The Field Trip Report
For an Aquatic Ecosystem

Monica Kimbrough

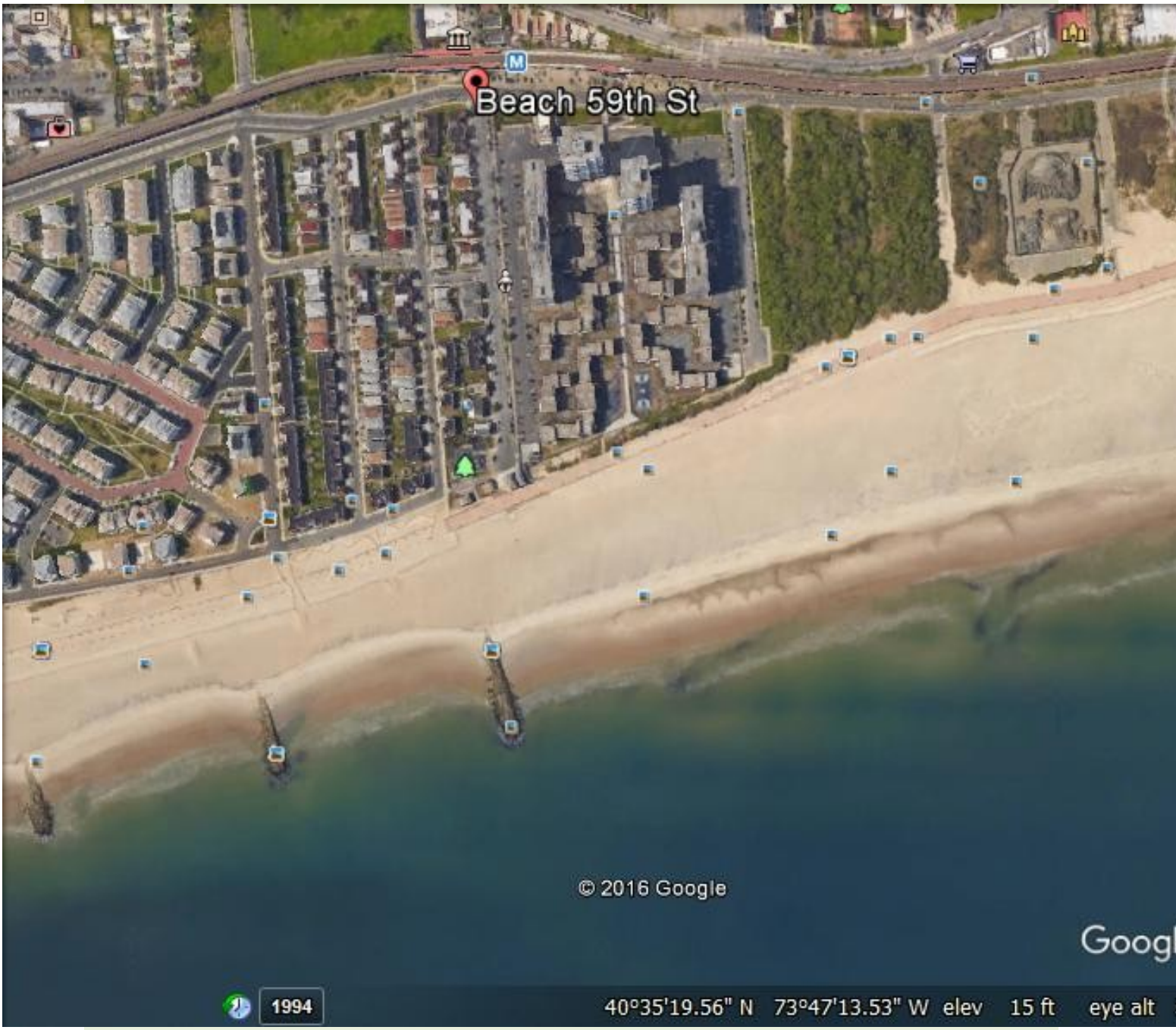
I. Introduction

1. My Field Trip Report for an Aquatic Ecosystem. This aquatic ecosystem is a seashore ecosystem. Located at Rockaway Park beach. This trip took place on Saturday 29th, October 2016. Rockaway Beach is a landform along the Rockaway Peninsula in Queens, New York. It is located on the South Shore of Long Island, bounded by Arverne to the east and Rockaway Park to the West. The beach stretched for 14 miles along the Rockaway Peninsula facing the Atlantic Ocean. The purpose of this trip is to observe, analyze and record this area of Rockaway Beach I am studying. This type of aquatic ecosystem is a Marine Ecosystem. Marine ecosystem or seawater covers approximately seventy - one percent of the Earth's surface, this body of water consists of mainly sodium and chlorine. However, this beach along the shoreline consists of loose particle which are composed of rocks, sand, gravel, pebble and