Appendix C
Biological Data Results
2008-2024

Compiled by the Town of Plymouth

Data Results Completed by David Worden (2008-2012), School of Marine Science and Technology (2013-Current)Town's Consultant Limnologist/Biologist

Location ID	Description	Macrophyte/ Phytoplankton	Macroinvertebrate/ Periphyton
BM-1	Downstream of Russell Mill Pond, near hatchery		☑
BM-2	Downstream of Hayden Pond, near Sandwich Road		☑
BM-3	Near Forge Drive		☑
BM-4	Downstream of Sawmill Pond Dam *		☑
Russell Mill Pond		☑	
Hayden Pond		☑	
Howland Pond		☑	
Eel River Basin		☑	

*Sawmill Pond Dam removed in 2009/2010. Location following dam removal is downstream of footbridge

2006 Master List of Aquatic Macrophytes Observed in Ponds of the Eel River System
(No Significant Changes in 2008 from 2006/2007 List)

Species Name	**Common Name**	**Occurance in Ponds**			
Submerged Plants		**Russell Mill**	**Hayden**	**Howland**	**Eel River**
Cabomba caroliniana	Fanwort (non-native)		**X**		**X**
Callitriche sp.	Water-starwort	x			
Ceratophyllum demersum	Coontail	x		x	
Elodea nuttallii	Waterweed	**X**	**X**	x	**X**
Nitell sp.	macroalga			x	x
Potamogeton sp.	Pondweed	x	x	x	x
Utricularia sp.	Bladderwort	**X**	x		
Vallisneria americana	Tapegrass	x			
Floating-Leaved Plants					
Nuphar variegata	Yellow Waterlily	x	x		
Nymphaea odorata	White Waterlily	x		**X**	x
Emergent Plants					
Alnus sp.	Alder			x	
Clethra alnifolia	Sweet Pepperbush			x	x
Decodon verticillatus	Water-willow	x	x	x	x
Impatiens capensis	Jewelweed	x			
Juncus sp.	Rush		x		x
Lythrum salicaria	Purple Loosestrife	x			x
Myosotis sp.	Forget-me-not	x			
Myrica gale	Sweet Gale	x	x	x	x
Phragmites australis	Common Reed		x		x
Pontederia cordata	Pickerel-weed		x		x
Sagittaria sp.	Arrowhead	x	x		
Scirpus cyperinus	Wool-grass		x	x	
Sparganium sp.	Bur-reed		x	x	x
Spiraea tomentosa	Steeple-bush		x	x	x
Typha latifolia	Common Cattail		x	x	
*dominant species indicated in bold, capital X					

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted May 20, 2008

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, **R**are <1%

Periphyton Taxa	**BM-1 (hatchery)**	**BM-2**	**BM-3a**	**BM-4 (TNC)**
Bacillariophyceae (diatoms)				
Cocconeis		A	R	
Eunotia	R	R	R	V
Gomphonema		R		
Melosira		R		
Navicula	V	R	A	V
Nitzschia	V	R	R	R
Tabellaria		R		
Chlorphyta (green algae, excluding desmids)				
Coleochaete	R	R	O	C
Oedogonium		R		
Zygnema		R		
Cyanophyta (blue-green algae)				
Oscillatoria				R
Phormidium	R		O	R
Desmidiaceae (desmids)				
Closterium				R
Cosmarium				R
Protozoa				
Vorticella		R		
Bacteria				
unidentified	V			
*BM-4 slides supported many midge (Chironomidae) retreats				

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted October 3, 2008

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, **R**are <1%

Periphyton Taxa	**BM-1 (hatchery)**	**BM-2**	**BM-3a**	**BM-4 (TNC)**
Bacillariophyceae (diatoms)				
Cocconeis		A	C	
Cymbella	R	R		
Eunotia	R	R	C	R
Gomphonema	R			
Melosira	R			R
Navicula	R	C	C	R
Nitzschia		R		R
Synedra	R		R	R
Tabellaria	C	R		
Chlorphyta (green algae, excluding desmids)				
Coleochaete	R	R	R	
Oedogonium				R
Cyanophyta (blue-green algae)				
Oscillatoria				R
Phormidium			V	
Protozoa				
Carchesium			R	R
Platycola			R	
Rhipidodendron				R
Sphaerophyra			R	
Vorticella			R	R
Bacteria				
unidentified	A		R	A

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted May 20, 2008

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, **R**are <1%

Phytoplankton Taxa	**Russell Mill Pond**	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Bacillariophyceae (diatoms)				
Asterionella	A	A	A	A
Eunotia			R	R
Fragilaria		R	R	R
Melosira	R	R	R	
Navicula	R	R	R	R
Nitzschia		R	R	R
Rhizosolenia	R	R	R	R
Synedra	R	R	R	
Tabellaria	R			
Chlorphyta (green algae, excluding desmids)				
Eudorina				R
Mougeotia		R		
Pediastrum			R	
Scenedesmus				R
Spirogyra			R	R
Chrysophyta (yellow-green algae, excluding diatoms)				
Dinobryon	R	R	R	R
Mallomonas			R	
Rhizochrysis	R			
Synura	R			
Cyanophyta (blue-green algae)				
Anabaena	R			
Microcystis	R			
Euglenophyta				
Phacus	R	R	R	R
Pyrrhophyta (dinoflagellates)				
Peridinium	R	R		

Eel River Field Measurements Recorded by DW on May 20, 2008

Station	Depth	Temp	SpC	DO	DO	pH
	meters	©	*uS/cm*	*% Sat*	*mg/L*	*units*
BM4 (TNC/Sawmill tailrace)	0.2	10.4	79.3	97.2	10.9	5.6
BM1 (Fish Hatchery)	0.2	14.1	99.1	91.3	9.4	5.8
Hayden Pond	0.3	13.7	105.7	87.7	9.1	6
BM2 (Sandwich Road)	0.2	13.8	105.3	97.2	10.1	6.1
BM3A (Forge Road)	0.4	14.9	95.1	97.4	9.8	5.8
Howland Pond	1.1	14.7	93.5	131.4	13.3	6.8
Eel River Basin	0.5	15.1	108.8	98.5	9.9	6.1
Russell Mill Pond(secchi = 3.5ft)	0.2	15.1	98.8	115	11.6	6.1
	1	15.1	99.2	114.9	11.6	6.2
	2	15	99.3	114.9	11.6	6.3
	3	14.7	98.8	112.9	11.5	6.3
	4	12.9	103.9	49.5	5.2	5.7
	5	10.9	117.2	2.2	0.2	5.8
	5.4	10.6	136.7	1.9	0.2	6

Results of Eel River Plankton Sampling Conducted September 28,2008

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, **R**are <1%

Phytoplankton Taxa	**Russell Mill Pond**	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Bacillariophyceae (diatoms)				
Asterionella	R	R	R	R
Cymbella		R		R
Eunotia			R	R
Fragilaria			R	R
Gomphonema		R		R
Melosira	R	R	R	R
Nitzschia	R	R	R	C
Rhizosolenia	R	R		R
Synedra	R	R		R
Tabellaria	A	A	A	A
Chlorphyta (green algae, excluding desmids)				
Arthrodesmus		R		
Closterium			R	R
Coelastrum				R
Crucigenia				R
Eudorina	R			
Mougeotia			R	R
Oedogonium				R
Pandorina		R		R
Pediastrum	R	R	R	R
Scenedesmus		R	R	R
Sphaerocystis			R	R
Spondylosium		R		
Chrysophyta (yellow-green algae, excluding diatoms)				
Dinobryon	R	R		R
Mallomonas			R	R
Rhizochrysis			R	
Synura	R	R	R	R
Uroglenopsis			R	
Cyanophyta (blue-green algae)				
Anabaena	R	R		R
Microcystis	R	R		
Oscillatoria				O
Pyrrhophyta (dinoflagellates)				
Glenodinium	R		R	R
Protozoa				
Euglena				R
Phacus				R
Trachelomanas	R	R	R	R

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Eel River Field Measurements Recorded by DW on September 28, 2008

Station	Depth	Temp	SpC	DO	DO	pH
	meters	©	*uS/cm*	*% Sat*	*mg/L*	*units*
Hayden Pond	0.4	16.5	100.7	82.7	8.1	5.6
Howland Pond	0.5	17.4	67.1	82	7.9	5.2
Eel River Basin	0.5	17.8	64.2	64.4	6.1	5.2
Russell Mill Pond(secchi = 4.5ft)	0.3	17.3	87.8	114.8	11	5.9
	1	16.4	92.9	111.8	10.9	6
	2	16	95.7	99.1	9.7	5.9
	3	15.8	88.8	86.1	8.5	5.7
	4	15	103.5	60.1	6.1	5.4
	5	14.3	110.5	30.7	3.1	5.3
	6	13.7	222.8	2	0.2	5.8
	6.6	13	390.7	1.3	0.1	6.1

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Macroinvertebrate Sampling of Eel River on September 20 & 21, 2008

INSECT TAXA	FFG*	BM-1 (fish hatchery)	BM-2 (Old Sandwich Rd)	BM-3A (Forges Rd)	BM-4 (TNC; mill tailrace)
Diptera (flies and midges)					
Chironomidae	V		2		1
Simuliidae	CF	1	13	7	8
Ephemeroptera (mayflies)					
Baetis	CG/SC		20	6	
Stenonema	SC/CG		7	2	14
Odonata (damselflies and dragonflies)					
Argia	P			1	
Boyeria	P				3
Plecoptera (stonefiles)					
Leuctra	SH				3
Trichoptera (caddisflies)					
Cheumatopsyche	CF	4	6		
Hydropsyche	CF	56	1	17	32
Polycentropodidae	CF			1	
Pycnopsyche	SH			1	
Triaenodes	SH			1	
NON-INSECT TAXA					
Amphipoda (scuds)					
Gammarus	CG	3	41	24	1
Hyalella	CG			8	
Decapoda (crayfish)					
unidentified (very small)	SH		1	1	
Isopoda (aquatic sow bugs)					
Caecidotea	CG	3		11	32
Mollusca (snails and clams)					
Physa	SC	4			
Pisidiidae (pea clams)	CF	11		5	1
Oligochaetes (aquatic worms)					
unidentified	V				3
Turbellaria (flatworms)					
Dugesia	CG	2	1	4	
Total Specimens		84	92	89	98
Community Richness (Total Taxa)		8	9	14	10
Community Eveness (Scaled SD)		0.31	0.52	0.66	0.56
EPT Taxa		2	4	6	3
Percent Dominant Taxa		0.67	0.45	0.27	0.33
Dominant FFG *		CF	CG	CG	CF/CG

*Functional Feeding Groups: CF= Collector-filterer, CG=Collector-gatherer, SC=Scraper, SH=Shredder, P=Predator, V=Variable

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Macroinvertebrate Sampling of Eel River on September 26, 2009

INSECT TAXA	FFG*	BM-1 (fish hatchery)	BM-2 (Old Sandwich Rd)	BM-3A (Forges Rd)	BM-4 (TNC; mill tailrace)
Coleoptera (beetles)					
Dytiscidae				1	
Diptera (flies and midges)					
Chironomidae	V	3	1	3	1
Simuliidae	CF	1	4	9	32
unidentified					1
Ephemeroptera (mayflies)					
Baetis	CG/SC		31		
Stenonema	SC/CG			8	33
Odonata (damselflies and dragonflies)					
Aeshna	P		1		
Argia	P		1	1	
Boyeria	P				2
Enallagma	P		1	2	
Plecoptera (stonefiles)					
Leuctra	SH				1
Trichoptera (caddisflies)					
Cheumatopsyche	CF	2			
Chimarra	CF	1	1		3
Hydropsyche	CF	40	5		13
Triaenodes	SH		2	1	
NON-INSECT TAXA					
Amphipoda (scuds)					
Gammarus	CG	3	30	31	3
Hyalella	CG		6	6	
Isopoda (aquatic sow bugs)					
Caecidotea	CG	5	4	15	12
Mollusca (snails and clams)					
Physa	SC	3		1	
Pisidiidae (pea clams)	CF	31		1	
Turbellaria (flatworms)					
Dugesia	CG	8	1		
Total Specimens		97	88	79	101
Community Richness (Total Taxa)		10	13	12	10
Community Eveness (Scaled SD)		0.49	0.49	0.54	0.56
EPT Taxa		3	4	2	4
Percent Dominant Taxa		0.41	0.35	0.39	0.33
Dominant FFG *		CF	CG	CG	CF/CG

*Functional Feeding Groups: CF= Collector-filterer, CG=Collector-gatherer, SC=Scraper, SH=Shredder, P=Predator, V=Variable

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted May 10,2009

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, **R**are <1%

Periphyton Taxa	**BM-4 (TNC)**	**BM-1*(hatchery)**	**BM-2**	**BM-3a**
Bacillariophyceae (diatoms)				
Cocconeis			C	C
Eunotia	V		R	R
Gomphonema	R	R		V
Navicula	O	V	V	C
Nitzschia		C		R
Pinnularia	R			
Synedra		C		
Chlorphyta (green algae, excluding desmids)				
Coleochaete	O		C	R
Leptosira		C		
Microthamnion		C		
Zygnema				
Cyanophyta (blue-green algae)				
Oscillatoria		C		
Phormidium		R		R
Desmidiaceae (desmids)				
Closterium	R			R
Bacteria				
unidentified	A		C	C
*slides at station BM-1 could not be located, so periphyton was collected from natural gravel and cobble substrates				

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted May 10,2009

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, **R**are <1%

	BM-1 (Hatchery)	BM-2	BM-3a	BM-4 (TNC)
Periphyton Taxa				
Bacillariophyceae (diatoms)				
Asterionella	C	R		
Cocconeis		V		
Cymbella		R		
Eunotia	R	C	R	C
Gomphonema	R			
Melosira	R			
Nitzschia	V			R
Rhizosolenia	R	R		R
Synedra	V	R		
Tabellaira	R			
Chlorphyta (green algae, excluding desmids)				
Coleochaete		C		
Scenedesmus	R			
Cyanophyta (blue-green algae)				
Phormidium			R	
Protozoa				
Carchesium	R			
Platycola			R	
Rhipidodendron				R
Sphaerophyra				
Vorticella	R		R	R
Bacteria				
unidentified	R		A	A

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Eel River Field Measurements Recorded by DW on September 7,2009

Station	Depth	Temp	SpC	DO	DO	pH
	meters	©	*uS/cm*	*% Sat*	*mg/L*	*units*
Hayden Pond	0.5	15.87	111.1	62.2	6.23	5.53
Howland Pond	1.4	16.36	105.3	70.5	7	5.41
Eel River Basin	0.9	17.46	117.1	69.9	6.78	5.59
Russell Mill Pond						
(secchi = 3.5feet / 1.1m)	0.3	18.66	100.8	113.9	10.78	5.62
	1	18.26	100.4	111.2	10.61	5.65
	2	17.86	104.8	77.6	7.47	5.41
	3	15.11	123.4	2.4	0.24	5.15
	4	14.63	123.6	18.9	1.95	5.14
	5	14.43	130	4.3	0.44	5.16
	6	14.22	138.7	3.1	0.32	5.24
	6.1	14.12	156.3	1.9	0.2	5.48

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted September 7,2009

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, **R**are <1%

Phytoplankton Taxa	**Russell Mill Pond**	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Bacillariophyceae (diatoms)				
Asterionella	A	A	A	V
Eunotia		R		R
Fragilaria			R	R
Melosira	R	R		R
Nitzschia	R	R		
Chlorphyta (green algae, excluding desmids)				
Crucigenia				R
Eudorina		R		
Pandorina		R		
Pediastrum		R		
Scenedesmus				
Sphaerocystis		R	R	R
Chrysophyta (yellow-green algae, excluding diatoms)				
Chrysospherella	R			R
Dinobryon	R	R	R	C
Mallomonas	R	R	R	C
Rhizochrysis	R	R		R
Synura	R	R	R	R
Cyanophyta (blue-green algae)				
Oscillatoria			R	

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted May 10 ,2009

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, **R**are <1%

Phytoplankton Taxa	**Russell Mill Pond**	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Bacillariophyceae (diatoms)				
Asterionella	R	R		R
Eunotia			C	R
Fragilaria	R	R		R
Melosira	R	R	R	R
Navicula	R	R	R	R
Nitzschia			R	R
Synedra	R	R		R
Tabellaria	R		R	
Chlorphyta (green algae, excluding desmids)				
Closterium		R	C	R
Eudorina			R	
Micractinium	R			
Mougeotia	R	R	R	
Oedegoniom			R	
Pediastrum		R		R
Pleurotaenium			R	
Spirogyra			V	R
Chrysophyta (yellow-green algae, excluding diatoms)				
Chrysospherella	R			R
Dinobryon			O	R
Mallomonas		R		
Synura	A	A	R	A
Cyanophyta (blue-green algae)				
Oscillatoria		R	R	R
Protozoa				
Phacus			R	
Trachelomonas			C	R
Pyrrhophyta (dinoflagellates)				
Peridinium				R

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Eel River Field Measurements Recorded by DW on May 10, 2009

Station	Depth	Temp	SpC	DO	DO	pH
	meters	©	*uS/cm*	*% Sat*	*mg/L*	*units*
BM-4 (TNC/Sawmill tailrace)	0.2	11.02	79.4	96.2	10.6	5.48
Russel Mill Pond	0.5	14.25	99.8	100.8	10.33	5.76
BM-1 (fish hatchery)	0.4	14.18	102	97.8	10.04	5.9
Hayden Pond	0.4	15.07	105.8	101.5	10.22	5.97
BM-2 (Sandwich Rd)	0.3	15.08	109.3	99.5	10.02	6.03
BM-3a (Forge Rd)	0.3	15.18	96.2	97.4	9.78	5.73
Howland Pond	1.2	15.75	97.7	101.9	10.11	5.72
Eel River Basin	0.9	16.6	113.9	83.2	8.11	5.78

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Macroinvertebrate Sampling of Eel River on September 5, 2010

INSECT TAXA	FFG*	BM-1 (fish hatchery)	BM-2 (Old Sandwich Rd)	BM-3A (Forges Rd)	BM-4 (TNC; mill tailrace)
Diptera (flies and midges)					
Chironomidae	V		3		2
Simuliidae	CF	7	18	73	6
Tipulidae	V				2
Ephemeroptera (mayflies)					
Baetis	CG/SC		55	12	
Stenonema	SC/CG	3	2	4	3
Megaloptera (alderflies)					
Sialis	P		1		
Odonata (damselflies and dragonflies)					
Aeshna	P		3	1	
Argia	P			1	
Calopteryx	P		1		
Zygoptera	P		2	1	
Trichoptera (caddisflies)					
Limniphilus	SH	1	1		
Oecetis	V		2		
Hydropsychidae	CF	61		7	13
NON-INSECT TAXA					
Amphipoda (scuds)					
Gammarus/Hyalella	CG	22	17	9	2
Isopoda (aquatic sow bugs)					
Caecidotea	CG	4			10
Hirudinea (leeches)					
Helobdella stagnalis	P	1			1
unidentified	P	1			1
Mollusca (snails and clams)					
Pisidiidae (pea clams)	CF	2			
Oligochaetes (aquatic worms)					
unidentified	V		1		
Turbellaria (flatworms)					
Dugesia	CG	1			
Total Specimens		103	106	108	40
Community Richness (Total Taxa)		10	12	8	9
Community Eveness (Scaled SD)		0.36	0.42	0.31	0.58
EPT Taxa		3	4	3	2
Percent Dominant Taxa		0.59	0.52	0.68	0.33
Dominant FFG *		CF	CG/SC	CF	CF

