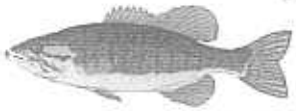
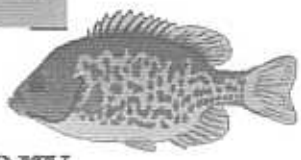
Corrected March 2003





Freshwater Fish Inventory
Northeast National Parks, 1999-2001
2002 Final Report

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Weir Farm National Historic Site (WEFA)

General Information

Dates of habitat survey (1999)	10/24/99-10/26/99
Dates of fish inventory (2000)	9/18/00 – 9/20/00
Number of days sampled for fish (2000)	3

Methods

Definitions

Resources:	Named body of water at each park
Resources Sampled:	Resources actually sampled
Habitat Types:	Type of aquatic habitat at each park
Sites:	Location where cluster of similar types of gear were set
Units of Effort:	Sum of all individual pieces of gear

Number of possible aquatic resources (Table 8)	1
Number of aquatic resources sampled (Table 28)	1
Habitat types sampled	1
Sites sampled (Table 28)	16
Low-flow impoundment/small pond	16
Total units of effort	88
By Gear type	
Fyke Net	14
Minnow Trap	60
Trammel Net	4
Spinning Rod	10

Results

Number of species collected	3
Number of native species collected	2
Total number of individuals	204

Number of individuals by species:

American eel	1
Largemouth bass	26
Pumpkinseed	177

Average length (mm) by species:

Largemouth bass	153.85
Pumpkinseed	189.95
YOY Pumpkinseed	42.30

(No length on American eel.)

Average length (mm) by habitat:

Low-flow Impoundments:

Largemouth bass	153.85
Pumpkinseed	189.95
YOY Pumpkinseed	42.30

Total number of species in reference collections 1

Total number of individuals in reference collections 1

Marsh Billings Rockefeller National Historical Park (MABI)

General Information

Dates of habitat survey (1999)	10/13/99 – 10/15/99
Dates of fish inventory (2000)	9/26/00 – 9/28/00
Number of days sampled for fish (2000)	3

Methods

Definitions

Resources:	Named body of water at each park
Resources Sampled:	Resources actually sampled
Habitat Types:	Type of aquatic habitat at each park
Sites:	Location where cluster of similar types of gear were set
Units of Effort:	Sum of all individual pieces of gear

Number of possible aquatic resources (Table 9)	1
Number of aquatic resources sampled (Table 29)	1
Habitat types sampled	1
Sites sampled (Table 29)	12
Low-flow impoundment/small pond	12
Total units of effort:	82
By Gear type:	
Fyke Net	16
Minnow trap	60
Trammel net	6

Results

Number of species collected	2
Number of native species collected	1
Total number of individuals	16

Number of individuals by species:

Largemouth bass	10
Yellow perch	6

Average length (mm) by species:

Largemouth bass	286.00
YOY Largemouth bass	50.00
Yellow perch	292.83

Average length (mm) by habitat:

Low-flow impoundments:

Largemouth bass	286.00
YOY Largemouth bass	50.00
Yellow perch	292.83

Total number of species in reference collections	1
Total number of individuals in reference collections	1

Morristown National Historical Park (MORR)

General Information

Dates of habitat survey (1999)	10/08/99 – 10/10/99
Dates of fish inventory (2000)	10/02/00 – 10/05/00
Number of days sampled for fish (2000)	4

Methods

Definitions

Resources:	Named body of water at each park
Resources Sampled:	Resources actually sampled
Habitat Types:	Type of aquatic habitat at each park
Sites:	Location where cluster of similar types of gear were set
Units of Effort:	Sum of all individual pieces of gear

Number of possible aquatic resources (Table 10)	7
Number of aquatic resources sampled (Table 30)	7
Habitat types sampled	4
Sites sampled (Table 30)	
Note: some sites had multiple habitat types	10
Low-flow impoundment/small pond	2
Lower gradient stream	3
Moderate gradient stream	8
Higher gradient stream	3
Total units of effort	59
By Gear type	
Backpack electroshocker	39
Fyke Net	5
Minnow Trap	15

Results

Number of species collected	11
Number of native species collected	8
Total number of individuals	1691

Number of individuals by species:

Blacknose dace	267	Rainbow trout	93
Bluegill	1	Slimy sculpin	180
Brook trout	68	Spottail shiner	16
Brown trout	14	Tessellated darter	1
Creek chub	102	White sucker	19
Golden shiner	930		

Average length (mm) by species:
(No measurement for bluegill.)

Blacknose dace	60.13	Golden shiner	87.15
YOY Blacknose dace	34.80	Rainbow trout	106.58
Brook trout	118.40	Slimy sculpin	70.92
YOY Brook trout	62.00	Spottail shiner	132.81
Brown trout	119.73	Tessellated darter	65.00
Creek chub	101.62	White sucker	101.00

Average length (mm) by habitat:

Low-flow Impoundments:

Golden shiner	87.15

Lower gradient Stream:
(Select measurements)

Spottail shiner	162.00

Moderate Gradient Stream:

Blacknose dace	60.98	Rainbow trout	98.45
Brook trout	122.09	Slimy sculpin	70.92
YOY Brook trout	62.00	Spottail shiner	130.87
Brown trout	114.00	White sucker	113.82
Creek chub	119.94	YOY Blacknose dace	34.80

Higher Gradient Stream:

Creek chub	84.26	Rainbow trout	113.65
Blacknose dace	57.69	Tessellated darter	65.00
Brook trout	91.33	White sucker	86.90
Brown trout	126.60		

Total number of species in reference collections 10

Total number of individuals in reference collections 50

Roosevelt Vanderbilt National Historic Site (ROVA)

General Information

Dates of habitat survey (1999)	10/03/99 – 10/05/99
Dates of fish inventory (2000)	10/09/00 – 10/12/00
Number of days sampled for fish (2000)	4

Methods

Definitions

Resources:	Named body of water at each park
Resources Sampled:	Resources actually sampled
Habitat Types:	Type of aquatic habitat at each park
Sites:	Location where cluster of similar types of gear were set
Units of Effort:	Sum of all individual pieces of gear

Number of possible aquatic resources (Table 11)	10
Number of aquatic resources sampled (Table 31)	6
Habitat types sampled	5
Sites sampled (Table 31)	15
Note: some sites had multiple habitat types	16
Low-flow impoundment/small pond	8
Lower gradient stream	2
Moderate gradient stream	2
Higher gradient stream	2
Total units of effort	76
By Gear type	
Backpack electroshocker	15
Beach seine	5
Fyke net	9
Minnow trap	45
Trammel net	2

Results

Number of species collected	18
Native species	16
Total number of individuals	553

Number of individuals by species

American eel	36	Golden shiner	2
Banded killifish	1	Johnny darter	13
Blacknose dace	363	Largemouth bass	6
Bluegill	17	Mummichog	12
Brown bullhead	1	Pumpkinseed	23
Chain pickerel	1	Redbreast sunfish	36
Common shiner	1	Redfin pickerel	6
Creek chub	1	Rock bass	6
Cutlips minnow	9	White sucker	19

Average length (mm) by species:

Banded killifish	89.00	Largemouth bass	75.17
Blacknose dace	61.66	Mummichog	48.00
Bluegill	107.41	Pumpkinseed	80.65
Brown bullhead	280.00	YOY Pumpkinseed	45.33
Chain pickerel	110.00	Redbreast sunfish	91.23
Common shiner	139.00	YOY Redbreast sunfish	33.50
Creek chub	150.00	Redfin pickerel	121.20
Cutlips minnow	99.13	Rock bass	108.50
Golden shiner	65.50	White sucker	274.38
Johnny darter	55.62		

Average length (mm) by habitat:

Low-flow Impoundments:

Bluegill	107.41
Brown bullhead	280.00
Redfin pickerel	94.00
Rock bass	131.00
White sucker	422.71

High-flow Impoundments:

Chain pickerel	110.00
Largemouth bass	75.17
Pumpkinseed	87.40
YOY Redbreast sunfish	33.50
Redfin pickerel	144.50
Rock bass	93.50

Lower Gradient Streams:

Banded killifish	89.00	YOY Pumpkinseed	45.33
Blacknose dace	66.27	Redbreast sunfish	75.09
Johnny darter	55.62	Redfin pickerel	111.50
Mummichog	48.00	White sucker	79.00
Pumpkinseed	78.40		

Moderate Gradient Streams:

Blacknose dace	61.20
Creek chub	150.00
Golden shiner	65.50

Higher Gradient Streams:

Blacknose dace	58.48
Common shiner	139.00
Cutlips minnow	99.13
Redbreast sunfish	135.63
Rock bass	111.00

Total number of species in reference collection 17

Total number of individuals in reference collection 48

Saratoga National Historical Park (SARA)

General Information

Dates of habitat survey (1999)	10/03/99 – 10/05/99
Dates of fish inventory (2000)	10/14/00 – 10/17/00
Number of days sampled for fish (2000)	4

Methods

Definitions

Resources:	Named body of water at each park
Resources Sampled:	Resources actually sampled
Habitat Types:	Type of aquatic habitat at each park
Sites:	Location where cluster of similar types of gear were set
Units of Effort:	Sum of all individual pieces of gear

Number of possible aquatic resources (Table 12)	14
Number of aquatic resources sampled (Table 32)	8
Habitat types sampled	4
Sites sampled (Table 32)	25
Low-flow impoundment/small pond	14
Lower gradient stream	5
Moderate gradient stream	4
Higher gradient stream	2
Total units of effort	110
By Gear type	
Backpack electroshocker	37
Fyke net	10
Minnow trap	60
Trammel net	3

Results

Number of species collected	13
Native species	12
Total number of individuals	1488

Number of individuals by species:

Blacknose dace	690	Largemouth bass	1
Bluegill	19	Longnose dace	32
Brassy minnow	38	Pumpkinseed	136
Brown bullhead	5	Rosyface shiner	2
Central mudminnow	6	Spottail shiner	415
Golden shiner	3	White sucker	43
Johnny darter	97		

Average length (mm) by species:

Blacknose dace	52.48	Longnose dace	71.4
Bluegill	106.47	Pumpkinseed	76.3
Brassy minnow	60.90	YOY Pumpkinseed	40.8
Brown bullhead	186.60	Rosyface shiner	73.8
Central mudminnow	78.40	Spottail shiner	72.1
Golden shiner	173.33	White sucker	122.5
Johnny darter	52.67		
Largemouth bass	287.00		

Low-Flow Impoundments:

Bluegill	106.47	Largemouth bass	287.00
Brassy minnow	60.90	Pumpkinseed	76.31
Brown bullhead	186.60	YOY Pumpkinseed	40.80
Central mudminnow	78.40	Spottail shiner	56.00
Golden shiner	173.33	White sucker	352.33

Lower Gradient Streams:

Blacknose dace	47.65
Johnny darter	52.67
Rosyface shiner	73.83
Spottail shiner	63.08
White sucker	90.74

Moderate Gradient Streams:

Blacknose dace	57.30
Johnny darter	61.33
Spottail shiner	99.70
White sucker	119.78

Higher Gradient Streams:

Longnose dace	71.48
White sucker	103.00

Total number of species in reference collections 13

Total number of individuals in reference collections 94

Saint Gaudens National Historic Site (SAGA)

General Information

Dates of habitat survey (1999)	10/17/99 – 10/19/99
Dates of fish inventory (2000)	10/19/00 – 10/21/00
Number of days sampled for fish (2000)	3

Methods

Definitions

Resources:	Named body of water at each park
Resources Sampled:	Resources actually sampled
Habitat Types:	Type of aquatic habitat at each park
Sites:	Location where cluster of similar types of gear were set
Units of Effort:	Sum of all individual pieces of gear

Number of possible aquatic resources (Table 13)	4
Number of aquatic resources sampled (Table 33)	4
Habitat types sampled	4
Sites sampled (Table 33)	15
Low-flow impoundment/small pond	2
Lower gradient stream	9
Moderate gradient stream	2
Higher gradient stream	2
Total units of effort:	91
By Gear type	
Backpack electroshocker	18
Fyke net	10
Minnow trap	60
Trammel net	3

Results

Number of species collected	12
Native species	12
Total number of individuals	1340

Number of individuals by species:

Blacknose dace	138	Golden shiner	322
Brook trout	6	Longnose dace	6
Brown Bullhead	14	Pumpkinseed	88
Common shiner	616	Slimy sculpin	34
Creek chub	47	Spottail shiner	13
Fallfish	2	White sucker	53

Average length (mm) by species:

Blacknose dace	52.00	Golden shiner	90.30
Brook trout	106.25	Longnose dace	57.67
Brown Bullhead	85.88	Pumpkinseed	69.05
Common shiner	60.68	Slimy sculpin	47.00
Creek chub	110.80	Spottail shiner	93.48
Fallfish	87.00	White sucker	92.39

Average length (mm) by habitat:

High-flow Impoundments:

Blacknose dace	55.00	Creek chub	110.80
Brown bullhead	85.88	Golden shiner	90.30
Common shiner	71.60	Pumpkinseed	69.30
Fallfish	107.00	White sucker	108.05

Moderate Gradient Streams:

Blacknose dace	55.40
Longnose dace	69.00
Spottail shiner	68.80
White sucker	133.00
Slimy Sculpin	47.00
Fallfish	67.00
Brook trout	106.25

Higher Gradient Streams:

Blacknose dace	48.45
Common shiner	49.75
Longnose dace	55.40
Pumpkinseed	64.00
Spottail shiner	65.63
White sucker	66.73

Total number of species in reference collections	10
Total number of individuals in reference collections	50

Minuteman National Historical Park (MIMA)

General Information

Dates of habitat survey (1999): MIMA was added after 1999 habitat survey; therefore no initial visit was made.

