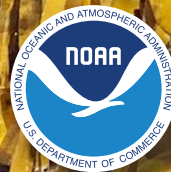


# What's in the Water?

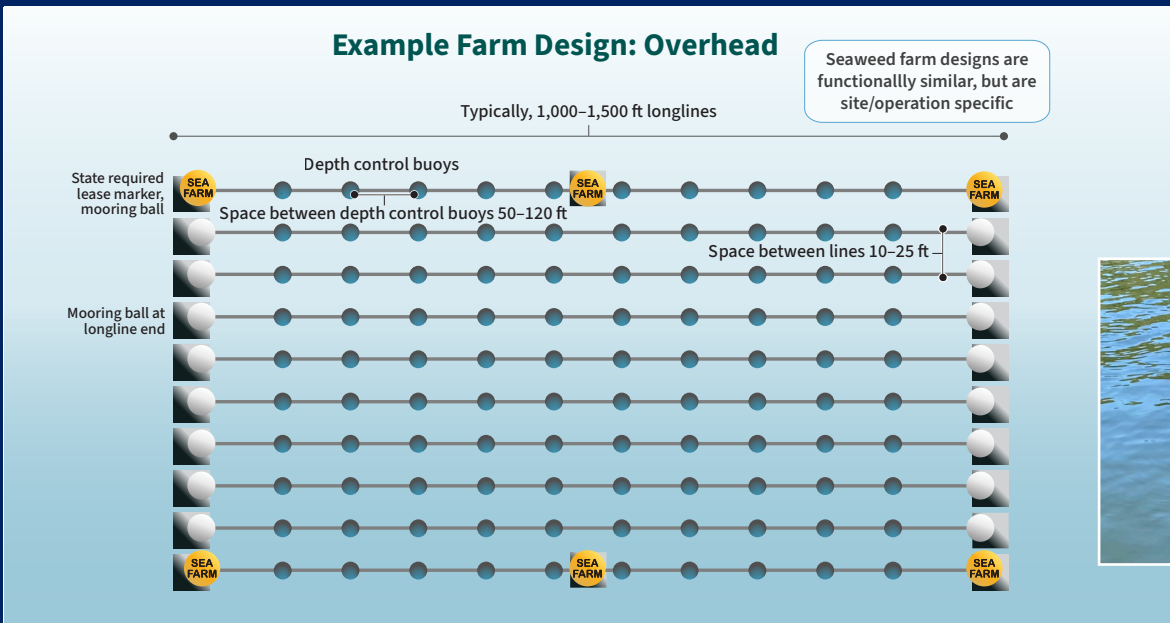
## Kelp Farming

Kelp farming is a growing industry in Maine, with more than 40 active farms across the state. Seaweeds, including kelp, have been harvested for thousands of years by indigenous communities for sustenance. Today, kelp is commercially farmed and harvested for foods and food products. It is also used in cosmetics, animal feed, organic fertilizers, and more.



