## BENTHIC MACROINVERTEBRATES AND HABITAT ASSESSMENTS

A list of the macroinvertebrate biomonitoring station locations for the 1997 Ten Mile River Basin survey is provided in Table B4. Sampling locations are shown in Figure B2. The taxonomic list of macroinvertebrates collected at each sampling station is provided in Table B5. Included in this list are total organism counts, and the functional feeding group (FG) and tolerance value (TV) of each taxon.

Table B4. List of macroinvertebrate biomonitoring station locations for the 1997 Ten Mile River Basin biomonitoring survey, including station number, station description, survey date, and sampling protocol used.

| STATION | SITE DESCRIPTION | SAMPLING DATE | SAMPLING METHOD |
|---|---|---|---|
| TM01 | Ten Mile River, downstream from Fuller St., Plainville, MA | 9 Sept. 1997 | RBPIII |
| TM02 | Ten Mile River, downstream from West Bacon St., Plainville, MA | 9 Sept. 1997 | RBPIII |
| TM04 | Ten Mile River, upstream from Route 1, N. Attleboro, MA | 9 Sept. 1997 | RBPIII |
| TM06 | Ten Mile River, upstream from N. Attleborough WWTP, Attleboro | 9 Sept. 1997 | RBPIII |
| TM06a | Ten Mile River, downstream from N. Attleborough WWTP, Attleboro | 9 Sept. 1997 | RBPIII |
| TM11 | Ten Mile River, downstream from Tiffany St., Attleboro, MA | 10 Sept. 1997 | RBPIII |
| TM14 | Ten Mile River, downstream from Central Av., Seekonk, MA | 17 Sept. 1997 | RBPIII |
| SM00 | Sevenmile River, upstream from Draper Av., N. Attleborough, MA | 10 Sept. 1997 | RBPIII |
| SW01M | Speedway (Thatcher) Brook, downstream from Dexter St., Attleboro, MA | 17 Sept. 1997 | RBPIII |
| FM01 | Fourmile Brook, between Greenfield and West St., Attleboro, MA | 10 Sept. 1997 | Qualitative |

Table B5. Species-level taxa list and counts, functional feeding groups (FG), and tolerance values (TV) for macroinvertebrates collected from stream sites in the Ten Mile River Basin between 9 and 17 September 1997. Sampling stations were in: Sevenmile River (SM00); Speedway Brook (SW01M); Ten Mile River (TM01, TM02, TM04, TM06, TM06a, TM11, TM14); and Fourmile Brook (FM01).

| *TAXON* | FG[1] | TV[2] | SM00 | SW01M | TM01 | TM02 | TM04 | TM06 | TM06A | TM11 | TM14 | FM01[3] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Hydrobiidae* | SC | 8 | 5 | | | | | | | | | |
| *Lymnaeidae* | GC | 6 | 1 | | | | | | | | | |
| *Physidae* | GC | 8 | 1 | | 2 | | | | 1 | | | |
| *Planorbidae* | SC | 6 | 3 | | | | | | | | | |
| *Pisidiidae* | FC | 6 | 23 | 2 | 4 | | | | 10 | 22 | | |
| *Lumbricina* | GC | 8 | | | 1 | 2 | | 1 | | | | x |
| *Tubificidae (w/o capilliform chaetae)* | GC | 10 | 2 | 2 | | | 33 | | 9 | | | |
| *Tubificidae (with capilliform chaetae)* | GC | 10 | 1 | 2 | | | | | | | | |
| *Aulodrilus pluriseta* | GC | 8 | 3 | | | | | | | | | |
| *Naididae* | GC | 9 | | | | | | | | | | x |
| *Nais behningi* | GC | 6 | | | | | | | | | 1 | |
| *Nais communis* | GC | 8 | 1 | | 13 | | | | | | | |
| *Nais variabilis* | GC | 10 | 1 | | | | | | | | | |
| *Lumbriculus sp.* | GC | 8 | 10 | | 5 | 1 | | 6 | 1 | | | |
| *Erpobdellidae* | PR | 8 | | | | | | | 1 | | | |
| *Caecidotea communis* | GC | 8 | 1 | | | | | | 45 | | | x |
| *Gammarus sp.* | GC | 6 | 6 | | | 40 | 23 | | | | | x |
| *Hyalella azteca* | GC | 8 | 22 | | 2 | | | | | 1 | | |
| *Hydracarina* | PR | 6 | 1 | | | | | | | | | |
| *Baetidae* | GC | 4 | | | | | | | | | 1 | |
| *Baetis sp.* | GC | 6 | | | | | | 6 | | | 2 | |
| *Heptageniidae* | SC | 4 | | | | | | | | | 2 | |
| *Stenonema sp.* | SC | 3 | | | | | | 1 | | | | |
| *Eurylophella sp.* | GC | 2 | | | 1 | | | | | | | |
| *Leptophlebiidae* | GC | 2 | | | | | | | | | 1 | |
| *Boyeria sp.* | PR | 2 | | | | | | | | | | x |
| *Calopterygidae* | PR | 5 | | | | | | 1 | | | | |
| *Coenagrionidae* | PR | 9 | | | | 1 | | | | | | |
| *Leuctridae* | SH | 1 | | | | | 1 | | | | | |
| *Sialis sp.* | PR | 8 | | | | | | | | | | x |
| *Corydalus sp.* | PR | 6 | | | | | | | | 1 | | |
| *Nigronia sp.* | PR | 6 | | | | 1 | | 2 | | | | x |
| *Trichoptera* | GC | 5 | | | 1 | | | | | | | |
| *Chimarra sp.* | FC | 3 | 1 | | | 10 | | 11 | | 16 | 18 | x |