Dates of fish inventory (2000)	10/24/00 – 10/27/00
Number of days sampled for fish (2000)	4

Methods

Definitions

Resources:	Named body of water at each park
Resources Sampled:	Resources actually sampled
Habitat Types:	Type of aquatic habitat at each park
Sites:	Location where cluster of similar types of gear were set
Units of Effort:	Sum of all individual pieces of gear

Number of possible aquatic resources (Table 14)	10
Number of aquatic resources sampled (Table 34)	8
Habitat types sampled	4
Sites sampled (Table 34)	15
Low-flow impoundment/small pond	9
Lower gradient stream	4
Moderate gradient stream	1
Higher gradient stream	1
Total units of effort:	99
By Gear type	
Backpack electroshocker	12
Fyke net	12
Minnow trap	75

Results

Number of species collected	10
Native species	7
Total number of individuals	148

Number of individuals by species:

American eel	2	Green sunfish	1
Bluegill	74	Largemouth bass	18
Brook trout	30	Pumpkinseed	8
Brown bullhead	2	Redfin pickerel	11
Golden shiner	1	Yellow perch	1

Average length (mm) by species:

Bluegill	90.15	Largemouth bass	59.72
Brook trout	91.00	Pumpkinseed	89.88
Brown bullhead	71.00	Redfin pickerel	114.36
Golden shiner	124.00	Yellow perch	71.00
Green sunfish	121.00		

(No length for American eel.)

Average length (mm) by habitat:

Low-flow Impoundments:

Bluegill	90.15
Brown bullhead	71.00
Largemouth bass	59.72
Pumpkinseed	90.00
Redfin pickerel	114.00

Lower Gradient Streams:

Brook trout	119.00
Golden shiner	124.00
Pumpkinseed	89.50
Redfin pickerel	115.56
Yellow perch	71.00
Green sunfish	121.00

Higher Gradient Streams:

Brook trout	91.00
Redfin pickerel	104.00

Total number of species in reference collections 6

Total number of individuals in reference collections 6

Cape Cod National Seashore (CACO)

General Information

Dates of habitat survey (1999) (Pamet River, Herring River, Pilgrim Lake, and Clapp's Pond)	9/27/99-9/28/99
Dates of fish inventory (2000)	
Herring River	9/25/00
Kettle Ponds (summer sample)	7/24/00-8/16/00
Kettle Ponds (fall sample)	10/07/00-11/12/00
Dates of fish inventory (2001)	
Pamet River, Lower Herring River	9/20/01
Upper Herring River, Clapp's Pond	9/21/01
Upper Herring River, Pilgrim Lake	9/22/01
Upper Herring River, Great Pond (Intradunal Pond)	9/24/01
Number of days sampled for fish	
2000	40
2001	4
Total Number of days sampled for fish	44

Methods

Definitions

Resources:	Named body of water at each park
Resources Sampled:	Resources actually sampled
Habitat Types:	Type of aquatic habitat at each park
Sites:	Location where cluster of similar types of gear were set
Units of Effort:	Sum of all individual pieces of gear

Number of possible aquatic resources (Table 15)	25
Number of aquatic resources sampled (Table 35)	25
Habitat types sampled	3
Sites sampled (Table 35)	290
Small pond	269
Medium lake/impoundment	6
Lower gradient stream	15

Total units of effort (1999-2001):	1133
Total units of efforts (1999):	13
Total units of efforts (2000):	1040
Total units of efforts (2001):	80
By Gear type (1999)	
Beach Seine	3
Minnow trap	10
By Gear type (2000)	
Backpack electroshocker	4
Beach Seine	36
Fyke net	205
Minnow trap	615
Trammel net	180
By Gear type (2001)	
Backpack electroshocker	2
Beach Seine	2
Fyke net	12
Minnow trap	54
Trammel net	5
Drift net	5
By Gear Type (1999-2001)	
Backpack electroshocker	6
Beach Seine	41
Fyke net	217
Minnow trap	679
Trammel net	185
Drift net	5

Results

Number of species collected	16
(Note: rainbow trout was stocked but was not caught.)	
(Note: river herring is a common name for alewife and blueback herring. These three names are used interchangeably.)	
Native species	13
Total number of individuals	13,356

Number of individuals by species:

Alewife	133	Golden shiner	229
American eel	56	Largemouth bass	172
Banded killifish	7201	Mummichog	21
Brook trout	2	Pumpkinseed	3123
Brown bullhead	333	Smallmouth bass	58
Brown trout	1	White perch	114
Chain pickerel	40	White sucker	28
Three spine stickleback	2	Yellow perch	1843

Average length (mm) by species:

Alewife	91.14	Largemouth bass	105.93
American eel	158.50	Mummichog	69.95
Banded killifish	53.60	Pumpkinseed	77.14
Brook trout	331.33	Smallmouth bass	230.00
Brown bullhead	252.33	White perch	205.79
Chain pickerel	277.79	White sucker	358.80
Golden shiner	126.37	Yellow perch	179.32

Average length (mm) by habitat:

Small Lakes:

Alewife	91.14	Largemouth bass	105.93
American eel	227.00	Pumpkinseed	93.22
Banded killifish	42.80	Smallmouth bass	230.00
Brook trout	331.33	White perch	272.29
Brown bullhead	252.33	White sucker	358.80
Chain pickerel	277.79	Yellow perch	179.32
Golden shiner	126.62		

Low-flow Impoundments:

White Perch	139.29

Lower Gradient Stream:

American eel	90
Banded killifish	64.39
Golden shiner	82.78
Mummichog	69.95
Pumpkinseed	45.00
Three spine stickleback	37.00

Total number of species in reference collections 7

Total number of individuals in reference collections 28

Table 12. Classification of resources at each site by habitat type for Saratoga NHP (SARA). Each line is a resource.

Park Name	Resource Name	Small Lake	Low Flow Impoundment	High Flow Impoundment	Lower Gradient Stream/River	Moderate Gradient Stream/River	Higher Gradient Stream/River
		Habitat Types					
Saratoga NHP	Mill Creek (North Branch)				X	X	
Saratoga NHP	Mill Creek (South Branch)				X	X	X
Saratoga NHP	Mill Creek (Middle Branch)				X	X	
Saratoga NHP	Kroma Kill				X		X
Saratoga NHP	American Creek				X		
Saratoga NHP	Old Champlain Canal (all sections)		X				
Saratoga NHP	Davidson Farm Pond		X				
Saratoga NHP	Burdyl Farm Pond		X				
Saratoga NHP	Devil's Hollow Creek				X		X
Saratoga NHP	Vly Pond		X				
Saratoga NHP	Service Road Pond		X				
Saratoga NHP	Tour Road Pond		X				
Saratoga NHP	Culvert Pond		X				
Saratoga NHP	River Road Pond		X				

Table 15. Classification of resources at each site by habitat type for Cape Cod National Seashore (CACO).

Park Name	Resource Name	Small Lake	Low Flow Impoundment	High Flow Impoundment	Lower Gradient Stream/River	Moderate Gradient Stream/River	Higher Gradient Stream/River
		Habitat Types					
Cape Cod National Seashore	Herring River				X		
Cape Cod National Seashore	Pilgrim Lake		X				
Cape Cod National Seashore	Pamet River				X		
Cape Cod National Seashore	Clapp	X					
Cape Cod National Seashore	Great	x					
Cape Cod National Seashore	Dyer Pond	X					
Cape Cod National Seashore	Duck Pond	X					
Cape Cod National Seashore	Great (Truro) Pond	X					
Cape Cod National Seashore	Great (Wellfleet) Pond	X					
Cape Cod National Seashore	Gull Pond	X					
Cape Cod National Seashore	Herring Pond	X					
Cape Cod National Seashore	Higgins Pond	X					
Cape Cod National Seashore	Horseleech Pond	X					
Cape Cod National Seashore	Kinnacum Pond	X					
Cape Cod National Seashore	Long Pond	X					
Cape Cod National Seashore	Northeast Pond	X					
Cape Cod National Seashore	Round (East) Pond	X					
Cape Cod National Seashore	Round (West) Pond	X					
Cape Cod National Seashore	Ryder Pond	X					
Cape Cod National Seashore	Slough Pond	X					
Cape Cod National Seashore	Snow Pond	X					
Cape Cod National Seashore	Southeast Pond	X					
Cape Cod National Seashore	Spectacle Pond	X					
Cape Cod National Seashore	Turtle Pond	X					
Cape Cod National Seashore	Williams Pond	X					

Table 16. Approximate number of habitat units and amount of habitats sampled for representative major aquatic resources at all parks. Amount of habitat was measured on a map. A stream unit is 25 m. A site is a location where a group of gear were set. Units of effort is the number of pieces of gear.

			STREAM	STREAM	STREAM	STREAM	POND/IMPOUNDMENT		
Park	Habitat Type	Habitat Name	Amount of Habitat (m)	Total Number of Units	Units Sampled	%	Amount of Habitat (acres)	SITES	UNITS OF EFFORT
WEFA	Lower Flow Impoundment	Weir Pond					3.68	16	88
MABI	Lower Flow Impoundment	The Pogue					15	12	82
ROVA	Stream	Crum Elbow	610	24.4	3	12.30			
		Meriches Kill	1067	42.68	12	28.12			
	Stream	Falkill Creek	1128	45.12	1	2.22			
	Lower Flow Impoundment	Upper Valkill Pond					7	8	57
		Lower Valkill Pond					2	0	0
	Higher Flow Impoundment	Upper Pond						1	3
		Middle Pond						1	1
		Lower Pond						0	0
		Roosevelt Ice Pond						0	0
SARA	Stream	Kroma Kill	2896	115.84	13	11.22			
		Mill Creek	7242	289.68	22	7.59			
		Americans Creek			2				
	Low Flow Impoundment	Old Champlain Canal						10	55
	Small Lake/Pond	Davidson Farm Pond						2	11
	Small Lake/Pond	Burdyl Farm Pond						2	7
SAGA	Stream	Blow-me-up Brook	1770	70.8	15	21.19			
	Stream	Blow-me-down Brook	430	17.2	3	17.44			
	Higher Flow Impoundment	Blow-me-down Pond						9	57
	Small Lake/Pond	Farm Pond						2	16

Table 16. Approximate number of habitat units and amount of habitats sampled for representative major aquatic resources at all parks. Amount of habitat was measured on a map. A stream unit is 25 m. A site is a location where a group of gear were set. Units of effort is the number of pieces of gear.

			STREAM	STREAM	STREAM	STREAM	POND/IMPOUNDMENT		
Park	Habitat Type	Habitat Name	Amount of Habitat (m)	Total Number of Units	Units Sampled	%	Amount of Habitat (acres)	SITES	UNITS OF EFFORT
MORR	Stream	Jersey Brook	457	18.28	2	10.94			
	Stream	Primrose Brook	2414	96.56	20	20.71			
		Indian Grave Brook	804	32.16	8	24.88			
		Passaic River	804	32.16	9	27.99			
	Low Flow Impoundment	Cat Swamp Pond						2	20
MIMA	Stream	Elm Brook	748	29.92	3	10.03			
		Mill Brook	2266	90.64	7	7.72			
		Unnamed Brook			2				
	Low Flow Impoundment	Unnamed Pond						4	36
	Small Lake/Pond	Palumbos Pond						4	36
	Small Lake/Pond	Folly Pond						1	15
CACO	Stream	Herring River 99	11440	457.6	4	0.87			
		Herring River 00-01			12	3.00			
		Pamet River 99	7568	302.72	2	0.50			
	Pond	Clapps, Great						8	80
	Large Impoundment	Pilgrim Lake						1	10
	Large Impoundment							5	50
	Small Lake/Pond	Kettle ponds						236	456

Fish Sampling

Methods

Standing water. Choice of gear was based on habitat (Table 17). For standing water (lakes, ponds, and impoundment), a standardized suite of gear included some combination of fyke nets, minnow traps, and trammel nets. A typical standardized suite of gear included 3 fyke nets, 15 minnow traps, and if the resource was large enough 1 trammel net (Figure 1). Under optimal conditions, this suite of gear was repeated at several locations or sites within the pond / impoundment each sampling day and repeated again over several adjacent days. When the habitat was small or presented difficulties with access or other logistics, fewer pieces of gear were included in each standardized suite of gear. For example, sometimes the number of fyke nets was reduced to 1-2 and under special circumstances increased to 5 per set. In many small ponds and impoundments, trammel nets were too large to be set. Beach seines were added to the suite of sampling gear on the rare occasion where the bottom was smooth. A standardized suite of gear was set repeatedly until no new species were caught. Before sampling, three intensities of sampling with different time commitments were proposed for each gear type in each habitat type (Table 18-Small lake and low flow impoundments; Table 19-High flow impoundments). We used a medium intensity and recommend this level of effort for future samples.