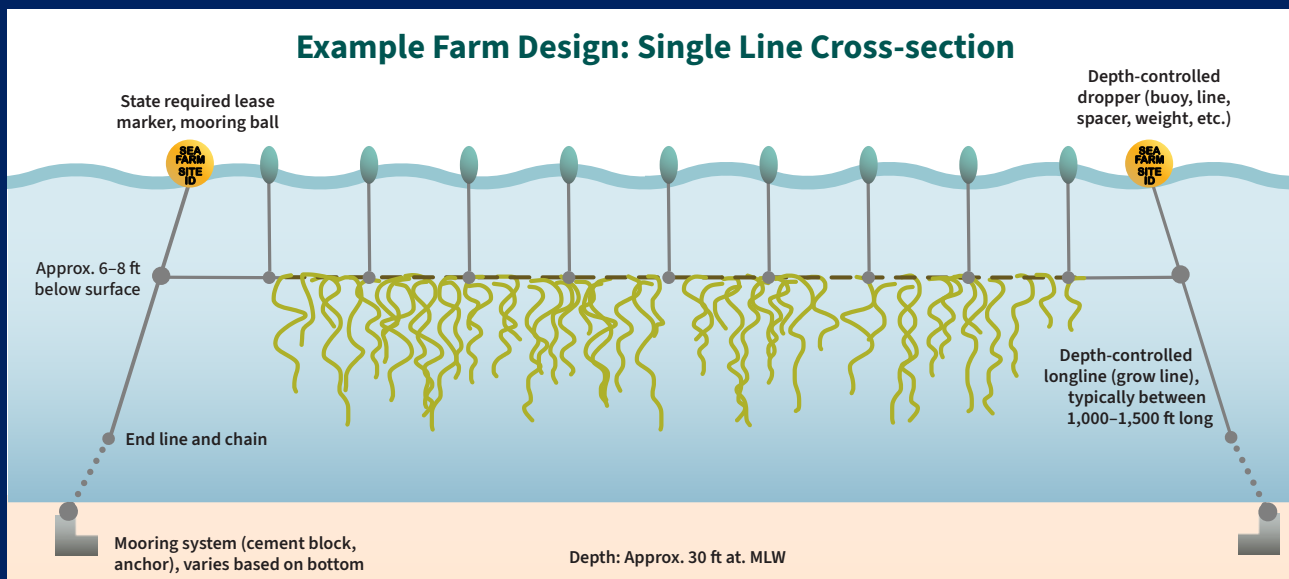
The Maine Sea Grant College Program at the University of Maine, sponsored by the National Oceanic and Atmospheric Administration (NOAA) and the State of Maine, is a part of a network of 34 NOAA Sea Grant Programs throughout the coastal and Great Lakes states and territories.

# What Can I See?



From the shore, you'll only be able to see the surface of the kelp farm. You may be able to see rows of buoys spaced anywhere from 10 to 25 feet apart, and mooring balls at the corners of the site labeled "Sea Farm" that contain site information. However, seeing a kelp farm is dependent on the season - kelp is farmed in the winter and harvested in the spring, and most farms remove the majority of their gear (except the corner site markers) after the harvest.

# What Can't I See?



Beneath the surface are horizontal ropes called longlines on which the kelp is planted. A longline runs the length of the row of buoys, anywhere between 1,000-1,500 feet, and is typically suspended 6 to 8 feet below the surface to keep the kelp submerged. Longlines may be differentiated by color buoys — this helps farmers visualize their underwater farm structure and identify tangled or broken lines. The ends of the longlines are connected to a mooring chain, and the mooring chain is anchored to the sea floor. If you were to dive below the farm at the end of the season in spring, you would see curtains of kelp on the longlines!

# Farming Process

Seaweed farming has three stages, which occur between early fall and early spring.

## Nurseries *(September - November, fall)*

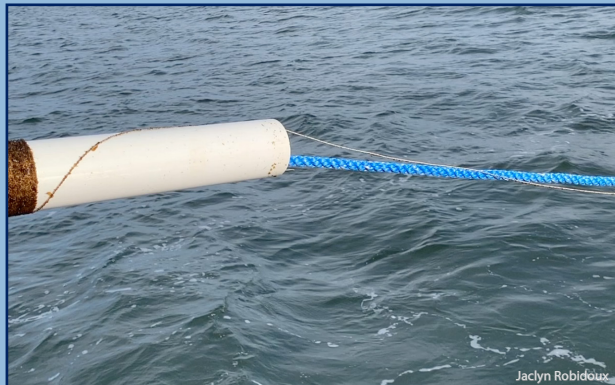
All seaweed farming begins with spores (called 'seed'). For kelp, seed production starts on land in a nursery facility. Kelp seed is introduced into seawater-filled tanks; PVC pipes wrapped in twine (called 'kelp spools') are set on the bottom. The seed attaches to the twine and grows. When the spool becomes brown and fuzzy with the growing kelp, the farmers know the seed is ready.



Kelp spools in tank

## Sea Farms *(November - May, fall - spring)*

Once the ocean waters begin to cool, typically between November and December, the seeded twine is unspooled around the longlines on the farm sites, where the kelp's natural attachment structure — the holdfast — begins to grow onto the stronger longline, anchoring the kelp to the farm structure for the duration of the winter growing season.



During deployment, the longline is pulled through the PVC pipe wrapped in seeded twine. The twine unspools and spirals around the longline.



Seeded twine wrapped around longline.

