Investigation into the Development of Biocriteria to Assess Wetland Condition in New Hampshire

R-WD-20-07

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March 2020

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Supported by U.S. Environmental Protection Agency – Wetland Program Development Grants

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Acknowledgments

This multi-year project would not have been possible without the support of, and collaboration with, many people.

I would like to extend my appreciation to the Maine Department of Environmental Protection (MEDEP) biomonitoring staff, especially Beth Connors and Jeanne DiFranco, who provided training, information, guidance, and moral support for the New Hampshire Department of Environmental Services (NHDES) to implement their wetland biomonitoring protocols and assist in interpreting the results. This project would not have been possible without their support. Thanks also to Tom Danielson and Leon Tsomides (retired) of the Biomonitoring group for guidance on several aspects of the project.

Many thanks also to NHDES colleagues who provided significant guidance and support for the four field seasons of the two-grant endeavor, including Ken Edwardson, Ted Walsh, Dave Neils, Gregg Comstock, Kristen Svendsen, as well as my sampling team colleagues, Sandra Mattfeldt Houghton (formerly with the NHDES Wetlands Bureau, now at New Hampshire Fish and Game), Karl Benedict, NHDES Wetlands Bureau, and interns Jessica Pearce (2014), Jill Pavlik (2015 and 2016), and Mariah Mitchell (2017). Thanks to Amanda McQuaid for identification of algae and cyanobacteria.

Analysis support - Dave Neils, Ken Edwardson and Cheryl Bondi, NHDES; Rob Cole, NHDOIT

Thanks to Bill Nichols of the New Hampshire Natural Heritage Bureau for guidance on the Ecological Integrity Assessment, and to Bill Nichols and Christopher Kane, also of the New Hampshire Natural Heritage Bureau, for assistance with plant identification or confirmation. Additional thanks to:

NHDES Wetlands Bureau: Mary Ann Tilton, for reviews.

USEPA-Region 1: Donna Smith-Williams, Project Officer for Wetland Program Development Grant (CD00A00014).

NEBAWWG- New England Biological Assessment of Wetlands Workgroup. It was as a result of this group's information and support that we learned of methods being used by other states, and were able to collaborate with MEDEP to conduct this project and advance our knowledge about methods to assess wetland condition in New Hampshire.

NH Natural Heritage Bureau: Sabrina Stanwood and Sara Cairns (retired).

NH Department of Health and Human Services water lab: Wendy Locke, Tina Wells, Rachel Rainey, Lou Barinelli.

ESS Group: Matt Ladewig (macroinvertebrate processing and taxonomy support).

Landowners who gave permission to access their properties.

The analysis and conclusions documented in this report are those of NHDES and may not reflect the views of the U.S. Environmental Protection Agency.

This project was supported by two USEPA Wetland Program Development Grants. The first two years of data were collected, analyzed and reported on under CD96179201, *Application of Four Methods to Assess Wetland Condition in New Hampshire: Macroinvertebrates, Vegetation, and Two Rapid Assessments*. R-WD-18-14. (NHDES, 2018). The second two years of data collection, and analysis of the four years of data were conducted under CD00A00014, and are reported herein.

1 Background

This project was conducted to advance New Hampshire's wetland monitoring and assessment work by investigating potential biological criteria (biocriteria) to assess the condition of freshwater wetlands. New Hampshire like many other states, has not assessed and reported on the condition of its wetlands under the Clean Water Act due to the lack of quantifiable biological criteria and thresholds and reproducible assessment methods for all wetlands. Maine is one of the few states that has included the results of wetland assessments in its §305(b) water quality assessment reports as required by the Clean Water Act (MEDEP, 2010, 2012, 2014, 2016, 2018).

NHDES has identified as a priority the development of wetland-specific criteria for current biological integrity narrative standards (NHDES, 2015; 2017a). Initially NHDES applied a GIS-based approach to evaluating its wetlands (NHDES, 2008; NHDES, 2013a). NHDES also collaborated with the NH Natural Heritage Bureau (NHB) to assess the condition of 27 bogs and fens (NHB, 2013).

To build upon this work, NHDES began to investigate development of numeric biocriteria thresholds for aquatic life use in fringing and emergent wetlands using Maine Department of Environmental Protection's (MEDEP) wetland macroinvertebrate biomonitoring protocols and rapid assessment, the Wetland Human Disturbance Assessment (WHDA). We applied New Hampshire's Ecological Integrity Assessment (EIA) and Floristic Quality Assessment (FQA) as an additional biological assemblage to assesses wetland condition (NHDES, 2018). New Hampshire approached the effort to identify potential wetland biocriteria by collaborating with the MEDEP Biomonitoring Program, and applying their protocols. The resulting NHDES data were processed through MEDEP's linear discriminant model (LDM) for wetland water quality.

Knowledge of wetland condition is valuable in monitoring existing protected lands, targeting wetlands for restoration or protection, and supporting decision-making. While wetland loss due to development may be occurring at a reduced rate when compared to the past, development continues to impact the ecosystem services that wetlands provide. Additionally, it is important to be able to measure the condition of wetlands and changes to these systems over time, especially considering potential impacts from climate change, (Faber-Langendoen et al., 2016).

This project applied all three levels of USEPA's suggested tiered approach for wetland monitoring and assessment, commonly referred to as Levels 1, 2 and 3 (USEPA, 2006).

- **Level 1** assessments use remote sensing and desktop analysis.
- **Level 2** assessments are rapid and field-based to provide information that can be observed only in the field, and should take about four field hours to complete, on average.
- **Level 3** assessments are intensive field surveys that include the collection of biological data or onsite sampling of water, soil, etc.

Ecological indicators should be easily measured; be sensitive to stresses on the system; respond to stress in a predictable manner; be anticipatory; predict changes that can be averted by management actions; be integrative; have a known response to disturbances, anthropogenic stresses, and changes over time; and have low variability in response (Dale and Beyeler, 2001).

Numerical or narrative criteria are one of three components of water quality standards. New Hampshire's surface water quality regulations (Env-Wq 1700) apply to all surface waters as defined in Env-Wq 1702.46, which includes most wetlands. New Hampshire's current wetland-specific water

quality criteria are narrative. The rules (Env-Wq 1703.2) specify that wetlands shall be subject to the criteria listed ...and wherever the naturally occurring conditions of the wetlands differ from the criteria listed, the naturally occurring conditions shall be the applicable water quality criteria. Env-Wq 1702.29 defines naturally occurring conditions as those "which exist in the absence of human influences."

New Hampshire's biological and aquatic community integrity criteria (Env-Wq 1703.19) state that:

- The surface waters shall support and maintain a balanced, integrated, and adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of similar natural habitats of a region.
- Difference from naturally occurring conditions shall be limited to non-detrimental differences in community structure and function.

1.1 Maine's Wetland Biomonitoring Program and Linear Discriminant Model

The MEDEP Biological Monitoring Program's sampling of macroinvertebrates, algae and water occurs during June and July. MEDEP samples in this time frame because:

- Aquatic invertebrate taxa of interest have developed sufficiently to be identified.
- Wetlands are less likely to dry down during this period compared with later in the summer.
- Overlap with stream algae and stream macroinvertebrate sampling is minimized (MDEP, 2014b).

Wetlands for sampling are chosen to represent a gradient of human disturbance. Site conditions range from reference sites nearly unaffected by human activity to severely degraded sites. Reference wetlands are chosen to include a range of wetland types and geographic regions. This broad reference set allows samples collected from human-impacted wetlands to be compared with reference wetlands of similar type to assess the degree of degradation occurring at impacted sites (MEDEP, 2018b).

MEDEP biologists developed the 12-variable linear discriminant model (LDM) based on quantitative ecological attributes of the macroinvertebrate community to determine the strength of the association of a test community to any of Maine's legislatively assigned water quality classes (Maine Class A, B, or C). The LDM requires a minimum total abundance of 50 individuals and minimum genera of 15 among the three replicates collected at a site. Under specific criteria, if a taxon is identified only to the Family level, the Family is included in the Adjusted Counts and in the Total Richness (B. Connors, personal communication).

The LDM uses taxa and function-based variables (e.g., shredder), which reflect the diversity and sensitivity of the macroinvertebrate community, to determine the probabilities that a wetland attains one of three classes (A, B, or C) or is in non-attainment (NA) of the minimum criteria for any class. The LDM also may generate the result of Indeterminate (I) status, which is assigned to wetlands where a class-specific probability value is greater than 0.4 but less than 0.6, so that the conclusion of classification attainment for that class cannot be determined without further information. The indeterminate result also may be assigned where the minimum abundance or genera for the LDM is not met.

Table 1. Maine's surface water classes and narrative water quality criteria.

Surface Water Class	**Narrative Aquatic Life Use Criteria**
Class GPA waters, include wetlands associated with great ponds, and natural ponds and lakes less than 10 acres in size.	Habitat for fish and aquatic life must be characterized as natural. Must have stable or decreasing trophic state, subject to natural fluctuations, and be free of culturally induced algal blooms which impair use and enjoyment.
Fresh surface waters not classified GPA, include wetlands associated with rivers and streams:	
Class AA	Habitat for fish and aquatic life must be characterized as free-flowing and natural. Aquatic life shall be as naturally occurs.
Class A	Habitat for fish and aquatic life must be characterized as natural. Aquatic life shall be as naturally occurs.
Class B	Habitat for fish and aquatic life must be characterized as unimpaired. Must support all indigenous aquatic species without detrimental changes in the resident biological community.
Class C	Some changes to aquatic life allowed. Must support all indigenous fish species. Structure and function of the resident biological community must be maintained.
Ref: State of Maine*, Department of Environmental Protection,* 2016 *Integrated Water Quality Monitoring and Assessment Report*. Wetlands, Chapter 5. Final 2/28/2018.	

The LDM applied herein by New Hampshire in this analysis was the version in place when this research began; it is based on 12 variables (MEDEP, undated; Davies et al., 2016). The 12 variables are:

1. Total mean abundance
2. Ephemeroptera abundance
3. Odonata relative abundance
4. Trichoptera relative abundance
5. Shredder taxa relative abundance
6. Non-insect taxa relative richness
7. Maine Tolerance Index (MTI) sensitive taxa abundance
8. MTI sensitive taxa relative abundance
9. MTI sensitive taxa richness
10. MTI intermediate taxa relative abundance
11. MTI intermediate taxa richness
12. Ratio of MTI sensitive to eurytopic taxa abundance

Additional information about the LDM is provided in the "Guidance for Understanding a Wetland Macroinvertebrate Life Classification Attainment report," (Appendix A).

1.2 Rapid Assessment Methods

A Rapid Assessment Method (RAM) is a Level 2 method to assess wetland condition that requires one person a half day or less for pre-field preparation and post-field analysis and half a day or less collecting data in the field (Fennessy et al., 2004). This project included the application of two rapid assessment methods, the Ecological Integrity Assessment (EIA) (Faber-Langendoen and Nichols, 2014) and MEDEP's Wetland Human Disturbance Assessment (WHDA).

The EIA, originally developed by NatureServe to address condition for conservation planning purposes, the EIA is considered "...an assessment of the structure, composition, and function of an ecosystem as compared to reference ecosystems operating within the bounds of natural or historic disturbance regimes" (Faber-Langendoen and Nichols, 2014). To have ecological integrity, an ecosystem should be relatively unimpaired across a range of ecological attributes and spatial and temporal scales (Faber-Langendoen and Nichols, 2014).

The EIA relies on a general conceptual model that:

- Identifies the major ecological attributes – landscape context, ecosystem size, vegetation, soil and hydrology.
- Provides a narrative description of declining integrity levels based on changes to ecological attributes.
- Uses a metrics-based approach to assess the levels of integrity.

The EIA approach focuses on the observed condition rather than the presence of stressors. Completion of each topical section of the EIA Pre-Field and Field Metrics Form results in a rank of A through D (with pluses or minuses possible) and once all sections are addressed, the ranks are converted to numeric values and are "rolled up" to generate a rank of A (highest) through D- (lowest) for each wetland assessed. For the EIA, a separate form, the Level 2 Stressor Checklist, is used to inform the assessment of condition indicators and does not involve the assignment of points or development of a numerical score.

The MEDEP wetland biomonitoring program protocols include the application of the Wetland Human Disturbance Assessment (WHDA) to document environmental stressors and characterize the degree of human disturbance in and around a wetland sampling location. The WHDA is not intended to serve as an impact assessment in the absence of biological data. Information on stressors is valuable for diagnosing causes of any impairment and determining possible remediation measures. The WHDA scores are used to categorize pristine reference sites, minimally impacted sites, and highly disturbed sites (MEDEP, 2013).

The WHDA assesses stressors in the wetland and surrounding watershed using four major categories: 1) hydrologic and vegetative modifications to the wetland, 2) evidence of chemical pollutants, 3) watershed characteristics, and 4) potential nonpoint source pollution impacts. The categories assessed and point values assigned by category are described in Section 3.3.5 The area evaluated by the WHDA is comprised of "all sections of the wetland/waterbody observed by Biomonitoring staff while performing the standard sampling procedure," a 100-foot buffer around the assessment area, and the wetland's watershed (MEDEP, 2013).

1.3 Floristic Quality Assessment

Vegetation is often one of the biological assemblages used for assessing wetland condition, because it:

- Is present in wetlands of multiple types (forested, emergent marsh, etc.) and is one of the three components used to identify and delineate wetlands.
- Is less costly to identify than some other biological assemblages (such as macroinvertebrates or algae) and identification can be done primarily in the field.
- Has taxonomic richness (affects ability to identify metrics).
- Integrates effects over time.

- Is sensitive to nutrient enrichment, herbicides, hydroperiod alteration, and habitat alteration (USEPA, 2002a; U.S. Army Corps of Engineers, 1987).

Floristic Quality Assessment (FQA) is a vegetation-based ecological assessment protocol that was first developed by Swink and Wilhelm (1979) to assess floristic integrity and address the need for a standardized, reproducible and objective assessment of ecological integrity. FQA requires the pre-assignment of a coefficient of conservatism (C-value) to every vascular plant species in a regional or state flora, relying on the collective knowledge of a group of experts. The coefficient of conservatism is typically an integer from 0 to 10 that is assigned to each taxon in an ecological or geographic region based on its fidelity to specific habitats and tolerance for disturbance (Taft et al., 1997). A C-value of 10 indicates a species that has a narrow range of ecological tolerances. A C-value of 1 indicates a species that is tolerant of disturbance or may not be associated with particular plant community. A C-value of 0 is assigned to nonnative species (Table 2).

In a USEPA-funded project that was completed in 2011, each New Hampshire vascular species was assigned a C-value following the methodology and philosophy detailed in Swink and Wilhelm (1994) and Wilhelm and Masters (1995) and described in Bried et al. (2012). Table 2 provides the descriptive guidance provided to botanists as part of the original state-level coefficient of conservatism effort for New York and the New England states.

Table 2. Guiding definitions for coefficients of conservatism (C-values) assigned to the vascular flora of New York and New England (Bried et al., 2012).

C-values	Criteria
0	Nonnative. Typically, with wide range of ecological tolerances. Often these are only opportunistic of intact undisturbed habitats
1 to 2	Native invasive or widespread native that is not typical of (or only marginally typical of) a particular plant community; tolerant of anthropogenic disturbance.
3 to 5	Native with an intermediate range of ecological tolerances and may typify a stable native community, but may also persist under some anthropogenic disturbance.
6 to 8	Native with a narrow range of ecological tolerances and typically associated with a stable community.
9 to 10	Native with a narrow range of ecological tolerances, high fidelity to particular habitat conditions, and sensitive to anthropogenic disturbance.

Once C-values are developed for a flora, they may be used in various floristic indices or metrics based on vascular plant inventory data recorded at a site (DeBerry et al., 2015). Where abundance data are collected they can be used in cover-weighted metrics. Common floristic quality metrics are described in section 3.3.3.2.

2 Project Objectives

The main objective of this project was to investigate development of numeric biocriteria thresholds for assessment of aquatic life in fringing and emergent open-water wetlands based on MEDEP wetland biomonitoring protocols. The assessment effort involved conducting two rapid assessments, and sampling water, vegetation, and macroinvertebrates. The NHDES macroinvertebrate data would then be provided to MEDEP to process through its LDM to produce a predicted attainment class for each wetland. To implement multiple biological assemblages, NHDES would apply FQA metrics using the vegetation data. In addition, the project included sharing and testing the NHDES aquatic vegetation

sampling protocol with the MEDEP wetlands biomonitoring group to advance their use of vegetation data in wetland assessment.

3 Methods

3.1 Site Selection

NHDES targeted wetland types sampled by MEDEP to support use of its model. We used National Wetland Inventory data to target lacustrine, palustrine, and riverine fringe open-water wetlands for sampling. Target wetlands were identified initially based on their Cowardin classification. The Cowardin types included palustrine unconsolidated bottom (PUB), palustrine aquatic bed (PAB), palustrine emergent (PEM), as well as backwater areas of flowing waters and shallow ponds classified as lacustrine unconsolidated bottom (LUB) with large proportions of littoral areas (FGDC, 2013). We reviewed aerial imagery (primarily from the USDA National Agriculture Imagery Program, NAIP) and New Hampshire Fish and Game Department (NHFG) bathymetry maps. We conducted a site reconnaissance visit at each wetland to confirm wetland type and adequate foot or canoe access before scheduling sampling.

Each wetland was assigned a unique alpha-numeric identification, consisting of three characters based on the (or one) municipality in which the wetland was located, followed by a sequential single-digit number for the number of wetlands sampled in a specific municipality for this project (e.g., CON4 was the fourth wetland to be sampled in Concord). Two wetlands have an additional "B" added to the site identification. The two wetlands were sampled in 2015, received an indeterminate status, and were resampled in 2017.

Table 3. Wetlands sampled: identification, name, location and year.

Wetland station ID	Wetland/site name	Location	Year sampled
ALL1	Catamount Brook wetland	Allenstown	2017
ALS1	Fuller wetland	Alstead	2014
ANT1	Rye Pond	Antrim	2016
AUB1	Clark Pond	Auburn	2017
BAR1	Richardson Pond	Barrington	2017
BOW1	Town Pond	Bow	2015
BOW2	Purgatory Brook wetland	Bow	2017
CNT1	Oxbow Pond	Canterbury	2015
CNT2	Kimball Pond	Canterbury	2017
CNW1	Dollof Pond	Conway	2017
CON1	South End marsh	Concord	2015
CON2	Horseshoe Pond (east)	Concord	2016
CON3	Horseshoe pond (mid-west)	Concord	2016
CON4	Hoit Road Marsh	Concord	2017
DAN1	Bog Pond	Danbury	2016
DEE1	Pawtuckaway marsh	Deerfield	2015
ELL1	Ellsworth Pond	Ellsworth	2017
ENF1	George Pond	Enfield	2014
FRN1	Echo Lake wetland	Franconia	2015
GRG1	White Mountain National Forest- Tributary to Peabody River	Green's Grant	2014
HKS1	Clay Pond	Hooksett	2015
HNV1	Mulherrin Farm Rd wetland	Hanover	2015

HSB1	Farrar Marsh	Hillsborough	2016
HUD1B*	Musquash Pond	Hudson	2017
JAF1	Contoocook River wetland	Jaffrey	2015
KIN1	Powwow River	Kingston	2017
MAN1	Rail Trail marsh	Manchester	2015
MAN2	Joseph Street pond	Manchester	2015
MLW1	Gregg wetland	Marlow	2014
NAS1B*	Fields Grove- Salmon Brook	Nashua	2017
NAS2	The Cove	Nashua	2015
NWB1	Great Meadow	New Boston	2014
NWD1	Merrymeeting River marsh	New Durham	2016
PEM1	Brickett Hill Rd. pond	Pembroke	2015
RAY1	Lamprey River wetland	Raymond	2017
SAL1	World End Pond	Salem	2015
SAL2	Salem High School/Geremonty Dr. wetland	Salem	2015
SHM1	Tuxbury Pond	South Hampton	2017
TRO1	Perkins Pond (upper)	Troy	2015
WAS1	Town Forest wetland - unnamed stream	Washington	2017
WHI1	Johns River	Whitefield	2014
WOO1	Elbow Pond	Woodstock	2015

Following the NHDES rotating basins approach for surface water monitoring, 21 of 42 wetlands were located within the rotational watersheds for that year (Figure 1). In 2016, three of seven wetlands and in 2017, nine of 13 wetlands sampled were in rotational watersheds (Years 4 and 5, NHDES, 2016a). Sampling was not limited to the rotating basins' timeframes to represent the range of human disturbance (NHDES, 2018).

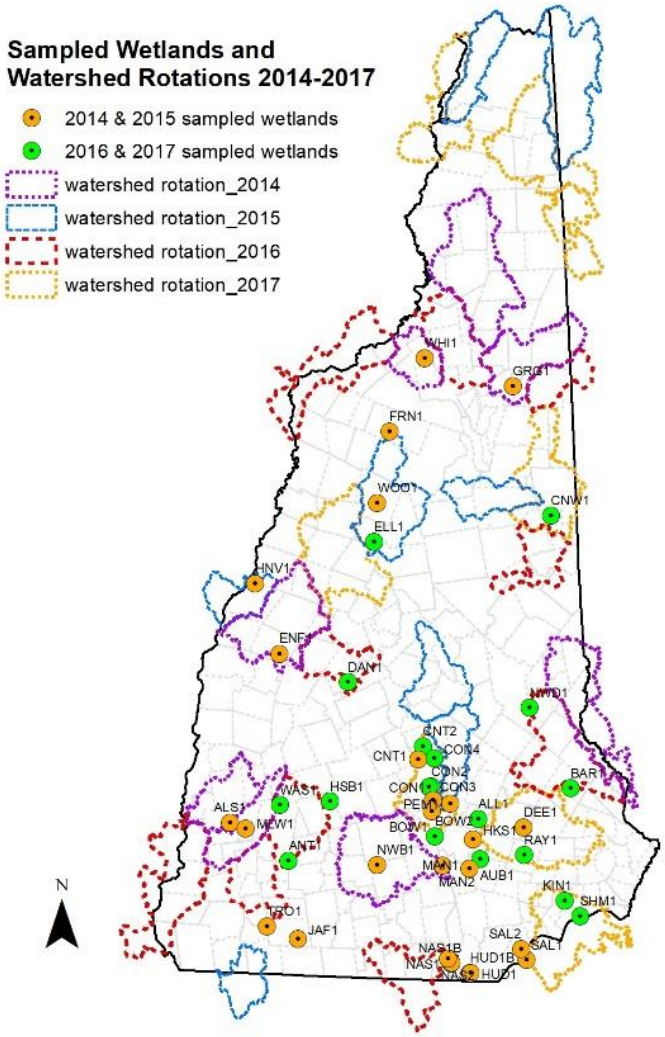

Figure 1. Sampled wetlands and watershed rotations 2014 - 2017.

3.2 Field Sampling Methods

Our sampling period was from late June to mid-August to balance the optimal macroinvertebrate and plant sampling dates. This overlapped with the MEDEP macroinvertebrate sampling timeframes which are a few weeks earlier in the season. We chose this timeframe as it tends to be better later in season for plant identification as more plants are in flower or fruit. From 2014-2017, thirty-two wetlands were sampled from a canoe and 10 wetlands were sampled on foot (in waders). We sampled the wetlands in the mid to late morning, depending on distance traveled, and completed the protocols before 2 pm. We conducted our sampling when the weather forecast indicated clear weather, in general.

Data were recorded on the following forms:

- Wetland Bioassessment Field Data Sheet (Appendix B)
- Wetland Monitoring - Water Field Data Sheet (Appendix C)
- Wetland Human Disturbance Assessment (Appendix D)
- Ecological Integrity Assessment forms:
    - Pre-Field and Field Metrics (Metric Form) (Appendix E)

- Stressor Checklist (Appendix F)
- Wetland Assessment Plant Data Sheet (2016) (Appendix G)
- Wetland Assessment Plant Data Sheet (2017) (Appendix H)

In 2016 and 2017, field surveys were conducted, vegetation was sampled, and macroinvertebrate and water samples were collected from 20 wetlands with permanent open water. This study added to the initial project where 24 wetlands were sampled in 2014 and 2015, thus completing a total of 44 wetland surveys. Two of the wetlands sampled in 2015 were resurveyed in 2017 because they were among those wetlands for which an attainment class could not be assigned (NAS1/B, HUD1/B); thus 42 distinct wetlands were sampled over four field seasons. This is the universe on which the analyses were conducted.

The wetlands represent multiple wetland system types, drainage marsh-shrub swamp, medium level fen, ponds with border fens, and two pond types – eutrophic and oxbow ponds (Sperduto, 2011a, 2011b; Nichols, 2015a, 2015b). The assessment areas for the wetlands included one or more of the following Cowardin classes:

- Palustrine system: aquatic bed, emergent, scrub-shrub and forested.
- Lacustrine system: aquatic bed.

The assessment areas of the 42 wetlands ranged in size from 0.22 acre (PEM1) to more than 330 acres (DAN1) (mean 83.41 ac.; median 43.5 ac.). The wetlands sampled in 2016 and 2017 were within that size range, from 19.2 (CON2) to 243 acres. (SHM1). Only one sampled wetland required landowner permission for access in 2016 or 2017 (SHM1).

3.3 Sampling and Analysis

The following sections describe the environmental and biological samples and measurements taken at the wetlands following the USEPA-approved Quality Assurance Project Plans (NHDES 2014, 2016b).

3.3.1 Water

In-situ measurements of dissolved oxygen (DO), specific conductance, temperature, turbidity, and pH were made using hand-held meters at each of the three macroinvertebrate sample locations (water depth ≤ one meter) before each macroinvertebrate sample was collected.

One water grab sample was collected at elbow depth in each wetland, with a wide-mouthed jug, dispersed to specific sample containers, placed in a cooler with ice and then transported to and logged into the New Hampshire Public Health Lab - Water Analysis Laboratory for analysis within standard holding times. Water samples collected during the 2014-2017 field surveys were analyzed for parameters listed in Table 4. In 2014 and 2015, we also sampled and analyzed for dissolved orthophosphorus (DOP); however, only four of 24 wetlands had detectable levels of dissolved orthophosphorus. Considering the information provided and the cost ($40 per sample for DOP sampling and analysis), the DOP analysis was eliminated from the 2016 and 2017 water analysis.

Table 4. Water quality parameters sampled in the field or analyzed by the lab for 2016 and 2017.

Water Quality Parameter	Frequency	Method
Dissolved Oxygen Specific Conductance Temperature	3 measurements per wetland	Field meter: YSI Pro 2030

Water Quality Parameter	Frequency	Method
pH	3 measurements per wetland	Field Meter: Oakton pH 11 Meter
Turbidity	3 measurements per wetland	Field Meter: LaMotte 2020we
Dissolved Organic Carbon (DOC) Nitrate+Nitrite (NO_3+NO_2) Total Kjeldahl Nitrogen (TKN) Total Phosphorus (TP) Total Alkalinity Chlorophyll-*a* Chloride (Cl) Dissolved orthophosphorus (DOP)*	1 per wetland	Lab analysis: DOC: EPA 415.3 NO_3+NO_2: Lachat 10-107-04-1-C TKN: EPA 600/4-79-020, method 351.2; Lachat 10-107-06-2-E TP: Lachat 10-115-01-1-F Total alkalinity: EPA 600/4-79-020, method 310.1; Standard Method 2320 B (APHA, 1995) 2320-B Chlorophyll-*a*, uncorrected: Standard Methods (1998) Method 10200-H MOD Chloride: DES 10.04f; Lachat QuikChem Method 10-511-00-1-A DOP: DES 10.19a; Lachat QuikChem Method 10-115-01-1-B
*In 2014 and 2015, water samples were analyzed for dissolved orthophosphorus (DOP).		

3.3.2 Macroinvertebrates

Following MEDEP's wetland biomonitoring protocols (Davies and Tsomides, 2014), the NHDES field team sampled macroinvertebrates at three locations within each wetland, where the water depth was one meter or less. At each of the three locations, a macroinvertebrate sample was collected using a standard D-frame dip net (600 µm) by performing a one-meter measured sweep (Appendix I). We used a 500 µm sieve bucket to rinse the sample before transfer into labeled one-liter wide-mouth Nalgene containers. The samples were preserved with 95% ethyl alcohol. Macroinvertebrate-related data (such as water depth, type of substrate, and dominant vegetation) were recorded on the NHDES Wetland Bioassessment Field Data Sheet (Appendix B).

The macroinvertebrate samples were provided to a contractor with a taxonomist having genus-level certification from the Society for Freshwater Science, for sorting, identification, and enumeration to genus level where possible.

Water, site and plant data for each wetland that were recorded on the Wetland Bioassessment Field Data Sheet were provided to MEDEP biomonitoring staff to establish the site in the MEDEP database. After the macroinvertebrate taxonomy data became available (by March following the sampling season), NHDES reviewed and provided the data to MEDEP for input to the LDM.

Macroinvertebrate samples collected in 2015 at five wetlands had excessive amounts of organic material, which resulted in the samples being subsampled before identification and enumeration (NHDES, 2018). In June 2016, MEDEP provided additional refresher training on macroinvertebrate collection with the dip net at a wetland sampled in 2015 that had areas of significant organic substrate (NAS1/NAS1B) to refine application of the protocol.

3.3.3 Vegetation Sampling

At each wetland, a shrub rake (Figure 2) was used to retrieve submergent aquatic vegetation using a method similar to the one-meter sweep used for sampling macroinvertebrates. We retrieved

submergent aquatic vegetation co-located with the three macroinvertebrate sampling locations. In addition, we noted emergent, floating, and woody vegetation when moving between the sampling locations and the wetland access location. We recorded vascular species to create a species list for each site.

Figure 2. Head of shrub rake used to retrieve aquatic vegetation.

In place of the EIA Recon Form to record vegetation data, NHDES developed and recorded plant taxa on the "Wetland Assessment - Plant Sampling Datasheet" (Appendix G). Plants were collected for subsequent pressing and preservation for later confirmation or immediate identification. All observed species were reflected on final species lists. Some identifications were confirmed or completed by New Hampshire Natural Heritage Bureau (NHB) botanists. As described in NHDES (2018), in the first year of sampling (2014), a modified hand cultivator was used to sample aquatic vegetation based on the method used for Minnesota's Rapid FQA protocol. After observing that few plants were retrieved, in the subsequent years of sampling, a shrub rake was used as described above.

3.3.3.1 *Aquatic Vegetation Sampling Protocol*

One aspect of the project was to share and test the aquatic vegetation sampling protocol with MEDEP. NHDES drafted a more detailed version of the aquatic vegetation sampling protocol before the 2017 season, which also increased the aquatic plant sampling locations to six. In June 2017, NHDES provided training to MEDEP on the draft aquatic vegetation sampling protocol and datasheet to facilitate its use with their existing sampling protocols (Appendix H). MEDEP subsequently has applied a modified version of the protocol, reducing the locations sampled to three and only sampling plants growing below the normal high water line (personal communication, Jeanne DiFranco, 2/5/19).

3.3.3.2 *Floristic Quality Assessment Method*

After plant identification was completed using the taxonomy of Haines et al. (2011), the vascular plant taxonomy (genus and species) was modified to be consistent with USDA PLANTS database (USDA, 2019) and entered into the universalfqa.org website using the New Hampshire 2013 coefficients of conservatism database (NEIWPCC, 2013) to generate several conservatism-based and FQA metrics; (Table 5; Freyman et al., 2016). We applied the New Hampshire C-values to the recorded taxa. For any taxa not assigned a State C-value (due to a lack of its documented presence in NH), we assigned an ecoregional C-value (Faber-Langendoen et al., 2018; NEIWPCC, 2018a, 2018b).

We calculated the mean C for each wetland and adjusted FQI. FQI accounts for the potential bias of assessment area size by weighting Mean C by species richness. Adjusted FQI eliminates the sensitivity of FQI to species richness and incorporates nonnative species.

Table 5. Floristic Quality metrics and descriptions.

Floristic quality metric	Formula	Description	Comments
Mean C (or Total mean C)	$\overline{C_t} = \sum_{i=0}^{t} C_i / N_t$	The average of C-values for all species in the sampled site/ wetland.	Based on presence/ absence; Independent of species richness.
Total FQI Floristic quality index (FQI)	$I_t = \overline{C_t}\sqrt{N_t}$	The total mean C multiplied by the square root of the total species richness.	May be affected by sampling area.
Adjusted FQI Adjusted floristic quality index	$I' = 100\left(\frac{\overline{C_n}}{10}\right)\left(\frac{\sqrt{N_n}}{\sqrt{N_t}}\right)$	The value obtained by multiplying 100 by the native mean C divided by 10 and multiplied by the square root of the native species richness divided by total species richness.	Reduces sensitivity to species richness present in the Total FQI.
Ref: Freyman et al., 2016; Bourdaghs et al., 2006; Miller and Wardrop, 2006			

3.3.4 Ecological Integrity Assessment

The Ecological Integrity Assessment (EIA) was one of two rapid assessments performed for each wetland (Faber-Langendoen and Nichols, 2014). The EIA provides a set of indicators of ecosystem structure, function, and composition with an emphasis on range of natural variation (Faber-Langendoen et al. 2016).

The EIA begins with a GIS-based Landscape Context (Level 1) analysis described below (Section 3.3.4.1).

Each assessment area (AA) consisted of the wetland complex based on the National Wetlands Inventory data layer, aerial imagery and field observations using distinct breakpoints (e.g., larger road-stream crossings).

The AAs encompassed the open water area and shoreline that were sampled and surveyed in the field, as well as contiguous forested or scrub-shrub communities not field surveyed. While the wetlands included both terrestrial wetland communities and aquatic communities, the main focus of the field survey was on the aquatic community within the AA.

Figure 3. Example of assessment area comprised of labeled National Wetland Inventory polygons. Assessment area in in red. Sample locations are shown (yellow circles for field meter measurements and macroinvertebrate sampling; green triangle for water grab sample). Upstream assessment area boundary (to the south) is a large road; downstream assessment area boundary (to the north) is a dam. Site: NAS1B.

The EIA vegetation component focuses on the vegetation structure, native plant species composition and invasive species present. The EIA hydrology component assesses the water source, hydroperiod, and connectivity. The EIA soil condition component assesses the extent and source of bare soil areas and to what extent they are caused by natural disturbance (Faber-Langendoen and Nichols, 2014).

Table 6. Ecological Integrity Assessment components and percentage contributions to score/rank.

EIA Section	**Percent contribution to site rank/score**
Hydrology	26.7
Vegetation	26.7
Landscape context (GIS component)	26.7
Soil	6.7
Size	13.3
Total	**100%**

As size itself is not a measure of condition, as many natural high quality wetlands can be small, differentiation in wetland size was not considered in the application of the EIA scoring. All wetlands

were given the same maximum score for size because the focus of this study was on ecological integrity or condition rather than conservation value (Faber-Langendoen et al., 2016).

3.3.4.1 *Landscape Context*

The GIS-based/Level 1 EIA landscape context analysis consists of three parts, 1) a Land Use Index, 2) the percent of wetland perimeter with a vegetated, natural 10-meter buffer, and 3) the average vegetated natural buffer width (to a maximum of 100 meters) (Figure 4). Current aerial imagery (2010-11 and 2015) was used to evaluate intactness of perimeter and evidence of human disturbance within buffers of 100 meters, 250 meters, and 500 meters beyond the AA boundary.

The EIA-Land Use Index (LUI) was calculated for each AA using a spatial analysis of the 2011 National Land Cover Database (NLCD) (Homer et al., 2015) based on a reclassification of the 16 categories of land use into four categories; developed, agriculture, cleared forest, and natural, which were assigned point values of 0, 4, 5, and 10, respectively (Faber-Langendoen and Nichols, 2014).

During review of the 2016 and 2017 sites with the 2011 NLCD imagery, we observed that for some sites, the land use classification within the buffers had areas (pixels) that didn't match the land uses on the imagery (e.g., a road was not identified as a disturbed area, a managed lawn was identified as cleared forest). We used a trial version of the ARIS Grid & Raster Editor for ArcMap software to manually revise pixel values in the NLCD raster to the appropriate classification(s) for nine sites. We edited those inappropriately classified areas that were closer to the assessment area (within the 100 m or 250 m buffer rings, in particular) and covered a large area (more than a few 30 m x 30 m pixels).

For the Land Use Index, we calculated zonal statistics with ArcGIS based upon the proportion of reclassified NLCD land cover pixel values within each buffer ring. Weighting was applied to each buffer ring based on proximity to the assessment area to generate a Land Use Index value from 0 to 10. (0.6 for the 0-100 m buffer, 0.25 for the >100-250 m buffer, and 0.15 for the >250 to 500 m buffer).

The second part of the EIA landscape context uses a 10-meter buffer line around the assessment area to determine the proportion of wetland perimeter that is considered undisturbed land (called the "percent of perimeter with buffer").

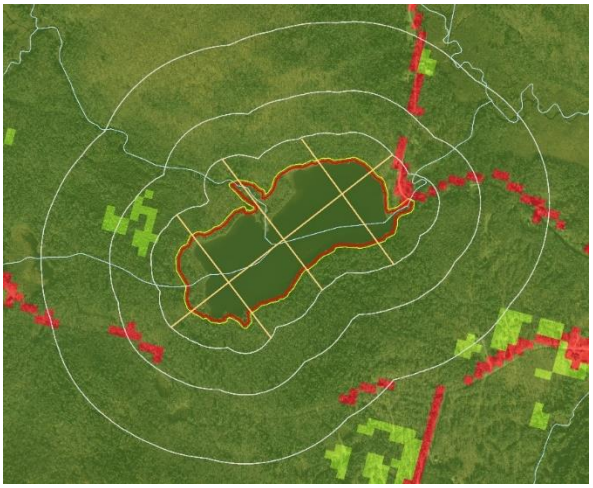

Figure 4. GIS-based Landscape Context for the EIA Buffer rings (100m, 250m, and 500m in white), wetland perimeter (10 m in yellow), and orange ladder-like spokes to measure average buffer width. Reclassified National Land Cover Dataset provides land use classification (here, cleared forest, light green; natural, darker green; and developed, red) (ELL1).

Average buffer distance, the third part of EIA landscape context, was calculated by placing eight radial spokes or ladder-like lines extending outward from the assessment area boundary for a distance of 100 meters (Figure 4). Along each relatively evenly distributed spoke, we measured the distance outward from the AA boundary until a disturbed area was reached, up to a maximum distance of 100 meters. The lengths of the undisturbed distances for the eight spokes/lines are summed and an "average buffer distance" is determined. Since many wetlands are somewhat linear – with water flowing through or alongside them – we typically placed one of the radials along the long axis of the wetland (parallel to any flow line), as many wetlands have disturbance at the inflow or outflow locations (and breakpoints for the assessment area boundary often are road crossings).

We used the *Rank Specifications for Wetland Systems* (Nichols, 2015c) to guide completion of the *Field Metrics* part of the *Pre-Field and Field Metrics* form. The EIA Stressor Checklist was used to inform completion of the *Field Metrics* part of the *Pre-Field and Field Metrics* form. It restricts the focus to those stressors located within the 100-meter area that have caused or are causing impacts.

3.3.4.2 *Overall EIA scores, ranks and associated definitions*

The NHB Excel/VBA-based worksheet with embedded formulas that assign numerical values to letter ranks was used to calculate the rank categories.

The EIA score/rank was determined by averaging a numeric conversion factor for the ranks (assigned letter grade) entered for each of the five major categories (Landscape Context, Size, Vegetation, Hydrology and Soils). For size, we entered the maximum value for all wetlands assessed, to remove the differentiation of size from consideration. There are four ranks/ condition categories, A, B, C, and D, each with a narrative description (Table 7).

Table 7. EIA Ranks, condition category and narrative description (Faber-Langendoen and Nichols, 2014).

Rank	Condition Category	Description
A	Intact, excellent	Occurrence is believed to be, across the range of a type, among the highest quality examples with respect to key ecological attributes functioning within the bounds of natural disturbance regimes. Characteristics include: the landscape context contains natural habitats that are essentially unfragmented (reflective of intact ecological processes) and with little to no stressors; the size is very large or much larger than the minimum dynamic area; vegetation structure and composition, soil status, and hydrological function are well within natural ranges of variation, exotics (nonnatives) are essentially absent or have negligible negative impact; and, a comprehensive set of key plant and animal indicators are present.
B	Minimally disturbed, good	Occurrence is not among the highest quality examples**,** but nevertheless exhibits favorable characteristics with respect to key ecological attributes functioning within the bounds of natural disturbance regimes. Characteristics include: the landscape context contains largely natural habitats that are minimally fragmented with few stressors; the size is large or above the minimum dynamic area, the vegetation structure and composition, soils, and hydrology are functioning within natural ranges of variation; invasives and exotics (nonnatives) are present in only minor amounts, or have or minor negative impact; and many key plant and animal indicators are present.
C	Moderately disturbed, fair	Occurrence has a number of unfavorable characteristics with respect to the key ecological attributes, natural disturbance regimes. Characteristics include: the landscape context contains natural habitat that is moderately fragmented, with several stressors; the size is small or below, but near the minimum dynamic area; the vegetation structure and composition, soils, and hydrology are altered somewhat

		outside their natural range of variation; invasives and exotics (nonnatives) may be a sizeable minority of the species abundance, or have moderately negative impacts; and many key plant and animal indicators are absent. Some management is needed to maintain or restore these key ecological attributes.
D	Severely disturbed, poor	Occurrence has severely altered characteristics (but still meets minimum criteria for the type), with respect to the key ecological attributes. Characteristics include: the landscape context contains little natural habitat and is very fragmented; size is very small or well below the minimum dynamic area; the vegetation structure and composition, soils, and hydrology are severely altered well beyond their natural range of variation; invasives or exotics (nonnatives) exert a strong negative impact, and most, if not all, key plant and animal indicators are absent. There may be little long-term conservation value without restoration, and such restoration may be difficult or uncertain.

3.3.5 Wetland Human Disturbance Assessment

We conducted a Wetland Human Disturbance Assessment (WHDA) for each wetland (MEDEP, 2013). As a rapid assessment, the WHDA has a desktop and field component to develop a Wetland Human Disturbance Score.

For each wetland, we reviewed current aerial imagery (typically 2010-11 fall leaf-off, 2015 spring leaf-off or 2014 National Agricultural Imagery Program [NAIP], leaf-on) to identify evidence of disturbances not visible from within the wetland, within a 100-foot buffer distance, and within the watershed of the wetland. Each wetland's watershed was determined using the USGS Stream Stats for New Hampshire (USGS, 2017), with manual modifications made in ArcGIS to the downloaded polygons as needed to represent existing conditions.

Land use also was noted during site reconnaissance (such as an active gravel mining operation in watershed). Upon completion of field sampling (water, macroinvertebrate, and vegetation), the field portion of the WHDA was conducted. Observations of stressors were documented in the following categories: Hydrologic and vegetative modifications to the wetland, evidence of chemical pollutants in the wetland and watershed, and watershed characterization and potential nonpoint source pollution impacts based on evidence of erosion and sedimentation, urban runoff, or nutrient enrichment in the wetland's watershed (Table 8).

Table 8. Categories assessed by Wetland Human Disturbance Assessment**.**

WHDA Section	**Maximum Point Value**
Hydrologic Modifications to Wetland	25 points
Vegetative Modifications to Wetland	30 points
Evidence of Chemical Pollutants (wetland and upstream)	25 points
Watershed Characterization and Potential NPS Pollution Impacts (land use and observed evidence of erosion)	40 points
Total point value possible	**120 points**

An observer can assign a maximum of 120 points, but the most degraded sites usually do not score much above 50 points (J. DiFranco, personal communication, undated). Depending on the point values assigned within each section, the proportional contribution of each section to a total point value can vary.

3.3.6 Decontamination

Standard Operating Protocols (SOPs) were developed and followed for decontamination of biomonitoring sampling equipment (including waders and canoe) to prevent the introduction or spread of disease pathogens and invasive algal, plant, or animal species (NHDES, 2016b).

3.4 Quality Assurance

A Quality Assurance Project Plan (QAPP) was prepared, approved by the USEPA on June 7, 2016 (NHDES, 2016b) and implemented. The QAPP specified field meter calibration and accuracy checks, quality assurance (QA) samples for 10% of the site water samples, multiple field samples (three per site) for macroinvertebrates, and macroinvertebrate processing and taxonomy conducted by a contractor with Society for Freshwater Science certifications. Additional reviews of plant specimen identifications were provided by NHB botanists Bill Nichols and Christopher Kane. A quality assurance review of 10% of the macroinvertebrate samples was conducted.

3.5 Data Analysis

We compared measured variables and metrics (physicochemical, vegetation, rapid assessments, and floristic data) across treatments (MEDEP's three attainment classes and indeterminate status). When comparing treatments, we used values for site medians for analysis of the field meter measurements. For the WHDA estimated total percent of buffer altered using cover classes, we used the midpoint to perform analyses (e.g., 11-25%, used a value of 18).

We applied a one-way analysis of variance (ANOVA) to determine statistically significant differences and measured parameters for significance at $p<0.05$. To test significance between one or more treatment pairs, we applied Tukey's Multiple Comparison of Means (or Bonferroni) test to determine significance between pairs. We used Levene's test to assess the homogeneity of variances. A significance level of $p < 0.05$ was used for Spearman's correlation analysis. Similarly, Tukey adjustments were applied to pairwise analysis of variance (ANOVA) tests. A significance level of $p < 0.05$ was used for one-way ANOVA analyses. Data that violated ANOVA assumptions were analyzed with Kruskal-Wallace one-way analysis of variance on ranks using a significance level of $p < 0.05$.

Nonparametric correlation analysis used Spearman rank. Correlation coefficient values range from +1 to -1, with zero indicating no correlation. We calculated Spearman rank correlation coefficients between paired variables for the following water quality parameters and land use and floristic metrics.

Site:
AA size (acres)
EIA
EIA-Average/mean buffer width
EIA-Land Use Index
Stream order where sampled
Watershed area (acres)
WHDA
WHDA percent altered buffer (midpoints)

Water:
Alkalinity (mg/L)
Carbon, dissolved organic (mg/L)
Chloride (mg/L)
Chlorophyll-a (ug/L)
Conductivity (median) (uS/cm)
Dissolved oxygen saturation, percent (median)
Dissolved oxygen (median) (mg/L)
Nitrate+Nitrite (mg/L)
Nitrogen, TKN (mg/)
pH (median)
Phosphorus, total (mg/L)
Phosphorus, ortho (dissolved) (mg/L)
Specific Conductance (median) (mg/L)
Temperature (median) degrees C
Turbidity (median) NTU

Vegetation:
FQI, adjusted
FQI, native
FQI, total
Mean C, native
Mean C, total
Percent species with C value = 0
Percent species with C value = 1-3
Percent species with C value = 4-6
Percent species with C value = 7-10
Percent submergent species of total species
Percent emergent species of total species
Percent floating leaved-species of total species
Percent woody species of total species
Percent native species of total species
Percent nonnative species of total species
Percent wetlands in watershed

Macroinvertebrates
Generic richness
Mean abundance

Statistical analyses were conducted using R v.3.4.3. Tables summarizing the results of the statistical analyses are provided in Appendices J (Subset of Statistical Analyses for Comparison of Parameters to Attainment Class) and K and L (Spearman's Rank Correlations).

To identify patterns and characterize differences in wetlands based on water quality parameters, we conducted nonmetric multi-dimensional scaling with PC-Ord v.6.08 (MjM Software, 2006).

4 Results

For the 42 different wetlands sampled and surveyed from 2014 to 2017, the LDM assigned the attainment classes of A, 6; B, 14; and C, 12; and 10 wetlands were assigned Indeterminate status because the threshold for total mean abundance or generic richness was not met (Figure 5). For 18 of the 20 wetlands sampled in 2016 and 2017, the 12-variable LDM assigned the attainment classes of A, 2; B, 9; and C, 7. Two wetlands were assigned "Indeterminate" status due to low total abundance (ELL1) or low generic richness (ALL1). The Wetland Aquatic Life Classification Attainment Reports for all 42 wetlands sampled are provided in Appendix M1 - M42. The term "attainment class" represents the *predicted* attainment class in reporting the results. Final site-specific data are provided as Appendix N.

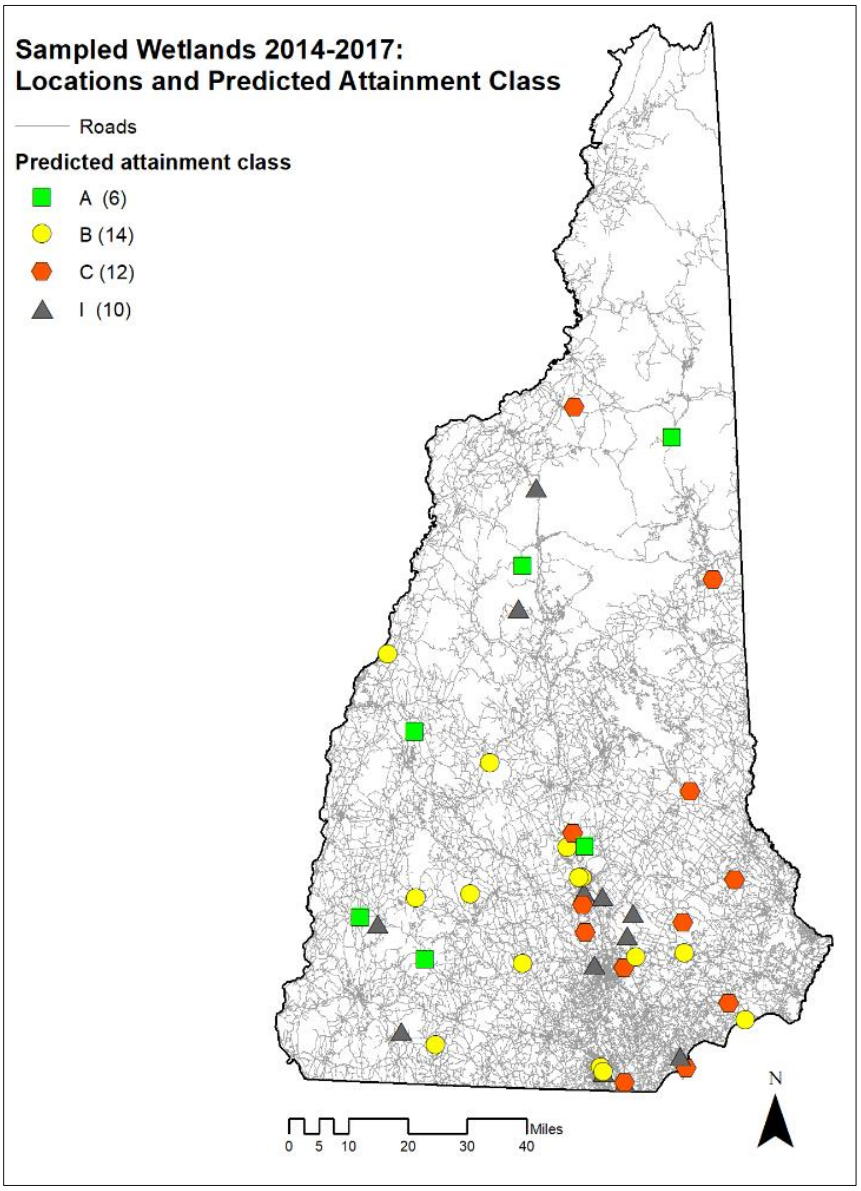

Figure 5. Locations of sampled wetlands showing attainment class or indeterminate status.

4.1 Water

The ordination of the physicochemical values represents increased levels of phosphorus, chlorophyll, and chloride concentrations and specific conductance values in anthropogenically influenced wetlands in the right section of the graph (Figure 6).

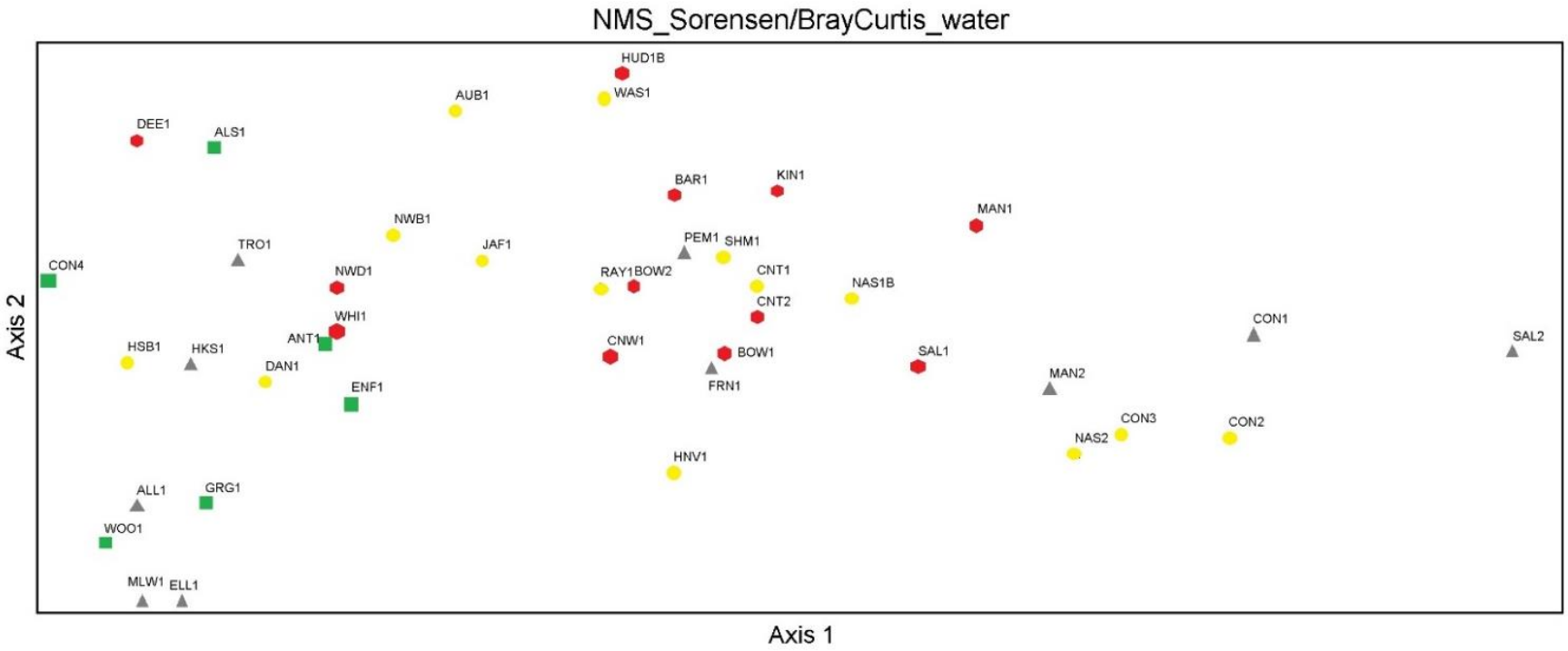

Figure 6. Ordination of wetlands based on water quality parameters. Colored markers represent attainment class assigned or indeterminate status: Attainment class A, green square; B, yellow circle; C, red hexagon; I (indeterminate status), grey triangle. Wetlands whose water parameter values are more similar to one another are closer together. The axes are arbitrary as is the orientation of the plot. Stress=4.69.

The water parameter results by attainment class provided in Table 9 illustrate the wide range in some parameter values, such as chloride, specific conductance and dissolved oxygen, within attainment classes and indeterminate status.

Table 9. Physicochemical water parameters measured: mean/median and (range of values) for 42 wetlands by attainment class or indeterminate status.

Attainment class **Wetlands in group**	**A** **(6)**	**B** **(14)**	**C** **(12)**	**I** **(10)**
Water parameter				
Field meter (3/site)				
pH	5.41/ 5.41 (4.22 - 6.6)	6.88/ 6.92 (5.11 - 9.81)	6.68/ 6.68 (5.07 - 6.37)	6.14/ 6.18 (4.32 - 6.16)
Dissolved oxygen (DO) (mg/L)	4.92/ 5.94 (0.38 - 8.87)	5.30/ 4.67 (0.87 - 15.67)	4.01/2.76 (0.23- 7.9)	4.90/ 4.66 (0.04 - 10.51)
Temperature (˚C)	21.9/ 22.0 (16.3 - 25.5)	23.5/ 24.2 (17.2 - 27.4)	23.2/ 23 (18.2 - 29.9)	23.3/ 24 (17.6 - 28.8)
Specific conductance (µS/cm)	37.0/ 34.4 (12.2 - 71.6)	270/ 163 (23.6 - 610)	188/ 175 (36.5 - 409.2)	345/ 120 (16.1 - 1569)
Turbidity (NTU)	0.853/ 0.9 (0.35 - 2.42)	1.38/ 1.23 (0.36 - 3.03)	1.87/ 0.93 (0.58- 25.10)	2.08/ 1.03 (0.34 - 23.60)
Grab sample (1/site)				
Alkalinity (gran acid neutralizing capacity) (mg/L)	5.72/ 4.25 (2.2 - 11.7)	23.7/ 16.7 (4.6 - 62.4)	18/ 12 (2.6 - 76.7)	9.95/ 5.95 (<1 - 31.2)
Dissolved organic carbon (mg/L)	9.13 /9.9 (3.8 - 11)	6.26/ 6.15 (2.5 - 10)	9.83/ 10.2 (5.4 - 17)	6.66/ 10.2 (1.6 - 12)
Chloride (mg/L)	7.39/ 7.15 (<3 - 13)	59.7/ 26.9 (<3- 130)	40.9/ 41.6 (<3 - 88)	96.0/ 18 (<3 - 461)
Nitrate+nitrite (mg/L)	NA/ <0.05 (<0.05)	0.155/ 0.155 (<0.05 - 0.11)	0.095/ 0.095 (<0.05- 0.95)	0.51/ 0.51 (<0.05 - 0.51)
Total Kjeldahl Nitrogen (mg/L)	0.59/ 0.6 (<0.25 - 0.84)	0.586/ 0.585 (0.33 - 0.89)	1.64/ 0.67 (0.36 - 11.0)	0.884/ 0.53 (< 0.25 - 3.2)
Phosphorus (total) (mg/L)	0.0202/ 0.0193 (0.00934 -0.036)	0.0204/ 0.0190 (0.0142 - 0.036)	0.0529/ 0.0232 (0.0117 - 0.196)	0.0511/ 0.0215 (0.009 - 0.289)
Phosphorus, ortho (dissolved)[1] (DOP) (mg/L)	NA/<0.01 (<0.01)	0.14/ 0.14 (<0.01 - 0.14)	0.024/0.024 (<0.01 - 0.014)	0.016/ 0.016 (<0.01 - 0.017)
Chlorophyll-a (µg/L)	3.91/ 2.89 (1.46 - 8.77)	3.30/ 2.85 (< 0.20- 8.91)	8.46/ 4.12 (2.51 - 29.9)	31.2/ 3.36 (1.02 - 219.77)

[1] Water was sampled and analyzed for dissolved orthophosphorus only in 2014 and 2015.

Statistically significant relationships were identified for alkalinity between attainment classes A and B (p=0.02) and for both specific conductance (p=0.009) and chloride (p=0.0083) between attainment classes A and C (Figure 7).

Total phosphorus was elevated in five wetlands above the lake nutrient threshold for eutrophic status (28 ug/L), including SAL2 (289 ug/L), MAN1 (196 ug/), HUD1B (148 ug/L), BAR1 (91.1 ug/) and CON1 (45 ug/L) (NHDES, 2020). Positive correlations were identified between phosphorus and chlorophyll (r=0.69; p= 1.96E-06) and to a lesser degree between phosphorus and TKN (r= 0.55; p=0.00026) (Table 10). Four of the five wetlands with elevated phosphorus levels had chlorophyll levels that exceeded the threshold level for lakes considered eutrophic, as well as nuisance levels under New Hampshire's Volunteer River Assessment Program (above 15 ug/L), SAL2 (219.8 ug/L), CON1 (33.5 ug/L, HUD1B (29.9 ug/L), MAN1 (15.3 ug/L)

(NHDES, 2011b;(Figure 8). Of the five wetlands with elevated phosphorus, three were assigned an attainment class of C and two were assigned an indeterminate status.

Four of the 42 wetlands had detectable levels of nitrate+nitrite (Table 9). Two wetlands with a predicted attainment class of B (NAS1B, RAY1), one with a predicted attainment class of C (MAN1), and the fourth wetland with detectable levels of NO_3+NO_2 (FRN1) was assigned an indeterminate status.

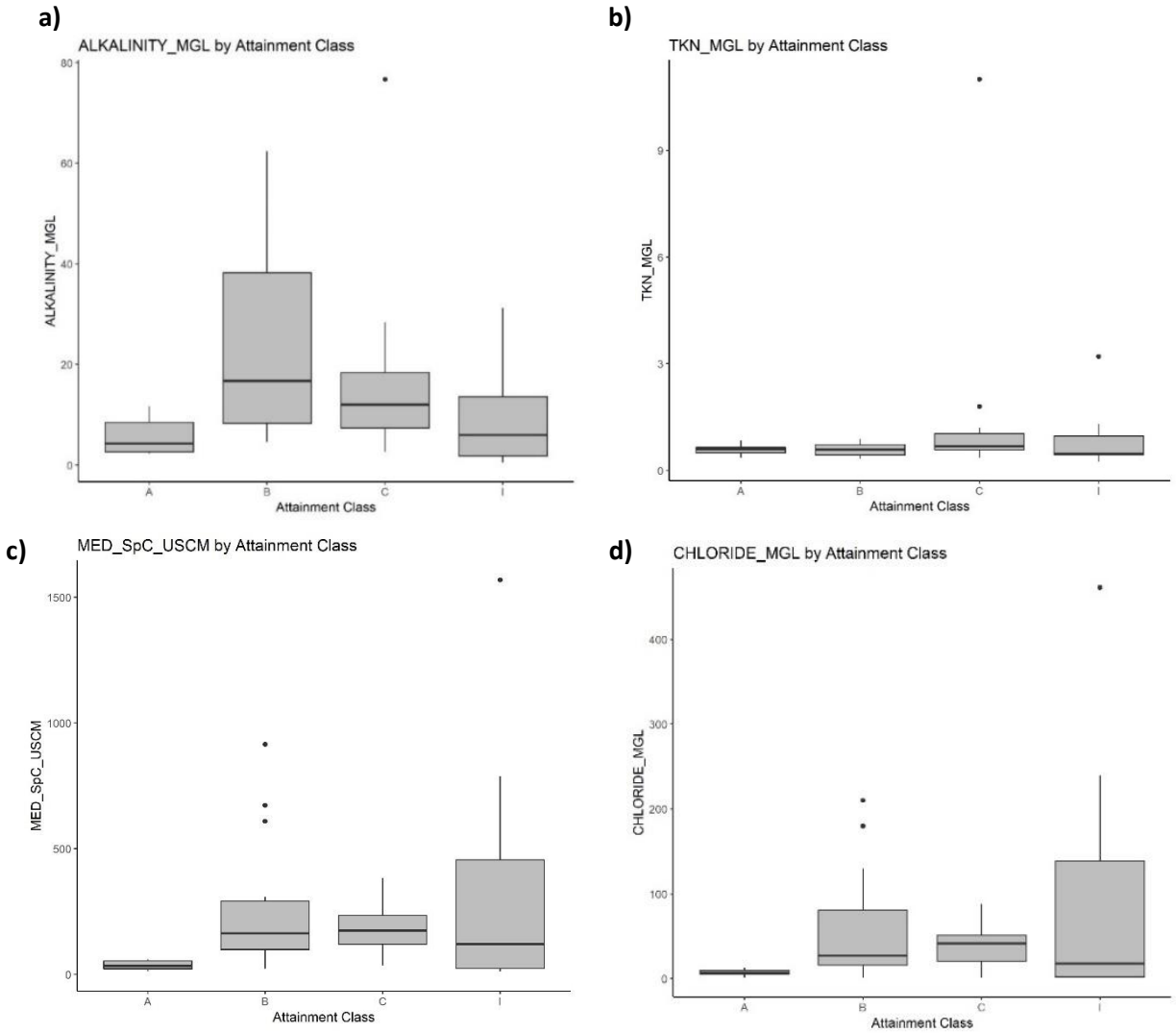

Figure 7. Box and whisker plots for grab and field meter water quality parameters by attainment class and indeterminate status. a) Statistically significant relationships were identified for alkalinity between attainment classes A and B, and c) and d) for both specific conductance and chloride between attainment classes A and C. Boxes show the median and interquartile range (IQR); whiskers show the largest value that is no farther than 1.5 X IQR. Points beyond the whiskers (outliers) represent values farther than 1.5 x IQR.

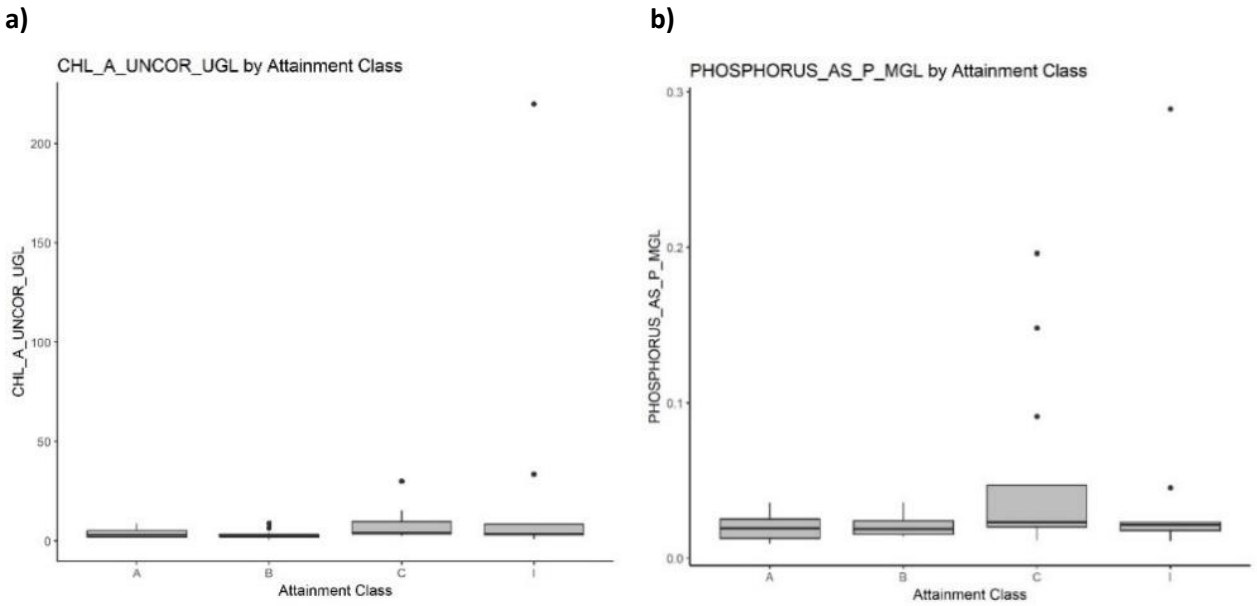

Figure 8. Box and whisker plots for water quality parameters by attainment class and indeterminate status for a) chlorophyll-a, and b) phosphorus. Boxes show the median and interquartile range; whiskers show the largest value that is no farther than 1.5 X interquartile range (IQR). Points beyond the whiskers (attainment classes B, C and indeterminate status) represent values farther than 1.5 x IQR.

We identified strong negative correlations between water quality parameters and the EIA score (alkalinity r= -0.69, chloride r= -0.83, and specific conductance, r= -0.87). There were also strong negative correlations between water quality parameters and the EIA's GIS-based metrics, Land Use Index (alkalinity r= -0.65, chloride r= -0.78, and specific conductance, r= -0.79) and Average Buffer Width (alkalinity r= -0.52, chloride r= -0.68, and specific conductance, r= -0.7) (Table 10; Figure 9). The increase in levels of these water quality parameters with increasing human disturbance was reflected in correlations with the WHDA score as well (where values increase with decreasing condition).

A regression of the Land Use Index values against chloride concentrations shows a relationship that is not quite linear. With increased chloride concentrations, there is a decrease in the Land Use Index values, representing increased human disturbance (Figure 9).

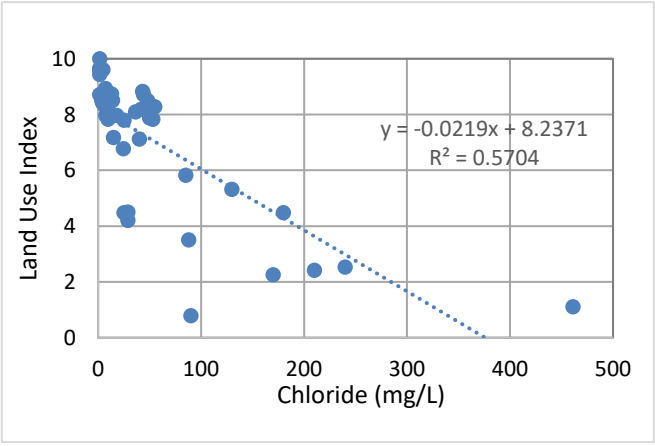

Figure 9. Relationship between EIA-Land Use Index and chloride concentrations.

Table 10. Spearman's rank correlation coefficients for various land use and floristic metrics and water analyses. The Spearman correlation coefficient (rho) is provided. All values shown represent correlations with a p value ≤ 0.05. The red cells represent negative correlations and the blue cells represent positive correlations; The darker the cell, the stronger the correlation. The grey cells had Spearman rho values with p value > 0.05. A table of all Spearman's rank correlation values and associated p values is provided in Appendices K and L.

	EIA Land Use Index	EIA Buffer width, Avg (m)	EIA (over-all)	WHDA % altera-tions to 100 ft buffer	WHD A (over-all)	Mean C	Non-native Spp (%)	Alkalinity, total (mg/L)	Carbon, dissolved organic (mg/L)	Chloride (mg/L)	Chloro-phyll-a (ug/L)	Nitrogen (TKN) (mg/L)	Phospho-rus (mg/L)	pH, median	Specific conduct-ance, median (uS/cm)
Alkalinity, total (mg/L)	-0.65	-0.52	-0.69	0.4	0.63	-0.5	0.56		-0.33	-0.64			0.31	-0.69	0.73
Carbon, dissolved organic (mg/L)	0.34		0.4			0.32		-0.33						-0.33	
Chloride (mg/L)	-0.78	-0.68	-0.83	0.52	0.77	-0.52	0.72	0.64			0.42		0.45	0.61	0.97
Chlorophyll-a (ug/L)										0.42		0.56	0.69		0.37
Nitrogen (TKN) (mg/L)											0.56		0.55		
Phosphorus (mg/L)	-0.33		-0.32		0.33		0.34	0.31		0.45	0.69	0.55			0.42
pH, median	-0.54	-0.56	-0.72	0.48	0.69	-0.35	0.51	0.69	-0.33	0.61					0.68
Specific conductance, median (uS/cm)	-0.79	-0.7	-0.87	0.55	0.81	-0.49	0.71	0.73		0.97	0.37		0.42	0.68	

4.2 Macroinvertebrates

More than 9,400 macroinvertebrates were collected at the 42 wetlands. The wide range in statistics for total abundance and generic richness and threshold requirements for the LDM, including the minimum values that were below the model thresholds are provided (Table 11).

Table 11. Macroinvertebrate richness and total mean abundance mean/median and (range of values) by attainment class.

Attainment class **Wetlands (no.)** **LDM component (minimum thresholds)**	**A** **(6)**	**B** **(14)**	**C** **(12)**	**I** **(10)**
Richness (15)	26.67/26 (22-35)	31.4/29.5 (25-46)	23.5/22 (16-33)	14.4/12.5 (9-19)
Total mean abundance (50)	143.2/136 (52-248)	374.9/345.5 (105-667)	218/181.5 (63-470)	67.4/32.5 (20-305)

Macroinvertebrates can be classified into functional feeding groups based on their primary source of food, which reflects how they function in their ecosystem (Merritt et. al., 2002). MEDEP recognizes six functional feeding groups for the LDM:

- Collector-filterers - Strain particles out of flowing water with brushes or nets.
- Collector-gatherers - Opportunistic omnivores that feed on whatever is easiest to find, using a variety of feeding methods.
- Shredders - Consumers of coarse organic matter such as leaves and detritus to obtain nourishment from associated fungi, bacteria and other organic material; “Shredder taxa relative abundance” is one LDM variable.
- Predators - Carnivores that consume other invertebrates.
- Piercers - Pierce tissues of plants and other invertebrates.
- Scrapers - Eat algae, bacteria and fungus (biofilm) on the surface of rocks, twigs and leaf debris (Merritt et al., 2002; MEDEP, 2014-2017).

The proportions of the various functional feeding groups were relatively consistent across attainment classes, with shredders showing an increased proportion in attainment class B (Figure 10). The collector-gatherers represented the largest group in all attainment classes.

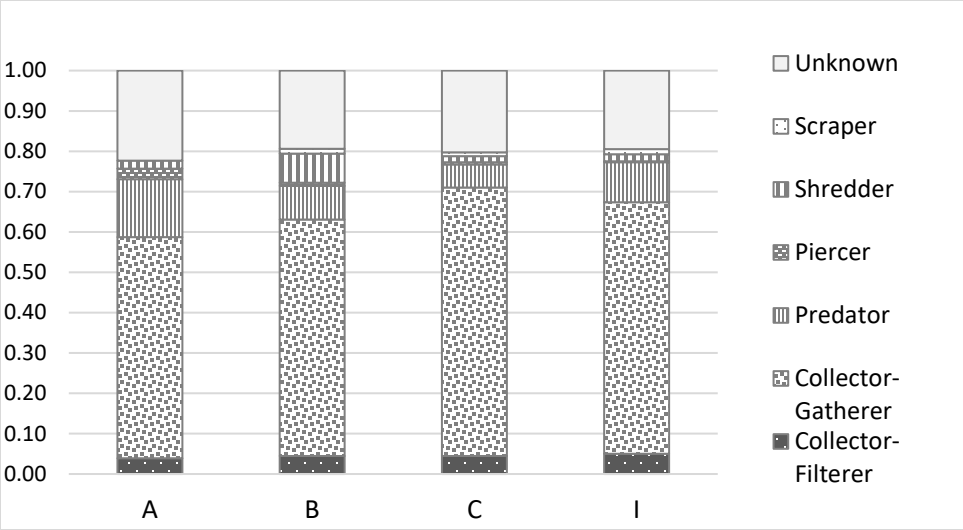

Figure 10. Functional feeding group composition (median relative abundance) by predicted attainment class and indeterminate status.

4.3 Vegetation

More than 270 vascular plant taxa were observed at the wetlands sampled (plants retrieved and surveyed), and more than 1,420 vascular plant taxa-wetland observations were made. The plant taxa recorded at each site averaged 32 species.

Two state-listed (S1) endangered species, *Lemna trisulca* (at one site) and *Potamogeton zosteriformis* (at two sites) were observed in the southern part of the State, and one state-threatened species (S2), *Bidens beckii* was observed in two wetlands in the southcentral part of the state. We noted the first documented occurrence of *Wolffia brasiliensis* in New Hampshire in 2016 (CON2), and in two additional wetlands in 2017 (SHM1, HUD1B).

Twelve species were observed at more than 50 percent of the sites. The most common species was red maple, *Acer rubrum* (Table 12).

Table 12. Most common plant species observed, percentage of wetlands where present, habit, wetland indicator, and NH C-values.

Species (Haines)	Common Name	Percent of wetlands	Habit	Wetland Indicator[1]	NH C-value[2]
Acer rubrum	Red maple	80	Woody	FAC	3
Nymphaea odorata	White / fragrant water lily	66	Floating-leaved rooted	OBL	4
Sparganium americanum	American bur-reed	66	Emergent	OBL	3
Utricularia vulgaris	Common bladderwort	64	Submergent	OBL	6
Lysimachia terrestris	Swamp candles	61	Emergent	OBL	4
Nuphar variegata	Yellow pond lily	61	Floating-leaved rooted	OBL	3
Pontederia cordata	Pickerelweed	61	Emergent	OBL	3
Brasenia schreberi	Water shield	57	Floating-leaved rooted	OBL	4

Species (Haines)	Common Name	Percent of wetlands	Habit	Wetland Indicator[1]	NH C-value[2]
Dulichium arundinaceum	Three-way sedge	55	Emergent	OBL	5
Alnus incana ssp. rugosa	Speckled alder	52	Woody	FACW	3
Calamagrostis canadensis	Blue joint grass	52	Emergent	OBL	2
Spiraea alba	Meadowsweet	52	Woody	FACW	3
Key: [1]OBL= obligate wetland plant, almost always is a hydrophyte, rarely in uplands; FACW= facultative wetland plant, usually is a hydrophyte but occasionally found in uplands; FAC = facultative plant, commonly occurs as either a hydrophyte or nonhydrophyte (Lichvar et al., 2016; US Army Corps of Engineers, 2016); [2]NEIWPCC (2013).					

Sixty-four percent (27/42) of the wetlands had at least one nonnative/invasive plant species present. The three most common invasive plant species were purple loosestrife (*Lythrum salicaria*), glossy buckthorn (*Frangula alnus*) and variable milfoil (*Myriophyllum heterophyllum*) (Table 13).

Table 13. Most common invasive plant species, percentage of wetlands where observed, and wetland indicator status.

Invasive Species (Haines, 2011)	Common Name	Percent of sites	Habit	Wetland Indicator status[1]
Lythrum salicaria	Purple loosestrife	43	Emergent	OBL
Frangula alnus	Glossy buckthorn	31	Woody	FAC
Myriophyllum heterophyllum	Variable milfoil	14	Submergent	OBL
Key: [1]OBL= obligate wetland plant, almost always is a hydrophyte, rarely in uplands; FAC = facultative plant, commonly occurs as either a hydrophyte or nonhydrophyte (Lichvar et al., 2016; US Army Corps of Engineers, 2016)				

Floristic Quality Assessment

The median "mean C" (also referred to as total mean C) and average mean C of all sampled wetlands were both 4.1; the median and mean adjusted FQI were 41 and 41.8. Wetlands assigned attainment class A had a greater percentage of plant species with C-values in the 7-10 "sensitive" range and a greater proportion of wetlands lacking nonnative species than wetlands in the other attainment classes (Table 14).

Table 14. FQA conservatism and floristic metric values - mean/median and (range of values) by attainment class.

Attainment class Number of wetlands in group	A (6)	B (14)	C (12)	I (10)
Floristic indicator				
Mean C	4.47/4.35 (3.4-5.9)	3.9/3.95 (3.5- 4.4)	4.2/4.1 (3.5- 5)	4.05/4.1 (3.1-4.8)
Adjusted FQI	45.1/44.2 (35.4-59)	40.5/40.4 (34.1- 44)	41.9/41.6 (36.4-50.3)	41.4/41.2 (32.6-48.5)
Percent nonnative species (C=0)	1.88/ 0 (0-8.5)	5.71/ 5.4 (0- 16.7)	2.78/ 2.75 (0- 8)	4.55/ 2.75 (0-19)
Percent species C=7-10	14.1/12.5 (1.7-31.3)	3.5/1.65 (0-10.7)	6.42/5.95 (0- 23.1)	7.11/8.1 (0-16.7)

A wetland-specific illustration of the C-value composition across attainment classes shows the variation, especially in nonnative species. Grouped C-values represent nonnative (C=0), wide range in tolerance

(C=1-3); moderate range in tolerance (C=4-6), and sensitive species/narrow range of tolerance/ high fidelity to specific habitat (C=7-10) (Figure 11).

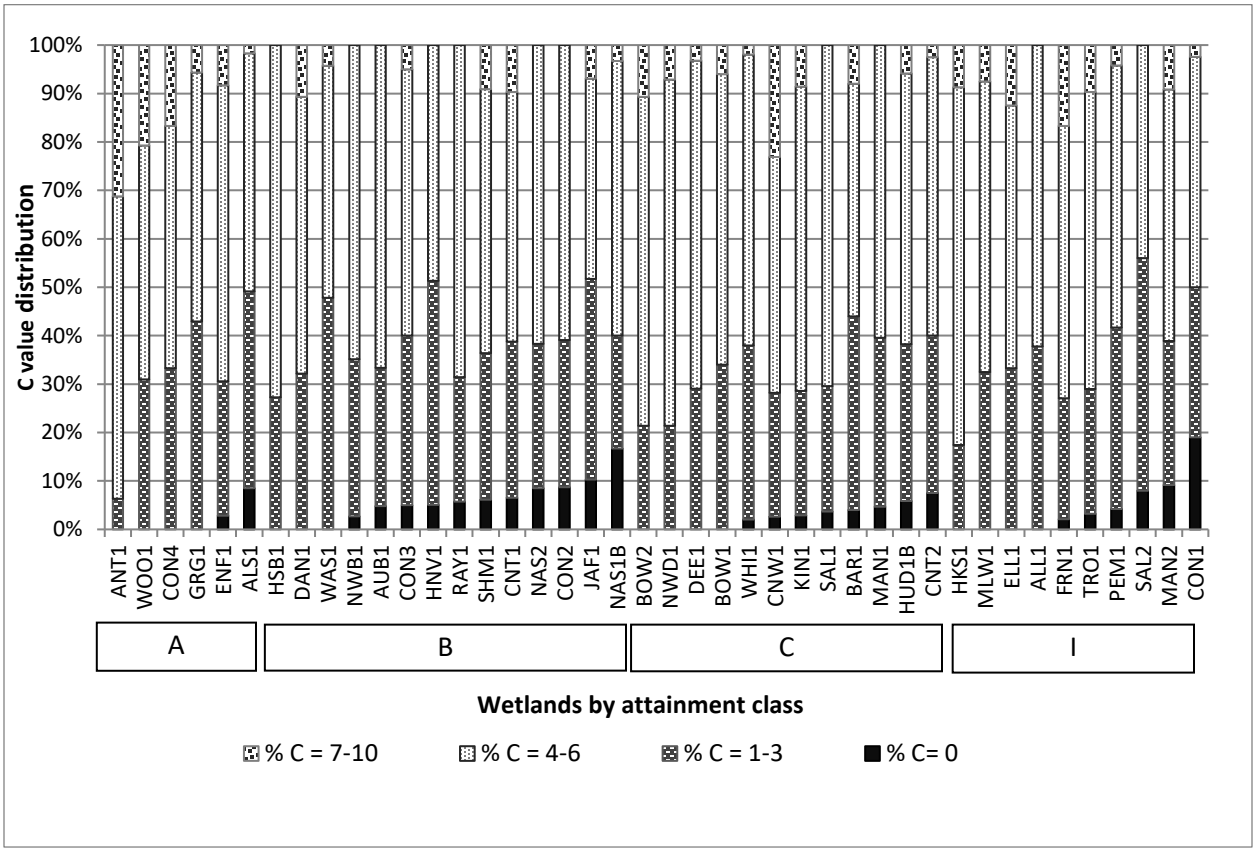

Figure 11. Distribution of taxa C-values by wetland and by attainment class. For each wetland, the plants are grouped into a maximum of four categories by C-values based on percent vegetation composition within each group.

We found no statistically significant relationships or correlations between a wetland's mean C-value and attainment class (Figure 12). However, the analysis of grouped C-values by predicted attainment class yielded one statistically significant result; percent species with C-values =7-10, the "sensitive"/narrow range of tolerance species (Table 14; Figure 12). The median percent species with C-values =7-10 for all wetlands was 5.8% (average 6.7%).

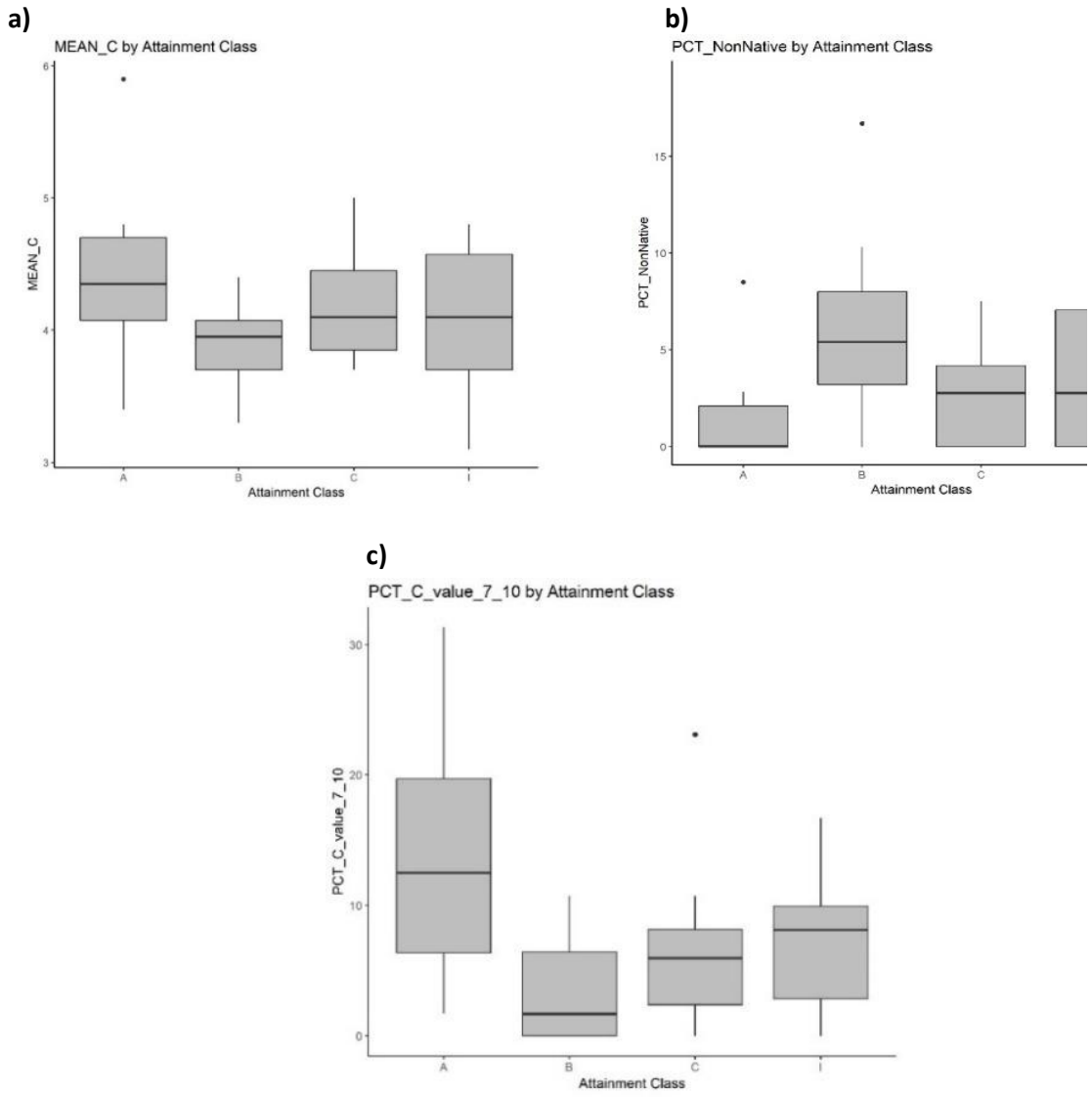

Figure 12. Whisker and box plots for floristic metrics: a) mean C, b) percent nonnative, and c) percent species with C-values = 7-10 (representing sensitive species). Percent species with C-values =7-10 was statistically significant between attainment classes A to B. Boxes show the median and interquartile range; whiskers show the largest value that is no farther than 1.5 X interquartile range (IQR). Points beyond the whiskers (attainment classes A, B and C) represent values farther than 1.5 x IQR.

For floristic metrics, the strongest correlations were between the percent of nonnative species (C=0) and the EIA-Land Use Index (r= -0.67, p<0.0001), and between the percent of nonnative species and the EIA score (r= -0.78, p<0.0001). The percent of nonnative species was positively correlated with the WHDA score (r= 0.67, p<0.0001) and negatively correlated with EIA-average buffer width (r= -0.72, p=9.10E-08) (Table 10; Appendices K and L).

Mean C showed a moderate correlation with both rapid assessments, EIA (r=0.54, p=0.0002) and WHDA (r=-0.46, p=0.0023). There was a moderate correlation between Adjusted FQI and EIA score (r=0.41, p=0.007).

4.4 Rapid Assessments

There were no statistically significant differences identified between either rapid assessment (EIA or WHDA) and attainment class (Figure 13). However, there was a strong correlation between the two rapid assessments, the WHDA and EIA (r= -0.89, p= 2.22E-15).

