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American Eel (*Anguilla rostrata*) Staging and Morphometrics at Recruitment to a Texas Bayou

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Introduction

- The American Eel (*Anguilla rostrata)* is a facultative catadromous fish with a distribution along the Western Atlantic ocean and drainages (Fig 1).
- Data related to juvenile (glass and elver) recruitment into Texas' coastal waters are lacking (Fig 2).
- The objective of this study was to evaluate recruitment timing and morphometric relationships for juvenile life history stages.

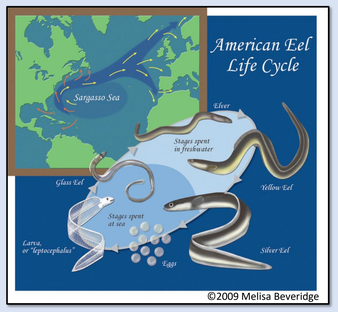

Figure 1. Life History of American Eel.

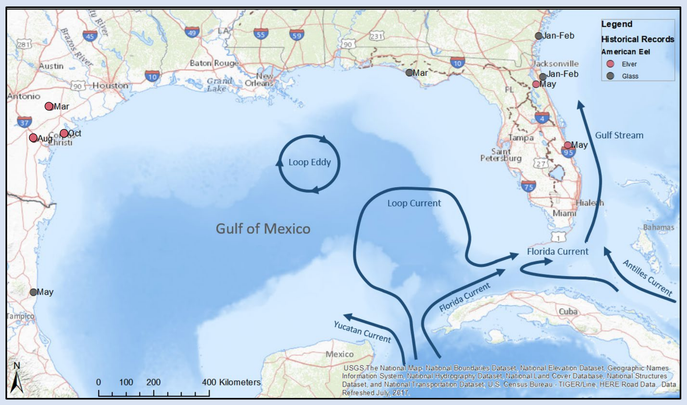

Figure 2. Historical records of glass and elver American Eel and major ocean currents.

Methods – Site and Ramps

- Study Area: coastal counties from Victoria to Orange, Texas.
- Results presented in this poster are from site 119 located on Lynn Bayou at the Port Lavaca wastewater treatment plant outfall (Fig 3).

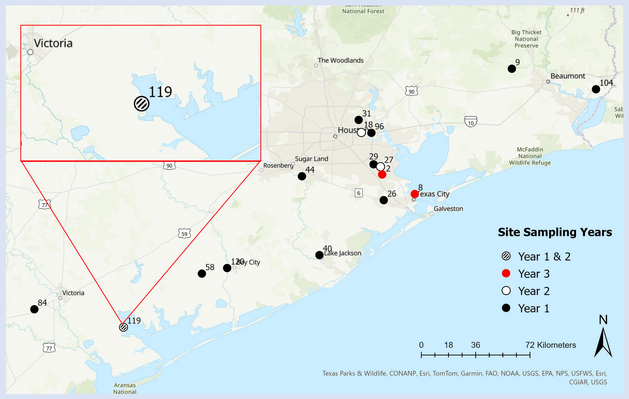

Figure 3. Map of study sites where eel ramps have been deployed over the first two years of the study. Site 119 is circled in red.

- Eel ramps (42" x 12" x 6" with ½" sheet drain as substrate) were deployed in coastal drainages (Fig 4).
- Year 1 (July 2022—June 2023) 13 eel ramps were deployed and checked weekly.
- Year 2 (December 2023—July 2024), three ramps were deployed and checked weekly and then twice/week after the first eel catch.

Figure 4. Example of deployed eel ramp setup at Site 119, Lynn Bayou in Calhoun County, Texas.

Methods – Morphometric Measurements

- All American eels captured at site 119 were staged and processed for morphometric measurements.
- Total length (tl), weight (wt), pigmentation stage (ps), pre-anal length (pal), head length (hl), body width (bw), and body depth (bd) (Fig 5).
- Pal, hl, bw, and bd were standardized using the tl for each specimen

Figure 5. Photos of elver stage juvenile American eel demonstrating the morphometric measurements for A) Head Length (hl), B) Body Width (bw), and C) Body Depth (bd).

- Kruskal-Wallis rank sum tests were used to determine significant differences between the medians in morphometric measurements for the glass and elver stages.
- Polynomial regression was used to determine length-weight relationship for the elver stage.

Results – Preliminary Recruitment Window

- 51 glass and 47 elver American Eel captured at site 119 in Years 1 & 2 combined (Fig 6).
- Preliminary recruitment window for juvenile American eel ingression to Texas coastal and freshwaters is from December to June.
- Preliminary peak glass recruitment occurs in January and elver recruitment occurs in March.

