Science, Service, Stewardship

NOAA's Restoration Efforts in Southern New England Coastal Mapping and Data Needs and Uses

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Presentation Topic Outline

- Overview of NOAA Restoration Center programs
- Habitat restoration types and project examples
- North Cape oil spill shellfish restoration program and outcomes
- Future directions for restoration in Southern New England and coastal and subaqueous soils mapping and data needs and applications

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Programs:

Community-Based Restoration Program (CRP)

- Creates partnerships with local organizations
- Provides grant funds through national and regional partnerships (e.g., American Rivers, Restore America's Estuaries, The Nature Conservancy)
- Fosters community support through hands-on citizen involvement in restoration projects
- Leverages technical expertise and grant funds
- Instills natural resource stewardship and a conservation ethic

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North Cape Spill

Programs:

Damage Assessment, Remediation and Restoration Program (DARRP) www.darrp.noaa.gov

- Participate in natural resource damage assessments (NRDAs) with other federal, state, and/or tribal Trustees
- Secure settlement with Responsible Party for injured resources and lost coastal resource uses (e.g., lost access, recreational fishing, boating)
- Restoration of resource losses, injury, and interim losses

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American Recovery and Reinvestment Act of 2009 (ARRA)

- NOAA appropriated $167M in 2009 for “shovel ready” restoration projects
- 803 grant applications received, nationwide requesting $3.2B
- 50 grants awarded including:
  - 6 fish passage projects (2 dam removals, 4 fishways) in RI
  - Marsh hydrology restoration and fish passage project (bypass channel) in CT
  - Marsh hydrology restoration in MA

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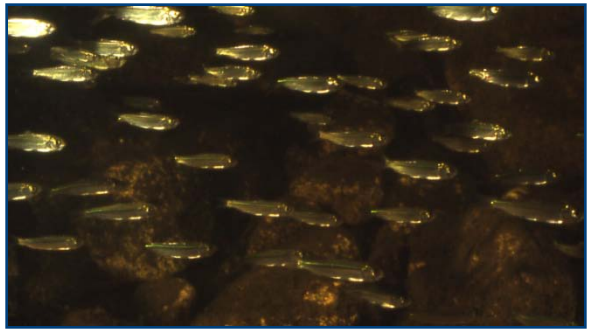
Dam Removal and Diadromous Fish Passage

River Herring, Nemasket River, Middleboro, MA

Saw Mill Dam, Acushnet, MA

Dam Removal with Step-Pool Fishway

Open Rivers Initiative (ORI)



Juvenile Alewife, Indian Lake, South Kingstown, RI

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Dam Removals: Sediment Characterization and Transport Analysis

- Grain size, bulk density, water content, contaminant analysis
- HEC-RAS and Tractive Force analysis

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Dam Removal and Diadromous Fish Passage

- Restore Dynamic Equilibrium and Channel Stability
- Restore Riverine Ecological Services
- Ensure Efficient Passage of Target Species

Lower Shannock Falls Dam,
Shannock, RI

Dam Removal
with Backwater Weir Installation

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Dam Removal and Diadromous Fish Passage

