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The Effect of the Waste Water Treatment Plant on the Nemasket River

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The Effect of the Waste Water Treatment Plant on the Water Quality of the Nemasket River

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Lizzy Iolli, Vicky Gavin, and
Hillary Locke

Our Question:

Will the Middleboro Wastewater Treatment Plant have an effect on the water quality of the Nemasket River?



The Middleboro Wastewater Treatment Facility

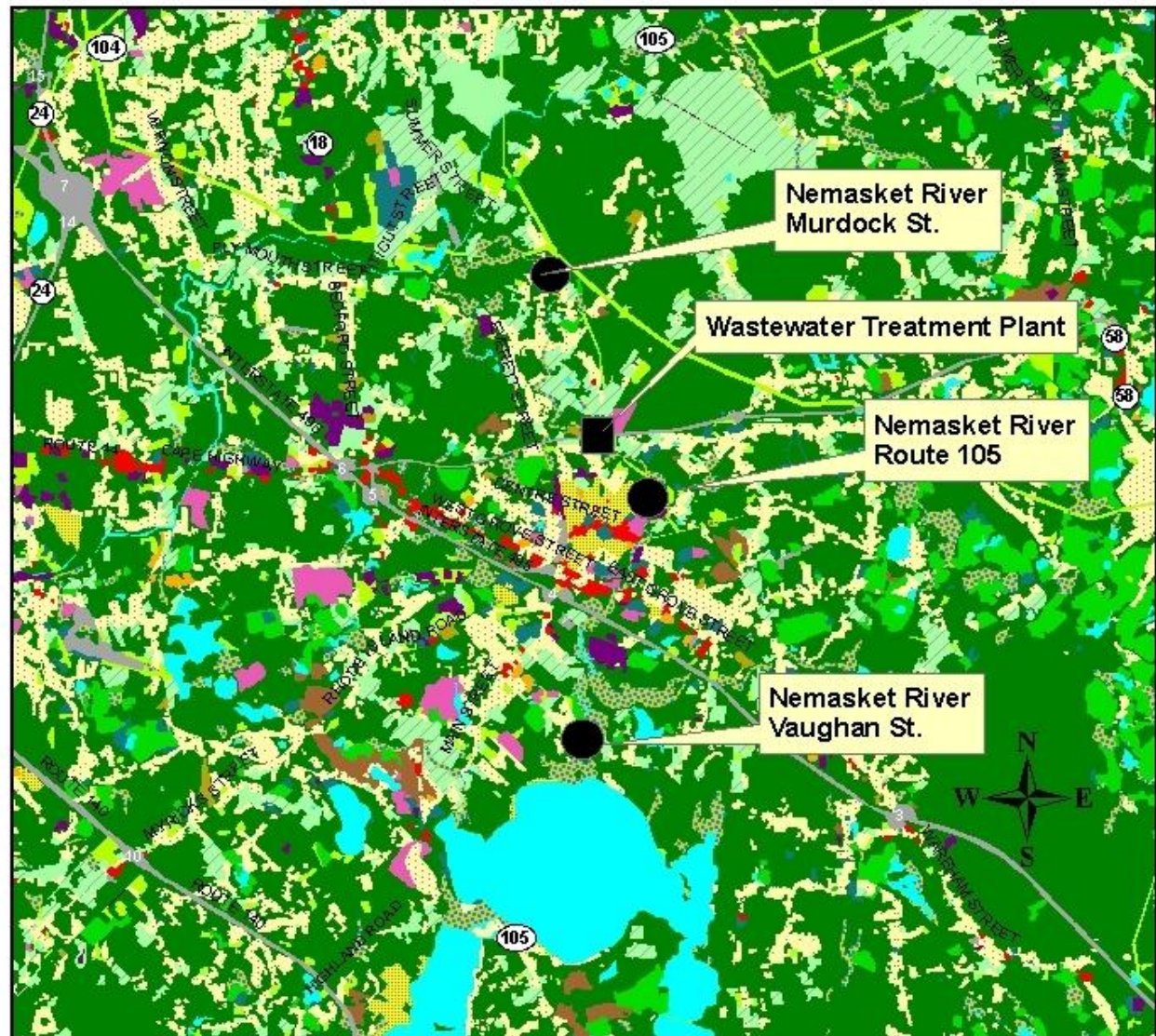
- Plant is 40 years old built in the 1960's
- Designed to process water from City of Middleboro and the production facility of Ocean Spray Cranberry Co.

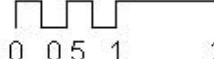


Nemasket River Land Use Map 2008-2009

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



 Miles
 0 0.5 1 2

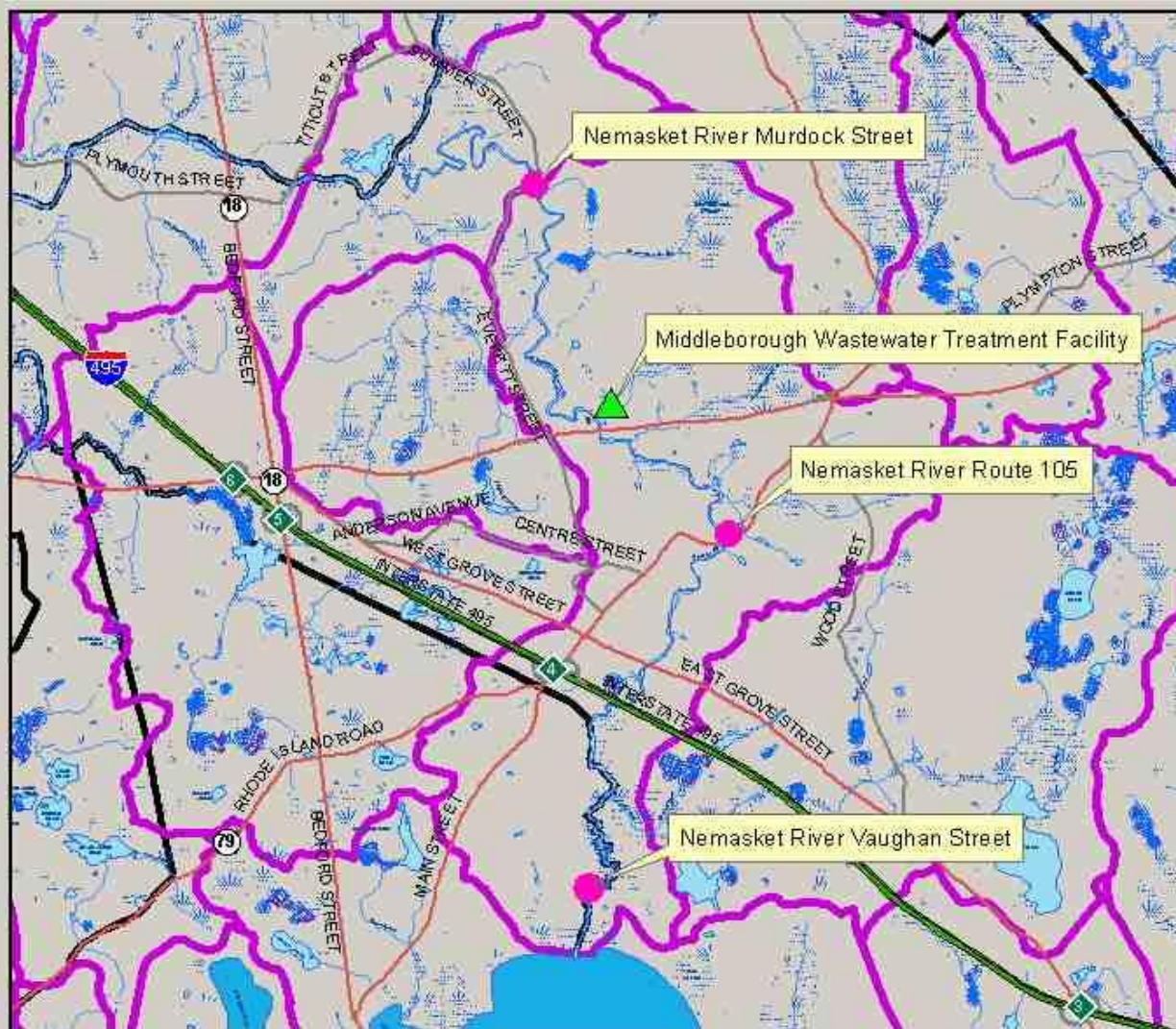
Nemasket River Sub-basin Area Map 2008-2009

