Northern Wild Rice (*Zizania palustris* L.) as a Phytoremediation Species in Eutrophic Wetlands – Investigation of Root-Sediment Interactions

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ABSTRACT

The causes of anthropogenic eutrophication in water bodies are multi-faceted and multi-generational, presenting an ever increasing need for effective and sustainable solutions. Phytoremediation presents a cost-effective strategy to improve water body nutrient retention and removal, contributing to eutrophication mitigation efforts.

This thesis examines the potential for northern wild rice (*Zizania palustris* L.) to be used as a phytoremediation species in eutrophic wetlands. An investigation into root-sediment interactions was undertaken to determine how northern wild rice affects water and sediment pore water chemistry. Northern wild rice growth was found to alter sediment pore water chemistry, contributing directly to nutrient retention during the summer growing season through nutrient assimilation in its tissues, and indirectly through increasing pore water Fe and Mn in the fall. The majority of P and N within the plant was found to be contained in the stems and leaves (44-53%), followed by the inflorescence (22-28%). Harvesting northern wild rice vegetation (including the seeds) at the end of the growing season would present a permanent nutrient removal mechanism.

Substantial iron plaque forms on the roots of northern wild rice, visible as an orange-brown coating that ranges structurally from <1 μm to 14 μm thick. Iron plaques were found to be composed mainly of Fe, O, Al and K, with Fe found within and on root epidermal cells. P was not found to be associated with iron root plaques.

With proper harvesting and management techniques, northern wild rice grown in eutrophic water bodies could present a viable phytoremediation method for nutrient removal.

LAY SUMMARY

Faculty and students in the Department of Biology at Lakehead University are bound together by a common interest in explaining the diversity of life, the fit between form and function, and the distribution and abundance of organisms. Northern wild rice (*Zizania palustris* L.) is a valuable wetland plant with significant cultural importance for Canada's Aboriginal people. The purpose of this research was to examine the root-sediment interactions of northern wild rice, contributing to "the fit between form and function" of this important aquatic plant. Nutrients (phosphorus and nitrogen) are required for plant growth; human activities have released excessive nutrients into freshwaters worldwide, resulting in nutrient pollution. This research explored how northern wild rice could help remediation efforts in nutrient-impacted water bodies.

Northern wild rice growth was found to alter water chemistry, reducing the amount of available nutrients in the summer by incorporating nutrients in its tissues and in the fall by increasing iron and manganese availability. The majority of nutrients within the plant were found in the stems and leaves, thus harvesting the entire plant at the end of the growing season could permanently remove nutrients. Northern wild rice roots were found to be covered in an orange-brown coating known as iron root plaques. These plaques were composed mainly of iron, oxygen, aluminum and potassium; phosphorous was not found in the iron root plaques.

The results of this research found that, with proper harvesting and management practices, northern wild rice grown in nutrient-rich water bodies could contribute to nutrient removal efforts.

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TABLE OF CONTENTS

LIST OF TABLES

Chapter 1

Chapter 2

LIST OF FIGURES

Chapter 1

Chapter 2

LIST OF APPENDICES

GENERAL INTRODUCTION

Clean freshwater is a vital resource that is rapidly becoming degraded (Carpenter et al. 1998). Of the vast water resources present on Earth, less than 0.5% is accessible as freshwater in ground and surface reservoirs (Wetzel 1992). This freshwater has been used to dispose of pollutants throughout human history, resulting in further stress to the crucial resource (Carpenter et al. 1998). Sources of human-induced surface water degradation include the direct release of toxic chemicals, increased erosion due to forestry and agriculture, and nutrient enrichment (leading to eutrophication) through fertilizer and wastewater discharge (Wetzel 1992).

The cultural eutrophication of water bodies is caused by excessive inputs of nutrients (phosphorus and nitrogen) into aquatic systems from human sources (Carpenter et al. 1998). Aquatic organisms require nitrogen (N) and phosphorus (P) to survive (Wetzel 2001), however when these nutrients are available in excess they are considered contaminants to an aquatic system (Reddy et al. 1999). Symptoms of this artificial enrichment include an increase in primary productivity, turbid water and a loss of biodiversity (Wetzel 2001; Søndergaard et al. 2003). As additional stresses are placed on the worlds' freshwater resources and individuals become aware of the health and ecological risks of nutrient pollution (Wetzel 1992; Galvez-Cloutier et al. 2006), the need for effective and sustainable solutions for cultural eutrophication increases.

Eutrophication can be reversed through the reduction of nutrient sources to a water body, however the rate of recovery is highly variable and internal P loading (i.e. P release from the water body sediments) can cause a persistent eutrophic state (Carpenter et al. 1998; Søndergaard et al. 2003). P has a tendency to accumulate in sediments, resulting in an internal load of P in eutrophic water bodies that can delay water quality improvements (Søndergaard et al. 2003; Hickey and Gibbs 2009). Effective remediation strategies must include a reduction in external nutrient loads and a mechanism for capturing nutrients from the water and sediment and rendering them unavailable (Søndergaard and Jeppesen 2007).

External load reductions, accomplished through government regulations/enforcement and public education campaigns, must target point and non-point sources of pollution including the capture and treatment of nutrient-rich wastewater, municipal sewage, fertilizer runoff and industrial discharges (Carpenter et al. 1998; LWSB 2006). Remediation mechanisms to improve contaminant retention in water bodies involve the manipulation of biotic and abiotic processes such as settling and sedimentation, sorption, chemical oxidation/reduction, biodegradation and plant uptake (Lavrova and Koumanova 2006). Several strategies exist to reduce P release from sediments, including hypolimnetic aeration and the addition of flocculating agents/capping materials, however these methods are frequently cost-inhibitive and require high implementation and monitoring efforts (Reddy et al. 1999).

Phytoremediation, remediating contaminants through the use of vegetation, presents a cost-effective strategy to improve nutrient retention within water bodies (Williams 2002). Wetland systems (constructed and natural) are considered a low-cost alternative for treating non-point source pollutants (Jiang et al. 2007; Lu et al. 2009). The retention and transformation of nutrients in wetlands decreases the quantity of available nutrients in the water column and sediment and thus lowering downstream export (Johnston 1991; Reddy et al. 1999; Mitsch and Gosselink 2007; En-Hua et al. 2010). Wetlands have been shown to retain organic and inorganic nutrients from the waters that flow through them by physical, chemical and biological processes (Dunbabin and Bowmer 1992; Reddy et al. 1999; Mitsch and Gosselink 2007). Aquatic plants (macrophytes) are the main biological components of wetlands (Maine et al. 2005*a*) and have a major role in nutrient assimilation and storage (Reddy et al. 1999). Emergent macrophytes with extensive root systems and a high ratio of above to below-ground biomass are well-suited to the phytoremediation of nutrient contaminants (Reddy et al. 1999; En-Hua et al. 2010).

Emergent macrophytes contribute to nutrient retention mainly through nutrient assimilation, denitrification and rhizosphere oxidation (Moore et al. 1994; Hoagland et al. 2001). Wetlands function as nutrient sources or sinks depending on the season (Kao et al. 2003), with wetlands typically functioning as net sinks for total P during the growing season (Reddy et al. 1999). Nutrient retention during the growing season, when the majority of problems associated with eutrophication are experienced, can significantly improve water quality and assist in the remediation of eutrophic water bodies (Reddy et al. 1999; Hoagland et al. 2001; Hupfer and Dollan 2003; Kao et al. 2003).

Emergent macrophytes acquire the nutrients required for growth directly from wetland sediments and incorporate them into the living biomass (Wetzel 2001; En-Hua et al. 2010). This process influences the sediment pore water chemistry, reducing the quantity of available nutrients in the sediment and lowering nutrient transfer into the water column (En-Hua et al. 2010). After the growing season, nutrients are released from the senesced vegetation at a variable rate through decomposition and leaching (Mitsch and Gosselink 2007; Reddy et al. 1999). The aboveground portion of the macrophyte returns nutrients to the water column, while the belowground biomass returns nutrients to the sediment pore water (Reddy et al. 1999; Shilla et al. 2006).

Denitrification, the conversion of nitrate (NO_3^-) to gaseous nitrous oxide (N_2O) and molecular nitrogen (N_2) by microbes in anaerobic conditions (Mitsch and Gosselink 2007), can permanently remove N from a water body (McCarthy et al. 2007; Hickey and Gibbs 2009). Denitrification is promoted by decomposing vegetation providing a nutrient source and substrate for bacteria (Hoagland et al. 2001). Maine et al. (2005*a*) found that constructed wetlands efficiently removed both N and P from wastewater high in Fe and SO_4^{2-} by promoting both denitrification and P precipitation and adsorption to Fe and $CaCO_3$.

Rhizosphere oxidation occurs when emergent macrophytes transport oxygen to their roots which subsequently "leaks" out (by radial oxygen loss) into the surrounding anaerobic rhizosphere (Armstrong 1964; Conlin and Crowder 1989; Mitsch and Gosselink 2007). Numerous biogeochemical processes occur within this oxidized rhizosphere, including the oxidation of iron which often results in the precipitation of ferric hydroxide onto root surfaces termed iron root plaque (Mendelssohn and Postek 1982; Crowder and MacFie 1986; St-Cyr et al. 1993; Christensen and Wigand 1998; Caetano and Vale 2002). Iron hydroxides have a high adsorption capacity, resulting in the adsorption or co-precipitation and incorporation of a number of elements including P into plaques (Chen et al. 1980*a*; Chambers and Odum 1990; Liu et al. 2011).

The ability of a wetland to retain nutrients is strongly influenced by the aquatic species present (Kao et al. 2003). Macrophytes best suited for eutrophic wetland phytoremediation are fast-growing indigenous species with vigorous root systems and high oxygenation ability (Dunbabin and Bowmer 1992; En-Hua et al. 2010). Many studies have shown constructed wetlands planted with emergent macrophytes including *Typha*, *Schoenoplectus*, *Phragmites*, *Juncus* and *Cyperus* species are successful in remediating polluted waters (Dunbabin and Bowmer 1992; Tanner 1996; Hoagland et al. 2001; Maine et al. 2005*a*; Jiang et al. 2007; Lu et al. 2009; En-Hua et al. 2010).

Zizania latifolia (Griseb.) Turcz. ex Stapf, Manchurian wild rice, has been studied for its nutrient uptake and retention potential in Eastern Asia (Tanner 1996; Jiang et al. 2007; Lu et al. 2009; En-Hua et al. 2010). Tanner (1996) examined eight wetland species, concluding that *Z. latifolia* accumulated the largest amount of N, P, S, K, Zn and Fe due to its high growth rate, well-developed root system, high root-zone aeration and stress tolerance. Jiang et al. (2007), Lu et al. (2009) and En-Hua et al. (2010) all found that *Z. latifolia* had a high capacity for N and P uptake, concluding that plant harvest at the end of the growing season provided a permanent nutrient removal mechanism.

Zizania palustris L., northern wild rice, is an emergent annual aquatic grass that grows in shallow lake waters and slow-moving rivers across eastern and north-central North America (Aiken et al. 1988; Painchaud and Archibold 1990). An important cereal crop, wild rice has been harvested for centuries by First Nations people (Aiken et al. 1988). Wild rice is the only wild grass in Canada that grows annually from seed (without being planted) with a grain of sufficient size for widespread human consumption (Aiken et al. 1988). *Z. palustris* has been cultivated in North America since the 1950s (Malvick and Percich 1993), while research into its cultivation potential in Eastern Asia has increased in recent years (Gemma et al. 1993; Jin et al. 2005).

Z. palustris grows in a wide range of water and sediment types and is known to oxidize the rhizosphere through its well-defined system of aerenchyma (Stover 1928; Aiken et al. 1988; Day and Lee 1989; Lee and McNaughton 2004). Stands of wild rice maintain wetland water quality through binding loose soil, retaining nutrients and reducing wind erosion (Bennett et al. 2000). The historic range of *Z. palustris* has been significantly reduced due to human disturbance including water pollution, boat turbulence and water level manipulations (Bennett et al. 2000; Meeker 2000). Since restoration is not a viable option on many historic waters, efforts have been made to seed wild rice into suitable habitats across its former range with variable success (David 2000).

The objective of this thesis was to examine the potential of *Z. palustris* as a phytoremediation species in eutrophic wetlands. An investigation of root-sediment interactions was undertaken with the following aims: 1) To determine how the establishment of *Z. palustris* in a eutrophic wetland alters water and sediment pore water chemistry; 2) To study the deposition, composition and structure of iron plaques formed on the roots of *Z. palustris*.

CHAPTER 1

Influence of northern wild rice (*Zizania palustris*) on water chemistry in freshwater wetlands

1.1 Introduction

Cultural eutrophication is caused by excessive inputs of the nutrients phosphorus (P) and nitrogen (N) into aquatic systems from human sources (Carpenter et al. 1998). When nutrients are available in excess, water bodies experience an increase in primary productivity, turbid water and a loss of biodiversity (Reddy et al. 1999; Wetzel 2001; Søndergaard et al. 2003). This condition can be reversed through the reduction of nutrient sources, however the rate of recovery for water bodies is highly variable since internal P loading from sediments often persists (Carpenter et al. 1998; Søndergaard et al. 2003).

Effective remediation strategies include a reduction in external nutrient loads and a mechanism for capturing nutrients from the water and sediment (Søndergaard and Jeppesen 2007). Phytoremediation through wetland macrophytes presents a cost-effective strategy to improve nutrient retention (Williams 2002). Nutrient retention and transformation in wetlands decreases the load to downstream water bodies (Johnston 1991; Reddy et al. 1999; Mitsch and Gosselink 2007; En-Hua et al. 2010). Emergent macrophytes in wetlands contribute to nutrient dynamics mainly through nutrient assimilation, denitrification and rhizosphere oxidation (Moore et al. 1994; Hoagland et al. 2001). Nutrient retention by macrophytes during the growing season can significantly improve water quality and assist in the remediation of eutrophic water bodies (Reddy et al. 1999; Hoagland et al. 2001; Hupfer and Dollan 2003; Kao et al. 2003).

Zizania palustris L., northern wild rice, is an emergent annual aquatic grass that grows in shallow lake waters and slow-moving rivers across eastern and north-central North America (Aiken et al. 1988; Painchaud and Archibold 1990). In North America, *Z. palustris* has been harvested for centuries by First Nations people and has been cultivated commercially since the 1950s (Aiken et al. 1988; Malvick and Percich 1993). *Z. palustris* grows in a wide range of water and sediment types and is known to oxidize the rhizosphere through its well-defined system of aerenchyma (Stover 1928; Aiken et al. 1988; Day and Lee 1989; Lee and McNaughton 2004; Jorgenson et al. 2013 *Botany - in press*). The phytoremediation potential of *Z. palustris* in nutrient-impacted water bodies has not been examined to date, however the commercial value and physical attributes of this annual aquatic grass suggest that this species may be suitable in such initiatives.

Sediment interstitial pore waters represent an important source of bioavailable nutrients and metals within water bodies (Teasdale et al. 1995). Pore water dynamics are useful in examining interactions between lake water and sediment, are more sensitive to seasonal variations and are a better indicator of the trophic status of a water body (Teasdale et al. 1995; Søndergaard 1990). Examining sediment pore water chemistry can help explain many chemical processes occurring within sediments, and in-situ methods of pore water collection are best for minimizing sampling artefacts (Azcue et al. 1996). An in-situ sampling field experiment was designed based on the research of Moore et al. (1994) to determine how water and sediment pore water chemistry are affected by northern wild rice. Dialysis pore water samplers (peepers) were used to examine the effect of northern wild rice on water chemistry and nutrient partitioning in adjacent vegetated and non-vegetated plots in two freshwater wetlands.

The objective of this study was to examine the potential of *Z. palustris* as a phytoremediation species for eutrophic water bodies. Lake Simcoe is a mesotrophic lake located in southern Ontario that has undergone numerous environmental changes due to anthropogenic P loading (Evans et al. 1996; Ginn 2011). P levels began to increase in Lake Simcoe in the 1930s, however P was not identified as a water quality problem until the 1970s when a decline in the coldwater fishery and excessive algal and aquatic macrophyte growth were observed (Eimers et al. 2005; Winter et al. 2007; Kilgour et al. 2008; Hawryshyn et al. 2012). Anthropogenic nutrient sources within the watershed include urban and agricultural run-off from 23 municipalities, livestock waste, effluent from 15 sewage treatment plants and atmospheric pollution (LSRCA 2009; Ontario Ministry of the Environment 2009*a*). Initiatives to reduce total P loading to Lake Simcoe, including the Lake Simcoe Protection Plan, have been ongoing since the 1990s with a substantial improvement in lake water quality observed in recent years (Winter et al. 2007; Ontario Ministry of the Environment 2009*b*; Ginn 2011; Winter et al. 2011; Hawryshyn et al. 2012). The goal of this study was to determine how water and sediment pore water chemistry are affected by the presence of *Z. palustris*, in an effort to determine the usefulness of *Z. palustris* as a phytoremediation species in eutrophic wetlands.

1.2 Materials and Methods

1.2.1 Field Experiment

Two freshwater wetlands were selected near Orillia, Ontario, to examine the influence of *Z. palustris* growth on water chemistry in differing wetland environments. Surface water and sediment pore water samples were collected in-situ from plots containing wild rice vs. plots containing no vegetation and submitted for laboratory analysis.

1.2.1.1 Study Area

Orillia, Ontario (44° 35’ 59” N, 79 24’ 59” W) is located on the northern shore of Lake Simcoe, adjacent to the Lake’s outflow to Lake Couchiching at Atherley Narrows (Winter et al. 2007). Both wetlands selected for this study (Figure 1.1) are part of the Lake Huron Drainage Basin, with Victoria Point located within the Lake Simcoe Watershed and Marchmont Marsh located within the Severn Sound Watershed (Environment Canada 2010; South Georgian Bay-Lake Simcoe Source Protection Committee 2011).

Victoria Point (VP) wetland (44° 35’ 36” N, 79 22’ 58” W), adjacent to the southeast boundary of Orillia, is a shallow open water marsh within Lake Simcoe with dark brown flocculent organic sediment (> 2 metres (m) deep) and a seasonally fluctuating water level (0.1 - 2 m depth). Dominant macrophyte species within the study area included *Nymphaea odorata* Aiton, *Nuphar variegata* Engelm. ex Durand, *Ceratophyllum demersum* L. and *Myriophyllum* sp., with *Typha angustifolia* L. dominant along the shoreline.

Marchmont Marsh (MM) (44° 38’ 03” N, 79 31’ 03” W), located approximately 5 km west of the City of Orillia, is an open water marsh along the shoreline of a slow-moving tributary of the North River with a stable water level (1 m depth). Within the study area, a firm light brown clay layer is located beneath the overlying brown organic sediments (0.3 – 0.5 m deep). Dominant macrophyte species within the study area included *Z. palustris*, *N. variegata* and *C. demersum*, bounded by a riparian forest dominated by *Abies balsamea* (L.) Mill. and *Thuja occidentalis* L.

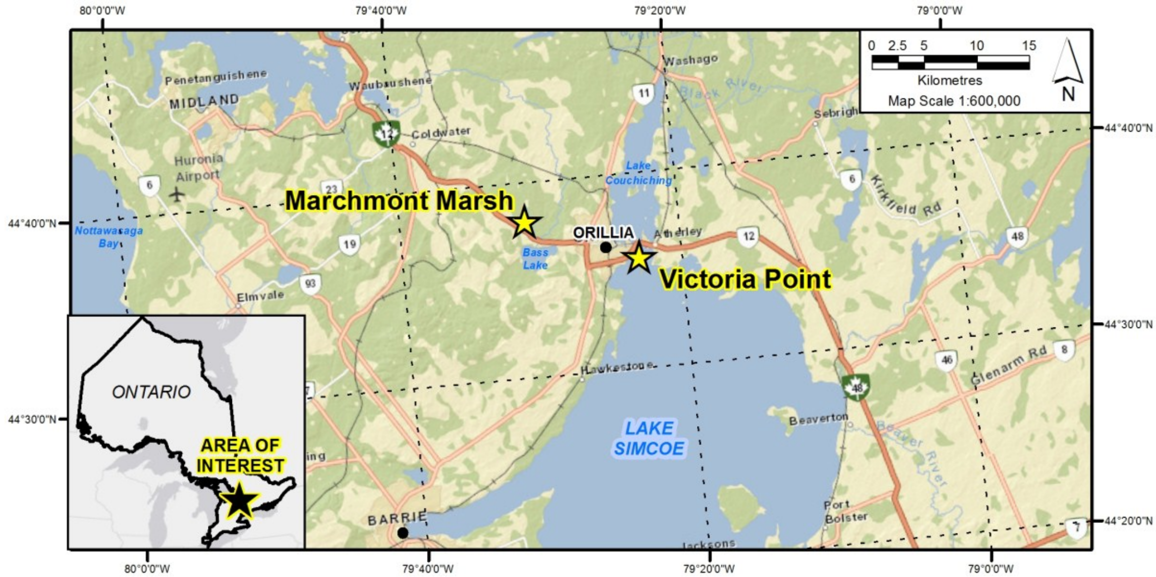

Figure 1.1 – Location of study sites near Orillia, Ontario (Canada). Basemap imagery from ESRI (2012).

1.2.1.2 Site Preparation

Victoria Point

In early May 2010, VP wetland was observed to be lacking vegetation cover. A suitable plot location was selected for seeding *Z. palustris* based on accessibility, adequate water depth (0.5 - 1 m), flocculent sediment conditions, a lack of competitive species and shelter from wind (Aiken et al. 1988; Gemma et al. 1993; Painchaud and Archibold 1990). A fence (constructed of ABS pipe and plastic safety fencing) was erected to eliminate waterfowl disturbance, delineating a study area approximately 7.5 m by 11 m in size. *Z. palustris* seeds (collected and over-wintered in a pond near Kakabeka Falls, Ontario) were scattered throughout the fenced area, with excess seed distributed in an area just north of the fence. Growth of the seeded northern wild rice was monitored in June and July, with the majority of successful growth observed adjacent to the fence due to the reduced turbidity from strong winds. Competitive species (*N. odorata* and *C. demersum*) were removed from within the fenced area as required to encourage growth.

In late July 2010, six plots were delineated within the study area based on the observed vegetation growth (Figure 1.2): three vegetated plots containing only northern wild rice vegetation; two non-vegetated plots containing no vegetation; and, one large mixed-vegetation plot containing *N. odorata* (dominant), *Myriophyllum* sp., *C. demersum* and *Z. palustris*. Non-vegetated plots were maintained throughout the growing season with bi-weekly vegetation removal.

Marchmont Marsh

In late June 2010, *Z. palustris* was observed to be growing vigorously along the southern shore of MM. Six plots were delineated (Figure 1.2) within the study area: three vegetated plots containing only northern wild rice vegetation, and three non-vegetated plots containing no vegetation. Non-vegetated plots were maintained through monthly vegetation removal of *C. demersum*.

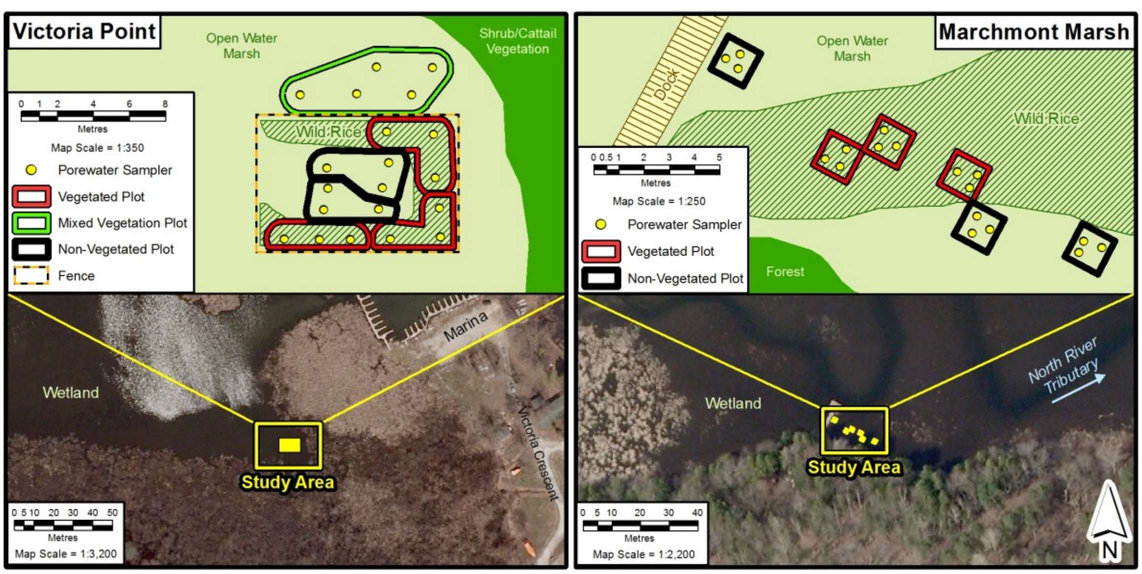

Figure 1.2 – Plot delineation in study sites.

1.2.1.3 Pore Water Sampler

Dialysis pore water samplers (peepers) were constructed to collect sediment pore water samples. Originally designed by Hesslein in 1976, peepers allow for the collection of discrete pore water samples from specified depths, through the equilibration of a contained quantity of water with the surrounding pore water (Hesslein 1976). Many modifications have been designed and used over the years to meet specific experimental requirements (Teasdale et al. 1995; Azcue et al. 1996; Jacobs 2002; Bally et al. 2005).

In this study, peepers were designed to collect the large sample volumes required for a wide range of chemical analyses. Fisherbrand® 50 mL centrifuge tubes were modified to use as the individual dialysis water samplers (Figure 1.3 C). A 180 mm diameter hole was drilled in each cap and fitted with a 0.45 µm Millipore Durapore® membrane filter, adhered with silicone between two 500 µm Nitex® screens. ABS pipe and fittings were used to construct an apparatus for anchoring multiple dialysis water samplers (Figure 1.3 A). Three dialysis water samplers were inserted into each 10 cm interval of the sampling apparatus, collecting 150 mL of water per 10 cm interval (Figure 1.3 B). Collectively, the sampling apparatus and multiple dialysis water samplers are herein referred to as a peeper.

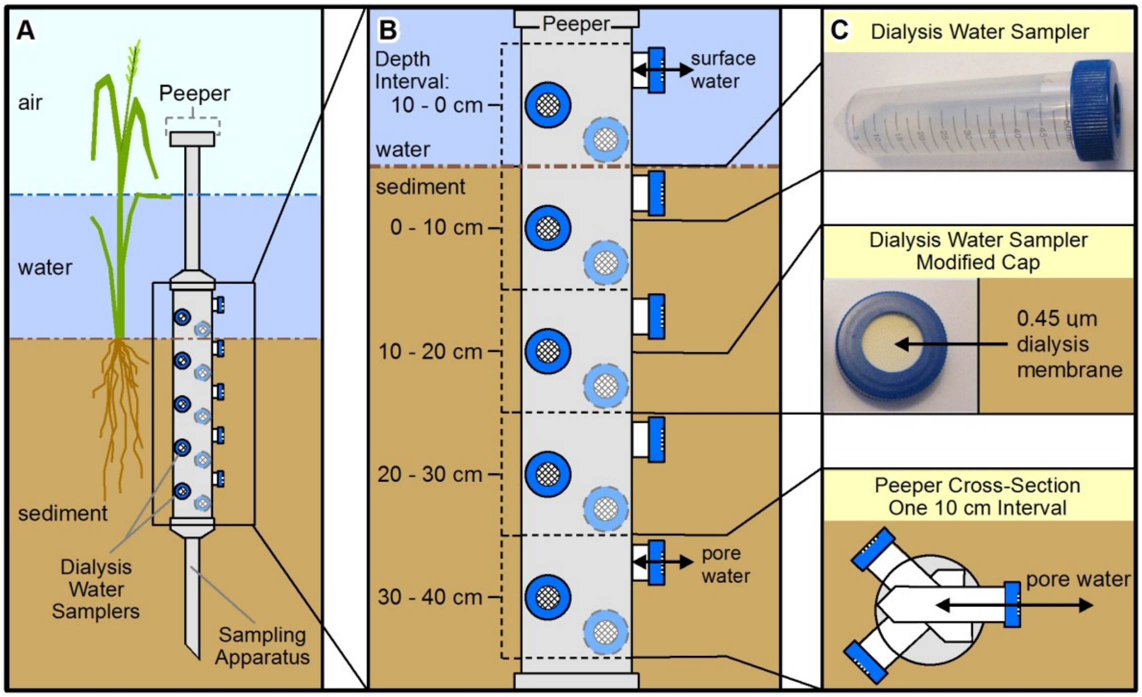

Figure 1.3 – Sediment pore water sampler (peeper) design.

At the time of deployment, each dialysis water sampler was filled with degassed distilled deionized water (DDW), capped (zero headspace) and placed in the sampling apparatus. The compiled peeper was pushed vertically into the sediment at a random location within each plot, with one 10 cm depth interval visible above the sediment-water interface (SWI) (Figure 1.3 B). In total, 36 peepers were constructed, 30 peepers with five 10 cm depth intervals to sample up to 40 cm below the SWI, and six "deep peepers" with eight 10 cm depth intervals to sample up to 70 cm below the SWI. Deep peepers were designed to examine pore water trends below the rooting zone of *Z. palustris*. After deployment, all peepers remained undisturbed for approximately one month (26-33 days), allowing adequate equilibration time with the surrounding water (Teasdale et al. 1995).

1.2.1.4 <u>Sample Collection</u>

At the time of sample collection, the peeper was carefully pulled vertically from the sediment and each individual dialysis water sampler was extracted and collected by 10 cm sampling depth. Compromised samples (e.g. from samplers with damaged caps) were discarded. The contents of all samplers from the same 10 cm depth interval (usually three samplers) were emptied into clean, pre-labelled 250 mL plastic bottles, resulting in one 150 mL water sample per 10 cm depth per peeper. Samples were placed in ice-filled coolers and transported to the Lakehead University Environmental Laboratory (LUEL) for analysis. After sample collection, the sampling apparatus was scrubbed clean, loaded with new degassed DDW-filled dialysis water samplers and re-deployed.

A control apparatus was also constructed to determine if peeper components contributed to the analytical results. A short length of ABS pipe was capped at both ends and filled with degassed DDW and three filled dialysis water samplers (Figure 1.4) at each deployment event. Samples of the control apparatus water, degassed DDW (used to fill samplers at deployment) and site surface water were collected at each sampling event. Samples were collected directly into clean 250 mL plastic bottles, sealed, labelled and stored in a cooler along with the peeper samples for transport to the LUEL for analysis.

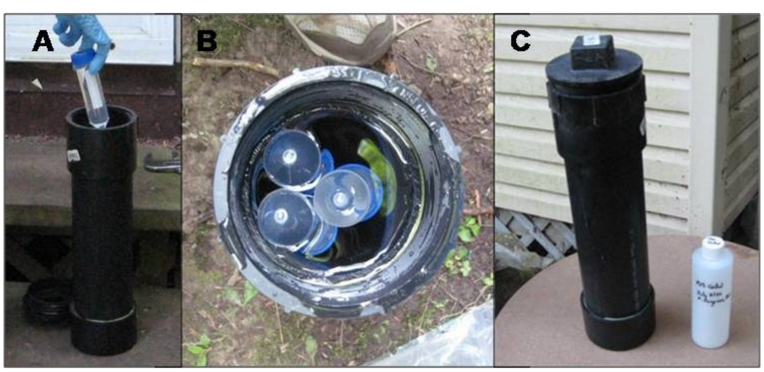

Figure 1.4 – Control apparatus.

Sediment and vegetation samples were also collected at select intervals from each study site. Sediment samples were collected by pre-cleaned shovel into new 1 L plastic bags, sealed, labelled and transported in coolers to the LUEL for analysis. Vegetation samples of *Z. palustris* were removed by hand from the sediment and placed into new plastic bags, sealed, labelled and transported in coolers to the LUEL for analysis.

Victoria Point

In total, 20 peepers were deployed and collected monthly in VP from July to October 2010. Three peepers each were located in the three vegetated plots and two non-vegetated plots, and five peepers were located in the mixed vegetation plot. One deep peeper was included in each plot (six deep peepers total). Three sample collection events occurred (August, September and October) for a total of 333 samples collected. Water levels within VP dropped significantly throughout the summer so that only 0.1 to 0.3 m of water and little vegetation remained within the study area in October. Accordingly, only one deep peeper from each of the vegetated plots was collected and analyzed in October.

One surface water sample was collected per month from July to October. One vegetation sample (10 plants) was collected in September, and one sediment sample was collected in October.

Marchmont Marsh

In total, 18 peepers were deployed and collected monthly in MM from June to October 2010. Three peepers each were located in the three vegetated plots and three non-vegetated plots. Firm clay impeded peeper deployment beyond 40 cm below the SWI, thus no deep peepers were used. Four sample collection events occurred (July, August, September and October), for a total of 388 samples collected. Water level and vegetation cover within MM was consistent throughout the study.

One surface water sample was collected per month from July to October. Two vegetation samples were collected, one in August (3 plants) and one in September (20 plants). Two sediment samples were collected, one each in June and October.

1.2.2 Laboratory Procedures

All sample analyses were conducted at the LUEL, a Canadian Association of Laboratory Accreditation (CALA) ISO 17025 accredited laboratory. All analyses followed standard operating procedures and included the use of blanks, quality control samples and replicates.

1.2.2.1 Water Analysis

As per the in-situ sample collection technique, water samples (surface and pore) were filtered in the field. The majority of samples contained a small portion of sediment, indicating that not all water passed through the 0.45 μm membrane (i.e. some water passed around the membrane and only through the 500 μm screen). In preparation for laboratory analysis, water samples were mixed, allowed to settle for 5 to 10 minutes and then decanted (eliminating the approximately 10 mL of water containing sediment particles from analysis).

Water (surface and pore) samples were analyzed for: pH, conductivity, total alkalinity, P (total P and phosphate), N (nitrite and nitrate), and total Al, As, Ba, Ca, Fe, K, Mg, Mn, Na, S, Sr and Zn. Select samples in June and July were also analyzed for dissolved organic carbon (DOC) and reactive silicates (MM only). For samples of insufficient quantity (i.e. less than 150 mL), analyses were prioritized as follows: 1) P and N; 2) Al, As, Ba, Ca, Fe, K, Mg, Mn, Na, S, Sr and Zn; 3) pH, conductivity and total alkalinity.

Within 24 hours of reaching the laboratory, pH and conductivity were analyzed by a probe (with temperature correction) and alkalinity was analyzed by titration with H_2SO_4 to a pH of 4.5 (automated titration procedure). Al, As, Ba, Ca, Fe, K, Mg, Mn, Na, S, Sr and Zn analyses were carried out by ICP spectrometry subsequent to their digestion and concentration by microwave following the addition of HNO_3. P and N were determined on filtered samples (0.45 µm) by ion chromatography on a Dionex DX-120.

1.2.2.2 Sediment Analysis

Sediment samples were analyzed for total P, Al, As, Ba, Ca, Fe, K, Mg, Mn, Na, S, Si, Sr, Ti and Zn. Samples from MM were also analyzed for pH and conductivity. Sediment samples were air-dried and ground to pass through a 2 mm mesh. Total P, Al, As, Ba, Ca, Fe, K, Mg, Mn, Na, S, Si, Sr, Ti and Zn analyses were conducted by ICP spectrometry subsequent to their digestion and concentration by microwave following the addition of HCl and HNO_3. Conductivity and pH were determined by probe (with temperature correction) on non-dried samples thoroughly mixed with DDW.

1.2.2.3 Vegetation Analysis

Vegetation samples were separated into four parts (root, leaf, stem and inflorescence), oven-dried at 35°C and ground to pass through a 2 mm mesh. All samples were analyzed for total P, N, Al, Ba, Ca, Fe, K, Mg, Mn, Na, S, Si, Sr, Ti and Zn. Total P, Al, Ba, Ca, Fe, K, Mg, Mn, Na, S, Si, Sr, Ti and Zn analyses were conducted by ICP spectrometry subsequent to their digestion and concentration by microwave following the addition of HNO_3. Total N analyses were conducted by colourimetry through a SKALAR AutoAnalyzer® subsequent to their digestion and concentration by microwave following the addition of H_2SO_4 catalyzed with a metal sulphate.

1.2.3 Data Analysis

All data was tabulated, with means and standard deviations calculated for each parameter, depth and plot type. Water data from depths ranging from 10-0 cm above the SWI to 30-40 cm (MM) and 40-50 cm (VP) below the SWI were statistically analyzed and graphed using SigmaPlot™ 12.0 Graphing and Statistical Software to determine trends with depth between sampling plots (vegetated vs. non-vegetated) by month. Since a trend in the distribution of data with depth was observed (indicating additive data), a correction was applied to all depths per plot per month, in accordance with the methodology outlined by Lee and Stewart (1981). This involved calculating the overall mean for all samples (all plots) within the same depth interval, and then transforming the mean for all samples within individual plots to a percentage of the overall mean value:

$$\textit{Same depth \& month: } \frac{\textit{mean (one plot, all samples)}}{\textit{mean (all plots, all samples)}} \times 100\% = \textit{depth-independent value for each plot}$$

This approach allowed for the comparison of the concentrations of variables in one plot in relation to another, rather than comparing the actual concentration values (Lee and Stewart 1981). Paired t-Tests and ANOVAs were then conducted on the depth-independent water data for each site, comparing each plot to the other, both within and between months. If the plots were significantly different from each other within the same month or if individual plots were significantly different between months ($P \leq 0.05$), a Tukey Post Hoc Test was conducted to determine where the data differed.

1.3 Results

1.3.1 Water Chemistry

In MM, 108 surface water samples (from a depth range of 10 cm to 0 cm above the SWI) and 280 pore water samples (from a depth range of 0 cm to 50 cm below the SWI) were analyzed. Table 1.1 presents the concentration ranges (minimum value – maximum value), means and stand deviations for all surface and pore water samples analyzed (all depths, all months) from MM. The mean As concentrations were less than the MDL

In VP, 39 surface water samples (from a depth range of 10 cm to 0 cm above the SWI) and 294 pore water samples (from a depth range of 0 cm to 80 cm below the SWI) were analyzed. Table 1.2 presents the concentration ranges (minimum value – maximum value), means and stand deviations for all surface and pore water samples analyzed (all depths, all months) from VP. The mean As concentrations were less than the MDL.

At both sites, pH, total S and Zn concentrations were higher in the surface waters, while alkalinity, conductivity, and total P, N, Al, Ba, Ca, Fe and Mn concentrations were higher in the pore waters. Total K, Mg, Na and Sr showed opposite trends in VP vs. MM, with total Na concentrations higher in the surface waters of VP (pore waters of MM) and total K, Mg and Sr concentrations higher in pore waters of VP (surface waters of MM).

The total P concentrations in the surface water of VP were indicative of a eutrophic state, while the surface waters of MM had P and N concentrations within the range of uncontaminated fresh waters (Wetzel 2001; Mitsch and Gosselink 2007). N concentrations in the surface water of VP were generally below the MDL, supporting the accepted theory that P is the nutrient of primary concern within Lake Simcoe (Winter et al. 2007; Palmer et al. 2011; Winter et al. 2011).

Table 1.1 - Marchmont Marsh water chemistry. Data presented by plot type for all months.

Analytical Parameter	Units	*MDL*	Water	Non-Vegetated Range	Mean	SD	n	Vegetated Range	Mean	SD	n
Total P	mg/L	*0.005*	Surface	0.003 - 0.238	0.026	*0.034*	*60*	0.003 - 0.128	0.031	*0.029*	*48*
			Pore	0.006 - 0.355	0.072	*0.068*	*133*	0.003 - 0.263	0.081	*0.053*	*147*
Phosphate PO_4-P	mg/L	*0.025*	Surface	0.013 - 0.013	0.013	*0*	*60*	0.013 - 0.013	0.013	*0*	*48*
			Pore	0.013 - 0.013	0.013	*0*	*133*	0.013 - 0.078	0.014	*0.006*	*147*
Nitrite NO_2-N	mg/L	*0.006*	Surface	0.003 - 0.003	0.003	*0*	*60*	0.003 - 0.098	0.008	*0.019*	*48*
			Pore	0.003 - 2.410	0.039	*0.236*	*133*	0.003 - 0.003	0.003	*0*	*147*
Nitrate NO_3-N	mg/L	*0.009*	Surface	0.005 - 0.044	0.008	*0.007*	*60*	0.005 - 0.171	0.018	*0.031*	*48*
			Pore	0.005 - 0.166	0.015	*0.028*	*133*	0.005 - 0.329	0.030	*0.064*	*147*
pH	N/A	*N/A*	Surface	7.23 - 7.93	7.67	*0.16*	*42*	6.87 - 7.88	7.59	*0.23*	*31*
			Pore	6.60 - 7.51	7.03	*0.19*	*107*	6.48 - 7.87	6.88	*0.22*	*126*
Alkalinity as $CaCO_3$	mg/L	*1.0*	Surface	124.4 - 167.4	130.0	*8.0*	*42*	123.2 - 163.6	130.6	*8.3*	*31*
			Pore	91.3 - 260.9	145.4	*26.3*	*107*	101.0 - 205.2	140.8	*20.0*	*126*
Conductivity	µS/cm	*0.50*	Surface	256.40 - 338.00	278.18	*14.51*	*42*	261.60 - 333.30	278.72	*14.63*	*31*
			Pore	188.00 - 504.00	314.76	*46.96*	*107*	223.10 - 391.10	303.03	*32.31*	*126*
Total Al	mg/L	*0.005*	Surface	0.006 - 0.066	0.024	*0.016*	*52*	0.006 - 0.071	0.019	*0.013*	*40*
			Pore	0.008 - 3.080	0.128	*0.329*	*128*	0.007 - 0.727	0.050	*0.081*	*138*
Total Ba	mg/L	*0.003*	Surface	0.054 - 0.089	0.059	*0.006*	*52*	0.055 - 0.092	0.061	*0.008*	*40*
			Pore	0.042 - 0.154	0.073	*0.018*	*128*	0.057 - 0.119	0.085	*0.013*	*138*
Total Ca	mg/L	*0.005*	Surface	30.500 - 41.940	33.842	*2.677*	*52*	30.740 - 44.752	34.308	*3.185*	*40*
			Pore	26.972 - 67.820	40.380	*6.061*	*128*	29.100 - 58.220	39.960	*4.624*	*138*
Total Fe	mg/L	*0.002*	Surface	0.011 - 1.839	0.128	*0.339*	*52*	0.008 - 1.754	0.270	*0.462*	*40*
			Pore	0.077 - 4.558	1.280	*0.835*	*128*	0.009 - 3.472	1.735	*0.647*	*138*
Total K	mg/L	*0.10*	Surface	1.01 - 1.47	1.20	*0.16*	*52*	0.50 - 1.45	1.15	*0.18*	*40*
			Pore	0.15 - 2.46	0.86	*0.43*	*128*	0.11 - 4.42	0.75	*0.51*	*138*
Total Mg	mg/L	*0.01*	Surface	8.84 - 11.24	10.47	*0.44*	*52*	7.12 - 11.09	10.11	*0.92*	*40*
			Pore	4.60 - 13.31	7.44	*1.73*	*128*	5.26 - 11.82	7.91	*1.32*	*138*
Total Mn	mg/L	*0.0002*	Surface	0.0009 - 0.3736	0.0277	*0.0763*	*52*	0.0011 - 0.8448	0.0771	*0.1499*	*40*
			Pore	0.0061 - 0.8744	0.1731	*0.1319*	*128*	0.0012 - 1.0704	0.3131	*0.1888*	*138*
Total Na	mg/L	*0.01*	Surface	4.54 - 6.07	5.05	*0.50*	*52*	4.21 - 5.99	4.96	*0.44*	*40*
			Pore	1.89 - 21.54	7.89	*4.31*	*128*	2.27 - 13.24	5.16	*2.02*	*138*
Total S	mg/L	*0.05*	Surface	0.36 - 2.12	1.81	*0.35*	*52*	0.11 - 2.06	1.68	*0.43*	*40*
			Pore	0.06 - 1.81	0.39	*0.26*	*128*	0.10 - 1.97	0.40	*0.31*	*138*
Total Sr	mg/L	*0.005*	Surface	0.097 - 0.118	0.103	*0.005*	*52*	0.089 - 0.133	0.104	*0.007*	*40*
			Pore	0.063 - 0.179	0.101	*0.016*	*128*	0.074 - 0.144	0.104	*0.013*	*138*
Total Zn	mg/L	*0.001*	Surface	0.001 - 0.012	0.006	*0.004*	*52*	0.001 - 0.015	0.007	*0.004*	*40*
			Pore	0.001 - 0.013	0.005	*0.003*	*128*	0.001 - 0.012	0.005	*0.003*	*138*
Dissolved Organic Carbon	mg/L	*0.5*	Surface[a]	3.8 - 9.3	5.0	*1.0*	*30*	1.3 - 8.6	4.9	*1.4*	*26*
			Pore[b]	4.1 - 15.6	7.5	*2.8*	*63*	1.4 - 10.1	6.3	*2.0*	*72*
Reactive Silicates SiO_2	mg/L	*0.25*	Surface[c]	7.70 - 22.4	11.13	*5.57*	*6*	8.60 - 10.30	9.12	*0.69*	*5*
			Pore[d]	15.20 - 29.60	22.31	*4.88*	*9*	16.80 - 28.80	22.95	*4.29*	*11*

Notes

MDL = method detection limit; N/A = not applicable; SD = standard deviation; n = sample size; [a] = measured in June, July & August; [b] = measured in July & August; [c] = measured in June & July; [d] = measured in July. <MDL results recorded as 0.5*MDL

Table 1.2 - Victoria Point water chemistry. Data presented by plot type for all months.

Analytical				Non-Vegetated				Vegetated				Mixed Vegetation			
Parameter	Units	*MDL*	Water	Range	Mean	SD	n	Range	Mean	SD	n	Range	Mean	SD	n
Total P	mg/L	*0.005*	Surface	0.024 - 0.873	0.184	*0.282*	*14*	0.022 - 0.610	0.235	*0.203*	*18*	0.011 - 0.714	0.218	*0.271*	*7*
			Pore	0.025 - 1.756	0.475	*0.372*	*98*	0.021 - 1.581	0.471	*0.341*	*119*	0.025 - 1.420	0.319	*0.304*	*77*
Phosphate	mg/L	*0.025*	Surface	0.013 - 0.406	0.042	*0.105*	*14*	0.013 - 0.140	0.029	*0.034*	*18*	0.013 - 0.761	0.146	*0.276*	*7*
PO_4-P			Pore	0.0125 - 1.306	0.254	*0.271*	*98*	0.0125 - 1.125	0.183	*0.197*	*119*	0.013 - 0.697	0.151	*0.163*	*77*
Nitrite	mg/L	*0.006*	Surface	0.003 - 0.003	0.003	*0*	*14*	0.003 - 0.003	0.003	*0*	*18*	0.003 - 0.003	0.003	*0*	*7*
NO_2-N			Pore	0.003 - 0.003	0.003	*0*	*98*	0.003 - 0.003	0.003	*0*	*119*	0.003 - 0.003	0.003	*0*	*77*
Nitrate	mg/L	*0.009*	Surface	0.005 - 0.005	0.005	*0*	*14*	0.005 - 0.018	0.005	*0.003*	*18*	0.005 - 0.052	0.016	*0.019*	*7*
NO_3-N			Pore	0.005 - 0.198	0.007	*0.020*	*98*	0.005 - 0.018	0.005	*0.001*	*119*	0.005 - 0.240	0.008	*0.027*	*77*
pH	N/A	*N/A*	Surface	6.83 - 7.29	7.06	*0.23*	*4*	7.07 - 7.12	7.10	*0.03*	*3*	7.05 - 7.08	7.06	*0.02*	*2*
			Pore	6.71 - 7.06	6.84	*0.08*	*83*	6.61 - 7.21	6.79	*0.11*	*103*	6.36 - 6.92	6.67	*0.13*	*71*
Alkalinity	mg/L	*1.0*	Surface	173.2 - 230.3	194.4	*26.6*	*4*	140.5 - 150.6	146.7	*5.4*	*3*	137.5 - 206.3	171.9	*48.6*	*2*
as $CaCO_3$			Pore	181.5 - 388.9	307.3	*47.1*	*83*	149.9 - 368.5	283.2	*45.8*	*103*	135.5 - 399.4	228.7	*56.6*	*71*
Conductivity	µS/cm	*0.50*	Surface	442.40 - 525.60	468.73	*39.04*	*4*	347.90 - 368.50	357.53	*10.36*	*3*	350.50 - 484.50	417.50	*94.75*	*2*
			Pore	438.10 - 805.60	657.11	*80.11*	*83*	370.10 - 727.00	599.74	*71.41*	*103*	375.40 - 836.60	533.60	*102.62*	*71*
Total Al	mg/L	*0.005*	Surface	0.006 - 0.015	0.010	*0.003*	*7*	0.005 - 0.018	0.011	*0.004*	*8*	0.009 - 0.013	0.010	*0.002*	*4*
			Pore	0.003 - 0.020	0.009	*0.004*	*95*	0.003 - 0.025	0.011	*0.005*	*115*	0.005 - 0.075	0.018	*0.012*	*77*
Total Ba	mg/L	*0.003*	Surface	0.030 - 0.083	0.049	*0.018*	*7*	0.027 - 0.057	0.040	*0.011*	*8*	0.027 - 0.049	0.042	*0.010*	*4*
			Pore	0.039 - 0.096	0.065	*0.009*	*95*	0.033 - 0.079	0.062	*0.008*	*115*	0.032 - 0.086	0.050	*0.011*	*77*
Total Ca	mg/L	*0.005*	Surface	54.467 - 106.400	70.782	*17.402*	*7*	48.080 - 77.887	58.699	*12.599*	*8*	49.200 - 87.247	69.640	*15.903*	*4*
			Pore	66.416 - 134.800	101.524	*14.183*	*95*	55.556 - 138.376	95.368	*15.392*	*115*	53.260 - 147.936	83.594	*20.264*	*77*
Total Fe	mg/L	*0.002*	Surface	0.012 - 0.215	0.081	*0.078*	*7*	0.015 - 0.119	0.047	*0.041*	*8*	0.017 - 0.083	0.054	*0.034*	*4*
			Pore	0.028 - 0.336	0.101	*0.060*	*95*	0.031 - 0.291	0.116	*0.053*	*115*	0.0300 - 0.270	0.094	*0.046*	*77*
Total K	mg/L	*0.10*	Surface	1.82 - 3.64	2.35	*0.65*	*7*	0.82 - 2.72	1.44	*0.72*	*8*	0.83 - 1.71	1.32	*0.37*	*4*
			Pore	1.25 - 7.94	4.20	*1.30*	*95*	0.50 - 7.20	3.18	*1.18*	*115*	0.12 - 9.72	2.11	*2.05*	*77*
Total Mg	mg/L	*0.01*	Surface	5.07 - 7.66	5.73	*0.87*	*7*	3.91 - 6.53	4.68	*0.92*	*8*	4.41 - 6.67	5.67	*0.94*	*4*
			Pore	4.93 - 7.74	6.62	*0.55*	*95*	4.38 - 8.14	6.36	*0.68*	*115*	4.57 - 8.78	6.31	*1.02*	*77*
Total Mn	mg/L	*0.0002*	Surface	0.0148 - 0.4550	0.1579	*0.1770*	*7*	0.0144 - 0.2880	0.1012	*0.0908*	*8*	0.0147 - 0.0942	0.0559	*0.0341*	*4*
			Pore	0.0136 - 0.6708	0.2595	*0.1746*	*94*	0.0137 - 0.6264	0.2842	*0.1420*	*115*	0.0339 - 0.6388	0.1644	*0.0963*	*77*
Total Na	mg/L	*0.01*	Surface	17.25 - 20.24	18.92	*0.97*	*7*	18.21 - 20.68	19.43	*1.00*	*8*	16.18 - 20.18	18.15	*1.88*	*4*
			Pore	10.34 - 18.69	14.81	*2.22*	*94*	9.44 - 21.18	15.81	*2.31*	*115*	11.34 - 29.76	17.90	*3.81*	*77*
Total S	mg/L	*0.05*	Surface	1.07 - 2.73	1.76	*0.64*	*7*	0.85 - 1.96	1.31	*0.32*	*8*	1.13 - 2.11	1.59	*0.41*	*4*
			Pore	0.21 - 1.28	0.77	*0.25*	*94*	0.23 - 2.66	0.84	*0.32*	*115*	0.34 - 2.84	0.98	*0.43*	*77*
Total Sr	mg/L	*0.005*	Surface	0.146 - 0.267	0.185	*0.041*	*7*	0.134 - 0.216	0.163	*0.033*	*8*	0.134 - 0.223	0.182	*0.037*	*4*
			Pore	0.162 - 0.295	0.226	*0.026*	*94*	0.135 - 0.278	0.221	*0.025*	*115*	0.132 - 0.285	0.189	*0.035*	*77*
Total Zn	mg/L	*0.001*	Surface	0.001 - 0.009	0.006	*0.003*	*7*	0.006 - 0.016	0.011	*0.004*	*8*	0.002 - 0.012	0.007	*0.004*	*4*
			Pore	0.001 - 0.011	0.005	*0.003*	*94*	0.001 - 0.011	0.006	*0.002*	*115*	0.001 - 0.012	0.005	*0.002*	*77*
Dissolved Organic	mg/L	*0.5*	Surface	18.7 - 20.7	19.4	*0.7*	*6*	18.0 - 24.4	20.7	*2.3*	*8*	14.2 - 17.5	16.4	*1.9*	*3*
Carbon[a]			Pore	9.5 - 17.8	13.6	*2.2*	*32*	8.9 - 18.7	14.4	*2.2*	*47*	9.1 - 22.5	12.8	*3.5*	*26*

Notes

MDL = method detection limit; N/A = not applicable; SD = standard deviation; n = sample size; [a] = measured in July and August

<MDL results recorded as 0.5*MDL

VP surface water P concentrations (0.209 ± 0.239 mg/L) were higher than those reported in previous studies of Lake Simcoe, with total P values of 0.010 mg/L to 0.015 mg/L reported in the open waters of Lake Simcoe (Evans et al. 1996; Winter et al. 2007), a mean P concentration of 0.0102 mg/L reported in Atherley Narrows (Eimers et al. 2005) and an average P concentration of 0.04 mg/L reported along the shoreline of Lake Simcoe (Kilgour et al. 2008). Elevated P concentrations within VP surface waters may be attributed to urban P runoff sources and sediment P release from re-suspension events in the shallow wetland and sample collection zone (Søndergaard and Jeppesen 2007).

Alkalinity and conductivity were much higher in VP compared to MM in both surface and pore waters. Lake Simcoe is a hard-water lake, with average surface water alkalinity concentrations reported to range from 116 mg/L to 125 mg/L (Evans et al. 1996; Palmer et al. 2011), lower than the surface water concentrations found in both VP (166 mg/L) and MM (130 mg/L). Alkalinity was higher in the pore water vs. the surface water of both sites, reflective of the limestone bedrock geology of the area (Armstrong 2000). Average surface water conductivity in VP (407 µS/cm) was also higher than the average value reported in Lake Simcoe surface waters (345 µS/cm) (Evans et al. 1996). VP had lower pH values compared with MM in both surface and pore waters, with pore water pH decreasing with depth at both sites. Surface water pH in VP (7.12) was lower than the reported average value in the surface waters of Lake Simcoe of 8.3 (Evans et al. 1996), possibly due to the influence of vegetation and shallow wetland waters.

For both surface and pore water, total Al, Ba, Fe and Mg concentrations were higher in MM, while total Ca, K, Na and Sr concentrations were higher in VP, and similar total Mn, S and Zn concentrations were found in both sites. The Ca concentrations in the surface and pore waters of VP were much higher than in the waters of MM. Surface water Fe concentrations at both sites were lower than the pore water concentrations, a consistent trend with earlier pore water studies (Søndergaard 1990; Azcue et al. 1996; Pulatsu and Topcu 2009).

Complete results, including raw analytical data, graphs, results of statistical analyses and site photos are included in Appendix A (MM) and Appendix B (VP). Appendix A, Tables A.1.1 to A.1.5 present the mean values, standard deviations and sample sizes for the water variables analyzed in MM by 10 cm depth interval (10-0 cm above to 30-40 cm below the SWI) from July to October. Appendix B, Tables B.1.1 to B.1.6 present the mean values, standard deviations and sample sizes for the water variables analyzed in VP by 10 cm depth interval (10-0 cm above to 40-50 cm below the SWI) from August to October. Values below the method detection limit (MDL) are reported as half of the MDL value. Parameters with mean values less than the MDL are omitted from these tables with the exception of nitrate.

1.3.2 Water Chemistry Data Trends

Depth profiles of P and N concentrations in August and September are presented graphically in Figure 1.5. The total P and phosphate depth profile for all months was similar in VP and MM, with P increasing from the surface water to 10 - 30 cm below the SWI, and then decreasing to the maximum depth sampled. Nitrate was only present in measurable concentrations in August in MM and in September in VP, and followed a similar depth profile as P.

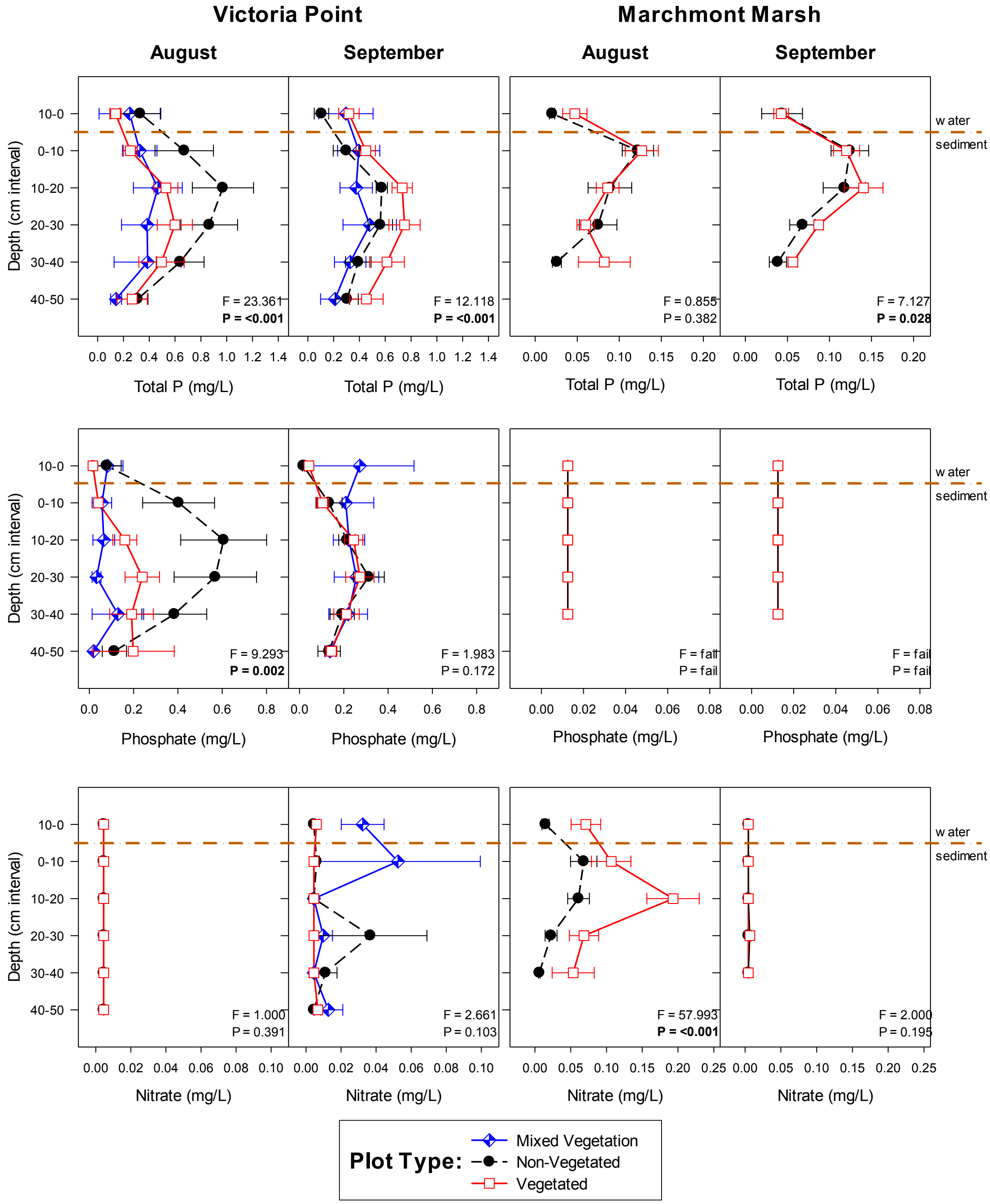

Figure 1.5 – VP and MM August and September P and N water profiles. Mean values plotted with error bars depicting one standard error. Dashed line indicates sediment-water interface. ANOVA (comparing all plots and depths shown per month) results significant at P ≤0.05.

The observed P concentration depth trend at both sites was consistent with the pore water trends reported by Søndergaard (1990), Moore et al. (1994), Templer et al. (1998) with *T. angustifolia* vegetation dominant, Reddy et al. (1999) and Bally et al. (2005). Nitrate in MM (August) had a similar depth trend to those reported for ammonium by Templer et al. (1998) in wetlands with *T. angustifolia* and *Phragmites australis* (Cav.) Trin. ex Steud. vegetation dominant, however Jiang et al. (2007) reported an opposite trend for total N in *Z. latifolia* dominant wetlands. This emphasizes that dominant vegetation communities influence N cycling and pore water dynamics.

Depth profiles of pH, alkalinity and conductivity concentrations in August and September are presented graphically in Figure 1.6.

The pH and conductivity depth profile for all months was similar in VP and MM. pH generally decreased from the surface water to the maximum depth sampled. The pH depth trends reported by Søndergaard (1990) from August to October, Moore et al. (1994) and Pulatsu and Topcu (2009) were similar to the observed depth trends in both VP and MM. Conductivity generally increased from the surface water to 10-20 cm below the SWI and then remained stable or decreased to the maximum depth sampled. The DOC depth trend for August was opposite between VP and MM, with DOC decreasing with depth in VP and increasing with depth in MM.

The alkalinity depth profile for all months was different between VP and MM. In VP alkalinity slightly increased or remained stable with depth, while in MM alkalinity increased from surface water to 10-20 cm below the SWI, and then decreased to the maximum depth sampled. The alkalinity depth trends reported by Moore et al. (1994) for *Menyanthes trifoliata* L. were similar to the observed trends in both VP and MM.

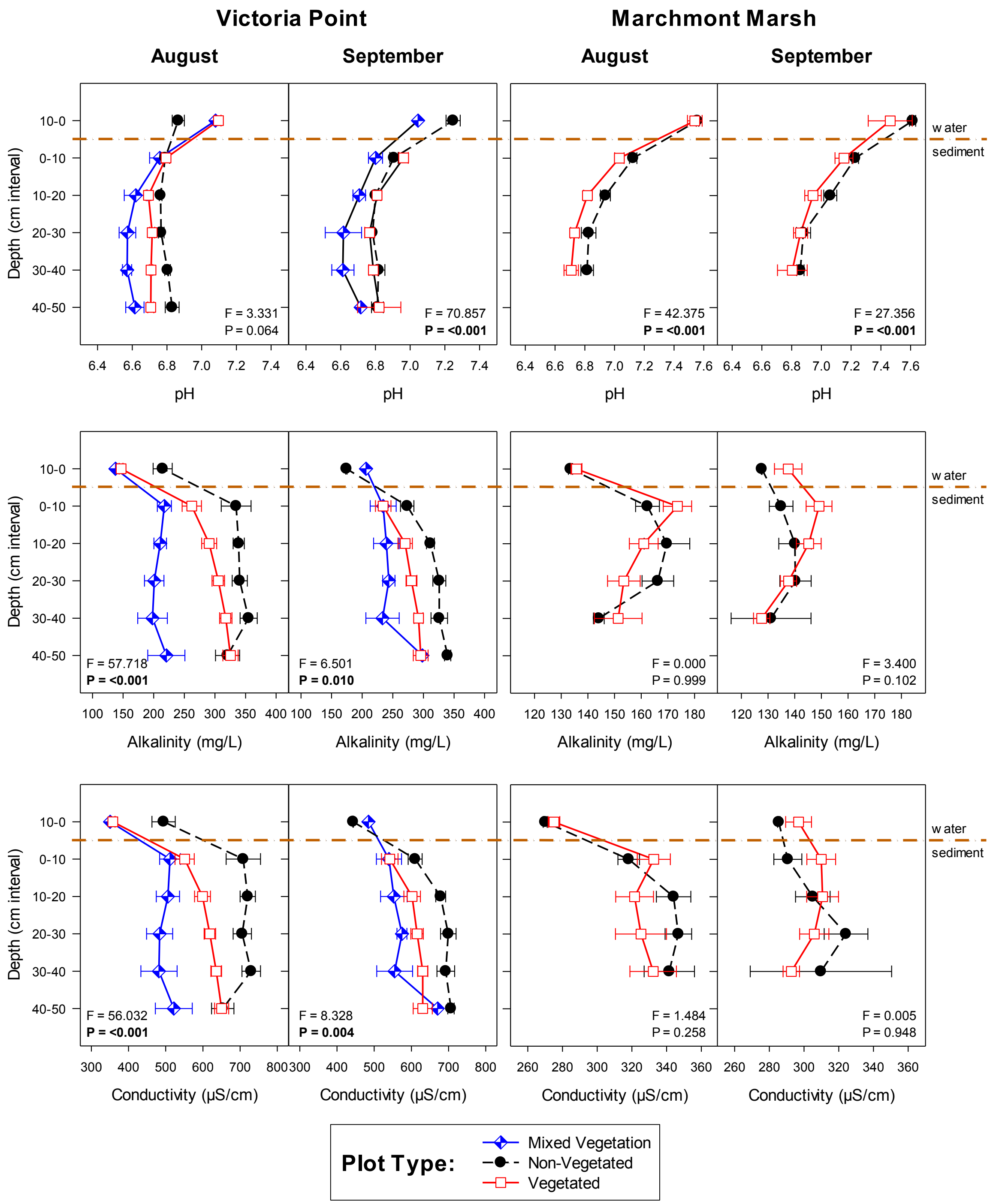

Figure 1.6 – VP and MM August and September pH, alkalinity and conductivity water profiles. Mean values plotted with error bars depicting one standard error. Dashed line indicates sediment-water interface. ANOVA (comparing all plots and depths shown per month) results significant at P ≤0.05.

Depth profiles of Ca, Fe, K and Mg concentrations in August and September are presented graphically in Figure 1.7. Depth profiles of Mn, Na, S and Zn concentrations in August and September are presented graphically in Figure 1.8.

The concentrations of Al, Ba, Ca, Fe, K, Mg, Na and Sr with depth for all months were different between VP and MM. In VP the Al concentration slightly increased or remained stable with depth, while in MM the Al concentration increased with depth. In VP August and in MM for all months, the Ba concentration increased from the surface water to 10-20 cm below the SWI and then remained stable or decreased to the maximum depth sampled. In VP during September and October, the Ba concentration increased or remained stable to the maximum depth sampled.

In VP the Ca concentration increased or remained stable with depth, while in MM the Ca concentration increased from the surface water to 10-20 cm below the SWI and then decreased to the maximum depth sampled. The total Ca concentration depth trend mirrored alkalinity at both sites. The total Ca concentration depth profile at VP was consistent with that reported by Azcue et al. (1996) and Moore et al. (1994) for November, while the Ca depth trend at MM was similar to that reported by Bally et al. (2005) and Moore et al. (1994) for September. In VP the Fe concentration increased from the surface water to 10-20 cm below the SWI and then decreased to the maximum depth sampled, while in MM the Fe concentration increased to the maximum depth sampled. The total Fe concentration depth profile at MM was consistent with the pore water trends reported by Søndergaard (1990), Moore et al. (1994) in vegetated plots, and Azcue et al. (1996), while the Fe depth profile at VP was similar to those reported by Moore et al. (1994) in non-vegetated plots, and Pulatsu and Topcu (2009).

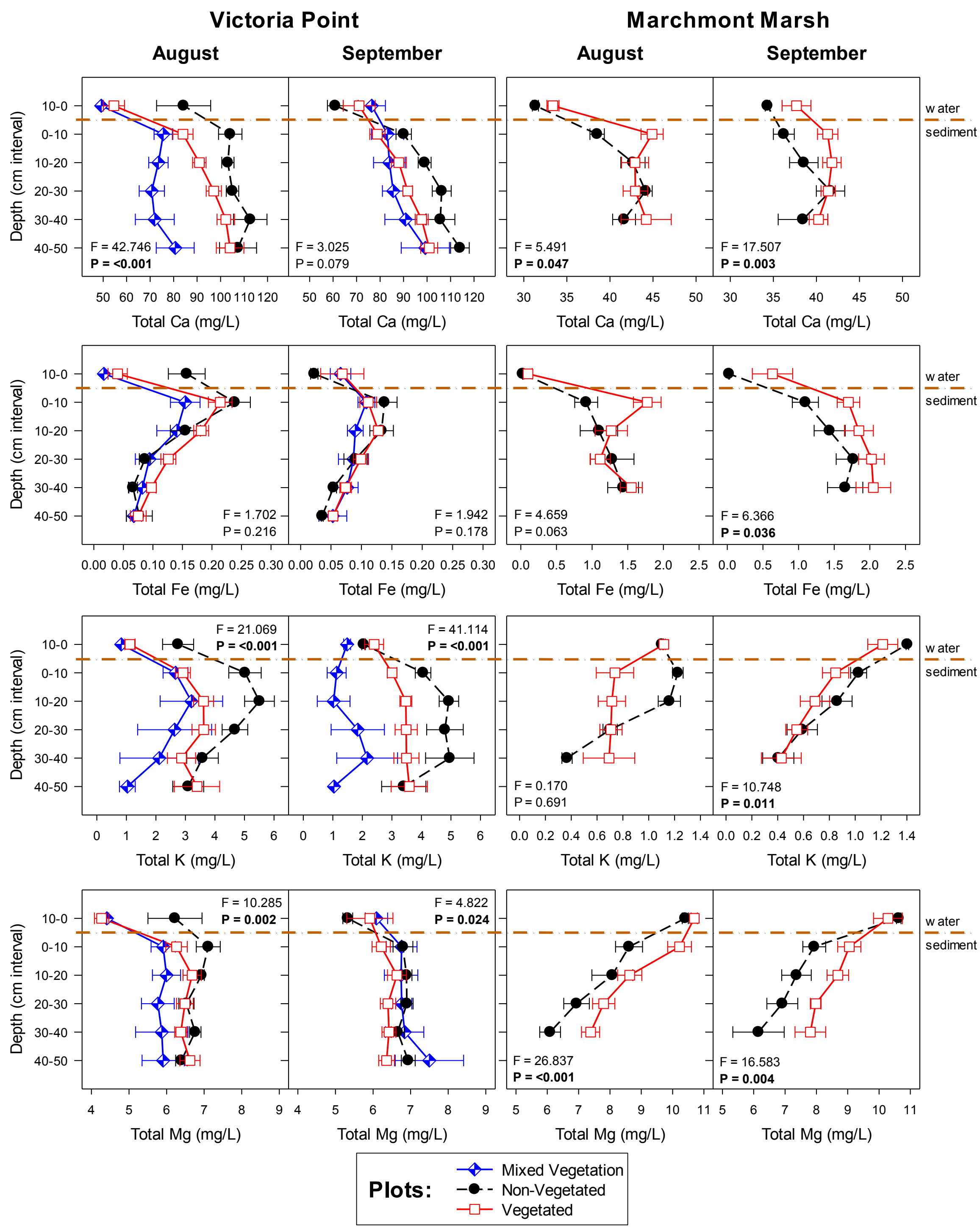

Figure 1.7 – VP and MM August and September Ca, Fe, K and Mg water profiles. Mean values plotted with error bars depicting one standard error. Dashed line indicates sediment-water interface. ANOVA (comparing all plots and depths shown per month) results significant at P ≤0.05.

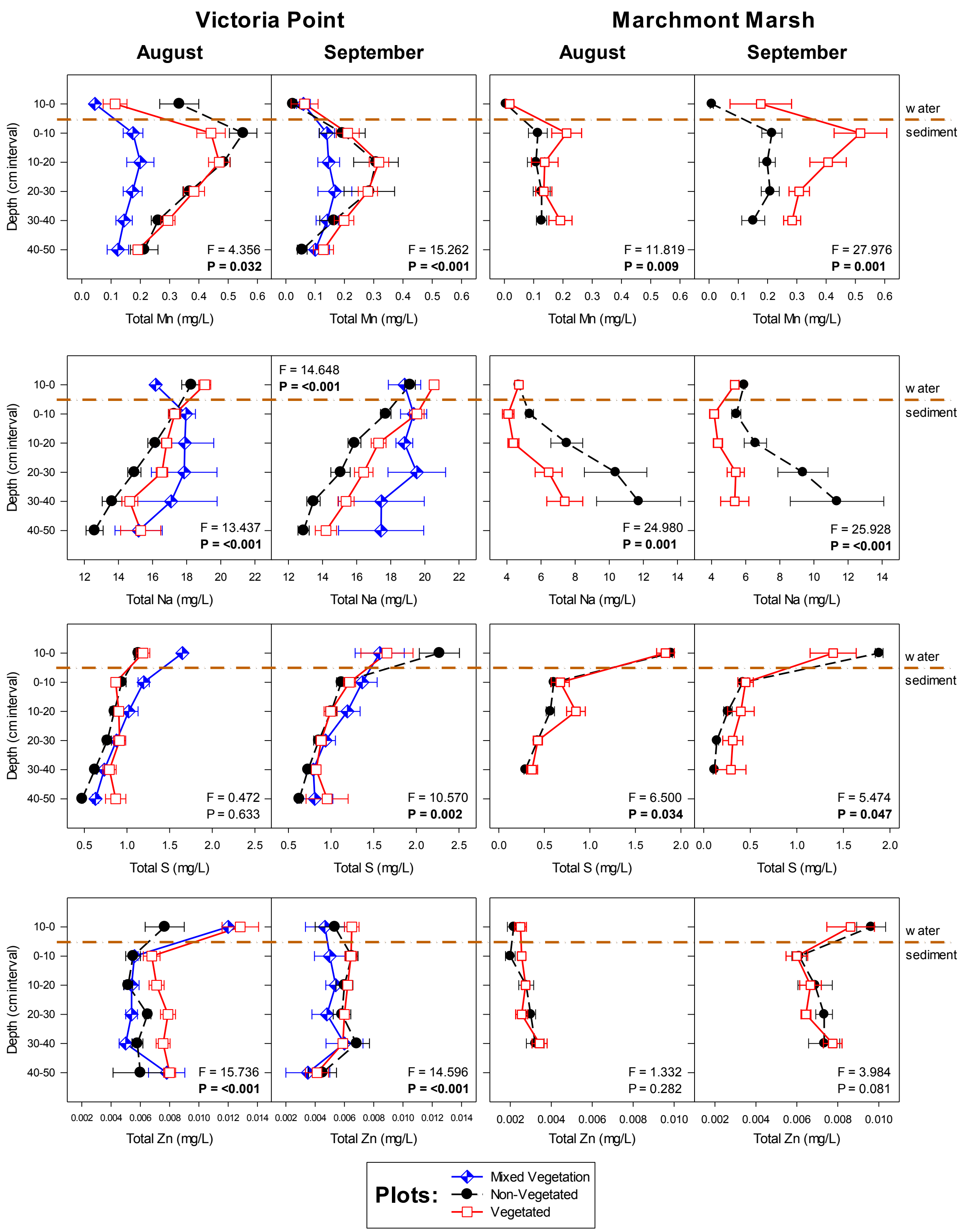

Figure 1.8 – VP and MM August and September Mn, Na, S and Zn water profiles. Mean values plotted with error bars depicting one standard error. Dashed line indicates sediment-water interface. ANOVA (comparing all plots and depths shown per month) results significant at P ≤0.05.

In VP the K concentration increased from the surface water to 10 cm below the SWI and then remained stable or decreased to the maximum depth sampled (except in the MV plot in October which increased with depth). In MM the K concentrations decreased with depth. The total K concentration depth profile at VP was similar to the pore water trend reported by Azcue et al. (1996).

In VP the Mg concentration slightly increased or remained stable with depth, while in MM the Mg concentration decreased with depth. The depth profile of total Mg concentrations at MM was similar to the pore water trend reported by Bally et al. (2005). In VP the Na concentration decreased with depth, while in MM the Na concentration increased with depth. The observed total Na concentration depth trend was consistent with the pore water trend reported by Bally et al. (2005), however neither site had a similar Na trend to that reported by Azcue et al. (1996). In VP during August and September, and MM in July, August and September, the Sr concentration increased from the surface water to 10-20 cm below the SWI and then remained stable or decreased to the maximum depth sampled. In October, the Sr concentration increased with depth in VP, while Sr decreased with depth in MM.

The concentrations of Mn, S and Zn with depth for all months were similar between VP and MM. The Mn concentration increased from the surface water to 10-20 cm below the SWI and then decreased or remained stable to the maximum depth sampled. The total Mn depth variation trend was similar to the pore water trend reported by Moore et al. (1994); this trend was different from the pore water trend reported by Azcue et al. (1996) for Lake Erie waters where Mn increased with depth. The S concentration decreased with depth, while the Zn concentration remained stable or slightly increased with depth.

Complete results on data trends between plots (by month) are tabulated along with statistical values in Appendix A, Table A.1.9 (MM) and Appendix B, Table B.1.10 (VP). Data trends within plots (i.e. monthly trends) are tabulated along with statistical values in Appendix A, Table A.1.10 (MM) and Appendix B, Table B.1.11 (VP). Statistical results are tabulated in Appendix A, Tables A.1.11, A.1.12 and A.1.13 (MM) and Appendix B, Tables B.1.12, B.1.13 and B.1.14 (VP). Results were considered significant at $P \leq 0.05$.

1.3.3 Sediment Chemistry

Complete sediment analytical results are included in Appendix A, Table A.1.7 (MM) and in Appendix B, Table B.1.8 (VP). Table 1.3 presents the values, mean values and standard deviations for the sediment variables analyzed.

Table 1.3 – Sediment chemistry data.

			Site				
Analytical			Victoria Point		Marchmont Marsh		
Parameter	Units	*DL*	Value	n	Mean	SD	n
pH	N/A	*N/A*	--	*0*	6.48	*0.08*	*2*
Conductivity	µS/cm	*1.0*	--	*0*	155.3	*3.6*	*2*
Total Silicon	µg/g	*1.20*	157.65	*1*	--	--	*0*
Total P	µg/g	*3.20*	1 433.33	*1*	506.81	*385.65*	*2*
Total Al (%)	µg/g	*0.00012*	0.25	*1*	0.91	*0.53*	*2*
Total As	µg/g	*2.00*	6.16	*1*	1.00	*0*	*2*
Total Ba	µg/g	*2.00*	47.71	*1*	108.42	*102.99*	*2*
Total Ca (%)	µg/g	*0.000004*	1.92	*1*	0.80	*0.59*	*2*
Total Fe (%)	µg/g	*0.00002*	0.54	*1*	1.21	*0.55*	*2*
Total K	µg/g	*0.40*	615.11	*1*	693.12	*638.23*	*2*
Total Mg (%)	µg/g	*0.00002*	0.16	*1*	0.25	*0.19*	*2*
Total Mn	µg/g	*0.04*	107.48	*1*	134.25	*108.39*	*2*
Total Na	µg/g	*0.40*	456.72	*1*	253.86	*63.83*	*2*
Total S (%)	µg/g	*1.20*	1.25	*1*	0.45	*0.55*	*2*
Total Sr	µg/g	*0.40*	53.23	*1*	21.48	*15.41*	*2*
Total Ti	µg/g	*2.00*	112.08	*1*	322.64	*153.44*	*2*
Total Zn	µg/g	*0.20*	92.69	*1*	75.14	*75.73*	*2*

Notes: DL = method detection limit; N/A = not applicable; n = sample size; SD = standard deviation; -- = not analyzed; Total Metal (%) = value/mean/SD values x 10^{-4}; <DL results recorded as 0.5*DL

Similar to water, total recoverable sediment P concentrations were higher in VP (1,433 µg/g) compared with MM. Kilgour et al. (2008) reported a lower average total P concentration (447 µg/g) in the shoreline sediments of Lake Simcoe, while Boström (1984) reported a higher average total P concentration in the sediments of nine eutrophic lakes (2,296 µg/g). It is interesting to note that the sediment of eutrophic water bodies examined by Søndergaard (1989) and Søndergaard et al. (2003) demonstrated a total P concentration depth trend similar to the pore water trend in this study, suggesting that the observed pore water nutrient trends may have been mirrored in the sediments.

Total recoverable Al, Ba, Fe, K, Mg, Mn and Ti concentrations were higher in the sediment samples of MM, while As, Ca, Na, S, Sr and Zn concentrations were higher in the sediment samples of VP. Landre et al. (2011) reported much higher Al, Ba, Fe and Mn concentrations and similar Zn concentrations in the sediments of Lake Simcoe's northern outlet compared to MM and VP. Boström (1984) reported similar Ca concentrations and much higher Al and Fe concentrations in eutrophic sediments compared with MM and VP. The sediment samples from eutrophic water bodies as examined by Søndergaard (1989) and Trolle et al. (2009) demonstrated similar depth profiles for total Fe and Ca concentrations to the pore water trends in this study.

1.3.4 Vegetation Chemistry

Table 1.4 (MM) and Table 1.5 (VP) present the values, mean values and standard deviations for the vegetation chemistry analyses. Complete vegetation analytical results are included in Appendix A, Table A.1.8 (MM) and in Appendix B, Table B.1.9 (VP).

Table 1.4 – Marchmont Marsh wild rice vegetation chemistry data.

Analytical Parameter	Units	*DL*	Inflorescence Mean	*SD*	Stem Mean	*SD*	Leaf Mean	*SD*	Root Mean	*SD*	n	tn
P (%)	µg/g	*0.00008*	0.164	*0.065*	0.167	*0.045*	0.137	*0.001*	0.111	*0.014*	*2*	*23*
N	% N	*0.01*	0.57	*0.09*	0.45	*0.10*	0.71	*0.22*	0.58	*0.01*	*2*	*23*
Al	µg/g	*5.00*	32.94	*38.35*	50.95	*55.37*	436.13	*487.73*	2717.25	*728.67*	*2*	*23*
Ba	µg/g	*10.00*	7.52	*3.56*	10.75	*8.13*	61.52	*25.00*	92.28	*5.62*	*2*	*23*
Ca (%)	µg/g	*0.00001*	0.179	*0.088*	0.150	*0.112*	0.780	*0.197*	0.687	*0.059*	*2*	*23*
Fe (%)	µg/g	*0.00001*	0.014	*0.010*	0.023	*0.019*	0.136	*0.128*	1.032	*0.019*	*2*	*23*
K (%)	µg/g	*0.0005*	0.790	*0.234*	2.090	*0.533*	0.902	*0.261*	0.337	*0.038*	*2*	*23*
Mg	µg/g	*0.10*	1360.29	*51.97*	1238.29	*304.41*	2125.04	*314.66*	1993.54	*352.85*	*2*	*23*
Mn	µg/g	*0.01*	118.88	*84.11*	241.30	*161.01*	1623.50	*388.91*	489.43	*226.38*	*2*	*23*
Na (%)	µg/g	*0.00001*	0.085	*0.038*	1.061	*0.065*	0.962	*0.345*	0.382	*0.082*	*2*	*23*
S (%)	µg/g	*0.0003*	0.084	*0.016*	0.101	*0.021*	0.156	*0.042*	0.489	*0.082*	*2*	*23*
Si	µg/g	*0.50*	139.86	*16.26*	165.76	*29.42*	165.76	*4.88*	176.39	*25.21*	*2*	*23*
Sr	µg/g	*0.10*	4.96	*2.79*	5.48	*3.10*	21.34	*4.55*	20.97	*1.26*	*2*	*23*
Ti	µg/g	*0.95*	1.64	*1.64*	2.39	*2.71*	14.49	*14.84*	100.95	*30.48*	*2*	*23*
Zn	µg/g	*0.10*	7.89	*0.60*	6.24	*2.47*	11.85	*7.91*	39.33	*8.86*	*2*	*23*

Notes: DL = method detection limit; tn = total number of plants analyzed; n = sample size; SD = standard deviation; % = mean and SD values x 10^{-4}; <DL results recorded as 0.5*DL

Table 1.5 – Victoria Point wild rice vegetation chemistry data.

Analytical Parameter	Units	*DL*	Inflorescence	Stem	Leaf	Root	tn
P (%)	µg/g	*0.00008*	0.114	0.114	0.148	0.137	*10*
N	% N	*0.01*	0.59	0.45	0.71	0.89	*10*
Al	µg/g	*5.00*	20.33	21.95	377.55	300.65	*10*
Ba	µg/g	*10.00*	5.00	5.00	28.99	15.73	*10*
Ca (%)	µg/g	*0.00001*	0.428	0.615	1.040	0.676	*10*
Fe (%)	µg/g	*0.00001*	0.012	0.014	0.102	1.187	*10*
K (%)	µg/g	*0.0005*	0.607	1.407	0.255	0.377	*10*
Mg	µg/g	*0.10*	924.83	840.54	776.54	712.04	*10*
Mn	µg/g	*0.01*	156.33	223.75	903.00	193.95	*10*
Na (%)	µg/g	*0.00001*	0.283	0.963	0.157	0.984	*10*
S (%)	µg/g	*0.0003*	0.127	0.217	0.338	0.621	*10*
Si	µg/g	*0.50*	237.25	180.41	157.81	54.31	*10*
Sr	µg/g	*0.10*	11.83	17.38	28.42	19.88	*10*
Ti	µg/g	*0.95*	2.17	1.33	14.63	12.78	*10*
Zn	µg/g	*0.10*	12.17	4.58	20.24	87.02	*10*

Notes: DL = method detection limit; tn = total number of plants analyzed; % = values x 10^{-4}; <DL results recorded as 0.5*DL; single sampling event.

Northern wild rice plants collected in MM exhibited more vigorous growth, with higher biomass than the plants collected from VP. The total dry weight of 10 plants collected in September from VP was 6.96 g and from MM was 41.62 g. The highest biomass in the wild rice plants was contributed by the stems, followed by the roots, leaves and inflorescence. The inflorescence of plants collected in VP were observed to contain few seeds, with the leaves having been damaged by waterfowl.

In MM, 53% of wild rice tissue P was found in the stems and leaves, followed by 28% in the inflorescence. Nitrogen followed a similar trend, with 50% of wild rice tissue N in the stems and leaves, followed by 25% in the inflorescence. In VP, 51% of wild rice tissue P was found in the stems and leaves, followed by 22% in the inflorescence. Nitrogen followed a similar trend, with 44% of wild rice tissue N found in the stems and leaves, followed by 22% in the inflorescence.

The total plant tissue concentrations of Al, Ba, K, Mg, Mn, Na and Ti were higher in MM than in VP, while the total plant tissue concentrations of Ca, Fe, S, Si, Sr and Zn were higher VP than in MM. The As concentration in the plant tissues of both sites were less than the MDL for all samples. In the majority of plant tissue samples, the concentrations of metals were highest in the roots.

1.4 Discussion

The main nutrient of concern in VP is P, with the surface water P concentrations indicative of a eutrophic state (Wetzel 2001) and elevated P concentrations found throughout the pore water and sediments. The retention of P within the sediments of VP (discussed in the following sections) is dependent on the surface and pore water chemistry of the wetland, as well as the seasonal influence of vegetation growth.

1.4.1 Water/Sediment Chemistry and Nutrient Retention

P retention is highest in waters with high Ca, Fe and Al concentrations as well as high alkalinity (Reddy et al. 1999), with calcite and alum frequently used in water treatment to bind and retain P (Galvez-Cloutier et al. 2006). House (1999) reported that P precipitation with calcite is dependent on temperature, pH and the concentration of other precipitating chemicals, with Boström et al. (1988) stating that high pH values favour this process. The high surface water alkalinity and concentrations of Ca and Fe in VP may contribute to P retention, however seasonal temperature variations and the near-neutral pH (6.83-7.29) may decrease this ability (Mitsch and Gosselink 2007). Boström et al. (1988) suggested that the adsorption of P onto precipitated $CaCO_3$ may occur favourably in sediment pore waters due to the presence of elevated P concentrations. While increased P concentrations were present in the pore waters of VP, the observed decrease in pH with depth (to a minimum value of 6.36) may have reduced $CaCO_3$ precipitation and countered the effect of additional P availability.

The surface water pH in VP (6.83 - 7.29) was lower than the reported pH value (8 - 10) required to induce P liberation from the sediment (Boström and Pettersson 1982). Shaw and Prepas (1990) reported that a pore water Fe to P ratio greater than 1.8 prevents the transfer of P into the water column (Pulatsu and Topcu 2009), while Jensen et al. (1992) reported that a sediment Fe to P ratio greater than 15 was indicative of a high sediment P retention capacity (Søndergaard et al. 2003). In VP the pore water and sediment Fe to P ratios (0.24 and 3.76, respectively) are far below these thresholds, indicating that Fe alone in the pore water and sediment of VP is not adequate to retain P.

1.4.2 *Vegetation Influence*

As shown in Figures 1.5, 1.6, 1.7 and 1.8, the presence of vegetation influenced pore water concentrations and monthly trends for most parameters, with vegetation altering concentrations throughout the depth profile (i.e. causing a shift in overall depth profiles). In VP (Table 1.2), more pronounced differences were observed in the pore water of the mixed-vegetation plot compared with the vegetation plots, indicating differing pore water dynamics with a change in dominant vegetation (i.e. *N. odorata* vs. *Z. palustris*). While the following discussion includes findings from both VP and MM, the influence of *Z. palustris* on pore water concentration/monthly trends was more pronounced in MM (Table 1.1) due to the vigour of the natural wild rice stand (vs. the seeded plots in VP). Vegetation influences were observed up to the maximum depth sampled (80 cm below the SWI), suggesting that vegetation growth influences sediment pore water chemistry beyond the rooting zone, altering pore water concentration gradients.

1.4.2.1 Northern Wild Rice Water Chemistry Influence

Northern wild rice vegetation influenced the amount of P and N in wetland waters throughout the growing season (Figure 1.5; Tables A.1.9, A.1.10, B.1.10 and B.1.11). During the summer (time of greatest biomass increase and N, K and P uptake (Day and Lee 1990)), P concentrations were lower in vegetated vs. non-vegetated plots. This trend was reversed in the fall, implying that wild rice vegetation was no longer assimilating P within its tissues and potentially acting as a P source through decomposition. Moore et al. (1994) reported a similar trend, observing that plots vegetated with *M. trifoliata* contained lower concentrations of P (compared with non-vegetated plots) in August/September, with this trend reversing in November.

An opposite trend was observed in the N concentrations in MM plots, with N increasing in wild rice vegetated plots in the summer and then decreasing in the fall (Figure 1.5; Tables A.1.9, A.1.10, B.1.10 and B.1.11). This result was unexpected since other studies have shown emergent macrophytes to reduce N throughout the growing season (Hoagland et al. 2001; Kao et al. 2003; Maine et al. 2005*a*; Jiang et al. 2007), and the majority of N uptake by wild rice occurring in the spring/summer (Walker et al. 2006). A potential explanation for this trend is that the N held in below-ground wild rice litter from the previous growing season was released through decomposition processes in the spring/summer, with this excess N subsequently removed through denitrification in the fall (Sain 1984; Walker et al. 2010).

Wild rice vegetation generally decreased pore water pH, alkalinity and conductivity (Figure 1.6; Tables 1.1, 1.2, A.1.9, A.1.10, B.1.10 and B.1.11). A similar water pH trend in vegetated plots was observed by Søndergaard (1990), Moore et al. (1994) and Lee and McNaughton (2004). Conlin and Crowder (1989) determined that three common emergent wetland species, *T. latifolia*, *P. australis* and *Carex rostrata* Stokes, all lowered their rhizosphere pH through oxidation. This acidification would be increased in the fall through vegetation decomposition (Søndergaard 1990), consistent with the monthly pH trend observed in MM. A similar alkalinity trend was reported by Moore et al. (1994) between the pore waters of vegetated and non-vegetated plots. Lee and McNaughton (2004) observed an opposite conductivity trend in the surface waters of a wild rice vegetated area, however pore water trends were not examined.

Wild rice vegetation generally decreased pore water Al and K (Figures 1.7, A.2.8 and B.2.8; Tables 1.1, 1.2, A.1.9, A.1.10, B.1.10 and B.1.11). K was likely assimilated into the biomass of wild rice vegetation (Day and Lee 1990), while Al (present in low concentrations) may have been adsorbed during the growing season onto wild rice iron root plaques (Batty et al. 2002). Wild rice vegetation generally increased pore water Ba, Fe, Mg, Mn and Zn (Figures 1.7, 1.8, A.2.9 and B.2.9; Tables 1.1, 1.2, A.1.9, A.1.10, B.1.10 and B.1.11). Lee and McNaughton (2004) found a similar Fe trend and an opposite S trend in the surface waters of wild rice vegetated areas. An opposite Fe and Mn concentration trend was reported by Moore et al. (1994) between the pore waters of vegetated and non-vegetated plots. If the observed decrease in pore water pH extended beyond the oxidized root zone, this could explain the observed increase in Fe and Mn concentrations (more soluble in lower pH conditions (Wetzel 2001)). Pore water Mg concentrations may have been influenced by below-ground wild rice litter decomposition releasing Mg (Sain 1984).

Monthly and site-specific trends were observed in Ca, Na, S and Sr (Figures 1.7, 1.8, A.2.17 and B.2.17; Tables 1.1, 1.2, A.1.9, A.1.10, B.1.10 and B.1.11). Summer Ca and Sr concentrations were lower in wild rice vegetated vs. non-vegetated plots, with this trend reversed in the fall. Lee and McNaughton (2004) reported a similar monthly Ca trend in the surface waters of wild rice vegetated areas, however Moore et al. (1994) reported lower Ca concentrations in the pore waters of vegetated and non-vegetated plots throughout the growing season. Pore water Ca concentrations may have been influenced by below-ground wild rice litter decomposition, releasing Ca in the summer season (Sain 1984). Lee and McNaughton (2004) found that Sr concentrations increased throughout the growing season in the surface waters of wild rice vegetated areas, however limited literature is available on the effect of vegetation on Sr concentrations. Summer

S concentrations were higher in wild rice vegetated vs. non-vegetated plots, with this trend reversed in the fall. The S held in below-ground wild rice litter from the previous growing season may have been released through decomposition in the summer, with this excess S precipitating as FeS later in the fall with the increased available pore water Fe (Sain 1984; Søndergaard 1990). Wild rice vegetation had an opposite effect on pore water Na concentrations in VP vs. MM; limited literature is available on fresh water Na concentration trends and the effect of vegetation.

1.4.2.2 Northern Wild Rice Tissue Assimilation

Similar to the findings of Oelke et al. (2000), approximately half of the wild rice tissue P and N was found in the stems and leaves, followed by approximately a quarter of tissue P and N in the inflorescence (Tables 1.4 and 1.5). The maximum plant tissue total P concentration in this study (5,790 µg/g in MM) was much higher than the P concentrations reported for *Z. palustris* by Malvick and Percich (1993) and Lee and McNaughton (2004). Similar to the findings of Bennett et al. (2000) who studied heavy metal uptake in *Z. palustris*, metal concentrations were highest in the root tissues. After the growing season, Sain (1984) found that dead/fallen wild rice plants release the majority of their nutrients in the first three weeks of decomposition (late fall), with 98% of K, 82 % Ca, 81% P, 79% S, 72% Mg and 57% N released after 350 days.

1.4.3 *Northern Wild Rice and Nutrient Retention*

Wild rice contributed to nutrient retention during the growing season in both wetlands by modifying rhizosphere chemistry. Wild rice vegetation reduced P availability in sediment pore waters in the summer (Figure 1.5; Tables 1.1, 1.2, A.1.9, A.1.10, B.1.10 and B.1.11) when the majority of problems associated with eutrophication are experienced (Reddy et al. 1999). Wild rice contributed directly to P and N retention through nutrient assimilation in its tissues (Tables 1.4 and 1.5), and potentially through the development of Fe and Mn oxide plaques and Al phosphate precipitates on its roots. P adsorption onto FeOOH appears to be the primary process governing sediment P retention when high concentrations of Fe are present (Reddy et al. 1999; Søndergaard et al. 2003; Maine et al. 2005*b*; Olli et al. 2009). Mn oxide plaques (which can adsorb P) and Al phosphate precipitates are often found on macrophyte roots with an oxidized rhizosphere (Christensen and Sand-Jensen 1998; Batty et al. 2002). Jorgenson et al. (2013 *Botany - in press*) found that substantial iron plaques (i.e. precipitated FeOOH) formed on the roots of northern wild rice were composed mainly of Fe, O, Al and K, however P was not found to be included in the plaques. Wild rice also indirectly contributed to nutrient retention through decreasing pore water pH (Tables 1.1 and 1.2), and subsequently increasing the availability of pore water Fe and Mn for P adsorption. Wild rice also likely contributed to enhanced denitrification though decomposition in the wetland however plant decomposition was not examined in this study.

After the growing season, nutrients will be released from senesced wild rice through decomposition and leaching (Sain 1984; Reddy et al. 1999; Mitsch and Gosselink 2007). Since wild rice is an economically viable cultivated species, plant harvest at the end of the growing season may provide a permanent nutrient removal mechanism (Jiang et al. 2007). Seed harvest alone would permanently remove some nutrients from the wetland (Keenan and Lee 1988). The vegetation analysis in this study (Tables 1.4 and 1.5) indicates that approximately 10% of the total P and N found in wild rice plant tissue could be removed through seed harvest (estimate allows for 15% of the analyzed inflorescence N and P remaining in litter and fallen seed). While this quantity could become significant over several years (Keenan and Lee 1988), harvesting the entire plant at the end of the growing season (in fall, prior to senescence) would result in the largest nutrient removal.

Unlike perennial species, P and N remain in wild rice plant tissues until the end of the growing season since plants regenerate from seed the following year (Morris and Lajtha 1986). With proper harvesting and management techniques, northern wild rice grown in eutrophic water bodies could contribute to nutrient reduction strategies. Macrophyte harvesting has been effectively used in eutrophication remediation strategies, with these efforts enhanced through the use of economically valuable plants (Jiang et al. 2007; Pulatsu and Topcu 2009). Since northern wild rice is a valuable cultivated crop that requires little effort to be uprooted and removed from a water body, additional study appears warranted to examine to the potential of wild rice harvest as an eutrophication reduction strategy.

1.4.4 *Conclusion*

Nutrient and metal distribution within wetland waters is highly site dependent, with vegetation type and distribution adding to this variability. Northern wild rice growth alters sediment pore water chemistry, contributing to nutrient retention during the growing season. Harvesting northern wild rice vegetation (including the economically viable seed) could present a method for permanent nutrient removal in eutrophic water bodies. With proper harvesting and management techniques, northern wild rice grown in eutrophic water bodies could contribute to nutrient reduction strategies and present a viable phytoremediation species for nutrient removal efforts.

CHAPTER 2

Electron microscopy study of iron plaques on the roots of northern wild rice (*Zizania palustris*)

2.1 Introduction

As an adaptation to the anaerobic wetland environment, many aquatic macrophytes transport oxygen from their aerial biomass to the below-ground roots, aerating the surrounding sediment (through radial oxygen loss) and creating an aerobic rhizosphere (Armstrong 1964; Conlin and Crowder 1989; Mitsch and Gosselink 2007). Numerous biogeochemical processes occur within this oxidized rhizosphere, including the oxidation of iron from its ferrous (Fe^{2+}) to ferric (Fe^{3+}) form (Crowder and MacFie 1986; Begg et al. 1994; Christensen and Wigand 1998). This reaction frequently results in the precipitation of ferric hydroxide onto root surfaces, visible as an orange-brown coating or plaque on wetland plant roots (Mendelssohn and Postek 1982; Crowder and MacFie 1986; St-Cyr et al. 1993; Caetano and Vale 2002).

The deposition of iron plaque depends on many biotic and abiotic factors, including plant anatomy, microbial activity and reactive iron pool availability in the sediment (Neubauer et al. 2007; Povidisa and Holmer 2008). The structure, composition and function of iron root plaques has been studied on several emergent aquatic macrophytes, including *Typha latifolia* L. (Taylor et al. 1984; Ye et al. 1998), *Phragmites australis* (Cav.) Trin. ex Steud. (Batty et al. 2000), *Juncus effusus* L. (Weiss et al. 2005; Neubauer et al. 2007) and *Oryza sativa* L. (Bacha and Hossner 1977; Green and Etherington 1977; Chen et al. 1980*a*, 1980*b*; Johnson-Green and Crowder 1991; Liang et al. 2006; Zhou and Shi 2007; Chen et al. 2008; Deng et al. 2010; Liu et al. 2011). Snowden and Wheeler (1995) examined iron hydroxide precipitation on the roots of 44 wetland species and found that only certain species had the ability to form iron root plaques, with iron-tolerant monocotyledons producing the most intense plaques. Iron-oxidizing and iron-reducing bacteria also contribute to the formation and reduction of iron root plaque, suggesting that a localized iron cycle exists within the wetland plant rhizosphere (St-Cyr et al. 1993; Mendelssohn et al. 1995; Neubauer et al. 2002; Weiss et al. 2003; Chen et al. 2008).

Iron plaques are mainly composed of amorphous iron hydroxides and the crystalline ferric hydroxide particles lepidocrocite (γ-FeOOH) and goethite (α-FeOOH) (Bacha and Hossner 1977; Chen et al. 1980*a*; Crowder and MacFie 1986; St-Cyr et al. 1993). Other elements commonly found incorporated into plaques include Al, Ca, Mn, P and silicate impurities such as quartz and clay (Chen et al. 1980*a*; St-Cyr et al. 1993; Batty et al. 2002; Hupfer and Dollan 2003).

Iron plaques usually appear as unevenly distributed precipitates on the surface of wetland plant roots (Mendelssohn and Postek 1982; Batty et al. 2002). The structure of iron plaques range from porous and thin to dense and thick, depending on the amount of iron hydroxide accumulated (Bacha and Hossner 1977; Chen et al. 1980*a*; St-Cyr and Campbell 1996). Thin iron plaques occur as amorphous layers of precipitate that take the form of the root epidermis (Bacha and Hossner 1977; Batty et al. 2002). Thick iron plaques can range from 1 μm to 15 μm coatings (St-Cyr et al. 1993), up to 1 mm thick crusts (Hupfer and Dollan 2003) and 4 mm thick rhizoconcretions (Caetano and Vale 2002) in some environments. Iron plaques have commonly been observed to penetrate the root epidermis cells of wetland plants, while in some species plaques can penetrate up to the root cortex cells (Green and Etherington 1977; Taylor et al. 1984). Iron hydroxides often fill open cell cavities in the root epidermis and have been observed to form complete casts of former cells (Chen et al. 1980*b*; Taylor et al. 1984).

Numerous studies have investigated the potential function of iron root plaques in sequestering heavy metals such as As, Cd, Cu, Ni, Pb and Zn (St-Cyr and Campbell 1996; Ye et al. 1997; Ye et al. 1998; Batty et al. 2002; Deng et al. 2010; Li et al. 2010; Liu et al. 2011) and nutrients including P (Chambers and Odum 1990; Christensen and Sand-Jensen 1998; Hupfer and Dollan 2003; Liang et al. 2006; Jiang et al. 2009; Xu et al. 2009). This sequestration ability is attributed to the high adsorption capacity of iron hydroxides, resulting in the adsorption or co-precipitation and incorporation of a number of elements into plaques (Chen et al. 1980*a*; Liu et al. 2011). The capacity of iron plaque to influence heavy metal or nutrient uptake is highly variable and depends on a number of factors including the amount of iron plaque on the root, plant species/cultivar, root age, sediment chemistry and the contaminant/nutrient of interest (Otte et al. 1989; Ye et al. 1997; Ye et al. 1998; Zhou and Shi 2007; Xu et al. 2009; Deng et al. 2010; Liu et al. 2011).

Plaques may also function as nutrient reservoirs, with P bound in the plaque available to plants when required (Christensen and Sand-Jensen 1998; Liang et al. 2006; Chen et al. 2008; Xu et al. 2009), however this function is limited by the amount of plaque present on the root since excessive amounts can act as a physical barrier to P uptake (Xu et al. 2009). The potential interaction between P and iron plaques on wetland plant roots is of particular interest in its application to bioremediation efforts in nutrient-impacted water bodies. Several studies have concluded that plants with a propensity to form iron root plaques are advantageous to such efforts (Chambers and Odum 1990; Hupfer and Dollan 2003; Xu et al. 2009).

This study examined iron root plaques on northern wild rice (*Zizania palustris* L.). Northern wild rice is an emergent annual aquatic grass that grows in shallow lake waters and slow-moving rivers across eastern and north-central North America (Aiken et al. 1988; Painchaud and Archibold 1990). *Zizania* sp. grow in a wide range of water and sediment types, are relatively stress tolerant and have a high potential for root-zone aeration (Aiken et al. 1988; Tanner 1996). Iron plaques have been observed on the roots of *Zizania* sp. (Yamasaki 1987; Aiken et al. 1988; Xu et al. 2009) which are known to oxidize the rhizosphere through their well-defined system of aerenchyma (Stover 1928; Lee and McNaughton 2004). Wild rice roots are up to 4 mm in diameter, lack root hairs, have a hypodermis (acting as the functional epidermis in older roots), possess a band of supportive sclerenchyma and a cortex with extensive aerenchyma (Stover 1928).

The objective of this study was to examine the deposition, composition and structure of iron plaque formed on the roots of *Z. palustris*. The goal was to increase our understanding of the anatomy of northern wild rice roots, their interactions with surrounding sediments and potential contribution to bioremediation efforts. To the knowledge of the Authors, northern wild rice root anatomy has not been examined through SEM, nor have iron root plaques been studied in this species.

2.2 Materials and Methods

2.2.1 Study Area

Five freshwater lakes/wetlands were selected across Ontario, Canada that support annual stands of northern wild rice (Figure 2.1). Study sites were chosen from a range of water bodies in Ontario that have been a focus of ongoing/historic wild rice research. Partridge Crop Lake (48° 43' 33" N, 92° 22' 53" W), located approximately 3 km east of the community of Seine River First Nation, is a small lake (expansion of Seine River) with northern wild rice stands along its shores. Lower Steep Rock Lake (48° 45' 57" N, 91° 40' 08" W), located approximately 2.5 km west of the Town of Atikokan, is a part of a complex of lakes with a natural stand of northern wild rice. Wild rice is currently harvested and consumed from both lakes by Seine River First Nation community members. However, concerns about potential heavy metal contamination from nearby historic iron-ore mining operations have prompted wild rice research in recent years. Whitefish Lake (48° 13' 43" N, 90° 03' 49" W), located approximately 60 km southwest of the City of Thunder Bay, is a large lake (3,015 ha in size (Lee and McNaughton 2004)) with northern wild rice stands along its western shore. This lake has been used for research into macrophyte-induced microchemical water column changes, specifically within wild rice beds (Lee and McNaughton 2004). Lake Tamblyn (48° 25' 12" N, 89° 15' 47" W), located within the Lakehead University campus in the City of Thunder Bay, is a man-made lake (constructed in the 1960s as an expansion of McIntyre River (TBFN 2008)) with northern wild rice growth monitored annually along the shoreline. Marchmont Marsh (44° 38' 03" N, 79 31' 03" W), located approximately 5 km west of the City of Orillia, is a wetland (expansion of a North River tributary) with natural stands of northern wild rice along its shores. Current research in this wetland focused on the influence of wild rice on sediment pore water chemistry.

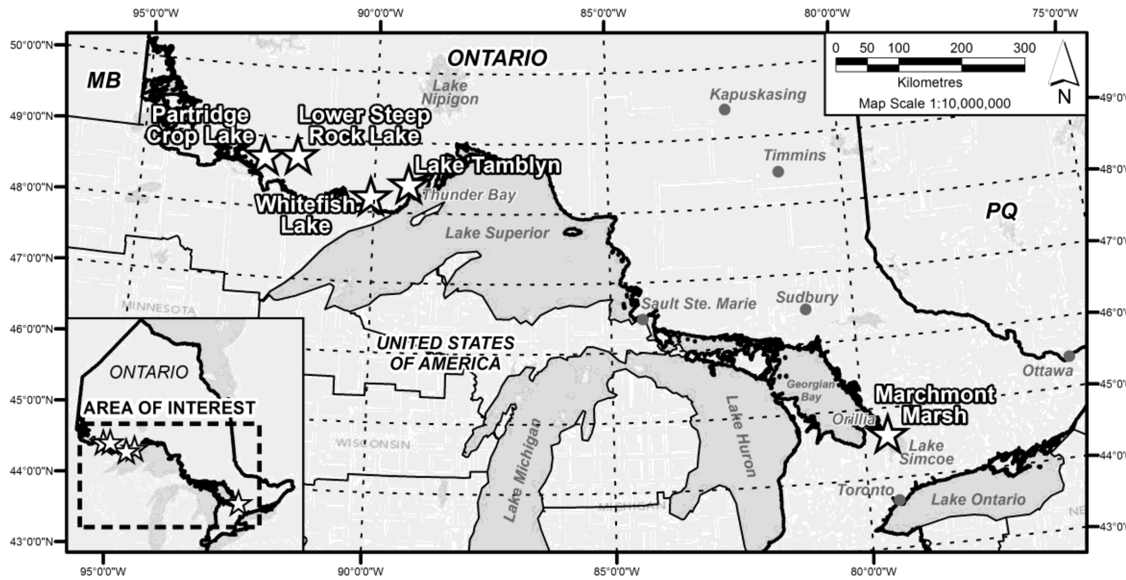

Figure 2.1 – Location of sample sites in Ontario, Canada. Basemap imagery from ESRI (2012).

2.2.2 Sample Collection and Preparation Procedures

2.2.2.1 Northern Wild Rice

Five mature northern wild rice plants were extracted from each sample site in September 2011. Samples with intact roots were placed in plastic bags, sealed, labelled and refrigerated. During sample collection, the roots of all samples extended to a depth of approximately 35 cm below the sediment-water interface. Prop roots were observed to originate from one to three nodes above the sediment-water interface and extended diagonally into the sediment surface. The majority of roots (including prop roots) were orange-brown in colour and ranged up to four millimetres in diameter. Ten roots with plaque (orange-brown in colour, Figure 2.2) were removed from each sample. Four roots without plaque (light yellow to white in colour) were also removed from two sites and treated as controls (it was difficult to find multiple plaque-free roots due to end of growing season, thus controls were only collected from two sites). All roots were rinsed with distilled deionized water and placed on a clean cutting surface. Random sections (no longer than 2 mm) were cut with a clean ceramic knife. Root fragments were grouped according to their relative age, based on distance from the root tip. Samples were then placed in clean Petri dishes, freeze-dried (LABCONCO® Freeze Dry System) for a minimum of 24 hours and finally sealed and stored in a glass desiccator until examination.

Figure 2.2 – Northern wild rice roots with orange-brown colouration.

2.2.2.2 Surface Water and Sediment

Current and historic surface water and sediment analytical data from locations close to the northern wild rice sample sites was gathered. Surface water and sediment samples were collected from Marchmont Marsh and Lake Tamblyn for this study. One surface water sample per month was collected from Marchmont Marsh from June to October 2010. Two sediment samples were also collected, one each in June and October 2010. One surface water and one sediment sample was collected from Lake Tamblyn in June 2012. All surface water samples were collected directly into clean 250 mL plastic bottles, sealed, labelled and transported in coolers to the Lakehead University

Environmental Laboratory (LUEL) for analyses. All sediment samples (grab samples of top 10 cm of sediment) were collected by pre-cleaned shovel into new plastic bags, sealed, labelled and transported in coolers to the LUEL for analysis.

Published data was available for Whitefish Lake from Lee and McNaughton (2004), with their "Wild Rice (30 m) Station" closest to the current northern wild rice sample site. Seven surface water and sediment sample collection events occurred at this Station, with one sample collected per event from June to September 1997 (Lee and McNaughton 2004). Unpublished data was available for Partridge Crop Lake and Lower Steep Rock Lake, with two Sample Stations per lake being closest to the northern wild rice sample sites[1]. Two sample collection events occurred at these Stations, with one surface water and sediment sample collected per event in July and September 2011. Samples from both of these sources were collected in a similar manner to those from Marchmont Marsh and Lake Tamblyn, and were also submitted to the LUEL for analysis.

2.2.3 Analytical Procedures

2.2.3.1 Northern Wild Rice

Sample preparation and analysis procedures followed those described in Batty et al. (2002). Prepared samples for Scanning Electron Microscope (SEM) investigation were mounted on alum stubs with carbon tape. 12 samples were carbon-coated prior to examination and used for method refinement. Samples were examined on a JEOL® JSM-5900LV SEM fitted with an Energy-Dispersive X-ray Analyzer (EDXA). Images collected by SEM were displayed with atomic number contrast through backscatter

[1] Unpublished surface water and sediment analytical data provided by Dr. P. F. Lee of Lakehead University, Thunder Bay, Ontario, Canada.

electron signals (LUCAS 2009*a*, 2009*b*). Spectrums generated by EDXA on a specified area (100 µm to 400 µm^2 in size) over a period of 50 seconds indicated all detectable elements in a specific area using a solid state detector (LUCAS 2009*a*, 2009*b*). Spectrum peaks were labelled according to the chemical signature of dominant elements and plotted as graphs (LUCAS 2009*a*). While EDXA does not quantify elements, an examination of the relative presence/absence of elements was considered appropriate for an understanding of plaque composition in this study. Root plaque (DCB) extraction techniques were not conducted because they are often considered harsh (especially on control samples) with a tendency to strip elements from within the root resulting in an overestimation of element concentrations (Bacha and Hossner 1977; Batty et al. 2000).

In total, 38 northern wild rice samples were examined from the five sampling sites. Specifically, six samples each from Partridge Crop Lake and Lower Steep Rock Lake, ten from Whitefish Lake (including three control samples), five from Lake Tamblyn and eleven from Marchmont Marsh (including three control samples) were examined. Image and x-ray spectrum data was collected from each sample to capture distinct plaque features. Elemental mapping of specific elements (Al, Fe, K, O, P and Si) was also conducted on select samples. An in-depth surface investigation was also conducted to examine plaque anomalies on two gold-coated samples using a Hitachi® SU-70 SEM.

2.2.3.2 Surface Water and Sediment

All sample analyses were conducted at the Lakehead University Environmental Laboratory (LUEL), a Canadian Association of Laboratory Accreditation (CALA) ISO 17025 accredited laboratory. All analyses followed standard operating procedures and included the use of blanks, quality control samples and duplicates.

2.2.4 Data Analysis

2.2.4.1 Northern Wild Rice

From SEM image data, images were compiled by sample site and plaque presence/absence and deposition was recorded (including plaque type, percent coverage, thickness and location). From EDXA x-ray spectra data, the top five elements according to relative peak heights were identified and recorded.

2.2.4.2 Surface Water and Sediment

All surface water and sediment analytical values were tabulated, with means and standard deviations calculated and recorded.

2.3 Results

All raw data, analytical results and photos are included in Appendix C.

2.3.1 Surface Water and Sediment

Table 2.1 presents the mean values and standard deviations for the surface water variables analyzed. Lake Tamblyn had the highest pH and conductivity values, while Partridge Crop Lake had the lowest values. Lake Tamblyn also had the highest total P concentration, while Whitefish Lake had the lowest concentration. Lake Tamblyn and

Whitefish Lake contained the highest concentrations of total metals, while Partridge Crop Lake and Marchmont Marsh had the lowest metal concentrations.

Table 2.1 – Surface water chemistry, northern wild rice sample sites.

		Site								
		L. Tam-blyn	Marchmont Marsh		Partridge Crop Lake		Lower Steep Rock Lake		Whitefish Lake	
Analytical Parameter	Units	Value	Mean	SD	Mean	SD	Mean	SD	Mean	SD
pH		7.84	7.76	*0.11*	6.77	*0.07*	7.35	*0.54*	6.84	*0.37*
Cond.	µS/cm	299.0	279.0	*13.3*	58.1	*1.2*	99.6	*1.4*	103.0	*23.4*
TKN	mg/L	--	--	--	0.37	*0.05*	0.50	*0.05*	0.43	*0.19*
NO_3-N	mg/L	0.125	0.008	*0.006*	--	--	--	--	--	--
Total P	mg/L	0.032	0.012	*0.006*	0.012	*0.006*	0.015	*0.004*	0.008	*0.004*
Total Al	mg/L	0.043	0.013	*0.004*	0.050	*0.003*	0.034	*0.017*	0.074	*0.156*
Total Ca	mg/L	31.2	33.5	*3.2*	6.8	*0.2*	11.5	*1.3*	144.1	*24.6*
Total Fe	mg/L	0.414	0.074	*0.017*	0.165	*0.002*	0.163	*0.101*	0.239	*0.069*
Total K	mg/L	1.11	1.12	*0.19*	0.51	*0.01*	0.60	*0.10*	2.57	*0.89*
Total Mg	mg/L	11.57	10.19	*1.05*	1.39	*0.06*	1.95	*0.21*	38.81	*6.70*
Total Mn	mg/L	0.031	0.012	*0.009*	0.013	*0.0003*	0.039	*0.008*	0.109	*0.064*
Total Na	mg/L	18.04	4.89	*0.43*	1.81	*0.09*	3.01	*0.33*	16.10	*2.47*
Total S	mg/L	2.88	1.87	*0.19*	0.77	*0.02*	1.02	*0.10*	1.03	*0.25*
Total Zn	mg/L	0.002	0.005	*0.003*	0.004	*0.001*	0.006	*0.004*	0.003	*0.001*

Number of replicates: Lake Tamblyn = 1; Marchmont Marsh = 5; Partridge Crop Lake = 2; Lower Steep Rock Lake = 2; Whitefish Lake = 7.
Note: Cond = Conductivity; SD = standard deviation; -- = not analyzed.

Table 2.2 presents the mean values and standard deviations for the sediment variables analyzed. Marchmont Marsh had the highest pH and conductivity values, while Partridge Crop Lake had the lowest values (of the sites analyzed). Lake Tamblyn also had the highest total P and metals concentrations, while Whitefish Lake had the lowest P and metals concentrations.

Table 2.2 – Sediment chemistry, northern wild rice sample sites.

		Site								
		L. Tamblyn	Marchmont Marsh		Partridge Crop Lake		Lower Steep Rock Lake		Whitefish Lake	
Analytical Parameter	Units	Value	Mean	SD	Mean	SD	Mean	SD	Mean	SD
pH		--	6.48	*0.08*	6.17	*0.36*	6.30	*0.29*	6.28	*0.03*
Conductivity	µS/cm	--	155.3	*3.6*	35.0	*16.1*	47.5	*14.8*	--	--
NH_4-N	µg/g	--	--	--	--	--	--	--	168.6	*19.7*
Total P	µg/g	519.8	506.8	*385.6*	296.9	*36.5*	317.4	*222.6*	31.8	*8.4*
Total Al (%)	µg/g	1.41	0.91	*0.53*	0.44	*0.11*	0.52	*0.43*	0.08	*0.02*
Total Ca (%)	µg/g	0.82	0.80	*0.59*	0.22	*0.04*	0.22	*0.13*	0.38	*0.04*
Total Fe (%)	µg/g	5.63	1.21	*0.55*	0.81	*0.21*	1.02	*0.76*	0.24	*0.06*
Total K (%)	µg/g	0.084	0.069	*0.064*	0.046	*0.012*	0.049	*0.032*	0.006	*0.002*
Total Mg (%)	µg/g	0.724	0.250	*0.192*	0.215	*0.051*	0.268	*0.215*	0.058	*0.006*
Total Mn	µg/g	837.7	134.2	*108.4*	164.4	*66.9*	227.1	*141.2*	49.8	*8.0*
Total Na	µg/g	1 031.2	253.9	*63.8*	195.7	*48.4*	268.5	*126.0*	32.7	*5.9*
Total S	µg/g	929.2	4 519.1	*5 460.6*	188.1	*180.9*	210.8	*95.9*	--	--
Total Zn	µg/g	122.0	75.1	*75.7*	21.0	*5.1*	29.3	*22.7*	12.7	*3.3*

Number of replicates: Lake Tamblyn = 1; Marchmont Marsh = 2; Partridge Crop Lake = 2; Lower Steep Rock Lake = 2; Whitefish Lake = 7.
Note: SD = standard deviation; -- = not analyzed; Total Metal (%) = mean and SD values x 10^{-4}.

2.3.2 Northern Wild Rice

2.3.2.1 Root Anatomy

Roots examined from all sites demonstrated similar anatomical characteristics, with no observed differences apparent between study sites. Figure 2.3 presents representative SEM images of cross-sectioned northern wild rice root samples. Root hairs were not observed on the root surfaces, nor were root epidermis cells (described by Stover (1928) to be present on young roots). A band of sclerenchyma was present adjacent to the hypodermis of all samples, and was observed to be one to three cells in thickness. Aerenchyma were observed throughout the cortex of the majority of samples. Four to five xylem tubules were observed in the vascular cylinder of all cross-sectioned samples.

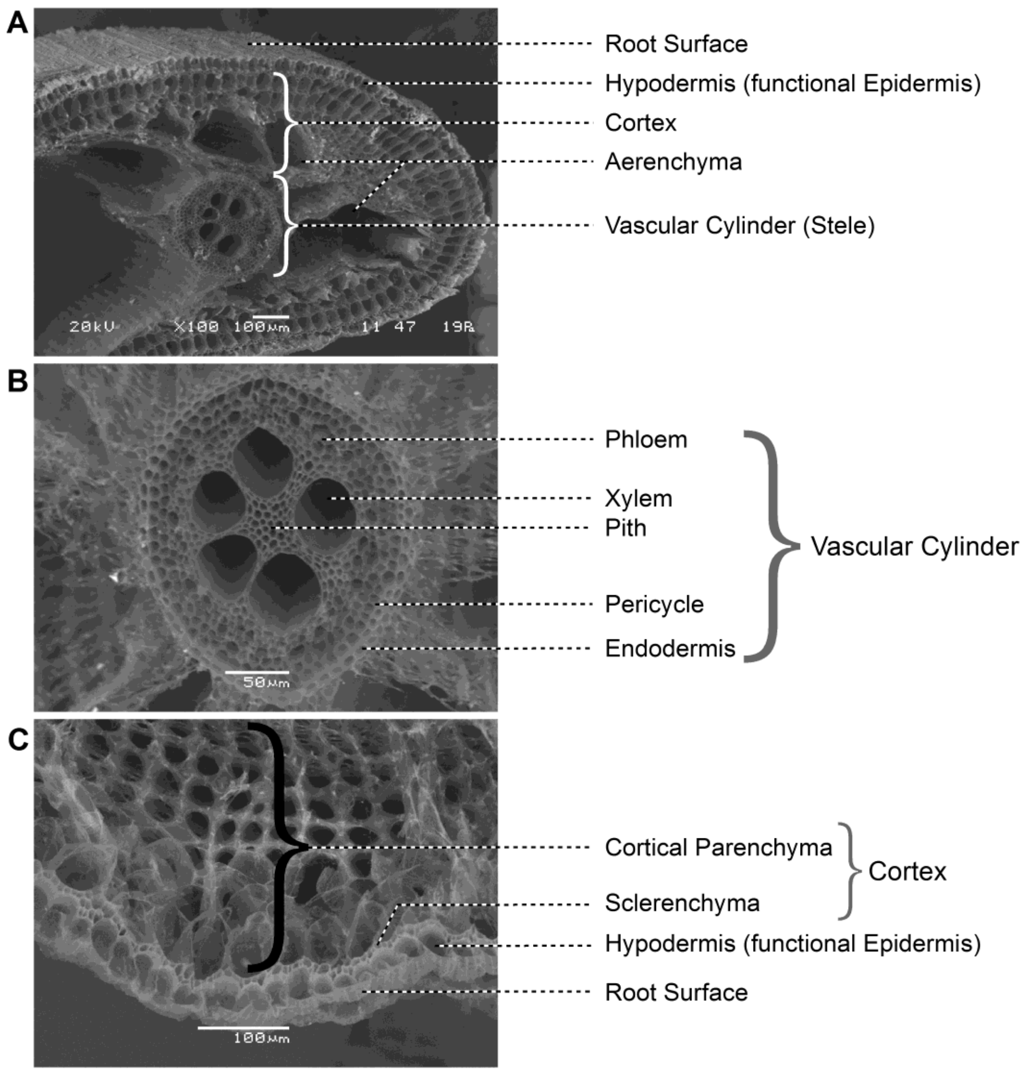

Figure 2.3 – Northern wild rice root anatomy. SEM images of cross-section samples. **A.**x100, whole root (Lower Steep Rock Lake); **B.** x350, vascular cylinder/stele (Lake Tamblyn); **C.** x250, cortex of young root, prior to formation of aerenchyma (control, Marchmont Marsh).

2.3.2.2 Plaque Presence

Considerable variation in plaque deposition was observed along the surface of individual roots and between roots of the same sample. Through SEM/EDXA examination, 92% (35 of 38) samples were confirmed to have plaque formation according to the following criteria: 1) visible orange-brown coating on the root surface; and/or 2) iron as one of the five most abundant elements through EDXA (Bacha and Hossner 1977; Chen et al. 1980*b*; Mendelssohn and Postek 1982; Taylor et al. 1984; Snowden and Wheeler 1995; Batty et al. 2000; Batty et al. 2002). Data from samples that were orange-brown in colour but without confirmed iron root plaque (8%) were excluded from the results/observations.

2.3.2.3 Plaque Structure

In total, 76 SEM images were collected from the root surface of samples with plaque and 11 SEM images from the root surface of samples without plaque. Three types of plaque deposition were observed: thin plaque, crust plaque and plaque-filled cells (Figure 2.4).

Thin plaque was present on 21.1% of sample SEM images. Thin plaque was detected by the presence of an orange-brown colour on the root surface and by EDXA spectra with high peaks of iron and oxygen relative to other elements. The depth of thin plaques was not discernible and was reasoned to be <0.1 μm thick. Samples from all sites had thin plaque, with thin plaque as the second-most dominant plaque type for Lake Tamblyn, Partridge Crop Lake and Whitefish Lake. Crust plaque was present on 47.4% of sample SEM images. Crust plaques were observed to be a thick (1 μm to 14 μm) crust-like layer of precipitate visible on the surface of root epidermis cells. Crust plaques often followed contours of individual epidermis cells. Samples from all sites had crust plaque, with crust plaque as the dominant plaque type for all sites except Marchmont Marsh. A combination of thin and crust plaque was present on 11.8% of sample SEM images, with this plaque type dominant in Marchmont Marsh samples and second-most dominant in Lower Steep Rock Lake samples.