[1]Functional Feeding Group (FG) lists the primary feeding habit of each species and follows the abbreviations: SH-Shredder; GC-Gathering Collector; FC-Filtering Collector; SC-Scraper; PR-Predator.
[2]Tolerance Value (TV) is an assigned value used in the calculation of the biotic index. Tolerance values range from 0 for organisms very intolerant of organic pollution to 10 for organisms very tolerant.
[3]Sampling at this station was qualitative only. An "x" indicates taxon presence.

Table B5 (continued). Species-level taxa list and counts, functional feeding groups (FG), and tolerance values (TV) for macroinvertebrates collected from stream sites in the Ten Mile River Basin between 9 and 17 September 1997. Sampling stations were in: Sevenmile River (SM00); Speedway Brook (SW01M); Ten Mile River (TM01, TM02, TM04, TM06, TM06a, TM11, TM14); and Fourmile Brook (FM01).

| *TAXON* | FG[1] | TV[2] | SM00 | SW01 M | TM01 | TM02 | TM04 | TM06 | TM06A | TM11 | TM14 | FM01[3] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Lype sp.* | SC | 3 | 1 | | | | | | | | | |
| *Hydropsychidae* | FC | 4 | 1 | 6 | 2 | 1 | 2 | 2 | 3 | | 4 | |
| *Cheumatopsyche sp.* | FC | 7 | 1 | 1 | 2 | 3 | 14 | 13 | 4 | 2 | 15 | x |
| *Hydropsyche betteni gr.* | FC | 8 | 1 | 55 | 9 | 10 | 1 | 18 | 3 | 24 | 33 | x |
| *Hydropsyche morosa gr.* | FC | 6 | | | | | | | | | 2 | |
| *Limnephilidae* | SH | 4 | | | | | | | | | | x |
| *Ceraclea sp.* | GC | 3 | | | | | | | | 5 | 1 | |
| *Oecetis sp.* | PR | 6 | | 1 | | | | | | | | |
| *Triaenodes sp.* | SH | 6 | | | | | | | | | | x |
| *Setodes sp.* | GC | 1 | 1 | | | | | | | | | |
| *Oulimnius sp.* | SC | 2 | | | 5 | | | | | | | |
| *Oulimnius latiusculus* | SC | 2 | | | 3 | | | | | | | |
| *Promoresia sp.* | SC | 2 | 2 | | | | | | | | | |
| *Stenelmis sp.* | SC | 5 | | | 5 | | | 11 | 10 | 23 | 14 | |
| *Stenelmis crenata* | SC | 5 | | | | | | | | | 2 | |
| *Antocha sp.* | GC | 5 | | | | | 2 | | | | 1 | |
| *Tipula sp.* | SH | 8 | | | | | | | 1 | | | |
| *Simulium sp.* | FC | 4 | 1 | | 4 | 15 | | 11 | | | 2 | |
| *Tanypodinae* | PR | 7 | | | | | | | | 2 | | |
| *Conchapelopia sp.* | PR | 9 | | 1 | | | | 3 | | 1 | 2 | |
| *Krenopelopia sp.* | PR | 7 | | | 1 | | | | | | | |
| *Larsia sp.* | PR | 7 | | | | | 1 | | | | | |
| *Natarsia sp.* | PR | 10 | | 1 | | | | | | | | |
| *Thienemannimyia gr.* | PR | 6 | | 12 | 1 | | | | | | | |
| *Thienemannimyia sp.* | PR | 6 | | | | | 1 | | | | | |
| *Zavrelimyia sp.* | PR | 8 | 1 | | | | | | | | | |
| *Diamesinae* | GC | 2 | | | | | | | 1 | | | |
| *Diamesa sp.* | GC | 8 | | | 1 | | 1 | | | | | |
| *Corynoneura sp.* | GC | 6 | | | 1 | | | 1 | | | | |
| *Cricotopus sp.* | SH | 7 | | 1 | | | 4 | | | | | |
| *Cricotopus bicinctus* | SH | 7 | | 3 | | 1 | 1 | | | | | |
| *Cricotopus tremulus* | SH | 7 | | | | 1 | | | | | | |
| *Diplocladius sp.* | GC | 8 | | | 1 | 1 | | | | | | |
| *Metriocnemus sp.* | GC | 5 | 1 | | | | | | | | | |
| *Parametriocnemus sp.* | GC | 4 | | | | | 1 | 5 | 1 | | | |
| *Rheocricotopus sp.* | GC | 6 | | 2 | | | | | | | | |

[1]Functional Feeding Group (FG) lists the primary feeding habit of each species and follows the abbreviations: SH-Shredder; GC-Gathering Collector; FC-Filtering Collector; SC-Scraper; PR-Predator.
[2]Tolerance Value (TV) is an assigned value used in the calculation of the biotic index. Tolerance values range from 0 for organisms very intolerant of organic pollution to 10 for organisms very tolerant.
[3]Sampling at this station was qualitative only. An "x" indicates taxon presence.

