1917

A Biological and Chemical Survey of Selected Surface Waters in the Lye Brook Wilderness Area, Vermont

By
James H. Kellogg
Steven L. Fiske
Richard W. Langdon

For
The United States Forest Service - Green Mountain National Forest

Vermont Agency of Natural Resources
Department of Environmental Conservation
Biomonitoring and Aquatic Studies Unit

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Appendix 2: **MACROINVERTEBRATE BIOCRITERIA**

Biocriteria used for determining the biological integrity of the aquatic biota for wadeable streams and rivers in Vermont. Method used 2 min. kick net sample and 300 organism subsample. Identifications in laboratory to the genus - species level. The overall biological integrity of a stream is made by the degree a metric is rated and the number of metrics which are found to be acceptable or unacceptable.

Metric Rating	Mean Richness	Mean EPT	Bio Index	Diversity
Very Poor	<15	<8	≥3.50	<1.50
Poor	15-19	8-12	3.01-3.49	1.51 - 2.24
Fair	20-29	13-17	2.75-3.00	2.25 - 2.99
		Unacceptable		
		Acceptable		
Good	30-39	18-22	2.01-2.74	3.00-3.99
Very Good	40-49	23-25	1.51-2.00	4.00-4.49
Excellent	≥50	>25	≤1.50	>4.50

	% Dominant Gene#aEPT/# Chiro		EPT/R	
Poor	≥55		≤.50	≤.30 Poor
Fair Fair	≥40 <55	**Unacceptable**	>.5 <1.00	>.30 ≤.45
Good Good	≥25 <40	**Acceptable**	>1 <2	>.45 ≤.60
Excellent Excellent	<25		>2	>.60

OTHER METRICS TO BE EVALUATED

Scraper/Filterer Ratios
Spec/Generalist Ratio
Community Loss Index
#4% Genera

[a]Generated using ABN Data 1987-1992

Appendix 1:

THE VERMONT IBI

		Scoring Criteria		
		5	3	1
Species Richness and Composition				
1. Total number of fish species		(Follows maximum species richness line)		
2. Number and identity of intolerant species	[Site Elevation >125m]	>1	1	0
	[Site Elevation <125m]	1	0	-
3. Number and identity of benthic insectivore species		>2	2	0-1
4. Proportion of individuals as blacknose dace		<50%	>50%	-
Trophic Composition				
5. Proportion of individuals as generalist feeders	[Site Elevation >210m]	<20%	20-45%	>45%
	[Site Elevation <210m]	<30%	30-60%	>60%
6. Proportion of individuals as insectivores	[Site Elevation >210m]	>65%	30-65%	<30%
	[Site Elevation <210m]	>55%	20-55%	<20%
7. Proportion of individuals as top carnivores:	Cold Water	>10%	3-10%	<3%
	Warm Water	>5%	1-5%	<1%
Fish Abundance and Condition				
8. Proportion of individuals with disease, tumors, fin damage and other anomalies		<2%	2-5%	>5%
		5	3	1 *
9. Abundance in Sample (one pass - #100m^2)	[Site Elevation <210m]	>20	10-20	<10
	[Site Elevation >210m]			
	[Alk. >9mg/l]	>10	7-10	<7
	[Alk. <9mg/l]	>6	3-6	<3

*Site fails to meet Class B/C Standards

Metric Scores

Excellent	41-45
Good	33-37
Fair*	27-29
Poor*	<27

Conditions for Use

1. For wadeable streams only.
2. At least four nonsalmonid species including one generalist feeder.
3. Only individuals more than 25mm TL.
4. Only resident stream species.
5. Count all trout species as one species only.
6. Only species with more than one individual captured are entered in metrics 2 & 3.

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Appendices

Appendix 1: The Vermont IBI

Appendix 2: Macroinvertebrate Biocriteria

Winhall River 8.1 FISH COMMUNITY COMPOSITION (%) 5/23/95

Species	10/09/84	8/16/93	8/02/94							
Atlantic Salmon		29.6	8.9							
Blacknose Dace	49.1	14.2	29.5							
Brook Trout	7.4	5.6	3.6							
Brown Trout	1.8									
Common Shiner	.6									
Creek Chub	.6		.1							
Longnose Dace	18.4	26.6	32.9							
Longnose Sucker	6.7									
Slimy Sculpin	13.5	23.8	24.7							
White Sucker	1.8	.2	.3							

Water Quality Division - Vt. Dept. of Environmental Conservation
Biomonitoring and Aquatic Studies Unit

5/23/95

Winhall River 8.1
Site Id: 033500000081

Ambient Biomonitoring Summary Report

Town: Winhall
Waterbody Id: VT11-16

Description: Located at IPCO bridge

	10/09/84	8/16/93	8/02/94							
FISH COMMUNITY: Id#	84-05	93-82	94-08							
Sampling Method	ES	ES	ES							
Species Richness	9( )	6( )	7( )							
# Intol. Species	3( )	3( )	3( )							
# Benth. Insect. Spp	3( )	3( )	3( )							
Blacknose Dace %	49.1( )	14.2( )	29.5( )							
Generalist feeders %	9.8( )	.2( )	.4( )							
Insectivores %	81.0( )	64.6( )	87.1( )							
Top carnivores %	9.2( )	35.2( )	12.5( )							
Anomolies %	0.0( )	0.0( )	0.0( )							
Density-1 Pass/100m2	7( )	33( )	53( )							
Vermont IBI	43	43	43							
Comm. Assessment	exc-									

Winhall River 8.1

DOMINANT MACROINVERTEBRATE TAXA COMPOSITION (%)

5/23/95

Dominant Taxa	10/14/92	9/19/94								
Oulimnius	6.9	2.6								
Cricotopus		4.6								
Orthocladius	7.4	.6								
Polypedilum	4.2	3.4								
Tvetenia	1.5	3.3								
Cricotopus/Orthocla	3.3									
Micropsectra	14.4	3.0								
Antocha	3.3	2.9								
Pseudocloeon	.2	3.9								
Ephemerella	4.3	5.9								
Brachycentrus	.3	3.6								
Symphitopsyche	14.5	14.2								
Lepidostoma	4.6	3.0								
Dolophilodes	3.4	8.0								
Chloroperlidae	4.0	13.0								
Isoperla	12.1	4.4								

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5/23/95

Winhall River 8.1
Site Id: 033500000081

Ambient Biomonitoring Summary Report

Town: Winhall
Waterbody Id: VT11-16

Description: Located at IPCO bridge

	10/14/92	9/19/94								
MACROINVERTEBRATES: Id#	92.080	94.025								
Sampling Method	KN	KN								
Density/Unit	2212	2344								
Species Richness	51.0	53.5								
EPT Richness	28.5	30.5								
EPT/Richness	.56	.57								
Bio Index	1.86	1.52								
Diversity	4.53	4.92								
# E/P/T Taxa	13/8/12	8/13/16								
EPT/EPTChiro	.61	.82								
Hydropsy %	14.47	16.38								
Dominant Taxa %	14	14								
Coleoptera %	7.2	3.4								
Diptera %	40.1	22.0								
Ephemeroptera %	9.3	17.3								
Trichoptera %	24.8	34.4								
Plecoptera %	18.1	21.8								
Oligochaeta %	.2	.6								
Other %	.3	.4								
Collector Gatherer %	39.7	24.1								
Collector Filterer %	19.1	28.5								
Predator %	22.9	24.6								
Shredder - Detritus %	5.5	5.8								
Shredder - Herbivore %	3.3	4.7								
Scraper	8.6	9.6								
Comm. Assessment	exc	exc								

Lye Brook 3.4 FISH COMMUNITY COMPOSITION (%) 6/20/95

Species	9/22/93	9/14/94								
NO FISH!	0	0								

Lye Brook 3.4
Site Id: 592500000034

Ambient Biomonitoring Summary Report

Town: Manchester
Waterbody Id: VT01-05

Description: Located 50 feet below where Lye Brook Falls Trib? enters Lye Brook

	9/22/93	9/14/94								
FISH COMMUNITY: Id#	93-65	94-32								
Sampling Method	ES	ES								
Species Richness	0	0								
# Intol. Species	0( )	0( )								
# Benth. Insect. Spp	0( )	0( )								
Blacknose Dace %	0.0( )	0.0( )								
Generalist feeders %	0.0( )	0.0( )								
Insectivores %	0.0( )	0.0( )								
Top carnivores %	0.0( )	0.0( )								
Anomolies %	0.0( )	0.0( )								
Density-1 Pass/100m2	0	0								
Vermont IBI										
Comm. Assessment										

Dominant Taxa	9/22/93	9/19/94								
Ameletus	10.6	.2								
Parapsyche	4.5	4.9								
Rhyacophila	7.6	4.9								
Capniidae	16.3	34.8								
Chloroperlidae	27.8	27.5								
Leuctridae	9.7	10.2								
Malirekus	5.4	6.9								

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6/20/95

Lye Brook 3.4
Site Id: 592500000034

Ambient Biomonitoring Summary Report

Town: Manchester
Waterbody Id: VT01-05

Description: Located 50 feet below where Lye Brook Falls Trib? enters Lye Brook

	9/22/93	9/19/94								
MACROINVERTEBRATES: Id#	93.087	94.030								
Sampling Method	KN	KN								
Density/Unit	166	246								
Species Richness	21.5	18.5								
EPT Richness	14.5	12.0								
EPT/Richness	.67	.65								
Bio Index	.65	.55								
Diversity	3.44	2.77								
# E/P/T Taxa	1/5/13	2/8/6								
EPT/EPTChiro	.97	.99								
Hydropsy %	.30	0.00								
Dominant Taxa %	28	35								
Coleoptera %	.9	.6								
Diptera %	6.3	4.3								
Ephemeroptera %	10.6	.2								
Trichoptera %	17.2	11.6								
Plecoptera %	61.9	82.9								
Oligochaeta %	.9	0.0								
Other %	2.1	.4								
Collector Gatherer %	15.7	1.6								
Collector Filterer %	6.0	6.5								
Predator %	46.8	45.0								
Shredder - Detritus %	29.3	45.8								
Shredder - Herbivore %	.3	.4								
Scraper	1.8	.6								
Comm. Assessment	fair	poor								

Species	9/22/93	9/19/94								
Brook Trout	64.9	54.9								
Brown Trout	10.8	7.3								
Slimy Sculpin	24.3	37.8								

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Lye Brook 1.8
Site Id: 592500000018

Ambient Biomonitoring Summary Report

Town: Manchester
Waterbody Id: VT01-05

Description: Located just inside boundary of Lye Brook Wilderness above the first small temporal trib.

	9/22/93	9/19/94								
FISH COMMUNITY: Id#	93-66	94-31								
Sampling Method	ES	ES								
Species Richness	3( )	3( )								
# Intol. Species	3( )	3( )								
# Benth. Insect. Spp	1( )	1( )								
Blacknose Dace %	0.0( )	0.0( )								
Generalist feeders %	0.0( )	0.0( )								
Insectivores %	24.3( )	37.8( )								
Top carnivores %	75.7( )	62.2( )								
Anomolies %	0.0( )	0.0( )								
Density-1 Pass/100m2	4( )	9( )								
Vermont IBI										
Comm. Assessment										

Lye Brook 1.8

DOMINANT MACROINVERTEBRATE TAXA COMPOSITION (%)

5/23/95

Dominant Taxa	9/22/93	9/19/94								
Atherix	1.9	3.8								
Eukiefferiella	.9	3.8								
Baetidae	8.5	.8								
Baetis	10.0	4.6								
Diplectrona	.5	4.2								
Symphitopsyche	11.0	13.1								
Lepidostoma	6.7	7.8								
Dolophilodes	23.8	10.5								
Rhyacophila	6.9	6.9								
Chloroperlidae	9.3	17.6								
Peltoperla	2.0	3.8								

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5/23/95

Lye Brook 1.8
Site Id: 592500000018

Ambient Biomonitoring Summary Report

Town: Manchester
Waterbody Id: VT01-05

Description: Located just inside boundary of Lye Brook Wilderness above the first small temporal trib.