## Harvest *(April - June, spring)*

By spring, the kelp will have grown from tiny seedlings the size of a grain of sand into long, narrow blades, which can be upwards of 10 feet long. To harvest the kelp, farmers lift the longlines out of the water and hand-cut the kelp off the lines and into containers on the deck of their boats. Once a boat is filled and the harvest day is over, farmers bring their kelp to shore where it is sold to processors (that are contracted in advance) who are responsible for making kelp products that people around the world know and love.



# Why Kelp Aquaculture?

Kelp farming supports fishermen and others with year-round work opportunities. Many of Maine's fisheries are seasonal; because kelp is farmed in the winter, it can provide supplemental income to lobstermen and fishermen during their off-season.

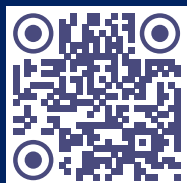
Seaweed is a climate-friendly crop, requiring no freshwater, fertilizer, or land to grow in the ocean. It absorbs carbon dioxide, nitrogen, and phosphorus; releases oxygen into water, mitigating the risk of harmful algal blooms; it also has the potential to buffer the effects of ocean acidification in its surrounding environments.

Many cultures have incorporated seaweed into their diets and wellness practices for thousands of years, and US consumers are only beginning to recognize its significant health benefits and nutritional value. As the demand for kelp increases, kelp farming can supplement wild harvest to increase the reach and impact of seaweed products.



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Maine Sea Grant's work across Maine, from the Piscataqua River to Passamaquoddy Bay, is carried out on the lands and waters of the Penobscot, Passamaquoddy, Maliseet, and Mi'kmaq. We thank them for their stewardship and continued strength and resilience in protecting it. We support all efforts for healing and protecting the land and water we share.

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# What's in the Water?

## Kelp Farming

### FREQUENTLY ASKED QUESTIONS

#### Why are Maine waters suitable for kelp farming?

Maine waters contain a great amount of nutrients, are in the right temperature zone, and have a diversity of environments along the coast that provide protection for raft culture.

#### Why does Maine lead the United States in kelp production?

According to the National Seaweed Hub, kelp requires cold, clean, salty waters to thrive - characteristics that make Maine appealing to seaweed farmers.

The three most commonly farmed species currently farmed in Maine are sugar kelp (*Saccharina latissima*), skinny kelp (*Saccharina angustissima*), and winged kelp (*Alaria esculenta*)

#### Wild kelp beds support a diversity of life, including a variety of fish and invertebrates. Will kelp farms in Maine attract new biodiversity on farm sites?

Researchers at the University of New England used visual and environmental DNA methods to see if kelp farms increased biodiversity and provided new habitat, but found minimal difference between sites with and without kelp farms. This is promising, as it demonstrates that kelp farms don't impact or disturb the natural biodiversity in an area.



#### How do kelp farms affect the environment?

Kelp farms provide a variety of benefits to their surrounding waters. As it grows, kelp has the potential to improve local water quality, increase oxygen levels in water, and defend against ocean acidification. By naturally regulating carbon dioxide and nutrients in the water, seaweed farms can help support healthy shellfish populations, which are particularly susceptible to high levels of carbon dioxide and the harmful effects of excess nutrients.

With 40+ active farms and 4 nurseries producing tens of thousands of seed spools in the state of Maine, over a million pounds of kelp were harvested in 2022



#### Where are kelp farms located?

Kelp farms are located in state waters, in relatively nearshore sites that are safely accessible by boat in the winter. Sites must be a minimum of 1,000 feet away from any state- or municipally-owned pier, beach, etc. and in areas with good water quality designated by the Maine Department of Marine Resources.



#### How large are kelp farms?

The average size of a kelp farm lease in Maine is between three and ten acres, but they can vary in size depending on the location, operation, and permitting structure.



#### How do storms affect kelp farms?

One of the biggest risks when storms hit kelp farms is the longlines tangling on themselves. Loose lines and tangles can be difficult to unravel, especially with a heavy curtain of kelp that will hide knots or wrap up in the tangle.



#### What precautions do boaters need to take around kelp farms?

It is unlikely you will encounter or interact with kelp farms if you are boating between June and September. After spring harvest, the majority of kelp farmers remove gear from the water, except those required for marking their site. If you happen to be boating during the overlap, be sure to keep an eye out for yellow "SEA FARM" marker buoys.