EP. 3: EXPLORING ESTUARINE HABITATS

TRANSCRIPT

Kaitlyn Dirr 0:19

Hey there, my name is Kaitlyn Dirr and this is the NERR or Far podcast. On today's episode we are going to be talking about estuaries and the benefits of estuarine habitats.

First things first, what is an estuary? According to National Geographic, an estuary is "an area where a freshwater river or stream meets the ocean". When fresh water and sea water combine, the water becomes brackish or slightly salty. The saltiness, or salinity, of these estuaries can vary from season to season. In a rainy season, there's more freshwater so it'll be less salty, also known as less saline. In a dry season, when there's less freshwater, it will be more salty. There are a number of estuarine habitats on our southeastern coast. A few that we'll be focusing on today are salt marshes, oyster reefs, maritime forests, and mangroves. Before we dig deeper into the benefits of estuaries, let's look at the differences between each of these individual estuarine habitats. Salt marshes are a type of coastal wetland that is flooded and drained by saltwater that comes from tides. The soil within salt marshes is made up of a deep mud and peat. Now, peat is a very thick, spongy material that is made of a decomposing plant matter. Because the peat in marshes is usually underwater and decomposition is taking place, the amount of oxygen in this material can be super low. This state is known as hypoxia. "Hypo-" meaning under or beneath, and "-oxia" connects the word to oxygen. There are certain types of bacteria that love these hypoxic conditions, so they grow within the marsh soil. These bacteria produce hydrogen sulfide, which gives salt marshes a characteristic rotten egg smell. Now, there are a lot of different types of marsh grasses and different foliage that you can find in the salt marsh, but the most common salt marsh plant species in the southeast is Spartina (specifically, *Spartina alterniflora*, or smooth cordgrass). Spartina helps with erosion control, acting as a stabilizer as well as a wind and wave buffer. It can also help remove pollutants, and when it dies, it forms what is called "wrack" and decomposes, returning nutrients to the system. This is a big reason why salt marshes are the second most productive ecosystem on the planet. Another important habitat in estuaries is an oyster reef. Oysters like to live in brackish to salty coastal waters, making estuaries a perfect place to call home. Oysters often cluster on hard submerged surfaces and then fuse together as they grow, forming hard, rock-like reefs. That can then become a habitat for a wide range of other marine species. They'll make reefs on anything from piers to old discarded shells. Here with more on oyster reefs is Anita Grove, the Coastal Training Program Coordinator at the Apalachicola reserve in Florida.

Anita Grove 3:35

Oyster reefs provide a huge- ecosystem services, they're like little apartment complexes, oyster reefs, subtidal oyster reefs tend to be, you know, they can be six to eight feet high, and you know, that wide and they're like a reef or a bar. So when waves get churned up in the bay, they buffer those waves so that when they hit the shoreline, they're not as strong and they're not eroding away the shoreline. So

that's a big service. Also that, that idea of a little apartment complex. It's for species. Oysters are keystone species, and they basically provide habitat and shelter for crabs and worms and just all sorts of marine creatures. So it's quite an interrelated, connected ecosystem.

Kaitlyn Dirr 4:24

Anita called oysters a keystone species. In case you're unfamiliar with this term, a keystone species is any organism, whether it be an animal, bacteria or fungi, or a plant that sort of serves as the glue holding the habitat together. If it were to disappear or be removed, the biodiversity and structure of that habitat could completely change. The Apalachicola reserve is supporting these keystone species through a shell recycling program as well as a new oyster aquaculture collaboration.

Anita Grove 4:56

Yeah, so it was a great project that started during COVID We've had a relationship with the Forgotten Coast of- the Conservation Corps of the Forgotten Coast. And that is a group of young people who are... it's modeled after the 1930 version of the CCC, which is the conservation organization. They built trails, they built launches, all sorts of things around the country in the 1930s. This is modeled after that, it's to take high school-aged and young adults and train them in environmental management, learning trail maintenance, all sorts of things. So I've always had the idea that we have so many oyster shells that we don't know what to do with them. Paved roads, alleys, all sorts of things for years, but now we find ourselves in an oyster shell deficit. So I started a recycling shell program with them in which they go to the restaurants that serve the oysters and they recover the shell and then we can clean it, dry it and then put it back out into the bay.

Kaitlyn Dirr 6:03

Next up is the maritime forest. Maritime forests, a type of shoreline estuary along coastal barrier islands, are constantly changing and moving with a changing shoreline. These forests are typically surrounded by a layer of dunes on one side and salt marsh on the other, but don't completely escape the impacts of ocean winds and salt spray. For this reason, there's a canopy of shrub-like foliage to protect less tolerant interior trees. One state in the southeast that has a lot of maritime forest habitat is North Carolina. Here to talk more about these forests and the diversity of the state's coastline is Lori Davis, Education Coordinator of the NC NERR.

