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Is the Nemasket River Stressed Out?

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Is the Nemasket River Stressed Out?



Group Members:

Kelsey Walker
Caitlin Young
Tim Emery
Ricky Garant
Nick Marangi
Pete Gauraldi

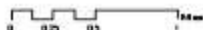
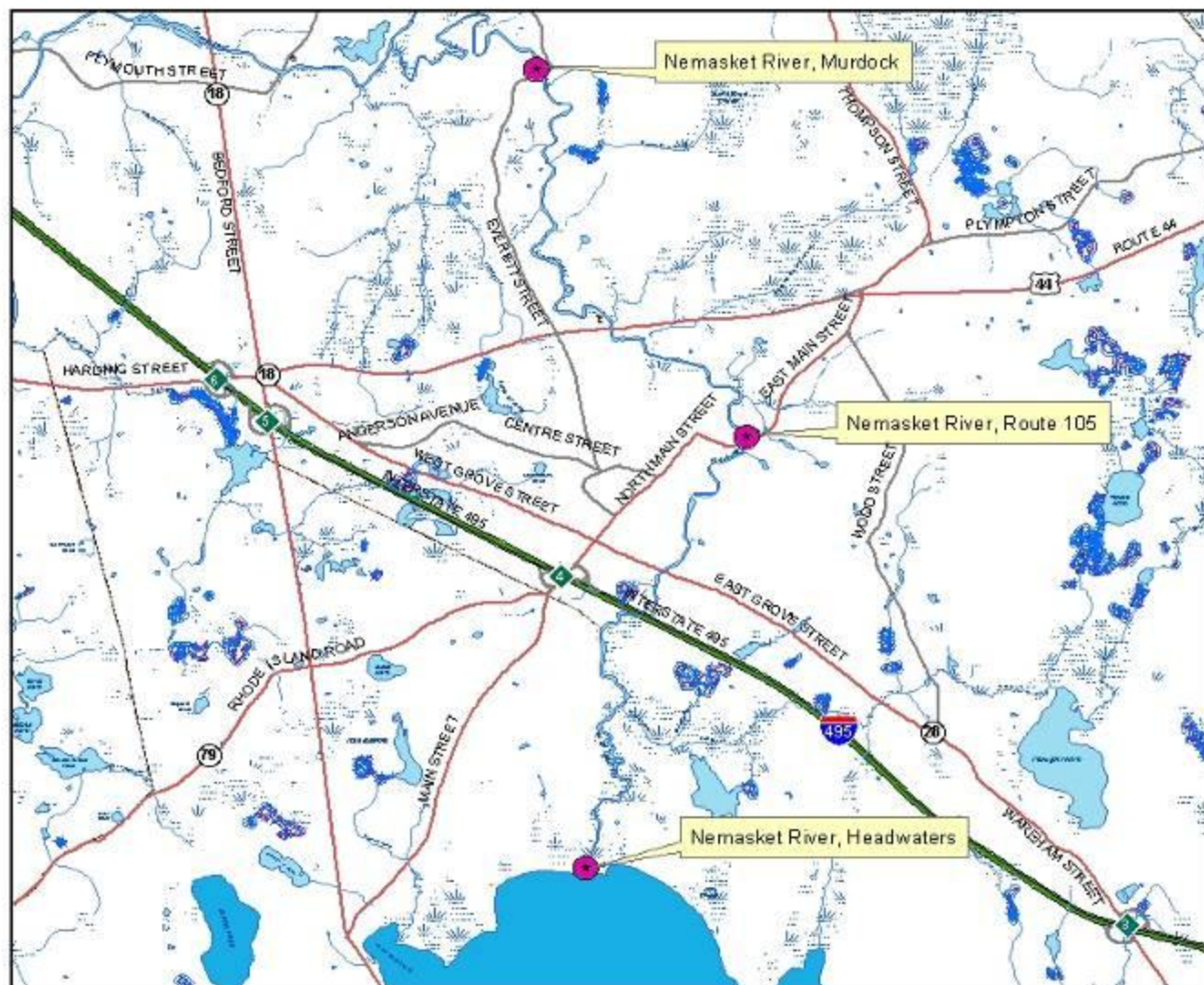
Introduction to the Nemasket River

- What is the effect of the Middleborough Waste Water Treatment Plant on the water quality of the Nemasket River?
- We used three sites: Headwaters, Route 105, and Murdock Street
- We also used water quality indicators such as nutrient load, dissolved oxygen, pH, and Family Biotic Index of macro invertebrates at Murdock Street and Route 105.

Nemasket River Sites

Legend

- Perennial Stream
- Intermittent Stream
- Shoreline
- Intermittent Shoreline
- Manmade Shoreline
- Ditch/Canal
- Aqueduct
- Dam
- Channel in Water
- Pond, Lake, Ocean
- Reservoir
- Wetland
- Salt Wetland
- Submerged Wetland
- Cranberry Bog
- Tidal Flat
- Inundated Area



The Nemasket River

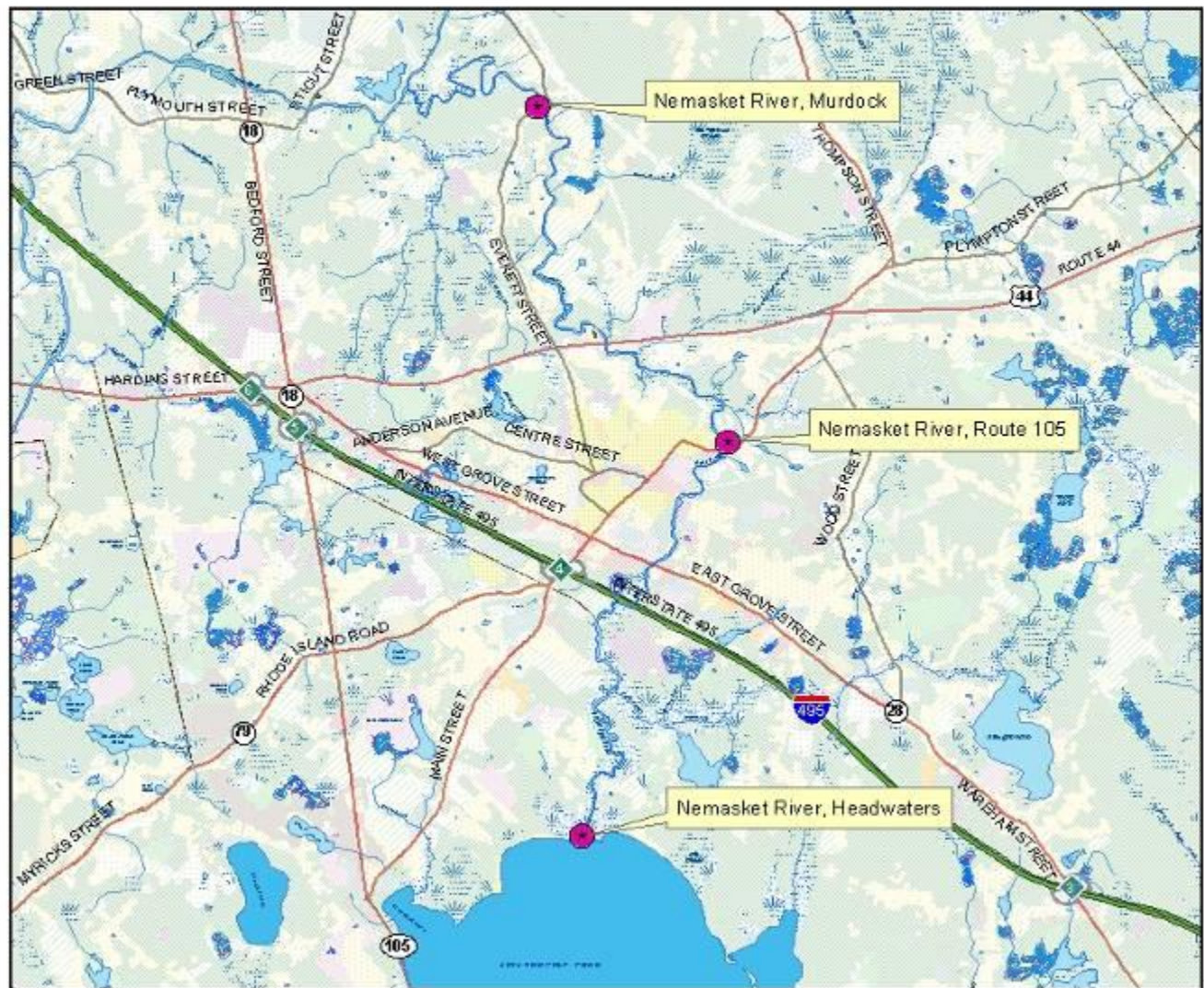
- The Nemasket River flows from Assawompsett Pond.
- We calculated the sub-basin area
- Land uses around the Nemasket.



