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Memorandum

To	Town of Wellesley	Pages	10 + appendix
CC			
Subject	2010 Morses Pond Management Update		
From	AECOM Environment, edited and expanded by WRS, Inc.		

October 10, 2011

This memorandum provides a progress update of the implementation of the 2005 Comprehensive Morses Pond Management Plan through 2010. From 2008 to 2010, AECOM has worked on the following pond management projects: 1) phosphorus inactivation, 2) plant harvesting, 3) low impact development demonstration, 4) education, and 5) dredging.

Phosphorus Inactivation

In the spring of 2008, AECOM assisted in the establishment of the phosphorus inactivation system in the north basin of Morses Pond. AECOM has operated the system in the spring and early summer of each year through 2010. The chemical pump station was established at the Town of Wellesley Dale Street Pump Station. General Environmental Systems, contracted by the Town, designed and installed the system with assistance from AECOM. Four chemical lines were run from the pump station into the north basin in 2008. The phosphorus inactivation chemicals used for the treatment are aluminum sulfate (alum) and sodium aluminate (aluminate). AECOM tested the system in 2008 and then operated the system as intended in spring of 2009 and 2010. After testing the system in 2008 and prior to operation in 2009, AECOM moved the two chemical lines with single diffusers from within the north basin to the mouth of the Boulder Brook and Bogle Brook inlets. This was done to facilitate inlet treatment. Figure 1 shows the current deployment locations of the four lines with approximate locations of the diffuser plates.

In the 2008 test year, AECOM treated the north basin during six storm events during the late spring and early summer (Appendix A, Table 2). Initially, treatment past early July was not planned, but since the system was not installed until mid-June, testing in 2008 proceeded later into the summer. A total of 2,000 gallons of alum and 1,000 gallons of aluminate were used in 2008 test treatments.

In the 2009 implementation year, AECOM treated the tributaries and north basin during or immediately after fourteen spring and early summer storm events (Appendix A, Table 3). The target alum to aluminate ratio of 2:1 was not achieved in early 2009 treatments, due to a malfunction within the aluminate pump. After the pumping system was repaired in May 2009, the alum to aluminate ratio dosage remained close to the 2:1 ratio. Based on estimated treatment delivery of chemicals, AECOM used the delivered total of 6,002 gallons of alum and 2,900 gallons of aluminate in spring 2009.

In 2010, AECOM treated the tributaries and north basin during or immediately after six spring storm events. Based on estimated treatment delivery of chemicals, AECOM used 4100 gallons of alum and 2080 gallons of aluminate. Table 1 provides a breakdown of recorded chemical usage by storm event.

Repairs to the distribution lines were necessitated in 2010 by damage done while harvesting the north basin to support sampling and measurement for dredging planning. Lines were cut in several places, and new hose sections were inserted where needed. It was assumed that a more major overhaul of the lines might be accomplished when the dredging was done, as lines would have to be moved out of the way, but in the interim the repairs facilitated continued treatment.

AECOM conducted water quality monitoring before and/or after storm events where alum treatment occurred. Water quality samples were collected for six storms in 2008, fourteen storms in 2009, and six storms in 2010. AECOM attempted to collect pre-treatment stormwater samples prior to the beginning of each storm event, but weekend and overnight storms often precluded pre-storm sampling. Water samples were collected at the inlets (Boulder and Bogle Brooks), within the area bounded by the north basin chemical lines, at the transition zone south of the islands, and at the Wellesley town beach. Figure 2 provides the sampling locations for 2008 and the changes made for the 2009 and 2010 phosphorus inactivation monitoring seasons. In 2009 and 2010, composite samples were created from discrete collection points in each of the following locations: the north basin, the transition zone, and the beach area. Water samples were sent to Berkshire Enviro-Labs, a Massachusetts State Certified Laboratory, and analyzed for dissolved aluminum as well as total and dissolved phosphorus. The 2010 water quality monitoring results are included in Table 2, and the previous years' data can be found in Appendix A.

The 2008 water chemistry results indicate a small difference in phosphorus concentrations before and after treatment, but there is a lot of variability in the data. Pre- and post-treatment total phosphorus concentrations can be found in Appendix A, Table 2. Elevated dissolved aluminum concentrations were observed shortly after treatment. The summer total phosphorus concentration (July 22) at the Wellesley Town Beach was relatively low at 12 ug/L. Phosphorus levels should have been influenced by treatment, however this is not likely the sole contributor to low phosphorus values. Flushing from storms can also lower phosphorus levels, and the summer of 2008 included multiple substantial storms. Total rainfall from May to July was 8.69 inches, with 5.03 inches falling in July alone. It cannot therefore be conclusively stated that the treatments reduced phosphorus to the observed levels, but the results are encouraging. Testing was conducted later in the summer than normally planned, and plant growths (especially water lilies) were dense in the north basin; even distribution of aluminum was not observed and efficiency of treatment is not believed to have been maximal. The re-alignment of two of the chemical feed lines at the inlets of Bogle and Boulder Brooks was intended to enhance the treatment. Implementing the treatment program earlier in the year, before dense plant assemblages form, was also expected to help improve treatment efficiency in subsequent years.

In 2009, the treatment resulted in variable phosphorus concentrations over the two month period, with high stormwater inflows overwhelming treatment capacity several times. However, recovery through treatment was also observed. Analytical results of the water chemistry are presented in Appendix A.

Within Bogle and Boulder Brooks, the post-treatment total phosphorus concentration results did not reflect treated water, but tributary water flowing into Morses Pond following a storm event. The treated water was observed in the North Basin rather than the tributaries during the post-treatment sampling, as continuous flow from the brooks flushes treated water through the basin. The similar inlet phosphorus concentrations before and after storm events suggest that the water quality is as nutrient rich before and after storm events, although the higher flows during storms indicate much greater loading during storms. Within the North Basin, post-treatment total phosphorus concentrations were generally lower than pre-treatment concentrations for individual storm events. The results suggest a decrease in the dissolved fraction of the total phosphorus concentration following aluminum treatment. However, there is variability in the data. Overall, dissolved aluminum concentrations were higher after treatment (no change to an increase of 0.395 mg/L). Within the Transition Zone beyond the islands, pre- and post-treatment concentrations were similar. This is likely due to treated water in the North Basin not reaching the Transition Zone at the time of the post-treatment sampling.

Treatment during the last two weeks of June 2009 resulted in a total phosphorus concentration of 10 ug/L at the Wellesley Town beach, which was the target level for the end of treatment. No algal blooms were observed in the summer of 2009 and no algaecide treatments were necessary. Flushing by numerous storms in 2009 was a substantial factor in the condition of Morses Pond, and may have prevented algal blooms much as suspected in 2008. However, despite the high phosphorus levels in the stormwater discharging to Morses Pond in 2009, the water quality at the beach in early July, a week after the last treatment, was very desirable from the perspective of swimming and overall appearance. The aluminum treatment may not have been the sole factor controlling phosphorus levels and algae in 2009, but the apparent success of the treatment, even under difficult weather conditions, was again encouraging.

In 2010, treatment resulted in concentrations that varied by storm. Due to the abundance of vegetation within the North Basin and resulting lack of significant mixing through most of the area, chemical treatment took place almost exclusively at the two lines within the Brooks. The exception to this was the first treatment of the year, June 7th, which occurred after a weekend storm and before vegetation became abundant. Although treatment generally takes place from May into early July, in 2009 the chemical remaining beyond the 4th of July weekend was used to treat a large storm at the end of August (4.64” over 48 hours). It was originally intended that such a treatment be conducted in late July to offset inputs in that month, but it was not until late August that the treatment was performed. The results from this storm for the most part showed pre-treatment phosphorus levels elevated from the July 9th sampling event representing the end of the normal spring/early summer treatment period. The post-treatment concentrations were also for the most part elevated, suggesting limited impact from the single treatment in late August.

Throughout the treatment period, several samples in all locations showed highly elevated concentrations of total aluminum. Concentrations were particularly high in the post treatment samples taken on 6/10 in Bogle Brook and at L2, and on 6/23 in Boulder and Bogle Brooks (7700 mg/L, 1100 mg/L, 58000 mg/L, and 7500 mg/L, respectively). However, no fish or invertebrate mortality was observed during the post-treatment sampling rounds or on the following treatment days. It is very likely that nearly all of the total aluminum was in a non-reactive form, and therefore non-toxic. This is a common problem in evaluation of aluminum toxicity; only the reactive form is toxic, and this form does not last long in lakes and ponds at a pH range of 6-8 SU. Aluminum discharged to the inlets or north basin has not produced any observable impacts on animal life in Morses Pond, and with the pH maintained between 6 and 8 by adequate buffering, this is as expected. Movement of particulate Al during storms (by wind or high flows) is to be expected and will yield elevatged total aluminum levels, but this does not represent a threat to the health of Morses Pond.

Visual observation of the channel leading from the inlet of Boulder Brook indicated a high amount of flocculent, as any stirring of the water that disrupted sediment resulted in a milky appearance. The amount of treatment residue in the channel is due to the slower flow out of Boulder Brook; the high volume of vegetation through which the flow from Boulder Brook must filter, and the shallow depth to sediment near the inlet. The shorter chemical delivery line length as compared to the line to Bogle Brook may also account for the appearance of the water, as less energy is needed to move more chemical into the diffusers placed in the Boulder Brook inlet. Care must be taken to balance the chemical additions to the two main inlets. Overdosing Boulder Brook may not have any major negative impacts, but undertreating Bogle Brook is to be avoided.

Within the North Basin and at the transition zone (Figure 2), the ratio of dissolved phosphorus to total phosphorus dropped post-treatment throughout the season, with the exception of elevated levels in the western edge of the basin (L2) on the June 17th and 23rd treatment days. On the 17th, dissolved phosphorus rose 36 percent, though the overall concentration of dissolved phosphorus rose only from 23 ug/L to 25 ug/L.

As mixing in the North Basin is limited by dense plant growths by mid-June, chemical was distributed almost exclusively through the lines within the two brook inlets in 2009 and 2010. Exclusive treatment through these lines, and especially through Bogle Brook, was expected to more effectively treat incoming stormwater. Water flowing in from Bogle Brook (which includes outflow from Jennings Pond in Natick as well) encounters less interference on its way to the main basin of Morses Pond, running along the west side of the North Basin in an area of less dense plant growth, slightly greater water depth, and a larger gap between the islands. As Bogle Brook provides more flow than Boulder Brook, more effort is needed to ensure adequate treatment of the Bogle Brook inflow.

Results varied over time at the beach, but at the end of the 2010 treatment period in early July, the dissolved phosphorus concentration was 10 ug/L and the total phosphorus concentration was 15 ug/L. The dissolved phosphorus fraction varied greatly across the treatment storms, with the most significant events being a rise of 27 percent from the June 7th treatment and a drop of 38 percent from the August 25th treatment. At the end of spring treatment on July 9th, the dissolved phosphorus fraction was 67 percent.

In 2010, conditions were considered quite acceptable at the end of June, but by the end of July there had been enough untreated storm water inputs to foster an algal bloom, and a copper sulfate treatment was performed to abate an algal bloom in the beach area. Addition of aluminum later in August provides little benefit, as the beach closes at that time, but was attempted in order to use up the chemical and evaluate any response. It may be necessary to extend treatment further into July to maintain desirable conditions throughout the summer.

As observed in 2009 and 2010, the treatment is most effective when the two inlets can be treated from the beginning of the storm. Treatment in the northern basin can be effective in May, but by June the growth of plants is too thick to allow even dispersion of the aluminum when injected through the ports over the aeration diffusers in that basin. AECOM will watch, forecast, and time the treatment in 2011, focusing on June storms, to maximize effectiveness and achieve desirable conditions in early July. It appears that treatment of enough stormwater inflow to represent approximately the volume of Morses Pond is sufficient to achieve the desired phosphorus level in the southern basin of the lake going into summer. This is not an exact science due to the unpredictability of the weather, and adaptive management is warranted. Treatment during July may be necessary, and is allowable under the permit, but requires saving or ordering chemical in late June.

Low Impact Development Demonstration

In the spring of 2008, AECOM evaluated public sites within the Morses Pond watershed for futire application of Low Impact Development (LID techniques. A desktop analysis was conducted on the approximately 60 parcels identified. Out of the 60 parcels, 13 locations were identified for further field investigation. Based on the field investigation, LID practices at many of the sites would not be practical due to current drainage patterns, topography, cost, or space available. Out of the 13 sites the Upham Elementary School and Bates Elementary School were chosen as the best properties where LID practices could be easily retrofitted.

The Upham Elementary School was selected for further design, and in 2009 preliminary design plans and specifications were prepared. The design included conversion of grassed islands and a portion of the paved play yard in front of the school to a series of water quality swales with added bioretention filtration of stormwater. The design also included a larger biorentention area behind the school by the ball field parking. AECOM worked with Wellesley DPW and the Natural Resource Commission (NRC) on fine tuning the design to provide a demonstration project that would provide water quality treatment with minimal maintenance requirements. As of the end of 2010, these plans were awaiting approval or further modification.

Plant Harvesting

Harvesting Strategy

The Town of Wellesley initiated the enhanced Morses Pond vegetation harvesting program in 2007. The zoned vegetation harvesting strategy originates from the 2005 pilot program and comprehensive management plan written that year. For the pilot program, Morses Pond was divided into seven zones in order to better track the harvesting process. Figure 3 shows these zones and Morses Pond bathymetry. Harvesting began later than desired in 2007 and various issues with the operation of the harvesting machine caused 2007 to be a training and testing year for the new approach to harvesting.

In 2008, plant harvesting occurred in June in the north basin, which is not typical of the harvesting program, but was done in order to facilitate the alum treatments. The main body of the pond was harvested in late June through the summer. Harvesting the north basin in June put the program behind the planned schedule. Both the old and new harvesting machines were used in 2008 in an effort to “catch up” in late spring. However, harvesting in Zone 6, the portion of the southwestern cove in Wellesley, resulted in substantial fragments of vegetation reaching the beach and east shore. The late timing of the harvesting is believed to have allowed greater plant growth before harvesting and more fragment generation, and was therefore less than ideal. Harvesting did keep plant growth under control and did not prevent recreational access to the pond in 2009, but with some accumulation of fragments along shorelines.

In 2009, adjustments were made to the harvesting plan based on observations and experiences in 2008. This revised strategy allowed generation of fewer plant fragments and overall greater success. The plant harvesting program began with harvesting in Zone 6, followed by harvesting in Zone 3, and finally harvesting in Zones 4 and 2. This first harvesting round was completed by July 4^{th} weekend, with Zones 6 and 3 cut well before the beach opened for summer. The early harvesting timing eliminated the plant fragment issue during early swim season. A second round of harvesting in August was performed to maintain control and exert selective pressures that favor low-growing, seed-producing, more desirable species. There were no fragment complaints, even by passive users, in 2009. Due to the greater overall success in 2009, AECOM recommended that the Town of Wellesley repeat the plant harvesting strategy applied in 2009 again in 2010. The keys to successful harvesting include:

- Initiating harvesting by the Memorial Day weekend.
- Cutting the southwest cove (Area 6) first, then proceeding through Areas 2, 3 and 4 in order of apparent need.
- Cutting with or against the wind, but not perpendicular to the wind, to aid fragment collection.
- Limiting harvesting on very windy days (a safety concern as well as fragment control measure).

Harvesting Record

Records provided by the Town of Wellesley indicate the harvesting effort expended on Morses Pond. Although the record is not always complete, records have been kept since 2007 Between late May and early September, from 2007 through 2010, harvesting was conducted on a range of 43 to 61 days. This represents a range of 303 to 359 total hours devoted to some aspect of the harvesting program, and 223 to 255 hours of actual harvesting time, or an average of 5.1 to 5.4 hours per day of harvesting. Approximately another 2 hours per day are expended on hauling plants, harvester maintenance, and related tasks other than actual cutting or offloading, accounting for the larger total time commitment. The harvesting effort has resulted in the removal of 224,000 to 270,000 pounds of plants (wet weight) per year, excluding plant material removed by hydroraking.

We are missing plant weight data from 2007 and hourly activity data from 2008, and the identification of plants being targeted by harvesting is not always consistent with what has been observed by AECOM staff in the field, so some improvement in record keeping is needed. A more complete analysis will be conducted after the 2011 harvesting season. Overall, however, the plant harvesting program is proceeding well, achieving desirable results, and being adjusted to enhance performance as warranted.

Plant Surveys

AECOM conducted plant surveys in early May of 2008, 2009, and 2010 prior to plant harvesting to determine the assemblage features. These surveys also identify areas supporting very dense aquatic plant growths and helps set priorities for harvesting. Shoreline surveys were also performed to guide localized plant control by shoreline residents, including proposed hydroraking. A benthic barrier was installed at the swimming beach in 2008 as a pilot study, but no further application occurred. As of 2010, the original benthic barrier was still in place. Hydroraking of shallow areas was desired by many shoreline residents, and was planned for 2009. However, equipment problems precluded execution of hydroraking beyond the beach area. Hydroraking of peripheral areas was conducted in 2010, with residents paying for those services off their shoreline parcels.