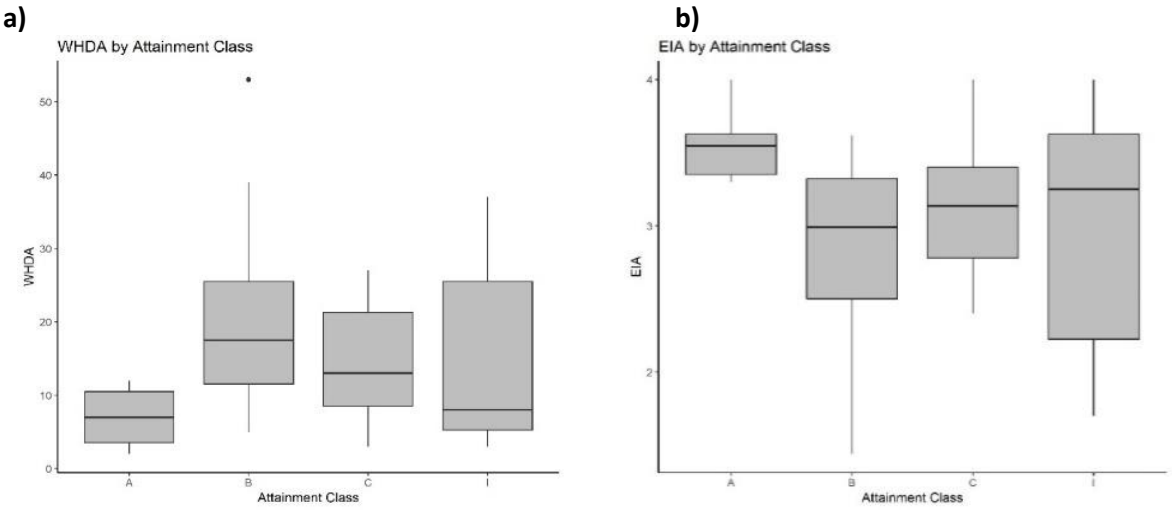

Figure 13. Box and whisker plots of rapid assessment results; a) WHDA, and b) EIA by predicted attainment class or indeterminate status. Boxes show the median and interquartile range; whiskers show the largest value that is no farther than 1.5 X interquartile range (IQR). The point beyond the whisker for a) WHDA (attainment class B) represents a value farther than 1.5 x IQR.

The WHDA scores for the wetlands ranged from 2 to 53, with a median of 12 and an average of 15.7.

The EIA scores/ranks for the wetlands ranged from A to C-. Median rank was a B, 3.23; mean 3.06. The EIA Landscape Context components include the LUI, perimeter with intact 10 m buffer, and Average Buffer Width. For 13 sites where we revised the NLCD raster pixel values, there was no or very small difference in the LUI when the pixels were revised. The largest percentage of change was -8%, for a site that already had significant disturbance and a low Land Use Index value (just above 4).

The LUI metric values reflect the wide range of human disturbance represented by the wetlands sampled. The LUI ranged from a maximum of 10 (undeveloped area; WOO1) to a minimum of 0.79 (NAS1B), with a median of 8.0 and a mean of 7.02.

Buffers

The two rapid assessments evaluate buffers differently in terms of “width” and condition. The average (intact) buffer width up to a maximum of 100 meters for the EIA, and percent altered of the 100-foot buffer in the WHDA. The average buffer widths for the wetlands ranged in size from zero meters to the maximum of 100 meters (393.7 feet), and had a median size of 69 meters (227 feet).

There was a moderate positive correlation (r=0.5960; p= 3.12E-05) between EIA average buffer width and mean C.

There was no statistically significant difference between EIA average buffer width by attainment class. However, the smallest average buffer width (greater than 40 meters) for wetlands assigned attainment class A was larger than the smallest buffers for the other attainment classes. The wetlands that were

assigned indeterminate status represent the full range of buffer widths, from 20.8 m (MAN2) to 100 m (ELL1) (Figure 14).

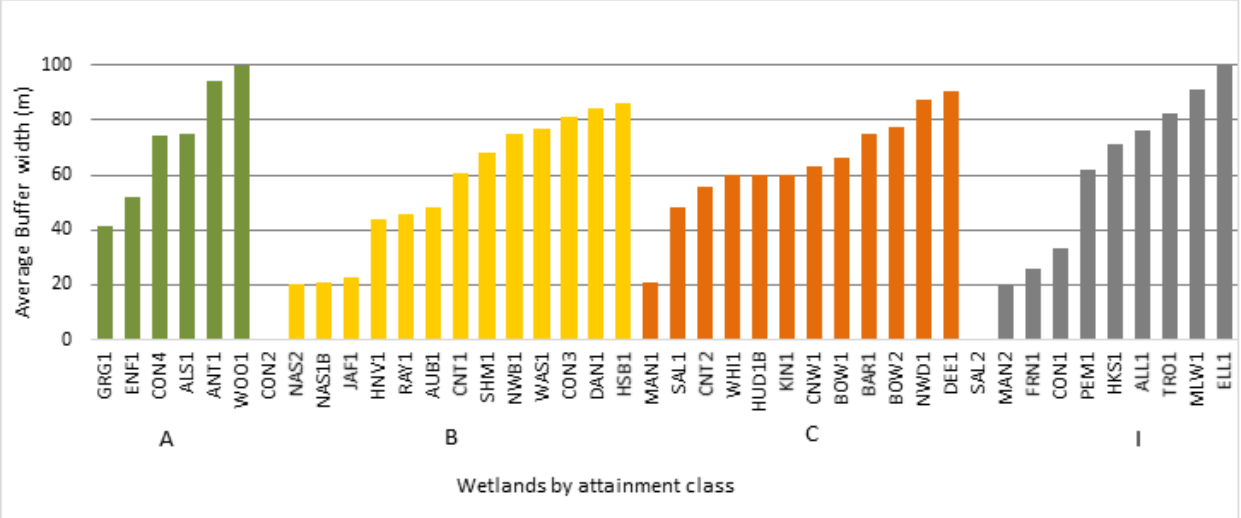

Figure 14. EIA-Average buffer width (up to a maximum of 100 meters) for each site, grouped by predicted attainment class.

4.5 Notable Aquatic Observations

We made additional observations while sampling wetlands. Macroinvertebrates observed and not sampled by dip nets included freshwater sponges (*Spongilla spp*.) observed in four wetlands (CNT1, ELL1, NAS1B, WOO1) and bryozoan colonies (SHM1).

While the established protocols did not include the sampling of algae or cyanobacteria, we sampled the algae when we observed unusual algal blooms. In one wetland it was a green alga (*Spirogyra*) and at other wetlands was cyanobacteria (including *Nostoc* colonies and *Oscillatoria*). Nutrient levels in these wetlands were not elevated relative to other wetlands sampled.

In several wetlands we observed macroalgae; in one wetland (HNV1) the abundance of *Chara* resulted in supersaturated dissolved oxygen conditions. It has been suggested that a condition assessment should consider macrophytic algae such as charophytes, which comprise a significant amount of biomass in some lacustrine wetlands (Alix and Scribailo, 2006).

5 Discussion

The LDM calculated from the macroinvertebrate community the predicted attainment class of A for six wetlands. The attainment class for these six wetlands reflects the absence or limited nature of observed stressors to these wetlands, based on rapid assessment scores (including GIS-based land cover metrics), multiple water quality parameters and floristic parameters.

For wetlands assigned attainment classes B or C, the rapid assessment results, water quality parameters and floristic indicators yielded results that do not reflect decreasing condition on a biological condition gradient. The Indeterminate group reflects the full range of condition based on many of the rapid assessment methods and other measured or calculated parameters.

Several possible reasons for this outcome are described herein. In the first two years of the project the sampling of macroinvertebrates in five of the wetlands resulted in the collection of excessive amounts of organic material (several times the average amount in MEDEP samples). After the 2015 sampling season, we learned that MEDEP uses a modified approach for macroinvertebrate sampling where there is a significant organic substrate present. An additional field training session was held in 2016. Our "unmodified" sampling in that unique microhabitat may have resulted in different and fewer taxa in the organic material than those associated with other habitats of a comparable condition. There were some hierarchical taxonomic differences that were identified in the quality assurance review process for the macroinvertebrates. The attainment classes were not rerun following the review, due to resource constraints.

In 2016, New Hampshire and at least part of Maine experienced severe drought conditions (NWS, 2019). In some wetlands with floating-leaved species, such as water lilies, the leaves were laying flat on the exposed substrate that would typically have been under water. Such drought conditions could be expected to impact the macroinvertebrate community that year or the following year. A greater proportion of more tolerant species may survive a drought while more sensitive species may not, thus result in a lower attainment class in subsequent years.

The collection of water measurements with field meters at three locations (co-located with macroinvertebrate sampling locations) in the wetlands revealed within-wetland variability for some of the wetlands sampled, especially in 2014 and 2015. The three in-situ measurements in wetlands with contiguous open areas of water, such as ponds or larger flowing waters (AUB1, JAF1), showed less variation than measurements taken in wetlands where there was little to no contiguous open water between measurement locations (FRN1, MAN1, SAL2). The variation in several parameters, including specific conductance, dissolved oxygen, and pH, was likely due to microhabitats that may have different amounts of interaction with groundwater, soils, atmospheric oxygen, exposure to sunlight, or biological resources such as submergent plants or benthic algae.

The macroinvertebrate protocols do not consider the potential for seasonal (intra-annual) variation, such as sampling a site in the beginning of the sampling period and returning for a second sampling just before the end of the sampling period. Given the temporal nature of some aquatic organisms' life cycles, the potential for differences in attainment class due to such seasonal variations should be considered by limited repeat sampling within a single field season.

5.1 Indicators of Human Disturbance/ Wetland Condition

The results of the sampling of vegetation and water and rapid assessments reflect wetlands subject to a range of human disturbance. Water quality impairment has been identified as an important factor contributing to wetland degradation (Morrice et al, 2008; Galatowitsch, 2018)

Two wetlands (CON1 and SAL2) had chloride levels that exceed the chronic freshwater quality criterion of 230 mg/L; they also were among the lowest scoring wetlands for the EIA-Land Use Index (CON1, 2.5; SAL2, 1.1). Both wetlands were assigned an indeterminate status due to low mean abundance and for SAL2, low generic richness. The low abundance or richness may reflect the poor water quality in the wetlands.

The strong negative correlation between the EIA-Land Use Index scores and chloride levels supports potential use of the Land Use Index as an independent screening level tool before targeting wetlands for sampling to determine if it is not supporting the designated aquatic life use.

In the northeast, deicing treatments (primarily sodium chloride) in the winter associated with development-related land uses and impervious surfaces, contribute to sources of chlorides in surface and ground waters (NHDES, 2011). Increases in salt concentrations caused by anthropogenic forces are referred to as secondary salinization (Herbert et al., 2015).

Elevated chloride concentrations in lakes can alter the composition and function of phytoplankton, zooplankton, macroinvertebrate, and fish communities. As a consequence of salinization, aquatic species richness and abundance may decline, which could result in trophic cascades and altered water quality and ecosystem structure and function (Dugan et al., 2017). Sadowski (2002) found that amphibian abundance and diversity were consistently low in all wetlands where chloride levels exceeded 200 mg/L. Results of research on the effects of road salt on aquatic macrophytes, suggest that increased anthropogenic disturbance of freshwater ecosystems by elevated salinity might stimulate the growth of some species (such as *Elodea canadensis*) while deterring the growth of others (such as *Potamogeton robbinsii* and *Elodea nuttallii*) (Stoler et al., 2018). Such a change may not affect the outcome of some FQA metrics, unless richness decreases or nonnative species "invade," as these native aquatic species have similar C-values (*Elodea nuttallii* C=4, *Elodea canadensis* C=5, *Potamogeton robbinsii*, C=5; NEIWPCC,2013).

For Great Lakes coastal wetlands, Harrison et al. (2019) developed water quality indices based on physicochemical measures (Chem-Rank), land use/land cover-rank (LULC-Rank), and their combined effects (Sum-Rank and Simplified Sum-Rank), for both vegetation zones and wetland sites. The strongest LULC-Rank correlation with a physicochemical variable was with specific conductance (r =−0.64).

Another anthropogenic impact to surface waters observed by researchers has been referred to as alkalinization. Kaushal et al. (2018) proposed the concept "freshwater alkalinization syndrome" linking the salinization and alkalinization processes long hydrologic flow paths from small watersheds to coastal waters. Sources of increased alkalinity include concrete structures (such as bridge and culverts). Weathering rates increase in in disturbed soils. Elevated carbon dioxide concentration in aquifers from receiving septic system effluent are a potential source. Stets, Kelly and Crawford (2014) examined long-term trends in alkalinity in 23 rivers of the conterminous US (included the Connecticut River) and found increased trends were widespread. However, in New Hampshire, the Granite State, suffers from extremely low soil buffering capacity due to the long-term impacts of the industrial revolution and continued acid deposition on the landscape as reflected in the median alkalinity by attainment class, ranging from 4.25 to 16.7 mg/L. However, we observed strong negative correlations between alkalinity and the EIA (r = -0.69) and between alkalinity and the EIA-Land Use Index (r = -0.65).

Floristic Quality

The two rapid assessments applied (EIA and WHDA) showed a moderate correlation with the FQA metric, mean C. Bell et al. (2017) documented correlations between mean C (as well as cover-weighted mean C) and EIA scores/ranks. Both rapid assessments (EIA and WHDA) include the survey and recording of limited data for invasive nonnative plant taxa. The EIA includes consideration of percent invasive nonnative species cover, but considers native plant species composition only as compared with the wetland system description (Faber-Langendoen and Nichols, 2014). The presence of nonnative species is an indicator of human disturbance (Kutcher and Forrester 2018) and the strong correlation between the average buffer size and percent nonnative species may reflect the effect of that stressor on the wetland.

Nichols (2018) identified cover-weighted mean C thresholds for a 14 of New Hampshire's 25 wetland system types, including drainage marsh - shrub swamp (median 2.9/mean 3.26) and medium level fen (median and mean: 5.04), two systems represented in the wetlands sampled in this study (Figure 15).

FQA thresholds for the remaining wetland system types are under development and anticipated to be completed later in 2020.

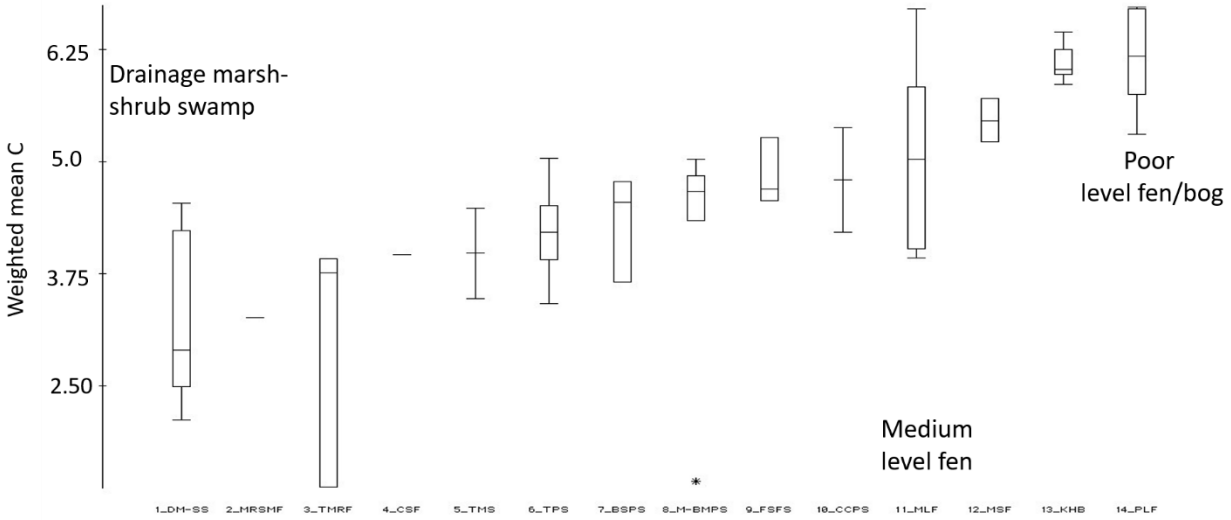

Figure 15. Reference thresholds for cover-weighted mean C-values for 14 wetland system types (Nichols, 2018). From left to right: 1, Drainage marsh shrub swamp; 2, Major river silver maple floodplain; 3, Temperate minor river floodplain; 4, Calcareous sloping fen; 5, Temperate minerotrophic swamp; 6, Temperate peat swamp; 7, Black spruce peat swamp; 8, Montane/ near boreal minerotrophic peat swamp; 9, Forest seep/seepage forest; 10, Coastal conifer peat swamp; 11, Medium level fen; 12, Montane sloping fen; 13, Kettle hole bog; 14, Poor level fen/bog. Wetlands systems among those represented in this study include drainage marsh-shrub swamp (DM-SS), medium level fen (MLF) and poor level fen/bog (PLF). The boxplots show median, 25th and 75th percentiles, and whiskers depict the minimum/maximum extent. The asterisk indicates an extreme value (outlier) (Nichols, 2018).

The mean C-values for this study's wetlands may differ from the cover-weighted mean C threshold values developed Nichols (2018) for wetland systems for several possible reasons. Mean C is based on a species list and doesn't reflect abundance or relative abundance. Each species is given equal weight in averaging the values to develop mean C-value for a wetland. System-specific cover-weighted mean C considers abundance within each community type in a wetland system, and then weights the average of those values for each of the multiple natural communities based on the percent of the system that they comprise (Nichols, 2018).

Relative to differences with this study's mean C values, we did not survey entire wetland systems; we surveyed aquatic bed communities, and to a lesser extent emergent communities that are associated with lacustrine wetlands and their shorelines. Aquatic bed communities are part of some wetland systems (Sperduto, 2011), although in general they have not been included in the FQA threshold analysis. Wetland species that have a wetland indicator status of obligate (OBL) have a higher average C-value than those with other indicator statuses (Figure 16). For example, native *Potamogeton* (pondweed) species, common in wetlands with permanent open water, have a mean C of 5 or 6. With this study's focus on the aquatic communities, including aquatic bed and emergent marsh, this focus may weight the mean C scores higher than surveys of the full wetland system in drainage marsh-shrub swamps or perhaps lower than surveys of aquatic communities associated with a poor level fen/bog.

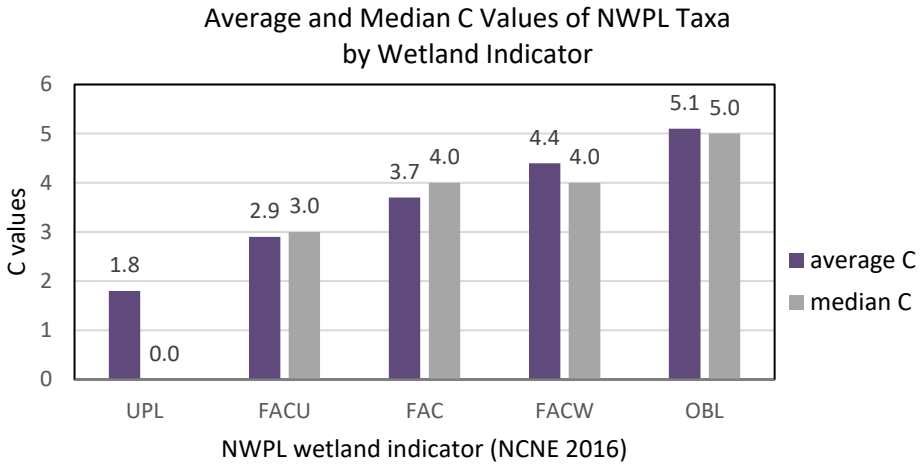

Figure 16. Average and median C-values of National Wetland Plant List Taxa (North Central North East region) by wetland indicator based on NH C-values (2013) or averaged ecoregional values.

Both cover-weighted mean C and mean C have shown a positive response to a wetland disturbance gradient, although mean C performed better than cover-weighted mean C in distinguishing between three condition ranks (Faber-Langendoen et al, 2019). Kutcher and Forrester (2018) suggest that the straightforward FQA variants, such as mean C, cover-weighted mean C, "respond meaningfully and predictably across a gradient of ecological conditions, are resistant to the confounding influences of site size, sampling effort, and hydrogeomorphology."

Buffers

The positive effects of vegetated buffers on water quality are well documented (Houlahan and Findlay, 2004; Wilkerson et al., 2006; McElfish et al., 2008). Rooney et al. (2012) identified that plant-based IBI scores were best predicted using 100 m buffers in shallow open-water marsh wetlands. Road cover or density and measures of the proportion of disturbed land were consistent predictors of IBI score. However, Harrison et al. (2019) found that in Great Lakes coastal marshes, giving credit to narrow buffers may underestimate the influence of the land use beyond them that was mostly disturbed. They identified that land cover within 20 km showed stronger correlations with the water quality endpoints than the land cover within 1 km. They suggested that the 20-km area may better represent what is loading into the wetlands (in the study, from agricultural land use) than a 1-km forested strip around the wetland. This observation may be consistent with some observations from our field work, where a pipe carrying stormwater from a local watershed may discharge into a wetland through a well vegetated buffer. Any beneficial near-buffer effects on water quality may be erased by the stormwater originating from farther away in the watershed.

In coastal wetlands of the Great Lakes, Harrison et al. (2019) used measurements of aquatic physiochemical and land cover variables to develop water quality indices. As observed in this study, they found that combining water quality monitoring with land use/ land cover data provided more information than either one individually. In the context of assessing the freshwater coastal resources studied, they recommended at a minimum, measuring specific conductance, total nitrogen, total phosphorus and chlorophyll-a along with land cover data. In the New Hampshire dataset, the correlations between land cover using the EIA Land Use Index and anthropogenic indicators of disturbance (chloride and specific conductance) provide a strong starting point for further investigation.

Defining Naturally Occurring / Reference condition

Toward the goal of developing a tool to assess wetlands, it is necessary to identify reference conditions and the levels of various parameters that are naturally occurring. MEDEP has used the following remote, rapid assessment and field meter-based criteria to identify reference wetlands for its analysis of differences in scores by ecoregion or wetland type (lacustrine vs. riverine) (DiFranco, personal communication, November 14, 2017):

- Watershed land use 95% or greater of forest or wetland.
- Total Wetland Human Disturbance Assessment score of 10 or less; no single category above five.
- Specific conductance <100 µS.

Using these criteria, 11 wetlands would be considered reference. The predicted attainment classes (or indeterminate statuses) that were generated based on the LDM are:

- Attainment class A: GRG1, WOO1, ANT1, CON4
- Attainment class C: DEE1, NWD1
- Indeterminate status: HKS1, MLW1, TRO1, ALL1, ELL1

If the criterion of no invasive species present was included, it would remove TRO1, which had glossy buckthorn (*Frangula alnus*).

Reviewing the above list of potential reference wetlands with the ordination of wetlands based on water quality parameters (Figure 17), these 11 wetlands assigned various attainment classes are located at the far left of the ordination (circled in blue), the area with the lowest levels of anthropogenic indicators, chloride, specific conductance, phosphorus and chlorophyll-a. This further supports the assignment of attainment class A to these undisturbed reference wetlands, but raises questions about the assignment of attainment class C to two wetlands. It further informs that sites assigned Indeterminate status may include those that represent undisturbed reference wetlands, but other factors are contributing to the low generic richness or low mean abundance. This is consistent with MEDEP's experience (Jeanne DiFranco, personal communication, undated).

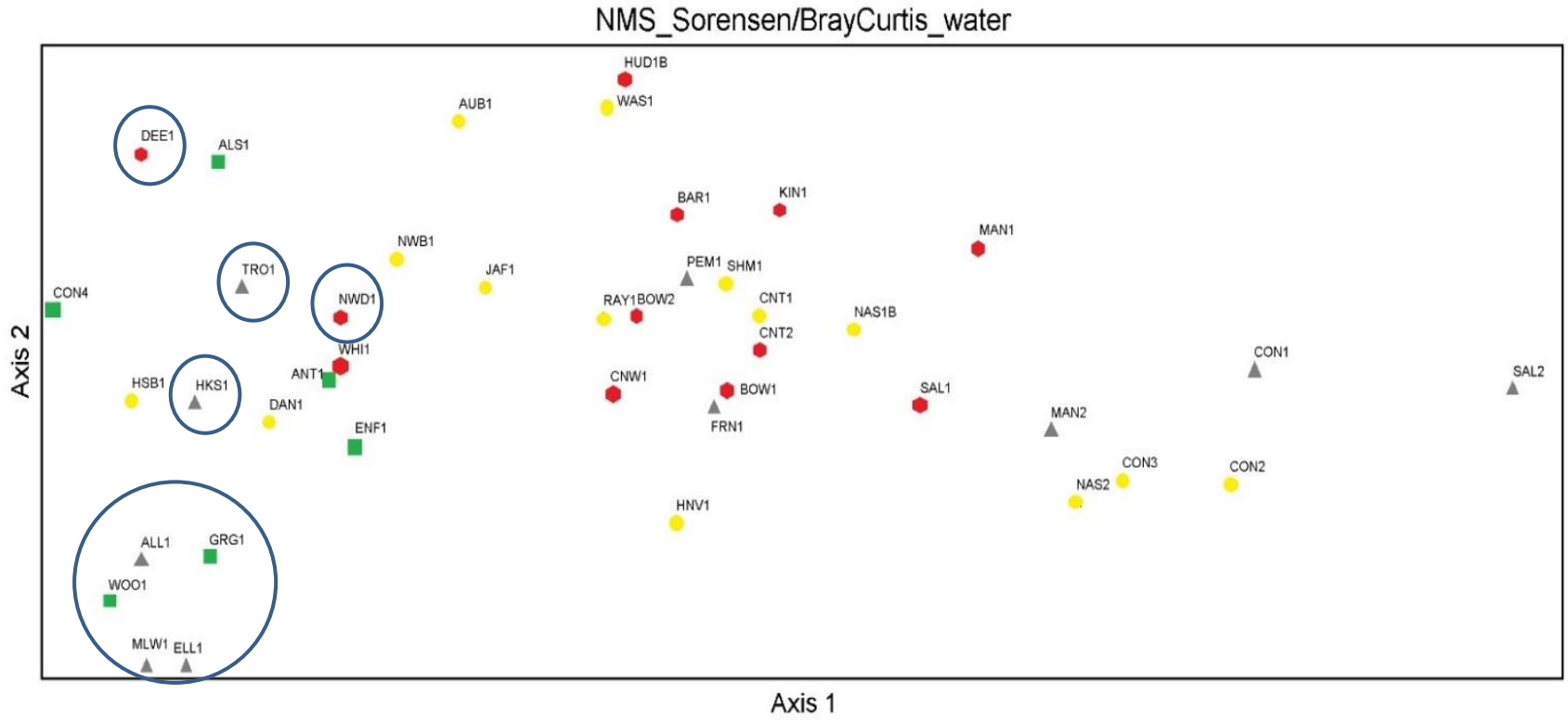

Figure 17. Ordination graph based on water quality parameter values and wetlands (circled in blue) that would be considered reference based on criteria used by MEDEP. Colored markers represent attainment class assigned or indeterminate status: Attainment class A, green square; B, yellow circle; C, red hexagon; I (indeterminate status), grey triangle. Wetlands whose water parameter values are more similar to one another are closer together. The axes are arbitrary as is the orientation of the plot. Stress=4.69

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5.2 Status of Biocriteria Identification

The NHDES wetlands monitoring and assessment strategy identified one of the top priorities as the collection data for the purpose of determining the appropriate indicators and numeric thresholds for assessing designated uses, such as aquatic life support, for the many types of wetlands (NHDES, 2013).

This multi-year study has been the start of a wetland network for New Hampshire; we have collected macroinvertebrate, vegetation, water and landscape data for open-water wetlands that represent a range of disturbance. These wetlands and collected data can begin to serve as "**reference** wetlands" – that is, wetlands that represent a **range** of human disturbance (Brooks et al, 2016). It is important to be able to recognize the signals along a disturbance gradient. Such data are necessary for assessing condition and targeting and tracking restoration, as a wetland that is disturbed beyond a certain condition (perhaps due to major changes in hydrology) may not be easily restorable, but one with fewer indicators of disturbance may be a good candidate for restoration. The New Hampshire NHB continues to identify and track minimally impacted "reference ***standard***" wetland systems, those that have the highest level of functioning or represent the least disturbed condition (Faber-Langendoen et al, 2016).

Earlier, we described New Hampshire's biological and aquatic community integrity criteria (Env-Wq 1703.19), which states that,

- The surface waters shall support and maintain a balanced, integrated, and adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of similar natural habitats of a region.
- Any difference from naturally occurring conditions shall be limited to non-detrimental differences in community structure and function.

New Hampshire's Consolidated Assessment and Listing Methodology (CALM) used to assess surface waters for the Clean Water Act §303(d)/§305(b), includes some indicators that could be considered for wetlands. The CALM describes the presence of particular invasive species (exotic macrophytes) as an indicator of impairment of surface waters (NHDES, 2020). This study has provided data that has started to illustrate the relationship of physicochemical results and land use to condition of biological assemblages.

5.3 Summary and Future Directions

NHDES has stated its interest in the development of indicators and thresholds for the assessment of the aquatic life designated use (NHDES, 2015). Since 2008, NHDES has been actively exploring the assessment of wetlands using EPA's suggested three-level approach.

- **Level 1** assessments use remote sensing and desktop analysis.
- **Level 2** assessments are rapid and field-based to provide information that can be observed only in the field, and should take about four field hours to complete, on average.
- **Level 3** assessments are intensive field surveys that include the collection of biological data or onsite sampling of water, soil, etc.

The assessment methods and sampling we applied represent all three levels. Some methods, like the EIA, integrates Level 1 and Level 2 assessment metrics. The four field seasons of data collected in this pilot project generated new information and identified opportunities for future investigation of promising approaches.

Below is a summary of the findings, missing pieces and next steps for each of the level-based assessment approaches:

Level 1

- The GIS-based land use metrics that are part of the EIA, the Land Use Index in particular, demonstrated a strong correlation with water quality parameters, especially for conductivity and chloride. Further testing of the EIA-Land Use Index and the relationship with chloride or specific conductance is needed to determine if it would be possible to predict elevated chloride levels in open-water wetlands based on intact buffer size.
- GIS-based analyses of land use, supplemented with water quality data where available, may address another challenge to field-based assessments, that is the need to access wetlands. One of the challenges in the assessment of wetlands that differs from surface waters is that access usually requires travel over "land" as opposed to access to surface water with a boat or from a bridge. In this study, we were able to use existing boat ramps or public access points to conduct the protocols on open-water wetlands. The ability to access an entire wetland system to assess its wetland condition may influence the development of assessment methods that minimizes on-site field work in lieu of better tools for assessment using GIS-based methods. Thus there is increased value in further research on the use of the GIS-based Land Use Index component of the EIA (complemented by conductivity measurements/ chloride sampling) and the index developed by Harrison et al. (2019). Maintenance of current high quality imagery is crucial to support GIS work for a Level 1 desktop-based assessment (and the EIA).

Level 2

- The EIA continued to perform well when compared with floristic metrics and water quality parameters at open water wetlands. It would be desirable to expand the use of the EIA by others and refine it, as needed, to enhance its robustness, transferability, and repeatability. A continued effort should be made to implement it wherever possible, such as for evaluation of wetlands proposed for restoration or mitigation. A comparison of the updated 2017 EIA version with the 2014 version used in this study is needed.

- Additional research and application of some of the rapid assessment and vegetation-based methods applied herein is needed to develop a larger data set for analysis. Additional data points are needed to validate and calibrate the EIA relative to its use to assess wetlands under CWA § 303(d)/305(b). Once verified with Level 3 data, it can be used for assessment purposes.

- Although invasive species were found at more than half of the wetlands, the strong correlation between average buffer width and the number of invasive species present warrants further consideration as a floristic metric of wetland condition.

Level 3

- Vegetation:
    - Conduct vegetation surveys as part of the EIA to obtain data sufficient to use floristic metrics and increase dataset for FQA thresholds. Sampling needs to includes the survey of non-exemplary wetlands to inform condition related to the range of human disturbance.
    - The absence of open water in many wetlands, hence no water to sample, further contributes to the need to develop robust vegetation data to apply FQA to wetlands subject to varying degrees of human disturbance to assess wetland condition. As stated

above, additional data are needed to validate and calibrate the any floristic metrics to assess wetlands under CWA §303(d)/§305(b).

  - Analysis of vegetation data gathered to validate and calibrate floristic metrics should identify if a reduced universe of wetland species may be sufficient as indicators for wetland condition assessment, following the Rapid Floristic Quality Assessment work in Minnesota (Bourdaghs, 2012).
  - For continued application to open-water wetlands, conduct further sampling to support development of FQA values for aquatic bed communities. This will complement the FQA work currently being done by NHB for wetland systems. This data may inform the identification of wetland water quality degradation.

- Macroinvertebrates:
  - Any future work to consider sampling macroinvertebrates as potential indicators in open-water wetlands should be closely integrated into the current programmatic efforts in surface water monitoring to increase efficiency in data collection and analysis.
  - Sampling of macroinvertebrates should target wetland type to better define/refine target wetland population for use of Maine's LDM.
  - Examine any temporal effects of macroinvertebrate sampling timeframe.
  - Analyze macroinvertebrates by specific location where sampled (finer scale of analysis), especially in wetlands that have multiple open water areas.

6 Conclusions

This project began in 2014 and involved four years of field sampling of freshwater wetlands, representing New Hampshire's initial efforts to collect and analyze Level 3 data. As a result, we have an increased knowledge of the wide variation in open-water wetland habitats and their complexity. By using existing rapid assessment tools, such as the EIA, coupled with standard water sampling protocols, we have identified some moderately strong correlations between landscape condition and wetland water quality, as well as floristics, which warrant further investigation.

Development of numerical or quantitative biological criteria takes time and resources. Ohio adopted quantitative biological criteria following a seven-year development process based on a ten-year database. (National Academy of Engineering, 1999). MEDEP piloted its wetland biomonitoring in 1998, and have developed multiple iterations of their model over the years, refining it based on the ongoing data collection and analyses.

New Hampshire's wetland monitoring strategy identified potential indicators to consider for wetland condition assessment (NHDES, 2015). This study began to apply those indicators with four years of fieldwork. NHDES sampled macroinvertebrates, water and vegetation in open-water wetlands that represent a range of human disturbance and applied some of those indicators.

Additional New Hampshire site data are needed to analyze and identify responsive indicators before addressing threshold levels for assessing wetland condition as part of the Clean Water Act §305(b) requirements. New Hampshire has started to fill a gap in knowledge of its wetlands and has identified areas for follow-up as resources become available. Most of New Hampshire's wetlands are in good condition, but tools are needed to measure their condition to support future resource management decisions.

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8 Abbreviations and Acronyms

AA	Assessment area
ac	acres
ANOVA	Analysis of Variance
C-value	Coefficient of conservatism
DO	Dissolved oxygen
DOP	Dissolved ortho phosphorus
EIA	Ecological Integrity Assessment
FAC	Facultative (wetland indicator)
FACW	Facultative wetland (indicator)
FGDC	Federal Geographic
FQA	Floristic Quality Assessment
FQI	Floristic Quality Index
GIS	Geographic Information System
IPANE	Invasive Plant Atlas of New England
IQR	Inter Quartile Range
km	Kilometer
LDM	Linear Discriminant Model
LUB	Lacustrine unconsolidated bottom
LUI	Land Use Index
m	Meter
MEDEP	Maine Department of Environmental Protection
MTI	Maine Tolerance Index
NAIP	National Agriculture Imagery Program
NHB	New Hampshire Natural Heritage Bureau
NHDES	New Hampshire Department of Environmental Services
NHFG	New Hampshire Fish and Game Department
NLCD	National Land Cover Database
NWI	National Wetland Inventory
OBL	Obligate (wetland indicator)
PAB	Palustrine aquatic bed
PEM	Palustrine Emergent
PUB	Palustrine unconsolidated bottom
QA	Quality assurance

QAPP	Quality Assurance Project Plan
QC	Quality control
RAM	Rapid Assessment Method
SOP	Standard Operating Procedures
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
UPL	Upland (wetland indicator)
VBA	Visual Basic for Applications
WHDA	Wetland Human Disturbance Assessment
WPDG	Wetland Program Development Grant

9 Appendices

A. Maine DEP - Wetland Key Report Guidance
B. Wetland Bioassessment Field Data Sheet
C. Wetland Monitoring - Water Field Data Sheet
D. Wetland Human Disturbance Assessment Form
E. EIA Pre-Field and Field Metrics Form
F. EIA Stressor Checklist
G. Wetland Assessment - Plant Data Sheet (2016 version)
H. Draft Aquatic Macrophyte Sampling Protocol for Wetland Assessment and Wetland Assessment - Plant Data Sheet (2017 version)
I. Collecting Macroinvertebrates Using a Dip Net Measured Sweep
J. Subset of Statistical Analyses for Comparison of Parameters to Attainment Class
K. Spearman rank correlations (sorted by absolute correlation value)
L. Spearman rank correlations (sorted by parameter-row)
M. M-1 to M-42 Maine DEP - Biological Monitoring Program - Wetland Aquatic Life Classification Attainment Reports. Site name, municipality, (year sampled).

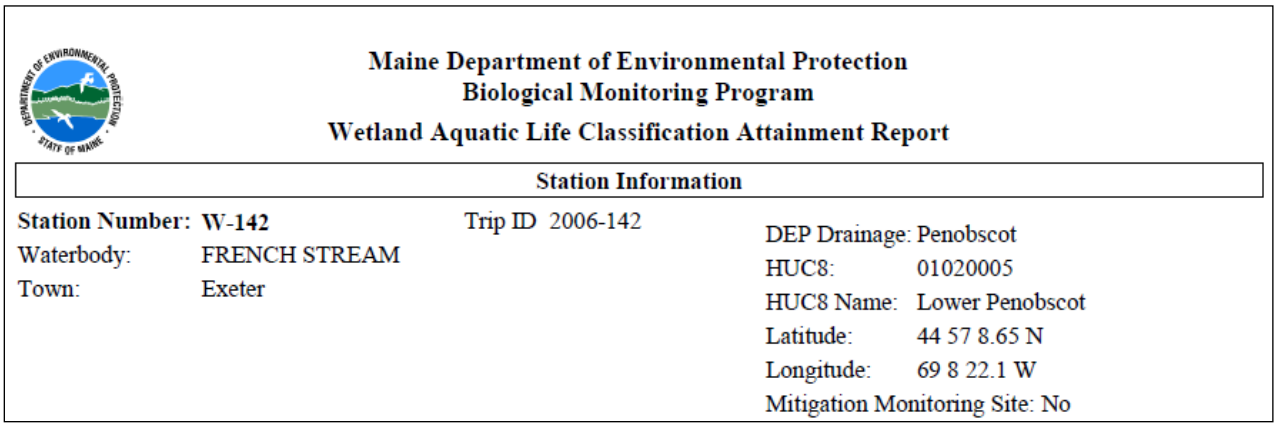
M-1	ALL1	Catamount Brook wetland, Allenstown (2017)
M-2	ALS1	Fuller wetland, Alstead (2014)
M-3	ANT1	Rye Pond, Antrim/ Nelson/Stoddard (2016)
M-4	AUB1	Clark Pond, Auburn (2017)
M-5	BAR1	Richardson Pond, Barrington (2017)
M-6	BOW1	Town Pond, Bow (2015)
M-7	BOW2	Purgatory Brook wetland, Bow (2017)
M-8	CNT1	Oxbow Pond, Canterbury (2015)
M-9	CNT2	Kimball Pond, Canterbury (2017)
M-10	CNW1	Dollof Pond, Conway (2017)
M-11	CON1	South End Marsh, Concord (2015)
M-12	CON2	Horseshoe Pond (east section), Concord (2016)
M-13	CON3	Horseshoe Pond (middle section), Concord (2016)
M-14	CON4	Hoit Road Marsh, Concord (2017)
M-15	DAN1	Danbury Bog, Danbury (2016)
M-16	DEE1	Pawtuckaway Marsh, Deerfield (2015)
M-17	ELL1	Ellsworth Pond, Ellsworth (2017)
M-18	ENF1	George Pond, Enfield (2014)
M-19	FRN1	Echo Lake wetland, Franconia (2015)
M-20	GRG1	White Mountain National Forest wetland (Tributary to Peabody River), Green's Grant (2014)
M-21	HSB1	Farrar Marsh, Hillsborough (2016)
M-22	HKS1	Clay Pond, Hooksett (2015)

M-23	HNV1	Mulherrin Farm Road wetland, Hanover (2015)
M-24	HUD1B	Musquash Pond, Hudson (2017)
M-25	JAF1	Contoocook River wetlands, Jaffrey (2015)
M-26	KIN1	Powwow River wetlands, Kingston (2017)
M-27	MAN1	Rail Trail marsh, Manchester (2015)
M-28	MAN2	Joseph Street Pond, Manchester (2015)
M-29	MLW1	Gregg wetland, Marlow (2014)
M-30	NAS1B	Fields Grove - Salmon Brook, Nashua (2017)
M-31	NAS2	The Cove, Nashua (2015)
M-32	NWB1	Great Meadow, New Boston (2014)
M-33	NWD1	Merrymeeting Marsh, New Durham (2016)
M-34	PEM1	Brickett Hill Road pond (Butterfield Conservation area), Pembroke (2015)
M-35	RAY1	Lamprey River wetlands (Elementary School), Raymond (2017)
M-36	SAL1	World End Pond, Salem (2015)
M-37	SAL2	Salem High School wetland, Salem (2015)
M-38	SHM1	Tuxbury Pond wetlands, South Hampton (2017)
M-39	TRO1	Perkins Pond - Upper, Troy/Jaffrey (2015)
M-40	WAS1	Town Forest wetland (Bog Brook), Washington (2016)
M-41	WHI1	Johns River, Whitefield (2014)
M-42	WOO1	Elbow Pond, Woodstock (WMNF) (2015)

N. Final Site-specific Data: NH Wetlands Sampled 2014-2017

Guidance for Understanding a Biomonitoring Wetland Macroinvertebrate Aquatic Life Classification Attainment Report

The ME DEP Biological Monitoring Program generates a Macroinvertebrate Aquatic Life Classification Attainment Report for each wetland macroinvertebrate sampling event. This 'Key' Report contains many attributes about the biological sample as well as any physical and chemical data collected in conjunction with the biological sampling. This document takes a representative Macroinvertebrate Aquatic Life Classification Attainment report and attempts to explain items from each section that may not be self–explanatory. See the Sampling and Analysis page of the Biomonitoring website for more details on our sampling methods (http://www.maine.gov/dep/water/monitoring/biomonitoring/sampling/index.htm). These reports can be found in the Biomonitoring Google Earth project by clicking on a station and then selecting the desired report from the 'Report' column. Access our Google Earth project through the Data and Maps page of our website (http://www.maine.gov/dep/water/monitoring/biomonitoring/data.htm.



Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number:	**W-142**	Trip ID 2006-142	
Waterbody:	FRENCH STREAM		
Town:	Exeter		
		DEP Drainage:	Penobscot
		HUC8:	01020005
		HUC8 Name:	Lower Penobscot
		Latitude:	44 57 8.65 N
		Longitude:	69 8 22.1 W
		Mitigation Monitoring Site:	No

The **Station Information** section contains a basic description of the station's location.

- **Trip ID** – Unique identifier assigned to each site visit (year sampled – station number).
- **DEP Drainage:** This is the name of the 4-digit hydrologic unit code.
- **HUC8 (Hydrologic Unit Code) – HUC8 refers to the U.S. Geological Survey (USGS) 8-digit hydrologic unit code.** The United States is divided and sub–divided into nested hydrologic units by the USGS using a nationwide numeric coding system. Two-digit codes (HUC2) are assigned to the largest hydrologic units. Successively smaller hydrologic units are designated by 4-digit (HUC4), 6-digit (HUC6), 8-digit (HUC8), 10-digit (HUC10) and 12-digit (HUC12) codes. Additional information on the USGS HUC system may be found at http://water.usgs.gov/GIS/huc.html.
- **Latitude** and **Longitude** are projected in NAD83, meters.
- **Mitigation Monitoring Site** – Indicates if the wetland has been created, restored, enhanced or preserved as part of a compensatory mitigation plan required by a DEP issued wetland alteration permit.

Sample Information

Sample ID:	**DN-2006-142**	Type of Sample:	DIPNET	Date Sampled:	6/20/2006
Subsample Factor:	X1	Replicates:	3		

The **Sample Information** section contains information about the macroinvertebrate sample.

- **Sample ID** – Unique identifier assigned to each biological sample, representing the sample method, the year sampled and the station number. "DN" Indicates that this macroinvertebrate sample was collected using the Dipnet measured sweep method.
- **Subsample factor** – The inverse of the fraction of the sample identified by the taxonomist. Only a portion of the sample is identified when the number of organisms exceeds established criteria. For example, a subsampling factor of 4 means that the taxonomist selected ¼ of the sample, using protocols established in the Methods Manual, identified and counted the organisms in that subsample, and then multiplied the counts by 4. The example above has a subsampling factor of X1, indicating that the sample was not subsampled. The Biomonitoring methods manual, "Methods for Biological Sampling and Analysis of Maine's Rivers and Streams" (DEP LW0387–B2002), can be found here: http://www.maine.gov/dep/water/monitoring/biomonitoring/materials/finlmeth1.pdf, and is subsequently referred to throughout this document as the Methods Manual.
- **Replicates** – Usually, 3 replicate samples are collected during a sampling event. Very rarely, less than 3 replicates are collected.

Classification Attainment				
Statutory Class:	**B**	**Final Determination:**	**A**	Date: 1/14/2013
Model Result with P>.6:	A	**Reason for Determination:**	**Model**	
Date Last Calculated:	12/3/2012	Comments:		

The **Classification Attainment** section contains information about the statutory class, model results, and final determination

- **Statutory Class** – Water classification assigned by the Maine Legislature, consisting of designated uses, numeric criteria, and specific limitation on certain activities. If a water body is meeting all of its classification standards, it is attaining its class. See the Classification of Maine Waters page on the DEP's website for more information (http://www.maine.gov/dep/water/monitoring/classification/index.htm).
- **Model Results with P>0.6** – The Class listed here is the aquatic life classification attainment predicted by the DEP's linear discriminant statistical model (LDM). The "P" refers to the probability of attaining a class. For the example above, the site has a greater than 60% probability of attaining class A.
- **Date Last Calculated** – Date sample was analyzed with the statistical model.
- **Final Determination** – The aquatic life classification attained, as determined by a qualified DEP biologist using DEP's statistical model and/or Best Professional Judgment (BPJ).
- **Reason for Determination** – Method used to assign the Final Determination (Model or BPJ). Rarely but under certain circumstances, DEP Biologists may adjust the Final Determination based on analytical, biological and habitat information, that may result in a Final Determination that is not consistent with the Model Result.
- **Comments** – Explanation of why the Final Determination does not match the Model Result, if applicable.
- **Date** – Date Final Determination was made.

Model Probabilities			
Class A: 0.90	Class B: 0.10	Class C: 0.00	NA: 0.00

Model Probabilities

DEP uses a linear discriminant model based on quantitative ecological attributes of the macroinvertebrate community to determine the strength of the association of a test community to any of the water quality classes (Class A, B, or C). The model uses the variables below, which reflect the diversity and sensitivity of the macroinvertebrate community, to determine the probabilities that a site attains one of three classes (A, B, or C) or is in non–attainment (NA) of the minimum criteria for any class. These probabilities have a possible range from 0.0 to 1.0.

The model may also come out with the model result Indeterminate (I)**. Indeterminate is** a term that describes a probability value for a class of greater than 0.4 but less than 0.6 so that the conclusion of classification attainment for that class cannot be determined without further information. In this case the DEP Biologist may use their best professional judgment in order to make a final determination.

Model Variables

Total Mean Abundance	590	MTI Sensitive Taxa Abundance	127.67
Ephemeroptera Abundance	60.00	MTI Sensitive Taxa Relative Abundance	0.22
Odonata Relative Abundance	0.005	MTI Sensitive Taxa Richness	11
Trichoptera Relative Abundance	0.002	MTI Intermediate Taxa Relative Abundance	0.76
Shredder Taxa Relative Abundance	0.01	MTI Intermediate Taxa Richness	23
Non-insect Taxa Relative Richness	0.24	Ratio of MTI Sensitve to Eurytopic Taxa Abundance	11.61

Other Variables

Generic Richness:	51
Hilsenhoff Biotic Index:	7.08
Shannon-Weiner Diversity:	3.56
Maine Tolerance Index:	25.18

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Tanytarsus*	34.01
2	*Amnicola*	9.94
3	*Paratendipes*	9.49
4	*Caenis*	8.76
5	*Procladius*	7.57

Model Variables and Other Variables

- **Total Mean Abundance** – The mean number of individuals in a sample, usually based on 3 replicates. It is used as a basic measure of community structure.
- **Relative Abundance**– The mean number of individuals from one taxonomic grouping divided by the total mean abundance for the whole sample
- **Generic Richness** – Generic richness is the total number of unique genera in a sample. In the example above, the total Generic Richness for the sample is 51. Generic Richness is a good measure of water quality, it will decline as water quality declines.
- **Relative Richness** – This is calculated by dividing a taxonomic group's richness by the sample's total generic richness.
- **Ephemeroptera Abundance**- Total number of Ephemeroptera (Mayfly) individuals. Mayflies are intolerant of many pollutants, so abundances are distinctly lower for nonattainment samples than the other classes.
- **Odonata Relative Abundance**- The relative abundance of organisms in the Odanata (dragonfly/damselfly) order.
- **Trichoptera Relative Abundance**- The relative abundance of organisms in the Trichoptera (Caddisfly) order. Many Trichoptera are intolerant of low water quality.

- **Shredder Taxa Relative Abundance**- The relative abundance of taxa in the functional feeding group shredders.
- **Non-Insect Taxa Relative Richness**- The relative richness of non-insect taxa.
- **MTI Sensitive Taxa Abundance**- The total number of sensitive taxa. Sensitive taxa determined using the Maine Tolerance Index (MTI).
- **MTI Sensitive Taxa Relative Abundance**- The relative abundance of sensitive taxa.
- **MTI Sensitive Taxa Richness**- the richness of sensitive taxa.
- **MTI Intermediate Taxa Relative Abundance**- The relative abundance of intermediate taxa. Intermediate taxa determined using the MTI.
- **MTI Intermediate Taxa Richness**- The richness of intermediate taxa.
- **Ratio of MTI Sensitive to Eurytopic Taxa Abundance**- The ratio of sensitive taxa to eurytopic taxa based on individual taxa tolerance values calculated for the MTI.
- **Hilsenhoff Biotic Index** (Hilsenhoff 1987.) – The Hilsenhoff biotic index provides a measure of the general tolerance level of the sample community toward organic (nutrient) enrichment. The index ranges from 0 (no apparent organic pollution) to 10 (severe organic pollution).
- **Shannon–Wiener Diversity** (Shannon and Weaver 1963.) – Shannon-Wiener Diversity is composed of a richness factor and an eveness factor. As both diversity and richness decline, the stability of most natural communities usually declines. Generally, the lower the number, the less stable the community is. Values can range from 0 to 4.6 but are usually between 1.5 and 3.5.
- **Maine Tolerance Index (MTI)** – Tolerance values for individual taxa are calculated using species optima (the predicted "preferred" environmental conditions for each taxon), on a scale from 1-100. Organisms with a tolerance value less than or equal to 22.0 are considered sensitive taxa. Organisms with a tolerance value between 22.1 and 42.9 are considered Intermediate taxa. And organisms with a tolerance value equal to or greater than 43.0 are considered Eurytopic taxa (taxa that occur across a wide range of environmental conditions). The MTI is a weighted average of tolerance values of the organisms found in the sample.

For more information about the specific macroinvertebrates and their ecology, see the Benthic Macroinvertebrate page of the Biomonitoring website. (http://www.maine.gov/dep/water/monitoring/biomonitoring/sampling/bugs/index.htm).

Five Most Dominant Taxa – List of the top 5 most abundant taxa found in the sample and their percentage of the sample's total abundance.

Sample Collection and Processing Information	
Sampling Organization:	BIOMONITORING UNIT
Taxonomist:	LOTIC INC.

Sample Collection and Processing Information

- **Sampling Organization** – Sampling must be performed by persons who can demonstrate their qualifications and ability to carry out the department's sampling protocol set forth in the Methods Manual and is usually done by the Biomonitoring Unit. Occasionally the department may also require monitoring as a condition of any license, permit or certification that it issues. Such monitoring must be conducted according to a quality

management plan provided to, and approved by, the department. This field shows the name of the sampling organization, agency or person.

- **Taxonomist** – Sample taxonomy for macroinvertebrates must be performed or supervised by a professional freshwater macroinvertebrate taxonomist who has the qualifications specified in the Methods Manual and is certified by the Society for Freshwater Science in the identification of eastern taxa. This field shows the name of the organization performing the taxonomy for the sample.

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Water Chemistry

Sample Date: 6/20/2006 12:45:00 PM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	Grab Sample	Chlorophyll A	0.0027	mg/l	
Surface Water	Grab Sample	Chlorophyll A - Phaeophytin	0.0024	mg/l	
Surface Water	Grab Sample	Dissolved Organic Carbon	4.6	mg/l	
Surface Water	Grab Sample	Nitrate+nitrite As N	0.22	mg/l	
Surface Water	Grab Sample	pH	7.9		
Surface Water	Grab Sample	Silica	2.6	mg/l	
Surface Water	Grab Sample	Soluble Reactive Phosphorus	0.001	mg/l	
Surface Water	Grab Sample	Specific Conductance	194	us/cm	
Surface Water	Grab Sample	Total Alkalinity	84	mg/l	
Surface Water	Grab Sample	Total Kjeldahl Nitrogen	0.5	mg/l	
Surface Water	Grab Sample	Total Phosphorus	0.017	mg/l	
Surface Water	Grab Sample	True Color	24	unit	
Surface Water	In-situ	Dissolved Oxygen	7.5	mg/l	
Surface Water	In-situ	pH	7.55		
Surface Water	In-situ	Specific Conductance	176	us/cm	
Surface Water	In-situ	Temperature	24.1	deg c	

Physical/chemical characteristics of the water body including temperature, dissolved oxygen, pH and specific conductance are measured in the field at the time macroinvertebrate sampling is performed. Water grab samples are also collected and analyzed for a suite of water quality parameters by an outside laboratory. Common qualifiers are: J= Associated value is estimated, U= Not detected above the associated quantitation limit, NAN= Not analyzed.
See SOPs for procedures:
(http://www.maine.gov/dep/water/monitoring/biomonitoring/material.html#QAandSOPs)

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	10	System:	PALUSTRINE	Landscape Position	LOTIC STREAM
Hydrologic Modifications:	2	Subsystem		Lotic Gradient:	DAMMED REACH
Vegetative Modifications:	0	Class 1:	UNCONSOLIDATED BOTTOM	Flow Path:	THROUGHFLOW
Chemical Contaminants:	0	Subclass 1	MUD	Land Form:	FRINGE
Impervious Surface:	4	Class 2:	UNCONSOLIDATED BOTTOM	Land Form Type:	LOTIC STREAM FRINGE POND
Non-point Sources:	4	Subclass 2	ORGANIC	Waterbody Type:	POND
		Class 3:		Waterbody Subtype	DAMMED/IMPOUNDED
		Subclass 3:		Comments:	

Dominant Plant Species: PICKERELWEED, YELLOW WATER LILY, POTAMOGETON SP., BULL RUSH, VALLISNERIA

Habitat Classification:	Substrate Classification:
EMERGENT NON-PERSISTENT VEGETATION	DETRITUS SUBSTRATE
	SILT/MUCK SUBSTRATE

Summary of Habitat Characteristics contains information about the area surrounding the sample station.

- **Human Disturbance** – A field based stressor assessment based on the five categories listed above. A lower score indicates less human disturbance, and higher score indicative of more disturbance.

The ME DEP uses two wetland classification systems, both developed by the US Fish and Wildlife Service's National Wetland Inventory (NWI) Program, to characterize the wetland area surrounding our sampling station from a landscape level perspective. Please note that the wetland classification for the actual location sampled is recorded in the field, and often varies from the landscape classification due to differences in scale.

- **Landscape–level Cowardin Classification** – Characterization of the site using the Cowardin wetland classification system. This system uses vegetation, substrate and hydrology to describe wetland types for inventory purposes. (Cowardin et. al., 1979)
- **Hydrogeomorphic (HGM) Setting** – The US Army Corp of Engineers (ACOE) has developed a HGM classification system (Brinson, 1993) which uses the wetland's watershed position, its sources of water and its hydrodynamics to evaluate its functions. The NWI program has developed a HGM–type coding system (Tiner, 2003) to complement the Cowardin classification, which is the system used by the MEDEP.
  Dominant Plant Species – General overview of the dominant and/or commonly observed plants seen at the station, not a comprehensive list of all species present.
- **Habitat Classification** – Type of habitat immediately surrounding where macroinvertebrate samples were collected. See Wetland field sheet for the list of possible habitat types (http://www.maine.gov/dep/water/monitoring/biomonitoring/materials/fieldsheet_wetlands.pdf).
- **Substrate Classification** – Type of substrate found where macroinvertebrate samples were collected. See Wetland field sheet for the list of possible substrate types (http://www.maine.gov/dep/water/monitoring/biomonitoring/materials/fieldsheet_wetlands.pdf).

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Landcover Summary - 2004 Data

Total Area (ac)	10381	High Int. Dev. %	0.0	Water %	0.4	Non-vegetated %	0.0
		Med Int. Dev. %	0.1	Wetland %	4.3	Tilled Agriculture %	13.3
		Low Int. Dev. %	3.6	Upland Woody %	73.0	Grassland %	5.2
		Development %	3.7	Natural %	77.5	Human Altered %	22.1
						Impervious %	1.8
Total Land (ac)	10339	High Int. Dev. %	0.0	Water %	N/A	Non-vegetated %	N/A
		Med Int. Dev. %	0.1	Wetland %	4.4	Tilled Agriculture %	13.4
		Low Int. Dev. %	3.6	Upland Woody %	73.3	Grassland %	5.2
		Development %	3.7	Natural %	77.8	Human Altered %	22.2
						Impervious %	1.8

Land used calculations are based on 2004 Maine Land Cover Data (MELCD). MELCD is a land cover map for Maine primarily derived from Landsat Thematic Mapper 5 and 7 imagery. This imagery constitutes the basis for the National Land Cover Dataset (NLCD 2001) and the NOAA Coastal Change Analysis Program (C–CAP). This land cover map was refined to the State of Maine requirements using SPOT 5 panchromatic imagery from 2004. For more information on these land cover layers and how each category is calculated, contact the ME DEP GIS Unit (http://www.maine.gov/dep/gis/datamaps) or the ME Office of GIS (http://megis.maine.gov/).

- **Total Area**– includes land, open water, and mudflats
- **Total Land** – total area minus open water and mudflats
- **High Int. Dev**. – High Intensity Developed
- **Med Int. Dev**. – Medium Intensity Developed
- **Low Int. Dev**. – Low Intensity Developed
- **Development** – total of high, medium and low development and roads/runways
- **Water** – open water
- **Wetland** – wetlands, including forested wetlands
- **Upland woody** – total of all forest types except forested wetlands, including recent clear cuts and partially cut lands
- **Natural** – total land area minus the human altered land category (see below)
- **Non–vegetated** – unconsolidated shores and bare land, mostly gravel pits but also rocky mountain tops, mud flats, beaches and rocky shoreline
- **Tilled Agriculture** – cultivated crops
- **Grassland** – unmanaged grasslands
- **Human Altered** –total of all the developed classes, road/runways, all agriculture classes and bare lands (which are mostly gravel pits)
- **Impervious** – The impervious data set was derived from 5 meter SPOT imagery collected in the summer of 2004 over the State of Maine. The impervious data set is part of a larger mapping initiative by the State of Maine to quantify land cover at a 5 meter resolution over the entire state. Areas of imperviousness are characterized by anthropogenic features such as buildings, roads, parking lots, etc.

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Additional Summary Variables

Station Number: W-142 Waterbody: FRENCH STREAM Town: Exeter

Log Number: DN-2006-142 Subsample Factor: X1 Replicates: 3 Calculated: 12/3/2012

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	64.00	0.108	12	0.24
EPT Taxa:	61.33	0.104	8	0.16
Insects:	459.00	0.778	39	0.76
Non-Insects:	131.00	0.222	12	0.24
Leeches:	4.33	0.007	1	0.02
Oligochaetes:	1.33	0.002	1	0.02
Snails:	89.33	0.151	6	0.12
Bivalves:	1.00	0.002	1	0.02
Isopods:	0.00	0.000	0	0.00
Amphipods:	34.33	0.058	1	0.02
Mites:	0.67	0.001	2	0.04
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	60.00	0.102	5	0.10
Odonates:	2.67	0.005	4	0.08
Caddisflies:	1.33	0.002	3	0.06
Diptera:	390.67	0.662	22	0.43
Hemiptera:	2.67	0.005	1	0.02
Beetles:	1.67	0.003	4	0.08
Chironomids:	383.33	0.650	18	0.35
Tanypodinae Tribe:	70.67	0.120	4	0.08
Chironomiinae Tribe:	306.00	0.519	11	0.22
Orthocladiinae Tribe:	6.67	0.011	3	0.06
Collector-Filterers:	203.00	0.344	3	0.06
Collector-Gatherers:	187.33	0.318	12	0.24
Predators:	82.67	0.140	9	0.18
Piercers:	1.33	0.002	2	0.04
Shredders:	8.67	0.015	4	0.08
Scrapers:	86.91	0.147	4	0.08
Maine Tolerance:				
Sensitive:	127.67	0.221	11	0.28
Intermediate:	439.67	0.760	23	0.59
Eurytopic:	11.00	0.019	5	0.13
Ratio of MTI Sensitive to Eurytopic	11.61	11.606	2.20	2.20

The **Additional Summary Variables** section contains abundance, relative abundance, richness and relative richness information for a variety of taxonomic and functional feeding groups.

EOT Taxa- The total number of individuals in the orders Ephemeroptera (E), Odonata (O), and Trichoptera (T).
EPT Taxa- The total number of individuals in the orders Ephemeroptera (E), Plecoptera (P), and Trichoptera (T). These orders are usually poorly represented in communities where water quality is poor.
MTI –Maine tolerance Index (see definition in Model Variable and Other Variables section)

Ratio of MTI Sensitive to Eurytopic- See definition in Model Variable and Other Variables section

For more information about the specific macroinvertebrates and their ecology, see the Benthic Macroinvertebrate page of the Biomonitoring website:
http://www.maine.gov/dep/water/monitoring/biomonitoring/sampling/bugs/index.htm

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Aquatic Life Taxonomic Inventory Report

Station Number: W-142 Waterbody: FRENCH STREAM Town: Exeter
Log Number: DN-2006-142 Subsample Factor: X1 Replicates: 3 Calculated: 12/3/2012

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsenhoff Biotic Index	Functional Feeding Group	Maine Tolerance Index	Tribe	Taxa Group
Lumbriculus	08020101002	1.33	1.33	--	CG	35	--	Worm
Helobdella	08030101005	0.00	4.33	--	--	43	--	Leech
Helobdella elongata	08030101005001	0.67	0.00	--	--	--	--	Leech
Helobdella stagnalis	08030101005004	3.67	0.00	--	--	--	--	Leech
Hyalella	09010203006	34.33	34.33	8	CG	24.5	--	Amphipod
Aeshnidae	09020301	0.33	0.33	--	--	--	--	Dragonfly/damselfly
Libellulidae	09020306	1.67	1.67	--	--	--	--	Dragonfly/damselfly
Libellula	09020306035	0.33	0.33	9	PR	15	--	Dragonfly/damselfly
Ischnura	09020309052	0.33	0.33	9	PR	14.6	--	Dragonfly/damselfly
Callibaetis	09020401002	4.67	4.67	9	CG	40.5	--	Mayfly
Procloeon	09020401010	3.00	3.00	--	CG	21	--	Mayfly

The **Aquatic Life Taxonomic Inventory Report** section is a list of all taxa found in the sample with some additional information described below.

- **Maine Taxonomic Code** – The Biomonitoring Unit use a hierarchical coding system to assign unique numeric identifiers to each taxa in our database.
- **Actual Mean count**– Calculated independently for each taxon by adding the number of individuals from each replicate and dividing by the number of replicates. For example, there was three individuals of *Helobdella elongata* in the three samplers, which makes the actual count 0.67 [(0+ 2 + 0) / 3 = 0.67]. Note that for taxa that are only observed in the pupal stage, no actual mean count is shown as pupae are excluded from model calculations.
- **Adjusted Mean count** – The LDM uses the adjusted counts that have been aggregated to the genus level. The mean abundances of all species are transferred to the corresponding genus. For example, this sample had two species in the genus Helobdella. The mean abundance counts for *Helobdella elongata* and *Helobdella stagnalis* were 0.67 and 3.67. The species counts were adjusted to genus by adding them together [0.67+3.67=4.33]. In some circumstances, counts of taxa at the family or order level are also aggregated to the genus level. See the Methods Manual for a detailed description of applying the counting rules. Note that for taxa that are only observed in the pupal stage, no actual mean count is shown as pupae are excluded from model calculations.

- **Hilsenhoff Biotic Index** (Hilsenhoff 1987.) – The biotic index provides a measure of the general tolerance level of the sample community toward organic (nutrient) enrichment. The index ranges from 0 (no apparent organic pollution) to 10 (severe organic pollution).
- **Functional Feeding Group –** Aquatic invertebrates can be grouped into groups according to how and what they eat:
    - Collector–filterers (CF) strain particles out of flowing water with brushes or nets.
    - Collector–gatherers (CG) are opportunistic omnivores that feed on whatever is easiest to find, using a variety of feeding methods.
    - Piercers (P) are organisms that obtain nourishment by piercing plant or animal tissue and sucking fluids.
    - Predators (PR) are carnivores that hunt and eat other organisms.
    - Scrapers (SC) remove algae, bacteria and fungus growing on the surface of rocks, twigs and leaf debris.
    - Shredders (SH) chew on coarse leaves and twigs that have started to decay to obtain nourishment from associated fungi, bacteria and other organic material.
- **Tribe** – One or more genera that share certain characteristics are placed into tribes. One or more genera that share certain characteristics are placed into tribes. In the MDEP taxa list, usually only members of the Chironomidae family have their tribes noted. 'T' indicates that the corresponding taxa is in the Tanypodinae tribe,'O' for the Orthocladiinae Tribe, 'C' for the Chironominae-Chironomini Tribe, 'D' for the Diamesinae Tribe, 'P' for the Podonominae Tribe, 'R' for the Prodiamesinae Tribe, 'Y' for the Chironominae-Tanytarsini Tribe, 'S' for the Chironominae-Pseudochironomini Tribe, and 'H' for the Chironominae Tribe.
- **Taxa Group-** Group common name

References

Brinson, M.M. 1993. A Hydrogeomorphic Classification for Wetlands. U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, MS, USA. Technical Report WRP- DE-4.

Cowardin, L.M., Carter, V., Golet, F.C., and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service, Washington, DC. FWS/OBS-79/31.

Tiner, R. 2003. Dichotomous Keys and Mapping Codes for Wetland Landscape Position, Landform, Water Flow Path, and Waterbody Type Descriptors. U.S. Fish and Wildlife Service, National Wetlands Inventory Program, Northeast Region, Hadley MA. 44 pp.

NHDES Wetland Bioassessment Field Data Sheet

Station ID:_____ Date:_____ Crew_____

Wetland/water body:_____ Town:_____ AUID: _____

Sample Access (circle one): boat / wading Latitude: _____ Longitude: _____for Site #: 1 / 2 / 3

Photos (Magnetic North) taken at best location to see most of wetland (GPS of photo point: _____)

& Photo file name □ N _____ □ E _____ □ S _____ □ W _____ Visible Flow?: □ Y □ N_____

Watershed Characteristics: ☐ flat _ ☐ rolling ☐ hilly ☐ mountains_____

Detailed directions (sample locations marked with GPS and waypoint noted below)**:** _____

_____

_____

Macroinvertebrate Samples: Record the following information for each site # sampled. (Use habitat and substrate codes below.)

Habitat Code(s)	Site #	Way-point #	Time	# of bottles	Water Depth (cm)	Substrate Code(s)	Dominant Plant Species (Aquatic/submergent/emergent) See separate sheet for full species list and any vouchers collected	Algal bloom?
	1			1 / 2 / _				
	2			1 / 2 / _				
	3			1 / 2 / _				

Habitat Codes

01. Open water – standing (ponds, marshes)
02. Open water – flowing (river/stream channels)
03. Aquatic macrophyte bed (floating/submerged vegetation dominant)
04. Emergent - non-persistent vegetation dominant (herbaceous species not visible at certain seasons, such as pickerelweed)
05. Emergent - persistent vegetation dominant (herbaceous species that remain standing until the beginning of the next growing season, such as grasses, cattails)

Note all habitat codes for those observed at the site

06. Scrub-shrub (dominated by woody vegetation < 6m tall)
07. Peatland (emergents, shrubs and trees < 30% cover)
08. Forested (dominated by woody vegetation > 6m tall)
09. Vernal pool/isolated wetland
10. Other_____

Cowardin class: _____
(field determined)

Substrate Codes

1. sand (<1/8")
2. gravel (1/8" – 3")
3. rubble (3" – 10")
4. silt/muck
5. clay
6. organic soil (well decomposed)
7. peat
8. boulders (>10")
9. bedrock
10. detritus

Physical/Chemical parameters: **See NHDES Wetland Monitoring - Water Field Data Sheet** also completed.

Water Samples Collected: Water samples (#): Site: 1 / 2 / 3 (circle one)

Notes/comments: _____

_____

_____

NHDES Wetland Monitoring - Water Field Data Sheet

Station ID: WET- ____ - __ **Date:** _____ **Grab Samples:** Site #: **1** ☐ **2** ☐ **3** ☐ **Time:** _____

Wetland/water body: _____ **Town**:_____ **Crew:** _____

Water sample location Latitude: _____ **Longitude:** _____ **AUID**: _____

Weather: □ Sunny □ Cloudy w/o rain □ Cloudy w/intermittent rain □ Cloudy w/rain □Windy □ Breezy □ Calm

Rain in the past 3 days? **Y / N**

Rain in the past 24 hours? **Y / N**

Temp: □ 50s □ 60s □ 70s □ 80s □ 90s

Time DO Meter turned ON: _____

Lab log-in #: 2017 - _____

Field Measurements □ Boat □ Wading			
Parameter	**Results** Site 1 WP_____	Site 2 WP_____	Site 3 WP_____
Time			
Temperature ºC			
Dissolved Oxygen (mg/L)			
Dissolved Oxygen (%)			
pH			
Conductivity (µS/cm)			
Specific Conductance (µS/cm)			
Turbidity (NTU)			

Lab Parameters			
Public Health Lab (PHL)		**Limnology Lab (JCLC)**	
$NO_2 + NO_3$		Alkalinity	
TKN		Chloride	
DOC		Chlorophyll-*a*	
TP			

Field Meter Documentation		
Make/Model	**Serial Number**	**Parameter(s) Measured**
YSI Pro 2030	14D101021	Temperature, DO % and mg/L, Conductance
Oakland pH 11 Meter	2160347	pH
LaMotte 2020we	4292	Turbidity

Field Data Validated: _____ By: _____

Lab Data Validated: _____ By:_____

Data Entered in EMD: _____ By: _____

EMD Data Entry Checked: _____ By: _____

Appendix C

On-Site Hand-held Meter Calibration and Meter Check Records – Complete Fields Below

Site	Dissolved Oxygen			Specific Conductance	pH	Turbidity		
	Time	DO Calibration Value (%)	DO% Saturation Chamber Reading	2,000 µS/cm std. (+/- 20%)	Calibration Slope (95%-105%)	Initial 1.0 NTU Reading (+/- 0.25 NTU)	Needs Calibration **Y** **N**	**If Yes:** After Calibration 1.0 NTU Reading
1								
2								
3								

Meter Precision Check First Site at Station			
	Location (Site #)	Time	Result
Turbidity DI Blank (+/- 0.25 NTU)	1		
pH 6.0 std. (+/- 0.3 units)	1		
Spec. Cond. 100 µS/cm (+/- 20 µS/cm)	1		
Turbidity DI Blank (+/- 0.25 NTU)	3		
pH 6.0 std. (+/- 0.3 units)	3		
Spec. Cond. 100 µS/cm (+/- 20 µS/cm)	3		
Meter precision check results should be recorded for all data sheets for each day of sampling.			

Field Notes:

NHDES Wetland Human Disturbance Assessment (WHDA)

Name of wetland / associated waterbodies: _____ Town: _____

Station #:_____ Date: _____ Evaluator(s): _____

The purpose of this assessment is to characterize the degree of human disturbance in and around a wetland Biomonitoring station and to document environmental stressors. Note that this human disturbance assessment is a stressor identification tool and not a direct measure of biological condition. See *Protocols for Completing the Biological Monitoring Wetland Human Disturbance Assessment* for scoring procedures and guidance.

For each wetland station assessed, score all factors in each section below using the following scale:

Severity	Severity Description	Rank
Not Observed or Unknown	The stressor is not observed or has no detrimental impact on wetland condition.	**0**
Observed; Minimal Disturbance	The stressor is present and appears to have negligible impacts on wetland condition.	**1**
Low Disturbance	The stressor is present and appears to have minor impacts on wetland condition.	**2**
Moderate Disturbance	The stressor is present and appears to moderately impact wetland condition.	**3**
High Disturbance	The stressor is present and appears to significantly impact wetland condition.	**4**
Severe Disturbance	The stressor is present and appears to have major impacts on wetland condition.	**5**

Section 1. Hydrologic Modifications to Wetland	Check if present	Score 0 to 5
Impoundment structures		
dams		
dikes		
man-made berms		
tide gates		
Other:		
Other structures that impede water flow		
causeways/roads		
railroad beds		
bridge abutments (and associated structures)		
inadequate, hanging or obstructed culverts (and associated structures)		
additional retaining walls/riprap (not included above)		
Other:		
Draining/Dewatering		
ditching		
drain tiles		
agricultural water withdrawal		
non-agricultural water withdrawal (fire hydrant, intake pipe)		
Other:		
Unnatural inputs of water		
stormwater drain/discharge		
combined sewer overflow		
municipal/industrial point source discharge		
agricultural irrigation		
spray irrigation (non-agricultural, waste discharge, etc.)		
Other:		
Filling and excavation		
fill – recent and/or ongoing		
fill – older, stabilized		
grading or bulldozing (elimination of micro-topography)		
plowing/tilling		
excavated farm pond		
other excavated pond		
excavated area associated with culvert or bridge		
channelization		
Other:		

Section 1. Hydrologic Modifications to Wetland (continued)	Check if present	Score 0 to 5
Natural hydrologic modifications (specify but do not score)		
beaver activity		
debris dams		
land slide		
major flooding/storm damage		
Other:		
Section 1 Comments:	**Section Score**	

Section 2. Vegetative Modifications to Wetland Score based on vegetation impacts directly in the wetland, not in the buffer or watershed.	Check if present	Score 0 to 5
Clearing/removal of vegetation		
roads		
recreation trails (atv, hiking, snowmobile, etc.)		
utility lines		
buildings, structures, parking lots, etc.		
mowing (in the wetland, not a lawn)		
brush hogging		
intentional/controlled burning		
human-caused accidental/arson fires		
chemical removal (herbicides, etc.)		
Other:		
Clearing/removal of wetland vegetation – forestry activities		
clear cut		
selective cut		
logging roads		
skidder trails/staging areas		
replacement of wetland vegetation by tree plantation		
Other:		
Clearing/removal of wetland vegetation - agricultural activities		
plowing/conversion to cropland		
pasture/grazing		
hayfield		
farm roads		
Other:		
Wetland vegetation changes due to other human activities (hydrological alterations, nutrient inputs, etc.)		
dead or dying vegetation due to inundation or flooding		
dead or dying vegetation due to desiccation (draining, water withdrawal, water diversion, upstream dam, etc.)		
replacement of natural plant community (excessive Typha sp., etc.)		
change in historic wetland class (conversion from PFO to PEM, etc.)		
Other:		
Presence of Non-aquatic Invasive Plants (total cover, all known species)		
Estimate total percent cover of non-aquatic invasive species in the assessment area using cover classes below and score accordingly. Check appropriate box if presence unknown and/or not assessed.		
1 (**< 5%** ☐ **5-10%** ☐) | **2** (**11-25%** ☐) | **3** (**26-50%** ☐) | **4** (**51-75%** ☐) | **5** (**76-100%** ☐) | **unknown/not assessed** ☐		
purple loosestrife		
Phragmites		
Other(s):		

Section 2. Vegetative Modifications to Wetland (continued) Score based on vegetation impacts directly in the wetland, not in the buffer or watershed.	Check if present	Score 0 to 5
Presence of Aquatic Invasive plants (check if present)**:** ☐ unknown/not assessed		
For aquatic invasive plants (floating or submerged), indicate if observed (positive ID) or known to be present through signs or other means. Check appropriate box if presence unknown and/or not assessed.		
Eurasian water- milfoil		
Variable water-milfoil		
Hydrilla		
Other(s)		
Natural vegetative modifications (specify but do not score)		
herbivory (insect damage, animal browsing, beavers, etc.)		
fires		
floods		
storm damage (blow downs, etc.)		
Other:		
Section 2 Comments:	**Section Score**	

Section 3. Evidence of Chemical Pollutants Score based on observations in the wetland and adjacent/upstream sources that may potentially impact the wetland.	Check if present	Score 0 to 5
Direct discharge present		
stormwater		
industrial discharge		
treatment plant		
combined sewer overflow		
leachate plume		
fish hatchery		
Other:		
Other evidence of contaminants		
documented previous oil/chemical spill		
free oil, petroleum, chemicals observed on site		
unusual water color/turbidity		
sheen (not from natural causes)		
soil staining (not from natural causes)		
foam (not from natural causes)		
chemical odor present		
sewage odor present		
evidence of CSO discharge (solids)		
sewage fungus present		
Other:		
Herbicide, pesticide and fertilizer application		
utility line maintenance		
agricultural application		
forestry application		
insect pest control (specify):		
invasive species management (plants, fish, etc.); Only score impacts to non-target species		
Other:		
Solid Waste		
municipal dump/landfill		
sludge spreading		
household trash/dumping		
petroleum, chemical containers, drums, etc.		
abandoned vehicles, tires, etc.		
demolition debris		
stump dump		
litter		
Other:		

Section 3. Evidence of Chemical Pollutants (continued)	Check if present	Score 0 to 5
Evidence of toxic effects to vegetation, aquatic life or wildlife in wetland		
dead, dying or stressed vegetation (no apparent natural causes)		
dead or dying fish, amphibians or other aquatic life/wildlife (no other apparent natural causes)		
Other:		
Section 3 Comments:	**Section Score**	

Section 4. Watershed Characterization and Potential NPS Pollution Impacts Score based on potential for erosion and sedimentation, urban runoff, nutrient enrichment, etc. in the wetland watershed.	Check if present	Score 0 to 5
Residential Development in watershed (including homes, lawns, residential roads)		
low density		
medium density		
high density		
Commercial/Industrial/Municipal Development in watershed (including associated roads, paved areas)		
stores/businesses/office buildings		
schools, universities		
landfills/transfer stations		
sewage treatment plants		
power generation facility		
composting facility		
manufacturing plants/factories		
gravel pits/mining		
airports		
railroads (tracks, rail yards, etc.)		
military facilities		
additional parking lots/ pavement (not associated with any of the above)		
Other:		
Recreation facilities in watershed		
lawn/park/picnic areas		
ball fields, tennis courts, basketball courts, etc.		
campgrounds		
boat launches		
piers/docks		
golf course		
trails (atv, hiking, snowmobile, etc.)		
boardwalks		
Wildlife Management Area (ME IF&W, US F&WS)		
Other:		
Additional Roads in watershed (not associated with any of the above)		
gravel, small, low usage		
gravel, large, more heavily used (the Golden Road)		
1 or 2 lane, paved		
>2 lane, paved		
Other:		
Forestry activities in watershed		
clear cut, recent/ongoing		
selective cut, recent/ongoing		
clear cut, older/recovering		
selective cut, older/recovering		
tree farm/plantation		
mixed or unknown type(s)		
Other:		
Agriculture in watershed		
pasture		
livestock		
feedlots		
manure piles/spreading		

Section 4. Watershed Characterization and Potential NPS Pollution Impacts (continued)	Check if present	Score 0 to 5
row crops		
hayfield		
fallow field		
commercial blueberry operations		
commercial cranberry operations		
commercial nursery		
commercial orchard		
sod farm		
mixed or unknown type(s)		
Other:		
Evidence of erosion, sedimentation and nutrient enrichment		
unstable soil in a position to wash into wetland or associated water body		
erosional gullies or washed out areas		
excess accumulated sediment		
sediment plume in water		
unnatural turbidity		
nuisance algae bloom		
presence of excessive duckweed (Lemna sp.)		
unusually heavy growth of epiphytic algae		
unusually dense or large growth habit of aquatic macrophytes or other vegetation		
Other:		
Alterations to wetland buffer (within 100 feet of wetland edge)		
Estimate total percent of buffer altered using cover classes below and score accordingly: **1** **2** **3** **4** **5** **< 5%** **5-10%** **11-25%** **26-50%** **51-75%** **76-100%** ☐ ☐ ☐ ☐ ☐ ☐		
Section 4 Comments:	**Section Score**	

Section 1 total: _____ (Hydrological Modifications to Wetland)

Section 2 total: _____ (Vegetative Modifications to Wetland)

Section 3 total: _____ (Evidence of Chemical Pollutants)

Section 4 total: _____ (Watershed Characterization and Potential NPS Pollution Impacts)

Total Wetland Human Disturbance Score (WHDS) _____

Additional Comments:

_____

_____

_____

_____

_____

_____

_____

This form is based on the Wetland Human Disturbance Assessment (WHDA) form created by the Biomonitoring Program of the Maine Department of Environmental Protection. 6/10/2014

PRE-FIELD METRICS

Site Name: **Site Code:** **Date** (yyyy-mm-dd)**:**
System: **Primary Surveyor:**
Overall EIA Rank:

LANDSCAPE CONTEXT

LAND USE INDEX

Calculate Land Use Index score using Landsat land cover data in a GIS (or calculate manually) following guidelines in manual; convert score to appropriate A–D rank.

