2015 Annual Aquifer Monitoring Report
Evergreen Spring
Fryeburg, Maine

Prepared for:

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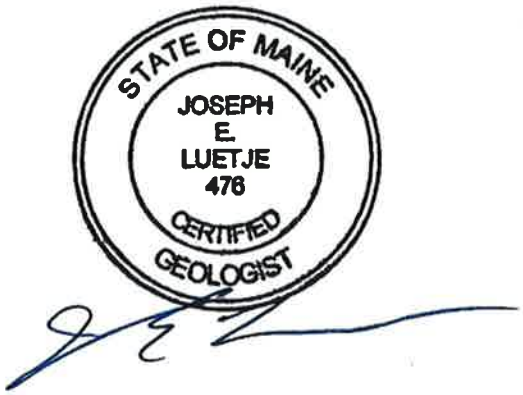
GROUND WATER HYDROLOGISTS



March, 2016

2015 ANNUAL AQUIFER MONITORING REPORT
EVERGREEN SPRING
FRYEBURG, MAINE

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1.0 INTRODUCTION

Nestle Waters North America Inc. (Poland Spring) has contracted with Luetje Geological Services (LGS) of Portland, Maine and McDonald Morrissey Associates, Inc. (MMA) of Concord, New Hampshire, independent hydrogeologic consulting firms, to collect and compile data from the Wards Brook Aquifer. Poland Spring is not required to submit these data to the Town of Fryeburg but started to do so voluntarily with the December 2008 monthly report. Annual reports are compiled after the end of each calendar year summarizing final data and drawing conclusions about hydrologic conditions in the Wards Brook Aquifer. Poland Spring purchases spring water in Fryeburg from the Fryeburg Water Company (FWC). The FWC also services other residential, commercial, industrial and public water users in Fryeburg.

Hydrogeologic data collection from locations in and around the Wards Brook Aquifer began in 2003 by Woodard & Curran for Pure Mountain Springs Company. LGS assumed responsibility for the monthly monitoring program in July, 2008 and continues to conduct monitoring of the Wards Brook Aquifer on behalf of Poland Spring. The primary role for LGS is monthly data collection and preparation of monthly and annual reports. MMA was contracted to perform data analysis, program review, and general oversight of site monitoring and reporting.

In August 2005, Emery & Garrett Groundwater, Inc. submitted a report (*Groundwater Flow Model, Wards Brook Aquifer, Fryeburg, Maine, 2005)* to the Town of Fryeburg Planning Board. This report was funded by the Fryeburg Aquifer Resource Committee (FARC). To date, this appears to be the most comprehensive investigation and report pertaining to the Wards Brook Aquifer. Emery & Garrett used groundwater and geologic data collected by several entities including:

- Pure Mountain Springs (PMS) and Woodard & Curran (W&C);
- Poland Spring;
- Fryeburg Water Company (FWC);
- WE Corporation (WE);
- SF Corporation, LLC (SF); and
- U.S. Geological Survey (USGS).

As part of its effort, Emery & Garrett created a groundwater model of the Wards Brook Aquifer. To simplify the report and present findings to the public, Emery and Garrett likened the Wards Brook Aquifer to a bank account, with income (groundwater recharge), fixed expenses (FWC needs for its customers other than Pure Mountain Springs and appropriate minimum flow through Wards Brook Drainage), and discretionary expenses (water used for other FWC customers, other water users of the aquifer, and excess flow through Wards Brook drainage). Emery & Garrett concluded that discretionary expenses (withdrawals) from the Wellhead Protection Area as delineated, after all other 'fixed expenses' were met, totaled approximately 293 million gallons per year (equivalent to 804,000 gallons per day over the course of a calendar year) during an average precipitation year. Emery & Garrett then imposed an arbitrary safety factor of 25%, arriving at a conservative 'discretionary expense' value of 220 million gallons per year (equivalent to 603,000 gallons per day over the course of a calendar year). Poland Spring purchases well below the 'discretionary expense' value. In 2015, water pumped from Borehole-1 (PBH-1) totaled approximately 145 million gallons.

2.0 AQUIFER MONITORING PROGRAM

This annual report is a compilation of data for the period from January 2015 through December 2015. The entire record of water elevations (2003 – present) measured at MW-108 is included, showing typical seasonal groundwater fluctuations in the Wards Brook Aquifer and is discussed further in Section 3.0

Data are presented for eleven monitoring wells, four surface water stations, two rain gauges (one at the load-out facility and the other from the Fryeburg Eastern Slopes Airport (ICAO Station KIZG, Northeast Regional Climate Center), and withdrawal data from PBH-1. Locations of all data collection stations are shown in Figure 1. Table 1 summarizes data collection stations and monitoring frequency.

3.0 GROUNDWATER LEVELS

Groundwater levels are measured in eleven monitoring wells at locations shown in Figure 1. These wells provide groundwater level data across and adjacent to the Wards Brook watershed. Photographs A and AA show a typical monitoring well in Fryeburg and the device used to measure the depth to water (water level indicator). Photographs appear in Appendix A.

Figure 2 shows groundwater elevations measured from the monitoring well network for the 2015 calendar year. Groundwater elevations range from approximately 380 to 430 feet NAVD88 (North American Vertical Datum 1988). Frozen conditions were observed at TW-2 and TW-9 through the winter months of 2015 as seen in Figure 2 and Appendix B. The water level in these wells is above ground surface and will freeze in the well casing during the winter months if water is not overflowing the well casing. Figure 3 shows the entire record of groundwater elevations for MW-108 (November 2003 – present) and demonstrates the typical general seasonal groundwater fluctuations observed across the aquifer.

Groundwater level fluctuations are primarily driven by the timing and amount of precipitation in a given region. In general, the highest groundwater levels occur in the spring in response to recharge from spring rain and snow melt after the ground thaws. Groundwater levels tend to decline through the summer months, when evapotranspiration is greatest, and lowest groundwater levels occur near the end of the summer or early fall. After the trees drop their leaves and evapotranspiration decreases, groundwater levels generally rise until the ground freezes. Another period of low groundwater levels then occurs in late winter after the ground has been frozen for several months. Data tables showing all groundwater and surface water elevation data appear in Appendix B.

Groundwater levels for 2015 show typical seasonal trends. A rise in groundwater elevations was observed in the spring caused by snowpack melt and precipitation. Groundwater levels reached their seasonal maximum in April and May 2015, after which elevations began to decline. Groundwater levels continued to decline throughout the summer, reaching seasonal low levels by August and September. At most locations, groundwater levels began to rise again in response to late fall/early winter recharge.

4.0 SURFACE WATER LEVELS

Surface water elevation is measured at four locations in and around the Wards Brook Aquifer watershed as seen in Figure 1. The surface water measuring locations are as follows:

- Saco River Monitoring Point (SRMP-1): surface water elevation is measured at the Route 113 bridge;
- Wards Pond Monitoring Point (WPMP-1): surface water elevation is measured at the Route 113 crossing;
- Lovewell Pond Staff Gauge (LPSG-1): surface water elevation is measured at the inlet from Wards Brook; and
- Wards Pond Staff Gauge (WPSG-2A): surface water elevation is measured near the center of the watershed in a bog located to the south of Wards Pond.

Appendix A includes a photograph (Photograph B) showing a typical staff gage used to measure surface water stage and a view of Lovewell Pond (Photograph BB) facing north from the boat ramp located off Route 113. The Lovewell Pond photograph is taken every month during regular monitoring if access is available. 2015 surface water elevations from surface water stations appear in Figure 4. A data table summarizing surface water elevation data appears in Appendix B.

