

- Intro: "The time has come," the Walrus said, "to talk of other things."
- Stephanie Otts: This is a podcast, not about shoes and ships and sealing wax, but about the who, what, where, why, and how of shellfish aquaculture, including the many different legal challenges that can arise. We're the National Sea Grant Law Center, and we invite you to sit down and get ready for a wave of knowledge.
- Stephanie Otts: Hi, I'm Stephanie. I'm the director of the National Sea Grant Law Center.
- Cathy Janasie: Hi, I'm Cathy. I'm a Senior Research Council at the National Sea Grant Law Center.
- Amanda Nichols: And I'm Amanda. I'm the Ocean and Coastal Law Fellow at the National Sea Grant Law Center.
- Stephanie Otts: You're listening to Law on the Half Shell. In this episode, we start at the beginning, exploring just what it means to be a shellfish farmer in the United States. Shellfish aquaculture is the farming of oysters, clams, mussels, and similar species in the water or in an aquatic environment. Fun fact... People have been growing shellfish since the time of the Ancient Romans, where oysters were cultivated to combat a shortage of oysters in local Mediterranean waters and has continued throughout history in much the same way. For example, mussel farming was actually invented in the 13th century, and the farming techniques used back then have served the industry well and have remained largely unchanged until the 1960's.
- Stephanie Otts: Like traditional livestock farming, a shellfish farmer works a farm, caring for the shellfish until they're large enough to sell to market, keeping their equipment clean and in working order, managing the farm area, and then harvesting their stock. According to NOAA Fisheries, in 2016, U.S. shellfish farmers produced 37 million pounds of oysters, 10 million pounds of clams, and almost a million pounds of mussels. And the estimated value of the shellfish was \$340 million. And as of 2016, Washington led the states in aquaculture sales, followed by Virginia, Connecticut, Florida, and California.
- Amanda Nichols: You might be wondering what types of people conduct shellfish aquaculture. There are actually a range of people involved. They can be either current or former commercial fishermen who might be looking to diversify. Or they could be foodies wanting to reconnect with the source of their food or grow the most delicious oyster. Or they could even be individuals who want to contribute to a sustainable food supply or even help improve the quality and productivity of our coastal waters.
- Cathy Janasie: And so while there are some pretty large operations right now in the United States, a lot of the farms that we see today are run by just a few family members. So it's a small family operation that may be employing a handful of employees to help them tend to the farm. So on the coast of New Jersey, you

see a kind of clusters of these smaller farms. So, one of the bigger operations for New Jersey is Cape May Salt Oyster Company, that I would say has a handful of employees that go out and tend the oyster farms on behalf of the family. But then there's even smaller ones that have individuals who are interested in raising the oysters and are just going out with their families after work to tend the farms.

Stephanie Otts: And then on the other side of the scale, there are some very large operations. For example, Taylor Shellfish Farms has been growing oysters in the Pacific Northwest since 1890 and has many farm locations throughout the area. And they've also expanded to grow other species, such as geoducks and mussels. But then there are also researchers that may operate farms to experiment with gear, learn about the impacts of environmental conditions on both the shellfish that are being grown and the surrounding water. So it's a variety of people that you might find working on a shellfish farm.

Amanda Nichols: But, the question now is how is it conducted? So, there are a variety of shellfish farming techniques, and they each differ slightly depending on what type of shellfish that you're culturing. So oysters, for example, can be grown directly on the sand. They could be placed in protective grow bags on the bottom, or they could even be suspended above the sediment on long lines or from rafts. Clams are cultivated in a different way, underneath protective netting or in bags buried in the sediment. And then mussels, again, are also different. They're almost exclusively grown on lines that are suspended from rafts or other floating materials.

Cathy Janasie: So when you're thinking of a shellfish farm, it can be helpful to think about growing an animal like a cow, pig, or chicken on land that need to be fed. But with shellfish, because it's grown in this aquatic environment, they're actually taking their nutrients and food directly from the water. And so the farmer of the shellfish doesn't have to purchase any food, which is a big economic benefit to them. And also like a traditional farm, you can kind of compare it to a chicken being hatched by an egg. The shellfish start off as tiny larvae collected from the wild or most commonly grown in a hatchery. After a couple of weeks, the larvae will transform into tiny juvenile clams, oysters, or mussels known as seed. Farmers purchase seed oysters from hatcheries and move them to their farms where they stay until they reach market size.

