Oyster mariculture provides benefits for the environment known as ecosystem services. Under optimal conditions a farm-raised market size oyster can filter up to 50 gallons of water per day. (source: 7, 9, 17, 24)

There are two types of oysters produced in South Carolina, wild-harvest and mariculture oysters. Wild oysters are harvested seasonally (approximately Oct-May) from natural oyster reefs which rely on natural recruitment for replenishment, and are often available as clusters. Mariculture oysters are grown in gear deployed into marine environments, and juvenile oysters produced in hatcheries are used to stock the gear. Triploid mariculture oysters are safe to consume year round. Mariculture oysters are often available as singles. (source: 11, 20, 21)

Similarly to natural oyster populations, cage-grown oysters improve the health and water quality of S.C. tidal creeks and estuaries by helping remove excess nutrients from the water. (source: 17, 24)

Increasing the number of oysters in our waterways helps combat eutrophication of our waterways, thus playing a major role in ensuring a healthy and viable habitat for other species. (source: 17, 24)

Excess nutrients in waterways (especially nitrogen) sometimes leads to algal blooms, which create hypoxic conditions that are harmful for fish and vegetation. As filter feeders, oysters remove excess nitrogen and help keep water conditions habitable for other fish and wildlife in the ecosystem. (source: 17, 24)

It is estimated that off-bottom oyster mariculture operations in South Carolina waterways contribute to a removal of over 1.2 tons of nitrogen annually. (source: 6, 17, 19)

The size of the oyster mariculture industry in South Carolina is relatively small, with only 10 off bottom farms currently permitted. Despite this small size, these 10 farms filter approximately 15 billion gallons of water annually in South Carolina estuarine environments. (source: 7, 9, 21)
OYSTER FARMING: ECOLOGICAL BENEFITS

Messaging

– A dozen locally produced mariculture oysters filter about 150k gallons of water while they grow to market size. When you order a dozen local oysters at a restaurant, not only are you supporting local businesses, you are consuming an environmentally beneficial product. (source: 7,9)

– On average in South Carolina, off-bottom mariculture produces over 35,000 market size oysters per acre, attributing to almost 30kg of low impact protein production per acre of leased water space. In a recent study, bivalve aquaculture ranked as one of the lowest impact food sources available. (source: 5, 10, 16, 23)

– When comparing the environmental footprint in terms of greenhouse gas emissions, 340 tons of greenhouse gases are produced per ton of edible beef whereas just 11 tons of emissions are produced per ton of bivalve protein. (source: 10, 13, 26)

– A sure way to consume seafood is to cook products thoroughly by heating to an internal temperature of at least 145°F for approximately five minutes, using various methods (roasting, broiling, boiling, baking, steaming, grilling, or poaching). (source: 4, 25)

– Oysters are lauded as a nutritious source of protein with added benefits of supplying micronutrients (selenium, zinc, iron, magnesium, and Vitamin A, C, D), and essential omega 3s. These health benefits are reaped from consuming both wild-harvest and farm-raised oysters. Farming oysters differs from most other agricultural practices. It requires no inputs and uses naturally available food sources, as mariculture oysters are grown in the same natural marine environments as the wild-harvest oysters. (source: 1, 5, 8, 16)

– Off bottom growing techniques, or floating cages, have gained popularity in South Carolina. Floating gear positions oysters in the upper water column where nutrients are dense and where oysters, through their natural filtering abilities, can have the greatest benefit on water quality. (source: 11)
The use of floating cages keeps oysters submerged at low tides, limiting exposure to high heat in the summer, which produces a safe product for summer consumption (source: 20).

Oysters are keystone species in estuarine environments because many other species are dependent on their existence. Aside from their filtering capabilities, oysters are natural ecosystem engineers. They settle onto existing hard structures which creates reefs that provide habitat for a high level of biodiversity. (source: 14, 22, 24)

The South Carolina Department of Natural Resources operates a program referred to as SCORE (South Carolina Oyster Restoration and Enhancement) which relies on volunteers to help place recycled shell material in S.C. brackish waters to elicit natural recruitment of spat. Several recycling stations are available along the coast to donate shells. The shells from a dozen market size oysters have the surface area to offer habitat for 9000 spat to settle- enhancing natural reefs as they grow. Consider the contribution you make to the environment when you consume a dozen oysters and recycle the shell. (source: 12, 18)

The crevices and expansive surface area of oyster reefs provide permanent habitat for mussels, barnacles, anemones, ascidians, crustaceans, polychaetes, and other bivalves. Reef dwelling fish seek dead oyster shells for a protected location to lay eggs. Other fish species may enter estuaries to spawn and oyster reefs act as nursery grounds for these juvenile finfish. (source: 14, 22, 24)