Examination of Figure 4 shows normal seasonal surface water fluctuations near the site. In general, there is typically a rise in surface water levels during spring melt, a decline through the summer months, another rise in the fall and early winter followed by frozen conditions during winter months. Frozen conditions were observed at all locations except for LPSG-1 during the winter months of 2015. LPSG-1 remained unfrozen due to moving water at this station.

5.0 PRECIPITATION

Precipitation is recorded on-site adjacent to PBH-1 using an Onset Data Logging Rain Gauge (RG). The location of the on-site rain gauge is shown in Figure 1. A photograph showing the on-site rain gauge (Photograph C) appears in Appendix A. The on-site rain gauge has a self-tipping bucket that is activated with every 0.01 inches of precipitation. The gauge is also wrapped with heat tape that melts snowfall and allows measurement of precipitation through the winter months.

Precipitation data are also recorded at the Fryeburg Eastern Slopes Airport (ICAO Station KIZG, Northeast Regional Climate Center) and compared to precipitation measurements taken by the on-site rain gauge. The Fryeburg Eastern Slopes Airport is approximately two miles to the south of the on-site rain gauge. Table 2 summarizes 2015 precipitation data available and used in the monthly reports.

Examination of Table 2 shows that there is a correlation between precipitation data collected at both locations. For the 2015 calendar year, the on-site rain gauge recorded a total of 42.12 inches of precipitation, 1.50 inches less than was recorded in 2014. The Fryeburg Eastern Slopes Airport gauging station recorded 44.30 inches of precipitation, 3.40 inches less than was recorded in 2014.

The Fryeburg area receives an average of approximately 49 inches of precipitation per year. This average was calculated from data collected at two long term National Weather Service Cooperative stations:

- East Hiram NWS Coop Station 173794 (1967 – 2008) (the East Hiram Station was discontinued in July 2009)
- North Conway NWS Coop Station 275995 (1975 – 2010)

6.0 WITHDRAWALS

In accordance with the contract with the Fryeburg Water Company, spring water volume withdrawn from PBH-1 is presented as total gallons recorded as offloaded at bottling facilities. Table 3 summarizes the 2015 monthly withdrawal volumes. Spring water withdrawals from PBH-1 totaled 144,746,021 gallons for the 2015 calendar year.

7.0 BIOLOGICAL MONITORING

To complement the biological investigations conducted by Normandeau Associates in the 2006 and 2008 field seasons, Poland Spring initiated a long-term biological monitoring program of Wards Brook beginning in 2009. Bio-monitoring, conducted every other year, was completed by Stantec in 2015 and appears in Appendix C.

8.0 FINDINGS

This report represents the seventh annual report for Fryeburg, Maine prepared on behalf of Poland Spring and is a summary of hydrologic data collected from the Wards Brook Aquifer through the 2015 calendar year. Poland Spring also provides these data voluntarily to the Town of Fryeburg, Fryeburg Water District and the Fryeburg Water Company on a monthly basis in the form of a monthly report that began with the December 2008 report. These data provide an on-going comprehensive summary of hydrologic conditions in the Wards Brook Aquifer. Findings for 2015 include the following:

- Spring water withdrawal from PBH-1 for 2015 totaled 144,746,021 gallons;
- 144,746,021 gallons represents approximately 66% of the discretionary water available as determined by Emery & Garrett Groundwater, Inc.;
- Normal seasonal variations of groundwater levels were observed through 2015 at all monitoring well locations;
- Highest groundwater elevations for 2015 were observed in April and May, while the lowest groundwater elevations were recorded primarily in the fall;
- Surface water levels showed normal seasonal variation in 2015;
- Total precipitation for the 2015 calendar year was 42.12 inches as recorded by the on-site rain gauge, 1.50 inches less than 2014.

9.0 CONCLUSIONS

Based on our analysis of groundwater and surface water data collected in Fryeburg, Luetje Geological Services and McDonald Morrissey Associates have not observed any adverse impact to waters of the State, water-related natural resources and existing uses as a result of the sale of water by the Fryeburg Water Company to Poland Spring.

If you have any questions regarding the data, explanations, or interpretations included in this report, please do not hesitate to contact Ed Luetje (207) 415-9898.

Sincerely,

Luetje Geological Services, LLC

Ed Luetje C.G.

McDonald Morrissey Associates, Inc.

Daniel J. Morrissey

cc: Fryeburg Water Company (Mr. Hugh Hastings)
Emery & Garrett Groundwater, Inc. (Mr. Peter Garrett)
Poland Spring (Mr. Mark Dubois)

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TABLE 1
FRYEBURG MONITORING PROGRAM PLAN

Monitoring Station	Frequency
Monitoring Wells	
TW-2 [1]	Monthly
TW-9	Monthly
MW-101 [2]	Monthly
MW-103	Monthly
MW-105	Monthly
MW-107	Monthly
MW-108	Monthly
MW-109	Monthly
MW-110	Monthly
MW-113	Monthly
MW-114	Monthly
Surface Water Stations	
WPMP-1 [3]	Monthly
WPSG-2A [4]	Monthly
SRMP-1 [5]	Monthly
LPSG-1 [6]	Monthly
Precipitation	
RG – On-site Rain Gauge	Continuous
ICAO Station KIZG (Fryeburg Airport)	Continuous
Withdrawal Data	
PBH-1	Continuous

Notes:
1. TW refers to 'test well'.
2. MW refers to 'monitoring well'.
3. WPMP refers to 'Wards Pond Monitoring Point'.
4. WPSG refers to 'Wards Pond Staff Gauge'.
5. SRMP refers to 'Saco River Monitoring Point'.
6. LPSG refers to 'Lovewell Pond Staff Gauge'.

TABLE 2
2015 PRECIPITATION SUMMARY

MONTH	*ON-SITE RAIN GAUGE DATA*	*FRYEBURG EASTERN SLOPES AIRPORT (ICAO STATION KIZG)[1]*
Jan 2015	2.66	2.75
Feb 2015	1.64	1.34
Mar 2015	1.16	1.18
Apr 2015	3.51	3.93
May 2015	1.15	1.13
Jun 2015	6.84	7.46
Jul 2015	3.64	4.15
Aug 2015	3.07	3.22
Sep 2015	7.08	7.80
Oct 2015	3.47	3.36
Nov 2015	2.50	2.57
Dec 2015	5.40	5.41
2015 TOTAL	**42.12**	**44.30**

Notes: 1. KIZG station updated data. KIZG data presented in the monthly reports is preliminary, and is rechecked for this annual report.

TABLE 3
PBH-1 2015 WITHDRAWAL SUMMARY

Month	Monthly Total (gal)
Jan 2015	7,667,225
Feb 2015	9,250,403
Mar 2015	8,954,881
Apr 2015	12,786,896
May 2015	15,905,937
Jun 2015	18,399,025
Jul 2015	13,666,159
Aug 2015	17,209,247
Sep 2015	17,066,646
Oct 2015	8,791,391
Nov 2015	5,139,659
Dec 2015	9,908,552
2015 Total	**144,746,021**