Merrimac Village Dam Removal, Souhegan River, NH

- 17-ft high dam
- Removal August 2008
- Tributary to Merrimac River

Upstream Headcutting

Downstream Deposition

http://www.gulfofmaine.org/streambarrierremoval

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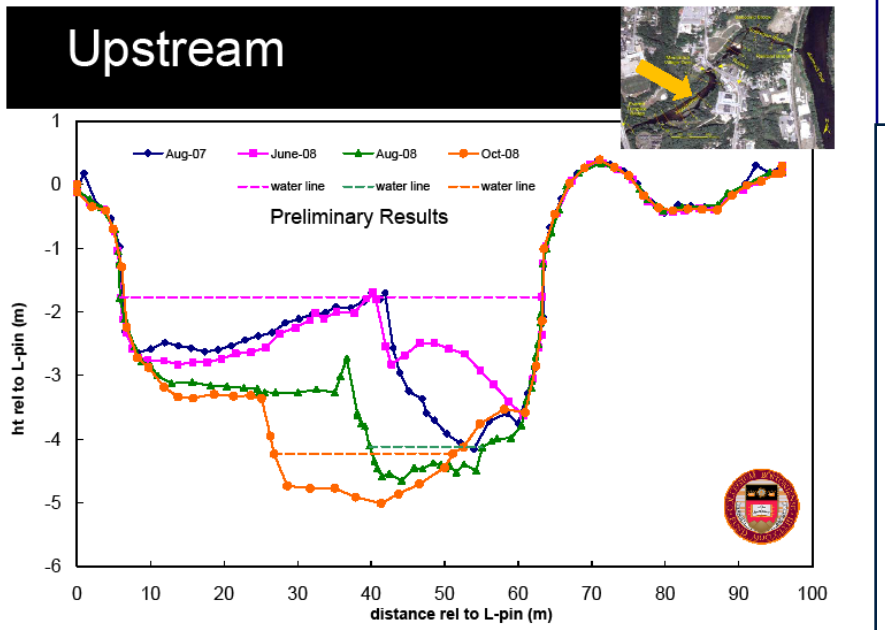
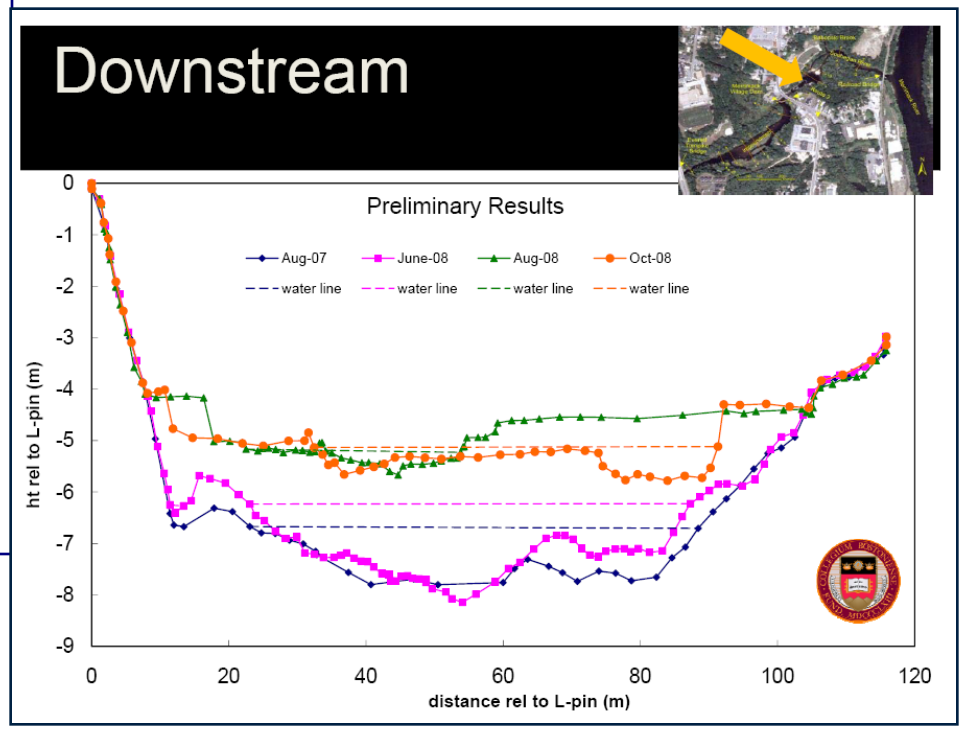
Dam Removal and Diadromous Fish Passage





Source: Pearson et al., 2009

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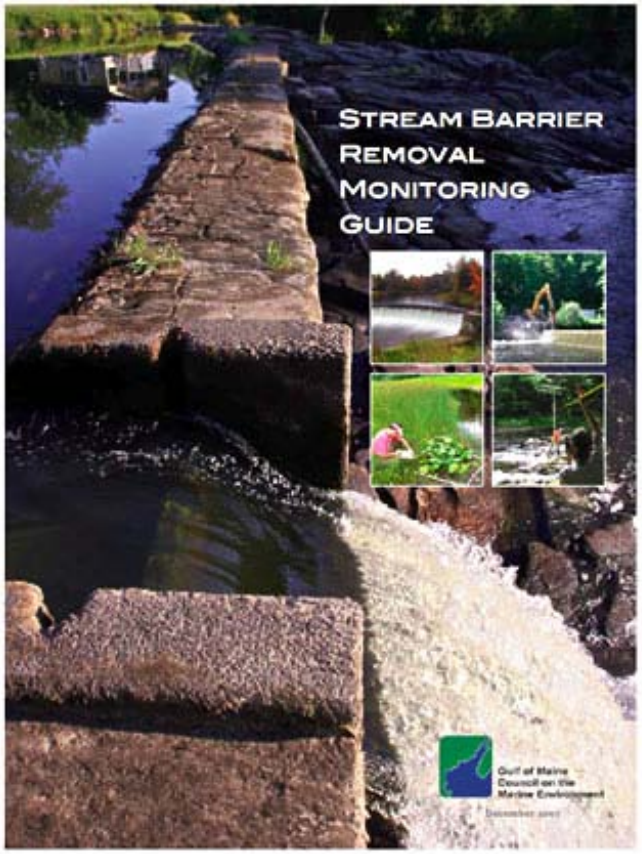
Barrier Removal Monitoring