stone. Wave and current action deposits different fragments, shells, algae and other organisms. The beach here support an ecosystem with a variety of organisms and interactions between them. The biotic factors I observed here are Seagull, Sea Lettuce, Ghost Crab, Mussels, Horseshoe Crab and Brown Algae. The abiotic factors also include, Water clarity, Water color, Water and air temperature, pebbles, sand, rocks and the sodium in the sea water.

II. Area Pictures

A. Aerial picture:

.



Beach 59th Street Rockaway Park NY. The sandy beach and the Rock jetties into the ocean.

B. General area that I visited.

I am standing here in the middle beach is a partly cloudy

This is the rocky Jet

Seagulls finding food in the rocky jet

Beach erosion, sand is eroded into the ocean, ocean moves further inland.

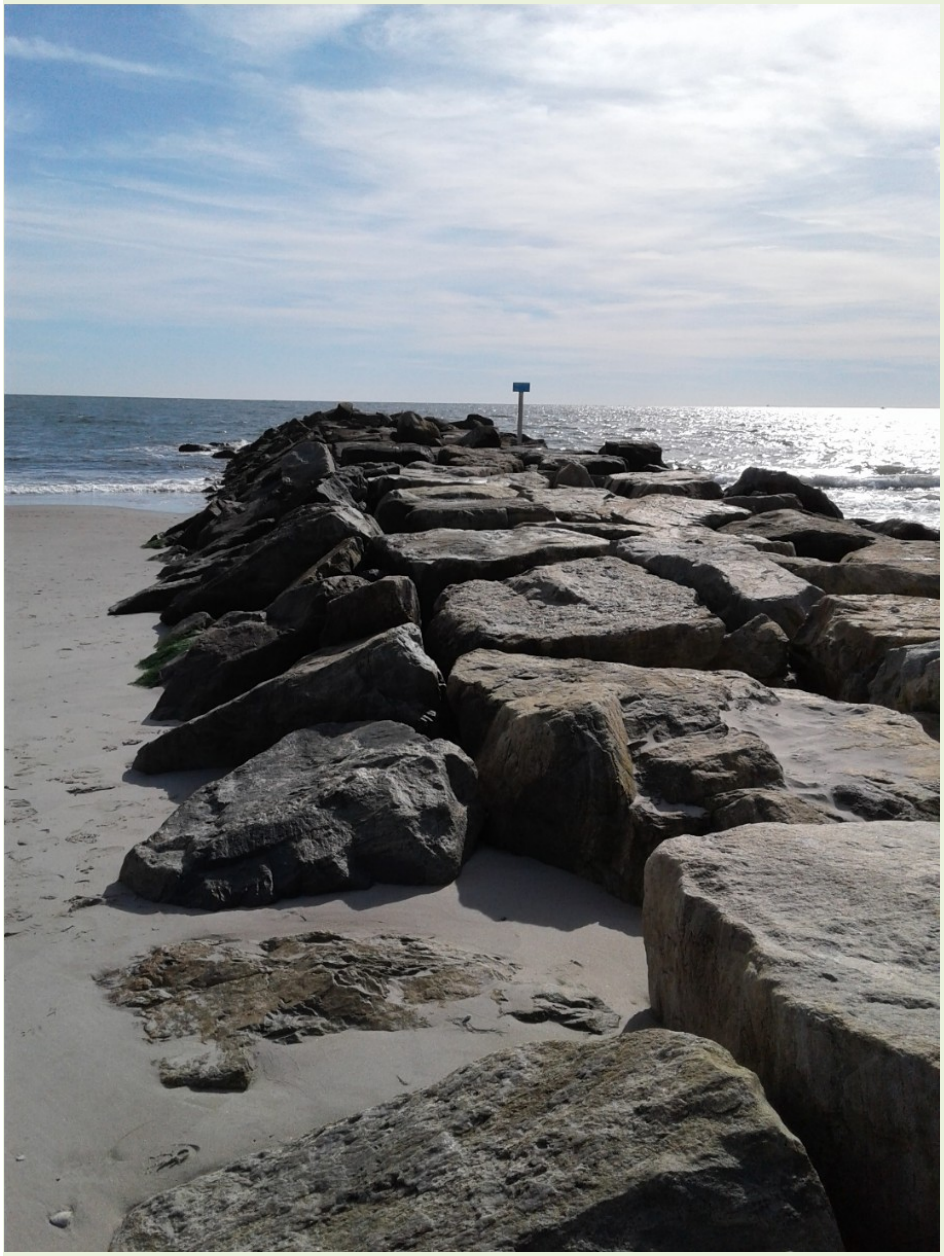
Houses seem to be built so close to the upper beach. The beach sand here is not natural it is sand deposited here by human. It is more brownish. Natural is usually light tan.