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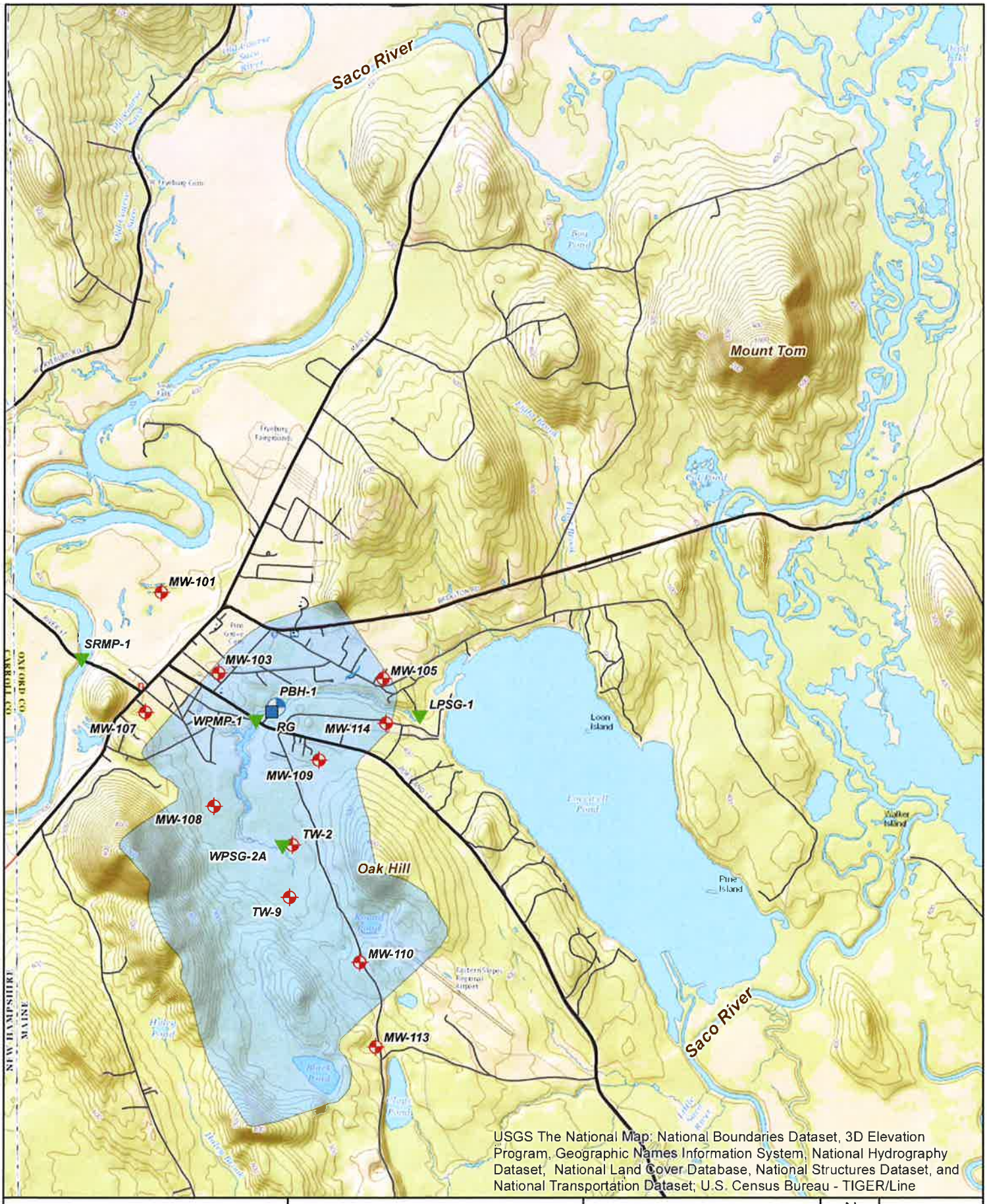

FIGURE 1
2015 ANNUAL AQUIFER MONITORING REPORT
EVERGREEN SPRING
FRYEBURG, MAINE

NOTES:
1. ALL GENERAL DATA LAYERS ACQUIRED FROM THE MAINE OFFICE OF GIS AND/OR ESRI ONLINE.

