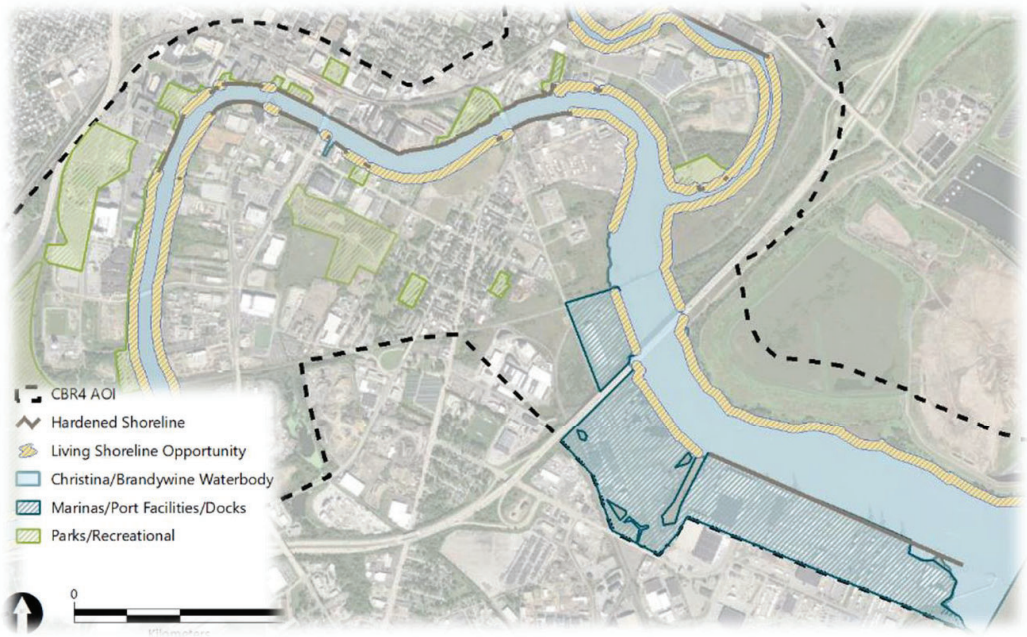
Opportunity: Restoring Shorelines



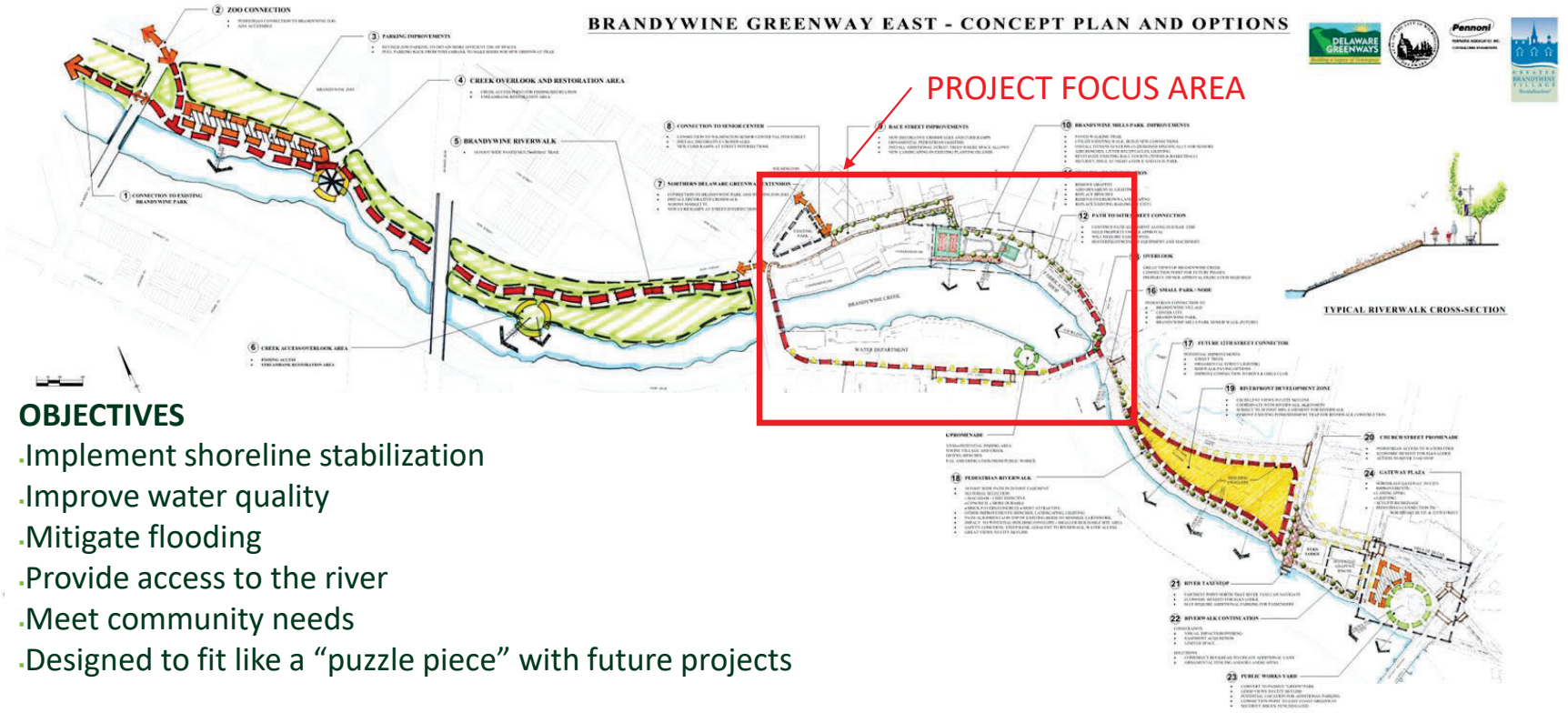
Shorelines where the river meets the land can support a wide array of plants, animals, and fish and act as natural water filters if kept and managed in a natural way.

There are over 20 miles of shoreline along the Christina and Brandywine Rivers in the project area. Where these shorelines have not been hardened with bulkheads or other structures, restoring living shorelines can provide natural habitat and help prevent erosion and flooding. A gradually sloping natural shoreline can also offer opportunities for people to view and interact with these natural areas and the water's edge.

Which CBR4 goals does this opportunity meet?

- ☑ Restoration and Protection of Wetlands
- ☑ Restoration and Protection of Riparian Areas
- ☑ Restoration and Protection of Shorelines
- ☑ Remediation of Contaminants
- ☑ Restoration and Protection of Adjacent Habitats
- ☑ Increase Community Resilience
- ☑ Improve Community Access to Rivers

CITY OF WILMINGTON BRANDYWINE RIVERFRONT NORTHEAST SHORELINE ENHANCEMENTS



OBJECTIVES

- Implement shoreline stabilization
- Improve water quality
- Mitigate flooding
- Provide access to the river
- Meet community needs
- Designed to fit like a “puzzle piece” with future projects