Table B5 (continued). Species-level taxa list and counts, functional feeding groups (FG), and tolerance values (TV) for macroinvertebrates collected from stream sites in the Ten Mile River Basin between 9 and 17 September 1997. Sampling stations were in: Sevenmile River (SM00); Speedway Brook (SW01M); Ten Mile River (TM01, TM02, TM04, TM06, TM06a, TM11, TM14); and Fourmile Brook (FM01).

| *TAXON* | FG[1] | TV[2] | SM00 | SW01 M | TM01 | TM02 | TM04 | TM06 | TM06A | TM11 | TM14 | FM01[3] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Symposiocladius lignicola* | SH | 5 | 1 | | | | | | | | | |
| *Tvetenia bavarica gr.* | GC | 5 | | | | 2 | | 2 | | | | |
| *Tvetenia vitracies gr.* | GC | 5 | | | | | | | | | 2 | |
| *Chironomus sp.* | GC | 10 | | 1 | | | | | | | | |
| *Microtendipes pedellus gr.* | FC | 6 | | | | | | 6 | | | | |
| *Phaenopsectra sp.* | SC | 7 | 1 | | | | 1 | | | | | |
| *Polypedilum sp.* | SH | 6 | 1 | | | | | 1 | | | | |
| *Polypedilum convictum* | SH | 5 | | | 3 | | | 2 | | 8 | | |
| *Polypedilum fallax gr.* | SH | 6 | | 4 | | | | | | | | |
| *Polypedilum illinoense* | SH | 9 | 2 | | | | | | 2 | | | |
| *Polypedilum scalaenum* | SH | 9 | | 1 | | | 1 | | | | | |
| *Stictochironomus sp.* | GC | 7 | 1 | | | | | | | | | |
| *Paratanytarsus sp.* | FC | 8 | | | | | 1 | | | | | |
| *Rheotanytarsus distinctissimus gr.* | FC | 6 | | | 6 | | | | | | | |
| *Rheotanytarsus exiguus gr.* | FC | 6 | | | 13 | 1 | 1 | | 2 | | | |
| *Tanytarsus sp.* | FC | 7 | 1 | 1 | | | | 3 | | 1 | | |
| *Tanytarsus/Micropsectra sp.* | GC | 4 | | | | | 1 | 1 | | | | |
| *Empididae* | PR | 6 | | | | | | | | | | x |
| *Hemerodromia sp.* | PR | 6 | | | 13 | 3 | 1 | | 1 | | 2 | |
| *TOTAL* | | | 98 | 96 | 99 | 93 | 91 | 107 | 95 | 106 | 105 | |

[1]Functional Feeding Group (FG) lists the primary feeding habit of each species and follows the abbreviations: SH-Shredder; GC-Gathering Collector; FC-Filtering Collector; SC-Scraper; PR-Predator.
[2]Tolerance Value (TV) is an assigned value used in the calculation of the biotic index. Tolerance values range from 0 for organisms very intolerant of organic pollution to 10 for organisms very tolerant.
[3]Sampling at this station was qualitative only. An "x" indicates taxon presence.

Summary tables of the RBP III data analyses, including biological metric calculations, metric scores and impairment scores are included in Tables B6 through B8. Habitat assessment scores for each station are also included in the data analysis summary tables. Table B9 provides a more detailed summary of the habitat evaluations for each biomonitoring station. Scores for individual habitat parameters are included as well as the total habitat assessment score. Results of these analyses are discussed within the segment summaries in the body of this report.

Table B6. Summary of RBP III data analysis for macroinvertebrate communities sampled at 9 stations in the Ten Mile River Basin between 9 and 17 September 1997. Seven biological metrics were calculated and scored (in italics) for taxa collected at each station. Scores were then totaled and compared to the regional reference station (SM00). The percent comparability to the reference station yields a final impairment score for each study site.