DATE: 2/11/2016

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FIGURE 2
HYDROGRAPH FOR 2015 GROUNDWATER ELEVATIONS

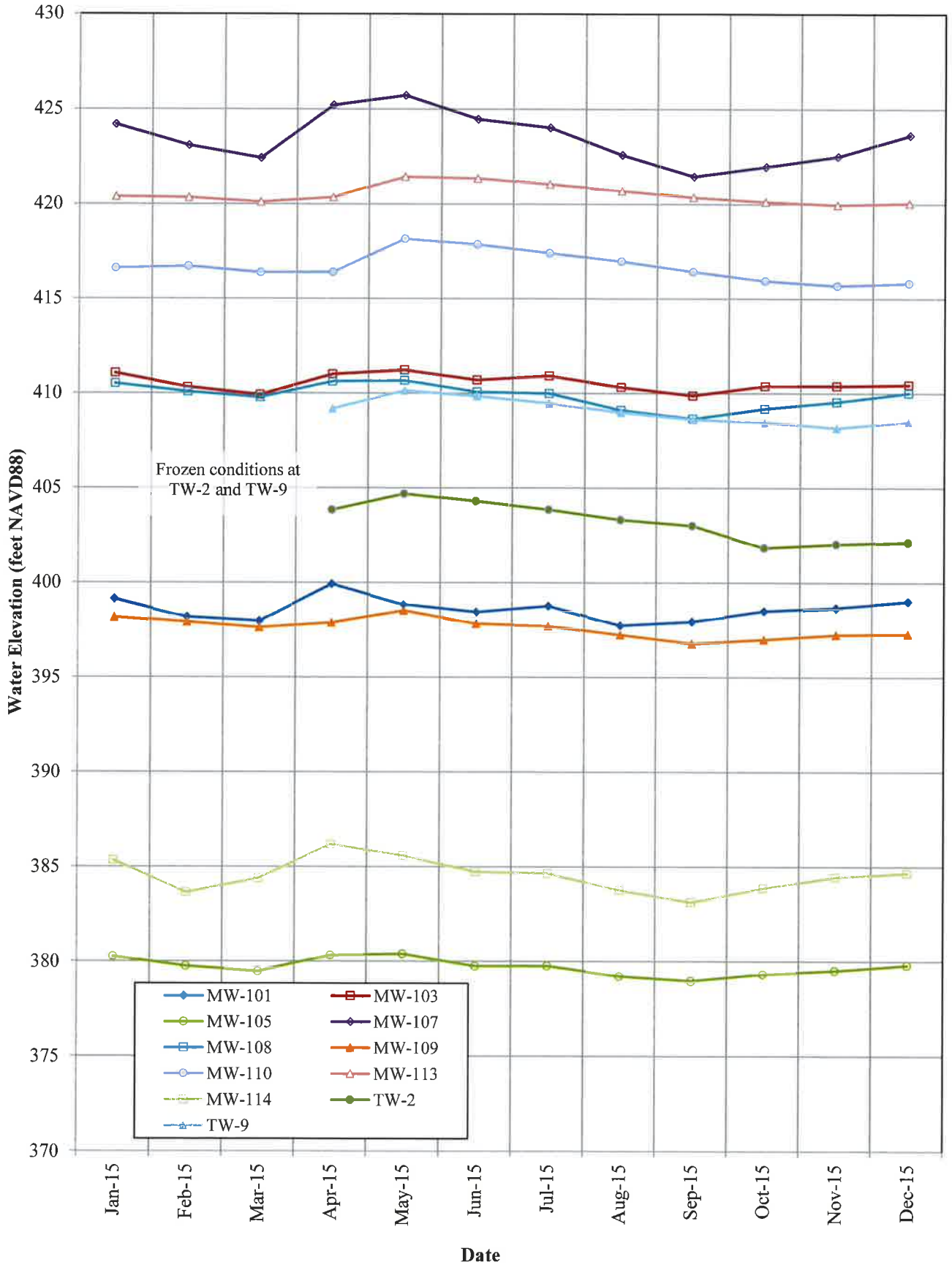


FIGURE 3
HYDROGRAPH FOR MW-108 - COMPLETE RECORD

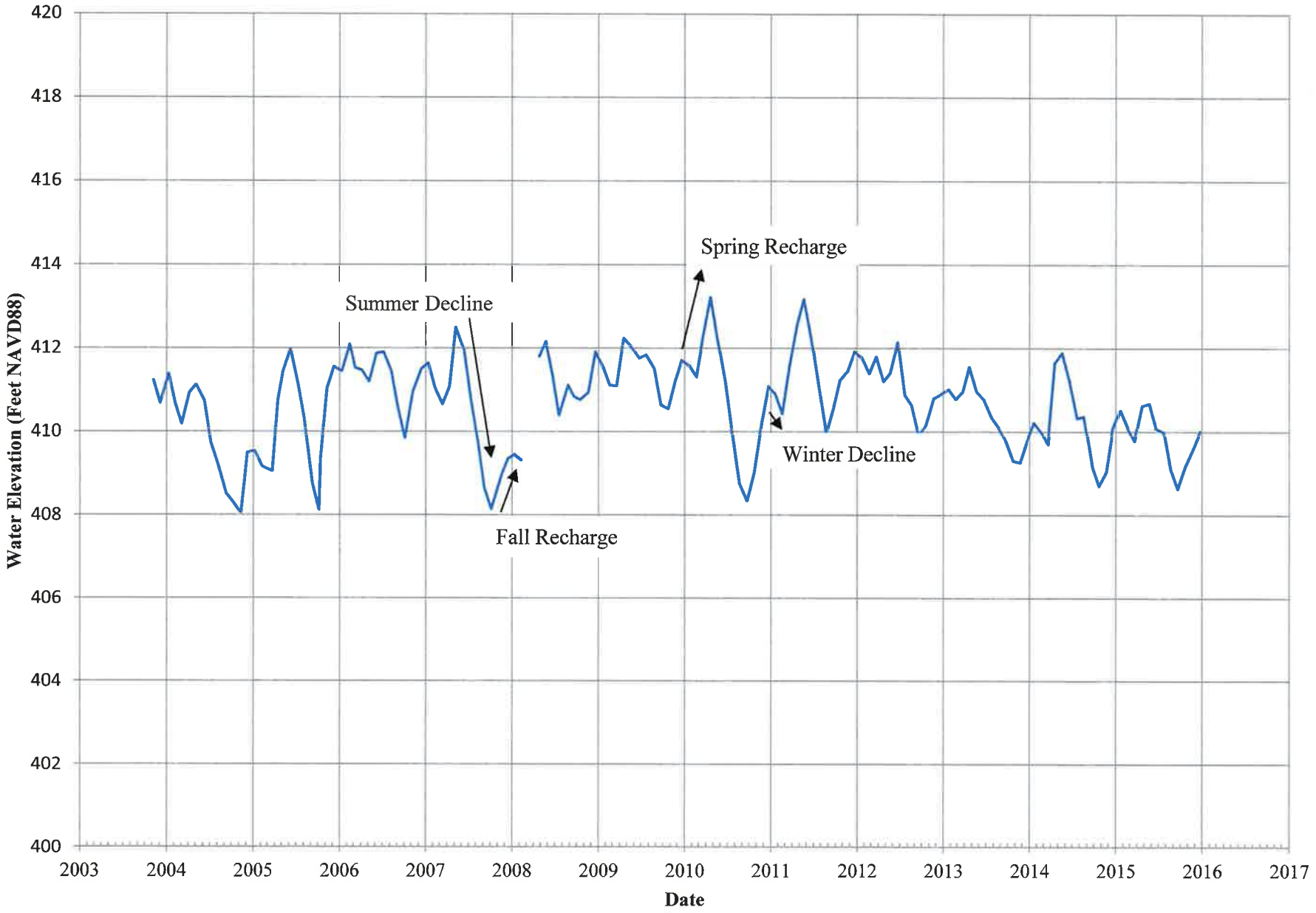
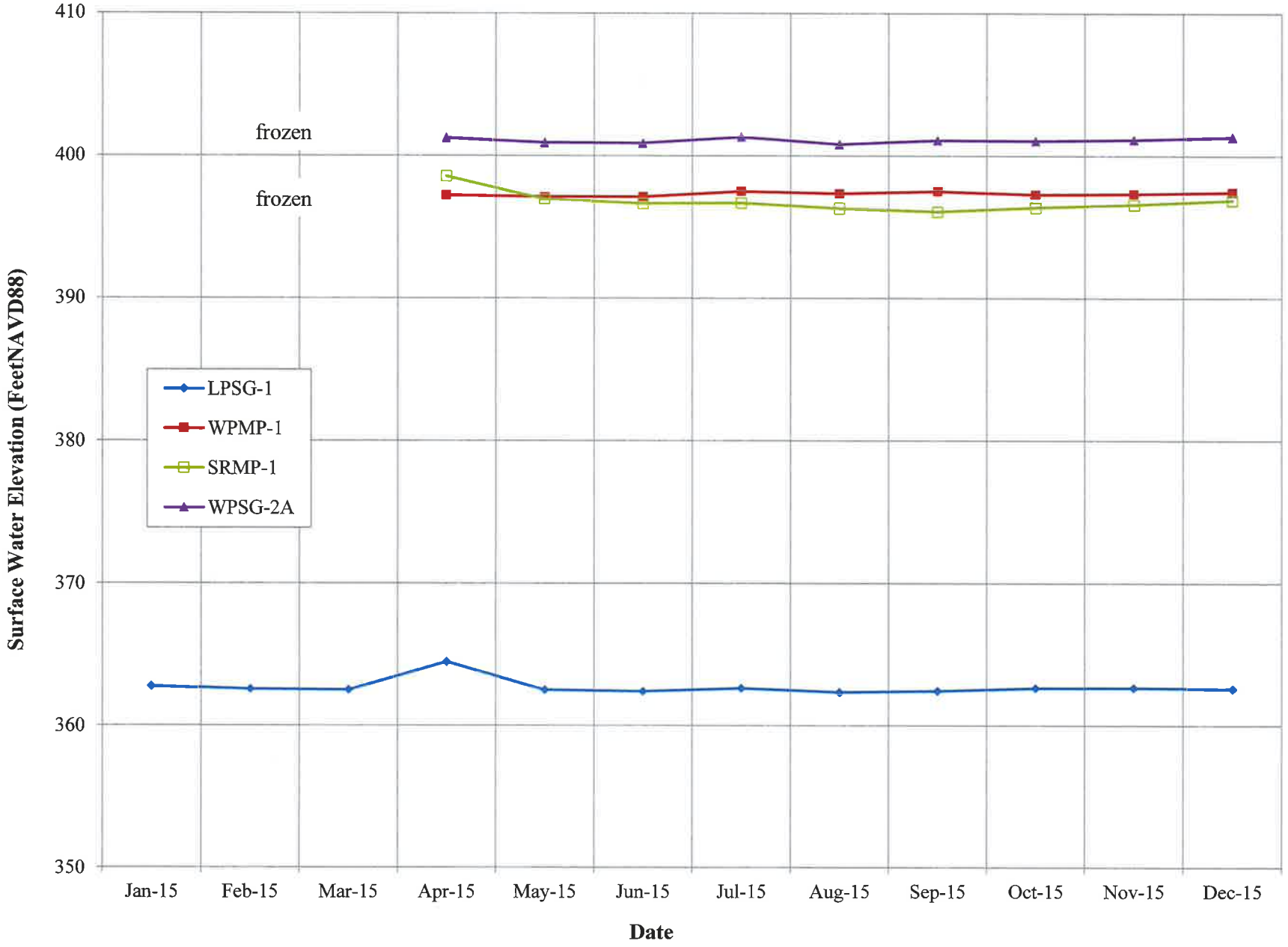


FIGURE 4
HYDROGRAPH FOR 2015 SURFACE WATER



Appendices

Appendix A	Photographs
Appendix B	Groundwater and Surface Water Elevation Data Table
Appendix C	Evergreen Spring 2015 Biomonitoring Report

APPENDIX A

Photographs

Photographs A and AA: Measuring depth to water using a water level indicator at MW-114.

