United States
Environmental Protection
Agency

Office of Water
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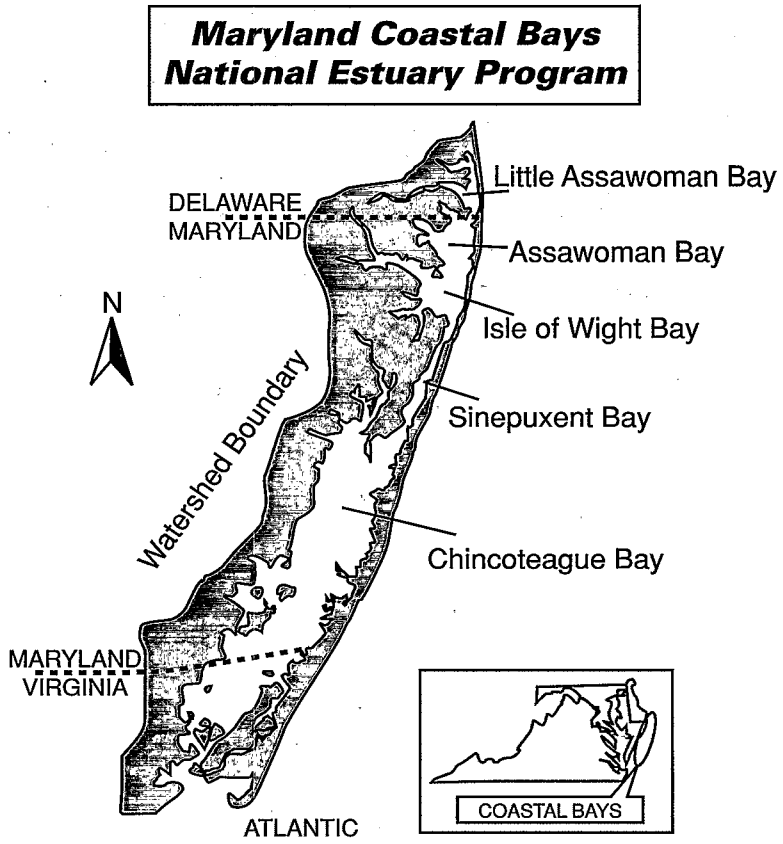
Bay Scallop Restoration Project in Chincoteague Bay

The Maryland Coastal Bays Program

Characteristics

The Coastal Bays' estuary system includes Assawoman, Isle of Wight, Sinepuxent, Newport and Chincoteague Bays, plus 23 creeks and tributaries which feed the bays. These bays are shallow water lagoons, located behind Ocean City and Assateague Island, where freshwater and saltwater mix. The entire system covers 175 square miles, with an average depth of approximately four feet. The Coastal Bays are surrounded by a year-round population of 27,000 residents, however, during the summer vacation season, that number swells to more than 250,000 people each week.

The Coastal Bays' watershed, the land area draining into the bays, has a relatively small land-to-water ratio--meaning the land area is a little less than twice the size of the bays themselves. Unfortunately, this means that anything placed, spilled, sprayed, drained or buried in the watershed, has a good chance of eventually ending up in the bays. Compounding this problem is the bays' slow flushing rate. There are only two openings from the ocean to the bays--through Ocean City and Chincoteague inlets—this constricted access means it takes 63 days for 99% of the water in Chincoteague Bay to be replaced by tidal exchange.



