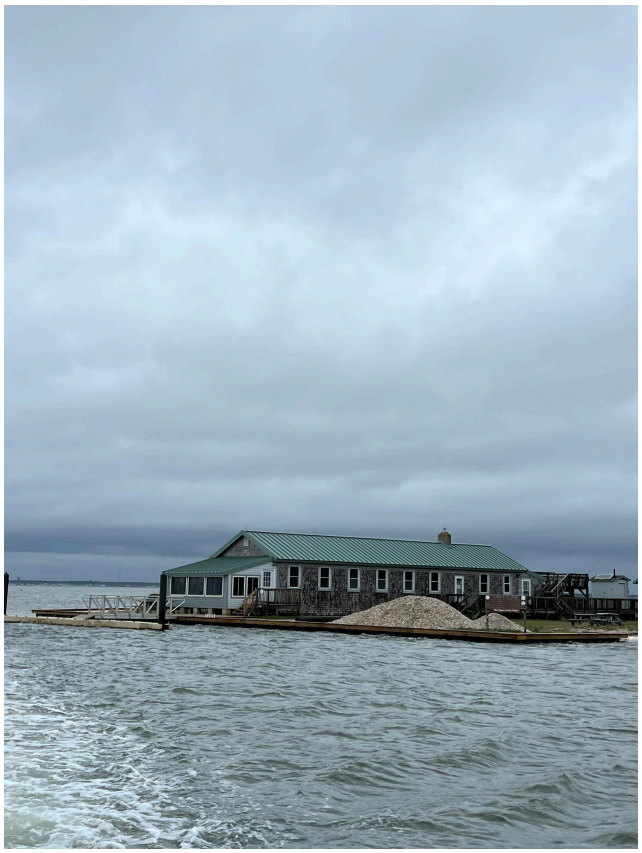
Sedge Island Field and Research Experience. With Other Relevant Notes.



I recently had the pleasure of participating in the 2025 Sedge Island Field and Research Experience, and thought I would write an article about it! For reference before I start, this camp had (I believe) 11 kids, 4 interns, and one counselor present.

Located within Island Beach State Park amongst the only Marine Reserve in NJ, Sedge Island is a beautiful gathering of Salt Marsh islands located within the Barnegate Bay on the east coast of New Jersey. When I arrived on the morning of August 18th it was rainy and cold outside, about 70 with high winds and a drizzle of rain. Despite this we had to get on a little boat to take a 5-10 minute boat ride out the island itself, as Sedge Island is (as the name suggests) inaccessible by foot. On the way over not too much wildlife was out and about, beyond some terns and seagulls hunting in the water.

Once we were off the small metal dock at Sedge Island we were able to take refuge in the 106 year old hunting cabin that would be our home for the next three days, two nights (we left around lunch on August 20th). It was a nice little cabin with an enclosed porch called the South Porch, a living room, 6-7 rooms with 2 beds (in the form of a bunk bed) if I remember correctly, a dining room with a table we did not eat at, and a kitchen. We actually ate on the south porch, but the finished food was displayed on the dining room table.

By now we had finished our tour of the house and put our belongings away in our allocated rooms, and it was about 10 AM. Due to the rain and ever-present wind we ended up staying inside for an hour or two. However, that was not too big of a deal because we ended up not only utilizing the time to get to know one-and-other better, but we also did some knot tying practice and *Gyotaku*. *Gyotaku* is a Japanese art form where inked-fish is pressed in cloth to form a copy of the fish on paper, and has been done since the *Edo* period as a way to accurately record many different types of fish. Much like we take photos with the fish we catch now, Japanese fishermen would “print” a photo of the fish they caught to showcase.

After this we went clamming in the bay directly off the island. Going out to the water I saw more Hermit Crabs than I have ever seen in one place,and at that moment thought places like this are where boardwalks get their stock from. Now I believe these Hermit

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Crabs have fish-like gills that make them unable to breathe out of the water, so that probably isn't the case.There had to have been 100+ little Hermit Crabs in the shallow by the shoreline all with seemingly identical little shells. After being distracted by the small army of Hermit Crabs we got distracted one more time before officially starting to clam, and that was via seining.

Seining is a method of fishing that really just involves dragging a net through the water to catch whatever is swimming by. Our net was 10-15 feet long and about 3-4 feet tall, and it had little "floaters" on the top of the net and weights on the bottom. All of that is connected to two wooden handles that run the height of the net, then some. Now actually seining is a little bit tricky to learn, but relatively easy after that. I was lucky that I had already done this before in the Delaware Bay, and was now able to try it out in the Barnegate!

To sein you hold the handles like a vacuum cleaner, with the bottom of the net out in front of top. While doing this you also have to make sure you are at least near the bottom of the bay, or you will miss out on a plethora of species who will take refuge in the deeper (relatively speaking in this case) water. After you and your partner walk out into the bay one person stands still, and the other pivots around that person to ensure the trip back to the beach, or opening in the salt marsh in our case, does not result in all the fish escaping. Much like those videos of people taking a pencil connected to a nail with some string to draw a perfect circle. Now the important thing here is to make sure you do not go too deep before starting the turn around, or the person walking out and around with nets may end up going for a swim as they walk into deeper waters.

After completing that you pull the net ashore, and see what you caught. This part always amazes me, as when looking into the waters of the bay from above it seems like there is nothing living in the brackish water, and especially not just a couple feet from where you stand on the shoreline. However, there definitely was this time. We got a couple different types of little fish, which largely consisted of Silver Sides, and even a Blue Crab! A couple other people had a turn seining after that, but as soon as we released the marine-animals back into the water I proceeded to begin clamming.