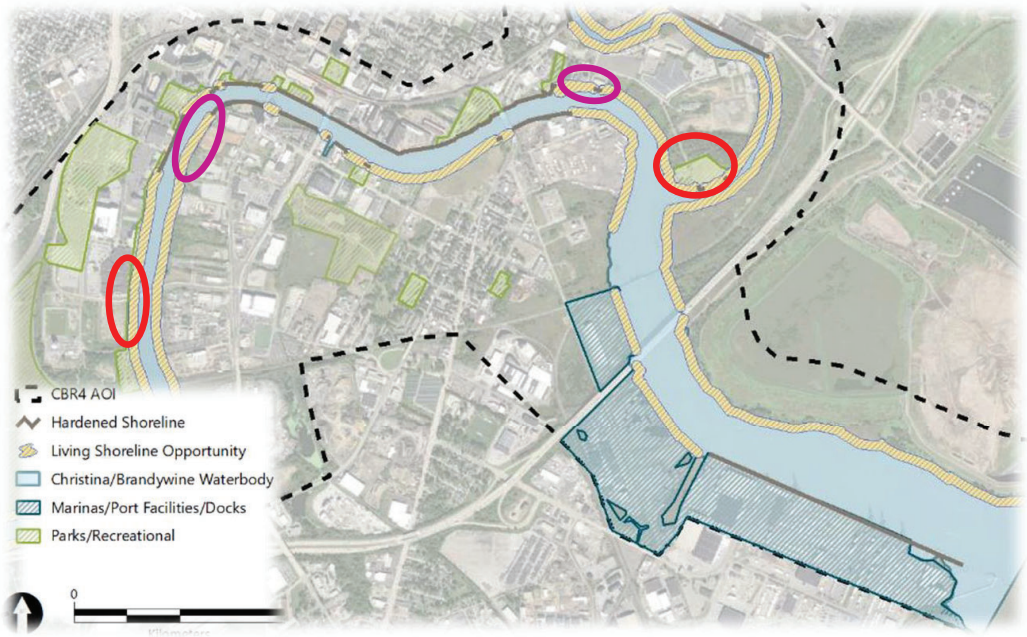

EXISTING CONDITIONS – OVERVIEW
Superfine Lane Condominiums
PROJECT BOUNDARY
Brandywine Mills Park (owned by Old Brandywine Village)
Existing Bulkheads
BRANDYWINE CREEK
Masley Property
Wilmington Dept. of Water – Brandywine Water Works
Race St
E 16th St
Palmers Row
Buena Vista St
Lamotte St
Carter St
Jessup St
Clen Ave

LIVING SHORELINE AND RIVER ACCESS IMPROVEMENTS

16TH STREET STREETSCAPE & STORMWATER BMP CONCEPT

BRANDYWINE MILLS PARK REHABILITATION CONCEPT

Opportunity: Restoring Shorelines



Shorelines where the river meets the land can support a wide array of plants, animals, and fish and act as natural water filters if kept and managed in a natural way.

There are over 20 miles of shoreline along the Christina and Brandywine Rivers in the project area. Where these shorelines have not been hardened with bulkheads or other structures, restoring living shorelines can provide natural habitat and help prevent erosion and flooding. A gradually sloping natural shoreline can also offer opportunities for people to view and interact with these natural areas and the water's edge.

Which CBR4 goals does this opportunity meet?

- ☑ Restoration and Protection of Wetlands
- ☑ Restoration and Protection of Riparian Areas
- ☑ Restoration and Protection of Shorelines
- ☑ Remediation of Contaminants
- ☑ Restoration and Protection of Adjacent Habitats
- ☑ Increase Community Resilience
- ☑ Improve Community Access to Rivers

Example Project

Restoring Shorelines: 7th St. Peninsula

Summary: Skate park and old boat ramp with sites of ecological interest

Existing Conditions: Characteristic mudflats with varying levels of protection that may be accreting, wetland forest with fringing *Phragmites*

Example Project

Restoring Shorelines: 7th St. Peninsula

ANCHOR QEA

Figure 2
7th Street Park - Plan View

Restoration Concept Plans
Christina-Brandywine River Remediation
Restoration Resilience (CBR4) Project
Wilmington, Delaware

Example Project

Restoring Shorelines: 7th St. Peninsula

Project Features:

1. Wetland forest understory restoration

- Control invasive *Phragmites*
- Plant native vegetation
- Trail alignment

Figure 2
7th Street Park - Plan View

Restoration Concept Plans
Christina-Brandywine River Remediation
Restoration Resilience (CBR4) Project
Wilmington, Delaware

Example Project

Restoring Shorelines: 7th St. Peninsula

Project Features:

