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Lower Lakes Sulfate Reduction Study
2011

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Printed on recycled paper
July 2011
ISBN 978-1-921735-19-6

Citation

This report should be cited as:

> Sullivan, L.A., Burton, E.D., Ward, N.J., Bush, R.T., Coughran, J., Cheetham, M.D., Fyfe, D.M., Cheeseman, P.J. and McIntyre, T. (2011) *Lower Lakes sulfate reduction study*. Southern Cross GeoScience Technical Report No. 711. Prepared for the SA Department of Environment and Natural Resources, Adelaide.

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Signed:

Date: 15th July, 2011

Distribution: SA Department of Environment and Natural Resources, Southern Cross GeoScience

Circulation: Public Domain

Lower Lakes sulfate reduction study

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Prepared by the Southern Cross University for the SA Department of Environment and Natural Resources

Part of the South Australian Government's $610 million *Murray Futures* Program funded by the Australian Government's *Water for Future* initiative.

2011

Government of South Australia
Department of Environment
and Natural Resources

Southern Cross
GeoScience

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Executive Summary

This project examined the effects of bioremediation techniques on the acidified Lower Lakes' sediments that had been exposed during the drying event from 2007-2010 during lake re-filling in mid 2010 to early 2011. The assessments included examination of sulfate reduction, acidity/alkalinity, sulfide contents and metal mobility consequent of these processes.

The bioremediation of the exposed acidified lake sediments by revegetation produced substantial benefits in terms of reduced acidity of the surficial lake sediments. These benefits are likely to have accrued from a combination of vegetation-associated processes including the provision of alkalinity from plant roots as well as from the vegetation minimising soil erosion and hence preventing the exposure of severely acidic subsoils.

The sulfur cycling occurring in these sediments as a result of bioremediation did not lead to the accumulation of sulfide minerals such as monosulfides and pyrite in the surficial lake sediments. Consequently, bioremediation did not lead to the development of appreciable hazards of acidification, metal and metalloid mobilisation, and deoxygenation associated with these sulfide minerals.

The data indicate that, apart from a considerable decrease in ammonium occurring with increased duration of inundation, there were few general trends in nutrient availability consequent of bioremediation during the study period.

This study only examined the first six months after refilling and whether the findings of this study will continue to apply to the bioremediation of the Lower Lakes, especially at the bioremediation sites where the organic matter from the planted vegetation continues to either be produced or is still being broken down, is a matter that will need to be further examined in detail.

Recommendations

1) Monitoring of the intermediate and long term effects of bioremediation on the geochemistry of the lake sediments be undertaken by assessment programs similar to that used in this project to fully assess the possible effects of the various bioremediation techniques on the lake ecosystem.

2) Monitoring of the pore-water nickel and zinc in the lake sediments as affected by bioremediation be undertaken to assess the ongoing environmental risks posed by the presence of very high bio-accessible concentrations of these two potentially-toxic trace metals.

3) A detailed investigation be undertaken into the effectiveness of different vegetation types and strategies used for bioremediation to understand in sufficient detail the reasons for differences in remediation effectiveness and to provide a factual basis to optimise bioremediation strategies.

1.0 Project Overview

This project examined sulfate reduction and the generation of alkalinity consequent of bioremediation in the form of various revegetation treatments, on the sediments around the Lower Lakes exposed during the prolonged lake-drying event from 2007-2010. Changes in the alkalinity, sulfide contents and metal availability of the sediments consequent of bioremediation were also assessed.

There were two components to this study:

1) The *field component* directly assessed changes in the lake sediments in response to lake refilling and bioremediation treatment.

2) The *laboratory component* complemented the field investigations with data gained by controlled inundation of intact sediments cores with synthetic River Murray water.

The project focused on four locations in the Lower Lakes (two on Lake Alexandrina (Poltalloch and Tolderol) and two on Lake Albert (Waltowa and Campbell Park)), and included two control sites and a range of revegetation treatments (in terms of both the vegetation species and the date of establishment of these vegetated treatments).

2.0 Aim

The primary aim of this project was to examine sulfate reduction consequent of bioremediation in the Lower Lakes. The findings are aimed at informing key management decisions on the effectiveness and limitations of bioremediation options in managing acid sulfate soils in the Lower Lakes.

3.0 Introduction

3.1 Background on acid sulfate soils

3.1.1. General

Acid sulfate soil materials are distinguished from other soil materials by having properties and behaviour that have either: 1) been affected considerably (mainly by severe acidification) by the oxidation of reduced inorganic sulfides (RIS), or 2) the capacity to be affected considerably (again mainly by severe acidification) by the oxidation of their RIS constituents.

A wide range of environmental hazards can be generated by the oxidation of RIS. These include: 1) severe acidification of soil and drainage waters (below pH 4 and often < pH 3), 2) mobilisation of metals (e.g. iron, aluminium, copper, cobalt, zinc), metalloids (e.g. arsenic), nutrients (e.g. phosphate), and rare earth elements (e.g. yttrium, lanthanum), 3) deoxygenation of water bodies, 4) production of noxious gases (e.g. hydrogen sulfide (H_2S)), and, 5) scalding (i.e. de-vegetation) of landscapes. Some of these hazards are caused directly or indirectly by the severe acidification that can occur as a result of the oxidation of RIS, whereas some can also be the result of other simultaneous processes occurring in the environment.

The properties and behaviour of acid sulfate soils can impact detrimentally on infrastructure such as bridges, drains, pipes, roads - especially when constructed of steel and concrete. Waters draining from acid sulfate soil materials may be enriched in a wide range of potential toxicants, including metals and metalloids, endangering aquatic life and public health. Crops, trees, pastures and aquaculture may also be severely affected by acid sulfate soil materials. Acid sulfate soils can have detrimental impacts on their surrounding environments as well as on communities who live in landscapes containing these soils.

The assessment and management of acid sulfate soils often requires an integration of knowledge from a wide range of disciplines including: geochemistry, pedology, hydrology, toxicology, geomorphology, microbiology, geotechnical engineering, geology, agronomy, sedimentology, environmental health, and ecology. The complexities involved with their identification, assessment, classification, and management ensure that acid sulfate soils will present a wide range of challenges for soil science.

3.1.2 Characteristics and formation

It is useful to distinguish between sulfidic soil materials that, if disturbed sufficiently, will become severely acidified, and sulfuric soil materials that have already become severely acidic as a result of the oxidation of RIS minerals.

Sulfidic materials may be current or former marine and estuarine sediments, sediments in brackish lakes and lagoons, peats that originally formed in freshwater but which have been inundated subsequently by brackish water, or accumulations of sediment in water bodies such as drains or wetlands affected by salinity (especially when sulfate is an appreciable component of that salinity). The required conditions for the formation and accumulation of RIS are: (1) a supply of organic matter, (2) reducing conditions sufficient for sulfate reduction brought about by continuous waterlogging, (3) a supply of sulfate from tidewater or other saline groundwater or surface water, (the sulfate is reduced to sulfides by bacteria decomposing the organic matter), and (4) a supply of iron from the sediment for the accumulation of iron sulfides which make up the bulk of the RIS.

These conditions are found in tidal swamps and salt marshes where, over the last 10,000 years, thick deposits of sulfidic clay have accumulated in many locations around the globe (Pons and van Breemen 1982; Dent and Pons 1995). Sulfidic layers vary greatly in appearance but often have the gleyed colours typical of soil materials that are dominated by reduced waterlogged conditions.

It is significant that the distribution of RIS within the soil matrix of acid sulfate soils is not uniform; this both affects acid sulfate soil behaviour and has implications for their management. Sandy and clayey acid sulfate soils often contain grains of pyrite (FeS_2) transported from elsewhere and deposited within the sediment. Subsequently, especially in slowly-deposited clays, masses of framboids or individual crystals of FeS_2 accumulate *in situ* in voids such as decomposing roots that provide both organic matter for bacterial decomposition and channels for the diffusion of SO_4^{2-} and dissolved Fe. Although the matrix may contain only relatively few embedded grains of pyrite, the network of neo-formed FeS_2 may raise the overall concentration of pyrite to several percent on a soil dry mass basis. Where freshwater conditions have followed brackish tidal conditions, sulfidic soil materials may have been buried by peat or alluvium devoid of RIS (Diemont *et al.* 1993).

Disturbance of sulfidic soils by, for example, drainage or excavation often causes dramatic changes in the properties of these soil materials and the draining waters. If there are insufficient effective neutralising materials (such as fine-grained calcium carbonate) in the sediment to neutralise the acidity generated by the oxidation of sulfides, extreme acidity can develop within weeks or months, resulting in sulfuric soil material. Sulfuric soil material is characterised by acidic pHs (e.g. pHs < 4), and usually presents yellow segregations of jarosite around pores and on ped faces. Acid sulfate soils of peaty constitution do not usually have visible jarosite segregations, presumably because these soil materials contain only minor amounts of the phyllosilicate clays that act as the main source, upon acid dissolution, of the potassium (K^+) necessary for jarosite precipitation.

Waters draining from acid sulfate soil landscapes can exhibit a range of colours and clarity. For example, they can be: red/brown from precipitation of iron flocs, white from the formation of aluminium flocs (especially if the pH is suddenly increased, for example, by the introduction of drainage waters into tidal waters), blue-green from dissolved ferrous iron compounds, or, crystal clear because low pH and Al^{3+} can effectively flocculate clays. In still-water conditions, the surfaces of acid sulfate soil-affected waterbodies can develop a brittle, iridescent film formed of iron-oxidising bacteria. Acid sulfate soil drainage waters can often have pH < 3.5 and can be the cause of massive fish kills, the death of invertebrates and benthic organisms, the development of chronic fish diseases, and impaired fish recruitment (Sammut *et al.* 1993).

Acid sulfate soils can also present health hazards to people living in landscapes containing these soils. Ljung *et al.* (2009) found that acid sulfate soils could impact detrimentally on human health. The human health issues were related mainly to the increased mobility of acid and metals from these soils affecting drinking water quality, food production and quality, but also to other issues such as increased dust generation causing respiratory health issues and acidic pools of surface water in acid sulfate soil landscapes providing suitable environments for mosquito breeding.

3.1.3 Occurrence

Estimates of the extent and distribution of acid sulfate soils globally suffer from scant field surveys, inadequate laboratory data, and also the lack of uniform, widely accepted definitions of these materials. Improvements in these areas have, however, led to better quantification of their extent and, in Australia at least, to better mapping of their distribution. Jennings *et al.* (1979) estimated the global extent of acid sulfate soil to be 15 million ha; 20 years later, this estimate was revised upwards to 50 million ha (Ritsema *et al.* 2000). The recent Australian Atlas of Acid Sulfate Soils (Fitzpatrick *et al.* 2008b) has greatly improved our understanding of the extent and distribution of acid sulfate soils within Australia.

The location of these soils is even more significant than their extent. Acid sulfate soils are often concentrated in otherwise densely settled coast and floodplains where development pressures are intense and little suitable alternative land exists for the expansion of farming or urban and industrial development. As well as being commonly found in tropical regions (e.g. Vietnam, Thailand, Indonesia, Malaysia and northern Australia), acid sulfate soils are also commonly found in temperate regions (e.g. USA, Scandinavia and southern Australia). Recent studies have shown acid sulfate soils are widely distributed within the Lower Lakes region of South Australia (e.g. Fitzpatrick *et al.* 2008a; Simpson *et al.* 2008; Sullivan *et al.* 2008, 2010a).

Although acid sulfate soils are often thought of as almost exclusively a coastal issue, acid sulfate soils are also widely distributed in inland areas wherever the general conditions for RIS formation - a ready source of sulfate, iron, and organic matter in reducing waterlogged sediments - are met. In Australia, the large areas affected by human-induced salinity caused by over-clearing of trees and sub-optimal irrigation practices have also been found to be areas affected by the contemporary formation of acid sulfate soil materials (Fitzpatrick *et al.* 1996; Sullivan *et al.* 2002; Fitzpatrick *et al.* 2009).

There is significant spatial variability in the distribution and properties of acid sulfate soils from the micro-scale to the regional scale. Dent (1986) gives examples of soil patterns at different scales that have been unearthed by soil surveys. Surveying acid sulfate soils in tropical tidal environments is often arduous and enlivened by mosquitoes and crocodiles: accordingly, remote sensing has been widely used for these activities.

3.1.4 Analysis

Quantitative methods of analysis are required to support soil survey programs and to provide essential data for modelling the likely response of the land to management options. The required analyses must either be performed in a timely fashion before gross chemical changes take place, or the samples must be preserved quickly by methods such as rapid oven drying or ideally freezing, otherwise, the pH may fall markedly to < 4 within days or weeks.

The methods of sampling, sample preparation, and analysis of acid sulfate soil materials vary widely according to the purpose of the study and the corresponding properties required. The methods of analysis vary from standard wet chemical methods (an authoritative, readily-available reference for these methods is Ahern *et al.* (2004)), standard soil physical methods for properties such as texture, hydraulic conductivity, and bulk density, to X-ray diffraction, X-ray fluorescence, analytical electron microscopy, through to advanced synchrotron-based techniques. In terms of management of acid sulfate soil materials, the Acid-Base Accounting approach has significant advantages over other routine analytical approaches as it allows ready quantification of the acidity hazard, necessary for the rational determination of liming rates and for verification of management practices (Ahern *et al.* 2004).

3.1.5 Minerals and reductive processes

A defining characteristic of sulfidic acid sulfate soils is the presence of significant concentrations of RIS. RIS include iron disulfides (most commonly pyrite (FeS_2) (Pons 1973; Bloomfield and Coulter 1973; van Breemen 1973), lower amounts of other minerals such as monosulfides (e.g. Georgala 1980; Bush *et al.* 2000), greigite (Fe_3S_4) (Bush and Sullivan 1997) and elemental sulfur (S_8) (Burton *et al.* 2006a,b).

The vast majority of RIS in sulfidic acid sulfate soil materials have formed at earth-surface temperatures and pressures under waterlogged, anoxic conditions. Under such conditions, accumulation of RIS species depends on microbially-mediated sulfate reduction, which is itself dependent on organic carbon availability, supply of sulfate, and on the amount of competing electron acceptors including reactive Fe^{III} minerals (Fanning *et al.* 2002). (Note in this report solid-phase species for components with a specific redox state are indicated by superscripted Roman numerals (e.g. Fe^{III}), and individual species in solution are shown with a charge (e.g. Fe^{3+})). These variables influence the activity of dissimilatory sulfate-reducing microorganisms, which include phylogenetically diverse anaerobes that oxidise simple organic compounds or hydrogen using sulfate as an electron acceptor. The overall process of dissimilatory sulfate reduction can be shown, for example, by:

$$CH_3COO^- + SO_4^{2-} + H^+ \rightarrow H_2S + 2HCO_3^- \qquad [3.1]$$

During this process, the sulfur in sulfate is reduced from the S^{6+} oxidation state to S^{2-}. Conditions that are conducive to microbially-mediated sulfate reduction occur in organic-rich coastal and estuarine sediments, such as in tidal marshes and swamps. In such systems, tidal exchange of pore-water supplies sulfate and removes the resultant HCO_3^- produced via the reaction in Eq. 3.1. Tidal flushing thereby prevents the accumulation of pore-water alkalinity. In iron-deficient systems, this tidal flushing can also remove pore-water H_2S and lead to its subsequent oxidation to elemental S (and eventually to sulfate).

In contrast, in soils containing Fe^{2+}, often produced by the activity of ferric iron reducing microorganisms, H_2S may react rapidly to form monosulfide (FeS) precipitates as below:

$$H_2S + Fe^{2+} \rightarrow FeS + 2H^+ \qquad [3.2]$$

The initial FeS phase to form by reaction between H_2S and Fe^{2+} (Eq. 3.2) has proved difficult to characterise, even in well-defined synthetic studies (Rickard and Morse 2005). Recently, such studies have shown that nanoparticulate mackinawite (tetragonal FeS) is the first condensed phase to form through this reaction. In acid sulfate soil materials the occurrence of mackinawite as 5 – 30 nm nanoparticles has been only recently demonstrated (Burton *et al.* 2009). The strong black colour seen in some of these acid sulfate soil materials is largely due to the presence of nanoparticulate mackinawite (Burton *et al.* 2009).

The H_2S produced by microbial sulfate reduction can also react with Fe^{III} contained in ferric oxide and oxyhydroxide minerals such as goethite, to produce elemental sulfur:

$$H_2S + 2FeOOH + 2H^+ \rightarrow S_8 + 2Fe^{2+} + 3H_2O \qquad [3.3]$$

The Fe^{2+} produced via this reaction may then feed into the reaction described by Eq. 3.2 thus also resulting in mackinawite formation. This overall process, termed “sulfidisation” can be represented as:

$$3H_2S + 2FeOOH \rightarrow S_8 + FeS + 4H_2O \qquad [3.4]$$

In the presence of an oxidant, such as O_2, mackinawite is unstable and can transform readily via a solid-state process to greigite:

$$4FeS + 0.5O_2 + 2H^+ \rightarrow Fe_3S_4 + Fe^{2+} + H_2O \qquad [3.5]$$

Although frequently mentioned, there are only few studies (e.g. Bush and Sullivan 1997) that conclusively document the occurrence of greigite in acid sulfate soil materials. On the basis of the limited amount of field data it appears that greigite occurrence is limited to the oxidation front in mildly acidic soils that are subject to an oscillating groundwater table. Mackinawite and greigite are often described as “iron-monosulfide” minerals because they have an Fe:S ratio that is close to 1:1 (Rickard and Morse 2005). These mineral species are defined analytically by their dissolution in HCl to yield H_2S gas and described as acid-volatile sulfide (AVS).

Both mackinawite and greigite have long been implicated as precursors to the formation of iron-disulfides such as pyrite and marcasite. For example:

$$Fe_3S_4 + 2H^+ \rightarrow FeS_2 + Fe^{2+} + H_2 \qquad [3.6]$$

Pyrite can also form without the need for precursory greigite via (1) mackinawite oxidation by polysulfide species (Rickard 1975; Luther 1991) and (2) mackinawite oxidation by H_2S (Rickard 1997; Rickard and Luther 1997). These two pathways of pyrite formation, which involve an intermediate dissolved FeS cluster complex, can be represented overall as:

Polysulfide pathway: $FeS + S_n^{2-} \rightarrow FeS_2 + S_{n-1}^{2-}$ [3.7]

Hydrogen sulfide pathway: $FeS + H_2S \rightarrow FeS_2 + H_2$ [3.8]

Whilst iron monosulfides are widely believed to be an essential precursor to pyrite formation, this is not necessarily always the case. Pyrite can form quite rapidly in the presence of suitable reactive surfaces such as bacterial surfaces (Canfield *et al.* 1998) that serve to overcome a significant supersaturation threshold by providing heterogeneous nucleation sites. Other suitable reactive surfaces include pre-existing pyrite crystals or organic substrates, such as plant material. Accumulation of pyrite in soil can occur rapidly under suitable field conditions (Howarth 1979; Rosicky *et al.* 2004a).

Pyrite is by far the most commonly observed RIS species in sulfidic acid sulfate soil materials. In these materials, pyrite presents a range of distinct crystal morphologies. The most remarkable of these morphologies are framboids (from the French term for raspberry – *frambois*). Pyrite framboids consist of spheroidal aggregates of densely packed, individual microcrystals. Earlier research into the origin of pyrite framboids in sediments pointed towards either a bacterial influence or the magnetic aggregation of precursor greigite crystals. However, it now seems that the formation of framboids is more likely a function of the degree of solution supersaturation with regard to pyrite.

Whilst pyrite is normally the most abundant iron-disulfide in acid sulfate soil materials, marcasite (orthorhombic FeS_2) may occur in specific situations. Acidic conditions (pH < 6) are required for the initial formation of marcasite instead of pyrite. Such conditions occur in waterlogged soils and sediments that are rich in dissolved organic acids, capable of buffering the low pH. For example, marcasite is a common iron sulfide in some peaty acid sulfate soil materials in eastern Australia (Bush *et al.* 2004a).

3.1.6 Minerals and oxidation processes

Pyrite and other iron-sulfide minerals can persist in soils only under anoxic, waterlogged conditions. If these conditions become oxic by, for example excavation of the soils, the iron-sulfide components can undergo a series of oxidation reactions. For example, in the presence of oxygen (and water) pyrite oxidises to ultimately yield sulfuric acid and a poorly soluble Fe^{III} precipitate:

$$FeS_2 + 3.75O_2 + 3.5H_2O \rightarrow Fe(OH)_3 + 4H^+ + 2SO_4^{2-} \quad [3.9]$$

While this reaction shows that exposure to oxygen under moist conditions is the driving force for pyrite oxidation, it neglects the great complexity of reaction steps in the overall oxidation process. This complexity includes a number of possible final iron phases as well as the formation of intermediate sulfoxyanions and elemental S. Chemolithotrophic Fe- and S-oxidising bacteria play an important role in mediating various steps in the overall oxidation process, and in determining the formation and persistence of intermediate S species.

A wide variety of potential phases play a role in determining the iron biogeochemistry following pyrite oxidation. Ferrous iron released in the initial stages of pyrite oxidation may precipitate as Fe^{II} hydroxysulfate minerals (Fanning *et al.* 2002), most importantly melanterite, rozenite and szomolnokite. These phases are readily soluble and are rarely observed in acid sulfate soil materials.

Under continuation of oxidising conditions, the Fe^{2+} released by pyrite oxidation is also subject to oxidation to Fe^{3+}. Whilst the simple oxidation process consumes some acidity, the subsequent hydrolysis of the resulting Fe^{3+} leads to the liberation of acidity. At low pH (e.g. < 4), Fe^{3+} is sufficiently soluble that it may serve as a very effective electron acceptor driving further pyrite oxidation (Moses *et al.* 1987). For this reason, it has been often suggested that rate of Fe^{2+} oxidation to Fe^{3+} may be the rate-determining step in pyrite oxidation.

Partial oxidation of Fe^{2+} to Fe^{3+} can lead to precipitates of mixed valence Fe salts, such as copiapite. This phase is one of the “soluble salts” that may form in acid sulfate soils under prolonged dry conditions (Fanning *et al.* 2002). Dissolution of these minerals during rainfall events may cause a first-flush of stored acidity.

The Fe^{3+} produced via pyrite oxidation also commonly precipitates as a range of Fe^{III} bearing minerals. In acid sulfate soil conditions at pH < 3, and/or in the presence of abundant K^+, jarosite appears to be the predominant Fe^{III} phase, whereas in the pH range of 3 – 4, schwertmannite is an important Fe^{III} phase in acid sulfate soil landscapes (Bigham *et al.* 1992; Sullivan and Bush 2004). The widespread occurrence of schwertmannite in acid sulfate soils has only been confirmed relatively recently (Sullivan and Bush 2004).

Schwertmannite is metastable and over time transforms, via dissolution-reprecipitation, to form a range of Fe^{III} oxyhydroxides (Bigham *et al.* 1996). These include ferrihydrite, lepidocrocite and goethite, with the latter being most stable. The transformation of schwertmannite (an Fe^{III} oxyhydroxysulfate) to these Fe^{III} oxyhydroxides involves the hydrolysis of Fe^{III} and the liberation of acidity. As a consequence, schwertmannite transformation can suppress pH long after the initial source of acidification (i.e. pyrite) has been consumed.

The type of secondary minerals formed from the Fe released during pyrite oxidation determines to a large extent the amount of acidity expressed (Dold and Fontbote 2001). For example, if the released Fe precipitates as goethite or ferrihydrite from the Fe^{3+} produced by sulfide oxidation, then 3.0 moles of H^+ are formed for every mole of Fe^{3+} hydrolysed from pyrite. However, if hydrolysis is incomplete and jarosite is formed, only around 2 moles of H^+ is released for every mole of Fe^{3+} hydrolysed from pyrite (van Breemen 1976). If schwertmannite is formed then approximately 2.575 moles of H^+ is released for every mole of Fe^{3+} hydrolysed from pyrite (Piene *et al.* 2000). The 'stored' acidity in these two minerals is important as the Fe^{3+} in both jarosite and schwertmannite can undergo further hydrolysis and result in the release of acidity into the surrounding environment (Dold and Fontbote 2001; Sullivan and Bush 2004).

3.1.7 Pyrite oxidation

The oxidation of FeS_2 depends on factors including the supply of O_2, the availability of water, and the physical properties of FeS_2. Pyrite oxidation generates acid and releases heat; consequently, the acidity and temperature of the surrounding solution will affect the overall reaction rates. The oxidation of FeS_2 in the environment is usually ultimately determined by the supply of O_2. Models describing FeS_2 oxidation are often based on the assumption that all other constituents required for the oxidation process are freely available except for O_2, which is supplied through the porous material from the atmosphere (Dent and Raiswell 1982; Davis and Ritchie 1986; Pantelis and Ritchie 1991; Bronswijk *et al.* 1993). The rate of pyritic oxidation is often assumed to be a linear function of the dissolved O_2 concentration (Bartlett 1973; Braun *et al.* 1974) but the Michaelis-Menton equation has also been adopted (Liu *et al.* 1987; Tan 1996).

Temperature, which influences both chemical and microbial oxidation, is an important factor in determining the oxidation rate of pyritic materials. Biological oxidation only occurs between 0°C to 55°C (optimum 25-45°C) (Lundgren and Silver 1980) but chemical oxidation can take place above this temperature. Jaynes *et al.* (1984) modelling acid generation in mine spoil, took account of rates of diffusion of both O_2 and Fe^{3+} and also the activity of the bacteria generating Fe^{3+}, which was estimated from available energy and deviations from ideal temperature, solution pH and O_2 concentration. Pantelis and Ritchie (1992) introduced a ceiling temperature (100°C) above which microorganisms cease to be effective as catalysts in FeS_2 oxidation. The influence of temperature on oxidation rate follows the empirical Arrhenius equation (Ahonen and Tuovinen 1991). Because the pyritic oxidation reaction is exothermic, temperature rises depending on the rate of reaction and thermal properties of the bulk soil. In acid sulfate soils, temperature profiles might be used to determine pyritic oxidation rates but because pyritic layers are typically shallow (1-2 m below the surface), distinguishing between the calorimetric contribution from pyritic oxidation and solar radiation may prove difficult.

3.1.8 Hazards from acid sulfate soils

3.1.8.1 Acidification

Oxidation of RIS is the primary cause of the extreme acidification that characterises sulfuric acid sulfate soil materials. By definition, the pH of sulfuric acid sulfate soil is < pH 4 (or < 3.5 according to the particular soil taxonomy being employed) but values of pH < 3 in actively oxidising soils are frequently observed (Dent 1986). Such extreme acidification significantly alters the soil chemistry, and can render it hostile to plants and create a source of contamination to groundwater and surface water run-off. The acid produced can react with clay minerals and oxides to release silica and metal ions, principally aluminium, iron, potassium, sodium and magnesium (Nriagu 1978). Other ions such as metals and metalloids can also be released (van Breemen 1973; Sammut *et al.* 1996b; Åström 2000).

The impacts of severe acid sulfate soil acidification on agricultural crops have been well documented (Dent 1986). Many crop plants are highly sensitive to low pH soil conditions and acidification can greatly reduce yields and in extreme cases, cause complete crop failure. In addition, the formation of acidic secondary iron minerals such as jarosite and schwertmannite can significantly reduce the availability of nutrients such as phosphorus and nitrogen. Farmers have tried many different approaches to ameliorate acidity by techniques, such as the addition of neutralising agents, soil amendments, organic mulch and reconfiguring plant beds to enhance the leaching of acidic products from the soil (Dent 1986). Success in cropping acid sulfate soil landscapes is mixed and highly dependent on the initial degree of acidification and capacity of the specific crop types to tolerate acidic conditions. Acidity severely constrains farming on acid sulfate soils with some exceptions (White *et al.* 1997).

Aluminium toxicity is a significant issue linked to acid sulfate soil acidification for terrestrial plants (Dent 1986) and downstream aquatic flora and fauna (Sammut *et al.* 1996a,b). The solubility of Al is critically dependent on pH, only becoming soluble at environmentally significant levels at approximately pH < 5. Soluble aluminium affects plant growth primarily by disrupting root function and is a major concern for food production and agricultural income for rural and regional communities. Severe environmental impacts can occur when acidic Al-rich leachate from acid sulfate soil enters water bodies. The more acute ecological impacts of acid sulfate soil acidification in waterways include fish kills (Sammut *et al.* 1996a,b; Callinan *et al.* 2005), loss of native aquatic macrophytes and fauna followed by invasion by acid tolerant species (Sammut *et al.* 1996a), mass mortality of crustaceans and shell fish (Simpson and Pedini 1985), and loss of benthic communities (Corfield 2000). Sub-lethal exposure of fish to acidity has also been linked to an increased susceptibility to skin diseases (Callinan *et al.* 2005), whereas depletion of alkalinity has been linked to poor shell development in crustaceans (Dove *et al.* 2007).

A range of potentially longer-term impacts on aquatic ecosystems arising from acid sulfate soil leachate include: disturbance to fish reproduction and recruitment, acidity barriers to fish migration, decline of primary food web, reduction of species diversity, and long term habitat degradation (Sammut *et al.* 1996a,b). In assessing the likely impacts of acid sulfate soil acidification on downstream aquatic environments, it is necessary to consider the vulnerability of the aquatic ecosytems, the duration and frequency of acidification episodes, the potential intensity of acidification based on the properties and quantities of the acidic leachate.

3.1.8.2 Iron mobilisation

Ferrous iron is a primary product of pyrite oxidation. At high pH values (pH > 7), Fe^{2+} is chemically rapidly oxidised to Fe^{3+} (Cornell and Schwertmann 2003). At lower pHs (i.e. pH < 4.5), the oxidation of Fe^{2+} to Fe^{3+} is catalysed by acidophilic lithotrophic bacteria such as *Acidithiobacillus ferroxidans* (Pronk and Johnston 1992), *Thiobacillus ferroxidans* and *Leptospirillium ferroxidans* (Johnson 1993). The oxidation of Fe^{2+} has direct environmental consequences arising from the liberation of acidity and the formation of secondary iron minerals that can control soil and water geochemistry.

Accumulations of iron minerals are ubiquitous in acid sulfate soil landscapes. The precipitation and mineralogy of secondary iron minerals has been reviewed elsewhere in this report and in detail by Alpers and Nordstrom (1999) and Cornell and Schwertmann (2003).

Understanding the types of iron precipitates that form in acid sulfate soil landscapes during oxidation is important as particular iron mineral phases can exercise a major influence on the environment (e.g. Dold and Fontbote 2001; Sullivan and Bush 2004). In a study of surface iron precipitate accumulations associated with waterways in acid sulfate soil landscapes, Sullivan and Bush (2004) found schwertmannite was the dominant secondary iron mineral. The schwertmannite occurred as coatings on vegetation, accumulations in low depressions and as iron flocs adhering to surfaces in acidified waterways. The potential acidity within the schwertmannite was high, ranging between 1,900 - 2,580 mol H^+ t^{-1}, indicating that the schwertmannite was a substantial intermediate store of acidity within these acid sulfate soil landscapes. The retained acidity within both schwertannite and jarosite have recently been included into the quantitative assessment of the net acidity of sulfate soil materials (Ahern *et al.* 2004).

Iron precipitates in the form of iron flocs within the water column also are known to directly affect gilled organisms, smother benthic communities and aquatic flora (Sammut *et al.* 1996a,b), diminish the aesthetic values of recreational waterways, and threaten estuarine and marine environments (Powell and Martens 2005). The accumulation of iron flocs has also been linked to contemporary sulfur cycling and the formation of monosulfidic black ooze (MBO) accumulations in acid sulfate soil affected waterways.

3.1.8.3 Metal and metalloid mobilisation

Mobilisation of metals and metalloids to soil pore-waters from acid sulfate soil can constitute a major environmental hazard (e.g. Åström *et al.* 2001; Burton *et al.* 2006c, 2008). Metals that have been reported at levels exceeding accepted environmental protection thresholds in acid sulfate soil include Al, As, Ba, Cd, Co, Cr, Cu, Fe, Mn, Ni, Pb, Sb, V and Zn (e.g. Åström *et al.* 2001; Macdonald *et al.* 2004a; Burton *et al.* 2006c). Metals in natural soils occur within mineral phases or as charged ions or ionic complexes sorbed to reactive surfaces (Åström 1998; Fältmarsch *et al.* 2008; Claff *et al.* 2010). Acidification can greatly enhance the solubility of metals, promoting their subsequent release from mineral phases by dissolution or cation exchange. The pH dependence of metal release has received considerable attention (Sammut *et al.* 1996b; Wilson *et al.* 1999; Åström 2001; Preda and Cox 2001; Macdonald *et al.* 2004a; Simpson *et al.* 2010), and there are strong similarities in metal release within acid sulfate soil and acid mine drainage systems (Evangelou and Zhang 1995).

Numerous studies have documented the impacts from soluble metals on crop production (e.g. Dent 1986), terrestrial habitats (van Breemen 1973), and more recently, attention has turned to their impact on aquatic environments (Sammut *et al.* 1996a,b; Wilson *et al.* 1999; Johnston *et al.* 2004; Callinan *et al.* 2005). Gilled organisms are particularly vulnerable to soluble metals and metal mobilisation can lead to rapid mortality rates in these species (Simpson and Pedini 1985; Sammut *et al.* 1995; Sammut *et al.* 1996a,b). Studies of the effects of metals on shellfish (oysters) revealed longer term, more chronic impacts on their growth and survival (Dove *et al.* 2007). However, the longer term impacts of metal release from acid sulfate soils to surrounding aquatic environments are poorly understood. Although elevated metal concentrations can be toxic to both aquatic flora and fauna, the consequences of these conditions to algal and phytoplankton production are largely unknown, as is the potential for their bioaccumulation (Macdonald *et al.* 2004a).

Most reports on the impacts arising from metal release from acid sulfate soil focus on the consequences of metal mobilisation under oxic-acidifying conditions. However, metals can also be mobilised when sulfuric acid sulfate soils are subject to prolonged inundation, resulting in the development of anoxic reducing conditions. Acid sulfate soil occurs in low-lying floodplain environments and therefore, is subject to periodic water logging and oscillating redox conditions. The processes of metal mobilisation and behaviour of metals is very different under these conditions. The behaviours of iron and arsenic is a good example of metal mobilisation from acid sulfate soil materials following inundation. Accumulations of iron minerals in acid sulfate soils are often concentrated at the ground surface and include goethite, ferrihydrite, jarosite and schwertmannite. These iron minerals often have a large surface area and are a significant sink for the sorption of metals. Under reducing conditions, these iron oxides are prone to microbial reductive dissolution (van Breemen 1973; Burton *et al.* 2007). Microbial iron reduction triggers three major changes that affect metal mobilisation. Firstly, it results in the dissolution of Fe^{3+} and transformation to Fe^{2+}, causing the co-release of other metals sorbed to the Fe mineral surfaces. Secondly, the microbial reduction process is proton-consuming and when accompanied by the formation of bicarbonate as a by-product of microbial respiration, can result in *in situ* neutralisation (Blodau 2006). The increase in pore-water pH generally reduces the solubility of divalent metals and aluminium. It also facilitates the recently identified Fe^{2+} catalysed transformation of poorly crystalline iron oxide minerals to more crystalline phases (e.g. rapid transformation of schwertmannite to goethite). Although the overall consequences of these rapid mineral transformations on metal mobility are yet to be quantified (Burton *et al.* 2010), the mobility of some metals and metalloids can increase under these conditions. For example, arsenic is most soluble at around pH 5 and when associated with iron oxides in acid sulfate soil materials, is readily mobilised at the onset of microbially-mediated iron reduction (Burton *et al.* 2008). Severe arsenic contamination of groundwater and surface water is occurring as the result of such processes in acid sulfate soil landscapes, such as parts of the Mekong delta. It is important to recognise that metals and metalloids can have a significant impact in acid sulfate soil landscapes both 1) when acid sulfate soil are allowed to oxidise and acidify, but 2) also following the prolonged inundation of previously oxidised, iron-enriched acid sulfate soil.

3.1.8.4 Deoxygenation of waterbodies

Acute deoxygenation of estuaries, lakes, rivers and drainage channels is a major contributor to catastrophic fish kills (Johnston *et al.* 2003; Howitt *et al.* 2007; Hamilton *et al.* 1997). Many potential factors contribute to deoxygenation events, and they are known to impact a very wide range of environments. Severe deoxygenation of waterways within acid sulfate soil landscapes have been linked directly to the behaviour of acid sulfate soil materials (e.g. Sullivan and Bush 2000).

Deoxygenation results when solids and aqueous compounds with a capacity to react with dissolved oxygen, enter water bodies and consume oxygen more rapidly than it can be replenished. The magnitude of deoxygenation depends on the spatial scale of the event, its persistence and its intensity. Aquatic ecosystems require dissolved oxygen concentrations generally greater than 85% saturation for lowland rivers (e.g. ANZECC/ARMCANZ 2000). Native fish and other large aquatic organisms are known to survive on dissolved oxygen concentration of as little as 2 mg L^{-1}, but may become stressed below 4 - 5 mg L^{-1} (Hladyz and Watkins 2009). In recent studies of a major estuarine river system in Eastern Australia affected by deoxygenation, Wong *et al.* (2010) found deoxygenation was confined to downstream acid sulfate soil confluences and occurred during the later phase of the flood recession.

Anaerobic decomposition of floodplain vegetation in backswamps can be a primary process leading to the deoxygenation of large volumes of waters in acid sulfate soil landscapes (e.g. Johnston *et al.* 2003; Wong *et al.* 2010). Decomposition of flood-intolerant vegetation in drained acid sulfate floodplains can lead to the formation of “blackwater” - a colloquial term used to describe anoxic stagnant floodplain water that develops a distinctive dark colour as a result of the accumulation of dissolved organic carbon compounds. Blackwater is typically anoxic, has a high chemical oxygen demand (COD) and high dissolved Fe concentrations, and rapidly consumes dissolved oxygen when it discharges to main water bodies (Johnston *et al.* 2003). Extensive floodplain drainage networks in acid sulfate soil areas can significantly enhance the transport of hypoxic backswamp blackwater to main river channels, thereby enhancing the magnitude and duration of consequent estuarine deoxygenation.

The propensity for monosulfidic black ooze (MBO) to accumulate and be mobilised by floodwaters in drainage channels has also been identified as a contributing factor to deoxygenation in acid sulfate soil areas (Sullivan *et al.* 2002; Bush *et al.* 2004b,c; Burton *et al.* 2006b,d).

The chemistry of estuarine waters during hypoxic events has indicated elevated concentrations of redox sensitive species associated with acid sulfate soil (e.g. Fe^{2+}, dissolved Mn, and elemental sulfur) (Wong *et al.* 2010), further implicating acid sulfate soil and MBO materials in deoxygenation events.

The role of MBO in deoxygenation and latter acidification in acid sulfate landscapes has only recently been discovered (Sullivan and Bush 2000; Sullivan *et al.* 2002). Burton *et al.* (2006c) have described the oxidation dynamics of MBO when mobilised into oxygenated water. The oxidation of MBO follows a two step process with oxygen consumption occurring with each step (after Burton *et al.* 2006c):

Step 1

$$FeS \begin{cases} Fe^{2+} + 0.5O_2 + 1.5\,H_2O \rightarrow 2H^+ + FeOOH \\ S^{2-} + 0.5O_2 + 2H^+ \rightarrow H_2O + 0.125S_8 \end{cases} \qquad [3.10]$$

Step 2

$$0.125S_8 + 1.5\,O_2 + H_2O \rightarrow SO_4^{2-} + 2H^+ \qquad [3.11]$$

The first step is a rapid chemical reaction of iron monosulfide minerals with oxygen, forming iron oxides and elemental sulfur. This initial oxygen-consuming step does not affect pH and is therefore non-acidifying. It is probably for this reason that the role of MBO in deoxygenation was overlooked until recently. Acidification associated with MBO oxidation can result from the second step, the microbially-mediated oxidation of elemental sulfur, when oxygen is available.

Elevated elemental sulfur concentrations in deoxygenated waterways in acid sulfate soil landscapes may be a useful indicator of MBOs as a contributing cause to deoxygenation, although elemental sulfur can also form as a primary product of H_2S oxidation, and may be present within MBOs prior to flood events (Burton *et al.* 2006a,b).

3.1.8.5 Production of noxious gases

Anthropogenic and biogenic sulfur-containing gases have important impacts on global climate change (Charlson *et al.* 1987; Lohmann and Feichter 2005), and atmospheric acid-base chemistry (Berresheim *et al.* 1995). Coastal estuarine and marine environments are major emitters of biogenic H_2S (Aneja 1990; Bates *et al.* 1992). Emissions of H_2S, and more recently sulfur dioxide (SO_2), from floodplains have been linked to acid sulfate soil management (Macdonald *et al.* 2004b).

Hydrogen sulfide is a highly noxious gas that causes distress to humans (Luther *et al.* 2003; EPA 2003) and threatens aquatic organisms (Diaz and Rosenberg 1995; Rabalais 2002). As described by Equation 3.1, H_2S is produced by sulfur-reducing bacteria under anoxic conditions. Even at small concentrations, H_2S can be detected by its characteristic rotten-egg odour. In acid sulfate soil landscapes, periodically inundated soil surfaces, shallow waterways and field drains where stratified anoxic conditions can develop, are all situations conducive to sulfate reduction and the formation of H_2S (Dent 1986). However, H_2S is an unstable phase and its persistence in water and soil and ultimate gaseous emission is highly constrained by a wide range of oxidants in natural sediments and water bodies (Jørgensen *et al.* 1991). These oxidants include O_2, NO_3, Mn and Fe oxyhydroxides (Froelich *et al.* 1979; Luther *et al.* 1997). Due to their abundance in acid sulfate soil, iron oxides (Millero *et al.* 1987) are a particularly effective oxidant of H_2S, a process leading to the formation of iron sulfides as described previously. Hydrogen sulfide becomes a problem when the rate of its formation exceeds the catalytic oxidative capacity of the sediments and water bodies to eliminate its gaseous emission. An excess of labile carbon and stagnant water bodies create conditions that favour H_2S emissions in acid sulfate soil landscapes (Rozan *et al.* 2002).

Partially oxidised RIS-containing acid sulfate soil materials are a known source of SO_2. Macdonald *et al.* (2004b) quantified SO_2 flux from agricultural acid sulfate soils using both ground chamber and micro metrological methods. In this study, the rates of SO_2 emission from the soil was closely linked to soil moisture and evaporative flux, leading the authors to conclude that acidic dissociation of sulfite (SO_3^{2-}) occurring within the near-surface soil pore-water was probably the major source of SO_2. The precise mechanisms for SO_2 formation in acid sulfate soil require resolution: bacterial processes that utilise sulfate (Saltzman and Cooper 1989) or organo-sulfur compounds (Freney 1961) are both possibilities. From relatively few measurements, Macdonald *et al.* (2004b) estimated global SO_2 emissions from acid sulfate soil to be 3.0 Tg S yr^{-1}, ~ 3% of global anthropogenic emissions.

3.1.8.6 Scalding of acid sulfate soil landscapes

Scalded (i.e. non-vegetated) land surfaces can be an extreme symptom of land degradation and in low-lying acid sulfate soil landscapes can extend for hundreds of hectares, impacting the environment, and those who live and rely on these areas. Scalded acid sulfate soil land is environmentally damaging, agriculturally unproductive and difficult to rehabilitate. There are a multitude of causes for the complete and prolonged failure of vegetation to establish. In acid sulfate soil landscapes, extreme acidification and/or salinisation are often involved with the initiation of scalds (Rosicky *et al.* 2004a,b). Peat fires arising from the desiccation of low-lying backswamps can also lead to the formation of scalds, as can the prolonged inundation of low-lying areas with acidic-aluminium-iron rich and shallow surface waters.

The size and condition of scalds vary considerably, spatially and temporally. In a broad study of scalds along the east coast of Australia, Rosicky *et al.* (2004a), found that even relatively minor changes such as a shift to wetter conditions, could instigate the rapid growth of acid tolerant plants such as spike-rush (*Eleocharis acuta*). The establishment of such re-vegetation typically would advance from the edge of scald, only to die off and recede when drier conditions returned.

Rosicky *et al.* (2004a,b) found that the surface soil layers of scalds experienced extreme acidification (pH < 3), evaporative accumulation of acidic salts and metals (Al, Fe), high salinities caused by the accumulation of evaporative salts (e.g. gypsum), and accumulations of iron minerals (e.g. schwertmannite, ferrihydrite, goethite and jarosite). Combined with other stresses such as grazing pressure and frosts, such soil conditions generally prevent the long-term establishment of vegetation.

The primary goal for restoring scalds is to establish persistent vegetation. Strategies for revegetating scalds generally revolve around improving the surface soil layers by practical agricultural intervention. Techniques that have been demonstrated to work include: the exclusion of stock, the use of ridges and furrows, mulching, liming, addition of fertiliser, pre-treating seed with nutrients and neutralising agents, and more recently water management practices that create and maintain wetter conditions. Of particular interest are the simpler interventions such as ridging and furrowing. This remediation involves the forming of ridges and furrows using cultivation, and especially when combined with a mulch layer (e.g. straw), has proven very effective in facilitating the establishment of vegetation. Ridges and furrows establish different micro-habitats, with the water-tolerant species occupying the wetter furrows (Rosicky *et al.* 2006). A similar approach for food crop production on acid sulfate soils has been used by farmers in South-East Asia for decades (Dent 1986).

More recently, landholders have begun experimenting with watertable manipulation to provide more persistent wetter conditions to enable plant establishment on scalds. Excessive drainage is generally the most important primary driver of acid sulfate soil scald formation and strategies that reduce evaporation from bare areas and maintain or raise watertables in the near vicinity of scalds, can contribute to their restoration and revegetation. The shallow ponding of fresh water can trigger rapid and complete re-vegetation of scalds (Rosicky *et al.* 2004b).

3.1.9 Inundation of acid sulfate soils

Inundation with freshwater has often been proposed to improve the water quality in acid sulfate soil landscapes (Dent 1986), however, the response of acid sulfate soils to submergence is reported to be highly variable (Ponnamperuma *et al.* 1973; Tuong 1993; Konsten *et al.* 1994; Johnston *et al.* 2005). In addition to aiming to prevent further sulfide oxidation, inundation often removes the acidity in partially-oxidised sediments as the acidity gets consumed from the reduction of iron (III) oxides, sulfates and other oxidised species by anaerobic bacteria (Dent 1986). In most moderate acid soils, reduction causes the pH to rise to approximately 7 within a few weeks. However, some acid sulfate soils may not reach a pH of more than 5 after months of submergence (Ponnamperuma 1972). Factors which have been identified as being responsible for slow reduction, and hence a slow increase in pH, include a low content of easily oxidisable organic matter, a low content of easily reducible iron, a low dissolved sulfate concentration, the adverse effect of low pH on activity of microbes, and a poor nutrient status (Ponnamperuma 1973; van Breemen 1976; Berner 1984).