Stephanie Otts: And the farmer, once they purchase that shellfish seed, has a variety of options available to them for how they want to then grow the shellfish to adult size. Some farms rely on on-bottom culture, which is the closest method to growing oysters or shellfish like they grow in the wild. So, seed oysters are placed directly on the bottom of the ocean. As the young oysters grow, they are worked by the farmer with harvest gear to break them apart to create oysters with better shape and size. If they left them alone on the bottom throughout their growing cycle, they would grow kind of together in clumps. And those oysters have less marketability due to the fact that they're all grown together.

They might go for canning purposes, but not for a half shell market where you want nice pretty shells.

Cathy Janasie: So, just like you can grow them right on the bottom of the water, shellfish can also be grown in what's called off-bottom culture. And you can do that in many different ways, based on what the grower is really deciding to use based on their area. So the shellfish can be in racks, cages, trays, or even grown on ropes.

Cathy Janasie: So, one example of this is known as structural aquaculture or this rack and bag technique. So, the shellfish are actually put in bags that are then placed on racks that are put in the intertidal zone of the waterway, which is the area where the tide is coming in and out. So half the day they're submerged. The other half of the day they're kind of open to the sun. And some growers like that method because they think it maximizes the water flow and food availability for the shellfish. And a lot of times that's used for these half shell market, because it allows the farmers to go out and tend to the bags. And they actually take the oysters out of those bags, and put in these tumblers, and manipulate the size and shape of the shells, so they look best when they get served to you on the restaurant plate.

Amanda Nichols: There's also some more experimental forms of aquaculture, such as integrated multi-trophic aquaculture. This type of aquaculture involves growing a combination of species on one's farm. So for example, a farmer could grow shellfish, finfish, and seaweed all in the same place at the same time. And these types of methods are interesting, because they can afford environmental and economic benefits. So, they would utilize the byproducts, including the waste from one aquatic species to help feed or fertilize another. So, for example, shellfish could filter water from byproducts that come from finfish, which in turn would consume marine plants that are grown in the same area and get their energy from that. Farmers would then be able to harvest and sell all three. And this is currently being encouraged in the Northeast in order to allow farmers to get more economic benefit out of their farms.

Cathy Janasie: So, for example, there's a company called GreenWave in Connecticut, which has been encouraging shellfish farmers in the state to grow seaweed in their farms, along with the shellfish that they've been currently growing. And there's two reasons for this. One, it is that seaweed can help recycle the waste from the shellfish operation and clean up the water. But it also gives that farmer another commodity that they can grow. Especially if the shellfish isn't ready for harvest in that point in time, they can harvest the seaweed and still have income coming from their farm.

Amanda Nichols: So, we might be wondering now, where does this type of aquaculture happen? So, typically shellfish aquaculture, in all its forms, takes place in sheltered estuaries and bays or close to the shore.

Stephanie Otts: But recently, innovations in gear and techniques are enabling farmers to move farther from shore into the open ocean. So Catalina Sea Ranch, a company in California, is growing mussels on ropes suspended under water in approximately 150 feet deep ocean waters at its 100 acre ranch located six miles offshore California. And to picture this farm, imagine a series of clotheslines strung under water, with dozens of socks hanging from the line, except the socks are mesh bags containing mussel seeds that will grow into adult mussels. So, they have their ranch covering a hundred acres with these lines with ropes, growing dozens and dozens of mussels far from shore.

Cathy Janasie: Shellfish aquaculture mostly takes place on public lands. So again, if you're thinking about that traditional on-land farming, where a farmer owns his property and his cows are on his pasture, that's not the case that we have with shellfish farming. Because dating back to even Roman times, and which was adopted by the United States when it became a country... In most States, the land below the high-water mark along the coast is held by the state in trust for the general public for certain uses, traditionally fishing, navigation, and commerce. So, shellfish farmers often need to actually lease that land beneath the water in able to use it for their farm. And so generally, in the United States, states have the authority over coastal waters all the way out to three nautical miles from shore. A couple of states are a little bit different based on that... based on how they came into the Union. And those are Texas and Florida.

Cathy Janasie: For the most part, if you're within that three nautical miles from shore, you're dealing with the state government in getting your lease. And then as we're seeing farms move further out in water, we're talking about the federal government, and that's creating unique kind of issues for the farmers. So while the farmer has to get a lease, they actually have to also deal with the public using that land. So if you're thinking about a farmer being off the shore in a bay or something, they may be having to allow boaters to come in to travel through the farm. And they can't keep people out of that waterway. They can keep them from taking, say their oysters, but not keep people completely out of the water. And then less common in the United States, submerged lands could actually be in private ownership. And this is rare. But if that happens, and the farmer wants to farm that area that is under private ownership, they have to go to that private property owner and ask them for permission to get out into the water.

