USA: New Jersey-Delaware: Delaware Bay Oyster Restoration Project

Overview

The Delaware Bay Oyster Restoration Project is a cooperative initiative carried out by the Delaware Bay Oyster Restoration Task Force to revitalize the Eastern oyster (Crassostrea virginica) population in Delaware Bay. A signature species of the Delaware Estuary and a commercially important fishery, the once-abundant Eastern oyster has experienced serious population declines as a result of over harvesting and Dermo disease. With congressional support and federal funding, the task force coordinated the planting of more than 280,000 bushels of ocean quahog, surf clam and Maryland oyster shells at several sites in New Jersey and Delaware in the summer of 2005. Between June and July 2007, an additional 550,000 bushels of clam shells will be planted at existing oyster beds in an attempt to build on past successes. These planting efforts are ultimately aimed at addressing the issue of low larvae recruitment in existing beds and at stabilizing oyster populations in the bay in order to revive the oyster industry in surrounding communities.

Project Details

Lead Entity:

Delaware Bay Oyster Restoration Task Force

Lead entity types:

- Regional NGO

Adaptive management

Describe adaptive management processes and mid-course corrections taken to address unforeseen challenges and improve outcomes in each of the following categories:

State of Progress:

- Implementation

Project Start:

2005-07-07

Project End:

2005-07-07

Total budgeted expenses:

- USD 2-5 million

Global Regions:

- Northern America
- Americas
- World

Countries:

- United States of America

Ecosystem Functional Groups / Biomes:

- Marine shelf biome

Ecosystems:

- Shellfish beds and reefs

Extent of project:

- Other

Extent of restoration:

- Other

Degradations:

- Other industrial and urban development
- Over hunting and over fishing, including poaching (including plants)

Description:

Between one and two million bushels of eastern oysters were harvested every year during the 1930s, when the population initially began to decline. The introduction of the oyster disease MSX in the 1950s, followed in the 1990s by a second disease, Dermo, has resulted in a further decline in the oyster population. Today, the oyster population is feeling the effects of five years of below-average biological recruitment for reasons that are not known.

Planning and Review

Goals and Objectives

Was a baseline assessment conducted:

UNSURE

Was a reference model used:

UNSURE

were_goals_identified:

YES

Goals and objectives:

- Other

Goals Description::

The goal of this project is the complete revitalization of Delaware Bay oysters and the industry that once thrived upon them. The annual harvest goal by the year 2009 is between 200,000 and 400,000 bushels. (In 2004, by comparison, the oyster industry was allocated only 100,000 bushels.)

Stakeholder Engagement

Were Stakeholders engaged?:

unsure

Description of Stakeholder Involvement:

The members of the Delaware Bay Oyster Restoration Task Force--as well as their constituents and affiliates--are stakeholders in this project, as are the communities around the bay that depend on the oyster industry for their livelihood.

Ecosystem Activities and Approaches

General Activities: During the summer of 2005, the Delaware Bay Oyster Restoration Task Force initiated a large-scale oyster shell-planting and transplant program using 280,000 bushels of shell (approximately 10,500 tons) spread over 150 acres. The program consisted of six shell plants in New Jersey and two shell plants in Delaware. Three types of shell were planted: surf clam shell obtained from New Jersey shucking houses, ocean quahog shell obtained from New Jersey shucking houses, and Maryland oyster shell obtained from shell mining operations in Chesapeake Bay. Shell planting was carried out in July 2005. Three 25-acre grids received direct plants in New Jersey: Shell Rock 4, 12, and 43. A fourth plant off Reed's Beach was moved up bay in September to Bennies Sand 11. All three types of shell were planted in New Jersey--surf clam, quahog, and oyster. In Delaware, two 25-acre areas were planted, one on the Jigger Hill bed and the other on the Lower Middle bed. Maryland oyster shell was planted in both areas, and ocean quahog shell was also planted on Lower Middle. With the new substrate in place, recruitment estimates were obtained via three sampling sources. In October, samples were taken by oyster dredge in survey mode as a component of the oyster stock assessment program. In October, diver samples were obtained as a component of the dredge calibration program. In early November, samples were obtained by scientific dredge as part of the growth and mortality monitoring program.