Photograph A

Photograph AA

Photograph B: WBSG-2 – Typical staff gage used for measuring surface water elevation.
Photograph BB: Lovewell Pond from boat ramp off Rt. 113 facing north (6/18/2015).

Photograph B

Photograph BB

Photograph C: On-site Rain Gage

APPENDIX B

2015 Groundwater and Surface Water Elevation Data Table
Fryeburg, Maine

APPENDIX B
2015 GROUNDWATER AND SURFACE WATER ELEVATION DATA TABLE
FRYEBURG, MAINE

Monitoring Wells	MW-101 [2]	MW-103	MW-105	MW-107	MW-108	MW-109	MW-110	MW-113	MW-114	TW-2	TW-9
Reference Elevation (feet NAVD88) [1]	408.32	421.42	404.98	432.05	419.88	420.08	461.84	441.11	405.25	404.19	409.17
1/19/2015	399.11	411.07	380.27	424.20	410.51	398.19	416.62	420.39	385.33	frozen	frozen
2/20/2015	398.18	410.32	379.75	423.09	410.08	397.91	416.72	420.35	383.63	frozen	frozen
3/19/2015	397.96	409.91	379.49	422.42	409.78	397.63	416.38	420.11	384.38	frozen	frozen
4/20/2015	399.92	411.00	380.33	425.21	410.62	397.88	416.41	420.36	386.16	403.83	409.18
5/20/2015	398.84	411.22	380.38	425.72	410.67	398.51	418.15	421.43	385.56	404.68	410.14
6/18/2015	398.43	410.69	379.75	424.47	410.07	397.83	417.87	421.35	384.72	404.28	409.84
7/21/2015	398.76	410.92	379.76	424.02	409.99	397.71	417.41	421.04	384.64	403.85	409.47
8/19/2015	397.74	410.32	379.23	422.58	409.11	397.25	416.98	420.70	383.76	403.31	408.99
9/17/2015	397.94	409.88	378.98	421.45	408.65	396.79	416.43	420.36	383.12	403.00	408.62
10/19/2015	398.50	410.38	379.34	421.97	409.18	397.00	415.95	420.12	383.87	401.84	408.48
11/18/2015	398.67	410.38	379.51	422.51	409.55	397.24	415.69	419.96	384.44	402.03	408.17
12/22/2015	398.99	410.45	379.79	423.63	410.01	397.30	415.82	420.05	384.66	402.15	408.52

Surface Water Stations	LPSG-1 [3]	WPMP-1 [4]	SRMP-1 [5]	WPSG-2A [6]
Reference Elevation (feet NAVD88)	364.75[3]	401.22[4]	418.85[5]	403.03[6]
1/19/2015	362.75	frozen	frozen	frozen
2/20/2015	362.53	frozen	frozen	frozen
3/19/2015	362.49	frozen	frozen	frozen
4/20/2015	364.46	397.19	398.54	401.22
5/20/2015	362.48	397.08	396.89	400.92
6/18/2015	362.39	397.08	396.61	400.89
7/21/2015	362.61	397.47	396.64	401.3
8/19/2015	362.33	397.33	396.27	400.81
9/17/2015	362.41	397.48	396.04	401.09
10/19/2015	362.62	397.26	396.34	401.05
11/18/2015	362.64	397.3	396.54	401.13
12/22/2015	362.58	397.42	396.84	401.31

NOTES:

1. NAVD88 is the North American Vertical Datum 1988. Elevations are in feet NAVD. Measuring points were re-surveyed in November 2015 by Bliss Associates and new reference elevations are reflected in this table.
= old reference elevation
408.32 = new reference elevation (November 2015, Bliss)

2. 'MW' refers to 'monitoring well'.

3. 'LPSG' refers to 'Lovewell Pond Staff Gauge'.
= old reference elevation
= new reference elevation (May 2015)
364.75 = new reference elevation (November 2015, Bliss)

4. 'WPMP' refers to 'Wards Pond Monitoring Point'.
= old reference elevation
401.22 = new reference elevation (November 2015, Bliss)

5. 'SRMP' refers to 'Saco River Monitorinng Point'.
= old reference elevation
418.85 = new reference elevation (November 2015, Bliss)

6. 'WPSG' refers to 'Wards Pond Staff Gauge.
= old reference elevation
= new reference elevation (May 2015)
403.03 = new reference elevation (November 2015, Bliss)

APPENDIX C

Evergreen Spring 2015 Biomonitoring Report

Nestle Waters North America Inc., Evergreen Spring, Fryeburg, Maine: 2015 Long-Term Biological Monitoring Report

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195600717

March 3, 2016

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1.0 INTRODUCTION

Nestle Waters North America Inc. (Poland Spring), through its subsidiary Pure Mountain Springs, purchases water from Evergreen Spring, a spring site owned by the Fryeburg Water Company along Wards Brook and Route 113 in Fryeburg, Maine (Figure 1). Poland Spring continues to conduct voluntary monthly monitoring of groundwater levels of the underlying aquifer and the surface water levels of Wards Brook to assess potential impacts of the groundwater withdrawal operations on the overall hydrology of the spring site. In 2007, Normandeau Associates, Inc. (Normandeau) conducted a biological characterization of aquatic and wetland resources within Wards Brook and Lovewell Pond to provide a preliminary assessment of potential impacts to wetland and aquatic resources as a result of groundwater withdrawal operations.[1]

To further supplement the ongoing hydrological monitoring of the spring site and to augment the previous biological sampling completed by Normandeau, Poland Spring asked Stantec Consulting Services Inc. (Stantec) to initiate an on-site biological monitoring (biomonitoring) program in 2009. The purpose of the biomonitoring is to monitor and assess potential stream habitat impacts as a result of continued groundwater withdrawal operations through benthic macroinvertebrate monitoring on an every-other-year schedule. This biomonitoring program was voluntarily initiated as part of Poland Spring's commitment to maintaining sustainable yields of groundwater withdrawal and avoiding adverse impacts to the associated natural resources. This biomonitoring program is not part of any required conditional compliance associated with permits issued by the Maine Department of Environmental Protection (MDEP) or any other state or federal regulatory agency. This report presents the results of the 2015 biomonitoring.

