

NORTH CAROLINA

AG MAG

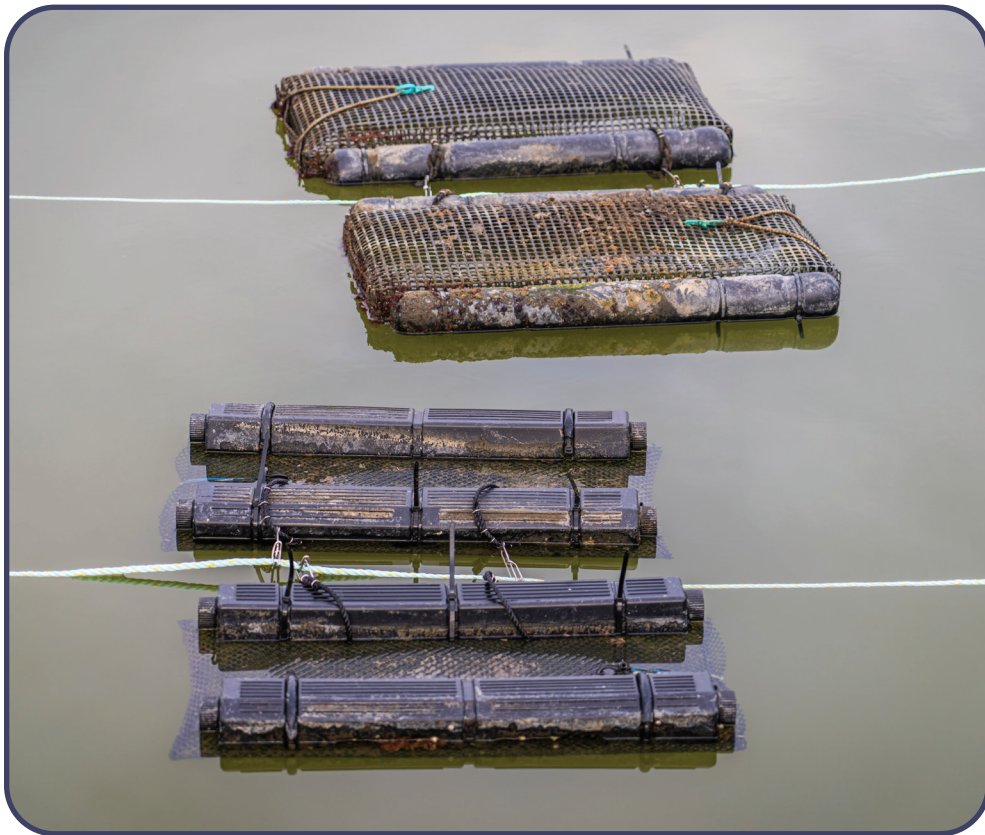


OYSTERS

The 3 "F"s

FILTER, FOOD, and FISH HABITAT

Oysters are a **keystone species**. If you remove them from **estuarine** waters, the entire coastal ecosystem will change for the worse. Oysters naturally **FILTER** brackish to salty water. They remove algae, nutrients and pollutants from our estuaries. One adult oyster filters up to 50 gallons of water a day! Currently, NC's oyster industry filters over 1.5 billion gallons of water a day. NC has some of the best



Farm gear

oysters in the country because our estuaries make for a great environment to grow and harvest them. Oysters are the "greenest" form of protein production on the planet, and are primarily grown for **FOOD**. Oysters taste like the water they come from (**salinity** level), and what algae they eat also affects their taste. Oyster beds and **farm gear** are **FISH HABITATS** for many species of crabs, fish, shrimp and other aquatic organisms. They reduce wave energy which helps prevent erosion along the coastline.

FUN FACTS

NATIONAL
OYSTER DAY IS



Oysters have **gills**  and breathe like **fish**

People **used to be told** that it was only **safe** to **eat oysters** in the months that contain an "r" in them (September through April). Thanks to oyster farms and refrigeration, you can eat them **all year round!** **Wild oysters** are only served in "r" months because the **summer months** are when they **spawn**.