While the increase in pH from reduction may improve water quality, recent studies have shown that the inundation of sulfuric soil materials from the Lower Lakes with freshwater was capable of mobilising high concentrations of contaminants (Simpson *et al.* 2008, 2010; Sullivan *et al.* 2008). The inundation of sulfuric soil materials from the Lower Lakes lead to the chemical reduction of iron minerals and caused the mobilisation of high concentrations of metals (i.e. Al, As, Cu, Mn, Ni, Ag, Cd, Cr, Co) and nutrients (i.e. NH_3, NO_X) (Sullivan *et al.* 2008). Sullivan *et al.* (2008) also found that while oxic suspensions of MBOs from the Lower Lakes did not result in acidification, there was still the mobilisation of various metals and nutrients to high concentrations.

A recent study by Sullivan *et al*. (2010a) examined the response of exposed Lower Lakes soils to rewetting with seawater and River Murray water. The study found the response of the inundating waters to the underlying soils varied considerably in terms of pH and alkalinity. While the inundation of most sediments did not appreciably acidify the inundating waters, inundation by seawater generally had a greater initial acidification effect than by River Murray water suggesting that the higher alkalinity of the seawater was insufficient (under the experimental conditions) to overcome the additional exchange of acidity from the lake soils caused by the higher salinity of the seawater.

By simulating inundation of Lower Lakes soil materials, Sullivan *et al*. (2010a) identified the availability of organic carbon as a major limiting factor to sulfate reduction. Consequently, bioremediation of Lower Lakes sites through enhancing organic carbon availability has been identified as a potential management option. The current study examines various revegetation methods aimed at increasing the availability of organic carbon so as to facilitate sulfate reduction and, consequently, enable improved management of acid sulfate soil materials in the Lower Lakes.

3.2 Introduction to this study

As a result of prolonged drought, combined with management practices upstream in the Murray-Darling catchment, the Lower Lakes of Lake Alexandrina and Lake Albert have recently experienced their first major drying phase since the introduction of barrages more than 50 years ago (Simpson *et al.* 2008; Sullivan *et al.* 2008). Concurrently, it has recently been identified that the Lower Lakes are also being impacted by the presence of acid sulfate soil materials (Fitzpatrick *et al.* 2008a). In considering management options for this problem, Sullivan *et al*. (2010a) simulated inundation of Lower Lakes soil materials with seawater and river water. Among other key findings, the study identified that the major factor limiting sulfate reduction in the Lower Lakes sediments was the availability of organic carbon, and given the potential importance of sulfate reduction in relation to critical sediment/water aspects (e.g. the development of alkalinity in the sediments), Sullivan *et al*. (2010a) recommended further investigations of the practical options of enhancing the availability of organic carbon in the Lower Lakes environment. The current study examines various bioremediation options aimed at facilitating sulfate reduction and, consequently, remediation of often strongly acidified acid sulfate soil materials around the drought-exposed margins of the Lower Lakes.

3.3 Sampling strategy

As mentioned previously (Section 1.0), there are two components to this study including a field component and a laboratory component. The field component addresses contemporary conditions in the lakes and assesses sulfate reduction and alkalinity generation in the subsurface sediments arising from leaching of soluble organic matter - derived from bioremediation - into the subsoil. The laboratory component assesses potential sulfate reduction and alkalinity generation arising from bioremediation as a consequence of inundation.

In this study sediments were collected from four sites around the Lower Lakes including Waltowa, (east Lake Albert), Poltalloch (east Lake Alexandrina), Tolderol (west Lake Alexandrina) and Campbell Park (west Lake Albert). The locations of the four sediment sampling sites are shown below in Figure 3-1.

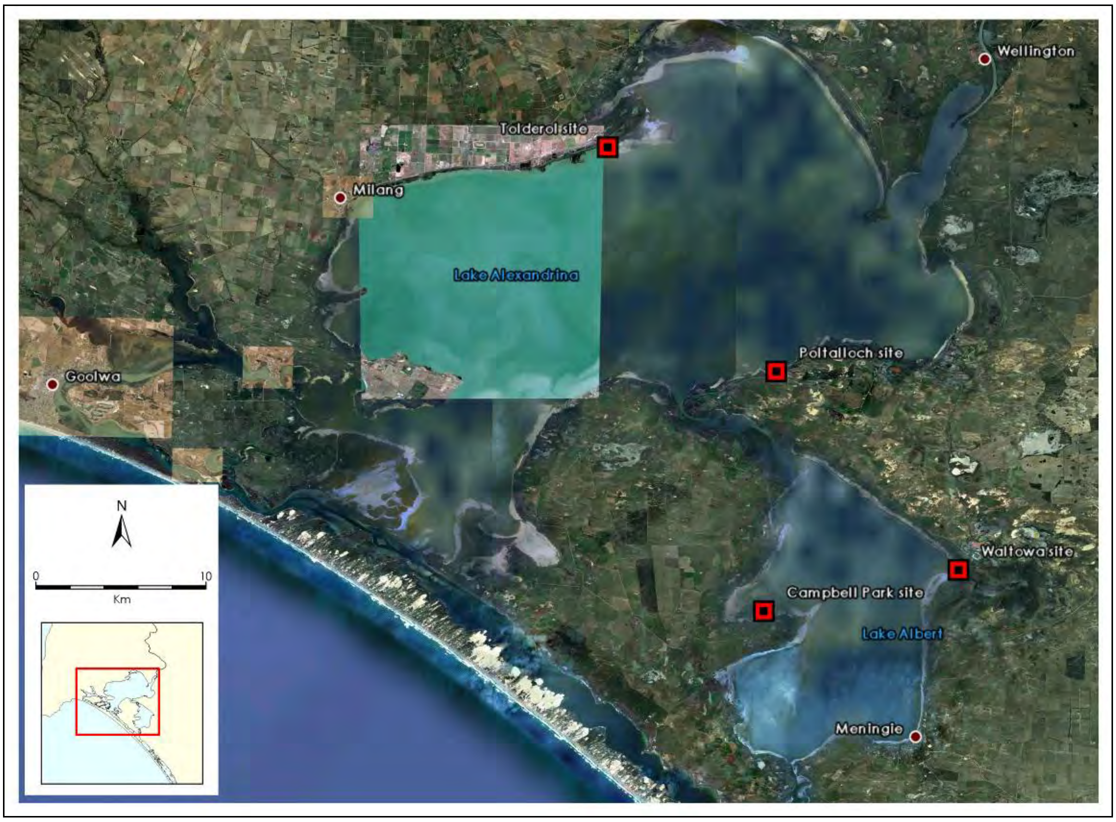

Figure 3-1. Map showing sediment sampling sites in the Lower Lakes.

When this project was planned and approved, the widespread rainfall that was experienced in the Murray-Darling Basin that lead to the relatively rapid refilling of the Lower Lakes was not apparent and could not have been reasonably anticipated. Accordingly, the project was designed to capture both the processes operating due to bioremediation during conditions both pre-filling of the lakes as well as post-filling. The field trials were designed primarily to examine the effects of bioremediation without lake filling occurring, whereas the column experiments were primarily designed to examine the latter situation, to provide data on which to predict the effects of bioremediation when the lakes refilled.

After the initial sampling of the trial sites in May 2010 to establish baseline conditions, prior to the seeding and planting phases of the planned bioremediation, heavy rains were experienced in the Murray-Darling Basin that lead to the relatively rapid refilling of the Lower Lakes. By August 2010 sampling the seeded treatment sites at both the Tolderol and Poltalloch sites were inundated without establishment of either the seeded or planted bioremediation vegetation. At the Campbell Park site the heavy rains had caused severe sheet erosion, with all of the seeded area planned for the trial being scoured before vegetation could be established.

These events inhibited the establishment of the vegetation on some of the recently seeded areas necessitating, after discussion with the representatives of the South Australian Department of Environment and Natural Resources (DENR) several of the planned trial sites not being able to offer the required information on the effects of bioremediation on sulfate reduction etc and appropriate modification to the sampling program from August 2010 to provide the required data.

The Waltowa site was unaffected by the changed conditions and the three treatment sites (phragmites, cotula, and juncus) remained as originally planned.

At the Campbell Park site one 2010 seeded area at near the original treatment sites had not been eroded by the heavy rainfalls and was being successfully revegetated by the plant species arising from the seeding operations. This new site was chosen as the bioremediated site, and a new adjacent scalded site was chosen to provide suitable comparison.

At the Poltalloch site where the 2010 seeded site was inundated prior to revegetation, two treatment sites were chosen to include: 1) an area of natural revegetation and 2) an adjacent comparison area of natural revegetation with planted juncus seedlings.

At the Tolderol site where the 2010 seeded site was inundated prior to revegetation, two treatment sites were chosen to include: 1) an area of revegetation by the Bevy rye arising from the 2009 seeding and 2) an adjacent scald comparison area.

The high level consequence of the relatively rapid refilling of the Lower Lakes during mid 2010 and the resulting required experimental changes is that the field experiments yielded data on the effects of bioremediation during lake refilling whereas the column experiments provided data to help inform the processes occurring in the field via closely controlled inundation conditions.

The nine treatment/locations that were examined between May 2010 and February 2011 are summarised in Table 3-1.

Table 3-1. Summary of the treatments examined at each site in the Lower Lakes.

Site	**Treatment**
Waltowa	i. Established *Phragmites*
	ii. Established *Cotula*
	iii. Established *Juncus*
Poltalloch	i. 2010 planted *Juncus* into 2009 plantings of Bevy rye
	ii. 2009 seedings of Bevy rye
Tolderol	i. Control (no bioremediation)
	ii. 2010 planted *Juncus* into 2009 plantings of Bevy rye
Campbell Park	i. Control (no bioremediation)
	ii. 2010 seeded with Bevy rye and *Puccinellia*

3.4 Lower Lakes site locations and characteristics

Maps showing the sampling locations and photographs of the landscape at each site are presented in Sections 3.4.1 to 3.4.4.

3.4.1 Waltowa, east Lake Albert site characteristics

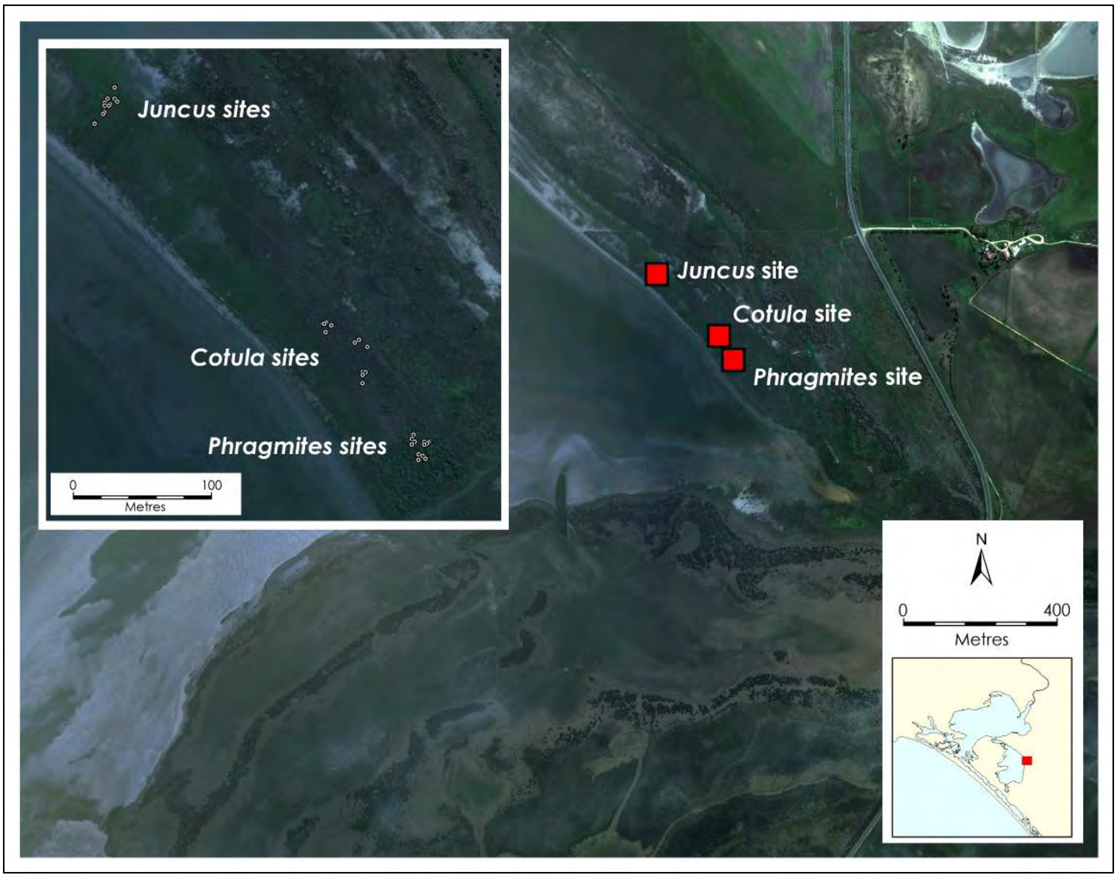

Figure 3-2. Waltowa sampling locations.

Figure 3-3. *Phragmites* at Waltowa including S reduction around root in August 2010 (left) and in February 2011 (right). Profile descriptions are presented in Appendix 1.

Figure 3-4. ***Cotula*** **in foreground at Waltowa in August 2010 (left) and sampling** ***Cotula*** **site in February 2011 (right). Profile descriptions are presented in Appendix 1.**

Figure 3-5. ***Juncus*** **at Waltowa in August 2010 (left) and sampling** ***Juncus*** **site in February 2011 (right). Profile descriptions are presented in Appendix 1.**

Figure 3-6. Sulfate reduction around ***Phragmites*** **roots at ~20 cm depth (left) and around** ***Juncus*** **roots at ~20 cm depth (right) in February 2011.**

Figure 3-7. Stirred up MBO at *Cotula* site outside *Phragmites* in February 2011.

3.4.2 Poltalloch, east Lake Alexandrina site characteristics

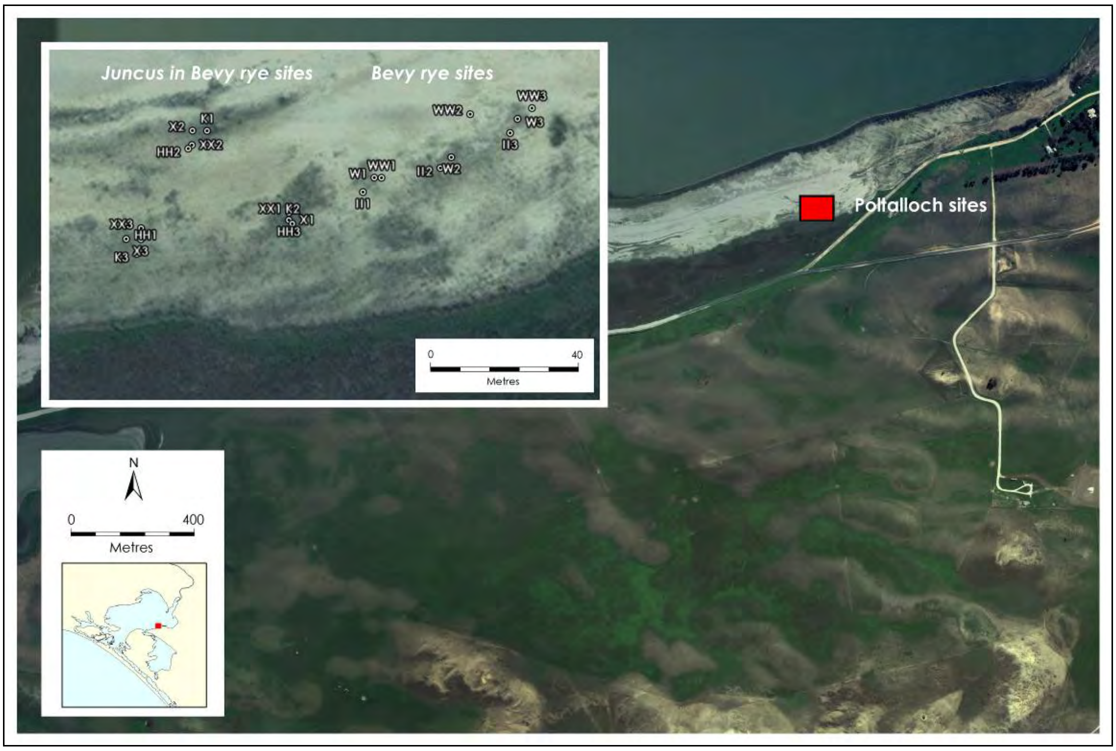

Figure 3-8. Poltalloch sampling locations.

Figure 3-9. Poltalloch Bevy rye/*Puccinellia* site (left) and site to be planted with *Juncus* (right). Profile descriptions are presented in Appendix 1.

Figure 3-10. Unvegetated site at Poltalloch (left), and an example of flooding at Poltalloch in August 2010 (right). Profile descriptions are presented in Appendix 1.

Figure 3-11. Flooding at Poltalloch in February 2011 (left), and filming at Poltalloch in February 2011 (right). Profile descriptions are presented in Appendix 1.

3.4.3 Tolderol, west Lake Alexandrina site characteristics

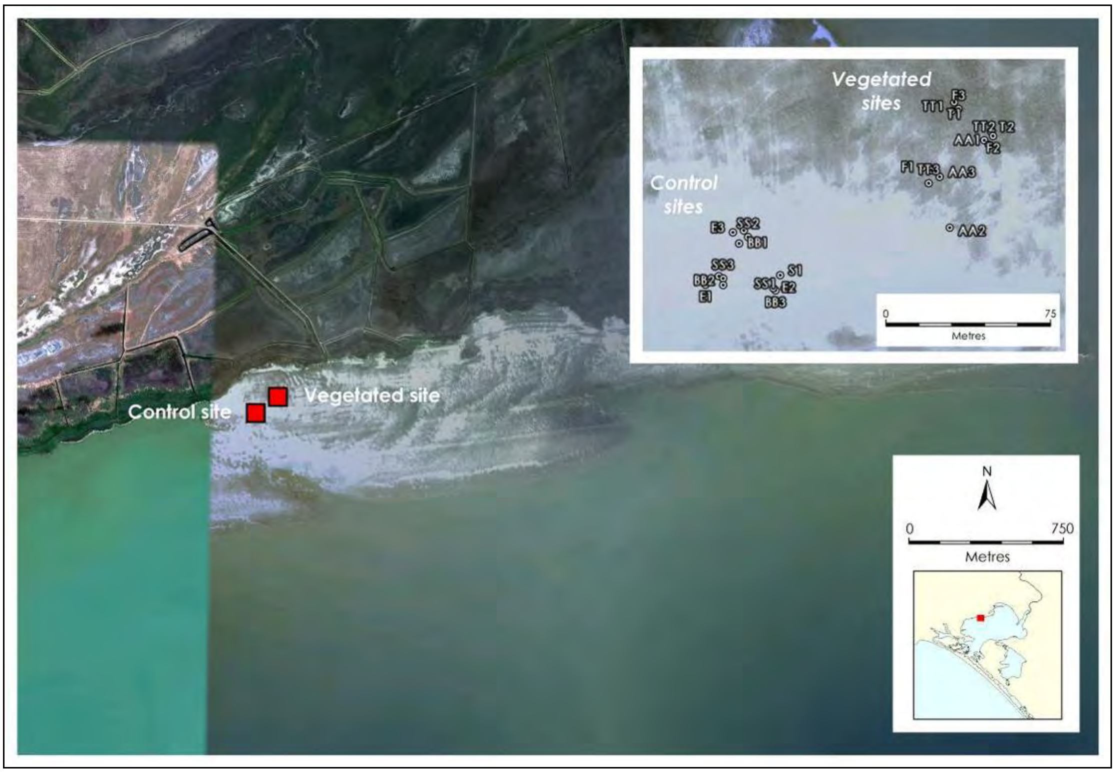

Figure 3-12. Tolderol sampling locations.

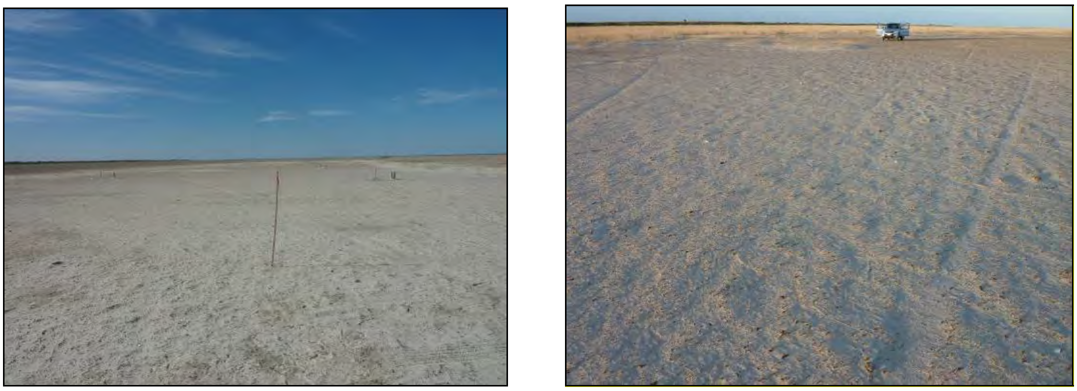

Figure 3-13. Control (left) and unvegetated site to be seeded shortly after sampling with Bevy rye and *Puccinellia* (right). Profile descriptions are presented in Appendix 1.

Figure 3-14. *Juncus* in Bevy rye site at start of project (left) and during subsequent flooding in August (right). Profile descriptions are presented in Appendix 1.

Figure 3-15. Sampling at Tolderol in November 2010 (left) and cores collected in November 2010 (right) (*Juncus* in Bevy rye cores on left and control core on right).
Profile descriptions are presented in Appendix 1.

Figure 3-16. Sediment slice at *Juncus* in Bevy rye site in November 2010 (left) and sampling in February 2011 (right).
Profile descriptions are presented in Appendix 1.

Figure 3-17. Sediment cores collected in November 2010 (left) and February 2011 (right) at Tolderol (*Juncus* in Bevy rye site core only in November 2010 and both cores in February 2011 (control site core on right)).
Profile descriptions are presented in Appendix 1.

3.4.4 Campbell Park, west Lake Albert site characteristics

Figure 3-18. Campbell Park sampling locations.

Figure 3-19. Control site (left) and Bevy rye/*Puccinellia* (right) at Campbell Park. Profile descriptions are presented in Appendix 1.

Figure 3-20. Sampling in November 2010 at Campbell Park (left) and core sample collected in November 2010 showing both oxidation and reduction (right). Profile descriptions are presented in Appendix 1.

Figure 3-21. Sediment cores collected in November 2010 (left) and February 2011 (right) at Campbell Park (Bevy rye/*Puccinellia* site core(s) are on the left and control site core(s) are on the right in both photographs). Profile descriptions are presented in Appendix 1.

Figure 3-22. Sampling in February 2010 at Campbell Park (left and right). Profile descriptions are presented in Appendix 1.

4.0 Materials and methods

4.1 Field sampling of soils

Field sampling at the four Lower Lakes sites was initially undertaken before seeding/planting in May 2010, and then undertaken on three separate occasions (i.e. August 2010, November 2010 and February 2011). A summary of all sampling dates for the laboratory study and field components of this study are presented in Table 4-1. The dates for the two field examinations coincide with the sampling dates for the laboratory study. The sampling dates were originally chosen to coincide with four growth stages of the annual vegetation to be planted during 2010: before planting, early-growth, near-maturity and post-maturity. However, as mentioned previously, flooding in the lakes during June-August 2010 impeded the establishment of the seeded/planted areas in Lake Alexandrina, and the development of the seeded areas at the Campbell Park site beyond early-growth stage after the inundation of Lake Albert that occurred post-August 2010.

Table 4-1. Sampling dates for the field examination, soil profile sampling and laboratory study.

Season (Date)	Field Examination	Soil Profile Sampling	Laboratory Study
Late Autumn (21st - 23rd May 2010)		✓	✓
Late Winter (28th - 31stAugust 2010)	✓	✓	✓
Late Spring (21st – 24th November 2010)		✓	✓
Late Summer (14th – 17th February 2011)	✓	✓	✓

For the laboratory study, duplicate intact sediment cores were collected from three replicate sampling sites from each treatment/location to a depth of 20 cm. The columns used to collect each core were 50 cm in length with an internal diameter of 15 cm (Figure 4-1). For the soil profile sampling component around seeding/planting in May 2010, three pits were excavated at each treatment/location to the water table or 80 cm depth (whichever is the shallowest) and sampled in 10 cm increments to 80 cm or to 10 cm below the water table (whichever was the shallowest). For the subsequent soil profile sampling components, intact soil cores were collected using soil corers. Once each replicate sampling site was established during the initial sampling, subsequent soil samplings were taken within 4 m of that site to ensure that the detection of any changes in soil properties over the sampling times was optimised.

For the field examination, the rate of sulfate reduction was determined on duplicate cores at two of the sampling sites at each treatment/location. The rate of sulfate reduction was measured (using the methodology described in Section 4.4.3) at the surface in 2.5 cm increments (i.e. 0-2.5 cm, 2.5-5.0 cm), then in 5 cm increments to 20 cm, and 10 cm increments from 20 cm to 40 cm.

A soil description together with pH/Eh data for each horizon collected during the soil profile sampling is presented in Appendix 1 (Table 9-2). The pH and Eh were determined using calibrated electrodes linked to either a TPS 90-FLMV multi-parameter meter or a TPS WP-80 meter; Eh measurements are presented versus the standard hydrogen electrode. The global positioning system (GPS) coordinates for each site are also presented in Appendix 1 (Table 9-2).

Figure 4-1. Sediment sampling at Tolderol (May 2010).

4.2 Simulation of inundation of soil materials

Laboratory experiments simulating inundation were undertaken to examine sulfate reduction and the generation of alkalinity consequent of bioremediation in the Lower Lakes. On return to the Southern Cross GeoScience laboratory the 20 cm deep intact sediment cores were inundated with synthetic River Murray water to a depth of 15 cm and loosely covered with foil (Figure 4-2).

Figure 4-2. Inundated sediment cores.

Surface water and pore-water samples were taken for analysis after inundation at three sampling times over a six week period (i.e. 2 weeks, 4 weeks and 6 weeks). This monitoring strategy provides an estimate of the initial, fast flux of acidity and nutrients to the water column, followed by slower diffusive transport rates and possible neutralisation (mineral and redox) processes.

Surface water samples were collected from 9 cm above the sediment surface from each column. Two columns containing only synthetic River Murray water (i.e. no sediment) were also sampled as controls. Pore-water samples were also collected from two sediment layers (3-5 cm and 10-12 cm depth). To obtain the pore-waters perforated plastic tubes were inserted into the sediments at the two depths (i.e. 4 cm and 11 cm) prior to inundation (Figure 4-2). Pore-water was removed using a syringe attached to a 0.45 µm filter.

The water column overlying the sediment cores was regularly oxygenated to simulate field mixing conditions. The dissolved oxygen concentration was measured in the water columns at regular intervals, and columns were bubbled with oxygen to maintain the dissolved oxygen level at approximately 80% saturation. Replacement synthetic River Murray water lost through evaporative and analysis aliquot water losses was made when required. The columns were maintained at a constant temperature of 21±1°C.

The overlying water and depth-profiled pore-water samples collected were analysed for key geochemical parameters (i.e. pH, alkalinity, Eh, EC, Cl, SO_4, dissolved sulfide, Fe(II)/Total Fe, major ions and nutrients species). Further details on the surface and pore-water analyses are given in Section 4.4.4.

Sediment samples were taken after six weeks of inundation with synthetic River Murray water. Sediment samples were collected from three depths (i.e. 0-4 cm, 4-8 cm, and 8-15 cm) from the inundated cores and immediately frozen. The sediments were also analysed for key geochemical parameters (e.g. acidity, sulfur species and organic matter). The parameters measured are discussed further in Section 4.4.2.

4.3 Metagenomic analysis of sediments

Samples of DNA were extracted from the sediments at the Tolderol site to to characterize microbial community structure and to examine the utility of a metagenomic approach to assessing the microbial ecology (including diversity and functioning) in the bioremediating and untreated lake sediments. The GeoChip v4.0 approach (Xie et al. (2010)) was chosen to assess the functional metagenomics of these sediments. GeoChip v4.0 contains 120,054 distinct probes, covering 200,393 coding sequences (CDS) for genes in different processes important to biogeochemistry, ecology, environmental sciences and human health.

Duplicate samples of sediment from the 0-10 cm and the 30-40 cm sediment layers from both the bioremediated and the untreated sites at Tolderol were taken during the August 2010 sampling. The DNA from these eight sediment samples was extracted and purified at Southern Cross University's Centre for Plant Sciences by Mr Mark Edwards. These samples were then sent for the GeoChip v.4.0 analysis at the University of Oklahoma. The results from the University of Oklahoma have only been recently received (June 2011) and only a brief examination of the vast metagenomic data has been possible.

4.4 Laboratory analysis methods

4.4.1 General comments

All laboratory glassware and plastic-ware were cleaned by soaking in 5% (v/v) HCl for at least 24 hours, followed by repeated rinsing with deionised water. Reagents were analytical grade and all reagent solutions were prepared with deionised water (milliQ). All solid-phase results are presented on a dry weight basis (except where otherwise noted).

4.4.2 Sediment analyses

Sediment samples collected both in the field and following six weeks of laboratory inundation were analysed. All sediment samples were immediately frozen upon sampling. A summary of the sediment parameters measured both on soil layers collected in the field and following six weeks of inundation are given in Table 4-2. Retained acidity (RA) and acid extractable metals/metalloids were only measured on sediments collected as part of the soil profile sampling (Table 4-2). Organic matter availability and quantity were measured as part of the soil profile sampling and the field component (Table 4-2). Sulfate reduction rates were measured during the field component (see Section 4.4.3).

The sediment moisture content was determined by weight loss due to drying at 105°C. Sediments for further analysis (except reduced inorganic sulfur (RIS) analysis) were oven-dried at 80°C and sieved (< 2 mm) prior to being ring mill ground.

The acid-volatile sulfide (AVS) and the total RIS fraction were determined using a sequential extraction procedure on duplicate frozen sub-samples. The AVS fraction was initially extracted via a cold diffusion procedure, with the use of ascorbic acid to prevent interferences from ferric iron (Fe (III)) (Burton *et al.* 2007). The remaining RIS fraction was determined using the chromium reduction analysis method of Burton *et al.* (2008).

Table 4-2. Summary of the parameters analysed in the sediments from the Lower Lakes.

Parameter	Soil Profile Sampling	Field Component	After 6 weeks of inundation
Moisture content	✓	✓	✓
pH (1:5 soil:water)	✓		✓
EC (1:5 soil:water)	✓		✓
RIS (CRS and AVS)	✓	✓	✓
Total C and N (by LECO)	✓	✓	✓
pH (1:40 soil: l.0 M KCl)	✓		✓
TAA (only if pH_{KCl} is <6.5)	✓		✓
ANC (only if pH_{KCl} is >6.5)	✓		✓
TAAlk (only if pH_{KCl} is >6.5)	✓		✓
RA (only if pH_{KCl} is <4.5)	✓		
HCl extractable metals/metalloids	✓		
Organic matter availability and quantity	✓	✓	
Sulfate reduction rates		✓	

Electrical conductivity (EC) and pH were determined by direct insertion of calibrated electrodes into a 1:5 soil:water extract linked to a TPS WP-81 meter. Total carbon (%C) and total nitrogen (%N) were measured on powdered oven-dried samples by combustion using a LECO-CNS 2000 analyser. The potassium chloride (KCl) extractable pH (pH_{KCl}) was measured in a 1:40 1.0 M KCl extract (Method Code 23A), and the titratable actual acidity (TAA) (i.e. sum of soluble and exchangeable acidity) was determined by titration of the KCl extract to pH 6.5 (Method Code 23F) (Ahern *et al.* 2004). Titratable actual acidity is a measure of the actual acidity in soil materials. The titratable actual alkalinity (TAAlk) was measured on samples where pH_{KCl} was >6.5 (Sullivan *et al.* 2010b). Titratable actual alkalinity where the suspension is titrated with 0.05 M hydrochloric acid (HCl) down to pH 6.5 is the reverse of the TAA method. The acid neutralising capacity (ANC_{BT}) was quantified on the <0.5 mm sieved soil fraction (only if pH_{KCl} is >6.5) using a standard back-titration determination (Method

Code 19A2) (Ahern *et al.* 2004). The retained acidity (RA) was determined from the difference between 4.0 M HCl extractable sulfur (S_{HCl}) and 1.0 M KCl extractable sulfur (S_{KCl}) when the sample pH_{KCl} was < 4.5 (Method Code 20J) (Ahern *et al.* 2004). The retained acidity identifies stored soil acidity in the form of jarosite and similar relatively insoluble iron and aluminium hydroxy sulfate compounds (Ahern *et al.* 2004). Reactive metals and metalloids (Fe, Al, Ag, As, Pb, Cd, Cr, Cu, Mn, Ni, Se and Zn) were extracted using 1.0 M HCl and analysed using ICP-MS (Inductively Coupled Plasma - Mass Spectrometry).

The organic matter availability and quantity (i.e. total organic C, hydrolysable C and non-hydrolysable C) were measured after the 1.0 M HCl method described by Silviera *et al.* (2008). The total organic carbon (TOC) content was determined by a LECO-CNS 2000 analyser following the removal of inorganic carbon by treatment with 1.0 M HCl. The non-hydrolysable organic carbon content was determined by a LECO-CNS 2000 analyser following treatment with 6.0 M HCl at 105°C for 2 hours. The hydrolysable organic carbon content was determined from the difference between the TOC and the non-hydrolysable carbon fractions.

Sediment data in the field and following 6 weeks of laboratory inundation are presented in Appendix 2 (Tables 9-3 to 9-34) and Appendix 3 (Tables 9-35 to 9-50), respectively.

4.4.3 Sulfate reduction analyses

In-situ SO_4^{2-}-reduction rates (SRR) were determined in August 2010 and February 2011 using a radiotracer ($^{35}SO_4^{2-}$) incubation approach (Fossing and Jørgensen 1989). Short-term products of sulfate reduction (i.e. iron-monosulfides, elemental sulfur and pyrite) were also investigated using this approach during the February 2011 field examination. Sediment profiles were collected using a 5 cm diameter push-tube coring device. As mentioned previously, the rate of sulfate reduction was measured at the surface in 2.5 cm increments (i.e. 0-2.5 cm, 2.5-5.0 cm), then in 5 cm increments to 20 cm, and 10 cm increments from 20 cm to 40 cm. Three replicate soil sub-samples for each soil layer were collected using 3 mL polypropylene syringes (with the distal end removed). After collection, each soil sample was immediately sealed within the 3 mL syringe using Parafilm and was subsequently injected with 100 kBq of carrier-free $^{35}SO_4^{2-}$. The replicates from each depth interval were incubated at ambient temperature for 24 hours. These incubations were terminated by freezing the sealed syringes. In addition to the triplicate 24 hour incubations, a single replicate for selected soil samples also served as a time zero blank (i.e. this sample was frozen immediately after injection of $^{35}SO_4^{2-}$).

The RIS speciation of the radiolabelled samples was determined by selective, sequential extraction of iron-monosulfides, elemental sulfur (S(0)) and pyrite (Burton *et al.* 2007, 2009). Iron-monosulfides, defined operationally as AVS, were extracted by shaking (150 rpm) ~ 0.5 grams of sediment with 10 mL of 6.0 M HCl/0.1 M ascorbic acid in gas-tight 55 cm³ polypropylene reactors for 18 hours (Burton *et al.* 2007). The use of ascorbic acid during this extraction prevents interferences from Fe(III) minerals, which can otherwise lead to S(0) formation (Hsieh *et al.* 2002). The evolved hydrogen sulfide ($H_2S_{(g)}$) was trapped in 7 mL of 3% zinc acetate in 2.0 M sodium hydroxide (NaOH), and subsequently quantified via iodometric titration. Elemental S was then extracted from the AVS-extracted sample by shaking the sediment with 10 mL of toluene for 16 hours. An aliquot of the toluene extract was analysed for S(0) by high-performance liquid chromatography (HPLC) with a Dionex UltiMate 3000 system. Residual S(0) was then removed from the sediment sample by three rinses with 25 mL of acetone, and a final rinse with 20 mL of ethanol. Each rinse involved 5 to 10 minutes of shaking, with the sediment and acetone/ethanol phases separated between rinses by centrifugation at 4000 rpm for 10 minutes. Pyritic sulfur in the residual AVS- and S(0)-extracted sediment was then quantified as chromium reducible sulfur (CRS) using the method of Burton *et al.* (2008).

The incorporation of ^{35}S into each of the three RIS fractions was determined by liquid-scintillation counting using a Perkin-Elmer microbeta counter (with Perkin-Elmer UltimaGold scintillation fluid). The SO_4^{2-}-reduction rate was determined by the sum of ^{35}S incorporated into AVS, S(0) and CRS according to:

$$SRR = \frac{a-b}{A}\left[SO_4^{2-}\right]\frac{1}{d}\bullet 1.06 \text{ nmol/g/day}$$

Where *a* is the radioactivity of the individual RIS species per mass of soil subjected to the incubation, *b* is the radioactivity of the corresponding time zero blank, *A* is the radioactivity of the added $^{35}SO_4^{2-}$ per mass of soil, [SO_4^{2-}] is the sulfate concentration per mass of soil (nmol/g), *d* is the incubation time in days, and 1.06 is the isotopic fractionation factor.

It is important to note that using ^{35}S incubations to quantify the importance of short-term sulfate reduction biomineralisation products is complicated by possible isotopic exchange of ^{35}S amongst separate RIS species. More specifically, absolute quantitative distinction between the in-situ formation rates of S(0) and AVS may be unreliable due to partial isotopic exchange of ^{35}S (Fossing *et al.* 1992). On the other hand, it is well established that isotopic exchange of ^{35}S does not occur between pyrite and other RIS species over a 24 hour period (Fossing *et al.* 1992). Therefore, differential incorporation of ^{35}S into the AVS versus S(0) pools must be interpreted cautiously, whereas ^{35}S incorporation into CRS can be soundly interpreted as real short-term pyrite formation (Burton *et al.* in press).

All sulfate reduction data, including pore-water properties (i.e. SO_4, Cl, Si and dissolved metals) and sediment properties (i.e. pH, total S, C, N and organic availability/quantity) on selected samples, are presented in Appendix 4 (Tables 9-51 to 9-94).

4.4.4 Surface and pore-water analyses

A summary of the surface and pore-water parameters measured following inundation are given in Table 4-3. Surface and pore-waters were analysed following two, four and six weeks of inundation. Note that the soluble cation (Ca, Mg, Na, K) and nutrient (orthophosphate, nitrate, nitrite, and ammonia) concentrations in the surface and pore-waters were only measured following six weeks of inundation.

Redox potential (Eh) and pH were determined using calibrated electrodes linked to a TPS 90-FLMV multi-parameter meter; Eh measurements are presented versus the standard hydrogen electrode. Redox potential and pH were measured on unfiltered surface water samples, and all other properties were determined on filtered (0.45 µm) water samples.

Table 4-3. Summary of the parameters analysed in the surface and pore-waters following inundation.

Parameter	Weeks of inundation		
	Week 2	**Week 4**	**Week 6**
pH	✓	✓	✓
Alkalinity	✓	✓	✓
Redox potential (Eh)	✓	✓	✓
Electrical conductivity (EC)	✓	✓	✓
Soluble Cl and SO_4	✓	✓	✓
Dissolved sulfide	✓	✓	✓
Dissolved Fe^{2+} and total dissolved Fe	✓	✓	✓
Soluble cations (Ca, Mg, Na, K)			✓
Nutrients (orthophosphate, nitrate, nitrite, and ammonia)			✓
Dissolved Se[#]	✓		✓

[#] *Dissolved selenium was only measured following inundation of the columns collected in February 2011.*

Ferrous iron (Fe^{2+}), total iron ($Fe^{2+} + Fe^{3+}$), alkalinity and dissolved sulfide were fixed immediately after sampling. The Fe^{2+} trap was made up from a phenanthroline solution with an ammonium acetate buffer (APHA 2005), and the total iron trap also included a hydroxylamine solution (APHA 2005). Bromophenol blue traps were used for alkalinity (Sarazin *et al.* 1999) and alkalinity standards were determined with 0.01 M HCl using the Gran procedure (Stumm and Morgan 1996). The dissolved sulfide fraction was trapped in an alkaline zinc acetate trap prior to determination by the spectrophotometric method of Cline (1969). The iron species, alkalinity and dissolved sulfide were all quantified colorimetrically using a Hach DR 2800 spectrophotometer.

Major cations and anions (Na^+, K^+, Ca^{2+}, Mg^{2+}, SO_4^{2-}, Cl^-) were analysed by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Nutrients (orthophosphate, nitrate, nitrite, and ammonia) were analysed turbidimetrically using flow-injection analysis (FIA) colorimetry (Lachat QuikChem 8000) (APHA 2005). In addition, selenium (Se) was also analysed on selected surface water and pore-water samples using ICP-MS.

The water quality characteristics of the synthetic River Murray water prior to inundation are given in Appendix 5 (Table 9-95). All surface water and pore-water data following inundation are presented in Appendix 5 (Tables 9-96 to 9-171). Graphs of selected surface and pore-water analyses (i.e. pH, Eh, EC, SO_4, Fe^{2+} and Cl) at each location are also given in Appendix 6 (Figures 9-1 to 9-24).

4.4.5 Expression of results

The means (Av.) and the standard deviations for triplicates (± SD) are presented in the tables in this document with graphs given to illustrate certain points. The standard errors (SE) are presented on many of the graphs.

4.4.6 Quality assurance and quality control

For all tests and analyses, the Quality Assurance and Quality Control procedures were equivalent to those endorsed by NATA (National Association of Testing Authorities). The standard procedures followed included the monitoring of blanks, duplicate analysis of at least 1 in 10 samples, and the inclusion of standards in each batch.

Blanks were collected for laboratory or field samples to examine whether contaminants had been introduced to the sample. Reagent blanks and method blanks were prepared and analysed for each method. All blanks examined here were either at, or very close to, the limits of detection.

Calibrations were performed on matrix-matched solutions and these were analysed along with standard solutions and the tested analytes. These calibrations and checks confirmed the methodology and the proper functioning of the analytical instruments.

Duplicates were prepared for all experiments and analysed separately. Selected analytical duplicate samples were prepared by dividing a test sample into two, then analysing these sub-samples separately. On average, the frequencies of quality control samples processed were: 10% blanks, ≥ 10% laboratory duplicates, and 5% laboratory controls. The analytical precision was ±10% for all analyses.

5.0 Results

5.1 General sediment condition prior to and after inundation

5.1.1 Waltowa

5.1.1.1 pH$_{(1:1,\ soil:water)}$ and TAA

All sites initially had slightly acidic subsoil layers from 10 – 40 cm, especially the site under *Cotula* where the pH in the 20 – 30 cm layer had a pH of ~4 (Figures 5-1 – 5-3). Upon near lake filling in August the pHs of these soil layers dropped considerably probably due to acidity exchange from the soil from the inundating waters.

The two treatment sites that had Aglime previously applied to the surface (i.e. the *Phragmites* and *Juncus* treatments) displayed surface pHs of about 8 - 8.5 initially but when the surfaces were saturated the pHs of these layers were thereafter maintained at a pH of ~ 7.

In the unlimed *Cotula* treatment site the pH of the surface layer initially decreased from ~ 7 to ~ 5 from May to August (when there was near inundation), but thereafter increased to ~pH 7 under the inundated conditions.

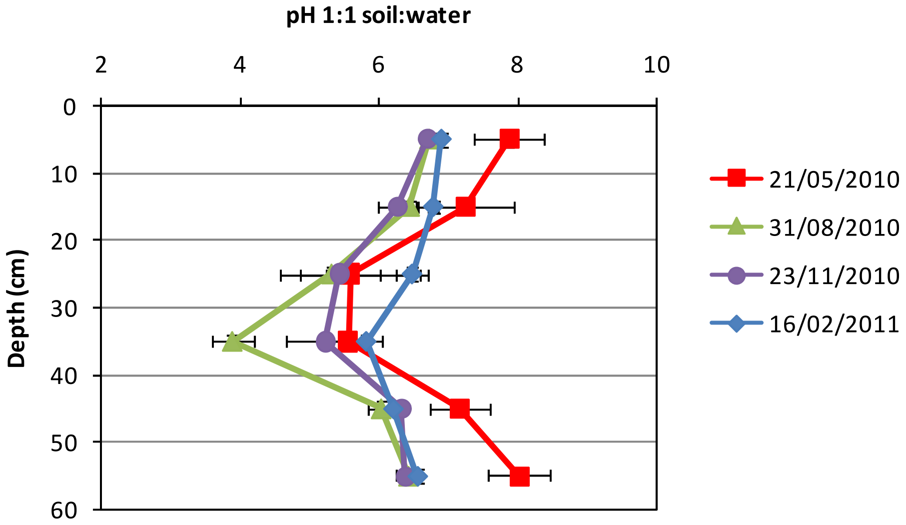

Figure 5-1. Waltowa field pH dynamics at the established *Phragmites* site.

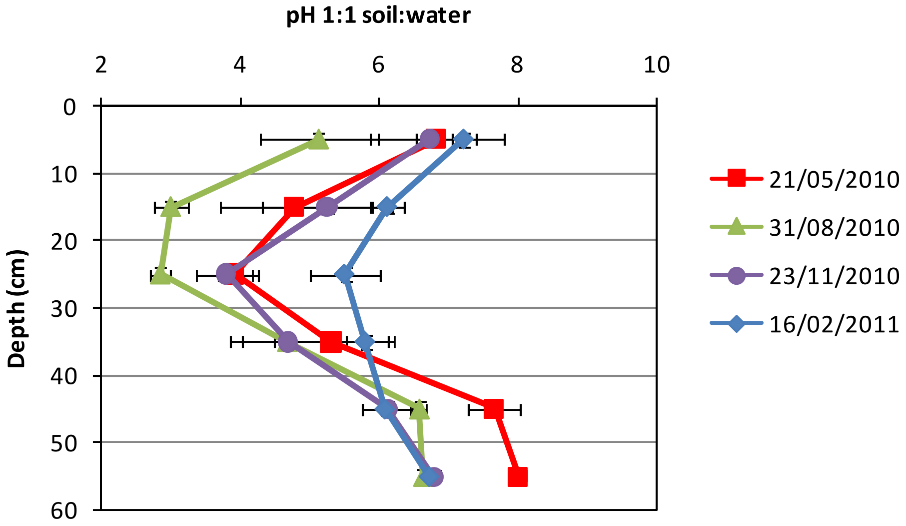

Figure 5-2. Waltowa field pH dynamics at the established *Cotula* site.

