

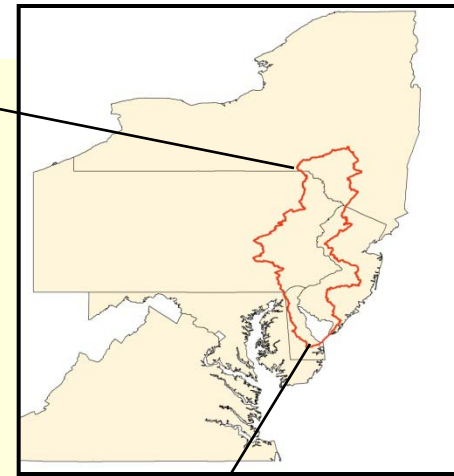
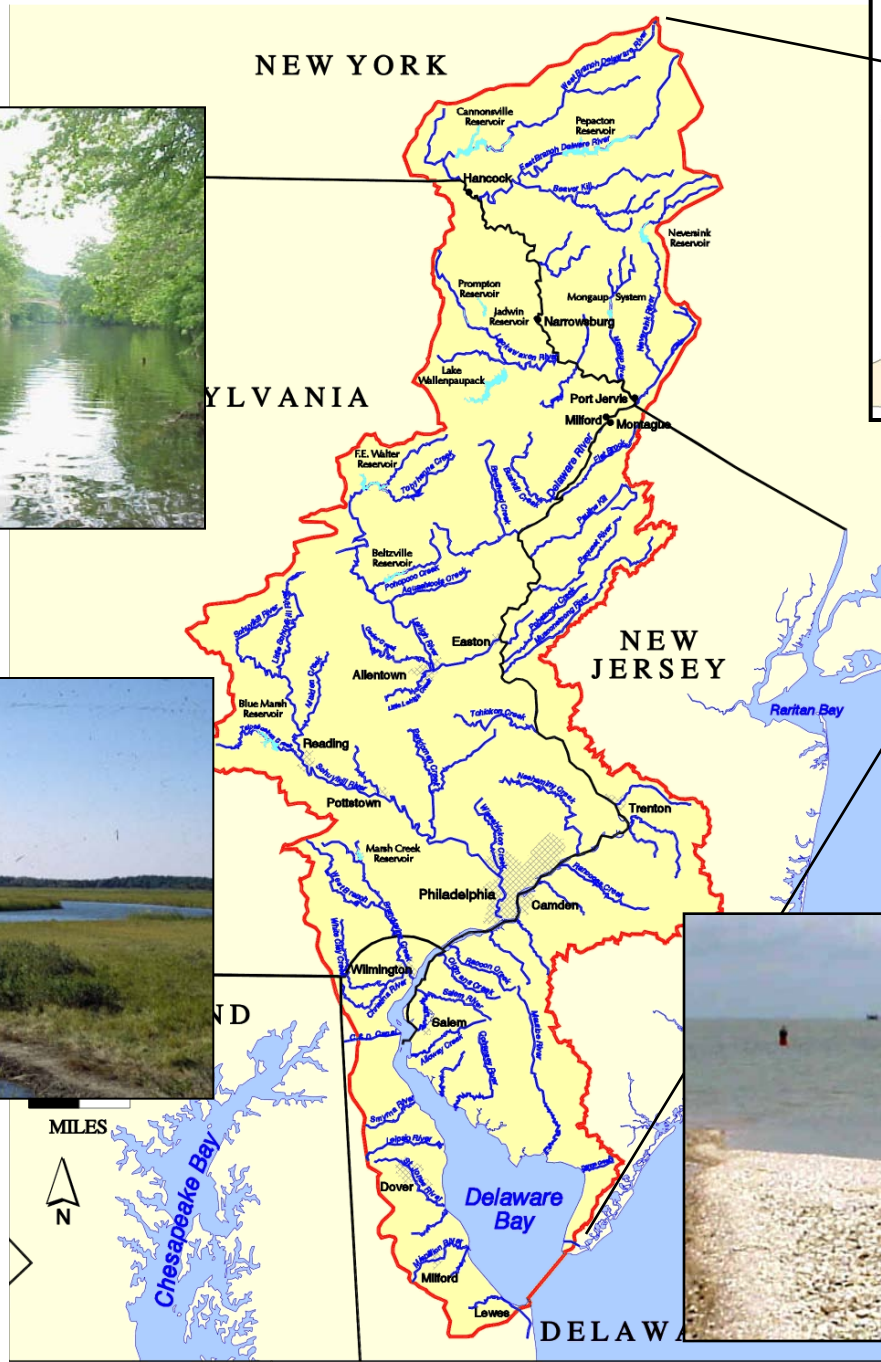
Musseling our way from the Headwater to the Bay: Shellfish as a Basis for Restoration Ecosystem