Lori Davis 6:43

So, as you know, North Carolina is very diverse already. You can go from the coast to the mountains in one day and cross through the piedmont there in the sandhills. And so even though just looking at our coastline, it's different already. If you start up north, we have a lot of plants that we don't want down south. And then one of our sites is mostly maritime forest, which is a great place that's kind of hidden between the estuary and the ocean that people forget about sometimes is the maritime forest. And

then as you go on down, you know, beaches, the marsh areas, and people just don't realize that you can go study a mammal in the maritime forest, and it might or might not travel over to the estuaries or the beach. And you can trap- you can actually do experiments on different types of marshes, you know, ones that are very, very salty and ones that have more of a freshwater influence. And so I think because of our diverse coastline, that scientists can pick and choose where they want to, and always tell kids, you know, very different what's happening here in Beaufort, and what's happening up north in Kitty Hawk. And you know, they're getting a lot of different types of water coming in, their tides are different. And it's just neat to pull up a map so they can see the differences in our coastline.

Kaitlyn Dirr 8:17

Lastly, mangroves are a type of tropical tree or shrub that live in the coastal intertidal zone. They're able to survive and thrive in conditions that many other trees could not. This hardy group tolerates brackish to salty coastal waters, and the never-ending ebb and flow of ocean tides. Their roots even create incredible underwater nursing environments for many marine species. So what value do marshes and oyster reefs and these other estuarine habitats bring to states here in the southeast? Here to tell us more is Josephine Spearman, the Education Coordinator at the GTM NERR in Florida.

Josephine Spearman 8:58

An incredible amount of value actually. So our oyster reefs and our salt marshes are part of the protection and stabilization of our coastline. They act as buffers, absorbing floodwaters during hurricanes and excess energy from boat lakes. They also act as carbon sinks, they act as nursery grounds and also a huge part of like the filtration process of the estuary. So it's so funny, when I teach kids in our program we talk about the three main functions of an estuary: storm protection, filtration and nursery and these two habitats do all that.

Kaitlyn Dirr 9:36

Storm protection, filtration and nursery. These are the three main benefits or ecosystem services of estuarine habitats. Let's look at storm protection. Estuaries have an incredible ability to serve as important buffer zones. These habitats soak up excess water during flooding and stabilize shorelines, absorbing wave energy, protecting streams and shores from excessive erosion. In the event of a hurricane or tropical storm, estuaries are a line of defense for inland habitats and communities. And it's not just flooding from hurricanes that estuaries can help control. It's any kind of flooding.

Anita Grove 10:16

So when we have and the towns above us have, which are many, all the way up past Atlanta, when those two states get a lot of water, it can go into the river and it's not really going to affect us because the water can spread out onto the floodplain and it spreads out and goes in all these sloughs and swamps and then is absorbed. It's also a carbon sink you know, it absorbs a lot of carbon.

Kaitlyn Dirr 10:45

This is another benefit of estuaries, they're carbon sinks. A carbon sink is anything natural or unnatural that collects and stores some carbon containing compounds for an indefinite period of time. By doing this, they remove CO2 from the atmosphere! Our next benefit is filtration. Salt marshes and mangroves, with their spongy peat and marsh grasses or complex matrices of tree roots, are like the Brita filters of coastal communities. They filter out all sorts of things, from herbicides and pesticides, heavy metals from industry, to excess sediments and nutrients from runoff. This is an incredible benefit, but not something to be taken advantage of. Declines in estuarine water quality can endanger aquatic life and impact human health. The NERRs do an incredible job of monitoring water quality through their System-Wide Monitoring Program (also known as SWMP). This is something that we'll explore in a later episode. Lastly, estuaries serve as a nursery for many species, creating a unique space for reproduction and early life. The mud and food particles brought in by the tide settle in some parts of estuaries where the water is more still, and hard structures like mangrove roots provide a degree of protection. These safe conditions are ideal for organisms to grow, feed and have young. Estuaries provide such great benefits to our coastal communities. It's important to study and protect these habitats. That's the purpose of the NERRs, and it's something that we can also help out with. Our activities on land can have a big impact on the health of our estuaries. We'll talk a little bit more about ways to be a good environmental steward and to protect the health of estuarine habitats in a later episode. For now, I'm Kaitlyn, and this is NERR or Far: The Reserves Are Where You Are.