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July 8, 2022

MEMORANDUM

TO: Honorable Mayor and Town Council
FROM: Ed H. Parvin, Assistant Town Manager
RE: Mooring Field Overview
Report request by Town Council

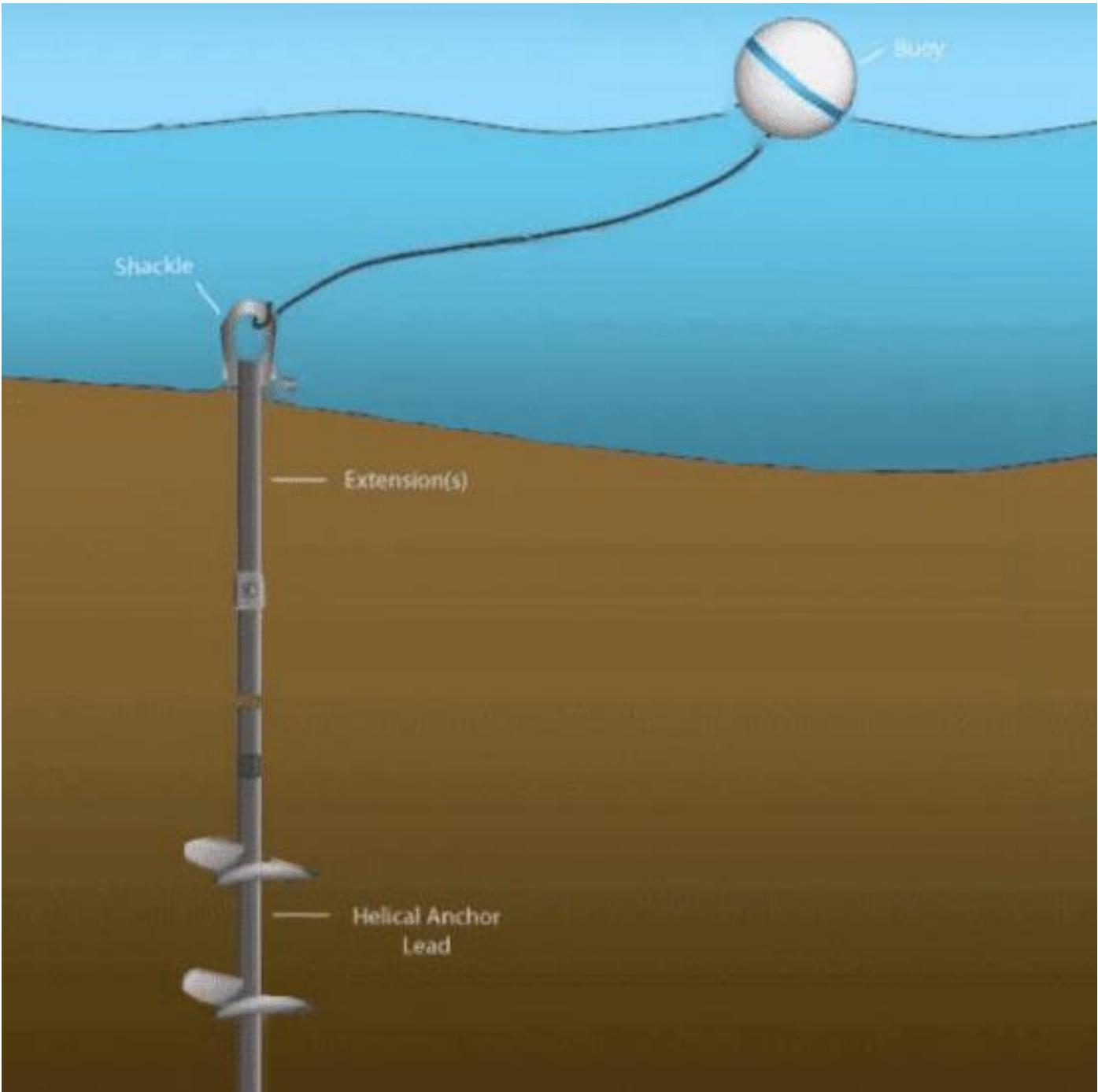
The moorings were originally funded by the Town and a Boating Infrastructure grant through NC Marine Fisheries. Ten mooring balls were installed in the Spring of 2012. The design utilizes a concrete block with two pivot chains. The moorings allow for vessels between 26' and 55' feet in length to tie on for up to 10 days at a time. Dinghy Docks provided at Sandpiper and the Town Marina allow patrons of the moorings to visit Carolina Beach. One of the mooring ball's chain did fail several years ago leaving us with 9 functioning moorings.