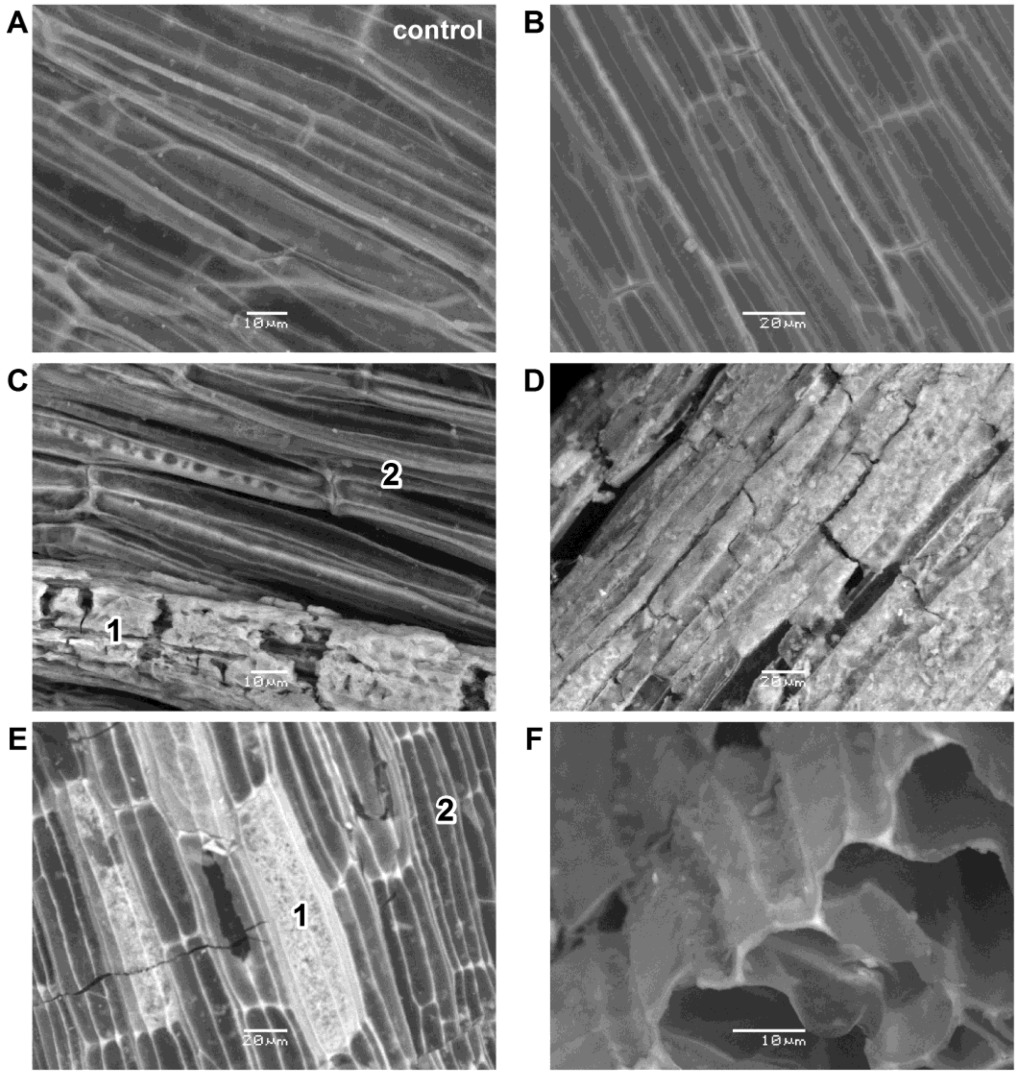

Figure 2.4 – SEM images of iron plaques on northern wild rice roots. Representative images selected to illustrate different plaque types. **A.** x1,100, control sample with no plaque (Whitefish Lake); **B.** x850, sample with thin plaque (Whitefish Lake); **C.** x1,000, sample with thicker crust plaque (1) and thin plaque (2) (Marchmont Marsh); **D.** x600, sample with crust plaque (Partridge Crop Lake); **E.** x600, sample with plaque-filled cells (1) and thin plaque (2) (Lake Tamblyn); **F.** x2,000, sample with thin crust plaque, cross-section view (Lower Steep Rock Lake).

Plaque-filled cells were observed as single root epidermis cells that contained precipitate within the cell cavities. Plaque-filled cells were inconsistently distributed across the root epidermis, with 15.8% of sample SEM images having a combination of thin plaque and plaque-filled cells. Samples from all sites (except Lower Steep Rock Lake) had a combination of thin plaque and plaque-filled cells, with this plaque type second-most dominant in Marchmont Marsh samples. The remaining 3.9% of sample SEM images (from Lower Steep Rock Lake only) had a combination of crust plaque and plaque-filled cells, though this number may be under-represented due to the potential of crust plaque obscuring the observation of plaque-filled cells.

In comparing plaque frequency between sites, Lake Tamblyn samples had the greatest occurrence of thin plaques and Partridge Crop Lake had the greatest occurrence of crust plaques, while Marchmont Marsh had the greatest occurrence of combination plaques (thin plaque with crust or plaque-filled cells).

Plaque casts were observed in two samples with crust plaque present on the root surface. As first described by Chen et al. (1980*b*), the plaque appeared to have solidly filled several epidermis cells, forming casts of the former cell walls (Figure 2.5).

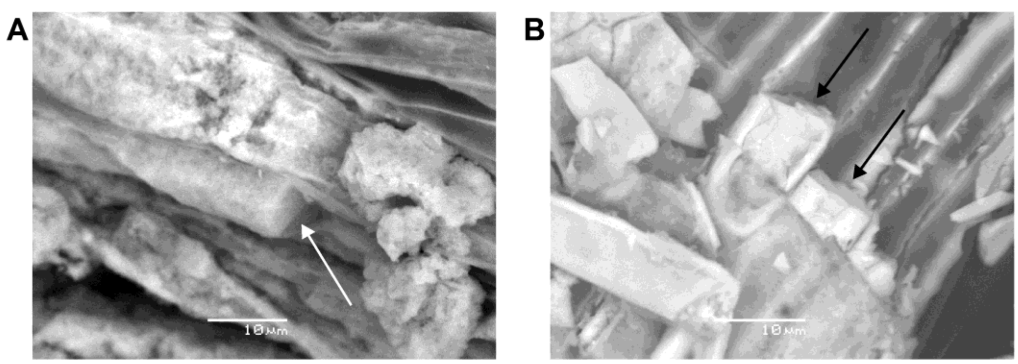

Figure 2.5 – SEM images of northern wild rice roots with iron plaque casts. Plaque casts indicated by arrows. **A.** x2,200, sample from Marchmont Marsh; **B.** x2,500, sample from Lake Tamblyn.

2.3.2.4 Plaque Composition

In total, 87 EDXA x-ray spectra were collected from the root surface of samples with plaque and 19 EDXA x-ray spectra were collected from the root surface of control samples (Figure 2.6). Fe was present in the x-ray spectra of all root plaques examined, with Fe as one of the two most abundant elements in 96.6% of plaques (after carbon spectra correction (LUCAS 2009*a*)). Fe and O were the two most abundant elements in 67.8% of plaque x-ray spectra, followed by: 13.8% with Fe and Al; 10.3% with Fe and K; 3.5% with Fe and Si; and 1.2 % with Fe and Cl. The remaining 3.4% contained O and either Si, S or Cl. Al was present on their root surface of 74% of control samples, followed by 26% with Ca, 21% with K, 16% with S and <5% with Cl, Si or Fe.

2.3.2.5 Plaque Deposition

In total, 61 EDXA x-ray spectra (with associated SEM images) were collected along the cross-section profile of nine root samples with plaque and four EDXA x-ray spectra along the cross-section profile of two root samples without plaque (Figure 2.7). Fe was detected on the epidermis cell surface of all root samples with plaque, with iron present in the interior of the epidermis cells of 92.9% of samples. Fe was present in the interior of the outer cortex cells in 46.7% of these samples, and in the interior of the cortex cells in 21.4 % of these samples. Fe was not present in the vascular cylinder cells of any sample, nor was Fe detected in any cells of the control samples.

EXDA maps of elemental distribution (Figure 2.8) found that Fe, Al and Si were most abundant on the surface and interior of root epidermis cells. K, O and P were evenly distributed throughout the root. Fe was abundant on the surface of samples with plaque, while Fe was scarcely present on the surface/interior of samples without plaque.

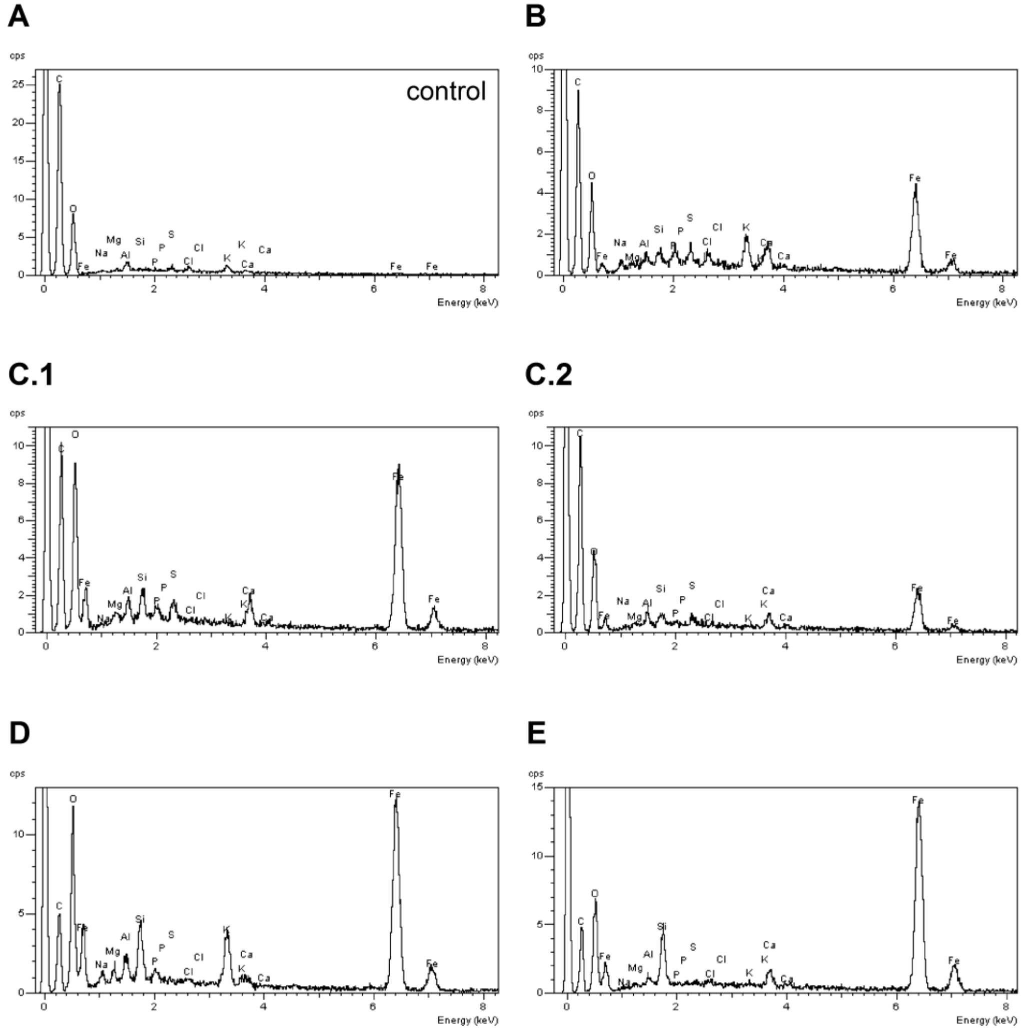

Figure 2.6 – EDXA x-ray spectra of iron plaques on northern wild rice roots. Representative spectra selected to illustrate different plaque types. cps = counts of energy per second, element energy peaks as labelled, measured in kiloelectronvolts (keV). **A.** Control sample with no plaque (Whitefish Lake); **B.** Sample with thin plaque (Whitefish Lake); **C.** Sample with crust plaque (C.1) and thin plaque (C.2) (Marchmont Marsh); **D.** Sample with crust plaque (Partridge Crop Lake); **E.** Sample with plaque-filled cells (Lake Tamblyn).

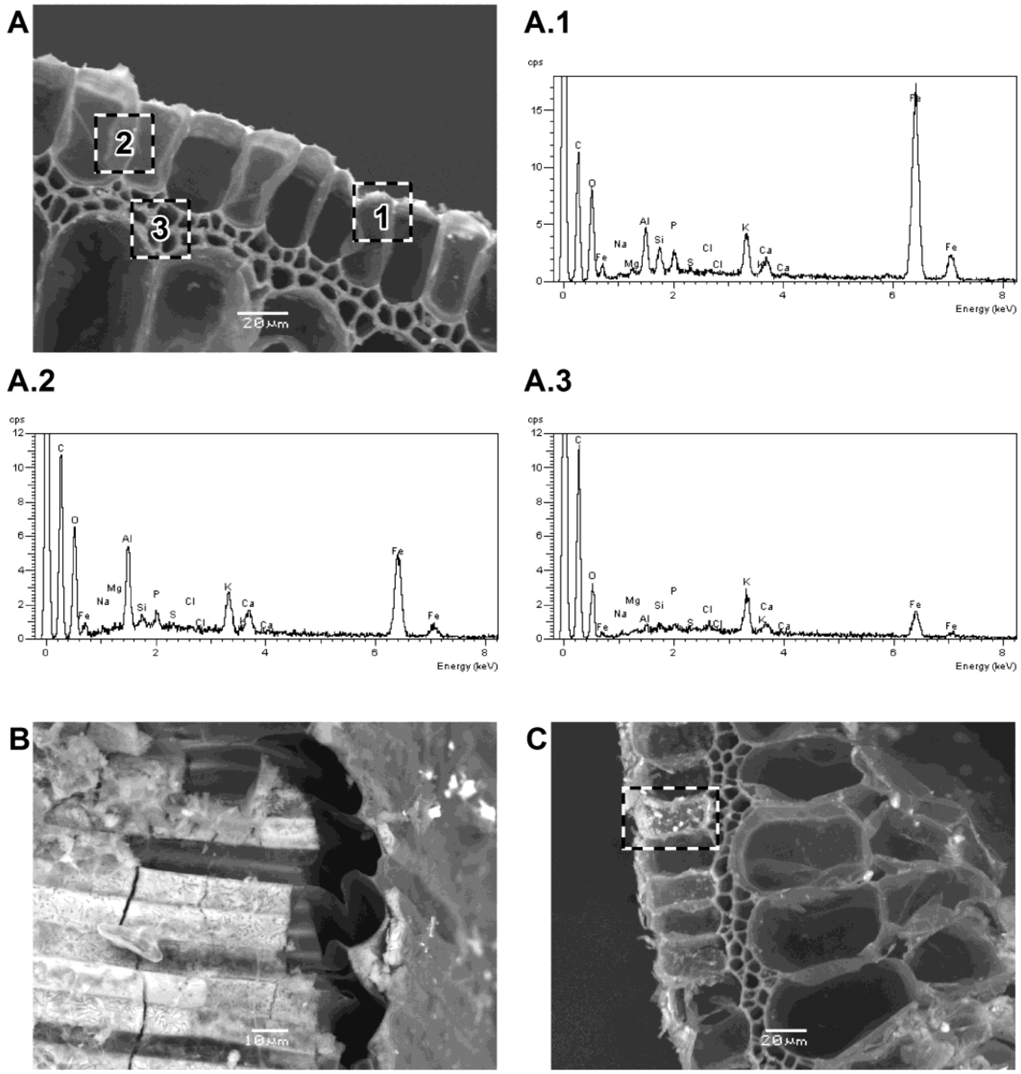

Figure 2.7 – SEM images and EDXA x-ray spectra of iron plaques on northern wild rice roots. Representative images and x-ray spectra selected to illustrate iron plaque deposition. cps = counts of energy per second, element energy peaks as labelled, measured in kiloelectronvolts. **A.** x700, sample showing x-ray spectra at epidermis surface (1, A.1), epidermis cell interior (2, A.2), and outer cortex (3, A.3) (Partridge Crop Lake); **B.** x1,000, sample with crust plaque, note plaque thickness on cell surface (Whitefish Lake); **C.** x500, sample with plaque-filled cell, indicated by box (Partridge Crop Lake).

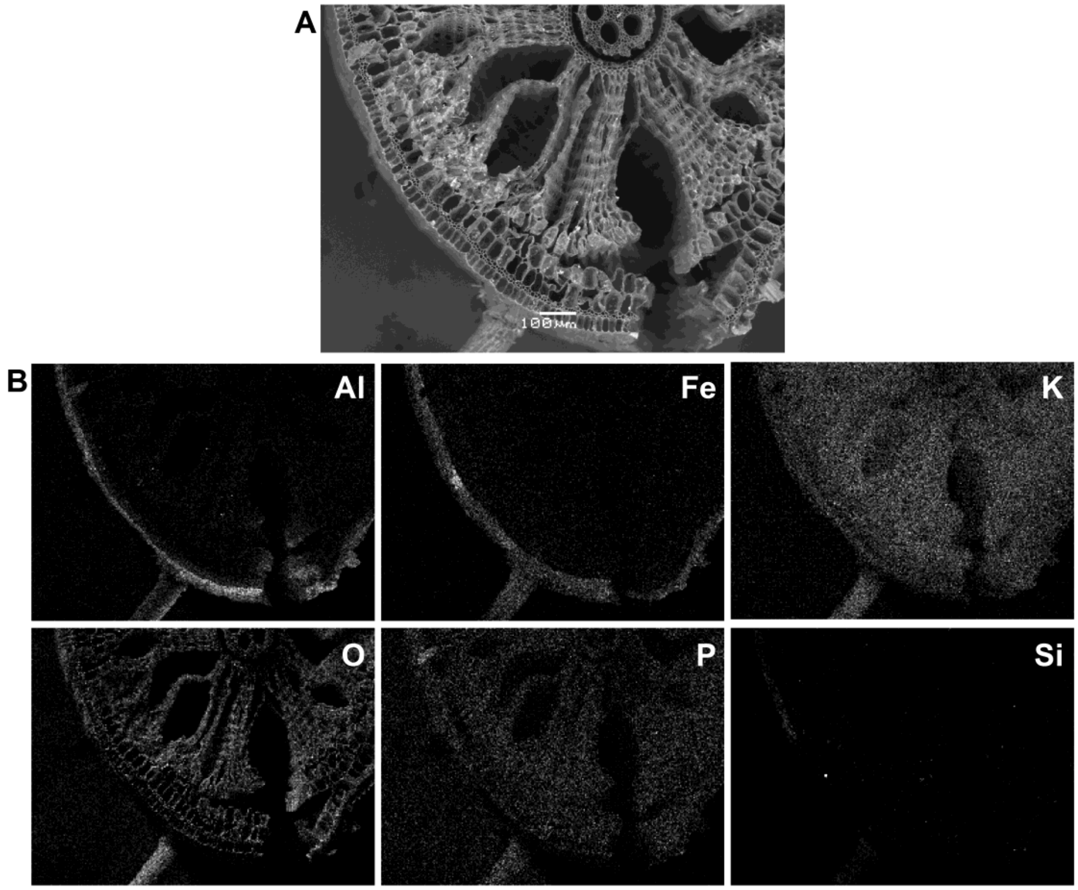

Figure 2.8 – SEM image and EDXA element distribution maps of select elements in northern wild rice root cross-section with iron plaque. A. x90 SEM image, sample from Partridge Crop Lake; **B.** Element maps, white dots indicate presence and location of each element as labelled. Note Al, Fe and Si mainly confined to root surface.

2.3.2.6 Plaque Anomalies

Grooves were observed in the crust plaque surface of two samples (confirmed through the examination of gold-plated samples), one each from Marchmont Marsh and Whitefish Lake (Figure 2.9). All grooves were rounded, approximately 0.4 µm in diameter and up to 6 µm in length, and were found either along the plaque surface or penetrating into the plaque. Grooves were inconsistently distributed across the plaque surface, their appearance confined to specific areas of thick crust plaque.

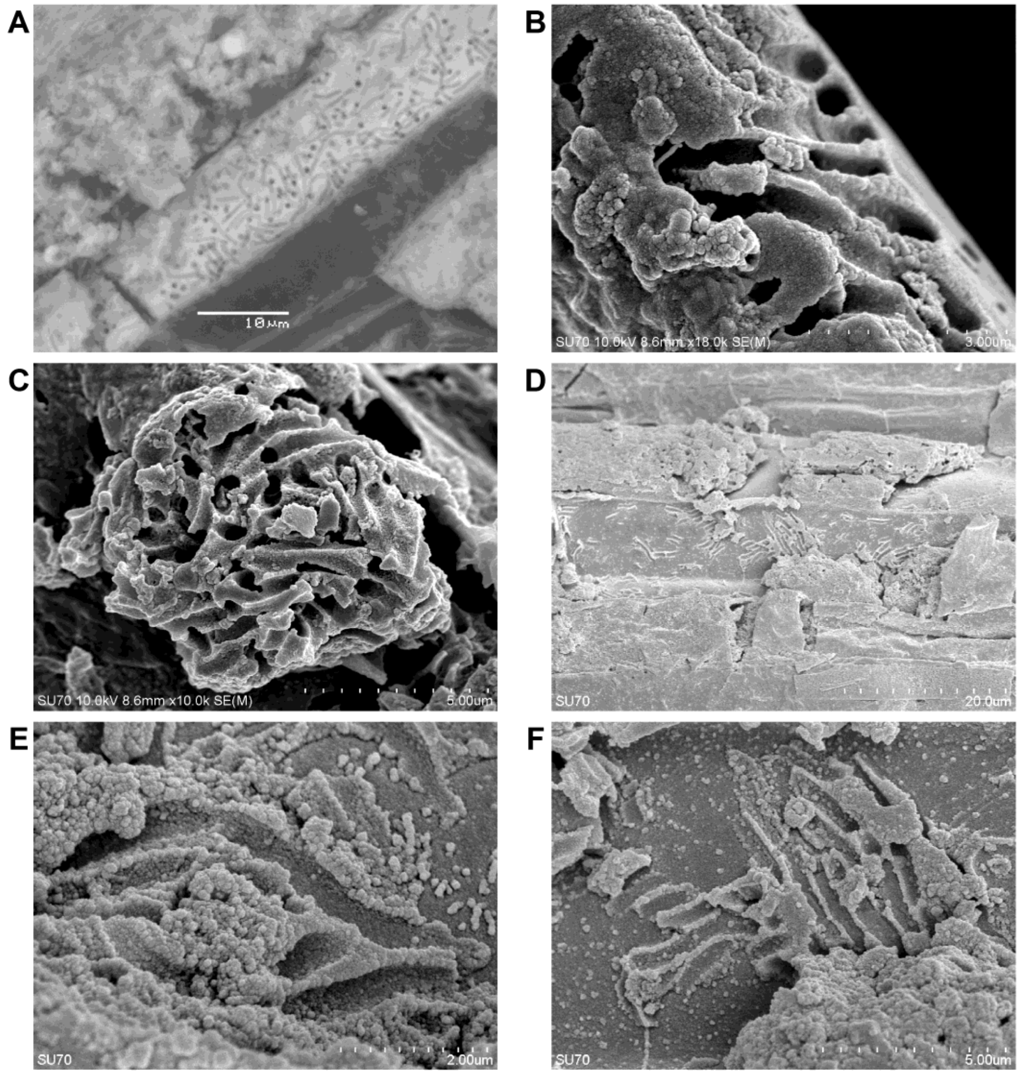

Figure 2.9 – SEM images of northern wild rice roots with grooves present in thick crust iron plaque. All samples gold-coated and images collected with Hitachi SU-70 SEM unless otherwise noted. Marchmont Marsh sample images: **A.** x2,500 (carbon-coated, JEOL JSM-5900LV SEM); **B.** x18,000; **C.** x10,000. Whitefish Lake sample images: **D.** x2,200; **E.** x20,000; **F.** x10,000.

2.4 Discussion

2.4.1 Surface Water and Sediment

The variable surface water and sediment chemistries of each site do not appear to have influenced the deposition, composition or structure of iron plaques on the roots of northern wild rice. Plaque composition and structure was similar in samples examined from both Lake Tamblyn (highest sediment metal concentrations) and Whitefish Lake (lowest sediment metal concentrations), suggesting that wild rice roots generate similar plaques independent of sediment metal concentrations. Surface water and sediment pH was within the range expected to support Fe precipitation at all sites (Patrick and Henderson 1981). Although sediment redox potentials can also influence the formation of Fe plaque (Taylor et al. 1984), redox potential data was not collected in this study.

2.4.2 Northern Wild Rice

2.4.2.1 Root Anatomy

Observations of the root system of northern wild rice, including root length, diameter, and the presence of prop roots, were similar to those described by Aiken et al. (1988). Orange-brown plaque and aerenchyma were observed on/in the majority of roots, suggesting that root-zone aeration occurs throughout the entire root system. Stover (1928) provides a detailed description of the anatomy of *Zizania aquatica* L. roots, though taxonomic debates occurred throughout the 1900s on the division between *Z. palustris* and *Z. aquatic*a (Aiken et al. 1988). The majority of root anatomy observations made in this study are similar to those of Stover (1928), including the hypodermis acting as the functional epidermis (i.e. outer-most layer of cells), the absence of root hairs and large aerenchyma appearing to be first schizogenous then lysigenous in formation.

2.4.2.2 Plaque Distribution

No consistent pattern of plaque deposition was observed on the samples collected from all five sites, with the appearance of iron root plaques varying little between sites and within samples. Iron plaque deposition was inconsistent between different roots of the same plant (i.e. the amount of plaque varied between roots) and along the surface of individual roots (i.e. no plaque zonation observed based on age or distance from root tip).

Several studies have reported trends in iron root plaque deposition based on root age, with older roots having a larger amount of plaque deposition compared with younger roots or younger root parts on the same plant (Chen et al. 1980*b*; Taylor et al. 1984; Begg et al. 1994; Snowden and Wheeler 1995). Batty et al. (2002) found that plaque deposited on the root surface of *P. australis* grown in a laboratory setting with adequate nutrients showed definite zonation, with plaque beginning 1 cm from the root tip and darkening with distance from the tip.

The natural variability of in-situ rhizosphere chemistry along with seasonal trends may have contributed to the lack of plaque zonation observed in this study. Ye et al. (1997) discussed the possibility that plaque deposition differs on hydroponic vs. field-grown plants due to the lack of root-induced rhizosphere changes present in nutrient solution and to the structural differences of adult plants vs. seedlings (shorter growth-periods common in hydroponic studies). Since all samples in this study were collected at the end of the growing season, slowed root growth may have provided root tips with adequate time for plaque deposition.

2.4.2.3 Plaque Composition

The majority of plaques contained Fe and O as their most abundant elements, consistent with the accepted composition of iron root plaques as iron hydroxides, FeOOH (Bacha and Hossner 1977; Chen et al. 1980*a*). Plaques also frequently contained Al, Ca, K, S and Si, however these elements were found on control sample surfaces as well, and no relationship was observed between Fe and the presence/location of these elements. These findings suggest that these elements may have been included in the plaque through incorporated sediment particles or have been adsorbed to the plaque from sediment pore water. This hypothesis is supported by multiple studies that have found additional elements included in root plaques, such as Al, As, Ca, Cl, Cu, K, Mn, P, Si and Zn (Chen et al. 1980*a*; St-Cyr et al. 1993; St-Cyr and Campbell 1996; Batty et al. 2000; Batty et al. 2002; Caetano and Vale 2002; Hupfer and Dollan 2003; Jiang et al. 2009). Batty et al. (2002) also commented that Si and Al observed in the iron root plaques of field-grown plants were likely indicative of the presence of clay particles.

Phosphorus was absent in the iron root plaques examined. Several studies have found P associated with iron root plaques (Chambers and Odum 1990; Hupfer and Dollan 2003), however the absence of P in the plaques of this study may be a result of the examination of field vs. laboratory-grown specimens. In addition to the aforementioned differences in rhizosphere chemistry, the availability of P in laboratory nutrient solutions is generally greater than in the field (Batty et al. 2000). Batty et al. (2000) compared iron root plaques on both laboratory and field-grown *P. australis* specimens, concluding that the absence of P in the plaque of field-grown specimens was due its extremely low concentration at the study site. The presence of iron root plaques may have influenced the bioavailability of P in the rhizosphere due to an enhanced uptake effect (Liang et al. 2006; Xu et al. 2009), however this study did not examine this potential relationship.

2.4.2.4 Plaque Morphology

A range of plaque densities (from thin to crust) was observed across the surfaces of each root, similar to the observations of Bacha and Hossner (1977), Taylor et al. (1984) and Batty et al. (2002). Thin plaques were observed to have no structure on the root surface, unlike the textured appearance of the amorphous deposits observed by Bacha and Hossner (1977) and Batty et al. (2002). This lack of observed thin plaque structure may have been due to the absence of gold-coating on SEM samples (due to EDXA requirements) which is generally required for the examination of fine-scale topography (LUCAS 2009*c*). Thinner crust plaques maintained the shape of epidermal cells (visible as cracks within the crust surface), while thicker crust plaques were observed as a solid coating on the root surface, entirely concealing the shape of epidermis cells. These observations are similar to that of Taylor et al. (1984), who found that heavy plaques masked the outline of individual cells, in some cases forming an even layer covering the root surface.

Cross-sectioned samples containing both plaque-filled cells and cells with thin plaque were observed to have iron hydroxide contained within the cell and no additional plaque deposited on the cell surface. Plaque may have precipitated in an increased concentration within single cells due to broken/deteriorated cell walls increasing the permeability of cells, however the cause of this selective deterioration is unknown. Thicker crust plaques were found associated with collapsed epidermal cells, similar to the observations of Taylor et al. (1984). Where portions of thicker crust plaque had broken away from the root surface (likely during sample preparation), the surfaces of the epidermal cells appeared to have also been removed. This finding suggests that iron hydroxide was present both within and on the cell surface, in effect cementing the collapsed cell wall within the plaque.

This hypothesis is supported by the presence of plaque-filled cells and the occurrence of cell casts in some samples. In contrast to the casts described by Chen et al. (1980*b*), a relic of the former cell wall was observed in one of the samples (Image B, Figure 2.10), suggesting that the outermost cell wall collapsed and became incorporated into the crust plaque. The cell casts were also solid in appearance and did not have a hollow interior like the casts observed by Chen et al. (1980*b*).

The plaque formation model presented by Chen et al. in 1980(*b*) assumes that the outer cell walls decompose when iron hydroxide is precipitated both on the root surface and within the cell cavities, while Taylor et al. (1984) suggested that the outer cell walls collapse during deposition rather than decompose. The observations in this study indicate that the cell walls collapse rather than decompose and are subsequently incorporated into the thick crust plaque. A hypothetical model of iron plaque development on the roots of northern wild rice is presented in Figure 2.10, adapted from the models presented by Chen et al. (1980*b*). This hypothetical model is supported by the findings of Crowder and St.-Cyr (1991) who stated that “plaque may be deposited on top of the epidermis or the outer cell wall may collapse inwards, allowing plaque to either remain on top or form a cast of the cell if the cell wall breaks”.

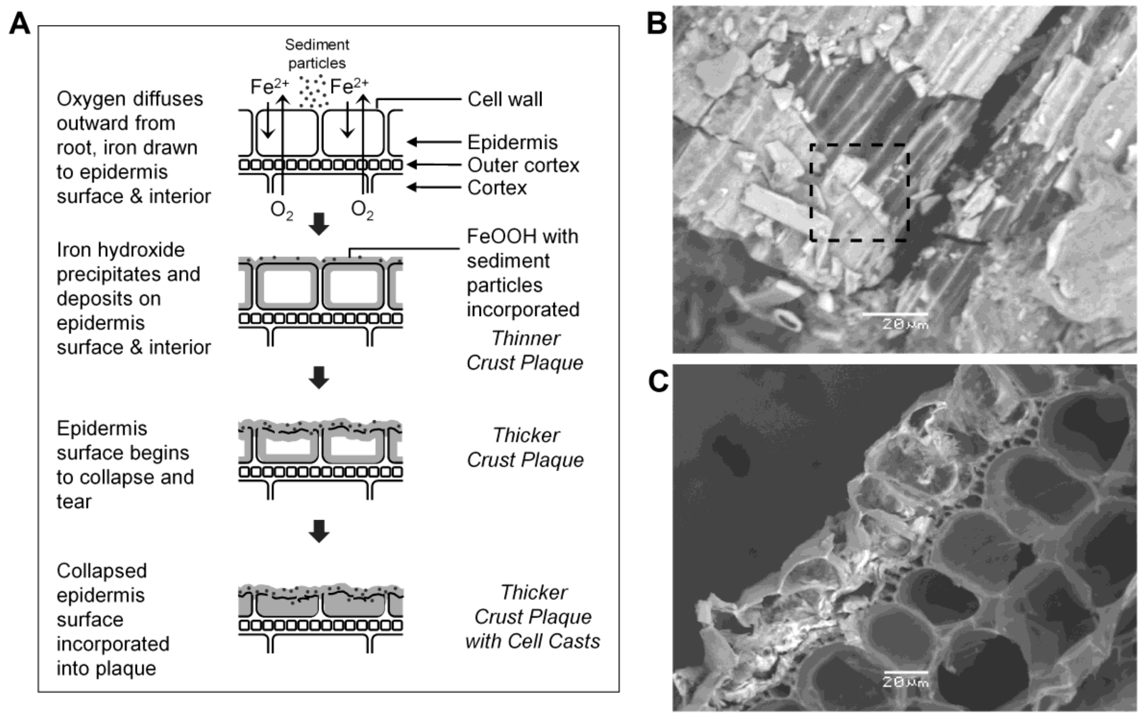

Figure 2.10 – Hypothetical model of iron plaque development on northern wild rice roots. **A.** Modification of "Fig. 7: Hypothetical model for Fe coating development" presented by Chen et al. 1980*b*. Model starts with undamaged epidermal cells in cross section and shows progression over time. Iron hydroxide is deposited on and within the epidermis cells, and as time advances the plaque thickens and cell walls collapse, becoming incorporated into the plaque. **B.** x900, sample with crust plaque showing solid cell cast with cell wall remnant incorporated into plaque, indicated by box (Lake Tamblyn). **C.** x600, sample with crust plaque and collapsed outermost cell walls (Lower Steep Rock Lake).

Iron penetration into the root cells was found to be comparable to the observations of Green and Etherington (1977) who found that iron deposits extended inwards from the root surface of *O. sativa* to the cells of the cortex, but were not detected in the tissues of the stele. The findings of Taylor et al. (1984) on *T. latifolia* also support this observation, however iron was not found to penetrate beyond the epidermal cells of *P. australis* by Batty et al. (2002), or *Spartina alterniflora* Loisel. by Mendelssohn and Postek (1982).

This variable depth of iron deposition may be attributed to site and species-dependent variables such as rhizosphere oxidation potential, root anatomy and iron-pool availability.

2.4.2.5 Plaque Anomalies

The observation of rounded grooves in the plaque surface was unexpected, as previous reports on iron root plaques have not reported this phenomenon. Based on the diameter and consistent shape of the grooves, as well as their tendency to occur within small concentrated areas, it is plausible to reason that they were caused by bacteria. No microbes were observed within the grooves, though they may have been removed during the sample preparation process.

The relationship between bacteria and iron root plaque is well-documented, with studies focusing on the contribution of iron-oxidizing and iron-reducing bacteria to the formation and reduction of plaque (St-Cyr et al. 1993; Mendelssohn et al. 1995; Neubauer et al. 2002; Weiss et al. 2003; Chen et al. 2008). One potential hypothesis for groove generation is that iron-reducing bacteria moved slowly across the plaque surface reducing ("consuming") portions of the ferric hydroxide, thus generating the observed grooves (Edwards et al. 2001; Valdés et al. 2008). This hypothesis assumes anaerobic conditions, perhaps in localized areas of the rhizosphere where plaque was substantially dense to impede oxidation by the root. Several studies on corrosion have collected SEM images of etch pits on the surface of iron-containing minerals (such as iron silicates), but the majority of pits in these studies are shallow, cell-sized and bacillus-shaped, only occasionally generating elongated pits (Edwards et al. 2001; Buss et al. 2007; Xu et al. 2008). The grooves observed in this study might differ in appearance due to differences in the structural stability of iron root plaque versus ferric-iron containing minerals.

2.4.3 Conclusion

Substantial iron root plaques form on northern wild rice in a variety of surface water and sediment chemistries. Iron plaques observed on the roots ranged structurally from thin to crust plaques (<1 μm to 14 μm thick) and were composed mainly of Fe, O, Al and K, however P was not found to be included in the plaques. Iron plaque was found within and on root epidermal cells, and occasionally filled epidermal cells and penetrated into the root cortex. Grooves observed in the plaque surface were hypothesized to be associated with iron-reducing bacteria.

SUMMARY AND GENERAL CONCLUSIONS

The causes of cultural eutrophication in water bodies are multi-faceted and multi-generational, presenting an ever increasing need for effective and sustainable solutions. A reduction in external nutrient sources remains the most viable solution for attaining long-term eutrophication reduction (Søndergaard and Jeppesen 2007), however strategies to reduce internal P loading within water bodies are also required to achieve a sustainable relief from the eutrophic state (Carpenter et al. 1998). The selection of appropriate P remediation strategies is specific to each water body (Reddy et al. 1999), with phytoremediation presenting a cost-effective strategy to improve water body nutrient retention and removal (Williams 2002).

This thesis examined the potential for northern wild rice (*Z. palustris*) to be used as a phytoremediation species in eutrophic wetlands. An investigation into the root-sediment interactions of this species was undertaken to determine how wild rice affects water and sediment pore water chemistry. Northern wild rice growth was found to alter sediment pore water chemistry, contributing directly to nutrient retention during the growing season through nutrient assimilation in its tissues, and indirectly by decreasing pore water pH and increasing the availability of pore water Fe and Mn for P adsorption. Iron plaques observed on the roots of wild rice were thought to potentially further contribute to P retention through P adsorption. Northern wild rice was found to form substantial iron root plaques in a variety of surface water and sediment chemistries. The plaques were composed mainly of Fe, O, Al and K, with no P concentrations detected. The presence of iron root plaques may have influenced the bioavailability of P in the rhizosphere (Liang et al. 2006; Xu et al. 2009), however this study did not examine this potential relationship. It was suggested that harvesting northern wild rice vegetation (including the economically viable seed) at the end of the growing season could present a method for permanent nutrient removal in eutrophic water bodies.

With proper harvesting and management techniques, northern wild rice (*Z. palustris*) grown in eutrophic water bodies could contribute to nutrient reduction strategies and present a viable phytoremediation species for nutrient removal efforts. This remediation strategy is most appropriately employed within the historic range of northern wild rice to contribute to restoration efforts. More research is needed into the harvesting and management techniques required for an entire-plant harvest (i.e. harvest technique, season and economic viability) and to determine genetically viable and vigorous strains of northern wild rice to maximize plant nutrient uptake (by increasing size and growth rate) and endurance in various habitats.

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APPENDICES

Appendix A: Marchmont Marsh Data

Appendix B: Victoria Point Data

Appendix C: *Zizania palustris* Root Plaque Examination Data

APPENDIX A

Marchmont Marsh Data

CONTENTS

A.1 - Data Tables

Table A.1.1 - Marchmont Marsh, surface water analytical data, 10-0 cm above SWI. Data presented by month and plot type.

			July						August						September						October					
Analytical			Non-Vegetated			Vegetated			Non-Vegetated			Vegetated			Non-Vegetated			Vegetated			Non-Vegetated			Vegetated		
Parameter	Units	*DL*	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Total P	mg/L	*0.005*	0.046	*0.037*	*9*	0.035	*0.035*	*9*	0.020	*0.007*	*6*	0.047	*0.038*	*7*	0.044	*0.073*	*9*	0.043	*0.026*	*9*	0.009	*0.005*	*9*	0.009	*0.010*	*9*
Phosphate	mg/L	*0.025*	0.013	*0*	*9*	0.013	*0*	*9*	0.013	*0*	*6*	0.013	*0*	*7*	0.013	*0*	*9*	0.013	*0*	*9*	0.013	*0*	*9*	0.013	*0*	*9*
Nitrate	mg/L	*0.009*	0.010	*0.004*	*9*	0.014	*0.015*	*9*	0.015	*0.013*	*6*	0.071	*0.054*	*7*	0.005	*0*	*9*	0.005	*0*	*9*	0.008	*0.003*	*9*	0.006	*0.002*	*9*
pH	N/A	*N/A*	7.53	*0.20*	*9*	7.57	*0.19*	*8*	7.56	*0.02*	*4*	7.54	*0.10*	*4*	7.61	*0.05*	*5*	7.46	*0.39*	*7*	7.81	*0.15*	*9*	7.68	*0.13*	*8*
Alkalinity	mg/L	*1.0*	135.6	*16.0*	*9*	127.8	*3.8*	*8*	133.5	*1.5*	*4*	135.7	*4.1*	*4*	127.6	*0.4*	*5*	137.6	*13.7*	*7*	130.1	*1.4*	*9*	126.5	*2.4*	*8*
Conductivity	µS/cm	*0.50*	284.12	*26.41*	*9*	271.94	*7.41*	*8*	269.98	*2.30*	*4*	275.08	*6.74*	*4*	285.44	*1.58*	*5*	296.84	*19.70*	*7*	284.40	*2.37*	*9*	277.06	*4.58*	*8*
Total Al	mg/L	*0.005*	0.043	*0.017*	*9*	0.029	*0.011*	*9*	0.012	*0.003*	*6*	0.020	*0.007*	*4*	0.013	*0.004*	*8*	0.019	*0.022*	*8*	0.015	*0.006*	*9*	0.012	*0.003*	*9*
Total Ba	mg/L	*0.003*	0.064	*0.013*	*9*	0.062	*0.007*	*9*	0.058	*0.002*	*6*	0.062	*0.004*	*4*	0.059	*0.002*	*8*	0.067	*0.014*	*8*	0.061	*0.001*	*9*	0.060	*0.003*	*9*
Total Ca	mg/L	*0.005*	34.227	*4.029*	*9*	32.373	*1.454*	*9*	31.343	*0.867*	*6*	33.380	*1.410*	*4*	34.317	*0.732*	*8*	37.692	*4.739*	*8*	36.952	*0.560*	*9*	35.792	*0.779*	*9*
Total Fe	mg/L	*0.002*	0.517	*0.722*	*9*	0.222	*0.345*	*9*	0.026	*0.009*	*6*	0.101	*0.118*	*4*	0.025	*0.022*	*8*	0.635	*0.802*	*8*	0.055	*0.059*	*9*	0.301	*0.376*	*9*
Total K	mg/L	*0.10*	1.14	*0.17*	*9*	1.04	*0.02*	*9*	1.10	*0.03*	*6*	1.12	*0.02*	*4*	1.40	*0.03*	*8*	1.21	*0.33*	*8*	1.30	*0.03*	*9*	1.26	*0.05*	*9*
Total Mg	mg/L	*0.01*	10.21	*0.17*	*9*	9.48	*1.05*	*9*	10.41	*0.24*	*6*	10.69	*0.20*	*4*	10.63	*0.20*	*8*	10.28	*1.30*	*8*	11.02	*0.16*	*9*	10.20	*0.73*	*9*
Total Mn	mg/L	*0.0002*	0.1143	*0.1609*	*9*	0.0869	*0.0975*	*9*	0.0051	*0.0047*	*6*	0.0178	*0.0269*	*4*	0.0093	*0.0151*	*8*	0.1766	*0.2973*	*8*	0.0111	*0.0258*	*9*	0.0744	*0.0689*	*9*
Total Na	mg/L	*0.01*	4.67	*0.05*	*9*	4.75	*0.09*	*9*	4.69	*0.12*	*6*	4.70	*0.04*	*4*	5.91	*0.14*	*8*	5.36	*0.70*	*8*	5.16	*0.10*	*9*	4.99	*0.20*	*9*
Total S	mg/L	*0.05*	1.39	*0.65*	*9*	1.60	*0.48*	*9*	1.89	*0.04*	*6*	1.83	*0.19*	*4*	1.88	*0.12*	*8*	1.39	*0.70*	*8*	2.02	*0.21*	*9*	1.81	*0.25*	*9*
Total Sr	mg/L	*0.005*	0.103	*0.007*	*9*	0.101	*0.003*	*9*	0.102	*0.002*	*6*	0.105	*0.002*	*4*	0.104	*0.003*	*8*	0.109	*0.013*	*8*	0.107	*0.001*	*9*	0.104	*0.004*	*9*
Total Zn	mg/L	*0.001*	0.008	*0.001*	*9*	0.010	*0.002*	*9*	0.002	*0.001*	*6*	0.003	*0.001*	*4*	0.010	*0.002*	*8*	0.009	*0.003*	*8*	0.002	*0.001*	*9*	0.004	*0.004*	*9*
DOC	mg/L	*0.50*	4.83	*0.64*	*9*	4.37	*1.32*	*9*	5.78	*1.87*	*6*	5.46	*1.99*	*7*	--	--	--	--	--	--	--	--	--	--	--	--

Notes
DL = method detection limit; N/A = not applicable; SD = standard deviation; n = sample size; -- = not analyzed
<DL results recorded as 0.5*DL

Table A.1.2 - Marchmont Marsh, pore water analytical data, 0-10 cm below SWI. Data presented by month and plot type.

			July						August						September						October					
Analytical			Non-Vegetated			Vegetated			Non-Vegetated			Vegetated			Non-Vegetated			Vegetated			Non-Vegetated			Vegetated		
Parameter	Units	*DL*	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Total P	mg/L	*0.005*	0.065	*0.051*	*9*	0.055	*0.019*	*9*	0.144	*0.081*	*9*	0.127	*0.059*	*9*	0.124	*0.067*	*9*	0.120	*0.046*	*9*	0.047	*0.047*	*9*	0.088	*0.053*	*9*
Phosphate	mg/L	*0.025*	0.013	*0*	*9*	0.013	*0*	*9*	0.013	*0*	*9*	0.013	*0*	*9*	0.013	*0*	*9*	0.013	*0*	*9*	0.013	*0*	*9*	0.015	*0.006*	*9*
Nitrate	mg/L	*0.009*	0.010	*0.004*	*9*	0.010	*0.009*	*9*	0.068	*0.055*	*9*	0.107	*0.083*	*9*	0.005	*0*	*9*	0.005	*0*	*9*	0.007	*0.005*	*9*	0.006	*0.004*	*9*
pH	N/A	*N/A*	7.17	*0.18*	*9*	7.12	*0.08*	*9*	7.13	*0.08*	*9*	7.03	*0.09*	*9*	7.23	*0.07*	*9*	7.15	*0.18*	*9*	7.26	*0.16*	*9*	7.07	*0.30*	*9*
Alkalinity	mg/L	*1.0*	157.7	*35.1*	*9*	147.0	*8.5*	*9*	162.3	*13.4*	*9*	173.6	*16.0*	*9*	134.9	*13.3*	*9*	149.1	*14.5*	*9*	128.6	*13.3*	*9*	134.4	*15.2*	*9*
Conductivity	µS/cm	*0.50*	324.80	*61.92*	*9*	304.60	*16.90*	*9*	318.16	*18.72*	*9*	332.64	*28.61*	*9*	290.63	*24.16*	*9*	309.90	*24.87*	*9*	279.84	*26.19*	*9*	287.72	*27.16*	*9*
Total Al	mg/L	*0.005*	0.035	*0.013*	*9*	0.021	*0.010*	*9*	0.038	*0.020*	*9*	0.032	*0.015*	*9*	0.017	*0.009*	*9*	0.016	*0.020*	*9*	0.026	*0.036*	*9*	0.012	*0.007*	*9*
Total Ba	mg/L	*0.003*	0.082	*0.024*	*9*	0.085	*0.007*	*9*	0.082	*0.009*	*9*	0.096	*0.010*	*9*	0.065	*0.010*	*9*	0.082	*0.009*	*9*	0.060	*0.010*	*9*	0.074	*0.010*	*9*
Total Ca	mg/L	*0.005*	40.880	*8.898*	*9*	37.793	*2.131*	*9*	38.516	*2.523*	*9*	44.900	*3.859*	*9*	36.219	*3.647*	*9*	41.312	*3.555*	*9*	37.574	*3.876*	*9*	38.452	*4.287*	*9*
Total Fe	mg/L	*0.002*	1.454	*1.273*	*9*	1.603	*0.413*	*9*	0.916	*0.484*	*9*	1.774	*0.581*	*9*	1.096	*0.549*	*9*	1.700	*0.474*	*9*	0.664	*0.672*	*9*	1.683	*1.037*	*9*
Total K	mg/L	*0.10*	1.35	*0.47*	*9*	1.16	*0.14*	*9*	1.23	*0.12*	*9*	0.74	*0.43*	*9*	1.03	*0.19*	*9*	0.85	*0.30*	*9*	1.06	*0.19*	*9*	1.02	*0.35*	*9*
Total Mg	mg/L	*0.01*	8.52	*1.63*	*9*	8.02	*0.54*	*9*	8.61	*1.30*	*9*	10.22	*1.14*	*9*	7.93	*1.09*	*9*	9.05	*1.11*	*9*	8.62	*1.27*	*9*	8.61	*1.43*	*9*
Total Mn	mg/L	*0.0002*	0.3145	*0.2427*	*9*	0.3730	*0.1299*	*9*	0.1143	*0.0964*	*9*	0.2126	*0.1532*	*9*	0.2148	*0.1034*	*9*	0.5173	*0.2701*	*9*	0.1435	*0.1002*	*9*	0.4437	*0.2366*	*9*
Total Na	mg/L	*0.01*	5.35	*1.08*	*9*	4.86	*0.94*	*9*	5.34	*0.68*	*9*	4.08	*1.01*	*9*	5.45	*0.80*	*9*	4.15	*0.79*	*9*	5.48	*0.94*	*9*	4.39	*0.74*	*9*
Total S	mg/L	*0.05*	0.50	*0.25*	*9*	0.46	*0.15*	*9*	0.60	*0.11*	*9*	0.67	*0.30*	*9*	0.42	*0.16*	*9*	0.45	*0.25*	*9*	0.86	*0.50*	*9*	0.61	*0.56*	*9*
Total Sr	mg/L	*0.005*	0.109	*0.022*	*9*	0.105	*0.006*	*9*	0.110	*0.009*	*9*	0.125	*0.012*	*9*	0.096	*0.010*	*9*	0.111	*0.012*	*9*	0.097	*0.010*	*9*	0.100	*0.012*	*9*
Total Zn	mg/L	*0.001*	0.007	*0.001*	*9*	0.007	*0.001*	*9*	0.002	*0.001*	*9*	0.003	*0.001*	*9*	0.006	*0.001*	*9*	0.006	*0.002*	*9*	0.002	*0.001*	*9*	0.005	*0.003*	*9*
DOC	mg/L	*0.50*	5.61	*0.41*	*9*	5.62	*0.72*	*9*	7.11	*2.62*	*9*	6.39	*2.56*	*9*	--	--	--	--	--	--	--	--	--	--	--	--

Notes
DL = method detection limit; N/A = not applicable; SD = standard deviation; n = sample size; -- = not analyzed
<DL results recorded as 0.5*DL

Table A.1.3 - Marchmont Marsh, pore water analytical data, 10-20 cm below SWI. Data presented by month and plot type.

			July						August						September						October					
Analytical			Non-Vegetated			Vegetated			Non-Vegetated			Vegetated			Non-Vegetated			Vegetated			Non-Vegetated			Vegetated		
Parameter	Units	*DL*	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Total P	mg/L	*0.005*	0.063	*0.037*	*9*	0.060	*0.024*	*9*	0.144	*0.126*	*9*	0.086	*0.041*	*9*	0.118	*0.076*	*9*	0.141	*0.069*	*9*	0.063	*0.060*	*9*	0.106	*0.061*	*9*
Phosphate	mg/L	*0.025*	0.013	*0*	*9*	0.013	*0*	*9*	0.013	*0*	*9*	0.013	*0*	*9*	0.013	*0*	*9*	0.013	*0*	*9*	0.013	*0*	*9*	0.017	*0.008*	*9*
Nitrate	mg/L	*0.009*	0.007	*0.004*	*9*	0.009	*0.006*	*9*	0.061	*0.046*	*9*	0.193	*0.110*	*9*	0.005	*0*	*9*	0.005	*0*	*9*	0.005	*0.003*	*9*	0.005	*0.002*	*9*
pH	N/A	*N/A*	7.01	*0.19*	*8*	6.91	*0.11*	*9*	6.94	*0.09*	*8*	6.82	*0.07*	*8*	7.06	*0.12*	*8*	6.94	*0.16*	*8*	7.05	*0.13*	*9*	6.81	*0.10*	*9*
Alkalinity	mg/L	*1.0*	161.6	*47.1*	*8*	135.9	*7.0*	*9*	169.6	*24.2*	*8*	160.9	*15.3*	*8*	140.1	*17.2*	*8*	145.3	*13.1*	*8*	124.8	*19.7*	*9*	132.9	*18.2*	*9*
Conductivity	µS/cm	*0.50*	346.59	*80.20*	*8*	292.28	*17.50*	*9*	344.04	*28.15*	*8*	321.58	*30.79*	*8*	305.09	*28.19*	*8*	310.70	*25.93*	*8*	277.72	*36.76*	*9*	291.11	*36.52*	*9*
Total Al	mg/L	*0.005*	0.075	*0.067*	*9*	0.044	*0.027*	*9*	0.075	*0.053*	*9*	0.070	*0.045*	*8*	0.039	*0.030*	*9*	0.014	*0.010*	*9*	0.046	*0.040*	*9*	0.014	*0.006*	*9*
Total Ba	mg/L	*0.003*	0.085	*0.029*	*9*	0.083	*0.007*	*9*	0.091	*0.014*	*9*	0.100	*0.011*	*8*	0.068	*0.014*	*9*	0.086	*0.010*	*9*	0.060	*0.016*	*9*	0.081	*0.015*	*9*
Total Ca	mg/L	*0.005*	43.631	*11.809*	*9*	35.987	*1.771*	*9*	42.667	*4.221*	*9*	42.918	*4.438*	*8*	38.536	*4.966*	*9*	41.801	*3.212*	*9*	37.588	*5.537*	*9*	39.474	*5.461*	*9*
Total Fe	mg/L	*0.002*	1.712	*1.463*	*9*	1.794	*0.357*	*9*	1.096	*0.785*	*9*	1.269	*0.640*	*8*	1.436	*0.654*	*9*	1.846	*0.606*	*9*	0.972	*0.767*	*9*	1.823	*0.964*	*9*
Total K	mg/L	*0.10*	1.07	*0.44*	*9*	1.05	*0.16*	*9*	1.16	*0.26*	*9*	0.72	*0.30*	*8*	0.86	*0.35*	*9*	0.69	*0.34*	*9*	0.92	*0.45*	*9*	0.83	*0.48*	*9*
Total Mg	mg/L	*0.01*	7.62	*2.30*	*9*	7.00	*0.44*	*9*	8.08	*1.96*	*9*	8.63	*1.09*	*8*	7.37	*1.41*	*9*	8.69	*1.03*	*9*	7.48	*1.82*	*9*	7.93	*1.13*	*9*
Total Mn	mg/L	*0.0002*	0.2789	*0.2574*	*9*	0.3282	*0.1074*	*9*	0.1081	*0.0884*	*9*	0.1379	*0.1285*	*8*	0.1988	*0.0831*	*9*	0.4068	*0.1865*	*9*	0.1503	*0.1148*	*9*	0.4735	*0.1994*	*9*
Total Na	mg/L	*0.01*	7.43	*3.16*	*9*	5.44	*1.75*	*9*	7.51	*2.81*	*9*	4.38	*0.91*	*8*	6.57	*1.97*	*9*	4.37	*0.81*	*9*	6.24	*1.84*	*9*	4.53	*1.62*	*9*
Total S	mg/L	*0.05*	0.34	*0.09*	*9*	0.34	*0.10*	*9*	0.57	*0.14*	*9*	0.85	*0.29*	*8*	0.26	*0.14*	*9*	0.40	*0.43*	*9*	0.37	*0.14*	*9*	0.32	*0.12*	*9*
Total Sr	mg/L	*0.005*	0.110	*0.030*	*9*	0.096	*0.005*	*9*	0.114	*0.014*	*9*	0.115	*0.012*	*8*	0.097	*0.012*	*9*	0.109	*0.008*	*9*	0.091	*0.014*	*9*	0.099	*0.014*	*9*
Total Zn	mg/L	*0.001*	0.007	*0.001*	*9*	0.008	*0.001*	*9*	0.003	*0.001*	*9*	0.003	*0.000*	*8*	0.007	*0.003*	*9*	0.007	*0.002*	*9*	0.002	*0.001*	*9*	0.005	*0.003*	*9*
DOC	mg/L	*0.50*	6.32	*1.12*	*9*	4.98	*1.70*	*9*	7.90	*3.17*	*9*	6.51	*2.43*	*9*	--	--	--	--	--	--	--	--	--	--	--	--

Notes
DL = method detection limit; N/A = not applicable; SD = standard deviation; n = sample size; -- = not analyzed
<DL results recorded as 0.5*DL

Table A.1.4 - Marchmont Marsh, pore water analytical data, 20-30 cm below SWI. Data presented by month and plot type.

			July						August						September						October					
Analytical			Non-Vegetated			Vegetated			Non-Vegetated			Vegetated			Non-Vegetated			Vegetated			Non-Vegetated			Vegetated		
Parameter	Units	*DL*	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Total P	mg/L	*0.005*	0.043	*0.008*	*5*	0.045	*0.015*	*9*	0.075	*0.067*	*9*	0.060	*0.031*	*9*	0.068	*0.046*	*9*	0.087	*0.015*	*9*	0.035	*0.022*	*9*	0.086	*0.060*	*9*
Phosphate	mg/L	*0.025*	0.013	*0*	*5*	0.013	*0*	*9*	0.013	*0*	*9*	0.013	*0*	*9*	0.013	*0*	*9*	0.013	*0*	*9*	0.013	*0*	*9*	0.014	*0.006*	*9*
Nitrate	mg/L	*0.009*	0.005	*0*	*5*	0.008	*0.004*	*9*	0.023	*0.025*	*9*	0.069	*0.061*	*9*	0.005	*0*	*9*	0.007	*0.006*	*9*	0.005	*0*	*9*	0.005	*0*	*9*
pH	N/A	*N/A*	7.04	*0.14*	*3*	6.82	*0.17*	*8*	6.83	*0.13*	*7*	6.73	*0.07*	*7*	6.88	*0.13*	*8*	6.86	*0.13*	*8*	6.94	*0.13*	*8*	6.68	*0.12*	*9*
Alkalinity	mg/L	*1.0*	130.6	*14.7*	*3*	123.1	*11.6*	*8*	166.2	*15.7*	*7*	153.5	*16.2*	*7*	140.3	*16.6*	*8*	137.7	*8.6*	*8*	138.1	*21.7*	*8*	126.1	*14.3*	*9*
Conductivity	µS/cm	*0.50*	326.27	*40.32*	*3*	278.80	*31.95*	*8*	346.79	*20.23*	*7*	325.24	*38.91*	*7*	324.19	*35.64*	*8*	305.88	*23.91*	*8*	303.78	*48.23*	*8*	289.58	*39.51*	*9*
Total Al	mg/L	*0.005*	0.089	*0.068*	*3*	0.112	*0.109*	*8*	0.148	*0.150*	*9*	0.093	*0.063*	*9*	0.072	*0.059*	*9*	0.019	*0.011*	*9*	0.100	*0.132*	*9*	0.017	*0.008*	*9*
Total Ba	mg/L	*0.003*	0.063	*0.002*	*3*	0.077	*0.012*	*8*	0.087	*0.011*	*9*	0.095	*0.015*	*9*	0.066	*0.014*	*9*	0.084	*0.010*	*9*	0.066	*0.014*	*9*	0.082	*0.017*	*9*
Total Ca	mg/L	*0.005*	39.073	*5.911*	*3*	34.680	*3.406*	*8*	44.144	*2.285*	*9*	42.958	*4.270*	*9*	41.643	*4.954*	*9*	41.370	*2.470*	*9*	42.534	*6.509*	*9*	38.781	*3.458*	*9*
Total Fe	mg/L	*0.002*	1.116	*0.170*	*3*	1.999	*0.338*	*8*	1.282	*0.917*	*9*	1.113	*0.427*	*9*	1.767	*0.720*	*9*	2.023	*0.546*	*9*	1.174	*0.682*	*9*	1.990	*0.869*	*9*
Total K	mg/L	*0.10*	0.60	*0.22*	*3*	0.57	*0.17*	*8*	0.70	*0.17*	*9*	0.71	*0.26*	*9*	0.59	*0.35*	*9*	0.55	*0.25*	*9*	0.72	*0.49*	*9*	0.98	*1.31*	*9*
Total Mg	mg/L	*0.01*	5.61	*0.64*	*3*	6.44	*0.61*	*8*	6.93	*1.23*	*9*	7.80	*1.06*	*9*	6.91	*1.48*	*9*	7.98	*0.51*	*9*	7.48	*2.07*	*9*	7.29	*0.75*	*9*
Total Mn	mg/L	*0.0002*	0.1269	*0.0326*	*3*	0.2409	*0.0750*	*8*	0.1272	*0.0871*	*9*	0.1345	*0.0830*	*9*	0.2091	*0.0923*	*9*	0.3080	*0.1047*	*9*	0.1683	*0.0777*	*9*	0.4168	*0.2289*	*9*
Total Na	mg/L	*0.01*	13.04	*0.95*	*3*	5.67	*1.91*	*8*	10.37	*5.48*	*9*	6.45	*2.36*	*9*	9.35	*4.40*	*9*	5.42	*1.52*	*9*	8.60	*3.83*	*9*	5.13	*2.82*	*9*
Total S	mg/L	*0.05*	0.30	*0.11*	*3*	0.27	*0.05*	*8*	0.43	*0.10*	*9*	0.43	*0.15*	*9*	0.14	*0.06*	*9*	0.31	*0.32*	*9*	0.24	*0.08*	*9*	0.21	*0.04*	*9*
Total Sr	mg/L	*0.005*	0.091	*0.011*	*3*	0.092	*0.010*	*8*	0.112	*0.009*	*9*	0.110	*0.012*	*9*	0.099	*0.011*	*9*	0.106	*0.005*	*9*	0.098	*0.015*	*9*	0.095	*0.010*	*9*
Total Zn	mg/L	*0.001*	0.007	*0.001*	*3*	0.008	*0.001*	*8*	0.003	*0.001*	*9*	0.003	*0.001*	*9*	0.007	*0.001*	*9*	0.006	*0.001*	*9*	0.003	*0.001*	*9*	0.005	*0.004*	*9*
DOC	mg/L	*0.50*	6.08	*0.29*	*5*	5.97	*1.36*	*9*	9.01	*3.40*	*9*	6.62	*2.30*	*9*	--	--	--	--	--	--	--	--	--	--	--	--

Notes
DL = method detection limit; N/A = not applicable; SD = standard deviation; n = sample size; -- = not analyzed
<DL results recorded as 0.5*DL

Table A.1.5 - Marchmont Marsh, pore water analytical data, 30-40 cm below SWI. Data presented by month and plot type.

			July						August						September						October					
Analytical			Non-Vegetated			Vegetated			Non-Vegetated			Vegetated			Non-Vegetated			Vegetated			Non-Vegetated			Vegetated		
Parameter	Units	*DL*	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Total P	mg/L	*0.005*	0.041	-	*1*	0.038	*0.009*	*4*	0.026	*0.016*	*9*	0.082	*0.087*	*8*	0.039	*0.027*	*7*	0.057	*0.016*	*9*	0.020	*0.010*	*8*	0.049	*0.031*	*9*
Phosphate	mg/L	*0.025*	0.013	-	*1*	0.013	*0*	*4*	0.013	*0*	*9*	0.013	*0*	*8*	0.013	*0*	*7*	0.013	*0*	*9*	0.013	*0*	*8*	0.015	*0.008*	*9*
Nitrate	mg/L	*0.009*	0.005	-	*1*	0.007	*0.004*	*4*	0.006	*0.003*	*9*	0.053	*0.083*	*8*	0.005	*0*	*7*	0.005	*0*	*9*	0.005	*0*	*8*	0.005	*0*	*9*
pH	N/A	*N/A*	--	-	*0*	6.66	*0.09*	*2*	6.82	*0.09*	*5*	6.71	*0.13*	*7*	6.86	*0.05*	*4*	6.80	*0.26*	*7*	6.87	-	*1*	6.63	*0.09*	*7*
Alkalinity	mg/L	*1.0*	--	-	*0*	112.9	*6.9*	*2*	144.1	*4.5*	*5*	151.4	*23.6*	*7*	131.2	*30.0*	*4*	127.6	*8.2*	*7*	128.7	-	*1*	116.6	*13.6*	*7*
Conductivity	µS/cm	*0.50*	--	-	*0*	271.85	*16.90*	*2*	341.56	*32.41*	*5*	332.27	*35.41*	*7*	309.75	*81.54*	*4*	292.64	*12.57*	*7*	320.30	-	*1*	280.34	*32.92*	*7*
Total Al	mg/L	*0.005*	0.178	-	*1*	0.194	*0.141*	*3*	0.441	*0.510*	*9*	0.172	*0.246*	*7*	0.232	*0.362*	*6*	0.016	*0.006*	*8*	0.106	*0.184*	*6*	0.030	*0.013*	*8*
Total Ba	mg/L	*0.003*	0.051	-	*1*	0.083	*0.010*	*3*	0.075	*0.012*	*9*	0.095	*0.013*	*7*	0.063	*0.016*	*6*	0.082	*0.008*	*8*	0.064	*0.017*	*6*	0.076	*0.009*	*8*
Total Ca	mg/L	*0.005*	43.560	-	*1*	34.853	*2.178*	*3*	41.642	*3.978*	*9*	44.206	*7.711*	*7*	38.435	*7.058*	*6*	40.252	*3.073*	*8*	41.230	*6.172*	*6*	37.013	*2.181*	*8*
Total Fe	mg/L	*0.002*	0.987	-	*1*	2.466	*0.749*	*3*	1.435	*0.646*	*9*	1.550	*0.405*	*7*	1.654	*0.608*	*6*	2.049	*0.689*	*8*	1.121	*0.605*	*6*	1.776	*0.325*	*8*
Total K	mg/L	*0.10*	0.49	-	*1*	0.64	*0.39*	*3*	0.37	*0.12*	*9*	0.69	*0.53*	*7*	0.41	*0.30*	*6*	0.43	*0.44*	*8*	0.66	*0.48*	*6*	0.52	*0.71*	*8*
Total Mg	mg/L	*0.01*	5.040	-	*1*	6.13	*0.24*	*3*	6.09	*1.00*	*9*	7.38	*0.77*	*7*	6.15	*2.01*	*6*	7.81	*1.38*	*8*	7.17	*1.89*	*6*	6.75	*0.49*	*8*
Total Mn	mg/L	*0.0002*	0.0781	-	*1*	0.2619	*0.1920*	*3*	0.1270	*0.0526*	*9*	0.1914	*0.1051*	*7*	0.1508	*0.0958*	*6*	0.2839	*0.0827*	*8*	0.1415	*0.0686*	*6*	0.2519	*0.0773*	*8*
Total Na	mg/L	*0.01*	14.100	-	*1*	4.59	*0.96*	*3*	11.72	*7.38*	*9*	7.39	*2.79*	*7*	11.35	*6.72*	*6*	5.36	*2.34*	*8*	8.46	*5.93*	*6*	5.45	*3.61*	*8*
Total S	mg/L	*0.05*	0.260	-	*1*	0.35	*0.17*	*3*	0.29	*0.04*	*9*	0.36	*0.16*	*7*	0.12	*0.04*	*6*	0.29	*0.46*	*8*	0.21	*0.09*	*6*	0.17	*0.03*	*8*
Total Sr	mg/L	*0.005*	0.093	-	*1*	0.091	*0.002*	*3*	0.100	*0.010*	*9*	0.108	*0.012*	*7*	0.090	*0.018*	*6*	0.102	*0.008*	*8*	0.094	*0.016*	*6*	0.089	*0.006*	*8*
Total Zn	mg/L	*0.001*	0.009	-	*1*	0.009	*0.001*	*3*	0.003	*0.001*	*9*	0.003	*0.001*	*7*	0.007	*0.002*	*6*	0.008	*0.001*	*8*	0.002	*0.001*	*6*	0.005	*0.004*	*8*
DOC	mg/L	*0.50*	5.60	-	*1*	6.53	*0.35*	*4*	9.32	*3.76*	*9*	7.00	*2.33*	*8*	--	--	--	--	--	--	--	--	--	--	--	--

Notes

DL = method detection limit; N/A = not applicable; SD = standard deviation; n = sample size; -- = not analyzed; - = incalculable

<DL results recorded as 0.5*DL

Table A.1.6 - Marchmont Marsh, Water Sample Analytical Results, June to October

Lab ID	Sample Date	Sample ID	Total P	Phosphate PO_4-P	Nitrite NO_2-N	Nitrate NO_3-N	DOC	pH	Total Alkalinity as $CaCO_3$	Conductivity	Total Metals: Al	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	S	Sr	Ti	V	Zn	Reactive Silicates SiO_2	Chlorophyll "a"
Parameter / Method Detection Limit / Units			0.0050	0.0250	0.006	0.0090	0.50	n/a	1.0	0.50	0.0050	0.0050	0.0030	0.002	0.0050	0.0010	0.010	0.002	0.002	0.002	0.10	0.010	0.0002	0.010	0.002	0.0050	0.050	0.0050	0.010	0.006	0.0010	0.250	0.2
			mg/L	mg/L	mg/L	mg/L	mg/L	n/a	mg/L	uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L
EL100186-004	06/29/10	MM-W-1	0.0110	0.0125	0.003	0.0170	24.70	7.80	134.7	288.20	0.0200	0.0025	0.0530	0.001	33.5370	0.0005	0.005	0.001	0.001	0.097	0.95	8.470	0.0181	5.030	0.001	0.0025	1.640	0.0950	0.005	0.003	0.0080	7.400	3.2
EL100186-005	06/29/10	MM-W-2	0.0160	0.0125	0.003	0.0150	24.00	7.79	133.2	287.30	0.0310	0.0025	0.0530	0.001	33.6970	0.0005	0.005	0.001	0.001	0.107	0.94	8.520	0.0200	5.000	0.002	0.0025	1.640	0.0950	0.005	0.003	0.0060	7.400	8.4
EL100186-006	06/29/10	MM-W-3	0.0120	0.0125	0.003	0.0110	10.40	7.80	133.6	287.40	0.0400	0.0025	0.0540	0.001	33.8370	0.0005	0.005	0.001	0.001	0.121	0.96	8.510	0.0219	5.090	0.001	0.0025	1.660	0.0950	0.005	0.003	0.0120	7.400	2.6
EL100219-055	07/26/10	MM-V-1a-1	0.0300	0.0125	0.003	0.0120	3.50	7.59	130.4	275.60	0.0440	0.0025	0.0670	0.001	33.7400	0.0005	0.005	0.001	0.002	0.220	1.03	10.320	0.1109	4.770	0.001	0.0025	1.600	0.1060	0.005	0.003	0.0070	--	--
EL100219-056	07/26/10	MM-V-1a-2	0.0620	0.0125	0.003	0.0310	4.30	7.14	134.7	280.40	0.0270	0.0025	0.0760	0.001	34.7200	0.0005	0.005	0.001	0.002	0.934	1.09	7.630	0.2480	4.340	0.001	0.0025	0.730	0.0990	0.005	0.003	0.0060	--	--
EL100219-057	07/26/10	MM-V-1a-3	0.0700	0.0125	0.003	0.0170	5.10	6.85	124.4	258.00	0.0560	0.0025	0.0730	0.001	33.8800	0.0005	0.005	0.001	0.002	2.014	0.66	6.440	0.2344	4.350	0.001	0.0025	0.290	0.0910	0.005	0.003	0.0080	--	--
EL100219-058	07/26/10	MM-V-1a-4	0.0360	0.0125	0.003	0.0100	6.60	6.91	101.8	223.10	0.3790	0.0025	0.0570	0.001	29.1000	0.0005	0.005	0.001	0.002	2.038	0.27	5.260	0.1618	4.140	0.001	0.0025	0.240	0.0740	0.012	0.003	0.0080	--	--
EL100219-059	07/26/10	MM-V-1b-0	0.0390	0.0125	0.003	0.0045	5.40	--	--	--	0.0180	0.0025	0.0570	0.001	31.6200	0.0005	0.005	0.001	0.002	0.028	1.06	10.230	0.0063	4.800	0.001	0.0025	1.830	0.1010	0.005	0.003	0.0120	8.90	--
EL100219-060	07/26/10	MM-V-1b-1	0.1280	0.0125	0.003	0.0110	5.60	7.64	124.5	264.70	0.0280	0.0025	0.0560	0.001	31.5400	0.0005	0.005	0.001	0.002	0.040	1.05	10.180	0.0059	4.760	0.001	0.0025	1.840	0.1010	0.005	0.003	0.0110	9.10	--
EL100219-061	07/26/10	MM-V-1b-2	0.0670	0.0125	0.003	0.0045	6.40	7.15	142.6	291.00	0.0130	0.0070	0.0820	0.001	37.3000	0.0005	0.005	0.001	0.002	1.330	0.92	8.270	0.3828	4.470	0.001	0.0025	0.560	0.1050	0.005	0.003	0.0080	25.60	--
EL100219-062	07/26/10	MM-V-1b-3	0.0720	0.0125	0.003	0.0045	7.10	6.87	142.2	300.40	0.0300	0.0060	0.0850	0.001	38.0400	0.0005	0.005	0.001	0.002	1.756	1.01	7.650	0.4380	4.670	0.001	0.0025	0.310	0.1030	0.005	0.003	0.0070	27.20	--
EL100219-063	07/26/10	MM-V-1b-4	0.0440	0.0125	0.003	0.0090	6.50	6.73	117.1	258.10	0.0730	0.0100	0.0710	0.001	32.5000	0.0005	0.005	0.001	0.002	1.811	0.56	6.070	0.2312	4.540	0.001	0.0025	0.190	0.0850	0.005	0.003	0.0090	20.00	--
EL100219-064	07/26/10	MM-V-1b-5	0.0340	0.0125	0.003	0.0045	6.70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16.80	--
EL100219-067	07/26/10	MM-V-1c-0	0.0220	0.0125	0.003	0.0045	4.30	7.71	126.4	268.00	0.0240	0.0025	0.0550	0.001	31.2200	0.0005	0.005	0.001	0.002	0.054	1.04	10.100	0.0112	4.690	0.001	0.0025	1.810	0.0990	0.005	0.003	0.0100	--	--
EL100219-068	07/26/10	MM-V-1c-1	0.0320	0.0125	0.003	0.0500	4.40	7.56	128.9	274.50	0.0470	0.0025	0.0660	0.001	31.7200	0.0005	0.005	0.001	0.002	0.363	1.05	8.780	0.1641	4.600	0.001	0.0025	1.520	0.1010	0.005	0.003	0.0100	--	--
EL100219-069	07/26/10	MM-V-1c-2	0.0760	0.0125	0.003	0.0180	5.10	7.09	147.6	307.50	0.0410	0.0025	0.0810	0.001	36.3800	0.0005	0.005	0.001	0.002	1.423	1.34	8.500	0.2200	4.710	0.001	0.0025	0.570	0.1050	0.005	0.003	0.0060	--	--
EL100219-070	07/26/10	MM-V-1c-3	0.0600	0.0125	0.003	0.0170	4.10	7.14	133.2	275.10	0.1030	0.0025	0.0800	0.001	34.4800	0.0005	0.005	0.001	0.002	1.874	1.08	7.290	0.2032	4.760	0.001	0.0025	0.490	0.0960	0.005	0.003	0.0070	--	--
EL100219-071	07/26/10	MM-V-1c-4	0.0410	0.0125	0.003	0.0150	6.80	6.77	117.9	258.70	0.1020	0.0025	0.0700	0.001	33.0800	0.0005	0.005	0.001	0.002	2.228	0.48	6.500	0.1541	4.650	0.001	0.0025	0.340	0.0880	0.005	0.003	0.0080	--	--
EL100219-072	07/26/10	MM-V-2a-1	0.0200	0.0125	0.003	0.0045	4.80	7.70	125.3	267.80	0.0290	0.0025	0.0570	0.001	32.0600	0.0005	0.005	0.001	0.002	0.035	1.07	10.290	0.0068	4.830	0.001	0.0025	1.840	0.1020	0.005	0.003	0.0120	8.60	--
EL100219-073	07/26/10	MM-V-2a-2	0.0510	0.0125	0.003	0.0045	5.80	7.04	147.1	302.50	0.0160	0.0050	0.0840	0.001	37.6600	0.0005	0.005	0.001	0.002	2.132	0.96	8.030	0.4806	4.220	0.001	0.0025	0.420	0.1060	0.005	0.003	0.0090	24.40	--
EL100219-074	07/26/10	MM-V-2a-3	0.0830	0.0125	0.003	0.0045	6.20	6.93	142.5	301.80	0.0250	0.0050	0.0900	0.001	37.0200	0.0005	0.005	0.001	0.002	1.743	1.08	7.370	0.3744	4.680	0.001	0.0025	0.300	0.1010	0.005	0.003	0.0070	28.80	--
EL100219-075	07/26/10	MM-V-2a-4	0.0520	0.0125	0.003	0.0110	6.10	7.21	127.9	287.90	0.0790	0.0080	0.0850	0.001	35.5800	0.0005	0.005	0.001	0.002	1.726	0.60	6.830	0.2160	5.730	0.001	0.0025	0.320	0.0990	0.005	0.003	0.0080	22.80	--
EL100219-076	07/26/10	MM-V-2a-5	0.0390	0.0125	0.003	0.0045	6.40	6.72	108.0	259.90	0.1280	0.0100	0.0770	0.001	32.3400	0.0005	0.005	0.001	0.002	2.070	0.27	5.930	0.2026	5.320	0.001	0.0025	0.280	0.0880	0.005	0.003	0.0100	17.20	--
EL100219-077	07/26/10	MM-V-2b-0	0.0220	0.0125	0.003	0.0045	5.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100219-078	07/26/10	MM-V-2b-1	0.0190	0.0125	0.003	0.0045	5.10	7.62	127.0	266.90	0.0210	0.0080	0.0600	0.001	32.4000	0.0005	0.005	0.001	0.002	0.060	1.06	10.210	0.0687	4.790	0.001	0.0025	1.740	0.1020	0.005	0.003	0.0110	--	--
EL100219-079	07/26/10	MM-V-2b-2	0.0430	0.0125	0.003	0.0045	5.50	7.22	148.8	304.90	0.0270	0.0060	0.0870	0.001	37.9000	0.0005	0.005	0.001	0.002	1.623	1.20	8.180	0.4104	4.680	0.001	0.0025	0.450	0.1060	0.005	0.003	0.0080	--	--
EL100219-080	07/26/10	MM-V-2b-3	0.0230	0.0125	0.003	0.0045	1.40	6.93	139.6	292.20	0.0340	0.0070	0.0840	0.001	36.7800	0.0005	0.005	0.001	0.002	1.816	1.25	7.090	0.4502	4.800	0.001	0.0025	0.310	0.0990	0.005	0.003	0.0090	--	--
EL100219-081	07/26/10	MM-V-2b-4	0.0190	0.0125	0.003	0.0045	2.40	6.76	121.1	272.20	0.0750	0.0130	0.0750	0.001	34.9000	0.0005	0.005	0.001	0.002	1.753	0.75	6.240	0.3002	5.090	0.001	0.0025	0.260	0.0920	0.005	0.003	0.0090	--	--
EL100219-082	07/26/10	MM-V-2b-5	0.0290	0.0125	0.003	0.0130	6.10	--	--	--	0.3550	0.0060	0.0780	0.001	36.2000	0.0005	0.005	0.001	0.002	1.999	0.59	6.400	0.1065	4.960	0.001	0.0025	0.540	0.0920	0.015	0.003	0.0100	--	--
EL100219-083	07/26/10	MM-V-2c-1	0.0200	0.0125	0.003	0.0130	4.70	--	--	--	0.0290	0.0025	0.0580	0.001	31.1200	0.0005	0.005	0.001	0.002	0.077	1.02	8.840	0.1177	4.670	0.001	0.0025	1.800	0.0990	0.005	0.003	0.0110	--	--
EL100219-084	07/26/10	MM-V-2c-2	0.0670	0.0125	0.003	0.0090	6.60	6.97	165.1	340.80	0.0140	0.0025	0.1010	0.001	42.2800	0.0005	0.005	0.001	0.002	1.735	1.24	8.810	0.5354	4.780	0.001	0.0025	0.360	0.1170	0.005	0.003	0.0070	--	--
EL100219-085	07/26/10	MM-V-2c-3	0.0990	0.0125	0.003	0.0045	4.00	6.83	145.6	315.50	0.0210	0.0110	0.0960	0.001	38.2800	0.0005	0.005	0.001	0.002	2.106	1.09	7.120	0.4598	4.330	0.001	0.0025	0.220	0.1010	0.005	0.003	0.0110	--	--
EL100219-086	07/26/10	MM-V-2c-4	0.0700	0.0125	0.003	0.0045	6.60	6.72	140.8	319.50	0.0770	0.0090	0.0990	0.001	40.6800	0.0005	0.005	0.001	0.002	2.728	0.77	7.240	0.3762	4.270	0.001	0.0025	0.270	0.1070	0.005	0.003	0.0090	--	--
EL100219-089	07/26/10	MM-V-2c-5	0.0490	0.0125	0.003	0.0045	6.90	6.59	117.8	283.80	0.0980	0.0140	0.0940	0.001	36.0200	0.0005	0.005	0.001	0.002	3.330	1.05	6.060	0.4766	3.500	0.001	0.0025	0.230	0.0920	0.005	0.003	0.0080	--	--
EL100219-090	07/26/10	MM-V-2c-6	0.0620	0.0125	0.003	0.0045	7.20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100219-091	07/26/10	MM-V-3a-0	0.0580	0.0125	0.003	0.0045	4.20	7.69	125.0	262.00	0.0200	0.0025	0.0560	0.001	31.3200	0.0005	0.005	0.001	0.002	0.051	1.03	10.090	0.0086	4.720	0.001	0.0025	1.790	0.1000	0.005	0.003	0.0100	--	--
EL100219-092	07/26/10	MM-V-3a-1	0.0270	0.0125	0.003	0.0220	4.30	7.63	124.8	270.00	0.0240	0.0025	0.0590	0.001	32.4200	0.0005	0.005	0.001	0.002	0.045	1.07	10.440	0.0063	4.880	0.001	0.0025	1.880	0.1030	0.005	0.003	0.0110	--	--
EL100219-093	07/26/10	MM-V-3a-2	0.0160	0.0125	0.003	0.0045	5.30	7.20	142.9	295.70	0.0160	0.0025	0.0830	0.001	37.3400	0.0005	0.005	0.001	0.002	1.419	1.26	8.250	0.2996	4.930	0.001	0.0025	0.450	0.1050	0.005	0.003	0.0080	--	--
EL100219-094	07/26/10	MM-V-3a-3	0.0380	0.0125	0.003	0.0130	4.70	6.93	133.5	291.30	0.0280	0.0025	0.0770	0.001	34.1600	0.0005	0.005	0.001	0.002	1.372	1.16	7.050	0.1976	6.280	0.001	0.0025	0.510	0.0930	0.005	0.003	0.0060	--	--
EL100219-095	07/26/10	MM-V-3a-4	0.0480	0.0125	0.003	0.0045	6.30	6.71	128.2	307.10	0.0390	0.0025	0.0790	0.001	34.5000	0.0005	0.005	0.001	0.002	1.866	0.70	6.440	0.2050	9.700	0.001	0.0025	0.220	0.0900	0.005	0.003	0.0070	--	--
EL100219-096	07/26/10	MM-V-3b-0b	0.0420	0.0125	0.003	0.0045	4.70	--	--	--	0.0110	0.0025	0.0550	0.001	30.7400	0.0005	0.005	0.001	0.002	0.039	1.01	8.840	0.0040	4.650	0.001	0.0025	1.780	0.0980	0.005	0.003	0.0120	--	--
EL100219-097	07/26/10	MM-V-3b-0	0.0180	0.0125	0.003	0.0090	4.80	7.59	133.3	278.50	0.0120	0.0025	0.0610	0.001	32.4000	0.0005	0.005	0.001	0.002	0.294	1.06	10.030	0.1019	4.700	0.001	0.0025	1.450	0.1020	0.005	0.003	0.0080	--	--
EL100219-098	07/26/10	MM-V-3b-1	0.0170	0.0125	0.003	0.0045	5.60	7.12	135.6	287.80	0.0120	0.0050	0.0760	0.001	35.5200	0.0005	0.005	0.001	0.002	1.095	1.02	7.440	0.2934	4.770	0.001	0.0025	0.360	0.0980	0.005	0.003	0.0070	--	--
EL100219-099	07/26/10	MM-V-3b-2	0.0430	0.0125	0.003	0.0090	6.20	7.20	141.3	303.50	0.0270	0.0070	0.0810	0.001	36.9000	0.0005	0.005	0.001	0.002	1.537	1.25	7.080	0.2312	7.300	0.001	0.0025	0.260	0.0970	0.005	0.003	0.0060	--	--
EL100219-100	07/26/10	MM-V-3b-3	0.0540	0.0125	0.003	0.0045	6.30	6.75	129.3	308.50	0.0690	0.0070	0.0830	0.001	36.9600	0.0005	0.005	0.001	0.002	2.314	1.13	6.340	0.3340	9.830	0.001	0.0025	0.230	0.0930	0.005	0.003	0.0080	--	--
EL100219-101	07/26/10	MM-V-3b-4	0.0610	0.0125	0.003	0.0045	6.10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100219-102	07/26/10	MM-V-3c-0	0.0170	0.0125	0.003	0.0045	4.40	7.73	124.1	261.60	0.0200	0.0025	0.0560	0.001	31.3600	0.0005	0.005	0.001	0.002	0.044	1.03	10.110	0.0059	4.740	0.001	0.0025	1.800	0.1000	0.005	0.003	0.0110	8.70	--
EL100219-103	07/26/10	MM-V-3c-1	0.0190	0.0125	0.003	0.0045	1.30	7.71	125.5	268.20	0.0240	0.0025	0.0550	0.001	30.8400	0.0005	0.005	0.001	0.002	0.063	1.02	8.860	0.0086	4.640	0.001	0.0025	1.790	0.0980	0.005	0.003	0.0080	10.30	--
EL100219-104	07/26/10	MM-V-3c-2	0.0730	0.0125	0.003	0.0045	5.40	7.08	152.5	315.10	0.0120	0.0060	0.0900	0.001	39.6600	0.0005	0.005	0.001	0.002	2.294	1.17	7.460	0.5492	4.330	0.001	0.0025	0.310	0.1040	0.005	0.003	0.0070	28.00	--
EL100219-105	07/26/10	MM-V-3c-3	0.0410	0.0125	0.003	0.0110	5.90	6.93	133.1	287.70	0.0300	0.0025	0.0760	0.001	34.2800	0.0005	0.005	0.001	0.002	1.149	1.01	6.680	0.2624	5.250	0.001	0.0025	0.370	0.0910	0.005	0.003	0.0070	22.80	--
EL100219-106	07/26/10	MM-V-3c-4	0.0350	0.0125	0.003	0.0100	6.30	6.71	130.3	303.80	0.0750	0.0025	0.0820	0.001	37.1000	0.0005	0.005	0.001	0.002	1.842	0.44	6.900	0.2828	7.220	0.001	0.0025	0.300	0.0970	0.005	0.003	0.0080	18.80	--
EL100219-004	07/26/10	MM-NV-1a-0b	0.0190	0.0125	0.003	0.0045	4.80	7.68	126.1	256.40	0.0270	0.0025	0.0550	0.001	31.5800	0.0005	0.005	0.001	0.001	0.054	1.01	10.050	0.0071	4.610	0.001	0.0025	1.760	0.0980	0.005	0.003	0.0090	--	--
EL100219-005	07/26/10	MM-NV-1a-0	0.0250	0.0125	0.003	0.0045	4.70	7.63	124.7	265.90	0.0330	0.0025	0.0550	0.001	31.5600	0.0005	0.005	0.001	0.002	0.067	1.02	10.090	0.0091	4.620	0.001	0.0025	1.770	0.0980	0.005	0.003	0.0080	--	--
EL100219-006	07/26/10	MM-NV-1a-1	0.0480	0.0125	0.003	0.0100	5.70	7.26	140.2	291.30	0.0520	0.0025	0.0740	0.001	35.5200	0.0005	0.005	0.001	0.002	0.826	1.20	10.060	0.2210	4.760	0.001	0.0025	0.900	0.1050	0.005	0.003	0.0090	--	--
EL100219-007	07/26/10	MM-NV-1a-2	0.0700	0.0125	0.003	0.0090	5.70	7.11	159.8	321.90	0.0490	0.0050	0.0850	0.001	41.3400	0.0005	0.005	0.001	0.002	1.728	1.42	8.750	0.4184	4.600	0.001	0.0025	0.320	0.1110	0.005	0.003	0.0070	--	--
EL100219-008	07/26/10	MM-NV-1a-3	0.0800	0.0125	0.003	0.0045	6.40	--	--	--	0.0610	0.0070	0.0800	0.001	36.6800	0.0005	0.005	0.001	0.002	2.294	0.93	7.080	0.1881	3.660	0.001	0.0025	0.300	0.0960	0.005	0.003	0.0080	--	--
EL100219-009	07/26/10	MM-NV-1b-0b	0.0300	0.0125	0.003	0.0100	4.40	7.65	125.4	266.50	0.0500	0.0025	0.0570	0.001	32.2200	0.0005	0.005	0.001	0.002	0.068	1.05	10.330	0.0100	4.800	0.001	0.0025	1.810	0.1010	0.005	0.003	0.0080	8.70	--
EL100219-010	07/26/10	MM-NV-1b-0	0.0200	0.0125	0.003	0.0110	4.50	7.69	126.0	269.20	0.0400	0.0025	0.0560	0.001	31.4600	0.0005	0.005	0.001	0.002	0.066	1.02	10.070	0.0093	4.670	0.001	0.0025	1.790	0.0990	0.005	0.003	0.0090	7.70	--
EL100219-011	07/26/10	MM-NV-1b-1	0.1190	0.0125	0.003	0.0100	5.70	7.31	156.8	317.50	0.0300	0.0025	0.0820	0.001	39.8600	0.0005	0.005	0.001	0.002	1.573	1.35	10.190	0.3680	4.630	0.001	0.0025	0.380	0.1130	0.005	0.003	0.0070	22.40	--
EL100219-012	07/26/10	MM-NV-1b-2	0.0780	0.0125	0.003	0.0150	5.20	6.84	195.9	388.80	0.0420	0.0025	0.1080	0.001	49.3800	0.0005	0.005	0.001	0.002	3.146	1.67	10.010	0.5382	3.800	0.001	0.0025	0.280	0.1290	0.005	0.003	0.0070	29.60	--
EL100219-013	07/26/10	MM-NV-1b-3	0.1100	0.0125	0.003	0.0045	7.80	6.68	186.5	371.30	0.0450	0.0080	0.1090	0.001	50.1000	0.0005	0.005	0.001	0.002	3.652	1.10	8.430	0.5288	2.860	0.001	0.0025	0.220	0.1300	0.005	0.003	0.0080	24.00	--
EL100219-014	07/26/10	MM-NV-1c-0b	0.0240	0.0125	0.003	0.0045	5.30	7.70	126.2	266.20	0.0510	0.0025	0.0560	0.001	31.9400	0.0005	0.005	0.001	0.002	0.101	1.04	10.190	0.0177	4.700	0.001	0.0025	1.800	0.0990	0.005	0.003	0.0080	--	--
EL100219-015	07/26/10	MM-NV-1c-0	0.0520	0.0125	0.003	0.0045	5.20	7.70	127.2	271.50	0.0160	0.0025	0.0560	0.001	31.3800	0.0005	0.005	0.001	0.002	0.032	1.02	8.840	0.0090	4.550	0.001	0.0025	1.740	0.0970	0.005	0.003	0.0090	--	--
EL100219-016	07/26/10	MM-NV-1c-1	0.1000	0.0125	0.003	0.0160	5.30	7.23	167.4	338.00	0.0480	0.0025	0.0890	0.001	41.9400	0.0005	0.005	0.001	0.002	1.839	1.47	10.530	0.3736	4.620	0.001	0.0025	0.360	0.1180	0.005	0.003	0.0060	--	--
EL100219-017	07/26/10	MM-NV-1c-2	0.1770	0.0125	0.003	0.0090	5.90	6.96	229.7	451.70	0.0560	0.0025	0.1340	0.001	59.3400	0.0005	0.005	0.001	0.002	3.978	2.46	12.110	0.8382	4.720	0.001	0.0025	0.360	0.1570	0.005	0.003	0.0100	--	--
EL100219-018	07/26/10	MM-NV-1c-3	0.1330	0.0125	0.003	0.0045	8.50	6.78	260.9	504.00	0.0800	0.0025	0.1540	0.001	67.8200	0.0005	0.005	0.001	0.002	4.558	2.16	13.310	0.8744	4.440	0.001	0.0025	0.340	0.1790	0.005	0.003	0.0090	--	--
EL100219-019	07/26/10	MM-NV-2a-0b	0.0390	0.0125	0.003	0.0045	4.50	--	--	--	0.0470	0.0025	0.0560	0.001	31.9200	0.0005	0.005	0.001	0.002	0.110	1.04	10.240	0.0229	4.710	0.001	0.0025	1.810	0.1000	0.005	0.003	0.0090	--	--
EL100219-020	07/26/10	MM-NV-2a-0	0.0220	0.0125	0.003	0.0045	4.60	7.69	125.6	268.10	0.0220	0.0025	0.0550	0.001	31.8000	0.0005	0.005	0.001	0.002	0.049	1.04	10.190	0.0094	4.720	0.001	0.0025	1.790	0.0990	0.005	0.003	0.0090	--	--
EL100219-023	07/26/10	MM-NV-2a-1	0.0180	0.0125	0.003	0.0100	4.90	7.67	127.4	270.70	0.0560	0.0025	0.0560	0.001	31.9800	0.0005	0.005	0.001	0.002	0.102	1.02	10.190	0.0188	4.620	0.001	0.0025	1.790	0.0980	0.005	0.003	0.0080	--	--
EL100219-024	07/26/10	MM-NV-2a-2	0.0650	0.0125	0.003	0.0100	5.80	7.41	161.2	342.30	0.0360	0.0025	0.0740	0.001	42.7000	0.0005	0.005	0.001	0.002	0.707	0.95	7.860	0.1783	7.380	0.001	0.0025	0.380	0.1050	0.005	0.003	0.0070	--	--
EL100219-025	07/26/10	MM-NV-2a-3	0.0520	0.0125	0.003	0.0045	5.90	7.15	179.8	408.30	0.2410	0.0025	0.0740	0.001	54.3400	0.0005	0.005	0.001	0.002	1.070	0.63	7.550	0.1627	12.220	0.001	0.0025	0.280	0.1160	0.005	0.003	0.0070	--	--
EL100219-026	07/26/10	MM-NV-2a-4	0.0530	0.0125	0.003	0.0045	6.40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100219-027	07/26/10	MM-NV-2b-0	0.0200	0.0125	0.003	0.0045	4.80	7.76	125.7	268.00	0.0480	0.0025	0.0540	0.001	31.5000	0.0005	0.005	0.001	0.002	0.087	1.01	10.050	0.0190	4.540	0.001	0.0025	1.770	0.0970	0.005	0.003	0.0090	--	--
EL100219-028	07/26/10	MM-NV-2b-1	0.0220	0.0125	0.003	0.0140	4.40	7.65	125.4	264.50	0.0570	0.0025	0.0570	0.001	32.5800	0.0005	0.005	0.001	0.002	0.084	1.04	10.420	0.0127	4.720	0.001	0.0025	1.860	0.1000	0.005	0.003	0.0080	--	--
EL100219-029	07/26/10	MM-NV-2b-2	0.1010	0.0125	0.003	0.0100	5.70	7.28	151.2	307.90	0.0230	0.0025	0.0770	0.001	39.0000	0.0005	0.005	0.001	0.002	0.827	1.11	8.090	0.2192	6.170	0.001	0.0025	0.430	0.1030	0.005	0.003	0.0080	--	--
EL100219-030	07/26/10	MM-NV-2b-3	0.0460	0.0125	0.003	0.0120	5.30	7.08	139.5	309.60	0.0250	0.0025	0.0720	0.001	38.2000	0.0005	0.005	0.001	0.002	0.742	0.84	7.090	0.1364	9.270	0.001	0.0025	0.290	0.0970	0.005	0.003	0.0050	--	--
EL100219-031	07/26/10	MM-NV-2b-4	0.0360	0.0125	0.003	0.0045	6.20	7.02	126.3	309.90	0.0590	0.0025	0.0610	0.001	36.8200	0.0005	0.005	0.001	0.002	1.312	0.39	5.940	0.1284	11.950	0.001	0.0025	0.220	0.0860	0.005	0.003	0.0070	--	--
EL100219-032	07/26/10	MM-NV-2c-1	0.0300	0.0125	0.003	0.0045	4.30	7.66	126.0	269.60	0.0150	0.0025	0.0550	0.001	31.9800	0.0005	0.005	0.001	0.002	0.026	1.03	10.180	0.0052	4.640	0.001	0.0025	1.780	0.0980	0.005	0.003	0.0080	8.80	--
EL100219-033	07/26/10	MM-NV-2c-2	0.0180	0.0125	0.003	0.0100	5.40	7.21	143.0	303.00	0.0280	0.0025	0.0710	0.001	38.1800	0.0005	0.005	0.001	0.002	1.113	1.20	8.100	0.2318	5.860	0.001	0.0025	0.660	0.1010	0.005	0.003	0.0070	27.20	--

Table A.1.6 - Marchmont Marsh, Water Sample Analytical Results, June to October

Parameter / Method Detection Limit / Units

Lab ID	Sample Date	Sample ID	Total P	Phosphate PO_4-P	Nitrite NO_2-N	Nitrate NO_3-N	DOC	pH	Total Alkalinity as $CaCO_3$	Conductivity	Total Metals: Al	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	S	Sr	Ti	V	Zn	Reactive Silicates SiO_2	Chlorophyll "a"
			0.0050	*0.0250*	*0.006*	*0.0090*	*0.50*	*n/a*	*1.0*	*0.50*	*0.0050*	*0.0050*	*0.0030*	*0.002*	*0.0050*	*0.0010*	*0.010*	*0.002*	*0.002*	*0.002*	*0.10*	*0.010*	*0.0002*	*0.010*	*0.002*	*0.0050*	*0.050*	*0.0050*	*0.010*	*0.006*	*0.0010*	*0.250*	*0.2*
			mg/L	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*n/a*	*mg/L*	*uS/cm*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*µg/L*
EL100219-034	07/26/10	MM-NV-2c-3	0.0460	0.0125	0.003	0.0100	6.20	7.15	151.0	343.70	0.0250	0.0025	0.0740	0.001	43.9600	0.0005	0.005	0.001	0.002	0.822	1.06	6.860	0.1846	9.650	0.001	0.0025	0.370	0.1050	0.005	0.003	0.0060	26.00	--
EL100219-035	07/26/10	MM-NV-2c-4	0.0480	0.0125	0.003	0.0045	6.10	7.19	146.9	372.20	0.0420	0.0070	0.0630	0.001	45.7800	0.0005	0.005	0.001	0.002	1.028	0.83	6.010	0.1587	13.490	0.001	0.0025	0.250	0.1030	0.005	0.003	0.0080	20.40	--
EL100219-036	07/26/10	MM-NV-2c-5	0.0410	0.0125	0.003	0.0045	5.60	--	--	--	0.1780	0.0025	0.0510	0.001	43.5600	0.0005	0.005	0.001	0.002	0.987	0.49	5.040	0.0781	14.100	0.001	0.0025	0.260	0.0930	0.005	0.003	0.0090	15.20	--
EL100219-037	07/26/10	MM-NV-3a-0	0.0250	0.0125	0.003	0.0045	4.80	7.71	124.4	264.90	0.0520	0.0025	0.0550	0.001	31.6400	0.0005	0.005	0.001	0.002	0.119	1.03	10.160	0.0246	4.610	0.001	0.0025	1.820	0.0980	0.005	0.003	0.0090	10.00	--
EL100219-038	07/26/10	MM-NV-3a-1	0.0200	0.0125	0.003	0.0100	4.70	7.67	125.9	267.70	0.0660	0.0025	0.0560	0.001	31.6200	0.0005	0.005	0.001	0.002	0.092	1.03	10.090	0.0132	4.650	0.001	0.0025	1.800	0.0980	0.005	0.003	0.0090	9.20	--
EL100219-039	07/26/10	MM-NV-3a-2	0.0160	0.0125	0.003	0.0045	6.40	7.28	126.1	271.20	0.0400	0.0060	0.0600	0.001	32.5000	0.0005	0.005	0.001	0.002	0.461	1.06	7.720	0.0988	5.090	0.001	0.0025	1.070	0.0910	0.005	0.003	0.0070	21.60	--
EL100219-040	07/26/10	MM-NV-3a-3	0.0290	0.0125	0.003	0.0045	5.90	7.19	133.1	298.10	0.0930	0.0025	0.0730	0.001	36.3800	0.0005	0.005	0.001	0.002	0.709	1.01	6.750	0.1104	9.070	0.001	0.0025	0.530	0.0960	0.005	0.003	0.0060	20.80	--
EL100219-041	07/26/10	MM-NV-3a-4	0.0350	0.0125	0.003	0.0045	6.10	6.92	118.5	296.70	0.1670	0.0060	0.0640	0.001	34.6200	0.0005	0.005	0.001	0.002	1.009	0.58	4.870	0.0935	13.670	0.001	0.0025	0.420	0.0830	0.005	0.003	0.0060	16.00	--
EL100219-042	07/26/10	MM-NV-3b-0b	0.0280	0.0125	0.003	0.0100	5.10	--	--	--	0.0310	0.0025	0.0540	0.001	31.7000	0.0005	0.005	0.001	0.002	0.069	1.01	10.120	0.0154	4.570	0.001	0.0025	1.800	0.0970	0.005	0.003	0.0110	--	--
EL100219-045	07/26/10	MM-NV-3b-0	0.0320	0.0125	0.003	0.0045	5.00	7.67	127.0	269.80	0.0330	0.0025	0.0570	0.001	32.2800	0.0005	0.005	0.001	0.002	0.078	1.08	10.350	0.0168	4.840	0.001	0.0025	1.840	0.1020	0.005	0.003	0.0090	--	--
EL100219-046	07/26/10	MM-NV-3b-1	0.0330	0.0125	0.003	0.0090	4.70	7.66	125.6	269.60	0.0280	0.0025	0.0560	0.001	31.3800	0.0005	0.005	0.001	0.002	0.067	1.05	10.170	0.0097	4.730	0.001	0.0025	1.830	0.1000	0.005	0.003	0.0080	--	--
EL100219-047	07/26/10	MM-NV-3b-2	0.0290	0.0125	0.003	0.0045	5.30	7.19	125.3	260.60	0.0170	0.0080	0.0630	0.001	31.4600	0.0005	0.005	0.001	0.002	0.625	1.21	7.220	0.1953	4.670	0.001	0.0025	0.380	0.0900	0.005	0.003	0.0070	--	--
EL100219-048	07/26/10	MM-NV-3b-3	0.0490	0.0125	0.003	0.0045	5.80	6.98	125.5	271.60	0.0380	0.0090	0.0660	0.001	32.8400	0.0005	0.005	0.001	0.002	0.911	1.10	6.140	0.2186	7.020	0.001	0.0025	0.290	0.0880	0.005	0.003	0.0060	--	--
EL100219-049	07/26/10	MM-NV-3b-4	0.0440	0.0125	0.003	0.0045	5.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100219-050	07/26/10	MM-NV-3c-0b	0.0240	0.0125	0.003	0.0045	4.30	7.71	125.8	269.20	0.0140	0.0025	0.0550	0.001	31.5400	0.0005	0.005	0.001	0.002	0.044	1.05	10.160	0.0058	4.730	0.001	0.0025	1.810	0.1000	0.005	0.003	0.0090	--	--
EL100219-051	07/26/10	MM-NV-3c-0	0.0260	0.0125	0.003	0.0045	4.20	7.74	126.0	269.00	0.0310	0.0025	0.0550	0.001	31.0200	0.0005	0.005	0.001	0.002	0.065	1.03	10.030	0.0112	4.680	0.001	0.0025	1.810	0.0990	0.005	0.003	0.0080	--	--
EL100219-052	07/26/10	MM-NV-3c-1	0.0280	0.0125	0.003	0.0045	3.80	7.67	125.8	268.20	0.0320	0.0025	0.0550	0.001	31.1800	0.0005	0.005	0.001	0.002	0.042	1.04	10.020	0.0061	4.690	0.001	0.0025	1.780	0.0990	0.005	0.003	0.0090	--	--
EL100219-053	07/26/10	MM-NV-3c-2	0.0330	0.0125	0.003	0.0140	5.10	7.29	127.5	275.80	0.0200	0.0025	0.0640	0.001	34.0200	0.0005	0.005	0.001	0.002	0.502	1.05	6.830	0.1126	5.900	0.001	0.0025	0.660	0.0920	0.005	0.003	0.0060	--	--
EL100219-054	07/26/10	MM-NV-3c-3	0.0240	0.0125	0.003	0.0130	5.10	7.04	116.6	266.10	0.0700	0.0050	0.0610	0.001	32.3600	0.0005	0.005	0.001	0.002	0.651	0.76	5.380	0.1058	8.650	0.001	0.0025	0.430	0.0830	0.005	0.003	0.0080	--	--
EL100261-004	08/26/10	MM-V-1a-1	0.061	0.0125	0.003	0.04	4.5	7.55	132.3	270.60	0.029	0.0025	0.059	0.001	33.42	0.0005	0.005	0.001	0.001	0.031	1.14	10.81	0.0055	4.71	0.001	0.0025	1.94	0.103	0.005	0.003	0.003	--	--
EL100261-005	08/26/10	MM-V-1a-0	0.098	0.0125	0.003	0.0045	4.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100261-006	08/26/10	MM-V-1a-2	0.121	0.0125	0.003	0.064	4.8	7.17	171.7	332.70	0.03	0.0025	0.084	0.001	43.26	0.0005	0.005	0.001	0.001	0.977	0.89	11.16	0.206	4.33	0.001	0.0025	0.74	0.123	0.005	0.003	0.003	--	--
EL100261-007	08/26/10	MM-V-1a-3	0.126	0.0125	0.003	0.311	5.4	6.87	150.6	294.10	0.116	0.0025	0.097	0.001	39.7	0.0005	0.005	0.001	0.001	1.263	0.96	8.33	0.0788	4.25	0.001	0.0025	0.88	0.104	0.005	0.003	0.003	--	--
EL100261-008	08/26/10	MM-V-1a-4	0.115	0.0125	0.003	0.195	5.4	--	--	--	0.229	0.0025	0.1	0.001	47.58	0.0005	0.005	0.001	0.001	1.49	1.09	7.34	0.0198	4.99	0.001	0.0025	0.59	0.106	0.005	0.003	0.003	--	--
EL100261-009	08/26/10	MM-V-1a-5	0.079	0.0125	0.003	0.247	5.7	6.92	187.1	372.70	0.727	0.0025	0.101	0.001	58.22	0.0005	0.005	0.001	0.001	1.599	0.7	8.07	0.0663	5.28	0.001	0.0025	0.68	0.117	0.021	0.003	0.004	--	--
EL100261-010	08/26/10	MM-V-1b-0	0.012	0.0125	0.003	0.013	4.4	--	--	--	0.027	0.0025	0.058	0.001	33.06	0.0005	0.005	0.001	0.001	0.048	1.1	10.8	0.006	4.67	0.001	0.0025	1.93	0.103	0.005	0.003	0.009	--	--
EL100261-011	08/26/10	MM-V-1b-1	0.015	0.0125	0.042	0.072	4.3	7.63	134.1	271.80	0.015	0.0025	0.059	0.001	32.82	0.0005	0.005	0.001	0.001	0.035	1.11	10.7	0.0035	4.66	0.001	0.0025	1.92	0.103	0.005	0.003	0.003	--	--
EL100261-012	08/26/10	MM-V-1b-2	0.116	0.0125	0.003	0.254	5.6	6.94	153.0	296.90	0.058	0.0025	0.087	0.001	40.72	0.0005	0.005	0.001	0.001	1.366	0.36	10.02	0.0751	3.32	0.001	0.0025	0.91	0.111	0.005	0.003	0.002	--	--
EL100261-013	08/26/10	MM-V-1b-3	0.084	0.0125	0.003	0.329	5.5	6.76	139.7	285.40	0.145	0.0025	0.09	0.001	39.82	0.0005	0.005	0.001	0.001	1.277	0.3	7.56	0.0483	4.03	0.001	0.0025	1.2	0.102	0.005	0.003	0.003	--	--
EL100261-014	08/26/10	MM-V-1b-4	0.042	0.0125	0.003	0.017	5.4	6.75	130.0	264.70	0.122	0.0025	0.065	0.001	36.78	0.0005	0.005	0.001	0.001	1.294	0.18	6.53	0.1073	4.19	0.001	0.0025	0.28	0.09	0.005	0.003	0.004	--	--
EL100261-015	08/26/10	MM-V-1c-1	0.038	0.0125	0.025	0.028	6.4	7.4	141.7	285.10	0.015	0.0025	0.066	0.001	35.3	0.0005	0.005	0.001	0.001	0.277	1.13	10.85	0.0582	4.75	0.001	0.0025	1.54	0.108	0.005	0.003	0.002	--	--
EL100261-016	08/26/10	MM-V-1c-2	0.215	0.0125	0.003	0.069	7.6	7	157.7	307.60	0.027	0.0025	0.089	0.001	39.34	0.0005	0.005	0.001	0.001	1.758	1.04	8.54	0.3062	4.62	0.001	0.0025	0.43	0.11	0.005	0.003	0.002	--	--
EL100261-017	08/26/10	MM-V-1c-3	0.133	0.0125	0.003	0.167	8.2	6.87	155.9	309.70	0.063	0.0025	0.1	0.001	40.26	0.0005	0.005	0.001	0.001	1.738	1	7.96	0.1199	4.97	0.001	0.0025	0.96	0.107	0.005	0.003	0.002	--	--
EL100261-018	08/26/10	MM-V-1c-4	0.097	0.0125	0.003	0.031	8.7	6.74	148.0	302.30	0.095	0.0025	0.088	0.001	40.3	0.0005	0.005	0.001	0.001	1.678	0.77	7.27	0.224	5.43	0.001	0.0025	0.36	0.103	0.005	0.003	0.002	--	--
EL100261-019	08/26/10	MM-V-1c-5	0.263	0.0125	0.003	0.057	9	6.74	155.0	321.60	0.119	0.0025	0.093	0.001	41.7	0.0005	0.005	0.001	0.001	1.81	1.58	7.43	0.1381	6.3	0.001	0.0025	0.44	0.104	0.005	0.003	0.003	--	--
EL100261-020	08/26/10	MM-V-2a-2	0.082	0.0125	0.003	0.012	9.2	6.9	167.2	318.40	0.012	0.0025	0.093	0.001	44.12	0.0005	0.005	0.001	0.001	2.612	0.21	8.38	0.4322	3	0.001	0.0025	0.33	0.118	0.005	0.003	0.003	--	--
EL100261-021	08/26/10	MM-V-2a-3	0.122	0.0125	0.003	0.049	9.5	6.75	164.1	328.90	0.027	0.0025	0.102	0.001	46.22	0.0005	0.005	0.001	0.001	1.813	0.48	8.53	0.2756	3.47	0.001	0.0025	0.45	0.121	0.005	0.003	0.002	--	--
EL100261-022	08/26/10	MM-V-2a-4	0.082	0.0125	0.003	0.039	9.6	6.65	166.0	350.10	0.055	0.0025	0.107	0.001	46.94	0.0005	0.005	0.001	0.001	1.417	0.59	8.54	0.2278	4.88	0.001	0.0025	0.37	0.125	0.005	0.003	0.002	--	--
EL100261-023	08/26/10	MM-V-2a-5	0.025	0.0125	0.003	0.017	9.8	6.57	142.8	323.60	0.059	0.0025	0.098	0.001	43.2	0.0005	0.005	0.001	0.001	1.21	0.35	7.61	0.1875	5.45	0.001	0.0025	0.26	0.113	0.005	0.003	0.002	--	--
EL100261-024	08/26/10	MM-V-2a-6	0.028	0.0125	0.003	0.01	10	6.53	138.7	318.00	0.097	0.0025	0.091	0.001	42.12	0.0005	0.005	0.001	0.001	1.346	0.41	7.4	0.2116	5.15	0.001	0.0025	0.35	0.108	0.005	0.003	0.003	--	--
EL100261-025	08/26/10	MM-V-2b-2	0.043	0.0125	0.003	0.0045	10.1	6.95	180.1	337.20	0.02	0.0025	0.102	0.001	50.04	0.0005	0.005	0.001	0.001	2.716	0.11	10.51	0.4394	2.58	0.001	0.0025	0.44	0.137	0.005	0.003	0.003	--	--
EL100261-026	08/26/10	MM-V-2b-3	0.059	0.0125	0.003	0.06	9.4	6.7	181.6	348.80	0.036	0.0025	0.116	0.001	50.66	0.0005	0.005	0.001	0.001	2.23	0.34	10.49	0.3912	2.91	0.001	0.0025	0.68	0.137	0.005	0.003	0.003	--	--
EL100261-027	08/26/10	MM-V-2b-4	0.06	0.0125	0.003	0.035	9	--	--	--	0.03	0.0025	0.102	0.001	45	0.0005	0.005	0.001	0.001	1.094	0.93	8.15	0.2034	5.04	0.001	0.0025	0.31	0.119	0.005	0.003	0.002	--	--
EL100261-028	08/26/10	MM-V-2b-5	0.163	0.0125	0.003	0.012	9	6.57	175.6	371.50	0.056	0.0025	0.119	0.001	49.76	0.0005	0.005	0.001	0.001	2.18	1.27	8.49	0.4068	6.04	0.001	0.0025	0.41	0.129	0.005	0.003	0.005	--	--
EL100261-029	08/26/10	MM-V-2b-6	0.149	0.0125	0.003	0.0045	9	--	--	--	0.118	0.0025	0.106	0.001	43.94	0.0005	0.005	0.001	0.001	1.606	1.07	7.55	0.3706	5.48	0.001	0.0025	0.41	0.112	0.005	0.003	0.004	--	--
EL100261-030	08/26/10	MM-V-2c-1	0.125	0.0125	0.084	0.116	8.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100261-031	08/26/10	MM-V-2c-2	0.142	0.0125	0.003	0.075	8.6	7.1	171.2	327.30	0.022	0.0025	0.096	0.001	44.18	0.0005	0.005	0.001	0.001	1.444	1.05	10.45	0.0404	4.62	0.001	0.0025	0.52	0.129	0.005	0.003	0.003	--	--
EL100261-032	08/26/10	MM-V-2c-3	0.125	0.0125	0.003	0.096	8.7	6.84	161.0	320.00	0.035	0.0025	0.097	0.001	40.78	0.0005	0.005	0.001	0.001	0.878	0.99	8.02	0.1121	4.54	0.001	0.0025	0.59	0.115	0.005	0.003	0.003	--	--
EL100261-033	08/26/10	MM-V-2c-4	0.038	0.0125	0.003	0.034	8.6	6.74	138.6	291.80	0.03	0.0025	0.086	0.001	37.52	0.0005	0.005	0.001	0.001	0.64	0.61	7.04	0.1125	5.8	0.001	0.0025	0.42	0.104	0.005	0.003	0.002	--	--
EL100261-034	08/26/10	MM-V-2c-5	0.029	0.0125	0.003	0.0045	8.6	6.64	123.0	272.00	0.089	0.0025	0.084	0.001	36.66	0.0005	0.005	0.001	0.001	0.939	0.24	6.39	0.2034	5.8	0.001	0.0025	0.26	0.099	0.005	0.003	0.004	--	--
EL100261-035	08/26/10	MM-V-2c-6	0.021	0.0125	0.003	0.0045	8.6	--	--	--	0.176	0.0025	0.084	0.001	36.82	0.0005	0.005	0.001	0.001	1.035	0.17	6.27	0.1881	5.08	0.001	0.0025	0.29	0.097	0.005	0.003	0.008	--	--
EL100261-036	08/26/10	MM-V-3a-0	0.018	0.0125	0.003	0.052	7.7	--	--	--	0.015	0.0025	0.058	0.001	31.9	0.0005	0.005	0.001	0.001	0.021	1.15	10.54	0.0024	4.81	0.001	0.0025	1.89	0.104	0.005	0.003	0.011	--	--
EL100261-039	08/26/10	MM-V-3a-1	0.011	0.0125	0.098	0.171	7.3	7.58	134.8	272.80	0.02	0.0025	0.065	0.001	31.98	0.0005	0.005	0.001	0.001	0.06	1.09	10.41	0.0041	4.69	0.001	0.0025	1.92	0.104	0.005	0.003	0.002	--	--
EL100261-040	08/26/10	MM-V-3a-2	0.06	0.0125	0.003	0.182	2.7	7	167.2	321.00	0.053	0.0025	0.099	0.001	44.54	0.0005	0.005	0.001	0.001	1.785	0.57	10.16	0.1736	3.6	0.001	0.0025	1.27	0.122	0.005	0.003	0.002	--	--
EL100261-041	08/26/10	MM-V-3a-3	0.045	0.0125	0.003	0.214	3.6	--	--	--	0.101	0.0025	0.112	0.001	47.16	0.0005	0.005	0.001	0.001	0.561	0.92	10.19	0.0477	5.48	0.001	0.0025	1.28	0.125	0.005	0.003	0.003	--	--
EL100261-042	08/26/10	MM-V-3a-4	0.043	0.0125	0.003	0.112	4	6.63	175.9	366.70	0.123	0.0025	0.117	0.001	48.1	0.0005	0.005	0.001	0.001	0.846	0.87	10.17	0.1855	7.07	0.001	0.0025	0.74	0.127	0.005	0.003	0.004	--	--
EL100261-043	08/26/10	MM-V-3a-5	0.051	0.0125	0.003	0.081	3.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100261-044	08/26/10	MM-V-3b-1	0.038	0.0125	0.029	0.021	3.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100261-045	08/26/10	MM-V-3b-2	0.178	0.0125	0.003	0.147	4.1	7.11	205.2	391.10	0.033	0.0025	0.119	0.001	50.9	0.0005	0.005	0.001	0.001	1.943	1.28	11.82	0.1983	5.68	0.001	0.0025	0.83	0.144	0.005	0.003	0.002	--	--
EL100261-046	08/26/10	MM-V-3b-3	0.045	0.0125	0.003	0.316	3.7	6.86	183.6	379.80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100261-047	08/26/10	MM-V-3b-4	0.022	0.0125	0.003	0.126	4.1	6.77	152.0	341.70	0.1	0.0025	0.096	0.001	41.18	0.0005	0.005	0.001	0.001	0.357	0.71	7.63	0.0057	11.11	0.001	0.0025	0.46	0.107	0.005	0.003	0.002	--	--
EL100261-048	08/26/10	MM-V-3b-5	0.026	0.0125	0.003	0.0045	4.6	6.71	127.0	316.00	0.096	0.0025	0.085	0.001	36.14	0.0005	0.005	0.001	0.001	1.675	0.32	6.51	0.1791	11.82	0.001	0.0025	0.24	0.092	0.005	0.003	0.003	--	--
EL100261-049	08/26/10	MM-V-3b-6	0.017	0.0125	0.003	0.0045	5.3	--	--	--	0.151	0.0025	0.076	0.001	36.56	0.0005	0.005	0.001	0.001	0.962	0.2	6.56	0.1291	11.08	0.001	0.0025	0.23	0.092	0.005	0.003	0.007	--	--
EL100261-050	08/26/10	MM-V-3c-1	0.042	0.0125	0.003	0.05	3.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100261-051	08/26/10	MM-V-3c-2	0.184	0.0125	0.003	0.152	4.8	7.12	188.9	361.60	0.035	0.0025	0.097	0.001	47	0.0005	0.005	0.001	0.001	1.362	1.14	10.96	0.0424	4.94	0.001	0.0025	0.6	0.134	0.005	0.003	0.003	--	--
EL100261-052	08/26/10	MM-V-3c-3	0.036	0.0125	0.003	0.196	4.6	6.89	151.0	305.90	0.035	0.0025	0.082	0.001	38.74	0.0005	0.005	0.001	0.001	0.39	0.73	7.98	0.0296	5.42	0.001	0.0025	0.73	0.106	0.005	0.003	0.003	--	--
EL100261-053	08/26/10	MM-V-3c-4	0.042	0.0125	0.003	0.028	4.8	6.84	163.9	359.40	0.052	0.0025	0.09	0.001	43.22	0.0005	0.005	0.001	0.001	1.203	0.62	7.54	0.1243	9.53	0.001	0.0025	0.32	0.11	0.005	0.003	0.002	--	--
EL100261-054	08/26/10	MM-V-3c-5	0.022	0.0125	0.003	0.0045	5.4	6.81	149.1	348.50	0.061	0.0025	0.083	0.001	43.76	0.0005	0.005	0.001	0.001	1.439	0.39	7.17	0.1587	11.05	0.001	0.0025	0.26	0.105	0.005	0.003	0.003	--	--
EL100261-055	08/26/10	MM-V-3c-6	0.015	0.0125	0.003	0.0045	5.5	--	--	--	0.163	0.0025	0.07	0.001	39.8	0.0005	0.005	0.001	0.001	1.296	0.24	6.35	0.1112	9.48	0.001	0.0025	0.27	0.092	0.005	0.003	0.008	--	--
EL100261-056	08/26/10	MM-NV-1a-2	0.114	0.0125	0.003	0.02	4.1	7.15	158.8	307.80	0.015	0.0025	0.075	0.001	37.14	0.0005	0.005	0.001	0.001	1.244	1.15	8.76	0.1511	4.44	0.001	0.0025	0.64	0.11	0.005	0.003	0.001	--	--
EL100261-057	08/26/10	MM-NV-1a-3	0.173	0.0125	0.003	0.036	5.6	--	--	--	0.098	0.0025	0.092	0.001	43.34	0.0005	0.005	0.001	0.001	1.676	1.07	10.57	0.0661	4.39	0.001	0.0025	0.61	0.121	0.005	0.003	0.002	--	--
EL100261-058	08/26/10	MM-NV-1a-4	0.11	0.0125	0.003	0.022	6.3	6.84	166.7	318.50	0.103	0.0025	0.088	0.001	43.16	0.0005	0.005	0.001	0.001	2.194	0.75	8.39	0.1805	3.7	0.001	0.0025	0.48	0.115	0.005	0.003	0.003	--	--
EL100261-059	08/26/10	MM-NV-1a-5	0.037	0.0125	0.003	0.013	6.8	--	--	--	1.755	0.0025	0.08	0.001	34.8	0.0005	0.005	0.003	0.001	2.22	0.28	6.66	0.0772	2.49	0.001	0.0025	0.33	0.086	0.03	0.003	0.005	--	--
EL100261-060	08/26/10	MM-NV-1a-6	0.052	0.0125	0.003	0.0045	7.4	6.65	116.1	229.80	3.08	0.0025	0.096	0.001	32.48	0.0005	0.005	0.006	0.001	2.736	0.35	6.34	0.1652	1.96	0.001	0.0025	0.3	0.078	0.047	0.003	0.006	--	--
EL100261-061	08/26/10	MM-NV-1b-1	0.024	0.0125	0.003	0.0045	4.3	7.58	133.7	268.10	0.009	0.0025	0.058	0.001	32.7	0.0005	0.005	0.001	0.001	0.018	1.16	10.81	0.0047	4.89	0.001	0.0025	1.91	0.106	0.005	0.003	0.002	--	--
EL100261-062	08/26/10	MM-NV-1b-2	0.2	0.0125	0.003	0.121	5.2	7.13	174.4	333.40	0.024	0.0025	0.097	0.001	41.18	0.0005	0.005	0.001	0.001	1.301	1.42	10.66	0.1204	4.69	0.001	0.0025	0.69	0.121	0.005	0.003	0.003	--	--
EL100261-063	08/26/10	MM-NV-1b-3	0.323	0.0125	0.003	0.035	6.3	6.9	189.9	363.10	0.023	0.0025	0.101	0.001	45.34	0.0005	0.005	0.001	0.001	1.752	1.68	10.11	0.2258	4.2	0.001	0.0025	0.44	0.123	0.005	0.003	0.003	--	--
EL100261-064	08/26/10	MM-NV-1b-4	0.131	0.0125	0.003	0.022	12.1	6.72	168.9	325.40	0.059	0.0025	0.095	0.001	42.88	0.0005	0.005	0.001	0.001	2.156	0.77	7.97	0.2146	3.87	0.001	0.0025	0.42	0.115	0.005	0.003	0.003	--	--
EL100261-065	08/26/10	MM-NV-1b-5	0.036	0.0125	0.003	0.0045	14.7	--	--	--	0.244	0.0025	0.072	0.001	37.64	0.0005	0.005	0.001	0.001	1.876	0.19	6.84	0.153	2.71	0.001	0.0025	0.26	0.097	0.005	0.003	0.005	--	--