The National Estuary Program

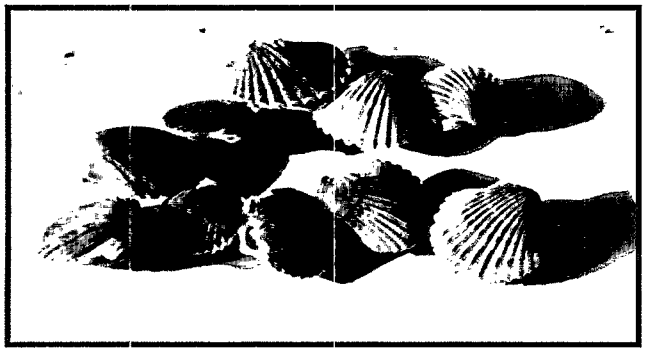
Estuaries and other coastal and marine waters are national resources that are increasingly threatened by pollution, habitat loss, coastal development, and resource conflicts. Congress established the National Estuary Program (NEP) in 1987 to provide a greater focus for coastal protection and to demonstrate practical, innovative approaches for protecting estuaries and their living resources.

As part of the demonstration role, the NEP offers funding for member estuaries to design and implement Action Plan Demonstration Projects that demonstrate innovative approaches to address priority problem areas, show improvements that can be achieved on a small scale, and help determine the time and resources needed to apply similar approaches basin-wide.

The NEP is managed by the U.S. Environmental Protection Agency (EPA). It currently includes 28 estuaries: Albemarle-Pamlico Sounds, NC; Barataria-Terrebonne Estuarine Complex, LA; Barnegat Bay, NJ; Buzzards Bay, MA; Casco Bay, ME; Charlotte Harbor, FL; Columbia River, OR and WA; Corpus Christi Bay, TX; Delaware Estuary, DE, NJ, and PA; Delaware Inland Bays, DE; Galveston Bay, TX; Indian River Lagoon, FL; Long Island Sound, CT and NY; Maryland Coastal Bays, MD; Massachusetts Bays, MA; Mobile Bay, AL; Morro Bay, CA; Narragansett Bay, RI; New Hampshire Estuaries, NH; New York-New Jersey Harbor, NY and NJ; Peconic Bay, NY; Puget Sound, WA; San Francisco Bay-Delta Estuary, CA; San Juan Bay, PR; Santa Monica Bay, CA; Sarasota Bay, FL; Tampa Bay, FL; and Tillamook Bay, OR.

The Problem:

Currently, large bivalves are at historically low levels in the coastal bays--oysters because of parasites, predators and fouling organisms -- hard clams due to overharvesting. These species serve an important role in the bays as important filter feeders and prey species. Filter feeding bivalves are important in cycling organic matter from the water column to the bottom, and serve as a key trophic link between primary producers and higher consumers. Over the past six decades these ecological roles have considerably diminished in the bays with the demise of the bays' larger bivalve species.



Historically, this region once supported large populations of bay scallops. The ribbed mollusks, -- a vital link in the coastal bays food chain -- were wiped out in the 1930s when eelgrass was eliminated due to an eelgrass blight which devastated the East Coast. The blue eyed bivalves need the grasses to escape predators and siltation -- when those grasses died, so did the scallops. Although eelgrass has recovered, the bay scallop has not returned, in large part due to the absence of any broodstock population close enough to repopulate the area.

The Project

In an effort to restore scallops to the Coastal Bays area, the Scallop Restoration Project was implemented. The purpose of the Scallop Restoration Project in Chincoteague Bay was to provide and protect broodstock by planting hatchery-reared juvenile scallops in predator exclosures. The scallops are expected to mature, reproduce and begin to restore this lost resource.

Introduction to the Maryland Coastal Bays Program

For more than a century, life on the Coastal Bays has depended on the ocean, bays, and their tributaries. Fishing, hunting, agriculture and more recently tourism, which support this coastal community are all dependent upon the land and water resources of the bays area.

