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Appendix J – Morgan Shoal Mudpuppy Survey Report

Draft Supplemental Environmental Assessment Morgan Shoal Revetment Reconstruction (45th - 51st)

SHEDD AQUARIUM

Assessment of Mudpuppy Presence nearshore of Morgan Shoal

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INTRODUCTION

The Chicago Park District and the Chicago Department of Transportation partnered with the Corps to address ongoing shoreline erosion and coastal storm damage that has affected parkland and threatens the stability of DuSable Lake Shore Drive along the Morgan Shoal corridor. The proposed project area is located along the Lake Michigan shoreline between 45th and 51st Streets.

The proposed project involves the reconstruction of the existing revetment along the Morgan Shoal corridor within the larger Burnham Park. Coastal structures include a combination of rubble mound and dynamic revetment, stepped stone blocks, and transitional revetment at the existing 51st Street structure. Shoreline improvements also include the addition of up to 9.5 acres of new parkland that enhance connectivity and recreation, promote natural and nature-based features for ecological functions, and reduce flooding and erosion.

The IL DNR has identified records of the state listed Mudpuppy (*Necturus maculosus*) within 0.25 miles of the project location along the same shoreline habitat, additionally Mudpuppies are known within the scientific community to historically utilize the Morgan Shoal area. The scope of the project includes fill of Lake Michigan with the potential to disturb existing Mudpuppy habitat along the shoreline. Given the proximity to resources, historical usage, and the scope of the project, a survey was deemed necessary to accurately assess the project's impacts on the state listed Mudpuppy.

Objective

The objective of this project was to perform a presence/absence survey for Mudpuppies along the Morgan Shoal shoreline between 45th and 51st street. The data collected would be used to assess whether the state listed Mudpuppy utilizes habitat found in the area. The USACE is preparing a National Environmental Policy Act (NEPA) compliance document on the impacts associated with a proposed shoreline protection project in the City of Chicago along the Morgan Shoal corridor. Results from this survey would contribute to the impact assessment of the NEPA document.

METHODS

Trotlines of consisting of 5 traps were constructed, where 3 Gee minnow traps, augmented to have 6.0 cm openings, were strung approximately 1 m apart with a folding, rounded, mesh crab trap (https://www.memphisnet.net/product/Eel-Crab-Finfish-Trap-1-2in-Sq-Mesh-28iny-20in-by-13in) which had 12.0 cm openings at both ends of the line. Traps were baited with caplin (*Mallotus villosus*) or dry dog food. Traps were set overnight on 3, 12, 15, and 16 March 2023 at various sites along the shoreline of Morgan Shoal (Fig. 1). Any Mudpuppies caught were photographed and returned promptly to the location of capture. Water temperature was taken from one site on each day.

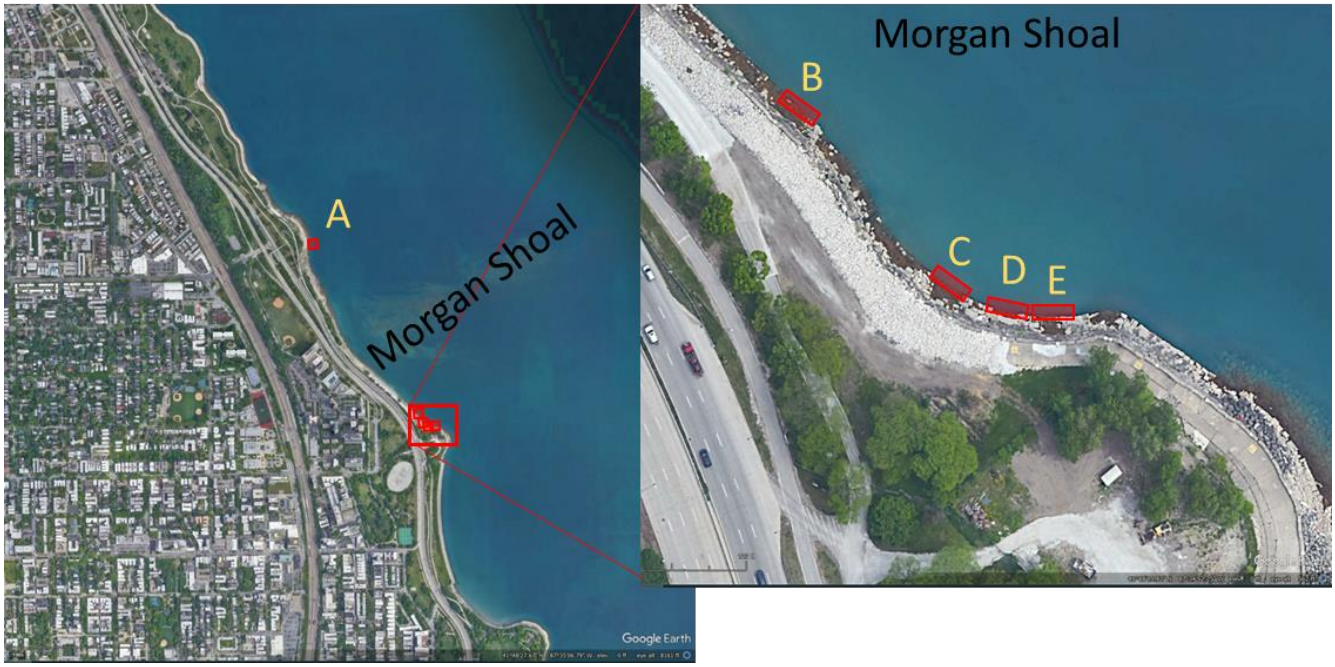

Fig. 1 Map of Morgan Shoal and sampling sites (A through E) where trot-lines of traps were set to assess the presence of Mudpuppy in the area.

