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Restoration Strategies for Oysters and Soft-shell Clams

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A Report to the New Hampshire Estuaries Project Shellfish Team

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<u>Oyster Enhancement and Restoration Strategy for 2003 to 2010</u>

7/11/03

<u>Approach</u>

In Chesapeake Bay, scientists have reached consensus on how to proceed with oyster restoration (CRC, 1999; CBP, 2000). The approach is described in detail in the draft Comprehensive Oyster Management Plan (CBP, 2002), which will be adopted by the Chesapeake Executive Council in 2003. In general, the approach calls for:

- Creating a network of oyster sanctuaries protected from harvest, encompassing at least 10% of the historically productive oyster reefs;
- Enhancing oyster reef habitat in sanctuaries by means of reef creation and hatchery production;
- Developing scientifically sound monitoring programs for oyster populations and population dynamics; and
- Incorporating disease management into all aspects of restoration activities, sanctuaries, hatchery production, and managing harvest.

The long-term goal of the Chesapeake oyster restoration program is not just sustainable harvests but also restoration of the habitat and ecological functions of reefs.

The oyster restoration approach for Chesapeake Bay is based on years of intensive research and scientific debate. Although the environment of Chesapeake Bay differs from NH's estuarine waters, this approach—combined with NH-specific research—is likely the best direction for the NHEP to follow in the next decade.

<u>Research Needs</u>

Three of the four components of the Chesapeake Bay strategy are already being addressed in NH. There is already a *de facto* network of oyster sanctuaries around Great Bay because the beds in the tidal tributaries are closed to harvesting due to bacteria pollution. Monitoring programs of oyster populations at the major oyster beds are already in place and managed by the NH Fish and Game Department. Finally, research in the Chesapeake Bay already provides useful information on the effectiveness of disease management strategies to NH managers. The available NHEP funding cannot support better research on this topic. Therefore, NH-specific research should focus on the last remaining component of the Chesapeake Bay strategy: enhancing oyster reef habitat. The NHEP Shellfish Team has developed the following list of research questions for this topic.

- How should reefs be structurally enhanced (if at all) to enhance oyster populations and improve spatsets? (Consider optimal vertical relief, rate of sedimentation, best materials to form core of structure, best materials for veneer of structure, one big reef or combination of smaller reefs.)
- What is the best way to enhance oyster broodstocks at reefs? (Consider seeding with disease-resistant spat, seeding with remote set wild spat. Note that NHF&G will not support inter- or intra-basin transplants of adult oysters.)

<u>Timeline and Work Products</u>

There will be four main steps in the NHEP oyster enhancement and restoration strategy: (1) Answering research questions; (2) Conducting a field trial to demonstrate the effectiveness of the most promising

methods for oyster enhancement and restoration in NH; (3) Developing an Oyster Management Plan; and (4) Implementing the Oyster Management Plan. CRC (1999) estimated that 4-8 years would be needed to demonstrate the effectiveness of reef sanctuaries in field trials. Therefore, the following schedule is proposed:

2003-2007:   Answer research questions (issue RFP)
                Decide on best option for oyster enhancement and restoration
                Develop protocols for field trial

2008-2010:   Conduct field trial at one reef

2011:   Develop Oyster Management Plan (similar to CBP, 2002)

2012-2014:   Implement Oyster Management Plan

2015:   Document attainment of NHEP restoration goals (20 acres restored)

NHEP Goals and Objectives

For the NHEP, the following objectives were written into the Management Plan (NHEP, 2000):
- Restore 20 acres of oyster beds by 2010.
- Maintain bed area and density of harvestable oysters at 1997 levels for 6 key oyster beds.
- Triple the standing stock of harvestable oysters from 1999 levels (50,000 bushels).

Achieving these targets should be the focus of the Oyster Restoration Plan. In the meantime, the NHEP should use the following administrative indicators to track how this strategy is being implemented.
- Answer research questions and develop protocols for a field trial by 12/31/07.
- Conduct field trial by 12/31/10.
- Develop oyster management plan by 12/31/11.
- Implement all aspects of oyster management plan by 12/31/14.

References

CRC (1999) Chesapeake Bay Oyster Restoration: Consensus of a Meeting of Scientific Experts, Virginia Institute of Marine Science, Wachapreague, Virginia. Produced for the Chesapeake Research Consortium by the Virginia Institute of Marine Science, Gloucester Point, VA. June 1999.

CBP (2000) Chesapeake Bay Program Oyster Restoration: Workshop Proceedings and Agreement Statements. Chesapeake Bay Program. March 2000.

CBP (2002) Comprehensive Oyster Management Plan, Draft. Chesapeake Bay Program. November 2002.

New Hampshire Estuaries Project

<u>Clam Enhancement and Restoration Strategy for 2003 to 2010</u>

7/11/03

<u>Approach</u>

Hampton Harbor contains the most productive clam flats in NH's estuarine waters. The clam population dynamics and hydrography of this harbor are unique. Therefore, the enhancement and restoration strategy for the clam resource in Hampton Harbor must be based on a good understanding of the factors controlling the clam population in this particular location.

An NHEP study in 2001-2002 provided useful insight into the factors affecting juvenile clam mortality in the harbor (NHEP, 2002). The author of the study, Dr. Brian Beal, made several recommendations for follow-up research. It is recommended that these follow-up studies as well as other relevant research be conducted until the controlling factors for clam populations in the harbor are well enough understood to prepare a restoration plan.

<u>Research Needs</u>

Based on the results of Beal's study, the NHEP has compiled the following list of clam enhancement and restoration research topics. These research questions will be the basis for a RFP in 2003.
- Can the results of Beal's juvenile clam study be confirmed using the modified study design proposed by Beal (NHEP, 2002, pp. 35-36, items 1, 2, and 4)?
- What are the effects of harvesting on wild and/or cultured clam populations?
- Are there low-cost, low-maintenance technologies to exclude green crabs from clam flats and to stabilize clam flats from erosion?

<u>Timeline and Work Products</u>

There will be four main steps in the NHEP clam enhancement and restoration strategy: (1) Answering research questions; (2) Conducting a field trial of the most promising methods for clam restoration in NH; (3) Developing a Clam Management Plan; and (4) Implementing the Clam Management Plan. Therefore, the following schedule is proposed:

2003-2007:   Answer research questions (issue RFP)
              Decide on best option for clam enhancement or restoration
              Develop protocols for field trial

2008-2010:   Conduct field trial at one flat

2011:   Develop Clam Management Plan

2012-2014:   Implement Clam Management Plan

2015:   Document attainment of NHEP goals

For the NHEP, the following objectives were written into the Management Plan (NHEP, 2000):
- Maintain 10-year average density of harvestable clams for 3 key clam flats in Hampton Harbor.
- Triple the quantity of harvestable clams from 1999 levels.

Achieving these targets should be the focus of the Clam Restoration Plan. In the meantime, the NHEP should use the following administrative indicators to track how this strategy is being implemented.
- Answer research questions, choose best option, and develop protocols for a field trial by 12/31/07.
- Conduct field trial by 12/31/10.
- Develop clam management plan by 12/31/11.
- Implement all aspects of clam management plan by 12/31/14.

References

NHEP (2002) Juvenile Clam Mortality Study at Three Intertidal Flats in Hampton Harbor, NH. A final report to the NH Estuaries Project by Dr. Brian Beal, University of Maine at Machias, Machias, ME. December 2002.