

Duck Brook Benthic Macroinvertebrate Survey, Acadia National Park, April, 1997

Acadia National Park Natural Resource Report, 99-03

Prepared by Bob Breen, March 1999

Introduction

A survey of benthic macroinvertebrates in Duck Brook, Acadia National Park was conducted by the Maine Department of Environmental Protection in response to the possible contamination of aquatic resources from chlorinated water. A hundred-year-old drinking water line, owned by the Bar Harbor Water Company, broke on January 22, 1997, and began discharging approximately 0.6ppm chlorinated water into Duck Brook. The discharge rate was initially estimated at 2.5 million gallons/day for 2 to 3 hours before the Water Company discovered the leak and reduced the flow to about 300,000 gal/day. On February 26, Acadia National Park staff inspected the broken line, which continued to discharge at an estimated rate of 75,000 gallons/day. The broken pipe continued to discharge at a reduced flow, needed to prevent further freezing and cracking of the water line and control valve, for several weeks until the line was permanently shut down.

Park resource staff concerned about the potential ecological consequences of the chlorinated water to the brook contacted the National Park Service Water Resource Division and the Maine Department of Environmental Protection to seek guidance in assessing the potential impacts. The Water Resources Division provided advice on possible consequences of chlorine contamination on aquatic resources and suggested sampling strategies to better define the amount of chlorine being added to the brook. The Maine DEP conducted water sampling to determine chlorine concentrations in the brook, and also conducted a rapid bio-assessment of benthic macroinvertebrates.

On March 5, Barry Mower of the Maine Department of Environmental Protection was notified of the incident. Jim Sohn (MDEP) and Bill Harding of the BH Water Company visited the site on March 7 and measured chlorine concentration at the pipe of 0.6 ppm, and in the stream (approximately 10 feet below the mixing zone) at 0.0 ppm. After consultation between Maine DEP and the Bar Harbor Water Company the flow from the broken pipe was further reduced.

Also on March 7, Bill Gawley and Bob Breen, Acadia NP, measured flow/volume in Duck Brook at 21.1 cubic feet per second. Duck Brook was relatively shallow; less than 1 foot in most places, with a rocky substrate, and a number of riffles which mixed and aerated the water. Also, there was about 25-30 feet of steep rocky slope over which the chlorinated water from the broken pipe flowed before entering the brook. Both of these factors quite likely resulted in a fair amount of volatilization of the chlorine before and after it entered the brook.

Rapid Bio-Assessment Methods

On April 4, 1997 Susan Davies, Leon Tsmoides, and Jim Sohns of Maine DEP, and Bob Breen conducted a benthic macroinvertebrate survey using rapid bioassessment methodology on Duck

Brook. Two sites, approximately 75 feet above and 50 feet below the spill mixing zone, were surveyed (see map). D-ring kick nets were used to sample midstream and along the shoreline. Large rocks, branches and leaves were also selectively sampled for invertebrate fauna at each site.

Care was taken to sample the two sites for the same length of time and intensity. The contents of the sample nets was transferred into sieve buckets and invertebrate fauna were separated and sorted into glass bottles and preserved with a 70% ethyl alcohol solution for transport to the laboratory. All procedures followed standard Maine DEP biological sampling methods.