RESULTS AND CONCLUSIONS

In total, three Mudpuppies were found and photographed from the shoreline along Morgan Shoal (Fig 2; Table 1). Two Mudpuppies were found on the same day, indicating that at least two different individuals reside in the area. Examination of the markings of the first individual compared to the two caught on the same day, along with different length measurements for each individual (30.22, 23.80, and 32.13 cm total length) suggests that these were three different individuals. These sizes were on par with total lengths of adults found in traps set in the nearby Wolf Lake (Beatti et al. 2017; Bilak and Whiles, 2021).

Table 1 Captures of Mudpuppies from Morgan Shoal in March of 2023. Sampling sites can be found in Fig. 1. Hyphens denote no set traps on that date at that site.

	Date Traps Were Deployed			
SITE	4-Mar	12-Mar	15-Mar	16-Mar
A	0	-	-	-
B	0	0	0	0
C	0	0	0	0
D	1	0	2	0
E	-	-	0	0

Fig. 2 Three Mudpuppies found at Morgan Shoal, believed to be three different individuals. Two different phones were used on the different dates, causing differences in lighting and appearance.

Mudpuppies were only found within the crab traps baited with Caplin, pulled on 5 and 16 March 2023. Mudpuppies were not found in any traps when baited with dry dog food. Fish and fish eggs have successfully been used previously to capture Mudpuppies (Bilak and Whiles, 2021), but cat food was unsuccessful when used (Tiemann et al., 2013). On 15 March, the same bait fish were kept in the traps and reset for a second night of captures, which were unsuccessful. Despite the cold temperatures, potentially these fish were no longer fresh enough to entice Mudpuppy into the traps, thus we recommend continued use of fresh fish or fresh fish products (i.e., eggs, fillets, etc.) as bait.

Mudpuppies were only found at Site D. All sites had similar water depths of ~ 2.0 to 3.0 m, temperatures < 4.0 °C, and shorelines composed of very large cement rubble (Fig. 3). The area that lies between site A and site B was deemed both too dangerous to access and set traps while also thought to have been too shallow to be of suitable habitat for Mudpuppies as exposed pebble substrate existed along much of the shore. It is unclear what specific habitat at site D makes it more suitable Mudpuppy habitat compared to the nearby sites C and E. We note that the Morgan Shoal Framework Plan aims to make much of the area between sites A and B into a more accessible beach, maintaining the existing shallow slope. The plan also involves in-fill and creation of a sloped stone revetment over sites B through E, including the area where we have documented the presence of Mudpuppies. These changes to the shoreline should take into consideration that Mudpuppies are present and require habitat composed of large rock and boulder substrate within which they can hide.

Fig. 3 Photos of site D where Mudpuppies were found.

Our success rate was 3 out of 75 traps set, of which 30 were crab traps. We thus calculate a total catch per unit effort of 0.04 per trap night, which is twice that of studies conducted in nearby Wolf Lake (Bilak and Whiles, 2021). These same studies have much higher catch rates (~ 0.72) when manually flipping rocks, however, this sampling method is not possible with the large rubble found along the Morgan Shoal shoreline but suggests that Mudpuppy density could be higher than documented in this short survey.

Mudpuppies are routinely found by anglers across the Chicago's Lake Michigan shoreline. We note several captures listed on iNaturalist within the Chicago area, often from along the Lake Michigan shoreline (i.e., https://www.inaturalist.org/observations/156454241 and https://chicago.suntimes.com/2021/4/3/22364736/chicago-outdoors-loon-mudpuppy-belmont-harbor-acres-restored-protected-ducks-unlimited-smelt-memory). A study by INHS along the shoreline near Fullerton Ave was unsuccessful in capturing Mudpuppies, though these traps were set in late April into May over just 3 consecutive nights and baited with the less preferable cat food or sardines in oil (Tiemann et al., 2013). Others have noted that May is likely past the prime feeding season for the species and thus captures via baited trapping is unlikely (Beatti et al. 2017; Bilak and Whiles, 2021), and our data suggest the bait used may not have been ideal. Given our capture rate, combined with angler observations, we believe that Mudpuppies reside throughout the rocky portions of Chicagoland's shoreline of Lake Michigan.

RECOMMENDATIONS

Our results suggest that areas with large rubble and 2.0 – 3.0 m deep along Chicago's Lake Michigan Shoreline provide desirable Mudpuppy habitat and should be enhanced or added as part of the Morgan Shoal project to provide habitat for this state threaten species. Trapping studies, perhaps via boat, could help confirm range throughout the non-shoreline accessible Morgan Shoal area before, during, and after any construction and in-fill projects. Studies across the Chicago shoreline would aide in identifying key habitats supporting Mudpuppy populations along this urbanized, armored, shoreline.

REFERENCES

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