1. Wetland forest understory restoration

2. Armored Intertidal living shoreline

- Increase tidal exchange
- Vegetation plantings and mussel installations

Example Project

Restoring Shorelines: 7th St. Peninsula

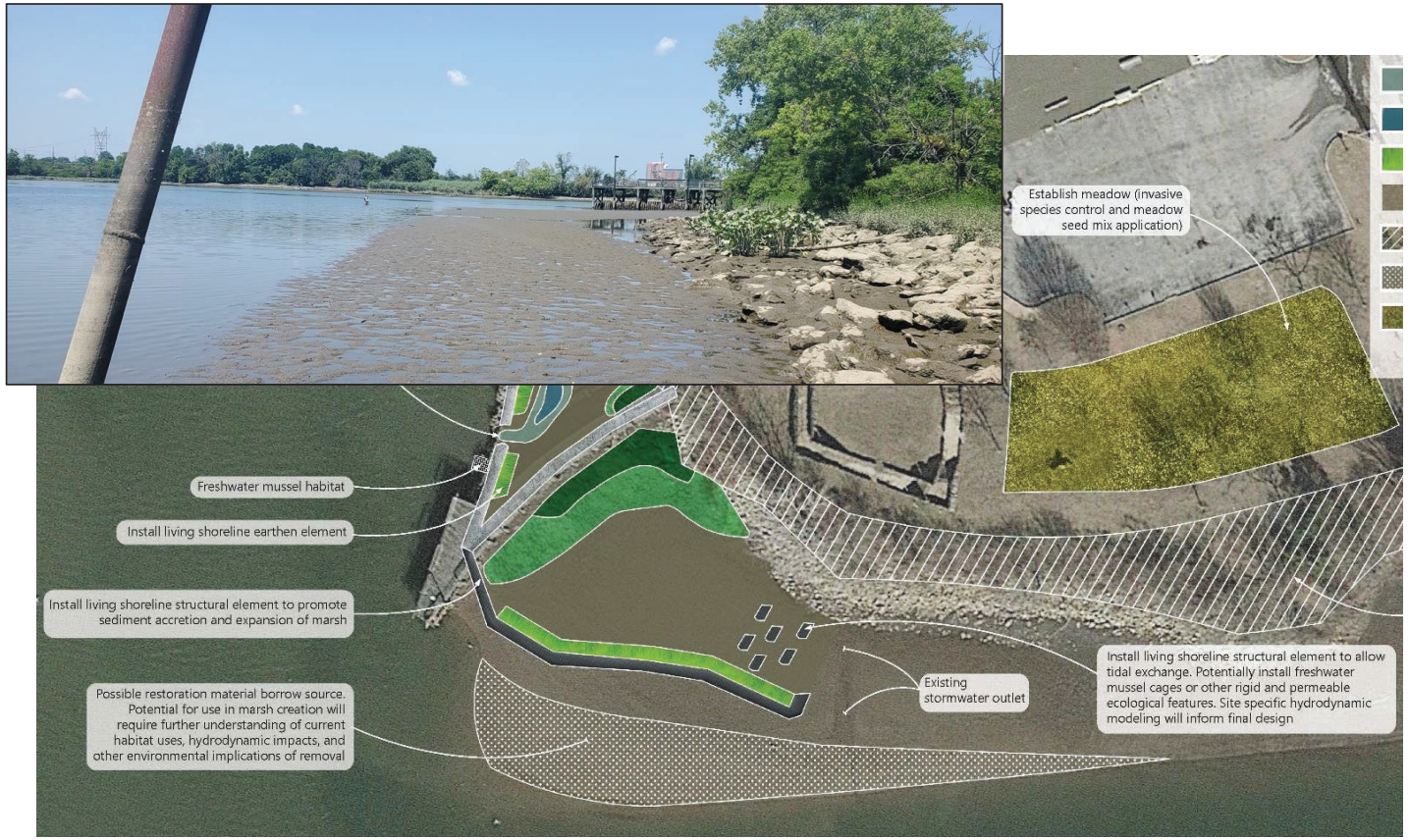
Project Features:

1. Wetland forest understory restoration

2. Armored Intertidal living shoreline

3. Intertidal living shoreline

- Upstream protection
- Plantings or structures



Example Project

Restoring Shorelines: 7th St. Peninsula

Restoration	Improved tidal exchange, increased habitat diversity, and potential mussel installations will restore key intertidal ecosystem characteristics and functions
Remediation	Sediment evaluation needed prior to redistribution; consider borrow material sources.
Resilience	Improving stability at high-energy confluence, potential flood mitigation
*Public Access	Public access will be integrated into the design to encourage more positive interaction with the site

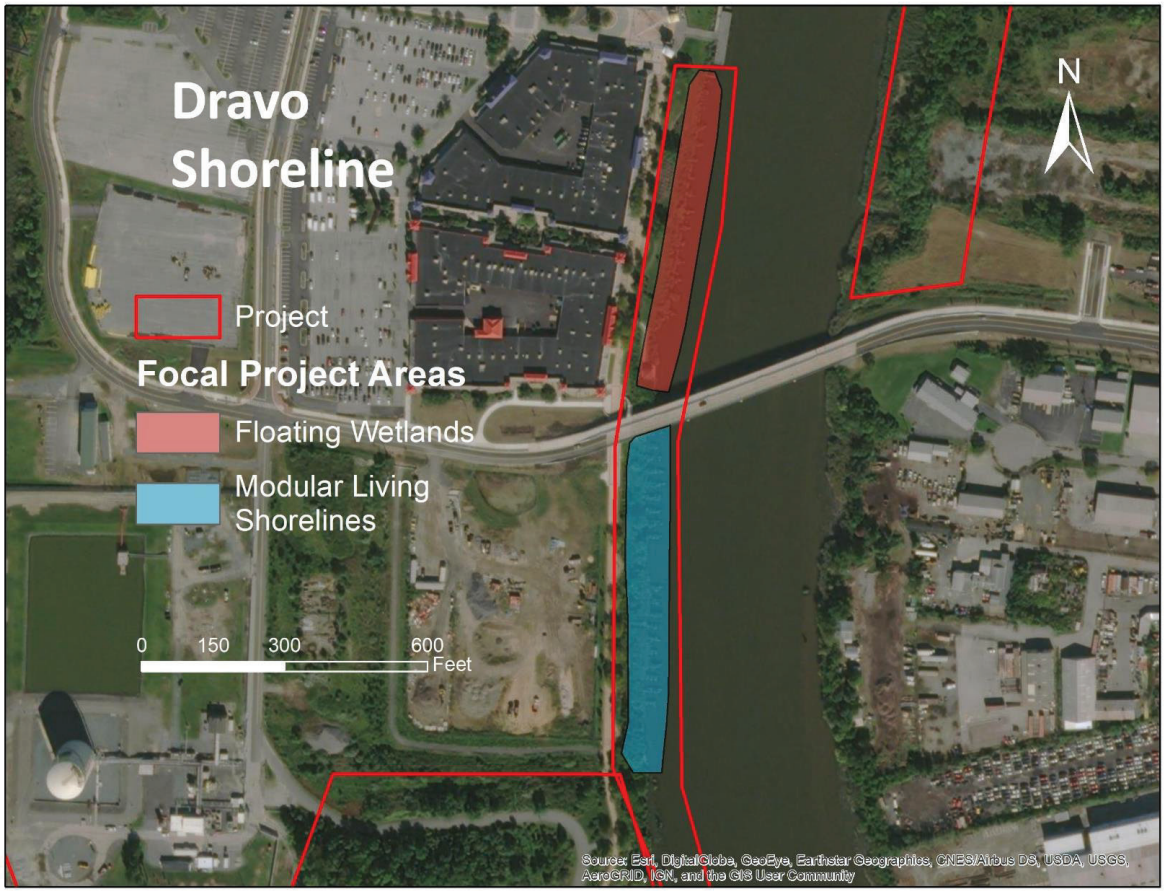
Signature Species

Eastern Elliptio

Eastern Elliptio is a freshwater mussel. It filters and improves water quality and serves as food for other species like fish, raccoons, otters, and birds.