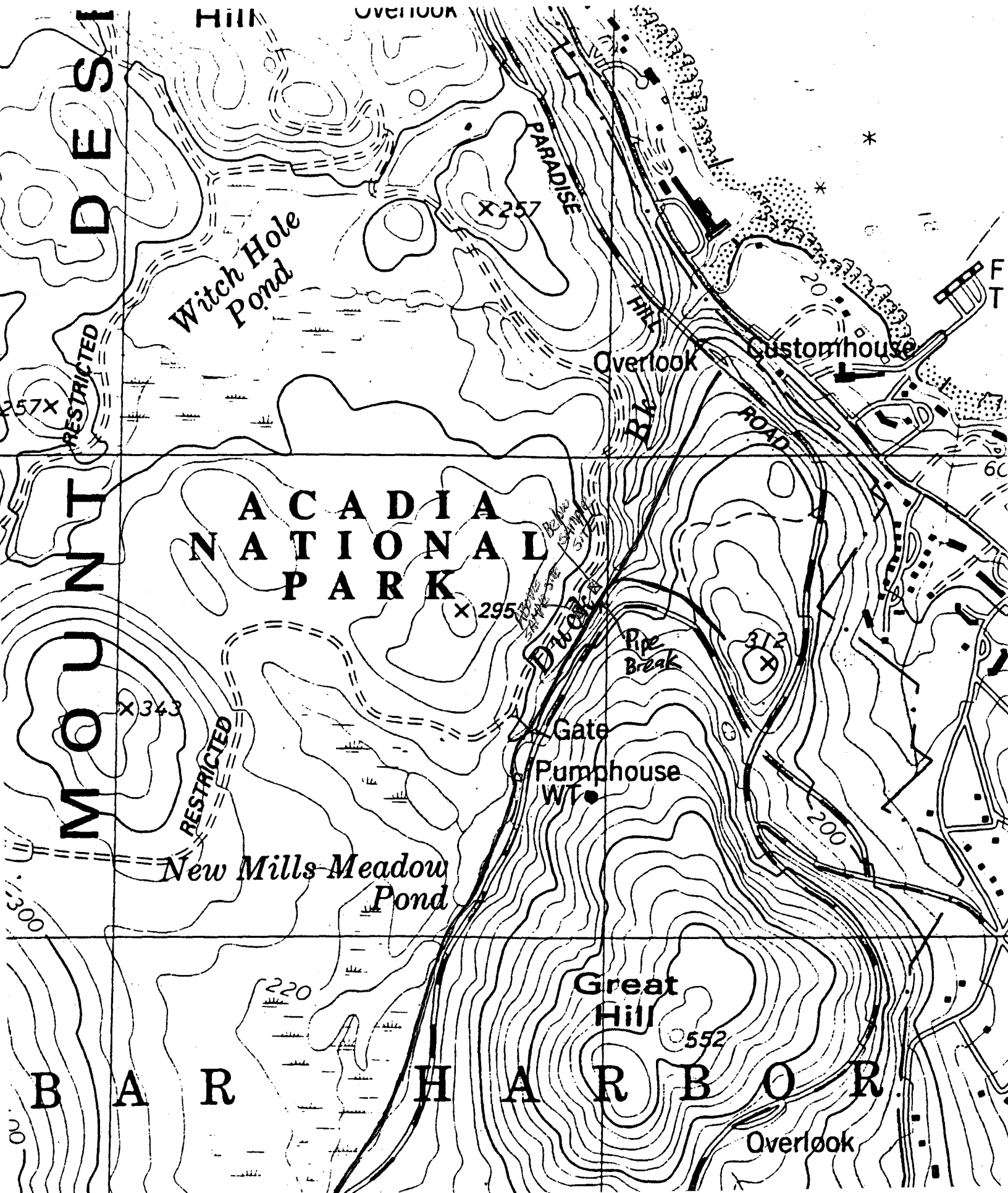
Results

Taxonomic identification was performed by Michael Winnell, Freshwater Benthic Services, Inc. under contract to Maine DEP (see attached report). Species diversity and total number of individuals collected at each site were very similar with 33 species and 148 total benthos at the above site, and 27 species and 153 total benthos at the below site. A total of 37 species of invertebrates was identified at the two sites. These findings suggest that there were no substantial impacts to benthic invertebrate fauna in Duck Brook as a result of the introduced chlorinated water.

A reference collection of the 37 species identified was prepared and archived into the Acadia National Park natural history collection.

Discussion

As a result of this collaborative one-time rapid bio-assessment of benthic invertebrates in Duck Brook, Maine DEP and park resource managers have established a cooperative relationship to conduct annual monitoring of benthic macroinvertebrates in selected streams at Acadia National Park. In 1997, park resource staff, following Maine DEP standardized procedures for benthic macroinvertebrate sampling, conducted sampling in Stanley, Hunters, Cannon, and Duck brooks.



Water Body: Duck Brook
Town: Acadia National Park

Method: Kicks (2 min)
Stream Order: 1
Sample Date: 4/4/97

TAXA GROUP	UPSTREAM		DOWNSTREAM	
	Density	Richness	Density	Richness
Ephemeroptera	523	5	51	5
Plecoptera	25	4	4	2
Trichoptera	61	6	90	6
Coleoptera	30	6	73	5
Odonata	4	1	4	2
Chironomidae	214	4	269	4
Other Diptera	5	2	75	2
Amphipoda	40	1	31	1
Isopoda	0	0	1	1
Oligochaeta	2	1	9	2
Mollusca	4	1	0	0
Hydrachnidia	0	0	1	1

LOG 608

Maine Department of Environmental Protection
Logsheet for Benthic Macroinvertebrates Identified

Michael Winnell -- Freshwater Benthic Services, Inc.

Sample Log No.:	608
Waterbody Name:	Duck Bk. - Below
Town Name:	Acadia National Park
Date of Collection:	04-Apr-97
Subsample Factor:	1.00
Sampler Type:	Sample