Stephanie Otts: And then depending on the geographic location of where the shellfish farming is taking place, there may also be tribal or Native American interests to consider. For example, the rights of tribes in the Pacific Northwest to harvest shellfish is recognized in a series of treaties signed in the 19th century, termed the Stevens Treaties. The Treaty of Point No Point, signed in January of 1855, recognizes the tribes' right of taking fish at all usual and accustomed grounds. In 1994, a federal district court affirmed the Puget Sound Treaty Indian Tribes rights, and ruled that the tribe has a right to 50% of the harvestable surplus of geoducks within their usual accustomed grounds and stations. Even when those grounds are on private lands.

Stephanie Otts: So, even in situations where shellfish farmers are conducting shellfish farming on private land, the treaties and courts have recognized that Indian tribes have a right to harvest a certain amount of the wild shellfish that are occurring on those properties. And so, individuals wishing to cultivate shellfish in Washington State on private land are required to notify any affected Indian tribes in advance. And this provides the tribes the opportunity to decide whether they want to come and survey that property to determine whether there are any natural wild shellfish on the property that they would then wish to harvest.

Amanda Nichols: And then shellfish aquaculture is overseen by federal and state agencies. And in some cases, local governments as well. At the federal level, permits have to be obtained from the U.S. Army Corps of Engineers under the Rivers and Harbors Act, in order to minimize navigational conflicts. And they also have to be obtained from the U.S. EPA under the Clean Water Act to address water quality issues. Leases are needed from state agencies in order to use public lands for aquaculture. And state environmental permits may be needed, as well. And then in some states, like Massachusetts, states have delegated authority for aquaculture leasing to local governments, meaning that aquaculturists would have to interact with those local authorities as well.

Amanda Nichols: And then oysters can either be sold whole, sold on the half shell, or shucked, such as canned. Furthermore, they can be sold live, frozen, or preserved in some other way. And traditionally, oyster aquaculture has skewed towards shucked products in the United States. But recent years have seen trends tip towards growing for the premium half shell market. Other species, like mussels, can be marketed in much the same way as oysters. So, live, frozen, or preserved. But farm mussels command a price premium in the market due to their higher meat content and perceived higher quality. Quality meaning... things such as cleanliness and better shell structure.

Cathy Janasie: So when a farmer is growing shellfish, they're always going to be thinking about how marketable their product is going to be when they take it out to stores to sell it. And how marketable a piece of shellfish is, depends on a lot of different things. So, when you think about aesthetics impact... What's the shape of the oyster shell? Is it nice and pretty, so you want to see it on the half shell in your restaurant plate? Or is it kind of in a clump? And so obviously, the one that's nice and pretty is going to get more money at market. The grade of the product and then the salinity can also affect it.

Cathy Janasie: So a lot of times, if you go to order oysters off a menu, it'll say where it's from. And then it'll say next to it typically... salty, briny, tasty oyster. They'll give these descriptive words to explain how that piece of shellfish is going to taste. And then growers can also use a lot of other tactics, such as unique naming strategies to entice buyers. So sometimes they try to create these cool names that may make you want to purchase that type of shellfish. Much like any kind of marketer would do with any other kind of product out there in the stores.

Stephanie Otts: Yeah. And some of you may have been to restaurants where you can order a "flight of oysters" or a variety of oysters from a lot of different places, because there are those that argue that the oysters from the Chesapeake Bay taste much different than oysters from the Gulf of Mexico. Mussels grown in the Pacific Northwest likely taste different from mussels grown elsewhere. Some oysters are named after their harvest areas, such as Goose Point or Thatch Island. Others may be designed to play off some unique history in the area or catch people's attention. For instance, consider Murder Point Oysters, "the oysters worth killing for." Murder Point Oysters is located in Alabama. Murder Point used to be called Myrtle Point, until one man stabbed another over an oyster lease in 1929, and it was renamed Murder Point. So, if you're lucky enough, as a shellfish farmer, to be in an area with a super cool history, then maybe you can get a cool name to help brand your oysters.

Stephanie Otts: That about wraps it up for this episode. Providing an overview of what shellfish farming is. Join us next time as we explore the important role of shellfish in our ecosystem.

Stephanie Otts: This podcast is a production of the National Sea Grant Law Center at the University of Mississippi School of Law. It is made possible in part by funding from the NOAA National Sea Grant College Program. The statements, findings, conclusions, and recommendations are those of the speakers and do not necessarily reflect the views of NOAA or the U.S. Department of Commerce. Editing and production assistance was provided by Kerrigan Herrick, a senior journalism student at the University of Mississippi. Thanks for listening.