*Functional Feeding Groups: CF= Collector-filterer, CG=Collector-gatherer, SC=Scraper, SH=Shredder, P=Predator, V=Variable

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted May 25,2010

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, **R**are <1%

Periphyton Taxa	**BM-4 (TNC)**	**BM-1*(hatchery)**	**BM-2**	**BM-3a**
Bacillariophyceae (diatoms)	No Sample [1]			
Asterionella		R		
Cocconeis			V	V
Eunotia		V	C	C
Navicula		R		R
Nitzschia		R		
Chlorphyta (green algae, excluding desmids)				
Coleochaete		C	R	R
Cyanophyta (blue-green algae)				
Anabaena			R	
Bacteria				
unidentified		V[2]	V	V

(1) Slides were not deployed at station BM-4 due to river restoration/dam removal activities

(2) Basal discs of "iron" bacteria (likely *Leptothrix*) were present on slides at BM-1

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted September 25, 2010

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, **R**are <1%

Periphyton Taxa	**BM-1 (Hatchery)**	**BM-2**	**BM-3a**	**BM-4 (TNC)**
Bacillariophyceae (diatoms)				
Asterionella	R			
Cocconeis	V	V	V	
Cymbella		R		R
Eunotia	V	V	V	V
Gomphonema		R		
Navicula	R	R	R	R
Nitzschia	R	R		
Pinnularia	R			
Synedra			R	
Tabellaira	R			
Chlorphyta (green algae, excluding desmids)				
Closterium				R
Coleochaete	R	R	R	R
Cyanophyta (blue-green algae)				
Lyngbya		R		
Phormidium				R
Protozoa				
Platycola			R	
Rhipidodendron				R
Vorticella		R	R	R
Bacteria				
unidentified				V

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Eel River Field Measurements Recorded by DW on May 21, 2010

Station	Depth	Temp	SpC	DO	DO	pH
	meters	©	*uS/cm*	*% Sat*	*mg/L*	*units*
Hayden Pond	0.4	15.58	106.2	74.7	7.48	5.51
Howland Pond	0.6	15.56	106.3	77.7	7.78	5.5
Eel River Basin	0.6	17.32	110	70.5	6.8	5.55
Russell Mill Pond	0.3	16.88	95.7	112.6	10.96	5.54
(Secchi = 5ft/1.5m)	1	16.43	95.5	108.7	10.69	5.5
	2	14.3	102.3	79.7	8.2	5.33
	3	12.42	110	26.8	2.87	5.13
	4	11.81	107.8	4.4	0.48	5.04
	5	11.46	113.7	1.7	0.18	5.19
	6	11.08	130.8	1.5	0.16	5.48
	6.3	10.94	146.3	1.4	0.15	5.66

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Eel River Field Measurements Recorded by DW on September 24, 2010

Station	Depth	Temp	SpC	DO	DO	pH
	meters	©	*uS/cm*	*% Sat*	*mg/L*	*units*
Hayden Pond	0.4	16.32	109.3	66.6	6.56	5.71
Howland Pond	1.2	17.62	111.6	64.7	6.2	5.16
Eel River Basin	1.2	18.29	116.3	68.2	6.45	5.81
Russell Mill Pond	0.2	18.2	102	120.1	11.38	6.27
(Secchi = 5.5ft/1.7m)	1	18.07	101.5	120.9	11.48	6.3
	2	17.95	101.8	120.3	11.46	6.31
	2.5	17.91	101.3	118.5	11.3	6.2
	3	14.95	120.1	41.9	4.25	5.45
	4	13.77	169.6	2.8	0.29	5.55
	5	12.9	204.5	2	0.22	5.39
	6	11.99	251.1	1.8	0.2	5.44
	6.3	11.85	293.6	1.7	0.19	5.62

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted May 21 ,2010

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, **R**are <1%

Phytoplankton Taxa	**Russell Mill Pond**	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Bacillariophyceae (diatoms)				
Asterionella	V	V	A	V
Fragilaria		R		
Melosira	R	R	R	R
Nitzschia	R		R	R
Rhizosolenia	R	R		R
Surirella			R	
Synedra		R	R	R
Chlorphyta (green algae, excluding desmids)				
Closterium		R		
Closteriopsis		R		
Dictyosphaerium	R	R		R
Oocystis		R		
Spaerocystis	R			
Chrysophyta (yellow-green algae, excluding diatoms)				
Dinobryon	C	C	R	C
Mallomonas	R	R		R
Synura	V	V		V
Cyanophyta (blue-green algae)				
Oscillatoria			R	R

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted September 24, 2010

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, **R**are <1%

Phytoplankton Taxa	**Russell Mill Pond**	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Bacillariophyceae (diatoms)				
Asterionella	R		R	R
Cymbella				R
Fragilaria			O	R
Melosira	R	V	V	R
Navicula		R	R	
Nitzschia		C	O	V
Rhizosolenia	R			
Synedra	R	R	R	R
Tabellaria	C	R	C	R
Chlorphyta (green algae)				
Ankistrodesmus			R	
Botryococcus				R
Closterium			R	
Crucigenia			R	
Eudorina	R	R		
Kirchneriella				R
Micrasterias			R	
Mougeotia			V	C
Pandorina	R			
Pediastrum		R	R	R
Rhizoclonium		R		
Scenedesmus		R	R	
Spirogyra		R	R	R
Spondylosium	R			
Staurastrum			R	
Zygnema		V	R	
Chrysophyta (yellow-green algae, excluding diatoms)				
Chrysosphaerella	R	R		
Dinobryon	A	V	R	
Mallomonas	R			
Synura			R	R
Uroglenopsis				R
Cyanophyta (blue-green algae)				
Anabaena	R	R	R	R
Microcystis				R
Oscillatoria				R
Protozoa				
Climacostomum	C	R		C
Phacus	R			
Trachelomonas	R			

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Master List of Aquatic Macrophytes Observed in Ponds of the Eel River System
(No Significant Changes in 2010 from 2006-2009 List, see report for futher info)

Species Name	Common Name	Occurance in Ponds			
Submerged Plants		**Russell Mill**	**Hayden**	**Howland**	**Eel River**
Cabomba caroliniana	Fanwort (non-native)		**X**		**X**
Callitriche sp.	Water-starwort	**X**	x		
Ceratophyllum demersum	Coontail	x		x	x
Elecharis sp	Spike-rush	x		x	
Elodea nuttallii	Waterweed	**X**	**X**	x	**x**
Ludwigia palustris	Water-purslane	**x**			
Myriophyllum humile	Water-milfoil	**x**		x	
Najas flesilis	Naiad			x	
Potamogeton sp.	Pondweed	x	x	x	x
Utricularia sp.	Bladderwort	**X**	x	x	x
Floating-Leaved Plants					
Nuphar variegata	Yellow Waterlily	x	x		
Nymphaea odorata	White Waterlily			**X**	x
Emergent Plants					
Bidens sp.	Beggar-ticks			x	
Decodon verticillatus	Water-willow		x	x	x
Gratiola aurea	Golden-pert			x	
Iris pseudacorus	Yellow Iris (alien)	x			
Juncus sp.	Rush	x	x		
Lythrum salicaria	Purple Loosestrife (alien)			x	x
Myosotis sp.	Forget-me-not				x
Phragmites australis	Common Reed		x		x
Pontederia cordata	Pickerel-weed	x	x	x	
Sparganium sp.	Bur-reed	x	x	x	x
Sagittaria sp.	Arrowhead			x	
Typha latifolia	Common Cattail		x	x	

***dominant species indicated in bold, capital X**

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Macroinvertebrate Sampling of Eel River on October 2, 2011					
INSECT TAXA	FFG*	BM-1 (fish hatchery)	BM-2 (Old Sandwich Rd)	BM-3A (Forges Rd)	BM-4 (TNC; footbridge)
Coleoptera (beetles)					
Stenelmis	SC/CG				
Diptera (flies and midges)					
Chironomidae	V				12
Simuliidae	CF		14	15	10
Tipulidae	V				1
Ephemeroptera (mayflies)					
Baetis	CG/SC		3		
Stenonema	SC/CG		8		16
Hemiptera (true bugs)					
Ranatra	P	1			
Odonata (damselflies and dragonflies)					
Boyeria	P		1		
Calopteryx	P	1		2	1
Trichoptera (caddisflies)					
Chimarra	CF				
Hydropsychidae	CF	44	23	15	40
NON-INSECT TAXA					
Amphipoda (scuds)					
Gammarus	CG	27	45	16	15
Isopoda (aquatic sow bugs)					
Caecidotea	CG		4	13	4
Mollusca (snails and clams)					
Physa	SC	2			
Pisidiidae (pea clams)	CF	9			
Oligochaetes (aquatic worms)					
unidentified	V				3
Turbellaria (flatworms)					
Dugesia	CG		1		
Total Specimens		84	99	61	102
Community Richness (Total Taxa)		6	8	5	9
Community Eveness (Scaled SD)		0.44	0.53	0.77	0.61
EPT Taxa		1	3	1	2
Percent Dominant Taxa		0.52	0.45	0.26	0.39
Dominant FFG *		CF	CG	CF	CF

*Functional Feeding Groups: CF= Collector-filterer, CG=Collector-gatherer, SC=Scraper, SH=Shredder, P=Predator, V=Variable

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted May 30,2011

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, **R**are <1%

	(1) BM-4 (TNC)	BM-1 (Hatchery)	BM-2 (Sandwich Rd)	BM-3a (Forges Rd)
Periphyton Taxa				
Bacillariophyceae (diatoms)				
Asterionella (2)		R	R	
Cocconeis		R	C	V
Cymbella		R	R	
Eunotia		V	C	V
Navicula		V	R	R
Nitzschia		R		
Pinnularia		R		
Chlorphyta (green algae, excluding desmids)				
Chaetophora	on natural substrates			
Coleochaete		R	V	R
Vaucheria	on natural substrates			
Cyanophyta (blue-green algae)				
Oscillatoria			R	
Protozoa				
Platycola			R	
Bacteria				
unidentified		C	C	C

(1) Slides mmissing at BM-4 station. Results are for macroscopic filaments collected from natural substrates (gravel and cobble).

(2) This diatom is usually planktonic, but occasionally appears enmeshed among periphyton when high densities are discharged from eutrophic Russell Mill Pond located upstream.

Results of Eel River Periphyton Sampling Conducted October 2, 2011

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, **R**are <1%

Periphyton Taxa	**BM-4 (TNC)**	**BM-1 (Hatchery)**	**BM-2 (Sandwich Rd)**	**BM-3a (Forges Rd)**
Asterionella		O		
Cymbella			O	R
Eunotia		O		V
Gomphonema		R		R
Navicula		R	C	V
Nitzschia			A	C
Synedra		O	C	O
Tabellaria		O		
Chlorphyta (green algae, excluding desmids)				
Coleochaete		R		
Mougeotia				R
Spirogyra	V			
Vaucheria	V			
Cyanophyta (blue-green algae)				
Anabaena		R		
Phormidium		R		
Protozoa				
Vorticella			C	R
Bacteria				
unidentified		A (1)		
(1) Slides at BM-1 were rusty-red with coatings of iron bacteria and precipitates.				

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Eel River Field Measurements Recorded by DW on May 7, 2011

Station	Depth	Temp	SpC	DO	DO	pH
	meters	©	*uS/cm*	*% Sat*	*mg/L*	*units*
Hayden Pond	0.3	14.01	121.6	79.4	8.16	6.26
Howland Pond	1.1	14.12	119.2	87.8	9.01	6.08
Eel River Basin	1	15.05	134.5	93.5	9.4	6.48
Russell Mill Pond	0.2	15.81	109.1	107.7	10.65	6.4
(Secchi = 7ft/2.1m)	1	15.73	108.9	107.8	10.68	6.42
	2	15.55	108.4	107.5	10.69	6.44
	3	14.85	111	91.9	9.28	6.19
	4	13.09	119.8	51.7	5.43	6
	5	11.2	111.6	24.3	2.66	5.98
	6	10.4	135.8	0	0	6.35
	6.1	10.49	250.5	0	0	6.56

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Eel River Field Measurements Recorded by DW on September 11, 2011

Station	Depth	Temp	SpC	DO	DO	pH
	meters	©	*uS/cm*	*% Sat*	*mg/L*	*units*
Hayden Pond	0.4	16.3	NS	66.4	6.5	NS
Howland Pond	1	17.3	NS	72.4	6.9	NS
Eel River Basin	1	18.8	NS	62.8	5.8	NS
Russell Mill Pond	0.2	18.8	NS	104.4	9.7	NS
(Secchi = 4.4ft/1.3m)	1	17.8	NS	79	7.5	NS
	2	16.6	NS	6.2	0.6	NS
	3	15.9	NS	3.5	0.3	NS
	4	15.5	NS	3.2	0.3	NS
	5	13.6	NS	3	0.3	NS
	6	12.5	NS	3	0.3	NS

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted May 7 ,2011

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, **R**are <1%

Phytoplankton Taxa	**Russell Mill Pond**	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Bacillariophyceae (diatoms)				
Asterionella	A	A	O	V
Attheya	R			
Cyclotella	R	R	R	
Eunotia	R		R	
Fragilaria	R	R	R	R
Gyrosigma				R
Melosira	R	R	R	C
Navicula	R	R	R	R
Nitzschia	R	R	R	R
Pinnularia				R
Rhizosolenia	R	R		R
Synedra	R	R	C	R
Tabellaria	R	R	V	R
Chlorphyta (green algae)				
Closterium			R	R
Dictyosphaerium		R		
Mougeotia			R	
Pediastrum				R
Scenedesmus		R		
Spaerocystis	R	R		
Staurastrum				R
Chrysophyta (yellow-green algae, excluding diatoms)				
Chrysosphaerella			O	
Dinobryon	R	R	V	C
Mallomonas	R	R		R
Synura			R	R
Cyanophyta (blue-green algae)				
Anabaena	R			
Oscillatoria		R		C
Pyrrhophyta (dinoflagellates)				
Peridinium	R		R	R
Protozoa				
Climacostomum	R			
Euglena	R			R
Phacus	R			
Trachelmonas				R
unidentified flagellate	R			

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted September 11 ,2011

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, **R**are <1%

Phytoplankton Taxa	**Russell Mill Pond**	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Bacillariophyceae (diatoms)				
Asterionella	C	V	C	C
Cyclotella	R	R		
Cymbella		R		
Eunotia			R	
Fragilaria			R	R
Gomphonema		R		
Gyrosigma				R
Melosira	R	R	C	R
Navicula			R	
Nitzschia	R	R		
Tabellaria	V	V	V	A
Chlorphyta (green algae)				
Ankistrodesmus				R
Closterium			R	
Desmidium			R	
Eudorina	R	R	R	
Kirchneriella		R		
Mougeotia			R	
Nephrocytium			R	
Pandorina		R		
Pediastrum	R	R	R	R
Pleurotaenium			R	
Scenedesmus				R
Spirogyra			R	
Chrysophyta (yellow-green algae, excluding diatoms)				
Chrysosphaerella	R	R		R
Dinobryon		R		
Synura			V	
Uroglenopis	R			
Cyanophyta (blue-green algae)				
Anabaena	R	C	R	R
Aphanocapsa	R			
Dactylococcopsis	R			
Oscillatoria	V		R	
Pyrrhophyta (dinoflagellates)				
Ceratium		R		
Protozoa				
Climacostomum	C	C		R
Euglena	R	R	R	
Trachelmonas			R	

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Macroinvertebrate Sampling of Eel River on September 23, 2012

INSECT TAXA	FFG*	BM-1 (fish hatchery)	BM-2 (Old Sandwich Rd)	BM-3A (Forges Rd)	BM-4 (TNC; footbridge)
Coleoptera (beetles)					
Stenelmis	SC/CG				
Diptera (flies and midges)					
Chironomidae	V				14
Simuliidae	CF	7		11	16
Tipulidae	V				2
Ephemeroptera (mayflies)					
Baetis	CG/SC		38	22	11
Stenonema	SC/CG		5	8	15
Odonata (damselflies and dragonflies)					
Boyeria	P		2		3
Calopteryx	P		1	2	1
Trichoptera (caddisflies)					
Chimarra	CF				
Oecetis				2	
Hydropsyche	CF	31	1	12	27
NON-INSECT TAXA					
Decopoda (crayfish)					
unidentified	SH		3	1	
Amphipoda (scuds)					
Gammarus	CG	14	43	27	7
Isopoda (aquatic sow bugs)					
Caecidotea	CG	6		1	2
Mollusca (snails and clams)					
Helisoma		3			
Physa	SC	1		3	
Pisidiidae (pea clams)	CF	40			
Turbellaria (flatworms)					
Dugesia	CG			1	
Total Specimens		102	93	90	98
Community Richness (Total Taxa)		7	7	11	10
Community Eveness (Scaled SD)		0.58	0.42	0.62	0.7
EPT Taxa		1	3	4	3
Percent Dominant Taxa		0.39	0.46	0.3	0.28
Dominant FFG *		CF	CG	CG	CF

*Functional Feeding Groups: CF= Collector-filterer, CG=Collector-gatherer, SC=Scraper, SH=Shredder, P=Predator, V=Variable

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Eel River Field Measurements Recorded by DW on May 12,2012

Station	Depth	Temp	DO	DO
	meters	©	*% Sat*	*mg/L*
Hayden Pond	0.4	13.6	87.5	9.1
Howland Pond	0.5	14	75	7.7
Eel River Basin	0.5	14.4	83.7	8.5
Russell Mill Pond	0.2	15	119.9	12.1
(Secchi = 2.5FT / 0.76M)	1	14.9	119.9	12.1
	2	14.8	119.6	12.1
	3	14.7	118.6	12
	4	12.2	12.3	1.3
	5	11.8	1.5	0.2
	6	11.2	1.4	0.2

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted May 12, 2012

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, **R**are <1%

Phytoplankton Taxa	**Russell Mill Pond**	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Bacillariophyceae (diatoms)				
Asterionella	A	A	C	A
Cymbella		R	R	
Eunotia	R			
Melosira	R	R		
Navicula		R		R
Nitzschia		R	R	R
Rhizosolenia	R			R
Synedra				R
Tabellaria	R	R	C	R
Chlorphyta (green algae)				
Crucigenia		R		
Mougeotia			O	
Pleurotaenium				R
Staurastrum			R	
Chrysophyta (yellow-green algae, excluding diatoms)				
Chrysosphaerella				
Dinobryon		R	V	R
Mallomonas			R	
Synura			R	
Cyanophyta (blue-green algae)				
Anabaena		R		
Oscillatoria		R		
Protozoa				
Phacus	R			
Trachelmonas	R			

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Eel River Field Measurements Recorded by DW on September 15 & 16, 2012

Station	Depth	Temp	DO	DO
	meters	©	*% Sat*	*mg/L*
Hayden Pond (9/15)	0.4	18.6	68.2	6.4
Howland Pond (9/15)	0.3	19.4	46.4	4.3
	1	19.4	43.7	4
Eel River Basin (9/15)	0.3	20.6	79	7.1
	1	20.5	80	7.2
Russell Mill Pond (9/16)	0.2	19.3	108.5	10
(Secchi = 5FT / 1.52M)	1	19	107.8	10
	1.5	18.8	102.4	9.5
	2	17.5	51.4	5
	3	16	3.4	0.3
	4	15.4	2.8	0.3
	5	14.2	2.7	0.3
	6	13.1	2.8	0.3

