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Benthic Macroinvertebrates: An Analysis of the Quashnet River

Benthic Macro Invertebrates

Cecily Hatch
Bryan West
Emily Nelson
Adam Cerulli

Research Objectives

- The educational objectives:
  - Identify different species of macroinvertebrate,
  - Describe general habitat associations of major groups of macroinvertebrates,
  - Learn about the macroinvertebrate communities living in rivers on Cape Cod.

Research Objectives cont.

- Environmental Objectives:
  - The Clean Water Act
    - A major objective of the Clean Water Act is to restore and maintain the chemical, physical, and biological integrity of the nation's waters by preventing pollution sources, providing assistance to publicly owned treatment works for the improvement of wastewater treatment, and maintaining the integrity of wetlands.
    - Macroinvertebrate community assessment provides key information to help determine how we are doing preventing pollution and maintaining our fresh water systems.

Map

= sample sites

- The northern site is downstream from the outflow at John's Pond.
- The middle site is downstream from a series of active cranberry bogs and a golf course.
- The lowest site is within the Mashpee National Wildlife Refuge

Headwaters

- The headwaters of the Quashnet river are very similar to the rest of the river when it comes to substrates and the canopy.
- The flow is a lot less then other sites, flowing at a rate of 1,555,200 gals a day.

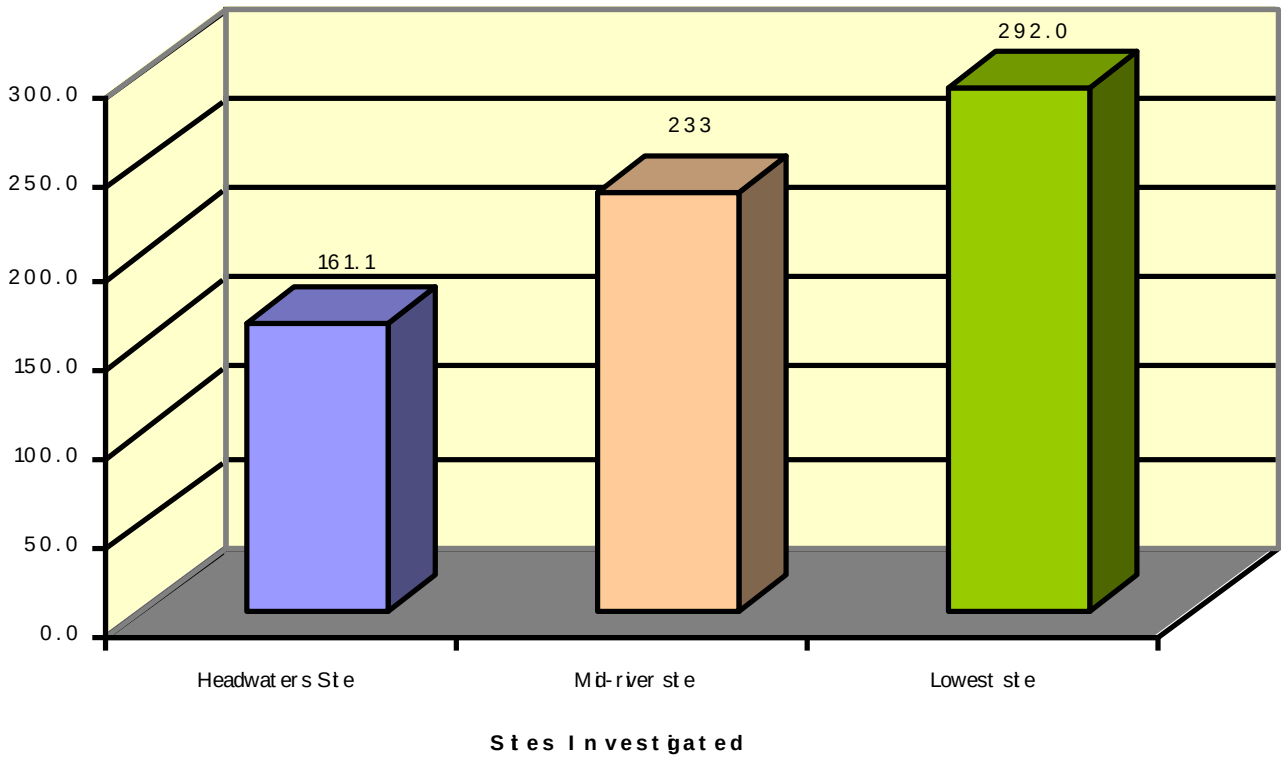
Mid River

- This area we surveyed has already traveled from the headwaters through a series of cranberry bogs and most of a golf course.

Lowest

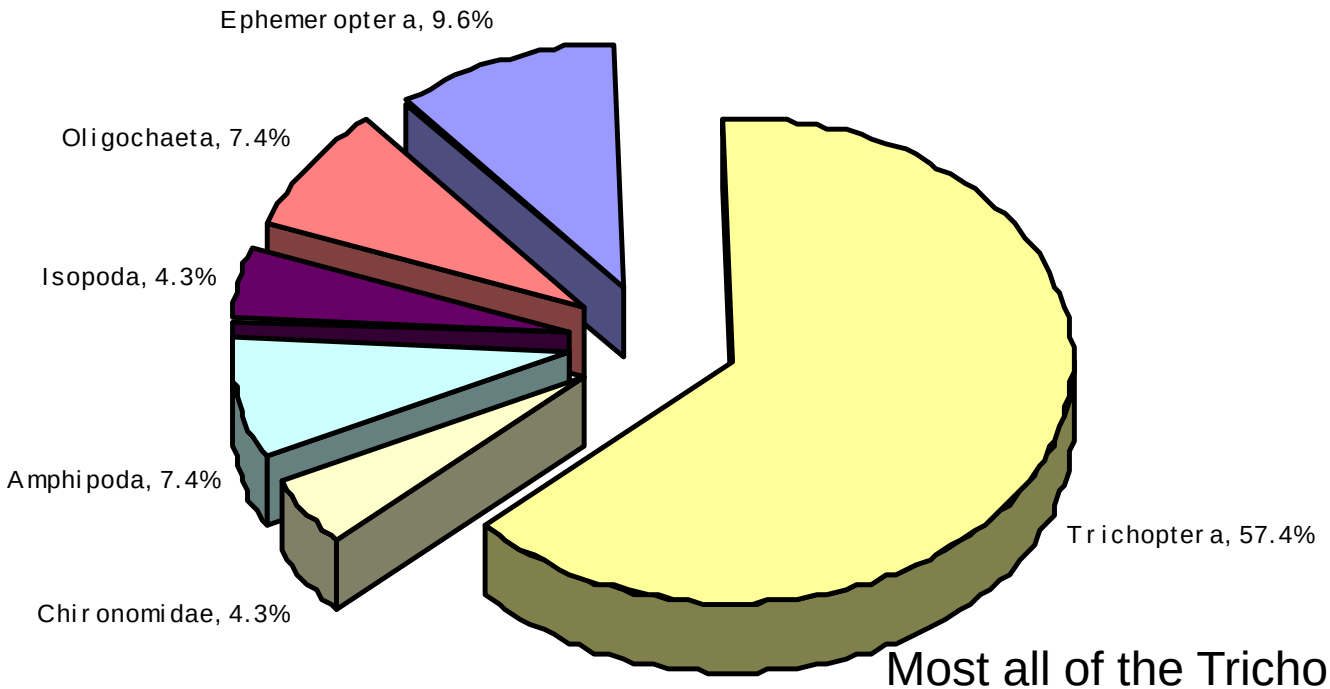
- This site is within the boundaries of a National Wildlife Refuge.