	9/22/93	9/19/94								
MACROINVERTEBRATES: Id#	93.088	94.029								
Sampling Method	KN	KN								
Density/Unit	460	682								
Species Richness	34.0	42.5								
EPT Richness	21.0	23.5								
EPT/Richness	.58	.55								
Bio Index	1.08	1.08								
Diversity	4.08	4.49								
# E/P/T Taxa	5/9/12	5/8/13								
EPT/EPTChiro	.95	.93								
Hydropsy %	11.01	13.06								
Dominant Taxa %	24	18								
Coleoptera %	.7	2.5								
Diptera %	10.4	14.6								
Ephemeroptera %	21.0	6.6								
Trichoptera %	50.1	45.8								
Plecoptera %	17.8	30.0								
Oligochaeta %	0.0	.2								
Other %	0.0	.3								
Collector Gatherer %	24.4	11.3								
Collector Filterer %	35.9	28.5								
Predator %	24.9	36.4								
Shredder - Detritus %	12.2	16.7								
Shredder - Herbivore %	.9	2.0								
Scraper	.7	4.2								
Comm. Assessment	exc	exc								

Species	8/09/93	8/09/94								
Brook Trout	100.0	100.0								

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5/23/95

Branch Pond Brook .1
Site Id: 591410000001

Ambient Biomonitoring Summary Report

Town: Sunderland
Waterbody Id: VT01-06

Description: Located immediately above the confluence of Roaring Brook.

	8/09/93	8/09/94								
FISH COMMUNITY: Id#	93-83	94-09								
Sampling Method	ES	ES								
Species Richness	1( )	1( )								
# Intol. Species	1( )	1( )								
# Benth. Insect. Spp	0( )	0( )								
Blacknose Dace %	( )	0.0( )								
Generalist feeders %	0.0( )	0.0( )								
Insectivores %	0.0( )	0.0( )								
Top carnivores %	100%	100%								
Anomolies %	0.0( )	0.0( )								
Density-1 Pass/100m2	2( )	2( )								
Vermont IBI										
Comm. Assessment										

Branch Pond Brook .1 DOMINANT MACROINVERTEBRATE TAXA COMPOSITION (%) 5/23/95

Dominant Taxa	9/19/94									
Promoresia	6.0									
Atherix	3.9									
Eukiefferiella	9.4									
Symphitopsyche	6.8									
Apatania	7.4									
Rhyacophila	9.9									
Capniidae	20.5									
Chloroperlidae	7.0									
Leuctridae	12.3									
Peltoperla	3.1									

Water Quality Division - Vt. Dept. of Environmental Conservation
Biomonitoring and Aquatic Studies Unit

5/23/95

Branch Pond Brook .1
Site Id: 591410000001

Ambient Biomonitoring Summary Report

Town: Sunderland
Waterbody Id: VT01-06

Description: Located immediately above the confluence of Roaring Brook.

	9/19/94									
MACROINVERTEBRATES: Id#	94.026									
Sampling Method	KN									
Density/Unit	912									
Species Richness	27.5									
EPT Richness	14.5									
EPT/Richness	.53									
Bio Index	1.12									
Diversity	3.81									
# E/P/T Taxa	1/6/9									
EPT/EPTChiro	.85									
Hydropsy %	6.82									
Dominant Taxa %	21									
Coleoptera %	6.0									
Diptera %	19.7									
Ephemeroptera %	2.0									
Trichoptera %	25.7									
Plecoptera %	46.3									
Oligochaeta %	0.0									
Other %	.3									
Collector Gatherer %	14.9									
Collector Filterer %	7.3									
Predator %	23.5									
Shredder - Detritus %	37.6									
Shredder - Herbivore %	3.1									
Scraper	13.4									
Comm. Assessment	fair									

Species	9/21/93	9/20/94								
Brook Trout	100.0	100.0								

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5/23/95

Bourn Brook 4.1
Site Id: 592600000041

Ambient Biomonitoring Summary Report

Town: Winhall
Waterbody Id: VT01-05

Description: Located about 1/4 mile below Little Mud Pond outlet and about 1/4 mile above William O. Douglas leanto

	9/21/93	9/20/94								
FISH COMMUNITY: Id#	93-63	94-33								
Sampling Method	ES	ES								
Species Richness	1( )	1( )								
# Intol. Species	1( )	1( )								
# Benth. Insect. Spp	0( )	0( )								
Blacknose Dace %	( )	0.0( )								
Generalist feeders %	0.0( )	0.0( )								
Insectivores %	0.0( )	0.0( )								
Top carnivores %	100%	100%								
Anomolies %	0.0( )	0.0( )								
Density-1 Pass/100m2	1( )	1( )								
Vermont IBI										
Comm. Assessment										

Bourn Brook 4.1

DOMINANT MACROINVERTEBRATE TAXA COMPOSITION (%)

5/23/95

Dominant Taxa	9/21/93	9/21/94								
Oulimnius	7.4	2.9								
Promoresia	5.9	13.9								
Atherix	1.6	3.2								
Eukiefferiella	.1	12.3								
Symphitopsyche	10.3	8.9								
Capniidae	21.9									
Paracapnia		13.8								
Chloroperlidae	10.6	4.7								
Leuctridae	17.7	14.4								
Peltoperla	2.3	3.6								
Taeniopteryx	5.7	10.0								

Water Quality Division - Vt. Dept. of Environmental Conservation
Biomonitoring and Aquatic Studies Unit

5/23/95

Bourn Brook 4.1
Site Id: 592600000041

Ambient Biomonitoring Summary Report

Town: Winhall
Waterbody Id: VT01-05

Description: Located about 1/4 mile below Little Mud Pond outlet and about 1/4 mile above William O. Douglas leanto

	9/21/93	9/21/94								
MACROINVERTEBRATES: Id#	93.085	94.028								
Sampling Method	KN	KN								
Density/Unit	756	1754								
Species Richness	27.5	31.5								
EPT Richness	19.0	16.5								
EPT/Richness	.69	.53								
Bio Index	1.03	1.35								
Diversity	3.79	3.86								
# E/P/T Taxa	4/6/12	3/7/9								
EPT/EPTChiro	.99	.82								
Hydropsy %	10.34	8.89								
Dominant Taxa %	22	14								
Coleoptera %	13.4	16.9								
Diptera %	5.2	18.9								
Ephemeroptera %	3.9	2.9								
Trichoptera %	16.5	12.7								
Plecoptera %	60.1	48.5								
Oligochaeta %	0.0	0.0								
Other %	.8	.2								
Collector Gatherer %	1.9	13.2								
Collector Filterer %	11.6	10.4								
Predator %	21.7	11.5								
Shredder - Detritus %	42.9	33.5								
Shredder - Herbivore %	7.4	12.5								
Scraper	14.2	17.0								
Comm. Assessment	good	good								

Bourn Brook 1.6 FISH COMMUNITY COMPOSITION (%) 5/23/95

Species	9/21/93	9/20/94								
Blacknose Dace	2.1	1.3								
Brook Trout	11.1	10.7								
Brown Trout	1.4	4.0								
Slimy Sculpin	85.4	83.9								

Bourn Brook 1.6
Site Id: 592600000016

Ambient Biomonitoring Summary Report

Town: Manchester
Waterbody Id: VT01-05

Description: Located about 1/4 mile above O.M. Pleisner homestead.

	9/21/93	9/20/94								
FISH COMMUNITY: Id#	93-64	94-34								
Sampling Method	ES	ES								
Species Richness	4( )	4( )								
# Intol. Species	3( )	3( )								
# Benth. Insect. Spp	2( )	2( )								
Blacknose Dace %	2.1( )	1.3( )								
Generalist feeders %	0.0( )	0.0( )								
Insectivores %	87.5( )	85.2( )								
Top carnivores %	12.5( )	14.8( )								
Anomolies %	0.0( )	0.0( )								
Density-1 Pass/100m2	17( )	20( )								
Vermont IBI										
Comm. Assessment										

Bourn Brook 1.6 DOMINANT MACROINVERTEBRATE TAXA COMPOSITION (%) 5/23/95

Dominant Taxa	9/21/93	9/20/94								
Optioservus	.5	4.8								
Oulimnius	2.6	7.7								
Atherix	.8	4.8								
Eukiefferiella	2.6	3.9								
Baetis	10.0	6.4								
Ephemerellidae	6.2	7.6								
Glossosoma	10.2	3.6								
Symphitopsyche	16.2	9.5								
Lepidostoma	9.2	5.6								
Dolophilodes	10.6	9.2								
Chloroperlidae	4.6	4.3								
Leuctridae	1.9	8.2								

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5/23/95

Bourn Brook 1.6
Site Id: 592600000016

Ambient Biomonitoring Summary Report

Town: Manchester
Waterbody Id: VT01-05

Description: Located about 1/4 mile above O.M. Pleisner homestead.

	9/21/93	9/20/94								
MACROINVERTEBRATES: Id#	93.086	94.027								
Sampling Method	KN	KN								
Density/Unit	1704	1760								
Species Richness	46.5	46.5								
EPT Richness	25.5	24.0								
EPT/Richness	.55	.52								
Bio Index	1.41	1.43								
Diversity	4.60	4.77								
# E/P/T Taxa	8/7/14	5/9/12								
EPT/EPTChiro	.92	.85								
Hydropsy %	16.20	9.55								
Dominant Taxa %	16	10								
Coleoptera %	3.8	13.5								
Diptera %	11.5	18.1								
Ephemeroptera %	22.2	16.8								
Trichoptera %	53.5	34.4								
Plecoptera %	8.1	16.6								
Oligochaeta %	.9	.2								
Other %	0.0	.3								
Collector Gatherer %	20.7	18.3								
Collector Filterer %	29.2	20.2								
Predator %	11.2	14.2								
Shredder - Detritus %	11.7	16.1								
Shredder - Herbivore %	2.6	3.8								
Scraper	17.1	18.9								
Comm. Assessment	exc	exc								

Site Summary Reports

Location: Winhall River # 8.1 Town: Winhall Site Id: 033500000081
Device: Kick Net Composites/Rep: 1
Lab Id: 94.025 Date: 9/19/94 Area: 1.00 m2 Number of Reps: 2
Comments:

Physical/Chemical Habitat Conditions:

pH: Alk (mg/l): Conductivity: 20.0

Embeddedness: 5 (5->1: Excellent->Poor) Canopy % 70.0 Velocity (fps): Depth (m): .2

Bedrock % Cobble % 40.0 Gravel % 10.0 Silt:
Boulder % 30.0 Course Gravel % 20.0 Sand % Clay:

Periphyton % Cover:
Diatom % 100.0 Fila. Green % 10.0 Blue Green %
Moss % Green % Other Peri. %