Horseshoe crab

Water clarity which I observed. the picture was taken while I walked out however the clarity was measured while It was about 2’.

Water table of the ocean as I dug

Mussels living on a rock in the rock jetty



Rocket jetty extended into to trap sand which stops erosion

Rock jetty used to stop the beach erosion, it traps sand. Barnacles, seaweed mussels growing on the rock jetty

Seagulls constantly scavenging for food that is washed up by the ocean

Brown algae just deposited by the waves

Horseshoe crab very primitive animal, very important to the migrating seabirds. They eat the eggs and continue their journey.

III. Non-living components

All the abiotic factors that I observed and some I recorded

FEATURE	ROCK JETTY	SANDY SHORE
SUBSTRATE	Large boulders	Fine sand grains
Wind Action	17 mph	17 mph
Water clarity		Approximately 2’
Temperature Air		63ºF
Humidity		73%
Visibility		About 2 miles
Conditions		Partly cloudy
Temperature Water		61ºF
Sand		yes
Pebbles		yes
Rocks		yes
Turbulence		Very little
Water		salty
Tides		low
Sediment		yes
Current		Rip Current in one area noted

1. **IV. Living components**

1. A. These are the 6 organisms that were found in my sample area

COMMON NAME	SCIENTIFIC NAME
Seagull	Larus
Sea Lettuce	Ulva lactuca
Ghost Crab	Ocypodinae
Mussels	Mytilidae
Horseshoe Crab	Limulidae
Brown Algae	Phaeophyceae

B. Physical Description of my organism.

1. Seagull

Seagulls range in size. I saw different sizes. some have long, pink legs, yellow, black or red legs. Basically, they are gray, white and black. They were all along the shore. They acted as scavengers

waiting for something, as soon as the water came to the shore they all flew and assembled together picking in the sand.