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted September 15 & 16 2012

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, **R**are <1%

Phytoplankton Taxa	**Russell Mill Pond**	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Bacillariophyceae (diatoms)				
Asterionella			R	C
Cymbella			R	
Eunotia		R	C	R
Fragilaria		R	V	
Melosira			R	R
Navicula		R	R	
Nitzschia		R	O	R
Synedra	R		R	V
Tabellaria	A	A	C	V
Chlorphyta (green algae)				
Ankistrodesmus			R	
Arthrodesmus	R			
Closterium			R	R
Crucigenia			R	
Mougeotia			O	
Oocystis	R			
Pediastrum	R	R	R	
Scenedesmus			R	
Sphareocystis			R	
Spirogyra		R		
Chrysophyta (yellow-green algae, excluding diatoms)				
Chrysosphaerella	R			
Dinobryon	R			
Mallomonas	R			
Synura			R	
Cyanophyta (blue-green algae)				
Anabaena	O	R		
Aphanocapsa	R			
Gomphosphaeria	R			
Oscillatoria	C			
Pyrrhophyta (dinoflagellates)				
Ceratium	R			
Protozoa				
Climacostomum	O			
Eulena	O	R		
Phacus	R		R	
Trachelomonas	O			

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted September 23, 2012

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, **R**are <1%

Sample Identification (glass slides incubated as artificial substrates except BM-4 see note 1

Periphyton Taxa	**BM-4 (TNC)**	**BM-1 (Hatchery)**	**BM-2 (Sandwich Rd)**	**BM-3a (Forges Rd)**
Bacillariophyceae (diatoms)				
Cocconeis		C	V	
Cymbella	R	R		V
Eunotia	C	C	V	C
Gomphonema				
Navicula	C	C	R	R
Pinnularia	R	R		
Synedra	C		R	R
Tabellaria (2)	C	C		
Chlorphyta (green algae, excluding desmids)				
Closterium				R
Coleochaete	R	R		
Mougeotia				C
Oedogonium				R
Pleurotaneium				R
Cyanophyta (blue-green algae)				
Oscillatoria	R	0		
Phormidium	R	R		
Protozoa				
Platycola				
Rhipidodendron		R		
Vorticella		R	R	

(1) Slides at BM-4 were missing, periphyton was scraped off PVC standpipe supporting staff gauge

(2) This diatom is usually planktonic, but occasionally appears enmeshed among periphyton when high densitites are discharged from Russell Mill Pond located upstream

Results of Macroinvertebrate Sampling of Eel River on September 10, 2013							
INSECT TAXA	FFG*	BM-1 (fish hatchery)	BM-2 (Old Sandwich Rd)	BM-3A (Forges Rd)	BM-4 (TNC; footbridge)	HEAD 2 (Bog 4/Preserve)	HEAD 4 (Bog 1,ds Long Pond Rd)
Coleoptera (beetles)							
Stenelmis	SC/CG					3	
Haliplus	SH	1		3			
Uvarus	P						
Dytiscidae	P					5	
Diptera (flies and midges)							
Chironomidae	V	15	14	32	13	12	2
Simuliidae	CF	1				15	4
Tipulidae	V						
Ephemeroptera (mayflies)							
Baetis	CG/SC					5	
Stenonema	SC/CG		2	1	4		23
Hemiptera (true bugs)							
Ranatra	P						
Belostoma	P					1	
Hesperocorixa						1	
Odonata (damselflies and dragonflies)							
Boyeria	P			1		2	5
Calopteryx	P				3	1	9
Ischnura	P			1			9
Trichoptera (caddisflies)							
Chimarra	CF			1		2	
Hydropsyche	CF	8	5	7	5	5	17
Oecetis	SC	2		6		1	
NON-INSECT TAXA							
Amphipoda (scuds)							
Gammarus	CG	16	48	22	35	25	13
Hyalella	CG	8	35	3	20	5	
Decopoda (crayfish)							
unidentified	SH						
Isopoda (aquatic sow bugs)							
Caecidotea	CG			3	5	3	
Mollusca (snails and clams)							
Helisoma			4	2	2		
Physa	SC	13			4		7
Pisidiidae (pea clams)	CF	39	11	5			
Oligochaetes (aquatic worms)							
unidentified	V	1					
Turbellaria (flatworms)							
Dugesia	CG		1	3		3	
Total Specimens		104	120	90	91	89	89
Community Richness (Total Taxa)		10	8	14	9	16	9
Community Eveness (Scaled SD)		0.74	0.71	0.74	0.77	0.71	0.83
EPT Taxa		1	2	4	2	4	2
Percent Dominant Taxa		0.38	0.4	0.36	0.38	0.28	0.26
Dominant FFG *		CF	CG	CG	CG	CG	P/SC/CG

*Functional Feeding Groups: CF= Collector-filterer, CG=Collector-gatherer, SC=Scraper, SH=Shredder, P=Predator, V=Variable

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Eel River Field Measurements Recorded by UMASS on May 28 & June 5,2013									
Station	**Secchi Depth**	**Total Depth**	**Sample Depth**	**Temp**	**DO**	**DO**	**pH**	**Alkalinity**	**Conductivity**
	meters	*meters*	*meters*	©	*% Sat*	*mg/L*	*unit*	*mg/L CaCO3*	*mS*
Hayden Pond (5/28/2013)	0.4	0.5	0.25	23	99	8.4	6.71	11.5	0.1576
Howland Pond 5/28/2013)	0.7	0.7	0.5	19.1	98	9.2	6.69	10.9	0.1331
Eel River Basin (6/5/2013)	0.85	1.5	1	21.9	72.4	6.4	6.65	15.9	0.381
Russell Mill Pond (6/5/2013)	0.8	5.25	0.15	20.3	122.1	11.2	6.75	10.9	0.1227
			1	18.3	105	10	6.53	10.9	0.1115
			2	16.2	65.5	6	6.4	11.4	0.1427
			3	14.2	35	3.4	6.31	13.7	0.1379
			4	13.2	0	0	6.25	12.7	0.1517

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Macrophyte Survey Conducted May and June 2013					
Species Name	**Common Name**	**Occurance in Ponds**			
		Russell Mill	**Hayden**	**Howland**	**Eel River**
Submerged Plants		5/30/2013	5/30/2013	5/28/2013	6/5/2013
Cabomba caroliniana	Fanwort (non-native)	x	**X**		x
Callitriche sp.	Water-starwort	**X**	**X**		
Ceratophyllum demersum	Coontail	x			
Elodea nuttallii	Waterweed	x			x
Ludwigia palustris	Water-purslane	x	x	**X**	**X**
Myriophyllum humile	Water-milfoil	**X**	x	**X**	
Najas flesilis	Naiad			x	
Potamogeton sp.	Pondweed				x
Utricularia sp.	Bladderwort				
		x			
Floating-Leaved Plants					
Nuphar variegata	Yellow Waterlily	x		x	x
Nymphaea odorata	White Waterlily	x	x		
Emergent Plants					
Alnus incana	Speckled Alder			x	
Clethra alnifolia	Sweet Pepperbush	x	x		x
Colocasia sp.	Elephant-ear				x
Decodon verticillatus	Water-Willow			x	x
Dennstaedtia punctilobula	Hay-Scented Fern				x
Digitaria sanguinalis	Hairy Crabgrass			x	
Elaeagnus umbellata	Autumn Olive			x	
Impatiens capensis	Jewelweed	**X**			
Iris pseudacorus	Yellow Iris	**X**	x		x
Juncus sp.	Rush	**X**	x	x	x
Lonicera sp.	Honeysuckle	x		x	
Lysimachia terrestris	Swamp Candle				x
Myosotis sp.	Forget-Me-Not	x			x
Myricaceae gale	Bayberry		**X**	**X**	**X**
Onoclea sensibillis	Sensitive Fern	x			x
Phragmites australis	Common Reed		x		**X**
Pontederia cordata	Pickerel-Weed	x	x	x	x
Rhus glabra	Smooth Sumac				x
Rosa multiflora	Multiflora Rose				x
Rubus idaeus	Raspberry	x			
Rumex crispus	Curly Dock	x			**X**
Sambucus sp.	Elderberry				x
Scirpus cyperinus	Woolgrass	x	x		x
Setaria pumila	Yellow Foxtail			x	
Sparganium sp.	Bur-Reed	x	x	x	x
Sphagnum sp.	Sphagnum Moss	x			
Toxicodendron radicans	Poison Ivy				**X**
Typha latifolia	Common Cattail	x	x	**X**	**X**
Viburnum dentatum\	Arrowwood				x
Vitis labrusca	Fox Grape			x	x
***dominant species indicated in bold, capital X**					

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted May 30 & June 5, 2013

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, Occassional= 1-5%, **R**are <1%

	Russell Mill Pond	Hayden Pond	Howland Pond	Eel River Basin
Phytoplankton Taxa				
Bacillariophyceae (diatoms)				
Asterionella	A	R	O	V
Cymbella		R	R	
Fragilaria		R		R
Gyrosigma				C
Melosira	V	C	R	
Navicula	R	C		
Nitzschia		R	R	R
Pinnularia	C	V		R
Synedra		R		R
Tabellaria	V	C	O	R
Chlorphyta (green algae)				
Closterium		R		C
Mougeotia		C		C
Pediastrum				C
Scenedesmus				R
Spirogyra		R		
Staurastrum	R			R
Chrysophyta (yellow-green algae, excluding diatoms)				
Chrysosphaerella	R			R
Dinobryon		R		R
Mallomonas				
Cyanophyta (blue-green algae)				
Gomphosphaeria				R
Other				
Invert Eggs		R		

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted September 25,2013

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, Occassional=1-5%, **R**are <1%

	Russell Mill Pond	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Phytoplankton Taxa				
Bacillariophyceae (diatoms)				
Asterionella	V	C		V
Cymbella		R	R	
Fragilaria	C		R	R
Fragilariopsis			C	R
Leptpcylindrus		C		C
Melosira	C		C	R
Navicula			R	O
Nitzschia	R			
Pinnularia	C	R		C
Synedra			R	
Tabellaria	V	C	C	
Chlorphyta (green algae)				
Closterium	R			R
Mougeotia	V			C
Oocystis	R			
Pediastrum	R	C		R
Staurastrum	R			
Chrysophyta (yellow-green algae, excluding diatoms)				
Dinobryon	V	C		R
Cyanophyta (blue-green algae)				
Gomphosphaeria			R	
Pyrrhophyta (dinoflagelletes)				
Ceratium		R		
Other				
Royifer	R			

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted May 29, 2013

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, Occasional = 1-5%, **R**are <1%

	Head 2 (Bog 4 Preserve)	Head 4 (ds Long Pond Rd	BM-1 (Hatchery)	BM-2 (Sandwich Rd)	BM-3a (Forges Rd)	BM-4 (TNC)
Periphyton Taxa						
Bacillariophyceae (diatoms)						
Asterionella			V	O		
Cymbella			R			O
Eunotia			R		C	
Fragilaria		R				R
Fragilariopsis	R					
Melorsira	R			R		
Navicula	O	R				R
Nitzschia			R		R	
Pinnularia		R				
Synedra	R		C	R	O	
Tabellaria	C	O	V			R
Chlorphyta (green algae)						
Chaetophora		R				
Mougeotia	O		O			
Oedogonium	R					
Spirogyra	R			R		
Chrysophyta (yellow-green algae,excluding diatoms)						
Dinobryon			R		R	
Cyanophyta (blue-green algae)						
Anabaena		R				R
Oscillatoria	R	C				
Phormidium	C					

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted September 10, 2013

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, Occasional = 1-5%, **R**are <1%

	Head 2 (Bog 4 Preserve)	Head 4 (ds Long Pond Rd	BM-1 (Hatchery)	BM-2 (Sandwich Rd)	BM-3a (Forges Rd)	BM-4 (TNC)
Periphyton Taxa						
Bacillariophyceae (diatoms)						
Asterionella			C	R		
Cymbella			C			C
Eunotia	O		R			
Navicula			R			
Pinnularia						R
Synedra	R					R
Tabellaria		R	C			C
Chlorphyta (green algae)						
Closterium						R
Mougeotia		R	O			
Phormidium				R		

Note: BM-1 Slides were rusty with iron deposits, BM-2 Slides were moderately colonized by macroinvert larvae, BM-3 Slides were very clean, few insect larvae attached

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Macroinvertebrate Sampling of Eel River on August 26,2014							
INSECT TAXA	FFG*	BM-1 (fish hatchery)	BM-2 (Old Sandwich Rd)	BM-3A (Forges Rd)	BM-4 (TNC; footbridge)	HEAD 2 (Bog 4/Preserve)	HEAD 4 (Bog 1,ds Long Pond Rd)
Coleoptera (beetles)							
Stenelmis	SC/CG					2	
Haliplus	SH						
Uvarus	P						
Dytiscidae	P						
unidentified	P	1				2	
Diptera (flies and midges)							
Chironomidae	V	3	17	32	20	14	8
Simuliidae	CF				57		3
Tipulidae	V						
Ephemeroptera (mayflies)							
Baetis	CG/SC	4			3	10	6
Stenonema	SC/CG				3		
Hemiptera (true bugs)							
Ranatra	P						
Belostoma	P						
Hesperocorixa							
Odonata (damselflies and dragonflies)							
Boyeria	P				3		3
Calopteryx	P						
Ischnura	P			6			4
Trichoptera (caddisflies)							
Chimarra	CF						
Hydropsyche	CF	33	20	4	2	4	23
Oecetis	SC						
NON-INSECT TAXA							
Amphipoda (scuds)							
Gammarus	CG	28	46	20	10	58	
Hyalella	CG	32		10	4	8	
Decopoda (crayfish)							
unidentified	SH						1
Isopoda (aquatic sow bugs)							
Caecidotea	CG		1				
Mollusca (snails and clams)							
Helisoma							17
Physa	SC	2				1	
Pisidiidae (pea clams)	CF	60		4		6	
Oligochaetes (aquatic worms)							
unidentified	V	4					
Turbellaria (flatworms)							
Dugesia	CG						
Total Specimens		167	84	76	102	105	65
Community Richness (Total Taxa)		9	4	6	8	9	8
Community Eveness (Scaled SD)		0.75	0.76	0.83	0.67	0.68	0.83
EPT Taxa		2	1	2	3	2	3
Percent Dominant Taxa		0.36	0.55	0.42	0.56	0.55	0.26
Dominant FFG *		CF/CG	CG/V	CG/V	CF	CG	CF
*Functional Feeding Groups: CF= Collector-filterer, CG=Collector-gatherer, SC=Scraper, SH=Shredder, P=Predator, V=Variable							

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Eel River Field Measurements Recorded by UMASS on May 20,2014								
Station	**Secchi Depth**	**Total Depth**	**Sample Depth**	**Temp**	**DO**	**DO**	**pH**	**Alkalinity**
	meters	*meters*	*meters*	*©*	*% Sat*	*mg/L*	*unit*	*mg/L CaCO3*
Hayden Pond	0.95	0.95	0.5	19.6	109.1	10.1	7.26	14
Howland Pond	0.85	0.85	0.4	21.1	127.8	11.7	6.87	12.6
Eel River Basin	1	1	0.5	20.2	84.6	7.7	6.93	17.6
Russell Mill Pond	1.65	4.75	0.5	105.8	18.7	9.8	6.81	12.1
			1	105.6	18.2	10.3	6.8	11.8
			2	88.1	16.9	8.5	6.51	11.7
			3	71	15.3	6.6	6.38	12.8
			4	27.6	14	2.7	6.38	15.2

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Macrophyte Survey Conducted May 20, 2014					
Species Name	**Common Name**	**Occurance in Ponds**			
		Russell Mill	**Hayden**	**Howland**	**Eel River**
Submerged Plants					
Cabomba caroliniana	Fanwort (non-native)		**X**	x	
Callitriche sp.	Water-starwort	x	x	x	x
Ceratophyllum demersum	Coontail	x	x		
Ludwigia palustris	Water-purslane	x	x	**X**	**X**
Myriophyllum humile	Water-milfoil	x	**X**	x	
Najas flesilis	Naiad	x			
Floating-Leaved Plants					
Nuphar variegata	Yellow Waterlily	x	x	x	x
Nymphaea odorata	White Waterlily	x			
Emergent Plants					
Alnus incana	Speckled Alder	x		x	x
Clethra alnifolia	Sweet Pepperbush	x	x	x	x
Elaeagnus umbellata	Autumn Olive	x		x	
Fallopia japonica	Japanese Knotweed	x			x
Impatiens capensis	Jewelweed	**X**			
Iris pseudacorus	Yellow Iris	**X**	x	x	x
Juncus sp.	Rush	**X**	x	x	x
Lonicera sp.	Honeysuckle	x	x	x	x
Lysimachia terrestris	Swamp Candle	x			x
Myosotis sp.	Forget-Me-Not	x			
Myricaceae gale	Bayberry	x	**X**	**X**	**X**
Onoclea sensibillis	Sensitive Fern	x		x	**X**
Phragmites australis	Common Reed		x		
Pontederia cordata	Pickerel-Weed	x	x	x	x
Rosa multiflora	Multiflora Rose	x			
Rumex crispus	Curly Dock	**X**	x		x
Scirpus cyperinus	Woolgrass	x			
Symplocarpus foetidus	Skunk Cabbage		x	x	x
Sparganium sp.	Bur-Reed	x	x	x	x
Toxicodendron radicans	Poison Ivy				x
Typha latifolia	Common Cattail	x	x	**X**	**X**
Rubus idaeus	Raspberry	x			
Vitis labrusca	Fox Grape				x
***dominant species indicated in bold, capital X**					

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted May 20 & 27, 2014

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, Occassional= 1-5%, **R**are <1%

	Russell Mill Pond	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Phytoplankton Taxa				
Bacillariophyceae (diatoms)				
Asterionella	O	V	O	
Cymbella		O	O	
Fragilaria			O	
Fragilariopsis		O		A
Guinardia				A
Leprocylindrus				A
Melosira	C	O	O	
Navicula	O			
Nitzschia	O		V	O
Pinnularia	O		R	
Synedra	O			
Tabellaria	O	O		O
Chlorphyta (green algae)				
Closterium			R	
Mougeotia		V		
Oocyctis		V		
Oedogonium			O	
Pediastrum	O		O	
Scenedesmus				
Spirogyra		O		
Staurastrum	V		O	O
Chrysophyta (yellow-green algae, excluding diatoms)				
Dinobryon		O	A	O
Cyanophyta (blue-green algae)				
Other				
Tintinnids	V	O	O	C

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted August 26, 2014

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, Occassional= 1-5%, **R**are <1%

Phytoplankton Taxa	**Russell Mill Pond**	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Bacillariophyceae (diatoms)				
Asterionella		O	O	O
Cymbella				
Fragilaria				A
Fragilariopsis	C			C
Leprocylindrus	C			A
Melosira		V	C	
Navicula			O	
Nitzschia			O	O
Pinnularia		O		
Synedra				
Tabellaria	A	O	O	C
Chlorphyta (green algae)				
Closterium			O	
Mougeotia		V	C	A
Oocyctis				
Pediastrum	C			O
Spirogyra		O		
Chrysophyta (yellow-green algae, excluding diatoms)				
Dinobryon	C	C		A
Cyanophyta (blue-green algae)				
Anabaena	R			
Pyrrhophyta (dinoflagellates)				
Ceratium				
Other				
Tintinnids	C			

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted June 9, 2014

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%,
Very Common = 30-60%, **C**ommon = 5-30%, Occasional = 1-5%, **R**are <1%