| Station # | SM00 | | SW01M | | TM01 | | TM02 | | TM04 | | TM06 | | TM06A | | TM11 | | TM14 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stream | Sevenmile River | | Speedway Brook | | Ten Mile River | | Ten Mile River | | Ten Mile River | | Ten Mile River | | Ten Mile River | | Ten Mile River | | Ten Mile River | |
| Habitat Score | 165 | | 111 | | 130 | | 130 | | 137 | | 144 | | 128 | | 136 | | 155 | |
| Taxa Richness | 29 | *6* | 15 | *2* | 21 | *4* | 15 | *2* | 17 | *2* | 18 | *4* | 15 | *2* | 11 | *0* | 15 | *2* |
| Biotic Index | 6.99 | *6* | 7.40 | *6* | 6.14 | *6* | 5.70 | *6* | 7.62 | *6* | 5.86 | *6* | 7.35 | *6* | 5.66 | *6* | 5.90 | *6* |
| EPT Index | 5 | *6* | 3 | *0* | 3 | *0* | 3 | *0* | 3 | *0* | 5 | *6* | 2 | *0* | 4 | *4* | 8 | *6* |
| EPT/Chironomidae | 0.67 | *6* | 2.33 | *6* | 0.56 | *6* | 4.00 | *6* | 1.29 | *6* | 2.13 | *6* | 1.67 | *6* | 3.92 | *6* | 19.75 | *6* |
| Scrapers/Filterers | 0.41 | *6* | 0.00 | *0* | 0.33 | *6* | 0.00 | *0* | 0.05 | *0* | 0.19 | *4* | 0.45 | *6* | 0.35 | *6* | 0.24 | *6* |
| % Dominant Taxon | 23% | *4* | 57% | *0* | 13% | *6* | 43% | *0* | 36% | *2* | 17% | *6* | 47% | *0* | 23% | *4* | 31% | *2* |
| Community Similarity | 100% | *6* | 9% | *0* | 17% | *0* | 12% | *0* | 12% | *0* | 7% | *0* | 10% | *0* | 4% | *0* | 5% | *0* |
| Total Metric Score | | *40* | | *14* | | 28 | | *14* | | *16* | | 32 | | *20* | | *26* | | *28* |
| % Comparability To Reference Station | | | 35% | | 70% | | 35% | | 40% | | 80% | | 50% | | 65% | | 70% | |
| Biological Condition-Degree Impairment | **REFERENCE STATION (regional)** | | **MODERATE** | | **SLIGHT** | | **MODERATE** | | **MODERATE** | | **NON/SLIGHT** | | **MODERATE** | | **SLIGHT** | | **SLIGHT** | |

Table B7. Summary of RBP III data analysis for macroinvertebrate communities sampled at 9 stations in the Ten Mile River Basin between 9 and 17 September 1997. Seven biological metrics were calculated and scored (in italics) for taxa collected at each station. Scores were then totaled and compared to the regional reference station (TM01). The percent comparability to the reference station yields a final impairment score for each study site.

| Station # | TM01 | | SM00 | | SW01M | | TM02 | | TM04 | | TM06 | | TM06A | | TM11 | | TM14 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stream | Ten Mile River | | Sevenmile River | | Speedway Brook | | Ten Mile River | | Ten Mile River | | Ten Mile River | | Ten Mile River | | Ten Mile River | | Ten Mile River | |
| Habitat Score | 130 | | 165 | | 111 | | 130 | | 137 | | 144 | | 128 | | 136 | | 155 | |
| Taxa Richness | 21 | *6* | 29 | *6* | 15 | *4* | 15 | *4* | 17 | *6* | 18 | *6* | 15 | *4* | 11 | *2* | 15 | *4* |
| Biotic Index | 6.14 | *6* | 6.99 | *6* | 7.40 | *4* | 5.70 | *6* | 7.62 | *4* | 5.86 | *6* | 7.35 | *4* | 5.66 | *6* | 5.90 | *6* |
| EPT Index | 3 | *6* | 5 | *6* | 3 | *6* | 3 | *6* | 3 | *6* | 5 | *6* | 2 | *0* | 4 | *6* | 8 | *6* |
| EPT/Chironomidae | 0.56 | *6* | 0.67 | *6* | 2.33 | *6* | 4.00 | *6* | 1.29 | *6* | 2.13 | *6* | 1.67 | *6* | 3.92 | *6* | 19.75 | *6* |
| Scrapers/Filterers | 0.33 | *6* | 0.41 | *6* | 0.00 | *0* | 0.00 | *0* | 0.05 | *0* | 0.19 | *6* | 0.45 | *6* | 0.35 | *6* | 0.24 | *6* |
| % Dominant Taxon | 13% | *6* | 23% | *4* | 57% | *0* | 43% | *0* | 36% | *2* | 17% | *6* | 47% | *0* | 23% | *4* | 31% | *2* |
| Community Similarity | 100% | *6* | 17% | *0* | 15% | *0* | 23% | *0* | 8% | *0* | 31% | *2* | 21% | *0* | 24% | *0* | 22% | *0* |
| Total Metric Score | | *42* | | *34* | | *20* | | *22* | | *24* | | *38* | | *20* | | *30* | | *30* |
| % Comparability To Reference Station | | | 81% | | 48% | | 52% | | 57% | | 90% | | 48% | | 71% | | 71% | |
| Biological Condition - Degree Impairment | **REFERENCE STATION (regional)** | | **NON/SLIGHT** | | **MODERATE** | | **SLIGHT** | | **SLIGHT** | | **NON** | | **MODERATE** | | **SLIGHT** | | **SLIGHT** | |

Table B8. Summary of RBP III data analysis for macroinvertebrate communities sampled at 2 stations in the Ten Mile River Basin on 9 September 1997. Seven biological metrics were calculated and scored (in italics) for taxa collected at each station. Scores for the downstream study station (TM06a) were then totaled and compared to the upstream reference station (TM06). The percent comparability to the reference station yields a final impairment score for the study site.

