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Benthic Macroinvertebrates: An Analysis of the Mashpee River

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Mashpee High School, Mashpee, Massachusetts (2008). *Benthic Macroinvertebrates: An Analysis of the Mashpee River*. In Watershed Access Lab Projects. Project 79.
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Benthic Macroinvertebrates

An analysis of the Mashpee River

Purpose

- To develop an understanding of the macroinvertebrate communities living in our rivers.
- To know how to identify major groups of freshwater macroinvertebrates.
- To apply knowledge of macroinvertebrates as evaluative tools for water quality in the Mashpee River by using the varying levels of pollution tolerances of these organisms as a reference.

- Three distinct sites were included in the study

- Head waters site

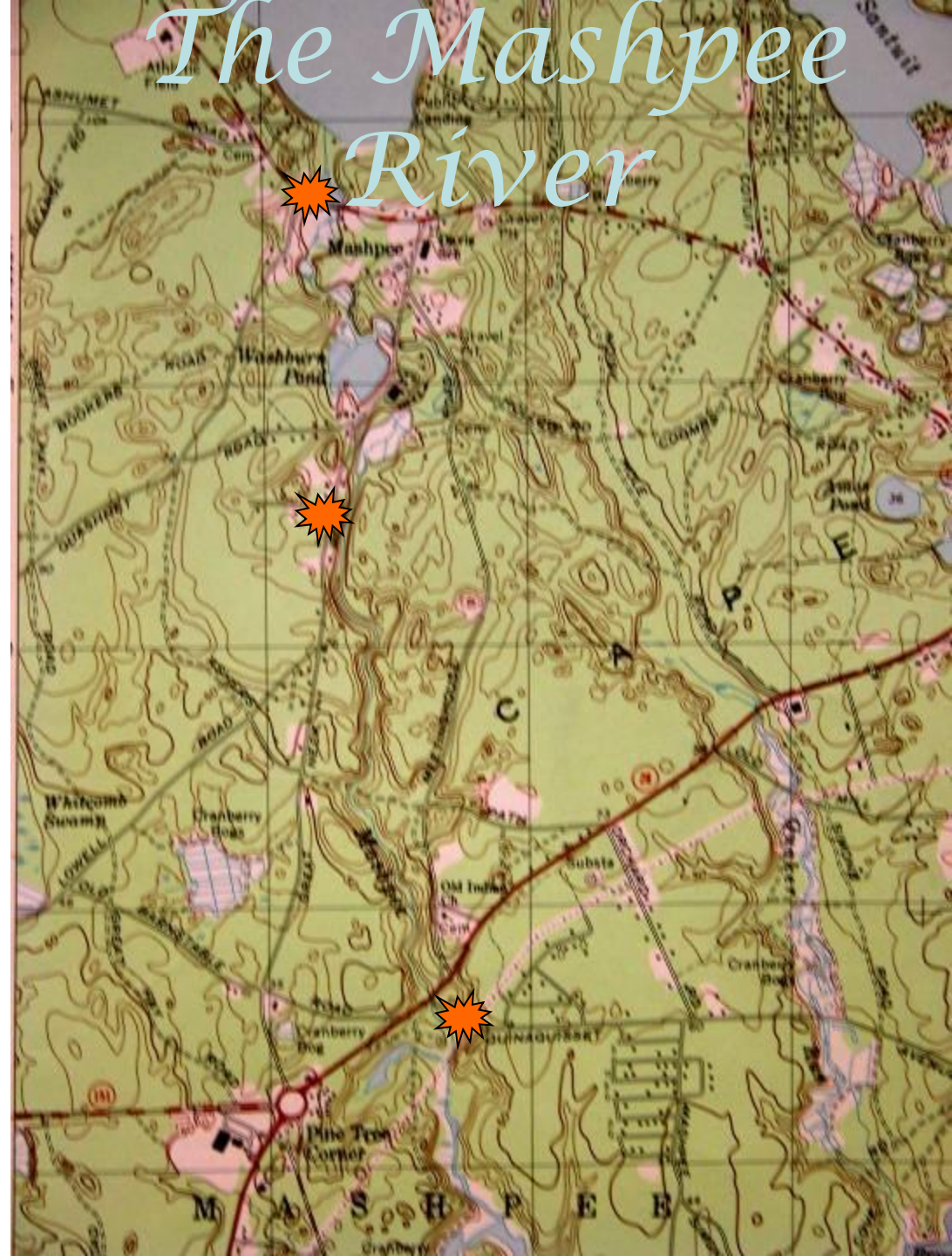
- Sampling immediately downstream of a fish ladder installed to assist with an anadromous herring run linking Mashpee-Wakeby Lake with Poponneset Bay in Mashpee, MA.

