

TRUSTEE'S MESSAGE

By Scott Knoche

In past newsletters, our president has provided messages about issues of concern to CEPA. In this newsletter, and in many future newsletters, one of our Trustees will discuss an issue that is particularly important to him/her.



Potential Commercial Fishing Benefits and Regional Economic Impacts Generated by Oyster Reef Restoration in the Chesapeake Bay

The oyster reef system in the Chesapeake Bay was so extensive that 18th century European visitors often remarked on the threat these reefs posed to nautical navigation. Large-scale exploitation of the oyster began in the 19th century through the dredging of oysters, with Maryland harvest peaking in the late 19th century at an estimated 15 million bushels annually. In contrast, in the 2016-2017 wild oyster harvest season, 224,609 bushels were harvested – about 1.5% of the 19th century peak. Less than 1% of the historic oyster population remains in Maryland Chesapeake Bay waters due to a combination of overharvesting, habitat loss, and disease.

The profound decrease in oysters in the Chesapeake Bay resulted in a concomitant decrease in ecosystem services provided by oysters. Water filtration by oysters can reduce excessive nutrient loads from waterways and increase water clarity, which can in turn potentially enhance growth of submerged aquatic vegetation. Oyster reefs also provide habitat and forage, increasing faunal production and potentially increasing seafood harvests. Restoration efforts to restore oyster populations in the Chesapeake Bay were driven by the [Executive Order 13508 for Chesapeake Bay Protection and Restoration \(2009\)](#) and supported by the [Chesapeake Bay Watershed Agreement \(2014\)](#) that was signed by governors of the six states of the Chesapeake Bay Watershed, mayor of Washington D.C., and officials from the U.S. EPA and Chesapeake Bay Commission. Specifically, these Chesapeake Bay Program partners have a stated goal to “Restore native oyster habitat and populations in 10 tributaries by 2025 and ensure their protection” in the Chesapeake Bay.

An interdisciplinary team of investigators led by Morgan State University researchers Dr. Scott Knoche and Dr. Thomas Ihde explored the potential changes in commercial fisheries harvest and regional economic impacts resulting from the oyster reef restoration efforts in the Choptank River System on the Eastern Shore of Maryland. To accomplish this, the project team developed an ecological trophic model of the Choptank River System which also incorporated commercial fishers as top predators in the food web. The abundance of oysters were manipulated across different scenarios to examine the effect of these organisms on ecological production and ultimately, seafood harvested and regional economic impacts to Dorchester and Talbot counties – the two Maryland counties in the NOAA-defined Choptank Habitat Focus Area. Specifically, these scenarios are:



- Scenario 1** – Young Reef in current sanctuaries,
- Scenario 2** – Mature Oyster Reef with Oyster biomass increase in sanctuaries, and
- Scenario 3** – Fished Down Oyster biomass, sanctuaries opened to harvest, and oyster density back to pre-restoration levels.

In addition, the existence of other filter feeders attaching to oysters (e.g., hooked mussels, tunicates, barnacles) were assumed to co-exist at levels consistent with oyster abundance in each scenario.

Harvested biomass estimates from the scenarios described above were translated into commercial fisher harvest revenues by applying mean, species-specific prices by fishery to the biomass harvest estimates. An original cost-earnings data collection effort involving 12 commercial fishers active in the Choptank River System used with regional economic impact modeling software enabled the calculation of total regional economic effects (that is, initial spending + multiplier effects) for four key economic measures: output, labor income, value-added and employment. The key findings are:

Key Finding 1: Increase in Commercial Harvest

The Mature Oyster Reef scenario supports an increase in annual commercially harvested finfish and shellfish biomass of about 45%, relative to the Young Reef scenario. These Mature Oyster Reefs are predicted to increase total harvested biomass by about 80% relative to the Fished-Down scenario in which restored oyster reef sanctuaries have been harvested down to a level that reflects the pre-restoration status of the area.

Key Finding 2: Large Predicted Increase in Blue Crab Harvest with Oyster Reef Restoration

The ecological model predicts large increases in Blue Crab commercial harvest due to the trophic effects of the restored oyster reefs. The Mature Oyster Reef scenario predicts an 80% increase in Blue Crab harvest relative to the current Young Reef scenario, and a 160% increase in harvest relative to the Fished Down scenario. These gains are specific to the Choptank River system analyzed in this project. The project team urges caution with respect to assumptions about the transferability of these predicted gains to other areas of the Chesapeake Bay, where factors not present in the Choptank could affect harvest.

Key Finding 3: Total Dockside Sales

The changes in commercially harvested biomass have the potential to contribute to millions of dollars in additional sales for commercial seafood harvesters. The Mature Reef scenario is projected to increase dockside sales receipts by more than \$4.5 million relative to the Young Reef scenario and by about \$11 million relative to the Fished Down scenario. These changes in dockside sales are primarily driven by Blue Crab harvest increases.

Key Finding 4: Regional Economic Impacts for Dorchester and Talbot Counties in Maryland

This modeling effort predicts sizable increases in total annual regional economic effects in Dorchester and Talbot Counties, Maryland from oyster reef restoration for four key economic measures: output, labor income, value-added, and employment. Total economic effects reflect the initial change to the economy resulting from the dockside sale of harvested seafood in the region, the additional inter-industry regional spending generated by the initial dockside sale, and the spending of labor income at regional businesses that stem from both the direct and indirect effects.

Differences in Total Annual Regional Economic Effects Across Scenarios		
	Young Reef -> Mature Reef	Fished Down Reef -> Mature Reef
Output (Sales) (\$million)		
Total value of production	+ \$9.9	+ \$22.8
Labor Income (\$million)		
All forms of employment income (employee and owner compensation)	+ \$3.3	+ \$7.8
Value-Added (\$million)		
Difference between output and cost of intermediate inputs	+ \$6.0	+ \$13.3
Employment (jobs)		
Annual full and part-time	+ 142	+ 319

Fisheries managers, seafood harvesters, and other commercial fishing stakeholders are increasingly seeking information regarding the regional economic impacts resulting from fisheries management decisions. This project contributed to addressing this need by generating estimates of key economic measures associated with the Choptank River commercial fishing industry and connected industries.