Oysters **can live** up to **20** years.

Oysters are rich in vitamins, minerals, & omega-3 fatty acids, which make them a great food for brain development.



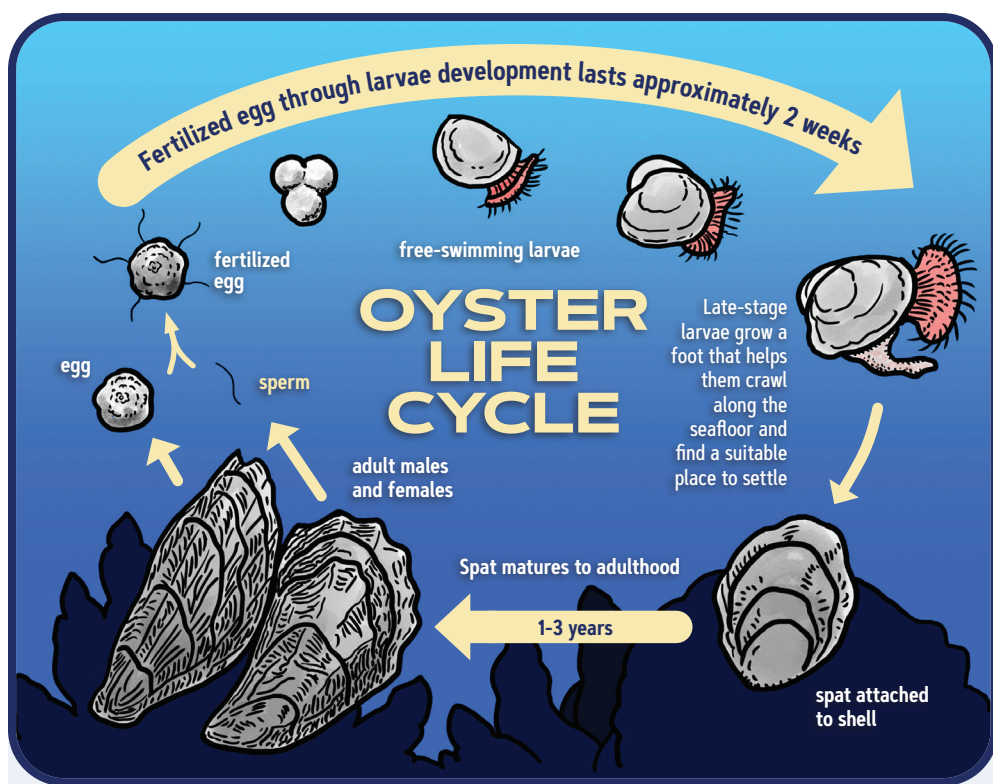
Learn more oyster facts with Ms. Grissett!

Many Thanks!


Thank you to Ashanda Grissett, Brunswick County Farm Bureau Kenan Fellow, for her efforts in assembling the content necessary to produce this publication. Thank you to the NC Shellfish Growers Association for its expertise and guidance.



Learn more about the environmental impact of oysters with Ms. Grissett!

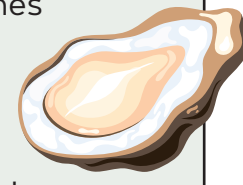


- Day 1 Spawning** takes place - where millions of eggs and sperm are released in the water from adult male and female oysters. When the two meet in the water, fertilization occurs. Once the egg is fertilized, it becomes an **embryo**.
- Days 14-21** The embryos then become free swimming **larvae** and they move around the water and seafloor using their new "feet" to find a good location to settle. The larvae live in the water column for 2 weeks. Once it finds a good area to settle, it becomes a **spat** (juvenile oyster).
- 1-3 years** The spat then becomes an adult oyster as it grows a shell. Wild oysters will fully mature between 1 to 3 years. Farm-raised mature in 6-18 months in NC.

