Abbott Run River Study

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Abbott Run River Study
North Attleboro High School
10/25/06 – 10/26/06

Bridgewater State College
Purpose of Study

• The purpose of our study is to research any physical, chemical or biological changes that may have occurred.

• Abbott Run river is a Class A river and a public water supply source for Pawtucket, RI.

• We checked the pH, dissolved oxygen, the river flow, specific conductivity, temperature, precipitation levels, benthic macro-invertebrates, fecal colony counts, and depth to see if the river met the standard of Massachusetts.
Cushman Rd. Site A
Shady Pines Site B

Site B

Golf Course
Precipitation Graph for North Attleboro
10/1/06 through 10/26/06

October Dates

Precipitation (in.)

24th and 25th (the days we went)
## Average Flow, Total Discharge, Average Stream Width, Average Depth, Bottom Composition

<table>
<thead>
<tr>
<th>Cushman Road</th>
<th>Shady Pines</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Average Flow</strong></td>
<td><strong>Average Flow</strong></td>
</tr>
<tr>
<td>0.36 ft/sec</td>
<td>0.76 ft/sec</td>
</tr>
<tr>
<td><strong>Total Discharge</strong></td>
<td><strong>Total Discharge</strong></td>
</tr>
<tr>
<td>18.77 CFS 531.68 L/s</td>
<td>24.92 CFS 705.67 L/s</td>
</tr>
<tr>
<td><strong>Average Width</strong></td>
<td><strong>Average Width</strong></td>
</tr>
<tr>
<td>38 feet</td>
<td>22 feet</td>
</tr>
<tr>
<td><strong>Average Depth</strong></td>
<td><strong>Average Depth</strong></td>
</tr>
<tr>
<td>1.47 feet</td>
<td>1.59 feet</td>
</tr>
<tr>
<td><strong>Bottom Composition</strong></td>
<td><strong>Bottom Composition</strong></td>
</tr>
<tr>
<td>The bottom is solid and rocky</td>
<td>The bottom is sandy</td>
</tr>
</tbody>
</table>
Shady Pines, 10/25/06

Site B

Golf Course
Hunts Bridge Road - Site B – Upstream
10/31/05
pH Comparison, Cushman Road, Shady Pines, Abbott Run, 10/25/06 through 10/26/06

Class A Water Standards: pH between 6.5 and 8.3 standard units
pH Comparison, Abbott Run, 05-06

Class A Water Standards: pH between 6.5 and 8.3 standard units
Dissolved Oxygen Comparison, Cushman Road, Shady Pines, Abbott Run, 10/25/06 through 10/26/06

Class A Water Standards: Dissolved Oxygen is not less than 6 mg/l
Class A Water Standards: Dissolved Oxygen is not less than 6 mg/l
Temperature Comparison, Cushman Road, Shady Pines, Abbott Run, 10/25/06 through 10/26/06

Class A Water Standards: Temperature
- Shall not exceed 28.3°C
Temperature Comparison, Abbott Run, 05-06

Class A Water Standards: Temperature
- Shall not exceed 28.3°C
% Dissolved Oxygen Comparison, Cushman Road and Shady Pines, Abbott Run, 10-25-06 through 10-26-06

Class A water standards: % dissolved oxygen = Levels shall be maintained no lower than 75% of saturation due to discharge.
% DO Comparison, Abbott Run, 05-06

Class A water standards: \(\%\) dissolved oxygen = Levels shall be maintained no lower than 75\% of saturation due to discharge.
Temperature and % Dissolved Oxygen Comparison, Cushman Road, Abbott Run, 10/25/06

Class A Standards:
- DO no less than 75%
- Cannot exceed 28.3 °C
Temperature and % Dissolved Oxygen Comparison, Shady Pines, Abbott Run, 10/25/06

Class A Standards
- DO no less than 75%
- Cannot exceed 28.3 C
Specific Conductivity Comparison, Cushman Road and Shady Pines, Abbott Run, 10/25-06 through 10/26/06

“…natural conductivity level without human influence would be around 0.05mS/cm or less. The levels in the 0.3 – 0.4mS/cm range indicate likely contamination from salt and or wastewater.” – Doug Heath, EPA
“…natural conductivity level without human influence would be around 0.05mS/cm or less. The levels in the 0.3 – 0.4mS/cm range indicate likely contamination from salt and or wastewater.”