Methods

The vegetation surveys occurred on May 7 and 8 of 2008; May 4, 6, and 8 of 2009; and May 4, 11, and 13 of 2010. During all surveys, AECOM used the point-intercept method, resulting in 306 survey points on Morses Pond (Appendix A, Figures Part 1 and 2). These same points were utilized during the 2005 vegetation survey. The point-intercept methodology is intended to document the spatial distribution and percent cover and biovolume of aquatic plants at specific re-locatable sites. At each point, AECOM recorded the following:

- The GPS waypoint.
- Water depth using a metal graduated rod or a mechanical depth finder.
- Plant cover and biovolume ratings using a standardized system.
- Relative abundance of plant species.

For each plant species, staff recorded whether the species was present at trace (one or two sprigs), sparse (a handful of the plant), moderate (a few handfuls of the plant), or dense (many handfuls of the plant) levels at each site. Plant cover represents the total surface area covered in plants (2 dimensions). For cover, areas with no plants were assigned a “0,” areas with approximately 1-25% cover were assigned a “1,” a “2” for 26-50%, a “3” for 51-75%, a “4” for 76-99%, and a “5” for 100% cover. Like plant cover, a quartile scale was used to express plant biovolume, defined as the estimated volume of living plant material filling the water column (3 dimensions). For biovolume, 0= no plants, 1= 1-25%, 2=26-50%, 3=51-75%, 4=76-100%, and 5= 100% of plants filling the water column.

AECOM also conducted shoreline surveys (Appendix A). For the 2008 shoreline survey, the shoreline was divided into 62 zones, representing different property owners. The 2009 survey consisted of only shoreline segments where property owners expressed interest in shoreline plant harvesting, around the northern islands, and along northern conservation areas of interest. The surveys were performed generally within the 0-5 ft depth range along the shoreline. For each zone, plants were identified, and the average density of each plant within the zone, was recorded. For example, if a plant was sparse in two areas within the zone, it was labeled as sparse, even though the plant may not necessarily be sparse throughout the zone. Similarly, if a plant species were very dense in one small area, but not present throughout the rest of the zone, this plant was recorded as sparse. Note that for early season surveys, values for cover and biovolume are expected to be much lower than might be encountered during summer, so some extrapolation is needed when assessing management needs.

Results

Overall, Morses Pond had moderate to dense vegetation cover and biovolume in all three survey years. With the exception of the deeper southern basin (Zone 7), plant cover had an average ranking of 3-5 (51-100% coverage) in 2008, 3 (51-75% coverage) in 2009 and 2-4 (25-99% coverage) in 2010. In all three years, the average biovolume for a majority of the pond was ranked as 2 to 3 (plants taking up about half of the water column), and this was for early season survey data. Vegetation coverage and biovolume in Morses Pond was densest in Zones 3 and 4 in 2008 and 2009, and in Zone 4 only in 2010. Harvesting has improved recreational conditions, and may have had some impact on coverage and biovolume in the 2010 survey year.

In the 2008 and 2009 shoreline surveys, the majority of Morses Pond's shoreline ranked as a 0 or 1 for both cover and volume. The cover and biovolume for no shoreline zones were categorized above a 3. However, because the survey was performed early in the growing season, there are many shoreline areas of the pond that may become overgrown later in the season due to the presence of the invasives *Myriophyllum spicatum* (Eurasian milfoil), *Myriophyllum heterophyllum* (variable milfoil), and/or *Cabomba caroliniana (*fanwort). In 2008, the southwestern cove had dense algae mats and the three invasive species throughout. The 2008 shoreline survey map is included in Appendix A. In 2009, AECOM acknowledged the appropriateness of shoreline hydroraking in front of several waterfront lots on the southern shore on College Road, the southeastern cove on Pickerel Rd and Pickerel Terrace, and the northwestern cove along Stovecleve Road. The shoreline of the islands and Pickle Point Conservation area also had sparse to moderately dense patches of one or all three of the common invasive species. Early season shoreline surveys do not adequately capture the likely summer conditions along the shoreline.

For the point-intercept surveys, twenty plant species were encountered in the 2008 survey, twenty-two plant species in 2009, and twenty-four in 2010. The five invasive plant species encountered are:

- *Cabomba caroliniana* (Fanwort)
- *Lythrum salicaria* (Purple loosestrife)
- *Myriophyllum spicatum* (Eurasian watermilfoil)
- *Myriophyllum heterophyllum* (Variable watermilfoil)
- *Potamogeton crispus* (Curlyleaf pondweed)

Eurasian watermilfoil and fanwort continue to dominate the Morses Pond plant community. Only in the deeper southern basin of Morses Pond (Zone 7) were the two invasive species not dominant. Dominant species are defined as plant species that constitute 50% or greater frequency of occurrence (2010 frequency data is provided in Table 3). Another invasive, curly leaf pondweed, was a dominant in the northeast and northwest coves (Zones 2 and 4) in 2008, but it was not dominant anywhere in 2009 or 2010. Variable milfoil was a dominant in the northern basin (Zone 1) in 2008 and in the southwestern cove (Zone 5, in Natick and not subject to management under the Wellesley program) in 2009. Variable milfoil was dominant in all zones except 6 and 7 in 2010. An invasive wetland species, purple loosestrife, was observed on the northern basin shoreline in all survey years. Frequency of occurrence data for previous years can be found in Appendix A.

Native species are also abundant in Morses Pond. *Nymphaea odorata* (white water lily) and *Ceratophyllum demersum* (coontail) were dominants at some survey sites in the northern basin (Zone 1) for all survey years. Coontail was additionally dominant at sites in zones 2 through 6 in 2010. Filamentous green algae mats were abundant in the northern basin and northeastern cove (Zones 1 and 2) in 2008 and 2009 with dominance also in zones 3, 4 and 6 in 2010. *Potamogeton robbinsii* (Robbins' pondweed) was dominant in the southwestern cove (Zones 5 and 6) for the 2008 and 2009 surveys, with dominance established in zone 6 in 2010. *Naja flexilis* (common naiad) was dominant in Zones 3 and 6 in 2008, but not in 2009, and nowhere was it dominant in 2010. Other native species not dominant in previous years but established in 2010 included *Potamogeton robbinsii* (Robbins' pondweed) in Zones 1, 5 and 6, *Potamogeton amplifolius* (Broadleaf pondweed) in Zones 3 and 4, and *Elodea canadensis* (Waterweed) in Zones 4 and 6.

Plant species that were not encountered during the 2009 and 2008 surveys, but were encountered in the 2005 survey include:

- *Potamogeton pulcher* (Spotted pondweed)
- *Utricularia gibba* (Bladderwort)
- *Wolffia columbiana* (Watermeal)
- *Spirodela polyrhiza* (Big duckweed)

Plant species encountered in 2010 but not in the previous two years' surveys include:

- *Cyanobacteria* (Blue-Green Algae, benthic mats)
- *Decodon verticillata* (Swamp Loosestrife)
- *Elodea canadensis* (Waterweed)
- *Potamogeton pulcher* (Spotted Pondweed)
- *Salix sp*. (Willow)
- *Utricularia geminiscapa* (Bladderwort)
- *Vallisneria americana* (Wild Celery)
- *Wolffia columbiana* (Watermeal)

Note that the 2005 survey was performed during summer, while the 2008, 2009, and 2010 surveys were conducted during spring. This shift can affect detection of some species. For example, spotted pondweed tends to bloom between June and August, which may be why this species was not encountered during the 2008 or 2009 survey. Likewise, curly-leaf pondweed usually dies back by early July, limiting its detection in summer surveys. For management purposes, however, the spring community is most important in guiding management efforts in Morses Pond. Later surveys would be impacted by harvesting efforts, so spring surveys are considered appropriate. See Appendix A for the tabular results of all years' plant surveys.

Conclusions Relating to Plants

Monitoring in 2011 and beyond will be necessary to determine if there are any lasting impacts of harvesting. In the 2010 survey, a decrease in vegetation coverage and biovolume was observed in Zone 4. Impacts are predicted to occur eventually, however three years may be too short of a time span to determine a shift in plant populations and any prolonged reduction in plant cover and biovolume.

Education

The Town of Wellesley produced an informative brochure on the importance of phosphorus control many years ago, and continues to use this tool in resident education. The brochure is not outdated, but the extent of distribution and the effectiveness of this mode of education are uncertain. The Town also has bylaws relating to lawn watering and other residential activities that affect water quality in streams and lakes, including Morses Pond. The extent to which residents understand these regulations is also uncertain. The right messages are being sent, but reception and reaction have not been gauged.

In 2006 a survey was conducted by AECOM on behalf of the Town to assess resident awareness and practices. It appeared that more people handled their own lawn care than expected, and that most were anxious to learn about approaches that might have less impact on water quality. Most homeowners had little background knowledge of issues relating to fertilizer use and other residential management practices.

It was determined that a website would be a better or at least effective additional means of communicating with residents on their role in protecting water quality through desirable residential practices. Morses Pond pages were constructed to be incorporated into the Town's website. Layout and content were adapted from existing materials and subject to review. As of the end of 2010, the latest iteration was awaiting further review and modification.

Dredging

The Town of Wellesley arranged for the North Basin to be dredged in the late 1970s; no dredging has been conducted since 1979, and both natural and anthropogenic sources of sediment have causes considerable infilling of the North Basin since that time. Dense growths of submergent and emergent vegetation limit recreational utility and habitat value in the North Basin, although some forms of water-dependent wildlife benefit from these conditions. While dense vegetation does provide some filtering capacity, the overall loss of depth limits detention time and facilitates resuspension during storms, threatening water quality in the main body of the pond. It was determined as part of the comprehensive planning process that the North Basin should be dredged again to restore detention capacity.

In 2009 the Town hired Apex Inc. to develop dredging plans and shepherd them through the dredging process. Sediment quantity and quality were assessed, plans were developed, and permits were secured. A number of complications arose, including the need to document yet again that Morses Pond was not a Great Pond under the laws of the Commonwealth and therefore not subject to Chapter 91, an additional regulatory process. That effort was ultimately successful.

More troublesome was the detection of metals and hydrocarbon contamination in the north basin, something not observed previously. However, dredging regulations and related contamination thresholds had changed since the previous sediment assessment in 2004, and not all the same tests were run in earlier sampling. The result was that the permitting process took longer than hoped and the cost to dispose of the sediment was considerably higher than initially expected. The targeted area was reduced to about two acres to both avoid areas of greater contamination and to attempt to keep the cost within the allocated amount.

An agreement was secured from the Catholic Diocese of Massachusetts to utilize the parking lot of the "closed" Catholic Church on Rt 9 as a dredged material processing area. However, material had to be removed by March of 2011, and delays in the permitting process caused bids to be secured for the work in September, with an anticipated starting date of early November 2010. Contractors were clearly uncertain about dredging in late autumn and achieving adequate dewatering over the winter to clear the parking area by spring. As a result, fewer bid, and the lowest bid was approximately twice the amount allocated for the dredging.

It was decided that no bid would be accepted and that the dredging project would be revisited in a year or two, when additional funds could be secured and when the timing of the project could be potentially made more advantageous.

This summarizes work through 2010 relating to the Comprehensive Management Plan for Morses Pond.

Sincerely yours,

Ken Wagner
Water Resource Services

Siona O'Flynn Patisteas
AECOM Environment

Figures and Tables

Legend

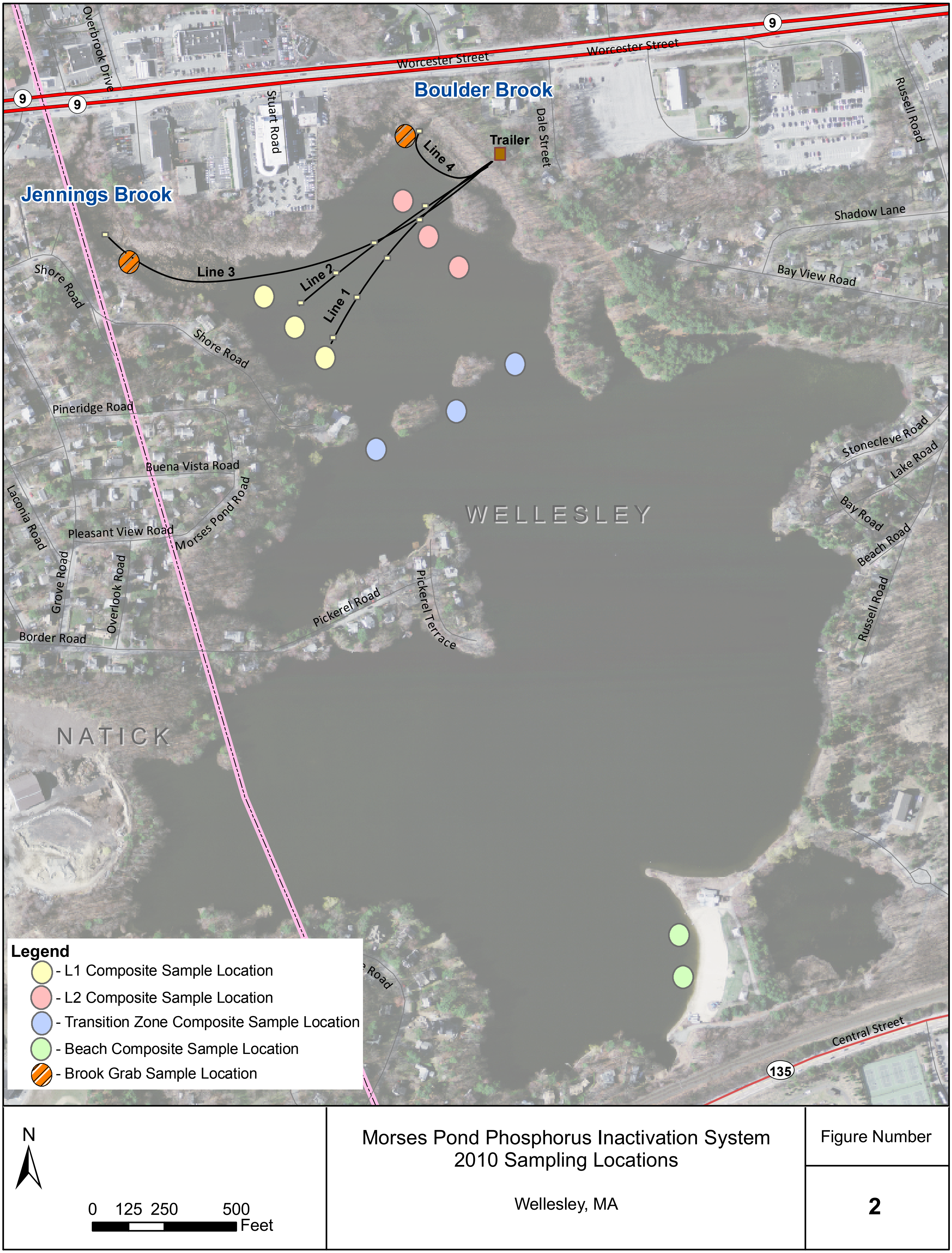
- Chemical Diffuser Port
- Treatment Line