See the oyster life cycle come to life with Ms. Grissett! 

Diploid vs. Triploid Oysters

Diploid Oysters (wild)	Triploid Oysters (farmed)
2 sets of chromosomes	3 sets of chromosomes
Naturally grown	Selectively bred and hatchery spawned
Smaller	Larger
Grow a little slower	Can eat them all year!
More rare	6-18 months to grow to harvest size
	More sustainable



A ROSE BY ANY OTHER NAME...

Only one type of oyster is native to North Carolina - The Eastern Oyster (*Crassostrea virginica*). However, since the taste profile of oysters is different from one farm to the next, NC has over 100 farm-branded oysters! How do you think these oysters got their names?

Bells Reef	Carolina Dreams
Core Sounder	Crab Slough
Croatan Selects	Currituck Selects
Devil Shoal	Fat Belly
Hatteras Salts	Kinnakeeter
Lawton Point	Lighthouse Shoal
Little Star	Masonboro Pearl
Pirate Pearl	Sea Cups
Siren's Salts	Slash Creak
Southern Salts	Stones Bay
Stump Sound	Tarheel Tiderunners
Topsail	Top Secrets

Hatteras Salts Oyster



Lawton Point Oyster



Photos provided by Locals Seafood



LET'S GET COOKING!

How are Oysters Prepared?

- Raw - these should always be served on ice to keep them fresh!
- Grilled
- Roasted
- Fried
- Steamed



A Popular Oyster Dish

Oysters Rockefeller - This dish is a charbroiled oyster with cream, shallots, cream cheese, spinach, chives and breadcrumbs. It gets its name because the topping was "green as money," a nod to the millionaire J.D. Rockefeller.

Common Toppings for Raw Oysters

- Lemon juice
- Hot sauce
- Mignonette sauce (vinegar, minced shallots, and pepper)
- Horseradish
- Cocktail sauce



How to Eat an Oyster

1. Shuck the oyster by prying it open and cutting the oyster from the shell. Move the oyster around the shell to make sure it is loose.
2. Add the topping(s) of your choice.
3. Pick up the shell.
4. Tilt your head back.
5. Slurp down the oyster from the wider end of the oyster shell.
6. Chew it once or twice.
7. Enjoy!



Don't throw the shells away! Most restaurants recycle the oyster shells for other uses.

PEARL-FECTION!



Many bivalves can produce pearls—not just oysters! And sand usually isn't the culprit! Oysters are able to easily dispel sand or fragments from inside their shells. The majority of natural pearls are formed from a response from a parasite. The oyster will cover the intruder with layers and layers of nacre, the innermost layer of the oyster shell, and all of these stacked layers create the pearl. Cultured pearls come from pearl harvesters inserting irritants into bivalves to start the nacre layering process. Natural pearls are more valuable than cultured pearls. Sadly, you'll rarely find a pearl in the NC oysters you consume!

Flavors of OYSTERS

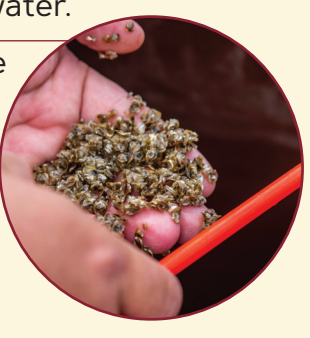
Oysters have different flavors based on the type of water they are harvested in.