Using combinations of different types of gear is important as each gear catches a different size of fish and some gear work best in certain parts of the pond/impoundment. For example, fyke nets can be set in the shallow area of almost any pond, regardless of the substrate, and can catch a range of fish from medium-small to medium-large. However, catch is variable and a number of fyke nets need to be set simultaneously. In addition, fyke nets target active fish and a number of fish species avoid them. Minnow traps can also be set in almost any resource, are easy to deploy, and often catch large numbers of small species and young-of year fish. However, the catch rate of minnow traps is also highly variable and a large number need to be set in space and time to even start to approximate representative sampling. Trammel nets are one of the few gears that can catch larger fish at the littoral-pelagic interface. However, trammel nets are somewhat difficult to set, fish can avoid them, catches are variable, and fish can die if left too long in them. Beach seines can catch a range of small to medium fish but are completely ineffective if the bottom is not smooth. Unlike smaller fish, like estuarine invertebrates and nekton, fish sampling cannot be successfully sampled at a small scale Hence, using all of these gear together is the only way to be assured that catches are representative. Repeating combinations of gear is the only way to test if the majority of species are being caught. Sampling at dusk or dawn typically gives the best result but gear can also be set in the day if fish are caught. The right way to use these gear is the way that catches fish. How we set the gear and how we recommend others set the gear is outlined in detail in the gear protocols that follow (Table 21, Fyke Net; Table 22, Minnow Trap; Table 23, Trammel Net; Table 24, Beach Seine).

A typical routine used to sample standing water was as follows. Specific details of deployment are in the protocols First the pond/impoundment was scouted and suitable and unsuitable sites for all gear identified. Then suitable locations were selected that sampled the entire resource. While light, all nets and traps were cleaned, tried, and packed for optimal deployment. Fyke nets should be stacked with anchors and leads carefully organized. Minnow traps should be put together and floats attached. Trammel nets should be folded into a carrying tote so that it will go into the water without tangles. About an hour or two before dusk, the fyke and minnow traps should be set. We dropped one person at different sides of the ponds to deploy these. Then, the trammel net is deployed from the boat using at least two samplers. While the nets and traps fish, a beach seine can be pulled and fish worked up. After 4-6 h, the trammel net is pulled, fish processed. Then the fyke nets and minnow traps are retrieved.

Flowing water. For flowing water (streams and rivers), backpack electrofishing was consistently used. We sampled a 25-m transect in an upstream zigzag pattern (Figure 2). These units were repeatedly sampled until no new species were caught. Before sampling three intensities of sampling with different time and effort commitments were identified (Table 20 a-c, Lower, Moderate, and Gradient Streams). We used and recommend option 1 (25 m transect/habitat unit) coupled with a medium to high intensity (2-5 transects). How we set the gear and how we recommend others set the gear is outlined in the gear protocols (Table 25, Backpack Electrofisher). Typically, after scouting the resources and mapping habitat that could be sampled, representative sampling sites were selected. These were then sampled throughout the daylight period until no new species were caught or catches leveled off.

Sampling Season. Aquatic resources for all parks were sampled from August to November, 2000 (Appendix) with additional sampling done at Cape Cod National Seashore in 2001. Catches will be less variable in the fall and we recommend this for monitoring.

Fish Processing. In the field, field identifications were made. Representatives of each species were placed in ethanol. All fish were counted and identified (Table 26-fish processing protocol). Then fish were returned to the wild after sampling. After field sampling, representative samples of each species were taken to the University of Massachusetts Museum and keyed out using critical characters (Appendix) suggested in relevant key. A field guide of these characters was composed (Fish Key). An equipment list will help prepare for future sampling (Table 27). When, where, and how each park was sampled is reviewed in Tables 28-35 and Maps 1C-16D.

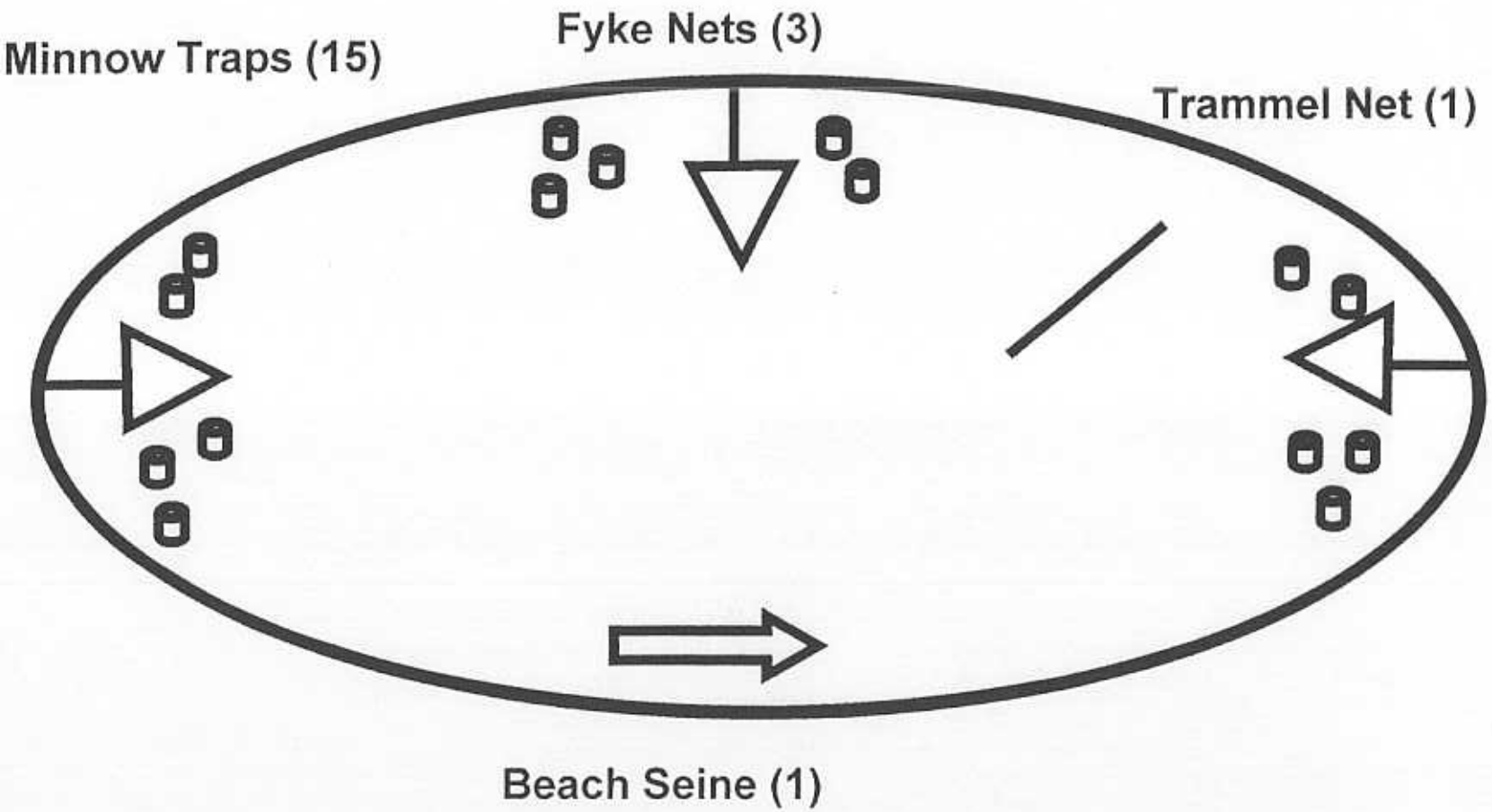
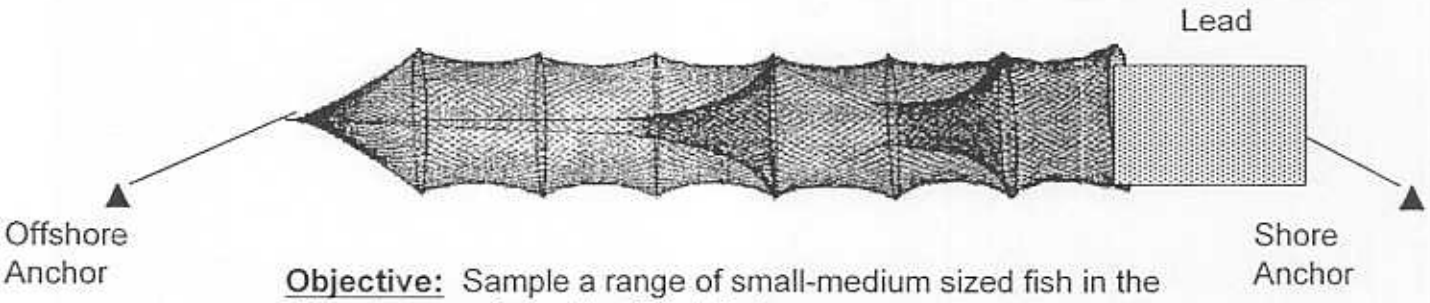


Figure 1. How gear was set. A standardized suite of gear was some combination of fyke nets, minnow traps, trammel nets, and beach seine.

Table 21. Gear Protocols for fyke net. Included are an objective data gained, sampling design, recommended number of people, deploying and retrieving gear, and other considerations.

Gear Protocol: Fyke Net



Objective: Sample a range of small-medium sized fish in the littoral zone of most lentic habitats.

Targets/Data Gained: Littoral zone is sampled for a wide variety of species and sizes. Although this catches a range of fish sizes and species, the fish must be actively moving such that they hit the lead and are guided into the hoops. This will not be true for all species

Description: The net is 12 feet long with 3 hoops each having a 3-foot diameter. A 3 foot deep by 20 foot long lead extends from the front of the net. Both the lead and trap are made of 3/8 inch mesh.

Sampling Design: The net is set 4 hours before sunset and allowed to fish for 8 hours, specifically encompassing the dusk time period.

Recommended Number of People: To set the net without a boat, you will need 1 person. With a boat, you will need 2 people. 2 people are best for pulling the nets.

Amount of Gear Set: Number of nets set were resource specific.

Pros:

- This gear can be set in most inshore habitats where the depth increases gradually. Of particular importance is that the bottom need not be smooth.
- The gear is pretty low tech and easy to set.
- Generally, fish survive long periods in the net especially when a float is placed in the terminal hoop

Cons:

-This gear doesn't catch some species, and catches can be variable. Hence a number of nets need to be set through time and space

-A stable boat is needed to retrieve the nets.

Setting Net:

1. Move nets and two anchors to location where the net will be set.
2. Carrying all hoops, place anchor for lead on or close to the shore.
3. Fully extend lead and net perpendicular to shore by walking or maneuvering boat in reverse.
4. Front hoop should ideally be set in a meter of water with no more than 1-2 inches above the water surface.
5. Before dropping the anchor, check that net is tied and float is in place.

Pulling Net:

1. Slowly and carefully approach front hoop.
2. Grab front anchor
3. Quickly, place hands on either side of hoop and quickly scoop entire hoop out of water.
4. Holding first hoop, shake fish toward end compartment.
5. Gather second hoop and shake again.
6. Continue gathering hoops and shaking net until all fish are in the last compartment.
7. Another person will need to untie bottom of net, remove the float, and assist the person holding net by shaking all fish into a live well.
8. Return float to net and tie.

Comments

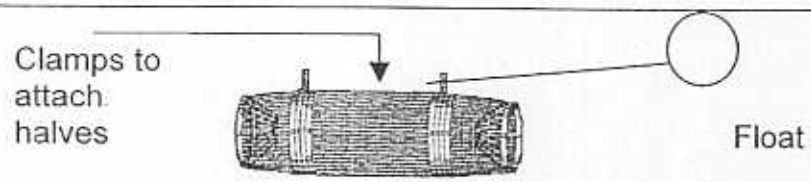
-Although these can be set without a boat, a boat is nice to carry the gear around the pond as you don't want to walk through the sample areas

-A stable boat is essential to retrieve the nets.

-Both deploying and retrieving, a motor is nice but not necessary.

Table 22. Gear Protocols for minnow trap. Included are an objective data gained, sampling design, recommended number of people, deploying and retrieving gear, and other considerations.

Gear Protocol: Minnow Traps



Objective: Sample small and young-of-year fish in littoral zone of most lentic habitats.

Targets/Data gained: The littoral zone is sampled with a focus on smaller fish.

Description: When clipped together in the center, each cylindrical trap measures 9 inches x 17.5 inches with a 1 inch opening at either end. They are made of ¼ inch galvanized wire mesh.

Sampling Design: Five traps complement each fyke net at the depth of the first hoop and are set at the same time as the fyke net (4 hours before sunset).

Recommended Number of People: One person can easily complete this task.

Amount of Gear Set: 15 available traps. Number set was resource s specific.