Legend

- Sub-basins
- 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



0 0.5 1 2 Miles



Created By Hannah Harkey

Vaughan Street

- Drains a Wetland
- Rocky Bottom
 - Boulders
- 0% Canopy
- Wide

Upstream



Downstream



Route 105

Downstream



- Not a lot of in stream Vegetation
- Gravel Bottom
- Canopy:
 - 80 % Downstream
 - 30% Upstream



← Upstream

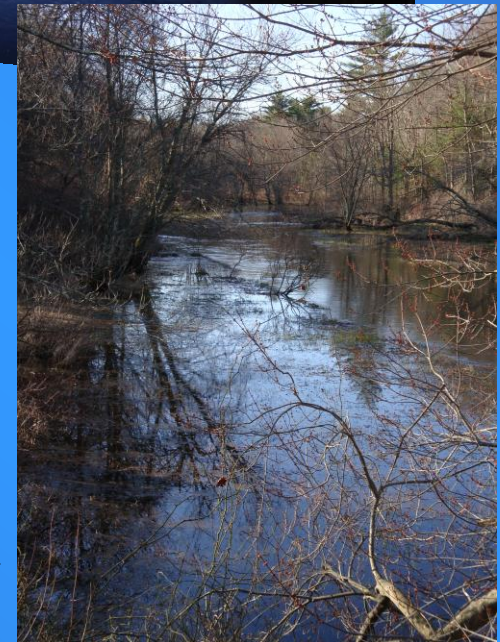
Murdock Street

Upstream

- A lot of in stream vegetation
- 50% Canopy
- Rocky Bottom
- Grasses on upstream side of river.



