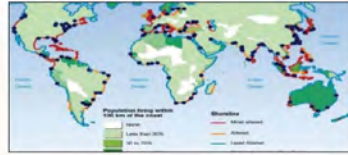


# OYSTOWER: Monitoring Coastal Resilience

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80% of the world's population lives in coastal regions significantly affected by accelerating sea level rise. (UN Environmental Programme) Coastal regions encapsulate dynamic ecosystems with enormous swings in conditions on a yearly, monthly, daily and hourly basis due to tidal changes as well as weather, sediment repositioning and temperature. But these conditions also make coastal ecosystems the most productive in terms of food, energy, navigation and lifestyle. Monitoring these coastal ecosystems is a challenging task, and in the near future, with sea level rise and climate change creating "global veering," it will become even more important to vigilantly watch for changes to the coast in order for human habitation and communities to sustain productive lives in threatened coastal regions.



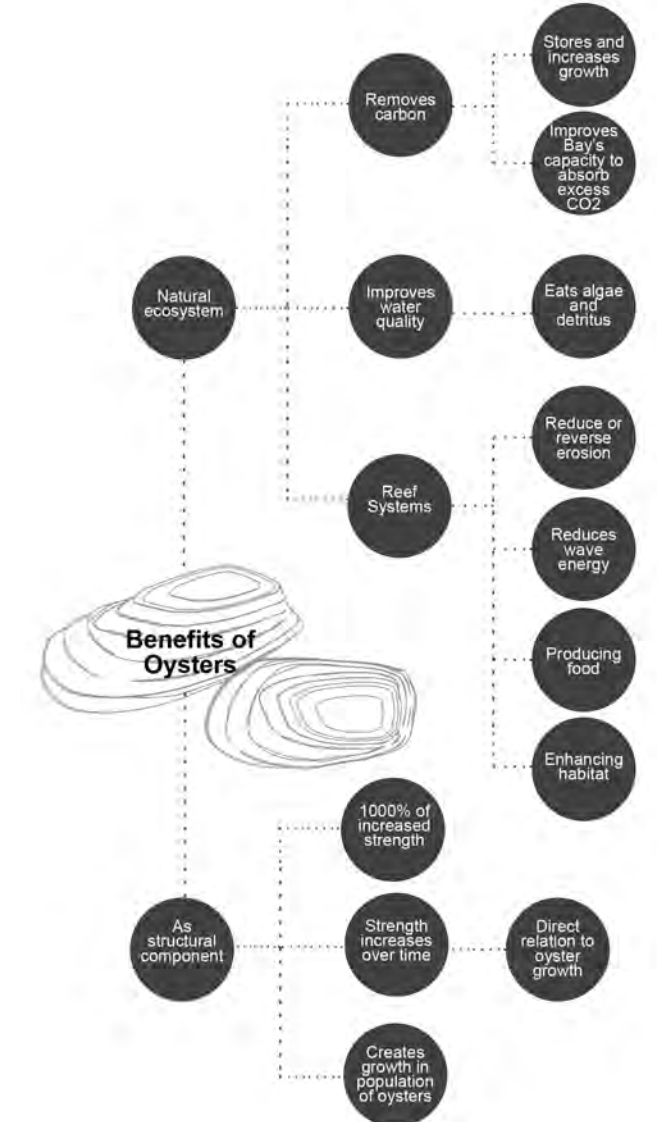
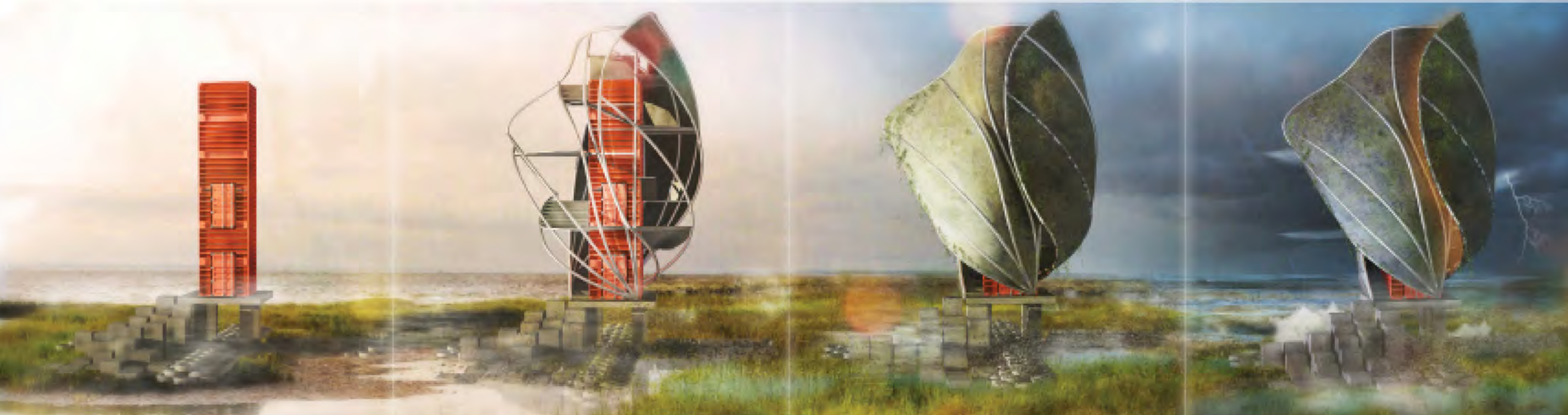
The base of the OYSTOWER is research into the structural capacity and potential of oyster accretion and reef construction. Oysters are one of the most ubiquitous organisms in aquatic environments and ancient oyster reefs form the basis of coastal islands and water edges around the world. Because of the positive impact of oysters as water filtration organisms and the strength of their shells, oysters have been the subject of numerous coastal protection proposals. OYSTOWER takes this one step further in using bio-enhanced concrete rings to form oyster reef growth into grade beams for the structure. Over time, the oyster reef will support sediment deposition and land building in coastal zones which provides an added level of protection in a highly threatened environment.



