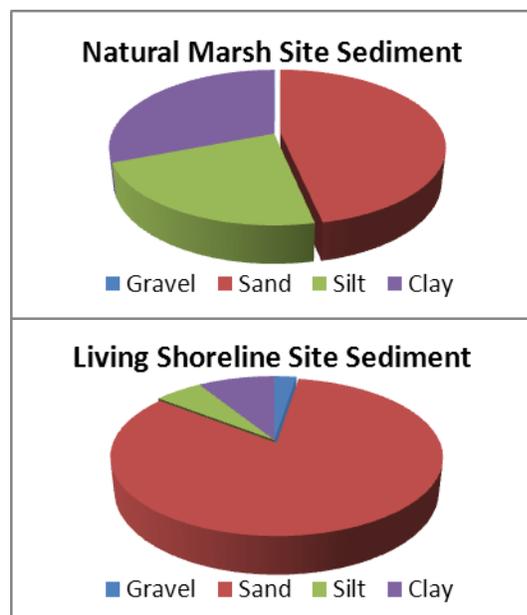


Comparing Communities on the York River

This study looked at the invertebrate animal community at two locations on the York River. One site (the Natural Marsh site) had a wide natural marsh with an eroding edge. The marsh had dense Smooth Cordgrass growing on it and clusters of mussels at the roots of the plants. The second site (the Living Shoreline site) once had a wide marsh (greater than 30 feet in width) along its shoreline, however, the marsh has eroded over the past 20+ years, leaving only a small remnant of marsh grass and almost no marsh peat. A Living Shoreline erosion control project is being installed on this shoreline to halt the erosion and restore the marsh community. We sampled at this site prior to any installation work, to create a baseline for the existing conditions. This will allow us to investigate whether the creation of the marsh provides habitat for the many invertebrate animals that live in the York River.



At the time of the sampling, the water was approximately 77°F and the salinity was 14 ppt (which is considered brackish water and is about half the salinity of ocean water). Dissolved oxygen at both sites was approximately 6.7 mg/L.

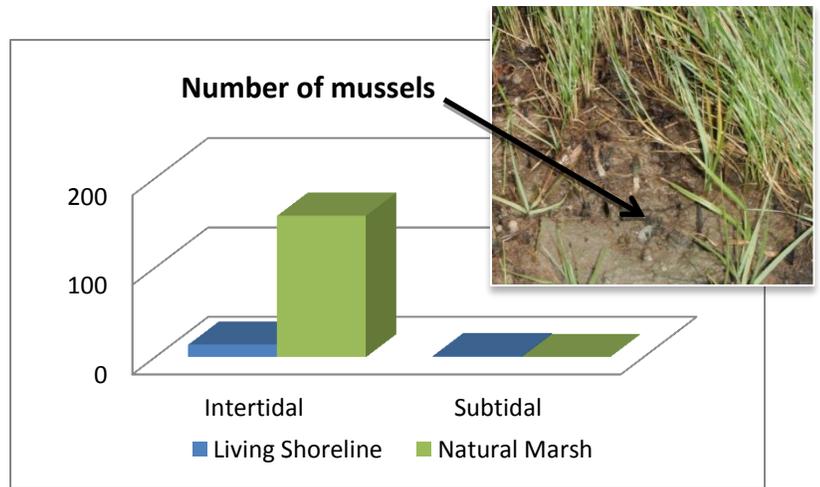


Turbidity was higher at the Living Shoreline site, meaning that the water was muddier. Clear water allows light to pass through it, creating a better habitat for seagrasses and algae.

Sediment type differed at the two sites. The Living Shoreline site was mostly sand with very little organic matter in it. This is likely due to the strong erosion occurring at this site which has scoured away both the marsh grasses and the peat surface that they were growing in. In contrast, the Natural Marsh site was only half sand and had higher organic matter. Re-establishing a marsh at the Living Shoreline site should increase the organic matter of the sediment over time (this is predicted to take 15-20 years) through sediment trapping and peat building.

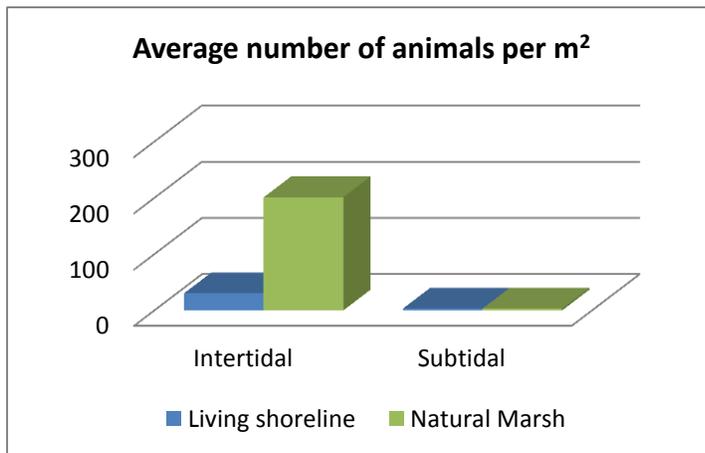
We looked at two animal communities—epifauna and infauna. Epifauna are the animals that live on a surface, such as baracles, mussels, oysters and snails. Infauna are animals that live in the sediment and are typically either crustaceans (similar to small shrimp), worms or clams .

At both sites, the only epifauna were mussels. Mussels were also found in the infauna cores, mostly in the intertidal zone. The Natural Marsh had many more mussels than the Living Shoreline site. This is likely due to the lack of marsh grass at the Living Shoreline site. Smooth Cordgrass has very strong roots that help to bind the sediments. The roots provide a safe place for young mussels to attach and grow. As the marsh grass becomes established at the Living Shoreline site, we expect to see an increase in the mussel population.



Mussels are filter feeders that help clean the surrounding water and the species found at these sites, the Ribbed Mussel, can live for up to 15 years. Establishing a strong mussel community can help improve water quality, promote marsh plant growth, and help retain sediment on the marsh.

Several species of infauna were found at both sites. Most of the species were found in the intertidal area, while the subtidal area had lower diversity. At the Living Shoreline site, we found one crustacean species: *Gammarus* (Scuds), worm species: *Streblospio benedicti* and *Neanthes succinea*, and several mollusc species: *Tagelus plebeius* (Stout Razor Clam), *Mulinia lateralis* (Dwarf Surf Clam), *Geukensia demissa* (Ribbed Mussel), *Mya arenaria* (Soft Shell Clam) and *Tellina agilis* (Northern Dwarf Tellin).



The different animals fulfill different roles in the ecosystem. We found filter feeders, grazers and deposit feeders at both sites. Therefore, both sites appear to be supporting communities that are functionally robust.

There were many more animals living at the Natural Marsh site than at the Living Shoreline site. However, most of the difference was due to the large number of mussels found at the Natural Marsh site.

The differences between the numbers of

the other animals were much smaller. The re-creation of the marsh at the Living Shoreline site should slightly increase animal diversity, but the current community is already functional.

Conclusions:

- ❖ The Living Shoreline site differs from the Natural Marsh site in a couple of different ways, mostly due to the lack of marsh grass at the Living Shoreline site
- ❖ Re-establishment of the marsh at the Living Shoreline site should increase the organic matter in the soil and allow for the establishment of a mussel population, making it more similar to the Natural Marsh site
- ❖ The change in sediment characteristics may take many years, but a mussel population could become established soon after the planted grass starts to spread