	Head 2 (Bog 4 Preserve)	Head 4 (ds Long Pond Rd	BM-1 (Hatchery)	BM-2 (Sandwich Rd)	BM-3a (Forges Rd)	BM-4 (TNC)
Periphyton Taxa						
Bacillariophyceae (diatoms)						
Asterionella			O	O		
Cymbella						
Eunotia						
Fragilaria						
Fragilariopsis						
Melorsia	O	R	R	R		
Navicula	R		O			
Nitzschia			R			
Pinnularia		R				R
Synedra	R		R	R	R	R
Tabellaria	V	R				R
Chlorphyta (green algae)						
Chaetophora						
Closterium						R
Mougeotia	V					
Oedogonium						
Spirogyra	R	O				
Staurastrum			R			
Chrysophyta (yellow-green algae, exluding diatoms)						
Dinobryan			O	O	R	
Cyanophyta (blue-green algae)						
Anabaena						
Oscillatoria						
Phormidium						

Note: Head 2 slide was loaded with epiphytic algae and lots of insect larvae attached, BM-1 some insect larvae attached

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted September 25, 2014

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%,
Very Common = 30-60%, **C**ommon = 5-30%, Occasional = 1-5%, **R**are <1%

	Head 2 (Bog 4 Preserve)	Head 4 (ds Long Pond Rd	BM-1 (Hatchery)	BM-2 (Sandwich Rd)	BM-3a (Forges Rd)	BM-4 (TNC)
Periphyton Taxa						
Bacillariophyceae (diatoms)						
Asterionella			VC			
Cymbella		R	R			R
Eunotia						
Fragilaria		R				R
Fragilariopsis						
Melorsia	O					
Navicula	R		R			
Nitzschia						
Pinnularia						R
Synedra		R	VC	R		R
Tabellaria	O		VC	A		
Chlorphyta (green algae)						
Chaetophora						
Closterium						
Mougeotia	R	R				
Oedogonium						
Spirogyra	O					
Staurastrum						
Chrysophyta (yellow-green algae, exluding diatoms)						
Dinobryan						
Cyanophyta (blue-green algae)						
Anabaena						
Oscillatoria						
Phormidium						

Note: Head 2 slide was loaded with epiphytic algae and lots of insect larvae attached, BM-1 some insect larvae attached

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Macroinvertebrate Sampling of Eel River on September 4, 2015							
INSECT TAXA	FFG*	BM-1 (fish hatchery)	BM-2 (Old Sandwich Rd)	BM-3A (Forges Rd)	BM-4 (TNC; footbridge)	HEAD 2 (Bog 4/Preserve)	HEAD 4 (Bog 1,ds Long Pond Rd)
Coleoptera (beetles)							
Stenelmis	SC/CG	12	6		2	30	
Haliplus	SH			4			
Uvarus	P						
Dytiscidae	P						
unidentified	P		3			6	
Diptera (flies and midges)							
Chironomidae	V	14	6		26		
Simuliidae	CF	14	17		4		
Tipulidae	V						
Ephemeroptera (mayflies)							
Baetis	CG/SC					4	
Stenonema	SC/CG						
Hemiptera (true bugs)							
Ranatra	P				4		
Belostoma	P						
Hesperocorixa	P						
Gerrid	P	2					
Odonata (damselflies and dragonflies)							
Boyeria	P	4	4	2			6
Calopteryx	P			6	2		
Ischnura	P		7		4		
Trichoptera (caddisflies)							
Chimarra	CF						
Hydropsyche	CF	6					
Oecetis	SC		5		4		
NON-INSECT TAXA							
Amphipoda (scuds)							
Gammarus	CG	26	6	50	20	66	
Hyalella	CG			20			
Decopoda (crayfish)							
unidentified	SH	2			2		4
Isopoda (aquatic sow bugs)							
Caecidotea	CG	2		6			
Mollusca (snails and clams)							
Helisoma			8			15	6
Physa	SC						35
Pisidiidae (pea clams)	CF			2			
Oligochaetes (aquatic worms)							
unidentified	V		1	4			
Turbellaria (flatworms)							
Dugesia	CG		1		2	3	
Total Specimens		83	63	94	70	124	51
Community Richness (Total Taxa)		10	10	8	10	6	4
Community Eveness (Scaled SD)		0.83	0.92	0.7	0.78	0.72	0.69
EPT Taxa		2	2	1	2	0	1
Percent Dominant Taxa		0.31	0.27	0.53	0.37	0.53	0.69
Dominant FFG *		CG	CG/PV	CG	CG	CG	n/a
*Functional Feeding Groups: CF= Collector-filterer, CG=Collector-gatherer, SC=Scraper, SH=Shredder, P=Predator, V=Variable							

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Eel River Field Measurements Recorded by UMASS on May 20,2015								
Station	**Secchi Depth**	**Total Depth**	**Sample Depth**	**Temp**	**DO**	**DO**	**pH**	**Alkalinity**
	meters	*meters*	*meters*	©	*% Sat*	*mg/L*	*unit*	*mg/L CaCO3*
Hayden Pond	1.1	1.1	0.65	18.3	100	9.4	6.76	21.1
Howland Pond	0.7	0.7	0.35	20.5	117	10.5	6.88	20.9
Eel River Basin	1.4	1.4	0.7	19.2	99	9.1	6.85	27.1
Russell Mill Pond	1.6	3.5	0.5	18.5	97	9.1	6.69	18.6
			1	18.4	102	9.6	6.63	18.6
			2	17.2	108	10.4	6.59	18.7
			3	15.6	64	6.3	6.36	19.1
			4	14.9	58	5.9	6.34	18.7

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Macrophyte Survey Conducted May 2015					
Species Name	**Common Name**	**Occurance in Ponds**			
		Russell Mill	**Hayden**	**Howland**	**Eel River**
Submerged Plants					
Cabomba caroliniana	Fanwort (non-native)				
Callitriche sp.	Water-starwort	**X**	x		
Ceratophyllum demersum	Coontail	**X**			
Ludwigia palustris	Water-purslane	x	x	**X**	**X**
Myriophyllum humile	Water-milfoil	x	**X**	x	
Lemna minor	Common Duckweed	x	**X**	x	
Hyrilla verticillata	Water-weed		x		
Najas flesilis	Naiad				
Floating-Leaved Plants					
Nuphar variegata	Yellow Waterlily	x	x	**X**	
Nymphaea odorata	White Waterlily	x	x		
Emergent Plants					
Alnus incana	Speckled Alder				
Clethra alnifolia	Sweet Pepperbush				
Elaeagnus umbellata	Autumn Olive				
Fallopia japonica	Japanese Knotweed				
Glysera sp.	Mannagrass				
Impatiens capensis	Jewelweed				
Iris pseudacorus	Yellow Iris	x			
Juncus sp.	Rush	x		x	
Lonicera sp.	Honeysuckle	x	x		
Lysimachia terrestris	Swamp Candle				
Myosotis sp.	Forget-Me-Not				
Myricaceae gale	Bayberry	x	x		
Onoclea sensibillis	Sensitive Fern				x
Phragmites australis	Common Reed	**X**	x		**X**
Pontederia cordata	Pickerel-Weed	x	x	**X**	x
Rosa multiflora	Multiflora Rose				
Rumex crispus	Curly Dock	x	x		
Scirpus cyperinus	Woolgrass				
Schoenoplectus americanus	Three Square		x		
Symplocarpus foetidus	Skunk Cabbage				
Sparganium sp.	Bur-Reed	x	x		
Toxicodendron radicans	Poison Ivy				
Typha latifolia	Common Cattail	**X**		**X**	x
Rubus idaeus	Raspberry				
Vitis labrusca	Fox Grape				
***dominant species indicated in bold, capital X**					

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted May 20 & 27, 2014

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, Occassional= 1-5%, **R**are <1%

	Russell Mill Pond	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Phytoplankton Taxa				
Bacillariophyceae (diatoms)				
Asterionella		VC	C	C
Cymbella	C			
Fragilaria	C	O	R	
Fragilariopsis	C			
Gomphonema		O	VC	
Guinardia				
Gyrosigma		O		
Leprocylindrus				
Melosira	C		C	
Navicula		O		R
Nitzschia		O		
Pinnularia		O	C	
Pieurosigma				R
Rhizosolenia				R
Synedra		O	R	
Tabellaria		O		
Chlorphyta (green algae)				
Chlorogonium				R
Closterium		O		
Crucigenia				
Mougeotia	C	O		C
Oocyctis				
Oedogonium		R	R	
Pediastrum		O		
Scenedesmus				
Spirogyra		R		
Staurastrum		R		
Chrysophyta (yellow-green algae, excluding diatoms)				
Chrysophaerella				
Dinobryon				
Mallomonas				
Cyanophyta (blue-green algae)				
Gomphosphaeria				
Other				
Tintinnids		VC	VC	
Rotifer		R		
Invert Eggs				

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted September 4, 2015

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, Occassional= 1-5%, **R**are <1%

	Russell Mill Pond	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Phytoplankton Taxa				
Bacillariophyceae (diatoms)				
Asterionella	O	C	R	O
Cymbella		O		
Fragilaria			O	C
Fragilariopsis			O	
Gomphonema				
Guinardia				
Gyrosigma				
Leprocylindrus				
Melosira				
Navicula			VC	O
Nitzschia				O
Pinnularia		O		
Pleurosigma				R
Rhizosolenia				
Synedra	O			O
Tabellaria	VC	C	O	O
Chlorphyta (green algae)				
Chlorogonium				
Closterium				O
Crucigenia			O	
Desmodemus				
Mougeotia	O	O		
Oocyctis				
Oedogonium				O
Pediastrum		O		O
Scenedesmus				
Spirogyra		O	O	O
Staurastrum			O	
Chrysophyta (yellow-green algae, excluding diatoms)				
Chrysophaerella				
Dinobryon	VC	O	C	
Mallomonas				
Cyanophyta (blue-green algae)				
Gomphosphaeria				
Anabaena		O	O	
Phormidium		C		
Other				
Invert Eggs				
Ceratium				
Rotifer	O			O
Tintinnids	O			

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted May 21, 2015

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%,
Very Common = 30-60%, **C**ommon = 5-30%, Occasional = 1-5%, **R**are <1%

	Head 2 (Bog 4 Preserve)	*Head 4 (ds Long Pond Rd)	BM-1 (Hatchery)	BM-2 (Sandwich Rd)	**BM-3a (Forges Rd)	BM-4 (TNC)
Periphyton Taxa						
Bacillariophyceae (diatoms)						
Asterionella			O	O		
Cymbella	O	O	O	O		
Eunotia						
Fragilaria					O	
Fragilariopsis						
Melorsia					C	
Navicula				R		
Nitzschia						
Pinnularia	O	R	R		C	R
Synedra	O				O	O
Tabellaria	O				O	O
Chlorphyta (green algae)						
Chaetophora						
Cladophora	R					
Closterium						R
Desmodesmus			R	R		
Mougeotia	O	R				
Oedogonium						
Spirogyra						
Staurastrum						
Chrysophyta (yellow-green algae, exluding diatoms)						
Dinobryan				O	O	
Cyanophyta (blue-green algae)						
Anabaena						
Oscillatoria						R
Phormidium						

* Slide has some insect larvae attached, **Slide very desnsely covered with epiphytes

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted September 9,2015

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%,
Very Common = 30-60%, **C**ommon = 5-30%, Occasional = 1-5%, **R**are <1%

	**Head 2 (Bog 4 Preserve)	*Head 4 (ds Long Pond Rd)	BM-1 (Hatchery)	BM-2 (Sandwich Rd)	BM-3a (Forges Rd)	BM-4 (TNC)
Periphyton Taxa						
Bacillariophyceae (diatoms)						
Asterionella			C	R		
Cymbella			R	R		
Diatoma		VC		R	C	VC
Eunotia						
Fragilaria						R
Fragilariopsis						
Melorsia			R			
Navicula						
Nitzschia						
Pinnularia			R			
Synedra		R				R
Tabellaria	R		R	R		C
Chlorphyta (green algae)						
Chaetophora						
Cladophora						
Closterium						
Mougeotia						
Oedogonium						
Spirogyra	R					
Staurastrum						
Chrysophyta (yellow-green algae, exluding diatoms)						
Dinobryan						
Cyanophyta (blue-green algae)						
Anabaena						
Oscillatoria						
Phormidium						
Other						
dinoflagellate	R					

* Insect Larvae on slide, ** Some rust colored epiphytes on slide

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted May 31 & June 6, 2016

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, Occassional= 1-5%, **R**are <1%

	Russell Mill Pond	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Phytoplankton Taxa				
Bacillariophyceae (diatoms)				
Asterionella	A	VC		VC
Cymbella	R		O	
Fragilaria			O	
Fragilariopsis	R		O	
Guinardia				
Gyrosigma				
Leprocylindrus				C
Melosira		O		
Navicula	O			
Nitzschia	R			
Pinnularia		O		
Synedra	C		O	
Tabellaria	R			
Chlorphyta (green algae)				
Closterium		O		C
Crucigenia				
Mougeotia	O			
Oocyctis				
Oedogonium				
Pediastrum		R		O
Scenedesmus				
Spirogyra		O	O	O
Staurastrum	R			O
Chrysophyta (yellow-green algae, excluding diatoms)				
Chrysophaerella				
Dinobryon			VC	
Mallomonas				
Cyanophyta (blue-green algae)				
Oscillatoria			O	
Anabaena				R
Gomphosphaeria				
Other				
Tintinnids	0		O	
Rotifer	C	O		
Invert Eggs				

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted September 30, 2016

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, Occassional= 1-5%, **R**are <1%

	Russell Mill Pond	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Phytoplankton Taxa				
Bacillariophyceae (diatoms)				
Asterionella	C	O	VC	O
Cymbella				
Fragilaria				
Fragilariopsis				
Leprocylindrus				
Melosira			O	
Navicula	R			
Nitzschia				
Pinnularia				
Pieurosigma	C			
Rhizosolenia				O
Synedra				
Tabellaria		O	O	
Chlorphyta (green algae)				
Closterium				
Mougeotia	C	O	C	
Oocyctis				
Pediastrum				
Spirogyra	R		O	
Staurastrum				
Chrysophyta (yellow-green algae, excluding diatoms)				
Dinobryon	C	C	VC	
Cyanophyta (blue-green algae)				
Anabaena				
Pyrrhophyta (dinoflagellates)				
Cerartium	O	O	O	O
Other				
Rotifer	R			
Tintinnids	C	O	C	

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Eel River Field Measurements Recorded by UMASS on May-June 2016								
Station	**Secchi Depth**	**Total Depth**	**Sample Depth**	**Temp**	**DO**	**DO**	**pH**	**Alkalinity**
	meters	*meters*	*meters*	©	*% Sat*	*mg/L*	*unit*	*mg/L CaCO3*
Hayden Pond	0.5	1.2	0.6	21.1	94	8.3	5.68	19.57
Howland Pond	0.45	0.45	0.25	22.8	124	10.7	5.98	22.56
Eel River Basin	0.7	1.65	0.8	22	82	7.2	5.91	23.87
Russell Mill Pond	1.2	3.5	0.5	20.8	100	8.9	6.29	18.65
			1	20.1	97	8.8	5.62	16.77
			2	19	95	8.9	5.76	19.13
			3	14.8	40	4	6.46	24.99

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted June
(Estimates of percent composition indicated as follows:
Abundant = 60-100%, **V**ery Common = 30-60%, **C**ommon
= 5-30%, Occasional = 1-5%, **R**are <1%

	**Head 2 (Bog 4 Preserve)	BM-1 (Hatchery)	BM-2 (Sandwich Rd)	BM-3a (Forges Rd)	BM-4 (TNC)
Periphyton Taxa					
Bacillariophyceae (diatoms)					
Asterionella	O	VC	C		
Cymbella		O	O		
Eunotia					
Fragilaria					
Fragilariopsis					
Melorsia			O		
Navicula				O	
Nitzschia					
Pinnularia					O
Synedra				C	O
Tabellaria					
Chlorphyta (green algae)					
Chaetophora					
Closterium					
Mougeotia		O	O		
Oedogonium			O		
Spirogyra					
Staurastrum					
Chrysophyta (yellow-green algae, exluding diatoms)					
Dinobryan	O				
Cyanophyta (blue-green algae)					
Anabaena					
Oscillatoria					
Phormidium					
Other					
dinoflagellate				R	

* Insect Larvae on slide, ** Some rust colored epiphytes on slide

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted October 7, 2016

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%,
Very Common = 30-60%, **C**ommon = 5-30%, Occasional = 1-5%, **R**are <1%

	Head 2 (Bog 4 Preserve)	***Head 4 (ds Long Pond Rd)**	****BM-1 (Hatchery)**	*****BM-2 (Sandwich Rd)**	**BM-3a (Forges Rd)**	**BM-4 (TNC)**
Periphyton Taxa						
Bacillariophyceae (diatoms)						
Asterionella	R					no organisms
Cymbella	O	C		O		
Diatomoa						
Eunotia						
Fragilaria						
Fragilariopsis	O	O			O	
Melorsia						
Navicula					O	
Nitzschia						
Pinnularia			O		R	
Synedra						
Tabellaria						
Chlorphyta (green algae)						
Chaetophora						
Cladophora						
Closterium						
Mougeotia						
Oedogonium			O			
Spirogyra						
Staurastrum						
Chrysophyta (yellow-green algae, exluding diatoms)						
Dinobryan	O			O		
Cyanophyta (blue-green algae)						
Anabaena						
Oscillatoria						
Phormidium						
Other						
dinoflagellate			O			
Prorocentrales	R (alive)					

* slide covered in algae, ** slide and jar covered in rust film, *** slide covered in insect larvae

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Macroinvertebrate Sampling of Eel River on September 31, 2016							
INSECT TAXA	FFG*	BM-1 (fish hatchery)	BM-2 (Old Sandwich Rd)	BM-3A (Forges Rd)	BM-4 (TNC; footbridge)	HEAD 2 (Bog 4/Preserve)	HEAD 4 (Bog 1,ds Long Pond Rd)
Coleoptera (beetles)							
Stenelmis	SC/CG	7	3			10	
Haliplus	SH						
Uvarus	P						
Dytiscidae	P						
unidentified	P		2				
Diptera (flies and midges)							
Chironomidae	V	5	17	3	16	5	2
Simuliidae	CF	3	5				
Tipulidae	V						
Ephemeroptera (mayflies)							
Baetis	CG/SC	1					
Stenonema	SC/CG	3					
Hemiptera (true bugs)							
Ranatra	P						
Belostoma	P						
Hesperocorixa	P						
Gerrid	P						
Odonata (damselflies and dragonflies)							
Boyeria	P				4		2
Calopteryx	P	2		3	7		7
Ischnura	P	2	4				
Trichoptera (caddisflies)							
Chimarra	CF						
Hydropsyche	CF						
Oecetis	SC						
NON-INSECT TAXA							
Amphipoda (scuds)							
Gammarus	CG	28	7	27	20	74	10
Hyalella	CG			17			
Decopoda (crayfish)							
unidentified	SH						
Isopoda (aquatic sow bugs)							
Caecidotea	CG	3					4
Mollusca (snails and clams)							
Helisoma					5		16
Physa	SC				1		10
Pisidiidae (pea clams)	CF					1	
Oligochaetes (aquatic worms)							
unidentified	V						
Turbellaria (flatworms)							
Dugesia	CG	2					
Total Specimens		56	38	50	53	90	51
Community Richness (Total Taxa)		10	6	4	6	4	7
Community Eveness (Scaled SD)		0.75	0.85	0.75	0.83	0.44	0.89
EPT Taxa		2	1	0	0	0	0
Percent Dominant Taxa		0.5	0.13	0.54	0.3	0.82	0.2
Dominant FFG *		CG	CG/V	CG	CG	CG	SC/P

