DEEP CORE RECOVERY

Project concerns creation of corer as well as method of recovery for corer

BACKGROUND

- Dr. Chapman for the last 15 years has been studying the ecology and interactions of the invasive Asian ispod parasite, Orthione griffenis on their native burrowing shrimp host.
- This research has been conducted primarily from Hatfield Marine Science Center in Newport, OR and its nearby estuary.
- Management and conservation responses to the dramatic declines and extinctions of burrowing shrimp populations are crippled by limited information on their population structures.
- Current core sampling devices (mega-cores and yabby pumps) are labor intensive and have sampling biases.
- Dr. Chapman wants a core device that can capture the burrowing tunnels of these shrimp which can reach depths of 2 m within a range of 15 cm in diameter.
- A core sampling device was created by past MIME Capstone teams but still required strenuous manual labor from the operators.
- A system to assist in the recovery of the core and the extrusion of the sediments was created along with modifications to the existing core to help with its overall use.

Figure 1: Burrowing shrimp

CORE DEVICE

The core device intends to improve upon the previous iteration created by the past MIME Capstone teams.

- Improvements to reduce the warping due to pressure present on the previous model through stress analyses and thicker components.
- Rather than welding the cap on to the body, latches were used for convenient access to the top of the core.
- The air system was optimized utilizing less valving

Figure 2: Corer CAD

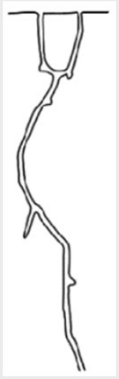

Figure 3: Drawing of shrimp burrows

RECOVERY DEVICE

The recovery device aims to easy the manual labor required to extract the core from the ground and when extruding the sample.

- The design was focused around not requiring more than two operators to take samples.
- This led to a rather simple design with a small footprint that is lightweight and easy to repair.
- This helped with transportation between the HMSC and the nearby mudflats.
- It should also be able to withstand the forces exerted when extracting which can reach upwards of 150 lbs.

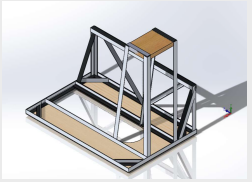

Figure 4: Recovery system CAD

Figure 5: First iteration of recovery device

Figure 6: Core sample on recovery trough

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GOING FORWARD

- Setbacks with the previous coring device being lost hampered progress of the project early on
- Future iterations will likely improve device weight and form factor.
- Ultimately, a sampling depth of 2m is desirable to capture more representative core samples.

Figure 7: Invasive Isdopod targeting shrimp

CITATIONS

[1] Hillewaert, H. (2006). Mud shrimp from the Belgian coastal waters. Retrieved January 22, 2022, from https://upload.wikimedia.org/wikipedia/commons/thumb/c/cb/Upogebia_deltaura.jpg/1024px-Upogebia_deltaura.jpg

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