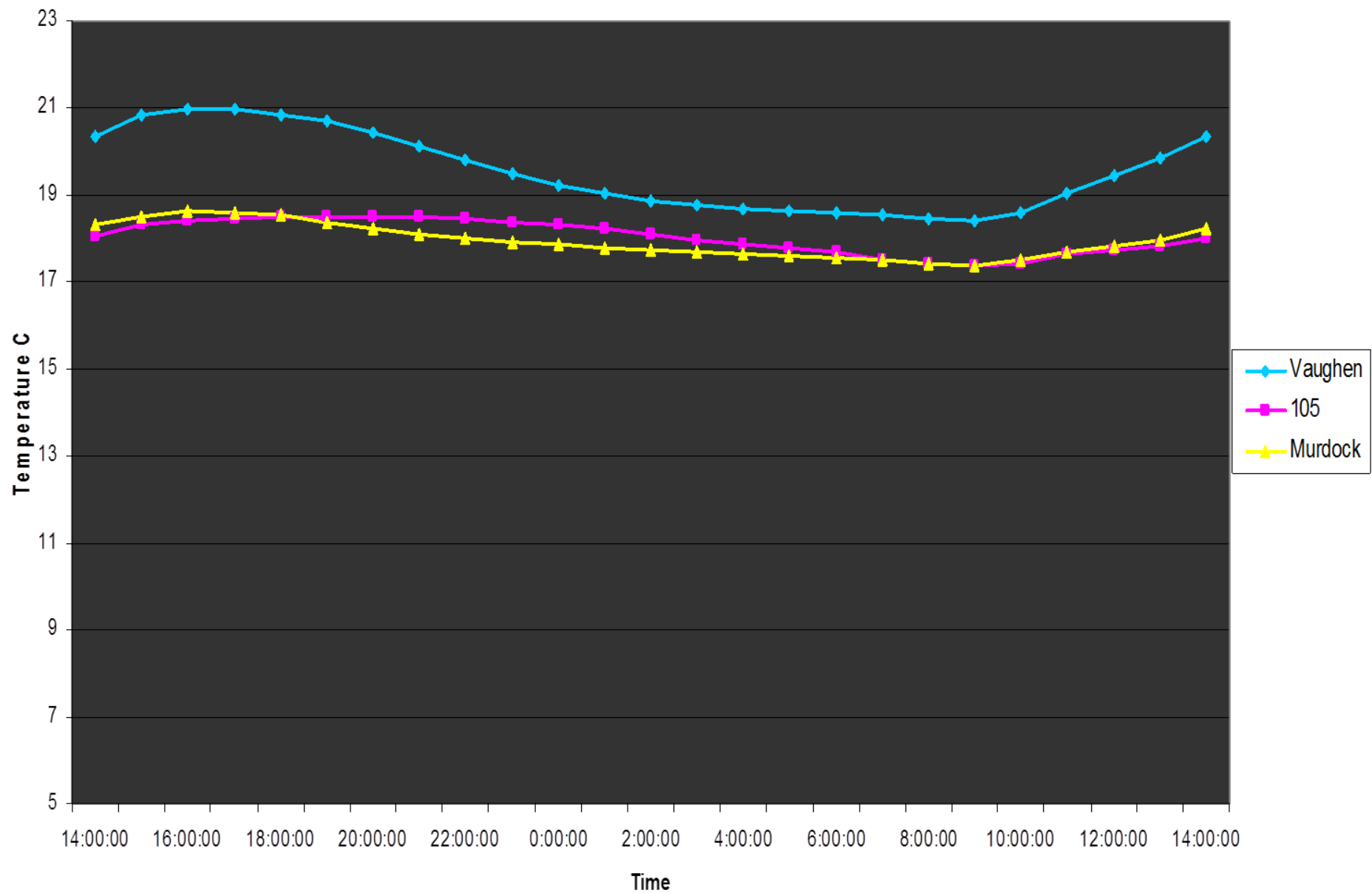
Downstream →



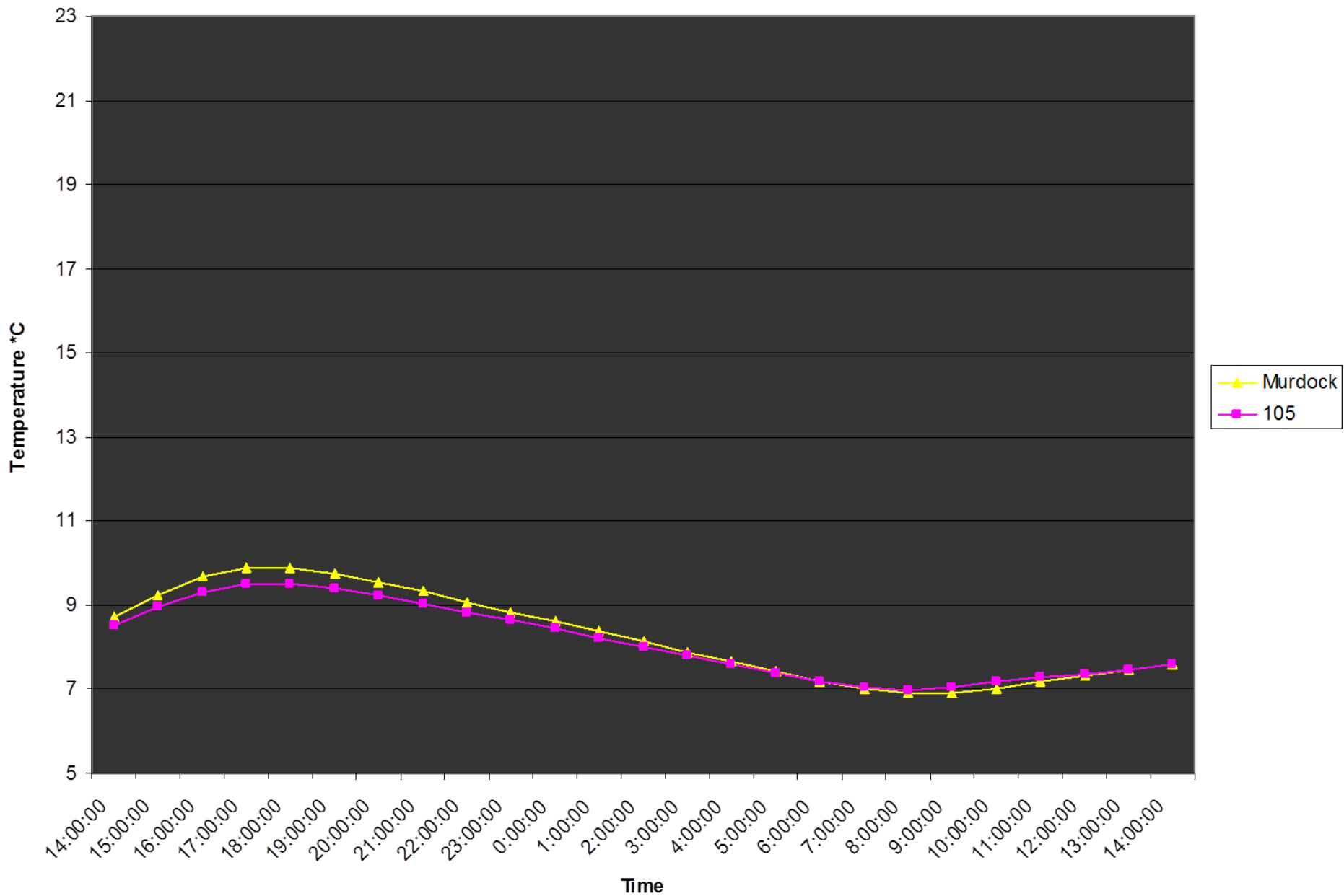
[illegible]

Major Group/ Family	Murdock	Rt. 105
Ephemeroptera		
Baetidae	4	4
Heptageniidae	4	4
Plecoptera		
Perlodidae	4	0
Trichoptera		
Brachycentridae	2	
Hydropsychidae	38	10
Philoctamidae	3	2
Diptera		
Chironomidae	7	2
Simuliidae	1	0
Odonata		
Coenagrionidae	1	0
Coleoptera		
Elmidae	14	4
Psephenidae	0	6
Amphipoda	96	102
Decapoda	0	1
Gastropoda	7	2
Pelecypoda	7	0
Oligochaeta	2	1
Hirudinea	2	0
Water Quality	Fair	Fairly-Poor
FBI	5.69	6.31
% Tolerant	63	75
%Intolerant	24	8

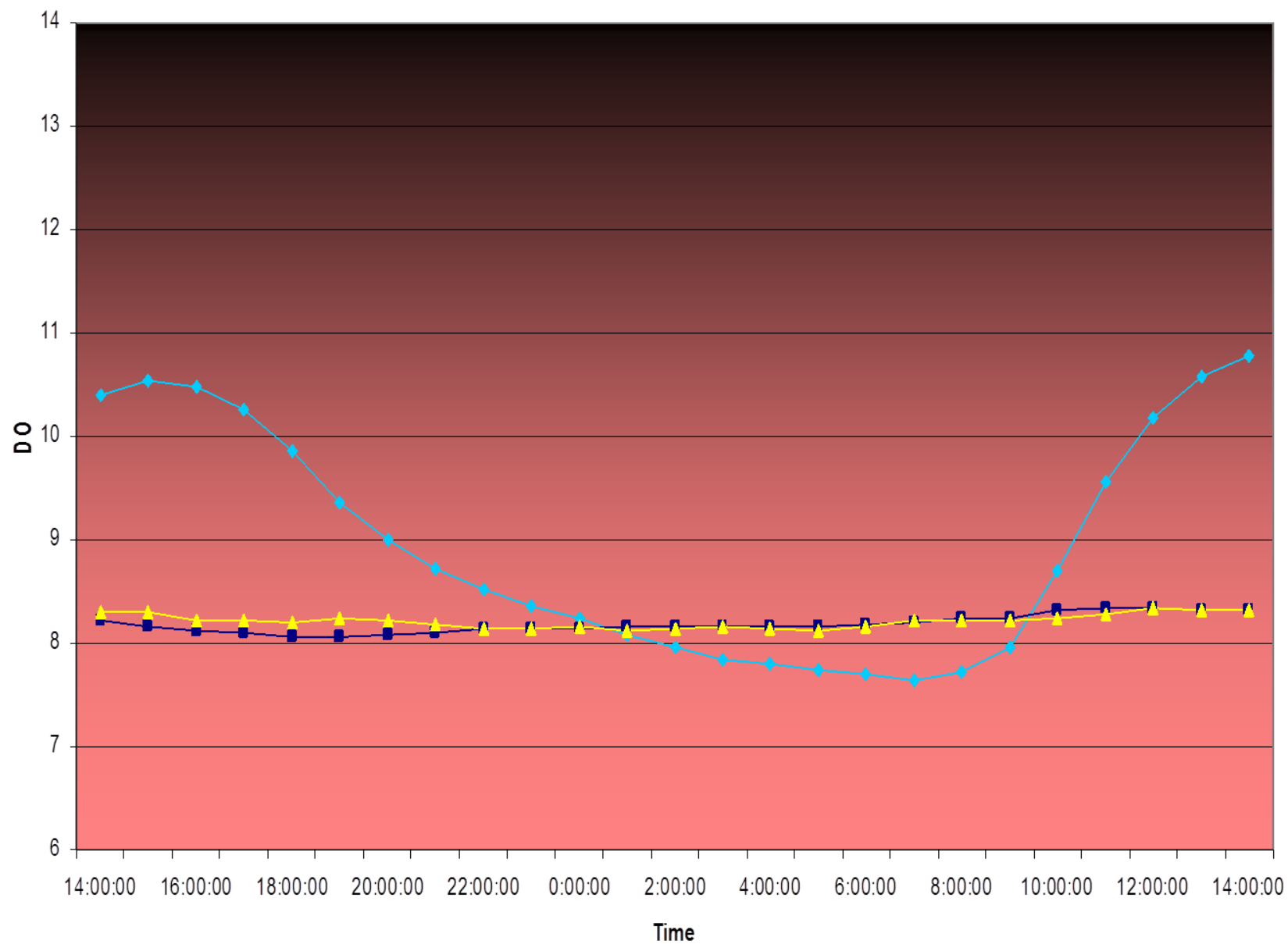
Temperature vs. Time Nemasket River, October 1-2, 2008