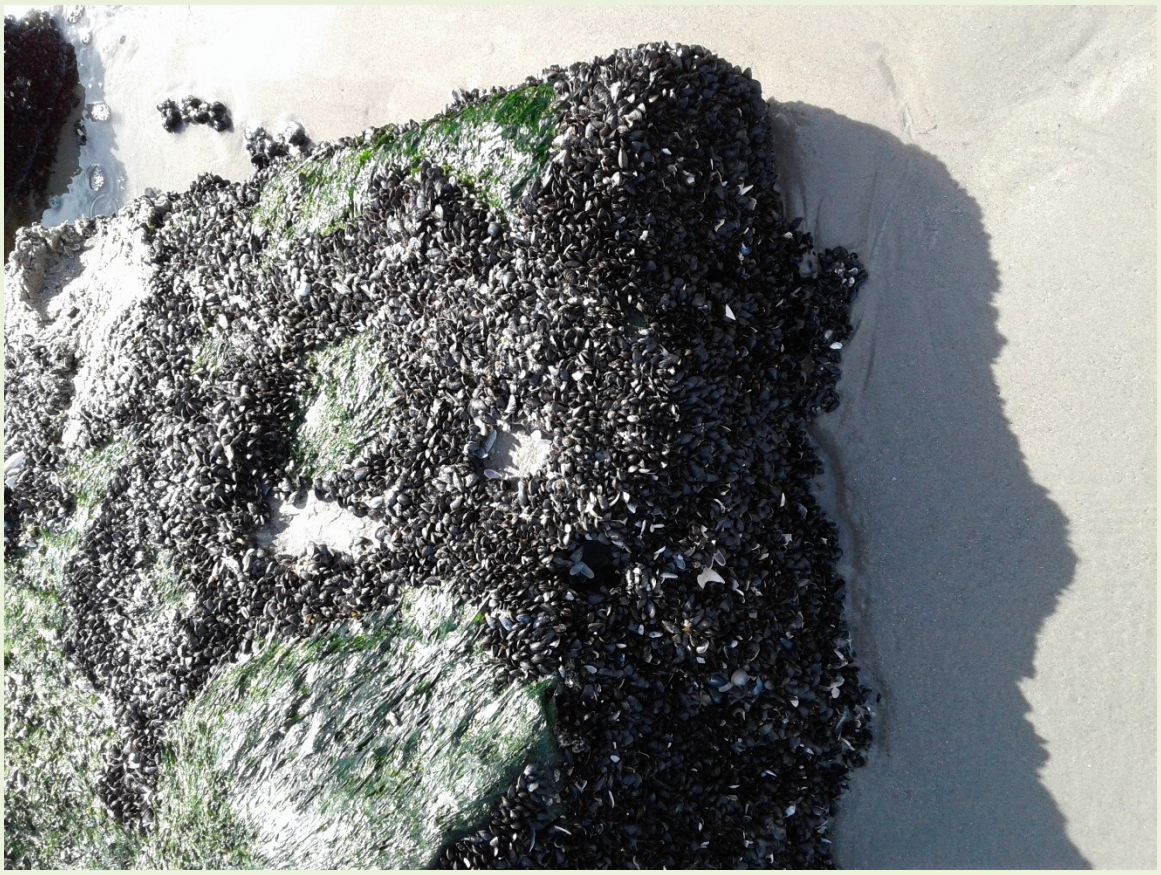
2. Sea Lettuce

Sea lettuce is some bright green algae; looked lobed with ruffle-edged leaves that are coarse and sheet-like and resemble a leaf of lettuce. Its translucent.

3. Ghost Crab

It is whitish in color, has claws of unequal size hairy legs. has five pairs of legs. Long stalks support the eyes.

4. Mussels



These Mussel shells are asymmetrical. The shells are in two halves that close and inside contain the meat. These two halves are hinged to open and close and stay connected in the center. It looks very ugly. It attaches itself on the rock.

5. Brown Algae

It is greenish brown, thin long and stringy with no leaves but strings. They seem to be easily muddled together with each other.

6. Horseshoe Crab

The horseshoe crab's body is composed of two parts: the cephalothorax and the abdomen. The cephalothorax is basically the crab's head and thorax fused together. Under the cephalothorax, there are six body segments, each equipped with a pair of limbs. the horseshoe crab does not have antennae. They have appendages equipped with pinchers used to grab and walk it has a long skinny straight tail.

C. The microhabitat.

Organism	Microhabitat
Seagull	Found on the Seashore, closer to the lower beach.
Sea Lettuce	Found at the lower beach washed by the breaking waves.
Ghost Crab	Found in the sand in the middle beach
Mussels	Found on the rocks on the lower side of the Rock Jetty
Horseshoe Crab	Found close to the rocks on the lower side of the Rock Jetty
Brown Algae	Found at the lower beach washed by the breaking waves.

D. The ecology of each organism.

1. Seagulls live near the coast, near sea and lake alike, they hunt and forage for food over the water, on the land and in the air. They are very versatile in their intake. They eat all sorts of marine animals, including fish, mollusks, crustaceans and insects, either alive or dead. On land, they eat worms, grubs, rodents, reptiles and amphibians. Because they have wings to fly they can catch food in the air, because of their beak they can easily break hard surface. Sight and hearing will be their most important senses which makes

them less susceptible to their predators. Several predators eat seagulls, including foxes, weasels, sharks and predatory birds. Hawks and falcons capture seagulls in flight, while foxes and weasels hunt gulls when they are on the ground. They build their nesting sites in more secluded habitats. While this may sometimes include the roofs of buildings, these birds often build nests closer to the water and on the steep inclines of cliff faces. This prevents most predators from accessing their nests, which are built near one another for group living. If a would-be predator invades the nesting area, the entire flock will descend upon it to protect the young. Seagulls and algae; the algae don't benefit from the presence of seagulls—neutralism. Seagulls are natural pest control for farmers and gardeners. As scavengers, they help clean up the environment. (dead Things)