Biometrics by Replicate

Rep #	Abunda.	EPT Abun.	Diver sity	Old BI	New BI	EPT/ EPTCh	EPT/ Chiro	Hydro- psy %	Spec/ Gen	Scrap/ Sc&Fi	Coll Gath	Coll Filt	Pred	Plank	Shred detri	Shred herbi	Scrap	Pierc Carni	Pierc Herbi	Un- Class
1	2472.0	1740.0	4.89	1.52	2.74	.80	3.99	12.94	.79	.27	28.6	25.1	23.0	0.0	5.3	4.9	9.1	0.0	0.0	4.0
2	2216.0	1708.0	4.95	1.51	2.94	.83	4.97	20.22	.92	.24	19.0	32.3	26.4	0.0	6.3	4.5	10.1	0.0	0.0	1.4

Community Metrics

Relative Abundance	=	2344.0
Total Richness	=	~~70.0~~ 64
Mean Richness	=	~~59.0~~ 53.5
Total EPT Richness	=	~~42.0~~ 34
Mean EPT Richness	=	~~35.5~~ 30.5
Mean EPT/Mean Rich.	=	~~.60~~ .57
Diversity	=	4.92
Old Bio-Index (0-5)	=	1.52
New Bio-Index (0-10)	=	2.84
(# EPT)/(# EPT+Chiro)	=	.82
(# EPT)/(# Chiro)	=	4.42
Hydropsy %	=	16.38
Dominant Taxa %	=	14.25
# Ephemeroptera	=	8
# Plecoptera	=	~~13~~ 13
# Trichoptera	=	16

Percent Composition Major Groups

Coleoptera %	=	3.4
Diptera %	=	22.0
Ephemeroptera %	=	17.3
Plecoptera %	=	21.8
Trichoptera %	=	34.4
Oligocheata %	=	.6
Other %	=	.4

Percent Composition by Functional Groups

Collector Gatherer	=	24.1
Collector Filterer	=	28.5
Predator	=	24.6
Shredder - Detritus	=	5.8
Shredder - Herbivore	=	4.7
Scraper	=	9.6

Location: Winhall River # 8.1 Town: Winhall Site Id: 0335
Device: Kick Net Composites/Rep: 1

Lab Id: 94.025 Date: 9/19/94 Source: DEC Area: 1.00 m2 Number of Reps: 2

Order	Genera	Species	Density	% Comp	Std Err	Minimum	M
TRICHOPTERA							
	DOLOPHILODES	sp	188.0	8.02	20.00	168.0	
	POLYCENTROPUS	sp	8.0	.34			
	RHYACOPHILA	fuscula	16.0	.68			
	RHYACOPHILA	melita	12.0	.51			
	RHYACOPHILA	fenestra'	4.0	.17			
	RHYACOPHILA	carpenteri	10.0	.43			
PLECOPTERA							
	CAPNIIDAE	imm	512.0	21.84	8.00	504.0	
	CHLOROPERLIDAE	imm	6.0	.26			
	LEUCTRIDAE	imm	304.0	12.97	24.00	280.0	
	PELTOPERLA	sp	52.0	2.22			
	PERLIDAE	unid	8.0	.34			
	ACRONEURIA	sp	2.0	.09			
	ACRONEURIA	carolinesis	2.0	.09			
	PARAGNETINA	sp	2.0	.09			
	PARAGNETINA	immarginata	4.0	.17			
	AGNETINA	capitata	4.0	.17			
	ISOGENOIDES	hansoni	16.0	.68			
	ISOPERLA	sp	6.0	.26			
	ISOPERLA	marlynia	70.0	2.99			
	ISOPERLA	richardsoni	32.0	1.37			
	MALIREKUS	hastatus	2.0	.09			
	PTERONARCYS	biloba	0.0	0.00			
	TAENIOPTERYX	sp	0.0	0.00			
			2.0	.09			
MEGALOPTERA							
	NIGRONIA	sp	10.0	.43	6.00	4.0	
			10.0	.43			
OLIGOCHAETA							
	NAIDIDAE	unid	14.0	.60	2.00	12.0	
	LUMBRICULIDAE	unid	2.0	.09			
	ENCHYTRAEIDAE	unid	10.0	.43			
			2.0	.09			
TOTAL			2344.0	100.00	128.00	2216.0	2

: Winhall River # 8.1 Town: Winhall Site Id: 033500000081
: Kick Net Composites/Rep: 1

: 94.025 Date: 9/19/94 Source: DEC Area: 1.00 m2 Number of Reps: 2

	Genera	Species	Density	% Comp	Std Err	Minimum	Maximum
A							
	OPTIOSERVUS	sp	80.0	3.41	48.00	32.0	128.0
	OPTIOSERVUS	trivittatus	8.0	.34			
	OULIMNIUS	latiusculus	4.0	.17			
	PROMORESIA	tardella	60.0	2.56			
			8.0	.34			
	ATHERIX	sp	516.0	22.01	60.00	456.0	576.0
	BEZZIA	sp	2.0	.09			
	CRICOTOPUS	sp	6.0	.26			
	DIAMESA	sp	108.0	4.61	12.00	96.0	120.0
	EUKIEFFERIELLA	brehmi	2.0	.09			
	EUKIEFFERIELLA	brevicalar	2.0	.09			
	ORTHOCLADIUS	sp	2.0	.09			
	PARACHAETOCLADIUS	sp	14.0	.60			
	POLYPEDILUM	aviceps	8.0	.34			
	RHEOTANYTARSUS	sp	80.0	3.41	20.00	60.0	100.0
	THIENEMANNIELLA	sp	6.0	.26			
	THIENEMANNEMYIA	sp	4.0	.17			
	TVETENIA	discoloripes	16.0	.68			
	TVETENIA	bavarica	22.0	.94			
	MICROPSECTRA	sp	56.0	2.39			
	EMPIDIDAE	unid	70.0	2.99			
	SIMULIUM	corbis	20.0	.85			
	ANTOCHA	sp	2.0	.09			
	DICRANOTA	sp	68.0	2.90			
	HEXATOMA	sp	4.0	.17			
			24.0	1.02			
ERA							
	BAETIDAE	unid	406.0	17.32	98.00	308.0	504.0
	PSEUDOCLOEON	sp	12.0	.51			
	PSEUDOCLOEON	carolina	72.0	3.07	28.00	44.0	100.0
	EPHEMERELLIDAE	unid	20.0	.85			
	EPHEMERELLA	subvaria	66.0	2.82			
	EURYLOPHELLA	sp	138.0	5.89	50.00	88.0	188.0
	EPEORUS	sp	10.0	.43			
	STENACRON	interpunctatum	32.0	1.37			
	STENONEMA	sp	6.0	.26			
	STENONEMA	luteum	2.0	.09			
	PARALEPTOPHLEBIA	sp	14.0	.60			
	ISONYCHIA	sp	30.0	1.28			
			4.0	.17			
	BRACHYCENTRUS	lateralis	806.0	34.39	90.00	716.0	896.0
	GLOSSOSOMA	sp	84.0	3.58	12.00	72.0	96.0
	CHEUMATOPSYCHE	sp	0.0	0.00			
	SYMPHITOPSYCHE	bronta	50.0	2.13			
	SYMPHITOPSYCHE	morosa	26.0	1.11			
	SYMPHITOPSYCHE	slossonae	40.0	1.71			
	SYMPHITOPSYCHE	sparna	174.0	7.42	42.00	132.0	216.0
	LEPIDOSTOMA	sp	94.0	4.01	6.00	88.0	100.0
	APATANIA	sp	70.0	2.99			
	PSILOTRETA	sp	16.0	.68			
			14.0	.60			

Location: Lye Brook # 3.4 Town: Manchester Site Id: 592500000034
Device: Kick Net Composites/Rep: 1

Lab Id: 94.030 Date: 9/19/94 Area: 1.00 m2 Number of Reps: 2
Comments: Good Sample

Physical/Chemical Habitat Conditions:

pH: 4.52 Alk (mg/l): -1.6 Conductivity: 20.7

Embeddedness: 5 Canopy % 95.0 Velocity (fps): 1.0 Depth (m): .2
(5->1: Excellent->Poor)

Bedrock % 0.0 Cobble % 30.0 Gravel % 10.0 Silt: 0.00
Boulder % 50.0 Course Gravel % 10.0 Sand % 0.0 Clay: 0.00

Periphyton % Cover:
Diatom % 100.0 Fila. Green % 0.0 Blue Green % 0.0
Moss % 40.0 Green % 0.0 Other Peri. % 0.0

Biometrics by Replicate

Rep	Abunda.	EPT Abun.	Diversity	Old BI	New BI	EPT/ EPTCh	EPT/ Chiro	Hydropsy %	Spec/ Gen	Scrap/ Sc&Fi	Coll Gath	Coll Filt	Pred	Plank	Shred detri	Shred herbi	Scrap	Pierc Carni	Pierc Herbi	Un-Class
1	228.0	216.0	2.97	.45	1.23	.99	72.00	0.00	8.91	.05	2.2	7.9	51.3	0.0	37.7	.4	.4	0.0	0.0	0.0
2	263.0	249.0	2.57	.65	1.78	.99	83.00	0.00	14.47	.12	1.1	5.3	39.5	0.0	52.9	.4	.8	0.0	0.0	0.0

Community Metrics

Relative Abundance	=	245.5
Total Richness	=	27.0
Mean Richness	=	18.5
Total EPT Richness	=	15.0
Mean EPT Richness	=	12.0
Mean EPT/Mean Rich.	=	.65
Diversity	=	2.77
Old Bio-Index (0-5)	=	.55
New Bio-Index (0-10)	=	1.51
(# EPT)/(# EPT+Chiro)	=	.99
(# EPT)/(# Chiro)	=	77.50
Hydropsy %	=	0.00
Dominant Taxa %	=	34.83
# Ephemeroptera	=	2
# Plecoptera	=	8
# Trichoptera	=	6

Percent Composition Major Groups

Coleoptera %	=	.6
Diptera %	=	4.3
Ephemeroptera %	=	.2
Plecoptera %	=	82.9
Trichoptera %	=	11.6
Oligocheata %	=	0.0
Other %	=	.4

Percent Composition by Functional Groups

Collector Gatherer	=	1.6
Collector Filterer	=	6.5
Predator	=	45.0
Shredder - Detritus	=	45.8
Shredder - Herbivore	=	.4
Scraper	=	.6

Location: Lye Brook # 3.4 Town: Manchester Site Id: 59250000003
Device: Kick Net Composites/Rep: 1