Table A.1.6 - Marchmont Marsh, Water Sample Analytical Results, June to October

Lab ID	Sample Date	Sample ID	Total P	Phosphate PO_4-P	Nitrite NO_2-N	Nitrate NO_3-N	DOC	pH	Total Alkalinity as $CaCO_3$	Conductivity	Al	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	S	Sr	Ti	V	Zn	Reactive Silicates SiO_2	Chlorophyll "a"
			Parameter / Method Detection Limit / Units								Total Metals																						
			0.0050	0.0250	0.006	0.0090	0.50	n/a	1.0	0.50	0.0050	0.0050	0.0030	0.002	0.0050	0.0010	0.010	0.002	0.002	0.002	0.10	0.010	0.0002	0.010	0.002	0.0050	0.050	0.0050	0.010	0.006	0.0010	0.250	0.2
Lab ID	Sample Date	Sample ID	mg/L	mg/L	mg/L	mg/L	mg/L	n/a	mg/L	uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L
EL100261-066	08/26/10	MM-NV-1c-1	0.031	0.0125	0.003	0.025	9.3	7.56	134.9	272.60	0.009	0.0025	0.061	0.001	32	0.0005	0.005	0.001	0.001	0.044	1.11	10.42	0.0143	4.69	0.001	0.0025	1.92	0.103	0.005	0.003	0.002	--	--
EL100261-067	08/26/10	MM-NV-1c-2	0.315	0.0125	0.003	0.038	11.1	7.17	190.6	358.40	0.018	0.0025	0.095	0.001	43.26	0.0005	0.005	0.001	0.001	1.829	1.34	10.76	0.3224	4.43	0.001	0.0025	0.55	0.125	0.005	0.003	0.002	--	--
EL100261-068	08/26/10	MM-NV-1c-3	0.355	0.0125	0.003	0.099	14.1	6.89	219.0	400.90	0.019	0.0025	0.121	0.001	52.46	0.0005	0.005	0.001	0.001	2.618	1.38	11.01	0.2678	4.14	0.001	0.0025	0.61	0.144	0.005	0.003	0.002	--	--
EL100261-069	08/26/10	MM-NV-1c-4	0.212	0.0125	0.003	0.024	15.4	6.81	193.6	362.40	0.04	0.0025	0.104	0.001	49.46	0.0005	0.005	0.001	0.001	2.824	0.72	8.65	0.283	3.56	0.001	0.0025	0.44	0.132	0.005	0.003	0.003	--	--
EL100261-070	08/26/10	MM-NV-1c-5	0.057	0.0125	0.003	0.011	15.6	6.65	151.1	296.20	0.308	0.0025	0.09	0.001	42.52	0.0005	0.005	0.001	0.001	2.424	0.27	7.59	0.2396	2.68	0.001	0.0025	0.34	0.113	0.005	0.003	0.004	--	--
EL100261-071	08/26/10	MM-NV-2a-2	0.1	0.0125	0.003	0.141	11.4	7.14	145.5	295.40	0.067	0.0025	0.079	0.001	36.64	0.0005	0.005	0.001	0.001	0.689	1.09	7.32	0.089	6.01	0.001	0.0025	0.73	0.1	0.005	0.003	0.002	--	--
EL100261-074	08/26/10	MM-NV-2a-3	0.044	0.0125	0.003	0.072	11.6	6.98	140.2	308.00	0.098	0.0025	0.074	0.001	37.72	0.0005	0.005	0.001	0.001	0.841	0.81	6.1	0.079	8.8	0.001	0.0025	0.61	0.096	0.005	0.003	0.005	--	--
EL100261-075	08/26/10	MM-NV-2a-4	0.022	0.0125	0.003	0.017	12	6.9	141.8	346.60	0.507	0.0025	0.072	0.001	42.68	0.0005	0.005	0.001	0.001	1.4	0.39	6.15	0.0818	12.81	0.001	0.0025	0.34	0.104	0.005	0.003	0.003	--	--
EL100261-076	08/26/10	MM-NV-2a-5	0.012	0.0125	0.003	0.0045	11.8	6.87	140.4	353.60	0.329	0.0025	0.063	0.001	45.08	0.0005	0.005	0.001	0.001	1.376	0.32	6.03	0.1052	13.45	0.001	0.0025	0.24	0.105	0.014	0.003	0.002	--	--
EL100261-077	08/26/10	MM-NV-2a-6	0.017	0.0125	0.003	0.0045	12.4	6.88	138.8	366.20	0.454	0.0025	0.066	0.001	46.26	0.0005	0.005	0.001	0.001	1.372	0.35	6.17	0.0998	13.47	0.001	0.0025	0.28	0.105	0.012	0.003	0.003	--	--
EL100261-078	08/26/10	MM-NV-2b-2	0.188	0.0125	0.003	0.156	8.2	7.17	165.4	325.00	0.037	0.0025	0.087	0.001	39.56	0.0005	0.005	0.001	0.001	1.087	1.39	8.62	0.1537	5.17	0.001	0.0025	0.76	0.115	0.005	0.003	0.002	--	--
EL100261-079	08/26/10	MM-NV-2b-3	0.176	0.0125	0.003	0.166	9.3	7.01	163.7	329.00	0.063	0.0025	0.095	0.001	40.68	0.0005	0.005	0.001	0.001	1.161	1.3	7.38	0.1162	6.47	0.001	0.0025	0.87	0.109	0.005	0.003	0.002	--	--
EL100261-080	08/26/10	MM-NV-2b-4	0.081	0.0125	0.003	0.086	9.2	6.96	170.0	360.00	0.06	0.0025	0.09	0.001	45.52	0.0005	0.005	0.001	0.001	0.81	0.98	6.72	0.073	11.24	0.001	0.0025	0.61	0.112	0.005	0.003	0.003	--	--
EL100261-081	08/26/10	MM-NV-2b-5	0.017	0.0125	0.003	0.0045	9	6.85	145.2	337.30	0.577	0.0025	0.077	0.001	42.38	0.0005	0.005	0.001	0.001	1.449	0.52	5.39	0.1076	13.86	0.001	0.0025	0.25	0.096	0.016	0.003	0.002	--	--
EL100261-082	08/26/10	MM-NV-2b-6	0.069	0.0125	0.003	0.0045	8.9	--	--	--	0.37	0.0025	0.074	0.001	39.92	0.0005	0.005	0.001	0.001	1.086	0.63	5.03	0.0724	13.36	0.001	0.0025	0.27	0.09	0.01	0.003	0.003	--	--
EL100261-083	08/26/10	MM-NV-2c-1	0.011	0.0125	0.003	0.016	6.3	--	--	--	0.015	0.0025	0.057	0.001	30.98	0.0005	0.005	0.001	0.001	0.023	1.08	10.35	0.0041	4.69	0.001	0.0025	1.91	0.102	0.005	0.003	0.003	--	--
EL100261-084	08/26/10	MM-NV-2c-2	0.14	0.0125	0.003	0.046	7.1	7.2	162.9	317.10	0.033	0.0025	0.08	0.001	39.4	0.0005	0.005	0.001	0.001	0.777	1.16	8.46	0.1319	5.41	0.001	0.0025	0.55	0.111	0.005	0.003	0.002	--	--
EL100261-085	08/26/10	MM-NV-2c-3	0.132	0.0125	0.003	0.042	7.6	7.01	166.7	337.40	0.043	0.0025	0.086	0.001	41.78	0.0005	0.005	0.001	0.001	0.739	1.11	7.67	0.1257	7.93	0.001	0.0025	0.47	0.112	0.005	0.003	0.003	--	--
EL100261-086	08/26/10	MM-NV-2c-4	0.065	0.0125	0.003	0.012	7.3	6.95	155.9	340.60	0.049	0.0025	0.081	0.001	41.96	0.0005	0.005	0.001	0.001	0.994	0.8	6.66	0.1592	10.86	0.001	0.0025	0.3	0.107	0.005	0.003	0.002	--	--
EL100261-087	08/26/10	MM-NV-2c-5	0.035	0.0125	0.003	0.0045	7	6.83	143.8	335.10	0.086	0.0025	0.074	0.001	40.78	0.0005	0.005	0.001	0.001	1.267	0.54	6.18	0.1381	12.4	0.001	0.0025	0.34	0.101	0.005	0.003	0.002	--	--
EL100261-088	08/26/10	MM-NV-3a-0	0.031	0.0125	0.003	0.0045	5.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100261-089	08/26/10	MM-NV-3a-1	0.023	0.0125	0.003	0.034	4.9	7.55	134.1	271.20	0.011	0.0025	0.057	0.001	30.5	0.0005	0.005	0.001	0.001	0.022	1.08	10.17	0.0019	4.55	0.001	0.0025	1.85	0.099	0.005	0.003	0.001	--	--
EL100261-090	08/26/10	MM-NV-3a-2	0.064	0.0125	0.003	0.029	5.7	6.94	154.1	311.00	0.025	0.0025	0.078	0.001	35.44	0.0005	0.005	0.001	0.001	0.404	1.11	7.7	0.0154	5.8	0.001	0.0025	0.51	0.102	0.005	0.003	0.001	--	--
EL100261-091	08/26/10	MM-NV-3a-3	0.037	0.0125	0.003	0.038	4.7	6.74	161.3	344.40	0.049	0.0025	0.092	0.001	40.58	0.0005	0.005	0.001	0.001	0.423	0.93	7.34	0.068	10.53	0.001	0.0025	0.41	0.11	0.005	0.003	0.002	--	--
EL100261-092	08/26/10	MM-NV-3a-4	0.017	0.0125	0.003	0.011	6.1	6.6	166.8	374.00	0.102	0.0025	0.097	0.001	43.58	0.0005	0.005	0.001	0.001	0.242	0.7	7.18	0.0918	13.27	0.001	0.0025	0.52	0.116	0.005	0.003	0.004	--	--
EL100261-093	08/26/10	MM-NV-3a-5	0.015	0.0125	0.003	0.0045	6.4	--	--	--	0.179	0.0025	0.096	0.001	44.46	0.0005	0.005	0.001	0.001	1.106	0.45	6.73	0.1599	17.93	0.001	0.0025	0.26	0.115	0.005	0.003	0.003	--	--
EL100261-094	08/26/10	MM-NV-3b-1	0.019	0.0125	0.003	0.0045	5.4	7.54	131.3	268.00	0.016	0.0025	0.056	0.001	30.54	0.0005	0.005	0.001	0.001	0.026	1.09	10.17	0.0038	4.6	0.001	0.0025	1.84	0.1	0.005	0.003	0.003	--	--
EL100261-095	08/26/10	MM-NV-3b-2	0.117	0.0125	0.003	0.014	5.6	7.12	154.2	309.40	0.064	0.0025	0.072	0.001	37.18	0.0005	0.005	0.001	0.001	0.445	1.17	7.5	0.0391	6.15	0.001	0.0025	0.44	0.1	0.005	0.003	0.003	--	--
EL100261-096	08/26/10	MM-NV-3b-3	0.031	0.0125	0.003	0.03	5.5	7.02	159.6	345.00	0.091	0.0025	0.077	0.001	40.7	0.0005	0.005	0.001	0.001	0.26	1.08	6.07	0.0172	10.97	0.001	0.0025	0.52	0.101	0.005	0.003	0.002	--	--
EL100261-097	08/26/10	MM-NV-3b-4	0.015	0.0125	0.003	0.0045	6	--	--	--	0.175	0.0025	0.073	0.001	44.98	0.0005	0.005	0.001	0.001	0.475	0.53	5.26	0.0344	18.36	0.001	0.0025	0.29	0.103	0.005	0.003	0.002	--	--
EL100261-098	08/26/10	MM-NV-3b-5	0.011	0.0125	0.003	0.0045	6.2	6.88	140.1	385.60	0.244	0.0025	0.061	0.001	47.72	0.0005	0.005	0.001	0.001	0.544	0.42	4.79	0.0847	21.54	0.001	0.0025	0.26	0.1	0.005	0.003	0.002	--	--
EL100261-099	08/26/10	MM-NV-3c-1	0.013	0.0125	0.003	0.0045	4.5	--	--	--	0.013	0.0025	0.057	0.001	31.34	0.0005	0.005	0.001	0.001	0.021	1.09	10.51	0.0016	4.72	0.001	0.0025	1.91	0.103	0.005	0.003	0.002	--	--
EL100261-100	08/26/10	MM-NV-3c-2	0.054	0.0125	0.003	0.049	5.6	7.11	155.2	305.90	0.056	0.0025	0.073	0.001	36.84	0.0005	0.005	0.001	0.001	0.472	1.2	7.7	0.0061	5.92	0.001	0.0025	0.56	0.103	0.005	0.003	0.002	--	--
EL100261-101	08/26/10	MM-NV-3c-3	0.029	0.0125	0.003	0.03	6.4	6.96	156.6	324.50	0.192	0.0025	0.084	0.001	41.4	0.0005	0.005	0.001	0.001	0.39	1.08	6.44	0.0069	10.16	0.001	0.0025	0.55	0.107	0.005	0.003	0.004	--	--
EL100261-102	08/26/10	MM-NV-3c-4	0.021	0.0125	0.003	0.0045	6.7	--	--	--	0.24	0.0025	0.08	0.001	43.08	0.0005	0.005	0.001	0.001	0.444	0.67	5.42	0.0268	15.67	0.001	0.0025	0.43	0.104	0.005	0.003	0.004	--	--
EL100261-103	08/26/10	MM-NV-3c-5	0.013	0.0125	0.003	0.0045	6.4	--	--	--	0.251	0.0025	0.061	0.001	39.4	0.0005	0.005	0.001	0.001	0.649	0.32	4.6	0.0774	18.43	0.001	0.0025	0.33	0.09	0.005	0.003	0.004	--	--
EL100300-004	09/25/10	MM-V-1a-1	0.0270	0.0125	0.003	0.0045	--	7.77	135.5	290.60	0.0100	0.0050	0.0670	--	38.1920	--	--	--	--	0.225	1.45	10.930	0.0397	5.970	--	--	1.760	0.1150	--	--	0.0150	--	--
EL100300-005	09/25/10	MM-V-1a-2	0.2100	0.0125	0.003	0.0045	--	6.98	127.9	270.40	0.0130	0.0025	0.0760	--	35.3920	--	--	--	--	1.503	0.95	7.810	0.3492	4.300	--	--	0.230	0.0950	--	--	0.0070	--	--
EL100300-006	09/25/10	MM-V-1a-3	0.1450	0.0125	0.003	0.0045	--	6.87	127.8	268.00	0.0160	0.0025	0.0770	--	36.9720	--	--	--	--	1.961	0.87	7.170	0.2998	4.420	--	--	0.200	0.0940	--	--	0.0080	--	--
EL100300-007	09/25/10	MM-V-1a-4	0.0850	0.0125	0.003	0.0045	--	6.83	133.4	287.10	0.0430	0.0025	0.0780	--	40.0920	--	--	--	--	2.408	0.64	7.350	0.2928	5.000	--	--	0.140	0.0990	--	--	0.0080	--	--
EL100300-008	09/25/10	MM-V-1a-5	0.0580	0.0125	0.003	0.0045	--	6.74	125.5	277.90	0.0250	0.0090	0.0680	--	38.5720	--	--	--	--	2.216	0.59	6.880	0.2372	5.020	--	--	0.100	0.0920	--	--	0.0090	--	--
EL100300-009	09/25/10	MM-V-1b-1	0.0660	0.0125	0.003	0.0045	--	6.97	148.7	315.70	0.0160	0.0060	0.0840	--	43.6920	--	--	--	--	1.616	1.00	10.950	0.3582	4.590	--	--	0.860	0.1200	--	--	0.0070	--	--
EL100300-010	09/25/10	MM-V-1b-2	0.0370	0.0125	0.003	0.0045	--	6.90	142.7	301.40	0.0160	0.0025	0.0790	--	43.2520	--	--	--	--	1.368	0.58	10.430	0.3498	3.070	--	--	0.830	0.1160	--	--	0.0090	--	--
EL100300-011	09/25/10	MM-V-1b-3	0.0830	0.0125	0.003	0.0045	--	6.82	142.9	308.70	0.0390	0.0025	0.0870	--	43.3520	--	--	--	--	1.678	1.02	10.370	0.2780	3.710	--	--	0.840	0.1170	--	--	0.0100	--	--
EL100300-012	09/25/10	MM-V-1b-4	0.0850	0.0125	0.003	0.0230	--	7.08	134.0	285.20	0.0250	0.0025	0.0690	--	39.5120	--	--	--	--	1.147	0.88	8.830	0.1709	4.400	--	--	0.910	0.1040	--	--	0.0060	--	--
EL100300-013	09/25/10	MM-V-1b-5	0.0740	0.0125	0.003	0.0045	--	6.64	139.1	298.20	0.0170	0.0025	0.0890	--	43.1320	--	--	--	--	2.434	0.21	8.370	0.4110	2.620	--	--	0.210	0.1100	--	--	0.0100	--	--
EL100300-014	09/25/10	MM-V-1c-1	0.0540	0.0125	0.003	0.0045	--	6.87	127.3	284.40	0.0710	0.0080	0.0560	--	40.1320	--	--	--	--	1.407	0.50	7.120	0.1567	4.210	--	--	0.110	0.0890	--	--	0.0070	--	--
EL100300-015	09/25/10	MM-V-1c-2	0.1030	0.0125	0.003	0.0045	--	7.00	142.7	303.40	0.0680	0.0025	0.0710	--	41.7320	--	--	--	--	1.352	0.95	8.330	0.1619	4.860	--	--	0.240	0.1020	--	--	0.0060	--	--
EL100300-016	09/25/10	MM-V-1c-3	0.0500	0.0125	0.003	0.0045	--	7.28	133.3	290.50	0.0100	0.0025	0.0650	--	36.7320	--	--	--	--	0.482	1.23	10.210	0.0582	5.320	--	--	1.390	0.1050	--	--	0.0060	--	--
EL100300-017	09/25/10	MM-V-1c-4	0.0740	0.0125	0.003	0.0045	--	6.86	129.2	285.00	0.0250	0.0025	0.0720	--	38.0320	--	--	--	--	1.374	1.00	8.500	0.1141	4.820	--	--	0.850	0.1020	--	--	0.0060	--	--
EL100300-018	09/25/10	MM-V-1c-5	0.0800	0.0125	0.003	0.0045	--	7.39	137.7	297.00	0.0080	0.0025	0.0820	--	37.8720	--	--	--	--	0.536	1.45	10.900	0.3066	5.530	--	--	1.420	0.1120	--	--	0.0060	--	--
EL100300-019	09/25/10	MM-V-2a-1	0.0190	0.0125	0.003	0.0045	--	--	--	--	0.0200	0.0080	0.0610	--	34.6120	--	--	--	--	0.047	1.41	10.790	0.0094	5.850	--	--	1.910	0.1060	--	--	0.0120	--	--
EL100300-020	09/25/10	MM-V-2a-2	0.1280	0.0125	0.003	0.0045	--	7.10	142.8	299.10	0.0080	0.0090	0.0820	--	39.5920	--	--	--	--	1.748	0.78	8.420	0.5650	4.030	--	--	0.580	0.1050	--	--	0.0070	--	--
EL100300-021	09/25/10	MM-V-2a-3	0.1730	0.0125	0.003	0.0045	--	6.91	141.2	305.80	0.0090	0.0025	0.0940	--	41.3920	--	--	--	--	2.296	0.47	8.150	0.5614	3.620	--	--	0.210	0.1050	--	--	0.0070	--	--
EL100300-022	09/25/10	MM-V-2a-4	0.1030	0.0125	0.003	0.0045	--	6.69	135.7	309.70	0.0110	0.0025	0.0980	--	42.4720	--	--	--	--	2.866	0.39	8.380	0.4268	4.010	--	--	0.160	0.1100	--	--	0.0070	--	--
EL100300-023	09/25/10	MM-V-2a-5	0.0410	0.0125	0.003	0.0045	--	6.61	126.9	301.70	0.0140	0.0070	0.0950	--	41.4320	--	--	--	--	2.970	0.20	7.970	0.3814	3.830	--	--	0.130	0.1050	--	--	0.0080	--	--
EL100300-024	09/25/10	MM-V-2a-6	0.0870	0.0125	0.003	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100300-025	09/25/10	MM-V-2b-1	0.0730	0.0125	0.003	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100300-026	09/25/10	MM-V-2b-2	0.1000	0.0125	0.003	0.0045	--	7.36	142.7	299.50	0.0100	0.0025	0.0750	--	37.9320	--	--	--	--	1.109	1.15	8.980	0.3206	4.720	--	--	0.820	0.1080	--	--	0.0060	--	--
EL100300-027	09/25/10	MM-V-2b-3	0.1940	0.0125	0.003	0.0045	--	--	--	--	0.0120	0.0025	0.0920	--	41.8920	--	--	--	--	2.256	0.66	8.430	0.5366	3.780	--	--	0.250	0.1110	--	--	0.0070	--	--
EL100300-028	09/25/10	MM-V-2b-4	0.0880	0.0125	0.003	0.0045	--	6.79	133.5	291.10	0.0110	0.0025	0.0850	--	38.5520	--	--	--	--	1.697	0.38	7.340	0.3244	4.500	--	--	0.180	0.1020	--	--	0.0060	--	--
EL100300-029	09/25/10	MM-V-2b-5	0.0390	0.0125	0.003	0.0045	--	6.78	116.9	271.60	0.0120	0.0025	0.0790	--	36.3320	--	--	--	--	2.044	0.20	6.590	0.2498	4.740	--	--	0.130	0.0950	--	--	0.0070	--	--
EL100300-030	09/25/10	MM-V-2b-6	0.1280	0.0125	0.003	0.0045	--	--	--	--	0.0330	0.0025	0.0790	--	36.8320	--	--	--	--	2.016	0.14	6.420	0.2306	4.070	--	--	0.160	0.0950	--	--	0.0040	--	--
EL100300-031	09/25/10	MM-V-2c-1	0.0840	0.0125	0.003	0.0045	--	7.43	163.6	333.30	0.0060	0.0090	0.0920	--	44.7520	--	--	--	--	1.754	1.16	11.090	0.8448	4.820	--	--	0.800	0.1330	--	--	0.0050	--	--
EL100300-032	09/25/10	MM-V-2c-2	0.1070	0.0125	0.003	0.0045	--	7.16	144.1	300.80	0.0070	0.0025	0.0840	--	40.8520	--	--	--	--	2.528	0.27	8.010	0.7466	2.780	--	--	0.170	0.1040	--	--	0.0040	--	--
EL100300-033	09/25/10	MM-V-2c-3	0.1010	0.0125	0.003	0.0045	--	6.81	145.1	316.70	0.0080	0.0060	0.0910	--	44.1520	--	--	--	--	2.432	0.28	8.390	0.5848	3.580	--	--	0.140	0.1150	--	--	0.0050	--	--
EL100300-034	09/25/10	MM-V-2c-4	0.0600	0.0125	0.003	0.0045	--	6.78	139.6	323.70	0.0160	0.0050	0.0900	--	42.9320	--	--	--	--	2.290	0.30	7.950	0.3556	4.990	--	--	0.130	0.1100	--	--	0.0060	--	--
EL100300-035	09/25/10	MM-V-2c-5	0.0430	0.0125	0.003	0.0045	--	6.72	120.8	298.30	0.0210	0.0025	0.0800	--	38.7320	--	--	--	--	2.098	0.17	7.020	0.2364	5.200	--	--	0.130	0.0960	--	--	0.0070	--	--
EL100300-036	09/25/10	MM-V-3a-0	0.0130	0.0125	0.003	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100300-037	09/25/10	MM-V-3a-1	0.0180	0.0125	0.003	0.0045	--	7.79	128.9	283.50	0.0080	0.0025	0.0580	--	33.3520	--	--	--	--	0.009	1.39	10.480	0.0013	5.780	--	--	1.880	0.1030	--	--	0.0070	--	--
EL100300-038	09/25/10	MM-V-3a-2	0.1190	0.0125	0.003	0.0045	--	7.45	161.2	330.30	0.0080	0.0060	0.0820	--	40.9720	--	--	--	--	1.412	1.19	10.440	0.5480	5.060	--	--	0.480	0.1200	--	--	0.0060	--	--
EL100300-039	09/25/10	MM-V-3a-3	0.1860	0.0125	0.003	0.0045	--	7.06	155.9	332.80	0.0110	0.0050	0.0870	--	41.8920	--	--	--	--	1.474	0.81	8.520	0.3534	5.870	--	--	0.180	0.1100	--	--	0.0060	--	--
EL100300-040	09/25/10	MM-V-3a-4	0.1030	0.0125	0.003	0.0045	--	7.04	157.3	352.70	0.0090	0.0025	0.0890	--	44.7720	--	--	--	--	2.032	0.57	8.010	0.3092	8.630	--	--	0.140	0.1120	--	--	0.0060	--	--
EL100300-041	09/25/10	MM-V-3a-5	0.0530	0.0125	0.003	0.0045	--	--	--	--	0.0220	0.0025	0.0840	--	45.7520	--	--	--	--	2.118	0.37	7.650	0.1571	10.630	--	--	0.100	0.1070	--	--	0.0080	--	--
EL100300-042	09/25/10	MM-V-3b-0	0.0240	0.0125	0.003	0.0045	--	--	--	--	0.0070	0.0050	0.0580	--	33.8720	--	--	--	--	0.011	1.43	10.600	0.0026	5.990	--	--	1.910	0.1040	--	--	0.0005	--	--
EL100300-043	09/25/10	MM-V-3b-1	0.0200	0.0125	0.003	0.0045	--	7.68	130.0	284.90	0.0080	0.0025	0.0580	--	33.2720	--	--	--	--	0.009	1.40	10.400	0.0012	5.840	--	--	1.870	0.1020	--	--	0.0070	--	--
EL100300-044	09/25/10	MM-V-3b-2	0.1230	0.0125	0.003	0.0045	--	7.17	161.8	326.70	0.0080	0.0070	0.0890	--	44.8920	--	--	--	--	2.254	0.66	8.510	0.5444	3.930	--	--	0.320	0.1150	--	--	0.0050	--	--
EL100300-045	09/25/10	MM-V-3b-3	0.0720	0.0125	0.003	0.0045	--	6.86	145.8	308.60	0.0100	0.0025	0.0830	--	43.1720	--	--	--	--	1.768	0.18	7.980	0.3566	4.770	--	--	0.170	0.1080	--	--	0.0050	--	--
EL100300-046	09/25/10	MM-V-3b-4	0.0820	0.0125	0.003	0.0045	--	--	--	--	0.0220	0.0025	0.0890	--	44.4320	--	--	--	--	2.416	0.27	7.670	0.3632	7.280	--	--	0.160	0.1100	--	--	0.0070	--	--

Table A.1.6 - Marchmont Marsh, Water Sample Analytical Results, June to October

Lab ID	Sample Date	Sample ID	Total P	Phosphate PO_4-P	Nitrite NO_2-N	Nitrate NO_3-N	DOC	pH	Total Alkalinity as $CaCO_3$	Conductivity	Total Metals: Al	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	S	Sr	Ti	V	Zn	Reactive Silicates SiO_2	Chlorophyll "a"
			0.0050	0.0250	0.006	0.0090	0.50	n/a	1.0	0.50	0.0050	0.0050	0.0030	0.002	0.0050	0.0010	0.010	0.002	0.002	0.002	0.10	0.010	0.0002	0.010	0.002	0.0050	0.050	0.0050	0.010	0.006	0.0010	0.250	0.2
			mg/L	mg/L	mg/L	mg/L	mg/L	n/a	mg/L	uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L
EL100300-047	09/25/10	MM-V-3b-5	0.0760	0.0125	0.003	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100300-048	09/25/10	MM-V-3c-1	0.0230	0.0125	0.003	0.0045	--	7.73	128.9	285.50	0.0090	0.0050	0.0580	--	33.5320	--	--	--	--	0.010	1.40	10.510	0.0013	5.840	--	--	1.930	0.1030	--	--	0.0090	--	--
EL100300-049	09/25/10	MM-V-3c-2	0.1560	0.0125	0.003	0.0045	--	7.25	176.4	357.50	0.0070	0.0025	0.1000	--	47.1920	--	--	--	--	2.022	1.11	10.520	1.0704	4.590	--	--	0.370	0.1340	--	--	0.0040	--	--
EL100300-050	09/25/10	MM-V-3c-3	0.2610	0.0125	0.003	0.0045	--	6.95	170.1	354.50	0.0090	0.0025	0.1000	--	46.6520	--	--	--	--	2.268	0.68	8.950	0.6322	4.300	--	--	0.210	0.1190	--	--	0.0060	--	--
EL100300-051	09/25/10	MM-V-3c-4	0.1050	0.0125	0.003	0.0045	--	6.82	138.8	312.50	0.0090	0.0025	0.0900	--	41.5320	--	--	--	--	1.975	0.50	7.780	0.4150	5.130	--	--	0.130	0.1070	--	--	0.0060	--	--
EL100300-052	09/25/10	MM-V-3c-5	0.0450	0.0125	0.003	0.0045	--	6.76	126.5	303.80	0.0120	0.0025	0.0800	--	40.1920	--	--	--	--	1.975	0.24	7.080	0.2914	5.320	--	--	0.110	0.0980	--	--	0.0070	--	--
EL100300-055	09/25/10	MM-NV-1a-0	0.0240	0.0125	0.003	0.0045	--	7.66	129.4	284.70	0.0090	0.0025	0.0570	--	34.2320	--	--	--	--	0.015	1.41	10.540	0.0022	5.840	--	--	1.940	0.1020	--	--	0.0020	--	--
EL100300-056	09/25/10	MM-NV-1a-1	0.0230	0.0125	0.003	0.0045	--	--	--	--	0.0220	0.0025	0.0570	--	33.7320	--	--	--	--	0.023	1.39	10.490	0.0027	5.740	--	--	1.890	0.1020	--	--	0.0120	--	--
EL100300-057	09/25/10	MM-NV-1a-2	0.1220	0.0125	0.003	0.0045	--	7.21	130.3	277.20	0.0150	0.0025	0.0600	--	34.1920	--	--	--	--	1.267	1.04	8.430	0.2048	4.890	--	--	0.500	0.0930	--	--	0.0050	--	--
EL100300-058	09/25/10	MM-NV-1a-3	0.1500	0.0125	0.003	0.0045	--	6.98	146.1	307.00	0.0620	0.0025	0.0710	--	40.0520	--	--	--	--	2.156	0.79	8.250	0.2426	4.610	--	--	0.280	0.1020	--	--	0.0060	--	--
EL100300-059	09/25/10	MM-NV-1a-4	0.1470	0.0125	0.003	0.0045	--	6.70	147.5	317.70	0.1420	0.0025	0.0650	--	41.7520	--	--	--	--	2.156	0.69	8.110	0.3374	4.580	--	--	0.220	0.1010	--	--	0.0060	--	--
EL100300-060	09/25/10	MM-NV-1b-1	0.0170	0.0125	0.003	0.0045	--	7.58	128.0	284.60	0.0140	0.0025	0.0570	--	33.0920	--	--	--	--	0.013	1.38	10.390	0.0020	5.680	--	--	1.880	0.1000	--	--	0.0080	--	--
EL100300-061	09/25/10	MM-NV-1b-2	0.1280	0.0125	0.003	0.0045	--	7.15	125.8	267.30	0.0370	0.0025	0.0590	--	33.0320	--	--	--	--	1.711	0.80	7.320	0.2222	4.160	--	--	0.350	0.0870	--	--	0.0050	--	--
EL100300-062	09/25/10	MM-NV-1b-3	0.1160	0.0125	0.003	0.0045	--	6.92	137.8	286.20	0.1070	0.0025	0.0640	--	37.5720	--	--	--	--	2.162	0.48	7.510	0.2096	3.300	--	--	0.220	0.0940	--	--	0.0070	--	--
EL100300-063	09/25/10	MM-NV-1b-4	0.0600	0.0125	0.003	0.0045	--	6.78	127.3	260.90	0.1660	0.0025	0.0560	--	36.2320	--	--	--	--	2.278	0.25	6.970	0.2424	2.660	--	--	0.150	0.0870	--	--	0.0080	--	--
EL100300-064	09/25/10	MM-NV-1b-5	0.0390	0.0125	0.003	0.0045	--	6.82	91.3	188.00	0.9590	0.0025	0.0470	--	26.9720	--	--	--	--	2.020	0.19	5.310	0.1056	1.890	--	--	0.140	0.0630	--	--	0.0060	--	--
EL100300-065	09/25/10	MM-NV-1c-1	0.2380	0.0125	0.003	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100300-066	09/25/10	MM-NV-1c-2	0.2770	0.0125	0.003	0.0045	--	7.15	159.1	331.30	0.0110	0.0025	0.0850	--	42.8320	--	--	--	--	1.988	1.37	10.080	0.4544	4.460	--	--	0.330	0.1130	--	--	0.0060	--	--
EL100300-067	09/25/10	MM-NV-1c-3	0.2840	0.0125	0.003	0.0045	--	6.93	171.1	355.30	0.0120	0.0025	0.0990	--	47.1520	--	--	--	--	2.304	1.66	10.510	0.3742	4.430	--	--	0.260	0.1220	--	--	0.0080	--	--
EL100300-068	09/25/10	MM-NV-1c-4	0.1340	0.0125	0.003	0.0045	--	6.86	168.5	346.00	0.0190	0.0025	0.0920	--	47.3320	--	--	--	--	2.850	1.39	10.160	0.3434	4.300	--	--	0.120	0.1200	--	--	0.0080	--	--
EL100300-069	09/25/10	MM-NV-1c-5	0.0950	0.0125	0.003	0.0045	--	6.81	163.5	340.50	0.0560	0.0025	0.0840	--	47.6120	--	--	--	--	2.712	0.97	10.110	0.3264	4.300	--	--	0.120	0.1170	--	--	0.0090	--	--
EL100300-070	09/25/10	MM-NV-1c-6	0.0770	0.0125	0.003	0.0045	--	--	--	--	0.0310	0.0025	0.0670	--	41.0520	--	--	--	--	2.628	0.56	7.840	0.2176	3.690	--	--	0.120	0.0990	--	--	0.0020	--	--
EL100300-071	09/25/10	MM-NV-2a-0	0.0230	0.0125	0.003	0.0045	--	--	--	--	0.0160	0.0025	0.0560	--	33.4920	--	--	--	--	0.022	1.39	10.440	0.0072	5.780	--	--	1.920	0.1010	--	--	0.0010	--	--
EL100300-072	09/25/10	MM-NV-2a-1	0.0190	0.0125	0.003	0.0045	--	7.57	127.9	287.60	0.0150	0.0025	0.0600	--	34.9320	--	--	--	--	0.028	1.37	10.400	0.0138	5.860	--	--	1.770	0.1040	--	--	0.0060	--	--
EL100300-073	09/25/10	MM-NV-2a-2	0.0630	0.0125	0.003	0.0045	--	7.23	113.8	256.60	0.0170	0.0025	0.0510	--	32.8320	--	--	--	--	0.821	0.83	6.280	0.1621	5.780	--	--	0.410	0.0820	--	--	0.0070	--	--
EL100300-074	09/25/10	MM-NV-2a-3	0.0430	0.0125	0.003	0.0045	--	7.14	120.7	284.20	0.0480	0.0025	0.0500	--	36.7320	--	--	--	--	1.319	0.52	5.780	0.1385	8.110	--	--	0.130	0.0870	--	--	0.0050	--	--
EL100300-075	09/25/10	MM-NV-2a-4	0.0260	0.0125	0.003	0.0045	--	6.99	132.9	337.70	0.0670	0.0025	0.0530	--	44.7520	--	--	--	--	1.959	0.34	6.210	0.1646	11.250	--	--	0.090	0.1020	--	--	0.0070	--	--
EL100300-076	09/25/10	MM-NV-2a-5	0.0170	0.0125	0.003	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100300-077	09/25/10	MM-NV-2b-0	0.0180	0.0125	0.003	0.0045	--	7.77	128.1	286.20	0.0120	0.0025	0.0580	--	34.2120	--	--	--	--	0.016	1.40	10.720	0.0026	5.950	--	--	1.950	0.1040	--	--	0.0090	--	--
EL100300-078	09/25/10	MM-NV-2b-1	0.0230	0.0125	0.003	0.0045	--	7.69	127.1	286.10	0.0120	0.0025	0.0600	--	34.8520	--	--	--	--	0.014	1.43	10.920	0.0034	6.050	--	--	2.010	0.1060	--	--	0.0100	--	--
EL100300-079	09/25/10	MM-NV-2b-2	0.1070	0.0125	0.003	0.0045	--	7.28	141.8	304.30	0.0170	0.0025	0.0590	--	37.8120	--	--	--	--	0.947	0.87	7.750	0.2438	6.220	--	--	0.300	0.0960	--	--	0.0060	--	--
EL100300-080	09/25/10	MM-NV-2b-3	0.0820	0.0125	0.003	0.0045	--	7.16	156.2	339.10	0.0280	0.0025	0.0620	--	44.7720	--	--	--	--	1.474	0.65	7.840	0.2190	8.870	--	--	0.260	0.1080	--	--	0.0050	--	--
EL100300-081	09/25/10	MM-NV-2b-4	0.0400	0.0125	0.003	0.0045	--	7.09	159.6	377.40	0.0820	0.0025	0.0580	--	50.0520	--	--	--	--	1.820	0.39	6.630	0.1787	12.720	--	--	0.070	0.1090	--	--	0.0070	--	--
EL100300-082	09/25/10	MM-NV-2c-1	0.0170	0.0125	0.003	0.0045	--	--	--	--	0.0140	0.0025	0.0580	--	34.0120	--	--	--	--	0.015	1.41	10.670	0.0031	5.930	--	--	1.950	0.1040	--	--	0.0120	--	--
EL100300-083	09/25/10	MM-NV-2c-2	0.0780	0.0125	1.101	0.0045	--	7.35	141.0	306.80	0.0100	0.0025	0.0680	--	40.1120	--	--	--	--	0.285	1.06	8.100	0.0919	6.270	--	--	0.650	0.1060	--	--	0.0080	--	--
EL100300-084	09/25/10	MM-NV-2c-3	0.0480	0.0125	0.003	0.0045	--	7.26	124.1	278.50	0.0250	0.0025	0.0580	--	35.8920	--	--	--	--	0.543	0.92	6.310	0.0765	7.030	--	--	0.580	0.0880	--	--	0.0130	--	--
EL100300-085	09/25/10	MM-NV-2c-4	0.0200	0.0125	0.003	0.0045	--	7.01	123.9	289.70	0.0210	0.0025	0.0550	--	37.4720	--	--	--	--	0.412	0.58	5.190	0.0537	10.010	--	--	0.180	0.0860	--	--	0.0090	--	--
EL100300-086	09/25/10	MM-NV-2c-5	0.0160	0.0125	0.003	0.0045	--	--	--	--	0.0410	0.0025	0.0510	--	36.5520	--	--	--	--	1.380	0.35	4.620	0.0374	11.830	--	--	0.060	0.0800	--	--	0.0090	--	--
EL100300-087	09/25/10	MM-NV-3a-1	0.0140	0.0125	0.003	0.0045	--	7.62	127.5	283.40	0.0120	0.0025	0.0590	--	34.6320	--	--	--	--	0.014	1.45	10.870	0.0018	6.070	--	--	1.980	0.1060	--	--	0.0090	--	--
EL100300-088	09/25/10	MM-NV-3a-2	0.0600	0.0125	0.229	0.0045	--	7.28	141.7	306.80	0.0160	0.0025	0.0660	--	37.9520	--	--	--	--	0.484	1.09	8.380	0.1833	6.180	--	--	0.690	0.1030	--	--	0.0070	--	--
EL100300-089	09/25/10	MM-NV-3a-3	0.0810	0.0125	0.392	0.0045	--	7.11	137.7	304.80	0.0370	0.0025	0.0640	--	39.3920	--	--	--	--	0.892	0.89	6.760	0.1664	7.890	--	--	0.310	0.0960	--	--	0.0050	--	--
EL100300-090	09/25/10	MM-NV-3a-4	0.0610	0.0125	0.003	0.0045	--	--	--	--	0.1180	0.0025	0.0610	--	42.2320	--	--	--	--	0.993	0.75	6.450	0.1427	10.630	--	--	0.220	0.0980	--	--	0.0060	--	--
EL100300-091	09/25/10	MM-NV-3a-5	0.0300	0.0125	0.003	0.0045	--	6.92	138.8	359.70	0.2120	0.0025	0.0570	--	43.8120	--	--	--	--	1.068	0.34	5.330	0.1383	17.040	--	--	0.170	0.0940	--	--	0.0050	--	--
EL100300-092	09/25/10	MM-NV-3b-1	0.0210	0.0125	0.003	0.0045	--	7.61	127.7	285.50	0.0110	0.0025	0.0590	--	33.9920	--	--	--	--	0.011	1.42	10.720	0.0022	6.000	--	--	1.940	0.1050	--	--	0.0100	--	--
EL100300-093	09/25/10	MM-NV-3b-2	0.1710	0.0125	0.198	0.0045	--	7.24	137.5	294.90	0.0080	0.0025	0.0730	--	34.7320	--	--	--	--	1.355	1.22	8.240	0.2420	5.220	--	--	0.310	0.0990	--	--	0.0050	--	--
EL100300-094	09/25/10	MM-NV-3b-3	0.1710	0.0125	2.410	0.0045	--	6.99	127.2	285.60	0.0140	0.0025	0.0750	--	32.9920	--	--	--	--	1.344	1.02	6.900	0.2110	6.810	--	--	0.190	0.0900	--	--	0.0060	--	--
EL100300-095	09/25/10	MM-NV-3b-4	0.0880	0.0125	0.003	0.0045	--	6.83	136.8	336.70	0.0110	0.0025	0.0880	--	38.4720	--	--	--	--	1.919	0.64	6.900	0.2324	13.190	--	--	0.130	0.1000	--	--	0.0060	--	--
EL100300-096	09/25/10	MM-NV-3b-5	0.0470	0.0125	0.003	0.0045	--	6.88	131.0	350.80	0.0270	0.0025	0.0810	--	38.1920	--	--	--	--	1.457	0.43	6.220	0.1465	16.610	--	--	0.110	0.0960	--	--	0.0060	--	--
EL100300-097	09/25/10	MM-NV-3c-1	0.0210	0.0125	0.003	0.0045	--	--	--	--	0.0060	0.0025	0.0620	--	35.2920	--	--	--	--	0.078	1.38	10.570	0.0452	5.930	--	--	1.650	0.1080	--	--	0.0100	--	--
EL100300-098	09/25/10	MM-NV-3c-2	0.1120	0.0125	0.521	0.0045	--	7.17	123.2	270.50	0.0200	0.0025	0.0640	--	32.4720	--	--	--	--	1.005	0.96	6.810	0.1285	5.890	--	--	0.240	0.0880	--	--	0.0060	--	--
EL100300-099	09/25/10	MM-NV-3c-3	0.0840	0.0125	0.003	0.0045	--	--	--	--	0.0190	0.0025	0.0710	--	32.2720	--	--	--	--	0.728	0.81	6.430	0.1517	8.070	--	--	0.110	0.0880	--	--	0.0070	--	--
EL100300-100	09/25/10	MM-NV-3c-4	0.0360	0.0125	0.003	0.0045	--	6.78	125.8	327.40	0.0240	0.0025	0.0670	--	36.4920	--	--	--	--	1.515	0.28	5.580	0.1868	14.850	--	--	0.090	0.0880	--	--	0.0090	--	--
EL100300-101	09/25/10	MM-NV-3c-5	0.0270	0.0125	0.003	0.0045	--	--	--	--	0.0970	0.0025	0.0590	--	37.4720	--	--	--	--	1.287	0.15	5.310	0.1507	16.450	--	--	0.090	0.0870	--	--	0.0090	--	--
EL100333-004	10/20/10	MM-V-1a-1	0.0025	0.0125	0.003	0.0100	--	7.88	128.5	281.10	0.0150	0.0025	0.0590	--	35.9700	--	--	--	--	0.021	1.28	10.730	0.0030	5.140	--	--	2.030	0.1060	--	--	0.0090	--	--
EL100333-005	10/20/10	MM-V-1a-2	0.0025	0.0125	0.003	0.0150	--	7.87	126.4	277.10	0.0090	0.0025	0.0590	--	35.3900	--	--	--	--	0.009	1.28	10.590	0.0012	5.110	--	--	1.970	0.1050	--	--	0.0090	--	--
EL100333-006	10/20/10	MM-V-1a-3	0.0980	0.0125	0.003	0.0090	--	7.00	121.4	264.50	0.0110	0.0025	0.0680	--	35.1500	--	--	--	--	1.139	0.94	7.740	0.3732	4.360	--	--	0.580	0.0930	--	--	0.0060	--	--
EL100333-007	10/20/10	MM-V-1a-4	0.1810	0.0125	0.003	0.0045	--	6.87	127.2	281.00	0.0170	0.0025	0.0770	--	37.4500	--	--	--	--	2.206	0.59	7.040	0.4214	3.980	--	--	0.240	0.0930	--	--	0.0080	--	--
EL100333-008	10/20/10	MM-V-1a-5	0.0680	0.0125	0.003	0.0045	--	6.67	126.0	286.50	0.0350	0.0025	0.0770	--	39.8100	--	--	--	--	1.675	0.30	7.100	0.2344	4.270	--	--	0.170	0.0970	--	--	0.0080	--	--
EL100333-09	10/20/10	MM-V-1b-0	0.0060	0.0125	0.003	0.0090	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100333-010	10/20/10	MM-V-1b-1	0.0025	0.0125	0.003	0.0045	--	7.67	123.2	274.50	0.0090	0.0025	0.0570	--	35.2900	--	--	--	--	0.012	1.27	10.490	0.0074	5.090	--	--	2.060	0.1030	--	--	0.0080	--	--
EL100333-011	10/20/10	MM-V-1b-2	0.0130	0.0125	0.003	0.0090	--	7.02	141.5	302.80	0.0090	0.0025	0.0700	--	38.7300	--	--	--	--	0.061	0.97	10.290	0.2784	4.110	--	--	0.960	0.1030	--	--	0.0080	--	--
EL100333-012	10/20/10	MM-V-1b-3	0.0180	0.0125	0.003	0.0045	--	6.75	138.3	296.50	0.0140	0.0025	0.0820	--	40.2900	--	--	--	--	0.071	0.72	8.620	0.4446	3.100	--	--	0.310	0.1010	--	--	0.0100	--	--
EL100333-013	10/20/10	MM-V-1b-4	0.0140	0.0125	0.003	0.0045	--	6.62	121.0	268.10	0.0130	0.0025	0.0790	--	37.5700	--	--	--	--	0.303	0.47	7.790	0.3128	2.700	--	--	0.230	0.0940	--	--	0.0100	--	--
EL100333-014	10/20/10	MM-V-1b-5	0.0130	0.0125	0.003	0.0045	--	--	--	--	0.0560	0.0025	0.0690	--	33.9900	--	--	--	--	1.316	0.19	6.950	0.1068	2.270	--	--	0.230	0.0830	--	--	0.0120	--	--
EL100333-015	10/20/10	MM-V-1c-0	0.0025	0.0125	0.003	0.0045	--	--	--	--	0.0090	0.0025	0.0600	--	36.2900	--	--	--	--	0.008	1.30	10.850	0.0011	5.190	--	--	2.050	0.1080	--	--	0.0110	--	--
EL100333-016	10/20/10	MM-V-1c-1	0.0025	0.0125	0.003	0.0045	--	7.84	126.8	277.40	0.0090	0.0025	0.0600	--	36.0700	--	--	--	--	0.011	1.30	10.770	0.0012	5.190	--	--	2.030	0.1070	--	--	0.0020	--	--
EL100333-017	10/20/10	MM-V-1c-2	0.0850	0.0125	0.003	0.0045	--	7.04	139.5	294.90	0.0100	0.0025	0.0770	--	41.0300	--	--	--	--	2.018	0.93	8.570	0.4616	4.160	--	--	0.590	0.1080	--	--	0.0070	--	--
EL100333-018	10/20/10	MM-V-1c-3	0.0550	0.0125	0.003	0.0045	--	6.83	120.9	259.50	0.0090	0.0025	0.0660	--	36.3500	--	--	--	--	1.737	0.52	7.550	0.3352	3.390	--	--	0.410	0.0930	--	--	0.0090	--	--
EL100333-019	10/20/10	MM-V-1c-4	0.0270	0.0125	0.003	0.0045	--	6.68	113.3	249.40	0.0160	0.0025	0.0640	--	35.0100	--	--	--	--	1.285	0.40	6.620	0.1664	3.060	--	--	0.240	0.0860	--	--	0.0080	--	--
EL100333-020	10/20/10	MM-V-1c-5	0.0240	0.0350	0.003	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100333-021	10/20/10	MM-V-2a-1	0.0110	0.0125	0.003	0.0045	--	--	--	--	0.0150	0.0025	0.0670	--	37.2700	--	--	--	--	0.835	1.32	10.580	0.1751	5.060	--	--	1.460	0.1110	--	--	0.0090	--	--
EL100333-022	10/20/10	MM-V-2a-2	0.1380	0.0125	0.003	0.0045	--	6.97	138.7	295.20	0.0090	0.0025	0.0820	--	38.5300	--	--	--	--	2.610	1.42	7.970	0.5960	5.540	--	--	0.310	0.1000	--	--	0.0070	--	--
EL100333-023	10/20/10	MM-V-2a-3	0.1310	0.0125	0.003	0.0045	--	6.78	147.5	326.30	0.0090	0.0025	0.0950	--	40.6900	--	--	--	--	2.588	1.96	8.040	0.6628	8.420	--	--	0.250	0.1020	--	--	0.0060	--	--
EL100333-024	10/20/10	MM-V-2a-4	0.1290	0.0125	0.003	0.0045	--	6.48	149.5	367.40	0.0110	0.0025	0.1150	--	43.1300	--	--	--	--	3.260	4.42	8.440	0.8770	11.540	--	--	0.220	0.1080	--	--	0.0080	--	--
EL100333-025	10/20/10	MM-V-2a-5	0.1180	0.0125	0.003	0.0045	--	6.58	141.9	344.20	0.0240	0.0025	0.0900	--	39.6700	--	--	--	--	2.300	2.28	7.500	0.3886	13.240	--	--	0.190	0.0970	--	--	0.0080	--	--
EL100333-026	10/20/10	MM-V-2a-6	0.1230	0.0780	0.003	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100333-027	10/20/10	MM-V-2b-1	0.0070	0.0125	0.003	0.0045	--	7.65	130.7	286.00	0.0100	0.0025	0.0600	--	36.1700	--	--	--	--	0.118	1.24	10.580	0.0974	5.020	--	--	1.790	0.1060	--	--	0.0020	--	--
EL100333-028	10/20/10	MM-V-2b-2	0.1110	0.0125	0.003	0.0045	--	6.90	131.5	281.40	0.0100	0.0025	0.0780	--	38.0100	--	--	--	--	1.889	0.64	8.290	0.5814	4.150	--	--	0.370	0.0990	--	--	0.0030	--	--
EL100333-029	10/20/10	MM-V-2b-3	0.0820	0.0125	0.003	0.0045	--	6.72	110.9	249.40	0.0120	0.0025	0.0690	--	33.6300	--	--	--	--	1.384	0.38	6.700	0.3152	3.810	--	--	0.260	0.0870	--	--	0.0020	--	--

Table A.1.6 - Marchmont Marsh, Water Sample Analytical Results, June to October

			Parameter / Method Detection Limit / Units																														
			Total P	Phosphate PO_4-P	Nitrite NO_2-N	Nitrate NO_3-N	DOC	pH	Total Alkalinity as $CaCO_3$	Conductivity	Total Metals																					Reactive Silicates SiO_2	Chlorophyll "a"
											Al	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	S	Sr	Ti	V	Zn		
			0.0050	*0.0250*	*0.006*	*0.0090*	*0.50*	*n/a*	*1.0*	*0.50*	*0.0050*	*0.0050*	*0.0030*	*0.002*	*0.0050*	*0.0010*	*0.010*	*0.002*	*0.002*	*0.002*	*0.10*	*0.010*	*0.0002*	*0.010*	*0.002*	*0.0050*	*0.050*	*0.0050*	*0.010*	*0.006*	*0.0010*	*0.250*	*0.2*
Lab ID	**Sample Date**	**Sample ID**	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*n/a*	*mg/L*	*uS/cm*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*µg/L*
EL100333-030	10/20/10	MM-V-2b-4	0.0480	0.0125	0.003	0.0045	--	6.65	109.8	253.90	0.0140	0.0025	0.0740	--	34.9300	--	--	--	--	1.843	0.34	6.610	0.2720	4.210	--	--	0.230	0.0880	--	--	0.0020	--	--
EL100333-031	10/20/10	MM-V-2b-5	0.0490	0.0125	0.003	0.0045	--	6.54	101.0	242.40	0.0160	0.0025	0.0730	--	34.8300	--	--	--	--	1.917	0.22	6.130	0.2348	3.810	--	--	0.140	0.0850	--	--	0.0030	--	--
EL100333-032	10/20/10	MM-V-2c-1	0.0190	0.0125	0.003	0.0100	--	7.49	126.7	277.50	0.0120	0.0025	0.0630	--	36.1700	--	--	--	--	0.905	1.27	9.010	0.1557	4.720	--	--	1.990	0.0990	--	--	0.0030	--	--
EL100333-033	10/20/10	MM-V-2c-2	0.0850	0.0125	0.003	0.0045	--	6.84	116.7	253.50	0.0090	0.0025	0.0720	--	35.0500	--	--	--	--	2.306	0.73	6.970	0.5906	3.180	--	--	0.280	0.0860	--	--	0.0020	--	--
EL100333-034	10/20/10	MM-V-2c-3	0.1320	0.0310	0.003	0.0045	--	6.65	125.1	277.10	0.0120	0.0025	0.0830	--	38.9900	--	--	--	--	2.182	0.65	7.380	0.4790	3.530	--	--	0.370	0.0950	--	--	0.0020	--	--
EL100333-035	10/20/10	MM-V-2c-4	0.1380	0.0300	0.003	0.0045	--	6.57	127.6	290.60	0.0110	0.0025	0.0860	--	40.0300	--	--	--	--	2.372	0.86	7.420	0.3920	3.290	--	--	0.200	0.0970	--	--	0.0010	--	--
EL100333-036	10/20/10	MM-V-2c-5	0.0380	0.0125	0.003	0.0045	--	6.60	106.1	253.30	0.0210	0.0025	0.0720	--	35.9300	--	--	--	--	2.122	0.26	6.420	0.2414	2.410	--	--	0.150	0.0830	--	--	0.0030	--	--
EL100333-037	10/20/10	MM-V-3a-1	0.0025	0.0125	0.003	0.0045	--	7.68	126.4	274.10	0.0110	0.0025	0.0580	--	34.6300	--	--	--	--	0.107	1.26	10.300	0.0971	4.970	--	--	1.700	0.1010	--	--	0.0010	--	--
EL100333-038	10/20/10	MM-V-3a-2	0.1310	0.0125	0.003	0.0045	--	7.00	157.7	328.60	0.0110	0.0025	0.0890	--	45.1500	--	--	--	--	2.724	1.66	10.020	0.7018	5.070	--	--	0.580	0.1160	--	--	0.0020	--	--
EL100333-039	10/20/10	MM-V-3a-3	0.1710	0.0125	0.003	0.0045	--	6.81	164.9	354.80	0.0110	0.0025	0.1090	--	50.8900	--	--	--	--	3.472	1.12	10.290	0.9006	4.890	--	--	0.300	0.1280	--	--	0.0020	--	--
EL100333-040	10/20/10	MM-V-3a-4	0.1310	0.0125	0.003	0.0045	--	6.72	147.4	339.50	0.0160	0.0025	0.1000	--	44.9100	--	--	--	--	2.836	0.88	8.050	0.7032	7.470	--	--	0.190	0.1110	--	--	0.0030	--	--
EL100333-041	10/20/10	MM-V-3a-5	0.0590	0.0125	0.003	0.0045	--	6.58	114.2	288.60	0.0290	0.0025	0.0810	--	37.6900	--	--	--	--	1.698	0.34	6.710	0.2788	7.940	--	--	0.140	0.0910	--	--	0.0030	--	--
EL100333-042	10/20/10	MM-V-3b-1	0.0060	0.0125	0.003	0.0045	--	7.70	123.5	272.20	0.0170	0.0025	0.0590	--	35.0100	--	--	--	--	0.066	1.27	10.490	0.0156	5.080	--	--	1.860	0.1020	--	--	0.0020	--	--
EL100333-043	10/20/10	MM-V-3b-2	0.0750	0.0125	0.003	0.0045	--	7.01	109.5	243.50	0.0310	0.0025	0.0600	--	31.1500	--	--	--	--	1.183	0.79	6.530	0.1805	4.440	--	--	0.190	0.0780	--	--	0.0020	--	--
EL100333-044	10/20/10	MM-V-3b-3	0.0560	0.0125	0.003	0.0045	--	6.89	117.1	267.20	0.0290	0.0025	0.0660	--	34.9900	--	--	--	--	1.571	0.51	6.550	0.2622	5.300	--	--	0.150	0.0830	--	--	0.0020	--	--
EL100333-045	10/20/10	MM-V-3b-4	0.0300	0.0125	0.003	0.0045	--	6.79	112.6	266.80	0.0370	0.0025	0.0610	--	36.5700	--	--	--	--	1.641	0.34	6.130	0.2554	5.690	--	--	0.130	0.0820	--	--	0.0030	--	--
EL100333-046	10/20/10	MM-V-3b-5	0.0430	0.0125	0.003	0.0045	--	6.80	112.7	268.20	0.0350	0.0025	0.0620	--	35.8900	--	--	--	--	1.477	0.31	6.150	0.2520	5.070	--	--	0.170	0.0820	--	--	0.0020	--	--
EL100333-047	10/20/10	MM-V-3c-1	0.0300	0.0125	0.003	0.0045	--	7.54	126.2	273.70	0.0090	0.0025	0.0610	--	35.5500	--	--	--	--	0.635	1.15	8.850	0.1171	4.600	--	--	1.390	0.1000	--	--	0.0005	--	--
EL100333-048	10/20/10	MM-V-3c-2	0.1550	0.0310	0.003	0.0045	--	7.01	148.3	312.50	0.0080	0.0025	0.0830	--	43.0300	--	--	--	--	2.344	0.78	8.240	0.6014	3.740	--	--	0.250	0.1060	--	--	0.0020	--	--
EL100333-049	10/20/10	MM-V-3c-3	0.2110	0.0310	0.003	0.0045	--	6.85	150.4	324.70	0.0170	0.0025	0.0920	--	44.2900	--	--	--	--	2.262	0.67	8.480	0.4888	3.970	--	--	0.270	0.1100	--	--	0.0020	--	--
EL100333-050	10/20/10	MM-V-3c-4	0.0740	0.0125	0.003	0.0045	--	6.71	126.6	289.50	0.0160	0.0025	0.0850	--	39.4300	--	--	--	--	2.168	0.49	7.490	0.3510	4.240	--	--	0.190	0.0980	--	--	0.0010	--	--
EL100333-051	10/20/10	MM-V-3c-5	0.0270	0.0125	0.003	0.0045	--	6.62	114.3	279.20	0.0210	0.0025	0.0810	--	38.2900	--	--	--	--	1.699	0.29	7.040	0.2782	4.620	--	--	0.150	0.0930	--	--	0.0020	--	--
EL100333-054	10/20/10	MM-NV-1a-1	0.0150	0.0125	0.003	0.0045	--	7.85	133.4	290.10	0.0130	0.0025	0.0600	--	36.5100	--	--	--	--	0.014	1.31	10.870	0.0029	5.220	--	--	2.060	0.1060	--	--	0.0020	--	--
EL100333-055	10/20/10	MM-NV-1a-0	0.0100	0.0125	0.003	0.0440	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100333-056	10/20/10	MM-NV-1a-2	0.0130	0.0125	0.003	0.0110	--	7.50	134.9	293.90	0.0190	0.0025	0.0650	--	38.1100	--	--	--	--	0.099	1.32	10.800	0.0517	4.990	--	--	1.810	0.1070	--	--	0.0020	--	--
EL100333-057	10/20/10	MM-NV-1a-3	0.0380	0.0125	0.003	0.0045	--	7.11	145.2	306.80	0.0210	0.0025	0.0750	--	40.9700	--	--	--	--	0.221	1.50	10.230	0.1392	4.300	--	--	0.720	0.1090	--	--	0.0020	--	--
EL100333-058	10/20/10	MM-NV-1a-4	0.0290	0.0125	0.003	0.0045	--	6.91	168.1	351.20	0.0230	0.0025	0.0930	--	48.7100	--	--	--	--	0.257	1.96	10.970	0.3222	4.230	--	--	0.350	0.1240	--	--	0.0040	--	--
EL100333-059	10/20/10	MM-NV-1a-5	0.0310	0.0125	0.003	0.0045	--	--	--	--	0.0270	0.0025	0.0920	--	48.2100	--	--	--	--	0.447	1.60	10.460	0.2318	3.860	--	--	0.340	0.1220	--	--	0.0020	--	--
EL100333-060	10/20/10	MM-NV-1b-0	0.0200	0.0125	0.003	0.0120	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100333-061	10/20/10	MM-NV-1b-1	0.0180	0.0125	0.003	0.0100	--	7.43	130.5	283.10	0.0270	0.0025	0.0640	--	37.9300	--	--	--	--	0.210	1.24	10.760	0.0798	4.990	--	--	1.470	0.1050	--	--	0.0020	--	--
EL100333-062	10/20/10	MM-NV-1b-2	0.0410	0.0125	0.003	0.0045	--	7.10	107.5	232.50	0.1230	0.0025	0.0510	--	31.6100	--	--	--	--	0.879	0.75	6.990	0.1524	3.760	--	--	0.400	0.0800	--	--	0.0030	--	--
EL100333-063	10/20/10	MM-NV-1b-3	0.0360	0.0125	0.003	0.0045	--	6.90	108.8	234.80	0.1370	0.0025	0.0530	--	32.5500	--	--	--	--	0.857	0.56	6.870	0.1426	3.380	--	--	0.310	0.0810	--	--	0.0040	--	--
EL100333-064	10/20/10	MM-NV-1b-4	0.0210	0.0125	0.003	0.0045	--	6.81	110.1	235.70	0.4180	0.0025	0.0590	--	34.5300	--	--	--	--	1.032	0.40	7.020	0.1586	2.930	--	--	0.340	0.0830	--	--	0.0050	--	--
EL100333-065	10/20/10	MM-NV-1b-5	0.0200	0.0125	0.003	0.0045	--	--	--	--	0.4810	0.0025	0.0490	--	30.6900	--	--	--	--	0.986	0.20	6.150	0.0794	2.310	--	--	0.310	0.0720	--	--	0.0030	--	--
EL100333-066	10/20/10	MM-NV-1c-0	0.0025	0.0125	0.003	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100333-067	10/20/10	MM-NV-1c-1	0.0080	0.0125	0.003	0.0100	--	7.75	129.6	284.90	0.0150	0.0025	0.0600	--	35.9900	--	--	--	--	0.037	1.29	10.850	0.0018	4.990	--	--	2.040	0.1050	--	--	0.0030	--	--
EL100333-068	10/20/10	MM-NV-1c-2	0.1540	0.0125	0.003	0.0045	--	7.06	147.2	307.30	0.0150	0.0025	0.0750	--	43.8100	--	--	--	--	2.108	1.30	9.000	0.3334	4.630	--	--	0.310	0.1080	--	--	0.0030	--	--
EL100333-069	10/20/10	MM-NV-1c-3	0.2170	0.0125	0.003	0.0045	--	6.86	162.5	337.10	0.0230	0.0025	0.0900	--	47.7100	--	--	--	--	2.666	1.83	10.740	0.4386	4.510	--	--	0.260	0.1170	--	--	0.0030	--	--
EL100333-070	10/20/10	MM-NV-1c-4	0.0720	0.0125	0.003	0.0045	--	6.78	162.0	333.70	0.0810	0.0025	0.0770	--	48.4700	--	--	--	--	2.736	0.81	10.630	0.2102	4.030	--	--	0.200	0.1150	--	--	0.0030	--	--
EL100333-071	10/20/10	MM-NV-1c-5	0.0340	0.0125	0.003	0.0045	--	--	--	--	0.0340	0.0025	0.0630	--	40.3500	--	--	--	--	2.178	0.61	7.940	0.1938	3.450	--	--	0.160	0.0950	--	--	0.0030	--	--
EL100333-072	10/20/10	MM-NV-2a-0	0.0090	0.0125	0.003	0.0100	--	--	--	--	0.0100	0.0025	0.0590	--	37.1900	--	--	--	--	0.036	1.31	11.200	0.0045	5.170	--	--	2.120	0.1080	--	--	0.0030	--	--
EL100333-073	10/20/10	MM-NV-2a-1	0.0070	0.0125	0.003	0.0045	--	7.93	129.4	282.50	0.0190	0.0025	0.0610	--	37.4100	--	--	--	--	0.047	1.33	11.240	0.0048	5.240	--	--	2.120	0.1090	--	--	0.0010	--	--
EL100333-074	10/20/10	MM-NV-2a-2	0.0090	0.0125	0.003	0.0200	--	7.31	109.6	245.10	0.0100	0.0025	0.0470	--	32.2700	--	--	--	--	0.077	0.96	7.230	0.0602	5.190	--	--	1.040	0.0820	--	--	0.0010	--	--
EL100333-075	10/20/10	MM-NV-2a-3	0.0120	0.0125	0.003	0.0045	--	7.21	104.8	244.90	0.0760	0.0025	0.0420	--	33.5500	--	--	--	--	0.164	0.66	5.490	0.0357	6.660	--	--	0.370	0.0760	--	--	0.0010	--	--
EL100333-076	10/20/10	MM-NV-2a-4	0.0090	0.0125	0.003	0.0045	--	7.00	117.6	302.20	0.0830	0.0025	0.0500	--	39.2900	--	--	--	--	0.760	0.41	5.250	0.0781	10.980	--	--	0.150	0.0850	--	--	0.0030	--	--
EL100333-077	10/20/10	MM-NV-2a-5	0.0060	0.0125	0.003	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100333-078	10/20/10	MM-NV-2b-0	0.0025	0.0125	0.003	0.0110	--	--	--	--	0.0100	0.0025	0.0590	--	36.7500	--	--	--	--	0.036	1.30	11.030	0.0021	5.170	--	--	2.080	0.1070	--	--	0.0005	--	--
EL100333-079	10/20/10	MM-NV-2b-1	0.0060	0.0125	0.003	0.0090	--	7.90	129.5	284.20	0.0100	0.0025	0.0600	--	37.3500	--	--	--	--	0.033	1.32	11.170	0.0015	5.240	--	--	2.110	0.1080	--	--	0.0020	--	--
EL100333-080	10/20/10	MM-NV-2b-2	0.0160	0.0125	0.003	0.0045	--	7.51	133.6	289.70	0.0130	0.0025	0.0550	--	39.0500	--	--	--	--	0.269	1.10	10.290	0.0450	5.670	--	--	1.380	0.1030	--	--	0.0020	--	--
EL100333-081	10/20/10	MM-NV-2b-3	0.0390	0.0125	0.003	0.0045	--	7.16	117.3	260.70	0.0610	0.0025	0.0440	--	36.4700	--	--	--	--	0.653	0.54	6.270	0.0854	6.560	--	--	0.310	0.0820	--	--	0.0030	--	--
EL100333-082	10/20/10	MM-NV-2b-4	0.0090	0.0125	0.003	0.0045	--	7.13	129.9	302.20	0.1940	0.0025	0.0480	--	43.6500	--	--	--	--	0.932	0.34	5.760	0.0608	9.220	--	--	0.210	0.0910	--	--	0.0020	--	--
EL100333-083	10/20/10	MM-NV-2b-5	0.0070	0.0125	0.003	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100333-084	10/20/10	MM-NV-2c-0	0.0100	0.0125	0.003	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100333-085	10/20/10	MM-NV-2c-1	0.0050	0.0125	0.003	0.0110	--	7.88	129.4	284.20	0.0150	0.0025	0.0600	--	36.9100	--	--	--	--	0.037	1.31	11.090	0.0019	5.170	--	--	2.100	0.1080	--	--	0.0020	--	--
EL100333-086	10/20/10	MM-NV-2c-2	0.0210	0.0125	0.003	0.0045	--	7.24	137.4	302.60	0.0160	0.0025	0.0500	--	40.7300	--	--	--	--	0.082	0.88	8.150	0.1276	6.560	--	--	0.420	0.0940	--	--	0.0020	--	--
EL100333-087	10/20/10	MM-NV-2c-3	0.0680	0.0125	0.003	0.0045	--	7.21	137.7	322.20	0.0400	0.0025	0.0530	--	44.1100	--	--	--	--	0.713	0.67	7.530	0.0928	8.570	--	--	0.240	0.0950	--	--	0.0020	--	--
EL100333-088	10/20/10	MM-NV-2c-4	0.0560	0.0125	0.003	0.0045	--	7.05	153.8	374.10	0.0280	0.0025	0.0590	--	52.0900	--	--	--	--	0.866	0.58	8.360	0.1333	11.720	--	--	0.160	0.1080	--	--	0.0030	--	--
EL100333-089	10/20/10	MM-NV-2c-5	0.0210	0.0125	0.003	0.0045	--	--	--	--	0.0310	0.0025	0.0520	--	46.2300	--	--	--	--	0.673	0.47	7.070	0.0491	11.720	--	--	0.140	0.0940	--	--	0.0020	--	--
EL100333-090	10/20/10	MM-NV-3a-0	0.0090	0.0125	0.003	0.0100	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100333-091	10/20/10	MM-NV-3a-1	0.0070	0.0125	0.003	0.0045	--	7.91	130.9	282.80	0.0180	0.0025	0.0600	--	36.7500	--	--	--	--	0.043	1.30	11.080	0.0029	5.110	--	--	2.100	0.1070	--	--	0.0020	--	--
EL100333-092	10/20/10	MM-NV-3a-2	0.0330	0.0125	0.003	0.0045	--	7.27	120.4	266.80	0.0230	0.0025	0.0580	--	36.2300	--	--	--	--	0.510	1.04	8.080	0.0998	6.160	--	--	0.950	0.0940	--	--	0.0020	--	--
EL100333-093	10/20/10	MM-NV-3a-3	0.0360	0.0125	0.003	0.0130	--	7.06	111.0	259.80	0.0290	0.0025	0.0540	--	34.1300	--	--	--	--	0.830	0.80	6.020	0.1308	7.570	--	--	0.310	0.0800	--	--	0.0020	--	--
EL100333-094	10/20/10	MM-NV-3a-4	0.0570	0.0125	0.003	0.0045	--	7.04	142.0	247.80	0.0390	0.0025	0.0620	--	44.6700	--	--	--	--	1.214	0.70	6.600	0.1667	13.010	--	--	0.230	0.0980	--	--	0.0010	--	--
EL100333-095	10/20/10	MM-NV-3a-5	0.0180	0.0125	0.003	0.0045	--	--	--	--	0.0380	0.0025	0.0520	--	42.4900	--	--	--	--	1.118	0.49	4.950	0.1386	15.880	--	--	0.140	0.0870	--	--	0.0020	--	--
EL100333-096	10/20/10	MM-NV-3b-1	0.0070	0.0125	0.003	0.0045	--	7.84	129.3	285.30	0.0130	0.0025	0.0600	--	36.8300	--	--	--	--	0.040	1.31	11.020	0.0026	5.200	--	--	2.070	0.1070	--	--	0.0010	--	--
EL100333-097	10/20/10	MM-NV-3b-2	0.0430	0.0125	0.003	0.0045	--	7.24	130.6	284.00	0.0090	0.0025	0.0650	--	37.0300	--	--	--	--	0.749	1.07	8.760	0.1480	5.690	--	--	0.890	0.1000	--	--	0.0030	--	--
EL100333-098	10/20/10	MM-NV-3b-3	0.0560	0.0125	0.003	0.0045	--	7.03	110.9	248.10	0.0130	0.0025	0.0620	--	31.7900	--	--	--	--	1.028	0.86	7.000	0.1212	6.260	--	--	0.400	0.0820	--	--	0.0010	--	--
EL100333-099	10/20/10	MM-NV-3b-4	0.0320	0.0125	0.003	0.0045	--	6.80	121.1	283.30	0.0140	0.0025	0.0740	--	35.2500	--	--	--	--	1.392	0.72	6.450	0.2112	9.680	--	--	0.170	0.0880	--	--	0.0030	--	--
EL100333-100	10/20/10	MM-NV-3b-5	0.0210	0.0125	0.003	0.0045	--	6.87	128.7	320.30	0.0240	0.0025	0.0770	--	39.4100	--	--	--	--	1.324	0.61	6.440	0.1563	13.560	--	--	0.190	0.0950	--	--	0.0020	--	--
EL100333-101	10/20/10	MM-NV-3c-0b	0.0070	0.0125	0.003	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100333-102	10/20/10	MM-NV-3c-0	0.0090	0.0125	0.003	0.0045	--	7.85	129.3	284.10	0.0100	0.0025	0.0610	--	37.1700	--	--	--	--	0.053	1.32	11.130	0.0009	5.240	--	--	2.090	0.1080	--	--	0.0100	--	--
EL100333-103	10/20/10	MM-NV-3c-1	0.0060	0.0125	0.003	0.0120	--	7.82	128.6	282.50	0.0080	0.0025	0.0600	--	36.8900	--	--	--	--	0.030	1.33	11.070	0.0021	5.240	--	--	2.100	0.1080	--	--	0.0010	--	--
EL100333-104	10/20/10	MM-NV-3c-2	0.0890	0.0125	0.003	0.0045	--	7.12	136.0	296.70	0.0100	0.0025	0.0720	--	39.3300	--	--	--	--	1.204	1.15	8.320	0.2736	6.670	--	--	0.570	0.1010	--	--	0.0030	--	--
EL100333-105	10/20/10	MM-NV-3c-3	0.0610	0.0125	0.003	0.0045	--	6.95	124.6	285.10	0.0160	0.0025	0.0690	--	37.0100	--	--	--	--	1.616	0.88	7.150	0.1660	8.380	--	--	0.440	0.0930	--	--	0.0040	--	--
EL100333-106	10/20/10	MM-NV-3c-4	0.0300	0.0125	0.003	0.0045	--	--	--	--	0.0190	0.0025	0.0710	--	36.1500	--	--	--	--	1.379	0.55	6.270	0.1736	11.580	--	--	0.320	0.0880	--	--	0.0020	--	--

Notes

June samples: all surface water

Sample ID code (July to October): Site (MM = Marchmont Marsh) - Plot Type (V = Vegetated; NV = Non-Vegetated) - Plot and Peeper # - Depth (0b = 30-20 cm above sediment-water interface; 0 = 20-10 cm above sediment-water interface; 1 = 10-0 cm above sediment-water interface; 2 = 0-10 cm below sediment-water interface; 3 = 10-20 cm below sediment-water interface; 4 = 20-30 cm below sediment-water interface; 5 = 30-40 cm below sediment-water interface; 6 =

Value -- in grey box = parameter not analyzed

Table A.1.6 - Marchmont Marsh, Water Sample Analytical Results, June to October

Lab ID	Sample Date	Sample ID	Parameter / Method Detection Limit / Units: Total P	Phosphate PO_4-P	Nitrite NO_2-N	Nitrate NO_3-N	DOC	pH	Total Alkalinity as $CaCO_3$	Conductivity	Total Metals																					Reactive Silicates SiO_2	Chlorophyll "a"
											Al	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	S	Sr	Ti	V	Zn		
			0.0050	*0.0250*	*0.006*	*0.0090*	*0.50*	*n/a*	*1.0*	*0.50*	*0.0050*	*0.0050*	*0.0030*	*0.002*	*0.0050*	*0.0010*	*0.010*	*0.002*	*0.002*	*0.002*	*0.10*	*0.010*	*0.0002*	*0.010*	*0.002*	*0.0050*	*0.050*	*0.0050*	*0.010*	*0.006*	*0.0010*	*0.250*	*0.2*
			mg/L	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*n/a*	*mg/L*	*uS/cm*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*µg/L*

Value in grey font = Value half of Detection Limit (result < Detection Limit)

Table A.1.7 - Marchmont Marsh, Sediment Sample Analytical Results

Lab ID	Sample Date	Sample ID	Parameter / Method Detection Limit / Units: Percent Moisture	Total Recoverable Phosphorus	pH	Cond-uctivity	Total Recoverable Metals																							
							Al	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	Pb	S	Sb	Se	Sr	Ti	V	Zn
			0.00	*3.20*	*n/a*	*1.0*	*1.20*	*2.00*	*2.00*	*0.04*	*0.04*	*0.08*	*0.20*	*0.08*	*0.20*	*0.20*	*0.40*	*0.20*	*0.04*	*2.00*	*0.40*	*0.20*	*1.00*	*1.20*	*2.00*	*2.00*	*0.40*	*2.00*	*0.40*	*0.20*
			%	*µg/g*	*n/a*	*uS/cm*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*
EL120175-006	06/29/10	MMS2-Jun-30	326.21	779.50	6.42	157.8	12794.00	1.00	181.24	0.35	12135.50	3.44	6.80	24.84	18.17	16041.60	1144.41	3858.45	210.89	1.00	298.99	12.39	53.38	8380.31	1.00	1.00	32.37	431.14	32.19	128.69
EL120175-005	10/20/10	MM-Oct-10	98.96	234.11	6.53	152.7	5364.11	1.00	35.59	0.09	3842.29	1.26	2.29	6.86	4.34	8221.10	241.82	1141.02	57.60	1.00	208.72	4.03	8.84	657.86	1.00	1.00	10.58	214.14	17.22	21.59

Notes

Sample ID code: Site (MM = Marchmont Marsh) - Date

Value in grey font = Value half of Detection Limit (result < Detection Limit)

Table A.1.8 - Marchmont Marsh, Wild Rice Vegetation Analytical Results

Lab ID	Sample Date	Sample ID	Plant Part	# of Plants	Parameter / Method Detection Limit / Units: Dry Plant Weight *(subsample analyzed)*	P in Plant Tissue	N in Plant Tissue	Metals in Plant Tissue																				
								Al	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	S	Si	Sr	Ti	V	Zn
						0.80	*0.01*	*5.00*	*5.00*	*10.00*	*0.04*	*0.10*	*0.40*	*0.10*	*0.25*	*0.02*	*0.10*	*5.00*	*0.10*	*0.01*	*0.10*	*0.03*	*2.50*	*3.00*	*0.50*	*0.10*	*0.95*	*0.05*	*0.10*
					g	*µg/g*	*% N*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*
EL100061-005	08/26/10	MM-AVEG-I-1	Inflorescence	3	4.7	2099.19	0.63	5.82	2.50	5.00	0.02	1162.78	0.20	0.05	0.330	1.88	65.94	9558.50	1397.04	59.40	576.97	2.790	1.25	954.07	128.36	2.99	0.475	0.025	8.31
EL100061-006	08/26/10	MM-AVEG-S-2	Stem	3	7.52	1986.19	0.38	11.80	2.50	5.00	0.02	707.78	0.20	0.05	1.940	0.77	96.09	24663.50	1023.04	127.45	11073.40	1.530	1.25	859.57	186.56	3.28	0.475	0.025	4.49
EL100061-007	08/26/10	MM-AVEG-L-3	Leaf	3	10.02	1358.19	0.55	91.25	2.50	43.84	0.02	6403.28	0.20	0.16	0.630	1.42	453.39	10858.50	1902.54	1348.50	12058.40	0.870	1.25	1258.57	162.31	18.12	3.990	0.420	6.26
EL100061-008	08/26/10	MM-AVEG-R-4	Root	3	11.34	1209.69	0.57	3232.50	2.50	96.25	0.09	7283.28	0.20	2.42	12.450	9.19	10179.30	3099.50	2243.04	329.35	3243.97	5.060	12.26	5468.07	194.21	21.86	122.500	15.610	45.59
EL100061-009	09/25/10	MM-SVEG-I-5	Inflorescence	20	8.92	1183.19	0.50	60.05	2.50	10.04	0.02	2408.28	0.20	0.05	0.560	0.80	207.34	6248.50	1323.54	178.35	1120.47	1.550	1.25	725.07	151.36	6.93	2.800	0.200	7.46
EL100061-004	09/25/10	MM-SVEG-S-6	Stem	20	37.09	1346.69	0.52	90.10	2.50	16.50	0.02	2290.78	0.20	0.05	2.470	0.86	369.48	17128.50	1453.54	355.15	10153.40	1.600	1.25	1152.07	144.96	7.67	4.310	0.300	7.99
EL100061-010	09/25/10	MM-SVEG-L-7	Leaf	20	16.19	1372.19	0.86	781.00	2.50	79.20	0.02	9193.28	0.20	0.66	2.450	2.85	2264.39	7173.50	2347.54	1898.50	7183.47	2.000	2.79	1858.57	169.21	24.55	24.980	3.720	17.44
EL100061-011	09/25/10	MM-SVEG-R-8	Root	20	21.03	1005.69	0.59	2202.00	2.50	88.30	0.06	6453.28	0.20	1.84	5.420	8.02	10454.30	3633.50	1744.04	649.50	4403.97	3.330	9.96	4303.07	158.56	20.08	79.400	13.840	33.06

Note

Sample ID code: Site (MM = Marchmont Marsh) - Month & Sample Type (A = August; S = September; VEG = Vegetation) - Plant Part (I = Inflorescence; S = Stem; L = Leaf; R = Root) - Sample #

Value in grey font = Value half of Detection Limit (result < Detection Limit)

Table A.1.9 – Marchmont Marsh, Water Data Trends Between Plots.

Analytical Parameter	Month	Plot Trend
Total P	July	V lower concentration than NV (P = 0.026).
	August	No significant trend between plots.
	September	NV lower concentration than V (P = 0.028).
	October	NV lower concentration than V (P = <0.001).
Phosphate (PO_4-P)	July	Mean concentrations less than MDL.
	August	Mean concentrations less than MDL.
	September	Mean concentrations less than MDL.
	October	NV lower concentration than V (P = 0.001).
Nitrate (NO_3-N)	July	NV lower concentration than V (P = 0.001).
	August	NV lower concentration than V (P = <0.001).
	September	No significant trend between plots.
	October	V lower concentration than NV (P = 0.033).
pH	July	No significant trend between plots.
	August	V lower concentration than NV (P = <0.001).
	September	V lower concentration than NV (P = <0.001).
	October	V lower concentration than NV (P = <0.001).
Total Alkalinity (as $CaCO_3$)	July	V lower concentration than NV (P = 0.004).
	August	No significant trend between plots.
	September	No significant trend between plots.
	October	No significant trend between plots.
Cond-uctivity	July	V lower concentration than NV (P = 0.005).
	August	No significant trend between plots.
	September	No significant trend between plots.
	October	No significant trend between plots.
DOC	July	No significant trend between plots.
	August	V lower concentration than NV (P = <0.001).
Reactive Silicates	July	No significant trend between plots.
Total Al	July	No significant trend between plots.
	August	No significant trend between plots.
	September	V lower concentration than NV (P = 0.032).
	October	V lower concentration than NV (P = <0.001).
Total Ba	July	No significant trend between plots.
	August	NV lower concentration than V (P = <0.001).
	September	NV lower concentration than V (P = <0.001).
	October	NV lower concentration than V (P = <0.001).

Notes: V = Vegetated Plots; NV = Non-Vegetated Plots; MV = Mixed Vegetation Plot

Table A.1.9 – Marchmont Marsh, Water Data Trends Between Plots.

Analytical Parameter	Month	Plot Trend
Total Ca	July	V lower concentration than NV (P = 0.002).
	August	NV lower concentration than V (P = 0.047).
	September	NV lower concentration than V (P = 0.003).
	October	No significant trend between plots.
Total Fe	July	No significant trend between plots.
	August	No significant trend between plots.
	September	NV lower concentration than V (P = 0.036).
	October	NV lower concentration than V (P = <0.001).
Total K	July	No significant trend between plots.
	August	No significant trend between plots.
	September	V lower concentration than NV (P = 0.011).
	October	No significant trend between plots.
Total Mg	July	No significant trend between plots.
	August	NV lower concentration than V (P = <0.001).
	September	NV lower concentration than V (P = 0.004).
	October	No significant trend between plots.
Total Mn	July	No significant trend between plots.
	August	NV lower concentration than V (P = 0.009).
	September	NV lower concentration than V (P = 0.001).
	October	NV lower concentration than V (P = <0.001).
Total Na	July	V lower concentration than NV (P = 0.034).
	August	V lower concentration than NV (P = 0.001).
	September	V lower concentration than NV (P = <0.001).
	October	V lower concentration than NV (P = <0.001).
Total S	July	No significant trend between plots.
	August	NV lower concentration than V (P = 0.034).
	September	NV lower concentration than V (P = 0.047).
	October	V lower concentration than NV (P = <0.001).
Total Sr	July	V lower concentration than NV (P = 0.042).
	August	NV lower concentration than V (P = 0.046).
	September	NV lower concentration than V (P = <0.001).
	October	No significant trend between plots.
Total Zn	July	NV lower concentration than V (P = 0.011).
	August	No significant trend between plots.
	September	No significant trend between plots.
	October	NV lower concentration than V (P = <0.001).

Notes: V = Vegetated Plots; NV = Non-Vegetated Plots; MV = Mixed Vegetation Plot

Table A.1.10 – Marchmont Marsh, Water Data Trends Between Months.

Analytical Parameter	Plot	Monthly Trend
Total P	V	No significant trend between months.
	NV	No significant trend between months.
Phosphate (PO_4-P)	V	October concentration significantly greater than all other months (P = 0.001).
	NV	October concentration significantly greater than all other months (P = 0.001).
Nitrate (NO_3-N)	V	Concentration increasing between July and August (P = <0.001). Concentration decreasing between August vs. September and October (P = <0.001).
	NV	Concentration increasing between July and August (P = 0.004). Concentration decreasing between August vs. September and October (P = <0.001).
pH	V	Value decreasing between July and October (P = 0.020).
	NV	No significant trend between months.
Total Alkalinity (as $CaCO_3$)	V	No significant trend between months.
	NV	No significant trend between months.
Cond-uctivity	V	No significant trend between months.
	NV	No significant trend between months.
DOC[A]	V	No significant trend between months.
	NV	No significant trend between months.
Total Al	V	No significant trend between months.
	NV	No significant trend between months.
Total Ba	V	No significant trend between months.
	NV	No significant trend between months.
Total Ca	V	Concentration increased between July vs. August (P = 0.005) and September (P = 0.002).
	NV	Concentration decreased between July vs. August (P = 0.003) and September (P = 0.001).
Total Fe	V	No significant trend between months.
	NV	No significant trend between months.
Total K	V	No significant trend between months.
	NV	No significant trend between months.
Total Mg	V	Concentration increased between August (P = 0.046) and September (P = 0.047) vs. October.
	NV	No significant trend between months.
Total Mn	V	No significant trend between months.
	NV	No significant trend between months.

Notes: V = Vegetated Plots; NV = Non-Vegetated Plots; MV = Mixed Vegetation Plot; [A] = measured in June, July and August

Table A.1.10 – Marchmont Marsh, Water Data Trends Between Months.

Analytical Parameter	Plot	Monthly Trend
Total Na	V	No significant trend between months.
	NV	No significant trend between months.
Total S	V	Concentration decreased between September and October (P = 0.025).
	NV	Concentration increased between September and October (P = 0.031).
Total Sr	V	Concentration increased between July and September (P = 0.005).
	NV	Concentration decreased between July and September (P = 0.004). Concentration increased between September and October (P = 0.045).
Total Zn	V	Concentration decreased between July, August and September (P = <0.001) vs. October.
	NV	Concentration decreased between July, August and September (P = <0.001) vs. October.

Notes: V = Vegetated Plots; NV = Non-Vegetated Plots; MV = Mixed Vegetation Plot

Table A.1.11 - Marchmont Marsh, Water Sample Statistical Analysis

Parameter	Non-Vegetated vs. Vegetated Data (All months, all depths)						
	Data Test ($P \geq 0.05$)				ANOVA ($P \leq 0.05$)		
	Normality		Equal Variance				
	Result	P	Result	P	F	P	Significant
Total P	pass	0.658	fail	<0.050	3.667	0.005	Y
Phosphate PO_4-P	fail	<0.050	pass	0.199	12.836	<0.001	Y
Nitrate NO_3-N	fail	<0.050	pass	0.385	25.572	<0.001	Y
DOC	pass	0.973	pass	0.471	3.226	0.110	N
pH	pass	0.079	pass	0.234	16.633	<0.001	Y
Total Alkalinity as $CaCO_3$	pass	0.204	pass	0.388	2.518	0.036	Y
Conductivity	pass	0.083	pass	0.582	3.201	0.011	Y
Total Al	pass	0.974	pass	0.137	6.223	<0.001	Y
Total Ba	fail	<0.050	pass	0.195	9.465	<0.001	Y
Total Ca	pass	0.471	pass	0.507	7.693	<0.001	Y
Total Fe	pass	0.539	pass	0.981	4.550	0.001	Y
Total K	fail	<0.050	pass	0.062	0.350	0.924	N
Total Mg	pass	0.866	pass	0.574	4.954	<0.001	Y
Total Mn	pass	0.702	pass	0.903	13.679	<0.001	Y
Total Na	fail	<0.050	fail	<0.050	6.718	<0.001	Y
Total S	pass	0.372	fail	<0.050	3.524	0.006	Y
Total Sr	pass	0.350	pass	0.992	6.553	<0.001	Y
Total Zn	pass	0.973	pass	0.317	50.360	<0.001	Y
Reactive Silicates SiO_2	pass	0.869	pass	0.884	0.010	0.924	N

Notes
All months = July, August, September and October; All depths = 10-0 cm above sediment-water interface, 0-10 cm, 10-20 cm, 20-30 cm and 30-40 cm below sediment-water interface
Significant based on P value: Y = Yes; N = No
Value -- in grey box = data not available / incalculable

Table A.1.12 - Marchmont Marsh, Water Sample Statistical Analysis by Month

		Non-Vegetated vs. Vegetated Data (All depths)						
		Data Test ($P \geq 0.05$)				ANOVA ($P \leq 0.05$)		
		Normality		Equal Variance				
Parameter	Month	Result	P	Result	P	F	P	Significant
Total P	July	pass	0.609	pass	0.980	7.370	0.026	Y
	August	pass	0.231	pass	0.996	0.855	0.382	N
	September	pass	0.279	pass	0.656	7.127	0.028	Y
	October	pass	0.986	pass	0.872	31.171	<0.001	Y
Phosphate PO_4-P	July	fail	<0.050	pass	1.000	0.400	0.545	N
	August	fail	--	fail	--	--	--	--
	September	fail	--	fail	--	--	--	--
	October	pass	0.328	pass	0.920	22.460	0.001	Y
Nitrate NO_3-N	July	pass	0.892	pass	0.178	22.426	0.001	Y
	August	pass	0.425	pass	0.997	57.993	<0.001	Y
	September	pass	0.223	fail	<0.050	2.000	0.195	N
	October	pass	0.931	pass	1.000	6.626	0.033	Y
DOC	July	pass	0.763	pass	0.558	0.823	0.391	N
	August	pass	0.180	pass	0.558	30.838	<0.001	Y
	September	--	--	--	--	--	--	--
	October	--	--	--	--	--	--	--
pH	July	pass	0.658	pass	0.484	4.324	0.076	N
	August	pass	0.915	pass	0.744	42.375	<0.001	Y
	September	pass	0.878	pass	0.830	27.356	<0.001	Y
	October	pass	0.827	pass	0.452	41.104	<0.001	Y
Total Alkalinity as $CaCO_3$	July	pass	0.950	pass	0.651	17.004	0.004	Y
	August	pass	0.246	pass	0.842	0.000	0.999	N
	September	pass	0.131	pass	0.338	3.400	0.102	N
	October	pass	0.596	pass	0.186	0.741	0.415	N
Conduc-tivity	July	pass	0.567	pass	0.274	15.886	0.005	Y
	August	pass	0.251	pass	1.000	1.484	0.258	N
	September	pass	0.172	pass	0.592	0.005	0.948	N
	October	pass	0.094	pass	0.289	1.018	0.343	N
Total Al	July	pass	0.101	pass	0.721	3.977	0.081	N
	August	pass	0.972	pass	0.648	1.682	0.231	N
	September	pass	0.791	pass	0.693	6.718	0.032	Y
	October	pass	0.925	pass	0.710	41.933	<0.001	Y
Total Ba	July	pass	0.172	pass	0.277	2.953	0.124	N
	August	pass	0.380	pass	0.905	34.103	<0.001	Y
	September	pass	0.691	pass	0.746	150.606	<0.001	Y
	October	pass	0.941	pass	0.867	25.491	<0.001	Y
Total Ca	July	pass	0.298	pass	0.218	22.111	0.002	Y
	August	pass	0.904	pass	0.851	5.491	0.047	Y
	September	pass	0.878	pass	0.889	17.507	0.003	Y
	October	pass	0.175	pass	0.484	2.144	0.181	N
Total Fe	July	pass	0.330	pass	0.340	0.339	0.576	N
	August	pass	0.573	pass	0.730	4.659	0.063	N
	September	pass	0.810	pass	0.978	6.366	0.036	Y
	October	pass	0.988	pass	0.891	39.281	<0.001	Y
Total K	July	pass	0.103	pass	0.574	0.045	0.838	N
	August	pass	0.805	pass	0.788	0.170	0.691	N
	September	pass	0.996	pass	0.938	10.748	0.011	Y
	October	pass	0.802	pass	0.878	0.126	0.732	N
Total Mg	July	pass	0.146	pass	0.425	0.223	0.649	N
	August	pass	0.377	pass	0.669	26.837	<0.001	Y
	September	pass	0.654	pass	0.773	16.583	0.004	Y
	October	pass	0.981	pass	0.827	1.594	0.242	N
Total Mn	July	pass	0.621	pass	0.220	3.867	0.085	N
	August	pass	0.633	pass	0.629	11.819	0.009	Y
	September	pass	0.993	pass	0.905	23.976	0.001	Y
	October	pass	0.577	pass	0.821	82.709	<0.001	Y
Total Na	July	pass	0.685	pass	0.170	6.478	0.034	Y
	August	pass	0.980	pass	0.858	24.980	0.001	Y
	September	pass	0.889	pass	0.574	25.928	<0.001	Y
	October	pass	0.800	pass	0.628	25.785	<0.001	Y
Total S	July	pass	0.455	pass	0.274	0.520	0.492	N
	August	pass	0.901	pass	0.648	6.500	0.034	Y
	September	pass	0.680	pass	0.683	5.474	0.047	Y
	October	pass	0.813	pass	0.772	38.519	<0.001	Y
Total Sr	July	pass	0.976	pass	0.986	5.832	0.042	Y
	August	pass	0.852	pass	0.879	5.545	0.046	Y
	September	pass	0.583	pass	0.681	54.708	<0.001	Y
	October	pass	0.620	pass	0.907	0.017	0.899	N
Total Zn	July	pass	0.439	pass	0.445	10.838	0.011	Y
	August	pass	0.793	pass	0.789	1.332	0.282	N
	September	pass	0.776	pass	0.886	3.984	0.081	N
	October	pass	0.519	pass	0.418	341.826	<0.001	Y
Reactive Silicates SiO_2	July	pass	0.869	pass	0.884	0.010	0.924	N
	August	--	--	--	--	--	--	--
	September	--	--	--	--	--	--	--
	October	--	--	--	--	--	--	--

Notes
All depths = 10-0 cm above sediment-water interface, 0-10 cm, 10-20 cm, 20-30 cm and 30-40 cm below sediment-water interface
Significant based on P value: Y = Yes; N = No
Value -- in grey box = data not available / incalculable

Table A.1.13 - Marchmont Marsh, Water Sample Statistical Analysis by Plot

Parameter	Plot	All Months (All depths)							July vs. August (All depths)				August vs. September (All depths)				September vs. October (All depths)				July vs. September (All depths)				July vs. October (All depths)				August vs. October (All depths)			
		Data Test ($P \geq 0.05$)				ANOVA ($P \leq 0.05$)			Tukey Test ($P \leq 0.05$)		T-Test ($P \leq 0.001$)		Tukey Test ($P \leq 0.05$)		T-Test ($P \leq 0.001$)		Tukey Test ($P \leq 0.05$)		T-Test ($P \leq 0.001$)		Tukey Test ($P \leq 0.05$)		T-Test ($P \leq 0.001$)		Tukey Test ($P \leq 0.05$)		T-Test ($P \leq 0.001$)		Tukey Test ($P \leq 0.05$)		T-Test ($P \leq 0.001$)	
		Normality		Equal Variance																												
		Result	P	Result	P	F	P	Sig	P	Sig	P	Sig	P	Sig	P	Sig	P	Sig	P	Sig	P	Sig	P	Sig	P	Sig	P	Sig	P	Sig	P	Sig
Total P	Non-Vegetated	pass	0.880	pass	0.068	2.640	0.085	N	--	--	0.335	N	--	--	0.893	N	--	--	0.038	N*	--	--	0.028	N*	--	--	0.002	N*	--	--	0.294	N
	Vegetated	pass	0.558	pass	0.077	2.415	0.104	N	--	--	0.364	N	--	--	0.847	N	--	--	0.028	N*	--	--	0.030	N*	--	--	0.002	N*	--	--	0.322	N
Phosphate PO_4-P	Non-Vegetated	fail	<0.050	pass	0.169	11.376	<0.001	Y	1.000	N	1.000	N	1.000	N	1.000	N	0.001	Y	0.010	N*	1.000	N	0.471	N	0.001	Y	0.010	N*	0.001	Y	0.010	N*
	Vegetated	fail	<0.050	pass	0.234	11.084	<0.001	Y	1.000	N	1.000	N	1.000	N	1.000	N	0.001	Y	0.010	N*	1.000	N	0.471	N	0.001	Y	0.010	N*	0.001	Y	0.010	N*
Nitrate NO_3-N	Non-Vegetated	pass	0.258	pass	0.287	18.931	<0.001	Y	0.004	Y	0.013	N*	<0.001	Y	0.001	Y	0.759	N	0.095	N	0.316	N	0.054	N	0.054	N	0.005	N*	<0.001	Y	<0.001	Y
	Vegetated	fail	<0.050	pass	0.364	19.236	<0.001	Y	<0.001	Y	0.005	N*	<0.001	Y	0.002	N*	0.729	N	0.095	N	0.782	N	0.144	N	0.234	N	0.004	N*	<0.001	Y	<0.001	Y
DOC	Non-Vegetated	pass	0.973	pass	0.471	3.226	0.110	N	--	--	0.110	N	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Vegetated	pass	0.617	pass	0.818	3.403	0.102	N	--	--	0.102	N	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH	Non-Vegetated	pass	0.123	pass	0.338	2.928	0.068	N	--	--	0.759	N	--	--	0.925	N	--	--	0.026	N*	--	--	0.734	N	--	--	0.184	N	--	--	0.026	N*
	Vegetated	pass	0.445	pass	0.065	4.186	0.023	Y	0.764	N	0.316	N	0.992	N	0.689	N	0.076	N	0.040	N*	0.899	N	0.481	N	0.020	Y	0.027	N*	0.127	N	0.057	N
Total Alkalinity as $CaCO_3$	Non-Vegetated	pass	0.331	pass	0.140	2.652	0.086	N	--	--	0.046	N*	--	--	0.441	N	--	--	0.204	N	--	--	0.012	N*	--	--	0.324	N	--	--	0.474	N
	Vegetated	pass	0.176	pass	0.967	2.366	0.109	N	--	--	0.138	N	--	--	0.382	N	--	--	0.313	N	--	--	0.026	N*	--	--	0.161	N	--	--	0.904	N
Conductivity	Non-Vegetated	pass	0.151	pass	0.610	2.009	0.156	N	--	--	0.056	N	--	--	0.598	N	--	--	0.434	N	--	--	0.040	N*	--	--	0.293	N	--	--	0.623	N
	Vegetated	pass	0.558	pass	0.928	2.177	0.131	N	--	--	0.159	N	--	--	0.524	N	--	--	0.752	N	--	--	0.065	N	--	--	0.077	N	--	--	0.696	N
Total Al	Non-Vegetated	pass	0.479	pass	0.112	2.129	0.137	N	--	--	0.960	N	--	--	0.247	N	--	--	0.753	N	--	--	0.231	N	--	--	0.021	N*	--	--	0.027	N*
	Vegetated	pass	0.834	pass	0.233	1.883	0.173	N	--	--	0.894	N	--	--	0.298	N	--	--	0.634	N	--	--	0.278	N	--	--	0.023	N*	--	--	0.057	N
Total Ba	Non-Vegetated	fail	<0.050	pass	0.181	0.358	0.784	N	--	--	0.666	N	--	--	0.028	Y	--	--	0.493	N	--	--	0.741	N	--	--	0.975	N	--	--	0.294	N
	Vegetated	pass	0.879	pass	0.544	2.616	0.087	N	--	--	0.200	N	--	--	0.126	N	--	--	0.538	N	--	--	0.019	N*	--	--	0.130	N	--	--	0.587	N
Total Ca	Non-Vegetated	pass	0.640	pass	0.322	8.988	0.001	Y	0.003	Y	0.007	N*	0.967	N	0.554	N	0.211	N	0.030	N*	0.001	Y	0.003	N*	0.076	N	0.060	N	0.409	N	0.104	N
	Vegetated	pass	0.465	pass	0.829	8.424	0.001	Y	0.005	Y	0.004	N*	0.987	N	0.753	N	0.097	N	0.032	N*	0.002	Y	0.001	Y	0.271	N	0.092	N	0.172	N	0.084	N
Total Fe	Non-Vegetated	pass	0.100	pass	0.831	0.838	0.493	N	--	--	0.748	N	--	--	0.579	N	--	--	0.606	N	--	--	0.456	N	--	--	0.166	N	--	--	0.168	N
	Vegetated	pass	0.065	pass	0.904	1.503	0.252	N	--	--	0.239	N	--	--	0.833	N	--	--	0.637	N	--	--	0.173	N	--	--	0.024	N*	--	--	0.460	N
Total K	Non-Vegetated	pass	0.219	pass	0.196	0.198	0.896	N	--	--	0.713	N	--	--	0.838	N	--	--	0.456	N	--	--	0.279	N	--	--	0.777	N	--	--	0.848	N
	Vegetated	fail	<0.050	fail	<0.050	0.128	0.942	N	--	--	0.936	N	--	--	0.777	N	--	--	0.336	N	--	--	0.232	N	--	--	0.881	N	--	--	0.891	N
Total Mg	Non-Vegetated	pass	0.905	pass	0.403	2.011	0.153	N	--	--	0.504	N	--	--	0.658	N	--	--	0.020	N*	--	--	0.384	N	--	--	0.386	N	--	--	0.009	N*
	Vegetated	pass	0.551	pass	0.843	5.257	0.010	Y	0.066	N	0.031	N*	1.000	N	0.988	N	0.047	Y	0.016	N*	0.068	N	0.046	N*	0.998	N	0.843	N	0.046	Y	0.008	N*
Total Mn	Non-Vegetated	pass	0.171	pass	0.737	1.906	0.169	N	--	--	0.939	N	--	--	0.188	N	--	--	0.662	N	--	--	0.254	N	--	--	0.097	N	--	--	0.035	N*
	Vegetated	fail	<0.050	pass	0.726	3.092	0.057	N	--	--	0.166	N	--	--	0.481	N	--	--	0.676	N	--	--	0.039	N*	--	--	0.004	N*	--	--	0.226	N
Total Na	Non-Vegetated	pass	0.224	pass	0.078	0.904	0.461	N	--	--	0.316	N	--	--	0.496	N	--	--	0.485	N	--	--	0.457	N	--	--	0.312	N	--	--	0.980	N
	Vegetated	pass	0.468	pass	0.578	0.170	0.915	N	--	--	0.833	N	--	--	0.808	N	--	--	0.456	N	--	--	0.672	N	--	--	0.863	N	--	--	0.639	N
Total S	Non-Vegetated	pass	0.491	fail	<0.050	3.295	0.048	Y	0.976	N	0.562	N	0.576	N	0.339	N	0.031	Y	0.036	N*	0.351	N	0.236	N	0.513	N	0.048	N*	0.302	N	0.005	N*
	Vegetated	pass	0.312	fail	<0.050	3.686	0.034	Y	0.848	N	0.226	N	0.698	N	0.442	N	0.025	Y	0.035	N*	0.264	N	0.175	N	0.567	N	0.012	N*	0.187	N	0.007	N*
Total Sr	Non-Vegetated	pass	0.710	pass	0.944	6.261	0.005	Y	0.115	N	0.046	N*	0.334	N	0.105	N	0.045	Y	0.018	N*	0.004	Y	0.002	N*	0.614	N	0.270	N	0.651	N	0.315	N
	Vegetated	pass	0.722	pass	0.879	5.856	0.007	Y	0.087	N	0.043	N*	0.506	N	0.178	N	0.067	N	0.019	N*	0.005	Y	0.002	N*	0.590	N	0.253	N	0.582	N	0.278	N
Total Zn	Non-Vegetated	pass	0.941	pass	0.401	39.120	<0.001	Y	0.807	N	0.439	N	0.585	N	0.245	N	<0.001	Y	<0.001	Y	0.171	N	0.023	N*	<0.001	Y	<0.001	Y	<0.001	Y	<0.001	Y
	Vegetated	pass	0.901	pass	0.225	40.162	<0.001	Y	0.996	N	0.852	N	0.390	N	0.188	N	<0.001	Y	<0.001	Y	0.285	N	0.032	N*	<0.001	Y	<0.001	Y	<0.001	Y	<0.001	Y
Reactive Silicates SiO_2	Non-Vegetated	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Vegetated	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes

All depths = 10-0 cm above sediment-water interface, 0-10 cm, 10-20 cm, 20-30 cm and 30-40 cm below sediment-water interface

Sig = Significant based on P value: Y = Yes; N = No

N* = T-Test only: No based on P value $\leq$0.001, Yes based on P value $\leq$0.05

Value -- in grey box = data not available / incalculable

A.2 – Graphs

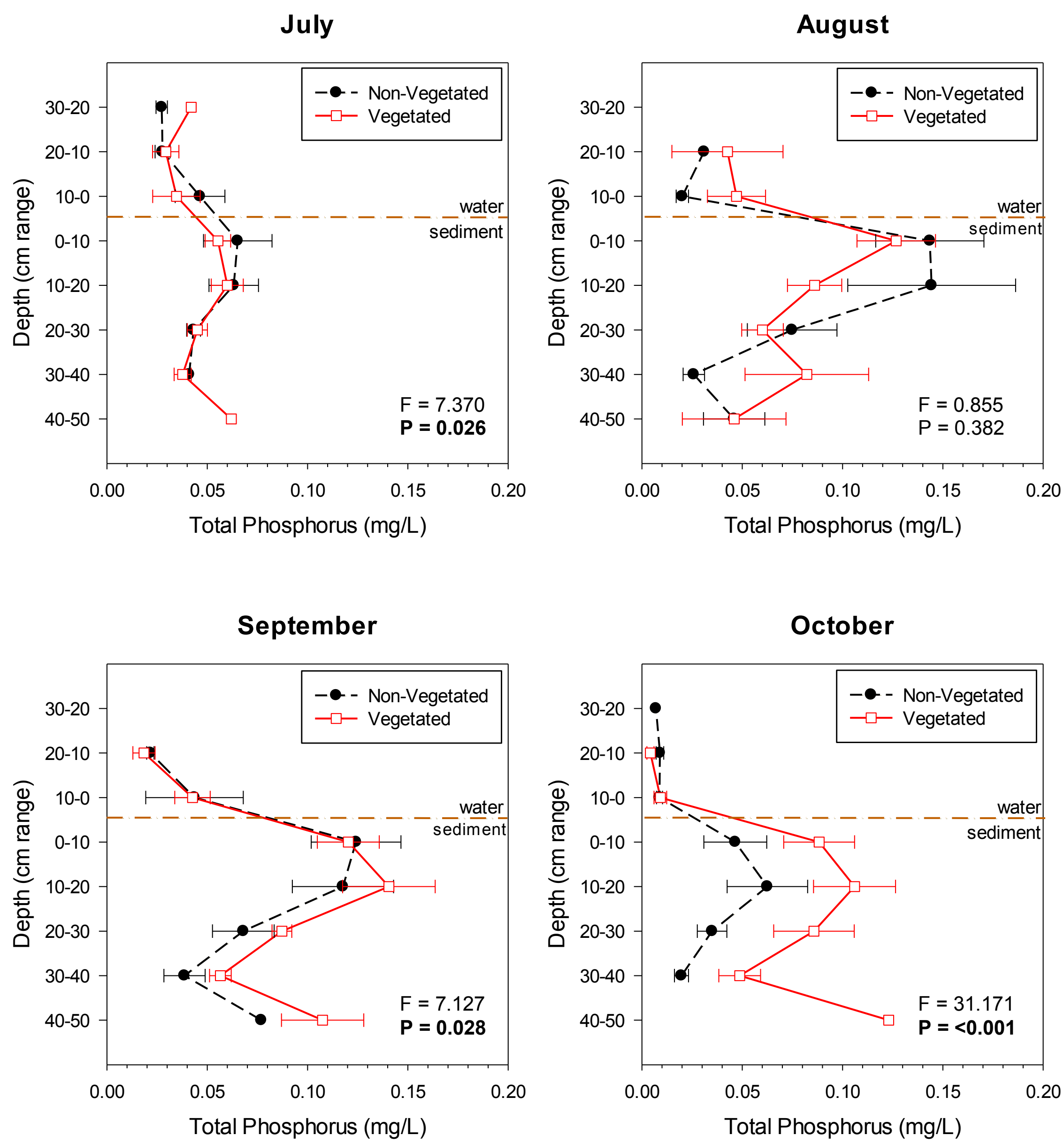


Figure A.2.1 – Marchmont Marsh, Total Phosphorus, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. ANOVA test (comparing both plots, depths: 10-0 cm above to 30-40 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

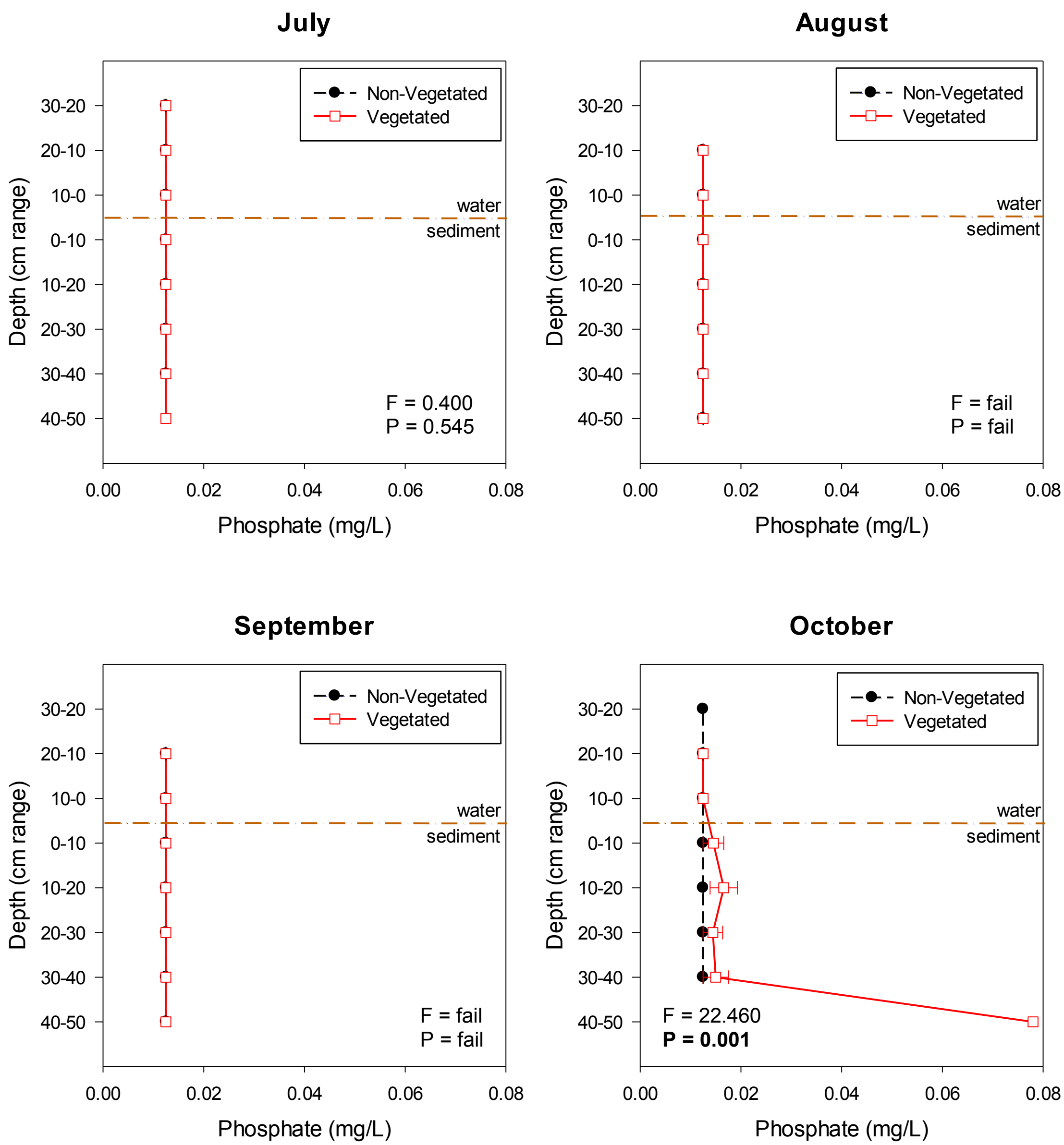


Figure A.2.2 – Marchmont Marsh, Phosphate PO_4-P, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. ANOVA test (comparing both plots, depths: 10-0 cm above to 30-40 cm below sediment-water interface), results significant at P≤ 0.05 (bold; "fail" result = test parameters not met).

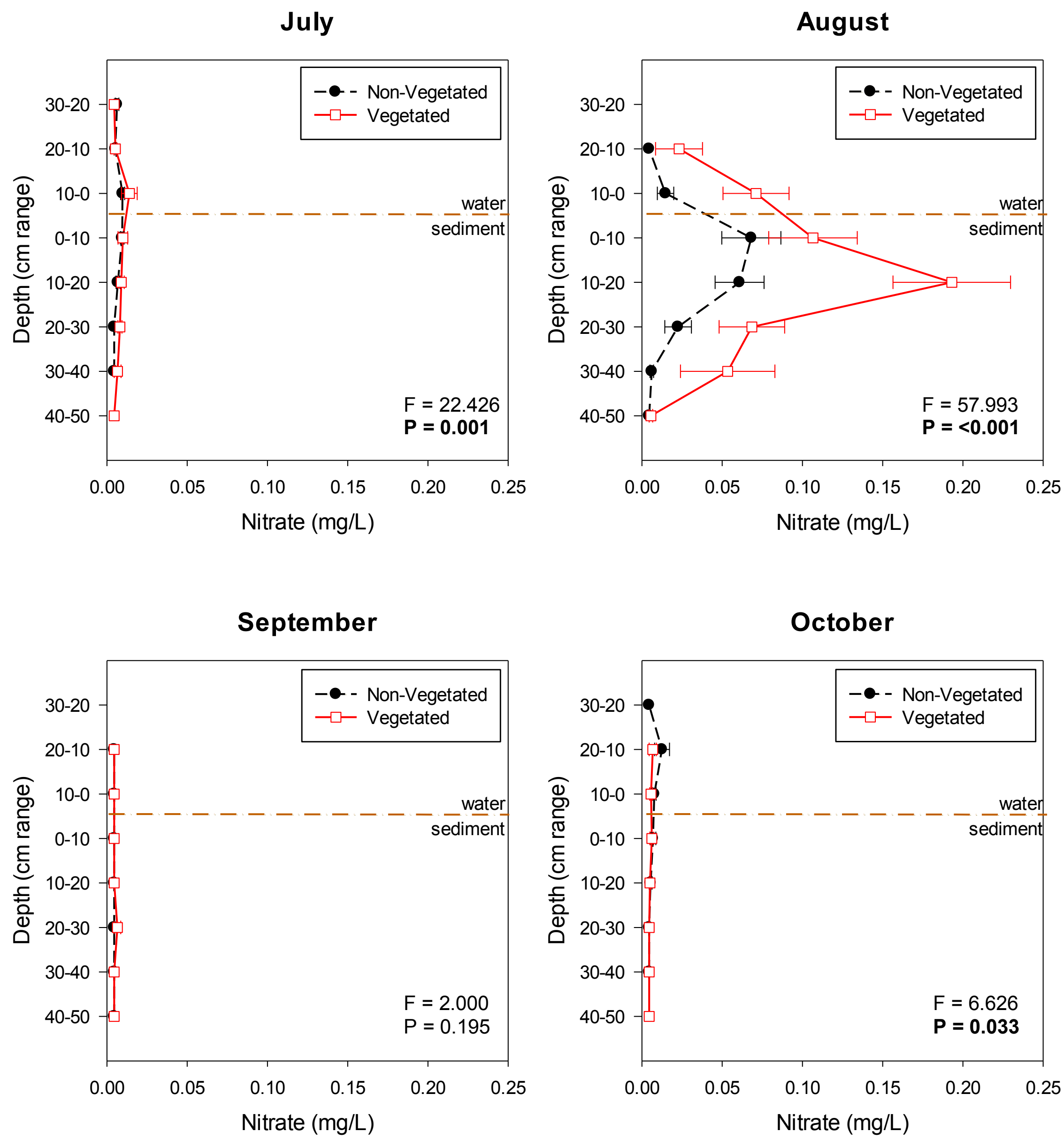


Figure A.2.3 – Marchmont Marsh, Nitrate NO_3-N, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. ANOVA test (comparing both plots, depths: 10-0 cm above to 30-40 cm below sediment-water interface), results significant at $P \leq 0.05$ (bold).

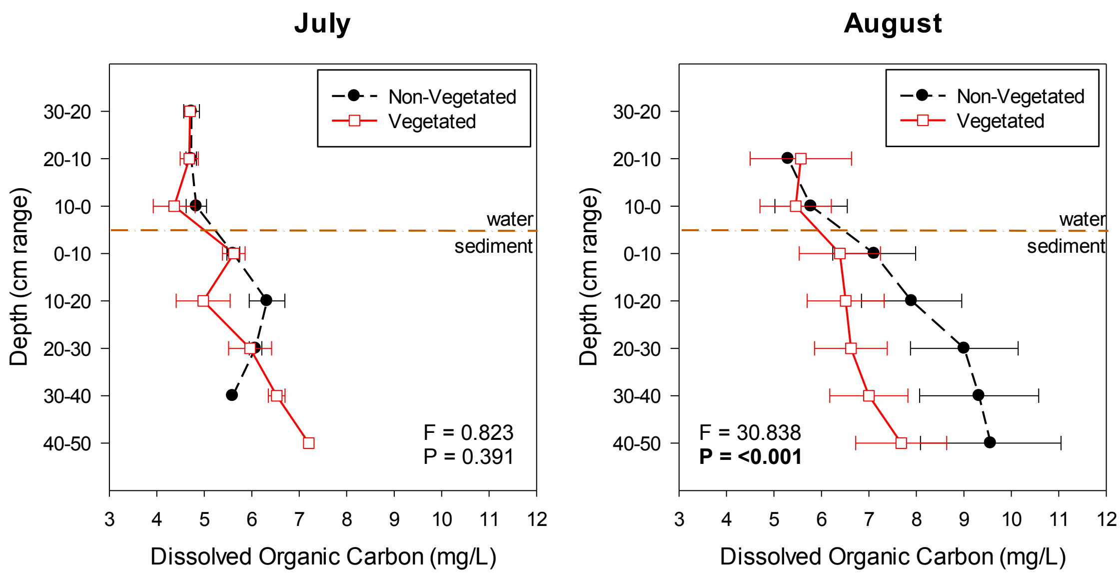


Figure A.2.4 – Marchmont Marsh, Dissolved Organic Carbon, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. ANOVA test (comparing both plots, depths: 10-0 cm above to 30-40 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

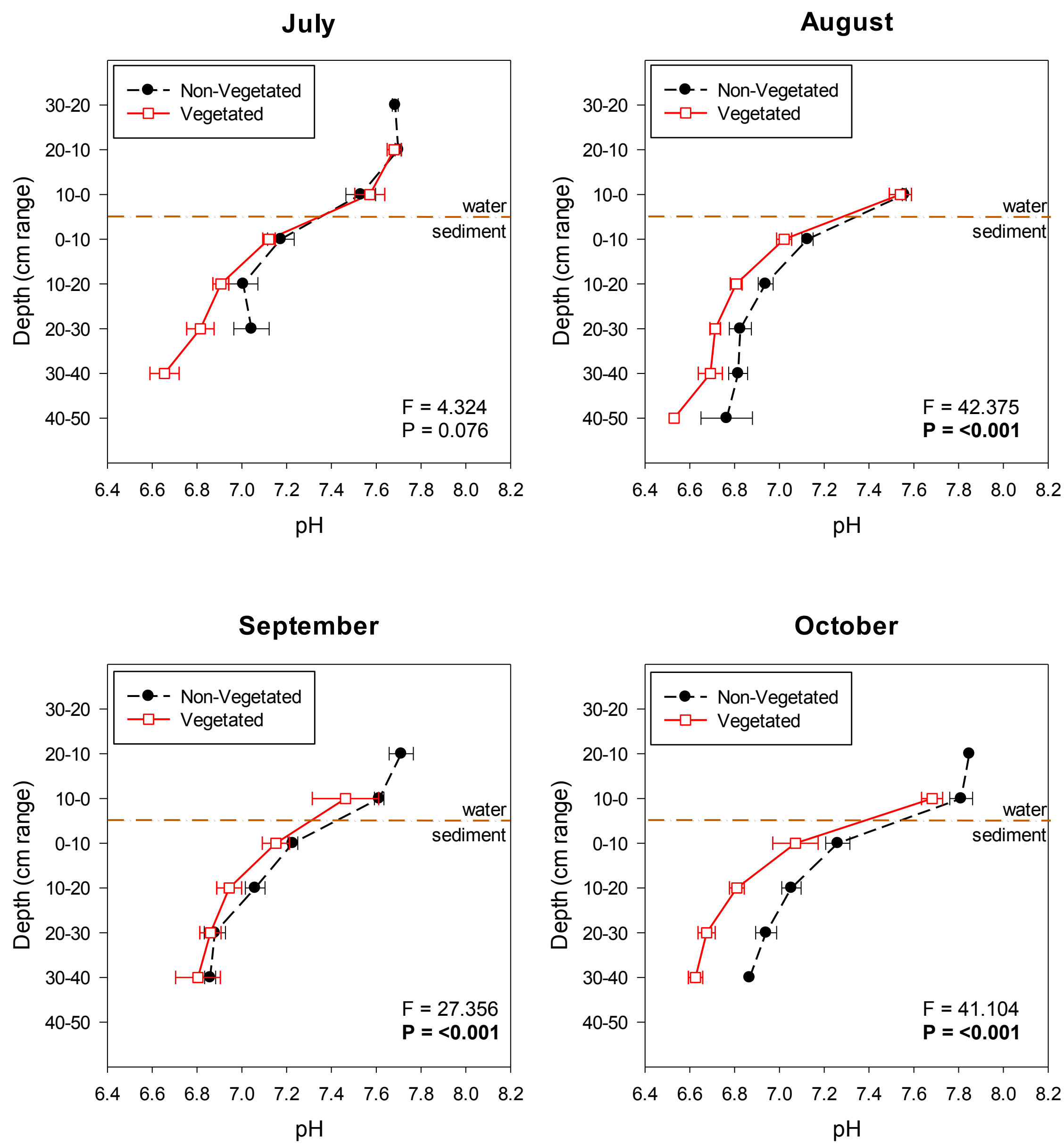


Figure A.2.5 – Marchmont Marsh, pH, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. ANOVA test (comparing both plots, depths: 10-0 cm above to 30-40 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

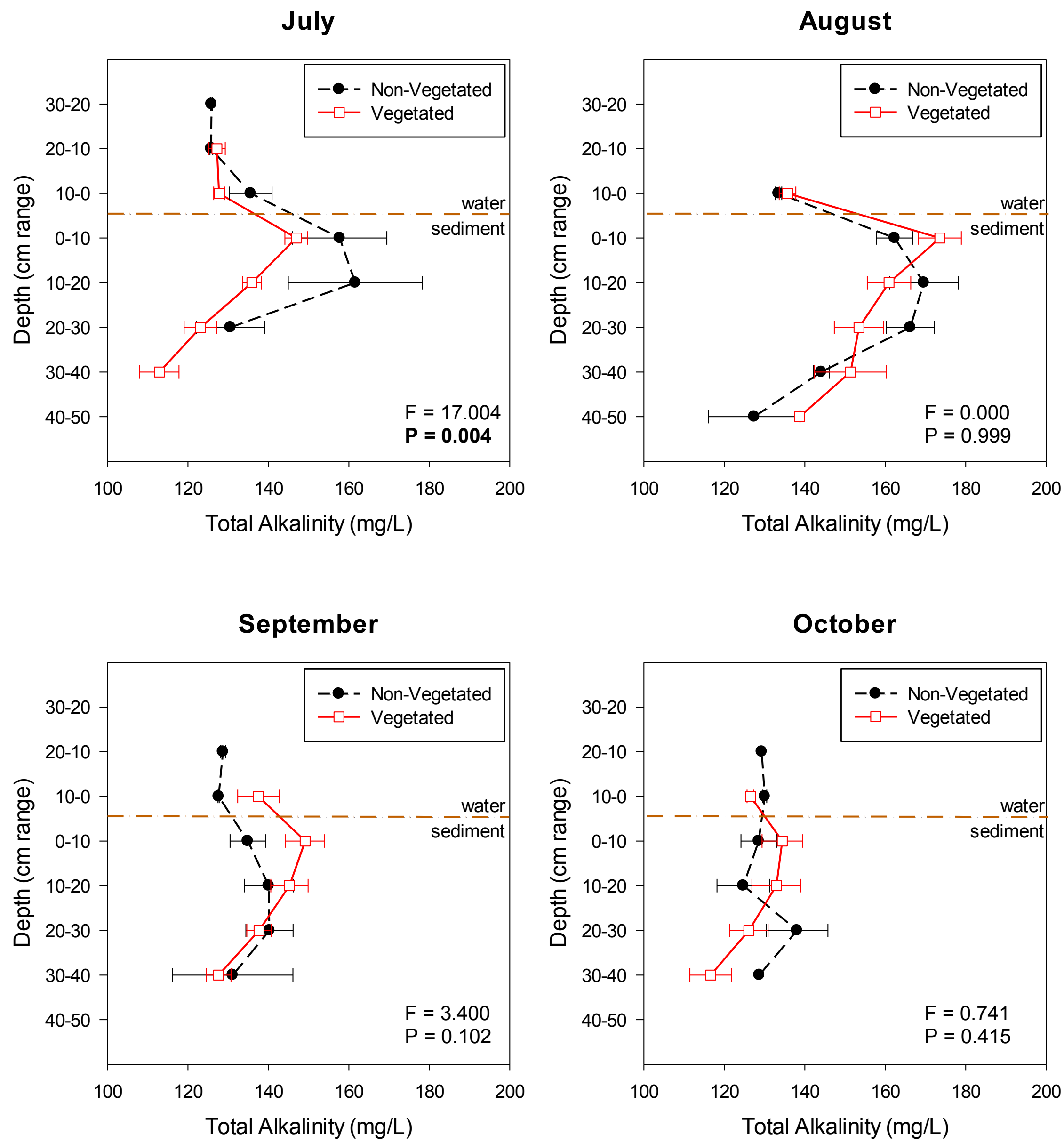


Figure A.2.6 – Marchmont Marsh, Total Alkalinity as $CaCO_3$, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. ANOVA test (comparing both plots, depths: 10-0 cm above to 30-40 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

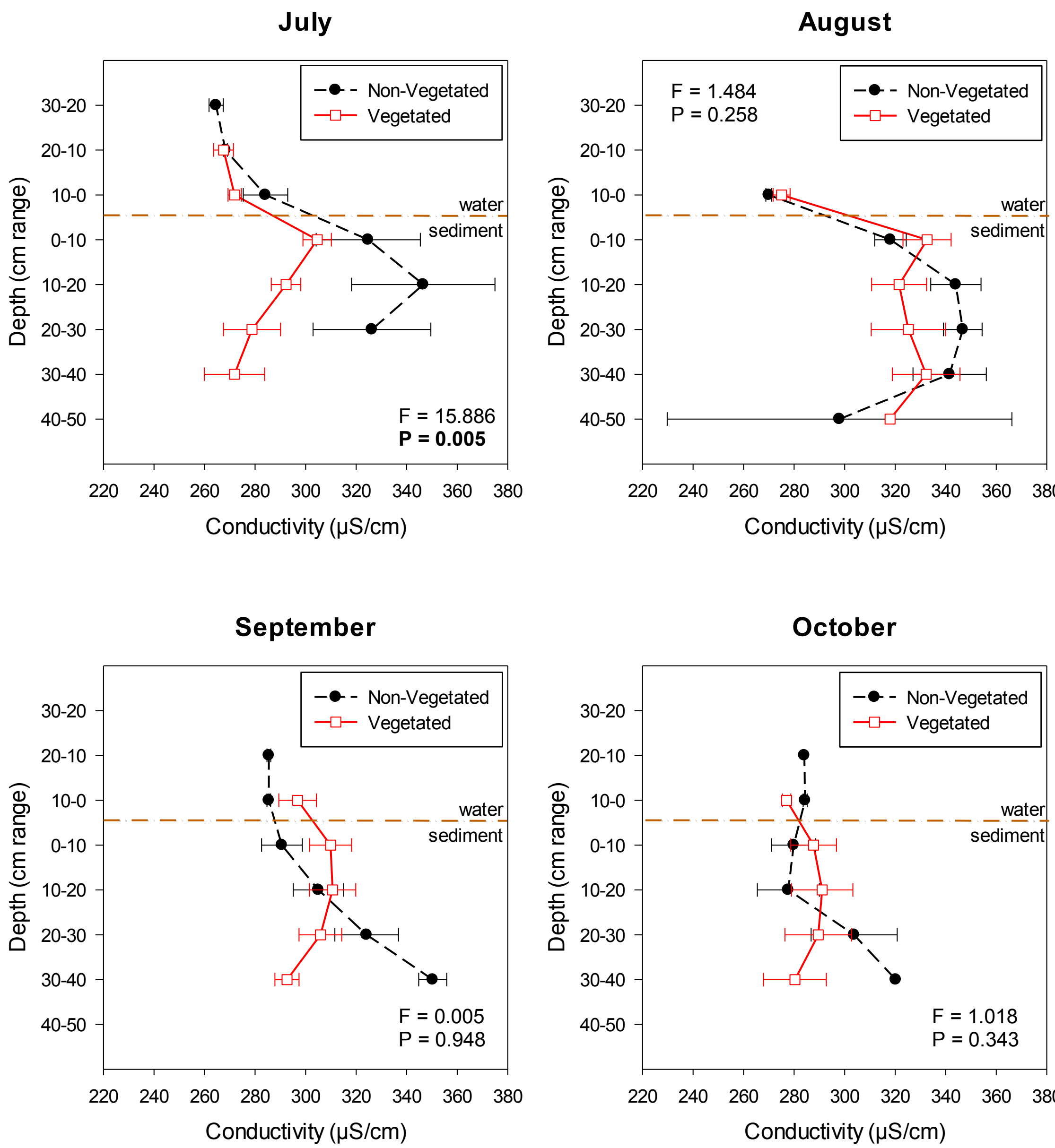


Figure A.2.7 – Marchmont Marsh, Conductivity, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. Removed one outlier from Non-Vegetated September data (30-40 cm depth = 188 µS/cm). ANOVA test (comparing both plots, no outliers removed, depths: 10-0 cm above to 30-40 cm below sediment-water interface), results significant at $P \leq 0.05$ (bold).