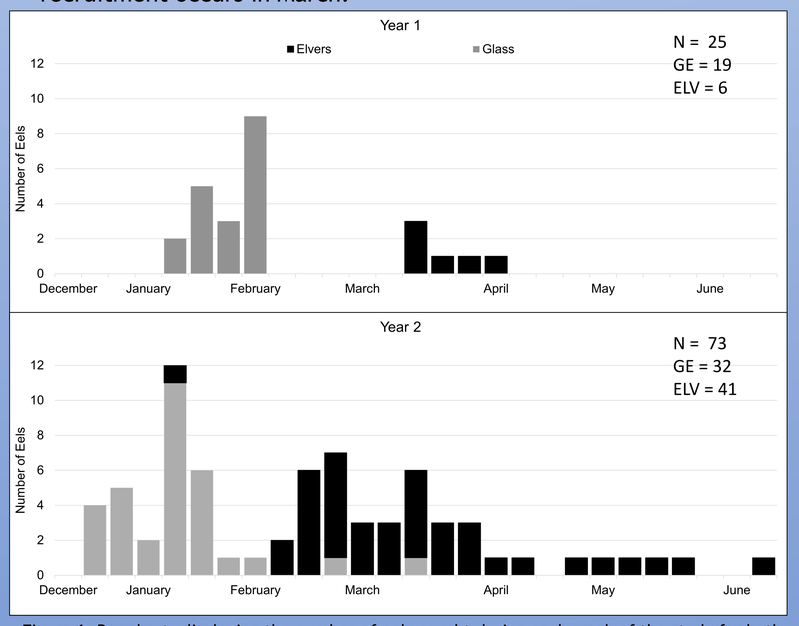

Figure 6. Bar charts displaying the number of eels caught during each week of the study for both Year 1 & 2. Legend at top for life stages. Total number of eels and the amount for each stage included in top right corner of each chart.

Results – Morphometrics

- Significant morphometric ratios differentiating glass and elver developmental stages (Fig 7).
- Preliminary length-weight relationship elver stage (Fig 8).

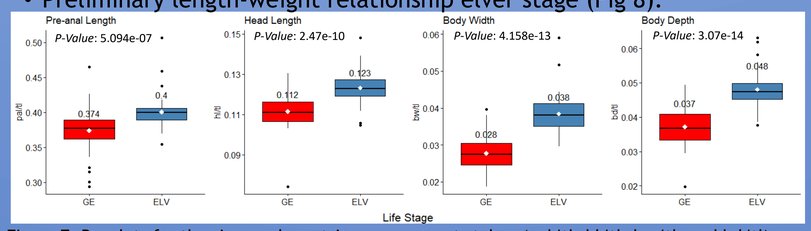

Figure 7. Boxplots for the six morphometric measurements taken (pal/tl, hl/tl, bw/tl, and bd/tl) grouped by life stage, elver (ELV) in blue and glass (GE) in red. Average values denoted by white point with value listed above. P-values for Kruskal-Wallis tests included in upper left corner of each panel

Results – Morphometrics

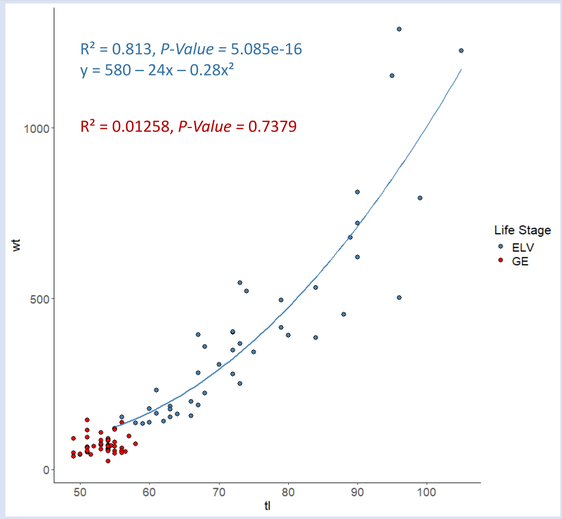

Figure 8. Length-weight relationships for the glass and elver life stages with polynomial regression displayed for the elver stage.

Discussion and Future Work

- First documentation of glass American eels in Texas.
- Preliminary recruitment window similar to timing of eels in Atlantic Coast:
  - New Jersey (January—June) Sullivan et al. 2009
  - Chesapeake Bay (February—June) Able and Fahay 1998; Fabrizio and Tuckey 2017
  - North Carolina (November—May) Powles and Warlen 2002
- On-going monitoring at site 119 and 2 new sites in the Galveston Bay watershed in Year 3 (December 2024—July 2025) (Fig 3 & 9).
- Plan to integrate glass and elvers caught by project partners: Lower Colorado River Authority to develop an encompassing recruitment window and finalized morphometric analyses.
- Continued monitoring with the goal of assisting natural resource agencies in determining the conservation and management needs of American Eels in Texas.

Figure 9. Game camera photos of the two sites currently monitored by EIH; Clear Creek on the left and Moses Lake on the right.

Acknowledgements

We would like to thank:

- EIH staff and students that assisted with the field sampling as well as field assistance from our Texas Parks and Wildlife Department partners and support staff.
- Texas State Wildlife Grants for funding the on-going eel ramp and eDNA studies. CFDA: 15.634

All sampling was conducted under Texas Parks and Wildlife Department Scientific Research Permit SPR-0524-051 and IACUC Protocol T0324.001.R0

For more information on the on-going study please visit:

For more information on EIH please visit:

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