This was a little nerve wracking at first, but I got used to it. We walked around the bay with a bucket rigged with pool noodles to keep it afloat, and felt the sandy/mucky bottom for clams. They can burrow well below the surface of the bay's bottom, and sometimes can be felt protruding through the sand. So we walked around the bay digging our feet in the sand looking for them. After successfully locating something hard and submerged in the sand with your foot the next step is hoping it doesn't bite and sticking your hand in the water to grab it. Assuming what you found was a clam, it was not as simple as picking it up, as they have a long "foot" dug into the sand to keep them from being brought out of the sand. Literally called a foot, it looks more like a big tubular tongue sticking out of the clam. you will know you have finally won the fight against the clam's foot when you feel the clam close in your hand, which I was always relieved to see my

fingers did not get stuck in. Beyond the Quahog clams we were searching for, we also found lots of Sea Squirts in the sediment. These are little “filters” of the bay, and definitely do not seem like a living creature, admittedly they don’t quite seem dead either. Rather a half squishy, half hard, middle ground.

I am glad to say I got 15 clams, and as a whole we got close to 100 I would say (maximum catch is 150). However we only kept about twenty of those clams and put the rest back. The kept ones were eaten shortly thereafter, and were used to teach the different parts of a clam.

Clams are a very interesting animal, especially so when you consider most people only ever see them immobile and locked in a shell. Before their life officially begins their parents release millions of eggs, and sperm, into the water undergoing a process called External Fertilization. Within 12 hours of successful fertilization a little, shell-less, clam larva begins to swim around the water. They will float around the bay as a larva for the next 12 hours or so, then they will begin to form a shell. After that they will find a suitable spot in the bay to settle, and start to turn into the big clams we enjoy eating. While in the water they not only filter water at a rate of about 40 gallons a day (once full grown), which alone directly improves water quality. To add to that though, they also hold the sediment at the bottom of the bay in place with their “feet”. This helps to reduce the free floating sediment in the water, thus improving water quality even further. Pretty incredible for what I would argue is an under appreciated little creature. They are ancient as well, and their fossilized shells are a fairly common find around the world.

Now somewhere around that time we also stopped for our first meal at sedge, lunch. We had two very nice cooks with us who kept us very well fed, and I thought I would give them a shoutout!

After that we also practiced Re-Sight surveys. The idea is, by tagging captured animals, and then noting when you recapture those tagged animals how many non-tagged animals you catch as well, you can estimate the population of the species you tagged. So let’s say you spend a day fishing and catch 5 Sea Robins, and you tag each of those before releasing them. If you come back the next day and catch 7 Sea Robins, 1 of which is tagged, we can estimate the Sea Robin population in that area to be about 35 fish (Total Marked/Population=Already Marked/Total Caught). Generally the more fish you tag and release the more accurate the population estimate will be.

After a fish designing session (I lost) we then had some more statistical fun. I won’t even attempt to describe how this one works, but just know it was called the Chi-Square equation and we learned it with M&M’s at first, then went off to catch Fiddler Crabs for some real life equations. Fiddler crab burrows dot Sedge Island, however actually finding crabs in the burrows is a bit tricky. We eventually found a small, oddly circular, mud flat that had some crabs in it. We caught them by taking a spade and plunging into the ground behind the active burrow we had located, and then tilted the spade up, while scooping our hands into the loosened dirt to catch the dislodged crab. I did not get

pinched thankfully, but the male fiddler crabs have some disproportionately large yellow claws. They use this arm, among other important functions, to play a big of chicken with other males. They will do elaborate rituals meant to intimidate other males, but rarely ever fight because the risk of injury is high (according to Virginia Institute of Marine Science at least). Fiddler crabs also serve an important ecological function, beyond acting as food for a plethora of animals. Through digging their burrows they bring oxygen deeper into the oxygen-deprived salt-marsh soils. This subsequently assists in mineralization and nutrient cycling, keeping the plants of the salt-marsh well fed in addition to the other animals, such as the Diamond-Backed Terrapin Turtle. An extremely cool looking turtle that has evolved to live in Brackish water, and can be found inhabiting coastlines and salt-marshes around the state.

After catching about 22 crabs, I believe the actual number was 23 but we needed an even amount, so we released them into a dugout “choice chamber”. In the middle was a small depression, and on the one side there was a bowl of hot water and the other cold. The idea was to see which side was preferred by the crabs so, after a few trials (we eventually forgot to do those), we could average our results and then use the Chi-Square test to see if any subsequent trials had “unacceptable” variations in choice by the crabs. In case you were wondering, the crabs preferred the hot water for the one trial we did.

I cannot lie while everyone was excitedly looking at the choices these crabs made, I was distracted by some sandpipers. They are a diverse group of small migratory shorebirds that were very much present in the island, in what seems to be groups of multiple species I struggled to individually identify. However when startled, or just flying to a new spot, they take off into the air in a big feathery cloud with their white belies out. It almost reminds me of a snow globe.

The bird watching on Sedge Island was amazing, and especially so because we were there during the annual fall migration. Many of our shorebirds are actually migratory species who only use New Jersey as a stepping stone in journeys as long as 9,000 miles from the tip of South America to the Canadian Arctic (the Red knot makes that extraordinary journey). While at Sedge I was able to confidently identify both non-migratory and migratory bird species, and saw many other species I was not sure about. Here are the ones I am sure about! Or not…

- Least Sandpipers (among other sandpipers I could not identify)
- Oyster Crackers
- Osprey
- White Ibis
- Semi-Palmated Plover, and watching these run around was great. They seem to have a “start-stop” type of movement. They go from standing still to running a short distance, back to standing still and then running again.
- Brown Pelicans