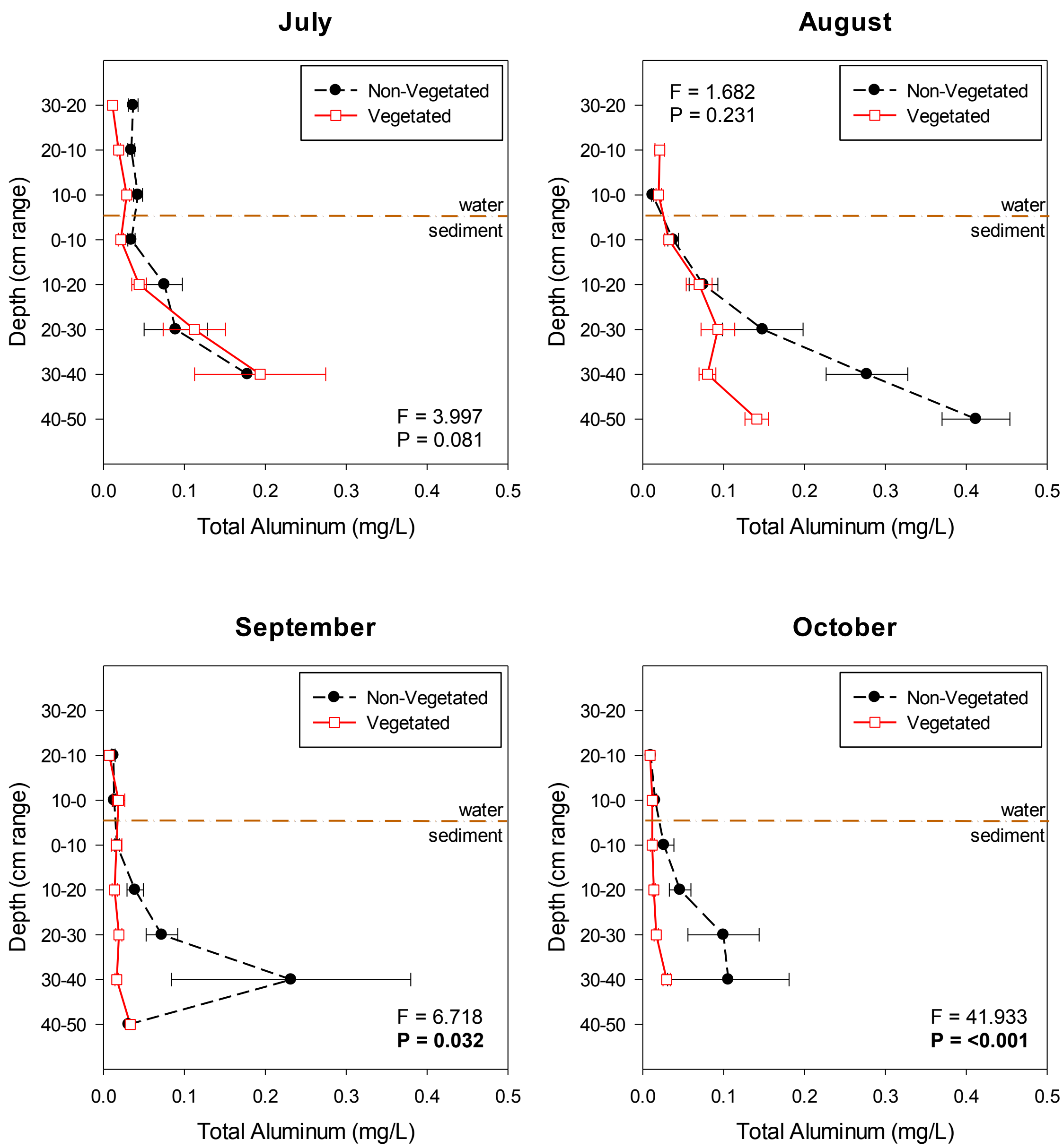


Figure A.2.8 – Marchmont Marsh, Total Aluminum, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. Removed two outliers from Non-Vegetated August data (40-50 cm depth = 3.08 mg/L; 30-40 cm depth = 1.755 mg/L) and one outlier from Vegetated August data (30-40 cm depth = 0.727 mg/L). ANOVA test (comparing both plots, no outliers removed, depths: 10-0 cm above to 30-40 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

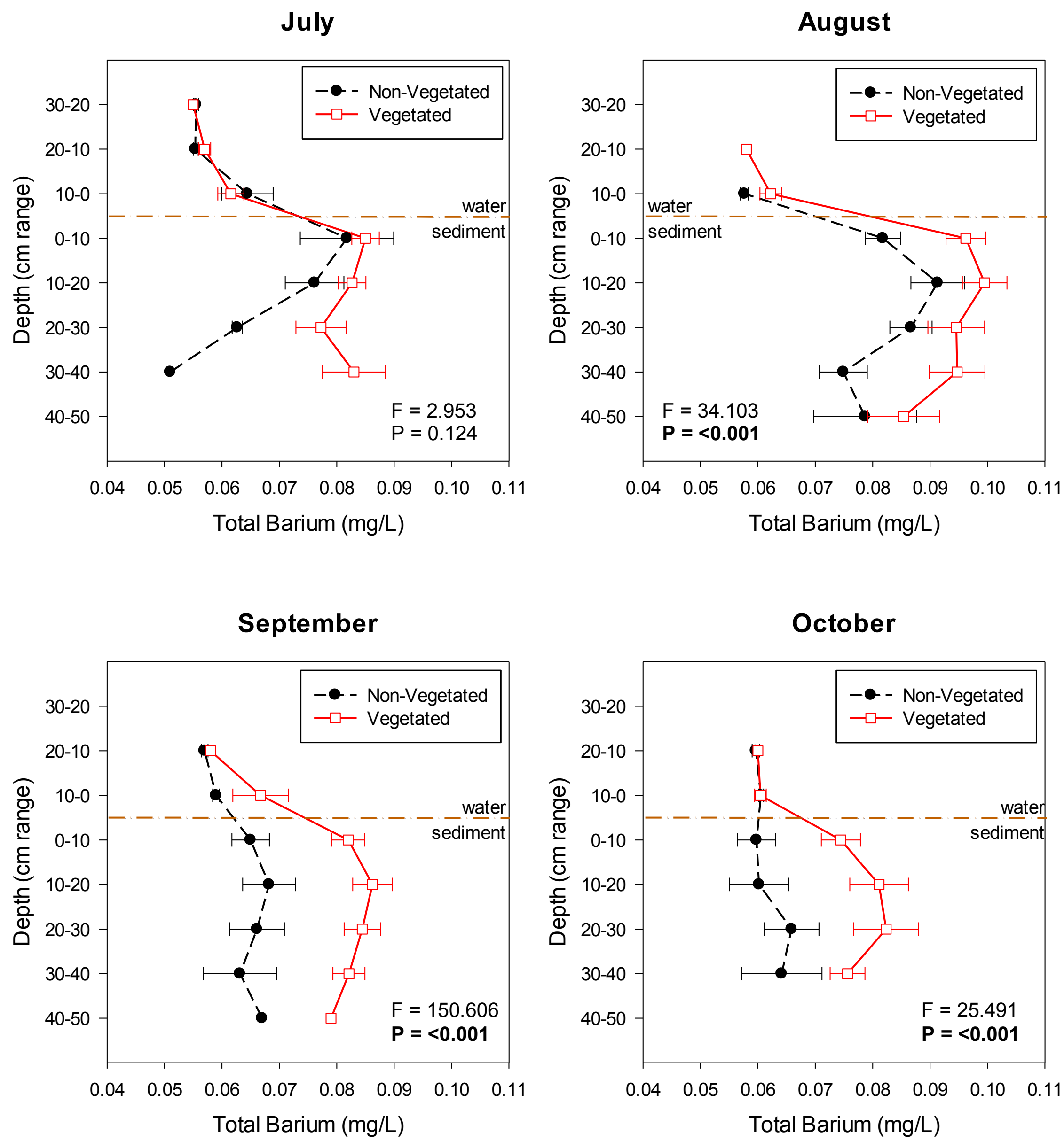


Figure A.2.9 – Marchmont Marsh, Total Barium, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. Removed one outlier from Non-Vegetated July data (10-20 cm depth = 0.154 mg/L). ANOVA test (comparing both plots, no outliers removed, depths: 10-0 cm above to 30-40 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

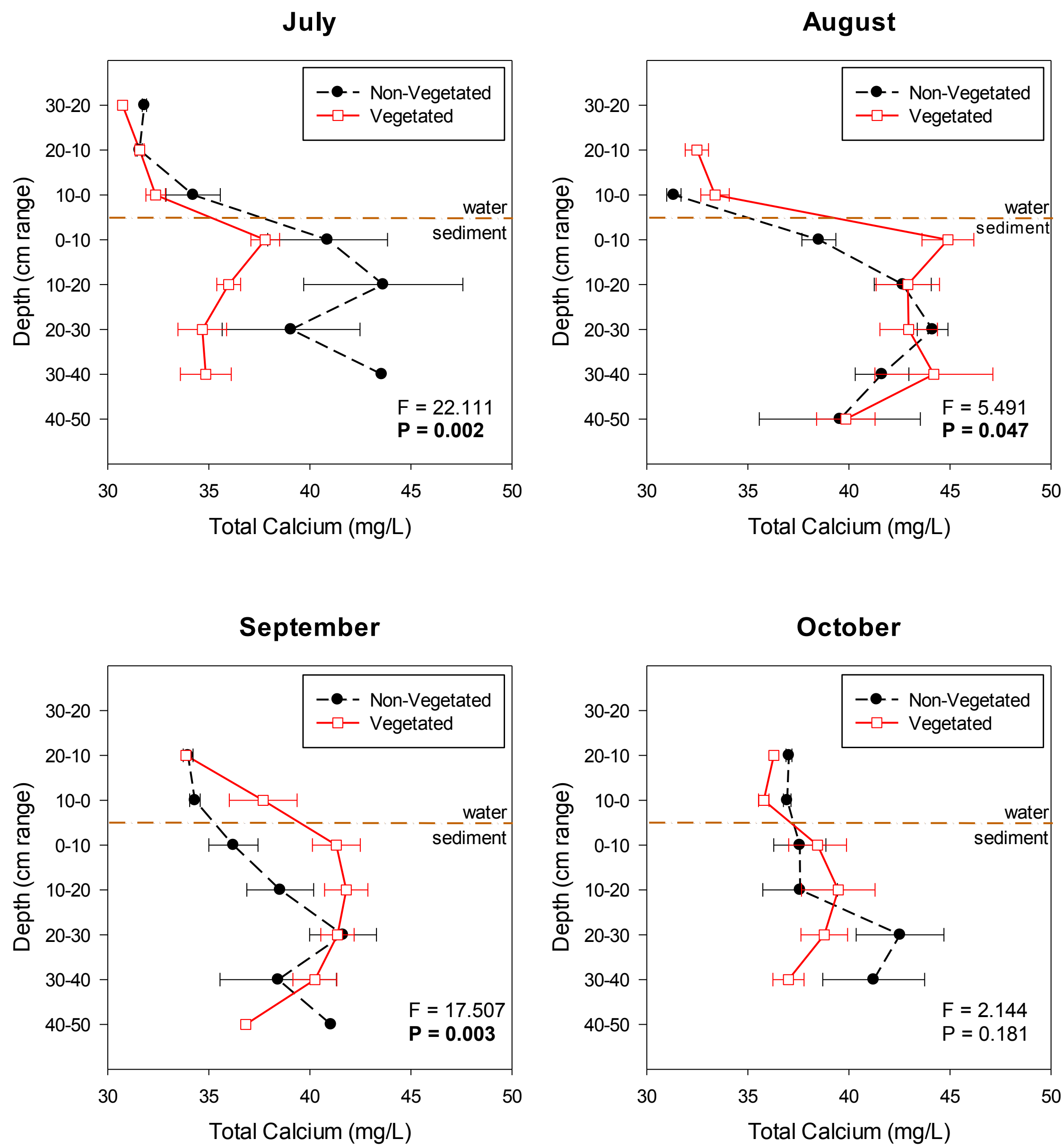


Figure A.2.10 – Marchmont Marsh, Total Calcium, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. ANOVA test (comparing both plots, depths: 10-0 cm above to 30-40 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

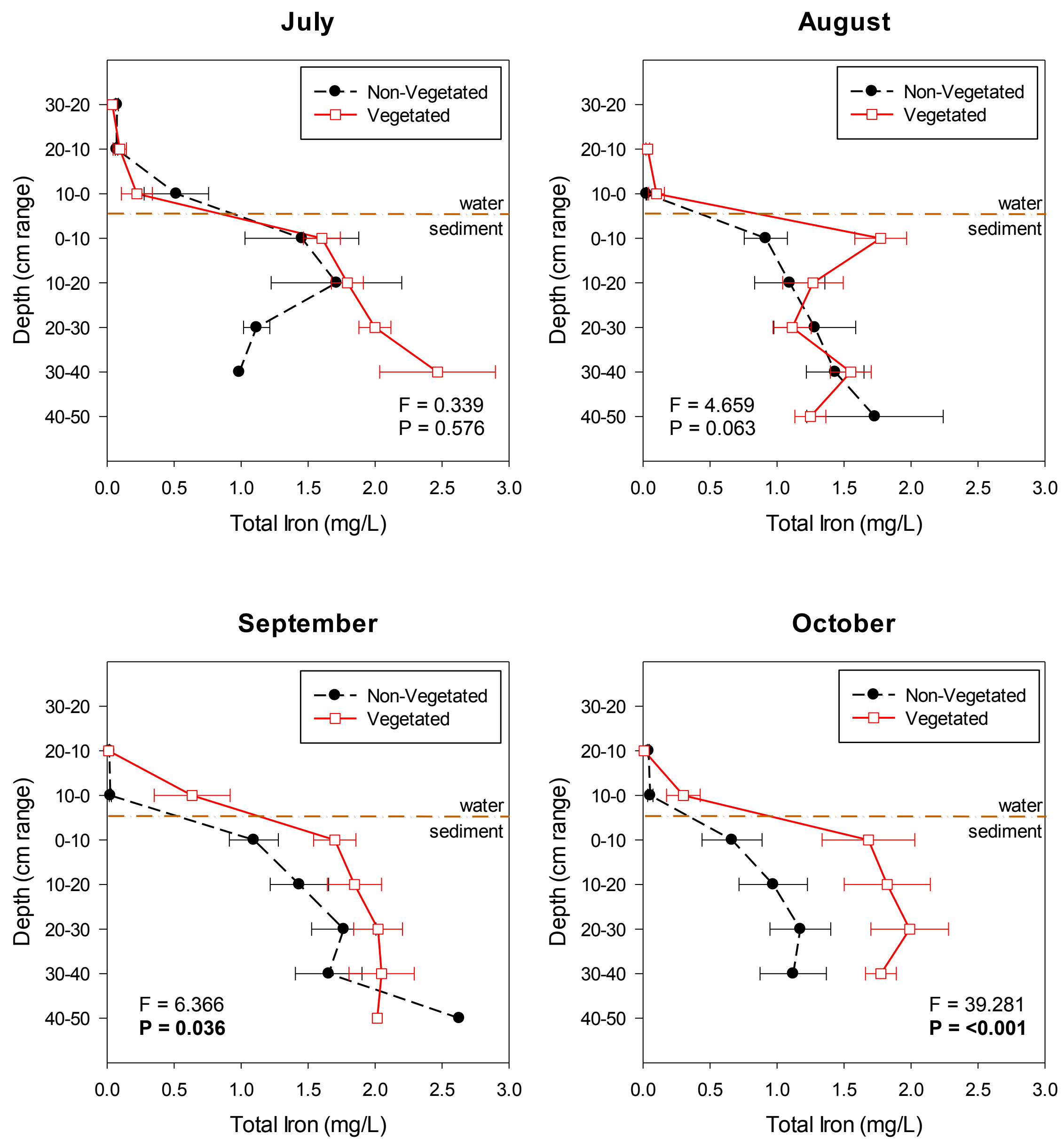


Figure A.2.11 – Marchmont Marsh, Total Iron, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. ANOVA test (comparing both plots, depths: 10-0 cm above to 30-40 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

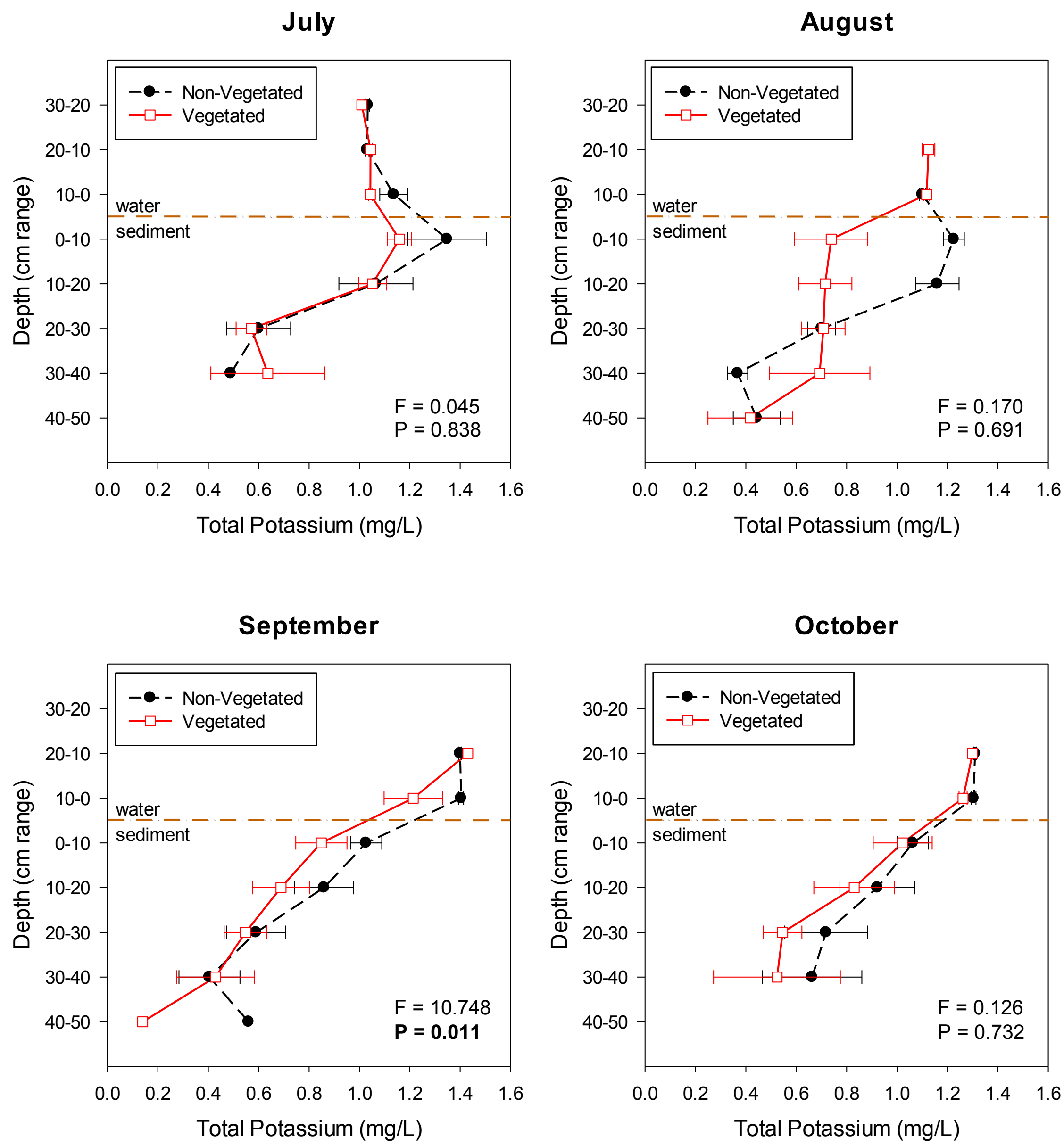


Figure A.2.12 – Marchmont Marsh, Total Potassium, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. Removed one outlier from Vegetated October data (20-30 cm depth = 4.42 mg/L). ANOVA test (comparing both plots, no outliers removed, depths: 10-0 cm above to 30-40 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

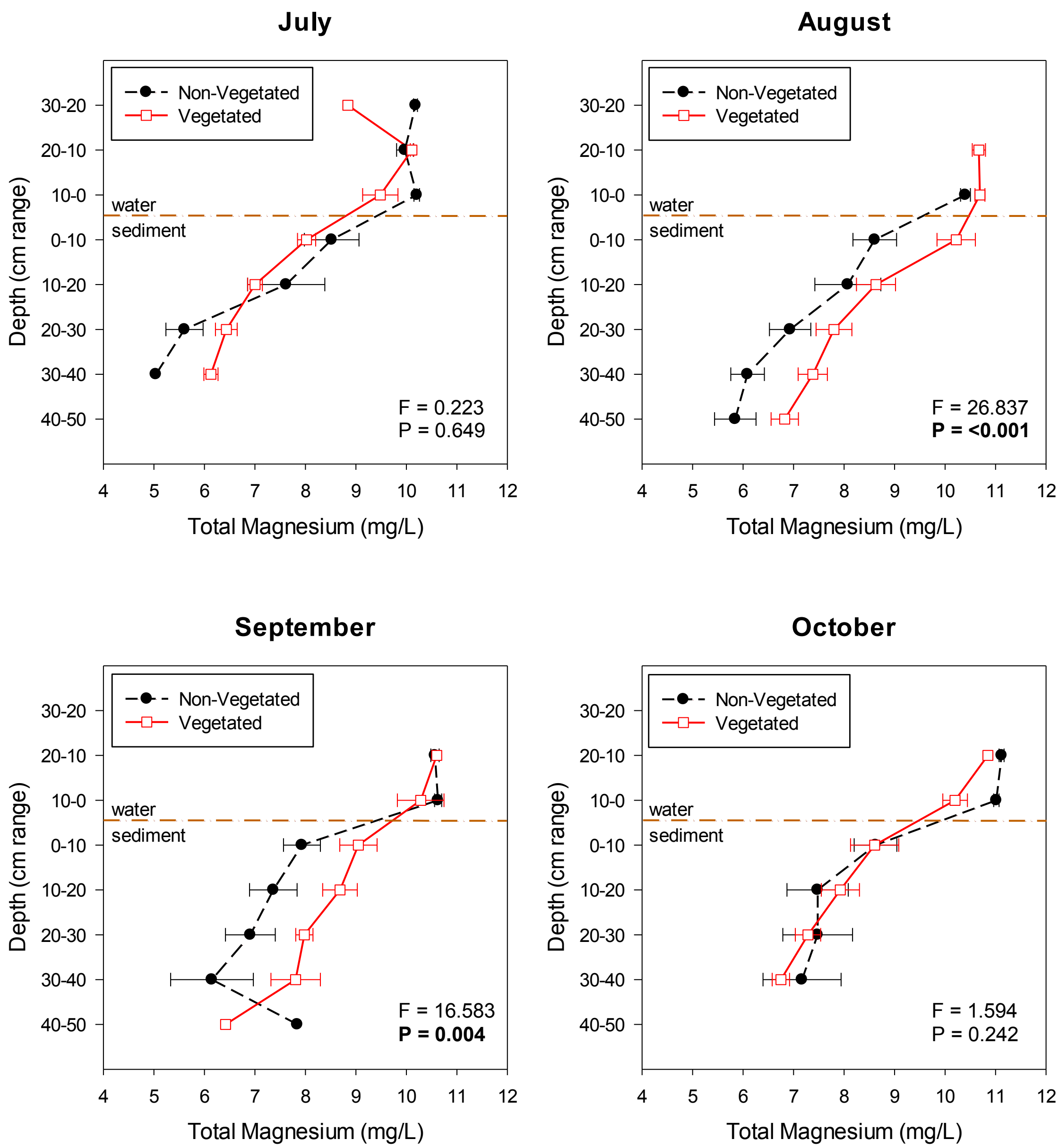


Figure A.2.13 – Marchmont Marsh, Total Magnesium, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. ANOVA test (comparing both plots, depths: 10-0 cm above to 30-40 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

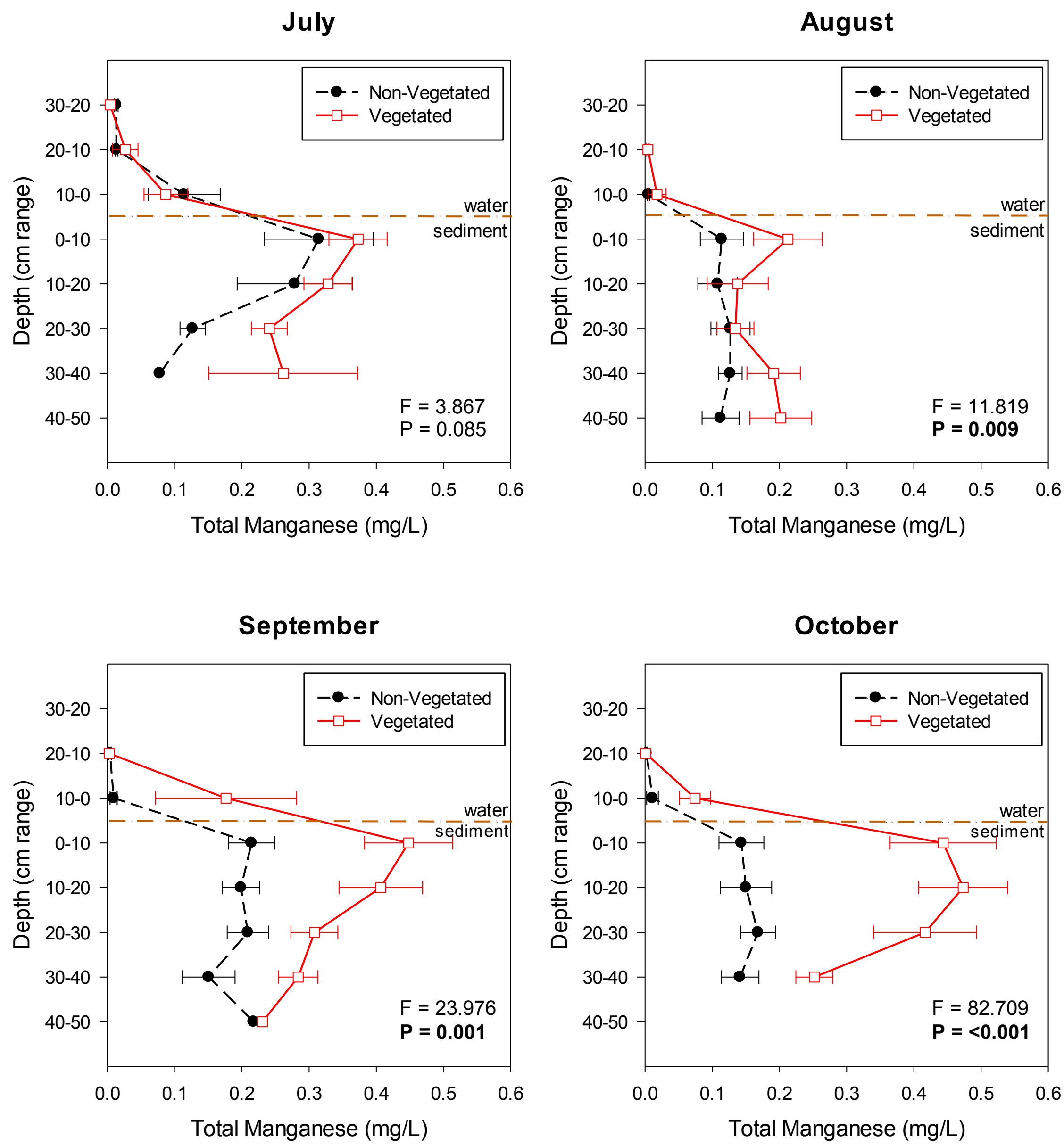


Figure A.2.14 – Marchmont Marsh, Total Manganese, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. Removed one outlier from Vegetated September data (0-10 cm depth = 1.0704 mg/L). ANOVA test (comparing both plots, no outliers removed, depths: 10-0 cm above to 30-40 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

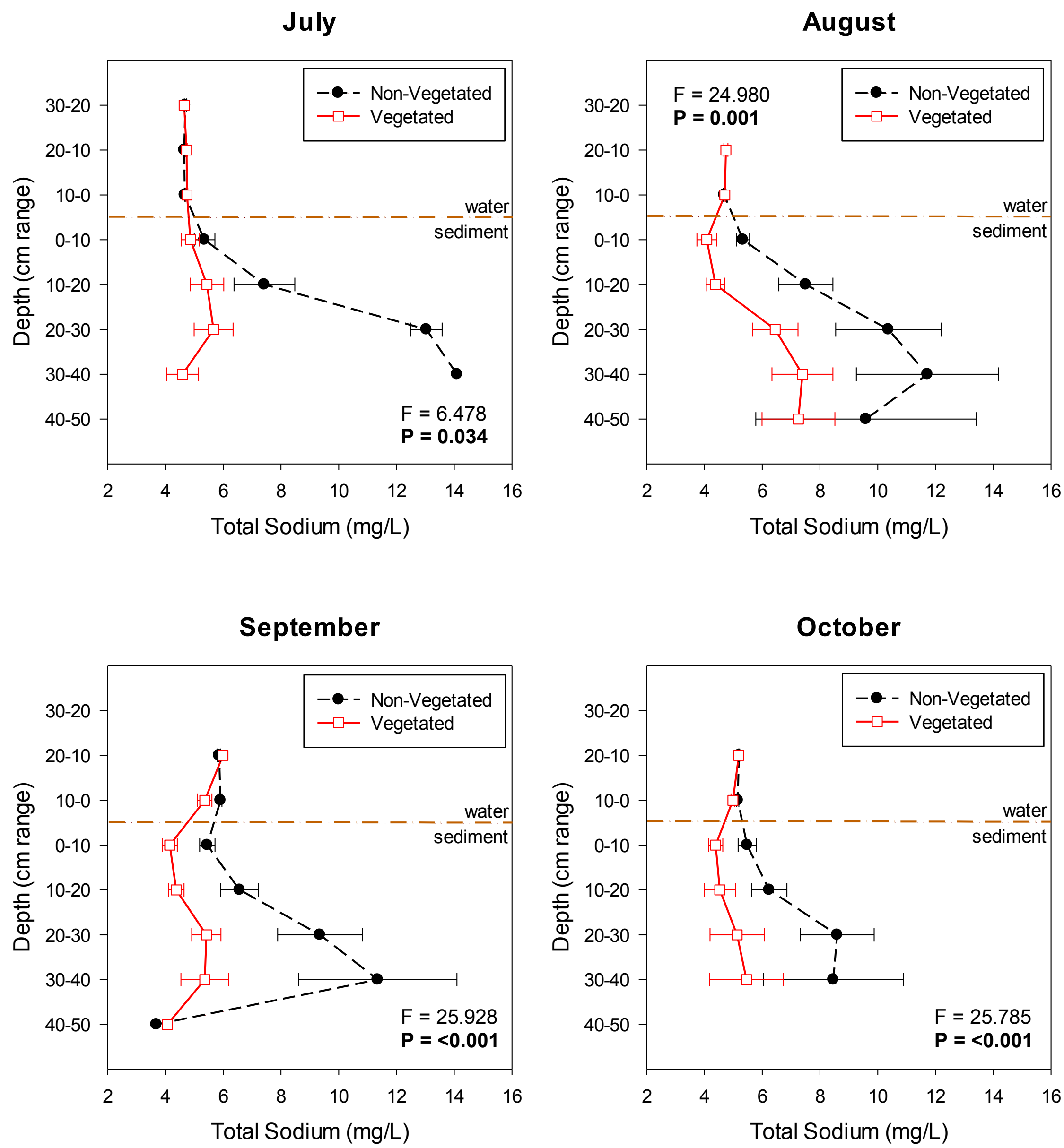


Figure A.2.15 – Marchmont Marsh, Total Sodium, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. ANOVA test (comparing both plots, depths: 10-0 cm above to 30-40 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

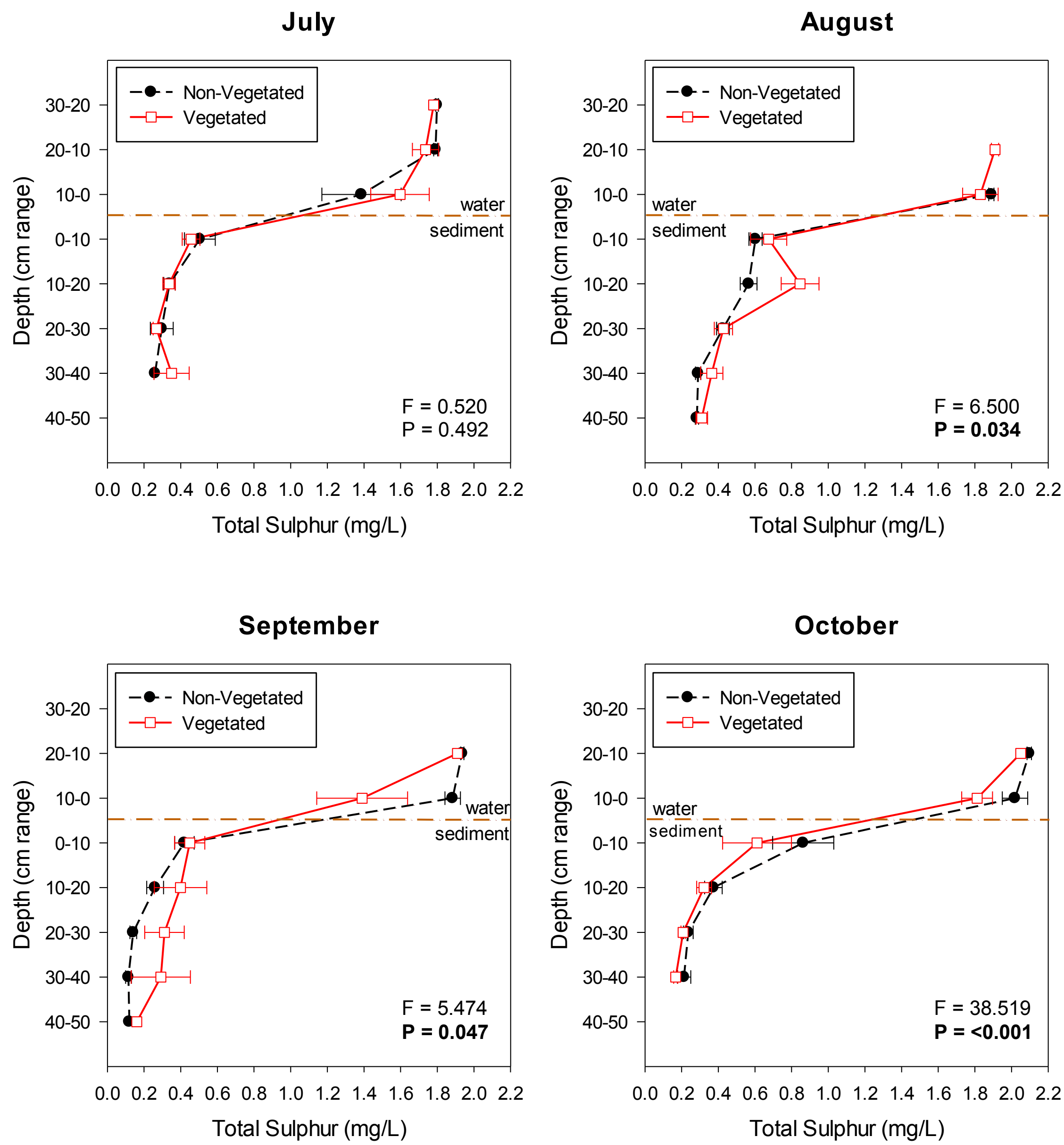


Figure A.2.16 – Marchmont Marsh, Total Sulphur, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. ANOVA test (comparing both plots, depths: 10-0 cm above to 30-40 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

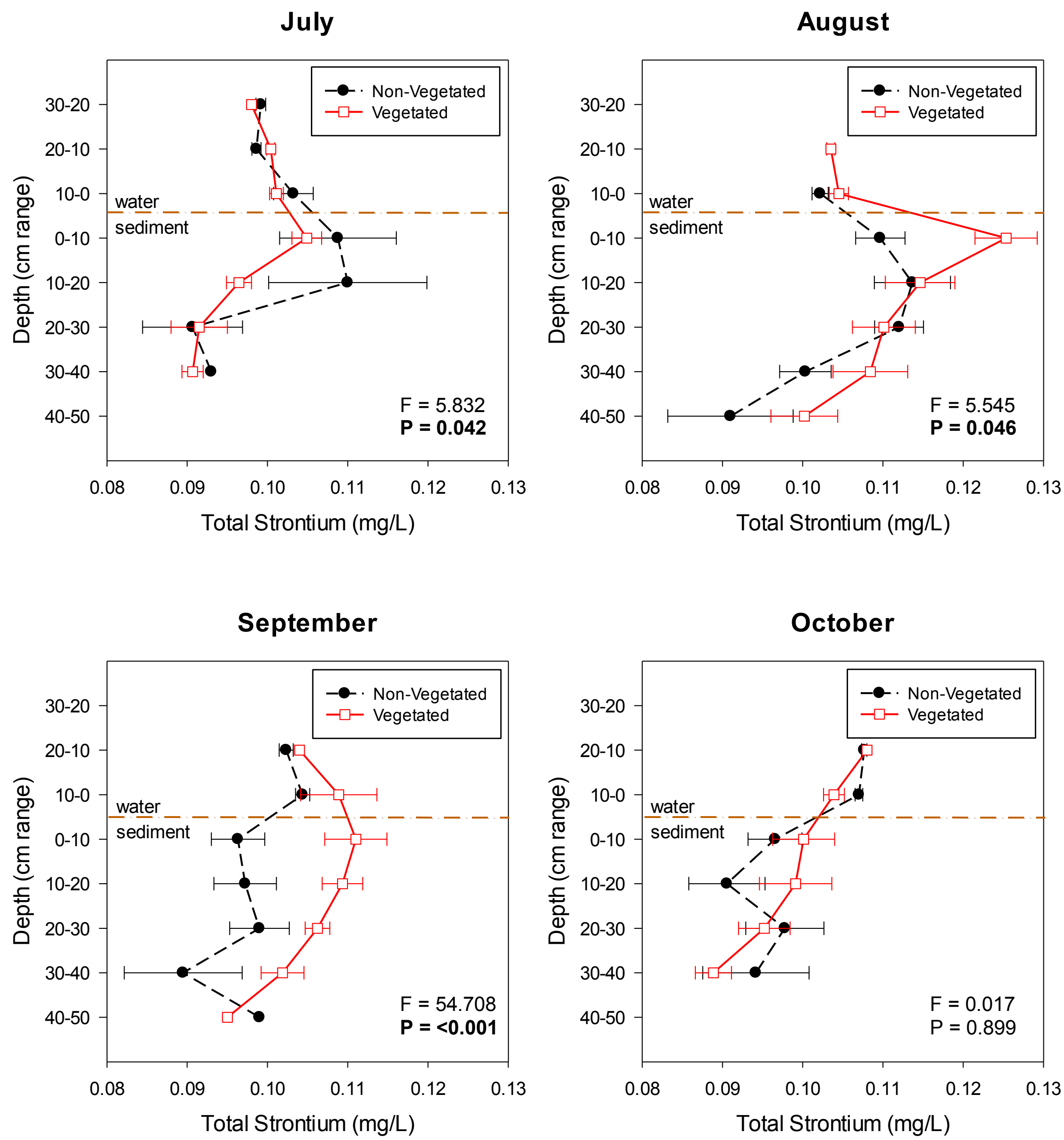


Figure A.2.17 – Marchmont Marsh, Total Strontium, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. ANOVA test (comparing both plots, depths: 10-0 cm above to 30-40 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

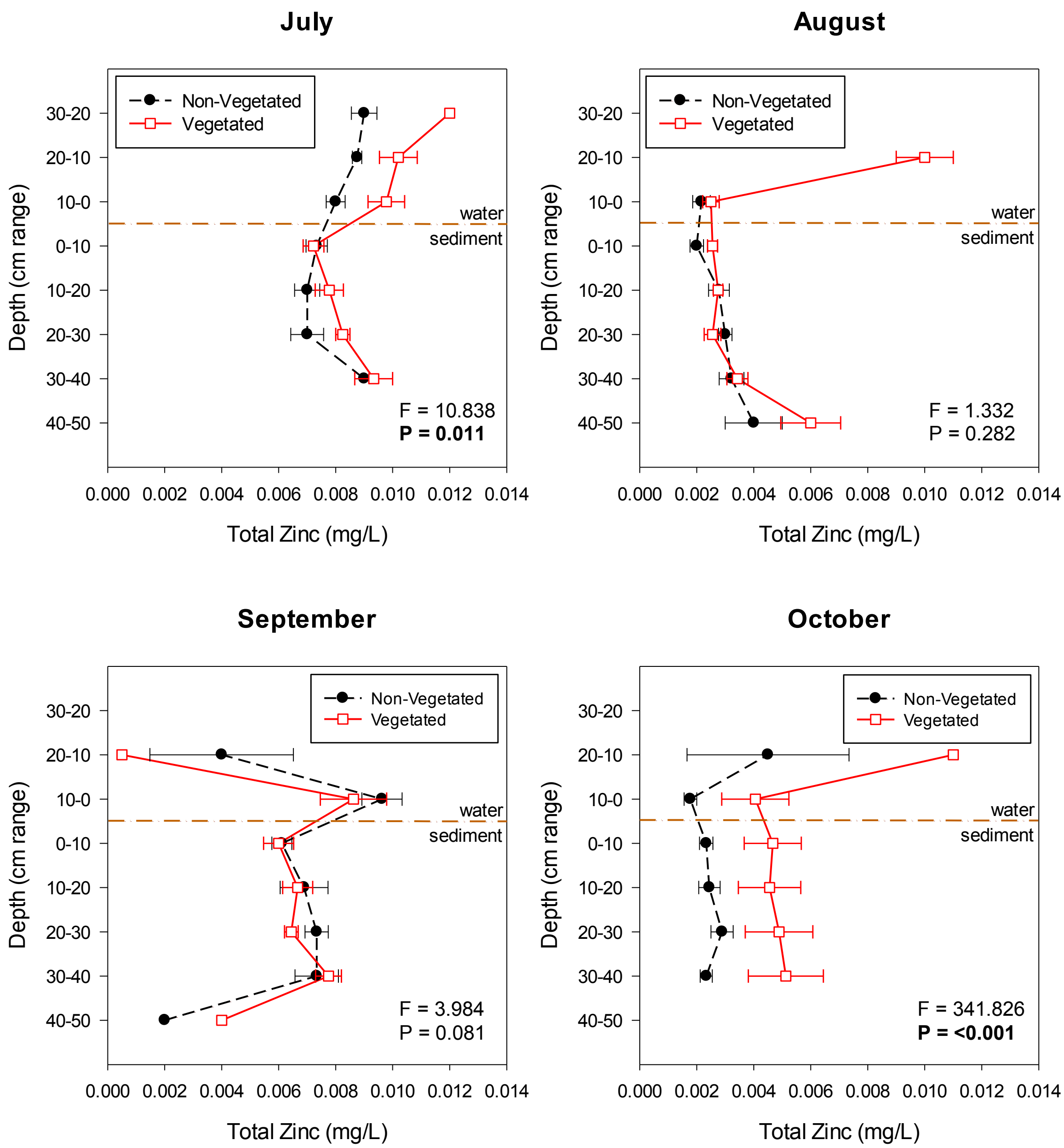


Figure A.2.18 – Marchmont Marsh, Total Zinc, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. ANOVA test (comparing both plots, depths: 10-0 cm above to 30-40 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

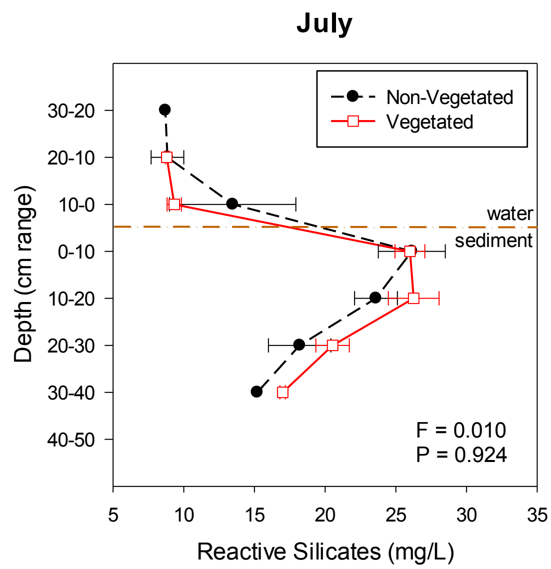


Figure A.2.19 – Marchmont Marsh, Total Reactive Silicates SiO_2, July water profile. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. ANOVA test (comparing both plots, depths: 10-0 cm above to 30-40 cm below sediment-water interface), results significant at $P \leq 0.05$ (bold).

A.3 - Control Data

Table A.3.1 - Marchmont Marsh, Water Sample Analytical Results, Control Data

Parameter / Method Detection Limit / Units

Lab ID	Month Analyzed	Sample Date	Sample ID	Total P	Phosphate PO_4-P	Nitrite NO_2-N	Nitrate NO_3-N	DOC	pH	Total Alkalinity as $CaCO_3$	Conductivity
				0.0050	*0.0250*	*0.006*	*0.0090*	*0.50*	*n/a*	*1.0*	*0.50*
				mg/L	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*n/a*	*mg/L*	*uS/cm*
EL100219-107	July	06/29/10	MM-Launch	0.0110	0.0125	0.003	0.0110	0.25	5.50	1.4	1.10
EL100219-108	July	07/26/10	MM-Control	0.0025	0.0125	0.003	0.0370	3.60	6.40	5.0	9.90
EL100219-109	July	07/26/10	MM-Water	0.0130	0.0125	0.003	0.0045	4.90	7.64	122.1	261.60
EL100261-106	August	07/27/10	MM-Launch	0.0025	0.0125	0.003	0.0045	0.25	5.44	1.5	1.00
EL100261-105	August	08/26/10	MMVP-Control	0.0025	0.0125	0.018	0.0045	2.5	5.57	2.1	2.00
EL100261-104	August	08/26/10	MM-Water	0.007	0.0125	0.003	0.0045	4.9	7.71	133.2	268.30
EL100300-103	September	08/27/10	MM-Launch	0.0200	0.0125	0.003	0.0045	--	5.66	1.5	0.90
EL100300-104	September	09/25/10	MMVPControl	0.0150	0.0125	0.003	0.0045	--	5.96	1.9	2.30
EL100300-102	September	09/25/10	MM-Water	0.0220	0.0125	0.003	0.0045	--	7.72	133.6	292.30
EL100333-109	October	09/24/10	MM-Launch	0.0100	0.0125	0.003	0.0330	--	5.39	1.2	0.90
EL100333-108	October	10/20/10	MM/VPControl	0.0025	0.0125	0.003	0.0045	--	5.57	1.4	1.50
EL100333-107	October	10/20/10	MM-Water	0.0080	0.0125	0.003	0.0110	--	7.94	130.8	284.70

Lab ID	Total Metals																				Reactive Silicates SiO_2	Chlorophyll "a"
	Al	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	S	Sr	Ti	V	Zn		
	0.0050	*0.0050*	*0.0030*	*0.002*	*0.0050*	*0.0010*	*0.010*	*0.002*	*0.002*	*0.002*	*0.10*	*0.010*	*0.0002*	*0.010*	*0.002*	*0.0050*	*0.050*	*0.0050*	*0.010*	*0.006*	*0.0010*	*0.25*	*0.2*
	mg/L	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*μg/L*
EL100219-107	0.0080	0.0025	0.0015	0.001	0.0025	0.0005	0.005	0.001	0.009	0.001	0.01	0.005	0.0001	0.005	0.001	0.0025	0.025	0.0025	0.005	0.003	0.0030	0.00	--
EL100219-108	0.0060	0.0025	0.0015	0.001	1.0250	0.0005	0.005	0.001	0.002	0.004	0.01	0.330	0.0017	0.180	0.001	0.0025	0.080	0.0025	0.005	0.003	0.0120	0.20	--
EL100219-109	0.0100	0.0025	0.0540	0.001	29.5200	0.0005	0.005	0.001	0.002	0.083	0.96	10.060	0.0234	4.280	0.001	0.0025	1.820	0.0960	0.005	0.003	0.0040	9.70	--
EL100261-106	0.0025	0.0025	0.0015	0.001	0.0025	0.0005	0.005	0.001	0.001	0.001	0.05	0.005	0.0001	0.005	0.001	0.0025	0.025	0.0025	0.005	0.003	0.01	--	--
EL100261-105	0.0025	0.0025	0.0015	0.001	0.051	0.0005	0.005	0.001	0.001	0.001	0.05	0.01	0.0026	0.02	0.001	0.0025	0.025	0.0025	0.005	0.003	0.003	--	--
EL100261-104	0.013	0.0025	0.058	0.001	31.34	0.0005	0.005	0.001	0.001	0.071	1.06	10.54	0.0107	4.68	0.001	0.0025	1.94	0.103	0.005	0.003	0.002	--	--
EL100300-103	0.0025	0.0025	0.0015	--	0.0130	--	--	--	--	0.001	0.05	0.005	0.0010	0.005	--	--	0.025	0.0025	--	--	0.0050	--	--
EL100300-104	0.0025	0.0025	0.0015	--	0.1090	--	--	--	--	0.001	0.05	0.010	0.0005	0.030	--	--	0.025	0.0025	--	--	0.0110	--	--
EL100300-102	0.0100	0.0025	0.0600	--	35.9120	--	--	--	--	0.061	1.37	10.630	0.0035	5.410	--	--	1.800	0.1080	--	--	0.0070	--	--
EL100333-109	0.0025	0.0025	0.0015	--	0.0025	--	--	--	--	0.001	0.05	0.050	0.0001	0.005	--	--	0.025	0.0025	--	--	0.0090	--	--
EL100333-108	0.0025	0.0025	0.0015	--	0.0240	--	--	--	--	0.001	0.05	0.050	0.0003	0.020	--	--	0.025	0.0025	--	--	0.0040	--	--
EL100333-107	0.0100	0.0025	0.0600	--	37.2100	--	--	--	--	0.056	1.28	11.260	0.0046	5.030	--	--	2.160	0.1080	--	--	0.0030	--	--

Notes

Sample ID code: Site (MM = Marchmont Marsh; VP = Victoria Point) - Sample Type (Launch = Surface Water on day of peeper deployment; Control = Control Apparatus Water Sample collected on day of peeper collection; Water = Surface Water on day of peeper collection)

Value -- in grey box = parameter not analyzed

Value in grey font = Value half of Detection Limit (result < Detection Limit)

A.4 – Photos

Figure A.4.1 – Marchmont Marsh, near Orillia, Ontario.

Figure A.4.2 – Marchmont Marsh, showing vegetated and non-vegetated plots.

Figure A.4.3 – Constructed pore water sampler.

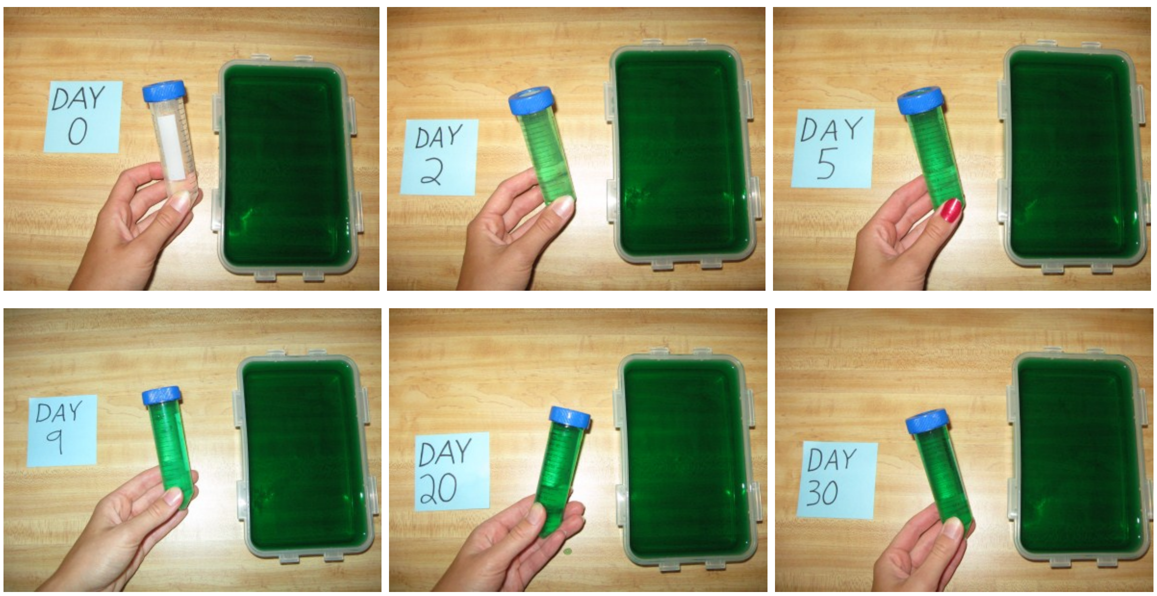


Figure A.4.4 – Pore water sampler dialysis test, demonstrating number of days to reach equilibrium.

Figure A.4.5 – Completed pore water sampler, showing two installed samplers (all holes filled with samplers during launch).

Figure A.4.6 – Marchmont Marsh sampler preparation, showing filling of sampler with deoxygenated distilled deionized water.

Figure A.4.7 – Marchmont Marsh pore water sampler installation, showing insertion of sampler into sediment of non-vegetated plot.

Figure A.4.8 – Marchmont Marsh pore water sampler installed in non-vegetated plot, showing three samplers above sediment-water interface.

Figure A.4.9 – Control sample apparatus launch, showing launched samplers.

Figure A.4.10 – Marchmont Marsh sample collection, showing samplers after removal. Note samplers above sediment-water interface with a coating of algae.

Figure A.4.11 – Marchmont Marsh sample collection, showing sample transfer to sample bottle.

APPENDIX B

Victoria Point Data

CONTENTS

B.1 - Data Tables

Table B.1.1 - Victoria Point surface water analytical data, 10-0 cm above SWI. Data presented by month and plot type.

Analytical			August									September									October								
			Non-Vegetated			Vegetated			Mixed Vegetation			Non-Vegetated			Vegetated			Mixed Vegetation			Non-Vegetated			Vegetated			Mixed Vegetation		
Parameter	Units	*DL*	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Total P	mg/L	*0.005*	0.330	*0.391*	*6*	0.138	*0.124*	*8*	0.248	*0.335*	*2*	0.106	*0.113*	*4*	0.318	*0.237*	*9*	0.295	*0.365*	*3*	0.045	*0.034*	*4*	0.256	-	*1*	--	--	--
Phosphate	mg/L	*0.025*	0.078	*0.161*	*6*	0.016	*0.009*	*8*	0.082	*0.099*	*2*	0.017	*0.009*	*4*	0.042	*0.044*	*9*	0.272	*0.424*	*3*	0.013	*0*	*4*	0.013	-	*1*	--	--	--
Nitrate	mg/L	*0.009*	0.005	*0*	*6*	0.005	*0*	*8*	0.005	*0*	*2*	0.005	*0*	*4*	0.006	*0.005*	*9*	0.032	*0.021*	*3*	0.005	*0*	*4*	0.005	-	*1*	--	--	--
pH	N/A	*N/A*	6.87	*0.05*	*2*	7.10	*0.03*	*3*	7.08	-	*1*	7.25	*0.06*	*2*	--	--	--	7.05	-	*1*	--	--	--	--	--	--	--	--	--
Alkalinity	mg/L	*1.0*	214.7	*22.1*	*2*	146.7	*5.4*	*3*	137.5	-	*1*	174.2	*1.4*	*2*	--	--	--	206.3	-	*1*	--	--	--	--	--	--	--	--	--
Conductivity	µS/cm	*0.50*	494.25	*44.34*	*2*	357.53	*10.36*	*3*	350.50	-	*1*	443.20	*1.13*	*2*	--	--	--	484.50	-	*1*	--	--	--	--	--	--	--	--	--
Total Al	mg/L	*0.005*	0.013	*0.002*	*3*	0.012	*0.004*	*6*	0.013	-	*1*	0.007	*0.001*	*3*	0.006	*0.001*	*2*	0.009	*0.001*	*3*	0.007	-	*1*	--	--	--	--	--	--
Total Ba	mg/L	*0.003*	0.063	*0.018*	*3*	0.037	*0.011*	*6*	0.027	-	*1*	0.041	*0.010*	*3*	0.048	*0.007*	*2*	0.046	*0.003*	*3*	0.030	-	*1*	--	--	--	--	--	--
Total Ca	mg/L	*0.005*	84.260	*19.939*	*3*	54.567	*11.037*	*6*	49.200	-	*1*	60.934	*5.808*	*3*	71.097	*9.603*	*2*	76.454	*10.042*	*3*	59.896	-	*1*	--	--	--	--	--	--
Total Fe	mg/L	*0.002*	0.157	*0.054*	*3*	0.040	*0.040*	*6*	0.017	-	*1*	0.022	*0.011*	*3*	0.069	*0.050*	*2*	0.066	*0.029*	*3*	0.028	-	*1*	--	--	--	--	--	--
Total K	mg/L	*0.10*	2.75	*0.91*	*3*	1.12	*0.43*	*6*	0.83	-	*1*	2.04	*0.10*	*3*	2.40	*0.45*	*2*	1.49	*0.20*	*3*	2.08	-	*1*	--	--	--	--	--	--
Total Mg	mg/L	*0.01*	6.22	*1.25*	*3*	4.27	*0.47*	*6*	4.41	-	*1*	5.33	*0.23*	*3*	5.92	*0.87*	*2*	6.09	*0.51*	*3*	5.45	-	*1*	--	--	--	--	--	--
Total Mn	mg/L	*0.0002*	0.3329	*0.1156*	*3*	0.1136	*0.0998*	*6*	0.0448	-	*1*	0.0237	*0.0105*	*3*	0.0638	*0.0652*	*2*	0.0596	*0.0408*	*3*	0.0355	-	*1*	--	--	--	--	--	--
Total Na	mg/L	*0.01*	18.27	*0.97*	*3*	19.06	*0.86*	*6*	16.18	-	*1*	19.13	*0.53*	*3*	20.54	*0.20*	*2*	18.81	*1.64*	*3*	20.24	-	*1*	--	--	--	--	--	--
Total S	mg/L	*0.05*	1.13	*0.09*	*3*	1.19	*0.19*	*6*	1.65	-	*1*	2.27	*0.41*	*3*	1.66	*0.43*	*2*	1.57	*0.50*	*3*	2.13	-	*1*	--	--	--	--	--	--
Total Sr	mg/L	*0.005*	0.218	*0.045*	*3*	0.153	*0.028*	*6*	0.134	-	*1*	0.164	*0.016*	*3*	0.195	*0.030*	*2*	0.197	*0.024*	*3*	0.151	-	*1*	--	--	--	--	--	--
Total Zn	mg/L	*0.001*	0.008	*0.002*	*3*	0.013	*0.003*	*6*	0.012	-	*1*	0.005	*0.002*	*3*	0.007	*0.001*	*2*	0.005	*0.002*	*3*	0.001	-	*1*	--	--	--	--	--	--
DOC	mg/L	*0.50*	19.38	*0.71*	*6*	20.65	*2.27*	*8*	15.85	*2.33*	*2*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes
DL = method detection limit; N/A = not applicable; SD = standard deviation; n = sample size; -- = not analyzed; - = incalculable
<DL results recorded as 0.5*DL

Table B.1.2 - Victoria Point pore water analytical data, 0-10 cm below SWI. Data presented by month and plot type.

Analytical			August									September									October								
			Non-Vegetated			Vegetated			Mixed Vegetation			Non-Vegetated			Vegetated			Mixed Vegetation			Non-Vegetated			Vegetated			Mixed Vegetation		
Parameter	Units	*DL*	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Total P	mg/L	*0.005*	0.671	*0.554*	*6*	0.254	*0.160*	*9*	0.326	*0.299*	*5*	0.298	*0.249*	*6*	0.449	*0.224*	*9*	0.394	*0.365*	*5*	0.047	*0.028*	*6*	0.215	*0.065*	*3*	0.099	*0.110*	*5*
Phosphate	mg/L	*0.025*	0.403	*0.398*	*6*	0.041	*0.056*	*9*	0.057	*0.099*	*5*	0.133	*0.144*	*6*	0.104	*0.080*	*9*	0.209	*0.283*	*5*	0.030	*0.042*	*6*	0.127	*0.053*	*3*	0.069	*0.106*	*5*
Nitrate	mg/L	*0.009*	0.005	*0*	*6*	0.005	*0*	*9*	0.005	*0*	*5*	0.006	*0.004*	*6*	0.005	*0*	*9*	0.053	*0.105*	*5*	0.005	*0*	*6*	0.005	*0*	*3*	0.005	*0*	*5*
pH	N/A	*N/A*	6.79	*0.06*	*6*	6.79	*0.06*	*9*	6.76	*0.13*	*5*	6.91	*0.06*	*6*	6.96	*0.08*	*9*	6.80	*0.09*	*5*	6.98	*0.06*	*6*	6.85	*0.14*	*3*	6.83	*0.07*	*4*
Alkalinity	mg/L	*1.0*	334.7	*59.7*	*6*	262.2	*47.3*	*9*	217.3	*25.8*	*5*	273.6	*26.8*	*6*	234.3	*38.2*	*9*	234.3	*47.4*	*5*	208.6	*16.9*	*6*	181.3	*35.2*	*3*	166.3	*21.8*	*4*
Conductivity	µS/cm	*0.50*	708.70	*113.06*	*6*	550.89	*77.70*	*9*	511.50	62.23	*5*	610.12	*46.29*	*6*	541.82	*66.89*	*9*	539.64	75.62	*5*	488.05	*29.06*	*6*	434.37	*75.42*	*3*	423.33	37.34	*4*
Total Al	mg/L	*0.005*	0.012	*0.001*	*6*	0.013	*0.002*	*9*	0.014	*0.003*	*5*	0.008	*0.002*	*6*	0.006	*0.002*	*9*	0.024	*0.017*	*5*	0.008	*0.002*	*6*	0.008	*0.002*	*3*	0.008	*0.002*	*5*
Total Ba	mg/L	*0.003*	0.075	*0.012*	*6*	0.064	*0.012*	*9*	0.054	*0.007*	*5*	0.065	*0.004*	*6*	0.057	*0.009*	*9*	0.050	*0.009*	*5*	0.046	*0.005*	*6*	0.041	*0.008*	*3*	0.038	*0.004*	*5*
Total Ca	mg/L	*0.005*	104.093	*12.214*	*6*	83.971	*12.902*	*9*	75.584	*8.727*	*5*	90.054	*7.954*	*6*	78.829	*9.753*	*9*	83.175	*15.300*	*5*	75.089	*5.261*	*6*	66.129	*11.514*	*3*	66.640	*8.417*	*5*
Total Fe	mg/L	*0.002*	0.239	*0.065*	*6*	0.214	*0.060*	*9*	0.155	*0.056*	*5*	0.138	*0.050*	*6*	0.111	*0.042*	*9*	0.108	*0.031*	*5*	0.103	*0.027*	*6*	0.115	*0.018*	*3*	0.073	*0.018*	*5*
Total K	mg/L	*0.10*	5.02	*1.35*	*6*	2.92	*0.75*	*9*	2.67	*0.95*	*5*	4.06	*0.65*	*6*	3.01	*0.48*	*9*	1.13	*0.71*	*5*	3.70	*0.68*	*6*	2.92	*0.26*	*3*	1.83	*0.50*	*5*
Total Mg	mg/L	*0.01*	7.11	*0.78*	*6*	6.27	*0.86*	*9*	5.91	*0.72*	*5*	6.80	*0.65*	*6*	6.22	*0.73*	*9*	6.76	*0.92*	*5*	5.52	*0.33*	*6*	5.15	*1.11*	*3*	5.35	*0.36*	*5*
Total Mn	mg/L	*0.0002*	0.5513	*0.1146*	*6*	0.4416	*0.1459*	*9*	0.1749	*0.0754*	*5*	0.1926	*0.1912*	*6*	0.2111	*0.1175*	*9*	0.1396	*0.0589*	*5*	0.2156	*0.1422*	*6*	0.3001	*0.0772*	*3*	0.0873	*0.0359*	*5*
Total Na	mg/L	*0.01*	17.26	*0.81*	*6*	17.30	*1.07*	*9*	17.96	*1.24*	*5*	17.71	*0.75*	*6*	19.53	*1.27*	*9*	19.34	*1.71*	*5*	17.62	*0.89*	*6*	16.35	*2.43*	*3*	18.13	*1.14*	*5*
Total S	mg/L	*0.05*	0.94	*0.12*	*6*	0.87	*0.12*	*9*	1.20	*0.15*	*5*	1.12	*0.14*	*6*	1.22	*0.21*	*9*	1.37	*0.39*	*5*	0.99	*0.19*	*6*	0.93	*0.34*	*3*	1.90	*0.62*	*5*
Total Sr	mg/L	*0.005*	0.256	*0.025*	*6*	0.225	*0.038*	*9*	0.192	*0.018*	*5*	0.232	*0.013*	*6*	0.213	*0.026*	*9*	0.210	*0.034*	*5*	0.185	*0.014*	*6*	0.163	*0.034*	*3*	0.159	*0.015*	*5*
Total Zn	mg/L	*0.001*	0.006	*0.001*	*6*	0.007	*0.002*	*9*	0.006	*0.001*	*5*	0.007	*0.001*	*6*	0.006	*0.001*	*9*	0.005	*0.002*	*5*	0.002	*0.002*	*6*	0.002	*0.001*	*3*	0.002	*0.003*	*5*
DOC	mg/L	*0.50*	16.72	*0.96*	*6*	16.10	*1.47*	*9*	14.32	*2.73*	*5*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes
DL = method detection limit; N/A = not applicable; SD = standard deviation; n = sample size; -- = not analyzed
<DL results recorded as 0.5*DL

Table B.1.3 - Victoria Point pore water analytical data, 10-20 cm below SWI. Data presented by month and plot type.

			August									September									October								
Analytical			Non-Vegetated			Vegetated			Mixed Vegetation			Non-Vegetated			Vegetated			Mixed Vegetation			Non-Vegetated			Vegetated			Mixed Vegetation		
Parameter	Units	*DL*	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Total P	mg/L	*0.005*	0.971	*0.581*	*6*	0.529	*0.280*	*9*	0.467	*0.424*	*5*	0.573	*0.106*	*6*	0.732	*0.237*	*9*	0.375	*0.280*	*5*	0.416	*0.209*	*6*	0.562	*0.035*	*3*	0.326	*0.101*	*5*
Phosphate	mg/L	*0.025*	0.607	*0.475*	*6*	0.160	*0.163*	*9*	0.065	*0.110*	*5*	0.215	*0.092*	*6*	0.244	*0.124*	*9*	0.223	*0.158*	*5*	0.198	*0.102*	*6*	0.398	*0.017*	*3*	0.285	*0.084*	*5*
Nitrate	mg/L	*0.009*	0.005	*0*	*6*	0.005	*0*	*9*	0.005	*0*	*5*	0.005	*0*	*6*	0.005	*0*	*9*	0.005	*0*	*5*	0.005	*0*	*6*	0.005	*0*	*3*	0.005	*0*	*5*
pH	N/A	*N/A*	6.76	*0.02*	*6*	6.69	*0.04*	*9*	6.62	*0.15*	*5*	6.80	*0.02*	*6*	6.81	*0.07*	*9*	6.71	*0.08*	*5*	6.85	*0.08*	*6*	6.77	*0.07*	*3*	6.69	*0.07*	*5*
Alkalinity	mg/L	*1.0*	338.9	*22.4*	*6*	290.6	*36.7*	*9*	210.6	*22.8*	*5*	311.5	*15.7*	*6*	270.2	*35.2*	*9*	239.5	*46.6*	*5*	270.7	*20.9*	*6*	225.5	*34.8*	*3*	203.7	*40.5*	*5*
Conductivity	µS/cm	*0.50*	720.63	*50.03*	*6*	598.90	*63.85*	*9*	505.90	70.16	*5*	678.88	*32.83*	*6*	601.92	*66.66*	*9*	552.80	79.76	*5*	602.35	*30.91*	*6*	512.57	*70.03*	*3*	480.34	66.49	*5*
Total Al	mg/L	*0.005*	0.010	*0.002*	*6*	0.014	*0.002*	*9*	0.018	*0.006*	*5*	0.010	*0.005*	*6*	0.006	*0.002*	*9*	0.032	*0.019*	*5*	0.007	*0.001*	*6*	0.008	*0.001*	*3*	0.009	*0.005*	*5*
Total Ba	mg/L	*0.003*	0.070	*0.005*	*6*	0.063	*0.008*	*9*	0.049	*0.007*	*5*	0.071	*0.004*	*6*	0.062	*0.007*	*9*	0.051	*0.010*	*5*	0.059	*0.005*	*6*	0.049	*0.006*	*3*	0.044	*0.008*	*5*
Total Ca	mg/L	*0.005*	103.087	*6.350*	*6*	90.953	*8.614*	*9*	73.532	*9.230*	*5*	98.974	*6.741*	*6*	87.983	*9.644*	*9*	83.923	*15.045*	*5*	92.426	*8.800*	*6*	79.909	*7.709*	*3*	75.500	*13.713*	*5*
Total Fe	mg/L	*0.002*	0.155	*0.062*	*6*	0.182	*0.038*	*9*	0.141	*0.076*	*5*	0.133	*0.047*	*6*	0.128	*0.019*	*9*	0.090	*0.029*	*5*	0.139	*0.034*	*6*	0.139	*0.018*	*3*	0.110	*0.028*	*5*
Total K	mg/L	*0.10*	5.51	*1.24*	*6*	3.61	*1.02*	*9*	3.21	*2.37*	*5*	4.93	*0.81*	*6*	3.48	*0.60*	*9*	1.03	*1.24*	*5*	4.72	*0.93*	*6*	3.65	*0.42*	*3*	1.65	*1.20*	*5*
Total Mg	mg/L	*0.01*	6.93	*0.19*	*6*	6.68	*0.72*	*9*	6.00	*0.84*	*5*	6.89	*0.35*	*6*	6.64	*0.76*	*9*	6.75	*1.00*	*5*	6.64	*0.31*	*6*	5.87	*1.20*	*3*	5.73	*0.59*	*5*
Total Mn	mg/L	*0.0002*	0.4843	*0.0558*	*6*	0.4697	*0.1090*	*9*	0.2000	*0.1036*	*5*	0.3077	*0.1865*	*6*	0.3179	*0.0995*	*9*	0.1461	*0.0834*	*5*	0.3657	*0.1497*	*6*	0.3789	*0.1075*	*3*	0.2047	*0.0733*	*5*
Total Na	mg/L	*0.01*	16.17	*1.08*	*6*	16.82	*0.91*	*9*	17.89	*3.79*	*5*	15.87	*0.92*	*6*	17.29	*1.30*	*9*	18.79	*1.10*	*5*	16.66	*0.74*	*6*	15.65	*1.32*	*3*	17.68	*2.23*	*5*
Total S	mg/L	*0.05*	0.85	*0.12*	*6*	0.90	*0.14*	*9*	1.02	*0.24*	*5*	1.00	*0.16*	*6*	0.99	*0.23*	*9*	1.19	*0.33*	*5*	0.93	*0.15*	*6*	0.85	*0.25*	*3*	1.19	*0.34*	*5*
Total Sr	mg/L	*0.005*	0.240	*0.018*	*6*	0.227	*0.029*	*9*	0.180	*0.021*	*5*	0.238	*0.017*	*6*	0.225	*0.028*	*9*	0.205	*0.032*	*5*	0.222	*0.018*	*6*	0.189	*0.030*	*3*	0.173	*0.024*	*5*
Total Zn	mg/L	*0.001*	0.005	*0.001*	*6*	0.007	*0.002*	*9*	0.005	*0.001*	*5*	0.006	*0.001*	*6*	0.006	*0.001*	*9*	0.005	*0.002*	*5*	0.001	*0.001*	*6*	0.002	*0.001*	*3*	0.002	*0.002*	*5*
DOC	mg/L	*0.50*	14.43	*0.99*	*6*	15.23	*1.10*	*9*	13.84	*4.53*	*5*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes

DL = method detection limit; N/A = not applicable; SD = standard deviation; n = sample size; -- = not analyzed

<DL results recorded as 0.5*DL

Table B.1.4 - Victoria Point pore water analytical data, 20-30 cm below SWI. Data presented by month and plot type.

			August									September									October								
Analytical			Non-Vegetated			Vegetated			Mixed Vegetation			Non-Vegetated			Vegetated			Mixed Vegetation			Non-Vegetated			Vegetated			Mixed Vegetation		
Parameter	Units	*DL*	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Total P	mg/L	*0.005*	0.865	*0.537*	*6*	0.598	*0.407*	*9*	0.383	*0.444*	*5*	0.562	*0.231*	*6*	0.749	*0.362*	*9*	0.479	*0.463*	*5*	0.607	*0.284*	*6*	0.577	*0.160*	*3*	0.380	*0.229*	*5*
Phosphate	mg/L	*0.025*	0.569	*0.456*	*6*	0.239	*0.233*	*9*	0.033	*0.045*	*5*	0.313	*0.171*	*6*	0.272	*0.192*	*9*	0.257	*0.225*	*5*	0.342	*0.196*	*6*	0.378	*0.124*	*3*	0.270	*0.146*	*5*
Nitrate	mg/L	*0.009*	0.005	*0*	*6*	0.005	*0*	*9*	0.005	*0*	*5*	0.037	*0.079*	*6*	0.005	*0*	*9*	0.010	*0.012*	*5*	0.005	*0*	*6*	0.005	*0*	*3*	0.005	*0*	*5*
pH	N/A	*N/A*	6.77	*0.04*	*6*	6.71	*0.04*	*9*	6.57	*0.11*	*5*	6.78	*0.02*	*5*	6.77	*0.09*	*9*	6.62	*0.21*	*4*	6.86	*0.11*	*6*	6.74	*0.08*	*3*	6.63	*0.07*	*5*
Alkalinity	mg/L	*1.0*	340.6	*30.3*	*6*	305.5	*30.4*	*9*	200.9	*35.5*	*5*	326.0	*23.7*	*5*	280.5	*26.6*	*9*	243.5	*20.0*	*4*	282.4	*23.3*	*6*	248.8	*36.2*	*3*	229.7	*67.7*	*5*
Conductivity	µS/cm	*0.50*	705.87	*60.53*	*6*	618.77	*46.26*	*9*	483.46	78.46	*5*	699.40	*46.72*	*5*	615.47	*50.31*	*9*	574.68	26.58	*4*	618.20	*34.48*	*6*	550.67	*70.32*	*3*	533.00	129.86	*5*
Total Al	mg/L	*0.005*	0.012	*0.002*	*6*	0.015	*0.002*	*9*	0.018	*0.003*	*5*	0.007	*0.003*	*6*	0.006	*0.004*	*9*	0.028	*0.013*	*5*	0.009	*0.002*	*6*	0.005	*0.002*	*3*	0.009	*0.003*	*5*
Total Ba	mg/L	*0.003*	0.069	*0.004*	*6*	0.067	*0.006*	*9*	0.046	*0.009*	*5*	0.073	*0.007*	*6*	0.062	*0.006*	*9*	0.052	*0.007*	*5*	0.061	*0.007*	*6*	0.054	*0.007*	*3*	0.049	*0.016*	*5*
Total Ca	mg/L	*0.005*	105.063	*6.515*	*6*	97.109	*9.754*	*9*	70.708	*11.995*	*5*	106.237	*9.836*	*6*	91.747	*5.941*	*9*	85.615	*10.315*	*5*	95.883	*12.660*	*6*	87.549	*7.763*	*3*	85.356	*23.633*	*5*
Total Fe	mg/L	*0.002*	0.087	*0.024*	*6*	0.126	*0.038*	*9*	0.094	*0.053*	*5*	0.090	*0.047*	*6*	0.099	*0.036*	*9*	0.087	*0.055*	*5*	0.093	*0.039*	*6*	0.134	*0.022*	*3*	0.110	*0.047*	*5*
Total K	mg/L	*0.10*	4.68	*1.06*	*6*	3.62	*1.19*	*9*	2.64	*2.80*	*5*	4.80	*1.52*	*6*	3.49	*1.12*	*9*	1.85	*2.02*	*5*	4.41	*0.93*	*6*	3.39	*0.99*	*3*	2.09	*2.55*	*5*
Total Mg	mg/L	*0.01*	6.53	*0.50*	*6*	6.49	*0.66*	*9*	5.77	*0.97*	*5*	6.90	*0.41*	*6*	6.40	*0.61*	*9*	6.76	*0.60*	*5*	6.51	*0.38*	*6*	6.10	*1.25*	*3*	6.36	*0.67*	*5*
Total Mn	mg/L	*0.0002*	0.3688	*0.0571*	*6*	0.3837	*0.1069*	*9*	0.1737	*0.0726*	*5*	0.2850	*0.2115*	*6*	0.2801	*0.0992*	*9*	0.1673	*0.1293*	*5*	0.2726	*0.1340*	*6*	0.3777	*0.1089*	*3*	0.2745	*0.2045*	*5*
Total Na	mg/L	*0.01*	14.93	*0.94*	*6*	16.56	*1.01*	*9*	17.86	*4.30*	*5*	15.06	*1.39*	*6*	16.41	*1.63*	*9*	19.53	*3.78*	*5*	15.57	*1.56*	*6*	15.21	*1.49*	*3*	19.59	*3.74*	*5*
Total S	mg/L	*0.05*	0.77	*0.12*	*6*	0.91	*0.21*	*9*	0.88	*0.24*	*5*	0.86	*0.15*	*6*	0.88	*0.18*	*9*	0.94	*0.26*	*5*	0.83	*0.10*	*6*	0.76	*0.27*	*3*	0.95	*0.26*	*5*
Total Sr	mg/L	*0.005*	0.227	*0.013*	*6*	0.228	*0.023*	*9*	0.165	*0.027*	*5*	0.242	*0.024*	*6*	0.219	*0.017*	*9*	0.201	*0.022*	*5*	0.218	*0.028*	*6*	0.203	*0.029*	*3*	0.190	*0.037*	*5*
Total Zn	mg/L	*0.001*	0.007	*0.001*	*6*	0.008	*0.002*	*9*	0.005	*0.001*	*5*	0.006	*0.001*	*6*	0.006	*0.001*	*9*	0.005	*0.002*	*5*	0.002	*0.002*	*6*	0.003	*0.001*	*3*	0.003	*0.002*	*5*
DOC	mg/L	*0.50*	13.60	*0.84*	*6*	14.77	*1.93*	*9*	12.28	*2.46*	*5*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes

DL = method detection limit; N/A = not applicable; SD = standard deviation; n = sample size; -- = not analyzed

<DL results recorded as 0.5*DL

Table B.1.5 - Victoria Point pore water analytical data, 30-40 cm below SWI. Data presented by month and plot type.

			August									September									October								
Analytical			Non-Vegetated			Vegetated			Mixed Vegetation			Non-Vegetated			Vegetated			Mixed Vegetation			Non-Vegetated			Vegetated			Mixed Vegetation		
Parameter	Units	*DL*	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Total P	mg/L	*0.005*	0.640	*0.453*	*6*	0.495	*0.527*	*9*	0.387	*0.580*	*5*	0.391	*0.241*	*6*	0.613	*0.405*	*9*	0.328	*0.272*	*5*	0.496	*0.253*	*6*	0.583	*0.369*	*3*	0.309	*0.216*	*5*
Phosphate	mg/L	*0.025*	0.384	*0.358*	*6*	0.190	*0.296*	*9*	0.129	*0.260*	*5*	0.193	*0.135*	*6*	0.212	*0.172*	*9*	0.220	*0.196*	*5*	0.249	*0.139*	*6*	0.415	*0.270*	*3*	0.200	*0.083*	*5*
Nitrate	mg/L	*0.009*	0.005	*0*	*6*	0.005	*0*	*9*	0.005	*0*	*5*	0.011	*0.016*	*6*	0.005	*0*	*9*	0.005	*0*	*5*	0.005	*0*	*6*	0.005	*0*	*3*	0.005	*0*	*5*
pH	N/A	*N/A*	6.80	*0.04*	*6*	6.71	*0.03*	*9*	6.57	*0.06*	*5*	6.82	*0.08*	*5*	6.79	*0.07*	*8*	6.61	*0.13*	*4*	6.83	*0.06*	*6*	6.73	*0.07*	*3*	6.64	*0.07*	*5*
Alkalinity	mg/L	*1.0*	355.1	*34.1*	*6*	317.7	*30.4*	*9*	198.1	*54.0*	*5*	326.0	*30.2*	*5*	292.1	*21.1*	*8*	233.2	*54.5*	*4*	282.1	*25.9*	*6*	265.0	*7.3*	*3*	243.3	*65.7*	*5*
Conductivity	µS/cm	*0.50*	730.03	*60.92*	*6*	635.89	*43.27*	*9*	481.76	108.92	*5*	692.56	*53.45*	*5*	630.59	*38.84*	*8*	554.98	96.55	*4*	613.05	*35.89*	*6*	578.13	*3.31*	*3*	560.10	133.64	*5*
Total Al	mg/L	*0.005*	0.012	*0.003*	*6*	0.015	*0.002*	*9*	0.019	*0.003*	*5*	0.007	*0.002*	*6*	0.008	*0.004*	*9*	0.030	*0.026*	*5*	0.008	*0.001*	*6*	0.006	*0.001*	*3*	0.012	*0.005*	*5*
Total Ba	mg/L	*0.003*	0.068	*0.007*	*6*	0.066	*0.005*	*9*	0.044	*0.012*	*5*	0.069	*0.008*	*6*	0.064	*0.004*	*9*	0.053	*0.008*	*5*	0.059	*0.006*	*6*	0.057	*0.001*	*3*	0.052	*0.014*	*5*
Total Ca	mg/L	*0.005*	112.623	*17.450*	*6*	102.216	*11.199*	*9*	71.972	*18.515*	*5*	105.640	*15.190*	*6*	97.707	*8.324*	*9*	90.855	*19.785*	*5*	97.686	*16.978*	*6*	95.956	*10.469*	*3*	90.672	*22.566*	*5*
Total Fe	mg/L	*0.002*	0.066	*0.019*	*6*	0.098	*0.025*	*9*	0.082	*0.051*	*5*	0.054	*0.012*	*6*	0.074	*0.028*	*9*	0.077	*0.040*	*5*	0.078	*0.035*	*6*	0.114	*0.044*	*3*	0.087	*0.027*	*5*
Total K	mg/L	*0.10*	3.58	*1.31*	*6*	2.87	*1.43*	*9*	2.11	*2.97*	*5*	4.96	*2.01*	*6*	3.50	*1.28*	*9*	2.16	*2.30*	*5*	3.71	*1.17*	*6*	3.23	*1.74*	*3*	2.56	*2.68*	*5*
Total Mg	mg/L	*0.01*	6.76	*0.37*	*6*	6.38	*0.49*	*9*	5.87	*1.56*	*5*	6.66	*0.42*	*6*	6.42	*0.56*	*9*	6.84	*1.14*	*5*	6.37	*0.61*	*6*	6.11	*0.42*	*3*	6.69	*0.88*	*5*
Total Mn	mg/L	*0.0002*	0.2609	*0.0529*	*5*	0.2943	*0.0726*	*9*	0.1443	*0.0626*	*5*	0.1642	*0.1192*	*6*	0.1986	*0.1004*	*9*	0.1411	*0.0853*	*5*	0.2005	*0.1116*	*6*	0.3353	*0.1456*	*3*	0.2101	*0.0992*	*5*
Total Na	mg/L	*0.01*	13.63	*1.29*	*5*	14.67	*1.42*	*9*	17.09	*6.02*	*5*	13.47	*0.95*	*6*	15.38	*1.42*	*9*	17.45	*5.62*	*5*	13.82	*1.25*	*6*	15.85	*3.99*	*3*	19.89	*5.65*	*5*
Total S	mg/L	*0.05*	0.62	*0.04*	*5*	0.80	*0.23*	*9*	0.73	*0.18*	*5*	0.73	*0.08*	*6*	0.83	*0.14*	*9*	0.79	*0.19*	*5*	0.71	*0.06*	*6*	0.72	*0.22*	*3*	0.82	*0.23*	*5*
Total Sr	mg/L	*0.005*	0.227	*0.031*	*5*	0.226	*0.012*	*9*	0.163	*0.040*	*5*	0.230	*0.028*	*6*	0.224	*0.015*	*9*	0.20	*0.04*	*5*	0.214	*0.035*	*6*	0.207	*0.008*	*3*	0.198	*0.037*	*5*
Total Zn	mg/L	*0.001*	0.006	*0.001*	*5*	0.008	*0.001*	*9*	0.005	*0.001*	*5*	0.007	*0.002*	*6*	0.006	*0.001*	*9*	0.006	*0.003*	*5*	0.002	*0.001*	*6*	0.002	*0.001*	*3*	0.003	*0.002*	*5*
DOC	mg/L	*0.50*	13.15	*1.06*	*6*	13.54	*1.46*	*9*	13.08	*5.34*	*5*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes

DL = method detection limit; N/A = not applicable; SD = standard deviation; n = sample size; -- = not analyzed

<DL results recorded as 0.5*DL

Table B.1.6 - Victoria Point pore water analytical data, 40-50 cm below SWI. Data presented by month and plot type.

			August									September									October								
Analytical			Non-Vegetated			Vegetated			Mixed Vegetation			Non-Vegetated			Vegetated			Mixed Vegetation			Non-Vegetated			Vegetated			Mixed Vegetation		
Parameter	Units	*DL*	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Total P	mg/L	*0.005*	0.310	*0.179*	*5*	0.268	*0.287*	*6*	0.143	*0.095*	*5*	0.304	*0.194*	*5*	0.454	*0.390*	*9*	0.211	*0.158*	*2*	0.326	*0.184*	*6*	0.349	*0.243*	*3*	0.276	*0.280*	*5*
Phosphate	mg/L	*0.025*	0.113	*0.122*	*5*	0.198	*0.454*	*6*	0.019	*0.015*	*5*	0.134	*0.113*	*5*	0.143	*0.075*	*9*	0.138	*0.035*	*2*	0.152	*0.091*	*6*	0.231	*0.191*	*3*	0.164	*0.139*	*5*
Nitrate	mg/L	*0.009*	0.005	*0*	*5*	0.005	*0*	*6*	0.005	*0*	*5*	0.005	*0*	*5*	0.007	*0.005*	*9*	0.013	*0.012*	*2*	0.005	*0*	*6*	0.005	*0*	*3*	0.005	*0*	*5*
pH	N/A	*N/A*	6.83	*0.06*	*2*	6.71	*0.03*	*3*	6.62	*0.11*	*4*	6.81	*0.06*	*3*	6.82	*0.18*	*2*	6.72	-	*1*	6.90	*0.03*	*2*	6.95	*0.23*	*3*	6.63	*0.14*	*5*
Alkalinity	mg/L	*1.0*	320.7	*27.9*	*2*	325.4	*21.6*	*3*	220.6	*60.8*	*4*	339.6	*8.9*	*3*	295.6	*17.1*	*2*	298.3	-	*1*	285.3	*3.6*	*2*	294.4	*21.1*	*3*	256.4	*83.5*	*5*
Conductivity	µS/cm	*0.50*	653.30	*42.57*	*2*	650.40	*32.67*	*3*	521.65	99.44	*4*	706.57	*14.76*	*3*	630.50	*36.49*	*2*	670.60	-	*1*	610.40	*9.76*	*2*	615.60	*37.67*	*3*	582.98	156.25	*5*
Total Al	mg/L	*0.005*	0.015	*0.004*	*4*	0.018	*0.004*	*4*	0.022	*0.005*	*5*	0.010	*0.006*	*4*	0.007	*0.002*	*8*	0.021	*0.008*	*2*	0.006	*0.004*	*6*	0.010	*0.002*	*3*	0.011	*0.007*	*5*
Total Ba	mg/L	*0.003*	0.063	*0.005*	*4*	0.065	*0.008*	*4*	0.044	*0.006*	*5*	0.070	*0.005*	*4*	0.063	*0.004*	*8*	0.055	*0.006*	*2*	0.061	*0.003*	*6*	0.060	*0.003*	*3*	0.055	*0.018*	*5*
Total Ca	mg/L	*0.005*	107.440	*15.761*	*4*	104.045	*11.712*	*4*	80.684	*18.078*	*5*	113.987	*7.940*	*4*	100.922	*10.214*	*8*	99.277	*14.524*	*2*	106.229	*14.082*	*6*	108.676	*10.602*	*3*	96.268	*30.846*	*5*
Total Fe	mg/L	*0.002*	0.077	*0.044*	*4*	0.075	*0.026*	*4*	0.068	*0.029*	*5*	0.036	*0.003*	*4*	0.053	*0.019*	*8*	0.053	*0.033*	*2*	0.063	*0.019*	*6*	0.111	*0.037*	*3*	0.085	*0.035*	*5*
Total K	mg/L	*0.10*	3.10	*1.05*	*4*	3.40	*1.54*	*4*	1.04	*0.60*	*5*	3.41	*1.50*	*4*	3.59	*1.74*	*8*	1.04	*0.06*	*2*	3.12	*1.26*	*6*	2.55	*0.99*	*3*	3.50	*3.66*	*5*
Total Mg	mg/L	*0.01*	6.40	*0.31*	*4*	6.62	*0.54*	*4*	5.91	*1.26*	*5*	6.94	*0.37*	*4*	6.36	*0.59*	*8*	7.50	*1.29*	*2*	6.57	*0.48*	*6*	6.42	*0.79*	*3*	6.75	*1.40*	*5*
Total Mn	mg/L	*0.0002*	0.2132	*0.0940*	*4*	0.1912	*0.0260*	*4*	0.1230	*0.0820*	*5*	0.0555	*0.0337*	*4*	0.1283	*0.0968*	*8*	0.1003	*0.0684*	*2*	0.1428	*0.0748*	*6*	0.2516	*0.0850*	*3*	0.1768	*0.0875*	*5*
Total Na	mg/L	*0.01*	12.60	*1.00*	*4*	15.31	*2.36*	*4*	15.18	*3.09*	*5*	12.89	*0.66*	*4*	14.20	*1.76*	*8*	17.44	*3.53*	*2*	12.87	*1.07*	*6*	14.08	*1.27*	*3*	18.77	*6.09*	*5*
Total S	mg/L	*0.05*	0.48	*0.02*	*4*	0.87	*0.24*	*4*	0.63	*0.08*	*5*	0.63	*0.05*	*4*	0.95	*0.70*	*8*	0.81	*0.30*	*2*	0.56	*0.12*	*6*	0.60	*0.28*	*3*	0.67	*0.21*	*5*
Total Sr	mg/L	*0.005*	0.217	*0.028*	*4*	0.231	*0.017*	*4*	0.170	*0.028*	*5*	0.234	*0.019*	*4*	0.220	*0.016*	*8*	0.215	*0.038*	*2*	0.219	*0.025*	*6*	0.222	*0.005*	*3*	0.202	*0.055*	*5*
Total Zn	mg/L	*0.001*	0.006	*0.004*	*4*	0.008	*0.001*	*4*	0.008	*0.003*	*5*	0.005	*0.002*	*4*	0.004	*0.002*	*8*	0.004	*0.002*	*2*	0.005	*0.004*	*6*	0.002	*0.002*	*3*	0.003	*0.003*	*5*
DOC	mg/L	*0.50*	11.74	*1.54*	*5*	13.45	*3.05*	*6*	11.32	*1.57*	*5*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes

DL = method detection limit; N/A = not applicable; SD = standard deviation; n = sample size; -- = not analyzed; - = incalculable

<DL results recorded as 0.5*DL

Table B.1.7 - Victoria Point, Water Sample Analytical Results, July to October

Parameter / Method Detection Limit / Units

Lab ID	Sample Date	Sample ID	Total P	Phosphate PO_4-P	Nitrite NO_2-N	Nitrate NO_3-N	DOC	pH	Total Alkalinity as $CaCO_3$	Conductivity	Total Metals: Al	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	S	Sr	Ti	V	Zn	Reactive Silicates SiO_2	Chlorophyll "a"
			0.0050	*0.0250*	*0.006*	*0.0090*	*0.50*	*n/a*	*1.0*	*0.50*	*0.0050*	*0.0050*	*0.0030*	*0.002*	*0.0050*	*0.0010*	*0.010*	*0.002*	*0.002*	*0.002*	*0.10*	*0.010*	*0.0002*	*0.010*	*0.002*	*0.0050*	*0.050*	*0.0050*	*0.010*	*0.006*	*0.0010*	*0.250*	*0.2*
			mg/L	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*n/a*	*mg/L*	*uS/cm*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*µg/L*
EL100222-014	07/22/10	Rice Plot	0.0380	0.0125	0.003	0.0045	12.70	7.56	97.6	285.00	0.0210	0.0025	0.0250	0.001	42.7800	0.0005	0.005	0.001	0.001	0.019	0.78	4.540	0.0351	16.710	0.001	0.0025	2.930	0.1250	0.005	0.003	0.0280	7.50	10.9
EL100253-004	08/24/10	VP-AV-1a-1	0.0110	0.0125	0.003	0.0045	17.5	7.08	137.5	350.50	0.0130	0.0025	0.0270	0.001	49.2000	0.0005	0.005	0.001	0.001	0.017	0.83	4.410	0.0448	16.180	0.001	0.0025	1.650	0.1340	0.005	0.003	0.0120	--	--
EL100253-005	08/24/10	VP-AV-1a-0	0.0360	0.0125	0.003	0.0045	17.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100253-006	08/24/10	VP-AV-1a-2	0.0920	0.0125	0.003	0.0045	11.7	6.82	195.7	462.10	0.0150	0.0025	0.0550	0.001	73.3600	0.0005	0.005	0.001	0.001	0.141	2.22	5.520	0.1423	17.040	0.001	0.0025	1.120	0.1880	0.005	0.003	0.0050	--	--
EL100253-007	08/24/10	VP-AV-1a-3	0.1920	0.0125	0.003	0.0045	11.7	6.65	185.4	448.60	0.0180	0.0025	0.0450	0.001	67.1200	0.0005	0.005	0.001	0.001	0.113	2.04	5.380	0.1508	16.000	0.001	0.0025	0.820	0.1660	0.005	0.003	0.0050	--	--
EL100253-008	08/24/10	VP-AV-1a-4	0.0920	0.0125	0.003	0.0045	10.2	6.51	157.7	393.90	0.0180	0.0070	0.0380	0.001	58.5200	0.0005	0.005	0.001	0.001	0.056	0.76	4.690	0.1386	14.660	0.001	0.0025	0.630	0.1330	0.005	0.003	0.0060	--	--
EL100253-009	08/24/10	VP-AV-1a-5	0.0420	0.0125	0.003	0.0045	11.4	6.58	158.7	403.50	0.0210	0.0025	0.0370	0.001	61.2200	0.0005	0.005	0.001	0.001	0.042	0.21	4.940	0.1275	11.960	0.001	0.0025	0.560	0.1360	0.005	0.003	0.0050	--	--
EL100253-010	08/24/10	VP-AV-1a-6	0.0380	0.0125	0.003	0.0045	10.2	6.64	195.4	462.70	0.0210	0.0025	0.0400	0.001	73.6800	0.0005	0.005	0.001	0.001	0.051	0.26	5.250	0.1067	11.340	0.001	0.0025	0.540	0.1510	0.005	0.003	0.0060	--	--
EL100253-011	08/24/10	VP-AV-1a-7	0.0300	0.0125	0.003	0.0045	9.1	--	--	--	0.0340	0.0090	0.0430	0.001	86.4000	0.0005	0.005	0.001	0.001	0.047	0.39	5.300	0.0654	11.740	0.001	0.0025	0.400	0.1650	0.005	0.003	0.0070	--	--
EL100253-012	08/24/10	VP-AV-1b-2	0.1830	0.0125	0.003	0.0045	14.1	6.74	228.0	519.00	0.0130	0.0025	0.0570	0.001	78.9000	0.0005	0.005	0.001	0.001	0.197	2.00	5.980	0.2022	18.980	0.001	0.0025	1.060	0.1940	0.005	0.003	0.0060	--	--
EL100253-013	08/24/10	VP-AV-1b-3	0.1930	0.0125	0.003	0.0045	12.3	6.66	210.6	489.80	0.0130	0.0025	0.0460	0.001	71.0000	0.0005	0.005	0.001	0.001	0.144	1.19	5.590	0.2062	17.360	0.001	0.0025	0.820	0.1600	0.005	0.003	0.0070	--	--
EL100253-014	08/24/10	VP-AV-1b-4	0.1240	0.0125	0.003	0.0045	12.6	6.60	222.8	512.30	0.0180	0.0025	0.0480	0.001	78.5400	0.0005	0.005	0.001	0.001	0.132	0.68	5.930	0.2400	18.410	0.001	0.0025	0.740	0.1620	0.005	0.003	0.0060	--	--
EL100253-015	08/24/10	VP-AV-1b-5	0.1780	0.0125	0.003	0.0045	11.8	6.62	239.4	543.40	0.0220	0.0025	0.0480	0.001	86.0000	0.0005	0.005	0.001	0.001	0.110	0.44	6.410	0.1568	17.660	0.001	0.0025	0.660	0.1700	0.005	0.003	0.0060	--	--
EL100253-016	08/24/10	VP-AV-1b-6	0.1940	0.0125	0.003	0.0045	12.6	6.67	293.0	646.80	0.0190	0.0060	0.0530	0.001	105.1800	0.0005	0.005	0.001	0.001	0.093	1.10	7.670	0.2586	18.170	0.001	0.0025	0.640	0.2070	0.005	0.003	0.0120	--	--
EL100253-017	08/24/10	VP-AV-1c-2	0.7050	0.0125	0.003	0.0045	18.9	6.54	240.7	590.30	0.0170	0.0025	0.0610	0.001	85.2600	0.0005	0.005	0.001	0.001	0.226	4.06	6.680	0.2860	19.190	0.001	0.0025	1.380	0.2100	0.005	0.003	0.0060	--	--
EL100253-018	08/24/10	VP-AV-1c-3	1.1830	0.0125	0.003	0.0045	21.9	6.36	247.6	627.00	0.0280	0.0025	0.0620	0.001	89.8400	0.0005	0.005	0.001	0.001	0.270	7.22	7.470	0.3754	23.880	0.001	0.0025	1.250	0.2150	0.005	0.003	0.0060	--	--
EL100253-019	08/24/10	VP-AV-1c-4	1.1520	0.0125	0.003	0.0045	16.4	6.42	249.0	601.30	0.0220	0.0025	0.0610	0.001	87.5600	0.0005	0.005	0.001	0.001	0.169	7.44	7.310	0.2634	24.600	0.001	0.0025	1.060	0.2080	0.005	0.003	0.0060	--	--
EL100253-020	08/24/10	VP-AV-1c-5	1.4200	0.5940	0.003	0.0045	22.5	6.49	271.5	644.00	0.0210	0.0025	0.0640	0.001	96.8600	0.0005	0.005	0.001	0.001	0.159	7.36	8.370	0.2462	26.900	0.001	0.0025	0.930	0.2300	0.005	0.003	0.0060	--	--
EL100253-021	08/24/10	VP-AV-1c-6	0.2500	0.0470	0.003	0.0045	13.0	6.69	242.3	553.10	0.0210	0.0025	0.0490	0.001	91.1000	0.0005	0.005	0.001	0.001	0.099	1.69	6.760	0.1210	18.480	0.001	0.0025	0.700	0.1920	0.005	0.003	0.0090	--	--
EL100253-022	08/24/10	VP-AV-1d-1	0.4850	0.1520	0.003	0.0045	14.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100253-023	08/24/10	VP-AV-1d-2	0.5900	0.2330	0.003	0.0045	13.9	6.83	238.1	548.30	0.0150	0.0025	0.0530	0.001	78.4800	0.0005	0.005	0.001	0.001	0.121	3.22	6.470	0.1605	18.250	0.001	0.0025	1.330	0.2030	0.005	0.003	0.0060	--	--
EL100253-024	08/24/10	VP-AV-1d-3	0.5250	0.2620	0.003	0.0045	12.2	6.71	207.0	495.20	0.0150	0.0025	0.0460	0.001	70.1400	0.0005	0.005	0.001	0.001	0.090	3.30	5.830	0.1556	18.480	0.001	0.0025	1.320	0.1790	0.005	0.003	0.0040	--	--
EL100253-025	08/24/10	VP-AV-1d-4	0.3790	0.1130	0.003	0.0045	11.0	6.69	191.5	466.10	0.0170	0.0025	0.0420	0.001	65.8000	0.0005	0.005	0.001	0.001	0.064	2.60	5.530	0.1202	17.970	0.001	0.0025	1.200	0.1640	0.005	0.003	0.0050	--	--
EL100253-026	08/24/10	VP-AV-1d-5	0.1590	0.0125	0.003	0.0045	9.7	6.63	170.5	426.40	0.0180	0.0025	0.0380	0.001	62.5200	0.0005	0.005	0.001	0.001	0.043	1.33	5.070	0.0880	16.490	0.001	0.0025	0.930	0.1450	0.005	0.003	0.0040	--	--
EL100253-027	08/24/10	VP-AV-1d-6	0.0470	0.0125	0.003	0.0045	9.3	--	--	--	0.0300	0.0025	0.0400	0.001	75.6800	0.0005	0.005	0.001	0.001	0.030	0.62	5.180	0.0385	14.550	0.001	0.0025	0.720	0.1580	0.005	0.003	0.0070	--	--
EL100253-028	08/24/10	VP-AV-1e-2	0.0610	0.0125	0.003	0.0045	13.0	6.86	184.1	437.80	0.0090	0.0025	0.0430	0.001	61.9200	0.0005	0.005	0.001	0.001	0.089	1.83	4.900	0.0833	16.330	0.001	0.0025	1.090	0.1640	0.005	0.003	0.0050	--	--
EL100253-029	08/24/10	VP-AV-1e-3	0.2410	0.0260	0.003	0.0045	11.1	6.72	202.4	468.90	0.0180	0.0025	0.0470	0.001	69.5600	0.0005	0.005	0.001	0.001	0.086	2.28	5.720	0.1119	13.730	0.001	0.0025	0.890	0.1820	0.005	0.003	0.0050	--	--
EL100253-030	08/24/10	VP-AV-1e-4	0.1700	0.0125	0.003	0.0045	11.2	6.64	183.5	443.70	0.0140	0.0025	0.0390	0.001	63.1200	0.0005	0.005	0.001	0.001	0.050	1.70	5.380	0.1061	13.640	0.001	0.0025	0.760	0.1590	0.005	0.003	0.0040	--	--
EL100253-031	08/24/10	VP-AV-1e-5	0.1350	0.0125	0.003	0.0045	10.0	6.53	150.4	391.50	0.0140	0.0025	0.0340	0.001	53.2600	0.0005	0.005	0.001	0.001	0.057	1.23	4.570	0.1032	12.420	0.001	0.0025	0.590	0.1320	0.005	0.003	0.0040	--	--
EL100253-032	08/24/10	VP-AV-1e-6	0.1850	0.0125	0.003	0.0045	11.5	6.46	151.8	424.00	0.0190	0.0025	0.0390	0.001	57.7800	0.0005	0.005	0.001	0.001	0.066	1.51	4.680	0.0902	13.370	0.001	0.0025	0.560	0.1410	0.005	0.003	0.0050	--	--
EL100256-004	08/25/10	VP-V-1a-2	0.3930	0.1420	0.003	0.0045	15.6	6.72	206.8	455.30	0.0130	0.0025	0.0530	0.001	69.0200	0.0005	0.005	0.001	0.001	0.174	2.72	5.180	0.4590	16.140	0.001	0.0025	0.760	0.1760	0.005	0.003	0.0060	--	--
EL100256-005	08/25/10	VP-V-1a-1	0.3220	0.0390	0.003	0.0045	18.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100256-006	08/25/10	VP-V-1a-3	0.4140	0.1600	0.003	0.0045	13.0	6.61	241.1	511.50	0.0140	0.0080	0.0530	0.001	83.0600	0.0005	0.005	0.001	0.001	0.197	3.72	6.160	0.4848	16.090	0.001	0.0025	0.780	0.1910	0.005	0.003	0.0100	--	--
EL100256-007	08/25/10	VP-V-1a-4	0.2990	0.0490	0.003	0.0045	12.6	6.66	278.1	571.70	0.0130	0.0080	0.0640	0.001	96.7400	0.0005	0.005	0.001	0.001	0.112	4.70	5.900	0.3748	16.760	0.001	0.0025	0.640	0.2080	0.005	0.003	0.0080	--	--
EL100256-008	08/25/10	VP-V-1a-5	0.1080	0.0125	0.003	0.0045	12.5	6.69	306.5	613.90	0.0170	0.0070	0.0610	0.001	104.3000	0.0005	0.005	0.001	0.001	0.089	2.88	5.530	0.2670	12.450	0.001	0.0025	0.590	0.2140	0.005	0.003	0.0080	--	--
EL100256-009	08/25/10	VP-V-1a-6	0.1080	0.0125	0.003	0.0045	13.0	6.68	335.5	655.20	0.0220	0.0070	0.0630	0.001	112.2000	0.0005	0.005	0.001	0.001	0.100	2.18	5.860	0.2130	12.310	0.001	0.0025	0.570	0.2270	0.005	0.003	0.0080	--	--
EL100256-010	08/25/10	VP-V-1a-7	0.0570	0.0125	0.003	0.0045	14.0	6.69	346.1	666.70	0.0250	0.0025	0.0730	0.001	123.8600	0.0005	0.005	0.001	0.001	0.111	1.45	6.650	0.1933	14.310	0.001	0.0025	0.620	0.2530	0.005	0.003	0.0070	--	--
EL100256-011	08/25/10	VP-V-1a-8	0.0210	0.0125	0.003	0.0045	12.2	--	--	--	0.0240	0.0050	0.0610	0.001	124.0200	0.0005	0.005	0.001	0.001	0.080	0.71	6.310	0.1239	12.450	0.001	0.0025	0.460	0.2420	0.005	0.003	0.0110	--	--
EL100256-012	08/25/10	VP-V-1b-1	0.1310	0.0125	0.003	0.0045	22.4	7.07	148.9	356.20	0.0090	0.0070	0.0410	0.001	52.8200	0.0005	0.005	0.001	0.001	0.042	1.05	4.100	0.1648	18.210	0.001	0.0025	1.090	0.1450	0.005	0.003	0.0110	--	--
EL100256-013	08/25/10	VP-V-1b-2	0.2390	0.0125	0.003	0.0045	15.6	6.74	223.6	491.30	0.0110	0.0090	0.0470	0.001	72.4200	0.0005	0.005	0.001	0.001	0.187	1.59	5.950	0.4466	15.150	0.001	0.0025	0.670	0.1850	0.005	0.003	0.0060	--	--
EL100256-014	08/25/10	VP-V-1b-3	0.2100	0.0125	0.003	0.0045	15.9	6.74	270.8	555.20	0.0120	0.0120	0.0550	0.001	88.6600	0.0005	0.005	0.001	0.001	0.146	1.25	5.470	0.4522	15.090	0.001	0.0025	0.670	0.1900	0.005	0.003	0.0090	--	--
EL100256-015	08/25/10	VP-V-1b-4	0.1390	0.0125	0.003	0.0045	13.4	6.72	321.7	619.60	0.0130	0.0110	0.0640	0.001	107.5200	0.0005	0.005	0.001	0.001	0.093	1.15	5.360	0.3188	14.800	0.001	0.0025	0.630	0.2080	0.005	0.003	0.0070	--	--
EL100256-016	08/25/10	VP-V-1b-5	0.1140	0.0125	0.003	0.0045	14.9	6.73	341.6	653.30	0.0150	0.0150	0.0670	0.001	118.1600	0.0005	0.005	0.001	0.001	0.120	0.72	5.630	0.2536	14.650	0.001	0.0025	0.530	0.2220	0.005	0.003	0.0090	--	--
EL100256-017	08/25/10	VP-V-1c-1	0.0500	0.0125	0.003	0.0045	24.4	--	--	--	0.0090	0.0130	0.0280	0.001	48.0800	0.0005	0.005	0.001	0.001	0.015	0.83	3.910	0.0851	18.250	0.001	0.0025	1.220	0.1340	0.005	0.003	0.0150	--	--
EL100256-018	08/25/10	VP-V-1c-2	0.2250	0.0125	0.003	0.0045	17.4	6.76	270.4	555.70	0.0100	0.0160	0.0680	0.001	93.5000	0.0005	0.005	0.001	0.001	0.248	3.00	6.480	0.5366	18.330	0.001	0.0025	0.770	0.2450	0.005	0.003	0.0090	--	--
EL100256-019	08/25/10	VP-V-1c-3	0.4480	0.0620	0.003	0.0045	15.7	6.69	320.1	633.20	0.0140	0.0120	0.0700	0.001	102.7400	0.0005	0.005	0.001	0.001	0.189	3.36	6.770	0.5770	17.360	0.001	0.0025	0.780	0.2520	0.005	0.003	0.0070	--	--
EL100256-020	08/25/10	VP-V-1c-4	0.3470	0.0930	0.003	0.0045	16.4	6.80	338.7	656.90	0.0160	0.0130	0.0700	0.001	108.8000	0.0005	0.005	0.001	0.001	0.185	2.14	6.630	0.5618	15.380	0.001	0.0025	0.690	0.2520	0.005	0.003	0.0100	--	--
EL100256-021	08/25/10	VP-V-1c-5	0.0760	0.0125	0.003	0.0045	14.3	6.73	346.0	656.10	0.0150	0.0120	0.0650	0.001	116.7600	0.0005	0.005	0.001	0.001	0.100	0.50	6.600	0.3670	13.330	0.001	0.0025	0.520	0.2440	0.005	0.003	0.0080	--	--
EL100256-022	08/25/10	VP-V-1c-6	0.0510	0.0125	0.003	0.0045	10.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100256-023	08/25/10	VP-V-2a-2	0.0460	0.0125	0.003	0.0045	14.8	6.81	276.3	574.10	0.0140	0.0080	0.0730	0.001	89.1000	0.0005	0.005	0.001	0.001	0.257	2.68	6.580	0.3112	18.100	0.001	0.0025	0.900	0.2490	0.005	0.003	0.0050	--	--
EL100256-024	08/25/10	VP-V-2a-3	0.1850	0.0125	0.003	0.0045	16.0	6.69	295.2	609.30	0.0170	0.0120	0.0620	0.001	89.4400	0.0005	0.005	0.001	0.001	0.177	3.20	7.270	0.3106	17.330	0.001	0.0025	1.060	0.2370	0.005	0.003	0.0060	--	--
EL100256-025	08/25/10	VP-V-2a-4	0.2440	0.0125	0.003	0.0045	12.3	6.68	291.3	584.90	0.0120	0.0120	0.0630	0.001	87.9400	0.0005	0.005	0.001	0.001	0.118	4.12	6.930	0.2610	17.720	0.001	0.0025	1.170	0.2250	0.005	0.003	0.0060	--	--
EL100256-026	08/25/10	VP-V-2a-5	0.1780	0.0125	0.003	0.0045	11.6	6.70	299.1	621.00	0.0150	0.0100	0.0640	0.001	87.3400	0.0005	0.005	0.001	0.001	0.140	4.26	6.650	0.2552	16.430	0.001	0.0025	1.200	0.2190	0.005	0.003	0.0060	--	--
EL100256-027	08/25/10	VP-V-2a-6	0.2190	0.0125	0.003	0.0045	10.1	6.74	300.6	615.60	0.0120	0.0120	0.0630	0.001	91.3800	0.0005	0.005	0.001	0.001	0.096	4.08	6.740	0.2108	15.490	0.001	0.0025	1.150	0.2170	0.005	0.003	0.0070	--	--
EL100256-028	08/25/10	VP-V-2a-7	0.2970	0.0125	0.003	0.0045	9.0	6.83	323.6	640.20	0.0170	0.0130	0.0610	0.001	95.6400	0.0005	0.005	0.001	0.001	0.051	3.08	6.420	0.1214	12.990	0.001	0.0025	0.740	0.2030	0.005	0.003	0.0070	--	--
EL100256-029	08/25/10	VP-V-2a-8	0.2430	0.0125	0.003	0.0045	8.9	6.96	342.4	644.30	0.0220	0.0070	0.0610	0.001	106.2000	0.0005	0.005	0.001	0.001	0.050	2.30	6.300	0.0934	11.300	0.001	0.0025	0.360	0.2020	0.005	0.003	0.0070	--	--
EL100256-030	08/25/10	VP-V-2b-1	0.0290	0.0125	0.003	0.0045	21.6	--	--	--	0.0180	0.0025	0.0330	0.001	49.4400	0.0005	0.005	0.001	0.001	0.024	1.04	4.250	0.0390	19.520	0.001	0.0025	1.390	0.1430	0.005	0.003	0.0150	--	--
EL100256-033	08/25/10	VP-V-2b-2	0.2780	0.0125	0.003	0.0045	15.5	6.88	306.4	625.00	0.0140	0.0130	0.0770	0.001	92.8400	0.0005	0.005	0.001	0.001	0.291	3.88	6.450	0.4860	17.430	0.001	0.0025	0.910	0.2490	0.005	0.003	0.0070	--	--
EL100256-034	08/25/10	VP-V-2b-3	0.7590	0.3670	0.003	0.0045	14.6	6.70	286.6	601.70	0.0140	0.0110	0.0690	0.001	86.4800	0.0005	0.005	0.001	0.001	0.212	4.48	6.270	0.4308	16.930	0.001	0.0025	0.950	0.2180	0.005	0.003	0.0050	--	--
EL100256-035	08/25/10	VP-V-2b-4	0.9390	0.4990	0.003	0.0045	14.6	6.69	298.1	616.70	0.0150	0.0060	0.0720	0.001	89.7600	0.0005	0.005	0.001	0.001	0.158	4.12	6.210	0.3520	16.500	0.001	0.0025	0.960	0.2120	0.005	0.003	0.0060	--	--
EL100256-036	08/25/10	VP-V-2b-5	0.5610	0.1770	0.003	0.0045	13.3	6.68	305.1	613.50	0.0130	0.0150	0.0690	0.001	99.6800	0.0005	0.005	0.001	0.001	0.110	2.84	6.630	0.3118	15.130	0.001	0.0025	0.700	0.2250	0.005	0.003	0.0060	--	--
EL100256-037	08/25/10	VP-V-2c-1	0.3050	0.0125	0.003	0.0045	18.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100256-038	08/25/10	VP-V-2c-2	0.2140	0.0125	0.003	0.0045	14.4	6.75	265.3	557.00	0.0160	0.0080	0.0580	0.001	83.1000	0.0005	0.005	0.001	0.001	0.198	4.06	6.460	0.3228	17.660	0.001	0.0025	0.900	0.2220	0.005	0.003	0.0060	--	--
EL100256-039	08/25/10	VP-V-2c-3	0.9180	0.3610	0.003	0.0045	14.1	6.67	269.4	573.70	0.0140	0.0110	0.0550	0.001	83.4000	0.0005	0.005	0.001	0.001	0.142	4.50	6.710	0.3124	18.050	0.001	0.0025	1.120	0.2140	0.005	0.003	0.0070	--	--
EL100256-040	08/25/10	VP-V-2c-4	0.7410	0.3680	0.003	0.0045	15.1	6.69	266.6	578.90	0.0190	0.0130	0.0560	0.001	83.7600	0.0005	0.005	0.001	0.001	0.087	3.76	6.560	0.2266	17.480	0.001	0.0025	1.120	0.2100	0.005	0.003	0.0090	--	--
EL100256-041	08/25/10	VP-V-2c-5	0.3540	0.0600	0.003	0.0045	12.2	6.68	263.9	563.30	0.0100	0.0120	0.0560	0.001	87.6800	0.0005	0.005	0.001	0.001	0.069	2.64	6.570	0.1706	16.250	0.001	0.0025	1.040	0.2090	0.005	0.003	0.0060	--	--
EL100256-042	08/25/10	VP-V-2c-6	0.1510	0.0125	0.003	0.0045	12.8	--	--	--	0.0190	0.0130	0.0580	0.001	96.9600	0.0005	0.005	0.001	0.001	0.056	2.08	7.130	0.1832	15.350	0.001	0.0025	0.860	0.2240	0.005	0.003	0.0080	--	--
EL100256-043	08/25/10	VP-V-3a-1	0.0220	0.0125	0.003	0.0045	22.0	7.12	140.5	347.90	0.0100	0.0080	0.0270	0.001	48.1400	0.0005	0.005	0.001	0.006	0.015	0.82	3.940	0.0144	18.480	0.001	0.0025	1.300	0.1340	0.005	0.003	0.0080	--	--
EL100256-044	08/25/10	VP-V-3a-2	0.1960	0.0125	0.003	0.0045	17.7	6.91	189.1	432.60	0.0130	0.0090	0.0500	0.001	62.8600	0.0005	0.005	0.001	0.001	0.088	2.28	4.770	0.1818	18.480	0.001	0.0025	1.080	0.1720	0.005	0.003	0.0100	--	--
EL100256-045	08/25/10	VP-V-3a-3	0.4250	0.0390	0.003	0.0045	15.7	6.69	261.1	541.60	0.0130	0.0080	0.0610	0.001	84.1000	0.0005	0.005	0.001	0.001	0.130	4.54	6.290	0.4690	17.670	0.001	0.0025	0.870	0.2100	0.005	0.003	0.0070	--	--
EL100256-046	08/25/10	VP-V-3a-4	0.4150	0.1070	0.003	0.0045	14.2	6.71	280.9	581.30	0.0170	0.0080	0.0650	0.001	95.4000	0.0005	0.005	0.001	0.001	0.095	4.52	6.200	0.4372	17.680	0.001	0.0025	0.890	0.2200	0.005	0.003	0.0100	--	--
EL100256-047	08/25/10	VP-V-3a-5	0.3340	0.0330	0.003	0.0045	15.9	6.67	302.0	617.90	0.0150	0.0025	0.0680	0.001	103.9600	0.0005	0.005	0.001	0.001	0.059	3.80	6.310	0.3290	16.090	0.001	0.0025	0.890	0.2330	0.005	0.003	0.0100	--	--
EL100256-048	08/25/10	VP-V-3a-6	0.2430	0.0125	0.003	0.0045	17.2	6.70	340.0	680.40	0.0200	0.0070	0.0760	0.001	115.6400	0.0005	0.005	0.001	0.001	0.049	5.24	6.760	0.1579	18.070	0.001	0.0025	0.890	0.2550	0.005	0.003	0.0090	--	--
EL100256-049	08/25/10	VP-V-3a-7	0.2410	0.0125	0.003	0.0045	15.1	6.66	368.5	725.90	0.0200	0.0025	0.0770	0.001	123.2000	0.0005	0.005	0.001	0.001	0.058	5.62	6.660	0.2362	13.380	0.001	0.0025	0.610	0.2520	0.005	0.003	0.0080	--	--
EL100256-050	08/25/10	VP-V-3b-1	0.2000	0.0125	0.003	0.0045	19.1	--	--	--	0.0150	0.0090	0.0570	0.001	76.7200	0.0005	0.005	0.001	0.001	0.119	1.98	5.190	0.2880	19.620	0.001	0.0025	0.850	0.2090	0.005	0.003	0.0120	--	--