A. T. Padeletti; D. A. Kreeger; L. Whalen

Delaware River Basin

Watershed Approach



Watershed Approach



Lampsilus cariosa



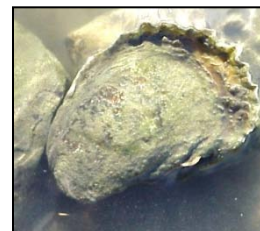
Elliptio complanata



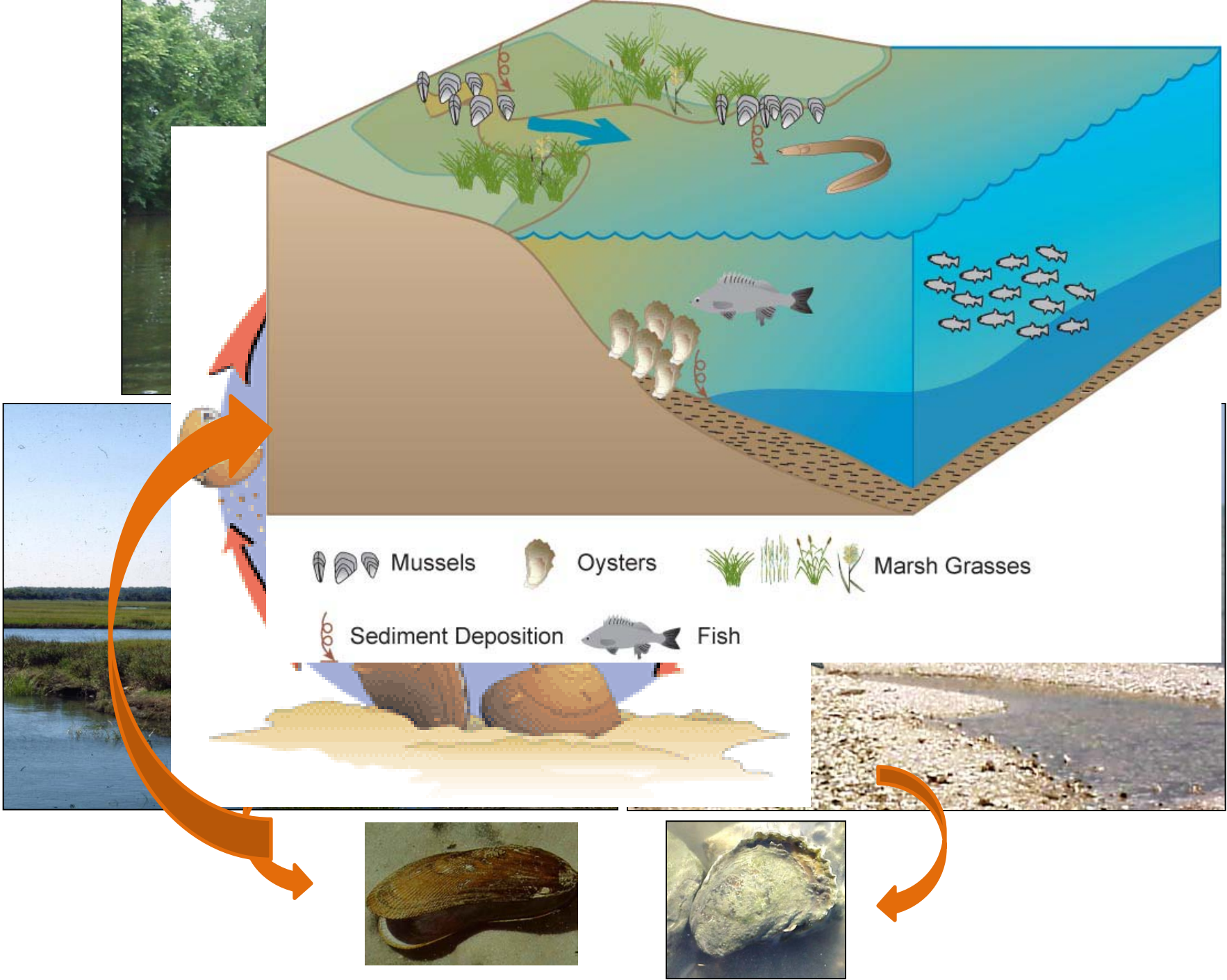
Geukensia demissa



Crassostrea virginica



Linkages

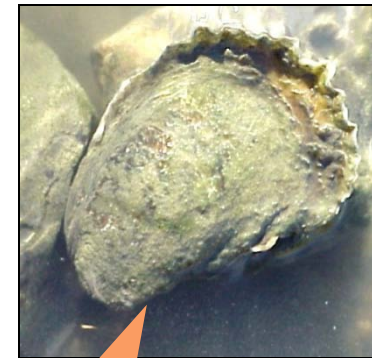


Bivalve Natural Capital		Oysters	Marsh Mussels	FW Mussels
Millennium Ecosystem Assessment Categories	Specific Services/Values	Relative Importance Scores		
Provisioning: Food & Fiber	Dockside Product	✓✓✓		✓
Regulating	Shoreline & Bottom Protection	✓✓		
	Shoreline Stabilization	✓✓	✓✓✓	✓✓
Supporting	Structural Habitat	✓✓✓	✓✓	✓✓
	Biodiversity: Imperiled Species			✓✓✓
	Bio-filtration	✓✓✓	✓✓✓	✓✓✓
	Biogeochemistry	✓✓	✓✓	✓✓
	Prey	✓	✓	✓
Cultural/ Spiritual/ Historical/ Human Well Being	Waterman Lifestyle, Ecotourism	✓✓		
	Native American	✓✓		✓✓✓
	Watershed Indicator	✓✓✓	✓✓	✓✓✓
	Bio-Assessment	✓✓✓	✓✓	✓✓✓