Example Project

Restoring Shorelines: Dravo Shoreline



Summary: Stretch of historic pilings

Existing Conditions:

- Vegetation growing atop pilings
- North end rip-rapped and steeper
- South end characterized by softer, but stable sediment and gentler slope

Example Project

Restoring Shorelines: Dravo Shoreline

ANCHOR QEA

Figure 6
Dravo Shoreline - Plan View

Restoration Concept Plans
Christina-Brandywine River Remediation
Restoration Resilience (CBR4) Project
Wilmington, Delaware

Example Project

Restoring Shorelines: Dravo Shoreline

Project Features:

1. Management of existing vegetation

- Control invasive species
- Bolster native plant populations

ANCHOR QEA

Figure 6
Dravo Shoreline - Plan View

Restoration Concept Plans
Christina Brandywine River Remediation
Restoration Resilience (CBR4) Project
Wilmington, Delaware

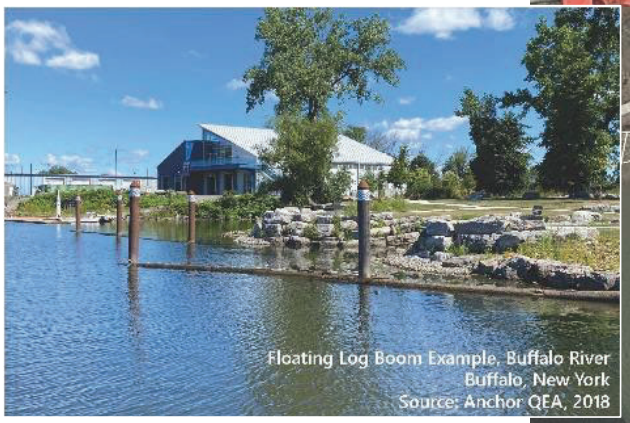
Example Project

Restoring Shorelines: Dravo Shoreline

Project Features:

1. Management of existing vegetation

2. **Wetland habitat uplift**
   - *Northern half:* experimental floating wetlands