- Mid River

- Sampling occurred within an area managed as a conservation area along both sides of the river and extending from Great Neck Road to the mouth of the river.

- Lowest Site

- This site is immediately south of State Route 28. It is, like the mid-river site within a conservation corridor, but as suggested it is impacted by stormwater runoff from the State Road.





 Mashpee River Outflow

Mashpee-Wakeby Lake

Headwaters Sample Site #1



A photograph of a stream with a mossy bank and bare tree branches. The stream flows from the upper right towards the lower left. The water is clear, revealing a rocky and sandy substrate. The banks are covered in green moss and some dry, brown vegetation. Bare, light-colored tree branches hang over the water from the left side. The overall scene is a natural, somewhat overgrown stream environment.

**Substrate and Bank Habitat
within the Conservation Corridor
adjacent to Meetinghouse Road**

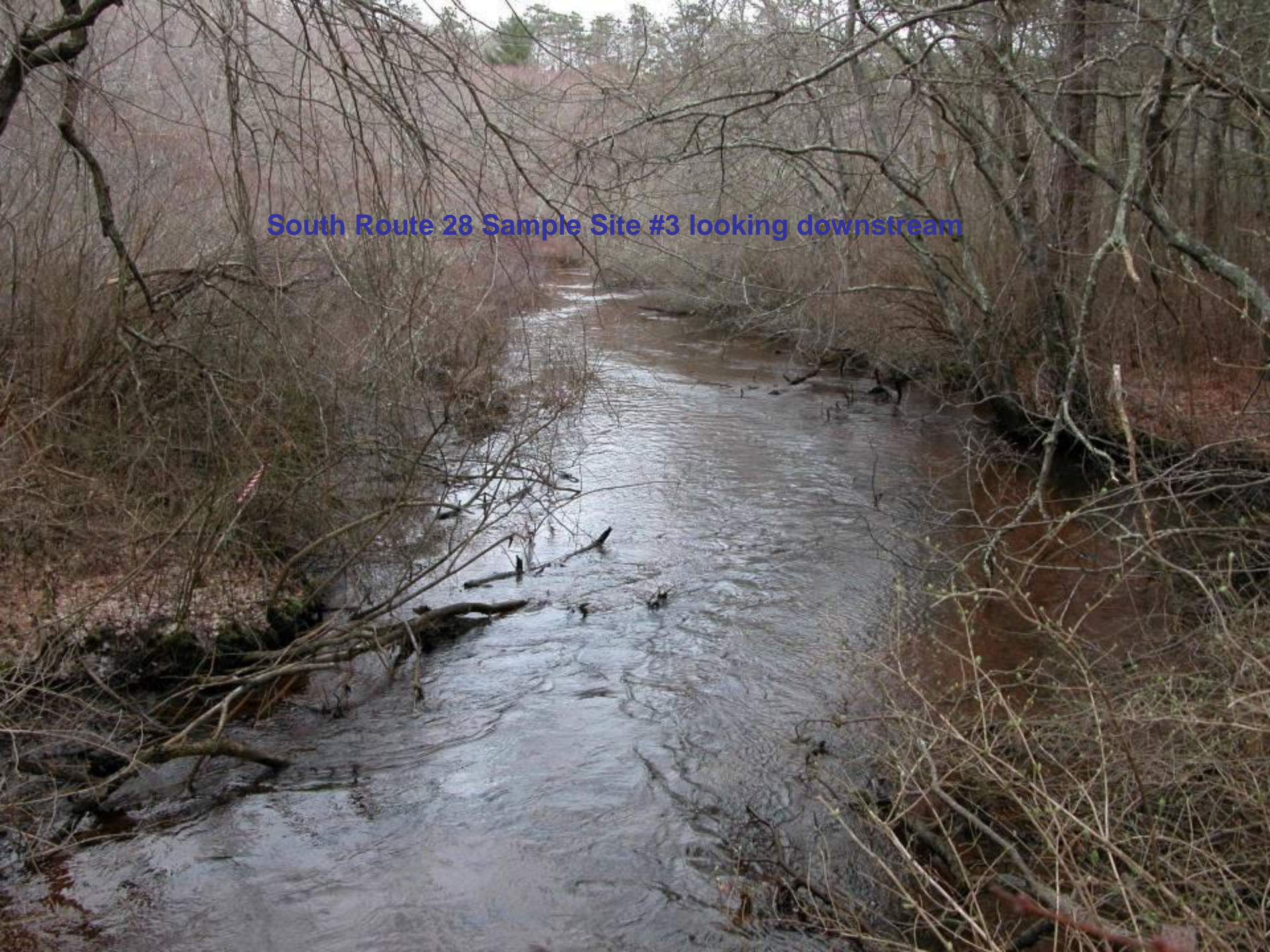
Meetinghouse Road Conservation Area: Sample Site #2