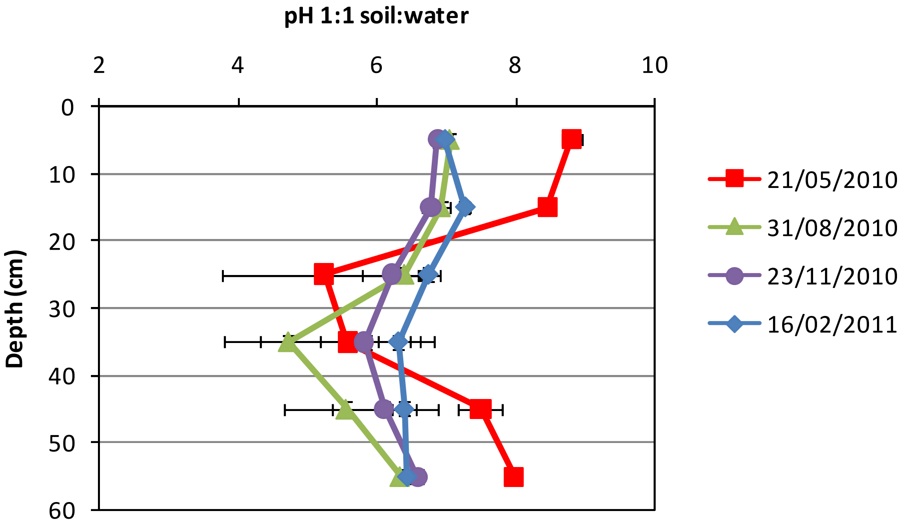

Figure 5-3. Waltowa field pH dynamics at the established *Juncus* site.

The TAAs (Figures 5-4 – 5-6) were all very low (i.e. < 18 mol H^+ t^{-1}) in each soil layer, and were especially low in the surface sediment layer of the *Cotula* site (i.e. initially ~ 2 mol H^+ t^{-1}) and the limed *Phragmites* and *Juncus* sites.

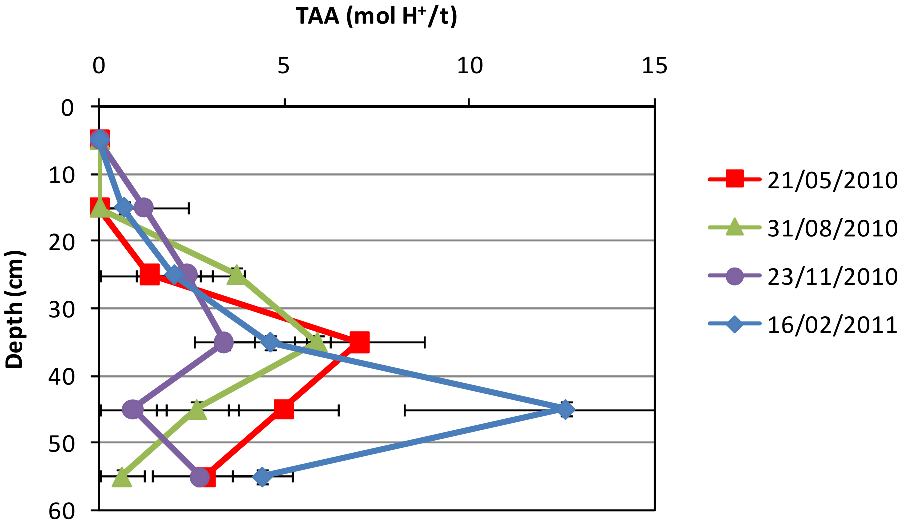

Figure 5-4. Waltowa field TAA dynamics at the established *Phragmites* site.

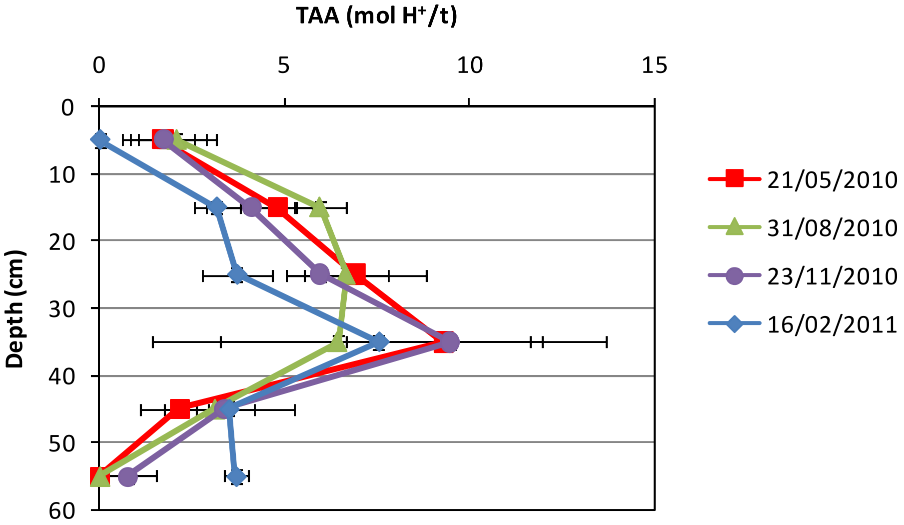

Figure 5-5. Waltowa field TAA dynamics at the established *Cotula* site.

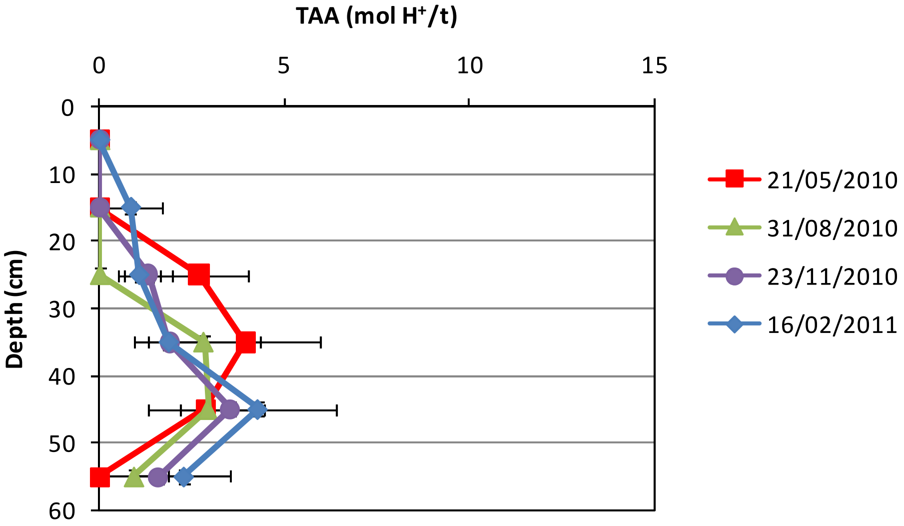

Figure 5-6. Waltowa field TAA dynamics at the established *Juncus* site.

5.1.1.2 Redox potential (Eh)

All sites initially (i.e. in May) had oxic conditions (Figures 5-7 – 5-9), but during the inundation process increasingly reductive conditions developed initially most strongly in the subsurface layers (August) but then in the whole profile down to 60 cm during the inundations. In the surface sediments the Ehs were ~ 0 mV during the February sampling in all treatment sites.

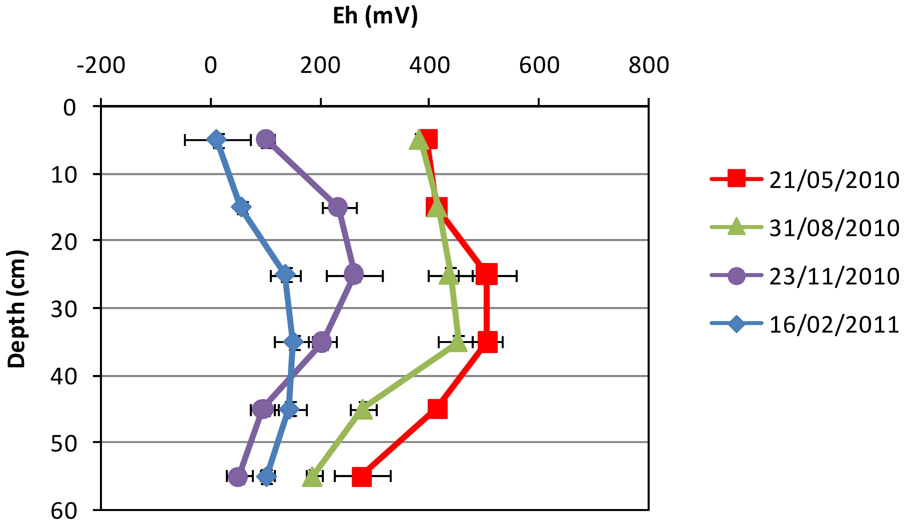

Figure 5-7. Waltowa field Eh dynamics at the established *Phragmites* site.

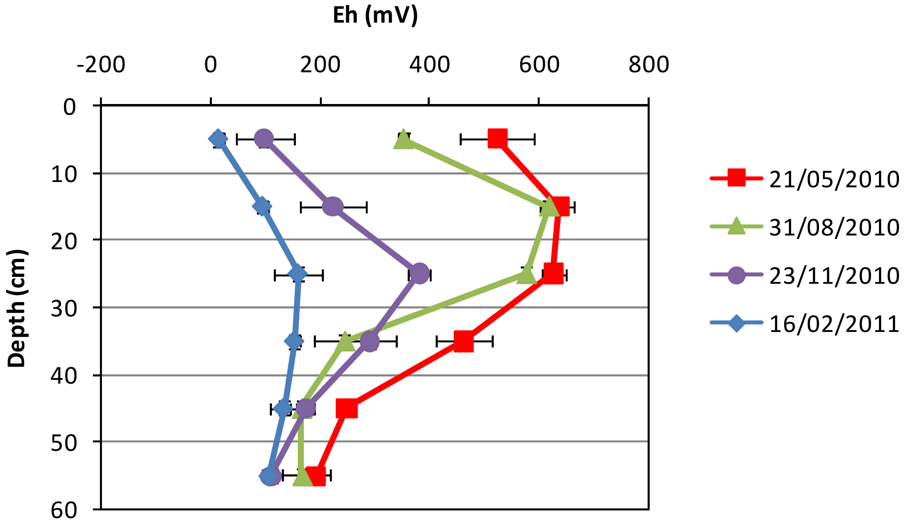

Figure 5-8. Waltowa field Eh dynamics at the established *Cotula* site.

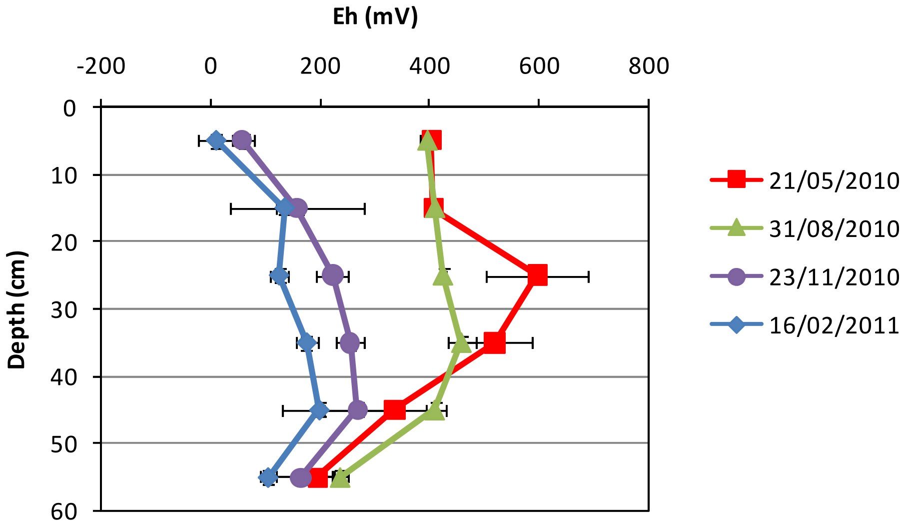

Figure 5-9. Waltowa field Eh dynamics at the established *Juncus* site.

5.1.1.3 Electrical conductivity (EC)

The salinity (i.e. EC) did not change appreciably from before inundation to after prolonged inundation. As shown in Figures 5-10 – 5-12 the salinity in all treatments was between 700 and 1500 mS cm^{-1} in the surface layers down to ~30 cm depth but increased to up to 9,000 mS cm^{-1} at 60 cm.

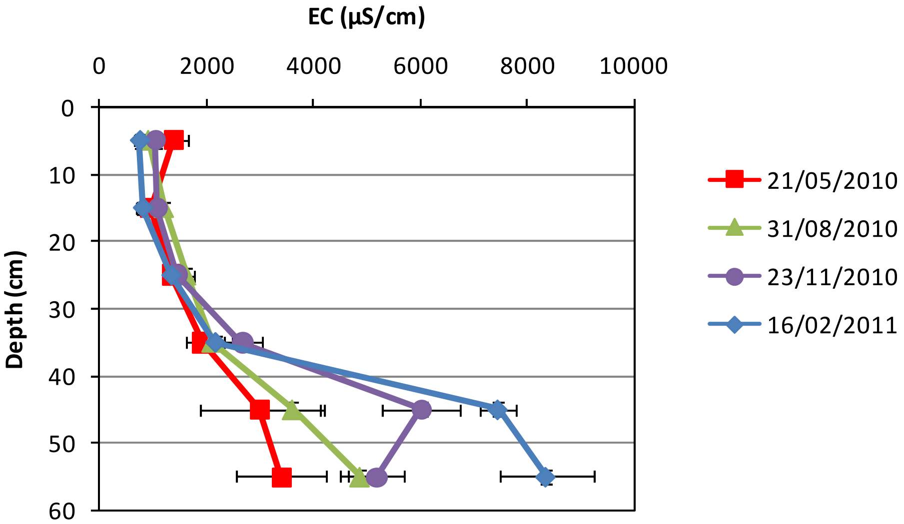

Figure 5-10. Waltowa field EC dynamics at the established *Phragmites* site.

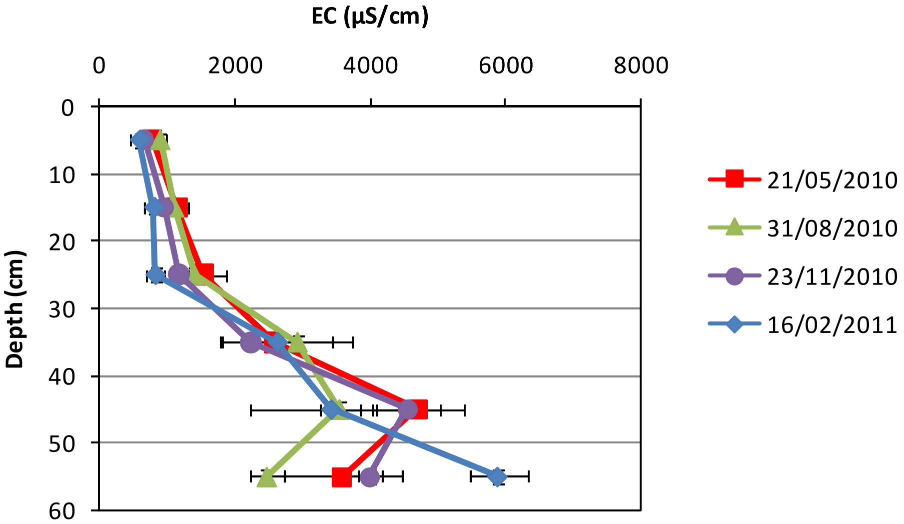

Figure 5-11. Waltowa field EC dynamics at the established *Cotula* site.

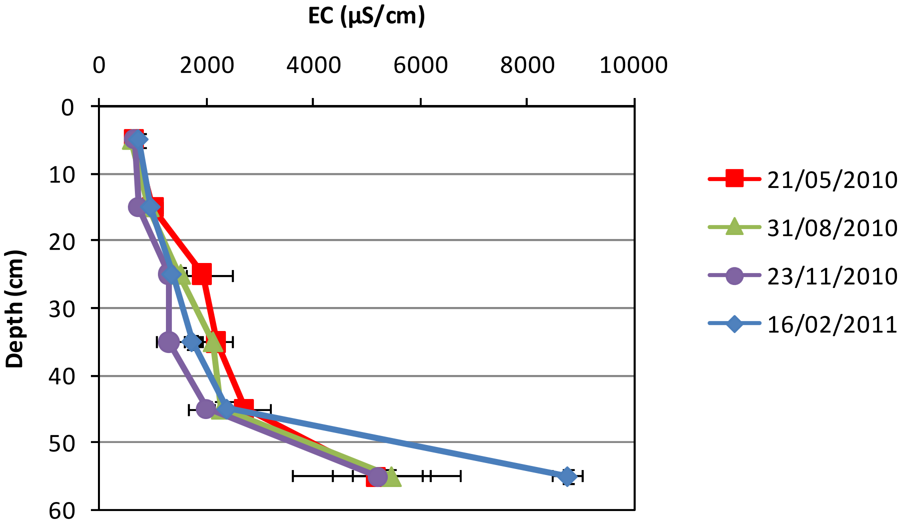

Figure 5-12. Waltowa field EC dynamics at the established *Juncus* site.

5.1.1.4 Chromium reducible sulfur (CRS)

The CRS content was very low in all sites prior to inundation with only the *Juncus* surface soil materials (i.e. 0 - 20 cm) having any appreciable CRS, although even these CRS contents of ~0.01% S were very low (Figures 5-13 – 5-15). The deeper soil materials had higher contents of CRS at all sites. There was evidence of accumulation of appreciable concentrations reduced inorganic sulfides (i.e. up to 0.10% S as CRS), especially in the *Phragmites* site profile and the *Cotula* surface layer after prolonged inundation.

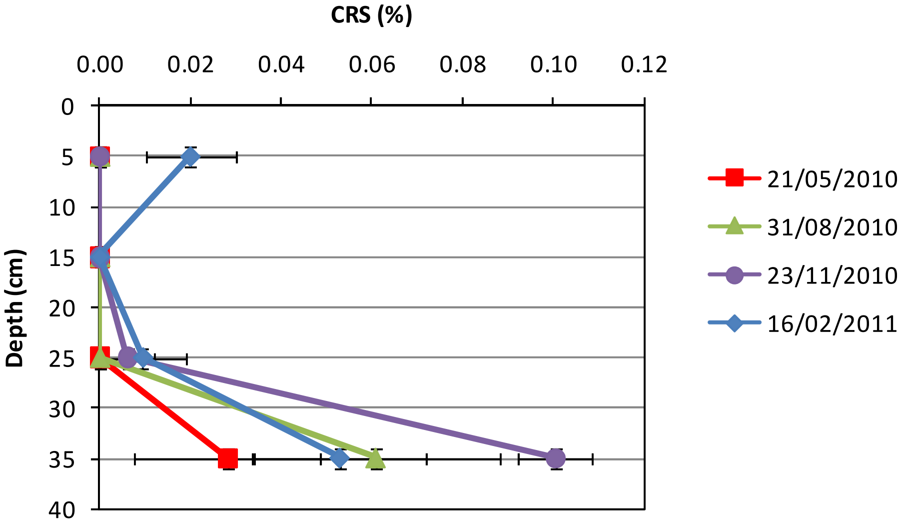

Figure 5-13. Waltowa field CRS dynamics in the surface soil (0-40 cm) at the established *Phragmites* site.

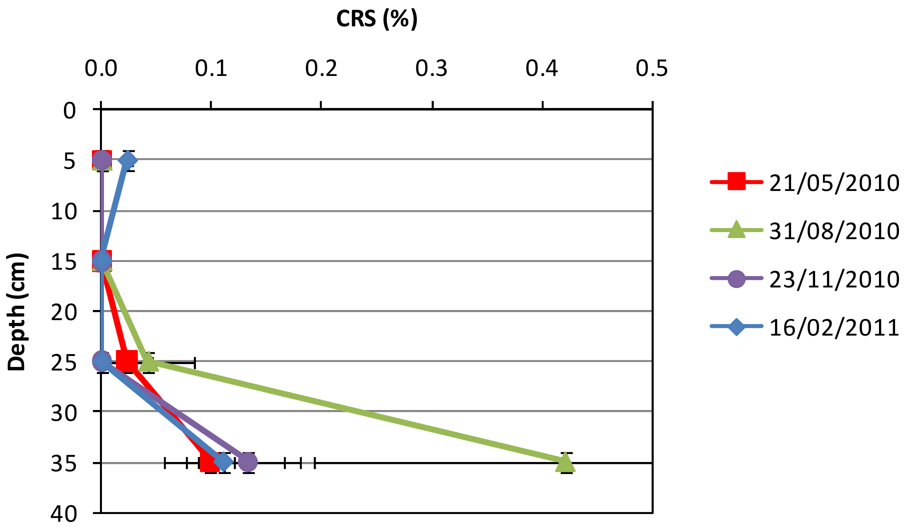

Figure 5-14. Waltowa field CRS dynamics in the surface soil (0-40 cm) at the established *Cotula* site.

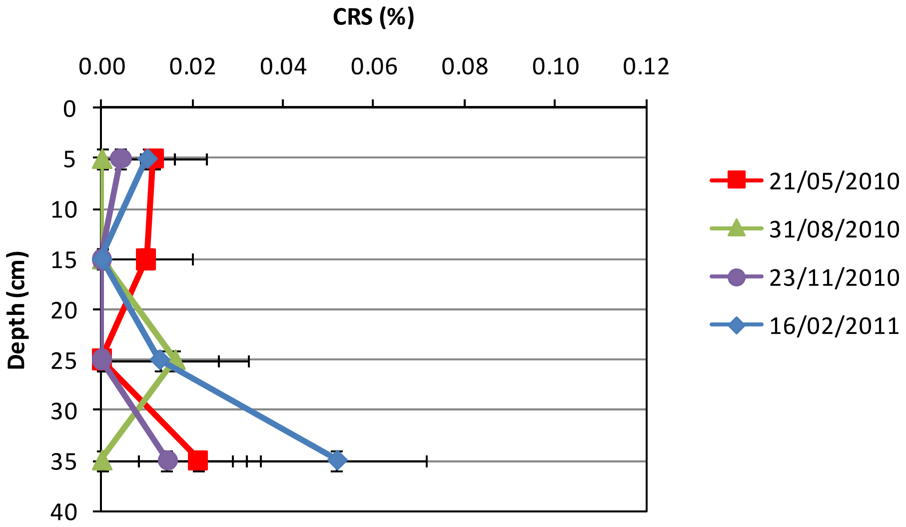

Figure 5-15. Waltowa field CRS dynamics in the surface soil (0-40 cm) at the established *Juncus* site.

5.1.1.5 Total organic carbon (TOC) and hydrolysable carbon

The total organic carbon and hydrolysable carbon contents measured at the three Waltowa sites in both August 2010 and February 2011 are shown below in Figures 5-16 – 5-21. The carbon contents at the Waltowa sites are discussed in detail in Section 5.2.1.

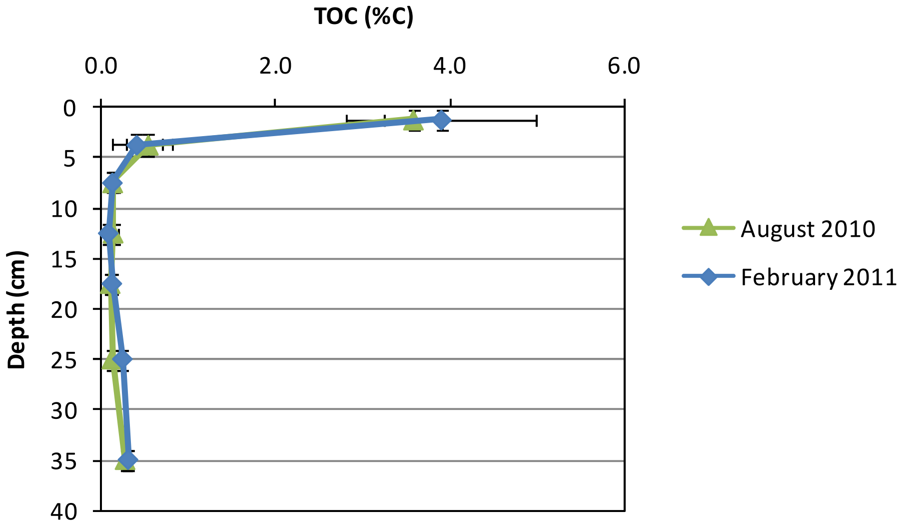

Figure 5-16. Waltowa field TOC in the surface soil (0-40 cm) at *Phragmites* site (August 2010 and February 2011).

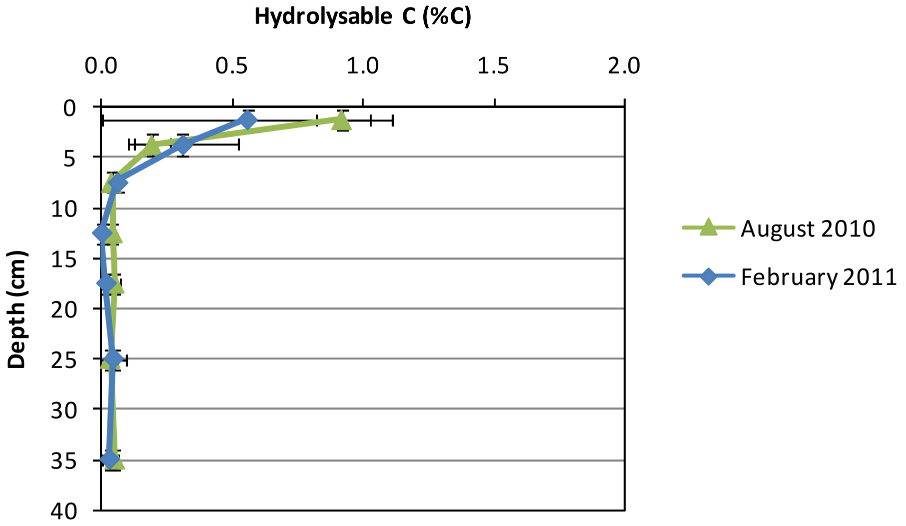

Figure 5-17. Waltowa field hydrolysable C in the surface soil (0-40 cm) at *Phragmites* site (August 2010 and February 2011).

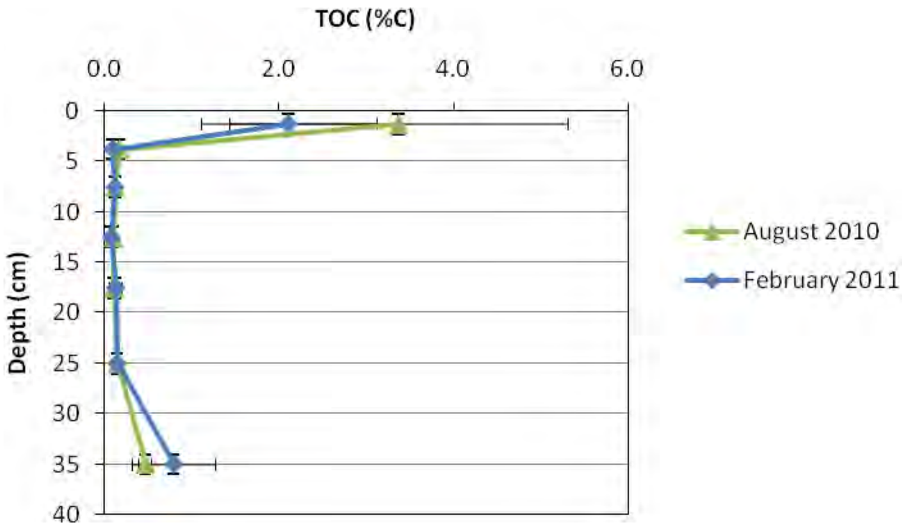

Figure 5-18. Waltowa field TOC in the surface soil (0-40 cm) at *Cotula* site (August 2010 and February 2011).

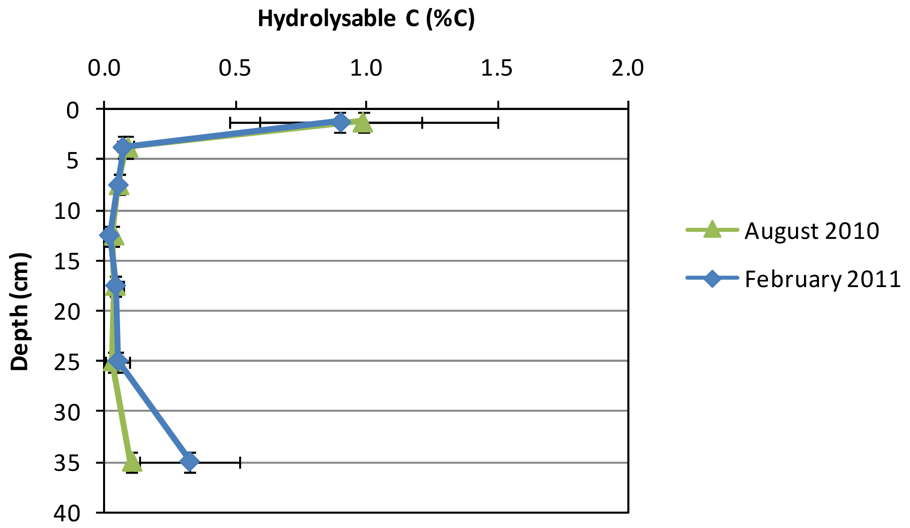

Figure 5-19. Waltowa field hydrolysable C in the surface soil (0-40 cm) at *Cotula* site (August 2010 and February 2011).

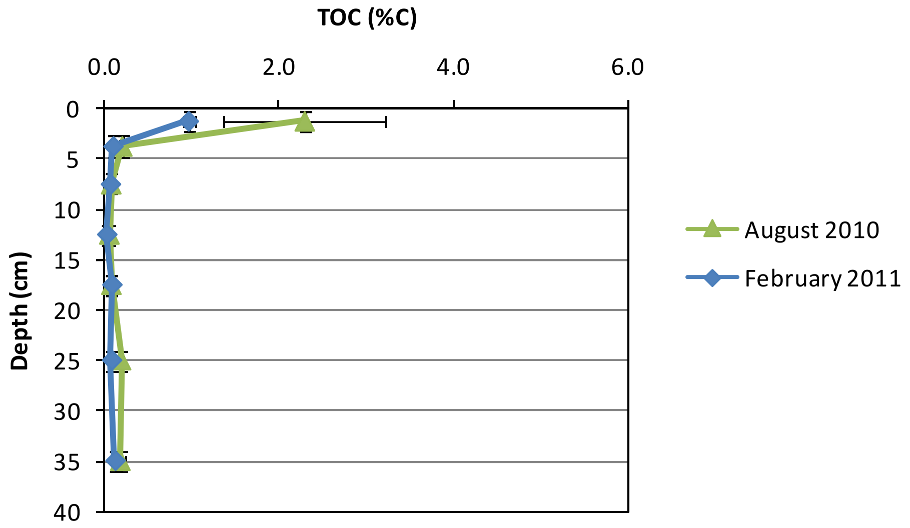

Figure 5-20. Waltowa field TOC in the surface soil (0-40 cm) at *Juncus* site (August 2010 and February 2011).

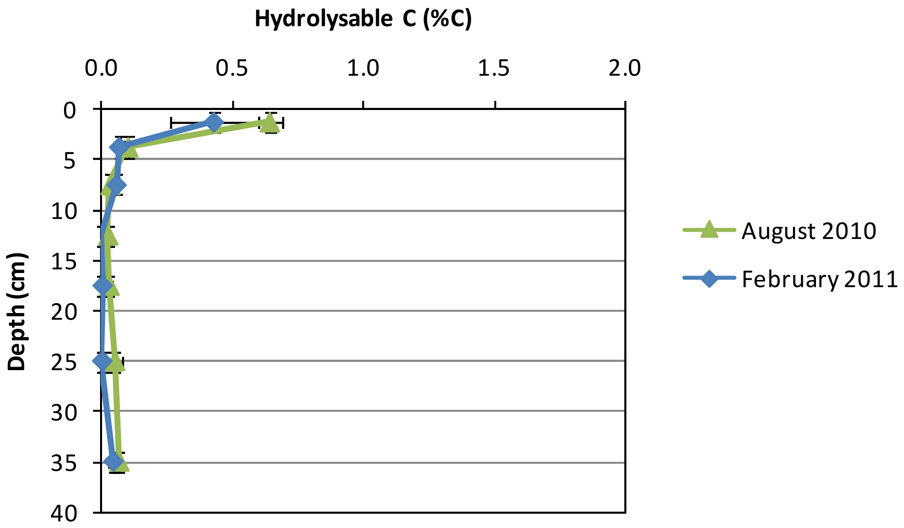

Figure 5-21. Waltowa field hydrolysable C in the surface soil (0-40 cm) at *Juncus* site (August 2010 and February 2011).

5.1.2 Poltalloch

5.1.2.1 pH$_{(1:1,\ soil:water)}$ and TAA

Both sites initially had acidic subsoil layers only from 10 – 40 cm (Figures 5-22 – 5-23). Upon inundation in August the pHs of most of these soil layers increased considerably upon prolonged inundation to ~ pH of 6.

The pH of the surface layers were ~7.5 prior to inundation, but after inundation remained constant at a range of pH 6.5 – 7.

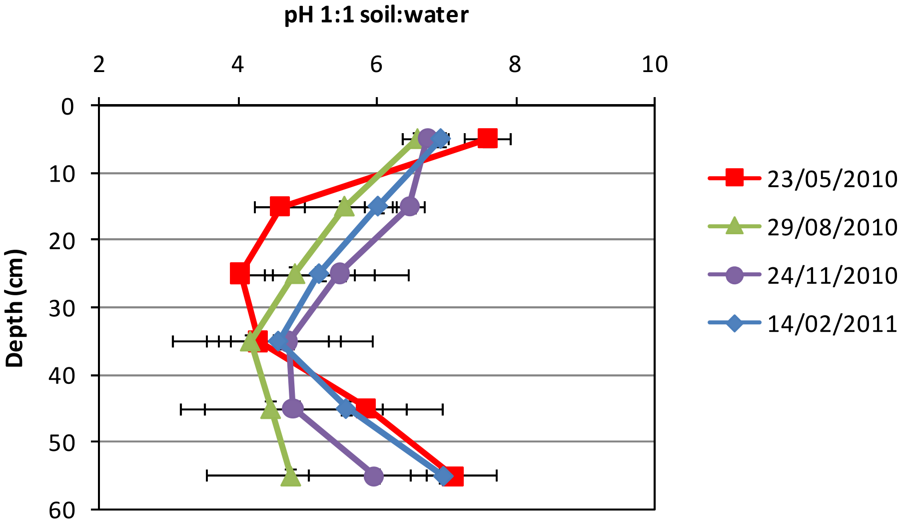

Figure 5-22. Poltalloch field pH dynamics at the *Juncus* plantings in Bevy rye site.

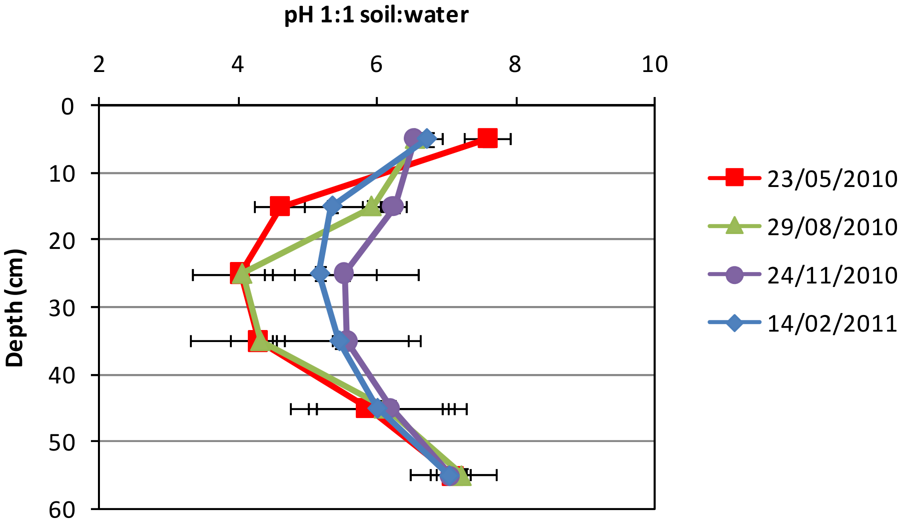

Figure 5-23. Poltalloch field pH dynamics at the Bevy rye only site.

The TAAs (Figures 5-24 – 5-25) were all very low (i.e. < 7 mol H^+ t^{-1}) in each soil layer, and were especially low (i.e. <2 mol H^+ t^{-1}) in the surface sediment layers of each site both prior to and during inundation.

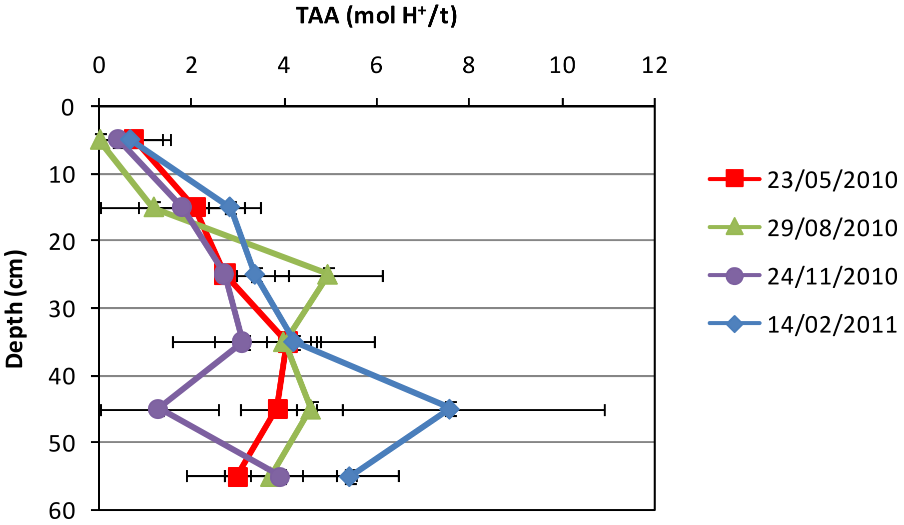

Figure 5-24. Poltalloch field TAA dynamics at the *Juncus* plantings in Bevy rye site.

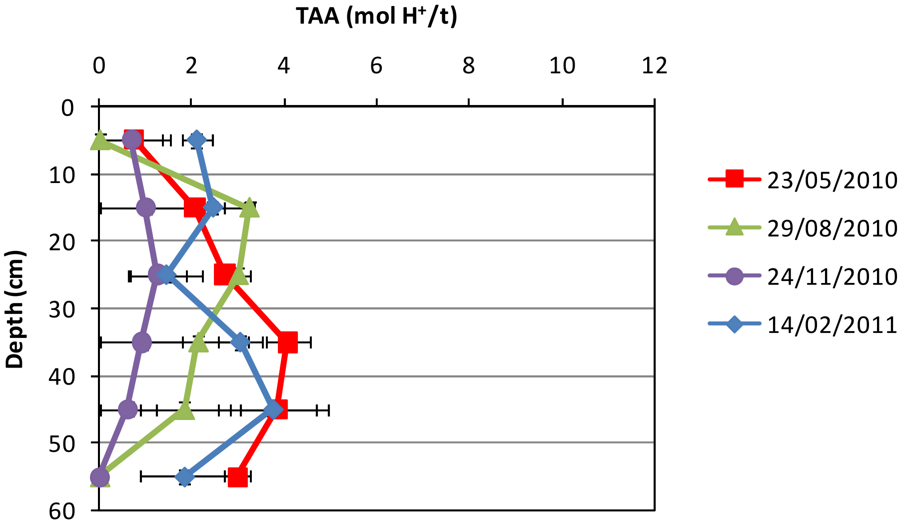

Figure 5-25. Poltalloch field TAA dynamics at the Bevy rye only site.

5.1.2.2 Redox potential (Eh)

All sites initially (i.e. in May) had oxic conditions (Figures 5-26 – 5-27), but during the inundation process increasingly reductive conditions developed throughout the whole profile down to 60 cm during the prolonged inundation.

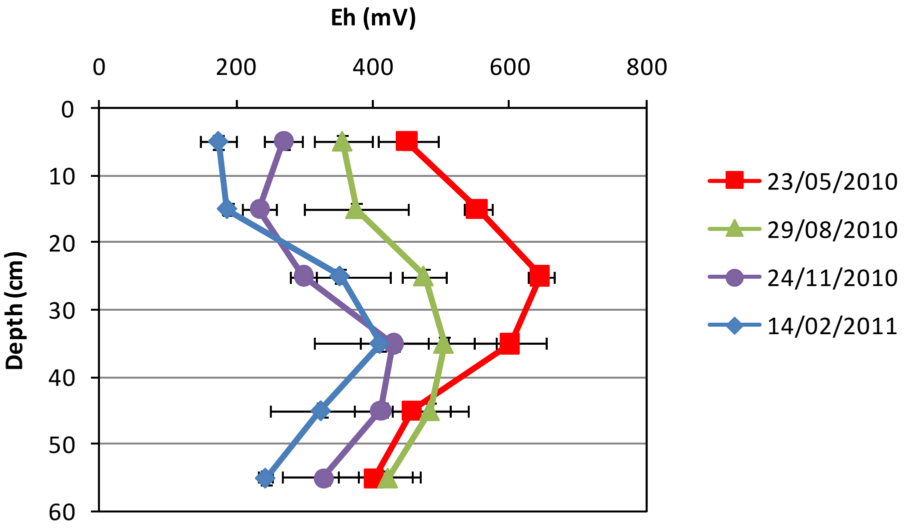

Figure 5-26. Poltalloch field Eh dynamics at the *Juncus* plantings in Bevy rye site.

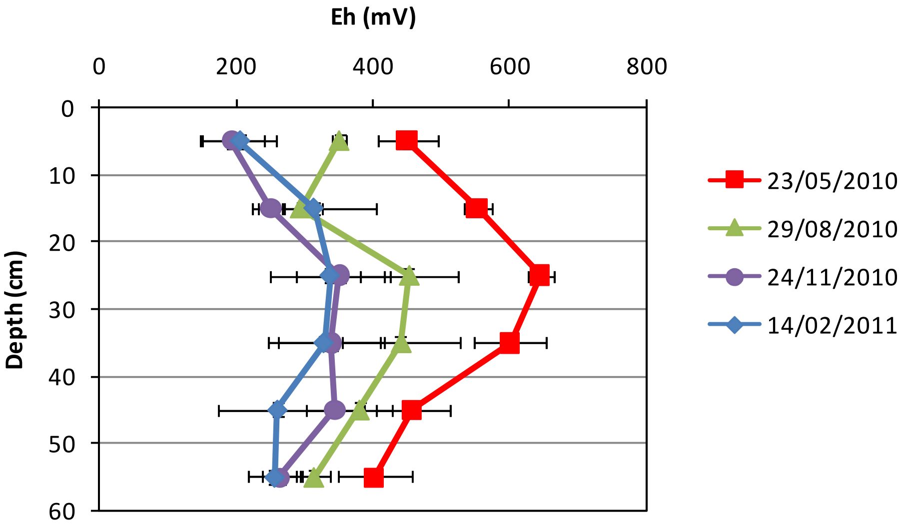

Figure 5-27. Poltalloch field Eh dynamics at the Bevy rye only site.

5.1.2.3 Electrical conductivity (EC)

The salinity (i.e. EC) did not change appreciably from before inundation to after prolonged inundation. As shown in Figures 5-28 – 5-29 the salinity in the surface layers of both treatments fell from ~500 mS cm^{-1} to ~200 mS cm^{-1} after prolonged inundation. The salinities of the soil layers gradually increased to ~1,300 mS cm^{-1} at 60 cm.

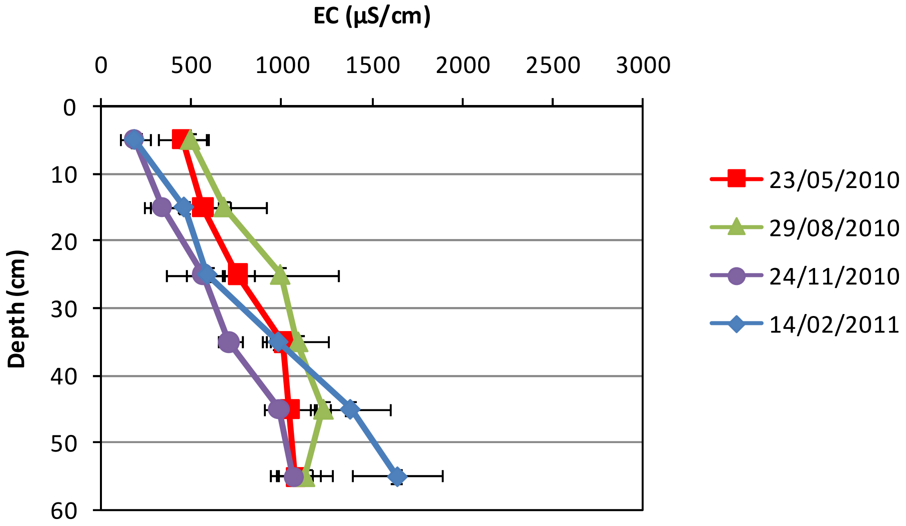

Figure 5-28. Poltalloch field EC dynamics at the *Juncus* plantings in Bevy rye site.

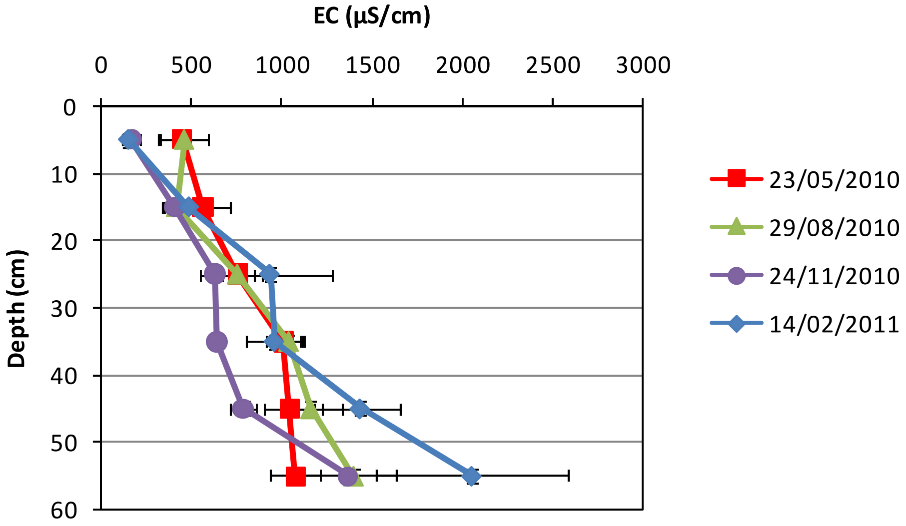

Figure 5-29. Poltalloch field EC dynamics at the Bevy rye only site.

5.1.2.4 Chromium reducible sulfur (CRS)

The CRS contents were very low (i.e. < 0.02% S) in the surficial layers (0 – 40 cm) at both sites (Figures 5-30 – 5-31) prior to inundation. There was clear evidence of the accumulation of appreciable concentrations reduced inorganic sulfides (i.e. up to 0.06% S as CRS) in especially the 20 – 40 cm deep layers after prolonged inundation.