Morses Pond Phosphorus Inactivation System
Treatment Line and Diffuser Locations

Wellesley, MA

Figure Number

1



Morses Pond Phosphorus Inactivation System
2010 Sampling Locations

Wellesley, MA

Figure Number

2

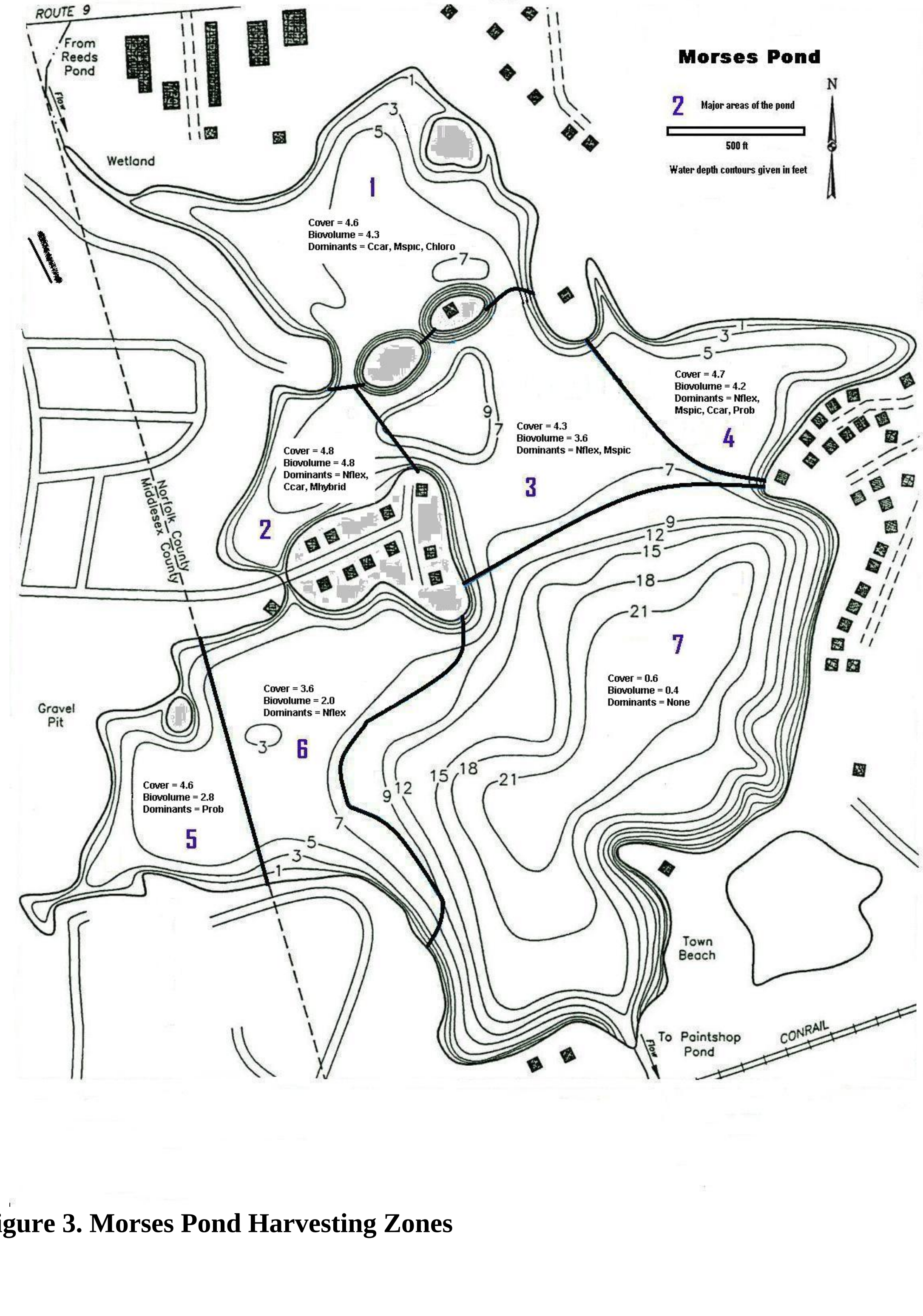


Figure 3. Morses Pond Harvesting Zones

Table 1. Phosphorus inactivation chemical usage broken down by storm

	Alum (gallons)			Aluminate (gallons)		
Treatment Date	**Start**	**End**	**Quantity Used**	**Start**	**End**	**Quantity Used**
new shipment	2100			1050		
5/11/2010	2100	1950	150	1050	970	80
5/13/2010	1950	1825	125	970	910	60
5/19/2010	1825	1725	100	910	790	120
5/27/2010	1725	1200	525	790	540	250
5/28/2010	1200	700	500	540	340	200
6/1/2010	700	400	300	340	200	140
6/2/2010	400	0	400	200	0	200
new shipment						
6/10/2010	2000	1950	50	1030	910	120
6/17/2010	1950	1310	640	910	700	210
6/23/2010	1310	1100	210	700	440	260
7/9/2010	1100	710	390	440	340	100
8/24/2010	710	550	160	340	150	190
8/25/2010	550	0	550	150	0	150
Total			4100			2080

Table 3. Morses Pond 2010 aquatic plant species frequency of occurrence.

Plant Species	Zone 1 % Freq	Zone 2 % Freq	Zone 3 % Freq	Zone 4 % Freq	Zone 5 % Freq	Zone 6 % Freq	Zone 7 % Freq
Callitriche sp. (Water starwort)	0%	0%	0%	0%	0%	0%	0%
Cabomba caroliniana (Fanwort)	93%	83%	77%	88%	50%	88%	23%
Ceratophyllum demersum (Coontail)	87%	72%	34%	56%	44%	59%	12%
Chlorophytes (Green Algae)	74%	67%	69%	97%	25%	71%	25%
Cyanobacteria (Blue-Green Algae)	26%	11%	6%	28%	38%	10%	2%
Decodon verticillatus (Swamp Loosestrife)	0%	6%	3%	0%	13%	2%	1%
Elodea canadensis (Waterweed)	39%	44%	49%	50%	25%	61%	19%
Lemna Minor (Duckweed)	26%	0%	0%	0%	0%	2%	0%
Lythrum salicaria (Purple Loosestrife)	9%	0%	0%	0%	0%	0%	0%
Myriophyllum heterophyllum (Variable milfoil)	54%	67%	51%	66%	63%	41%	8%
Myriophyllum spicatum (Eurasian milfoil)	91%	83%	91%	100%	75%	85%	38%
Nitella flexilis (Common naiad)	0%	22%	23%	28%	6%	12%	23%
Nymphaea odorata (White water lily)	67%	17%	14%	3%	44%	17%	2%
Nuphar variegatum (Yellow water lily)	35%	6%	0%	3%	13%	5%	0%
Potamogeton amplifolius (Broadleaf pondweed)	46%	22%	63%	63%	31%	34%	4%
Pontederia cordata (Pickerelweed)	0%	0%	0%	0%	6%	0%	0%
Potamogeton crispus (Crispy pondweed)	41%	44%	43%	41%	31%	34%	7%
Potamogeton epihydrus (Ribbonleaf pondweed)	9%	28%	9%	6%	0%	12%	2%
Potamogeton robbinsii (Robbins' pondweed)	65%	33%	49%	28%	50%	63%	17%
Polygonum amphibium (Water smartweed)	15%	0%	6%	0%	0%	0%	0%
Potamogeton pulcher (Spotted Pondweed)	2%	0%	0%	13%	6%	2%	2%
Ranunculus sp. (Water Crowfoot)	0%	0%	0%	0%	0%	0%	0%
Salix sp. (Willow)	2%	0%	0%	3%	0%	0%	0%
Sagittaria gramineus (Submerged arrowhead)	0%	0%	0%	0%	0%	0%	0%
Spirodela polyrhiza (Big Duckweed)	0%	0%	0%	0%	0%	0%	0%
Typha latifolia (Cattail)	0%	0%	0%	0%	0%	0%	0%
Trapa natans (Water Chestnut)	0%	0%	0%	0%	0%	0%	0%
Utricularia geminiscapa (Bladderwort)	0%	0%	0%	0%	0%	0%	5%
Utricularia gibba (Bladderwort)	0%	0%	0%	0%	0%	0%	0%
Vallisneria americana (Wild Celery)	4%	6%	0%	0%	0%	0%	0%
Wolffia columbiana (Watermeal)	2%	0%	0%	0%	0%	0%	0%
Unknown	7%	0%	0%	6%	13%	7%	0%

≥50% Frequency of Occurrence

%= number of encounters at points containing plants

Red lettering=invasive species

Date	5/4/2010	5/19/2010	5/25/2010	6/7/2010	6/7/2010	6/10/2010	6/10/2010	6/17/2010	6/17/2010	6/23/2010	6/23/2010	7/9/2010	8/24/2010	8/25/2010
Treatment	PRE	POST	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	PRE	POST
Storm Event	Beginning of Year Baseline	1.30" (May 18-19)	Dry Weather Sample		0.15" (June 5-6)		0.36" (June 9-10)		0.07" (June 16-17)		0.06"	End of Treatment Year		4.64" (Aug 22-25)
Dissolved Phosphorus (ug/L)														
Boulder Brook	25	32	-	77	39	35	10	23	28	*	43	32	74	99
Bogle Brook	26	34	-	37	37	38	22	26	28	60	22	41	55	74
L1 Composite-North Basin-E Edge	22	-	28	42	-	36	34	24	20	*	*	33	45	39
L2 Composite-North Basin-W Edge	-	-	-	47	-	49	19	23	25	*	28	20	37	36
Transition Zone Composite	22	-	26	34	27	23	25	23	19	26	23	13	31	37
Beach Composite	16	-	16	23	27	15	15	17	16	14	13	10	37	48
Total Phosphorus (ug/L)														
Boulder Brook	32	58	-	85	73	57	61	62	52	*	68	53	89	113
Bogle Brook	25	52	-	59	53	54	61	38	37	71	51	78	69	85
L1 Composite-North Basin-E Edge	26	-	46	75	-	54	60	112	108	*	*	61	58	51
L2 Composite-North Basin-W Edge	-	-	-	57	-	66	53	113	45	*	38	30	48	119
Transition Zone Composite	28	-	34	46	47	41	50	69	71	42	34	21	32	46
Beach Composite	19	-	20	92	52	23	24	27	25	18	16	15	43	101
Dissolved Aluminum (mg/L)														
Boulder Brook	-	72	-	61	1400	57	370	100	140	*	58000	970	78	72
Bogle Brook	-	50	-	38	26	38	7700	92	69	120	7500	62	66	150
L1 Composite-North Basin-E Edge	-	-	50	88	-	32	1100	110	140	*	*	91	89	2800
L2 Composite-North Basin-W Edge	-	-	-	66	-	120	200	94	75	*	1700	82	66	250
Transition Zone Composite	-	-	110	50	72	60	56	96	78	160	140	40	78	76
Beach Composite	-	-	67	99	65	36	30	83	82	110	130	75	61	160
Notes:	Initial sampling, no treatment	Collected after rain event & treatment	Collected in Dry Weather	Collected after rain event & prior to treatment	Collected after rain event & treatment	Collected during rain event & prior to treatment	Collected after rain event & treatment	Collected during rain event & prior to treatment	Collected after rain event & treatment	Collected after rain event & prior to treatment	Collected after rain event & treatment		Collected during rain event & prior to treatment	Collected after rain event & treatment

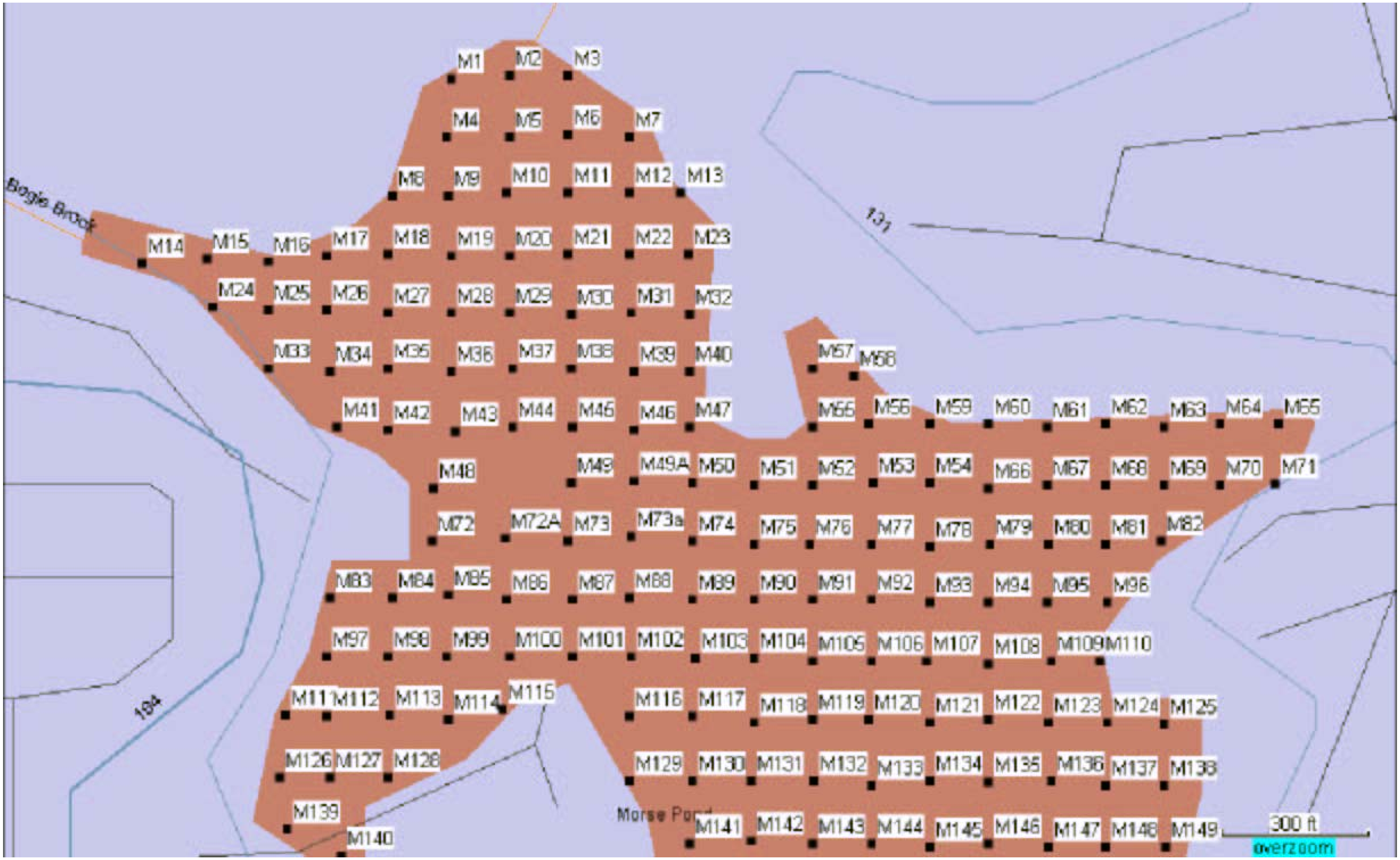
`- Sample Not Collected

* Sample Bottles Broken during Shipping, No Tests Performed

Appendix A

-Survey Data and Maps 2008-2009

-Plant Frequency Tabular Data 2008-2010



Morses Pond plant monitoring locations, part 1.

Morses Pond plant monitoring locations, part 2.

Table 1. Phosphorus inactivation chemical usage broken down by storm

	Alum (gallons)			Aluminate (gallons)		
Treatment Date	**Start**	**End**	**Quantity Used**	**Start**	**End**	**Quantity Used**
new shipment	2000			1000		
testing	2000	1700	300	1000	720	280
5/14/2009	1700	1670	30	720	660	60
5/15/2009	1670	1630	40	660	640	20
5/18/2009	1630	1610	20	640	580	60
5/27/2009	1610	1580	30	580	510	70
5/28/2009	1580	1490	90	510	480	30
5/29/2009	fixed pump					
Emptied Tank	1490	0	1490	480	0	480
new shipment	2000			900		
6/9/2009	2000	1550	450	900	830	70
6/10/2009	1550	1330	220	830	740	90
6/12/2009	1330	900	430	740	530	210
6/15/2009	900	680	220	530	440	90
6/18/2009	680	510	170	440	270	170
6/19/2009	510	150	360	270	170	100
Emptied Tank	150	0	150	170	0	170
new shipment	2002			1000		
6/23/2009	2002	1600	402	1000	850	150
6/25/2009	1600	1380	220	850	740	110
6/26/2009	1380	1150	230	740	630	110
7/1/2009	1150	930	220	630	530	100
7/9/2009	930	510	420	530	310	220
Emptied Tank	510	0	510	310	0	310
Total			6002			2900

Table 2. 2008 Phosphorus Inactivation Monitoring Results

Date	**6/24/2008**	**6/24/2008**	**6/26/2008**	**7/14/2008**	**7/14/2008**	**7/21/2008**	**7/21/2008**	**7/22/2008**	**7/22/2008**	**7/23/2008**
Treatment	Pre	Post	Post	During	1 hr Post	During	1 hr Post	Pre	Post	1 hr Post
Storm Event		0.01"	0.02"		0.39"		0.35"		0.17"	0.59"
pH (s.u.)	6.5-7.5	6.5-6.6			6.9-7.7			6.5-7.7	6.7-7.7	6.6-7.4
Dissolved Phosphorus (ug/L)										
Bogle Brook								18		
Boulder Brook								22		
MP-NB-L1D1	16	14	14		8			18	4	8
MP-NB-L1D2	16	16	11							
MP-NB-L1D3	18		15		6			8	4	2
MP-NB-L2D3	24				6			6	11	8
MP-NB-L4D1	15	16								
MP-C-L1D1					11				7	13
MP-C-L1D4					8				6	18
MP-C-L2D3					5				9	22
MP-T1	16				10			11	9	23
MP-T2	23									
MP-T3	20									
MP-B1	13							5		
MP-B2	16									
Total Phosphorus (ug/L)										
Bogle Brook								37		
Boulder Brook								46		
MP-NB-L1D1	25	19	21		19			44	12	18
MP-NB-L1D2	24	23	20							
MP-NB-L1D4	31	21	21		15			16	10	18
MP-NB-L2D3	36				15			14	18	13
MP-NB-L4D1	23									
MP-C-L1D1					21				14	22
MP-C-L1D3					26				10	27
MP-C-L2D3					27				16	27
MP-T1	23				25			20	14	33
MP-T2	38									
MP-T3	31									
MP-B1	19							12		
MP-B2	23									
Blank		5	1							
Dissolved Aluminum (ug/L)										
Bogle Brook								0.025		
Boulder Brook								0.025		
MP-NB-L1D1	0.036	0.130	0.170		0.270			0.340	0.200	0.380
MP-NB-L1D2	0.043	0.130	0.069							
MP-NB-L1D4	0.063	0.130	0.120		0.280			0.025	2.800	2.400
MP-NB-L2D3	0.062				1.100			0.079	0.180	0.590
MP-NB-L4D1	0.066									
MP-C-L1D1					0.210				0.025	0.025
MP-C-L1D3					0.025				0.025	0.140
MP-C-L2D3					0.460				0.062	0.025
MP-T1	0.005				0.025			0.025	0.025	0.067
MP-T2	0.005									
MP-T3	0.019									
MP-B1	0.005							0.025		
MP-B2	0.005									

Table 3. 2009 Phosphorus Inactivation Monitoring Results

Date	5/14/2009	5/15/2009	5/27/2009	5/27/2009	6/9/2009	6/12/2009	6/17/2009	7/9/2009
Treatment	PRE	POST	PRE	POST	PRE	POST	PRE	POST
Storm Event		0.11"		0.15"		0.42"		cum ~4.5", last event 0.65"
Dissolved Phosphorus (ug/L)								
Boulder Brook	24	25	30	12	37	48	27	17
Bogle Brook	24	23	36	26	45	29	29	10
North Basin Composite	23	21						
N2 Composite-North Basin-E Edge			31	31	37	12		11
N1 Composite-North Basin-W Edge			35	19	36	21		19
Transition Zone Composite	15	26	29	23	24	12		12
Beach Composite	13	12	21	16	17	19	17	6
Total Phosphorus (ug/L)								
Boulder Brook	36	27	38	40	42	104	105	44
Bogle Brook	34	29	42	51	48	78	38	37
North Basin Composite	35	30						
N2 Composite-North Basin-E Edge			41	50	40	32		23
N1 Composite-North Basin-W Edge			44	47	49	51		57
Transition Zone Composite	35	31	42	53	40	35		39
Beach Composite	15	13	28	35	17	22	37	10
Dissolved Aluminum (mg/L)								
Boulder Brook	<0.050	0.062	<0.010	0.047	<0.050	0.27	<.010	<0.050
Bogle Brook	<0.050	<0.050	0.013	1.8	<0.050	3.2	<.010	<0.050
North Basin Composite	<0.050	0.42						
N2 Composite-North Basin-E Edge			0.021	0.260	0.070	0.160		<0.050
N1 Composite-North Basin-W Edge			0.019	0.033	<0.050	0.180		<0.050
Transition Zone Composite	<0.050	0.092	0.015	0.016	<0.050	0.090		<0.050
Beach Composite	0.068	<0.050	0.016	0.018	<0.050	<0.050	0.012	<0.050
Notes:	Collected before rain event & treatment	Collected after rain event & treatment	Collected during rain event & before treatment	Collected after rain event & treatment	Collected before rain event & treatment	Collected after rain event & during treatment	Collected before rain event & treatment	Collected after rain event & treatment

Table 4. Morses Pond 2008 aquatic plant species frequency of occurrence.

