

New Jersey's Coastal Estuaries Inventory: Preliminary seine results from the Mullica River-Great Bay Estuary, NJ



Stockton University undergraduate students: Taylor Fuchs, Sean Crowley, Thomas Johnson, Chase Barber, Fall 2016 Introduction to Ichthyology students

Stockton University Marine Field Station support: Colby Capri, David Ambrose, Nathan Robinson, Elizabeth Zimmermann

Stockton University Principal Investigators: Mark Sullivan, Steve Evert

Commercial partner (fyke net collections): Newt Sterling

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Abstract and Introduction

One element frequently omitted from traditional estuarine fish and invertebrate surveys in an academic setting is meaningful stakeholder involvement and timely access to the data by fisheries professionals. This project explicitly engaged Stockton University faculty and staff, undergraduate students, recent graduates, as well as local commercial fishers to collect seasonal seine and fyke net data from 14 locations in the Mullica River-Great Bay (MRGB) Estuary (NJ). Stockton faculty and staff have been collecting formal seine data since 2006 from a variety of locations in MRGB as part of undergraduate coursework. This project seeks to continue this tradition of hands-on research, but explicitly aims to make the data more standardized, multi-seasonal, and available to fisheries professionals to foster informed management decisions. Preliminary seine results are reported herein.



Figure 1. A. 100 foot haul seine deployed at Hog Island site. B. Sorting a catch at Pebble Beach. C. Fyke net proof of concept (April 2016). D. Representative fyke net catch.

Materials and Methods

- 180 samples anticipated (2x month May-Oct, 1x month Nov-April) over 10 sites.
- Single 100' x 6' x 1/4" haul seine deployed perpendicular to shoreline at each site.
- Catch identified, counted, and measured to fork or total length (for abundant species first 50 individuals measured, remainder counted).
- Water temperature, salinity, dissolved oxygen, pH recorded with each sample.