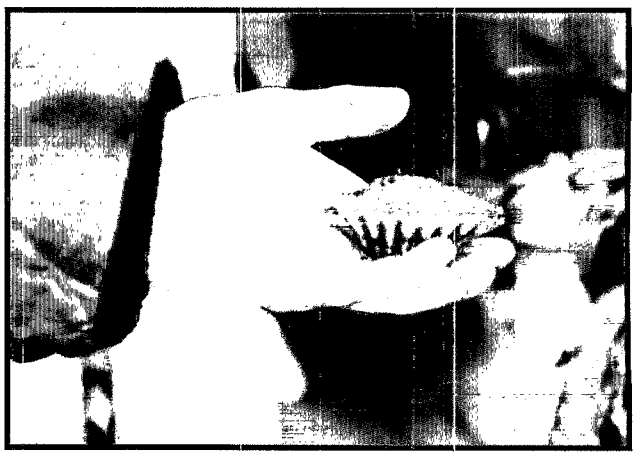
An environmental characterization of the bays has found excessive levels of nitrogen resulting in algal blooms that reduce oxygen levels in bay waters; loss of natural habitats for fish, crabs, birds and other wildlife; declines in numbers of fish, clams, crabs and other important species; local bacterial contamination; and negative impacts from boating, dredging, and other water-based activities.

Seagrass communities, which had been decimated, have begun to recover in the southern and eastern sides of the bay, particularly in Chincoteague Bay, but continue to be sparse in the northern bays. In general, living resource communities are more degraded in the northern bays and artificial canals, while the southern bays are comparatively healthier.

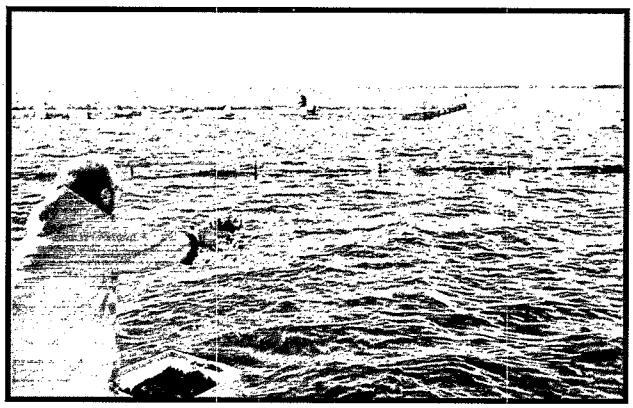
The Maryland Coastal Bays Program, established in 1995, is actively involved in the development of a management plan to address these issues. In a collaborative partnership of citizens and elected officials from Worcester County, Ocean City, and Berlin, Maryland with representatives from various federal and state governmental agencies, it is hoped that realistic and common sense solutions to these problems will be developed.

Overview of the Project

Over 60 years ago, the bay scallop (*Argopecten irradians*) disappeared from Chincoteague Bay soon after a disease virtually wiped out eelgrass (*Zostera marina*) beds in the region. Although eelgrass has since repopulated a substantial portion of Chincoteague Bay, bay scallop populations have not recovered. In 1998 small numbers were discovered in the Maryland and Virginia portions of Chincoteague Bay, this appears to be a range expansion of the North Carolina subspecies.



In 1996, Maryland's Department of Natural Resources' Shellfish Monitoring Program initiated investigations into restoring the bay scallop in Chincoteague Bay. Scallops require vertical structure, such as seagrasses, for settlement, to avoid predators and suffocation from silt. The scallops also require salinities over 20 ppt, along with clean, hard packed sand substrate throughout their life cycle. Such conditions were found to exist in a number of areas along the eastern side of Chincoteague Bay. That same year, the Shellfish Monitoring Program applied for and received funding from NOAA's Fishing Industry Grant Program (FIG) to begin a bay scallop restoration project.



In October, 1997, 533,000 seed bay scallops were purchased from a hatchery and transplanted to Chincoteague Bay. The 8 mm bivalves were placed into 80-foot square predator exclusion pens, constructed in about 3 feet of water over seagrass beds. Records were kept on growth and survivorship, along with measurements of recruitment success. By mid-November, the scallops had tripled in size and survivorship exceeded 85%. Overwintering mortality, usually substantial throughout its geographical range, was relatively minor, on the order of 25-30%.