Table B.1.7 - Victoria Point, Water Sample Analytical Results, July to October

			Parameter / Method Detection Limit / Units								Total Metals																					Reactive Silicates	Chlorophyll
			Total P	Phosphate PO_4-P	Nitrite NO_2-N	Nitrate NO_3-N	DOC	pH	Total Alkalinity as $CaCO_3$	Conductivity	Al	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	S	Sr	Ti	V	Zn	SiO_2	"a"
			0.0050	*0.0250*	*0.006*	*0.0090*	*0.50*	*n/a*	*1.0*	*0.50*	*0.0050*	*0.0050*	*0.0030*	*0.002*	*0.0050*	*0.0010*	*0.010*	*0.002*	*0.002*	*0.002*	*0.10*	*0.010*	*0.0002*	*0.010*	*0.002*	*0.0050*	*0.050*	*0.0050*	*0.010*	*0.006*	*0.0010*	*0.250*	*0.2*
Lab ID	**Sample Date**	**Sample ID**	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*n/a*	*mg/L*	*uS/cm*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*µg/L*
EL100256-051	08/25/10	VP-V-3b-2	0.5890	0.1370	0.003	0.0045	15.2	6.78	288.6	602.90	0.0140	0.0110	0.0690	0.001	93.2000	0.0005	0.005	0.001	0.001	0.238	3.12	6.960	0.6264	17.300	0.001	0.0025	0.950	0.2500	0.005	0.003	0.0070	--	--
EL100256-052	08/25/10	VP-V-3b-3	0.9390	0.3790	0.003	0.0045	16.3	6.70	306.5	636.90	0.0140	0.0100	0.0690	0.001	93.8600	0.0005	0.005	0.001	0.001	0.193	3.96	7.330	0.5948	16.600	0.001	0.0025	0.990	0.2500	0.005	0.003	0.0070	--	--
EL100256-053	08/25/10	VP-V-3b-4	1.3510	0.6310	0.003	0.0045	16.0	6.71	315.7	648.30	0.0160	0.0025	0.0680	0.001	93.4200	0.0005	0.005	0.001	0.001	0.108	4.36	6.980	0.4594	16.550	0.001	0.0025	1.120	0.2440	0.005	0.003	0.0070	--	--
EL100256-054	08/25/10	VP-V-3b-5	1.5810	0.7950	0.003	0.0045	12.5	6.74	332.5	667.80	0.0140	0.0070	0.0690	0.001	94.3800	0.0005	0.005	0.001	0.001	0.092	4.44	6.470	0.4198	14.070	0.001	0.0025	0.820	0.2310	0.005	0.003	0.0070	--	--
EL100256-055	08/25/10	VP-V-3c-1	0.0430	0.0125	0.003	0.0045	19.3	7.10	150.6	368.50	0.0120	0.0070	0.0380	0.001	52.2000	0.0005	0.005	0.001	0.001	0.027	1.02	4.240	0.0904	20.280	0.001	0.0025	1.280	0.1500	0.005	0.003	0.0160	--	--
EL100256-056	08/25/10	VP-V-3c-2	0.1020	0.0125	0.003	0.0045	18.7	6.80	333.2	664.10	0.0150	0.0090	0.0790	0.001	99.7000	0.0005	0.005	0.001	0.001	0.245	2.94	7.560	0.6038	17.110	0.001	0.0025	0.870	0.2780	0.005	0.003	0.0050	--	--
EL100256-057	08/25/10	VP-V-3c-3	0.4610	0.0470	0.003	0.0045	15.8	6.75	364.6	727.00	0.0170	0.0070	0.0770	0.001	106.8400	0.0005	0.005	0.001	0.001	0.250	3.52	7.850	0.5956	16.290	0.001	0.0025	0.920	0.2770	0.005	0.003	0.0060	--	--
EL100256-058	08/25/10	VP-V-3c-4	0.9110	0.3810	0.003	0.0045	18.3	6.77	358.6	710.60	0.0160	0.0130	0.0790	0.001	110.6400	0.0005	0.005	0.001	0.001	0.180	3.72	7.620	0.4616	16.130	0.001	0.0025	1.000	0.2710	0.005	0.003	0.0080	--	--
EL100256-059	08/25/10	VP-V-3c-5	1.1460	0.5990	0.003	0.0045	14.7	6.75	362.9	716.20	0.0170	0.0025	0.0720	0.001	107.6800	0.0005	0.005	0.001	0.001	0.099	3.74	7.020	0.2746	13.600	0.001	0.0025	0.870	0.2390	0.005	0.003	0.0080	--	--
EL100256-060	08/25/10	VP-V-3c-6	0.8370	1.1250	0.003	0.0045	17.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100253-033	08/24/10	VP-NV-1a-1	0.8730	0.4060	0.003	0.0045	18.7	--	--	--	0.0150	0.0025	0.0830	0.001	106.4000	0.0005	0.005	0.001	0.001	0.215	3.64	7.660	0.4550	19.190	0.001	0.0025	1.070	0.2670	0.005	0.003	0.0050	--	--
EL100253-034	08/24/10	VP-NV-1a-2	1.4860	1.0710	0.003	0.0045	15.7	6.76	364.9	774.10	0.0120	0.0025	0.0710	0.001	101.6600	0.0005	0.005	0.001	0.001	0.159	4.46	7.740	0.4662	16.370	0.001	0.0025	1.070	0.2410	0.005	0.003	0.0050	--	--
EL100253-035	08/24/10	VP-NV-1a-3	1.3630	1.0380	0.003	0.0045	14.8	6.78	325.4	705.70	0.0120	0.0025	0.0620	0.001	91.7400	0.0005	0.005	0.001	0.001	0.074	3.90	6.960	0.3752	14.580	0.001	0.0025	0.790	0.2060	0.005	0.003	0.0050	--	--
EL100253-036	08/24/10	VP-NV-1a-4	1.0820	0.7610	0.003	0.0045	12.9	6.79	309.4	665.50	0.0120	0.0025	0.0620	0.001	92.8000	0.0005	0.005	0.001	0.001	0.058	3.50	6.940	0.3140	14.370	0.001	0.0025	0.890	0.2060	0.005	0.003	0.0070	--	--
EL100253-039	08/24/10	VP-NV-1a-5	0.6400	0.3980	0.003	0.0045	11.6	6.79	291.8	620.60	0.0100	0.0025	0.0550	0.001	85.1000	0.0005	0.005	0.001	0.001	0.046	2.90	6.100	0.2352	12.080	0.001	0.0025	0.580	0.1800	0.005	0.003	0.0060	--	--
EL100253-040	08/24/10	VP-NV-1a-6	0.3960	0.1270	0.003	0.0045	10.1	6.87	300.9	623.20	0.0120	0.0025	0.0570	0.001	93.9200	0.0005	0.005	0.001	0.001	0.036	2.70	6.110	0.1338	11.960	0.001	0.0025	0.500	0.1880	0.005	0.003	0.0050	--	--
EL100253-041	08/24/10	VP-NV-1a-7	0.2880	0.0580	0.003	0.0045	9.5	--	--	--	0.0130	0.0090	0.0580	0.001	101.6600	0.0005	0.005	0.001	0.001	0.037	2.48	6.050	0.1157	10.740	0.001	0.0025	0.280	0.1900	0.005	0.003	0.0070	--	--
EL100253-042	08/24/10	VP-NV-1b-1	0.7920	0.0125	0.003	0.0045	19.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100253-043	08/24/10	VP-NV-1b-2	0.8040	0.3770	0.003	0.0045	17.8	6.79	381.4	787.90	0.0120	0.0025	0.0960	0.001	123.3400	0.0005	0.005	0.001	0.001	0.336	4.92	7.600	0.6708	18.100	0.001	0.0025	1.050	0.2950	0.005	0.003	0.0050	--	--
EL100253-044	08/24/10	VP-NV-1b-3	1.0750	0.7060	0.003	0.0045	15.4	6.78	360.4	764.70	0.0090	0.0060	0.0750	0.001	107.7000	0.0005	0.005	0.001	0.001	0.166	5.08	6.830	0.4848	16.650	0.001	0.0025	0.980	0.2450	0.005	0.003	0.0050	--	--
EL100253-045	08/24/10	VP-NV-1b-4	0.7150	0.5980	0.003	0.0045	14.5	6.81	360.2	755.80	0.0130	0.0025	0.0700	0.001	106.9400	0.0005	0.005	0.001	0.001	0.095	4.56	6.720	0.3108	15.440	0.001	0.0025	0.850	0.2300	0.005	0.003	0.0070	--	--
EL100253-046	08/24/10	VP-NV-1b-5	0.7140	0.4690	0.003	0.0045	13.4	6.85	350.9	728.40	0.0120	0.0080	0.0680	0.001	108.2000	0.0005	0.005	0.001	0.001	0.063	4.24	6.670	0.2218	14.680	0.001	0.0025	0.620	0.2250	0.005	0.003	0.0050	--	--
EL100253-047	08/24/10	VP-NV-1b-6	0.4980	0.3110	0.003	0.0045	11.4	--	--	--	0.0130	0.0050	0.0610	0.001	99.6000	0.0005	0.005	0.001	0.001	0.045	3.52	6.180	0.1341	12.640	0.001	0.0025	0.460	0.2010	0.005	0.003	0.0110	--	--
EL100253-048	08/24/10	VP-NV-1c-1	0.0950	0.0125	0.003	0.0045	20.7	6.83	230.3	525.60	0.0120	0.0025	0.0590	0.001	78.6600	0.0005	0.005	0.001	0.001	0.149	2.80	5.600	0.3186	18.370	0.001	0.0025	1.100	0.2070	0.005	0.003	0.0090	--	--
EL100253-049	08/24/10	VP-NV-1c-2	0.7090	0.3480	0.003	0.0045	17.8	6.71	370.1	780.70	0.0130	0.0025	0.0790	0.001	109.0800	0.0005	0.005	0.001	0.001	0.215	6.60	7.680	0.6300	17.440	0.001	0.0025	1.010	0.2690	0.005	0.003	0.0050	--	--
EL100253-050	08/24/10	VP-NV-1c-3	1.6590	1.0880	0.003	0.0045	15.6	6.76	362.6	780.00	0.0120	0.0025	0.0750	0.001	109.6600	0.0005	0.005	0.001	0.001	0.089	6.62	7.210	0.5076	17.210	0.001	0.0025	1.030	0.2540	0.005	0.003	0.0050	--	--
EL100253-051	08/24/10	VP-NV-1c-4	1.7560	1.3060	0.003	0.0045	14.6	6.81	388.9	805.60	0.0140	0.0025	0.0740	0.001	110.9400	0.0005	0.005	0.001	0.001	0.057	5.54	7.090	0.3692	15.110	0.001	0.0025	0.880	0.2450	0.005	0.003	0.0060	--	--
EL100253-052	08/24/10	VP-NV-1c-5	1.4220	1.0320	0.003	0.0045	13.0	6.83	388.3	800.90	0.0100	0.0025	0.0700	0.001	108.4000	0.0005	0.005	0.001	0.001	0.047	4.56	6.850	0.2260	13.270	0.001	0.0025	0.690	0.2250	0.005	0.003	0.0050	--	--
EL100253-053	08/24/10	VP-NV-2a-1	0.1240	0.0125	0.003	0.0045	19.1	6.90	199.0	462.90	0.0120	0.0025	0.0480	0.001	67.7200	0.0005	0.005	0.001	0.001	0.108	1.82	5.410	0.2252	17.250	0.001	0.0025	1.230	0.1790	0.005	0.003	0.0090	--	--
EL100253-054	08/24/10	VP-NV-2a-2	0.9360	0.5970	0.003	0.0045	16.7	6.76	375.6	783.10	0.0110	0.0050	0.0750	0.001	107.4400	0.0005	0.005	0.001	0.001	0.290	6.62	7.400	0.6636	16.140	0.001	0.0025	0.900	0.2630	0.005	0.003	0.0040	--	--
EL100253-055	08/24/10	VP-NV-2a-3	1.1980	0.7580	0.003	0.0045	13.4	6.73	352.8	742.40	0.0090	0.0060	0.0720	0.001	104.6800	0.0005	0.005	0.001	0.001	0.177	7.10	6.700	0.5048	15.020	0.001	0.0025	0.730	0.2410	0.005	0.003	0.0040	--	--
EL100253-056	08/24/10	VP-NV-2a-4	0.9270	0.5530	0.003	0.0045	12.5	6.73	344.8	670.50	0.0140	0.0080	0.0690	0.001	103.2400	0.0005	0.005	0.001	0.001	0.106	6.22	6.300	0.3508	13.310	0.001	0.0025	0.630	0.2220	0.005	0.003	0.0060	--	--
EL100253-057	08/24/10	VP-NV-2a-5	0.6010	0.2490	0.003	0.0045	12.4	6.82	360.8	724.40	0.0170	0.0080	0.0710	0.001	111.3200	0.0005	0.005	0.001	0.001	0.096	5.32	6.860	0.2732	12.900	0.001	0.0025	0.600	0.2370	0.005	0.003	0.0060	--	--
EL100253-058	08/24/10	VP-NV-2a-6	0.3940	0.1020	0.003	0.0045	10.5	6.79	340.4	683.40	0.0140	0.0025	0.0670	0.001	106.4400	0.0005	0.005	0.001	0.001	0.128	4.30	6.770	0.2660	11.810	0.001	0.0025	0.460	0.2280	0.005	0.003	0.0060	--	--
EL100253-059	08/24/10	VP-NV-2a-7	0.2500	0.0125	0.003	0.0045	10.5	6.89	354.1	699.90	0.0180	0.0090	0.0680	0.001	115.7800	0.0005	0.005	0.001	0.001	0.062	3.46	6.670	0.1136	11.000	0.001	0.0025	0.300	0.2250	0.005	0.003	0.0080	--	--
EL100253-060	08/24/10	VP-NV-2a-8	0.1350	0.0125	0.003	0.0045	9.7	6.98	363.2	707.20	0.0160	0.0025	0.0680	0.001	119.7200	0.0005	0.005	0.001	0.001	0.116	2.94	6.560	0.0990	10.340	0.001	0.0025	0.210	0.2230	0.005	0.003	0.0020	--	--
EL100253-061	08/24/10	VP-NV-2b-1	0.0330	0.0125	0.003	0.0045	19.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100253-062	08/24/10	VP-NV-2b-2	0.0350	0.0125	0.003	0.0045	15.6	6.85	250.8	550.90	0.0140	0.0025	0.0600	0.001	88.5800	0.0005	0.005	0.001	0.001	0.193	4.26	6.260	0.4390	17.710	0.001	0.0025	0.840	0.2260	0.005	0.003	0.0070	--	--
EL100253-063	08/24/10	VP-NV-2b-3	0.2830	0.0370	0.003	0.0045	13.3	6.76	310.8	653.80	0.0110	0.0070	0.0670	0.001	100.8200	0.0005	0.005	0.001	0.001	0.185	5.84	6.820	0.4994	16.820	0.001	0.0025	0.770	0.2420	0.005	0.003	0.0060	--	--
EL100253-064	08/24/10	VP-NV-2b-4	0.1880	0.0125	0.003	0.0045	13.4	6.73	315.7	657.40	0.0100	0.0025	0.0680	0.001	107.7800	0.0005	0.005	0.001	0.001	0.092	4.62	5.730	0.4106	15.740	0.001	0.0025	0.650	0.2260	0.005	0.003	0.0070	--	--
EL100253-065	08/24/10	VP-NV-2b-5	0.0390	0.0125	0.003	0.0045	14.5	6.79	380.4	768.30	0.0120	0.0060	0.0730	0.001	134.8000	0.0005	0.005	0.001	0.001	0.069	2.12	6.880	0.3482	15.210	0.001	0.0025	0.630	0.2670	0.005	0.003	0.0070	--	--
EL100253-066	08/24/10	VP-NV-2b-6	0.0490	0.0125	0.003	0.0045	13.3	--	--	--	0.0200	0.0070	0.0680	0.001	129.8000	0.0005	0.005	0.001	0.001	0.099	1.87	6.520	0.3188	14.000	0.001	0.0025	0.480	0.2510	0.005	0.003	0.0020	--	--
EL100253-067	08/24/10	VP-NV-2c-1	0.0620	0.0125	0.003	0.0045	19.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100253-068	08/24/10	VP-NV-2c-2	0.0570	0.0125	0.003	0.0045	16.7	6.87	265.6	575.50	0.0110	0.0025	0.0680	0.001	94.4600	0.0005	0.005	0.001	0.001	0.238	3.26	5.980	0.4384	17.820	0.001	0.0025	0.770	0.2400	0.005	0.003	0.0070	--	--
EL100253-069	08/24/10	VP-NV-2c-3	0.2470	0.0125	0.003	0.0045	14.1	6.77	321.3	677.20	0.0090	0.0060	0.0690	0.001	103.9200	0.0005	0.005	0.001	0.001	0.239	4.52	7.060	0.5340	16.710	0.001	0.0025	0.820	0.2530	0.005	0.003	0.0060	--	--
EL100253-070	08/24/10	VP-NV-2c-4	0.5220	0.1820	0.003	0.0045	13.7	6.73	324.3	680.40	0.0080	0.0060	0.0680	0.001	108.6800	0.0005	0.005	0.001	0.001	0.111	3.62	6.390	0.4574	15.630	0.001	0.0025	0.720	0.2340	0.005	0.003	0.0060	--	--
EL100253-071	08/24/10	VP-NV-2c-5	0.4210	0.1410	0.003	0.0045	14.0	6.74	358.5	737.60	0.0130	0.0050	0.0730	0.001	127.9200	0.0005	0.005	0.001	0.001	0.077	2.34	7.220	--	--	--	--	--	--	--	--	--	--	--
EL100253-072	08/24/10	VP-NV-2c-6	0.2120	0.0125	0.003	0.0045	13.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100303-004	09/25/10	VP-AV-1a-1	0.0500	0.0125	0.003	0.0520	--	--	--	--	0.0090	0.0025	0.0430	--	67.3870	--	--	--	--	0.032	1.71	5.910	0.0147	20.180	--	--	2.110	0.1760	--	--	0.0060	--	--
EL100303-005	09/25/10	VP-AV-1a-2	0.1640	0.0125	0.003	0.0090	--	6.735	228.8	535.40	0.0480	0.0025	0.0570	--	78.8870	--	--	--	--	0.161	2.12	6.190	0.1562	20.560	--	--	1.340	0.2040	--	--	0.0070	--	--
EL100303-006	09/25/10	VP-AV-1a-3	0.7890	0.4110	0.003	0.0045	--	6.597	246.8	582.80	0.0220	0.0025	0.0660	--	82.9270	--	--	--	--	0.114	3.24	6.310	0.2810	20.240	--	--	1.010	0.2060	--	--	0.0060	--	--
EL100303-007	09/25/10	VP-AV-1a-4	0.8280	0.5370	0.003	0.0310	--	6.390	215.3	551.50	0.0300	0.0025	0.0580	--	78.0070	--	--	--	--	0.110	4.42	6.480	0.2998	24.080	--	--	0.800	0.1900	--	--	0.0060	--	--
EL100303-008	09/25/10	VP-AV-1a-5	0.5950	0.4500	0.003	0.0045	--	6.583	243.7	590.70	0.0250	0.0025	0.0600	--	88.7270	--	--	--	--	0.055	2.92	7.110	0.1941	25.580	--	--	0.820	0.2050	--	--	0.0050	--	--
EL100303-009	09/25/10	VP-AV-1a-6	0.0990	0.1130	0.003	0.0210	--	--	--	--	0.0150	0.0025	0.0500	--	89.0070	--	--	--	--	0.030	1.08	6.590	0.0519	14.940	--	--	0.600	0.1880	--	--	0.0020	--	--
EL100303-010	09/25/10	VP-AV-1a-7	0.0530	0.0640	0.003	0.0045	--	6.720	269.0	589.90	0.0340	0.0025	0.0510	--	99.5270	--	--	--	--	0.047	0.62	6.550	0.0456	12.650	--	--	0.560	0.2000	--	--	0.0050	--	--
EL100303-011	09/25/10	VP-AV-1b-1	0.7140	0.7610	0.003	0.0350	--	--	--	--	0.0090	0.0025	0.0490	--	87.2470	--	--	--	--	0.083	1.43	6.670	0.0700	19.250	--	--	1.470	0.2230	--	--	0.0020	--	--
EL100303-012	09/25/10	VP-AV-1b-2	0.9380	0.6970	0.003	0.0045	--	6.829	293.4	632.10	0.0100	0.0025	0.0570	--	103.0070	--	--	--	--	0.091	0.99	7.330	0.1560	18.500	--	--	1.320	0.2470	--	--	0.0020	--	--
EL100303-013	09/25/10	VP-AV-1b-3	0.2590	0.2040	0.003	0.0045	--	6.771	289.2	630.20	0.0240	0.0025	0.0540	--	103.3070	--	--	--	--	0.068	0.41	7.550	0.1067	18.450	--	--	1.190	0.2350	--	--	0.0030	--	--
EL100303-014	09/25/10	VP-AV-1b-4	0.1010	0.0880	0.003	0.0045	--	6.747	250.0	557.60	0.0130	0.0025	0.0470	--	89.3270	--	--	--	--	0.042	0.31	6.050	0.0678	14.920	--	--	0.820	0.1870	--	--	0.0010	--	--
EL100303-015	09/25/10	VP-AV-1b-5	0.0450	0.0125	0.003	0.0045	--	6.747	250.9	554.00	0.0120	0.0025	0.0480	--	93.0470	--	--	--	--	0.041	0.18	6.550	0.0840	13.410	--	--	0.670	0.1970	--	--	0.0030	--	--
EL100303-016	09/25/10	VP-AV-1c-2	0.0800	0.0125	0.003	0.0045	--	6.917	164.2	430.90	0.0300	0.0025	0.0350	--	61.5070	--	--	--	--	0.107	1.28	5.770	0.0717	20.400	--	--	1.810	0.1600	--	--	0.0060	--	--
EL100303-017	09/25/10	VP-AV-1c-3	0.0890	0.0290	0.003	0.0045	--	6.689	171.3	438.60	0.0450	0.0025	0.0370	--	63.4870	--	--	--	--	0.091	0.57	5.950	0.0595	18.290	--	--	1.520	0.1630	--	--	0.0050	--	--
EL100303-018	09/25/10	VP-AV-1c-4	0.0930	0.0125	0.003	0.0045	--	--	--	--	0.0470	0.0025	0.0430	--	71.7470	--	--	--	--	0.064	0.42	6.840	0.0339	20.800	--	--	1.370	0.1810	--	--	0.0050	--	--
EL100303-019	09/25/10	VP-AV-1c-5	0.3450	0.1740	0.003	0.0045	--	6.449	155.5	423.40	0.0750	0.0025	0.0410	--	58.8870	--	--	--	--	0.099	5.74	5.150	0.0743	14.260	--	--	0.780	0.1440	--	--	0.0090	--	--
EL100303-020	09/25/10	VP-AV-1d-2	0.1860	0.1500	0.003	0.2400	--	6.687	257.0	583.60	0.0240	0.0025	0.0490	--	90.5070	--	--	--	--	0.100	0.12	8.040	0.0934	20.540	--	--	1.590	0.2360	--	--	0.0030	--	--
EL100303-021	09/25/10	VP-AV-1d-3	0.2150	0.1220	0.003	0.0045	--	6.675	272.1	608.60	0.0580	0.0025	0.0500	--	92.3270	--	--	--	--	0.122	0.29	8.060	0.1581	19.550	--	--	1.500	0.2360	--	--	0.0060	--	--
EL100303-022	09/25/10	VP-AV-1d-4	1.1090	0.4390	0.003	0.0045	--	6.490	246.4	610.30	0.0290	0.0025	0.0610	--	93.1070	--	--	--	--	0.173	3.66	7.690	0.3086	21.440	--	--	0.970	0.2330	--	--	0.0050	--	--
EL100303-023	09/25/10	VP-AV-1d-5	0.5970	0.3970	0.003	0.0045	--	6.670	282.8	651.80	0.0240	0.0025	0.0600	--	103.2270	--	--	--	--	0.136	1.75	8.290	0.2662	21.080	--	--	1.090	0.2440	--	--	0.0040	--	--
EL100303-024	09/25/10	VP-AV-1d-6	0.3220	0.1620	0.003	0.0045	--	6.715	298.3	670.60	0.0260	0.0025	0.0590	--	109.5470	--	--	--	--	0.076	1.00	8.410	0.1487	19.930	--	--	1.020	0.2420	--	--	0.0050	--	--
EL100303-025	09/25/10	VP-AV-1e-0	0.1130	0.0280	0.003	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100303-026	09/25/10	VP-AV-1e-1	0.1200	0.0430	0.003	0.0100	--	7.046	206.3	484.50	0.0100	0.0025	0.0470	--	74.7270	--	--	--	--	0.082	1.32	5.690	0.0942	16.990	--	--	1.130	0.1930	--	--	0.0060	--	--
EL100303-027	09/25/10	VP-AV-1e-2	0.6020	0.1710	0.003	0.0045	--	6.834	228.1	516.20	0.0070	0.0025	0.0520	--	81.9670	--	--	--	--	0.082	1.14	6.470	0.2208	16.700	--	--	0.770	0.2010	--	--	0.0070	--	--
EL100303-028	09/25/10	VP-AV-1e-3	0.5220	0.3500	0.003	0.0045	--	6.800	218.2	503.80	0.0120	0.0025	0.0480	--	77.5670	--	--	--	--	0.055	0.64	5.870	0.1250	17.440	--	--	0.740	0.1830	--	--	0.0070	--	--
EL100303-029	09/25/10	VP-AV-1e-4	0.2660	0.2080	0.003	0.0045	--	6.834	262.4	579.30	0.0210	0.0025	0.0520	--	95.8870	--	--	--	--	0.046	0.42	6.750	0.1265	16.390	--	--	0.720	0.2130	--	--	0.0070	--	--
EL100303-030	09/25/10	VP-AV-1e-5	0.0590	0.0640	0.003	0.0045	--	--	--	--	0.0160	0.0025	0.0560	--	110.3870	--	--	--	--	0.052	0.23	7.110	0.0869	12.910	--	--	0.600	0.2330	--	--	0.0090	--	--

Table B.1.7 - Victoria Point, Water Sample Analytical Results, July to October

Lab ID	Sample Date	Sample ID	Total P	Phosphate PO_4-P	Nitrite NO_2-N	Nitrate NO_3-N	DOC	pH	Total Alkalinity as $CaCO_3$	Conductivity	Total Metals: Al	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	S	Sr	Ti	V	Zn	Reactive Silicates SiO_2	Chlorophyll "a"
		Parameter / Method Detection Limit / Units	*0.0050*	*0.0250*	*0.006*	*0.0090*	*0.50*	*n/a*	*1.0*	*0.50*	*0.0050*	*0.0050*	*0.0030*	*0.002*	*0.0050*	*0.0010*	*0.010*	*0.002*	*0.002*	*0.002*	*0.10*	*0.010*	*0.0002*	*0.010*	*0.002*	*0.0050*	*0.050*	*0.0050*	*0.010*	*0.006*	*0.0010*	*0.250*	*0.2*
			mg/L	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*n/a*	*mg/L*	*uS/cm*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*μg/L*
EL100303-031	09/25/10	VP-V-1a-1	0.2840	0.0125	0.003	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100303-032	09/25/10	VP-V-1a-2	0.3370	0.1410	0.003	0.0045	--	7.025	213.1	501.50	0.0050	0.0025	0.0530	--	76.1270	--	--	--	--	0.074	2.78	5.740	0.1478	20.580	--	--	1.370	0.2000	--	--	0.0060	--	--
EL100303-033	09/25/10	VP-V-1a-3	0.8760	0.3600	0.003	0.0045	--	6.726	251.5	565.90	0.0060	0.0025	0.0650	--	84.7470	--	--	--	--	0.140	4.30	6.240	0.5152	18.090	--	--	0.820	0.2090	--	--	0.0060	--	--
EL100303-034	09/25/10	VP-V-1a-4	0.8140	0.5380	0.003	0.0045	--	6.703	272.7	601.40	0.0070	0.0025	0.0650	--	92.7670	--	--	--	--	0.135	4.68	6.240	0.4444	18.510	--	--	0.760	0.2200	--	--	0.0060	--	--
EL100303-035	09/25/10	VP-V-1a-5	0.5550	0.2630	0.003	0.0045	--	6.772	288.0	624.20	0.0070	0.0025	0.0680	--	100.0470	--	--	--	--	0.101	4.66	6.140	0.3694	16.480	--	--	0.650	0.2280	--	--	0.0070	--	--
EL100303-036	09/25/10	VP-V-1a-6	0.2790	0.1410	0.003	0.0180	--	--	--	--	0.0080	0.0025	0.0630	--	101.9870	--	--	--	--	0.052	3.36	5.880	0.0997	14.630	--	--	0.670	0.2250	--	--	0.0080	--	--
EL100303-037	09/25/10	VP-V-1a-7	0.3960	0.1000	0.003	0.0100	--	6.763	308.8	650.40	0.0070	0.0025	0.0680	--	107.4870	--	--	--	--	0.109	3.20	6.080	0.2264	15.020	--	--	0.550	0.2340	--	--	0.0070	--	--
EL100303-038	09/25/10	VP-V-1a-8	0.1030	0.0125	0.003	0.0045	--	--	--	--	0.0080	0.0025	0.0600	--	112.8670	--	--	--	--	0.070	1.56	6.040	0.1154	13.040	--	--	0.370	0.2310	--	--	0.0020	--	--
EL100303-039	09/25/10	VP-V-1b-1	0.4740	0.0125	0.003	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100303-040	09/25/10	VP-V-1b-2	0.5870	0.0750	0.003	0.0045	--	6.977	204.9	486.80	0.0090	0.0025	0.0480	--	70.8870	--	--	--	--	0.113	2.40	5.440	0.1886	19.180	--	--	1.000	0.1890	--	--	0.0070	--	--
EL100303-041	09/25/10	VP-V-1b-3	1.0010	0.3400	0.003	0.0045	--	6.802	229.8	522.30	0.0050	0.0025	0.0500	--	76.6870	--	--	--	--	0.116	2.54	5.690	0.2770	16.620	--	--	0.750	0.1840	--	--	0.0060	--	--
EL100303-042	09/25/10	VP-V-1b-4	0.4930	0.1620	0.003	0.0045	--	6.737	258.1	563.10	0.0160	0.0025	0.0550	--	91.3270	--	--	--	--	0.084	1.82	5.120	0.1578	16.900	--	--	0.720	0.1850	--	--	0.0070	--	--
EL100303-043	09/25/10	VP-V-1b-5	0.3960	0.1880	0.003	0.0045	--	6.758	267.6	579.80	0.0150	0.0025	0.0580	--	95.8870	--	--	--	--	0.067	2.04	5.260	0.0929	15.540	--	--	0.720	0.1960	--	--	0.0060	--	--
EL100303-044	09/25/10	VP-V-1b-6	0.2270	0.0860	0.003	0.0045	--	--	--	--	0.0060	0.0025	0.0600	--	102.2670	--	--	--	--	0.038	2.08	5.260	0.0278	15.000	--	--	2.660	0.1980	--	--	0.0030	--	--
EL100303-045	09/25/10	VP-V-1c-1	0.0800	0.0630	0.003	0.0180	--	--	--	--	0.0050	0.0025	0.0430	--	64.3070	--	--	--	--	0.033	2.08	5.300	0.0177	20.400	--	--	1.960	0.1740	--	--	0.0060	--	--
EL100303-048	09/25/10	VP-V-1c-2	0.3250	0.1590	0.003	0.0045	--	6.909	230.2	524.80	0.0060	0.0025	0.0560	--	81.3670	--	--	--	--	0.128	2.74	6.390	0.2948	19.260	--	--	1.030	0.2190	--	--	0.0070	--	--
EL100303-049	09/25/10	VP-V-1c-3	0.3130	0.1490	0.003	0.0045	--	6.753	272.0	595.00	0.0025	0.0025	0.0610	--	93.4670	--	--	--	--	0.136	2.76	6.760	0.3958	17.260	--	--	0.830	0.2310	--	--	0.0080	--	--
EL100303-050	09/25/10	VP-V-1c-4	0.1120	0.0690	0.003	0.0045	--	6.657	261.9	575.80	0.0080	0.0025	0.0580	--	93.8270	--	--	--	--	0.048	2.28	5.870	0.2646	16.530	--	--	0.660	0.2130	--	--	0.0070	--	--
EL100303-051	09/25/10	VP-V-1c-5	0.0700	0.0430	0.003	0.0045	--	6.780	308.2	650.80	0.0070	0.0025	0.0650	--	113.3670	--	--	--	--	0.040	1.72	6.540	0.1445	15.670	--	--	0.770	0.2440	--	--	0.0060	--	--
EL100303-052	09/25/10	VP-V-1c-6	0.0630	0.0125	0.003	0.0110	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100303-053	09/25/10	VP-V-2a-1	0.0290	0.0125	0.003	0.0045	--	--	--	--	0.0060	0.0025	0.0530	--	77.8870	--	--	--	--	0.104	2.72	6.530	0.1099	20.680	--	--	1.350	0.2160	--	--	0.0070	--	--
EL100303-054	09/25/10	VP-V-2a-2	0.5340	0.0900	0.003	0.0045	--	6.863	280.5	628.20	0.0060	0.0025	0.0640	--	89.4670	--	--	--	--	0.155	3.02	7.420	0.2786	19.090	--	--	1.360	0.2410	--	--	0.0060	--	--
EL100303-055	09/25/10	VP-V-2a-3	0.5250	0.1830	0.003	0.0045	--	6.853	317.6	696.10	0.0080	0.0025	0.0690	--	101.3470	--	--	--	--	0.124	3.16	8.140	0.2226	18.870	--	--	1.360	0.2650	--	--	0.0060	--	--
EL100303-056	09/25/10	VP-V-2a-4	0.4100	0.0970	0.003	0.0045	--	6.818	269.3	599.30	0.0025	0.0025	0.0560	--	85.2670	--	--	--	--	0.059	2.82	6.770	0.1626	16.120	--	--	0.990	0.2130	--	--	0.0050	--	--
EL100303-057	09/25/10	VP-V-2a-5	0.3700	0.1010	0.003	0.0045	--	6.917	278.6	606.00	0.0025	0.0025	0.0560	--	85.1070	--	--	--	--	0.044	2.42	6.640	0.0992	14.520	--	--	0.910	0.2070	--	--	0.0050	--	--
EL100303-058	09/25/10	VP-V-2a-6	0.3330	0.1240	0.003	0.0045	--	6.946	283.5	604.70	0.0070	0.0025	0.0580	--	92.1070	--	--	--	--	0.043	2.18	6.700	0.0912	13.290	--	--	0.680	0.2080	--	--	0.0060	--	--
EL100303-059	09/25/10	VP-V-2a-7	0.2230	0.0700	0.003	0.0045	--	6.944	298.0	611.70	0.0070	0.0025	0.0560	--	97.8870	--	--	--	--	0.033	1.93	6.230	0.0470	11.390	--	--	0.390	0.1980	--	--	0.0060	--	--
EL100303-060	09/25/10	VP-V-2a-8	0.2130	0.0630	0.003	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100303-061	09/25/10	VP-V-2b-1	0.1820	0.0125	0.003	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100303-062	09/25/10	VP-V-2b-2	0.1850	0.0125	0.003	0.0045	--	7.010	215.2	513.70	0.0060	0.0025	0.0590	--	73.8270	--	--	--	--	0.055	2.96	5.710	0.0137	21.180	--	--	1.280	0.2010	--	--	0.0050	--	--
EL100303-063	09/25/10	VP-V-2b-3	0.8830	0.4660	0.003	0.0045	--	6.812	275.2	611.20	0.0060	0.0025	0.0640	--	86.6670	--	--	--	--	0.126	3.38	6.680	0.2652	17.290	--	--	0.930	0.2290	--	--	0.0070	--	--
EL100303-064	09/25/10	VP-V-2b-4	0.9710	0.2010	0.003	0.0045	--	6.778	294.8	637.90	0.0060	0.0025	0.0670	--	95.6070	--	--	--	--	0.062	2.98	6.670	0.1701	16.510	--	--	0.950	0.2260	--	--	0.0060	--	--
EL100303-065	09/25/10	VP-V-2b-5	0.7060	0.1270	0.003	0.0045	--	6.801	316.8	670.80	0.0090	0.0025	0.0680	--	106.5470	--	--	--	--	0.046	2.78	6.900	0.1360	15.990	--	--	0.860	0.2380	--	--	0.0050	--	--
EL100303-066	09/25/10	VP-V-2b-6	0.1960	0.1250	0.003	0.0045	--	--	--	--	0.0110	0.0025	0.0670	--	122.6470	--	--	--	--	0.031	1.88	7.210	0.0820	14.260	--	--	0.680	0.2500	--	--	0.0030	--	--
EL100303-067	09/25/10	VP-V-2c-1	0.0740	0.0125	0.003	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100303-068	09/25/10	VP-V-2c-2	0.0780	0.0320	0.003	0.0045	--	7.125	173.8	441.20	0.0025	0.0025	0.0400	--	61.3070	--	--	--	--	0.060	2.56	5.500	0.0726	20.040	--	--	1.640	0.1710	--	--	0.0070	--	--
EL100303-069	09/25/10	VP-V-2c-3	0.4590	0.0560	0.003	0.0045	--	6.779	228.3	537.40	0.0025	0.0025	0.0520	--	74.5270	--	--	--	--	0.089	3.70	6.090	0.1849	18.870	--	--	1.230	0.1980	--	--	0.0050	--	--
EL100303-070	09/25/10	VP-V-2c-4	0.8290	0.2040	0.003	0.0045	--	6.680	262.3	597.20	0.0025	0.0025	0.0600	--	82.8470	--	--	--	--	0.130	5.06	6.770	0.3108	18.550	--	--	1.230	0.2180	--	--	0.0060	--	--
EL100303-071	09/25/10	VP-V-2c-5	0.4940	0.1970	0.003	0.0045	--	6.686	280.7	619.90	0.0025	0.0025	0.0640	--	91.5270	--	--	--	--	0.120	4.40	7.060	0.2798	17.460	--	--	1.090	0.2350	--	--	0.0060	--	--
EL100303-072	09/25/10	VP-V-2c-6	0.3340	0.1640	0.003	0.0045	--	--	--	--	0.0025	0.0025	0.0590	--	90.0670	--	--	--	--	0.058	4.42	6.710	0.2218	16.110	--	--	0.900	0.2170	--	--	0.0020	--	--
EL100303-073	09/25/10	VP-V-3a-1	0.5560	0.0770	0.003	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100303-074	09/25/10	VP-V-3a-2	0.6640	0.1780	0.003	0.0045	--	6.935	234.2	543.40	0.0050	0.0025	0.0570	--	77.4470	--	--	--	--	0.105	3.28	5.880	0.2728	20.900	--	--	1.070	0.2100	--	--	0.0060	--	--
EL100303-075	09/25/10	VP-V-3a-3	0.8670	0.1980	0.003	0.0045	--	6.807	247.3	555.50	0.0060	0.0025	0.0600	--	82.3670	--	--	--	--	0.126	3.94	6.050	0.3586	17.120	--	--	0.870	0.2080	--	--	0.0060	--	--
EL100303-076	09/25/10	VP-V-3a-4	0.7180	0.3080	0.003	0.0045	--	6.768	261.6	580.90	0.0060	0.0025	0.0600	--	85.9670	--	--	--	--	0.121	4.34	6.210	0.3346	16.650	--	--	0.770	0.2140	--	--	0.0060	--	--
EL100303-077	09/25/10	VP-V-3a-5	0.4460	0.1260	0.003	0.0045	--	6.734	273.5	598.20	0.0060	0.0025	0.0640	--	93.1470	--	--	--	--	0.097	5.28	6.000	0.3050	16.120	--	--	0.660	0.2180	--	--	0.0060	--	--
EL100303-078	09/25/10	VP-V-3a-6	0.5180	0.1510	0.003	0.0045	--	6.697	307.7	656.30	0.0070	0.0025	0.0700	--	105.2470	--	--	--	--	0.093	7.20	6.260	0.3264	16.560	--	--	0.550	0.2300	--	--	0.0060	--	--
EL100303-079	09/25/10	VP-V-3a-7	0.3400	0.1100	0.003	0.0045	--	6.738	331.9	696.10	0.0170	0.0025	0.0710	--	115.2070	--	--	--	--	0.098	5.36	6.670	0.2048	16.520	--	--	0.490	0.2420	--	--	0.0060	--	--
EL100303-080	09/25/10	VP-V-3a-8	0.0540	0.0450	0.003	0.0045	--	--	--	--	0.0130	0.0025	0.0670	--	126.9070	--	--	--	--	0.085	1.59	6.680	0.1199	13.150	--	--	0.340	0.2490	--	--	0.0030	--	--
EL100303-081	09/25/10	VP-V-3b-1	0.6100	0.0390	0.003	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100303-082	09/25/10	VP-V-3b-2	0.6450	0.0125	0.003	0.0045	--	6.930	266.5	599.10	0.0025	0.0025	0.0630	--	87.4470	--	--	--	--	0.172	3.36	6.900	0.3886	18.210	--	--	1.070	0.2430	--	--	0.0050	--	--
EL100303-083	09/25/10	VP-V-3b-3	0.8620	0.2250	0.003	0.0045	--	6.789	283.1	621.50	0.0070	0.0025	0.0640	--	90.8270	--	--	--	--	0.131	3.40	6.650	0.3470	14.600	--	--	0.870	0.2340	--	--	0.0060	--	--
EL100303-084	09/25/10	VP-V-3b-4	1.1720	0.2430	0.003	0.0045	--	6.933	309.4	661.90	0.0025	0.0025	0.0690	--	98.6070	--	--	--	--	0.112	3.22	6.840	0.3382	13.900	--	--	0.860	0.2420	--	--	0.0050	--	--
EL100303-085	09/25/10	VP-V-3b-5	1.4270	0.2290	0.003	0.0045	--	--	--	--	0.0060	0.0025	0.0670	--	95.6470	--	--	--	--	0.083	4.28	6.440	0.2300	13.640	--	--	0.880	0.2270	--	--	0.0060	--	--
EL100303-086	09/25/10	VP-V-3b-6	1.3190	0.2040	0.003	0.0045	--	--	--	--	0.0060	0.0025	0.0660	--	97.6470	--	--	--	--	0.049	4.00	6.340	0.0953	12.120	--	--	0.770	0.2170	--	--	0.0020	--	--
EL100303-087	09/25/10	VP-V-3c-1	0.5740	0.1400	0.003	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100303-090	09/25/10	VP-V-3c-2	0.6830	0.2380	0.003	0.0045	--	6.889	290.3	637.70	0.0080	0.0060	0.0690	--	91.5870	--	--	--	--	0.139	3.98	6.980	0.2426	17.330	--	--	1.130	0.2440	--	--	0.0090	--	--
EL100303-091	09/25/10	VP-V-3c-3	0.7990	0.2200	0.003	0.0045	--	6.961	326.8	712.40	0.0070	0.0090	0.0730	--	101.2070	--	--	--	--	0.161	4.10	7.430	0.2950	16.860	--	--	1.290	0.2650	--	--	0.0060	--	--
EL100303-092	09/25/10	VP-V-3c-4	1.2230	0.6290	0.003	0.0045	--	6.826	334.3	721.70	0.0050	0.0070	0.0710	--	99.5070	--	--	--	--	0.138	4.18	7.090	0.3380	14.050	--	--	1.020	0.2410	--	--	0.0060	--	--
EL100303-093	09/25/10	VP-V-3c-5	1.0570	0.6340	0.003	0.0045	--	6.855	323.2	695.00	0.0130	0.0025	0.0640	--	98.0870	--	--	--	--	0.068	3.88	6.840	0.1304	12.990	--	--	0.890	0.2240	--	--	0.0060	--	--
EL100303-094	09/25/10	VP-V-3c-6	0.8160	0.2830	0.003	0.0045	--	--	--	--	0.0060	0.0025	0.0600	--	95.4070	--	--	--	--	0.063	3.62	6.530	0.0824	11.640	--	--	0.720	0.2150	--	--	0.0030	--	--
EL100303-095	09/25/10	VP-NV-1a-1	0.0490	0.0125	0.003	0.0045	--	7.207	173.2	442.40	0.0060	0.0025	0.0450	--	62.6270	--	--	--	--	0.022	2.16	5.420	0.0209	18.900	--	--	2.120	0.1680	--	--	0.0040	--	--
EL100303-096	09/25/10	VP-NV-1a-2	0.7080	0.4110	0.003	0.0140	--	6.924	302.1	662.20	0.0070	0.0070	0.0650	--	95.2070	--	--	--	--	0.102	4.20	7.290	0.1272	16.980	--	--	1.250	0.2310	--	--	0.0070	--	--
EL100303-097	09/25/10	VP-NV-1a-3	0.5130	0.2980	0.003	0.0045	--	6.784	291.7	639.90	0.0180	0.0025	0.0660	--	87.7070	--	--	--	--	0.077	4.48	6.510	0.0834	14.370	--	--	1.120	0.2100	--	--	0.0050	--	--
EL100303-098	09/25/10	VP-NV-1a-4	0.6240	0.4150	0.003	0.0045	--	6.806	305.8	661.60	0.0060	0.0060	0.0670	--	93.5870	--	--	--	--	0.057	4.52	6.820	0.0813	14.070	--	--	1.020	0.2170	--	--	0.0040	--	--
EL100303-099	09/25/10	VP-NV-1a-5	0.4720	0.2810	0.003	0.0045	--	6.807	277.5	608.20	0.0070	0.0060	0.0600	--	85.4270	--	--	--	--	0.048	4.80	6.190	0.0764	13.040	--	--	0.880	0.1940	--	--	0.0050	--	--
EL100303-100	09/25/10	VP-NV-1a-6	0.2380	0.1030	0.003	0.0045	--	6.875	336.4	698.50	0.0170	0.0080	0.0690	--	112.1070	--	--	--	--	0.038	4.02	6.630	0.0447	12.510	--	--	0.650	0.2200	--	--	0.0060	--	--
EL100303-101	09/25/10	VP-NV-1a-7	0.1200	0.0590	0.003	0.0045	--	--	--	--	0.0100	0.0080	0.0690	--	118.8670	--	--	--	--	0.037	3.34	6.460	0.0136	11.150	--	--	0.290	0.2190	--	--	0.0060	--	--
EL100303-102	09/25/10	VP-NV-1b-1	0.2740	0.0125	0.003	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100303-103	09/25/10	VP-NV-1b-2	0.3040	0.0430	0.003	0.0045	--	6.821	288.6	639.30	0.0060	0.0100	0.0650	--	96.5470	--	--	--	--	0.158	4.96	7.740	0.1408	18.030	--	--	1.250	0.2430	--	--	0.0070	--	--
EL100303-104	09/25/10	VP-NV-1b-3	0.5350	0.1940	0.003	0.0045	--	6.802	323.0	711.70	0.0120	0.0025	0.0690	--	105.2470	--	--	--	--	0.087	4.96	7.440	0.1216	16.800	--	--	1.130	0.2400	--	--	0.0060	--	--
EL100303-105	09/25/10	VP-NV-1b-4	0.3540	0.1900	0.003	0.0045	--	--	--	--	0.0025	0.0060	0.0660	--	104.6470	--	--	--	--	0.049	4.26	7.080	0.0871	15.680	--	--	0.820	0.2290	--	--	0.0070	--	--
EL100303-106	09/25/10	VP-NV-1b-5	0.2070	0.0810	0.003	0.0045	--	--	--	--	0.0025	0.0025	0.0590	--	93.0870	--	--	--	--	0.045	3.76	6.350	0.0336	14.330	--	--	0.720	0.2050	--	--	0.0070	--	--
EL100303-107	09/25/10	VP-NV-1b-6	0.1840	0.0400	0.003	0.0045	--	--	--	--	0.0025	0.0025	0.0630	--	106.3070	--	--	--	--	0.033	3.40	6.620	0.0158	13.550	--	--	0.620	0.2170	--	--	0.0020	--	--
EL100303-108	09/25/10	VP-NV-1c-1	0.0590	0.0125	0.003	0.0045	--	--	--	--	0.0080	0.0050	0.0300	--	54.4670	--	--	--	--	0.012	1.97	5.070	0.0148	18.750	--	--	2.730	0.1460	--	--	0.0080	--	--
EL100303-109	09/25/10	VP-NV-1c-2	0.0430	0.0125	0.003	0.0045	--	6.976	240.3	553.00	0.0070	0.0060	0.0640	--	80.0070	--	--	--	--	0.092	2.94	6.100	0.0236	18.450	--	--	1.090	0.2190	--	--	0.0060	--	--

Table B.1.7 - Victoria Point, Water Sample Analytical Results, July to October

Parameter / Method Detection Limit / Units

Lab ID	Sample Date	Sample ID	Total P	Phosphate PO_4-P	Nitrite NO_2-N	Nitrate NO_3-N	DOC	pH	Total Alkalinity as $CaCO_3$	Conductivity	Total Metals Al	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	S	Sr	Ti	V	Zn	Reactive Silicates SiO_2	Chlorophyll "a"
			0.0050	*0.0250*	*0.006*	*0.0090*	*0.50*	*n/a*	*1.0*	*0.50*	*0.0050*	*0.0050*	*0.0030*	*0.002*	*0.0050*	*0.0010*	*0.010*	*0.002*	*0.002*	*0.002*	*0.10*	*0.010*	*0.0002*	*0.010*	*0.002*	*0.0050*	*0.050*	*0.0050*	*0.010*	*0.006*	*0.0010*	*0.250*	*0.2*
			mg/L	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*n/a*	*mg/L*	*uS/cm*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*µg/L*
EL100303-110	09/25/10	VP-NV-1c-3	0.6020	0.3420	0.003	0.0045	--	6.799	310.5	673.50	0.0070	0.0050	0.0750	--	97.6070	--	--	--	--	0.186	5.12	6.940	0.4502	16.000	--	--	0.870	0.2510	--	--	0.0060	--	--
EL100303-111	09/25/10	VP-NV-1c-4	0.8680	0.3720	0.003	0.0045	--	6.768	330.1	721.10	0.0090	0.0090	0.0780	--	102.2470	--	--	--	--	0.163	6.92	6.910	0.5250	15.560	--	--	0.770	0.2500	--	--	0.0060	--	--
EL100303-112	09/25/10	VP-NV-1c-5	0.6950	0.3870	0.003	0.0045	--	6.813	343.0	724.40	0.0070	0.0070	0.0730	--	109.2070	--	--	--	--	0.059	5.82	7.090	0.1952	13.900	--	--	0.680	0.2420	--	--	0.0070	--	--
EL100303-113	09/25/10	VP-NV-1c-6	0.6200	0.3180	0.003	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100303-114	09/25/10	VP-NV-2a-2	0.0300	0.0700	0.003	0.0045	--	6.951	242.6	558.60	0.0080	0.0070	0.0590	--	80.1070	--	--	--	--	0.091	4.12	6.100	0.0386	18.140	--	--	1.210	0.2170	--	--	0.0050	--	--
EL100303-115	09/25/10	VP-NV-2a-3	0.4790	0.1090	0.003	0.0045	--	6.841	323.3	705.60	0.0060	0.0070	0.0690	--	98.7470	--	--	--	--	0.184	6.30	6.980	0.4426	16.090	--	--	1.120	0.2370	--	--	0.0080	--	--
EL100303-116	09/25/10	VP-NV-2a-4	0.7860	0.5790	0.003	0.1980	--	6.772	349.7	745.70	0.0080	0.0090	0.0770	--	108.5270	--	--	--	--	0.079	6.30	6.800	0.3236	15.230	--	--	0.960	0.2410	--	--	0.0070	--	--
EL100303-117	09/25/10	VP-NV-2a-5	0.6210	0.2560	0.003	0.0440	--	6.731	318.6	679.10	0.0080	0.0090	0.0720	--	102.2670	--	--	--	--	0.057	5.48	6.320	0.2418	13.360	--	--	0.710	0.2210	--	--	0.0080	--	--
EL100303-118	09/25/10	VP-NV-2a-6	0.3490	0.1570	0.003	0.0045	--	6.757	332.7	697.60	0.0080	0.0080	0.0750	--	112.4070	--	--	--	--	0.038	4.86	7.150	0.0660	13.330	--	--	0.680	0.2400	--	--	0.0060	--	--
EL100303-119	09/25/10	VP-NV-2a-7	0.2680	0.1020	0.003	0.0045	--	6.782	334.3	692.10	0.0050	0.0070	0.0740	--	113.7270	--	--	--	--	0.028	4.58	7.260	0.0188	12.880	--	--	0.510	0.2410	--	--	0.0100	--	--
EL100303-120	09/25/10	VP-NV-2a-8	0.2440	0.0940	0.003	0.0045	--	6.877	359.4	720.90	0.0060	0.0025	0.0740	--	121.3070	--	--	--	--	0.042	3.64	7.230	0.0528	11.400	--	--	0.280	0.2430	--	--	0.0070	--	--
EL100303-121	09/25/10	VP-NV-2b-1	0.0400	0.0300	0.003	0.0045	--	7.289	175.2	444.00	0.0080	0.0050	0.0480	--	65.7070	--	--	--	--	0.033	2.00	5.490	0.0353	19.740	--	--	1.960	0.1780	--	--	0.0040	--	--
EL100303-122	09/25/10	VP-NV-2b-2	0.3620	0.1340	0.003	0.0045	--	6.852	272.1	603.10	0.0070	0.0025	0.0660	--	91.6870	--	--	--	--	0.173	4.08	6.760	0.2974	16.570	--	--	0.920	0.2330	--	--	0.0060	--	--
EL100303-123	09/25/10	VP-NV-2b-3	0.7740	0.1280	0.003	0.0045	--	6.784	293.3	640.20	0.0060	0.0025	0.0710	--	97.9470	--	--	--	--	0.115	4.88	6.490	0.2300	15.260	--	--	0.760	0.2330	--	--	0.0040	--	--
EL100303-124	09/25/10	VP-NV-2b-4	0.3530	0.1630	0.003	0.0045	--	6.772	297.3	638.30	0.0070	0.0025	0.0690	--	104.9070	--	--	--	--	0.061	3.88	6.270	0.1513	12.910	--	--	0.620	0.2300	--	--	0.0040	--	--
EL100303-125	09/25/10	VP-NV-2b-5	0.1000	0.0540	0.003	0.0045	--	6.950	355.7	747.20	0.0080	0.0060	0.0790	--	125.9870	--	--	--	--	0.042	7.94	6.840	0.0900	11.860	--	--	0.750	0.2610	--	--	0.0040	--	--
EL100303-126	09/25/10	VP-NV-2c-2	0.3410	0.1280	0.003	0.0045	--	6.918	295.7	644.50	0.0120	0.0025	0.0720	--	96.7670	--	--	--	--	0.212	4.06	6.790	0.5282	18.060	--	--	1.010	0.2490	--	--	0.0080	--	--
EL100303-127	09/25/10	VP-NV-2c-3	0.5370	0.2160	0.003	0.0045	--	6.793	326.9	702.40	0.0080	0.0025	0.0750	--	106.5870	--	--	--	--	0.150	3.86	6.980	0.5184	16.710	--	--	1.010	0.2580	--	--	0.0070	--	--
EL100303-128	09/25/10	VP-NV-2c-4	0.3840	0.1580	0.003	0.0045	--	6.802	347.1	730.30	0.0110	0.0060	0.0820	--	123.5070	--	--	--	--	0.132	2.92	7.520	0.5418	16.890	--	--	0.950	0.2850	--	--	0.0070	--	--
EL100303-129	09/25/10	VP-NV-2c-5	0.2500	0.0960	0.003	0.0045	--	6.790	335.0	703.90	0.0090	0.0025	0.0720	--	117.8670	--	--	--	--	0.074	1.98	7.150	0.3480	14.340	--	--	0.650	0.2590	--	--	0.0100	--	--
EL100303-130	09/25/10	VP-NV-2c-6	0.1290	0.0500	0.003	0.0045	--	6.802	349.7	723.60	0.0110	0.0070	0.0710	--	125.1270	--	--	--	--	0.033	1.34	7.350	0.0956	12.170	--	--	0.560	0.2580	--	--	0.0040	--	--
EL100336-005	10/21/10	VP-AV-1a-2	0.0250	0.0310	0.0030	0.0045	--	--	--	--	0.0080	0.0025	0.0420	--	76.0360	--	--	--	--	0.054	2.32	5.290	0.0781	17.620	--	--	1.360	0.1730	--	--	0.0010	--	--
EL100336-004	10/21/10	VP-AV-1a-3	0.3850	0.2810	0.0030	0.0045	--	6.598	253.6	555.60	0.0170	0.0025	0.0550	--	91.9960	--	--	--	--	0.130	3.74	5.730	0.3296	20.420	--	--	1.100	0.1920	--	--	0.0020	--	--
EL100336-006	10/21/10	VP-AV-1a-4	0.6980	0.3080	0.0030	0.0045	--	6.559	346.3	758.40	0.0130	0.0025	0.0770	--	125.7560	--	--	--	--	0.186	6.54	7.240	0.6388	26.220	--	--	1.000	0.2500	--	--	0.0030	--	--
EL100336-007	10/21/10	VP-AV-1a-5	0.6740	0.2680	0.0030	0.0045	--	6.562	356.0	794.90	0.0150	0.0025	0.0770	--	128.4360	--	--	--	--	0.124	7.22	8.190	0.3740	29.760	--	--	0.740	0.2600	--	--	0.0030	--	--
EL100336-008	10/21/10	VP-AV-1a-6	0.7030	0.2710	0.0030	0.0045	--	6.717	385.6	836.60	0.0230	0.0025	0.0860	--	141.3560	--	--	--	--	0.135	9.72	8.780	0.3116	27.100	--	--	0.820	0.2850	--	--	0.0020	--	--
EL100336-009	10/21/10	VP-AV-1a-7	0.2510	0.0800	0.0030	0.0045	--	6.673	295.5	646.10	0.0190	0.0025	0.0690	--	116.4960	--	--	--	--	0.062	6.40	6.940	0.1519	12.930	--	--	0.490	0.2240	--	--	0.0030	--	--
EL100336-010	10/21/10	VP-AV-1a-8	0.1580	0.1040	0.0030	0.0045	--	6.830	354.2	723.20	0.0110	0.0025	0.0680	--	135.3760	--	--	--	--	0.057	3.24	7.480	0.1810	14.260	--	--	0.410	0.2490	--	--	0.0020	--	--
EL100336-011	10/21/10	VP-AV-1a-9	0.2900	0.1310	0.0030	0.0045	--	6.860	399.4	799.80	0.0100	0.0025	0.0690	--	147.9360	--	--	--	--	0.077	2.62	7.420	0.1992	16.180	--	--	0.340	0.2520	--	--	0.0060	--	--
EL100336-012	10/21/10	VP-AV-1b-2	0.0660	0.0125	0.0030	0.0045	--	6.869	166.6	412.20	0.0090	0.0025	0.0400	--	62.6160	--	--	--	--	0.071	2.00	5.040	0.1284	16.730	--	--	1.400	0.1520	--	--	0.0070	--	--
EL100336-013	10/21/10	VP-AV-1b-3	0.4010	0.3850	0.0030	0.0045	--	6.738	186.1	442.70	0.0070	0.0025	0.0400	--	67.9160	--	--	--	--	0.074	1.40	5.140	0.1891	14.740	--	--	0.730	0.1550	--	--	0.0050	--	--
EL100336-014	10/21/10	VP-AV-1b-4	0.5160	0.4720	0.0030	0.0045	--	6.657	212.7	492.00	0.0080	0.0025	0.0450	--	76.2560	--	--	--	--	0.065	1.88	5.540	0.2124	17.500	--	--	0.600	0.1670	--	--	0.0060	--	--
EL100336-015	10/21/10	VP-AV-1b-5	0.3270	0.3050	0.0030	0.0045	--	6.670	232.2	522.70	0.0080	0.0025	0.0490	--	88.6760	--	--	--	--	0.077	1.23	6.060	0.2348	16.030	--	--	0.530	0.1920	--	--	0.0070	--	--
EL100336-016	10/21/10	VP-AV-1b-6	0.0940	0.0125	0.0030	0.0045	--	6.591	250.4	563.30	0.0090	0.0025	0.0500	--	100.0960	--	--	--	--	0.107	1.80	6.390	0.2092	13.060	--	--	0.430	0.2010	--	--	0.0080	--	--
EL100336-017	10/21/10	VP-AV-1c-2	0.2930	0.2580	0.0030	0.0045	--	6.733	178.4	449.80	0.0100	0.0025	0.0380	--	69.4560	--	--	--	--	0.102	1.18	5.910	0.1203	19.850	--	--	2.160	0.1660	--	--	0.0010	--	--
EL100336-018	10/21/10	VP-AV-1c-3	0.4030	0.3530	0.0030	0.0045	--	6.745	211.2	504.00	0.0090	0.0025	0.0410	--	79.0760	--	--	--	--	0.144	0.93	6.530	0.1786	19.220	--	--	1.490	0.1890	--	--	0.0020	--	--
EL100336-019	10/21/10	VP-AV-1c-4	0.3440	0.3170	0.0030	0.0045	--	6.749	219.8	511.10	0.0100	0.0025	0.0430	--	84.7160	--	--	--	--	0.104	0.48	6.750	0.1684	18.550	--	--	1.230	0.2010	--	--	0.0020	--	--
EL100336-020	10/21/10	VP-AV-1c-5	0.1990	0.1600	0.0030	0.0045	--	6.746	234.9	530.10	0.0080	0.0025	0.0460	--	89.6360	--	--	--	--	0.072	0.49	6.750	0.1503	17.960	--	--	1.070	0.1980	--	--	0.0030	--	--
EL100336-021	10/21/10	VP-AV-1c-6	0.1000	0.1790	0.0030	0.0045	--	6.823	279.1	602.90	0.0090	0.0025	0.0520	--	105.1160	--	--	--	--	0.068	0.36	7.530	0.1583	16.410	--	--	0.920	0.2190	--	--	0.0020	--	--
EL100336-022	10/21/10	VP-AV-1d-2	0.0690	0.0290	0.0030	0.0045	--	6.872	184.5	455.90	0.0060	0.0025	0.0400	--	70.8360	--	--	--	--	0.063	2.22	5.470	0.0456	18.180	--	--	1.750	0.1690	--	--	0.0005	--	--
EL100336-023	10/21/10	VP-AV-1d-3	0.2610	0.2050	0.0030	0.0045	--	6.744	221.8	513.60	0.0050	0.0025	0.0510	--	82.1360	--	--	--	--	0.096	1.33	6.040	0.1905	16.500	--	--	1.050	0.1900	--	--	0.0005	--	--
EL100336-024	10/21/10	VP-AV-1d-4	0.1760	0.1420	0.0030	0.0045	--	6.607	197.4	477.10	0.0060	0.0025	0.0420	--	74.9560	--	--	--	--	0.079	0.86	6.340	0.1881	18.290	--	--	0.790	0.1740	--	--	0.0030	--	--
EL100336-025	10/21/10	VP-AV-1d-5	0.1300	0.1030	0.0030	0.0045	--	6.605	196.0	477.10	0.0200	0.0025	0.0440	--	74.4560	--	--	--	--	0.056	2.28	6.260	0.1437	16.530	--	--	0.720	0.1680	--	--	0.0020	--	--
EL100336-026	10/21/10	VP-AV-1d-6	0.0620	0.0320	0.0030	0.0045	--	6.550	182.0	443.20	0.0080	0.0025	0.0460	--	69.7960	--	--	--	--	0.047	2.04	5.560	0.1011	14.110	--	--	0.490	0.1520	--	--	0.0020	--	--
EL100336-027	10/21/10	VP-AV-1e-2	0.0410	0.0125	0.0030	0.0045	--	6.840	135.5	375.40	0.0070	0.0025	0.0320	--	54.2560	--	--	--	--	0.074	1.43	5.030	0.0639	18.290	--	--	2.840	0.1370	--	--	0.0005	--	--
EL100336-028	10/21/10	VP-AV-1e-3	0.1790	0.2020	0.0030	0.0045	--	6.644	145.7	385.80	0.0070	0.0025	0.0350	--	56.3760	--	--	--	--	0.107	0.83	5.190	0.1358	17.520	--	--	1.570	0.1410	--	--	0.0010	--	--
EL100336-029	10/21/10	VP-AV-1e-4	0.1640	0.1130	0.0030	0.0045	--	6.587	172.2	426.40	0.0060	0.0025	0.0380	--	65.0960	--	--	--	--	0.117	0.69	5.910	0.1650	17.390	--	--	1.130	0.1600	--	--	0.0010	--	--
EL100336-030	10/21/10	VP-AV-1e-5	0.2140	0.1660	0.0030	0.0045	--	6.626	197.3	475.70	0.0080	0.0025	0.0420	--	72.1560	--	--	--	--	0.104	1.59	6.200	0.1478	19.190	--	--	1.060	0.1730	--	--	0.0020	--	--
EL100336-031	10/21/10	VP-AV-1e-6	0.4220	0.3240	0.0030	0.0045	--	6.465	185.0	468.90	0.0060	0.0025	0.0390	--	64.9760	--	--	--	--	0.067	3.58	5.490	0.1040	23.160	--	--	0.670	0.1510	--	--	0.0005	--	--
EL100336-032	10/22/10	VP-V-1a-1	0.2560	0.0125	0.0030	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100336-033	10/22/10	VP-V-1a-2	0.2740	0.1720	0.0030	0.0045	--	6.701	149.9	370.10	0.0080	0.0025	0.0330	--	55.5560	--	--	--	--	0.094	2.64	4.380	0.2984	14.510	--	--	0.910	0.1350	--	--	0.0005	--	--
EL100336-034	10/22/10	VP-V-1a-3	0.5220	0.3900	0.0030	0.0045	--	6.695	194.9	451.90	0.0070	0.0025	0.0440	--	73.6960	--	--	--	--	0.120	3.88	5.000	0.4282	14.380	--	--	0.750	0.1650	--	--	0.0010	--	--
EL100336-035	10/22/10	VP-V-1a-4	0.3950	0.2970	0.0030	0.0045	--	6.665	218.6	490.80	0.0025	0.0025	0.0470	--	81.9760	--	--	--	--	0.114	2.44	5.330	0.4028	13.530	--	--	0.700	0.1810	--	--	0.0030	--	--
EL100336-036	10/22/10	VP-V-1a-5	0.1590	0.1030	0.0030	0.0045	--	6.720	273.4	578.40	0.0050	0.0025	0.0560	--	107.8760	--	--	--	--	0.085	1.35	6.220	0.3014	12.850	--	--	0.770	0.2160	--	--	0.0020	--	--
EL100336-037	10/22/10	VP-V-1a-6	0.1050	0.0410	0.0030	0.0045	--	6.757	306.7	626.80	0.0090	0.0025	0.0600	--	120.9160	--	--	--	--	0.077	1.48	6.260	0.2138	12.620	--	--	0.460	0.2240	--	--	0.0010	--	--
EL100336-038	10/22/10	VP-V-1a-7	0.4220	0.2980	0.0030	0.0045	--	6.753	331.9	673.00	0.0090	0.0025	0.0660	--	129.2560	--	--	--	--	0.116	2.56	6.800	0.2984	15.580	--	--	0.370	0.2400	--	--	0.0020	--	--
EL100336-039	10/22/10	VP-V-1a-8	0.0720	0.0125	0.0030	0.0045	--	7.083	356.6	696.10	0.0100	0.0025	0.0630	--	138.3760	--	--	--	--	0.143	0.98	6.440	0.1475	10.580	--	--	0.230	0.2360	--	--	0.0080	--	--
EL100336-040	10/22/10	VP-V-2a-2	0.1460	0.0690	0.0030	0.0045	--	6.963	219.4	517.40	0.0100	0.0025	0.0490	--	78.3960	--	--	--	--	0.129	2.96	6.420	0.2238	19.100	--	--	1.280	0.2000	--	--	0.0020	--	--
EL100336-041	10/22/10	VP-V-2a-3	0.5860	0.4170	0.0030	0.0045	--	6.841	263.4	589.20	0.0080	0.0025	0.0550	--	88.5360	--	--	--	--	0.142	3.16	7.230	0.2556	17.010	--	--	1.130	0.2230	--	--	0.0010	--	--
EL100336-042	10/22/10	VP-V-2a-4	0.6970	0.5210	0.0030	0.0045	--	6.828	289.0	628.10	0.0050	0.0025	0.0610	--	96.4160	--	--	--	--	0.130	3.30	7.540	0.2584	16.390	--	--	1.050	0.2350	--	--	0.0040	--	--
EL100336-043	10/22/10	VP-V-2a-5	0.8300	0.5580	0.0030	0.0045	--	6.805	261.4	574.70	0.0050	0.0025	0.0560	--	88.2560	--	--	--	--	0.092	3.56	6.470	0.2096	14.320	--	--	0.900	0.2020	--	--	0.0030	--	--
EL100336-044	10/22/10	VP-V-2a-6	0.5900	0.4220	0.0030	0.0045	--	6.894	306.5	646.40	0.0120	0.0025	0.0630	--	102.3560	--	--	--	--	0.104	3.42	7.280	0.1921	14.890	--	--	0.930	0.2260	--	--	0.0040	--	--
EL100336-045	10/22/10	VP-V-2a-7	0.4070	0.3070	0.0030	0.0045	--	6.943	287.1	598.00	0.0110	0.0025	0.0580	--	99.4560	--	--	--	--	0.076	2.36	6.380	0.1169	12.080	--	--	0.540	0.2020	--	--	0.0010	--	--
EL100336-046	10/22/10	VP-V-2a-8	0.1950	0.1390	0.0030	0.0045	--	--	--	--	0.0230	0.0025	0.0540	--	102.0160	--	--	--	--	0.063	1.77	5.650	0.0587	9.440	--	--	0.290	0.1830	--	--	0.0005	--	--
EL100336-049	10/22/10	VP-V-3a-2	0.2260	0.1400	0.0030	0.0045	--	6.890	174.7	415.60	0.0070	0.0025	0.0400	--	64.4360	--	--	--	--	0.121	3.16	4.650	0.3782	15.430	--	--	0.610	0.1530	--	--	0.0020	--	--
EL100336-050	10/22/10	VP-V-3a-3	0.5790	0.3860	0.0030	0.0045	--	6.778	218.2	496.60	0.0080	0.0025	0.0490	--	77.4960	--	--	--	--	0.155	3.90	5.370	0.4530	15.560	--	--	0.660	0.1790	--	--	0.0030	--	--
EL100336-051	10/22/10	VP-V-3a-4	0.6400	0.3170	0.0030	0.0045	--	6.731	238.9	533.10	0.0070	0.0025	0.0530	--	84.2560	--	--	--	--	0.157	4.42	5.430	0.4718	15.700	--	--	0.530	0.1920	--	--	0.0020	--	--
EL100336-052	10/22/10	VP-V-3a-5	0.7600	0.5830	0.0030	0.0045	--	6.672	260.2	581.30	0.0070	0.0025	0.0580	--	91.7360	--	--	--	--	0.164	4.78	5.650	0.4948	20.380	--	--	0.480	0.2040	--	--	0.0005	--	--
EL100336-053	10/22/10	VP-V-3a-6	0.3510	0.2290	0.0030	0.0045	--	7.205	270.0	573.60	0.0100	0.0025	0.0580	--	102.7560	--	--	--	--	0.151	2.76	5.730	0.3490	14.730	--	--	0.420	0.2170	--	--	0.0020	--	--
EL100336-054	10/22/10	VP-V-3a-7	0.3210	0.2010	0.0030	0.0045	--	6.808	317.7	648.40	0.0150	0.0025	0.0620	--	118.5560	--	--	--	--	0.158	2.20	6.040	0.2858	13.680	--	--	0.420	0.2330	--	--	0.0010	--	--
EL100336-055	10/22/10	VP-V-3a-8	0.1260	0.0125	0.0030	0.0045	--	6.871	363.3	718.80	0.0160	0.0025	0.0630	--	133.5760	--	--	--	--	0.139	1.22	6.290	0.1984	11.780	--	--	0.310	0.2450	--	--	0.0005	--	--
EL100336-056	10/22/10	VP-NV-1a-1	0.0330	0.0125	0.0030	0.0045	--	--	--	--	0.0070	0.0025	0.0300	--	59.8960	--	--	--	--	0.028	2.08	5.450	0.0355	20.240	--	--	2.130	0.1510	--	--	0.0010	--	--
EL100336-057	10/22/10	VP-NV-1a-2	0.0570	0.0125	0.0030	0.0045	--	6.940	220.0	514.50	0.0070	0.0025	0.0520	--	77.4160	--	--	--	--	0.134	4.22	5.830	0.4144	17.910	--	--	1.280	0.1930	--	--	0.0005	--	--
EL100336-058	10/22/10	VP-NV-1a-3	0.5230	0.3040	0.0030	0.0045	--	6.841	274.3	615.10	0.0080	0.0025	0.0620	--	92.1760	--	--	--	--	0.108	5.06	7.090	0.4238	16.880	--	--	1.190	0.2220	--	--	0.0005	--	--
EL100336-059	10/22/10	VP-NV-1a-4	0.5800	0.3050	0.0030	0.0045	--	6.828	273.6	594.50	0.0070	0.0025	0.0560	--	87.2960	--	--	--	--	0.063	4.22	6.560	0.2810	14.390	--	--	0.920	0.2000	--	--	0.0005	--	--

Table B.1.7 - Victoria Point, Water Sample Analytical Results, July to October

Lab ID	Sample Date	Sample ID	Total P	Phosphate PO_4-P	Nitrite NO_2-N	Nitrate NO_3-N	DOC	pH	Total Alkalinity as $CaCO_3$	Conductivity	Total Metals: Al	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	S	Sr	Ti	V	Zn	Reactive Silicates SiO_2	Chlorophyll "a"
		Parameter / Method Detection Limit / Units	*0.0050*	*0.0250*	*0.006*	*0.0090*	*0.50*	*n/a*	*1.0*	*0.50*	*0.0050*	*0.0050*	*0.0030*	*0.002*	*0.0050*	*0.0010*	*0.010*	*0.002*	*0.002*	*0.002*	*0.10*	*0.010*	*0.0002*	*0.010*	*0.002*	*0.0050*	*0.050*	*0.0050*	*0.010*	*0.006*	*0.0010*	*0.250*	*0.2*
			mg/L	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*n/a*	*mg/L*	*uS/cm*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*µg/L*
EL100336-060	10/22/10	VP-NV-1a-5	0.5560	0.4220	0.0030	0.0045	--	6.875	259.7	576.90	0.0070	0.0025	0.0530	--	82.2760	--	--	--	--	0.063	3.92	5.770	0.2312	12.680	--	--	0.730	0.1810	--	--	0.0010	--	--
EL100336-061	10/22/10	VP-NV-1a-6	0.3720	0.1650	0.0030	0.0045	--	6.876	287.8	617.30	0.0130	0.0025	0.0590	--	93.6760	--	--	--	--	0.070	3.90	6.150	0.1971	12.450	--	--	0.610	0.1980	--	--	0.0010	--	--
EL100336-062	10/22/10	VP-NV-1a-7	0.2410	0.1480	0.0030	0.0045	--	--	--	--	0.0080	0.0025	0.0610	--	103.4560	--	--	--	--	0.055	3.32	6.110	0.1132	11.140	--	--	0.360	0.2000	--	--	0.0010	--	--
EL100336-063	10/22/10	VP-NV-1a-8	0.2240	0.0870	0.0030	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100336-064	10/22/10	VP-NV-1b-1	0.0960	0.0125	0.0030	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100336-065	10/22/10	VP-NV-1b-2	0.0990	0.1160	0.0030	0.0045	--	6.884	194.4	473.60	0.0070	0.0025	0.0490	--	72.2160	--	--	--	--	0.089	4.66	5.560	0.2616	18.690	--	--	0.930	0.1810	--	--	0.0020	--	--
EL100336-066	10/22/10	VP-NV-1b-3	0.6430	0.2200	0.0030	0.0045	--	6.718	240.9	560.30	0.0070	0.0025	0.0540	--	80.8360	--	--	--	--	0.144	6.14	6.420	0.4972	17.420	--	--	0.810	0.1980	--	--	0.0010	--	--
EL100336-067	10/22/10	VP-NV-1b-4	0.8260	0.4370	0.0030	0.0045	--	6.726	252.9	580.30	0.0090	0.0025	0.0580	--	83.8960	--	--	--	--	0.094	5.60	6.360	0.3766	16.990	--	--	0.800	0.1940	--	--	0.0020	--	--
EL100336-068	10/22/10	VP-NV-1b-5	0.7020	0.3500	0.0030	0.0045	--	6.718	261.5	591.50	0.0070	0.0025	0.0560	--	85.9960	--	--	--	--	0.074	4.82	6.170	0.3070	15.310	--	--	0.690	0.1920	--	--	0.0020	--	--
EL100336-069	10/22/10	VP-NV-1b-6	0.3210	0.1410	0.0030	0.0045	--	--	--	--	0.0050	0.0025	0.0640	--	109.6760	--	--	--	--	0.052	3.76	6.850	0.1523	14.980	--	--	0.510	0.2190	--	--	0.0070	--	--
EL100336-070	10/22/10	VP-NV-1c-1	0.0240	0.0125	0.0030	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100336-071	10/22/10	VP-NV-1c-2	0.0260	0.0125	0.0030	0.0045	--	7.010	181.5	438.10	0.0050	0.0025	0.0390	--	66.4160	--	--	--	--	0.065	3.72	4.930	0.0593	16.730	--	--	0.820	0.1620	--	--	0.0020	--	--
EL100336-072	10/22/10	VP-NV-1c-3	0.4560	0.2330	0.0030	0.0045	--	6.875	254.7	577.10	0.0090	0.0025	0.0520	--	83.6360	--	--	--	--	0.126	4.60	6.290	0.3014	15.970	--	--	0.930	0.2050	--	--	0.0020	--	--
EL100336-073	10/22/10	VP-NV-1c-4	0.7780	0.3260	0.0030	0.0045	--	6.803	264.1	590.40	0.0060	0.0025	0.0520	--	85.9960	--	--	--	--	0.047	4.76	5.930	0.0966	14.020	--	--	0.820	0.1930	--	--	0.0020	--	--
EL100336-074	10/22/10	VP-NV-1c-5	0.6240	0.2350	0.0030	0.0045	--	6.823	268.9	590.20	0.0070	0.0025	0.0550	--	90.2360	--	--	--	--	0.040	4.58	6.020	0.0541	12.510	--	--	0.760	0.1970	--	--	0.0030	--	--
EL100336-075	10/22/10	VP-NV-1c-6	0.5140	0.2780	0.0030	0.0045	--	--	--	--	0.0025	0.0025	0.0580	--	96.3960	--	--	--	--	0.043	4.22	6.360	0.0403	12.340	--	--	0.750	0.2040	--	--	0.0100	--	--
EL100336-076	10/22/10	VP-NV-2a-2	0.0410	0.0125	0.0030	0.0045	--	6.969	211.8	494.00	0.0090	0.0025	0.0460	--	74.7560	--	--	--	--	0.133	3.68	5.380	0.3278	16.380	--	--	0.890	0.1790	--	--	0.0060	--	--
EL100336-077	10/22/10	VP-NV-2a-3	0.5340	0.2540	0.0030	0.0045	--	6.947	294.4	643.70	0.0080	0.0025	0.0630	--	96.5360	--	--	--	--	0.195	5.08	6.840	0.5268	15.830	--	--	0.880	0.2350	--	--	0.0005	--	--
EL100336-078	10/22/10	VP-NV-2a-4	0.8930	0.6550	0.0030	0.0045	--	7.040	285.7	629.90	0.0120	0.0025	0.0620	--	95.1760	--	--	--	--	0.117	4.98	6.380	0.3312	14.940	--	--	0.770	0.2130	--	--	0.0010	--	--
EL100336-079	10/22/10	VP-NV-2a-5	0.6820	0.2510	0.0030	0.0045	--	6.843	276.1	607.30	0.0090	0.0025	0.0570	--	89.5360	--	--	--	--	0.101	4.38	5.980	0.2452	13.130	--	--	0.600	0.1960	--	--	0.0005	--	--
EL100336-080	10/22/10	VP-NV-2a-6	0.5020	0.2120	0.0030	0.0045	--	6.918	282.7	603.50	0.0070	0.0025	0.0570	--	92.5760	--	--	--	--	0.081	3.78	5.950	0.1736	11.960	--	--	0.430	0.1930	--	--	0.0060	--	--
EL100336-081	10/22/10	VP-NV-2a-7	0.3200	0.2560	0.0030	0.0045	--	6.890	283.7	596.60	0.0070	0.0025	0.0570	--	93.7560	--	--	--	--	0.072	3.32	6.060	0.1193	11.270	--	--	0.340	0.1950	--	--	0.0005	--	--
EL100336-082	10/22/10	VP-NV-2a-8	0.1960	0.1390	0.0030	0.0045	--	6.990	328.6	661.00	0.0090	0.0025	0.0640	--	112.3160	--	--	--	--	0.073	2.94	6.230	0.0611	10.480	--	--	0.210	0.2110	--	--	0.0020	--	--
EL100336-083	10/22/10	VP-NV-2b-2	0.0300	0.0125	0.0030	0.0045	--	7.055	222.9	515.70	0.0100	0.0025	0.0480	--	81.2360	--	--	--	--	0.098	3.06	5.800	0.1489	17.740	--	--	0.840	0.2000	--	--	0.0020	--	--
EL100336-084	10/22/10	VP-NV-2b-3	0.0780	0.0125	0.0030	0.0045	--	6.881	291.9	623.30	0.0060	0.0025	0.0640	--	104.0160	--	--	--	--	0.104	3.52	6.760	0.1219	16.270	--	--	0.770	0.2420	--	--	0.0020	--	--
EL100336-085	10/22/10	VP-NV-2b-4	0.1520	0.0620	0.0030	0.0045	--	6.931	310.8	654.10	0.0070	0.0025	0.0670	--	111.5560	--	--	--	--	0.081	2.94	6.830	0.1260	15.110	--	--	0.700	0.2470	--	--	0.0060	--	--
EL100336-086	10/22/10	VP-NV-2b-5	0.0410	0.0125	0.0030	0.0045	--	6.864	324.9	670.20	0.0070	0.0025	0.0670	--	123.1360	--	--	--	--	0.055	1.90	7.210	0.0688	14.050	--	--	0.690	0.2600	--	--	0.0020	--	--
EL100336-087	10/22/10	VP-NV-2b-6	0.0250	0.0125	0.0030	0.0045	--	--	--	--	0.0070	0.0025	0.0620	--	124.4960	--	--	--	--	0.044	1.25	7.080	0.0648	12.680	--	--	0.590	0.2520	--	--	0.0005	--	--
EL100336-088	10/22/10	VP-NV-2c-1	0.0260	0.0125	0.0030	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EL100336-089	10/22/10	VP-NV-2c-2	0.0280	0.0125	0.0030	0.0045	--	7.025	220.8	492.40	0.0070	0.0025	0.0440	--	78.4960	--	--	--	--	0.099	2.84	5.620	0.0813	18.250	--	--	1.150	0.1920	--	--	0.0020	--	--
EL100336-090	10/22/10	VP-NV-2c-3	0.2590	0.1630	0.0030	0.0045	--	6.850	267.7	594.60	0.0060	0.0025	0.0610	--	97.3560	--	--	--	--	0.157	3.94	6.420	0.3232	17.570	--	--	0.970	0.2320	--	--	0.0005	--	--
EL100336-091	10/22/10	VP-NV-2c-4	0.4150	0.2650	0.0030	0.0045	--	6.825	307.1	660.00	0.0100	0.0025	0.0700	--	111.3760	--	--	--	--	0.155	3.94	7.010	0.4244	17.970	--	--	0.960	0.2580	--	--	0.0030	--	--
EL100336-092	10/22/10	VP-NV-2c-5	0.3680	0.2250	0.0030	0.0045	--	6.829	301.7	642.20	0.0100	0.0050	0.0670	--	114.9360	--	--	--	--	0.136	2.64	7.050	0.2964	15.250	--	--	0.770	0.2580	--	--	0.0010	--	--
EL100336-093	10/22/10	VP-NV-2c-6	0.2230	0.1040	0.0030	0.0045	--	--	--	--	0.0025	0.0025	0.0640	--	120.5560	--	--	--	--	0.086	1.81	7.040	0.2288	12.830	--	--	0.470	0.2450	--	--	0.0080	--	--

Notes

July sample: surface water

Sample ID code: Site (VP = Victoria Point) - Plot Type (V = Vegetated; NV = Non-Vegetated; AV = Mixed Vegetation) - Plot and Peeper # - Depth (0b = 30-20 cm above sediment-water interface; 0 = 20-10 cm above sediment-water interface; 1 = 10-0 cm above sediment-water interface; 2 = 0-10 cm below sediment-water interface; 3 = 10-20 cm below sediment-water interface; 4 = 20-30 cm below sediment-water interface; 5 = 30-40 cm below sediment-water interface; 6 = 40-50 cm below sediment-water interface; 7 = 50-60 cm below sediment-water interface; 8 = 60-70 cm below sediment-water interface; 9 = 70-80 cm below sediment-water interface)

Value -- in grey box = parameter not analyzed

Value in grey font = Value half of Detection Limit (result < Detection Limit)

Table B.1.8 - Victoria Point, Sediment Sample Analytical Results

Lab ID	Sample Date	Sample ID	Total Recoverable Phosphorus	Total Recoverable	Total Recoverable Metals: Al	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	Pb	S	Sb	Se	Sn	Sr	Ti	Tl	V	Zn
			3.20	*1.20*	*1.20*	*2.00*	*2.00*	*0.04*	*0.04*	*0.08*	*0.20*	*0.08*	*0.20*	*0.20*	*0.40*	*0.20*	*0.04*	*2.00*	*0.40*	*0.20*	*1.00*	*1.20*	*2.00*	*2.00*	*2.00*	*0.40*	*2.00*	*2.00*	*0.40*	*0.20*
			µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g
EL120240 -013	10/21/10	VPSEDOCT10	1433.33	157.65	2457.32	6.16	47.71	0.08	19238.8	1.07	0.45	7.52	19	5363.09	615.11	1630.67	107.48	1.00	456.72	9.87	36.96	12517.9	1.00	2.85	2.87	53.23	112.08	1.00	9.84	92.69

Notes
Sample ID code: Site (VP = Victoria Point) - Date
Value in grey font = Value half of Detection Limit (result < Detection Limit)

Table B.1.9 - Victoria Point, Wild Rice Vegetation Analytical Results

Lab ID	Sample Date	Sample ID	Plant Part	# of Plants	Dry Plant Weight *(subsample analyzed)*	P in Plant Tissue	N in Plant Tissue	Metals in Plant Tissue: Al	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	S	Si	Sr	Ti	V	Zn
						0.80	*0.01*	*5.00*	*5.00*	*10.00*	*0.04*	*0.10*	*0.40*	*0.10*	*0.25*	*0.02*	*0.10*	*5.00*	*0.10*	*0.01*	*0.10*	*0.03*	*2.50*	*3.00*	*0.50*	*0.10*	*0.95*	*0.05*	*0.10*
					g	µg/g	*% N*	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g
EL100061-012	09/25/10	VP-SVEG-I-9	Inflorescence	10	0.39	1143.08	0.59	20.33	2.50	5.00	0.08	4284.67	0.20	0.05	0.125	1.00	116.50	6074.40	924.83	156.33	2827.00	0.015	1.25	1269.50	237.25	11.83	2.17	0.25	12.17
EL100061-013	09/25/10	VP-SVEG-S-10	Stem	10	3.04	1137.19	0.45	21.95	2.50	5.00	0.02	6148.28	0.20	0.05	0.320	0.85	142.73	14068.50	840.54	223.75	9633.47	0.840	1.25	2166.57	180.41	17.38	1.33	0.17	4.58
EL100061-014	09/25/10	VP-SVEG-L-11	Leaf	10	1.69	1480.69	0.71	377.55	2.50	28.99	0.02	10403.20	0.20	0.47	1.300	4.21	1020.39	2551.00	776.54	903.00	1570.97	2.830	7.08	3375.07	157.81	28.42	14.63	2.00	20.24
EL100061-015	09/25/10	VP-SVEG-R-12	Root	10	1.84	1365.69	0.89	300.65	2.50	15.73	0.02	6763.28	0.20	1.59	3.200	8.49	11869.30	3766.00	712.04	193.95	9843.47	4.240	7.24	6213.07	54.31	19.88	12.78	2.83	87.02

Note
Sample ID code: Site (VP = Victoria Point) - Month & Sample Type (S = September; VEG = Vegetation) - Plant Part (I = Inflorescence; S = Stem; L = Leaf; R = Root) - Sample #
Value in grey font = Value half of Detection Limit (result < Detection Limit)

Table B.1.10 – Victoria Point, Water Data Trends Between Plots.

Analytical Parameter	Month	Plot Trend
Total P	August	V & MV lower concentration than NV (P = <0.001). No significant difference between V and MV.
	September	NV & MV lower concentration than V (P = <0.001). No significant difference between NV and MV.
	October	NV & MV lower concentration than V (P = 0.017). No significant difference between NV and MV.
Phosphate (PO_4-P)	August	V & MV lower concentration than NV (P = 0.002). No significant difference between V and MV.
	September	No significant trend between plots.
	October	NV & MV lower concentration than V (P = 0.003). No significant difference between NV and MV.
Nitrate (NO_3-N)	August	No significant trend between plots.
	September	No significant trend between plots.
	October	No significant trend between plots.
pH	August	No significant trend between plots.
	September	MV lower value than V and NV (P = <0.001). No significant difference between V and NV.
	October	MV lower value than V (P = 0.010) and NV (P = <0.001). No significant difference between V and NV.
Total Alkalinity (as $CaCO_3$)	August	MV lower concentration than V and NV (P = <0.001). V lower concentration than NV (P = 0.002).
	September	MV lower concentration than NV (P = 0.009). No significant difference between V and MV. No significant difference between V and NV.
	October	MV lower concentration than V (P = 0.009) and NV (P = <0.001). V lower concentration than NV (P = 0.006).
Cond-uctivity	August	MV lower concentration than V and NV (P = <0.001). V lower concentration than NV (P = <0.001).
	September	NV higher concentration than V (P = 0.023) and MV (P = 0.005). No significant difference between V and MV.
	October	NV higher concentration than V (P = 0.003) and MV (P = <0.001). No significant difference between V and MV.
DOC	August	MV lower concentration than NV (P = 0.010) and V (P = <0.001). No significant difference between NV and V.
Total Al	August	NV lower concentration than V (P = 0.039) and MV (P = <0.001). V lower concentration than MV (P = 0.010).
	September	MV lower concentration than V and NV (P = <0.001). No significant difference between V and NV.
	October	No significant trend between plots.

Notes: V = Vegetated Plots; NV = Non-Vegetated Plots; MV = Mixed Vegetation Plot

Table B.1.10 – Victoria Point, Water Data Trends Between Plots.

Analytical Parameter	Month	Plot Trend
Total Ba	August	MV lower concentration than V (P = 0.001) and NV (P = <0.001). No significant difference between V and NV.
	September	MV lower concentration than V (P = 0.016) and NV (P = <0.001). No significant difference between V and NV.
	October	MV lower concentration than V (P = 0.016) and NV (P = <0.001). V lower concentration than NV (P = 0.011).
Total Ca	August	MV lower concentration than V and NV (P = <0.001). V lower concentration than NV (P = 0.002).
	September	No significant trend between plots.
	October	NV higher concentration than V (P = 0.033) and MV (P = <0.001). No significant difference between V and MV.
Total Fe	August	No significant trend between plots.
	September	No significant trend between plots.
	October	V higher concentration than MV and NV (P = 0.004). No significant difference between MV and NV.
Total K	August	MV lower concentration than V (P = 0.036) and NV (P = <0.001). V lower concentration than NV (P = 0.006).
	September	MV lower concentration than V and NV (P = <0.001). No significant difference between V and NV.
	October	MV lower concentration than NV (P = 0.003). No significant difference between MV and V. No significant difference between NV and V.
Total Mg	August	NV higher concentration than V (P = 0.049) and MV (P = 0.001). No significant difference between V and MV.
	September	V lower concentration than MV (P = 0.019). No significant difference between V and NV. No significant difference between MV and NV.
	October	V lower concentration than NV (P = 0.018). No significant difference between MV and V. No significant difference between MV and NV.
Total Mn	August	MV lower concentration than V (P = 0.002) and NV (P = <0.001). No significant difference between V and NV.
	September	MV lower concentration than V (P = 0.040). No significant difference between MV and NV. No significant difference between V and NV.
	October	V higher concentration than NV (P = 0.006) and MV (P = <0.001). No significant difference between NV and MV.

Notes: V = Vegetated Plots; NV = Non-Vegetated Plots; MV = Mixed Vegetation Plot

Table B.1.10 – Victoria Point, Water Data Trends Between Plots.

Analytical Parameter	Month	Plot Trend
Total Na	August	NV lower concentration than MV (P = 0.028). No significant difference between NV and V. No significant difference between MV and V.
	September	NV lower concentration than V (P = 0.048) and MV (P = <0.001). No significant difference between V and MV.
	October	MV higher concentration than V and NV (P = 0.001). No significant difference between V and NV.
Total S	August	NV lower concentration than MV (P = 0.023). No significant difference between NV and V. No significant difference between MV and V.
	September	No significant trend between plots.
	October	MV higher concentration than NV (P = 0.006) and V (P = 0.003). No significant difference between NV and V.
Total Sr	August	MV lower concentration than V and NV (P = <0.001). No significant difference between V and NV.
	September	No significant trend between plots.
	October	NV higher concentration than V (P = 0.036) and MV (P = <0.001). No significant difference between V and MV.
Total Zn	August	V higher concentration than MV (P = 0.003) and NV (P = <0.001). No significant difference between MV and NV.
	September	MV lower concentration than NV (P = 0.001) and V (P = <0.001). No significant difference between NV and V.
	October	No significant trend between plots.

Notes: V = Vegetated Plots; NV = Non-Vegetated Plots; MV = Mixed Vegetation Plot

Table B.1.11 – Victoria Point, Water Data Trends Between Months.

Analytical Parameter	Plot	Monthly Trend
Total P	V	Concentration increasing between August and October (P = 0.016).
	NV	Concentration decreasing between August vs. September (P = <0.001) & October (P = 0.003). No significant difference between September and October.
	MV	No significant trend between months.
Phosphate (PO_4-P)	V	Concentration increasing between August and October (P = 0.023).
	NV	Concentration decreasing between August vs. September (P = 0.002) & October (P = 0.002). No significant difference between September and October.
	MV	No significant trend between months.
Nitrate (NO_3-N)	V	Concentration increasing between August and September (P = 0.011). Concentration decreasing between September and October (P = 0.011). No significant difference between August and October.
	NV	No significant trend between months.
	MV	No significant trend between months.
pH	V	No significant trend between months.
	NV	No significant trend between months.
	MV	No significant trend between months.
Total Alkalinity (as $CaCO_3$)	V	No significant trend between months.
	NV	Concentration decreased between August vs. September (P = 0.010) and October (P = 0.016). No significant difference between September and October.
	MV	Concentration increased between August vs. September (P = 0.004) and October (P = 0.018). No significant difference between September and October.
Cond-uctivity	V	No significant trend between months.
	NV	Concentration decreased between August vs. September and October (P = 0.005). No significant difference between September and October.
	MV	Concentration increased between August vs. September (P = 0.004) and October (P = 0.016). No significant difference between September and October.
Total Al	V	Concentration decreased between August and September (P = <0.001). Concentration increased between September and October (P = 0.010). No significant difference between August and October.
	NV	No significant trend between months.
	MV	Concentration increased between August and September (P = <0.001). Concentration decreased between September and October (P = <0.001). No significant difference between August and October.

Notes: V = Vegetated Plots; NV = Non-Vegetated Plots; MV = Mixed Vegetation Plot

Table B.1.11 – Victoria Point, Water Data Trends Between Months.

Analytical Parameter	Plot	Monthly Trend
Total Ba	V	No significant trend between months.
	NV	No significant trend between months.
	MV	Concentration increased between August vs. September (P = 0.014) and October (P = 0.006).
Total Ca	V	No significant trend between months.
	NV	Concentration decreased between August vs. September (P = 0.031) and October (P = 0.021).
	MV	Concentration increased between August vs. September (P = <0.001) and October (P = 0.002).
Total Fe	V	No significant trend between months.
	NV	No significant trend between months.
	MV	No significant trend between months.
Total K	V	No significant trend between months.
	NV	No significant trend between months.
	MV	No significant trend between months.
Total Mg	V	No significant trend between months.
	NV	No significant trend between months.
	MV	Concentration increased between August vs. September (P = <0.001) and October (P = 0.005).
Total Mn	V	Concentration decreased between August and October (P = 0.010).
	NV	Concentration decreased between August and September (P = 0.027).
	MV	Concentration decreased between August and September (P = 0.047).
Total Na	V	Concentration decreased between August and September (P = 0.001) vs. October.
	NV	No significant trend between months.
	MV	No significant trend between months.
Total S	V	No significant trend between months.
	NV	No significant trend between months.
	MV	No significant trend between months.
Total Sr	V	No significant trend between months.
	NV	No significant trend between months.
	MV	Concentration increased between August vs. September (P = <0.001) and October (P = 0.001).
Total Zn	V	Concentration decreased between August and October (P = 0.006).
	NV	No significant trend between months.
	MV	No significant trend between months.

Notes: V = Vegetated Plots; NV = Non-Vegetated Plots; MV = Mixed Vegetation Plot

Table B.1.12 - Victoria Point, Water Sample Statistical Analysis

Parameter	Vegetated vs. Non-Vegetated vs. Mixed Vegetation Plots (All months, all depths)							Vegetated vs. Non-Vegetated Plots (All months, all depths)							Mixed Vegetation vs. Non-Vegetated Plots (All months, all depths)							Vegetated vs. Mixed Vegetation Plots (All months, all depths)						
	Data Test (P ≥ 0.05)				ANOVA (P ≤ 0.05)			Data Test (P ≥ 0.05)				ANOVA (P ≤ 0.05)			Data Test (P ≥ 0.05)				ANOVA (P ≤ 0.05)			Data Test (P ≥ 0.05)				ANOVA (P ≤ 0.05)		
	Normality		Equal Variance					Normality		Equal Variance					Normality		Equal Variance					Normality		Equal Variance				
	Result	P	Result	P	F	P	Sig	Result	P	Result	P	F	P	Sig	Result	P	Result	P	F	P	Sig	Result	P	Result	P	F	P	Sig
Total P	fail	<0.050	pass	0.163	6.686	<0.001	Y	fail	<0.050	pass	0.143	6.246	<0.001	Y	pass	0.701	pass	0.797	8.892	<0.001	Y	fail	<0.050	pass	0.137	6.429	<0.001	Y
Phosphate PO_4-P	fail	<0.050	pass	0.733	4.190	<0.001	Y	pass	0.120	pass	0.274	7.595	<0.001	Y	fail	<0.050	pass	0.682	4.520	0.004	Y	fail	<0.050	pass	0.772	2.704	0.040	Y
Nitrate NO_3-N	fail	<0.050	fail	<0.050	2.096	0.057	N	fail	<0.050	fail	<0.050	1.243	0.314	N	fail	<0.050	fail	<0.050	1.522	0.214	N	fail	<0.050	fail	<0.050	3.185	0.021	Y
DOC*	pass	0.385	pass	0.353	16.371	<0.001	Y	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH	fail	<0.050	pass	0.436	8.946	<0.001	Y	fail	<0.050	pass	0.372	1.067	0.100	N	fail	<0.050	pass	0.414	12.325	<0.001	Y	fail	<0.050	pass	0.425	9.372	<0.001	Y
Total Alkalinity as $CaCO_3$	pass	0.137	pass	0.604	21.243	<0.001	Y	pass	0.140	pass	0.683	9.763	<0.001	Y	pass	0.225	pass	0.516	34.741	<0.001	Y	pass	0.359	pass	0.474	10.161	<0.001	Y
Conductivity	pass	0.568	pass	0.739	22.466	<0.001	Y	pass	0.577	pass	0.731	15.134	<0.001	Y	pass	0.614	pass	0.810	35.581	<0.001	Y	pass	0.678	pass	0.432	7.194	<0.001	Y
Total Al	fail	<0.050	pass	0.295	28.147	<0.001	Y	pass	0.466	fail	<0.050	5.889	<0.001	Y	fail	<0.050	pass	0.609	29.253	<0.001	Y	fail	<0.050	pass	0.270	31.312	<0.001	Y
Total Ba	fail	<0.050	pass	0.914	16.160	<0.001	Y	fail	<0.050	pass	0.800	4.062	0.006	Y	fail	<0.050	pass	0.973	22.687	<0.001	Y	fail	<0.050	pass	0.526	14.208	<0.001	Y
Total Ca	fail	<0.050	pass	0.900	16.342	<0.001	Y	pass	0.082	pass	0.838	7.620	<0.001	Y	fail	<0.050	pass	0.932	23.778	<0.001	Y	pass	0.632	pass	0.497	11.231	<0.001	Y
Total Fe	fail	<0.050	pass	0.681	1.806	0.102	N	fail	<0.050	pass	0.460	1.397	0.255	N	fail	<0.050	pass	0.674	1.238	0.317	N	fail	<0.050	pass	0.932	3.618	0.012	Y
Total K	pass	0.078	pass	0.813	16.900	<0.001	Y	pass	0.300	pass	0.777	5.648	<0.001	Y	pass	0.136	pass	0.973	32.550	<0.001	Y	pass	0.087	pass	0.518	9.615	<0.001	Y
Total Mg	fail	<0.050	pass	0.560	6.249	<0.001	Y	fail	<0.050	pass	0.554	4.290	0.005	Y	fail	<0.050	pass	0.548	7.314	<0.001	Y	fail	<0.050	pass	0.333	7.391	<0.001	Y
Total Mn	pass	0.443	pass	0.789	9.549	<0.001	Y	pass	0.306	pass	0.655	4.693	0.003	Y	pass	0.540	pass	0.871	7.372	<0.001	Y	pass	0.779	pass	0.626	15.991	<0.001	Y
Total Na	pass	0.326	fail	<0.050	8.566	<0.001	Y	pass	0.242	fail	<0.050	5.125	0.002	Y	pass	0.406	pass	0.234	8.893	<0.001	Y	pass	0.219	fail	<0.050	6.164	<0.001	Y
Total S	fail	<0.050	pass	0.891	3.978	0.001	Y	pass	0.073	pass	0.814	2.106	0.093	N	pass	0.156	pass	0.795	4.900	0.002	Y	pass	0.059	pass	0.877	3.456	0.015	Y
Total Sr	fail	<0.050	pass	0.865	14.438	<0.001	Y	pass	0.135	pass	0.795	3.182	0.021	Y	fail	<0.050	pass	0.960	21.945	<0.001	Y	pass	0.105	pass	0.366	15.061	<0.001	Y
Total Zn	fail	<0.050	fail	<0.050	2.841	0.013	Y	fail	<0.050	fail	<0.050	3.359	0.016	Y	pass	0.172	fail	<0.050	2.028	0.104	N	pass	0.186	fail	<0.050	3.802	0.009	Y

Notes
All months = August, September and October; All depths = 10-0 cm above sediment-water interface, 0-10 cm, 10-20 cm, 20-30 cm, 30-40 cm and 40-50 cm below sediment-water interface
* = DOC data only available for August
Sig = Significant; Y = Yes; N = No
Value -- in grey box = data not available / incalculable

Table B.1.13 - Victoria Point, Water Sample Statistical Analysis by Month

		All Plots (All depths)							**Vegetated vs. Non-Vegetated Plots** (All depths)				**Mixed Vegetation vs. Non-Vegetated Plots** (All depths)				**Vegetated vs. Mixed Vegetation Plots** (All depths)			
		Data Test ($P \geq 0.05$)				**ANOVA ($P \leq 0.05$)**			**Tukey Test ($P \leq 0.05$)**		**T-Test ($P \leq 0.001$)**		**Tukey Test ($P \leq 0.05$)**		**T-Test ($P \leq 0.001$)**		**Tukey Test ($P \leq 0.05$)**		**T-Test ($P \leq 0.001$)**	
		Normality		**Equal Variance**																
Parameter	**Month**	Result	P	Result	P	F	P	Sig	P	Sig	P	Sig	P	Sig	P	Sig	P	Sig	P	Sig
Total P	**August**	pass	0.322	pass	0.818	23.361	<0.001	Y	<0.001	Y	<0.001	Y	<0.001	Y	<0.001	Y	0.721	N	0.476	N
	September	pass	0.822	pass	0.172	12.118	<0.001	Y	0.002	Y	<0.001	Y	0.976	N	0.865	N	0.002	Y	0.001	Y
	October	fail	0.043	pass	0.362	5.535	0.017	Y	0.029	Y	0.038	N*	0.968	N	0.647	N	0.029	Y	0.032	N*
Phosphate PO_4-P	**August**	pass	0.123	pass	0.939	9.293	0.002	Y	0.012	Y	0.006	Y	0.003	Y	0.003	N*	0.768	N	0.500	N
	September	fail	<0.050	pass	0.461	1.983	0.172	N	--	--	0.784	N	--	--	0.168	N	--	--	0.186	N
	October	pass	0.537	pass	0.471	8.909	0.003	Y	0.004	Y	0.006	N*	0.839	N	0.464	N	0.017	Y	0.015	N*
Nitrate NO_3-N	**August**	fail	<0.050	pass	1.000	1.000	0.391	N	--	--	0.341	N	--	--	0.341	N	--	--	0.341	N
	September	pass	0.210	pass	0.055	2.661	0.103	N	--	--	0.227	N	--	--	0.287	N	--	--	0.047	N*
	October	fail	<0.050	pass	1.000	0.000	1.000	N	--	--	1.000	N	--	--	1.000	N	--	--	1.000	N
DOC	**August**	pass	0.385	pass	0.353	16.371	<0.001	Y	0.094	N	0.013	N*	0.010	Y	0.011	N*	<0.001	Y	<0.001	Y
	September	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	October	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH	**August**	pass	0.263	pass	0.346	3.331	0.064	N	--	--	0.660	N	--	--	0.069	N	--	--	0.024	N*
	September	pass	0.339	pass	0.148	70.857	<0.001	Y	0.999	N	0.957	N	<0.001	Y	<0.001	Y	<0.001	Y	<0.001	Y
	October	fail	<0.050	pass	0.549	16.608	<0.001	Y	0.132	N	0.108	N	<0.001	Y	<0.001	Y	0.010	Y	0.017	N*
Total Alkalinity as $CaCO_3$	**August**	pass	0.989	pass	0.298	57.718	<0.001	Y	0.002	Y	0.003	N*	<0.001	Y	<0.001	Y	<0.001	Y	<0.001	Y
	September	pass	0.253	pass	0.444	6.501	0.010	Y	0.080	N	0.012	N*	0.009	Y	0.012	N*	0.591	N	0.358	N
	October	pass	0.349	pass	0.834	27.775	<0.001	Y	0.006	Y	0.008	N*	<0.001	Y	<0.001	Y	0.009	Y	0.008	N*
Conductivity	**August**	pass	0.901	pass	0.498	56.032	<0.001	Y	<0.001	Y	<0.001	Y	<0.001	Y	<0.001	Y	<0.001	Y	0.001	Y
	September	pass	0.814	pass	0.412	8.328	0.004	Y	0.023	Y	0.005	N*	0.005	Y	0.007	N*	0.811	N	0.546	N
	October	pass	0.573	pass	0.946	19.750	<0.001	Y	0.003	Y	0.003	N*	<0.001	Y	<0.001	Y	0.187	N	0.086	N
Total Al	**August**	pass	0.692	pass	0.204	18.726	<0.001	Y	0.039	Y	0.012	N*	<0.001	Y	<0.001	Y	0.011	Y	0.003	N*
	September	fail	<0.050	pass	0.534	51.061	<0.001	Y	0.528	N	0.076	N	<0.001	Y	<0.001	Y	<0.001	Y	<0.001	Y
	October	pass	0.643	pass	0.068	3.786	0.051	N	--	--	0.776	N	--	--	0.013	N*	--	--	0.057	N
Total Ba	**August**	pass	0.461	pass	0.941	26.021	<0.001	Y	0.061	N	0.048	N*	<0.001	Y	<0.001	Y	0.001	Y	<0.001	Y
	September	pass	0.102	pass	0.640	13.673	<0.001	Y	0.147	N	0.060	N	<0.001	Y	0.001	Y	0.016	Y	0.004	N*
	October	pass	0.962	pass	0.621	23.772	<0.001	Y	0.011	Y	0.011	N*	<0.001	Y	<0.001	Y	0.016	Y	0.004	N*
Total Ca	**August**	pass	0.740	pass	0.845	42.746	<0.001	Y	0.002	Y	0.003	N*	<0.001	Y	<0.001	Y	<0.001	Y	<0.001	Y
	September	pass	0.164	pass	0.615	3.025	0.079	N	--	--	0.067	N	--	--	0.088	N	--	--	0.739	N
	October	pass	0.639	pass	0.337	13.317	<0.001	Y	0.033	Y	0.032	N*	<0.001	Y	<0.001	Y	0.118	N	0.061	N
Total Fe	**August**	fail	<0.050	pass	0.600	1.702	0.216	N	--	--	0.557	N	--	--	0.139	N	--	--	0.134	N
	September	pass	0.535	pass	0.185	1.942	0.178	N	--	--	0.088	N	--	--	0.289	N	--	--	0.425	N
	October	pass	0.148	pass	0.847	10.651	0.002	Y	0.004	Y	0.003	N*	0.982	N	0.865	N	0.004	Y	0.003	N*
Total K	**August**	pass	0.129	pass	0.792	21.069	<0.001	Y	0.006	Y	0.007	N*	<0.001	Y	<0.001	Y	0.036	Y	0.022	N*
	September	pass	0.846	pass	0.431	41.114	<0.001	Y	0.068	N	0.026	N*	<0.001	Y	<0.001	Y	<0.001	Y	<0.001	Y
	October	pass	0.614	pass	0.340	8.999	0.004	Y	0.176	N	0.039	N*	0.003	Y	0.005	N*	0.102	N	0.063	N
Total Mg	**August**	fail	<0.050	pass	0.332	10.285	0.002	Y	0.049	Y	0.057	N	0.001	Y	0.001	Y	0.172	N	0.018	N*
	September	pass	0.850	pass	0.897	4.822	0.024	Y	0.260	N	0.118	N	0.336	N	0.218	N	0.019	Y	0.007	N*
	October	pass	0.498	pass	0.198	5.164	0.022	Y	0.018	Y	0.003	N*	0.506	N	0.361	N	0.161	N	0.074	N
Total Mn	**August**	pass	0.169	pass	0.711	19.012	<0.001	Y	0.180	N	0.129	N	<0.001	Y	<0.001	Y	0.002	Y	<0.001	Y
	September	pass	0.907	pass	0.240	4.356	0.032	Y	0.078	N	0.030	N*	0.934	N	0.773	N	0.040	Y	0.009	N*

Table B.1.13 - Victoria Point, Water Sample Statistical Analysis by Month

Parameter	Month	All Plots (All depths)							Vegetated vs. Non-Vegetated Plots (All depths)				Mixed Vegetation vs. Non-Vegetated Plots (All depths)				Vegetated vs. Mixed Vegetation Plots (All depths)			
		Data Test (P ≥ 0.05)				ANOVA (P ≤ 0.05)			Tukey Test (P ≤ 0.05)		T-Test (P ≤ 0.001)		Tukey Test (P ≤ 0.05)		T-Test (P ≤ 0.001)		Tukey Test (P ≤ 0.05)		T-Test (P ≤ 0.001)	
		Normality		Equal Variance																
Parameter	Month	Result	P	Result	P	F	P	Sig	P	Sig	P	Sig	P	Sig	P	Sig	P	Sig	P	Sig
	October	pass	0.313	pass	0.590	15.262	<0.001	Y	0.006	Y	0.002	N*	0.196	N	0.117	N	<0.001	Y	0.001	Y
Total Na	**August**	pass	0.072	pass	0.436	4.488	0.030	Y	0.129	N	0.010	N*	0.028	Y	0.033	N*	0.687	N	0.463	N
	September	pass	0.830	fail	<0.050	13.437	<0.001	Y	0.048	Y	<0.001	Y	<0.001	Y	0.001	Y	0.054	N	0.048	N*
	October	pass	0.187	fail	<0.050	14.648	<0.001	Y	0.996	N	0.925	N	0.001	Y	0.003	N*	0.001	Y	0.001	Y
Total S	**August**	pass	0.220	pass	0.513	4.882	0.023	Y	0.098	N	0.035	N*	0.023	Y	0.009	N*	0.720	N	0.506	N
	September	pass	0.628	pass	0.742	0.472	0.633	N	--	--	0.532	N	--	--	0.420	N	--	--	0.749	N
	October	pass	0.415	pass	0.606	10.570	0.002	Y	0.850	N	0.517	N	0.006	Y	0.005	N*	0.003	Y	0.006	N*
Total Sr	**August**	pass	0.330	pass	0.553	32.754	<0.001	Y	0.116	N	0.101	N	<0.001	Y	<0.001	Y	<0.001	Y	<0.001	Y
	September	pass	0.269	pass	0.669	2.740	0.097	N	--	--	0.392	N	--	--	0.076	N	--	--	0.112	N
	October	pass	0.741	pass	0.724	14.663	<0.001	Y	0.036	Y	0.027	N*	<0.001	Y	<0.001	Y	0.069	N	0.024	N*
Total Zn	**August**	pass	0.514	pass	0.085	15.736	<0.001	Y	<0.001	Y	<0.001	Y	0.449	N	0.326	N	0.003	Y	0.002	N*
	September	pass	0.431	pass	0.701	14.596	<0.001	Y	0.989	N	0.897	N	0.001	Y	<0.001	Y	<0.001	Y	0.002	N*
	October	pass	0.489	pass	0.705	1.305	0.305	N	--	--	0.469	N	--	--	0.395	N	--	--	0.133	N

Notes

All depths = 10-0 cm above sediment-water interface, 0-10 cm, 10-20 cm, 20-30 cm, 30-40 cm and 40-50 cm below sediment-water interface

Sig = Significant; Y = Yes; N = No; N* = T-Test only: No based on P value ≤0.001, Yes based on P value ≤0.05

Value -- in grey box = data not available / incalculable

Table B.1.14 - Victoria Point, Water Sample Statistical Analysis by Plot

		All Months (All depths)							August vs. September (All depths)				September vs. October (All depths)				August vs. October (All depths)			
		Data Test ($P \geq 0.05$)				ANOVA ($P \leq 0.05$)			Tukey Test ($P \leq 0.05$)		T-Test ($P \leq 0.001$)		Tukey Test ($P \leq 0.05$)		T-Test ($P \leq 0.001$)		Tukey Test ($P \leq 0.05$)		T-Test ($P \leq 0.001$)	
		Normality		Equal Variance																
Parameter	**Plot**	Result	P	Result	P	F	P	Sig	P	Sig	P	Sig	P	Sig	P	Sig	P	Sig	P	Sig
Total P	**Non-Vegetated**	pass	0.099	pass	0.519	13.741	<0.001	Y	<0.001	Y	<0.001	Y	0.715	N	0.497	N	0.003	Y	0.003	N*
	Vegetated	fail	<0.050	pass	0.121	5.095	0.020	Y	0.346	N	0.001	Y	0.221	N	0.171	N	0.016	Y	0.026	N*
	Mixed Vegetation	pass	0.151	pass	0.711	0.078	0.925	N	--	--	0.814	N	--	--	0.901	N	--	--	0.666	N
Phosphate PO_4-P	**Non-Vegetated**	pass	0.198	pass	0.149	12.858	<0.001	Y	0.002	Y	0.004	N*	0.999	N	0.962	N	0.002	Y	0.002	N*
	Vegetated	pass	0.071	pass	0.346	4.992	0.022	Y	0.814	N	0.571	N	0.076	N	0.009	N*	0.023	Y	0.028	N*
	Mixed Vegetation	fail	<0.050	pass	0.678	2.805	0.095	N	--	--	0.073	N	--	--	0.251	N	--	--	0.189	N
Nitrate NO_3-N	**Non-Vegetated**	fail	<0.050	fail	<0.050	0.074	0.929	N	--	--	0.792	N	--	--	0.792	N	--	--	<0.001	Y
	Vegetated	fail	<0.050	fail	<0.050	7.631	0.005	Y	0.011	Y	0.020	N*	0.011	Y	0.020	N*	1.000	N	<0.001	Y
	Mixed Vegetation	fail	<0.050	fail	<0.050	2.223	0.145	N	--	--	0.148	N	--	--	0.190	N	--	--	<0.001	Y
DOC	**Non-Vegetated**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Vegetated	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Mixed Vegetation	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH	**Non-Vegetated**	fail	<0.050	pass	0.285	1.308	0.302	N	--	--	0.895	N	--	--	0.003	N*	--	--	0.296	N
	Vegetated	fail	<0.050	pass	0.329	0.121	0.887	N	--	--	0.378	N	--	--	0.720	N	--	--	0.964	N
	Mixed Vegetation	pass	0.164	pass	0.373	1.623	0.232	N	--	--	0.173	N	--	--	0.847	N	--	--	0.251	N
Total Alkalinity as $CaCO_3$	**Non-Vegetated**	pass	0.136	pass	0.798	7.648	0.006	Y	0.010	Y	0.010	N*	0.997	N	0.948	N	0.016	Y	0.002	N*
	Vegetated	pass	0.625	pass	0.399	0.743	0.495	N	--	--	0.306	N	--	--	0.501	N	--	--	0.534	N
	Mixed Vegetation	pass	0.316	pass	0.304	8.716	0.003	Y	0.004	Y	0.007	N*	0.849	N	0.626	N	0.018	Y	0.001	Y
Conduc-tivity	**Non-Vegetated**	pass	0.318	pass	0.977	9.891	0.002	Y	0.005	Y	0.005	N*	0.991	N	0.903	N	0.005	Y	0.002	N*
	Vegetated	pass	0.834	pass	0.290	0.169	0.846	N	--	--	0.633	N	--	--	0.827	N	--	--	0.729	N
	Mixed Vegetation	pass	0.392	pass	0.398	8.853	0.003	Y	0.004	Y	0.006	N*	0.871	N	0.644	N	0.016	Y	0.003	N*
Total Al	**Non-Vegetated**	pass	0.496	pass	0.510	1.929	0.180	N	--	--	0.328	N	--	--	0.106	N	--	--	0.311	N
	Vegetated	pass	0.693	fail	<0.050	12.517	<0.001	Y	<0.001	Y	<0.001	Y	0.010	Y	0.021	N*	0.514	N	0.332	N
	Mixed Vegetation	fail	<0.050	pass	0.507	21.545	<0.001	Y	<0.001	Y	<0.001	Y	<0.001	Y	0.001	Y	1.000	N	0.941	N
Total Ba	**Non-Vegetated**	pass	0.071	pass	0.896	2.092	0.158	N	--	--	0.204	N	--	--	0.673	N	--	--	0.092	N
	Vegetated	fail	<0.050	pass	0.186	0.482	0.628	N	--	--	0.691	N	--	--	0.312	N	--	--	0.431	N
	Mixed Vegetation	pass	0.396	pass	0.704	8.479	0.004	Y	0.014	Y	0.017	N*	0.812	N	0.517	N	0.006	Y	0.002	N*
Total Ca	**Non-Vegetated**	pass	0.189	pass	0.860	5.798	0.014	Y	0.031	Y	0.036	N*	0.979	N	0.835	N	0.021	Y	0.006	N*
	Vegetated	pass	0.403	pass	0.261	0.226	0.801	N	--	--	0.548	N	--	--	0.766	N	--	--	0.729	N
	Mixed Vegetation	pass	0.139	pass	0.488	16.878	<0.001	Y	<0.001	Y	<0.001	Y	0.608	N	0.383	N	0.002	Y	<0.001	Y
Total Fe	**Non-Vegetated**	fail	<0.050	pass	0.443	1.105	0.357	N	--	--	0.256	N	--	--	0.531	N	--	--	0.363	N
	Vegetated	pass	0.069	pass	0.756	2.277	0.139	N	--	--	0.442	N	--	--	0.116	N	--	--	0.082	N
	Mixed Vegetation	pass	0.082	pass	0.895	2.124	0.156	N	--	--	0.102	N	--	--	0.414	N	--	--	0.254	N
Total K	**Non-Vegetated**	pass	0.465	pass	0.972	1.782	0.202	N	--	--	0.445	N	--	--	0.306	N	--	--	0.084	N
	Vegetated	pass	0.062	pass	0.383	0.717	0.505	N	--	--	0.342	N	--	--	0.164	N	--	--	0.899	N
	Mixed Vegetation	pass	0.335	pass	0.502	2.432	0.124	N	--	--	0.104	N	--	--	0.088	N	--	--	0.543	N
Total Mg	**Non-Vegetated**	fail	<0.050	pass	0.517	2.836	0.090	N	--	--	0.096	N	--	--	0.772	N	--	--	0.110	N
	Vegetated	fail	<0.050	pass	0.265	0.875	0.438	N	--	--	0.576	N	--	--	0.237	N	--	--	0.275	N

Table B.1.14 - Victoria Point, Water Sample Statistical Analysis by Plot

		All Months (All depths)							August vs. September (All depths)				September vs. October (All depths)				August vs. October (All depths)			
		Data Test (P ≥ 0.05)				ANOVA (P ≤ 0.05)			Tukey Test (P ≤ 0.05)		T-Test (P ≤ 0.001)		Tukey Test (P ≤ 0.05)		T-Test (P ≤ 0.001)		Tukey Test (P ≤ 0.05)		T-Test (P ≤ 0.001)	
		Normality		Equal Variance																
Parameter	**Plot**	Result	P	Result	P	F	P	Sig	P	Sig	P	Sig	P	Sig	P	Sig	P	Sig	P	Sig
	Mixed Vegetation	pass	0.458	pass	0.250	20.876	<0.001	Y	<0.001	Y	<0.001	Y	0.089	N	0.091	N	0.005	Y	0.002	N*
Total Mn	**Non-Vegetated**	pass	0.618	pass	0.698	4.613	0.027	Y	0.027	Y	0.030	N*	0.762	N	0.438	N	0.103	N	0.043	N*
	Vegetated	pass	0.138	pass	0.659	6.052	0.013	Y	0.366	N	0.198	N	0.120	N	0.023	N*	0.010	Y	0.016	N*
	Mixed Vegetation	pass	0.938	pass	0.585	4.095	0.040	Y	0.047	Y	0.023	N*	0.945	N	0.781	N	0.105	N	0.032	N*
Total Na	**Non-Vegetated**	pass	0.233	pass	0.093	0.148	0.863	N	--	--	0.514	N	--	--	0.711	N	--	--	0.927	N
	Vegetated	pass	0.181	pass	0.951	14.243	<0.001	Y	0.996	N	0.937	N	0.001	Y	<0.001	Y	0.001	Y	0.001	Y
	Mixed Vegetation	pass	0.340	pass	0.627	1.632	0.231	N	--	--	0.274	N	--	--	0.527	N	--	--	0.107	N
Total S	**Non-Vegetated**	pass	0.069	pass	0.682	0.631	0.546	N	--	--	0.334	N	--	--	0.611	N	--	--	0.487	N
	Vegetated	pass	0.610	pass	0.569	3.146	0.074	N	--	--	0.477	N	--	--	0.061	N	--	--	0.057	N
	Mixed Vegetation	pass	0.159	pass	0.813	2.046	0.166	N	--	--	0.251	N	--	--	0.062	N	--	--	0.432	N
Total Sr	**Non-Vegetated**	pass	0.419	pass	0.927	2.773	0.094	N	--	--	0.075	N	--	--	0.563	N	--	--	0.104	N
	Vegetated	pass	0.244	pass	0.198	1.028	0.383	N	--	--	0.408	N	--	--	0.431	N	--	--	0.270	N
	Mixed Vegetation	pass	0.070	pass	0.597	18.995	<0.001	Y	<0.001	Y	<0.001	Y	0.549	N	0.369	N	0.001	Y	<0.001	Y
Total Zn	**Non-Vegetated**	pass	0.091	fail	<0.050	1.991	0.171	N	--	--	<0.001	Y	--	--	0.527	N	--	--	0.339	N
	Vegetated	pass	0.264	fail	<0.050	7.106	0.007	Y	0.471	N	0.044	N*	0.055	N	0.067	N	0.006	Y	0.010	N*
	Mixed Vegetation	pass	0.651	fail	<0.050	3.038	0.080	N	--	--	0.479	N	--	--	0.068	N	--	--	0.148	N

Notes
All depths = 10-0 cm above sediment-water interface, 0-10 cm, 10-20 cm, 20-30 cm, 30-40 cm and 40-50 cm below sediment-water interface
Sig = Significant; Y = Yes; N = No; N* = T-Test only: No based on P value ≤0.001, Yes based on P value ≤0.05
Value -- in grey box = data not available / incalculable

B.2 – Graphs

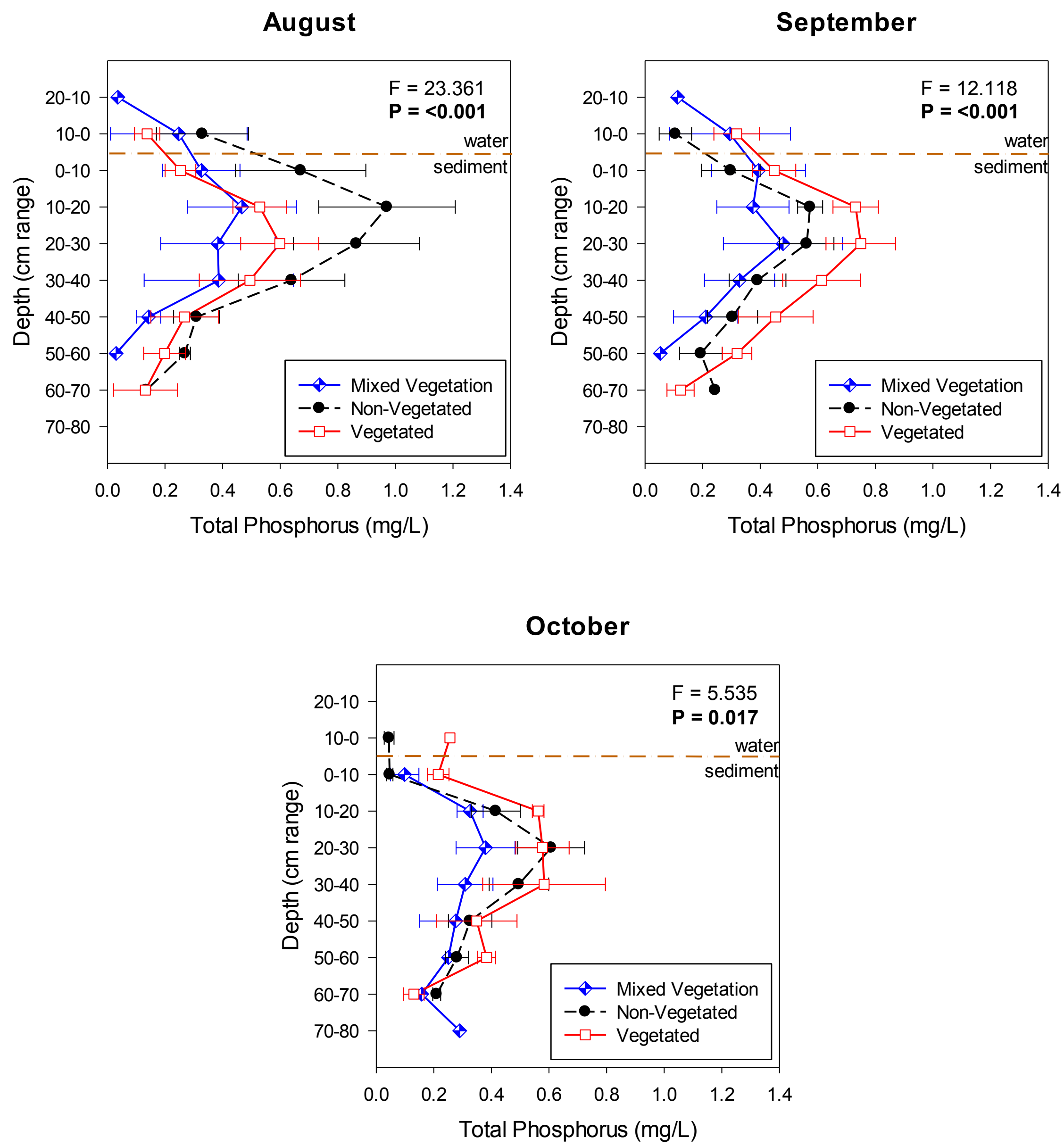


Figure B.2.1 – Victoria Point, Total Phosphorus, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. Note: October water level extremely low with little vegetation remaining in all plots. ANOVA test (comparing all plots, depths: 10-0 cm above to 40-50 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

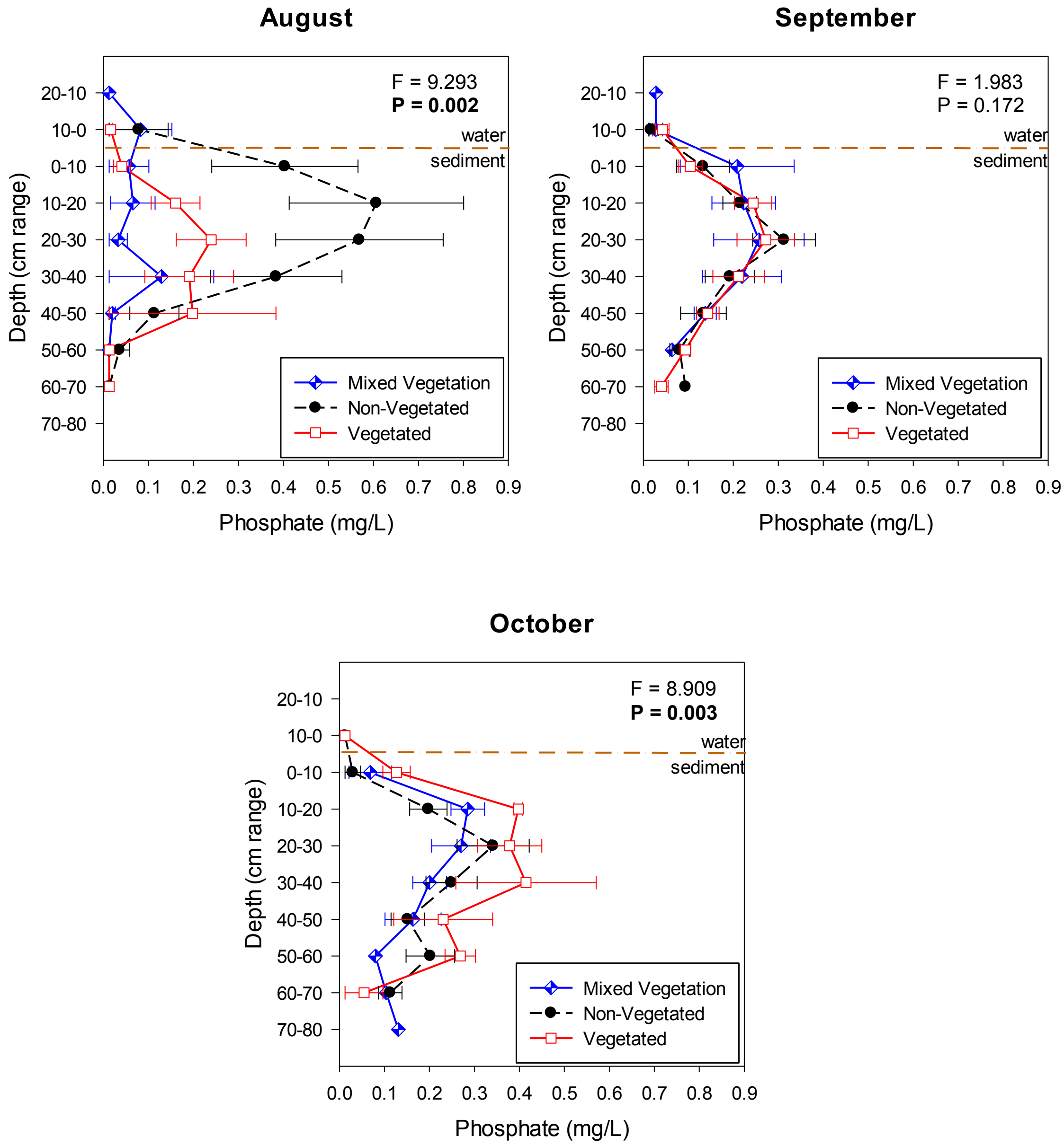


Figure B.2.2 – Victoria Point, Phosphate PO_4-P, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. Removed one outlier from Mixed Vegetation September data (10-0 cm depth = 0.761 mg/L). Note: October water level extremely low with little vegetation remaining in all plots. ANOVA test (comparing all plots, no outliers removed, depths: 10-0 cm above to 40-50 cm below sediment-water interface), results significant at $P \leq 0.05$ (bold).

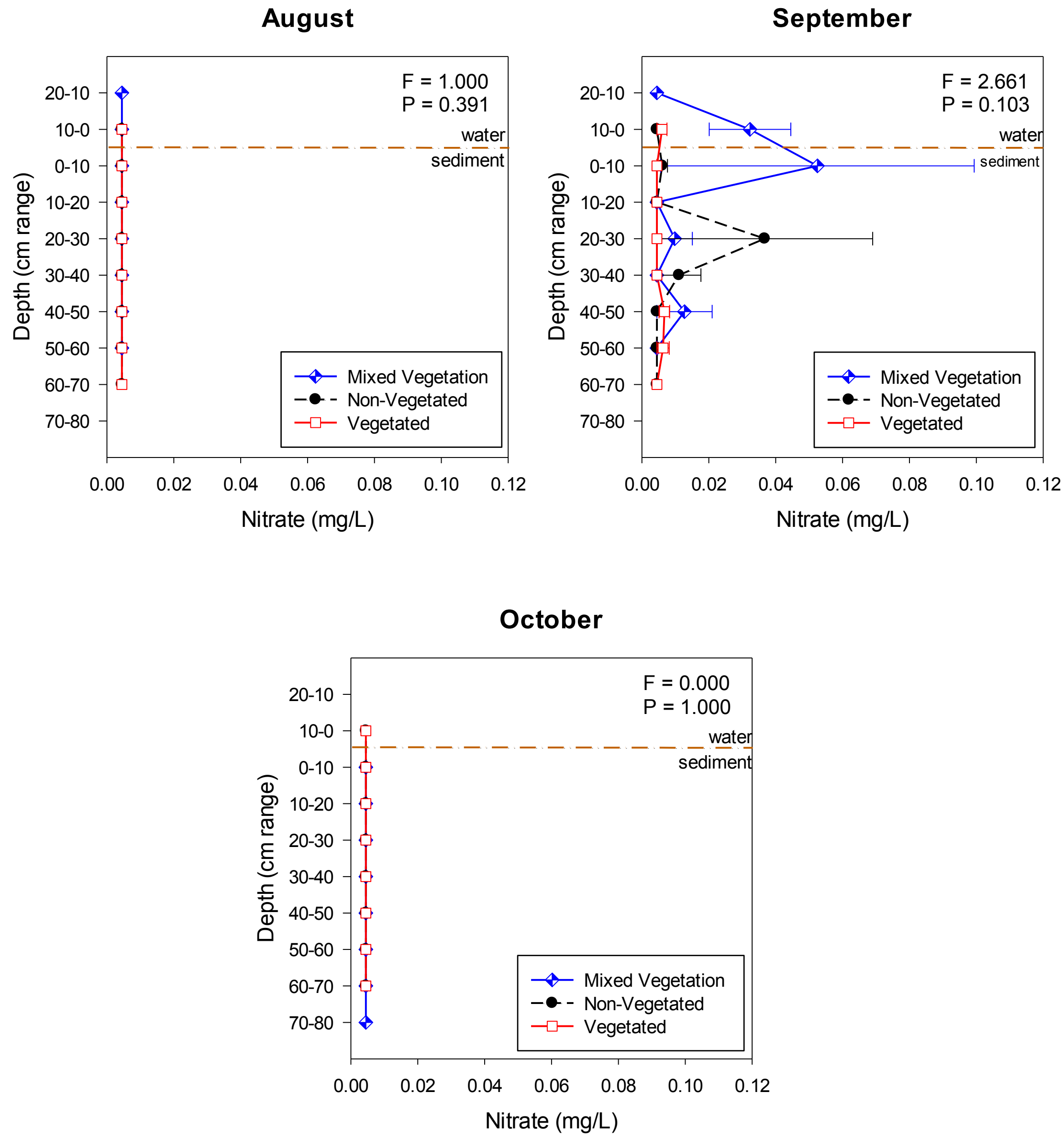


Figure B.2.3 – Victoria Point, Nitrate NO_3-N, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. Note: October water level extremely low with little vegetation remaining in all plots. ANOVA test (comparing all plots, depths: 10-0 cm above to 40-50 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

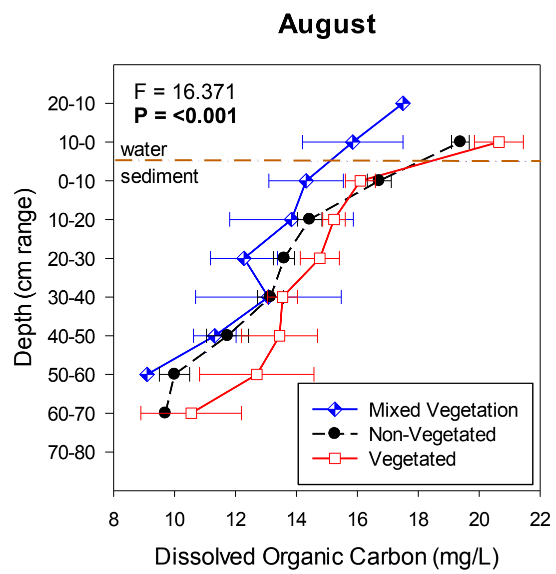
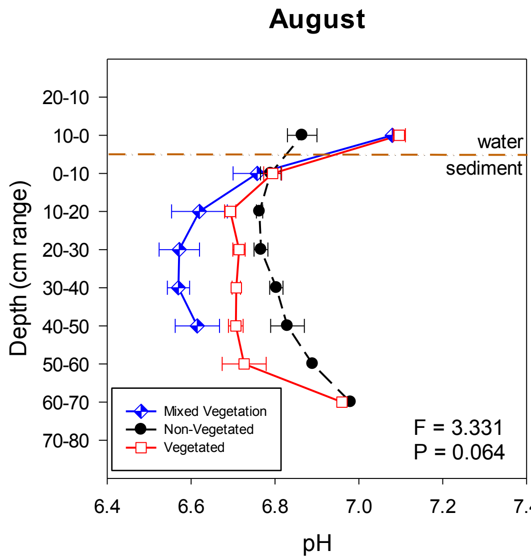
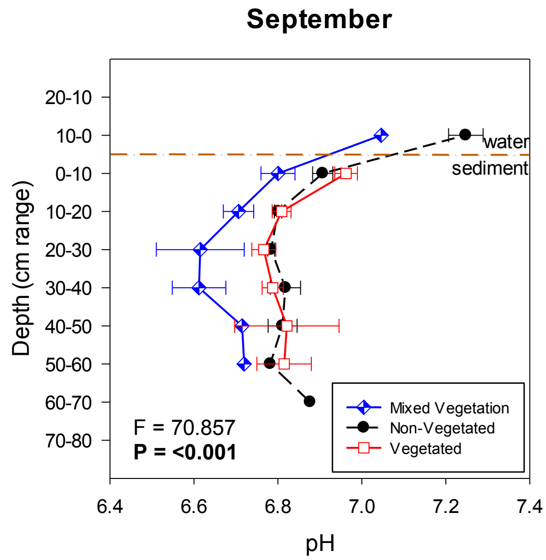


Figure B.2.4 – Victoria Point, Dissolved Organic Carbon, August water profile. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. ANOVA test (comparing all plots, depths: 10-0 cm above to 40-50 cm below sediment-water interface), results significant at P≤ 0.05 (bold).





