Fact Sheet 2022

NOAA FISHERIES

Office of Aquaculture

Shellfish and seaweed aquaculture can increase food production, create economic opportunities in coastal areas, and enhance natural harvests.

These aquatic crops provide important ecosystem services that can improve water quality around farm sites.

Aquaculture farms can also provide habitat for fish and crustaceans, benefiting wild populations.

Learn more:
fisheries.noaa.gov/aquaculture

Aquaculture Provides Beneficial Ecosystem Services

Freshly harvested oysters. Credit: NOAA Fisheries.

Removing Nitrogen, Improving Water Quality

Nitrogen is an essential nutrient, but too much of it in water—often from excess fertilizer in runoff—boosts the growth of algae. Algae overwhelms water bodies and reduces oxygen levels, killing fish, crabs, lobsters, and other aquatic life. Fortunately, shellfish aquaculture has emerged as a promising, low-cost tool to help improve water quality.

Around the nation, shellfish and seaweed farms (many of which are family-owned) are providing sustainable seafood and improving the surrounding environment. These farms are described as 'low-to-no input,' because feed, fresh water, and fertilizer typically aren't necessary for their crops. By raising shellfish and seaweed, farms improve access to local seafood and mitigate the harmful effects of excess nutrients, ocean acidification, and habitat loss.

As shellfish filter feed, they remove nitrogen by incorporating it into their shells and tissues. An adult oyster can filter up to 50 gallons of water a day, while a large quahog can clean about 24 gallons of water a day. A farm with 100,000 oysters per acre can potentially filter up to 5,000,000 gallons of water per day, per acre.

NOAA scientists are studying the nitrogen removal that shellfish aquaculture can provide to coastal communities. Coastal communities are increasingly adding shellfish aquaculture to help meet water quality goals. Waterfronts along the Chesapeake Bay and on Cape Cod are looking into seeding and growing shellfish as a way to reduce excess nitrogen in their local waters.

WHY FARM SEAFOOD?

Today, the United States ***imports between 70-85% of the seafood we eat*** *by value–more than any other country. Global and domestic demand for seafood continues to grow. Even as we maintain and rebuild our wild harvest fisheries, we cannot meet increasing domestic demand for seafood through wild-caught fisheries alone.*

Marine aquaculture provides a domestic source of economically and environmentally sustainable seafood that complements and supports our wild fisheries production.

Learn more:
fisheries.noaa.gov/aquaculture

LOW-TO-NO INPUT SHELLFISH AND SEAWEED FARMS

Around the nation, shellfish and seaweed farms, many of which are family-owned, are providing sustainable seafood and improving the surrounding environment. Shellfish and seaweed are often referred to as 'low-to-no input' farms, meaning that no feed, fresh water, or fertilizer are typically required to grow these crops. For many forms of bivalve shellfish aquaculture, production of juvenile shellfish 'seed' occurs within a hatchery where they are fed cultured algae until they reach a suitable size for planting on farms where they eat naturally available algae. As these farms improve access to local seafood, they are also mitigating impacts of excess nutrients, ocean acidification, and habitat loss.

KELP FARMS REDUCE EFFECTS OF OCEAN ACIDIFICATION

Our oceans are absorbing carbon dioxide from the atmosphere, which in turn makes the oceans more acidic and alters their chemistry. Many marine animals such as oysters, clams, sea urchins, corals, and some plankton, use calcium carbonate to build and maintain their shells and other vital structures. Ocean acidification reduces the available calcium carbonate in the water, making it harder for animals to survive and grow.

Many seaweeds, including kelp, are capable of growing in acidic ocean waters. They pull carbon dioxide from their environment, reducing its availability and potential to form carbonic acid—the main perpetrator of ocean acidification. This reduction can provide a localized buffering effect that benefits many marine species that utilize calcium carbonate. Additionally, seaweeds produce oxygen which can mitigate low-oxygen areas known as 'dead zones' at a local scale, while reducing excess nutrients and improving habitat for marine species.

AQUACULTURE FARMS STIMULATE DIVERSITY

Wild oyster reefs provide important habitat for fish and crustaceans. Species like mussels, barnacles, and sea anemones settle on them, providing abundant food resources. Reefs also provide nursery habitat for commercially valuable species including anchovies, blue crab, flounder, and herring.

However, wild oyster populations are at historic lows as prior overharvest and a steady decline in water quality have diminished oyster reef habitat on all of our coasts. In response, the NOAA Fisheries Northeast and Northwest Science Centers are studying the beneficial effects that oyster farms may provide for wild species. Researchers placed GoPro cameras on oyster farm gear in Connecticut and Washington to document species interactions. The footage shows that commercially and recreationally important species like black sea bass, scup, and tautog use the shellfish aquaculture gear for shelter from predators, to feed on algae on the gear, and even for courting mates.

To further these efforts, the Northeast Fisheries Science Center's Milford Laboratory maintains a guide for farmers who wish to install their own GoPro cameras. NOAA Fisheries is also advising partners in Massachusetts, New Jersey, and Maryland on similar projects. This valuable data will help shape farming practices that can increase biodiversity and support aquatic ecosystems.

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