| Station # | **TM06** | | **TM06A** | |
|---|---|---|---|---|
| Stream, description | Ten Mile River, upstream from North Attleborough WWTP | | Ten Mile River, downstream from North Attleborough WWTP | |
| Habitat Score | 144 | | 128 | |
| Taxa Richness | 18 | *6* | 15 | *6* |
| Biotic Index | 5.86 | *6* | 7.35 | *4* |
| EPT Index | 5 | *6* | 2 | *0* |
| EPT/Chironomidae | 2.13 | *6* | 1.67 | *6* |
| Scrapers/Filterers | 0.19 | *6* | 0.45 | *6* |
| % Dominant Taxon | 17% | *6* | 47% | *0* |
| Community Similarity | 100% | *6* | 22% | *0* |
| Total Metric Score | *42* | | *22* | |
| % Comparability To Reference Station | | | 52% | |
| Biological Condition -Degree Impairment | **REFERENCE STATION (upstream)** | | **SLIGHT/MODERATE** | |

Table B9. Habitat assessment summary for the 10 macroinvertebrate stations sampled during the 1997 Ten Mile River Basin survey. For those primary parameters, scores ranging from 16-20 =optimal; 11-15 =suboptimal; 6-10 =marginal; 0-5 =poor. For those secondary parameters, scores ranging from 9-10 =optimal; 6-8 =suboptimal; 3-5 =marginal; 0-2 =poor.

| STATION | **SM00** | **SW01M** | **TM01** | **TM02** | **TM04** | **TM06** | **TM06A** | **TM11** | **TM14** | **FM01** |
|---|---|---|---|---|---|---|---|---|---|---|
| **PRIMARY HABITAT PARAMETER (range is 0-20)** | | | | | | | | | | |
| Instream Cover | 18 | 2 | 5 | 10 | 7 | 14 | 4 | 12 | 14 | 1 |
| Epifaunal Substrate | 16 | 8 | 16 | 16 | 16 | 18 | 11 | 16 | 18 | 11 |
| Embeddedness | 12 | 13 | 18 | 12 | 16 | 11 | 11 | 11 | 8 | 7 |
| Channel Alteration | 15 | 11 | 16 | 15 | 12 | 15 | 17 | 15 | 14 | 12 |
| Sediment Deposition | 11 | 3 | 16 | 11 | 18 | 6 | 6 | 11 | 12 | 15 |
| Velocity-Depth Combinations | 15 | 11 | 3 | 12 | 5 | 17 | 13 | 11 | 14 | 5 |
| Channel Flow Status | 20 | 15 | 1 | 11 | 18 | 19 | 20 | 19 | 19 | 19 |
| **SECONDARY HABITAT PARAMETERS (range is 0-10) FOR EACH BANK** (reported left bank, right bank – determine left or right side by facing downstream) | | | | | | | | | | |
| Bank Vegetative Protection | 10<br>10 | 10<br>10 | 10<br>10 | 10<br>10 | 10<br>10 | 10<br>5 | 10<br>4 | 9<br>10 | 10<br>10 | 2<br>10 |
| Bank Stability | 10<br>10 | 9<br>7 | 10<br>10 | 10<br>10 | 10<br>10 | 9<br>8 | 10<br>6 | 7<br>10 | 8<br>10 | 5<br>10 |
| Riparian Vegetative Zone Width | 10<br>8 | 10<br>2 | 6<br>9 | 2<br>1 | 2<br>3 | 10<br>2 | 10<br>0 | 4<br>1 | 9<br>9 | 1<br>3 |
| Total Score | **165** | **111** | **130** | **130** | **137** | **144** | **122** | **136** | **155** | **101** |

## PERIPHYTON

The periphyton population and abundance data summarized in Table B11 afforded a qualitative assessment of in-stream water quality and habitats (MA DEP 1997a). The information described is critical for the determination of dominance in-stream. However, dominance alone does not provide all the information necessary to evaluate the impacts of algal growth on a stream. Information on the habitat and on the algal coverage is also helpful. Current field collection methods do not include a quantitative assessment of algal cover. Any indication of the extent of algal cover in a particular reach is based on an estimate made during the habitat assessment. Areas with extensive algal growth are certainly identified in this manner, but areas in transition maybe overlooked. This does limit the usefulness of the data; therefore, the analysis is limited to general comments regarding a particular site. Comparative observations with other streams and habitats may also be described.

## FISH POPULATION

Results from the 1997 fish population survey are presented in Table B10 (MA DEP 1997b).

## FISH TOXICS

Sampling in the north basin of Falls Pond resulted in the collection of largemouth bass *Micropterus salmoides*, white perch *Morone americana*, and black crappie *Pomoxis nigromaculatus*. Species, length, and weight data (MA DEP 1997c) is provided in Table B12. Lead, arsenic and cadmium concentrations were below method detection limits (Table B12) (Pb=<0.140 mg/Kg, As=<0.040 mg/Kg, and Cd=<0.020 mg/Kg) in all samples analyzed. Selenium and mercury were detected in all samples analyzed. Mercury ranged from 0.145 mg/Kg in a three fish composite of black crappie (Nfpf97-7-9) to 0.300 mg/Kg in a three fish composite of largemouth bass (Nfpf97-1-3). Selenium ranged from 0.147 mg/Kg in the composite of largemouth bass (Nfpf97-1-3) to 0.276 in a three fish composite of white perch (Nfpf97-4-6). PCB Arochlor 1254 was detected at a concentration of 0.33 mg/Kg in the composite sample of white perch (Nfpf97-4-6). Organochlorine pesticides were not detected. This data was sent to MDPH for review. MDPH did not issue a fish consumption advisory.

