MARYLAND DEPARTMENT OF NATURAL RESOURCES

Substrate Requirements for Oyster Management

A Report To The Governor And The Maryland General Assembly
December 31, 2023
As required by the 2022 General Assembly Session
Senate Bill 830 and cross-filed House Bill 1228
Publication Number MSAR 14098
Maryland Department of Natural Resources Fishing and Boating Services

Background

Maryland General Assembly's 2022 session, Senate Bill 830, cross filed with House Bill 1228

DNR shall submit a plan describing the substrate needs for oyster repletion, aquaculture, and restoration activities in the State over the next 10 years.

The plan shall include:

1. *an estimate of the quantity of the substrate materials that will be needed and the purposes for which the substrate materials will be used;*
2. *an overview of the full spectrum of substrate materials available;*
3. *an analysis of the availability, sourcing, and relative cost of each substrate material;*
4. *an estimate of the total and annual costs of implementing the plan; and*
5. *opportunities for improving the cost–effectiveness of substrate acquisition and use, including opportunities for increasing coordination with the Commonwealth of Virginia, undertaking larger–scale projects to take advantage of economies of scale, and reducing mobilization and demobilization costs.*

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Report Sections

1. Type of substrate materials
   a. Description
   b. Spat recruitment potential
   c. Availability
   d. Sources
   e. Costs

2. Estimate of needs and costs
   a. Sanctuary
   b. Public fishery
   c. Aquaculture

3. Overall needs and cost
4. Opportunities for improvement in cost effectiveness

Restoration Needs and Cost

Estimated needs and cost for just the raw material over the next 10 years if used fresh shell (bushels) for spat-on-shell within sanctuary restoration projects		
Large-scale restoration	337,920	$2 million
Eastern Bay project	352,000	$2 million
Small-scale restoration	144,000	$864,000
Marylanders Grow Oysters program	8,530	$51,180

Note: Based on current known DNR projects. Cost estimates are just for the shell and not cost associated with producing and planting spat-on-shell.

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Replenishment Needs and Cost

Estimated needs and cost for just the raw material over the next 10 years if used fresh shell (bushels) within public fishery replenishment projects		
Replenishment Program (shell)*	5 million to 10 million	$30 million to $60 million
Replenishment Program (spat-on-shell)	720,000	$4 million
Eastern Bay Region Project (spat-on-shell or shell)	400,000 to 1.1 million	$2.4 million to $6.6 million

* Based 2 to 1 ratio of shell planted versus oyster harvested to maintain productive fishery oyster reefs. Cost estimates are just for the shell and not cost associated with producing and planting spat-on-shell.

Aquaculture Needs and Cost

Estimated needs and cost for just the raw material over the next 10 years if used fresh shell (bushels) within aquaculture		
Aquaculture	6 million	$36 million

The current yearly average for reported plantings for aquaculture is 229,000 bushels of shell. Assuming 10% growth, the 10 year demand will grow to almost 600,000 bushels of shell per year for aquaculture. This estimate is likely conservative.

Overall Needs and Costs

An ESTIMATED maximum need for fresh shells over next 10 years:

- 17.502 million bushels assuming the current projects and programs remain constant
- $105,012,000 using recent cost estimates for shell, not including planting costs
- Planting costs range based on distance traveled, planting deployment method, and if fresh shell or spat-on-shell is being planted.

Note: Used an estimated ratio for shell-only and spat-on-shell projects within public fishery replenishment program and the Eastern Bay Project.

Overall Needs and Costs

- Raw material costs: alternative substrate less than shell
- Planting costs: alternative substrate more (??) than shell
  - Large-scale restoration: varies by material type → increased oversight, exact placement, placement methodology, multiple bathymetric surveys, and tweaking placement
  - Fishery/Aquaculture: varies by material type → increased trips by traditional run boats because heavier material? placement methodology? exact height placement? transportation to loading area?

???

- DNR submitted permit to USACE/MDE for planting spat-on-substrate and substrate baywide
  - Decreases need for shell

Improving Cost-Effectiveness

- Shortage of shell on land ready to be used today based on current needs
- Multifaceted issue → three sectors
- Not just one option will solve the shell shortage; instead multiple sources of shell and substrate will be required to meet all the needs of Maryland
- Opportunities for improving cost effectiveness:
  - retain more shell after harvest within Maryland
  - economy of scale
  - others??