

Memorandum

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Subject **Town of Orleans, MA
Water Quality and Wastewater Planning
Task Number 10.1.B.1 – Demonstration Projects-Design and Implementation –
Shellfish/Aquaculture - Lonnie's Pond Year 1 Project Report Outline**

Project Number 60476644

From Thomas Parece, P.E., AECOM Project Manager

Date 12/29/16

Approvals

	Date	Signature / Initials
George Meservey, Orleans, MA Director of Planning & Community Development		_____
Michael Domenica, PE, Water Resources Associates, Program Manager		_____

1. Project Purpose and Background

- A. Purpose of Year 1 of the Lonnie's Pond Oyster Aquaculture Demonstration Project
 - 1) Quantify the total oyster biomass needed in Lonnie's Pond to fully achieve nitrogen reduction goals. To make this determination, several parameters were monitored and measured:
 - a. Growth rate of oysters in Lonnie's pond (grams/season);
 - b. Nitrogen content in the shell and soft tissue of oysters that reach harvestable size;
 - c. Water quality changes due to filter feeding by introduced oysters;
 - d. Quantification of sediment denitrification rates attributable to oysters in Lonnie's Pond; and
 - e. Evaluation of oyster impacts on other sediment and benthic processes.
 - 2) Determine the area needed to grow this biomass.
 - 3) Design and test a system for growing oysters that optimizes the use of space and addresses the known predation and soft sediment issues in Lonnie's Pond.

- 4) Design and test a system for overwintering oysters that addresses the known predation and soft sediment issues in Lonnie's Pond and which also reduces overwintering mortality.
 - 5) Document costs associated with oyster aquaculture.
- B. Selection of Lonnie's Pond for Demonstration Location
- 1) Peer-reviewed decision making process and participants:
 - a. Technical Team (scientists, engineers, growers);
 - b. Shellfish Working Group; and
 - c. Peer Review Team (Barnstable County Cooperative Extension, Henry Lind, Sandy Macfarlane, Chatham Shellfish Propagation department).
 - 2) Scientific review and analysis of selection criteria using decision matrix approach:
 - a. Ample tidal flushing and exchange in Lonnie's Pond;
 - b. Ample food supply;
 - c. Available area;
 - d. Sediment type expected to be conducive to denitrification;
 - e. Ability to monitor inputs from channel and herring run effectively;
 - f. Ability to monitor impacts of oysters effectively; and
 - g. Replicability to other sites (terminal ponds are most impaired and will require floating gear due to soft bottom conditions).
- C. Design of Lonnie's Pond Demonstration
- 1) The Lonnie's Pond demonstration was designed to meet two key project goals:
 - a. Ability to monitor water and sediment impacts from oysters; and
 - b. Ability to replicate growing system in other impaired waters.
 - 2) Engineering, grower and scientific review and analysis for:
 - a. Location within the pond (pond circulation, access, visibility);
 - b. Gear type (floating gear to address issues of predation and soft sediment); and
 - c. Seed size (larger seed has higher filtration rate, able to monitor effects of adult oysters in first year).
 - 3) Decision making Process and Participants:
 - a. Technical Team (scientists, engineers, growers); and
 - b. Shellfish Working Group.

2. Installation Details

- A. Permitting and Ongoing Public Information for Lonnie's Pond Demonstration:
- 1) Conservation Commission Request for Determination of Applicability (RDA) with abutter notification (permission granted);
 - 2) Meeting with Friends of Lonnie's Pond;
 - 3) Informational flyer posted at the herring run (in close proximity to the Project);
 - 4) Newspaper coverage;
 - 5) Bi-weekly email updates; and

- 6) Monthly Shellfish Working Group meetings.
 - B. Demonstration layout.
 - C. Number and size of oysters installed per floating bag.
 - D. Process for selecting installation approach/peer review.
- 3. Measuring of Oyster Growth (June – November)**
- A. Number and locations (within the field) of bags sampled.
 - B. Analytical approach used for weighing oysters.
 - C. Analytical approach used for determining length.
 - D. Analytical approach used for determining percent content of nitrogen in shell and soft tissue.
- 4. Operation and Maintenance (June – November)**
- A. Timing, frequency, level of effort.
 - B. Meeting requirement of no disturbance to sediment.
- 5. Overwintering Details**
- A. System layout, footprint and oyster biomass installed.
 - B. Process for selecting overwintering approach (designed in consultation with Orleans growers, Maine Cooperative Extension, Mook Sea Farms, Executive Director of East Coast Shellfish Growers Association, and a Canadian oyster farm that regularly overwinters market-size oysters).
- 6. Preliminary Cost Analysis**
- A. Labor and materials required for seasonal grow-out.
 - B. Labor and materials required for overwintering installation.
 - C. Costs associated with demonstration (specialized engineering, monitoring, public outreach and information, reporting).
 - D. Market value of oysters if sold.
- 7. Summary of Monitoring Results and Recommendations**
- A. Summary of Results from SMAST Monitoring Report**
 - B. Proposed approach for full scale demonstration project implementation:**
 - 1) Private aquaculture growing operation;
 - 2) Permitting requirements;
 - 3) Biomass production requirements for nitrogen-removal;
 - 4) Operation and maintenance requirements for compatibility with other uses of Lonnie’s Pond; and
 - 5) Reporting and enforcement requirements
 - C. Next Steps:**
 - 1) Peer review of Lonnie’s Pond Year 1 Report.
 - 2) Decision to proceed with Year Two of Lonnie’s Demonstration.
 - 3) Permitting for Year Two of Lonnie’s Demonstration.