Table B10. 1997 Ten Mile River Basin fish population data. Samples collected at four sites on the Ten Mile River and two sites on the Sevenmile River.

| Station Description | Collection Date | Species[1] | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | LMB | GS | YB | CP | WS | B | P | RFP | EBT | BT | CCS | D | observed but not collected |
| **Ten Mile River** (TM02) West Bacon Street, Plainville. (just upstream of Wetherells Pond) | 9/97 | | | | | | 3 | 14 | 8 | 6 (2)[2] | 1 | | | 2 BT<br>approximately 5 large EBT<br>numerous P |
| **Ten Mile River** (TM05) upstream of Cedar Road, North Attleborough. (an approximate 100 meter upstream extension of the reach above the North Attleborough WWTP, Attleboro) | 10/97 | (3) | | | | | | (1) | 1 | | | | | |
| **Ten Mile River** (TM06) upstream of Cedar Road, North Attleborough. (above the North Attleborough WWTP, Attleboro) | 9/97 | 2 | | | | | | | | | | | | 1 unidentified pickerel<br>1 unidentified sunfish |
| **Ten Mile River** (TM06A) below North Attleborough WWTP, Attleboro. | 9/97 | | | | | | | | | | | | | no fish, some crayfish |
| **Ten Mile River** (TM12) below Bridge Street, Attleboro. | 10/97 | 10 | 1 | 20 | 1 | 4 | 1 | 12 | | | | 7 | | 2 unidentified pickerel |
| **Sevenmile River** (SM00) upstream of Draper Avenue, North Attleborough. | 9/97 | 1 (2) | | | | | (12) | | 4 | | | | | |
| **Sevenmile River** (SM02) at Pitas Avenue, Attleboro. | 10/97 | | | | | 1 | | 1 | 18 | | | 1 (TNTC[3]) | 35 (TNTC) | |

| [1]Species Code | Common Name | Scientific Name |
|---|---|---|
| B | bluegill | Lepomis macrochirus |
| BT | brown trout | Salmo trutta |
| CCS | creek chubsucker | Erimyzon oblongus |
| CP | chain pickerel | Esox niger |
| D | darters | Etheostoma sp. |
| EBT | brook trout | Salvelinus fontinalis |
| GS | golden shiner | *Notemigonus crysoleucas* |
| LMB | largemouth bass | *Micropterus salmoides* |
| P | pumpkinseed | Lepomis gibbosus |
| RFP | redfin pickerel | *Esox americanus americanus* |
| WS | white sucker | *Catostomus commersoni* |
| YB | yellow bullhead | *Ameiurus natalis* |

[2] number in parentheses indicate young-of-the-year

[3] TNTC - too numerous to count

Table B11. Periphyton population and abundance data collected by DWM at biomonitoring stations in the Ten Mile River Basin between 7 and 17 September 1997.

| Station | Date | Location | Habitat | Genus | Algal grouping | Abundance |
|---|---|---|---|---|---|---|
| Sevenmile River SM00 | 10-Sep-97 | upstream from Draper Avenue, North Attleborough | riffle | *Melosira* | diatoms | very abundant |
| | | | | *Nostoc* | blue-green | rare |
| | | | | *Lyngbya* | blue-green | rare |
| | | | | | sewage fungus | rare |
| | | | | *Fragilaria* | diatoms | rare |
| | | | | *Synedra* | diatoms | rare |
| Speedway (Thatcher) Brook SW01M | 17-Sep-97 | downstream from Dexter St., Attleboro | pool | *Spirogyra* | green | very abundant |
| Ten Mile River TM01 | 09-Sep-97 | downstream from Fuller Street, Plainville | riffle | *Lyngbya* | blue-green | very abundant |
| | | | | *Phormidium* | blue-green | abundant |
| Ten Mile River TM02 | 09-Sep-97 | downstream from West Bacon St., Plainville | riffle | *Lyngbya* | blue-green | very abundant |
| Ten Mile River TM04 | 07-Sep-97 | upstream from Rte. 1, North Attleborough | riffle | *Spirogyra* | green | very abundant |
| | | | | *Mougeotia* | green | rare |
| Ten Mile River TM06 | 09-Sep-97 | upstream from North Attleborough WWTP | riffle | *Spirogyra* | green | very abundant |
| Ten Mile River TM06a | 09-Sep-97 | downstream from North Attleboro WWTP | cobble, riffle | *Kyliniella* | red | common |
| | | | | unidentified | diatoms | common |
| Ten Mile River TM11 | 10-Sep-97 | downstream from Tiffany Street, Attleboro | riffle, run | *Vaucheria* | chrysophyta | very abundant |
| Ten Mile River TM14 | 17-Sep-97 | downstream from Central Ave., Seekonk, MA/Pawtucket, RI | riffle | *Spirogyra* | green | very abundant |
| | | | | *Melosira* | diatoms | common |
| | | | | *Coleochaete* | green | rare |
| Fourmile Brook FM01 | 10-Sep-97 | between Greenfield and West Street, Attleboro | riffle, run | *Lyngbya* | blue-green | abundant |

Table B12. 1997 Ten Mile River Basin Survey. Fish toxics monitoring data for the north basin of Falls Pond, North Attleborough. The reporting units are mg/kg unless otherwise noted. All concentrations are in wet weight.