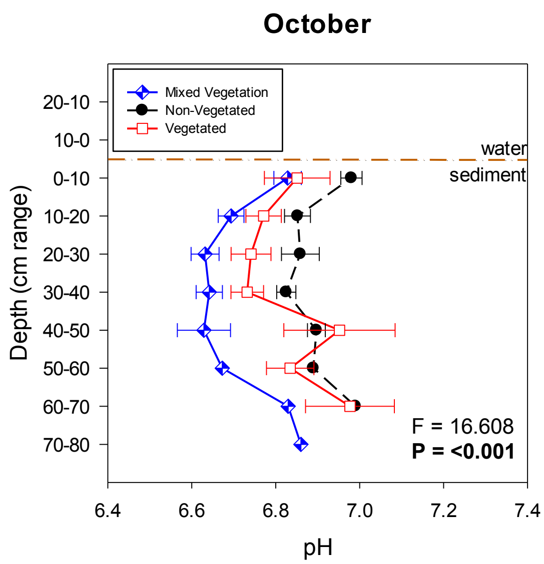


Figure B.2.5 – Victoria Point, pH, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. Note: October water level extremely low with little vegetation remaining in all plots. ANOVA test (comparing all plots, depths: 10-0 cm above to 40-50 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

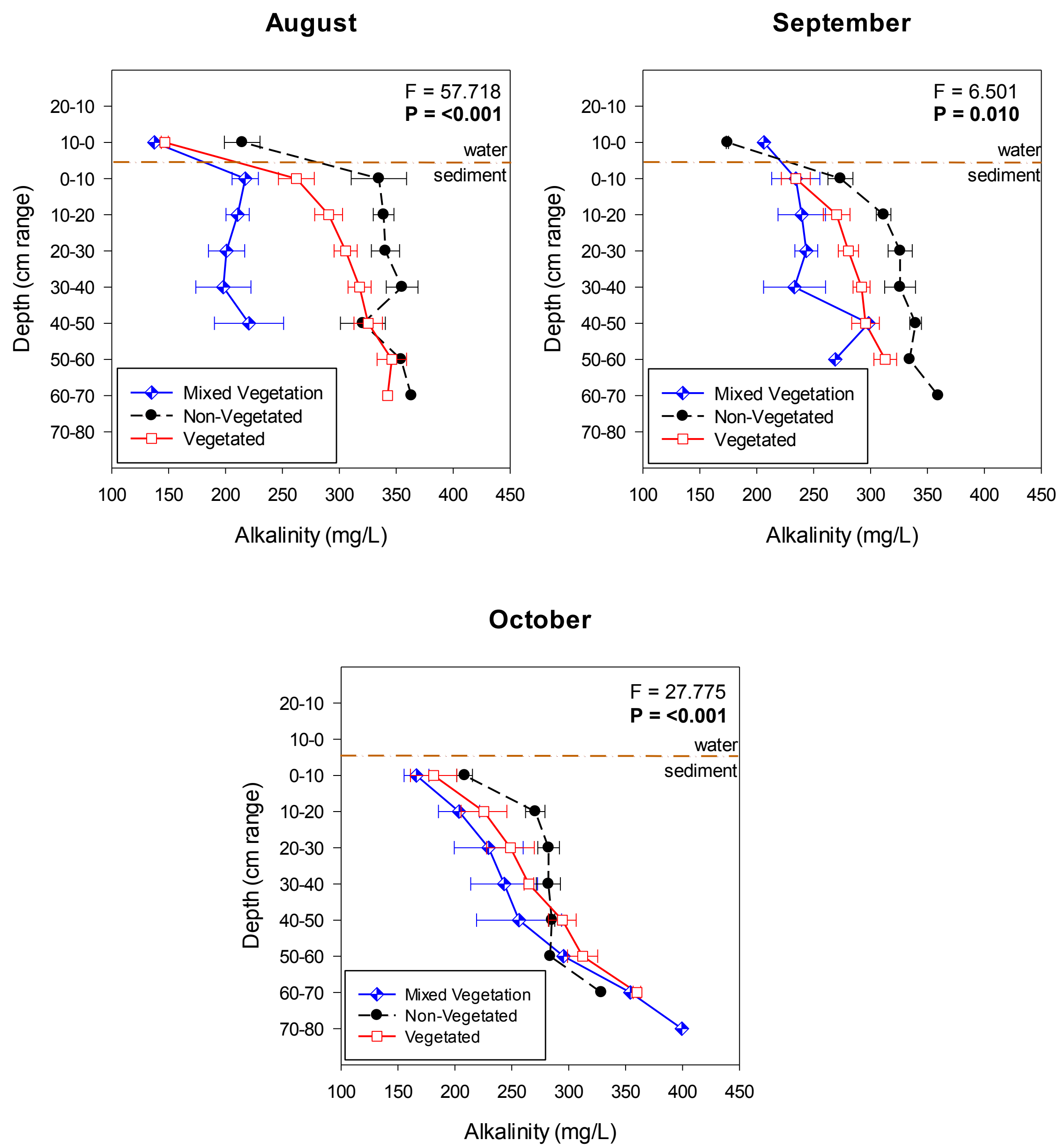


Figure B.2.6 – Victoria Point, Total Alkalinity as $CaCO_3$, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. Note: October water level extremely low with little vegetation remaining in all plots. ANOVA test (comparing all plots, depths: 10-0 cm above to 40-50 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

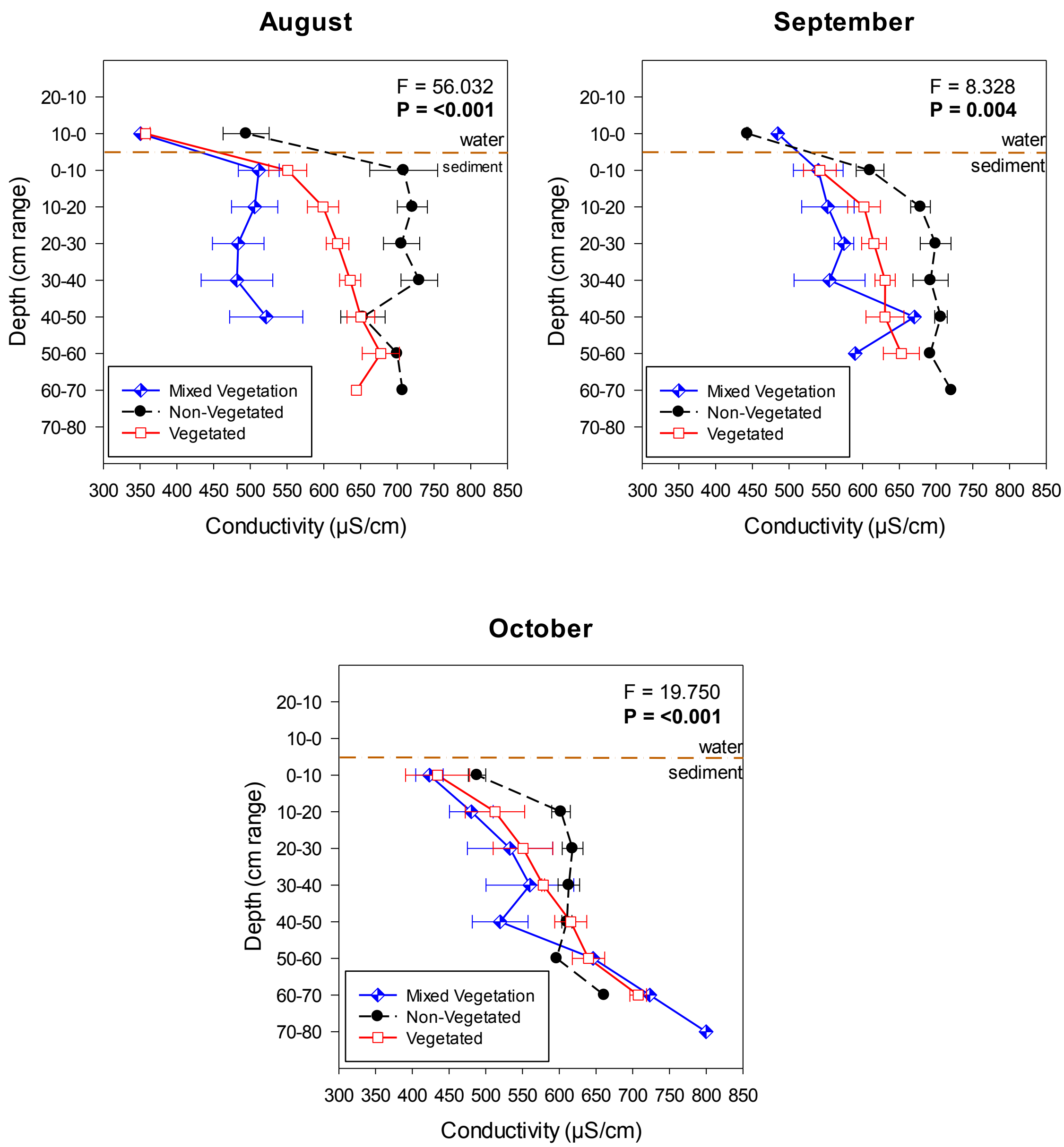


Figure B.2.7 – Victoria Point, Conductivity, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. Removed one outlier from Mixed Vegetation October data (40-50 cm depth = 836.6 µS/cm). Note: October water level extremely low with little vegetation remaining in all plots. ANOVA test (comparing all plots, no outliers removed, depths: 10-0 cm above to 40-50 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

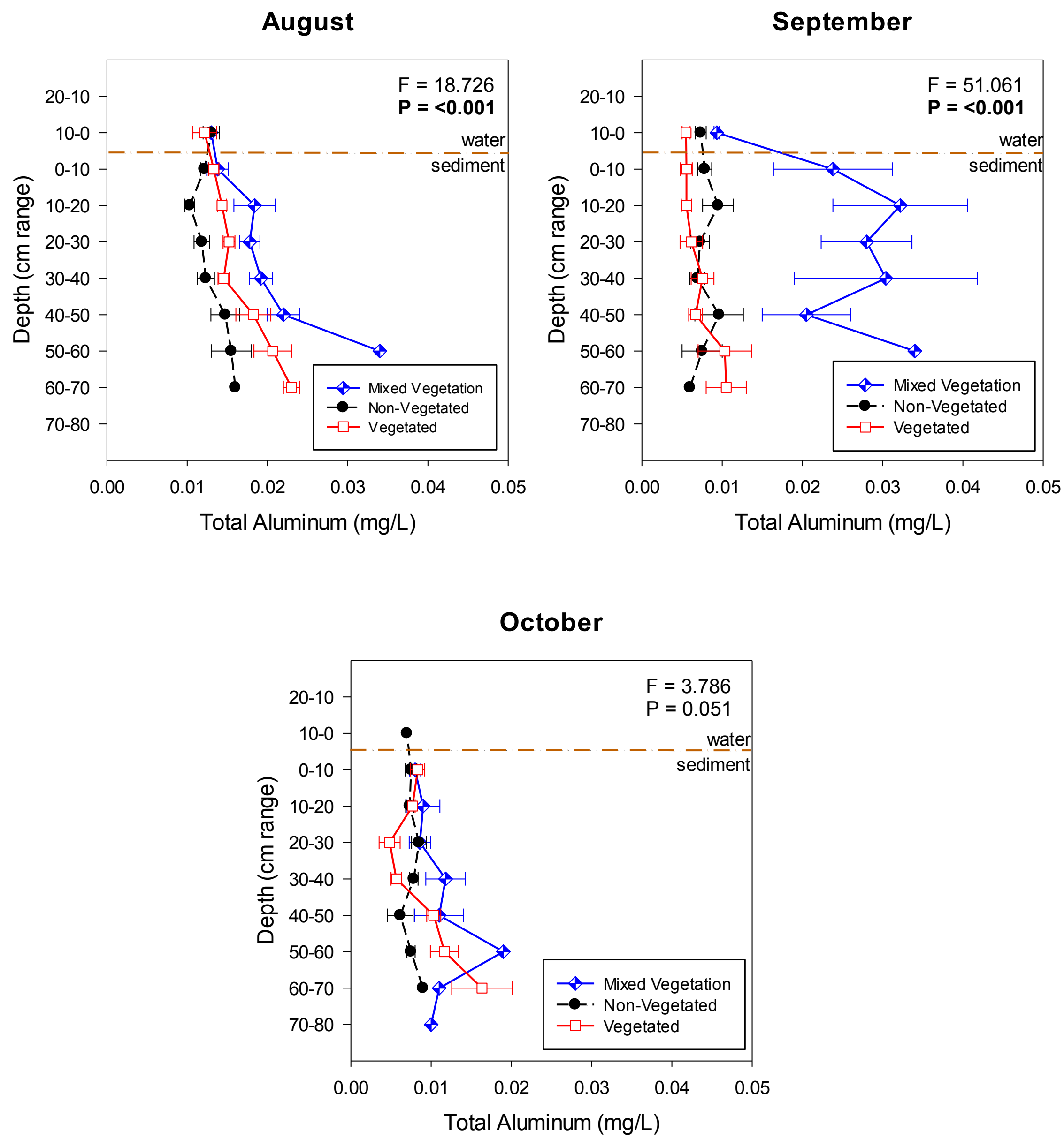


Figure B.2.8 – Victoria Point, Total Aluminum, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. Note: October water level extremely low with little vegetation remaining in all plots. ANOVA test (comparing all plots, depths: 10-0 cm above to 40-50 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

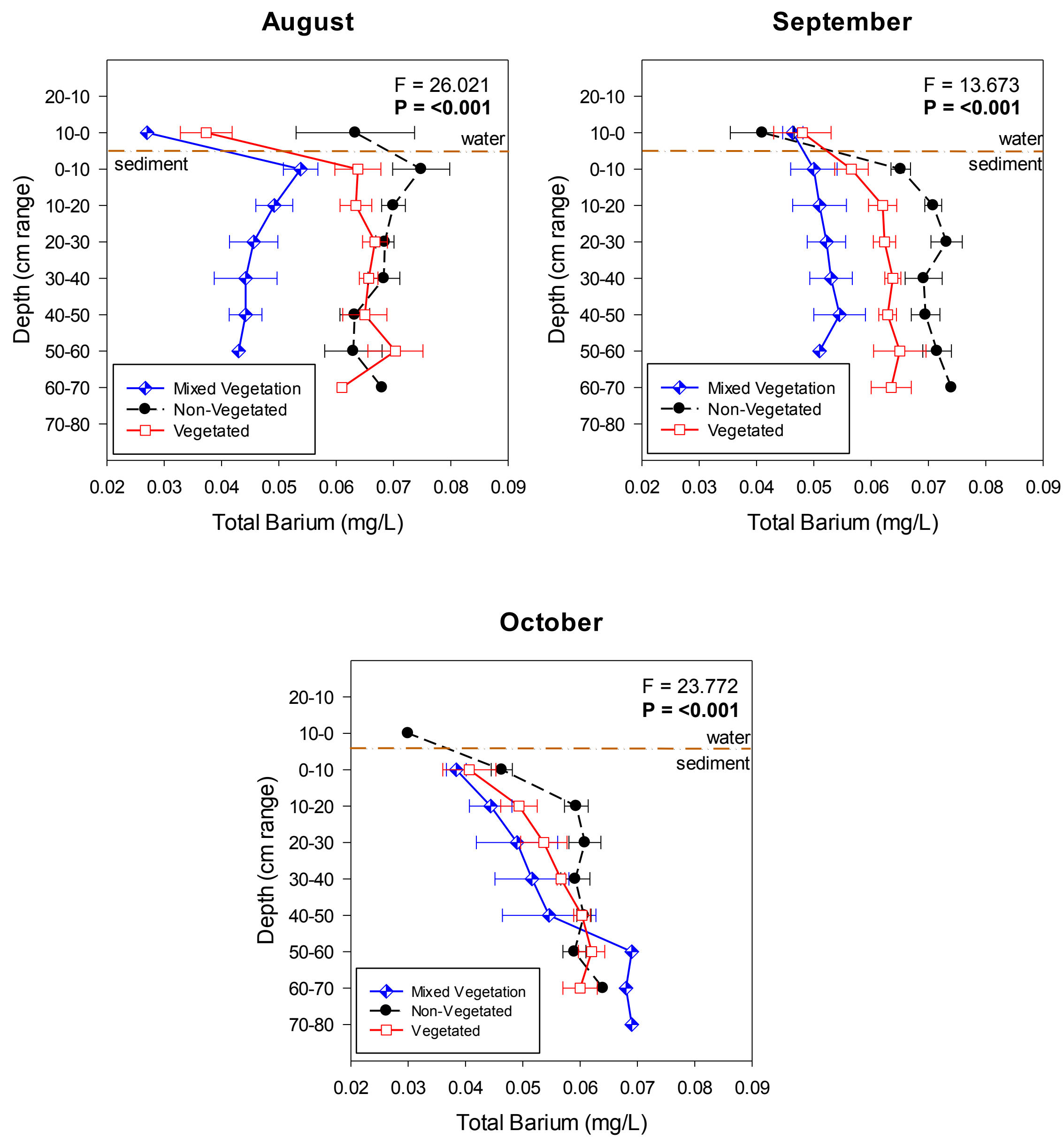


Figure B.2.9 – Victoria Point, Total Barium, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. Note: October water level extremely low with little vegetation remaining in all plots. ANOVA test (comparing all plots, depths: 10-0 cm above to 40-50 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

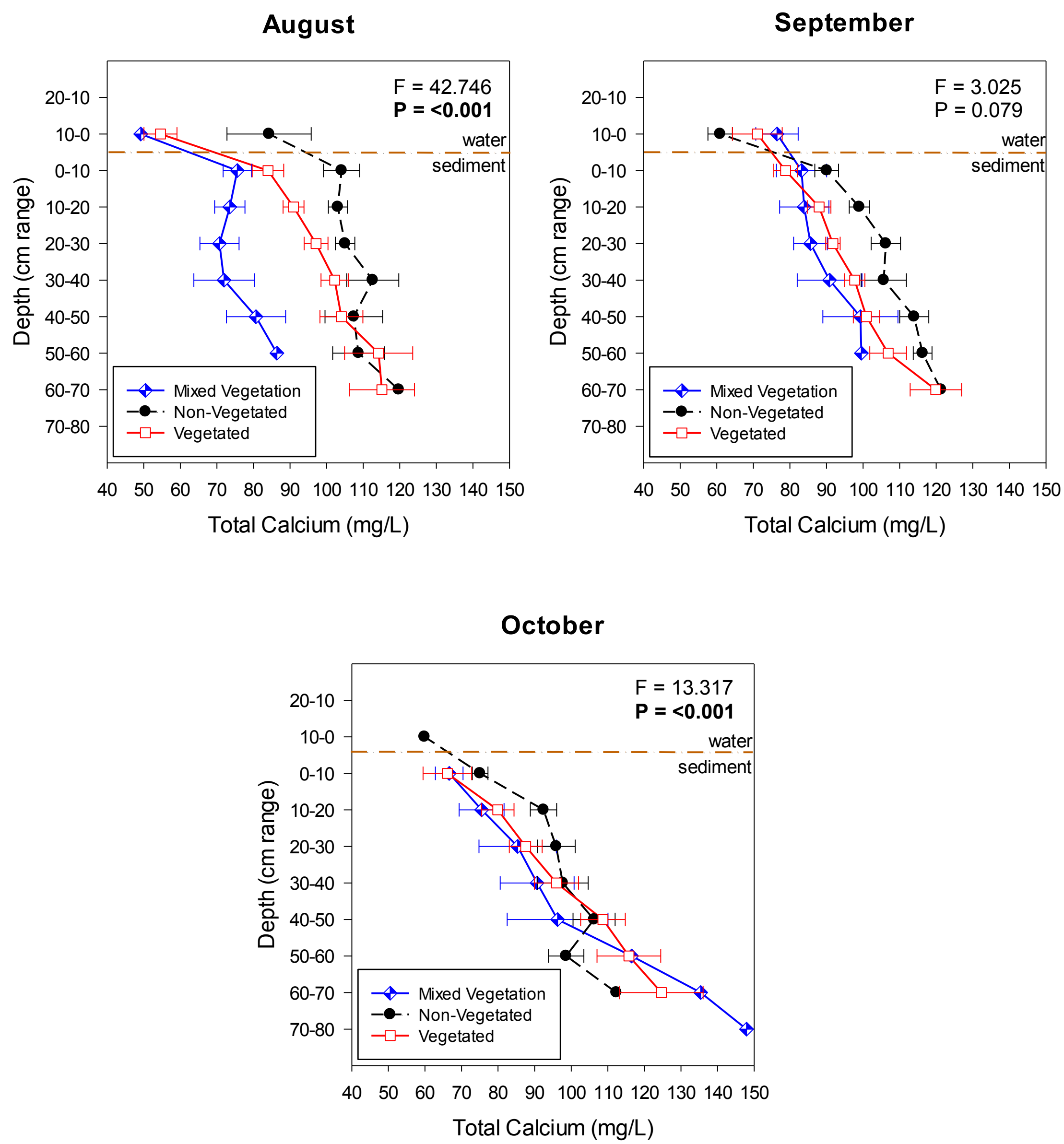


Figure B.2.10 – Victoria Point, Total Calcium, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. Note: October water level extremely low with little vegetation remaining in all plots. ANOVA test (comparing all plots, depths: 10-0 cm above to 40-50 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

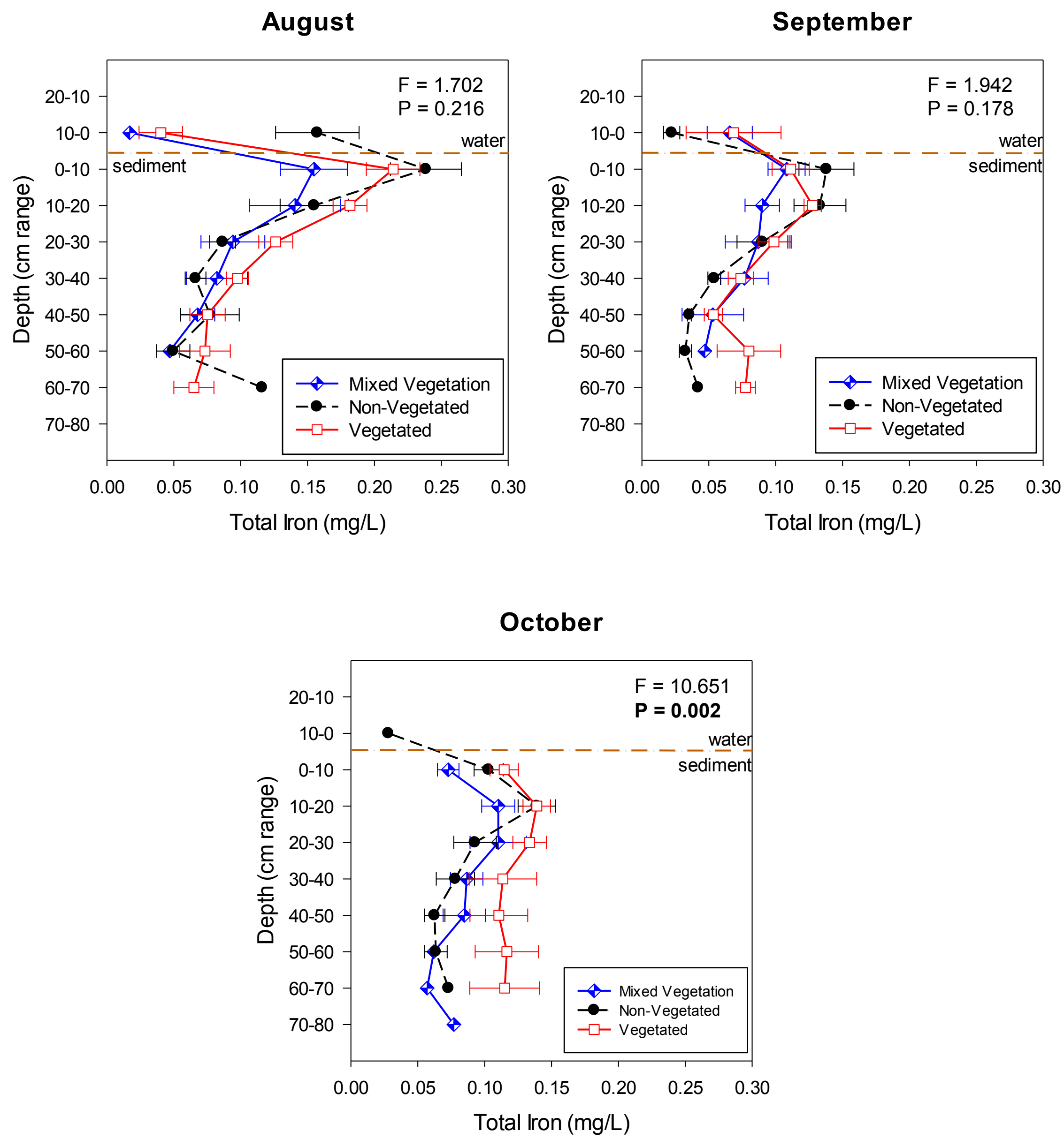


Figure B.2.11 – Victoria Point, Total Iron, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. Note: October water level extremely low with little vegetation remaining in all plots. ANOVA test (comparing all plots, depths: 10-0 cm above to 40-50 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

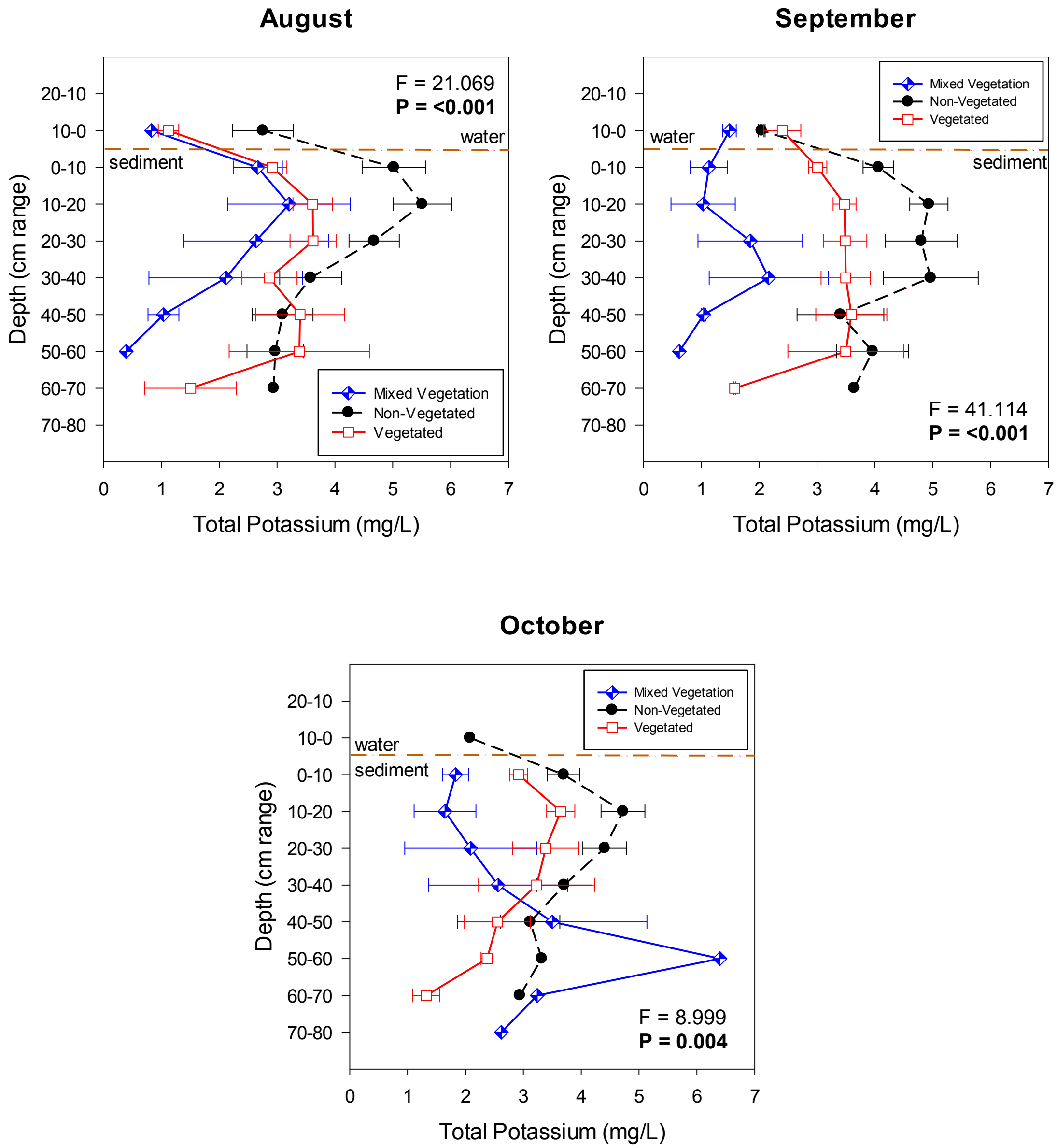


Figure B.2.12 – Victoria Point, Total Potassium, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. Note: October water level extremely low with little vegetation remaining in all plots. ANOVA test (comparing all plots, depths: 10-0 cm above to 40-50 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

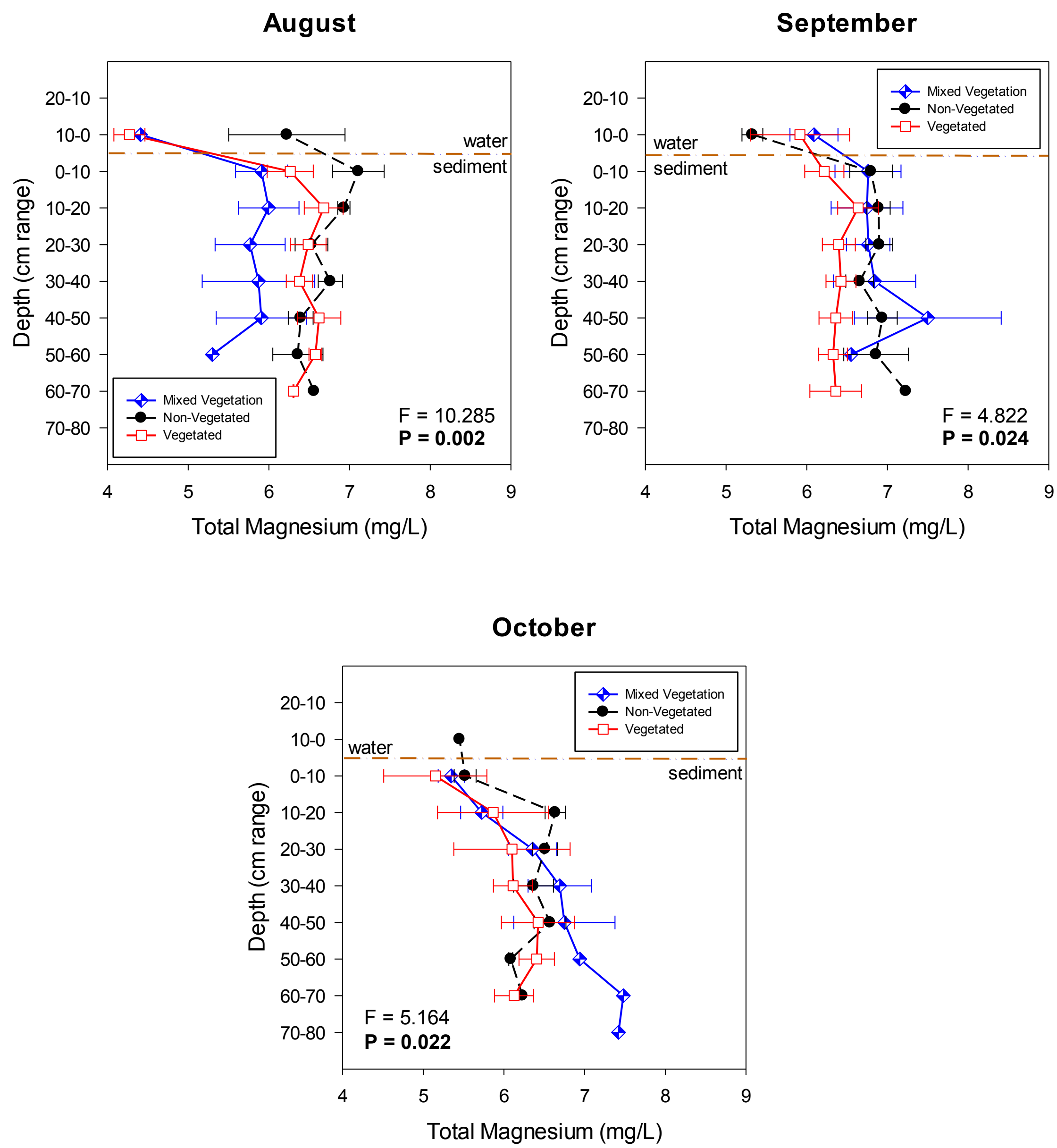


Figure B.2.13 – Victoria Point, Total Magnesium, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. Note: October water level extremely low with little vegetation remaining in all plots. ANOVA test (comparing all plots, depths: 10-0 cm above to 40-50 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

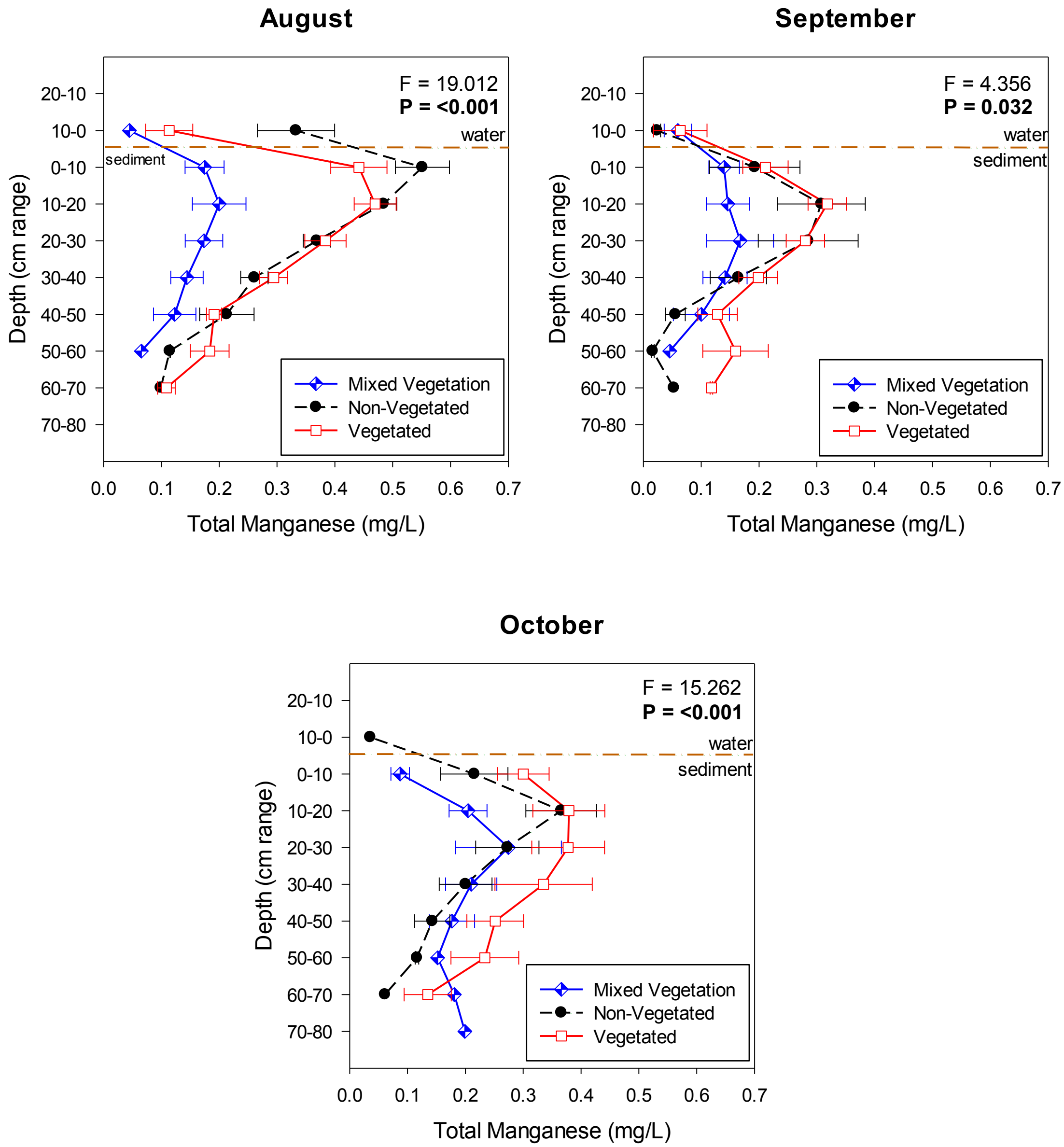


Figure B.2.14 – Victoria Point, Total Manganese, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. Note: October water level extremely low with little vegetation remaining in all plots. ANOVA test (comparing all plots, depths: 10-0 cm above to 40-50 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

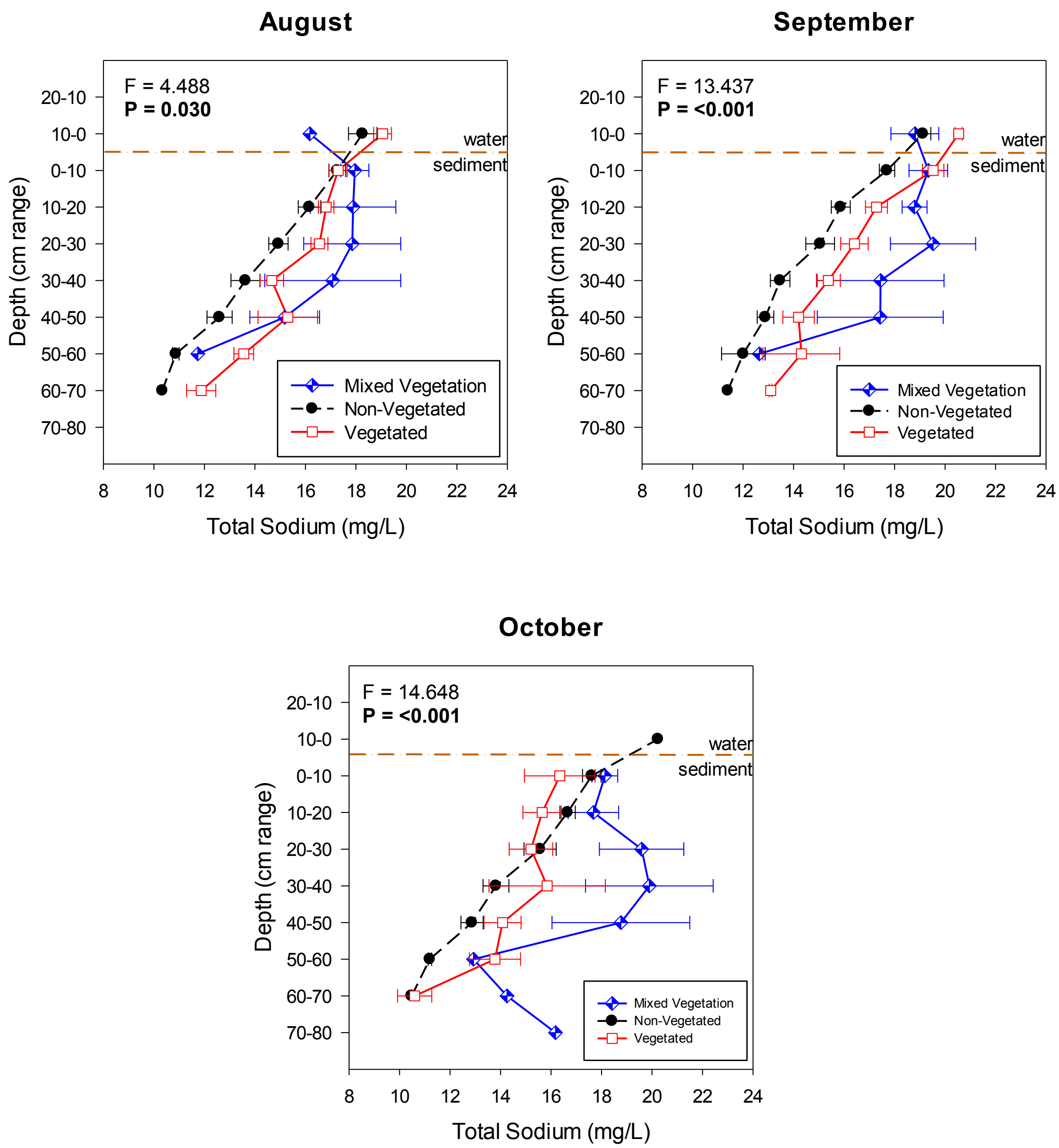


Figure B.2.15 – Victoria Point, Total Sodium, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. Note: October water level extremely low with little vegetation remaining in all plots. ANOVA test (comparing all plots, depths: 10-0 cm above to 40-50 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

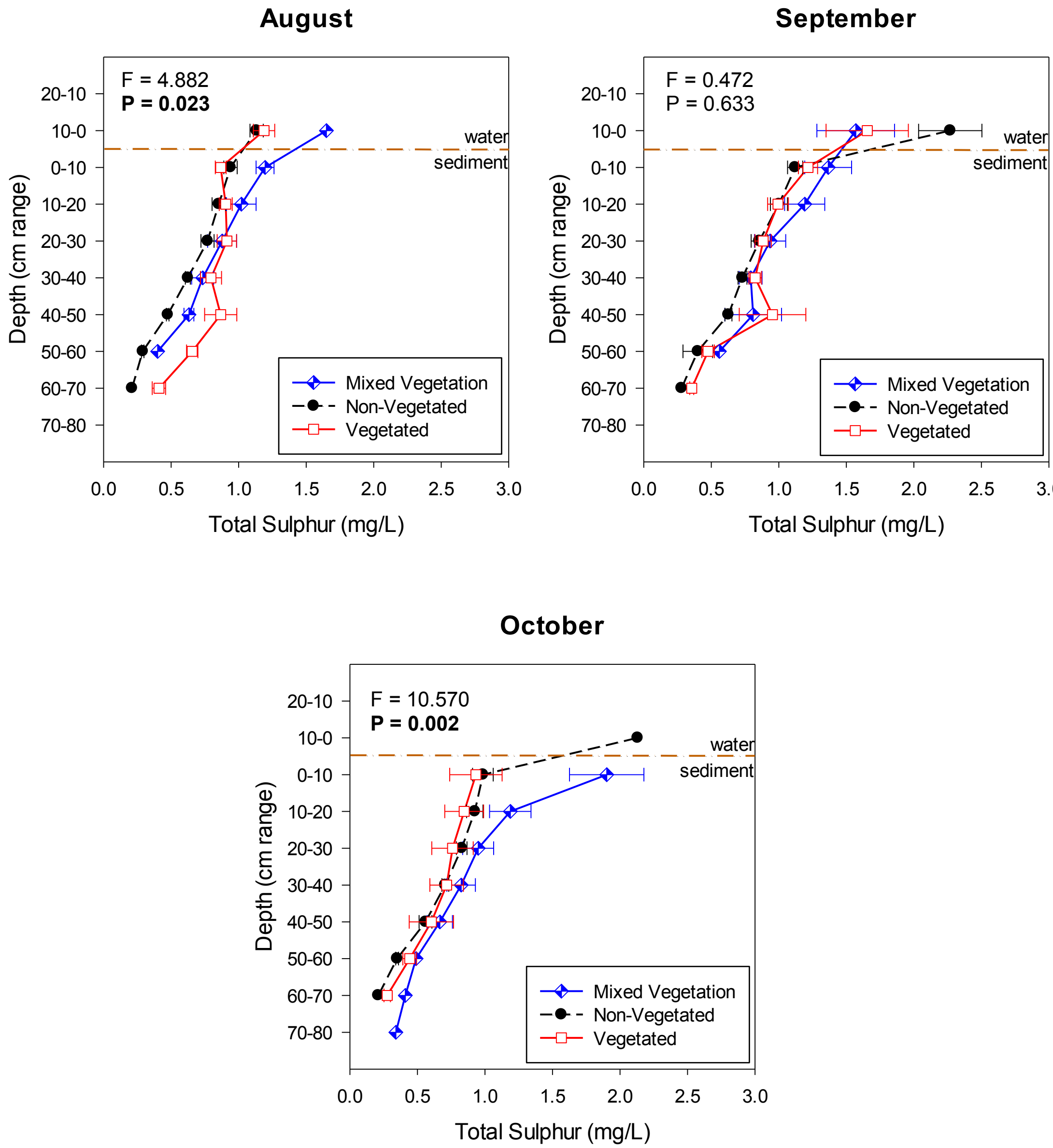


Figure B.2.16 – Victoria Point, Total Sulphur, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. Note: October water level extremely low with little vegetation remaining in all plots. ANOVA test (comparing all plots, depths: 10-0 cm above to 40-50 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

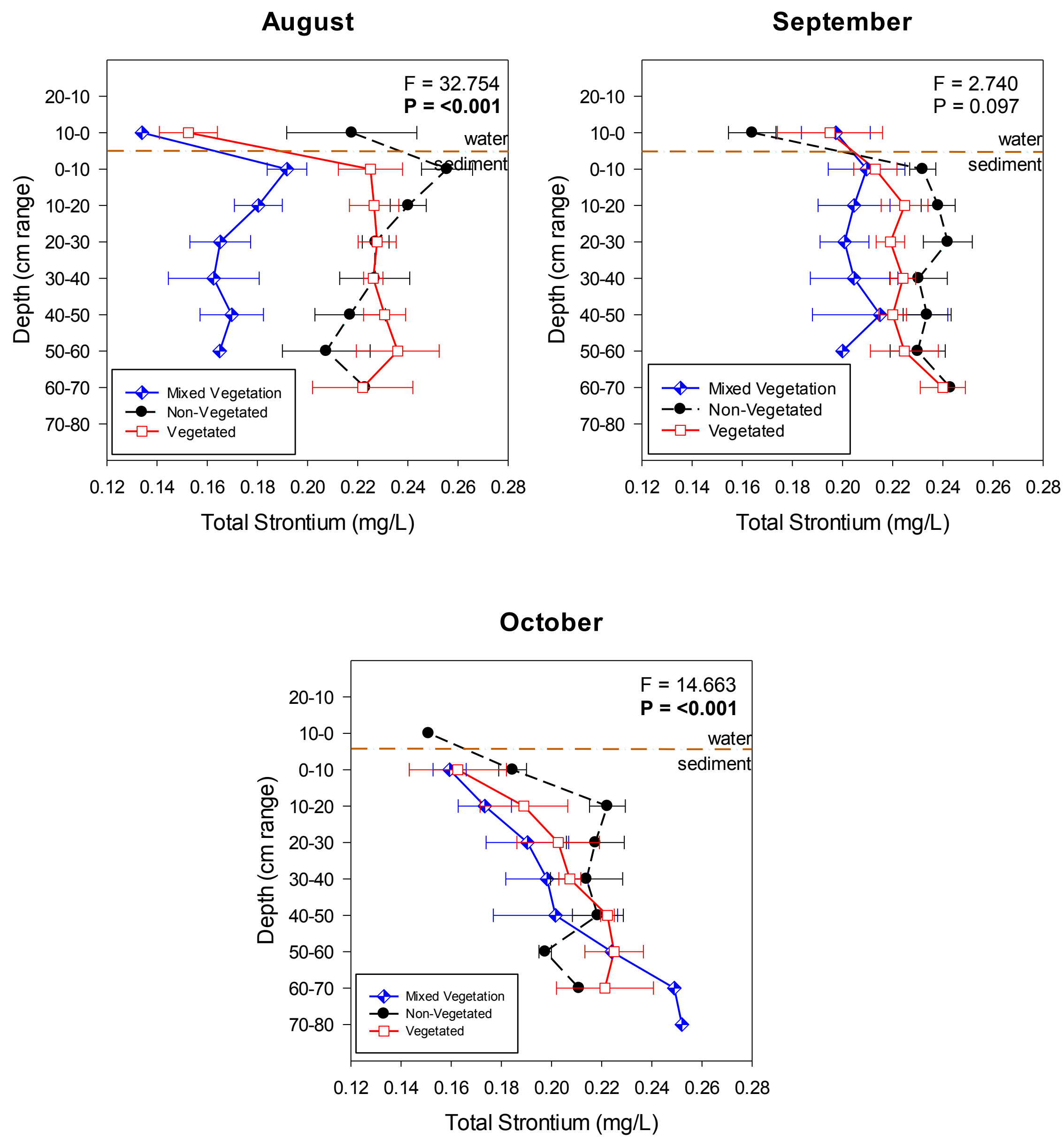


Figure B.2.17 – Victoria Point, Total Strontium, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. Note: October water level extremely low with little vegetation remaining in all plots. ANOVA test (comparing all plots, depths: 10-0 cm above to 40-50 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

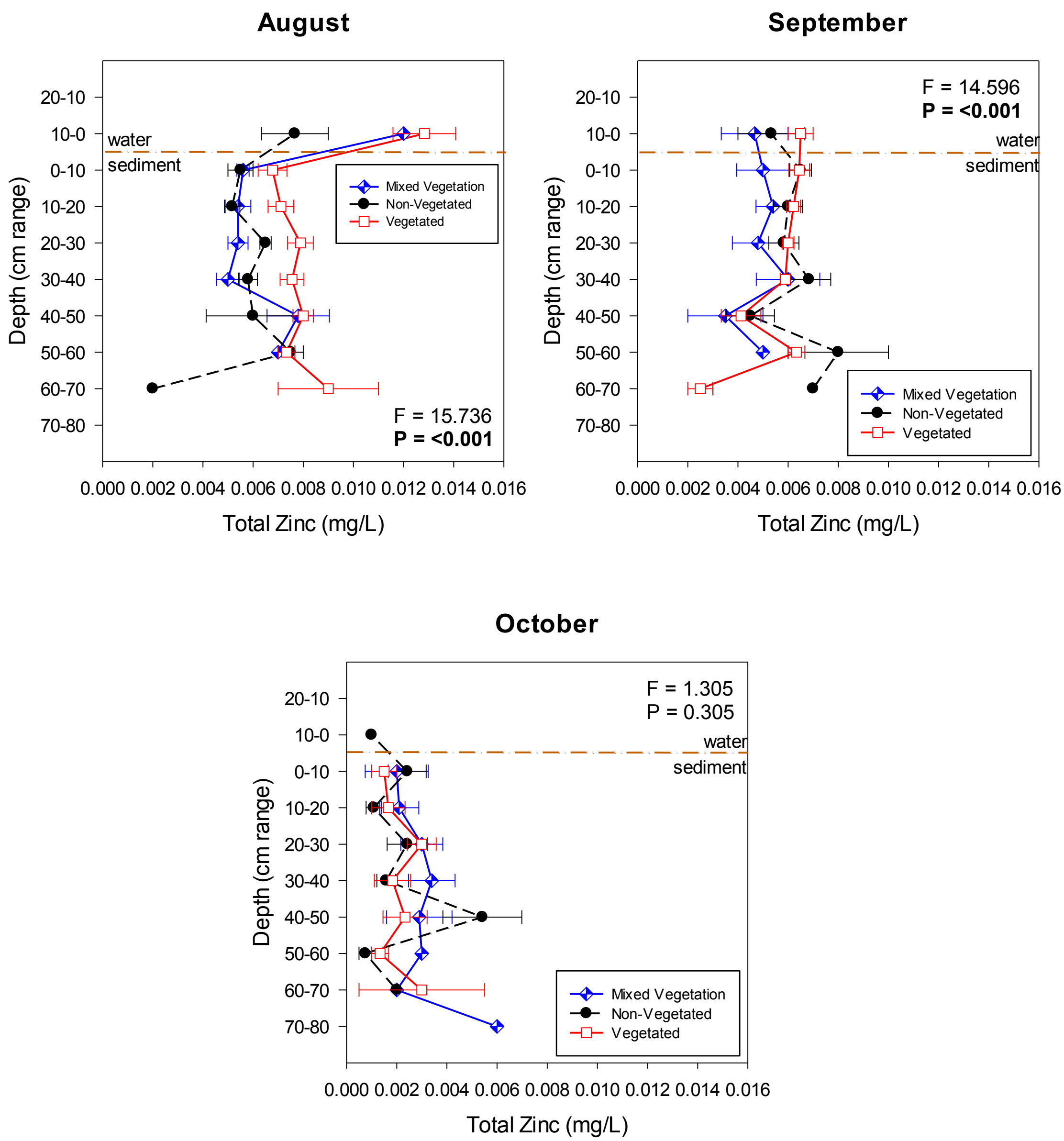


Figure B.2.18 – Victoria Point, Total Zinc, water profiles by month. Mean values plotted with error bars depicting one standard error. Dashed/dotted line indicates sediment-water interface. Note: October water level extremely low with little vegetation remaining in all plots. ANOVA test (comparing all plots, depths: 10-0 cm above to 40-50 cm below sediment-water interface), results significant at P≤ 0.05 (bold).

B.3 - Control Data

Table B.3.1 - Victoria Point, Water Sample Analytical Results, Control Data

Parameter / Method Detection Limit / Units

Lab ID	Month Analyzed	Sample Date	Sample ID	Total P	Phosphate PO_4-P	Nitrite NO_2-N	Nitrate NO_3-N	DOC	pH	Total Alkalinity as $CaCO_3$	Conductivity
				0.0050	*0.0250*	*0.006*	*0.0090*	*0.50*	*n/a*	*1.0*	*0.50*
				mg/L	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*n/a*	*mg/L*	*uS/cm*
EL100256-062	August	07/22/10	VP-Launch	0.0025	0.0125	0.003	0.0045	0.25	5.56	1.9	0.9
EL100261-105	August	08/26/10	MMVP-Control	0.0025	0.0125	0.018	0.0045	2.5	5.57	2.1	2.00
EL100256-061	August	08/25/10	VP-Water	0.0370	0.0125	0.003	0.0045	23.4	7.11	145.3	355.4
EL100303-132	September	08/25/10	VP-Launch	0.0130	0.0125	0.003	0.0170	--	5.54	1.3	1.10
EL100300-104	September	09/25/10	MMVPControl	0.0150	0.0125	0.003	0.0045	--	5.96	1.9	2.30
EL100303-131	September	09/25/10	VP-Water	0.0540	0.0125	0.003	0.0140	--	7.02	158.4	420.80
EL100336-095	October	09/25/10	VP-Launch	0.0090	0.0125	0.0030	0.0045	--	5.2910	1.0000	1.1000
EL100333-108	October	10/20/10	MM/VPControl	0.0025	0.0125	0.003	0.0045	--	5.57	1.4	1.50
EL100336-094	October	10/22/10	VP-Water	0.0690	0.0125	0.0030	0.0045	--	7.1610	151.7000	414.4000

Lab ID	Total Metals Al	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	S	Sr	Ti	V	Zn	Reactive Silicates SiO_2	Chlorophyll "a"
	0.0050	*0.0050*	*0.0030*	*0.002*	*0.0050*	*0.0010*	*0.010*	*0.002*	*0.002*	*0.002*	*0.10*	*0.010*	*0.0002*	*0.010*	*0.002*	*0.0050*	*0.050*	*0.0050*	*0.010*	*0.006*	*0.0010*	*0.25*	*0.2*
	mg/L	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*µg/L*
EL100256-062	0.0025	0.0025	0.0015	0.001	0.0110	0.0005	0.005	0.001	0.001	0.001	0.05	0.005	0.0001	0.005	0.001	0.0025	0.025	0.0025	0.005	0.003	0.0010	--	--
EL100261-105	0.0025	0.0025	0.0015	0.001	0.051	0.0005	0.005	0.001	0.001	0.001	0.05	0.01	0.0026	0.02	0.001	0.0025	0.025	0.0025	0.005	0.003	0.003	--	--
EL100256-061	0.0160	0.0025	0.0280	0.001	51.7000	0.0005	0.005	0.001	0.001	0.026	1.02	4.250	0.0116	18.580	0.001	0.0025	1.400	0.1440	0.005	0.003	0.0030	--	--
EL100303-132	0.0025	0.0025	0.0015	--	0.0080	--	--	--	--	0.001	0.05	0.005	0.0001	0.010	--	--	0.025	0.0025	--	--	0.0090	--	--
EL100300-104	0.0025	0.0025	0.0015	--	0.1090	--	--	--	--	0.001	0.05	0.010	0.0005	0.030	--	--	0.025	0.0025	--	--	0.0110	--	--
EL100303-131	0.0080	0.0060	0.0350	--	58.2070	--	--	--	--	0.025	2.42	5.080	0.0823	19.050	--	--	2.310	0.1520	--	--	0.0050	--	--
EL100336-095	0.0025	0.0025	0.0015	--	0.0025	--	--	--	--	0.0010	0.0500	0.0050	0.0001	0.0050	--	--	0.0250	0.0025	--	--	0.0090	--	--
EL100333-108	0.0025	0.0025	0.0015	--	0.0240	--	--	--	--	0.001	0.05	0.050	0.0003	0.020	--	--	0.025	0.0025	--	--	0.0040	--	--
EL100336-094	0.0150	0.0025	0.0300	--	62.7560	--	--	--	--	0.0360	2.0600	5.6700	0.0161	20.2200	--	--	2.4900	0.1560	--	--	0.0030	--	--

Notes

Sample ID code: Site (MM = Marchmont Marsh; VP = Victoria Point) - Sample Type (Launch = Surface Water on day of peeper deployment; Control = Control Apparatus Water Sample collected on day of peeper collection; Water = Surface Water on day of peeper collection)

Value -- in grey box = parameter not analyzed

Value in grey font = Value half of Detection Limit (result < Detection Limit)

B.4 – Photos

Figure B.4.1 – Victoria Point wetland, near Orillia, Ontario.

Figure B.4.2 – Victoria Point fence installation.

Figure B.4.3 – Victoria Point, completed fence.

Figure B.4.4 – Victoria Point, wild rice seeding.

Figure B.4.5 – Victoria Point, wild rice growth in vegetated plots.

Figure B.4.6 – Victoria Point, vegetation growth in mixed-vegetation plots (wild rice and water lilies dominant).

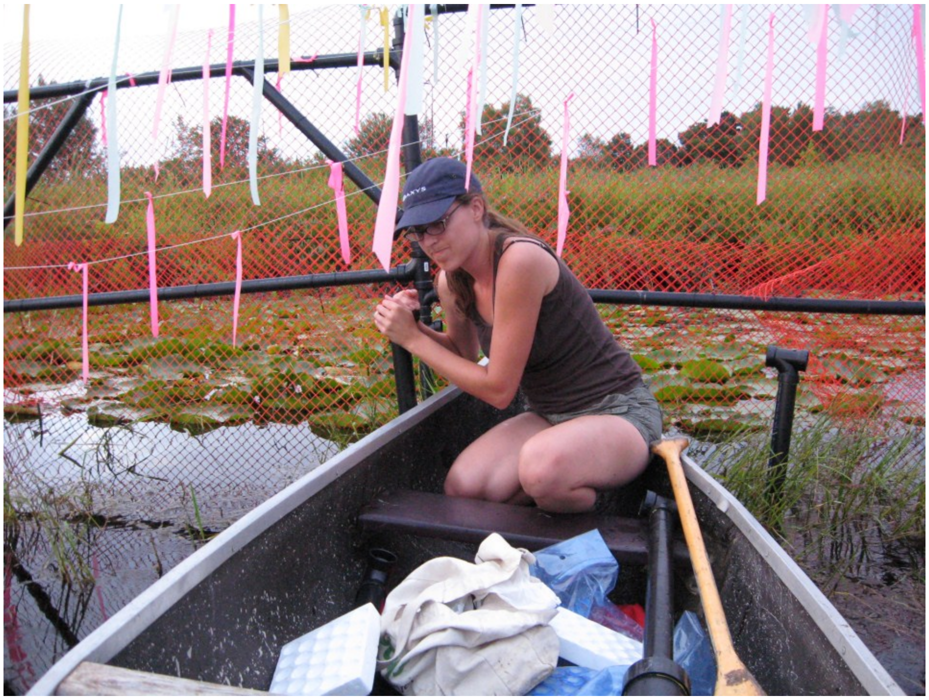


Figure B.4.7 – Victoria Point pore water sampler installation, showing insertion of sampler into sediment of vegetated plot.

Figure B.4.8 – Victoria Point pore water samplers installed in non-vegetated and vegetated plots.

Figure B.4.9 – Victoria Point in October, note significantly reduced water level.

Figure B.4.10 – Victoria Point sample bottles sorted for analysis in LUEL.

Figure A.4.12 – Marchmont Marsh, sample collection, showing sample storage for transport to laboratory.

Figure A.4.13 – Marchmont Marsh, sample analysis in LUEL.

APPENDIX C

***Zizania palustris* Root Plaque Examination Data**

CONTENTS

C.1 – SEM Images and EDXA X-Ray Spectra

C.1.1 – Lake Tamblyn

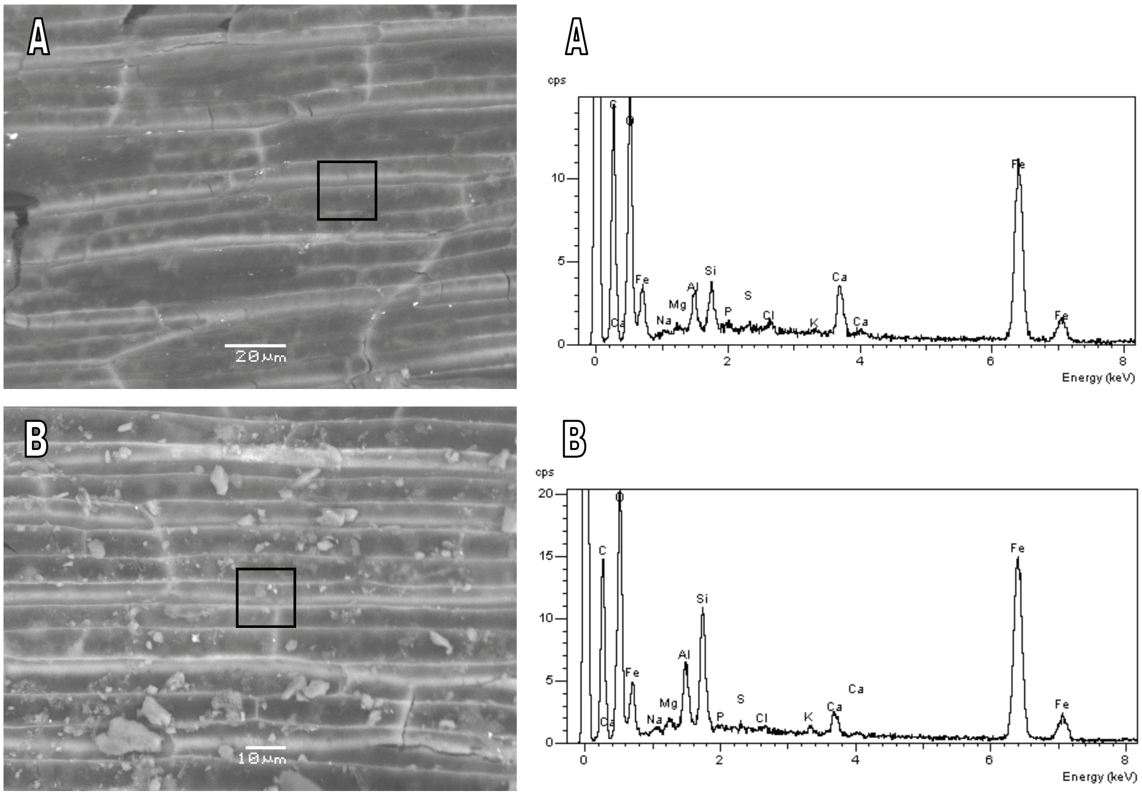


Figure C.1.1.1 – Lake Tamblyn, Sample 1 (longitudinal section: root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x750, root surface with plaque; B. x1,000, root surface with particulate deposits and plaque.

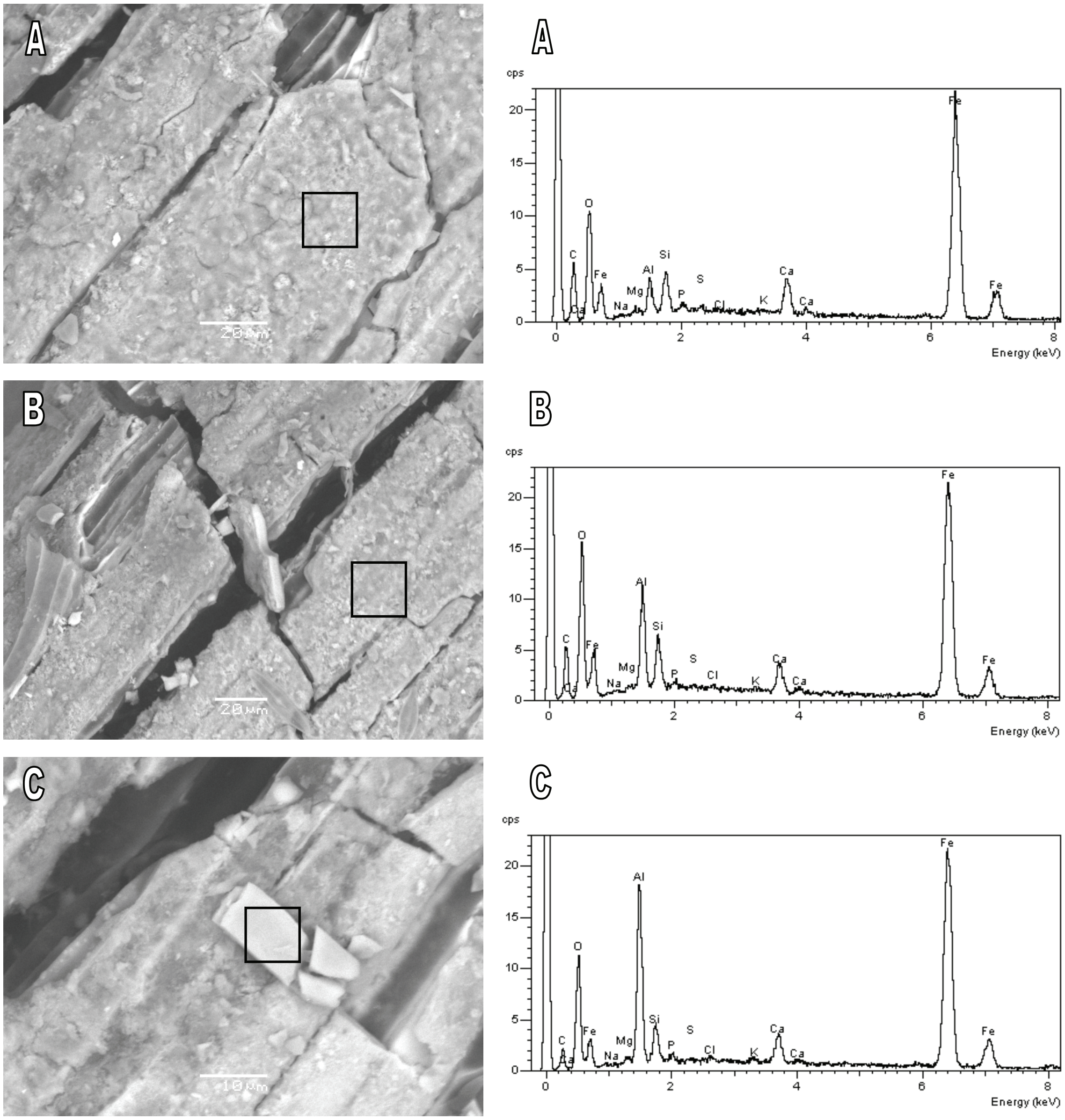


Figure C.1.1.2 – Lake Tamblyn, Sample 2 (longitudinal section: root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x900, root surface with plaque crust; B. x700, root surface with plaque crust ; C. x2,500, close-up of broken-away plaque crust.

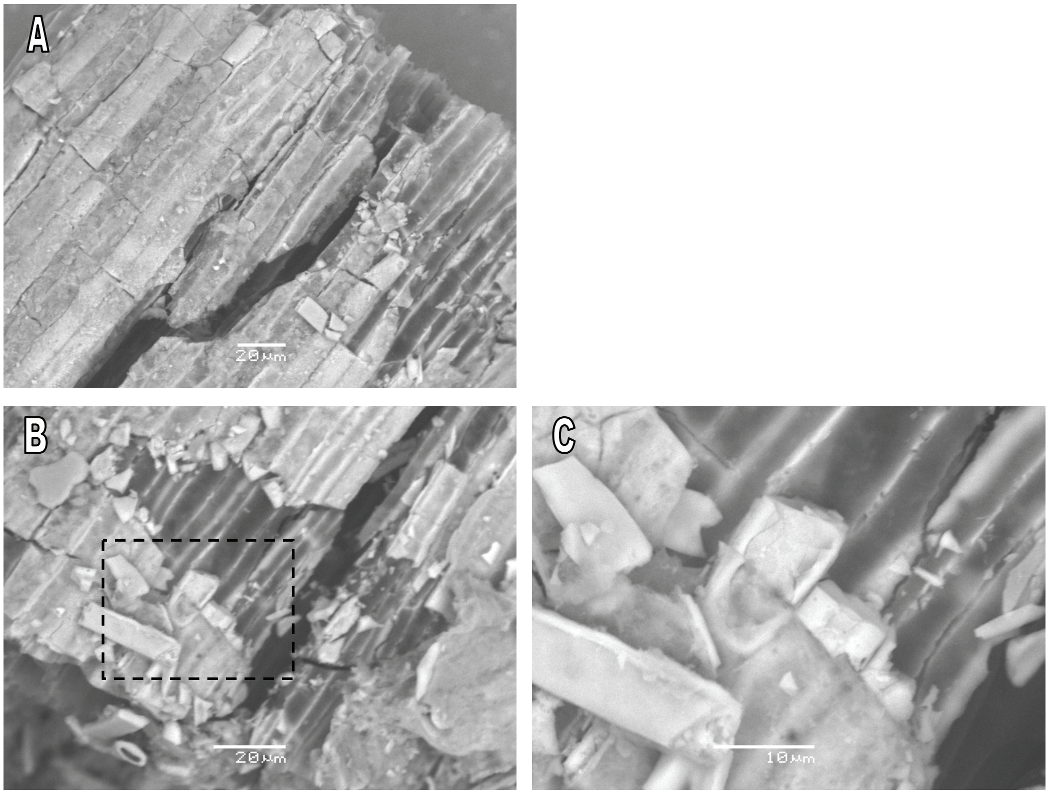


Figure C.1.1.3 – Lake Tamblyn, Sample 2 (longitudinal section: root surface orange-brown), SEM images; A. x600, root surface with plaque crust, note delineation of individual cells; B. x900, plaque crust showing plaque cell cast; C. x2,500, close-up of plaque casts within root surface cells (zoom area shown by dashed box in B).

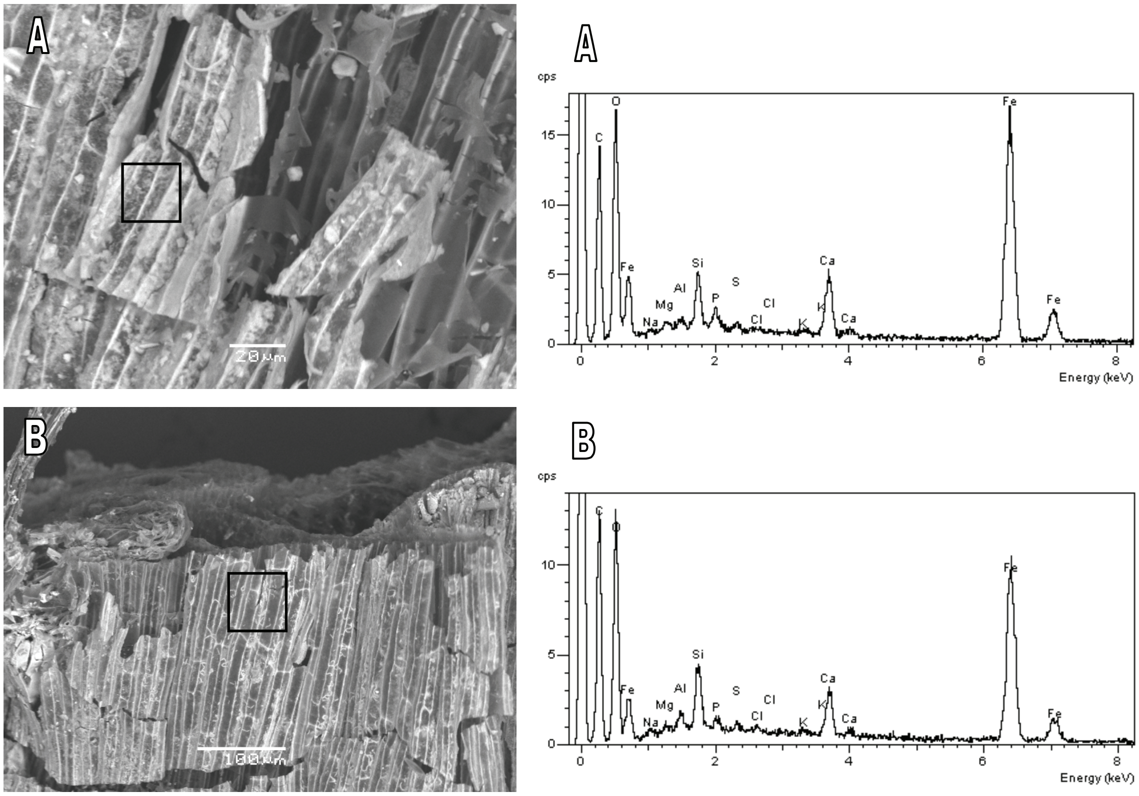


Figure C.1.1.4 – Lake Tamblyn, Sample 3 (carbon-coated longitudinal section: root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x700, root surface with plaque crust; B. x220, root surface with plaque at cut edge.

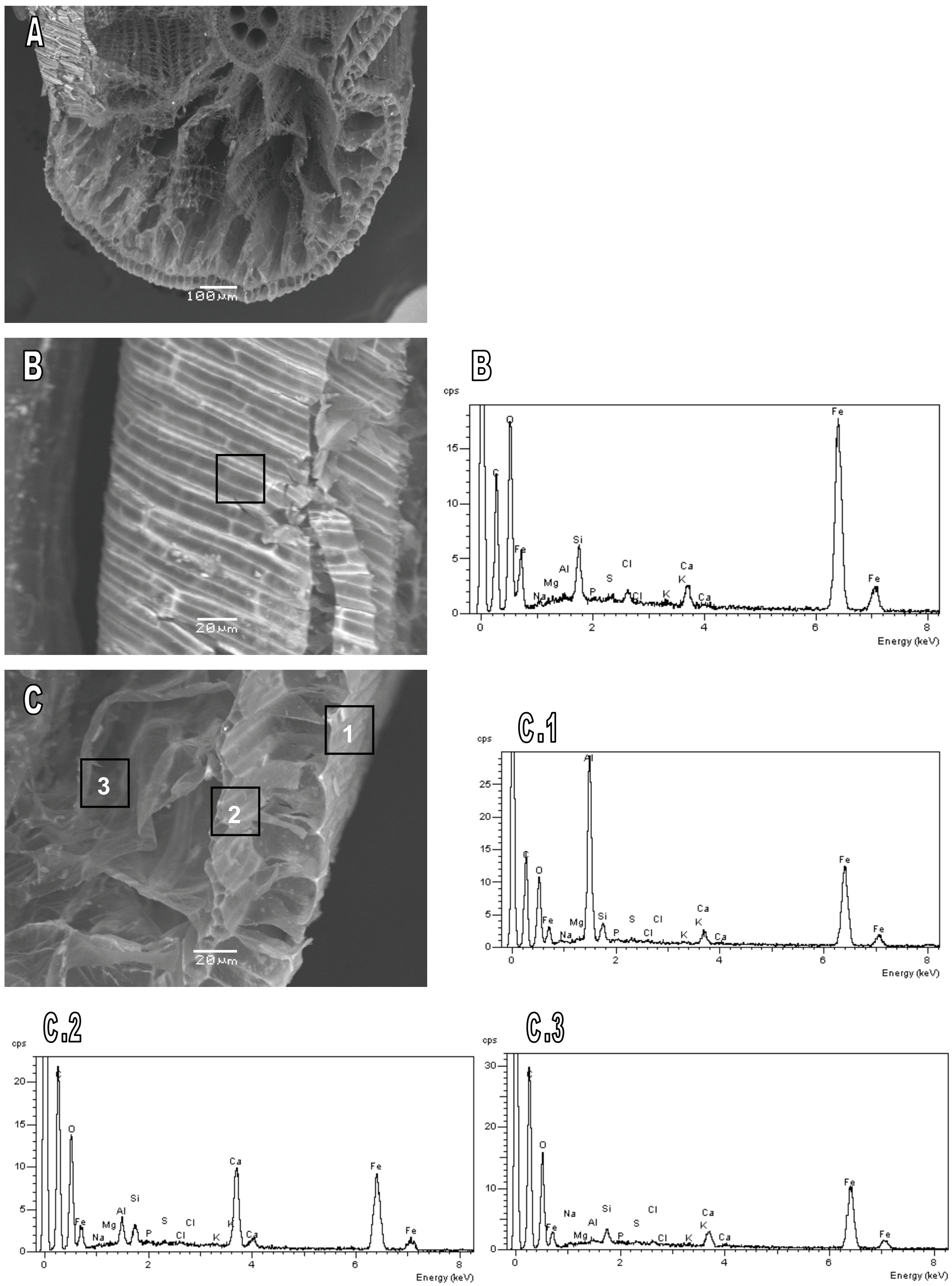


Figure C.1.1.5 (cont'd on next page)

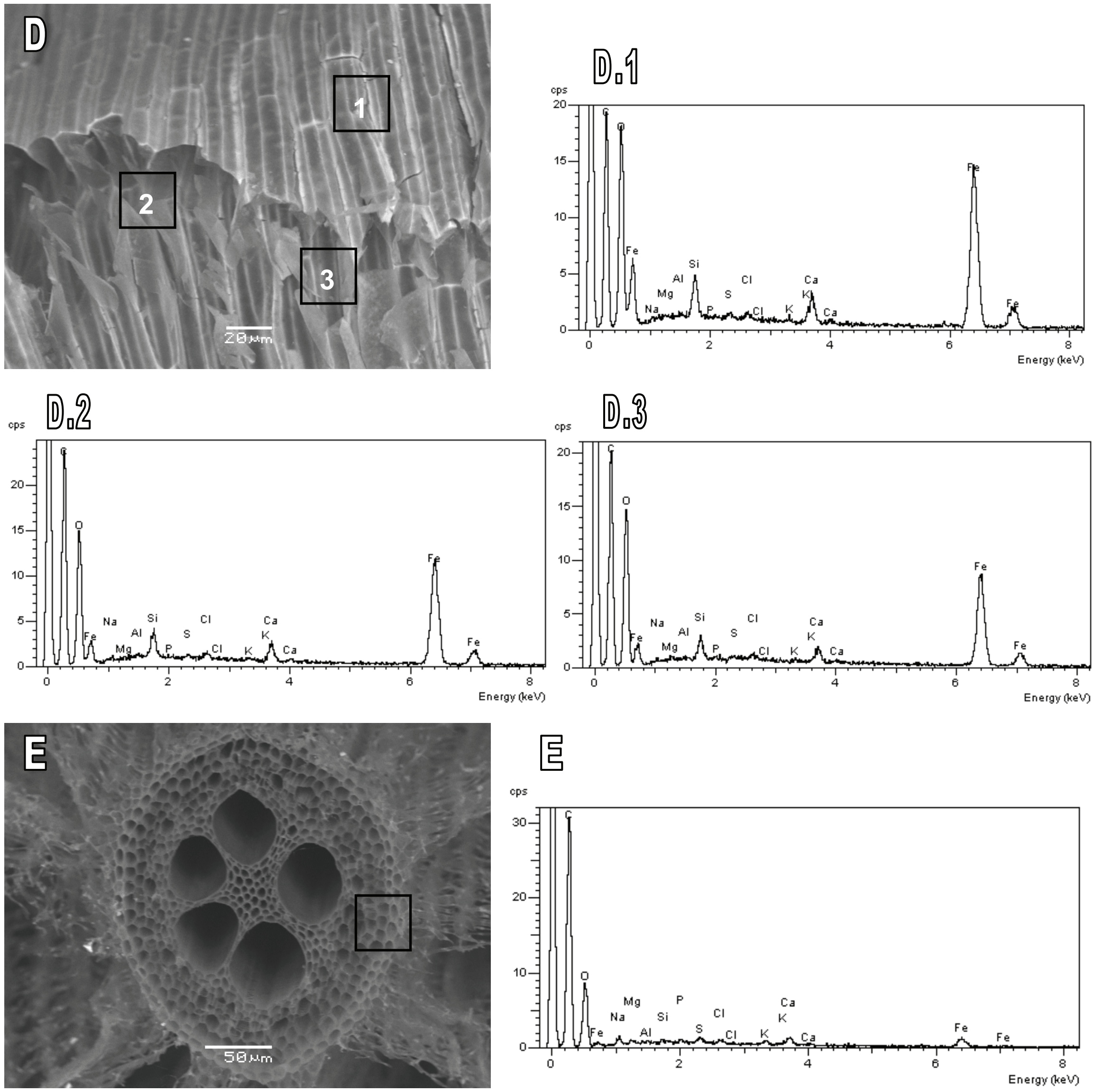


Figure C.1.1.5 – Lake Tamblyn, Sample 4 (carbon-coated cross section: root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x110, overview of cross section; B. x600, root surface with plaque; C. x650, root surface (spectrum C.1), outer cortex (spectrum C.2) and cortex (spectrum C.3); D. x650, epidermis / root surface (spectrum D.1) and epidermis cell interior (spectra D.2 and D.3); E. x350, root vascular cylinder.

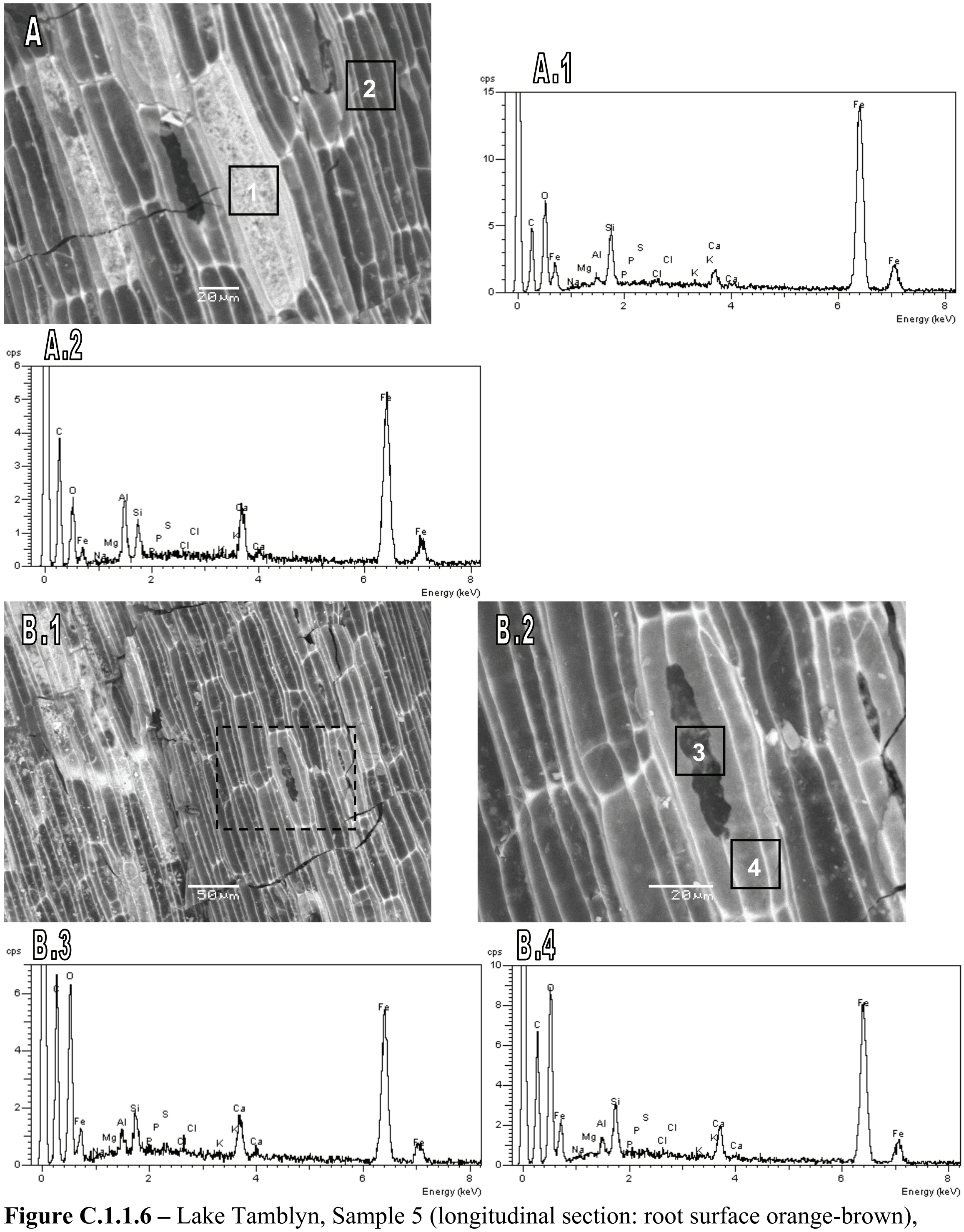


Figure C.1.1.6 – Lake Tamblyn, Sample 5 (longitudinal section: root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x600, root surface cells, packed with plaque (spectrum A.1) and with surface plaque (spectrum A.2); B.1 x300, root surface with plaque, B.2 x950, zoom of B.1 (dashed box area) showing “hallow” cell interior (spectrum E.3) and exterior (spectrum E.4).

Table C.1.1.1 - Lake Tamblyn, *Zizania palustris* Root Plaque SEM Image Data Compilation

Sample Data			**SEM Observation Data**													**Comments**
Site	**Sample**	**Root Colour**	**Image**	**Image Location**	**Plaque Present**	**Zoom**	**Primary Deposition**				**Secondary Deposition**				**Other Particulate Deposits**	
							Type	% Coverage	Thickness	Location	Type	% Coverage	Thickness	Location		
LT	1	orange-brown	A	root surface	Y	750	thin	100	thin	cell surface	-	-	-	-	none	plaque extremely thin, only evidence of presence is x-ray spectra
LT	1	orange-brown	B	root surface	Y	1,000	thin	100	thin	cell surface	-	-	-	-	$CaCO_3$ & soil	plaque extremely thin, only evidence of presence is x-ray spectra, particulates not likely plaque
LT	2	orange-brown	A	root surface	Y	900	crust	95	thick	cell surface	broken away	5	N/A	N/A	none	consistent crust, gaps only where crust broken away from cell surface; cracks along cell lines
LT	2	orange-brown	B	root surface	Y	700	crust	90	4 µm	cell surface	broken away	10	N/A	N/A	none	consistent crust, gaps only where crust broken away from cell surface; cracks along cell lines
LT	2	orange-brown	C	root surface	Y	2,500	crust	85	4 µm	cell surface	broken away	15	N/A	N/A	none	consistent crust, gaps only where crust broken away from cell surface; cracks along cell lines
LT	2	orange-brown	A	root surface	Y	600	crust	75	thick	on and within cells	broken away	25	N/A	N/A	none	crust delineates individual cells
LT	2	orange-brown	B	root surface	Y	900	crust	70	3 µm	on and within cells	broken away	30	N/A	N/A	none	crust appears in and on cells
LT	2	orange-brown	C	root surface	Y	2,500	crust	65	3 µm	on and within cells	broken away	35	N/A	N/A	none	plaque cell cast (similar to that in Chen et al., 1980b)
LT	3	orange-brown	A	root surface	Y	700	crust	70	thick	in surface cells	broken away	30	N/A	N/A	$CaCO_3$ & soil	cell appears destroyed where crust broken away
LT	3	orange-brown	B	root surface	Y	220	crust	90	unknown	unknown	broken away	10	N/A	N/A	$CaCO_3$ & soil	unsure if in or on cell; deposition % based on observed root surface area
LT	4	orange-brown	A	cross section	N/A	110	-	-	-	-	-	-	-	-	-	cross section image for reference to subsequent image locations
LT	4	orange-brown	B	root surface	Y	600	thin	100	thin	cell surface	-	-	-	-	soil	deposition % based on observed root surface area
LT	4	orange-brown	C	cross section	Y	650	thin	N/A	thin	cell surface	-	-	-	-	none	small portion of root surface visible
LT	4	orange-brown	D	root surface	Y	650	thin	100	thin	on and within cells	-	-	-	-	none	location of plaque based on x-ray spectra of interior of cells
LT	4	orange-brown	E	vascular cylinder	N/A	350	-	-	-	-	-	-	-	-	-	vascular cylinder image for x-ray spectrum reference
LT	5	orange-brown	A	root surface	Y	600	thin	75	thin	cell surface	packed cells	25	unknown	in surface cells	$CaCO_3$ & soil	plaque-packed cells and one hallow-plaque cell cast observed (similar to that in Chen et al., 1980b)
LT	5	orange-brown	B.1	root surface	Y	300	thin	80	thin	cell surface	packed cells	20	unknown	in surface cells	$CaCO_3$ & soil	plaque-packed cells and three hallow-plaque cell casts observed (similar to that in Chen et al., 1980b)
LT	5	orange-brown	B.2	root surface	Y	950	thin	60	thin	cell surface	packed cells	40	unknown	in surface cells	$CaCO_3$ & soil	two hallow-plaque cell casts (similar to that in Chen et al., 1980b)

Notes
Plaque thickness = thin (too thin to measure, approximately <1 µm)
Plaque thickness = thick (not able to measure, at least >1.5 µm)
- = N/A

Table C.1.1.2 - Lake Tamblyn, *Zizania palustris* Root Plaque EDXA X-Ray Spectra Data Compilation

Sample Data			X-Ray Spectra Data									Comments
Site	Sample	Root Colour	Spectrum	Plaque Present	Location	Relative Peak Height of Elements					Other Particulate Deposits	
						1	2	3	4	5		
LT	1	orange-brown	A	Y	root surface	O	C	Fe	Si	Ca	none	
LT	1	orange-brown	B	Y	root surface	O	Fe	C	Si	Al	$CaCO_3$ & soil	
LT	2	orange-brown	A	Y	root surface	Fe	O	C	Si	Al	none	
LT	2	orange-brown	B	Y	root surface	Fe	O	Al	Si	C	none	
LT	2	orange-brown	C	Y	piece of plaque	Fe	Al	O	Si	Ca	none	piece of root plaque on plaque-crusted surface
LT	3	orange-brown	A	Y	root surface	Fe	O	C	Ca	Si	$CaCO_3$ & soil	
LT	3	orange-brown	B	Y	root surface	O	C	Fe	Si	Ca	$CaCO_3$ & soil	
LT	4	orange-brown	B	Y	root surface	Fe	O	C	Si	Ca(Fe)	soil	
LT	4	orange-brown	C.1	Y	root surface	Al	C	Fe	O	Si	none	
LT	4	orange-brown	C.2	N/A	outer cortex	C	O	Ca	Fe	Al	none	root interior, high Ca and Fe
LT	4	orange-brown	C.3	N/A	cortex	C	O	Fe	Si	Ca	none	root interior, high Fe
LT	4	orange-brown	D.1	Y	root surface	C	O	Fe	Si(Fe)	Ca	none	
LT	4	orange-brown	D.2	N/A	epidermis cells	C	O	Fe	Si	Ca(Fe)	none	cell interior, similar to cell surface
LT	4	orange-brown	D.3	N/A	epidermis cells	C	O	Fe	Si	Ca(Fe)	none	cell interior, similar to cell surface
LT	4	orange-brown	E	N/A	vascular cylinder	C	O	-	-	-	-	other element peaks extremely low
LT	5	orange-brown	A.1	Y	root surface	Fe	O	C	Si	Ca(Fe)	$CaCO_3$ & soil	plaque-packed cell
LT	5	orange-brown	A.2	Y	root surface	Fe	C	O	Al	Ca	$CaCO_3$ & soil	thin plaqued cell
LT	5	orange-brown	B.3	Y	epidermis cells	C	O	Fe	Si	Ca	$CaCO_3$ & soil	interior of hallow-plaque cell cast (Chen et al., 1980b)
LT	5	orange-brown	B.4	Y	epidermis cells	O	Fe	C	Si	Ca(Fe)	$CaCO_3$ & soil	exterior of hallow-plaque cell cast (Chen et al., 1980b)

Notes

Relative Peak Height of Elements: Xx(Yy) means that element Xx had the next highest peak relative to element Yy, shown in brackets because it is the second peak for element Yy

- = element peaks too low to determine relative height

C.1.2 – Marchmont Marsh

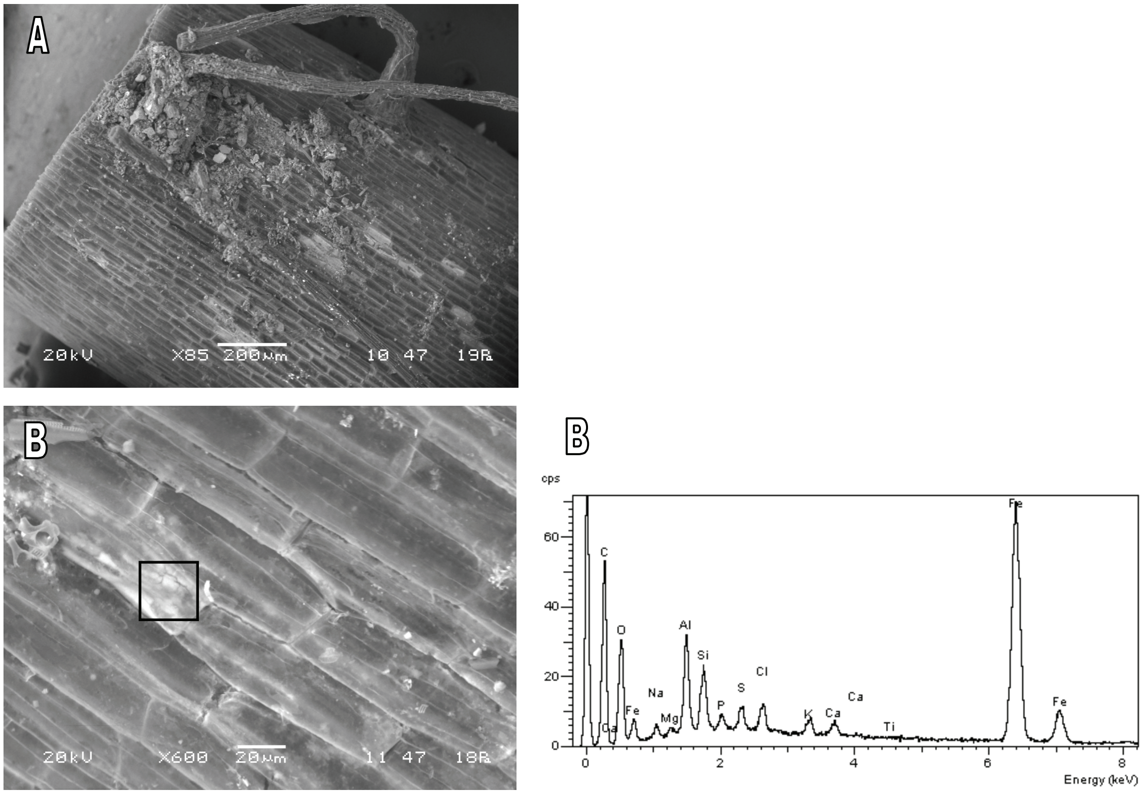


Figure C.1.2.1 – Marchmont Marsh, Sample 1 (longitudinal section: root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x85, root surface showing lateral roots and particulate deposits (likely soil) and plaqued cells (white); B. x600, root surface with one plaqued cell.

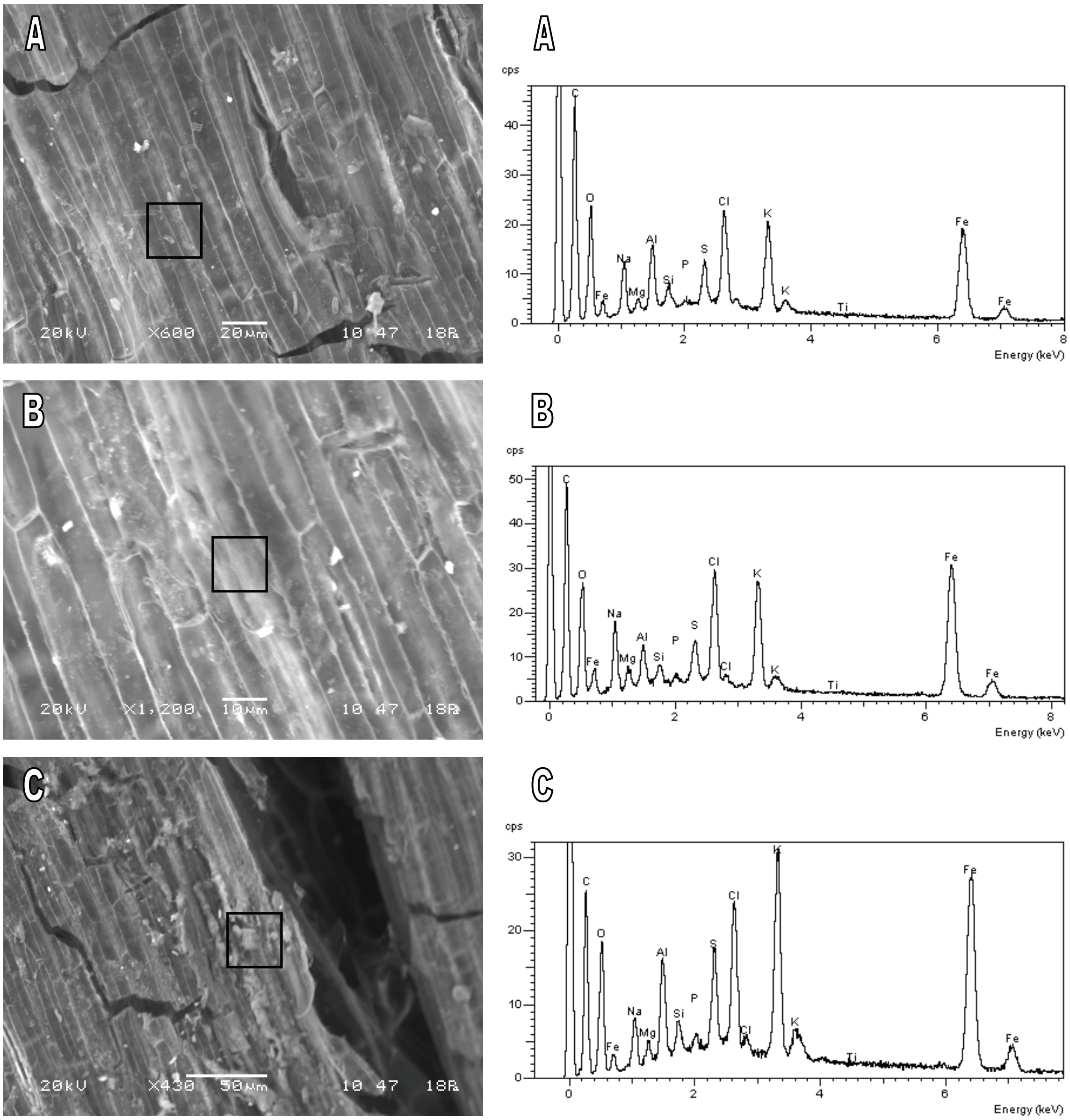


Figure C.1.2.2 – Marchmont Marsh, Sample 2 (longitudinal section: root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x600, root surface with particulate deposits; B. x1,200, root surface; C. x600, root surface.

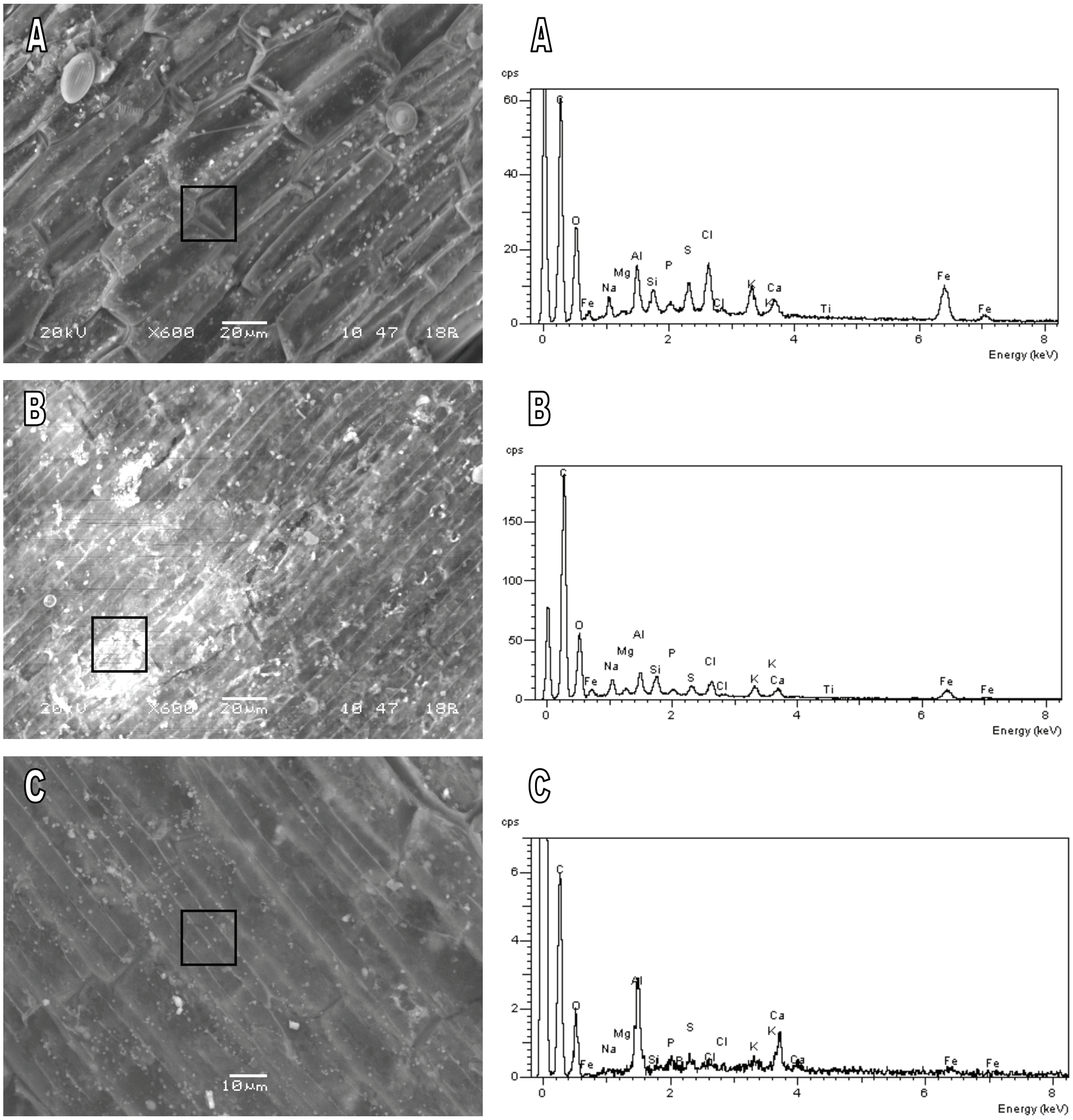


Figure C.1.2.3 – Marchmont Marsh, Sample 3 (longitudinal section: root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x600, root surface with particulate deposits and little plaque present; B. x600, root surface with particulate deposits; C. x1,000, root surface with particulate deposits (likely $CaCO_3$).

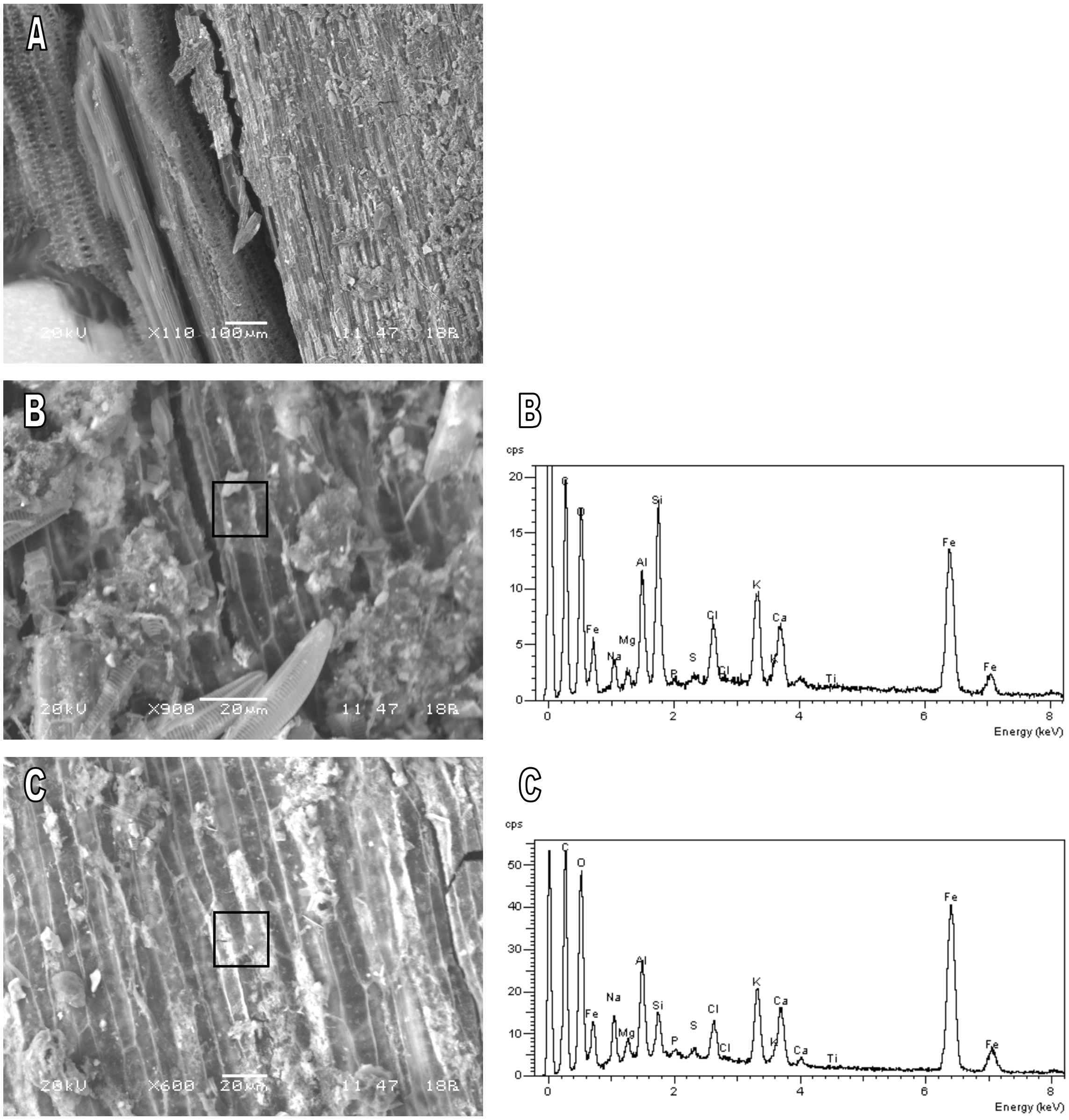


Figure C.1.2.4 – Marchmont Marsh, Sample 4 (longitudinal section: root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x110, root surface near cut edge; B. x900, root surface with particulate deposits (soil and plaque); C. x600, general root surface, showing white plaqued cells.

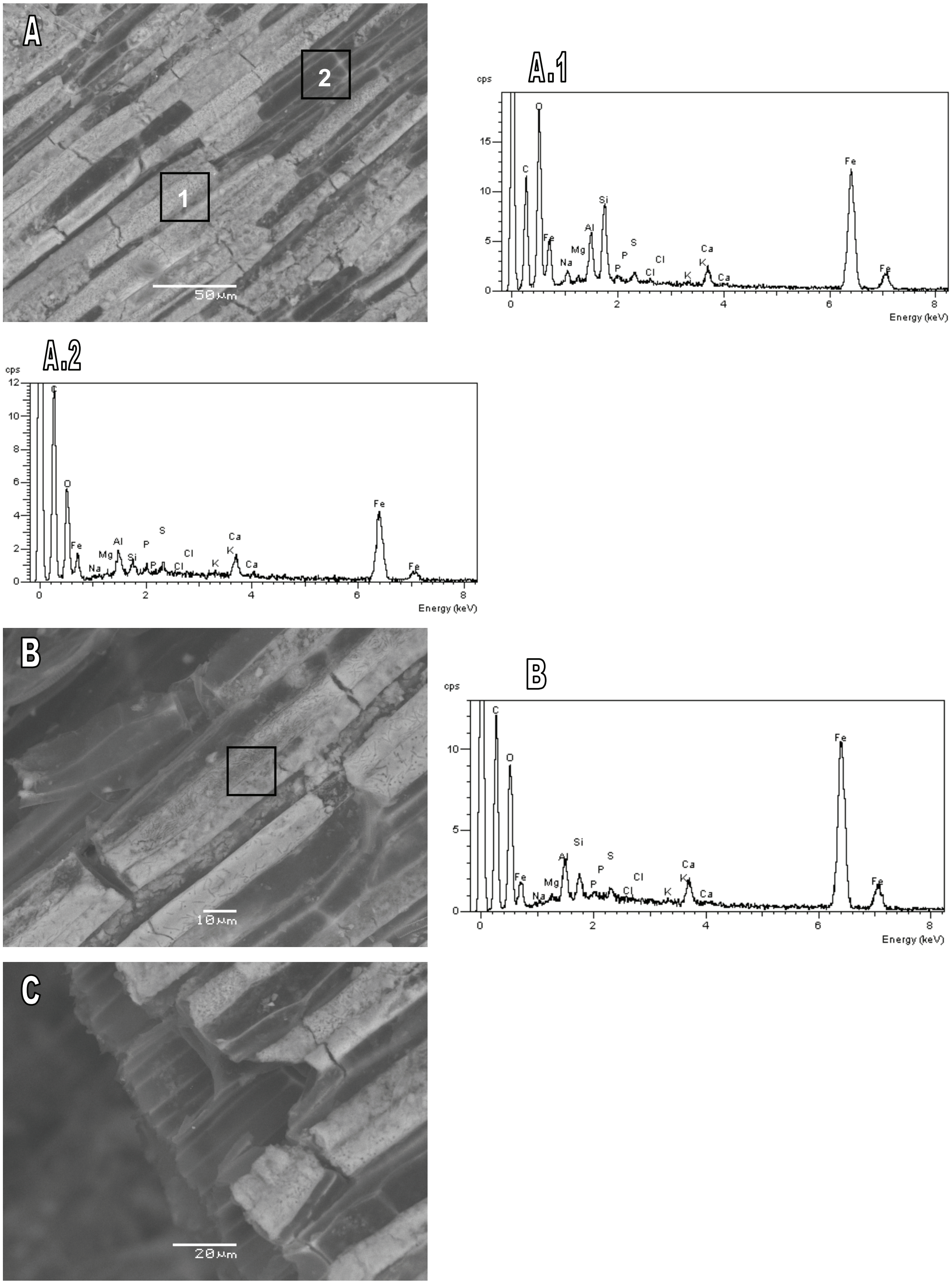


Figure C.1.2.5 (cont'd on next page)

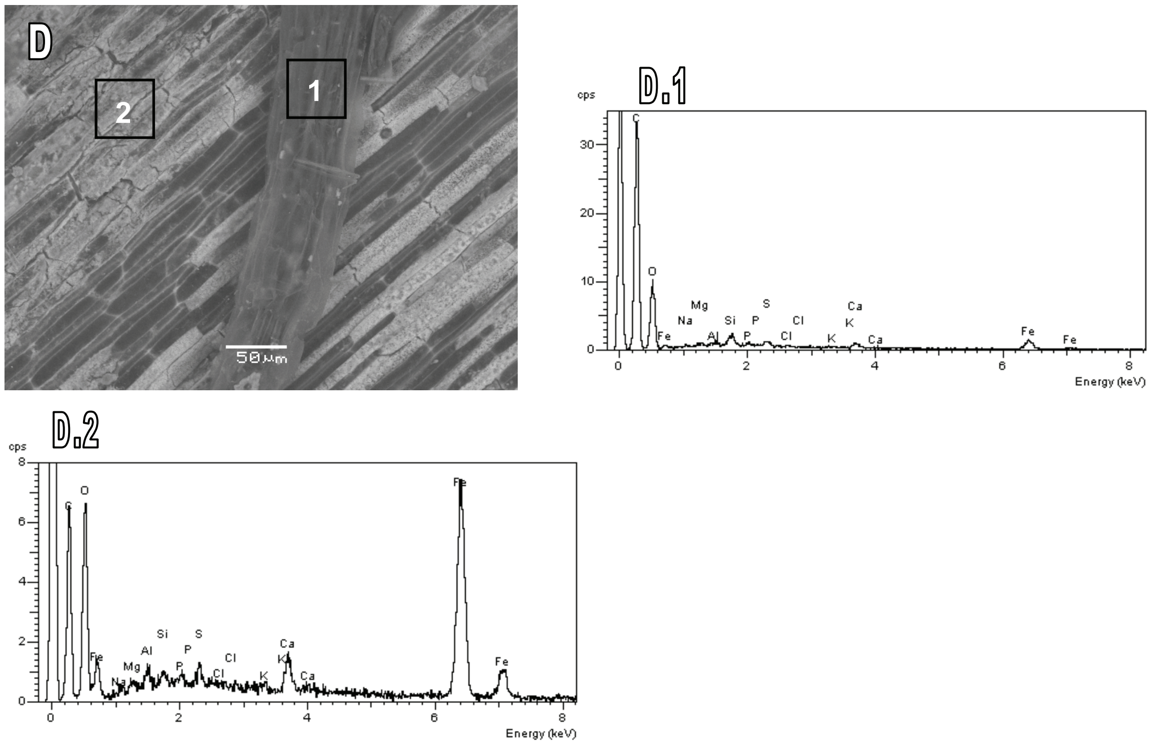


Figure C.1.2.5 – Marchmont Marsh, Sample 8 (longitudinal section: oldest portion of root, root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x500, root surface with plaque-crusted cells (spectrum A.1) and plaqued cells (spectrum A.2); B. x1,000, root surface with plaque-crusted cells; C. x950, root surface, habit of plaque crust on cell edge; D. x300, unplaqued lateral root surface (spectrum D.1) and root surface with plaque-crusted cells (spectrum D.2).

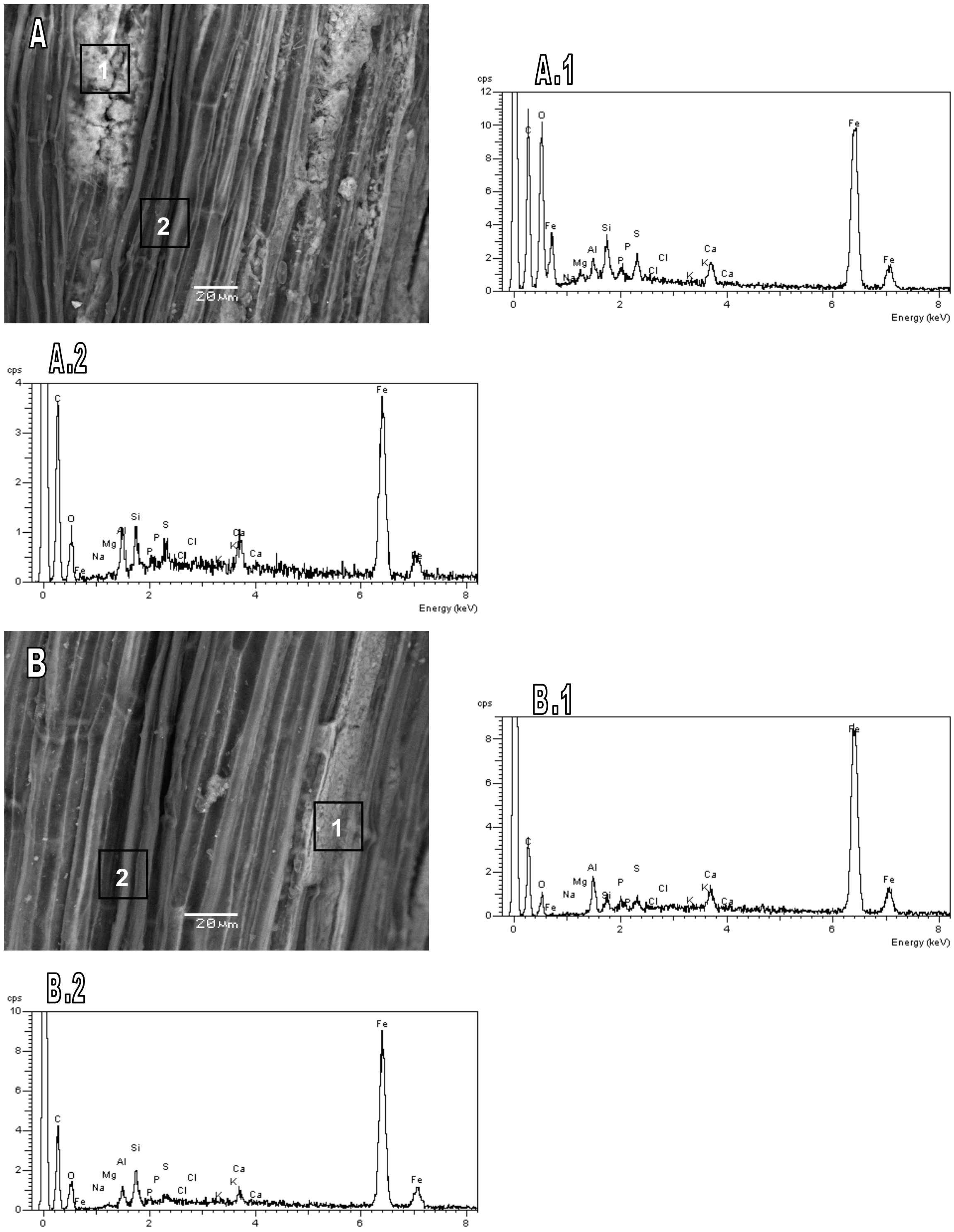


Figure C.1.2.6 (cont'd on next page)

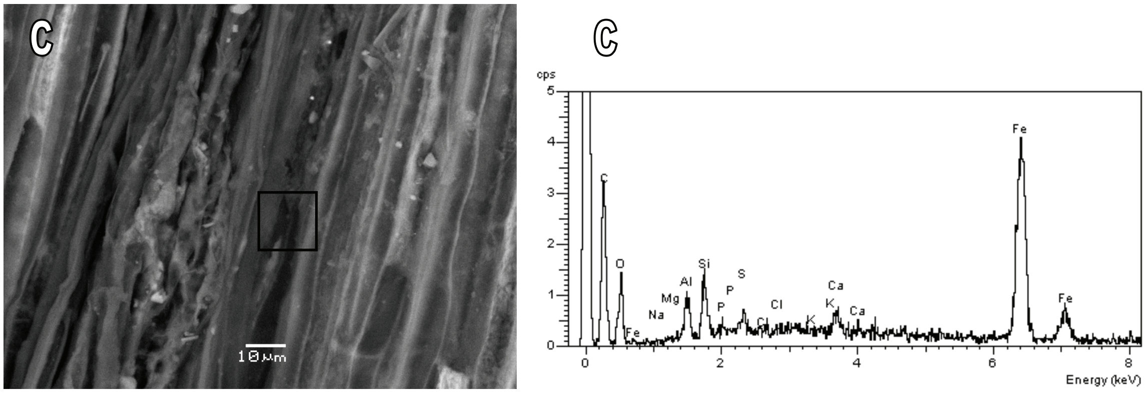


Figure C.1.2.6 – Marchmont Marsh, Sample 9 (longitudinal section: middle-aged portion of root, root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x650, root surface with plaque-packed cells (spectrum A.1) and surface-plaqued cells (spectrum A.2); B. x800, root surface with plaque-packed cells (spectrum B.1) and surface-plaqued cells (spectrum B.2); C. x1,000, plaqued root surface.

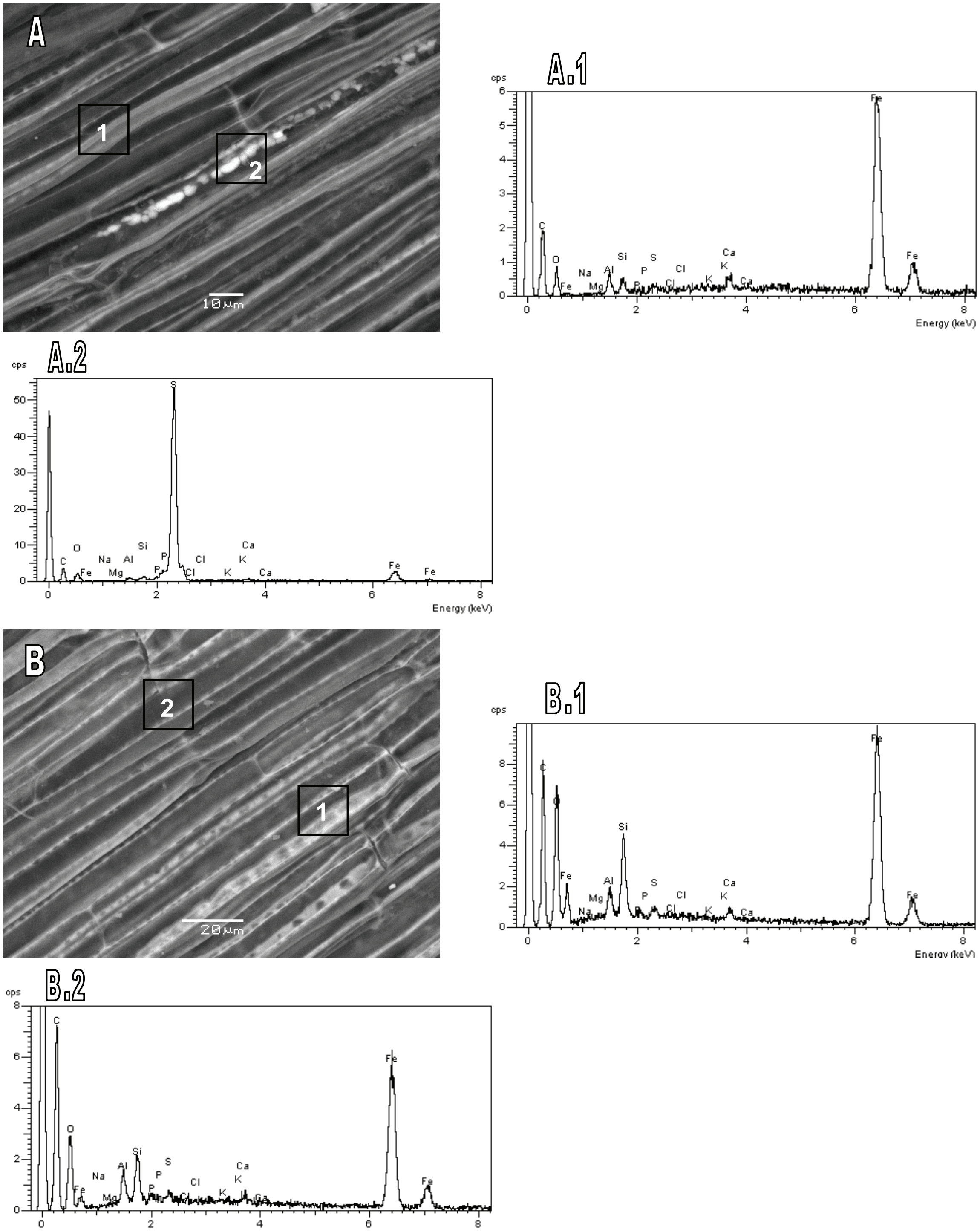


Figure C.1.2.7 – Marchmont Marsh, Sample 10 (longitudinal section: youngest portion of root, root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x1,000, plaqued root surface (spectrum A.1) and deposit between two cells (spectrum A.2); B. x900, unevenly plaqued root surface with light areas (spectrum B.1) and dark areas (spectrum B.2).