*Functional Feeding Groups: CF= Collector-filterer, CG=Collector-gatherer, SC=Scraper, SH=Shredder, P=Predator, V=Variable

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Macrophyte Survey Conducted May & June 2016					
Species Name	**Common Name**	**Occurance in Ponds**			
		Russell Mill	**Hayden**	**Howland**	**Eel River**
Submerged Plants					
Cabomba caroliniana	Fanwort (non-native)				
Callitriche sp.	Water-starwort	**X**		x	
Ceratophyllum demersum	Coontail	**X**			
Elotia sp.	Pondweed		**X**		
Ludwigia palustris	Water-purslane	x	x	**X**	**X**
Myriophyllum humile	Water-milfoil	x	**X**	**X**	
Lemna minor	Common Duckweed	x			
Hyrilla verticillata	Water-weed	x			
Utricularia macrorhiza	Bladderwort			x	
Najas flesilis	Naiad	x		**X**	x
Floating-Leaved Plants					
Nuphar variegata	Yellow Waterlily	x	**X**	**X**	
Nymphaea odorata	White Waterlily	x			
Vallisneria americana	Wild Celery				
Emergent Plants					
Alnus incana	Speckled Alder				
Clethra alnifolia	Sweet Pepperbush				
Cyperus sp.	Sedge			x	
Elaeagnus umbellata	Autumn Olive				
Fallopia japonica	Japanese Knotweed				
Glysera sp.	Mannagrass				
Impatiens capensis	Jewelweed				
Iris pseudacorus	Yellow Iris	x			x
Juncus sp.	Rush	x	x	x	x
Justicia americana	Water Willow	x	x	x	x
Lonicera sp.	Honeysuckle	x			
Lysimachia terrestris	Swamp Candle				
Myosotis sp.	Forget-Me-Not	x			
Myricaceae gale	Bayberry	x			**x**
Onoclea sensibillis	Sensitive Fern				
Phragmites australis	Common Reed	**X**	x	x	**X**
Pontederia cordata	Pickerel-Weed	x	x	**x**	
Rosa multiflora	Multiflora Rose				
Rumex crispus	Curly Dock	x	x		
Scirpus cyperinus	Woolgrass				
Schoenoplectus americanus	Three Square				
Solanum sp.	Nightshade		x		x
Symplocarpus foetidus	Skunk Cabbage	x			
Sparganium sp.	Bur-Reed	x	x		
Toxicodendron radicans	Poison Ivy				x
Typha latifolia	Common Cattail	**X**	x	**X**	**X**
Rubus idaeus	Raspberry				
Vitis labrusca	Fox Grape				
***dominant species indicated in bold, capital X**					

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted June 1, 2017

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, Occassional= 1-5%, **R**are <1%

	Russell Mill Pond	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Phytoplankton Taxa				
Bacillariophyceae (diatoms)				
Asterionella	A	VC	VC	A
Cymbella			R	R
Fragilaria			O	
Fragilariopsis				
Guinardia				
Gyrosigma				
Leprocylindrus				O
Melosira		O		
Navicula	R		O	
Nitzschia				
Pinnularia		O	R	R
Pieurosigma				O
Synedra	R	O		R
Tabellaria	C	O	R	C
Chlorphyta (green algae)				
Closterium				
Crucigenia				
Mougeotia	R	O		
Oocyctis				
Oedogonium				
Pediastrum				
Scenedesmus			R	
Spirogyra		R		
Staurastrum				
Chrysophyta (yellow-green algae, excluding diatoms)				
Chrysophaerella				
Dinobryon				
Mallomonas				
Cyanophyta (blue-green algae)				
Oscillatoria				
Anabaena				R
Gomphosphaeria				
Other				
Tintinnids		VC		VC
Rotifer		R		
Invert Eggs				

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted August 23,2017

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, Occassional= 1-5%, **R**are <1%

	Russell Mill Pond	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Phytoplankton Taxa				
Bacillariophyceae (diatoms)				
Asterionella	R	O	O	C
Cymbella	R	R		
Diadesmis				O
Fragilaria				VC
Fragilariopsis				VC
Guindardia				O
Leprocylindrus				
Melosira				
Navicula		R		
Nitzschia				
Pinnularia				R
Pieurosigma				
Rhizosolenia				
Synedra	R	R		
Tabellaria	R			
Chlorphyta (green algae)				
Closterium				
Mougeotia				
Oocyctis				
Pediastrum				
Spirogyra				
Staurastrum			O	
Chrysophyta (yellow-green algae, excluding diatoms)				
Dinobryon				
Cyanophyta (blue-green algae)				
Anabaena				
Pyrrhophyta (dinoflagellates)				
Cerartium				
Other				
Rotifer	R	R	O	
Tintinnids		R		

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Eel River Field Measurements Recorded by UMASS on June 1, 2017								
Station	**Secchi Depth**	**Total Depth**	**Sample Depth**	**Temp**	**DO**	**DO**	**pH**	**Alkalinity**
	meters	*meters*	*meters*	©	*% Sat*	*mg/L*	*unit*	*mg/L CaCO3*
Hayden Pond	0.5	0.5	0.3	20.2	130	12.6	7.17	17.2
Howland Pond	0.8	0.8	0.5	20.1	132	10.6	6.94	20.9
Eel River Basin	20	1	1	19.7	108.5	10.3	7.01	23.4
Russell Mill Pond	1.6	3	0.5	17.8	111.4	11.2	6.75	16.6
			1	17.5	116.5	10.9	6.6	15.5
			2	14.8	92.5	9.6	6.53	15.3
			2.5	14.6	75.7	7	6.27	18.5

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted June 2, 2017
(Estimates of percent composition indicated as follows:
Abundant = 60-100%, **V**ery Common = 30-60%, **C**ommon
= 5-30%, Occasional = 1-5%, **R**are <1%

	Head 2 (Bog 4 Preserve)	BM-1 (Hatchery)*	BM-2 (Sandwich Rd)	BM-3a (Forges Rd)	BM-4 (TNC)
Periphyton Taxa					
Bacillariophyceae (diatoms)					
Asterionella		C	R	no organisms	
Cymbella	R	O			R
Eunotia					
Fragilaria					
Fragilariopsis					
Melorsia					
Navicula					
Nitzschia					
Pinnularia		O			
Synedra					
Tabellaria	R	C	R		O
Chlorphyta (green algae)					
Chaetophora					
Closterium					
Mougeotia					
Oedogonium					
Spirogyra	O				
Staurastrum					
Chrysophyta (yellow-green algae, exluding diatoms)					
Dinobryan					
Cyanophyta (blue-green algae)					
Anabaena					
Oscillatoria					
Phormidium					
Other					
dinoflagellate					

* slide covered with red algae

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted October 7, 2017

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%,
Very Common = 30-60%, **C**ommon = 5-30%, Occasional = 1-5%, **R**are <1%

	Head 2 (Bog 4 Preserve)	Head 4 (ds Long Pond Rd)	*BM-1 (Hatchery)	BM-2 (Sandwich Rd)	BM-3a (Forges Rd)	BM-4 (TNC)
Periphyton Taxa	**slide missing**					
Bacillariophyceae (diatoms)						
Asterionella			R			no organisms
Cymbella		O	O	O		
Diatomoa						
Eunotia						
Fragilaria						
Fragilariopsis						
Melorsia		O	R			
Navicula				R		
Nitzschia						
Pinnularia			R		R	
Pluerosigma			C			
Synedra						
Tabellaria		R	C		R	
Chlorphyta (green algae)						
Chaetophora						
Cladophora						
Closterium		R				
Mougeotia				O		
Oedogonium						
Spirogyra						
Staurastrum						
Chrysophyta (yellow-green algae, exluding diatoms)						
Dinobryan				R		
Cyanophyta (blue-green algae)						
Anabaena			R			
Oscillatoria						
Phormidium						
Other						
dinoflagellate						
Prorocentrales						

*slide and jar covered in rust colored film

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Macroinvertebrate Sampling of Eel River on August 23, 2017							
INSECT TAXA	FFG*	BM-1 (fish hatchery)	BM-2 (Old Sandwich Rd)	BM-3A (Forges Rd)	BM-4 (TNC; footbridge)	HEAD 2 (Bog 4/Preserve)	HEAD 4 (Bog 1,ds Long Pond Rd)
Coleoptera (beetles)							
Stenelmis	SC/CG		4			27	1
Haliplus	SH		3				
Uvarus	P						
Dytiscidae	P						
unidentified	P						
Diptera (flies and midges)							
Chironomidae	V		11		15		2
Simuliidae	CF	3			17		
Tipulidae	V						
Ephemeroptera (mayflies)							
Baetis	CG/SC						2
Stenonema	SC/CG						
Hemiptera (true bugs)							
Ranatra	P						
Belostoma	P						
Hesperocorixa	P						
Gerrid	P						
Odonata (damselflies and dragonflies)							
Boyeria	P				7	1	
Calopteryx	P						
Ischnura	P				1		18
Trichoptera (caddisflies)							
Chimarra	CF						
Hydropsyche	CF	14					
Oecetis	SC						
NON-INSECT TAXA							
Amphipoda (scuds)							
Gammarus	CG	49	4			60	
Hyalella	CG	15	57	42	12	12	24
Decopoda (crayfish)							
unidentified	SH				1		2
Isopoda (aquatic sow bugs)							
Caecidotea	CG	2			2		
Mollusca (snails and clams)							
Helisoma		3				2	3
Physa	SC				2		
Pisidiidae (pea clams)	CF			3		1	
Oligochaetes (aquatic worms)							
unidentified	V						
Turbellaria (flatworms)							
Dugesia	CG					1	
Total Specimens		86	79	45	57	104	52
Community Richness (Total Taxa)		6	5	2	8	7	7
Community Eveness (Scaled SD)		0.69	0.58	0.35	0.81	0.58	0.69
EPT Taxa		1	0	0	0	0	0
Percent Dominant Taxa		0.57	0.72	0.93	0.3	0.58	0.46
Dominant FFG *		CG	CG	CG	CF/V	CG	CG/P

*Functional Feeding Groups: CF= Collector-filterer, CG=Collector-gatherer, SC=Scraper, SH=Shredder, P=Predator, V=Variable

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Macrophyte Survey Conducted May 2017					
Species Name	**Common Name**	**Occurance in Ponds**			
		Russell Mill	**Hayden**	**Howland**	**Eel River Basin**
Submerged Plants					
Cabomba caroliniana	Fanwort (non-native)				
Callitriche sp.	Water-starwort	**X**	x	x	
Ceratophyllum demersum	Coontail	**X**			
Elotia sp.	Pondweed				
Ludwigia palustris	Water-purslane	x		**X**	**X**
Myriophyllum humile	Water-milfoil	x	x	**X**	
Lemna minor	Common Duckweed	x			x
Hyrilla verticillata	Water-weed	x	**X**		
Utricularia macrorhiza	Bladderwort			x	
Rupia maritima	Widgeon Grass		x		
Najas flesilis	Naiad	x		x	x
Floating-Leaved Plants					
Nuphar variegata	Yellow Waterlily	x	**X**	**X**	
Nymphaea odorata	White Waterlily	x		x	
Vallisneria americana	Wild Celery			x	
Emergent Plants					
Alnus incana	Speckled Alder				
Clethra alnifolia	Sweet Pepperbush				
Cyperus sp.	Sedge			x	
Elaeagnus umbellata	Autumn Olive				
Fallopia japonica	Japanese Knotweed				
Glysera sp.	Mannagrass				
Impatiens capensis	Jewelweed				
Iris pseudacorus	Yellow Iris	x			x
Juncus sp.	Rush	x	x	x	x
Justicia americana	Water Willow	**X**		x	
Lonicera sp.	Honeysuckle	x			
Lysimachia terrestris	Swamp Candle				
Myosotis sp.	Forget-Me-Not	x			
Myricaceae gale	Bayberry	x	x	x	x
Onoclea sensibillis	Sensitive Fern				
Phragmites australis	Common Reed	**X**	x	x	**X**
Pontederia cordata	Pickerel-Weed	x	x	x	
Rosa multiflora	Multiflora Rose	x	x		x
Rumex crispus	Curly Dock				
Scirpus cyperinus	Woolgrass				
Schoenoplectus americanus	Three Square				
Solanum sp.	Nightshade				
Symplocarpus foetidus	Skunk Cabbage	x			
Sparganium sp.	Bur-Reed	x			
Toxicodendron radicans	Poison Ivy				x
Typha latifolia	Common Cattail	**X**	x	**X**	**X**

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Rubus idaeus	Raspberry				
Vitis labrusca	Fox Grape				
***dominant species indicated in bold, capital X**					

Results of Eel River Plankton Sampling Conducted June 13,2018

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, Occassional= 1-5%, **R**are <1%

	Russell Mill Pond	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Phytoplankton Taxa				
Bacillariophyceae (diatoms)				
Asterionella	A	A	VC	VC
Cymbella	R	O	O	O
Diadesmis		VC		
Fragilaria	C	VC	C	
Fragilariopsis				
Guinardia				
Gyrosigma	O	O	O	O
Leprocylindrus				O
Melosira		O	O	
Navicula			O	O
Nitzschia			O	
Pinnularia	O	O	O	O
Pieurosigma				C
Rhizosolenia	O			
Synedra	O	O	O	O
Tabellaria	A	A	VC	
Chlorphyta (green algae)				
Closterium			O	O
Crucigenia				
Mougeotia	VC	C		O
Oocyctis				
Oedogonium	O			
Pediastrum	C			O
Scenedesmus			O	
Spirogyra		O	O	
Staurastrum				
Chrysophyta (yellow-green algae, excluding diatoms)				
Chrysophaerella				
Dinobryon	A	A	O	VC
Mallomonas				
Cyanophyta (blue-green algae)				
Oscillatoria	O	R	O	
Anabaena				
Gomphosphaeria				
Other				
Ceratium		R	O	
Tintinnids	O			
Rotifer	O	R		

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted September 27,2018

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, Occassional= 1-5%, **R**are <1%

	Russell Mill Pond	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Phytoplankton Taxa				
Bacillariophyceae (diatoms)				
Asterionella	VC	VC	VC	VC
Cymbella	O	O		O
Diadesmis				
Fragilaria	O	O	O	
Fragilariopsis				
Guindardia				
Gyrosigma	O			
Leprocylindrus				
Melosira				
Navicula				O
Nitzschia		C	O	
Pinnularia	O	O		
Pieurosigma				O
Rhizosolenia				
Synedra		O		O
Tabellaria	C	C	C	C
Chlorphyta (green algae)				
Closterium				
Mougeotia	VC	C	C	
Oocyctis				
Pediastrum			O	
Spirogyra			VC	
Staurastrum				
Chrysophyta (yellow-green algae, excluding diatoms)				
Dinobryon				
Cyanophyta (blue-green algae)				
Anabaena				
Pyrrhophyta (dinoflagellates)				
Cerartium		O		
Other				
Rotifer	O			O
Tintinnids				

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Eel River Field Measurements Recorded by UMASS on June 13, 2018								
Station	**Secchi Depth**	**Total Depth**	**Sample Depth**	**Temp**	**DO**	**DO**	**pH**	**Alkalinity**
	meters	*meters*	*meters*	*©*	*% Sat*	*mg/L*	*unit*	*mg/L CaCO3*
Hayden Pond	0.25	0.5	0.25	18.7	127.4	11.7	6.83	21.4
Howland Pond	0.5	0.5	0.25	18.7	134.1	14	7.21	22.3
Eel River Basin	1.15	1.5	0.75	19.1	128	12	6.75	23.9
Russell Mill Pond	1.4	3.5	0.5	18.4	103	9.6	6.66	29.4
			1	18.2	103.9	9	6.47	18.1
			2	17.7	100.9	10.3	6.21	17.9
			2.75	17.7	111.3	11	6.09	21.1

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted June 6,2018

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%,
Very Common = 30-60%, **C**ommon = 5-30%, Occasional = 1-5%, **R**are <1%

	Head 2 (Bog 4 Preserve)	Head 4 (Bog 1 Preserve)	BM-1 (Hatchery)*	BM-2 (Sandwich Rd)	BM-3a (Forges Rd)	BM-4 (TNC)
Periphyton Taxa	**Slides were missing**		**Slides were missing**		**Slides were missing**	**Slides were missing**
Bacillariophyceae (diatoms)						
Asterionella						
Cymbella		O		VC		
Eunotia						
Fragilaria				O		
Fragilariopsis						
Melorsia						
Navicula		O		C		
Nitzschia						
Pinnularia		C		C		
Rhizosolenia		O				
Synedra				C		
Tabellaria		A		A		
Chlorphyta (green algae)						
Chaetophora						
Closterium		O				
Mougeotia		O				
Oedogonium				O		
Spirogyra						
Staurastrum						
Chrysophyta (yellow-green algae, exluding diatoms)						
Dinobryan						
Cyanophyta (blue-green algae)						
Anabaena						
Oscillatoria						
Phormidium						
Other						
dinoflagellate						

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted October 15, 2018

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%,
Very Common = 30-60%, **C**ommon = 5-30%, Occasional = 1-5%, **R**are <1%

	Head 2 (Bog 4 Preserve)	**Head 4 (ds Long Pond Rd)**	***BM-1 (Hatchery)**	**BM-2 (Sandwich Rd)**	**BM-3a (Forges Rd)**	**BM-4 (TNC)**
Periphyton Taxa				SLIDES MISSING		
Bacillariophyceae (diatoms)						
Asterionella		C	O			
Cymbella	VC	VC	O			
Diatomoa						
Eunotia						
Fragilaria		VC	O			O
Fragilariopsis						O
Gomphonema			R			
Melorsia						
Navicula		C	O		O	
Nitzschia	O		VC			
Pinnularia		O	C		O	O
Pluerosigma						
Rhizosolenia	C					
Synedra	O					
Tabellaria	A	C	VC		O	O
Chlorphyta (green algae)						
Chaetophora						
Cladophora						
Closterium			O			
Mougeotia		VC			O	
Oedogonium						
Spirogyra						
Staurastrum						
Chrysophyta (yellow-green algae, exluding diatoms)						
Dinobryan	O					
Cyanophyta (blue-green algae)						
Anabaena						
Oscillatoria						
Phormidium						
Other						
dinoflagellate						
Prorocentrales						