Lab Id: 94.030 Date: 9/19/94 Source: DEC Area: 1.00 m2 Number of Reps: 2

Order	Genera	Species	Density	% Comp	Std Err	Minimum	Maximum
COLEOPTERA							
	OULIMNIUS	latiusculus	1.5	.61	.50	1.0	2.0
	PROMORESIA	tardella	1.0	.41			
			.5	.20			
DIPTERA							
	BRILLIA	sp	10.5	4.28	1.50	9.0	12.0
	EUKIEFFERIELLA	claripennis	.5	.20			
	PARACHAETOCLADIUS	sp	.5	.20			
	PARAMETRIOCNEMUS	sp	1.0	.41			
	THIENEMANNIELLA	sp	.5	.20			
	ANTOCHA	sp	.5	.20			
	DICRANOTA	sp	.5	.20			
			7.0	2.85			
EPHEMEROPTERA							
	EPEORUS	sp	.5	.20	.50	0.0	1.0
	AMELETUS	sp	0.0	0.00			
			.5	.20			
TRICHOPTERA							
	PARAPSYCHE	apicalis	28.5	11.61	7.50	21.0	36.0
	DOLOPHILODES	sp	12.0	4.89	1.00	11.0	13.0
	POLYCENTROPUS	sp	4.0	1.63			
	RHYACOPHILA	fuscula	.5	.20			
	RHYACOPHILA	carolina	4.5	1.83			
	RHYACOPHILA	torva	6.5	2.65			
			1.0	.41			
PLECOPTERA							
	CAPNIIDAE	imm	203.5	82.89	24.50	1	28.0
	CHLOROPERLIDAE	imm	85.5	34.83	29.50		15.0
	LEUCTRIDAE	imm	67.5	27.49	5.50		3.0
	NEMOURIDAE	imm	25.0	10.18	4.00	2	9.0
	ISOPERLA	marlynia	.5	.20			
	MALIREKUS	hastatus	6.5	2.65			
	TAENIOPTERYX	sp	17.0	6.92	4.00	13	0
	TAENIONEMA	sp	.5	.20			
			1.0	.41			
LEPIDOPTERA							
	NEPTICULIDAE	sp	.5	.20	.50	0.0	1.0
			.5	.20			
DECAPODA							
	CAMBARUS	bartoni	.5	.20	.50	0.0	1.0
			.5	.20			
TOTAL			245.5	100.00	17.50	228.0	263.0

EPHEMER

Location: Lye Brook # 1.8 Town: Manchester Site Id: 592500000018
Device: Kick Net Composites/Rep: 1

Lab Id: 94.029 Date: 9/19/94 Area: 1.00 m2 Number of Reps: 2
Comments: Good Sample

Physical/Chemical Habitat Conditions:

pH: 6.77 Alk (mg/l): 5.6 Conductivity: 27.8

Embeddedness: 5 Canopy %: 80.0 Velocity (fps): 1.0 Depth (m): .2
(5->1: Excellent->Poor)

Bedrock %: 0.0 Cobble %: 30.0 Gravel %: 10.0 Silt: 0.00
Boulder %: 50.0 Course Gravel %: 10.0 Sand %: 0.0 Clay:

Periphyton % Cover:
Diatom %: 100.0 Fila. Green %: Blue Green %:
Moss %: 40.0 Green %: Other Peri. %:

Biometrics by Replicate

Rep #	Abunda.	EPT Abun.	Diver sity	Old BI	New BI	EPT/ EPTCh	EPT/ Chiro	Hydro- psy %	Spec/ Gen	Scrap/ Sc&Fi	Coll Gath	Coll Filt	Pred	Plank	Shred detri	Shred herbi	Scrap	Pierc Carni	Pierc Herbi	Un- Class
1	840.0	698.4	4.43	1.03	1.84	.94	17.12	13.71	1.38	.16	10.9	30.9	35.1	0.0	15.7	.9	6.0	0.0	0.0	.6
2	513.2	413.5	4.49	1.15	2.02	.90	9.33	12.23	1.63	.07	12.2	25.2	36.7	0.0	18.7	4.0	1.8	0.0	0.0	1.4

Community Metrics

Relative Abundance	=	676.6
Total Richness	=	~~59.0~~ 54
Mean Richness	=	~~43.5~~ 42.5
Total EPT Richness	=	~~30.0~~ 25
Mean EPT Richness	=	~~26.5~~ 23.5
Mean EPT/Mean Rich.	=	~~.58~~ .55
Diversity	=	4.46
Old Bio-Index (0-5)	=	1.09
New Bio-Index (0-10)	=	1.93
(# EPT)/(# EPT+Chiro)	=	.93
(# EPT)/(# Chiro)	=	13.07
Hydropsy %	=	13.15
Dominant Taxa %	=	17.76
# Ephemeroptera	=	5
# Plecoptera	=	8
# Trichoptera	=	13

Percent Composition Major Groups

Coleoptera %	=	2.7
Diptera %	=	14.7
Ephemeroptera %	=	6.7
Plecoptera %	=	29.3
Trichoptera %	=	46.2
Oligocheata %	=	.2
Other %	=	.3

Percent Composition by Functional Groups

Collector Gatherer	=	11.4
Collector Filterer	=	28.7
Predator	=	35.7
Shredder - Detritus	=	16.8
Shredder - Herbivore	=	2.0
Scraper	=	4.4

Location: Lye Brook # 1.8 Town: Manchester Site Id: 5925000000
Device: Kick Net Composites/Rep: 1

Lab Id: 94.029 Date: 9/19/94 Source: DEC Area: 1.00 m2 Number of Reps: 2

Order	Genera	Species	Density	% Comp	Std Err	Minimum	Maximum
PLECOPTERA							
	CAPNIIDAE	imm	198.6	29.35	34.25	164.3	232.8
	CHLOROPERLIDAE	imm	18.8	2.78			
	LEUCTRIDAE	imm	120.2	17.76	33.42	86.8	153.6
	PELTOPERLA	sp	13.8	2.05			
	ACRONEURIA	sp	26.2	3.87	7.02	19.2	33.2
	ACRONEURIA	carolinesis	3.0	.45			
	ISOPERLA	sp	1.2	.18			
	MALIREKUS	hastatus	6.1	.90			
	TAENIOPTERYGIDAE	imm	3.0	.45			
	TAENIOPTERYX	sp	1.2	.18			
			4.9	.72			
ODONATA							
	CORDULEGASTER	sp	.9	.14	.92	0.0	1.8
			.9	.14			
OLIGOCHAETA							
	ENCHYTRAEIDAE	unid	1.2	.18	1.20	0.0	2.4
			1.2	.18			
HYDRACARINA							
	UID		1.2	.18	1.20	0.0	2.4
			1.2	.18			
TOTAL			676.6	100.00	163.38	513.2	840.0

$\frac{\%\ \text{Std E}}{\text{Mean}} = 24\%$

Location: Lye Brook # 1.8 Town: Manchester Site Id: 5925000000
Device: Kick Net Composites/Rep: 1

Lab Id: 94.029 Date: 9/19/94 Source: DEC Area: 1.00 m2 Number of Reps: 2

Order	Genera	Species	Density	% Comp	Std Err	Minimum	Maximum
COLEOPTERA							
	HELICHUS	fastigiatus	18.1	2.67	10.71	7.4	28.8
	OPTIOSERVUS	fastiditus	1.2	.18			
	OPTIOSERVUS	ovalis	1.2	.18			
	OULIMNIUS	latiusculus	11.4	1.69			
			4.2	.63			
DIPTERA							
	ATHERIX	sp	99.2	14.67	8.77	90.5	108.0
	BEZZIA	sp	25.8	3.81	5.45	20.3	31.2
	CRICOTOPUS	sp	4.8	.71			
	EUKIEFFERIELLA	devonica	4.9	.72			
	EUKIEFFERIELLA	brehmi	4.2	.63			
	EUKIEFFERIELLA	claripennis	20.4	3.02	3.60	16.8	24.0
	PARACHAETOCLADIUS	sp	.9	.14			
	POLYPEDILUM	illionoense	1.2	.18			
	POLYPEDILUM	aviceps	1.2	.18			
	SYNORTHOCLADIUS	sp	1.2	.18			
	THIENEMANNIELLA	sp	1.2	.18			
	THIENEMANNEMYIA	sp	1.2	.18			
	MICROPSECTRA	sp	.9	.14			
	SYMPOSIOCLADIUS	sp	4.0	.59			
	DIXA	sp	1.2	.18			
	EMPIDIDAE	unid	.9	.14			
	SIMULIUM	fibrinflatum	2.1	.31			
	SIMULIUM	tubersom	.9	.14			
	DICRANOTA	sp	4.0	.59			
	HEXATOMA	sp	1.8	.27			
	TIPULA	sp	15.4	2.28			
			.9	.14			
EPHEMEROPTERA							
	BAETIDAE	imm	45.1	6.67	10.06	35.1	55.2
	BAETIS	sp	5.7	.85			
	BAETIS	flavistriga	6.6	.98			
	BAETIS	tricaudatus	1.2	.18			
	EPHEMERELLIDAE	imm	23.6	3.49	5.17	18.5	28.8
	EURYLOPHELLA	funeralis	.9	.14			
	HEPTAGENIIDAE	imm	.9	.14			
	EPEORUS	sp	5.2	.76			
			.9	.14			
TRICHOPTERA							
	MICRASEMA	sp	312.3	46.15	98.12	214.2	410.4
	GLOSSOSOMA	sp	3.0	.45			
	DIPLECTRONA	modesta	3.6	.53			
	SYMPHITOPSYCHE	alhedra	28.6	4.23	19.38	9.2	48.0
	SYMPHITOPSYCHE	slossonae	31.5	4.65	9.32	22.2	40.8
	SYMPHITOPSYCHE	sparna	11.2	1.65			
	LEPIDOSTOMA	sp	46.3	6.85	11.26	35.1	57.6
	APATANIA	sp	53.0	7.83	14.22	38.8	67.2
	DOLOPHILODES	sp	8.1	1.20			
	POLYCENTROPUS	sp	71.7	10.60	21.88	49.8	93.6
	RHYACOPHILA	fuscula	8.2	1.21			
	RHYACOPHILA	fenestra	41.8	6.18	8.58	33.2	50.4
	RHYACOPHILA	carpenteri	0.0	0.00			
			5.2	.76			

Location: Branch Pond Brook # .1 Town: Sunderland Site Id: 591410000001
Device: Kick Net Composites/Rep: 1

Lab Id: 94.026 Date: 9/19/94 Area: 1.00 m2 Number of Reps: 2
Comments: Good Sample

Physical/Chemical Habitat Conditions:

pH: 5.41 Alk (mg/l): .5 Conductivity: 20.4

Embeddedness: 3 (5->1: Excellent->Poor) Canopy %: 70.0 Velocity (fps): 1.0 Depth (m): .2

Bedrock %: 0.0 Cobble %: 30.0 Gravel %: 10.0 Silt: 0.00
Boulder %: 35.0 Course Gravel %: 15.0 Sand %: 10.0 Clay: 0.00

Periphyton % Cover:
Diatom %: 100.0 Fila. Green %: Blue Green %:
Moss %: 40.0 Green %: Other Peri. %:

Biometrics by Replicate

Rep #	Abunda.	EPT Abun.	Diver sity	Old BI	New BI	EPT/ EPTCh	EPT/ Chiro	Hydro- psy %	Spec/ Gen	Scrap/ Sc&Fi	Coll Gath	Coll Filt	Pred	Plank	Shred detri	Shred herbi	Scrap	Pierc Carni	Pierc Herbi	Un- Class
1	783.3	630.5	3.80	1.09	2.01	.97	28.90	6.69	5.87	.70	6.7	7.8	25.6	0.0	38.2	3.3	17.8	0.0	0.0	.6
2	1041.0	720.0	3.83	1.15	2.29	.75	3.00	6.92	2.37	.59	22.8	6.9	20.2	0.0	37.2	2.9	10.1	0.0	0.0	0.0

Community Metrics

Relative Abundance	=	912.1
Total Richness	=	~~37.0~~ 34
Mean Richness	=	~~29.0~~ 27.5
Total EPT Richness	=	~~18.0~~ 16
Mean EPT Richness	=	~~15.5~~ 14.5
Mean EPT/Mean Rich.	=	.53
Diversity	=	3.81
Old Bio-Index (0-5)	=	1.12
New Bio-Index (0-10)	=	2.15
(# EPT)/(# EPT+Chiro)	=	.84
(# EPT)/(# Chiro)	=	5.16
Hydropsy %	=	6.82
Dominant Taxa %	=	20.54
# Ephemeroptera	=	1
# Plecoptera	=	6
# Trichoptera	=	9