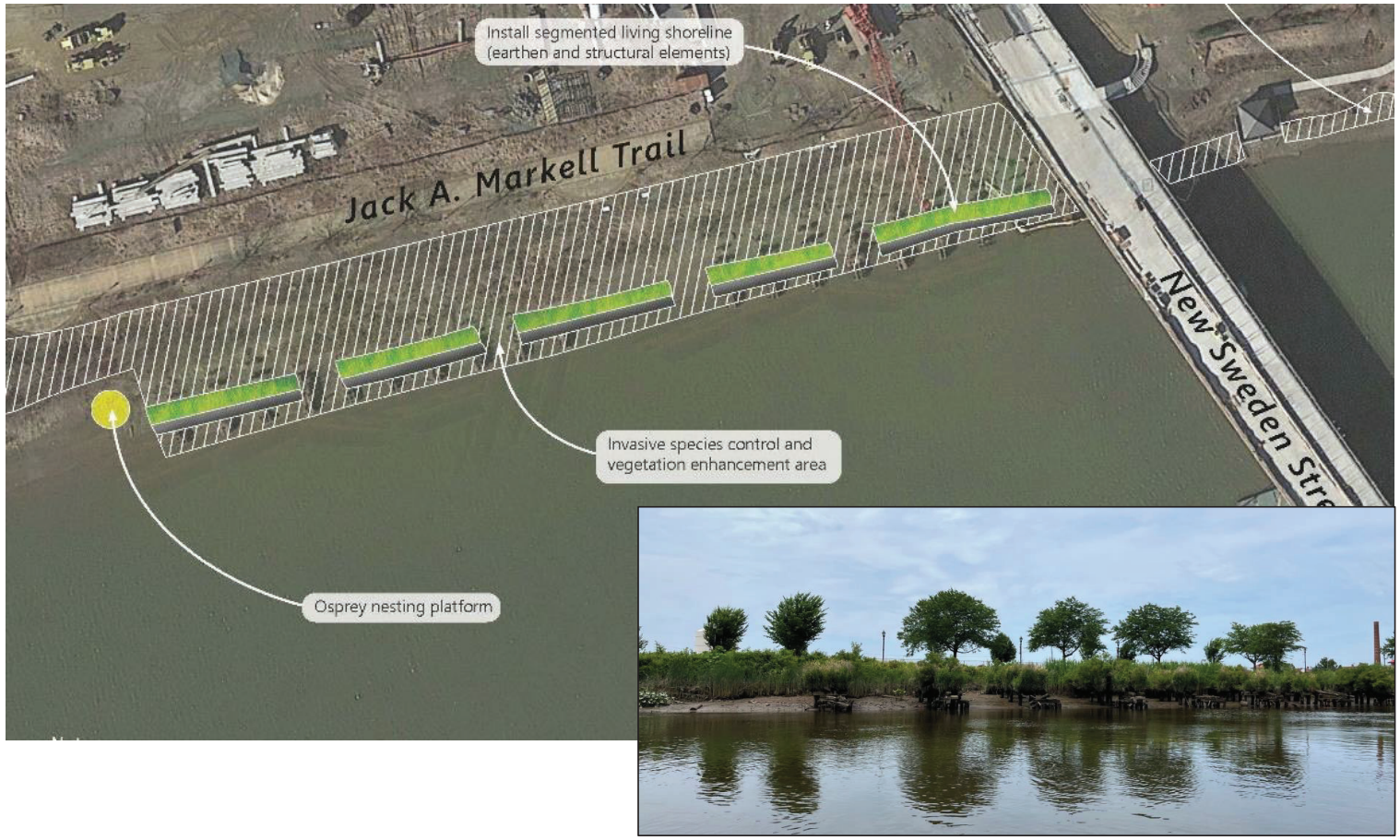
Example Project

Restoring Shorelines: Dravo Shoreline

Project Features:

1. Management of existing vegetation

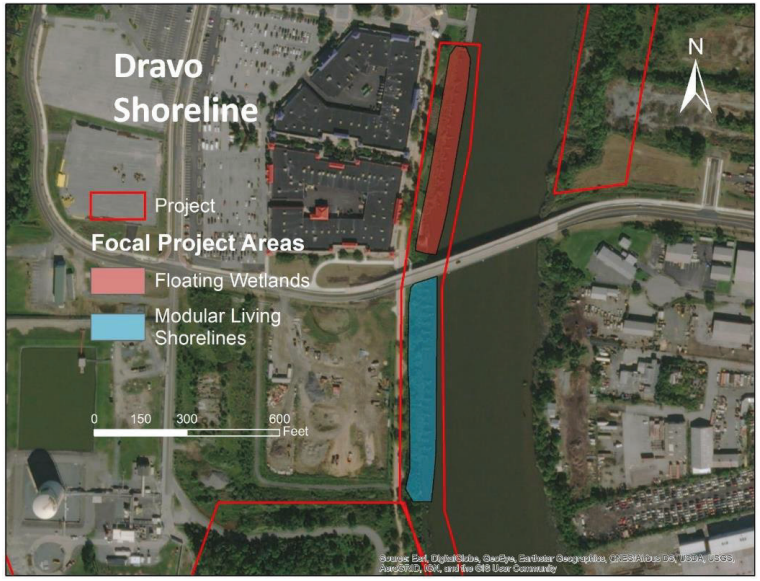
2. **Wetland habitat uplift**
- *Northern half:* experimental floating wetlands
- *Southern half:* stabilized, modular living shoreline pockets



Example Project

Restoring Shorelines: Dravo Shoreline

Restoration	Management of invasives and maintenance of important native plant communities will benefit pollinators and aquatic species
Remediation	Less sediment disturbance necessary, but evaluations will still take place
Resilience	Floating wetlands and pocket living shorelines will contribute to cleaner, healthier waters
*Public Access	Offers great opportunity to pilot novel floating wetland and modular living shoreline concepts at a site that experiences considerable foot traffic.



Signature Species

Juvenile Striped Bass

Young striped bass live and forage in estuarine environments before they grow large enough to migrate; they receive protection and abundant food from complex vegetated habitats