Plant Species	Zone 1 % Freq	Zone 2 % Freq	Zone 3 % Freq	Zone 4 % Freq	Zone 5 % Freq	Zone 6 % Freq	Zone 7 % Freq
Cabomba caroliniana (Fanwort)	63%	61%	26%	28%	50%	10%	1%
Chlorophytes (Green Algae)	83%	61%	23%	41%	31%	46%	5%
Cyanophytes (Bluegreen Algae)	30%	0%	9%	0%	13%	12%	9%
Decodon verticillatus (Swamp Loosestrife)	4%	0%	0%	0%	0%	0%	0%
Elodea canadensis (Waterweed)	4%	50%	63%	78%	31%	34%	10%
Lemna Minor (Duckweed)	39%	0%	0%	0%	0%	0%	0%
Lythrum salicaria (Purple Loosestrife)	13%	0%	0%	0%	0%	0%	0%
Myriophyllum heterophyllum (Variable milfoil)	61%	39%	0%	41%	38%	17%	0%
Myriophyllum spicatum (Eurasian milfoil)	74%	67%	86%	100%	81%	78%	28%
Nymphaea odorata (White water lily)	67%	6%	0%	0%	31%	7%	1%
Nuphar variegatum (Yellow water lily)	33%	0%	0%	6%	0%	0%	0%
Potamogeton amplifolius (Broadleaf pondweed)	35%	78%	63%	53%	13%	20%	4%
Potamogeton robbinsii (Robbins' pondweed)	41%	56%	11%	31%	94%	78%	6%
Utricularia geminiscapa (Bladderwort)	2%	0%	0%	0%	0%	0%	0%
Ceratophyllum demersum (Coontail)	72%	17%	11%	28%	6%	2%	3%
Polygonum amphibium (Water smartweed)	11%	0%	0%	0%	0%	0%	0%
Sagittaria gramineus (Submerged arrowhead)	0%	0%	0%	9%	0%	2%	0%
Potamogeton crispus (Crispy pondweed)	22%	78%	43%	56%	13%	15%	3%
Potamogeton epihydrus (Ribbonleaf pondweed)	13%	0%	6%	19%	13%	5%	0%
Nitella flexilis (Common naiad)	0%	17%	60%	28%	19%	59%	8%

≥50%

%= number of encounters at points containing plants

Red lettering=invasive species

Table 5. Morses Pond 2009 aquatic plant species frequency of occurrence.

Plant Species	Zone 1 % Freq	Zone 2 % Freq	Zone 3 % Freq	Zone 4 % Freq	Zone 5 % Freq	Zone 6 % Freq	Zone 7 % Freq
Callitriche sp. (Water starwort)	2%	0%	0%	0%	0%	0%	0%
Cabomba caroliniana (Fanwort)	70%	56%	77%	78%	44%	71%	14%
Ceratophyllum demersum (Coontail)	50%	22%	14%	13%	19%	20%	7%
Chlorophytes (Green Algae)	46%	50%	6%	38%	25%	5%	3%
Elodea canadensis (Waterweed)	11%	33%	40%	22%	25%	44%	12%
Lemna Minor (Duckweed)	26%	11%	6%	0%	6%	0%	0%
Lythrum salicaria (Purple Loosestrife)	11%	6%	0%	0%	0%	0%	0%
Myriophyllum heterophyllum (Variable milfoil)	46%	44%	17%	28%	56%	37%	2%
Myriophyllum spicatum (Eurasian milfoil)	61%	78%	71%	94%	69%	88%	37%
Nitella flexilis (Common naiad)	2%	22%	11%	31%	13%	15%	8%
Nymphaea odorata (White water lily)	52%	28%	11%	0%	38%	7%	2%
Nuphar variegatum (Yellow water lily)	33%	6%	3%	3%	13%	2%	0%
Potamogeton amplifolius (Broadleaf pondweed)	24%	22%	34%	34%	31%	27%	7%
Pontederia cordata (Pickerelweed)	0%	6%	3%	0%	0%	0%	0%
Potamogeton crispus (Crispy pondweed)	26%	22%	43%	22%	31%	24%	4%
Potamogeton epihydrus (Ribbonleaf pondweed)	26%	11%	29%	13%	13%	7%	5%
Potamogeton robbinsii (Robbins' pondweed)	30%	33%	49%	41%	56%	66%	11%
Polygonum amphibium (Water smartweed)	11%	0%	0%	0%	0%	0%	1%
Sagittaria gramineus (Submerged arrowhead)	0%	0%	0%	3%	6%	5%	0%
Typha latifolia (Cattail)	4%	0%	0%	0%	0%	0%	1%

≥50% Frequency of Occurrence

%= number of encounters at points containing plants

Red lettering=invasive species

Table 6. Pre-project stormwater sampling results for Low Impact Design demonstration project

Date	Description	Turbidity NTU	Dissolved Phosphorus ug/L	Total Phosphorus ug/L	Ammonia mg/L	Nitrite mg/L	Nitrate mg/L	TKN mg/L
7/9/2008	Bates Elementary Outfall	21	97	603	0.25	<0.01	0.36	2.0
	Upham- Catch Basin by Field	59	200	2580	1.07	<0.01	0.7	9.6
	Upham- Catch Basin in Front of School	72	205	2530	0.34	<0.01	0.47	5.0
6/9/2009	Upham- Sheet flow entering Catch Basin, Front of School	118	187	395	1.3	0.02	0.8	4.7
	Upham- Sump water, Catch Basin in Front of School	36	522	795	2.5	0.21	0.2	3.2
	Upham- Sheet flow entering Catch Basin, Field Parkinglot	104	599	1385	2.0	0.10	0.6	5.8
	Upham- Sump water, Catch Basin by Fields	69	719	1029	1.0	0.07	1.0	5.0

Columns Turbidity through TKN are grouped under the heading "Analytes".

Key to Plant Species

Abbreviation	**Scientific Name**	**Common Name**
Calli	*Callitriche sp.*	Water starwort
Ccar	*Cabomba caroliniana*	Fanwort
Cdem	*Ceratophyllum demersum*	Coontail
Chloro	*Chlorophyta*	Green algae
Cyano	*Cyanobacteria*	Blue green algae
Dver	*Decodon verticillatus*	Swamp loosestrife
Ecan	*Elodea canadensis*	Waterweed
Lmin	*Lemna Minor*	Duckweed
Lsal	*Lythrum salicaria*	Purple loosestrife
Mhet	*Myriophyllum heterophyllum*	Variable watermilfoil
Mhybrid	*Myriophyllum hybrid*	Milfoil hybrid
Mspic	*Myriophyllum spicatum*	Eurasian watermilfoil
Nflex	*Naja flexilis*	Common naiad
Nodo	*Nymphaea odorata*	White water lily
Nvar	*Nuphar variegatum*	Yellow water lily
Pamp	*Potamogeton amplifolius*	Broadleaf pondweed
Pc	*Potamogeton crispus*	Crispy pondweed
Pcord	*Pontederia cordata*	Pickerelweed
Pe	*Potamogeton epihydrus*	Ribbonleaf pondweed
Poly	*Polygonum amphibium*	Water smartweed
Ppul	*Potamogeton pulcher*	Spotted pondweed
Prob	*Potamogeton robbinsii*	Fern-leaf pondweed
Ranu	*Ranunculus sp.*	Water crowfoot
Salix	*Salix sp.*	Willow
Sgram	*Sagittaria gramineus*	Submerged arrowhead
Spol	*Spirodela polyrhiza*	Big duckweed
Tlat	*Typha latifolia*	Cattail
Tnat	*Trapa natans*	Water chestnut
Ugem	*Utricularia geminiscapa*	Bladderwort
Ugib	*Utricularia gibba*	Bladderwort
Unk A	*Unknown*	Unknown
Val	*Vallisneria americana*	Wild Celery
Wcol	*Wolffia columbiana*	Watermeal

Morses Pond 2008 Transect Data

Station #	Water Depth (ft)	Plant Cover	Plant Volume	Plant Species																			
M-				Ccar	Chloro	Cyano	Dver	Ecan	Lmin	Lsal	Mhet	Mspic	Nodo	Nvar	Pamp	Prob	Ugem	Cdem	Poly	Sgram	Pc	Pe	Nflex
1	3.3	1	1		M								S					T					
2	3.5	1	1	T	M				S		T		S										
3	2.8	1	1						S		S	T	M					T					
4	2.6	3	2	T	M	D			S				M	T				T					
5	3.7	1	1		M	D			S		S	S	M	M	T								
6	4.3	1	1		M				T		S	T	S					T					
7	2	2	2		D	M			M	S	S		M					T					
8	2.1	2	2		M	D			S	S			M					T				S	
9	4	1	1		M	M			M		M	S	M	M				T	S				
10	3.8	1	1		S						M	S	M		T			T					
11	4	2	1		S						S	M	S					S					
12	3.8	1	1	T					D		T	T	S										
13	2.7	1	1	T	D		S		M	S	S	T	S					S	S				
14	1.7	3	3	S	M	D	S	S	S		M	M	T	T	S	S		M				S	
15	3.5	4	2	M	T						M	S	M		T	S		M					
16	3.8	3	3	D	M						M	D	T	D		T							
17	4	4	3	D	M						M	D			S	S							
18	2.9	4	2	D	M							M	M	M		S		T					
19	1.3	5	4		S	S				S	D	M			S	S	T	M				S	
20	4.6	5	5	T	M				S	M	D	M			M	T		D	D				
21	3.8	3	3	S					S			M	M	D				S	S				
22	2.5	1	1									S	M	M				M					
23	2.5	1	1										M					T				T	
24	5.4	3	2	M	S							M			D	M		S					
25	3	3	3	D	D						T		D	S		D		S					
26	3	3	3	D	M								S	D		S		S					
27	3.8	5	4	D	M	S					M	D	M					S				T	
28	5.2	5	4	M	M							S			D	D					T		
29	4.5	5	4		S						D	D		M	S	M		M					
30	5	4	4	M	S	M					M	M			S	S		D					
31	4.6	4	3	M	D	D					D	D						M					
32	2.5	2	2	S	S				T			M	M										
33	5.8	4	2	M					T			T	S			S		T					
34	5.6	5	2	S	T						T	M			M	D							
35	3.5	4	4	M	D			S				M	S	M							D		
36	3.9	3	3	M	D						S		M		D	M					M		
37	5	4	3	D	D						D	M			M	S		S			D		
38	5.2	4	4		D	S						D									M		
39	5.5	2	2	S	D	S						M	T					D			M		
40	4.5	3	3		D				M	M	S		D					D	D				
41	5	4	3	M		S			S						S						D		
42	7.2	2	2	DD	M						M	D						S			M		
43	5.2	5	3	M							S	D				M		S			M		
45	5	4	2	M	M							M		M	S	S					M		
46	5	3	2		D	D			S		M		S	M				S				S	
47	4.5	1	1		D							S	S	T				M					
48	6.5	3	2	M				S							M			M			D		
49	9	3	1	M											T						M		
49a	6.4	5	4	S	M							D			S						D		
50	6.5	5	4		S							D									M		
51	6.2	5	4	M								D									D		
52	6.3	5	4					T			S	D				S					D		

Station #	Water Depth (ft)	Plant Cover	Plant Volume	Plant Species																			
M-				Ccar	Chloro	Cyano	Dver	Ecan	Lmin	Lsal	Mhet	Mspic	Nodo	Nvar	Pamp	Prob	Ugem	Cdem	Poly	Sgram	Pc	Pe	Nflex
53	6.5	4	4		D			S				D			T	M					D		
54	6.2	5	4					M			S	D			D	S					D		
55	5.9	5	5					S			T	D				T		M					
56	5.7	4	3		S			T				D		D						T	S	M	
57	4.8	2	2		M			S			T	D			T			M			D		
58	3	1	1					S				T			S			S					
59	5.7	4	4		S			M				D						T		T	S	M	
60	4.9	4	4					T			T	D			S	T				T	S	S	
61	5.4	5	4		S							D			T						S		
62	5	5	5		D							D			M						S		
63	4.9	5	5	S	D			T			M	D											
64	4.5	5	5	S	D						T	D										T	
65	4.6	3	2		S			T				D			M							T	
66	5.9	5	4		S			M			S	D									S	T	
67	6	5	4	M	S			D			M	D									M		
68	5.4	5	4	D				M				D				M					M		D
69	5	4	4		D			T			T	D									M		
70	5.2	4	4	M				S				D									S		
71	4.2	4	4								S	D									S		
72	4.3	3	2	M				D				S			S	M							
72a	8.5	3	1	S				M							T	M					D		
73	9.5	1	1	M		M															S		
73a	6.1	5	1					D				D									S		D
74	6.8	5	4		S			M				D			D						M		D
75	6.8	5	4					M				D			M						M		M
76	6.2	5	4	M								D			D	S		T			S		
77	6.4	5	4					M				D			M			S					M
78	6.2	5	4					M				D			M						S		S
79	6.1	4	4	M				S			T	D			S						S		
80	6.1	5	3					D				D			D								S
81	5.1	3	2								T	M		M	S	M		M			M		
82	4.8	2	2		S			T				M						M					
83	4.1	2	1	M	D						T	T				S							
84	4.7	3	2	S	M			D				M			M	D							
85	5	5	3					M				D			D	M					M		
86	9.5	1	1			D						T									S		
87	6.2	5	4	S				D				D			M								M
88	6.5	5	4					M				D			S						D		D
89	6.8	5	4					S				D			S	S		S					D
90	6.5	5	4		S							D			M								D
91	6.4	5	3					M				D										D	D
92	6.2	5	3	T				M				D			S								D
93	6.4	4	3					S				M											D
94	6	3	3					S				M			M	M							D
95	6	2	2	S				D				T			S			M					M
96	5.8	1	1	T								T											
97	4.8	3	3	M							S	S									D		
98	5	5	1	M	M										D	S					S		M
99	9.5	2	1					D							T						D		
100	6	3	3		S							M									M		M
101	6.8	5	3					M				D			M							M	M
102	6.5	5	4					M				D			S								

Station #	Water Depth (ft)	Plant Cover	Plant Volume	Plant Species																			
M-				Ccar	Chloro	Cyano	Dver	Ecan	Lmin	Lsal	Mhet	Mspic	Nodo	Nvar	Pamp	Prob	Ugem	Cdem	Poly	Sgram	Pc	Pe	Nflex
103	6.8	5	4					S				D			M						M		
104	7.3	5	4					M				D			M						T		D
105	6.4	5	3					S				D			D			M					M
106	6.3	5	3	S				S				D											D
107	6.5	5	3									D				T							D
108	6.5	5	3	D								D			M			S					D
109	8	4	3	M								D			M	M		S					M
110	4.1	4	1					S				S			D	S							M
111	4.2	1	1	S	D								M		T			S					
112	4.5	4	2		M			T			S	T									M		
113	5.4	5	2		D						M	S			D	S					M		S
114	5.4	5	2									M			D	S					M		S
115	4.9	2	1					M				S			M						D		
116	5.8	5	1					D															D
117	5.9	5	2					D				T											S
118	6.5	5	3		D			D				M			D								
119	7	5	3									D			D								
120	9.5	1	1									S									S		
121	9.8	1	1	T								S									S		
122	8.5	2	2					S				D									S		
123	11	0	0																				
124	8	3	3					M				D			S								
125	5.7	2	1		M							M											
126	5.3	3	2	S	D						T	S			M			T			M		
127	5	3	2		D			M			S				M						T		
128	4.9	1	1		S			M								M					M		
129	6	4	3		D			D				M				S							M
130	3.8	5	4		M			S				D			D								S
131	7.1	5	3									D			M								
132	7.2	5	3		D			M				D			M								
133	11.8	1	1									T											
134	14.7	0	0																				
135	12.7	0	0																				
136	12.2	0	0																				
137	11.2	0	0																				
138	6.5	1	1									S											S
139	4.5	4	2	M	D						D	S			M						S		
140	4.5	3	2	S	D							S			S	T					S		
141	5.8	4	2					D															
142	6.8	5	3			M		D				T			M								M
143	9.3	2	2					T				M						T					
144	13.5	0	0																				
145	16.8	0	0																				
146	31.2	0	0																				
147	22.4	0	0																				
148	17.8	0	0																				
149	9.1	0	0																				
150	6	5	1					M								M							M
151	6.5	4	2		M			M				S				M							M
152	6.2	4	2								S	S				M		M					M
153	5.4	2	1		S			S				S											
154	7.8	5	1					D				S				D							