Nemasket River Land Uses

Legend

- Crop Land
- Pasture
- Forest
- Non-Forested Wetland
- Mining
- Open Land
- Participation Recreation
- Spectator Recreation
- Water-Based Recreation
- Multi-Family Residential
- High Density Residential
- Medium Density Residential
- Low Density Residential
- Salt Water Wetland
- Commercial
- Industrial
- Urban Open
- Transportation
- Waste Disposal
- Water
- Woody Perennial



Headwaters



- The headwaters are located north of Assowompsett Pond.
- There are building restrictions, which results in few houses.
- Riparian corridor is left intact on both sides of the headwaters.

Rt. 105

- Route 105 is located upstream of the Waste Water Treatment Plant.
- Riparian corridor is interrupted at this site, due to a house lot on the left side of the river.
- Route 105, a commonly traveled road, passes over this site.



Murdock Street

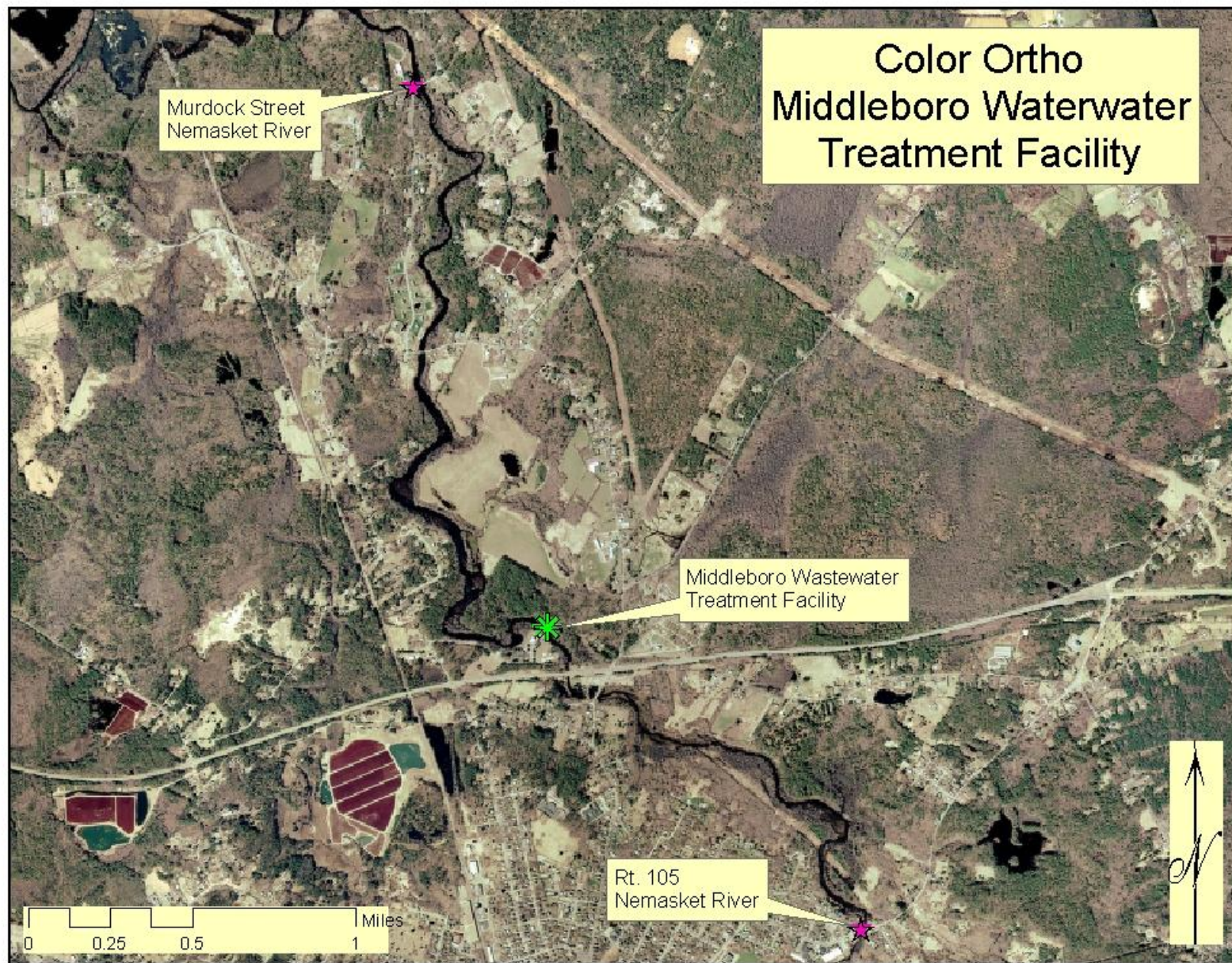


- This is the impact site for our project, located downstream of the Waste Water Treatment Plant.
- Large patches of grass in September
- Riparian corridor left intact on both sides of the river.

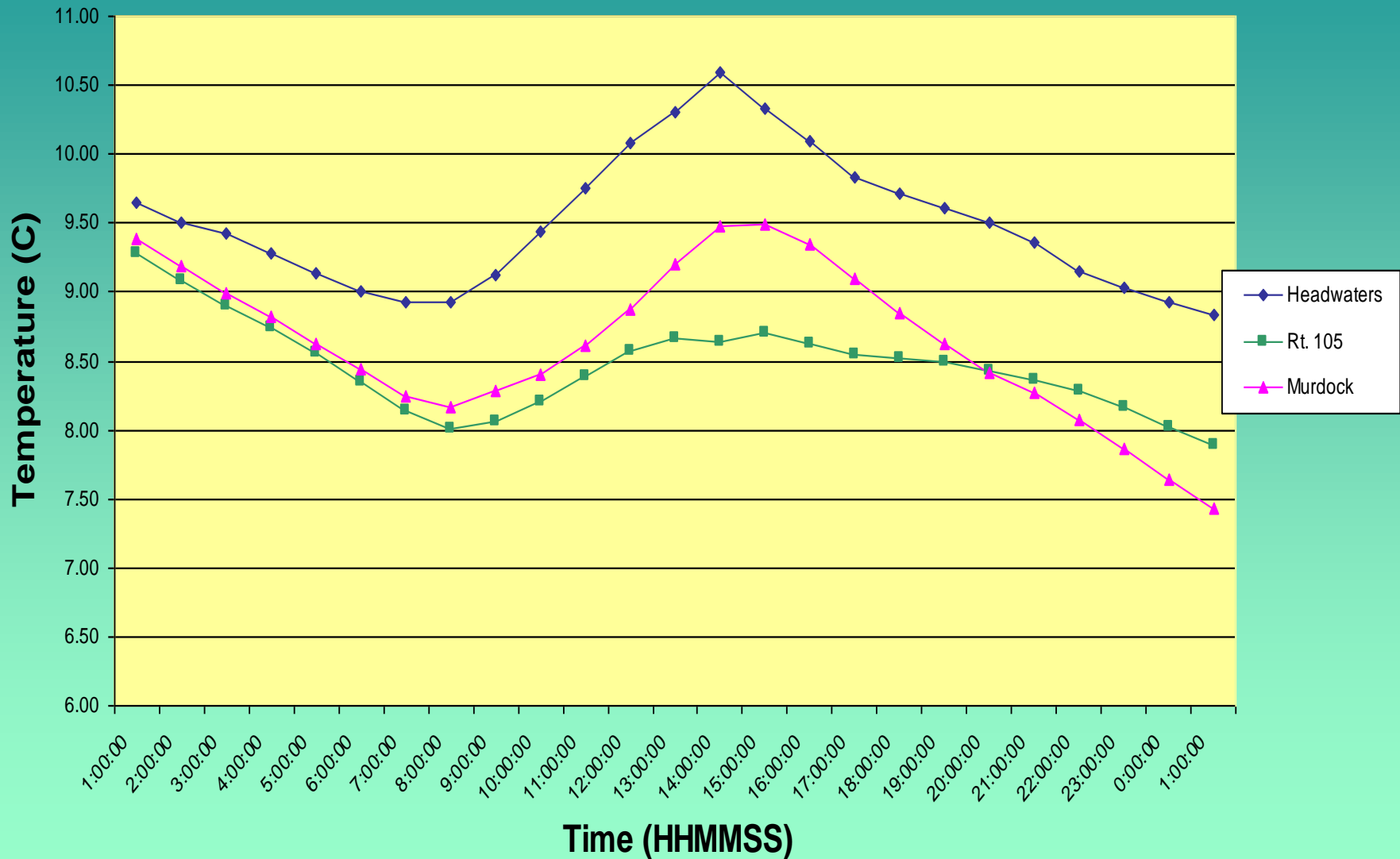
Middleborough Waste Water Treatment Plant