Bar Code No.	Taxon		Number identified from Sample		
	Genus	Species	Sample 1		
	Caecidotea	communis	3		
09020604015	Cheumatopsyche		5		
09020601003	Chimarra		3		
09020601001	Dolophilodes		1		
09020410035	Ephemerella	invaria	3		
	Ephemerella/Serratella		2		
09021011041	Eukiefferiella	gracei-gr.	1		
09021011041	Eukiefferiella	nr. brevicar-gr.	1		
09020604016	Hydropsyche	sparna	8		
09020604016	Hydropsyche		1		
09020611064	Lepidostoma		7		
09020402011	Leucrocuta	hebe	1		
	Lumbricidae		2		
09021011070	Micropsectra		1		
09021011094	Microtendipes	pedellus-gr.	1		
09021011049	Nanocladius	downesi	2		
09020610062	Neophylax		1		
09020701003	Nigronia	serricornis	1		
09020406026	Paraleptophlebia		8		
09021011053	Parametriocnemus		2		
09021012045	Prosimulium	mixtum-gr. sp.1	47		
09021012045	Prosimulium	mixtum-gr. sp.2	12		
09021108058	Psephenus	herricki	2		
09020402013	Rhithrogena		9		
09020605019	Rhyacophila	fuscata	8		
09020402015	Stenonema	modestum	1		
09020202012	Strophopteryx	fasciatus	3		
09020208040	Sweltsa		1		
	Synurella	chamberlaini	16		

Total Benthos	153		
Total OTUs	29		
Total spp.	27		

Below (Spill w/ chlorinated water)

KEY REPORT

PRINTED 07/15/97 @ 11:41

STATION ID:

LOG NUMBER: 608

LAST CALCULATED: 07/15/97

ADJUSTED TO GENUS

MODEL CALCULATED: / /

River Basin CENTRAL AND
Water Body DUCK BROOK
Town ACADIA NATIONAL
Stream Order 1

Sample Method M
Subsample Factor X1
Ref LOG # 0
Date IN 04/04/97
Date OUT 04/04/97

SUMMARY OF HABITAT CHARACTERISTICS

Land Use	Terrain	Temp	-99
	Cover	Width	-99.0
	Pollutant	Depth	-99.0
		Veloc	-99.00

Substrate Composition

Bedrock	-99	Gravel	-99
Boulder	-99	Sand	-99
Rubble	-99	Silt	-99
		Detritus	-99

GIS Site Location
Latitude
Longitude

Legislative Class: Model Classification: with P >= 60%

Classification Attainment Model Probabilities

<u>First Stage Model</u>		<u>C or better Model</u>	
Class A	0.00000	Class A,B, or C	0.00000
Class C	0.00000	Non-Attainment	0.00000

<u>B or Better Model</u>		<u>A Model</u>	
Class A or B	0.00000	Class A	0.00000
Class C or Non-Attainment	0.00000	Class B or C or Non-Attainment	0.00000

Model Variable Values

01 TOT ABUN	153.000	07 REL ABUN CHI	0.052	13 REL ABUN OLI	0.013
02 GEN RICH	26.000	08 REL RICH DIP	0.230	14 PROB AB 1ST	0.000
03 PLEC ABUN	4.000	09 HYDRO ABUN	9.000	15 PERL ABUN	0.000
04 EPHEM ABUN	24.000	10 PROB ABC 1ST	0.000	16 TANYPOD ABUN	0.000
05 SW GEN DIV	3.480	11 CHEUM ABUN	5.000	17 CHIRON ABUN	1.000
06 HILS BIO IND	3.270	12 EPT/DIPT	2.500	18 REL AB EPHEM	0.156
19 EPT GEN RICH	15.000	25 SUM ABUN	5.000	5 Dominant Taxa	
20 PROB(AB) SUB	0.000	26 SUM ABUN	1.000	PROSIMULIUM	38.5
21 SUMMED ABUN	1.000	27 PROB(A) SUB	0.000	SYNURELLA	10.4
22 PROB(A) 1ST	0.000	28 EP GEN RICH	0.571	RHITHROGENA	5.8
23 REL PLEC RI	0.076	29 DOM A IND	0.000	HYDROPSYCHE	5.8
24 REL AB BRACH	0.000	30 PRES A INDIC	0.142	PARALEPTOPHLEBIA	5.2

KEY REPORT

PRINTED 07/15/97 @ 11:41

STATION ID:

LOG NUMBER: 608

LAST CALCULATED: 07/15/97

MODEL CALCULATED: / /

TAXA	CODE	AVG/BSKT		BI	FG	R/K	REL		ABUND
		ACTUAL	ADJUST				ACT	ADJ	
LUMBRICIDAE	08020205	2.0	2.0				1.3	1.3	
CAECIDOTEA	09010101001	0.0	3.0	8	S		0.0	1.9	
CAECIDOTEA	09010101001001	3.0	0.0	8	S		1.9	0.0	
SYNURELLA	09010202006	0.0	16.0				0.0	10.4	
SYNURELLA	09010202006001	16.0	0.0				10.4	0.0	
STROPHOPTERYX	09020202012	0.0	3.0	3	SC		0.0	1.9	
STROPHOPTERYX	09020202012022	3.0	0.0	3	SC		1.9	0.0	
SWELTSIA	09020208040	1.0	1.0		PR		0.6	0.6	
LEUCROCUTA	09020402011	0.0	1.0	1	SC		0.0	0.6	
LEUCROCUTA	09020402011038	1.0	0.0	1	SC		0.6	0.0	
RHITHROGENA	09020402013	9.0	9.0	0	CG		5.8	5.8	
STENONEMA	09020402015	0.0	1.0	4	SC		0.0	0.6	
STENONEMA	09020402015051	1.0	0.0	4	SC		0.6	0.0	
PARALEPTOPHLEBIA	09020406026	8.0	8.0	1	CG		5.2	5.2	
EPHEMERELLIDAE	09020410	2.0	2.0				1.3	1.3	
EPHEMERELLA	09020410035	0.0	3.0	1	CG		0.0	1.9	
EPHEMERELLA	09020410035107	3.0	0.0	1	CG		1.9	0.0	
DOLOPHILODES	09020601001	1.0	1.0	0	CF		0.6	0.6	
CHIMARRA	09020601003	3.0	3.0	2	CF		1.9	1.9	
CHEUMATOPSYCHE	09020604015	5.0	5.0	5	CF		3.2	3.2	
HYDROPSYCHE	09020604016	1.0	9.0	4	CF		0.6	5.8	
HYDROPSYCHE	09020604016032	8.0	0.0	4	CF		5.2	0.0	
RHYACOPHILA	09020605019	0.0	8.0	2	PR		0.0	5.2	
RHYACOPHILA	09020605019060	8.0	0.0	2	PR		5.2	0.0	
NEOPHYLAX	09020610062	1.0	1.0	3	SC		0.6	0.6	
LEPIDOSTOMA	09020611064	7.0	7.0	1	S		4.5	4.5	
NIGRONIA	09020701003	0.0	1.0	0	PR		0.0	0.6	
NIGRONIA	09020701003003	1.0	0.0	0	PR		0.6	0.0	
EUKIEFFERIELLA	09021011041	0.0	2.0	8	CG		0.0	1.3	
EUKIEFFERIELLA	09021011041074	1.0	0.0	8	CG		0.6	0.0	
EUKIEFFERIELLA	09021011041079	1.0	0.0	8	CG		0.6	0.0	
NANOCLADIUS	09021011049	0.0	2.0	3	CG		0.0	1.3	
NANOCLADIUS	09021011049092	2.0	0.0	3	CG		1.3	0.0	
PARAMETRIOCNEMUS	09021011053	2.0	2.0	5	CG		1.3	1.3	
MICROPSECTRA	09021011070	1.0	1.0	7	CG		0.6	0.6	
MICROTENDIPES	09021011094	0.0	1.0	6	CF		0.0	0.6	
MICROTENDIPES	09021011094166	1.0	0.0	6	CF		0.6	0.0	
PROSIMULIUM	09021012045	0.0	59.0	4	CF		0.0	38.5	
PROSIMULIUM	09021012045047	59.0	0.0	4	CF		38.5	0.0	
PSEPHENUS	09021108058	0.0	2.0	4	SC		0.0	1.3	
PSEPHENUS	09021108058028	2.0	0.0	4	SC		1.3	0.0	

TOTAL

153.0

100.0

LOG 607
Maine Department of Environmental Protection
Logsheet for Benthic Macroinvertebrates Identified

Michael Winnell -- Freshwater Benthic Services, Inc.

Sample Log No.:	607
Waterbody Name:	Duck Bk. - Above
Town Name:	Acadia National Park
Date of Collection:	04-Apr-97
Subsample Factor:	1.00
Sampler Type:	Sample

Bar Code No.	Taxon		Number identified from Sample		
	Genus	Species	Sample 1		
09020209042	Acroneuria	abnormis	1		
09020209042	Acroneuria		2		
090102	Amphipoda	(genus ?)	1		
09020301004	Boyeria	vinosa	1		
	Caecidotea	(female)	1		
09020604015	Cheumatopsyche		6		
09020601003	Chimarra		8		
09020410035	Ephemerella	invaria	9		
09020410035	Ephemerella	rotunda	6		
	Ephemerella/Serratella		3		
09021011041	Eukiefferiella	nr. brevicar-gr.	1		
09020604016	Hydropsyche	betteni complex	1		
09020604016	Hydropsyche	sparna	5		
09020207026	Isoperla	?similis	1		
09020611064	Lepidostoma		11		
09020406	Leptophlebiidae	(prob. Paraleptophlebia)	14		
09020402011	Leucrocuta	hebe	4		
	Lumbricidae		2		
09021011094	Microtendipes	pedellus-gr.	1		
09021011049	Nanocladius	downesi	6		
09020701003	Nigronia	serricornis	4		
09021011053	Parametriocnemus		1		
09021012045	Prosimulium	mixtum-gr. sp.1	19		
09021012045	Prosimulium	mixtum-gr. sp.2	1		
09021108058	Psephenus	herricki	1		
09020610049	Pycnopsyche		2		
09020402013	Rhithrogena		3		
09020605019	Rhyacophila	fuscula	1		
09020402014	Stenacron	modestum	7		
09020202012	Strophopteryx	fasciatus	2		
09020208040	Sweltsa		5		
	Synurella	chamberlaini	14		
09021011076	Tanytarsus	sp.06	2		
09021011062	Thienemanniella		1		
09021001002	Tipula		1		