Station #	Water Depth (ft)	Plant Cover	Plant Volume	Plant Species																			
M-				Ccar	Chloro	Cyano	Dver	Ecan	Lmin	Lsal	Mhet	Mspic	Nodo	Nvar	Pamp	Prob	Ugem	Cdem	Poly	Sgram	Pc	Pe	Nflex
155	9.5	5	2					D								M							
156	12.1	1	1									T											
157	14.3	0	0																				
158	16.6	0	0																				
159	21	0	0																				
160	23.3	0	0																				
161	22.3	0	0																				
162	13.9	0	0																				
163	7.6	0	0																				
164	4.1	3	1		D								M			M				S			M
165	5.5	3	1					D					S			M							
166	6	4	2		D			S				D				M							M
167	6.3	4	2		D							M				M							D
168	6.2	5	1									S				D							D
169	8.5	5	1												T	D							D
170	9.5	3	3					D				D											D
171	9.8	1	1					T				T											
172	15.1	0	0																				
173	16.2	0	0																				
174	17.8	0	0																				
175	20.4	0	0																				
176	22.9	0	0																				
177	23.5	0	0																				
178	21.3	1	1			S																	
179	14.2	0	0																				
180	7	1	1					T				S											
181	5.1	5	1		D								T			D							D
182	5.6	2	1		D							M				T						T	D
183	6	4	2								T	M				D							D
184	6.1	4	2			D						M											D
185	6	3	1			D						M											D
186	8	3	1		T	D					T	M			M						T		
187	7.5	3	1			D						M			D						T		
188	9.5	1	1			D						M			T								
189	9	1	1			D						S				M							
190	15.2	0	0																				
191	6.8	0	0																				
192	18.8	0	0																				
193	22.6	1	1			M																	
194	23.5	1	1			M																	
195	21.5	0	0																				
196	13.6	0	0																				
197	6.4	0	0																				
198	5.4	3	1			D						T	M			D							
199	5.4	3	2			D						S				D						T	
200	5.3	5	2	S		D										D							
201	6.6	3	2		D						T	M				D							
202	6.6	5	1		D			S				D			T	D							
203	6.5	5	3		S							M			D	M							
204	7	5	3		S							D				M						M	S
205	9.4	1	1									D											
206	11.8	1	1									T											

Station #	Water Depth (ft)	Plant Cover	Plant Volume	Plant Species																			
M-				Ccar	Chloro	Cyano	Dver	Ecan	Lmin	Lsal	Mhet	Mspic	Nodo	Nvar	Pamp	Prob	Ugem	Cdem	Poly	Sgram	Pc	Pe	Nflex
207	13.5	0	0																				
208	17.5	0	0																				
209	18.9	0	0																				
210	19.8	0	0																				
211	21.2	0	0			D																	
212	21.2	0	0																				
213	18.2	0	0																				
214	17.4	1	1									T											
215	13.6	5	1									S			T	D							
216	5.2	3	2					S				D				D							
217	5.6	3	2	M				M				M			M	D							M
218	5.7	5	2	T				M			T					D							M
219	6.3	5	3	S	D							D				D							S
220	6.3	4	4		D							D			M	D							S
221	6.3	5	3									D			D	M					S		
222	5.9	5	1		D							D			D	M					T		
223	9.4	2	1									D				M							
224	10.6	1	1		D							S											
225	12.5	1	1		D							S											
226	14.5	1	1																				
227	18.9	0	0																				
228	20	0	0																				
229	19.7	0	0																				
230	19.2	0	0																				
231	18.4	0	0																				
232	17	0	0																				
233	3.5	5	2					S				D				D							D
234	5	4	3		D						D	S				D							
235	5.4	4	3		M							M	T			D							S
236	5	5	3	M	D							M	S			M							
237	7.8	3	3	S								D				D						T	
238	7.5	3	3	S				M			T					M							M
239	6.5	5	3									M				M					T		M
240	6.7	4	3		D							S			D								
241	10.9	1	1									S											
242	16	0	0																				
243	20	0	0																				
244	20.4	1	1			D																	
245	20.6	0	0																				
246	19.8	0	0																				
247	19.2	0	0																				
248	18	0	0																				
249	18.1	0	0																				
250	13	0	0																				
251	5.6	3	1									M				M		M					S
252	5.5	5	4					S			D	M	M										
253	5.5	5	3	S							D					D							
254	6	3	3	M								M				D							
255	6	4	3					D				M				D							D
256	6.4	4	3		D			D				M				D							D
257	6	4	3		D			D				M				D							D
258	6.3	3	2		D							D			S	D							M

Station #	Water Depth (ft)	Plant Cover	Plant Volume	Plant Species																			
M-				Ccar	Chloro	Cyano	Dver	Ecan	Lmin	Lsal	Mhet	Mspic	Nodo	Nvar	Pamp	Prob	Ugem	Cdem	Poly	Sgram	Pc	Pe	Nflex
259	11.1	1	1									M											
260	16.9	0	0																				
261	21.4	1	1			D																	
262	22.2	1	1			D																	
263	22.2	0	0																				
264	9.5	1	1									T											
265	15.8	0	0																				
266	11.1	1	1																				S
267	4.1	5	2					D				D	S			M		S					M
268	4.8	4	3		D						D					D		T			D		
269	5.1	4	3	D							T	M	M			D							
270	6.4	4	2	M	D			M			M					D							M
271	6.7	3	3	M				D				M				D					D		
272	5.7	5	2									S				D							
273	6	3	3		D							M				M							M
274	6.7	1	1					M								M					S		
275	7.3	5	3		D							D				M							
276	10.9	1	1								S	S											
277	13.7	0	0																				
278	17.4	0	0																				
279	19.7	0	0																				
280	19.2	0	0																				
281	11.9	0	0																				
282	5.4	1	1					M				M											
283	9.6	1	1					M				M											
284	13.3	0	0																				
285	19	0	0																				
286	20.5	0	0																				
287	15.5	0	0																				
288	11.1	0	0																				
289	4.1	0	0																				
290	6.8	1	1									S											
291	9	1	1									T											
292	12.6	0	0																				
293	15.3	0	0																				
294	16.8	0	0																				
295	15.7	0	0																				
296	11.6	0	0																				
297	8.7	0	0																				
298	14.7	0	0																				
299	13.6	0	0																				
300	11.8	0	0																				
301	10.9	1	1									T											
302	8.7	4	3					T				D											
303	6.3	4	1			D																	D
304	6.7	4	1			D																	D
305	8.8	1	1									S											
306	6.8	1	1									M											D

Morses Pond 2008 Shoreline Survey Data

Zone	Plant Cover	Plant Volume	Ccar	Chloro	Cyano	Dver	Ecan	Lmin	Lsal	Mhet	Mspic	Nodo	Nvar	Pamp	Prob	Cdem	Poly	Sgram	Pc	Pe	Nflex	Notes
1	1	1									S											Mostly barren; brown house near outlet
2	1	1								T												Mostly barren
3	0	0																				Vacant blue house
4	1	1										S						S				Brown house with lots of ground cover
5	0	0																				Grey house
6	0	0																				Light grey house with circular sun room
7	0	0																				House set back from shoreline
8	1	1									T				T	T		S				House up on hill
9	1	1									T	M		S		T		M			D	Lot's of potential to be dense in this area; Plants are just coming up; some wetland arrowhead; rebuilt house with a dock
10	1	1					T				S				S			S			T	Lot's of sunfish nests; small house set back from shoreline
11	1	1					S				S				S			T				Light grey house with retaining wall
12	1	1					S				T			T				M			S	House with point
13	1	1										S						M			S	Lot's of sunfish nests; house with large sunroom
14	1	1									T										S	Lot's of woody debris; large house with a green/cream trim
15	1	1		T												T		M				Illicit discharge-laundry water discharging to pond. GPS waypoint 311; Light grey house
16	1	1	S		D		T								M	T		M				U shaped house
17	1	1	S		D		T				T	T		T	S	T		M	T			House set back from shoreline

Zone	Plant Cover	Plant Volume	Ccar	Chloro	Cyano	Dver	Ecan	Lmin	Lsal	Mhet	Mspic	Nodo	Nvar	Pamp	Prob	Cdem	Poly	Sgram	Pc	Pe	Nflex	Notes
18	2	1	M				T			T	T	S	S	T	D	T		M		T		Penninsula
19	3	2	M		D				S	M	S	S	T	T	S			S				Lot's of algae
20	2	2	M	D			T		S	M	T	M	T	S	S	T					T	Mostly barren
21	1	1	M	M							T	M			T	T						Mostly green and some blue-green algae mats
22	1	1										M	T		S	T						House on corner with a dock with platform
23	1	1	T									T			S	S		S				House with platform; fenced in geese
24	1	1	M								S	M				T		M				White house- no dock
25	1	1		M							S	M		T	T	T		M				Arrowhead along shoreline
26	1	1	T								T	S										
27	1	1					T				S			T	T							Mostly barren; white house
28	1	1		D							S	S			S							Much of the shoreline is reserved for dock/boat storage
29	1	1					T				S					T						Large house on a shoreline curve
30	1	1					M		S		M	M		T	T	T		M				Most of plants towards the end of the zone; lot's of overhanging trees
31	1	1					T				T	T				T						Red house
32	1	1					M				T			T	T							Large swim platform
33	1	1	S	M			M	S			T	M		T	T							Barren areas, arrowhead; grey house on the corner
34	2	1	T				T	M						S	T	S					M	Large swim platform covering most of the shoreline
35	1	1	T				T				T	T			T							Sump pump; swim platform
36	1	1								T	S	S	S	T	S	S						
37	1	1	T	D	S			M			T	S	S		T							
38	1	1	T									M	S		M	T						Overhanging trees- could not get close to shore

Zone	Plant Cover	Plant Volume	Ccar	Chloro	Cyano	Dver	Ecan	Lmin	Lsal	Mhet	Mspic	Nodo	Nvar	Pamp	Prob	Cdem	Poly	Sgram	Pc	Pe	Nflex	Notes
39	1	1	S	S							T	M	T		S	S					T	
40	1	1		M						T		T		M	T	M					M	
41	2	1	S	D					D		S	M	S	S		M						Excessive algae in cove
42	3	1	S	D				T	M	M	T	D	S			T						House hidden in the trees
43	2	1	S	D					S		S	M			T							House up on a hill; no formal access
44	3	2								D	S								S			Little circular pond in front of property
45	2	1	S	D						M	S	D	S		S	M					S	
46	2	1					S		D		S	M	T			M						House close to the pond
47	1	1							D		S					S			T			
48	1	1	M	M			T				S	S		T	T	M						
49	1	1									T	T										
50	2	1	S							D	M	D	S	T		D	S					Cruised though this section since there are no houses here; Ms more prevelant at the end of the zone
51	3	3								D									S			
52	2	1		D			T		M	M	D	D			T	S	T		T			
53	1	1		D																		Too much sediment for benthic barrier; ~> 9' of sediment
54	1	1		D						T	S											
55	1	1		D			S				S											
56	1	1					S				S	T						S				Rocky
57	1	1		S			T				S					T		T				Rocky
58	1	1									T											Rocky; overhanging trees; retaining wall
59	1	1	T																			Rocky cobble shoreline
60	1	1					T		T		S			S								
61	1	1							M		S	S		T	T			S		T		
62	1	1					S		D		M	T			T			S				1/2 of the penninsula and all of the beach area

Morses Pond 2009 Plant Transect Data

Station	Water Depth	Sed Depth	Sed Type	Zone	Cover	Bio-volume	Calli	Ccar	Cdem	Chl	Ecan	Lmin	Lsal	Mhet	Mspic	Nflex	Nodo	Nvar	Pamp	Pc	Pe	Prob	Poly	Salix	Sgram	Tlat
M	**ft**	**ft**																								
1	2	0.8	S	1	2	1				M		S	M	T			S									
2	2.4	2.6	S/M	1	2	1						M					M									
3	4.5	0.5	S/M	1	3	2		S	S			M		M	T	M	M									
4	5	0.1	S	1	3	2		D	M			S		S	T							T	S			
5	5.5	0.5	M	1	3	2		M						M	S											
6	3.5	0.1	C	1	4	2			M			M	S				D						S			
7	4	1	M	1	3	2		S				M	T	T			M		T		M		T			
8	2.5	1	M/S	1	3	2	S					S		T	M		M				S	S				
9	5.25	0.75	S	1	3	2		D	S					S	S						S					
10	5.25	0.05	S	1	3	2		M		M				S	S			M			S					
11	4.75	0.25	M/S	1	4	2		M	S	M		M		T	M		M				S					
12	4.5	1.5	M	1	2	1			M	M		D							T							
13	4	1.2	M	1	4	2		S		M			T		S		M	D		T			D			
14	3	3	M	1	1	1							S											T		
15	3.5	1.5	S/M	1	1	1				S								S								
16	3.7	0.6	M	1	1	1		T									T	S				T				T
17	4	0.8	S/M	1	3	2		S	M		T	S		T	D		M	M	S		T	T				T
18	4.9	0.3	S/M	1	3	2		M	M					S	S			T	M			S				
19	4.5	1	S	1	4	2		D	M						S				T		T	S				
20	4	1.4	M	1	3	2		M									M	M			T		T			
21	4.5	1.8	M	1	3	2		S		M							S	M			S					
22	5.2	1.3	M	1	2	2		M	S						T		M	M		S						
23	5	1	M	1	4	3		S	S			M			S		M	D			T					
24	5	0.25	M/S	1	1	1		M		S							T		T			T				
25	5	1.2	M/S	1	3	1			M						S				M			S				
26	3.5	1	M	1	3	2				M					T		M	M								
27	3.5			1	4	2				S					S		M	M								
28	6.25	0.25	M/S	1	3	2		M	S					S	S							M				
29	6.5	0.3	M/S	1	4	2		D	S					S	S				T		T	M				
30	5.2	1	M/S	1	4	3		D	M	M				T				M								
31	5.3	0.2	M	1	4	3		M	S	M				S	S		S			T						
32	5.5	1	M	1	3	3		M		M				S	M			M		S						
33	4	0.5	M	1	2	2			S			S					S		S	S						
34	6.2	0.5	M/S	1	3	1		M	S										S			M				
35	4	0.5	M	1	3	2		M							S											
36	7.5	0.4	S	1	2	2				M										M						
37	6	0.2	S	1	3	2		M		M					M					M		S				
38	5.25	0.25	S	1	3	2		M		M				S	S		S			M						
39	4.5	0.1	M	1	3	2		S	S	M					T		M									
40	5.5	0.8	M	1	3	2		M	S	M	S			S	S					M						
41	3.5	1.7	M	1	2	2			M	S	M						S	S								
42	6.5	0.2	S/ST	1	2	2		M			T								M	M	T	M				
43	4.5	1	M	1	3	2		M	M	S				S	T		S			M						

Station	Water Depth	Sed Depth	Sed Type	Zone	Cover	Biovolume	Calli	Ccar	Cdem	Chl	Ecan	Lmin	Lsal	Mhet	Mspic	Nflex	Nodo	Nvar	Pamp	Pc	Pe	Prob	Poly	Salix	Sgram	Tlat
44	3.4			1	2	1				M	S						M									
45	4			1	3	2		M	S					S	S											
46	5.2			1	4	2		M						S	M					S		S				
47	5.4			2	3	2		D							S					S						
71	5	1.9		2	2	1				M																
72	4			2	2	1		S	S						S		M									
82	5.5	1.5	M	2	2	1		S		M				S	S											
83	3.3			2	3	2		S				S			T		M	M				S				
84	5.2			2	3	2				M						S			T	T	S	S				
96	6	0.2	S	2	2	2		S		M				M	T											
97	5.2			2	3	2				M	S			T	S							M				
110	6.1			2	3	1					M				S	M			M							
111	3			2	3	2		S	M	M	S				T		M									
112	5.2			2	4	4		M		M				D	S							S				
113	5.2			2	3	2		M			M			M	S					S		S				
114	5.4			2	3	2		M			S				M	S			M	S	S					
125	7.8			2	1	1		T							S											
126	2			2	4	2			S	M		M		T	S		D					M				
127	4.8			2	4	2			D		S			M		S			S							
138	9.2			2	1	1									T											
139	2			2	2	2				M			S	S			M									
48	6.5			3	2	2		M	M		S								M	M	S	M				
49	9			3	1	1								T						S						
50	6			3	3	3		M	S					T	M						S	S				
73	10.7			3	1	1														S	S	T				
74	7			3	4	3		M		T					D				S	S		S				
75	7.4			3	3	3		M							D						T					
85	5.8			3	3	3		M			S			S	M				M							
86	8.5			3	2	1		M			T				S											
87	6.4			3	3	2		M				M			S				M	M		S				
88	6.5			3	4	3		M							D	M				S						
89	6.9			3	4	4		S							D	S			S		S					
90	6.6			3	4	3		S							D											
91	6.8			3	4	4									D					S	S	T				
98	5.5			3	3	3		M	S		S			M	S				M			S				
99	5.8			3	4	3		M			S			S	M				M	S		S				
100	3.7			3	4	2											D				T					
101	6			3	3	2		M	S		M	M							S			M				
102	5.8			3	3	2		M			M				M					M						
103	6.5			3	4	3		M							M				M		S					
104	6.4			3	4	2		T			M				D	S			S			S				
105	7			3	4	4		M							D				S			S				
106	7.9			3	4	3		M							D											
107	7			3	4	4		S							D	M						S				
115	5.2			3	2	2		S		M					M		S					S				