Land Use Index Score	10–9.5	9.4–8	7.9–4	<4
Land Use Index Rank	**A** ☐	**B** ☐	**C** ☐	**D** ☐

Explain rank if adjusted:

PERCENT OF PERIMETER HAVING BUFFER

[estimate using 10 m minimum buffer width and length]

Natural buffer is ≥90%	**A** ☐
Natural buffer is 75–89%	**B** ☐
Natural buffer is 25–74%	**C** ☐
Natural buffer is <25%	**D** ☐
Explain rank if adjusted:	

AVERAGE BUFFER WIDTH

[average width measured along 8 spokes in 100 m zone surrounding wetland]

Average natural buffer width is ≥90 m	**A** ☐
Average natural buffer width is 75–89 m	**B** ☐
Average natural buffer width is 25–74 m	**C** ☐
Average natural buffer width is <25 m	**D** ☐
Explain rank if adjusted:	

SIZE

COMPARATIVE SIZE *SEE WETLAND SYSTEM DESCRIPTION*

Largest 10% based on current and historical sizes (very large compared to other examples of the same type); see Comparative Size Rank Table	**A** ☐
Within 10-30% of current and historical sizes (large compared to other examples of the same type); see Comparative Size Rank Table	**B** ☐
Within 30-70% of current and historical sizes (medium to small compared to other examples of the same type); see Comparative Size Rank Table	**C** ☐
Smallest 30% of current and historical sizes (small to very small compared to other examples of the same type); see Comparative Size Rank Table	**D** ☐
Explain rank if adjusted from one given in Comparative Size Rank Table:	

CHANGE IN SIZE

Occurrence is at or only minimally reduced (<3%) from its original natural extent due to human activity	**A** ☐
Occurrence is somewhat modestly reduced (3-10%) from its original natural extent	**B** ☐
Occurrence is modestly reduced (10-30%) from its original natural extent	**C** ☐
Occurrence is substantially reduced (>30%) from its original natural extent	**D** ☐
Explain rank if B, C, or D:	

Site Name: _____ Date: _____

VEGETATION

VEGETATION STRUCTURE *SEE WETLAND SYSTEM DESCRIPTION* [vertical layers and horizontal patches]

FORESTED FLOODPLAIN & SWAMP		NON-FORESTED WETLAND	
Canopy a mosaic of patches of different ages or sizes; gap sizes also vary; # of live tree stems 12-20" and >20" dbh well within expected range; very wide size-class diversity of downed logs and standing snags; characteristic woody species regenerating with expected abundance and diversity, so no human-related degradation to vegetation structure evident	A ☐	Characteristic woody species regenerating with expected abundance and diversity, so no human-related degradation to vegetation structure evident; some very wet peatlands or marshes may naturally not have any woody vegetation or only scattered stunted individuals; standing tree snags, dead shrubs, downed woody debris, and litter due to natural factors	A ☐
Canopy largely heterogeneous in age or size; # of live tree stems of medium and large size slightly below expected range; wide size-class diversity of downed logs and standing snags; characteristic woody species regenerating but present in somewhat lower abundance and/or diversity than expected due to human-related factors, so slight degradation to vegetation structure evident (e.g., low levels of cutting, browsing, and/or grazing)	B ☐	Characteristic woody species regeneration somewhat lower in abundance and/or diversity than expected due to human-related factors, so slight degradation to vegetation structure evident (e.g., low levels of cutting, browsing, grazing, and/or mowing); standing tree snags, dead shrubs, downed woody debris, and/or litter with minor alterations from human disturbances	B ☐
Canopy somewhat homogeneous in age or size; # of live tree stems of medium and large size moderately below expected range; moderate size-class diversity of downed logs and standing snags; characteristic woody species with noticeably reduced regeneration, abundance, and/or diversity than expected due to human-related factors, so moderate degradation to vegetation structure evident (e.g., intermediate levels of cutting, browsing, and/or grazing)	C ☐	Characteristic woody species regeneration moderately lower in abundance and/or diversity than expected due to human-related factors, so moderate degradation to vegetation structure evident (e.g., intermediate levels of cutting, browsing, grazing, and/or mowing); standing tree snags, dead shrubs, downed woody debris, and/or litter with moderate alterations from human disturbances	C ☐
Canopy very homogeneous in age or size; # of live tree stems of medium and large size substantially below expected range; low size-class diversity of downed logs and standing snags (or absent); characteristic woody species with severely reduced regeneration, abundance, or diversity than expected due to human-related factors, so substantial degradation to vegetation structure evident (e.g., high levels of cutting, browsing, or grazing)	D ☐	Characteristic woody species regeneration strongly altered in abundance or diversity than expected due to human-related factors, so substantial degradation to vegetation structure evident (e.g., high levels of cutting, browsing, grazing, or mowing); standing tree snags, dead shrubs, downed woody debris, or litter with substantial alterations from human disturbances	D ☐
Explain rank if B, C, or D:			

INVASIVE NON-NATIVE PLANT SPECIES COVER *SEE WETLAND SYSTEM DESCRIPTION*

Invasive plant species absent	A ☐
Cover of invasive plant species <1–4%	B ☐
Cover of invasive plant species 5–20%	C ☐
Cover of invasive plant species >20%	D ☐
Explain rank if B, C, or D:	

NATIVE PLANT SPECIES COMPOSITION *SEE WETLAND SYSTEM DESCRIPTION*

Native vegetation composition with expected species abundance and diversity: • Typical range of native diagnostic species present, including those native species sensitive to anthropogenic degradation, and • Native species indicative of anthropogenic disturbance (aggressive and weedy natives) absent to minor	A ☐
Native vegetation composition (species abundance and diversity) slightly altered from expected due to human factors: • Some native diagnostic species absent or substantially reduced in abundance, and/or • Some native species indicative of anthropogenic disturbance (aggressive and weedy natives) are present but minor in abundance	B ☐
Native vegetation composition (species abundance and diversity) moderately altered from expected due to human factors: • Many native diagnostic species absent or substantially reduced in abundance, and/or • Species are still largely native and characteristic of the type, but they also include aggressive and weedy natives	C ☐
Native vegetation composition (species abundance and diversity) substantially altered from expected due to human factors: • Most or all native diagnostic species absent, a few may remain in very low abundance, or • Native species from entire strata may be absent or vegetation is dominated by weedy species, or comprised of planted stands of non-characteristic species, or unnaturally dominated by single species (aggressive natives)	D ☐
Explain rank if B, C, or D:	

Site Name: _____ Date: _____

HYDROLOGY

WATER SOURCE *SEE WETLAND SYSTEM DESCRIPTION* [nature of water inputs and diversions]

Non-Tidal			Tidal	
Water source is natural; hydrology is dominated by precipitation, groundwater, natural runoff, and/or overbank flow; there is no indication of direct artificial water sources; land use in the wetland's local drainage area is primarily open space or low density, passive uses	A ☐		Tidal and non-tidal water sources are natural with no artificial alterations to natural salinity; no indication of direct artificial water sources (e.g., land use in the local drainage area of the wetland is primarily open space or low density, passive uses); lacks point source discharges into or adjacent to the wetland	A ☐
Water source contains slight amounts of inflow from anthropogenic sources; indications of anthropogenic input include developed land (<20%) in the immediate drainage area of the wetland, some road runoff, small storm drains, and/or minor point source discharges into or adjacent to the wetland	B ☐		Tidal and non-tidal water sources are slightly altered by human impacts; wetland directly receives slight amounts of inflow from anthropogenic sources; indications of anthropogenic input include developed land (<20%) in the immediate drainage area of the wetland, some road runoff, small storm drains and/or minor point source discharges into or adjacent to the wetland	B ☐
Water source contains moderate amounts of inflow from anthropogenic sources; indications of anthropogenic input include 20-60% developed land adjacent to the wetland, moderate amounts of road runoff, moderately-sized storm drains, and/or moderate point source discharges into or adjacent to the wetland	C ☐		Tidal and non-tidal water sources are moderately altered by human impacts; wetland directly receives moderate amounts of inflow from anthropogenic sources; indications of anthropogenic input include 20-60% developed land adjacent to the wetland, moderate amounts of road runoff, moderately-sized storm drains, and/or moderate point source discharges into or adjacent to the wetland	C ☐
Water source contains substantial amounts of inflow from anthropogenic sources; indications of anthropogenic input include >60% developed land adjacent to the wetland, large amounts of road runoff, large-sized storm drains, or major point source discharges into or adjacent to the wetland	D ☐		Tidal and non-tidal water sources are substantially altered by human impacts; wetland directly receives substantial amounts of inflow from anthropogenic sources; indications of anthropogenic input include >60% developed land adjacent to the wetland, large amounts of road runoff, large-sized storm drains, or major point source discharges into or adjacent to the wetland	D ☐
Explain rank if B, C, or D:				

Site Name: _____ Date: _____

HYDROLOGY

HYDROPERIOD *SEE WETLAND SYSTEM DESCRIPTION*

[assessment of the characteristic frequency, duration, intensity, and/or timing of inundation, saturation, and/or drawdown]
[includes assessment of the effects dams may have on wetland system hydroperiod even when the dam is located a considerable distance up- or downstream from the wetland]

Riverine/Lacustrine [channels, open & forested floodplains, shores]		**Non-Riverine Enriched** [rich swamps, medium & rich fens, drainage marshes]		**Nutrient-Poor Isolated Wetlands** [bogs & poor fens, poor swamps, basin marshes]		**Tidal** [salt & brackish marshes, tidal flats, subtidal]	
Natural patterns of flood frequency, duration, intensity, and/or timing; stressors that impact the natural hydroperiod absent; channel/riparian zone characterized by equilibrium conditions, with no evidence of severe aggradation or degradation (see field indicators in manual)	**A** ☐	Natural patterns of inundation & drawdown, saturation, and/or seepage discharge; stressors that impact the natural hydroperiod absent	**A** ☐	Naturally stable and saturated hydrology, or natural cycles of saturation and partial drying; stressors that impact the natural hydroperiod absent	**A** ☐	Full natural tidal prism, with two daily tidal minima and maxima; storm tides, tidal river flooding, and onshore wind-maintained high tides causing short-term changes in tidal amplitude are within the expected norm	**A** ☐
Flood frequency, duration, intensity, and/or timing deviate slightly from natural conditions due to stressors (e.g., flood control dams upstream or downstream slightly effect hydroperiod, small ditches/diversions, berms or roads near grade, minor pugging, and/or minor flow additions); outlets may be slightly constricted; if managed water levels, they closely mimic natural patterns (very unusual for artificial wetland to be rated here); some aggradation or degradation of shore/bank, none of which is severe	**B** ☐	Deviates slightly from natural patterns of inundation & drawdown, saturation, and/or seepage discharge due to stressors (e.g., small ditches/diversions, berms or roads near grade, minor pugging, and/or minor flow additions); outlets may be slightly constricted	**B** ☐	Deviates slightly from naturally stable and saturated hydrology, or natural cycles of saturation and partial drying due to stressors (e.g., small ditches/diversions, berms or roads near grade, minor pugging, and/or minor flow additions)	**B** ☐	Slightly muted tidal prism, although two daily minima and maxima are observed, and/or slightly inadequate drainage such that a small part of the marsh remains flooded during low tide	**B** ☐
Flood frequency, duration, intensity, and/or timing deviate moderately from natural conditions due to stressors (e.g., flood control dams upstream or downstream moderately effect hydroperiod, ditches/diversions 1–3 ft. deep, two lane roads, culverts adequate for base stream flow but not flood flow, moderate pugging, and/or moderate flow additions); outlets may be moderately constricted, but flow still possible; if managed water levels, they less closely mimic natural patterns; moderate to severe aggradation or degradation of shore/bank	**C** ☐	Deviates moderately from natural patterns of inundation & drawdown, saturation, and/or seepage discharge due to stressors (e.g., ditches/diversions 1–3 ft. deep, two lane roads, culverts adequate for base stream flow but not flood flow, moderate pugging, and/or moderate flow additions); outlets may be moderately constricted, but flow still possible	**C** ☐	Deviates moderately from naturally stable and saturated hydrology, or natural cycles of saturation and partial drying due to stressors (e.g., ditches/diversions 1–3 ft. deep, two lane roads, culverts adequate for base flow but not flood flow, moderate pugging, and/or moderate flow additions)	**C** ☐	Moderately muted tidal prism and/or moderately inadequate drainage such that a significant portion of the marsh remains flooded during low tide	**C** ☐
Flood frequency, duration, intensity, and/or timing deviate substantially from natural conditions due to stressors (e.g., flood control dams upstream or downstream substantially effect hydroperiod, 4-lane highway, large dikes, diversions >3 ft. deep that withdraw a significant portion of flow, large amounts of fill, significant artificial groundwater pumping, or heavy flow additions); outlets may be significantly constricted, blocking most flow; if managed water levels, they are not connected to natural seasonal fluctuations; shore/bank is concrete or artificially hardened or with severe aggradation or degradation	**D** ☐	Deviates substantially from natural patterns of inundation & drawdown, saturation, and/or seepage discharge due to stressors (e.g., 4-lane highway, large dikes/diversions >3 ft. deep that withdraw a significant portion of flow, large amounts of fill, significant artificial groundwater pumping, or heavy flow additions); outlets may be significantly constricted, blocking most flow	**D** ☐	Deviates substantially from naturally stable and saturated hydrology, or natural cycles of saturation and partial drying due to stressors (e.g., 4-lane highway, large dikes/diversions >3 ft. deep that withdraw a significant portion of flow, large amounts of fill, significant artificial groundwater pumping, or heavy flow additions)	**D** ☐	Substantially muted tidal prism or inadequate drainage such that most or all of the marsh remains flooded during low tide	**D** ☐
Explain rank if B, C, or D:							

Site Name: _____ Date: _____

HYDROLOGY

HYDROLOGIC CONNECTIVITY [ability of water to naturally flow into or out of the wetland, or to inundate adjacent areas]

Riverine/Lacustrine [channels, open & forested floodplains, shores]		**Non-Riverine Enriched** [rich swamps, medium & rich fens, drainage marshes]		**Nutrient-Poor Isolated Wetlands** [bogs & poor fens, poor swamps, basin marshes]		**Tidal** [salt & brackish marshes, tidal flats, subtidal]	
River or lake is completely connected to floodplain/shore, backwater sloughs, and channels; no geomorphic modifications made to contemporary floodplain/shore; channel is not unnaturally entrenched	**A** ☐	No unnatural obstructions to lateral and vertical movement of ground or surface water; rising water in the wetland has unrestricted access to adjacent upland, without obstructions to the lateral movement of flood flows; if perched water table then impermeable soil layer intact	**A** ☐	No unnatural barriers restricting water movement into or out of wetland from adjacent areas	**A** ☐	Tidal channel sinuosity reflects natural processes; unimpeded tidal flooding; total absence of tide gates, flaps, dikes, culverts, and human-made channels	**A** ☐
River or lake is slightly disconnected from floodplain/shore, backwater sloughs, and channels (<25% of banks affected) due to dikes, tide gates, rip rap, and/or elevated culverts; channel is slightly entrenched (overbank flow occurs during most floods)	**B** ☐	Slight restrictions (impacting <25% of the wetland) to the lateral and/or vertical movement of ground or surface waters by unnatural features (e.g., levees and/or excessively high banks); restrictions may be intermittent along the wetland, or the restrictions may occur only along one bank or shore; flood flows may exceed the obstructions, but drainage back to the wetland is incomplete due to impoundment; if perched then impermeable soil layer slightly disturbed (e.g., by drilling or blasting)	**B** ☐	Surrounding land use slightly restricts water movement into or out of wetland	**B** ☐	Tidal channel sinuosity slightly altered; tidal flooding is slightly impeded by tide gates, flaps, dikes, culverts, and/or human-made channels	**B** ☐
River or lake is moderately disconnected from floodplain/shore, backwater sloughs, and channels (25-75% of banks affected) due to dikes, tide gates, rip rap, and/or elevated culverts; channel is moderately entrenched (overbank flow only occurs during moderate to severe floods)	**C** ☐	Moderate restrictions (impacting 25-75% of the wetland) to the lateral and/or vertical movement of ground or surface waters by unnatural features (e.g., levees and/or excessively high banks); flood flows may exceed the obstructions, but drainage back to the wetland is incomplete due to impoundment; if perched then impermeable soil layer moderately disturbed (e.g., by drilling or blasting)	**C** ☐	Surrounding land use moderately restricts water movement into or out of wetland	**C** ☐	Tidal channel sinuosity moderately altered; tidal flooding is moderately impeded by tide gates, flaps, dikes, culverts, and/or human-made channels	**C** ☐
River or lake is substantially disconnected from floodplain/shore, backwater sloughs, and channels (>75% of banks affected) due to dikes, tide gates, rip rap, or elevated culverts; channel is substantially entrenched (overbank flow never occurs or only during severe floods)	**D** ☐	Substantial restrictions (impacting >75% of the wetland) to the lateral or vertical movement of ground or surface waters by unnatural features (e.g., levees or excessively high banks); most or all water stages are contained within the obstructions; if perched then impermeable soil layer substantially disturbed (e.g., by drilling or blasting)	**D** ☐	Surrounding land use substantially restricts water movement into or out of wetland	**D** ☐	Tidal channel sinuosity substantially altered; tidal flooding is substantially impeded by tide gates, flaps, dikes, culverts, or human-made channels	**D** ☐

Explain rank if B, C, or D:

Site Name: _____ Date: _____

SOIL

SOIL CONDITION

Non-Tidal		Tidal	
Bare soil areas are limited to naturally caused disturbances such as flood deposition or game trails	**A** ☐	Excluding mud flats, bare soils are naturally occurring and largely limited to salt pannes	**A** ☐
Slight amounts of bare soil areas due to human causes (e.g., soil trampling by livestock or ruts by off-road-vehicles shallow; slight amounts of unnatural ponding or channeling of water)	**B** ☐	Small amounts of bare soil areas caused by rafts of anthropogenic debris (killing marsh vegetation and creating artificial pannes), ditch spoils impounding water and forming artificial pannes, trampling by livestock, and/or erosion of marsh and channel banks due to excavation by marine traffic or altered current/tidal patterns resulting from deficient culverts (leading to erosion)	**B** ☐
Moderate amounts of bare soil areas due to human causes (e.g., soil trampling by livestock or ruts by off-road-vehicles moderately deep; moderate amounts of unnatural ponding or channeling of water)	**C** ☐	Moderate amounts of bare soil areas caused by rafts of anthropogenic debris (killing marsh vegetation and creating artificial pannes), ditch spoils impounding water and forming artificial pannes, trampling by livestock, and/or erosion of marsh and channel banks due to excavation by marine traffic or altered current/tidal patterns resulting from deficient culverts (leading to erosion)	**C** ☐
Substantial amounts of bare soil areas due to human causes (e.g., soil trampling by livestock or ruts by off-road-vehicles substantially deep; substantial amounts of unnatural ponding or channeling of water contributing to altered hydrology or other long-lasting impacts)	**D** ☐	Substantial amounts of bare soil areas caused by rafts of anthropogenic debris (killing marsh vegetation and creating artificial pannes), ditch spoils impounding water and forming artificial pannes, trampling by livestock, or erosion of marsh and channel banks due to excavation by marine traffic or altered current/tidal patterns resulting from deficient culverts (leading to erosion)	**D** ☐
Explain rank if B, C, or D:		Explain rank if B, C, or D:	

LEVEL 2 STRESSOR CHECKLIST

Site Name:		Site Code:		Last Obs (yyyy-mm-dd):	
System:				Surveyor:	

Stressors: human activities or processes that have caused, are causing, or may cause the destruction, degradation, and/or impairment of biodiversity and natural processes (e.g., ditching, logging, exotic pest diseases, septic tanks, or pesticide spray). Altered disturbance regime may be stressor (e.g., flooding, fire, or browse).

Some Important Points about the Stressor Checklist.

1. Stressor checklist must be completed for Landscape Context (LC), Vegetation, Soil, and Hydrology.
2. Assessment of LC is here limited to stressors found from system perimeter out to 100 m (not for stressors beyond 100 m or the degree to which LC stressors may impact the wetland system being evaluated).
3. Stressors for Vegetation, Soil, and Hydrology are assessed for the very same area for which the Level2 metrics ratings are applied (i.e., to the **wetland system [WS]**).
4. Threat impact is calculated considering only present observed or inferred stressors (if inferred, the reason for the inference should be clearly stated)
5. If two stressors conceptually overlap as applied at a particular site, choose only one and note the overlap.

SCOPE of threat: percent of LC or system affected [Assess for up to next 10 years]	
1 = Small	Affects a small (1-10%) proportion of the total occurrence
2 = Restricted	Affects some (11-30%) of the total occurrence
3 = Large	Affects much (31-70%) of the total occurrence
4 = Pervasive	Affects all or most (71-100%) of total occurrence
SEVERITY of degradation in scope [Assess for up to next 10 years]	
1 = Slight	Likely to only slightly degrade/reduce occurrence
2 = Moderate	Likely to moderately degrade/reduce occurrence
3 = Serious	Likely to seriously degrade/reduce occurrence
4 = Extreme	Likely to extremely degrade/destroy or eliminate occurrence

		LC [100 m]			Vegetation [WS]			Soil [WS]			Hydrology [WS]			
	STRESSOR CHECKLIST	Scope	Severity	Impact	Scope	Severity	Impact	Scope	Severity	Impact	Scope	Severity	Impact	Comments [LC=LandCon, V=Veg, S=Soil, H=Hydro]
DEVLOP	Residential													
	Industrial, commercial, military													
	Sports field, golf course, urban parkland, lawn													
	Row-crop agriculture, orchard/nursery													
	Hay field													
	Roads [gravel, paved, highway], railroad													
	Livestock, grazing, excessive herbivory													
	Utility/powerline corridor													
	Other [specify]:													
REC	Passive recreation [bird, hike, trample, camp]													
	Active recreation [ATV, mt bike, hunt, fish, boat]													
	Other [specify]:													
VEG	Woody resource extraction: logs, shrub cuts, debris													
	Vegetation management: cutting, mowing													
	Excessive animal herbivory or insect damage													
	Invasive exotic plant species													
	Aggressive native plant species													
	Herb-Pesticide, vector control, chemicals [give evidence]													
	Other [specify]:													
NDD	Altered natural disturb regime [specify expected regime]													
	Other [specify]:													
SOIL	Incr sediment/org debris, erosion, gully [logged sites]													
	Filling, spoils, excavation													
	Soil disturbance: trampling, vehicle, pugging, skidding													
	Grading, compaction, plowing, discing													
	Physical resource extraction: rock, sand, gravel, etc													
	Trash or refuse dumping													
	Other [specify]:													
HYDROLOGY	Dam, ditch, diversion, dike, levee, unnat inflow, reservoir													
	Water extraction [lake/groundwater; water table lowered]													
	Flow obstructions [culverts, paved stream crossings]													
	Engineered channel [riprap, armored bank, bed]													
	Actively managed hydrology [controlled lake level]													
	Tide gate, weir/drop structure, dredged inlet/channel													
	PS Discharge: treatment water, non-storm discharg, septic													
	NPS Discharge: urban runoff, farm drainage													
	Other [specify]:													

Wetland Assessment - Plant Data Sheet - 1

(Plant retrievals and observations from aquatic sampling)

Station ID:	Date:	Crew:
Wetland/water body:		Town:

Site #	Water Depth (m)	Plant tag #	Retrieved/ Observed (R/ O)	Plant Species (Aquatic/submergent/emergent) One species per line	Abundance: Dominant, Common, Sparse, Found	F-floating S-submergent E-emergent W-woody
1						
1						
1						
1						
1						
1						
1						
1						
1						
1						
1						
1						
1						
1						
1						
1						
1						
1						
Site 1 Comments:						
2						
2						
2						
2						
2						
2						
2						
2						
2						

Dominant > 60% Common 21-60% Sparse 2-20% Found < 2%

Wetland Assessment – Plant Data Sheet – 2

(Plant retrievals and observations from aquatic sampling)

Station ID:	**Date:**	**Crew**:
Wetland/water body:		**Town:**

Site #	Water Depth (m)	Plant tag #	Retrieved/ Observed (R/ O)	Plant Species (Aquatic/submergent/emergent) One species per line	Abundance: Dominant Common Sparse, Found	F-floating S-submergent E-emergent W-woody
2						
2						
2						
2						
2						
2						
2						
2						
2						
Site 2 Comments:						
3						
3						
3						
3						
3						
3						
3						
3						
3						
3						
3						
3						
3						
3						
3						
3						
3						
3						
3						
3						
Site 3 comments:						

Dominant > 60% Common 21-60% Sparse 2-20% Found < 2%

Wetland Assessment - Plant Data Sheet – page 1
Aquatic vegetation sampling - retrievals and observations

Station ID:	**Date:**	**Crew:**
Town:	**Wetland/Waterbody name:**	
Water level: high / med / low		

Species Name or Pseudonym	1 R/O	Frm	Ab		2 R/O	Frm	Ab		3 R/O	Frm	Ab		4 R/O	Frm	Ab		5 R/O	Frm	Ab		6 R/O	Frm	Ab	
	depth 1 (cm):				depth 2 (cm):				depth 3 (cm):				depth 4 (cm):				depth 5 (cm):				depth 6 (cm):			
	substrate:				substrate:				substrate:				substrate:				substrate:				substrate:			
	wypt:				wypt:				wypt:				wypt:				wypt:				wypt:			

Abundance (Ab): **D**ominant > 60% **C**ommon 21-60% **Sp**arse 2-20% **P**resent < 2%

Plant **Form (Frm):** **F-Free**-floating **FL:** Floating Leaf **S**-submergent **E**-emergent

Substrate: (**Soft):** silt / clay/ muck / detritus (**Hard):** Rock / gravel / sand

Appendix H

Wetland Assessment - Plant Data Sheet – page 2
Aquatic vegetation sampling - retrievals and observations

Station ID:	Date:	Crew:
Town:	Wetland/waterbody name:	

Species Name or Pseudonym	1 R/O	Frm	Ab	2 R/O	Frm	Ab	3 R/O	Frm	Ab	4 R/O	Frm	Ab	5 R/O	Frm	Ab	6 R/O	Frm	Ab
	depth 1 (cm):			depth 2 (cm):			depth 3 (cm):			depth 4 (cm):			depth 5 (cm):			depth 6 (cm):		
	substrate:			substrate:			substrate:			substrate:			substrate:			substrate:		
	wypt:			wypt:			wypt:			wypt:			wypt:			wypt:		
General notes:	Note 1:			Note 2:			Note 3:			Note 4:			Note 5:			Note 6:		

Abundance (Ab): **D**ominant > 60% **C**ommon 21-60% **Sp**arse 2-20% **P**resent < 2%

Plant **Form (Frm):** **F-Free**-floating **FL:** Floating Leaf **S**-submergent **E**-emergent

Substrate: (**Soft):** silt / clay/ muck / detritus (**Hard):** Rock / gravel / sand

Aquatic Macrophyte Sampling Protocol for Wetland Assessment

Purpose

This protocol aims to provide limited baseline information that can assist in establishing future trends (when additional sampling occurs in the future), identify the need for more intensive sampling, and overall aims to complement existing protocols (macroinvertebrate and water) that inform wetland condition. Last but not least, it attempts to do so with limited resources (field survey time, especially).

Background

Increasingly plants are being used as indicators of condition, from microscopic algae to macrophytes. Macrophytes consist principally of aquatic vascular flowering plants, but also include the aquatic mosses, liverworts, ferns and larger macroalgae. Macrophytes are an important component of aquatic ecosystems. They provide physical structure, increase habitat complexity and heterogeneity and affect a diversity of organisms like invertebrates, fishes and water birds. Additionally, submerged macrophytes create microhabitats, replenish detritus and benthos algae eaten by invertebrates, stabilize sediments and store nutrients (Klepinger, 1985).

It is important to choose or develop a sampling method that is as objective and as quantitative as possible while balancing the need to consider macrophytes in the assessment of wetland condition, with the challenges of characterizing aquatic habitat. While rapid assessment methods have been developed for wetlands, there are virtually no methods that assess wetlands and include sampling of aquatic macrophytes. Additional challenges to sampling aquatic macrophytes include the difficulty of accessing entire wetland where open water is limited and the use of a boat is not possible.

The data obtained may be used in wetlands assessments that incorporate floristic quality assessment indices (for vascular species). Additional indices may be developed as further macrophyte sampling is conducted and patterns or trends emerge.

Surveyors should be familiar with regional aquatic macrophyte species and the use of plant identification keys (e.g., Haines 2011). Surveyors should also know how to prepare and preserve aquatic plants for lab/office identification or submission to a qualified plant taxonomist.

Protocol

Timing: Preferably mid July through August so fruits (or flowers) are more likely to be available for identification, and annual plants (like Najas) are apparent. Earlier sampling is possible, but identification can be more difficult.

Equipment

- ☐ Canoe (and PFDs) or waders to access sampling locations
- ☐ GPS unit to record sampled locations
- ☐ Shrub rake with 48” metal handle and 8- inch wide head (at least 11-tines wide).
- ☐ Clip board and pencils
- ☐ Extra blank Rite in the Rain paper for plant labels
- ☐ Cooler with ice
- ☐ A supply of 13 gallon white opaque plastic trash bags (likely max of 6 per station)
- ☐ A supply of 1-2 gallon self-closing plastic bags (e.g., Ziploc)
- ☐ Wetland Assessment - Plant Data Sheet on Rite in the Rain paper
- ☐ Map/imagery of lake/ pond/ wetland (with bathymetry or depth information where available)
- ☐ Waterproof camera
- ☐ Meter stick or weighted measuring tape
- ☐ Polarized sunglasses
- ☐ Permanent marker (to label plastic bags)
- ☐ List of RTE species in freshwater aquatic environments (and ID info)
- ☐ ID information (waterproof card) for invasive plant species
- ☐ Mylar “bag” (to hold plastic bags and “shade” plants)

☐ Anchor for canoe (optional)

Lab equipment

☐ Large white shallow pan or dishpan
☐ Plant press with blotters and newsprint
☐ Wax paper (for pressing of thin or fine-leaved aquatic plants).

To keep collected plants cooler on sunny days, make a Mylar emergency blanket into a bag (fold in half tape sides and bottom with packing tape). Keep plastic bags of collected specimens in Mylar bag until they can be put in a cooler and taken back to lab for ID/ pressing/ processing.

Methods Overview

Pre field preparation

- Obtain an aerial image of the wetland to be surveyed during the summer growing season (such as the USDA NAIP imagery) that includes the entire open water area within the assessment area. On a computer screen or a high-resolution printed image, review the visible aquatic and wetland vegetation. Target potential areas to sample the aquatic vegetation or to identify the signatures of dominant vegetated areas depicted on the imagery, after reviewing the following protocol.
- Check with your Natural Heritage Program regarding the sampling locations and known or potential rare aquatic macrophyte species to be aware of.

Preparing for field sampling

Sample a total of six locations for aquatic macrophytes as described below:

a) Three locations near to each of the three macroinvertebrate sampling locations "in areas of emergent vegetation or macrophyte beds having a similar habitat ...representative of the overall site."[1]

b) An additional three locations located within the assessment area, where the water depth is one meter or less; the three additional locations **need not** be comparable to the macroinvertebrate sampling locations.

Selecting Sampling locations

1.1. Select the three locations where the macroinvertebrate samples will be collected (sites 1, 2 and 3). Consistent with existing protocols, select locations where water depths are one meter or less.

1.2. After collecting the first macroinvertebrate sample, locate an area in a close and comparable location (such as the other side of the boat, or adjacent area if using waders).

1.3. Take a GPS point at the vegetation sampling location and record the water depth.

1.4. Use the shrub rake to sweep just above the bottom substrate for a continuous one-meter sweep, in a continuous motion and lift the shrub rake and any collected vegetation out of the water.

1.5. Review the plants retrieved. It may be necessary to spread them out on a white plastic bag to group by species. It may be helpful to photograph the materials retrieved by the single sweep of the shrub rake (add a label/sign in the photograph so you can refer to it later and associate it with a site and location. (Station name/ date/ site 3 retrieve). Check for any invasive species as well as any rare, threatened or endangered species. Collect a voucher specimen of any potential invasive for confirmation. Follow recommendations from your Natural Heritage Program for collection of rare plants.

Notify your invasive species coordinator immediately if you have collected a plant that may be an invasive species.

[1] MDEP Wetland Sampling Steps to Success: Collecting Macroinvertebrates Using a Dip Net Measured Sweep. DEP-LW0877; NHDES Collecting Macroinvertebrates Using a Dip Net Measured Sweep (NHDES, 2016)

1.6. Identify the species of the plants collected with the shrub rake and record each species on the Wetland Assessment - Plant Data Sheet.

1.6.1. If the genus is known, but species is unknown, add to the genus a number and short description of identifying characteristics is substituted for the species (*Potamogeton*1 – fine subm. lvs).

1.6.2. Where neither genus nor species name is known, create a descriptive name reflecting growth habit, microhabitat, or some distinctive morphological feature. (Narrow-lvd emerg, red base)

1.7. Estimate and record the relative abundance of each species (based on relative quantity on the shrub rake). Example, 100 *Lemna minor* plants would be assigned a smaller relative abundance category than 2 *Nuphar plants* and leaves).

> If conditions, timing, or the lack of plant species names make this "abundance estimation" effort too time consuming in the field the retrieved plant material can be placed in the opaque plastic bags and further work to identify and assign a relative abundance can be done in the lab within a day or two.
>
> Check for any animals (macroinvertebrates or small vertebrates) before bagging the material for identification and recording.

Record any other organisms collected with the rake's retrieved material (such as freshwater sponge). If the relative abundance of the retrieved material in the rake does not match the visual observation of that plant's relative abundance, note that in the comment section. This could be the case with water lilies or *Brasenia*, which may have a partial stem retrieved in the shrub rake, but are very abundant at the surface in the vicinity of the shrub rake sweep.

1.8. If no plants were collected by the shrub rake, make such notation (in the notes area on page 2).

1.9. Record information about the substrate. If possible, use an Ekman dredge to sample the benthic substrate.

1.10. Place any unidentified rake-retrieved plant material in a labeled opaque large plastic bag. For some species, it may preferable to place the collected plant (with some water) in a plastic container (a 1-liter container or smaller)

1.11. Record observed (non-retrieved) plant species in the vicinity (5m radius).

1.12. Take photo at each location and confirm that it captures the characteristics that you have observed and recorded in field notes. If the water column is clear and there is sufficient light, take a photo underwater in the vicinity of the sampling locations as well.

1.13. Repeat at the two additional macroinvertebrate sampling locations/vicinities. (1.2 – 1.13)

1.14. To select three additional sampling locations (4, 5, and 6), briefly survey the assessment area beyond the macroinvertebrate locations sampled. Identify different vegetation or substrates that may not be considered comparable to the macroinvertebrate sampling locations. Potential sampling locations of these additional locations should also be limited to water depths of 1 meter or less.

1.15. Use the depth or bathymetry map and aerial imagery to potentially target locations as part of your sampling preparation. If flowing water, choose the inside or outside of a bend in a flowing waterbody, a shoreline with a different aspect ("facing" east vs. west, near location of an inflow or outflow).

1.16. Measure the water depth at a location that is one meter or shallower in depth. Conduct the one meter sweep with the shrub rake. Record your location with the GPS unit.

1.17. Repeat steps 1.3 through 1.12 for a total of three macroinvertebrate plus macrophyte sampling locations AND three macrophyte-only sampling locations.

1.18. Decontaminate equipment according to existing SOPs before leaving the wetland and sampling at a subsequent location.

Completing the Wetland Assessment Plant Data Sheet

1. Complete the information in the heading: station ID, town, date, wetland/waterbody name/ crew (A heading to complete is provided on both pages 1 and 2).
2. When you are in the field, identify whether the water level is considered high, medium, or low. This is based on the water level relative to any water marks on rocks, trees, exposed roots, flooded shrubs, etc. and not relative to any seasonal changes. Low water is considered low regardless of whether in June or August.
3. Once you select an appropriate location (as described in the protocol), use the shrub rake to complete a one meter sweep. When the rake is retrieved and the plant material is reviewed record the species of each plant, for those species retrieved enter "R" in the R/O column. If a plant species is not retrieved but only observed (see step 6 below), enter the letter "O."
4. In the "frm" column, add the appropriate letter for the form of the plant: Free-floating, Floating Leaved, Submergent, Emergent.
5. In the "Ab" column, record the appropriate abundance category based on the relative abundance of each species retrieved (or if not retrieved, then observed):

   Dominant **> 60%**, **C**ommon **21-60%** , **Sp**arse **2-20%**, **P**resent **< 2%** .

6. Record the depth of the shrub rake retrieve (in centimeters) "depth 1...", in the "substrate" section, enter the substrate observed for each sampling location, and in the "wypt" section, enter the GPS waypoint on the form.

   In addition to retrieving aquatic plants with the shrub rake, conduct a visual survey of the vegetation within a 5 m area of each sampling location. Record the species noted and the relative abundance in the area surveyed. If a species is under-represented in the retrieve and a visual survey shows it to be more abundant, record the abundance information and make note about the species' abundance observed noted in the visual survey.

Definitions

Submergent species/form**-** These plants grow primarily under the water surface. Upper leaves may float near the surface and flowers may extend above the surface, although they are mostly rooted to the bottom (although the inflorescence may be above water).

Emergent species/form - Rooted plants with significant portions extending above the water surface, Arrowhead (*Sagittaria* spp), Pickerelweed (*Pontederia cordata*), cattail (*Typha* spp.), purple loosestrife (*Lythrum salicaria*), bulrushes (*Schoenoplectus* spp.), spike rushes (*Eleocharis spp.*), sedges (*Carex* spp.).

Floating-leaved species/forms: Those plants that are rooted to the bottom but typically have floating leaves; these include water lilies (*Nuphar*, *Nymphaea*), and *Brasenia.*

Floating species: Those plants that float freely on the surface and are not rooted to the bottom; primarily species in the Lemnaceae, (duckweed family), which includes *Lemna*, *Wolffia*, and *Spirodela*.

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Collecting Macroinvertebrates Using a Dip Net Measured Sweep

Sampling Season: mid-June to mid-August

Macroinvertebrate Collection

- Collect from areas not disturbed by other sampling.
- Complete all sweeps in areas of emergent vegetation or macrophyte beds having a similar habitat that is representative of the overall site (station).
- Three macroinvertebrate samples should be collected per site (station).

Dip Net Measured Sweep:

- Using a 600 micron D-frame (dip) net, sweep through the water for a 1-meter measured sweep. (A meter-wide mark may be placed on the boat gunnel to assist in standardizing the measurement)
- Bump net against bottom substrate 3 times (beginning, middle, end), to dislodge and collect organisms from the sediment.
- Keep the net submerged during the entire sweep.
- Complete sweep in approximately 3 seconds.
- At the end of the sweep, turn net so the opening is facing the surface of the water and lift the net quickly out of the water - so no organisms are lost out of the opening.
- *If net becomes clogged or full of organic matter*, discard the sample and start again in an undisturbed location, using a modified approach by reducing the depth of the sweep (not bumping the net off the substrate bottom).
- For plants that hang over the rim of the net, retain the part within the net rim, and discard any part of the plant that extends outside the rim.
- Transfer all material collected in the net into a 500 micron sieve bucket by placing the bucket halfway into the water and turning the net inside out into the bucket.
- Visually inspect the net and remove any clinging organisms.
- Examine, wash, and discard any large pieces of vegetation, woody debris, and stones – remove and retain any aquatic macroinvertebrates observed.
- Retain fine plant material and detritus.
- Drain water out of sieve bucket and transfer all material collected into a 1 liter container(s). None of the containers should be more than half full. The amount of water that is associated with the macroinvertebrate samples and debris placed in the 1 liter container(s) should be minimized.
- Preserve samples in 95% ethyl alcohol for later sorting and taxonomic analysis in the laboratory.
- Repeat process in two additional similar locations (similar water depth, vegetative community structure, and substrate type) at the site to collect a total of three replicate samples.

Other information collected at each macroinvertebrate sampling location:

- Physical/chemical water characteristics using hand-held meters.
  Water grab sample from one macroinvertebrate sampling location, for analysis at the lab.

Adapted from: Wetland Sampling Steps to Success: Collecting Macroinvertebrates Using a Dip Net Measured Sweep. Maine DEP-LW0877

Subset of Statistical Analyses for Comparison of Parameters to Attainment Class

Parameters compared to attainment class or indeterminate status	A- Overall Normality Test using Shapiro-Wilk If p ≥ 0.05, samples are assumed to come from normally distributed population	B - ANOVA If p < 0.05 then one or more pairs are assumed to be different	C - Tukey Multiple Comparison of Means	Pairs Determined to be Significantly Different based on Tukey Test	D- Multiple Pairwise comparison for a one-way Anova	Pairs Determined to be Significantly Different based on multiple pairwise comparison for one-way ANOVA	E - Pairwise Comparisons using the Bonferroni adjustment	Pairs Determined to be Significantly Different based on Bonferroni adjustment	F Levene's test for 1-Way ANOVA If p > 0.05 homogeneity of variances between groups is assumed	G-Welch One-way test (Use with one-way ANOVA when Levene's Test indicates NO homogeneity of variance between groups)	H- Pairwise t-test (assumes normal distribution) with no assumption of equal variance and a Bonferroni adjustment. (Use w/ one-way ANOVA when Levene's Test indicates no homogeneity of variance between groups) If p < 0.05, results are assumed significantly different	I - Shapiro Wilk test of Normality of ANOVA Residuals If p > 0.05, residuals are assumed normally distributed	Pairs determined to be significantly different based on Pair-wise t-test	J - Kruskal Wallis (K-W) test If p < 0.05 then one or more pairs are assumed to be different	K - Pairwise Wilcoxon test on pairs with Bonferroni adjustment for cases where K-W test indicates significant If p < 0.05, results are assumed significantly different	Pairwise Wilcoxon (Pairs Determined to be Significantly Different)
Alkalinity	3.09E-06	0.081	p ≥ 0.05		p ≥ 0.05		p ≥ 0.05		0.2487		0.018	p < 0.05	A - B	**0.02**	0.056	A - B
Carbon, dissolved organic	0.5765	0.016	0.023	**B - C**	**0.0231**	**B - C**	**0.028**	**B - C**	**0.096**		0.079	0.95	B -C			
Chloride	4.078E-09	0.227	p ≥0.05		p ≥ 0.05		p ≥ 0.05		0.104		**0.0083**, 0.06	p < 0.05	A - C, A - B	p ≥ 0.05	p ≥ 0.05	
Conductivity, median	1.621E-08	0.257	p ≥0.05		p ≥ 0.05		p ≥ 0.05		0.125		0.05, **0.005**	p < 0.05	A - B, A - C	**0.03**	**0.006, 0.008**	**A - B, A - C**
EIA	0.0690	0.14	p ≥ 0.05		p ≥ 0.05		p ≥ 0.05		p < 0.05	0.01	0.013	0.53	A - B	p ≥ 0.05	p ≥ 0.05	
Percent submergent	0.0026	0.027	p ≥ 0.05		p ≥ 0.05		p ≥ 0.05		0.2506		p ≥ 0.05	p < 0.05		**0.02**	**0.017**	**B - I**
Percent woody	0.279	0.02	0.018	**I-C**	**0.047 0.018**	**I-B, I-C**	**0.022**	**I - C**	**0.2123**		p ≥ 0.05	0.3		p ≥ 0.05	p ≥ 0.05	
pH, median	0.823	0.066	p ≥ 0.05		p ≥ 0.05		p ≥ 0.05		0.69		p ≥ 0.05	p < 0.05		p ≥ 0.05	p ≥ 0.05	
Specific Conductance, median	3.45E-08	0.23	p ≥ 0.05		p ≥ 0.05		p ≥ 0.05		0.09	0.0003	0.04 0.004	3.98E-06	A - B A - C	**0.03**	**0.009, 0.0045**	**A - B, A - C**
WHDA	0.001236	0.089	p ≥ 0.05		p ≥ 0.05		p ≥ 0.05		0.3565	0.01	0.015	0.01897	A - B	p ≥ 0.05	p ≥ 0.05	

Number of samples used in analysis A, 6; B,14; C,12; I,10 .

Appendix J

Spearman rank correlations
(sorted by absolute correlation value)

Parameter-row	Parameter-column	correlation value (r)	p	abs correlation
CHLORIDE_MGL	CONDUCTIVITY_MED_USCM	0.9739	0	0.9739
SPECIFIC CONDUCTANCE_MED_USCM	CHLORIDE_MGL	0.9731	0	0.9731
WSHED_area_acres	STREAM_order_where_smpld	0.8963	8.88E-16	0.8963
EIA	WHDA	-0.8919	2.22E-15	0.8919
EIA	CONDUCTIVITY_MED_USCM	-0.8703	7.15E-14	0.8703
EIA	SPECIFIC CONDUCTANCE_MED_USCM	-0.8699	7.59E-14	0.8699
CHLORIDE_MGL	EIA	-0.8347	6.47E-12	0.8347
WHDA	CONDUCTIVITY_MED_USCM	0.8136	5.78E-11	0.8136
WHDA	SPECIFIC CONDUCTANCE_MED_USCM	0.8100	8.15E-11	0.8100
EIA-LAND USE INDEX	SPECIFIC CONDUCTANCE_MED_USCM	-0.7894	5.20E-10	0.7894
SPECIFIC CONDUCTANCE_MED_USCM	EIA-LAND USE INDEX	-0.7894	5.20E-10	0.7894
EIA	PCT_NonNative (c=0)	-0.7812	1.04E-09	0.7812
EIA-LAND USE INDEX	CONDUCTIVITY_MED_USCM	-0.7784	1.29E-09	0.7784
EIA-LAND USE INDEX	CHLORIDE_MGL	-0.7755	1.63E-09	0.7755
WHDA	CHLORIDE_MGL	0.7656	3.51E-09	0.7656
WHDA	EIA-LAND USE INDEX	-0.7630	4.24E-09	0.7630
WHDA-CONV-PCT_MDPT_ALT_TO_100_FT_BU	EIA-PCT_PERIM_INTACT	-0.7353	6.50E-08	0.7353
ALKALINITY_MGL	CONDUCTIVITY_MED_USCM	0.7294	4.27E-08	0.7294
ALKALINITY_MGL	SPECIFIC CONDUCTANCE_MED_USCM	0.7270	4.98E-08	0.7270
SPECIFIC CONDUCTANCE_MED_USCM	ALKALINITY_MGL	0.7270	4.98E-08	0.7270
EIA	WHDA_PCT-MDPT_ALT_TO_100_FT_BUF	-0.7232	9.27E-08	0.7232
CONDUCTIVITY_MED_USCM	PCT_NonNative (c=0)	0.7189	8.20E-08	0.7189
PCT_NonNative C=0	CONDUCTIVITY_MED_USCM	0.7189	8.20E-08	0.7189
EIA-AVE_BUFF_WIDTH_M	PCT_NonNative (c=0)	-0.7172	9.10E-08	0.7172
PCT_NonNative C=0	EIA-AVE_BUFF_WIDTH_M	-0.7172	9.10E-08	0.7172
CHLORIDE_MGL	PCT_NonNative (c=0)	0.7167	9.40E-08	0.7167
PCT_NonNative C=0	CHLORIDE_MGL	0.7167	9.40E-08	0.7167
EIA	pH_MED	-0.7162	9.67E-08	0.7162
pH_MED	EIA	-0.7162	9.67E-08	0.7162
MEAN_C	PCT_C_value_7_10	0.7153	1.02E-07	0.7153
PCT_C_value_7_10	MEAN_C	0.7153	1.02E-07	0.7153
PCT_NonNative C=0	SPECIFIC CONDUCTANCE_MED_USCM	0.7108	1.33E-07	0.7108
SPECIFIC CONDUCTANCE_MED_USCM	PCT_NonNative (C=0)	0.7108	1.33E-07	0.7108
EIA-AVE_BUFF_WIDTH_M	WHDA_PCT-MDPT_ALT_TO_100_FT_BUF	-0.7014	3.26E-07	0.7014
WHDA-CONV-PCT_MDPT_ALT_TO_100_FT_BU	EIA-AVE_BUFF_WIDTH_M	-0.7014	3.26E-07	0.7014
EIA-AVE_BUFF_WIDTH_M	WHDA	-0.7005	2.41E-07	0.7005
WHDA	EIA-AVE_BUFF_WIDTH_M	-0.7005	2.41E-07	0.7005
EIA-AVE_BUFF_WIDTH_M	SPECIFIC CONDUCTANCE_MED_USCM	-0.6962	3.07E-07	0.6962
SPECIFIC CONDUCTANCE_MED_USCM	EIA-AVE_BUFF_WIDTH_M	-0.6962	3.07E-07	0.6962
ALKALINITY_MGL	pH_MED	0.6915	3.97E-07	0.6915
pH_MED	ALKALINITY_MGL	0.6915	3.97E-07	0.6915
CONDUCTIVITY_MED_USCM	pH_MED	0.6907	4.15E-07	0.6907
pH_MED	CONDUCTIVITY_MED_USCM	0.6907	4.15E-07	0.6907
CONDUCTIVITY_MED_USCM	EIA-AVE_BUFF_WIDTH_M	-0.6890	4.54E-07	0.6890
EIA-AVE_BUFF_WIDTH_M	CONDUCTIVITY_MED_USCM	-0.6890	4.54E-07	0.6890
ALKALINITY_MGL	EIA	-0.6878	4.85E-07	0.6878
EIA	ALKALINITY_MGL	-0.6878	4.85E-07	0.6878
pH_MED	WHDA	0.6869	5.07E-07	0.6869
WHDA	pH_MED	0.6869	5.07E-07	0.6869
EIA-AVE_BUFF_WIDTH_M	EIA-PCT_PERIM_INTACT	0.6865	7.20E-07	0.6865
EIA-PCT_PERIM_INTACT	EIA-AVE_BUFF_WIDTH_M	0.6865	7.20E-07	0.6865
CHL_A_UNCOR_UGL	PHOSPHORUS_AS_P_MGL	0.6865	1.95E-06	0.6865
PHOSPHORUS_AS_P_MGL	CHL_A_UNCOR_UGL	0.6865	1.95E-06	0.6865
EIA	PCT_Native	0.6862	5.26E-07	0.6862
PCT_Native	EIA	0.6862	5.26E-07	0.6862
pH_MED	SPECIFIC CONDUCTANCE_MED_USCM	0.6800	7.31E-07	0.6800
SPECIFIC CONDUCTANCE_MED_USCM	pH_MED	0.6800	7.31E-07	0.6800
CHLORIDE_MGL	EIA-AVE_BUFF_WIDTH_M	-0.6779	8.14E-07	0.6779
EIA-AVE_BUFF_WIDTH_M	CHLORIDE_MGL	-0.6779	8.14E-07	0.6779
AA_acres	WSHED_area_acres	0.6776	8.28E-07	0.6776
WSHED_area_acres	AA_acres	0.6776	8.28E-07	0.6776
EIA-LAND USE INDEX	PCT_NonNative (c=0)	-0.6745	9.67E-07	0.6745
PCT_NonNative C=0	EIA-LAND USE INDEX	-0.6745	9.67E-07	0.6745
PCT_NonNative C=0	WHDA	0.6724	1.08E-06	0.6724
WHDA	PCT_NonNative (C=0)	0.6724	1.08E-06	0.6724
WHDA	WHDA-CONV-PCT_MDPT_ALT_TO_100_I	0.6664	1.97E-06	0.6664
ALKALINITY_MGL	EIA-LAND USE INDEX	-0.6469	3.68E-06	0.6469
EIA-LAND USE INDEX	ALKALINITY_MGL	-0.6469	3.68E-06	0.6469

Spearman rank correlations
(sorted by absolute correlation value)

Parameter-row	Parameter-column	correlation value (r)	p	abs correlation
GENERIC_RICHNESS_INVERTS_TOTAL_R	MEAN_ABUNDANCE_INVERTS_TOTAL_A	0.6452	3.97E-06	0.6452
MEAN_abundance_Inverts_TOTAL_A	GENERIC_RICHNESS_INVERTS_TOTAL_R	0.6452	3.97E-06	0.6452
ALKALINITY_MGL	CHLORIDE_MGL	0.6414	4.72E-06	0.6414
CHLORIDE_MGL	ALKALINITY_MGL	0.6414	4.72E-06	0.6414
ALKALINITY_MGL	WHDA	0.6301	7.76E-06	0.6301
WHDA	ALKALINITY_MGL	0.6301	7.76E-06	0.6301
EIA	EIA-PCT_PERIM_INTACT	0.6294	1.04E-05	0.6294
EIA-PCT_PERIM_INTACT	EIA	0.6294	1.04E-05	0.6294
CONDUCTIVITY_MED_USCM	PCT_Native	-0.6196	1.21E-05	0.6196
PCT_Native	CONDUCTIVITY_MED_USCM	-0.6196	1.21E-05	0.6196
EIA-AVE_BUFF_WIDTH_M	PCT_Native	0.6180	1.30E-05	0.6180
PCT_Native	EIA-AVE_BUFF_WIDTH_M	0.6180	1.30E-05	0.6180
CHLORIDE_MGL	pH_MED	0.6111	1.72E-05	0.6111
pH_MED	CHLORIDE_MGL	0.6111	1.72E-05	0.6111
PCT_Native	SPECIFIC CONDUCTANCE_MED_USCM	-0.6058	2.12E-05	0.6058
SPECIFIC CONDUCTANCE_MED_USCM	PCT_Native	-0.6058	2.12E-05	0.6058
EIA-LAND USE INDEX	WHDA_PCT-MDPT_ALT_TO_100_FT_BUF	-0.6042	2.88E-05	0.6042
WHDA-CONV-PCT_MDPT_ALT_TO_100_FT_BU	EIA-LAND USE INDEX	-0.6042	2.88E-05	0.6042
EIA-LAND USE INDEX	PCT_Native	0.5979	2.90E-05	0.5979
PCT_Native	EIA-LAND USE INDEX	0.5979	2.90E-05	0.5979
CHLORIDE_MGL	PCT_Native	-0.5979	2.90E-05	0.5979
PCT_Native	CHLORIDE_MGL	-0.5979	2.90E-05	0.5979
EIA-AVE_BUFF_WIDTH_M	MEAN_C	0.5960	3.12E-05	0.5960
MEAN_C	EIA-AVE_BUFF_WIDTH_M	0.5960	3.12E-05	0.5960
PCT_Native	WHDA	-0.5958	3.15E-05	0.5958
WHDA	PCT_Native	-0.5958	3.15E-05	0.5958
AA_acres	STREAM_order_where_smpld	0.5892	4.04E-05	0.5892
STREAM_order_where_smpld	AA_acres	0.5892	4.04E-05	0.5892
PCT_Emergent	PCT_Submergent	-0.5856	4.62E-05	0.5856
PCT_Submergent	PCT_Emergent	-0.5856	4.62E-05	0.5856
EIA-AVE_BUFF_WIDTH_M	pH_MED	-0.5649	9.74E-05	0.5649
pH_MED	EIA-AVE_BUFF_WIDTH_M	-0.5649	9.74E-05	0.5649
CHL_A_UNCOR_UGL	TKN_MGL	0.5604	0.00025	0.5604
TKN_MGL	CHL_A_UNCOR_UGL	0.5604	0.00025	0.5604
ALKALINITY_MGL	PCT_NonNative (c=0)	0.5598	0.00012	0.5598
PCT_NonNative C=0	ALKALINITY_MGL	0.5598	0.00012	0.5598
PHOSPHORUS_AS_P_MGL	TKN_MGL	0.5531	0.00026	0.5531
TKN_MGL	PHOSPHORUS_AS_P_MGL	0.5531	0.00026	0.5531
ALKALINITY_MGL	TURBIDITY _MED, NTU	0.5497	0.00020	0.5497
TURBIDITY _MED, NTU	ALKALINITY_MGL	0.5497	0.00020	0.5497
EIA-PCT_PERIM_INTACT	PCT_Native	0.5496	0.00020	0.5496
PCT_Native	EIA-PCT_PERIM_INTACT	0.5496	0.00020	0.5496
SPECIFIC CONDUCTANCE_MED_USCM	WHDA_PCT-MDPT_ALT_TO_100_FT_BUF	0.5487	0.00020	0.5487
WHDA-CONV-PCT_MDPT_ALT_TO_100_FT_BU	SPECIFIC CONDUCTANCE_MED_USCM	0.5487	0.00020	0.5487
EIA-LAND USE INDEX	EIA-PCT_PERIM_INTACT	0.5482	0.00021	0.5482
EIA-PCT_PERIM_INTACT	EIA-LAND USE INDEX	0.5482	0.00021	0.5482
EIA-LAND USE INDEX	pH_MED	-0.5426	0.00021	0.5426
pH_MED	EIA-LAND USE INDEX	-0.5426	0.00021	0.5426
EIA	MEAN_C	0.5419	0.00021	0.5419
MEAN_C	EIA	0.5419	0.00021	0.5419
PCT_NonNative C=0	WHDA_PCT-MDPT_ALT_TO_100_FT_BUF	0.5387	0.00028	0.5387
WHDA-CONV-PCT_MDPT_ALT_TO_100_FT_BU	PCT_NonNative (C=0)	0.5387	0.00028	0.5387
CONDUCTIVITY_MED_USCM	WHDA_PCT-MDPT_ALT_TO_100_FT_BUF	0.5384	0.00028	0.5384
WHDA-CONV-PCT_MDPT_ALT_TO_100_FT_BU	CONDUCTIVITY_MED_USCM	0.5384	0.00028	0.5384
ADJ_FQI	PCT_NonNative (c=0)	-0.5316	0.00029	0.5316
PCT_NonNative C=0	ADJ_FQI	-0.5316	0.00029	0.5316
PCT_Native	WHDA_PCT-MDPT_ALT_TO_100_FT_BUF	-0.5315	0.00035	0.5315
WHDA-CONV-PCT_MDPT_ALT_TO_100_FT_BU	PCT_Native	-0.5315	0.00035	0.5315
ALKALINITY_MGL	PCT_Native	-0.5273	0.00033	0.5273
PCT_Native	ALKALINITY_MGL	-0.5273	0.00033	0.5273
CHLORIDE_MGL	WHDA_PCT-MDPT_ALT_TO_100_FT_BUF	0.5210	0.00048	0.5210
WHDA-CONV-PCT_MDPT_ALT_TO_100_FT_BU	CHLORIDE_MGL	0.5210	0.00048	0.5210
ALKALINITY_MGL	EIA-AVE_BUFF_WIDTH_M	-0.5202	0.00041	0.5202
EIA-AVE_BUFF_WIDTH_M	ALKALINITY_MGL	-0.5202	0.00041	0.5202
CHLORIDE_MGL	MEAN_C	-0.5174	0.00045	0.5174
MEAN_C	CHLORIDE_MGL	-0.5174	0.00045	0.5174
DISSOLVED OXYGEN SAT_PCT_MED	PHOSPHORUS_AS_P_MGL	-0.5127	0.00061	0.5127
PHOSPHORUS_AS_P_MGL	DISSOLVED OXYGEN SAT_PCT_MED	-0.5127	0.00061	0.5127

Parameter-row	Parameter-column	correlation value (r)	p	abs correlation
GENERIC_RICHNESS_INVERTS_TOTAL_R	PCT_Submergent	0.5102	0.00056	0.5102
PCT_Submergent	GENERIC_RICHNESS_INVERTS_TOTAL_R	0.5102	0.00056	0.5102
PCT_NonNative C=0	pH_MED	0.5069	0.00061	0.5069
pH_MED	PCT_NonNative (C=0)	0.5069	0.00061	0.5069
EIA-PCT_PERIM_INTACT	WHDA	-0.5067	0.00072	0.5067
WHDA	EIA-PCT_PERIM_INTACT	-0.5067	0.00072	0.5067
CONDUCTIVITY_MED_USCM	MEAN_C	-0.5036	0.00067	0.5036
MEAN_C	CONDUCTIVITY_MED_USCM	-0.5036	0.00067	0.5036
EIA-PCT_PERIM_INTACT	PCT_NonNative (C=0)	-0.5028	0.00081	0.5028
PCT_NonNative C=0	EIA-PCT_PERIM_INTACT	-0.5028	0.00081	0.5028
ALKALINITY_MGL	MEAN_C	-0.4969	0.00082	0.4969
MEAN_C	ALKALINITY_MGL	-0.4969	0.00082	0.4969
ADJ_FQI	PCT_Native	0.4958	0.00084	0.4958
PCT_Native	ADJ_FQI	0.4958	0.00084	0.4958
AA_acres	ADJ_FQI	0.4926	0.00092	0.4926
ADJ_FQI	AA_acres	0.4926	0.00092	0.4926
DISSOLVED OXYGEN_MED_MGL	PHOSPHORUS_AS_P_MGL	-0.4923	0.00108	0.4923
PHOSPHORUS_AS_P_MGL	DISSOLVED OXYGEN_MED_MGL	-0.4923	0.00108	0.4923
MEAN_C	SPECIFIC CONDUCTANCE_MED_USCM	-0.4913	0.00095	0.4913
SPECIFIC CONDUCTANCE_MED_USCM	MEAN_C	-0.4913	0.00095	0.4913
PCT_Submergent	Depth_of_samples_mean_cm	0.4913	0.00095	0.4913
PCT_Floating_leaved	PCT_Submergent	0.4885	0.00103	0.4885
PCT_Submergent	PCT_Floating_leaved	0.4885	0.00103	0.4885
AA_acres	CARBON_ORGANIC_DISS_MGL	0.4844	0.00115	0.4844
CARBON_ORGANIC_DISS_MGL	AA_acres	0.4844	0.00115	0.4844
ADJ_FQI	EIA-AVE_BUFF_WIDTH_M	0.4798	0.00130	0.4798
EIA-AVE_BUFF_WIDTH_M	ADJ_FQI	0.4798	0.00130	0.4798
ADJ_FQI	NATIVE_mean_C	0.4785	0.00135	0.4785
NATIVE_mean_C	ADJ_FQI	0.4785	0.00135	0.4785
AA_acres	MEAN_C	0.4781	0.00136	0.4781
MEAN_C	AA_acres	0.4781	0.00136	0.4781
pH_MED	WHDA_PCT-MDPT_ALT_TO_100_FT_BUF	0.4765	0.00164	0.4765
WHDA-CONV-PCT_MDPT_ALT_TO_100_FT_BU	pH_MED	0.4765	0.00164	0.4765
GENERIC_RICHNESS_INVERTS_TOTAL_R	STREAM_order_where_smpld	0.4700	0.00168	0.4700
STREAM_order_where_smpld	GENERIC_RICHNESS_INVERTS_TOTAL_R	0.4700	0.00168	0.4700
ALKALINITY_MGL	PCT_C_value_7_10	-0.4672	0.00181	0.4672
PCT_C_value_7_10	ALKALINITY_MGL	-0.4672	0.00181	0.4672
MEAN_C	NATIVE_mean_C	0.4639	0.00197	0.4639
NATIVE_mean_C	MEAN_C	0.4639	0.00197	0.4639
ADJ_FQI	CHLORIDE_MGL	-0.4636	0.00199	0.4636
CHLORIDE_MGL	ADJ_FQI	-0.4636	0.00199	0.4636
NATIVE_mean_C	PCT_C_value_7_10	0.4624	0.00205	0.4624
PCT_C_value_7_10	NATIVE_mean_C	0.4624	0.00205	0.4624
GENERIC_RICHNESS_INVERTS_TOTAL_R	WSHED_area_acres	0.4588	0.00224	0.4588
WSHED_area_acres	GENERIC_RICHNESS_INVERTS_TOTAL_R	0.4588	0.00224	0.4588
PCT_C_value_7_10	PCT_Native	0.4588	0.00225	0.4588
PCT_Native	PCT_C_value_7_10	0.4588	0.00225	0.4588
MEAN_C	WHDA	-0.4578	0.00230	0.4578
WHDA	MEAN_C	-0.4578	0.00230	0.4578
CHLORIDE_MGL	PHOSPHORUS_AS_P_MGL	0.4547	0.00282	0.4547
PHOSPHORUS_AS_P_MGL	CHLORIDE_MGL	0.4547	0.00282	0.4547
PCT_Emergent	PCT_wetlands_in_wshed	-0.4507	0.00274	0.4507
PCT_wetlands_in_wshed	PCT_Emergent	-0.4507	0.00274	0.4507
MEAN_abundance_Inverts_TOTAL_A	PCT_Submergent	0.4495	0.00282	0.4495
PCT_Submergent	MEAN_ABUNDANCE_INVERTS_TOTAL_A	0.4495	0.00282	0.4495
EIA-PCT_PERIM_INTACT	MEAN_C	0.4493	0.00321	0.4493
MEAN_C	EIA-PCT_PERIM_INTACT	0.4493	0.00321	0.4493
EIA-LAND USE INDEX	MEAN_C	0.4470	0.00300	0.4470
MEAN_C	EIA-LAND USE INDEX	0.4470	0.00300	0.4470
AA_acres	PCT_C_value_1_3	-0.4428	0.00332	0.4428
PCT_C_value_1_3	AA_acres	-0.4428	0.00332	0.4428
MEAN_C	TURBIDITY _MED, NTU	-0.4377	0.00421	0.4377
TURBIDITY _MED, NTU	MEAN_C	-0.4377	0.00421	0.4377
ADJ_FQI	CONDUCTIVITY_MED_USCM	-0.4335	0.00413	0.4335
CONDUCTIVITY_MED_USCM	ADJ_FQI	-0.4335	0.00413	0.4335
ADJ_FQI	SPECIFIC CONDUCTANCE_MED_USCM	-0.4316	0.00432	0.4316
SPECIFIC CONDUCTANCE_MED_USCM	ADJ_FQI	-0.4316	0.00432	0.4316
EIA-AVE_BUFF_WIDTH_M	PCT_C_value_7_10	0.4304	0.00444	0.4304

Parameter-row	Parameter-column	correlation value (r)	p	abs correlation
PCT_C_value_7_10	EIA-AVE_BUFF_WIDTH_M	0.4304	0.00444	0.4304
PCT_Emergent	PCT_Floating_leaved	-0.4283	0.00466	0.4283
PCT_Floating_leaved	PCT_Emergent	-0.4283	0.00466	0.4283
EIA-PCT_PERIM_INTACT	SPECIFIC CONDUCTANCE_MED_USCM	-0.4277	0.00528	0.4277
SPECIFIC CONDUCTANCE_MED_USCM	EIA-PCT_PERIM_INTACT	-0.4277	0.00528	0.4277
NATIVE_mean_C	PCT_C_value_1_3	-0.4275	0.00475	0.4275
PCT_C_value_1_3	NATIVE_mean_C	-0.4275	0.00475	0.4275
PCT_C_value_1_3	PCT_Emergent	0.4274	0.00475	0.4274
PCT_Emergent	PCT_C_value_1_3	0.4274	0.00475	0.4274
ADJ_FQI	ALKALINITY_MGL	-0.4260	0.00491	0.4260
ALKALINITY_MGL	ADJ_FQI	-0.4260	0.00491	0.4260
CONDUCTIVITY_MED_USCM	EIA-PCT_PERIM_INTACT	-0.4246	0.00566	0.4246
EIA-PCT_PERIM_INTACT	CONDUCTIVITY_MED_USCM	-0.4246	0.00566	0.4246
PHOSPHORUS_AS_P_MGL	SPECIFIC CONDUCTANCE_MED_USCM	0.4229	0.00587	0.4229
SPECIFIC CONDUCTANCE_MED_USCM	PHOSPHORUS_AS_P_MGL	0.4229	0.00587	0.4229
ALKALINITY_MGL	EIA-PCT_PERIM_INTACT	-0.4223	0.00595	0.4223
EIA-PCT_PERIM_INTACT	ALKALINITY_MGL	-0.4223	0.00595	0.4223
PCT_Native	pH_MED	-0.4217	0.00541	0.4217
pH_MED	PCT_Native	-0.4217	0.00541	0.4217
PCT_Submergent	PCT_Woody	-0.4210	0.00550	0.4210
PCT_Woody	PCT_Submergent	-0.4210	0.00550	0.4210
CHL_A_UNCOR_UGL	CHLORIDE_MGL	0.4152	0.00857	0.4152
CHLORIDE_MGL	CHL_A_UNCOR_UGL	0.4152	0.00857	0.4152
MEAN_abundance_Inverts_TOTAL_A	Depth_of_samples_mean_cm	0.4130	0.00656	0.4130
SPECIFIC CONDUCTANCE_MED_USCM	TURBIDITY _MED, NTU	0.4122	0.00740	0.4122
TURBIDITY _MED, NTU	SPECIFIC CONDUCTANCE_MED_USCM	0.4122	0.00740	0.4122
CONDUCTIVITY_MED_USCM	PHOSPHORUS_AS_P_MGL	0.4120	0.00745	0.4120
PHOSPHORUS_AS_P_MGL	CONDUCTIVITY_MED_USCM	0.4120	0.00745	0.4120
EIA-PCT_PERIM_INTACT	PCT_C_value_7_10	0.4098	0.00779	0.4098
PCT_C_value_7_10	EIA-PCT_PERIM_INTACT	0.4098	0.00779	0.4098
ADJ_FQI	EIA	0.4081	0.00730	0.4081
EIA	ADJ_FQI	0.4081	0.00730	0.4081
CONDUCTIVITY_MED_USCM	TURBIDITY _MED, NTU	0.4074	0.00821	0.4074
TURBIDITY _MED, NTU	CONDUCTIVITY_MED_USCM	0.4074	0.00821	0.4074
MEAN_C	TOTAL_FQI	0.4058	0.00767	0.4058
TOTAL_FQI	MEAN_C	0.4058	0.00767	0.4058
EIA-PCT_PERIM_INTACT	pH_MED	-0.4054	0.00856	0.4054
pH_MED	EIA-PCT_PERIM_INTACT	-0.4054	0.00856	0.4054
ADJ_FQI	TURBIDITY _MED, NTU	-0.4052	0.00859	0.4052
TURBIDITY _MED, NTU	ADJ_FQI	-0.4052	0.00859	0.4052
CARBON_ORGANIC_DISS_MGL	PCT_Floating_leaved	0.4043	0.00793	0.4043
PCT_Floating_leaved	CARBON_ORGANIC_DISS_MGL	0.4043	0.00793	0.4043
MEAN_C	PCT_C_value_4_6	0.4041	0.00795	0.4041
PCT_C_value_4_6	MEAN_C	0.4041	0.00795	0.4041
CARBON_ORGANIC_DISS_MGL	EIA	0.4015	0.00841	0.4015
EIA	CARBON_ORGANIC_DISS_MGL	0.4015	0.00841	0.4015
EIA-LAND USE INDEX	TURBIDITY _MED, NTU	-0.4001	0.00953	0.4001
TURBIDITY _MED, NTU	EIA-LAND USE INDEX	-0.4001	0.00953	0.4001
CARBON_ORGANIC_DISS_MGL	TURBIDITY _MED, NTU	-0.3984	0.00988	0.3984
TURBIDITY _MED, NTU	CARBON_ORGANIC_DISS_MGL	-0.3984	0.00988	0.3984
ALKALINITY_MGL	WHDA_PCT-MDPT_ALT_TO_100_FT_BUF	0.3978	0.01000	0.3978
WHDA-CONV-PCT_MDPT_ALT_TO_100_FT_BU	ALKALINITY_MGL	0.3978	0.01000	0.3978
CHLORIDE_MGL	TURBIDITY _MED, NTU	0.3974	0.01009	0.3974
TURBIDITY _MED, NTU	CHLORIDE_MGL	0.3974	0.01009	0.3974
MEAN_abundance_Inverts_TOTAL_A	WSHED_area_acres	0.3959	0.00946	0.3959
WSHED_area_acres	MEAN_ABUNDANCE_INVERTS_TOTAL_A	0.3959	0.00946	0.3959
PCT_Floating_leaved	PCT_Woody	-0.3913	0.01040	0.3913
PCT_Woody	PCT_Floating_leaved	-0.3913	0.01040	0.3913
DISSOLVED OXYGEN SAT_PCT_MED	TEMP_MED_W_DEG_C	0.3893	0.01082	0.3893
TEMP_MED_W_DEG_C	DISSOLVED OXYGEN SAT_PCT_MED	0.3893	0.01082	0.3893
GENERIC_RICHNESS_INVERTS_TOTAL_R	PCT_Emergent	-0.3866	0.01143	0.3866
PCT_Emergent	GENERIC_RICHNESS_INVERTS_TOTAL_R	-0.3866	0.01143	0.3866
CHLORIDE_MGL	EIA-PCT_PERIM_INTACT	-0.3853	0.01286	0.3853
EIA-PCT_PERIM_INTACT	CHLORIDE_MGL	-0.3853	0.01286	0.3853
CHL_A_UNCOR_UGL	CONDUCTIVITY_MED_USCM	0.3834	0.01598	0.3834
CONDUCTIVITY_MED_USCM	CHL_A_UNCOR_UGL	0.3834	0.01598	0.3834
ADJ_FQI	PCT_C_value_4_6	0.3817	0.01263	0.3817
PCT_C_value_4_6	ADJ_FQI	0.3817	0.01263	0.3817

Spearman rank correlations
(sorted by absolute correlation value)

Parameter-row	Parameter-column	correlation value (r)	p	abs correlation
EIA	TURBIDITY _MED, NTU	-0.3796	0.01436	0.3796
TURBIDITY _MED, NTU	EIA	-0.3796	0.01436	0.3796
PCT_C_value_7_10	PCT_NonNative (C=0)	-0.3778	0.01363	0.3778
PCT_NonNative C=0	PCT_C_value_7_10	-0.3778	0.01363	0.3778
DISSOLVED OXYGEN_MED_MGL	pH_MED	0.3739	0.01473	0.3739
pH_MED	DISSOLVED OXYGEN_MED_MGL	0.3739	0.01473	0.3739
DISSOLVED OXYGEN SAT_PCT_MED	pH_MED	0.3719	0.01530	0.3719
pH_MED	DISSOLVED OXYGEN SAT_PCT_MED	0.3719	0.01530	0.3719
ADJ_FQI	WSHED_area_acres	0.3714	0.01544	0.3714
WSHED_area_acres	ADJ_FQI	0.3714	0.01544	0.3714
CHL_A_UNCOR_UGL	SPECIFIC CONDUCTANCE_MED_USCM	0.3689	0.02082	0.3689
SPECIFIC CONDUCTANCE_MED_USCM	CHL_A_UNCOR_UGL	0.3689	0.02082	0.3689
EIA	PCT_C_value_7_10	0.3676	0.01663	0.3676
PCT_C_value_7_10	EIA	0.3676	0.01663	0.3676
TURBIDITY _MED, NTU	WHDA_PCT-MDPT_ALT_TO_100_FT_BUF	0.3651	0.02053	0.3651
WHDA-CONV-PCT_MDPT_ALT_TO_100_FT_BU	TURBIDITY _MED, NTU	0.3651	0.02053	0.3651
PCT_NonNative C=0	TURBIDITY _MED, NTU	0.3623	0.01991	0.3623
TURBIDITY _MED, NTU	PCT_NonNative (C=0)	0.3623	0.01991	0.3623
MEAN_abundance_Inverts_TOTAL_A	PCT_Floating_leaved	0.3609	0.01886	0.3609
PCT_Floating_leaved	MEAN_ABUNDANCE_INVERTS_TOTAL_A	0.3609	0.01886	0.3609
PCT_C_value_7_10	WHDA_PCT-MDPT_ALT_TO_100_FT_BUF	-0.3599	0.02081	0.3599
WHDA-CONV-PCT_MDPT_ALT_TO_100_FT_BU	PCT_C_value_7_10	-0.3599	0.02081	0.3599
AA_acres	Depth_of_samples_mean_cm	0.3594	0.01940	0.3594
ADJ_FQI	EIA-LAND USE INDEX	0.3576	0.02008	0.3576
EIA-LAND USE INDEX	ADJ_FQI	0.3576	0.02008	0.3576
CHL_A_UNCOR_UGL	DISSOLVED OXYGEN_MED_MGL	-0.3562	0.02602	0.3562
DISSOLVED OXYGEN_MED_MGL	CHL_A_UNCOR_UGL	-0.3562	0.02602	0.3562
PCT_Native	TURBIDITY _MED, NTU	-0.3542	0.02309	0.3542
TURBIDITY _MED, NTU	PCT_Native	-0.3542	0.02309	0.3542
PHOSPHORUS_AS_P_MGL	TURBIDITY _MED, NTU	0.3524	0.02572	0.3524
TURBIDITY _MED, NTU	PHOSPHORUS_AS_P_MGL	0.3524	0.02572	0.3524
EIA-LAND USE INDEX	PCT_C_value_7_10	0.3522	0.02215	0.3522
PCT_C_value_7_10	EIA-LAND USE INDEX	0.3522	0.02215	0.3522
MEAN_C	pH_MED	-0.3505	0.02289	0.3505
pH_MED	MEAN_C	-0.3505	0.02289	0.3505
ADJ_FQI	TOTAL_FQI	0.3501	0.02304	0.3501
TOTAL_FQI	ADJ_FQI	0.3501	0.02304	0.3501
TURBIDITY _MED, NTU	WHDA	0.3498	0.02495	0.3498
WHDA	TURBIDITY _MED, NTU	0.3498	0.02495	0.3498
PCT_C_value_7_10	TURBIDITY _MED, NTU	-0.3493	0.02518	0.3493
TURBIDITY _MED, NTU	PCT_C_value_7_10	-0.3493	0.02518	0.3493
CHL_A_UNCOR_UGL	DISSOLVED OXYGEN SAT_PCT_MED	-0.3459	0.03102	0.3459
DISSOLVED OXYGEN SAT_PCT_MED	CHL_A_UNCOR_UGL	-0.3459	0.03102	0.3459
PCT_C_value_7_10	pH_MED	-0.3442	0.02561	0.3442
pH_MED	PCT_C_value_7_10	-0.3442	0.02561	0.3442
PCT_C_value_4_6	PCT_NonNative (c=0)	-0.3416	0.02684	0.3416
PCT_NonNative C=0	PCT_C_value_4_6	-0.3416	0.02684	0.3416
CHL_A_UNCOR_UGL	MEAN_ABUNDANCE_INVERTS_TOTAL_A	-0.3402	0.03408	0.3402
MEAN_abundance_Inverts_TOTAL_A	CHL_A_UNCOR_UGL	-0.3402	0.03408	0.3402
GENERIC_RICHNESS_INVERTS_TOTAL_R	PCT_Floating_leaved	0.3401	0.02753	0.3401
PCT_Floating_leaved	GENERIC_RICHNESS_INVERTS_TOTAL_R	0.3401	0.02753	0.3401
PCT_NonNative C=0	PHOSPHORUS_AS_P_MGL	0.3393	0.03001	0.3393
PHOSPHORUS_AS_P_MGL	PCT_NonNative (C=0)	0.3393	0.03001	0.3393
ADJ_FQI	PCT_Emergent	-0.3385	0.02833	0.3385
PCT_Emergent	ADJ_FQI	-0.3385	0.02833	0.3385
CARBON_ORGANIC_DISS_MGL	EIA-LAND USE INDEX	0.3383	0.02842	0.3383
EIA-LAND USE INDEX	CARBON_ORGANIC_DISS_MGL	0.3383	0.02842	0.3383
ADJ_FQI	WHDA	-0.3365	0.02934	0.3365
WHDA	ADJ_FQI	-0.3365	0.02934	0.3365
EIA-LAND USE INDEX	PHOSPHORUS_AS_P_MGL	-0.3349	0.03234	0.3349
PHOSPHORUS_AS_P_MGL	EIA-LAND USE INDEX	-0.3349	0.03234	0.3349
CARBON_ORGANIC_DISS_MGL	pH_MED	-0.3334	0.03095	0.3334
pH_MED	CARBON_ORGANIC_DISS_MGL	-0.3334	0.03095	0.3334
PHOSPHORUS_AS_P_MGL	WHDA	0.3321	0.03392	0.3321
WHDA	PHOSPHORUS_AS_P_MGL	0.3321	0.03392	0.3321
AA_acres	PCT_Floating_leaved	0.3320	0.03170	0.3320
PCT_Floating_leaved	AA_acres	0.3320	0.03170	0.3320
PCT_C_value_4_6	PCT_Emergent	-0.3314	0.03206	0.3314

Spearman rank correlations
(sorted by absolute correlation value)

Parameter-row	Parameter-column	correlation value (r)	p	abs correlation
PCT_Emergent	PCT_C_value_4_6	-0.3314	0.03206	0.3314
ADJ_FQI	EIA-PCT_PERIM_INTACT	0.3302	0.03501	0.3302
EIA-PCT_PERIM_INTACT	ADJ_FQI	0.3302	0.03501	0.3302
NATIVE_FQI	PCT_Floating_leaved	-0.3299	0.03288	0.3299
PCT_Floating_leaved	NATIVE_FQI	-0.3299	0.03288	0.3299
ALKALINITY_MGL	CARBON_ORGANIC_DISS_MGL	-0.3296	0.03304	0.3296
CARBON_ORGANIC_DISS_MGL	ALKALINITY_MGL	-0.3296	0.03304	0.3296
DISSOLVED OXYGEN_MED_MGL	TKN_MGL	-0.3283	0.03861	0.3283
TKN_MGL	DISSOLVED OXYGEN_MED_MGL	-0.3283	0.03861	0.3283
PCT_Woody	TOTAL_FQI	0.3283	0.03379	0.3283
TOTAL_FQI	PCT_Woody	0.3283	0.03379	0.3283
pH_MED	TURBIDITY _MED, NTU	0.3277	0.03650	0.3277
TURBIDITY _MED, NTU	pH_MED	0.3277	0.03650	0.3277
CARBON_ORGANIC_DISS_MGL	STREAM_order_where_smpld	0.3271	0.03447	0.3271
STREAM_order_where_smpld	CARBON_ORGANIC_DISS_MGL	0.3271	0.03447	0.3271
MEAN_abundance_Inverts_TOTAL_A	STREAM_order_where_smpld	0.3248	0.03585	0.3248
STREAM_order_where_smpld	MEAN_ABUNDANCE_INVERTS_TOTAL_A	0.3248	0.03585	0.3248
DISSOLVED OXYGEN SAT_PCT_MED	TKN_MGL	-0.3240	0.04138	0.3240
TKN_MGL	DISSOLVED OXYGEN SAT_PCT_MED	-0.3240	0.04138	0.3240
MEAN_abundance_Inverts_TOTAL_A	PCT_Emergent	-0.3238	0.03646	0.3238
PCT_Emergent	MEAN_ABUNDANCE_INVERTS_TOTAL_A	-0.3238	0.03646	0.3238
CARBON_ORGANIC_DISS_MGL	MEAN_C	0.3226	0.03718	0.3226
MEAN_C	CARBON_ORGANIC_DISS_MGL	0.3226	0.03718	0.3226
CHL_A_UNCOR_UGL	TURBIDITY _MED, NTU	0.3221	0.04552	0.3221
TURBIDITY _MED, NTU	CHL_A_UNCOR_UGL	0.3221	0.04552	0.3221
NATIVE_FQI	PCT_Woody	0.3220	0.03753	0.3220
PCT_Woody	NATIVE_FQI	0.3220	0.03753	0.3220
STREAM_order_where_smpld	Depth_of_samples_mean_cm	0.3220	0.03756	0.3220
PCT_C_value_7_10	WHDA	-0.3208	0.03829	0.3208
WHDA	PCT_C_value_7_10	-0.3208	0.03829	0.3208
WSHED_area_acres	Depth_of_samples_mean_cm	0.3205	0.03849	0.3205
DISSOLVED OXYGEN SAT_PCT_MED	STREAM_order_where_smpld	-0.3189	0.03954	0.3189
STREAM_order_where_smpld	DISSOLVED OXYGEN SAT_PCT_MED	-0.3189	0.03954	0.3189
EIA	PHOSPHORUS_AS_P_MGL	-0.3182	0.04264	0.3182
PHOSPHORUS_AS_P_MGL	EIA	-0.3182	0.04264	0.3182
PCT_C_value_1_3	PCT_C_value_7_10	-0.3180	0.04012	0.3180
PCT_C_value_7_10	PCT_C_value_1_3	-0.3180	0.04012	0.3180
PCT_Floating_leaved	Depth_of_samples_mean_cm	0.3174	0.04056	0.3174
NATIVE_mean_C	TURBIDITY _MED, NTU	-0.3160	0.04417	0.3160
TURBIDITY _MED, NTU	NATIVE_mean_C	-0.3160	0.04417	0.3160
ALKALINITY_MGL	PHOSPHORUS_AS_P_MGL	0.3149	0.04490	0.3149
PHOSPHORUS_AS_P_MGL	ALKALINITY_MGL	0.3149	0.04490	0.3149
EIA-PCT_PERIM_INTACT	TURBIDITY _MED, NTU	-0.3148	0.04785	0.3148
TURBIDITY _MED, NTU	EIA-PCT_PERIM_INTACT	-0.3148	0.04785	0.3148
DISSOLVED OXYGEN_MED_MGL	TEMP_MED_W_DEG_C	0.3134	0.04327	0.3134
TEMP_MED_W_DEG_C	DISSOLVED OXYGEN_MED_MGL	0.3134	0.04327	0.3134
PCT_Woody	Depth_of_samples_mean_cm	-0.3126	0.04387	0.3126
MEAN_C	NATIVE_FQI	0.3058	0.04893	0.3058
NATIVE_FQI	MEAN_C	0.3058	0.04893	0.3058
MEAN_C	WHDA_PCT-MDPT_ALT_TO_100_FT_BUF	-0.3032	0.05396	0.3032
WHDA-CONV-PCT_MDPT_ALT_TO_100_FT_BU	MEAN_C	-0.3032	0.05396	0.3032
CONDUCTIVITY_MED_USCM	PCT_C_value_7_10	-0.3022	0.05174	0.3022
PCT_C_value_7_10	CONDUCTIVITY_MED_USCM	-0.3022	0.05174	0.3022
DISSOLVED OXYGEN_MED_MGL	STREAM_order_where_smpld	-0.3015	0.05233	0.3015
STREAM_order_where_smpld	DISSOLVED OXYGEN_MED_MGL	-0.3015	0.05233	0.3015
PCT_Floating_leaved	TOTAL_FQI	-0.2997	0.05386	0.2997
TOTAL_FQI	PCT_Floating_leaved	-0.2997	0.05386	0.2997

Spearman rank correlations
(sorted by Parameter-row)

Parameter-row	Parameter-column	correlation value (r)	p	abs correlation
AA_acres	ADJ_FQI	0.4926	0.00092	0.4926
AA_acres	CARBON_ORGANIC_DISS_MGL	0.4844	0.00115	0.4844
AA_acres	Depth_of_samples_mean_cm	0.3594	0.01940	0.3594
AA_acres	MEAN_C	0.4781	0.00136	0.4781
AA_acres	PCT_C_value_1_3	-0.4428	0.00332	0.4428
AA_acres	PCT_Floating_leaved	0.3320	0.03170	0.3320
AA_acres	STREAM_order_where_smpld	0.5892	4.04E-05	0.5892
AA_acres	WSHED_area_acres	0.6776	8.28E-07	0.6776
ADJ_FQI	AA_acres	0.4926	0.00092	0.4926
ADJ_FQI	ALKALINITY_MGL	-0.4260	0.00491	0.4260
ADJ_FQI	EIA-AVE_BUFF_WIDTH_M	0.4798	0.00130	0.4798
ADJ_FQI	CHLORIDE_MGL	-0.4636	0.00199	0.4636
ADJ_FQI	CONDUCTIVITY_MED_USCM	-0.4335	0.00413	0.4335
ADJ_FQI	EIA	0.4081	0.00730	0.4081
ADJ_FQI	EIA-LAND USE INDEX	0.3576	0.02008	0.3576
ADJ_FQI	NATIVE_mean_C	0.4785	0.00135	0.4785
ADJ_FQI	PCT_C_value_4_6	0.3817	0.01263	0.3817
ADJ_FQI	PCT_Emergent	-0.3385	0.02833	0.3385
ADJ_FQI	PCT_Native	0.4958	0.00084	0.4958
ADJ_FQI	PCT_NonNative (c=0)	-0.5316	0.00029	0.5316
ADJ_FQI	EIA-PCT_PERIM_INTACT	0.3302	0.03501	0.3302
ADJ_FQI	SPECIFIC CONDUCTANCE_MED_USCM	-0.4316	0.00432	0.4316
ADJ_FQI	TOTAL_FQI	0.3501	0.02304	0.3501
ADJ_FQI	TURBIDITY _MED, NTU	-0.4052	0.00859	0.4052
ADJ_FQI	WHDA	-0.3365	0.02934	0.3365
ADJ_FQI	WSHED_area_acres	0.3714	0.01544	0.3714
ALKALINITY_MGL	ADJ_FQI	-0.4260	0.00491	0.4260
ALKALINITY_MGL	EIA-AVE_BUFF_WIDTH_M	-0.5202	0.00041	0.5202
ALKALINITY_MGL	CARBON_ORGANIC_DISS_MGL	-0.3296	0.03304	0.3296
ALKALINITY_MGL	CHLORIDE_MGL	0.6414	4.72E-06	0.6414
ALKALINITY_MGL	CONDUCTIVITY_MED_USCM	0.7294	4.27E-08	0.7294
ALKALINITY_MGL	EIA	-0.6878	4.85E-07	0.6878
ALKALINITY_MGL	EIA-LAND USE INDEX	-0.6469	3.68E-06	0.6469
ALKALINITY_MGL	MEAN_C	-0.4969	0.00082	0.4969
ALKALINITY_MGL	PCT_C_value_7_10	-0.4672	0.00181	0.4672
ALKALINITY_MGL	PCT_Native	-0.5273	0.00033	0.5273
ALKALINITY_MGL	PCT_NonNative (c=0)	0.5598	0.00012	0.5598
ALKALINITY_MGL	EIA-PCT_PERIM_INTACT	-0.4223	0.00595	0.4223
ALKALINITY_MGL	pH_MED	0.6915	3.97E-07	0.6915
ALKALINITY_MGL	PHOSPHORUS_AS_P_MGL	0.3149	0.04490	0.3149
ALKALINITY_MGL	SPECIFIC CONDUCTANCE_MED_USCM	0.7270	4.98E-08	0.7270
ALKALINITY_MGL	TURBIDITY _MED, NTU	0.5497	0.00020	0.5497
ALKALINITY_MGL	WHDA	0.6301	7.76E-06	0.6301
ALKALINITY_MGL	WHDA_PCT-MDPT_ALT_TO_100_FT_BUF	0.3978	0.01000	0.3978
CARBON_ORGANIC_DISS_MGL	AA_acres	0.4844	0.00115	0.4844
CARBON_ORGANIC_DISS_MGL	ALKALINITY_MGL	-0.3296	0.03304	0.3296
CARBON_ORGANIC_DISS_MGL	EIA	0.4015	0.00841	0.4015
CARBON_ORGANIC_DISS_MGL	EIA-LAND USE INDEX	0.3383	0.02842	0.3383
CARBON_ORGANIC_DISS_MGL	MEAN_C	0.3226	0.03718	0.3226
CARBON_ORGANIC_DISS_MGL	PCT_Floating_leaved	0.4043	0.00793	0.4043
CARBON_ORGANIC_DISS_MGL	pH_MED	-0.3334	0.03095	0.3334
CARBON_ORGANIC_DISS_MGL	STREAM_order_where_smpld	0.3271	0.03447	0.3271
CARBON_ORGANIC_DISS_MGL	TURBIDITY _MED, NTU	-0.3984	0.00988	0.3984
CHL_A_UNCOR_UGL	CHLORIDE_MGL	0.4152	0.00857	0.4152
CHL_A_UNCOR_UGL	CONDUCTIVITY_MED_USCM	0.3834	0.01598	0.3834
CHL_A_UNCOR_UGL	DISSOLVED OXYGEN SAT_PCT_MED	-0.3459	0.03102	0.3459
CHL_A_UNCOR_UGL	DISSOLVED OXYGEN_MED_MGL	-0.3562	0.02602	0.3562
CHL_A_UNCOR_UGL	MEAN_ABUNDANCE_INVERTS_TOTAL_A	-0.3402	0.03408	0.3402
CHL_A_UNCOR_UGL	PHOSPHORUS_AS_P_MGL	0.6865	1.95E-06	0.6865
CHL_A_UNCOR_UGL	SPECIFIC CONDUCTANCE_MED_USCM	0.3689	0.02082	0.3689
CHL_A_UNCOR_UGL	TKN_MGL	0.5604	0.00025	0.5604
CHL_A_UNCOR_UGL	TURBIDITY _MED, NTU	0.3221	0.04552	0.3221
CHLORIDE_MGL	ADJ_FQI	-0.4636	0.00199	0.4636
CHLORIDE_MGL	ALKALINITY_MGL	0.6414	4.72E-06	0.6414
CHLORIDE_MGL	EIA-AVE_BUFF_WIDTH_M	-0.6779	8.14E-07	0.6779
CHLORIDE_MGL	CHL_A_UNCOR_UGL	0.4152	0.00857	0.4152
CHLORIDE_MGL	CONDUCTIVITY_MED_USCM	0.9739	0	0.9739
CHLORIDE_MGL	EIA	-0.8347	6.47E-12	0.8347

Parameter-row	Parameter-column	correlation value (r)	p	abs correlation
CHLORIDE_MGL	MEAN_C	-0.5174	0.00045	0.5174
CHLORIDE_MGL	PCT_Native	-0.5979	2.90E-05	0.5979
CHLORIDE_MGL	PCT_NonNative (c=0)	0.7167	9.40E-08	0.7167
CHLORIDE_MGL	EIA-PCT_PERIM_INTACT	-0.3853	0.01286	0.3853
CHLORIDE_MGL	pH_MED	0.6111	1.72E-05	0.6111
CHLORIDE_MGL	PHOSPHORUS_AS_P_MGL	0.4547	0.00282	0.4547
CHLORIDE_MGL	TURBIDITY _MED, NTU	0.3974	0.01009	0.3974
CHLORIDE_MGL	WHDA_PCT-MDPT_ALT_TO_100_FT_BUF	0.5210	0.00048	0.5210
CONDUCTIVITY_MED_USCM	ADJ_FQI	-0.4335	0.00413	0.4335
CONDUCTIVITY_MED_USCM	EIA-AVE_BUFF_WIDTH_M	-0.6890	4.54E-07	0.6890
CONDUCTIVITY_MED_USCM	CHL_A_UNCOR_UGL	0.3834	0.01598	0.3834
CONDUCTIVITY_MED_USCM	MEAN_C	-0.5036	0.00067	0.5036
CONDUCTIVITY_MED_USCM	PCT_C_value_7_10	-0.3022	0.05174	0.3022
CONDUCTIVITY_MED_USCM	PCT_Native	-0.6196	1.21E-05	0.6196
CONDUCTIVITY_MED_USCM	PCT_NonNative (c=0)	0.7189	8.20E-08	0.7189
CONDUCTIVITY_MED_USCM	EIA-PCT_PERIM_INTACT	-0.4246	0.00566	0.4246
CONDUCTIVITY_MED_USCM	pH_MED	0.6907	4.15E-07	0.6907
CONDUCTIVITY_MED_USCM	PHOSPHORUS_AS_P_MGL	0.4120	0.00745	0.4120
CONDUCTIVITY_MED_USCM	TURBIDITY _MED, NTU	0.4074	0.00821	0.4074
CONDUCTIVITY_MED_USCM	WHDA_PCT-MDPT_ALT_TO_100_FT_BUF	0.5384	0.00028	0.5384
DISSOLVED OXYGEN SAT_PCT_MED	CHL_A_UNCOR_UGL	-0.3459	0.03102	0.3459
DISSOLVED OXYGEN SAT_PCT_MED	pH_MED	0.3719	0.01530	0.3719
DISSOLVED OXYGEN SAT_PCT_MED	PHOSPHORUS_AS_P_MGL	-0.5127	0.00061	0.5127
DISSOLVED OXYGEN SAT_PCT_MED	STREAM_order_where_smpld	-0.3189	0.03954	0.3189
DISSOLVED OXYGEN SAT_PCT_MED	TEMP_MED_W_DEG_C	0.3893	0.01082	0.3893
DISSOLVED OXYGEN SAT_PCT_MED	TKN_MGL	-0.3240	0.04138	0.3240
DISSOLVED OXYGEN_MED_MGL	CHL_A_UNCOR_UGL	-0.3562	0.02602	0.3562
DISSOLVED OXYGEN_MED_MGL	pH_MED	0.3739	0.01473	0.3739
DISSOLVED OXYGEN_MED_MGL	PHOSPHORUS_AS_P_MGL	-0.4923	0.00108	0.4923
DISSOLVED OXYGEN_MED_MGL	STREAM_order_where_smpld	-0.3015	0.05233	0.3015
DISSOLVED OXYGEN_MED_MGL	TEMP_MED_W_DEG_C	0.3134	0.04327	0.3134
DISSOLVED OXYGEN_MED_MGL	TKN_MGL	-0.3283	0.03861	0.3283
EIA	ADJ_FQI	0.4081	0.00730	0.4081
EIA	ALKALINITY_MGL	-0.6878	4.85E-07	0.6878
EIA	CARBON_ORGANIC_DISS_MGL	0.4015	0.00841	0.4015
EIA	CONDUCTIVITY_MED_USCM	-0.8703	7.15E-14	0.8703
EIA	MEAN_C	0.5419	0.00021	0.5419
EIA	PCT_C_value_7_10	0.3676	0.01663	0.3676
EIA	PCT_Native	0.6862	5.26E-07	0.6862
EIA	PCT_NonNative (c=0)	-0.7812	1.04E-09	0.7812
EIA	EIA-PCT_PERIM_INTACT	0.6294	1.04E-05	0.6294
EIA	pH_MED	-0.7162	9.67E-08	0.7162
EIA	PHOSPHORUS_AS_P_MGL	-0.3182	0.04264	0.3182
EIA	SPECIFIC CONDUCTANCE_MED_USCM	-0.8699	7.59E-14	0.8699
EIA	TURBIDITY _MED, NTU	-0.3796	0.01436	0.3796
EIA	WHDA	-0.8919	2.22E-15	0.8919
EIA	WHDA_PCT-MDPT_ALT_TO_100_FT_BUF	-0.7232	9.27E-08	0.7232
EIA-AVE_BUFF_WIDTH_M	ADJ_FQI	0.4798	0.00130	0.4798
EIA-AVE_BUFF_WIDTH_M	ALKALINITY_MGL	-0.5202	0.00041	0.5202
EIA-AVE_BUFF_WIDTH_M	CHLORIDE_MGL	-0.6779	8.14E-07	0.6779
EIA-AVE_BUFF_WIDTH_M	CONDUCTIVITY_MED_USCM	-0.6890	4.54E-07	0.6890
EIA-AVE_BUFF_WIDTH_M	MEAN_C	0.5960	3.12E-05	0.5960
EIA-AVE_BUFF_WIDTH_M	PCT_C_value_7_10	0.4304	0.00444	0.4304
EIA-AVE_BUFF_WIDTH_M	PCT_Native	0.6180	1.30E-05	0.6180
EIA-AVE_BUFF_WIDTH_M	PCT_NonNative (c=0)	-0.7172	9.10E-08	0.7172
EIA-AVE_BUFF_WIDTH_M	EIA-PCT_PERIM_INTACT	0.6865	7.20E-07	0.6865
EIA-AVE_BUFF_WIDTH_M	pH_MED	-0.5649	9.74E-05	0.5649
EIA-AVE_BUFF_WIDTH_M	SPECIFIC CONDUCTANCE_MED_USCM	-0.6962	3.07E-07	0.6962
EIA-AVE_BUFF_WIDTH_M	WHDA	-0.7005	2.41E-07	0.7005
EIA-AVE_BUFF_WIDTH_M	WHDA_PCT-MDPT_ALT_TO_100_FT_BUF	-0.7014	3.26E-07	0.7014
EIA-LAND USE INDEX	ADJ_FQI	0.3576	0.02008	0.3576
EIA-LAND USE INDEX	ALKALINITY_MGL	-0.6469	3.68E-06	0.6469
EIA-LAND USE INDEX	CARBON_ORGANIC_DISS_MGL	0.3383	0.02842	0.3383
EIA-LAND USE INDEX	CHLORIDE_MGL	-0.7755	1.63E-09	0.7755
EIA-LAND USE INDEX	CONDUCTIVITY_MED_USCM	-0.7784	1.29E-09	0.7784
EIA-LAND USE INDEX	MEAN_C	0.4470	0.00300	0.4470
EIA-LAND USE INDEX	PCT_C_value_7_10	0.3522	0.02215	0.3522
EIA-LAND USE INDEX	PCT_Native	0.5979	2.90E-05	0.5979