Categories of ecosystem restoration activities and approaches utilized:

- Ecological restoration

Project Outcomes

Eliminate existing threats to the ecosystem: The 2005 planting effort yielded a 10% increase in oyster recruitment despite an overall population decline in areas outside the seed beds. It is thus concluded that recruitment enhancement programs were successful. In New Jersey, where a quantitative evaluation is easier, the shell plants raised the ratio of spat to oyster on Shell Rock from 0.471 to 0.991 and on the high mortality beds (Bennies Sand, Bennies, New Beds, Ledge, Egg Island, Vexton, Nantuxent Point, Beadons, Hog Shoal, Strawberry, and Hawk's Nest) from 0.808 to 0.905. This latter was accomplished even though only one high mortality bed, Bennies Sand, received a shell plant. In the 53-year history of the New Jersey survey, a bay-wide set exceeding 1 spat per oyster has happened only 17 times. Values above 0.5 generally are associated with stock expansion. Consequently, the ratios achieved on these two beds are substantive. Shell planting in New Jersey in 2005 enhanced recruitment by 10%, even though the total area planted was a mere 100 acres. On Shell Rock, shell plants accounted for 52.4% of total recruitment. On the high mortality beds, the single shell plant on Bennies Sand 11 accounted for 10.7% of total recruitment. Comparisons in Delaware can only be made on a per bushel basis. Nevertheless, data from the Delaware survey indicates that shell planting successfully enhanced recruitment. The average spat/bushel, based on 15 samples, for the Ridge/Jigger Hill area was 8.1. The average spat/bushel, based on 6 samples, for the Lower Middle bed was 23.3. Whereas the average spat/bushel for all Delaware beds was 14.5 (+/- 3.53), the shell plants yielded an average of 43 spat/bushel. This represents at least three times the bay average, and it is likely an underestimate given the difficulty of tracking results for the Maryland oyster shell. Factors limiting recovery of the ecosystem: Recruitment rates were lower in Delaware, and this is due, to some extent, to more concentrated shell planting and to the reliance on Maryland oyster shell. On Upper Middle, the lower recruitment rate is likely explained by the fact that oyster shell was planted more thickly here than elsewhere to build up bed integrity. Elsewhere in Delaware, ocean quahog shell was planted as a base for a cover of Maryland oyster shell. Therefore, ocean quahog shell did not obtain the recruitment success of other plants, even though it was shown to be equally as effective as surf clam shell in facilitating settlement. Maryland oyster shell tended to be lower in total spat catch across the planting sites, but this may have been due to a couple of factors: (a) the lateness of planting and/or (b) the difficulty in tracking planted shells. This difficulty arose because as time went on, the Maryland oyster shell lost its original unique appearance. Final numbers for the Maryland shell plants are therefore less precise and are most likely underestimated in comparison to the clam shell plants. Even in light of these intervening factors, though, evidence suggests that the recruitment rate in Delaware waters in 2005 was lower overall. Another factor that will ultimately limit the recovery of oysters at the planting sites is an increasing trend in natural mortality from Dermo disease. Dermo prevalence in the area of the bay used for shell planting is typically above 50%. Although the impact of disease on the animals obtained from shell plants cannot yet be determined, the data suggest that an average exposure will occur and that mortality from Dermo will be observed among newly recruited oysters. Economic vitality and local livelihoods: Over time, the shell-planting and transplant program currently underway in Delaware Bay could increase oyster production to between 200,000 and 400,000 bushels per year. According to projections, the restoration project will generate $50 for every $1 invested during its first harvests in 2008 and 2009. If project goals are realized, the potential economic impact of a revitalized oyster industry would constitute as much as $60 million between the two states. This revenue would not only help revitalize and sustain the oyster population in the future; it would also represent a much-needed boost for the livelihood of many coastal communities dependent upon the resource.

Monitoring and Data Sharing

Does the project have a defined monitoring plan?:

NO

Open Access URL:

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Long Term Management

STAPER