Station	Water Depth	Sed Depth	Sed Type	Zone	Cover	Biovolume	Calli	Ccar	Cdem	Chl	Ecan	Lmin	Lsal	Mhet	Mspic	Nflex	Nodo	Nvar	Pamp	Pc	Pe	Prob	Poly	Salix	Sgram	Tlat
116	6			3	2	1					M									M						
117	6			3	4	3		M			M				D					S						
118	6			3	4	4		M			M				D					S						
128	5			3	3	2		M	S					T				T				S				
129	6.3			3	3	2		S			M						M					M				
130	7			3	4	2					M				D					S						
140	3.1			3	2	2		S									S									
141	8			3	2	1					M				S						S	M				
49a	5.5			3	3	2		M							S				M	M		M				
72a	9.9			3	1	1														S	S					
73a	6.5			3	3	2		S							M											
51	6			4	3	2		M							M					T		M			T	
52	6			4	3	3		M			S				M				S			S				
53	6			4	3	3		M			S				D				S							
54	6.5			4	4	4		M							D	M						S				
55	5		M	4	2	2		M		M				S	M					S						
56	5.9		M	4	3	2		M		S					M				S	S	S	S				
57	5		M	4	2	2		M		S				T	M					T						
58	4.25		M	4	2	2		M	S					T	S				T	S		T				
59	4.9		M	4	4	3		M	S	S				S	M	S						S				
60	4.5			4	3	2		S		M					M											
61	4.4			4	1	1									S											
62	5.7		M	4	1	1				M					S											
63	4.9			4	1	1				T					S											
64	5		M	4	2	1				M					S											
65	4			4	2	1				M																
66	6			4	3	2		M							M				M			S				
67	6			4	3	3		M			S			S	M	S						S				
68	7		M	4	3	2		M	S						S				T							
69	5.5		M	4	3	2		M		S	S			S	M											
70	5			4	2	1				M	S				S											
76	6.9			4	4	4		S							D											
77	6.5			4	4	4		M							D	T			T			T				
78	7.1			4	4	4		S							D	M						M				
79	6.7			4	4	3		S							D	D										
80	6.2		M	4	4	4		D	S					S	D	D			T			S				
81	6			4	3	2		S		M	S			M												
92	6.5			4	4	4		M							D	M				S						
93	6.8			4	4	4									D			S	S		S					
94	7.3			4	4	4		M							D				M	S	S					
95	6.7			4	4	3		S			S			S	S	S			M			M				
108	8.2			4	4	4		M							D	D					S	S				
109	9.5			4	4	2		M							D											
197	5.6			5	3	2					M				M				D							
198	5.5			5	3	2			M						S		M	T	T			M				

Station	Water Depth	Sed Depth	Sed Type	Zone	Cover	Biovolume	Calli	Ccar	Cdem	Chl	Ecan	Lmin	Lsal	Mhet	Mspic	Nflex	Nodo	Nvar	Pamp	Pc	Pe	Prob	Poly	Salix	Sgram	Tlat
214	18.7			5	0	0																				
215	15.7			5	0	0																				
216	5.2			5	3	2				S	S			T	S							M				
233	3.8			5	2	1			T						T		M									
234	5.6			5	4	3		S						M	M					M		M				
235	5.0			5	4	4		D						M		S	D	D		S		S				
236	5.8			5	4	3		D			M	S		M	D							S				
251	2.0			5	1	1															S				T	
252	5.2			5	4	4				S				D	M					S		T				
253	5.5			5	4	4		D	S		M			M	M				T	S		M				
267	1.0			5	1	1															S					
268	3.5			5	4	3		S		M				D	M		D									
269	4.5			5	4	4		M						D	M		M		M	S		S				
270	4.2			5	4	3		M		M				M	M	M	M		S			D				
149	8.5			6	0	0																				
150	5.8			6	4	3		M							M	S	D		S			S				
151	6			6	3	2		S	S		M			S	S		M			S		S				
152	6.5			6	3	3		S			S			S	M	S				M		S				
163	7.8			6	0	0																				
164	5.5			6	3	3		M	S		M				M											
165	6			6	4	4			D		S				D							S				
166	6.5			6	4	4								S	D					T						
167	6.5			6	4	4									D					T						
168	6.3			6	4	4					T				D					T						
169	6.2			6	4	4									D				M		T					
180	6.2			6	0	0																				
181	5.1			6	4	3		D							S	M						S				
182	6.5			6	4	4		T						S	D							M				
183	6.2			6	4	4		S			S			T	D	S						M				
184	6.5			6	4	4		S							D							S				
185	6.8			6	4	4		S						S	D							M				
186	6.5			6	4	3		M							D				S	S		M				
199	4.9			6	3	2		M	S						S							M				
200	6.8			6	3	3								S	M				M							
201	6.0			6	4	3		M	S		M				D							M				
202	6.5			6	4	4		S			M			S	D				S			M				
203	6.5			6	4	4		M			M			T	D				M			S				
217	5.5			6	4	2		M							S		M					M				
218	7.0			6	4	4					D			S	M					S		D				
219	7.3			6	4	3		M			S				D					T		M				
220	6.3			6	4	3		M			M				D					S	S	M				
221	6.5			6	4	3		S			M				D				D			M				
222	6.7			6	4	3		D							M							M				
237	6.4			6	4	3		D						D	S											
238	5.2			6	4	3		D							S				D			S				

Station	Water Depth	Sed Depth	Sed Type	Zone	Cover	Biovolu me	Calli	Ccar	Cdem	Chl	Ecan	Lmin	Lsal	Mhet	Mspic	Nflex	Nodo	Nvar	Pamp	Pc	Pe	Prob	Poly	Salix	Sgram	Tlat
254	5.8			6	4	3		D			S			T	T					S		M				
255	6.1			6	4	3		M			D			M	S							S				
256	6.2			6	3	3		D			S			D	M				S			M				
271	5.5			6	4	3		D	S					T	M			M				S			M	
272	3.8			6	1	1		S											M							
273	6.0			6	3	2		S	M	D					M	S						M				
274	3.0			6	3	2		M			S				M	S			M							
275	6.0			6	2	2		S	S	D	S				S							T				
282	13.8			6	1	1																			T	
289	4.5			6	3	3									D						S					
119	7.3			7	4	4		M							D											
120	7.4			7	4	3		M							D											
121	7.8			7	4	3		M							D				S	S						
122	10			7	1	1			S											T						
123	11			7	0	0																				
124	11			7	0	0																				
131	11.5			7	1	1									T					S						
132	12.5			7	0	0																				
133	16.5			7	1	1			T																	
134	15			7	0	0																				
135	17			7	0	0																				
136	16.5			7	0	0																				
137	16.5			7	0	1			T																	
142	12.5			7	1	1									T											
143	14.8			7	0	0																				
144	16.5			7	0	0																				
145	18.5			7	0	0																				
146	23			7	0	0																				
147	24			7	0	0																				
148	20.5			7	0	0																				
153	6.5			7	3	3									D	S				S						
154	9			7	1	1					S				S							T	S			
155	11.1			7	1	1				S					S											
156	14			7	0	0																				
157	16.7			7	1	0																				
158	18.2			7	0	1																T				
159	22.5			7	0	0																				
160	23.5			7	0	0																				
161	23			7	0	0																				
162	16			7	1	1									T											
170	8.3			7	4	3		M							D							M				
171	10.5			7	3	2		S			T				M											
172	11.5			7	1	1									T						T					
173	15.5			7	1	1									T											
174	17.8			7	0	0																				

Station	Water Depth	Sed Depth	Sed Type	Zone	Cover	Biovolume	Calli	Ccar	Cdem	Chl	Ecan	Lmin	Lsal	Mhet	Mspic	Nflex	Nodo	Nvar	Pamp	Pc	Pe	Prob	Poly	Salix	Sgram	Tlat
175	19.8			7	0	0																				
176	20.8			7	0	0									T											
177	24			7	0	0																				
178	20.8			7	0	0																				
179	16			7	0	0																				
187	12.5			7	2	2									M						T					
188	14.4			7	1	1									T											
189	15.1			7	0	0									S											
190	15.7			7	0	0																				
191	19.0			7	0	0																				
192	21.0			7	0	0																				
193	20.8			7	0	0																				
194	21.6			7	0	0																				
195	20.0			7	0	0																				
196	17.6			7	0	0																				
204	7.2			7	4	4		M							D				S			S				
205	8.5			7	3	2									D											
206	14.4			7	0	0									T											
207	18.0			7	0	0																				
208	19.0			7	0	0																				
209	20.7			7	0	0																				
210	21.0			7	0	0																				
211	21.0			7	0	0																				
212	20.0			7	0	0																				
213	19.7			7	0	0																				
223	9.2			7	3	2		S							M											
224	14.8			7	0	0																				
225	19.0			7	0	0																				
226	21.3			7	1	1					T															
227	22.3			7	0	0																				
228	22.0			7	0	0																				
229	19.0			7	0	0																				
230	18.0			7	0	0																				
231	17.7			7	0	0																				
232	17.7			7	1	1													T							
239	5.2			7	4	4		M			S				D	M						S				
240	7.9			7	4	4		M		M					D				M			S				
241	11.2			7	3	3			S						M											
242	13.8			7	0	0																				
243	19.7			7	0	0																				
244	23.0			7	1	1		M																		
245	23.0			7	0	0																				
246	21.6			7	0	0																				
247	11.5			7	2	2		S			S				D											
248	13.1			7	0	0																				

Station	Water Depth	Sed Depth	Sed Type	Zone	Cover	Biovolume	Calli	Ccar	Cdem	Chl	Ecan	Lmin	Lsal	Mhet	Mspic	Nflex	Nodo	Nvar	Pamp	Pc	Pe	Prob	Poly	Salix	Sgram	Tlat
249	11.5			7	1	1									S											
250	4.9			7	3	2			S		M				S	D						S				
257	6.3			7	4	2		M		D	S				M				D							
258	7.9			7	4	4		M		D					D											
259	8.2			7	3	3		M							D											
260	11.5			7	0	0																				
261	14.8			7	0	0																				
262	21.3			7	0	0																				
263	22.0			7	0	0																				
264	13.1			7	0	0																				
265	4.9			7	4	2					D				S						M	M				
266	2.2			7	1	1													T		T					T
276	6.2			7	3	2					D			S	S	M			D			M				
277	11.5			7	0	0																				
278	13.4			7	0	0																				
279	18.0			7	0	0																				
280	19.7			7	0	0																				
281	19.0			7	0	0																				
283	4.9			7	2	2					M			S	M				S			M				
284	13.1			7	0	0																				
285	15.4			7	1	1		T														T				
286	18.0			7	0	0																				
287	18.0			7	0	0																				
288	15.4			7	0	0																				
290	5			7	1	1									T						T					
291	9.8			7	1	1									S											
292	14.8			7	0	0																				
293	17.4			7	0	0																				
294	15.4			7	0	0																				
295	12.5			7	1	1		T																		
296	8.5			7	2	2					M				M	S										
297	6.0			7	3	2			S						M		T		M			M				
298	12.1			7	1	1									T											
299	13.1			7	0	0																				
300	10.5			7	1	1									S											
301	8.2			7	3	2			S		M				S	M										
302	19.0			7	1	1									S	M										
303	6.5			7	3	1					M				S											
304	5.2			7	2	2					M				S	M	T					M				
305	5.5			7	5	1			S						T	D				M	M					
306	7.9			7	3	2		S							S	D										

Morses Pond 2009 Shoreline Survey Data

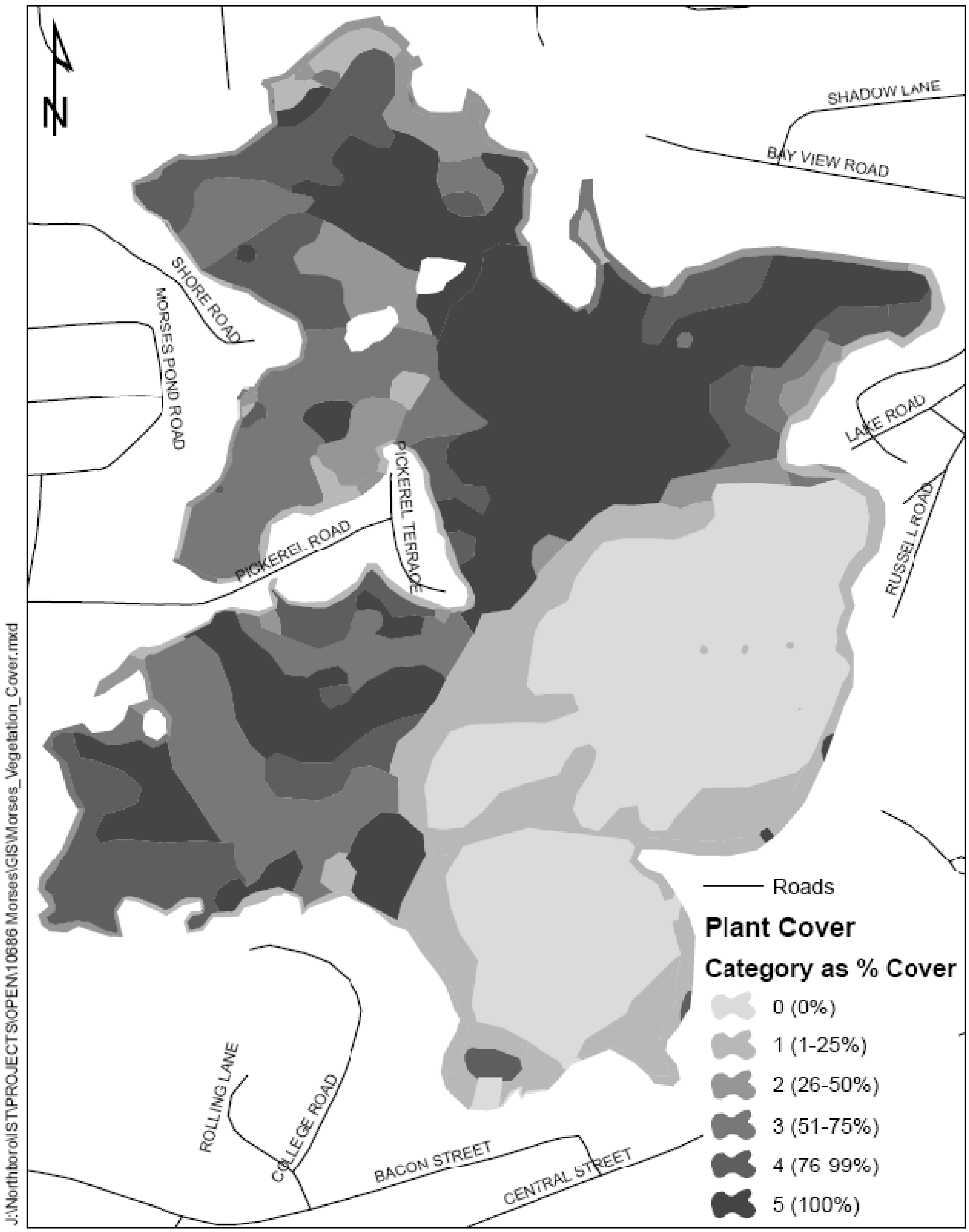
Zone	Address of Property Wishing to Hydrorake	Cover	Biovolume	Calli	Ccar	Cdem	Chloro	Cyano	Dver	Ecan	Lmin	Lsal	Mhet	Mspic	Nflex
2	5 Bacon St	1	1											S	
8	15 Bacon St	1	1			T				S				T	
9	19 College Rd	2	1											T	M
10	21 College Rd	2	1			T								S	M
11	23 College Rd	2	2		T					M				S	
13	35 College Rd	2	1		T	T								T	M
22	2 Pickerel Rd	3	1		M										
23	1 Pickerel Rd	2	1		M	S									S
25	8 Pickerel Rd	3	3		T	T							T	S	M
27	14 Pickerel Rd	3	1							D				S	
28	25 Pickerel Rd	3	2							S			T		M
29	29 Pickerel Rd	3	2				S							S	
30	12 Pickerel Terrace	2	2			M				S				S	M
31	10 Pickerel Terrace	2	2		T									S	M
32	6 Pickerel Terrace	2	2		S	T				S					M
35	32 Pickerel Rd	2	1		T	M									S
37	11 Pickerel Rd	3	2		T	S				S			T	S	M
40	4 Pickerel Rd	2	2		M	T									
44	49 Shore Rd	3	2		M										
45	50 Shore Rd	3	3		M							M		T	
50	E) North Cons Land	3	2				S				S	M			
51a	F) Pickel Point	3	2											M	
51b	F) Pickel Point Cove	3	2		M									S	
52	G) Pine Point West	3	3		M								M	M	
53	49 Russel Rd	2	1				M							T	
54	17 Stonecleve Rd	1	1											S	
55	19 Stonecleve Rd	2	2		S								S	S	
56a	2 Lake Rd	2	1				S			M			T	S	
56b	1 Lake Rd	1	1							S				S	
57a	1 Beach Rd	1	1							T				T	
57b	69 Russell Rd	1	1											S	
57c	73 Russell Rd	1	1											S	
57d	75 Russell Rd	1	1											S	
58	89 Russell Rd	1	1											T	
Islands															
A	South of West Island	2	2		M	S				S			T	S	
B	North of West Island	2	2		M	S							T	S	
C	South of East Island	3	2		M								S	M	
D	North of West Island	3	2		M	S							M	S	S