Shoreline Stabilization

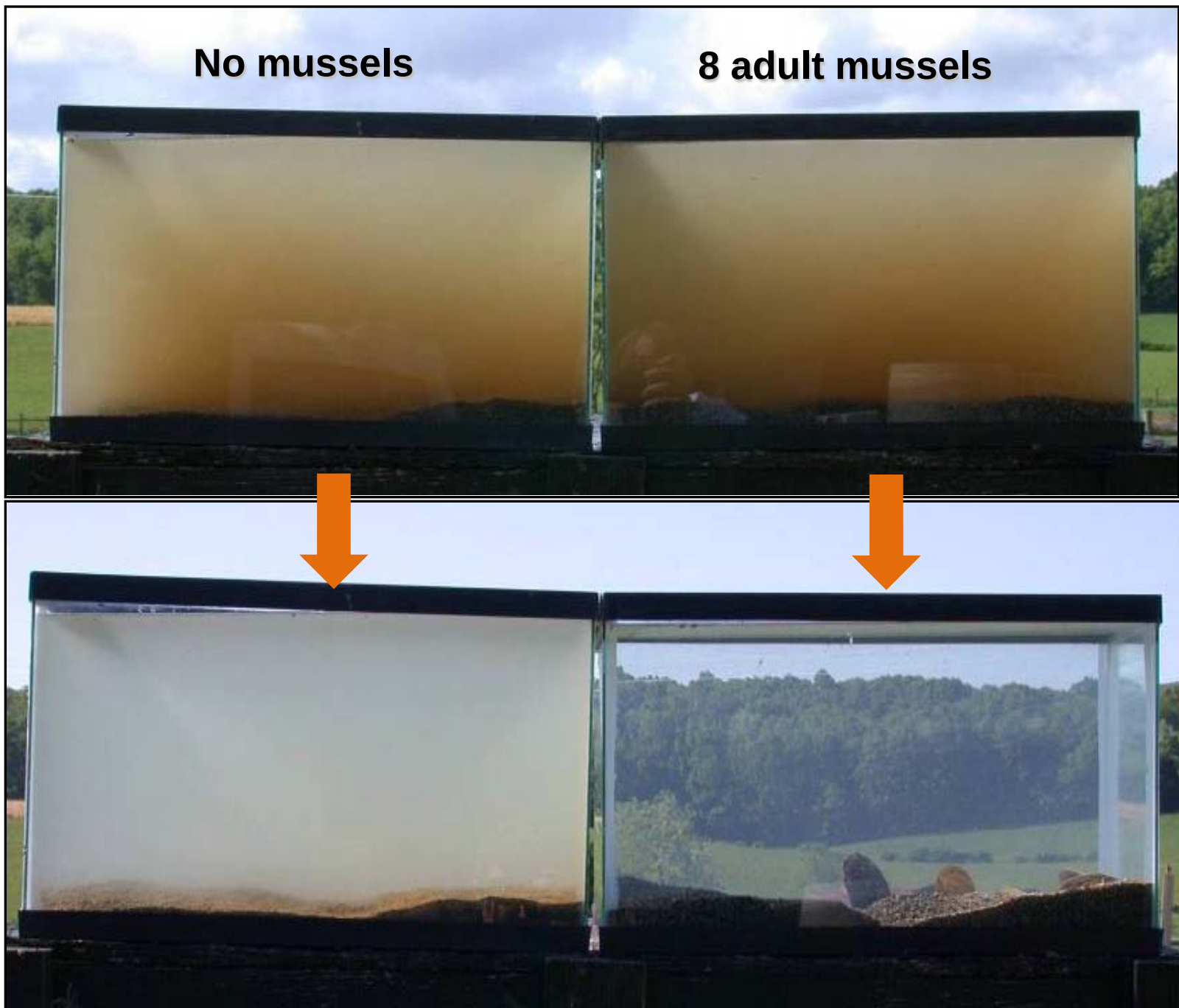


Crassostrea virginica



Geukensia demissa

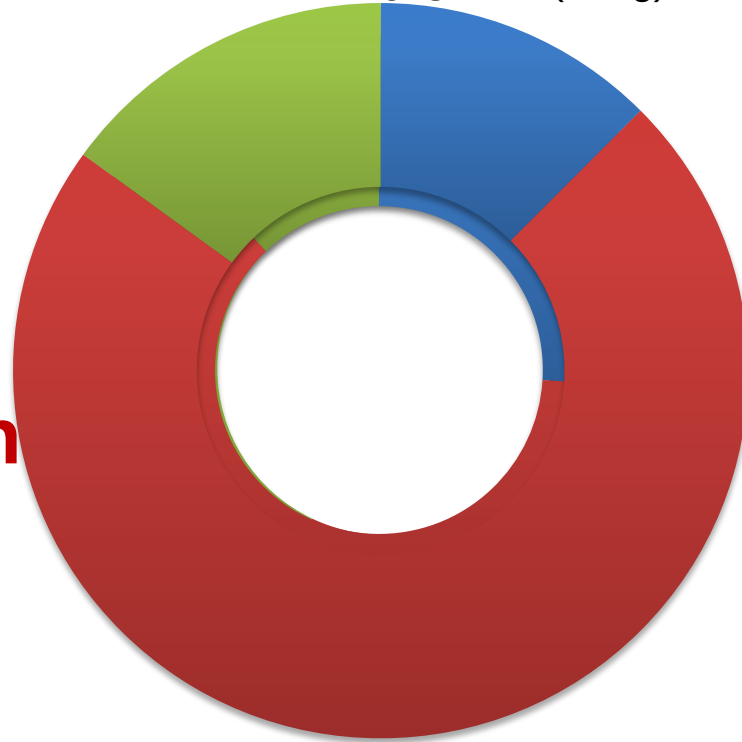




Slide from Catherine Gatenby, USFWS

Population-level Water Processing Water Processing per Unit Biomass

Billions of Liters per Hour
Summer Clearance Rate (L/h/g)



59.0 Billion L/h



Freshwater
Mussel



Marsh
Mussel



Oyster

A diverse and robust assemblage of bivalves in available niches and providing natural capital goods and services