| Analysis # | Sample ID | Collection Date | Species Code[1] | Sample Type[2] | Length (cm) | Weight (gm) | Cd | Pb | Hg | As | Se | % Lipids | PCB[3] (ug/g) | Pesticides[3] (ug/g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Falls Pond (north basin)** | | | | | | | | | | | | | | |
| **Station F0044** | | | | | | | | | | | | | | |
| 97020 | NFPF97-1 | 09/09/97 | LMB | C | 35.0 | 660 | <0.020 | <0.140 | 0.300 | <0.040 | 0.147 | 0.24 | ND | ND |
| | NFPF97-2 | 09/09/97 | LMB | C | 36.6 | 740 | | | | | | | | |
| | NFPF97-3 | 09/09/97 | LMB | C | 35.5 | 760 | | | | | | | | |
| 97021 | NFPF97-4 | 09/09/97 | WP | C | 28.3 | 400 | <0.020 | <0.140 | 0.240 | <0.040 | 0.276 | 2.3 | 0.33* | ND |
| | NFPF97-5 | 09/09/97 | WP | C | 27.8 | 340 | | | | | | | | |
| | NFPF97-6 | 09/09/97 | WP | C | 28.9 | 360 | | | | | | | | |
| 97022 | NFPF97-7 | 09/09/97 | BC | C | 27.0 | 300 | <0.020 | <0.140 | 0.145 | <0.040 | 0.150 | 0.16 | ND | ND |
| | NFPF97-8 | 09/09/97 | BC | C | 25.4 | 290 | | | | | | | | |
| | NFPF97-9 | 09/09/97 | BC | C | 25.2 | 280 | | | | | | | | |

[1]Species black crappie (BC) *Pomoxis nigromaculatus*
largemouth bass (LMB) Micropterus salmoides
white perch (WP) Morone americana

[2]Sample Type (All samples were fillets with skin off.)
Composite (C)
Individual (I)

[3] Analyzed just beyond the EPA recommended holding time although extraction was within holding time.

* Arochlor 1245

ND - not detected or analytical result is at or below established minimum detection limit (MDL)

## Lakes/Ponds

Lake synoptic survey results (MA DEP 1997d) are presented in Table B13.

Table B13. 1997 DEP DWM Ten Mile River Basin lake survey data.

| LAKE and LOCATION | SIZE (Acres) | TROPHIC STATE | OBSERVATIONS and/or OBJECTIONABLE CONDITIONS | POTENTIAL THREATS TO WATER QUALITY |
|---|---|---|---|---|
| Cargill Pond, Plainville | 5 | E | Water level very low, heavy turbidity (brown color), low transparency, heavy vegetation, siltation. | Gravel operation runoff |
| Central Pond, Seekonk, MA/Pawtucket/Providence, RI | 139 | H | Dense algal bloom/mats covering approximately 10% of lake area. | Road runoff |
| Chestnut Street Pond, Plainville | 10 | – | Totally dry. *Lythrum salicaria* present. | _____ |
| Lake Como, Attleboro | 5 | H | Excessive turbidity, non-native aquatic plant (*Cabomba caroliniana*), low transparency, dense algal bloom. *Lythrum salicaria* also present. | Road runoff |
| Dodgeville Pond, Attleboro | 47 | H | Dense algal bloom, moderate turbidity. *Lythrum salicaria* present. | Railroad, new road construction |
| Falls Pond (North Basin), North Attleborough | 62 | E | Excessive turbidity, low transparency, water level down approximately 6', algal bloom. *Lythrum salicaria* present. | Road runoff (erosion and storm water controls present @ Reservoir Road no longer effective), dam repair |
| Falls Pond (South Basin), North Attleborough | 60 | M | Moderate turbidity, algal bloom, Non-native plants (*Myriophyllum heterophyllum*). *Lythrum salicaria* present. | Road runoff, power lines, residential development |
| Farmers Pond, Attleboro | 9 | H | *Lemna sp.* covers most of surface area. *Lythrum salicaria* present. | Residential development, highway runoff |
| Fuller Pond, Plainville | 4 | E | Moderate turbidity, algal mats, excessive vegetation, *Myriophyllum* sp. needs confirmation. *Lythrum salicaria* and *Phragmites* sp. also present. | Waterfowl population, gravel operation runoff |
| Greenwood Pond, Mansfield/ North Attleborough | 153 | M | Moderate turbidity, slight algal bloom. | Development, road runoff |
| Hebronville Pond, Attleboro | 16 | H | Dense algal bloom/mats. *Lythrum salicaria* present. | Heavy shoreline development |
| Hoppin Hill Reservoir **, North Attleborough | 30 | U | Moderate turbidity, water level very low, silt. | Possibly dam repair, residential development, water withdrawal |
| Luther Reservoir **, North Attleborough/ Attleboro | 12 | E | Moderate turbidity, algal bloom. *Lythrum salicaria* present. | Runoff, residential development on shore |
| Manchester Pond Reservoir **, Attleboro | 218 | U | *Lythrum salicaria* present. | Rte 95 adjacent to Southeast Shore, gulls |
| Mechanics Pond, Attleboro | 9 | H | Moderate algal bloom, silt, surface scum with *Lemna* sp. and algae, approximately 50% of area covered with *Lemna* sp. *Lythrum salicaria* present. | Residential and industrial development |

** Indicates Class A (water supply) waterbody; all others are Class B.

Trophic State Codes O= Oligotrophic, M= Mesotrophic, E= Eutrophic, H= Hypereutrophic, U= Undetermined.