Pros:

-This gear can be set in most inshore habitats.
-The gear is low tech, inexpensive, and easy to set.
-No boat is needed
-Generally, fish survive long periods (hours) in the traps.

Cons:

-This gear doesn't catch some species,
-Minnow traps only catch very small fish
-Catches can be variable. Hence a number of traps need to be set through time and space

Setting Traps:

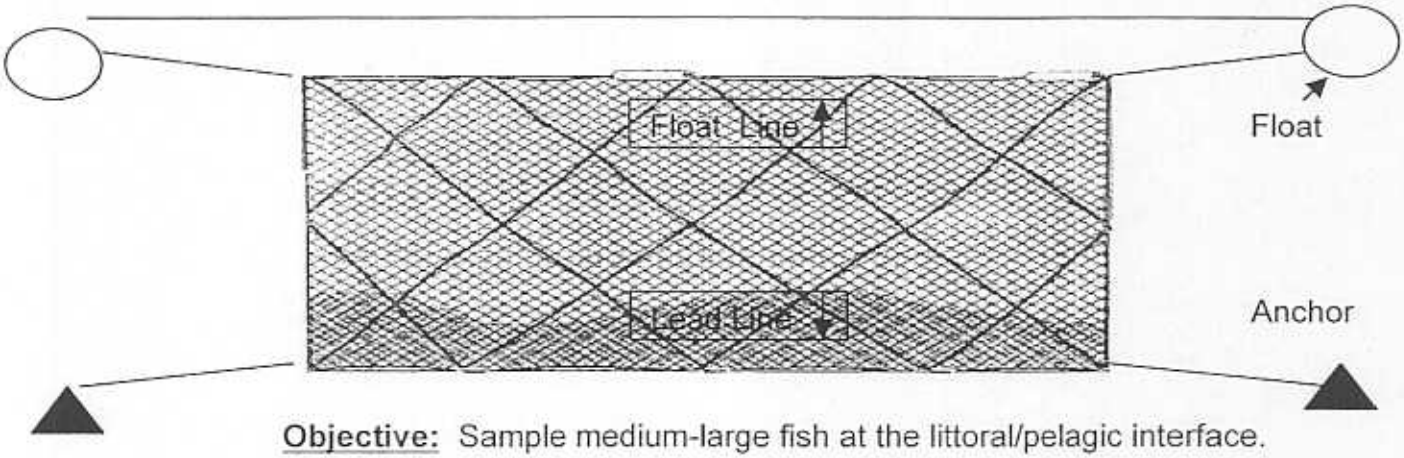
1. Clip two matching ends together.
2. Attach a floated line to the clip.
3. Set on side in 1 meter of water or a depth equal to the first hoop of the fyke net.

Pulling Traps:

1. Pull traps in by float line.
2. Take trap apart.
3. Empty contents into live well.

Table 23. Gear Protocols for trammel net. Included are an objective data gained, sampling design, recommended number of people, deploying and retrieving gear, and other considerations.

Gear Protocol: Trammel net



Objective: Sample medium-large fish at the littoral/pelagic interface.

Targets/Data Gained: The littoral/pelagic interface is surveyed for a variety of fish species and sizes with an emphasis on larger fish.

Description: Each trammel net is 99 feet long with a wall depth of 4 feet, an outer netting of 12 square inch mesh, and an inner mesh of either1 square inch, 1.5 square inch or 2.0 square inch mesh.

Sampling Design: The net will be set for 1.5 hours before sunset and fished for 4 hours. This time period is selected to increase efficiency of net. Three nets, each having a different mesh size, were/can be set simultaneously.

Recommended Number of People: Two people are necessary in order to complete all aspects of this task.

Pros:

-This (along with gill nets) is the one of the few gear to catch this size fish in this habitat.

Cons:

-This gear doesn't catch some species,
-Catches can be variable.
-This gear requires a boat and motor and two somewhat skilled workers.
-Fish cannot be left in this for too long or they will die.

Setting Net:

1. Make sure the net is packed/folded so it will deploy without tangles. Attach an anchor to one end of the lead line and a float to one end of the float line.
2. Place anchor in approximately 1 meter of water. Then throw float over
3. In order to keep the net perpendicular to the near shore, one person will need to slowly maneuver the boat in reverse toward a fixed point on the other shore line. (This is why a motor is needed.)
4. As the boat is reversing, the other person will be evenly guiding the lead and float line out the front of the boat.
5. Upon reaching the other end of the net, the driver should stop the boat. The person with the net should attach the other anchor to the lead line and the other float to the float line.
6. Drop the anchor and float overboard

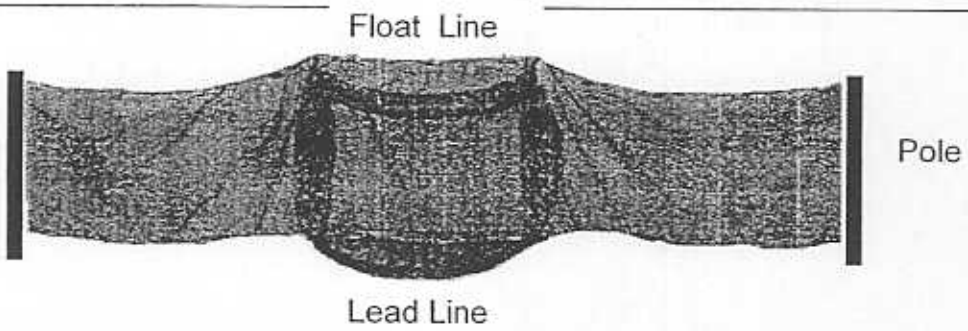
*** After setting, driving along net to check for twists and tangles may be necessary. If twists and tangles are present, may need to reset net.**

Pulling Net:

1. Slowly approach shallow float. Pull in float and anchor. Detach float and anchor before placing net into transport box.
2. One person should man the float line and the other person should man the lead line.
3. Evenly pull in the float and lead lines.
4. Disentangle any fish and place in a live well.
5. Upon reaching other end, pull in and detach deep float and anchor.

Table 24. Gear Protocols for beach seine. Included are an objective data gained, sampling design, recommended number of people, deploying and retrieving gear, and other considerations.

Gear Protocol: Beach Seine



Objective: Sample a range of fish, mostly small, fish in littoral zone of most lentic habitats.

Data Gained: The littoral zone is sampled for a range of species and sizes. (Note: large fish often escape.

Description: The seine is 44 feet from pole to pole with a 4 x 4 x 4 foot bag in the center and a 1/8 inch mesh size.

Sampling Design: The seine is fished in 33 meter sections. To maximize the effectiveness, transects are done at night.

Recommended Number of People: You will need at least two people.

Amount of Gear Set: One available net. Number of transects done were resource specific.

Prepare Site

1. Measure out a transect, usually 33 m.

2. Avoid disturbing, i.e. walking through, site.

Fishing Transect:

1. Unwrap net at 0#m and extend net perpendicular to shore making sure that bag is open in correct direction.

2. Pull seine parallel to shore with shallow person maintaining a water depth of a few inches, while the deep person should stay in 1 meter of water. Deep person should remain slightly ahead of shallow

person throughout transect and maintain a distance of at least 25 ft. between poles.

3. At end of transect, deep person should move shallower in order to meet the shallow person simultaneously at the 33 m endpoint. Note: If the net gets snagged on rocks or branches, the fish will escape so the bottom must be clear. We recommend clearing a seining path ahead of time.

4. After laying poles on ground, each person should grab a lead line and corresponding float line and evenly pull each end of the net until each reaches the bag.

5. Each person should grab a corner of the bag and decrease the size of the bag by rolling the sides down.

6. Pull all fish out of bag and place into a live well.

7. Shake netting to remove excess debris and compactly roll seine for storage.

Pro:

-Low tech, relatively easy to use
-Can produce good catches

Con:

-Requires a smooth bottom
-Biased towards small fish

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2. As fish surface, release button temporarily to net fish and place in live well. Proceed in this manner through remainder of transect. Note: Some fish float when stunned, others sink to the bottom, so watch carefully.
3. At end of transect, if not proceeding directly to next transect, an assistant should disconnect the battery prior to transporting the unit any distance.
4. Next transect must begin at least 10 meters past the endpoint of the previous transect.
5. Process fish after each transect.

Pro:

-Only consistent gear for stream sampling
-Can produce good catches

Con:

-Can be dangerous to fish and humans
-Only works in relatively shallow water
-Need to be able to walk safely

Note: This method can be dangerous so great care should be exercised. Keep all non-rubberized body parts out of the water. Watch for dogs and children on the bank. Also, the person running the shocker should watch others so they can stop the electricity if someone slips.

Table 32. At Saratoga NHP (SARA), for each sampling date, resource, habitat, list of gear type, time set, units of effort, and reference map location. Each line is a site.

Date	Resource Name	Small Lake	Low Flow Impoundment	High Flow Impoundment	Lower Gradient Stream/River	Moderate Gradient Stream/River	Higher Gradient Stream/River	Gear Type	Time	Units of Effort	Map #
101500	Mill Creek (North Branch)					X		Electroshocker	Day	7	7D
101600	Mill Creek (North Branch)				X			Electroshocker	Day	4	7D
101500	Mill Creek (South Branch)					X		Electroshocker	Day	2	7D
101500	Mill Creek (South Branch)						X	Electroshocker	Day	2	7D
101500	Mill Creek (South Branch)				X			Electroshocker	Day	1	7D
101600	Mill Creek (Middle Branch)				X			Electroshocker	Day	1	7D
101600	Mill Creek (Middle Branch)					X		Electroshocker	Day	1	7D
101700	Mill Creek (Middle Branch)					X		Electroshocker	Day	4	7D
101400	Kroma Kill				X			Electroshocker	Day	10	7D
101400	Kroma Kill						X	Electroshocker	Day	3	7D

Table 32. At Saratoga NHP (SARA) , for each sampling date, resource, habitat, list of gear type, time set, units of effort, and reference map location.

Date	Resource Name	Small Lake	Low Flow Impoundment	High Flow Impoundment	Lower Gradient Stream/River	Moderate Gradient Stream/River	Higher Gradient Stream/River	Gear Type	Time	Units of Effort	Map #
		Habitat Type									
101400	Old Champlain Canal (section 1)		X					Fyke Net	Day	3	7D
101400	Old Champlain Canal (section 1)		X					Minnow Trap	Day	15	7D
101400	Old Champlain Canal (section 1)		X					Trammel Net 1.5	Day	1	7D
101400	Old Champlain Canal (section 1)		X					Fyke Net	Night	3	7D
101400	Old Champlain Canal (section 1)		X					Minnow Trap	Night	15	7D
101400	Old Champlain Canal (section 1)		X					Trammel Net 1.5	Night	1	7D
101600-101700	Old Champlain Canal (section 1)		X					Fyke Net	Overnight	1	7D
101600-101700	Old Champlain Canal (section 1)		X					Minnow Trap	Overnight	9	7D
101600	Old Champlain Canal (section 1)		X					Trammel Net 1.5	Night	1	7D

Table 32. At Saratoga (SARA), for each sampling date, resource, habitat, list of gear type, time set, units of effort, and reference map location. Each line is a site.

Date	Resource Name	Habitat Type: Small Lake	Low Flow Impoundment	High Flow Impoundment	Lower Gradient Stream/River	Moderate Gradient Stream/River	Higher Gradient Stream/River	Gear Type	Time	Units of Effort	Map #
101600-101700	Old Champlain Canal (section 5)		X					Minnow Trap	Overnight	6	7D
101500-101600	Davidson's Farm Pond		X					Fyke Net	Overnight	1	7D
101500-101600	Davidson's Farm Pond		X					Minnow Trap	Overnight	10	7D
101500-101600	Burdyl Farm Pond		X					Fyke Net	Overnight	2	7D
101500-101600	Burdyl Farm Pond		X					Minnow Trap	Overnight	5	7D
101700	American Creek				X			Electroshocker	Day	2	7D

Table 35. At Cape Cod National Seashore (CACO), for each sampling date, resource, habitat, list of gear type, time set, units of effort, and reference map location.

Date	Resource Name	Small Lake	Low Flow Impoundment	High Flow Impoundment	Lower Gradient Stream/River	Moderate Gradient Stream/River	Higher Gradient Stream/River	Gear Type	Time	Units of Effort	Map #
		Habitat Type									
092201	Herring River				X			Drift Net	Day	1	N/A
092201	Pilgrim Lake		X					Beach Seine	Night	1	N/A
092201	Pilgrim Lake		X					Fyke Net	Night	3	N/A
092201	Pilgrim Lake		X					Minnow Traps	Night	15	N/A
092201	Pilgrim Lake		X					Trammel Net 1.0	Night	1	N/A
092201	Pilgrim Lake		X					Trammel Net 1.5	Night	1	N/A
092401	Herring River				X			Drift Net	Day	1	N/A
092401	Great Pond	X						Fyke Net	Night	3	N/A
092401	Great Pond	X						Minnow Traps	Night	15	N/A
092401	Great Pond	X						Trammel Net 1.5	Night	1	N/A

* Potential sample bias due to net disruption by turtle.

Table 51. For Morristown NHP (MORR), common name, Latin name, and ITIS number for species collected by sampling.