- GOMC web-based BRM publication released in 2007
- Result of workshop in Orono, ME, June 2006 (U.S. and Canada)
- Detailed methods for stream cross sections, channel profile, sediment grain size, photo stations, water quality, and riparian plant community structure monitoring
- Suggestions for fish methods and state and provincial macro-invertebrate protocols

http://www.gulfofmaine.org/streambarrierremoval

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Tidal Marsh Hydrologic Restoration

Nonquitt Marsh, Dartmouth, MA

Lost Lake Estuary, Guilford, CT

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Tidal Marsh Hydrologic Restoration

Gooseneck Cove Marsh, Newport, RI

- Loss of normal diurnal wetting and drying; waterlogged peat
- Plant stress and mortality due to high sulfides
- Degradation of fibrous peat
- Erosion, suspension and transport
- Loss in elevation

Nonquitt Marsh, Dartmouth, MA

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Tidal Marsh Hydrologic Restoration

Gooseneck Cove, Newport, RI

Potters Cove, Prudence Island, Portsmouth, RI

Walker Farm, Barrington, RI

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Tidal Marsh Loss Through ASLR and Regional Coastal Subsidence

Five Mile River Marsh, Darien, CT

Niering,1972

Shadel and Turek, 2000

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North Cape Oil Spill

- Grounding of barge *North Cape* and tug *Scandia*
- Release of 828,000 gallons of No. 2 heating oil in Block Island Sound nearshore environment during January 1996 storm
- Oil mixed throughout water column causing mortality of 150 million surf clams (*Spisula solidissima*) and other bivalves, lobsters, loons, sea ducks, and other biota
- 379,000 kg of lost shellfish wet tissue biomass
- 9 million lobster killed and lost recruitment
- 111,000 kg of finfish
- 2,100 sea ducks and loons killed, loss of 5-10 piping plover chicks

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North Cape Shellfish Restoration

- Case settlement in 2000 resulted in $1.5M for shellfish restoration
- Surf clam was primary species affected by the spill, but natural recruitment and recovery was expected to return population to baseline conditions within relatively short period
- Target shellfish restoration species: Eastern oyster (*Crassostrea virginica*), bay scallop (Argopecten irradians) and quahog (*Mercenaria mercenaria*)
- Consider Narragansett Bay and coastal pond sites for potential restoration and/or stock enhancement

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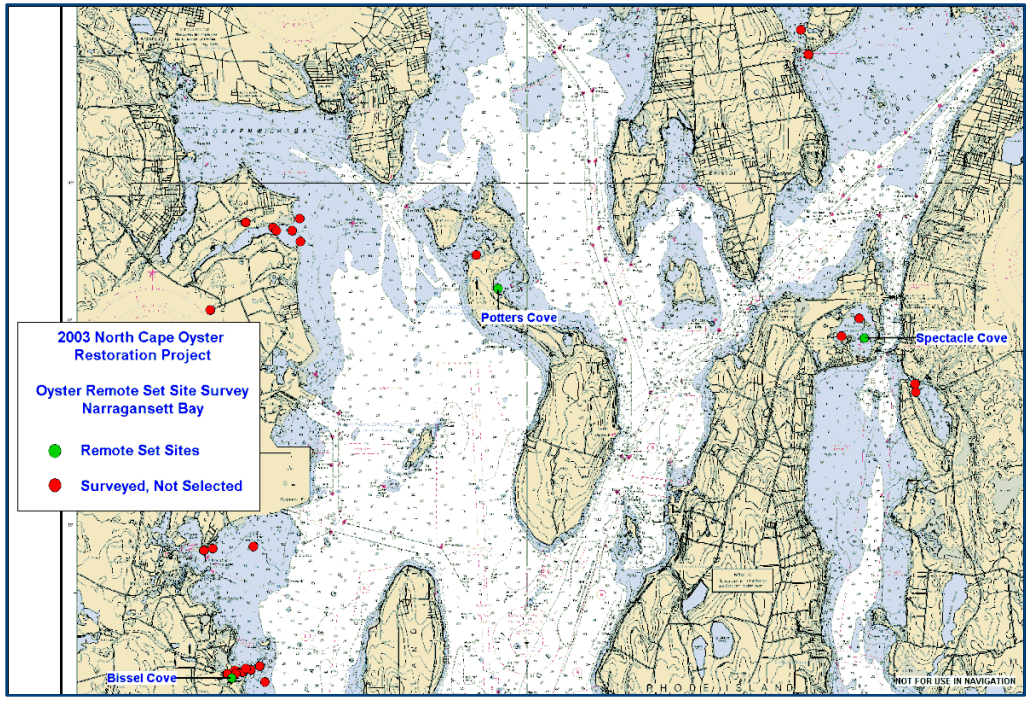
North Cape Oyster Restoration