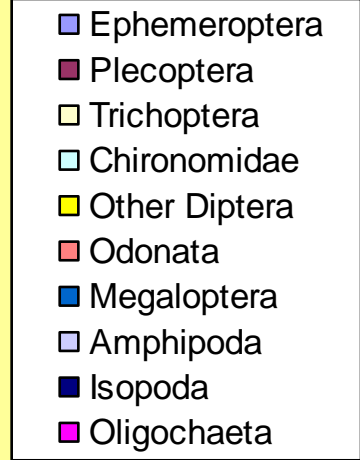
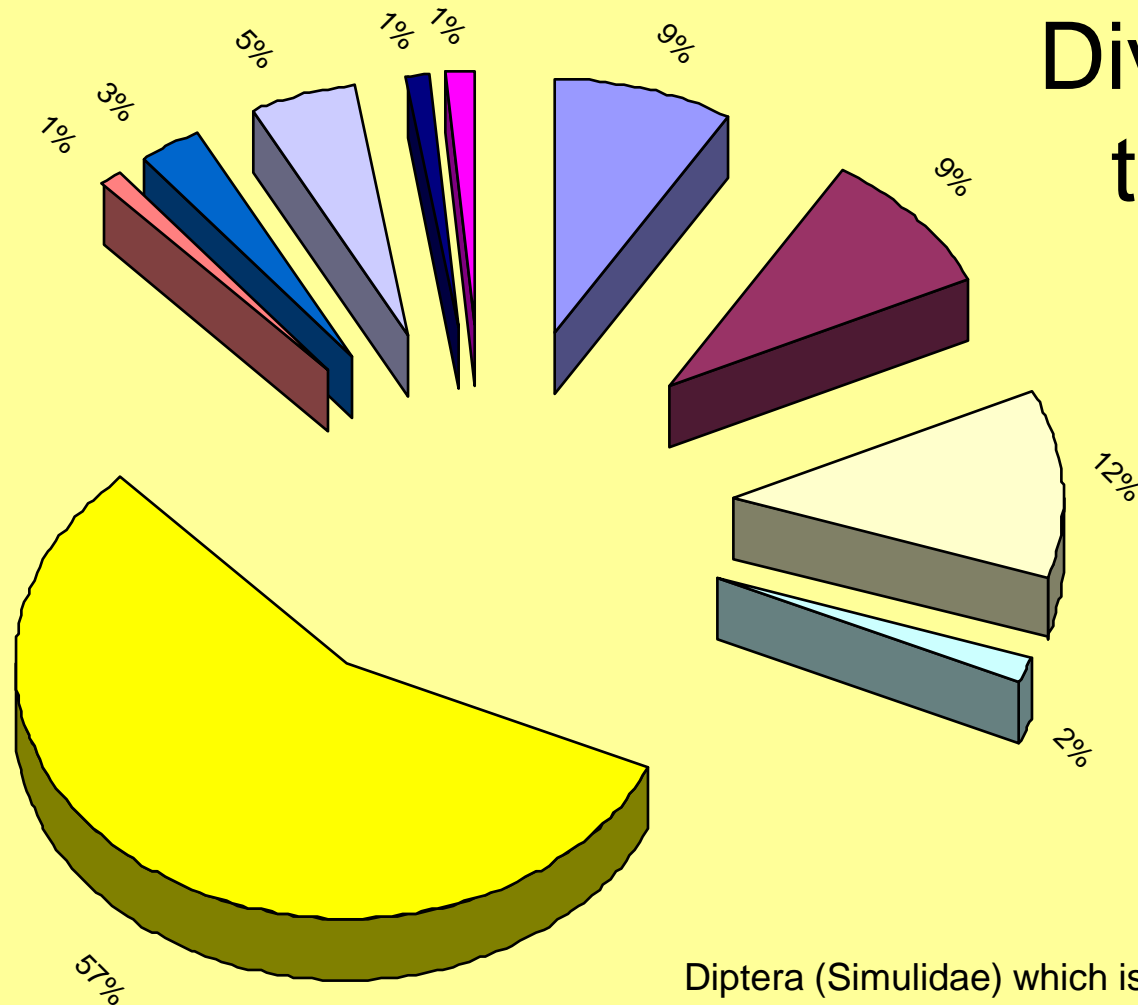
South Route 28 Sample Site #3 looking upstream