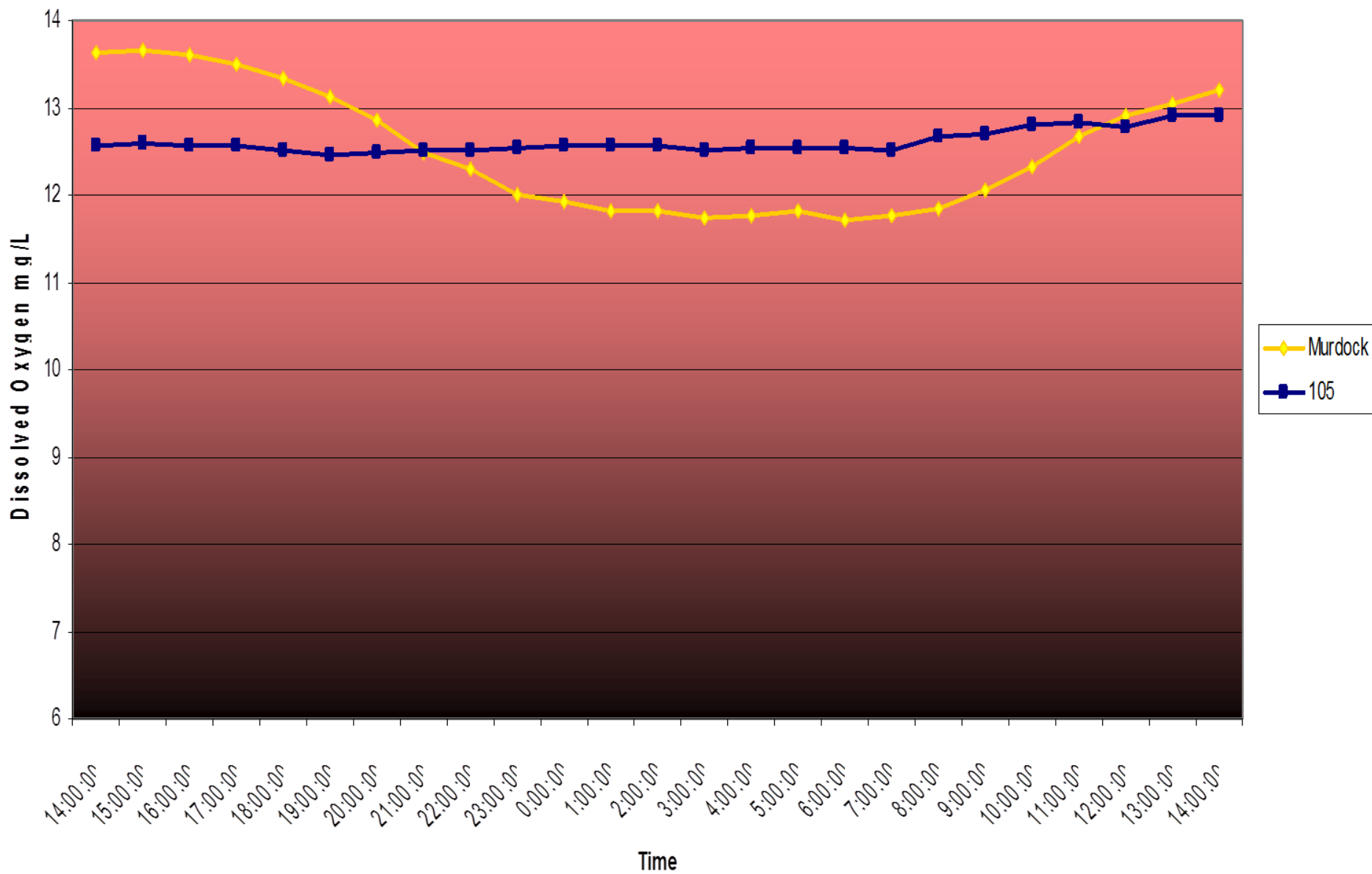
Temperature vs. Time, Nemasket River, March 31-April 1, 2009