Type	Flavor	Waters
Briny	Salty	High salinity waters
Sweet	Fruity	Low salinity waters like estuaries and bays
Metallic	Taste like copper or iron metal	High levels of metals in the water
Creamy	Rich & buttery	High nutrient waters like bays and lagoons
Earthy	Earthy texture like mushrooms and truffles	High level of sediments in the water

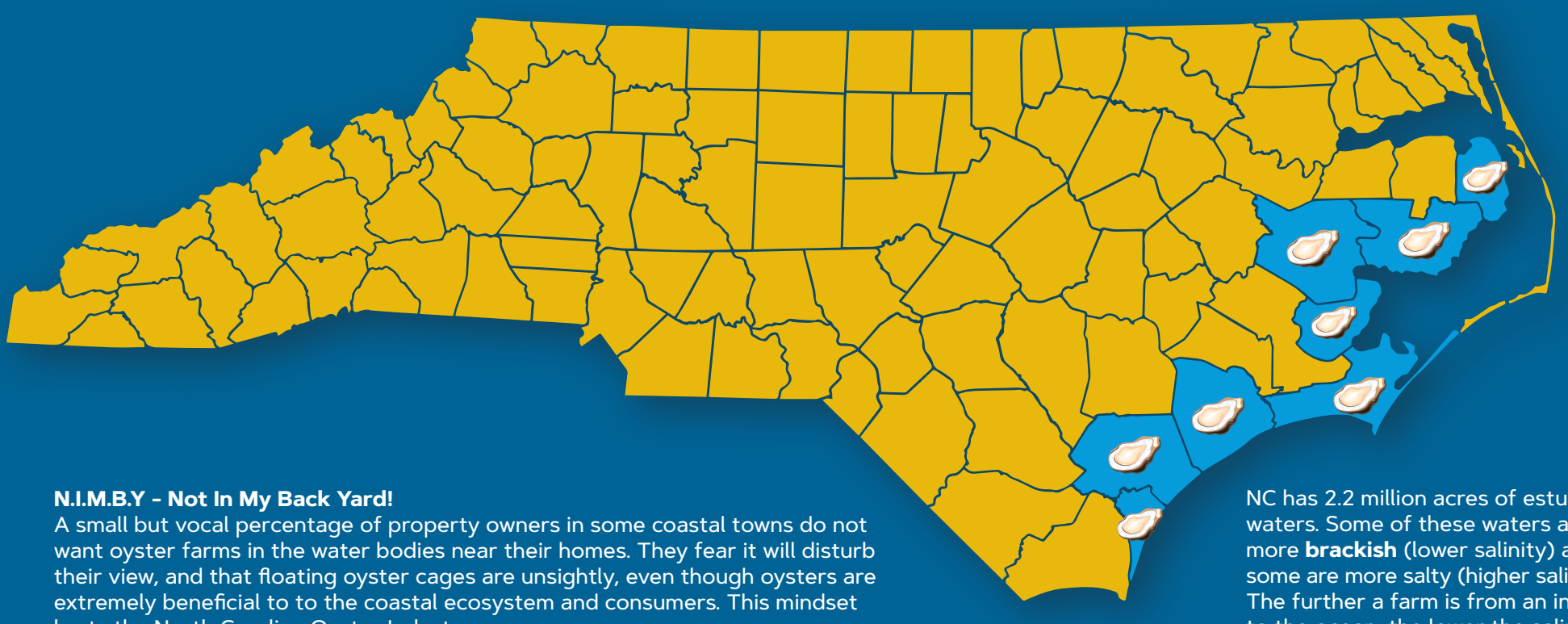


VOCABULARY

- Aquaculture:** farming in water.
- Bivalve:** A mollusk with 2 hinged shells that contain the soft-bodied invertebrate.
- Brackish:** slightly salty water.
- Commercial harvest:** the oysters are harvested to sell. In NC you need a license from the Division of Marine Fisheries.
- Diploid:** organisms that have two sets of chromosomes - one from each parent.
- Embryo:** a fertilized egg.
- Estuarine (estuary):** the wide part of a river at the place it joins the ocean.
- Farm gear:** Equipment or containers used to grow out oyster seed.
- Keystone species:** an important organism of the ecosystem that helps to keep it all together. Without this organism, the ecosystem would be dramatically different or cease to exist altogether.
- Larva** (larvae is the plural): an oyster in the early stages of development.
- Moratorium** (moratoria is the plural): a temporary prohibition on an activity.
- Oyster reef/bed:** a dense cluster of oysters.
- Recreational harvest:** the oysters that are harvested for personal consumption.
- Salinity:** the salt content of water.
- Seeds:** young oysters after the spat phase. These are used to plant in beds or reefs.
- Shucking:** removing the shell from the oyster.
- Spat:** juvenile oysters or seed oysters.
- Spawn:** the eggs and sperm from aquatic animals.
- Triploid:** hatchery-bred oysters with three sets of chromosomes. These are not able to reproduce.