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Macroinvertebrate Sampling of Eel River on October 15, 2018							
INSECT TAXA	FFG*	BM-1 (fish hatchery)	BM-2 (Old Sandwich Rd)	BM-3A (Forges Rd)	BM-4 (TNC; footbridge)	HEAD 2 (Bog 4/Preserve)	HEAD 4 (Bog 1,ds Long Pond Rd)
Coleoptera (beetles)							
Stenelmis	SC/CG	39	11		15	30	
Haliplus	SH	4					
Uvarus	P						
Dytiscidae	P						
unidentified	P						
Diptera (flies and midges)							
Chironomidae	V		35	9			
Simuliidae	CF		3				
Tipulidae	V						
Ephemeroptera (mayflies)							
Baetis	CG/SC						
Stenonema	SC/CG						
Hemiptera (true bugs)							
Ranatra	P						
Belostoma	P						
Hesperocorixa	P						
Gerrid	P						
Odonata (damselflies and dragonflies)							
Boyeria	P	1	1				3
Calopteryx	P					2	
Ischnura	P					5	
Trichoptera (caddisflies)							
Chimarra	CF						
Hydropsyche	CF	2					
Oecetis	SC						
NON-INSECT TAXA							
Amphipoda (scuds)							
Gammarus	CG	25	15	5	30	61	25
Hyalella	CG	8	4	25	5	8	6
Decopoda (crayfish)							
unidentified	SH						
Isopoda (aquatic sow bugs)			3				
Caecidotea	CG				2	1	
Mollusca (snails and clams)							
Helisoma							2
Physa	SC						
Pisidiidae (pea clams)	CF	18	3			2	
Oligochaetes (aquatic worms)							
unidentified	V					1	
Turbellaria (flatworms)							
Dugesia	CG				3	1	
Total Specimens		100	72	42	53	110	36
Community Richness (Total Taxa)		8	7	4	5	8	4
Community Eveness (Scaled SD)		0.76	0.74	0.78	0.68	0.6	0.66
EPT Taxa		1	0	0	0	0	0
Percent Dominant Taxa		0.25	0.06	0.6	0	0.55	0.17
Dominant FFG *		CF	CG	CG	CG	CG	CG

*Functional Feeding Groups: CF= Collector-filterer, CG=Collector-gatherer, SC=Scraper, SH=Shredder, P=Predator, V=Variable

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Macrophyte Survey Conducted June 2018

Species Name	Common Name	Occurance in Ponds			
		Russell Mill	Hayden	Howland	Eel River Basin
Submerged Plants					
Cabomba caroliniana	Fanwort (non-native)				
Callitriche sp.	Water-starwort	**X**			
Ceratophyllum demersum	Coontail	**X**	x		
Elotia sp.	Pondweed				
Ludwigia palustris	Water-purslane		x	**X**	**X**
Myriophyllum humile	Water-milfoil			x	
Lemna minor	Common Duckweed				
Hyrilla verticillata	Water-weed	x			
Utricularia macrorhiza	Bladderwort				
Rupia maritima	Widgeon Grass				
Najas flesilis	Naiad	x		x	
Floating-Leaved Plants					
Nuphar variegata	Yellow Waterlily	x	x	x	
Nymphaea odorata	White Waterlily				
Vallisneria americana	Wild Celery				
Nymphoides cordata	Little Floating Heart	x			
Nelumbo lutea	American Lotus			x	
Emergent Plants					
Alnus incana	Speckled Alder				
Clethra alnifolia	Sweet Pepperbush				
Cyperus sp.	Sedge		**X**		x
Elaeagnus umbellata	Autumn Olive				
Fallopia japonica	Japanese Knotweed				
Glysera sp.	Mannagrass				
Impatiens capensis	Jewelweed				
Iris pseudacorus	Yellow Iris	x			x
Juncus sp.	Rush	x	x	x	x
Justicia americana	Water Willow				
Lonicera sp.	Honeysuckle				
Lysimachia terrestris	Swamp Candle				
Myosotis sp.	Forget-Me-Not	x			
Myricaceae gale	Bayberry	x	x	x	x
Onoclea sensibillis	Sensitive Fern				x
Phragmites australis	Common Reed	**X**			**X**
Pontederia cordata	Pickerel-Weed	x	x		x
Rosa multiflora	Multiflora Rose				
Rumex crispus	Curly Dock	x			
Scirpus cyperinus	Woolgrass				
Schoenoplectus americanus	Three Square				
Solanum sp.	Nightshade			x	
Symplocarpus foetidus	Skunk Cabbage				
Sparganium sp.	Bur-Reed				

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Toxicodendron radicans	Poison Ivy				x
Typha latifolia	Common Cattail	**X**	x	**X**	**X**
Rubus idaeus	Raspberry				
Vitis labrusca	Fox Grape				
***dominant species indicated in bold, capital X**					

Results of Eel River Plankton Sampling Conducted May 19, 2019

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, Occassional= 1-5%, **R**are <1%

	Russell Mill Pond	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Phytoplankton Taxa				
Bacillariophyceae (diatoms)				
Asterionella	A	A	A	C
Cymbella		O		O
Diadesmis				
Fragilaria		O		
Fragilariopsis				
Guinardia				
Gyrosigma				
Leprocylindrus				O
Melosira	O		O	
Navicula				O
Nitzschia				
Pinnularia	O	O	O	
Pieurosigma				O
Rhizosolenia				
Synedra	O	O	O	
Tabellaria		O		
Chlorphyta (green algae)				
Closterium				
Crucigenia				
Mougeotia		O	O	
Oocyctis				
Oedogonium				
Pediastrum				
Scenedesmus				
Spirogyra		O	A	O
Staurastrum	R	R		R
Chrysophyta (yellow-green algae, excluding diatoms)				
Chrysophaerella				
Dinobryon	C	VC	VC	O
Mallomonas				
Cyanophyta (blue-green algae)				
Oscillatoria				
Anabaena		R		
Gomphosphaeria				
Other				
Ceratium				
Tintinnids	A	VC	A	O
Rotifer	R	R		
Invert eggs				

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted September 19,2019

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, Occassional= 1-5%, **R**are <1%

	Russell Mill Pond	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Phytoplankton Taxa				
Bacillariophyceae (diatoms)				
Asterionella	VC	C	O	O
Cymbella	O		O	
Diadesmis				
Fragilaria			O	O
Fragilariopsis				O
Guinardia				
Gyrosigma				
Leprocylindrus				O
Melosira	O	O	C	C
Navicula			O	
Nitzschia				
Pinnularia			C	O
Pieurosigma		O	O	O
Rhizosolenia				
Synedra	O	O		
Tabellaria	O			
Chlorphyta (green algae)				
Closterium	O			
Crucigenia				
Mougeotia			C	C
Oocyctis				
Oedogonium				
Pediastrum				
Scenedesmus				
Spirogyra		O		C
Staurastrum	R			
Chrysophyta (yellow-green algae, excluding diatoms)				
Chrysophaerella				
Dinobryon	VC	VC	O	
Mallomonas				
Cyanophyta (blue-green algae)				
Oscillatoria				
Anabaena				
Gomphosphaeria				
Other				
Ceratium				
Tintinnids				
Rotifer				

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Eel River Field Measurements Recorded by UMASS on Mau 29,2019								
Station	**Secchi Depth**	**Total Depth**	**Sample Depth**	**Temp**	**DO**	**DO**	**pH**	**Alkalinity**
	meters	*meters*	*meters*	*©*	*% Sat*	*mg/L*	*unit*	*mg/L CaCO3*
Hayden Pond	0.5	1	0.5	16.4	90.6	8.86	6.36	19.1
Howland Pond	0.3	0.75	0.5	16.9	120	11.7	6.29	20.2
Eel River Basin	1.4	1.7	1	16.8	92.9	8.96	6.34	22.9
Russell Mill Pond	1.7	3	0.5	17.1	94.6	9.2	6.31	25.3
			1	16.8	91.4	9.3	6.46	17.6
			1	15.8	67.4	6.65	6.13	18.1
			2.5	15.4	15.4	4.21	6.14	19.6

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted May 2019

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%,
Very Common = 30-60%, **C**ommon = 5-30%, Occasional = 1-5%, **R**are <1%

	Head 2 (Bog 4 Preserve)	Head 4 (Bog 1 Preserve)	BM-1 (Hatchery)*	BM-2 (Sandwich Rd)	BM-3a (Forges Rd)	BM-4 (TNC)
Periphyton Taxa	**Slides were missing**					
Bacillariophyceae (diatoms)						
Asterionella			VC	O		
Cymbella			O	C	O	C
Eunotia						
Fragilaria		C	C	O	C	
Fragilariopsis						
Melorsia				O	O	
Navicula						
Nitzschia						
Pinnularia		C	C			
Rhizosolenia						
Synedra						
Tabellaria			O	O	O	VC
Chlorphyta (green algae)						
Chaetophora						
Closterium					O	
Mougeotia			C			
Oedogonium						
Spirogyra						
Staurastrum						
Chrysophyta (yellow-green algae, exluding diatoms)						
Dinobryan						
Cyanophyta (blue-green algae)						
Anabaena						
Oscillatoria						
Phormidium						
Other						
dinoflagellate						

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted October 2019

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%,
Very Common = 30-60%, **C**ommon = 5-30%, Occasional = 1-5%, **R**are <1%

	Head 2 (Bog 4 Preserve)	Head 4 (Bog 1 Preserve)	BM-1 (Hatchery)*	BM-2 (Sandwich Rd)	BM-3a (Forges Rd)	BM-4 (TNC)
Periphyton Taxa	**Slides were missing**		**Slides were missing**		**Slides were missing**	
Bacillariophyceae (diatoms)						
Asterionella						
Cymbella		C		O		
Eunotia						
Fragilaria		C		O		
Fragilariopsis						
Melorsia				O		
Navicula				O		
Nitzschia						
Pinnularia		C				O
Rhizosolenia						
Synedra						
Tabellaria		O				O
Chlorphyta (green algae)						
Chaetophora						
Closterium						
Mougeotia						
Oedogonium						
Spirogyra						
Staurastrum						
Chrysophyta (yellow-green algae, exluding diatoms)						
Dinobryan						
Cyanophyta (blue-green algae)						
Anabaena						
Oscillatoria						
Phormidium						
Other						
dinoflagellate						

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Macroinvertebrate Sampling of Eel River on							
INSECT TAXA	FFG*	BM-1 (fish hatchery)	BM-2 (Old Sandwich Rd)	BM-3A (Forges Rd)	BM-4 (TNC; footbridge)	HEAD 2 (Bog 4/Preserve)	HEAD 4 (Bog 1,ds Long Pond Rd)
Coleoptera (beetles)							
Stenelmis	SC/CG	12			2	21	1
Haliplus	SH	1					
Uvarus	P						
Dytiscidae	P						
unidentified	P						
Diptera (flies and midges)							
Chironomidae	V		16	17	3		4
Simuliidae	CF	3			10		
Tipulidae	V						
Ephemeroptera (mayflies)							
Baetis	CG/SC						
Stenonema	SC/CG						
Hemiptera (true bugs)							
Ranatra	P						
Belostoma	P						
Hesperocorixa	P						
Gerrid	P						
Odonata (damselflies and dragonflies)							
Boyeria	P	4	1			2	2
Calopteryx	P					1	
Ischnura	P					4	10
Trichoptera (caddisflies)							
Chimarra	CF						
Hydropsyche	CF	7					
Oecetis	SC						
NON-INSECT TAXA							
Amphipoda (scuds)							
Gammarus	CG	63	34	18	43	73	35
Hyalella	CG	8	9	38	14	5	4
Decopoda (crayfish)							
unidentified	SH		1				
Isopoda (aquatic sow bugs)							
Caecidotea	CG					3	
Mollusca (snails and clams)							
Helisoma		2					5
Physa	SC						
Pisidiidae (pea clams)	CF	7	3				
Oligochaetes (aquatic worms)							
unidentified	V						
Turbellaria (flatworms)							
Dugesia	CG			1			
Total Specimens		107	64	74	72	109	61
Community Richness (Total Taxa)		9	6	4	5	7	7
Community Eveness (Scaled SD)		0.66	0.69	0.78	0.7	0.55	0.7
EPT Taxa		1	0	0	0	0	0
Percent Dominant Taxa		0.59	0.53	0.51	0.6	0.67	0.57
Dominant FFG *		CG	CG	CG	CG	CG	CG

*Functional Feeding Groups: CF= Collector-filterer, CG=Collector-gatherer, SC=Scraper, SH=Shredder, P=Predator, V=Variable

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted June 2, 2020

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, Occassional= 1-5%, **R**are <1%

	Russell Mill Pond	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Phytoplankton Taxa				
Bacillariophyceae (diatoms)				
Asterionella	A	VC	A	VC
Cymbella				
Diadesmis				
Fragilaria				O
Fragilariopsis				
Guinardia				
Gyrosigma				
Leprocylindrus				O
Melosira			O	
Navicula				
Nitzschia				
Pinnularia				C
Pieurosigma				O
Rhizosolenia				
Synedra				
Tabellaria	O	O		
Chlorphyta (green algae)				
Closterium				
Crucigenia				
Mougeotia	O	O		
Oocyctis				
Oedogonium				
Pediastrum				
Scenedesmus				
Spirogyra				O
Staurastrum			R	
Chrysophyta (yellow-green algae, excluding diatoms)				
Chrysophaerella				
Dinobryon				
Mallomonas				
Cyanophyta (blue-green algae)				
Oscillatoria				
Anabaena				
Gomphosphaeria				
Other				
Ceratium				
Tintinnids			O	
Rotifer				
Invert eggs				

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted October 2,2020

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, Occassional= 1-5%, **R**are <1%

	Russell Mill Pond	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Phytoplankton Taxa				
Bacillariophyceae (diatoms)				
Asterionella	C	C	O	
Cymbella	O			O
Diadesmis				
Fragilaria	O		C	O
Fragilariopsis				
Guinardia				
Gyrosigma				
Leprocylindrus				O
Melosira				
Navicula		O		O
Nitzschia				
Pinnularia				
Pieurosigma				
Rhizosolenia				
Synedra	R		O	
Tabellaria	O			
Chlorphyta (green algae)				
Closterium				
Crucigenia				
Mougeotia	O		O	
Oocyctis				
Oedogonium			C	
Pediastrum	R			
Scenedesmus				
Spirogyra				O
Staurastrum				
Chrysophyta (yellow-green algae, excluding diatoms)				
Chrysophaerella				
Dinobryon		VC		
Mallomonas				
Cyanophyta (blue-green algae)				
Oscillatoria				
Anabaena			R	
Gomphosphaeria				
Other				
Ceratium				
Tintinnids				
Rotifer				

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Eel River Field Measurements Recorded by UMASS on June 2, 2020								
Station	**Secchi Depth**	**Total Depth**	**Sample Depth**	**Temp**	**DO**	**DO**	**pH**	**Alkalinity**
	meters	*meters*	*meters*	©	*% Sat*	*mg/L*	*unit*	*mg/L CaCO3*
Hayden Pond	0.9	0.9	0.5	22.6	141.2	12.12	7.76	20.2
Howland Pond	0.3	0.3	0.15	23.8	141.9	11.9	8.04	22.9
Eel River Basin	0.7	0.7	0.4	23.8	109.8	9.21	6.71	23.8
Russell Mill Pond	1.5	3.2	0.5	20.6	104.9	9.32	6.55	17.4
			1	19.6	122.5	9.3	6.21	18.3
			2	17.7	97	9.17	6.2	19.1
			3	15.1	37.7	3.79	6.21	16.8

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted June 2020

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%,
Very Common = 30-60%, **C**ommon = 5-30%, Occasional = 1-5%, **R**are <1%

	Head 2 (Bog 4 Preserve)	Head 4 (Bog 1 Preserve)	BM-1 (Hatchery)*	BM-2 (Sandwich Rd)	BM-3a (Forges Rd)	BM-4 (TNC)
Periphyton Taxa	**Slides were missing**		**Slides were missing**			
Bacillariophyceae (diatoms)						
Asterionella		O		O	O	C
Cymbella						
Eunotia						
Fragilaria						
Fragilariopsis						
Melorsia						
Navicula						O
Nitzschia						
Pinnularia						
Rhizosolenia						
Synedra					O	
Tabellaria		O			O	
Chlorphyta (green algae)						
Chaetophora						
Closterium						R
Mougeotia						
Oedogonium						O
Spirogyra						
Staurastrum						
Chrysophyta (yellow-green algae, exluding diatoms)						
Dinobryan						
Cyanophyta (blue-green algae)						
Anabaena						
Oscillatoria						
Phormidium						
Other						
dinoflagellate						

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted October 2020

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%,
Very Common = 30-60%, **C**ommon = 5-30%, Occasional = 1-5%, **R**are <1%

	Head 2 (Bog 4 Preserve)	Head 4 (Bog 1 Preserve)	BM-1 (Hatchery)*	BM-2 (Sandwich Rd)	BM-3a (Forges Rd)	BM-4 (TNC)
Periphyton Taxa	**Slides were missing**					
Bacillariophyceae (diatoms)			O		O	
Asterionella						
Cymbella		O	C	O		O
Eunotia						
Fragilaria			C			O
Fragilariopsis						
Melorsia						
Navicula			C	O		
Nitzschia						
Pinnularia		O				
Rhizosolenia						
Synedra		O				
Tabellaria		O	C		O	O
Chlorphyta (green algae)						
Chaetophora						
Closterium						
Mougeotia					O	
Oedogonium						
Spirogyra						
Staurastrum						
Chrysophyta (yellow-green algae, exluding diatoms)						
Dinobryan						
Cyanophyta (blue-green algae)						
Anabaena						
Oscillatoria						
Phormidium						
Other						
dinoflagellate						

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Macroinvertebrate Sampling of Eel River on October 2, 2020							
INSECT TAXA	FFG*	BM-1 (fish hatchery)	BM-2 (Old Sandwich Rd)	BM-3A (Forges Rd)	BM-4 (TNC; footbridge)	HEAD 2 (Bog 4/Preserve)	HEAD 4 (Bog 1,ds Long Pond Rd)
Coleoptera (beetles)							
Stenelmis	SC/CG	24			2	15	4
Haliplus	SH	1					
Uvarus	P						
Dytiscidae	P						
unidentified	P						
Diptera (flies and midges)							
Chironomidae	V		22	9	3		4
Simuliidae	CF	3			10		
Tipulidae	V						
Ephemeroptera (mayflies)							
Baetis	CG/SC						
Stenonema	SC/CG						
Hemiptera (true bugs)							
Ranatra	P						
Belostoma	P						
Hesperocorixa	P						
Gerrid	P						
Odonata (damselflies and dragonflies)							
Boyeria	P	4	3			1	
Calopteryx	P					4	
Ischnura	P					6	10
Trichoptera (caddisflies)							
Chimarra	CF						
Hydropsyche	CF	1					
Oecetis	SC						
NON-INSECT TAXA							
Amphipoda (scuds)							
Gammarus	CG	33	50	25	43	46	35
Hyalella	CG	10	2	8	14	2	4
Decopoda (crayfish)							
unidentified	SH						
Isopoda (aquatic sow bugs)							
Caecidotea	CG					3	
Mollusca (snails and clams)							
Helisoma		2					5
Physa	SC						
Pisidiidae (pea clams)	CF	10					
Oligochaetes (aquatic worms)							
unidentified	V						
Turbellaria (flatworms)							
Dugesia	CG			2			
Total Specimens		88	77	44	72	77	62
Community Richness (Total Taxa)		9	4	4	5	7	6
Community Eveness (Scaled SD)		0.75	0.62	0.79	0.7	0.64	0.75
EPT Taxa		1	0	0	0	0	0
Percent Dominant Taxa		0.38	0.65	0.18	0.6	0.6	0.56
Dominant FFG *		CG	CG	CG	CG	CG	CG

*Functional Feeding Groups: CF= Collector-filterer, CG=Collector-gatherer, SC=Scraper, SH=Shredder, P=Predator, V=Variable

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted May 26,2021

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, Occassional= 1-5%, **R**are <1%