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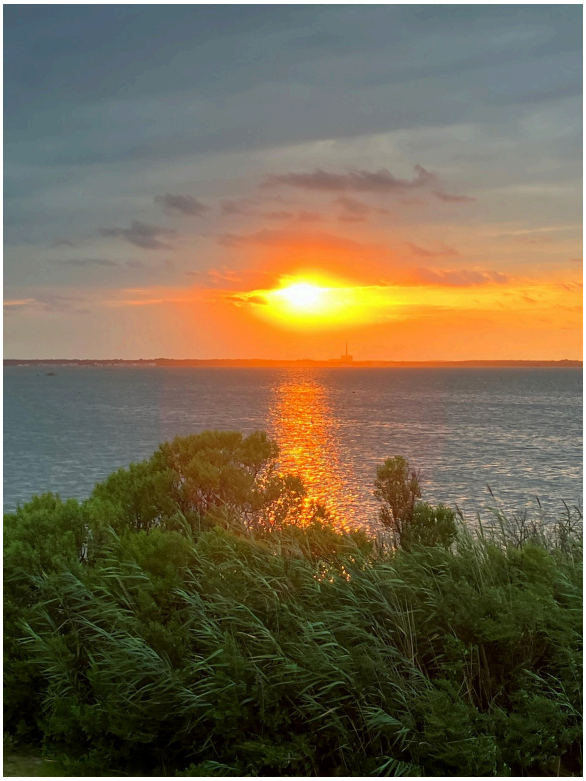
- Great Black-Backed Gulls
- Unidentified Terns
- Gull-Billed Terns
- Herring Gulls
- Laughing Gulls
- Herons (not 100% sure what type).
- Ruddy Turnstone.
- Cormorants. They are like less graceful, fatter ducks and entertaining to watch when they fly out of the water. They seem to slowly lift themselves into the air, with their little legs furiously kicking as they seem to run across the water while trying to get airborne.
- Other unidentified birds!

It was also around that time we met another type of crab, the third that day in fact! It was the invasive Green Crab. An intern simply dropped a crab trap with some fish in it off the dock by the sedge house, and about half an hour later pulled it up with 10-15 green crabs in it. Originally from Europe, these little stinkers are outcompeting our native Blue Crabs whilst effectively disrupting the coastal ecosystem. So we continued to catch them, and eventually I was told they were given to a bait shop to sell as bait. A good use, and hopefully future market, for an invasive species we need better ways to manage. When out in the deeper, relatively debris-free waters of the Barnegate Bay we did not get any Green Crabs, but probably close to 20 Blue Crabs through various catching methods I have yet to discuss. This is because Green Crabs thrive near these man-made structures, which makes catching them quite easy.



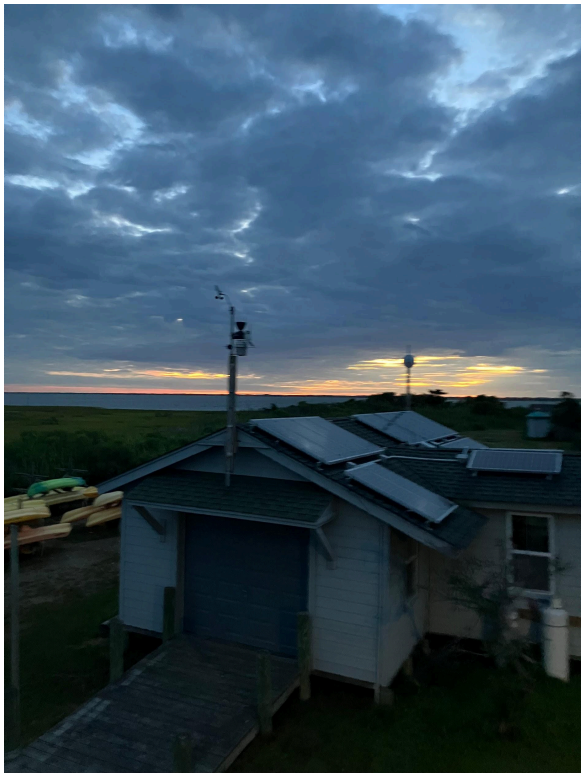
To be honest I feel like we did something prior to watching the sunset (foreshadowing), but for the life of me I can't remember what. Oh well. The sunset though. Both nights we were there the sky's cleared up, and sunsets on the bay are different. When in the woods, assuming to the west of you is not completely cleared for a good while, your view of the setting sun is inevitably blocked before it reaches the bottom of the horizon. On the bay however, this is not the case. You get to watch the sun fully set, and the pastel of colors present with that. Along with ospreys, seagulls and terns going about their food finding

business. It is spectacular, and something everyone should see at least once.

Somewhere in between sunset and stargazing while sitting on the outdoor North Porch talking until 10 PM, we played a little game to get to know each other. More like a round table discussion where we each introduced ourselves (by then we knew each other's names, so this focused more on hobbies).

And that was the first day.

The second day started bright and early for me. I was up at about 5:15 just sitting in bed, and then my sleeping back syphoned over the edge of the top bunk in which I was staying. That happened at around 5:30, and I was effectively without a blanket. At that point I was not going to fall back asleep, so I decided to get up and watch the sunrise. The whole cabin was still asleep however, so I just parked by a relatively east facing window and waited. When I got there the horizon directly around due east (presumably, I admittedly did not pull a compass out to check) was starting to turn pink/purple. At the same time the birds outside were slowly waking up with the sun rising over the water. Much like the sunset, the sunrise on the bay is different then in the woods because you can see the sun for the entire process. In the woods you are able to see the sky starting to lighten, but the sun could still be hidden behind some trees for a good amount of time.

