Ichthyofaunal Utilization of a Man-Made Salt Marsh Creek in Mission Bay, California, 25 Years After Creation

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Background & Objectives

- Crown Point Mitigation Site (CPMS), also known as the Stribley Marsh, is a man-made marsh adjacent to a natural marsh, the Kendall Frost Northern Wildlife Preserve (NWP), in Mission Bay.
- CPMS was created to simulate the ecological functions of a natural marsh.
- Fish use of CPMS was examined for ~ 3 years after creation in 1997 (Talley 2000).
- This study focuses on the dominant wetland resident fish *Fundulus parvipinnis.*
- Our goal was to analyze the change in fish use reflected by *F. parvipinnis* size-structure, fish diversity, and marsh depth 25 years after creation.

Study Site

Fishes were sampled at NWP and CPMS in the northern part of Mission Bay, San Diego, California (Figure 1A). The NWP is a natural, 12-hectare marsh with three discrete creek systems; the system closest to the mitigation marsh was used for this study (Figure 1B). The CPMS is a created 2.8-hectare marsh of intertidal and subtidal habitat with approximately 0.8 hectares of upland habitat. CPMS was built by on what was formerly an unsuccessful least tern nesting site, although historically this area was a tidal wetland (Marcus, 1989).

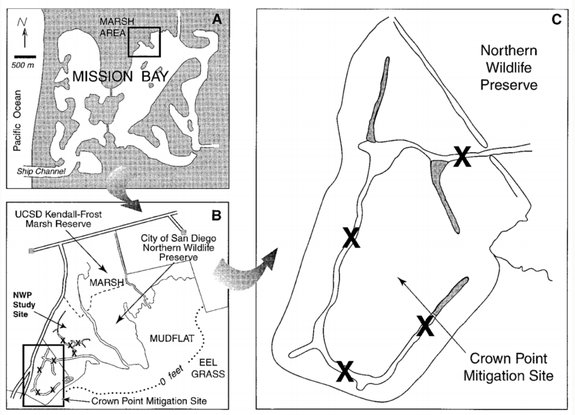

Figure 1: Study area map of Kendall Frost Marsh and Crown Point Mitigation Site.

Methods

- Ichthyofauna were sampled with minnow traps baited with canned cat food, attached to stakes with 2–3 m of rope, and placed at four locations in the creek at CPMS and four locations in the NWP (Figure 1B, C).
- Between June 21, 2021, and July 20, 2021, traps were placed in creeks during daytime low tide and recovered the following day at low tide (soak time ≈ 24 hours). At that time all fishes were counted, identified to species, and measured (total length) to the nearest mm.

Results

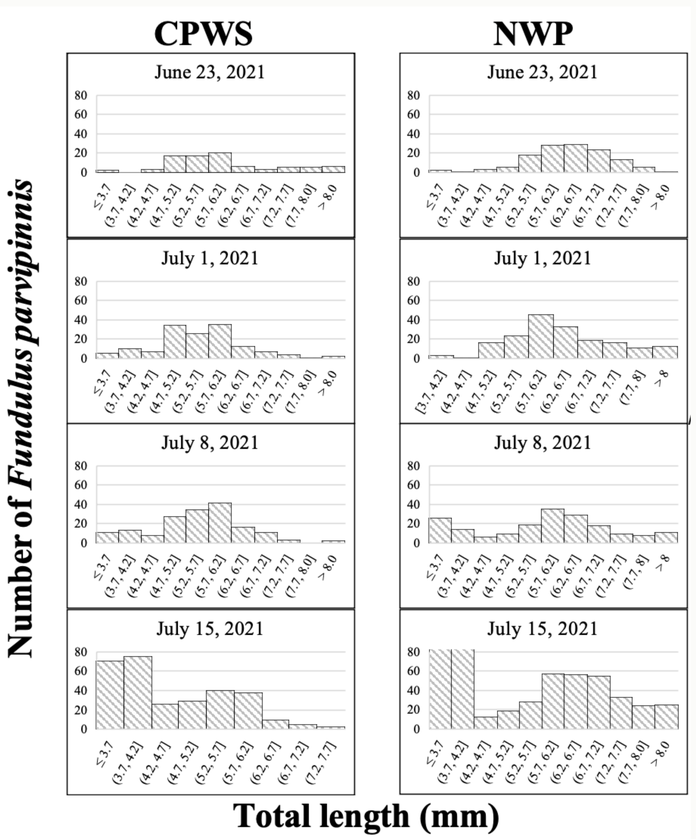

Figure 2: Length-frequency histograms for *Fundulus parvipinnis* from the Crown Point Mitigation Site (CPMS) and the Northern Wildlife Preserve (NWP) creeks.

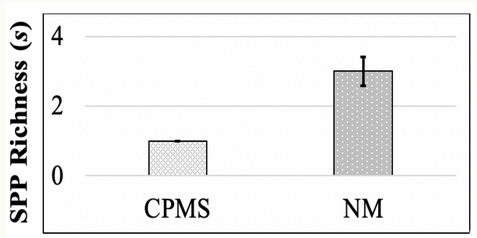

Figure 3: Calculated mean of species richness from the Crown Point Mitigation Site (CPMS) and the Northern Wildlife Preserve (NWP) creeks (t-test, $p<0.05$). Error bar shows error bars do not overlap, indicating the difference may be significant.

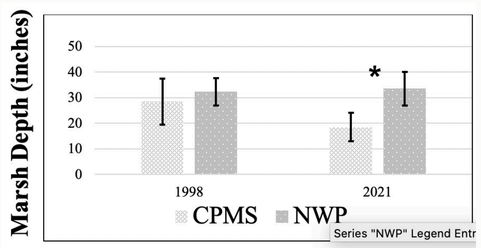

Figure 4: Depth of Crown Point Mitigation Site (CPMS) and the Northern Wildlife Preserve (NWP) marsh in 1998 and 2021 (t-test, *$p<0.05$). Error bar shows error bars do not overlap, indicating the difference may be significant.

Discussion

- A man-made marsh requires more than simply abundance or diversity similarities.
- *F. parvipinnis* was skewed towards larger size classes in the natural marsh, contrary to previous results (Talley 2000), most likely from an increase in shallow-water habitat now present in the created marsh.
- The CPMS is shallower than it was in 1996 and even shallower than the NWP currently (t-test, $p<0.05$; figure 4).
- Distribution and mean size likely shifted towards smaller fishes in CPMS relative to NWP due to juveniles preference to shallower water that provides protection from potential predators (Kneib,1987).

Future Work

- Collecting sediment samples and comparing the two creeks for heavy metal concentrations will provide insight on the toxicity levels in each marsh and determine if metals affect the fish use.

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