	Russell Mill Pond	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Phytoplankton Taxa				
Bacillariophyceae (diatoms)				
Asterionella	A	A	VC	C
Cymbella	O		O	
Diadesmis				
Fragilaria				
Fragilariopsis				
Guinardia				
Gyrosigma				
Leprocylindrus				C
Melosira	C			
Navicula				O
Nitzschia				
Pinnularia			O	C
Pieurosigma				VC
Rhizosolenia				
Synedra	O		O	
Tabellaria	O	C	C	
Chlorphyta (green algae)				
Closterium				
Crucigenia				
Mougeotia				
Oocyctis				
Oedogonium				
Pediastrum				
Scenedesmus				
Spirogyra				VC
Staurastrum	O			
Chrysophyta (yellow-green algae, excluding diatoms)				
Chrysophaerella				
Dinobryon		O	VC	
Mallomonas				
Cyanophyta (blue-green algae)				
Oscillatoria				
Anabaena				
Gomphosphaeria				
Other				
Ceratium				
Tintinnids			O	
Rotifer	O		C	
Invert eggs				

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted September 24,2021

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, Occassional= 1-5%, **R**are <1%

	Russell Mill Pond	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Phytoplankton Taxa				
Bacillariophyceae (diatoms)				
Asterionella	C	VC	O	
Cymbella	O			O
Diadesmis				
Fragilaria	O		O	O
Fragilariopsis				
Guinardia				
Gyrosigma				
Leprocylindrus				O
Melosira	C			
Navicula		O		O
Nitzschia				
Pinnularia				
Pieurosigma				
Rhizosolenia				
Synedra	R		O	
Tabellaria	O	O	O	
Chlorphyta (green algae)				
Closterium				
Crucigenia				
Mougeotia	O		O	
Oocyctis				
Oedogonium			R	
Pediastrum	R			
Scenedesmus				O
Spirogyra				
Staurastrum				
Chrysophyta (yellow-green algae, excluding diatoms)				
Chrysophaerella				
Dinobryon		VC		
Mallomonas				
Cyanophyta (blue-green algae)				
Oscillatoria				
Anabaena				
Gomphosphaeria				
Other				
Ceratium				
Tintinnids				
Rotifer				

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Eel River Field Measurements Recorded by UMASS on May 26,2021								
Station	**Secchi Depth**	**Total Depth**	**Sample Depth**	**Temp**	**DO**	**DO**	**pH**	**Alkalinity**
	meters	*meters*	*meters*	©	*% Sat*	*mg/L*	*unit*	*mg/L CaCO3*
Hayden Pond	0.6	0.6	0.3	23.6	140.7	12.19	5.41	9.9
Howland Pond	0.6	0.6	0.3	24.8	167	6.23	5.03	8.8
Eel River Basin	1.5	1.3	0.7	23.3	123.3	9.48	5.42	9.8
Russell Mill Pond	1.25	3.3	0.15	22.2	130.5	12.55	6.21	16.5
			1	21	142.4	12.22	6.23	16.4
			2	19.6	130.3	12.4	5.51	9.8
			3	16.6	99.3	9.15	5.54	11.5

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted July 2021

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%,
Very Common = 30-60%, **C**ommon = 5-30%, Occasional = 1-5%, **R**are <1%

	Head 2 (Bog 4 Preserve)	Head 4 (Bog 1 Preserve)	BM-1 (Hatchery)*	BM-2 (Sandwich Rd)	BM-3a (Forges Rd)	BM-4 (TNC)
Periphyton Taxa	**Slides were missing**					**Slides were missing**
Bacillariophyceae (diatoms)						
Asterionella			O			
Cymbella		O	O		O	
Eunotia						
Fragilaria		O				
Fragilariopsis						
Melorsia			O			
Navicula						
Nitzschia						
Pinnularia						
Rhizosolenia						
Synedra			O			
Tabellaria		O		O	O	
Chlorphyta (green algae)						
Chaetophora						
Closterium						
Mougeotia						
Oedogonium						
Spirogyra						
Staurastrum						
Chrysophyta (yellow-green algae, exluding diatoms)						
Dinobryan						
Cyanophyta (blue-green algae)						
Anabaena						
Oscillatoria						
Phormidium						
Other						
dinoflagellate						

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted October 6, 2021

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%,
Very Common = 30-60%, **C**ommon = 5-30%, Occasional = 1-5%, **R**are <1%

	Head 2 (Bog 4 Preserve)	Head 4 (Bog 1 Preserve)	BM-1 (Hatchery)*	BM-2 (Sandwich Rd)	BM-3a (Forges Rd)	BM-4 (TNC)
Periphyton Taxa	**Slides were missing**		**Slides were missing**			**SLIDE BARE**
Bacillariophyceae (diatoms)						
Asterionella		O		O	O	
Cymbella						
Diatoma						
Eunotia						
Fragilaria		O				
Fragilariopsis						
Gomphonema						
Melorsia						
Navicula						
Nitzschia						
Pinnularia		O				
Pluerosigma						
Rhizosolenia						
Synedra		O		O		
Tabellaria		R			O	
Chlorphyta (green algae)						
Chaetophora						
Cladophora						
Closterium						
Mougeotia					O	
Oedogonium						
Spirogyra						
Staurastrum						
Chrysophyta (yellow-green algae, exluding diatoms)						
Dinobryan						
Cyanophyta (blue-green algae)						
Anabaena						
Oscillatoria						
Phormidium						
Other						
dinoflagellate						

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Macroinvertebrate Sampling of Eel River on October 6, 2021							
INSECT TAXA	FFG*	BM-1 (fish hatchery)	BM-2 (Old Sandwich Rd)	BM-3A (Forges Rd)	BM-4 (TNC; footbridge)	HEAD 2 (Bog 4/Preserve)	HEAD 4 (Bog 1,ds Long Pond Rd)
Coleoptera (beetles)							
Stenelmis	SC/CG	14			2	7	4
Haliplus	SH						
Uvarus	P						
Dytiscidae	P						
unidentified	P						
Diptera (flies and midges)							
Chironomidae	V		10	9	3		2
Simuliidae	CF	5			10		
Tipulidae	V						
Ephemeroptera (mayflies)							
Baetis	CG/SC						
Stenonema	SC/CG						
Hemiptera (true bugs)							
Ranatra	P						
Belostoma	P						
Hesperocorixa	P						
Gerrid	P						
Odonata (damselflies and dragonflies)							
Boyeria	P	3	5			2	
Calopteryx	P			3			
Ischnura	P					6	10
Trichoptera (caddisflies)							
Chimarra	CF						
Hydropsyche	CF	1					
Oecetis	SC						
NON-INSECT TAXA							
Amphipoda (scuds)							
Gammarus	CG	60	45	35	43	32	18
Hyalella	CG	12	7	20	14	2	14
Decopoda (crayfish)							
unidentified	SH						
Isopoda (aquatic sow bugs)							
Caecidotea	CG					3	
Mollusca (snails and clams)							
Helisoma		2					16
Physa	SC						
Pisidiidae (pea clams)	CF	4					
Oligochaetes (aquatic worms)							
unidentified	V						
Turbellaria (flatworms)							
Dugesia	CG	1					
Total Specimens		102	67	67	72	52	64
Community Richness (Total Taxa)		9	4	4	5	6	6
Community Eveness (Scaled SD)		0.63	0.71	0.8	0.7	0.69	0.9
EPT Taxa		1	0	0	0	0	0
Percent Dominant Taxa		0.59	0.67	0.3	0.6	0.62	0.28
Dominant FFG *		CG	CG	CG	CG	CG	CG

*Functional Feeding Groups: CF= Collector-filterer, CG=Collector-gatherer, SC=Scraper, SH=Shredder, P=Predator, V=Variable

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Macrophyte Survey Conducted May 2021					
Species Name	**Common Name**	**Occurance in Ponds**			
		Russell Mill	**Hayden**	**Howland**	**Eel River Basin**
Submerged Plants					
Cabomba caroliniana	Fanwort (non-native)				
Callitriche sp.	Water-starwort	**X**		x	
Ceratophyllum demersum	Coontail	x		X	
Elotia sp.	Pondweed	x	**x**		
Ludwigia palustris	Water-purslane		x	**x**	
Myriophyllum humile	Water-milfoil	x	X	X	
Lemna minor	Common Duckweed				
Hyrilla verticillata	Water-weed		**x**		
Trapa natans	Water-chestnut	x			
Utricularia macrorhiza	Bladderwort	x			
Rupia maritima	Widgeon Grass				
Najas flesilis	Naiad				
Floating-Leaved Plants					
Nuphar variegata	Yellow Waterlily	x		x	
Nymphaea odorata	White Waterlily				
Vallisneria americana	Wild Celery				
Nymphoides cordata	Little Floating Heart	x			
Nelumbo lutea	American Lotus			x	
Nuphar advena	Spatterdock		x		
Emergent Plants					
Alnus incana	Speckled Alder				
Clethra alnifolia	Sweet Pepperbush				
Cyperus sp.	Sedge				
Elaeagnus umbellata	Autumn Olive				
Fallopia japonica	Japanese Knotweed				
Glysera sp.	Mannagrass				
Impatiens capensis	Jewelweed				
Iris pseudacorus	Yellow Iris	x			
Juncus sp.	Rush	x			
Justicia americana	Water Willow	**x**			
Lonicera sp.	Honeysuckle				
Lysimachia terrestris	Swamp Candle				
Myosotis sp.	Forget-Me-Not				
Myricaceae gale	Bayberry	x		x	
Onoclea sensibillis	Sensitive Fern				x
Phragmites australis	Common Reed	**X**			**X**
Pontederia cordata	Pickerel-Weed	x	x		x
Rosa multiflora	Multiflora Rose				
Rumex crispus	Curly Dock	x			
Scirpus cyperinus	Woolgrass				
Schoenoplectus americanus	Three Square				
Solanum sp.	Nightshade		x		
Symplocarpus foetidus	Skunk Cabbage				
Sparganium sp.	Bur-Reed				
Toxicodendron radicans	Poison Ivy				x
Typha latifolia	Common Cattail	**X**			**X**
Rubus idaeus	Raspberry				
Vitis labrusca	Fox Grape				
***dominant species indicated in bold, capital X**					

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted June 1, 2022

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, Occassional= 1-5%, **R**are <1%

	Russell Mill Pond	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Phytoplankton Taxa				
Bacillariophyceae (diatoms)				
Asterionella	A	A	VC	VC
Cymbella	O		O	
Diadesmis				
Fragilaria				
Fragilariopsis				
Guinardia				
Gyrosigma				
Leprocylindrus				O
Melosira	C			
Navicula				
Nitzschia				
Pinnularia	O		O	C'O
Pieurosigma				
Rhizosolenia				
Synedra	O		O	
Tabellaria	C	C	C	
Chlorphyta (green algae)				
Closterium				
Crucigenia				
Mougeotia	R			
Oocyctis				
Oedogonium				
Pediastrum				
Scenedesmus				
Spirogyra				C
Staurastrum				
Chrysophyta (yellow-green algae, excluding diatoms)				
Chrysophaerella				
Dinobryon		R	C	
Mallomonas				
Cyanophyta (blue-green algae)				
Oscillatoria				
Anabaena				
Gomphosphaeria				
Other				
Ceratium				
Tintinnids				
Rotifer				
Invert eggs				

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted September 12,2022

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, Occassional= 1-5%, **R**are <1%

	Russell Mill Pond	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Phytoplankton Taxa				
Bacillariophyceae (diatoms)				
Asterionella	C	VC	O	
Cymbella	O			O
Diadesmis				
Fragilaria	O		C	O
Fragilariopsis				
Guinardia				
Gyrosigma				
Leprocylindrus				O
Melosira	C			
Navicula		O		
Nitzschia				
Pinnularia				
Pieurosigma				
Rhizosolenia				
Synedra			C	
Tabellaria	C	C	O	
Chlorphyta (green algae)				
Closterium				
Crucigenia				
Mougeotia	O		R	
Oocyctis				
Oedogonium			R	
Pediastrum				
Scenedesmus				
Spirogyra				O
Staurastrum				
Chrysophyta (yellow-green algae, excluding diatoms)				
Chrysophaerella				
Dinobryon		C		
Mallomonas				
Cyanophyta (blue-green algae)				
Oscillatoria				
Anabaena				
Gomphosphaeria				
Other				
Ceratium				
Tintinnids				
Rotifer				

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Eel River Field Measurements Recorded by UMASS on June 1, 2022								
Station	**Secchi Depth**	**Total Depth**	**Sample Depth**	**Temp**	**DO**	**DO**	**pH**	**Alkalinity**
	meters	*meters*	*meters*	©	*% Sat*	*mg/L*	*unit*	*mg/L CaCO3*
Hayden Pond	0.3	0.3	0.15	18.6	66.8	6.26	6.18	27.4
Howland Pond	0.66	0.66	0.3	26.1	11	6.23	7.54	22.3
Eel River Basin	1.1	1.1	0.6	21.7	113.3	10.12	8.82	24
Russell Mill Pond	1.9	3.35	0.15	20.7	105.3	9.53	6.53	24.7
			1	20.6	103.5	9.32	NS	NS
			2	17.5	107.6	10.21	NS	NS
			3	15.2	39.9	3.89	NS	NS

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted JuNE 2022

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%,
Very Common = 30-60%, **C**ommon = 5-30%, Occasional = 1-5%, **R**are <1%

Periphyton Taxa	**Head 2 (Bog 4 Preserve) Slides were missing**	**Head 4 (Bog 1 Preserve)**	**BM-1 (Hatchery)***	**BM-2 (Sandwich Rd)**	**BM-3a (Forges Rd)**	**BM-4 (TNC)**
Bacillariophyceae (diatoms)						
Asterionella			C			
Cymbella		0	0		0	0
Eunotia						
Fragilaria					0	
Fragilariopsis						
Melorsia			0			
Navicula						0
Nitzschia						
Pinnularia						
Rhizosolenia						
Synedra			0			
Tabellaria		0		0	0	
Chlorphyta (green algae)						
Chaetophora						
Closterium						R
Mougeotia						
Oedogonium						R
Spirogyra						
Staurastrum						
Chrysophyta (yellow-green algae, exluding diatoms)						
Dinobryan						
Cyanophyta (blue-green algae)						
Anabaena						
Oscillatoria						
Phormidium						
Other						
dinoflagellate						

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Macroinvertebrate Sampling of Eel River on September 12, 2022							
INSECT TAXA	FFG*	BM-1 (fish hatchery)	BM-2 (Old Sandwich Rd)	BM-3A (Forges Rd)	BM-4 (TNC; footbridge)	HEAD 2 (Bog 4/Preserve)	HEAD 4 (Bog 1,ds Long Pond Rd)
Coleoptera (beetles)							
Stenelmis	SC/CG	11			1	4	5
Haliplus	SH						
Uvarus	P						
Dytiscidae	P						
unidentified	P						
Diptera (flies and midges)							
Chironomidae	V	2	12	14	1		2
Simuliidae	CF	7			11		
Tipulidae	V						
Ephemeroptera (mayflies)							
Baetis	CG/SC						
Stenonema	SC/CG						
Hemiptera (true bugs)							
Ranatra	P						
Belostoma	P						
Hesperocorixa	P						
Gerrid	P						
Odonata (damselflies and dragonflies)							
Boyeria	P	6	1			4	
Calopteryx	P			5			
Ischnura	P					6	9
Trichoptera (caddisflies)							
Chimarra	CF						
Hydropsyche	CF	2					
Oecetis	SC		1				
NON-INSECT TAXA							
Amphipoda (scuds)							
Gammarus	CG	72	40	54	50	33	19
Hyalella	CG	20	3	10	12	1	13
Decopoda (crayfish)							
unidentified	SH						
Isopoda (aquatic sow bugs)							
Caecidotea	CG					2	
Mollusca (snails and clams)							
Helisoma							16
Physa	SC						
Pisidiidae (pea clams)	CF						
Oligochaetes (aquatic worms)							
unidentified	V						
Turbellaria (flatworms)							
Dugesia	CG						
Total Specimens		120	57	83	75	50	64
Community Richness (Total Taxa)		7	5	4	5	6	6
Community Eveness (Scaled SD)		0.66	0.54	0.72	0.6	0.64	0.9
EPT Taxa		1	1	0	0	0	0
Percent Dominant Taxa		0.6	0.7	0.65	0.67	0.66	0.3
Dominant FFG *		CG	CG	CG	CG	CG	CG
*Functional Feeding Groups: CF= Collector-filterer, CG=Collector-gatherer, SC=Scraper, SH=Shredder, P=Predator, V=Variable							

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Macrophyte Survey Conducted June 1, 2022					
Species Name	**Common Name**	**Occurance in Ponds**			
		Russell Mill	**Hayden**	**Howland**	**Eel River Basin**
Submerged Plants					
Cabomba caroliniana	Fanwort (non-native)				
Callitriche sp.	Water-starwort	**X**		x	
Ceratophyllum demersum	Coontail	x			
Elotia sp.	Pondweed	x	**x**		x
Ludwigia palustris	Water-purslane		x	**x**	
Myriophyllum humile	Water-milfoil	x	**X**	**X**	
Lemna minor	Common Duckweed				x
Hyrilla verticillata	Water-weed				
Trapa natans	Water-chestnut				
Utricularia macrorhiza	Bladderwort	x			
Rupia maritima	Widgeon Grass				
Najas flesilis	Naiad	**X**			
Floating-Leaved Plants					
Nuphar variegata	Yellow Waterlily	x		**X**	
Nymphaea odorata	White Waterlily			**X**	
Vallisneria americana	Wild Celery	x			
Nymphoides cordata	Little Floating Heart	x			
Nelumbo lutea	American Lotus			x	
Nuphar advena	Spatterdock				
Emergent Plants					
Alnus incana	Speckled Alder				
Clethra alnifolia	Sweet Pepperbush				
Cyperus sp.	Sedge				
Elaeagnus umbellata	Autumn Olive				
Fallopia japonica	Japanese Knotweed				
Glysera sp.	Mannagrass				
Impatiens capensis	Jewelweed				
Iris pseudacorus	Yellow Iris	x			
Juncus sp.	Rush	x			
Justicia americana	Water Willow	**X**			
Lonicera sp.	Honeysuckle				
Lysimachia terrestris	Swamp Candle				
Myosotis sp.	Forget-Me-Not	x			
Myricaceae gale	Bayberry	x		x	
Onoclea sensibillis	Sensitive Fern				x
Phragmites australis	Common Reed	**X**	x		**X**
Pontederia cordata	Pickerel-Weed	x			x
Rosa multiflora	Multiflora Rose				
Rumex crispus	Curly Dock	x			
Scirpus cyperinus	Woolgrass				
Schoenoplectus americanus	Three Square				
Solanum sp.	Nightshade		x		
Symplocarpus foetidus	Skunk Cabbage	x			x
Sparganium sp.	Bur-Reed				
Toxicodendron radicans	Poison Ivy				
Typha latifolia	Common Cattail	**X**			**X**
Rubus idaeus	Raspberry				
Vitis labrusca	Fox Grape				
***dominant species indicated in bold, capital X**					

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted May 30, 2023

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, Occassional= 1-5%, **R**are <1%

	Russell Mill Pond	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Phytoplankton Taxa				
Bacillariophyceae (diatoms)				
Asterionella	A	A	C	VC
Cymbella		O		
Diadesmis				
Fragilaria				O
Fragilariopsis				
Guinardia				
Gyrosigma				
Leprocylindrus				
Melosira				O
Navicula				
Nitzschia		O	O	
Pinnularia	O			
Pieurosigma	O			
Rhizosolenia				
Synedra		C	O	O
Tabellaria				
Chlorphyta (green algae)				
Closterium				R
Crucigenia				
Mougeotia			O	
Oocyctis		O		
Oedogonium				
Pediastrum				
Scenedesmus				O
Spirogyra			C	
Staurastrum		R		
Chrysophyta (yellow-green algae, excluding diatoms)				
Chrysophaerella				
Dinobryon				
Mallomonas				
Cyanophyta (blue-green algae)				
Oscillatoria				
Anabaena				
Gomphosphaeria				
Other				
Ceratium				
Tintinnids				
Rotifer				
Invert eggs				