South Route 28 Sample Site #3 looking downstream

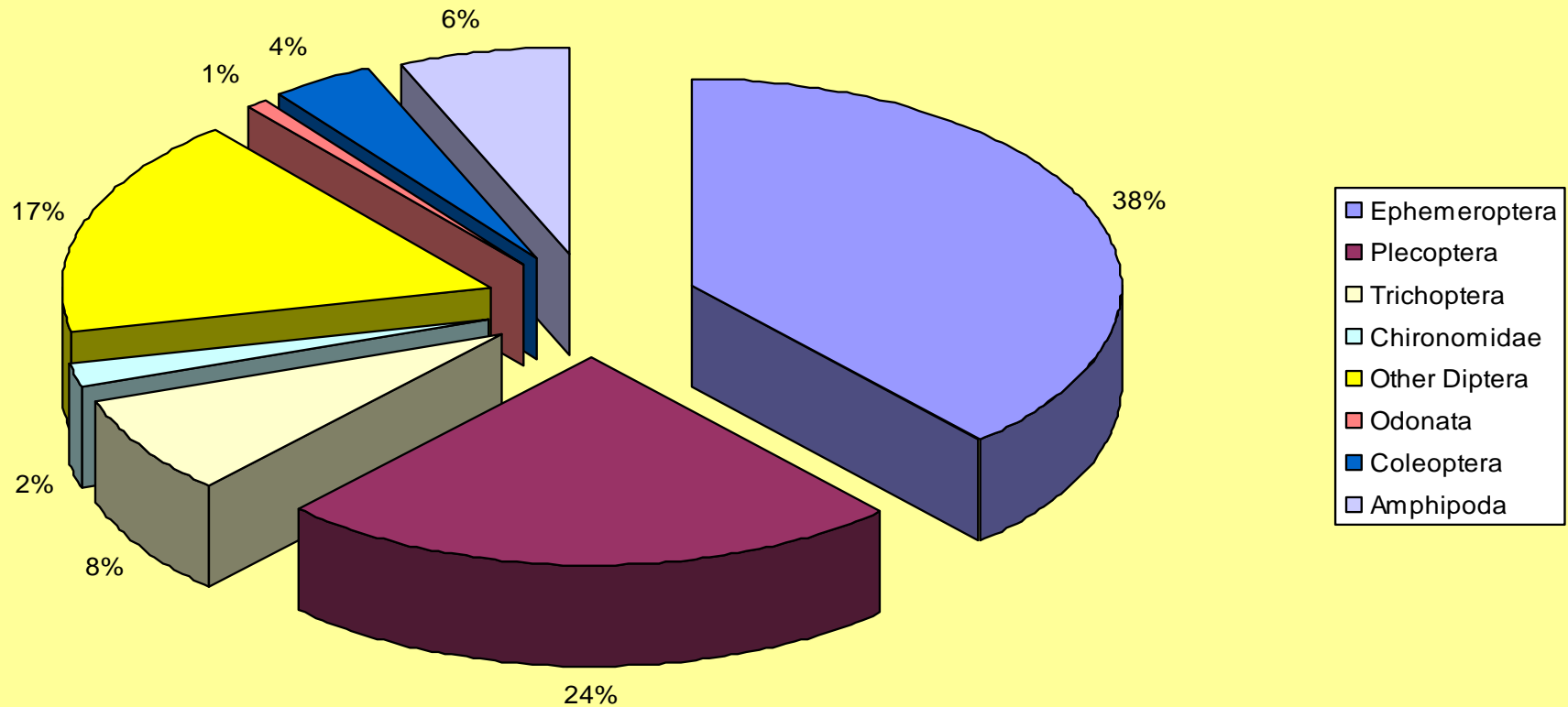


Major Group Diversity For the Head Waters



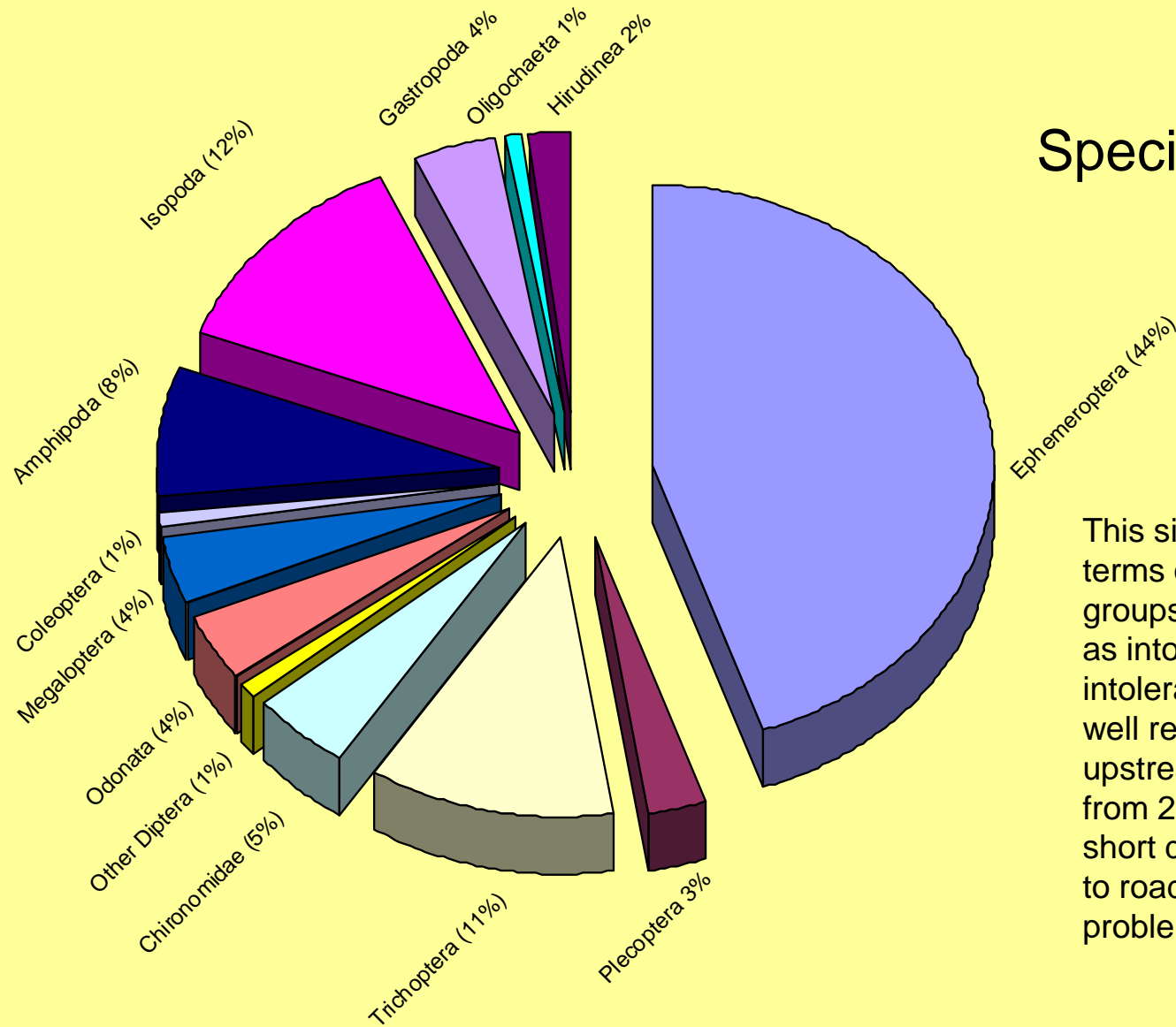
Diptera (Simuliidae) which is a group of relatively pollution tolerant species represented more than 50% of all organisms collected at this site. The exposed (open canopy) habitat at this site may be favoring species that filter algae from the water column.

