

Thesis Portfolio

Yakski: An Electric Waterjet Propulsion System
(Technical Report)

Florida Manatee Conservation
(STS Research Paper)

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Sociotechnical Synthesis

For people living on the coasts of Florida, protecting their waters and its inhabitants is a priority. Oceans and rivers are a main aspect of the Floridian culture and the attraction of living there. Due to the increased popularity of boating in rivers and the effects of climate change, the Florida manatees have suffered. As a result of the high human-cause death and injury rates combined with the natural disaster effects on their habitat, all manatees have been placed on the national Endangered Species list. In attempt to save this native Floridian mammal, building an Actor Network is proposed. This would include trading zones to lead to new governmental policies and boat enhancements that create a safer environment for the manatees. One example of a boating improvement would be creating an electric impeller-based engine. This limits the amount of gasoline that enters the water and eliminates the danger of propeller lacerations on manatees. Combined these could help to restore a staple Florida species.

For an Actor Network, actors, human and non-human, must be chosen and connected into a working unit. Each actor will have unique responsibilities and be equally important. For a network to be formed and have an actual effect, all actors have full commitment and dedication to the cause. The actors for this proposed network would include the Florida Fish and Wildlife Conservation Committee (FWC), manatee researchers and scientists, the Coast Guard, local, state, and federal government officials, and boat design engineers. These actors cover all the aspects that will be essential to making a change. The FWC handles all regulation and promotion of wildlife activities throughout Florida. This covers hunting permits, boat ramp access, and waterway regulations. Since FWC has influence in each aspect, policies, research, enforcement, they will act as the main actor, binding all others to the network. The researchers are important because they are the direct connection to the manatees. Their findings will be the basis for

policymakers' decisions, and they will assess the effectiveness of the network. The rest of the actors branch off from the researchers. The government officials will use their data to create appropriate bills, the engineers will use it as design parameters. With those actors in place, the Coast Guard can act accordingly, monitoring boaters and ensure safe practicing. Although it may seem that some actors are more crucial than others, it only takes one to fail. Similar to the game Jenga, some pieces seem sturdier than others, but even pulling out the loosest piece can cause the whole tower to fall.

With this network there will be multiple areas of expertise collaborating together toward their common goal of saving the manatees. Trading zones will be utilized to create an efficient working space. Creating a common language between the researchers and the policymakers will help to make the most influential regulations. Government officials and scientists, obviously, come from different backgrounds of learning and that could lead to confusion. A trading zone will allow the officials to fully understand what needs to change and the scientists to understand how it will be done. Similarly, creating a trading zone between the boat design engineers and the researchers will be useful. Although they both stem from science backgrounds, their specialties are exceedingly different. Trading zones will eliminate or at least limited the amount of confusion in the network.

One of the potential solutions to reduce the amount of propeller lacerations is to create more impeller type engines. Today's current boat motor is a propeller style, where the blades are exposed in the water. The blades are made of thin metal and moving at extremely high speeds so they can be very dangerous. Manatees are shallow water animals who tend to graze and float near the surface. Unfortunately, due to their gray color and slow speed, boats often don't see them in the water and run over them. With the proposed impeller design, the blades will be

hidden away, producing a propelling water jet stream. This is the same concept as a jet ski engine. By creating larger scale impeller propulsion systems, boats could continue to boat at high speeds with acting as such a danger to the manatees. This design idea is also electric and caters to helping create a better habitat for the manatees.

This potential network could create vast awareness and have a substantial impact on the manatee community. Building a connection between all of the influential players and getting them all on the same page. Trading zone will allow for clear and productive communication so ideas can be produced similar to the electric impeller propulsion design. Together they can build a community that has the potential to save a declining species.