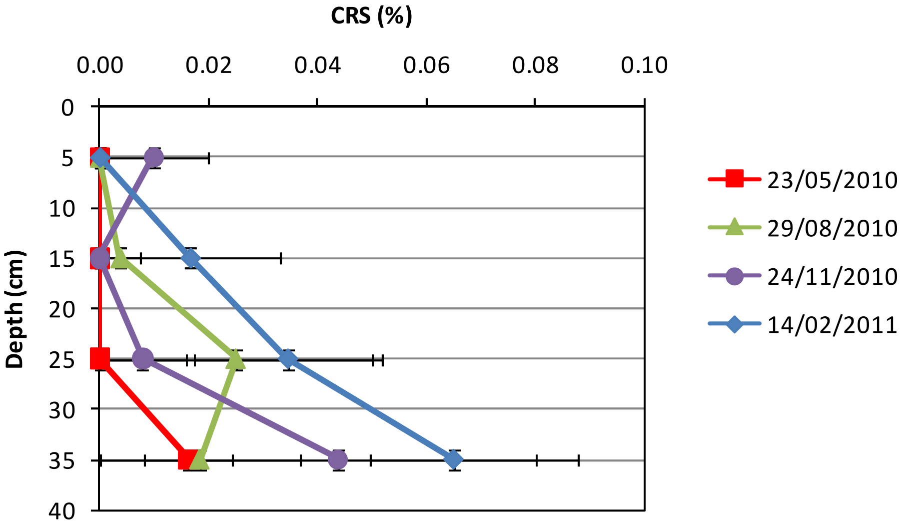

Figure 5-30. Poltalloch field CRS dynamics in the surface soil (0-40 cm) at the *Juncus* plantings in Bevy rye site.

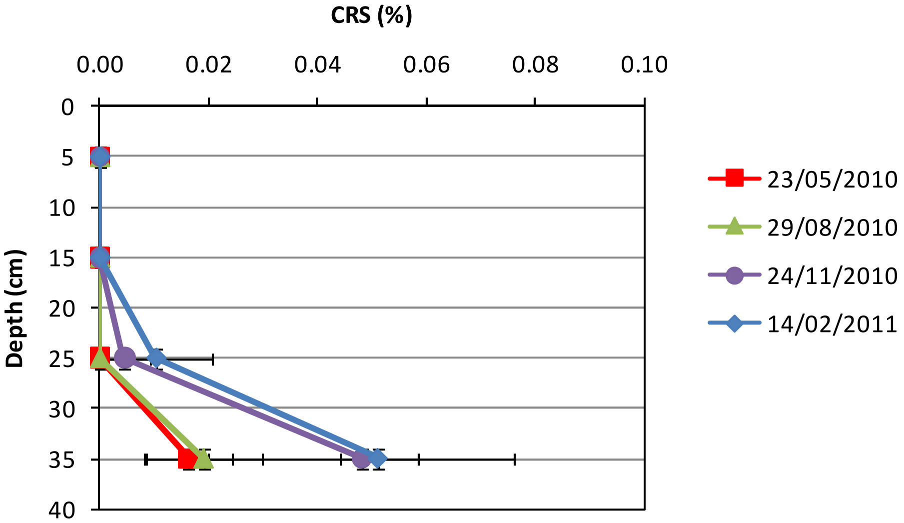

Figure 5-31. Poltalloch field CRS dynamics in the surface soil (0-40 cm) at the Bevy rye only site.

5.1.2.5 Total organic carbon (TOC) and hydrolysable carbon

The total organic carbon and hydrolysable carbon contents measured at the two Poltalloch sites in both August 2010 and February 2011 are shown below in Figures 5-32 – 5-35. The carbon contents at the Poltalloch sites are discussed in detail in Section 5.2.2.

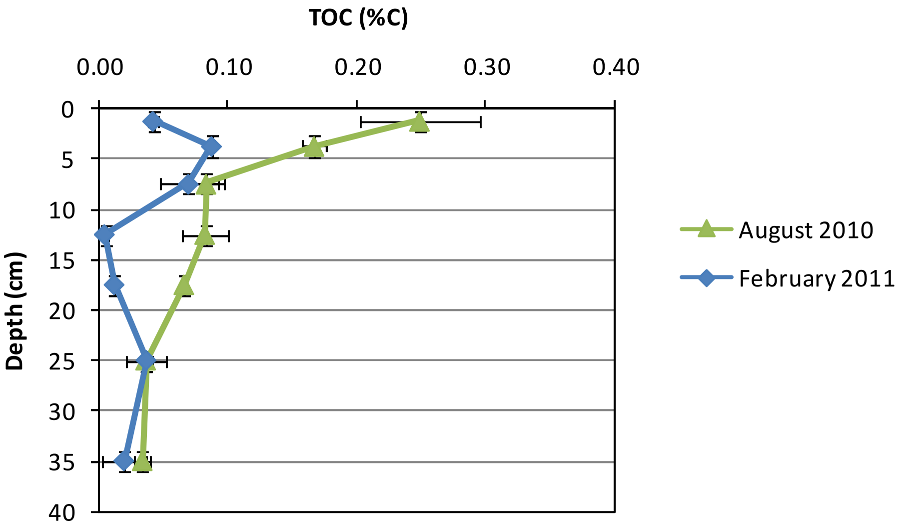

Figure 5-32. Poltalloch field TOC in the surface soil (0-40 cm) at the *Juncus* plantings in Bevy rye site (August 2010 and February 2011).

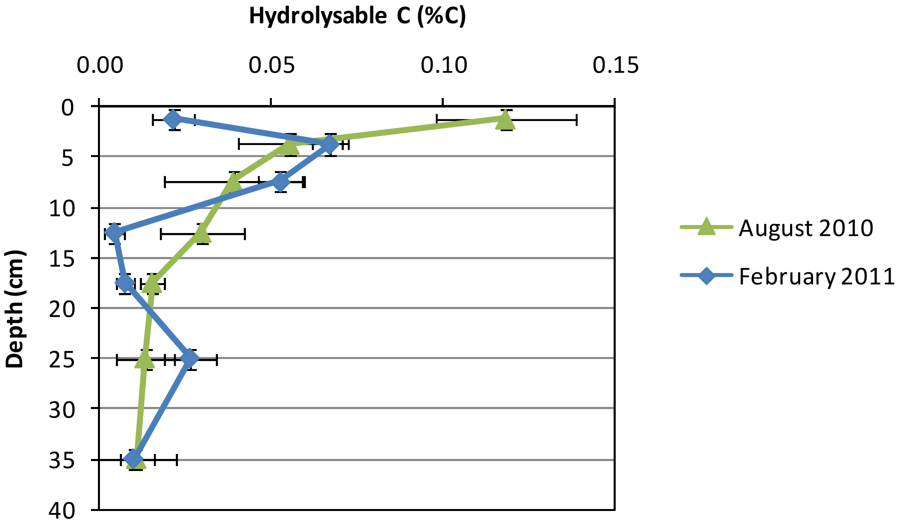

Figure 5-33. Poltalloch field hydrolysable C in the surface soil (0-40 cm) at the *Juncus* plantings in Bevy rye site (August 2010 and February 2011).

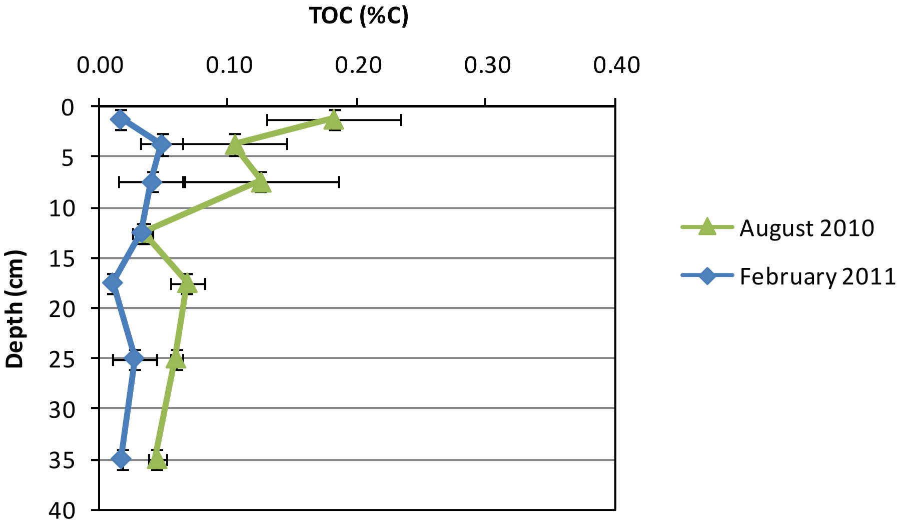

Figure 5-34. Poltalloch field TOC in the surface soil (0-40 cm) at the Bevy rye only site (August 2010 and February 2011).

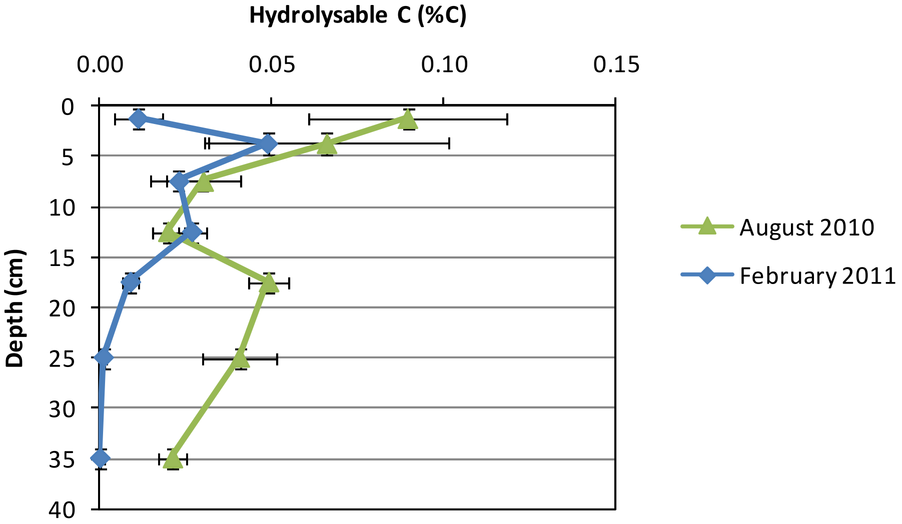

Figure 5-35. Poltalloch field hydrolysable C in the surface soil (0-40 cm) at the Bevy rye only site (August 2010 and February 2011).

5.1.3 Tolderol

5.1.3.1 pH$_{(1:1,\ soil:water)}$ and TAA

The control site (from 0 - 60 cm) and the Bevy rye site (only 10 -60 cm) initially were acidic (pH < ~4) prior to inundation (Figures 5-36 – 5-37). Upon lake filling in August the pHs of the surface soil layers down to 40 cm depth in the control site further acidified considerably likely due to acidity exchange from the soil from the inundating waters. This acidification upon inundation effect was confined to the 20 – 50 cm layer in the Bevy rye site.

During prolonged inundation of both sites the pHs of both sites increased although this was most pronounced in the Bevy rye site in comparison with the control site.

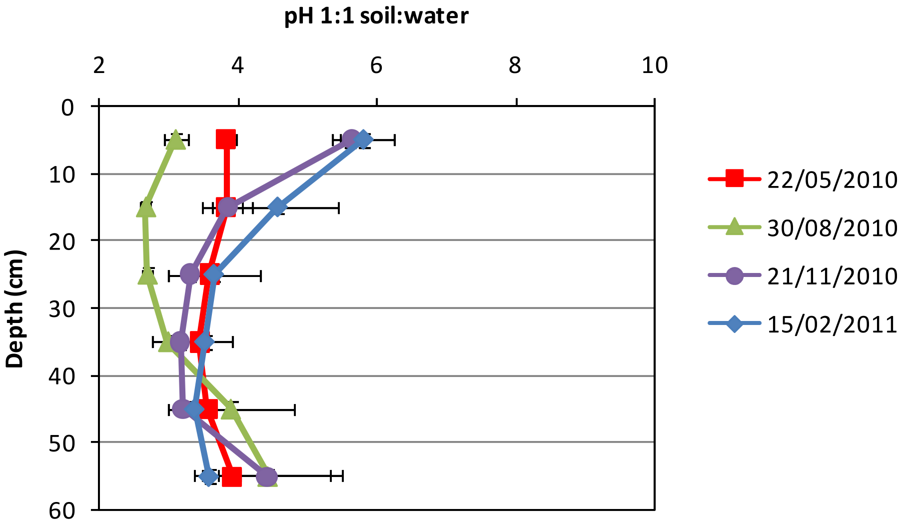

Figure 5-36. Tolderol field pH dynamics at the control site.

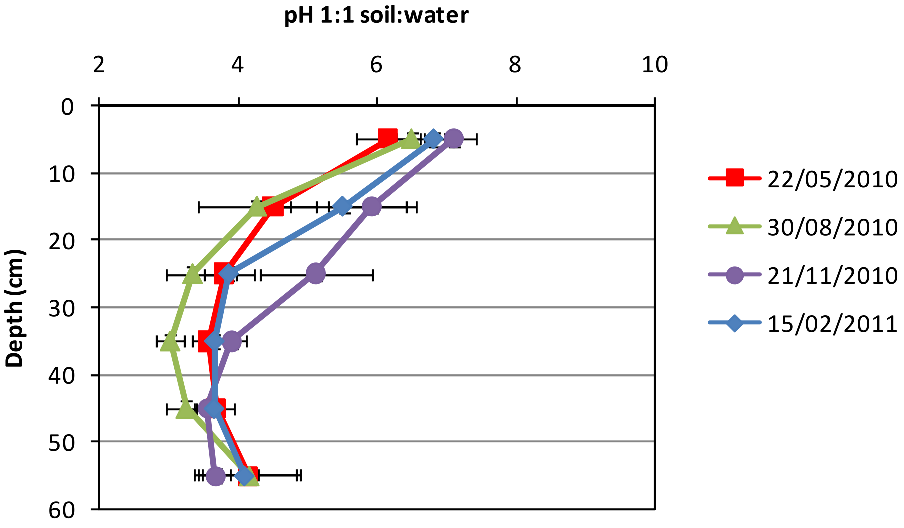

Figure 5-37. Tolderol field pH dynamics at the *Juncus* in Bevy rye site.

The TAAs (Figures 5-38 – 5-39) were all very low (i.e. < 18 mol H^+ t^{-1}) in each soil layer, and were especially low in the surface sediment layers of the Bevy rye site (i.e. initially ~3 mol H^+ t^{-1}). The TAAs generally decreased with prolonged exposure in all Bevy rye site soil layers but only in the surficial layer (0 – 10 cm) of the control site.

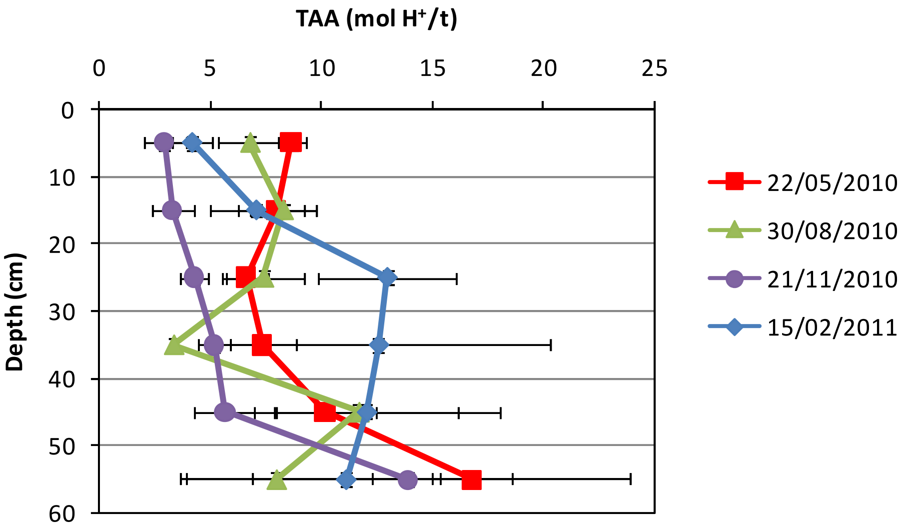

Figure 5-38. Tolderol field TAA dynamics at the control site.

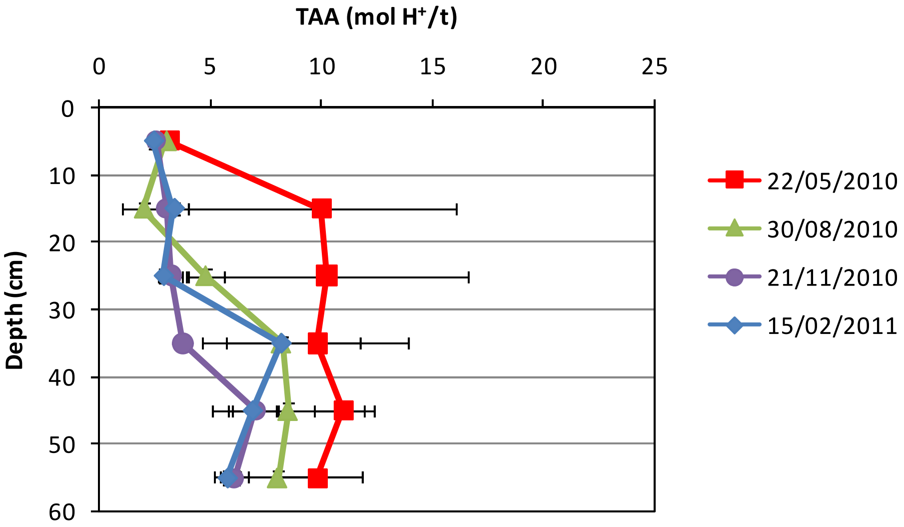

Figure 5-39. Tolderol field TAA dynamics at the *Juncus* in Bevy rye site.

5.1.3.2 Redox potential (Eh)

All sites initially (i.e. in May) had oxic conditions (Figures 5-40 – 5-41), but during the inundation process increasingly reductive conditions developed throughout the whole profile down to 40 cm during the prolonged inundation. It is noticeable that the reduction in Eh in the surficial layers occurred much earlier (e.g. by August) and more intensively (i.e. down to 200 mV cf. 300 mV in the 0 – 1- cm layer) in the Bevy rye site as compared to the control site.

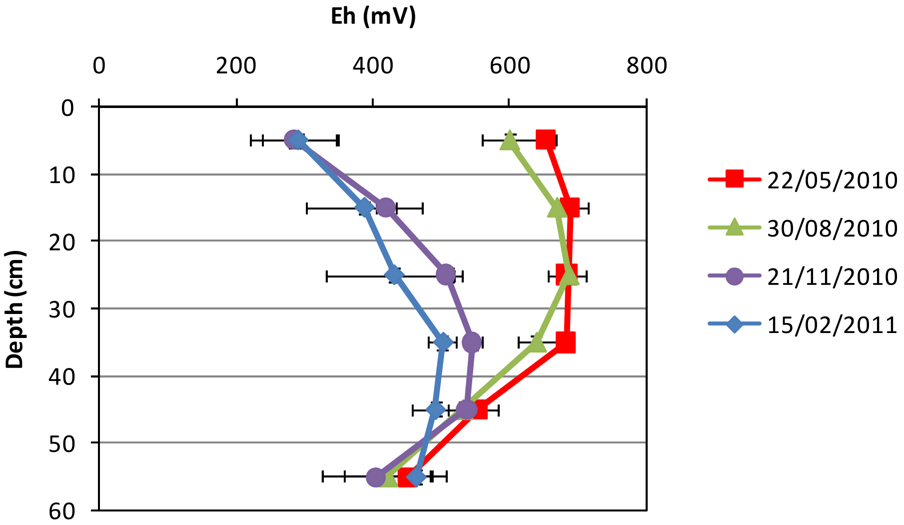

Figure 5-40. Tolderol field Eh dynamics at the control site.

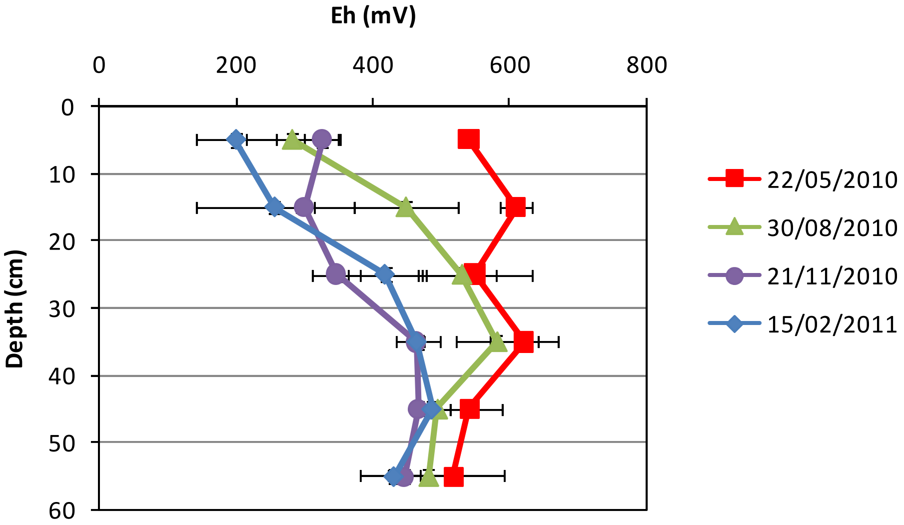

Figure 5-41. Tolderol field Eh dynamics at the *Juncus* in Bevy rye site.

5.1.3.3 Electrical conductivity (EC)

The salinity (i.e. EC) did not change appreciably from before inundation to after prolonged inundation. As shown in Figures 5-42 – 5-43 the salinity in the surface layers (0 – 10 cm) of both treatments fell from ~300 mS cm^{-1} to ~150 mS cm^{-1} after prolonged inundation. The salinities of the soil layers gradually increased to ~600 mS cm^{-1} at 60 cm.

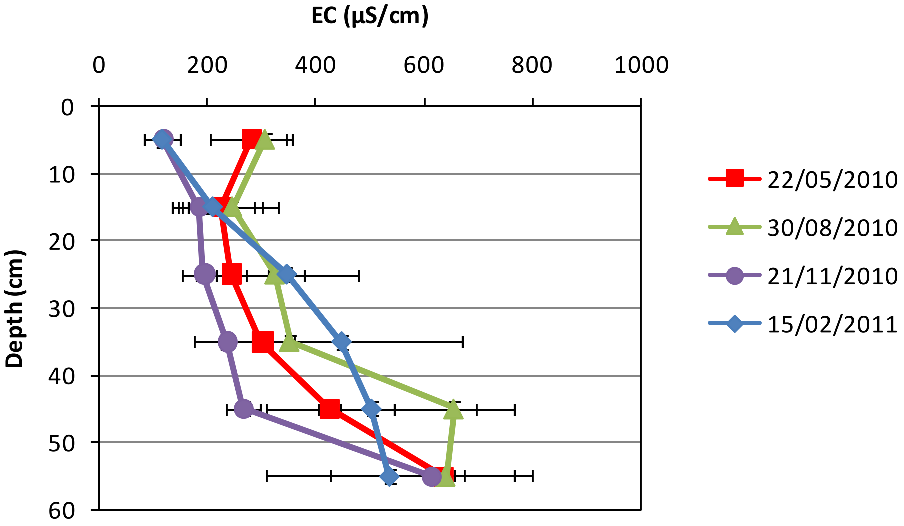

Figure 5-42. Tolderol field EC dynamics at the control site.

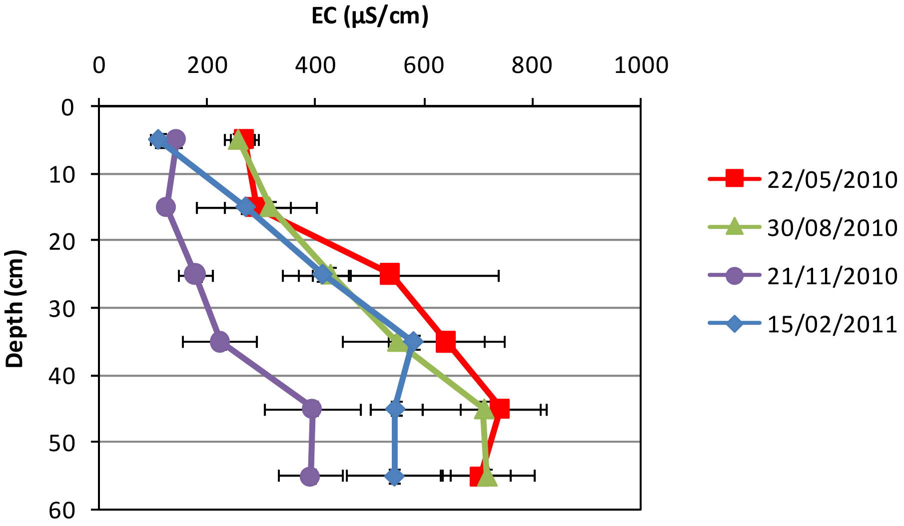

Figure 5-43. Tolderol field EC dynamics at the *Juncus* in Bevy rye site.

5.1.3.4 Chromium reducible sulfur (CRS)

The CRS contents were very low (i.e. < 0.02% S) in the surficial layers (0 – 40 cm) at both sites prior to inundation (Figures 5-44 – 5-45). There was clear evidence of the accumulation of appreciable concentrations reduced inorganic sulfides (i.e. up to 0.06% S as CRS) in only the 30 – 40 cm deep layers after prolonged inundation.

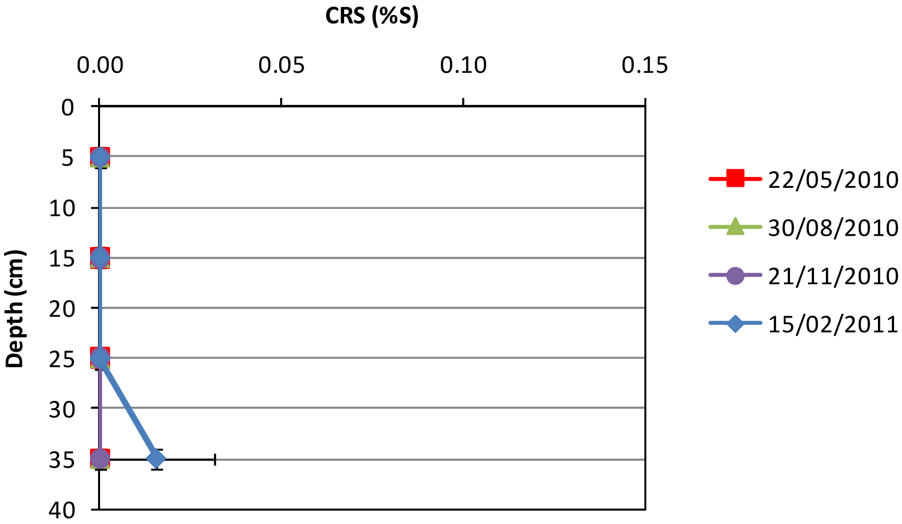

Figure 5-44. Tolderol field CRS dynamics in the surface soil (0-40 cm) at the control site.

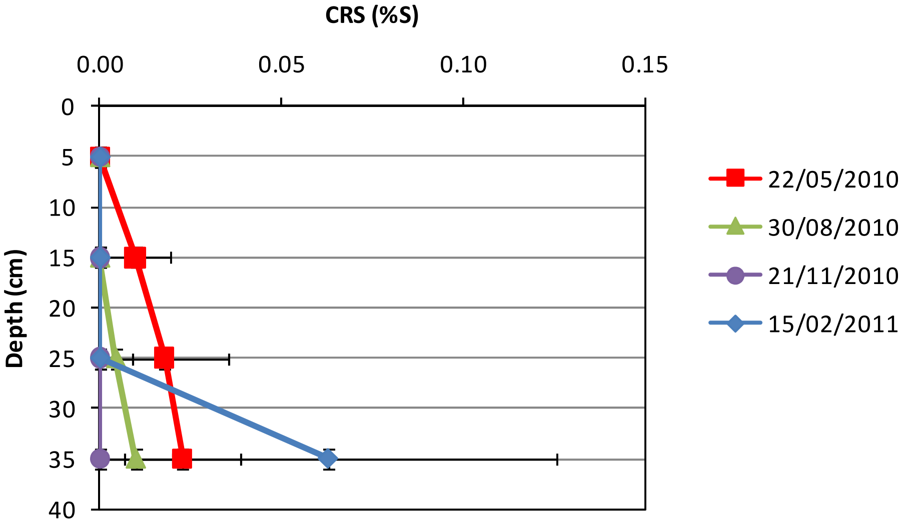

Figure 5-45. Tolderol field CRS dynamics in the surface soil (0-40 cm) at the *Juncus* in Bevy rye site.

5.1.3.5 Total organic carbon (TOC) and hydrolysable carbon

The total organic carbon and hydrolysable carbon contents measured at the two Tolderol sites in both August 2010 and February 2011 are shown below in Figures 5-46 – 5-49. The carbon contents at the Tolderol sites are discussed in detail in Section 5.2.3.

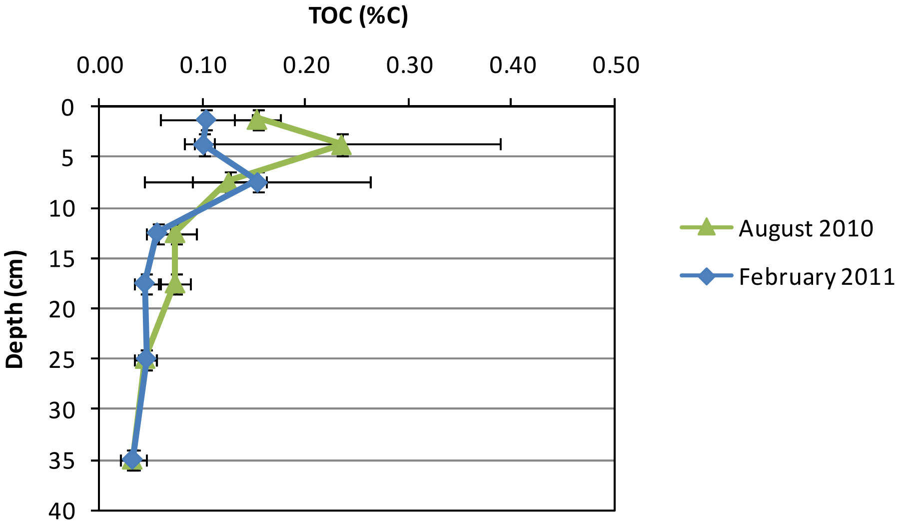

Figure 5-46. Tolderol field TOC in the surface soil (0-40 cm) at the control site (August 2010 and February 2011).

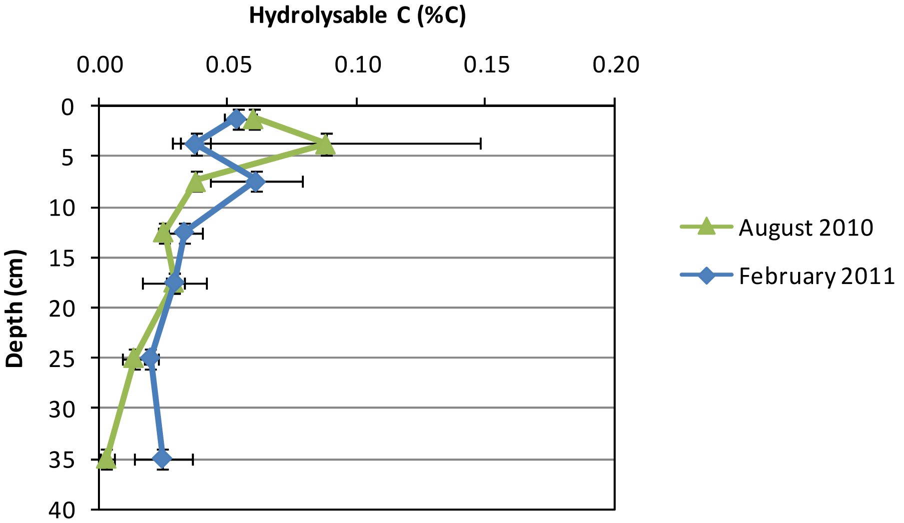

Figure 5-47. Tolderol field hydrolysable C in the surface soil (0-40 cm) at the control site (August 2010 and February 2011).

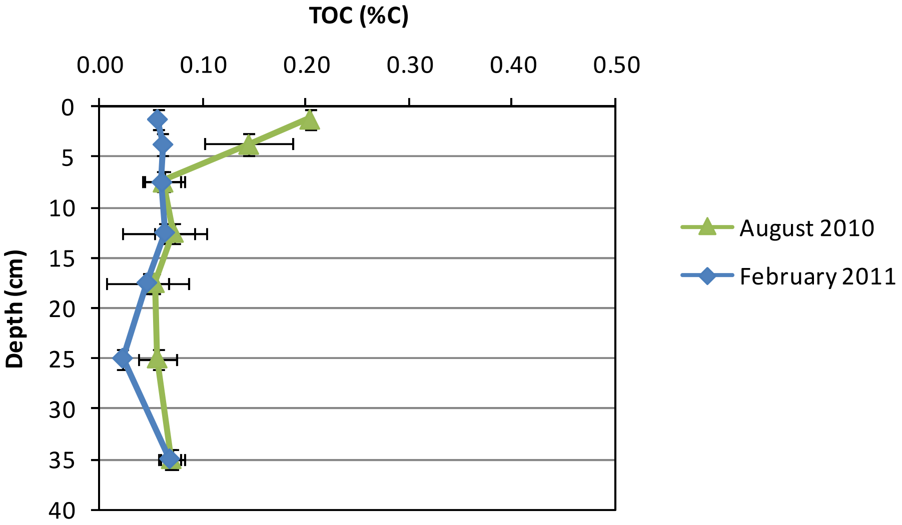

Figure 5-48. Tolderol field TOC in the surface soil (0-40 cm) at the *Juncus* in Bevy rye site.

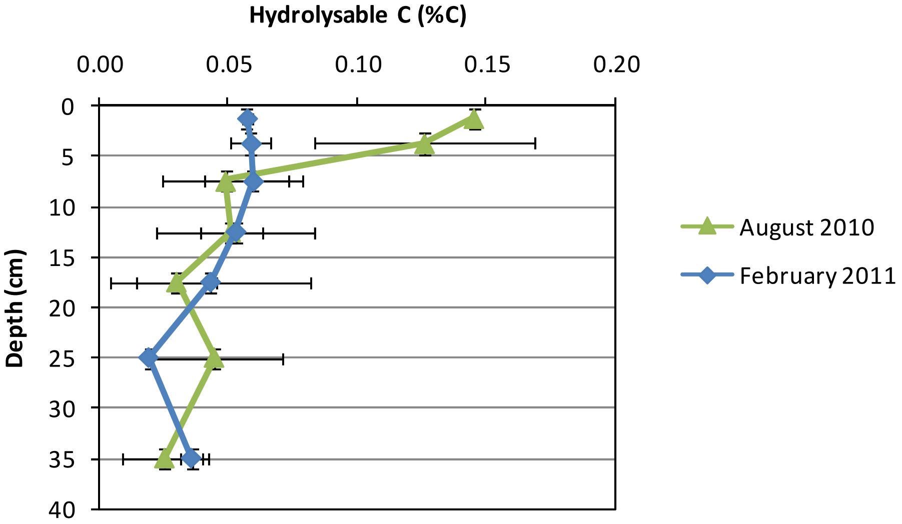

Figure 5-49. Tolderol field hydrolysable C in the surface soil (0-40 cm) at the *Juncus* in Bevy rye site.

5.1.4 Campbell Park

5.1.4.1 pH$_{(1:1,\ soil:water)}$ and TAA

Both sites initially had acidic soil layers prior to the inundation that took place after the August sampling (Figures 5-50 – 5-51). For the control site this acidic layer was severely acidic pH < 3 down to 30 cm depth where as for the vegetated site only the 10 – 40 cm was severely acidified: the surface layer (0 – 10 cm) had a pH of ~6.5.

Prior to inundation the surficial layer of the vegetated treatment were elevated relative to the control treatment. As these treatments were not able to be sampled separately prior to the establishment of the vegetation is not possible to ascribe this pH difference directly to the presence of the vegetation. Indeed it was noticed that the control treatment had suffered from severe erosion post the establishment of the vegetation whereas the vegetated treatment was protected from the erosion. Therefore differences in the surficial pHs of the vegetated site and the control treatments are complicated at this site due to erosion exposing acidic subsoils in the case of the control sites.

The pH of the surface layers of both sites increased after inundation to a pH of 6.5 for the control site and 7.5 for the vegetated site.

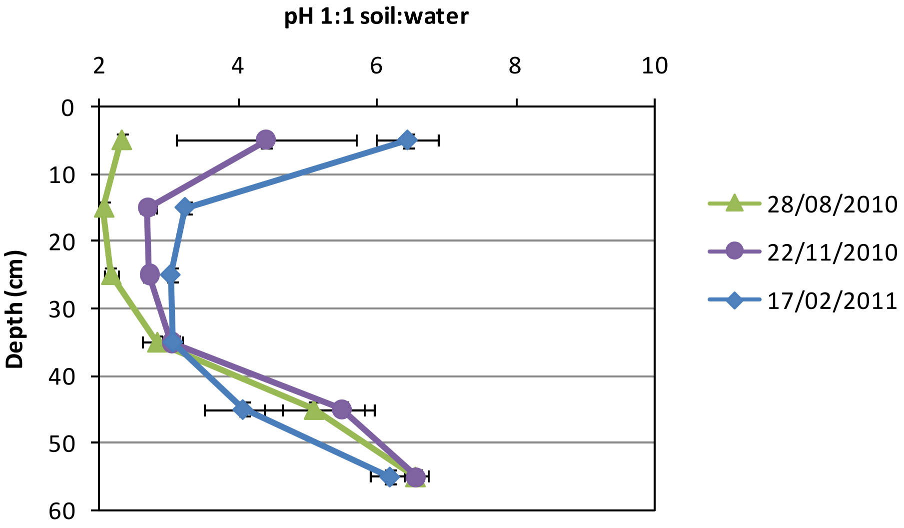

Figure 5-50. Campbell Park field pH dynamics at the control site.

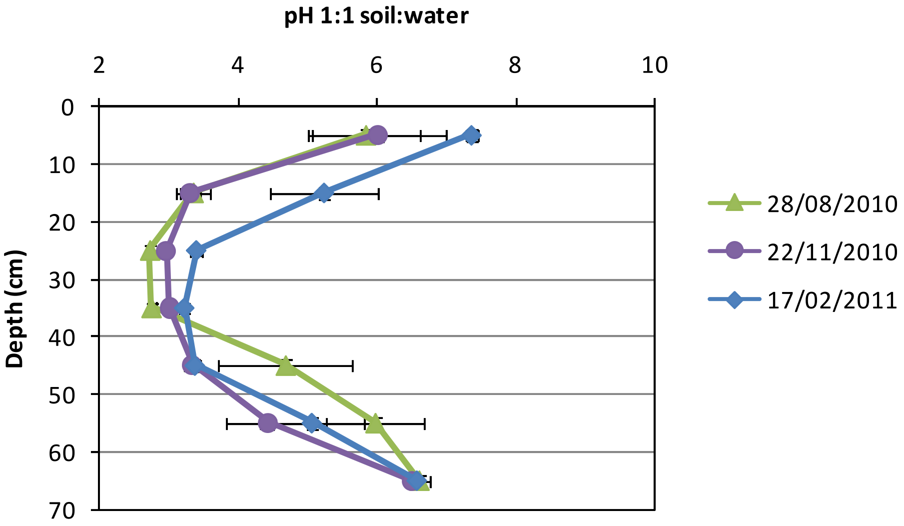

Figure 5-51. Campbell Park field pH dynamics at the Bevy rye/*Puccinellia* site.

The TAAs (Figures 5-52 – 5-53) were all low in the surface soil layers (i.e. < 18 mol H^+ t^{-1}) but increased up to 35 mol H^+ t^{-1} in the 30 - 50 cm layers of each site both prior to and during inundation. This is the zone that contains appreciable quantities of jarosite and other iron oxides and this may account for the much higher TAAs found at Campbell Park compared to the other experimental location.

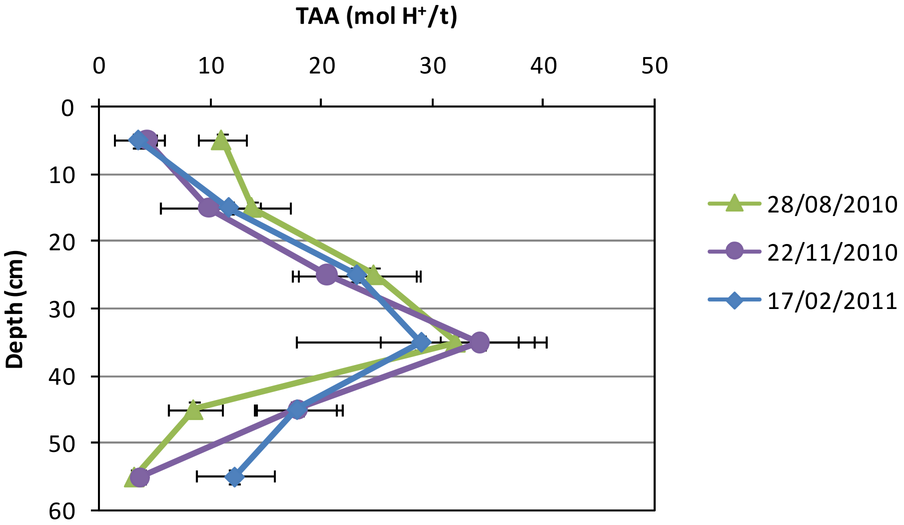

Figure 5-52. Campbell Park field TAA dynamics at the control site.

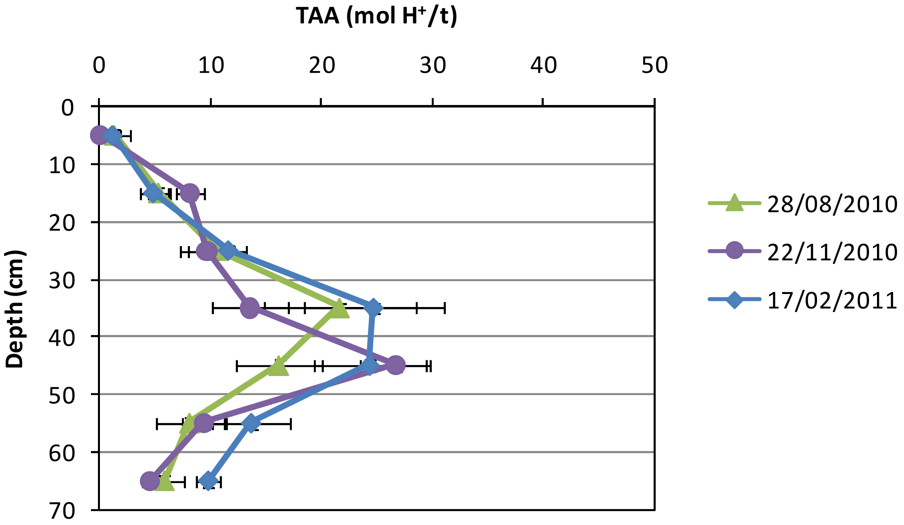

Figure 5-53. Campbell Park field TAA dynamics at the Bevy rye/*Puccinellia* site.

5.1.4.2 Redox potential (Eh)

All sites initially (i.e. in August) had oxic conditions of from 400 – 700 mV in the top 40 cm sandy-textured layers (Figures 5-54 – 5-55), but during the inundation process increasingly reductive conditions developed throughout these layers especially in the top 20 cm of the sediment where the Eh decreased down to 150 mV.

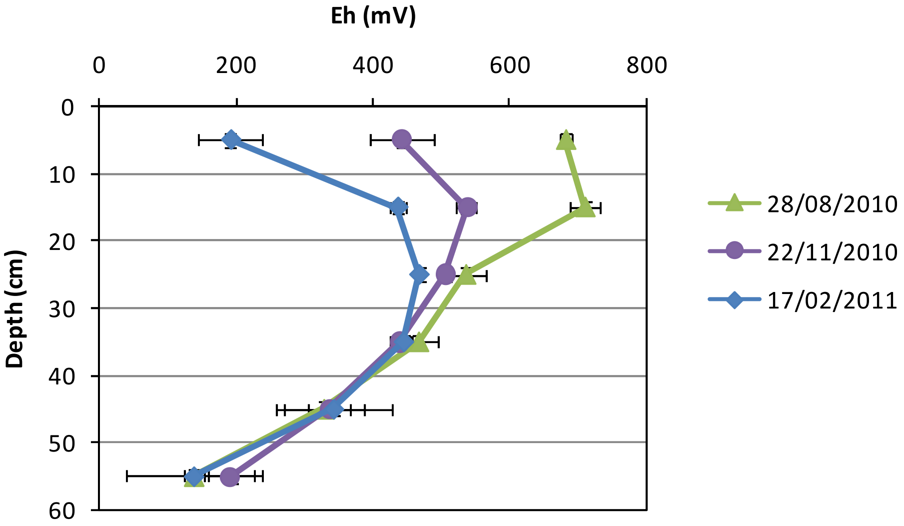

Figure 5-54. Campbell Park field Eh dynamics at the control site.

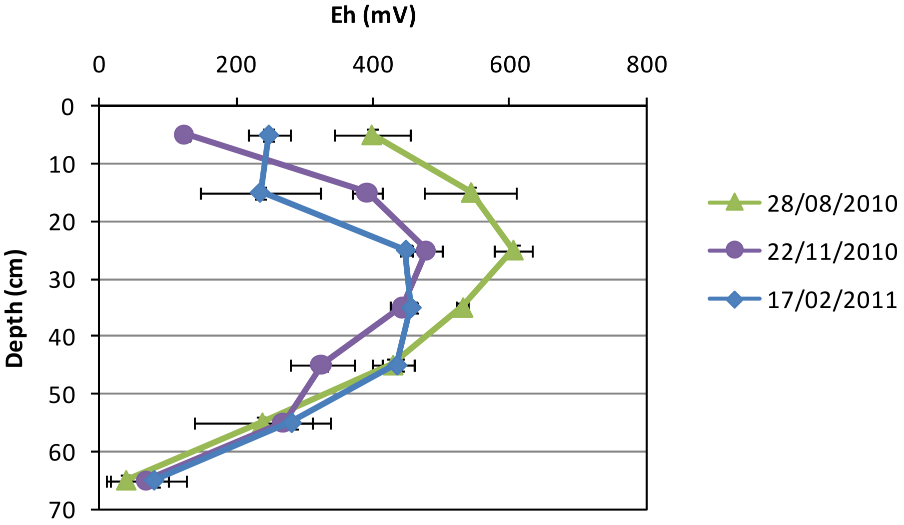

Figure 5-55. Campbell Park field Eh dynamics at the Bevy rye/*Puccinellia* site.

5.1.4.3 Electrical conductivity (EC)

The salinity (i.e. EC) did not change appreciably from before inundation to after prolonged inundation as shown in Figures 5-56 – 5-57. The salinity in all treatments was between 500 and 1200 mS cm^{-1} in the surface layers down to ~ 30 cm depth but increased from 1,500 – 2,000 mS cm^{-1} to 3,000 – 4,000 mS cm^{-1} below 30 cm in the February sampling period.