Parameter-row	Parameter-column	correlation value (r)	p	abs correlation
EIA-LAND USE INDEX	PCT_NonNative (c=0)	-0.6745	9.67E-07	0.6745
EIA-LAND USE INDEX	EIA-PCT_PERIM_INTACT	0.5482	0.00021	0.5482
EIA-LAND USE INDEX	pH_MED	-0.5426	0.00021	0.5426
EIA-LAND USE INDEX	PHOSPHORUS_AS_P_MGL	-0.3349	0.03234	0.3349
EIA-LAND USE INDEX	SPECIFIC CONDUCTANCE_MED_USCM	-0.7894	5.20E-10	0.7894
EIA-LAND USE INDEX	TURBIDITY _MED, NTU	-0.4001	0.00953	0.4001
EIA-LAND USE INDEX	WHDA_PCT-MDPT_ALT_TO_100_FT_BUF	-0.6042	2.88E-05	0.6042
EIA-PCT_PERIM_INTACT	ADJ_FQI	0.3302	0.03501	0.3302
EIA-PCT_PERIM_INTACT	ALKALINITY_MGL	-0.4223	0.00595	0.4223
EIA-PCT_PERIM_INTACT	EIA-AVE_BUFF_WIDTH_M	0.6865	7.20E-07	0.6865
EIA-PCT_PERIM_INTACT	CHLORIDE_MGL	-0.3853	0.01286	0.3853
EIA-PCT_PERIM_INTACT	CONDUCTIVITY_MED_USCM	-0.4246	0.00566	0.4246
EIA-PCT_PERIM_INTACT	EIA	0.6294	1.04E-05	0.6294
EIA-PCT_PERIM_INTACT	EIA-LAND USE INDEX	0.5482	0.00021	0.5482
EIA-PCT_PERIM_INTACT	MEAN_C	0.4493	0.00321	0.4493
EIA-PCT_PERIM_INTACT	PCT_C_value_7_10	0.4098	0.00779	0.4098
EIA-PCT_PERIM_INTACT	PCT_Native	0.5496	0.00020	0.5496
EIA-PCT_PERIM_INTACT	PCT_NonNative (C=0)	-0.5028	0.00081	0.5028
EIA-PCT_PERIM_INTACT	pH_MED	-0.4054	0.00856	0.4054
EIA-PCT_PERIM_INTACT	SPECIFIC CONDUCTANCE_MED_USCM	-0.4277	0.00528	0.4277
EIA-PCT_PERIM_INTACT	TURBIDITY _MED, NTU	-0.3148	0.04785	0.3148
EIA-PCT_PERIM_INTACT	WHDA	-0.5067	0.00072	0.5067
GENERIC_RICHNESS_INVERTS_TOTAL_R	MEAN_ABUNDANCE_INVERTS_TOTAL_A	0.6452	3.97E-06	0.6452
GENERIC_RICHNESS_INVERTS_TOTAL_R	PCT_Emergent	-0.3866	0.01143	0.3866
GENERIC_RICHNESS_INVERTS_TOTAL_R	PCT_Floating_leaved	0.3401	0.02753	0.3401
GENERIC_RICHNESS_INVERTS_TOTAL_R	PCT_Submergent	0.5102	0.00056	0.5102
GENERIC_RICHNESS_INVERTS_TOTAL_R	STREAM_order_where_smpld	0.4700	0.00168	0.4700
GENERIC_RICHNESS_INVERTS_TOTAL_R	WSHED_area_acres	0.4588	0.00224	0.4588
MEAN_abundance_Inverts_TOTAL_A	CHL_A_UNCOR_UGL	-0.3402	0.03408	0.3402
MEAN_abundance_Inverts_TOTAL_A	Depth_of_samples_mean_cm	0.4130	0.00656	0.4130
MEAN_abundance_Inverts_TOTAL_A	GENERIC_RICHNESS_INVERTS_TOTAL_R	0.6452	3.97E-06	0.6452
MEAN_abundance_Inverts_TOTAL_A	PCT_Emergent	-0.3238	0.03646	0.3238
MEAN_abundance_Inverts_TOTAL_A	PCT_Floating_leaved	0.3609	0.01886	0.3609
MEAN_abundance_Inverts_TOTAL_A	PCT_Submergent	0.4495	0.00282	0.4495
MEAN_abundance_Inverts_TOTAL_A	STREAM_order_where_smpld	0.3248	0.03585	0.3248
MEAN_abundance_Inverts_TOTAL_A	WSHED_area_acres	0.3959	0.00946	0.3959
MEAN_C	AA_acres	0.4781	0.00136	0.4781
MEAN_C	ALKALINITY_MGL	-0.4969	0.00082	0.4969
MEAN_C	EIA-AVE_BUFF_WIDTH_M	0.5960	3.12E-05	0.5960
MEAN_C	CARBON_ORGANIC_DISS_MGL	0.3226	0.03718	0.3226
MEAN_C	CHLORIDE_MGL	-0.5174	0.00045	0.5174
MEAN_C	CONDUCTIVITY_MED_USCM	-0.5036	0.00067	0.5036
MEAN_C	EIA	0.5419	0.00021	0.5419
MEAN_C	EIA-LAND USE INDEX	0.4470	0.00300	0.4470
MEAN_C	NATIVE_FQI	0.3058	0.04893	0.3058
MEAN_C	NATIVE_mean_C	0.4639	0.00197	0.4639
MEAN_C	PCT_C_value_4_6	0.4041	0.00795	0.4041
MEAN_C	PCT_C_value_7_10	0.7153	1.02E-07	0.7153
MEAN_C	EIA-PCT_PERIM_INTACT	0.4493	0.00321	0.4493
MEAN_C	pH_MED	-0.3505	0.02289	0.3505
MEAN_C	SPECIFIC CONDUCTANCE_MED_USCM	-0.4913	0.00095	0.4913
MEAN_C	TOTAL_FQI	0.4058	0.00767	0.4058
MEAN_C	TURBIDITY _MED, NTU	-0.4377	0.00421	0.4377
MEAN_C	WHDA	-0.4578	0.00230	0.4578
MEAN_C	WHDA_PCT-MDPT_ALT_TO_100_FT_BUF	-0.3032	0.05396	0.3032
NATIVE_FQI	MEAN_C	0.3058	0.04893	0.3058
NATIVE_FQI	PCT_Floating_leaved	-0.3299	0.03288	0.3299
NATIVE_FQI	PCT_Woody	0.3220	0.03753	0.3220
NATIVE_mean_C	ADJ_FQI	0.4785	0.00135	0.4785
NATIVE_mean_C	MEAN_C	0.4639	0.00197	0.4639
NATIVE_mean_C	PCT_C_value_1_3	-0.4275	0.00475	0.4275
NATIVE_mean_C	PCT_C_value_7_10	0.4624	0.00205	0.4624
NATIVE_mean_C	TURBIDITY _MED, NTU	-0.3160	0.04417	0.3160
PCT_C_value_1_3	AA_acres	-0.4428	0.00332	0.4428
PCT_C_value_1_3	NATIVE_mean_C	-0.4275	0.00475	0.4275
PCT_C_value_1_3	PCT_C_value_7_10	-0.3180	0.04012	0.3180
PCT_C_value_1_3	PCT_Emergent	0.4274	0.00475	0.4274
PCT_C_value_4_6	ADJ_FQI	0.3817	0.01263	0.3817

Parameter-row	Parameter-column	correlation value (r)	p	abs correlation
PCT_C_value_4_6	MEAN_C	0.4041	0.00795	0.4041
PCT_C_value_4_6	PCT_Emergent	-0.3314	0.03206	0.3314
PCT_C_value_4_6	PCT_NonNative (c=0)	-0.3416	0.02684	0.3416
PCT_C_value_7_10	ALKALINITY_MGL	-0.4672	0.00181	0.4672
PCT_C_value_7_10	EIA-AVE_BUFF_WIDTH_M	0.4304	0.00444	0.4304
PCT_C_value_7_10	CONDUCTIVITY_MED_USCM	-0.3022	0.05174	0.3022
PCT_C_value_7_10	EIA	0.3676	0.01663	0.3676
PCT_C_value_7_10	EIA-LAND USE INDEX	0.3522	0.02215	0.3522
PCT_C_value_7_10	MEAN_C	0.7153	1.02E-07	0.7153
PCT_C_value_7_10	NATIVE_mean_C	0.4624	0.00205	0.4624
PCT_C_value_7_10	PCT_C_value_1_3	-0.3180	0.04012	0.3180
PCT_C_value_7_10	PCT_Native	0.4588	0.00225	0.4588
PCT_C_value_7_10	PCT_NonNative (C=0)	-0.3778	0.01363	0.3778
PCT_C_value_7_10	EIA-PCT_PERIM_INTACT	0.4098	0.00779	0.4098
PCT_C_value_7_10	pH_MED	-0.3442	0.02561	0.3442
PCT_C_value_7_10	TURBIDITY _MED, NTU	-0.3493	0.02518	0.3493
PCT_C_value_7_10	WHDA	-0.3208	0.03829	0.3208
PCT_C_value_7_10	WHDA_PCT-MDPT_ALT_TO_100_FT_BUF	-0.3599	0.02081	0.3599
PCT_Emergent	ADJ_FQI	-0.3385	0.02833	0.3385
PCT_Emergent	GENERIC_RICHNESS_INVERTS_TOTAL_R	-0.3866	0.01143	0.3866
PCT_Emergent	MEAN_ABUNDANCE_INVERTS_TOTAL_A	-0.3238	0.03646	0.3238
PCT_Emergent	PCT_C_value_1_3	0.4274	0.00475	0.4274
PCT_Emergent	PCT_C_value_4_6	-0.3314	0.03206	0.3314
PCT_Emergent	PCT_Floating_leaved	-0.4283	0.00466	0.4283
PCT_Emergent	PCT_Submergent	-0.5856	4.62E-05	0.5856
PCT_Emergent	PCT_wetlands_in_wshed	-0.4507	0.00274	0.4507
PCT_Floating_leaved	AA_acres	0.3320	0.03170	0.3320
PCT_Floating_leaved	CARBON_ORGANIC_DISS_MGL	0.4043	0.00793	0.4043
PCT_Floating_leaved	Depth_of_samples_mean_cm	0.3174	0.04056	0.3174
PCT_Floating_leaved	GENERIC_RICHNESS_INVERTS_TOTAL_R	0.3401	0.02753	0.3401
PCT_Floating_leaved	MEAN_ABUNDANCE_INVERTS_TOTAL_A	0.3609	0.01886	0.3609
PCT_Floating_leaved	NATIVE_FQI	-0.3299	0.03288	0.3299
PCT_Floating_leaved	PCT_Emergent	-0.4283	0.00466	0.4283
PCT_Floating_leaved	PCT_Submergent	0.4885	0.00103	0.4885
PCT_Floating_leaved	PCT_Woody	-0.3913	0.01040	0.3913
PCT_Floating_leaved	TOTAL_FQI	-0.2997	0.05386	0.2997
PCT_Native	ADJ_FQI	0.4958	0.00084	0.4958
PCT_Native	ALKALINITY_MGL	-0.5273	0.00033	0.5273
PCT_Native	EIA-AVE_BUFF_WIDTH_M	0.6180	1.30E-05	0.6180
PCT_Native	CHLORIDE_MGL	-0.5979	2.90E-05	0.5979
PCT_Native	CONDUCTIVITY_MED_USCM	-0.6196	1.21E-05	0.6196
PCT_Native	EIA	0.6862	5.26E-07	0.6862
PCT_Native	EIA-LAND USE INDEX	0.5979	2.90E-05	0.5979
PCT_Native	PCT_C_value_7_10	0.4588	0.00225	0.4588
PCT_Native	EIA-PCT_PERIM_INTACT	0.5496	0.00020	0.5496
PCT_Native	pH_MED	-0.4217	0.00541	0.4217
PCT_Native	SPECIFIC CONDUCTANCE_MED_USCM	-0.6058	2.12E-05	0.6058
PCT_Native	TURBIDITY _MED, NTU	-0.3542	0.02309	0.3542
PCT_Native	WHDA	-0.5958	3.15E-05	0.5958
PCT_Native	WHDA_PCT-MDPT_ALT_TO_100_FT_BUF	-0.5315	0.00035	0.5315
PCT_NonNative C=0	ADJ_FQI	-0.5316	0.00029	0.5316
PCT_NonNative C=0	ALKALINITY_MGL	0.5598	0.00012	0.5598
PCT_NonNative C=0	EIA-AVE_BUFF_WIDTH_M	-0.7172	9.10E-08	0.7172
PCT_NonNative C=0	CHLORIDE_MGL	0.7167	9.40E-08	0.7167
PCT_NonNative C=0	CONDUCTIVITY_MED_USCM	0.7189	8.20E-08	0.7189
PCT_NonNative C=0	EIA-LAND USE INDEX	-0.6745	9.67E-07	0.6745
PCT_NonNative C=0	PCT_C_value_4_6	-0.3416	0.02684	0.3416
PCT_NonNative C=0	PCT_C_value_7_10	-0.3778	0.01363	0.3778
PCT_NonNative C=0	EIA-PCT_PERIM_INTACT	-0.5028	0.00081	0.5028
PCT_NonNative C=0	pH_MED	0.5069	0.00061	0.5069
PCT_NonNative C=0	PHOSPHORUS_AS_P_MGL	0.3393	0.03001	0.3393
PCT_NonNative C=0	SPECIFIC CONDUCTANCE_MED_USCM	0.7108	1.33E-07	0.7108
PCT_NonNative C=0	TURBIDITY _MED, NTU	0.3623	0.01991	0.3623
PCT_NonNative C=0	WHDA	0.6724	1.08E-06	0.6724
PCT_NonNative C=0	WHDA_PCT-MDPT_ALT_TO_100_FT_BUF	0.5387	0.00028	0.5387
PCT_Submergent	Depth_of_samples_mean_cm	0.4913	0.00095	0.4913
PCT_Submergent	GENERIC_RICHNESS_INVERTS_TOTAL_R	0.5102	0.00056	0.5102
PCT_Submergent	MEAN_ABUNDANCE_INVERTS_TOTAL_A	0.4495	0.00282	0.4495

Parameter-row	Parameter-column	correlation value (r)	p	abs correlation
PCT_Submergent	PCT_Emergent	-0.5856	4.62E-05	0.5856
PCT_Submergent	PCT_Floating_leaved	0.4885	0.00103	0.4885
PCT_Submergent	PCT_Woody	-0.4210	0.00550	0.4210
PCT_wetlands_in_wshed	PCT_Emergent	-0.4507	0.00274	0.4507
PCT_Woody	Depth_of_samples_mean_cm	-0.3126	0.04387	0.3126
PCT_Woody	NATIVE_FQI	0.3220	0.03753	0.3220
PCT_Woody	PCT_Floating_leaved	-0.3913	0.01040	0.3913
PCT_Woody	PCT_Submergent	-0.4210	0.00550	0.4210
PCT_Woody	TOTAL_FQI	0.3283	0.03379	0.3283
pH_MED	ALKALINITY_MGL	0.6915	3.97E-07	0.6915
pH_MED	EIA-AVE_BUFF_WIDTH_M	-0.5649	9.74E-05	0.5649
pH_MED	CARBON_ORGANIC_DISS_MGL	-0.3334	0.03095	0.3334
pH_MED	CHLORIDE_MGL	0.6111	1.72E-05	0.6111
pH_MED	CONDUCTIVITY_MED_USCM	0.6907	4.15E-07	0.6907
pH_MED	DISSOLVED OXYGEN SAT_PCT_MED	0.3719	0.01530	0.3719
pH_MED	DISSOLVED OXYGEN_MED_MGL	0.3739	0.01473	0.3739
pH_MED	EIA	-0.7162	9.67E-08	0.7162
pH_MED	EIA-LAND USE INDEX	-0.5426	0.00021	0.5426
pH_MED	MEAN_C	-0.3505	0.02289	0.3505
pH_MED	PCT_C_value_7_10	-0.3442	0.02561	0.3442
pH_MED	PCT_Native	-0.4217	0.00541	0.4217
pH_MED	PCT_NonNative (C=0)	0.5069	0.00061	0.5069
pH_MED	EIA-PCT_PERIM_INTACT	-0.4054	0.00856	0.4054
pH_MED	SPECIFIC CONDUCTANCE_MED_USCM	0.6800	7.31E-07	0.6800
pH_MED	TURBIDITY _MED, NTU	0.3277	0.03650	0.3277
pH_MED	WHDA	0.6869	5.07E-07	0.6869
pH_MED	WHDA_PCT-MDPT_ALT_TO_100_FT_BUF	0.4765	0.00164	0.4765
PHOSPHORUS_AS_P_MGL	ALKALINITY_MGL	0.3149	0.04490	0.3149
PHOSPHORUS_AS_P_MGL	CHL_A_UNCOR_UGL	0.6865	1.95E-06	0.6865
PHOSPHORUS_AS_P_MGL	CHLORIDE_MGL	0.4547	0.00282	0.4547
PHOSPHORUS_AS_P_MGL	CONDUCTIVITY_MED_USCM	0.4120	0.00745	0.4120
PHOSPHORUS_AS_P_MGL	DISSOLVED OXYGEN SAT_PCT_MED	-0.5127	0.00061	0.5127
PHOSPHORUS_AS_P_MGL	DISSOLVED OXYGEN_MED_MGL	-0.4923	0.00108	0.4923
PHOSPHORUS_AS_P_MGL	EIA	-0.3182	0.04264	0.3182
PHOSPHORUS_AS_P_MGL	EIA-LAND USE INDEX	-0.3349	0.03234	0.3349
PHOSPHORUS_AS_P_MGL	PCT_NonNative (C=0)	0.3393	0.03001	0.3393
PHOSPHORUS_AS_P_MGL	SPECIFIC CONDUCTANCE_MED_USCM	0.4229	0.00587	0.4229
PHOSPHORUS_AS_P_MGL	TKN_MGL	0.5531	0.00026	0.5531
PHOSPHORUS_AS_P_MGL	TURBIDITY _MED, NTU	0.3524	0.02572	0.3524
PHOSPHORUS_AS_P_MGL	WHDA	0.3321	0.03392	0.3321
SPECIFIC CONDUCTANCE_MED_USCM	ADJ_FQI	-0.4316	0.00432	0.4316
SPECIFIC CONDUCTANCE_MED_USCM	ALKALINITY_MGL	0.7270	4.98E-08	0.7270
SPECIFIC CONDUCTANCE_MED_USCM	EIA-AVE_BUFF_WIDTH_M	-0.6962	3.07E-07	0.6962
SPECIFIC CONDUCTANCE_MED_USCM	CHL_A_UNCOR_UGL	0.3689	0.02082	0.3689
SPECIFIC CONDUCTANCE_MED_USCM	CHLORIDE_MGL	0.9731	0	0.9731
SPECIFIC CONDUCTANCE_MED_USCM	EIA-LAND USE INDEX	-0.7894	5.20E-10	0.7894
SPECIFIC CONDUCTANCE_MED_USCM	MEAN_C	-0.4913	0.00095	0.4913
SPECIFIC CONDUCTANCE_MED_USCM	PCT_Native	-0.6058	2.12E-05	0.6058
SPECIFIC CONDUCTANCE_MED_USCM	PCT_NonNative (C=0)	0.7108	1.33E-07	0.7108
SPECIFIC CONDUCTANCE_MED_USCM	EIA-PCT_PERIM_INTACT	-0.4277	0.00528	0.4277
SPECIFIC CONDUCTANCE_MED_USCM	pH_MED	0.6800	7.31E-07	0.6800
SPECIFIC CONDUCTANCE_MED_USCM	PHOSPHORUS_AS_P_MGL	0.4229	0.00587	0.4229
SPECIFIC CONDUCTANCE_MED_USCM	TURBIDITY _MED, NTU	0.4122	0.00740	0.4122
SPECIFIC CONDUCTANCE_MED_USCM	WHDA_PCT-MDPT_ALT_TO_100_FT_BUF	0.5487	0.00020	0.5487
STREAM_order_where_smpld	AA_acres	0.5892	4.04E-05	0.5892
STREAM_order_where_smpld	CARBON_ORGANIC_DISS_MGL	0.3271	0.03447	0.3271
STREAM_order_where_smpld	Depth_of_samples_mean_cm	0.3220	0.03756	0.3220
STREAM_order_where_smpld	DISSOLVED OXYGEN SAT_PCT_MED	-0.3189	0.03954	0.3189
STREAM_order_where_smpld	DISSOLVED OXYGEN_MED_MGL	-0.3015	0.05233	0.3015
STREAM_order_where_smpld	GENERIC_RICHNESS_INVERTS_TOTAL_R	0.4700	0.00168	0.4700
STREAM_order_where_smpld	MEAN_ABUNDANCE_INVERTS_TOTAL_A	0.3248	0.03585	0.3248
TEMP_MED_W_DEG_C	DISSOLVED OXYGEN SAT_PCT_MED	0.3893	0.01082	0.3893
TEMP_MED_W_DEG_C	DISSOLVED OXYGEN_MED_MGL	0.3134	0.04327	0.3134
TKN_MGL	CHL_A_UNCOR_UGL	0.5604	0.00025	0.5604
TKN_MGL	DISSOLVED OXYGEN SAT_PCT_MED	-0.3240	0.04138	0.3240
TKN_MGL	DISSOLVED OXYGEN_MED_MGL	-0.3283	0.03861	0.3283
TKN_MGL	PHOSPHORUS_AS_P_MGL	0.5531	0.00026	0.5531
TOTAL_FQI	ADJ_FQI	0.3501	0.02304	0.3501

Parameter-row	Parameter-column	correlation value (r)	p	abs correlation
TOTAL_FQI	MEAN_C	0.4058	0.00767	0.4058
TOTAL_FQI	PCT_Floating_leaved	-0.2997	0.05386	0.2997
TOTAL_FQI	PCT_Woody	0.3283	0.03379	0.3283
TURBIDITY _MED, NTU	ADJ_FQI	-0.4052	0.00859	0.4052
TURBIDITY _MED, NTU	ALKALINITY_MGL	0.5497	0.00020	0.5497
TURBIDITY _MED, NTU	CARBON_ORGANIC_DISS_MGL	-0.3984	0.00988	0.3984
TURBIDITY _MED, NTU	CHL_A_UNCOR_UGL	0.3221	0.04552	0.3221
TURBIDITY _MED, NTU	CHLORIDE_MGL	0.3974	0.01009	0.3974
TURBIDITY _MED, NTU	CONDUCTIVITY_MED_USCM	0.4074	0.00821	0.4074
TURBIDITY _MED, NTU	EIA	-0.3796	0.01436	0.3796
TURBIDITY _MED, NTU	EIA-LAND USE INDEX	-0.4001	0.00953	0.4001
TURBIDITY _MED, NTU	MEAN_C	-0.4377	0.00421	0.4377
TURBIDITY _MED, NTU	NATIVE_mean_C	-0.3160	0.04417	0.3160
TURBIDITY _MED, NTU	PCT_C_value_7_10	-0.3493	0.02518	0.3493
TURBIDITY _MED, NTU	PCT_Native	-0.3542	0.02309	0.3542
TURBIDITY _MED, NTU	PCT_NonNative (C=0)	0.3623	0.01991	0.3623
TURBIDITY _MED, NTU	EIA-PCT_PERIM_INTACT	-0.3148	0.04785	0.3148
TURBIDITY _MED, NTU	pH_MED	0.3277	0.03650	0.3277
TURBIDITY _MED, NTU	PHOSPHORUS_AS_P_MGL	0.3524	0.02572	0.3524
TURBIDITY _MED, NTU	SPECIFIC CONDUCTANCE_MED_USCM	0.4122	0.00740	0.4122
TURBIDITY _MED, NTU	WHDA	0.3498	0.02495	0.3498
TURBIDITY _MED, NTU	WHDA_PCT-MDPT_ALT_TO_100_FT_BUF	0.3651	0.02053	0.3651
WHDA	ADJ_FQI	-0.3365	0.02934	0.3365
WHDA	ALKALINITY_MGL	0.6301	7.76E-06	0.6301
WHDA	EIA-AVE_BUFF_WIDTH_M	-0.7005	2.41E-07	0.7005
WHDA	CHLORIDE_MGL	0.7656	3.51E-09	0.7656
WHDA	CONDUCTIVITY_MED_USCM	0.8136	5.78E-11	0.8136
WHDA	EIA-LAND USE INDEX	-0.7630	4.24E-09	0.7630
WHDA	MEAN_C	-0.4578	0.00230	0.4578
WHDA	PCT_C_value_7_10	-0.3208	0.03829	0.3208
WHDA	PCT_Native	-0.5958	3.15E-05	0.5958
WHDA	PCT_NonNative (C=0)	0.6724	1.08E-06	0.6724
WHDA	EIA-PCT_PERIM_INTACT	-0.5067	0.00072	0.5067
WHDA	pH_MED	0.6869	5.07E-07	0.6869
WHDA	PHOSPHORUS_AS_P_MGL	0.3321	0.03392	0.3321
WHDA	SPECIFIC CONDUCTANCE_MED_USCM	0.8100	8.15E-11	0.8100
WHDA	TURBIDITY _MED, NTU	0.3498	0.02495	0.3498
WHDA	WHDA-CONV-PCT_MDPT_ALT_TO_100_I	0.6664	1.97E-06	0.6664
WHDA-CONV-PCT_MDPT_ALT_TO_100_FT_BU	ALKALINITY_MGL	0.3978	0.01000	0.3978
WHDA-CONV-PCT_MDPT_ALT_TO_100_FT_BU	EIA-AVE_BUFF_WIDTH_M	-0.7014	3.26E-07	0.7014
WHDA-CONV-PCT_MDPT_ALT_TO_100_FT_BU	CHLORIDE_MGL	0.5210	0.00048	0.5210
WHDA-CONV-PCT_MDPT_ALT_TO_100_FT_BU	CONDUCTIVITY_MED_USCM	0.5384	0.00028	0.5384
WHDA-CONV-PCT_MDPT_ALT_TO_100_FT_BU	EIA-LAND USE INDEX	-0.6042	2.88E-05	0.6042
WHDA-CONV-PCT_MDPT_ALT_TO_100_FT_BU	MEAN_C	-0.3032	0.05396	0.3032
WHDA-CONV-PCT_MDPT_ALT_TO_100_FT_BU	PCT_C_value_7_10	-0.3599	0.02081	0.3599
WHDA-CONV-PCT_MDPT_ALT_TO_100_FT_BU	PCT_Native	-0.5315	0.00035	0.5315
WHDA-CONV-PCT_MDPT_ALT_TO_100_FT_BU	PCT_NonNative (C=0)	0.5387	0.00028	0.5387
WHDA-CONV-PCT_MDPT_ALT_TO_100_FT_BU	EIA-PCT_PERIM_INTACT	-0.7353	6.50E-08	0.7353
WHDA-CONV-PCT_MDPT_ALT_TO_100_FT_BU	pH_MED	0.4765	0.00164	0.4765
WHDA-CONV-PCT_MDPT_ALT_TO_100_FT_BU	SPECIFIC CONDUCTANCE_MED_USCM	0.5487	0.00020	0.5487
WHDA-CONV-PCT_MDPT_ALT_TO_100_FT_BU	TURBIDITY _MED, NTU	0.3651	0.02053	0.3651
WSHED_area_acres	AA_acres	0.6776	8.28E-07	0.6776
WSHED_area_acres	ADJ_FQI	0.3714	0.01544	0.3714
WSHED_area_acres	Depth_of_samples_mean_cm	0.3205	0.03849	0.3205
WSHED_area_acres	GENERIC_RICHNESS_INVERTS_TOTAL_R	0.4588	0.00224	0.4588
WSHED_area_acres	MEAN_ABUNDANCE_INVERTS_TOTAL_A	0.3959	0.00946	0.3959
WSHED_area_acres	STREAM_order_where_smpld	0.8963	8.88E-16	0.8963

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-310 Trip ID: 2017-310-WET-ALL-1 River Basin:
Waterbody: CATAMOUNT BROOK (NH) HUC8 Name:
Town: Not Designated Latitude: 43 7 59.96 N
Mitigation Monitoring Site: No Longitude: 71 21 56.89 W

Sample Information

Sample ID: DN-2017-310-WET-ALL-1 Type of Sample: DIPNET Date Sampled: 7/12/2017
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination:** Date:
Model Result with P≥0.6: I **Reason for Determination:**
Date Last Calculated: 5/4/2018 Comments:

Model Probabilities

First Stage Model

Class A:	0.00	Class C:	0.53
Class B:	0.03	NA:	0.44

B or Better Model

Class A or B	0.03
Class C or Non-Attainment	0.97

C or Better Model

Class A, B, or C	0.56
Non-Attainment	0.44

A Model

Class A	0.00
Class B or C or Non-Attainment	1.00

Model Variables

		Reference Range
Total Mean Abundance	305	< 787
Ephemeroptera Abundance	0.00	most > 35
Odonata Relative Abundance	0.002	most > 0.04
Trichoptera Relative Abundance	0.000	most > 0.02
Shredder Taxa Relative Abundance	0.00	< 0.2
Non-insect Taxa Relative Richness	0.08	< 0.4
MTI Sensitive Taxa Abundance	0.00	most > 30
MTI Sensitive Taxa Relative Abundance	0.00	most > 0.05
MTI Sensitive Taxa Richness	0	most > 7
MTI Intermediate Taxa Relative Abundance	1.00	> 0.5
MTI Intermediate Taxa Richness	7	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	0.00	most > 1

Other Variables

Generic Richness:	13
Hilsenhoff Biotic Index:	8.25
Shannon-Weiner Diversity:	1.69
Maine Tolerance Index:	24.86

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	63.86
2	*Procladius*	19.65
3	*Chironomus*	6.55
4	*Tanytarsus*	4.48
5	*Ablabesmyia*	2.18

Sample Collection and Processing Information

Sampling Organization: NHDES
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 7/12/2017 9:24:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	6.1	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	72.1	%	
Surface Water	In-situ	pH	4.49		
Surface Water	In-situ	Specific Conductance	18.2	us/cm	
Surface Water	In-situ	Temperature	24.1	deg c	

Landcover Summary - 2004 Data

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	4	System:	PALUSTRINE	Landscape Position:	
Hydrologic Modifications:	0	Subsystem:		Lotic Gradient:	
Vegetative Modifications:	1	Class 1:	UNCONSOLIDATED BOTTOM	Flow Path:	
Chemical Pollutants:	0				
Watershed Characterization and Non-point Sources:	3	Subclass 1:	NON-PERSISTENT	Land Form:	
		Class 2:		Land Form Type:	
		Subclass 2:		Waterbody Type:	
		Class 3:		Waterbody Subtype:	
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations: AQUATIC MOSS PRESENT- FONTANALIS. BARBERRY IN ADJACENT UPLAND

Habitat Classification:
AQUATIC MACROPHYTE BED
OPEN WATER STANDING

Substrate Classification:
BEDROCK SUBSTRATE
BOULDER SUBSTRATE
SILT/MUCK SUBSTRATE

Average Depth: 77 cm Visible Flow: No Rain In Previous 24 Hours: Yes

Sample Comments: WATER WAS VERY CLEAR.

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Utricularia		LW-34022305002			
Vaccinium corymbosum	Highbush blueberry	LW-34021302023005	4	FACW	SHRUB
Spiraea alba var. latifolia	White meadowsweet	LW-34024202026002	2	FACW	SHRUB
Utricularia gibba	Humped bladderwort	LW-34022305002003	6	OBL	FORB/HERB
Brasenia schreberi	Watershield	LW-34023103001001	6	OBL	FORB/HERB
Dulichium arundinaceum	Threeway sedge	LW-34010501005001	5	OBL	GRAMINOID
Spiraea tomentosa	Steeplebush	LW-34024202026005	3	FACW	SHRUB
Carex lurida	Shallow sedge	LW-34010501002089	2	OBL	GRAMINOID
Utricularia macrorhiza	Common bladderwort	LW-34022305002005	3	OBL	FORB/HERB
Viburnum dentatum	Southern arrowwood	LW-34021201002002	4	FAC	TREE, SHRUB
Nymphaea odorata	American white waterlily	LW-34023103003002	5	OBL	FORB/HERB
Acer rubrum	Red maple	LW-34024603001006	2	FAC	TREE
Lysimachia terrestris	Earth loosestrife	LW-34023801002009	2	OBL	FORB/HERB
Osmunda regalis	Royal fern	LW-35010305001003	6		FORB/HERB
Chamaedaphne calyculata	Leatherleaf	LW-34021302004001	5	OBL	SHRUB
Potamogeton confervoides	Tuckerman's pondweed	LW-34011101001004	8	OBL	FORB/HERB

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Additional Summary Variables

Station Number: W-310 Waterbody: CATAMOUNT BROOK (NH) Town: Not Designated

Log Number: DN-2017-310-WET-ALL-1 Subsample Factor: X1 Replicates: 3 Calculated: 5/4/2018

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	0.67	0.002	2	0.15
EPT Taxa:	0.00	0.000	0	0.00
Insects:	110.33	0.361	12	0.92
Non-Insects:	195.00	0.639	1	0.08
Leeches:	0.00	0.000	0	0.00
Oligochaetes:	0.00	0.000	0	0.00
Snails:	0.00	0.000	0	0.00
Bivalves:	0.00	0.000	0	0.00
Isopods:	0.00	0.000	0	0.00
Amphipods:	195.00	0.639	1	0.08
Mites:	0.00	0.000	0	0.00
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	0.00	0.000	0	0.00
Odonates:	0.67	0.002	2	0.15
Caddisflies:	0.00	0.000	0	0.00
Diptera:	104.33	0.342	6	0.46
Hemiptera:	3.00	0.010	2	0.15
Beetles:	2.33	0.008	2	0.15
Chironomids:	100.33	0.329	4	0.31
Tanypodinae Tribe:	66.67	0.218	2	0.15
Chironomiinae Tribe:	33.67	0.110	2	0.15
Orthoclodiinae Tribe:	0.00	0.000	0	0.00
Collector-Filterers:	13.67	0.045	1	0.08
Collector-Gatherers:	215.00	0.704	2	0.15
Predators:	68.00	0.223	5	0.38
Piercers:	0.00	0.000	0	0.00
Shredders:	0.00	0.000	0	0.00
Scrapers:	0.00	0.000	0	0.00
Maine Tolerance:				
Sensitive:	0.00	0.000	0	0.00
Intermediate:	296.00	1.000	7	1.00
Eurytopic:	0.00	0.000	0	0.00
Ratio of MTI Sensitive to Eurytopic	0.00	0.000	0.00	0.00

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-310 Waterbody: CATAMOUNT BROOK (NH) Town: Not Designated

Log Number: DN-2017-310-WET-ALL-1 Subsample Factor: X1 Replicates: 3 Calculated: 5/4/2018

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsenhoff Biotic Index	Functional Feeding Group	Maine Tolerance Index	Tribe	Taxa Group
Hyalella	09010203006	0.00	195.00	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	195.00	0.00	--	--	--	--	Amphipod
Libellulidae	09020306	0.33	0.33	--	--	--	--	Dragonfly/damselfly
Coenagrionidae	09020309	0.33	0.33	--	--	--	--	Dragonfly/damselfly
Corixidae	09020501	2.33	2.33	--	--	--	--	True Bug
Notonecta	09020505015	0.67	0.67	--	PR	--	--	True Bug
Chaoborus	09021007025	0.33	0.33	8	PR	25-I	--	Fly: Phantom Midge
Ceratopogonidae	09021010	3.67	3.67	--	--	--	--	Fly: Biting Midge
Ablabesmyia	09021011001	6.67	6.67	8	PR	23.6-I	T	Fly: Midge
Procladius	09021011015	60.00	60.00	9	PR	25.1-I	T	Fly: Midge
Tanytarsus	09021011076	13.67	13.67	6	CF	25.7-I	Y	Fly: Midge
Chironomus	09021011080	20.00	20.00	10	CG	27.4-I	C	Fly: Midge
Dytiscidae	09021103	2.00	2.00	--	--	--	--	Beetle
Graphoderus	09021103030	0.33	0.33	--	PR	27.4-I	--	Beetle

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-264 Trip ID: 2014-264-WET-ALS-1 River Basin: Connecticut
Waterbody: FULLER WETLAND (NH) HUC8 Name:
Town: Not Designated Latitude: 43 7 22.23 N
Mitigation Monitoring Site: No Longitude: 72 16 35.15 W

Sample Information

Sample ID: DN-2014-264-WET-ALS-1 Type of Sample: DIPNET Date Sampled: 8/7/2014
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: A** Date: 2/9/2016
Model Result with P≥0.6: A **Reason for Determination: Model**
Date Last Calculated: 2/8/2016 Comments:

Model Probabilities

First Stage Model

Class A:	1.00	Class C:	0.00
Class B:	0.00	NA:	0.00

B or Better Model

Class A or B	1.00
Class C or Non-Attainment	0.00

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	1.00
Class B or C or Non-Attainment	0.00

Model Variables

		Reference Range
Total Mean Abundance	123	< 787
Ephemeroptera Abundance	55.67	most > 35
Odonata Relative Abundance	0.195	most > 0.04
Trichoptera Relative Abundance	0.079	most > 0.02
Shredder Taxa Relative Abundance	0.04	< 0.2
Non-insect Taxa Relative Richness	0.14	< 0.4
MTI Sensitive Taxa Abundance	10.71	most > 30
MTI Sensitive Taxa Relative Abundance	0.10	most > 0.05
MTI Sensitive Taxa Richness	7	most > 7
MTI Intermediate Taxa Relative Abundance	0.90	> 0.5
MTI Intermediate Taxa Richness	13	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	10.71	most > 1

Other Variables

Generic Richness:	28
Hilsenhoff Biotic Index:	7.39
Shannon-Weiner Diversity:	3.06
Maine Tolerance Index:	23.30

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Caenis*	45.26
2	*Enallagma*	17.89
3	*Hyalella azteca*	5.69
4	*Oxyethira*	3.25
5	*Banksiola*	2.98

Sample Collection and Processing Information

Sampling Organization: NHDES
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 8/7/2014 10:45:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	0.98	mg/l	
Surface Water	In-situ	pH	5.27		
Surface Water	In-situ	Specific Conductance	52.2	us/cm	
Surface Water	In-situ	Temperature	22.6	deg c	

Landcover Summary - 2004 Data

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	10	System:	PALUSTRINE	Landscape Position:	
Hydrologic Modifications:	4	Subsystem:		Lotic Gradient:	
Vegetative Modifications:	1	Class 1:	EMERGENT	Flow Path:	
Chemical Pollutants:	0	Subclass 1:	NON-PERSISTENT	Land Form:	
Watershed Characterization and Non-point Sources:	5	Class 2:	EMERGENT	Land Form Type:	
		Subclass 2:	PERSISTENT	Waterbody Type:	
		Class 3:	SCRUB SHRUB	Waterbody Subtype:	
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations: COULD NOT REACH FLOATING MAT ISLAND IN THE MIDDLE OF THE LOWER PART OF THE WETLAND. PLANT LIST IS NOT COMPREHENSIVE.

Habitat Classification:
AQUATIC MACROPHYTE BED
EMERGENT NON-PERSISTENT VEGETATION
EMERGENT PERSISTENT VEGETATION

Substrate Classification:
ORGANIC SOIL SUBSTRATE
SILT/MUCK SUBSTRATE

Average Depth: 39 cm Visible Flow: No Rain In Previous 24 Hours: No

Sample Comments: BEAVER DAM LOCATED BETWEEN SITES 2 AND 3. SITE 1 IS THE MOST DOWNSTREAM SAMPLING POINT. MACROSITES 2&3 WERE SAMPLED ON 8/11 DUE TO THREATENING THUNDERSTORM ON 8/7

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Glyceria canadensis	Rattlesnake mannagrass	LW-34010502036003	4	OBL	GRAMINOID
Eupatorium perfoliatum	Common boneset	LW-34020501032001	4	FACW	FORB/HERB
Utricularia		LW-34022305002			
Nymphaea odorata	American white waterlily	LW-34023103003002	5	OBL	FORB/HERB
Eleocharis		LW-34010501006			
Phalaris arundinacea	Reed canarygrass	LW-34010502054001	1	FACW	GRAMINOID
Sagittaria		LW-34011401002			
Alnus incana ssp. rugosa	Speckled alder	LW-34021701001002	2	FACW	TREE, SHRUB
Nuphar lutea ssp. variegata	Varigated yellow pond-lily	LW-34023103002002	4	OBL	FORB/HERB
Carex lurida	Shallow sedge	LW-34010501002089	2	OBL	GRAMINOID
Impatiens capensis	Jewelweed	LW-34021901001001	2	FACW	FORB/HERB
Brasenia schreberi	Watershield	LW-34023103001001	6	OBL	FORB/HERB
Carex		LW-34010501002			
Sparganium americanum	American bur-reed	LW-34011301001001	5	OBL	FORB/HERB

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Rosa multiflora	Multiflora rose	LW-34024202020010	0	FACU	VINE, SUBSHRUB
Spiraea tomentosa	Steeplebush	LW-34024202026005	3	FACW	SHRUB

Additional Summary Variables

Station Number: W-264 Waterbody: FULLER WETLAND (NH) Town: Not Designated

Log Number: DN-2014-264-WET-ALS-1 Subsample Factor: X1 Replicates: 3 Calculated: 2/8/2016

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	89.33	0.726	9	0.32
EPT Taxa:	65.33	0.531	7	0.25
Insects:	111.00	0.902	24	0.86
Non-Insects:	12.00	0.098	4	0.14
Leeches:	0.00	0.000	0	0.00
Oligochaetes:	3.33	0.027	1	0.04
Snails:	0.33	0.003	1	0.04
Bivalves:	0.00	0.000	0	0.00
Isopods:	0.00	0.000	0	0.00
Amphipods:	7.00	0.057	1	0.04
Mites:	1.33	0.011	1	0.04
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	55.67	0.453	1	0.04
Odonates:	24.00	0.195	2	0.07
Caddisflies:	9.67	0.079	6	0.21
Diptera:	14.33	0.117	11	0.39
Hemiptera:	4.67	0.038	2	0.07
Beetles:	2.67	0.022	2	0.07
Chironomids:	14.33	0.117	11	0.39
Tanypodinae Tribe:	5.12	0.042	4	0.14
Chironomiinae Tribe:	8.87	0.072	6	0.21
Orthoclodiinae Tribe:	0.34	0.003	1	0.04
Collector-Filterers:	3.41	0.028	2	0.07
Collector-Gatherers:	67.79	0.551	6	0.21
Predators:	35.79	0.291	11	0.39
Piercers:	4.00	0.033	1	0.04
Shredders:	4.68	0.038	3	0.11
Scrapers:	0.33	0.003	1	0.04
Maine Tolerance:				
Sensitive:	10.71	0.098	7	0.35
Intermediate:	98.60	0.902	13	0.65
Eurytopic:	0.00	0.000	0	0.00
Ratio of MTI Sensitive to Eurytopic	10.71	9.801	7.00	35.00

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-264 Waterbody: FULLER WETLAND (NH) Town: Not Designated

Log Number: DN-2014-264-WET-ALS-1 Subsample Factor: X1 Replicates: 3 Calculated: 2/8/2016

Taxon	Maine Taxonomic Code	Count (Mean of Samples)		Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
		Actual	Adjusted					
Naididae	08020202	3.33	3.33	--	--	--	--	Worm
Hyalella	09010203006	0.00	7.00	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	7.00	0.00	--	--	--	--	Amphipod
Odonata	090203	0.33	0.33	--	--	--	--	Dragonfly/damselfly
Sympetrum	09020306041	1.67	1.67	10	PR	37-I	--	Dragonfly/damselfly
Enallagma	09020309051	22.00	22.00	9	PR	26.2-I	--	Dragonfly/damselfly
Caenis	09020412040	55.67	55.67	7	CG	22.1-I	--	Mayfly
Corixidae	09020501	1.33	1.33	--	--	--	--	True Bug
Notonecta	09020505015	3.33	3.33	--	PR	--	--	True Bug
Polycentropus	09020603010	0.67	0.67	6	PR	15.4-S	--	Caddisfly
Oxyethira	09020607028	4.00	4.00	3	P	22-S	--	Caddisfly
Phryganeidae	09020608	0.67	0.67	--	--	--	--	Caddisfly
Banksiola	09020608036	3.67	3.67	--	SH	14.9-S	--	Caddisfly
Lepidostoma	09020611064	0.33	0.33	1	SH	--	--	Caddisfly
Oecetis	09020618078	0.33	0.33	8	PR	16.3-S	--	Caddisfly
Chironomidae	09021011	0.33	0.00	--	--	--	--	Fly: Midge
Ablabesmyia	09021011001	3.00	3.07	8	PR	23.6-I	T	Fly: Midge
Labrundinia	09021011008	1.00	1.02	7	PR	18.1-S	T	Fly: Midge
Procladius	09021011015	0.33	0.34	9	PR	25.1-I	T	Fly: Midge
Thienemannimyia	09021011020	0.00	0.68	3	PR	--	T	Fly: Midge
Thienemannimyia group	09021011020041	0.67	0.00	--	--	--	T	Fly: Midge
Psectrocladius	09021011056	0.33	0.34	8	CG	22-S	--	Fly: Midge
Tanytarsus	09021011076	1.67	1.71	6	CF	25.7-I	Y	Fly: Midge
Chironomus	09021011080	2.00	2.05	10	CG	27.4-I	C	Fly: Midge
Dicrotendipes	09021011085	2.00	2.05	8	CG	28.8-I	C	Fly: Midge
Microtendipes	09021011094	1.67	1.71	6	CF	22.3-I	C	Fly: Midge
Polypedilum	09021011102	0.67	0.68	6	SH	24.2-I	C	Fly: Midge
Tribelos	09021011107	0.00	0.68	5	CG	9.3-S	C	Fly: Midge
Tribelos jucundus	09021011107198	0.67	0.00	--	--	--	C	Fly: Midge
Hydrovatus	09021103007	2.33	2.33	--	PR	--	--	Beetle
Celina	09021103012	0.33	0.33	--	PR	--	--	Beetle
Arachnida	0903	1.00	1.00	--	--	--	--	Arachnid
Arrenurus	09030111001	0.33	0.33	--	--	23.8-I	--	Mite
Helisoma	10010203030	0.33	0.33	--	SC	42.8-I	--	Snail

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-296 Trip ID: 2016-296-WET-ANT-1 River Basin: Merrimack
Waterbody: RYE POND (NH) HUC8 Name:
Town: Not Designated Latitude: 43 1 8.23 N
Mitigation Monitoring Site: No Longitude: 72 3 35.05 W

Sample Information

Sample ID: DN-2016-296-WET-ANT-1 Type of Sample: DIPNET Date Sampled: 7/21/2016
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: A** Date: 5/10/2017
Model Result with P≥0.6: A **Reason for Determination: Model**
Date Last Calculated: 4/19/2017 Comments:

Model Probabilities

First Stage Model

Class A:	0.99	Class C:	0.00
Class B:	0.01	NA:	0.00

B or Better Model

Class A or B	1.00
Class C or Non-Attainment	0.00

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.99
Class B or C or Non-Attainment	0.01

Model Variables

		Reference Range
Total Mean Abundance	118	< 787
Ephemeroptera Abundance	0.67	most > 35
Odonata Relative Abundance	0.011	most > 0.04
Trichoptera Relative Abundance	0.045	most > 0.02
Shredder Taxa Relative Abundance	0.01	< 0.2
Non-insect Taxa Relative Richness	0.15	< 0.4
MTI Sensitive Taxa Abundance	18.37	most > 30
MTI Sensitive Taxa Relative Abundance	0.17	most > 0.05
MTI Sensitive Taxa Richness	10	most > 7
MTI Intermediate Taxa Relative Abundance	0.82	> 0.5
MTI Intermediate Taxa Richness	12	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	11.76	most > 1

Other Variables

Generic Richness:	27
Hilsenhoff Biotic Index:	7.96
Shannon-Weiner Diversity:	3.63
Maine Tolerance Index:	24.70

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	27.89
2	*Chironomus*	9.30
3	*Chironomidae*	8.17
3	*Procladius*	8.17
3	*Tanytarsus*	8.17
4	*Ablabesmyia*	6.20
5	*Ceratopogonidae*	5.92

Sample Collection and Processing Information

Sampling Organization: NHDES
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 7/21/2016 10:50:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	5.2	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	59.2	%	
Surface Water	In-situ	pH	4.84		
Surface Water	In-situ	Specific Conductance	53.5	us/cm	
Surface Water	In-situ	Temperature	20.8	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	5	System:	PALUSTRINE	Landscape Position:	
Hydrologic Modifications:	1	Subsystem:		Lotic Gradient:	
Vegetative Modifications:	0	Class 1:	UNCONSOLIDATED BOTTOM	Flow Path:	
Chemical Pollutants:	0				
Watershed Characterization and Non-point Sources:	4	Subclass 1:	ROOTED VASCULAR	Land Form:	
		Class 2:	UNCONSOLIDATED BOTTOM	Land Form Type:	
		Subclass 2:	ORGANIC	Waterbody Type:	
		Class 3:		Waterbody Subtype:	
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations: VERY LOW WATER LEVELS STRANDED NYMPHAEA LEAVES ON EXPOSED SUBSTRATE

Habitat Classification:	Substrate Classification:
AQUATIC MACROPHYTE BED	ORGANIC SOIL SUBSTRATE
EMERGENT NON-PERSISTENT VEGETATION	PEAT SUBSTRATE

Average Depth: 67 cm Visible Flow: No Rain In Previous 24 Hours: No

Sample Comments:

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Eleocharis robbinsii	Robbins' spikerush	LW-34010501006016	6	OBL	GRAMINOID
Nuphar lutea ssp. variegata	Varigated yellow pond-lily	LW-34023103002002	4	OBL	FORB/HERB
Schoenoplectus subterminalis	Swaying bulrush	LW-34010501011010	6	OBL	GRAMINOID
Eriocaulon aquaticum	Sevenangle pipewort	LW-34010601001001	7	OBL	FORB/HERB
Utricularia intermedia	Flatleaf bladderwort	LW-34022305002004	6	OBL	FORB/HERB
Nymphaea odorata	American white waterlily	LW-34023103003002	5	OBL	FORB/HERB
Utricularia purpurea	Eastern purple bladderwort	LW-34022305002007	5	OBL	FORB/HERB

Additional Summary Variables

Station Number: W-296 Waterbody: RYE POND (NH) Town: Not Designated

Log Number: DN-2016-296-WET-ANT-1 Subsample Factor: X1 Replicates: 3 Calculated: 4/19/2017

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	7.33	0.062	6	0.22
EPT Taxa:	6.00	0.051	5	0.19
Insects:	81.33	0.687	23	0.85
Non-Insects:	37.00	0.313	4	0.15
Leeches:	0.00	0.000	0	0.00
Oligochaetes:	3.67	0.031	2	0.07
Snails:	0.00	0.000	0	0.00
Bivalves:	0.00	0.000	0	0.00
Isopods:	0.00	0.000	0	0.00
Amphipods:	33.00	0.279	1	0.04
Mites:	0.33	0.003	1	0.04
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	0.67	0.006	2	0.07
Odonates:	1.33	0.011	1	0.04
Caddisflies:	5.33	0.045	3	0.11
Diptera:	73.00	0.617	16	0.59
Hemiptera:	1.00	0.008	1	0.04
Beetles:	0.00	0.000	0	0.00
Chironomids:	66.00	0.558	15	0.56
Tanypodinae Tribe:	23.43	0.198	6	0.22
Chironomiinae Tribe:	36.32	0.307	8	0.30
Orthoclodiinae Tribe:	6.25	0.053	1	0.04
Collector-Filterers:	11.33	0.096	1	0.04
Collector-Gatherers:	64.54	0.545	9	0.33
Predators:	26.77	0.226	9	0.33
Piercers:	2.33	0.020	1	0.04
Shredders:	1.56	0.013	1	0.04
Scrapers:	0.00	0.000	0	0.00
Maine Tolerance:				
Sensitive:	18.37	0.169	10	0.42
Intermediate:	89.07	0.817	12	0.50
Eurytopic:	1.56	0.014	2	0.08
Ratio of MTI Sensitive to Eurytopic	11.76	11.761	5.00	5.00

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-296 Waterbody: RYE POND (NH) Town: Not Designated

Log Number: DN-2016-296-WET-ANT-1 Subsample Factor: X1 Replicates: 3 Calculated: 4/19/2017

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
Naididae	08020202	1.00	0.00	--	--	--	--	Worm
Stylaria	08020202014	0.00	2.75	--	CG	18-S	--	Worm
Stylaria lacustris	08020202014002	2.00	0.00	--	--	--	--	Worm
Vejdovskyella	08020202015	0.00	0.92	--	--	13.7-S	--	Worm
Vejdovskyella comata	08020202015001	0.67	0.00	--	--	--	--	Worm
Hyalella	09010203006	0.00	33.00	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	33.00	0.00	--	--	--	--	Amphipod
Odonata	090203	1.00	1.00	--	--	--	--	Dragonfly/damselfly
Arigomphus	09020302009	0.33	0.33	--	PR	--	--	Dragonfly/damselfly
Callibaetis	09020401002	0.33	0.33	9	CG	40.5-I	--	Mayfly
Caenis	09020412040	0.33	0.33	7	CG	22.1-I	--	Mayfly
Corixidae	09020501	1.00	1.00	--	--	--	--	True Bug
Polycentropus	09020603010	2.33	2.33	6	PR	15.4-S	--	Caddisfly
Oxyethira	09020607028	2.33	2.33	3	P	22-S	--	Caddisfly
Oecetis	09020618078	0.67	0.67	8	PR	16.3-S	--	Caddisfly
Ceratopogonidae	09021010	7.00	7.00	--	--	--	--	Fly: Biting Midge
Chironomidae	09021011	9.67	0.00	--	--	--	--	Fly: Midge
Ablabesmyia	09021011001	7.33	8.59	8	PR	23.6-I	T	Fly: Midge
Guttipelopia	09021011006	0.00	0.78	5	PR	19.4-S	T	Fly: Midge
Guttipelopia guttipennis	09021011006018	0.67	0.00	--	--	--	T	Fly: Midge
Labrundinia	09021011008	1.00	1.17	7	PR	18.1-S	T	Fly: Midge
Larsia	09021011009	0.67	0.78	6	PR	15.6-S	T	Fly: Midge
Procladius	09021011015	9.67	11.33	9	PR	25.1-I	T	Fly: Midge
Tanypus	09021011018	0.67	0.78	10	PR	33.5-I	T	Fly: Midge
Psectrocladius	09021011056	5.33	6.25	8	CG	22-S	--	Fly: Midge
Paratanytarsus	09021011071	1.00	1.17	6	--	43-E	Y	Fly: Midge
Tanytarsus	09021011076	9.67	11.33	6	CF	25.7-I	Y	Fly: Midge
Pseudochironomus	09021011078	0.33	0.39	5	CG	47.7-E	S	Fly: Midge
Chironomus	09021011080	11.00	12.89	10	CG	27.4-I	C	Fly: Midge
Cladopelma	09021011081	6.67	7.81	9	CG	27.9-I	C	Fly: Midge
Dicrotendipes	09021011085	0.67	0.78	8	CG	28.8-I	C	Fly: Midge
Pagastiella	09021011096	0.33	0.39	--	--	11.8-S	C	Fly: Midge
Polypedilum	09021011102	1.33	1.56	6	SH	24.2-I	C	Fly: Midge
Arrenurus	09030111001	0.33	0.33	--	--	23.8-I	--	Mite

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-311 Trip ID: 2017-311-WET-AUB-1 River Basin:
Waterbody: CLARK POND (NH) HUC8 Name:
Town: Not Designated Latitude: 43 1 31.67 N
Mitigation Monitoring Site: No Longitude: 71 21 27.89 W

Sample Information

Sample ID: DN-2017-311-WET-AUB-1 Type of Sample: DIPNET Date Sampled: 8/9/2017
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination:** Date:
Model Result with P≥0.6: B **Reason for Determination:**
Date Last Calculated: 5/7/2018 Comments:

Model Probabilities

First Stage Model

Class A: 0.08 Class C: 0.11
Class B: 0.81 NA: 0.00

B or Better Model

Class A or B 0.89
Class C or Non-Attainment 0.11

C or Better Model

Class A, B, or C 1.00
Non-Attainment 0.00

A Model

Class A 0.08
Class B or C or Non-Attainment 0.92

Model Variables

		Reference Range
Total Mean Abundance	344	< 787
Ephemeroptera Abundance	7.33	most > 35
Odonata Relative Abundance	0.051	most > 0.04
Trichoptera Relative Abundance	0.028	most > 0.02
Shredder Taxa Relative Abundance	0.17	< 0.2
Non-insect Taxa Relative Richness	0.33	< 0.4
MTI Sensitive Taxa Abundance	22.26	most > 30
MTI Sensitive Taxa Relative Abundance	0.07	most > 0.05
MTI Sensitive Taxa Richness	8	most > 7
MTI Intermediate Taxa Relative Abundance	0.81	> 0.5
MTI Intermediate Taxa Richness	19	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	0.58	most > 1

Other Variables

Generic Richness:	42
Hilsenhoff Biotic Index:	8.11
Shannon-Weiner Diversity:	3.34
Maine Tolerance Index:	28.54

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	42.64
2	*Caecidotea*	10.56
3	*Chironomus*	10.08
4	*Chironomidae*	4.36
5	*Polypedilum*	3.59

Sample Collection and Processing Information

Sampling Organization: NHDES
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 8/9/2017 11:19:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	0.87	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	9.4	%	
Surface Water	In-situ	pH	5.11		
Surface Water	In-situ	Specific Conductance	91.9	us/cm	
Surface Water	In-situ	Temperature	21.6	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	11	System:	LACUSTRINE	Landscape Position:	
Hydrologic Modifications:	1	Subsystem:	LIMNETIC	Lotic Gradient:	
Vegetative Modifications:	2	Class 1:	AQUATIC BED	Flow Path:	THROUGHFLOW
Chemical Pollutants:	0	Subclass 1:	NON-PERSISTENT	Land Form:	
Watershed Characterization and Non-point Sources:	8	Class 2:	EMERGENT	Land Form Type:	
		Subclass 2:	PERSISTENT	Waterbody Type:	LAKE
		Class 3:		Waterbody Subtype:	
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations:

Habitat Classification:
AQUATIC MACROPHYTE BED
EMERGENT NON-PERSISTENT VEGETATION

Substrate Classification:
SILT/MUCK SUBSTRATE

Average Depth: 65 cm Visible Flow: No Rain In Previous 24 Hours: No

Sample Comments: WATER SCORPION OBSERVED AT SITE 1; BEAVER LODGE AND DAMS PRESENT

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Sparganium		LW-34011301001			
Solidago		LW-34020501071			
Viburnum dentatum	Southern arrowwood	LW-34021201002002	4	FAC	TREE, SHRUB
Thalictrum pubescens	King of the meadow	LW-34024002013002	2	FACW	FORB/HERB
Spiraea alba var. latifolia	White meadowsweet	LW-34024202026002	2	FACW	SHRUB
Pontederia cordata	Pickerelweed	LW-34010906002002	4	OBL	FORB/HERB
Acer rubrum	Red maple	LW-34024603001006	2	FAC	TREE
Ilex verticillata	Common winterberry	LW-34020201001005	3	FACW	TREE, SHRUB
Nuphar lutea ssp. variegata	Variegated yellow pond-lily	LW-34023103002002	4	OBL	FORB/HERB
Scirpus cyperinus	Woolgrass	LW-34010501012003	2	OBL	GRAMINOID
Decodon verticillatus	Swamp loosestrife	LW-34022901001001	6	OBL	SUBSHRUB, SHRUB
Myrica gale	Sweetgale	LW-34022801003001	5	OBL	SHRUB
Utricularia purpurea	Eastern purple bladderwort	LW-34022305002007	5	OBL	FORB/HERB
Brasenia schreberi	Watershield	LW-34023103001001	6	OBL	FORB/HERB
Hypericum		LW-34022601001			
Lythrum salicaria	Purple loosestrife	LW-34022901002004	0	OBL	FORB/HERB
Nymphaea odorata	American white waterlily	LW-34023103003002	5	OBL	FORB/HERB
Eleocharis		LW-34010501006			

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Osmunda regalis	Royal fern	LW-35010305001003	6		FORB/HERB
Potamogeton pulcher	Spotted pondweed	LW-34011101001015	6	OBL	FORB/HERB
Utricularia gibba	Humped bladderwort	LW-34022305002003	6	OBL	FORB/HERB
Cephalanthus occidentalis	Common buttonbush	LW-34024301001001	6	OBL	TREE, SHRUB
Potamogeton		LW-34011101001			
Utricularia macrorhiza	Common bladderwort	LW-34022305002005	3	OBL	FORB/HERB
Dulichium arundinaceum	Threeway sedge	LW-34010501005001	5	OBL	GRAMINOID
Triadenum virginicum	Virginia marsh St. Johnswort	LW-34022601002002	6	OBL	FORB/HERB
Typha latifolia	Broadleaf cattail	LW-34011301002002	2	OBL	FORB/HERB
Chamaedaphne calyculata	Leatherleaf	LW-34021302004001	5	OBL	SHRUB

Additional Summary Variables

Station Number: W-311 Waterbody: CLARK POND (NH) Town: Not Designated

Log Number: DN-2017-311-WET-AUB-1 Subsample Factor: X1 Replicates: 3 Calculated: 5/7/2018

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	34.67	0.101	9	0.21
EPT Taxa:	17.00	0.049	5	0.12
Insects:	129.00	0.375	28	0.67
Non-Insects:	215.00	0.625	14	0.33
Leeches:	1.33	0.004	2	0.05
Oligochaetes:	3.67	0.011	3	0.07
Snails:	6.33	0.018	4	0.10
Bivalves:	11.67	0.034	1	0.02
Isopods:	36.33	0.106	1	0.02
Amphipods:	146.67	0.426	1	0.02
Mites:	9.00	0.026	2	0.05
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	7.33	0.021	2	0.05
Odonates:	17.67	0.051	4	0.10
Caddisflies:	9.67	0.028	3	0.07
Diptera:	87.67	0.255	13	0.31
Hemiptera:	6.00	0.017	5	0.12
Beetles:	0.00	0.000	0	0.00
Chironomids:	85.00	0.247	12	0.29
Tanypodinae Tribe:	17.81	0.052	4	0.10
Chironomiinae Tribe:	67.19	0.195	8	0.19
Orthoclodiinae Tribe:	0.00	0.000	0	0.00
Collector-Filterers:	18.55	0.054	3	0.07
Collector-Gatherers:	199.83	0.581	7	0.17
Predators:	42.02	0.122	12	0.29
Piercers:	0.33	0.001	1	0.02
Shredders:	57.64	0.168	3	0.07
Scrapers:	1.67	0.005	2	0.05
Maine Tolerance:				
Sensitive:	22.26	0.071	8	0.27
Intermediate:	251.74	0.806	19	0.63
Eurytopic:	38.33	0.123	3	0.10
Ratio of MTI Sensitive to Eurytopic	0.58	0.581	2.67	2.67

Aquatic Life Taxonomic Inventory Report

Station Number: W-311 Waterbody: CLARK POND (NH) Town: Not Designated

Log Number: DN-2017-311-WET-AUB-1 Subsample Factor: X1 Replicates: 3 Calculated: 5/7/2018

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
Lumbriculidae	08020101	0.33	0.33	--	--	--	--	Worm
Naididae	08020202	2.67	0.00	--	--	--	--	Worm
Dero	08020202007	0.33	1.67	--	CG	37.9-I	--	Worm
Stylaria	08020202014	0.00	1.67	--	CG	18-S	--	Worm
Stylaria lacustris	08020202014002	0.33	0.00	--	--	--	--	Worm
Glossiphoniidae	08030101	0.33	0.33	--	--	--	--	Leech
Helobdella	08030101005	0.00	1.00	--	--	43-E	--	Leech
Helobdella elongata	08030101005001	1.00	0.00	--	--	--	--	Leech
Caecidotea	09010101001	36.33	36.33	8	SH	51.9-E	--	Isopod
Hyalella	09010203006	0.00	146.67	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	146.67	0.00	--	--	--	--	Amphipod
Gomphidae	09020302	0.67	0.67	--	--	--	--	Dragonfly/damselfly
Libellulidae	09020306	2.00	2.00	--	--	--	--	Dragonfly/damselfly
Lestes	09020308045	4.00	4.00	9	PR	32.6-I	--	Dragonfly/damselfly
Enallagma	09020309051	11.00	11.00	9	PR	26.2-I	--	Dragonfly/damselfly
Callibaetis	09020401002	6.00	6.00	9	CG	40.5-I	--	Mayfly
Caenis	09020412040	1.33	1.33	7	CG	22.1-I	--	Mayfly
Corixidae	09020501	1.00	1.00	--	--	--	--	True Bug
Belostoma	09020502009	1.00	1.00	--	PR	41.7-I	--	True Bug
Notonecta	09020505015	0.33	0.33	--	PR	--	--	True Bug
Mesovelia	09020509024	1.00	1.00	--	PR	60.6-E	--	True Bug
Neoplea	09020512016	2.67	2.67	--	PR	35.5-I	--	True Bug
Polycentropus	09020603010	3.00	3.00	6	PR	15.4-S	--	Caddisfly
Oxyethira	09020607028	0.33	0.33	3	P	22-S	--	Caddisfly
Banksiola	09020608036	6.33	6.33	--	SH	14.9-S	--	Caddisfly
Lepidoptera	090209	0.67	0.67	--	--	--	--	Moth
Ceratopogonidae	09021010	2.67	2.67	--	--	--	--	Fly: Biting Midge
Chironomidae	09021011	15.00	0.00	--	--	--	--	Fly: Midge
Ablabesmyia	09021011001	3.33	4.05	8	PR	23.6-I	T	Fly: Midge
Guttipelopia	09021011006	0.00	8.90	5	PR	19.4-S	T	Fly: Midge
Guttipelopia guttipennis	09021011006018	7.33	0.00	--	--	--	T	Fly: Midge
Labrundinia	09021011008	0.33	0.40	7	PR	18.1-S	T	Fly: Midge
Procladius	09021011015	3.67	4.45	9	PR	25.1-I	T	Fly: Midge
Tanytarsus	09021011076	3.33	4.05	6	CF	25.7-I	Y	Fly: Midge
Chironomus	09021011080	34.67	42.10	10	CG	27.4-I	C	Fly: Midge

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-311 Waterbody: CLARK POND (NH) Town: Not Designated

Log Number: DN-2017-311-WET-AUB-1 Subsample Factor: X1 Replicates: 3 Calculated: 5/7/2018

Taxon	Maine Taxonomic Code	Count (Mean of Samples)		Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
		Actual	Adjusted					
Cladopelma	09021011081	0.33	0.40	9	CG	27.9-I	C	Fly: Midge
Microtendipes	09021011094	2.33	2.83	6	CF	22.3-I	C	Fly: Midge
Parachironomus	09021011097	1.00	1.21	10	PR	28.6-I	C	Fly: Midge
Polypedilum	09021011102	12.33	14.98	6	SH	24.2-I	C	Fly: Midge
Omisus	09021011130	0.67	0.81	--	--	20.7-S	H	Fly: Midge
Zavreliella	09021011133	0.00	0.81	--	--	21.8-S	H	Fly: Midge
Zavreliella marmorata	09021011133010	0.67	0.00	--	--	--	S	Fly: Midge
Hydrachnidia	09030101	7.33	7.33	--	--	--	--	Mite
Arrenurus	09030111001	1.67	1.67	--	--	23.8-I	--	Mite
Lymnaeidae	10010201	3.67	3.67	--	--	--	--	Snail
Stagnicola	10010201025	1.00	1.00	--	--	42.8-I	--	Snail
Physidae	10010202	1.00	1.00	--	SC	--	--	Snail
Helisoma	10010203030	0.67	0.67	--	SC	42.8-I	--	Snail
Sphaeriidae	10020201	11.67	11.67	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-312 Trip ID: 2017-312-WET-BAR-1 River Basin: Saco
Waterbody: RICHARDSON POND (NH) HUC8 Name: Piscataqua-Salmon Falls
Town: Not Designated Latitude: 43 12 50.09 N
Mitigation Monitoring Site: No Longitude: 71 1 31.74 W

Sample Information

Sample ID: DN-2017-312-WET-BAR-1 Type of Sample: DIPNET Date Sampled: 7/10/2017
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination:** Date:
Model Result with P≥0.6: C **Reason for Determination:**
Date Last Calculated: 5/7/2018 Comments:

Model Probabilities

First Stage Model

Class A:	0.00	Class C:	0.99
Class B:	0.01	NA:	0.00

B or Better Model

Class A or B	0.01
Class C or Non-Attainment	0.99

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.00
Class B or C or Non-Attainment	1.00

Model Variables

		Reference Range
Total Mean Abundance	323	< 787
Ephemeroptera Abundance	0.00	most > 35
Odonata Relative Abundance	0.009	most > 0.04
Trichoptera Relative Abundance	0.064	most > 0.02
Shredder Taxa Relative Abundance	0.30	< 0.2
Non-insect Taxa Relative Richness	0.32	< 0.4
MTI Sensitive Taxa Abundance	21.86	most > 30
MTI Sensitive Taxa Relative Abundance	0.08	most > 0.05
MTI Sensitive Taxa Richness	3	most > 7
MTI Intermediate Taxa Relative Abundance	0.56	> 0.5
MTI Intermediate Taxa Richness	8	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	0.23	most > 1

Other Variables

Generic Richness:	25
Hilsenhoff Biotic Index:	7.82
Shannon-Weiner Diversity:	2.51
Maine Tolerance Index:	33.84

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	41.49
2	*Caecidotea*	29.41
3	*Naididae*	7.02
4	*Polycentropus*	6.30
5	*Sphaeriidae*	4.75

Sample Collection and Processing Information

Sampling Organization: NHDES
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 7/10/2017 11:30:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	2.75	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	27.4	%	
Surface Water	In-situ	pH	5.1		
Surface Water	In-situ	Specific Conductance	166.7	us/cm	
Surface Water	In-situ	Temperature	23.6	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	12	System:	PALUSTRINE	Landscape Position:	
Hydrologic Modifications:	1	Subsystem:		Lotic Gradient:	
Vegetative Modifications:	4	Class 1:	AQUATIC BED	Flow Path:	THROUGHFLOW
Chemical Pollutants:	0	Subclass 1:	FLOATING VASCULAR	Land Form:	FRINGE
Watershed Characterization and Non-point Sources:	7	Class 2:	EMERGENT	Land Form Type:	
		Subclass 2:	NON-PERSISTENT	Waterbody Type:	POND
		Class 3:		Waterbody Subtype:	NATURAL
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations:

Habitat Classification:
AQUATIC MACROPHYTE BED
OPEN WATER STANDING
SCRUB SHRUB

Substrate Classification:
DETRITUS SUBSTRATE

Average Depth: 54 cm Visible Flow: No Rain In Previous 24 Hours: No

Sample Comments: LARGE CLAMS PRESENT IN POND

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Brasenia schreberi	Watershield	LW-34023103001001	6	OBL	FORB/HERB
Frangula alnus	Glossy buckthorn	LW-34024102002002	0	FAC	TREE SHRUB
Drosera rotundifolia	Roundleaf sundew	LW-34023001001004	3	OBL	FORB/HERB
Typha latifolia	Broadleaf cattail	LW-34011301002002	2	OBL	FORB/HERB
Chamaedaphne calyculata	Leatherleaf	LW-34021302004001	5	OBL	SHRUB
Eleocharis palustris	Common spikerush	LW-34010501006013	6	OBL	GRAMINOID
Nuphar lutea ssp. variegata	Variegated yellow pond-lily	LW-34023103002002	4	OBL	FORB/HERB
Carex stricta	Upright sedge	LW-34010501002139	4	OBL	GRAMINOID
Scirpus cyperinus	Woolgrass	LW-34010501012003	2	OBL	GRAMINOID
Spiraea tomentosa	Steeplebush	LW-34024202026005	3	FACW	SHRUB
Cephalanthus occidentalis	Common buttonbush	LW-34024301001001	6	OBL	TREE, SHRUB
Pontederia cordata	Pickerelweed	LW-34010906002002	4	OBL	FORB/HERB
Nymphaea odorata	American white waterlily	LW-34023103003002	5	OBL	FORB/HERB
Alnus incana ssp. rugosa	Speckled alder	LW-34021701001002	2	FACW	TREE, SHRUB
Eupatorium perfoliatum	Common boneset	LW-34020501032001	4	FACW	FORB/HERB
Polygonum		LW-34023701005			
Acer rubrum	Red maple	LW-34024603001006	2	FAC	TREE

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Bidens frondosa	Devil's beggartick	LW-34020501012007	2	FACW	FORB/HERB
Carex lasiocarpa	Woollyfruit sedge	LW-34010501002078	6	OBL	GRAMINOID
Utricularia		LW-34022305002			
Utricularia macrorhiza	Common bladderwort	LW-34022305002005	3	OBL	FORB/HERB
Lysimachia terrestris	Earth loosestrife	LW-34023801002009	2	OBL	FORB/HERB

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Additional Summary Variables

Station Number: W-312 Waterbody: RICHARDSON POND (NH) Town: Not Designated

Log Number: DN-2017-312-WET-BAR-1 Subsample Factor: X1 Replicates: 3 Calculated: 5/7/2018

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	23.67	0.073	4	0.16
EPT Taxa:	20.67	0.064	2	0.08
Insects:	48.67	0.151	17	0.68
Non-Insects:	274.33	0.849	8	0.32
Leeches:	0.00	0.000	0	0.00
Oligochaetes:	22.67	0.070	1	0.04
Snails:	3.67	0.011	3	0.12
Bivalves:	15.33	0.047	1	0.04
Isopods:	95.00	0.294	1	0.04
Amphipods:	134.00	0.415	1	0.04
Mites:	3.67	0.011	1	0.04
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	0.00	0.000	0	0.00
Odonates:	3.00	0.009	2	0.08
Caddisflies:	20.67	0.064	2	0.08
Diptera:	17.33	0.054	4	0.16
Hemiptera:	3.00	0.009	4	0.16
Beetles:	4.00	0.012	4	0.16
Chironomids:	13.67	0.042	3	0.12
Tanypodinae Tribe:	1.19	0.004	1	0.04
Chironomiinae Tribe:	12.48	0.039	2	0.08
Orthoclodiinae Tribe:	0.00	0.000	0	0.00
Collector-Filterers:	15.33	0.047	1	0.04
Collector-Gatherers:	145.29	0.450	2	0.08
Predators:	24.19	0.075	6	0.24
Piercers:	0.33	0.001	1	0.04
Shredders:	96.00	0.297	3	0.12
Scrapers:	0.33	0.001	1	0.04
Maine Tolerance:				
Sensitive:	21.86	0.081	3	0.20
Intermediate:	149.96	0.558	8	0.53
Eurytopic:	96.86	0.361	4	0.27
Ratio of MTI Sensitive to Eurytopic	0.23	0.226	0.75	0.75

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-312 Waterbody: RICHARDSON POND (NH) Town: Not Designated

Log Number: DN-2017-312-WET-BAR-1 Subsample Factor: X1 Replicates: 3 Calculated: 5/7/2018

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsenhoff Biotic Index	Functional Feeding Group	Maine Tolerance Index	Tribe	Taxa Group
Naididae	08020202	22.67	22.67	--	--	--	--	Worm
Caecidotea	09010101001	95.00	95.00	8	SH	51.9-E	--	Isopod
Hyalella	09010203006	0.00	134.00	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	134.00	0.00	--	--	--	--	Amphipod
Libellulidae	09020306	2.00	2.00	--	--	--	--	Dragonfly/damselfly
Enallagma	09020309051	1.00	1.00	9	PR	26.2-I	--	Dragonfly/damselfly
Corixidae	09020501	1.33	1.33	--	--	--	--	True Bug
Pelocoris	09020504013	1.00	1.00	--	PR	24.7-I	--	True Bug
Mesovelia	09020509024	0.33	0.33	--	PR	60.6-E	--	True Bug
Neoplea	09020512016	0.33	0.33	--	PR	35.5-I	--	True Bug
Polycentropus	09020603010	20.33	20.33	6	PR	15.4-S	--	Caddisfly
Banksiola	09020608036	0.33	0.33	--	SH	14.9-S	--	Caddisfly
Parapoynx	09020901002	0.67	0.67	5	SH	--	--	Moth
Ceratopogonidae	09021010	3.67	3.67	--	--	--	--	Fly: Biting Midge
Chironomidae	09021011	6.00	0.00	--	--	--	--	Fly: Midge
Larsia	09021011009	0.67	1.19	6	PR	15.6-S	T	Fly: Midge
Paratanytarsus	09021011071	0.67	1.19	6	--	43-E	Y	Fly: Midge
Dicrotendipes	09021011085	6.33	11.29	8	CG	28.8-I	C	Fly: Midge
Peltodytes	09021101002	0.33	0.33	--	P	56.2-E	--	Beetle
Dytiscidae	09021103	1.67	1.67	--	--	--	--	Beetle
Dineutus	09021104032	0.33	0.33	2	--	23.2-I	--	Beetle
Donacia	09021114071	1.67	1.67	--	--	25.1-I	--	Beetle
Hydrachnidia	09030101	3.67	3.67	--	--	--	--	Mite
Hydrobiidae	10010104	2.67	2.67	--	--	--	--	Snail
Lymnaeidae	10010201	0.67	0.67	--	--	--	--	Snail
Helisoma	10010203030	0.33	0.33	--	SC	42.8-I	--	Snail
Sphaeriidae	10020201	15.33	15.33	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-270 Trip ID: 2015-270-WET-BOW-1
Waterbody: TOWN POND (NH)
Town: Not Designated
Mitigation Monitoring Site: No

River Basin: Merrimack
HUC8 Name: Merrimack River
Latitude: 43 9 13.2 N
Longitude: 71 32 7.16 W

Sample Information

Sample ID: DN-2015-270-WET-BOW-1 Type of Sample: DIPNET Date Sampled: 6/25/2015
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: C** Date: 10/25/2016
Model Result with P≥0.6: C **Reason for Determination: Model**
Date Last Calculated: 8/24/2016 Comments:

Model Probabilities

First Stage Model

Class A:	0.01	Class C:	0.74
Class B:	0.25	NA:	0.00

B or Better Model

Class A or B	0.26
Class C or Non-Attainment	0.74

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.01
Class B or C or Non-Attainment	0.99

Model Variables

		Reference Range
Total Mean Abundance	175	< 787
Ephemeroptera Abundance	0.67	most > 35
Odonata Relative Abundance	0.000	most > 0.04
Trichoptera Relative Abundance	0.011	most > 0.02
Shredder Taxa Relative Abundance	0.00	< 0.2
Non-insect Taxa Relative Richness	0.23	< 0.4
MTI Sensitive Taxa Abundance	2.02	most > 30
MTI Sensitive Taxa Relative Abundance	0.01	most > 0.05
MTI Sensitive Taxa Richness	3	most > 7
MTI Intermediate Taxa Relative Abundance	0.98	> 0.5
MTI Intermediate Taxa Richness	13	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	1.99	most > 1

Other Variables

Generic Richness:	22
Hilsenhoff Biotic Index:	8.08
Shannon-Weiner Diversity:	1.78
Maine Tolerance Index:	24.91

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	70.80
2	*Hydrobiidae*	7.82
3	*Procladius*	7.06
4	*Sphaeriidae*	5.53
5	*Ablabesmyia*	1.53

Sample Collection and Processing Information

Sampling Organization: SJC, SDM
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 6/25/2015 12:40:00 PM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	7.9	mg/l	
Surface Water	In-situ	pH	6.03		
Surface Water	In-situ	Specific Conductance	228.5	us/cm	
Surface Water	In-situ	Temperature	28.3	deg c	

Landcover Summary - 2004 Data

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	22	System:	PALUSTRINE	Landscape Position:	
Hydrologic Modifications:	5	Subsystem:	LITTORAL	Lotic Gradient:	
Vegetative Modifications:	3	Class 1:	EMERGENT	Flow Path:	
Chemical Pollutants:	0	Subclass 1:	PERSISTENT	Land Form:	
Watershed Characterization and Non-point Sources:	14	Class 2:	EMERGENT	Land Form Type:	
		Subclass 2:	NON-PERSISTENT	Waterbody Type:	
		Class 3:	AQUATIC BED	Waterbody Subtype:	
		Subclass 3:	ROOTED VASCULAR		
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations: TYPHA LATIFOLIA GROWTH IS MOST DENSE ON THE E SIDE OF POND, BELOW RESIDENTIAL DEVELOPMENT

Habitat Classification:
AQUATIC MACROPHYTE BED

Substrate Classification:
ORGANIC SOIL SUBSTRATE
SAND SUBSTRATE

Average Depth: 43 cm Visible Flow: Yes Rain In Previous 24 Hours: Yes

Sample Comments: THE STREAM THROUGH A DRAINAGE MARSH-SHRUB SWAMP SYSTEM WAS IMPOUNDED/ DREDGED C. 1955 TO CREATE A WATER SOURCE FOR FIRE PROTECTION PURPOSES.