–Doug Heath, EPA
# Cushman Road, Site A, Abbott Run, Averages and Ranges (10/25/06)

<table>
<thead>
<tr>
<th></th>
<th>Averages</th>
<th>Ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature ©</td>
<td>8.92</td>
<td>9.52 – 7.86</td>
</tr>
<tr>
<td>pH Units</td>
<td>6.77</td>
<td>6.86 – 6.73</td>
</tr>
<tr>
<td>DO mg/l</td>
<td>10.21</td>
<td>10.63 – 9.94</td>
</tr>
<tr>
<td>DO% Sat.</td>
<td>87.30</td>
<td>91.3 – 85.6</td>
</tr>
<tr>
<td>Sp. Cond. mS/cm</td>
<td>0.13</td>
<td>0.1288 – 0.1281</td>
</tr>
</tbody>
</table>
# Shady Pines, Site B, Abbott Run

## Averages and Ranges (10/25/06)

<table>
<thead>
<tr>
<th>Metric</th>
<th>Averages</th>
<th>Ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature ©</td>
<td>9.04</td>
<td>10.03 – 7.94</td>
</tr>
<tr>
<td>pH Units</td>
<td>9.12</td>
<td>9.41 – 9.00</td>
</tr>
<tr>
<td>DO mg/l</td>
<td>9.74</td>
<td>10.02 – 9.56</td>
</tr>
<tr>
<td>DO % Sat.</td>
<td>83.50</td>
<td>85.7 – 81.4</td>
</tr>
<tr>
<td>Sp. Cond. mS/cm</td>
<td>0.13</td>
<td>0.1280 – 0.1274</td>
</tr>
</tbody>
</table>
# Fecal Colony Counts

**Abbott Run River**

**Site A Cushman Rd. 10/25/06**

<table>
<thead>
<tr>
<th>ml Filtered</th>
<th>Colonies</th>
</tr>
</thead>
<tbody>
<tr>
<td>100ml</td>
<td>14</td>
</tr>
<tr>
<td>100ml</td>
<td>9</td>
</tr>
<tr>
<td>10ml</td>
<td>0</td>
</tr>
<tr>
<td>10ml</td>
<td>1</td>
</tr>
</tbody>
</table>

Class A standard say Fecal Levels should not Exceed 200 Colonies Per 100ml

**Site B Shady Pines 10/25/06**

<table>
<thead>
<tr>
<th>ml Filtered</th>
<th>Colonies</th>
</tr>
</thead>
<tbody>
<tr>
<td>100ml</td>
<td>11</td>
</tr>
<tr>
<td>100ml</td>
<td>10</td>
</tr>
<tr>
<td>10ml</td>
<td>2</td>
</tr>
<tr>
<td>10ml</td>
<td>0</td>
</tr>
</tbody>
</table>
Benthic Macro-Invertebrate
Top Five Percent, Cushman Rd, Site A, Abbott Run, 10/25/06

- Trichoptera Hydropsychidae 53%
- Trichoptera Polycentropodidae 19%
- Ephemeroptera Baetidae 7.6%
- Diptera Simuliidae 5.5%
- Trichoptera Philopotamidae 1.8%

FBI = 3.7
Very Good
Cushman Rd, Site A, Abbott Run, 10/31/05
Benthic Macro-Invertebrates
Top Five Percent

FBI=3.2
Excellent

- Trichoptera Hydropsychidae 51%
- Ephemeroptera Heptageniidae 21%
- Oligochaeta 17%
- Diptera Chironomidae 6%
- Diptera Simuliidae 5%
Benthic Macro-Invertebrates
Top Five Percent,
Shady Pines, Site B 10/25/06

FBI= 3.4
Excellent

- Trichoptera
  Hydropsychidae 52%
- Ephemeroptera
  Heptageniidae 17.5%
- Trichoptera
  Polycentropodidae 5.5%
- Coleoptera
  Elmidae 5.5%
- Plecoptera
  Taeniopterygidae 4.7%
Hunts Bridge, Site B, 10/31/05
Benthic Macro-Invertebrates
Top Five Percent

- Trichoptera Hydropsychidae 29%
- Oligochaeta 28%
- Coleoptera Elmidae 20%
- Ephemeroptera Heptageniidae (mayflies) 15%
- Plecoptera Perlodidae 4%
- Trichoptera Brachycentridae 4%

FBI = 2.9
Excellent
### EPT Richness Comparison 10/25/06

<table>
<thead>
<tr>
<th>Cushman Road</th>
<th>#Families</th>
<th>Shady Pines</th>
<th>#Families</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ephemeroptera</td>
<td>4</td>
<td>Ephemeroptera</td>
<td>4</td>
</tr>
<tr>
<td>Plecoptera</td>
<td>4</td>
<td>Plecoptera</td>
<td>3</td>
</tr>
<tr>
<td>Trichoptera</td>
<td>5</td>
<td>Trichoptera</td>
<td>4</td>
</tr>
<tr>
<td>Totals</td>
<td>13</td>
<td>Totals</td>
<td>11</td>
</tr>
</tbody>
</table>
Summary

• Overall, Abbott Run met the Class A Standards.

• Site A and Site B had about the same number of net-spinning caddisflies. This is a significant change for site B when compared to the 2006 data. This type of caddisfly can tolerate a higher level of organic pollution.

• Family Biotic Index (FBI) values increased at both sites. Site A went from excellent to very good water quality and Site B is still in the excellent range.

• For site B, the pH was higher which we believe had to do with pouring of basic concrete abutments for the Hunts Bridge throughout September.
The End

By:

**PowerPoint Coordinator