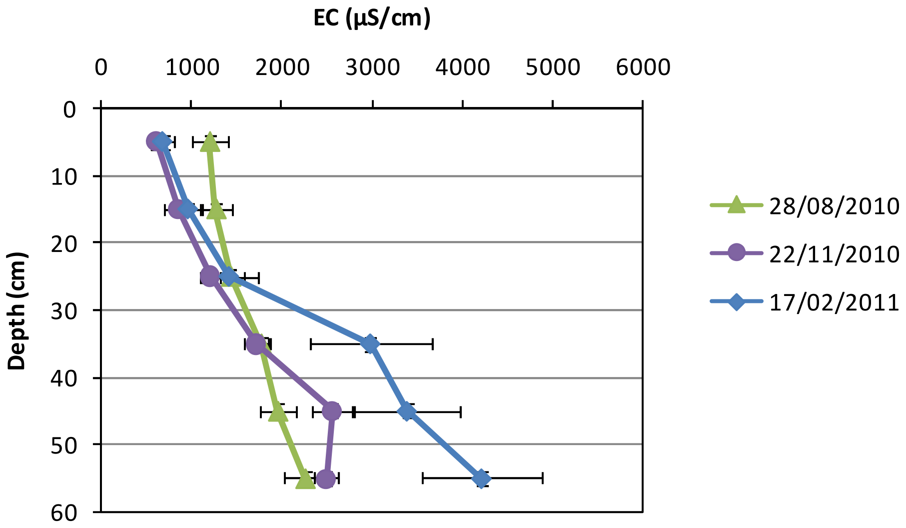

Figure 5-56. Campbell Park field EC dynamics at the control site.

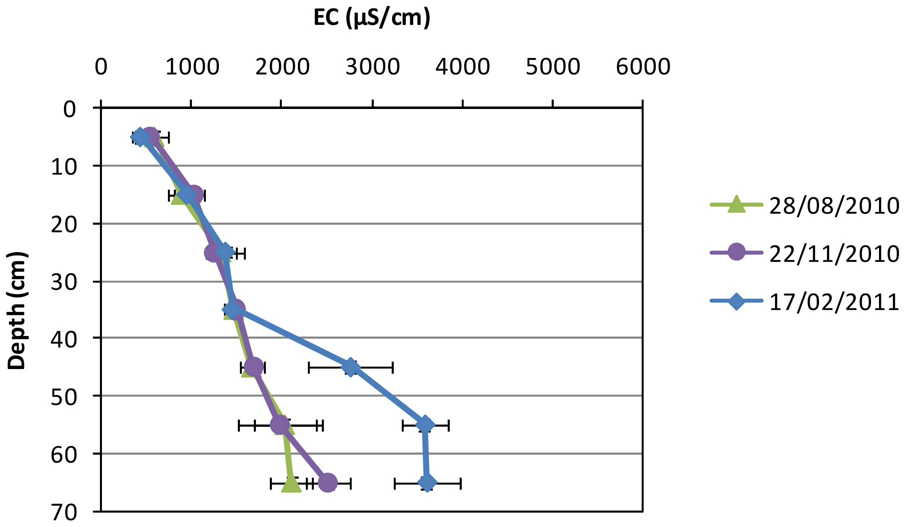

Figure 5-57. Campbell Park field EC dynamics at the Bevy rye/*Puccinellia* site.

5.1.4.4 Chromium reducible sulfur (CRS)

The CRS contents were low (i.e. < 0.08% S) in the surficial layers (0 – 40 cm) at both sites (Figures 5-58 – 5-59) prior to inundation. There was clear evidence of the accumulation of minor amounts of reduced inorganic sulfides (i.e. up to 0.02% S as CRS) only in the 20 – 40 cm deep layers of the vegetated site after prolonged inundation.

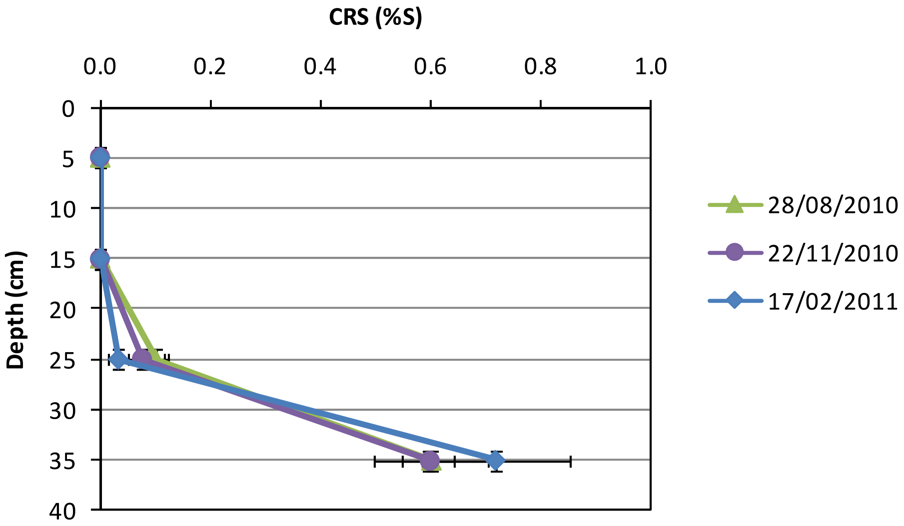

Figure 5-58. Campbell Park field CRS dynamics in the surface soil (0-40 cm) at the control site.

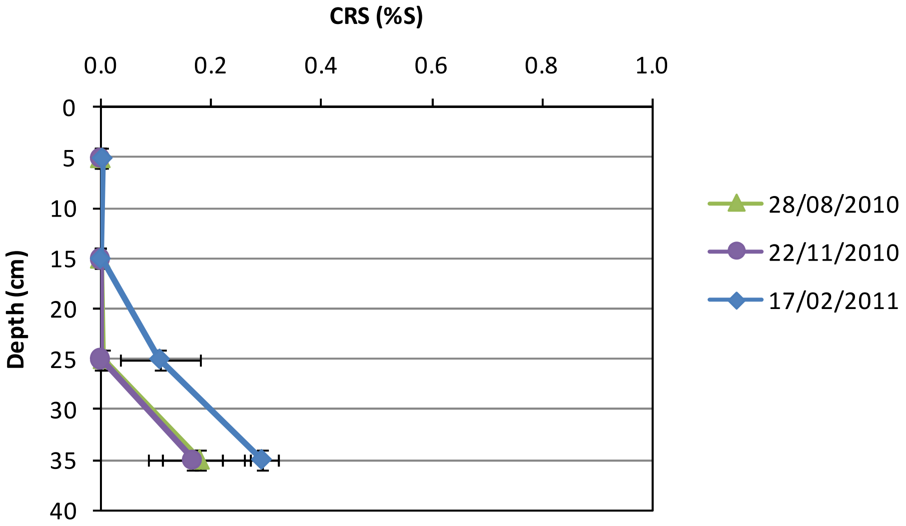

Figure 5-59. Campbell Park field CRS dynamics in the surface soil (0-40 cm) at the Bevy rye/*Puccinellia* site.

5.1.4.5 Total organic carbon (TOC) and hydrolysable carbon

The total organic carbon and hydrolysable carbon contents measured at the two Campbell Park sites in both August 2010 and February 2011 are shown below in Figures 5-60 – 5-63. The carbon contents at the Campbell Park sites are discussed in detail in Section 5.2.4.

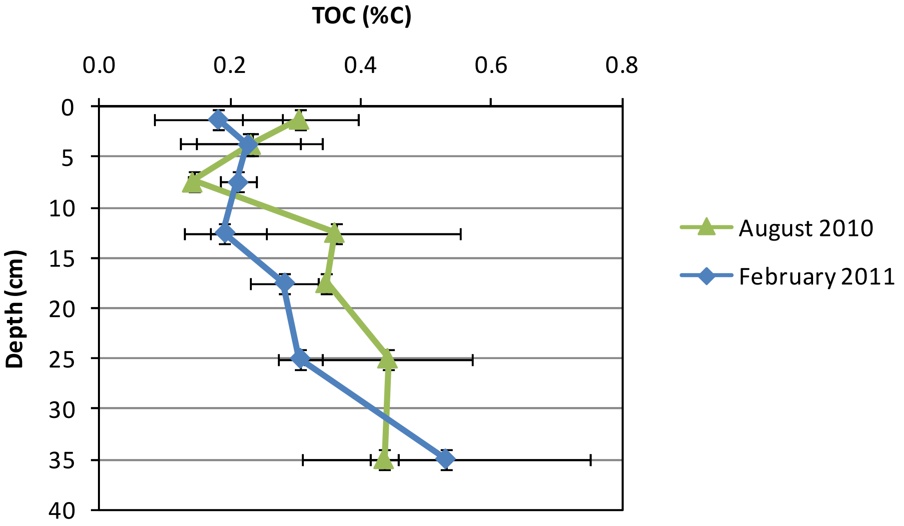

Figure 5-60. Campbell Park field TOC in the surface soil (0-40 cm) at the control site (August 2010 and February 2011).

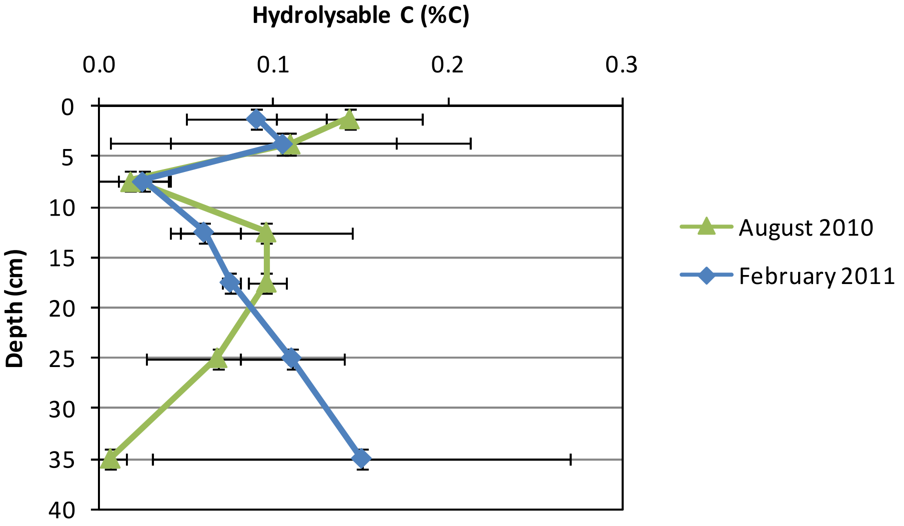

Figure 5-61. Campbell Park field hydrolysable C in the surface soil (0-40 cm) at the control site (August 2010 and February 2011).

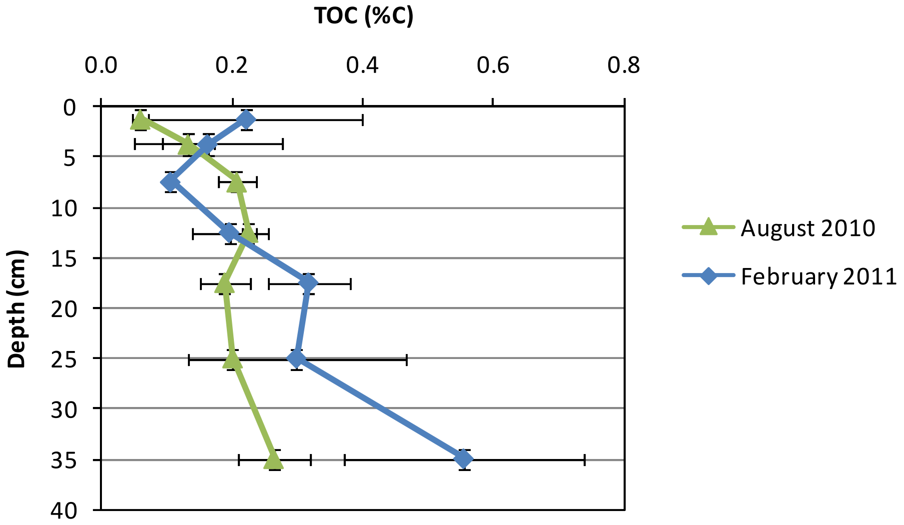

Figure 5-62. Campbell Park field TOC in the surface soil (0-40 cm) at the Bevy rye/*Puccinellia* site (August 2010 and February 2011).

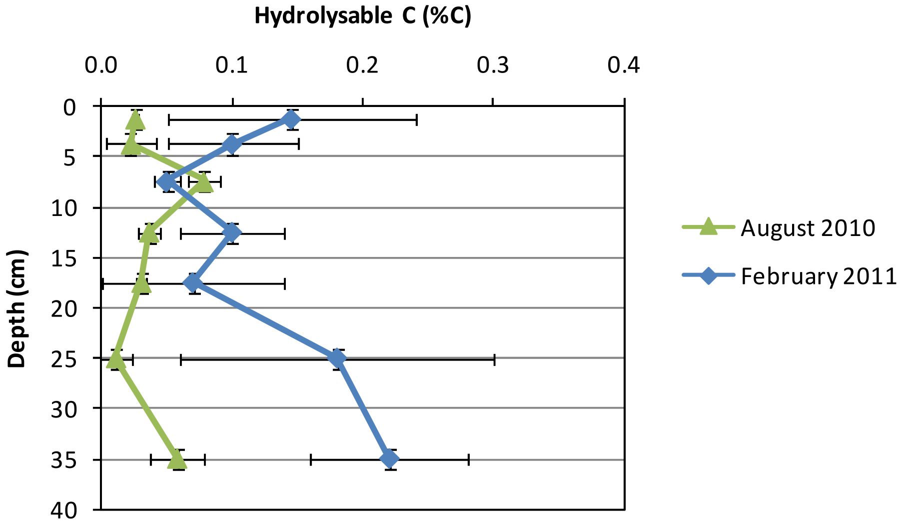

Figure 5-63. Campbell Park field hydrolysable C in the surface soil (0-40 cm) at the Bevy rye/*Puccinellia* site (August 2010 and February 2011).

5.2 Sulfate reduction rates

5.2.1 Waltowa sulfate reduction rates

The sulfate reduction rates measured at the three Waltowa sites in both August 2010 and February 2011 are shown below in Figures 5-64, 5-65 and 5-66.

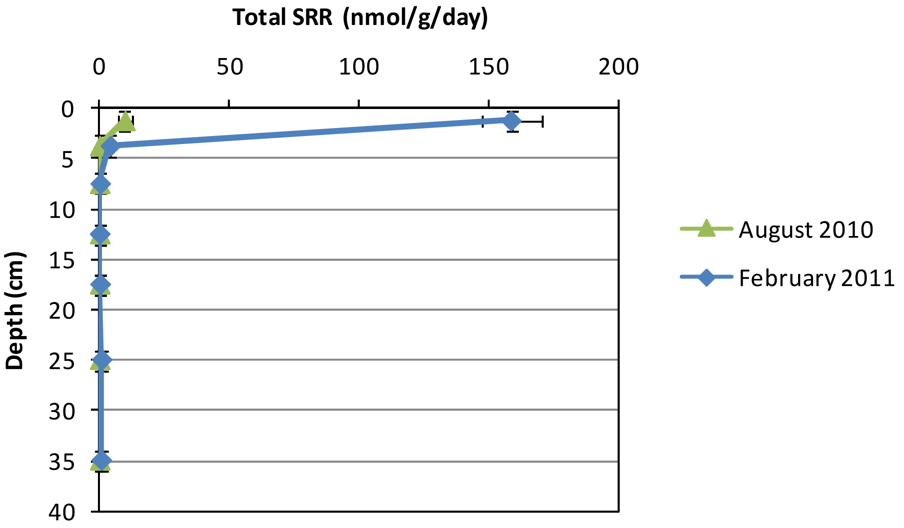

Figure 5-64. Waltowa sulfate reduction rates (nmol/g/day) at the established *Phragmites* site in August 2010 and February 2011.

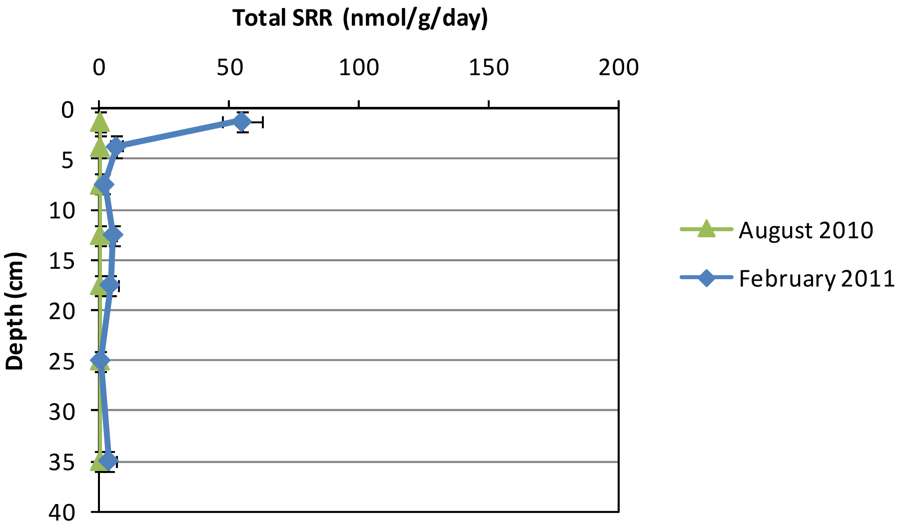

Figure 5-65. Waltowa sulfate reduction rates (nmol/g/day) at the established *Cotula* site in August 2010 and February 2011.

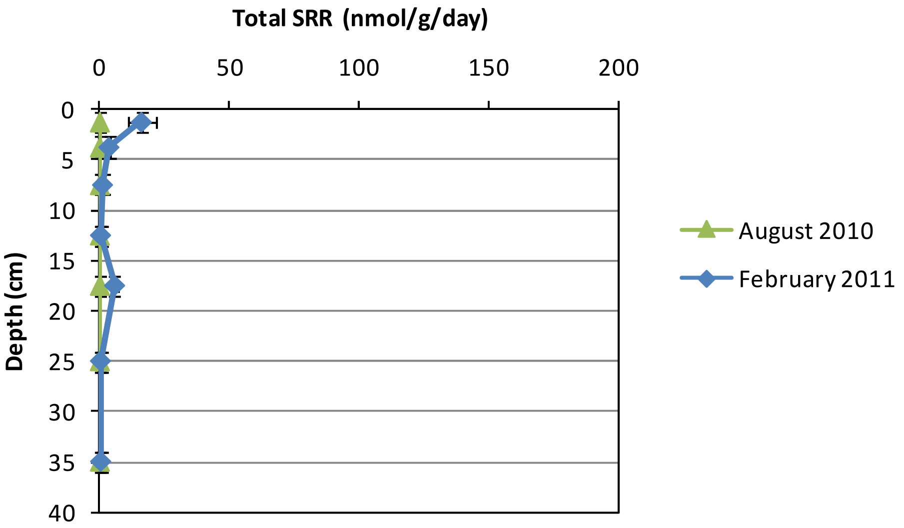

Figure 5-66. Waltowa sulfate reduction rates (nmol/g/day) at the established *Juncus* site in August 2010 and February 2011.

Figures 5-64 – 5-66 clearly show:

- Sulfate reduction was mainly limited to the 0 - 2.5 cm layer of the sediment at each treatment site.
- Sulfate reduction in the near inundating conditions in the August assessment period only allowed limited sulfate reduction and only in the *Phragmites* treatment and only at relatively low rates (i.e. ~10 nmolg^{-1}day^{-1}).
- Prolonged (i.e. ~6 months) inundation by the February period allowed appreciable sulfate reduction to occur in the 0 - 2.5 cm layer of all treatments (Figure 5-67), but with much higher rates in the *Phragmites* treatment (i.e. 170 nmolg^{-1}day^{-1}) than in the *Cotula* treatment (32 nmolg^{-1}day^{-1}) or the *Juncus* treatment (~15 nmolg^{-1}day^{-1}).
- There was limited sulfate reduction (i.e. < 10 nmolg^{-1}day^{-1}) occurring down to the 20 cm layer in both the *Cotula* and *Juncus* treatments during the February sampling period (Figures 5-65 and 5-66).

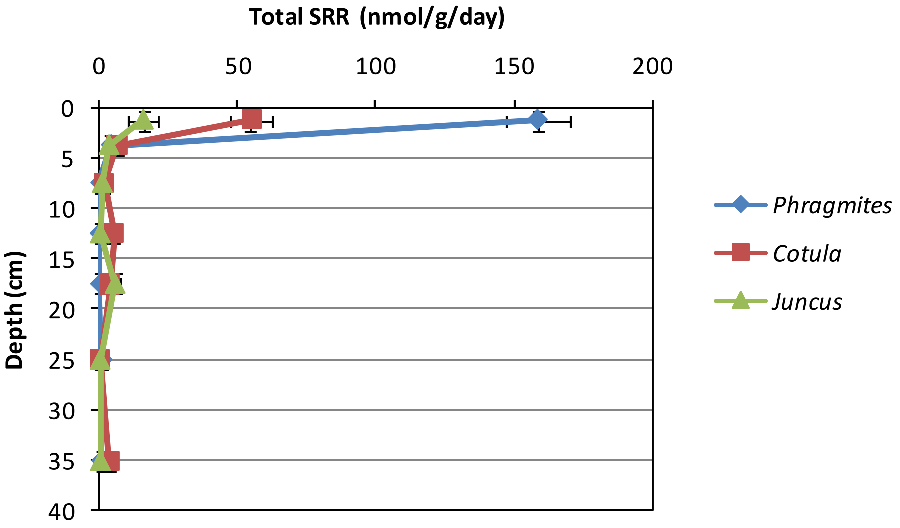

Figure 5-67. Waltowa sulfate reduction rates (nmol/g/day) at the established *Phragmites*, *Cotula* and *Juncus* sites in February 2011.

Figures 5-68 to 5-70 show that during the sulfate reduction period in February that the bulk of the sulfate that was reduced ended up in the form of elemental sulfur, although there was some accumulation of monosulfides (as measured as Acid Volatile Sulfur (AVS)) and pyrite.

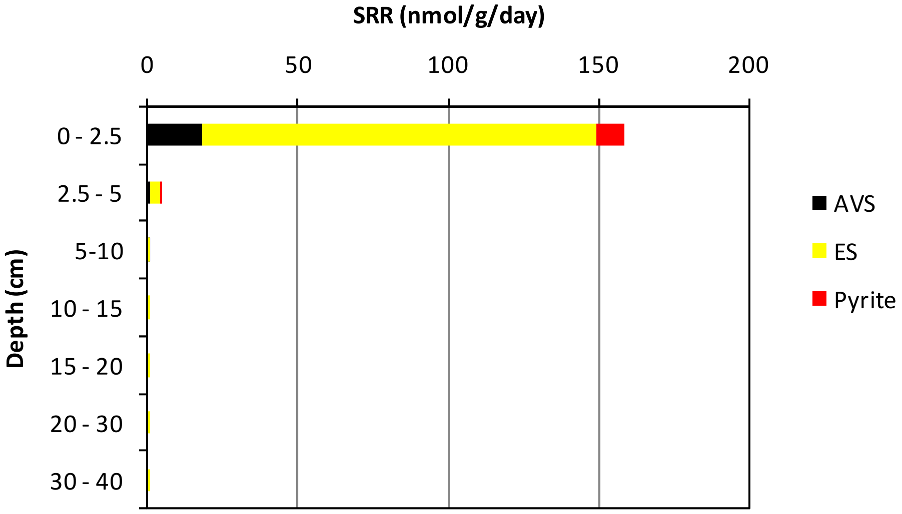

Figure 5-68. Products of sulfate reduction at the established *Phragmites* site, Waltowa (February 2011).

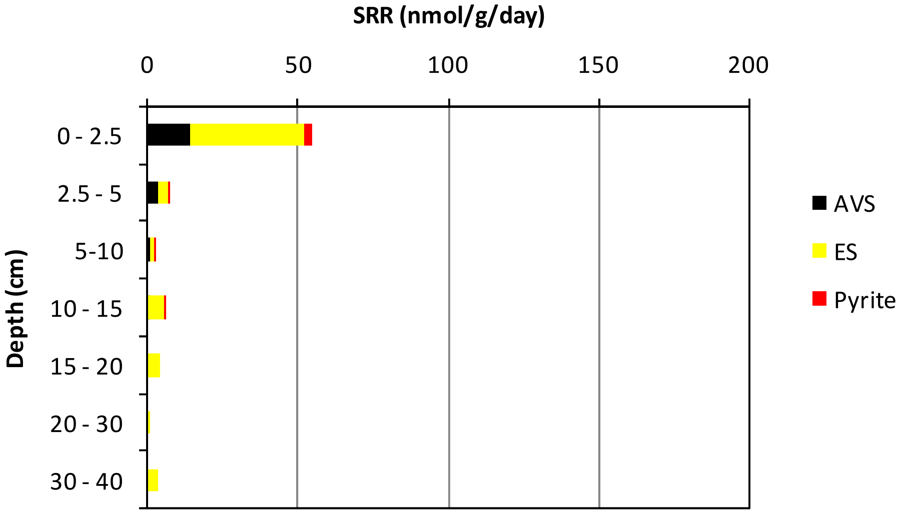

Figure 5-69. Products of sulfate reduction at the established *Cotula* site, Waltowa (February 2011).

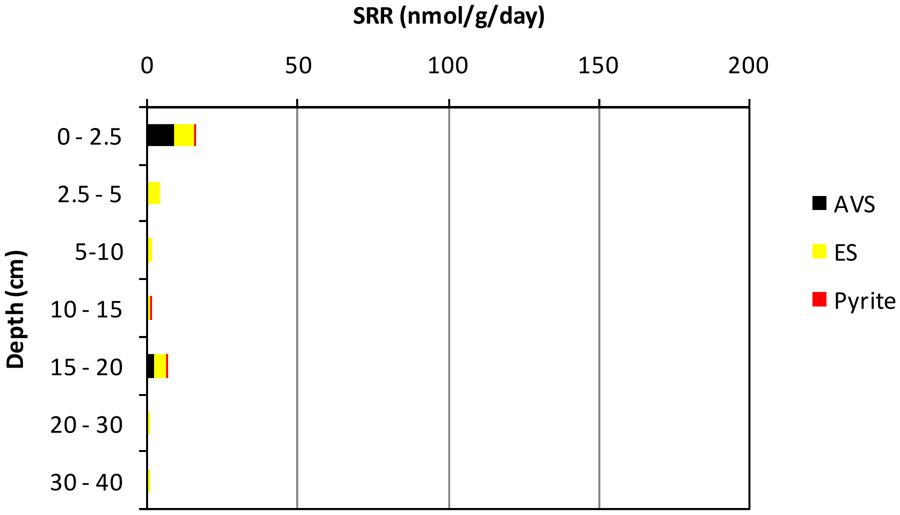

Figure 5-70. Products of sulfate reduction at the established *Juncus* site, Waltowa (February 2011).

The total organic matter contents at these sites (see Figures 5-16, 5-18 and 5-20 in Section 5.1.1.5) indicate that after inundation occurred at this location the concentration of organic matter in the surficial layers rapidly began to decrease in the *Juncus* (from 2.3% TOC in August to 0.9% TOC in February) and *Cotula* (from 3.5% TOC in August to 2.1% TOC in February) treatments. Some of this decomposition was via sulfate reduction as shown previously. In the *Phragmites* treatment, in contrast to the other two treatments, the presence of this vigorous growing vegetation instead of the completely inundated and decomposing *Cotula* and *Juncus* organic matter caused the TOC concentration to be essentially maintained in this surficial sediment layer with only a minor decrease of TOC from 3.9% TOC in August to 3.7% TOC in February.

The hydrolysable C data for these three sites are also shown in Section 5.1.1.5 (Figures 5-17, 5-19 and 5-21) and support the total organic matter data with approximately 0.5% hydrolysable carbon content in the uppermost (0 – 2.5 cm) layer. Hydrolysable carbon is regarded as available carbon and in decaying vegetation such as under recent flooded vegetation as in the experimental sites, is a balance between losses arising from processes such as sulfate reduction and gains due to lysis of vegetative material. Under these conditions both hydrolysable carbon and total organic carbon are desirable as the hydrolysable carbon contents inform on the availability of organic matter for sulfate reduction, whereas the total organic carbon gives a better view on the net accumulation or decomposition of organic matter.

The pore-water properties in the inundation cores sampled from the *Phragmites* site (Figure 5-71) clearly indicate that sulfate was being consumed by sulfate reduction during the prolonged periods of the inundation. The increase in Cl:SO_4 ratio was more prominent in the *Phragmites* treatment than in the other two treatments in line with the ^{35}S-sulfate reduction data discussed previously. These data suggest that it is likely that at Waltowa for the *Phragmites* treatment that a ready source of sulfate may become constraint on sulfate reduction in the future.

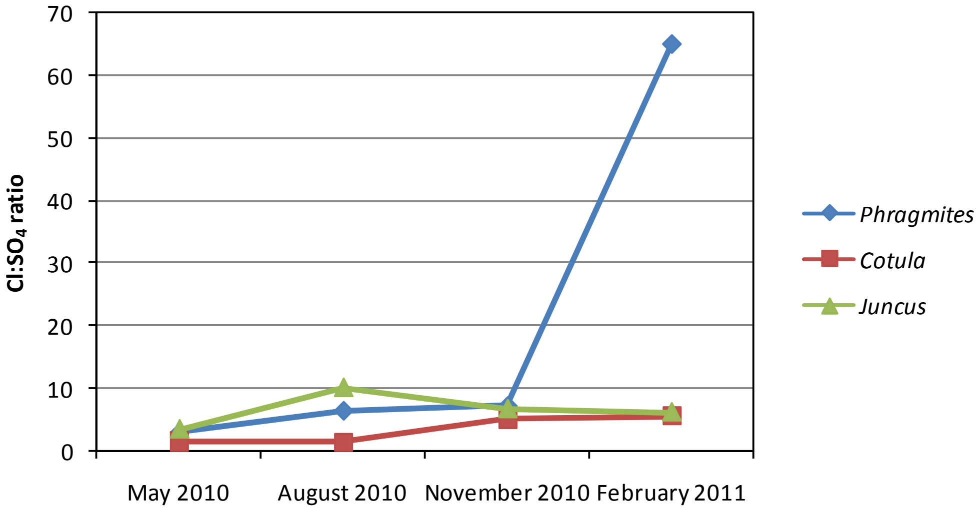

Figure 5-71. $Cl:SO_4$ ratios after 2 weeks of inundation in the 11 cm pore-water at Waltowa.

5.2.2 Sulfate reduction rates at Poltalloch

The sulfate reduction rates measured at the two Poltalloch sites in both August 2010 and February 2011 are shown below in Figures 5-72 and 5-73.

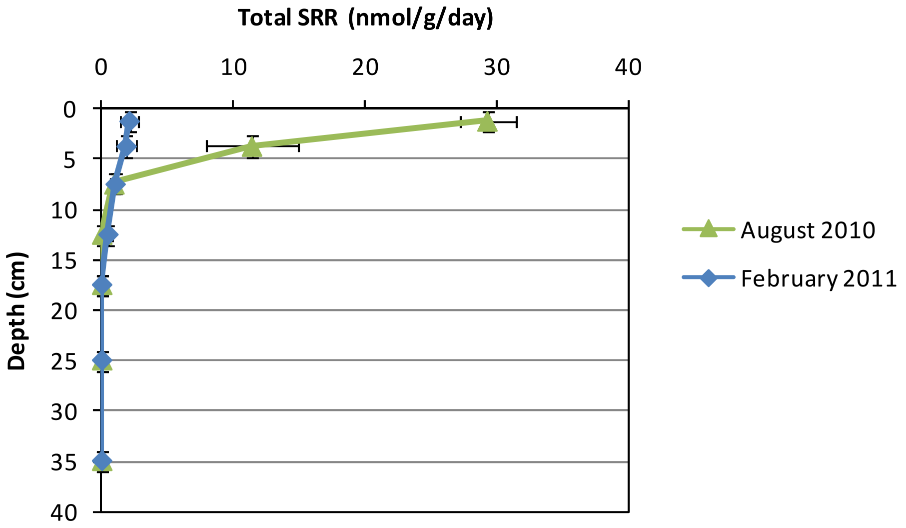

Figure 5-72. Poltalloch sulfate reduction rates (nmol/g/day) at the *Juncus* plantings in Bevy rye site in August 2010 and February 2011.

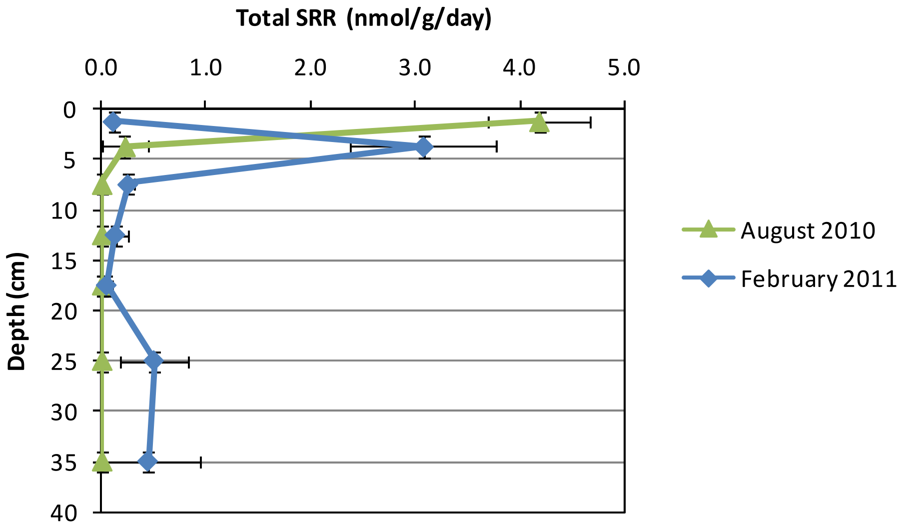

Figure 5-73. Poltalloch sulfate reduction rates (nmol/g/day) at the Bevy rye only site in August 2010 and February 2011.

Figures 5-72 and 5-73 clearly show:

- The sulfate reduction is mainly limited to the 0 - 5 cm layer of the sediment at each site at appreciable rates in the *Juncus* plantings site in August i.e. up to 30 nmolg^{-1}day^{-1}, but only up to 4 nmolg^{-1}day^{-1} in the Bevy rye only plantings.
- In the *Juncus* plantings site, sulfate reduction in the 0 – 5 cm layers was much higher during the initial period of inundation (as assessed in August) at ~ 30 nmolg^{-1}day^{-1} compared to the sulfate reduction rates of only ~3 nmolg^{-1}day^{-1} in the February assessment period.

Figures 5-74 and 5-75 show that during the sulfate reduction period in February that the bulk of the sulfate that was reduced ended up in the form of elemental sulfur, although there was some minor accumulation of monosulfides (as measured as Acid Volatile Sulfur (AVS)) and pyrite.

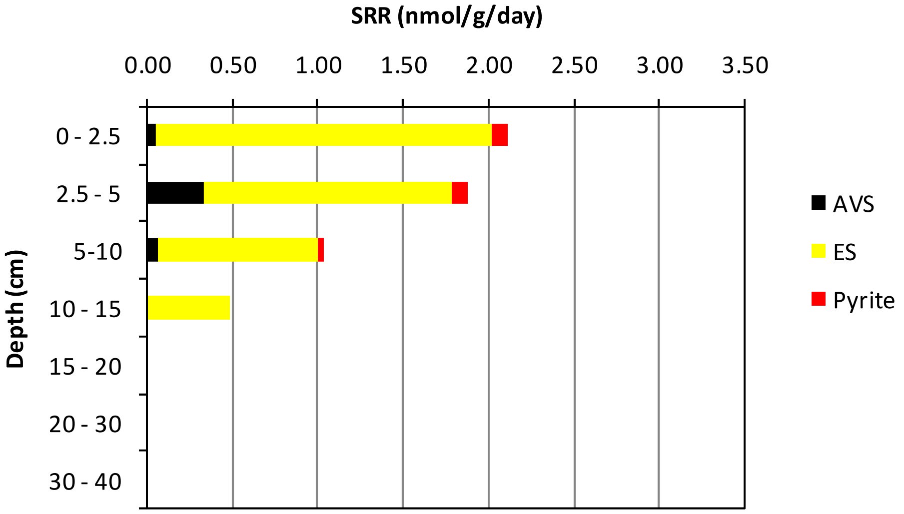

Figure 5-74. Products of sulfate reduction at the *Juncus* plantings in Bevy rye site, Poltalloch (February 2011).

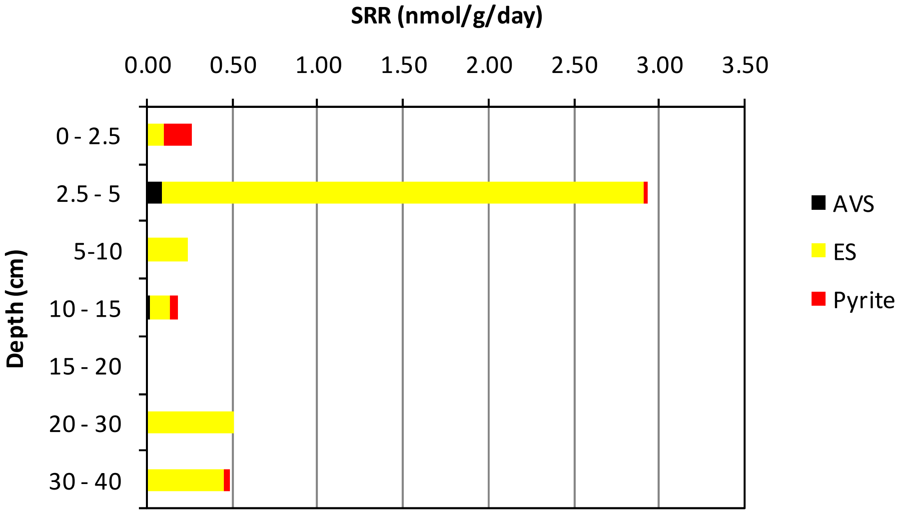

Figure 5-75. Products of sulfate reduction at the Bevy rye only site, Poltalloch (February 2011).

The total organic matter contents at these sites (see Figures 5-32 and 5-34 in Section 5.1.2.5) indicate that after inundation occurred at this location the concentration of organic matter in the surficial layers decreased in both of the sites from a relatively low value of ~ 0.20% TOC and ~ 0.10% hydrolysable carbon in August, to 0.02 % TOC comprised mainly of hydrolysable carbon in February. Some of this decomposition was via sulfate reduction as shown previously.

It is most probable that the observed substantial decreases in sulfate reduction rates in February at these sites compared to those observed in August are due to the near exhaustion of initially low organic matter content in these sediments, as a result of sulfate reduction since inundation in August.

The pore-water properties in the inundation cores sampled from the site (Figure 5-76) indicate that some sulfate was being consumed by sulfate reduction during the prolonged periods of the inundation. The moderate increases in $Cl:SO_4$ ratios are in line with the ^{35}S-sulfate reduction data discussed previously. The sulfate pore-water data in Table 9-123 (Appendix 5) suggest that it is very unlikely that the availability of sulfate was a constraint on sulfate reduction at this site.

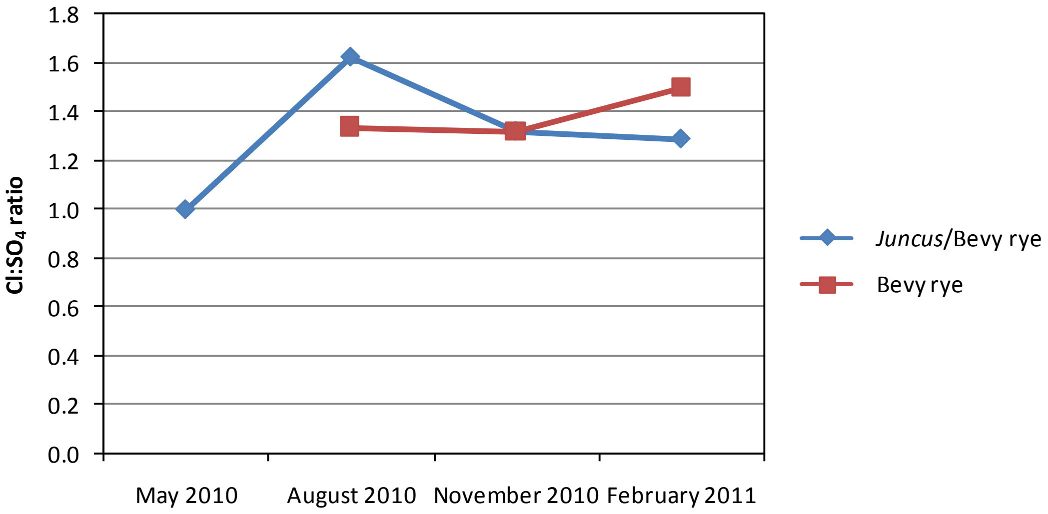

Figure 5-76. Cl:SO_4 ratios after 2 weeks of inundation in the 11 cm pore-water at Poltalloch.

5.2.3 Sulfate reduction rates at Tolderol

The sulfate reduction rates measured at the two Tolderol sites in both August 2010 and February 2011 are shown below in Figures 5-77 and 5-78.

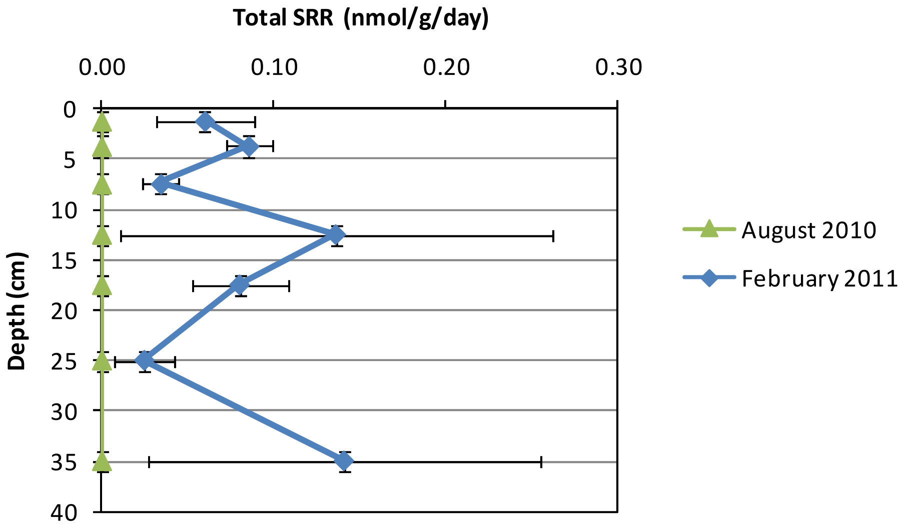

Figure 5-77. Tolderol sulfate reduction rates (nmol/g/day) at the control site in August 2010 and February 2011.

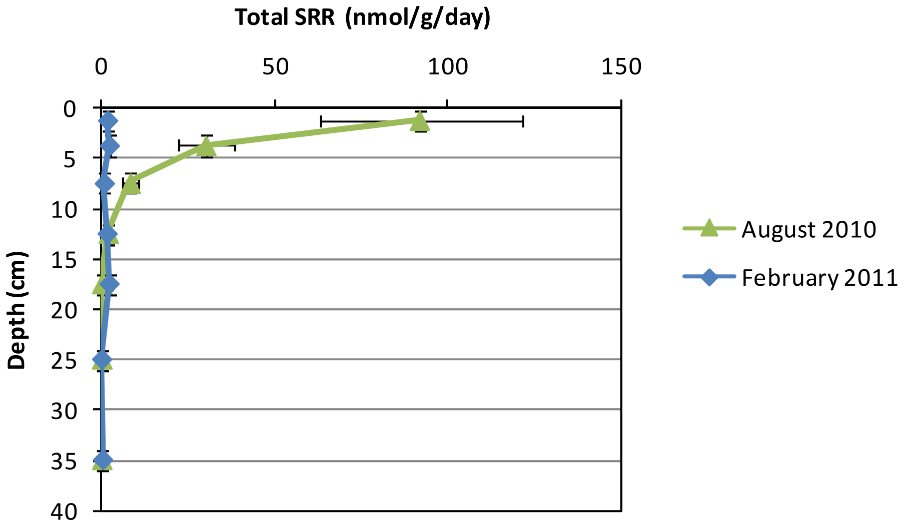

Figure 5-78. Tolderol sulfate reduction rates (nmol/g/day) at the *Juncus* in Bevy rye site in August 2010 and February 2011.

Figures 5-77 and 5-78 clearly show:

- The sulfate reduction is mainly limited to the 0 - 10 cm layer of the sediment in the Bevy rye revegetated site and was negligible in the control site.
- In the Bevy rye revegetated site, sulfate reduction in the 0 – 10 cm layer was relatively high (i.e. up to ~90 nmolg^{-1}day^{-1}in the 0 – 2.5 cm layer) during the initial period of inundation (as assessed in August) and only very low (< 5 nmolg^{-1}day^{-1}) in the February assessment period.

Figures 5-79 and 5-80 show that during the sulfate reduction period in February that the bulk of the sulfate that was reduced in the control site ended up in either the form of elemental sulfur or monosulfides (as measured as Acid Volatile Sulfur (AVS)) with only minor accumulation of pyrite. It should be noted that sulfate reduction during this period was very minor in the vegetated site compared to that during the August assessment period.

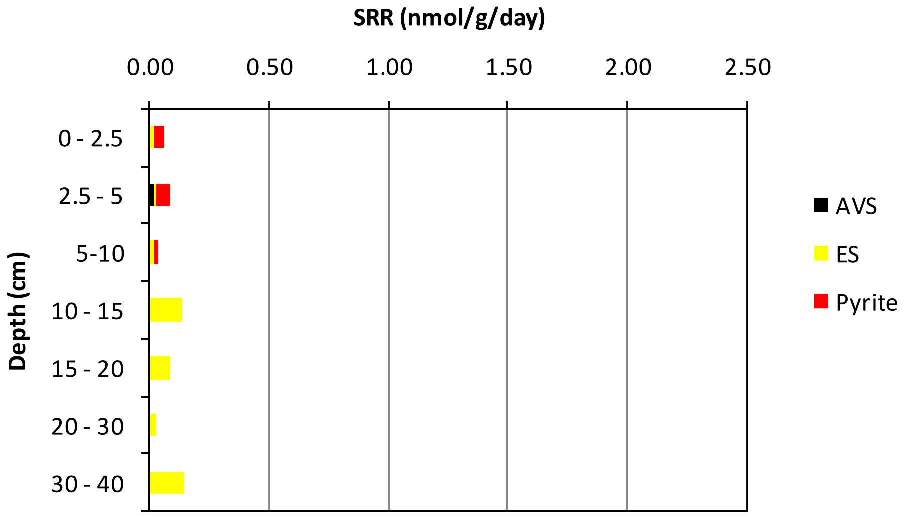

Figure 5-79. Products of sulfate reduction at the control site, Tolderol (February 2011).