2.0 2015 STREAM BIOMONITORING METHODOLOGY

To monitor the aquatic habitats within Wards Brook relative to the potential impacts of groundwater withdrawals from the borehole at Evergreen Spring, Stantec deployed one set of rock bags (i.e., 3 bags) in run-riffle habitat downstream of the borehole and upstream of a snowmobile bridge at the Grist Mill site (RB-1; Figure 2) to sample the macroinvertebrate community. Macroinvertebrate species vary in their tolerance to organic pollutants and stream habitat alterations. Through sampling and analyses of the macroinvertebrate communities, determinations of overall water quality can be made. Long-term biological sampling of the macroinvertebrate communities can be conducted to document potential changes in water quality over time. The RB-1 sampling site is similar in stream habitat to the Downstream Station as sampled by Normandeau in 2007 and by Stantec in 2009, 2011, and 2013. Deployment and

[1] Normandeau Associates, Inc. December 2007. *Baseline Characterization of Natural Resources of Wards Brook and Lovewell Pond in Support of Assessment of Potential Groundwater Withdrawal Impacts.* Prepared for Town of Fryeburg.

retrieval of the rock bags was conducted in accordance with *Methods for Biological Sampling and Analysis of Maine's Rivers and Streams*.[2] Rock bags were deployed for a portion of the low flow season (i.e., July through September). This biomonitoring methodology is consistent with the approach implemented by Normandeau in 2007 and continued by Stantec in 2009 through 2013. Each rock bag was located using a Trimble® Pro-XR Global Positioning System receiver. Samples were preserved in the field and submitted to Lotic, Inc. (Lotic) for taxonomic identification and habitat quality analysis using their macroinvertebrate water quality estimation model. MDEP Biological Monitoring Unit Stream Macroinvertebrate Field Data Sheets were completed at the time of rock bag collection and included habitat information and water quality parameters such as temperature, dissolved oxygen, specific conductivity, and pH.

Lotic's water quality model uses several parameters from the stream macroinvertebrate community, including species diversity and abundance of certain species, to determine the water quality of the stream. Under Maine Revised Statutes Title 38, Chapter 3, Section 465, four categories of water classification have been established. These standards describe the standards of aquatic life (e.g., macroinvertebrates) that shall be attained within Maine streams.

The aquatic life standards are as follows:

Class	Biological Standard
AA	Aquatic life as naturally occurs
A	Aquatic life as naturally occurs
B	Water quality sufficient to support all indigenous aquatic species. Only non-detrimental changes to the resident biological community are allowed.
C	Water quality sufficient to support all indigenous fish species. Changes to aquatic life may occur but structure and function of the resident biological community must be maintained.

Through systematic sampling of various stream habitats throughout Maine, the MDEP compiled a baseline database of representative macroinvertebrate communities from unimpaired streams to highly altered streams. A stream water classification was subsequently adopted by the Maine Legislature. This baseline database provides a reference point to which successive samples can be compared to determine stream classification and water quality. Lotic's report provided in Appendix A further elaborates on the baseline data compilation and the relevant macroinvertebrate community parameters used in evaluating water quality.

[2] Davies, S. and L. Tsomides. 2002 . *Methods for Biological Sampling and Analysis of Maine's Rivers and Streams*. Maine Department of Environmental Protection. Bureau of Land and Water Quality. Augusta, ME.

3.0 2015 STREAM BIOMONITORING RESULTS

Stantec deployed rock bags on July 30, 2015, and retrieved the rock bags on August 31, 2015. Rock bags were deployed in a shallow run-riffle habitat with a sand-gravel substrate. Stantec collected the macroinvertebrate species from each rock bag and provided the samples to Lotic. Lotic identified and enumerated each macroinvertebrate species from the rock bag samples. Lotic then analyzed the data using their water quality model to determine the water quality of the stream. Based on the macroinvertebrate water quality estimation model, Lotic determined that the benthic community at the RB-1 station in Wards Brook best represents a Class A stream. Lotic noted the high richness of mayflies, stoneflies, and caddisflies (i.e., EPT species) supported the Class A determination. The statutory designation of Wards Brook is only Class C so the Class A water quality designation based on Lotic's water quality model is better than the statutory classification relative to the macroinvertebrate communities.[3] Appendix A contains the results of Lotic's analyses. Appendix B contains representative stream habitat photographs.

4.0 DISCUSSION

Similar to previous sampling results in 2011 and 2013, the macroinvertebrate community sampled in 2015 continues to indicate Class A water quality. Class A results attained in 2011, 2013, and 2015 resulted from a high proportion of EPT species, which generally do not tolerate poor water quality. Both mayflies (Ephemeroptera) and stoneflies (Plecoptera) are species that are characteristic of higher quality waters with minimal disturbances. Lotic noted that the high proportion of black fly larvae (*Simulium* sp.) was most likely due to stream habitat and not water quality impairment. Black fly larvae are filter feeding organisms and their abundance is known to fluctuate widely on a yearly basis.

A comparison of the macroinvertebrate communities sampled between 2007 and 2015 is presented in Appendix C. Table 1 below compares various metrics relative to the macroinvertebrate communities sampled between 2007 and 2015 in Wards Brook. Minor shifts in species diversity and abundance are evident, but dominant species have been relatively consistent since the initiation of biomonitoring. Dominant species continue to include black fly, bloodworm midges (e.g., *Eukiefferiella claripennis* and *Tvetenia paucunca*), a mayfly (*Paraleptophlebia* sp.), and two species of caddisflies (i.e., *Diplectrona* sp. and *Dolophilodes* sp.).

[3] Wards Brook is classified as Class C surface water. Title 38, Section 467-12(B)(2).

Table 1. Comparison of Rock Bag Data

Category	2007	2009	2011	2013	2015
Plecoptera mean abundance	24	37	48.7	8.7	8.3
Relative Plecoptera abundance	0.07	0.06	0.12	0.04	0.03
Ephemeroptera mean abundance	45.3	80.3	95	44.7	57.3
Relative Ephemeroptera abundance	0.12	0.13	0.24	0.18	0.22
Tricoptera mean abundance	147.3	99.3	105.3	52.7	58.3
Relative Trichoptera abundance	0.40	0.16	0.27	0.21	0.22
Chironomid mean abundance	65.7	78.7	39.7	59.3	85.3
Relative Chironomid abundance	0.18	0.12	0.1	0.24	0.33
Number of taxa with tolerance values between 0 and 2*	8	16	18	17	15
Number of taxa with tolerance values between 3 and 5*	13	16	15	12	13
Number of taxa with tolerance values between 6 and 8*	12	15	16	9	8
Number of taxa with tolerance values above 8*	1	1	0	1	0
Stream Classification	NR**	B	A	A	A

**Tolerance values obtained from Bode et al. 1996. Quality Assurance Work Plan for Biological Stream Monitoring in New York State. NYS Department of Environmental Conservation, Albany, NY. 89p.; Mandaville, S.M. 2002. Benthic Macroinvertebrates in Freshwaters- Taxa Tolerance Values, Metrics, and Protocols. Soil and Water Conservation Society of Metro Halifax, Nova Scotia, Canada*

*** 2007 studies were completed by Normandeau and stream classification was not reported in the December 2007 report*

The water quality of Wards Brook is attributed to natural variation of macroinvertebrate species as a result of environmental factors. As Wards Brook is located in a suburban landscape, surrounded by residential developments and major roadways such as Route 113 and Route 302, the stream has been and continues to be affected by anthropogenic activities in the watershed such as surface water runoff from impervious surfaces, including roadways and parking lots. Sedimentation, nutrient inputs such as phosphorus, and stream temperature increases from surface water runoff are expected to contribute (under normal conditions) to a macroinvertebrate community that includes species that are more tolerant of anthropogenic disturbances such as black flies, bloodworm midges, other true flies (Diptera), or net-spinning caddisflies (*Hydropsyche* spp. and *Cheumatopsyche* spp.).

The continued abundance of EPT taxa, as well as species with moderate tolerance values, is characteristic of streams in wooded suburban environments. In 2015, the data indicate that water withdrawals have not adversely affected the water quality of Wards Brook.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The biomonitoring program in Wards Brook that was initiated by Normandeau in 2007 and continued by Stantec at Evergreen Spring allows for reasonable conclusions to be made relative to the potential impacts water withdrawal may have on the benthic stream communities and habitats.