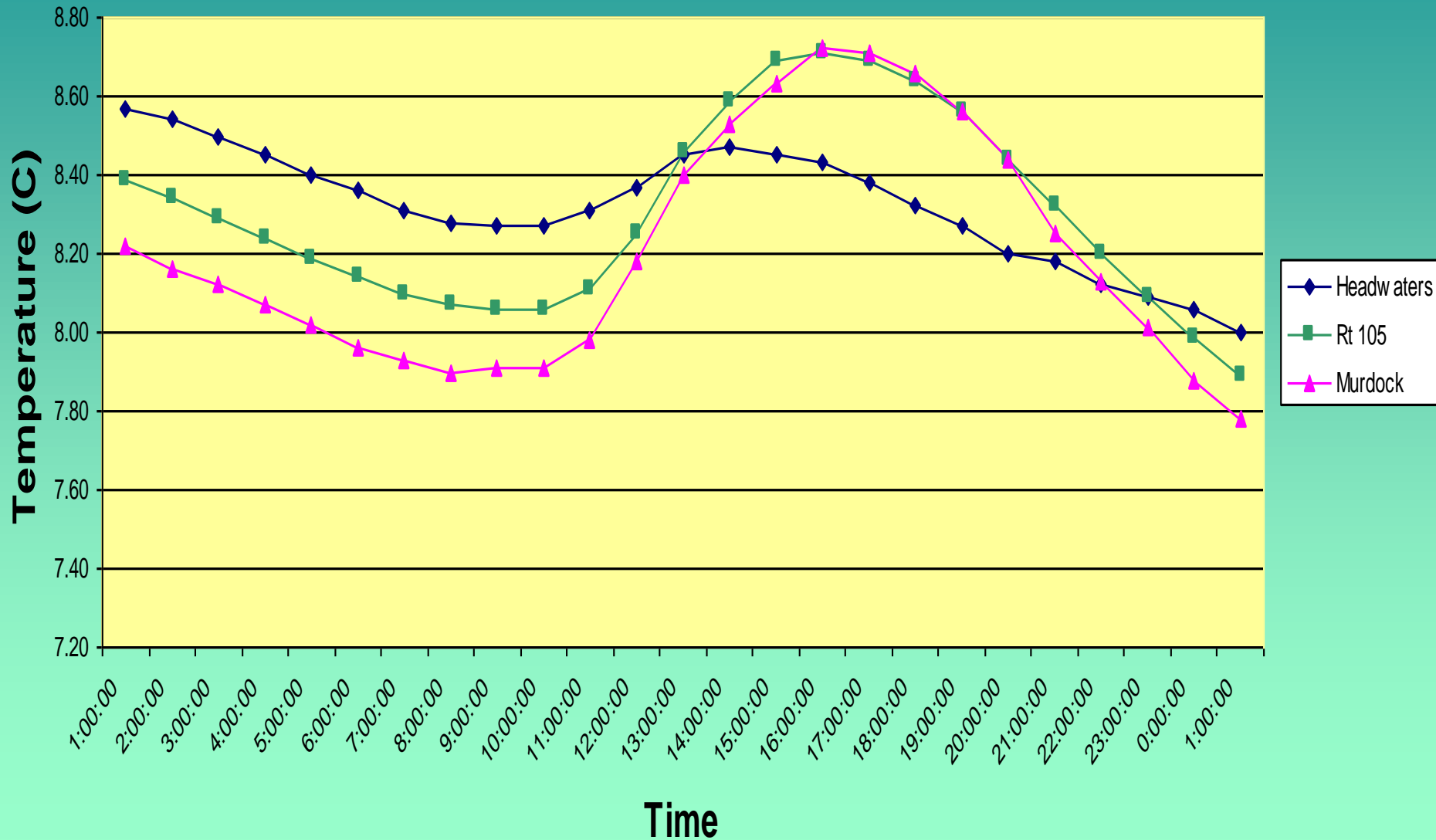
- The Waste Water Treatment Plant is located between our Route 105 and Murdock Sites.
- The NPDES permit allows 2.6MGD to be dumped into the water.