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Typha		LW-34011301002			
Vaccinium		LW-34021302023			
Spiraea		LW-34024202026			
Acer rubrum	Red maple	LW-34024603001006	2	FAC	TREE
Juncus		LW-34010801001			
Nymphaea odorata	American white waterlily	LW-34023103003002	5	OBL	FORB/HERB
Carex		LW-34010501002			
Utricularia		LW-34022305002			
Triadenum		LW-34022601002			
Juncus effusus	Common rush	LW-34010801001016	2	OBL	GRAMINOID
Rubus		LW-34024202021			
Glyceria		LW-34010502036			
Eleocharis		LW-34010501006			
Eupatorium perfoliatum	Common boneset	LW-34020501032001	4	FACW	FORB/HERB
Schoenoplectus tabernaemontani	Softstem bulrush	LW-34010501011011	5	OBL	GRAMINOID

Additional Summary Variables

Station Number: W-270 Waterbody: TOWN POND (NH) Town: Not Designated

Log Number: DN-2015-270-WET-BOW-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/24/2016

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	2.67	0.015	4	0.18
EPT Taxa:	2.67	0.015	4	0.18
Insects:	26.67	0.153	17	0.77
Non-Insects:	148.00	0.847	5	0.23
Leeches:	0.33	0.002	1	0.05
Oligochaetes:	0.00	0.000	0	0.00
Snails:	13.67	0.078	1	0.05
Bivalves:	9.67	0.055	1	0.05
Isopods:	0.00	0.000	0	0.00
Amphipods:	123.67	0.708	1	0.05
Mites:	0.67	0.004	1	0.05
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	0.67	0.004	2	0.09
Odonates:	0.00	0.000	0	0.00
Caddisflies:	2.00	0.011	2	0.09
Diptera:	23.00	0.132	11	0.50
Hemiptera:	0.00	0.000	0	0.00
Beetles:	1.00	0.006	2	0.09
Chironomids:	21.00	0.120	10	0.45
Tanypodinae Tribe:	15.92	0.091	3	0.14
Chironomiinae Tribe:	4.74	0.027	6	0.27
Orthoclodiinae Tribe:	0.34	0.002	1	0.05
Collector-Filterers:	11.02	0.063	2	0.09
Collector-Gatherers:	125.69	0.720	5	0.23
Predators:	20.94	0.120	9	0.41
Piercers:	0.00	0.000	0	0.00
Shredders:	0.00	0.000	0	0.00
Scrapers:	0.00	0.000	0	0.00
Maine Tolerance:				
Sensitive:	2.02	0.013	3	0.17
Intermediate:	146.97	0.980	13	0.72
Eurytopic:	1.01	0.007	2	0.11
Ratio of MTI Sensitive to Eurytopic	1.99	1.995	1.50	1.50

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-270 Waterbody: TOWN POND (NH) Town: Not Designated

Log Number: DN-2015-270-WET-BOW-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/24/2016

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
Helobdella	08030101005	0.00	0.33	--	--	43-E	--	Leech
Helobdella modesta	08030101005004	0.33	0.00	--	--	--	--	Leech
Hyalella	09010203006	0.00	123.67	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	123.67	0.00	--	--	--	--	Amphipod
Callibaetis	09020401002	0.33	0.33	9	CG	40.5-I	--	Mayfly
Caenis	09020412040	0.33	0.33	7	CG	22.1-I	--	Mayfly
Polycentropus	09020603010	1.00	1.00	6	PR	15.4-S	--	Caddisfly
Phryganeidae	09020608	1.00	1.00	--	--	--	--	Caddisfly
Culicoides	09021010037	2.00	2.00	10	PR	42.1-I	--	Fly: Biting Midge
Chironomidae	09021011	0.33	0.00	--	--	--	--	Fly: Midge
Ablabesmyia	09021011001	2.67	2.71	8	PR	23.6-I	T	Fly: Midge
Clinotanypus	09021011002	0.00	0.68	8	PR	30.3-I	T	Fly: Midge
Clinotanypus pinguis	09021011002008	0.67	0.00	--	--	--	--	Fly: Midge
Procladius	09021011015	12.33	12.53	9	PR	25.1-I	T	Fly: Midge
Psectrocladius	09021011056	0.33	0.34	8	CG	22-S	--	Fly: Midge
Paratanytarsus	09021011071	0.67	0.68	6	--	43-E	Y	Fly: Midge
Tanytarsus	09021011076	1.33	1.35	6	CF	25.7-I	Y	Fly: Midge
Cladopelma	09021011081	1.00	1.02	9	CG	27.9-I	C	Fly: Midge
Cryptochironomus	09021011082	0.33	0.34	8	PR	31.3-I	C	Fly: Midge
Cryptotendipes	09021011083	0.67	0.68	6	--	7.1-S	C	Fly: Midge
Parachironomus	09021011097	0.67	0.68	10	PR	28.6-I	C	Fly: Midge
Agabus	09021103016	0.67	0.67	--	PR	34.5-I	--	Beetle
Rhantus	09021103026	0.33	0.33	--	PR	--	--	Beetle
Arrenurus	09030111001	0.67	0.67	--	--	23.8-I	--	Mite
Hydrobiidae	10010104	13.67	13.67	--	--	--	--	Snail
Sphaeriidae	10020201	9.67	9.67	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-313 Trip ID: 2017-313-WET-BOW-2 River Basin:
Waterbody: PURGATORY BROOK (NH) HUC8 Name:
Town: Not Designated Latitude: 43 5 11.11 N
Mitigation Monitoring Site: No Longitude: 71 31 30.14 W

Sample Information

Sample ID: DN-2017-313-WET-BOW-2 Type of Sample: DIPNET Date Sampled: 6/29/2017
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination:** Date:
Model Result with P≥0.6: C **Reason for Determination:**
Date Last Calculated: 5/7/2018 Comments:

Model Probabilities

First Stage Model

Class A: 0.00 Class C: 0.82
Class B: 0.18 NA: 0.00

B or Better Model

Class A or B 0.18
Class C or Non-Attainment 0.82

C or Better Model

Class A, B, or C 1.00
Non-Attainment 0.00

A Model

Class A 0.00
Class B or C or Non-Attainment 1.00

Model Variables

		Reference Range
Total Mean Abundance	343	< 787
Ephemeroptera Abundance	0.33	most > 35
Odonata Relative Abundance	0.006	most > 0.04
Trichoptera Relative Abundance	0.002	most > 0.02
Shredder Taxa Relative Abundance	0.00	< 0.2
Non-insect Taxa Relative Richness	0.38	< 0.4
MTI Sensitive Taxa Abundance	0.00	most > 30
MTI Sensitive Taxa Relative Abundance	0.00	most > 0.05
MTI Sensitive Taxa Richness	0	most > 7
MTI Intermediate Taxa Relative Abundance	1.00	> 0.5
MTI Intermediate Taxa Richness	6	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	0.00	most > 1

Other Variables

Generic Richness:	16
Hilsenhoff Biotic Index:	7.97
Shannon-Weiner Diversity:	0.42
Maine Tolerance Index:	24.55

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	95.44
2	*Ceratopogonidae*	0.87
3	*Chironomidae*	0.68
4	*Microtendipes*	0.58
5	*Corixidae*	0.39

Sample Collection and Processing Information

Sampling Organization: NHDES
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 6/29/2017 10:43:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	4.3	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	47.4	%	
Surface Water	In-situ	pH	5.75		
Surface Water	In-situ	Specific Conductance	154.3	us/cm	
Surface Water	In-situ	Temperature	18.8	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	7	System:	LACUSTRINE	Landscape Position:	TERRENE
Hydrologic Modifications:	1	Subsystem:		Lotic Gradient:	
Vegetative Modifications:	0	Class 1:	AQUATIC BED	Flow Path:	OUTFLOW
Chemical Pollutants:	0	Subclass 1:	NON-PERSISTENT	Land Form:	BASIN
Watershed Characterization and Non-point Sources:	6	Class 2:	UNCONSOLIDATED BOTTOM	Land Form Type:	
		Subclass 2:	FLOATING VASCULAR	Waterbody Type:	POND
		Class 3:		Waterbody Subtype:	
		Subclass 3:			
				Comments:	HEADWATER POND

Dominant Plant Species:

Additional Plant Community Observations:

Habitat Classification:
OPEN WATER STANDING

Substrate Classification:
SILT/MUCK SUBSTRATE

Average Depth: 58 cm Visible Flow: No Rain In Previous 24 Hours: No

Sample Comments: GREEN ALGAE BLOOM WAS PRESENT - MOSTLY SPIROGYRA, ABUNDANCE OF WOODY MATERIAL IN THE WATER IMPEDED TRAVEL WITH CANOE

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Utricularia gibba	Humped bladderwort	LW-34022305002003	6	OBL	FORB/HERB
Utricularia intermedia	Flatleaf bladderwort	LW-34022305002004	6	OBL	FORB/HERB
Poaceae		LW-34010502			
Chamaedaphne calyculata	Leatherleaf	LW-34021302004001	5	OBL	SHRUB
Drosera rotundifolia	Roundleaf sundew	LW-34023001001004	3	OBL	FORB/HERB
Brasenia schreberi	Watershield	LW-34023103001001	6	OBL	FORB/HERB
Dulichium arundinaceum	Threeway sedge	LW-34010501005001	5	OBL	GRAMINOID
Lycopus uniflorus	Northern bugleweed	LW-34022303011002	3	OBL	FORB/HERB
Pinus strobus	Eastern white pine	LW-31010102004005	2	FACU	TREE
Utricularia macrorhiza	Common bladderwort	LW-34022305002005	3	OBL	FORB/HERB
Spiraea		LW-34024202026			
Triadenum virginicum	Virginia marsh St. Johnswort	LW-34022601002002	6	OBL	FORB/HERB
Potamogeton		LW-34011101001			
Decodon verticillatus	Swamp loosestrife	LW-34022901001001	6	OBL	SUBSHRUB, SHRUB
Lysimachia terrestris	Earth loosestrife	LW-34023801002009	2	OBL	FORB/HERB
Nymphaea odorata	American white waterlily	LW-34023103003002	5	OBL	FORB/HERB
Sparganium		LW-34011301001			

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Nuphar lutea ssp. variegata	Variegated yellow pond-lily	LW-34023103002002	4	OBL	FORB/HERB
Iris versicolor	Harelquin blueflag iris	LW-34010903001006	3	OBL	FORB/HERB
Carex lasiocarpa	Woollyfruit sedge	LW-34010501002078	6	OBL	GRAMINOID
Thelypteris palustris	Eastern marsh fern	LW-35010308002002	3	FACW	FORB/HERB
Schoenoplectus tabernaemontani	Softstem bulrush	LW-34010501011011	5	OBL	GRAMINOID
Vaccinium macrocarpon	Cranberry	LW-34021302023007	5	OBL	SUBSHRUB, SHRUB
Juncus brevicaudatus	Narrowpanicle rush	LW-34010801001010	3	OBL	GRAMINOID

Additional Summary Variables

Station Number: W-313 Waterbody: PURGATORY BROOK (NH) Town: Not Designated

Log Number: DN-2017-313-WET-BOW-2 Subsample Factor: X1 Replicates: 3 Calculated: 5/7/2018

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	3.00	0.009	5	0.31
EPT Taxa:	1.00	0.003	3	0.19
Insects:	12.67	0.037	10	0.63
Non-Insects:	330.67	0.963	6	0.38
Leeches:	0.00	0.000	0	0.00
Oligochaetes:	0.33	0.001	1	0.06
Snails:	1.00	0.003	1	0.06
Bivalves:	0.00	0.000	0	0.00
Isopods:	0.00	0.000	0	0.00
Amphipods:	327.67	0.954	1	0.06
Mites:	1.00	0.003	2	0.13
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	0.33	0.001	1	0.06
Odonates:	2.00	0.006	2	0.13
Caddisflies:	0.67	0.002	2	0.13
Diptera:	7.67	0.022	3	0.19
Hemiptera:	2.00	0.006	2	0.13
Beetles:	0.00	0.000	0	0.00
Chironomids:	4.67	0.014	2	0.13
Tanypodinae Tribe:	0.00	0.000	0	0.00
Chironomiinae Tribe:	4.67	0.014	2	0.13
Orthoclodiinae Tribe:	0.00	0.000	0	0.00
Collector-Filterers:	4.67	0.014	2	0.13
Collector-Gatherers:	328.00	0.955	2	0.13
Predators:	1.33	0.004	2	0.13
Piercers:	0.00	0.000	0	0.00
Shredders:	0.00	0.000	0	0.00
Scrapers:	1.00	0.003	1	0.06
Maine Tolerance:				
Sensitive:	0.00	0.000	0	0.00
Intermediate:	334.33	1.000	6	1.00
Eurytopic:	0.00	0.000	0	0.00
Ratio of MTI Sensitive to Eurytopic	0.00	0.000	0.00	0.00

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-313 Waterbody: PURGATORY BROOK (NH) Town: Not Designated

Log Number: DN-2017-313-WET-BOW-2 Subsample Factor: X1 Replicates: 3 Calculated: 5/7/2018

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsenhoff Biotic Index	Functional Feeding Group	Maine Tolerance Index	Tribe	Taxa Group
Hydra	02010101001	0.67	0.67	--	PR	--	--	Hydroid
Naididae	08020202	0.33	0.33	--	--	--	--	Worm
Hyalella	09010203006	0.00	327.67	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	327.67	0.00	--	--	--	--	Amphipod
Libellulidae	09020306	1.00	1.00	--	--	--	--	Dragonfly/damselfly
Coenagrionidae	09020309	1.00	1.00	--	--	--	--	Dragonfly/damselfly
Callibaetis	09020401002	0.33	0.33	9	CG	40.5-I	--	Mayfly
Corixidae	09020501	1.33	1.33	--	--	--	--	True Bug
Notonecta	09020505015	0.67	0.67	--	PR	--	--	True Bug
Polycentropodidae	09020603	0.33	0.33	--	--	--	--	Caddisfly
Hydroptilidae	09020607	0.33	0.33	--	--	--	--	Caddisfly
Ceratopogonidae	09021010	3.00	3.00	--	--	--	--	Fly: Biting Midge
Chironomidae	09021011	2.33	0.00	--	--	--	--	Fly: Midge
Tanytarsus	09021011076	0.33	0.67	6	CF	25.7-I	Y	Fly: Midge
Microtendipes	09021011094	2.00	4.00	6	CF	22.3-I	C	Fly: Midge
Hydrachnidia	09030101	0.33	0.33	--	--	--	--	Mite
Arrenurus	09030111001	0.67	0.67	--	--	23.8-I	--	Mite
Helisoma	10010203030	1.00	1.00	--	SC	42.8-I	--	Snail

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-271 Trip ID: 2015-271-WET-CNT-1 River Basin: Merrimack
Waterbody: OXBOW POND (NH) HUC8 Name: Merrimack River
Town: Not Designated Latitude: 43 17 39.12 N
Mitigation Monitoring Site: No Longitude: 71 34 59.36 W

Sample Information

Sample ID: DN-2015-271-WET-CNT-1 Type of Sample: DIPNET Date Sampled: 7/7/2015
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: B** Date: 10/25/2016
Model Result with P≥0.6: B **Reason for Determination: Model**
Date Last Calculated: 8/26/2016 Comments:

Model Probabilities

First Stage Model

Class A:	0.22	Class C:	0.01
Class B:	0.77	NA:	0.00

B or Better Model

Class A or B	0.99
Class C or Non-Attainment	0.01

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.22
Class B or C or Non-Attainment	0.78

Model Variables

		Reference Range
Total Mean Abundance	544	< 787
Ephemeroptera Abundance	261.33	most > 35
Odonata Relative Abundance	0.018	most > 0.04
Trichoptera Relative Abundance	0.023	most > 0.02
Shredder Taxa Relative Abundance	0.02	< 0.2
Non-insect Taxa Relative Richness	0.40	< 0.4
MTI Sensitive Taxa Abundance	26.67	most > 30
MTI Sensitive Taxa Relative Abundance	0.05	most > 0.05
MTI Sensitive Taxa Richness	6	most > 7
MTI Intermediate Taxa Relative Abundance	0.93	> 0.5
MTI Intermediate Taxa Richness	15	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	2.66	most > 1

Other Variables

Generic Richness:	30
Hilsenhoff Biotic Index:	7.39
Shannon-Weiner Diversity:	2.54
Maine Tolerance Index:	23.92

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Caenis*	48.01
2	*Hyalella azteca*	27.31
3	*Hydrobiidae*	5.14
4	*Stylaria*	2.33
5	*Procladius*	1.78

Sample Collection and Processing Information

Sampling Organization: SC, JP, SM
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 7/7/2015 10:45:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	6.2	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	73.9	%	
Surface Water	In-situ	pH	6.22		
Surface Water	In-situ	Specific Conductance	235.5	us/cm	
Surface Water	In-situ	Temperature	23.6	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	13	System:	PALUSTRINE	Landscape Position:	
Hydrologic Modifications:	0	Subsystem:		Lotic Gradient:	
Vegetative Modifications:	4	Class 1:	UNCONSOLIDATED BOTTOM	Flow Path:	
Chemical Pollutants:	0				
Watershed Characterization and Non-point Sources:	9	Subclass 1:	NON-PERSISTENT	Land Form:	
		Class 2:	EMERGENT	Land Form Type:	
		Subclass 2:	NON-PERSISTENT	Waterbody Type:	
		Class 3:	SCRUB SHRUB	Waterbody Subtype:	
		Subclass 3:	PERSISTENT		
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations: CATTAIL COMMUNITY DOMINATES MARSH, WHICH HAS BEEN SUBJECT TO IMPACTS HISTORICALLY. WOOD PILINGS OF UNKNOWN ORIGIN WERE OBSERVED IN WETLAND. UPLAND IS DOMINATED BY INVASIVES, SUCH AS BITTERSWEET, AND TRAVELING THROUGH IT WAS EXTEREMELY DIFFICULT.

Habitat Classification:
AQUATIC MACROPHYTE BED
EMERGENT NON-PERSISTENT VEGETATION
OPEN WATER STANDING

Substrate Classification:
SAND SUBSTRATE
SILT/MUCK SUBSTRATE

Average Depth: 67 cm Visible Flow: No Rain In Previous 24 Hours: No

Sample Comments:

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Frangula alnus	Glossy buckthorn	LW-34024102002002	0	FAC	TREE SHRUB
Juncus effusus	Common rush	LW-34010801001016	2	OBL	GRAMINOID
Rosa multiflora	Multiflora rose	LW-34024202020010	0	FACU	VINE, SUBSHRUB
Lemna		LW-34010201002			
Utricularia		LW-34022305002			
Carex		LW-34010501002			
Schoenoplectus subterminalis	Swaying bulrush	LW-34010501011010	6	OBL	GRAMINOID
Potamogeton		LW-34011101001			
Celastrus orbiculatus	Oriental bittersweet	LW-34020901001001	0	UPL	VINE
Poaceae		LW-34010502			
Sparganium		LW-34011301001			
Nuphar lutea ssp. variegata	Varigated yellow pond-lily	LW-34023103002002	4	OBL	FORB/HERB
Polygonum amphibium	Water knotweed	LW-34023701005002	5	OBL	FORB/HERB

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Additional Summary Variables

Station Number: W-271 Waterbody: OXBOW POND (NH) Town: Not Designated

Log Number: DN-2015-271-WET-CNT-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/26/2016

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	283.67	0.521	9	0.30
EPT Taxa:	274.00	0.503	5	0.17
Insects:	310.67	0.571	18	0.60
Non-Insects:	233.67	0.429	12	0.40
Leeches:	0.67	0.001	1	0.03
Oligochaetes:	12.67	0.023	1	0.03
Snails:	45.33	0.083	5	0.17
Bivalves:	4.67	0.009	2	0.07
Isopods:	8.67	0.016	1	0.03
Amphipods:	148.67	0.273	1	0.03
Mites:	13.00	0.024	1	0.03
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	261.33	0.480	1	0.03
Odonates:	9.67	0.018	4	0.13
Caddisflies:	12.67	0.023	4	0.13
Diptera:	24.00	0.044	5	0.17
Hemiptera:	2.00	0.004	2	0.07
Beetles:	1.00	0.002	2	0.07
Chironomids:	19.33	0.036	4	0.13
Tanypodinae Tribe:	16.62	0.031	2	0.07
Chironomiinae Tribe:	2.71	0.005	2	0.07
Orthoclodiinae Tribe:	0.00	0.000	0	0.00
Collector-Filterers:	4.67	0.009	2	0.07
Collector-Gatherers:	424.02	0.779	4	0.13
Predators:	37.62	0.069	10	0.33
Piercers:	3.00	0.006	1	0.03
Shredders:	9.67	0.018	2	0.07
Scrapers:	14.67	0.027	3	0.10
Maine Tolerance:				
Sensitive:	26.67	0.054	6	0.26
Intermediate:	459.64	0.926	15	0.65
Eurytopic:	10.02	0.020	2	0.09
Ratio of MTI Sensitive to Eurytopic	2.66	2.660	3.00	3.00

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-271 Waterbody: OXBOW POND (NH) Town: Not Designated

Log Number: DN-2015-271-WET-CNT-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/26/2016

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsenhoff Biotic Index	Functional Feeding Group	Maine Tolerance Index	Tribe	Taxa Group
Stylaria	08020202014	12.67	12.67	--	CG	18-S	--	Worm
Erpobdella	08030203002	0.00	0.67	--	--	36.4-I	--	Leech
Erpobdella punctata	08030203002001	0.67	0.00	--	--	--	--	Leech
Caecidotea	09010101001	0.00	8.67	8	SH	51.9-E	--	Isopod
Caecidotea communis	09010101001001	8.67	0.00	--	--	--	--	Isopod
Hyalella	09010203006	0.00	148.67	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	148.67	0.00	--	--	--	--	Amphipod
Aeshna	09020301001	0.33	0.33	5	PR	27.9-I	--	Dragonfly/damselfly
Libellulidae	09020306	3.33	3.33	--	--	--	--	Dragonfly/damselfly
Sympetrum	09020306041	1.33	1.33	10	PR	37-I	--	Dragonfly/damselfly
Enallagma	09020309051	4.67	4.67	9	PR	26.2-I	--	Dragonfly/damselfly
Caenis	09020412040	261.33	261.33	7	CG	22.1-I	--	Mayfly
Corixidae	09020501	1.00	1.00	--	--	--	--	True Bug
Neoplea	09020512016	1.00	1.00	--	PR	35.5-I	--	True Bug
Polycentropus	09020603010	4.00	4.00	6	PR	15.4-S	--	Caddisfly
Oxyethira	09020607028	3.00	3.00	3	P	22-S	--	Caddisfly
Banksiola	09020608036	1.00	1.00	--	SH	14.9-S	--	Caddisfly
Oecetis	09020618078	4.67	4.67	8	PR	16.3-S	--	Caddisfly
Bezzia/palpomyia	09021010043	4.67	4.67	6	PR	26.9-I	--	Fly: Biting Midge
Chironomidae	09021011	0.33	0.00	--	--	--	--	Fly: Midge
Ablabesmyia	09021011001	6.67	6.78	8	PR	23.6-I	T	Fly: Midge
Procladius	09021011015	9.67	9.84	9	PR	25.1-I	T	Fly: Midge
Paratanytarsus	09021011071	1.33	1.36	6	--	43-E	Y	Fly: Midge
Dicrotendipes	09021011085	1.33	1.36	8	CG	28.8-I	C	Fly: Midge
Agabus	09021103016	0.33	0.33	--	PR	34.5-I	--	Beetle
Chrysomelidae	09021114	0.67	0.67	--	--	--	--	Beetle
Arachnida	0903	7.67	7.67	--	--	--	--	Arachnid
Arrenurus	09030111001	5.33	5.33	--	--	23.8-I	--	Mite
Hydrobiidae	10010104	28.00	28.00	--	--	--	--	Snail
Amnicola	10010104013	1.33	1.33	--	SC	18.7-S	--	Snail
Lymnaeidae	10010201	2.67	2.67	--	--	--	--	Snail
Gyraulus	10010203029	0.00	8.33	--	SC	37.2-I	--	Snail
Gyraulus deflectus	10010203029056	6.67	0.00	--	--	--	--	Snail
Gyraulus parvus	10010203029057	1.67	0.00	--	--	--	--	Snail
Helisoma	10010203030	5.00	5.00	--	SC	42.8-I	--	Snail

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-271 Waterbody: OXBOW POND (NH) Town: Not Designated

Log Number: DN-2015-271-WET-CNT-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/26/2016

Taxon	Maine Taxonomic Code	Count (Mean of Samples)		Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
		Actual	Adjusted					
Sphaeriidae	10020201	0.33	0.33	--	CF	--	--	Clam
Pisidium	10020201002	4.33	4.33	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-314 Trip ID: 2017-314-WET-CNT-2 River Basin:
Waterbody: KIMBALL POND (NH) HUC8 Name:
Town: Not Designated Latitude: 43 19 44.83 N
Mitigation Monitoring Site: No Longitude: 71 34 0.98 W

Sample Information

Sample ID: DN-2017-314-WET-CNT-2 Type of Sample: DIPNET Date Sampled: 8/2/2017
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination:** Date:
Model Result with P≥0.6: C **Reason for Determination:**
Date Last Calculated: 5/8/2018 Comments:

Model Probabilities

First Stage Model

Class A: 0.01 Class C: 0.70
Class B: 0.29 NA: 0.00

B or Better Model

Class A or B 0.30
Class C or Non-Attainment 0.70

C or Better Model

Class A, B, or C 1.00
Non-Attainment 0.00

A Model

Class A 0.01
Class B or C or Non-Attainment 0.99

Model Variables

		Reference Range
Total Mean Abundance	336	< 787
Ephemeroptera Abundance	2.33	most > 35
Odonata Relative Abundance	0.012	most > 0.04
Trichoptera Relative Abundance	0.014	most > 0.02
Shredder Taxa Relative Abundance	0.00	< 0.2
Non-insect Taxa Relative Richness	0.36	< 0.4
MTI Sensitive Taxa Abundance	4.00	most > 30
MTI Sensitive Taxa Relative Abundance	0.01	most > 0.05
MTI Sensitive Taxa Richness	3	most > 7
MTI Intermediate Taxa Relative Abundance	0.98	> 0.5
MTI Intermediate Taxa Richness	10	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	3.00	most > 1

Other Variables

Generic Richness:	22
Hilsenhoff Biotic Index:	8.14
Shannon-Weiner Diversity:	1.59
Maine Tolerance Index:	24.99

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	74.83
2	*Sphaeriidae*	6.24
3	*Chironomus*	5.05
4	*Ceratopogonidae*	4.96
5	*Chironomidae*	1.98

Sample Collection and Processing Information

Sampling Organization: NHDES
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 8/2/2017 9:01:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	4.81	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	56.9	%	
Surface Water	In-situ	pH	6.23		
Surface Water	In-situ	Specific Conductance	236.8	us/cm	
Surface Water	In-situ	Temperature	24.1	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	7	System:	PALUSTRINE	Landscape Position:	
Hydrologic Modifications:	1	Subsystem:		Lotic Gradient:	
Vegetative Modifications:	2	Class 1:	UNCONSOLIDATED BOTTOM	Flow Path:	THROUGHFLOW
Chemical Pollutants:	0				
Watershed Characterization and Non-point Sources:	4	Subclass 1:	NON-PERSISTENT	Land Form:	
		Class 2:	UNCONSOLIDATED BOTTOM	Land Form Type:	
		Subclass 2:	PERSISTENT	Waterbody Type:	LAKE
		Class 3:		Waterbody Subtype:	
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations:

Habitat Classification:
AQUATIC MACROPHYTE BED

Substrate Classification:
DETRITUS SUBSTRATE
SILT/MUCK SUBSTRATE

Average Depth: 87 cm Visible Flow: No Rain In Previous 24 Hours: No

Sample Comments:

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Brasenia schreberi	Watershield	LW-34023103001001	6	OBL	FORB/HERB
Lemna minor	Common duckweed	LW-34010201002001	3	OBL	FORB/HERB
Utricularia gibba	Humped bladderwort	LW-34022305002003	6	OBL	FORB/HERB
Acer rubrum	Red maple	LW-34024603001006	2	FAC	TREE
Pinus strobus	Eastern white pine	LW-31010102004005	2	FACU	TREE
Euthamia graminifolia	Common goldentop	LW-34020501034002	2	FAC	FORB/HERB
Phalaris arundinacea	Reed canarygrass	LW-34010502054001	1	FACW	GRAMINOID
Cicuta bulbifera	Bulblet-bearing water hemlock	LW-34020101008001	4	OBL	FORB/HERB
Eupatorium perfoliatum	Common boneset	LW-34020501032001	4	FACW	FORB/HERB
Glyceria canadensis	Rattlesnake mannagrass	LW-34010502036003	4	OBL	GRAMINOID
Spiraea alba var. latifolia	White meadowsweet	LW-34024202026002	2	FACW	SHRUB
Osmunda regalis	Royal fern	LW-35010305001003	6		FORB/HERB
Typha latifolia	Broadleaf cattail	LW-34011301002002	2	OBL	FORB/HERB
Potamogeton		LW-34011101001			
Sparganium		LW-34011301001			
Proserpinaca palustris	Marsh mermaidweed	LW-34022001002001	5	OBL	FORB/HERB

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Nymphaea odorata	American white waterlily	LW-34023103003002	5	OBL	FORB/HERB
Vaccinium corymbosum	Highbush blueberry	LW-34021302023005	4	FACW	SHRUB
Lysimachia terrestris	Earth loosestrife	LW-34023801002009	2	OBL	FORB/HERB
Spiraea tomentosa	Steeplebush	LW-34024202026005	3	FACW	SHRUB
Triadenum virginicum	Virginia marsh St. Johnswort	LW-34022601002002	6	OBL	FORB/HERB
Spirodela polyrrhiza	Common duckmeal	LW-34010201004001	3	OBL	FORB/HERB
Impatiens capensis	Jewelweed	LW-34021901001001	2	FACW	FORB/HERB
Utricularia macrorhiza	Common bladderwort	LW-34022305002005	3	OBL	FORB/HERB
Frangula alnus	Glossy buckthorn	LW-34024102002002	0	FAC	TREE SHRUB
Carex		LW-34010501002			
Sparganium americanum	American bur-reed	LW-34011301001001	5	OBL	FORB/HERB
Mimulus ringens	Allegheny monkeyflower	LW-34022310002002	6	OBL	FORB/HERB
Carex utriculata	Northwest territory sedge	LW-34010501002153	5	OBL	GRAMINOID
Nuphar lutea ssp. variegata	Variegated yellow pond-lily	LW-34023103002002	4	OBL	FORB/HERB
Calamagrostis canadensis	Bluejoint	LW-34010502017001	2	OBL	GRAMINOID
GALIUM		LW-34024301002			
Lycopus uniflorus	Northern bugleweed	LW-34022303011002	3	OBL	FORB/HERB

Additional Summary Variables

Station Number: W-314 Waterbody: KIMBALL POND (NH) Town: Not Designated

Log Number: DN-2017-314-WET-CNT-2 Subsample Factor: X1 Replicates: 3 Calculated: 5/8/2018

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	11.00	0.033	9	0.41
EPT Taxa:	7.00	0.021	6	0.27
Insects:	54.00	0.161	14	0.64
Non-Insects:	282.33	0.839	8	0.36
Leeches:	1.33	0.004	1	0.05
Oligochaetes:	0.00	0.000	0	0.00
Snails:	6.67	0.020	3	0.14
Bivalves:	21.00	0.062	1	0.05
Isopods:	0.00	0.000	0	0.00
Amphipods:	251.67	0.748	1	0.05
Mites:	1.67	0.005	2	0.09
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	2.33	0.007	2	0.09
Odonates:	4.00	0.012	3	0.14
Caddisflies:	4.67	0.014	4	0.18
Diptera:	42.00	0.125	3	0.14
Hemiptera:	1.00	0.003	2	0.09
Beetles:	0.00	0.000	0	0.00
Chironomids:	25.33	0.075	2	0.09
Tanypodinae Tribe:	2.26	0.007	1	0.05
Chironomiinae Tribe:	23.07	0.069	1	0.05
Orthoclodiinae Tribe:	0.00	0.000	0	0.00
Collector-Filterers:	21.00	0.062	1	0.05
Collector-Gatherers:	277.07	0.824	4	0.18
Predators:	6.26	0.019	5	0.23
Piercers:	1.67	0.005	1	0.05
Shredders:	1.33	0.004	1	0.05
Scrapers:	2.67	0.008	2	0.09
Maine Tolerance:				
Sensitive:	4.00	0.014	3	0.21
Intermediate:	285.00	0.982	10	0.71
Eurytopic:	1.33	0.005	1	0.07
Ratio of MTI Sensitive to Eurytopic	3.00	3.000	3.00	3.00

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-314 Waterbody: KIMBALL POND (NH) Town: Not Designated

Log Number: DN-2017-314-WET-CNT-2 Subsample Factor: X1 Replicates: 3 Calculated: 5/8/2018

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
Helobdella	08030101005	0.00	1.33	--	--	43-E	--	Leech
Helobdella elongata	08030101005001	0.33	0.00	--	--	--	--	Leech
Helobdella modesta	08030101005004	1.00	0.00	--	--	--	--	Leech
Hyalella	09010203006	0.00	251.67	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	251.67	0.00	--	--	--	--	Amphipod
Libellulidae	09020306	1.67	1.67	--	--	--	--	Dragonfly/damselfly
Lestes	09020308045	1.00	1.00	9	PR	32.6-I	--	Dragonfly/damselfly
Enallagma	09020309051	1.33	1.33	9	PR	26.2-I	--	Dragonfly/damselfly
Callibaetis	09020401002	2.00	2.00	9	CG	40.5-I	--	Mayfly
Caenis	09020412040	0.33	0.33	7	CG	22.1-I	--	Mayfly
Corixidae	09020501	0.33	0.33	--	--	--	--	True Bug
Neoplea	09020512016	0.67	0.67	--	PR	35.5-I	--	True Bug
Polycentropus	09020603010	1.00	1.00	6	PR	15.4-S	--	Caddisfly
Oxyethira	09020607028	1.67	1.67	3	P	22-S	--	Caddisfly
Leptoceridae	09020618	0.67	0.67	--	--	--	--	Caddisfly
Triaenodes	09020618077	1.33	1.33	6	SH	19.3-S	--	Caddisfly
Ceratopogonidae	09021010	16.67	16.67	--	--	--	--	Fly: Biting Midge
Chironomidae	09021011	6.67	0.00	--	--	--	--	Fly: Midge
Procladius	09021011015	1.67	2.26	9	PR	25.1-I	T	Fly: Midge
Chironomus	09021011080	17.00	23.07	10	CG	27.4-I	C	Fly: Midge
Hydrachnidia	09030101	0.67	0.67	--	--	--	--	Mite
Arrenurus	09030111001	1.00	1.00	--	--	23.8-I	--	Mite
Hydrobiidae	10010104	4.00	4.00	--	--	--	--	Snail
Physidae	10010202	1.00	1.00	--	SC	--	--	Snail
Gyraulus	10010203029	1.67	1.67	--	SC	37.2-I	--	Snail
Sphaeriidae	10020201	21.00	21.00	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-315 Trip ID: 2017-315-WET-CNW-1 River Basin: Saco
Waterbody: DOLLOF POND (NH) HUC8 Name: Saco
Town: Not Designated Latitude: 43 56 48.31 N
Mitigation Monitoring Site: No Longitude: 71 5 26.56 W

Sample Information

Sample ID: DN-2017-315-WET-CNW-1 Type of Sample: DIPNET Date Sampled: 7/19/2017
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination:** Date:
Model Result with P≥0.6: C **Reason for Determination:**
Date Last Calculated: 5/8/2018 Comments:

Model Probabilities

First Stage Model

Class A: 0.01 Class C: 0.64
Class B: 0.34 NA: 0.00

B or Better Model

Class A or B 0.36
Class C or Non-Attainment 0.64

C or Better Model

Class A, B, or C 1.00
Non-Attainment 0.00

A Model

Class A 0.01
Class B or C or Non-Attainment 0.99

Model Variables

		Reference Range
Total Mean Abundance	188	< 787
Ephemeroptera Abundance	11.67	most > 35
Odonata Relative Abundance	0.037	most > 0.04
Trichoptera Relative Abundance	0.011	most > 0.02
Shredder Taxa Relative Abundance	0.00	< 0.2
Non-insect Taxa Relative Richness	0.41	< 0.4
MTI Sensitive Taxa Abundance	2.00	most > 30
MTI Sensitive Taxa Relative Abundance	0.01	most > 0.05
MTI Sensitive Taxa Richness	3	most > 7
MTI Intermediate Taxa Relative Abundance	0.98	> 0.5
MTI Intermediate Taxa Richness	8	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	3.00	most > 1

Other Variables

Generic Richness:	22
Hilsenhoff Biotic Index:	7.98
Shannon-Weiner Diversity:	2.01
Maine Tolerance Index:	25.30

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	68.50
2	*Sphaeriidae*	9.03
3	*Caenis*	3.36
3	*Ceratopogonidae*	3.36
4	*Callibaetis*	2.83
5	*Coenagrionidae*	2.30

Sample Collection and Processing Information

Sampling Organization: NHDES
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 7/19/2017 12:17:00 PM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	7.72	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	102.3	%	
Surface Water	In-situ	pH	6.25		
Surface Water	In-situ	Specific Conductance	167.8	us/cm	
Surface Water	In-situ	Temperature	29.9	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	13	System:	PALUSTRINE	Landscape Position:	
Hydrologic Modifications:	2	Subsystem:		Lotic Gradient:	
Vegetative Modifications:	3	Class 1:	UNCONSOLIDATED BOTTOM	Flow Path:	
Chemical Pollutants:	1				
Watershed Characterization and Non-point Sources:	7	Subclass 1:	NON-PERSISTENT	Land Form:	
		Class 2:	EMERGENT	Land Form Type:	
		Subclass 2:	PERSISTENT	Waterbody Type:	
		Class 3:		Waterbody Subtype:	
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations:

Habitat Classification:
AQUATIC MACROPHYTE BED
EMERGENT NON-PERSISTENT VEGETATION

Substrate Classification:
ORGANIC SOIL SUBSTRATE
SILT/MUCK SUBSTRATE

Average Depth: 72 cm Visible Flow: No Rain In Previous 24 Hours: Yes

Sample Comments:

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Carex lasiocarpa	Woollyfruit sedge	LW-34010501002078	6	OBL	GRAMINOID
Juncus brevicaudatus	Narrowpanicle rush	LW-34010801001010	3	OBL	GRAMINOID
Acer rubrum	Red maple	LW-34024603001006	2	FAC	TREE
Ilex mucronata	Catberry	LW-34020201001003	5	OBL	SHRUB, TREE
Peltandra virginica	Green arrow arum	LW-34010201003001	7	OBL	FORB/HERB
Drosera intermedia	Spoonleaf sundew	LW-34023001001002	3	OBL	FORB/HERB
Cladium mariscoides	Smooth sawgrass	LW-34010501003001	6	OBL	GRAMINOID
Utricularia gibba	Humped bladderwort	LW-34022305002003	6	OBL	FORB/HERB
Nymphaea odorata	American white waterlily	LW-34023103003002	5	OBL	FORB/HERB
Schoenoplectus subterminalis	Swaying bulrush	LW-34010501011010	6	OBL	GRAMINOID
Typha latifolia	Broadleaf cattail	LW-34011301002002	2	OBL	FORB/HERB
Lycopus uniflorus	Northern bugleweed	LW-34022303011002	3	OBL	FORB/HERB
Pontederia cordata	Pickerelweed	LW-34010906002002	4	OBL	FORB/HERB
Brasenia schreberi	Watershield	LW-34023103001001	6	OBL	FORB/HERB
Eleocharis		LW-34010501006			
Myrica gale	Sweetgale	LW-34022801003001	5	OBL	SHRUB
Andromeda polifolia var.	Bog rosemary	LW-34021302001001	8	OBL	SUBSHRUB/SHRUB

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
glaucophylla					
Vaccinium macrocarpon	Cranberry	LW-34021302023007	5	OBL	SUBSHRUB, SHRUB
Carex utriculata	Northwest territory sedge	LW-34010501002153	5	OBL	GRAMINOID
Utricularia intermedia	Flatleaf bladderwort	LW-34022305002004	6	OBL	FORB/HERB
Chamaedaphne calyculata	Leatherleaf	LW-34021302004001	5	OBL	SHRUB
Utricularia radiata	Little floating bladderwort	LW-34022305002008	6	OBL	FORB/HERB
Nuphar lutea ssp. variegata	Variegated yellow pond-lily	LW-34023103002002	4	OBL	FORB/HERB
Rhynchospora alba	White beaksedge	LW-34010501010001	6	OBL	GRAMINOID
Eriocaulon aquaticum	Sevenangle pipewort	LW-34010601001001	7	OBL	FORB/HERB
Sarracenia purpurea	Purple pitcherplant	LW-34023002001001	7	OBL	SUBSHRUB, FORB/HERB
Lysimachia terrestris	Earth loosestrife	LW-34023801002009	2	OBL	FORB/HERB
Ilex verticillata	Common winterberry	LW-34020201001005	3	FACW	TREE, SHRUB
Dulichium arundinaceum	Threeway sedge	LW-34010501005001	5	OBL	GRAMINOID
Utricularia purpurea	Eastern purple bladderwort	LW-34022305002007	5	OBL	FORB/HERB
Triadenum virginicum	Virginia marsh St. Johnswort	LW-34022601002002	6	OBL	FORB/HERB

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Additional Summary Variables

Station Number: W-315 Waterbody: DOLLOF POND (NH) Town: Not Designated

Log Number: DN-2017-315-WET-CNW-1 Subsample Factor: X1 Replicates: 3 Calculated: 5/8/2018

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	20.67	0.110	8	0.36
EPT Taxa:	13.67	0.073	5	0.23
Insects:	31.67	0.168	13	0.59
Non-Insects:	156.67	0.832	9	0.41
Leeches:	0.00	0.000	0	0.00
Oligochaetes:	1.67	0.009	1	0.05
Snails:	5.67	0.030	3	0.14
Bivalves:	17.00	0.090	1	0.05
Isopods:	0.33	0.002	1	0.05
Amphipods:	129.00	0.685	1	0.05
Mites:	3.00	0.016	2	0.09
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	11.67	0.062	2	0.09
Odonates:	7.00	0.037	3	0.14
Caddisflies:	2.00	0.011	3	0.14
Diptera:	9.67	0.051	2	0.09
Hemiptera:	1.33	0.007	3	0.14
Beetles:	0.00	0.000	0	0.00
Chironomids:	3.33	0.018	1	0.05
Tanypodinae Tribe:	3.33	0.018	1	0.05
Chironomiinae Tribe:	0.00	0.000	0	0.00
Orthoclodiinae Tribe:	0.00	0.000	0	0.00
Collector-Filterers:	17.00	0.090	1	0.05
Collector-Gatherers:	140.67	0.747	3	0.14
Predators:	6.67	0.035	6	0.27
Piercers:	1.33	0.007	1	0.05
Shredders:	0.33	0.002	1	0.05
Scrapers:	1.67	0.009	1	0.05
Maine Tolerance:				
Sensitive:	2.00	0.013	3	0.23
Intermediate:	148.33	0.982	8	0.62
Eurytopic:	0.67	0.004	2	0.15
Ratio of MTI Sensitive to Eurytopic	3.00	3.000	1.50	1.50

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-315 Waterbody: DOLLOF POND (NH) Town: Not Designated

Log Number: DN-2017-315-WET-CNW-1 Subsample Factor: X1 Replicates: 3 Calculated: 5/8/2018

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
Naididae	08020202	1.67	1.67	--	--	--	--	Worm
Caecidotea	09010101001	0.33	0.33	8	SH	51.9-E	--	Isopod
Hyalella	09010203006	0.00	129.00	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	129.00	0.00	--	--	--	--	Amphipod
Libellulidae	09020306	0.67	0.67	--	--	--	--	Dragonfly/damselfly
Coenagrionidae	09020309	4.33	4.33	--	--	--	--	Dragonfly/damselfly
Enallagma	09020309051	2.00	2.00	9	PR	26.2-I	--	Dragonfly/damselfly
Callibaetis	09020401002	5.33	5.33	9	CG	40.5-I	--	Mayfly
Caenis	09020412040	6.33	6.33	7	CG	22.1-I	--	Mayfly
Corixidae	09020501	0.67	0.67	--	--	--	--	True Bug
Mesovelia	09020509024	0.33	0.33	--	PR	60.6-E	--	True Bug
Neoplea	09020512016	0.33	0.33	--	PR	35.5-I	--	True Bug
Polycentropus	09020603010	0.33	0.33	6	PR	15.4-S	--	Caddisfly
Oxyethira	09020607028	1.33	1.33	3	P	22-S	--	Caddisfly
Oecetis	09020618078	0.33	0.33	8	PR	16.3-S	--	Caddisfly
Ceratopogonidae	09021010	6.33	6.33	--	--	--	--	Fly: Biting Midge
Procladius	09021011015	3.33	3.33	9	PR	25.1-I	T	Fly: Midge
Hydrachnidia	09030101	2.67	2.67	--	--	--	--	Mite
Arrenurus	09030111001	0.33	0.33	--	--	23.8-I	--	Mite
Hydrobiidae	10010104	2.00	2.00	--	--	--	--	Snail
Planorbidae	10010203	2.00	2.00	--	--	--	--	Snail
Helisoma	10010203030	1.67	1.67	--	SC	42.8-I	--	Snail
Sphaeriidae	10020201	17.00	17.00	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-272 Trip ID: 2015-272-WET-CON-1 River Basin: Merrimack
Waterbody: SOUTH END MARSH (NH) HUC8 Name: Merrimack River
Town: Not Designated Latitude: 43 11 7.56 N
Mitigation Monitoring Site: No Longitude: 71 31 46.98 W

Sample Information

Sample ID: DN-2015-272-WET-CON-1 Type of Sample: DIPNET Date Sampled: 7/27/2015
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: I** Date: 10/25/2016
Model Result with P≥0.6: I **Reason for Determination: Model**
Date Last Calculated: 8/26/2016 Comments: Minimum provisions for Total Mean Abundance not met.

Model Probabilities

First Stage Model

Class A:	0.00	Class C:	1.00
Class B:	0.00	NA:	0.00

B or Better Model

Class A or B	0.00
Class C or Non-Attainment	1.00

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.00
Class B or C or Non-Attainment	1.00

Model Variables

		Reference Range
Total Mean Abundance	32	< 787
Ephemeroptera Abundance	0.00	most > 35
Odonata Relative Abundance	0.000	most > 0.04
Trichoptera Relative Abundance	0.000	most > 0.02
Shredder Taxa Relative Abundance	0.03	< 0.2
Non-insect Taxa Relative Richness	0.53	< 0.4
MTI Sensitive Taxa Abundance	1.00	most > 30
MTI Sensitive Taxa Relative Abundance	0.04	most > 0.05
MTI Sensitive Taxa Richness	1	most > 7
MTI Intermediate Taxa Relative Abundance	0.81	> 0.5
MTI Intermediate Taxa Richness	8	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	0.25	most > 1

Other Variables

Generic Richness:	15
Hilsenhoff Biotic Index:	7.20
Shannon-Weiner Diversity:	3.56
Maine Tolerance Index:	31.22

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Tanytarsus*	20.00
2	*Gyraulus*	16.84
3	*Dicrotendipes*	9.47
3	*Naididae*	9.47
4	*Chironomus*	6.32
4	*Lumbriculidae*	6.32
4	*Paratanytarsus*	6.32

5	*Ablabesmyia*	3.16
5	*Bezzia/palpomyia*	3.16
5	*Caecidotea communis*	3.16
5	*Chaoborus*	3.16
5	*Helobdella modesta*	3.16
5	*Hyalella azteca*	3.16
5	*Sphaeriidae*	3.16
5	*Stylaria*	3.16

Sample Collection and Processing Information

Sampling Organization: JP
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 7/27/2015 12:30:00 PM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	1.36	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	15.3	%	
Surface Water	In-situ	pH	5.89		
Surface Water	In-situ	Specific Conductance	737	us/cm	
Surface Water	In-situ	Temperature	21.4	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	34	System:	PALUSTRINE	Landscape Position:	
Hydrologic Modifications:	8	Subsystem:		Lotic Gradient:	
Vegetative Modifications:	6	Class 1:	EMERGENT	Flow Path:	
Chemical Pollutants:	5	Subclass 1:	PERSISTENT	Land Form:	
Watershed Characterization and Non-point Sources:	15	Class 2:	EMERGENT	Land Form Type:	
		Subclass 2:	NON-PERSISTENT	Waterbody Type:	
		Class 3:		Waterbody Subtype:	
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations:

Habitat Classification:
EMERGENT NON-PERSISTENT VEGETATION
EMERGENT PERSISTENT VEGETATION

Substrate Classification:
ORGANIC SOIL SUBSTRATE
SAND SUBSTRATE
SILT/MUCK SUBSTRATE

Average Depth: 53 cm Visible Flow: No Rain In Previous 24 Hours: No

Sample Comments:

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Alnus		LW-34021701001			
Nymphaea odorata	American white waterlily	LW-34023103003002	5	OBL	FORB/HERB
Lythrum salicaria	Purple loosestrife	LW-34022901002004	0	OBL	FORB/HERB
Spiraea		LW-34024202026			
Carex comosa	Longhair sedge	LW-34010501002039	6	OBL	GRAMINOID
Eleocharis		LW-34010501006			
Typha latifolia	Broadleaf cattail	LW-34011301002002	2	OBL	FORB/HERB
Triadenum		LW-34022601002			
Frangula alnus	Glossy buckthorn	LW-34024102002002	0	FAC	TREE SHRUB
Lemna		LW-34010201002			
Impatiens capensis	Jewelweed	LW-34021901001001	2	FACW	FORB/HERB
Utricularia macrorhiza	Common bladderwort	LW-34022305002005	3	OBL	FORB/HERB
Celastrus orbiculatus	Oriental bittersweet	LW-34020901001001	0	UPL	VINE

Additional Summary Variables

Station Number: W-272 Waterbody: SOUTH END MARSH (NH) Town: Not Designated

Log Number: DN-2015-272-WET-CON-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/26/2016

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	0.00	0.000	0	0.00
EPT Taxa:	0.00	0.000	0	0.00
Insects:	16.33	0.516	7	0.47
Non-Insects:	15.33	0.484	8	0.53
Leeches:	1.00	0.032	1	0.07
Oligochaetes:	6.00	0.189	3	0.20
Snails:	5.33	0.168	1	0.07
Bivalves:	1.00	0.032	1	0.07
Isopods:	1.00	0.032	1	0.07
Amphipods:	1.00	0.032	1	0.07
Mites:	0.00	0.000	0	0.00
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	0.00	0.000	0	0.00
Odonates:	0.00	0.000	0	0.00
Caddisflies:	0.00	0.000	0	0.00
Diptera:	16.33	0.516	7	0.47
Hemiptera:	0.00	0.000	0	0.00
Beetles:	0.00	0.000	0	0.00
Chironomids:	14.33	0.453	5	0.33
Tanypodinae Tribe:	1.00	0.032	1	0.07
Chironomiinae Tribe:	13.33	0.421	4	0.27
Orthoclodiinae Tribe:	0.00	0.000	0	0.00
Collector-Filterers:	7.33	0.232	2	0.13
Collector-Gatherers:	7.00	0.221	4	0.27
Predators:	3.00	0.095	3	0.20
Piercers:	0.00	0.000	0	0.00
Shredders:	1.00	0.032	1	0.07
Scrapers:	5.33	0.168	1	0.07
Maine Tolerance:				
Sensitive:	1.00	0.039	1	0.08
Intermediate:	20.67	0.805	8	0.67
Eurytopic:	4.00	0.156	3	0.25
Ratio of MTI Sensitive to Eurytopic	0.25	0.250	0.33	0.33

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-272 Waterbody: SOUTH END MARSH (NH) Town: Not Designated

Log Number: DN-2015-272-WET-CON-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/26/2016

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
Lumbriculidae	08020101	2.00	2.00	--	--	--	--	Worm
Naididae	08020202	3.00	3.00	--	--	--	--	Worm
Stylaria	08020202014	1.00	1.00	--	CG	18-S	--	Worm
Helobdella	08030101005	0.00	1.00	--	--	43-E	--	Leech
Helobdella modesta	08030101005004	1.00	0.00	--	--	--	--	Leech
Caecidotea	09010101001	0.00	1.00	8	SH	51.9-E	--	Isopod
Caecidotea communis	09010101001001	1.00	0.00	--	--	--	--	Isopod
Hyalella	09010203006	0.00	1.00	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	1.00	0.00	--	--	--	--	Amphipod
Chaoborus	09021007025	1.00	1.00	8	PR	25-I	--	Fly: Phantom Midge
Bezzia/palpomyia	09021010043	1.00	1.00	6	PR	26.9-I	--	Fly: Biting Midge
Ablabesmyia	09021011001	1.00	1.00	8	PR	23.6-I	T	Fly: Midge
Paratanytarsus	09021011071	2.00	2.00	6	--	43-E	Y	Fly: Midge
Tanytarsus	09021011076	6.33	6.33	6	CF	25.7-I	Y	Fly: Midge
Chironomus	09021011080	2.00	2.00	10	CG	27.4-I	C	Fly: Midge
Dicrotendipes	09021011085	3.00	3.00	8	CG	28.8-I	C	Fly: Midge
Gyraulus	10010203029	5.33	5.33	--	SC	37.2-I	--	Snail
Sphaeriidae	10020201	1.00	1.00	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-297 Trip ID: 2016-297-WET-CON-2 River Basin: Merrimack
Waterbody: HORSESHOE POND EAST (NH) HUC8 Name: Merrimack River
Town: Not Designated Latitude: 43 13 13.94 N
Mitigation Monitoring Site: No Longitude: 71 32 11.76 W

Sample Information

Sample ID: DN-2016-297-WET-CON-2 Type of Sample: DIPNET Date Sampled: 7/19/2016
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: B** Date: 5/11/2017
Model Result with P≥0.6: B **Reason for Determination: Model**
Date Last Calculated: 4/19/2017 Comments:

Model Probabilities

First Stage Model

Class A:	0.08	Class C:	0.02
Class B:	0.91	NA:	0.00

B or Better Model

Class A or B	0.98
Class C or Non-Attainment	0.02

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.08
Class B or C or Non-Attainment	0.92

Model Variables

		Reference Range
Total Mean Abundance	568	< 787
Ephemeroptera Abundance	13.00	most > 35
Odonata Relative Abundance	0.001	most > 0.04
Trichoptera Relative Abundance	0.008	most > 0.02
Shredder Taxa Relative Abundance	0.12	< 0.2
Non-insect Taxa Relative Richness	0.29	< 0.4
MTI Sensitive Taxa Abundance	60.85	most > 30
MTI Sensitive Taxa Relative Abundance	0.11	most > 0.05
MTI Sensitive Taxa Richness	8	most > 7
MTI Intermediate Taxa Relative Abundance	0.85	> 0.5
MTI Intermediate Taxa Richness	13	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	3.50	most > 1

Other Variables

Generic Richness:	31
Hilsenhoff Biotic Index:	7.49
Shannon-Weiner Diversity:	2.81
Maine Tolerance Index:	25.38

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	51.76
2	*Polypedilum*	8.51
3	*Physa acuta*	6.81
4	*Chironomidae*	4.99
5	*Ceratopogonidae*	3.52

Sample Collection and Processing Information

Sampling Organization: NHDES
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 7/19/2016 10:46:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	5.27	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	66	%	
Surface Water	In-situ	pH	6.38		
Surface Water	In-situ	Specific Conductance	976	us/cm	
Surface Water	In-situ	Temperature	26.8	deg c	

Landcover Summary - 2004 Data

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	53	System:	LACUSTRINE	Landscape Position:	
Hydrologic Modifications:	8	Subsystem:	LIMNETIC	Lotic Gradient:	
Vegetative Modifications:	9	Class 1:	UNCONSOLIDATED BOTTOM	Flow Path:	
Chemical Pollutants:	9				
Watershed Characterization and Non-point Sources:	27	Subclass 1:		Land Form:	
		Class 2:		Land Form Type:	
		Subclass 2:		Waterbody Type:	
		Class 3:		Waterbody Subtype:	
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations: HEAVY GROWTH OF WOLFFIA BRASILIENSIS ON SURFACE OF POND

Habitat Classification:
AQUATIC MACROPHYTE BED
EMERGENT NON-PERSISTENT VEGETATION

Substrate Classification:
DETRITUS SUBSTRATE
GRAVEL SUBSTRATE
SAND SUBSTRATE

Average Depth: 57 cm Visible Flow: No Rain In Previous 24 Hours: Yes

Sample Comments:

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Utricularia purpurea	Eastern purple bladderwort	LW-34022305002007	5	OBL	FORB/HERB
Utricularia macrorhiza	Common bladderwort	LW-34022305002005	3	OBL	FORB/HERB
Wolffia brasiliensis	Brazilian watermeal	LW-34010201006002	4	OBL	FORB/HERB
Nymphaea odorata	American white waterlily	LW-34023103003002	5	OBL	FORB/HERB
Lemna minor	Common duckweed	LW-34010201002001	3	OBL	FORB/HERB
Pontederia cordata	Pickerelweed	LW-34010906002002	4	OBL	FORB/HERB
Nuphar lutea ssp. variegata	Varigated yellow pond-lily	LW-34023103002002	4	OBL	FORB/HERB
Myriophyllum heterophyllum	Twoleaf watermilfoil	LW-34022001001003	0	OBL	FORB/HERB

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Additional Summary Variables

Station Number: W-297 Waterbody: HORSESHOE POND EAST (NH) Town: Not Designated

Log Number: DN-2016-297-WET-CON-2 Subsample Factor: X1 Replicates: 3 Calculated: 4/19/2017

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	18.33	0.032	5	0.16
EPT Taxa:	17.67	0.031	4	0.13
Insects:	177.33	0.312	22	0.71
Non-Insects:	390.67	0.688	9	0.29
Leeches:	0.00	0.000	0	0.00
Oligochaetes:	38.33	0.067	3	0.10
Snails:	39.33	0.069	3	0.10
Bivalves:	11.67	0.021	1	0.03
Isopods:	7.33	0.013	1	0.03
Amphipods:	294.00	0.518	1	0.03
Mites:	0.00	0.000	0	0.00
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	13.00	0.023	1	0.03
Odonates:	0.67	0.001	1	0.03
Caddisflies:	4.67	0.008	3	0.10
Diptera:	156.00	0.275	16	0.52
Hemiptera:	3.00	0.005	1	0.03
Beetles:	0.00	0.000	0	0.00
Chironomids:	135.67	0.239	14	0.45
Tanypodinae Tribe:	48.03	0.085	5	0.16
Chironomiinae Tribe:	85.11	0.150	8	0.26
Orthoclodiinae Tribe:	2.53	0.004	1	0.03
Collector-Filterers:	25.15	0.044	3	0.10
Collector-Gatherers:	349.55	0.615	9	0.29
Predators:	52.21	0.092	8	0.26
Piercers:	4.33	0.008	2	0.06
Shredders:	68.43	0.120	2	0.06
Scrapers:	38.67	0.068	1	0.03
Maine Tolerance:				
Sensitive:	60.85	0.114	8	0.33
Intermediate:	455.43	0.853	13	0.54
Eurytopic:	17.38	0.033	3	0.13
Ratio of MTI Sensitive to Eurytopic	3.50	3.501	2.67	2.67

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-297 Waterbody: HORSESHOE POND EAST (NH) Town: Not Designated

Log Number: DN-2016-297-WET-CON-2 Subsample Factor: X1 Replicates: 3 Calculated: 4/19/2017

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsenhoff Biotic Index	Functional Feeding Group	Maine Tolerance Index	Tribe	Taxa Group
Naididae	08020202	13.33	0.00	--	--	--	--	Worm
Dero	08020202007	5.33	8.18	--	CG	37.9-I	--	Worm
Nais	08020202009	1.33	2.04	--	CG	43-E	--	Worm
Stylaria	08020202014	0.00	28.11	--	CG	18-S	--	Worm
Stylaria lacustris	08020202014002	18.33	0.00	--	--	--	--	Worm
Caecidotea	09010101001	7.33	7.33	8	SH	51.9-E	--	Isopod
Hyalella	09010203006	0.00	294.00	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	294.00	0.00	--	--	--	--	Amphipod
Coenagrionidae	09020309	0.67	0.67	--	--	--	--	Dragonfly/damselfly
Caenis	09020412040	13.00	13.00	7	CG	22.1-I	--	Mayfly
Neoplea	09020512016	3.00	3.00	--	PR	35.5-I	--	True Bug
Oxyethira	09020607028	3.33	3.33	3	P	22-S	--	Caddisfly
Orthotrichia	09020607031	1.00	1.00	--	P	--	--	Caddisfly
Oecetis	09020618078	0.33	0.33	8	PR	16.3-S	--	Caddisfly
Ceratopogonidae	09021010	20.00	20.00	--	--	--	--	Fly: Biting Midge
Chironomidae	09021011	28.33	0.00	--	--	--	--	Fly: Midge
Ablabesmyia	09021011001	14.33	18.12	8	PR	23.6-I	T	Fly: Midge
Guttipelopia	09021011006	0.00	0.42	5	PR	19.4-S	T	Fly: Midge
Guttipelopia guttipennis	09021011006018	0.33	0.00	--	--	--	T	Fly: Midge
Labrundinia	09021011008	5.00	6.32	7	PR	18.1-S	T	Fly: Midge
Larsia	09021011009	15.33	19.38	6	PR	15.6-S	T	Fly: Midge
Tanypus	09021011018	3.00	3.79	10	PR	33.5-I	T	Fly: Midge
Psectrocladius	09021011056	2.00	2.53	8	CG	22-S	--	Fly: Midge
Paratanytarsus	09021011071	6.33	8.01	6	--	43-E	Y	Fly: Midge
Tanytarsus	09021011076	10.33	13.06	6	CF	25.7-I	Y	Fly: Midge
Chironomus	09021011080	0.33	0.42	10	CG	27.4-I	C	Fly: Midge
Dicrotendipes	09021011085	0.67	0.84	8	CG	28.8-I	C	Fly: Midge
Lauterborniella	09021011092	0.00	0.42	--	CG	17.4-S	C	Fly: Midge
Lauterborniella agrayloides	09021011092001	0.33	0.00	--	--	--	C	Fly: Midge
Microtendipes	09021011094	0.33	0.42	6	CF	22.3-I	C	Fly: Midge
Parachironomus	09021011097	0.67	0.84	10	PR	28.6-I	C	Fly: Midge
Polypedilum	09021011102	48.33	61.09	6	SH	24.2-I	C	Fly: Midge
Sciomyzidae	09021020	0.33	0.33	--	--	--	--	Fly: Marsh
Hydrobiidae	10010104	0.33	0.33	--	--	--	--	Snail
Physa	10010202027	0.00	38.67	--	SC	34-I	--	Snail

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-297 Waterbody: HORSESHOE POND EAST (NH) Town: Not Designated

Log Number: DN-2016-297-WET-CON-2 Subsample Factor: X1 Replicates: 3 Calculated: 4/19/2017

Taxon	Maine Taxonomic Code	Count (Mean of Samples)		Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
		Actual	Adjusted					
Physa acuta	10010202027053	38.67	0.00	--	--	--	--	Snail
Planorbidae	10010203	0.33	0.33	--	--	--	--	Snail
Sphaeriidae	10020201	11.67	11.67	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-298 Trip ID: 2016-298-WET-CON-3B River Basin: Merrimack
Waterbody: HORSESHOE POND - MID-WEST (NH) HUC8 Name: Merrimack River
Town: Not Designated Latitude: 43 13 10.88 N
Mitigation Monitoring Site: No Longitude: 71 32 46.36 W

Sample Information

Sample ID: DN-2016-298-WET-CON-3B Type of Sample: DIPNET Date Sampled: 8/3/2016
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: B** Date: 5/11/2017
Model Result with P≥0.6: B **Reason for Determination: Model**
Date Last Calculated: 4/19/2017 Comments:

Model Probabilities

First Stage Model

Class A:	0.05	Class C:	0.00
Class B:	0.95	NA:	0.00

B or Better Model

Class A or B	1.00
Class C or Non-Attainment	0.00

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.05
Class B or C or Non-Attainment	0.95

Model Variables

		Reference Range
Total Mean Abundance	197	< 787
Ephemeroptera Abundance	3.00	most > 35
Odonata Relative Abundance	0.000	most > 0.04
Trichoptera Relative Abundance	0.034	most > 0.02
Shredder Taxa Relative Abundance	0.12	< 0.2
Non-insect Taxa Relative Richness	0.32	< 0.4
MTI Sensitive Taxa Abundance	30.31	most > 30
MTI Sensitive Taxa Relative Abundance	0.27	most > 0.05
MTI Sensitive Taxa Richness	5	most > 7
MTI Intermediate Taxa Relative Abundance	0.63	> 0.5
MTI Intermediate Taxa Richness	12	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	2.62	most > 1

Other Variables

Generic Richness:	25
Hilsenhoff Biotic Index:	7.13
Shannon-Weiner Diversity:	3.34
Maine Tolerance Index:	26.15

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hydrobiidae*	36.89
2	*Hyalella azteca*	13.37
3	*Labrundinia*	8.29
4	*Polypedilum*	6.60
5	*Caecidotea*	4.40

Sample Collection and Processing Information

Sampling Organization: NHDES
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 8/3/2016 11:28:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	5.91	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	72.6	%	
Surface Water	In-situ	pH	6.68		
Surface Water	In-situ	Specific Conductance	673	us/cm	
Surface Water	In-situ	Temperature	25.2	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	39	System:	LACUSTRINE	Landscape Position:	
Hydrologic Modifications:	8	Subsystem:	LIMNETIC	Lotic Gradient:	
Vegetative Modifications:	4	Class 1:	UNCONSOLIDATED BOTTOM	Flow Path:	
Chemical Pollutants:	8				
Watershed Characterization and Non-point Sources:	19	Subclass 1:		Land Form:	
		Class 2:		Land Form Type:	
		Subclass 2:		Waterbody Type:	
		Class 3:		Waterbody Subtype:	
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations:

Habitat Classification:
AQUATIC MACROPHYTE BED

Substrate Classification:
DETRITUS SUBSTRATE
SAND SUBSTRATE

Average Depth: 55 cm Visible Flow: No Rain In Previous 24 Hours: Yes

Sample Comments:

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Sparganium		LW-34011301001			
Nymphoides cordata	Little floatingheart	LW-34024802002001	6	OBL	FORB/HERB
Myriophyllum heterophyllum	Twoleaf watermilfoil	LW-34022001001003	0	OBL	FORB/HERB
Potamogeton natans	Floating pondweed	LW-34011101001009	5	OBL	FORB/HERB
Potamogeton		LW-34011101001			
Bidens beckii	Beck's water-marigold	LW-34020501012002	6	OBL	FORB/HERB
Pontederia cordata	Pickerelweed	LW-34010906002002	4	OBL	FORB/HERB
Utricularia gibba	Humped bladderwort	LW-34022305002003	6	OBL	FORB/HERB
Nymphaea odorata	American white waterlily	LW-34023103003002	5	OBL	FORB/HERB
Potamogeton robbinsii	Robbins' pondweed	LW-34011101001019	6	OBL	FORB/HERB

Additional Summary Variables

Station Number: W-298 Waterbody: HORSESHOE POND - MID-WEST (NH) Town: Not Designated

Log Number: DN-2016-298-WET-CON-3B Subsample Factor: X1 Replicates: 3 Calculated: 4/19/2017

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	9.67	0.049	4	0.16
EPT Taxa:	9.67	0.049	4	0.16
Insects:	70.33	0.357	17	0.68
Non-Insects:	126.67	0.643	8	0.32
Leeches:	0.00	0.000	0	0.00
Oligochaetes:	10.67	0.054	3	0.12
Snails:	75.00	0.381	2	0.08
Bivalves:	6.00	0.030	1	0.04
Isopods:	8.67	0.044	1	0.04
Amphipods:	26.33	0.134	1	0.04
Mites:	0.00	0.000	0	0.00
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	3.00	0.015	1	0.04
Odonates:	0.00	0.000	0	0.00
Caddisflies:	6.67	0.034	3	0.12
Diptera:	57.67	0.293	11	0.44
Hemiptera:	1.00	0.005	1	0.04
Beetles:	2.00	0.010	1	0.04
Chironomids:	56.67	0.288	10	0.40
Tanypodinae Tribe:	27.57	0.140	3	0.12
Chironomiinae Tribe:	26.04	0.132	6	0.24
Orthoclodiinae Tribe:	3.06	0.016	1	0.04
Collector-Filterers:	12.51	0.063	2	0.08
Collector-Gatherers:	47.27	0.240	9	0.36
Predators:	28.95	0.147	5	0.20
Piercers:	2.00	0.010	1	0.04
Shredders:	23.60	0.120	2	0.08
Scrapers:	2.33	0.012	1	0.04
Maine Tolerance:				
Sensitive:	30.31	0.269	5	0.25
Intermediate:	70.79	0.628	12	0.60
Eurytopic:	11.57	0.103	3	0.15
Ratio of MTI Sensitive to Eurytopic	2.62	2.621	1.67	1.67

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-298 Waterbody: HORSESHOE POND - MID-WEST (NH) Town: Not Designated

Log Number: DN-2016-298-WET-CON-3B Subsample Factor: X1 Replicates: 3 Calculated: 4/19/2017

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
Naididae	08020202	5.67	0.00	--	--	--	--	Worm
Dero	08020202007	1.00	2.13	--	CG	37.9-I	--	Worm
Nais	08020202009	1.00	2.13	--	CG	43-E	--	Worm
Stylaria	08020202014	0.00	6.40	--	CG	18-S	--	Worm
Stylaria lacustris	08020202014002	3.00	0.00	--	--	--	--	Worm
Caecidotea	09010101001	8.67	8.67	8	SH	51.9-E	--	Isopod
Hyalella	09010203006	0.00	26.33	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	26.33	0.00	--	--	--	--	Amphipod
Caenis	09020412040	3.00	3.00	7	CG	22.1-I	--	Mayfly
Neoplea	09020512016	1.00	1.00	--	PR	35.5-I	--	True Bug
Oxyethira	09020607028	2.00	2.00	3	P	22-S	--	Caddisfly
Leptoceridae	09020618	3.67	3.67	--	--	--	--	Caddisfly
Leptocerus	09020618073	1.00	1.00	--	--	--	--	Caddisfly
Ceratopogonidae	09021010	1.00	1.00	--	--	--	--	Fly: Biting Midge
Chironomidae	09021011	7.33	0.00	--	--	--	--	Fly: Midge
Ablabesmyia	09021011001	7.33	8.42	8	PR	23.6-I	T	Fly: Midge
Labrundinia	09021011008	16.33	18.76	7	PR	18.1-S	T	Fly: Midge
Procladius	09021011015	0.33	0.38	9	PR	25.1-I	T	Fly: Midge
Corynoneura	09021011036	2.67	3.06	7	CG	40.1-I	--	Fly: Midge
Cladotanytarsus	09021011068	2.00	2.30	7	CG	22.2-I	Y	Fly: Midge
Tanytarsus	09021011076	5.67	6.51	6	CF	25.7-I	Y	Fly: Midge
Pseudochironomus	09021011078	0.67	0.77	5	CG	47.7-E	S	Fly: Midge
Lauterborniella	09021011092	0.00	1.15	--	CG	17.4-S	C	Fly: Midge
Lauterborniella agrayloides	09021011092001	1.00	0.00	--	--	--	C	Fly: Midge
Parachironomus	09021011097	0.33	0.38	10	PR	28.6-I	C	Fly: Midge
Polypedilum	09021011102	13.00	14.93	6	SH	24.2-I	C	Fly: Midge
Dubiraphia	09021113064	2.00	2.00	6	--	10.4-S	--	Beetle
Hydrobiidae	10010104	72.67	72.67	--	--	--	--	Snail
Physa	10010202027	0.00	2.33	--	SC	34-I	--	Snail
Physa acuta	10010202027053	2.33	0.00	--	--	--	--	Snail
Sphaeriidae	10020201	6.00	6.00	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-316 Trip ID: 2017-316-WET-CON-4 River Basin:
Waterbody: HOIT ROAD MARSH (NH) HUC8 Name:
Town: Not Designated Latitude: 43 17 46.39 N
Mitigation Monitoring Site: No Longitude: 71 31 36.68 W

Sample Information

Sample ID: DN-2017-316-WET-CON-4 Type of Sample: DIPNET Date Sampled: 7/6/2017
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination:** Date:
Model Result with P≥0.6: A **Reason for Determination:**
Date Last Calculated: 5/8/2018 Comments:

Model Probabilities

First Stage Model

Class A:	1.00	Class C:	0.00
Class B:	0.00	NA:	0.00

B or Better Model

Class A or B	1.00
Class C or Non-Attainment	0.00

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	1.00
Class B or C or Non-Attainment	0.00

Model Variables

		Reference Range
Total Mean Abundance	248	< 787
Ephemeroptera Abundance	0.67	most > 35
Odonata Relative Abundance	0.005	most > 0.04
Trichoptera Relative Abundance	0.781	most > 0.02
Shredder Taxa Relative Abundance	0.03	< 0.2
Non-insect Taxa Relative Richness	0.36	< 0.4
MTI Sensitive Taxa Abundance	194.00	most > 30
MTI Sensitive Taxa Relative Abundance	0.88	most > 0.05
MTI Sensitive Taxa Richness	2	most > 7
MTI Intermediate Taxa Relative Abundance	0.12	> 0.5
MTI Intermediate Taxa Richness	11	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	291.00	most > 1

Other Variables

Generic Richness:	22
Hilsenhoff Biotic Index:	3.54
Shannon-Weiner Diversity:	1.54
Maine Tolerance Index:	22.42

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Oxyethira*	76.91
2	*Ceratopogonidae*	8.19
3	*Hyalella azteca*	2.68
3	*Polypedilum*	2.68
4	*Chaoborus*	1.34
5	*Chironomus*	1.21
5	*Corixidae*	1.21

5	*Polycentropus*	1.21

Sample Collection and Processing Information

Sampling Organization: NHDES
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 7/6/2017 11:55:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	1.83	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	21.7	%	
Surface Water	In-situ	pH	5.01		
Surface Water	In-situ	Specific Conductance	20.3	us/cm	
Surface Water	In-situ	Temperature	22.7	deg c	

Landcover Summary - 2004 Data

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	9	System:	LACUSTRINE	Landscape Position:	
Hydrologic Modifications:	2	Subsystem:	LITTORAL	Lotic Gradient:	
Vegetative Modifications:	1	Class 1:	UNCONSOLIDATED BOTTOM	Flow Path:	THROUGHFLOW
Chemical Pollutants:	0				
Watershed Characterization and Non-point Sources:	6	Subclass 1:	NON-PERSISTENT	Land Form:	
		Class 2:	EMERGENT	Land Form Type:	
		Subclass 2:	PERSISTENT	Waterbody Type:	LAKE
		Class 3:		Waterbody Subtype:	
		Subclass 3:			
				Comments:	DAMMED RIVER VALLEY LAKE

Dominant Plant Species:

Additional Plant Community Observations:

Habitat Classification: AQUATIC MACROPHYTE BED

Substrate Classification: ORGANIC SOIL SUBSTRATE

Average Depth: 86 cm Visible Flow: No Rain In Previous 24 Hours: No

Sample Comments:

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Nymphaea odorata	American white waterlily	LW-34023103003002	5	OBL	FORB/HERB
Potamogeton		LW-34011101001			
Spiraea alba var. latifolia	White meadowsweet	LW-34024202026002	2	FACW	SHRUB
Carex utriculata	Northwest territory sedge	LW-34010501002153	5	OBL	GRAMINOID
Lycopus uniflorus	Northern bugleweed	LW-34022303011002	3	OBL	FORB/HERB
Pontederia cordata	Pickerelweed	LW-34010906002002	4	OBL	FORB/HERB
Utricularia intermedia	Flatleaf bladderwort	LW-34022305002004	6	OBL	FORB/HERB
Brasenia schreberi	Watershield	LW-34023103001001	6	OBL	FORB/HERB
Typha latifolia	Broadleaf cattail	LW-34011301002002	2	OBL	FORB/HERB
Carex		LW-34010501002			
Eleocharis		LW-34010501006			
Triadenum virginicum	Virginia marsh St. Johnswort	LW-34022601002002	6	OBL	FORB/HERB
Utricularia		LW-34022305002			
Lysimachia terrestris	Earth loosestrife	LW-34023801002009	2	OBL	FORB/HERB

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Additional Summary Variables

Station Number: W-316 Waterbody: HOIT ROAD MARSH (NH) Town: Not Designated

Log Number: DN-2017-316-WET-CON-4 Subsample Factor: X1 Replicates: 3 Calculated: 5/8/2018

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	196.00	0.789	5	0.23
EPT Taxa:	194.67	0.784	3	0.14
Insects:	236.67	0.953	14	0.64
Non-Insects:	11.67	0.047	8	0.36
Leeches:	1.00	0.004	2	0.09
Oligochaetes:	0.33	0.001	1	0.05
Snails:	0.33	0.001	1	0.05
Bivalves:	2.67	0.011	1	0.05
Isopods:	0.00	0.000	0	0.00
Amphipods:	6.67	0.027	1	0.05
Mites:	0.67	0.003	2	0.09
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	0.67	0.003	1	0.05
Odonates:	1.33	0.005	2	0.09
Caddisflies:	194.00	0.781	2	0.09
Diptera:	35.67	0.144	5	0.23
Hemiptera:	4.00	0.016	2	0.09
Beetles:	1.00	0.004	2	0.09
Chironomids:	12.00	0.048	3	0.14
Tanypodinae Tribe:	2.33	0.009	1	0.05
Chironomiinae Tribe:	9.67	0.039	2	0.09
Orthoclodiinae Tribe:	0.00	0.000	0	0.00
Collector-Filterers:	2.67	0.011	1	0.05
Collector-Gatherers:	10.67	0.043	4	0.18
Predators:	9.67	0.039	4	0.18
Piercers:	191.00	0.769	1	0.05
Shredders:	6.67	0.027	1	0.05
Scrapers:	0.00	0.000	0	0.00
Maine Tolerance:				
Sensitive:	194.00	0.882	2	0.14
Intermediate:	25.33	0.115	11	0.79
Eurytopic:	0.67	0.003	1	0.07
Ratio of MTI Sensitive to Eurytopic	291.00	291.000	2.00	2.00

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-316 Waterbody: HOIT ROAD MARSH (NH) Town: Not Designated

Log Number: DN-2017-316-WET-CON-4 Subsample Factor: X1 Replicates: 3 Calculated: 5/8/2018

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsenhoff Biotic Index	Functional Feeding Group	Maine Tolerance Index	Tribe	Taxa Group
Dero	08020202007	0.33	0.33	--	CG	37.9-I	--	Worm
Glossiphoniidae	08030101	0.33	0.33	--	--	--	--	Leech
Helobdella	08030101005	0.00	0.67	--	--	43-E	--	Leech
Helobdella modesta	08030101005004	0.67	0.00	--	--	--	--	Leech
Hyalella	09010203006	0.00	6.67	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	6.67	0.00	--	--	--	--	Amphipod
Libellulidae	09020306	0.67	0.67	--	--	--	--	Dragonfly/damselfly
Coenagrionidae	09020309	0.67	0.67	--	--	--	--	Dragonfly/damselfly
Callibaetis	09020401002	0.67	0.67	9	CG	40.5-I	--	Mayfly
Corixidae	09020501	3.00	3.00	--	--	--	--	True Bug
Neoplea	09020512016	1.00	1.00	--	PR	35.5-I	--	True Bug
Polycentropus	09020603010	3.00	3.00	6	PR	15.4-S	--	Caddisfly
Oxyethira	09020607028	191.00	191.00	3	P	22-S	--	Caddisfly
Chaoborus	09021007025	3.33	3.33	8	PR	25-I	--	Fly: Phantom Midge
Ceratopogonidae	09021010	20.33	20.33	--	--	--	--	Fly: Biting Midge
Procladius	09021011015	2.33	2.33	9	PR	25.1-I	T	Fly: Midge
Chironomus	09021011080	3.00	3.00	10	CG	27.4-I	C	Fly: Midge
Polypedilum	09021011102	6.67	6.67	6	SH	24.2-I	C	Fly: Midge
Dineutus	09021104032	0.33	0.33	2	--	23.2-I	--	Beetle
Donacia	09021114071	0.67	0.67	--	--	25.1-I	--	Beetle
Hydrachnidia	09030101	0.33	0.33	--	--	--	--	Mite
Arrenurus	09030111001	0.33	0.33	--	--	23.8-I	--	Mite
Hydrobiidae	10010104	0.33	0.33	--	--	--	--	Snail
Sphaeriidae	10020201	2.67	2.67	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-299 Trip ID: 2016-299-WET-DAN-1 River Basin: Merrimack
Waterbody: BOG POND (NH) HUC8 Name: Pemigewasset
Town: Not Designated Latitude: 43 30 1.78 N
Mitigation Monitoring Site: No Longitude: 71 50 39.18 W

Sample Information

Sample ID: DN-2016-299-WET-DAN-1 Type of Sample: DIPNET Date Sampled: 7/5/2016
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: B** Date: 5/11/2017
Model Result with P≥0.6: B **Reason for Determination: Model**
Date Last Calculated: 4/19/2017 Comments:

Model Probabilities

First Stage Model

Class A:	0.04	Class C:	0.09
Class B:	0.87	NA:	0.00

B or Better Model

Class A or B	0.91
Class C or Non-Attainment	0.09

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.04
Class B or C or Non-Attainment	0.96

Model Variables

		Reference Range
Total Mean Abundance	190	< 787
Ephemeroptera Abundance	8.33	most > 35
Odonata Relative Abundance	0.000	most > 0.04
Trichoptera Relative Abundance	0.002	most > 0.02
Shredder Taxa Relative Abundance	0.08	< 0.2
Non-insect Taxa Relative Richness	0.24	< 0.4
MTI Sensitive Taxa Abundance	11.30	most > 30
MTI Sensitive Taxa Relative Abundance	0.06	most > 0.05
MTI Sensitive Taxa Richness	8	most > 7
MTI Intermediate Taxa Relative Abundance	0.85	> 0.5
MTI Intermediate Taxa Richness	13	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	0.68	most > 1

Other Variables

Generic Richness:	29
Hilsenhoff Biotic Index:	8.10
Shannon-Weiner Diversity:	3.67
Maine Tolerance Index:	27.69

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	20.39
2	*Cladopelma*	16.70
3	*Procladius*	12.48
4	*Caecidotea*	7.21
5	*Ablabesmyia*	6.85

Sample Collection and Processing Information

Sampling Organization: NHDES
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 7/5/2016 12:30:00 PM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	5.48	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	66.3	%	
Surface Water	In-situ	pH	5.79		
Surface Water	In-situ	Specific Conductance	43.9	us/cm	
Surface Water	In-situ	Temperature	24.9	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	16	System:	LACUSTRINE	Landscape Position:	
Hydrologic Modifications:	5	Subsystem:	LIMNETIC	Lotic Gradient:	
Vegetative Modifications:	0	Class 1:	UNCONSOLIDATED BOTTOM	Flow Path:	
Chemical Pollutants:	1				
Watershed Characterization and Non-point Sources:	10	Subclass 1:		Land Form:	
		Class 2:		Land Form Type:	
		Subclass 2:		Waterbody Type:	
		Class 3:		Waterbody Subtype:	
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations: WETLAND IS A FEN

Habitat Classification:
AQUATIC MACROPHYTE BED
EMERGENT PERSISTENT VEGETATION

Substrate Classification:
DETRITUS SUBSTRATE

Average Depth: 37 cm Visible Flow: Yes Rain In Previous 24 Hours: No

Sample Comments:

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Utricularia macrorhiza	Common bladderwort	LW-34022305002005	3	OBL	FORB/HERB
Potamogeton robbinsii	Robbins' pondweed	LW-34011101001019	6	OBL	FORB/HERB
Brasenia schreberi	Watershield	LW-34023103001001	6	OBL	FORB/HERB
Eleocharis		LW-34010501006			
Pontederia cordata	Pickerelweed	LW-34010906002002	4	OBL	FORB/HERB
Nuphar lutea ssp. variegata	Varigated yellow pond-lily	LW-34023103002002	4	OBL	FORB/HERB
Utricularia purpurea	Eastern purple bladderwort	LW-34022305002007	5	OBL	FORB/HERB
Carex lasiocarpa	Woollyfruit sedge	LW-34010501002078	6	OBL	GRAMINOID

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Additional Summary Variables

Station Number: W-299 Waterbody: BOG POND (NH) Town: Not Designated

Log Number: DN-2016-299-WET-DAN-1 Subsample Factor: X1 Replicates: 3 Calculated: 4/19/2017

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	8.67	0.046	3	0.10
EPT Taxa:	8.67	0.046	3	0.10
Insects:	128.00	0.675	22	0.76
Non-Insects:	61.67	0.325	7	0.24
Leeches:	0.33	0.002	1	0.03
Oligochaetes:	7.33	0.039	3	0.10
Snails:	0.00	0.000	0	0.00
Bivalves:	1.67	0.009	1	0.03
Isopods:	13.67	0.072	1	0.03
Amphipods:	38.67	0.204	1	0.03
Mites:	0.00	0.000	0	0.00
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	8.33	0.044	2	0.07
Odonates:	0.00	0.000	0	0.00
Caddisflies:	0.33	0.002	1	0.03
Diptera:	118.67	0.626	18	0.62
Hemiptera:	0.00	0.000	0	0.00
Beetles:	0.00	0.000	0	0.00
Chironomids:	113.33	0.598	17	0.59
Tanypodinae Tribe:	43.37	0.229	5	0.17
Chironomiinae Tribe:	69.60	0.367	11	0.38
Orthoclodiinae Tribe:	0.36	0.002	1	0.03
Collector-Filterers:	19.16	0.101	3	0.10
Collector-Gatherers:	100.97	0.532	11	0.38
Predators:	43.37	0.229	5	0.17
Piercers:	0.33	0.002	1	0.03
Shredders:	15.12	0.080	3	0.10
Scrapers:	0.00	0.000	0	0.00
Maine Tolerance:				
Sensitive:	11.30	0.062	8	0.31
Intermediate:	154.15	0.847	13	0.50
Eurytopic:	16.55	0.091	5	0.19
Ratio of MTI Sensitive to Eurytopic	0.68	0.683	1.60	1.60

Aquatic Life Taxonomic Inventory Report

Station Number: W-299 Waterbody: BOG POND (NH) Town: Not Designated

Log Number: DN-2016-299-WET-DAN-1 Subsample Factor: X1 Replicates: 3 Calculated: 4/19/2017

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
Naididae	08020202	4.67	0.00	--	--	--	--	Worm
Dero	08020202007	0.67	1.83	--	CG	37.9-I	--	Worm
Stylaria	08020202014	0.00	3.67	--	CG	18-S	--	Worm
Stylaria lacustris	08020202014002	1.33	0.00	--	--	--	--	Worm
Vejdovskyella	08020202015	0.00	1.83	--	--	13.7-S	--	Worm
Vejdovskyella comata	08020202015001	0.67	0.00	--	--	--	--	Worm
Helobdella	08030101005	0.00	0.33	--	--	43-E	--	Leech
Helobdella modesta	08030101005004	0.33	0.00	--	--	--	--	Leech
Caecidotea	09010101001	13.67	13.67	8	SH	51.9-E	--	Isopod
Hyalella	09010203006	0.00	38.67	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	38.67	0.00	--	--	--	--	Amphipod
Sminthuridae	09020104	0.67	0.67	--	--	--	--	Collembola
Callibaetis	09020401002	2.33	2.33	9	CG	40.5-I	--	Mayfly
Caenis	09020412040	6.00	6.00	7	CG	22.1-I	--	Mayfly
Oxyethira	09020607028	0.33	0.33	3	P	22-S	--	Caddisfly
Ceratopogonidae	09021010	5.33	5.33	--	--	--	--	Fly: Biting Midge
Chironomidae	09021011	9.67	0.00	--	--	--	--	Fly: Midge
Ablabesmyia	09021011001	13.00	14.21	8	PR	23.6-I	T	Fly: Midge
Guttipelopia	09021011006	0.00	2.19	5	PR	19.4-S	T	Fly: Midge
Guttipelopia guttipennis	09021011006018	2.00	0.00	--	--	--	T	Fly: Midge
Labrundinia	09021011008	0.67	0.73	7	PR	18.1-S	T	Fly: Midge
Procladius	09021011015	23.67	25.87	9	PR	25.1-I	T	Fly: Midge
Tanypus	09021011018	0.33	0.36	10	PR	33.5-I	T	Fly: Midge
Psectrocladius	09021011056	0.33	0.36	8	CG	22-S	--	Fly: Midge
Paratanytarsus	09021011071	0.67	0.73	6	--	43-E	Y	Fly: Midge
Tanytarsus	09021011076	11.33	12.39	6	CF	25.7-I	Y	Fly: Midge
Pseudochironomus	09021011078	1.00	1.09	5	CG	47.7-E	S	Fly: Midge
Chironomus	09021011080	4.33	4.74	10	CG	27.4-I	C	Fly: Midge
Cladopelma	09021011081	31.67	34.62	9	CG	27.9-I	C	Fly: Midge
Dicrotendipes	09021011085	6.67	7.29	8	CG	28.8-I	C	Fly: Midge
Glyptotendipes	09021011088	0.67	0.73	10	SH	43-E	C	Fly: Midge
Microtendipes	09021011094	4.67	5.10	6	CF	22.3-I	C	Fly: Midge
Polypedilum	09021011102	0.67	0.73	6	SH	24.2-I	C	Fly: Midge
Tribelos	09021011107	0.33	0.36	5	CG	9.3-S	C	Fly: Midge
Zavreliella	09021011133	0.00	1.82	--	--	21.8-S	H	Fly: Midge

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-299 Waterbody: BOG POND (NH) Town: Not Designated

Log Number: DN-2016-299-WET-DAN-1 Subsample Factor: X1 Replicates: 3 Calculated: 4/19/2017

Taxon	Maine Taxonomic Code	Count (Mean of Samples)		Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
		Actual	Adjusted					
Zavreliella marmorata	09021011133010	1.67	0.00	--	--	--	S	Fly: Midge
Sphaeriidae	10020201	1.67	1.67	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-273 Trip ID: 2015-273-WET-DEE-1B
Waterbody: PAWTUCKAWAY MARSH (NH)
Town: Not Designated
Mitigation Monitoring Site: No
River Basin: Saco
HUC8 Name: Piscataqua-Salmon Falls
Latitude: 43 6 35.47 N
Longitude: 71 11 49.21 W

Sample Information

Sample ID: DN-2015-273-WET-DEE-1B Type of Sample: DIPNET Date Sampled: 8/13/2015
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: C** Date: 5/15/2017
Model Result with P≥0.6: C **Reason for Determination: Model**
Date Last Calculated: 5/12/2017 Comments:

Model Probabilities

First Stage Model

Class A:	0.01	Class C:	0.68
Class B:	0.32	NA:	0.00

B or Better Model

Class A or B	0.32
Class C or Non-Attainment	0.68

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.01
Class B or C or Non-Attainment	1.00

Model Variables

		Reference Range
Total Mean Abundance	141	< 787
Ephemeroptera Abundance	0.67	most > 35
Odonata Relative Abundance	0.002	most > 0.04
Trichoptera Relative Abundance	0.007	most > 0.02
Shredder Taxa Relative Abundance	0.00	< 0.2
Non-insect Taxa Relative Richness	0.33	< 0.4
MTI Sensitive Taxa Abundance	3.05	most > 30
MTI Sensitive Taxa Relative Abundance	0.02	most > 0.05
MTI Sensitive Taxa Richness	4	most > 7
MTI Intermediate Taxa Relative Abundance	0.96	> 0.5
MTI Intermediate Taxa Richness	14	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	1.28	most > 1

Other Variables

Generic Richness:	24
Hilsenhoff Biotic Index:	8.09
Shannon-Weiner Diversity:	2.20
Maine Tolerance Index:	25.68

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	62.80
2	*Procladius*	13.03
3	*Naididae*	4.98
4	*Sphaeriidae*	4.03
5	*Helisoma*	2.61

Sample Collection and Processing Information

Sampling Organization: JP, SC, AH
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 8/13/2015 1:55:00 PM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	1.03	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	11.1	%	
Surface Water	In-situ	pH	5.61		
Surface Water	In-situ	Specific Conductance	32.7	us/cm	
Surface Water	In-situ	Temperature	19.5	deg c	

Landcover Summary - 2004 Data

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	3	System:	PALUSTRINE	Landscape Position:	
Hydrologic Modifications:	1	Subsystem:		Lotic Gradient:	
Vegetative Modifications:	0	Class 1:	EMERGENT	Flow Path:	
Chemical Pollutants:	0	Subclass 1:	PERSISTENT	Land Form:	
Watershed Characterization and Non-point Sources:	2	Class 2:	EMERGENT	Land Form Type:	
		Subclass 2:	NON-PERSISTENT	Waterbody Type:	
		Class 3:	SCRUB SHRUB	Waterbody Subtype:	
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations: THIS CATTAIL MARSH WAS SURVEYED AS IT HAD BEEN IDENTIFIED AS A REFERENCE WETLAND BASED ON AVAILABLE INFORMATION.

