Ten Mile River Study

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Ten Mile River Study
North Attleboro High School
North Attleboro, MA

By: Mike O’Hear,
Shannon Raymond, Jackie Cieri,
Kaitlyn Menyo, Kyle Pfantz,
and Andrew Cerrone
Purpose

• To start a baseline study for the Ten Mile River
• To test the chemical, biological, and physical components of the river
• To find out if the river is polluted
It begins in Plainville, MA and flows through N. Attleboro, Attleboro, Seekonk, and into Pawtucket and East Providence, RI.
Cedar Street Stream Profile
10/08/03

Average Depth: 0.35 ft.
Width: 8 ft.
Water Street Stream Profile
10/08/03

Average Depth: 3.11 ft

Width: 25 ft
Temperature Comparison
Cedar St. and Water St.
10/9-10/10/03
Dissolved Oxygen Comparison
Cedar St. and Water St.
10/9-10/10/03
Percent DO Comparison Cedar St. and Water St. 10/9-10/10/03

Dissolved Oxygen Percentages Water & Cedar Street 10/09/03-10/11/03

- Water St.
- Cedar St.
pH Comparison
Cedar St. and Water St.
10/9-10/10/03
Comparison of Dissolved Oxygen and Temperature Cedar Street
10/9-10/10/03

Comparison of Dissolved Oxygen and Temperature Cedar St. 10/9-10/10/03

Time (hours)

DO (mg/L)

Temp (degrees C)

DO

Temp

9:00 10:00 11:00 12:00 1:00 2:00 3:00 4:00 5:00 6:00 7:00 8:00 9:00 10:00 11:00 12:00 1:00 2:00 3:00 4:00 5:00 6:00 7:00 8:00 9:00
Comparison of Dissolved Oxygen and Temperature at Water St. 10/9-10/10/03

The graph shows the comparison of Dissolved Oxygen (DO) and Temperature over time at Water St. from 10/9 to 10/10/03. The x-axis represents time in hours, ranging from 9:00 to 9:00, while the y-axis represents DO (mg/L) and Temperature (degrees C). The graph illustrates the fluctuation of both DO and Temperature throughout the day, highlighting the relationship between these two variables.
N-NO$_3$ Comparison
Cedar St. and Water St.
10/9-10/10/03

N-N03 Water Street And Cedar Street

Class

B

Detection Limit .10

TIME

mg/L

Water
Cedar
Soluble Reactive Phosphorous Comparison Cedar St. and Water St. 10/9-10/10/03

Water & Cedar Street 10/09-10/03 Soluble Reactive Phosphorous

<table>
<thead>
<tr>
<th>Times (Hours)</th>
<th>Cedar St.</th>
<th>Water St.</th>
</tr>
</thead>
<tbody>
<tr>
<td>900AM</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>1000AM</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td>1100AM</td>
<td>0.03</td>
<td>0.03</td>
</tr>
<tr>
<td>1200PM</td>
<td>0.04</td>
<td>0.04</td>
</tr>
<tr>
<td>1300PM</td>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>1400PM</td>
<td>0.06</td>
<td>0.06</td>
</tr>
<tr>
<td>1500PM</td>
<td>0.07</td>
<td>0.07</td>
</tr>
<tr>
<td>1600PM</td>
<td>0.08</td>
<td>0.08</td>
</tr>
<tr>
<td>1700PM</td>
<td>0.09</td>
<td>0.09</td>
</tr>
<tr>
<td>1800PM</td>
<td>0.10</td>
<td>0.10</td>
</tr>
<tr>
<td>1900PM</td>
<td>0.11</td>
<td>0.11</td>
</tr>
<tr>
<td>2000PM</td>
<td>0.12</td>
<td>0.12</td>
</tr>
<tr>
<td>2100PM</td>
<td>0.13</td>
<td>0.13</td>
</tr>
<tr>
<td>2200PM</td>
<td>0.14</td>
<td>0.14</td>
</tr>
</tbody>
</table>

Detection Limit .008

*Scale is of .02
Ten Mile River Cedar Street Site
Major Benthic Macro-Invertebrate Group Percentages

- Ephemeroptera
- Trichoptera
- Diptera
- Coleoptera
- Amphipoda
- Hirudinae

MGBI: 4.1
Benthic Macro-Invertebrates
Water St. 10/08/03

Major Group Percentages

- Coleoptera
- Tricoptera
- Diptera
- Oligochaeta
- Ephemeroptera
- Gastropoda
- Isopoda
- Odonata
- Amphipoda
- Hirudinea

MGBI 6.4
Fecal Coliform 10/10/03

- Cedar Street had a dry count of 60 colonies per 100 ml
- Water Street had a dry count of 200 colonies per 100 ml
## Ten Mile River Data Summary

**10/9-10/10/03**

<table>
<thead>
<tr>
<th>Ten Mile River</th>
<th>Temp °C</th>
<th>pH</th>
<th>Dissolved Oxygen</th>
<th>% Dissolved Oxygen</th>
<th>N-NO₃</th>
<th>SRP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cedar St.</strong></td>
<td>Range</td>
<td>Avg</td>
<td>Range</td>
<td>Avg</td>
<td>Range</td>
<td>Avg</td>
</tr>
<tr>
<td>13.45-15.39</td>
<td>14.36</td>
<td>6.71-6.75</td>
<td>6.73</td>
<td>7.83-8.66</td>
<td>8.49</td>
<td>76.5-84.8</td>
</tr>
<tr>
<td><strong>Water St.</strong></td>
<td>Range</td>
<td>Avg</td>
<td>Range</td>
<td>Avg</td>
<td>Range</td>
<td>Avg</td>
</tr>
<tr>
<td>13.33-16.99</td>
<td>15.11</td>
<td>6.47-6.64</td>
<td>6.55</td>
<td>6.49-8.29</td>
<td>7.57</td>
<td>62.9-85.1</td>
</tr>
<tr>
<td><strong>Class B River Values</strong></td>
<td>Range</td>
<td>Avg</td>
<td>Range</td>
<td>Avg</td>
<td>Range</td>
<td>Avg</td>
</tr>
<tr>
<td>2.8-29.40 Degrees</td>
<td>6.5-8.3 Healthy</td>
<td>5.0 Minimum</td>
<td>60% Minimum</td>
<td>1 PPM Healthy</td>
<td>Clean is under 1 PPM</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- **Temp °C:** Temporal range and average temperatures.
- **pH:** Range and average pH values.
- **Dissolved Oxygen:** Range and average dissolved oxygen values.
- **% Dissolved Oxygen:** Range and average percentage of dissolved oxygen values.
- **N-NO₃:** Range and average nitrogen as nitrate values.
- **SRP:** Range and average soluble reactive phosphorus values.

**Guidelines:**
- **Temp °C:** Healthy range is 2.8-29.40 Degrees.
- **pH:** Healthy range is 6.5-8.3, minimum is 5.0.
- **Dissolved Oxygen:** Minimum is 60% of saturation.
- **N-NO₃:** Healthy range is 1 PPM.
- **SRP:** Clean is under 1 PPM.
Possible Reasons for Results

- North Attleboro has many geese problems along with pig, horse, and cow farms which could cause non-point source pollution.
- Runoff from Rt. 1, I-95, I-295, and developed areas flow into the river.
- Rt. 1 is highly urbanized which increases the amount of runoff from impervious surfaces.
- There was evidence of duckweed at the Water Street site which uses nitrogen.
- Testing on Water St. was done at confluence of Bungay River and Ten Mile. This may affect N-NO$_3$ readings.