TABLE B13 (continued). 1997 DEP DWM Ten Mile River Basin lake survey data.

| LAKE and LOCATION | SIZE (Acres) | TROPHIC STATE | OBSERVATIONS and/or OBJECTIONABLE CONDITIONS | POTENTIAL THREATS TO WATER QUALITY |
|---|---|---|---|---|
| Orrs Pond **, Attleboro | 48 | U | Non-native plants (*Myriophyllum spicatum*). *Lythrum salicaria* present. | None noted |
| Pawtucket Pond, Seekonk, MA/ Pawtucket, RI | 30 | – | Pond reduced to a river channel, wetland and terrestrial plant encroachment, moderate turbidity and algal bloom. *Lythrum salicaria* present. | Runoff, wastewater treatment plant |
| Plain Street Pond, Mansfield | 15 | H | Moderate turbidity and algal blooms/mats, 90% cover of dense aquatic plants (only a channel through center of pond with scant surface cover), silt/muck, Non-native plants (*Cabomba caroliniana*). *Lythrum salicaria* also present. | Residential development, road runoff |
| Ten Mile Reservation Pond, Pawtucket, RI | 19 | E | Moderate turbidity, dense algal bloom, silt, approximately 75% pond covered with lilies and algae. *Lythrum salicaria* and *Phragmites* sp. also present. | Runoff, erosion, waterfowl, Pawtucket Country Club |
| James V. Turner Reservoir, Seekonk, MA/Providence, RI | 124 | H | Moderate turbidity, dense algal bloom/mats, silt. | Heavy road runoff, bank erosion |
| Wetherells Pond, Plainville | 13 | E | Moderate turbidity, dense algal bloom, low transparency, very heavy algae mats (*Lemna* sp., *Wolffia* sp., algae) cover approximately 75% area. *Lythrum salicaria* and *Phragmites* sp. also present. | Cemetery, residential |
| Whitings Pond, North Attleborough | 21 | M | Water level appeared low (down approximately 6'), slight to moderate algal bloom. *Lythrum salicaria* and *Phragmites* sp. also present. | Dense residential development, road runoff, dam repair |

** Indicates Class A (water supply) waterbody; all others are Class B.

Trophic State Codes O= Oligotrophic, M= Mesotrophic, E= Eutrophic, H= Hypereutrophic, U= Undetermined.

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## APPENDIX C – DEP BIOMONITORING TECHNICAL MEMORANDUM

To: Ten Mile River Watershed Team, David Burns, DEP, SERO

From: Robert Nuzzo, DWM

Date: 25 March 1997

Subject: **Results of 1990 biomonitoring in the Ten Mile River watershed.**

As part of the water quality monitoring program conducted in the Ten Mile River watershed in 1990, benthic macroinvertebrate samples were collected on 17, 18, and 19 September. The samples were collected from 11 stations within the watershed:

SM00--Located in the Sevenmile River downstream from Draper Avenue, North Attleborough, MA. This site was intended as one of the two watershed references.

TM01--The most upstream sampling location on the Ten Mile River, it was situated just downstream from Fuller Street (outlet of Fuller Pond), Plainville, MA. This was also used as a watershed reference station.

TM02--Ten Mile River upstream from West Bacon Street, Plainville, MA

TM04A--Ten Mile River behind trailer park upstream from East Washington St. (Route 1), North Attleborough, MA

TM06--Ten Mile River upstream from Cedar Street, North Attleborough, MA. This station served as the upstream bracket for the North Attleborough wastewater treatment plant.

TM06A--Ten Mile River downstream from Cedar Street and the wastewater treatment plant discharge, North Attleborough.

TM08A--Ten Mile River downstream from Olive Street, Attleboro, MA.

TM11--Ten Mile River downstream from Tiffany Street, Attleboro, MA.

TM12--Ten Mile River downstream from Hebronville Dam (off Bridge Street) and the railroad bridge, Attleboro. The station served as the upstream bracket for the Attleboro wastewater treatment plant.

TM14--Ten Mile River downstream from the Attleboro wastewater treatment plant and Central Avenue, Pawtucket, RI.

SW01--Speedway Brook downstream from Route 152, Attleboro, MA.

Laboratory-sorted random 100-organism subsamples were taken from each sample within a few weeks of collection; but no taxonomy was done on these specimens at that time. We have recently brought the specimens out to do family-level taxonomy in the event the biomonitoring data may be of use to you in planning your information/data needs for the upcoming survey year (1997).

By using the counts of families present, RBP II (Plafkin *et al.* 1989) metrics can be calculated. These metrics are then compared against those from a reference station (usually a site upstream on the same stream or a surrogate within the watershed) and used to score the relative status of the health of the aquatic community. With family-level identifications the categories that can be differentiated are non-impaired, moderately impaired, and severely impaired. This is a good screen for sites that are in good health and for sites that are in need of urgent attention. Those sites that score in the moderately impaired category, however, need to be looked at in more depth, in the context of supporting data, or may require