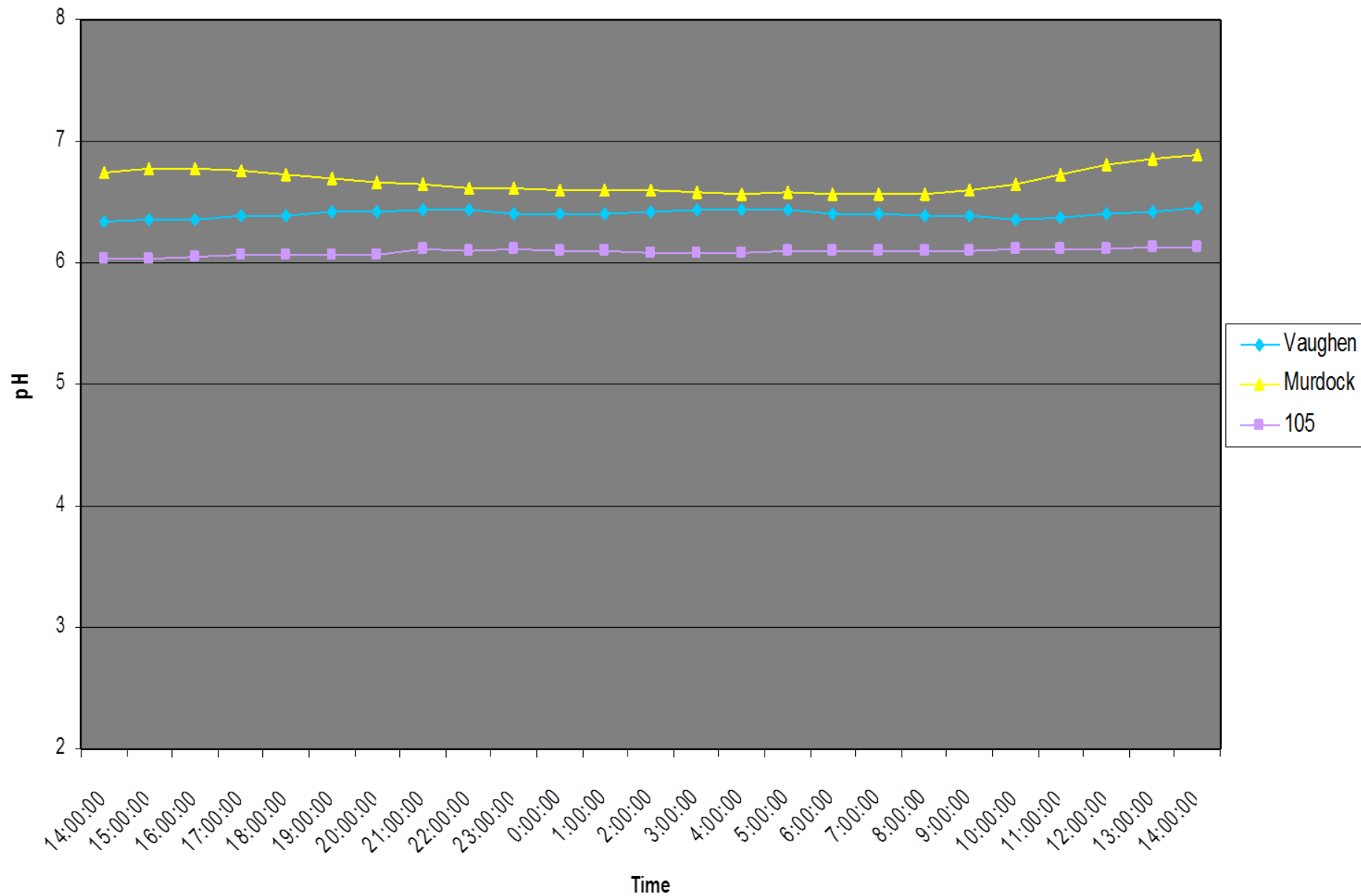
Dissolved Oxygen vs. Time, Nemasket River, October 1-2, 2008



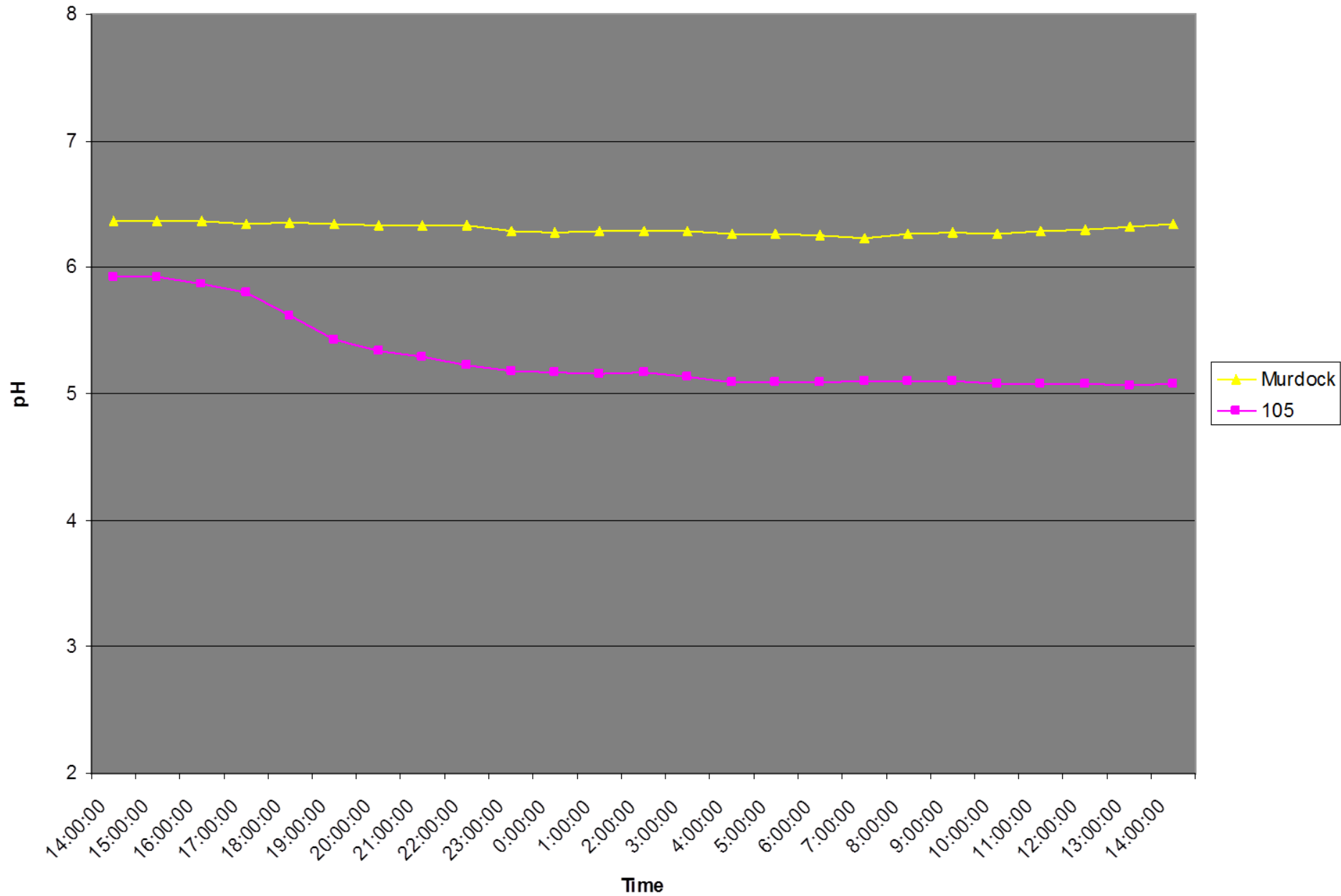
Dissolved Oxygen vs. Time, Nemasket River, March 31-April 1, 2009