Common or Field Name	NPS Preferred Common Name	ITIS Latin Name	NPS Preferred Latin Name	ITIS TSN #
Blacknose dace	Blacknose Dace	*Rhynichthys atratulus*	*Rhynichthys atratulus*	163382
Bluegill	Bluegill	*Lepomis macrochirus*	*Lepomis macrochirus*	168141
	Bluegill Sunfish	*Lepomis macrochirus*	*Lepomis macrochirus*	168141
Brook Trout	Brook Trout	*Salvelinus fontinalis*	*Salvelinus fontinalis*	162003
	Brook Trout	*Salvelinus fontinalis*	*Salvelinus f. fontinalis*	162003
	Eastern Brook Trout	*Salvelinus fontinalis*	*Salvelinus fontinalis*	162003
	Eastern Brook Trout	*Salvelinus fontinalis*	*Salvelinus f. fontinalis*	162003
	Native Brook Trout	*Salvelinus fontinalis*	*Salvelinus f. fontinalis*	162003
	Native Brook Trout	*Salvelinus fontinalis*	*Salvelinus fontinalis*	162003
Brown Trout	Brown Trout	*Salmo trutta*	*Salmo trutta*	161997
Creek Chub	Creek Chub	*Semotilus atromaculatus*	*Semotilus atromaculatus*	163376
Golden Shiner	Golden Shiner	*Notemigonus chrysoleucas*	*Notemigonus chrysoleucas*	163368
			Notemigonus crysoleucas	163368
			Notemigonus cysoleucas	163368
Slimy Sculpin	Slimy Sculpin	*Cottus cognatus*	*Cottus cognatus*	N/A
Spottail Shiner	Spottail Shiner	*Notropis hudsonius*	*Notropis hudsonius*	163404
	Spotted Shiner	*Notropis hudsonius*	*Notropis hudsonius*	163404
Rainbow Trout	Rainbow Trout	*Oncorhynchus mykiss*	*Oncoryhnchus mykiss*	161989
	Rainbow Trout or Steelhead	*Oncorhynchus mykiss*	*Oncoryhnchus mykiss*	161989
Tesselated Darter	Tessalated Darter	*Etheostoma olmstedi*	*Etheostoma olmstedi*	168360
	Tessellated Darter	*Etheostoma olmstedi*	*Etheostoma olmstedi*	168360
White Sucker	Common Sucker	*Catostomus commersoni*	*Catostomus commerosni*	163895
	Common Sucker	*Catostomus commersoni*	*Catostomus c. commersonii*	163895
	Common Sucker	*Catostomus commersoni*	*Catostomus commersoni*	163895
	White Sucker	*Catostomus commersoni*	*Catostomus c. commersonii*	163895
	White Sucker	*Catostomus commersoni*	*Catostomus commerosni*	163895
	White Sucker	*Catostomus commersoni*	*Catostomus commersoni*	163895

Table 52. For Roosevelt Vanderbilt NHS (ROVA), common name, Latin name, and ITIS number for species collected by sampling.

Common or Field Name	NPS Preferred Common Name	ITIS Latin Name	NPS Preferred Latin Name	ITIS TSN #
White Sucker	Common Sucker	*Catostomus commersoni*	*Catostomus commerosni*	163895
	Common Sucker	*Catostomus commersoni*	*Catostomus c. commersonii*	163895
	Common Sucker	*Catostomus commersoni*	*Catostomus commersoni*	163895
	White Sucker	*Catostomus commersoni*	*Catostomus c. commersonii*	163895
	White Sucker	*Catostomus commersoni*	*Catostomus commerosni*	163895
	White Sucker	*Catostomus commersoni*	*Catostomus commersoni*	163895
Bluegill	Bluegill	*Lepomis macrochirus*	*Lepomis macrochirus*	168141
Brown Bullhead	Brown Bullhead	*Ameiurus nebulosus*	*Ameiurus nebulosus*	164043
Rock Bass	Rock Bass	*Ambloplites rupestris*	*Ambloplites rupestris*	168097
Redfin Pickerel	Redfin Pickerel	*Esox americanus*	*Esox americanus*	162140
	Redfin Pickerel	*Esox americanus americanus*	*Esox americanus americanus*	162141
Redbreast Sunfish	Redbreast Sunfish	*Lepomis auritus*	*Lepomis auritus*	168131
	Redbellied Sunfish	*Lepomis auritus*	*Lepomis auritus*	168131
Johnny Darter	Johnny Darter	*Etheostoma nigrum*	*Etheostoma nigrum*	168369
Mummichog	Mummichog	*Fundulus heteroclitus*	*Fundulus heteroclitus*	165647
	Mummichog, Bull minnow	*Fundulus heteroclitus*	*Fundulus heteroclitus*	165647
Banded Killifish	Banded Killifish	*Fundulus diaphanus*	*Fundulus diapanus*	165646
	Banded Killifish	*Fundulus diaphanus*	*Fundulus diapanus*	165646
	Top Minnow	*Fundulus diaphanus*	*Fundulus diapanus*	165646
American Eel	American Eel	*Anguilla rostrata*	*Anguilla rostrata*	161127
	Common Eel	*Anguilla rostrata*	*Anguilla rostrata*	161127
Pumpkinseed	Pumpkinseed	*Lepomis gibbosus*	*Lepomis gibbosus*	168141
	Pumpkinseed Sunfish	*Lepomis gibbosus*	*Lepomis gibbosus*	168141
Blacknose Dace	Blacknose Dace	*Rhynichthys atratulus*	*Rhynichthys atratulus*	163382
Golden Shiner	Golden Shiner	*Notemigonus crysoleucas*	*Notemigonus chrysoleucas*	163368
			Notemigonus crysoleucas	163368
			Notemigonus cysoleucas	163368
Cutlips Minnow	Cutlips Minnow	*Exoglossum maxillingua*	*Exoglossum maxillingua*	163356
Common Shiner	Common Shiner	*Notropis cornutus*	*Notropis cornutus*	N/A
Largemouth Bass	Largemouth Bass	*Micropterus salmoides*	*Micropterus salmoides*	168160
Chain Pickerel	Chain Pickeral	*Esox niger*	*Esox niger*	162143
	Chain Pickerel	*Esox niger*	*Esox niger*	162143
Creek Chub	Creek Chub	Semotilus atromaculatus	Semotilus atromaculatus	163376

Table 55. For Minuteman NHP (MIMA), common name, Latin name, and ITIS number for species collected by sampling.

Common or Field Name	NPS Preferred Common Name	ITIS Latin Name	NPS Preferred Latin Name	ITIS TSN #	NPS Preferred TSN #
Pumpkinseed	Pumpkinseed	*Lepomis gibbosus*	*Lepomis gibbosus*	168141	168141
	Pumpkinseed Sunfish	*Lepomis gibbosus*	*Lepomis gibbosus*	168141	168141
Golden Shiner	Golden Shiner	*Notemigonus chrysoleucas*	*Notemigonus chrysoleucas*	163368	163368
			Notemigonus crysoleucas	163368	163368
			Notemigonus cysoleucas	163368	163368
Brown Bullhead	Brown Bullhead	*Ameiurus nebulosus*	*Ameiurus nebulosus*	164043	164043
Brook Trout	Brook Trout	*Salvelinus fontinalis*	*Salvelinus fontinalis*	162003	162003
	Brook Trout	*Salvelinus fontinalis*	*Salvelinus f. fontinalis*	162003	162003
	Eastern Brook Trout	*Salvelinus fontinalis*	*Salvelinus fontinalis*	162003	162003
	Eastern Brook Trout	*Salvelinus fontinalis*	*Salvelinus f. fontinalis*	162003	162003
	Native Brook Trout	*Salvelinus fontinalis*	*Salvelinus f. fontinalis*	162003	162003
	Native Brook Trout	*Salvelinus fontinalis*	*Salvelinus fontinalis*	162003	162003
Redfin Pickerel	Redfin Pickerel	*Esox americanus*	*Esox americanus*	162140	162140
	Redfin Pickerel	*Esox americanus americanus*	*Esox americanus americanus*	162141	162141
Yellow Perch	Yellow Perch	*Perca flavescens*	*Perca flavescens*	168469	168469
			Perca falvescens	168469	168469
Green Sunfish	Green Sunfish	*Lepomis cyanellus*	*Lepomis cyanellus*	168132	168132
Largemouth Bass	Largemouth Bass	*Micropterus salmoides*	*Micropterus salmoides*	168160	168160
Bluegill	Bluegill	*Lepomis macrochirus*	*Lepomis macrochirus*	168141	168141
	Bluegill Sunfish	*Lepomis macrochirus*	*Lepomis macrochirus*	168141	168141
American Eel	American Eel	*Anguilla rostrata*	*Anguilla rostrata*	161127	161127
	Common Eel	*Anguilla rostrata*	*Anguilla rostrata*	161127	161127

Table 56. For Cape Cod National Seashore (CACO), common name, Latin name, and ITIS number for species collected by sampling.

Common or Field Name	NPS Preferred Common Name	ITIS Latin Name	NPS Preferred Latin Name	ITIS TSN #
Alewife	Alewife	*Alosa pseudoharengus*	*Alosa pseudoharengus*	161706
American Eel	American Eel	*Anguilla rostrata*	*Anguilla rostrata*	161127
	Common Eel	*Anguilla rostrata*	*Anguilla rostrata*	161127
Banded Killifish	Banded Killifish	*Fundulus diaphanus*	*Fundulus diapanus*	165646
	Banded Killifish	*Fundulus diaphanus*	*Fundulus diapanus*	165646
	Top Minnow	*Fundulus diaphanus*	*Fundulus diapanus*	165646
Blueback Herring	Blueback Herring	*Alosa aestivalis*	*Alosa aestivalis*	161703
Brook Trout	Brook Trout	*Salvelinus fontinalis*	*Salvelinus fontinalis*	162003
	Brook Trout	*Salvelinus fontinalis*	*Salvelinus f. fontinalis*	162003
	Eastern Brook Trout	*Salvelinus fontinalis*	*Salvelinus fontinalis*	162003
	Eastern Brook Trout	*Salvelinus fontinalis*	*Salvelinus f. fontinalis*	162003
	Native Brook Trout	*Salvelinus fontinalis*	*Salvelinus f. fontinalis*	162003
	Native Brook Trout	*Salvelinus fontinalis*	*Salvelinus fontinalis*	162003
Brown Bullhead	Brown Bullhead	*Ameiurus nebulosus*	*Ameiurus nebulosus*	164043
Brown Trout	Brown Trout	*Salmo trutta*	*Salmo trutta*	161997
Chain Pickerel	Chain Pickeral	*Esox niger*	*Esox niger*	162143
	Chain Pickerel	*Esox niger*	*Esox niger*	162143
Golden Shiner	Golden Shiner	*Notemigonus chrysoleucas*	*Notemigonus chrysoleucas*	163368
			Notemigonus crysoleucas	163368
			Notemigonus cysoleucas	163368
Largemouth Bass	Largemouth Bass	*Micropterus salmoides*	*Micropterus salmoides*	168160
Pumpkinseed	Pumpkinseed	*Lepomis gibbosus*	*Lepomis gibbosus*	168141
	Pumpkinseed Sunfish	*Lepomis gibbosus*	*Lepomis gibbosus*	168141
White Perch	White Perch	*Morone americana*	*Morone americana*	167678
White Sucker	Common Sucker	*Catostomus commersoni*	*Catostomus commerosni*	163895
	Common Sucker	*Catostomus commersoni*	*Catostomus c. commersonii*	163895
	Common Sucker	*Catostomus commersoni*	*Catostomus commersoni*	163895
	White Sucker	*Catostomus commersoni*	*Catostomus c. commersonii*	163895
	White Sucker	*Catostomus commersoni*	*Catostomus commerosni*	163895
	White Sucker	*Catostomus commersoni*	*Catostomus commersoni*	163895
Yellow Perch	Yellow Perch	*Perca flavescens*	*Perca flavescens*	168469
Yellow Perch	Yellow Perch	*Perca flavescens*	*Perca flavescens*	168469
Mummichog	Mummichog	*Fundulus heteroclitus*	*Fundulus heteroclitus*	165647
	Mummichog, Bull minnow	*Fundulus heteroclitus*	*Fundulus heteroclitus*	165647
Three spine stickleback	Three spine stickleback	*Gasterosteus aculeatus*	*Gasterosteus aculeatus*	166365

Table 57. References used to classify proposed origin (native or non-native) for each species collected in freshwater fish inventory.

Sources Cited for Origin
Pictures for Fish Key and Origin of Species Table
United States Geological Survey. Nonindigenous Aquatic Species. http://nas.er.usgs.gov/fishes
Hartel, K. E., D. Halliwell, and A. Launer. 1996. An Annotated working list of Fishes of Massachusetts. http://www.mcz.harvard.edu/fish/ma_fi.htm

Table 9. For Weir Farm NHS (WEFA), proposed origin (native or non-native/introduced) for each species collected in freshwater fish inventory.

Species Present	Native	Non-native/ Introduced	Unknown
Largemouth Bass		X	
Pumpkinseed	X		
American Eel	X		

Table 59. For Marsh Billings Rockefeller NHP (MABI), proposed origin (native or non-native / introduced) for each species collected in freshwater fish inventory. We use non-native and introduced interchangeably.

