Seaweed in the Spotlight

NOAA scientists and partners investigate seaweed farming for ocean acidification mitigation

Ocean acidification is just one of the ways in which coastal communities are already feeling the effects of a changing global ocean. The potentially devastating ramifications have made it an urgent environmental and economic issue. A collaborative project led by the **Puget Sound Restoration Fund** in conjunction with NOAA and other partners, was just awarded $1.5 million by the **Paul G. Allen Family Foundation** to tackle the impacts of ocean acidification. The project looks to employ an unlikely hero: seaweed.

"There are not a lot of tools in the tool box that can fight ocean acidification or remove carbon dioxide (CO_2) from the ocean" says Dr. Michael Rust, **NOAA Aquaculture** Science Coordinator and a collaborator on the project. "Seaweed farms might be one of our best bets."

Help from Kelp

Many seaweeds, including kelp, thrive in acidifying ocean waters. They take up CO_2 and nutrients from their environment, improving water quality as they grow by drawing down levels of the dissolved acid along with nitrogen and phosphorus. Seaweeds also give off oxygen, which can help with dead zones. The combination may result in seaweed farms acting as protective "halos" that mitigate acidification and pollution locally while creating habitat for marine species.

"When the seaweed is harvested it takes the excess carbon and nitrogen with it, effectively removing them from the ocean" says Rust.

Led by Dr. Jonathon (Joth) Davis, senior scientist, and Betsy Peabody, executive director, at the Puget Sound Restoration Fund, the five-year project involves collaboration with NOAA's **Northwest Fisheries Science Center** (NWFSC) and **Pacific Marine Environmental Laboratory** (PMEL). Using the **Manchester Research Station** and NOAA's new **Kenneth K. Chew Center for Shellfish Research and Restoration**, kelp sporophytes, or seedlings, will be cultured and seeded onto twine for deployment and growth at an existing aquaculture facility in north Hood Canal. NOAA's PMEL will undertake water quality monitoring.

"This project is like planting a little underwater forest in a part of Hood Canal that would not support a kelp forest otherwise," describes Dr. Walt Dickhoff, researcher at NOAA's NWFSC and a collaborator on the project.

Building up Blue Carbon Business

The project will also address more than just the seaweed's potential to mitigate ocean acidification. "A final goal in a future study would be to harvest kelp and develop useful kelp products," says Dickhoff.

These potentially carbon-neutral products could help stimulate new "blue carbon" based industries. Although it constitutes a minor portion of marine aquaculture in the United States, the cultivation of aquatic plants globally produced an impressive 26.1 million metric tons in 2013 (**UN FAO**), most of which was seaweed. The ability of seaweeds to be farmed without freshwater, arable land or nutrient inputs uniquely positions them as an ecologically and economically efficient source of biomass.

Eventually the Hood Canal project looks to develop the seaweeds it cultivates as food and other products that can support local communities and businesses, as well as potentially generate new bio-products. NOAA's NWFSC, **Montlake Laboratory** will be involved in seaweed product development later in the project.

Developing Green Spaces

The changing conditions in Puget Sound, especially ocean acidification, threaten to disrupt the ecosystem and the livelihoods of its surrounding coastal communities. The project's unique approach hopes to show that seaweed farms can decrease acidification and nutrient pollution while providing habitat, basically creating underwater "refugia".

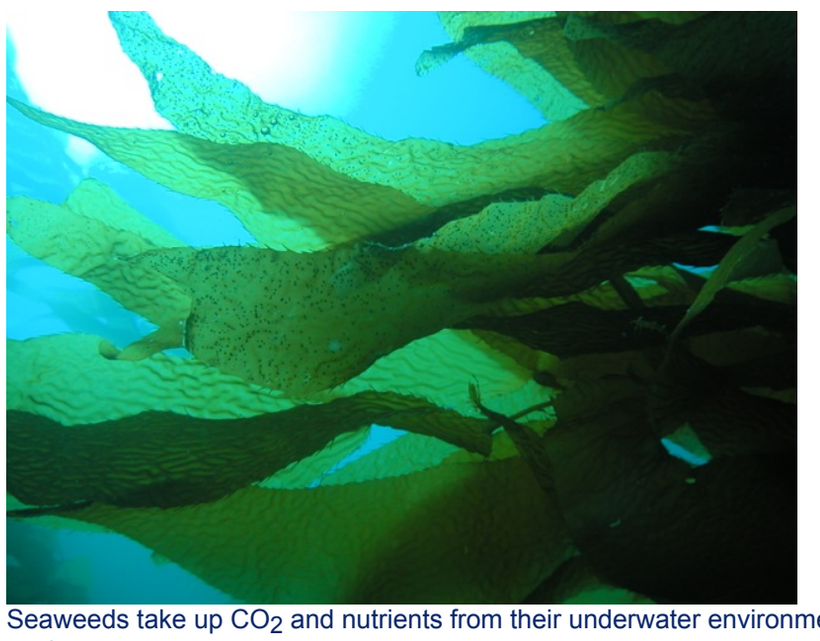
"We have green space gardens in cities, so this is like creating an underwater garden in an urban estuary," Dickhoff describes it.

Maybe we can develop our "blue carbon" assets by growing a little seaweed?

Explore more:

- Paul G. Allen Family Foundation Article EXIT
- Learn to Grow Seaweed Video Series: VIDEO
- Seaweed Growing Manual
- Maine's Seaweed Festival EXIT
- Eat Kelp!: VIDEO EXIT
- NOAA Ocean Acidification Program

Kelp and other seaweeds naturally grow in Puget Sound, but their current density is a fraction of historical levels.



Seaweeds take up CO_2 and nutrients from their underwater environment as they grow.

Seedlings will be cultured at NOAA's Kenneth K. Chew Center for Shellfish Restoration & Research.

Farmed seaweed can be harvested and used for food and other products. Credit: Sea Grant.