Percent Composition Major Groups

Coleoptera %	=	6.0
Diptera %	=	19.7
Ephemeroptera %	=	2.0
Plecoptera %	=	46.3
Trichoptera %	=	25.7
Oligocheata %	=	0.0
Other %	=	.3

Percent Composition by Functional Groups

Collector Gatherer	=	15.9
Collector Filterer	=	7.3
Predator	=	22.5
Shredder - Detritus	=	37.6
Shredder - Herbivore	=	3.1
Scraper	=	13.4

Location: Branch Pond Brook # .1 Town: Sunderland Site Id: 5914100000
Device: Kick Net Composites/Rep: 1

Lab Id: 94.026 Date: 9/19/94 Source: DEC Area: 1.00 m2 Number of Reps: 2

Order	Genera	Species	Density	% Comp	Std Err	Minimum	Maximum
COLEOPTERA							
	PROMORESIA	tardella	54.8	6.01	12.82	42.0	67.6
			54.8	6.01	12.82	42.0	67.6
DIPTERA							
	ATHERIX	sp	179.5	19.67	96.55	82.9	276.0
	BEZZIA	sp	35.3	3.87	8.32	27.0	43.6
	DIAMESA	sp	1.5	.16			
	EUKIEFFERIELLA	brehmi	8.6	.94			
	LIMNOHYPHES	sp	85.8	9.40	79.23	6.5	165.0
	MICROTENDIPES	sp	1.5	.16			
	ORTHOCLADIUS	sp	1.1	.12			
	POLYPEDILUM	aviceps	1.5	.16			
	PSEUDORTHOCLADIUS	sp	6.0	.66			
	RHEOCRICOTOPUS	sp	6.7	.73			
	THIENEMANNIELLA	sp	1.5	.16			
	THIENEMANNEMYIA	sp	7.1	.78			
	TVETENIA	bavarica	2.6	.28			
	MICROPSECTRA	sp	7.5	.82			
	SIMULIUM	tubersom	1.1	.12			
	TIPULA	sp	4.4	.48			
			7.4	.81			
EPHEMEROPTERA							
	EPHEMERELLIDAE	unid	18.5	2.03	18.55	0.0	37.1
	EPHEMERELLA	sp	2.2	.24			
			16.4	1.79			
TRICHOPTERA							
	SYMPHITOPSYCHE	macleodi	234.4	25.70	20.59	213.8	255.0
	PALAEGAPETUS	sp	62.2	6.82	9.82	52.4	72.0
	LEPIDOSTOMA	sp	1.5	.16			
	NECTOPSYCHE	albida	5.9	.64			
	APATANIA	sp	1.5	.16			
	POLYCENTROPUS	sp	67.5	7.40	4.50	63.0	72.0
	RHYACOPHILA	fuscula	5.2	.57			
	RHYACOPHILA	carolina	47.5	5.20	12.55	34.9	60.0
	RHYACOPHILA	minora	32.5	3.56	2.45	30.0	34.9
			10.8	1.18			
PLECOPTERA							
	CAPNIIDAE	imm	422.3	46.30	42.68	379.6	465.0
	CHLOROPERLIDAE	imm	187.4	20.54	10.64	176.7	198.0
	LEUCTRIDAE	imm	63.8	7.00	3.82	60.0	67.6
	PELTOPERLA	sp	112.4	12.32	31.64	80.7	144.0
	ACRONEURIA	sp	28.5	3.12	4.50	24.0	33.0
	ACRONEURIA	carolinesis	4.1	.45			
	TAENIOPTERYX	sp	1.1	.12			
			25.1	2.75			
LEPIDOPTERA							
	NEPTICULIDAE	sp	1.5	.16	1.50	0.0	3.0
			1.5	.16			
HEMIPTERA							
	GERRIS	sp	1.1	.12	1.09	0.0	2.2
			1.1	.12			
TOTAL			912.1	100.00	128.86	783.3	1041.0

Location: Bourn Brook # 4.1 Town: Winhall Site Id: 592600000041
Device: Kick Net Composites/Rep: 1

Lab Id: 94.028 Date: 9/21/94 Area: 1.00 m2 Number of Reps: 2
Comments: Good Sample

Physical/Chemical Habitat Conditions:

pH: 5.97 Alk (mg/l): 1.9 Conductivity: 19.1

Embeddedness: 3 (5->1: Excellent->Poor) Canopy % 90.0 Velocity (fps): 1.0 Depth (m): .2

Bedrock % 0.0 Cobble % 20.0 Gravel % 20.0 Silt: 0.00
Boulder % 40.0 Course Gravel % 20.0 Sand % 5.0 Clay: 0.00

Periphyton % Cover:
Diatom % 100.0 Fila. Green % 0.0 Blue Green % 0.0
Moss % 80.0 Green % 0.0 Other Peri. % 0.0

Biometrics by Replicate

Rep #	Abunda.	EPT Abun.	Diversity	Old BI	New BI	EPT/ EPTCh	EPT/ Chiro	Hydro-psy %	Spec/ Gen	Scrap/ Sc&Fi	Coll Gath	Coll Filt	Pred	Plank	Shred detri	Shred herbi	Scrap	Pierc Carni	Pierc Herbi	Un-Class
1	1420.0	964.0	3.82	1.23	1.73	.83	4.92	9.58	3.28	.56	12.1	11.3	14.1	0.0	38.6	9.6	14.4	0.0	0.0	0.0
2	2088.0	1280.0	3.90	1.48	2.03	.81	4.21	8.43	3.19	.66	14.0	9.8	9.8	0.0	30.1	14.6	18.8	0.0	2.5	.6

Community Metrics

Relative Abundance	=	1754.0
Total Richness	=	~~41.0~~ 40
Mean Richness	=	~~32.5~~ 31.5
Total EPT Richness	=	20.0 / 19
Mean EPT Richness	=	~~17.5~~ 16.5
Mean EPT/Mean Rich.	=	.54
Diversity	=	3.86
Old Bio-Index (0-5)	=	1.35
New Bio-Index (0-10)	=	1.88
(# EPT)/(# EPT+Chiro)	=	.82
(# EPT)/(# Chiro)	=	4.49
Hydropsy %	=	8.89
Dominant Taxa %	=	14.37
# Ephemeroptera	=	3
# Plecoptera	=	7
# Trichoptera	=	9

Percent Composition Major Groups

Coleoptera %	=	16.9
Diptera %	=	18.9
Ephemeroptera %	=	2.9
Plecoptera %	=	48.5
Trichoptera %	=	12.7
Oligocheata %	=	0.0
Other %	=	.2

Percent Composition by Functional Groups

Collector Gatherer	=	13.2
Collector Filterer	=	10.4
Predator	=	11.5
Shredder - Detritus	=	33.5
Shredder - Herbivore	=	12.5
Scraper	=	17.0

Location: Bourn Brook # 4.1 Town: Winhall Site Id: 5926000000
Device: Kick Net Composites/Rep: 1

Lab Id: 94.028 Date: 9/21/94 Source: DEC Area: 1.00 m2 Number of Reps: 2

Order	Genera	Species	Density	% Comp	Std Err	Minimum	Maximum
HYDRACARINA	UID		2.0	.11			
TOTAL			1754.0	100.00	334.00	1420.0	2088.0

Location: Bourn Brook # 4.1 Town: Winhall Site Id: 59260000004
Device: Kick Net Composites/Rep: 1

Lab Id: 94.028 Date: 9/21/94 Source: DEC Area: 1.00 m2 Number of Reps: 2

Order	Genera	Species	Density	% Comp	Std Err	Minimum	Maximum
COLEOPTERA							
	OPTIOSERVUS	sp	296.0	16.88	92.00	204.0	388.0
	OULIMNIUS	latiusculus	2.0	.11			
	PROMORESIA	tardella	50.0	2.85			
			244.0	13.91	80.00	164.0	324.0
DIPTERA							
	ATHERIX	sp	332.0	18.93	84.00	248.0	416.0
	CORYNONEURA	sp	56.0	3.19	24.00	32.0	80.0
	EUKIEFFERIELLA	devonica	2.0	.11			
	EUKIEFFERIELLA	brehmi	4.0	.23			
	POLYPEDILUM	aviceps	212.0	12.09	60.00	152.0	272.0
	RHEOTANYTARSUS	sp	2.0	.11			
	SYNORTHOCLADIUS	sp	10.0	.57			
	TANYTARSUS	sp	2.0	.11			
	THIENEMANNIELLA	sp	4.0	.23			
	THIENEMANNEMYIA	sp	2.0	.11			
	TVETENIA	bavarica	4.0	.23			
	EURYHAPSIS	sp	6.0	.34			
	SIMULIUM	tubersom	2.0	.11			
	DICRANOTA	sp	12.0	.68			
	TIPULA	spa	10.0	.57			
	TIPULA	spb	2.0	.11			
			2.0	.11			
EPHEMEROPTERA							
	BAETIS	tricaudatus	50.0	2.85	42.00	8.0	92.0
	EURYLOPHELLA	funeralis	2.0	.11			
	HEPTAGENIIDAE	unid	44.0	2.51			
			4.0	.23			
TRICHOPTERA							
	SYMPHITOPSYCHE	alhedra	222.0	12.66	42.00	180.0	264.0
	SYMPHITOPSYCHE	slossonae	18.0	1.03			
	SYMPHITOPSYCHE	sparna	16.0	.91			
	SYMPHITOPSYCHE	macleodi	54.0	3.08	14.00	40.0	68.0
	HYDROPTILA	sp	68.0	3.88	4.00	64.0	72.0
	PALAEGAPETUS	sp	26.0	1.48			
	LEPIDOSTOMA	sp	14.0	.80			
	LYPE	sp	12.0	.68			
	RHYACOPHILA	fuscula	2.0	.11			
			12.0	.68			
PLECOPTERA							
	PARACAPNIA	sp	850.0	48.46	74.00	776.0	924.0
	CHLOROPERLIDAE	imm	242.0	13.80	34.00	208.0	276.0
	LEUCTRIDAE	imm	82.0	4.68	18.00	64.0	100.0
	PELTOPERLA	sp	252.0	14.37	0.00	252.0	252.0
	ACRONEURIA	sp	64.0	3.65	4.00	60.0	68.0
	ACRONEURIA	carolinesis	14.0	.80			
	ACRONEURIA	abnormis	18.0	1.03			
	TAENIOPTERYX	sp	2.0	.11			
			176.0	10.03	48.00	128.0	224.0
MEGALOPTERA							
	NIGRONIA	sp	2.0	.11	2.00	0.0	4.0
			2.0	.11			
HYDRACARINA							
			2.0	.11	2.00	0.0	4.0

Location: Bourn Brook # 1.6 Town: Manchester Site Id: 592600000016
Device: Kick Net Composites/Rep: 1

Lab Id: 94.027 Date: 9/20/94 Area: 1.00 m2 Number of Reps: 2
Comments: Good Sample

Physical/Chemical Habitat Conditions:

pH: 6.76 Alk (mg/l): 4.7 Conductivity: 24.5

Embeddedness: 5 Canopy %: 50.0 Velocity (fps): 1.0 Depth (m): .2
(5->1: Excellent->Poor)