Estimated Organism Density per Site



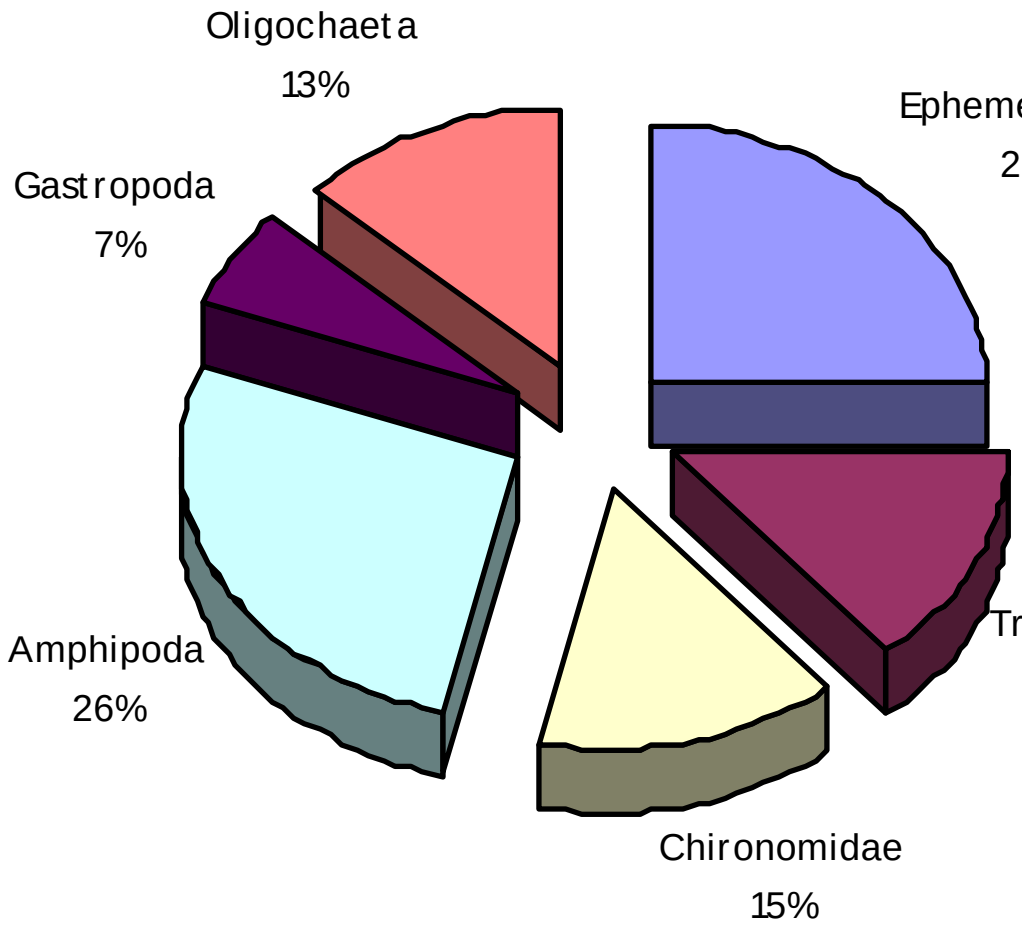
The density is shown to be higher at the lowest sample site, and lowest at the headwaters site. This could be due to an increase of nutrients and habitat diversity

Headwaters Site % Composition of Major Groups:



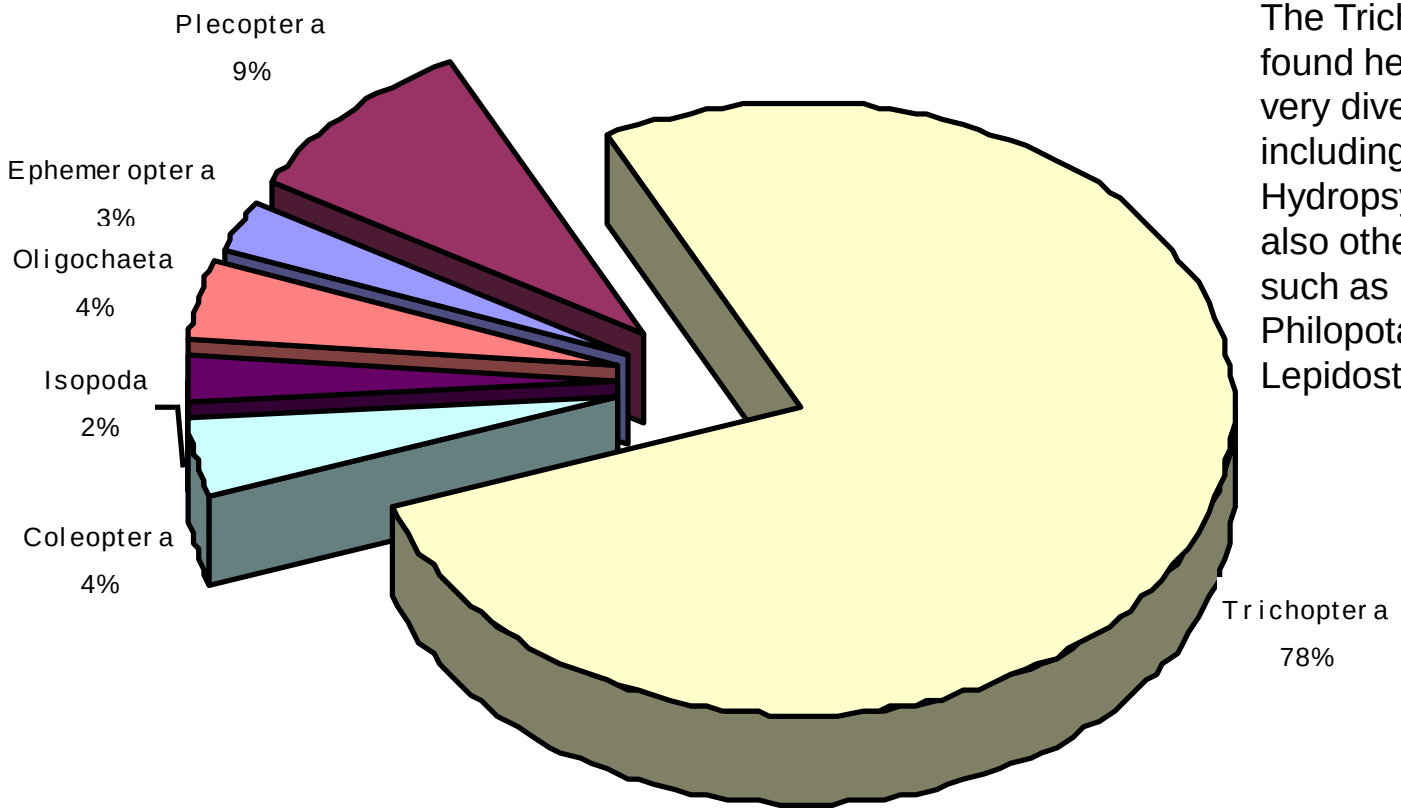
Most all of the Trichoptera found here were Hydropsychidae; a Family of relatively pollution tolerant caddisflies.

Midriver site % composition of major groups:



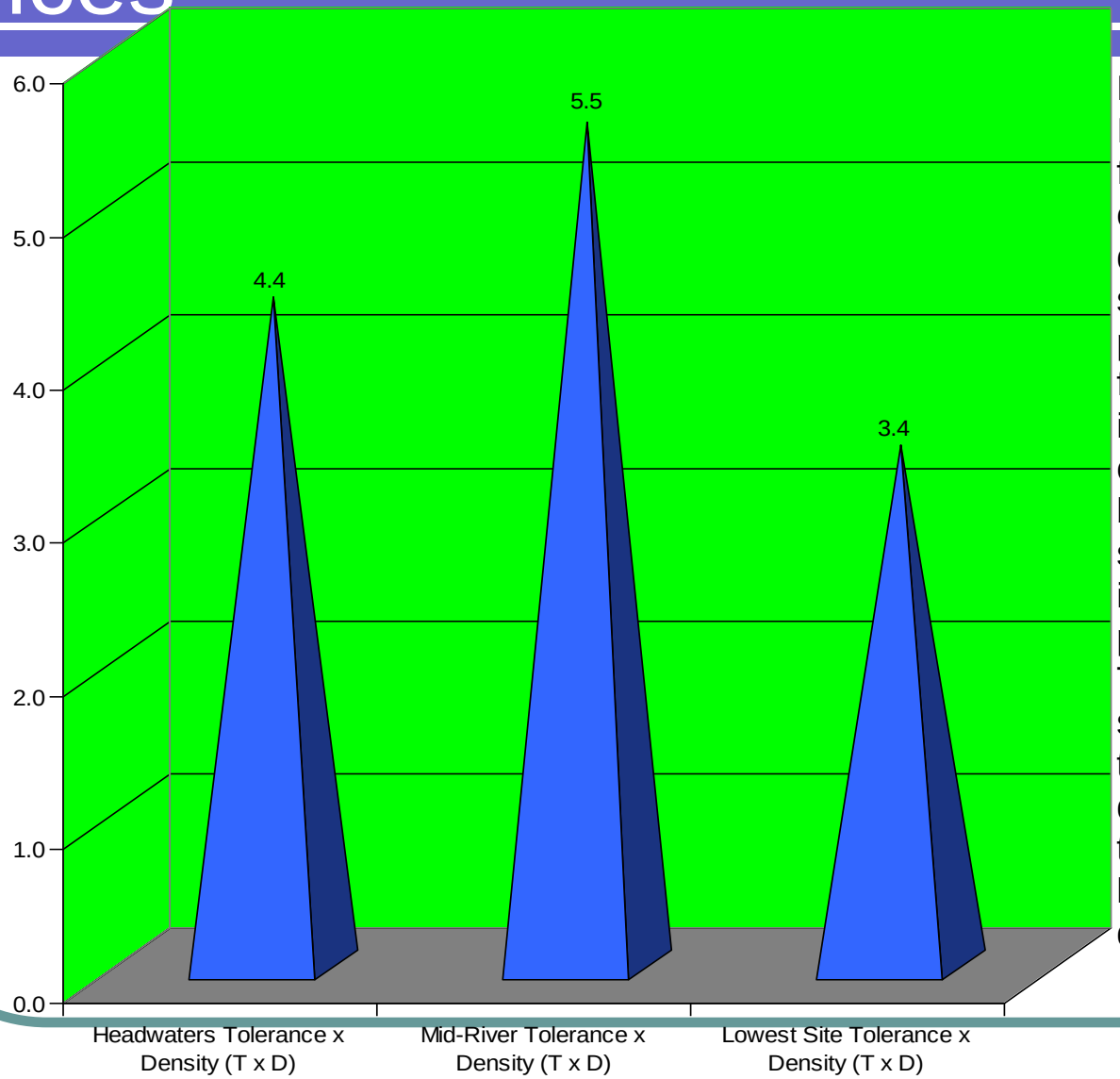
Most organisms found here were in groups considered tolerant of pollution

Lowest Site % Composition of Major Groups



The Trichoptera found here were very diverse, including some Hydropsychidae but also other families such as Philopotamidae, and Lepidostomatidae

Comparison of Major Group Biotic Indices



Major Group Biotic Indices are products from data that uses field occurrence and density data of groups of species along with pollution tolerance factors. Low values indicate that communities are balanced, and habitat is supportive of species intolerant to water pollution.

Together, with the high species density found at the Lowest site, these data strongly indicate that this site is the most healthy in terms of water quality.

Macroinvertebrate Exemplars









Concluding Remarks

- The lowest site, in the wildlife refuge, appears to support the greatest diversity of pollution intolerant species of macroinvertebrates.
- This site also has the lowest Major Group Biotic Index.
- It is the only site where Plecoptera were found as a meaningful percent of the macroinvertebrate community.
- As part of a National Wildlife Refuge the river at the lowest site appears to be recovering from upstream impacts that affect water quality.
- Some clearly identifiable potential impacts to water quality in the Quashnet River include:
  - cranberry bog management,
  - golf course management, and
  - stormwater runoff from roads and parking areas