

## **Oysters: Value Beyond the Plate**

In the modern world, a price tag can be put on anything and will be placed on everything. Education to provide a future, water (a basic necessity), and time all have a dollar value. Environmental protection laws require payment to repair damage caused by industries, construction, and other activities. People and mechanical systems that provide these services are compensated for the valuable work that they do. What if there were an organism that could offer these valuable environmental services? Well, there is, and it is already doing the work that humans pay to be completed without any compensation. It's time to pay due to one of the most effective ecosystem servicers: the eastern oyster.

Ecosystem services are defined as benefits that the human population receives from nature. These fall into four categories: provisions, regulating, cultural, and supporting. These services are entirely natural and are present in many aspects of life. The eastern oyster provides all of the services. Provisions through the food it provides, cultural elements rooted in traditional Chesapeake life, and even the festivals it represents (such as the Urbanna Oyster Festival), and support through the habitat it provides. Well, what about regulating?

Oysters provide \$40 million in dockside market value every year to Virginia, yet their regulatory services may prove to be more valuable than the oysters' food value. Oysters perform regulating services in three main areas. Carbon Sequestration, Nutrient Assimilation, and Sedimentation Removal.

One square meter of prime oyster beds can sequester 3kg of carbon a year. A typical gas-powered power plant produces 3 kilograms of carbon per 7.74 kilowatt-hours. The average home uses 10,772 kilowatt-hours. This means that 1,391.97 square meters of oysters could sequester as

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much carbon in a year as a home's electrical system produces. With some additional calculations, the amount of active oyster beds in VA can sequester the amount of carbon produced by 395,859 homes. Oysters alone can have this much impact on sequestering carbon. Similarly, oysters can remove large amounts of excess nutrients in the water and utilize them for growth. One square meter of oysters can remove approximately 95 grams of nitrogen and 15 grams of phosphorus per year. The active oyster farms in VA can absorb approximately 51,670,801 kilograms of nitrogen and 8,158,547 kilograms of phosphorus annually. This can account for over one-third of the nitrogen expelled into the Chesapeake Bay each year. Oysters are very proficient at sediment removal, expelling pseudofeces that settle out large amounts of sediment, aiding in maintaining the clearness of the water. The reduction of sedimentation has great benefits for the dissolved oxygen of the water and photosynthetic production which overall benefits fisheries as a whole. One square meter filters out between 1,000 and 2,500 gallons of water a day. The oysters currently alive in the Chesapeake Bay can filter the entire Bay in one year, continuously providing these extremely valuable regulating services without any additional human input into the oyster industry.

The question of whether oysters produce an economic value beyond their food market value has arisen with the Chesapeake Bay Nutrient Credit exchange program. This program was in continuous development from 2005 to 2012. The program allows companies with nutrient reduction programs in the Chesapeake Bay to earn nutrient credits, which businesses that contribute nutrients to the Chesapeake Bay can purchase to offset their environmental impacts. The policy was designed to hold companies accountable for the harm they caused to the Chesapeake Bay. The program usually provides credit for Best Management Practices, manure

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management, and green infrastructure. What if oyster farmers could sell credits that would generate extra income to continue growing their oyster beds, thereby further improving the environment? There are quantifying issues that have made this process complicated, but it may develop in the future. If oyster farmers could be compensated for one benefit of their industry, there is a possibility to expand towards the removal of carbon, sedimentation, and other pollutants, creating two vast, thriving markets within the growing oyster industry.

Oysters are truly a Chesapeake Bay classic, a celebration of culture, and a thriving industry. Oysters constantly serve the people of the Bay that they call home and work towards improving the lives of those who rely on the Bay for a living. As the Earth changes in the future, one organism could help sustain the lives we have today. We may not be able to pay oysters for what they do, but we can pay them by continuing to recognize their vast impacts on our food, culture, and especially the place we call home.