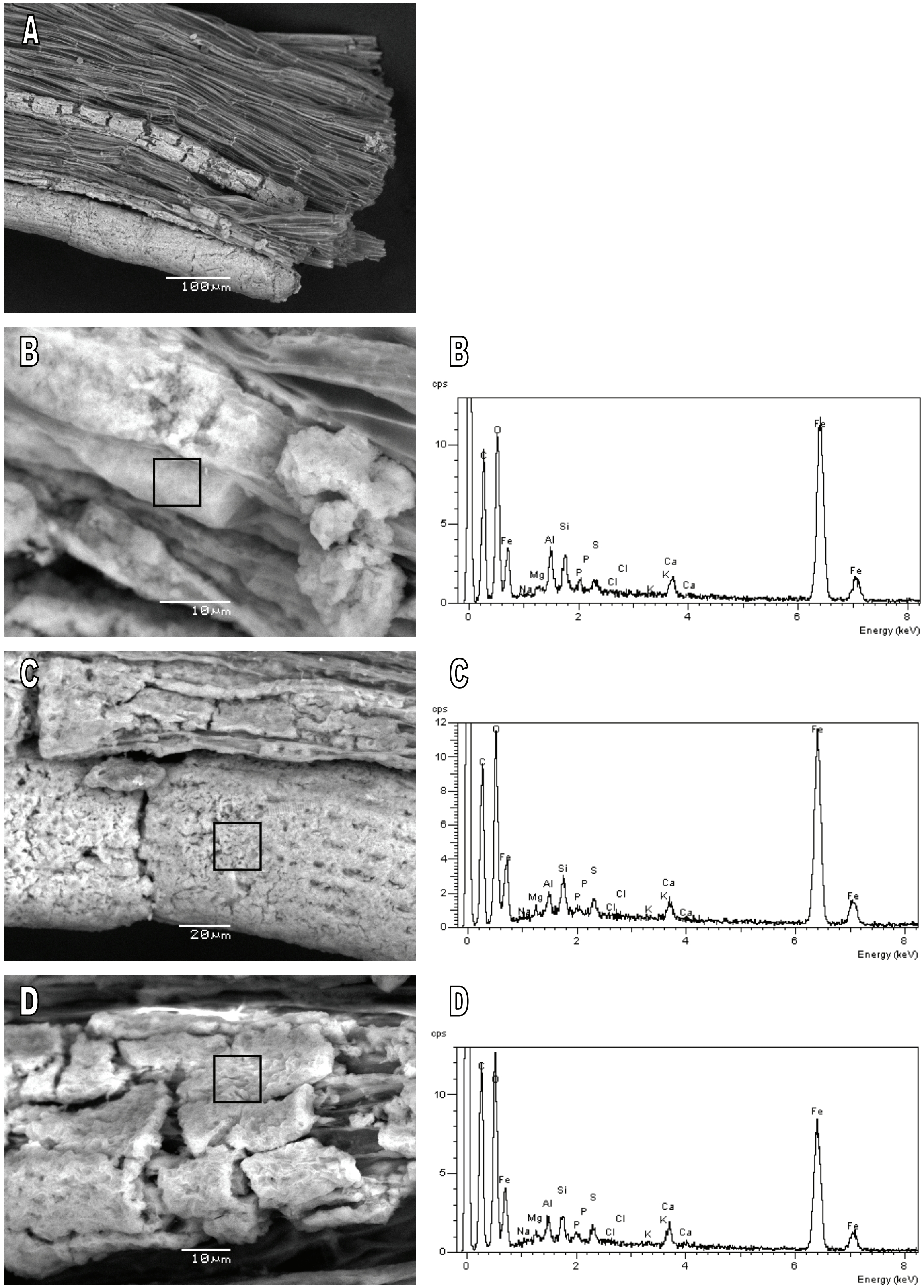


Figure C.1.2.8 (cont'd on next page)

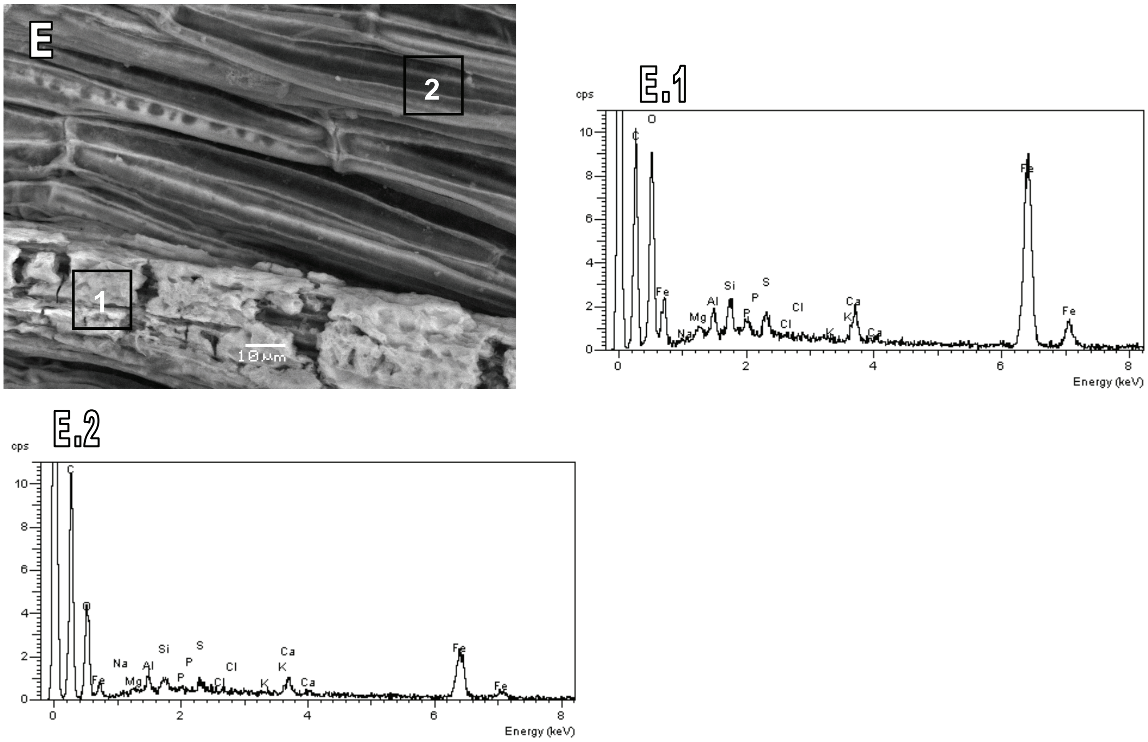


Figure C.1.2.8 – Marchmont Marsh, Sample 11 (longitudinal section: youngest portion of root, root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x200, root surface with plaque-crusted areas; B. x2,200, plaque-crusted cells with cell cast; C. x800, plaque crust; D. x1,500, plaque crust; E. x1,000, root surface with plaque-crusted areas (spectrum E.1) and surface-plaqued areas (spectrum E.2).

Table C.1.2.1 - Marchmont Marsh, *Zizania palustris* Root Plaque SEM Image Data Compilation

Sample Data			SEM Observation Data													Comments
							Primary Deposition				Secondary Deposition					
Site	Sample	Root Colour	Image	Image Location	Plaque Present	Zoom	Type	% Coverage	Thickness	Location	Type	% Coverage	Thickness	Location	Other Particulate Deposits	
MM	1	orange-brown	A	whole section	N/A	85	-	-	-	-	-	-	-	-	soil	longitudinal section image for reference to subsequent image locations
MM	1	orange-brown	B	root surface	Y	600	thin	95	thin	cell surface	packed cells	5	unknown	unknown	soil	single plaque-packed cell in image (white in image)
MM	2	orange-brown	A	root surface	Y	600	thin	100	thin	cell surface	-	-	-	-	KCl	KCl appears evenly distributed with plaque
MM	2	orange-brown	B	root surface	Y	1,200	thin	100	thin	cell surface	-	-	-	-	KCl	KCl appears evenly distributed with plaque
MM	2	orange-brown	C	root surface	Y	600	thin	75	thin	cell surface	crust	25	unknown	cell surface	KCl	KCl appears evenly distributed with plaque
MM	3	orange-brown	A	root surface	N	600	-	-	-	-	-	-	-	-	present, unknown	may be a very slight plaque present, slight peak in Fe shown in x-ray spectra
MM	3	orange-brown	B	root surface	N	600	-	-	-	-	-	-	-	-	present, unknown	no plaque present
MM	3	orange-brown	C	root surface	N	1,000	-	-	-	-	-	-	-	-	present, unknown	no plaque present
MM	4	orange-brown	A	whole section	N/A	110	-	-	-	-	-	-	-	-	soil	longitudinal section image for reference to subsequent image locations
MM	4	orange-brown	B	root surface	Y	900	unknown	-	-	-	-	-	-	-	soil	plaque may be thin, too much soil to confirm
MM	4	orange-brown	C	root surface	Y	600	thin	70	thin	cell surface	packed cells	30	unknown	unknown	soil	white cells indicative of plaque-packed cells
MM	8	orange-brown	A	root surface	Y	500	crust	85	thick	cell surface	thin	15	thin	cell surface	soil	oldest portion of root: crust follows shape of cells, could be on and within cells, difficult to determine
MM	8	orange-brown	B	root surface	Y	1,000	crust	50	1.5 - 3 µm	cell surface	thin	50	thin	cell surface	none	oldest portion of root: crust could be on and within cells, difficult to determine
MM	8	orange-brown	C	root surface	Y	950	crust	60	2 µm	cell surface	thin	40	thin	cell surface	none	oldest portion of root: crust appears to be on the surface of compacted cells (likely compacted from sample processing), deposition % based on observed root surface cell area
MM	8	orange-brown	D	root surface	Y	300	crust	60	thick	cell surface	thin	40	thin	cell surface	none	oldest portion of root: plaque type and deposition % based on observed root surface area (minus lateral root area which has no plaque)
MM	9	orange-brown	A	root surface	Y	650	thin	50	thin	cell surface	packed cells	50	unknown	on and within cells	soil	middle-aged portion of root: plaque appears to be within plaque-packed cells
MM	9	orange-brown	B	root surface	Y	800	thin	90	thin	cell surface	packed cells	10	unknown	on and within cells	soil	middle-aged portion of root: plaque-packed and thin plaqued cells
MM	9	orange-brown	C	root surface	Y	1,000	thin	85	thin	cell surface	packed cells	15	unknown	unknown	none	middle-aged portion of root
MM	10	orange-brown	A	root surface	Y	1,000	thin	100	thin	cell surface	-	-	-	-	S	youngest portion of root: strip of particulate deposit along centre cell, composed of sulphur
MM	10	orange-brown	B	root surface	Y	900	thin	100	thin	cell surface	-	-	-	-	soil	youngest portion of root: plaque unevenly distributed
MM	11	orange-brown	A	whole section	N/A	200	-	-	-	-	-	-	-	-	-	youngest portion of root: longitudinal section image, plaque crust over lower portion of root and along middle-line
MM	11	orange-brown	B	root surface	Y	2,200	crust	100	2 to 7 µm	on and within cells	-	-	-	-	none	youngest portion of root: plaque-crusted area with plaque cell cast (similar to that in Chen et al., 1980b)
MM	11	orange-brown	C	root surface	Y	800	crust	100	thick	on and within cells	-	-	-	-	none	youngest portion of root: thick plaque crust
MM	11	orange-brown	D	root surface	Y	1,500	crust	100	4 µm	on and within cells	-	-	-	-	none	youngest portion of root: thick plaque crust
MM	11	orange-brown	E	root surface	Y	1,000	thin	75	thick	on and within cells	crust	25	thin	cell surface	none	youngest portion of root: crusted area, thin plaque on remainder of root

Notes

Plaque thickness = thin (too thin to measure, approximately <1 µm)

Plaque thickness = thick (not able to measure, at least >1.5 µm)

\- = N/A

Table C.1.2.2 - Marchmont Marsh, *Zizania palustris* Root Plaque EDXA X-Ray Spectra Data Compilation

Sample Data			X-Ray Spectra Data									Comments
Site	Sample	Root Colour	Spectrum	Plaque Present	Location	Relative Peak Height of Elements					Other Particulate Deposits	
						1	2	3	4	5		
MM	1	orange-brown	B	Y	root surface	Fe	C	Al	O	Si	soil	spectra on single plaque-packed cell
MM	2	orange-brown	A	Y	root surface	C	O	Cl	K	Fe	KCl	KCl present, evenly distributed
MM	2	orange-brown	B	Y	root surface	C	Fe	Cl	K	O	KCl	KCl present, evenly distributed
MM	2	orange-brown	C	Y	root surface	K	Fe	C	Cl	O	KCl	KCl present, evenly distributed
MM	3	orange-brown	A	N	root surface	C	O	Cl	Al	Fe	present, unknown	may be a slight Fe plaque, not prominent
MM	3	orange-brown	B	N	root surface	C	O	Al	-	-	present, unknown	particulate deposits visible, unsure of composition
MM	3	orange-brown	C	N	root surface	C	Al	O	Ca	-	present, unknown	particulate deposits visible, unsure of composition
MM	4	orange-brown	B	Y	root surface	C	O	Si	Fe	Al	soil	soil particulates and plaque present
MM	4	orange-brown	C	Y	root surface	C	O	Fe	Al	K	soil	
MM	8	orange-brown	A.1	Y	root surface	O	Fe	C	Si	Al	soil	oldest portion of root: crust follows shape of cells, Fe peak stronger in crust
MM	8	orange-brown	A.2	Y	root surface	C	O	Fe	Al	Ca	soil	oldest portion of root: cells with thin plaque
MM	8	orange-brown	B	Y	root surface	C	Fe	O	Al	Si	none	oldest portion of root: crust follows shape of cells
MM	8	orange-brown	D.1	N	lateral root	C	O	-	-	-	none	oldest portion of root: other element peaks extremely low
MM	8	orange-brown	D.2	Y	root surface	Fe	O	C	Ca	S(Fe)	none	oldest portion of root: crust
MM	9	orange-brown	A.1	Y	root surface	C	O	Fe	Si(Fe)	S	soil	middle-aged portion of root: plaque-packed cell
MM	9	orange-brown	A.2	Y	root surface	Fe	C	O	Si	Al	soil	middle-aged portion of root: thin-plaqued cell
MM	9	orange-brown	B.1	Y	root surface	Fe	C	Al	Ca	O(Fe)	soil	middle-aged portion of root: plaque-packed cell
MM	9	orange-brown	B.2	Y	root surface	Fe	C	Si	O	Al	soil	middle-aged portion of root: thin-plaqued cell
MM	9	orange-brown	C	Y	root surface	Fe	C	Si	O	Al	none	middle-aged portion of root: dark area, soil particulates and plaque present
MM	10	orange-brown	A.1	Y	root surface	Fe	C	O(Fe)	Ca	Al	none	youngest portion of root: thin plaque
MM	10	orange-brown	A.2	N	between-cell deposit	S	C	Fe	-	-	S	youngest portion of root: particulate deposit between cells
MM	10	orange-brown	B.1	Y	root surface	Fe	C	O	Si	Al(Fe)	soil	youngest portion of root: uneven thin plaque distribution: light area
MM	10	orange-brown	B.2	Y	root surface	C	Fe	O	Si	Al	soil	youngest portion of root: uneven thin plaque distribution: dark area
MM	11	orange-brown	B	Y	root surface	Fe	O	C	Al(Fe)	Si	none	youngest portion of root: plaque cast (Chen et al., 1980b)
MM	11	orange-brown	C	Y	root surface	Fe	O	C	Si(Fe)	Al	none	youngest portion of root: plaque crust
MM	11	orange-brown	D	Y	root surface	O	C	Fe	Al(Fe)	Si	none	youngest portion of root: plaque crust
MM	11	orange-brown	E.1	Y	root surface	C	Fe	O	Si(Fe)	Ca	none	youngest portion of root: plaque crust
MM	11	orange-brown	E.2	Y	root surface	C	O	Fe	Al	Ca	none	youngest portion of root: thin plaque

Notes

Relative Peak Height of Elements: Xx(Yy) means that element Xx had the next highest peak relative to element Yy, shown in brackets because it is the second peak for element Yy

- = element peaks too low to determine relative height

C.1.3 – Partridge Crop Lake

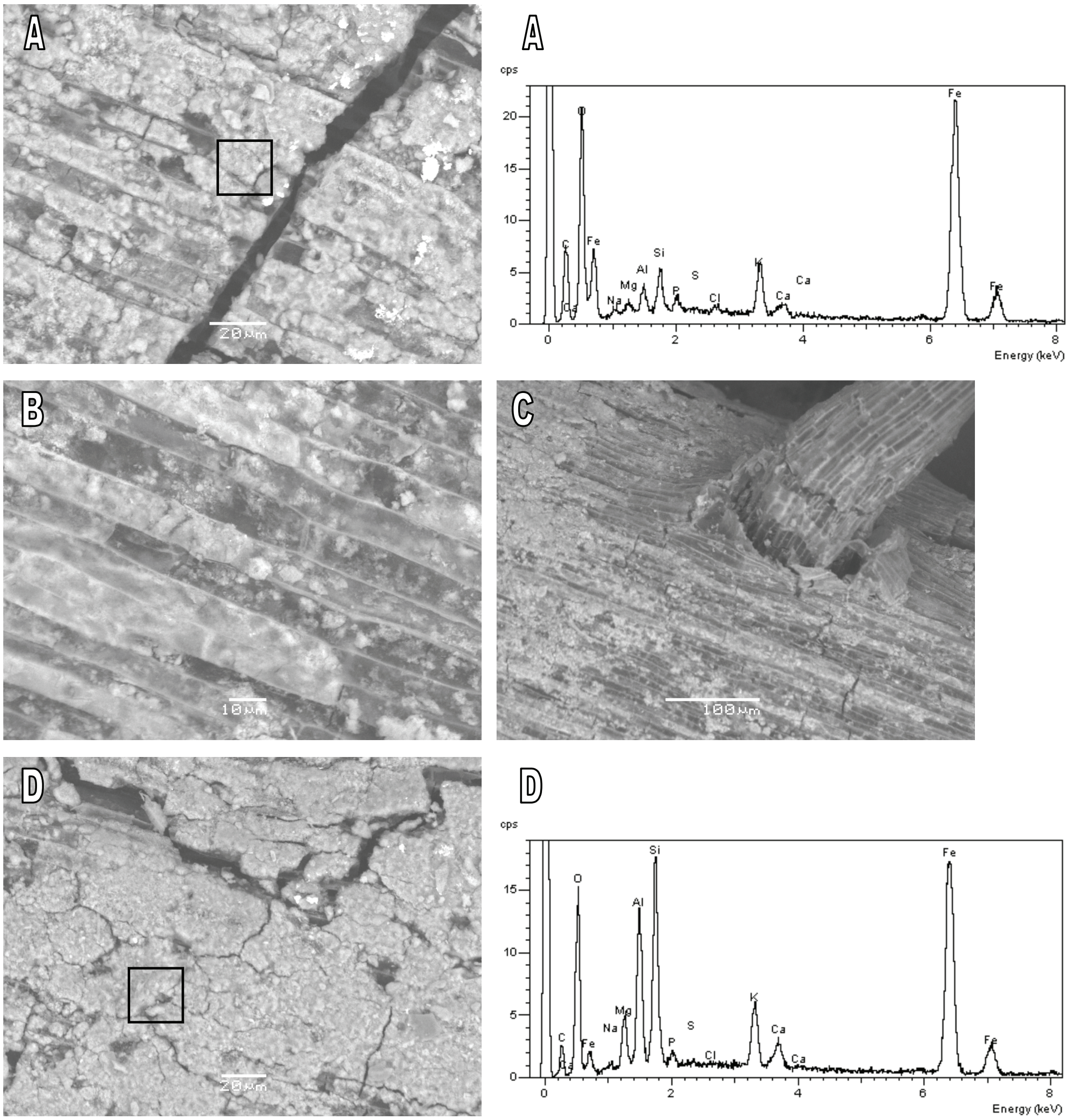


Figure C.1.3.1 – Partridge Crop Lake, Sample 1 (longitudinal section: root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x750, plaque-crusted root surface, note deposit follows contours of cells; B. x1,000, plaque-crusted root surface; C. x250, root surface with lateral root protruding; D. x600, plaque-crusted root surface.

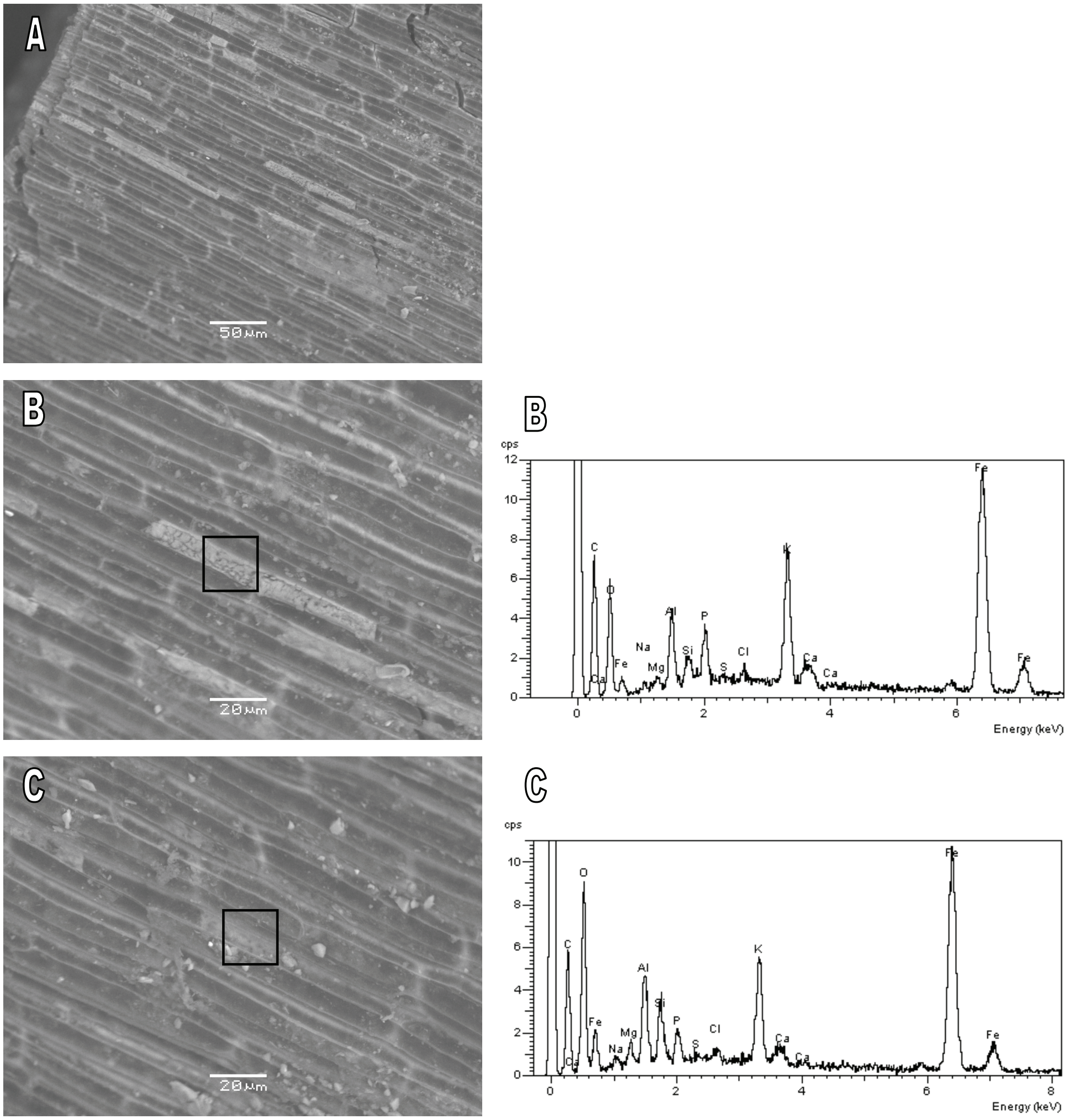


Figure C.1.3.2 – Partridge Crop Lake, Sample 2 (longitudinal section: root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x300, root surface with plaque; B. x750, root surface cell packed with plaque; C. x750, root surface with particulate deposits.

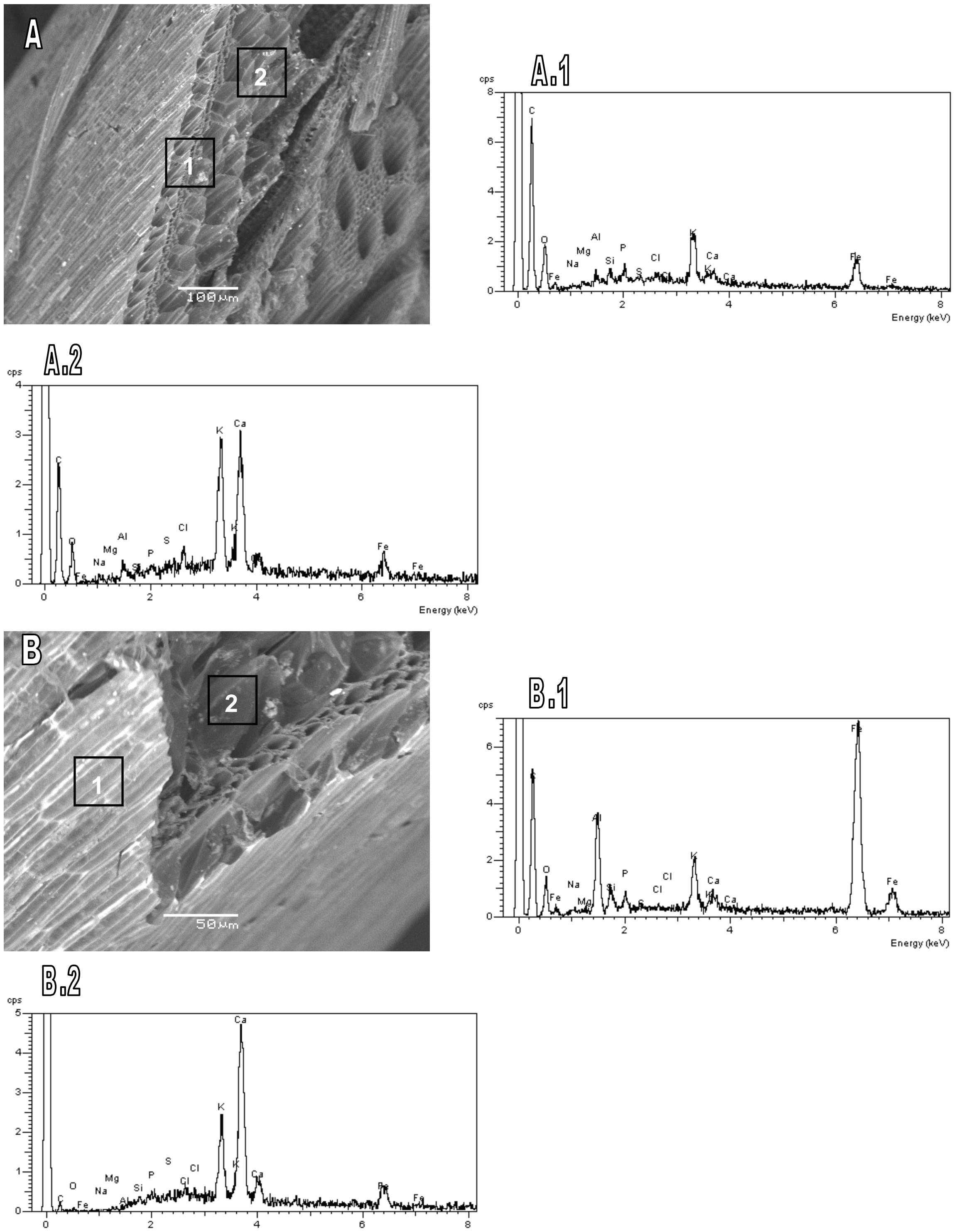


Figure C.1.3.3 (cont'd on next page)

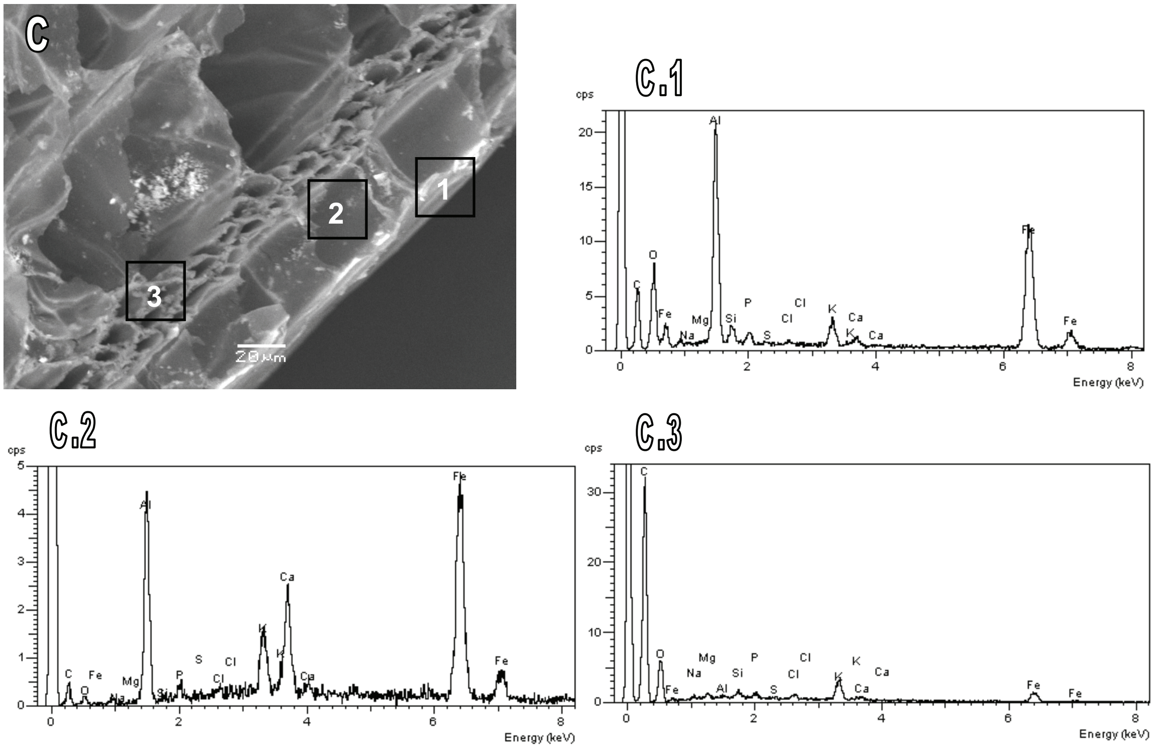
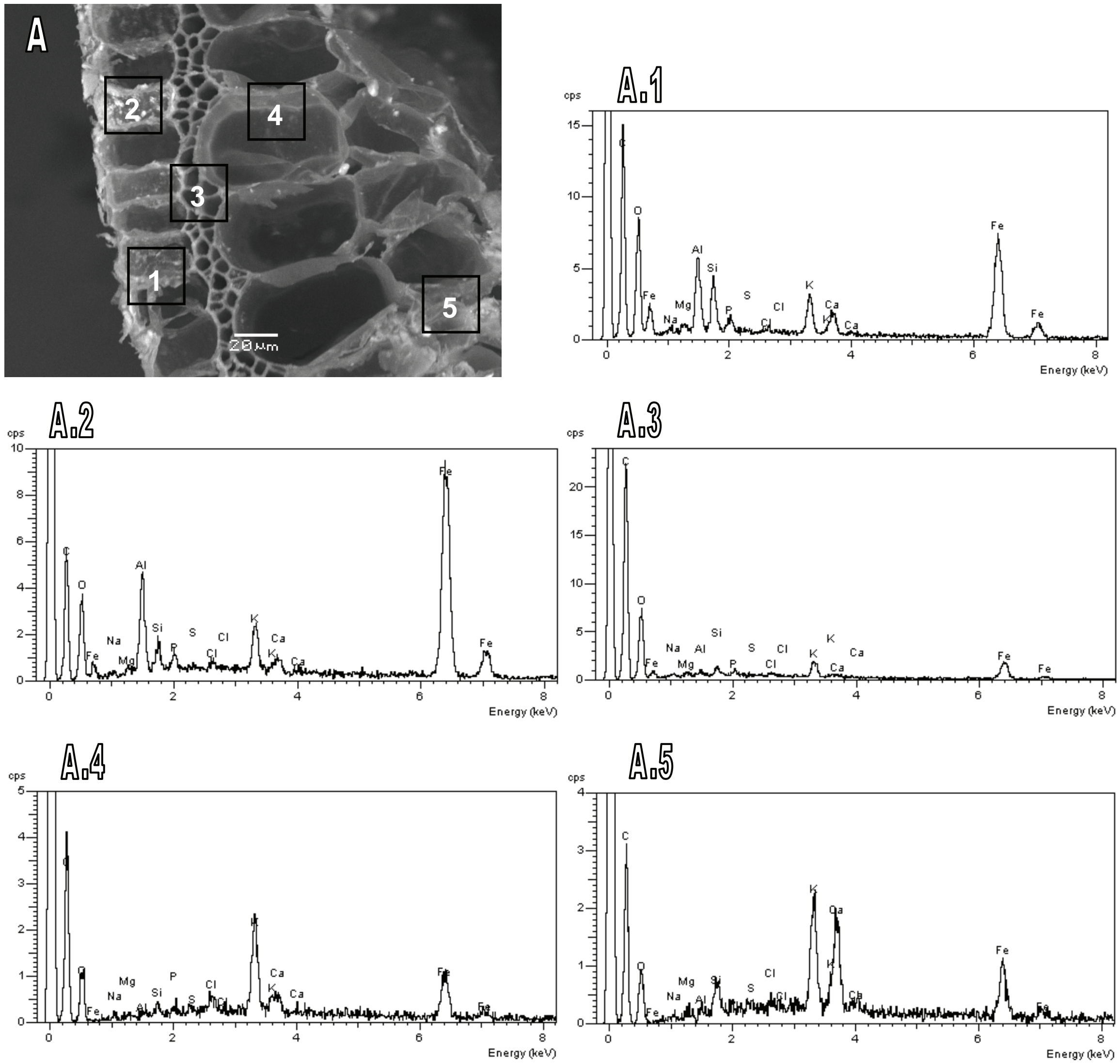


Figure C.1.3.3 – Partridge Crop Lake, Sample 3 (carbon-coated cross section: root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x180, outer cortex (spectrum A.1) and cortex (spectrum A.2); B. x450, root surface (spectrum B.1) and cortex (spectrum B.2); C. x600, epidermis / root surface (spectrum C.1), epidermis cell interior (spectrum C.2) and outer cortex (spectrum C.3).



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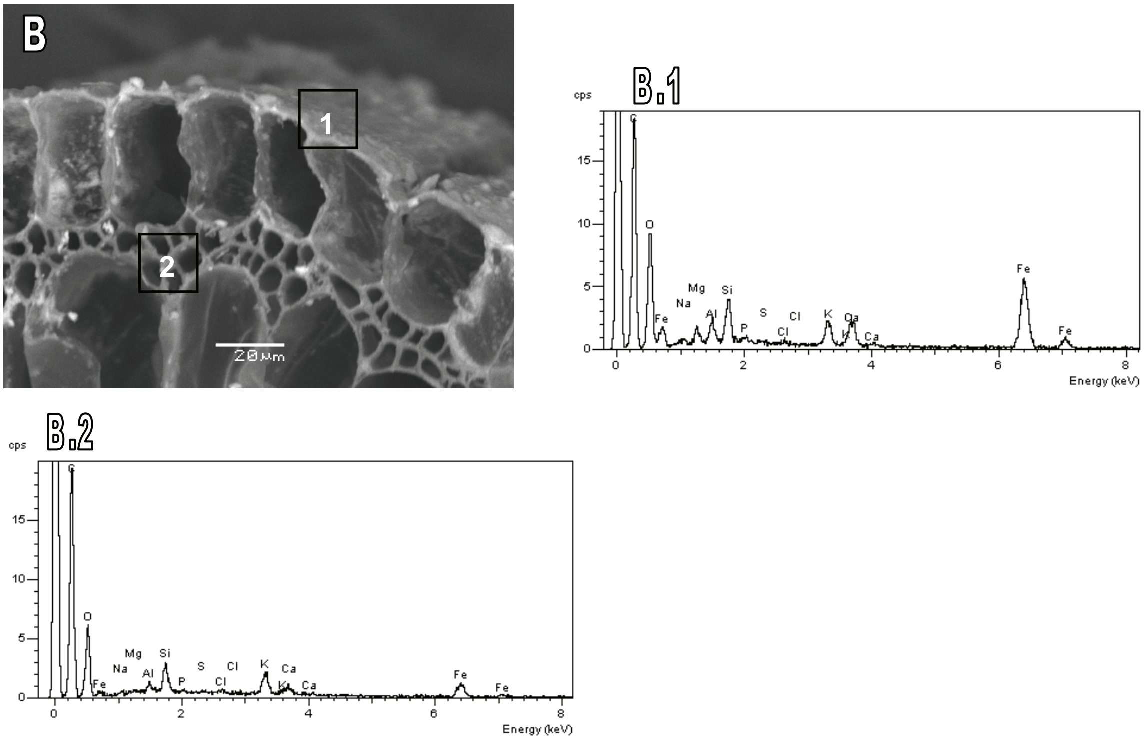
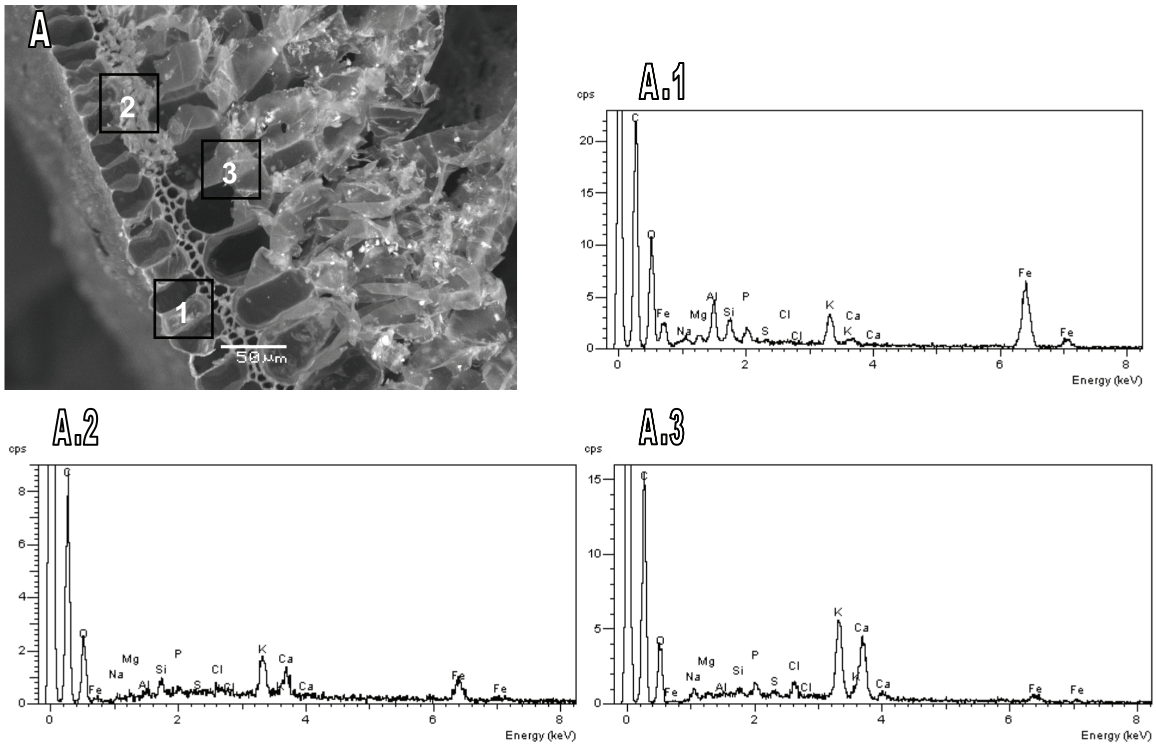


Figure C.1.3.4 – Partridge Crop Lake, Sample 4 (carbon-coated cross section: root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x550, epidermis cell interior (spectrum A.1), plaque-packed epidermis cell (spectrum A.2), outer cortex (spectrum A.3), and cortex (spectra A.4 and A.5); B. x850, root surface (spectrum B.1) and outer cortex (spectrum B.2).



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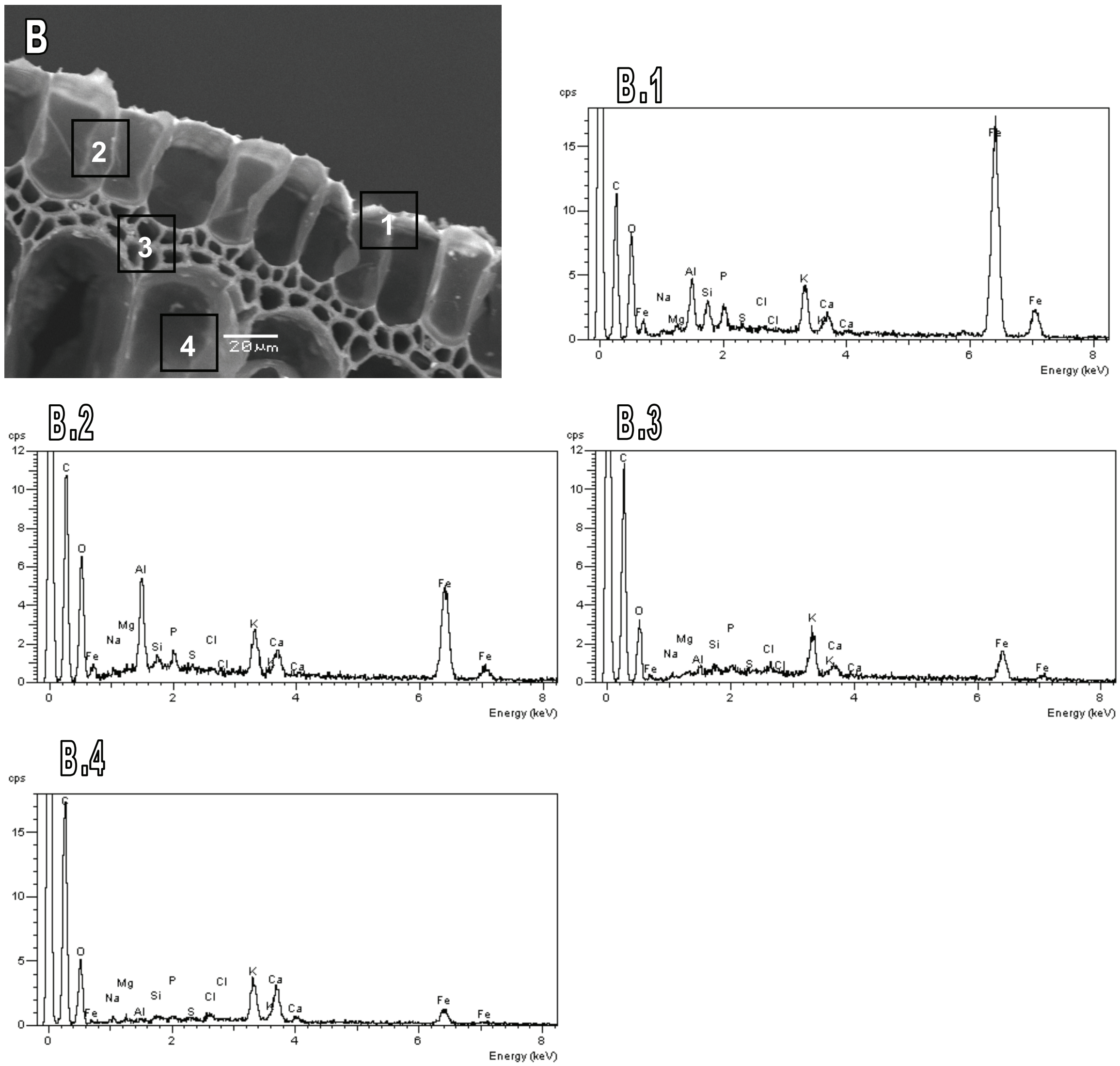

Figure C.1.3.5 – Partridge Crop Lake, Sample 5 (carbon-coated cross section: root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x330, epidermis cell interior (spectrum A.1), outer cortex (spectrum A.2) and cortex (spectrum A.3); B. x700, root / epidermis surface (spectrum B.1), epidermis cell interior (spectrum B.2), outer cortex (spectrum B.3) and cortex (spectrum B.4).

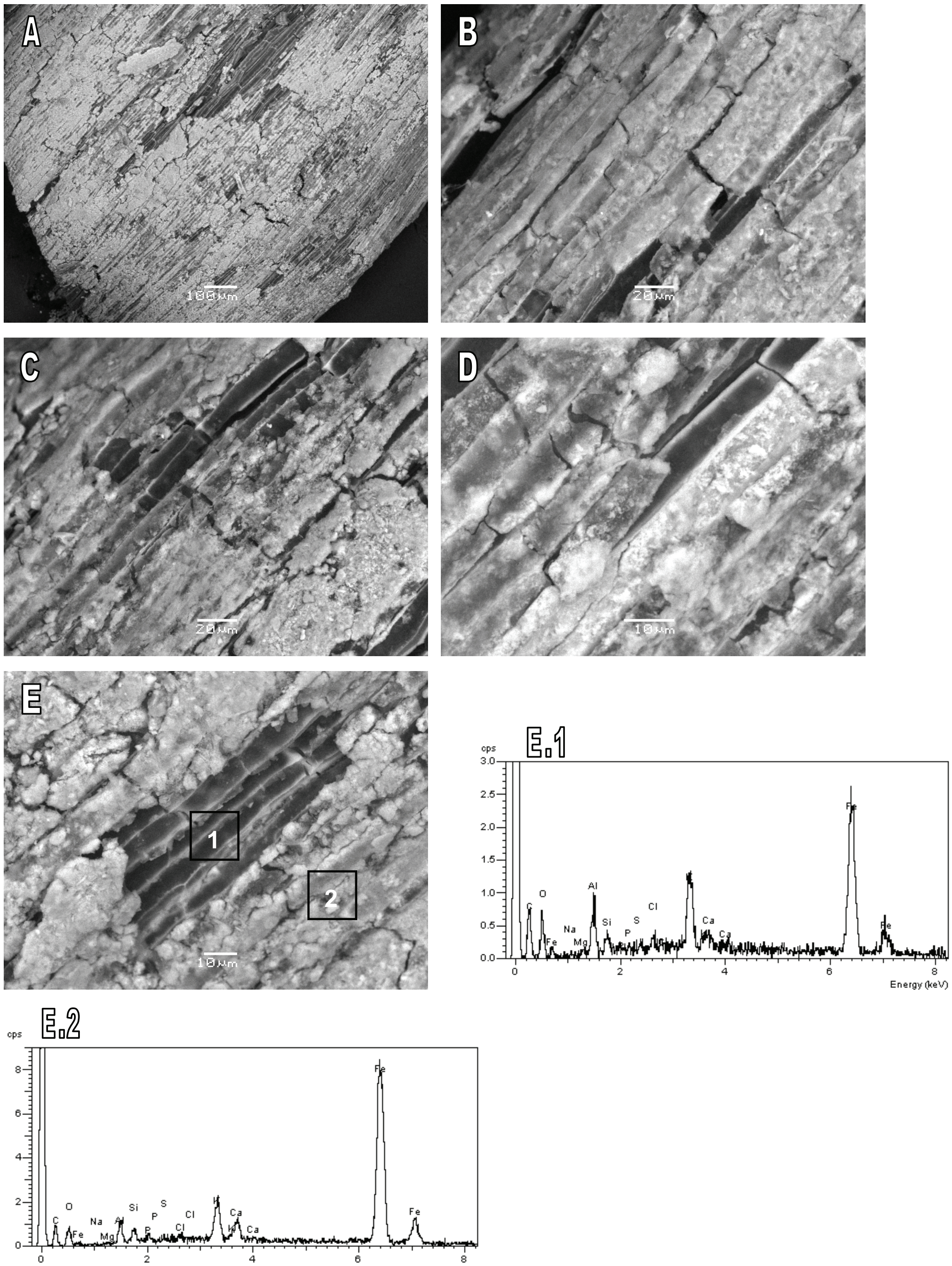

Figure C.1.3.6 (cont'd on next page)

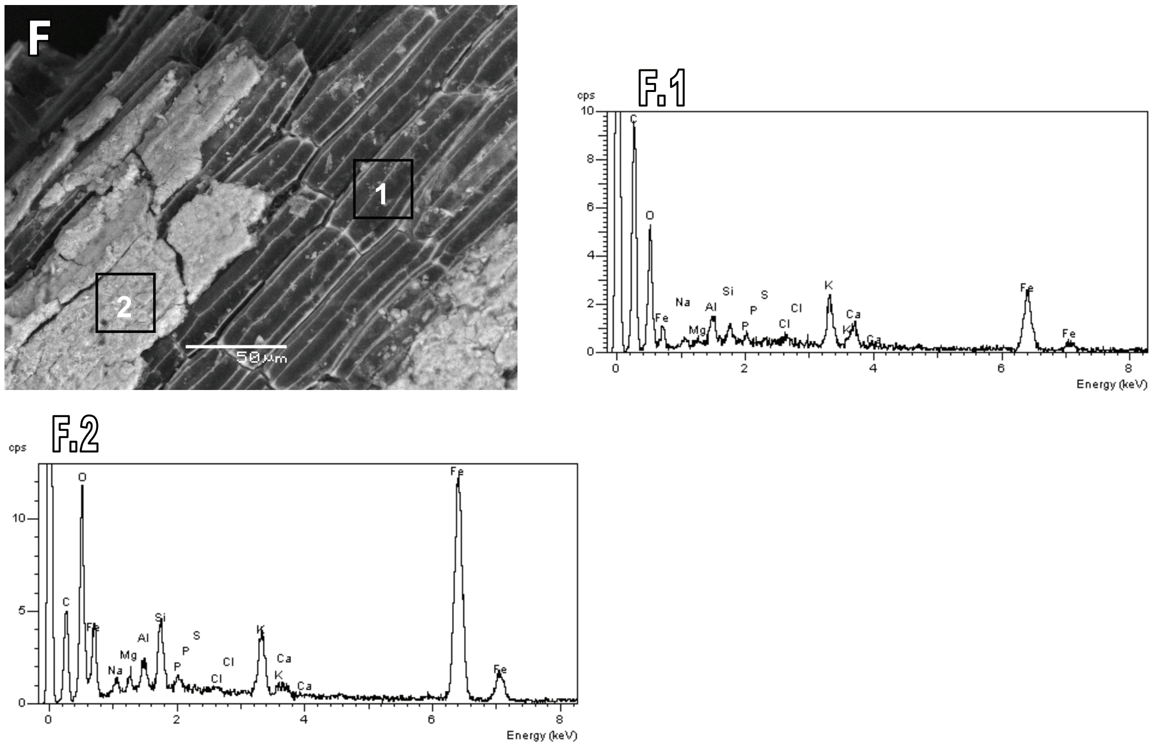

Figure C.1.3.6 – Partridge Crop Lake, Sample 6 (longitudinal section: root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x100, root surface with plaque crust; B. x600, plaque crust; C. x600, plaque crust; D. x1,500, plaque crust; E. x1,000, root surface with plaque crust broken away (spectrum E.1) and present (spectrum E.2); F. x500, root surface with plaque crust broken away (spectrum F.1) and present (spectrum F.2).

Table C.1.3.1 - Partridge Crop Lake, *Zizania palustris* Root Plaque SEM Image Data Compilation

Sample Data			SEM Observation Data														Comments
Site	Sample	Root Colour	Image	Image Location	Plaque Present	Zoom	Primary Deposition				Secondary Deposition				Other Particulate Deposits	
							Type	% Coverage	Thickness	Location	Type	% Coverage	Thickness	Location		
SeR	1	orange-brown	A	root surface	Y	750	crust	100	thick	cell surface	-	-	-	-	none	crust appears to be of variable thickness
SeR	1	orange-brown	B	root surface	Y	1,000	crust	100	thick	cell surface	-	-	-	-	none	crust appears to be of variable thickness
SeR	1	orange-brown	C	root surface	Y	250	crust	100	thick	cell surface	-	-	-	-	none	crust appears to be of variable thickness; plaque appears present on lateral root
SeR	1	orange-brown	D	root surface	Y	600	crust	100	thick	cell surface	-	-	-	-	none	consistent thickness in crust, some cracks
SeR	2	orange-brown	A	root surface	Y	300	thin	85	thin	cell surface	packed cells	15	unknown	within cells	none	deposition % based on observed root surface area
SeR	2	orange-brown	B	root surface	Y	750	thin	90	thin	cell surface	packed cells	10	unknown	within cells	soil	
SeR	2	orange-brown	C	root surface	Y	750	thin	100	thin	cell surface	-	-	-	-	soil	
SeR	3	orange-brown	A	cross section	Y	180	thin	100	thin	cell surface	-	-	-	-	soil	deposition % based on observed root surface area
SeR	3	orange-brown	B	cross section	Y	450	thin	100	thin	cell surface	-	-	-	-	none	deposition % based on observed root surface area
SeR	3	orange-brown	C	cross section	N/A	600	-	-	-	-	-	-	-	-	-	cross section, no root surface visible to assess plaque
SeR	4	orange-brown	A	cross section	N/A	550	crust	100	thick	on and within cells	-	-	-	-	none	plaque deposits on root surface and within root surface cells, but not past epidermis
SeR	4	orange-brown	B	cross section	Y	850	crust	100	1.5 µm	on and within cells	-	-	-	-	soil	plaque deposits on root surface and within root surface cells, but not past epidermis
SeR	5	orange-brown	A	cross section	N/A	330	-	-	-	-	-	-	-	-	-	cross section, no root surface visible to assess plaque
SeR	5	orange-brown	B	cross section	Y	700	unknown	-	-	-	-	-	-	-	-	cross section, not enough root surface visible to assess plaque thickness, can confirm presence
SeR	6	orange-brown	A	root surface	Y	100	crust	90	thick	on and within cells	broken away	10	unknown	within cells	none	deposition % based on observed root surface area
SeR	6	orange-brown	B	root surface	Y	600	crust	100	thick	on and within cells	-	-	-	-	none	thick plaque crust, follows contours of cells
SeR	6	orange-brown	C	root surface	Y	600	crust	90	thick	on and within cells	broken away	10	unknown	within cells	none	where plaque crust has broken away, appears that the cell wall of the root surface cell is gone as well
SeR	6	orange-brown	D	root surface	Y	1,500	crust	95	3 µm	within cells	broken away	5	unknown	within cells	none	plaque-crusted area with plaque cell cast (similar to that in Chen et al., 1980b)
SeR	6	orange-brown	E	root surface	Y	1,000	crust	80	thick	on and within cells	broken away	20	unknown	within cells	none	where plaque crust has broken away, appears that the cell wall of the root surface cell is gone as well
SeR	6	orange-brown	F	root surface	Y	500	crust	60	thick	unknown	broken away	40	unknown	unknown	soil	cannot tell if plaque is in or on cells

Notes

Plaque thickness = thin (too thin to measure, approximately <1 µm)

Plaque thickness = thick (not able to measure, at least >1.5 µm)

\- = N/A

Table C.1.3.2 - Partridge Crop Lake, *Zizania palustris* Root Plaque EDXA X-Ray Spectra Data Compilation

Sample Data			X-Ray Spectra Data									Comments
Site	Sample	Root Colour	Spectrum	Plaque Present	Location	Relative Peak Height of Elements					Other Particulate Deposits	
						1	2	3	4	5		
SeR	1	orange-brown	A	Y	root surface	Fe	O	C(Fe)	K	Si	none	plaque crust
SeR	1	orange-brown	D	Y	root surface	Si	Fe	O	Al	K	none visible	soil may be incoporated into plaque crust
SeR	2	orange-brown	B	Y	root surface	Fe	K	C	O	Al	none	plaque-packed cell
SeR	2	orange-brown	C	Y	root surface	Fe	O	C	K	Al	none	
SeR	3	orange-brown	A.1	N/A	outer cortex	C	K	O	Fe	P	N/A	root interior, for comparison to root surface
SeR	3	orange-brown	A.2	N/A	cortex	Ca	K	C	O	Fe	N/A	root interior, for comparison to root surface
SeR	3	orange-brown	B.1	Y	root surface	Fe	C	Al	K	O	none	
SeR	3	orange-brown	B.2	N/A	cortex	Ca	K	Fe(Ca)	-	-	N/A	root interior, for comparison to root surface
SeR	3	orange-brown	C.1	Y	root surface	Al	Fe	O	C	K	none	
SeR	3	orange-brown	C.2	N/A	epidermis cells	Fe	Al	Ca	K	-	N/A	root interior, for comparison to root surface
SeR	3	orange-brown	C.3	N/A	outer cortex	C	O	K	-	-	N/A	root interior, for comparison to root surface
SeR	4	orange-brown	A.1	Y	epidermis cells	C	O	Fe	Al	Si	none	surface cell
SeR	4	orange-brown	A.2	Y	epidermis cells	Fe	C	Al	O	K	none	plaque-packed cell
SeR	4	orange-brown	A.3	N/A	outer cortex	C	O	-	-	-	N/A	root interior, for comparison to root surface
SeR	4	orange-brown	A.4	N/A	cortex	C	K	O	Fe	-	N/A	root interior, for comparison to root surface
SeR	4	orange-brown	A.5	N/A	cortex	C	K	Ca	Fe	O	N/A	root interior, for comparison to root surface
SeR	4	orange-brown	B.1	Y	epidermis cells	C	O	Fe	Si	Al	none	plaque crust
SeR	4	orange-brown	B.2	N/A	outer cortex	C	O	Si	K	-	N/A	root interior, for comparison to root surface
SeR	5	orange-brown	A.1	N/A	epidermis cells	C	O	Fe	Al	K	N/A	surface cell
SeR	5	orange-brown	A.2	N/A	outer cortex	C	O	K	Ca	Si	N/A	root interior, for comparison to root surface
SeR	5	orange-brown	A.3	N/A	cortex	C	K	Ca	O	-	N/A	root interior, for comparison to root surface
SeR	5	orange-brown	B.1	Y	root surface	Fe	C	O	Al	K	none	plaque visible
SeR	5	orange-brown	B.2	N/A	epidermis cells	C	O	Al	Fe	K	N/A	Fe spectrum greatly reduced compared to root surface
SeR	5	orange-brown	B.3	N/A	outer cortex	C	O	K	Fe	-	N/A	root interior, for comparison to root surface
SeR	5	orange-brown	B.4	N/A	cortex	C	O	K	Ca	Fe	N/A	root interior, for comparison to root surface
SeR	6	orange-brown	E.1	Y	root surface	Fe	K	Al	C	O	none	root surface, appears that crust is broken away
SeR	6	orange-brown	E.2	Y	root surface	Fe	K	Ca(Fe)	Al	O	none	plaque crust, extremely high Fe
SeR	6	orange-brown	F.1	Y	root surface	C	O	Fe	K	Al	none	root surface where plaque crust has broken away
SeR	6	orange-brown	F.2	Y	root surface	Fe	O	C	Si	K(Fe)	soil	plaque crust, extremely high Fe

Notes

Relative Peak Height of Elements: Xx(Yy) means that element Xx had the next highest peak relative to element Yy, shown in brackets because it is the second peak for element Yy

\- = element peaks too low to determine relative height

C.1.4 – Lower Steep Rock Lake

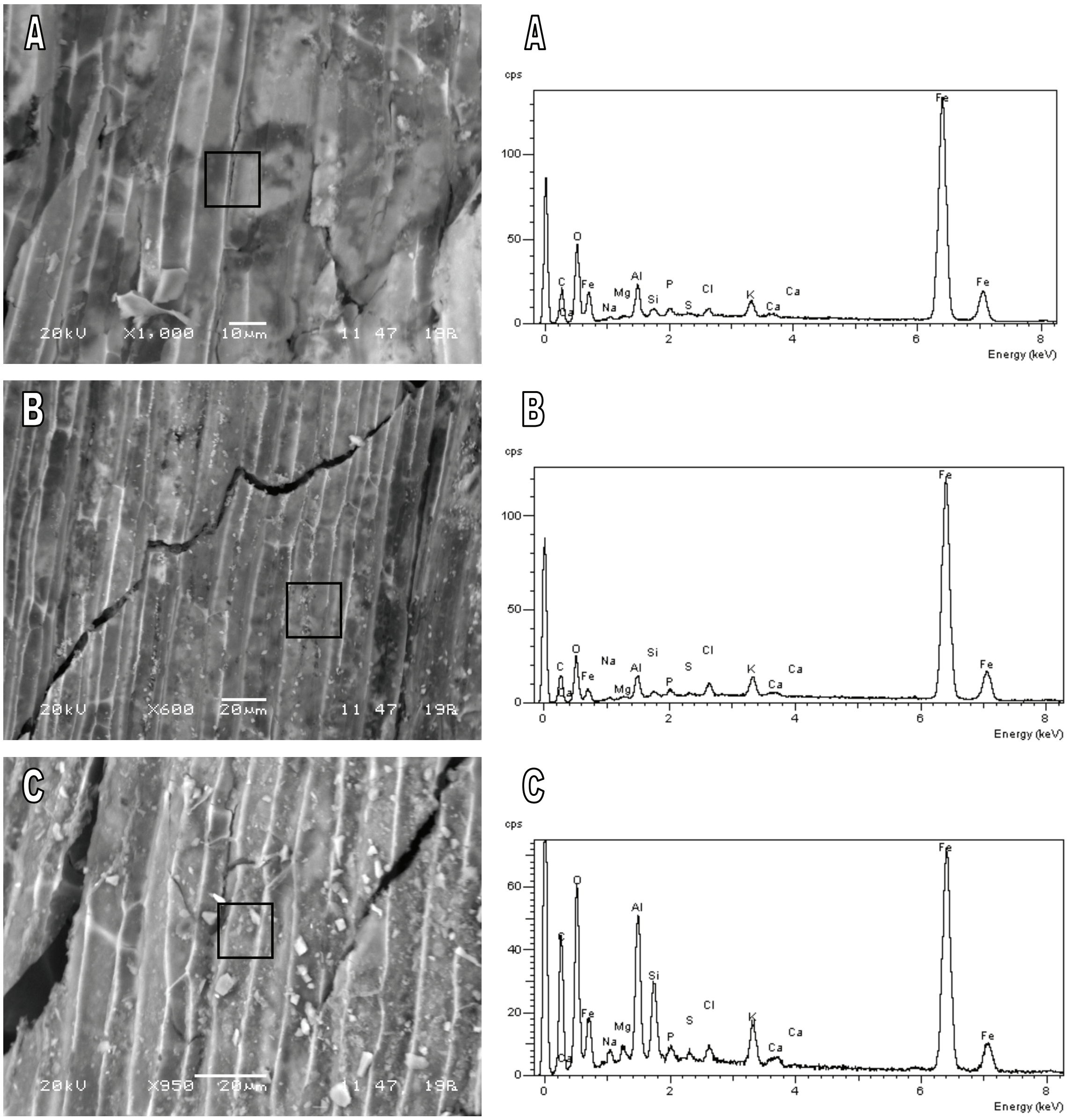

Figure C.1.4.1 – Lower Steep Rock Lake, Sample 1 (longitudinal section: root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x1,000, plaque-crusted root surface; B. x600, root surface; C. x950, root surface with particulate deposits.

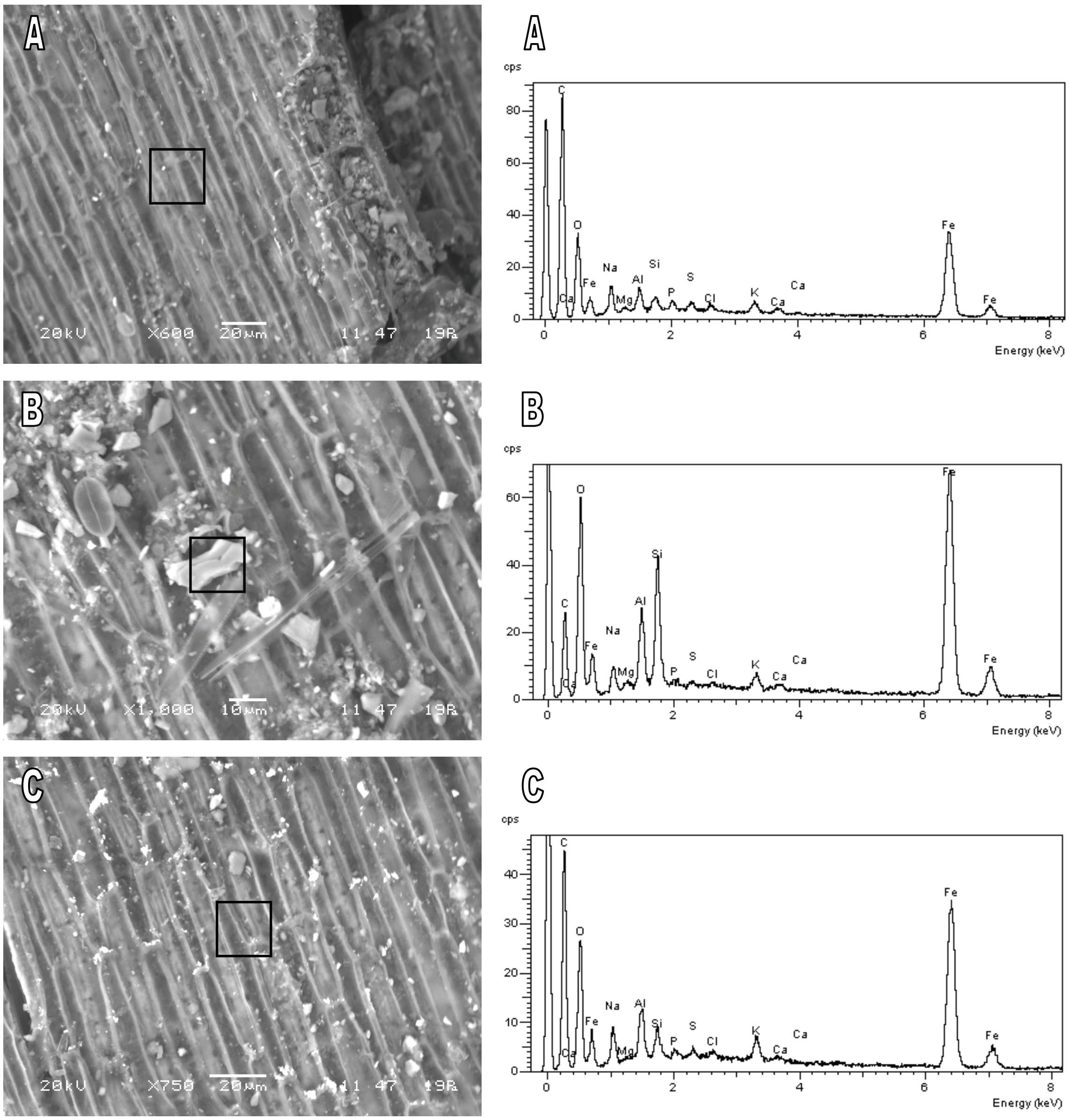

Figure C.1.4.2 – Lower Steep Rock Lake, Sample 2 (longitudinal section: root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x600, root surface; B. x1,000, root surface with particulate deposits; C. x750, root surface with particulate deposits.

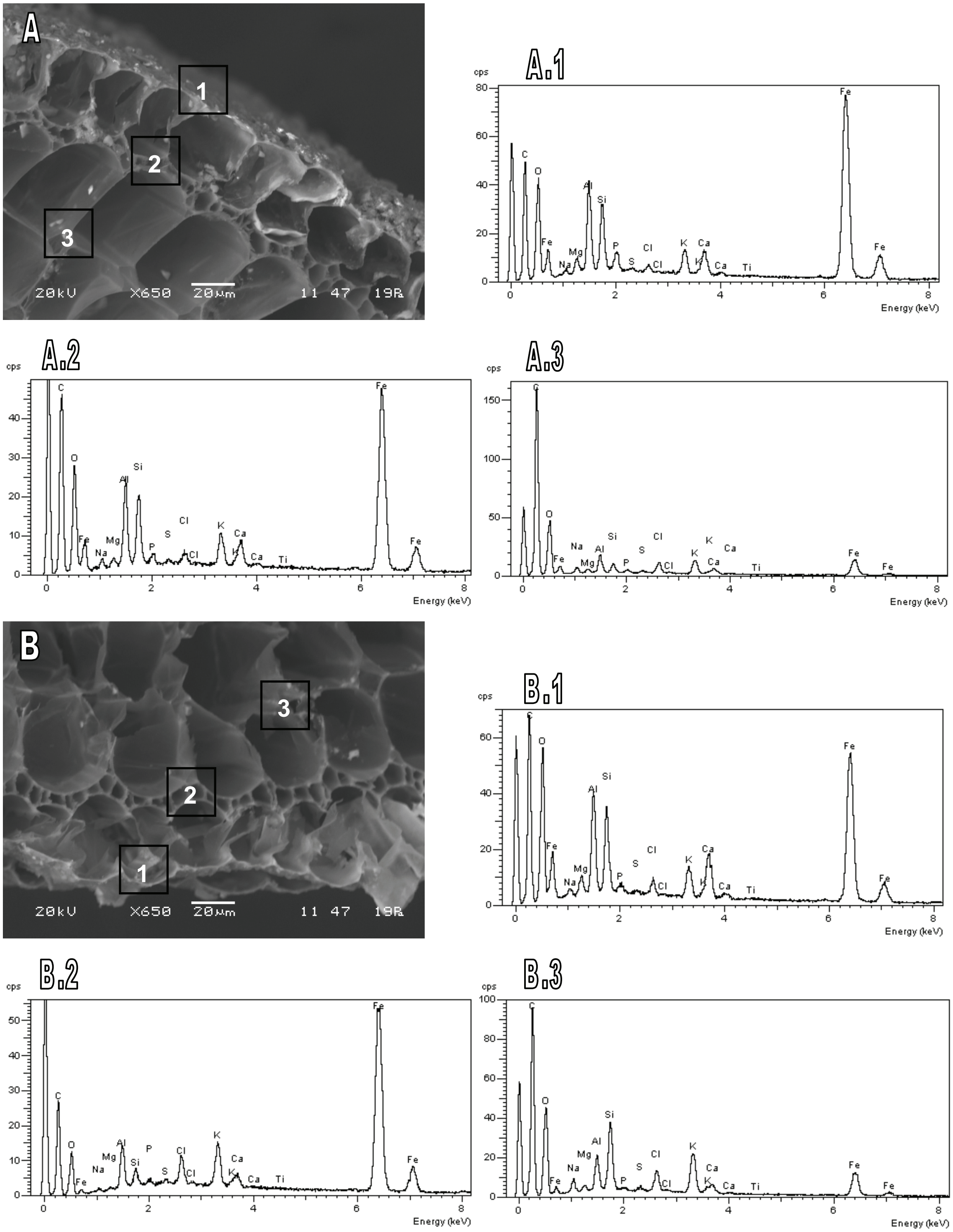

Figure C.1.4.3 (cont'd on next page)

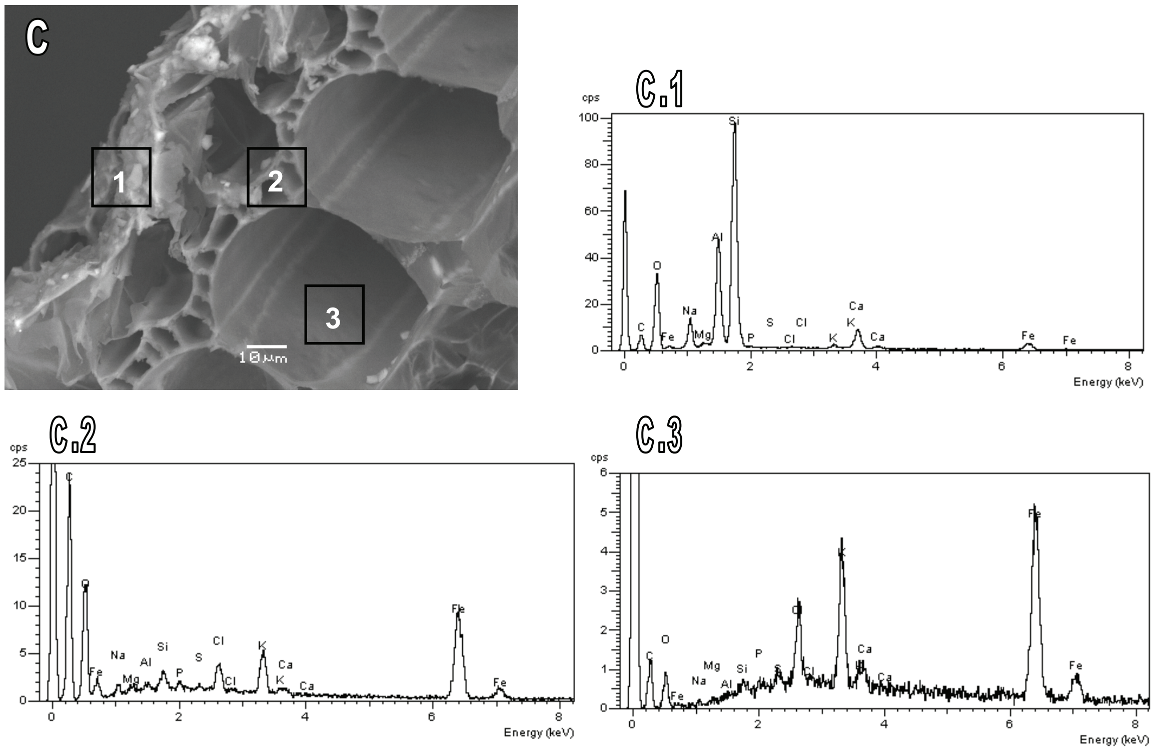

Figure C.1.4.3 – Lower Steep Rock Lake, Sample 3 (cross section: root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x650, "crusted" root surface (spectrum A.1), outer cortex (spectrum A.2) and cortex (spectrum A.3); B. x650, root surface (spectrum B.1), outer cortex (spectrum B.2) and cortex (spectrum B.3); C. x1,000, root surface (spectrum C.1), outer cortex (spectrum C.2) and cortex (spectrum C.3).

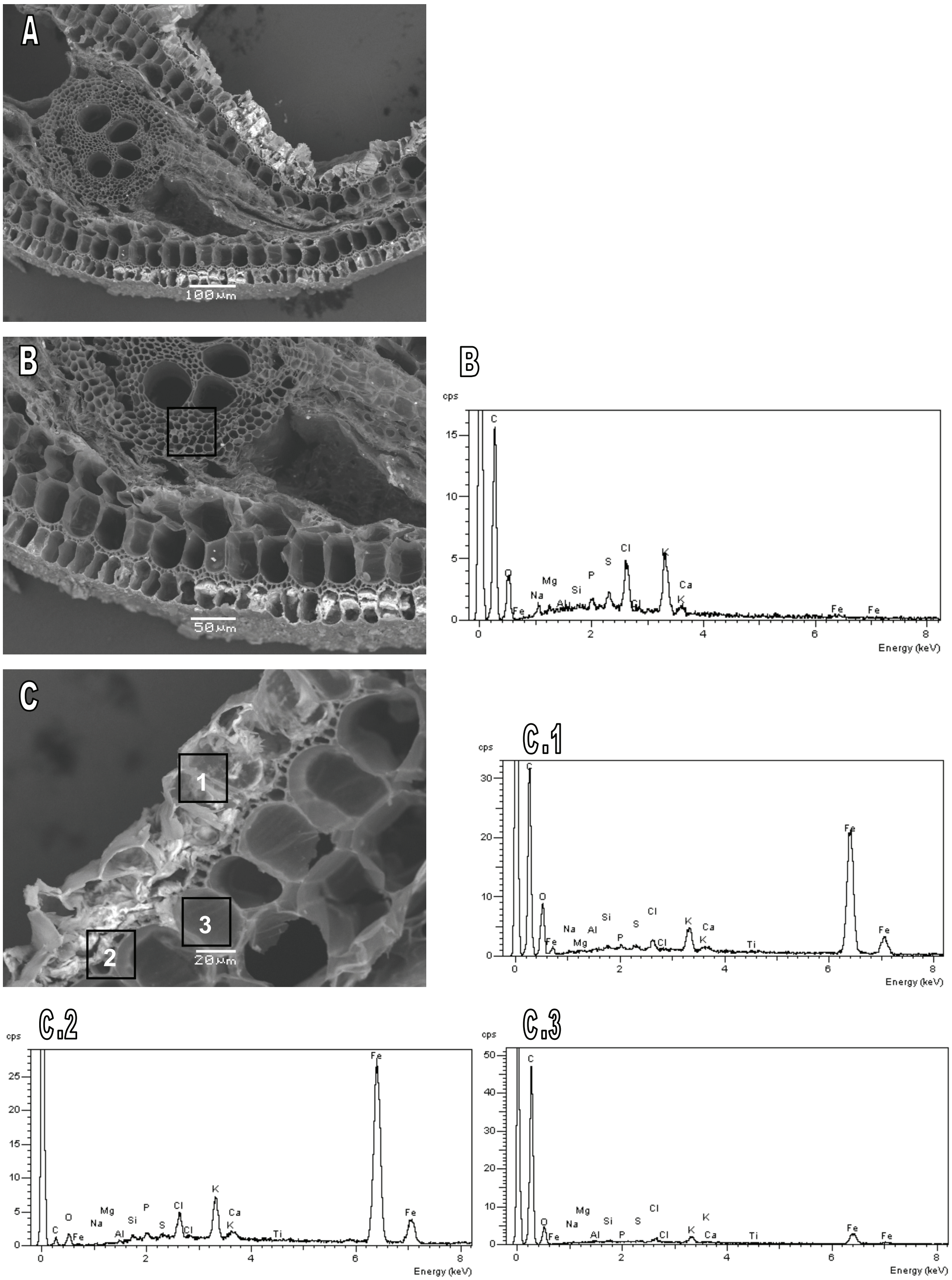

Figure C.1.4.4 (cont'd on next page)

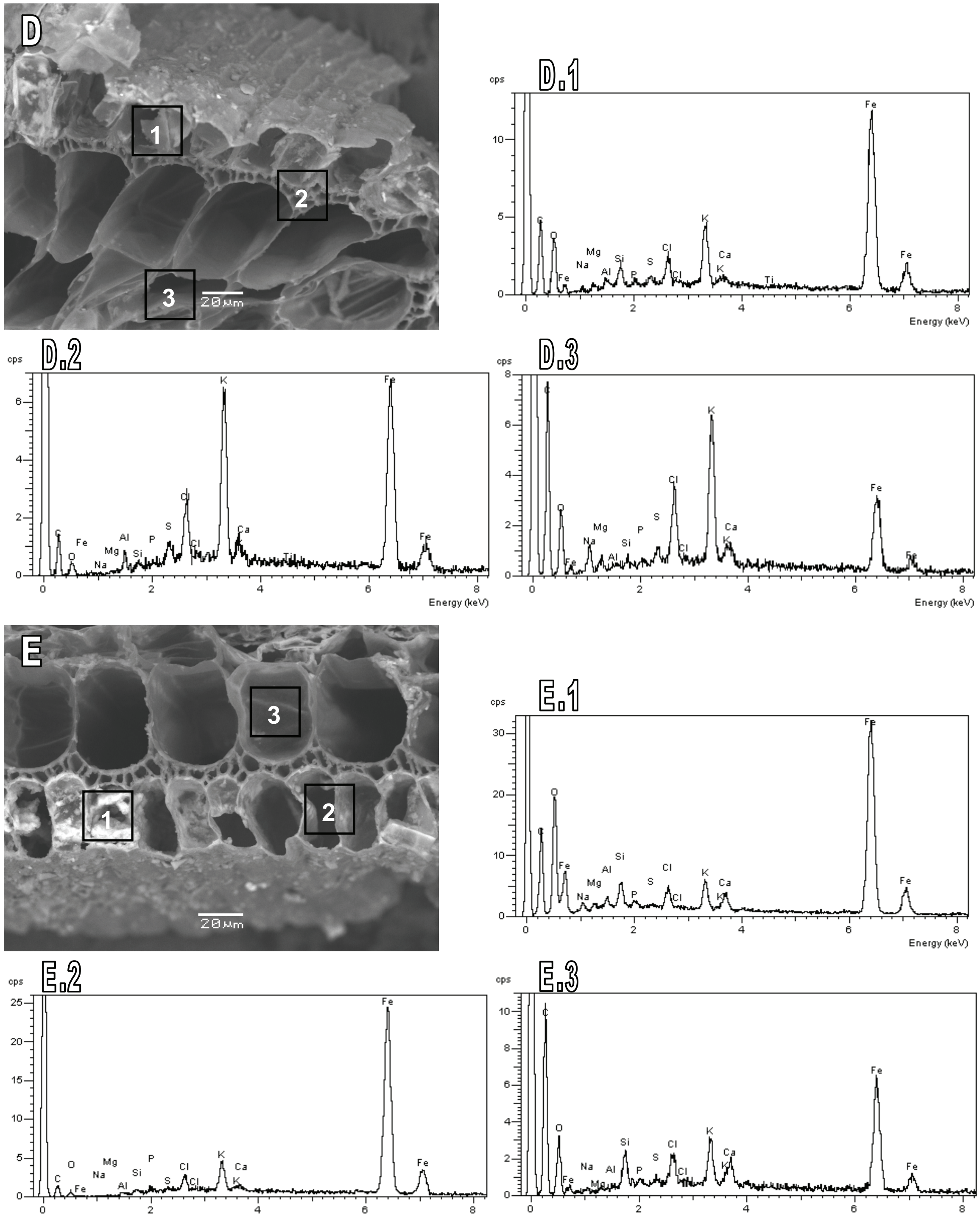

Figure C.1.4.4 – Lower Steep Rock Lake, Sample 4 (carbon-coated cross section: root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x140, root cross section; B. x270, root vascular cylinder; C. x600, epidermis/root surface cells filled with plaque (spectrum C.1), outer cortex (spectrum C.2) and cortex (spectrum C.3); D. x600, epidermis cell interior (spectrum D.1), outer cortex (spectrum D.2) and cortex (spectrum D.3); E. x650, epidermis plaque-filled cell interior (spectrum E.1), epidermis empty cell interior (spec. E.2) and cortex (spec. E.3).

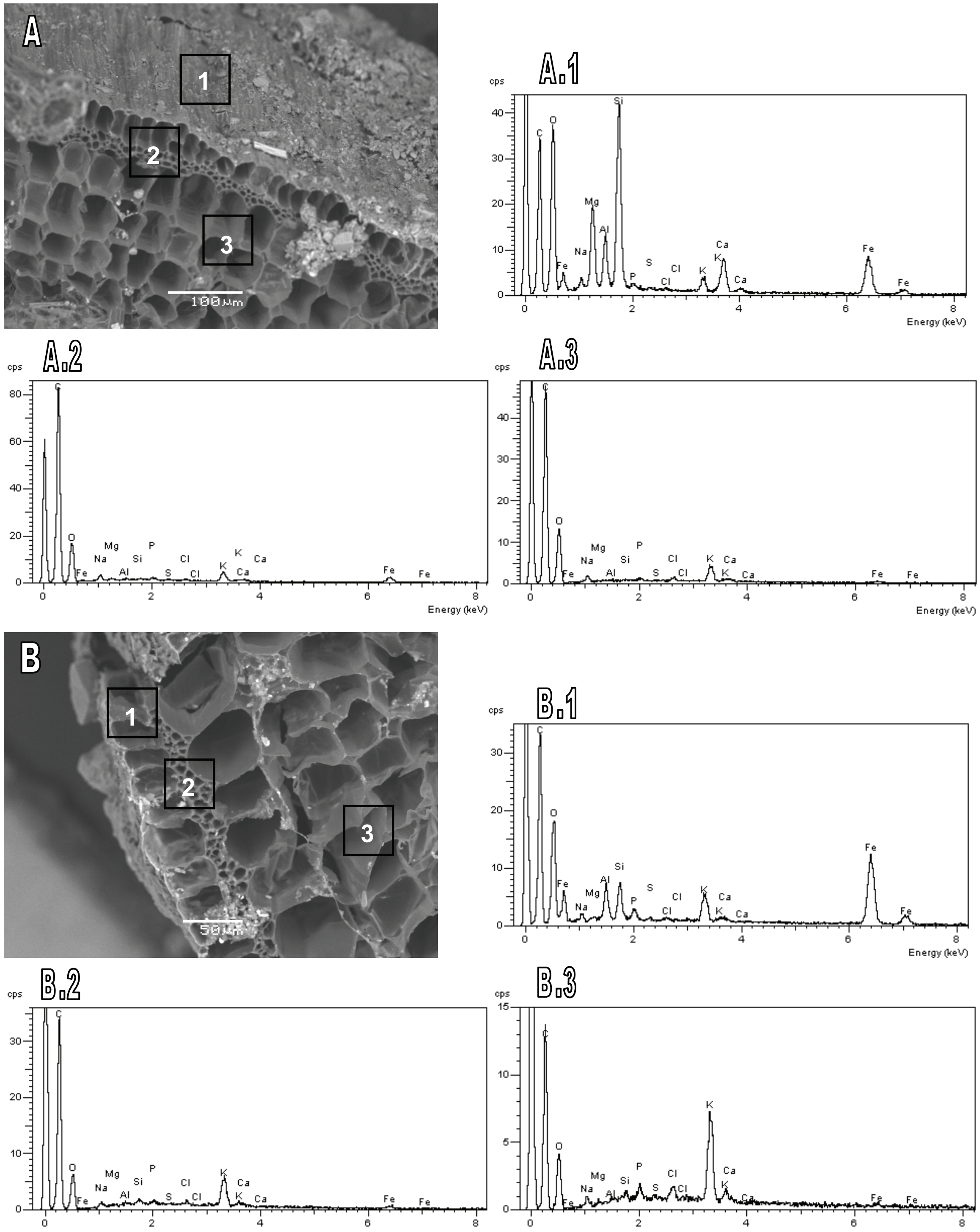

Figure C.1.4.5 – Lower Steep Rock Lake, Sample 5 (carbon-coated cross section: root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x220, root surface (spectrum A.1), outer cortex (spectrum A.2) and cortex (spectrum A.3); B. x350, root surface cells (spectrum B.1), outer cortex (spectrum B.2) and cortex (spectrum B.3).

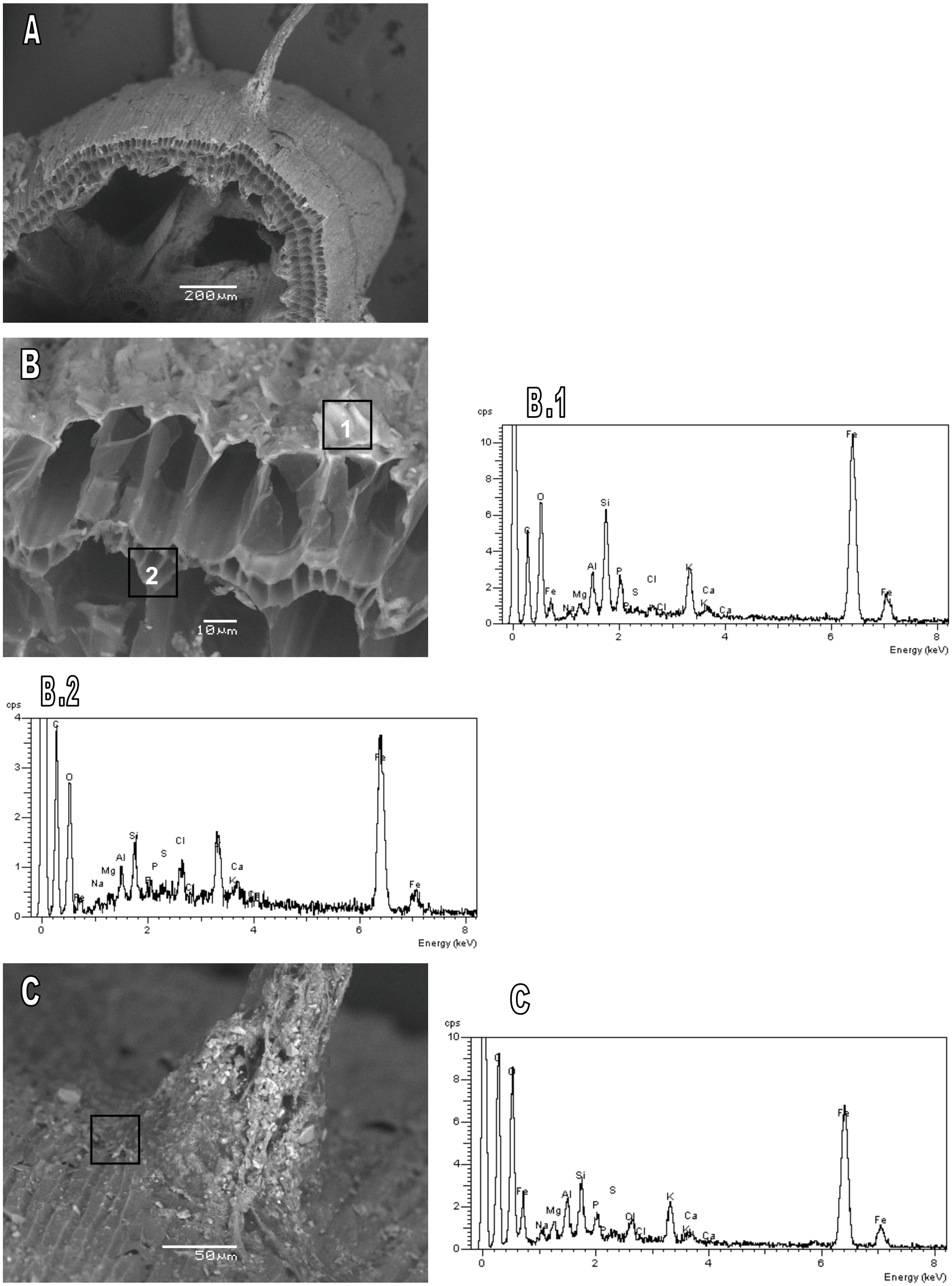

Figure C.1.4.6 (cont'd on next page)

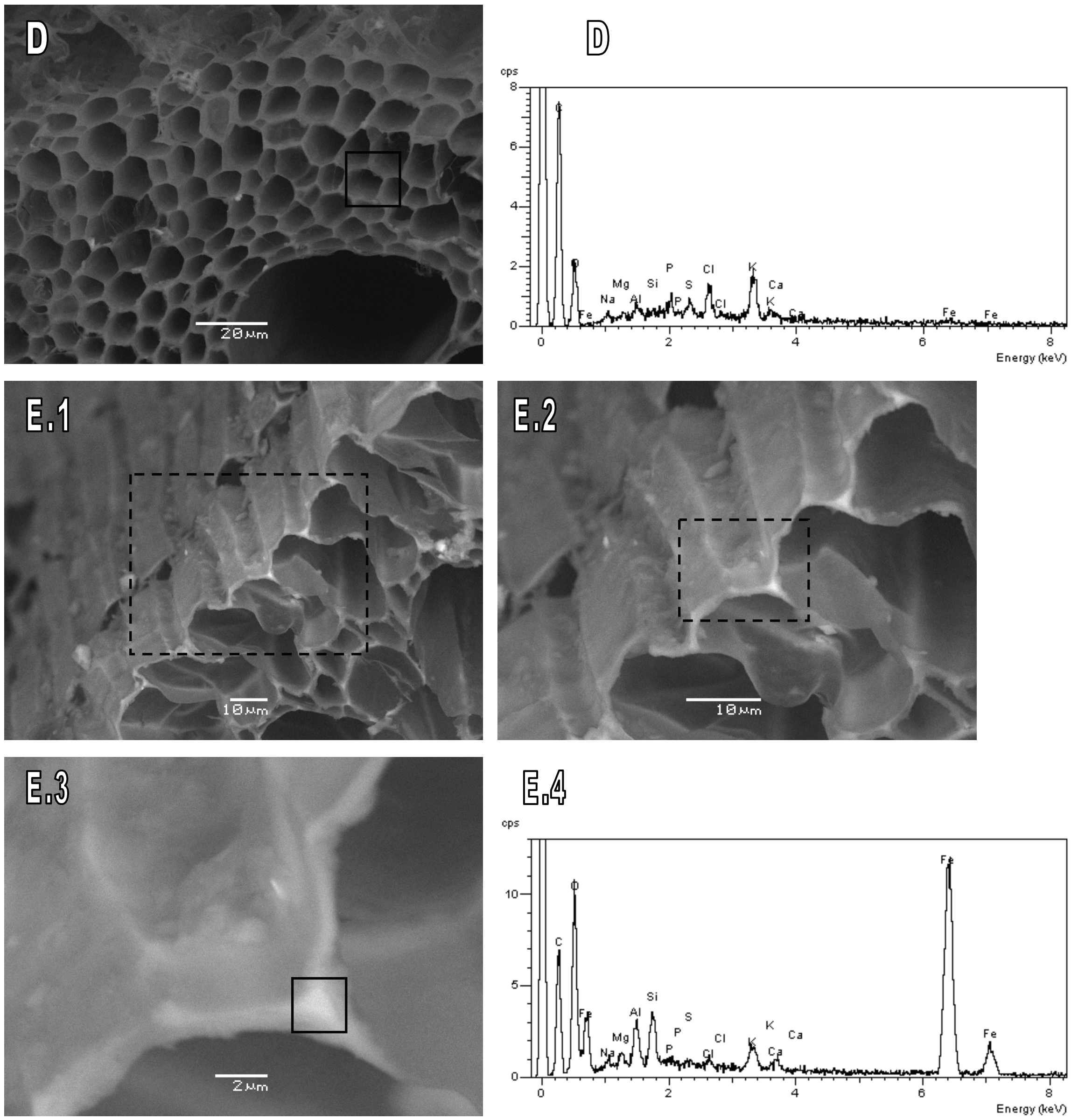

Figure C.1.4.6 – Lower Steep Rock Lake, Sample 6 (cross section: root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x85, root cross section; B. x1,000, root surface (spectrum B.1) and outer cortex (spectrum B.2); C. x450, lateral root, showing root surface plaque coverage; D. x950, root vascular cylinder; E. root surface with plaque, three zoomed images showing plaque thickness (area shown by dashed box), E.1 x1,000, E.2 x2,000, E.3 x7,000.

Table C.1.4.1 - Lower Steep Rock Lake, *Zizania palustris* Root Plaque SEM Image Data Compilation

Sample Data			SEM Observation Data													Comments
Site	Sample	Root Colour	Image	Image Location	Plaque Present	Zoom	Primary Deposition				Secondary Deposition				Other Particulate Deposits	
							Type	% Coverage	Thickness	Location	Type	% Coverage	Thickness	Location		
StR	1	orange-brown	A	root surface	Y	1,000	crust	100	1 µm	cell surface	-	-	-	-	none	thin plaque crust, cell surface flaking up
StR	1	orange-brown	B	root surface	Y	600	crust	100	1 µm	cell surface	-	-	-	-	none	even crust
StR	1	orange-brown	C	root surface	Y	950	crust	100	1 µm	cell surface	-	-	-	-	soil	bits of soil and plaque on surface
StR	2	orange-brown	A	root surface	Y	600	thin with crust pieces	100	thin	cell surface	-	-	-	-	soil	thin plaque with pieces of plaque on surface
StR	2	orange-brown	B	root surface	Y	1,000	thin with crust pieces	100	thin	cell surface	-	-	-	-	soil	thin plaque with pieces of plaque (up to 20 µm in length) on surface
StR	2	orange-brown	C	root surface	Y	750	thin with crust pieces	100	thin	cell surface	-	-	-	-	soil	thin plaque with pieces of plaque (up to 10 µm in length) on surface
StR	3	orange-brown	A	cross section	Y	650	unknown	-	-	-	-	-	-	-	soil	cross section, not enough root surface visible to assess plaque thickness, can confirm presence
StR	3	orange-brown	B	cross section	Y	650	unknown	-	-	-	-	-	-	-	soil	cross section, not enough root surface visible to assess plaque thickness, can confirm presence
StR	3	orange-brown	C	cross section	N/A	1,000	-	-	-	-	-	-	-	-	soil	cross section, not enough root surface visible to assess plaque presence
StR	4	orange-brown	A	cross section	N/A	140	-	-	-	-	-	-	-	-	-	cross section image for reference to subsequent image locations
StR	4	orange-brown	B	cross section	N/A	270	-	-	-	-	-	-	-	-	-	cross section image for reference to subsequent image locations
StR	4	orange-brown	C	cross section	Y	600	crust/packed cells	N/A	-	-	-	-	-	-	none	root surface cells filled with loosely-packed plaque, from root surface to epidermis cells, up to 40 µm in depth
StR	4	orange-brown	D	cross section	Y	600	crust/packed cells	N/A	2 µm	on and within cells	-	-	-	-	none	deposition % based on observed root surface area
StR	4	orange-brown	E	cross section	Y	650	crust/packed cells	N/A	2 to 30 µm	on and within cells	-	-	-	-	none	deposition % based on observed root surface area
StR	5	orange-brown	A	cross section	N	220	-	-	-	-	-	-	-	-	soil	no plaque on root surface
StR	5	orange-brown	B	cross section	Y	350	thin	N/A	thin	cell surface	-	-	-	-	soil	thin plaque on root surface
StR	6	orange-brown	A	cross section	N/A	85	-	-	-	-	-	-	-	-	-	cross section image for reference to subsequent image locations
StR	6	orange-brown	B	cross section	Y	1,000	crust	100	1 µm	cell surface	-	-	-	-	soil	flakey crust on root surface, deposition % based on observed root surface area
StR	6	orange-brown	C	root surface	Y	450	crust	100	thick	cell surface	-	-	-	-	soil	plaque crust on root and lateral root surface
StR	6	orange-brown	D	vascular cylinder	N/A	95	-	-	-	-	-	-	-	-	-	root interior
StR	6	orange-brown	E.1	root surface	Y	1,000	crust	100	1 to 2 µm	cell surface	-	-	-	-	none	plaque crust on root surface
StR	6	orange-brown	E.2	root surface	Y	2,000	crust	N/A	1 to 2 µm	cell surface	-	-	-	-	none	zoom of above; plaque crust on root surface
StR	6	orange-brown	E.3	root surface	Y	7,000	crust	N/A	1 to 2 µm	cell surface	-	-	-	-	none	zoom of above; plaque crust on two root surface cells

Notes

Plaque thickness = thin (too thin to measure, approximately <1 µm)

Plaque thickness = thick (not able to measure, at least >1.5 µm)

\- = N/A

Table C.1.4.2 - Lower Steep Rock Lake, *Zizania palustris* Root Plaque EDXA X-Ray Spectra Data Compilation

Sample Data			X-Ray Spectra Data									Comments
Site	Sample	Root Colour	Spectrum	Plaque Present	Location	Relative Peak Height of Elements 1	2	3	4	5	Other Particulate Deposits	
StR	1	orange-brown	A	Y	root surface	Fe	O	Al	C(Fe)	K(Fe)	none	flakey plaque crust
StR	1	orange-brown	B	Y	root surface	Fe	O	Al(Fe)	C	K	none	even plaque crust
StR	1	orange-brown	C	Y	root surface	Fe	O	Al	C	Si	soil	bits of soil and plaque on surface of crust
StR	2	orange-brown	A	Y	root surface	C	Fe	O	Na	Al	soil	thin plaque with pieces
StR	2	orange-brown	B	Y	piece of plaque	Fe	O	Si	Al	C	soil	large piece of plaque on root surface
StR	2	orange-brown	C	Y	root surface	C	Fe	O	Al	Na/Si	soil	thin plaque with pieces
StR	3	orange-brown	A.1	Y	root surface	Fe	C	O	Al	Si	soil	unsure of plaque type
StR	3	orange-brown	A.2	Y	outer cortex	Fe	C	O	Al	Si	N/A	root interior, for comparison to root surface; plaque presence may be result of sample preparation
StR	3	orange-brown	A.3	N/A	cortex	C	O	Al	Fe	K	N/A	root interior, for comparison to root surface
StR	3	orange-brown	B.1	Y	root surface	C	O	Fe	Al	Si	soil	unsure of plaque type
StR	3	orange-brown	B.2	Y	outer cortex	Fe	C	K	Al	O	N/A	high Fe, plaque present, consistent with that of A.2
StR	3	orange-brown	B.3	N/A	cortex	C	O	Si	K	Al	N/A	root interior, for comparison to root surface
StR	3	orange-brown	C.1	N	root surface	Si	Al	O	Na	Ca	soil	surface "crust" appears to be soil
StR	3	orange-brown	C.2	N/A	outer cortex	C	O	Fe	K	Cl	N/A	root interior, for comparison to root surface
StR	3	orange-brown	C.3	N/A	cortex	Fe	K	Cl	C	Ca	N/A	root interior, for comparison to root surface
StR	4	orange-brown	B	N/A	vascular cylinder	C	K	Cl	O	S	N/A	root interior, for comparison to root surface
StR	4	orange-brown	C.1	Y	epidermis cells	C	Fe	O	K	-	none	root surface cells filled with plaque, collapsed down to epidermis
StR	4	orange-brown	C.2	Y	outer cortex	Fe	K	Cl	Ca(Fe)	-	none	epidermis with root surface cells collapsed in
StR	4	orange-brown	C.3	N/A	cortex	C	O	-	-	-	N/A	cortex intact, no plaque
StR	4	orange-brown	D.1	Y	epidermis cells	Fe	K	C	O	Cl	none	plaque-filled surface cells
StR	4	orange-brown	D.2	Y	outer cortex	Fe	K	Cl	Ca	C	none	epidermis cells with plaque
StR	4	orange-brown	D.3	N/A	cortex	C	K	Cl	Fe	O	N/A	root interior, for comparison to root surface
StR	4	orange-brown	E.1	Y	epidermis cells	Fe	O	C	K(Fe)	Si	none	plaque-packed surface cell
StR	4	orange-brown	E.2	Y	epidermis cells	Fe	K	Cl(Fe)	-	-	none	empty surface cell; still high Fe
StR	4	orange-brown	E.3	N/A	cortex	C	Fe	O	K	Si	N/A	root interior, for comparison to root surface; high Fe
StR	5	orange-brown	A.1	N	root surface	Si	O	C	Mg	Al	soil	no plaque
StR	5	orange-brown	A.2	N/A	outer cortex	C	O	-	-	-	N/A	root interior, for comparison to root surface
StR	5	orange-brown	A.3	N/A	cortex	C	O	K	-	-	N/A	root interior, for comparison to root surface
StR	5	orange-brown	B.1	Y	epidermis cells	C	O	Fe	Al	Si	soil	slight root surface plaque
StR	5	orange-brown	B.2	N/A	outer cortex	C	O	K	-	-	N/A	root interior, for comparison to root surface
StR	5	orange-brown	B.3	N/A	cortex	C	K	O	P	Ca	N/A	root interior, for comparison to root surface
StR	6	orange-brown	B.1	Y	root surface	Fe	O	Si	C	K/Al	soil	flakey plaque crust
StR	6	orange-brown	B.2	Y	outer cortex	C	Fe	O	K	Si	none	root interior, for comparison to root surface; plaque present
StR	6	orange-brown	C	Y	root surface	C	O	Fe	Si	Al(Fe)	soil	plaque crust on root and lateral root surface
StR	6	orange-brown	D	N/A	vascular cylinder	C	O	K	Cl	P	N/A	root interior, for comparison to root surface
StR	6	orange-brown	E.4	Y	root surface	Fe	O	C	Si	Al(Fe)	none	plaque crust

Notes

Relative Peak Height of Elements: Xx(Yy) means that element Xx had the next highest peak relative to element Yy, shown in brackets because it is the second peak for element Yy

Relative Peak Height of Elements: Xx/Yy means that element Xx and Yy had equal peak heights

\- = element peaks too low to determine relative height

C.1.5 – Whitefish Lake

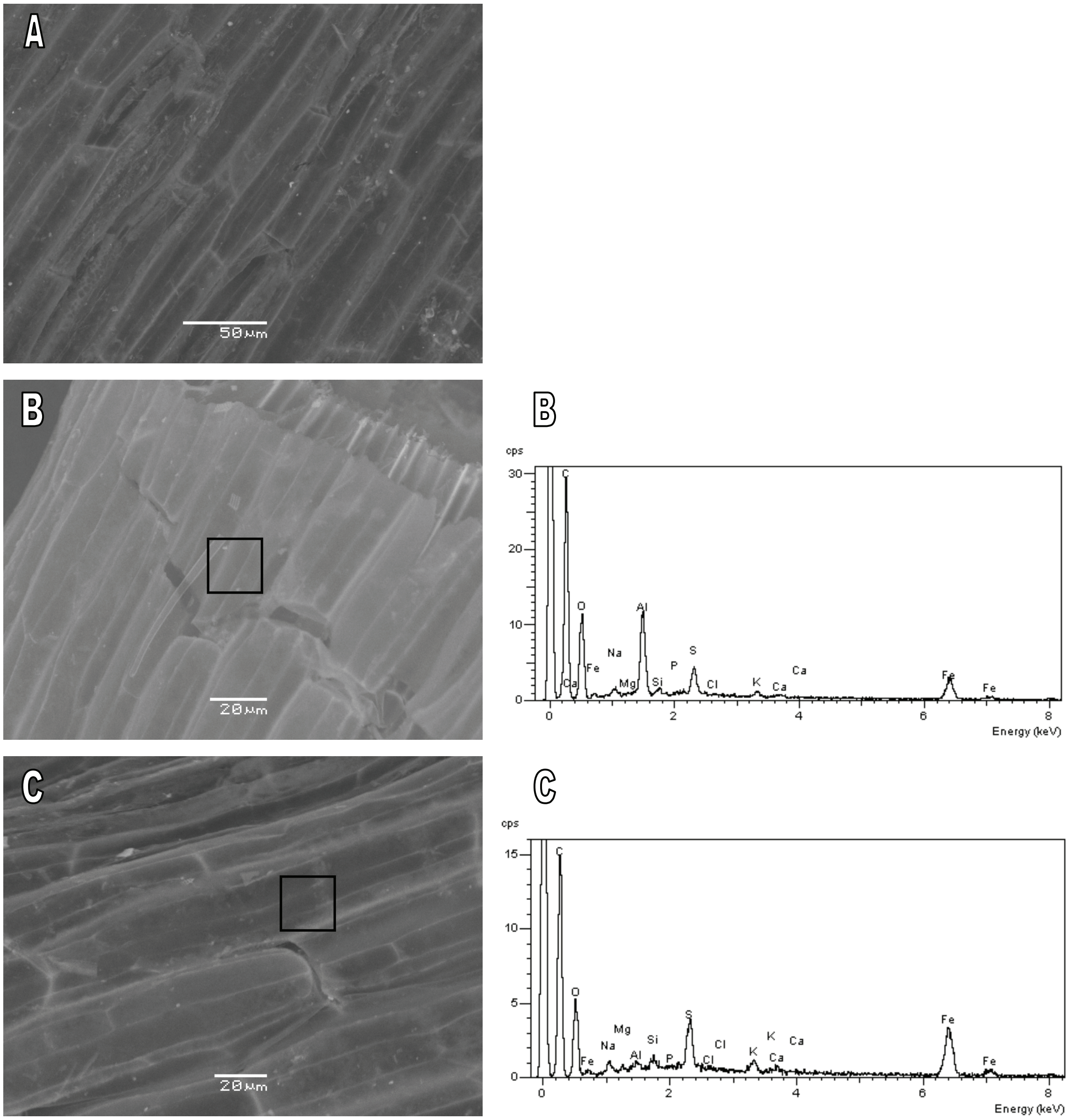

Figure C.1.5.1 – Whitefish Lake, Sample 1 (longitudinal section: root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x450, root surface; B. x750, root surface, no plaque; C. x700, root surface with little plaque.

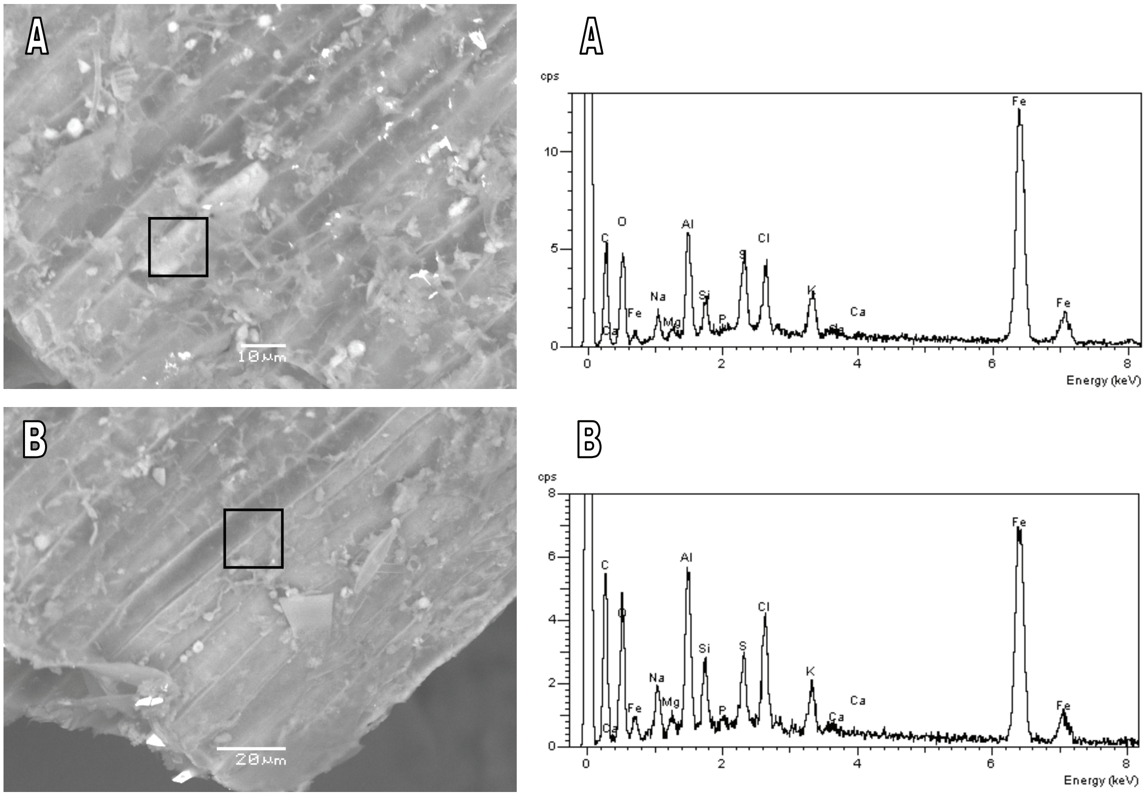

Figure C.1.5.2 – Whitefish Lake, Sample 2 (longitudinal section: root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x1,100, root surface with plaque/particulate deposits; B. x850, root surface with plaque.

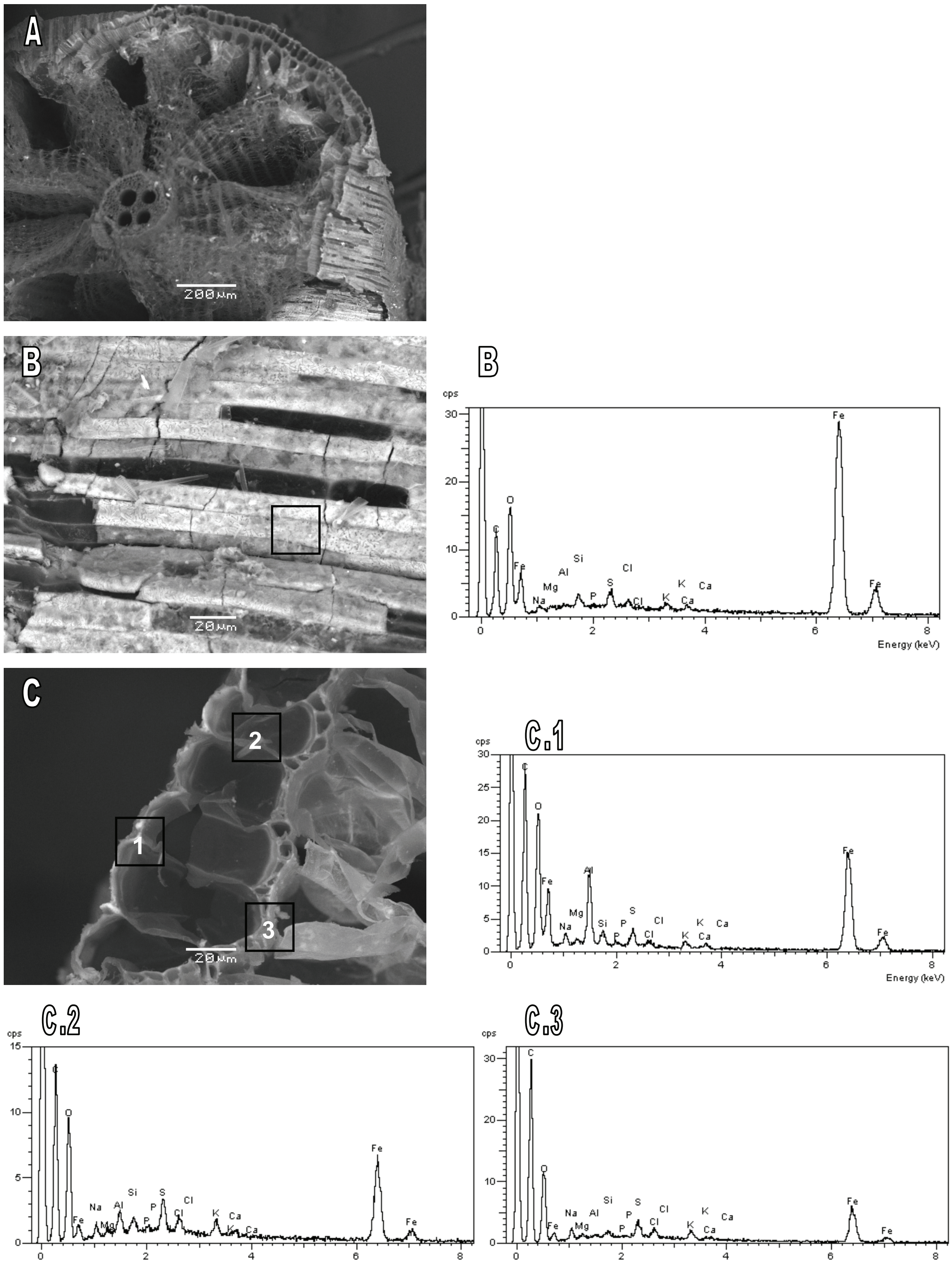

Figure C.1.5.3 (cont'd on next page)

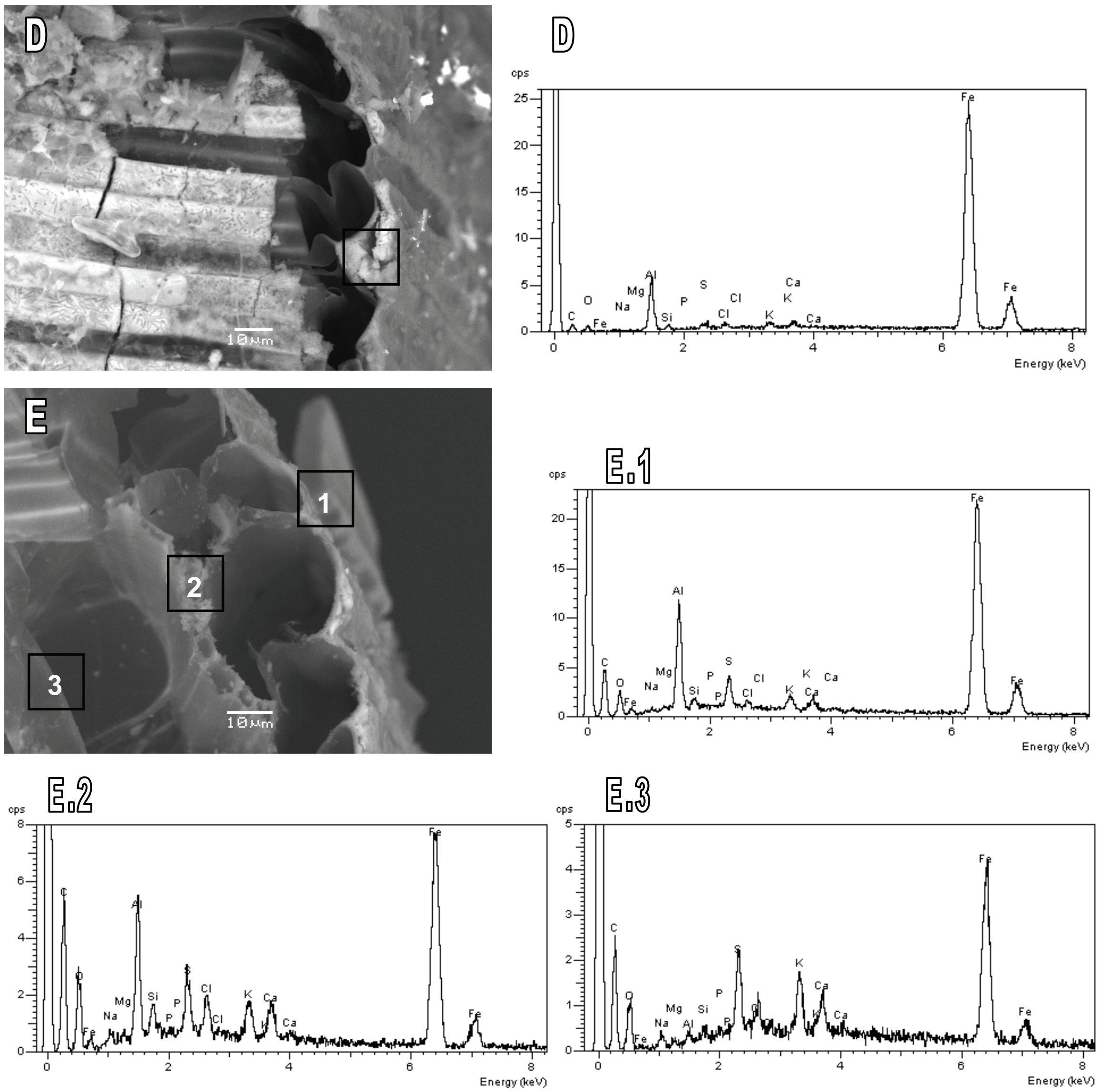

Figure C.1.5.3 – Whitefish Lake, Sample 3 (carbon-coated cross section: root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x90, root cross section; B. x700, root surface with plaque crust; C. x750, epidermis / root surface (spectrum C.1), epidermis cell interior (spectrum C.2) and outer cortex (spectrum C.3); D. x1,000, root surface with plaque crust; E. x1,200, epidermis / root surface (spectrum E.1), outer cortex (spectrum E.2) and cortex (spectrum E.3).

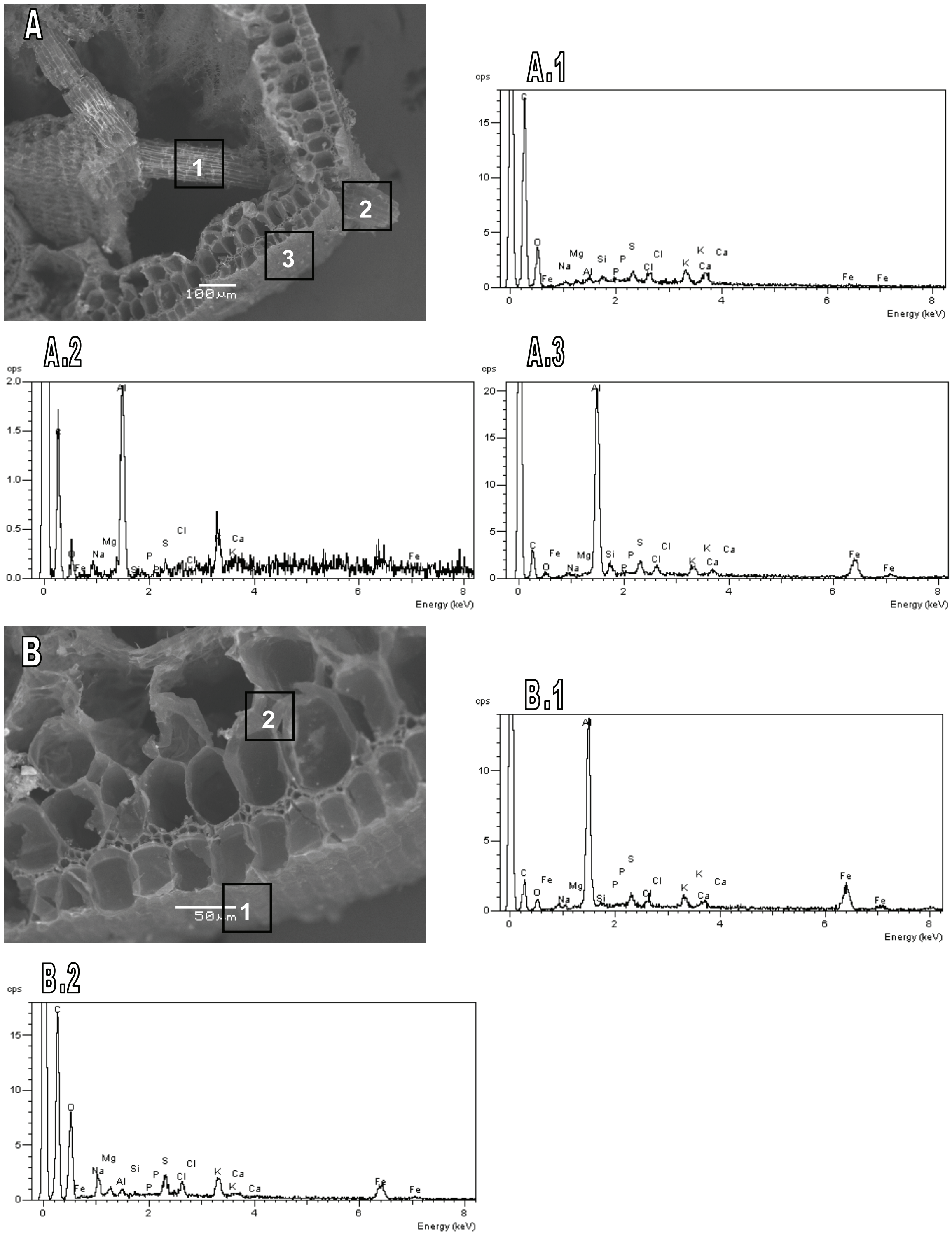

Figure C.1.5.4 (cont'd on next page)

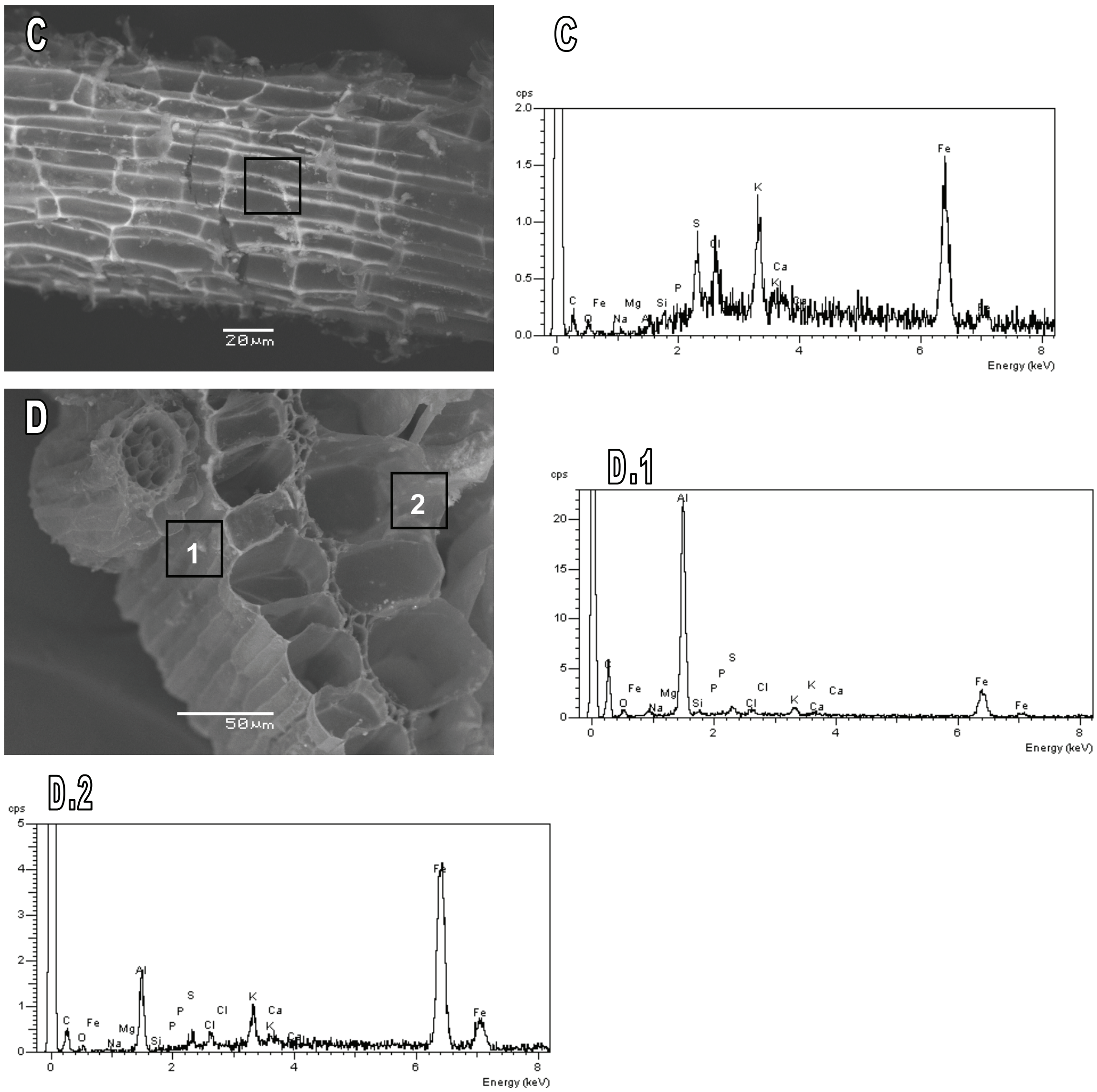

Figure C.1.5.4 – Whitefish Lake, Sample 4 (carbon-coated cross section: root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x110, lateral root within epidermis (spectrum A.1), lateral root outside of epidermis (spectrum A.2) and root surface (spectrum A.3); B. x370, root surface (spectrum B.1) and cortex (spectrum B.2); C. x650, lateral root surface within epidermis; D. x500, root surface (spectrum D.1) and cortex (spectrum D.2).

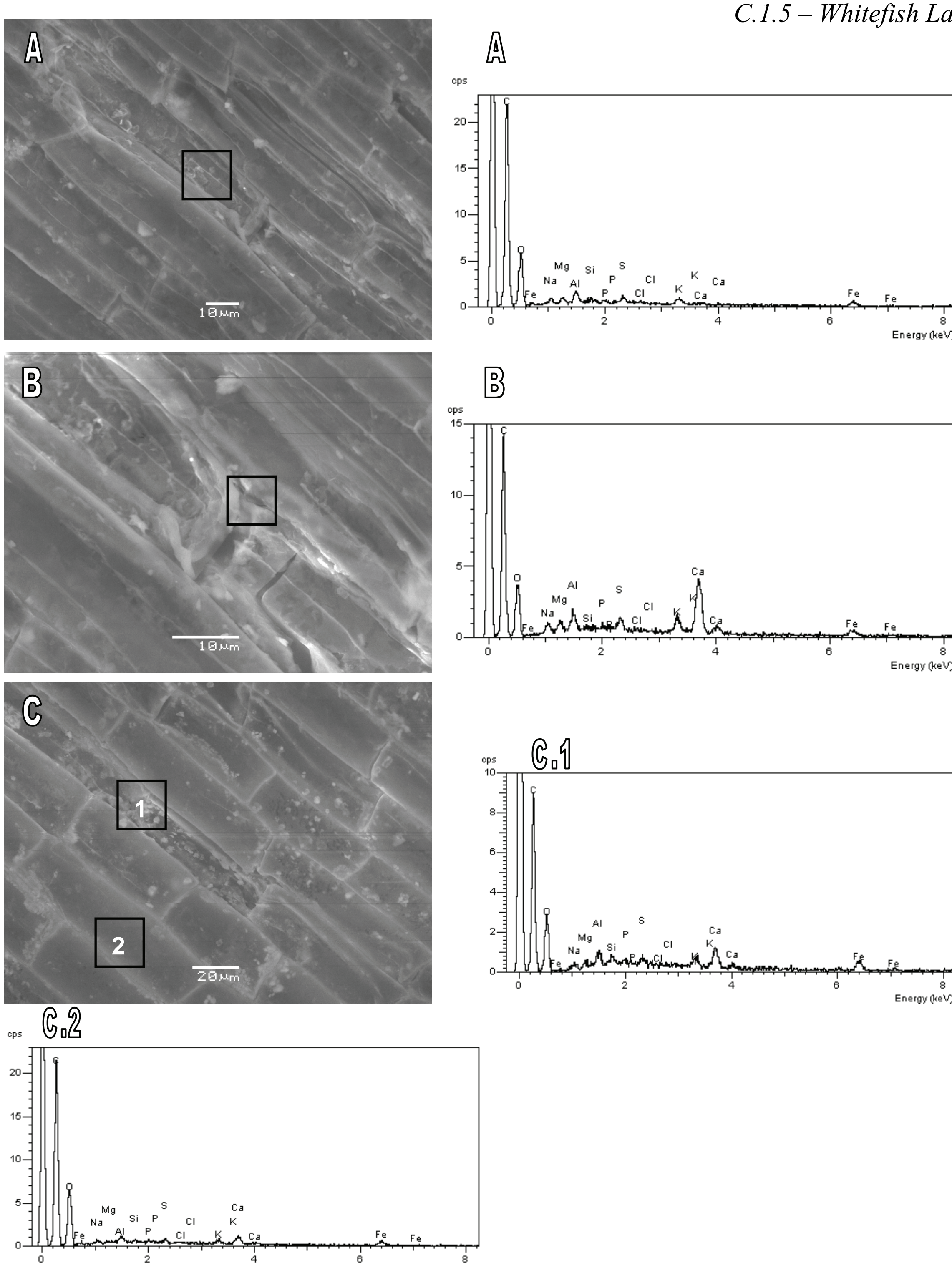

Figure C.1.5.5 – Whitefish Lake, Sample 8 (longitudinal section: oldest portion of root, root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x1,000, root surface, no plaque; B. x2,000, cell with $CaCO_3$ deposit; C. x700, root surface, cell with $CaCO_3$ deposit (spectrum C.1) and cell without deposit (spectrum C.2).