Major Group Diversity for Mid River

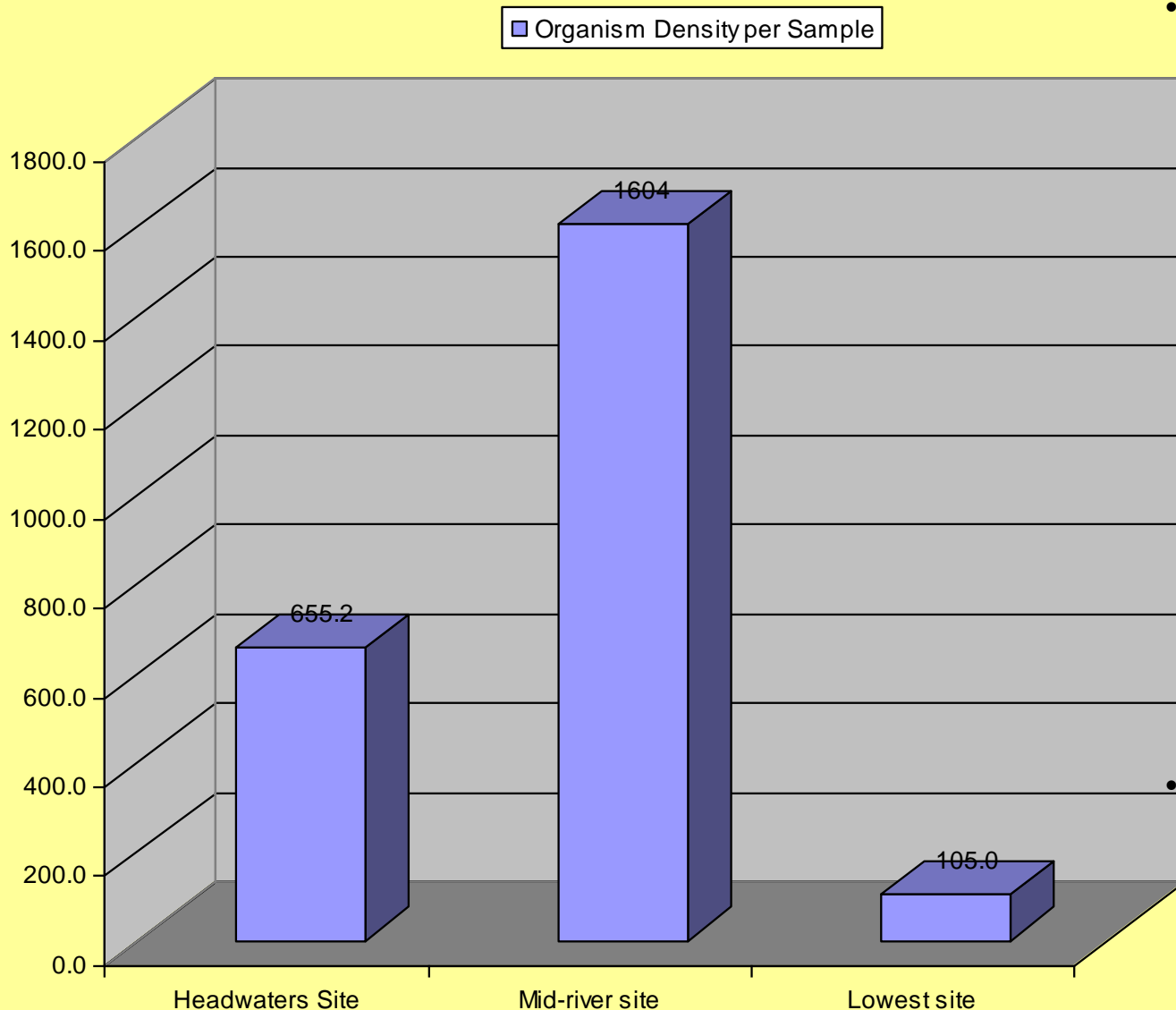


Close to 70% of all organisms collected at this site are considered healthy water indicators from the orders: Plecoptera, Ephemeroptera and Trichoptera.