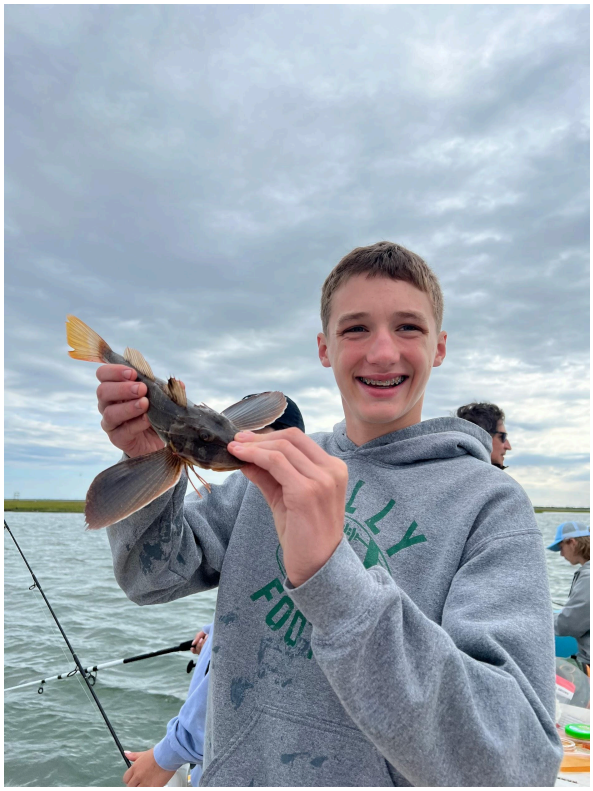


At about 5:50 two other campers woke up to see the sunrise, and they wanted to go outside. At this point I decided to go with them because I figured if the door slammed and woke everyone up the blame could be split amongst us three. However when we got outside it was relatively clear and beautiful, but horribly windy, and miraculously the door did not slam. I did not last very long outside before retreating back to the relative comfort of the window, but did notice on thing in particular; That is, it quite cool to look east and see the sky starting to light up, with its early morning oranges and pinks and purples, only to then about-face to the west just for it to still be dark.

The funny thing is I can't even remember what time everyone woke up, so we will skip to the day's activities. The first thing I did was go out on a little boat to fish in the Barnegate Bay, and we were joined by two people from the American Littoral Society's Sandy Hook office. The American Littoral Society is a coastal conservation group that works in both South and North Jersey, and the purpose of their visit today was to teach us about fish tagging, and with any luck, tag the fish we

caught. The fish are tagged to help us better understand their population size, based on how many are tagged vs how many are re-caught (this relates back to yesterday's lesson on recapture surveys). Since 1965 they have tagged nearly 1,000,000 fish! Fishermen have recaptured about 5% of those tagged fish since 1965, or about 50,000. Each tag has a code, and/or a phone number to report the number to. Here is a link to the society's interactive maps that showcase their tagging statistics! This data is crucial not only in estimating population sizes, but also migratory routes, habitat ranges, and even how fast a fish grows. This is because the size of the fish is noted when the fish is tagged, and when the fish is recaptured it is easy to re-measure and compare to the previous measurement

With that out of the way, we were ready to start fishing. We had regular rods (not deep-sea), and they had two medium-sized hooks with no weights. We put a gulp on each hook, and dropped the lines to the bottom of the bay in the hope of catching flounder. When I say we dropped the line, I mean we hardly cast out from the boat at all. With almost 10 people, for only half the students plus 2 interns fished at a time, casting the lines from the boat would have been a disaster. The boat was about as wide as the rods were long, and casting them would have resulted in someone in the opposite end of the boat getting an ear piercing. We simply dropped the line, and then "jiggled" it to make the bait underwater move around like a live prey; The goal of this was to entice a hungry flounder to jump from its hiding spot in the sand and try to eat the artificial bait.



Not too long into the trip I caught the first, and only, fish of the entire trip. It was a pre-historic looking fish called a Sea-Robin. Now these are some very odd fish. For starters, as I learned this day, they make a lot of chirping noises out of the water. I had never seen anything like it before this moment, and I can't describe it very well. Just imagine catching a fish, taking into the little boat, and along with all the characteristic thrashing associated with catching a fish they also proceed to make noise. I should also remedy my earlier statement about them "chirping", it is more like a bunch of croaks. Nothing too loud, but noticeable nonetheless. Then there are the huge pectoral fins. They use these not only to maneuver through the water, but also to walk the bottom of the bay with "legs"

that come off the fin itself. They primarily use these legs to walk on the sea floor, in search of food such as small mollusks to pull out of the water and eat.

To finish off the Sea-Robin oddness, I thought I would point out they are incredibly bony and hard. I especially noticed their head and upper jaw were super hard, but their whole body is also covered in small bony plates.

Much to my dismay, my fish was too small to tag and ultimately released back into the water. After this I was more focused on the birds and scenery around us. Two things, beyond the salt-marsh, stood out to me. The first being multiple “dredge islands”. These are tall, non-marshy islands in the bay formed by the dredging of waterways. The Army Core of Engineers and NJDOT are charged with keeping designated waterways in the state deep enough for safe travel, and they do this by pumping the sand out of the bottom of the bay in select locations. Historically, and even still now, this sediment was either pumped right onto these islands (hence the name “Dredge Islands”), or trucked off somewhere. However, as the rate of sea-level rise increases and our marshes are starting to drown, more and more of this sediment is rather being dumped onto growing marshes to give them a “boost”. This might only add up to a couple inches over the whole marsh, but that is the difference between life and death for the plants of the salt-marsh, and the waterways have to be dredged regardless. Here is a good example of this from the Wetlands Institute.

Now on one of these artificial islands, right on the edge by the water, I saw what looked like about 20 cormorants standing with their wings wide open, soaking in the cloudy day in a frantic little party. Their wings looked so stubby, and they were just moving around the little edge of the island. I don’t know why though, it was cold and cloudy right then. I won’t complain though, it was entertaining to watch.

After this trip I also really started work on my project. For this we got into groups of 2-3, and prepared a poster and presentation on a chosen subject. Me and my partner did Invasive Species of The Barnegate Bay. The actual presentation was the last thing we did before camp ended, so I will save that for the end of this paper.

