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Dwarf Seahorse (Hippocampus zosterae) Distribution, Abundance, and Sampling Gear Catch Efficacy in Texas

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Introduction

- Dwarf Seahorse live in shallow waters throughout the Gulf of Mexico, Atlantic Coast of Florida, and Caribbean
- July 2020 – NOAA determined Dwarf Seahorse do not warrant protection under the Endangered Species Act (ESA)
  - Only population viability study conducted in Florida
- No consistent monitoring of Dwarf Seahorse in Texas
  - Only records of random observation during TPWD routine monitoring
- Routine monitoring gear may not be effective for catching this small species

Objectives:
1. Describe the distribution and abundance of Dwarf Seahorse in Texas
2. Compare CPUE of Dwarf Seahorse using different sampling gears

Methods

- 80 sites sampled summer 2020 in density/distribution study
  - 8 sites with highest catch of Dwarf Seahorse from 2020 (Figure 1)
- Water Quality and Environmental Conditions
  - Ambient Conditions – Water depth (m), specific conductivity (us), salinity (psu), dissolved oxygen (mg/L), temperature (C), turbidity (NTU), secchi depth (m), PAR (µmol/(m²s))
- Dwarf Seahorse Sampling
  - 5 different gear types used: pushnet (1/32" mesh), throw trap (1/32" mesh), beam trawl (1/32" mesh), 15ft straight seine (1/8" mesh), 60ft bag seine
  - Site area divided into lanes to avoid re-sampling areas (Figure 1)
  - Three replicates of each gear type (except only 1 replicate of 60ft bag seine at the nearest shoreline)

Results

Dwarf Seahorse Catch

- 12 Dwarf Seahorse captured at 7 of 8 sites in 2021
  - Total of 91 individuals captured in 2020 and 2021 combined
  - Dwarf Seahorse were captured in the throw trap, pushnet, and beam trawl, but none were detected using either of the seine gears
  - Throw trap provided significantly higher CPUE than the pushnet (p = 0.0285) and the beam trawl (p = 0.019) (Figure 2)
  - CPUE of Dwarf Seahorse for all sites and replicates in 2021
    - Throw trap = 0.222 per m²
    - Pushnet = 0.019 per m²
    - Beam trawl = 0.003 per m²

Nekton Community

- 9,826 individuals captured from 30 families and 47 different species
  - Dwarf Seahorse had 10th highest CPUE of captured fish
  - Highest fish CPUE = 0.079 per m² of Pinfish (Lagodon rhomboides)
  - Highest invert CPUE = 0.321 per m² of Grass Shrimp (Palaemonetes spp.)
  - Species richness and evenness differed significantly by gear, while Shannon H Diversity did not (Figure 3)
  - ANOSIM shows significant difference in captured nekton community among gear types (p ≤ 0.003) (Figure 4)
  - Clustering of sites with Dwarf Seahorse detection to the right along MDS1

Conclusions

- Most effective gear type for capturing Dwarf Seahorse was throw trap followed by pushnet
- Use of throw trap is recommended for future Dwarf Seahorse abundance studies, due to its exhaustive sampling technique
- Use of pushnet is recommended for future demographic analysis, as it allows for coverage of a larger spatial area
  - Likely underestimates abundance
  - Fewer males captured with this gear type, may be a gear bias
- Based on observational accounts, male Dwarf Seahorses may be located closer to the base of seagrass blades (Rose et al. 2019)
- No Dwarf Seahorse captured with seine gears, which are used in long-term coastal monitoring projects (should not be used for population estimations)

Recommendations

- Future community assemblage studies would benefit from the use of a combination of gear types as indicated by our results
- Unconventional gear types may be beneficial in these projects to assemble a more clear picture of the nekton communities along the Texas coast and provide accurate density and distribution data for the Dwarf Seahorse

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Literature Cited


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