



THE SALT MARSH

Nature's Filter Between Land and Sea

Salt marshes, also known as tidal marshes, naturally grow along the shorelines of our creeks and bays in saline and brackish waters. The species of grass that grows within the tidal zone (submerged at high tide, exposed at low tide) is called smooth cordgrass (*Spartina alterniflora*). A different species called saltmeadow cordgrass (*Spartina patens*) grows above the high tide line in the area known as the high marsh. Salt marshes are highly productive ecosystems that help filter polluted water from land while protecting our shorelines from flooding and erosion. The roots secure the sediment (sand and mud) in place, preventing it from washing away during storms.



Smooth cordgrass

Spartina alterniflora

also known as saltmarsh cordgrass,
marsh grass, *Spartina* grass



Ribbed mussels attached to
Spartina roots



Fiddler crab burrows in the
salt marsh



Fiddler crab out of its
burrow

Symbiotic Relationships in the Salt Marsh

During high tide, the roots and lower sections of smooth cordgrass become submerged, allowing ribbed mussels (*Geukensia demissa*), attached to the base of the grass, to filter feed. Ribbed mussels and marsh grass benefit from each other in that the mussels help to strengthen the roots of the grass and provide extra resiliency from storms. They also provide nutrients to the grass in their excrement. The grass provides the structure that the mussels need in order to attach themselves at just the right level in order to filter feed and not sink into the mud.

At low tide, fiddler crabs (*Uca* spp.) get to work building burrows and feeding off of organic particles left in the sand by the tidal waters. Their burrows help the salt marsh by allowing oxygen into the root zones of the *Spartina*, which helps it to grow faster than in low oxygen environments. The fiddler crabs benefit from the protection provided by the grass from birds and other predators, the rich sand it accumulates as it grows that the crabs feed on, and the stability that the roots provide the sediment in order for the burrows not to collapse.



The Salt Marsh- Nature's Filter Between Land and Sea *continued*

Healthy salt marshes, with ample ribbed mussels and fiddler crabs, constantly grow. With every tide that comes and goes, the marsh grass slows water currents which settles particles of sediment down from the water. Then the roots help to trap and accumulate more sediment, creating more marsh habitat.



Salt marshes are considered one of the most productive ecosystems on earth. This means that they convert more carbon dioxide into oxygen than a forest or other plant-based ecosystem of the same size. In order to grow, the salt marsh not only needs carbon dioxide, but also nutrients such as nitrogen. Nitrogen is found in many forms, and humans produce a lot of extra nitrogen which can cause pollution to our bays and creeks. Even though nitrogen is "plant food", too much of it causes other things to grow, such as bacteria and algae which can make our waters cloudy, discolored and harmful to humans and wildlife.

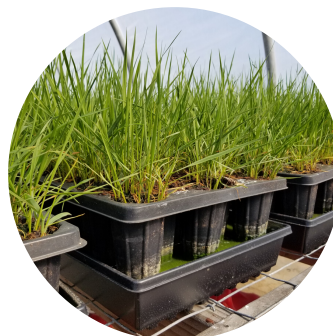
Humans use nitrogen to fertilize their crops and lawns, and every time we use the restroom or take a shower, we create wastewater containing nitrogen. All of this wastewater, as well as runoff from rainstorms which picks up pet waste, fertilizer and other contaminants, eventually flows into our bays. Salt marshes can catch some of this wastewater and runoff before it enters our bays, and can utilize the nitrogen for growth. This makes them a natural filter, helping to keep our waters healthy.



Seed collection



Seed germination



Plant propagation



Restoration plantings

Salt Marsh Restoration with Cornell Cooperative Extension Marine Program

Cornell Cooperative Extension Marine Program's Habitat Restoration Program has been actively restoring salt marsh habitat on Long Island for over 30 years. Salt marshes have been destroyed throughout history to make way for buildings, canals and hardened shorelines. Now that we have a better understanding of the value of salt marshes, local governments as well as waterfront homeowners are choosing to convert shorelines back to their natural state, and utilize mother nature's best line of defense for protecting the shores of our estuaries, salt marsh habitat.



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After reading about salt marshes and how they help water quality, answer the questions below.

Question 1. What is erosion, and how do salt marshes help to prevent it?

Question 2. Why is too much nitrogen bad for our waters?

Question 3. What is a symbiotic relationship? What two species that live in the salt marsh are symbiotic with the marsh grass? How do they help/hurt each other?

Question 4. Why have we lost a lot of our salt marsh habitat?

Question 5. Why are salt marshes considered natural filters?

Bonus Question: Using your knowledge of ribbed mussels and salt marshes, explain how salt marshes help with water quality other than catching and using nitrogen (think about what mussels eat).