2. Sea Lettuce grows primarily on rocks in shallow areas that are fairly protected from waves. To survive they need plenty exposure to sunlight. sea lettuce is composed only of two layers of cells; these allow it to easily absorb nutrients from sea water. Like other marine algae and terrestrial plants, it uses photosynthesis to produce energy and sugars. Sea lettuce is an important food source for grazing marine animals including, crustaceans such as amphipods, molluscs such as snails and chitons, and echinoderms, especially sea urchins. Brant geese also eat sea lettuce at low tide. sea lettuce can be damaged by pollution such as dissolved metals in the ocean.

3. Ghost Crab are usually found in sandy beaches and backshores where they live in burrows. they burrow deep holes to keep themselves cool during daytime. Can "hold their breath" for up to six weeks by storing oxygen in special sacs near their gills. This keep them underwater. They remain in burrows during daytime and when winter is at its coldest. it feeds on both animals and plants. It feeds on snails, clams, turtle hatchlings, lizards and small crabs also organic matter. Ghost crabs

generally look for food at night. male ghost crabs neatly pile the burrowed sand next to their entrance. Female crabs can identify a male residence by the neat sand pile. Younger crabs burrow and make homes around shore that is closer to water. Older crabs are seen to burrow away from water. Occasionally, the crabs go out into the sea to protect themselves from predators such as raccoons and birds. They devour baby turtles while they hatching out in the sand. The crabs drag the baby turtles into their burrows and eat them up. The strong hairy legs of this animal make it run very fast with speed away from its predators. its club-shaped eyestalks give it 360° vision. This helps it catches its prey, insects which are in mid-air. Competition- The mole crabs and the ghost crab fighting each other for food. Ghost crab burrows are regarded as valuable ecological indicators for quickly assessing the impact of human disturbance on beach habitats.

4. Mussels live in a variety of freshwater habitats or marine waters. mussels are filter feeders; they feed on plankton and other microscopic sea creatures which are free-floating in seawater. They spend their lives attached to rocks. They are also free-swimming. The young mussel is released into the water to attach themselves to a passing fish as a parasite. After feeding on the fish during their larval stage, they detach themselves, fall to the bottom, and begin their adult stage. They use their threads calls byssus to attach themselves to underwater rocks, jetties, and other structures.

5. Horseshoe Crab They are one of the few animals that has no predators, other than humans who capture horseshoe crabs primarily for bait. The horseshoe crab is equipped with 4 pairs of jointed walking legs each ending in a claw. The fifth pair is larger and allows the animal to lurch forward. The middle segment of each leg is covered with spines used to chew food before it is

passed forward and into the mouth located at the base of the legs. movement and feeding are closely related; it can chew only when it moves. 10 eyes but poor eyesight, it is to sense light and locate mates. They eat small bivalves, mollusks, worms, dead fish and algae. Horseshoe crabs utilize different habitat depending on the stage in their development. The eggs are laid on coastal beaches in late spring and summer. After hatching, the juvenile horseshoe crabs can be found offshore on the sandy ocean floor of tidal flats. Adult horseshoe crabs feed deeper in the ocean until they return to the beach to spawn. The helmet of the shell protects the crab from predation by sharks, turtles, and sea gulls. spine-like tail of horseshoe crabs helps them to turn over when they are upside down. In the late spring, adult horseshoe crabs migrate from deep water to mate along the shore. Horseshoe crab's superpower blue blood is bacteria fighting machine, its being used to help test medical injections for contamination. Male – male competition among themselves for access to eggs.