Species Present	Native	Non-native/ Introduced
Largemouth Bass		X
Yellow Perch	X	

Table 60. For Morristown NHP (MORR), proposed origin (native or non-native/introduced) for each species collected in freshwater fish inventory. We use non-native and introduced interchangeably.

Species Present	Native	Non-native/ Introduced
Blacknose dace	X	
Bluegill		X
Brook Trout.	X	
Brown Trout		X
Creek Chub	X	
Golden Shiner	X	
Rainbow Trout		X
Slimy Sculpin	X	
Spottail Shiner	X	
Tesselated Darter	X	
White Sucker	X	

Table 61. For Roosevelt Vanderbilt NHS (ROVA), proposed origin (native or non-native/introduced) for each species collected in freshwater fish inventory.

Species Present	Native	Non-native/ Introduced	Unknown
American Eel	X		
Banded Killifish	X		
Blacknose Dace	X		
Bluegill		X	
Brown Bullhead	X		
Chain Pickerel	X		
Common Shiner	X		
Creek Chub	X		
Cutlips Minnow	X		
Golden Shiner	X		
Johnny Darter	X		
Largemouth Bass	X		
Mummichog	X		
Pumpkinseed	X		
Redbreast Sunfish	X		
Redfin Pickerel	X		
Rock Bass		X	
White Sucker	X		

Table 62. For Saratoga NHS (SARA), proposed origin (native or non-native/introduced) for each species collected in freshwater fish inventory.

Species Present	Native	Non-native/ Introduced	Unknown
Brassy Minnow	X		
Spottail Shiner	X		
Rosyface Shiner	X		
Blacknose dace	X		
Bluegill		X	
Brown Bullhead	X		
Central Mudminnow	X		
Golden Shiner	X		
Johnny Darter	X		
Largemouth Bass	X		
Longnose Dace	X		
Pumpkinseed	X		
White Sucker	X		

Table 63. For Saint Gaudens NHS (SAGA), proposed origin (native or non-native/introduced) for each species collected in freshwater fish inventory.

Species Present	Native	Non-native/ Introduced
Common Shiner	X	
Blacknose dace	X	
Brook Trout	X	
Brown Bullhead	X	
Creek Chub	X	
Fallfish	X	
Golden Shiner	X	
Longnose Dace	X	
Pumpkinseed	X	
Slimy Sculpin	X	
Spottail Shiner	X	
White Sucker	X	

Table 64. For Minuteman NHP (MIMA), proposed origin (native or non-native/introduced) for each species collected in freshwater fish inventory.

Species Present	Native	Non-native/ Introduced
American Eel	X	
Bluegill		X
Brook Trout	X	
Brown Bullhead	X	
Golden Shiner	X	
Green Sunfish		X
Largemouth Bass		X
Pumpkinseed	X	
Redfin Pickerel	X	
Yellow Perch	X	

Table 65. For Cape Cod National Seashore (CACO), proposed origin (native or non-native/introduced) for each species collected in freshwater fish inventory. We use non-native and introduced interchangeably. *Note: we did not catch rainbow trout but they are stocked so we include them here for completeness.

Species Present	Native	Non-native/ Introduced
Alewife/Blueback Herring	X	
American Eel	X	
Banded Killifish	X	
Brook Trout	X	
Brown Bullhead	X	
Brown Trout		X
Chain Pickerel	X	
Golden Shiner	X	
Largemouth Bass		X
Mummichog	X	
Pumpkinseed	X	
Smallmouth Bass		X
White Perch	X	
White Sucker	X	
Yellow Perch	X	
Three Spine Stickleback	X	
Rainbow Trout**		X

Table 66. For Saugus Iron Works (SAIR), proposed origin (native or non-native) for each species collected in freshwater fish inventory.

Origin of Freshwater Species
Saugus Iron Works

Common Name	Scientific Name	Native	Non-native
Alewife	*Alosa pseudoharengus*	X	
American Eel	*Anguilla rostrata*	X	
Banded Sunfish	*Enneacanthus obesus*	X*	
Blueback Herring	*Alosa aestivalis*	X	
Bluegill	*Lepomis macrochirus*		X
Chain Pickerel	*Esox niger*	X	
Fourspine Stickleback	*Apeltes quadracus*	X	
Mummichog	*Fundulus heteroclitus*	X	
Rainbow Smelt	*Osmerus mordax*	X	
Redfin Pickerel	*Esox americanus*	X	
White Sucker	*Catostomus* commersoni	X	
Yellow Perch	*Perca flavescens*	X	

* Native to eastern part of the state.

Table 75. For Cape Cod National Seashore (CACO), common names for fish species collected in freshwater fish inventory classified by habitat.

	Habitat Types					
Common Name	*Small Lakes*	*Low Flow Impoundments*	*High Flow Impoundments*	*Lower Gradient Stream/River*	*Moderate Gradient Stream/River*	*Higher Gradient Stream/River*
Alewife/Blueback Herring	X					
American Eel	X			X		
Banded Killifish	X			X		
Blacknose Dace						
Bluegill						
Brassy Minnow						
Brook Trout	X					
Brown Bullhead	X					
Brown Trout	X					
Central Mudminnow						
Chain Pickerel	X					
Common Shiner						
Creek Chub						
Cutlips Minnow						
Fallfish						
Golden Shiner	X			X		
Green Sunfish						

Table 75. For Cape Cod National Seashore (CACO), common names for fish species collected in freshwater fish inventory classified by habitat.

	Habitat Types					
Common Name	Small Lakes	Low Flow Impoundments	High Flow Impoundments	Lower Gradient Stream/River	Moderate Gradient Stream/River	Higher Gradient Stream/River
Johnny Darter						
Largemouth Bass	X					
Longnose Dace						
Mummichog	X			X		
Pumpkinseed	X			X		
Rainbow Trout						
Redbreast Sunfish						
Redfin Pickerel						
Rock Bass						
Rosyface Shiner						
Slimy Sculpin						
Smallmouth Bass	X					
Spottail Shiner						
Tessellated Darter						
White Perch	X	X				
White Sucker	X					
Yellow Perch	X					
Stickleback				X		

Table 81. For Morristown NHP (MORR), number of species (species richness) for fish species collected in freshwater fish inventory.

	Resource Name						
Species Name	Indian Grave Brook	Passaic River	Jersey Brook	W. Primrose Brook	E. Primrose Brook	Primrose Brook	Cat Swamp Pond
Blacknose Dace	X	X	X	X	X	X	
Bluegill	X						
Brook Trout		X		X	X	X	
Brown Trout	X	X					
Creek Chub	X	X					
Golden Shiner							X
Rainbow Trout	X	X					
Slimy Sculpin			X	X	X	X	
Spottail Shiner			X		X	X	
Tessellated Darter		X					
White Sucker	X	X				X	

Table 82. For Roosevelt Vanderbilt NHS (ROVA), number of species (species richness) for fish species collected in freshwater fish inventory.

	Resource Name					
Species Name	**Upper Valkill Pond**	**Fallkill Creek**	**Meriches Kill**	**Crum Elbow Creek**	**Upper Pond**	**Middle Pond**
American Eel			X	X		
Banded Killifish			X			
Blacknose Dace			X	X		
Bluegill	X					
Brown Bullhead	X					
Chain Pickerel					X	
Common Shiner				X		
Creek Chub			X			
Cutlips Minnow				X		
Golden Shiner			X			
Johnny Darter			X			
Largemouth Bass					X	X
Mummichog			X			
Pumpkinseed			X		X	X
Redbreast Sunfish		X	X	X		X
Redfin Pickerel	X	X	X		X	
Rock Bass	X			X	X	
White Sucker	X		X			

Table 83. For Saratoga, number of species (species richness) for fish species collected in freshwater fish inventory classified by habitat.

	Resource Name						
Species Name	Kroma Kill	Canal (Section 1)	Canal (Section 5)	Mill Creek (North)	Mill Creek (South)	Mill Creek (Middle)	Davidson Farm Pond
Blacknose Dace	X			X	X	X	
Bluegill		X					
Brassy Minnow							X
Brown Bullhead		X					X
Central Mudminnow			X				
Golden Shiner		X					
Johnny Darter	X			X			
Largemouth Bass		X					
Longnose Dace	X						
Pumpkinseed	X	X					X
Rosyface Shiner	X						
Spottail Shiner	X			X	X	X	X
White Sucker	X	X		X		X	

Table 84. For Saint Gaudens NHS (SAGA), number of species (species richness) for fish species collected in freshwater fish inventory.

	Resource Name		
Species Name	**Blow-me-down Brook**	**Blow-me- up Brook**	**Blow-me-down Pond**
Blacknose Dace	X	X	X
Brook Trout		X	
Brown Bullhead			X
Common Shiner	X		X
Creek Chub			X
Fallfish		X	X
Golden Shiner			X
Longnose Dace	X		
Pumpkinseed			X
Slimy Sculpin		X	
Spottail Shiner	X	X	X
White Sucker	X		X

Table 85. For Minuteman NHP (MIMA), number of species (species richness) for fish species collected in freshwater fish inventory.

Species Name	Resource Name				
	Palumbo's Farm Pond	Un-named Pond	Elm Brook	Mill Brook 1	Mill Brook 2
American Eel			X		
Bluegill		X			
Brook Trout			X		
Brown Bullhead	X				
Golden Shiner				X	
Green Sunfish				X	
Largemouth Bass		X			
Pumpkinseed	X	X		X	
Redfin Pickerel	X		X	X	X
Yellow Perch				X	

Table 86. For Cape Cod National Seashore (CACO), number of species (species richness) for fish species collected in freshwater fish inventory.

Resource Name	Brown Bullhead	Banded Killifish	Brook Trout	Brown Trout	Chain Pickerel	American Eel	Golden Shiner	Herring	Largemouth Bass	Mummichog	Pumpkinseed	Smallmouth Bass	White Perch	White Sucker	Yellow Perch	3 Spine Stickleback
	Species Name															
Dyer Pond		X													X	
Duck Pond		X													X	
Great (T) Pond	X	X	X	X			X				X	X			X	
Great (W) Pond	X										X				X	
Gull Pond	X	X				X		X			X	X	X	X	X	
Herring Pond	X				X	X	X	X	X	X	X		X		X	
Higgins Pond	X	X				X	X	X	X		X		X	X	X	
Horseleech Pond		X				X			X		X		X	X	X	
Kinnacum Pond															X	
Long Pond		X									X				X	
Northeast Pond	X				X				X		X	X			X	
Round (E) Pond		X													X	
Round (W) Pond							X				X				X	
Ryder Pond											X				X	
Slough Pond	X	X							X		X				X	
Snow Pond	X								X		X					
Southeast Pond	X				X						X				X	
Spectacle Pond		X													X	
Turtle Pond					X						X				X	
Williams Pond	X					X	X	X	X		X		X		X	
Herring River																
Pamet River		X				X	X			X	X					X
Pilgrim Lake													X			
Intradunal Ponds																
Clapp's Pond	X						X		X		X					
Great Pond					X											

* Presence/Absence for CACO was taken from Summer and Fall 2000 data.

Table 87. Relative Abundance by Park

Common Name	WEFA	MABI	MORR	ROVA	SARA	SAGA	MIMA	* CACO
	Park Names							
Alewife/Blueback Herring								133
American Eel	1			33+			2	56
Banded Killifish				1				7201
Blacknose Dace			267	363	690	138		
Bluegill			1	17	19		74	
Brassy Minnow					38			
Brook Trout			68			6	30	2
Brown Bullhead				1	5	14	2	333
Brown Trout			14					1
Central Mudminnow					6			
Chain Pickerel				1				40
Common Shiner				1		616		
Creek Chub			102	1		47		
Cutlips Minnow				9				
Fallfish						2		
Golden Shiner			930	2	3	322	1	229
Green Sunfish							1	
Johnny Darter				13	97			
Largemouth Bass	26	10		6	1		18	172
Longnose Dace					32	6		
Mummichog				12				21
Pumpkinseed	177			23	136	88	8	3123
Rainbow Trout			93					
Redbreast Sunfish				36				
Redfin Pickerel				6			8	
Rock Bass				6				
Rosyface Shiner					2			
Slimy Sculpin			180			34		
Smallmouth Bass								58
Spottail Shiner			16		415	13		
Tessellated Darter			1					
White Perch								114
White Sucker			19	13	43	53		28
Yellow Perch		6					1	1843
Three spine Stickleback								2

* Relative abundance numbers for CACO were taken from Summer and Fall 2000 data.

Table 88. Overall relative abundance for fish species by habitat type. Relative abundance is number of fish per standardized effort.