*11 Other Species of
Freshwater Unio
Mussels*

Corbicula fluminea



Mytilus edulis



Mya arenaria



*Mercenaria
mercenaria*



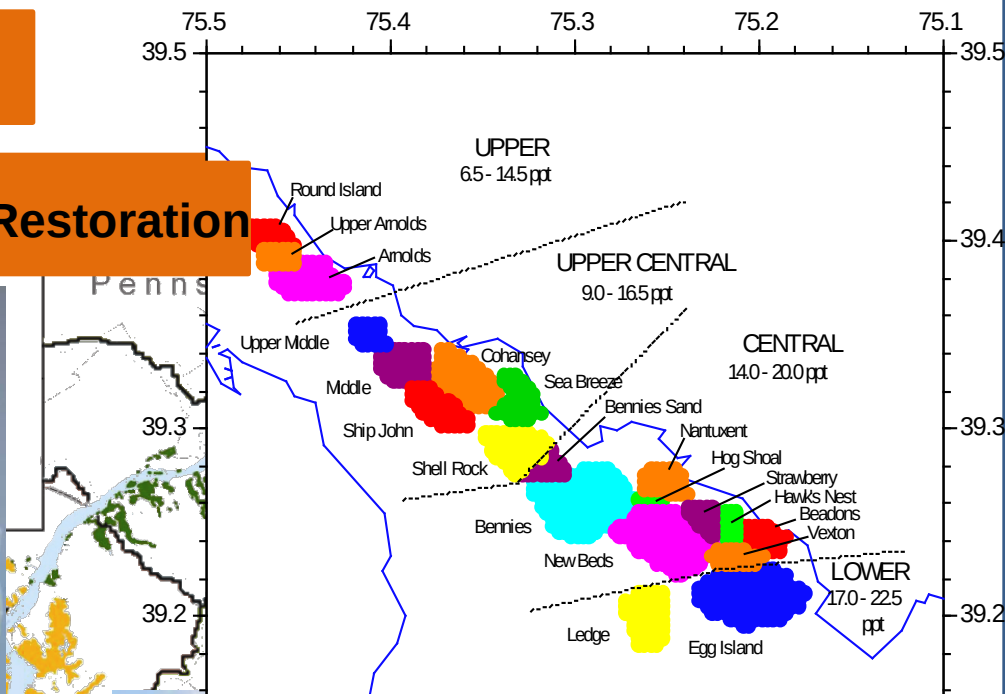
Rangia cuneata

Ensis directus



Habitat Restoration Projects

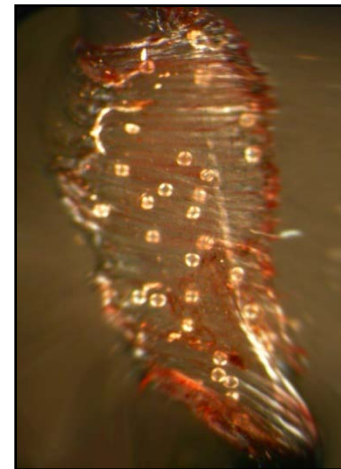
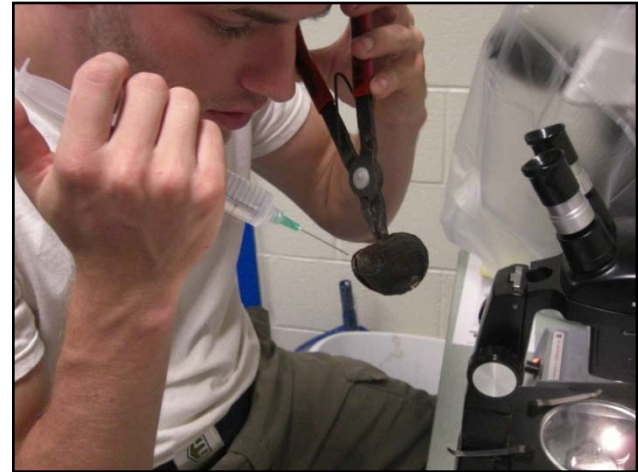
Delaware Bay Oyster Restoration