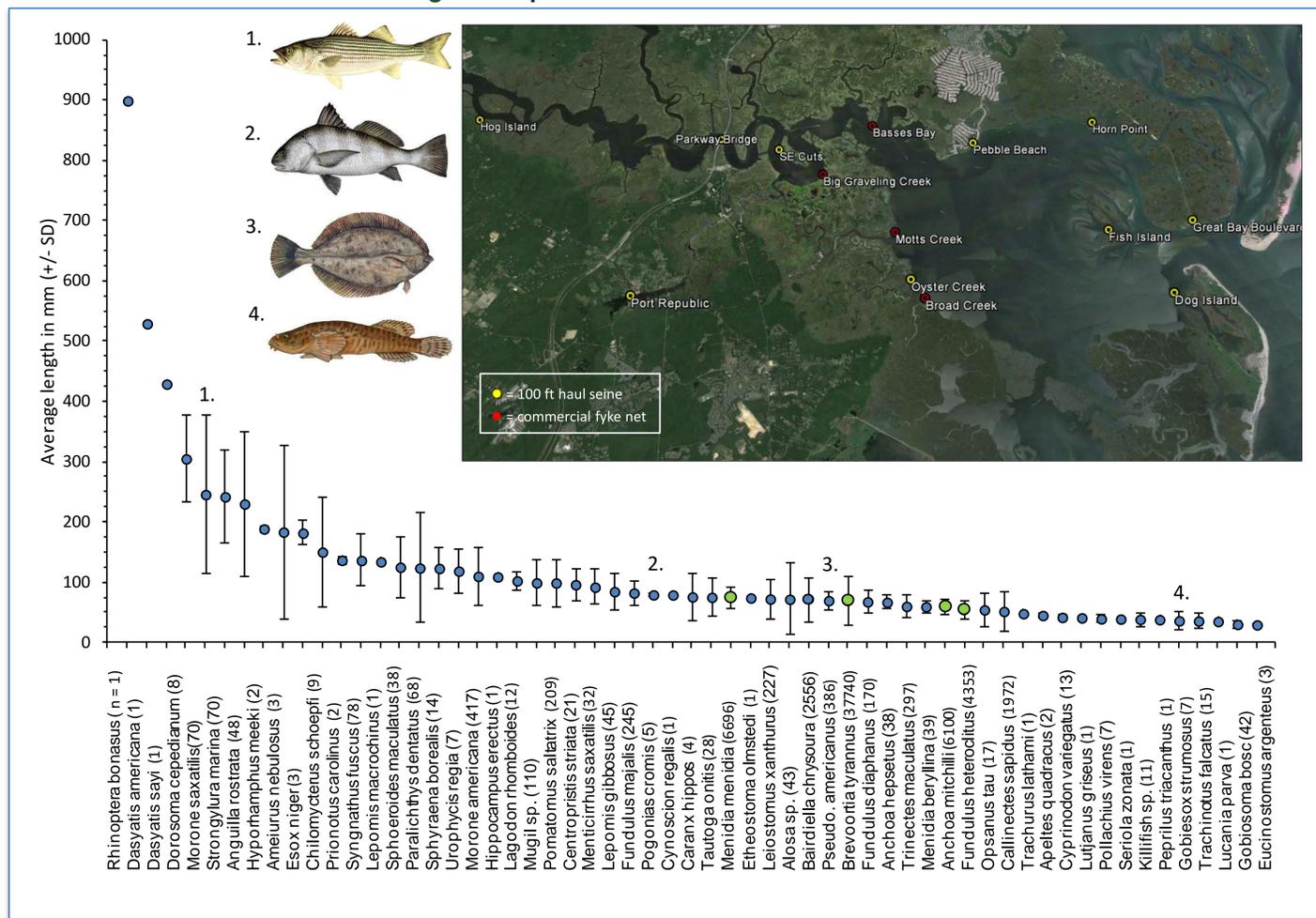


Figure 2. Average length (+/-SD) of each species caught (number of individuals collected noted above each data point). Green data points indicate the top 4 species collected by numerical abundance. Inset: Google Earth image of sampling locations within the Mullica River-Great Bay Estuary (10 haul seine - yellow, 4 fyke net - red). Depicted species with numbers are expanded on below. Note: all data is preliminary. The above graph does not include specimens awaiting confirmation via preserved samples (i.e. categories grouped "sp."). Data through 9/9/2016.

Species of Note / Preliminary Observations

1. *Morone saxatilis* – Smaller individuals rare in Stockton coursework from 2004-2014, average length 246 mm FL over 70+ individuals collected in 2016.
2. *Pogonias cromis* – Abundant in recent Stockton coursework collections from 2010-2014 (n = 300+), surprisingly low/absent in 2016 initial seine collections (n=5).
3. *Pseudopleuronectes americanus* – High abundance of YOY (n=300+) over multiple sites at Inlet mouth in 2016.
4. *Gobiesox strumosus* - Rare/absent in coursework collections from 2004-2014(n=1). Appearing in greater numbers over multiple projects in Mullica River-Great Bay Estuary (including 2016 seine work).
5. *Bairdiella chrysoura* – Excluding *Brevoortia tyrannus*, highest YOY abundance of all finfish collected in 2016.

Rationale

- Longer-term monitoring remains critical in order to appreciate shifting baselines in marine environments (Able 2016)
- To gain a better understand of fluctuations in fish stocks, initial observations are needed to help formulate realistic testable hypotheses (i.e. pattern-process-mechanism).
- Collections targeting multiple life history stages can help identify population bottlenecks.
- In the Mullica River-Great Bay Estuary, effort is being directed towards "closing-the-loop" by sampling over multiple life stages with a variety of gears (seine, fyke nets – Stockton University; plankton, trawl, gill nets – Rutgers University).

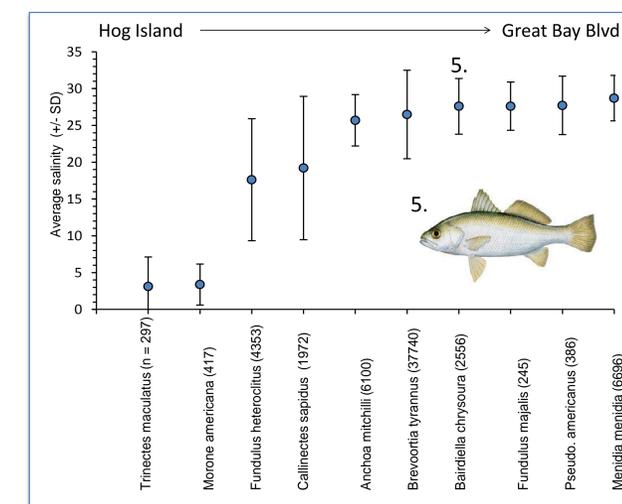
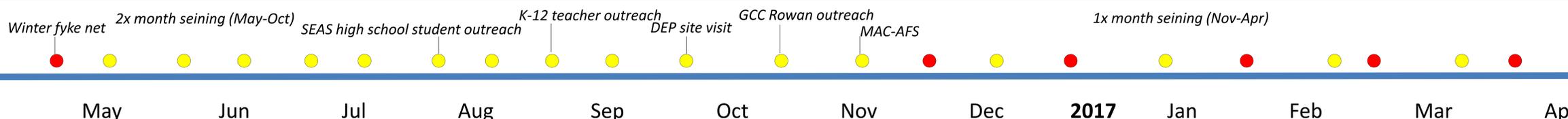


Figure 3. Average salinity (+/-SD) for top ten species collected by numerical abundance (noted in parentheses after species name). Low and high salinity sites that bookend study area noted at top.

By the Numbers

- 110 hauls performed to date covering 2.08 miles
- 70,000+ individuals counted
- 60+ species inventoried
- 40+ undergraduates directly involved in the field
- 2 multi-day field outreach events completed with K-12 students and teachers

Project Timeline



Acknowledgements

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References

- Able KW, Fahay MP (2011) Ecology of Estuarine Fishes: Temperate Waters of the W. North Atlantic. Johns Hopkins Univ. Press.
 Beck MW and 12 others (2003) The role of near shore ecosystems as fish and shellfish nurseries. Issues in Ecology 11.
 Able KW (2016) Natural history: an approach whose time has come, passed, and needs to be resurrected. ICES J Mar Sci 73(9).