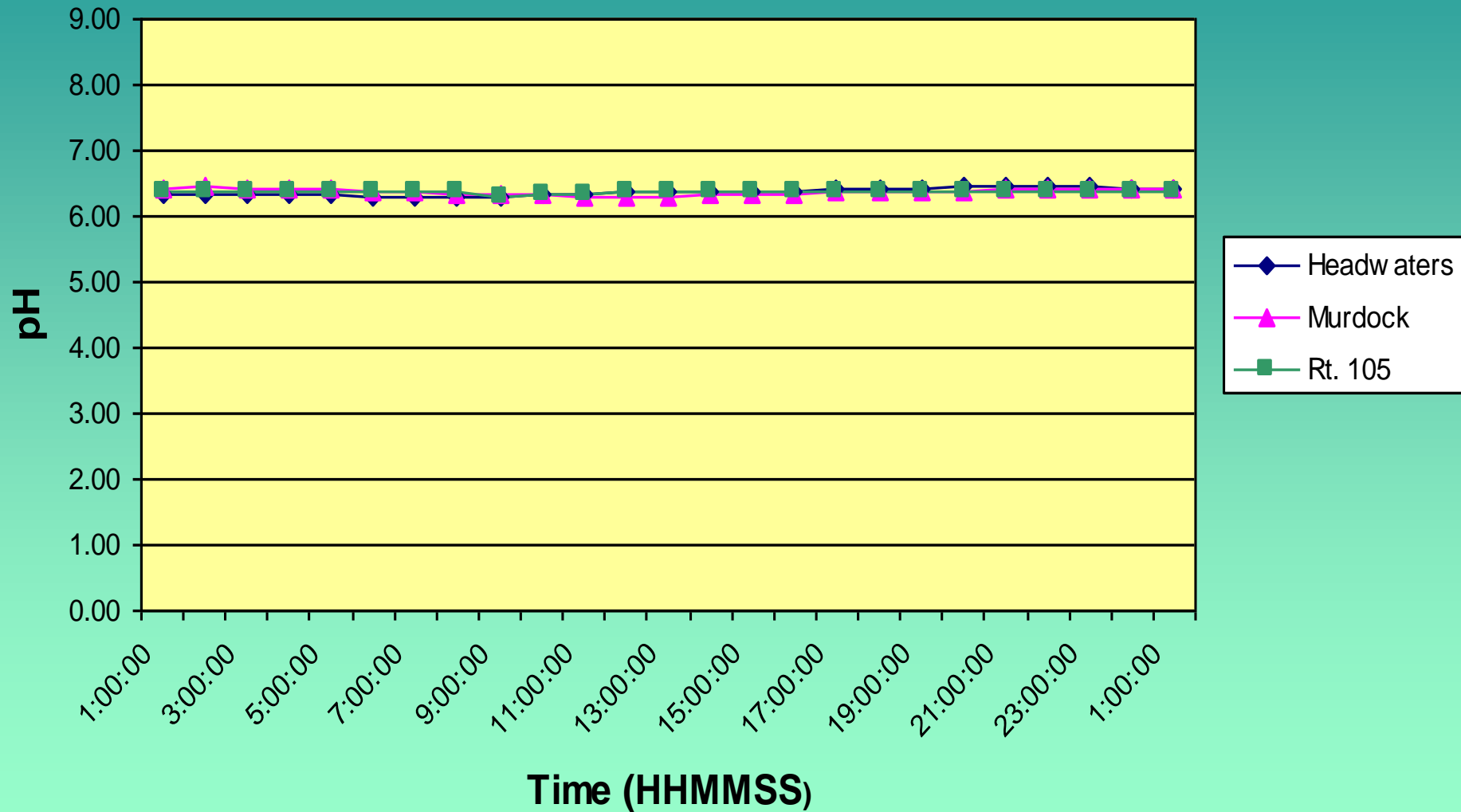
Temperature vs. Time, Nemasket River, Nov.3-4, 2006



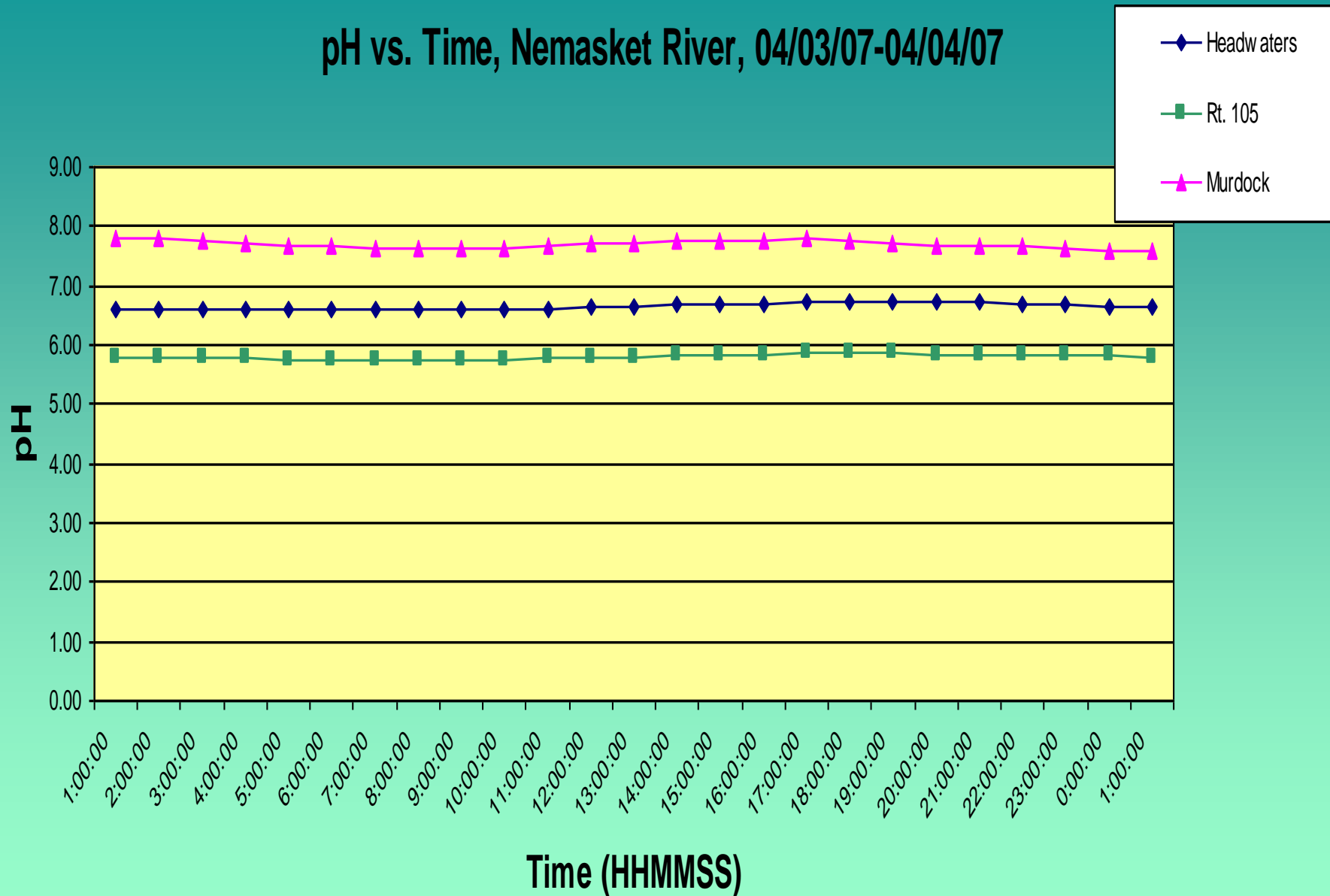
Temp. vs. Time, Nemasket River, 04/03/07-04/04/07