WHERE IN NORTH CAROLINA?



N.I.M.B.Y - Not In My Back Yard!
A small but vocal percentage of property owners in some coastal towns do not want oyster farms in the water bodies near their homes. They fear it will disturb their view, and that floating oyster cages are unsightly, even though oysters are extremely beneficial to the coastal ecosystem and consumers. This mindset hurts the North Carolina Oyster Industry.

Shellfish Lease Moratoria: These are areas of our estuary where no new shellfish leases can be granted to farmers. Some areas have been under moratoria for decades (Brunswick County and Core Sound). Some areas were preemptively put into moratoria more recently in 2019 (New Hanover County and Bogue Sound). These new moratoria were due to expire in 2021 but were extended to 2026.

NC has 2.2 million acres of estuarine waters. Some of these waters are more **brackish** (lower salinity) and some are more salty (higher salinity). The further a farm is from an inlet to the ocean, the lower the salinity of that oyster and vice-versa, due to the impact from our rivers (fresh water).

CAREER CORNER



Tyler Chadwick

Owner of Carolina Gold Oyster Company

Tell me about your job in the oyster industry.

As an oyster farmer I wear many hats! One day I'm on the farm, the next I am stuck behind the desk and the next I am at our State or United States Capitol telling people about how great our industry is. I have learned one very important thing, all of it is just as important as the rest, from working on the farm to walking the Hill.

What is the most common obstacle you face as an oyster farmer?

I would say our biggest obstacle is the public being misinformed about our industry!

What is the best part about your job?

To be honest I love every part of my job and my industry. I wake up every morning and I think to myself, 'Is this really considered work?' I know for a fact this is what I was born to do! Oysters are special! When people eat oysters, they come together, fellowship, laugh and enjoy each other's company. To know I grew a product that brings people together in a loving way is something special!



Eduardo Mera

Mera Brothers Oysters

Tell me about your job.

We're three brothers that each have a unique skill set for each of our designated roles in our small family-run business. All three of us are hands-on farming. I handle sales and marketing. Fernando Mera handles logistics and operations, and Robert Mera handles administrative needs and licensing/permitting.

What is a typical day like at your job?

A typical day can vary from harvesting oysters that are market-ready to building equipment to keep up with the constant influx of oyster spat year-round. We get to the farm, take the boat off the launch, ride over 400 yards to our farm and get to work. Oyster farming is hard work, and we are constantly in our office—the ocean.

What is the hardest part about your job?

The hardest part of the job is natural disasters. We've been through some hurricanes and storms throughout the years, and they can basically wipe out farms. Luckily, that hasn't happened to us yet (knock on wood). However, as any farmer knows, it's a risk and reward job. We risk and reap rewards.

Watch Ed Mera on his farm!



Dr. Jane Harrison

Coastal Economics Specialist, North Carolina Sea Grant

Tell me about your job.

I'm an environmental economist that helps communities safeguard natural resources. I work for NC Sea Grant, a NOAA program at NC State University. We conduct research, outreach and education on freshwater, coastal and marine issues. I frequently assist oyster farmers and coastal communities to achieve seafood sustainability.

How has education helped you in your current job?

My education has been essential to getting me where I am today. I have a Ph.D. in natural resource management from Oregon State University and a master's degree in agricultural, environmental and development economics from The Ohio State University. Through my education, I developed advanced social science research skills and a broad knowledge of societal interactions with the environment.