Total Benthos	148		
Total OTUs	35		
Total spp.	33		

above spill zone

KEY REPORT

PRINTED 07/15/97 @ 11:41

STATION ID:

LOG NUMBER: 607

LAST CALCULATED: 07/15/97

ADJUSTED TO GENUS

MODEL CALCULATED: / /

River Basin CENTRAL AND
Water Body DUCK BROOK
Town ACADIA NATIONAL
Stream Order 1

Sample Method M
Subsample Factor X1
Ref LOG # 0
Date IN 04/04/97
Date OUT 04/04/97

SUMMARY OF HABITAT CHARACTERISTICS

Land Use	Terrain	Temp	-99
	Cover	Width	-99.0
	Pollutant	Depth	-99.0
		Veloc	-99.00

Substrate Composition

Bedrock	-99	Gravel	-99
Boulder	-99	Sand	-99
Rubble	-99	Silt	-99
		Detritus	-99

GIS Site Location
Latitude
Longitude

Legislative Class: Model Classification: with P >= 60%

Classification Attainment Model Probabilities

<u>First Stage Model</u>		<u>C or better Model</u>	
Class A	0.00000	Class A,B, or C	0.00000
Class C	0.00000	Non-Attainment	0.00000

<u>B or Better Model</u>		<u>A Model</u>	
Class A or B	0.00000	Class A	0.00000
Class C or Non-Attainment	0.00000	Class B or C or Non-Attainment	0.00000

Model Variable Values

01 TOT ABUN	148.000	07 REL ABUN CHI	0.081	13 REL ABUN OLI	0.013
02 GEN RICH	29.000	08 REL RICH DIP	0.275	14 PROB AB 1ST	0.000
03 PLEC ABUN	11.000	09 HYDRO ABUN	6.000	15 PERL ABUN	3.000
04 EPHEM ABUN	46.000	10 PROB ABC 1ST	0.000	16 TANYPD ABUN	0.000
05 SW GEN DIV	4.230	11 CHEUM ABUN	6.000	17 CHIRON ABUN	1.000
06 HILS BIO IND	2.790	12 EPT/DIPT	1.875	18 REL AB EPHEM	0.310
19 EPT GEN RICH	15.000	25 SUM ABUN	8.000	5 Dominant Taxa	
20 PROB(AB) SUB	0.000	26 SUM ABUN	10.000	PROSIMULIUM	13.5
21 SUMMED ABUN	0.000	27 PROB(A) SUB	0.000	EPHEMERELLA	12.1
22 PROB(A) 1ST	0.000	28 EP GEN RICH	0.642	SYNURELLA	9.4
23 REL PLEC RI	0.137	29 DOM A IND	0.000	LEPTOPHLEBIIDAE	9.4
24 REL AB BRACH	0.000	30 PRES A INDIC	0.142	LEPIDOSTOMA	7.4