	Habitat Types					
Common Name	*Small Lakes*	*Low Flow Impoundments*	*High Flow Impoundments*	*Lower Gradient Stream/River*	*Moderate Gradient Stream/River*	*Higher Gradient Stream/River*
Alewife/Blueback Herring	133					
American Eel	25	1		34	30+	5
Banded Killifish	7182			20		
Blacknose Dace			4	344	793	317
Bluegill		110				1
Brassy Minnow		38				
Brook Trout	2			10	62	32
Brown Bullhead	333	8	14			
Brown Trout	1				9	5
Central Mudminnow		6				
Chain Pickerel	40		1			
Common Shiner			586			31
Creek Chub			47		24	79
Cutlips Minnow						9
Fallfish			1		1	
Golden Shiner	217	933	322	13	2	
Green Sunfish				1		
Johnny Darter				104	3	3
Largemouth Bass	172	55	6			
Longnose Dace				5	1	32
Mummichog	1			88		
Pumpkinseed	2708	315	92	438		1
Rainbow Trout					58	35
Redbreast Sunfish			2	26		8
Redfin Pickerel		3	2	8		1
Rock Bass		1	2			3
Rosyface Shiner				2		
Slimy Sculpin				34	180	
Smallmouth Bass	58					
Spottail Shiner		27		205	194	18
Tessellated Darter						1
White Perch	48					
White Sucker	28	76	37	28	24	29
Yellow Perch	1843	6		1		
Three-spine stickleback				2		

Table 101. Numbers of individuals for Saratoga NHP.

Date	Time	Resource Name	Habitat	Species Name	Number of Individuals	Map #	Map Site #
001014	Day	Old Champlain Canal (sect. 1)	Low flow impoundment	Bluegill	3	7D	A1
001014	Night	Old Champlain Canal (sect. 1)	Low flow impoundment	Bluegill	1	7D	A1
001014	Night	Old Champlain Canal (sect. 1)	Low flow impoundment	Bluegill	3	7D	A2
001014	Night	Old Champlain Canal (sect. 1)	Low flow impoundment	Bluegill	1	7D	A3
001014	Night	Old Champlain Canal (sect. 1)	Low flow impoundment	Bluegill	3	7D	B2
001014	Night	Old Champlain Canal (sect. 1)	Low flow impoundment	Bluegill	6	7D	B3
001014	Night	Old Champlain Canal (sect. 1)	Low flow impoundment	Bluegill	1	7D	C1
001014	Night	Old Champlain Canal (sect. 1)	Low flow impoundment	Brown Bullhead	1	7D	C1
001014	Night	Old Champlain Canal (sect. 1)	Low flow impoundment	Golden Shiner	1	7D	A1
001014	Night	Old Champlain Canal (sect. 1)	Low flow impoundment	Golden Shiner	1	7D	A2
001014	Day	Old Champlain Canal (sect. 1)	Low flow impoundment	No Fish	0	7D	A2
001014	Day	Old Champlain Canal (sect. 1)	Low flow impoundment	No Fish	0	7D	A3
001014	Night	Old Champlain Canal (sect. 1)	Low flow impoundment	No Fish	0	7D	B1
001014	Day	Old Champlain Canal (sect. 1)	Low flow impoundment	Pumpkinseed	1	7D	A1
001014	Day	Old Champlain Canal (sect. 1)	Low flow impoundment	Pumpkinseed	8	7D	B1-15
001014	Day	Old Champlain Canal (sect. 1)	Low flow impoundment	Pumpkinseed	2	7D	C1
001014	Day	Old Champlain Canal (sect. 1)	Low flow impoundment	White Sucker	1	7D	C1
001014	Night	Old Champlain Canal (sect. 1)	Low flow impoundment	White Sucker	1	7D	C1
001015	Day	Mill Creek (North Branch)	Moderate gradient stream	Blacknose Dace	12	7D	E1
001015	Day	Mill Creek (North Branch)	Moderate gradient stream	Blacknose Dace	20	7D	E2
001015	Day	Mill Creek (North Branch)	Moderate gradient stream	Blacknose Dace	38	7D	E3
001015	Day	Mill Creek (North Branch)	Moderate gradient stream	Blacknose Dace	18	7D	E4
001015	Day	Mill Creek (North Branch)	Moderate gradient stream	Blacknose Dace	23	7D	E5
001015	Day	Mill Creek (North Branch)	Moderate gradient stream	Blacknose Dace	11	7D	E6
001015	Day	Mill Creek (North Branch)	Moderate gradient stream	Blacknose Dace	9	7D	E7
001015	Day	Mill Creek (North Branch)	Moderate gradient stream	Blacknose Dace	14	7D	E8
001015	Day	Mill Creek (North Branch)	Moderate gradient stream	Johnny Darter	1	7D	E3
001015	Day	Mill Creek (North Branch)	Moderate gradient stream	Johnny Darter	1	7D	E6

Table 101. Numbers of individuals for Saratoga NHP.

Date	Time	Resource Name	Habitat	Species Name	Number of Individuals	Map #	Map Site #
001015	Day	Mill Creek (North Branch)	Moderate gradient stream	Johnny Darter	1	7D	E7
001015	Day	Mill Creek (North Branch)	Moderate gradient stream	Spottail Shiner	5	7D	E1
001015	Day	Mill Creek (North Branch)	Moderate gradient stream	Spottail Shiner	12	7D	E2
001015	Day	Mill Creek (North Branch)	Moderate gradient stream	Spottail Shiner	15	7D	E3
001015	Day	Mill Creek (North Branch)	Moderate gradient stream	Spottail Shiner	7	7D	E4
001015	Day	Mill Creek (North Branch)	Moderate gradient stream	Spottail Shiner	3	7D	E5
001015	Day	Mill Creek (North Branch)	Moderate gradient stream	Spottail Shiner	4	7D	E6
001015	Day	Mill Creek (North Branch)	Moderate gradient stream	Spottail Shiner	6	7D	E7
001015	Day	Mill Creek (North Branch)	Moderate gradient stream	White Sucker	2	7D	E2
001015	Day	Mill Creek (North Branch)	Moderate gradient stream	White Sucker	3	7D	E4
001015	Day	Mill Creek (North Branch)	Moderate gradient stream	White Sucker	2	7D	E6
001015	Day	Mill Creek (South Branch)	Moderate gradient stream	Blacknose Dace	1	7D	E9
001015	Day	Mill Creek (South Branch)	Moderate gradient stream	Blacknose Dace	13	7D	E10
001015	Day	Mill Creek (South Branch)	Moderate gradient stream	Blacknose Dace	5	7D	E11
001015	Day	Mill Creek (South Branch)	Lower gradient stream	Blacknose Dace	5	7D	E12
001015	Day	Mill Creek (South Branch)	Moderate gradient stream	Spottail Shiner	15	7D	E8
001015	Day	Mill Creek (South Branch)	Moderate gradient stream	Spottail Shiner	15	7D	E10
001015	Day	Mill Creek (South Branch)	Moderate gradient stream	Spottail Shiner	6	7D	E11
001015	Day	Mill Creek (South Branch)	Lower gradient stream	Spottail Shiner	22	7D	E12
001015-001016	Overnight	Burdyl Farm Pond	Low flow impoundment	No Fish	0	7D	A2
001015-001016	Overnight	Burdyl Farm Pond	Low flow impoundment	No Fish	0	7D	A3
001015-001016	Overnight	Burdyl Farm Pond	Low flow impoundment	No Fish	0	7D	B1-5
001015-001016	Overnight	Davidson Farm Pond	Low flow impoundment	Brassy Minnow	37	7D	B1-10
001015-001016	Overnight	Davidson Farm Pond	Low flow impoundment	Brassy Minnow	1	7D	A1
001015-001016	Overnight	Davidson Farm Pond	Low flow impoundment	Brown Bullhead	3	7D	B1-10
001015-001016	Overnight	Davidson Farm Pond	Low flow impoundment	Pumpkinseed	55	7D	B1-10
001015-001016	Overnight	Davidson Farm Pond	Low flow impoundment	Pumpkinseed	6	7D	A1
001015-001016	Overnight	Davidson Farm Pond	Low flow impoundment	Spottail Shiner	27	7D	B1-10
001015-001016	Overnight	Davidson Farm Pond	Low flow impoundment	YOY Pumpkinseed	1	7D	A1
001015-001016	Overnight	Davidson Farm Pond	Low flow impoundment	YOY Pumpkinseed	58	7D	B1-10

Table 101. Numbers of individuals for Saratoga NHP.

Date	Time	Resource Name	Habitat	Species Name	Number of Individuals	Map #	Map Site #
001016	Day	Mill Creek (North Branch)	Lower gradient stream	Blacknose Dace	30	7D	E13
001016	Day	Mill Creek (North Branch)	Lower gradient stream	Blacknose Dace	70	7D	E14
001016	Day	Mill Creek (North Branch)	Lower gradient stream	Blacknose Dace	20	7D	E15
001016	Day	Mill Creek (North Branch)	Lower gradient stream	Blacknose Dace	44	7D	E16
001016	Day	Mill Creek (North Branch)	Lower gradient stream	Spottail Shiner	27	7D	E13
001016	Day	Mill Creek (North Branch)	Lower gradient stream	Spottail Shiner	24	7D	E14
001016	Day	Mill Creek (North Branch)	Lower gradient stream	Spottail Shiner	16	7D	E15
001016	Day	Mill Creek (North Branch)	Lower gradient stream	Spottail Shiner	26	7D	E16
001016	Day	Mill Creek (Middle Branch)	Moderate gradient stream	Blacknose Dace	45	7D	E17
001016	Day	Mill Creek (Middle Branch)	Moderate gradient stream	Blacknose Dace	11	7D	E18
001016	Day	Mill Creek (Middle Branch)	Moderate gradient stream	Blacknose Dace	33	7D	E19
001016	Day	Mill Creek (Middle Branch)	Moderate gradient stream	Spottail Shiner	23	7D	E17
001016	Day	Mill Creek (Middle Branch)	Moderate gradient stream	Spottail Shiner	5	7D	E18
001016	Day	Mill Creek (Middle Branch)	Moderate gradient stream	Spottail Shiner	17	7D	E19
001016	Day	Mill Creek (Middle Branch)	Moderate gradient stream	White Sucker	2	7D	E17
001016	Night	Old Champlain Canal (sect. 1)	Low flow impoundment	Brown Bullhead	1	7D	C1
001016	Night	Old Champlain Canal (sect. 1)	Low flow impoundment	Largemouth Bass	1	7D	C1
001016	Night	Old Champlain Canal (sect. 1)	Low flow impoundment	Pumpkinseed	2	7D	C1
001016	Night	Old Champlain Canal (sect. 1)	Low flow impoundment	White Sucker	1	7D	C1
001016-001017	Overnight	Old Champlain Canal (sect. 1)	Low flow impoundment	Bluegill	1	7D	A1
001016-001017	Overnight	Old Champlain Canal (sect. 1)	Low flow impoundment	Golden Shiner	1	7D	A1
001016-001017	Overnight	Old Champlain Canal (sect. 1)	Low flow impoundment	No Fish	0	7D	B1-9
001016-001017	Overnight	Old Champlain Canal (sect. 5)	Low flow impoundment	Central Mudminnow	6	7D	B1-9
001017	Day	Americans Creek	Lower gradient stream	No Fish	0	7D	E2
001017	Day	Americans Creek	Lower gradient stream	Not counted	0	7D	E1
001017	Day	Mill Creek (Middle Branch)	Moderate gradient stream	Blacknose Dace	11	7D	E20
001017	Day	Mill Creek (Middle Branch)	Moderate gradient stream	Blacknose Dace	14	7D	E21
001017	Day	Mill Creek (Middle Branch)	Moderate gradient stream	Blacknose Dace	13	7D	E22
001017	Day	Mill Creek (Middle Branch)	Moderate gradient stream	Spottail Shiner	4	7D	E20
001017	Day	Mill Creek (Middle Branch)	Moderate gradient stream	Spottail Shiner	32	7D	E21
001017	Day	Mill Creek (Middle Branch)	Moderate gradient stream	Spottail Shiner	5	7D	E22

Table 102. Numbers of individuals for Saint Gaudens NHS.

Date	Time	Site Name	Habitat	Species Name	Number of Individuals	Map #	Map Site #
101900	Day	Blow-me-down Brook	Higher gradient stream	Blacknose Dace	78	8D	E1
101900	Day	Blow-me-down Brook	Higher gradient stream	Common Shiner	30	8D	E1
101900	Day	Blow-me-down Brook	Higher gradient stream	Spottail Shiner	4	8D	E1
101900	Day	Blow-me-down Brook	Higher gradient stream	White Sucker	10	8D	E1
101900	Night	Blow-me-down Pond	High flow impoundment	Blacknose Dace	2	8D	B3
101900	Night	Blow-me-down Pond	High flow impoundment	Brown Bullhead	4	8D	A2
101900	Night	Blow-me-down Pond	High flow impoundment	Brown Bullhead	5	8D	B2
101900	Night	Blow-me-down Pond	High flow impoundment	Brown Bullhead	1	8D	B3
101900	Night	Blow-me-down Pond	High flow impoundment	Common Shiner	71	8D	A1
101900	Night	Blow-me-down Pond	High flow impoundment	Common Shiner	47	8D	A2
101900	Night	Blow-me-down Pond	High flow impoundment	Common Shiner	14	8D	A3
101900	Night	Blow-me-down Pond	High flow impoundment	Common Shiner	14	8D	B1
101900	Night	Blow-me-down Pond	High flow impoundment	Common Shiner	33	8D	B2
101900	Night	Blow-me-down Pond	High flow impoundment	Common Shiner	121	8D	B3
101900	Night	Blow-me-down Pond	High flow impoundment	Creek Chub	8	8D	A1
101900	Night	Blow-me-down Pond	High flow impoundment	Creek Chub	2	8D	A2
101900	Night	Blow-me-down Pond	High flow impoundment	Creek Chub	1	8D	B2
101900	Night	Blow-me-down Pond	High flow impoundment	Creek Chub	7	8D	B3
101900	Night	Blow-me-down Pond	High flow impoundment	Fallfish	1	8D	A2
101900	Night	Blow-me-down Pond	High flow impoundment	Fallfish	1	8D	C1
101900	Night	Blow-me-down Pond	High flow impoundment	Golden Shiner	63	8D	A1
101900	Night	Blow-me-down Pond	High flow impoundment	Golden Shiner	19	8D	A2
101900	Night	Blow-me-down Pond	High flow impoundment	Golden Shiner	98	8D	A3
101900	Night	Blow-me-down Pond	High flow impoundment	Golden Shiner	2	8D	B2

Table 124. Average Lengths for Saratoga NHP.