Habitat Classification:
EMERGENT PERSISTENT VEGETATION
OPEN WATER STANDING
SCRUB SHRUB

Substrate Classification:
ORGANIC SOIL SUBSTRATE
SILT/MUCK SUBSTRATE

Average Depth: 53 cm Visible Flow: No Rain In Previous 24 Hours: No

Sample Comments: NOSTOC SP. BALLS SUSPENDED IN THE WATER COLUMN

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Typha		LW-34011301002			
Lemna		LW-34010201002			
Sparganium		LW-34011301001			
Carex stricta	Upright sedge	LW-34010501002139	4	OBL	GRAMINOID
Myricaceae		LW-34022801			
Nymphaea odorata	American white waterlily	LW-34023103003002	5	OBL	FORB/HERB
Carex comosa	Longhair sedge	LW-34010501002039	6	OBL	GRAMINOID
Bidens		LW-34020501012			
Vaccinium		LW-34021302023			
Triadenum		LW-34022601002			
Haloragaceae		LW-34022001			
Spiraea		LW-34024202026			

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Additional Summary Variables

Station Number: W-273 Waterbody: PAWTUCKAWAY MARSH (NH) Town: Not Designated

Log Number: DN-2015-273-WET-DEE-1B Subsample Factor: X1 Replicates: 3 Calculated: 5/12/2017

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	2.00	0.014	3	0.13
EPT Taxa:	1.67	0.012	2	0.08
Insects:	32.67	0.232	16	0.67
Non-Insects:	108.00	0.768	8	0.33
Leeches:	0.00	0.000	0	0.00
Oligochaetes:	7.00	0.050	1	0.04
Snails:	4.00	0.028	2	0.08
Bivalves:	7.00	0.050	2	0.08
Isopods:	0.67	0.005	1	0.04
Amphipods:	88.33	0.628	1	0.04
Mites:	1.00	0.007	1	0.04
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	0.67	0.005	1	0.04
Odonates:	0.33	0.002	1	0.04
Caddisflies:	1.00	0.007	1	0.04
Diptera:	30.00	0.213	12	0.50
Hemiptera:	0.67	0.005	1	0.04
Beetles:	0.00	0.000	0	0.00
Chironomids:	25.33	0.180	10	0.42
Tanypodinae Tribe:	21.91	0.156	4	0.17
Chironomiinae Tribe:	3.42	0.024	6	0.25
Orthoclodiinae Tribe:	0.00	0.000	0	0.00
Collector-Filterers:	7.34	0.052	3	0.13
Collector-Gatherers:	90.37	0.642	5	0.21
Predators:	24.58	0.175	7	0.29
Piercers:	1.00	0.007	1	0.04
Shredders:	0.67	0.005	1	0.04
Scrapers:	4.34	0.031	3	0.13
Maine Tolerance:				
Sensitive:	3.05	0.024	4	0.19
Intermediate:	119.57	0.957	14	0.67
Eurytopic:	2.38	0.019	3	0.14
Ratio of MTI Sensitive to Eurytopic	1.28	1.284	1.33	1.33

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-273 Waterbody: PAWTUCKAWAY MARSH (NH) Town: Not Designated

Log Number: DN-2015-273-WET-DEE-1B Subsample Factor: X1 Replicates: 3 Calculated: 5/12/2017

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
Naididae	08020202	7.00	7.00	--	--	--	--	Worm
Caecidotea	09010101001	0.67	0.67	8	SH	51.9-E	--	Isopod
Hyalella	09010203006	0.00	88.33	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	88.33	0.00	--	--	--	--	Amphipod
Lestes	09020308045	0.33	0.33	9	PR	32.6-I	--	Dragonfly/damselfly
Caenis	09020412040	0.67	0.67	7	CG	22.1-I	--	Mayfly
Pelocoris	09020504013	0.67	0.67	--	PR	24.7-I	--	True Bug
Oxyethira	09020607028	1.00	1.00	3	P	22-S	--	Caddisfly
Ceratopogonidae	09021010	3.00	3.00	--	--	--	--	Fly: Biting Midge
Culicoides	09021010037	1.67	1.67	10	PR	42.1-I	--	Fly: Biting Midge
Chironomidae	09021011	0.67	0.00	--	--	--	--	Fly: Midge
Ablabesmyia	09021011001	1.33	1.37	8	PR	23.6-I	T	Fly: Midge
Guttipelopia	09021011006	0.67	0.68	5	PR	19.4-S	T	Fly: Midge
Labrundinia	09021011008	1.00	1.03	7	PR	18.1-S	T	Fly: Midge
Procladius	09021011015	18.33	18.83	9	PR	25.1-I	T	Fly: Midge
Cladotanytarsus	09021011068	0.33	0.34	7	CG	22.2-I	Y	Fly: Midge
Paratanytarsus	09021011071	1.33	1.37	6	--	43-E	Y	Fly: Midge
Tanytarsus	09021011076	0.33	0.34	6	CF	25.7-I	Y	Fly: Midge
Chironomus	09021011080	0.67	0.68	10	CG	27.4-I	C	Fly: Midge
Lauterborniella	09021011092	0.00	0.34	--	CG	17.4-S	C	Fly: Midge
Lauterborniella agrayloides	09021011092001	0.33	0.00	--	--	--	C	Fly: Midge
Phaenopsectra	09021011101	0.33	0.34	7	SC	44.2-E	C	Fly: Midge
Arrenurus	09030111001	1.00	1.00	--	--	23.8-I	--	Mite
Physa	10010202027	0.00	0.33	--	SC	34-I	--	Snail
Physa acuta	10010202027053	0.33	0.00	--	--	--	--	Snail
Helisoma	10010203030	3.67	3.67	--	SC	42.8-I	--	Snail
Sphaeriidae	10020201	5.67	5.67	--	CF	--	--	Clam
Musculium	10020201001	1.33	1.33	--	CF	24.8-I	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-317 Trip ID: 2017-317-WET-ELL-1 River Basin:
Waterbody: ELLSWORTH POND (NH) HUC8 Name:
Town: Not Designated Latitude: 43 52 39.63 N
Mitigation Monitoring Site: No Longitude: 71 44 56.36 W

Sample Information

Sample ID: DN-2017-317-WET-ELL-1 Type of Sample: DIPNET Date Sampled: 7/17/2017
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination:** Date:
Model Result with P≥0.6: I **Reason for Determination:**
Date Last Calculated: 5/8/2018 Comments:

Model Probabilities

First Stage Model

Class A:	0.75	Class C:	0.00
Class B:	0.25	NA:	0.00

B or Better Model

Class A or B	1.00
Class C or Non-Attainment	0.00

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.75
Class B or C or Non-Attainment	0.25

Model Variables

		Reference Range
Total Mean Abundance	25	< 787
Ephemeroptera Abundance	4.67	most > 35
Odonata Relative Abundance	0.027	most > 0.04
Trichoptera Relative Abundance	0.040	most > 0.02
Shredder Taxa Relative Abundance	0.02	< 0.2
Non-insect Taxa Relative Richness	0.21	< 0.4
MTI Sensitive Taxa Abundance	2.77	most > 30
MTI Sensitive Taxa Relative Abundance	0.14	most > 0.05
MTI Sensitive Taxa Richness	5	most > 7
MTI Intermediate Taxa Relative Abundance	0.86	> 0.5
MTI Intermediate Taxa Richness	9	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	2.77	most > 1

Other Variables

Generic Richness:	19
Hilsenhoff Biotic Index:	6.83
Shannon-Weiner Diversity:	3.64
Maine Tolerance Index:	24.42

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Chironomidae*	22.67
2	*Tanytarsus*	16.00
3	*Hexagenia*	10.67
4	*Ablabesmyia*	6.67
4	*Caenis*	6.67
5	*Clinotanypus*	5.33
5	*Hydrachnidia*	5.33

Sample Collection and Processing Information

Sampling Organization: NHDES
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 7/17/2017 11:20:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	8.26	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	102.7	%	
Surface Water	In-situ	pH	5.67		
Surface Water	In-situ	Specific Conductance	16.1	us/cm	
Surface Water	In-situ	Temperature	25.1	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	4	System:	LACUSTRINE	Landscape Position:	
Hydrologic Modifications:	0	Subsystem:	LITTORAL	Lotic Gradient:	
Vegetative Modifications:	0	Class 1:	AQUATIC BED	Flow Path:	
Chemical Pollutants:	0	Subclass 1:	NON-PERSISTENT	Land Form:	
Watershed Characterization and Non-point Sources:	4	Class 2:	UNCONSOLIDATED BOTTOM	Land Form Type:	
		Subclass 2:	FLOATING VASCULAR	Waterbody Type:	
		Class 3:		Waterbody Subtype:	
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations:

Habitat Classification:
AQUATIC MACROPHYTE BED
OPEN WATER STANDING

Substrate Classification:
BEDROCK SUBSTRATE
SAND SUBSTRATE
SILT/MUCK SUBSTRATE

Average Depth: 65 cm Visible Flow: No Rain In Previous 24 Hours: No

Sample Comments: RAIN IN PAST 3 DAYS; BEAVER LODGE PRESENT; ALSO OBSERVED BULLFROGS AND MANY (LARGE) BULLFROG TADPOLES

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Alnus incana ssp. rugosa	Speckled alder	LW-34021701001002	2	FACW	TREE, SHRUB
Dulichium arundinaceum	Threeway sedge	LW-34010501005001	5	OBL	GRAMINOID
Parthenocissus quinquefolia	Virginia creeper	LW-34024103001001	3	fac	VINE
Brasenia schreberi	Watershield	LW-34023103001001	6	OBL	FORB/HERB
Eriocaulon aquaticum	Sevenangle pipewort	LW-34010601001001	7	OBL	FORB/HERB
Abies Balsamea	Balsam fir	LW-31010102001001	3	fac	TREE
Nymphoides cordata	Little floatingheart	LW-34024802002001	6	OBL	FORB/HERB
Lysimachia terrestris	Earth loosestrife	LW-34023801002009	2	OBL	FORB/HERB
Equisetum palustre	Marsh horsetail	LW-32010101001007	6	FACW	FORB/HERB
Hypericum		LW-34022601001			
Lobelia dortmanna	Dortmann's cardinalflower	LW-34020601003002	8	obl	FORB/HERB
Myrica gale	Sweetgale	LW-34022801003001	5	OBL	SHRUB
Utricularia purpurea	Eastern purple bladderwort	LW-34022305002007	5	OBL	FORB/HERB
Thalictrum pubescens	King of the meadow	LW-34024002013002	2	FACW	FORB/HERB
Eleocharis palustris	Common spikerush	LW-34010501006013	6	OBL	GRAMINOID

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Nuphar lutea ssp. variegata	Variegated yellow pond-lily	LW-34023103002002	4	OBL	FORB/HERB

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Additional Summary Variables

Station Number: W-317 Waterbody: ELLSWORTH POND (NH) Town: Not Designated

Log Number: DN-2017-317-WET-ELL-1 Subsample Factor: X1 Replicates: 3 Calculated: 5/8/2018

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	6.33	0.253	6	0.32
EPT Taxa:	5.67	0.227	5	0.26
Insects:	21.67	0.867	15	0.79
Non-Insects:	3.33	0.133	4	0.21
Leeches:	0.00	0.000	0	0.00
Oligochaetes:	1.00	0.040	2	0.11
Snails:	0.00	0.000	0	0.00
Bivalves:	0.00	0.000	0	0.00
Isopods:	0.00	0.000	0	0.00
Amphipods:	1.00	0.040	1	0.05
Mites:	1.33	0.053	1	0.05
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	4.67	0.187	3	0.16
Odonates:	0.67	0.027	1	0.05
Caddisflies:	1.00	0.040	2	0.11
Diptera:	15.33	0.613	9	0.47
Hemiptera:	0.00	0.000	0	0.00
Beetles:	0.00	0.000	0	0.00
Chironomids:	14.33	0.573	7	0.37
Tanypodinae Tribe:	6.62	0.265	4	0.21
Chironomiinae Tribe:	7.72	0.309	3	0.16
Orthoclodiinae Tribe:	0.00	0.000	0	0.00
Collector-Filterers:	6.62	0.265	1	0.05
Collector-Gatherers:	6.33	0.253	5	0.26
Predators:	7.28	0.291	6	0.32
Piercers:	0.67	0.027	1	0.05
Shredders:	0.55	0.022	1	0.05
Scrapers:	0.00	0.000	0	0.00
Maine Tolerance:				
Sensitive:	2.77	0.143	5	0.36
Intermediate:	16.56	0.857	9	0.64
Eurytopic:	0.00	0.000	0	0.00
Ratio of MTI Sensitive to Eurytopic	2.77	14.324	5.00	35.71

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-317 Waterbody: ELLSWORTH POND (NH) Town: Not Designated

Log Number: DN-2017-317-WET-ELL-1 Subsample Factor: X1 Replicates: 3 Calculated: 5/8/2018

Taxon	Maine Taxonomic Code	Count (Mean of Samples)		Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
		Actual	Adjusted					
Naididae	08020202	0.33	0.33	--	--	--	--	Worm
Stylaria	08020202014	0.00	0.67	--	CG	18-S	--	Worm
Stylaria lacustris	08020202014002	0.67	0.00	--	--	--	--	Worm
Hyalella	09010203006	0.00	1.00	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	1.00	0.00	--	--	--	--	Amphipod
Libellulidae	09020306	0.67	0.67	--	--	--	--	Dragonfly/damselfly
Callibaetis	09020401002	0.33	0.33	9	CG	40.5-I	--	Mayfly
Hexagenia	09020407028	2.67	2.67	6	CG	--	--	Mayfly
Caenis	09020412040	1.67	1.67	7	CG	22.1-I	--	Mayfly
Oxyethira	09020607028	0.67	0.67	3	P	22-S	--	Caddisfly
Oecetis	09020618078	0.33	0.33	8	PR	16.3-S	--	Caddisfly
Chaoborus	09021007025	0.33	0.33	8	PR	25-I	--	Fly: Phantom Midge
Ceratopogonidae	09021010	0.67	0.67	--	--	--	--	Fly: Biting Midge
Chironomidae	09021011	5.67	0.00	--	--	--	--	Fly: Midge
Ablabesmyia	09021011001	1.67	2.76	8	PR	23.6-I	T	Fly: Midge
Clinotanypus	09021011002	1.33	2.21	8	PR	30.3-I	T	Fly: Midge
Labrundinia	09021011008	0.33	0.55	7	PR	18.1-S	T	Fly: Midge
Procladius	09021011015	0.67	1.10	9	PR	25.1-I	T	Fly: Midge
Tanytarsus	09021011076	4.00	6.62	6	CF	25.7-I	Y	Fly: Midge
Cryptotendipes	09021011083	0.33	0.55	6	--	7.1-S	C	Fly: Midge
Polypedilum	09021011102	0.33	0.55	6	SH	24.2-I	C	Fly: Midge
Hydrachnidia	09030101	1.33	1.33	--	--	--	--	Mite

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-265 Trip ID: 2014-265-WET-ENF-1 River Basin: Connecticut
Waterbody: GEORGE POND (NH) HUC8 Name:
Town: Not Designated Latitude: 43 34 22.61 N
Mitigation Monitoring Site: No Longitude: 72 5 49.64 W

Sample Information

Sample ID: DN-2014-265-WET-ENF-1 Type of Sample: DIPNET Date Sampled: 8/5/2014
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: A** Date: 2/9/2016
Model Result with P≥0.6: A **Reason for Determination: Model**
Date Last Calculated: 11/9/2015 Comments:

Model Probabilities

First Stage Model

Class A:	0.99	Class C:	0.00
Class B:	0.01	NA:	0.00

B or Better Model

Class A or B	1.00
Class C or Non-Attainment	0.00

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.99
Class B or C or Non-Attainment	0.01

Model Variables

		Reference Range
Total Mean Abundance	169	< 787
Ephemeroptera Abundance	8.67	most > 35
Odonata Relative Abundance	0.020	most > 0.04
Trichoptera Relative Abundance	0.024	most > 0.02
Shredder Taxa Relative Abundance	0.02	< 0.2
Non-insect Taxa Relative Richness	0.29	< 0.4
MTI Sensitive Taxa Abundance	17.13	most > 30
MTI Sensitive Taxa Relative Abundance	0.12	most > 0.05
MTI Sensitive Taxa Richness	9	most > 7
MTI Intermediate Taxa Relative Abundance	0.88	> 0.5
MTI Intermediate Taxa Richness	18	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	25.20	most > 1

Other Variables

Generic Richness:	35
Hilsenhoff Biotic Index:	7.81
Shannon-Weiner Diversity:	2.96
Maine Tolerance Index:	24.11

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	53.15
2	*Hydrobiidae*	10.43
3	*Caenis*	4.92
4	*Procladius*	3.74
5	*Lauterborniella agrayloides*	2.76

Sample Collection and Processing Information

Sampling Organization: NHDES
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 8/5/2014 12:46:00 PM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	7.18	mg/l	
Surface Water	In-situ	pH	6.6		
Surface Water	In-situ	Specific Conductance	61.3	us/cm	
Surface Water	In-situ	Temperature	25.5	deg c	

Landcover Summary - 2004 Data

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	12	System:	LACUSTRINE	Landscape Position:	
Hydrologic Modifications:	3	Subsystem:	LITTORAL	Lotic Gradient:	
Vegetative Modifications:	1	Class 1:	UNCONSOLIDATED BOTTOM	Flow Path:	
Chemical Pollutants:	0				
Watershed Characterization and Non-point Sources:	8	Subclass 1:	FLOATING VASCULAR	Land Form:	
		Class 2:	EMERGENT	Land Form Type:	
		Subclass 2:	NON-PERSISTENT	Waterbody Type:	
		Class 3:	SCRUB SHRUB	Waterbody Subtype:	
		Subclass 3:	NEEDLE-LEAVED DECIDUOUS		
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations: PLANT LIST IS NOT COMPREHENSIVE. THE WETLAND THAT SURROUNDS THE OPEN WATER IS A FEN.

Habitat Classification:
AQUATIC MACROPHYTE BED

Substrate Classification:
DETRITUS SUBSTRATE
ORGANIC SOIL SUBSTRATE
PEAT SUBSTRATE

Average Depth: 72 cm Visible Flow: Yes Rain In Previous 24 Hours: Yes

Sample Comments:

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Pontederia cordata	Pickerelweed	LW-34010906002002	4	OBL	FORB/HERB
Nuphar lutea ssp. variegata	Varigated yellow pond-lily	LW-34023103002002	4	OBL	FORB/HERB
Utricularia purpurea	Eastern purple bladderwort	LW-34022305002007	5	OBL	FORB/HERB
Eriocaulon aquaticum	Sevenangle pipewort	LW-34010601001001	7	OBL	FORB/HERB
Brasenia schreberi	Watershield	LW-34023103001001	6	OBL	FORB/HERB
Nymphaea odorata	American white waterlily	LW-34023103003002	5	OBL	FORB/HERB

Additional Summary Variables

Station Number: W-265 Waterbody: GEORGE POND (NH) Town: Not Designated

Log Number: DN-2014-265-WET-ENF-1 Subsample Factor: X1 Replicates: 3 Calculated: 11/9/2015

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	16.00	0.094	9	0.26
EPT Taxa:	12.67	0.075	5	0.14
Insects:	50.67	0.299	25	0.71
Non-Insects:	118.67	0.701	10	0.29
Leeches:	0.33	0.002	1	0.03
Oligochaetes:	4.67	0.028	3	0.09
Snails:	19.33	0.114	2	0.06
Bivalves:	3.67	0.022	2	0.06
Isopods:	0.00	0.000	0	0.00
Amphipods:	90.00	0.531	1	0.03
Mites:	0.67	0.004	1	0.03
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	8.67	0.051	2	0.06
Odonates:	3.33	0.020	4	0.11
Caddisflies:	4.00	0.024	3	0.09
Diptera:	34.67	0.205	16	0.46
Hemiptera:	0.00	0.000	0	0.00
Beetles:	0.00	0.000	0	0.00
Chironomids:	34.67	0.205	16	0.46
Tanypodinae Tribe:	11.22	0.066	3	0.09
Chironomiinae Tribe:	20.39	0.120	11	0.31
Orthoclodiinae Tribe:	3.06	0.018	2	0.06
Collector-Filterers:	8.42	0.050	4	0.11
Collector-Gatherers:	116.90	0.690	11	0.31
Predators:	18.22	0.108	9	0.26
Piercers:	0.33	0.002	1	0.03
Shredders:	2.72	0.016	1	0.03
Scrapers:	1.67	0.010	1	0.03
Maine Tolerance:				
Sensitive:	17.13	0.117	9	0.32
Intermediate:	128.47	0.878	18	0.64
Eurytopic:	0.68	0.005	1	0.04
Ratio of MTI Sensitive to Eurytopic	25.20	25.197	9.00	9.00

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-265 Waterbody: GEORGE POND (NH) Town: Not Designated

Log Number: DN-2014-265-WET-ENF-1 Subsample Factor: X1 Replicates: 3 Calculated: 11/9/2015

Taxon	Maine Taxonomic Code	Count (Mean of Samples)		Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
		Actual	Adjusted					
Enchytraeidae	08020201	0.33	0.33	--	--	--	--	Worm
Naididae	08020202	2.33	0.00	--	--	--	--	Worm
Ripistes	08020202011	0.00	0.72	--	--	--	--	Worm
Ripistes parasita	08020202011001	0.33	0.00	--	--	--	--	Worm
Stylaria	08020202014	1.67	3.61	--	CG	18-S	--	Worm
Erpobdella	08030203002	0.00	0.33	--	--	36.4-I	--	Leech
Erpobdella punctata	08030203002001	0.33	0.00	--	--	--	--	Leech
Hyalella	09010203006	0.00	90.00	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	90.00	0.00	--	--	--	--	Amphipod
Aeshna	09020301001	0.33	0.33	5	PR	27.9-I	--	Dragonfly/damselfly
Libellulidae	09020306	0.33	0.33	--	--	--	--	Dragonfly/damselfly
Sympetrum	09020306041	0.33	0.33	10	PR	37-I	--	Dragonfly/damselfly
Enallagma	09020309051	2.33	2.33	9	PR	26.2-I	--	Dragonfly/damselfly
Leptophlebiidae	09020406	0.33	0.33	--	--	--	--	Mayfly
Caenis	09020412040	8.33	8.33	7	CG	22.1-I	--	Mayfly
Polycentropus	09020603010	2.33	2.33	6	PR	15.4-S	--	Caddisfly
Oxyethira	09020607028	0.33	0.33	3	P	22-S	--	Caddisfly
Oecetis	09020618078	1.33	1.33	8	PR	16.3-S	--	Caddisfly
Chironomidae	09021011	0.67	0.00	--	--	--	--	Fly: Midge
Ablabesmyia	09021011001	3.67	3.74	8	PR	23.6-I	T	Fly: Midge
Labrundinia	09021011008	1.00	1.02	7	PR	18.1-S	T	Fly: Midge
Procladius	09021011015	6.33	6.46	9	PR	25.1-I	T	Fly: Midge
Corynoneura	09021011036	2.00	2.04	7	CG	40.1-I	--	Fly: Midge
Psectrocladius	09021011056	1.00	1.02	8	CG	22-S	--	Fly: Midge
Tanytarsus	09021011076	4.33	4.42	6	CF	25.7-I	Y	Fly: Midge
Pseudochironomus	09021011078	0.67	0.68	5	CG	47.7-E	S	Fly: Midge
Chironomus	09021011080	2.67	2.72	10	CG	27.4-I	C	Fly: Midge
Cladopelma	09021011081	0.67	0.68	9	CG	27.9-I	C	Fly: Midge
Dicrotendipes	09021011085	1.00	1.02	8	CG	28.8-I	C	Fly: Midge
Lauterborniella	09021011092	0.00	4.76	--	CG	17.4-S	C	Fly: Midge
Lauterborniella agrayloides	09021011092001	4.67	0.00	--	--	--	C	Fly: Midge
Microtendipes	09021011094	0.33	0.34	6	CF	22.3-I	C	Fly: Midge
Pagastiella	09021011096	0.67	0.68	--	--	11.8-S	C	Fly: Midge
Parachironomus	09021011097	0.00	0.34	10	PR	28.6-I	C	Fly: Midge

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-265 Waterbody: GEORGE POND (NH) Town: Not Designated

Log Number: DN-2014-265-WET-ENF-1 Subsample Factor: X1 Replicates: 3 Calculated: 11/9/2015

Taxon	Maine Taxonomic Code	Count (Mean of Samples)		Hilsenhoff Biotic Index	Functional Feeding Group	Maine Tolerance Index	Tribe	Taxa Group
		Actual	Adjusted					
Parachironomus chaetoalus complex	09021011097176	0.33	0.00	--	--	--	C	Fly: Midge
Polypedilum	09021011102	2.67	2.72	6	SH	24.2-I	C	Fly: Midge
Tribelos	09021011107	0.00	2.04	5	CG	9.3-S	C	Fly: Midge
Tribelos jucundus	09021011107198	2.00	0.00	--	--	--	C	Fly: Midge
Arrenurus	09030111001	0.67	0.67	--	--	23.8-I	--	Mite
Hydrobiidae	10010104	17.67	17.67	--	--	--	--	Snail
Gyraulus	10010203029	0.00	1.67	--	SC	37.2-I	--	Snail
Gyraulus deflectus	10010203029056	1.67	0.00	--	--	--	--	Snail
Sphaeriidae	10020201	3.33	3.33	--	CF	--	--	Clam
Pisidium	10020201002	0.33	0.33	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-274 Trip ID: 2015-274-WET-FRN-1 River Basin: Connecticut
Waterbody: ECHO LAKE WETLAND (NH) HUC8 Name: Waits
Town: Not Designated Latitude: 44 10 20.97 N
Mitigation Monitoring Site: No Longitude: 71 41 20.66 W

Sample Information

Sample ID: DN-2015-274-WET-FRN-1 Type of Sample: DIPNET Date Sampled: 7/16/2015
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: I** Date: 10/25/2016
Model Result with P≥0.6: I **Reason for Determination: Model**
Date Last Calculated: 8/26/2016 Comments: Minimum provisions for Total Mean Abundance and Generic Richness not met.

Model Probabilities

First Stage Model

Class A:	0.00	Class C:	0.94
Class B:	0.06	NA:	0.00

B or Better Model

Class A or B	0.06
Class C or Non-Attainment	0.94

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.00
Class B or C or Non-Attainment	1.00

Model Variables

		Reference Range
Total Mean Abundance	22	< 787
Ephemeroptera Abundance	0.00	most > 35
Odonata Relative Abundance	0.000	most > 0.04
Trichoptera Relative Abundance	0.000	most > 0.02
Shredder Taxa Relative Abundance	0.02	< 0.2
Non-insect Taxa Relative Richness	0.33	< 0.4
MTI Sensitive Taxa Abundance	1.39	most > 30
MTI Sensitive Taxa Relative Abundance	0.07	most > 0.05
MTI Sensitive Taxa Richness	1	most > 7
MTI Intermediate Taxa Relative Abundance	0.91	> 0.5
MTI Intermediate Taxa Richness	5	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	4.17	most > 1

Other Variables

Generic Richness:	9
Hilsenhoff Biotic Index:	7.67
Shannon-Weiner Diversity:	2.23
Maine Tolerance Index:	25.11

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	50.00
2	*Tanytarsus*	16.67
3	*Procladius*	10.61
4	*Naididae*	9.09
5	*Psectrocladius*	6.06

Sample Collection and Processing Information

Sampling Organization: JP, SC, SM
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 7/16/2015 11:36:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	11.2	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	122.7	%	
Surface Water	In-situ	pH	6.16		
Surface Water	In-situ	Specific Conductance	145.4	us/cm	
Surface Water	In-situ	Temperature	20.4	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	23	System:	PALUSTRINE	Landscape Position:	
Hydrologic Modifications:	9	Subsystem:		Lotic Gradient:	
Vegetative Modifications:	5	Class 1:	SCRUB SHRUB	Flow Path:	
Chemical Pollutants:	0	Subclass 1:	PERSISTENT	Land Form:	
Watershed Characterization and Non-point Sources:	9	Class 2:		Land Form Type:	
		Subclass 2:		Waterbody Type:	
		Class 3:		Waterbody Subtype:	
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations:

Habitat Classification:
SCRUB SHRUB

Substrate Classification:
ORGANIC SOIL SUBSTRATE
PEAT SUBSTRATE
SAND SUBSTRATE

Average Depth: 23 cm Visible Flow: No Rain In Previous 24 Hours: No

Sample Comments:

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Alnus		LW-34021701001			
Utricularia		LW-34022305002			
Carex		LW-34010501002			
Panicum		LW-34010502051			
Triadenum		LW-34022601002			
Juncus		LW-34010801001			
Betula populifolia	Gray birch	LW-34021701002012	2	FAC	TREE
Myrica gale	Sweetgale	LW-34022801003001	5	OBL	SHRUB
Solidago		LW-34020501071			
Frangula alnus	Glossy buckthorn	LW-34024102002002	0	FAC	TREE SHRUB
Spiraea		LW-34024202026			
Salix		LW-34024401002			
Poaceae		LW-34010502			

Additional Summary Variables

Station Number: W-274 Waterbody: ECHO LAKE WETLAND (NH) Town: Not Designated

Log Number: DN-2015-274-WET-FRN-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/26/2016

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	0.00	0.000	0	0.00
EPT Taxa:	0.00	0.000	0	0.00
Insects:	8.67	0.394	6	0.67
Non-Insects:	13.33	0.606	3	0.33
Leeches:	0.00	0.000	0	0.00
Oligochaetes:	2.00	0.091	1	0.11
Snails:	0.00	0.000	0	0.00
Bivalves:	0.00	0.000	0	0.00
Isopods:	0.33	0.015	1	0.11
Amphipods:	11.00	0.500	1	0.11
Mites:	0.00	0.000	0	0.00
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	0.00	0.000	0	0.00
Odonates:	0.00	0.000	0	0.00
Caddisflies:	0.00	0.000	0	0.00
Diptera:	8.33	0.379	5	0.56
Hemiptera:	0.00	0.000	0	0.00
Beetles:	0.00	0.000	0	0.00
Chironomids:	8.33	0.379	5	0.56
Tanypodinae Tribe:	2.43	0.110	1	0.11
Chironomiinae Tribe:	4.51	0.205	3	0.33
Orthoclodiinae Tribe:	1.39	0.063	1	0.11
Collector-Filterers:	4.17	0.189	2	0.22
Collector-Gatherers:	12.74	0.579	3	0.33
Predators:	2.76	0.126	2	0.22
Piercers:	0.00	0.000	0	0.00
Shredders:	0.33	0.015	1	0.11
Scrapers:	0.00	0.000	0	0.00
Maine Tolerance:				
Sensitive:	1.39	0.071	1	0.14
Intermediate:	17.94	0.912	5	0.71
Eurytopic:	0.33	0.017	1	0.14
Ratio of MTI Sensitive to Eurytopic	4.17	4.167	1.00	1.00

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-274 Waterbody: ECHO LAKE WETLAND (NH) Town: Not Designated

Log Number: DN-2015-274-WET-FRN-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/26/2016

Taxon	Maine Taxonomic Code	Count (Mean of Samples)		Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
		Actual	Adjusted					
Naididae	08020202	2.00	2.00	--	--	--	--	Worm
Caecidotea	09010101001	0.00	0.33	8	SH	51.9-E	--	Isopod
Caecidotea communis	09010101001001	0.33	0.00	--	--	--	--	Isopod
Hyalella	09010203006	0.00	11.00	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	11.00	0.00	--	--	--	--	Amphipod
Sialis	09020702004	0.33	0.33	4	PR	--	--	Alderfly
Chironomidae	09021011	0.33	0.00	--	--	--	--	Fly: Midge
Procladius	09021011015	2.33	2.43	9	PR	25.1-I	T	Fly: Midge
Psectrocladius	09021011056	1.33	1.39	8	CG	22-S	--	Fly: Midge
Tanytarsus	09021011076	3.67	3.82	6	CF	25.7-I	Y	Fly: Midge
Chironomus	09021011080	0.33	0.35	10	CG	27.4-I	C	Fly: Midge
Microtendipes	09021011094	0.33	0.35	6	CF	22.3-I	C	Fly: Midge

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-266 Trip ID: 2014-266-WET-GRG-1 River Basin: Androscoggin
Waterbody: TRIBUTARY TO PEABODY RIVER (NH) HUC8 Name: Lower Androscoggin
Town: Not Designated Latitude: 44 17 37.95 N
Mitigation Monitoring Site: No Longitude: 71 13 41.65 W

Sample Information

Sample ID: DN-2014-266-WET-GRG-1 Type of Sample: DIPNET Date Sampled: 8/12/2014
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: A** Date: 2/9/2016
Model Result with P≥0.6: A **Reason for Determination: Model**
Date Last Calculated: 11/20/2015 Comments:

Model Probabilities

First Stage Model

Class A:	0.97	Class C:	0.00
Class B:	0.03	NA:	0.00

B or Better Model

Class A or B	1.00
Class C or Non-Attainment	0.00

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.97
Class B or C or Non-Attainment	0.03

Model Variables

		Reference Range
Total Mean Abundance	52	< 787
Ephemeroptera Abundance	20.67	most > 35
Odonata Relative Abundance	0.038	most > 0.04
Trichoptera Relative Abundance	0.032	most > 0.02
Shredder Taxa Relative Abundance	0.01	< 0.2
Non-insect Taxa Relative Richness	0.08	< 0.4
MTI Sensitive Taxa Abundance	3.67	most > 30
MTI Sensitive Taxa Relative Abundance	0.14	most > 0.05
MTI Sensitive Taxa Richness	3	most > 7
MTI Intermediate Taxa Relative Abundance	0.85	> 0.5
MTI Intermediate Taxa Richness	12	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	11.00	most > 1

Other Variables

Generic Richness:	25
Hilsenhoff Biotic Index:	7.09
Shannon-Weiner Diversity:	3.60
Maine Tolerance Index:	23.06

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Leptophlebiidae*	28.03
2	*Pisidium*	12.74
3	*Caenis*	11.46
4	*Tanytarsus*	7.64
5	*Hyalella azteca*	7.01

Sample Collection and Processing Information

Sampling Organization: NHDES
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 8/12/2014 11:00:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	7.61	mg/l	
Surface Water	In-situ	pH	5.84		
Surface Water	In-situ	Specific Conductance	40.8	us/cm	
Surface Water	In-situ	Temperature	21.9	deg c	

Landcover Summary - 2004 Data

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Summary of Habitat Characteristics

Human Disturbance	Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	System:	PALUSTRINE	Landscape Position:	
Hydrologic Modifications:	Subsystem:		Lotic Gradient:	
Vegetative Modifications:	Class 1:	UNCONSOLIDATED BOTTOM	Flow Path:	THROUGHFLOW
Chemical Pollutants:				
Watershed Characterization and Non-point Sources:	Subclass 1:	NON-PERSISTENT	Land Form:	
	Class 2:	EMERGENT	Land Form Type:	
	Subclass 2:	NON-PERSISTENT	Waterbody Type:	
	Class 3:	SCRUB SHRUB	Waterbody Subtype:	
	Subclass 3:			
			Comments:	

Dominant Plant Species:

Additional Plant Community Observations: PLANT LIST IS NOT COMPREHENSIVE.

Habitat Classification:	Substrate Classification:
EMERGENT NON-PERSISTENT VEGETATION	BEDROCK SUBSTRATE
OPEN WATER FLOWING	SAND SUBSTRATE
SCRUB SHRUB	SILT/MUCK SUBSTRATE

Average Depth: 32 cm Visible Flow: Yes Rain In Previous 24 Hours: Yes

Sample Comments:

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Nuphar lutea ssp. variegata	Varigated yellow pond-lily	LW-34023103002002	4	OBL	FORB/HERB
Solidago		LW-34020501071			
Rubus hispidus	Bristly dewberry	LW-34024202021010	2	FACW	SUBSHRUB
Eleocharis		LW-34010501006			
Acer rubrum	Red maple	LW-34024603001006	2	FAC	TREE
Carex		LW-34010501002			
Triadenum virginicum	Virginia marsh St. Johnswort	LW-34022601002002	6	OBL	FORB/HERB
Ilex mucronata	Catberry	LW-34020201001003	5	OBL	SHRUB, TREE
Alnus incana ssp. rugosa	Speckled alder	LW-34021701001002	2	FACW	TREE, SHRUB
Spiraea tomentosa	Steeplebush	LW-34024202026005	3	FACW	SHRUB

Additional Summary Variables

Station Number: W-266 Waterbody: TRIBUTARY TO PEABODY RIVER (NH) Town: Not Designated

Log Number: DN-2014-266-WET-GRG-1 Subsample Factor: X1 Replicates: 3 Calculated: 11/20/2015

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	24.33	0.465	9	0.36
EPT Taxa:	22.33	0.427	6	0.24
Insects:	42.00	0.803	23	0.92
Non-Insects:	10.33	0.197	2	0.08
Leeches:	0.00	0.000	0	0.00
Oligochaetes:	0.00	0.000	0	0.00
Snails:	0.00	0.000	0	0.00
Bivalves:	6.67	0.127	1	0.04
Isopods:	0.00	0.000	0	0.00
Amphipods:	3.67	0.070	1	0.04
Mites:	0.00	0.000	0	0.00
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	20.67	0.395	2	0.08
Odonates:	2.00	0.038	3	0.12
Caddisflies:	1.67	0.032	4	0.16
Diptera:	15.00	0.287	11	0.44
Hemiptera:	2.00	0.038	1	0.04
Beetles:	0.33	0.006	1	0.04
Chironomids:	15.00	0.287	11	0.44
Tanypodinae Tribe:	6.00	0.115	4	0.16
Chironomiinae Tribe:	9.00	0.172	7	0.28
Orthoclodiinae Tribe:	0.00	0.000	0	0.00
Collector-Filterers:	11.33	0.217	3	0.12
Collector-Gatherers:	13.33	0.255	5	0.20
Predators:	8.67	0.166	10	0.40
Piercers:	0.33	0.006	1	0.04
Shredders:	0.33	0.006	1	0.04
Scrapers:	0.00	0.000	0	0.00
Maine Tolerance:				
Sensitive:	3.67	0.139	3	0.19
Intermediate:	22.33	0.848	12	0.75
Eurytopic:	0.33	0.013	1	0.06
Ratio of MTI Sensitive to Eurytopic	11.00	11.000	3.00	3.00

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-266 Waterbody: TRIBUTARY TO PEABODY RIVER (NH) Town: Not Designated

Log Number: DN-2014-266-WET-GRG-1 Subsample Factor: X1 Replicates: 3 Calculated: 11/20/2015

Taxon	Maine Taxonomic Code	Count (Mean of Samples)		Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
		Actual	Adjusted					
Hyalella	09010203006	0.00	3.67	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	3.67	0.00	--	--	--	--	Amphipod
Odonata	090203	0.33	0.33	--	--	--	--	Dragonfly/damselfly
Stylurus	09020302018	0.33	0.33	4	PR	--	--	Dragonfly/damselfly
Corduliidae	09020305	0.67	0.67	--	--	--	--	Dragonfly/damselfly
Sympetrum	09020306041	0.67	0.67	10	PR	37-I	--	Dragonfly/damselfly
Leptophlebiidae	09020406	14.67	14.67	--	--	--	--	Mayfly
Caenis	09020412040	6.00	6.00	7	CG	22.1-I	--	Mayfly
Corixidae	09020501	2.00	2.00	--	--	--	--	True Bug
Polycentropus	09020603010	0.33	0.33	6	PR	15.4-S	--	Caddisfly
Hydroptila	09020607026	0.33	0.33	6	P	--	--	Caddisfly
Phryganeidae	09020608	0.33	0.33	--	--	--	--	Caddisfly
Oecetis	09020618078	0.67	0.67	8	PR	16.3-S	--	Caddisfly
Sialis	09020702004	0.33	0.33	4	PR	--	--	Fishfly
Ablabesmyia	09021011001	2.67	2.67	8	PR	23.6-I	T	Fly: Midge
Clinotanypus	09021011002	0.00	0.33	8	PR	30.3-I	T	Fly: Midge
Clinotanypus pinguis	09021011002008	0.33	0.00	--	--	--	--	Fly: Midge
Procladius	09021011015	2.67	2.67	9	PR	25.1-I	T	Fly: Midge
Thienemannimyia	09021011020	0.00	0.33	3	PR	--	T	Fly: Midge
Thienemannimyia group	09021011020041	0.33	0.00	--	--	--	T	Fly: Midge
Paratanytarsus	09021011071	0.33	0.33	6	--	43-E	Y	Fly: Midge
Tanytarsus	09021011076	4.00	4.00	6	CF	25.7-I	Y	Fly: Midge
Chironomus	09021011080	0.33	0.33	10	CG	27.4-I	C	Fly: Midge
Cladopelma	09021011081	0.67	0.67	9	CG	27.9-I	C	Fly: Midge
Microtendipes	09021011094	0.67	0.67	6	CF	22.3-I	C	Fly: Midge
Polypedilum	09021011102	0.33	0.33	6	SH	24.2-I	C	Fly: Midge
Tribelos	09021011107	0.00	2.67	5	CG	9.3-S	C	Fly: Midge
Tribelos jucundus	09021011107198	2.67	0.00	--	--	--	C	Fly: Midge
Agabus	09021103016	0.33	0.33	--	PR	34.5-I	--	Beetle
Pisidium	10020201002	6.67	6.67	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-275 Trip ID: 2015-275-WET-HKS-1
Waterbody: CLAY POND (NH)
Town: Not Designated
Mitigation Monitoring Site: No
River Basin: Merrimack
HUC8 Name: Merrimack River
Latitude: 43 4 36.8 N
Longitude: 71 23 7.05 W

Sample Information

Sample ID: DN-2015-275-WET-HKS-1 Type of Sample: DIPNET Date Sampled: 7/13/2015
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: I** Date: 10/25/2016
Model Result with P≥0.6: I **Reason for Determination: Model**
Date Last Calculated: 8/26/2016 Comments: Minimum Provisions for Total Mean Abundance and Generic Richness not met.

Model Probabilities

First Stage Model

Class A:	0.20	Class C:	0.29
Class B:	0.51	NA:	0.00

B or Better Model

Class A or B	0.71
Class C or Non-Attainment	0.29

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.20
Class B or C or Non-Attainment	0.80

Model Variables

		Reference Range
Total Mean Abundance	33	< 787
Ephemeroptera Abundance	2.00	most > 35
Odonata Relative Abundance	0.070	most > 0.04
Trichoptera Relative Abundance	0.030	most > 0.02
Shredder Taxa Relative Abundance	0.00	< 0.2
Non-insect Taxa Relative Richness	0.25	< 0.4
MTI Sensitive Taxa Abundance	2.00	most > 30
MTI Sensitive Taxa Relative Abundance	0.06	most > 0.05
MTI Sensitive Taxa Richness	3	most > 7
MTI Intermediate Taxa Relative Abundance	0.94	> 0.5
MTI Intermediate Taxa Richness	8	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	2.00	most > 1

Other Variables

Generic Richness:	12
Hilsenhoff Biotic Index:	7.70
Shannon-Weiner Diversity:	1.85
Maine Tolerance Index:	24.21

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	69.00
2	*Libellulidae*	7.00
3	*Caenis*	6.00
4	*Ablabesmyia*	5.00
5	*Oxyethira*	3.00

Sample Collection and Processing Information

Sampling Organization: SDM, SJC, JP
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 7/13/2015 11:45:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	4.3	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	53.2	%	
Surface Water	In-situ	pH	4.82		
Surface Water	In-situ	Specific Conductance	35.5	us/cm	
Surface Water	In-situ	Temperature	27.8	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	6	System:	LACUSTRINE	Landscape Position:	
Hydrologic Modifications:	0	Subsystem:	LIMNETIC	Lotic Gradient:	
Vegetative Modifications:	1	Class 1:	UNCONSOLIDATED BOTTOM	Flow Path:	
Chemical Pollutants:	1				
Watershed Characterization and Non-point Sources:	4	Subclass 1:		Land Form:	
		Class 2:	SCRUB SHRUB	Land Form Type:	
		Subclass 2:		Waterbody Type:	
		Class 3:	AQUATIC BED	Waterbody Subtype:	
		Subclass 3:	FLOATING VASCULAR		
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations:

Habitat Classification:
AQUATIC MACROPHYTE BED
EMERGENT NON-PERSISTENT VEGETATION
SCRUB SHRUB

Substrate Classification:
PEAT SUBSTRATE

Average Depth: 33 cm Visible Flow: No Rain In Previous 24 Hours: No

Sample Comments: POND SAMPLED IS PART OF A MUCH LARGER DrAiNage MARSH/SHRUB SWAMP.
POND SAMPLED IS PART OF A MUCH LARGER DIANGAE MARSH/SHRUB SWAMP.

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Pontederia cordata	Pickerelweed	LW-34010906002002	4	OBL	FORB/HERB
Decodon verticillatus	Swamp loosestrife	LW-34022901001001	6	OBL	SUBSHRUB, SHRUB
Poaceae		LW-34010502			
Vaccinium		LW-34021302023			
Nymphaea odorata	American white waterlily	LW-34023103003002	5	OBL	FORB/HERB
Myrica gale	Sweetgale	LW-34022801003001	5	OBL	SHRUB
Carex lasiocarpa	Woollyfruit sedge	LW-34010501002078	6	OBL	GRAMINOID
Pinus strobus	Eastern white pine	LW-31010102004005	2	FACU	TREE
Utricularia		LW-34022305002			
Acer rubrum	Red maple	LW-34024603001006	2	FAC	TREE

Additional Summary Variables

Station Number: W-275 Waterbody: CLAY POND (NH) Town: Not Designated

Log Number: DN-2015-275-WET-HKS-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/26/2016

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	5.33	0.160	3	0.25
EPT Taxa:	3.00	0.090	2	0.17
Insects:	9.00	0.270	9	0.75
Non-Insects:	24.33	0.730	3	0.25
Leeches:	0.00	0.000	0	0.00
Oligochaetes:	0.67	0.020	1	0.08
Snails:	0.00	0.000	0	0.00
Bivalves:	0.00	0.000	0	0.00
Isopods:	0.00	0.000	0	0.00
Amphipods:	23.00	0.690	1	0.08
Mites:	0.67	0.020	1	0.08
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	2.00	0.060	1	0.08
Odonates:	2.33	0.070	1	0.08
Caddisflies:	1.00	0.030	1	0.08
Diptera:	3.00	0.090	4	0.33
Hemiptera:	0.67	0.020	2	0.17
Beetles:	0.00	0.000	0	0.00
Chironomids:	2.33	0.070	3	0.25
Tanypodinae Tribe:	2.00	0.060	2	0.17
Chironomiinae Tribe:	0.33	0.010	1	0.08
Orthoclodiinae Tribe:	0.00	0.000	0	0.00
Collector-Filterers:	0.00	0.000	0	0.00
Collector-Gatherers:	26.00	0.780	4	0.33
Predators:	3.33	0.100	5	0.42
Piercers:	1.00	0.030	1	0.08
Shredders:	0.00	0.000	0	0.00
Scrapers:	0.00	0.000	0	0.00
Maine Tolerance:				
Sensitive:	2.00	0.065	3	0.27
Intermediate:	29.00	0.935	8	0.73
Eurytopic:	0.00	0.000	0	0.00
Ratio of MTI Sensitive to Eurytopic	2.00	6.452	3.00	27.27

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-275 Waterbody: CLAY POND (NH) Town: Not Designated

Log Number: DN-2015-275-WET-HKS-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/26/2016

Taxon	Maine Taxonomic Code	Count (Mean of Samples)		Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
		Actual	Adjusted					
Stylaria	08020202014	0.67	0.67	--	CG	18-S	--	Worm
Hyalella	09010203006	0.00	23.00	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	23.00	0.00	--	--	--	--	Amphipod
Libellulidae	09020306	2.33	2.33	--	--	--	--	Dragonfly/damselfly
Caenis	09020412040	2.00	2.00	7	CG	22.1-I	--	Mayfly
Pelocoris	09020504013	0.33	0.33	--	PR	24.7-I	--	True Bug
Neoplea	09020512016	0.33	0.33	--	PR	35.5-I	--	True Bug
Oxyethira	09020607028	1.00	1.00	3	P	22-S	--	Caddisfly
Bezzia/palpomyia	09021010043	0.67	0.67	6	PR	26.9-I	--	Fly: Biting Midge
Ablabesmyia	09021011001	1.67	1.67	8	PR	23.6-I	T	Fly: Midge
Guttipelopia	09021011006	0.33	0.33	5	PR	19.4-S	T	Fly: Midge
Chironomus	09021011080	0.33	0.33	10	CG	27.4-I	C	Fly: Midge
Arrenurus	09030111001	0.67	0.67	--	--	23.8-I	--	Mite

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-276 Trip ID: 2015-276-WET-HNV-1 River Basin: Connecticut
Waterbody: MULHERRIN FARM RD WETLAND (NH) HUC8 Name:
Town: Not Designated Latitude: 43 45 49.83 N
Mitigation Monitoring Site: No Longitude: 72 11 27.76 W

Sample Information

Sample ID: DN-2015-276-WET-HNV-1 Type of Sample: DIPNET Date Sampled: 7/21/2015
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: B** Date: 10/25/2016
Model Result with P≥0.6: B **Reason for Determination: Model**
Date Last Calculated: 8/26/2016 Comments:

Model Probabilities

First Stage Model

Class A:	0.30	Class C:	0.18
Class B:	0.52	NA:	0.00

B or Better Model

Class A or B	0.82
Class C or Non-Attainment	0.18

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.30
Class B or C or Non-Attainment	0.70

Model Variables

		Reference Range
Total Mean Abundance	105	< 787
Ephemeroptera Abundance	24.33	most > 35
Odonata Relative Abundance	0.019	most > 0.04
Trichoptera Relative Abundance	0.022	most > 0.02
Shredder Taxa Relative Abundance	0.00	< 0.2
Non-insect Taxa Relative Richness	0.24	< 0.4
MTI Sensitive Taxa Abundance	2.97	most > 30
MTI Sensitive Taxa Relative Abundance	0.03	most > 0.05
MTI Sensitive Taxa Richness	3	most > 7
MTI Intermediate Taxa Relative Abundance	0.96	> 0.5
MTI Intermediate Taxa Richness	13	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	4.18	most > 1

Other Variables

Generic Richness:	25
Hilsenhoff Biotic Index:	8.08
Shannon-Weiner Diversity:	3.62
Maine Tolerance Index:	30.50

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	18.41
2	*Callibaetis*	16.51
3	*Helisoma*	13.65
4	*Arachnida*	10.16
5	*Arrenurus*	8.89

Sample Collection and Processing Information

Sampling Organization: SJC
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 7/21/2015 11:10:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	11.94	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	149.8	%	
Surface Water	In-situ	pH	8.62		
Surface Water	In-situ	Specific Conductance	141.2	us/cm	
Surface Water	In-situ	Temperature	26.1	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	13	System:	PALUSTRINE	Landscape Position:	
Hydrologic Modifications:	3	Subsystem:		Lotic Gradient:	
Vegetative Modifications:	4	Class 1:	UNCONSOLIDATED BOTTOM	Flow Path:	
Chemical Pollutants:	0				
Watershed Characterization and Non-point Sources:	6	Subclass 1:		Land Form:	
		Class 2:	EMERGENT	Land Form Type:	
		Subclass 2:	PERSISTENT	Waterbody Type:	
		Class 3:	EMERGENT	Waterbody Subtype:	
		Subclass 3:	NON-PERSISTENT		
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations:

Habitat Classification:
AQUATIC MACROPHYTE BED
OPEN WATER STANDING

Substrate Classification:
GRAVEL SUBSTRATE
SILT/MUCK SUBSTRATE

Average Depth: 59 cm Visible Flow: No Rain In Previous 24 Hours: No

Sample Comments:

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Potamogeton amplifolius	Largeleaf pondweed	LW-34011101001002	6	OBL	FORB/HERB
Lythrum salicaria	Purple loosestrife	LW-34022901002004	0	OBL	FORB/HERB
Polygonum		LW-34023701005			
Carex lurida	Shallow sedge	LW-34010501002089	2	OBL	GRAMINOID
Glyceria borealis	Small floating mannagrass Small floating mannagrass	LW-34010502036002	6	OBL	GRAMINOID
Alismataceae		LW-34011401			
Triadenum		LW-34022601002			
Schoenoplectus tabernaemontani	Softstem bulrush	LW-34010501011011	5	OBL	GRAMINOID
Hypericum		LW-34022601001			
Phragmites australis	Common reed	LW-34010502056001	0	FACW	GRAMINOID
Typha angustifolia	Narrowleaf cattail	LW-34011301002001	0	OBL	FORB/HERB
Typha latifolia	Broadleaf cattail	LW-34011301002002	2	OBL	FORB/HERB
Solidago		LW-34020501071			
Eupatorium perfoliatum	Common boneset	LW-34020501032001	4	FACW	FORB/HERB
Eleocharis		LW-34010501006			
Alnus		LW-34021701001			

Additional Summary Variables

Station Number: W-276 Waterbody: MULHERRIN FARM RD WETLAND (NH) Town: Not Designated

Log Number: DN-2015-276-WET-HNV-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/26/2016

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	28.67	0.273	8	0.32
EPT Taxa:	26.67	0.254	5	0.20
Insects:	46.67	0.444	19	0.76
Non-Insects:	58.33	0.556	6	0.24
Leeches:	0.00	0.000	0	0.00
Oligochaetes:	3.33	0.032	2	0.08
Snails:	15.67	0.149	2	0.08
Bivalves:	0.00	0.000	0	0.00
Isopods:	0.00	0.000	0	0.00
Amphipods:	19.33	0.184	1	0.04
Mites:	20.00	0.190	1	0.04
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	24.33	0.232	2	0.08
Odonates:	2.00	0.019	3	0.12
Caddisflies:	2.33	0.022	3	0.12
Diptera:	17.67	0.168	10	0.40
Hemiptera:	0.33	0.003	1	0.04
Beetles:	0.00	0.000	0	0.00
Chironomids:	17.33	0.165	9	0.36
Tanypodinae Tribe:	8.29	0.079	3	0.12
Chironomiinae Tribe:	8.67	0.083	5	0.20
Orthoclodiinae Tribe:	0.38	0.004	1	0.04
Collector-Filterers:	4.86	0.046	3	0.12
Collector-Gatherers:	47.81	0.455	6	0.24
Predators:	9.62	0.092	5	0.20
Piercers:	1.67	0.016	1	0.04
Shredders:	0.38	0.004	1	0.04
Scrapers:	15.67	0.149	2	0.08
Maine Tolerance:				
Sensitive:	2.97	0.034	3	0.17
Intermediate:	83.99	0.958	13	0.72
Eurytopic:	0.71	0.008	2	0.11
Ratio of MTI Sensitive to Eurytopic	4.18	4.184	1.50	1.50

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-276 Waterbody: MULHERRIN FARM RD WETLAND (NH) Town: Not Designated

Log Number: DN-2015-276-WET-HNV-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/26/2016

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Count (Mean of Samples) Adjusted	Hilsenhoff Biotic Index	Functional Feeding Group	Maine Tolerance Index	Tribe	Taxa Group
Enchytraeidae	08020201	0.33	0.33	--	--	--	--	Worm
Naididae	08020202	3.00	3.00	--	--	--	--	Worm
Hyalella	09010203006	0.00	19.33	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	19.33	0.00	--	--	--	--	Amphipod
Aeshnidae	09020301	0.33	0.33	--	--	--	--	Dragonfly/damselfly
Libellulidae	09020306	0.67	0.67	--	--	--	--	Dragonfly/damselfly
Enallagma	09020309051	1.00	1.00	9	PR	26.2-I	--	Dragonfly/damselfly
Callibaetis	09020401002	17.33	17.33	9	CG	40.5-I	--	Mayfly
Caenis	09020412040	7.00	7.00	7	CG	22.1-I	--	Mayfly
Corixidae	09020501	0.33	0.33	--	--	--	--	True Bug
Orthotrichia	09020607031	1.67	1.67	--	P	--	--	Caddisfly
Leptoceridae	09020618	0.33	0.33	--	--	--	--	Caddisfly
Oecetis	09020618078	0.33	0.33	8	PR	16.3-S	--	Caddisfly
Anopheles	09021008028	0.33	0.33	--	CF	43-E	--	Fly: Mosquito
Chironomidae	09021011	2.00	0.00	--	--	--	--	Fly: Midge
Ablabesmyia	09021011001	6.33	7.16	8	PR	23.6-I	T	Fly: Midge
Labrundinia	09021011008	0.33	0.38	7	PR	18.1-S	T	Fly: Midge
Procladius	09021011015	0.67	0.75	9	PR	25.1-I	T	Fly: Midge
Cricotopus	09021011037	0.00	0.38	7	SH	43-E	--	Fly: Midge
Cricotopus sylvestris group	09021011037079	0.33	0.00	--	SH	--	--	Fly: Midge
Tanytarsus	09021011076	2.33	2.64	6	CF	25.7-I	Y	Fly: Midge
Chironomus	09021011080	1.00	1.13	10	CG	27.4-I	C	Fly: Midge
Dicrotendipes	09021011085	0.67	0.75	8	CG	28.8-I	C	Fly: Midge
Lauterborniella	09021011092	0.00	2.26	--	CG	17.4-S	C	Fly: Midge
Lauterborniella agrayloides	09021011092001	2.00	0.00	--	--	--	C	Fly: Midge
Microtendipes	09021011094	1.67	1.88	6	CF	22.3-I	C	Fly: Midge
Arachnida	0903	10.67	10.67	--	--	--	--	Arachnid
Arrenurus	09030111001	9.33	9.33	--	--	23.8-I	--	Mite
Gyraulus	10010203029	0.00	1.33	--	SC	37.2-I	--	Snail
Gyraulus deflectus	10010203029056	1.33	0.00	--	--	--	--	Snail
Helisoma	10010203030	14.33	14.33	--	SC	42.8-I	--	Snail

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-300 Trip ID: 2016-300-WET-HSB-1 River Basin: Merrimack
Waterbody: FARRAR MARSH (NH) HUC8 Name:
Town: Not Designated Latitude: 43 10 49.23 N
Mitigation Monitoring Site: No Longitude: 71 54 35.97 W

Sample Information

Sample ID: DN-2016-300-WET-HSB-1 Type of Sample: DIPNET Date Sampled: 8/15/2016
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: B** Date: 5/11/2017
Model Result with P≥0.6: B **Reason for Determination: Model**
Date Last Calculated: 4/19/2017 Comments:

Model Probabilities

First Stage Model

Class A:	0.19	Class C:	0.02
Class B:	0.79	NA:	0.00

B or Better Model

Class A or B	0.98
Class C or Non-Attainment	0.02

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.19
Class B or C or Non-Attainment	0.81

Model Variables

		Reference Range
Total Mean Abundance	347	< 787
Ephemeroptera Abundance	9.67	most > 35
Odonata Relative Abundance	0.000	most > 0.04
Trichoptera Relative Abundance	0.009	most > 0.02
Shredder Taxa Relative Abundance	0.11	< 0.2
Non-insect Taxa Relative Richness	0.19	< 0.4
MTI Sensitive Taxa Abundance	22.54	most > 30
MTI Sensitive Taxa Relative Abundance	0.07	most > 0.05
MTI Sensitive Taxa Richness	8	most > 7
MTI Intermediate Taxa Relative Abundance	0.90	> 0.5
MTI Intermediate Taxa Richness	12	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	2.61	most > 1

Other Variables

Generic Richness:	27
Hilsenhoff Biotic Index:	7.58
Shannon-Weiner Diversity:	3.79
Maine Tolerance Index:	25.07

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	18.85
2	*Chironomidae*	10.58
3	*Ablabesmyia*	9.81
4	*Polypedilum*	9.62
5	*Procladius*	8.27

Sample Collection and Processing Information

Sampling Organization: NHDES
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 8/15/2016 10:40:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	3.18	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	38.3	%	
Surface Water	In-situ	pH	5.23		
Surface Water	In-situ	Specific Conductance	26.2	us/cm	
Surface Water	In-situ	Temperature	24.7	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	7	System:	LACUSTRINE	Landscape Position:	
Hydrologic Modifications:	2	Subsystem:	LITTORAL	Lotic Gradient:	
Vegetative Modifications:	0	Class 1:	UNCONSOLIDATED BOTTOM	Flow Path:	
Chemical Pollutants:	0				
Watershed Characterization and Non-point Sources:	5	Subclass 1:		Land Form:	
		Class 2:		Land Form Type:	
		Subclass 2:		Waterbody Type:	
		Class 3:		Waterbody Subtype:	
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations: SITE 3 WAS MORE VEGETATED; SOLID BRASENIA ON ONE SIDE AND SOLID PONTEDERIA ON THE OTHER.

Habitat Classification:
AQUATIC MACROPHYTE BED
EMERGENT NON-PERSISTENT VEGETATION

Substrate Classification:
DETRITUS SUBSTRATE

Average Depth: 51 cm Visible Flow: Yes Rain In Previous 24 Hours: Yes

Sample Comments:

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Brasenia schreberi	Watershield	LW-34023103001001	6	OBL	FORB/HERB
Pontederia cordata	Pickerelweed	LW-34010906002002	4	OBL	FORB/HERB
Sparganium		LW-34011301001			
Nuphar lutea ssp. variegata	Varigated yellow pond-lily	LW-34023103002002	4	OBL	FORB/HERB
Potamogeton		LW-34011101001			

Additional Summary Variables

Station Number: W-300 Waterbody: FARRAR MARSH (NH) Town: Not Designated

Log Number: DN-2016-300-WET-HSB-1 Subsample Factor: X1 Replicates: 3 Calculated: 4/19/2017

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	12.67	0.037	3	0.11
EPT Taxa:	12.67	0.037	3	0.11
Insects:	276.00	0.796	22	0.81
Non-Insects:	70.67	0.204	5	0.19
Leeches:	0.00	0.000	0	0.00
Oligochaetes:	4.00	0.012	2	0.07
Snails:	1.00	0.003	1	0.04
Bivalves:	0.33	0.001	1	0.04
Isopods:	0.00	0.000	0	0.00
Amphipods:	65.33	0.188	1	0.04
Mites:	0.00	0.000	0	0.00
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	9.67	0.028	1	0.04
Odonates:	0.00	0.000	0	0.00
Caddisflies:	3.00	0.009	2	0.07
Diptera:	263.33	0.760	19	0.70
Hemiptera:	0.00	0.000	0	0.00
Beetles:	0.00	0.000	0	0.00
Chironomids:	240.67	0.694	18	0.67
Tanypodinae Tribe:	90.45	0.261	5	0.19
Chironomiinae Tribe:	143.93	0.415	11	0.41
Orthoclodiinae Tribe:	6.29	0.018	2	0.07
Collector-Filterers:	33.37	0.096	2	0.07
Collector-Gatherers:	144.88	0.418	10	0.37
Predators:	94.59	0.273	7	0.26
Piercers:	2.00	0.006	1	0.04
Shredders:	39.32	0.113	1	0.04
Scrapers:	3.93	0.011	1	0.04
Maine Tolerance:				
Sensitive:	22.54	0.071	8	0.35
Intermediate:	288.14	0.902	12	0.52
Eurytopic:	8.65	0.027	3	0.13
Ratio of MTI Sensitive to Eurytopic	2.61	2.606	2.67	2.67

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-300 Waterbody: FARRAR MARSH (NH) Town: Not Designated

Log Number: DN-2016-300-WET-HSB-1 Subsample Factor: X1 Replicates: 3 Calculated: 4/19/2017

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsenhoff Biotic Index	Functional Feeding Group	Maine Tolerance Index	Tribe	Taxa Group
Naididae	08020202	3.33	3.33	--	--	--	--	Worm
Stylaria	08020202014	0.00	0.67	--	CG	18-S	--	Worm
Stylaria lacustris	08020202014002	0.67	0.00	--	--	--	--	Worm
Hyalella	09010203006	0.00	65.33	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	65.33	0.00	--	--	--	--	Amphipod
Caenis	09020412040	9.67	9.67	7	CG	22.1-I	--	Mayfly
Oxyethira	09020607028	2.00	2.00	3	P	22-S	--	Caddisfly
Oecetis	09020618078	1.00	1.00	8	PR	16.3-S	--	Caddisfly
Ceratopogonidae	09021010	22.67	22.67	--	--	--	--	Fly: Biting Midge
Chironomidae	09021011	36.67	0.00	--	--	--	--	Fly: Midge
Ablabesmyia	09021011001	34.00	40.11	8	PR	23.6-I	T	Fly: Midge
Guttipelopia	09021011006	0.00	1.57	5	PR	19.4-S	T	Fly: Midge
Guttipelopia guttipennis	09021011006018	1.33	0.00	--	--	--	T	Fly: Midge
Labrundinia	09021011008	3.33	3.93	7	PR	18.1-S	T	Fly: Midge
Procladius	09021011015	28.67	33.82	9	PR	25.1-I	T	Fly: Midge
Tanypus	09021011018	9.33	11.01	10	PR	33.5-I	T	Fly: Midge
Corynoneura	09021011036	1.33	1.57	7	CG	40.1-I	--	Fly: Midge
Psectrocladius	09021011056	4.00	4.72	8	CG	22-S	--	Fly: Midge
Cladotanytarsus	09021011068	16.67	19.66	7	CG	22.2-I	Y	Fly: Midge
Paratanytarsus	09021011071	0.67	0.79	6	--	43-E	Y	Fly: Midge
Tanytarsus	09021011076	28.00	33.03	6	CF	25.7-I	Y	Fly: Midge
Pseudochironomus	09021011078	3.33	3.93	5	CG	47.7-E	S	Fly: Midge
Chironomus	09021011080	8.00	9.44	10	CG	27.4-I	C	Fly: Midge
Cladopelma	09021011081	18.67	22.02	9	CG	27.9-I	C	Fly: Midge
Parachironomus	09021011097	2.67	3.15	10	PR	28.6-I	C	Fly: Midge
Phaenopsectra	09021011101	3.33	3.93	7	SC	44.2-E	C	Fly: Midge
Polypedilum	09021011102	33.33	39.32	6	SH	24.2-I	C	Fly: Midge
Tribelos	09021011107	0.00	7.86	5	CG	9.3-S	C	Fly: Midge
Tribelos jucundus	09021011107198	6.67	0.00	--	--	--	C	Fly: Midge
Omisus	09021011130	0.67	0.79	--	--	20.7-S	H	Fly: Midge
Planorbidae	10010203	1.00	1.00	--	--	--	--	Snail
Sphaeriidae	10020201	0.33	0.33	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-277 Trip ID: 2017-277-WET-HUD-1 River Basin:
Waterbody: MUSQUASH POND (NH) HUC8 Name:
Town: Not Designated Latitude: 42 43 10.72 N
Mitigation Monitoring Site: No Longitude: 71 23 46.01 W

Sample Information

Sample ID: DN-2017-277-WET-HUD-1 Type of Sample: DIPNET Date Sampled: 8/7/2017
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination:** Date:
Model Result with P≥0.6: C **Reason for Determination:**
Date Last Calculated: 5/3/2018 Comments:

Model Probabilities

First Stage Model

Class A:	0.00	Class C:	0.98
Class B:	0.02	NA:	0.00

B or Better Model

Class A or B	0.02
Class C or Non-Attainment	0.98

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.00
Class B or C or Non-Attainment	1.00

Model Variables

		Reference Range
Total Mean Abundance	320	< 787
Ephemeroptera Abundance	1.00	most > 35
Odonata Relative Abundance	0.005	most > 0.04
Trichoptera Relative Abundance	0.008	most > 0.02
Shredder Taxa Relative Abundance	0.12	< 0.2
Non-insect Taxa Relative Richness	0.31	< 0.4
MTI Sensitive Taxa Abundance	0.67	most > 30
MTI Sensitive Taxa Relative Abundance	0.00	most > 0.05
MTI Sensitive Taxa Richness	2	most > 7
MTI Intermediate Taxa Relative Abundance	0.86	> 0.5
MTI Intermediate Taxa Richness	11	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	0.02	most > 1

Other Variables

Generic Richness:	29
Hilsenhoff Biotic Index:	8.05
Shannon-Weiner Diversity:	1.75
Maine Tolerance Index:	28.28

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	72.78
2	*Caecidotea*	11.57
3	*Chironomus*	2.50
4	*Chaoborus*	1.98
5	*Donacia*	1.56

Sample Collection and Processing Information

Sampling Organization: NHDES
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 8/7/2017 11:54:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	0.32	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	3.6	%	
Surface Water	In-situ	pH	5.5		
Surface Water	In-situ	Specific Conductance	126.8	us/cm	
Surface Water	In-situ	Temperature	20	deg c	

Landcover Summary - 2004 Data

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	9	System:	LACUSTRINE	Landscape Position:	
Hydrologic Modifications:	0	Subsystem:	LITTORAL	Lotic Gradient:	
Vegetative Modifications:	1	Class 1:	UNCONSOLIDATED SHORE	Flow Path:	THROUGHFLOW
Chemical Pollutants:	0				
Watershed Characterization and Non-point Sources:	8	Subclass 1:	FLOATING VASCULAR	Land Form:	
		Class 2:	EMERGENT	Land Form Type:	
		Subclass 2:	NON-PERSISTENT	Waterbody Type:	POND
		Class 3:	SCRUB SHRUB	Waterbody Subtype:	
		Subclass 3:	PERSISTENT		
				Comments:	BEAVER POND

Dominant Plant Species:

Additional Plant Community Observations: SHORELINE: ACER RUBRUM, PINUS STROBUS, LYTHRUM SALICARIA; VERY DENSE GROWTH OF NYMPHAEA ON POND (LEAVES OVERLAPPING).; SPHAGNUM PRESENT

Habitat Classification:	Substrate Classification:
AQUATIC MACROPHYTE BED	PEAT SUBSTRATE
EMERGENT NON-PERSISTENT VEGETATION	SAND SUBSTRATE
SCRUB SHRUB	SILT/MUCK SUBSTRATE

Average Depth: 69 cm Visible Flow: No Rain In Previous 24 Hours: No

Sample Comments: RAIN IN PAST 3 DAYS; POND SAMPLED IN 2015 BUT EXACT SAMPLING LOCATIONS DIFFER.

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Pontederia cordata	Pickerelweed	LW-34010906002002	4	OBL	FORB/HERB
Proserpinaca palustris	Marsh mermaidweed	LW-34022001002001	5	OBL	FORB/HERB
Scirpus cyperinus	Woolgrass	LW-34010501012003	2	OBL	GRAMINOID
Dulichium arundinaceum	Threeway sedge	LW-34010501005001	5	OBL	GRAMINOID
Myrica gale	Sweetgale	LW-34022801003001	5	OBL	SHRUB
Sparganium americanum	American bur-reed	LW-34011301001001	5	OBL	FORB/HERB
Wolffia brasiliensis	Brazilian watermeal	LW-34010201006002	4	OBL	FORB/HERB
Brasenia schreberi	Watershield	LW-34023103001001	6	OBL	FORB/HERB
Nuphar lutea ssp. variegata	Variegated yellow pond-lily	LW-34023103002002	4	OBL	FORB/HERB
Eriocaulon aquaticum	Sevenangle pipewort	LW-34010601001001	7	OBL	FORB/HERB
Triadenum virginicum	Virginia marsh St. Johnswort	LW-34022601002002	6	OBL	FORB/HERB
Lysimachia terrestris	Earth loosestrife	LW-34023801002009	2	OBL	FORB/HERB
Osmunda regalis	Royal fern	LW-35010305001003	6		FORB/HERB

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Utricularia gibba	Humped bladderwort	LW-34022305002003	6	OBL	FORB/HERB
Juncus		LW-34010801001			
Decodon verticillatus	Swamp loosestrife	LW-34022901001001	6	OBL	SUBSHRUB, SHRUB
Lycopus uniflorus	Northern bugleweed	LW-34022303011002	3	OBL	FORB/HERB
Hypericum		LW-34022601001			
Ceratophyllum demersum	Coon's tail	LW-34023101001001	3	OBL	FORB/HERB
Nymphaea odorata	American white waterlily	LW-34023103003002	5	OBL	FORB/HERB
Eleocharis acicularis	Needle spikerush	LW-34010501006001	4	OBL	GRAMINOID
Lythrum salicaria	Purple loosestrife	LW-34022901002004	0	OBL	FORB/HERB
Spirodela polyrrhiza	Common duckmeal	LW-34010201004001	3	OBL	FORB/HERB
Utricularia macrorhiza	Common bladderwort	LW-34022305002005	3	OBL	FORB/HERB
GALIUM		LW-34024301002			
Potamogeton		LW-34011101001			
Acer rubrum	Red maple	LW-34024603001006	2	FAC	TREE

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Additional Summary Variables

Station Number: W-277 Waterbody: MUSQUASH POND (NH) Town: Not Designated

Log Number: DN-2017-277-WET-HUD-1 Subsample Factor: X1 Replicates: 3 Calculated: 5/3/2018

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	5.33	0.017	4	0.14
EPT Taxa:	3.67	0.011	3	0.10
Insects:	39.33	0.123	20	0.69
Non-Insects:	280.33	0.877	9	0.31
Leeches:	4.67	0.015	2	0.07
Oligochaetes:	0.00	0.000	0	0.00
Snails:	2.67	0.008	3	0.10
Bivalves:	1.00	0.003	1	0.03
Isopods:	37.00	0.116	1	0.03
Amphipods:	232.67	0.728	1	0.03
Mites:	2.33	0.007	1	0.03
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	1.00	0.003	1	0.03
Odonates:	1.67	0.005	1	0.03
Caddisflies:	2.67	0.008	2	0.07
Diptera:	22.33	0.070	8	0.28
Hemiptera:	5.67	0.018	4	0.14
Beetles:	6.00	0.019	4	0.14
Chironomids:	12.33	0.039	6	0.21
Tanypodinae Tribe:	1.67	0.005	2	0.07
Chironomiinae Tribe:	10.33	0.032	3	0.10
Orthoclodiinae Tribe:	0.33	0.001	1	0.03
Collector-Filterers:	1.00	0.003	1	0.03
Collector-Gatherers:	242.00	0.757	4	0.14
Predators:	11.33	0.035	9	0.31
Piercers:	0.33	0.001	1	0.03
Shredders:	38.67	0.121	2	0.07
Scrapers:	1.67	0.005	1	0.03
Maine Tolerance:				
Sensitive:	0.67	0.002	2	0.13
Intermediate:	258.33	0.863	11	0.69
Eurytopic:	40.33	0.135	3	0.19
Ratio of MTI Sensitive to Eurytopic	0.02	0.017	0.67	0.67

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-277 Waterbody: MUSQUASH POND (NH) Town: Not Designated

Log Number: DN-2017-277-WET-HUD-1 Subsample Factor: X1 Replicates: 3 Calculated: 5/3/2018

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
Glossiphoniidae	08030101	1.67	1.67	--	--	--	--	Leech
Helobdella	08030101005	0.00	3.00	--	--	43-E	--	Leech
Helobdella elongata	08030101005001	0.33	0.00	--	--	--	--	Leech
Helobdella modesta	08030101005004	2.67	0.00	--	--	--	--	Leech
Caecidotea	09010101001	37.00	37.00	8	SH	51.9-E	--	Isopod
Hyalella	09010203006	0.00	232.67	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	232.67	0.00	--	--	--	--	Amphipod
Libellulidae	09020306	1.67	1.67	--	--	--	--	Dragonfly/damselfly
Callibaetis	09020401002	1.00	1.00	9	CG	40.5-I	--	Mayfly
Corixidae	09020501	3.67	3.67	--	--	--	--	True Bug
Pelocoris	09020504013	1.00	1.00	--	PR	24.7-I	--	True Bug
Notonecta	09020505015	0.67	0.67	--	PR	--	--	True Bug
Neoplea	09020512016	0.33	0.33	--	PR	35.5-I	--	True Bug
Polycentropus	09020603010	0.33	0.33	6	PR	15.4-S	--	Caddisfly
Leptoceridae	09020618	2.33	2.33	--	--	--	--	Caddisfly
Chaoborus	09021007025	6.33	6.33	8	PR	25-I	--	Fly: Phantom Midge
Ceratopogonidae	09021010	3.67	3.67	--	--	--	--	Fly: Biting Midge
Ablabesmyia	09021011001	1.33	1.33	8	PR	23.6-I	T	Fly: Midge
Labrundinia	09021011008	0.33	0.33	7	PR	18.1-S	T	Fly: Midge
Corynoneura	09021011036	0.33	0.33	7	CG	40.1-I	--	Fly: Midge
Chironomus	09021011080	8.00	8.00	10	CG	27.4-I	C	Fly: Midge
Parachironomus	09021011097	0.67	0.67	10	PR	28.6-I	C	Fly: Midge
Polypedilum	09021011102	1.67	1.67	6	SH	24.2-I	C	Fly: Midge
Peltodytes	09021101002	0.33	0.33	--	P	56.2-E	--	Beetle
Dytiscidae	09021103	0.33	0.33	--	--	--	--	Beetle
Celina	09021103012	0.33	0.33	--	PR	--	--	Beetle
Donacia	09021114071	5.00	5.00	--	--	25.1-I	--	Beetle
Hydrachnidia	09030101	2.33	2.33	--	--	--	--	Mite
Hydrobiidae	10010104	0.67	0.67	--	--	--	--	Snail
Lymnaeidae	10010201	0.33	0.33	--	--	--	--	Snail
Physidae	10010202	1.67	1.67	--	SC	--	--	Snail
Sphaeriidae	10020201	1.00	1.00	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-278 Trip ID: 2015-278-WET-JAF-1 River Basin: Merrimack
Waterbody: CONTOOCOOK RIVER WETLAND (NH) HUC8 Name:
Town: Not Designated Latitude: 42 48 35.94 N
Mitigation Monitoring Site: No Longitude: 72 1 27.96 W

Sample Information

Sample ID: DN-2015-278-WET-JAF-1 Type of Sample: DIPNET Date Sampled: 7/22/2015
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: B** Date: 10/25/2016
Model Result with P≥0.6: B **Reason for Determination: Model**
Date Last Calculated: 8/26/2016 Comments:

Model Probabilities

First Stage Model

Class A:	0.29	Class C:	0.00
Class B:	0.71	NA:	0.00

B or Better Model

Class A or B	1.00
Class C or Non-Attainment	0.00

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.29
Class B or C or Non-Attainment	0.71

Model Variables

		Reference Range
Total Mean Abundance	393	< 787
Ephemeroptera Abundance	40.33	most > 35
Odonata Relative Abundance	0.008	most > 0.04
Trichoptera Relative Abundance	0.047	most > 0.02
Shredder Taxa Relative Abundance	0.07	< 0.2
Non-insect Taxa Relative Richness	0.32	< 0.4
MTI Sensitive Taxa Abundance	32.01	most > 30
MTI Sensitive Taxa Relative Abundance	0.14	most > 0.05
MTI Sensitive Taxa Richness	7	most > 7
MTI Intermediate Taxa Relative Abundance	0.76	> 0.5
MTI Intermediate Taxa Richness	21	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	1.25	most > 1

Other Variables

Generic Richness:	38
Hilsenhoff Biotic Index:	7.37
Shannon-Weiner Diversity:	3.55
Maine Tolerance Index:	27.33

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	25.61
2	*Pisidium*	19.76
3	*Hydrobiidae*	14.08
4	*Caenis*	8.82
5	*Caecidotea communis*	6.45

Sample Collection and Processing Information

Sampling Organization: SDM
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 7/22/2015 11:35:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	4.35	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	54.7	%	
Surface Water	In-situ	pH	5.78		
Surface Water	In-situ	Specific Conductance	103.8	us/cm	
Surface Water	In-situ	Temperature	26.2	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	18	System:	PALUSTRINE	Landscape Position:	
Hydrologic Modifications:	4	Subsystem:		Lotic Gradient:	
Vegetative Modifications:	5	Class 1:	UNCONSOLIDATED BOTTOM	Flow Path:	
Chemical Pollutants:	1				
Watershed Characterization and Non-point Sources:	8	Subclass 1:	FLOATING VASCULAR	Land Form:	
		Class 2:	SCRUB SHRUB	Land Form Type:	
		Subclass 2:		Waterbody Type:	
		Class 3:	EMERGENT	Waterbody Subtype:	
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations:

Habitat Classification:
AQUATIC MACROPHYTE BED
EMERGENT NON-PERSISTENT VEGETATION
OPEN WATER FLOWING

Substrate Classification:
GRAVEL SUBSTRATE

Average Depth: 58 cm Visible Flow: Yes Rain In Previous 24 Hours: No

Sample Comments:

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Sparganium		LW-34011301001			
Myriophyllum heterophyllum	Twoleaf watermilfoil	LW-34022001001003	0	OBL	FORB/HERB
Brasenia schreberi	Watershield	LW-34023103001001	6	OBL	FORB/HERB
Nymphaea odorata	American white waterlily	LW-34023103003002	5	OBL	FORB/HERB
Potamogeton		LW-34011101001			
Glyceria canadensis	Rattlesnake mannagrass	LW-34010502036003	4	OBL	GRAMINOID
Utricularia purpurea	Eastern purple bladderwort	LW-34022305002007	5	OBL	FORB/HERB
Utricularia macrorhiza	Common bladderwort	LW-34022305002005	3	OBL	FORB/HERB
Acer saccharinum	Silver maple	LW-34024603001008	6	FACW	TREE
Pontederia cordata	Pickerelweed	LW-34010906002002	4	OBL	FORB/HERB
Frangula alnus	Glossy buckthorn	LW-34024102002002	0	FAC	TREE SHRUB
Juncus effusus	Common rush	LW-34010801001016	2	OBL	GRAMINOID
Eleocharis		LW-34010501006			
Najas		LW-34010701003			
Acer rubrum	Red maple	LW-34024603001006	2	FAC	TREE

Additional Summary Variables

Station Number: W-278 Waterbody: CONTOOCOOK RIVER WETLAND (NH) Town: Not Designated

Log Number: DN-2015-278-WET-JAF-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/26/2016

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	62.33	0.159	9	0.24
EPT Taxa:	59.00	0.150	5	0.13
Insects:	102.67	0.261	26	0.68
Non-Insects:	290.33	0.739	12	0.32
Leeches:	2.67	0.007	1	0.03
Oligochaetes:	6.33	0.016	1	0.03
Snails:	64.67	0.165	5	0.13
Bivalves:	83.33	0.212	2	0.05
Isopods:	25.33	0.064	1	0.03
Amphipods:	100.67	0.256	1	0.03
Mites:	7.33	0.019	1	0.03
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	40.33	0.103	2	0.05
Odonates:	3.33	0.008	4	0.11
Caddisflies:	18.67	0.047	3	0.08
Diptera:	24.33	0.062	10	0.26
Hemiptera:	9.00	0.023	3	0.08
Beetles:	6.67	0.017	3	0.08
Chironomids:	23.67	0.060	9	0.24
Tanypodinae Tribe:	6.86	0.017	3	0.08
Chironomiinae Tribe:	16.81	0.043	6	0.16
Orthoclodiinae Tribe:	0.00	0.000	0	0.00
Collector-Filterers:	91.22	0.232	4	0.11
Collector-Gatherers:	153.51	0.391	7	0.18
Predators:	21.55	0.055	12	0.32
Piercers:	15.97	0.041	3	0.08
Shredders:	28.41	0.072	3	0.08
Scrapers:	6.00	0.015	3	0.08
Maine Tolerance:				
Sensitive:	32.01	0.136	7	0.23
Intermediate:	178.32	0.756	21	0.70
Eurytopic:	25.67	0.109	2	0.07
Ratio of MTI Sensitive to Eurytopic	1.25	1.247	3.50	3.50

Aquatic Life Taxonomic Inventory Report

Station Number: W-278 Waterbody: CONTOOCOOK RIVER WETLAND (NH) Town: Not Designated

Log Number: DN-2015-278-WET-JAF-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/26/2016

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsenhoff Biotic Index	Functional Feeding Group	Maine Tolerance Index	Tribe	Taxa Group
Stylaria	08020202014	6.33	6.33	--	CG	18-S	--	Worm
Erpobdella	08030203002	0.00	2.67	--	--	36.4-I	--	Leech
Erpobdella punctata	08030203002001	2.67	0.00	--	--	--	--	Leech
Caecidotea	09010101001	0.00	25.33	8	SH	51.9-E	--	Isopod
Caecidotea communis	09010101001001	25.33	0.00	--	--	--	--	Isopod
Hyalella	09010203006	0.00	100.67	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	100.67	0.00	--	--	--	--	Amphipod
Aeshna	09020301001	0.33	0.33	5	PR	27.9-I	--	Dragonfly/damselfly
Libellulidae	09020306	1.67	1.67	--	--	--	--	Dragonfly/damselfly
Lestes	09020308045	0.33	0.33	9	PR	32.6-I	--	Dragonfly/damselfly
Enallagma	09020309051	1.00	1.00	9	PR	26.2-I	--	Dragonfly/damselfly
Callibaetis	09020401002	5.67	5.67	9	CG	40.5-I	--	Mayfly
Caenis	09020412040	34.67	34.67	7	CG	22.1-I	--	Mayfly
Corixidae	09020501	4.00	0.00	--	--	--	--	True Bug
Hesperocorixa	09020501004	0.33	0.64	--	P	--	--	True Bug
Trichocorixa	09020501008	4.00	7.69	--	PR	--	--	True Bug
Neoplea	09020512016	0.67	0.67	--	PR	35.5-I	--	True Bug
Polycentropus	09020603010	2.00	2.00	6	PR	15.4-S	--	Caddisfly
Oxyethira	09020607028	15.00	15.00	3	P	22-S	--	Caddisfly
Oecetis	09020618078	1.67	1.67	8	PR	16.3-S	--	Caddisfly
Parapoynx	09020901002	0.33	0.33	5	SH	--	--	Moth
Bezzia/palpomyia	09021010043	0.67	0.67	6	PR	26.9-I	--	Fly: Biting Midge
Chironomidae	09021011	0.67	0.00	--	--	--	--	Fly: Midge
Ablabesmyia	09021011001	5.00	5.14	8	PR	23.6-I	T	Fly: Midge
Labrundinia	09021011008	0.33	0.34	7	PR	18.1-S	T	Fly: Midge
Procladius	09021011015	1.33	1.37	9	PR	25.1-I	T	Fly: Midge
Tanytarsus	09021011076	6.67	6.86	6	CF	25.7-I	Y	Fly: Midge
Chironomus	09021011080	0.33	0.34	10	CG	27.4-I	C	Fly: Midge
Cladopelma	09021011081	4.67	4.80	9	CG	27.9-I	C	Fly: Midge
Dicrotendipes	09021011085	1.00	1.03	8	CG	28.8-I	C	Fly: Midge
Microtendipes	09021011094	1.00	1.03	6	CF	22.3-I	C	Fly: Midge
Polypedilum	09021011102	2.67	2.74	6	SH	24.2-I	C	Fly: Midge
Peltodytes	09021101002	0.33	0.33	--	P	56.2-E	--	Beetle
Agabus	09021103016	0.33	0.33	--	PR	34.5-I	--	Beetle
Dubiraphia	09021113064	6.00	6.00	6	--	10.4-S	--	Beetle

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-278 Waterbody: CONTOOCOOK RIVER WETLAND (NH) Town: Not Designated

Log Number: DN-2015-278-WET-JAF-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/26/2016

Taxon	Maine Taxonomic Code	Count (Mean of Samples)		Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
		Actual	Adjusted					
Arachnida	0903	4.67	4.67	--	--	--	--	Arachnid
Arrenurus	09030111001	2.67	2.67	--	--	23.8-I	--	Mite
Hydrobiidae	10010104	55.33	55.33	--	--	--	--	Snail
Amnicola	10010104013	0.67	0.67	--	SC	18.7-S	--	Snail
Lymnaeidae	10010201	3.33	3.33	--	--	--	--	Snail
Gyraulus	10010203029	0.00	2.00	--	SC	37.2-I	--	Snail
Gyraulus deflectus	10010203029056	2.00	0.00	--	--	--	--	Snail
Helisoma	10010203030	3.33	3.33	--	SC	42.8-I	--	Snail
Sphaeriidae	10020201	5.67	5.67	--	CF	--	--	Clam
Pisidium	10020201002	77.67	77.67	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-318 Trip ID: 2017-318-WET-KIN-1 River Basin:
Waterbody: POWWOW RIVER (NH) HUC8 Name:
Town: Not Designated Latitude: 42 54 44.73 N
Mitigation Monitoring Site: No Longitude: 71 2 58.75 W

Sample Information

Sample ID: DN-2017-318-WET-KIN-1 Type of Sample: DIPNET Date Sampled: 7/31/2017
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination:** Date:
Model Result with P≥0.6: C **Reason for Determination:**
Date Last Calculated: 5/8/2018 Comments:

Model Probabilities

First Stage Model

Class A:	0.00	Class C:	0.49
Class B:	0.51	NA:	0.00

B or Better Model

Class A or B	0.51
Class C or Non-Attainment	0.49

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.00
Class B or C or Non-Attainment	1.00

Model Variables

		Reference Range
Total Mean Abundance	470	< 787
Ephemeroptera Abundance	44.33	most > 35
Odonata Relative Abundance	0.023	most > 0.04
Trichoptera Relative Abundance	0.024	most > 0.02
Shredder Taxa Relative Abundance	0.11	< 0.2
Non-insect Taxa Relative Richness	0.39	< 0.4
MTI Sensitive Taxa Abundance	13.33	most > 30
MTI Sensitive Taxa Relative Abundance	0.03	most > 0.05
MTI Sensitive Taxa Richness	4	most > 7
MTI Intermediate Taxa Relative Abundance	0.85	> 0.5
MTI Intermediate Taxa Richness	11	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	0.25	most > 1