Morses Pond 2009 Shoreline Survey Data

Zone	Address of Property Wishing to Hydrorake	Nodo	Nvar	Pamp	Pcord	Pc	Pe	Prob	Poly	Ppul	Ranu	Salix	Sgram	Spol	Tlat	Tnat
2	5 Bacon St							S								
8	15 Bacon St															
9	19 College Rd												S			
10	21 College Rd	S											T			
11	23 College Rd	S											S			
13	35 College Rd			T				T					T			
22	2 Pickerel Rd	S	S													
23	1 Pickerel Rd							S								
25	8 Pickerel Rd	M				T										
27	14 Pickerel Rd		T													
28	25 Pickerel Rd	M		T				T								
29	29 Pickerel Rd					T		T								
30	12 Pickerel Terrace	M		T		T		T								
31	10 Pickerel Terrace	T						T								
32	6 Pickerel Terrace	T				T										
35	32 Pickerel Rd	T		S				S								
37	11 Pickerel Rd	M	M													
40	4 Pickerel Rd							M								
44	49 Shore Rd	T		T				T								
45	50 Shore Rd		M			T		S								
50	E) North Cons Land	M	M													Tuber?
51a	F) Pickel Point	S				S										
51b	F) Pickel Point Cove	S				M										
52	G) Pine Point West					S										
53	49 Russel Rd															
54	17 Stonecleve Rd	T	T													
55	19 Stonecleve Rd															
56a	2 Lake Rd	S		M				T								
56b	1 Lake Rd	S														
57a	1 Beach Rd			T				T								
57b	69 Russell Rd			S												
57c	73 Russell Rd			S												
57d	75 Russell Rd			S												
58	89 Russell Rd															
Islands																
A	South of West Island	M		T		S										
B	North of West Island	M				S										
C	South of East Island	M	S			S	T									
D	North of West Island	M														Tuber?

Morses Pond 2010 Plant Transect Data

Station	Depth Ft	Total Depth ft	Sed Type	Zone	Cover	Biovol	Calli	Ccar	Cdem	Chloro	Cyano	Dver	Ecan	Lmin	Lsal	Mhet	Mspic	Nflex	Nodo	Nvar	Pamp	Pcord	Pc	Pe	Prob	Poly	Ppul	Ranu	Salix	Sgram	Spol	Tlat	Tnat	Ugem	Ugib	Val	Wcol	Unk A	Note
1	2	2.8	S	1	3	3		M	M	S				M			S		M				T		S														
2	2.4	5	S/M	1	1	2		T	S					S		S			M		T				T														
3	4.5	5	S/M	1	4	3		M	M	D			M	T	M	S	M		M								S												
4	5	5.1	S	1	3	3		S	S	M	M					M	M		S		M				S														
5	5.5	6	M	1	2	2			S	M	M					S	M																						
6	3.5	3.6	C	1	4	4		S	S	D				M	M	S	M		D		S					M													
7	4	5	M	1	3	2		M	M	M				S					S							S										T			
8	2.5	3.5	M/S	1	3	2		M	M	M			T	S		M	M		M						S	S												M	
9	5.25	6	S	1	3	3		S	S	S	M		S	S		M	M		S	M	T				S														
10	5.25	5.3	S	1	2	2		T	S	M	M		S			M	S								M														
11	4.75	5	M/S	1	4	3		S		S	S			T		M	S		S	M	T																		
12	4.5	6	M	1	4	4		M	M	M	M					M	M						S		S														
13	4	5.2	M	1	4	3		M	M	M				M	M		S		S	M					S	M													
14	3	6	M	1	1	1		S															S													S	S		
15	3.5	5	S/M	1	2	2		S		S			S				S		M	S			S															T	
16	3.7	4.3	M	1	3	4		M	M	M			S				M																						
17	4	4.8	S/M	1	4	4		S	M	M						M	M		S	M	S		T		T	S													
18	4.9	5.2	S/M	1	4	4		M		M			S			M	M		S		M																		
19	4.5	5.5	S	1	3	2		S		M							M				M				S														
20	4	5.4	M	1	3	2		S	T	M						S	M		M	S	T			T															
21	4.5	6.3	M	1	3	2		M	S	S						S	M		S	M	T				T														
22	5.2	6.5	M	1	3	2		S	S	S						M	M		S	M	T				T				T										
23	5	6	M	1	2	2		M	M		S				T	S			S		S		T		S	S													
24	5	5.25	M/S	1	2	1		S	S				S	S			S		S				M		S													S	
25	5	6.2	M/S	1	2	2		S		S							S		M				M	M															
26	3.5	4.5	M	1	4	3		S	S	M	S			T			S		S	M			S																
27	3.5			1	4	3		M	S	M	S		T	S			M		M	M			S		S														
28	6.25	6.5	M/S	1	3	1		M	S	M			T			S	S				S				T														
29	6.5	6.8	M/S	1	3	2		M	S	T	T					M	S		M	M	T				T														
30	5.2	6.2	M/S	1	3	2		M	S	S			T			S	S		S	M					M														
31	5.3	5.5	M	1	2	2			M	M						S	S								M														
32	5.5	6.5	M	1	4	3		M	M							S	S		M		S		T																
33	4	4.5	M	1	2	2		M	S	S			S				S		T				S	T	M	T													
34	6.2	6.7	M/S	1	3	2		M	M				S				S				S		S		M														
35	4	4.5	M	1	1	2		S	S	M				S		S	M			M	S		T		S														
36	7.5	7.9	S	1	2	2		M	M				S			S	S				M				S														
37	6	6.2	S	1	2	2		S	S	S						S	S			M	S			S	S														
38	5.25	5.5	S	1	3	2			S		M						S		M																				
39	4.5	4.6	M	1	3	2		M	M								M				S		S		S														
40	5.5	6.3	M	1	2	2		S	M		M		S				S						T		T														
41	3.5	5.2	M	1	2	2		M	S	M				S			S		S	M			T																
42	6.5	6.7	S/ST	1	3	2		M	S				S			T	S						S		M														
43	4.5	5.5	M	1	2	2		S	M	M			S				S		S						T														
44	3.4			1	5	2		M	M	D			S				S		S																				
45	4			1	4	2		M	S	M							S		M						S														
46	5.2			1	4	2		M	T								M		T	S	T		T		S														
						Total Plants	0	43	40	34	12	0	18	14	4	25	42	0	31	16	21	0	19	4	30	7	1	0	1	0	0	0	0	0	0	2	1	3	
						Total Points	46																																
47	5.4			2	4	2		D	S	M	S					S	S		S				M																
71	5	6.9		2	4	2		S	T	M	T		T			S	S						S																
72	4			2	1	1		S	S	S							S	T					T		S														
82	5.5	7	M	2	2	2		S	S	S			T				T								T														
83	3.3			2	3	2		M	S	T			T			S	S				T			T															
84	5.2			2	3	2		S		M							M	D			T		T		S														
96	6	6.2	S	2	3	2		S	T	M							S				T		T		T														
97	5.2			2	3	2		S	T				T			M	M							T															
110	6.1			2	2	1		T		S			T			T																				T			
111	3			2	4	3		S	S							M	S																						
112	5.2			2	3	2		T		T			M			S	M				S		S		S														
113	5.2			2	3	2		S	T	D			S			S	S		S					S															
114	5.4			2	3	2		M	S	M			S			S		S					T	T	T														
125	7.8			2	3	1				S							S	M																					
126	2			2	4	3			S							D	M						S																
127	4.8			2	3	1		S	M			S				M	S							S															



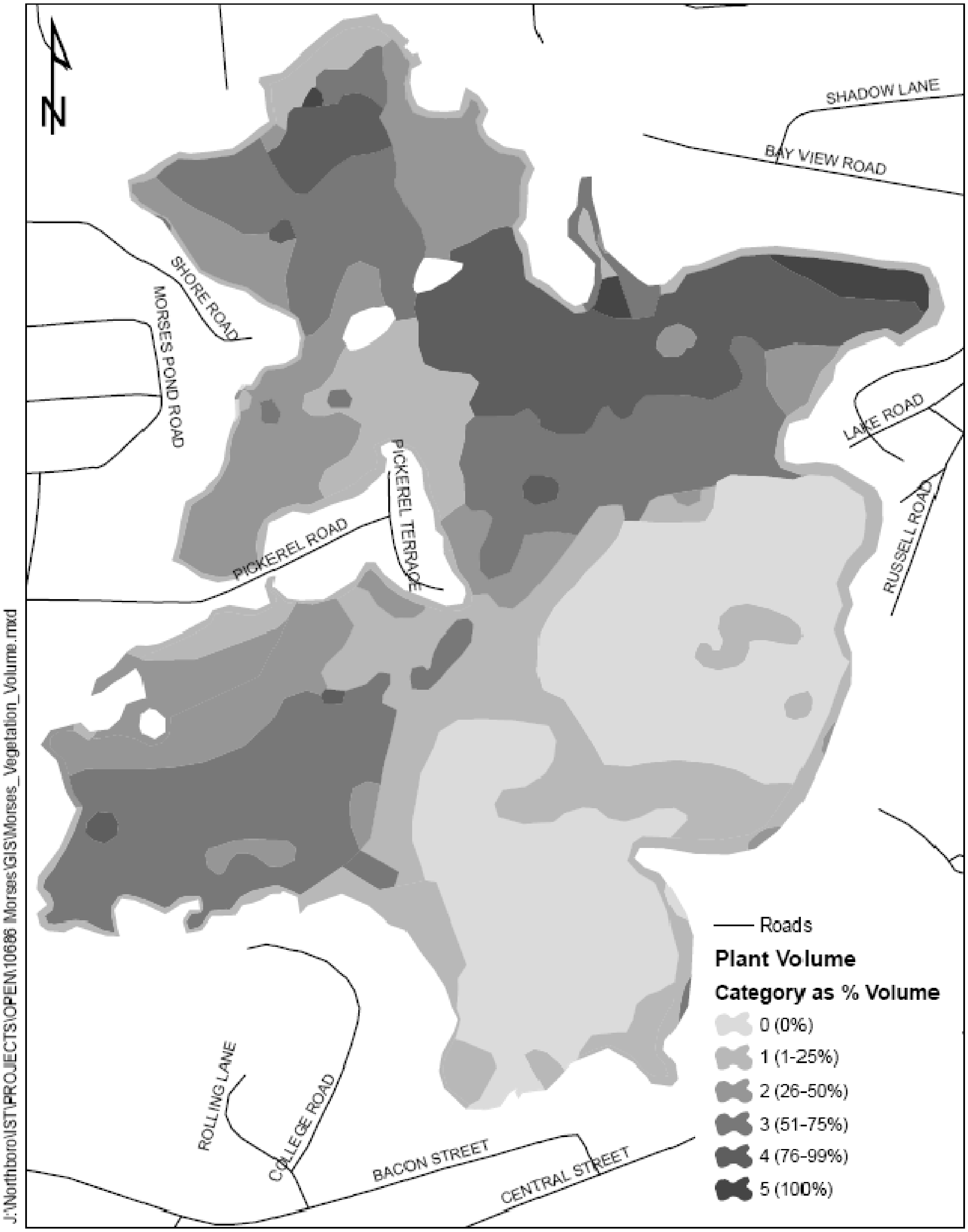
Morses Pond Plant Cover

Wellesley, MA

Survey Performed: May 2008

ENSR | AECOM

0 75 150 300 Meters



Morses Pond Plant Volume

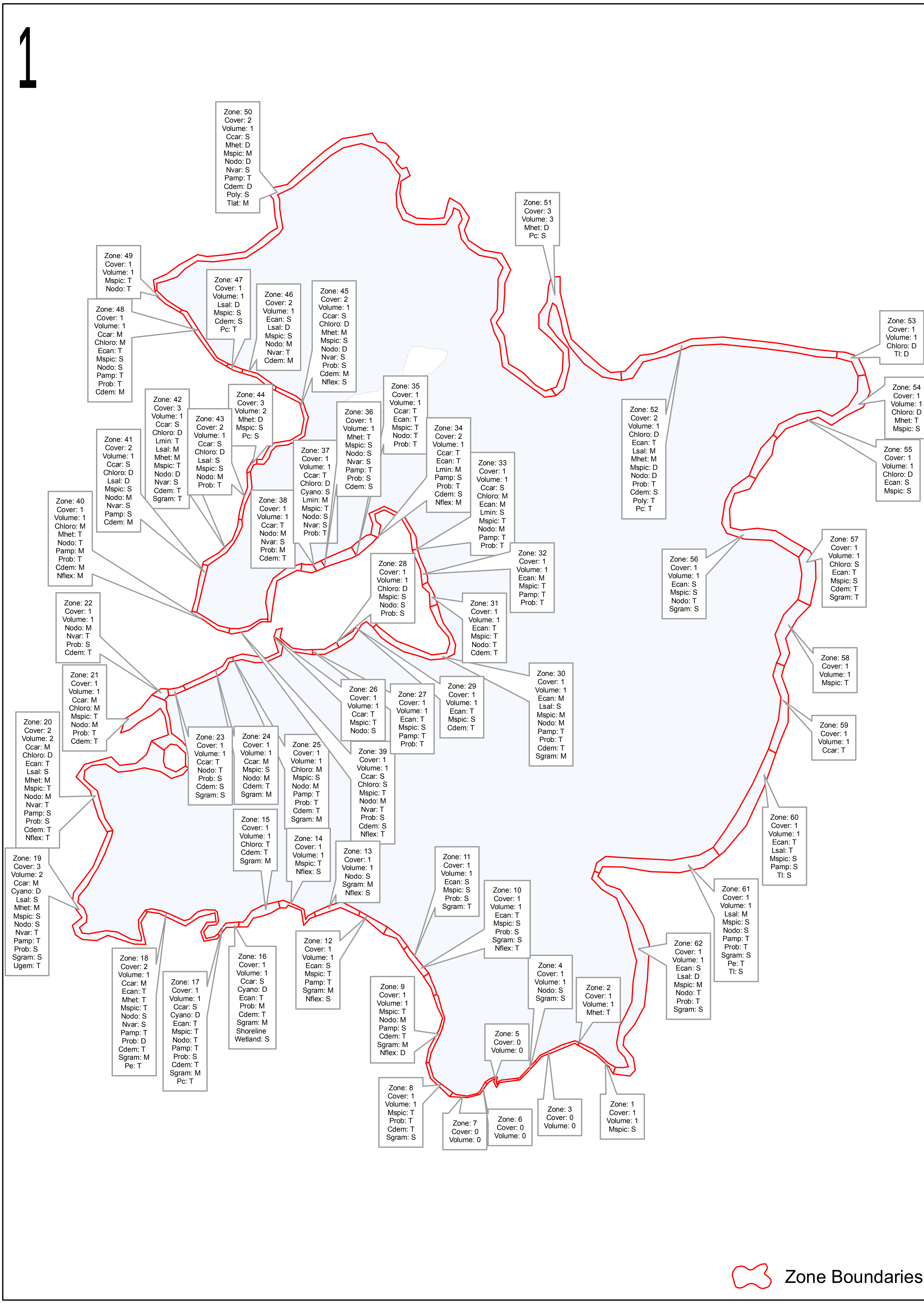
Wellesley, MA

Survey Performed: May 2008

ENSR | AECOM

0 75 150 300 Meters

1



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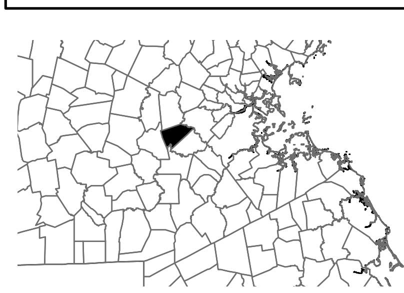