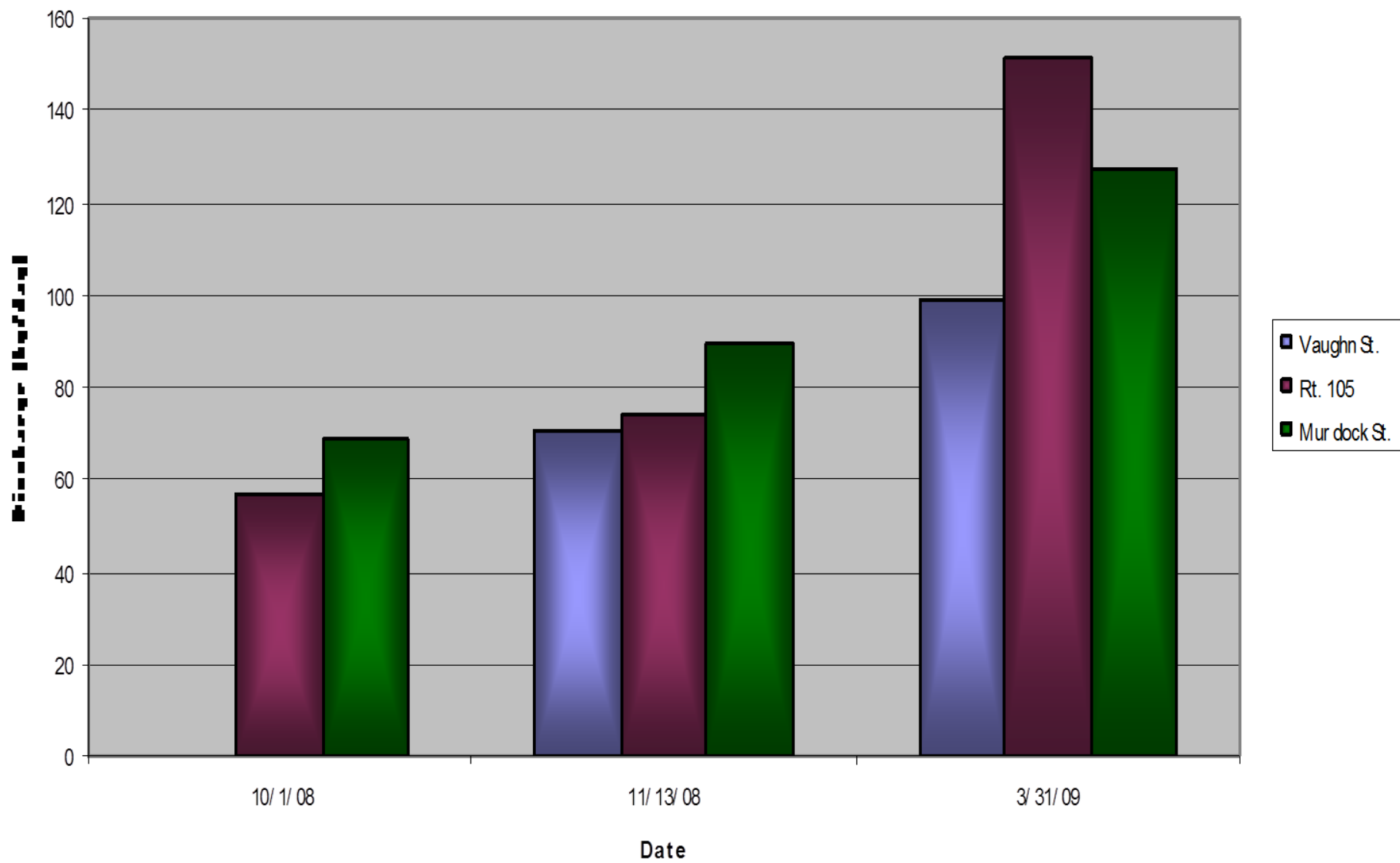
pH vs. Time, Nemakset River, October 1-2, 2008



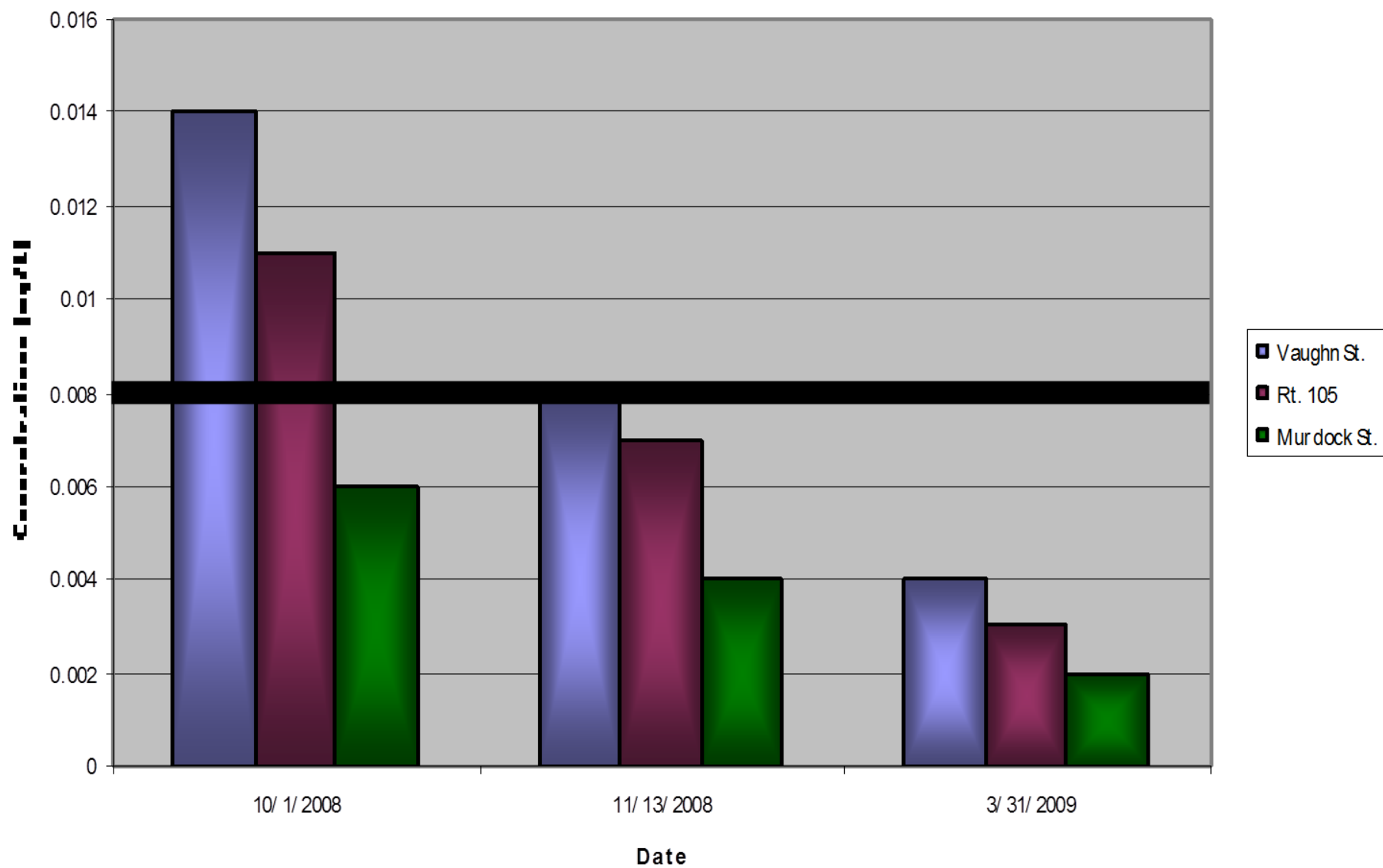
pH vs. Time, Nemasket River, March 31- April 1, 2009