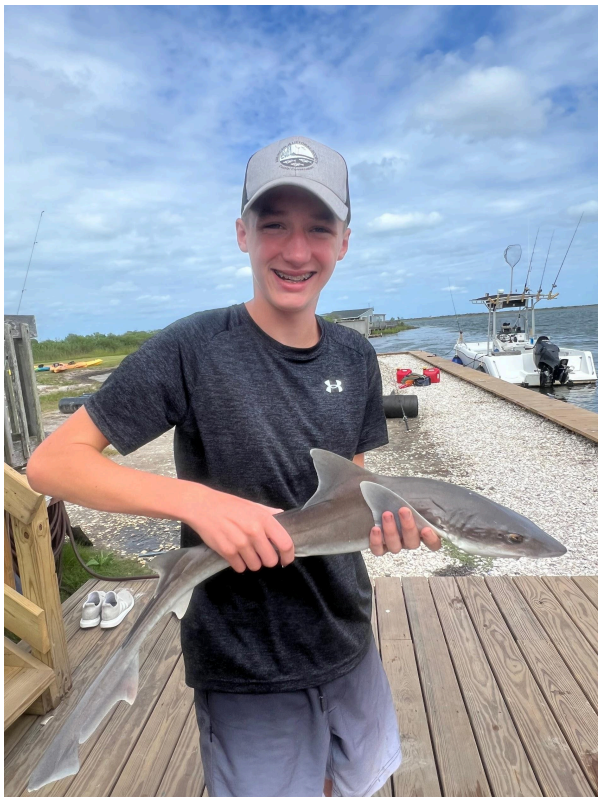
The next event for me that day was Trawling. This is like seining, but instead you drop a big net off the back of the boat.. Although the simplified version is, we dropped a net into the bay, and after some time pulled it back up on the boat, there was more to it than I expected. The first step was setting up the twenty or so feet of rope connected to the net so they could fluidly roll out of the perforated bins they were stored in, and not take any children into the water whilst doing so. When done right this was upper satisfying. The next step was having two people stand on opposite sides of the boat, width wise, holding these big metal “planks” called doors. These were attached to the yellow rope which was attached to the net, and were near the opening of the net . This was, to my understanding, to prevent the net from closing underwater (as these 15-20 lb things will simply not float towards each other in the water, but they are held up in the water by the yellow rope that connects to the boat). After the two people on the very end

of the boat drop the net in the water, and ensure it is opened correctly, the doors are dropped in. Thereafter it is simply a matter of making sure the rest of the rope goes in smoothly. In my never ending effort to always be in on the action I ended up being one of the people up front holding the doors before they get dropped in the water,, and that is how I can give an estimated weight with confidence.

After driving around the bay for 7 minutes it was time to pull the net back up. This part is pretty self explanatory, so I will skip to the good part. Although I expected some fish to be in the net, and maybe some crabs, what I definitely did not expect was starfish. They were relatively abundant, perhaps 3-4 per net, and very small. No more than 4 inches across. However they were not the only thing we pulled out from the net by a long shot. In addition to those we also got…

- Silver-Sides, a small silver fish.
- One Gag Grouper.
- Blue Crabs, no green! We also were lucky enough to see one female with eggs. The individual eggs were super small, and the whole clutch just looked like a dull, orange sponge. Which is ironic because the clutch is actually called a sponge!
- Croaker's. Yes, they croak a little. Nothing like the Sea-Robin I believe.
- Sea-Bass. Just a few inches, not the fully grown ones. None of the fish we caught in the net were more than a few inches.
- Flounders, although I can't remember if they were summer or winter flounders. What is cool about them, and was made very noticeable when I tried picking them up to put back in water, is that they are not only flat, but have both their eyes and camouflage on one side. These all relate back to each other, in a wonderful evolutionary fashion. They actually start their life off "normal", with pigment and an eye on both sides of their relatively symmetrical bodies. However they eventually go through *metamorphosis,* much like a caterpillar will to turn into a butterfly. Except the process of turning into a flounder is a bit different. Their whole body begins to flatten, their skull literally changes shape, one of their eyes begins to migrate to the other side of their head, and they slowly begin to settle to the sea floor. As this happens the exposed side of their body that will inevitably contain two eyes will start to camouflage with its surroundings, but not the other side. This is because that other side is always buried in the sand, as flounders mostly just lay in the sand with their two-eyed side up perfectly camouflaged with the bottom of the ocean, waiting for their next meal to stumble by.
- Back in topic here, lots of aquatic plants.
- Shrimp, not the kind we eat though.
- Pipefish.
- And more!

We repeated that three times. When the second group went out, they came back with a little Dogfish Shark**.** So that definitely beat the finds of my group, and made for some good pictures.



We also were able to meet a wildlife biologist who worked with the Conserve Wildlife Foundation of NJ. He works primarily with Osprey, but also Peregrine Falcons, and has been lucky enough over the past 20 years to see the osprey population in NJ about double. Now although he did give a short lesson and introduction, the real fun was in moving an already stationed osprey tower to a more suitable location. I admit I don't completely know why we moved the tower, but I believe it had something to do with poor nesting, and the realization of a better location was a short walk away. It is worth noting though, all osprey nesting in NJ, and along the East Coast, has been poor for the past few years.

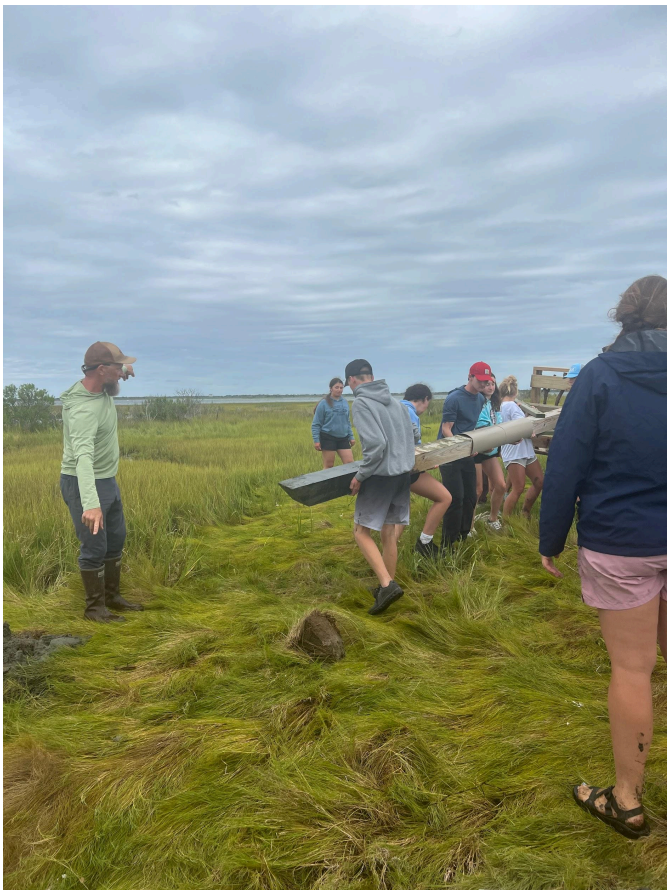
For reasons we cannot explain, Ospreys are exceptionally reliant on a fish called Menhaden. One of the most abundant fish in the sea, our "teacher" for the afternoon referred to them as "evolved to be eaten". Also known as Bunker, they are key food sources for many different species ranging from Striped Bass to Whales. However, for reasons we do not completely understand, they are drastically reducing in population size. Factors such as Climate Change (and the AMOC) are no doubt having an impact, along with the inevitably deteriorated conditions of our bays and estuaries after years of abuse. There is also the argument that they are being over-fished, but I cannot say for sure on that. What I can say though, is that Virginia and along the Chesapeake Bay has faced a *complete* collapse of their Osprey population in recent years. Virginia is also the only state that still allows for the industrial harvest of Menahden using massive sein nets that can effectively capture whole schools of Menahden, or at least large portions of them. So although fishing is undoubtedly not the only factor affecting Menhaden, that is nonetheless suspicious.