The state of Louisiana, in the US, has developed a crude but effective Coast-wide Reference Monitoring System, which is a network of "stations" deployed across the coast. Each station is simply a wooden boardwalk surrounded by various instruments for continuous and discrete data collection. Most of the data from these instruments is computerized but scientists are still responsible for physically downloading the data on site and uploading it to the CRMS database. In addition, discrete measurements are taken with each site visit using tools the scientist brings with them, and periodic maintenance is performed on the electronic equipment. True to the CRMS's purpose, these site visits also give the scientist an opportunity to observe the qualitative and ephemeral characteristics of the site, giving insight to the Louisiana coastal environment.



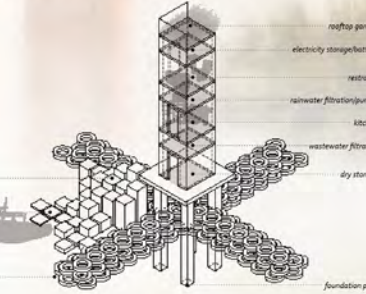
The materials for the OYSTOWER include pre-cast concrete components (oyster rings), a core made of a recycled shipping container, and 3D swarm cast concrete shells. The foundation of the project is created using oyster rings - proprietary biologically enhanced concrete shaped into interlocking rings that have significantly increased strength once oysters begin to propagate on them. Forming the foundation of OYSTOWER, the reef anchors the building to the marsh bed and resists lateral forces by providing stability under the building's weight and natural stresses such as wind and storm surge. The 3D printed concrete shells replicate the modern technique of Gunite in a new way that provide opportunities for the shell to adapt to changing needs of the monitoring station, restorable and self-sustaining.



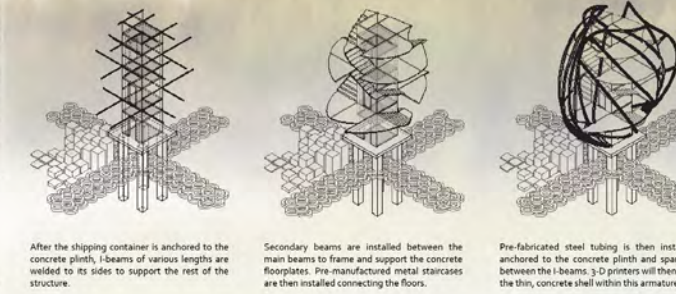
## 1 - OYSTER RING + SHIPPING CONTAINER CORE INSTALLATION

The first stage of the project installation includes placing the oyster rings and concrete pilings, driving the piles for the platform and replacing the modified shipping container. The biologically enhanced oyster rings will begin to accrete oysters within a year and begin hardening and strengthening into a grade beam able to resist the lateral forces of wave action and storm surge. At the same time, the concrete pilings will be placed, providing boat access to the structure as well as adding to the water filtration system for the structure and opportunities for plant experimentation.

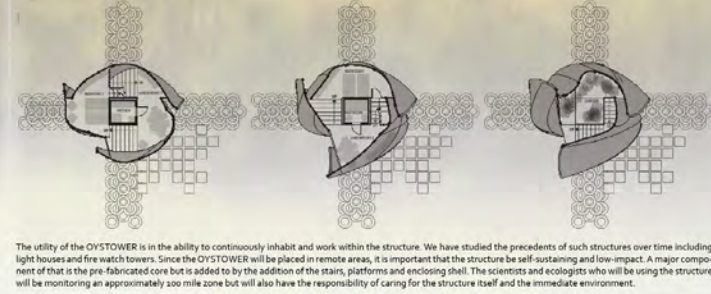
The shipping container contains based habitation needs in a strong and resilient core including energy and water storage, cooking and sanitary needs and equipment storage and protection. In a storm event, the core would be preserved and provide refuge and protection for the base operations of the OYSTOWER.



## 2 - CONCRETE SHELL CONSTRUCTION



## 3 - OCCUPANCY + USAGE



## 4 - STORM EVENT + ENVIRONMENTAL RESPONSES