6. Brown Algae receive energy trap light from the Sun. They can occur in freshwater or salt water or on the surfaces of moist soil or rocks. They do not have stems, leaves, or roots like most plants. They are the beginning of the food chain for some animals. larger algae provide shelter and habitat for fish and other invertebrate animals. When this alga die, they are consumed by organisms mostly fungi and bacteria. The decomposers feed on decaying plants and release important minerals that are used by other organisms. the plant matter partially digested by the decomposers serves as food for worms, snails, and clams.

V. Discussion

For a Seashore Field Trip

1) Rock jetty is an intertidal area that consists of solid rocks. Rock jetty can be used to stop the beach erosion by trapping sand. it is an environment which includes different habitat such as Barnacles, seaweed and mussels growing on the rock jetty. A sea beach is a landform along the shoreline of an ocean or a sea and consists of loose particle which are often composed of rocks such as sand, gravel, pebble and sea shells. Because of the continuous action of the tides, it is characterized by erosional features. Together with the wind, sunlight and other physical factors it creates a complex environment. Organisms that live in this area experience daily fluctuations in their environment. Therefore, they must be able to tolerate extreme changes in temperature, salinity, moisture and wave action to survive. Large scale erosion of beaches can destabilize the structure of the beach ecosystem

2) Mussels is permanently attached to the rock jetty by thread to be protected from the waves actions. The ghost crab used camouflage on the sand to protect themselves against their predators. Some organisms are threatened by dehydration during emersion at low tides or when they are positioned in the high intertidal zones. Salinity stress can occur and the concentration of the fluids determines whether the organism will lose water. The intertidal zone can experience extreme temperature changes. The organisms in this zone must be resistant to these changes to survive. Most of the marine organisms are ectothermic and need the warmth from the environment to survive. Sunlight is another parameter that influences the organisms. When there is too much sunlight, organisms dry out and the capacity to capture light energy can be weakened. Intertidal organisms are regularly exposed to air and water. Air differs physically from seawater in diverse and important features. Warmer temperatures can cause scarcity of food for seagulls which cause them to eat of each other. They thrive better in cold temperatures. The stress factor for horseshoe crab are the rise in sea level and water temperature. Also, human over-harvesting for use as fish bait and the pharmaceuticals industry use their blood to clinically detect toxin and bacteria. The destruction of habitats around the

beaches used as their breeding grounds has contributed to their stresses.

3) God has a purpose for interactions between organisms and their environment. God shows that He has a plan for and cares about His creation. God designed all the ecosystems to satisfy the needs of a vast arrangement of organisms. Every organism that is created God has a plan for each one and he does not delight in thoughtless destruction of His creation. Leviticus 11:2: “Speak to the children of Israel, saying, ‘These are the animals which you may eat among all the animals that are on the earth. I have a better understanding on this scripture now that I did observe this ecosystem. Not all animals are for man some are energy for other animals. some animals serve as nature’s “clean-up crew” and are not for humans to eat. Scavengers, bottom feeders, shellfish and others are essential for maintaining the flow of nutrients through an ecosystem and keeping it clean and healthy for other organisms. For example, an oyster is an unclean sea creature. So, when we over fish and threaten for example, oyster’s populations we can cause environmental adversity. They Also, filter-feeding also concentrates harmful bacteria, viruses and algal toxins in their bodies which is a good reason to avoid eating them. Seagulls are scavenger of the earth they help in maintaining the ecosystem balance they prey on some insects so you don’t have an overpopulation of that insect or animal. Like many other creatures they are food for others and this helps in keeping a balance in the ecosystem. God designed and cares about the interdependence of His creation.

VI. References

http://phys.org/news/2010-10-climate-affects-horseshoe-crab.html#jCp

Horseshoe Crabs, Limulus polyphemus ~ MarineBio.org." MarineBio Conservation Society. Web. Accessed Wednesday, November 02, 2016.

http://www.ucmp.berkeley.edu/chromista/browns/phaeolh.html

https://www.researchgate.net/profile/Thomas_Schlacher/publication/265966367_The_ecology_of_ghost_crabs_-a_review/links/542249ee0cf26120b7a020cd.pdf

https://sites.google.com/site/islandecology12/aquatic-flora/sea-lettuce

http://www.livingalongsidewildlife.com/2013/06/seagulls-in-ecosystem-guest-post.html

http://www.conservewildlifenj.org/blog/2012/08/27/freshwater-vs-marine-mussels

Remember the due dates for this field report--October 30.