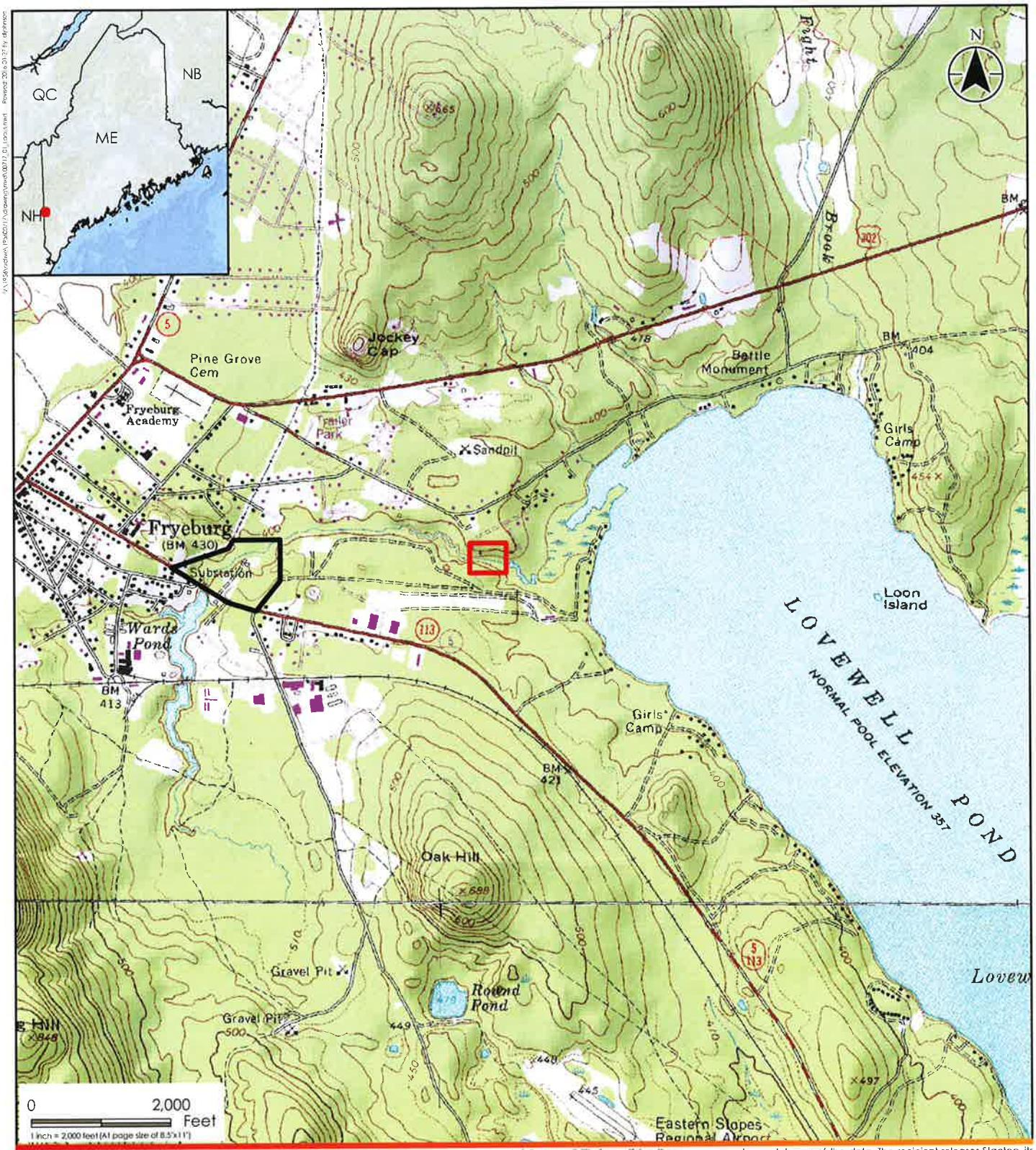
The data collected in 2007 through 2015 indicate that Wards Brook maintains a community of macroinvertebrates that are consistent for small woodland stream communities in a suburban watershed. Data collected in 2015 continue to indicate that Wards Brook attains Class A water quality standards, which is above the statutory Class C designation. Based on the results of macroinvertebrate sampling, the water withdrawal operations at Evergreen Spring have not had an adverse effect on the water quality of Wards Brook.

Stantec recommends continued stream biomonitoring on an every-other year schedule (i.e., 2017, 2019 and beyond) to monitor Wards Brook for potential effects of groundwater withdrawal operations.

March 3, 2016

Figures

Stantec



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Prepared by DLJ on 2016-01-25
Quality Review by KWH on 2016-01-26
Independent Review by MPA on 2016-01-27

00717_01_Locus.mxd

Legend

- Approximate Spring Site
- Approximate Sampling Location

Client/Project

Nestle Waters North America Inc.
Evergreen Spring
Fryeburg, Maine

Figure No.

1

Title

Project Location Map
1/27/2016

195600717

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00717_02_Biomonitoring.mxd

Legend

- Approximate Borehore Location
- Rock Basket Monitoring Location

Client/Project

Nestle Waters North America Inc.
Evergreen Spring
Fryeburg, Maine

Figure No.

2

Title

2015 Biomonitoring Locations
1/27/2016

Appendix A MACROINVERTEBRATE DATA

Report on the Benthic Macroinvertebrate Community Collected from Ward Brook in Fryeburg, Maine 2015.

Prepared for: Stantec Consulting Services Inc.
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Prepared by: Lotic Inc.
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February 23, 2016

Introduction

Stantec, Inc. sampled the benthic macroinvertebrate community in Wards Brook in Fryeburg following Maine Department on Environmental Protection procedures. Three rock-bags were deployed on July 30, 2015 and were recovered on August 31, 2015.

Lotic, Inc. was retained by Stantec, Inc. to provide sample processing and organism identification, and to provide a water quality estimation using Lotic's macroinvertebrate model. The following report details the procedures that Lotic used for sample sorting, macroinvertebrate identification and water quality estimation.

Executive Summary

The sampling of benthic macroinvertebrates in all locations followed established MEDEP protocols. The collected organisms from the samples were enumerated, identified, and then evaluated using Lotic's water quality estimation model.

The results of the water quality determinations are as follows:

Wards Brook	Class A

Methods

Three rock bags were deployed in Wards Brook on July 30, 2015 and retrieved on August 31, 2015 by Stantec personnel. All three rock bags were collected and preserved with 70% ethyl alcohol (ETOH) in the field. Preserved samples were shipped to Lotic for sample sorting, organism identification and enumeration.

Each sample was poured into a standard 40-mesh sieve and rinsed. Large debris was removed after inspection for clinging organisms. If found they were removed and the debris discarded. Benthic organisms were sorted from fine sample debris and placed in a labeled vial containing 70% ETOH. Sample debris was discarded.

Organisms were then identified to the lowest practical taxonomic level with the aid of a stereo microscope. While every attempt was made to identify the organisms to species level, identifications could be impeded by the age of the organism (early instars may not have developed the characteristics used in the identification process), condition of organism (some organisms are damaged i.e. missing gills, cerci, or legs in the collecting/sorting process), or categorical (in many groups species are known from adults only, larval keys are either non-existent or incomplete). Organisms in the groups Chironomidae (midges) and Oligochaeta (worms) were slide mounted and identified using a compound microscope.

These data were then evaluated using Lotic's water quality estimation model.

Background

Lotic's macroinvertebrate model estimates water quality by comparing the resident biological community at a collection site to macroinvertebrate communities collected from a range of previously established water qualities (Class A, B, C, and NA). Identified community metrics are tabulated and compared to the baseline information. Estimations of water quality are made using weight of evidence from the comparative template. Based on years of evaluations, the agreement between Lotic's model and the MEDEP water quality evaluation model is greater than 90%. The comparative template and a detailed explanation of metrics are included in this report along with the macroinvertebrate data sheet.