Strategies

Population Restoration Projects

Freshwater Mussel Restoration Program



Fish gill with glochidia

Juvenile mussel



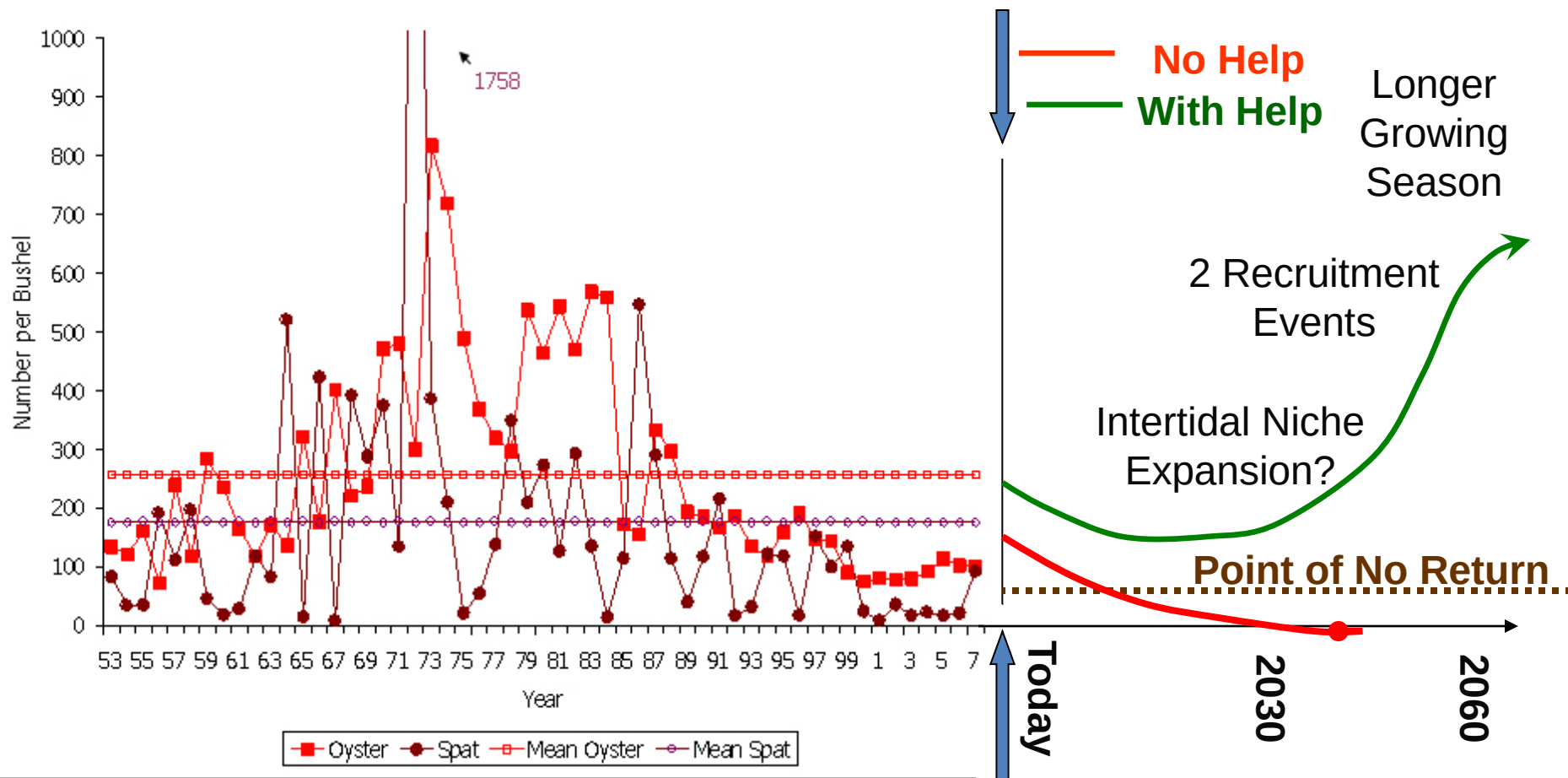
- **Freshwater and marsh mussels provide just as many goods and services as oyster**
- **Bivalves represent excellent targets for ecosystem-based management, conservation and restoration ADD**
- **New technologies exist for restoring and enhancing populations and habitat of all bivalve species**
- **Restoring single habitats or species in a watershed is**
- **Efforts to maintain and improve the ecological health of coastal and estuarine systems may benefit from a holistic approach to conserve and boost the natural capital of bivalve populations throughout the basin**

Thank you



Partners

Could Climate Change benefit oysters?



Historical data from Rutgers Haskin Shellfish Laboratory