Other Variables

Generic Richness:	33
Hilsenhoff Biotic Index:	7.87
Shannon-Weiner Diversity:	2.01
Maine Tolerance Index:	27.43

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	66.76
2	*Caecidotea*	11.06
3	*Caenis*	9.14
4	*Hydrobiidae*	1.63
5	*Enallagma*	1.56

Sample Collection and Processing Information

Sampling Organization: NHDES
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 7/31/2017 10:00:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	0.54	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	6.1	%	
Surface Water	In-situ	pH	5.57		
Surface Water	In-situ	Specific Conductance	204	us/cm	
Surface Water	In-situ	Temperature	19.5	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	15	System:	LACUSTRINE	Landscape Position:	
Hydrologic Modifications:	3	Subsystem:	LITTORAL	Lotic Gradient:	
Vegetative Modifications:	2	Class 1:	AQUATIC BED	Flow Path:	THROUGHFLOW
Chemical Pollutants:	0	Subclass 1:	FLOATING VASCULAR	Land Form:	
Watershed Characterization and Non-point Sources:	10	Class 2:	EMERGENT	Land Form Type:	
		Subclass 2:	NON-PERSISTENT	Waterbody Type:	LAKE
		Class 3:		Waterbody Subtype:	
		Subclass 3:			
				Comments:	NATURAL LAKE

Dominant Plant Species:

Additional Plant Community Observations: CLETHRA ALNIFOLIA (SWEET PEPPERBUSH) IN BLOOM WITHIN BUFFER

Habitat Classification:
AQUATIC MACROPHYTE BED
EMERGENT NON-PERSISTENT VEGETATION

Substrate Classification:
SAND SUBSTRATE
SILT/MUCK SUBSTRATE

Average Depth: 62 cm Visible Flow: No Rain In Previous 24 Hours: No

Sample Comments: WATER QC SAMPLES COLLECTED; SAW BLUE HERON CATCHING AND EATING FISH

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Potamogeton natans	Floating pondweed	LW-34011101001009	5	OBL	FORB/HERB
Utricularia macrorhiza	Common bladderwort	LW-34022305002005	3	OBL	FORB/HERB
Nymphaea odorata	American white waterlily	LW-34023103003002	5	OBL	FORB/HERB
Eleocharis		LW-34010501006			
Najas		LW-34010701003			
Pontederia cordata	Pickerelweed	LW-34010906002002	4	OBL	FORB/HERB
Potamogeton		LW-34011101001			
Schoenoplectus subterminalis	Swaying bulrush	LW-34010501011010	6	OBL	GRAMINOID
Sparganium		LW-34011301001			
Brasenia schreberi	Watershield	LW-34023103001001	6	OBL	FORB/HERB
Utricularia purpurea	Eastern purple bladderwort	LW-34022305002007	5	OBL	FORB/HERB
Typha latifolia	Broadleaf cattail	LW-34011301002002	2	OBL	FORB/HERB

Additional Summary Variables

Station Number: W-318 Waterbody: POWWOW RIVER (NH) Town: Not Designated

Log Number: DN-2017-318-WET-KIN-1 Subsample Factor: X1 Replicates: 3 Calculated: 5/8/2018

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	66.67	0.142	9	0.27
EPT Taxa:	55.67	0.118	5	0.15
Insects:	82.33	0.175	20	0.61
Non-Insects:	388.00	0.825	13	0.39
Leeches:	3.00	0.006	2	0.06
Oligochaetes:	2.00	0.004	1	0.03
Snails:	10.33	0.022	3	0.09
Bivalves:	2.67	0.006	1	0.03
Isopods:	52.00	0.111	1	0.03
Amphipods:	314.00	0.668	1	0.03
Mites:	3.00	0.006	2	0.06
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	44.33	0.094	2	0.06
Odonates:	11.00	0.023	4	0.12
Caddisflies:	11.33	0.024	3	0.09
Diptera:	11.00	0.023	6	0.18
Hemiptera:	2.67	0.006	3	0.09
Beetles:	0.00	0.000	0	0.00
Chironomids:	9.67	0.021	5	0.15
Tanypodinae Tribe:	6.00	0.013	1	0.03
Chironomiinae Tribe:	3.67	0.008	4	0.12
Orthoclodiinae Tribe:	0.00	0.000	0	0.00
Collector-Filterers:	3.67	0.008	2	0.06
Collector-Gatherers:	362.67	0.771	6	0.18
Predators:	25.33	0.054	8	0.24
Piercers:	1.67	0.004	1	0.03
Shredders:	53.00	0.113	2	0.06
Scrapers:	2.67	0.006	2	0.06
Maine Tolerance:				
Sensitive:	13.33	0.030	4	0.22
Intermediate:	377.33	0.850	11	0.61
Eurytopic:	53.33	0.120	3	0.17
Ratio of MTI Sensitive to Eurytopic	0.25	0.250	1.33	1.33

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-318 Waterbody: POWWOW RIVER (NH) Town: Not Designated

Log Number: DN-2017-318-WET-KIN-1 Subsample Factor: X1 Replicates: 3 Calculated: 5/8/2018

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Count (Mean of Samples) Adjusted	Hilsenhoff Biotic Index	Functional Feeding Group	Maine Tolerance Index	Tribe	Taxa Group
Hydra	02010101001	0.33	0.33	--	PR	--	--	Hydroid
Platyhelminthes	03	0.67	0.67	--	--	--	--	Flat Worm
Stylaria	08020202014	0.00	2.00	--	CG	18-S	--	Worm
Stylaria lacustris	08020202014002	2.00	0.00	--	--	--	--	Worm
Glossiphoniidae	08030101	2.00	2.00	--	--	--	--	Leech
Helobdella	08030101005	0.00	1.00	--	--	43-E	--	Leech
Helobdella modesta	08030101005004	1.00	0.00	--	--	--	--	Leech
Caecidotea	09010101001	52.00	52.00	8	SH	51.9-E	--	Isopod
Hyalella	09010203006	0.00	314.00	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	314.00	0.00	--	--	--	--	Amphipod
Sminthuridae	09020104	1.00	1.00	--	--	--	--	Collembola
Aeshnidae	09020301	0.33	0.33	--	--	--	--	Dragonfly/damselfly
Anax	09020301002	0.00	1.00	8	PR	--	--	Dragonfly/damselfly
Anax junius	09020301002008	1.00	0.00	--	--	--	--	Dragonfly/damselfly
Libellulidae	09020306	2.33	2.33	--	--	--	--	Dragonfly/damselfly
Enallagma	09020309051	7.33	7.33	9	PR	26.2-I	--	Dragonfly/damselfly
Callibaetis	09020401002	1.33	1.33	9	CG	40.5-I	--	Mayfly
Caenis	09020412040	43.00	43.00	7	CG	22.1-I	--	Mayfly
Corixidae	09020501	1.67	1.67	--	--	--	--	True Bug
Notonecta	09020505015	0.67	0.67	--	PR	--	--	True Bug
Neoplea	09020512016	0.33	0.33	--	PR	35.5-I	--	True Bug
Polycentropus	09020603010	5.33	5.33	6	PR	15.4-S	--	Caddisfly
Oxyethira	09020607028	1.67	1.67	3	P	22-S	--	Caddisfly
Oecetis	09020618078	4.33	4.33	8	PR	16.3-S	--	Caddisfly
Parapoynx	09020901002	1.00	1.00	5	SH	--	--	Moth
Ceratopogonidae	09021010	1.33	1.33	--	--	--	--	Fly: Biting Midge
Ablabesmyia	09021011001	6.00	6.00	8	PR	23.6-I	T	Fly: Midge
Paratanytarsus	09021011071	0.33	0.33	6	--	43-E	Y	Fly: Midge
Tanytarsus	09021011076	1.00	1.00	6	CF	25.7-I	Y	Fly: Midge
Chironomus	09021011080	1.67	1.67	10	CG	27.4-I	C	Fly: Midge
Dicrotendipes	09021011085	0.67	0.67	8	CG	28.8-I	C	Fly: Midge
Hydrachnidia	09030101	2.33	2.33	--	--	--	--	Mite
Arrenurus	09030111001	0.67	0.67	--	--	23.8-I	--	Mite
Hydrobiidae	10010104	7.67	7.67	--	--	--	--	Snail
Physidae	10010202	1.33	1.33	--	SC	--	--	Snail

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-318 Waterbody: POWWOW RIVER (NH) Town: Not Designated

Log Number: DN-2017-318-WET-KIN-1 Subsample Factor: X1 Replicates: 3 Calculated: 5/8/2018

Taxon	Maine Taxonomic Code	Count (Mean of Samples)		Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
		Actual	Adjusted					
Gyraulus	10010203029	1.33	1.33	--	SC	37.2-I	--	Snail
Sphaeriidae	10020201	2.67	2.67	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-279 Trip ID: 2015-279-WET-MAN-1 River Basin: Merrimack
Waterbody: RAIL TRAIL MARSH (NH) HUC8 Name: Merrimack River
Town: Not Designated Latitude: 42 59 58.08 N
Mitigation Monitoring Site: No Longitude: 71 23 48.12 W

Sample Information

Sample ID: DN-2015-279-WET-MAN-1 Type of Sample: DIPNET Date Sampled: 7/14/2015
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: C** Date: 10/25/2016
Model Result with P≥0.6: C **Reason for Determination: Model**
Date Last Calculated: 8/26/2016 Comments:

Model Probabilities

First Stage Model

Class A:	0.00	Class C:	0.60
Class B:	0.00	NA:	0.40

B or Better Model

Class A or B	0.00
Class C or Non-Attainment	1.00

C or Better Model

Class A, B, or C	0.60
Non-Attainment	0.40

A Model

Class A	0.00
Class B or C or Non-Attainment	1.00

Model Variables

		Reference Range
Total Mean Abundance	63	< 787
Ephemeroptera Abundance	0.33	most > 35
Odonata Relative Abundance	0.000	most > 0.04
Trichoptera Relative Abundance	0.000	most > 0.02
Shredder Taxa Relative Abundance	0.07	< 0.2
Non-insect Taxa Relative Richness	0.47	< 0.4
MTI Sensitive Taxa Abundance	0.00	most > 30
MTI Sensitive Taxa Relative Abundance	0.00	most > 0.05
MTI Sensitive Taxa Richness	0	most > 7
MTI Intermediate Taxa Relative Abundance	0.68	> 0.5
MTI Intermediate Taxa Richness	7	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	0.00	most > 1

Other Variables

Generic Richness:	19
Hilsenhoff Biotic Index:	9.29
Shannon-Weiner Diversity:	2.81
Maine Tolerance Index:	44.14

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Sphaeriidae*	40.21
2	*Culicoides*	23.81
3	*Caecidotea communis*	7.41
4	*Naididae*	6.35
5	*Lumbriculidae*	4.23
5	*Natarsia*	4.23

Sample Collection and Processing Information

Sampling Organization: SC, JP, SM
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 7/14/2015 11:18:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	1.52	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	17.3	%	
Surface Water	In-situ	pH	6.37		
Surface Water	In-situ	Specific Conductance	492	us/cm	
Surface Water	In-situ	Temperature	21.9	deg c	

Landcover Summary - 2004 Data

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	25	System:	PALUSTRINE	Landscape Position:	
Hydrologic Modifications:	7	Subsystem:		Lotic Gradient:	
Vegetative Modifications:	4	Class 1:	EMERGENT	Flow Path:	
Chemical Pollutants:	2	Subclass 1:	PERSISTENT	Land Form:	
Watershed Characterization and Non-point Sources:	12	Class 2:	EMERGENT	Land Form Type:	
		Subclass 2:	NON-PERSISTENT	Waterbody Type:	
		Class 3:	SCRUB SHRUB	Waterbody Subtype:	
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations:

Habitat Classification:
EMERGENT NON-PERSISTENT VEGETATION
EMERGENT PERSISTENT VEGETATION
OPEN WATER STANDING

Substrate Classification:
CLAY SUBSTRATE
ORGANIC SOIL SUBSTRATE
SAND SUBSTRATE
SILT/MUCK SUBSTRATE

Average Depth: 35 cm Visible Flow: No Rain In Previous 24 Hours: Yes

Sample Comments:

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Proserpinaca palustris	Marsh mermaidweed	LW-34022001002001	5	OBL	FORB/HERB
Acer rubrum	Red maple	LW-34024603001006	2	FAC	TREE
Lythrum salicaria	Purple loosestrife	LW-34022901002004	0	OBL	FORB/HERB
Frangula alnus	Glossy buckthorn	LW-34024102002002	0	FAC	TREE SHRUB
Eleocharis		LW-34010501006			
Sagittaria		LW-34011401002			
Pontederia cordata	Pickerelweed	LW-34010906002002	4	OBL	FORB/HERB
Asclepias		LW-34021801002			
Lemna		LW-34010201002			
Carex		LW-34010501002			
Sparganium		LW-34011301001			
Rosa palustris	Swamp rose	LW-34024202020012	4	OBL	SUBSHRUB
Spiraea tomentosa	Steeplebush	LW-34024202026005	3	FACW	SHRUB
Typha		LW-34011301002			
Cornus		LW-34021001001			
Alnus		LW-34021701001			
Carex comosa	Longhair sedge	LW-34010501002039	6	OBL	GRAMINOID

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Additional Summary Variables

Station Number: W-279 Waterbody: RAIL TRAIL MARSH (NH) Town: Not Designated

Log Number: DN-2015-279-WET-MAN-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/26/2016

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	0.33	0.005	1	0.05
EPT Taxa:	0.33	0.005	1	0.05
Insects:	23.00	0.365	10	0.53
Non-Insects:	40.00	0.635	9	0.47
Leeches:	0.00	0.000	0	0.00
Oligochaetes:	6.67	0.106	2	0.11
Snails:	2.67	0.042	3	0.16
Bivalves:	25.33	0.402	1	0.05
Isopods:	4.67	0.074	1	0.05
Amphipods:	0.33	0.005	1	0.05
Mites:	0.33	0.005	1	0.05
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	0.33	0.005	1	0.05
Odonates:	0.00	0.000	0	0.00
Caddisflies:	0.00	0.000	0	0.00
Diptera:	18.67	0.296	4	0.21
Hemiptera:	0.00	0.000	0	0.00
Beetles:	4.00	0.063	5	0.26
Chironomids:	3.00	0.048	2	0.11
Tanypodinae Tribe:	2.67	0.042	1	0.05
Chironomiinae Tribe:	0.00	0.000	0	0.00
Orthoclodiinae Tribe:	0.33	0.005	1	0.05
Collector-Filterers:	25.33	0.402	1	0.05
Collector-Gatherers:	2.00	0.032	5	0.26
Predators:	19.67	0.312	4	0.21
Piercers:	0.67	0.011	1	0.05
Shredders:	4.67	0.074	1	0.05
Scrapers:	0.33	0.005	1	0.05
Maine Tolerance:				
Sensitive:	0.00	0.000	0	0.00
Intermediate:	17.33	0.684	7	0.70
Eurytopic:	8.00	0.316	3	0.30
Ratio of MTI Sensitive to Eurytopic	0.00	0.000	0.00	0.00

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-279 Waterbody: RAIL TRAIL MARSH (NH) Town: Not Designated

Log Number: DN-2015-279-WET-MAN-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/26/2016

Taxon	Maine Taxonomic Code	Count (Mean of Samples)		Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
		Actual	Adjusted					
Lumbriculidae	08020101	2.67	2.67	--	--	--	--	Worm
Naididae	08020202	4.00	4.00	--	--	--	--	Worm
Caecidotea	09010101001	0.00	4.67	8	SH	51.9-E	--	Isopod
Caecidotea communis	09010101001001	4.67	0.00	--	--	--	--	Isopod
Hyalella	09010203006	0.00	0.33	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	0.33	0.00	--	--	--	--	Amphipod
Callibaetis	09020401002	0.33	0.33	9	CG	40.5-I	--	Mayfly
Mansonia	09021008033	0.67	0.67	--	CG	42.2-I	--	Fly: Mosquito
Culicoides	09021010037	15.00	15.00	10	PR	42.1-I	--	Fly: Biting Midge
Natarsia	09021011011	2.67	2.67	8	PR	43.6-E	T	Fly: Midge
Corynoneura	09021011036	0.33	0.33	7	CG	40.1-I	--	Fly: Midge
Haliplus	09021101001	0.67	0.67	--	P	67.1-E	--	Beetle
Hydrovatus	09021103007	1.33	1.33	--	PR	--	--	Beetle
Celina	09021103012	0.67	0.67	--	PR	--	--	Beetle
Enochrus	09021105044	0.33	0.33	--	CG	--	--	Beetle
Scirtidae	09021107	1.00	1.00	--	--	--	--	Beetle
Arrenurus	09030111001	0.33	0.33	--	--	23.8-I	--	Mite
Hydrobiidae	10010104	0.67	0.67	--	--	--	--	Snail
Lymnaeidae	10010201	1.67	1.67	--	--	--	--	Snail
Gyraulus	10010203029	0.00	0.33	--	SC	37.2-I	--	Snail
Gyraulus deflectus	10010203029056	0.33	0.00	--	--	--	--	Snail
Sphaeriidae	10020201	25.33	25.33	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-280 Trip ID: 2015-280-WET-MAN-2 River Basin: Merrimack
Waterbody: JOSEPH STREET POND (NH) HUC8 Name: Merrimack River
Town: Not Designated Latitude: 43 0 30.37 N
Mitigation Monitoring Site: No Longitude: 71 29 44.75 W

Sample Information

Sample ID: DN-2015-280-WET-MAN-2 Type of Sample: DIPNET Date Sampled: 7/30/2015
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: I** Date: 10/25/2016
Model Result with P≥0.6: I **Reason for Determination: Model**
Date Last Calculated: 8/26/2016 Comments: Minimum provisions for Total Mean Abundance and Generic Richness not met.

Model Probabilities

First Stage Model

Class A:	0.00	Class C:	0.99
Class B:	0.01	NA:	0.00

B or Better Model

Class A or B	0.01
Class C or Non-Attainment	0.99

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.00
Class B or C or Non-Attainment	1.00

Model Variables

		Reference Range
Total Mean Abundance	20	< 787
Ephemeroptera Abundance	4.00	most > 35
Odonata Relative Abundance	0.133	most > 0.04
Trichoptera Relative Abundance	0.000	most > 0.02
Shredder Taxa Relative Abundance	0.02	< 0.2
Non-insect Taxa Relative Richness	0.00	< 0.4
MTI Sensitive Taxa Abundance	0.33	most > 30
MTI Sensitive Taxa Relative Abundance	0.02	most > 0.05
MTI Sensitive Taxa Richness	1	most > 7
MTI Intermediate Taxa Relative Abundance	0.93	> 0.5
MTI Intermediate Taxa Richness	10	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	0.33	most > 1

Other Variables

Generic Richness:	12
Hilsenhoff Biotic Index:	7.75
Shannon-Weiner Diversity:	3.08
Maine Tolerance Index:	25.96

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Caenis*	20.00
2	*Procladius*	16.67
2	*Tanytarsus*	16.67
3	*Enallagma*	13.33
4	*Dicrotendipes*	11.67
5	*Chironomus*	8.33

Sample Collection and Processing Information

Sampling Organization: JP
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 7/30/2015 10:05:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	3.15	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	38.7	%	
Surface Water	In-situ	pH	5.74		
Surface Water	In-situ	Specific Conductance	556	us/cm	
Surface Water	In-situ	Temperature	26.6	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	19	System:	PALUSTRINE	Landscape Position:	
Hydrologic Modifications:	3	Subsystem:		Lotic Gradient:	
Vegetative Modifications:	3	Class 1:	UNCONSOLIDATED BOTTOM	Flow Path:	
Chemical Pollutants:	6				
Watershed Characterization and Non-point Sources:	7	Subclass 1:	FLOATING VASCULAR	Land Form:	
		Class 2:	EMERGENT	Land Form Type:	
		Subclass 2:		Waterbody Type:	
		Class 3:		Waterbody Subtype:	
		Subclass 3:	NON-PERSISTENT		
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations: UPLAND BUFFER HAS INVASIVES

Habitat Classification:
AQUATIC MACROPHYTE BED
OPEN WATER STANDING

Substrate Classification:
SILT/MUCK SUBSTRATE

Average Depth: 65 cm Visible Flow: No Rain In Previous 24 Hours: No

Sample Comments: POND HAS NO SURFACE WATER INFLOW OR OUTLET; ONE GOLDFISH OBSERVED SWIMMING IN POND

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Sparganium		LW-34011301001			
Utricularia gibba	Humped bladderwort	LW-34022305002003	6	OBL	FORB/HERB
Eleocharis obtusa	Blunt spikerush	LW-34010501006010	2	OBL	GRAMINOID
Potamogeton		LW-34011101001			
Haloragaceae		LW-34022001			
Triadenum		LW-34022601002			
Carex		LW-34010501002			

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Additional Summary Variables

Station Number: W-280 Waterbody: JOSEPH STREET POND (NH) Town: Not Designated

Log Number: DN-2015-280-WET-MAN-2 Subsample Factor: X1 Replicates: 3 Calculated: 8/26/2016

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	6.67	0.333	2	0.17
EPT Taxa:	4.00	0.200	1	0.08
Insects:	20.00	1.000	12	1.00
Non-Insects:	0.00	0.000	0	0.00
Leeches:	0.00	0.000	0	0.00
Oligochaetes:	0.00	0.000	0	0.00
Snails:	0.00	0.000	0	0.00
Bivalves:	0.00	0.000	0	0.00
Isopods:	0.00	0.000	0	0.00
Amphipods:	0.00	0.000	0	0.00
Mites:	0.00	0.000	0	0.00
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	4.00	0.200	1	0.08
Odonates:	2.67	0.133	1	0.08
Caddisflies:	0.00	0.000	0	0.00
Diptera:	13.33	0.667	10	0.83
Hemiptera:	0.00	0.000	0	0.00
Beetles:	0.00	0.000	0	0.00
Chironomids:	13.33	0.667	10	0.83
Tanypodinae Tribe:	3.67	0.183	2	0.17
Chironomiinae Tribe:	9.67	0.483	8	0.67
Orthoclodiinae Tribe:	0.00	0.000	0	0.00
Collector-Filterers:	3.33	0.167	1	0.08
Collector-Gatherers:	9.00	0.450	6	0.50
Predators:	6.33	0.317	3	0.25
Piercers:	0.00	0.000	0	0.00
Shredders:	0.33	0.017	1	0.08
Scrapers:	0.00	0.000	0	0.00
Maine Tolerance:				
Sensitive:	0.33	0.017	1	0.08
Intermediate:	18.67	0.933	10	0.83
Eurytopic:	1.00	0.050	1	0.08
Ratio of MTI Sensitive to Eurytopic	0.33	0.333	1.00	1.00

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-280 Waterbody: JOSEPH STREET POND (NH) Town: Not Designated

Log Number: DN-2015-280-WET-MAN-2 Subsample Factor: X1 Replicates: 3 Calculated: 8/26/2016

Taxon	Maine Taxonomic Code	Count (Mean of Samples)		Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
		Actual	Adjusted					
Enallagma	09020309051	2.67	2.67	9	PR	26.2-I	--	Dragonfly/damselfly
Caenis	09020412040	4.00	4.00	7	CG	22.1-I	--	Mayfly
Ablabesmyia	09021011001	0.33	0.33	8	PR	23.6-I	T	Fly: Midge
Procladius	09021011015	3.33	3.33	9	PR	25.1-I	T	Fly: Midge
Cladotanytarsus	09021011068	0.33	0.33	7	CG	22.2-I	Y	Fly: Midge
Paratanytarsus	09021011071	1.00	1.00	6	--	43-E	Y	Fly: Midge
Tanytarsus	09021011076	3.33	3.33	6	CF	25.7-I	Y	Fly: Midge
Chironomus	09021011080	1.67	1.67	10	CG	27.4-I	C	Fly: Midge
Cladopelma	09021011081	0.33	0.33	9	CG	27.9-I	C	Fly: Midge
Dicrotendipes	09021011085	2.33	2.33	8	CG	28.8-I	C	Fly: Midge
Polypedilum	09021011102	0.00	0.33	6	SH	24.2-I	C	Fly: Midge
Polypedilum braseniae	09021011102196	0.33	0.00	--	--	--	C	Fly: Midge
Tribelos	09021011107	0.33	0.33	5	CG	9.3-S	C	Fly: Midge

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-267 Trip ID: 2014-267-WET-MLW-1 River Basin: Connecticut
Waterbody: GREGG WETLAND (NH) HUC8 Name:
Town: Not Designated Latitude: 43 6 22.22 N
Mitigation Monitoring Site: No Longitude: 72 13 3.18 W

Sample Information

Sample ID: DN-2014-267-WET-MLW-1 Type of Sample: DIPNET Date Sampled: 8/11/2014
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: I** Date: 2/9/2016
Model Result with P≥0.6: I **Reason for Determination: Model**
Date Last Calculated: 2/8/2016 Comments: Minimum provisions for total abundance not met.

Model Probabilities

First Stage Model

Class A:	0.97	Class C:	0.00
Class B:	0.03	NA:	0.00

B or Better Model

Class A or B	1.00
Class C or Non-Attainment	0.00

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.97
Class B or C or Non-Attainment	0.03

Model Variables

		Reference Range
Total Mean Abundance	27	< 787
Ephemeroptera Abundance	0.67	most > 35
Odonata Relative Abundance	0.025	most > 0.04
Trichoptera Relative Abundance	0.012	most > 0.02
Shredder Taxa Relative Abundance	0.09	< 0.2
Non-insect Taxa Relative Richness	0.13	< 0.4
MTI Sensitive Taxa Abundance	7.53	most > 30
MTI Sensitive Taxa Relative Abundance	0.34	most > 0.05
MTI Sensitive Taxa Richness	7	most > 7
MTI Intermediate Taxa Relative Abundance	0.66	> 0.5
MTI Intermediate Taxa Richness	11	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	7.53	most > 1

Other Variables

Generic Richness:	23
Hilsenhoff Biotic Index:	7.86
Shannon-Weiner Diversity:	4.11
Maine Tolerance Index:	24.56

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Tanypus*	13.58
2	*Naididae*	12.35
3	*Polypedilum*	8.64
3	*Procladius*	8.64
4	*Labrundinia*	6.17
5	*Cladopelma*	4.94
5	*Guttipelopia*	4.94

Sample Collection and Processing Information

Sampling Organization: NHDES
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 8/11/2014 11:32:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	7.11	mg/l	
Surface Water	In-situ	pH	5.61		
Surface Water	In-situ	Specific Conductance	13	us/cm	
Surface Water	In-situ	Temperature	23.6	deg c	

Landcover Summary - 2004 Data

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	3	System:	PALUSTRINE	Landscape Position:	
Hydrologic Modifications:	0	Subsystem:		Lotic Gradient:	
Vegetative Modifications:	0	Class 1:	UNCONSOLIDATED BOTTOM	Flow Path:	
Chemical Pollutants:	0				
Watershed Characterization and Non-point Sources:	3	Subclass 1:	FLOATING VASCULAR	Land Form:	
		Class 2:	EMERGENT	Land Form Type:	
		Subclass 2:	NON-PERSISTENT	Waterbody Type:	
		Class 3:	SCRUB SHRUB	Waterbody Subtype:	
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations: PLANT LIST IS NOT COMPREHENSIVE.

Habitat Classification:
AQUATIC MACROPHYTE BED
EMERGENT NON-PERSISTENT VEGETATION
SCRUB SHRUB

Substrate Classification:
SILT/MUCK SUBSTRATE

Average Depth: 60 cm Visible Flow: No Rain In Previous 24 Hours: No

Sample Comments:

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Sagittaria		LW-34011401002			
Betulaceae		LW-34021701			
Spiraea		LW-34024202026			
Glyceria		LW-34010502036			
Brasenia schreberi	Watershield	LW-34023103001001	6	OBL	FORB/HERB
Ilex		LW-34020201001			
Utricularia		LW-34022305002			
Carex		LW-34010501002			
Juncus		LW-34010801001			
Gentianaceae		LW-34021802			
Nuphar lutea ssp. variegata	Varigated yellow pond-lily	LW-34023103002002	4	OBL	FORB/HERB
Carex lurida	Shallow sedge	LW-34010501002089	2	OBL	GRAMINOID
Potamogeton		LW-34011101001			
Acer rubrum	Red maple	LW-34024603001006	2	FAC	TREE

Additional Summary Variables

Station Number: W-267 Waterbody: GREGG WETLAND (NH) Town: Not Designated

Log Number: DN-2014-267-WET-MLW-1 Subsample Factor: X1 Replicates: 3 Calculated: 2/8/2016

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	1.67	0.062	4	0.17
EPT Taxa:	1.00	0.037	2	0.09
Insects:	21.00	0.778	20	0.87
Non-Insects:	6.00	0.222	3	0.13
Leeches:	0.00	0.000	0	0.00
Oligochaetes:	5.00	0.185	2	0.09
Snails:	0.00	0.000	0	0.00
Bivalves:	0.00	0.000	0	0.00
Isopods:	0.00	0.000	0	0.00
Amphipods:	0.00	0.000	0	0.00
Mites:	1.00	0.037	1	0.04
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	0.67	0.025	1	0.04
Odonates:	0.67	0.025	2	0.09
Caddisflies:	0.33	0.012	1	0.04
Diptera:	19.00	0.704	15	0.65
Hemiptera:	0.33	0.012	1	0.04
Beetles:	0.00	0.000	0	0.00
Chironomids:	19.00	0.704	15	0.65
Tanypodinae Tribe:	11.05	0.409	7	0.30
Chironomiinae Tribe:	7.25	0.269	7	0.30
Orthoclodiinae Tribe:	0.69	0.026	1	0.04
Collector-Filterers:	0.35	0.013	1	0.04
Collector-Gatherers:	6.47	0.240	6	0.26
Predators:	11.39	0.422	8	0.35
Piercers:	0.33	0.012	1	0.04
Shredders:	2.42	0.090	1	0.04
Scrapers:	0.00	0.000	0	0.00
Maine Tolerance:				
Sensitive:	7.53	0.342	7	0.39
Intermediate:	14.47	0.658	11	0.61
Eurytopic:	0.00	0.000	0	0.00
Ratio of MTI Sensitive to Eurytopic	7.53	34.215	7.00	38.89

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-267 Waterbody: GREGG WETLAND (NH) Town: Not Designated

Log Number: DN-2014-267-WET-MLW-1 Subsample Factor: X1 Replicates: 3 Calculated: 2/8/2016

Taxon	Maine Taxonomic Code	Count (Mean of Samples)		Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
		Actual	Adjusted					
Naididae	08020202	3.33	0.00	--	--	--	--	Worm
Ripistes	08020202011	0.00	3.00	--	--	--	--	Worm
Ripistes parasita	08020202011001	1.00	0.00	--	--	--	--	Worm
Stylaria	08020202014	0.67	2.00	--	CG	18-S	--	Worm
Libellulidae	09020306	0.33	0.33	--	--	--	--	Dragonfly/damselfly
Sympetrum	09020306041	0.33	0.33	10	PR	37-I	--	Dragonfly/damselfly
Caenis	09020412040	0.67	0.67	7	CG	22.1-I	--	Mayfly
Hesperocorixa	09020501004	0.33	0.33	--	P	--	--	True Bug
Phryganeidae	09020608	0.33	0.33	--	--	--	--	Caddisfly
Chironomidae	09021011	0.67	0.00	--	--	--	--	Fly: Midge
Ablabesmyia	09021011001	1.00	1.04	8	PR	23.6-I	T	Fly: Midge
Clinotanypus	09021011002	0.00	0.35	8	PR	30.3-I	T	Fly: Midge
Clinotanypus pinguis	09021011002008	0.33	0.00	--	--	--	--	Fly: Midge
Guttipelopia	09021011006	1.33	1.38	5	PR	19.4-S	T	Fly: Midge
Labrundinia	09021011008	1.67	1.73	7	PR	18.1-S	T	Fly: Midge
Larsia	09021011009	0.33	0.35	6	PR	15.6-S	T	Fly: Midge
Procladius	09021011015	2.33	2.42	9	PR	25.1-I	T	Fly: Midge
Tanypus	09021011018	3.67	3.80	10	PR	33.5-I	T	Fly: Midge
Psectrocladius	09021011056	0.67	0.69	8	CG	22-S	--	Fly: Midge
Chironomus	09021011080	1.00	1.04	10	CG	27.4-I	C	Fly: Midge
Cladopelma	09021011081	1.33	1.38	9	CG	27.9-I	C	Fly: Midge
Dicrotendipes	09021011085	0.67	0.69	8	CG	28.8-I	C	Fly: Midge
Microtendipes	09021011094	0.33	0.35	6	CF	22.3-I	C	Fly: Midge
Nilothauma	09021011095	0.67	0.69	2	--	11-S	C	Fly: Midge
Polypedilum	09021011102	2.33	2.42	6	SH	24.2-I	C	Fly: Midge
Zavreliella	09021011133	0.00	0.69	--	--	21.8-S	H	Fly: Midge
Zavreliella marmorata	09021011133010	0.67	0.00	--	--	--	S	Fly: Midge
Arachnida	0903	1.00	1.00	--	--	--	--	Arachnid

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-281 Trip ID: 2017-281-WET-NAS-1 River Basin:
Waterbody: FIELDS GROVE - SALMON BROOOK (NH) HUC8 Name:
Town: Not Designated Latitude: 42 44 49.15 N
Mitigation Monitoring Site: No Longitude: 71 27 47.63 W

Sample Information

Sample ID: DN-2017-281-WET-NAS-1 Type of Sample: DIPNET Date Sampled: 7/25/2017
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination:** Date:
Model Result with P≥0.6: B **Reason for Determination:**
Date Last Calculated: 5/4/2018 Comments:

Model Probabilities

First Stage Model

Class A:	0.23	Class C:	0.01
Class B:	0.76	NA:	0.00

B or Better Model

Class A or B	0.99
Class C or Non-Attainment	0.01

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.23
Class B or C or Non-Attainment	0.77

Model Variables

		Reference Range
Total Mean Abundance	667	< 787
Ephemeroptera Abundance	6.33	most > 35
Odonata Relative Abundance	0.026	most > 0.04
Trichoptera Relative Abundance	0.276	most > 0.02
Shredder Taxa Relative Abundance	0.00	< 0.2
Non-insect Taxa Relative Richness	0.42	< 0.4
MTI Sensitive Taxa Abundance	128.00	most > 30
MTI Sensitive Taxa Relative Abundance	0.28	most > 0.05
MTI Sensitive Taxa Richness	2	most > 7
MTI Intermediate Taxa Relative Abundance	0.71	> 0.5
MTI Intermediate Taxa Richness	6	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	29.10	most > 1

Other Variables

Generic Richness:	26
Hilsenhoff Biotic Index:	6.34
Shannon-Weiner Diversity:	2.68
Maine Tolerance Index:	24.28

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	43.25
2	*Oxyethira*	19.05
3	*Physidae*	11.35
4	*Ochrotrichia*	8.30
5	*Hydrobiidae*	4.85

Sample Collection and Processing Information

Sampling Organization: NHDES
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 7/25/2017 10:30:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	4.35	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	45.5	%	
Surface Water	In-situ	pH	6.1		
Surface Water	In-situ	Specific Conductance	265.1	us/cm	
Surface Water	In-situ	Temperature	17.6	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	30	System:	PALUSTRINE	Landscape Position:	
Hydrologic Modifications:	4	Subsystem:		Lotic Gradient:	
Vegetative Modifications:	6	Class 1:	EMERGENT	Flow Path:	THROUGHFLOW
Chemical Pollutants:	3	Subclass 1:	NON-PERSISTENT	Land Form:	BASIN
Watershed Characterization and Non-point Sources:	17	Class 2:	EMERGENT	Land Form Type:	
		Subclass 2:	PERSISTENT	Waterbody Type:	STREAM
		Class 3:		Waterbody Subtype:	
		Subclass 3:			
				Comments:	PD

Dominant Plant Species:

Additional Plant Community Observations: LARGE NORTHERN WILD RICE MARSH

Habitat Classification:
AQUATIC MACROPHYTE BED
EMERGENT NON-PERSISTENT VEGETATION
OPEN WATER FLOWING

Substrate Classification:
ORGANIC SOIL SUBSTRATE
SILT/MUCK SUBSTRATE

Average Depth: 71 cm Visible Flow: Yes Rain In Previous 24 Hours: Yes

Sample Comments: SAMPLED THE SAME WETLAND AS IN 2015, BUT SPECIFIC LOCATIONS DIFFER.

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Potamogeton		LW-34011101001			
Thelypteris palustris	Eastern marsh fern	LW-35010308002002	3	FACW	FORB/HERB
Lycopus uniflorus	Northern bugleweed	LW-34022303011002	3	OBL	FORB/HERB
Peltandra virginica	Green arrow arum	LW-34010201003001	7	OBL	FORB/HERB
Ludwigia palustris	Marsh seedbox	LW-34022903004001	5	OBL	FORB/HERB
Lemna minor	Common duckweed	LW-34010201002001	3	OBL	FORB/HERB
Alnus incana ssp. rugosa	Speckled alder	LW-34021701001002	2	FACW	TREE, SHRUB
Frangula alnus	Glossy buckthorn	LW-34024102002002	0	FAC	TREE SHRUB
Typha latifolia	Broadleaf cattail	LW-34011301002002	2	OBL	FORB/HERB
Lythrum salicaria	Purple loosestrife	LW-34022901002004	0	OBL	FORB/HERB
Vaccinium corymbosum	Highbush blueberry	LW-34021302023005	4	FACW	SHRUB
Sagittaria latifolia	Broadleaf arrowhead	LW-34011401002005	5	OBL	FORB/HERB
Acer rubrum	Red maple	LW-34024603001006	2	FAC	TREE
Elodea canadensis	Canadian waterweed	LW-34010701001001	5	OBL	FORB/HERB
Schoenoplectus tabernaemontani	Softstem bulrush	LW-34010501011011	5	OBL	GRAMINOID
Onoclea sensibilis	Sensitive fern	LW-34022904002001	2	FACW	FORB/HERB
Zizania palustris	Northern wildrice	LW-34010502081002	5	obl	GRAMINOID

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Pontederia cordata	Pickerelweed	LW-34010906002002	4	OBL	FORB/HERB
Viburnum dentatum	Southern arrowwood	LW-34021201002002	4	FAC	TREE, SHRUB
Cicuta bulbifera	Bulblet-bearing water hemlock	LW-34020101008001	4	OBL	FORB/HERB
Nuphar lutea ssp. variegata	Variegated yellow pond-lily	LW-34023103002002	4	OBL	FORB/HERB
Cephalanthus occidentalis	Common buttonbush	LW-34024301001001	6	OBL	TREE, SHRUB

Additional Summary Variables

Station Number: W-281 Waterbody: FIELDS GROVE - SALMON BROOOK (NH) Town: Not Designated

Log Number: DN-2017-281-WET-NAS-1 Subsample Factor: X1 Replicates: 3 Calculated: 5/4/2018

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	207.33	0.311	7	0.27
EPT Taxa:	190.33	0.286	5	0.19
Insects:	243.33	0.365	15	0.58
Non-Insects:	423.33	0.635	11	0.42
Leeches:	5.67	0.009	2	0.08
Oligochaetes:	0.33	0.001	1	0.04
Snails:	108.00	0.162	2	0.08
Bivalves:	1.33	0.002	1	0.04
Isopods:	0.67	0.001	1	0.04
Amphipods:	288.33	0.433	1	0.04
Mites:	5.33	0.008	1	0.04
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	6.33	0.010	1	0.04
Odonates:	17.00	0.026	2	0.08
Caddisflies:	184.00	0.276	4	0.15
Diptera:	27.00	0.041	3	0.12
Hemiptera:	7.33	0.011	3	0.12
Beetles:	1.67	0.003	2	0.08
Chironomids:	16.33	0.025	2	0.08
Tanypodinae Tribe:	0.00	0.000	0	0.00
Chironomiinae Tribe:	16.33	0.025	2	0.08
Orthoclodiinae Tribe:	0.00	0.000	0	0.00
Collector-Filterers:	2.00	0.003	2	0.08
Collector-Gatherers:	310.60	0.466	3	0.12
Predators:	17.00	0.026	4	0.15
Piercers:	184.00	0.276	4	0.15
Shredders:	1.67	0.003	2	0.08
Scrapers:	75.67	0.114	1	0.04
Maine Tolerance:				
Sensitive:	128.00	0.278	2	0.14
Intermediate:	327.27	0.712	6	0.43
Eurytopic:	4.40	0.010	6	0.43
Ratio of MTI Sensitive to Eurytopic	29.10	29.102	0.33	0.33

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-281 Waterbody: FIELDS GROVE - SALMON BROOOK (NH) Town: Not Designated

Log Number: DN-2017-281-WET-NAS-1 Subsample Factor: X1 Replicates: 3 Calculated: 5/4/2018

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Count (Mean of Samples) Adjusted	Hilsenhoff Biotic Index	Functional Feeding Group	Maine Tolerance Index	Tribe	Taxa Group
Hydra	02010101001	0.33	0.33	--	PR	--	--	Hydroid
Platyhelminthes	03	13.33	13.33	--	--	--	--	Flat Worm
Lumbriculidae	08020101	0.33	0.33	--	--	--	--	Worm
Glossiphoniidae	08030101	4.67	4.67	--	--	--	--	Leech
Helobdella	08030101005	0.00	1.00	--	--	43-E	--	Leech
Helobdella modesta	08030101005004	1.00	0.00	--	--	--	--	Leech
Caecidotea	09010101001	0.67	0.67	8	SH	51.9-E	--	Isopod
Hyalella	09010203006	0.00	288.33	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	288.33	0.00	--	--	--	--	Amphipod
Coenagrionidae	09020309	1.00	1.00	--	--	--	--	Dragonfly/damselfly
Enallagma	09020309051	16.00	16.00	9	PR	26.2-I	--	Dragonfly/damselfly
Caenis	09020412040	6.33	6.33	7	CG	22.1-I	--	Mayfly
Corixidae	09020501	6.67	6.67	--	--	--	--	True Bug
Belostoma	09020502009	0.33	0.33	--	PR	41.7-I	--	True Bug
Pelocoris	09020504013	0.33	0.33	--	PR	24.7-I	--	True Bug
Phylocentropus	09020603011	0.00	0.67	5	CF	43.8-E	--	Caddisfly
Phylocentropus placidus	09020603011021	0.67	0.00	--	--	--	--	Caddisfly
Ochrotrichia	09020607027	55.33	55.33	4	P	--	--	Caddisfly
Oxyethira	09020607028	127.00	127.00	3	P	22-S	--	Caddisfly
Triaenodes	09020618077	1.00	1.00	6	SH	19.3-S	--	Caddisfly
Ceratopogonidae	09021010	10.67	10.67	--	--	--	--	Fly: Biting Midge
Chironomidae	09021011	2.67	0.00	--	--	--	--	Fly: Midge
Paratanytarsus	09021011071	0.33	0.40	6	--	43-E	Y	Fly: Midge
Dicrotendipes	09021011085	13.33	15.93	8	CG	28.8-I	C	Fly: Midge
Haliplus	09021101001	1.33	1.33	--	P	67.1-E	--	Beetle
Berosus	09021105040	0.33	0.33	--	P	87.9-E	--	Beetle
Hydrachnidia	09030101	5.33	5.33	--	--	--	--	Mite
Hydrobiidae	10010104	32.33	32.33	--	--	--	--	Snail
Physidae	10010202	75.67	75.67	--	SC	--	--	Snail
Sphaeriidae	10020201	1.33	1.33	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-282 Trip ID: 2015-282-WET-NAS-2 River Basin: Merrimack
Waterbody: THE COVE (NH) HUC8 Name:
Town: Not Designated Latitude: 42 45 24.29 N
Mitigation Monitoring Site: No Longitude: 71 28 32.92 W

Sample Information

Sample ID: DN-2015-282-WET-NAS-2 Type of Sample: DIPNET Date Sampled: 7/15/2015
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: B** Date: 10/25/2016
Model Result with P≥0.6: B **Reason for Determination: Model**
Date Last Calculated: 8/26/2016 Comments:

Model Probabilities

First Stage Model

Class A:	0.01	Class C:	0.35
Class B:	0.64	NA:	0.00

B or Better Model

Class A or B	0.65
Class C or Non-Attainment	0.35

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.01
Class B or C or Non-Attainment	0.99

Model Variables

		Reference Range
Total Mean Abundance	249	< 787
Ephemeroptera Abundance	52.33	most > 35
Odonata Relative Abundance	0.033	most > 0.04
Trichoptera Relative Abundance	0.029	most > 0.02
Shredder Taxa Relative Abundance	0.14	< 0.2
Non-insect Taxa Relative Richness	0.41	< 0.4
MTI Sensitive Taxa Abundance	12.67	most > 30
MTI Sensitive Taxa Relative Abundance	0.06	most > 0.05
MTI Sensitive Taxa Richness	5	most > 7
MTI Intermediate Taxa Relative Abundance	0.75	> 0.5
MTI Intermediate Taxa Richness	13	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	0.30	most > 1

Other Variables

Generic Richness:	29
Hilsenhoff Biotic Index:	7.73
Shannon-Weiner Diversity:	3.10
Maine Tolerance Index:	29.53

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	35.21
2	*Caenis*	21.02
3	*Caecidotea communis*	14.46
4	*Hydrobiidae*	5.35
5	*Erpobdella punctata*	3.35

Sample Collection and Processing Information

Sampling Organization: JP
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 7/15/2015 11:48:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	10.5	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	131.9	%	
Surface Water	In-situ	Specific Conductance	7.38	us/cm	
Surface Water	In-situ	Temperature	565	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	24	System:	PALUSTRINE	Landscape Position:	
Hydrologic Modifications:	4	Subsystem:		Lotic Gradient:	
Vegetative Modifications:	6	Class 1:	UNCONSOLIDATED BOTTOM	Flow Path:	
Chemical Pollutants:	2				
Watershed Characterization and Non-point Sources:	12	Subclass 1:	FLOATING VASCULAR	Land Form:	
		Class 2:	EMERGENT	Land Form Type:	
		Subclass 2:	NON-PERSISTENT	Waterbody Type:	
		Class 3:		Waterbody Subtype:	
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations: OXBOW POND IMPACTED BY AREA DEVELOPMENT AND LOSS OF FULL HYDROLOGIC CONNECTION TO NASHUA RIVER. UPLAND IS MORE THAN 50% INVASIVE SPECIES

Habitat Classification:	Substrate Classification:
EMERGENT NON-PERSISTENT VEGETATION	GRAVEL SUBSTRATE
EMERGENT PERSISTENT VEGETATION	ORGANIC SOIL SUBSTRATE
OPEN WATER STANDING	SILT/MUCK SUBSTRATE

Average Depth: 60 cm Visible Flow: No Rain In Previous 24 Hours: Unknown

Sample Comments:

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Schoenoplectus tabernaemontani	Softstem bulrush	LW-34010501011011	5	OBL	GRAMINOID
Phragmites australis	Common reed	LW-34010502056001	0	FACW	GRAMINOID
Typha		LW-34011301002			
Impatiens capensis	Jewelweed	LW-34021901001001	2	FACW	FORB/HERB
Lythrum salicaria	Purple loosestrife	LW-34022901002004	0	OBL	FORB/HERB
Frangula alnus	Glossy buckthorn	LW-34024102002002	0	FAC	TREE SHRUB
Nuphar lutea ssp. variegata	Varigated yellow pond-lily	LW-34023103002002	4	OBL	FORB/HERB
Polygonum		LW-34023701005			
Nymphaea odorata	American white waterlily	LW-34023103003002	5	OBL	FORB/HERB
Pontederia cordata	Pickerelweed	LW-34010906002002	4	OBL	FORB/HERB
Sparganium		LW-34011301001			
Verbena hastata	Swamp verbena	LW-34022312001002	4	FACW	FORB/HERB
Hypericum		LW-34022601001			
Lemna		LW-34010201002			

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Poaceae		LW-34010502			
Cyperus esculentus	Yellow nutsedge	LW-34010501004005	2	FACW	GRAMINOID
Rorippa		LW-34020701029			

Additional Summary Variables

Station Number: W-282 Waterbody: THE COVE (NH) Town: Not Designated

Log Number: DN-2015-282-WET-NAS-2 Subsample Factor: X1 Replicates: 3 Calculated: 8/26/2016

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	68.00	0.273	7	0.24
EPT Taxa:	59.67	0.240	3	0.10
Insects:	78.33	0.315	17	0.59
Non-Insects:	170.67	0.685	12	0.41
Leeches:	8.67	0.035	2	0.07
Oligochaetes:	9.33	0.037	2	0.07
Snails:	17.33	0.070	4	0.14
Bivalves:	7.67	0.031	1	0.03
Isopods:	36.00	0.145	1	0.03
Amphipods:	87.67	0.352	1	0.03
Mites:	4.00	0.016	1	0.03
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	52.33	0.210	1	0.03
Odonates:	8.33	0.033	4	0.14
Caddisflies:	7.33	0.029	2	0.07
Diptera:	7.33	0.029	7	0.24
Hemiptera:	3.00	0.012	3	0.10
Beetles:	0.00	0.000	0	0.00
Chironomids:	7.00	0.028	6	0.21
Tanypodinae Tribe:	0.67	0.003	2	0.07
Chironomiinae Tribe:	6.33	0.025	4	0.14
Orthoclodiinae Tribe:	0.00	0.000	0	0.00
Collector-Filterers:	8.67	0.035	2	0.07
Collector-Gatherers:	147.33	0.592	5	0.17
Predators:	14.67	0.059	9	0.31
Piercers:	2.67	0.011	1	0.03
Shredders:	36.00	0.145	1	0.03
Scrapers:	3.00	0.012	2	0.07
Maine Tolerance:				
Sensitive:	12.67	0.058	5	0.23
Intermediate:	163.67	0.751	13	0.59
Eurytopic:	41.67	0.191	4	0.18
Ratio of MTI Sensitive to Eurytopic	0.30	0.304	1.25	1.25

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-282 Waterbody: THE COVE (NH) Town: Not Designated

Log Number: DN-2015-282-WET-NAS-2 Subsample Factor: X1 Replicates: 3 Calculated: 8/26/2016

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
Naididae	08020202	2.67	2.67	--	--	--	--	Worm
Stylaria	08020202014	0.00	6.67	--	CG	18-S	--	Worm
Stylaria lacustris	08020202014002	6.67	0.00	--	--	--	--	Worm
Helobdella	08030101005	0.00	0.33	--	--	43-E	--	Leech
Helobdella fusca	08030101005002	0.33	0.00	--	--	--	--	Leech
Erpobdella	08030203002	0.00	8.33	--	--	36.4-I	--	Leech
Erpobdella punctata	08030203002001	8.33	0.00	--	--	--	--	Leech
Caecidotea	09010101001	0.00	36.00	8	SH	51.9-E	--	Isopod
Caecidotea communis	09010101001001	36.00	0.00	--	--	--	--	Isopod
Hyalella	09010203006	0.00	87.67	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	87.67	0.00	--	--	--	--	Amphipod
Libellulidae	09020306	1.33	1.33	--	--	--	--	Dragonfly/damselfly
Sympetrum	09020306041	4.67	4.67	10	PR	37-I	--	Dragonfly/damselfly
Lestes	09020308045	0.33	0.33	9	PR	32.6-I	--	Dragonfly/damselfly
Enallagma	09020309051	2.00	2.00	9	PR	26.2-I	--	Dragonfly/damselfly
Caenis	09020412040	52.33	52.33	7	CG	22.1-I	--	Mayfly
Corixidae	09020501	1.00	1.00	--	--	--	--	True Bug
Mesovelia	09020509024	0.67	0.67	--	PR	60.6-E	--	True Bug
Neoplea	09020512016	1.33	1.33	--	PR	35.5-I	--	True Bug
Orthotrichia	09020607031	2.67	2.67	--	P	--	--	Caddisfly
Oecetis	09020618078	4.67	4.67	8	PR	16.3-S	--	Caddisfly
Bezzia/palpomyia	09021010043	0.33	0.33	6	PR	26.9-I	--	Fly: Biting Midge
Ablabesmyia	09021011001	0.33	0.33	8	PR	23.6-I	T	Fly: Midge
Labrundinia	09021011008	0.33	0.33	7	PR	18.1-S	T	Fly: Midge
Paratanytarsus	09021011071	4.67	4.67	6	--	43-E	Y	Fly: Midge
Tanytarsus	09021011076	1.00	1.00	6	CF	25.7-I	Y	Fly: Midge
Cladopelma	09021011081	0.33	0.33	9	CG	27.9-I	C	Fly: Midge
Lauterborniella	09021011092	0.00	0.33	--	CG	17.4-S	C	Fly: Midge
Lauterborniella agrayloides	09021011092001	0.33	0.00	--	--	--	C	Fly: Midge
Arachnida	0903	1.33	1.33	--	--	--	--	Arachnid
Arrenurus	09030111001	2.67	2.67	--	--	23.8-I	--	Mite
Hydrobiidae	10010104	13.33	13.33	--	--	--	--	Snail
Amnicola	10010104013	0.67	0.67	--	SC	18.7-S	--	Snail
Lymnaeidae	10010201	1.00	1.00	--	--	--	--	Snail
Gyraulus	10010203029	0.00	2.33	--	SC	37.2-I	--	Snail

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-282 Waterbody: THE COVE (NH) Town: Not Designated

Log Number: DN-2015-282-WET-NAS-2 Subsample Factor: X1 Replicates: 3 Calculated: 8/26/2016

Taxon	Maine Taxonomic Code	Count (Mean of Samples)		Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
		Actual	Adjusted					
Gyraulus deflectus	10010203029056	1.67	0.00	--	--	--	--	Snail
Gyraulus parvus	10010203029057	0.67	0.00	--	--	--	--	Snail
Pisidium	10020201002	7.67	7.67	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-268 Trip ID: 2014-268-WET-NWB-1 River Basin: Merrimack
Waterbody: GREAT MEADOW (NH) HUC8 Name: Merrimack River
Town: Not Designated Latitude: 43 0 40.56 N
Mitigation Monitoring Site: No Longitude: 71 44 13.65 W

Sample Information

Sample ID: DN-2014-268-WET-NWB-1 Type of Sample: DIPNET Date Sampled: 8/4/2014
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: B** Date: 2/9/2016
Model Result with P≥0.6: B **Reason for Determination: Model**
Date Last Calculated: 10/19/2015 Comments:

Model Probabilities

First Stage Model

Class A:	0.05	Class C:	0.27
Class B:	0.68	NA:	0.00

B or Better Model

Class A or B	0.74
Class C or Non-Attainment	0.27

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.05
Class B or C or Non-Attainment	0.95

Model Variables

		Reference Range
Total Mean Abundance	624	< 787
Ephemeroptera Abundance	3.67	most > 35
Odonata Relative Abundance	0.014	most > 0.04
Trichoptera Relative Abundance	0.049	most > 0.02
Shredder Taxa Relative Abundance	0.01	< 0.2
Non-insect Taxa Relative Richness	0.26	< 0.4
MTI Sensitive Taxa Abundance	31.02	most > 30
MTI Sensitive Taxa Relative Abundance	0.05	most > 0.05
MTI Sensitive Taxa Richness	4	most > 7
MTI Intermediate Taxa Relative Abundance	0.93	> 0.5
MTI Intermediate Taxa Richness	16	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	3.00	most > 1

Other Variables

Generic Richness:	27
Hilsenhoff Biotic Index:	7.89
Shannon-Weiner Diversity:	1.32
Maine Tolerance Index:	24.66

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	82.81
2	*Polycentropus*	4.43
3	*Arachnida*	2.08
4	*Helobdella modesta*	1.55
5	*Enallagma*	1.39

Sample Collection and Processing Information

Sampling Organization: NHDES
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 8/4/2014 12:45:00 PM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	2.32	mg/l	
Surface Water	In-situ	pH	6.01		
Surface Water	In-situ	Specific Conductance	75.3	us/cm	
Surface Water	In-situ	Temperature	23.6	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	11	System:	PALUSTRINE	Landscape Position:	
Hydrologic Modifications:	1	Subsystem:		Lotic Gradient:	
Vegetative Modifications:	1	Class 1:	SCRUB SHRUB	Flow Path:	THROUGHFLOW
Chemical Pollutants:	1	Subclass 1:	BROAD-LEAVED DECIDUOUS	Land Form:	
Watershed Characterization and Non-point Sources:	8	Class 2:	EMERGENT	Land Form Type:	
		Subclass 2:	PERSISTENT	Waterbody Type:	
		Class 3:		Waterbody Subtype:	
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations: FLOATING MAP AND NORTHEAST AREA OF WETLAND -- DOMINATED BY PROSERPINACA PALUSTRIS, BUT OVERALL VERY DIVERSE GRAMINOIDS AND FORBS. PLANT LIST IS NOT COMPREHENSIVE.

Habitat Classification:
AQUATIC MACROPHYTE BED
EMERGENT NON-PERSISTENT VEGETATION
SCRUB SHRUB

Substrate Classification:
SAND SUBSTRATE
SILT/MUCK SUBSTRATE

Average Depth: 73 cm Visible Flow: No Rain In Previous 24 Hours: Yes

Sample Comments: HAD A RAIN SHOWER AFTER METER READINGS AT SITE 2.

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Utricularia intermedia	Flatleaf bladderwort	LW-34022305002004	6	OBL	FORB/HERB
Lythrum salicaria	Purple loosestrife	LW-34022901002004	0	OBL	FORB/HERB
Potamogeton natans	Floating pondweed	LW-34011101001009	5	OBL	FORB/HERB
Utricularia macrorhiza	Common bladderwort	LW-34022305002005	3	OBL	FORB/HERB
Juncus		LW-34010801001			
Polygonum amphibium	Water knotweed	LW-34023701005002	5	OBL	FORB/HERB
Potamogeton amplifolius	Largeleaf pondweed	LW-34011101001002	6	OBL	FORB/HERB
Proserpinaca palustris	Marsh mermaidweed	LW-34022001002001	5	OBL	FORB/HERB
Nymphaea odorata	American white waterlily	LW-34023103003002	5	OBL	FORB/HERB
Schoenoplectus tabernaemontani	Softstem bulrush	LW-34010501011011	5	OBL	GRAMINOID
Sparganium americanum	American bur-reed	LW-34011301001001	5	OBL	FORB/HERB
Pontederia cordata	Pickerelweed	LW-34010906002002	4	OBL	FORB/HERB
Eleocharis		LW-34010501006			

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Sagittaria latifolia	Broadleaf arrowhead	LW-34011401002005	5	OBL	FORB/HERB
Potamogeton		LW-34011101001			
Brasenia schreberi	Watershield	LW-34023103001001	6	OBL	FORB/HERB
Nuphar lutea ssp. variegata	Varigated yellow pond-lily	LW-34023103002002	4	OBL	FORB/HERB
Ilex verticillata	Common winterberry	LW-34020201001005	3	FACW	TREE, SHRUB

Additional Summary Variables

Station Number: W-268 Waterbody: GREAT MEADOW (NH) Town: Not Designated

Log Number: DN-2014-268-WET-NWB-1 Subsample Factor: X1 Replicates: 3 Calculated: 10/19/2015

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	43.00	0.069	7	0.26
EPT Taxa:	34.00	0.054	5	0.19
Insects:	71.00	0.114	20	0.74
Non-Insects:	553.33	0.886	7	0.26
Leeches:	13.00	0.021	2	0.07
Oligochaetes:	0.00	0.000	0	0.00
Snails:	6.67	0.011	1	0.04
Bivalves:	2.33	0.004	2	0.07
Isopods:	0.00	0.000	0	0.00
Amphipods:	517.00	0.828	1	0.04
Mites:	13.00	0.021	1	0.04
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	3.67	0.006	2	0.07
Odonates:	9.00	0.014	2	0.07
Caddisflies:	30.33	0.049	3	0.11
Diptera:	15.33	0.025	8	0.30
Hemiptera:	12.00	0.019	4	0.15
Beetles:	0.67	0.001	1	0.04
Chironomids:	14.33	0.023	7	0.26
Tanypodinae Tribe:	4.78	0.008	2	0.07
Chironomiinae Tribe:	9.56	0.015	5	0.19
Orthoclodiinae Tribe:	0.00	0.000	0	0.00
Collector-Filterers:	5.06	0.008	4	0.15
Collector-Gatherers:	523.06	0.838	5	0.19
Predators:	46.78	0.075	8	0.30
Piercers:	4.00	0.006	2	0.07
Shredders:	4.44	0.007	1	0.04
Scrapers:	6.67	0.011	1	0.04
Maine Tolerance:				
Sensitive:	31.02	0.052	4	0.19
Intermediate:	556.65	0.931	16	0.76
Eurytopic:	10.33	0.017	1	0.05
Ratio of MTI Sensitive to Eurytopic	3.00	3.002	4.00	4.00

Aquatic Life Taxonomic Inventory Report

Station Number: W-268 Waterbody: GREAT MEADOW (NH) Town: Not Designated

Log Number: DN-2014-268-WET-NWB-1 Subsample Factor: X1 Replicates: 3 Calculated: 10/19/2015

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Count (Mean of Samples) Adjusted	Hilsenhoff Biotic Index	Functional Feeding Group	Maine Tolerance Index	Tribe	Taxa Group
Helobdella	08030101005	0.00	10.33	--	--	43-E	--	Leech
Helobdella elongata	08030101005001	0.33	0.00	--	--	--	--	Leech
Helobdella fusca	08030101005002	0.33	0.00	--	--	--	--	Leech
Helobdella modesta	08030101005004	9.67	0.00	--	--	--	--	Leech
Erpobdella	08030203002	0.00	2.67	--	--	36.4-I	--	Leech
Erpobdella punctata	08030203002001	2.67	0.00	--	--	--	--	Leech
Hyalella	09010203006	0.00	517.00	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	517.00	0.00	--	--	--	--	Amphipod
Libellulidae	09020306	0.33	0.33	--	--	--	--	Dragonfly/damselfly
Enallagma	09020309051	8.67	8.67	9	PR	26.2-I	--	Dragonfly/damselfly
Callibaetis	09020401002	2.00	2.00	9	CG	40.5-I	--	Mayfly
Caenis	09020412040	1.67	1.67	7	CG	22.1-I	--	Mayfly
Corixidae	09020501	6.00	6.00	--	--	--	--	True Bug
Hesperocorixa	09020501004	3.33	3.33	--	P	--	--	True Bug
Pelocoris	09020504013	1.00	1.00	--	PR	24.7-I	--	True Bug
Neoplea	09020512016	1.67	1.67	--	PR	35.5-I	--	True Bug
Polycentropus	09020603010	27.67	27.67	6	PR	15.4-S	--	Caddisfly
Oxyethira	09020607028	0.67	0.67	3	P	22-S	--	Caddisfly
Oecetis	09020618078	2.00	2.00	8	PR	16.3-S	--	Caddisfly
Chaoborus	09021007025	1.00	1.00	8	PR	25-I	--	Fly: Phantom Midge
Chironomidae	09021011	0.33	0.00	--	--	--	--	Fly: Midge
Ablabesmyia	09021011001	4.00	4.10	8	PR	23.6-I	T	Fly: Midge
Guttipelopia	09021011006	0.67	0.68	5	PR	19.4-S	T	Fly: Midge
Tanytarsus	09021011076	0.67	0.68	6	CF	25.7-I	Y	Fly: Midge
Chironomus	09021011080	0.67	0.68	10	CG	27.4-I	C	Fly: Midge
Dicrotendipes	09021011085	1.67	1.71	8	CG	28.8-I	C	Fly: Midge
Microtendipes	09021011094	2.00	2.05	6	CF	22.3-I	C	Fly: Midge
Polypedilum	09021011102	4.33	4.44	6	SH	24.2-I	C	Fly: Midge
Donacia	09021114071	0.67	0.67	--	--	25.1-I	--	Beetle
Arachnida	0903	13.00	13.00	--	--	--	--	Arachnid
Mollusca	10	1.33	1.33	--	--	--	--	Mollusk
Gyraulus	10010203029	0.00	6.67	--	SC	37.2-I	--	Snail
Gyraulus deflectus	10010203029056	6.67	0.00	--	--	--	--	Snail
Sphaeriidae	10020201	1.67	1.67	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-268 Waterbody: GREAT MEADOW (NH) Town: Not Designated

Log Number: DN-2014-268-WET-NWB-1 Subsample Factor: X1 Replicates: 3 Calculated: 10/19/2015

Taxon	Maine Taxonomic Code	Count (Mean of Samples)		Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
		Actual	Adjusted					
Pisidium	10020201002	0.67	0.67	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-301 Trip ID: 2016-301-WET-NWD-1 River Basin: Merrimack
Waterbody: MERRYMEETING MARSH (NH) HUC8 Name: Winnipesaukee River
Town: Not Designated Latitude: 43 25 50.68 N
Mitigation Monitoring Site: No Longitude: 71 10 26.46 W

Sample Information

Sample ID: DN-2016-301-WET-NWD-1 Type of Sample: DIPNET Date Sampled: 7/27/2016
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: C** Date: 5/11/2017
Model Result with P≥0.6: C **Reason for Determination: Best Professional Judgement**
Date Last Calculated: 4/26/2017 Comments: Indeterminate B (0.41) not raised to B due to community structure and function.

Model Probabilities

First Stage Model

Class A:	0.00	Class C:	0.59
Class B:	0.41	NA:	0.00

B or Better Model

Class A or B	0.41
Class C or Non-Attainment	0.59

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.00
Class B or C or Non-Attainment	1.00

Model Variables

		Reference Range
Total Mean Abundance	110	< 787
Ephemeroptera Abundance	1.33	most > 35
Odonata Relative Abundance	0.000	most > 0.04
Trichoptera Relative Abundance	0.018	most > 0.02
Shredder Taxa Relative Abundance	0.00	< 0.2
Non-insect Taxa Relative Richness	0.36	< 0.4
MTI Sensitive Taxa Abundance	2.44	most > 30
MTI Sensitive Taxa Relative Abundance	0.03	most > 0.05
MTI Sensitive Taxa Richness	4	most > 7
MTI Intermediate Taxa Relative Abundance	0.90	> 0.5
MTI Intermediate Taxa Richness	8	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	0.43	most > 1

Other Variables

Generic Richness:	22
Hilsenhoff Biotic Index:	7.84
Shannon-Weiner Diversity:	2.15
Maine Tolerance Index:	26.12

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	56.80
2	*Hydrobiidae*	24.17
3	*Sphaeriidae*	3.02
4	*Helobdella modesta*	2.72
5	*Dicrotendipes*	1.81

Sample Collection and Processing Information

Sampling Organization: NHDES
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 7/27/2016 10:40:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	3.83	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	48.1	%	
Surface Water	In-situ	pH	5.5		
Surface Water	In-situ	Specific Conductance	63.4	us/cm	
Surface Water	In-situ	Temperature	26.4	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	14	System:	PALUSTRINE	Landscape Position:	
Hydrologic Modifications:	4	Subsystem:		Lotic Gradient:	
Vegetative Modifications:	1	Class 1:	EMERGENT	Flow Path:	
Chemical Pollutants:	0	Subclass 1:	ROOTED VASCULAR	Land Form:	
Watershed Characterization and Non-point Sources:	9	Class 2:		Land Form Type:	
		Subclass 2:		Waterbody Type:	
		Class 3:		Waterbody Subtype:	
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations: ABUNDANT AQUATIC MOSS RETRIEVED WITH SHRUB RAKE

Habitat Classification:
AQUATIC MACROPHYTE BED
OPEN WATER STANDING

Substrate Classification:
SILT/MUCK SUBSTRATE

Average Depth: 78 cm Visible Flow: Yes Rain In Previous 24 Hours: No

Sample Comments:

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Utricularia macrorhiza	Common bladderwort	LW-34022305002005	3	OBL	FORB/HERB
Pontederia cordata	Pickerelweed	LW-34010906002002	4	OBL	FORB/HERB
Carex lasiocarpa	Woollyfruit sedge	LW-34010501002078	6	OBL	GRAMINOID
Peltandra virginica	Green arrow arum	LW-34010201003001	7	OBL	FORB/HERB
Typha latifolia	Broadleaf cattail	LW-34011301002002	2	OBL	FORB/HERB
Nuphar lutea ssp. variegata	Varigated yellow pond-lily	LW-34023103002002	4	OBL	FORB/HERB
Cephalanthus occidentalis	Common buttonbush	LW-34024301001001	6	OBL	TREE, SHRUB

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Additional Summary Variables

Station Number: W-301 Waterbody: MERRYMEETING MARSH (NH) Town: Not Designated

Log Number: DN-2016-301-WET-NWD-1 Subsample Factor: X1 Replicates: 3 Calculated: 4/26/2017

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	3.33	0.030	3	0.14
EPT Taxa:	3.33	0.030	3	0.14
Insects:	12.00	0.109	14	0.64
Non-Insects:	98.33	0.891	8	0.36
Leeches:	3.00	0.027	1	0.05
Oligochaetes:	0.33	0.003	1	0.05
Snails:	28.67	0.260	3	0.14
Bivalves:	3.67	0.033	2	0.09
Isopods:	0.00	0.000	0	0.00
Amphipods:	62.67	0.568	1	0.05
Mites:	0.00	0.000	0	0.00
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	1.33	0.012	1	0.05
Odonates:	0.00	0.000	0	0.00
Caddisflies:	2.00	0.018	2	0.09
Diptera:	7.33	0.066	9	0.41
Hemiptera:	1.33	0.012	2	0.09
Beetles:	0.00	0.000	0	0.00
Chironomids:	6.33	0.057	8	0.36
Tanypodinae Tribe:	2.81	0.026	3	0.14
Chironomiinae Tribe:	3.52	0.032	5	0.23
Orthoclodiinae Tribe:	0.00	0.000	0	0.00
Collector-Filterers:	5.33	0.048	3	0.14
Collector-Gatherers:	66.80	0.605	5	0.23
Predators:	3.15	0.029	4	0.18
Piercers:	0.33	0.003	1	0.05
Shredders:	0.35	0.003	1	0.05
Scrapers:	2.00	0.018	2	0.09
Maine Tolerance:				
Sensitive:	2.44	0.031	4	0.24
Intermediate:	69.85	0.896	8	0.47
Eurytopic:	5.70	0.073	5	0.29
Ratio of MTI Sensitive to Eurytopic	0.43	0.429	0.80	0.80

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-301 Waterbody: MERRYMEETING MARSH (NH) Town: Not Designated

Log Number: DN-2016-301-WET-NWD-1 Subsample Factor: X1 Replicates: 3 Calculated: 4/26/2017

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
Nais	08020202009	0.00	0.33	--	CG	43-E	--	Worm
Nais variabilis	08020202009009	0.33	0.00	--	--	--	--	Worm
Helobdella	08030101005	0.00	3.00	--	--	43-E	--	Leech
Helobdella modesta	08030101005004	3.00	0.00	--	--	--	--	Leech
Hyalella	09010203006	0.00	62.67	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	62.67	0.00	--	--	--	--	Amphipod
Caenis	09020412040	1.33	1.33	7	CG	22.1-I	--	Mayfly
Corixidae	09020501	1.00	1.00	--	--	--	--	True Bug
Pelocoris	09020504013	0.33	0.33	--	PR	24.7-I	--	True Bug
Phylocentropus	09020603011	1.67	1.67	5	CF	43.8-E	--	Caddisfly
Oxyethira	09020607028	0.33	0.33	3	P	22-S	--	Caddisfly
Ceratopogonidae	09021010	1.00	1.00	--	--	--	--	Fly: Biting Midge
Chironomidae	09021011	0.33	0.00	--	--	--	--	Fly: Midge
Ablabesmyia	09021011001	1.00	1.06	8	PR	23.6-I	T	Fly: Midge
Guttipelopia	09021011006	0.00	1.41	5	PR	19.4-S	T	Fly: Midge
Guttipelopia guttipennis	09021011006018	1.33	0.00	--	--	--	T	Fly: Midge
Labrundinia	09021011008	0.33	0.35	7	PR	18.1-S	T	Fly: Midge
Paratanytarsus	09021011071	0.33	0.35	6	--	43-E	Y	Fly: Midge
Chironomus	09021011080	0.33	0.35	10	CG	27.4-I	C	Fly: Midge
Dicrotendipes	09021011085	2.00	2.11	8	CG	28.8-I	C	Fly: Midge
Endochironomus	09021011087	0.00	0.35	10	SH	50.2-E	C	Fly: Midge
Endochironomus nigricans	09021011087156	0.33	0.00	--	--	--	C	Fly: Midge
Zavreliella	09021011133	0.00	0.35	--	--	21.8-S	H	Fly: Midge
Zavreliella marmorata	09021011133010	0.33	0.00	--	--	--	S	Fly: Midge
Hydrobiidae	10010104	26.67	26.67	--	--	--	--	Snail
Physa	10010202027	0.00	1.67	--	SC	34-I	--	Snail
Physa acuta	10010202027053	1.67	0.00	--	--	--	--	Snail
Helisoma	10010203030	0.33	0.33	--	SC	42.8-I	--	Snail
Sphaeriidae	10020201	3.33	3.33	--	CF	--	--	Clam
Pisidium	10020201002	0.00	0.33	--	CF	--	--	Clam
Pisidium casertanum	10020201002006	0.33	0.00	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-283 Trip ID: 2015-283-WET-PEM-1 River Basin: Merrimack
Waterbody: BRICKETT HILL ROAD POND (NH) HUC8 Name: Merrimack River
Town: Not Designated Latitude: 43 10 27.61 N
Mitigation Monitoring Site: No Longitude: 71 28 4.6 W

Sample Information

Sample ID: DN-2015-283-WET-PEM-1 Type of Sample: DIPNET Date Sampled: 8/14/2015
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: I** Date: 10/25/2016
Model Result with P≥0.6: I **Reason for Determination: Model**
Date Last Calculated: 8/30/2016 Comments: Minimum provisions for Total Mean Abundance not met.

Model Probabilities

First Stage Model

Class A:	0.00	Class C:	0.97
Class B:	0.03	NA:	0.00

B or Better Model

Class A or B	0.03
Class C or Non-Attainment	0.97

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.00
Class B or C or Non-Attainment	1.00

Model Variables

		Reference Range
Total Mean Abundance	34	< 787
Ephemeroptera Abundance	7.33	most > 35
Odonata Relative Abundance	0.117	most > 0.04
Trichoptera Relative Abundance	0.019	most > 0.02
Shredder Taxa Relative Abundance	0.10	< 0.2
Non-insect Taxa Relative Richness	0.21	< 0.4
MTI Sensitive Taxa Abundance	0.67	most > 30
MTI Sensitive Taxa Relative Abundance	0.02	most > 0.05
MTI Sensitive Taxa Richness	2	most > 7
MTI Intermediate Taxa Relative Abundance	0.84	> 0.5
MTI Intermediate Taxa Richness	10	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	0.14	most > 1

Other Variables

Generic Richness:	19
Hilsenhoff Biotic Index:	7.50
Shannon-Weiner Diversity:	3.39
Maine Tolerance Index:	28.90

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Caenis*	20.39
2	*Hyalella azteca*	18.45
3	*Gyraulus deflectus*	13.59
4	*Enallagma*	10.68
4	*Paratanytarsus*	10.68
5	*Polypedilum braseniae*	7.77

Sample Collection and Processing Information

Sampling Organization: SC, TW, JP
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 8/14/2015 9:40:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	3.83	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	42.1	%	
Surface Water	In-situ	pH	5.98		
Surface Water	In-situ	Specific Conductance	175.8	us/cm	
Surface Water	In-situ	Temperature	20.01	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	7	System:	PALUSTRINE	Landscape Position:	
Hydrologic Modifications:	2	Subsystem:		Lotic Gradient:	
Vegetative Modifications:	1	Class 1:	UNCONSOLIDATED BOTTOM	Flow Path:	
Chemical Pollutants:	0				
Watershed Characterization and Non-point Sources:	4	Subclass 1:		Land Form:	
		Class 2:	EMERGENT	Land Form Type:	
		Subclass 2:	NON-PERSISTENT	Waterbody Type:	
		Class 3:		Waterbody Subtype:	
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations:

Habitat Classification:
AQUATIC MACROPHYTE BED
OPEN WATER STANDING

Substrate Classification:
BEDROCK SUBSTRATE
DETRITUS SUBSTRATE
SAND SUBSTRATE

Average Depth: 49 cm Visible Flow: No Rain In Previous 24 Hours: No

Sample Comments:

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Sparganium		LW-34011301001			
Ilex verticillata	Common winterberry	LW-34020201001005	3	FACW	TREE, SHRUB
Glyceria canadensis	Rattlesnake mannagrass	LW-34010502036003	4	OBL	GRAMINOID
Utricularia macrorhiza	Common bladderwort	LW-34022305002005	3	OBL	FORB/HERB
Triadenum		LW-34022601002			
Nymphaea odorata	American white waterlily	LW-34023103003002	5	OBL	FORB/HERB
Carex comosa	Longhair sedge	LW-34010501002039	6	OBL	GRAMINOID
Bidens		LW-34020501012			
Salix		LW-34024401002			
Vaccinium		LW-34021302023			

Additional Summary Variables

Station Number: W-283 Waterbody: BRICKETT HILL ROAD POND (NH) Town: Not Designated

Log Number: DN-2015-283-WET-PEM-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/30/2016

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	12.00	0.350	5	0.26
EPT Taxa:	8.00	0.233	3	0.16
Insects:	22.67	0.660	15	0.79
Non-Insects:	11.67	0.340	4	0.21
Leeches:	0.00	0.000	0	0.00
Oligochaetes:	0.00	0.000	0	0.00
Snails:	5.00	0.146	2	0.11
Bivalves:	0.00	0.000	0	0.00
Isopods:	0.00	0.000	0	0.00
Amphipods:	6.33	0.184	1	0.05
Mites:	0.00	0.000	0	0.00
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	7.33	0.214	2	0.11
Odonates:	4.00	0.117	2	0.11
Caddisflies:	0.67	0.019	1	0.05
Diptera:	10.33	0.301	9	0.47
Hemiptera:	0.33	0.010	1	0.05
Beetles:	0.00	0.000	0	0.00
Chironomids:	10.33	0.301	9	0.47
Tanypodinae Tribe:	1.00	0.029	1	0.05
Chironomiinae Tribe:	9.33	0.272	8	0.42
Orthoclodiinae Tribe:	0.00	0.000	0	0.00
Collector-Filterers:	0.33	0.010	1	0.05
Collector-Gatherers:	15.67	0.456	7	0.37
Predators:	5.00	0.146	3	0.16
Piercers:	0.00	0.000	0	0.00
Shredders:	3.33	0.097	2	0.11
Scrapers:	4.67	0.136	1	0.05
Maine Tolerance:				
Sensitive:	0.67	0.020	2	0.13
Intermediate:	27.33	0.837	10	0.67
Eurytopic:	4.67	0.143	3	0.20
Ratio of MTI Sensitive to Eurytopic	0.14	0.143	0.67	0.67

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-283 Waterbody: BRICKETT HILL ROAD POND (NH) Town: Not Designated

Log Number: DN-2015-283-WET-PEM-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/30/2016

Taxon	Maine Taxonomic Code	Count (Mean of Samples)		Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
		Actual	Adjusted					
Hyalella	09010203006	0.00	6.33	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	6.33	0.00	--	--	--	--	Amphipod
Orconectes	09010301008	0.33	0.33	--	CG	--	--	Crayfish
Libellulidae	09020306	0.33	0.33	--	--	--	--	Dragonfly/damselfly
Enallagma	09020309051	3.67	3.67	9	PR	26.2-I	--	Dragonfly/damselfly
Callibaetis	09020401002	0.33	0.33	9	CG	40.5-I	--	Mayfly
Caenis	09020412040	7.00	7.00	7	CG	22.1-I	--	Mayfly
Mesovelia	09020509024	0.33	0.33	--	PR	60.6-E	--	True Bug
Phryganeidae	09020608	0.67	0.67	--	--	--	--	Caddisfly
Procladius	09021011015	1.00	1.00	9	PR	25.1-I	T	Fly: Midge
Paratanytarsus	09021011071	3.67	3.67	6	--	43-E	Y	Fly: Midge
Chironomus	09021011080	0.67	0.67	10	CG	27.4-I	C	Fly: Midge
Dicrotendipes	09021011085	0.67	0.67	8	CG	28.8-I	C	Fly: Midge
Glyptotendipes	09021011088	0.67	0.67	10	SH	43-E	C	Fly: Midge
Microtendipes	09021011094	0.33	0.33	6	CF	22.3-I	C	Fly: Midge
Polypedilum	09021011102	0.00	2.67	6	SH	24.2-I	C	Fly: Midge
Polypedilum braseniae	09021011102196	2.67	0.00	--	--	--	C	Fly: Midge
Tribelos	09021011107	0.33	0.33	5	CG	9.3-S	C	Fly: Midge
Omisus	09021011130	0.33	0.33	--	--	20.7-S	H	Fly: Midge
Lymnaeidae	10010201	0.33	0.33	--	--	--	--	Snail
Gyraulus	10010203029	0.00	4.67	--	SC	37.2-I	--	Snail
Gyraulus deflectus	10010203029056	4.67	0.00	--	--	--	--	Snail

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-319 Trip ID: 2017-319-WET-RAY-1 River Basin: Saco
Waterbody: LAMPREY RIVER (NH) HUC8 Name: Piscataqua-Salmon Falls
Town: Not Designated Latitude: 43 2 7.47 N
Mitigation Monitoring Site: No Longitude: 71 11 46.32 W

Sample Information

Sample ID: DN-2017-319-WET-RAY-1 Type of Sample: DIPNET Date Sampled: 7/26/2017
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination:** Date:
Model Result with P≥0.6: B **Reason for Determination:**
Date Last Calculated: 5/8/2018 Comments:

Model Probabilities

First Stage Model

Class A: 0.32 Class C: 0.02
Class B: 0.66 NA: 0.00

B or Better Model

Class A or B 0.98
Class C or Non-Attainment 0.02

C or Better Model

Class A, B, or C 1.00
Non-Attainment 0.00

A Model

Class A 0.32
Class B or C or Non-Attainment 0.68

Model Variables

		Reference Range
Total Mean Abundance	254	< 787
Ephemeroptera Abundance	40.67	most > 35
Odonata Relative Abundance	0.052	most > 0.04
Trichoptera Relative Abundance	0.021	most > 0.02
Shredder Taxa Relative Abundance	0.00	< 0.2
Non-insect Taxa Relative Richness	0.34	< 0.4
MTI Sensitive Taxa Abundance	14.33	most > 30
MTI Sensitive Taxa Relative Abundance	0.07	most > 0.05
MTI Sensitive Taxa Richness	5	most > 7
MTI Intermediate Taxa Relative Abundance	0.90	> 0.5
MTI Intermediate Taxa Richness	15	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	3.30	most > 1

Other Variables

Generic Richness:	35
Hilsenhoff Biotic Index:	7.73
Shannon-Weiner Diversity:	3.03
Maine Tolerance Index:	25.82

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	46.06
2	*Caenis*	11.15
3	*Sphaeriidae*	10.24
4	*Hydrobiidae*	6.04
5	*Callibaetis*	4.86

Sample Collection and Processing Information

Sampling Organization: NHDES
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 7/26/2017 12:05:00 PM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	6.23	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	67.1	%	
Surface Water	In-situ	pH	6.13		
Surface Water	In-situ	Specific Conductance	143.4	us/cm	
Surface Water	In-situ	Temperature	19.7	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	17	System:	RIVERINE	Landscape Position:	LOTIC RIVER
Hydrologic Modifications:	5	Subsystem:	LOWER PERENNIAL	Lotic Gradient:	LOW GRADIENT
Vegetative Modifications:	1	Class 1:	UNCONSOLIDATED BOTTOM	Flow Path:	THROUGHFLOW
Chemical Pollutants:	0				
Watershed Characterization and Non-point Sources:	11	Subclass 1:	FLOATING VASCULAR	Land Form:	
		Class 2:	SCRUB SHRUB	Land Form Type:	
		Subclass 2:	PERSISTENT	Waterbody Type:	RIVER
		Class 3:	EMERGENT	Waterbody Subtype:	
		Subclass 3:	NON-PERSISTENT		

Comments:

Dominant Plant Species:

Additional Plant Community Observations:

Habitat Classification:
AQUATIC MACROPHYTE BED
OPEN WATER FLOWING

Substrate Classification:
DETRITUS SUBSTRATE
SILT/MUCK SUBSTRATE

Average Depth: 65 cm Visible Flow: Yes Rain In Previous 24 Hours: Yes

Sample Comments:

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Utricularia macrorhiza	Common bladderwort	LW-34022305002005	3	OBL	FORB/HERB
Brasenia schreberi	Watershield	LW-34023103001001	6	OBL	FORB/HERB
Cephalanthus occidentalis	Common buttonbush	LW-34024301001001	6	OBL	TREE, SHRUB
Elatine americana	American waterwort	LW-34024902001001	6	OBL	FORB/HERB
Potamogeton robbinsii	Robbins' pondweed	LW-34011101001019	6	OBL	FORB/HERB
Nymphaea odorata	American white waterlily	LW-34023103003002	5	OBL	FORB/HERB
Schoenoplectus tabernaemontani	Softstem bulrush	LW-34010501011011	5	OBL	GRAMINOID
Myrica gale	Sweetgale	LW-34022801003001	5	OBL	SHRUB
Acer rubrum	Red maple	LW-34024603001006	2	FAC	TREE
Spiraea alba var. latifolia	White meadowsweet	LW-34024202026002	2	FACW	SHRUB
Sparganium		LW-34011301001			
Decodon verticillatus	Swamp loosestrife	LW-34022901001001	6	OBL	SUBSHRUB, SHRUB
Triadenum virginicum	Virginia marsh St. Johnswort	LW-34022601002002	6	OBL	FORB/HERB
Thelypteris palustris	Eastern marsh fern	LW-35010308002002	3	FACW	FORB/HERB
Eleocharis palustris	Common spikerush	LW-34010501006013	6	OBL	GRAMINOID
Polygonum		LW-34023701005			

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Scirpus cyperinus	Woolgrass	LW-34010501012003	2	OBL	GRAMINOID
Osmunda regalis	Royal fern	LW-35010305001003	6		FORB/HERB
Nymphoides cordata	Little floatingheart	LW-34024802002001	6	OBL	FORB/HERB
Carex stricta	Upright sedge	LW-34010501002139	4	OBL	GRAMINOID
Rosa palustris	Swamp rose	LW-34024202020012	4	OBL	SUBSHRUB
Salix		LW-34024401002			
Utricularia radiata	Little floating bladderwort	LW-34022305002008	6	OBL	FORB/HERB
Pontederia cordata	Pickerelweed	LW-34010906002002	4	OBL	FORB/HERB
Calamagrostis canadensis	Bluejoint	LW-34010502017001	2	OBL	GRAMINOID

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Additional Summary Variables

Station Number: W-319 Waterbody: LAMPREY RIVER (NH) Town: Not Designated

Log Number: DN-2017-319-WET-RAY-1 Subsample Factor: X1 Replicates: 3 Calculated: 5/8/2018

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	59.33	0.234	8	0.23
EPT Taxa:	46.00	0.181	4	0.11
Insects:	79.67	0.314	23	0.66
Non-Insects:	174.33	0.686	12	0.34
Leeches:	1.33	0.005	1	0.03
Oligochaetes:	8.67	0.034	2	0.06
Snails:	18.33	0.072	4	0.11
Bivalves:	26.00	0.102	1	0.03
Isopods:	1.00	0.004	1	0.03
Amphipods:	117.00	0.461	1	0.03
Mites:	2.00	0.008	2	0.06
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	40.67	0.160	2	0.06
Odonates:	13.33	0.052	4	0.11
Caddisflies:	5.33	0.021	2	0.06
Diptera:	14.33	0.056	9	0.26
Hemiptera:	5.00	0.020	4	0.11
Beetles:	1.00	0.004	2	0.06
Chironomids:	12.67	0.050	7	0.20
Tanypodinae Tribe:	7.19	0.028	3	0.09
Chironomiinae Tribe:	5.48	0.022	4	0.11
Orthoclodiinae Tribe:	0.00	0.000	0	0.00
Collector-Filterers:	30.79	0.121	3	0.09
Collector-Gatherers:	166.33	0.655	5	0.14
Predators:	12.19	0.048	10	0.29
Piercers:	5.67	0.022	2	0.06
Shredders:	1.00	0.004	1	0.03
Scrapers:	1.33	0.005	1	0.03
Maine Tolerance:				
Sensitive:	14.33	0.074	5	0.20
Intermediate:	174.99	0.904	15	0.60
Eurytopic:	4.34	0.022	5	0.20
Ratio of MTI Sensitive to Eurytopic	3.30	3.301	1.00	1.00

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-319 Waterbody: LAMPREY RIVER (NH) Town: Not Designated

Log Number: DN-2017-319-WET-RAY-1 Subsample Factor: X1 Replicates: 3 Calculated: 5/8/2018