Implementing the Project

In May, 1998, evidence of spawning was found in the transplanted scallops and the larvae were collected from the water column. This initial spawning continued through early August, a second reproductive event occurred in late September. Spat collector bags were deployed to catch the setting larval scallops and were retrieved in November. In addition, the seagrass beds were surveyed for juvenile scallops using a suction dredge sampler, which is non-destructive to eelgrass.

The original FIG grant provided for two years of scallop seedlings. The second year was supplemented with a Maryland Coastal Bays Program mini-grant, allowing the planting of over 700,000 seed bay scallops with an average length of 20 mm. The larger size should enhance survivorship and reproductive effort next summer. Three additional 100-foot square exclosures, in proximity to the first pens, have been constructed to protect the young scallops. Baited crab pots were placed within the pens to further control and monitor predators.

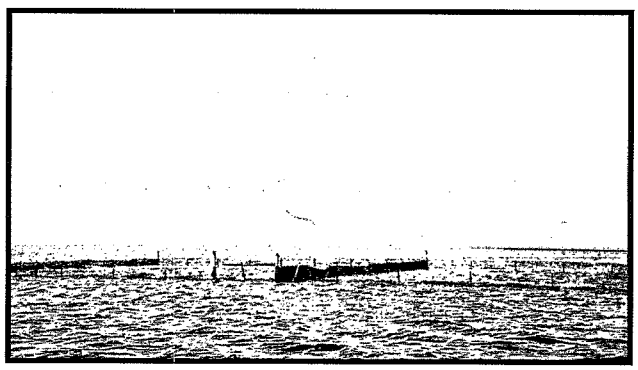
Success Stories

The combined reproductive effort of the protected scallops, along with the progeny of last year's planting, presumably will overwhelm predation pressure sufficiently to allow a self-sustaining population of bay scallops to become established. Monitoring by the Maryland Department of Natural Resources and the Virginia Institute of Marine Science discovered 'wild' bay scallops in Chincoteage Bay this past summer. These observations mark the return of this ecologically and economically important species to Chincoteague Bay after a 60-year absence. Scientists anticipate restoring the scallops to their ecological niche will positively impact everything from fish to water clarity.

Future Management Implications

Scallop restoration is just one part of the picture, the recent comeback of seagrasses is integral to the return of these once ßimperiled mollusks. Although seagrass beds have been re-establishing in Maryland's Coastal Bays, expansion to its historical range may be limited by many factors, including increased nutrient runoff from land, as well as physical impacts from recreational boating and commercial fishing activities, particularly hydraulic clam dredging.

Nutrients from stormwater runoff, atmospheric deposition, and groundwater continue to threaten seagrass recovery in some areas. Eutrophication may further impact the scallops by increasing macroalgal populations, which can smother existing seagrass. Projects are underway to develop habitat criteria, i.e., water quality, sediment type, and wave exposure for seagrasses within the bays.



Impacts from recreational and commercial boating activities are also being studied in an effort to protect the resource. Hydraulic clam dredging has been identified as a potentially significant factor impacting seagrass in the northern Isle of Wight Bay. Restoring the scallop population will increase scallop harvesting, therefore management measures to protect seagrasses during scallop harvesting need to be in place to avoid ruining the resource.

Seagrasses must be protected from all of these threats in order to allow the scallops to survive. Because the grasses serve as a nursery for almost every species of crab and fish sought by recreational and commercial fisherman, scientists hope management tools for the grasses will boost the local economy and, along with it, the local ecology.

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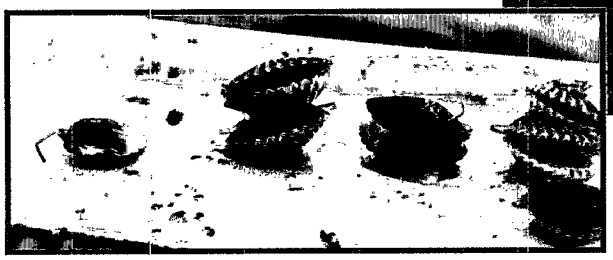

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