What do you think people should know the most about oysters and the environment in North Carolina?

Oysters provide the 3Fs: filter, food, and fish habitat. They filter water, improving water quality. They provide food for marine organisms, as well as humans. And oyster reefs serve as habitat for spawning fish and crustaceans. They are a keystone species for regulating the coastal and marine ecosystem in our state.

This Ag Mag complements and connects to the following North Carolina Standard Course of Study:

English Language Arts

Kindergarten RI.K.3, RI.K.4, RI.K.7, RI.K.10
1st grade RI.1.1, RI.1.2, RI.1.3, RI.1.4, RI.1.5, RI.1.6, RI.1.7, RI.1.10

2nd grade RI.2.2, RI.2.4, RI.2.5, RI.2.6, RI.2.7, RI.2.10

3rd grade RI.3.1, RI.3.2, RI.3.4, RI.3.5, RI.3.7, RI.3.8, RI.3.10

4th grade RI.4.1, RI.4.2, RI.4.4, RI.4.5, RI.4.7, RI.4.10

5th grade RI.5.1, RI.5.4, RI.5.10

6th grade RI.6.1, RI.6.2, RI.6.3, RI.6.4, RI.6.7, RI.6.10

7th grade RI.7.2, RI.7.4, RI.7.7, RI.7.10

8th grade RI.8.1, RI.8.2, RI.8.4, RI.8.10

Science

Kindergarten LS.K.11, LS.K.12, LS.K.21

1st grade LS.1.1, LS.1.2

2nd grade LS.2.11

4th grade ESS.4.3.1, ESS.4.3.3

5th grade LS.5.2.1

6th grade LS.6.2.2

8th grade LS.8.2.1, ESS.8.2.2

Biology (9-12)

LS.Bio.4.1, LS.Bio.5.2, LS.Bio.10.1

Earth Environmental Science (9-12)

ESS.EES.4.1, ESS.EES.4.4

Social Studies

1st grade 1.C&G.1.1, 1.E.11

2nd grade 2.E.11

3rd grade 3.E.11, 3.E.12

4th grade 4.E.1.3

8th grade 8.C&G.2.2



OYSTER JOKES

They're SHELLarious!

Why don't oysters give to charity? Because they are shellfish!

How do oysters call their friends? With their SHELL phones!

Why do Oysters go to the gym? It's good for their mussels!

What kind of picture does an oyster take? A shell-fie!

Our mission statements:

Ag in the Classroom (AIRC) is a unique educational program founded and affiliated with **North Carolina Farm Bureau (NCFB)** in 1985. AIRC is dedicated to promoting the importance of agriculture to all Pre-K through 12th grade school teachers and students through the North Carolina Standard Course of Study-based curricula, workshops for in-service and pre-service teachers, grants, ag literacy books, and county Farm Bureau support. **NCFB** was formed in 1936 as a non-profit grassroots general farm organization and along with **Brunswick County Farm Bureau**, aims to serve farmers and provide a unified voice for the interests and needs of the farming community through special projects and partnerships with **AIRC**.

The **Kenan Fellows Program for Teacher Leadership (KFP)** at **NC State** connects outstanding public-school teachers with mentors

in local industry and research settings, creating opportunities that build meaningful relationships. Kenan Fellows are K-12 public school educators who spend three weeks during the summer interning at a local mentor site where they develop a deeper understanding of workforce needs, and how they can make relevant connections for students. Fellows are given unprecedented opportunities for networking, professional growth, and leadership development. **KFP** supports these exceptional teachers through its proprietary professional development that focuses on instructional leadership, project-based learning, elevating teacher voice, strengthening ties between the school and the local community, peer coaching and mentoring, and growing professional learning networks. Teachers who complete the program say they feel empowered to lead within their content-area teams, their schools, and their districts. Many become empowered to influence and lead educational innovation at state and national levels.

This issue of the North Carolina Ag Mag has been provided by:



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