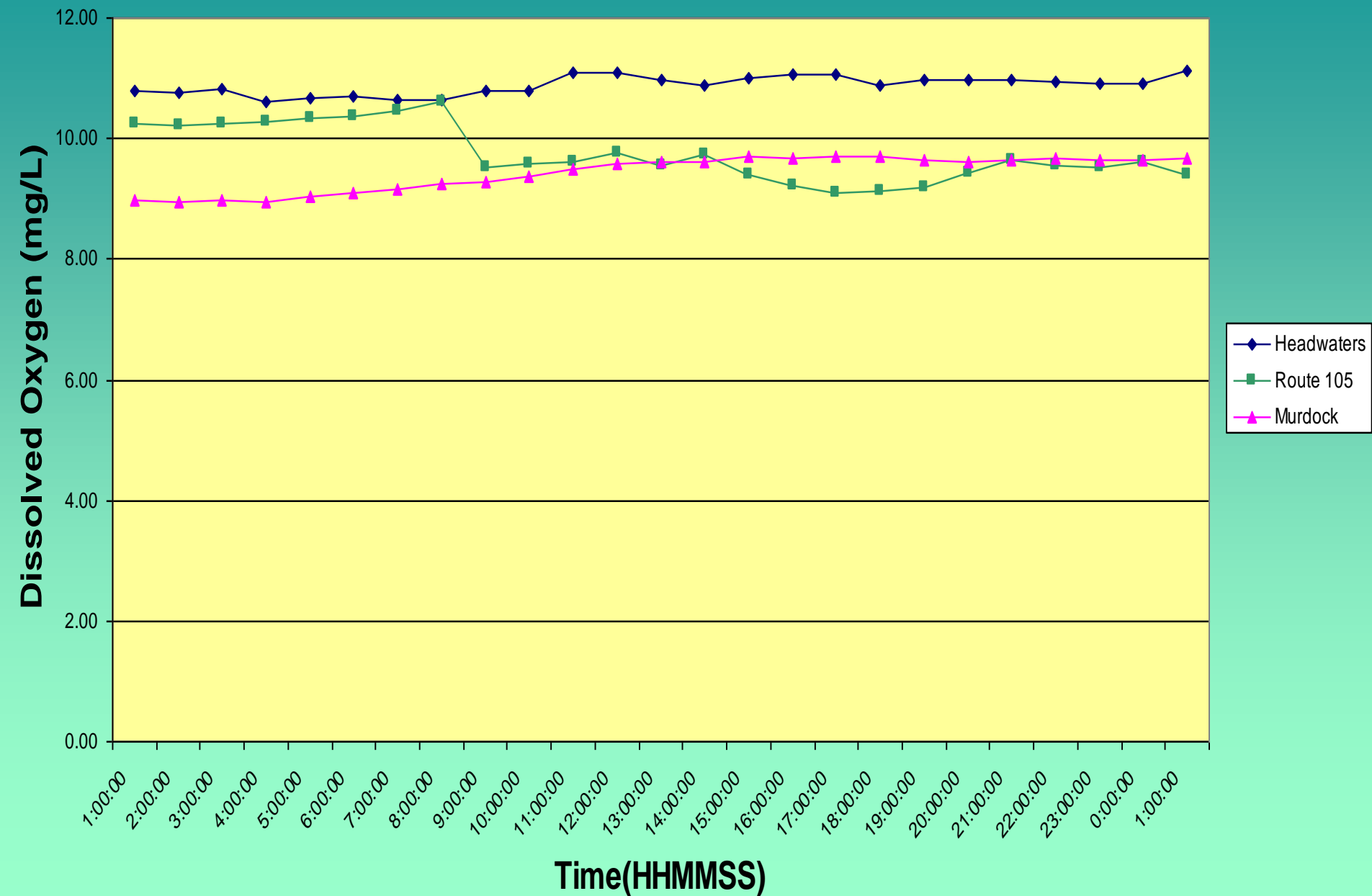
ph vs. time, Nemasket River, 11/3-11/4/2006



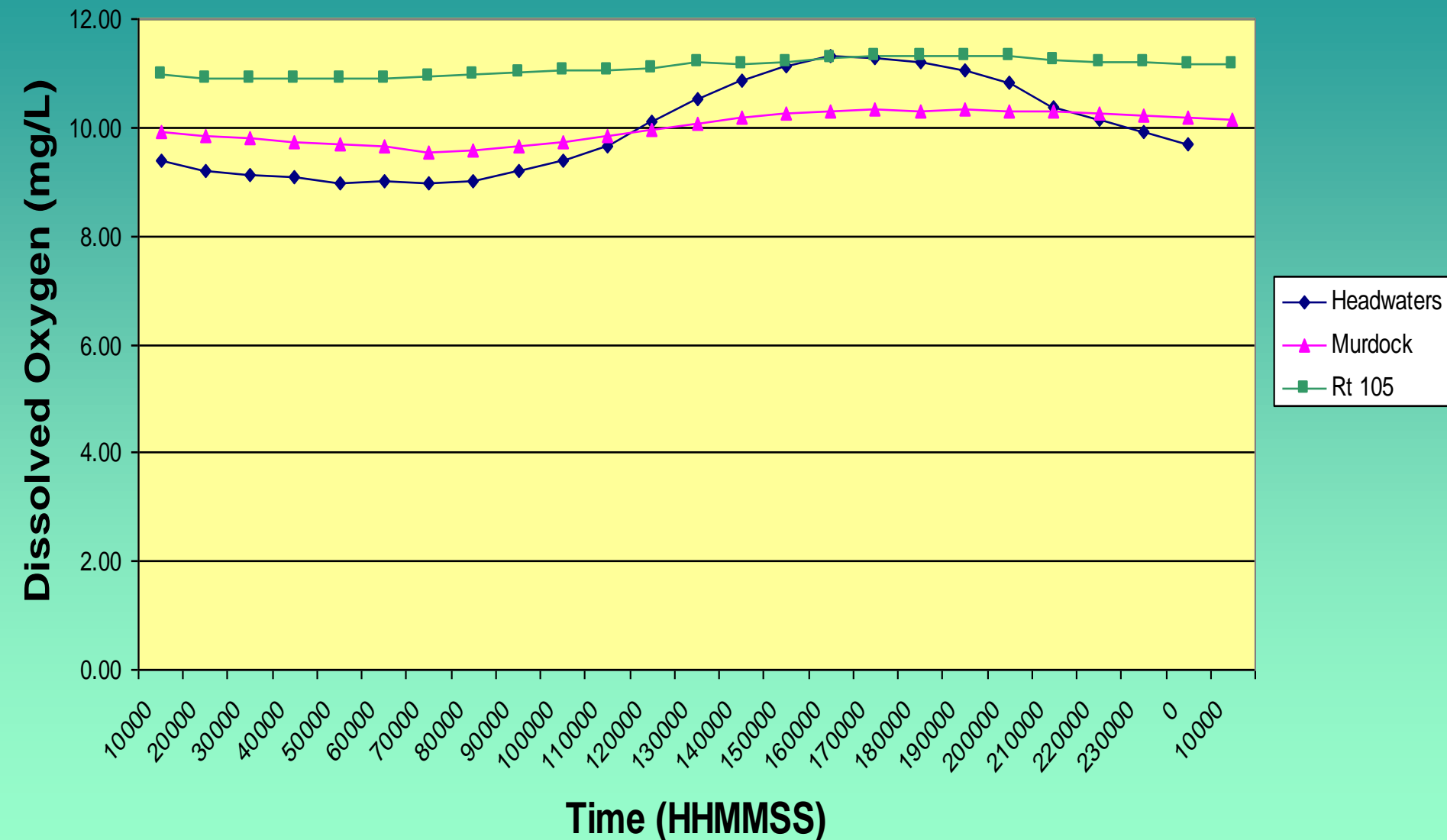
pH vs. Time, Nemasket River, 04/03/07-04/04/07