Resource Name	Habitat	Species Name	Average Lengths	Number of Individuals
Davidson Farm Pond	Low flow impoundment	Brassy Minnow	60.9	20
Davidson Farm Pond	Low flow impoundment	Brown Bullhead	96	3
Davidson Farm Pond	Low flow impoundment	Pumpkinseed	61.2	20
Davidson Farm Pond	Low flow impoundment	Spottail Shiner	56	20
Davidson Farm Pond	Low flow impoundment	YOY Pumpkinseed	40.8	20
Kroma Kill	Lower gradient stream	Blacknose Dace	47.7	20
Kroma Kill	Lower gradient stream	Johnny darter	51.4	21
Kroma Kill	Higher gradient stream	Longnose Dace	71.5	21
Kroma Kill	Lower gradient stream	Pumpkinseed	60.3	3
Kroma Kill	Lower gradient stream	Rosyface Shiner	73.8	6
Kroma Kill	Lower gradient stream	Spottail Shiner	63.1	25
Kroma Kill	Lower gradient stream	White Sucker	90.7	19
Kroma Kill	Higher gradient stream	White Sucker	103	3
Mill Creek (North Branch)	Moderate gradient stream	Blacknose Dace	57.3	20
Mill Creek (North Branch)	Moderate gradient stream	Johnny darter	61.3	3
Mill Creek (North Branch)	Moderate gradient stream	Spottail Shiner	99.7	20
Mill Creek (North Branch)	Moderate gradient stream	White Sucker	133.4	7
Old Champlain Canal (section 1)	Low flow impoundment	Bluegill	106.5	19
Old Champlain Canal (section 1)	Low flow impoundment	Brown Bullhead	322.5	2
Old Champlain Canal (section 1)	Low flow impoundment	Golden Shiner	173.3	3
Old Champlain Canal (section 1)	Low flow impoundment	Pumpkinseed	103.2	13
Old Champlain Canal (section 1)	Low flow impoundment	White Sucker	240.2	5
Old Champlain Canal (section 5)	Low flow impoundment	Central Mudminnow	78.4	5

Table 125. Average lengths for Saint Gaudens NHS.

Resource Name	Habitat	Species Name	Average Lengths	Number of Individuals
Blow-me-down Brook	Higher gradient stream	Blacknose Dace	48.5	20
Blow-me-down Brook	Higher gradient stream	* Common Shiner	49.8	20
Blow-me-down Brook	Higher gradient stream	Longnose Dace	55.4	5
Blow-me-down Brook	Higher gradient stream	Pumpkinseed	64	1
Blow-me-down Brook	Higher gradient stream	Spottail Shiner	65.6	8
Blow-me-down Brook	Higher gradient stream	White Sucker	66.7	15
Blow-me-down Pond	High flow impoundment	Brown Bullhead	85.9	16
Blow-me-down Pond	High flow impoundment	* Common Shiner	71.6	20
Blow-me-down Pond	High flow impoundment	* Fallfish	107	1
Blow-me-down Pond	High flow impoundment	UID Sucker	322.5	2
Blow-me-down Pond	High flow impoundment	Golden Shiner	90.3	20
Blow-me-down Pond	High flow impoundment	Pumpkinseed	69.3	20
Blow-me-down Pond	High flow impoundment	Creek Chub	110.8	20
Blow-me-down Pond	High flow impoundment	White Sucker	108	22
Blow-me-up Brook	Moderate gradient stream	Blacknose Dace	55.4	20
Blow-me-up Brook	Moderate gradient stream	Brook Trout	106.3	8
Blow-me-up Brook	Moderate gradient stream	* Fallfish	67	1
Blow-me-up Brook	Moderate gradient stream	Longnose Dace	69	1
Blow-me-up Brook	Moderate gradient stream	Slimy Sculpin	47	20
Blow-me-up Brook	Moderate gradient stream	Spottail Shiner	68.8	5
Blow-me-up Brook	Moderate gradient stream	White Sucker	133	1

Table 126. Average lengths for Minuteman NHP.

Site Name	Resource Name	Habitat	Species Name	Average Lengths	Number of Individuals
Main Unit	Elm Brook	Higher gradient stream	Brook Trout	91	20
Main Unit	Elm Brook	Lower gradient stream	Redfin Pickerel	103.5	3
Main Unit	Elm Brook	Higher gradient stream	Redfin Pickerel	104	1
Main Unit	Palumbo's Farm Pond	Low flow impoundment	Brown Bullhead	71	2
Main Unit	Palumbo's Farm Pond	Low flow impoundment	Pumpkinseed	92.5	2
Main Unit	Palumbo's Farm Pond	Low flow impoundment	Redfin Pickerel	114	1
Main Unit	Un-named Pond	Low flow impoundment	Bluegill	90.2	20
Main Unit	Un-named Pond	Low flow impoundment	Largemouth Bass	59.7	18
Main Unit	Un-named Pond	Low flow impoundment	Pumpkinseed	88.8	4
North Bridge Unit	Mill Brook	Lower gradient stream	Golden Shiner	124	1
North Bridge Unit	Mill Brook	Lower gradient stream	Pumpkinseed	89.5	2
North Bridge Unit	Mill Brook	Lower gradient stream	Redfin Pickerel	121.7	6
North Bridge Unit	Mill Brook	Lower gradient stream	Yellow Perch	71	1
Wayside Unit	Mill Brook	Lower gradient stream	Green Sunfish	121	1

Table 127. Average lengths for Cape Cod NS non-kettle pond systems.

Resource Name	Habitat	Species Name	Average Lengths	Number of Individuals
Clapp's Pond	Small Lake	Brown Bullhead	255.57	7
Clapp's Pond	Small Lake	Golden Shiner	69.40	5
Clapp's Pond	Small Lake	Largemouth Bass	70.50	2
Clapp's Pond	Small Lake	Pumpkinseed	99.00	5
Great Pond	Small Lake	Chain Pickerel	330.80	5
Pamet River	Lower Gradient Stream	American Eel	~90	1
Pamet River	Lower Gradient Stream	Banded Killifish	64.39	18
Pamet River	Lower Gradient Stream	3 Spine Stickleback	37.00	2
Pamet River	Lower Gradient Stream	Golden Shiner	82.78	9
Pamet River	Lower Gradient Stream	Mummichog	69.95	20
Pamet River	Lower Gradient Stream	Pumpkinseed	45.00	20
Pilgrim Lake	Low-flow Impoundment	White Perch	139.29	21

Table 128. Effectiveness of sampling for representative resources at representative parks.

Park	Resource	Sample Number	Species New	(Number) Cumulative	Percent
WEFA	Weir Pond	1	2	2	67
	|	2	0	2	67
	|	3	0	2	67
	|	4	0	2	67
	|	5	0	2	67
	|	6	0	2	67
	|	7	0	2	67
	|	8	0	2	67
	|	9	1	3	100
	|	10	0	3	100
	|	11	0	3	100
	|	12	0	3	100
	|	13	0	3	100
	|	14	0	3	100
	|	15	0	3	100
	Weir Pond	16	0	3	100
MABI	The Pogue	1	0	0	0
	|	2	0	0	0
	|	3	1	1	50
	|	4	0	1	50
	|	5	0	1	50
	|	6	1	2	100
	|	7	0	2	100
	|	8	0	2	100
	|	9	0	2	100
	|	10	0	2	100
	|	11	0	2	100
MABI	The Pogue	12	0	2	100
ROVA	Crum Elbow	1	3	3	50
	|	2	1	4	80
	|	3	1	5	100
ROVA	Meriches Kill	1	6	6	60
	|	2	2	8	80
	|	3	1	9	90
	|	4	0	9	90
	|	5	0	9	90
	|	6	0	9	90
	|	7	1	10	100
	|	8	0	10	100
	|	9	0	10	100
	|	10	0	10	100
	|	11	0	10	100
	Meriches Kill	12	0	10	100

Table 128. Effectiveness of sampling for representative resources at representative parks.

Park	Resource	Sample Number	Species New	(Number) Cumulative	Percent
ROVA	Lower Valkill Creek	1	2	2	100
	Upper Valkill Pond	1	2	2	33
	|	2	0	2	33
	|	3	1	3	50
	|	4	0	3	50
	|	5	0	3	50
	|	6	2	5	83
	Upper Valkill Pond	7	1	6	100
	Middle Pond	1	1	2	40
	|	2	0	2	40
	|	3	3	5	100
SARA	Upper Kroma Kill	1	4	4	80
	|	2	0	4	80
	|	3	1	5	100
	|	4	0	5	100
	Upper Kroma Kill	5	0	5	100
	Lower Kroma Kill	1	3	3	60
	|	2	0	3	60
	|	3	1	4	80
	|	4	0	4	80
	|	5	1	5	100
	|	6	0	5	100
	|	7	0	5	100
	Lower Kroma Kill	8	0	5	100
	Mill Creek- North	1	2	2	50
	|	2	0	2	50
	|	3	1	3	75
	|	4	1	4	100
	|	5	0	4	100
	|	6	0	4	100
	|	7	0	4	100
	|	8	0	4	100
	|	9	0	4	100
	|	10	0	4	100
	|	11	0	4	100
	|	12	0	4	100
	|	13	0	4	100
	|	14	0	4	100
	|	15	0	4	100
	Mill Creek- North	16	0	4	100

Table 128. Effectiveness of sampling for representative resources at representative parks.

Park	Resource	Sample Number	Species New	(Number) Cumulative	Percent
SARA	Mill Creek South	1	2	2	100
	|	2	0	2	100
	|	3	0	2	100
	Mill Creek South	4	0	2	100
	Americans Creek	1	0	0	100
		2	0	0	100
	Champlain Canal	1	2	2	33
	|	2	0	2	33
	|	3	1	3	50
	|	4	1	4	67
	|	5	0	4	67
	|	6	1	5	83
	|	7	1	6	100
	|	8	0	6	100
	|	9	0	6	100
	Champlain Canal	10	0	6	100
	Davidson Farm Pond	1	4	4	100
		2	0	4	100
SARA	Burdyl Farm Pond	1	0	0	100
		2	0	0	100
SAGA	Blow me up Brook	1	3	3	60
	|	2	0	3	60
	|	3	0	3	60
	|	4	1	4	80
	|	5	1	5	100
	|	6	0	5	100
	|	7	0	5	100
	|	8	0	5	100
	|	9	0	5	100
	|	10	0	5	100
	|	11	0	5	100
	|	12	0	5	100
	|	13	0	5	100
	|	14	0	5	100
	Blow me up Brook	15	0	5	100
	Blow me down Brook	1	4	4	80
	|	2	1	5	100

Table 128. Effectiveness of sampling for representative resources at representative parks.

Park	Resource	Sample Number	Species New	(Number) Cumulative	Percent
	Blow me down Pond	1	6	6	75
	|	2	1	7	88
	|	3	1	8	100
	|	4	0	8	100
	|	5	0	8	100
	|	6	0	8	100
	|	7	0	8	100
	|	8	0	8	100
SAGA	Blow me down Pond	9	0	8	100
MORR	Jersey	1	3	3	100
	|	2	0	3	100
	Primrose-Main	1	4	4	80
	|	2	0	4	80
	|	3	0	4	80
	|	4	1	5	100
	|	5	0	5	100
	|	6	0	5	100
	|	7	0	5	100
	Primrose-Main	8	0	5	100
	West Primrose	1	3	3	100
	|	2	0	3	100
	|	3	0	3	100
	|	4	0	3	100
	|	5	0	3	100
	|	6	0	3	100
	|	7	0	3	100
	West Primrose	8	0	3	100
	East Primrose	1	2	2	50
	|	2	1	3	75
	|	3	0	3	75
	East Primrose	4	1	4	100
	Indian Grave	1	4	4	67
	|	2	0	4	67
	|	3	0	4	67
	|	4	1	5	83
	|	5	0	5	83
	|	6	0	5	83
	|	7	0	5	83
	Indian Grave	8	1	6	100

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