A night on a mooring ball is \$20 and is scheduled to be increased to \$30 starting January 1, 2023. An overview of last year's usage is included which shows the dates, and gross profits of just over \$30K.

The Town utilizes one full time and one part-time employee to manage the mooring field. With the current setup one of the employees is available 24/7/365 for monitoring (ensure rules are enforced), maintenance (mooring lines, baskets, balls), and management (DOCKWA, online reservations, phone calls, emails). Under this design we have experienced approximately 38 overtime hours per 2 week pay period for the full time employee. In addition, the Executive staff provides management support by overseeing all contracts for maintenance and manages administrative issues with reservation software.

Last fiscal year we had the chains analyzed by a contractor. It was determined that the chain directly connecting to the mooring balls will need to be replaced w/in the next 5 years. Due to the difficulties with maintenance on the existing mooring tackle staff has investigated installing helical anchors to replace and expand the moorings. The helical anchors would replace the massive block and chain system that is currently in place. The helical anchors would allow for access to maintain the tackle without full replacement. There is a large range in anchor cost with many variables to consider. The size of the Helix Mooring anchor depends upon the site location bottom and the holding requirements. Compared to other anchors on the basis of delivered holding and effective life, the Helix Mooring anchor is the most cost-effective option.

The grant we previously used was just released and is due on August 15, 2022. It requires a 25% match by the municipality. Currently the town does not have this project in the budget. We do not have plans, permitting, or cost estimates. If Town Council is interested we could (1) move forward this year if we dedicate additional resources to developing the project asap, or (2) spend additional time planning and be ready to submit in August 2023?



	HOLDING POWER	ADVANTAGES	DISADVANTAGES	NOTES
Deadweight	An 8,000lb. concrete mooring has approximately 4,000lb. of holding power	<ul style="list-style-type: none"> • Simple design • Good for most bottom types • Still holds position even if dragged during storm 	<ul style="list-style-type: none"> • Heavy, bulky, requires assistance for installation 	<ul style="list-style-type: none"> • Better suited for rock bottoms than other anchors • Deadweight moorings made from concrete can lose over half their weight when submerged in water • Deadweight moorings made from granite can lose over a third of their weight when submerged in water • Fault lines in stone anchors can crack when putting in staples
Mushroom	A 500lb. mushroom anchor has approximately 1,200lb. of holding power	<ul style="list-style-type: none"> • Has a high holding power-to-weight ratio 	<ul style="list-style-type: none"> • Limited success in rocky areas • Prone to spin out and chain wrap 	<ul style="list-style-type: none"> • Better suited for muddy bottom conditions • Limited success in rocky areas • Prone to spin out and chain wrap • Better suited for muddy bottom conditions • Generally, weight of mushroom anchors would be 10-20 lbs per foot of boat in mud bottom • Proper installation is important to assure it is buried
Pyramid	A 650lb. pyramid anchor has approximately 6,500lb. of holding power	<ul style="list-style-type: none"> • Has high holding power to weight ratio • Simple design 	<ul style="list-style-type: none"> • Limited success in rocky areas • Higher cost 	<ul style="list-style-type: none"> • Better suited for muddy bottom conditions • Size and shape help it penetrate the bottom more rapidly • Generally, weight of pyramid anchors would be 10-20 lbs per foot of boat in mud bottom
Helix	A 10" screw Helix anchor has approximately 10,000lb. of holding power	<ul style="list-style-type: none"> • High holding power to weigh ratio • Small size • Longevity • More environmentally sensitive 	<ul style="list-style-type: none"> • Specialized installer needed • Difficult in rock • Heavy, bulky, requires assistance for installation • More difficult to move 	<ul style="list-style-type: none"> • Better suited for softer bottom conditions and don't perform as well in rocky bottom conditions • Type of helix used might differ with condition of bottom. • Requires diver to set and maintain

ATTACHMENTS

1. 2021-22 fiscal year usage and revenue
2. Proposed area of expansion