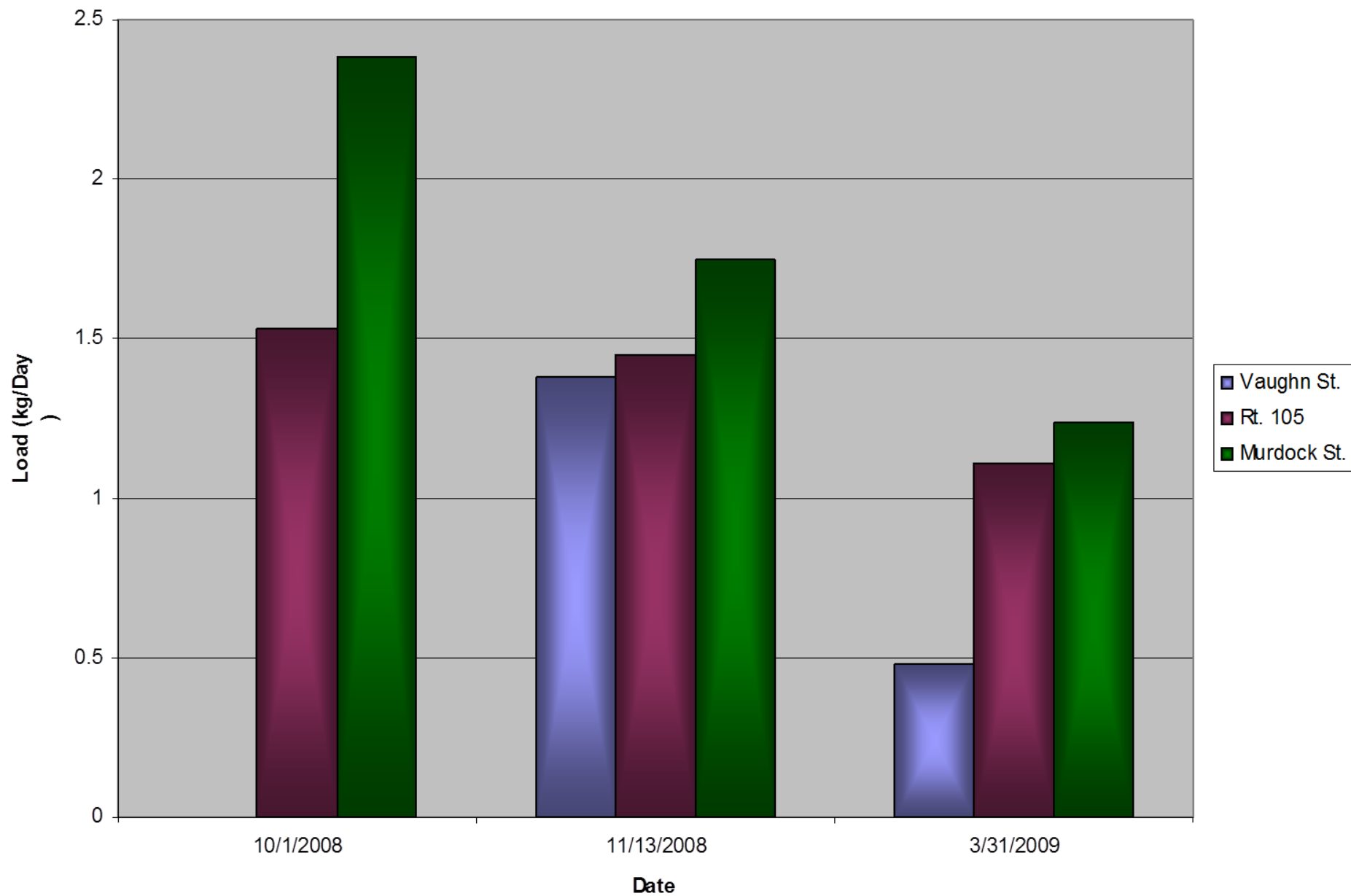
Nemasket River Discharge 2008-2009



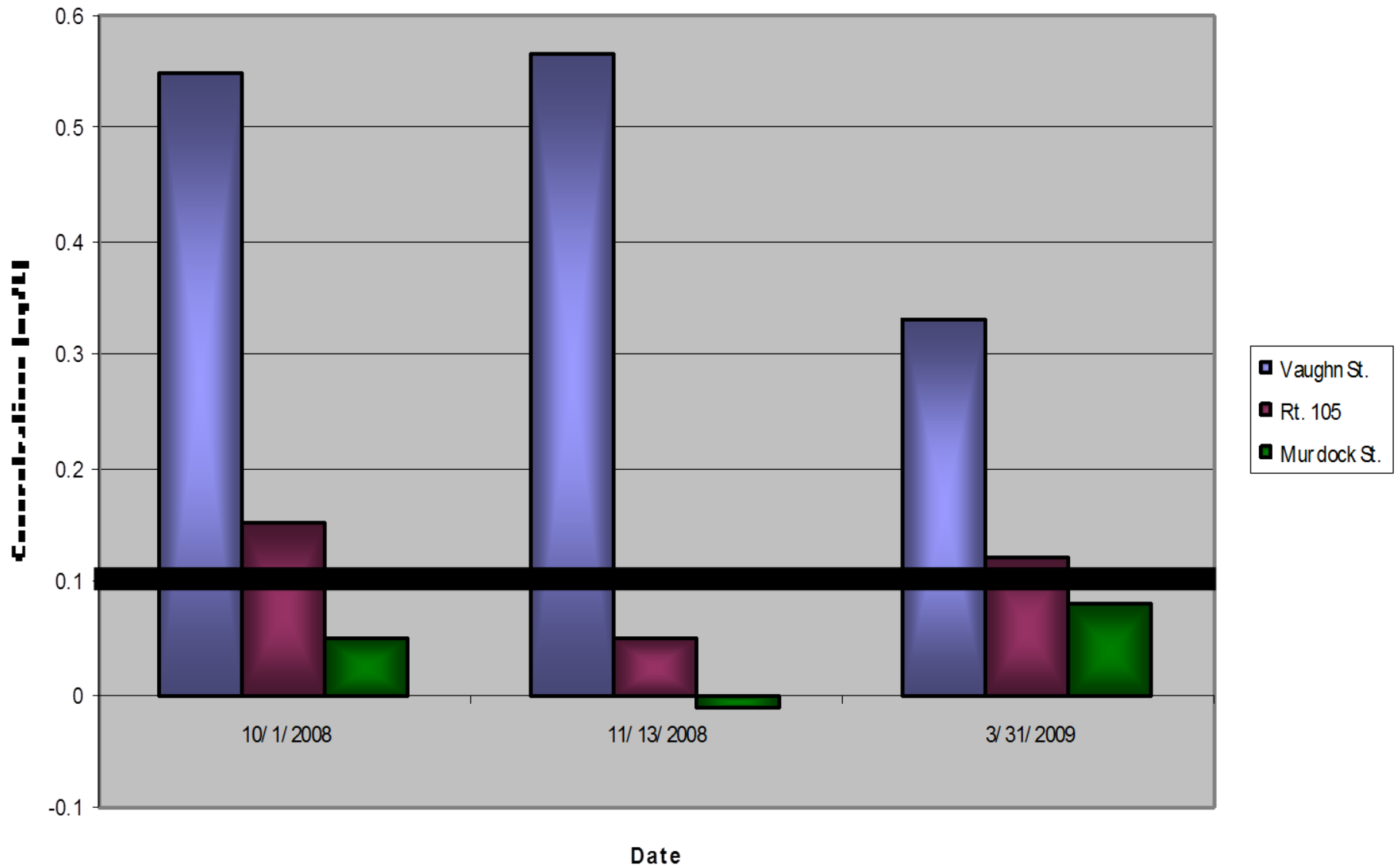
Nemasket River Phosphorus Concentrations (mg/L)