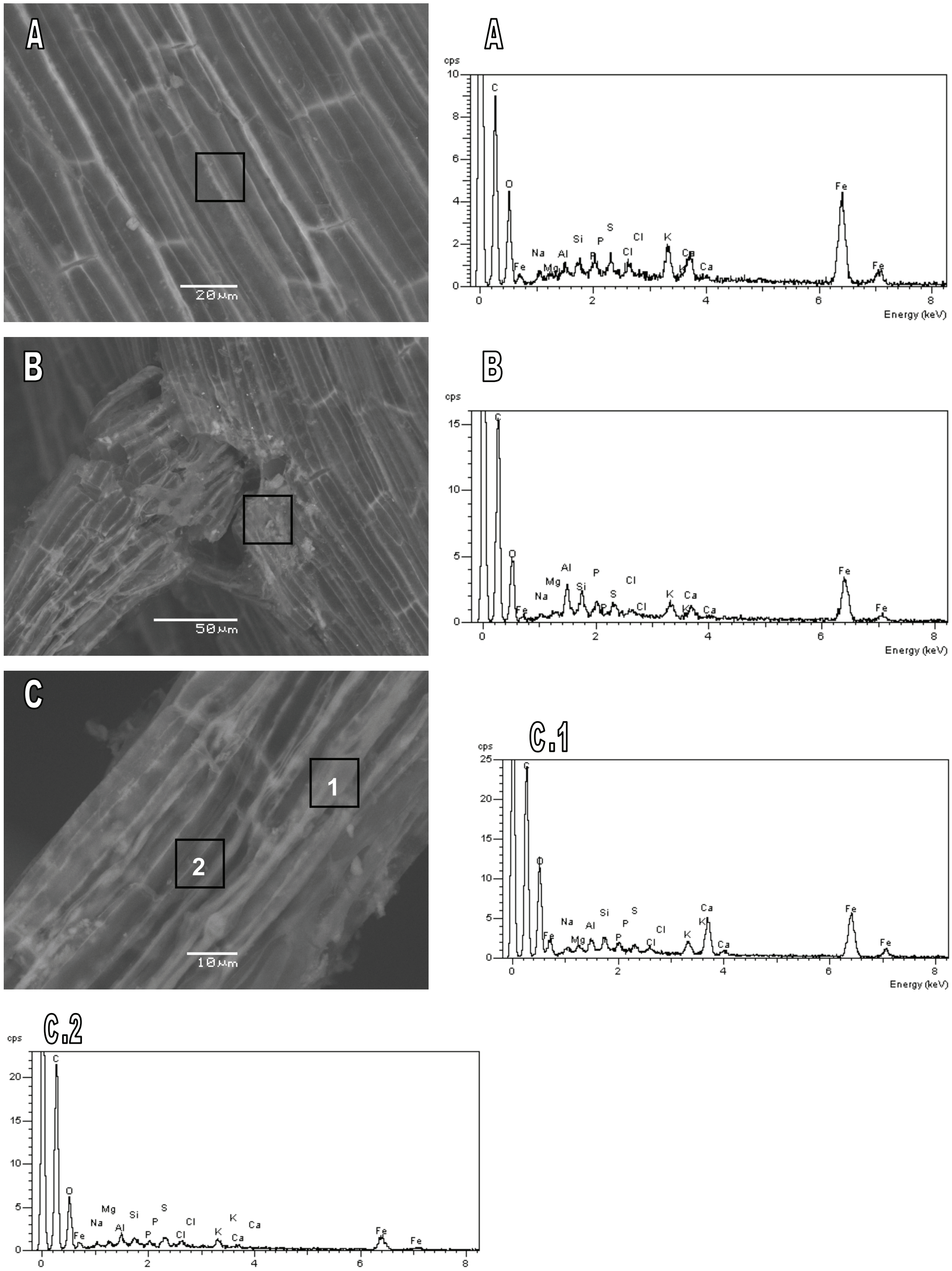

Figure C.1.5.6 (cont'd on next page)

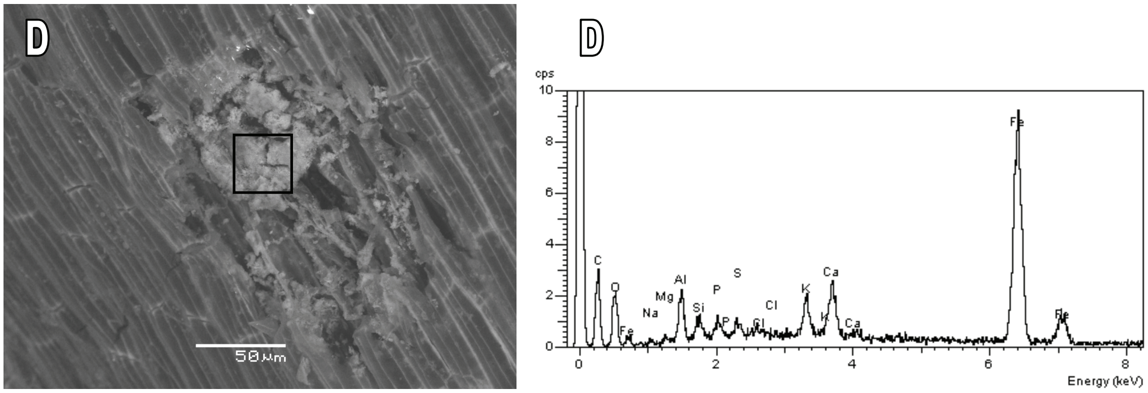

Figure C.1.5.6 – Whitefish Lake, Sample 9 (longitudinal section: middle-aged portion of root, root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x850, general root surface; B. x500, lateral root protruding through root surface; C. x1,500, lateral root surface, light coloured cell (spectrum C.1) and dark coloured cell (spectrum C.2); D. x450, root surface with Fe particulate matter deposit.

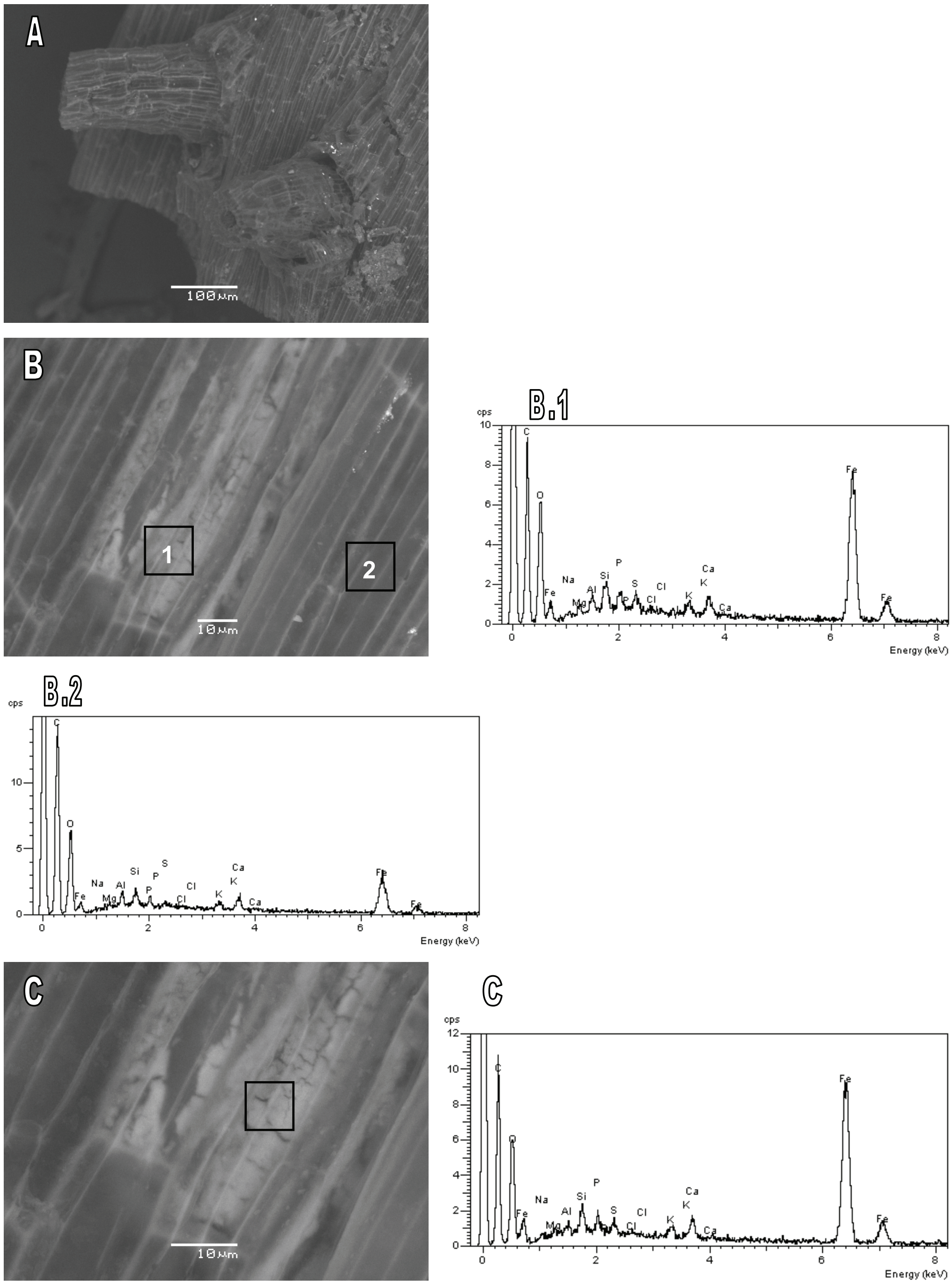

Figure C.1.5.7 (cont'd on next page)

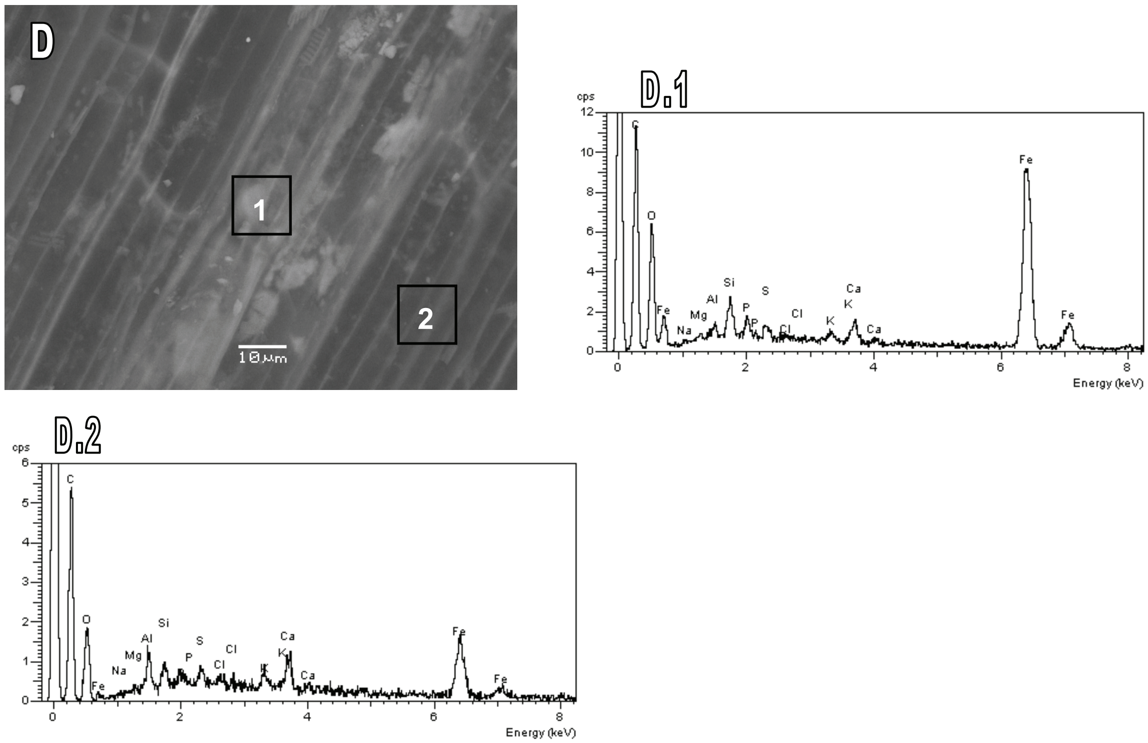

Figure C.1.5.7 – Whitefish Lake, Sample 10 (longitudinal section: youngest portion of root, root surface orange-brown), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x200, general root surface showing lateral roots; B. x1,200, root surface, cell packed with plaque (spectrum B.1) and un-packed cell (spectrum B.2); C. x2,000, close-up of plaque-packed cell; D. x1,200, root surface with precipitate (spectrum D.1) and without precipitate (spectrum D.2).

Table C.1.5.1 - Whitefish Lake**,** *Zizania palustris* Root Plaque SEM Image Data Compilation

Sample Data			SEM Observation Data													Comments
Site	Sample	Root Colour	Image	Image Location	Plaque Present	Zoom	Primary Deposition: Type	Primary Deposition: % Coverage	Primary Deposition: Thickness	Primary Deposition: Location	Secondary Deposition: Type	Secondary Deposition: % Coverage	Secondary Deposition: Thickness	Secondary Deposition: Location	Other Particulate Deposits	
WF	1	orange-brown	A	root surface	N	450	-	-	-	-	-	-	-	-	none	may be some thin plaque, not visible
WF	1	orange-brown	B	root surface	N	750	-	-	-	-	-	-	-	-	none	no plaque
WF	1	orange-brown	C	root surface	Y	700	thin	100	thin	cell surface	-	-	-	-	none	very little thin plaque
WF	2	orange-brown	A	root surface	Y	1,100	crust	100	thin	cell surface	-	-	-	-	none	flakey plaque crust
WF	2	orange-brown	B	root surface	Y	850	crust	100	thin	cell surface	-	-	-	-	none	flakey plaque crust
WF	3	orange-brown	A	cross section	N/A	90	-	-	-	-	-	-	-	-	-	cross section image for reference to subsequent image locations
WF	3	orange-brown	B	root surface	Y	700	crust	85	3 µm	on and within cells	broken away	15	unknown	within	soil	crust follows contours of cells, where plaque crust broken away, appears that cell wall of root surface cell is gone
WF	3	orange-brown	C	cross section	Y	750	crust	N/A	1 µm	cell surface	-	-	-	-	none	cross section, not enough root surface visible to assess plaque thickness, can confirm presence
WF	3	orange-brown	D	root surface	Y	1,000	crust	85	1 to 14 µm	cell surface	broken away	15	unknown	within	soil	thick crust, follows contours of cells
WF	3	orange-brown	E	cross section	Y	1,200	crust	N/A	2 µm	cell surface	-	-	-	-	none	thin plaque precipitate may also be present on root epidermis cells
WF	4	orange-brown	A	cross section	N	110	-	-	-	-	-	-	-	-	none	cross section image for reference to subsequent image locations
WF	4	orange-brown	B	cross section	N	370	-	-	-	-	-	-	-	-	none	cross section, no plaque on root surface
WF	4	orange-brown	C	lateral root surface	N	650	-	-	-	-	-	-	-	-	none	lateral root within epidermis, has flakey surface, not likely plaque
WF	4	orange-brown	D	cross section	N	500	-	-	-	-	-	-	-	-	none	cross section, no plaque on root surface
WF	8	orange-brown	A	root surface	N	1,000	-	-	-	-	-	-	-	-	-	oldest portion of root: no plaque
WF	8	orange-brown	B	root surface	N	2,000	-	-	-	-	-	-	-	-	-	oldest portion of root: no plaque
WF	8	orange-brown	C	root surface	N	700	-	-	-	-	-	-	-	-	$CaCO_3$	oldest portion of root: no plaque, $CaCO_3$ deposits
WF	9	orange-brown	A	root surface	Y	850	thin	100	thin	cell surface	-	-	-	-	none	middle-aged portion of root: extremely thin plaque
WF	9	orange-brown	B	root surface	N	500	-	-	-	-	-	-	-	-	Fe deposit	middle-aged portion of root: Fe/particulate matter deposit
WF	9	orange-brown	C	lateral root surface	N	1,500	-	-	-	-	-	-	-	-	none	middle-aged portion of root: lateral root has flakey surface, not likely plaque
WF	9	orange-brown	D	root surface	N	450	-	-	-	-	-	-	-	-	Fe deposit	middle-aged portion of root: Fe/particulate matter deposit
WF	10	orange-brown	A	whole section	N/A	200	-	-	-	-	-	-	-	-	-	youngest portion of root: longitudinal section image for reference to subsequent image locations
WF	10	orange-brown	B	root surface	Y	1,200	thin	65	thin	cell surface	packed cells	35	unknown	within	none	youngest portion of root: plaque-packed cells
WF	10	orange-brown	C	root surface	Y	2,000	packed cells	65	unknown	within	thin	35	thin	cell surface	none	youngest portion of root: zoom of prior image of plaque-packed cells
WF	10	orange-brown	D	root surface	Y	1,200	thin	100	thin	cell surface	-	-	-	-	none	youngest portion of root: plaque precipitate appears uneven, thicker on certain cells

Notes

Plaque thickness = thin (too thin to measure, approximately <1 µm)

Plaque thickness = thick (not able to measure, at least >1.5 µm)

\- = N/A

Table C.1.5.2 - Whitefish Lake, *Zizania palustris* Root Plaque EDXA X-Ray Spectra Data Compilation

Sample Data			X-Ray Spectra Data									Comments
Site	Sample	Root Colour	Spectrum	Plaque Present	Location	Relative Peak Height of Elements					Other Particulate Deposits	
						1	2	3	4	5		
WF	1	orange-brown	B	N	root surface	C	Al	O	S	-	none	no plaque
WF	1	orange-brown	C	Y	root surface	C	O	S	Fe	-	none	very little plaque
WF	2	orange-brown	A	Y	root surface	Fe	Al	C	S	O	none	flakey plaque crust
WF	2	orange-brown	B	Y	root surface	Fe	Al	C	O	Cl	none	flakey plaque crust
WF	3	orange-brown	B	Y	root surface	Fe	O	C	S(Fe)	-	soil	plaque crust
WF	3	orange-brown	C.1	Y	root surface	C	O	Fe	Al	S(Fe)	none	
WF	3	orange-brown	C.2	Y	epidermis cells	C	O	Fe	S	Al	none	plaque present within cells
WF	3	orange-brown	C.3	N	outer cortex	C	O	Fe	S	-	N/A	root interior, high Fe
WF	3	orange-brown	D	Y	root surface	Fe	Al	-	-	-	soil	thick plaque crust
WF	3	orange-brown	E.1	Y	root surface	Fe	Al	C	S	O(Fe)	none	plaque crust
WF	3	orange-brown	E.2	Y	outer cortex	Fe	C	Al	S	O	none	plaque precipitates visible
WF	3	orange-brown	E.3	N/A	cortex	Fe	C	S	K	Ca	N/A	root interior, Fe elevated though not high
WF	4	orange-brown	A.1	N	lateral root surface	C	O	-	-	-	none	lateral root within epidermis, no plaque
WF	4	orange-brown	A.2	N	lateral root surface	Al	C	K	O	-	none	lateral root protruding outside of epidermis, no plaque
WF	4	orange-brown	A.3	N	root surface	Al	C	Fe	S	Si	none	no plaque
WF	4	orange-brown	B.1	N	root surface	Al	C	Fe	Cl	K	none	no plaque
WF	4	orange-brown	B.2	N	cortex	C	O	S	Na	K	N/A	root interior
WF	4	orange-brown	C	N	lateral root surface	Fe	K	S	Cl	-	none	Fe elevated, though not high (only 1.7 counts per second)
WF	4	orange-brown	D.1	N	root surface	Al	C	Fe	-	-	none	no plaque
WF	4	orange-brown	D.2	N/A	cortex	Fe	Al	K	C(Fe)	-	none	root interior, Fe elevated though not high
WF	8	orange-brown	A	N	root surface	C	O	Al	S	-	none	oldest portion of root: root surface with no plaque
WF	8	orange-brown	B	N	root surface	C	Ca	O	Al	K	none	oldest portion of root: root surface cell with Ca deposit
WF	8	orange-brown	C.1	N	root surface	C	O	Ca	Al	-	$CaCO_3$	oldest portion of root: root surface cell with particulates
WF	8	orange-brown	C.2	N	root surface	C	O	-	-	-	none	oldest portion of root: root surface cell without particulates
WF	9	orange-brown	A	Y	root surface	C	O	Fe	K	-	none	middle-aged portion of root: extremely thin plaque
WF	9	orange-brown	B	N	root surface	C	O	Fe	Al	Si	Fe deposit	middle-aged portion of root: Fe/particulate matter deposit
WF	9	orange-brown	C.1	N	lateral root surface	C	O	Fe	Ca	-	none	middle-aged portion of root: lighter coloured cell
WF	9	orange-brown	C.2	N	lateral root surface	C	O	Al	-	-	none	middle-aged portion of root: darker coloured cell
WF	9	orange-brown	D	N	deposit on root surface	Fe	C	Ca	Al	K	Fe deposit	middle-aged portion of root: Fe/particulate matter deposit
WF	10	orange-brown	B.1	Y	root surface cells	C	Fe	O	Si	S	none	youngest portion of root: plaque-packed cell
WF	10	orange-brown	B.2	Y	root surface cells	C	O	Fe	Si	Al	none	youngest portion of root: thin plaque
WF	10	orange-brown	C	Y	root surface cells	C	Fe	O	Si	P	none	youngest portion of root: plaque-packed cell
WF	10	orange-brown	D.1	Y	root surface cells	C	Fe	O	Si	Ca(Fe)	none	youngest portion of root: thicker thin plaque
WF	10	orange-brown	D.2	Y	root surface cells	C	O	Fe	Al	Ca	none	youngest portion of root: thin plaque

Notes

Relative Peak Height of Elements: Xx(Yy) means that element Xx had the next highest peak relative to element Yy, shown in brackets because it is the second peak for element Yy

\- = element peaks too low to determine relative height

C.1.6 – Plaque Observation Summary

Table C.1.6.1 - Plaque Structure, *Zizania palustris* Root Plaque SEM Image Data Summary

Sample Data		Plaque Type Observed				
Site	**# Images Observed with Plaque**	**Crust**	**Thin**	**Thin & Packed cells**	**Thin & Crust**	**Crust & Packed cells**
LT	*16*	8	5	3	0	0
MM	*18*	3	4	5	6	0
SeR	*16*	11	3	2	0	0
StR	*15*	8	1	0	3	3
WF	*11*	6	3	2	0	0
Totals	***76***	***36***	***16***	***12***	***9***	***3***
% Images with Plaque Type		**47.4%**	**21.1%**	**15.8%**	**11.8%**	**3.9%**

Notes

Site = Marchmont Marsh (MM), Partridge Crop Lake (SeR), Lower Steep Rock Lake (StR), Whitefish Lake (WF)

"Broken away" plaque type observation not included; not a type, only a different form of crust plaque

Table C.1.6.2 - Plaque Composition, *Zizania palustris* Root Plaque EDXA X-Ray Spectra Data Summary

Sample Data		**X-ray Spectra - Two Most Abundant Elements**							
Site	**# Plaque X-ray Spectra Collected**	**Fe + O**	**Fe + Al**	**Fe + K**	**Fe + Si**	**Fe + Cl**	**O + Si**	**O + S**	**O + Cl**
LT	*14*	12	2	0	0	0	0	0	0
MM	*23*	15	2	1	2	1	1	0	1
SeR	*14*	7	3	3	1	0	0	0	0
StR	*21*	16	0	5	0	0	0	0	0
WF	*15*	9	5	0	0	0	0	1	0
Totals	***87***	***59***	***12***	***9***	***3***	***1***	***1***	***1***	***1***
	% X-ray Spectra with Two Most Abundant Elements	**67.8%**	**13.8%**	**10.3%**	**3.4%**	**1.1%**	**1.1%**	**1.1%**	**1.1%**

Notes

Site = Marchmont Marsh (MM), Partridge Crop Lake (SeR), Lower Steep Rock Lake (StR), Whitefish Lake (WF)

Two most abundant elements based on relative peak height observations in x-ray spectrum.

Table C.1.6.3 - Plaque Deposition, *Zizania palustris* Root Plaque EDXA X-Ray Spectra Profile Data Summary

Sample Data			Location and Fe Presence									
Site	# Samples with Profiles Collected	Total # X-ray Spectra Profiles	Epidermis - Surface		Epidermis - Interior		Outer Cortex		Cortex		Vascular Cylinder	
			# X-ray Spectra	Iron Presence	# X-ray Spectra	Iron Presence	# X-ray Spectra	Iron Presence	# X-ray Spectra	Iron Presence	# X-ray Spectra	Iron Presence
LT	1	8	3	3	2	2	1	0	1	1	1	0
MM	0	0	0	0	0	0	0	0	0	0	0	0
SeR	3	21	3	3	6	5	6	0	6	0	0	0
StR	4	24	5	5	5	5	6	5	6	1	2	0
WF	1	8	4	4	1	1	2	2	1	1	0	0
Totals	***9***	***61***	***15***	***15***	***14***	***13***	***15***	***7***	***14***	***3***	***3***	***0***
% Observations with Fe Present at Location			**100%**		**92.9%**		**46.7%**		**21.4%**		**0%**	

Notes

Site = Marchmont Marsh (MM), Partridge Crop Lake (SeR), Lower Steep Rock Lake (StR), Whitefish Lake (WF)

Data from cross section samples with plaque (none collected from MM samples)

Outer Cortex = layer of small cells 2 - 3 cells thick, directly adjacent to the epidermis

"Iron Presence" based on Fe being one of the two most abundant elements, based on relative peak height observations in x-ray spectrum.

Iron presence in cortex may be due to x-ray disperson since cortex spectra collected in cells adjacent to outer cortex

C.2 – Element Maps

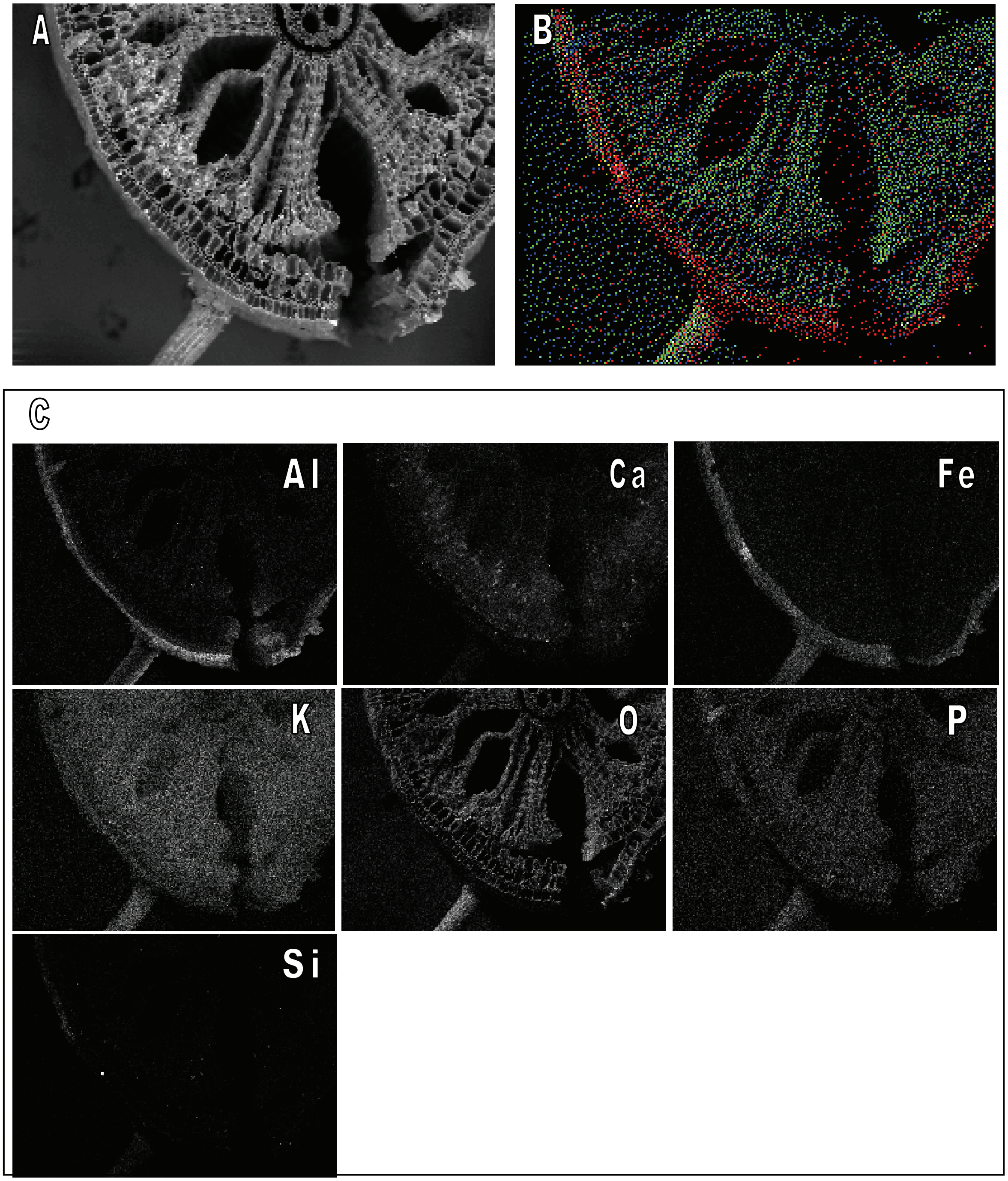

Figure C.2.1 – Partridge Crop Lake, Sample 5 (carbon-coated cross section: root surface orange-brown), SEM image with associated EDXA element maps. A. x90, original image; B. coloured points indicate the presence and location of each of the elements Fe (red), O (green) and P (blue); C. light coloured points indicate the presence and location of each element (as labelled).

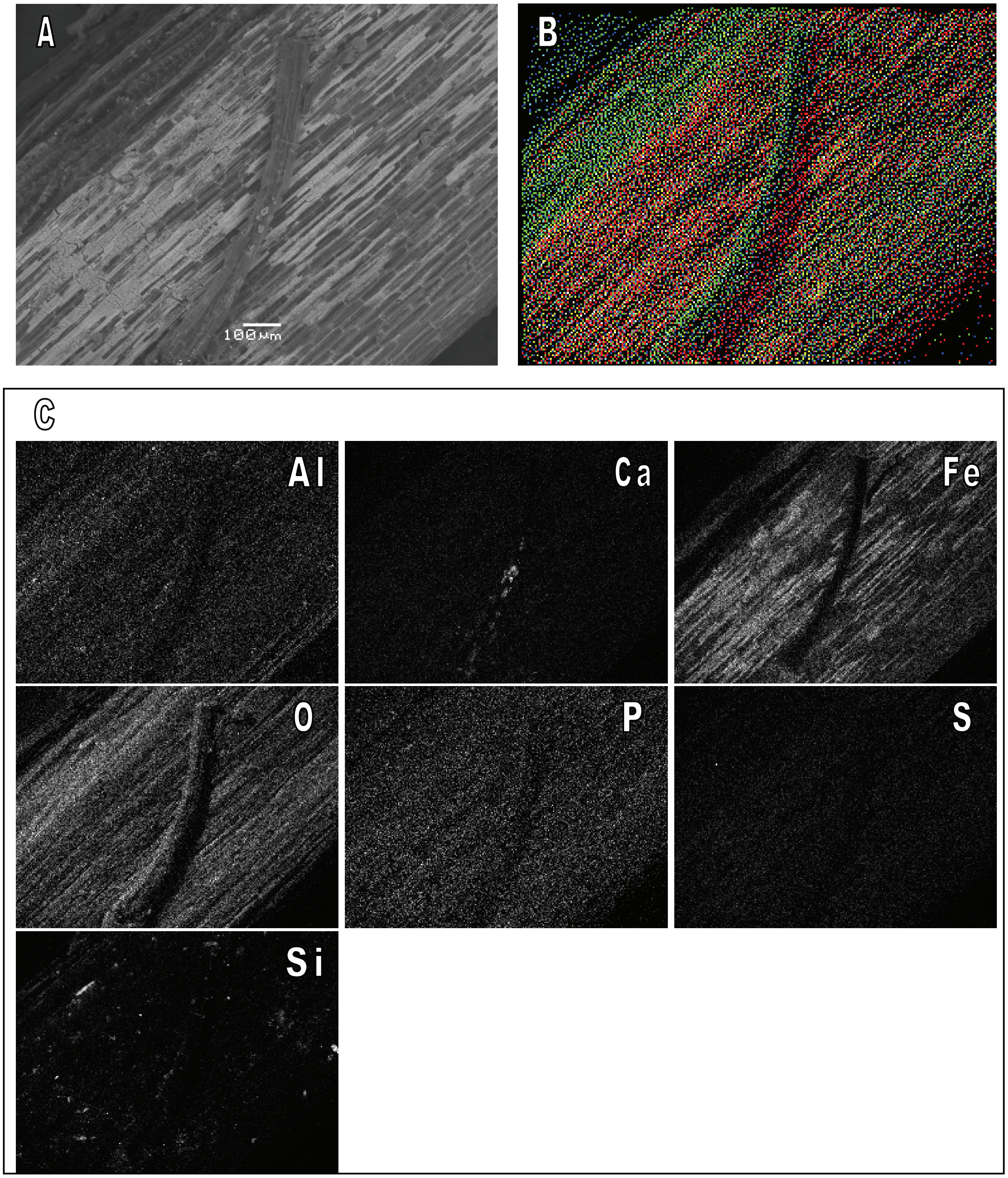

Figure C.2.2 – Marchmont Marsh, Sample 8 (longitudinal section: root surface orange-brown), SEM image with associated EDXA element maps. A. x100, original image; B. coloured points indicate the presence and location of each of the elements Fe (red), O (green) and P (blue); C. light coloured points indicate the presence and location of each element (as labelled).

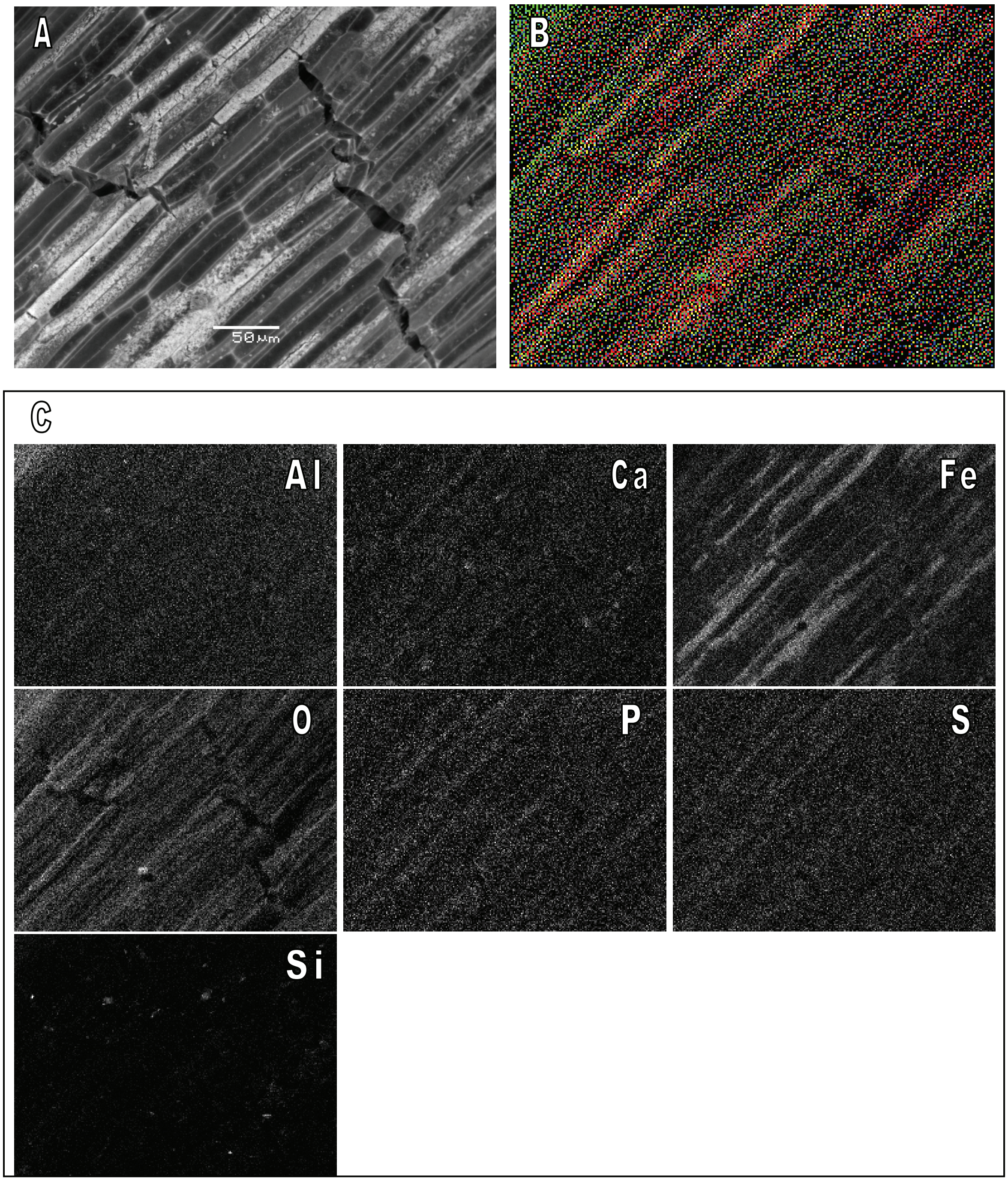

Figure C.2.3 – Marchmont Marsh, Sample 8 (longitudinal section: root surface orange-brown), SEM image with associated EDXA element maps. A. x350, original image; B. coloured points indicate the presence and location of each of the elements Fe (red), O (green) and P (blue); C. light coloured points indicate the presence and location of each element (as labelled).

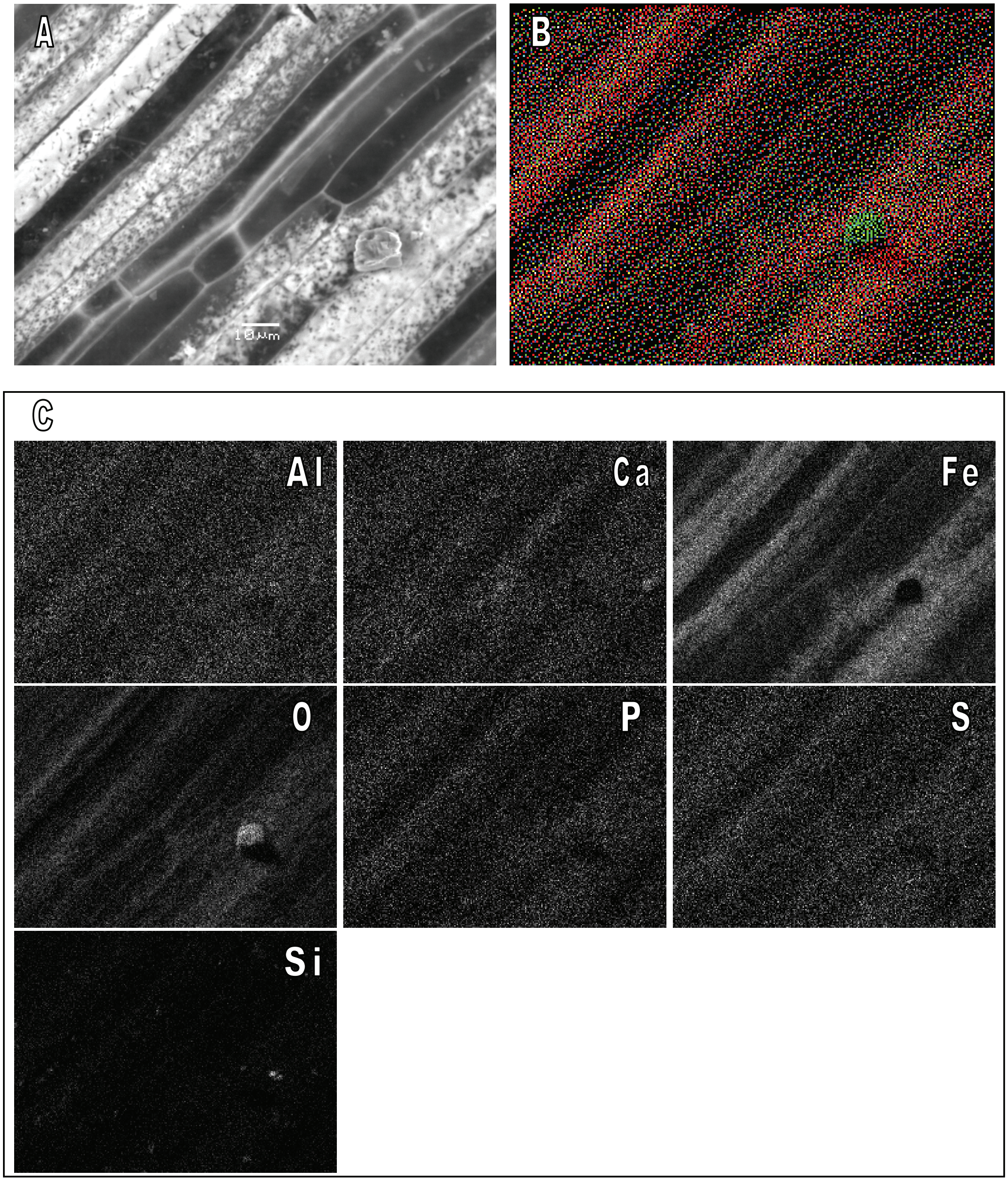

Figure C.2.4 – Marchmont Marsh, Sample 8 (longitudinal section: root surface orange-brown), SEM image with associated EDXA element maps. A. x1,000, original image; B. coloured points indicate the presence and location of each of the elements Fe (red), O (green) and P (blue); C. light coloured points indicate the presence and location of each element (as labelled).

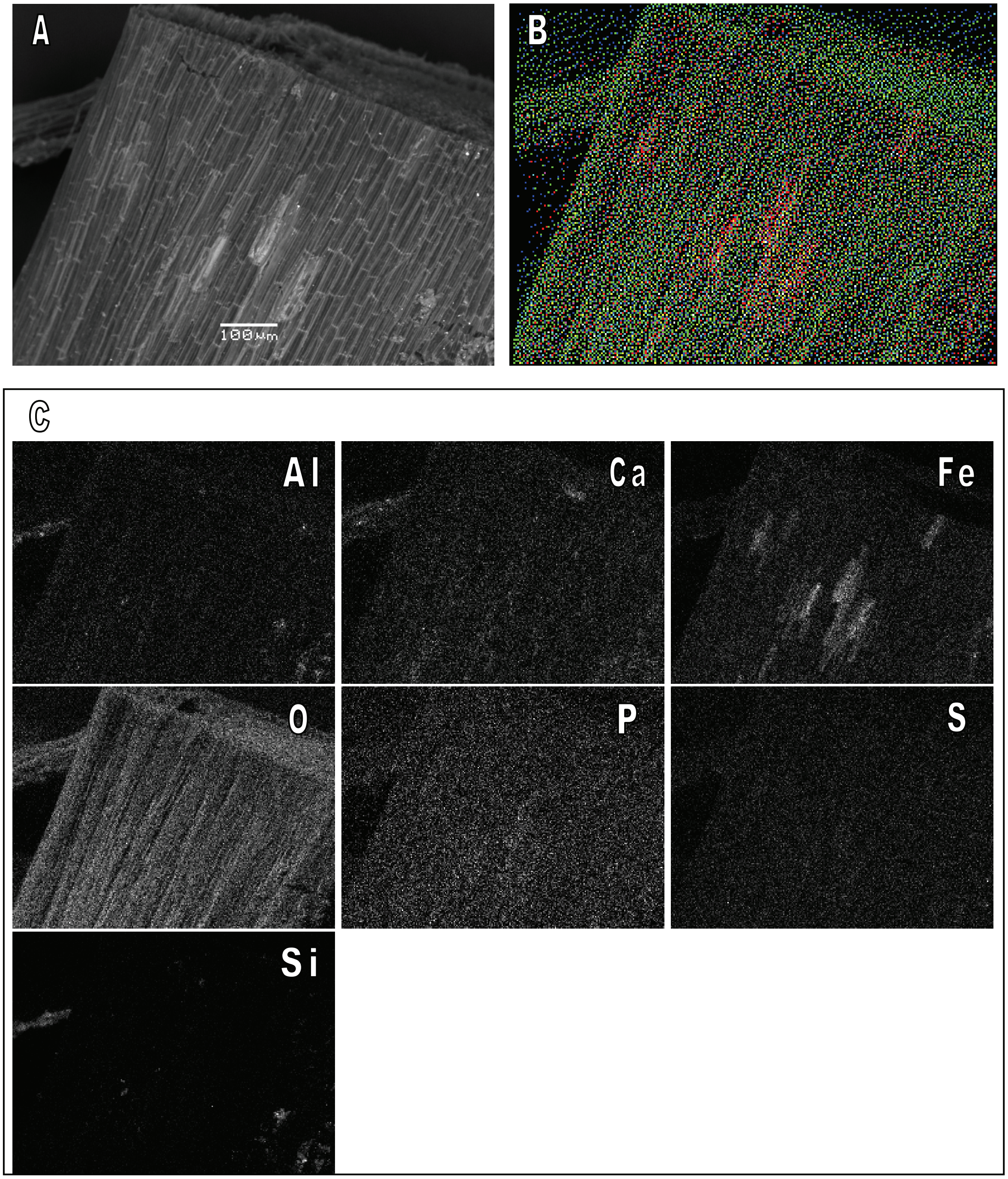

Figure C.2.5 – Whitefish Lake, Sample 10 (longitudinal section: root surface orange-brown), SEM image with associated EDXA element maps. A. x150, original image; B. coloured points indicate the presence and location of each of the elements Fe (red), O (green) and P (blue); C. light coloured points indicate the presence and location of each element (as labelled).

C.3 – Plaque Anomalies

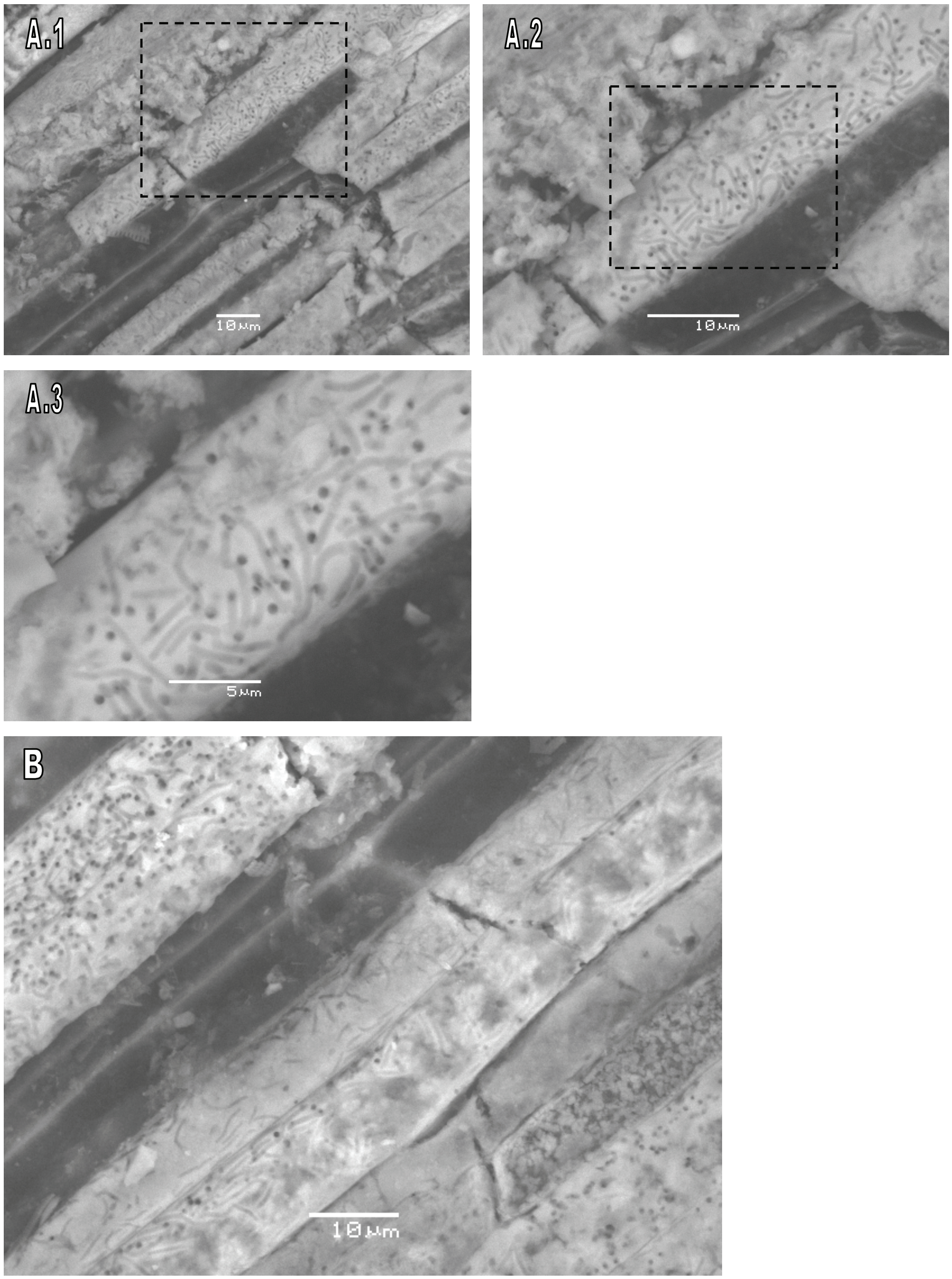

Figure C.3.1 (cont'd on next page)

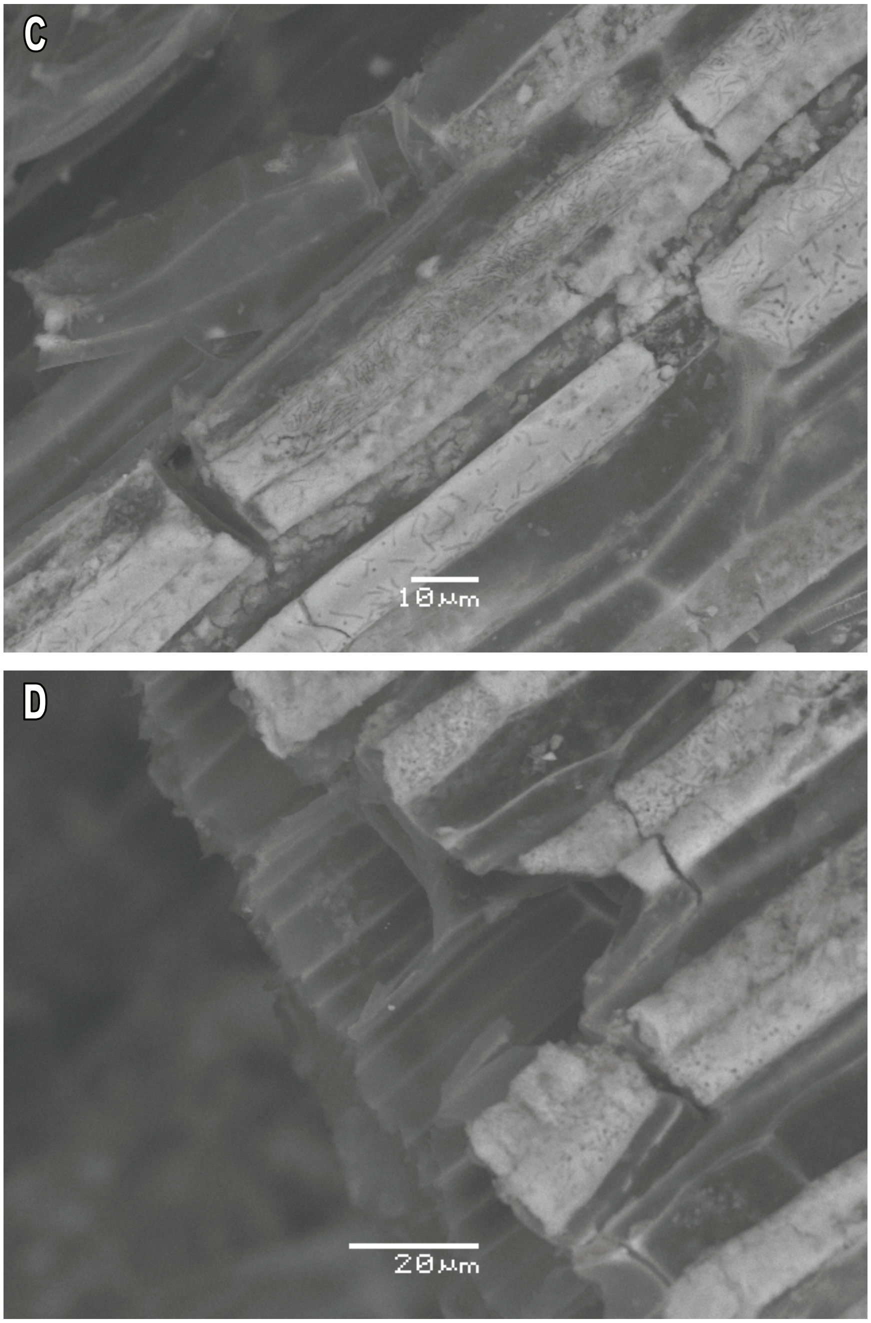

Figure C.3.1 – Marchmont Marsh, Sample 8 (longitudinal section: oldest portion of root, root surface orange-brown), SEM images; root surface with grooves present in plaque crust, A. three zoom images (area shown by dashed box), A.1 x1,200, A.2 x2,500, A.3 x5,000; B. x1,600, C. x1,000, and D. x950.

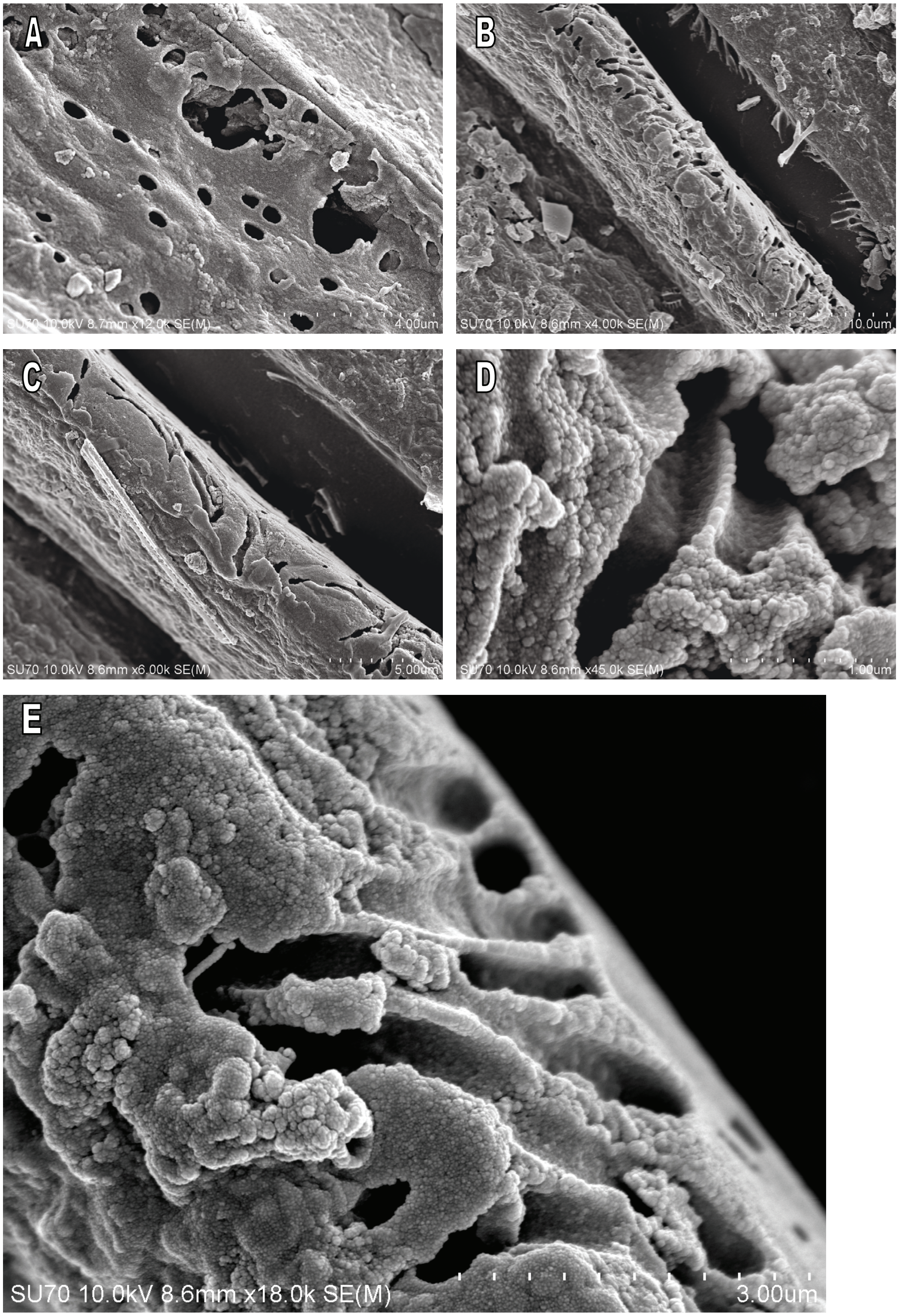

Figure C.3.2 (cont'd on next page)

Figure C.3.2 – Marchmont Marsh, Sample 8 (gold-coated longitudinal section: oldest portion of root, root surface orange-brown), SEM images from Hitachi SU-70 SEM; A. x12,000, holes in plaque crust; root surface with grooves present in plaque crust, B. x4,000, C. x6,000, D. x45,000, E. x18,000 and F. x10,000.

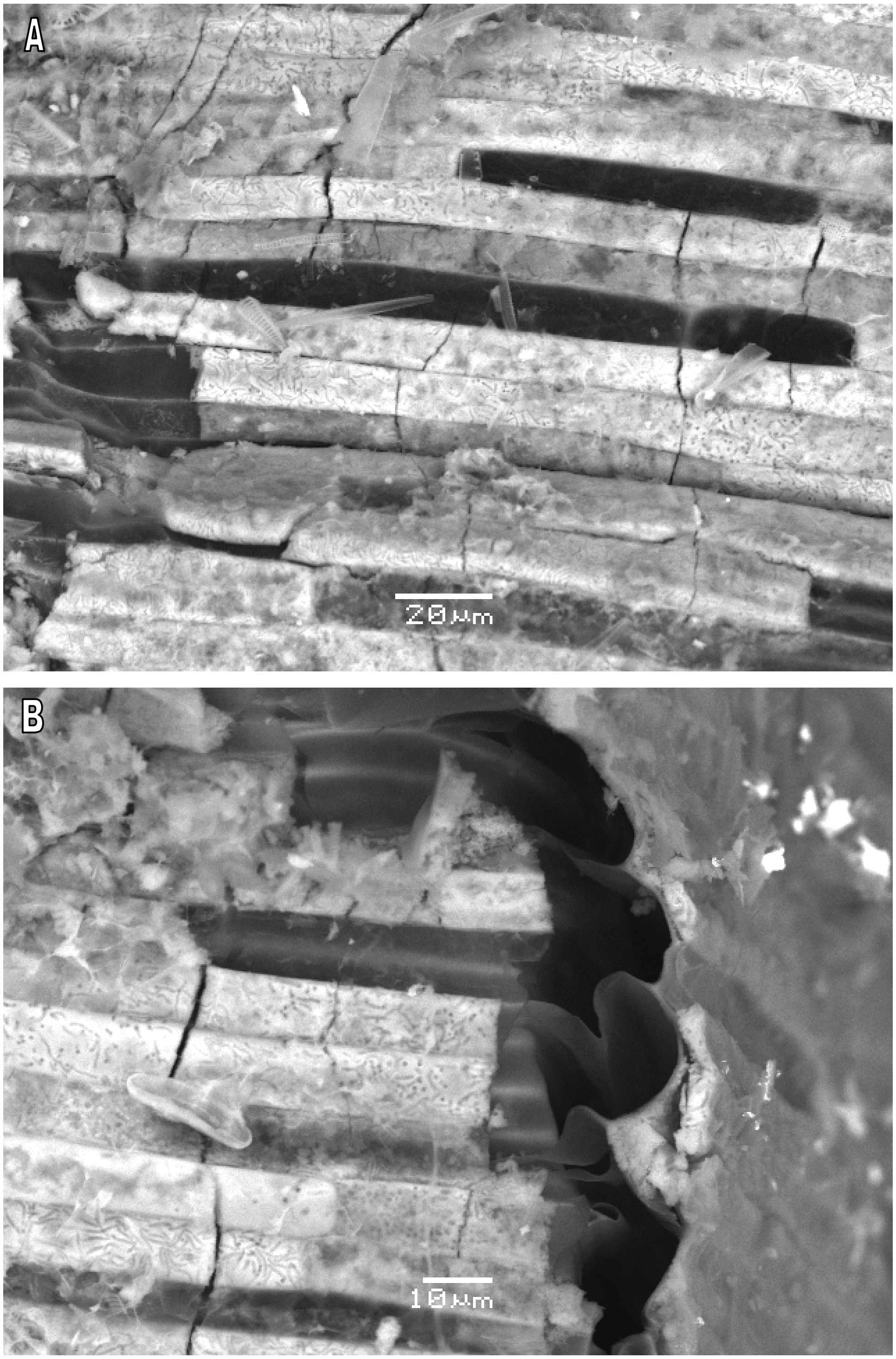

Figure C.3.3 – Whitefish Lake, Sample 3 (carbon-coated cross section: root surface orange-brown), SEM images; root surface with grooves present in plaque crust, A. x700 and B. x1,000 (note grooves extending through entire depth of plaque crust).

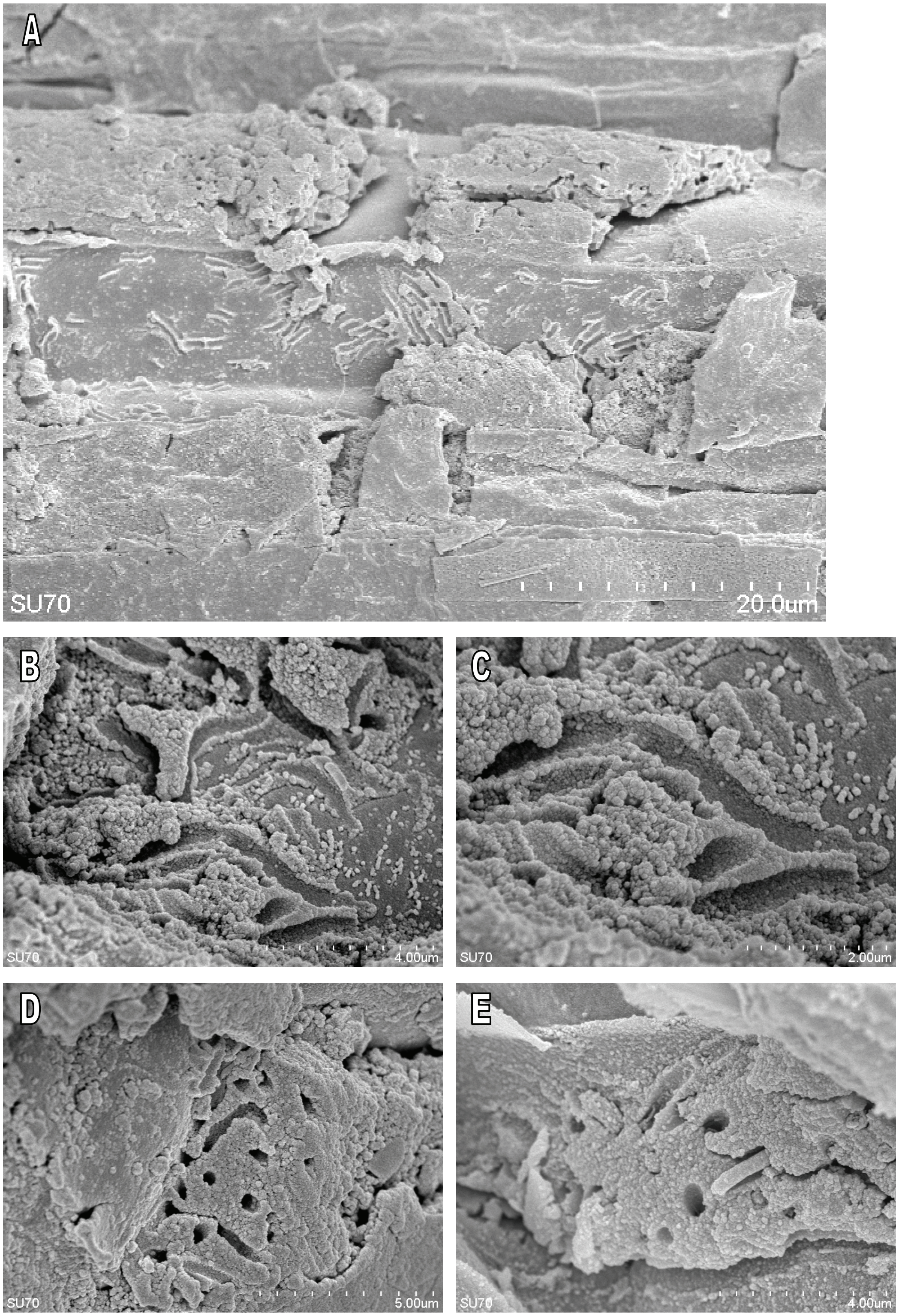

Figure C.3.4 (cont'd on next page)

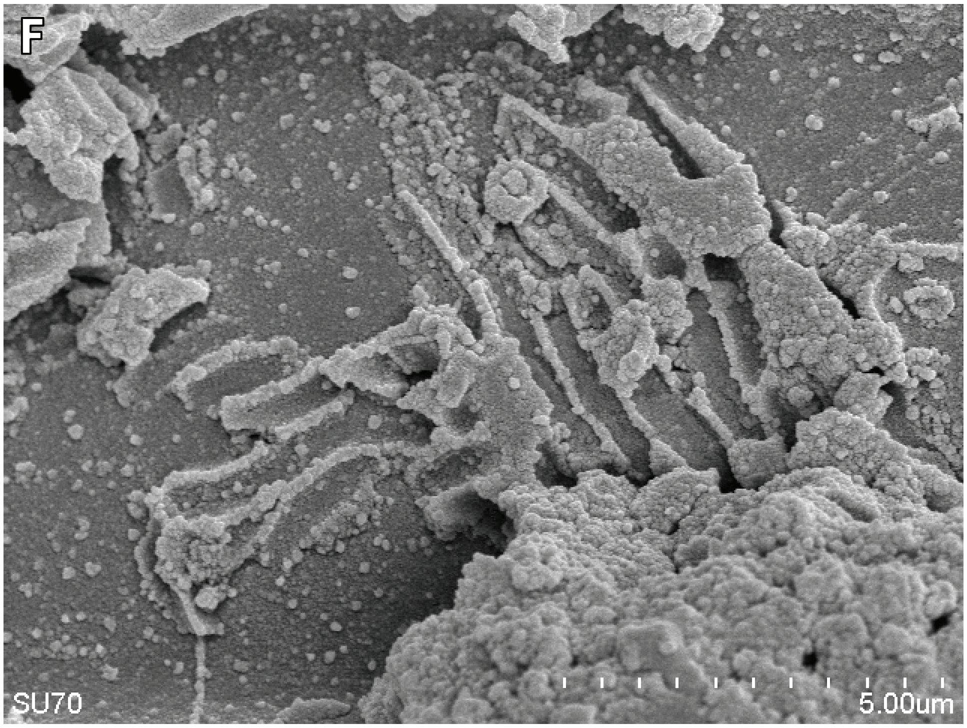

Figure C.3.4 – Whitefish Lake, Sample 3 (gold-coated longitudinal section: root surface orange-brown), SEM images from Hitachi SU-70 SEM; A. x2,200, grooves present across cell surface in plaque crust; root surface with grooves present in plaque crust, B. x12,000, C x20,000, D x9,990, E x12,000 and F x10,000

C.4 – Base/Control Data

C.4.1 – Control Samples, SEM Images and EDXA X-Ray Spectra

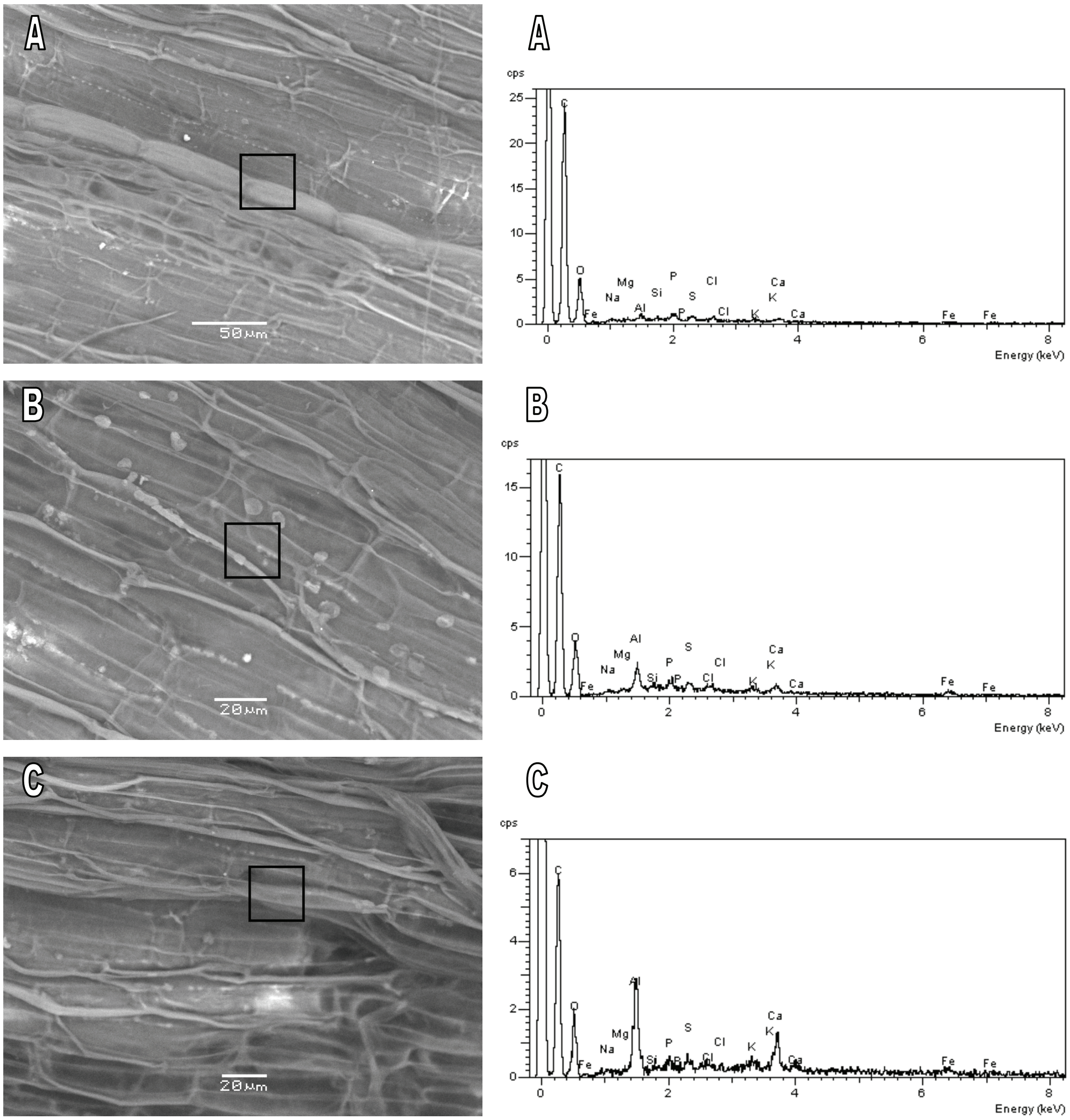

Figure C.4.1.1 – Marchmont Marsh, Sample 5 (longitudinal section: control, root surface white), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x400, root surface; B. x700, root surface ; C. x600, root surface.

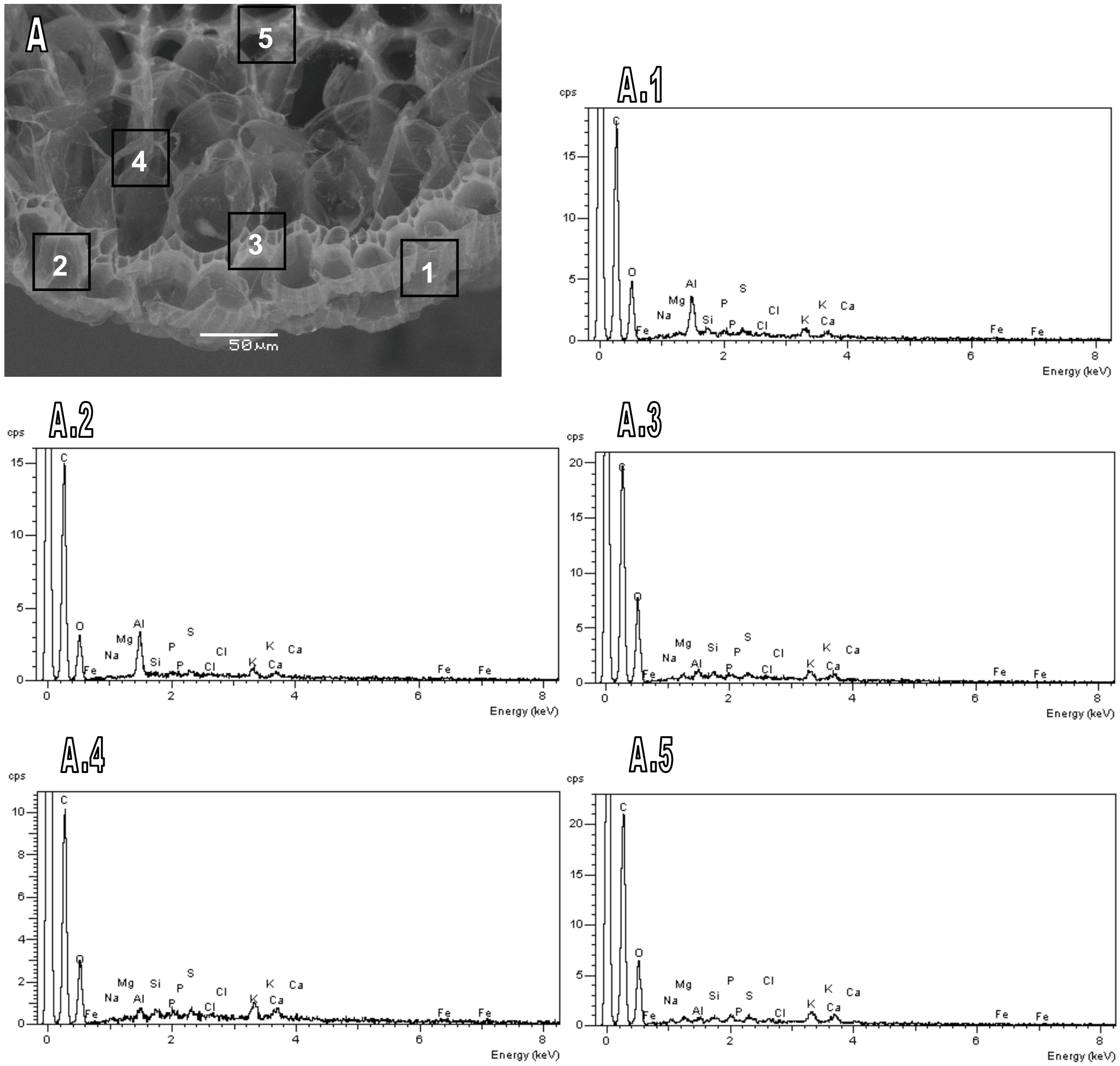

Figure C.4.1.2 (cont'd on next page)

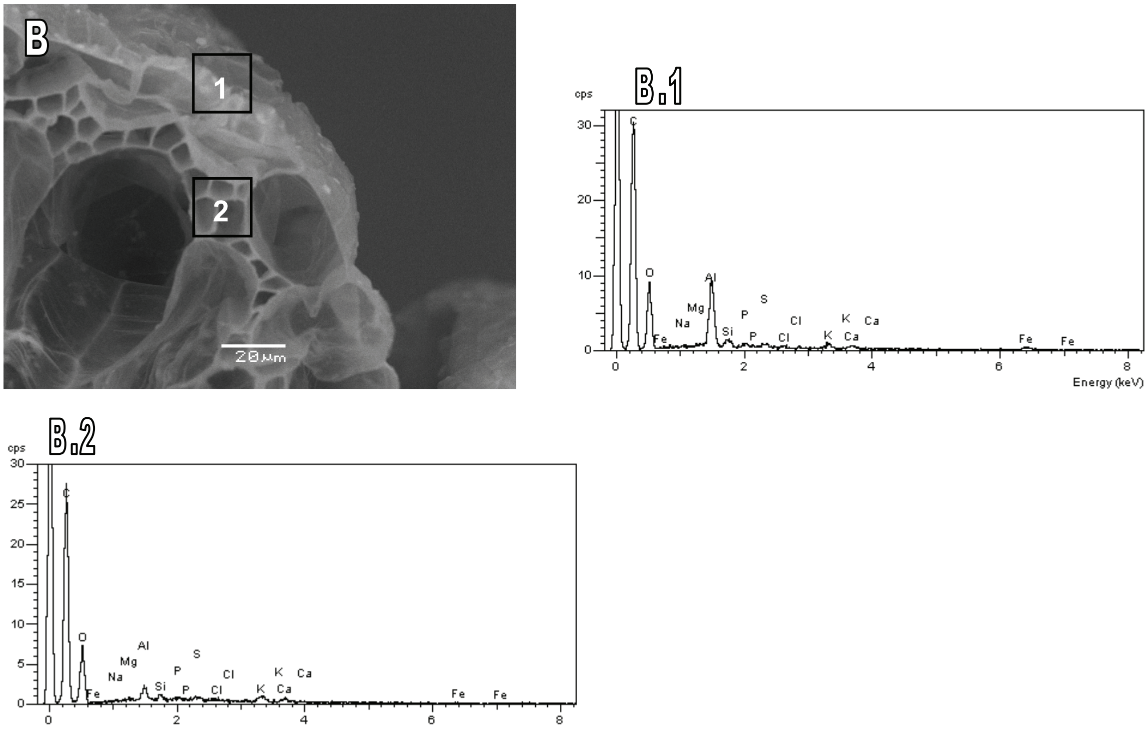

Figure C.4.1.2 – Marchmont Marsh, Sample 6 (cross section: control, root surface white), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x400, epidermis / root surface (spectrum A.1), epidermis cell interior (spectrum A.2), outer cortex (spectrum A.3) and cortex (spectra A.4 and A.5); B. x800, epidermis / root surface (spectrum B.1) and outer cortex (spectrum B.2).

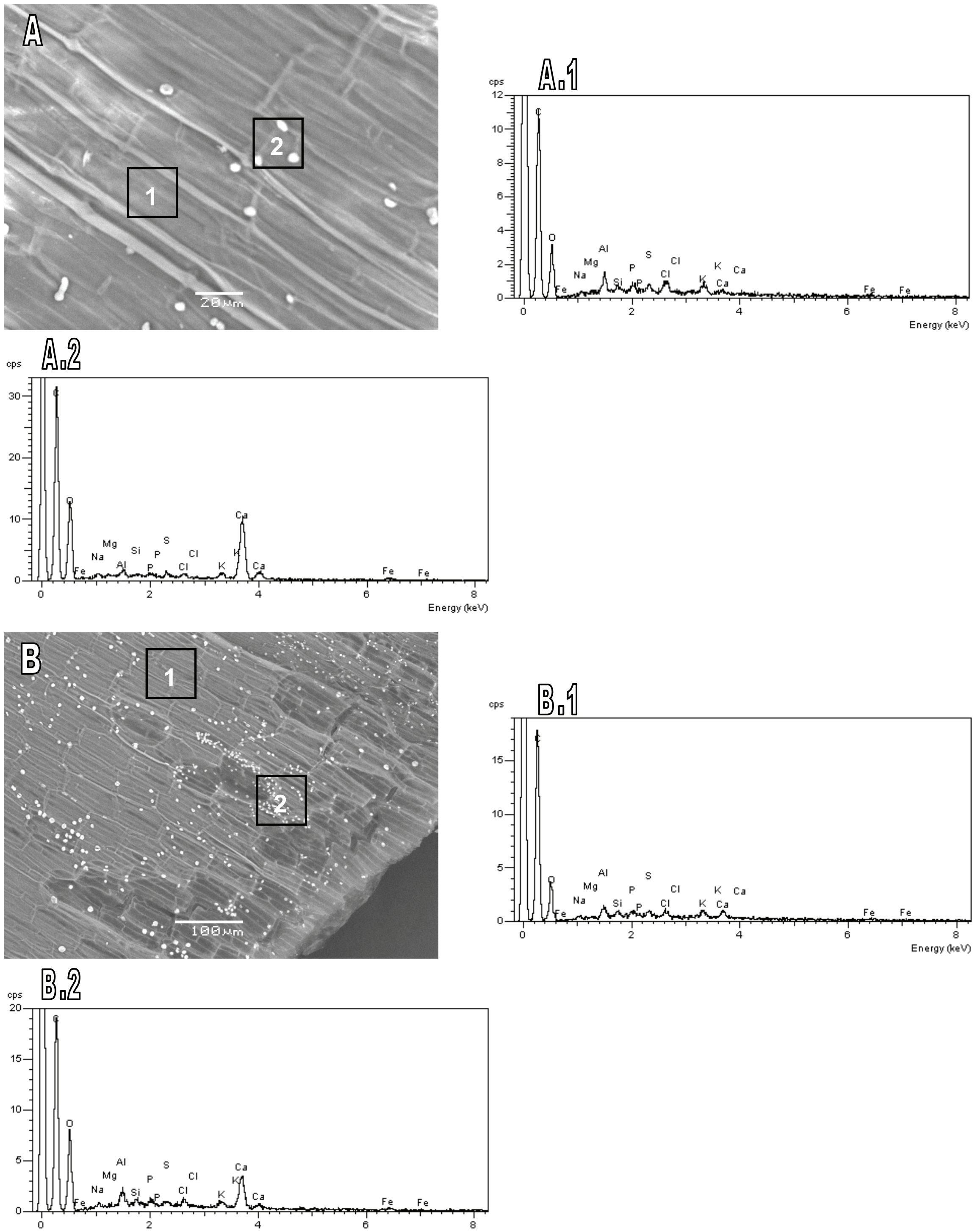

Figure C.4.1.3 – Marchmont Marsh, Sample 7 (longitudinal section: control, root surface white), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x700, root surface (spectrum A.1) and root surface with $CaCO_3$ particulate deposits (spectrum A.2); B. x200, root surface (spectrum B.1) and root surface with $CaCO_3$ particulate deposits (spectrum B.2).

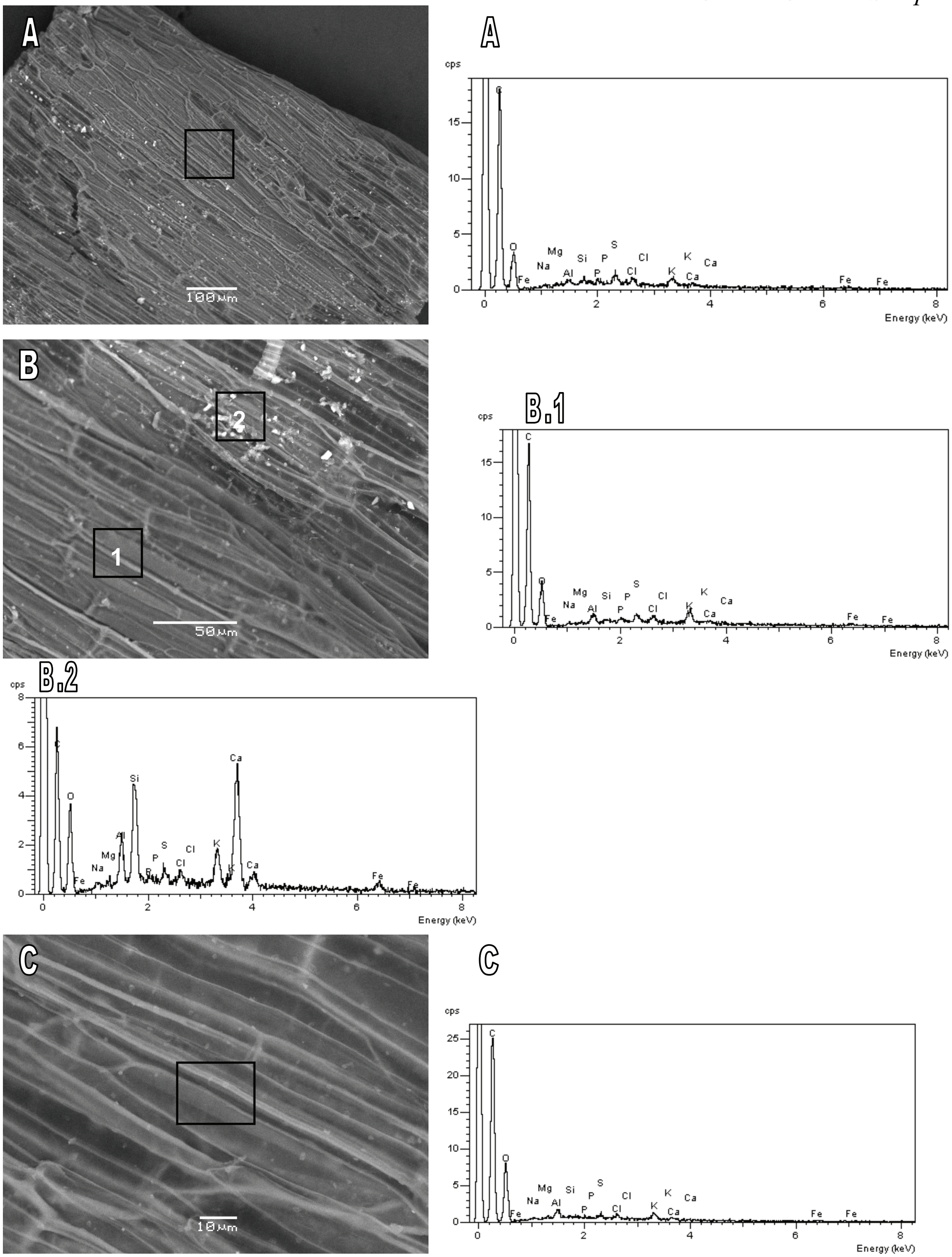

Figure C.4.1.4 – Whitefish Lake, Sample 5 (longitudinal section: control, root surface light yellow), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x150, root surface (white particulates likely $CaCO_3$); B. x500, root surface (spectrum B.1) and $CaCO_3$ particulate deposits (spectrum B.2); C. x1,100, root surface.

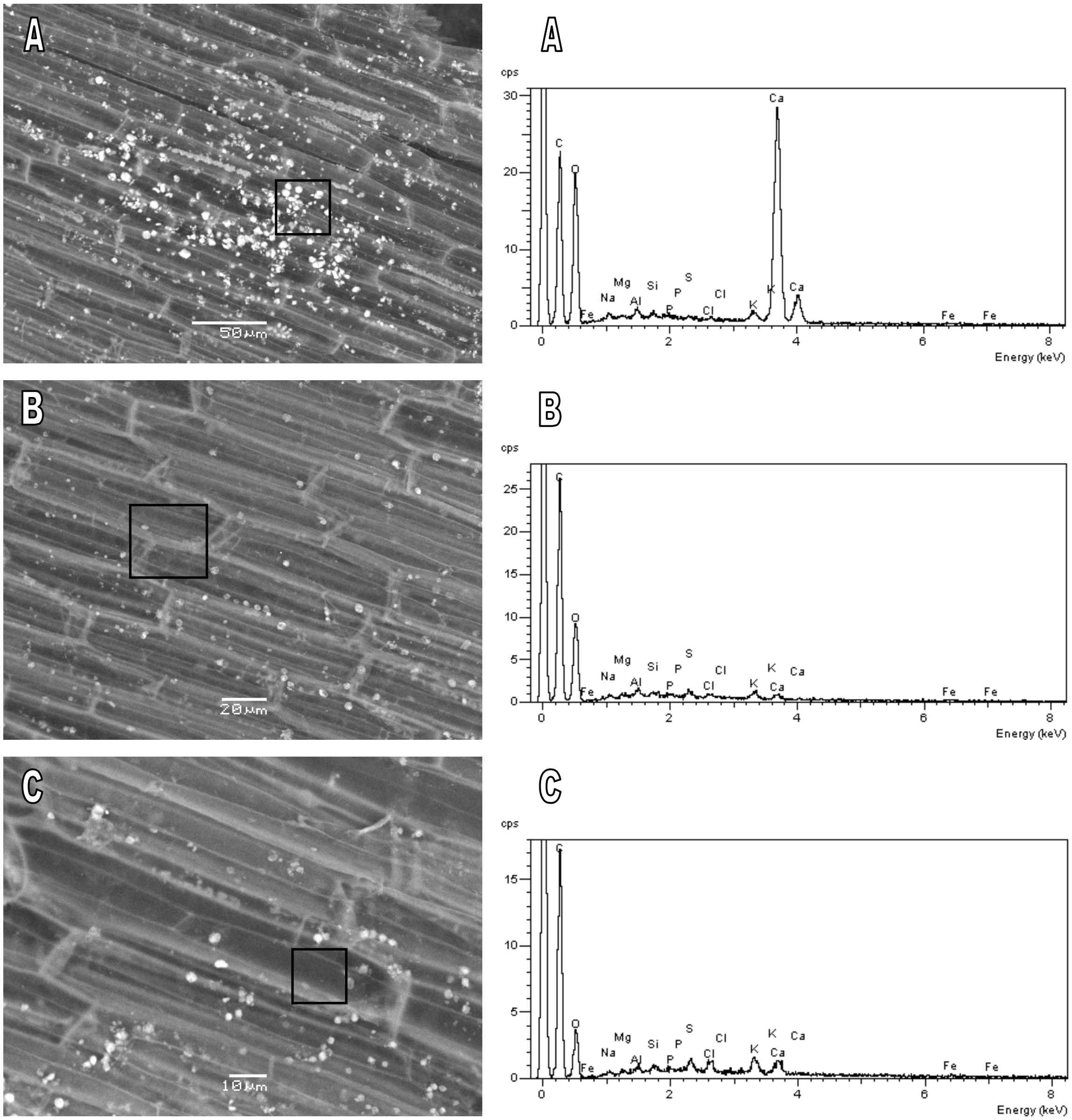

Figure C.4.1.5 – Whitefish Lake, Sample 6 (longitudinal section: control, root surface light yellow), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x400, root surface with $CaCO_3$ particulate deposits; B. x600, root surface; C. x1,000, root surface.

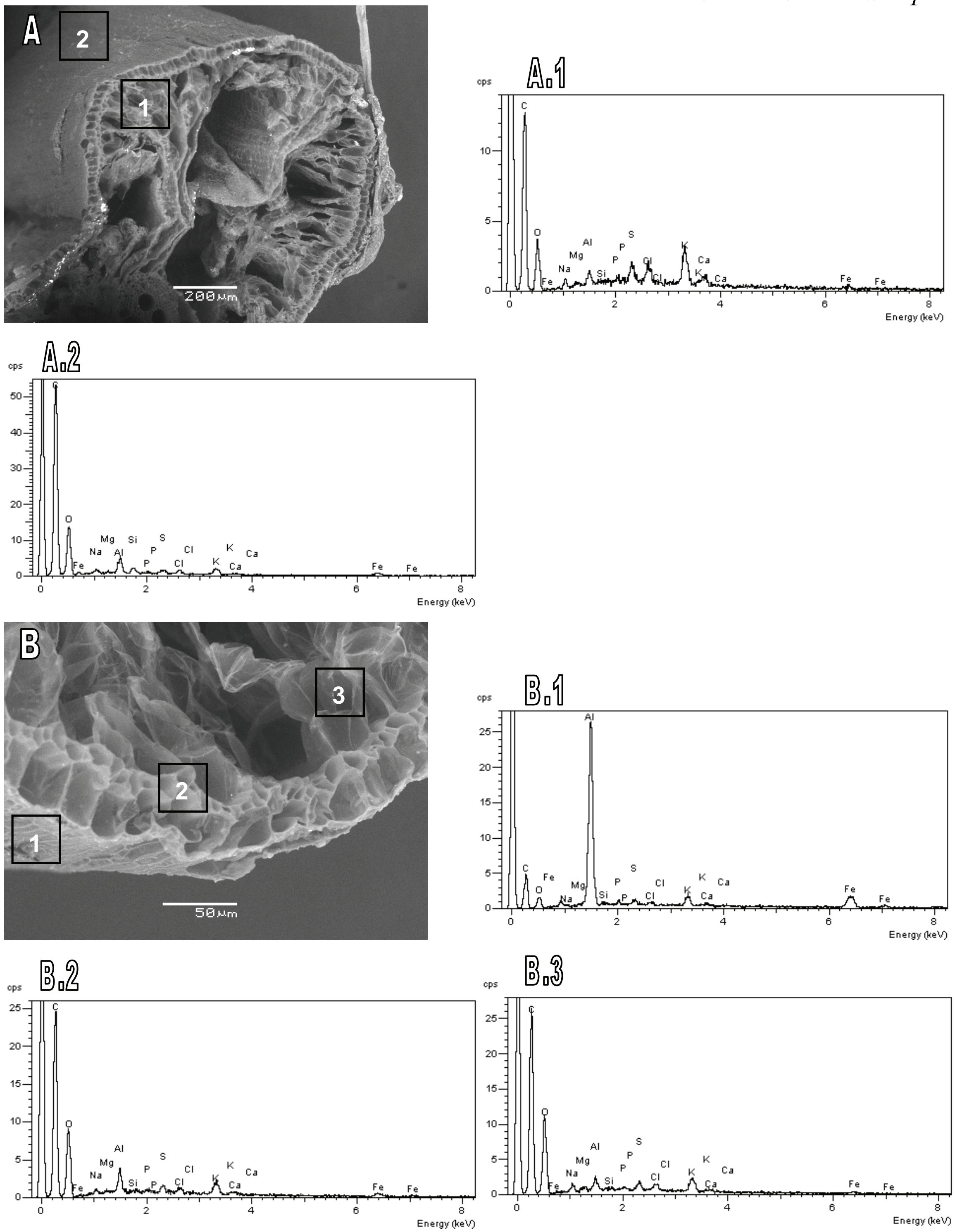

Figure C.4.1.6 – Whitefish Lake, Sample 7 (cross section: control, root surface light yellow), SEM images with associated EDXA x-ray spectra (x-ray location shown by box); A. x95, cross section showing cortex (spectrum A.1) and root surface (spectrum A.2); B. x450, epidermis / root surface (spectrum B.1), outer cortex (spectrum B.2) and cortex (spectrum B.3).

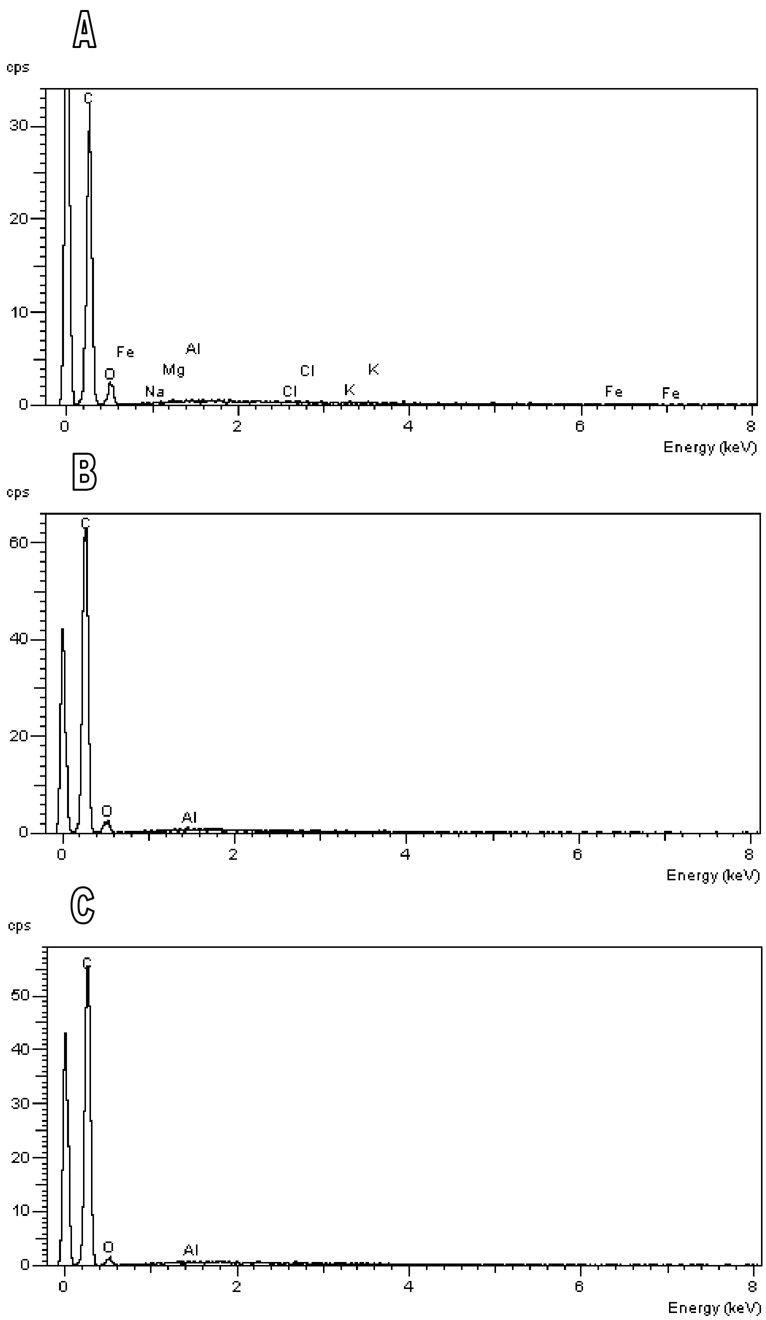

Figure C.4.1.7 – Blank stub, no sample EDXA x-ray spectra. X-ray spectra of carbon-tape at three locations (A, B and C).

Table C.4.1.1 - Control Samples, *Zizania palustris* Root Plaque SEM Image Data Compilation

Sample Data			SEM Observation Data													Comments
Site	Sample	Root Colour	Image	Image Location	Plaque Present	Zoom	Primary Deposition				Secondary Deposition				Other Particulate Deposits	
							Type	% Coverage	Thickness	Location	Type	% Coverage	Thickness	Location		
MM	5	white	A	root surface	N	400	-	-	-	-	-	-	-	-	none	no plaque
MM	5	white	B	root surface	N	700	-	-	-	-	-	-	-	-	none	no plaque
MM	5	white	C	root surface	N	600	-	-	-	-	-	-	-	-	none	no plaque
MM	6	white	A	cross section	N	400	-	-	-	-	-	-	-	-	none	no plaque
MM	6	white	B	cross section	N	800	-	-	-	-	-	-	-	-	none	no plaque
MM	7	white	A	root surface	N	700	-	-	-	-	-	-	-	-	$CaCO_3$	$CaCO_3$ deposits (white spots), no plaque
MM	7	white	B	root surface	N	200	-	-	-	-	-	-	-	-	$CaCO_3$	$CaCO_3$ deposits (white spots), no plaque
WF	5	light yellow	A	root surface	N	150	-	-	-	-	-	-	-	-	$CaCO_3$	$CaCO_3$ deposits (white spots), no plaque
WF	5	light yellow	B	root surface	N	500	-	-	-	-	-	-	-	-	$CaCO_3$ and soil	$CaCO_3$ deposits (white spots) and soil, no plaque
WF	5	light yellow	C	root surface	N	1,100	-	-	-	-	-	-	-	-	none	no plaque
WF	6	light yellow	A	root surface	N	400	-	-	-	-	-	-	-	-	$CaCO_3$	$CaCO_3$ deposits (white spots), no plaque
WF	6	light yellow	B	root surface	N	600	-	-	-	-	-	-	-	-	$CaCO_3$	$CaCO_3$ deposits (white spots), no plaque
WF	6	light yellow	C	root surface	N	1,000	-	-	-	-	-	-	-	-	$CaCO_3$	$CaCO_3$ deposits (white spots), no plaque
WF	7	light yellow	A	cross section	N	95	-	-	-	-	-	-	-	-	none	no plaque
WF	7	light yellow	B	cross section	N	450	-	-	-	-	-	-	-	-	none	no plaque

Notes
- = N/A

Table C.4.1.2 - Control Samples, *Zizania palustris* Root Plaque EDXA X-Ray Spectra Data Compilation

Sample Data			X-Ray Spectra Data									Comments
Site	Sample	Root Colour	Spectrum	Plaque Present	Location	Relative Peak Height of Elements					Other Particulate Deposits	
						1	2	3	4	5		
MM	5	white	A	N	root surface	C	O	-	-	-	none	no plaque
MM	5	white	B	N	root surface	C	O	Al	-	-	none	no plaque
MM	5	white	C	N	root surface	C	Al	O	Ca	-	none	no plaque
MM	6	white	A.1	N	root surface	C	O	Al	-	-	none	no plaque
MM	6	white	A.2	N	epidermis cells	C	Al	O	-	-	none	no plaque
MM	6	white	A.3	N	outer cortex	C	O	-	-	-	none	root interior
MM	6	white	A.4	N	cortex	C	O	K	-	-	none	root interior
MM	6	white	A.5	N	cortex	C	O	K	-	-	none	root interior
MM	6	white	B.1	N	root surface	C	O	Al	-	-	none	no plaque
MM	6	white	B.2	N	outer cortex	C	O	Al	-	-	none	root interior
MM	7	white	A.1	N	root surface	C	O	Al	Cl	K	none	no plaque
MM	7	white	A.2	N	root surface	C	O	Ca	-	-	$CaCO_3$	$CaCO_3$ deposits, no plaque
MM	7	white	B.1	N	root surface	C	O	Al	-	-	none	no plaque
MM	7	white	B.2	N	root surface	C	O	Ca	Al	-	$CaCO_3$	$CaCO_3$ deposits, no plaque
WF	5	light yellow	A	N	root surface	C	O	S	-	-	none	no plaque
WF	5	light yellow	B.1	N	root surface	C	O	K	Al	S	none	no plaque
WF	5	light yellow	B.2	N	root surface	C	Ca	Si	O	Al	soil and $CaCO_3$	$CaCO_3$ deposits and soil, no plaque
WF	5	light yellow	C	N	root surface	C	O	Al	-	-	none	no plaque
WF	6	light yellow	A	N	root surface	Ca	C	O	Al(Ca)	-	$CaCO_3$	$CaCO_3$ deposits, no plaque
WF	6	light yellow	B	N	root surface	C	O	-	-	-	none	no plaque
WF	6	light yellow	C	N	root surface	C	O	K	S	-	none	no plaque
WF	7	light yellow	A.1	N	cortex	C	O	K	S	Cl	none	root interior
WF	7	light yellow	A.2	N	root surface	C	O	Al	-	-	none	no plaque
WF	7	light yellow	B.1	N	root surface	Al	C	K	O	Fe	none	no plaque
WF	7	light yellow	B.2	N	outer cortex	C	O	Al	K	-	none	root interior
WF	7	light yellow	B.3	N	cortex	C	O	Al	K	S	none	root interior
N/A	N/A	N/A	A	N/A	carbon tape	C	O	-	-	-	N/A	blank stub with carbon tape, no sample
N/A	N/A	N/A	B	N/A	carbon tape	C	O	-	-	-	N/A	blank stub with carbon tape, no sample
N/A	N/A	N/A	C	N/A	carbon tape	C	O	-	-	-	N/A	blank stub with carbon tape, no sample

Notes

Relative Peak Height of Elements: Xx(Yy) means that element Xx had the next highest peak relative to element Yy, shown in brackets because it is the second peak for element Yy

- = element peaks too low to determine relative height

C.4.2 – Control Samples, Element Maps

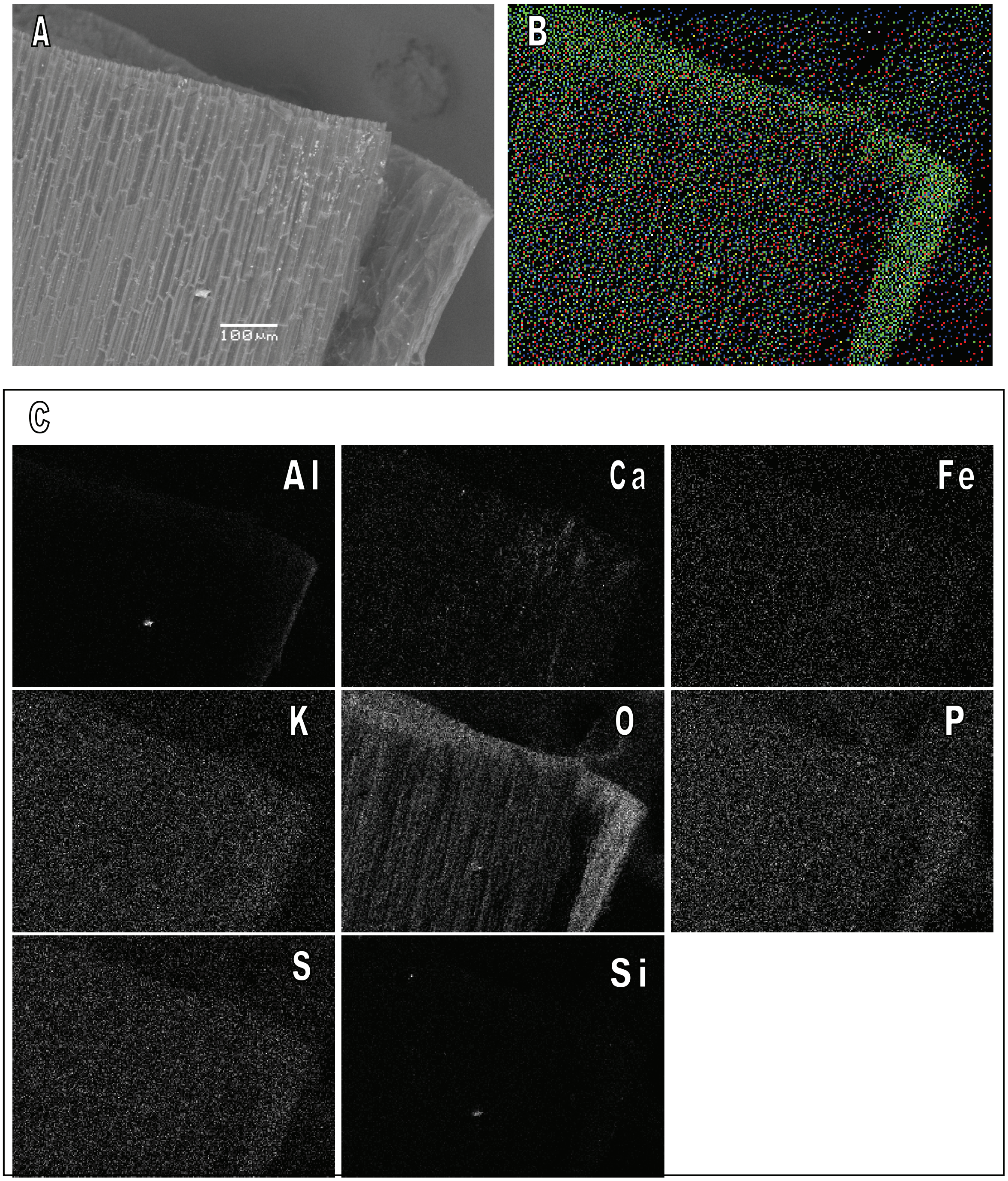

Figure C.4.2.1 – Whitefish Lake, Sample 6 (longitudinal section: control, root surface light yellow), SEM image with associated EDXA element maps. A. x150, original image; B. coloured points indicate the presence and location of each of the elements Fe (red), O (green) and P (blue); C. light coloured points indicate the presence and location of each element (as labelled).

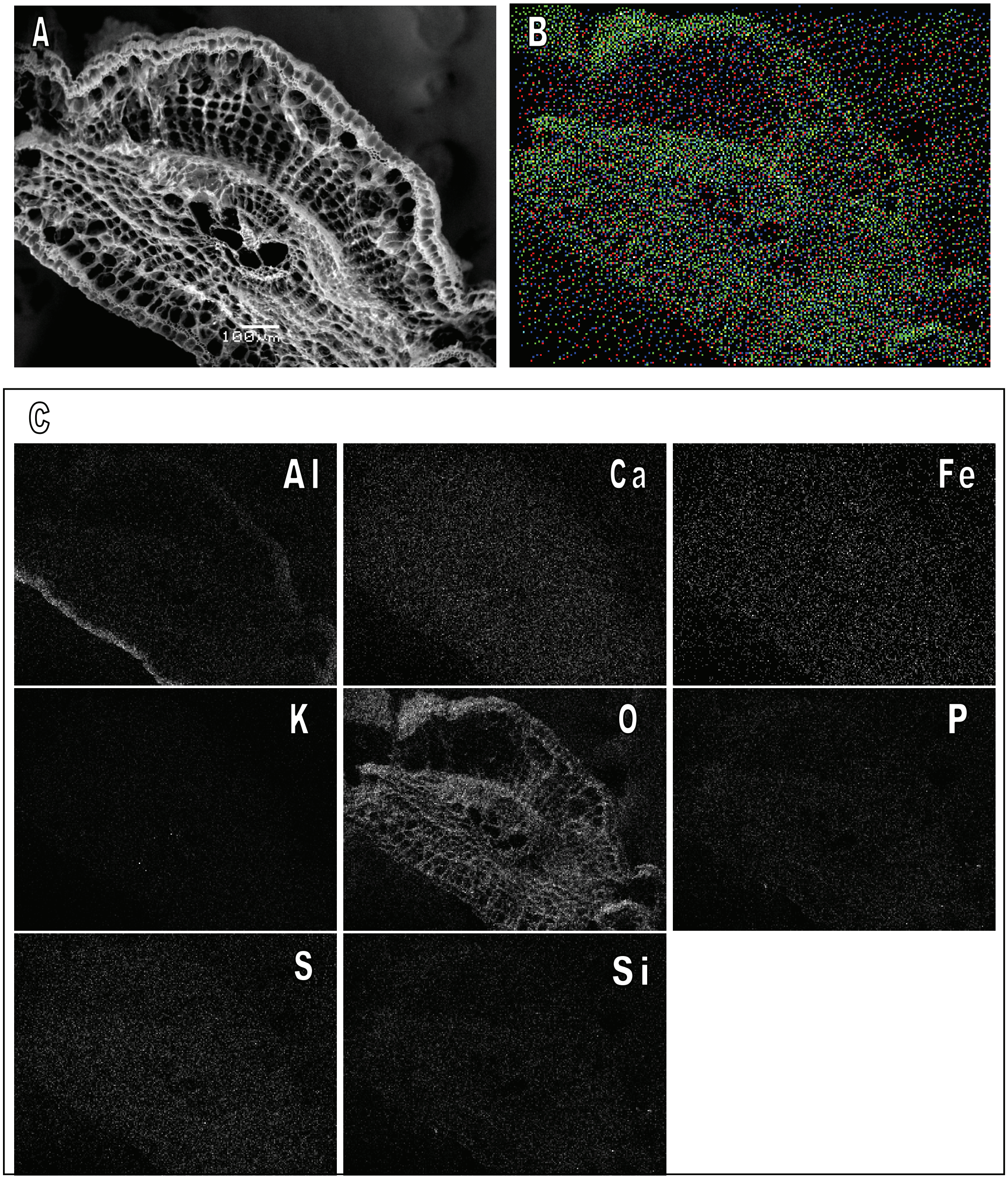

Figure C.4.2.2 – Marchmont Marsh, Sample 6 (cross section: control, root surface white), SEM image with associated EDXA element maps. A. x100, original image; B. coloured points indicate the presence and location of each of the elements Fe (red), O (green) and P (blue); C. light coloured points indicate the presence and location of each element (as labelled).

C.4.3 – Water Analytical Base Data

Table C.4.3.1 - Water Analytical Data, Collected Near *Zizania palustris* Sample Sites

Sample Data					Analytical Parameters (Units)															
								Total Metals												
Sample Date	Site	Sample ID	Matrix	Depth	Total Alkalinity as $CaCO_3$ (mg/L)	Con-ductivity (µS/cm)	pH	Al (mg/L)	Ca (mg/L)	Fe (mg/L)	K (mg/L)	Mg (mg/L)	Mn (mg/L)	Na (mg/L)	S (mg/L)	Zn (mg/L)	$N\text{-}NH_4{+}NH_3$ (mg/L)	Nitrate NO_3-N (mg/L)	Total K. Nitrogen (mg/L)	Total P (mg/L)
25-Sep-10	MM	MM-Water	Water	Surface	133.6	292.3	7.715	0.010	35.912	0.061	1.37	10.63	0.0035	5.41	1.80	0.007	-	0.0045[B]	-	0.022
25-Sep-10	MM	MM-V-1a-1	Water	Surface	135.5	290.6	7.774	0.010	38.192	0.225	1.45	10.93	0.0397	5.97	1.76	0.015	-	0.0045[B]	-	0.027
25-Sep-10	MM	MM-V-1a-2	Sediment Porewater	0-10 cm[A]	127.9	270.4	6.981	0.013	35.392	1.503	0.95	7.81	0.3492	4.30	0.23	0.007	-	0.0045[B]	-	0.210
25-Sep-10	MM	MM-V-1a-3	Sediment Porewater	10-20 cm[A]	127.8	268.0	6.867	0.016	36.972	1.961	0.87	7.17	0.2998	4.42	0.20	0.008	-	0.0045[B]	-	0.145
25-Sep-10	MM	MM-V-1a-4	Sediment Porewater	20-30 cm[A]	133.4	287.1	6.829	0.043	40.092	2.408	0.64	7.35	0.2928	5.00	0.14	0.008	-	0.0045[B]	-	0.085
25-Jul-11	SeR	PCrop4	Water	Surface	20.3	56.8	6.831	0.046	6.947	0.168	0.50	1.43	0.0131	1.87	0.77	0.002	0.015	0.030	0.406	0.016
25-Jul-11	SeR	PCrop6	Water	Surface	20.4	57.3	6.825	0.052	6.993	0.165	0.52	1.44	0.0129	1.90	0.78	0.004	0.025	0.037	0.423	0.017
06-Sep-11	SeR	PCrEpi	Water	Surface	20.7	59.0	6.710	0.049	6.754	0.163	0.50	1.35	0.0137	1.76	0.77	0.004	0.005[B]	0.023	0.304	0.005
06-Sep-11	SeR	PCrOut	Water	Surface	21.2	59.1	6.709	0.051	6.642	0.164	0.50	1.33	0.0132	1.72	0.74	0.004	0.005[B]	0.024	0.349	0.008
27-Jul-11	StR	LSR01	Water	Surface	36.6	97.8	7.136	0.055	12.695	0.308	0.54	2.10	0.0461	3.23	1.04	0.004	0.057	0.023	0.506	0.019
27-Jul-11	StR	LSR02	Water	Surface	36.8	99.6	7.233	0.014	12.436	0.156	0.54	2.07	0.0300	3.34	1.01	0.005	0.034	0.0045[B]	0.450	0.016
07-Sep-11	StR	LSRIn1	Water	Surface	37.9	100.0	6.903	0.034	10.880	0.093	0.74	1.99	0.0341	2.65	1.14	0.012	0.053	0.195	0.560	0.013
07-Sep-11	StR	LSREpi	Water	Surface	38.3	101.1	8.126	0.033	9.885	0.094	0.56	1.64	0.0446	2.83	0.90	0.004	0.005[B]	0.0045[B]	0.445	0.010
Summer 1997[C]	WF	Wild Rice (30m)	Water	Surface	-	103.0	6.840	0.074	144.100	0.239	2.57	38.81	0.1090	16.10	1.03	0.003	-	-	0.430	0.008

Notes

No water data available for Lake Tamblyn sample collection site

All samples analyzed at Lakehead University Environmental Laboratory (LUEL) according to LUEL QA/QC protocols, CALA approved.

\- = parameter not analyzed

A = Depth below sediment-water interface

B = Results reported as "less than detection limit" are shown as half of the value of the detection limit

C = Data presented are means of seven sampling dates from mid-June to mid-September 1997, data published by Lee & McNaughton, 2004

Site = Marchmont Marsh (MM), Partridge Crop Lake (SeR), Lower Steep Rock Lake (StR), Whitefish Lake (WF)

C.5 – Photos

Figure C.5.1 – Lake Tamblyn wild rice root sample preparation prior to freeze-drying.

Figure C.5.2 – Marchmont Marsh wild rice root sample.

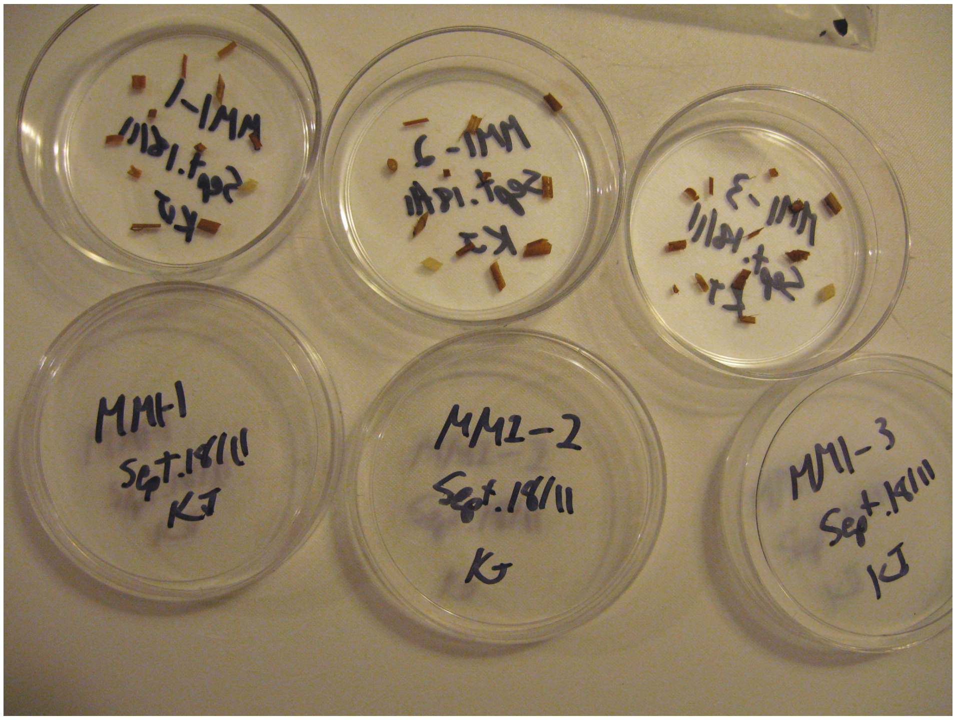

Figure C.5.3 – Prepared samples of Marchmont Marsh wild rice roots prior to freeze-drying.

Figure C.5.4 – Partridge Crop Lake wild rice root sample preparation prior to freeze-drying.

Figure C.5.5 – Lower Steep Rock Lake wild rice root sample preparation prior to freeze-drying.

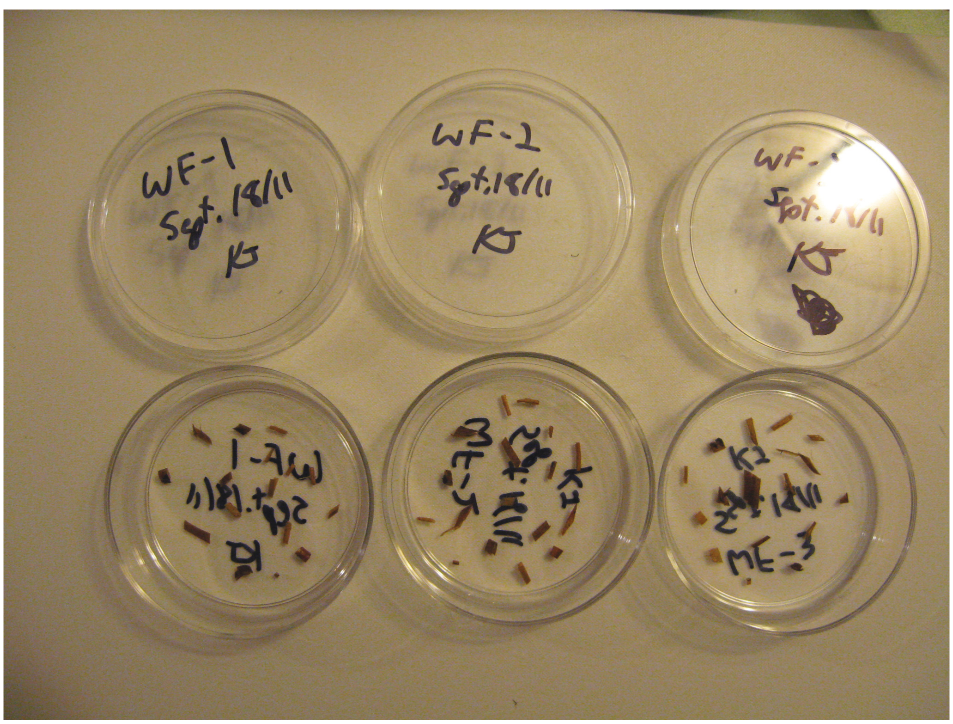

Figure C.5.6 – Prepared samples of Whitefish Lake wild rice roots prior to freeze-drying.

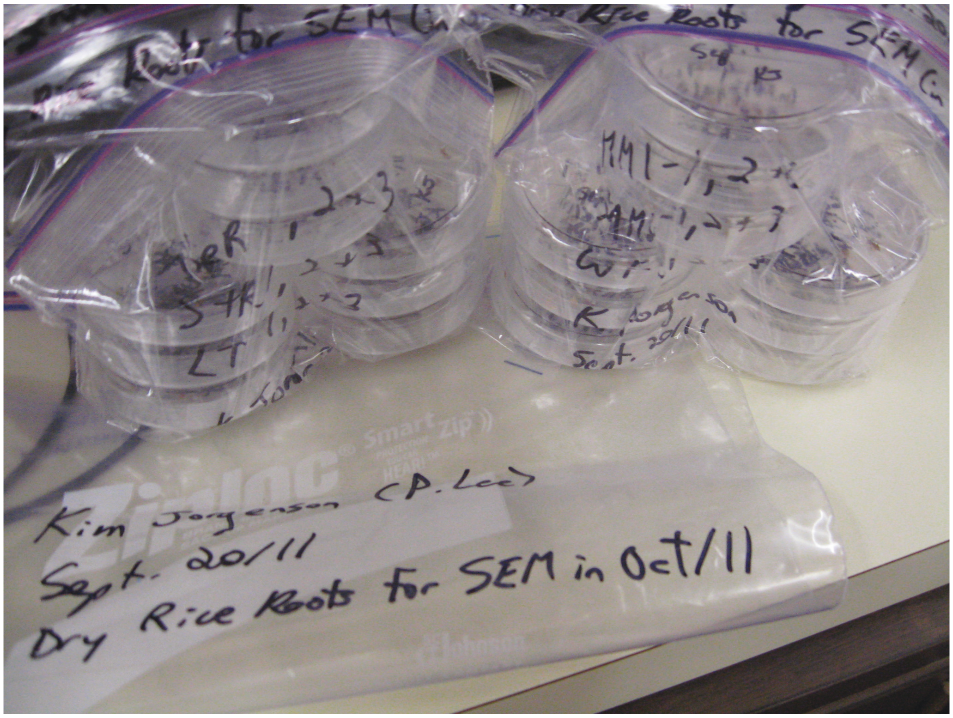

Figure C.5.7 – Prepared samples for freeze-drying.

Figure C.5.8 – LABCONCO Freeze Dry System (freeze-dryer) used to dry wild rice root samples. Located in the Lakehead University Instrument Laboratory (LUIL).

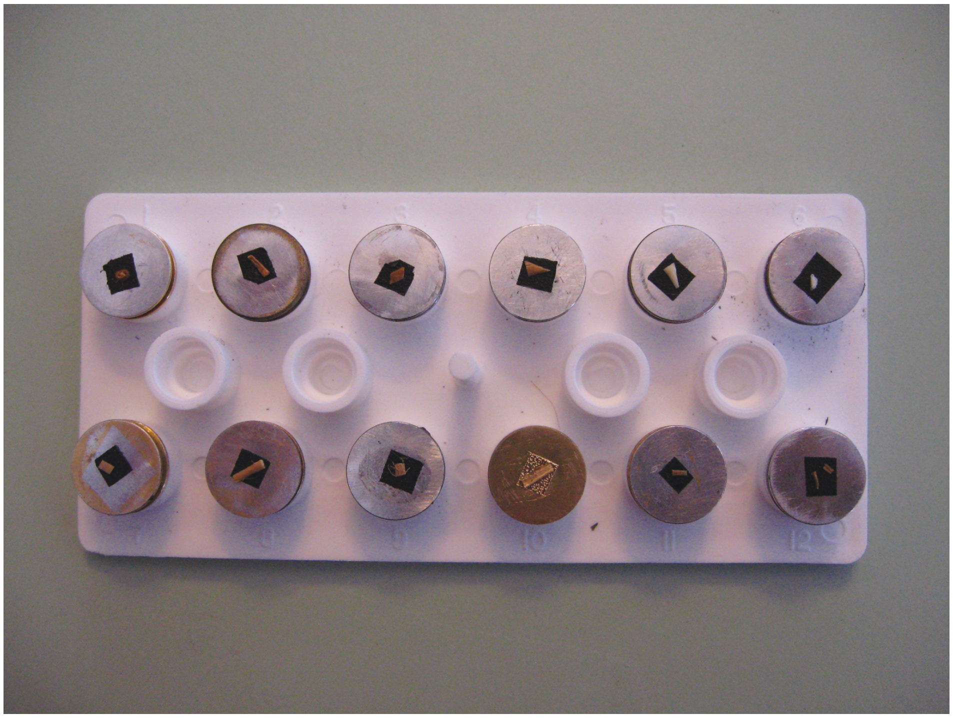

Figure C.5.9 – Freeze-dried wild rice root samples mounted on stubs with carbon tape, in preparation for SEM and x-ray analysis. Sample 10 is gold-coated.

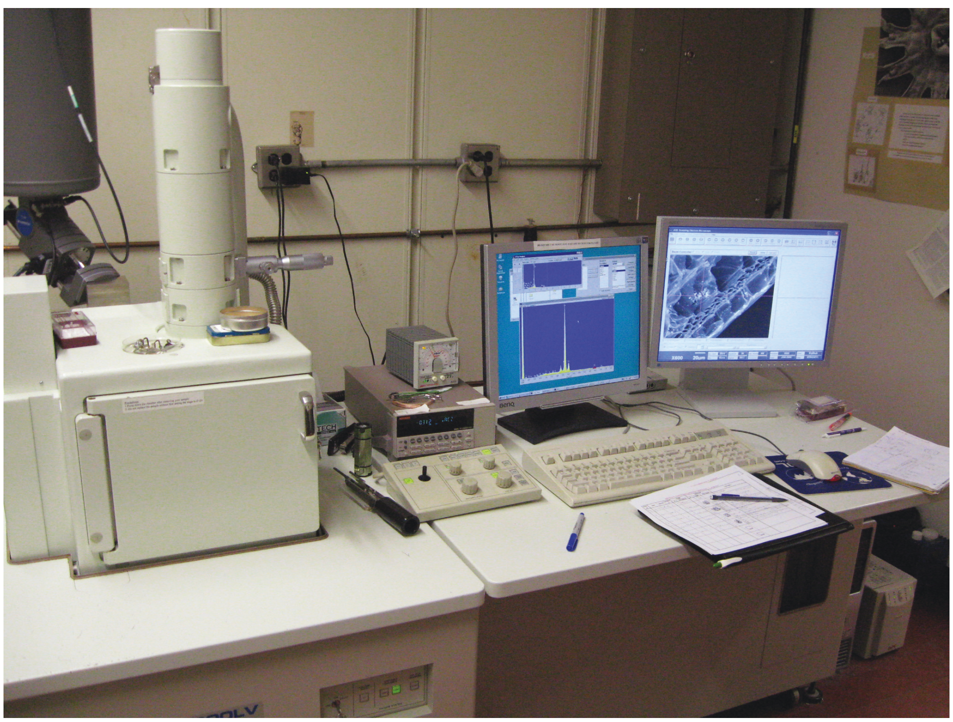

Figure C.5.10 – JEOL JSM-5900LV Scanning Electron Microscope (SEM) fitted with EDXA to view and x-ray wild rice root samples. Located in the Lakehead University Instrument Laboratory (LUIL).