Morses Pond
Shoreline Vegetation Survey

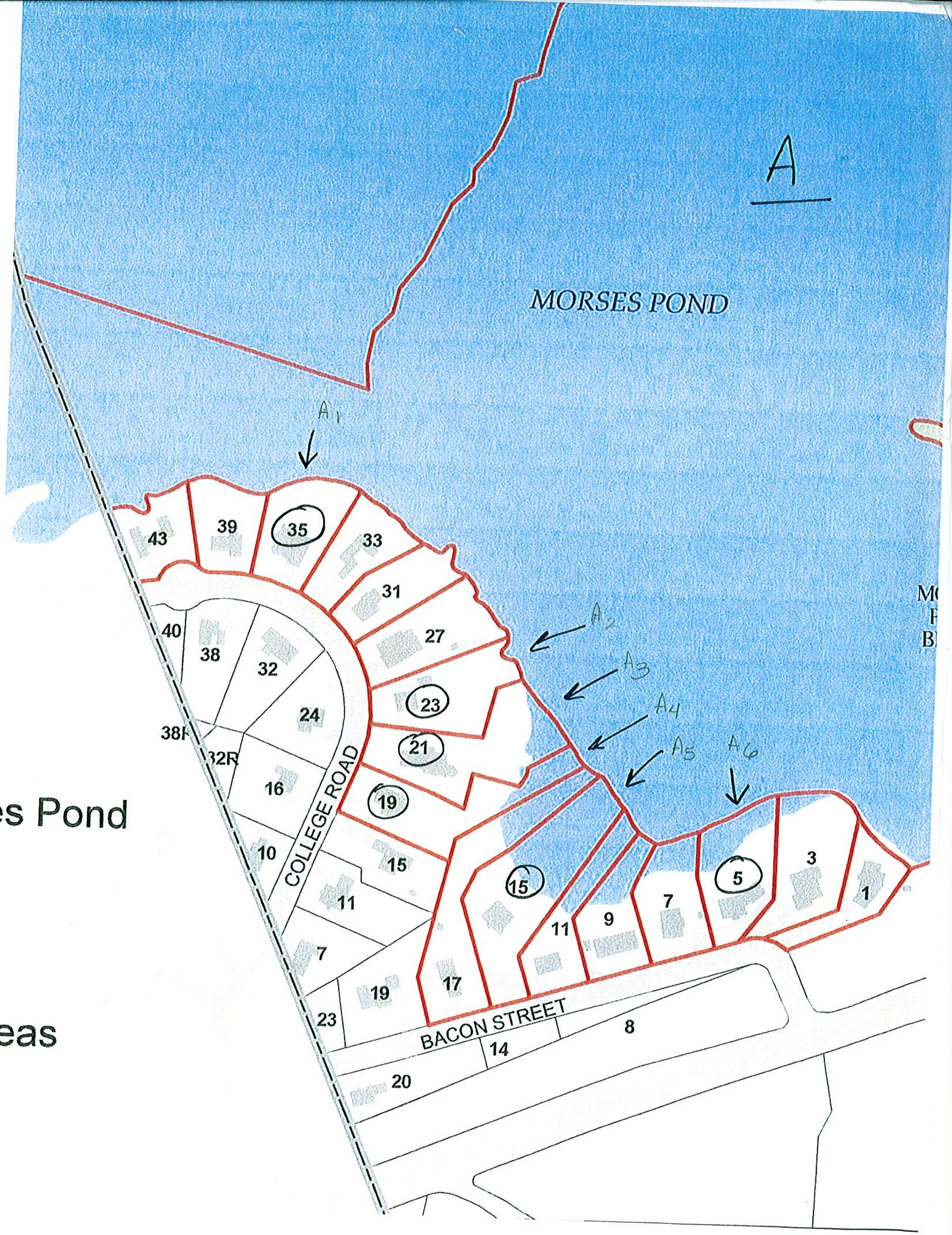
Wellesley, MA

Survey Performed: May 2008

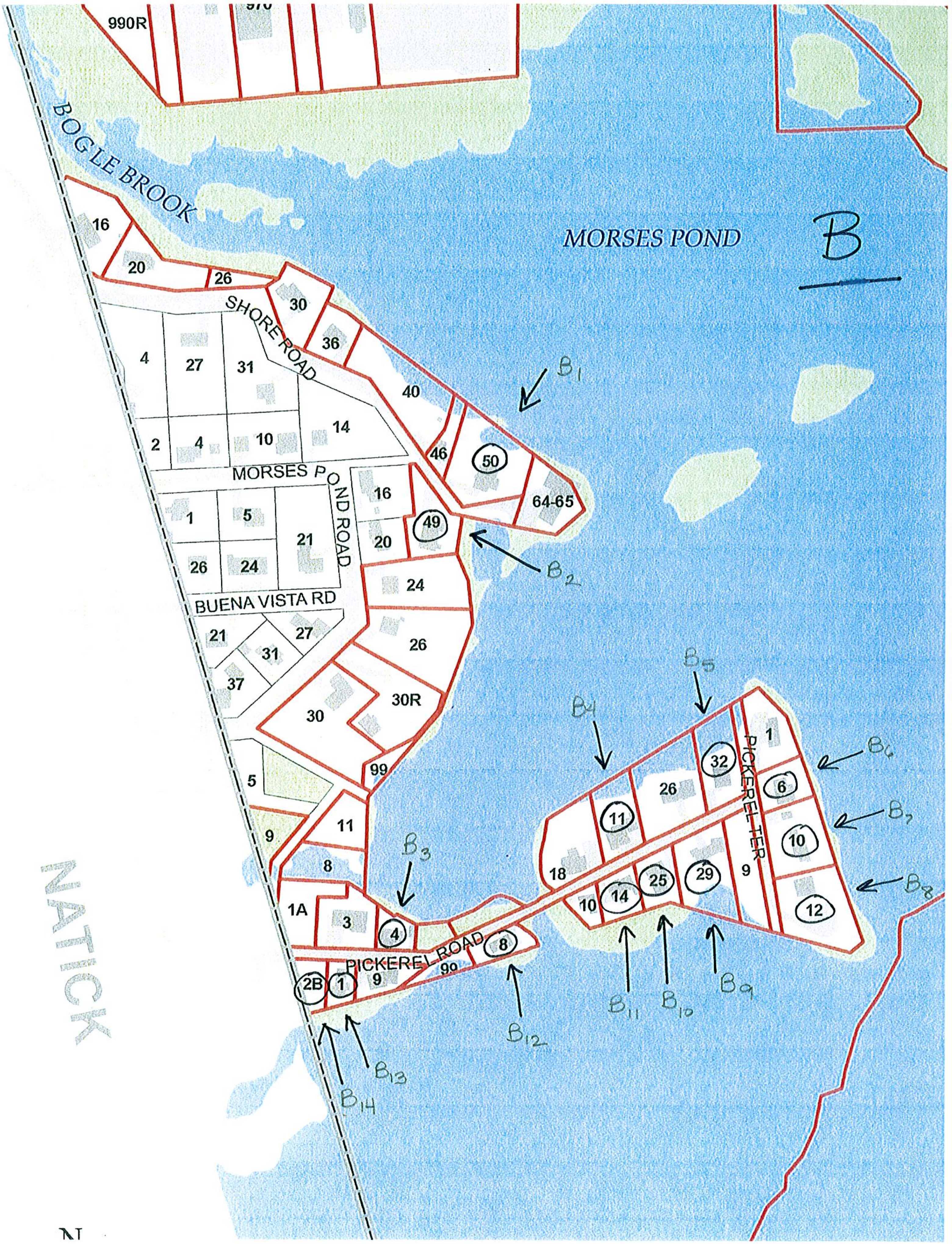
0 37.5 75 150 225 300 Meters

ENSR | AECOM


Abutters to Morse's Pond
WORCESTER STREET
WORCESTER STREET
BOGLE BROOK
MORSES POND
MORSES POND
MORSES POND
COCHITUATE AQUEDUCT
PICKLE POINT (WCC)
PINE POINT
COVESIDE BANK SANCTUARY (WCC)
SHORE ROAD
MORSES POND ROAD
BUENA VISTA RD
PICKEREL ROAD
PICKEREL TER
SHADOW LANE
BAY VIEW ROAD
RUSSELL ROAD
KENDALL RD
STONECLEVE ROAD
LAKE ROAD
MCLAREN ROAD
BAY RD
BEACH RD
DALE ST
NATICK
MORSES POND BEACH
BEACH ACCESS ROAD
CENTRAL STREET
COLLEGE ROAD
BACON STREET
N
W
E
S
Feb. 18, 2009
0 125 250 500 Feet
Town Boundary
Abutters to Morses Pond
Parcels
Buildings
Roads / Paved Areas
Municipal Land
DISCLAIMER:
This map is for display purposes only --- it is not intended for survey or legal purposes. Questions about specific datalayers on this map should be directed to the respective Town board, committee or department. The Town of Wellesley expressly disclaims responsibility for damages or liability that may arise from any errors, omissions, or inaccuracies in the information provided herein.
A
B
C
#1 beaches
Benthic Barrier



A
MORSES POND
A1
A2
A3
A4
A5
A6
43
39
35
33
31
27
23
21
19
15
40
38
32
24
38R
32R
16
10
11
7
19
23
20
14
8
17
15
11
9
7
5
3
1
COLLEGE ROAD
BACON STREET
es Pond
reas


B
MORSES POND
BOGLE BROOK
SHORE ROAD
MORSES POND ROAD
BUENA VISTA RD
PICKEREL ROAD
PICKEREL TER
NATICK
990R
16
20
26
30
36
4
27
31
40
2
4
10
14
46
50
64-65
16
1
5
21
49
20
26
24
24
21
27
26
31
37
30
30R
99
5
11
9
8
1A
3
4
8
2B
1
9
99
18
11
26
32
1
6
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10
14
25
29
9
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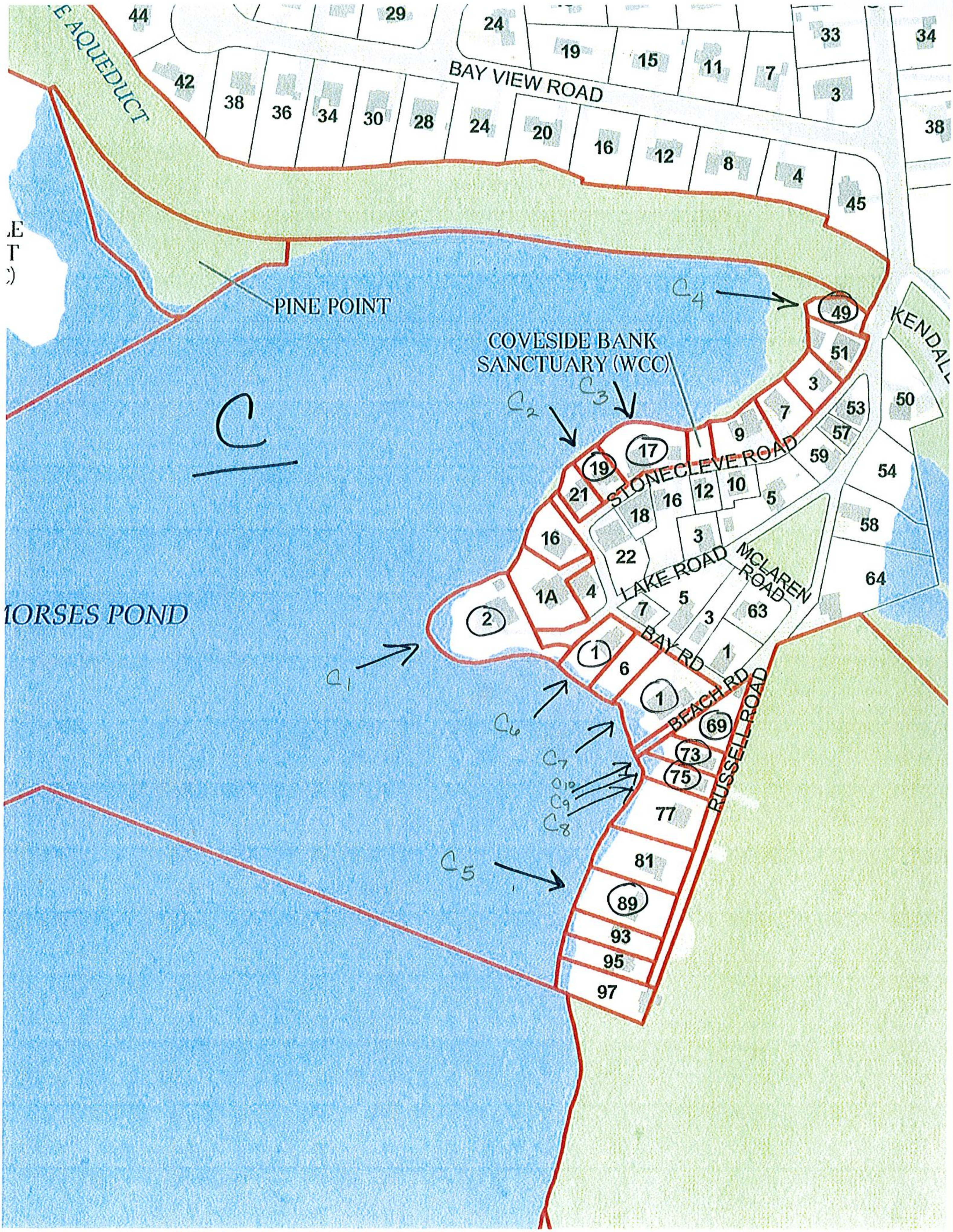

BAY VIEW ROAD
PINE POINT
COVESIDE BANK
SANCTUARY (WCC)
STONECLEVE ROAD
LAKE ROAD
MCLAREN ROAD
BAY RD
BEACH RD
RUSSELL ROAD
KENDALL
MORSES POND
C
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10

2009 Morses Pond Hydroraking Plan

Section		Name	Address	email	Ph	cell
A	A1	Fred Breimyer	35 College Rd.	fbreimyer@fdic.gov	781 237-4888	
	A2	Emma K. Folkard	23 College Rd.		781 235-4724	(Ellen) 617 710-2031
	A3	Dorene & Duncan Higgons	21 College Rd.	dhiggons@comcast.net	781 237-9489	781 724-7306
	A4	Karl Hammond	19 College Rd.	khammond@aol.com	781-431-9603	781-439-7359
	A5	Christine Larsen & Douglas Golenbock	15 Bacon St.	christinelars@gmail.com	781 235-3111	617 515-6546
	A6	Barry Herring	5 Bacon Street	jbherring@comcast.net	781-237-8841	781-405-2325
B	B1	Paul Martin	50 Shore Rd.	paul@especialties.com	781 235-1315	781 308-4937
	B2	Frank Hays	49 Shore Rd.	f.frankhays@comcast.net	781 856-7767	781 856-7767
	B3	Carol Hildebrand/Don Eburne	4 Pickerel Rd.	cjhildebrand@comcast.net	781 235--1981	781 608-9043
	B4	Frank M. Roper	11 Pickerel Rd.	memft11@verizon.net (incorrect)	781 431-8424	508 333-4267
	B5	John Ciolfi	32 Pickerel Rd.	ciolfi@mathworks.com	508 740-9236	508 740-9236
	B6	Donald W. Moon	6 Pickerel Terrace		781 235-0122	781 718-0683
	B7	Stanley Hodges	10 Pickerel Terrace		781 235-8868	
	B8	Anthony Franciose	12 Pickerel Terrace	afranciose@verizon.net	508 653-0665	
	B9	Kara and Matt Kressy	29 Pickerel Rd.	kkressy@designturn.com	781 239-9894	Kara 781 290-7765
	B10	Cathleen & Joel Lunger	25 Pickerel Rd.	jlunger@jslengineeringinc.com	781 431-2383 781-416-1037	781 223-5959
	B11	Helen Belitsos	14 Pickerel Rd.	hcbelitsos@aol.com	781 235-9486	859 608-4739
	B12	Kim and Peter Mitchell	8 Pickerel Rd	pjkatsmom@verizon.net	781-235-2807	508-380-3095
	B13	Guy and Maya Yehiav	1 Pickerel Rd	guy@yehiav.com	617-407-3730	
					781-431-0931	
	B14	Sarah Greene	2 Pickerel Rd.	cammie2drive@yahoo.com	339 225-0252	same
C	C1	Terence McNally	2 Lake Rd.	mcnallytd@comcast.net	781 235-2309	617 448-2350
	C2	Lucinda Briggs / Mark Yeske	19 Stonecleve Rd	lucindaeb@comcast.net	781-235-1364	508-733-4442
	C3	Oliver and Joanna Bandte	17 Stonecleve Rd.	oliverbandte@comcast.net	781 489-5595	617 821-1885
	C4	Fred & MaryJane Fortmiller	49 Russell Rd.	fortmiller@comcast.net	781 235-3090 781 416-2011	
	C5	Barbara Burke	89 Russell Rd.	bburkebb@aol.com	781 237-5908	617 244-2104
	C6	Vernon Robinson	1 Lake Rd.	vernonwr@aol.com	781 235-5903	617 571-8465
	C7	John and Barbara Ligor	1 Beach Rd.	johnligor@gmail.com	781-237-3427	617-717-4815
	C8	Paul Folglia	75 Russell Rd.	pmfoglia@yahoo.com	617-721-0567	617-721-0567
	C9	Amy Gould	73 Russell Rd.	ajgould@verizon.net	781-235-0934	617-680-4663
				agould@globalp.com	781-398-4033	
	C10	Michelle and Ed Jacobs	69 Russell Rd.	m.jacobs@neu.edu	781-239-9904	781-608-3558 (Ed)