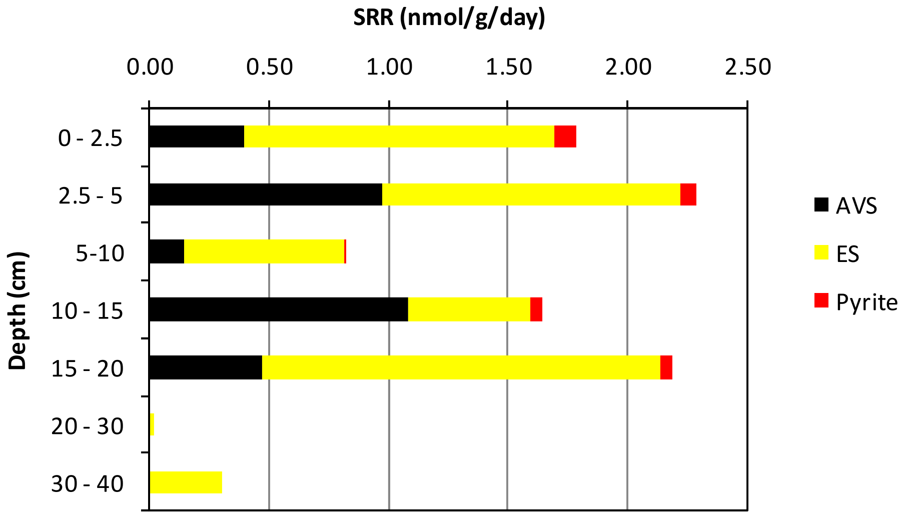

Figure 5-80. Products of sulfate reduction at the *Juncus* in Bevy rye site, Tolderol (February 2011).

The total organic matter contents at these sites (see Figures 5-46 and 5-48 in Section 5.1.3.5) that after inundation of the vegetated Bevy rye site, the concentration of organic matter in the surficial layer decreased from a relatively low value of ~ 0.20% TOC and ~ 0.15% hydrolysable carbon in August, to 0.06 % TOC comprised mainly of hydrolysable carbon in February. Some of this decomposition was via sulfate reduction as shown previously.

In contrast in the control site the concentration of organic matter in the surficial layer was initially at a very low value of ~ 0.15% TOC and ~ 0.06% hydrolysable carbon in August, and decreased to 0.10% TOC comprised of 0.05% hydrolysable carbon in February.

It is most probable that the observed substantial decreases in sulfate reduction rates in February at the vegetated site at Tolderol compared to those observed in August are due to the near exhaustion of the initially low organic matter content in these sediments, as a result of sulfate reduction since inundation in August.

The pore-water properties in the inundated cores sampled from the vegetated treatment (Figure 5-81) indicate that sulfate was being consumed by sulfate reduction in the cores in this treatment during the initial period of the inundation with a sharp increase in the Cl:SO_4 ratio from May to August. The initial increase in Cl:SO_4 ratios upon inundation and the subsequent decrease in the inundated cores from the vegetated site (most likely from subsequent elemental sulfur oxidation), and the lack of appreciable Cl:SO_4 ratio changes in the inundated cores from the control site, are both in line with the ^{35}S-sulfate reduction data discussed previously and the likely organic matter constraint. The sulfate pore-water data in Table 9-133 (Appendix 5) suggest that it is very unlikely that the availability of sulfate would be a constraint on sulfate reduction at this site.

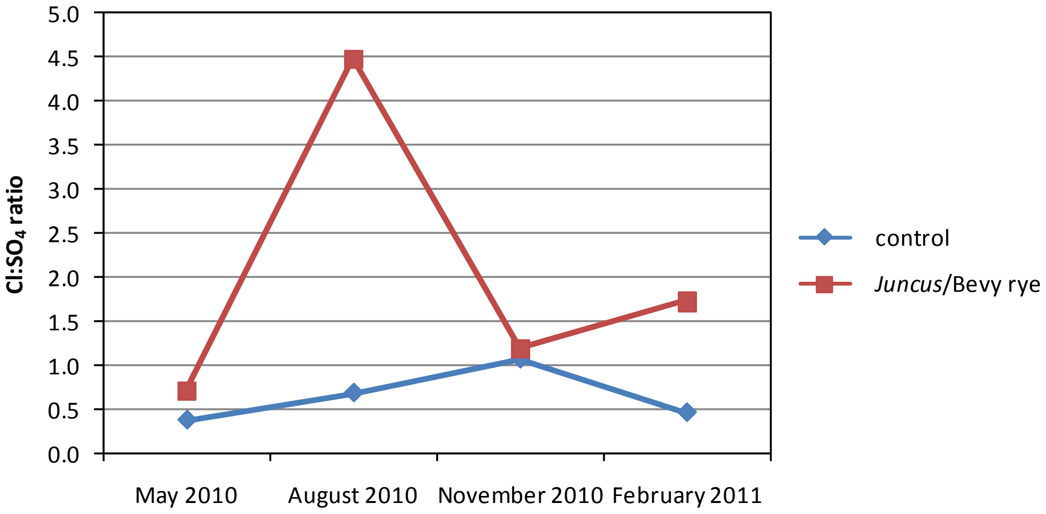

Figure 5-81. Cl:SO_4 ratios after 2 weeks of inundation in the 11 cm pore-water at Tolderol.

5.2.4 Sulfate reduction rates at Campbell Park

The sulfate reduction rates measured at the two Campbell Park sites in both August 2010 and February 2011 are shown below in Figures 5-82 and 5-83.

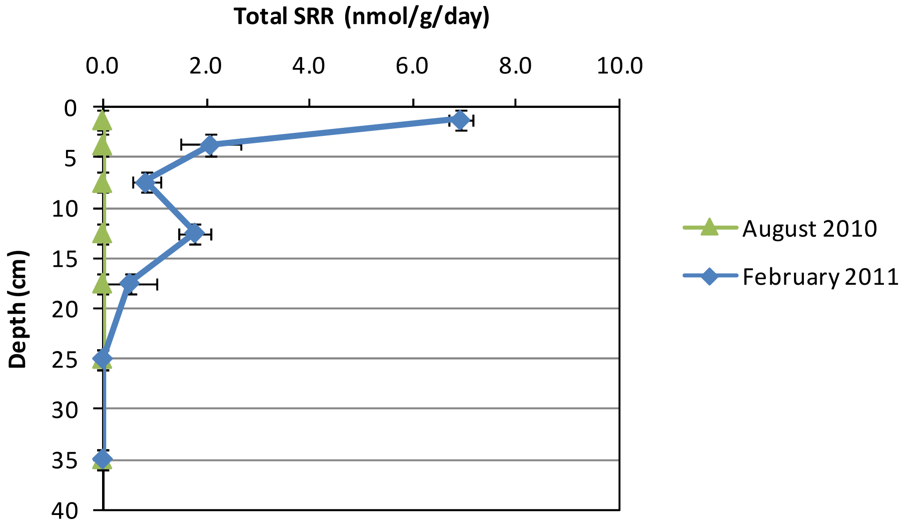

Figure 5-82. Campbell Park sulfate reduction rates (nmol/g/day) at the control site in August 2010 and February 2011.

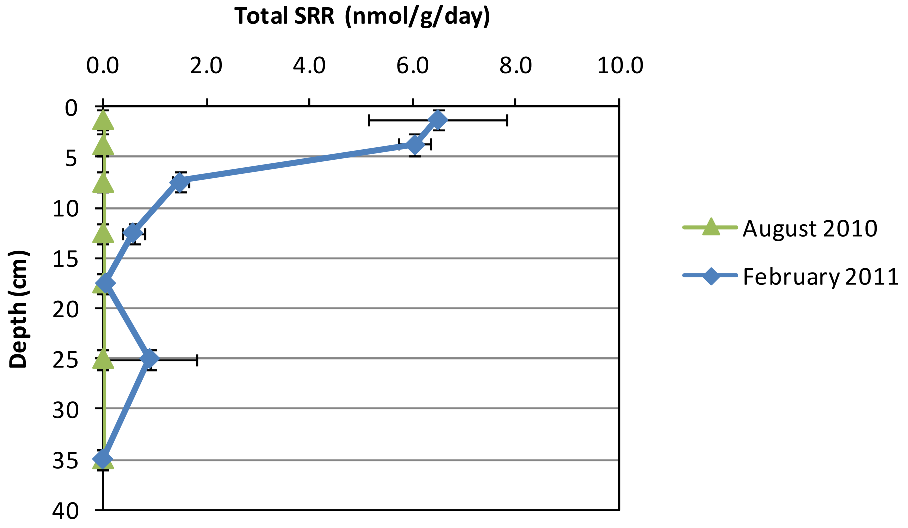

Figure 5-83. Campbell Park sulfate reduction rates (nmol/g/day) at the Bevy rye/*Puccinellia* site in August 2010 and February 2011.

Figures 5-82 and 5-83 clearly show:

- Sulfate reduction mainly occurred in the 0 - 2.5 cm layer of the sediment at each treatment but extended down to the 30 cm layer.
- Sulfate reduction only occurred after the inundating conditions that developed after the August assessment period and only at relatively low rates (i.e. < 7 nmolg^{-1}day^{-1}). The observed sulfate reduction rates in February were similar at both sites.

Figures 5-84 and 5-85 show that during the sulfate reduction period in February that the bulk of the sulfate that was reduced ended up in the form of elemental sulfur, although there was some minor accumulation of monosulfides (as measured as Acid Volatile Sulfur (AVS)) and pyrite.

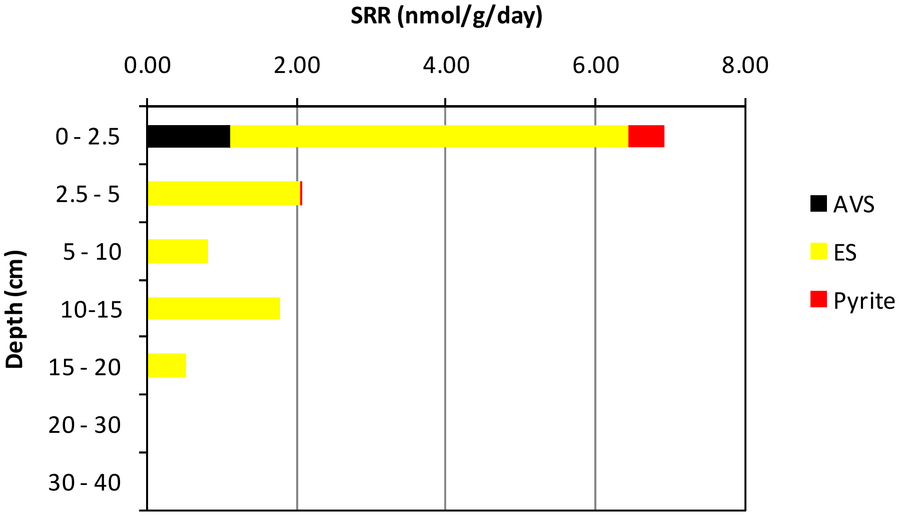

Figure 5-84. Products of sulfate reduction at the control site, Campbell Park (February 2011).

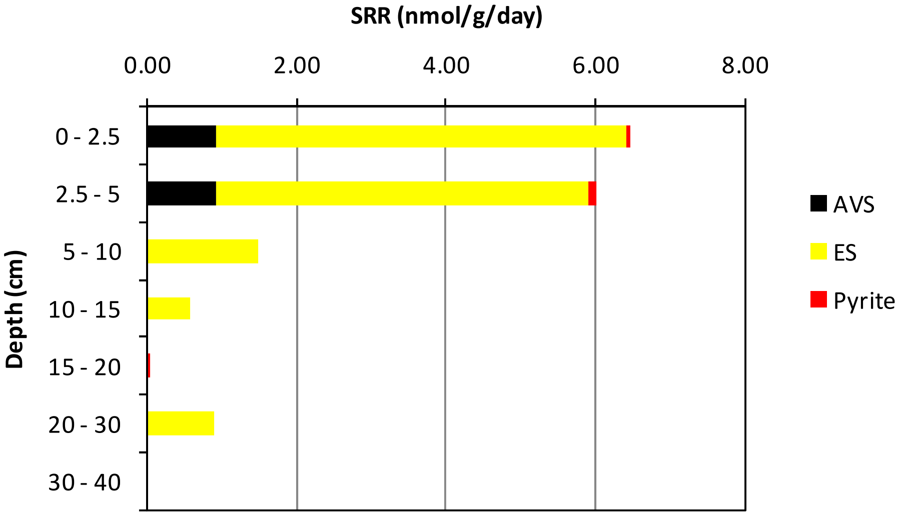

Figure 5-85. Products of sulfate reduction at the Bevy rye/*Puccinellia* site, Campbell Park (February 2011).

The total organic matter contents at these sites (see Figures 5-60 and 5-62 in Section 5.1.4.5) indicate that after inundation of the vegetated site, the concentration of organic matter in the surficial layer decreased from a relatively low value of ~ 0.22% TOC and ~ 0.19% hydrolysable carbon in August, to 0.06 % TOC comprised mainly of hydrolysable carbon in February. Some of this decomposition was via sulfate reduction as shown previously.

At the control site the concentration of organic matter in the surficial layer was initially at a similar value of ~ 0.30% TOC and ~ 0.20% hydrolysable carbon in August, and decreased similarly to 0.18% TOC comprised of 0.13% hydrolysable carbon in February.

The pore-water properties in the inundated cores sampled from both of the treatment cores (Figure 5-86) indicate that sulfate was being consumed by sulfate reduction in the cores at a moderate rate in these treatments during the period of the inundation with a steady increase in the $Cl:SO_4$ ratios from May to February. The $Cl:SO_4$ ratio changes in the inundated cores are in line with the ^{35}S-sulfate reduction data discussed previously. The sulfate pore-water data in Table 9-148 (Appendix 5) suggest that it is very unlikely that the availability of sulfate would be a constraint on sulfate reduction at this site.

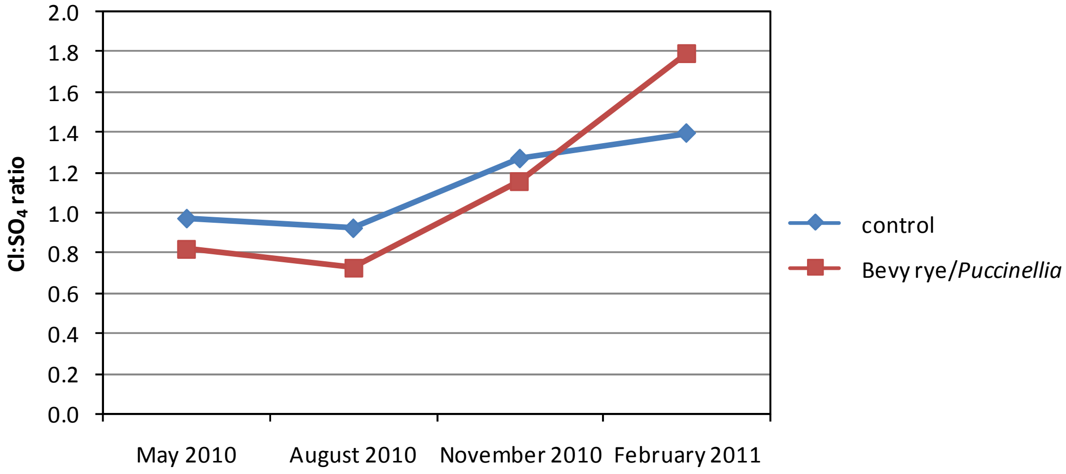

Figure 5-86. Cl:SO_4 ratios after 2 weeks of inundation in the 11 cm pore-water at Campbell Park.

5.3 Acidity and pH of the exposed surficial lake sediments

The surficial layers of the exposed lake sediments are the sediments that have suffered the most appreciable acidification during the lowering of the Lower Lakes during the drought of 2007-2010.

Figures 5-87 and 5-88 support a conclusion of our previous studies of the sediments of the Lower Lakes that had been exposed and acidified during the 2007-2010 drought, that although the surficial (0-40 cm) sandy lake sediments can exhibit very low pHs that the quantity of acidity contained in the sediments is relatively low. This is due to both the very low clay (as indicated by the sand textures (see Table 9-2, Appendix 1)) and very low organic matter content (see Appendix 2) of these sediments. To illustrate this point the current lowest action criterion for acid sulfate soils accepted around Australia is 18 mol H^+ t^{-1} (see red line on Figures 5-87 and 5-88). As Figure 5-87 clearly indicates many of the severely acidified surficial soil materials (as defined by having a $pH_{1:1,\ soil:water} < 4.0$) have acidities (i.e. as measured by TAA) of less than this criterion.

The relationship in Figure 5-88 between pH_{KCl} and TAA for these sediments is important for many reasons. Firstly, it indicates that not only will small amounts of acidity added to or produced in these sediments effect an appreciable lowering of the pH of the sediments to extremely low levels, but also and conversely the relationship indicates that only small amounts of alkalinity added to or produced in these sediments will be required to effect an appreciable raising of the pH of the sediments from even extremely low levels to approximately neutral pHs.

Such alkalinity can be derived from a number of possible sources during the inundation of the formerly exposed acidified lake sediments. This can come from the alkalinity that is contained in the lake waters and derived from the River Murray water entering the sediment profile via either convective or diffusive processes, alkalinity from solid phase liming materials (e.g. Aglime) added to the sediments, alkalinity as measured by TAAlk values in other sediment layers, or from the alkalinity derived from microbial organic matter decomposition pathways (see Equation 3.1). Of these three examples of alkalinity sources, the first and the latter have been identified as the most likely sources of alkalinity to neutralise the acidic surficial lake sediments during infilling of the lakes (Sullivan *et al.* 2010a).

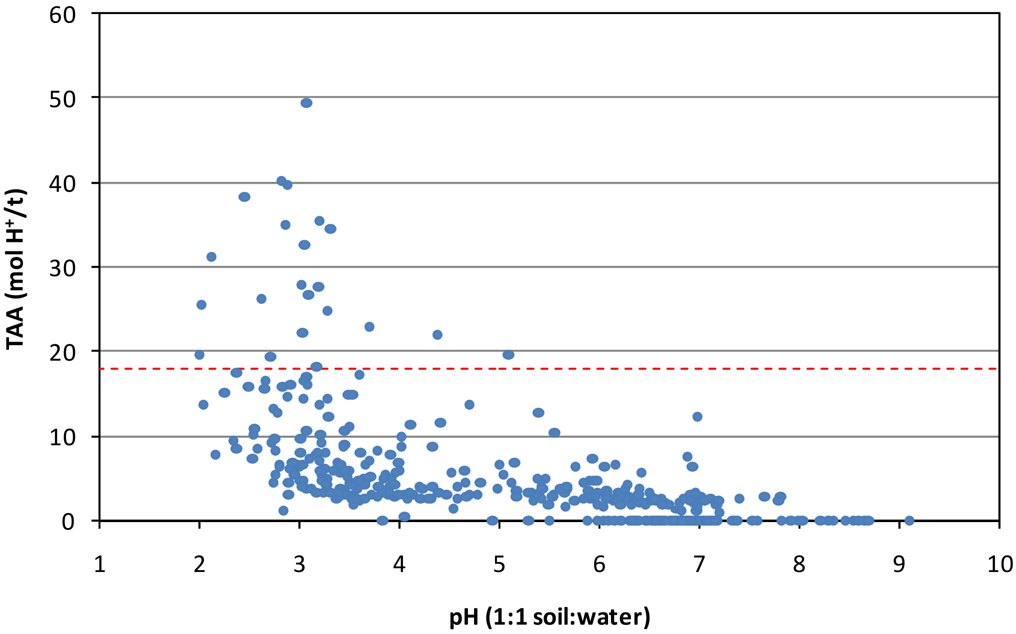

Figure 5-87. Relationship between TAA and pH (1:1 soil:water) for all surface soil samples (0-40 cm) (--- represents action criterion of 18 mol H^+ t^{-1}).

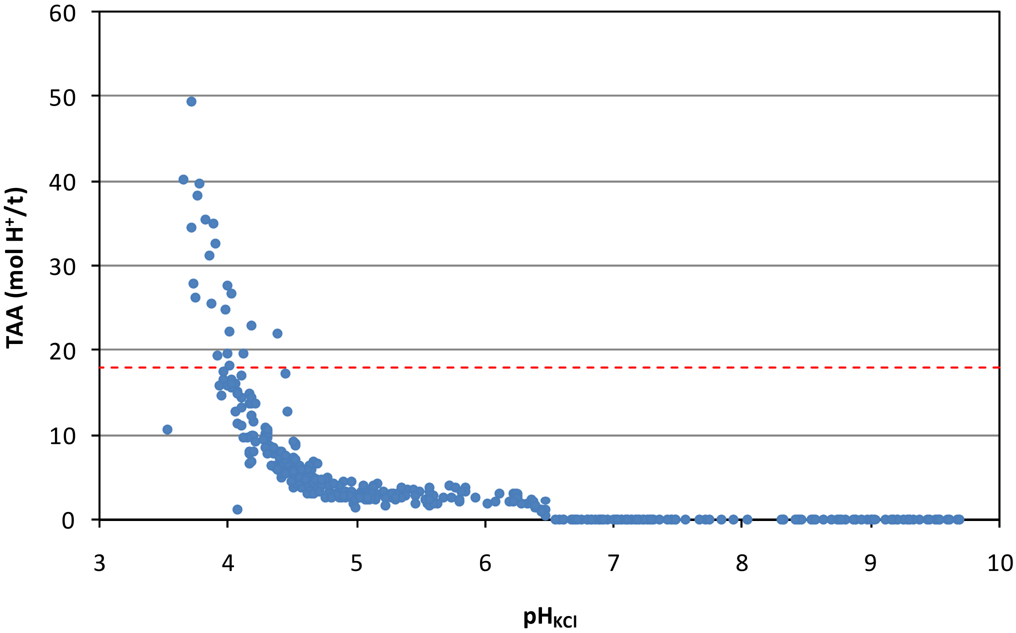

Figure 5-88. Relationship between TAA and pH_{KCl} for all surface soil samples (0-40 cm) (--- represents action criterion of 18 mol H^+ t^{-1}).

Organic matter is decomposed by a wide variety of microorganisms in such lake sediments. If the surface sediment is aerobic, organic matter decomposition occurs through oxic processes. However, this is a rapid process, and as oxygen is rapidly consumed in most lake sediments, anoxic conditions generally occur at depths of <10 mm from the sediment aerobic lake water interface.

Much of the organic matter decomposition in lake sediments thus takes place in these subsurface anaerobic zones under less favourable conditions utilising electron acceptors other than O_2. These include nitrate, manganese and iron oxides or hydroxides, sulfate, and CO_2: these substrates differ in their suitability for respiration and there is often overlap between these different respiration pathways (Lovley and Klug 1983; Capone and Kiene 1988).

As mentioned, the previous study of Sullivan *et al.* (2010a), using the ^{35}S-sulfate reduction techniques and organic carbon content data, identified that the availability of organic matter was a likely major constraint to sulfate reduction (and the consequent in situ generation of alkalinity in the acidic sediments). Another likely constraint to sulfate reduction identified in Sullivan *et al.* (2010a) was the ability of the sediment and the inundating River Murray waters to supply sufficient sulfate. A further likely constraint to sulfate reduction is the low pH of the sediments. As noted by both Rao and Burnison (1989) and Blodau *et al.* (1998) sulfate reduction in acidic lakes is generally low (but not insignificant) as compared with non-acidic lakes.

5.4 Inundation of soil materials with River Murray water

The laboratory inundation study was implemented as part of this project for two main reasons:

1) in case the lakes did not refill (n.b. this was a very real possibility before the project was finalised) we would have useful data on which to base predictions of the effect of bioremediation by revegetation and on which to develop management recommendations, and
2) to be able to obtain properties (such as pore-water properties) that could be used to complement and confirm the results of the field study should the lakes refill.

As a general principle the field data has been preferred over the data derived from the laboratory inundation study wherever differences occur. Accordingly the results of this study have been used to help explain the processes operating in the field and incorporated in the other sections of this report. In particular the pore-water data derived from the inundation cores has been very useful to augment and help interpret the sulfate reduction data derived in the field from ^{35}S-sulfate.

5.5 Discussion

5.5.1 Remediation of acidified sediment layers

The data clearly show that both the acidity and low pHs of many of the acidified acid sulfate sediment layers at the study sites are being remediated by a number of processes and sources that deliver alkalinity to these layers. These include:

- Movement of the alkalinity that is contained in the lake waters - and derived from the River Murray water - entering the sediment profile via either convective or diffusive processes. The unvegetated control sites at both Tolderol and Campbell Park where the other likely sources of alkalinity addressed in this study are either absent or negligible, are instructive in assessing the magnitude of the contribution of this source of alkalinity in the remediation of acidified acid sulfate sediments. Figures 5-36 and 5-50 both indicate that the diffusion of the substantial alkalinity in the lake waters is capable of causing appreciable increases in sediment pH down to 30 cm depth within a few months. For example, at Tolderol control site the pH of the 0 - 10 cm layer initially 2.4 prior to inundation (May 2010) and 3.0 after inundation (August 2010), rose to a pH of 5.7 by November 2010. Similarly, at Campbell Park control site the pH of the 0 - 10 cm layer initially 3.7 prior to inundation (August 2010), rose to a pH of 4.3 by November 2010 and then to 6.4 by February 2011. This data showing the neutralising trends in both of the unvegetated and formerly strongly acidified sites strongly suggests that even left unvegetated, these formerly degraded lake sediments will slowly remediate via the movement of alkalinity into the sediments.

- Alkalinity from added solid phase liming materials. Aglime was added to the surface layers at only two of the treatment sites; the *Juncus* and *Phragmites* treatments at Waltowa. The pH data from field sampling (Figures 5-1 – 5-3) clearly show that this application resulted in elevated pHs in the top 0 – 20 cm sediment layers with pHs between 7 and 8.8 pre-inundation, much higher that the pHs of between 4.7 and 6.7 observed at this time in the unlimed *Cotula* treatment and Waltowa. However, the effect of such liming materials are often localised and this is exemplified by subsurface sediment layers at both the *Juncus* and *Phragmites* treatments at Waltowa having pHs < 5 during the study period.

- Alkalinity already existing in the sediments (i.e. the sediment's Acid Neutralising Capacity (ANC)). As may be expected from recently severely acidified surface soil layers the ANC contents of the 0 - 40 cm surficial layers were negligible apart from those two treatments discussed above that had received additions of Aglime and the sediments as Poltalloch down to 20 cm depth (where there were only minor sporadic occurrences of $CaCO_3$). Similarly, the Titratable Actual Alkalinity values of these surficial sediment layers were also generally very low. This data indicates that the ANC of the exposed acidified lake sediments is negligible (unless Aglime had been applied) and unable to supply alkalinity to remediate acidity upon lake refilling.

- Alkalinity derived from sulfate reduction. The data clearly show that sulfate reduction has taken place where organic materials have been added to the lake sediments by revegetation. Whether this process results in the net production of alkalinity is anymore than only minor or ephemeral quantities will be discussed in a later section.

Figures 5-89 and 5-90 clearly show that there are two main constraints against sulfate reduction in the formerly exposed lake sediments:

1. Lack of organic matter, and
2. Severely acidified (i.e. pH < 4) sediment layers.

These two factors will be addressed separately below:

a. *Organic matter*

Organic matter in the lake sediments (as noted previously in Sullivan *et al.* 2010a) is very low. The data in this study demonstrates that the organic matter content of these sediments has been greatly increased by the bioremediation program using the establishment of vegetation. However, different vegetation produces organic matter in different amounts and over different time periods. For example, annual plants like Bevy rye produce appreciable amounts of vegetation relatively quickly but then die, leaving dead dry straw-like residue. In contrast perennial plants like *Phragmites* and *Juncus* continue to produce organic matter: it is clear from the Waltowa site that *Phragmites* could successfully resist prolonged flooding to greater inundation depths than the *Juncus* species planted on this site.

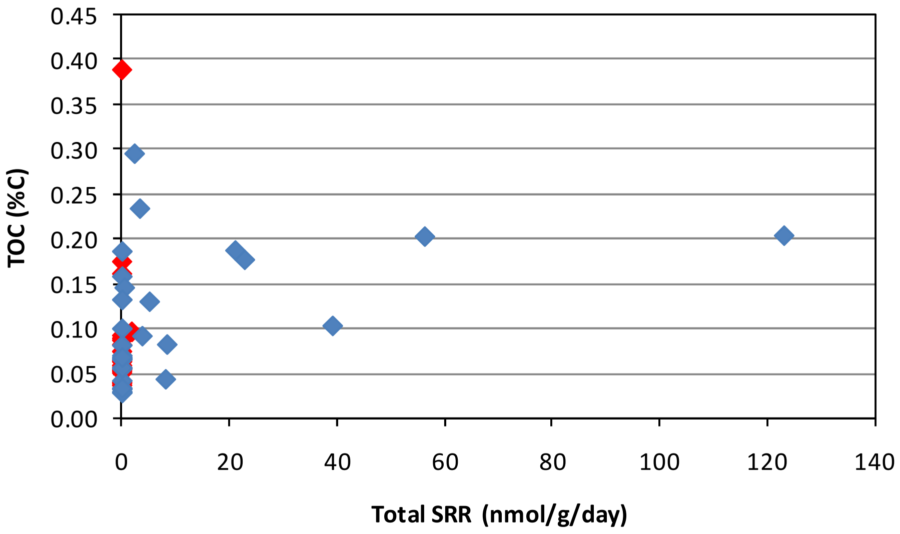

Figure 5-89. Relationship between sulfate reduction rate and TOC for all surface soil samples (0-40 cm) from Lake Alexandrina in August 2010. (♦ indicates the soil pH is < 4).

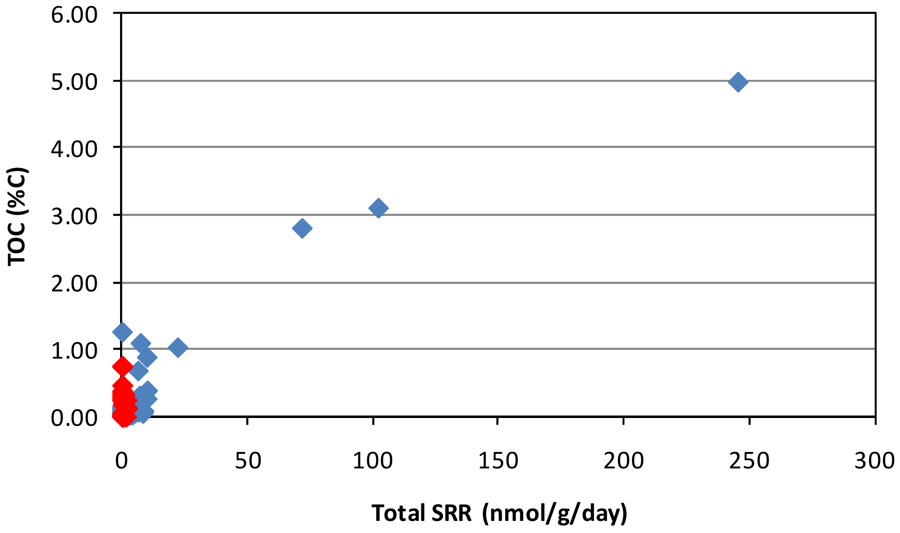

Figure 5-90. Relationship between sulfate reduction rate and TOC for all surface soil samples (0-40 cm) in February 2011. (♦ indicates the soil pH is < 4).

These different patterns of organic matter production and capacity clearly affected sulfate reduction rates. This is best shown by both the TOC and sulfate reduction data at the Waltowa and Tolderol sites.

> *Tolderol:* The organic matter supplied by the Bevy rye initially stimulated intense sulfate reduction in the 0-5 cm surface layers immediately after inundation. This can be seen in the comparison of sulfate reduction rates for the August assessment period between the vegetated site (Figure 5-78) and the unvegetated control site (Figure 5-77). However, these figures and the TOC data for these two treatments (i.e. Figures 5-46 and 5-48) show that by February the organic matter supplied by the Bevy rye bioremediation treatment had largely been depleted causing a substantial depletion in the sulfate reduction rates. The Cl:SO$_4$ ratio data (Figure 5-81) for these two sites support this interpretation with the ratios increasing greatly from very low values during August in the revegetated treatment and then decreasing at subsequent times (most likely due to the oxidation of elemental sulfur as discussed further below), whereas the ratios for the unvegetated control plot remained stable by comparison at very low values.

Waltowa: The organic matter supply differed markedly between the three treatments at Waltowa. The *Phragmites* treatment continued to produce abundant organic matter and thus maintained high TOC levels during all the assessment periods (Figure 5-16), whereas the production of organic matter in both the *Cotula* and *Juncus* treatments, ceased after substantial inundation (and certainly by the February assessment period) resulting in TOC depletions in the uppermost sediment layers (Figures 5-18 and 5-20). The comparative sulfate reduction data for this site (Figure 5-67) indicates firstly that much of this organic matter in the surficial sediment layer was depleted by sulfate reduction and secondly, that the ability of *Phragmites* to continue to enrich the surficial sediment layer with organic matter even after relatively deep inundation helped to enhance the rates of sulfate reduction as compared to the two other vegetation types that had completely submerged and died.

b. *pH*

Low pHs as noted previously can inhibit sulfate reduction processes in sediments. The data here clearly shows that severely acidified sediments had comparatively negligible sulfate reduction rates regardless of TOC, indicating that extremely low pHs was also acted as a constraint against sulfate reduction. It should be noted that appreciable sulfate reduction in sediments has been recorded under similarly highly acidic conditions (e.g. pHs < 3) (Koschorreck *et al*. 2003).

It is well understood that vegetation can also increase soil and sediment pH by the action of root exudation and nutrient uptake, and that there is likely an indirect effect on reducing soil acidity by revegetation quite separate from any alkalinity caused by sulfate reduction arising from inputs of organic matter by the vegetation.

An additional indirect effect of the establishment of vegetation is the stabilisation of the exposed sediment against erosion. It was noted in the field at both the Tolderol and Campbell Park sites prior to inundation, that the surface of the unvegetated control sites has suffered considerable (i.e. ~9 cm depth) of erosion by both wind and water (e.g. Figure 5-91).

Given, 1) that not only does vegetation protect the sediment surface from such soil losses but that it also promotes in the trapping of eroded sediment, and 2) that the surface 0 – 10 cm layers of uneroded sediments prior to inundation tend to be at a far higher pH than the immediately underlying soil layers (e.g. Figures 5-1 and 5-2), then it is likely that the observed disparities in soil surface layer pHs between the vegetated and the unvegetated control sites prior to inundation, may be due to the effects of different sediment erosion rates between treatments.

Figure 5-91. Soil erosion of unprotected area of Campbell Park site. The small dead vegetation remnant protecting the underlying soil was derived from the earlier planting at this site in June 2010. (the coin given for scale is a 20c coin (diameter of 28.5 mm)).

5.5.2 The nature of sulfur cycling and organic matter decomposition during the initial inundation of the Lower Lakes sediments

It is clear that the provision of organic matter in these sediments by revegetation has generally resulted in sulfate reduction to take place. The nature of the sulfate reduction process was dependent on the supply of organic matter that varied according to the type of vegetation used for bioremediation including such factors as whether the vegetation is perennial or annual, and importantly, whether the vegetation can maintain viability and productivity after inundation.

However, the data also indicate that the alkalinity supplied to the sediments by sulfate reduction during the assessment period occurs via a sulfur cycling process that will be only ephemeral and minor. The data at all locations where sulfate reduction occurred at appreciable rates, indicate a common process of sulfate reduction in these sediments upon bioremediation by revegetation as described in Figure 5-92 below:

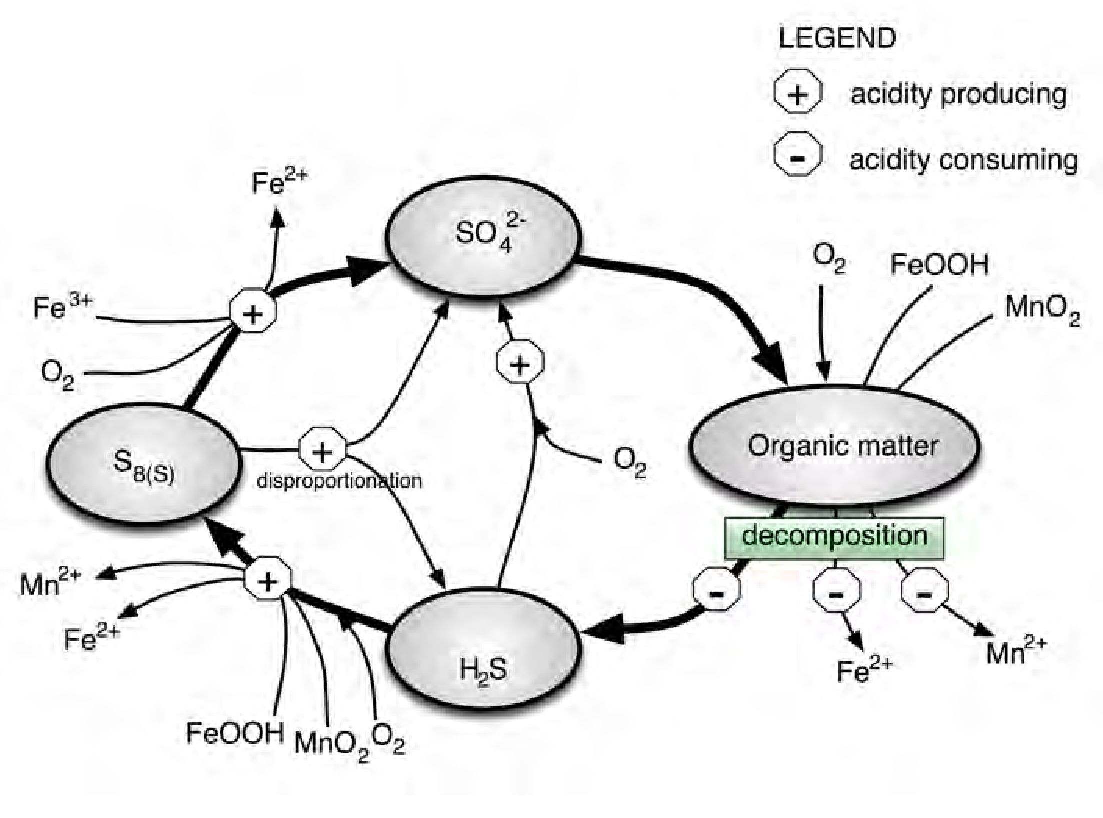

Figure 5-92. Conceptual diagram of sulfur cycle operating in the upper layers of the bioremediated inundated Lower Lakes sediments during the assessment period.

This conceptual diagram shows that sulfate is reduced during organic matter decomposition (often in microsites around the roots of the plants used for bioremediation (e.g. Figure 3-6)). The sulfide (e.g. H_2S) released from this process is mainly converted to elemental sulfur ($S_8^0{}_{(s)}$). This could be by either chemical means (reaction with O_2, or manganese and iron oxides) as per the equations below:

$$O_2 + 2H_2S \rightarrow \tfrac{1}{4}\, S_8^0{}_{(S)} + 2H_2O \qquad [5.1]$$

$$2Fe(OH)_{3(s)} + H_2S + 4H^+ \rightarrow {}^1/_8\, S_8^0{}_{(S)} + 2Fe^{2+} + 6H_2O \qquad [5.2]$$

$$MnO_{2(s)} + H_2S + 4H^+ \rightarrow {}^1/_8\, S_8^0{}_{(S)} + Mn^{2+} + 2H_2O \qquad [5.3]$$

The data at some of the sites showing intense sulfate reduction (e.g. Tolderol vegetated site in the uppermost soil layer) do show gradual removal of manganese and iron upon prolonged inundation (see Figures 5-93 and 5-94) as well as greatly increased Fe^{2+} contents in the surfical sediment pore-waters after inundation (e.g. Table 9-99, Appendix 5). These findings are consistent with the process described in Equations 5.2 and 5.3 above operating. Of the observed decreases in both HCl-extractable manganese and iron such as observed in Figures 5-93 and 5-94, and the observed increases in Fe^{2+} concentrations in the sediment pore-waters may also have occurred as a result of manganese oxides and iron oxides acting as electron acceptors during the decomposition of organic matter.

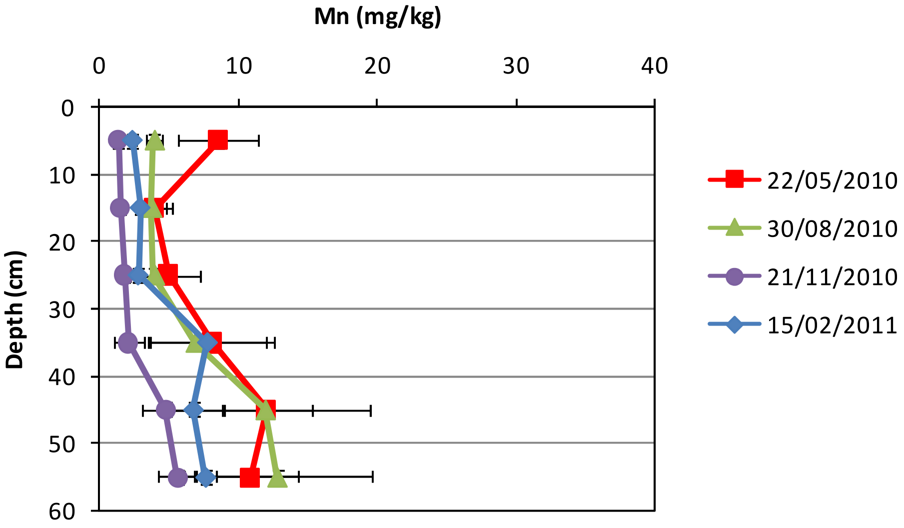

Figure 5-93. Tolderol field HCl soluble manganese dynamics at the *Juncus* in Bevy rye site.

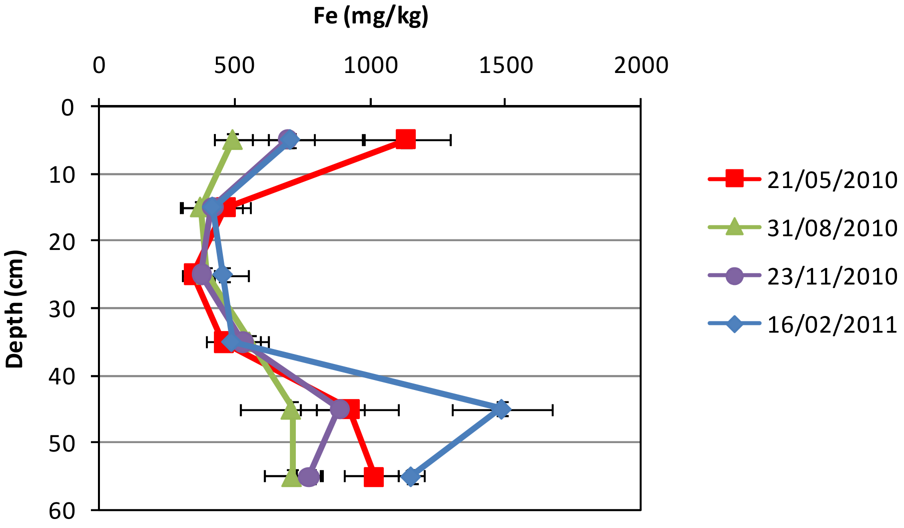

Figure 5-94. Waltowa field HCl soluble iron dynamics at the established *Phragmites* site.

Another possible formation pathway of elemental sulfur in this system is via bacterial oxidation of the sulfide produced by sulfate reduction (e.g. Elsgaard and Jørgensen 1992).

It is important that there was very little formation and accumulation of either iron monosulfides or pyrite in the surficial sediment layers. Elemental sulfur was the most common product forming from sulfate reduction. The elemental sulfur that is formed does not accumulate or convert and accumulate in the more stable pyrite form as the CRS values for all these sediments show negligible CRS accumulation over time even when sulfate reduction rates are appreciably high (e.g. the *Phragmites* treatment at Waltowa). This may be expected as sedimentary elemental sulfur is considered to be a very dynamic phase (Howarth and Jørgensen 1984).

Rather, the data indicate that elemental sulfur oxidises back to sulfate soon after formation (this can be seen in Figure 5-81 that show the decreasing $Cl:SO_4$ ratios at the revegetated site at Tolderol after the August assessment period when the near exhaustion of organic matter resulted in negligible further sulfate reduction rates in February 2011). Elemental sulfur oxidation may occur using O_2 or Fe^{3+} (Burton *et al.* 2006a) as below:

$$^{1}/_{8}S_8^o{}_{(s)} + {}^{3}/_{2}O_2 + H_2O \rightarrow SO_4^{2-} + 2H^+ \qquad [5.4]$$

$$^{1}/_{8}S_8^o{}_{(s)} + 6Fe^{3+} + 4\ H_2O \rightarrow SO_4^{2-} + 6Fe^{2+} + 8H^+ \qquad [5.5]$$

Elemental sulfur can also undergo bacterial disproportionation (Thamdrup *et al.* 1993) as below:

$$^{1}/_{2}S_8^o{}_{(s)} + 4H_2O \rightarrow 3H_2S + SO_4^{2-} + 2H^+ \qquad [5.6]$$

The sulfate reduction process as a result of bioremediation using vegetation on the exposed sediments of the Lower Lakes will be an acidity-neutral process unless potential acidity is stored in sulfides, or acidity is lost from the system (e.g. elemental sulfur gets entrained in overlying lake waters and oxidises there), or acidity from elemental sulfur oxidation escapes from sediment into lake waters. The data from this study indicate that alkalinity from sulfate reduction in these systems is likely to be minimal for the initial period (~ 6 months) of inundation.

There was little formation and accumulation of either AVS or pyrite due to bioremediation in these sediments. Accordingly the data indicate that there was negligible accumulation of metals in either monosulfides or disulfides. It may be puzzling to reconcile the black colours of the sediments undergoing intense sulfate reduction (e.g. as shown in the surface layers of Figures 3-15 and 3-16) with the only slight production and accumulation of iron monosulfides in these layers. The explanation lies in the remarkably effective pigmentation of iron monosulfides especially in such otherwise generally colourless sandy sediments.

Although the avoidance of the accumulation of elemental sulfur, monosulfides and disulfides in the surficial lake sediments after bioremediation results in negligible net production of alkalinity in the upper lake sediments, this may be regarded as a positive outcome as this situation also results in the avoidance of some key possible future hazards that were important foci of this study. These are:

1. there was no appreciable development of potential sulfidic acidity in these surface layers over the duration of the study. Thus during any future drying events if lake levels are lowered sufficiently to expose sediments, the hazard of rapid surface acidification that may have been present if for example pyrite had accumulated in these layers, should not be realised. However, pyrite may start to accumulate at longer periods of inundation than the short to medium (i.e. ~ 6 months) that were able to be observed given the funding timelines of this study. Such an acidification hazard due to sulfide accumulation may develop at longer inundation durations than those able to be observed in this study, especially in areas where lake vegetation such as *Phragmites* continues to supply organic matter that can fuel further sulfate reduction in such sediments.

2. there was no appreciable development of monosulfides in these surface layers over the duration of the study. Thus the hazards of both deoxygenation and metal accumulation (as monosulfides) in the sediment surface layers did not develop to any appreciable extent during the short to medium (i.e. ~ 6 months) period of this study. Again hazards may develop at longer inundation durations than those able to be observed in this study, especially in areas where lake vegetation such as *Phragmites* continues to supply organic matter that can fuel further sulfate reduction in these sediments.

Figure 5-95 conceptualises in a very simple way the main changes in acidity and the associated key processes occurring in the sediments from: prior to the drought and during the various bioremediation scenarios upon and at 6 months after lake refilling as described in the preceeding discussion. Clearly the continued processes that may operate at longer time periods that 6 months after inundation are not yet able to be adequeately predicted and would require further monitoring.