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsenhoff Biotic Index	Functional Feeding Group	Maine Tolerance Index	Tribe	Taxa Group
Naididae	08020202	0.33	0.00	--	--	--	--	Worm
Dero	08020202007	0.67	0.69	--	CG	37.9-I	--	Worm
Stylaria	08020202014	0.00	7.97	--	CG	18-S	--	Worm
Stylaria lacustris	08020202014002	7.67	0.00	--	--	--	--	Worm
Helobdella	08030101005	0.00	1.33	--	--	43-E	--	Leech
Helobdella modesta	08030101005004	1.33	0.00	--	--	--	--	Leech
Caecidotea	09010101001	1.00	1.00	8	SH	51.9-E	--	Isopod
Hyalella	09010203006	0.00	117.00	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	117.00	0.00	--	--	--	--	Amphipod
Gomphidae	09020302	0.67	0.67	--	--	--	--	Dragonfly/damselfly
Libellulidae	09020306	1.33	1.33	--	--	--	--	Dragonfly/damselfly
Lestes	09020308045	0.67	0.67	9	PR	32.6-I	--	Dragonfly/damselfly
Coenagrionidae	09020309	10.67	10.67	--	--	--	--	Dragonfly/damselfly
Callibaetis	09020401002	12.33	12.33	9	CG	40.5-I	--	Mayfly
Caenis	09020412040	28.33	28.33	7	CG	22.1-I	--	Mayfly
Corixidae	09020501	1.67	1.67	--	--	--	--	True Bug
Belostoma	09020502009	0.33	0.33	--	PR	41.7-I	--	True Bug
Mesovelia	09020509024	1.00	1.00	--	PR	60.6-E	--	True Bug
Neoplea	09020512016	2.00	2.00	--	PR	35.5-I	--	True Bug
Oxyethira	09020607028	5.00	5.00	3	P	22-S	--	Caddisfly
Oecetis	09020618078	0.33	0.33	8	PR	16.3-S	--	Caddisfly
Chaoborus	09021007025	0.33	0.33	8	PR	25-I	--	Fly: Phantom Midge
Ceratopogonidae	09021010	1.33	1.33	--	--	--	--	Fly: Biting Midge
Chironomidae	09021011	0.33	0.00	--	--	--	--	Fly: Midge
Ablabesmyia	09021011001	2.00	2.05	8	PR	23.6-I	T	Fly: Midge
Guttipelopia	09021011006	0.00	0.68	5	PR	19.4-S	T	Fly: Midge
Guttipelopia guttipennis	09021011006018	0.67	0.00	--	--	--	T	Fly: Midge
Procladius	09021011015	4.33	4.45	9	PR	25.1-I	T	Fly: Midge
Paratanytarsus	09021011071	0.33	0.34	6	--	43-E	Y	Fly: Midge
Tanytarsus	09021011076	4.00	4.11	6	CF	25.7-I	Y	Fly: Midge
Microtendipes	09021011094	0.67	0.68	6	CF	22.3-I	C	Fly: Midge
Zavreliella	09021011133	0.00	0.34	--	--	21.8-S	H	Fly: Midge
Zavreliella marmorata	09021011133010	0.33	0.00	--	--	--	S	Fly: Midge
Haliplus	09021101001	0.67	0.67	--	P	67.1-E	--	Beetle
Agabus	09021103016	0.33	0.33	--	PR	34.5-I	--	Beetle

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-319 Waterbody: LAMPREY RIVER (NH) Town: Not Designated

Log Number: DN-2017-319-WET-RAY-1 Subsample Factor: X1 Replicates: 3 Calculated: 5/8/2018

Taxon	Maine Taxonomic Code	Count (Mean of Samples)		Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
		Actual	Adjusted					
Hydrachnidia	09030101	1.67	1.67	--	--	--	--	Mite
Arrenurus	09030111001	0.33	0.33	--	--	23.8-I	--	Mite
Hydrobiidae	10010104	15.33	15.33	--	--	--	--	Snail
Lymnaeidae	10010201	0.33	0.33	--	--	--	--	Snail
Planorbidae	10010203	1.33	1.33	--	--	--	--	Snail
Helisoma	10010203030	1.33	1.33	--	SC	42.8-I	--	Snail
Sphaeriidae	10020201	26.00	26.00	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-284 Trip ID: 2015-284-WET-SAL-1
Waterbody: WORLD END POND (NH)
Town: Not Designated
Mitigation Monitoring Site: No
River Basin: Merrimack
HUC8 Name: Merrimack River
Latitude: 42 45 22.03 N
Longitude: 71 11 20.07 W

Sample Information

Sample ID: DN-2015-284-WET-SAL-1 Type of Sample: DIPNET Date Sampled: 7/6/2015
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: C** Date: 10/25/2016
Model Result with P≥0.6: C **Reason for Determination: Model**
Date Last Calculated: 8/30/2016 Comments:

Model Probabilities

First Stage Model

Class A:	0.00	Class C:	0.99
Class B:	0.01	NA:	0.00

B or Better Model

Class A or B	0.01
Class C or Non-Attainment	0.99

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.00
Class B or C or Non-Attainment	1.00

Model Variables

		Reference Range
Total Mean Abundance	77	< 787
Ephemeroptera Abundance	0.33	most > 35
Odonata Relative Abundance	0.009	most > 0.04
Trichoptera Relative Abundance	0.061	most > 0.02
Shredder Taxa Relative Abundance	0.36	< 0.2
Non-insect Taxa Relative Richness	0.57	< 0.4
MTI Sensitive Taxa Abundance	9.33	most > 30
MTI Sensitive Taxa Relative Abundance	0.13	most > 0.05
MTI Sensitive Taxa Richness	3	most > 7
MTI Intermediate Taxa Relative Abundance	0.42	> 0.5
MTI Intermediate Taxa Richness	14	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	0.29	most > 1

Other Variables

Generic Richness:	28
Hilsenhoff Biotic Index:	7.86
Shannon-Weiner Diversity:	3.25
Maine Tolerance Index:	36.09

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Caecidotea communis*	35.06
2	*Hyalella azteca*	22.08
3	*Helobdella modesta*	6.06
3	*Polycentropus*	6.06
4	*Amnicola*	5.63
5	*Arrenurus*	5.19

Sample Collection and Processing Information

Sampling Organization: JP, SC, SM
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 7/6/2015 10:33:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	6.35	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	74.1	%	
Surface Water	In-situ	pH	6.72		
Surface Water	In-situ	Specific Conductance	372	us/cm	
Surface Water	In-situ	Temperature	23.6	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	14	System:	LACUSTRINE	Landscape Position:	
Hydrologic Modifications:	2	Subsystem:	LITTORAL	Lotic Gradient:	
Vegetative Modifications:	2	Class 1:	AQUATIC BED	Flow Path:	
Chemical Pollutants:	1	Subclass 1:		Land Form:	
Watershed Characterization and Non-point Sources:	9	Class 2:	EMERGENT	Land Form Type:	
		Subclass 2:		Waterbody Type:	
		Class 3:		Waterbody Subtype:	
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations:

Habitat Classification:
AQUATIC MACROPHYTE BED
EMERGENT NON-PERSISTENT VEGETATION
EMERGENT PERSISTENT VEGETATION

Substrate Classification:
PEAT SUBSTRATE

Average Depth: 81 cm Visible Flow: No Rain In Previous 24 Hours: Unknown

Sample Comments:

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Utricularia intermedia	Flatleaf bladderwort	LW-34022305002004	6	OBL	FORB/HERB
Nuphar lutea ssp. variegata	Varigated yellow pond-lily	LW-34023103002002	4	OBL	FORB/HERB
Typha		LW-34011301002			
Eleocharis		LW-34010501006			
Myrica gale	Sweetgale	LW-34022801003001	5	OBL	SHRUB
Lythrum salicaria	Purple loosestrife	LW-34022901002004	0	OBL	FORB/HERB
Sparganium		LW-34011301001			
Proserpinaca palustris	Marsh mermaidweed	LW-34022001002001	5	OBL	FORB/HERB
Nymphaea odorata	American white waterlily	LW-34023103003002	5	OBL	FORB/HERB
Acer rubrum	Red maple	LW-34024603001006	2	FAC	TREE
Pontederia cordata	Pickerelweed	LW-34010906002002	4	OBL	FORB/HERB
Lemna minor	Common duckweed	LW-34010201002001	3	OBL	FORB/HERB
Lemna trisulca	Star duckweed	LW-34010201002002	4	OBL	FORB/HERB
Utricularia		LW-34022305002			

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Additional Summary Variables

Station Number: W-284 Waterbody: WORLD END POND (NH) Town: Not Designated

Log Number: DN-2015-284-WET-SAL-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/30/2016

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	5.67	0.074	3	0.11
EPT Taxa:	5.00	0.065	2	0.07
Insects:	12.67	0.165	12	0.43
Non-Insects:	64.33	0.835	16	0.57
Leeches:	6.33	0.082	4	0.14
Oligochaetes:	0.67	0.009	2	0.07
Snails:	8.00	0.104	5	0.18
Bivalves:	0.67	0.009	1	0.04
Isopods:	27.00	0.351	1	0.04
Amphipods:	17.00	0.221	1	0.04
Mites:	4.33	0.056	1	0.04
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	0.33	0.004	1	0.04
Odonates:	0.67	0.009	1	0.04
Caddisflies:	4.67	0.061	1	0.04
Diptera:	4.33	0.056	7	0.25
Hemiptera:	2.67	0.035	2	0.07
Beetles:	0.00	0.000	0	0.00
Chironomids:	4.33	0.056	7	0.25
Tanypodinae Tribe:	0.67	0.009	2	0.07
Chironomiinae Tribe:	3.00	0.039	4	0.14
Orthoclodiinae Tribe:	0.67	0.009	1	0.04
Collector-Filterers:	0.67	0.009	1	0.04
Collector-Gatherers:	20.33	0.264	6	0.21
Predators:	8.00	0.104	5	0.18
Piercers:	0.00	0.000	0	0.00
Shredders:	27.67	0.359	2	0.07
Scrapers:	5.67	0.074	3	0.11
Maine Tolerance:				
Sensitive:	9.33	0.131	3	0.15
Intermediate:	29.67	0.416	14	0.70
Eurytopic:	32.33	0.453	3	0.15
Ratio of MTI Sensitive to Eurytopic	0.29	0.289	1.00	1.00

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-284 Waterbody: WORLD END POND (NH) Town: Not Designated

Log Number: DN-2015-284-WET-SAL-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/30/2016

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsenhoff Biotic Index	Functional Feeding Group	Maine Tolerance Index	Tribe	Taxa Group
Nematoda	05	0.33	0.33	--	--	--	--	Nematode
Naididae	08020202	0.33	0.33	--	--	--	--	Worm
Stylaria	08020202014	0.33	0.33	--	CG	18-S	--	Worm
Alboglossiphonia	08030101002	0.00	0.67	--	--	--	--	Leech
Alboglossiphonia heteroclita	08030101002001	0.67	0.00	--	--	--	--	Leech
Glossiphonia	08030101004	0.33	0.33	--	--	55.3-E	--	Leech
Helobdella	08030101005	0.00	5.00	--	--	43-E	--	Leech
Helobdella papillata	08030101005003	0.33	0.00	--	--	--	--	Leech
Helobdella modesta	08030101005004	4.67	0.00	--	--	--	--	Leech
Erpobdella	08030203002	0.00	0.33	--	--	36.4-I	--	Leech
Erpobdella punctata	08030203002001	0.33	0.00	--	--	--	--	Leech
Caecidotea	09010101001	0.00	27.00	8	SH	51.9-E	--	Isopod
Caecidotea communis	09010101001001	27.00	0.00	--	--	--	--	Isopod
Hyalella	09010203006	0.00	17.00	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	17.00	0.00	--	--	--	--	Amphipod
Enallagma	09020309051	0.67	0.67	9	PR	26.2-I	--	Dragonfly/damselfly
Caenis	09020412040	0.33	0.33	7	CG	22.1-I	--	Mayfly
Corixidae	09020501	0.67	0.67	--	--	--	--	True Bug
Neoplea	09020512016	2.00	2.00	--	PR	35.5-I	--	True Bug
Polycentropus	09020603010	4.67	4.67	6	PR	15.4-S	--	Caddisfly
Ablabesmyia	09021011001	0.33	0.33	8	PR	23.6-I	T	Fly: Midge
Procladius	09021011015	0.33	0.33	9	PR	25.1-I	T	Fly: Midge
Corynoneura	09021011036	0.67	0.67	7	CG	40.1-I	--	Fly: Midge
Chironomus	09021011080	1.67	1.67	10	CG	27.4-I	C	Fly: Midge
Dicrotendipes	09021011085	0.33	0.33	8	CG	28.8-I	C	Fly: Midge
Polypedilum	09021011102	0.67	0.67	6	SH	24.2-I	C	Fly: Midge
Hyporhygma	09021011129	0.00	0.33	--	--	--	H	Fly: Midge
Hyporhygma quadripunctatus	09021011129001	0.33	0.00	--	--	--	H	Fly: Midge
Arachnida	0903	0.33	0.33	--	--	--	--	Arachnid
Arrenurus	09030111001	4.00	4.00	--	--	23.8-I	--	Mite
Hydrobiidae	10010104	0.67	0.67	--	--	--	--	Snail
Amnicola	10010104013	4.33	4.33	--	SC	18.7-S	--	Snail
Lymnaeidae	10010201	1.67	1.67	--	--	--	--	Snail
Physa	10010202027	0.00	1.00	--	SC	34-I	--	Snail
Physa acuta	10010202027053	1.00	0.00	--	--	--	--	Snail

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-284 Waterbody: WORLD END POND (NH) Town: Not Designated

Log Number: DN-2015-284-WET-SAL-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/30/2016

Taxon	Maine Taxonomic Code	Count (Mean of Samples)		Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
		Actual	Adjusted					
Gyraulus	10010203029	0.33	0.33	--	SC	37.2-I	--	Snail
Pisidium	10020201002	0.67	0.67	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-285 Trip ID: 2015-285-WET-SAL-2 River Basin: Merrimack
Waterbody: SALEM HS WETLAND (NH) HUC8 Name: Merrimack River
Town: Not Designated Latitude: 42 46 58.03 N
Mitigation Monitoring Site: No Longitude: 71 12 36.15 W

Sample Information

Sample ID: DN-2015-285-WET-SAL-2 Type of Sample: DIPNET Date Sampled: 7/20/2015
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: I** Date: 10/25/2016
Model Result with P≥0.6: I **Reason for Determination: Model**
Date Last Calculated: 8/30/2016 Comments: Minimum provisions for Total Mean Abundance and Generic Richness not met.

Model Probabilities

First Stage Model

Class A:	0.00	Class C:	0.01
Class B:	0.99	NA:	0.00

B or Better Model

Class A or B	0.99
Class C or Non-Attainment	0.01

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.00
Class B or C or Non-Attainment	1.00

Model Variables

		Reference Range
Total Mean Abundance	45	< 787
Ephemeroptera Abundance	0.00	most > 35
Odonata Relative Abundance	0.000	most > 0.04
Trichoptera Relative Abundance	0.000	most > 0.02
Shredder Taxa Relative Abundance	0.04	< 0.2
Non-insect Taxa Relative Richness	0.45	< 0.4
MTI Sensitive Taxa Abundance	25.33	most > 30
MTI Sensitive Taxa Relative Abundance	0.68	most > 0.05
MTI Sensitive Taxa Richness	2	most > 7
MTI Intermediate Taxa Relative Abundance	0.27	> 0.5
MTI Intermediate Taxa Richness	5	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	12.67	most > 1

Other Variables

Generic Richness:	11
Hilsenhoff Biotic Index:	6.80
Shannon-Weiner Diversity:	2.59
Maine Tolerance Index:	24.85

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Stylaria*	51.47
2	*Sphaeriidae*	8.82
3	*Bezzia/palpomyia*	4.41
3	*Erpobdella punctata*	4.41
3	*Hyalella azteca*	4.41
3	*Hydrovatus*	4.41

3	*Lumbriculidae*	4.41
3	*Odontomyia*	4.41
3	*Polypedilum*	4.41
3	*Psectrocladius*	4.41
3	*Tanytarsus*	4.41

Sample Collection and Processing Information

Sampling Organization: SJC
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 7/20/2015 11:45:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	0.03	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	0.2	%	
Surface Water	In-situ	pH	5.93		
Surface Water	In-situ	Specific Conductance	1700	us/cm	
Surface Water	In-situ	Temperature	25.6	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	37	System:	PALUSTRINE	Landscape Position:	
Hydrologic Modifications:	8	Subsystem:		Lotic Gradient:	
Vegetative Modifications:	6	Class 1:	EMERGENT	Flow Path:	
Chemical Pollutants:	4	Subclass 1:	PERSISTENT	Land Form:	
Watershed Characterization and Non-point Sources:	19	Class 2:		Land Form Type:	
		Subclass 2:		Waterbody Type:	
		Class 3:		Waterbody Subtype:	
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations: SUPERABUNDANCE OF TYPHA LATIFOLIA.

Habitat Classification:	Substrate Classification:
EMERGENT NON-PERSISTENT VEGETATION	ORGANIC SOIL SUBSTRATE
EMERGENT PERSISTENT VEGETATION	SILT/MUCK SUBSTRATE

Average Depth: 26 cm Visible Flow: No Rain In Previous 24 Hours: No

Sample Comments: ORIGIN OF WETLAND IS DIFFICULT TO DETERMINE -- WHETHER IS WAS ENCROACHED UPON OR WHETHER DEVELOPMENT HAS CONTRIBUTED TO ITS FORMATION WITH THE ADDITION OF DRAINAGE FROM NATURAL AND ANTHROPOGENIC SOURCES.

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Eleocharis obtusa	Blunt spikerush	LW-34010501006010	2	OBL	GRAMINOID
Spiraea		LW-34024202026			
Lemna		LW-34010201002			
Typha		LW-34011301002			
Hypericum		LW-34022601001			
Lythrum salicaria	Purple loosestrife	LW-34022901002004	0	OBL	FORB/HERB
Polygonum		LW-34023701005			
Triadenum		LW-34022601002			
Cornus		LW-34021001001			
Eleocharis acicularis	Needle spikerush	LW-34010501006001	4	OBL	GRAMINOID

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Additional Summary Variables

Station Number: W-285 Waterbody: SALEM HS WETLAND (NH) Town: Not Designated

Log Number: DN-2015-285-WET-SAL-2 Subsample Factor: X1 Replicates: 3 Calculated: 8/30/2016

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	0.00	0.000	0	0.00
EPT Taxa:	0.00	0.000	0	0.00
Insects:	12.00	0.265	6	0.55
Non-Insects:	33.33	0.735	5	0.45
Leeches:	2.00	0.044	1	0.09
Oligochaetes:	25.33	0.559	2	0.18
Snails:	0.00	0.000	0	0.00
Bivalves:	4.00	0.088	1	0.09
Isopods:	0.00	0.000	0	0.00
Amphipods:	2.00	0.044	1	0.09
Mites:	0.00	0.000	0	0.00
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	0.00	0.000	0	0.00
Odonates:	0.00	0.000	0	0.00
Caddisflies:	0.00	0.000	0	0.00
Diptera:	10.00	0.221	5	0.45
Hemiptera:	0.00	0.000	0	0.00
Beetles:	2.00	0.044	1	0.09
Chironomids:	6.00	0.132	3	0.27
Tanypodinae Tribe:	0.00	0.000	0	0.00
Chironomiinae Tribe:	4.00	0.088	2	0.18
Orthoclodiinae Tribe:	2.00	0.044	1	0.09
Collector-Filterers:	6.00	0.132	2	0.18
Collector-Gatherers:	29.33	0.647	4	0.36
Predators:	4.00	0.088	2	0.18
Piercers:	0.00	0.000	0	0.00
Shredders:	2.00	0.044	1	0.09
Scrapers:	0.00	0.000	0	0.00
Maine Tolerance:				
Sensitive:	25.33	0.679	2	0.25
Intermediate:	10.00	0.268	5	0.63
Eurytopic:	2.00	0.054	1	0.13
Ratio of MTI Sensitive to Eurytopic	12.67	12.667	2.00	2.00

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-285 Waterbody: SALEM HS WETLAND (NH) Town: Not Designated

Log Number: DN-2015-285-WET-SAL-2 Subsample Factor: X1 Replicates: 3 Calculated: 8/30/2016

Taxon	Maine Taxonomic Code	Count (Mean of Samples)		Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
		Actual	Adjusted					
Lumbriculidae	08020101	2.00	2.00	--	--	--	--	Worm
Stylaria	08020202014	23.33	23.33	--	CG	18-S	--	Worm
Erpobdella	08030203002	0.00	2.00	--	--	36.4-I	--	Leech
Erpobdella punctata	08030203002001	2.00	0.00	--	--	--	--	Leech
Hyalella	09010203006	0.00	2.00	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	2.00	0.00	--	--	--	--	Amphipod
Bezzia/palpomyia	09021010043	2.00	2.00	6	PR	26.9-I	--	Fly: Biting Midge
Psectrocladius	09021011056	2.00	2.00	8	CG	22-S	--	Fly: Midge
Tanytarsus	09021011076	2.00	2.00	6	CF	25.7-I	Y	Fly: Midge
Polypedilum	09021011102	2.00	2.00	6	SH	24.2-I	C	Fly: Midge
Odontomyia	09021013051	2.00	2.00	--	CG	94.2-E	--	Fly: Aquatic Soldier
Hydrovatus	09021103007	2.00	2.00	--	PR	--	--	Beetle
Sphaeriidae	10020201	4.00	4.00	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-320 Trip ID: 2017-320-WET-SHM-1 River Basin:
Waterbody: TUXBURY POND (NH) HUC8 Name:
Town: Not Designated Latitude: 42 52 15.03 N
Mitigation Monitoring Site: No Longitude: 70 59 38.53 W

Sample Information

Sample ID: DN-2017-320-WET-SHM-1 Type of Sample: DIPNET Date Sampled: 8/1/2017
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination:** Date:
Model Result with P≥0.6: B **Reason for Determination:**
Date Last Calculated: 5/8/2018 Comments:

Model Probabilities

First Stage Model

Class A: 0.06 Class C: 0.26
Class B: 0.68 NA: 0.00

B or Better Model

Class A or B 0.74
Class C or Non-Attainment 0.26

C or Better Model

Class A, B, or C 1.00
Non-Attainment 0.00

A Model

Class A 0.06
Class B or C or Non-Attainment 0.95

Model Variables

		Reference Range
Total Mean Abundance	433	< 787
Ephemeroptera Abundance	10.00	most > 35
Odonata Relative Abundance	0.015	most > 0.04
Trichoptera Relative Abundance	0.011	most > 0.02
Shredder Taxa Relative Abundance	0.07	< 0.2
Non-insect Taxa Relative Richness	0.26	< 0.4
MTI Sensitive Taxa Abundance	7.89	most > 30
MTI Sensitive Taxa Relative Abundance	0.02	most > 0.05
MTI Sensitive Taxa Richness	7	most > 7
MTI Intermediate Taxa Relative Abundance	0.89	> 0.5
MTI Intermediate Taxa Richness	21	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	0.27	most > 1

Other Variables

Generic Richness:	46
Hilsenhoff Biotic Index:	7.95
Shannon-Weiner Diversity:	2.39
Maine Tolerance Index:	27.14

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	64.64
2	*Hydrobiidae*	9.48
3	*Caecidotea*	5.47
4	*Sphaeriidae*	2.54
5	*Callibaetis*	1.77

Sample Collection and Processing Information

Sampling Organization: NHDES
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 8/1/2017 11:48:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	3.68	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	42.9	%	
Surface Water	In-situ	pH	5.89		
Surface Water	In-situ	Specific Conductance	208.7	us/cm	
Surface Water	In-situ	Temperature	23.2	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	21	System:	LACUSTRINE	Landscape Position:	
Hydrologic Modifications:	4	Subsystem:	LIMNETIC	Lotic Gradient:	LOW GRADIENT
Vegetative Modifications:	5	Class 1:	AQUATIC BED	Flow Path:	THROUGHFLOW
Chemical Pollutants:	0	Subclass 1:	NON-PERSISTENT	Land Form:	
Watershed Characterization and Non-point Sources:	12	Class 2:	UNCONSOLIDATED BOTTOM	Land Form Type:	
		Subclass 2:	PERSISTENT	Waterbody Type:	LAKE
		Class 3:		Waterbody Subtype:	
		Subclass 3:			
				Comments:	DAMMED RIVER VALLEY LAKE

Dominant Plant Species:

Additional Plant Community Observations: CHAMAECYPARIS THYOIDES AND NYSSA SYLVATICA OBSERVED ALONG PART OF SHORELINE. DEAD PIECE OF MYRIOPHYLLUM HETEROPHYLLUM FOUND FLOATING IN RIVER. (IT IS PRESENT UPSTREAM IN POWWOW POND.) ATLANTIC WHITE CEDAR - YELLOW BIRCH - PEPPERBUSH SWAMP OCCURS AS PART OF A COASTAL CONIFER PEAT SWAMP SYSTEM.

Habitat Classification: AQUATIC MACROPHYTE BED

Substrate Classification: SILT/MUCK SUBSTRATE

Average Depth: 82 cm Visible Flow: Yes Rain In Previous 24 Hours: No

Sample Comments: BRYOZOAN COLONY OBSERVED NEAR ACCESS. APPROXIMATELY 0.5 METER IN LENGTH. ALSO NOTED WALKING STICK/WATER SCORPION. PHOTOS TAKEN.

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Alnus incana ssp. rugosa	Speckled alder	LW-34021701001002	2	FACW	TREE, SHRUB
Lythrum salicaria	Purple loosestrife	LW-34022901002004	0	OBL	FORB/HERB
Elodea canadensis	Canadian waterweed	LW-34010701001001	5	OBL	FORB/HERB
Myrica gale	Sweetgale	LW-34022801003001	5	OBL	SHRUB
Acer rubrum	Red maple	LW-34024603001006	2	FAC	TREE
Cephalanthus occidentalis	Common buttonbush	LW-34024301001001	6	OBL	TREE, SHRUB
Ludwigia palustris	Marsh seedbox	LW-34022903004001	5	OBL	FORB/HERB
Spiraea alba var. latifolia	White meadowsweet	LW-34024202026002	2	FACW	SHRUB
WOLFFIA		LW-34010201006			
Sparganium		LW-34011301001			
Utricularia intermedia	Flatleaf bladderwort	LW-34022305002004	6	OBL	FORB/HERB
Ceratophyllum		LW-34023101001			
Nuphar lutea ssp. variegata	Variegated yellow pond-	LW-34023103002002	4	OBL	FORB/HERB

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
	lily				
Rosa palustris	Swamp rose	LW-34024202020012	4	OBL	SUBSHRUB
Dulichium arundinaceum	Threeway sedge	LW-34010501005001	5	OBL	GRAMINOID
Nymphaea odorata	American white waterlily	LW-34023103003002	5	OBL	FORB/HERB
Osmunda regalis	Royal fern	LW-35010305001003	6		FORB/HERB
Ilex verticillata	Common winterberry	LW-34020201001005	3	FACW	TREE, SHRUB
Utricularia macrorhiza	Common bladderwort	LW-34022305002005	3	OBL	FORB/HERB
Pontederia cordata	Pickerelweed	LW-34010906002002	4	OBL	FORB/HERB
Brasenia schreberi	Watershield	LW-34023103001001	6	OBL	FORB/HERB
Lemna minor	Common duckweed	LW-34010201002001	3	OBL	FORB/HERB

Additional Summary Variables

Station Number: W-320 Waterbody: TUXBURY POND (NH) Town: Not Designated

Log Number: DN-2017-320-WET-SHM-1 Subsample Factor: X1 Replicates: 3 Calculated: 5/8/2018

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	21.00	0.049	8	0.17
EPT Taxa:	14.67	0.034	6	0.13
Insects:	52.67	0.122	34	0.74
Non-Insects:	380.00	0.878	12	0.26
Leeches:	5.33	0.012	2	0.04
Oligochaetes:	6.33	0.015	2	0.04
Snails:	45.67	0.106	3	0.07
Bivalves:	11.00	0.025	1	0.02
Isopods:	23.67	0.055	1	0.02
Amphipods:	279.67	0.646	1	0.02
Mites:	8.33	0.019	2	0.04
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	10.00	0.023	2	0.04
Odonates:	6.33	0.015	2	0.04
Caddisflies:	4.67	0.011	4	0.09
Diptera:	24.67	0.057	18	0.39
Hemiptera:	6.33	0.015	6	0.13
Beetles:	0.67	0.002	2	0.04
Chironomids:	21.33	0.049	16	0.35
Tanypodinae Tribe:	4.27	0.010	7	0.15
Chironomiinae Tribe:	16.36	0.038	8	0.17
Orthoclodiinae Tribe:	0.71	0.002	1	0.02
Collector-Filterers:	11.71	0.027	3	0.07
Collector-Gatherers:	292.13	0.675	6	0.13
Predators:	18.36	0.042	18	0.39
Piercers:	1.67	0.004	2	0.04
Shredders:	31.13	0.072	3	0.07
Scrapers:	4.67	0.011	2	0.04
Maine Tolerance:				
Sensitive:	7.89	0.022	7	0.21
Intermediate:	317.22	0.894	21	0.64
Eurytopic:	29.56	0.083	5	0.15
Ratio of MTI Sensitive to Eurytopic	0.27	0.267	1.40	1.40

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-320 Waterbody: TUXBURY POND (NH) Town: Not Designated

Log Number: DN-2017-320-WET-SHM-1 Subsample Factor: X1 Replicates: 3 Calculated: 5/8/2018

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
Tubificida	080202	3.67	3.67	--	--	--	--	Worm
Naididae	08020202	2.33	2.33	--	--	--	--	Worm
Dero	08020202007	0.33	0.33	--	CG	37.9-I	--	Worm
Glossiphoniidae	08030101	3.33	3.33	--	--	--	--	Leech
Helobdella	08030101005	0.00	2.00	--	--	43-E	--	Leech
Helobdella elongata	08030101005001	1.00	0.00	--	--	--	--	Leech
Helobdella fusca	08030101005002	0.67	0.00	--	--	--	--	Leech
Helobdella modesta	08030101005004	0.33	0.00	--	--	--	--	Leech
Caecidotea	09010101001	23.67	23.67	8	SH	51.9-E	--	Isopod
Hyalella	09010203006	0.00	279.67	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	279.67	0.00	--	--	--	--	Amphipod
Coenagrionidae	09020309	0.67	0.67	--	--	--	--	Dragonfly/damselfly
Enallagma	09020309051	5.67	5.67	9	PR	26.2-I	--	Dragonfly/damselfly
Callibaetis	09020401002	7.67	7.67	9	CG	40.5-I	--	Mayfly
Caenis	09020412040	2.33	2.33	7	CG	22.1-I	--	Mayfly
Corixidae	09020501	3.00	3.00	--	--	--	--	True Bug
Trichocorixa	09020501008	0.33	0.33	--	PR	--	--	True Bug
Ranatra	09020503012	0.33	0.33	--	PR	42.3-I	--	True Bug
Notonecta	09020505015	1.00	1.00	--	PR	--	--	True Bug
Mesovelia	09020509024	0.33	0.33	--	PR	60.6-E	--	True Bug
Neoplea	09020512016	1.33	1.33	--	PR	35.5-I	--	True Bug
Polycentropus	09020603010	2.33	2.33	6	PR	15.4-S	--	Caddisfly
Oxyethira	09020607028	1.33	1.33	3	P	22-S	--	Caddisfly
Orthotrichia	09020607031	0.33	0.33	--	P	--	--	Caddisfly
Oecetis	09020618078	0.67	0.67	8	PR	16.3-S	--	Caddisfly
Chaoborus	09021007025	0.33	0.33	8	PR	25-I	--	Fly: Phantom Midge
Ceratopogonidae	09021010	3.00	3.00	--	--	--	--	Fly: Biting Midge
Chironomidae	09021011	1.33	0.00	--	--	--	--	Fly: Midge
Ablabesmyia	09021011001	1.33	1.42	8	PR	23.6-I	T	Fly: Midge
Clinotanypus	09021011002	0.00	0.36	8	PR	30.3-I	T	Fly: Midge
Clinotanypus pinguis	09021011002008	0.33	0.00	--	--	--	--	Fly: Midge
Guttipelopia	09021011006	0.00	0.36	5	PR	19.4-S	T	Fly: Midge
Guttipelopia guttipennis	09021011006018	0.33	0.00	--	--	--	T	Fly: Midge
Labrundinia	09021011008	0.67	0.71	7	PR	18.1-S	T	Fly: Midge
Larsia	09021011009	0.33	0.36	6	PR	15.6-S	T	Fly: Midge

Maine Department of Environmental Protection
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Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-320 Waterbody: TUXBURY POND (NH) Town: Not Designated

Log Number: DN-2017-320-WET-SHM-1 Subsample Factor: X1 Replicates: 3 Calculated: 5/8/2018

Taxon	Maine Taxonomic Code	Count (Mean of Samples)		Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
		Actual	Adjusted					
Procladius	09021011015	0.67	0.71	9	PR	25.1-I	T	Fly: Midge
Tanypus	09021011018	0.33	0.36	10	PR	33.5-I	T	Fly: Midge
Corynoneura	09021011036	0.67	0.71	7	CG	40.1-I	--	Fly: Midge
Paratanytarsus	09021011071	3.00	3.20	6	--	43-E	Y	Fly: Midge
Tanytarsus	09021011076	0.33	0.36	6	CF	25.7-I	Y	Fly: Midge
Chironomus	09021011080	1.33	1.42	10	CG	27.4-I	C	Fly: Midge
Endochironomus	09021011087	0.33	0.36	10	SH	50.2-E	C	Fly: Midge
Microtendipes	09021011094	0.33	0.36	6	CF	22.3-I	C	Fly: Midge
Parachironomus	09021011097	1.33	1.42	10	PR	28.6-I	C	Fly: Midge
Polypedilum	09021011102	6.67	7.11	6	SH	24.2-I	C	Fly: Midge
Zavreliella	09021011133	0.00	2.13	--	--	21.8-S	H	Fly: Midge
Zavreliella marmorata	09021011133010	2.00	0.00	--	--	--	S	Fly: Midge
Dytiscidae	09021103	0.33	0.33	--	--	--	--	Beetle
Agabus	09021103016	0.33	0.33	--	PR	34.5-I	--	Beetle
Hydrachnidia	09030101	6.33	6.33	--	--	--	--	Mite
Arrenurus	09030111001	2.00	2.00	--	--	23.8-I	--	Mite
Hydrobiidae	10010104	41.00	41.00	--	--	--	--	Snail
Physidae	10010202	1.67	1.67	--	SC	--	--	Snail
Gyraulus	10010203029	1.67	3.00	--	SC	37.2-I	--	Snail
Gyraulus deflectus	10010203029056	1.33	0.00	--	--	--	--	Snail
Sphaeriidae	10020201	11.00	11.00	--	CF	--	--	Clam

Maine Department of Environmental Protection
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Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-286 Trip ID: 2015-286-WET-TRO-1 River Basin: Connecticut
Waterbody: PERKINS POND - UPPER (NH) HUC8 Name:
Town: Not Designated Latitude: 42 50 35.89 N
Mitigation Monitoring Site: No Longitude: 72 8 16.39 W

Sample Information

Sample ID: DN-2015-286-WET-TRO-1 Type of Sample: DIPNET Date Sampled: 7/29/2015
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: I** Date: 10/25/2016
Model Result with P≥0.6: I **Reason for Determination: Model**
Date Last Calculated: 8/30/2016 Comments: Minimum provisions for Generic Richness not met.

Model Probabilities

First Stage Model

Class A:	0.00	Class C:	0.98
Class B:	0.02	NA:	0.00

B or Better Model

Class A or B	0.02
Class C or Non-Attainment	0.98

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.00
Class B or C or Non-Attainment	1.00

Model Variables

		Reference Range
Total Mean Abundance	131	< 787
Ephemeroptera Abundance	0.00	most > 35
Odonata Relative Abundance	0.005	most > 0.04
Trichoptera Relative Abundance	0.003	most > 0.02
Shredder Taxa Relative Abundance	0.01	< 0.2
Non-insect Taxa Relative Richness	0.27	< 0.4
MTI Sensitive Taxa Abundance	1.00	most > 30
MTI Sensitive Taxa Relative Abundance	0.01	most > 0.05
MTI Sensitive Taxa Richness	2	most > 7
MTI Intermediate Taxa Relative Abundance	0.99	> 0.5
MTI Intermediate Taxa Richness	7	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	1.00	most > 1

Other Variables

Generic Richness:	11
Hilsenhoff Biotic Index:	8.04
Shannon-Weiner Diversity:	0.73
Maine Tolerance Index:	24.47

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	89.09
2	*Procladius*	6.09
3	*Pisidium*	2.03
4	*Arrenurus*	0.51
4	*Polypedilum*	0.51
4	*Tribelos*	0.51
5	*Cladopelma*	0.25

5	*Corixidae*	0.25
5	*Enallagma*	0.25
5	*Lestes*	0.25
5	*Oecetis*	0.25

Sample Collection and Processing Information

Sampling Organization: JP
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 7/29/2015 11:35:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	1.86	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	22	%	
Surface Water	In-situ	pH	5.51		
Surface Water	In-situ	Specific Conductance	45.8	us/cm	
Surface Water	In-situ	Temperature	24.3	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	8	System:	LACUSTRINE	Landscape Position:	
Hydrologic Modifications:	3	Subsystem:	LITTORAL	Lotic Gradient:	
Vegetative Modifications:	1	Class 1:	EMERGENT	Flow Path:	
Chemical Pollutants:	0	Subclass 1:	NON-PERSISTENT	Land Form:	
Watershed Characterization and Non-point Sources:	4	Class 2:	SCRUB SHRUB	Land Form Type:	
		Subclass 2:		Waterbody Type:	
		Class 3:		Waterbody Subtype:	
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations: FEN COMMUNITY

Habitat Classification:
AQUATIC MACROPHYTE BED
EMERGENT NON-PERSISTENT VEGETATION
OPEN WATER STANDING

Substrate Classification:
PEAT SUBSTRATE

Average Depth: 60 cm Visible Flow: No Rain In Previous 24 Hours: No

Sample Comments: AREA USED BY BIRDS/WATERFOWL. DROPPINGS ON VEGETATED MOUNDS/ AREAS USED BY WATERFOWL ARE APPARENT.

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Potamogeton		LW-34011101001			
Alnus		LW-34021701001			
Carex lasiocarpa	Woollyfruit sedge	LW-34010501002078	6	OBL	GRAMINOID
Nuphar lutea ssp. variegata	Varigated yellow pond-lily	LW-34023103002002	4	OBL	FORB/HERB
Poaceae		LW-34010502			
Utricularia purpurea	Eastern purple bladderwort	LW-34022305002007	5	OBL	FORB/HERB
Sparganium		LW-34011301001			
Vaccinium macrocarpon	Cranberry	LW-34021302023007	5	OBL	SUBSHRUB, SHRUB
Spiraea		LW-34024202026			
Symphyotrichum novi-belgii	New York aster	LW-34020501073014	4	FACW	FORB/HERB
Triadenum		LW-34022601002			
Frangula alnus	Glossy buckthorn	LW-34024102002002	0	FAC	TREE SHRUB

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Additional Summary Variables

Station Number: W-286 Waterbody: PERKINS POND - UPPER (NH) Town: Not Designated

Log Number: DN-2015-286-WET-TRO-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/30/2016

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	1.00	0.008	3	0.27
EPT Taxa:	0.33	0.003	1	0.09
Insects:	11.00	0.084	8	0.73
Non-Insects:	120.33	0.916	3	0.27
Leeches:	0.00	0.000	0	0.00
Oligochaetes:	0.00	0.000	0	0.00
Snails:	0.00	0.000	0	0.00
Bivalves:	2.67	0.020	1	0.09
Isopods:	0.00	0.000	0	0.00
Amphipods:	117.00	0.891	1	0.09
Mites:	0.67	0.005	1	0.09
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	0.00	0.000	0	0.00
Odonates:	0.67	0.005	2	0.18
Caddisflies:	0.33	0.003	1	0.09
Diptera:	9.67	0.074	4	0.36
Hemiptera:	0.33	0.003	1	0.09
Beetles:	0.00	0.000	0	0.00
Chironomids:	9.67	0.074	4	0.36
Tanypodinae Tribe:	8.00	0.061	1	0.09
Chironomiinae Tribe:	1.67	0.013	3	0.27
Orthoclodiinae Tribe:	0.00	0.000	0	0.00
Collector-Filterers:	2.67	0.020	1	0.09
Collector-Gatherers:	118.00	0.898	3	0.27
Predators:	9.00	0.069	4	0.36
Piercers:	0.00	0.000	0	0.00
Shredders:	0.67	0.005	1	0.09
Scrapers:	0.00	0.000	0	0.00
Maine Tolerance:				
Sensitive:	1.00	0.008	2	0.22
Intermediate:	127.33	0.992	7	0.78
Eurytopic:	0.00	0.000	0	0.00
Ratio of MTI Sensitive to Eurytopic	1.00	0.779	2.00	22.22

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-286 Waterbody: PERKINS POND - UPPER (NH) Town: Not Designated

Log Number: DN-2015-286-WET-TRO-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/30/2016

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsenhoff Biotic Index	Functional Feeding Group	Maine Tolerance Index	Tribe	Taxa Group
Hyalella	09010203006	0.00	117.00	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	117.00	0.00	--	--	--	--	Amphipod
Lestes	09020308045	0.33	0.33	9	PR	32.6-I	--	Dragonfly/damselfly
Enallagma	09020309051	0.33	0.33	9	PR	26.2-I	--	Dragonfly/damselfly
Corixidae	09020501	0.33	0.33	--	--	--	--	True Bug
Oecetis	09020618078	0.33	0.33	8	PR	16.3-S	--	Caddisfly
Procladius	09021011015	8.00	8.00	9	PR	25.1-I	T	Fly: Midge
Cladopelma	09021011081	0.33	0.33	9	CG	27.9-I	C	Fly: Midge
Polypedilum	09021011102	0.67	0.67	6	SH	24.2-I	C	Fly: Midge
Tribelos	09021011107	0.67	0.67	5	CG	9.3-S	C	Fly: Midge
Arrenurus	09030111001	0.67	0.67	--	--	23.8-I	--	Mite
Pisidium	10020201002	2.67	2.67	--	CF	--	--	Clam

Maine Department of Environmental Protection
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Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-302 Trip ID: 2016-302-WET-WAS-1 River Basin: Merrimack
Waterbody: UNNAMED STREAM (NH) HUC8 Name:
Town: Not Designated Latitude: 43 10 12.86 N
Mitigation Monitoring Site: No Longitude: 72 5 30.79 W

Sample Information

Sample ID: DN-2016-302-WET-WAS-1 Type of Sample: DIPNET Date Sampled: 8/4/2016
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: B** Date: 5/11/2017
Model Result with P≥0.6: B **Reason for Determination: Best Professional Judgement**
Date Last Calculated: 4/19/2017 Comments: Indeterminate A (0.17) and Indeterminate C (0.25), not raised or lowered due to community structure and function.

Model Probabilities

First Stage Model

Class A:	0.17	Class C:	0.25
Class B:	0.58	NA:	0.00

B or Better Model

Class A or B	0.75
Class C or Non-Attainment	0.25

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.17
Class B or C or Non-Attainment	0.83

Model Variables

		Reference Range
Total Mean Abundance	333	< 787
Ephemeroptera Abundance	1.33	most > 35
Odonata Relative Abundance	0.083	most > 0.04
Trichoptera Relative Abundance	0.030	most > 0.02
Shredder Taxa Relative Abundance	0.02	< 0.2
Non-insect Taxa Relative Richness	0.23	< 0.4
MTI Sensitive Taxa Abundance	10.40	most > 30
MTI Sensitive Taxa Relative Abundance	0.03	most > 0.05
MTI Sensitive Taxa Richness	6	most > 7
MTI Intermediate Taxa Relative Abundance	0.94	> 0.5
MTI Intermediate Taxa Richness	16	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	1.19	most > 1

Other Variables

Generic Richness:	30
Hilsenhoff Biotic Index:	7.88
Shannon-Weiner Diversity:	2.80
Maine Tolerance Index:	26.00

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	54.91
2	*Coenagrionidae*	6.51
3	*Ablabesmyia*	5.11
4	*Naididae*	4.61
5	*Chironomidae*	3.81

Sample Collection and Processing Information

Sampling Organization: NHDES
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 8/4/2016 10:11:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	1.42	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	15	%	
Surface Water	In-situ	pH	5.21		
Surface Water	In-situ	Specific Conductance	101.8	us/cm	
Surface Water	In-situ	Temperature	17.2	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	8	System:	PALUSTRINE	Landscape Position:	
Hydrologic Modifications:	3	Subsystem:		Lotic Gradient:	
Vegetative Modifications:	0	Class 1:	EMERGENT	Flow Path:	
Chemical Pollutants:	0	Subclass 1:	PERSISTENT	Land Form:	
Watershed Characterization and Non-point Sources:	5	Class 2:	AQUATIC BED	Land Form Type:	
		Subclass 2:	ROOTED VASCULAR	Waterbody Type:	
		Class 3:	SCRUB SHRUB	Waterbody Subtype:	
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations:

Habitat Classification:
AQUATIC MACROPHYTE BED
EMERGENT PERSISTENT VEGETATION

Substrate Classification:
DETRITUS SUBSTRATE

Average Depth: 68 cm Visible Flow: No Rain In Previous 24 Hours: No

Sample Comments:

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Pontederia cordata	Pickerelweed	LW-34010906002002	4	OBL	FORB/HERB
Potamogeton robbinsii	Robbins' pondweed	LW-34011101001019	6	OBL	FORB/HERB
Sparganium		LW-34011301001			
Chamaedaphne calyculata	Leatherleaf	LW-34021302004001	5	OBL	SHRUB
Nuphar lutea ssp. variegata	Varigated yellow pond-lily	LW-34023103002002	4	OBL	FORB/HERB
Utricularia macrorhiza	Common bladderwort	LW-34022305002005	3	OBL	FORB/HERB

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Additional Summary Variables

Station Number: W-302 Waterbody: UNNAMED STREAM (NH) Town: Not Designated

Log Number: DN-2016-302-WET-WAS-1 Subsample Factor: X1 Replicates: 3 Calculated: 4/19/2017

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	39.00	0.117	10	0.33
EPT Taxa:	11.33	0.034	7	0.23
Insects:	122.00	0.367	23	0.77
Non-Insects:	210.67	0.633	7	0.23
Leeches:	0.00	0.000	0	0.00
Oligochaetes:	21.67	0.065	3	0.10
Snails:	1.33	0.004	2	0.07
Bivalves:	0.00	0.000	0	0.00
Isopods:	0.00	0.000	0	0.00
Amphipods:	182.67	0.549	1	0.03
Mites:	5.00	0.015	1	0.03
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	1.33	0.004	2	0.07
Odonates:	27.67	0.083	3	0.10
Caddisflies:	10.00	0.030	5	0.17
Diptera:	82.33	0.247	11	0.37
Hemiptera:	0.33	0.001	1	0.03
Beetles:	0.33	0.001	1	0.03
Chironomids:	80.33	0.241	10	0.33
Tanypodinae Tribe:	22.16	0.067	2	0.07
Chironomiinae Tribe:	58.17	0.175	8	0.27
Orthoclodiinae Tribe:	0.00	0.000	0	0.00
Collector-Filterers:	14.25	0.043	2	0.07
Collector-Gatherers:	227.08	0.683	8	0.27
Predators:	35.24	0.106	7	0.23
Piercers:	2.67	0.008	1	0.03
Shredders:	7.91	0.024	1	0.03
Scrapers:	0.67	0.002	1	0.03
Maine Tolerance:				
Sensitive:	10.40	0.034	6	0.26
Intermediate:	283.56	0.937	16	0.70
Eurytopic:	8.71	0.029	1	0.04
Ratio of MTI Sensitive to Eurytopic	1.19	1.195	6.00	6.00

Maine Department of Environmental Protection
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Aquatic Life Taxonomic Inventory Report

Station Number: W-302 Waterbody: UNNAMED STREAM (NH) Town: Not Designated

Log Number: DN-2016-302-WET-WAS-1 Subsample Factor: X1 Replicates: 3 Calculated: 4/19/2017

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsenhoff Biotic Index	Functional Feeding Group	Maine Tolerance Index	Tribe	Taxa Group
Naididae	08020202	15.33	0.00	--	--	--	--	Worm
Dero	08020202007	5.33	18.25	--	CG	37.9-I	--	Worm
Stylaria	08020202014	0.00	2.28	--	CG	18-S	--	Worm
Stylaria lacustris	08020202014002	0.67	0.00	--	--	--	--	Worm
Vejdovskyella	08020202015	0.00	1.14	--	--	13.7-S	--	Worm
Vejdovskyella comata	08020202015001	0.33	0.00	--	--	--	--	Worm
Hyalella	09010203006	0.00	182.67	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	182.67	0.00	--	--	--	--	Amphipod
Lestes	09020308045	0.67	0.67	9	PR	32.6-I	--	Dragonfly/damselfly
Coenagrionidae	09020309	21.67	21.67	--	--	--	--	Dragonfly/damselfly
Enallagma	09020309051	5.33	5.33	9	PR	26.2-I	--	Dragonfly/damselfly
Callibaetis	09020401002	1.00	1.00	9	CG	40.5-I	--	Mayfly
Caenis	09020412040	0.33	0.33	7	CG	22.1-I	--	Mayfly
Corixidae	09020501	0.33	0.33	--	--	--	--	True Bug
Polycentropodidae	09020603	0.67	0.67	--	--	--	--	Caddisfly
Polycentropus	09020603010	1.33	1.33	6	PR	15.4-S	--	Caddisfly
Oxyethira	09020607028	2.67	2.67	3	P	22-S	--	Caddisfly
Phryganeidae	09020608	4.33	4.33	--	--	--	--	Caddisfly
Oecetis	09020618078	1.00	1.00	8	PR	16.3-S	--	Caddisfly
Ceratopogonidae	09021010	2.00	2.00	--	--	--	--	Fly: Biting Midge
Chironomidae	09021011	12.67	0.00	--	--	--	--	Fly: Midge
Ablabesmyia	09021011001	17.00	20.18	8	PR	23.6-I	T	Fly: Midge
Labrundinia	09021011008	1.67	1.98	7	PR	18.1-S	T	Fly: Midge
Paratanytarsus	09021011071	7.33	8.71	6	--	43-E	Y	Fly: Midge
Tanytarsus	09021011076	10.00	11.87	6	CF	25.7-I	Y	Fly: Midge
Chironomus	09021011080	12.33	14.64	10	CG	27.4-I	C	Fly: Midge
Cladopelma	09021011081	1.00	1.19	9	CG	27.9-I	C	Fly: Midge
Dicrotendipes	09021011085	5.67	6.73	8	CG	28.8-I	C	Fly: Midge
Microtendipes	09021011094	2.00	2.37	6	CF	22.3-I	C	Fly: Midge
Parachironomus	09021011097	4.00	4.75	10	PR	28.6-I	C	Fly: Midge
Polypedilum	09021011102	6.67	7.91	6	SH	24.2-I	C	Fly: Midge
Dytiscidae	09021103	0.33	0.33	--	--	--	--	Beetle
Arrenurus	09030111001	5.00	5.00	--	--	23.8-I	--	Mite
Physa	10010202027	0.00	0.67	--	SC	34-I	--	Snail
Physa acuta	10010202027053	0.67	0.00	--	--	--	--	Snail

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-302 Waterbody: UNNAMED STREAM (NH) Town: Not Designated

Log Number: DN-2016-302-WET-WAS-1 Subsample Factor: X1 Replicates: 3 Calculated: 4/19/2017

Taxon	Maine Taxonomic Code	Count (Mean of Samples)		Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
		Actual	Adjusted					
Planorbidae	10010203	0.67	0.67	--	--	--	--	Snail

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-269 Trip ID: 2014-269-WET-WHI-1 River Basin: Connecticut
Waterbody: ST JOHNS RIVER (NH) HUC8 Name: Waits
Town: Not Designated Latitude: 44 22 9.06 N
Mitigation Monitoring Site: No Longitude: 71 33 37.85 W

Sample Information

Sample ID: DN-2014-269-WET-WHI-1 Type of Sample: DIPNET Date Sampled: 8/6/2014
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: C** Date: 2/9/2016
Model Result with P≥0.6: C **Reason for Determination: Model**
Date Last Calculated: 10/20/2015 Comments:

Model Probabilities

First Stage Model

Class A:	0.00	Class C:	0.69
Class B:	0.31	NA:	0.00

B or Better Model

Class A or B	0.31
Class C or Non-Attainment	0.69

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.00
Class B or C or Non-Attainment	1.00

Model Variables

		Reference Range
Total Mean Abundance	70	< 787
Ephemeroptera Abundance	1.67	most > 35
Odonata Relative Abundance	0.000	most > 0.04
Trichoptera Relative Abundance	0.005	most > 0.02
Shredder Taxa Relative Abundance	0.00	< 0.2
Non-insect Taxa Relative Richness	0.20	< 0.4
MTI Sensitive Taxa Abundance	3.03	most > 30
MTI Sensitive Taxa Relative Abundance	0.05	most > 0.05
MTI Sensitive Taxa Richness	2	most > 7
MTI Intermediate Taxa Relative Abundance	0.90	> 0.5
MTI Intermediate Taxa Richness	12	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	0.90	most > 1

Other Variables

Generic Richness:	20
Hilsenhoff Biotic Index:	7.61
Shannon-Weiner Diversity:	3.13
Maine Tolerance Index:	26.00

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	32.23
2	*Procladius*	17.54
3	*Tanytarsus*	15.64
4	*Dicrotendipes*	8.53
5	*Paratanytarsus*	4.74

Sample Collection and Processing Information

Sampling Organization: NHDES
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 8/6/2014 12:00:00 PM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	6.12	mg/l	
Surface Water	In-situ	pH	6		
Surface Water	In-situ	Specific Conductance	6.75	us/cm	
Surface Water	In-situ	Temperature	21.4	deg c	

Landcover Summary - 2004 Data

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	21	System:	PALUSTRINE	Landscape Position:	
Hydrologic Modifications:	8	Subsystem:		Lotic Gradient:	
Vegetative Modifications:	3	Class 1:	UNCONSOLIDATED BOTTOM	Flow Path:	
Chemical Pollutants:	1				
Watershed Characterization and Non-point Sources:	9	Subclass 1:		Land Form:	
		Class 2:	EMERGENT	Land Form Type:	
		Subclass 2:	NON-PERSISTENT	Waterbody Type:	
		Class 3:	SCRUB SHRUB	Waterbody Subtype:	
		Subclass 3:	BROAD-LEAVED DECIDUOUS		
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations: PLANT LIST IS NOT COMPREHENSIVE. EDGES OF WATERWAY HAVE EQUISETUM FLUVIATILE AND SPARGANIUM.

Habitat Classification:	Substrate Classification:
AQUATIC MACROPHYTE BED	GRAVEL SUBSTRATE
EMERGENT NON-PERSISTENT VEGETATION	SAND SUBSTRATE
EMERGENT PERSISTENT VEGETATION	SILT/MUCK SUBSTRATE

Average Depth: 55 cm Visible Flow: Yes Rain In Previous 24 Hours: Yes

Sample Comments: RAINED DURING MACRO SAMPLING AT SITE2. WATER SAMPLE HAD BEEN PREVIOUSLY COLLECTED AT SITE 1. RIVER IS CROSSED BY MULTIPLE BEAVER DAMS

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Alnus incana ssp. rugosa	Speckled alder	LW-34021701001002	2	FACW	TREE, SHRUB
Equisetum fluviatile	Water horsetail	LW-32010101001004	6	OBL	FORB/HERB
Potamogeton amplifolius	Largeleaf pondweed	LW-34011101001002	6	OBL	FORB/HERB
Vaccinium corymbosum	Highbush blueberry	LW-34021302023005	4	FACW	SHRUB
Brasenia schreberi	Watershield	LW-34023103001001	6	OBL	FORB/HERB
Nymphaea odorata	American white waterlily	LW-34023103003002	5	OBL	FORB/HERB
Phalaris arundinacea	Reed canarygrass	LW-34010502054001	1	FACW	GRAMINOID
Sparganium americanum	American bur-reed	LW-34011301001001	5	OBL	FORB/HERB
Sagittaria latifolia	Broadleaf arrowhead	LW-34011401002005	5	OBL	FORB/HERB
Spiraea		LW-34024202026			
Eleocharis		LW-34010501006			
Schoenoplectus tabernaemontani	Softstem bulrush	LW-34010501011011	5	OBL	GRAMINOID
Potamogeton		LW-34011101001			

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Acer rubrum	Red maple	LW-34024603001006	2	FAC	TREE
Carex		LW-34010501002			
Scirpus cyperinus	Woolgrass	LW-34010501012003	2	OBL	GRAMINOID

Additional Summary Variables

Station Number: W-269 Waterbody: ST JOHNS RIVER (NH) Town: Not Designated

Log Number: DN-2014-269-WET-WHI-1 Subsample Factor: X1 Replicates: 3 Calculated: 10/20/2015

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	2.00	0.028	4	0.20
EPT Taxa:	2.00	0.028	4	0.20
Insects:	43.33	0.616	16	0.80
Non-Insects:	27.00	0.384	4	0.20
Leeches:	0.00	0.000	0	0.00
Oligochaetes:	2.00	0.028	1	0.05
Snails:	1.00	0.014	1	0.05
Bivalves:	1.33	0.019	1	0.05
Isopods:	0.00	0.000	0	0.00
Amphipods:	22.67	0.322	1	0.05
Mites:	0.00	0.000	0	0.00
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	1.67	0.024	3	0.15
Odonates:	0.00	0.000	0	0.00
Caddisflies:	0.33	0.005	1	0.05
Diptera:	40.33	0.573	11	0.55
Hemiptera:	1.00	0.014	1	0.05
Beetles:	0.00	0.000	0	0.00
Chironomids:	40.33	0.573	11	0.55
Tanypodinae Tribe:	15.46	0.220	4	0.20
Chironomiinae Tribe:	24.54	0.349	6	0.30
Orthoclodiinae Tribe:	0.34	0.005	1	0.05
Collector-Filterers:	13.43	0.191	3	0.15
Collector-Gatherers:	33.08	0.470	6	0.30
Predators:	15.46	0.220	4	0.20
Piercers:	0.00	0.000	0	0.00
Shredders:	0.34	0.005	1	0.05
Scrapers:	1.00	0.014	1	0.05
Maine Tolerance:				
Sensitive:	3.03	0.046	2	0.13
Intermediate:	58.95	0.902	12	0.80
Eurytopic:	3.36	0.051	1	0.07
Ratio of MTI Sensitive to Eurytopic	0.90	0.900	2.00	2.00

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-269 Waterbody: ST JOHNS RIVER (NH) Town: Not Designated

Log Number: DN-2014-269-WET-WHI-1 Subsample Factor: X1 Replicates: 3 Calculated: 10/20/2015

Taxon	Maine Taxonomic Code	Count (Mean of Samples)		Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
		Actual	Adjusted					
Naididae	08020202	2.00	2.00	--	--	--	--	Worm
Hyalella	09010203006	0.00	22.67	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	22.67	0.00	--	--	--	--	Amphipod
Callibaetis	09020401002	0.33	0.33	9	CG	40.5-I	--	Mayfly
Litobrancha	09020407029	0.33	0.33	--	--	--	--	Mayfly
Caenis	09020412040	1.00	1.00	7	CG	22.1-I	--	Mayfly
Corixidae	09020501	1.00	1.00	--	--	--	--	True Bug
Limnephilidae	09020610	0.33	0.33	--	--	--	--	Caddisfly
Chironomidae	09021011	0.33	0.00	--	--	--	--	Fly: Midge
Ablabesmyia	09021011001	0.67	0.67	8	PR	23.6-I	T	Fly: Midge
Clinotanypus	09021011002	0.00	1.01	8	PR	30.3-I	T	Fly: Midge
Clinotanypus pinguis	09021011002008	1.00	0.00	--	--	--	--	Fly: Midge
Procladius	09021011015	12.33	12.44	9	PR	25.1-I	T	Fly: Midge
Tanypus	09021011018	1.33	1.34	10	PR	33.5-I	T	Fly: Midge
Psectrocladius	09021011056	0.33	0.34	8	CG	22-S	--	Fly: Midge
Paratanytarsus	09021011071	3.33	3.36	6	--	43-E	Y	Fly: Midge
Tanytarsus	09021011076	11.00	11.09	6	CF	25.7-I	Y	Fly: Midge
Dicrotendipes	09021011085	6.00	6.05	8	CG	28.8-I	C	Fly: Midge
Microtendipes	09021011094	1.00	1.01	6	CF	22.3-I	C	Fly: Midge
Polypedilum	09021011102	0.33	0.34	6	SH	24.2-I	C	Fly: Midge
Tribelos	09021011107	0.00	2.69	5	CG	9.3-S	C	Fly: Midge
Tribelos jucundus	09021011107198	2.67	0.00	--	--	--	C	Fly: Midge
Gyraulus	10010203029	0.00	1.00	--	SC	37.2-I	--	Snail
Gyraulus deflectus	10010203029056	1.00	0.00	--	--	--	--	Snail
Pisidium	10020201002	1.33	1.33	--	CF	--	--	Clam

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Station Information

Station Number: W-287 Trip ID: 2015-287-WET-WOO-1
Waterbody: ELBOW POND (NH)
Town: Not Designated
Mitigation Monitoring Site: No
River Basin: Merrimack
HUC8 Name: Pemigewasset
Latitude: 43 58 45.62 N
Longitude: 71 44 7.7 W

Sample Information

Sample ID: DN-2015-287-WET-WOO-1 Type of Sample: DIPNET Date Sampled: 7/23/2015
Subsample Factor: X1 Replicates: 3

Classification Attainment

Statutory Class: A **Final Determination: A** Date: 10/25/2016
Model Result with P≥0.6: A **Reason for Determination: Model**
Date Last Calculated: 8/30/2016 Comments:

Model Probabilities

First Stage Model

Class A:	0.91	Class C:	0.01
Class B:	0.08	NA:	0.00

B or Better Model

Class A or B	0.99
Class C or Non-Attainment	0.01

C or Better Model

Class A, B, or C	1.00
Non-Attainment	0.00

A Model

Class A	0.91
Class B or C or Non-Attainment	0.09

Model Variables

		Reference Range
Total Mean Abundance	149	< 787
Ephemeroptera Abundance	0.33	most > 35
Odonata Relative Abundance	0.002	most > 0.04
Trichoptera Relative Abundance	0.060	most > 0.02
Shredder Taxa Relative Abundance	0.02	< 0.2
Non-insect Taxa Relative Richness	0.22	< 0.4
MTI Sensitive Taxa Abundance	8.75	most > 30
MTI Sensitive Taxa Relative Abundance	0.06	most > 0.05
MTI Sensitive Taxa Richness	6	most > 7
MTI Intermediate Taxa Relative Abundance	0.93	> 0.5
MTI Intermediate Taxa Richness	11	< 25
Ratio of MTI Sensitive to Eurytopic Taxa Abundance	24.76	most > 1

Other Variables

Generic Richness:	23
Hilsenhoff Biotic Index:	7.82
Shannon-Weiner Diversity:	2.03
Maine Tolerance Index:	24.39

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella azteca*	69.13
2	*Procladius*	5.82
3	*Corixidae*	5.37
4	*Ablabesmyia*	3.80
5	*Oxyethira*	3.13

Sample Collection and Processing Information

Sampling Organization: AH, SC, SM
Taxonomist: ESS LABORATORY

Water Chemistry

Sample Date: 7/23/2015 11:53:00 AM

Sample Type	Collection Method	Parameter	Value	Units	Qualifier
Surface Water	In-situ	Dissolved Oxygen	6.67	mg/l	
Surface Water	In-situ	Dissolved Oxygen Saturation	72.3	%	
Surface Water	In-situ	pH	4.45		
Surface Water	In-situ	Specific Conductance	11.4	us/cm	
Surface Water	In-situ	Temperature	18.9	deg c	

Landcover Summary - 2004 Data

Summary of Habitat Characteristics

Human Disturbance		Landscape-level Cowardin Classification		Hydrogeomorphic Setting	
Total Score:	2	System:	LACUSTRINE	Landscape Position:	
Hydrologic Modifications:	0	Subsystem:	LITTORAL	Lotic Gradient:	
Vegetative Modifications:	0	Class 1:	UNCONSOLIDATED BOTTOM	Flow Path:	
Chemical Pollutants:	0				
Watershed Characterization and Non-point Sources:	2	Subclass 1:	ROOTED VASCULAR	Land Form:	
		Class 2:	EMERGENT	Land Form Type:	
		Subclass 2:	NON-PERSISTENT	Waterbody Type:	
		Class 3:	SCRUB SHRUB	Waterbody Subtype:	
		Subclass 3:			
				Comments:	

Dominant Plant Species:

Additional Plant Community Observations:

Habitat Classification:
AQUATIC MACROPHYTE BED
EMERGENT NON-PERSISTENT VEGETATION
OPEN WATER STANDING

Substrate Classification:
PEAT SUBSTRATE
SAND SUBSTRATE

Average Depth: 65 cm Visible Flow: No Rain In Previous 24 Hours: No

Sample Comments: FRESHWATER SPONGES OBSERVED

Common Plants Observed

Scientific Name	Common Name	Maine Taxonomic Code	Plant CoC Score	Wetland Indicator Status	Growth Form
Eleocharis		LW-34010501006			
Eriocaulon aquaticum	Sevenangle pipewort	LW-34010601001001	7	OBL	FORB/HERB
Utricularia		LW-34022305002			
Brasenia schreberi	Watershield	LW-34023103001001	6	OBL	FORB/HERB
Rosa palustris	Swamp rose	LW-34024202020012	4	OBL	SUBSHRUB
Carex lasiocarpa	Woollyfruit sedge	LW-34010501002078	6	OBL	GRAMINOID
Nymphoides cordata	Little floatingheart	LW-34024802002001	6	OBL	FORB/HERB
Spiraea		LW-34024202026			
Myrica gale	Sweetgale	LW-34022801003001	5	OBL	SHRUB
Sparganium		LW-34011301001			
Pontederia cordata	Pickerelweed	LW-34010906002002	4	OBL	FORB/HERB
Nuphar lutea ssp. variegata	Varigated yellow pond-lily	LW-34023103002002	4	OBL	FORB/HERB
Triadenum		LW-34022601002			

Additional Summary Variables

Station Number: W-287 Waterbody: ELBOW POND (NH) Town: Not Designated

Log Number: DN-2015-287-WET-WOO-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/30/2016

	Abundance	Relative Abundance	Richness	Relative Richness
EOT Taxa:	9.67	0.065	7	0.30
EPT Taxa:	9.33	0.063	6	0.26
Insects:	42.00	0.282	18	0.78
Non-Insects:	107.00	0.718	5	0.22
Leeches:	0.00	0.000	0	0.00
Oligochaetes:	0.67	0.004	1	0.04
Snails:	0.67	0.004	1	0.04
Bivalves:	1.00	0.007	1	0.04
Isopods:	0.00	0.000	0	0.00
Amphipods:	103.00	0.691	1	0.04
Mites:	1.67	0.011	1	0.04
Stoneflies:	0.00	0.000	0	0.00
Mayflies:	0.33	0.002	1	0.04
Odonates:	0.33	0.002	1	0.04
Caddisflies:	9.00	0.060	5	0.22
Diptera:	24.33	0.163	10	0.43
Hemiptera:	8.00	0.054	1	0.04
Beetles:	0.00	0.000	0	0.00
Chironomids:	23.67	0.159	9	0.39
Tanypodinae Tribe:	15.54	0.104	3	0.13
Chironomiinae Tribe:	7.06	0.047	5	0.22
Orthoclodiinae Tribe:	1.06	0.007	1	0.04
Collector-Filterers:	2.06	0.014	3	0.13
Collector-Gatherers:	107.93	0.724	4	0.17
Predators:	18.21	0.122	7	0.30
Piercers:	4.67	0.031	1	0.04
Shredders:	3.47	0.023	3	0.13
Scrapers:	0.00	0.000	0	0.00
Maine Tolerance:				
Sensitive:	8.75	0.064	6	0.33
Intermediate:	127.23	0.933	11	0.61
Eurytopic:	0.35	0.003	1	0.06
Ratio of MTI Sensitive to Eurytopic	24.76	24.761	6.00	6.00

Maine Department of Environmental Protection
Biological Monitoring Program
Wetland Aquatic Life Classification Attainment Report

Aquatic Life Taxonomic Inventory Report

Station Number: W-287 Waterbody: ELBOW POND (NH) Town: Not Designated

Log Number: DN-2015-287-WET-WOO-1 Subsample Factor: X1 Replicates: 3 Calculated: 8/30/2016

Taxon	Maine Taxonomic Code	Count (Mean of Samples) Actual	Adjusted	Hilsen-hoff Biotic Index	Func-tional Feeding Group	Maine Toler-ance Index	Tribe	Taxa Group
Pristina	08020202004	0.67	0.67	--	--	--	--	Worm
Hyalella	09010203006	0.00	103.00	8	CG	24.5-I	--	Amphipod
Hyalella azteca	09010203006011	103.00	0.00	--	--	--	--	Amphipod
Sympetrum	09020306041	0.33	0.33	10	PR	37-I	--	Dragonfly/damselfly
Caenis	09020412040	0.33	0.33	7	CG	22.1-I	--	Mayfly
Corixidae	09020501	8.00	8.00	--	--	--	--	True Bug
Polycentropus	09020603010	1.33	1.33	6	PR	15.4-S	--	Caddisfly
Oxyethira	09020607028	4.67	4.67	3	P	22-S	--	Caddisfly
Banksiola	09020608036	1.00	1.00	--	SH	14.9-S	--	Caddisfly
Leptoceridae	09020618	1.67	1.67	--	--	--	--	Caddisfly
Oecetis	09020618078	0.33	0.33	8	PR	16.3-S	--	Caddisfly
Bezzia/palpomyia	09021010043	0.67	0.67	6	PR	26.9-I	--	Fly: Biting Midge
Chironomidae	09021011	1.33	0.00	--	--	--	--	Fly: Midge
Ablabesmyia	09021011001	5.67	6.00	8	PR	23.6-I	T	Fly: Midge
Guttipelopia	09021011006	0.33	0.35	5	PR	19.4-S	T	Fly: Midge
Procladius	09021011015	8.67	9.18	9	PR	25.1-I	T	Fly: Midge
Psectrocladius	09021011056	1.00	1.06	8	CG	22-S	--	Fly: Midge
Tanytarsus	09021011076	0.67	0.71	6	CF	25.7-I	Y	Fly: Midge
Dicrotendipes	09021011085	3.33	3.53	8	CG	28.8-I	C	Fly: Midge
Glyptotendipes	09021011088	0.33	0.35	10	SH	43-E	C	Fly: Midge
Microtendipes	09021011094	0.33	0.35	6	CF	22.3-I	C	Fly: Midge
Polypedilum	09021011102	2.00	2.12	6	SH	24.2-I	C	Fly: Midge
Arachnida	0903	0.67	0.67	--	--	--	--	Arachnid
Arrenurus	09030111001	1.00	1.00	--	--	23.8-I	--	Mite
Lymnaeidae	10010201	0.67	0.67	--	--	--	--	Snail
Pisidium	10020201002	1.00	1.00	--	CF	--	--	Clam

Sampled Wetland ID	Date sampled	AA (acres)	EIA_overall rank	EIA-numeric score (overall)	EIA-Land Use Index	EIA-Perimeter w/10 m buff rank	EIA-Average buffer width	EIA-BUFFER_width_rank	WHDA	WHDA % alterations to 100ft_buf (mdpt)	Attainment _class	Stream order where smpld	Watershed (acres)	PCT wetlands in wshed	MEAN C	ADJ_FQI	TOTAL_FQI
ALL1	17-07-12	20.65	A-	3.67	9.44	A-	76.25	B-	5	7.5	I	1	168.3	12.3	3.9	39	23.7
ALS1	14-08-07	15.77	B+	3.3	8.02	C	75	B-	11	18	A	1	386.46	6.83	3.4	35.4	26.1
ANT1	16-07-21	41.2	A-	3.59	8.74	B-	94	A	5	38	A	2	419	7.95	5.9	59	23.6
AUB1	17-08-09	71.66	B+	3.33	7.97	A-	48.4	C	11	18	B	3	9622	15.8	4	41	25.9
BAR1	17-07-10	64.51	A-	3.67	8.83	A	74.9	B-	12	2.5	C	2	1534	9.17	3.7	37.2	18.5
BOW1	15-06-25	26.47	B	2.6	8.28	A	66.13	C	22	18	C	1	413.78	7.18	4.1	41	29
BOW2	17-06-29	48.9	A-	3.52	7.12	A	77.4	B-	7	2.5	C	1	299	14.13	4.8	41	25.4
CNT1	15-07-07	58.2	B	3.1	7.83	B	60.63	C	13	7.5	B	2	442.09	11.26	4	40.6	22.3
CNT2	17-08-02	16.34	B.	2.84	8.5	B	55.9	C	7	18	C	1	120	9.05	3.7	38.5	23.4
CNW1	17-07-19	194.8	B+	3.23	8.09	A	63	C	14	18	C	1	1334	13.41	5	50.3	31.2
CON1	15-07-27	26	C	2	2.53	B	33.5	C-	34	38	I	2	524.64	7.59	3.2	36	20.7
CON2	16-07-19	23.1	D+	1.44	2.41	D	0	D	53	88	B	1	487	13.86	3.7	40.1	17.5
CON3	16-08-03	19.2	C+	2.37	4.48	B	81	B	39	7.5	B	1	487	13.86	4	40.9	17.9
CON4	17-07-06	170.8	A-	3.64	9.61	A	74.4	C+	9	7.5	A	3	3142	15.24	4.3	43	18.2
DAN1	16-07-05	329.2	B+	3.44	8.52	B	84	B	16	2.5	B	3	3543	8.35	4.4	44	23.3
DEE1	15-08-13	27.1	A	4	9.64	A	90.38	A-	3	2.5	C	2	80.46	80.16	4.3	43	23.9
ELL1	17-07-17	62.38	A.	4	9.62	A	100	A	4	2.5	I	3	5756	4.16	4.5	45	22
ENF1	14-08-05	189.8	B+	3.3	8.39	C+	52	C	12	18	A	3	3273.94	10.42	4.4	45.4	26.4
FRN1	15-07-16	43.5	C+	2.3	4.5	C	25.7	C-	27	88	I	1	295.45	14.25	4.8	48.5	33.3
GRG1	14-08-12	12.36	A-	3.5	7.97	C	41.25	C	3	18	A	1	258.98	4.63	4	40	23.7
HKS1	15-07-13	119.3	B+	3.5	8.41	A-	71.38	C+	6	2.5	I	2	2173.36	15.39	4.7	47	22.5
HNV1	15-07-21	34.2	B-	2.8	7.18	C	44	C	26	18	B	1	374.43	8.94	3.3	34.6	20.6
HSB1	16-08-15	191.7	A-	3.62	8.71	B	86	B	7	18	B	3	3749	5.78	4.1	42.7	23.7
HUD1B	17-08-07	67.4	B	3.04	6.77	A	59.8	C	10	7.5	C	3	2357	10.03	4.1	42.7	23.7
JAF1	15-07-22	17.4	B-	2.5	4.48	C	22.75	D	18	18	B	4	19081.68	15.1	3.7	39.9	19.9
KIN1	17-07-31	39.1	B+	3.23	7.88	B	60	C	15	18	C	4	16645	22.88	4.4	44.4	26
MAN1	15-07-14	12	C+	2.4	5.82	C	20.75	D	25	63	C	3	1331.34	5.93	3.7	38.1	24.3
MAN2	15-07-30	3.1	C	2.2	2.25	C	20.25	D	21	38	I	1	30.93	11.06	3.7	39.5	21.6
MLW1	14-08-11	10.21	A	3.9	9.63	A	90.88	A-	3	7.5	I	2	403.53	15.98	4.3	43	27.2
NAS1B	17-07-25	105.4	C.	2.07	0.79	D	20.75	D	30	88	B	4	19236	15.34	3.7	40.2	20.3
NAS2	15-07-15	21.24	C+	2.5	5.32	C	20.25	D	24	63	B	1	42.85	49.71	3.6	38.3	24.7
NWB1	14-08-04	166.23	B+	3.3	8.51	B	75	B-	11	18	B	3	3716.5	9.8	3.9	39.5	23.7
NWD1	16-07-27	68.2	B+	3.36	7.83	A	87.5	B+	9	7.5	C	3	11529	15.66	4.6	46	17.2
PEM1	15-08-14	0.22	B	3.1	8.71	B	61.75	C	8	2.5	I	1	19.93	1.51	3.7	37.2	18.1
RAY1	17-07-26	85.4	B	2.99	4.2	B	45.69	C	17	63	B	4	43273	6.25	4.1	42.7	24.3
SAL1	15-07-06	323.7	B-	2.6	3.5	C	48	C	27	88	C	3	1328.46	32.62	4.1	42.2	21.3
SAL2	15-07-20	21.24	C-	1.7	1.103	D-	0	D-	37	88	I	1	31.33	22.85	3.1	32.6	15.5
SHM1	17-08-01	243.1	B	2.99	8.19	B	68.2	C	21	38	B	5	27022	25.83	4.2	43.6	24.1
TRO1	15-07-29	24.29	B+	3.4	8.93	B	82.5	B	8	18	I	2	938.7	4.12	4.6	46.2	25.6
WAS1	16-08-04	43.5	B+	3.5	7.8	B	76.75	B-	5	2.5	B	2	837	5.42	3.9	39	18.7
WHI1	14-08-06	264.2	B	3	8.4	B-	59.75	C	21	38	C	4	16888.77	9.98	3.9	38.6	27.6
WOO1	15-07-23	180.21	A	4	10	A	100	A	2	2.5	A	2	1743.16	4.55	4.8	48	25.8

Appendix N

Sampled Wetland ID	NATIVE_FQI	PCT C-value =1-3	PCT C-value =4-6	PCT C-value =7-10	Total species	PCT_Native	PCT NonNative (C-value = 0)	PCT_Woody	PCT_Emergent	PCT_Floating_leaved	PCT_Submergent	Generic richness (inverts) TOTAL Richness	Mean abundance (inverts) TOTAL Abundance	ALKALINITY MGL (RL=1)	CARBON ORGANIC (MGL)	CHLORIDE MGL (RL=3)	CHL_A UNCOR (UGL)
ALL1	23.7	37.8	62.2	0	37	100	0	42	45	5	8	13	305.30	0.5	12	1.5	1.07
ALS1	27.2	40.7	49.2	1.7	59	91.5	8.5	28.8	64.4	5.1	1.7	28	123.00	9.7	9.2	11	8.77
ANT1	23.6	6.3	62.5	31.3	16	100	0	13	31	13	44	27	118.30	2.2	11	13	5.9
AUB1	26.6	28.6	66.7	0	43	95.3	4.7	38	45	7	4	42	344.00	4.6	8.2	17.9	1.61
BAR1	18.6	40	48	8	25	96	4	24	60	12	4	25	323.00	2.6	12	43.2	8.9
BOW1	29	34	60	6	50	100	0	28	66	2	4	22	174.67	7.5	6.2	55	7.48
BOW2	25.4	21.4	67.9	10.7	28	100	0	28.6	53.6	10.7	7.1	16	343.30	6.7	13	40	3.83
CNT1	22.6	32.3	51.6	9.7	31	93.5	6.5	22.6	45.2	9.7	22.6	30	544.33	15.7	6.4	53	2.85
CNT2	24.3	32.5	57.5	2.5	40	92.5	7.5	13	65	13	10	22	336.30	23.7	7.1	48.1	2.51
CNW1	31.4	25.6	48.7	23.1	39	97.4	2.6	20	55	10	15	22	188.30	5.5	9.4	36.3	NA
CON1	23.3	31	47.6	2.4	42	81	19	42.9	45.2	7.1	4.8	15	31.67	31.2	6.7	240	33.49
CON2	18.8	30.4	60.9	0	23	91.3	8.7	17.4	30.4	21.7	30.4	31	568.00	40.1	5.4	210	1.86
CON3	18.3	35	55	5	20	95	5	32	16	16	37	25	197.00	28.2	3.7	180	6.58
CON4	18.2	33.3	50	16.7	18	100	0	17	50	17	17	22	248.30	3.7	10	4.55	3.01
DAN1	23.3	32.1	57.1	10.7	28	100	0	18	57	11	14	29	189.70	10.4	8.3	3.5	2.86
DEE1	23.9	29	67.7	3.2	31	100	0	25.8	51.6	12.9	9.7	24	140.67	15.6	7.1	1.5	3.15
ELL1	22	33.3	54.2	12.5	24	100	0	17	61	17	8	19	25.00	3	5.6	1.5	NA
ENF1	27.2	27.8	61.1	8.3	36	97.2	2.8	30.6	52.8	8.3	8.3	35	169.33	11.7	11	6.9	1.46
FRN1	33.6	25	56.3	16.7	48	97.9	2.1	39.6	58.3	0	2.1	9	22.00	12	1.6	29	1.02
GRG1	23.7	42.9	51.4	5.7	35	100	0	31.4	51.4	2.9	14.3	25	52.33	4.8	3.8	7.4	1.56
HKS1	22.5	17.4	73.9	8.7	23	100	0	52.2	43.5	4.3	0	12	33.33	1.4	9.1	4.2	3.25
HNV1	21.6	46.2	48.7	0	39	94.9	5.1	10.3	82.1	2.6	5.1	25	105.00	45.5	4	15	2.6
HSB1	13.6	27.3	72.7	0	11	10	0	20	50	20	10	27	346.70	7.6	9.3	1.5	3.51
HUD1B	24.4	32.4	55.9	5.9	34	94.1	5.9	8.6	62.9	14.3	14.3	29	319.70	16.6	14	24.4	29.9
JAF1	21.5	41.4	41.4	6.9	29	89.7	10.3	13.8	51.7	6.9	27.6	38	393.00	5.4	6	25	0.69
KIN1	26.2	25.7	62.9	8.6	35	97.1	2.9	29	40	11	20	33	470.30	14.4	12	50	3.37
MAN1	25	34.9	60.5	0	43	95.3	4.7	27.9	65.1	4.7	2.3	19	63.00	76.7	5.4	85	15.34
MAN2	23	32.4	50	8.8	34	91.2	8.8	23.5	55.9	5.9	14.7	12	20.00	6.7	4.3	170	6.73
MLW1	27.2	32.5	60	7.5	40	100	0	35	50	5	10	23	27.00	1.1	8.1	1.5	3.36
NAS1B	22	23.3	56.7	3.3	30	83.3	16.7	27	50	7	17	26	666.70	39.2	5	90	1.95
NAS2	26.2	29.8	61.7	0	47	91.5	8.5	19.1	57.4	10.6	12.8	29	249.00	35.2	2.5	130	8.91
NWB1	24	32.4	64.9	0	37	97.3	2.7	18.9	56.8	8.1	16.2	27	624.33	6.2	6.3	14	2.18
NWD1	17.2	21.4	71.4	7.1	14	100	0	14	57	7	21	22	110.30	8.2	3.8	9.6	3.99
PEM1	18.2	37.5	54.2	4.2	24	95.8	4.2	20.8	70.8	4.2	4.2	19	34.33	14.1	4.6	44	8.55
RAY1	25.3	25.7	68.6	0	35	94.3	5.7	26	43	11	20	35	254.00	13.1	7.4	28.8	NA
SAL1	21.9	25.9	70.4	0	27	96.3	3.7	14.8	40.7	22.2	22.2	28	77.00	28.4	17	88	10.45
SAL2	16.3	48	44	0	25	92	8	28	60	12	0	11	45.33	24.3	8.2	461	219.77
SHM1	25.1	30.3	54.5	9.1	33	93.9	6.1	30	33	15	21	46	432.70	17.7	10	41.7	4.17
TRO1	25.7	24.1	62.1	10.3	31	96.6	3.4	25.8	61.3	3.2	9.7	11	131.33	5.2	6.4	7	3.15
WAS1	18.7	47.8	47.8	4.3	23	100	0	30	57	4	9	30	332.70	62.4	5.1	25	3.14
WHI1	27.3	36	60	2	50	98	2	22	68	4	6	20	70.33	9.6	11	10	4.12
WOO1	25.8	31	48.3	20.7	29	100	0	24.1	58.6	10.3	6.9	23	149.00	2.2	9.8	1.5	2.77

Sampled Wetland ID	TKN (MGL)	NO2+NO3 (MGL)	Total Phosphorus (MGL)	PHOSPHORUS_ORTHO DISS (MGL)	MED CONDUCTIVITY (USCM)	MED DO (MGL)	MED DO SAT (PCNT)	MED_PH	MED_Specific Conductance (USCM)	MED TEMP Water (Deg C)	MED Turbidity (NTU)
ALL1	0.34	ND	0.011	ND	19.1	6.27	74.2	4.4	19.4	23.8	0.52
ALS1	0.65	ND	0.0356	ND	38.8	1.19	13.1	5.42	42.4	21.2	0.92
ANT1	0.6	ND	0.0254	ND	56.5	5.2	61.9	4.97	58.2	22.1	0.98
AUB1	0.39	ND	0.0175	ND	92.3	0.88	9.7	5.17	98.5	21.6	0.6
BAR1	0.76	ND	0.0911	ND	172.2	1.77	21.3	5.1	172.5	23.6	1.04
BOW1	0.98	ND	0.0211	ND	226.6	7.85	98.9	6.04	217.4	27.1	0.75
BOW2	0.61	ND	0.0252	ND	156.3	5.4	60	5.79	177.6	19.1	0.79
CNT1	0.89	ND	0.0264	ND	235.5	4.3	46.7	5.97	242.5	23.5	1.7
CNT2	0.49	ND	0.0213	ND	241.9	5.77	68.4	6.23	246.2	24.1	0.67
CNW1	0.36	ND	0.0117	ND	158.9	7.72	98	6.25	149.2	28.6	NA
CON1	1.3	ND	0.0453	ND	735	0.08	0.8	5.89	788	19.7	1.39
CON2	0.52	ND	0.0204	ND	936	5.27	66	6.38	915	26.5	1.23
CON3	0.59	ND	0.0216	ND	673	5.91	72.6	6.69	672	25.2	1.22
CON4	0.5	ND	0.0241	ND	20.3	1.83	21.7	5.01	21.3	22.7	0.81
DAN1	0.54	ND	0.0198	ND	43.9	5.76	67.4	5.69	43.5	24.9	0.53
DEE1	0.65	ND	0.0167	ND	32.7	1.03	11.1	5.68	36.5	19.5	7.58
ELL1	ND	ND	0.0115	ND	16.1	8.4	105.9	5.67	16.1	24.2	0.34
ENF1	0.36	ND	0.00934	ND	61.3	7.02	84.5	6.54	61.1	24.5	0.43
FRN1	0.25	0.51		0.015	188	10.51	98.2	5.86	245.3	17.6	0.89
GRG1	ND	ND	0.0145	ND	23.3	7.61	87	5.61	26.3	21.9	1.1
HKS1	0.97	ND	0.0185	ND	35.5	4.3	54.5	4.82	34.2	27.5	0.41
HNV1	0.58	ND	0.0142	0.14	174.9	15.67	196.8	9.22	166.7	27.3	1.56
HSB1	0.75	ND	0.0181	ND	24.5	3.51	43.9	5.27	23.9	25.9	1
HUD1B	11	ND	0.148	ND	126.8	0.37	4.2	5.5	140.1	20.5	0.79
JAF1	0.88	ND	0.0142	ND	103.8	4.35	54.1	5.72	101.8	26.2	0.81
KIN1	0.63	ND	0.0184	ND	212.4	0.85	9.5	5.66	231.4	20.7	0.59
MAN1	1.2	0.095	0.196	0.034	367.1	1.72	20	6.16	382.5	22.4	3.16
MAN2	0.53	ND	0.0178	ND	534	5.02	61.1	5.84	527	25.8	1.43
MLW1	0.44	ND	0.0223	ND	12.2	8.15	97.1	5.51	12.3	23.6	0.82
NAS1B	0.75	0.2	0.0359	ND	265.1	4.99	52.5	6.1	309.1	17.8	2.169
NAS2	0.62	ND	0.0162	ND	627	10.33	126.3	6.91	610	25.9	1.37
NWB1	0.33	ND	0.0143	ND	76.3	2.74	42	5.92	82.1	21.6	0.91
NWD1	0.69	ND	0.0322	ND	63.5	3.83	48.1	5.45	61.8	26.6	1.35
PEM1	0.46	ND	0.023	ND	175.8	3.83	42.1	5.99	193.9	20.01	1.18
RAY1	0.4	0.11	0.0251	ND	146.9	5.68	64.1	6.17	159.7	21.1	2.06
SAL1	1.8	ND	0.032	0.014	388.2	6.35	74.1	6.72	384.1	24.3	0.93
SAL2	3.2	ND	0.289	ND	1615	0.07	0.8	5.93	1569	26.6	12.3
SHM1	0.63	ND	0.0274	ND	208.7	3.4	39.3	5.97	216.3	23	1.2
TRO1	0.47	ND	0.0215	0.017	45.8	2.42	34.9	5.24	46.3	24.1	1.57
WAS1	0.33	ND	0.0152	ND	120.5	1.42	15.1	5.35	137.7	18.5	2.93
WHI1	0.46	ND	0.0207	ND	58.5	5.51	62	5.99	62.1	21.9	2.87
WOO1	0.84	ND	0.0124	ND	11.4	6.67	72.3	4.45	12.8	18.8	0.88