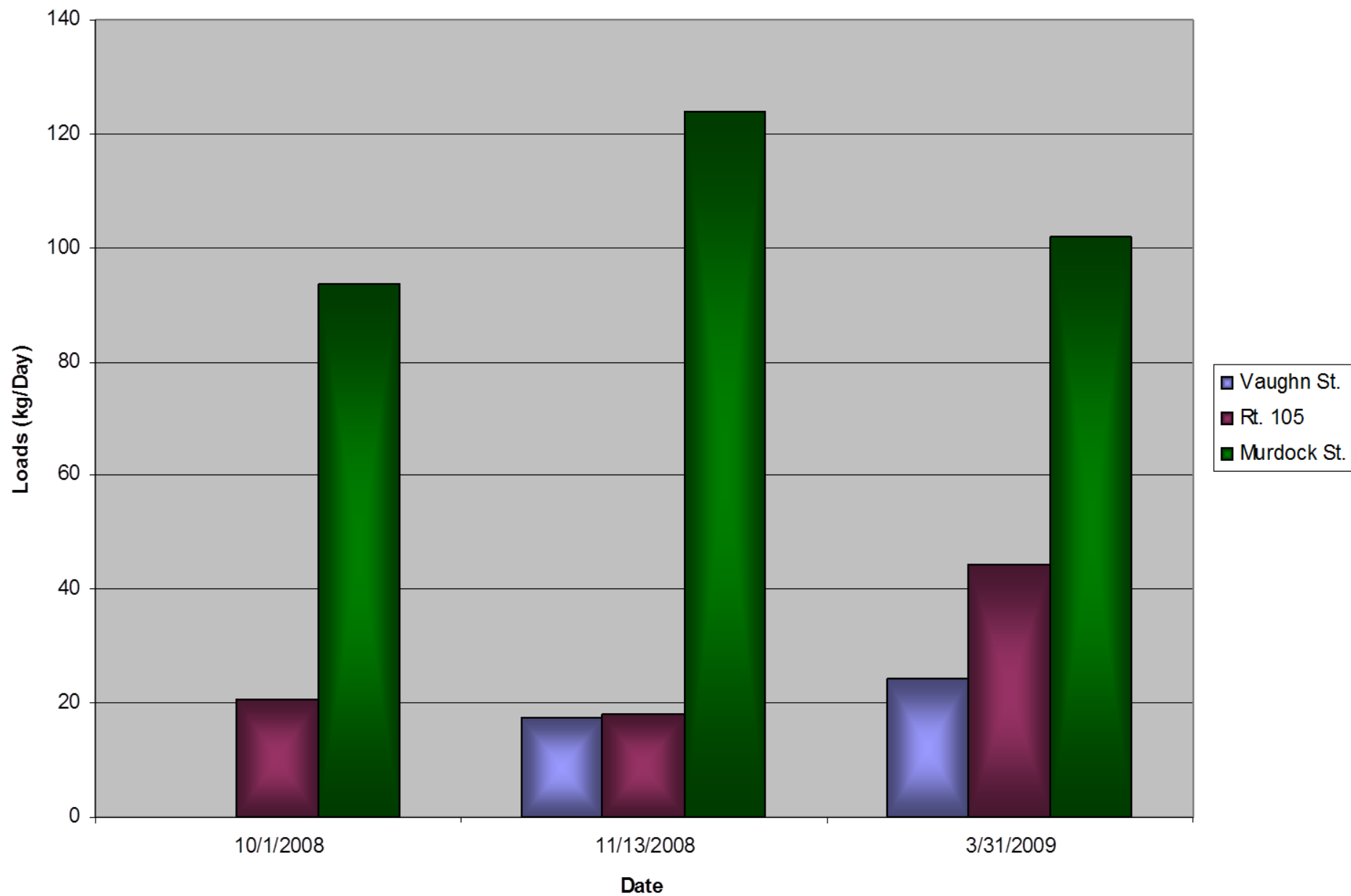
Nemasket River Phosphate Loads (kg/Day)



Nemasket River Nitrogen Concentrations (mg/L)



Nemasket River Nitrate Loads (kg/Day)



Conclusion

We believe that the Middleboro Wastewater Treatment Facility is a factor in the Nemasket River's Water Quality.

- Why?
 - The pH is greater at Murdock in both October and March data.
 - The plant also discharges 0.2 mg/L of phosphorous in the effluent.
 - Nitrate Load is much greater at Murdock site because the Waste Water treatment plant converts ammonia in the effluent to nitrates.
 - The macroinvertebrates were inconclusive because it does not follow historical data

In the Future...

- Water quality of the NMK is affected by the nitrates in the water.
- Mr. Cialo expects the state regulations to change in the near future and is preparing already.



The Nemasket Group



We Would Like to Thank...

- Dr. Kevin Curry (Bridgewater State College)
- Kim McCoy (Bridgewater state College)
- Mr. Cialo (Wastewater Treatment facility)
- Mrs. McNally (Apponequet High School)
- Mr. Lincoln (Apponequet High School)