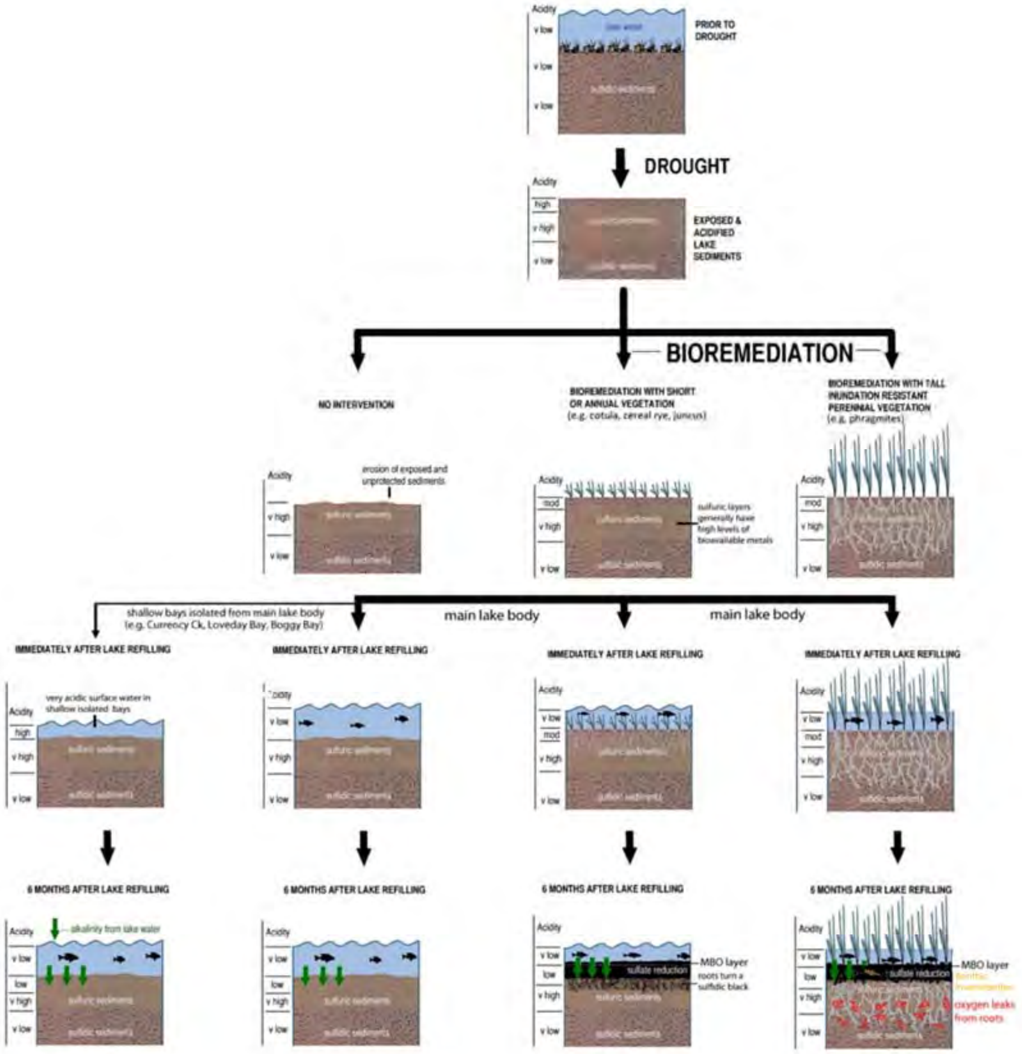

Figure 5-95. Conceptual diagram, of sulfur cycling and acidity as affected by bioremediation.

5.5.3 Metal and metalloid dynamics in the sediments resulting from bioremediation

The mobility of metals is likely to be affected by numerous factors and processes operating in the bioremediated sediments. These include the effects on metal mobility of the increased pH of the sediments (after the often initial decrease in pH due to exchange of acidity) most likely (as discussed previously) arising mainly from movement of alkalinity downward from inundating lake waters.

Another process that often affects metal mobility in sediments experiencing appreciable sulfate reduction is the sequestration of metals in the low-solubility sulfides that can accumulate under such conditions. However as discussed previously, the accumulation of both monosulfides and disulfides (e.g. pyrite) in these sediments was minimal due to the nature of the sulfur cycling (see Figure 5-92). Thus the sequestration within sulfides of appreciable quantities of metals or metalloids was not likely during the initial inundation of these lake sediments.

In addition, and as shown in Figures 5-92 to 5-94, the processes of sulfur cycling and organic matter decomposition can independently impact on the mobility of metal oxides especially iron oxides and oxyhydroxides and manganese oxides. As these two phases are, of course, comprised of metals and are known for their ability to adsorb a wide range of metals it is likely that the bioremediation may have affected the mobility of a range of metals in these sediments. However the data from both the field studies and the inundated core materials, apart from greatly increased Fe^{2+} contents in the surficial sediment pore-waters after inundation (e.g. Table 9-99, Appendix 5), do not show appreciable systematic changes in metal mobility during the initial inundation of these lake sediments. Differences may become more pronounced during later stages of inundation as the sediments sweep through a wider range of biogeochemical regimes than occurred during the initial inundation of these lake sediments, especially where living bioremediation vegetation that survived the inundation of the lakes continue to provide organic matter to drive these geochemical regime changes.

Analysis of HCl-extractable metal contents in the sediment samples from the four field sampling dates were used to assess the effect of bioremediation on metal mobility during the initial inundation of these lake sediments (see Appendix 2). HCl-extractable metal contents represent a potentially very mobile fraction in acid sulfate soil materials derived from sources such as monosulfides and poorly crystalline iron oxides (e.g. Claff *et al. 2011*). As shown in Figure 5-94 in some of the soil layers where sulfur cycling and organic matter decomposition were most intense (i.e. the revegetated Tolderol surficial sediment layers) HCl-extractable iron was depleted, and therefore likely mobilised elsewhere in the sediment, however clear relationships between HCl-extractable iron and both sulfate reduction rates and organic matter depletion were not uniformly observed across all of the experimental sites.

Similarly, as shown in Figure 5-93 in some of the soil layers where sulfur cycling and organic matter decomposition were most intense (i.e. the *Phragmites* sites) HCl-extractable manganese was depleted, and therefore likely mobilised elsewhere in the sediment, however whilst much clearer relationships between HCl-extractable manganese depletion with both sulfate reduction rates and organic matter depletion occurred relative to those with iron, these relationships were not uniformly observed across all of the experimental sites.

There were no consistent observable changes in the mobility of Zn, As, Cr, Cu, Ni or Pb during the initial inundation of these lake sediments. The data however did indicate that the increasing pHs during the initial inundation of these lake sediments reduced the mobility of Al.

The data for selenium in the pore-waters of the inundating columns (Tables 5-100, 5-105, 5-100, 5-125, 5-130, 5-135, 5-145, 5-150 and 5-155 in Appendix 5) clearly show that selenium concentrations in the surficial sediment pore-waters were always less than the ANZECC freshwater guideline level of 11 µg/L during the initial inundation of these lake sediments.

5.5.4 Nutrient dynamics in the sediments resulting from bioremediation

The production and consumption of nutrients in sediments is very likely to be affected by numerous factors and processes operating in the bioremediated sediments. These include the mineralisation of the nutrients contained in the organic matter provided by the bioremediating vegetation.

The decomposition of organic matter in freshwater environments can occur under either aerobic or anaerobic conditions. Under aerobic conditions oxygen is used to facilitate decomposition whereas under anaerobic conditions the lack of oxygen forces bacteria to use other terminal electron acceptors. Nitrates are a nutrient that can be used for this process in place of oxygen and are energetically favoured relative to the use of sulfate for this purpose, but generally if sulfate is present in adequate concentration it fulfils this role leading to sulfate reduction (sulfides are inhibitory to nitrification (Joye and Hollibaugh 1995)).

If sulfate is not present in adequate amounts then carbon in organic matter can be used to facilitate decomposition of organic matter (albeit at very slow rates) and methane will be produced (i.e. methanogenesis). In marine water affected sediments the terminal electron acceptor is predominantly sulfur, whereas in freshwater sediments it is carbon (Harris 1999).

The presence of sulfate in appreciable concentrations can greatly increase the rate of organic matter decomposition and nutrient mineralisation in sediments (Jørgenson 1982). Caraco *et al.* (1989) proposed that phosphorus release from freshwater sediments correlates with the sulfate concentration of the overlying water. The work of Lamers and co-workers (e.g. Lamers *et al.* 2002) confirm this for sulfate-polluted freshwater wetlands. Therefore, it is likely that sulfate reduction may also increase the release of phosphates (and other nutrients) from sediments which could contribute to algal blooms.

The nutrient data gained from the inundated core materials (see Tables 5-156 – 5-171, Appendix 5) show few general trends during the assessment period, the main one is a considerable decrease in ammonium over the study. Apart from ammonium (and sulfate which has been discussed previously) there are few appreciable systematic changes in nutrient concentration during the initial phases of inundation of these lake sediments. Of course, such changes may become more pronounced during later stages of inundation as the sediments sweep through a wider range of biogeochemical regimes than occurred during the initial inundation of these lake sediments especially where living bioremediation vegetation that survived the inundation of the lakes continue to provide organic matter to drive these geochemical regime changes.

5.6 Preliminary results of metagenomic study at Tolderol

The results of the metagenomic analysis clearly indicate the utility of this approach to characterise microbial community structure (including the assessment of the microbial ecology) in the bioremediating and untreated lake sediments. The bioinformatic information provided by this approach is vast. This is both a strength and a limitation of this approach with novel bioinformatic data analytical skill requirements. Only a brief examination of this data has been possible to date given the recent acquisition of this data from the laboratory at the University of Oklahoma (U.S.A.).

Figure 5-96 clearly shows the ability of this approach to precisely distinguish microbial communities in the different geochemical environments examined in this study with close groupings of replicates and space between soil material types in the first pass detrended correspondence analysis.

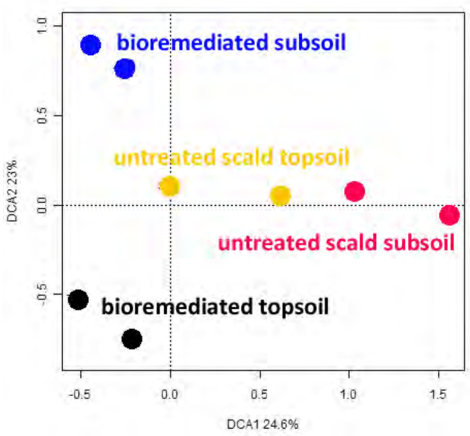

Figure 5-96. Detrended correspondence analysis (for cut 1) for Tolderol sediments at August 2010.

Figure 5-97 is more informative and shows that the microbial biodiversity on the bioremediated topsoil was far higher than those in either the untreated scald area topsoil, or the subsoil materials. This has presumably been due to the provision of organic materials by the bioremediating vegetation. Indeed the highly acidic exposed eroded scald topsoil had the least microbial diversity being lower than both of the subsoil materials. Perhaps not unexpectedly, there were also a considerable number of genetic materials shared between the soil materials.

Further analysis of the data (there are over 13,000 genes identified in these soil materials) will focus on the grouping of the specific functions of these genes using a 'compare and contrast' approach to identify and rationalize the biogeochemical processes that have been promoted here as a result of the bioremediation treatment.

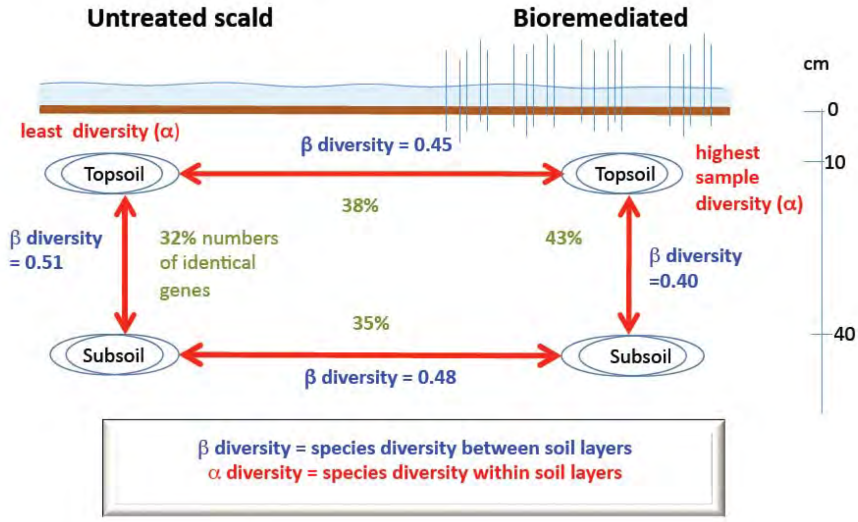

Figure 5-97. Microbial diversity (β and α) using the GeoChip.4.0 approach for Tolderol sediments at August 2010 *(based on analysis provided by Mark Edwards, SCU).*

6.0 Conclusions

The key findings of this study are:

1) Both the acidity and low pHs of the acidified acid sulfate sediment layers are being remediated by a number of processes and sources some consequent of the bioremediation, some not.
   The two main factors effecting acidity remediation appear to be:
   - the movement into the sediment of the alkalinity that is contained in the lake waters and;
   - the vegetation established during bioremediation firstly adding alkalinity to the soil via root-mediated processes, and secondly preventing severe erosion of exposed sandy less-acidic surficial sediment layer and thereby preventing the exposure of the more severely acidified sub-surface sediment layers.

2) Substantially enhanced sulfate reduction has taken place in the surficial sediments consequent of the additions of organic matter produced by the vegetation established on these sites during the bioremediation program. There were clear differences in the effectiveness of the vegetation in driving this process. For example, different vegetation types produced organic matter in different amounts and over different time periods. Whereas annual plants produce appreciable amounts of organic matter but then die, perennial plants can continue to produce organic matter. This is important because in sediments such as these where the availability of organic matter is, along with extremely low pHs, the main constraint against sulfate reduction, the patterns of organic matter accumulation and production dictate the consequent patterns of sulfate reduction. Importantly, vegetation (such as *Phragmites*) that can successfully resist prolonged flooding continued to supply organic matter to sediments after inundation and hence are likely to continue to drive sulfate reduction processes.

3) Importantly, the net rates of production of alkalinity arising from the nature of the sulfur cycling processes in these sediments, with the lack of accumulation of elemental sulfur, monosulfides or pyrite, were no more than minor and ephemeral during the initial stages (i.e. first 6 months) of lake re-inundation that were examined in this study.

4) Although the avoidance of the accumulation of elemental sulfur, monosulfides and disulfides in the surficial lake sediments after bioremediation results in minor net production of alkalinity in the upper lake sediments, this may be regarded as a positive outcome as this situation also results in the avoidance of some key future hazards that were important foci of this study. These include: 1. the avoidance of the development of potential sulfidic acidity in these surface sediment layers, and 2. the avoidance of the development of monosulfidic materials (including Monosulfidic Black Oozes (MBOs)) and their associated acidification, metal mobilisation and deoxygenation hazards. Even so these hazards may develop at longer inundation durations than those that were observed in this study, especially in areas where lake vegetation such as *Phragmites* continues to supply organic matter that can fuel further sulfate reduction and biogeochemical regime shifts in these sediments.

5) The data indicate that, apart from increases in ferrous iron (Fe^{2+}) concentrations in pore-waters, there were no appreciable systematic changes in the mobility of sequestration of metals or metalloids in these lake sediments consequent of bioremediation during the study period.

6) The data indicate that, apart from a considerable decrease in ammonium occurring with increased duration of inundation, there were few general trends in nutrient availability consequent of bioremediation during the study period.

7.0 Recommendations

1) We are aware that this study has focussed on the geochemical processes and changes that have occurred in the relatively early stages of lake re-filling. Whilst this is unlikely to be a major limitation for those bioremediated sites where the organic matter produced by the bioremediation vegetation was largely removed or exhausted during this period, it is an important consideration when assessing the possible long-term effects of bioremediation using vegetation that is still producing organic materials or where there was (at the end of our study) still a relative abundance of organic matter to drive further changes to the biogeochemistry of the lake sediments.

   Differences in geochemical behaviour to those observed in this study may develop during later stages of inundation as the sediments sweep through a wider range of biogeochemical regimes than occurred initially, especially where living bioremediation vegetation that survived the inundation of the lakes continue to provide organic matter to drive such geochemical regime changes. Such changes could result in the development of the hazards that can be associated with sulfate reduction resulting in the accumulation of sulfides such as monosulfides and pyrite, hazards that were avoided during the initial period of lake infilling.

   It is our recommendation that future monitoring of the effects of bioremediation on the geochemistry of the lake sediments, by assessment programs similar to that used in this project, be undertaken to fully assess the possible effects in both the medium and long term of the various bioremediation techniques on the lake ecosystem.

2) The results also indicate that subsurface pore-water nickel and zinc concentrations greatly exceed the respective Australian water quality guidelines for ecosystem protection. The nickel- and zinc-rich pore-water is currently separated from the overlying lake water by 10 - 15 cm of near-neutral sediment, containing low pore-water nickel and zinc concentrations. On this basis, one could conclude that the deeper nickel- and zinc-rich pore-water does not represent an immediate environmental hazard as they are isolated from the surface water. However, in a lake setting, including sites treated by bioremediation techniques, there are a number of important scenarios where subsurface bio-available trace metals could enter the surface aquatic ecosystem. This includes ingestion by burrowing benthic organisms, translocation into plants via roots (this is an especially important consideration for lake sediment bioremediation via revegetation) and direct ingestion by foraging animals (e.g. birds and fish). As such, the fate and possible mobility of subsurface pore-water nickel and zinc at these sites requires consideration from both a geochemical perspective (i.e. developing the knowledge required to predict how pore-water nickel and zinc will change into the future) and an ecological perspective (i.e. examining nickel and zinc uptake in potentially exposed organisms).

   It is our recommendation that future monitoring of the pore-water nickel and zinc in the lake sediments as affected by bioremediation is required in order to assess ongoing environmental risks posed by the presence of very high bio-accessible concentrations of these two potentially-toxic trace metals.

3) The results also demonstrate that the different vegetation types used for bioremediation had very different organic matter production characteristics and that these differences markedly affected the initial geochemical behaviour during the first 6 months of lake refilling. The results of this study strongly suggest that more detailed study on the effectiveness of the different vegetation types and strategies used for bioremediation is required in order to understand in sufficient detail the reasons for these differences and to provide a factual basis to optimise bioremediation strategies. It is our recommendation that such a study be undertaken.

8.0 References

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9.0 Appendices

APPENDIX 1. Site and sample descriptions

Table 9-1. Summary of minor changes to sampling in August 2010 necessitated by unforeseen flood conditions, with the relevant site codes for all sampling events.

Site	Treatment	MAY 2010	AUGUST 2010	NOVEMBER 2010	FEBRUARY 2011
Waltowa	i. Established *Phragmites*	C	P	GG	PP
	ii. Established *Cotula*	A	Q	FF	QQ
	iii. Established *Juncus*	B	R	EE	RR
Poltalloch	i. Control (no bioremediation)	I	n/a (flooded)	n/a (flooded)	n/a (flooded)
	ii. 2010 seeded with Bevy rye and *Puccinellia*	J	n/a (flooded)	n/a (flooded)	n/a (flooded)
	iii. 2010 planted *Juncus* into 2009 plantings of Bevy rye	K*	X – *Juncus* plantings in 2009 Bevy rye	HH	XX
			W – 2009 plantings of Bevy rye	II	WW
Tolderol	i. Control (no bioremediation)	E	S	BB	SS
	ii. 2010 seeded with Bevy rye and *Puccinellia*	D	n/a (flooded)	n/a (flooded)	n/a (flooded)
	iii. 2010 planted *Juncus* into 2009 plantings of Bevy rye	F	T	AA	TT
Campbell Park	i. Control (no bioremediation)	G	Y	CC	YY
	ii. 2010 seeded with Bevy rye and *Puccinellia*	H	Z	DD	ZZ

*Treatment subdivided during August phase into two separate sites of 2009 Bevy rye plantings, one site with successful 2010 *Juncus* plantings (‘site iii’) and one site without *Juncus* (‘site iv’).

Table 9-2. Lower Lakes site and profile descriptions.

Location	Treatment	Date	Profile	GPS Co-ordinates Zone East, North.	Depth (cm)	pH	Eh* (mV)	Location and Profile Remarks
Waltowa	Established *Cotula*	21/05/10	A1	54H 0352248, 6059185	0-10	4.92	650	A1, A2, A3 replicate pits in the *Cotula* site down to 70 cm.
					10-20	3.53	686	Water table depth at ~62 cm depth.
					20-30	3.44	582	0-30 cm: beige sand with iron segregations.
					30-40	4.57	542	30-40 cm: grey sand.
					40-50	7.92	236	40-70 cm: grey clay.
					50-60	7.96	174	
					60-70	7.80	182	
		21/05/10	A2	54H 0352245, 6059159	0-10	7.80	493	*Cotula* site down to 70 cm.
					10-20	6.92	602	Water table depth at ~65 cm depth.
					20-30	4.32	654	0-30 cm: beige sand with iron segregations.
					30-40	4.40	364	30-40 cm: grey sand.
					40-50	6.94	225	40-70 cm: grey clay.
					50-60	7.84	158	
					60-70	8.15	133	
		21/05/10	A3	54H 0352218, 6059195	0-10	7.78	423	*Cotula* site down to 70 cm.
					10-20	3.91	617	Water table depth at ~73 cm depth.
					20-30	4.01	639	0-30 cm: beige sand with iron segregations.
					30-40	6.97	475	30-40 cm: grey sand.
					40-50	8.12	281	40-70 cm: grey clay.
					50-60	8.23	244	
					60-70	8.43	184	
	Established *Juncus*	21/05/10	B1	54H 0352066, 6059357	0-10	9.09	416	B1, B2, B3 replicate pits in the *Juncus* site down to 70 cm.
					10-20	8.53	413	Water table depth at >80 cm depth. Drier than Site A.
					20-30	3.94	665	0-30 cm: beige sand with iron segregations.
					30-40	3.66	495	30-40 cm: grey sand.
					40-50	6.85	477	40-70 cm: grey clay.
					50-60	7.98	172	
					60-70	8.08	124	
		21/05/10	B2	54H 0352057, 6059356	0-10	8.64	404	*Juncus* site down to 80 cm.
					10-20	8.28	417	Water table depth at >90 cm depth.
					20-30	3.57	711	0-30 cm: beige sand with iron segregations.
					30-40	5.14	646	30-40 cm: grey sand.
					40-50	7.81	225	40-70 cm: grey clay.
					50-60	7.96	143	
					60-70	8.00	149	
					70-80	7.94	142	
		21/05/10	B3	54H 0352050, 6059341	0-10	8.68	386	*Juncus* site down to 80 cm.
					10-20	8.58	384	Water table depth at >95 cm depth.
					20-30	8.20	411	0-30 cm: beige sand with iron segregations.
					30-40	7.91	412	30-40 cm: grey sand.
					40-50	7.82	302	40-70 cm: grey clay.
					50-60	8.00	267	
					60-70	8.51	244	
					70-80	8.43	132	

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-2 (continued). Lower Lakes site and profile descriptions.

Location	Treatment	Date	Profile	GPS Co-ordinates Zone East, North.	Depth (cm)	pH	Eh* (mV)	Location and Profile Remarks
Waltowa	Established *Phragmites*	21/05/10	C1	54H 0352290, 6059116	0-10	8.33	409	C1, C2, C3 replicate pits in the *Phragmites* site down to 80 cm. Water table depth at >90 cm depth. 0-30 cm: beige sand with iron segregations. 30-40 cm: grey sand. 40-70 cm: grey clay.
					10-20	5.87	422	
					20-30	3.89	454	
					30-40	5.54	488	
					40-50	7.73	431	
					50-60	8.42	189	
					60-70	8.26	139	
					70-80	8.80	117	
		21/05/10	C2	54H 0352286, 6059109	0-10	8.45	394	*Phragmites* site down to 90 cm. Water table depth at >90 cm depth. 0-30 cm: beige sand with iron segregations. 30-40 cm: grey sand. 40-70 cm: grey clay.
					10-20	7.98	419	
					20-30	7.36	448	
					30-40	5.11	468	
					40-50	7.43	394	
					50-60	8.49	274	
					60-70	8.72	163	
					70-80	8.59	123	
					80-90	8.34	149	
		21/05/10	C3	54H 0352281, 6059116	0-10	6.84	380	*Phragmites* site down to 80 cm. Water table depth at >90 cm depth. 0-30 cm: beige sand with iron segregations. 30-40 cm: grey sand. 40-70 cm: grey clay.
					10-20	7.90	393	
					20-30	5.49	608	
					30-40	6.04	556	
					40-50	6.32	413	
					50-60	7.14	362	
					60-70	8.06	271	
					70-80	8.19	235	
Tolderol	2010 seeded with Bevy rye and *Puccinellia*	22/05/10	D1	54H 0331001, 6083423	0-10	3.95	617	D1, D2, D3 replicate pits in the unvegetated site to be seeded in a couple of weeks time down to 80 cm. Water table depth at ~70 cm depth. 0-35 cm: beige sand with frequent jarosite in roots. 35-70 cm: grey sand, frequent jarosite in roots. 70-80 cm: grey sandy clay.
					10-20	3.99	629	
					20-30	3.71	666	
					30-40	3.50	689	
					40-50	3.59	686	
					50-60	4.18	457	
					60-70	5.83	381	
					70-80	6.65	184	
		22/05/10	D2	54H 0330975, 6083434	0-10	3.64	677	Unvegetated site to be seeded in a couple of weeks time down to 80 cm. Water table depth at ~65 cm depth. 0-35 cm: beige sand with frequent jarosite in roots (more frequent than at D1). 35-70 cm: grey sand with frequent jarosite in roots. 70-80 cm: grey sandy clay with shell grit.
					10-20	3.50	703	
					20-30	3.60	697	
					30-40	3.83	638	
					40-50	4.30	497	
					50-60	5.76	436	
					60-70	6.00	375	
					70-80	6.96	192	

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-2 (continued). Lower Lakes site and profile descriptions.

Location	Treatment	Date	Profile	GPS Co-ordinates Zone East, North.	Depth (cm)	pH	Eh* (mV)	Location and Profile Remarks
Tolderol	2010 seeded with Bevy rye and *Puccinellia*	22/05/10	D3	54H 0330967, 6083415	0-10	4.31	652	Unvegetated site to be seeded in a couple of weeks time down to 80 cm. Water table depth at ~82 cm depth (Groundwater: pH 6.69; Eh 49). 0-35 cm: beige sand with frequent jarosite in roots (more frequent than at D1). 35-70 cm: grey sand with frequent jarosite in roots. 70-80 cm: grey sandy clay. Contains shell grit at 80 cm. Frequent jarosite around root holes.
					10-20	3.89	653	
					20-30	3.60	652	
					30-40	3.62	670	
					40-50	3.65	539	
					50-60	4.77	535	
					60-70	6.60	274	
					70-80	6.16	351	
					80-90	7.43	414	
	Control (no bioremediation)	22/05/10	E1	54H 0331037, 6083413	0-10	4.01	639	E1, E2, E3 replicate pits in the unvegetated site to be left unseeded down to 80 cm Water table depth at ~65 cm depth. 0-40 cm: beige sand with very occasional jarosite in roots. 40-50 cm: beige sand with abundant jarosite in roots. 50-60 cm: dark grey sandy clay with abundant jarosite in roots. 60-80 cm: dark grey sandy clay but no jarosite.
					10-20	4.10	671	
					20-30	3.77	698	
					30-40	3.47	688	
					40-50	3.46	609	
					50-60	3.74	473	
					60-70	4.07	386	
					70-80	4.20	341	
		22/05/10	E2	54H 0331068, 6083412	0-10	3.90	637	Unvegetated site to be left unseeded down to 80 cm Water table depth at ~69 cm depth. 0-40 cm: beige sand with very occasional jarosite in roots. 40-50 cm: beige sand with some jarosite in roots. 50-60 cm: dark grey sandy clay with abundant jarosite in roots. 60-80 cm: dark grey sandy clay but no jarosite.
					10-20	3.98	649	
					20-30	3.63	629	
					30-40	3.65	659	
					40-50	3.65	509	
					50-60	3.94	455	
					60-70	4.36	361	
					70-80	4.64	319	
		22/05/10	E3	54H 0331049, 6083437	0-10	3.60	681	Unvegetated site to be left unseeded down to 70 cm Water table depth at ~62 cm depth. 0-40 cm: beige sand with some jarosite in roots. 40-50 cm: beige sand with abundant jarosite in roots. 50-60 cm: dark grey sandy clay with some jarosite in roots. 60-80 cm: dark grey sandy clay but no jarosite.
					10-20	3.40	740	
					20-30	3.37	720	
					30-40	3.20	698	
					40-50	3.55	540	
					50-60	4.07	424	
					60-70	4.74	376	
	2010 planted *Juncus* into 2009 plantings of Bevy rye	22/05/10	F1	54H 0331135, 6083468	0-10	5.31	547	F1, F2, F3 replicate pits in the vegetated site down to 80 cm Water table depth at 73 cm depth. 0-30 cm: beige sand with some iron segregations, iron band at 30 cm. 30-45 cm: beige sand with jarosite band at 40-45 cm. 45-60 cm: grey sand with some iron segregations. 60-80 cm: grey sand.
					10-20	4.97	568	
					20-30	4.13	586	
					30-40	3.71	598	
					40-50	3.91	472	
					50-60	4.40	440	
					60-70	6.02	344	
					70-80	6.83	329	

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-2 (continued). Lower Lakes site and profile descriptions.

Location	Treatment	Date	Profile	GPS Co-ordinates Zone East, North.	Depth (cm)	pH	Eh* (mV)	Location and Profile Remarks
Tolderol	2010 planted *Juncus* into 2009 plantings of Bevy rye	22/05/10	F2	54H 0331167, 6083483	0-10	6.28	548	Vegetated site down to 80 cm Water table depth at 67 cm depth. 0-30 cm: beige sand with lots of iron segregations at 20-50 cm, iron band at 30 cm. 30-45 cm: beige sand with jarosite band at 40-45 cm. 45-60 cm: grey sand with some iron segregations. 60-80 cm: grey sand.
					10-20	4.19	608	
					20-30	3.59	668	
					30-40	3.59	545	
					40-50	3.60	521	
					50-60	3.97	445	
					60-70	6.15	284	
					70-80	6.85	265	
		22/05/10	F3	54H 0331151, 6083495	0-10	6.90	522	Vegetated site down to 60 cm Water table depth at 75 cm depth. 0-30 cm: beige sand with some iron segregations, iron band at 30 cm. 30-45 cm: beige sand with jarosite band at 40-45 cm. 45-60 cm: grey sand with some iron segregations, strong H_2S smell. 60-80 cm: grey sand, strong H_2S smell.
					10-20	4.37	647	
					20-30	3.69	388	
					30-40	3.44	716	
					40-50	3.57	629	
					50-60	4.11	666	
					60-70	6.09	496	
					70-80	6.86	403	
Campbell Park	Control (no bioremediation)	22/05/10	G1	54H 0340857, 6056751	0-10	3.28	744	G1, G2, G3 replicate pits down to 80 cm (except G1&G2 where there was rock refusal) in the unvegetated site to remain unseeded. 0-35 cm: light grey sand with abundant jarosite segregations around pores. 35-53 cm: dark grey sand (a little clayey) with large jarosite accumulations. 53 cm: rock refusal.
					10-20	3.10	762	
					20-30	2.82	784	
					30-40	2.86	782	
					40-50	3.60	545	
					50-60	4.22	488	
					60-70	4.67	427	
					70-80	4.78	397	
		22/05/10	G2	54H 0340867, 6056730	0-10	2.99	690	Unvegetated site to remain unseeded down to 40 cm (as rock at 40 cm depth). 0-40 cm: light grey sand with abundant jarosite segregations around pores. Jarosite krotovina. 40 cm: rock refusal
					10-20	2.94	737	
					20-30	2.87	739	
					30-40	3.30	725	
		22/05/10	G3	54H 0340880, 6056745	0-10	3.00	755	Unvegetated site to remain unseeded down to 80 cm. Water table depth at 70 cm depth. 0-30 cm: light grey sand with abundant jarosite segregations. 30-50 cm: dark grey sand with some jarosite. 50-80 cm: dark grey clayey sand.
					10-20	2.78	766	
					20-30	2.89	780	
					30-40	3.19	582	
					40-50	3.91	511	
					50-60	4.20	427	
					60-70	4.57	436	
					70-80	4.95	370	
	2010 seeded with Bevy rye and *Puccinellia*	22/05/10	H1	54H 0340823, 6056681	0-10	2.99	752	H1, H2, H3 replicate pits down to 80 cm in the unvegetated site to be seeded with rye grass in a few weeks time. Water table depth >90 cm depth. 0-30 cm: light grey sand with abundant jarosite segregations. 30-50 cm: dark grey sand with some jarosite. 50-60 cm: dark grey clayey sand. 60-80 cm: beige light clay.
					10-20	2.86	746	
					20-30	2.71	784	
					30-40	2.93	499	
					40-50	4.42	470	
					50-60	7.03	376	
					60-70	7.17	131	
					70-80	7.57	69	

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-2 (continued). Lower Lakes site and profile descriptions.

Location	Treatment	Date	Profile	GPS Co-ordinates Zone East, North.	Depth (cm)	pH	Eh* (mV)	Location and Profile Remarks
Campbell Park	2010 seeded with Bevy rye and *Puccinellia*	22/05/10	H2	54H 0340796, 6056694	0-10	3.49	680	Unvegetated site to be seeded with rye grass in a few weeks time down to 80 cm. Water table depth at 70 cm depth. 0-30 cm: light grey sand with abundant jarosite segregations. 30-50 cm: dark grey sand with some jarosite. 50-60 cm: dark grey clayey sand. 60-80 cm: beige light clay.
					10-20	3.06	739	
					20-30	2.93	761	
					30-40	3.65	521	
					40-50	4.43	440	
					50-60	6.06	325	
					60-70	7.08	98	
					70-80	7.61	47	
		22/05/10	H3	54H 0340808, 6056734	0-10	3.11	697	Unvegetated site to be seeded with rye grass in a few weeks time down to 80 cm. Water table depth at 70 cm depth. 0-30 cm: light grey sand with abundant jarosite segregations. 30-50 cm: dark grey sand with some jarosite. 50-60 cm: dark grey clayey sand. 60-80 cm: beige light clay.
					10-20	2.93	742	
					20-30	3.06	719	
					30-40	2.96	563	
					40-50	2.90	485	
					50-60	7.14	457	
					60-70	7.12	270	
					70-80	6.94	170	
Poltalloch	Control (no bioremediation)	23/05/10	I1	54H 0341248, 6070729	0-10	4.29	653	Unvegetated site to remain unseeded down to 80 cm. Water table depth at 55 cm depth. 0-20 cm: beige sand with iron segregations, and frequent jarosite 2-20 cm. 20-35 cm: grey sand with iron segregations, and frequent jarosite to 25 cm. 35-80 cm: grey sand.
					10-20	3.72	730	
					20-30	3.82	541	
					30-40	4.63	461	
					40-50	5.20	458	
					50-60	6.76	351	
					60-70	7.72	317	
					70-80	7.76	302	
		23/05/10	I2	54H 0341271, 6070758	0-10	3.50	698	Unvegetated site to remain unseeded down to 80 cm. Water table depth at 55 cm depth. 0-20 cm: beige sand with iron segregations, and frequent jarosite 2-20 cm. 20-35 cm: grey sand with iron segregations, and frequent jarosite to 25 cm. 35-80 cm: grey sand.
					10-20	3.24	736	
					20-30	3.53	565	
					30-40	4.04	507	
					40-50	5.31	424	
					50-60	6.59	400	
					60-70	7.77	323	
					70-80	7.50	340	
		23/05/10	I3	54H 0341272, 6070730	0-10	4.86	586	Unvegetated site to remain unseeded down to 80 cm. Water table depth at 43 cm depth. 0-20 cm: beige sand with iron segregations, and frequent jarosite 2-20 cm. 20-35 cm: grey sand with iron segregations, and frequent jarosite to 25 cm. 35-60 cm: grey sand.
					10-20	4.75	608	
					20-30	4.91	526	
					30-40	6.71	465	
					40-50	7.51	366	
					50-60	7.65	306	

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-2 (continued). Lower Lakes site and profile descriptions.

Location	Treatment	Date	Profile	GPS Co-ordinates Zone East, North.	Depth (cm)	pH	Eh* (mV)	Location and Profile Remarks
Poltalloch	2010 seeded with Bevy rye and *Puccinellia*	23/05/10	J1	54H 0341226, 6070727	0-10	4.92	536	Unvegetated site to be seeded down to 80 cm.
					10-20	6.03	538	Water table depth at 55 cm depth.
					20-30	6.04	482	0-20 cm: beige sand with iron segregations, and frequent jarosite 2-20 cm.
					30-40	7.31	325	20-35 cm: grey sand with iron segregations, and frequent jarosite to 25 cm.
					40-50	7.96	325	35-80 cm: grey sand.
					50-60	8.01	311	
					60-70	7.85	298	
		23/05/10	J2	54H 0341195, 6070736	0-10	3.83	690	Unvegetated site to be seeded down to 80 cm.
					10-20	3.51	735	Water table depth at 50 cm depth.
					20-30	3.45	583	0-20 cm: beige sand with iron segregations, and frequent jarosite 2-20 cm.
					30-40	3.68	522	20-35 cm: grey sand with iron segregations, and frequent jarosite to 25 cm.
					40-50	4.09	508	35-80 cm: grey sand.
					50-60	5.68	417	
					60-70	7.30	372	
					70-80	7.65	345	
		23/05/10	J3	54H 0341195, 6070714	0-10	3.52	645	Unvegetated site to be seeded down to 80 cm.
					10-20	3.45	694	Water table depth at 50 cm depth.
					20-30	3.73	584	0-20 cm: beige sand with iron segregations, and frequent jarosite 2-20 cm.
					30-40	3.90	521	20-35 cm: grey sand with iron segregations, and frequent jarosite to 25 cm.
					40-50	4.76	394	35-60 cm: grey sand.
					50-60	6.81	308	
	2010 planted *Juncus* into 2009 plantings of Bevy rye	23/05/10	K1	54H 0341221, 6070671	0-10	6.95	532	Grassed site to be planted with *Juncus*, down to 80 cm.
					10-20	4.46	579	Water table depth at 55 cm depth.
					20-30	4.07	627	0-20 cm: beige sand with iron segregations.
					30-40	4.65	600	20-35 cm: grey sand with iron segregations.
					40-50	7.67	404	35-60 cm: grey sand.
					50-60	8.33	301	
		23/05/10	K2	54H 0341245, 6070650	0-10	8.02	434	Grassed site to be planted with *Juncus*, down to 80 cm.
					10-20	5.28	565	Water table depth at 60 cm depth.
					20-30	4.07	681	0-20 cm: beige sand with iron segregations, and jarosite from 15 cm.
					30-40	3.50	691	20-35 cm: grey sand with iron segregations and jarosite.
					40-50	3.89	566	35-70 cm: grey sand with fine shell grit, and jarosite to 45 cm.
					50-60	6.54	485	
					60-70	7.87	255	
		23/05/10	K3	54H 0341203, 6070637	0-10	7.81	382	Grassed site to be planted with *Juncus*, down to 80 cm.
					10-20	4.04	512	Water table depth at 60 cm depth.
					20-30	3.94	622	0-20 cm: beige sand with iron segregations, and jarosite from 15 cm.
					30-40	4.69	508	20-35 cm: grey sand with iron segregations and jarosite.
					40-50	5.98	402	35-70 cm: grey sand.
					50-60	6.42	419	
					60-70	8.33	284	

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-2 (continued). Lower Lakes site and profile descriptions.

Location	Treatment	Date	Profile	GPS Co-ordinates Zone East, North.	Depth (cm)	pH	Eh* (mV)	Location and Profile Remarks
Waltowa	Established *Phragmites*	31/08/10	P1	54H 0352281, 6059120	0-10	6.73	395	Profiles P1, P2 and P3 coincide with the 'established *Phragmites*' treatment (i.e. profiles C1, C2 and C3 in the May 2010 sampling phase).
					10-20	6.37	426	
					20-30	5.41	461	
					30-40	3.39	500	
					40-50	6.36	242	
					50-60	6.77	203	
		31/08/10	P2	54H 0352292, 6059117	0-10	6.81	378	*see above*
					10-20	6.51	408	
					20-30	5.16	359	
					30-40	4.44	381	
					40-50	6.01	269	
					50-60	6.29	157	
		31/08/10	P3	54H 0352289, 6059108	0-10	6.64	370	*see above*
					10-20	6.45	408	
					20-30	5.39	486	
					30-40	3.85	472	
					40-50	5.73	323	
					50-60	6.22	198	
	Established *Cotula*	31/08/10	Q1	54H 0352239, 6059188	0-10	3.43	334	Profiles Q1, Q2 and Q3 coincide with the 'established *Cotula*' treatment (i.e. profiles A1, A2 and A3 in the May 2010 sampling phase).
					10-20	2.52	643	
					20-30	2.57	575	
					30-40	3.37	131	
					40-50	6.71	122	
					50-60	6.65	115	
		31/08/10	Q2	54H 0352217, 6059201	0-10	5.92	355	*see above*
					10-20	3.26	588	
					20-30	3.00	582	
					30-40	5.28	317	
					40-50	6.39	194	
					50-60	6.62	145	
		31/08/10	Q3	54H 0352245, 6059165	0-10	6.03	361	*see above*
					10-20	3.21	616	
					20-30	2.97	566	
					30-40	5.38	283	
					40-50	6.63	180	
					50-60	6.63	239	
	Established *Juncus*	31/08/10	R1	54H 0352059, 6059359	0-10	7.05	422	Profiles R1, R2 and R3 coincide with the 'established *Juncus*' treatment (i.e. profiles B1, B2 and B3 in the May 2010 sampling phase).
					10-20	7.17	404	
					20-30	6.08	416	
					30-40	3.88	496	
					40-50	3.75	441	
					50-60	6.36	243	
					60-70	6.65	142	

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-2 (continued). Lower Lakes site and profile descriptions.

Location	Treatment	Date	Profile	GPS Co-ordinates Zone East, North.	Depth (cm)	pH	Eh* (mV)	Location and Profile Remarks
Waltowa	Established *Juncus*	31/08/10	R2	54H 0352057, 6059354	0-10	7.08	380	*see above*
					10-20	6.84	418	
					20-30	6.31	433	
					30-40	3.70	463	
					40-50	6.32	406	
					50-60	6.22	256	
					60-70	6.46	154	
		31/08/10	R3	54H 0352056, 6059348	0-10	7.03	384	*see above*
					10-20	6.76	405	
					20-30	6.80	421	
					30-40	6.57	412	
					40-50	6.58	378	
					50-60	6.42	209	
Tolderol	Control (no bioremediation)	30/08/10	S1	54H 0331071, 6083418	0-10	3.22	655	Profiles S1, S2 and S3 coincide with the control area (i.e. profiles E1, E2 and E3 in the May 2010 sampling phase).
					10-20	2.75	671	
					20-30	2.73	690	
					30-40	2.87	686	
					40-50	2.92	557	
					50-60	3.29	481	
		30/08/10	S2	54H 0331054, 6083438	0-10	2.74	616	*see above*
					10-20	2.53	665	
					20-30	2.54	688	
					30-40	2.64	589	
					40-50	3.05	488	
					50-60	3.45	489	
					60-70	5.88	392	
		30/08/10	S3	54H 0331043, 6083417	0-10	3.33	523	*see above*
					10-20	2.71	666	
					20-30	2.79	677	
					30-40	3.45	637	
					40-50	5.73	545	
					50-60	6.57	290	
	2010 planted *Juncus* into 2009 plantings of Bevy rye	30/08/10	T1	54H 0331149, 6083498	0-10	6.95	169	Profiles T1, T2 and T3 coincide with the '2010 *Juncus* in 2009 Bevy rye' treatment (i.e. profiles F1, F2 and F3 in the May 2010 sampling phase).
					10-20	5.97	293	
					20-30	4.09	427	
					30-40	3.40	469	
					40-50	3.14	525	
					50-60	3.56	503	
		30/08/10	T2	54H 0331166, 6083485	0-10	6.18	275	*see above*
					10-20	3.38	517	
					20-30	2.90	573	
					30-40	2.90	597	
					40-50	3.80	468	
					50-60	5.63	400	

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-2 (continued). Lower Lakes site and profile descriptions.

Location	Treatment	Date	Profile	GPS Co-ordinates Zone East, North.	Depth (cm)	pH	Eh* (mV)	Location and Profile Remarks
Tolderol	2010 planted *Juncus* into 2009 plantings of Bevy rye	30/08/10	T3	54H 0331139, 6083467	0-10	6.35	399	*see above*
					10-20	3.45	529	
					20-30	3.03	584	
					30-40	2.75	672	
					40-50	2.79	485	
					50-60	3.28	536	
Poltalloch	2009 plantings of Bevy rye	29/08/10	W1	54H 0341267, 6070659	0-10	6.58	344	Profiles W1, W2 and W3 constitute one of two subsequent subdivisions of the '2009 plantings of Bevy rye' treatment (i.e. profiles K1, K2 and K3 in the May 2010 sampling phase), featuring **no** 2010 *Juncus* plantings.
					10-20	5.97	239	
					20-30	5.53	307	
					30-40	6.36	267	
					40-50	7.73	291	
					50-60	7.19	291	
					60-70	7.18	275	
		29/08/10	W2	54H 0341288, 6070665	0-10	6.55	370	*see above*
					10-20	6.18	304	
					20-30	3.30	509	
					30-40	3.16	542	
					40-50	6.31	391	
					50-60	7.27	336	
					60-70	7.75	320	
		29/08/10	W3	54H 0341306, 6070676	0-10	6.55	336	*see above*
					10-20	5.64	339	
					20-30	3.36	538	
					30-40	3.46	510	
					40-50	4.29	456	
	Juncus plantings in 2009 Bevy rye	29/08/10	X1	54H 0341245, 6070646	0-10	6.92	272	Profiles X1, X2 and X3 constitute one of two subsequent subdivisions of the '2009 plantings of Bevy rye' treatment (i.e. profiles K1, K2 and K3 in the May 2010 sampling phase), featuring 2010 *Juncus* plantings.
					10-20	6.70	231	
					20-30	5.42	460	
					30-40	2.88	645	
					40-50	2.96	586	
					50-60	3.29	502	
		29/08/10	X2	54H 0341217, 6070671	0-10	6.61	412	*see above*
					10-20	6.06	402	
					20-30	5.92	426	
					30-40	6.41	380	
					40-50	7.07	398	
					50-60	7.21	347	
					60-70	7.00	195	

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-2 (continued). Lower Lakes site and profile descriptions.