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted September 30,2023

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, Occassional= 1-5%, **R**are <1%

	Russell Mill Pond	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Phytoplankton Taxa				
Bacillariophyceae (diatoms)				
Asterionella	VC		O	O
Cymbella		C		
Diadesmis				
Fragilaria	O			O
Fragilariopsis				
Guinardia				
Gyrosigma				
Leprocylindrus				
Melosira		C	O	
Navicula				
Nitzschia				
Pinnularia			O	O
Pieurosigma	R			
Rhizosolenia				
Synedra		O		O
Tabellaria	VC	O		
Chlorphyta (green algae)				
Closterium				
Crucigenia				
Mougeotia				
Oocyctis				
Oedogonium				
Pediastrum				
Scenedesmus				
Spirogyra	O			
Staurastrum	R			
Chrysophyta (yellow-green algae, excluding diatoms)				
Chrysophaerella				
Dinobryon				
Mallomonas				
Cyanophyta (blue-green algae)				
Oscillatoria				
Anabaena				
Gomphosphaeria				
Other				
Ceratium				
Tintinnids				
Rotifer				O

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Eel River Field Measurements Recorded by UMASS on June 1,								
Station	**Secchi Depth**	**Total Depth**	**Sample Depth**	**Temp**	**DO**	**DO**	**pH**	**Alkalinity**
	meters	*meters*	*meters*	©	*% Sat*	*mg/L*	*unit*	*mg/L CaCO3*
Hayden Pond	0.6	0.6	0.3	18.5	111	19.51	5.85	18.6
Howland Pond	0.6	0.6	0.3	20.1	160.3	14.96	7.89	21.3
Eel River Basin	1.5	1.5	0.8	19.7	104	9.51	6.43	25.8
Russell Mill Pond	1.7	3.1	0.5	19.1	105.3	10	6.16	17.9
			1	19.1	105	9.87	6.16	25.4
			2	18.2	97.1	9.3	5.97	17.1
			2.5	15.6	61.1	6.15	5.87	22.6

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted June 2023

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%,
Very Common = 30-60%, **C**ommon = 5-30%, Occasional = 1-5%, **R**are <1%

	Head 2 (Bog 4 Preserve)	Head 4 (Bog 1 Preserve)	BM-1 (Hatchery)*	BM-2 (Sandwich Rd)	BM-3a (Forges Rd)	BM-4 (TNC)
Periphyton Taxa						
Bacillariophyceae (diatoms)						
Asterionella	O		C			
Cymbella		C	O		O	O
Eunotia						
Fragilaria					R	
Fragilariopsis						
Melorsia			R			
Navicula						O
Nitzschia						
Pinnularia						
Rhizosolenia						
Synedra			O			
Tabellaria	O	O		O	C	
Chlorphyta (green algae)						
Chaetophora						
Closterium						
Mougeotia						
Oedogonium						
Spirogyra						
Staurastrum						
Chrysophyta (yellow-green algae, exluding diatoms)						
Dinobryan	*O*					
Cyanophyta (blue-green algae)						
Anabaena						
Oscillatoria						
Phormidium						
Other						
dinoflagellate						

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted September 2023

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%,
Very Common = 30-60%, **C**ommon = 5-30%, Occasional = 1-5%, **R**are <1%

	Head 2 (Bog 4 Preserve)	Head 4 (Bog 1 Preserve)	BM-1 (Hatchery)*	BM-2 (Sandwich Rd)	BM-3a (Forges Rd)	BM-4 (TNC)
Periphyton Taxa						
Bacillariophyceae (diatoms)			sliudes missing			slides bare
Asterionella	O					
Cymbella	O	C		O	O	
Eunotia						
Fragilaria						
Fragilariopsis	R	O				
Melorsia						
Navicula						
Nitzschia						
Pinnularia		R				
Rhizosolenia						
Synedra		O		O		
Tabellaria		R			O	
Chlorphyta (green algae)						
Chaetophora						
Closterium						
Mougeotia					O	
Oedogonium						
Spirogyra						
Staurastrum						
Chrysophyta (yellow-green algae, exluding diatoms)						
Dinobryan	*O*					
Cyanophyta (blue-green algae)						
Anabaena						
Oscillatoria						
Phormidium						
Other						
dinoflagellate						

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Macroinvertebrate Sampling of Eel River on September 2023							
INSECT TAXA	FFG*	BM-1 (fish hatchery)	BM-2 (Old Sandwich Rd)	BM-3A (Forges Rd)	BM-4 (TNC; footbridge)	HEAD 2 (Bog 4/Preserve)	HEAD 4 (Bog 1,ds Long Pond Rd)
Coleoptera (beetles)			Sample broken				
Stenelmis	SC/CG	5		2	5		
Haliplus	SH						
Uvarus	P						
Dytiscidae	P						
unidentified	P				5		
Diptera (flies and midges)							
Chironomidae	V	2		14	10		
Simuliidae	CF	5		1			
Tipulidae	V						
Ephemeroptera (mayflies)							
Baetis	CG/SC						
Stenonema	SC/CG						
Hemiptera (true bugs)							
Ranatra	P						
Belostoma	P						
Hesperocorixa	P						
Gerrid	P						
Odonata (damselflies and dragonflies)							
Boyeria	P			2	2	1	3
Calopteryx	P						1
Ischnura	P			6	3	2	
Trichoptera (caddisflies)							
Chimarra	CF						
Hydropsyche	CF						
Oecetis	SC						
NON-INSECT TAXA							
Amphipoda (scuds)							
Gammarus	CG	65		38	34	40	
Hyalella	CG			12	10	10	20
Decopoda (crayfish)							
unidentified	SH			4		2	1
Isopoda (aquatic sow bugs)							
Caecidotea	CG						
Mollusca (snails and clams)							
Helisoma							1
Physa	SC						
Pisidiidae (pea clams)	CF			1			
Oligochaetes (aquatic worms)							
unidentified	V						
Turbellaria (flatworms)							
Dugesia	CG						
Total Specimens		77		80	69	55	26
Community Richness (Total Taxa)		4		9	7	5	5
Community Eveness (Scaled SD)		0.43		0.72	0.79	0.53	0.51
EPT Taxa		0		0	0	0	0
Percent Dominant Taxa		0.84		0.48	0.49	0.73	0.77
Dominant FFG *		CG		CG	CG	CG	CG
*Functional Feeding Groups: CF= Collector-filterer, CG=Collector-gatherer, SC=Scraper, SH=Shredder, P=Predator, V=Variable							

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Macrophyte Survey Conducted May 30, 2023					
Species Name	**Common Name**	**Occurance in Ponds**			
		Russell Mill	**Hayden**	**Howland**	**Eel River Basin**
Submerged Plants					
Cabomba caroliniana	Fanwort (non-native)				
Callitriche sp.	Water-starwort	**X**		x	
Ceratophyllum demersum	Coontail	x			
Elotia sp.	Pondweed	x	**x**		x
Ludwigia palustris	Water-purslane		x	**x**	
Myriophyllum humile	Water-milfoil	x	**X**	**X**	
Lemna minor	Common Duckweed				x
Hyrilla verticillata	Water-weed	x			
Trapa natans	Water-chestnut				
Utricularia macrorhiza	Bladderwort	x			
Rupia maritima	Widgeon Grass				
Najas flesilis	Naiad				
Floating-Leaved Plants					
Nuphar variegata	Yellow Waterlily	x		**X**	
Nymphaea odorata	White Waterlily			**X**	
Vallisneria americana	Wild Celery	x			
Nymphoides cordata	Little Floating Heart	x			
Nelumbo lutea	American Lotus			x	
Nuphar advena	Spatterdock				
Emergent Plants					
Alnus incana	Speckled Alder				
Clethra alnifolia	Sweet Pepperbush				
Cyperus sp.	Sedge				
Elaeagnus umbellata	Autumn Olive				
Fallopia japonica	Japanese Knotweed				
Glysera sp.	Mannagrass				
Impatiens capensis	Jewelweed				
Iris pseudacorus	Yellow Iris	x			
Juncus sp.	Rush	x			
Justicia americana	Water Willow	**x**			
Lonicera sp.	Honeysuckle				
Lysimachia terrestris	Swamp Candle				
Myosotis sp.	Forget-Me-Not	x			
Myricaceae gale	Bayberry	x		x	
Onoclea sensibillis	Sensitive Fern				
Phragmites australis	Common Reed	**X**			**X**
Pontederia cordata	Pickerel-Weed	x			x
Rosa multiflora	Multiflora Rose				
Rumex crispus	Curly Dock	x			
Scirpus cyperinus	Woolgrass				
Schoenoplectus americanus	Three Square				
Solanum sp.	Nightshade				
Symplocarpus foetidus	Skunk Cabbage	x			
Sparganium sp.	Bur-Reed	x			
Toxicodendron radicans	Poison Ivy				x
Typha latifolia	Common Cattail	**X**			**X**
Rubus idaeus	Raspberry				
Vitis labrusca	Fox Grape				
***dominant species indicated in bold, capital X**					

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted June 11, 2024

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, Occassional= 1-5%, **R**are <1%

	Russell Mill Pond	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Phytoplankton Taxa				
Bacillariophyceae (diatoms)				
Asterionella	VC	C	C	C
Cymbella			O	
Diadesmis				
Fragilaria			O	
Fragilariopsis			O	
Guinardia				
Gyrosigma				
Leprocylindrus				
Melosira	O	R		O
Navicula			O	
Nitzschia				
Pinnularia				O
Pieurosigma				O
Rhizosolenia				
Synedra			O	
Tabellaria	O	O		
Chlorphyta (green algae)				
Closterium				
Crucigenia				
Mougeotia	O			
Oocyctis				
Oedogonium				
Pediastrum				
Scenedesmus				
Spirogyra		O		
Staurastrum	R			
Chrysophyta (yellow-green algae, excluding diatoms)				
Chrysophaerella				
Dinobryon	C	C		C
Mallomonas				
Cyanophyta (blue-green algae)				
Oscillatoria				
Anabaena				
Gomphosphaeria				
Other				
Ceratium				
Tintinnids				
Rotifer	O	C		O

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Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Plankton Sampling Conducted September 27, 2024

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%, **V**ery Common = 30-60%, **C**ommon = 5-30%, Occassional= 1-5%, **R**are <1%

	Russell Mill Pond	**Hayden Pond**	**Howland Pond**	**Eel River Basin**
Phytoplankton Taxa				
Bacillariophyceae (diatoms)				
Asterionella				
Cymbella		O		
Diadesmis				
Fragilaria			O	O
Fragilariopsis				
Guinardia				
Gyrosigma				
Leprocylindrus				
Melosira	C			O
Navicula				
Nitzschia				
Pinnularia				
Pieurosigma				
Rhizosolenia				
Synedra	O			
Tabellaria	O			
Chlorphyta (green algae)				
Closterium				
Crucigenia				
Mougeotia		O		
Oocyctis				
Oedogonium				
Pediastrum				
Scenedesmus				
Spirogyra				
Staurastrum				
Chrysophyta (yellow-green algae, excluding diatoms)				
Chrysophaerella				
Dinobryon		O		
Mallomonas				
Cyanophyta (blue-green algae)				
Oscillatoria				
Anabaena				
Gomphosphaeria				
Other				
Ceratium				
Tintinnids				
Rotifer				
Invert eggs				

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Eel River Field Measurements Recorded by UMASS on June 11,2024								
Station	**Secchi Depth**	**Total Depth**	**Sample Depth**	**Temp**	**DO**	**DO**	**pH**	**Alkalinity**
	meters	*meters*	*meters*	©	*% Sat*	*mg/L*	*unit*	*mg/L CaCO3*
Hayden Pond	0.8	0.8	0.4	19.1	98.3	9.1	6.05	19.7
Howland Pond	0.4	0.6	0.3	19	82.3	7.65	5.36	20.9
Eel River Basin	0.8	0.8	0.4	19.3	73.8	6.83	5.68	21
Russell Mill Pond	1.2	3.4	0.5	20.6	110.4	8.75	6.99	22.5
			1	18.1	84.4	8.08	5.79	17.1
			2	16.2	60	5.88	5.7	17.9
			3	15.1	42	4.14	5.36	20.9

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Results of Eel River Periphyton Sampling Conducted June 2024

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%,
Very Common = 30-60%, **C**ommon = 5-30%, Occasional = 1-5%, **R**are <1%

	Head 2 (Bog 4 Preserve)	Head 4 (Bog 1 Preserve)	BM-1 (Hatchery)*	BM-2 (Sandwich Rd)	BM-3a (Forges Rd)	BM-4 (TNC)
Periphyton Taxa						
Bacillariophyceae (diatoms)	No Sample					
Asterionella			C	O		R
Cymbella				O		
Eunotia						
Fragilaria						
Fragilariopsis		O				O
Melorsia						
Navicula						
Nitzschia					O	
Pinnularia		O				
Rhizosolenia						
Synedra						
Tabellaria			O			
Chlorphyta (green algae)						
Chaetophora						
Closterium						
Mougeotia						
Oedogonium						
Spirogyra						
Staurastrum						
Chrysophyta (yellow-green algae, exluding diatoms)						
Dinobryan				O		
Cyanophyta (blue-green algae)						
Anabaena						
Oscillatoria						
Phormidium						
Other						
dinoflagellate						

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Periphyton Sampling Conducted September 2024

(Estimates of percent composition indicated as follows: **A**bundant = 60-100%,
Very Common = 30-60%, **C**ommon = 5-30%, Occasional = 1-5%, **R**are <1%

	Head 2 (Bog 4 Preserve)	Head 4 (Bog 1 Preserve)	BM-1 (Hatchery)*	BM-2 (Sandwich Rd)	BM-3a (Forges Rd)	BM-4 (TNC)
Periphyton Taxa					Slide Bare	No sample
Bacillariophyceae (diatoms)						
Asterionella						
Cymbella	O	C		O		
Eunotia						
Fragilaria			O			
Fragilariopsis						
Melorsia			O			
Navicula						
Nitzschia	O	R				
Pinnularia						
Rhizosolenia						
Synedra				R		
Tabellaria		O				
Chlorphyta (green algae)						
Chaetophora						
Closterium						
Mougeotia						
Oedogonium						
Spirogyra						
Staurastrum						
Chrysophyta (yellow-green algae, exluding diatoms)						
Dinobryan	*R*					
Cyanophyta (blue-green algae)						
Anabaena						
Oscillatoria						
Phormidium						
Other						
dinoflagellate						

Compiled by the Town of Plymouth
Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Macroinvertebrate Sampling of Eel River on September 2024							
INSECT TAXA	FFG*	BM-1 (fish hatchery)	BM-2 (Old Sandwich Rd)	BM-3A (Forges Rd)	BM-4 (TNC; footbridge)	HEAD 2 (Bog 4/Preserve)	HEAD 4 (Bog 1,ds Long Pond Rd)
Coleoptera (beetles)							
Stenelmis	SC/CG	39	11		15	30	
Haliplus	SH	4					
Uvarus	P						
Dytiscidae	P						
unidentified	P						
Diptera (flies and midges)							
Chironomidae	V		35	9			
Simuliidae	CF	3					
Tipulidae	V						
Ephemeroptera (mayflies)							
Baetis	CG/SC						
Stenonema	SC/CG						
Hemiptera (true bugs)							
Ranatra	P						
Belostoma	P						
Hesperocorixa	P						
Gerrid	P						
Odonata (damselflies and dragonflies)							
Boyeria	P	1	1				3
Calopteryx	P					2	
Ischnura	P					5	
Trichoptera (caddisflies)							
Chimarra	CF						
Hydropsyche	CF	2					
Oecetis	SC						
NON-INSECT TAXA							
Amphipoda (scuds)							
Gammarus	CG	25	15	5	30	61	25
Hyalella	CG	8	4	25	5	8	6
Decopoda (crayfish)							
unidentified	SH						
Isopoda (aquatic sow bugs)			3				
Caecidotea	CG				2	1	
Mollusca (snails and clams)							
Helisoma							2
Physa	SC						
Pisidiidae (pea clams)	CF	18	3			2	
Oligochaetes (aquatic worms)							
unidentified	V					1	
Turbellaria (flatworms)							
Dugesia	CG			3	1		
Total Specimens		100	72	42	53	110	36
Community Richness (Total Taxa)		8	7	4	5	8	4
Community Eveness (Scaled SD)		0.58	0.65	0.78	0.54	0.46	0.66
EPT Taxa		0	0	0	0	0	0
Percent Dominant Taxa		0.39	0.49	0.6	0.57	0.56	0.69
Dominant FFG *		SC/CG	V	CG	CG	CG	CG
*Functional Feeding Groups: CF= Collector-filterer, CG=Collector-gatherer, SC=Scraper, SH=Shredder, P=Predator, V=Variable							

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Data collected by Town Consultant, David Worden, Limnologist/Biologist

Results of Eel River Macrophyte Survey Conducted June 11, 2024					
Species Name	**Common Name**	**Occurance in Ponds**			
		Russell Mill	**Hayden**	**Howland**	**Eel River Basin**
Submerged Plants					
Cabomba caroliniana	Fanwort (non-native)				
Callitriche sp.	Water-starwort				
Ceratophyllum demersum	Coontail	x		x	
Elotia sp.	Pondweed		x		x
Ludwigia palustris	Water-purslane		x		x
Myriophyllum humile	Water-milfoil	x	x	x	
Lemna minor	Common Duckweed				
Hyrilla verticillata	Water-weed	x		x	
Trapa natans	Water-chestnut				
Utricularia macrorhiza	Bladderwort	x			
Rupia maritima	Widgeon Grass				
Najas flesilis	Naiad			x	
Floating-Leaved Plants					
Nuphar variegata	Yellow Waterlily			**X**	
Nymphaea odorata	White Waterlily			**X**	
Vallisneria americana	Wild Celery			x	
Nymphoides cordata	Little Floating Heart				
Nelumbo lutea	American Lotus				
Nuphar advena	Spatterdock			x	
Emergent Plants					
Alnus incana	Speckled Alder				
Clethra alnifolia	Sweet Pepperbush				x
Cyperus sp.	Sedge				
Elaeagnus umbellata	Autumn Olive				
Fallopia japonica	Japanese Knotweed				
Glysera sp.	Mannagrass				
Impatiens capensis	Jewelweed				
Iris pseudacorus	Yellow Iris	x			
Juncus sp.	Rush	x			
Justicia americana	Water Willow	x			
Lonicera sp.	Honeysuckle				
Lysimachia terrestris	Swamp Candle				
Myosotis sp.	Forget-Me-Not	x			
Myricaceae gale	Bayberry				
Onoclea sensibillis	Sensitive Fern				
Phragmites australis	Common Reed	**X**			**X**
Pontederia cordata	Pickerel-Weed	x			
Rosa multiflora	Multiflora Rose				
Rumex crispus	Curly Dock				
Scirpus cyperinus	Woolgrass				
Schoenoplectus americanus	Three Square				
Solanum sp.	Nightshade		x		
Symplocarpus foetidus	Skunk Cabbage				
Sparganium sp.	Bur-Reed	x			
Toxicodendron radicans	Poison Ivy				x
Typha latifolia	Common Cattail	x			**X**
Rubus idaeus	Raspberry				
Vitis labrusca	Fox Grape				
***dominant species indicated in bold, capital X**					

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