KEY REPORT
 PRINTED 07/15/97 @ 11:41

STATION ID:
 LOG NUMBER: 607 LAST CALCULATED: 07/15/97 MODEL CALCULATED: / /

TAXA	CODE	AVG/BSKT		BI	FG R/K	REL ABUND	
		ACTUAL	ADJUST			ACT	ADJ
LUMBRICIDAE	08020205	2.0	2.0			1.3	1.3
CAECIDOTEA	09010101001	1.0	1.0	8	S	0.6	0.6
AMPHIPODA	090102	1.0	1.0	08		0.6	0.6
SYNURELLA	09010202006	0.0	14.0			0.0	9.4
SYNURELLA	09010202006001	14.0	0.0			9.4	0.0
STROPHOPTERYX	09020202012	0.0	2.0	3	SC	0.0	1.3
STROPHOPTERYX	09020202012022	2.0	0.0	3	SC	1.3	0.0
ISOPERLA	09020207026	0.0	1.0	2	PR	0.0	0.6
ISOPERLA	09020207026085	1.0	0.0	2	PR	0.6	0.0
SWELTSIA	09020208040	5.0	5.0		PR	3.3	3.3
ACRONEURIA	09020209042	2.0	3.0	0	PR	1.3	2.0
ACRONEURIA	09020209042121	1.0	0.0	0	PR	0.6	0.0
BOYERIA	09020301004	0.0	1.0	2	PR	0.0	0.6
BOYERIA	09020301004012	1.0	0.0	2	PR	0.6	0.0
LEUCROCUTA	09020402011	0.0	4.0	1	SC	0.0	2.7
LEUCROCUTA	09020402011038	4.0	0.0	1	SC	2.7	0.0
RHITHROGENA	09020402013	3.0	3.0	0	CG	2.0	2.0
STENONEMA	09020402015	0.0	7.0	4	SC	0.0	4.7
STENONEMA	09020402015051	7.0	0.0	4	SC	4.7	0.0
LEPTOPHLEBIIDAE	09020406	14.0	14.0			9.4	9.4
EPHEMERELLIDAE	09020410	3.0	0.0			2.0	0.0
EPHEMERELLA	09020410035	0.0	18.0	1	CG	0.0	12.1
EPHEMERELLA	09020410035107	9.0	0.0	1	CG	6.0	0.0
EPHEMERELLA	09020410035109	6.0	0.0	1	CG	4.0	0.0
CHIMARRA	09020601003	8.0	8.0	2	CF	5.4	5.4
CHEUMATOPSYCHE	09020604015	6.0	6.0	5	CF	4.0	4.0
HYDROPSYCHE	09020604016	0.0	6.0	4	CF	0.0	4.0
HYDROPSYCHE	09020604016032	5.0	0.0	4	CF	3.3	0.0
HYDROPSYCHE	09020604016037	1.0	0.0	4	CF	0.6	0.0
RHYACOPHILA	09020605019	0.0	1.0	2	PR	0.0	0.6
RHYACOPHILA	09020605019060	1.0	0.0	2	PR	0.6	0.0
PYCNOPSYCHE	09020610049	2.0	2.0	4	S	1.3	1.3
LEPIDOSTOMA	09020611064	11.0	11.0	1	S	7.4	7.4
NIGRONIA	09020701003	0.0	4.0	0	PR	0.0	2.7
NIGRONIA	09020701003003	4.0	0.0	0	PR	2.7	0.0
TIPULA	09021001002	1.0	1.0	4	S	0.6	0.6
EUKIEFFERIELLA	09021011041	0.0	1.0	8	CG	0.0	0.6
EUKIEFFERIELLA	09021011041074	1.0	0.0	8	CG	0.6	0.0
NANOCLADIUS	09021011049	0.0	6.0	3	CG	0.0	4.0
NANOCLADIUS	09021011049092	6.0	0.0	3	CG	4.0	0.0
PARAMETRIOCNEMUS	09021011053	1.0	1.0	5	CG	0.6	0.6
THIENEMANNIELLA	09021011062	1.0	1.0	6	CG	0.6	0.6
TANYTARSUS	09021011076	2.0	2.0	6	CF	1.3	1.3
TOTAL		126.0				85.1	

KEY REPORT

PRINTED 07/15/97 @ 11:41

STATION ID:

LOG NUMBER: 607

LAST CALCULATED: 07/15/97

MODEL CALCULATED: / /

TAXA	CODE	AVG/BSKT		BI	FG	R/K	REL ABUND	
		ACTUAL	ADJUST				ACT	ADJ
MICROTENDIPES	09021011094	1.0	1.0	6	CF		0.6	0.6
PROSIMULIUM	09021012045	0.0	20.0	4	CF		0.0	13.5
PROSIMULIUM	09021012045047	20.0	0.0	4	CF		13.5	0.0
PSEPHENUS	09021108058	0.0	1.0	4	SC		0.0	0.6
PSEPHENUS	09021108058028	1.0	0.0	4	SC		0.6	0.0

TOTAL

148.0

100.0

Acadia Natl Park (02)

Maine Department of Environmental Protection Reference Collection
Acadia National Park

Total Number of Species in Reference Collection: 37

Current Date: 01-Jul-97

Michael Winnell -- Freshwater Benthic Services, Inc.