Bedrock %: 0.0 Cobble %: 30.0 Gravel %: 0.0 Silt: 0.00
Boulder %: 60.0 Course Gravel %: 10.0 Sand %: 0.0 Clay: 0.00

Periphyton % Cover:
Diatom %: 100.0 Fila. Green %: Blue Green %:
Moss %: 20.0 Green %: Other Peri. %:

Biometrics by Replicate

Rep #	Abunda.	EPT Abun.	Diver sity	Old BI	New BI	EPT/ EPTCh	EPT/ Chiro	Hydro- psy %	Spec/ Gen	Scrap/ Sc&Fi	Coll Gath	Coll Filt	Pred	Plank	Shred detri	Shred herbi	Scrap	Pierc Carni	Pierc Herbi	Un- Class
1	1580.0	1104.0	4.76	1.33	2.41	.83	4.93	10.89	1.28	.41	19.0	21.8	10.6	0.0	19.7	6.3	15.4	0.0	0.0	7.1
2	1940.0	1284.0	4.78	1.30	2.41	.87	6.55	8.45	1.46	.53	17.7	19.0	17.1	0.0	13.2	1.6	21.6	0.0	0.0	9.7

Community Metrics

Relative Abundance	=	1760.0
Total Richness	=	~~60.0~~ 55
Mean Richness	=	~~49.5~~ 46,5
Total EPT Richness	=	~~30.0~~ 26
Mean EPT Richness	=	~~26.0~~ 24
Mean EPT/Mean Rich.	=	~~.53~~
Diversity	=	4.77
Old Bio-Index (0-5)	=	1.31
New Bio-Index (0-10)	=	2.41
(# EPT)/(# EPT+Chiro)	=	.85
(# EPT)/(# Chiro)	=	5.69
Hydropsy %	=	9.55
Dominant Taxa %	=	9.55
# Ephemeroptera	=	5
# Plecoptera	=	9
# Trichoptera	=	12

Percent Composition Major Groups

Coleoptera %	=	13.5
Diptera %	=	18.1
Ephemeroptera %	=	16.8
Plecoptera %	=	16.6
Trichoptera %	=	34.4
Oligocheata %	=	.2
Other %	=	.3

Percent Composition by Functional Groups

Collector Gatherer	=	18.3
Collector Filterer	=	20.2
Predator	=	14.2
Shredder - Detritus	=	16.1
Shredder - Herbivore	=	3.8
Scraper	=	18.9

Location: Bourn Brook # 1.6 Town: Manchester Site Id: 5926000000
Device: Kick Net Composites/Rep: 1

Lab Id: 94.027 Date: 9/20/94 Source: DEC Area: 1.00 m2 Number of Reps: 2

Order	Genera	Species	Density	% Comp	Std Err	Minimum	Maximum
TRICHOPTERA							
	RHYACOPHILA	carolina	2.0	.11			
	RHYACOPHILA	carpenteri	8.0	.45			
PLECOPTERA							
	PARACAPNIA	sp	292.0	16.59	8.00	284.0	300.0
	CHLOROPERLIDAE	imm	8.0	.45			
	LEUCTRIDAE	imm	76.0	4.32	24.00	52.0	100.0
	NEMOURIDAE	imm	144.0	8.18	0.00	144.0	144.0
	PELTOPERLA	sp	2.0	.11			
	PERLIDAE	imm	26.0	1.48			
	AGNETINA	capitata	4.0	.23			
	ISOPERLA	sp	10.0	.57			
	ISOPERLA	marlynia	12.0	.68			
	PTERONARCYS	proteus	4.0	.23			
			6.0	.34			
GASTROPODA							
	FERRISSIA	rivularis	6.0	.34	2.00	4.0	8.0
			6.0	.34			
OLIGOCHAETA							
	LUMBRICULIDAE	unid	4.0	.23	4.00	0.0	8.0
			4.0	.23			
TOTAL			1760.0	100.00	180.00	1580.0	1940.0

Location: Bourn Brook # 1.6 Town: Manchester Site Id: 5926000000
Device: Kick Net Composites/Rep: 1

Lab Id: 94.027 Date: 9/20/94 Source: DEC Area: 1.00 m2 Number of Reps: 2

Order	Genera	Species	Density	% Comp	Std Err	Minimum	Maximum
COLEOPTERA							
	OPTIOSERVUS	sp	238.0	13.52	86.00	152.0	324.0
	OPTIOSERVUS	fastiditus	4.0	.23			
	OPTIOSERVUS	trivittatus	26.0	1.48			
	OPTIOSERVUS	ovalis	4.0	.23			
	OULIMNIUS	latiusculus	50.0	2.84			
	PROMORESIA	tardella	136.0	7.73	32.00	104.0	168.0
			18.0	1.02			
DIPTERA							
	ATHERIX	sp	318.0	18.07	10.00	308.0	328.0
	BEZZIA	sp	84.0	4.77	24.00	60.0	108.0
	CRICOTOPUS	sp	4.0	.23			
	CRICOTOPUS	trifascia	34.0	1.93			
	DIAMESA	sp	2.0	.11			
	EUKIEFFERIELLA	devonica	2.0	.11			
	EUKIEFFERIELLA	brehmi	6.0	.34			
	EUKIEFFERIELLA	gracei	48.0	2.73			
	EUKIEFFERIELLA	pseudomontana	2.0	.11			
	EUKIEFFERIELLA	claripennis	2.0	.11			
	PARAMETRIOCNEMUS	sp	10.0	.57			
	POLYPEDILUM	aviceps	16.0	.91			
	THIENEMANNIELLA	sp	20.0	1.14			
	THIENEMANNEMYIA	sp	34.0	1.93			
	TVETENIA	bavarica	2.0	.11			
	MICROPSECTRA	sp	6.0	.34			
	SYMPOSIOCLADIUS	sp	22.0	1.25			
	EMPIDIDAE	unid	4.0	.23			
	SIMULIUM	tubersom	2.0	.11			
	ANTOCHA	sp	6.0	.34			
	DICRANOTA	sp	2.0	.11			
	HEXATOMA	sp	2.0	.11			
			8.0	.45			
EPHEMEROPTERA							
	BAETIS	sp	296.0	16.82	64.00	232.0	360.0
	BAETIS	flavistriga	14.0	.80			
	BAETIS	tricaudatus	12.0	.68			
	EPHEMERELLIDAE	unid	86.0	4.89	14.00	72.0	100.0
	EPHEMERELLA	sp	134.0	7.61	38.00	96.0	172.0
	HEPTAGENIIDAE	unid	4.0	.23			
	EPEORUS	sp	16.0	.91			
	STENONEMA	luteum	28.0	1.59			
			2.0	.11			
TRICHOPTERA							
	BRACHYCENTRUS	lateralis	606.0	34.43	18.00	588.0	624.0
	MICRASEMA	sp	2.0	.11			
	GLOSSOSOMA	sp	30.0	1.70			
	DIPLECTRONA	modesta	64.0	3.64	8.00	56.0	72.0
	SYMPHITOPSYCHE	slossonae	18.0	1.02			
	SYMPHITOPSYCHE	sparna	64.0	3.64	12.00	52.0	76.0
	LEPIDOSTOMA	sp	104.0	5.91	16.00	88.0	120.0
	APATANIA	sp	98.0	5.57	2.00	96.0	100.0
	DOLOPHILODES	sp	22.0	1.25			
	RHYACOPHILA	fuscula	162.0	9.20	22.00	140.0	184.0
			32.0	1.82			

1994 Sampling Event Report

Lye Brook Wilderness Area Macroinvertebrate Stream Communities

Four of the six sites sampled in the Lye Brook Wilderness aquatic resources study are in good to excellent conditions. Bourn Brook upper and lower; Lye Brook lower; and the Winhall River. The macroinvertebrate communities from these streams exhibit moderate densities, moderate to high numbers of taxa, and are dominated by clean water indicator taxa from the orders Ephemeroptera, Plecoptera, and Trichoptera (EPT's). The Bio Index and EPT/EPT Chiro ratio biometrics are used to measure a community's tolerance toward organic loading (enrichment). Both metrics were rated in the good to excellent range for the four sites (BI values, < 1.75 and EPT/EPT Chiro ratio, $> .7$), indicating low levels of organic enrichment. Refer to Appendix 2 for an explanation of Vermont's biocriteria indices used for wadeable streams and rivers.

Two sites appear to be in less than optimal condition; Lye Brook upper, and Branch Pond Brook. The upper Lye Brook site rated poor due to very low densities (206), low taxa richness (20) and a low number of EPT taxa (13). The Bio index and EPT/EPT Chiro ratio were in the good-excellent range indicating that enrichment is <u>not</u> the cause for the poor condition of the biota at the upper Lye Brook site. The <u>low</u> densities, taxa richness and EPT values point toward a physical habitat or toxic limitation on the community. The habitat evaluation does not indicate that physical habitat is limiting at the site. The water quality, however, is low in pH ($x = 4.49$ std. units) and alkalinity ($x = -1.78$ mg/l), which is probably the reason for the poor community integrity at the site. This is supported by a very poor showing of the Ephemeroptera : 1-2 species and $\approx 5\%$ composition of the community. Dominance by the pH tolerant Plecoptera ($\approx 72\%$ composition) also points toward acidity as a probable cause for the impaired macroinvertebrate community. The site surprisingly still contains a population of crayfish (<u>Cambarus bartoni bartoni</u>) despite the very low calcium levels ($x = 0.82$ mg/l) in the water.

The Branch Pond site rated only fair primarily due to the lower number of taxa and sensitive EPT species as well as a slightly lower density. The site also seems to be impaired by low pH and alkalinity due to the poor number (<u>1</u>) and % composition (<u>2</u>) of Ephemeroptera in the community. The habitat evaluation also indicates that the substrate is carrying a higher than normal level of sand. Sand can limit the biological potential at a site by burying the cobble substate and physically limiting the available habitat for invertebrates. Sand embeddedness may also be contributing to the lower biological integrity of Branch Pond Brook.

The functional guild composition of a stream's macroinvertebrate community indicates where the stream community is receiving its energy (food) inputs. All the higher elevation stream sites; Bourn upper, Lye upper and Branch Pond Brook, are dominated by detritus shredders. This indicates that forest leaf breakdown is the most important energy source for these stream sites. The Winhall River contains the highest composition of collector gatherers and fewest percentage of detritus shredders, indicating this community is oriented toward processing fine particulate organic material already broken down in its headwaters and/or produced in the extensive wetlands and lakes in the drainage. To a lesser extent, the lower Lye Brook and Bourn Brook sites also have a higher proportion of collector gatherers . The scraper functional group reaches its greatest dominance in both Bourn Brook sites and Branch Pond Brook, indicating that diatom type periphyton growth is significant in these streams. Both Lye Brook sites contain very few scrapers (1-2%). This is especially unexpected at its lower site and is perhaps again due to the acidic nature of Lye Brook depressing the diatom community.

The biological data for all six sites is found in two attachments. The summary report shows the biometrics and dominant taxa for all dates sampled at a site and the sampling report includes a complete taxa list at each site for 1994.