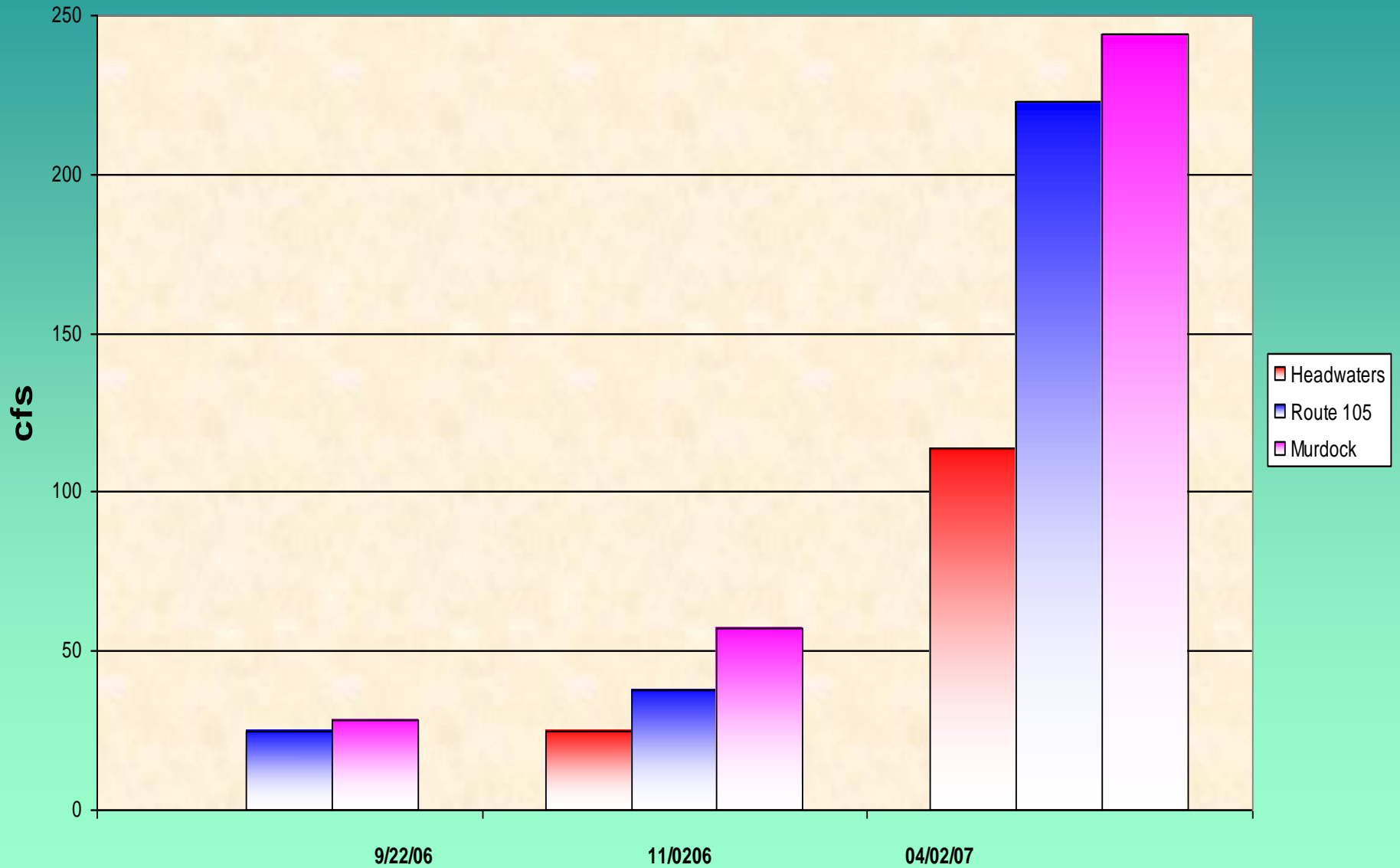
Dissolved Oxygen vs. Time, Nemasket River, Nov. 3-4, 2006



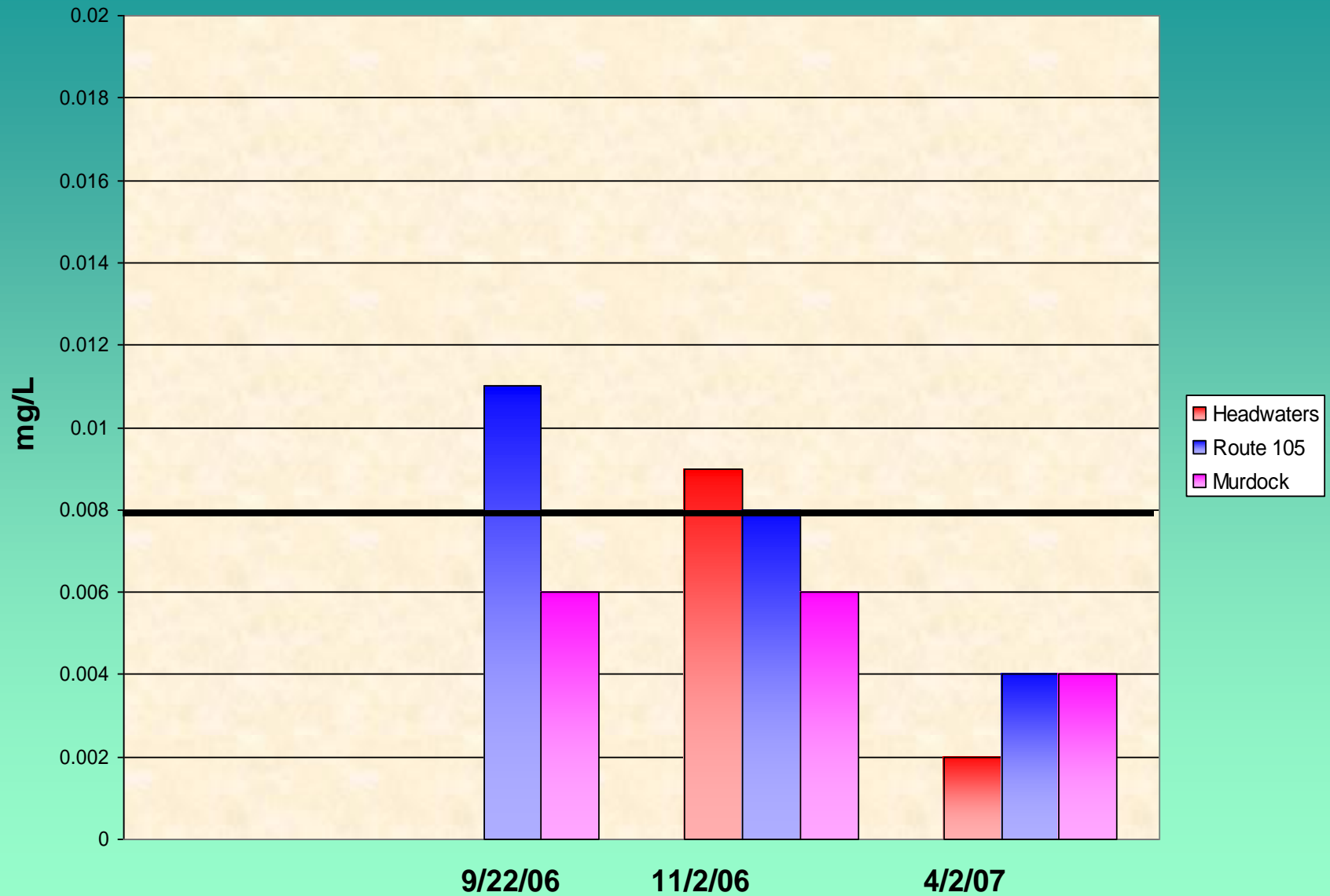
Dissolved Oxygen vs. Time, Nemasket River, April 3-4, 2007



