

## Benthic Impacts of Kelp Farms

### How might kelp farms affect life on the sea floor?

Although research on kelp farms in the United States is as young as the industry, it is reasonable to believe that kelp farming provides many positive benefits to the local ecosystem and the environment.

A multi-year project is just taking off in Alaska to study these impacts and provide more clear guidance for regulators.

#### Reducing Greenhouse Gas Emissions

Kelp farming may contribute to efforts to capture and sequester carbon in our atmosphere, mitigating the effects of global warming. For example, as it grows, kelp removes CO<sub>2</sub> from the ocean. It may then be used for fertilizers which have a lower carbon footprint than synthetic fossil-fuel derived fertilizers. Red and brown seaweeds can also be fed to animals, which research suggests may reduce the animals' greenhouse gas emissions. As mariculture continues to develop, we will continue to learn more about these climate impacts!

#### Shading the sea floor

The degree that a kelp farm shades the floor depends on water depth and clarity, wave action, current, and kelp density. One study of a Swedish farm at 5m (15 feet) depth found that during peak growth, the kelp significantly shaded the floor but it did not change the oxygen, nutrients or number of mobile animals on the floor. Generally, most Alaska kelp farms are located at depths of between 50-100 feet, which may result in less shading.

#### Genetic Diversity of Wild Kelp

Research into the genetic diversity of Alaska's wild populations is ongoing, with the purpose of assessing the risk posed by farming. In the meantime, ADF&G has taken a conservative approach to protect against alterations to native genetic diversity, requiring that broodstock (parent plants) consist of 50 individuals and be collected within 50 km by water of the farm.

#### Slowing ocean acidification

A consequence of increased levels of carbon dioxide in our atmosphere is that ocean acidity increases as the ocean absorbs CO<sub>2</sub>. Ocean acidity poses unique challenges to shell forming organisms (e.g., crabs, oysters, clams and mussels). For example, crabs have less energy to grow and stave off disease. Research on potential impacts to Alaska bivalves is ongoing but research elsewhere has shown that, in some ocean conditions, kelp can significantly decrease acidity in the water column as it uses CO<sub>2</sub> to grow.

#### Creating Habitat

Studies in other parts of the U.S. and the world have found that an aquatic farm may provide important habitat for fish and invertebrate species, including as nursery habitat for early life stages. Research on Alaska farms is ongoing.

What kind of impacts might mariculture have on benthic environments?

Want to learn more? Visit us:

The Alaska Mariculture Alliance at [alaskamariculture.org](http://alaskamariculture.org)

Photo Courtesy of Alaska Sea Grant



Want to learn more or get involved in mariculture? Visit us:

**Alaska Mariculture Alliance**

[alaskamariculture.org](http://alaskamariculture.org)

**Alaska Fisheries Development Foundation**

[afdf.org/projects/current-projects/alaska-mariculture-initiative/](http://afdf.org/projects/current-projects/alaska-mariculture-initiative/)

**Alaska Department of Natural Resources**

[dnr.alaska.gov/mlw/aquatic/](http://dnr.alaska.gov/mlw/aquatic/)

**NOAA Fisheries**

[fisheries.noaa.gov/alaska/aquaculture/alaska-region-aquaculture](http://fisheries.noaa.gov/alaska/aquaculture/alaska-region-aquaculture)

**Want training on kelp or oyster farming? Or information on the application process for an aquatic farm lease?**

**Alaska Sea Grant**

<https://alaskaseagrant.org/our-work/aquaculture/>

**Alaska Aquaculture Permitting Portal**

<http://akaquaculturepermitting.org/>

**Alaska Mariculture  
Training & Research Center**



[amrtc.org](http://amrtc.org)



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