5/23/95

FISH COMMUNITY EVALUTATON

Location: Winhall River 8.1 Sample Date: 8/02/94 Event Id: 94-08 Site Id: 033500000081

Town: Winhall Eco-region: 2 Elevation (ft): 1470 Drainage Area (km2): 46.6
Gear: electro-shock Section Length (m): 152.0 Section Width (m): 7.3
Effort: 3 Shocker Setting: 600vdc Sampling Conditions: Collector: SXR

Fish Species	Run 1	Run 2	Run 3	Run 4	Total Fish	% Comp.	Run 1 /100m2	Total /100m2	N/100m2	CI +95%	CI -95%	P	SE	X2
Longnose Dace	180	78	62		320	32.9	16.22	28.84	34.61	3.44	-3.44	.45	1.75	5.2
Blacknose Dace	168	61	58		287	29.5	15.14	25.87	30.55	2.96	-2.96	.46	1.51	10.8
Slimy Sculpin	156	50	34		240	24.7	14.06	21.63	23.34	1.32	-1.32	.58	.67	5.1
Atlantic Salmon	58	13	16		87	8.9	5.23	7.84	8.47	.84	-.63	.57	.43	8.6
Brook Trout	23	6	6		35	3.6	2.07	3.15	3.33	.46	-.18	.59	.23	2.8
White Sucker	0	0	3		3	.3	0.00	.27	.36	1.31	-.09	.25	.67	13.2
Creek Chub	0	0	1		1	.1	0.00	.09	.09	.36	0.00	.33	.18	6.3
Totals	585	208	180	0	973	100.0	52.72	87.69						

No change from last year.

BIOMETRICS

Richness: 7
No. of Intol. species: 3
No. of Benthic Ins.: 3
Blacknose Dace %: 29.5

Generalist Feeders %: .4
Insectivores %: 87.1
Top Carnivores %: 12.5

Anomolies %: 0.0
Density - Run 1: 52.72

Species Diversity: 2.07

VT IBI: 43

HABITAT ANALYSIS

Riffle % Run % Pool %

Bank Stability: Embeddedness: Instream Cover:
Bank Vegetation: Canopy %

Ledge % Boulder % Rubble %
Gravel % Sand % Silt %
Clay % Macrophyte %

EPA-RBP Habitat Assessment Score:

PHYSICO-CHEMICAL

Temperature: 19.0 Specific Conductance (umhos): 10
pH: Alkalinity (mg/l):
Discharge (cfs):

5/23/95

FISH COMMUNITY EVALUTATON

Location: Lye Brook 3.4 Sample Date: 9/14/94 Event Id: 94-32 Site Id: 592500000034

Town: Manchester Eco-region: 2 Elevation (ft): 1300 Drainage Area (km2): 14.77
Gear: electro-shock Section Length (m): 120.0 Section Width (m): 6.3
Effort: 1 Shocker Setting: 1200vdc Sampling Conditions: Poor Collector: RWL

Fish Species	Run 1	Run 2	Run 3	Run 4	Total Fish	% Comp.	Run 1 /100m2	Total /100m2	N/100m2	CI +95%	CI -95%	P	SE	X2
NO FISH!	0				0									
Totals	0	0	0	0	0									

No change from last year.

BIOMETRICS

Richness: 0
No. of Intol. species: 0
No. of Benthic Ins.: 0
Blacknose Dace %: 0.0

Generalist Feeders %: 0.0
Insectivores %: 0.0
Top Carnivores %: 0.0

Anomolies %: 0.0
Density - Run 1: 0

Species Diversity: 0.00

VT IBI:

HABITAT ANALYSIS

Riffle % Run % Pool %

Bank Stability: Embeddedness: Instream Cover:
Bank Vegetation: Canopy %

Ledge % Boulder % Rubble %
Gravel % Sand % Silt %
Clay % Macrophyte %

EPA-RBP Habitat Assessment Score:

PHYSICO-CHEMICAL

Temperature: 10.5 Specific Conductance (umhos): 21
pH: 4.52 Alkalinity (mg/l): -1.60
Discharge (cfs):

5/23/95

FISH COMMUNITY EVALUTATON

Location: Lye Brook 1.8 Sample Date: 9/19/94 Event Id: 94-31 Site Id: 592500000018

Town: Manchester Eco-region: 2 Elevation (ft): 840 Drainage Area (km2): 19.09
Gear: electro-shock Section Length (m): 116.0 Section Width (m): 6.3
Effort: 2 Shocker Setting: 1200vdc Sampling Conditions: Collector: RWL

Fish Species	Run 1	Run 2	Run 3	Run 4	Total Fish	% Comp.	Run 1 /100m2	Total /100m2	N/100m2	CI +95%	CI -95%	P	SE	X2
Brook Trout	39	6			45	54.9	5.34	6.16	6.16	.27	0.00	.88	.14	
Slimy Sculpin	23	8			31	37.8	3.15	4.24	4.52	.79	-.27	.72	.41	
Brown Trout	4	2			6	7.3	.55	.82	.82	.28	0.00	.75	.14	
Totals	66	16	0	0	82	100.0	9.03	11.22						

No change from last year

BIOMETRICS

Richness: 3
No. of Intol. species: 3
No. of Benthic Ins.: 1
Blacknose Dace %: 0.0

Generalist Feeders %: 0.0
Insectivores %: 37.8
Top Carnivores %: 62.2

Anomolies %: 0.0
Density - Run 1: 9.03

Species Diversity: 1.28

VT IBI:

HABITAT ANALYSIS

Riffle % Run % Pool %

Bank Stability: Embeddedness: Instream Cover:
Bank Vegetation: Canopy %

Ledge % Boulder % Rubble %
Gravel % Sand % Silt %
Clay % Macrophyte %

EPA-RBP Habitat Assessment Score:

PHYSICO-CHEMICAL

Temperature: 10.5 Specific Conductance (umhos): 28
pH: 6.77 Alkalinity (mg/l): 5.56
Discharge (cfs):

5/23/95

FISH COMMUNITY EVALUTATON

Location: Branch Pond Brook .1 Sample Date: 8/09/94 Event Id: 94-09 Site Id: 591410000001

Town: Sunderland Eco-region: 2 Elevation (ft): 2160 Drainage Area (km2): 6.3
Gear: electro-shock Section Length (m): 152.0 Section Width (m): 4.6
Effort: 2 Shocker Setting: 900vdc Sampling Conditions: Collector: SXR

Fish Species	Run 1	Run 2	Run 3	Run 4	Total Fish	% Comp.	Run 1 /100m2	Total /100m2	N/100m2	CI +95%	CI -95%	P	SE	X2
Brook Trout	15	3			18	100.0	2.15	2.57	2.57	.23	0.00	.86	.12	
Totals	15	3	0	0	18	100.0	2.15	2.57						

No change from last year.

BIOMETRICS

Richness:	1
No. of Intol. species:	1
No. of Benthic Ins.:	0
Blacknose Dace %	0.0
Generalist Feeders %	0.0
Insectivores %	0.0
Top Carnivores %	100.0
Anomolies %	0.0
Density - Run 1:	2.15
Species Diversity:	0.00

VT IBI:

HABITAT ANALYSIS

Riffle % Run % Pool %

Bank Stability: Embeddedness: Instream Cover:
Bank Vegetation: Canopy %

Ledge % Boulder % Rubble %
Gravel % Sand % Silt %
Clay % Macrophyte %

EPA-RBP Habitat Assessment Score:

PHYSICO-CHEMICAL

Temperature: 14.5 Specific Conductance (umhos): 10
pH: Alkalinity (mg/l):
Discharge (cfs):

5/23/95

FISH COMMUNITY EVALUTATON

Location: Bourn Brook 4.1 Sample Date: 9/20/94 Event Id: 94-33 Site Id: 592600000041

Town: Winhall Eco-region: 2 Elevation (ft): 2162 Drainage Area (km2): 11.1
Gear: electro-shock Section Length (m): 130.0 Section Width (m): 5.4
Effort: 2 Shocker Setting: 1200vdc Sampling Conditions: Fair Collector: RWL

Fish Species	Run 1	Run 2	Run 3	Run 4	Total Fish	% Comp.	Run 1 /100m2	Total /100m2	N/100m2	CI +95%	CI -95%	P	SE	X2
Brook Trout	5	4	1		9	100.0	.71	1.28	1.57	1.37	-.28	.53	.70	
Totals	5	4	1	0	9	100.0	.71	1.28						

No change from last year

BIOMETRICS

Richness:	1
No. of Intol. species:	1
No. of Benthic Ins.:	0
Blacknose Dace %	0.0
Generalist Feeders %	0.0
Insectivores %	0.0
Top Carnivores %	100.0
Anomolies %	0.0
Density - Run 1:	.71
Species Diversity:	0.00

VT IBI:

HABITAT ANALYSIS

Riffle % Run % Pool %

Bank Stability: Embeddedness: Instream Cover:
Bank Vegetation: Canopy %

Ledge % Boulder % Rubble %
Gravel % Sand % Silt %
Clay % Macrophyte %

EPA-RBP Habitat Assessment Score:

PHYSICO-CHEMICAL

Temperature: 9.0 Specific Conductance (umhos): 19
pH: 5.97 Alkalinity (mg/l): 1.90
Discharge (cfs):

5/23/95

FISH COMMUNITY EVALUTATON

Location: Bourn Brook 1.6 Sample Date: 9/20/94 Event Id: 94-34 Site Id: 592600000016

Town: Manchester Eco-region: 2 Elevation (ft): 900 Drainage Area (km2): 18.26
Gear: electro-shock Section Length (m): 92.0 Section Width (m): 5.6
Effort: 2 Shocker Setting: 1200vdc Sampling Conditions: Fair Collector: RWL

Fish Species	Run 1	Run 2	Run 3	Run 4	Total Fish	% Comp.	Run 1 /100m2	Total /100m2	N/100m2	CI +95%	CI -95%	P	SE	X2
Slimy Sculpin	82	43			125	83.9	15.92	24.26	32.22	8.49	-7.96	.50	4.33	
Brook Trout	13	3			16	10.7	2.52	3.11	3.11	.33	0.00	.84	.17	
Brown Trout	6	0			6	4.0	1.16	1.16	1.16			1.00		
Blacknose Dace	0	2			2	1.3	0.00	.39	.39	.93	0.00	.50	.48	
Totals	101	48	0	0	149	100.0	19.60	28.92						

No change from last year.

BIOMETRICS

Richness: 4
No. of Intol. species: 3
No. of Benthic Ins.: 2
Blacknose Dace %: 1.3

Generalist Feeders %: 0.0
Insectivores %: 85.2
Top Carnivores %: 14.8

Anomolies %: 0.0
Density - Run 1: 19.60

Species Diversity: .83

VT IBI:

HABITAT ANALYSIS

Riffle % Run % Pool %

Bank Stability: Embeddedness: Instream Cover:
Bank Vegetation: Canopy %

Ledge % Boulder % Rubble %
Gravel % Sand % Silt %
Clay % Macrophyte %

EPA-RBP Habitat Assessment Score:

PHYSICO-CHEMICAL

Temperature: 10.5 Specific Conductance (umhos): 25
pH: 6.76 Alkalinity (mg/l): 4.70
Discharge (cfs):

Fish Population Summary Reports

Fish Community Summary for Lye Brook Wilderness Streams

Lye Brook (Station 1.8) - The same three species were collected in 1993 and 1994 in the same order of abundance (brook and brown trout and slimy sculpins). The 1994 sample was three times more dense, but still classifies as a low productivity reach.