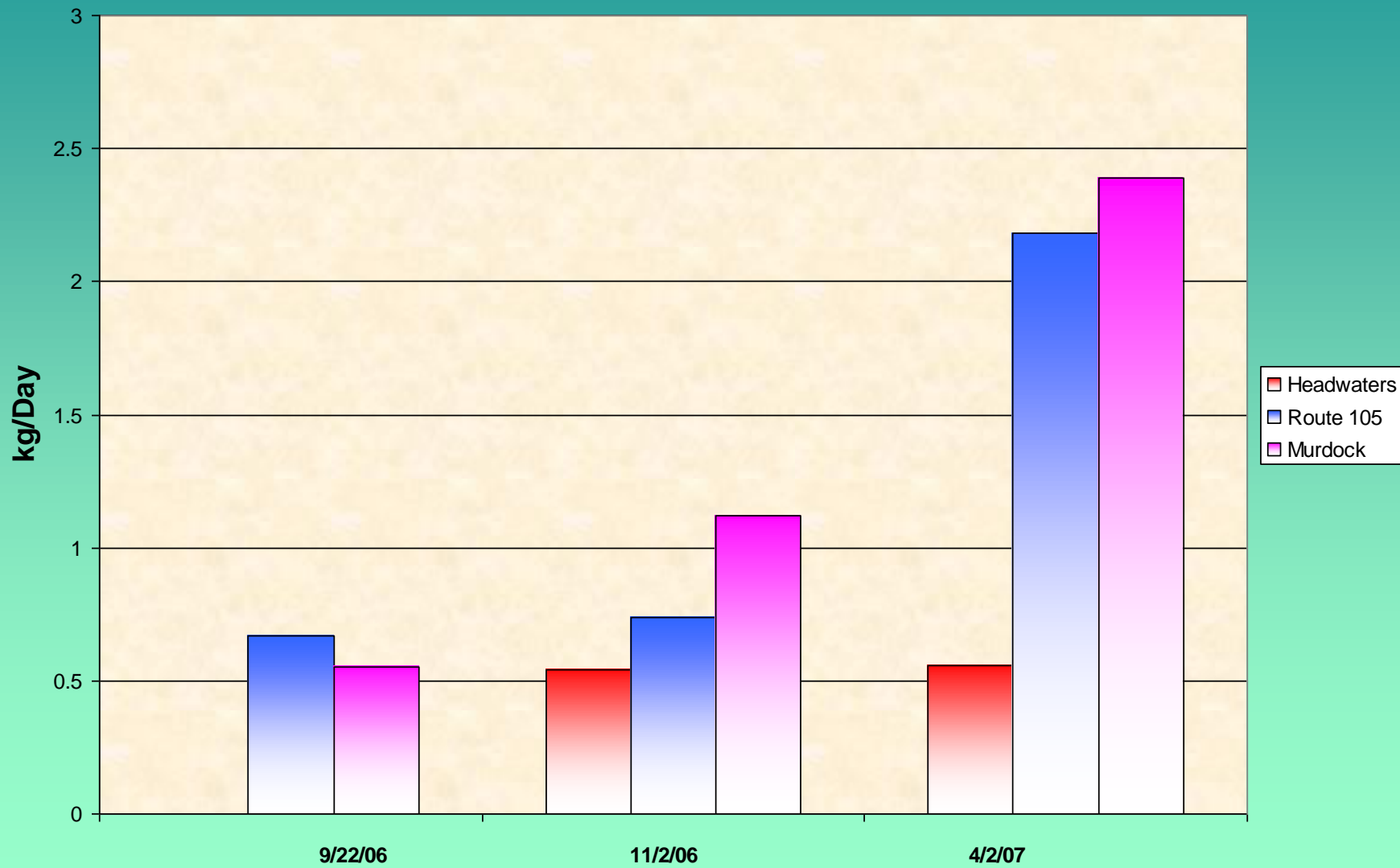
Discharge, Nemasket River, 2006-2007



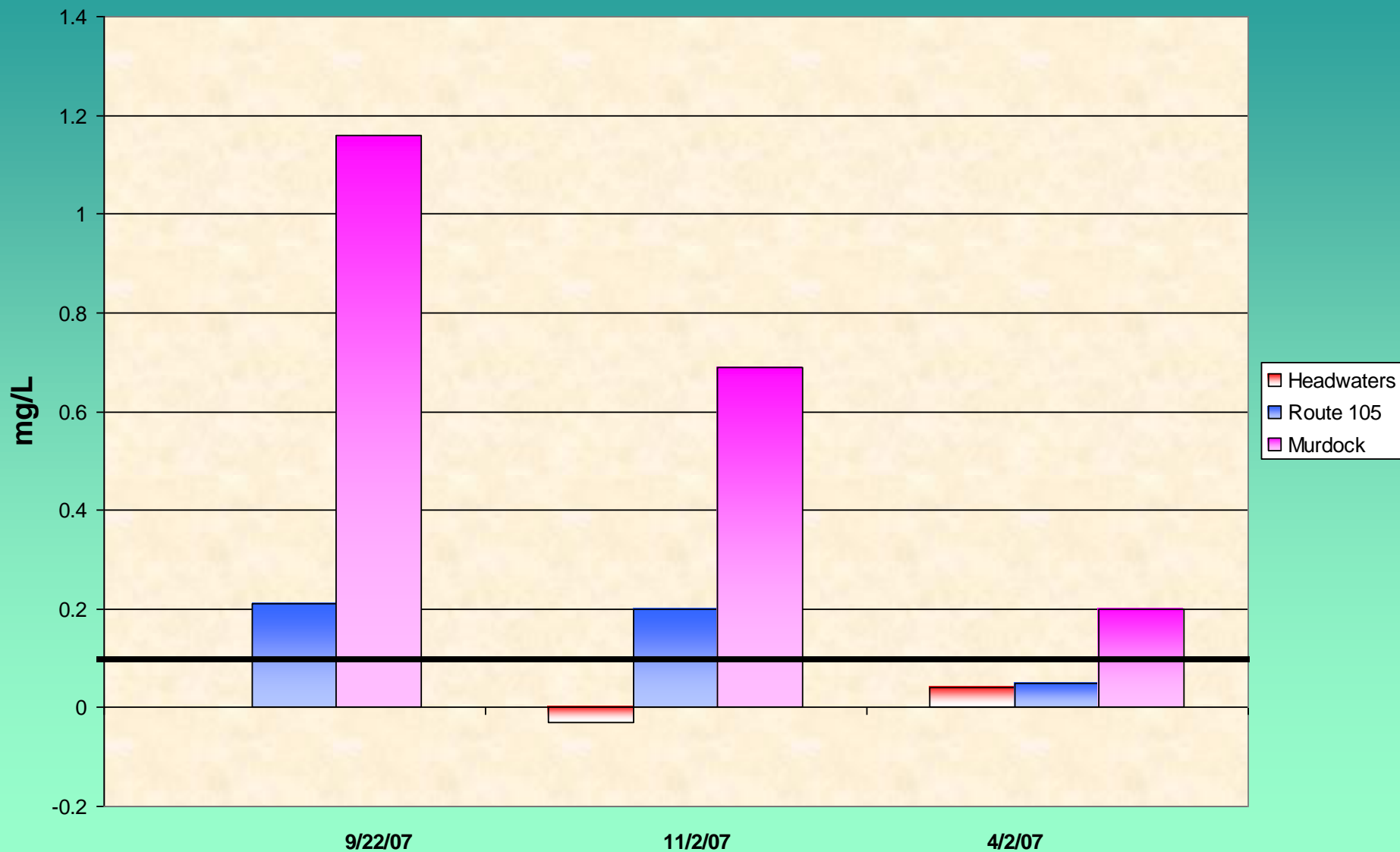
Reactive Phosphorus Concentrations, Nemasket River, 2006-2007