Species Diversity for the Lowest Site

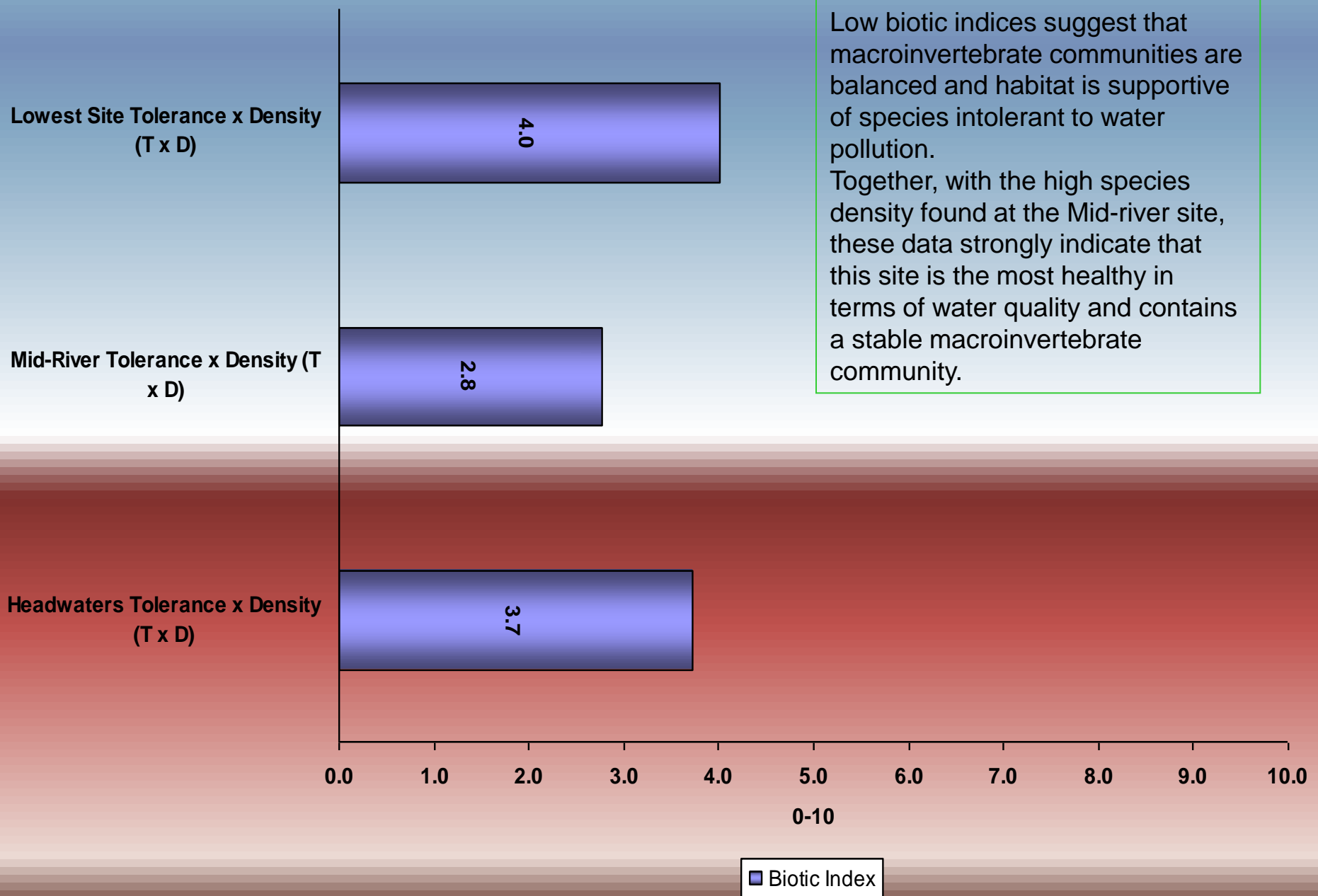


This site was the most diverse in terms of groups found. It supports groups considered tolerant as well as intolerant of pollution. One intolerant group that was extremely well represented in the mid-river site upstream from here has dropped from 24% to 3% over a relatively short distance. This may be related to road runoff or some groundwater problem.



- Organism density changed considerably between all three sites.
- Changes between the upper two sites may be due to natural riverine system dynamics related to increased riparian shading, and nutrient levels as the river enters a forest and flows downstream. It is also likely to be associated with the fact that the downstream site was away from impervious surfaces and had stable side banks as well as a mature forest overstory.
- Further down at the lowest site the low organism density may be due to deteriorated water quality associated with poor stormwater management.

Major Group Biotic Index



Species of Interest

- Crane fly Larva
 - Diptera: Tipulidae
 - Tolerance value – 3
 - This macroinvertebrate has a mild tolerance for pollution and was found in two out of three sites. It was found in both the mid stream site and the lowest site.



- Stonefly Larva
 - Plecoptera