And so with less Menhaden to eat the Osprey have been foraging when they should have been nesting, and the result is a very unsuccessful nesting season.

That brings us back to the task at hand. To access this nesting tower we had to walk through the salt marsh adjacent to the Sedge House, and therefore were able to avoid

getting wet. For now. As we were walking to the Nesting Tower, not only did we flush some poor birds, I believe some sort of sanderling, but we were also lucky enough to have spotted a small nest in the marsh. The eggs had already hatched, and I do not know what type of bird it was sadly. Once we reached the nesting platform that was to be moved, the first step was setting up a ladder on it, and removing the old nesting material. We actually saved the bigger sticks and twigs to partially rebuild the nest once we moved it, to give the osprey a head start.

Now it was time for the fun part. We could not simply pull the tower out of the ground. It was a big wooden post buried a couple feet underground, and the sandy, wet soil of the marsh just seems to hold onto things like I imagine quicksand would (Once you get past the layer of grass and roots of course, we were perfectly safe above ground.). Using post hole diggers we had to dig about 3 feet deep around half of the post, and that was interesting to say the least. Many people who have been around the bay know of that characteristicly sulfuric smell that can make or break (probably not make) the salt-marsh experience for them. Now imagine that, but while digging and mixing up the soil. For those of you who do not know, the bay kinda smells like rotten eggs sometimes. This is due to the low-oxygen conditions of the soggy (wetland!) soil causing something called anaerobic decomposition to take place. This then produces Hydrogen Sulfide Gas, which then causes many people to get ill.



However, I don't mind the smell of the bay. Don't like it, but I think I appreciate everything else the Salt-Marsh has to offer enough to forgive the smell. This, combined with the fact I hate sitting around doing nothing and know how to use posthole diggers, led me to volunteer to do a good chunk (maybe ¼ or ⅕) of the digging. Eventually it reached the point where sending the post hole digger into the ground just caused me to nearly get this stinky mud into my mouth, and it was right about then that we decided to give the next part of this adventure a shot.

We did not lift the nesting tower straight out, even after digging out around it, instead we half pulled and half lifted it out. With part of the group holding ropes tied to the top,

and the other holding a board drilled to the “base” of the nesting tower pole (base as in ground level, not the actual base of the pole) we pulled/lifted it out. Honestly it was not super heavy, albeit very awkward. Especially when walking across the salt-marsh with it. I can’t even accurately estimate how far we walked across the marsh to the new location, but it was not super far. Once there we had to repeat the steps from before, but not in the same order obviously.

Now I am not saying I was not helping with the installation of the Osprey Tower. In fact I helped a lot. I helped to dig out the post hole, raise the tower, secure the board on the bottom (to prevent it from sinking), along with carrying around a ladder. I also, however, did have a side quest. From where we were I was able to see a new type of grass on the salt-marsh, to me obviously, and it caught my attention to say the least. It looked much thinner, how about flimsy-er, than the Spartina Altinaflora I was used to (the explanation for that is coming) and the standing portions of it reminded me of a wheat field. A lot of it though seemed to have been blown over by the wind, and weight of seed heads presumably, and looked indescribable to me. I am sure someone could think of a way to describe it, but I can only envy that person. So here is a picture!

What I was looking at, as I learned then, was Spartina Patens. Also known as Salt-Hay, it used to be widely harvested for use as animal feed (it was not very nutritious though), animal bedding and even packaging material. Although there are still a few farms that cut and bale Spartina Patens as a hay, Salt-Hay, these are few and far in between and (at least for NJ) largely in Cumberland County. This is in part due to climate change and Hurricane Sandy. You see, Spartina Patens really only grows in higher-elevation parts of the marsh that receive only occasional tidal flooding. Figuring this out, early colonial farmers started diking our wetlands, and then cultivating Salt-Hay or even vegetables on them. The dikes prevented the tide from flooding the marsh most of the time, and created great conditions for Salt-Hay to grow. However, as it fell out of style more and more of these diked fields were used for conventional agricultural products, but not all of them. With rising sea-levels however these fields are flooding more and more, reaching the point where flooding is not just occasional. With Hurricane Sandy however, many dikes broke and now these fields get flooded far too often to grow Salt-Hay though. Despite all that, there are still farmers finding a way to cultivate Spartina Patens, and supposedly it is a great garden mulch.

Now the other major type of Salt-Marsh plant/grass is Spartina Alterniflora, however we see it in two very different forms. The first is the “Tall Form”, this is the grass growing in the intertidal zone. Because of the daily flooding it not only needs to grow taller to

survive, but also gets more nutrients deposited on it from the water that floods it every day. With these extra nutrients it is able to grow much taller than the other form of Spartina Alterniflora, “Short Form” Spartina Alterniflora. This form grows further from the intertidal zone, and like the Spartina Patens, is not flooded as frequently. This means less of a need to be tall, and less nutrients being deposited to fuel taller growth in the first place. It is very interesting to see these two next to each other in a marsh, simply because they look so different. In fact, even if you can’t see creeks running through the Salt-Marsh, you will know they are there if you see random lines of Tall Form Spartina Alterniflora growing in the middle of the marsh. The creeks flood the edges daily with the tides, and so the Spartina Alterniflora (that’s the last time I am writing that) grows taller.