Lye Brook (Station 3.4) - No fish were collected in either 1993 or 1994 most likely because of this reach's acidity and high levels of aluminum (see Table 2). The USFS sampling of Lye Brook Meadows in July of 1995 will determine if fish do exist upstream of this station. Based on the bedrock geology (see Table 2) chemical conditions should not be expected to be any better.

Bourn Brook (Station 1.6) - The same four species (blacknose dace, brook and brown trout and slimy sculpin) were collected in 1993 and 1994. The two dominant species (slimy sculpin and brook trout) had nearly the same densities both years.

Bourn Brook (Station 4.1) - As was observed in 1993, only brook trout were captured. This site is definately a very low productivity reach with marginal fish habitat.

Branch Pond Brook (Station 0.1) - As was observed in 1993, only brook trout were captured. The pH and aluminum levels are indicative of an acid stressed environment.

Winhall River (Station 8.1) - Seven species of fish were collected in 1994 with the capture of one creek chub in the final run versus six in 1993. Greater relative abundance of each species was found in 1994 with the exception of atlantic salmon where approximately 50% fewer were captured. The Winhall is the only stream where the VTIBI can be calculated because enough non-salmonids species were collected. The VTIBI was 43 and maintains its excellent population integrity.

River	Date	TEMP °C	pH Std. U.	ALK mg/l	COND[0] µs/cm	DC2[1] Pt-Co	TC[2] Pt-Co	DCL[3] mg/l	DNO3[4] mg/l	DSO4[5] mg/l	DCA[6] mg/l	DMG[7] mg/l	DNA[8] mg/l	DK[9] mg/l	DAL[10] µg/l	IMAL[11] µg/l	OMAL[12] µg/l	DOC[13] mg/l
Winhall	06-Apr-94	1.0	5.68	0.71	18.3	45		0.30	0.26	3.88	1.37	0.42	0.63	0.47	190	35	71	3.74
Winhall	13-Apr-94	1.0	5.40	0.34	18.6	42	45	0.24	0.27	3.52	1.28	0.37	0.55	0.44	214	41	72	4.14
Winhall	28-Apr-94		5.01	0.19	17.3	67	55	0.25	0.17	3.43	1.12	0.30	0.43	0.41	246	63	93	5.41
Winhall	11-May-94	10.0	6.14	1.10	16.2	59	50	0.27	0.07	3.83	1.33	0.35	0.58	0.45	230	10	100	4.56
Winhall	18-May-94	9.0	5.44	0.64	16.5	64	50	0.25	0.06	3.97	1.32	0.35	0.56	0.41	246	70	82	5.27
Winhall	01-Aug-94	18.5	6.56	3.06	18.9	83	60	0.31	0.08	3.14	1.59	0.51	0.95	0.55	168	3	82	6.17
Winhall	14-Sep-94	12.5	6.66	3.42	22.5													
Winhall	19-Sep-94	10.5	6.70	3.39		80												
Winhall	03-Oct-94	4.5	5.98	1.37	19.5	71	50	0.45	0.03	4.30	1.58	0.49	0.73	0.54	231	10	106	6.05

Parameter:
[0]Cond = Conductivity
[1]DC2 = Filtered Color
[2]TC = Unfiltered Color
[3]DCL = Dissolved Chloride
[4]DNO_3 = Dissolved Nitrate
[5]DSO_4 = Dissolved Sulfate
[6]DCA = Dissolved Calcium
[7]DMG = Dissolved Magnesium
[8]DNA = Dissolved Sodium
[9]DK = Dissolved Potassium
[10]DAL = Dissolved Aluminum
[11]IMAL = Inorganic Monomeric Aluminum (most toxic form to aquatic biota)
[12]OMAL = Organic Monomeric Aluminum
[13]DOC = Dissolved Organic Carbon

[14] This Lye Brook sample was collected further downstream near the campsite just upstream from the parking area. The bedrock type is Dunham dolomite and imparts a considerable source of buffering. Lye Brook headwaters are located in an area of profound unconformity dominated by gneiss, quartzite and calc-silicate granulite. The lower site is located in Cheshire quartzite and between the upper and lower sites is the Dalton formation (a conglomerate found at the base of the southern Green Mountains).

Table 2. Chemistry of Lye Brook Wilderness Study Streams 1994

River	Date	TEMP °C	pH Std. U.	ALK mg/l	COND[9] µs/cm	DC2[1] Pt-Co	TC[2] Pt-Co	DCL[3] mg/l	DNO3[4] mg/l	DSO4[5] mg/l	DCA[6] mg/l	DMG[7] mg/l	DNA[8] mg/l	DK[9] mg/l	DAL[10] µg/l	IMAL[11] µg/l	OMAL[12] µg/l	DOC[13] mg/l
Bourn (Upper)	20-Sep-94	9.0	5.97	1.85	18.3	169	>70	0.48	0.03	3.46	1.29	0.59	1.04	0.58	348	12	120	9.03
Bourn (Lower)	14-Apr-94	1.5	4.85	-0.41	20.1	84	65	0.23	0.26	3.58	1.13	0.38	0.41	0.46	306	60	91	6.54
Bourn (Lower)	28-Apr-94	4.0	4.80	-0.55	17.7	104	>70	0.20	0.13	3.23	1.01	0.32	0.36	0.33	303	26	107	6.90
Bourn (Lower)	19-May-94	6.5	5.33	0.43	17.2	81	60	0.24	0.07	4.14	1.32	0.44	0.49	0.41	299	55	101	5.91
Bourn (Lower)	08-Aug-94	17.5	6.70	4.92	26.6	97	70	0.40	0.19	4.23	2.31	0.93	0.86	0.65	204	0	80	6.50
Bourn (Lower)	20-Sep-94	10.5	6.76	4.68	24.9	81	55	0.42	0.08	4.39	2.20	0.91	0.93	0.61	80	5	58	5.03
Branch Pond Bk.	06-Apr-94	1.0	4.73	-0.65	22.9	55		0.29	0.28	4.24	1.02	0.36	0.68	0.47	279	79	79	4.30
Branch Pond Bk.	13-Apr-94	1.0	4.66	-1.28	25.2	58	50	0.24	0.32	3.87	0.91	0.31	0.53	0.41	303	82	78	5.07
Branch Pond Bk.	28-Apr-94		4.61	-1.26	19.8	93	>70	0.17	0.20	3.01	0.73	0.24	0.39	0.31	314	61	90	6.56
Branch Pond Bk.	11-May-94	8.5	4.76	-0.72	18.7	84	65	0.23	0.06	3.71	0.87	0.27	0.54	0.38	309	26	127	5.84
Branch Pond Bk.	18-May-94	9.0	4.58	-1.05	20.1	88	70	0.22	0.06	3.84	0.89	0.27	0.52	0.34	315	89	100	6.46
Branch Pond Bk.	01-Aug-94	14.5	5.17	0.47	15.2	155	>70	0.26	0.01	2.73	0.82	0.30	0.88	0.41	312	25	114	8.75
Branch Pond Bk.	14-Sep-94	11.5	5.22	0.45	21.6													
Branch Pond Bk.	19-Sep-94	10.5	5.41	0.53		117												
Branch Pond Bk.	03-Oct-94	5.5	5.22	-0.29	20.8	86	65	0.39	<0.01	4.45	0.98	0.34	0.72	0.44	309	56	108	7.79
Lye (Upper)	28-Apr-94	4.0	4.46	-1.99	22.4	162	>70	0.18	0.09	3.07	0.58	0.20	0.35	0.36	342	89	134	9.31
Lye (Upper)	02-Oct-94	5.5	4.52	-1.56	29.4	194	>70	0.47	0.02	4.59	1.06	0.41	0.62	0.47	504	98	98	13.90
Lye (Lower)	16-Mar-94	1.0	6.10	1.92	24.2			0.42	0.20	4.82	0.95	0.77	0.63	0.61	276			
Lye (Lower)	14-Apr-94	2.0	4.54	-1.36	25.8	139	>70	0.26	0.22	3.65	0.87	0.36	0.37	0.48	456	119	101	9.09
Lye (Lower)	28-Apr-94	5.0	4.70	-0.82	18.8	163	>70	0.56	0.08	3.22	0.81	0.34	0.34	0.35	348	103	109	9.47
Lye (Lower)	19-May-94	6.5	5.46	0.88	18.2	148	>70	0.22	0.07	4.06	1.40	0.64	0.43	0.39	390	84	130	8.88
Lye (Lower)	20-Sep-94	10.5	6.77	5.56	30.6	137	>70	0.50	0.11	4.27	2.42	1.22	0.83	0.54	276	13	83	7.99
Lye (Lowest)[14]	03-Aug-94	17.5	7.43	24.10	58.8	114	>70	0.46	0.21	4.14	6.22	3.28	0.65	0.53	192	15	92	6.77

1994 Lye Brook Chemistry Results

(Streams)

Table 1. Chemistry of Lye Brook Wilderness Study Lakes - 1994

Lake	Depth (m)	Date	TEMP °C	pH Std. U.	ALK mg/l	COND[6] µs/cm	DC2[1] Pt-Co	TC[2] Pt-Co	DCL[3] mg/l	DNO3[4] mg/l	DSO4[5] mg/l	DCA[6] mg/l	DMG[7] mg/l	DNA[8] mg/l	DK[9] mg/l	DAL[10] µg/l	IMAL[11] µg/l	OMAL[12] µg/l	DOC[13] mg/l
Bourn	1	10-May-94	11.2	5.07	0.01	14.8	64	60	0.25	0.11	3.03	0.82	0.29	0.44	0.33	252	42	69	4.52
Bourn	1	20-Jul-94	22.6	5.28	0.26	14.0	112	>70	0.23	<0.01	3.29	0.70	0.30	0.48	0.32	312	27	63	5.43
Bourn	8	20-Jul-94	8.0	5.34	1.07	14.9	128	>70	0.24	<0.01	3.09	0.79	0.31	0.47	0.36	279	9	77	5.52
Bourn	1	29-Sep-94	13.0	5.36	0.79	15.6	67	>70	0.26	<0.01	3.22	0.76	0.33	0.49	0.34	195	24	49	5.43
Branch	1	10-May-94	9.8	4.67	-0.85	19.0	88	>70	0.28	0.12	3.36	0.74	0.24	0.42	0.34	315	95	68	5.30
Branch	1	20-Jul-94	21.7	4.76	-0.67	19.7	71	55	0.36	0.03	4.02	0.61	0.24	0.53	0.35	252	79	57	4.85
Branch	9	20-Jul-94	4.3	4.76	-0.68	20.3	91	65	0.32	0.12	3.81	0.70	0.24	0.53	0.44	292	99	69	4.88
Branch	1	29-Sep-94	12.4	4.68	-0.74	21.3	77	>70	0.33	0.04	3.97	0.71	0.24	0.50	0.41	270	69	51	5.12

Parameter:

[6]Cond = Conductivity
[1]DC2 = Filtered Color
[2]TC = Unfiltered Color
[3]DCL = Dissolved Chloride
[4]DNO_3 = Dissolved Nitrate
[5]DSO_4 = Dissolved Sulfate
[6]DCA = Dissolved Calcium
[7]DMG = Dissolved Magnesium
[8]DNA = Dissolved Sodium
[9]DK = Dissolved Potassium
[10]DAL = Dissolved Aluminum
[11]IMAL = Inorganic Monomeric Aluminum (most toxic form to aquatic biota)
[12]OMAL = Organic Monomeric Aluminum
[13]DOC = Dissolved Organic Carbon

1994 Lye Brook Chemistry Results

(Lakes)

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