Source column: S = slide, V = vial, OV = oversized vial

Reference collection in alphabetic order

Reference Number	Source	Phylum	Class	Order	Family	Genus/species	Log No.	Town	Date of Collection
035	S	Annelida	Oligochaeta	Lumbricida	Lumbricidae	?	607	Duck Bk.	04-Apr-97
002	V	Arthropoda	Crustacea	Amphipoda	Crangonyctidae	Synurella chamberlaini	607	Duck Bk.	04-Apr-97
006	V	Arthropoda	Crustacea	Amphipoda	?	?	607	Duck Bk.	04-Apr-97
027	V	Arthropoda	Crustacea	Isopoda	Asellidae	Caecidotea sp.	607	Duck Bk.	04-Apr-97
012	V	Arthropoda	Insecta	Coleoptera	Pspheniidae	Psphenus herricki	608	Duck Bk.	04-Apr-97
036	S	Arthropoda	Insecta	Diptera	Chironomidae	Eukiefferiella gracei-gr.	608	Duck Bk.	04-Apr-97
033	S	Arthropoda	Insecta	Diptera	Chironomidae	Eukiefferiella nr. brevicar-gr.	607	Duck Bk.	04-Apr-97
037	S	Arthropoda	Insecta	Diptera	Chironomidae	Micropsectra sp.	608	Duck Bk.	04-Apr-97
029	S	Arthropoda	Insecta	Diptera	Chironomidae	Microtendipes pedellus-gr.	607	Duck Bk.	04-Apr-97
030	S	Arthropoda	Insecta	Diptera	Chironomidae	Nanocladius dowensi	607	Duck Bk.	04-Apr-97
032	S	Arthropoda	Insecta	Diptera	Chironomidae	Parametrioctonus sp.	607	Duck Bk.	04-Apr-97
031	S	Arthropoda	Insecta	Diptera	Chironomidae	Tanytarsus sp.06	607	Duck Bk.	04-Apr-97
034	S	Arthropoda	Insecta	Diptera	Chironomidae	Thienemanniella sp.	607	Duck Bk.	04-Apr-97
010	V	Arthropoda	Insecta	Diptera	Simuliidae	Prosimulium sp. 01	607	Duck Bk.	04-Apr-97
011	V	Arthropoda	Insecta	Diptera	Simuliidae	Prosimulium sp. 02	608	Duck Bk.	04-Apr-97
007	V	Arthropoda	Insecta	Diptera	Tipulidae	Tipula sp.	607	Duck Bk.	04-Apr-97
015	V	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Ephemerella invaria	607	Duck Bk.	04-Apr-97
014	V	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Ephemerella rotunda	607	Duck Bk.	04-Apr-97
026	V	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Leucocuta hebe	607	Duck Bk.	04-Apr-97
003	V	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Rhithrogena sp.	607, 608	Duck Bk.	04-Apr-97
005	V	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Stenonema modestum	607	Duck Bk.	04-Apr-97
013	V	Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae	Paraleptophlebia sp.	608	Duck Bk.	04-Apr-97
028	OV	Arthropoda	Insecta	Megaloptera	Corydalidae	Nigronia serricornis	607	Duck Bk.	04-Apr-97
025	V	Arthropoda	Insecta	Odonata	Aeschnidae	Boyeria vinosa	607	Duck Bk.	04-Apr-97
004	V	Arthropoda	Insecta	Plecoptera	Chloroperlidae	Sweltsa sp.	607	Duck Bk.	04-Apr-97
019	V	Arthropoda	Insecta	Plecoptera	Perlidae	Acroneuria abnormis	607	Duck Bk.	04-Apr-97

Acadia Natl Park (02)

Reference collection in alphabetic order

Reference Number	Source	Phylum	Class	Order	Family	Genus/species	Log No.	Town	Date of Collection
024	V	Arthropoda	Insecta	Plecoptera	Perlodidae	Isoperla ?similis	607	Duck Bk.	04-Apr-97
008	V	Arthropoda	Insecta	Plecoptera	Taeniopterygidae	Strophopteryx fasciata	607, 608	Duck Bk.	04-Apr-97
016	V	Arthropoda	Insecta	Trichoptera	Hydropsychidae	Cheumatopsyche sp.	607	Duck Bk.	04-Apr-97
017	V	Arthropoda	Insecta	Trichoptera	Hydropsychidae	Hydropsyche betteni complex	607	Duck Bk.	04-Apr-97
018	V	Arthropoda	Insecta	Trichoptera	Hydropsychidae	Hydropsyche sparna	607, 608	Duck Bk.	04-Apr-97
021	V	Arthropoda	Insecta	Trichoptera	Lepidostomatidae	Lepidostoma sp.	607	Duck Bk.	04-Apr-97
023	V	Arthropoda	Insecta	Trichoptera	Limnophilidae	Pycnopsyche sp.	607	Duck Bk.	04-Apr-97
009	V	Arthropoda	Insecta	Trichoptera	Philopotamidae	Chimarra sp.	607	Duck Bk.	04-Apr-97
022	V	Arthropoda	Insecta	Trichoptera	Philopotamidae	Dolophilodes sp.	608	Duck Bk.	04-Apr-97
001	V	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila fuscula	607, 608	Duck Bk.	04-Apr-97
020	V	Arthropoda	Insecta	Trichoptera	Uenoidae	Neophylax sp.	607	Duck Bk.	04-Apr-97

Acadia Natl Park (01)

Maine Department of Environmental Protection Reference Collection
Acadia National Park

Total Number of Species in Reference Collection: 37

Current Date: 01-Jul-97

Michael Winnell -- Freshwater Benthic Services, Inc. (616) 347-9752 e mail: benthos@freeway.net
Source column: S = slide, V = vial, OV = oversized vial