After getting back from moving the Osprey Tower, we also had to straighten another one. To do this though we actually had to go out on kayaks and paddle to one of the islands directly in front of the sedge house. This was relatively simple, and the truly story-worthy stuff happened while kayaking afterwards.

While kayaking the sun had finally come out, and it was beautiful out. Much like sunrise from earlier this eventful day, kayaking through a marsh just is a whole other experience from kayaking through woods. You just see so much further, and being down at the marshes level puts a whole other perspective on it. At one point when we took a break I explicitly remember thinking I wished I could stop this moment in time, or at least etch it into my brain. The second one worked better than the first so far. The picture I added here is of a peregrine falcon tower, but due to relationship drama it was recently abandoned. Basically the male Falcon left his girlfriend for a younger girlfriend who would hopefully, and actually with any luck, lay eggs. The new girlfriend then proceeded to kill the old girlfriend. The new girlfriend was unable to lay any eggs as well however, and so the nest was just abandoned altogether.

We also saw some interesting things while kayaking, beyond the peregrine falcon tower. The first of which was an oddly straight line dug through the marsh we kayaked through. Although this does not sound very interesting, it kind of is. Maybe almost sort-of. This was a mosquito control ditch dug by the Army Corp of Engineers. They are super common in our coastal Salt-Marshes, and super problematic. Only about 15 years ago this channel was so narrow you could hardly even get a kayak to fit

in it, and would have had to run your paddle through the grass to move forward. Now it is about 10 feet wide, because the marsh is simply washing away. This completely unnatural cut through the marsh is something it has not evolved to be able to handle, and it is now just washing away with the current as a consequence. So we enjoy while we can, and try to come up with solutions in the meantime.

We also went on some hikes through the marsh! Now this is where I mention, due to Hurricane Erin rolling in the tide was way higher than usual, and this was one of those unusual moments when even the high marsh was flooded. So we went on a very soggy hike(s). The first of these we stopped by a super high spot in the marsh where a small, maybe 40 sq foot section, of cedar trees and some other not very salt tolerant plants were growing. As sea-level rises we can see where the old Cedar trees grew, but are now dead as a result of Salt-Water Intrusion. Even in the Pinelands of NJ we see this in our Atlantic-White Cedar Forest, and as a result the state has set an ambitious, but achievable, goal of restoring 10,000 acres of this remarkable forest type.

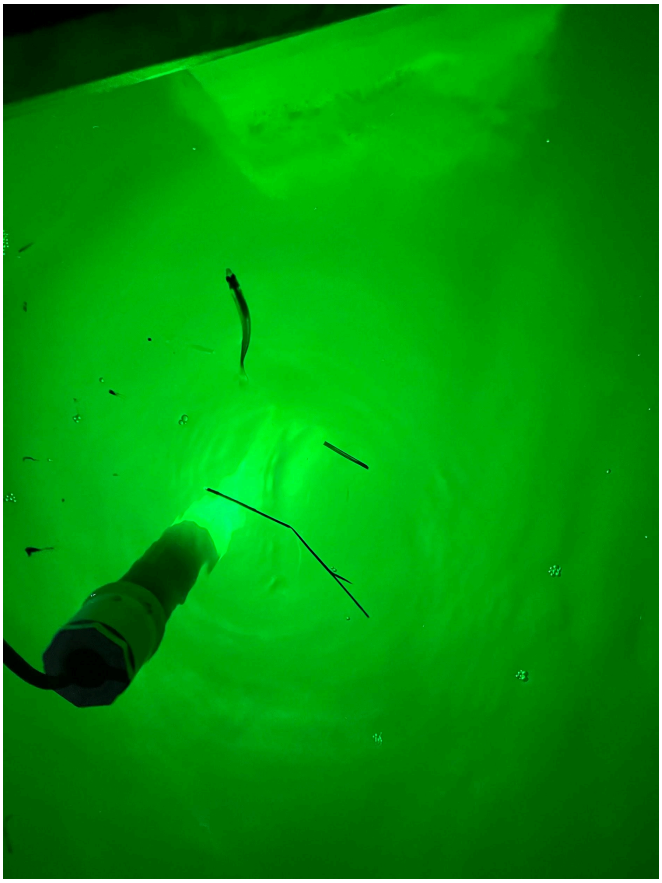
After that two of the interns just turned around and jumped into the water, and we all just stood there dumb-founded. Then realized we could jump in and proceeded to. Now of course this did not go without incident for me, and on my second or third jump I decided to try and get a running start into the water but ended up just face planting into the marsh. Smooth.

Then we pulled up to another island, and proceeded to walk to a mud pit. Filled with somewhat decomposed organic material, this was basically a warm and extremely muddy pool. So we got in this detritus pit, as supposedly people pay to do this because it is good for your skin. I don't know about that, but I will say it was very odd. It feels like what a baby's oatmeal looks like, just super crushed up soupy material. Nice and warm, but in this case as a result of decomposition. And it did not smell like the mud from the regular marsh, not nearly as strong I believe. While here we also learned that farmers used to take their cows on barges to these islands, drop them off for the summer and hope it rained enough to fill freshwater ponds in the marsh. The surrounding water was a built in fence, the cows had plenty of grass to graze on. As a result of inevitable cow deaths however, it is not too uncommon to find cow bones. This has then inevitably resulted in some people believing they solved a crime.

After that we paddled back to the Sedge House, and I hosed off in the freezing hose water. After that I proceeded to sit like a lizard in the sun for a few minutes, before mustering the body heat to continue my day. However, by now it was about to be dinner (cheeseburgers, very good). To be completely honest, what happened between then and dark I cannot remember. Much like when I try to remember everything what happened between this time on the first day and dark. So I will skip to dark.