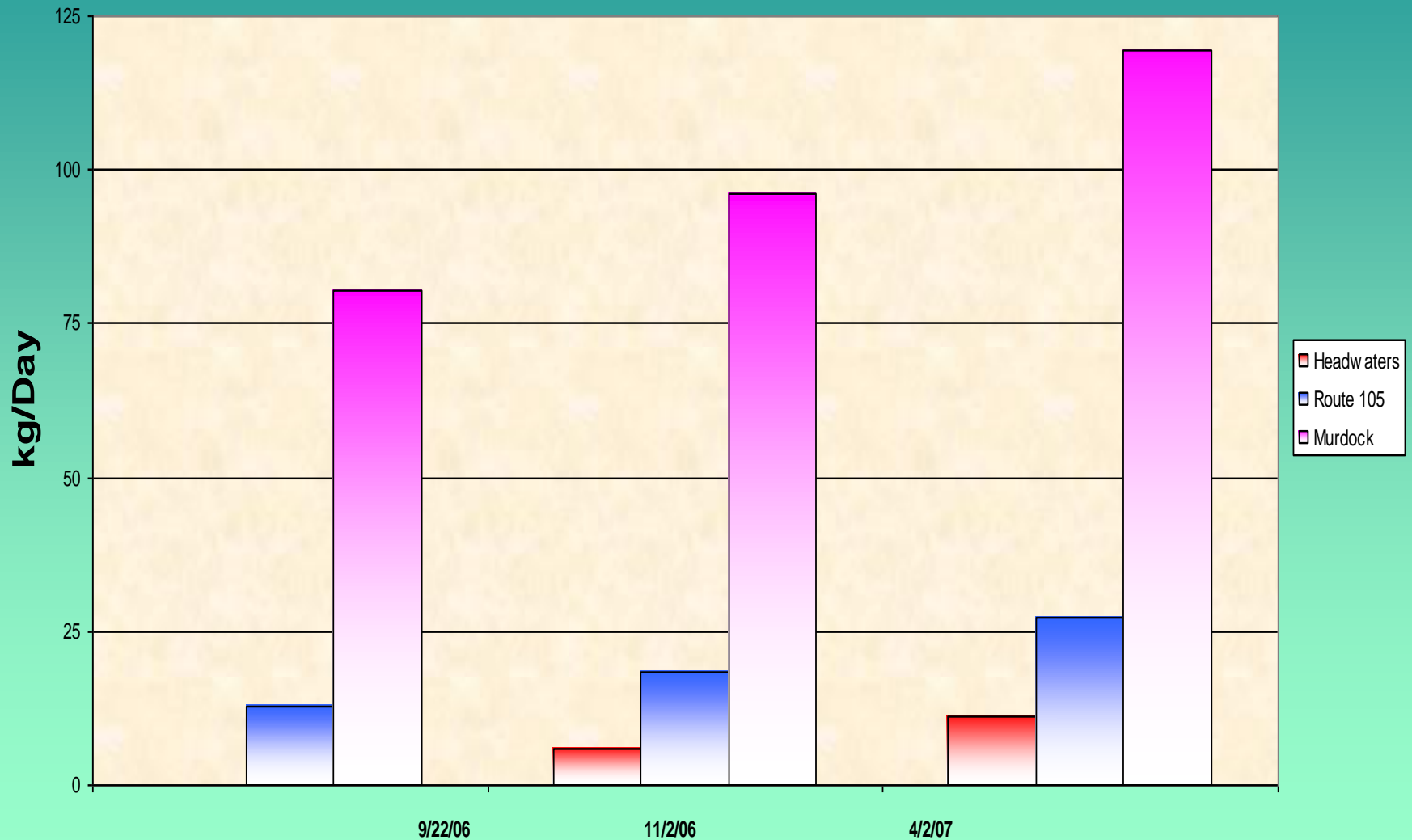
Load for Reactive Phosphorus, Nemasket River, 2006-2007



Concentration of Nitrogen, Nemasket River, 2006-2007



Load for Nitrogen, Nemasket River, 2006-2007



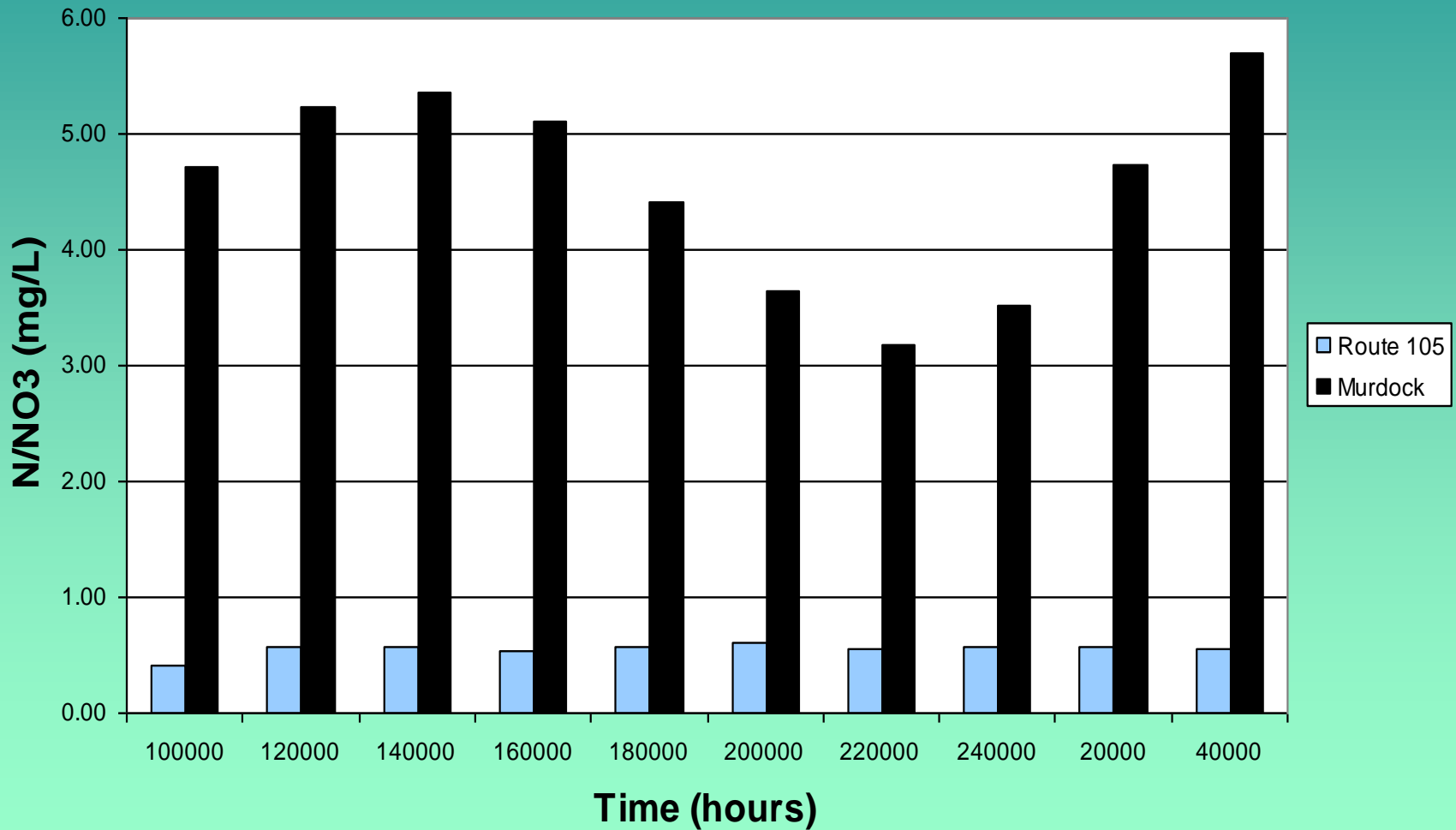
Macroinvertebrate Families - Nemasket River, Route 105 and Murdock St., 2006				
	route 105	Murdock		
Ephemeroptera				
Baetidae	11	4		
Heptageniidae	33	1		
Leptophlebiidae		2		
Plecoptera		1		
Perlidae		1		
Trichoptera		1		
Hydropsychidae	96	40		
Philopotamidae	9	4		
Limnephilidae	2	2		
Rhyacophilidae	2	2		
Polycentropodidae	20	4		
Diptera	1	1		
Chironomidae	2	8		
Simuliidae		2		
Odonata				
Cordulegastridae		1		
Gomphidae		1		

Coleoptera				
Elmidae	9	10		
Haliplidae		2		
Dysticidae	1			
Psephenidae	11	1		
Amphipoda		3		
Gammaridae	4			
Isopoda				
Asellidae		2		
Decapoda		1		
Gastropoda		65		
Planorbidae	1			
Pelecypoda		2		
Oligochaeta	2	1		
Hirudinea	1	1		
FBI	3.69	5.31		
	Excellent	Fair		

Conclusion

- Our hypothesis has been proven correct.
- Nutrient Loads are higher at Murdock Street than the other two sites.
- Our conclusion is that the Middleboro Wastewater Treatment Plant causes stress to the Nemasket River.
- The water quality of Route 105 is excellent, and the water quality of Murdock is fair based on the Family Biotic Index.

Comparison of Nitrogen/Nitrate for Nemasket River, Route 105 and Murdock Street August 17-18, 2005



Acknowledgments

- Watershed Access Lab
 - Kim McCoy
- Taunton Department of Public Works
 - Mark Terra

Citations

- Testing the Waters: Chemical and Physical Vital Signs of a River
 - Sharon Behar
- Picture of the Wastewater Treatment Plant from <http://www.who.edu/science/GG/marineadhesives/fieldtrips/Stirrer1.jpg>