 - Tolerance value – 1 to 2
 - This organism has a very low tolerance for pollution and was found in abundance only at the mid-river site



Habitat Data

- Substrate
 - sand, gravel, w/ less than 10% fine silt, this was typical of all sites
- Banks
 - Head waters.
 - Unstable, replaced with man made banks.
 - Mid Stream.
 - Stable natural banks.
 - Lowest collection area.
 - 80% stable natural.
 - 20% unstable due to active and ancient roads.

Habitat Data

- Volume of water flow
 - Head Waters
 - 5 million gallons/day
 - Midstream
 - 7 million gallons/day
 - Lowest collection point
 - 9.5 million gallons/day

Potential Sources of Impact

- Head Waters
 - Rt. 130, Herring Ladder, parking lot
- Midstream
 - Greatneck Rd. is upstream
- Lowest collection point
 - High traffic State Route 28, and Quinnquisett Rd.



Where They Stand

- Headwaters
 - With a major group biotic index of 3.7 this is considered a borderline excellent site.
- Mid-river
 - With a major group biotic index of 2.8 this is considered an excellent site. This was also where the highest overall density as well as density of pollution intolerant groups was found.
 - May represent a good reference site for this and similar nearby rivers.
- Lowest Collection Point
 - With a major group biotic index of 4.0 this is considered a moderately impaired site.