That started with a desert treat, smores. They were open faced however, so when I walked in to grab mine I (for reasons I don't understand) tilted my head back and the chocolate and the marshmallow fell right into my throat and I proceeded to walk around

like a chicken without a head as a result of that. Right then another camper walked in, and that was fun to explain as I half-choked. I also proceeded to drop the rest of my smore, and although kind of funny (as a whole little process), I was slightly annoyed.



We also did some cool stuff outside in the dark. The first thing we did was set up a big green light in the water, and watched all the fish coming by. They were attracted to the light, and even though only small fish came, it was fun to watch them go about their fishy business. We also caught a jellyfish in a net, and if you shake the net a little you could see it sparking because of the microbes on it. It looked just like a few little sparks in the water to me, like when you light a firework and see the little sparks coming off the bottom.

Speaking of which, we also were able to look across the bay and see fireworks being shot-off! After that we also played a very interesting game. It turns out I was not very good at it. There were two teams, each team sitting on one side of the bench in the south porch. On one end was a shell, the other a person holding a flashlight and a quarter. While everyone on each team held hands, on one end the person with the quarter flipped it and shined the flashlight on it. If it was tails (or maybe heads, I can't remember) the person closest to the quarter had to squeeze the person next to them hand, and so on and so forth. Eventually the person next to the shell had to grab it before the opposing team's person by the shell could. However, if it turns out the person by the quarter started the sequence when the quarter was actually on the wrong side your team lost a point. First to 10 wins. That took a while, thanks to penalties mostly.

We also learned about the Barnegate Light House while here. There are a few cool things about it. First, like every lighthouse on the East Coast, it is completely unique. It has a red top and white bottom, with a light rotation that takes ten seconds. It has stood since 1859, which is insane. It has been there for the Civil-War, Spanish-American War, World-War 1, 2, Korea and Vietnam. It has seen the Spanish Influenza Pandemic grip

the nation, and more recently Covid. It has seen the coast slowly developed, and it's ecologically changed in an ever changing world. It has realistically seen a now extinct species, and has watched over 320 migratory bird migrations take place. I could go on forever, but I am sure you get the point. You can visit it if you want to, and even climb the 217 steps to the top. It is part of a 118 acre state park that also contains one the last sizable maritime forest on Long Beach Island. These are forests that are not quite in the sand dunes, but still within the Salt-Spray. Characteristic of Barrier Islands, they contain many common plant species that have adapted to survive the harsh conditions. These include high winds, flooding of sea water, salt-spray and sandy soils that struggle to hold water. They do not grow as tall as a normal forest, and are critical for migratory birds looking for a stopover. According to NJDEP State Parks and Forest Service, some plants you can find in this specific forest within the Brigantine Lighthouse State Park are American Beachgrass, Poison Ivy, American Holly, Eastern Redcedar, Northern Bayberry, Beach Heather, Seaside Goldenrod, Beach Plum, Virginia Creeper, and Black Cherry.

Two of the people at the camp were also fishing for Stripers off of the marsh behind the sedge house that night, and you could see the fish splashing around being tempted by the bait. At one point, while I was briefly there, a huge Striper jumped on one of the people's rods and made a big commotion of splashing and thrashing. That rod bent in half almost immediately, and the line snapped with it. That was one big fish, and a sight to see even if it never got reeled in fully.

That was my second day at Sedge.

The third and final day started bright and early at 5AM with the prospect of fishing for flounder and watching a good sunrise. However the weather had other plans, and it was rainy and cold outside. I couldn't fall back asleep, so I just stayed up and watched the sunrise again, but it wasn't the same as the day before. Once everyone else got up we went about finishing up our projects and cleaning up the cabin. Now when cleaning up the cabins we were told if the interns could find one handful of trash, which apparently included some dead flies, we were to rake the compost toilets "debris" around to make sure it composted correctly. Now they found a handful, and I pretty much resigned myself to this fate. It makes sense, and when I compost chicken manure I have to do the same thing. So when they needed helpers I figured I would just volunteer myself as I deemed myself to be the most experienced in mixing turds around a bin. Thankfully right around then I learned they were messing with us, and was very very relieved. That was too close for comfort.

Then it was time to leave and do our projects in the parking lot by the dock. Now for the last segment of this paper I will explain mine.

My partner and I did one on Invasive Species of The Barnegate Bay. I did *Phragmites Australis*, and they did Green Crabs. Now *Phragmites Australis,* also known as Common Reed, is one of the most invasive species in America. It takes over freshwater

habitat at unprecedented speeds, and displaces our native plants and animals such as nesting ducks and our native Phragmites. This is because it grows insanely dense, and fast. It can grow upward of ten feet of root per year, grow more plants from those roots, and send out thousands of seeds. It is also nearly 10 feet tall. It has decimated Freshwater marshes nationwide, but thankfully our Salt-Water Marshes have been only invaded in the very edges due to this plant's lack of tolerance for salt. Control methods are being tested and utilized nationwide, but it is extremely hard to remove and will take thousands of people thousands of man hours to make a dent in its population nationwide. So not impossible, just not easy either.

Green crabs are similar. Introduced from Europe (which the *Phragmites Australis* was to, not Australia), they completely outcompete native Blue Crabs and disrupt coastal ecosystems. They are extraordinarily common up in the New England coast, and are in some places the most abundant crab. They have seemed to relatively stayed away from the Delaware Bay, but also don't venture as much into the deeper parts of the bay. They seem to like staying near buildings and structures, and that is why we caught so many under the dock at the Sedge House. They are completely edible, and efforts are being made to utilize them more as a way to reduce their population and restore balance to our coastal ecosystem's, or at least one part of this balance.

After our presentations, we were done. This was an amazing camp I thoroughly enjoyed, and recommend for anyone interested in being outside. Even if you don't do the camp, I hope this paper encourages you to go outside and not only enjoy NJ's coastal habitat's, but also protect and steward them.
Thank you for reading! By:Mason Cain