DATE: September 13, 2018
TO: To Whom It May Concern
FROM: Dr. Lisa McGarity, Professor of Chemistry
Florida SouthWestern State College
RE: ***Ocean Habitats, Inc.***

Ocean Habitats

I. Background Information

1. When coastal properties were developed in Southwest Florida, the land was cleared and mangrove stands were removed. Tangled mangrove roots immersed in sea water act as a nursery for many ocean species.
2. Mangroves provide food, shelter and protection from predation. After mangroves were removed, devastating effects resulted in the federal protection of mangroves as habitats for sea creatures.
3. Concrete sea walls were installed to protect property from erosion but were an inadequate substitute for the mangroves, causing coastal waters to become cloudy and nutrient poor. Populations of oysters, crabs, shrimp, lobsters, and multiple sport fish species declined due to loss of habitat.
4. 80 - 90% of marine animals that we use as food sources have nurseries in coastal marine environments, which are key to healthy ocean habitats.
5. Of the thirty-two largest cities in the world, twenty-two are located on ocean coastlines.
6. As ecosystems, coastal habitats are under threat from human activities such as pollution and overfishing. They are also threatened by sewage, coastal development and much more. Land run-off and industrial, agricultural, and domestic waste enter rivers and are discharged into coastal waters. Contaminants can be introduced which do not disintegrate rapidly in the marine environment, such as plastics, pesticides, furans (organic toxins), dioxins (organic toxins that come from burning and breakdown of plastics), phenols (organic toxins) and heavy metals. Such toxins can accumulate in the tissues of many species of aquatic life in a process called **bioaccumulation.** Coastlines tend to be naturally eutrophic because urban and land runoff discharges nutrients causing red tides and other algae blooms. This is currently happening in our waters due to agricultural waste in water releases from Lake Okeechobee. Land run-off includes the many chemicals used as fertilizers in agriculture as well as waste from livestock and humans. Oxygen depleting chemicals in the water can lead to hypoxia and the creation of dead zones. This can result in reductions in water quality, and mortality of fish and other aquatic populations.

7. Overfishing also adversely affects coastal marine life. Chesapeake Bay once had a flourishing oyster population which has been almost wiped out by overfishing. Historically the oysters filtered the water of excess nutrients every three or four days. Today that process takes almost a year, and sediment, nutrients, and algae can cause problems in local waters. Oyster's filter these pollutants, and either eat them or shape them into small packets that are deposited on the bottom where they are harmless.

II. Why install ocean habitats?

1. Ocean habitats are artificial habitats that are installed under docks and provide a mangrove-like environment for infant sea creatures but are out of the way of recreational water usage.
2. The habitats can support as much or more sea life as 40 meters (130 feet) of sea wall. And sea walls, being solid structures, do not offer the protection that the habitat offers because of its corrugated design.
3. The marine organisms that cling to the habitats are filter feeders and those in one mature habitat can filter 122,000 liters (32,000 gallons) of seawater each day.
4. Karenia brevis, (the dinoflagellate species that is responsible for the majority of red tides in SW Florida), is devoured by the filter feeders.
5. Cleaner water allows light to travel deeper promoting the growth of plant species that infuse the water with oxygen through photosynthesis and provide a food source for the nursery.
6. Each year more than $20 million of revenue for Collier County is generated as a direct result of our sea life, an economic advantage worth protecting.
7. More than 500 homes on Marco Island have them installed under their docks.
8. More than 150 different aquatic species have been identified in and around the ocean habitats.

Please feel free to contact me if you have any questions.

Dr. Lisa McGarity
239-450-5486
lmcgarity@fsw.edu