Release Site Assessment

- Historic documented oyster bed site
- Bottom condition – qualitative field assessment
- Tidal hydrodynamics
- Documented levels of oyster disease and/or predators
- Shellfishing pressure
- Other user conflicts
- 7 sites selected



Upper Narragansett Bay Assessment Sites

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North Cape Oyster Remote Set

Monitoring: Survivorship and growth, visual examination of oyster gonads, computation of oyster condition indices and sampling of the water column for oyster larvae abundance throughout spawning season. Spat settlement collectors deployed to monitor oyster settlement

Volunteer shell-bagging efforts

Oyster spat grown on shell cultch in shallow subtidal waters

5.5 million oyster spat released over 5 years

Oyster release in targeted habitat

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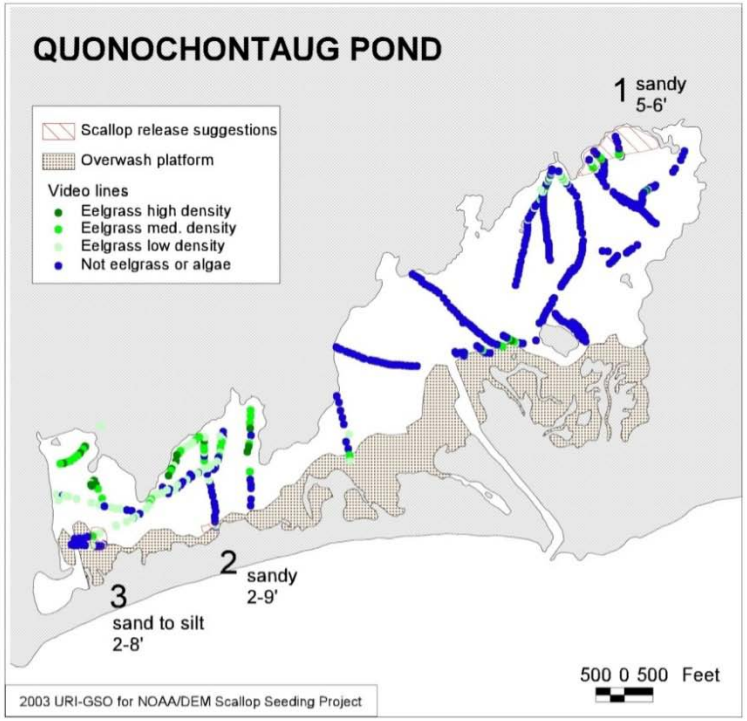
North Cape Scallop Restoration

Underwater Video

- Focus on coastal ponds
- Bottom type and structure
- Submerged vegetation cover

Ford and King, 2003



COMMENTS:

Area 1 -- rocky/sandy shore and rocks interspersed on sandy bottom. Eelgrass throughout area, thick in many areas. Abundant growth of macrophytes (including algae) on moorings in the area.

Area 2 -- just to west of Ski Beach on edge of overwash platform. Thick eelgrass bed from 3-9 feet (mid-tide). All sand.

Area 3 -- just to north & east of overwash platform. Medium to low density eelgrass (likely spots of high density also). Low density eelgrass throughout this basin ("1st Pond"). On edge of overwash platform bottom is sandy, grades to soft bottom with depth.

NOTE: 2-3 may be a continuous bed.

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North Cape Scallop Restoration

Restoration in 5 salt ponds – release of 3.54 million scallops

25+ mm Seed Free Planting

Caged Spawner Sanctuary

Spat Monitoring Bags

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North Cape Quahog Stock Enhancement

Grow-out of 1+ mm seed to 15-20 mm seed for release

RIDEM Coastal Fisheries Lab Upweller

Quahog “Notatta” Seed

Released 761,000 quahogs – In 2005, compared pond bottom grow-out of 2nd year quahogs to seed grown in upweller. Results revealed that upweller produced much higher survival and slightly better growth, but demanded substantially higher investment of staff time.

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Community-Based Quahog Relays and Stock Enhancement

Is substrate type and quality a limiting factor for success?

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Future Oyster Restoration Efforts

Potential limitations on success: prevalence of oyster disease and lack of substrate or substrate inadequate for larval settlement and recruitment

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Community-Based Scallop restoration – Caged Spawner Sanctuaries

Substrate type and quality are limiting factors for success!