Results

The results of the comparative evaluation suggest that the resident macroinvertebrate community at Wards Brook best represents a community residing in Class A waters. The comparative template category scores were Class A (8), Class B (5) and Class C (2). The high EPT richness and high Plecoptera richness lend weight to the Class A estimation. The dominance of *Simulium sp.* is most likely due to habitat type, rather than any sort of water quality impact.

Wards Brook, Fryeburg, Maine 2013

Site value	Community Parameter		WATER CLASS A	B	C	NA
	Plecoptera Richness					
		mean	2.5	1.9	0.3	0
4		mode	3	1	0	0
		range	1-4	1-4	0-1	0
			X			
	Taxa Ratio (E/T) · (P)					
		mean	2.7	1.7	0.3	0
3.11		range	0.5-8.0	0.4-3.7	0.0-1.0	0
			X			
	Indicator Taxa					
		mean	3.7	2.0	0.5	0
2,5		range	1-7	0-4	0-1	0
		mean abundance when present	24.0	2.0	0.5	0
			X			
	EPT Richness					
		mean	16.8	19.5	10.3	3.2
20		range	13-24	11-27	7-13	0-11
			X	X		
	Total Richness					
		mean	36.8	47.3	26.8	17.6
31		range	20-48	25-63	20-33	4-27
			X	X	X	
	Dominance (% of sites)					
		Ephemeroptera, Plecoptera taxa	60%	0%	0%	0%
		Trichoptera taxa	35%	70%	50%	10%
Diptera, 7.7%						
		Diptera taxa	5%	20%	50%	40%
		Non-insect taxa	0%	10%	0%	50%
	Dominant organism greater than 45%		5%	20%	40%	90%
				X	X	

	Site Index				
	mean	3.70	4.34	5.24	7.73
3.20	range	2.22-4.96	3.76-5.41	4.55-6.08	6.12-8.73
		X			
	Trichoptera Richness				
	mean	8.3	10.0	6.8	1.7
9	mode	7	8	7	0
	range	5-13	6-17	3-10	0-7
		X	X		
	Ephemeroptera Richness				
	mean	7.8	7.6	3.3	1.3
7	mode	10	7	3	0
	range	5-10	4-11	3-4	0-5
		X	X		

TOTAL	**A**	**B**	**C**	**NA**
	8	**5**	**2**	**0**

Water Quality Estimation

Evidence suggests that Class A is most probable due to the number of evaluation characters that suggest good water quality, including high EPT richness and high mean abundance of indicator taxa. The dominant taxon, S*imulium sp.* was much less abundant than in previously sampling years.

Appendix B PHOTOGRAPHS

Photo 1. RB-1 Stream Sampling Station looking upstream. Stantec. July 30, 2015.

Photo 2. RB-1 Stream Sampling Station looking downstream. Stantec. July 30, 2015.

Photo 3. RB-1 Stream Sampling Station looking upstream. Stantec. August 31, 2015.

Photo 4. RB-1 Stream Sampling Station looking downstream. Stantec. August 31, 2015.

Appendix C MACROINVERTEBRATE COMMUNITY COMPARISON

Wards Brook Macroinvertebrate Comparison*

Order	Taxon	Tolerance Value**	2007			2009			2011			2013			2015		
			Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3
Amphipoda	Gammarus sp.	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coleoptera	Elmidae	4	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
Coleoptera	Dubiraphia	6	0	0	0	0	0	0	3	0	1	1	0	1	0	0	0
Coleoptera	Optioservus	4	0	0	0	0	0	0	0	0	0	0	0	0	2	5	2
Coleoptera	Promoresia	2	0	4	16	38	12	1	20	1	7	6	11	12	6	12	8
Coleoptera	Promoresia (adult)	2	0	0	0	0	0	3	0	0	0	2	0	4	0	0	1
Coleoptera	Stenelmis	5	0	4	0	3	0	1	0	0	0	0	0	0	0	0	0
Diptera	Antocha	3	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0
Diptera	Bezzia / Palpomyia	6	0	0	0	2	4	2	0	2	3	0	0	0	2	5	4
Diptera	Culicoides	6	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Diptera	Dicranota	3	0	0	0	4	2	0	2	1	5	0	0	0	2	0	0
Diptera	Empididae	6	0	0	0	5	4	0	1	0	0	0	0	0	0	0	0
Diptera	Hemerodromia	6	2	0	4	0	0	0	0	0	0	2	0	1	0	0	0
Diptera	Hexatoma	2	0	0	0	2	4	1	0	3	2	0	1	0	2	1	0
Diptera	Neoplasta	--	0	0	0	0	0	0	1	1	2	0	0	0	0	0	0
Diptera	Oreogeton	--	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0
Diptera	Simuliidae	6	0	0	0	68	139	2	0	0	0	0	0	0	0	0	0
Diptera	Simulium	5	14	40	64	212	395	11	96	91	28	56	75	47	26	38	39
Diptera	Tipulidae	6	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
Diptera	Tipula	6	0	0	0	2	2	0	0	2	2	1	0	3	0	0	0
Diptera (Chironomidae)	Brillia	5	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diptera (Chironomidae)	Cardiocladius	5	0	0	0	3	4	0	0	0	0	0	0	0	3	0	0
Diptera (Chironomidae)	Corynoneura	4	0	0	0	5	2	1	5	1	1	1	3	1	4	5	1
Diptera (Chironomidae)	Eukiefferiella	8	0	20	0	17	14	0	0	0	0	0	0	0	0	0	0
Diptera (Chironomidae)	Eukiefferiella claripennis group	8	0	0	0	0	0	0	22	29	11	21	22	12	21	24	24
Diptera (Chironomidae)	Eukiefferiella brehmi group	8	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Diptera (Chironomidae)	Eukiefferiella devonica group	8	0	0	0	0	0	0	5	0	0	3	0	1	0	0	0
Diptera (Chironomidae)	Larsia	7	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0
Diptera (Chironomidae)	Micropsectra	7	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0
Diptera (Chironomidae)	Nanocladius	7	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Trichoptera	Palaeagapetus	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Trichoptera	Parapsyche	0	0	0	0	1	2	0	0	0	1	1	0	0	1	0	0
Trichoptera	Philopotamidae	3	0	0	0	6	7	0	0	0	0	0	0	0	0	0	0
Trichoptera	Ptilostomis	5	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera	Rhyacophila	1	2	16	0	0	0	0	21	15	78	0	0	0	1	0	0
Trichoptera	Rhyacophila carolina	1	0	0	0	32	8	0	0	0	0	0	0	0	0	0	0
Trichoptera	Rhyacophila fuscula	0	0	0	0	17	25	1	0	0	0	3	12	6	0	0	0
Trombidiformes	Lebertia	6	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0
Turbellaria	Planariidae	6	0	0	0	4	1	1	1	1	4	0	0	0	0	0	0
Veneroida	Sphaerium	6	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0
Veneroida	Sphaeriidae	8	0	0	0	2	1	1	0	5	0	0	0	0	0	0	0

* 2007 data sampled by Normaneau Associates, Inc.; 2009 – 2015 data sampled by Stantec Consulting.

** Tolerance values obtained from Bode *et al.* 1996. Quality Assurance Work Plan for Biological Stream Monitoring in New York State. NYS Department of Environmental Conservation, Albany, NY. 89p.; Mandaville, S.M. 2002. Benthic Macroinvertebrates in Freshwaters- Taxa Tolerance Values, Metrics, and Protocols. Soil and Water Conservation Society of Metro Halifax, Nova Scotia, Canada