Reference collection in numerical order

Reference Number	Source	Phylum	Class	Order	Family	Genus/species	Log No.	Town	Date of Collection
001	V	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila fuscula	607, 608	Duck Bk.	04-Apr-97
002	V	Arthropoda	Crustacea	Amphipoda	Crangonyctidae	Synurella chamberlaini	607	Duck Bk.	04-Apr-97
003	V	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Rhithrogena sp.	607, 608	Duck Bk.	04-Apr-97
004	V	Arthropoda	Insecta	Plecoptera	Chloroperlidae	Sweltsa sp.	607	Duck Bk.	04-Apr-97
005	V	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Stenonema modestum	607	Duck Bk.	04-Apr-97
006	V	Arthropoda	Crustacea	Amphipoda	?	?	607	Duck Bk.	04-Apr-97
007	V	Arthropoda	Insecta	Diptera	Tipulidae	Tipula sp.	607	Duck Bk.	04-Apr-97
008	V	Arthropoda	Insecta	Plecoptera	Taeniopterygidae	Strophopteryx fasciata	607, 608	Duck Bk.	04-Apr-97
009	V	Arthropoda	Insecta	Trichoptera	Philopotamidae	Chimarra sp.	607	Duck Bk.	04-Apr-97
010	V	Arthropoda	Insecta	Diptera	Simuliidae	Prosimulium sp. 01	607	Duck Bk.	04-Apr-97
011	V	Arthropoda	Insecta	Diptera	Simuliidae	Prosimulium sp. 02	608	Duck Bk.	04-Apr-97
012	V	Arthropoda	Insecta	Coleoptera	Pspheniidae	Psphenus herricki	608	Duck Bk.	04-Apr-97
013	V	Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae	Paraleptophlebia sp.	608	Duck Bk.	04-Apr-97
014	V	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Ephemerella rotunda	607	Duck Bk.	04-Apr-97
015	V	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Ephemerella invaria	607	Duck Bk.	04-Apr-97
016	V	Arthropoda	Insecta	Trichoptera	Hydropsychidae	Cheumatopsyche sp.	607	Duck Bk.	04-Apr-97
017	V	Arthropoda	Insecta	Trichoptera	Hydropsychidae	Hydropsyche betteni complex	607	Duck Bk.	04-Apr-97
018	V	Arthropoda	Insecta	Trichoptera	Hydropsychidae	Hydropsyche sparna	607, 608	Duck Bk.	04-Apr-97
019	V	Arthropoda	Insecta	Plecoptera	Perlidae	Acroneuria abnormis	607	Duck Bk.	04-Apr-97
020	V	Arthropoda	Insecta	Trichoptera	Uenoidae	Neophylax sp.	607	Duck Bk.	04-Apr-97
021	V	Arthropoda	Insecta	Trichoptera	Lepidostomatidae	Lepidostoma sp.	607	Duck Bk.	04-Apr-97
022	V	Arthropoda	Insecta	Trichoptera	Philopotamidae	Dolophilodes sp.	608	Duck Bk.	04-Apr-97
023	V	Arthropoda	Insecta	Trichoptera	Limnophilidae	Pycnopsyche sp.	607	Duck Bk.	04-Apr-97
024	V	Arthropoda	Insecta	Plecoptera	Perlidae	Isoperla ?similis	607	Duck Bk.	04-Apr-97
025	V	Arthropoda	Insecta	Odonata	Aeschnidae	Boyeria vinosa	607	Duck Bk.	04-Apr-97
026	V	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Leucocuta hebe	607	Duck Bk.	04-Apr-97

Acadia Natl Park (01)

Reference collection in numerical order

Reference Number	Source	Phylum	Class	Order	Family	Genus/species	Log No.	Town Waterbody	Date of Collection
027	V	Arthropoda	Crustacea	Isopoda	Asellidae	Caecidotea sp.	607	Duck Bk.	04-Apr-97
028	OV	Arthropoda	Insecta	Megaloptera	Corydalidae	Nigronia serricornis	607	Duck Bk.	04-Apr-97
029	S	Arthropoda	Insecta	Diptera	Chironomidae	Microtendipes pedellus-gr.	607	Duck Bk.	04-Apr-97
030	S	Arthropoda	Insecta	Diptera	Chironomidae	Nanocladius dowensi	607	Duck Bk.	04-Apr-97
031	S	Arthropoda	Insecta	Diptera	Chironomidae	Tanytarsus sp.06	607	Duck Bk.	04-Apr-97
032	S	Arthropoda	Insecta	Diptera	Chironomidae	Parametriocnemus sp.	607	Duck Bk.	04-Apr-97
033	S	Arthropoda	Insecta	Diptera	Chironomidae	Eukiefferiella nr. brevicar-gr.	607	Duck Bk.	04-Apr-97
034	S	Arthropoda	Insecta	Diptera	Chironomidae	Thienemanniella sp.	607	Duck Bk.	04-Apr-97
035	S	Annelida	Oligochaeta	Lumbricida	Lumbricidae	?	607	Duck Bk.	04-Apr-97
036	S	Arthropoda	Insecta	Diptera	Chironomidae	Eukiefferiella gracei-gr.	608	Duck Bk.	04-Apr-97
037	S	Arthropoda	Insecta	Diptera	Chironomidae	Micropsectra sp.	608	Duck Bk.	04-Apr-97