Peconic River Estuary:
A Time Series Analysis of Biodiversity

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Abstract

Over the last 10 years, students collected and document specimens of both aquatic and terrestrial organisms to assess the biodiversity of the Peconic River Estuary. These collections took place at the same location, the NYS DEC Boat Ramp on South River Road, on or about October 18 each year from 2015 through 2025. We report here the totality of organisms collected which illustrates the great biodiversity within the Peconic Estuary at this location.

Introduction

- All samples were prepared, and documented by previous year's teams
- The goal of each team each year was to identify organisms, determine if any were invasive or disease carrying, and determine if and how these impacted human health
- All DNA sequences were obtained from previously extracted, sequenced, and analyzed mitochondrial CO1-gene sequences.

Materials and Methods

The Barcode Long Island Sample Database was used to develop a complete list of all organisms positively identified using DNA Barcoding.

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Samples with high quality sequences were selected as the samples have confirmed positive matches

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Samples were verified by checking the FASTA sequences using a BLAST search to confirm the identification of the organisms

References

Results

Table 1: Most abundant organisms collected from the Peconic River Estuary from 2015 through 2025

Organism	Approximate Number Collected
Amphipod	Over 100
Beetle	40-50
Damselfly	60-70
Dragonfly	80-90
Isopod	Over 100
Snail	20-30
Water Boatman	20-30

Table 2: Least abundant organisms collected from the Peconic River Estuary from 2015 through 2025

Organism	Approximate Number Collected
Amphipod	Over 100
Beetle	40-50
Damselfly	60-70
Dragonfly	80-90
Isopod	Over 100
Snail	20-30
Water Boatman	20-30

Table 3: Specimens that are designated as invasive and novel species in New York State

Organism	Invasive Species
Asian Clam	*Corbicula fluminea*
Banded Mystery Snail	*Viviparus georgianus*
Ribbon leeches	*Erpobdellidae*

Table 4: Species diversity of most abundant organisms collected from the Peconic River Estuary from 2015 through 2025. Names in red are most abundant.

Organism	Number of Different Species	Species Identified
Amphipod	2	*Gammarus gammarus*, *Ampithoe helleri*
Beetle	8	*Peltodytes tortulosus, Peltodytes edentulous*, *Harpalus affinis, Pelocoris femoratus, Anomala orientalis, Melanotus morosus,* Sacarbidae species, Halipdae species
Damselfly	4	*Enallagma geminatum, Enallagma signatum, Ischnura verticalis, Lestes inaequalis*
Dragonfly	7	*Erythemis simplicicollis, Anax junius, Basiaeschna Janata, Tetragoneuria canis, Tetragoneuria cynosure, Pachydiplax longipennis*
Isopod	2	*Caecidotea communis*, Asellidae species
Snail	6	*Viviparus georgianus, Tritia obsoleta, Menetus dilatatus, Physella acuta, Pseudosuccinea columella, Amnicola limosus*
Water Boatman	2	*Notonecta triguttata, Corixidae species*

Table 4: Organisms whose abundance has decreased observed

Organism	Year Last Observed
Caddisfly	2016
Crayfish	2017
Hellgrammite	2016
Spring Fishfly	2016
Water Flea	2016

Table 5: Organisms indicative of water quality and frequency

Organism	Water Quality Indicators
Leech	Poor (every year)
Crayfish	Good (2017)
Dragonfly	Good (every year)
Hellgrammite	Very Good (2016)
Caddisfly	Very Good (2016)

Table 6: Organisms that may transmit disease (viruses or bacteria)

Organism	Pathogen Transmitted or Effect on Ecosystem
Amphipods	Carry viruses, some are parasitic
Crayfish	Can reduce dragonfly population increases mosquito population
Leech	Vector of blood-borne pathogens
Snails	Parasitic flatworms (Schistosomes)

Discussion

- **Most Abundant Sampled:**
  Dragonfly and damselfly larvae make up a majority of the organisms sampled. Both organisms are potent biological controls of mosquitoes. Amphipods are a major food source for many organisms.
- **Water quality**
  Questionable due to the presence of many poor water quality indicators such as leeches and snails and absence of crayfish
- **Human Health Impacts**
  Direct Effects: Snails and leeches can impact human health negatively; they can transmit disease directly to humans.
  Indirect Effects: Crayfish that can reduce dragonfly populations which result in increased mosquitoes

Acknowledgements

Thank you to the DNA Learning Center Staff for support with proposals, providing laboratory equipment, and supporting sequence analysis. Thank you to the teachers at ESM who mentored over 200 students the last 10 years: Mr. Bolen, Ms. Murray, Mr. Ostensen, Ms. Schmirl, and Dr. Spata. We are grateful to the scientists who provided open lab space: Dr. Daniel Moloney at SUNY Stony Brook and Dr. Aleida Perez at Brookhaven National Laboratory. Thank you to the BLI Program Directors, Dr. Sharon Pepenella and Dr. Cristina Fernandez-Marco for your guidance.