Floating aquaculture gear functions similarly to natural reef habitat. In fact, a study evaluated habitat assemblages around floating cages and determined a total of 49 species of fish and invertebrates plus eight species of macroalgae were identified amongst the gear. (source: 14, 17, 22)

A recent study found that several commercially and recreationally valuable species assemble around floating mariculture gear, including: blue crab, American eel, mummichog, summer flounder, spotted seatrout, black sea bass, sheepshead, bay anchovy, and oyster toadfish. These species use floating aquaculture gear for...
structured habitat, provision of food, and for reproduction and recruitment (source: 14, 17, 22)

– Growing oysters using mariculture techniques increases the number of oysters that are in the waterways. A recent study from The Nature Conservancy indicated that commercial oyster aquaculture operations provide similar benefits as natural oyster reefs. The study showed a five-acre aquaculture operation offers the filtering equivalent of an acre of wild-oyster reef. (source: 2)

– Growing hatchery-produced oyster seed (diploids) in waterways positively contributes to natural oyster populations. Hatcheries will often select for desired characteristics such as disease resistance and/or persistence under certain environmental conditions. These oysters will spawn in the warmer months dispersing gametes that may present high fitness thus improving chances of survival to replenish reef habitat. (source: 15)

– It has been habit to consume oysters in months with the letter “r” in their name. This rule does not apply to triploid mariculture oysters. All seafood is susceptible to containing naturally occurring bacteria that at increased concentrations can result in human illness, if seafood is consumed raw or undercooked. Vibrio bacteria proliferate in warm temperatures, such as air exposure during warmer months (e.g., tidal cycles) making it unsafe to consume wild-harvest oysters in the summer. Conversely, triploid mariculture oysters are grown in gear that must remain submerged two-weeks prior to harvest as well as meet time-to-temperature regulations when harvested, ensuring a safe to consume product. (source: 20)

– Triploid oysters differ from diploid (or naturally occurring oysters), in that they have three sets of chromosomes in their cells versus the normal two-sets. Triploid oysters are produced in hatcheries. Mariculturists often choose to grow triploid oysters because the extra set of chromosomes often renders them sterile, meaning oysters maintain meat quality in summer months and tend to grow faster. The appearance of diploid and triploid oysters us identical. (source: 15)
An oyster industry has been existent in South Carolina from the time of colonial settlement. Originally, settlers obtained grants from England so that they could control a section of oyster bed. There were three types of grants: Proprietary grants from 1670-1719, Kings grants from 1719-1776, and State grants after 1776. During this time oysters were a source of food and shell was used for a variety of other purposes such as building material, lime for fertilizing land, and feed for chickens. (source: 3)

Early historical significance: shell middens and circular arrangements formed from oyster shells are dotted along coastal South Carolina. Archaeologists have indicated that Native Americans were consuming oysters and using the shells for tools and trade in South Carolina as long ago as 2000BC. Records indicate that a midden near present day Awendaw was as large as three football fields. (source: 3)

In Post-civil war S.C., the oyster industry was growing. Ice allowed shipment of fresh oysters beyond a local range. Shucking houses and canneries were also established which used the natural clustered oysters for product. In the early 1900s canneries were a significant source of employment for men and women of diverse backgrounds. Canneries were able to provide year round employment by processing vegetables in summer months when oysters were not harvestable (source: 3)

Post World War II, oyster roasts became popular events for social gatherings. By the 1980s many of the canneries were closed due to labor shortages, natural resource shortages, and increased competition by imports from Asia. Recreational harvests became more important and by the early 2000s, commercial oyster production supplied unshucked oysters to markets. Today, oyster roasts are part of the cultural and social integrity of coastal South Carolina. Harvesting, culturing, processing, and consuming oysters are all age old practices in the state. (source: 3)

Cultivation of oysters is no new process in South Carolina. Forms of cultivation likely have been ongoing since Native Americans began using oyster resources. There are records of people raking oysters below the intertidal range to produce large single oysters, though this practice is no longer viable in South Carolina.
As culture methods have developed, we now use intensive culture, i.e., we stock hatchery produced seed into gear and maintain the stock until it reaches a market size. This process produces single oysters (source: 3)

– The L.P. Maggioni Company was one of S.C.’s major oyster operations, with an initial location on Daufuskie Island. By the 1940s canned oysters were being shipped around the United States and to Europe. During this time the Maggioni Company was the largest producer of canned oysters in the world. The canned oysters they produced were referred to as “cove oysters”. (source: 3)


value of oyster clusters and loose shell. *Journal of Shellfish Research*, 29(4), 889-904.)


