and restored marshes, age dated with 210-lead and soil carbon density measured. Elevation was determined to 2 cm.

Project Benefits: **RESTORED ECOSYSTEM SERVICES**

- ✓ **Shellfishing:** Elimination of Bacterial Contamination of Recreational and Commercial Habitats
- ✓ **Other Recreation**: Boating, Hiking, Fishing
- ✓ **Managing Sea Level Rise**: Estuarine Habitats More Resilient to Coastal Flooding; Improved Drainage
- ✓ **Natural Mosquito Control**: Tidal Flushing of Breeding Areas, Larvae-eating Fish
- ✓ **Reduce Methane Emissions**: Equal to Taking Hundreds of Cars off the Road Each Year (preliminary data)
- ✓ **Local Economy**: $1 Spent on Coastal Restoration = $13 to Local Businesses (Center for Amer. Progress/OXFAM 2014)