Location	Treatment	Date	Profile	GPS Co-ordinates Zone East, North.	Depth (cm)	pH	Eh* (mV)	Location and Profile Remarks
Poltalloch	*Juncus* plantings in 2009 Bevy rye	29/08/10	X3	54H 0341204, 6070641	0-10	6.20	381	*see above*
					10-20	3.82	490	
					20-30	3.11	534	
					30-40	3.23	483	
					40-50	3.37	463	
					50-60	3.77	415	
					60-70	6.37	277	
Campbell Park	Control (no bioremediation)	28/08/10	Y1	54H 0340760, 6056752	0-10	2.24	671	Profiles Y1, Y2 and Y3 coincide with the control area (i.e. profiles G1, G2 and G3 in the May 2010 sampling phase).
					10-20	1.99	729	
					20-30	2.11	541	
					30-40	2.87	455	
					40-50	3.66	405	
					50-60	6.53	111	
					60-70	6.76	-3	
		28/08/10	Y2	54H 0340767, 6056769	0-10	2.33	675	*see above*
					10-20	2.03	732	
					20-30	2.01	582	
					30-40	2.44	521	
					40-50	5.96	364	
					50-60	6.55	320	
					60-70	6.62	267	
		28/08/10	Y3	54H 0340779, 6056738	0-10	2.36	697	*see above*
					10-20	2.15	666	
					20-30	2.36	482	
					30-40	3.16	422	
					40-50	5.63	214	
					50-60	6.56	-18	
					60-70	6.60	38	
	2010 seeded with Bevy rye and *Puccinellia*	28/08/10	Z1	54H 0340737, 6056750	0-10	4.32	508	Profiles Z1, Z2 and Z3 coincide with the '2010 Bevy rye and *Puccinellia*' treatment (i.e. profiles H1, H2 and H3 in the May 2010 sampling phase).
					10-20	2.99	672	
					20-30	2.64	656	
					30-40	2.85	535	
					40-50	6.22	422	
					50-60	6.84	265	
					60-65	6.84	26	
		28/08/10	Z2	54H 0340730, 6056764	0-10	6.82	347	*see above*
					10-20	3.24	504	
					20-30	2.74	596	
					30-40	2.65	513	
					40-50	2.90	483	
					50-60	4.57	393	
					60-70	6.34	86	

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-2 (continued). Lower Lakes site and profile descriptions.

Location	Treatment	Date	Profile	GPS Co-ordinates Zone East, North.	Depth (cm)	pH	Eh* (mV)	Location and Profile Remarks
Campbell Park	2010 seeded with Bevy rye and *Puccinellia*	28/08/10	Z3	54H 0340717, 6056757	0-10	6.37	336	*see above*
					10-20	3.82	450	
					20-30	2.79	559	
					30-40	2.73	543	
					40-50	4.92	380	
					50-60	6.51	55	
					60-70	6.64	5	
Tolderol	2010 planted *Juncus* into 2009 plantings of Bevy rye	21/11/10	AA1	54H 0331165, 6083479	0-10	7.64	319	Profiles AA1, AA2 and AA3 coincide with the '2010 *Juncus* in 2009 Bevy rye' treatment (i.e. profiles F1, F2 and F3 in the May 2010 sampling phase). Water level at ~1 m depth. No vegetation on surface (all floated away and on shoreline) 0-2 cm: beige sand. 2-10 cm: dark grey/black sand. 10-27 cm: v. light grey sand and some orange iron segregations. 27-41 cm: as above but abundant jarosite segregations. 41-70 cm: grey sandy with dark brown iron segregations.
					10-20	4.66	322	
					20-30	3.53	407	
					30-40	3.50	446	
					40-50	3.25	452	
					50-60	4.41	424	
					60-70	4.57	406	
		21/11/10	AA2	54H 0331148, 6083441	0-10	6.51	372	AA2 profile description as for AA1 but 2-10 cm layer is a light grey/dark grey colour.
					10-20	6.49	279	
					20-30	5.93	343	
					30-40	3.98	462	
					40-50	3.80	458	
					50-60	4.06	416	
					60-70	4.80	324	
		21/11/10	AA3	54H 0331143, 6083464	0-10	7.16	283	AA3 profile description as for AA1 but 2-10 cm layer is a light grey/dark grey colour.
					10-20	6.61	296	
					20-30	5.90	286	
					30-40	4.22	481	
					40-50	3.63	485	
					50-60	3.56	493	
					60-70	3.79	468	
	Control (no bioremediation)	21/11/10	BB1	54H 0331052, 6083432	0-10	5.65	411	Profiles BB1, BB2 and BB3 coincide with the control area (i.e. profiles E1, E2 and E3 in the May 2010 sampling phase). 0-30 cm: light grey sand with occasional brown iron segregations and organic matter. 30-39 cm: as above but abundant jarosite with some brown iron segregations 39-70 cm: grey sand with occasional brown iron segregations.
					10-20	4.53	405	
					20-30	3.89	507	
					30-40	3.64	522	
					40-50	3.41	518	
					50-60	3.49	509	
					60-70	3.49	506	
		21/11/10	BB2	54H 0331045, 6083413	0-10	5.89	239	BB2 profile description as for BB1 but 5-10 mm shells in grey clay layer below this depth.
					10-20	3.58	446	
					20-30	3.06	489	
					30-40	2.88	564	
					40-50	3.11	547	
					50-60	6.22	250	
					60-70	6.54	152	

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-2 (continued). Lower Lakes site and profile descriptions.

Location	Treatment	Date	Profile	GPS Co-ordinates Zone East, North.	Depth (cm)	pH	Eh* (mV)	Location and Profile Remarks
Tolderol	Control (no bioremediation)	21/11/10	BB3	54H 0331069, 6083411	0-10	5.33	201	BB3 profile description as for BB1 but from 55-70 cm frequent black root/holes (~4 mm diameter)
					10-20	3.40	403	
					20-30	2.94	526	
					30-40	2.96	547	
					40-50	3.07	546	
					50-60	3.51	449	
					60-70	5.19	396	
Campbell Park	Control (no bioremediation)	21/11/10	CC1	54H 0340777, 6056766	0-10	3.20	456	Profiles CC1, CC2 and CC3 coincide with the control area (i.e. profiles G1, G2 and G3 in the May 2010 sampling phase). 0-2 cm: coarse beige ooze material. 2-2.5 cm: dark grey zone. 2.5-28 cm: v. light grey/beige sand and some jarosite. 28-37 cm: grey clay with jarosite and orange iron segregations. 37-45 cm: blue/grey clay with some jarosite and orange iron segregations. 45-65 cm: blue/grey clay.
					10-20	2.77	532	
					20-30	2.70	514	
					30-40	3.01	457	
					40-50	6.24	313	
					50-60	6.86	139	
					60-70	7.08	148	
		21/11/10	CC2	54H 0340788, 6056744	0-10	7.00	513	CC2 profile description as for CC1
					10-20	2.83	513	
					20-30	2.82	497	
					30-40	3.30	412	
					40-50	5.60	297	
					50-60	6.30	252	
					60-70	6.79	147	
		21/11/10	CC3	54H 0340769, 6056753	0-10	3.02	352	CC3 profile description as for CC1
					10-20	2.48	562	
					20-30	2.61	503	
					30-40	2.81	445	
					40-50	4.62	397	
					50-60	6.53	184	
					60-70	6.84	67	
	2010 seeded with Bevy rye and *Puccinellia*	21/11/10	DD1	54H 0340735, 6056755	0-10	4.04	142	Profiles DD1, DD2 and DD3 coincide with the '2010 Bevy rye and *Puccinellia*' treatment (i.e. profiles H1, H2 and H3 in the May 2010 sampling phase). 0-2 cm: beige ooze material. 2-8 cm: Light brown layered sand with some small dark grey patches up to 2 cm in size. 8-35 cm: v. light grey/beige sand with some jarosite. 35-45 cm: blue/grey clay with some jarosite around root holes and orange iron segregations. 45-55 cm: blue/grey clay with jarosite and iron segregations. 55-75 cm: blue/grey clay.
					10-20	3.00	428	
					20-30	2.87	483	
					30-40	2.92	435	
					40-50	3.30	236	
					50-60	4.03	258	
					60-65	6.46	17	
		21/11/10	DD2	54H 0340732, 6056763	0-10	7.32	116	DD2 profile description as for DD1 but with dark grey sand band at 8-13 cm.
					10-20	3.43	393	
					20-30	3.02	436	
					30-40	3.06	412	
					40-50	3.16	341	
					50-60	5.65	269	
					60-70	6.51	4	

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-2 (continued). Lower Lakes site and profile descriptions.

Location	Treatment	Date	Profile	GPS Co-ordinates Zone East, North.	Depth (cm)	pH	Eh* (mV)	Location and Profile Remarks
Campbell Park	2010 seeded with Bevy rye and *Puccinellia*	21/11/10	DD3	54H 0340721, 6056760	0-10	6.65	111	DD3 profile description as for DD1 but with prominent v. dark grey sand band at 5-15 cm.
					10-20	3.48	350	
					20-30	3.00	511	
					30-40	3.04	481	
					40-50	3.56	394	
					50-60	3.61	277	
					60-70	6.50	182	
Waltowa	Established *Juncus*	23/11/10	EE1	54H 0352064, 6059359	0-10	6.93	93	Profiles EE1, EE2 and EE3 coincide with the 'established *Juncus*' treatment (i.e. profiles B1, B2 and B3 in the May 2010 sampling phase).
					10-20	6.53	268	
					20-30	5.48	280	
					30-40	4.77	306	
					40-50	4.57	377	
					50-60	6.58	276	
					60-70	6.76	248	
		23/11/10	EE2	54H 0352061, 6059355	0-10	6.82	29	*see above*
					10-20	6.92	291	
					20-30	6.20	192	
					30-40	5.74	224	
					40-50	6.95	255	
					50-60	6.65	130	
					60-70	6.59	135	
		23/11/10	EE3	54H 0352057, 6059350	0-10	6.88	53	*see above*
					10-20	6.89	-89	
					20-30	6.99	193	
					30-40	6.97	230	
					40-50	6.80	168	
					50-60	6.55	87	
					60-70	6.62	101	
	Established *Cotula*	23/11/10	FF1	54H 0352216, 6059201	0-10	6.76	156	Profiles FF1, FF2 and FF3 coincide with the 'established *Cotula*' treatment (i.e. profiles A1, A2 and A3 in the May 2010 sampling phase).
					10-20	6.16	148	
					20-30	4.64	365	
					30-40	6.15	262	
					40-50	6.84	186	
					50-60	6.90	92	
					60-70	6.92	95	
		23/11/10	FF2	54H 0352222, 6059200	0-10	6.39	145	*see above*
					10-20	3.40	341	
					20-30	3.16	419	
					30-40	3.25	382	
					40-50	5.53	147	
					50-60	6.84	91	
					60-70	6.89	90	

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-2 (continued). Lower Lakes site and profile descriptions.

Location	Treatment	Date	Profile	GPS Co-ordinates Zone East, North.	Depth (cm)	pH	Eh* (mV)	Location and Profile Remarks
Waltowa	Established *Cotula*	23/11/10	FF3	54H 0352245, 6059167	0-10	7.02	-8	*see above*
					10-20	6.19	175	
					20-30	3.62	352	
					30-40	4.69	222	
					40-50	6.00	183	
					50-60	6.59	146	
					60-70	6.74	100	
	Established *Phragmites*	23/11/10	GG1	54H 0352290, 6059118	0-10	6.58	115	Profiles GG1, GG2 and GG3 coincide with the 'established *Phragmites*' treatment (i.e. profiles C1, C2 and C3 in the May 2010 sampling phase). Cores from this site smelt strongly of H_2S.
					10-20	5.88	241	
					20-30	5.60	190	
					30-40	5.37	166	
					40-50	6.47	56	
					50-60	6.42	10	
					60-70	6.46	33	
		23/11/10	GG2	54H 0352291, 6059106	0-10	6.75	70	*see above*
					10-20	6.76	177	
					20-30	6.34	235	
					30-40	6.13	190	
					40-50	6.23	143	
					50-60	6.36	94	
					60-70	6.72	74	
		23/11/10	GG3	54H 0352283, 6059118	0-10	6.76	114	*see above*
					10-20	6.14	281	
					20-30	4.38	356	
					30-40	4.20	249	
					40-50	6.25	86	
					50-60	6.38	45	
					60-70	6.55	6	
Poltalloch	*Juncus* plantings in 2009 Bevy rye	24/11/10	HH1	54H 0341200, 6070641	0-10	6.70	215	Profiles HH1, HH2 and HH3 constitute one of two subsequent subdivisions of the '2009 plantings of Bevy rye' treatment (i.e. profiles K1, K2 and K3 in the May 2010 sampling phase), featuring 2010 *Juncus* plantings.
					10-20	6.70	200	
					20-30	6.50	259	
					30-40	3.83	448	
					40-50	3.59	455	
					50-60	4.12	440	
					60-70	4.11	402	
		24/11/10	HH2	54H 0341216, 6070666	0-10	6.52	312	*see above*
					10-20	6.06	283	
					20-30	6.38	318	
					30-40	7.10	336	
					40-50	7.35	333	
					50-60	7.34	235	
					60-70	7.04	214	

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-2 (continued). Lower Lakes site and profile descriptions.

Location	Treatment	Date	Profile	GPS Co-ordinates Zone East, North.	Depth (cm)	pH	Eh* (mV)	Location and Profile Remarks
Poltalloch	*Juncus* plantings in 2009 Bevy rye	24/11/10	HH3	54H 0341244, 6070647	0-10	6.96	277	*see above*
					10-20	6.64	218	
					20-30	3.51	316	
					30-40	3.26	505	
					40-50	3.44	445	
					50-60	6.42	306	
					60-70	6.43	195	
	2009 plantings of Bevy rye	24/11/10	II1	54H 0341264, 6070655	0-10	6.39	243	Profiles II1, II2 and II3 constitute one of two subsequent subdivisions of the '2009 plantings of Bevy rye' treatment (i.e. profiles K1, K2 and K3 in the May 2010 sampling phase), featuring **no** 2010 *Juncus* plantings.
					10-20	6.46	264	
					20-30	7.10	310	
					30-40	6.90	294	
					40-50	7.43	305	
					50-60	7.26	305	
					60-70	6.91	65	
		24/11/10	II2	54H 0341285, 6070662	0-10	6.63	101	*see above*
					10-20	6.38	212	
					20-30	5.97	264	
					30-40	6.29	234	
					40-50	7.13	297	
					50-60	7.40	266	
					60-70	7.24	190	
		24/11/10	II3	54H 0341304, 6070672	0-10	6.58	235	*see above*
					10-20	5.88	274	
					20-30	3.53	477	
					30-40	3.52	488	
					40-50	4.04	428	
					50-60	6.50	215	
					60-70	6.74	217	
Waltowa	Established *Phragmites*	16/02/11	PP1	54H 0352293, 6059118	0-10	6.88	-111	Profiles PP1, PP2 and PP3 coincide with the 'established *Phragmites*' treatment (i.e. profiles C1, C2 and C3 in the May 2010 sampling phase). Two MBO samples collected from site PP1 (pH: 6.93 & 6.98; Eh: -94 & -116 mV)
					10-20	6.68	59	
					20-30	6.27	84	
					30-40	5.45	79	
					40-50	6.22	104	
					50-60	6.64	74	
					60-70	6.79	77	
		16/02/11	PP2	54H 0352286, 6059105	0-10	6.87	80	*see above*
					10-20	6.74	66	
					20-30	6.21	179	
					30-40	6.25	189	
					40-50	6.17	124	
					50-60	6.55	121	
					60-70	6.24	122	

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-2 (continued). Lower Lakes site and profile descriptions.

Location	Treatment	Date	Profile	GPS Co-ordinates Zone East, North.	Depth (cm)	pH	Eh* (mV)	Location and Profile Remarks
Waltowa	Established *Phragmites*	16/02/11	PP3	54H 0352282, 6059123	0-10	6.95	65	*see above*
					10-20	6.93	44	
					20-30	6.95	144	
					30-40	5.75	183	
					40-50	6.24	201	
					50-60	6.49	111	
					60-70	6.56	102	
	Established *Cotula*	16/02/11	QQ1	54H 0352242, 6059190	0-10	6.97	-4	Profiles QQ1, QQ2 and QQ3 coincide with the 'established *Cotula*' treatment (i.e. profiles A1, A2 and A3 in the May 2010 sampling phase). *Cotula* very fine roots go down 40 cm.
					10-20	5.67	111	
					20-30	4.51	249	
					30-40	5.08	170	
					40-50	5.40	178	
					50-60	6.53	107	
					60-70	7.21	101	
		16/02/11	QQ2	54H 0352218, 6059202	0-10	7.57	25	*see above*
					10-20	6.25	85	
					20-30	6.08	104	
					30-40	6.47	148	
					40-50	6.53	112	
					50-60	6.82	97	
					60-70	7.00	65	
		16/02/11	QQ3	54H 0352247, 6059167	0-10	7.13	19	*see above*
					10-20	6.45	86	
					20-30	5.94	124	
					30-40	5.87	140	
					40-50	6.35	107	
					50-60	6.84	114	
					60-70	6.89	117	
	Established *Juncus*	16/02/11	RR1	54H 0352064, 6059367	0-10	6.85	67	Profiles RR1, RR2 and RR3 coincide with the 'established *Juncus*' treatment (i.e. profiles B1, B2 and B3 in the May 2010 sampling phase).
					10-20	7.10	119	
					20-30	6.43	107	
					30-40	5.83	194	
					40-50	6.15	90	
					50-60	6.22	125	
					60-70	6.52	115	
		16/02/11	RR2	54H 0352060, 6059354	0-10	7.14	9	*see above*
					10-20	7.33	165	
					20-30	6.81	112	
					30-40	6.21	193	
					40-50	6.31	319	
					50-60	6.53	109	
					60-70	7.13	107	

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-2 (continued). Lower Lakes site and profile descriptions.

Location	Treatment	Date	Profile	GPS Co-ordinates Zone East, North.	Depth (cm)	pH	Eh* (mV)	Location and Profile Remarks
Waltowa	Established *Juncus*	16/02/11	RR3	54H 0352057, 6059349	0-10	6.94	-46	*see above*
					10-20	7.37	120	
					20-30	6.97	154	*Lake Albert: bicarbonate alkalinity average 205 mg/L (no phenolphthalein alkalinity)*
					30-40	6.88	137	
					40-50	6.71	184	
					50-60	6.56	79	
					60-70	6.76	79	
Tolderol	Control (no bioremediation)	15/02/11	SS1	54H 0331073, 6083412	0-10	5.03	400	Profiles SS1, SS2 and SS3 coincide with the control area (i.e. profiles E1, E2 and E3 in the May 2010 sampling phase). Water depth 90 cm. Dark colour in 0-10 cm layer at site SS1. *Lake water sampled at 14:00 hrs: pH 8.44, Eh 381 mV, & bicarbonate alkalinity average 67 mg/L (no phenolphthalein alkalinity).*
					10-20	3.95	459	
					20-30	2.90	534	
					30-40	3.09	533	
					40-50	2.96	534	
					50-60	3.43	494	
					60-70	4.09	454	
		15/02/11	SS2	54H 0331056, 6083435	0-10	5.83	235	*see above*
					10-20	3.49	484	
					20-30	3.07	524	
					30-40	3.18	507	
					40-50	3.39	424	
					50-60	3.51	374	
					60-70	4.29	348	
		15/02/11	SS3	54H 0331045, 6083416	0-10	6.55	239	*see above*
					10-20	6.27	219	
					20-30	4.99	233	
					30-40	4.29	464	
					40-50	3.77	513	
					50-60	3.80	519	
					60-70	3.75	509	
	2010 planted *Juncus* into 2009 plantings of Bevy rye	15/02/11	TT1	54H 0331148, 6083494	0-10	6.90	159	Profiles TT1, TT2 and TT3 coincide with the '2010 *Juncus* in 2009 Bevy rye' treatment (i.e. profiles F1, F2 and F3 in the May 2010 sampling phase).
					10-20	6.83	166	
					20-30	4.57	310	
					30-40	4.30	401	
					40-50	4.23	435	
					50-60	5.54	329	
					60-70	6.76	206	
		15/02/11	TT2	54H 0331163, 6083481	0-10	6.54	314	*see above*
					10-20	3.77	484	
					20-30	3.64	484	
					30-40	3.48	504	
					40-50	3.42	520	
					50-60	3.47	469	
					60-70	3.46	399	

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-2 (continued). Lower Lakes site and profile descriptions.

Location	Treatment	Date	Profile	GPS Co-ordinates Zone East, North.	Depth (cm)	pH	Eh* (mV)	Location and Profile Remarks
Tolderol	2010 planted *Juncus* into 2009 plantings of Bevy rye	15/02/11	TT3	54H 0331138, 6083461	0-10	7.04	123	*see above*
					10-20	5.93	116	
					20-30	3.38	458	
					30-40	3.19	488	
					40-50	3.31	504	
					50-60	3.26	494	
					60-70	3.40	475	
Poltalloch	2009 plantings of Bevy rye	14/02/11	WW1	54H 0341269, 6070659	0-10	6.27	302	Profiles WW1, WW2 and WW3 constitute one of two subsequent subdivisions of the ‘2009 plantings of Bevy rye’ treatment (i.e. profiles K1, K2 and K3 in the May 2010 sampling phase), featuring 2010 *Juncus* plantings. Water depth ~90 cm.
					10-20	4.28	458	
					20-30	5.93	324	
					30-40	7.18	178	
					40-50	7.00	149	
					50-60	7.44	267	
		14/02/11	WW2	54H 0341293, 6070677	0-10	6.97	198	*see above*
					10-20	6.62	148	
					20-30	6.03	193	
					30-40	3.78	456	
					40-50	3.99	435	
					50-60	6.75	182	
		14/02/11	WW3	54H 0341310, 6070679	0-10	6.93	114	*see above*
					10-20	5.16	335	
					20-30	3.56	496	
					30-40	5.41	352	
					40-50	7.03	197	
					50-60	6.96	319	
	Juncus plantings in 2009 Bevy rye	14/02/11	XX1	54H 0341244, 6070649	0-10	6.79	143	Profiles XX1, XX2 and XX3 constitute one of two subsequent subdivisions of the ‘2009 plantings of Bevy rye’ treatment (i.e. profiles K1, K2 and K3 in the May 2010 sampling phase), featuring **no** 2010 *Juncus* plantings.
					10-20	6.31	181	
					20-30	3.59	482	
					30-40	3.44	557	
					40-50	3.98	460	
					50-60	6.57	229	
		14/02/11	XX2	54H 0341217, 6070667	0-10	7.15	154	*see above*
					10-20	5.66	201	
					20-30	5.97	342	
					30-40	6.32	226	
					40-50	6.93	196	
					50-60	7.46	237	
		14/02/11	XX3	54H 0341204, 6070644	0-10	6.82	224	*see above*
					10-20	6.08	178	
					20-30	5.95	232	
					30-40	3.99	449	
					40-50	5.76	317	
					50-60	6.85	262	

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-2 (continued). Lower Lakes site and profile descriptions.

Location	Treatment	Date	Profile	GPS Co-ordinates Zone East, North.	Depth (cm)	pH	Eh* (mV)	Location and Profile Remarks
Campbell Park	Control (no bioremediation)	17/02/11	YY1	54H 0340784, 6056740	0-10	6.91	107	Profiles YY1, YY2 and YY3 coincide with the control area (i.e. profiles G1, G2 and G3 in the May 2010 sampling phase).
					10-20	3.17	455	
					20-30	3.04	470	
					30-40	3.06	438	
					40-50	3.58	386	
					50-60	6.10	150	
					60-70	6.74	149	
		17/02/11	YY2	54H 0340770, 6056761	0-10	5.52	266	*see above*
					10-20	3.28	416	
					20-30	3.02	468	
					30-40	3.06	426	
					40-50	3.44	461	
					50-60	6.69	109	
					60-70	6.93	138	
		17/02/11	YY3	54H 0340765, 6056743	0-10	6.87	202	*see above*
					10-20	3.27	437	
					20-30	3.03	463	
					30-40	3.08	469	
					40-50	5.19	179	
					50-60	5.75	153	
					60-70	6.59	74	
	2010 seeded with Bevy rye and *Puccinellia*	17/02/11	ZZ1	54H 0340734, 6056750	0-10	7.39	309	Profiles ZZ1, ZZ2 and ZZ3 coincide with the '2010 Bevy rye and *Puccinellia*' treatment (i.e. profiles H1, H2 and H3 in the May 2010 sampling phase). 0-3 cm: beige sand. 3-10 cm: dark sand. 10-20 cm: white sand. 20-40 cm: dark sand in abundant jarosite and iron nodules. 40-50 cm: grey sand. with iron segregations. >50 cm: dark grey clay.
					10-20	3.69	412	
					20-30	3.21	462	
					30-40	3.19	459	
					40-50	3.39	396	
					50-60	4.28	237	
					60-70	6.48	108	
		17/02/11	ZZ2	54H 0340728, 6056756	0-10	7.52	225	*see above*
					10-20	5.96	138	
					20-30	3.44	448	
					30-40	3.19	458	
					40-50	3.25	432	
					50-60	4.33	335	
					60-70	6.71	44	
		17/02/11	ZZ3	54H 0340719, 6056753	0-10	7.19	209	*see above* *Lake Albert: pH 8.43, Eh 287, & bicarbonate alkalinity 210 mg/L (no phenolphthalein alkalinity)*
					10-20	6.06	154	
					20-30	3.52	433	
					30-40	3.27	450	
					40-50	3.47	477	
					50-60	6.57	271	
					60-70	6.54	89	

* Eh measurements are presented versus the standard hydrogen electrode

APPENDIX 2. Sediment characteristics of field soil materials

Table 9-3. Acid sulfate characteristics of the Waltowa soil materials at field sampling, May 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol $H^+ t^{-1}$)	ANC ($\%CaCO_3$)	TAAlk (mol $OH^- t^{-1}$)	Retained acidity (mol $H^+ t^{-1}$)	Chromium Reducible Sulfur ($\%S_{CR}$)	Acid Volatile Sulfide ($\%S_{AV}$)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
C1	0-10	17.56	8.83	851	9.27	0.00	2.01	32.54	0.00	<0.01	<0.01	1.01	0.08	0.32	0.72
C1	10-20	16.85	8.01	575	7.23	0.00	0.30	2.47	0.00	<0.01	<0.01	0.12	0.01	0.01	0.09
C1	20-30	19.55	5.89	1546	5.72	4.08	0.00	0.00	0.00	<0.01	<0.01	0.13	0.01	0.01	0.08
C1	30-40	29.47	3.68	2433	4.30	10.36	0.00	0.00	9.36	0.07	<0.01	0.48	0.05	0.05	0.44
C1	40-50	32.50	4.36	2440	4.54	7.90	0.00	0.00	0.00	0.16	<0.01	0.71	0.08	0.09	0.66
C1	50-60	55.68	5.74	4060	5.86	4.13	0.00	0.00	0.00	1.22	<0.01	2.54	0.28	0.40	2.37
C1	60-70	62.04	7.34	3215	7.25	0.00	1.12	3.61	0.00	1.25	<0.01	2.99	0.33	0.44	2.85
C1	70-80	59.21	7.71	2598	7.31	0.00	0.97	5.66	0.00	1.20	<0.01	2.81	0.30	-	2.68
C2	0-10	20.83	8.37	1585	9.11	0.00	0.89	23.35	0.00	<0.01	<0.01	0.97	0.09	0.30	0.84
C2	10-20	18.22	7.63	1275	7.26	0.00	0.26	2.51	0.00	<0.01	<0.01	0.11	0.01	0.02	0.09
C2	20-30	20.53	7.11	1405	6.66	0.00	0.30	1.27	0.00	<0.01	<0.01	0.13	0.02	<0.01	0.11
C2	30-40	21.57	4.58	1362	4.96	4.39	0.00	0.00	0.00	0.02	<0.01	0.16	0.03	-	0.15
C2	40-50	25.45	5.08	1368	5.27	2.95	0.00	0.00	0.00	0.12	<0.01	0.55	0.06	-	0.53
C2	50-60	58.24	5.06	1719	6.71	0.00	0.64	3.34	0.00	1.41	<0.01	2.13	0.23	-	2.05
C2	60-70	53.54	6.86	2704	6.77	0.00	0.73	3.07	0.00	2.08	<0.01	2.43	0.28	-	2.41
C2	70-80	55.60	7.29	2126	6.99	0.00	0.73	4.08	0.00	1.30	<0.01	2.51	0.29	-	2.48
C2	80-90	53.67	7.31	2187	7.00	0.00	0.80	3.90	0.00	1.05	<0.01	2.45	0.28	-	2.33
C3	0-10	19.99	8.54	1729	9.17	0.00	4.85	48.72	0.00	<0.01	<0.01	2.12	0.16	0.52	1.44
C3	10-20	17.95	8.10	1029	7.31	0.00	0.22	4.02	0.00	<0.01	<0.01	0.11	0.02	<0.01	0.06
C3	20-30	19.53	8.08	1099	7.03	0.00	0.31	2.39	0.00	<0.01	<0.01	0.14	0.02	0.01	0.08
C3	30-40	24.82	3.84	1962	4.41	6.36	0.00	0.00	4.35	<0.01	<0.01	0.24	0.04	-	0.21
C3	40-50	53.47	4.25	5180	5.85	4.05	0.00	0.00	0.00	0.76	<0.01	2.27	0.26	-	2.16
C3	50-60	57.88	5.99	4390	5.84	4.51	0.00	0.00	0.00	1.30	<0.01	3.28	0.37	-	3.18
C3	60-70	54.79	6.60	3590	6.39	5.97	0.00	0.00	0.00	1.37	<0.01	2.36	0.27	-	2.33
C3	70-80	59.96	6.93	3520	6.80	0.00	0.77	3.94	0.00	1.32	<0.01	2.55	0.29	-	-
A1	0-10	17.11	7.15	613	6.79	0.00	0.05	1.41	0.00	<0.01	<0.01	0.13	0.02	0.04	0.10
A1	10-20	18.15	4.93	901	5.11	3.15	0.00	0.00	0.00	<0.01	<0.01	0.11	0.03	0.04	0.10
A1	20-30	19.68	4.16	1200	4.87	3.18	0.00	0.00	0.00	<0.01	<0.01	0.12	0.03	0.04	0.12
A1	30-40	27.81	4.52	2585	5.72	4.01	0.00	0.00	0.00	0.06	<0.01	0.59	0.08	0.10	0.56
A1	40-50	59.01	2.29	5120	6.33	3.08	0.00	0.00	0.00	0.75	<0.01	3.36	0.36	0.38	3.22

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-3 (continued). Acid sulfate characteristics of the Waltowa soil materials at field sampling, May 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH$_{KCl}$	TAA (mol H$^+$ t^{-1})	ANC (%CaCO$_3$)	TAAlk (mol OH$^-$ t^{-1})	Retained acidity (mol H$^+$ t^{-1})	Chromium Reducible Sulfur (%S$_{CR}$)	Acid Volatile Sulfide (%S$_{AV}$)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
A1	50-60	55.89	7.53	2901	8.33	0.00	3.47	28.38	0.00	0.69	<0.01	2.56	0.29	0.29	2.05
A1	60-70	58.94	7.56	2484	7.89	0.00	1.51	18.37	0.00	0.86	<0.01	2.32	0.28	0.26	2.15
A2	0-10	16.78	6.63	960	6.24	2.83	0.00	0.00	0.00	<0.01	<0.01	0.19	0.04	<0.01	0.15
A2	10-20	19.21	3.90	1429	4.55	6.39	0.00	0.00	0.00	<0.01	<0.01	0.18	0.02	0.03	0.13
A2	20-30	23.92	3.68	2183	4.32	8.85	0.00	0.00	9.96	0.07	<0.01	0.27	0.03	0.10	0.28
A2	30-40	29.89	3.77	3122	4.20	11.57	0.00	0.00	0.00	0.12	<0.01	0.71	0.07	-	0.69
A2	40-50	56.03	6.38	5600	6.58	0.00	0.53	3.07	0.00	0.57	<0.01	2.75	0.30	-	2.59
A2	50-60	59.74	6.75	5320	6.85	0.00	0.71	3.18	0.00	0.34	<0.01	2.71	0.28	-	2.55
A2	60-70	57.18	6.94	3690	6.65	0.00	0.49	3.04	0.00	0.88	<0.01	1.95	0.22	-	1.83
A3	0-10	16.51	6.89	795	6.35	2.27	0.00	0.00	0.00	<0.01	<0.01	0.09	<0.01	<0.01	0.05
A3	10-20	20.02	4.17	1122	4.62	4.92	0.00	0.00	0.00	<0.01	<0.01	0.13	0.01	0.02	0.11
A3	20-30	24.16	3.84	1229	4.30	8.78	0.00	0.00	10.50	<0.01	<0.01	0.24	0.03	0.04	0.21
A3	30-40	29.77	3.82	2063	4.18	12.33	0.00	0.00	3.84	0.12	<0.01	0.62	0.06	-	0.60
A3	40-50	49.45	5.72	3370	5.70	3.45	0.00	0.00	0.00	0.69	<0.01	2.08	0.22	-	1.97
A3	50-60	58.26	6.82	2550	6.91	0.00	1.01	6.51	0.00	0.71	<0.01	2.28	0.23	-	2.13
A3	60-70	60.05	6.87	2590	7.12	0.00	0.99	4.90	0.00	0.88	<0.01	2.56	0.28	-	2.42
B1	0-10	7.36	8.47	630	9.20	0.00	0.31	11.52	0.00	<0.01	<0.01	0.16	0.01	0.01	0.09
B1	10-20	11.81	7.70	1051	7.28	0.00	0.11	3.14	0.00	<0.01	<0.01	0.09	0.02	<0.01	0.05
B1	20-30	17.20	5.20	1796	5.16	4.17	0.00	0.00	0.00	<0.01	<0.01	0.10	0.02	0.03	0.08
B1	30-40	20.37	4.36	1967	4.77	4.92	0.00	0.00	0.00	0.02	<0.01	0.21	0.02	0.01	0.12
B1	40-50	23.82	4.55	2380	4.83	5.43	0.00	0.00	0.00	0.19	<0.01	0.36	0.05	0.07	0.34
B1	50-60	54.71	6.13	5940	6.54	0.00	0.57	1.43	0.00	0.66	<0.01	1.82	0.21	0.31	1.74
B1	60-70	61.60	6.61	6090	6.73	0.00	1.04	4.10	0.00	0.83	<0.01	3.24	0.37	0.42	3.05
B2	0-10	9.06	8.40	851	9.25	0.00	1.15	20.16	0.00	<0.01	<0.01	0.43	0.04	0.08	0.27
B2	10-20	14.13	7.78	1268	7.06	0.00	0.09	1.97	0.00	<0.01	<0.01	0.10	0.02	<0.01	0.04
B2	20-30	22.07	6.48	2970	5.85	3.84	0.00	0.00	0.00	<0.01	<0.01	0.29	0.03	<0.01	0.27
B2	30-40	21.57	4.36	2800	4.66	6.85	0.00	0.00	0.00	0.05	<0.01	0.28	0.04	-	0.25
B2	40-50	30.06	5.37	3640	5.60	3.15	0.00	0.00	0.00	0.46	<0.01	0.65	0.08	-	0.63
B2	50-60	55.30	6.38	7440	6.79	0.00	0.90	2.87	0.00	0.60	<0.01	2.68	0.31	-	2.56
B2	60-70	60.03	6.98	6500	7.01	0.00	1.27	4.15	0.00	1.07	<0.01	3.61	0.41	-	3.43

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-3 (continued). Acid sulfate characteristics of the Waltowa soil materials at field sampling, May 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC (%$CaCO_3$)	TAAlk (mol OH^- t^{-1})	Retained acidity (mol H^+ t^{-1})	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
B2	70-80	59.53	6.96	5050	6.86	0.00	0.93	3.60	0.00	1.04	<0.01	2.66	0.32	-	2.48
B3	0-10	7.53	8.57	458	9.37	0.00	0.28	15.96	0.00	0.03	<0.01	0.13	0.02	<0.01	0.06
B3	10-20	8.36	6.81	665	7.13	0.00	0.09	2.18	0.00	0.03	<0.01	0.08	0.02	<0.01	0.04
B3	20-30	14.32	7.22	981	7.17	0.00	0.14	2.74	0.00	<0.01	<0.01	0.10	0.04	<0.01	0.04
B3	30-40	21.95	7.37	1761	7.45	0.00	0.19	2.91	0.00	<0.01	<0.01	0.16	0.06	-	0.09
B3	40-50	20.92	7.46	2124	7.43	0.00	0.16	2.84	0.00	<0.01	<0.01	0.12	0.03	-	0.07
B3	50-60	21.88	7.27	2146	7.07	0.00	0.25	3.46	0.00	<0.01	<0.01	0.10	0.02	-	0.07
B3	60-70	56.54	7.33	5560	7.30	0.00	1.15	3.92	0.00	1.10	<0.01	3.18	0.34	-	2.97
B3	70-80	59.80	7.65	4350	7.33	0.00	1.41	4.57	0.00	1.40	<0.01	3.53	0.39	-	3.31

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-4. HCl extractable metal/metalloid content of the Waltowa soil materials at field sampling, May 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)[#]	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
C1	0-10	890.85	374.95	0.01	1.18	1.74	0.01	0.29	2.19	48.33	0.97	0.08	1.41
C1	10-20	295.89	138.54	0.01	0.61	1.13	<0.01	0.15	1.04	7.17	0.69	0.05	1.17
C1	20-30	276.93	113.18	<0.01	0.80	0.78	<0.01	0.08	0.95	6.78	0.53	0.05	0.65
C1	30-40	559.12	314.81	0.01	1.32	0.70	0.01	0.19	2.12	13.41	0.71	0.08	1.25
C1	40-50	748.67	446.31	0.01	1.90	1.66	0.02	0.31	2.87	29.30	1.50	0.14	2.84
C1	50-60	991.84	777.03	0.02	4.39	2.43	0.02	0.53	6.40	76.11	2.43	0.28	3.33
C1	60-70	559.86	1095.53	0.03	4.69	2.98	0.02	0.84	7.85	84.33	3.04	0.36	3.95
C1	70-80	596.55	1076.63	0.03	4.13	2.95	0.02	0.87	7.84	95.39	2.87	0.32	4.42
C2	0-10	1075.23	406.05	0.02	1.69	2.06	0.01	0.30	2.91	56.30	1.28	0.10	1.64
C2	10-20	611.05	174.82	0.01	0.56	1.43	<0.01	0.14	1.00	13.25	0.45	0.06	0.77
C2	20-30	429.06	253.13	0.01	0.73	1.43	0.01	0.24	1.26	7.03	0.76	0.06	1.16
C2	30-40	341.53	133.42	0.01	1.14	0.96	<0.01	0.13	1.09	4.45	0.30	0.06	0.65
C2	40-50	735.12	366.65	0.01	1.77	1.67	0.01	0.25	2.47	25.51	1.03	0.10	1.48
C2	50-60	827.69	836.73	0.02	3.68	2.41	0.02	0.61	6.03	61.61	2.36	0.23	2.84
C2	60-70	606.47	946.87	0.03	4.57	2.85	0.02	0.71	7.46	64.14	2.68	0.28	3.33
C2	70-80	640.79	998.10	0.03	4.17	2.90	0.02	1.07	7.98	71.09	2.94	0.30	4.20
C2	80-90	568.69	925.90	0.04	3.36	2.86	0.02	0.88	8.34	67.44	2.92	0.31	4.51
C3	0-10	1435.61	481.26	0.02	2.03	1.99	0.02	0.49	3.75	89.01	1.78	0.14	1.95
C3	10-20	484.47	220.06	0.01	0.55	1.44	<0.01	0.30	1.12	8.45	0.58	0.06	0.66
C3	20-30	334.86	214.91	0.01	0.76	1.25	<0.01	0.31	1.20	6.55	0.67	0.06	0.67
C3	30-40	473.52	253.40	0.01	1.24	0.69	<0.01	0.18	1.50	6.30	0.46	0.05	0.74
C3	40-50	1285.12	677.93	0.02	3.46	2.25	0.02	0.36	6.16	59.33	3.18	0.26	3.24
C3	50-60	1224.25	1234.37	0.03	4.31	2.60	0.03	0.86	7.78	89.58	3.32	0.33	4.35
C3	60-70	613.27	936.31	0.03	4.77	2.76	0.02	0.71	7.05	63.37	2.88	0.29	3.12
C3	70-80	744.37	1273.55	0.03	4.19	2.81	0.02	0.97	7.65	69.11	2.80	0.31	3.97
A1	0-10	302.16	105.88	<0.01	0.40	0.72	<0.01	0.27	0.79	4.66	0.42	0.04	0.74
A1	10-20	310.05	124.62	0.01	0.81	0.77	<0.01	0.18	0.99	4.23	0.31	0.04	0.72
A1	20-30	216.94	146.99	0.01	0.44	0.35	<0.01	0.18	0.74	5.92	0.25	0.03	0.82

** See Table 9-1 in Appendix 1 for further details on the treatment.*

[#] The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

Table 9-4 (continued). HCl extractable metal/metalloid content of the Waltowa soil materials at field sampling, May 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)[#]	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
A1	30-40	501.32	321.83	0.01	1.42	1.44	0.01	0.22	2.65	24.27	1.25	0.09	1.12
A1	40-50	1876.12	818.86	0.03	5.28	2.13	0.03	0.55	9.52	106.43	4.31	0.36	3.88
A1	50-60	1333.43	915.44	0.03	3.36	1.98	0.02	0.64	7.04	93.40	2.95	0.27	3.80
A1	60-70	1177.05	831.44	0.04	5.04	2.31	0.02	0.46	7.15	81.41	2.54	0.29	2.35
A2	0-10	357.28	217.90	0.01	0.74	0.81	<0.01	0.24	1.11	9.58	0.42	0.05	0.81
A2	10-20	385.99	169.69	0.01	0.56	0.45	<0.01	0.17	1.01	6.88	0.24	0.05	2.57
A2	20-30	383.74	202.66	0.01	0.94	0.30	<0.01	0.13	1.41	12.48	0.42	0.06	0.84
A2	30-40	682.08	410.86	0.01	1.36	1.29	0.03	0.24	3.12	28.47	1.44	0.15	1.70
A2	40-50	1319.88	929.15	0.03	3.02	2.08	0.02	1.00	7.94	85.22	4.07	0.29	3.96
A2	50-60	1171.18	1019.41	0.03	3.66	2.13	0.02	0.84	7.66	82.49	2.81	0.33	2.62
A2	60-70	858.43	743.67	0.02	4.23	2.25	0.02	0.47	6.35	57.16	2.25	0.25	2.11
A3	0-10	376.05	107.06	0.01	0.49	0.82	<0.01	0.25	0.79	8.35	0.35	0.03	0.40
A3	10-20	312.30	221.05	0.01	0.65	0.70	<0.01	0.47	1.00	6.63	0.45	0.04	1.59
A3	20-30	435.97	258.18	0.01	1.14	0.43	<0.01	0.34	1.39	9.18	0.34	0.05	0.82
A3	30-40	772.97	433.03	0.01	1.73	1.18	0.01	0.50	2.57	20.40	1.35	0.10	1.68
A3	40-50	1590.59	945.50	0.03	4.42	2.09	0.02	0.74	6.92	80.55	2.88	0.30	4.31
A3	50-60	1236.69	855.49	0.02	3.35	2.10	0.02	1.28	6.63	79.31	2.97	0.29	3.81
A3	60-70	794.68	870.92	0.03	4.31	2.35	0.02	0.76	7.07	79.18	2.92	0.29	3.64
B1	0-10	480.31	183.32	0.01	0.56	0.99	<0.01	0.74	0.98	6.97	0.67	0.05	0.43
B1	10-20	327.08	122.41	<0.01	0.36	0.83	<0.01	0.29	0.83	9.23	0.55	0.06	0.28
B1	20-30	296.75	185.42	0.01	0.67	0.73	<0.01	0.38	0.99	8.35	0.55	0.05	0.39
B1	30-40	212.15	168.35	0.01	0.62	0.44	0.01	0.40	0.98	10.29	0.56	0.06	0.91
B1	40-50	449.68	302.75	0.01	1.43	1.16	0.01	0.33	1.73	21.58	1.08	0.10	1.17
B1	50-60	1368.54	795.18	0.02	3.76	2.07	0.02	0.56	5.81	73.74	2.03	0.30	2.79
B1	60-70	1542.16	1090.90	0.04	4.16	2.60	0.02	0.66	8.36	98.88	3.02	0.41	3.54
B2	0-10	645.89	242.67	0.01	0.88	1.20	0.01	0.46	1.33	26.08	0.75	0.05	0.74
B2	10-20	416.92	114.05	0.01	0.47	1.02	<0.01	0.26	0.80	17.04	0.50	0.05	0.38
B2	20-30	713.01	297.32	0.01	1.30	1.36	0.01	0.38	2.01	18.78	1.08	0.08	0.79

** See Table 9-1 in Appendix 1 for further details on the treatment.*

[#] The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

Table 9-4 (continued). HCl extractable metal/metalloid content of the Waltowa soil materials at field sampling, May 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)#	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
B2	30-40	531.83	290.57	0.01	1.44	1.19	0.01	0.52	1.67	16.49	0.92	0.10	0.98
B2	40-50	744.36	374.63	0.01	1.90	1.51	0.01	0.66	2.50	26.57	1.13	0.14	1.35
B2	50-60	1716.92	863.46	0.03	3.90	2.31	0.02	0.54	7.38	94.77	2.60	0.37	2.97
B2	60-70	1538.28	1233.15	0.04	3.97	2.79	0.03	0.74	9.04	93.45	3.05	0.41	3.71
B2	70-80	1126.57	973.88	0.03	4.33	2.67	0.02	0.72	7.49	74.69	2.63	0.35	3.69
B3	0-10	315.23	169.14	0.01	0.92	0.75	<0.01	0.46	0.93	18.49	0.59	0.04	0.46
B3	10-20	320.75	110.79	0.01	0.75	0.72	<0.01	0.20	0.68	8.04	0.30	0.03	0.26
B3	20-30	443.87	91.79	<0.01	0.66	0.77	<0.01	0.11	0.72	21.85	0.38	0.05	1.18
B3	30-40	526.94	140.90	0.01	0.77	1.08	<0.01	0.17	0.98	15.85	0.52	0.06	0.87
B3	40-50	564.71	122.80	<0.01	1.01	1.07	<0.01	0.17	0.80	12.72	0.40	0.06	0.36
B3	50-60	399.48	196.95	0.01	0.65	1.57	0.02	0.16	1.03	13.93	0.40	0.07	0.53
B3	60-70	894.85	1085.32	0.04	4.82	2.75	0.02	0.72	7.62	143.66	2.70	0.39	3.11
B3	70-80	754.71	1419.40	0.04	4.31	2.98	0.02	1.05	8.48	175.58	3.26	0.41	3.79

** See Table 9-1 in Appendix 1 for further details on the treatment.*

 # The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

Table 9-5. Acid sulfate characteristics of the Waltowa soil materials at field sampling, August 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH$_{KCl}$	TAA (mol H$^+$ t^{-1})	ANC (%CaCO$_3$)	TAAlk (mol OH$^-$ t^{-1})	Retained acidity (mol H$^+$ t^{-1})	Chromium Reducible Sulfur (%S$_{CR}$)	Acid Volatile Sulfide (%S$_{AV}$)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
P1	0-10	24.83	8.89	950	9.58	0.00	8.85	103.84	0.00	<0.01	<0.01	1.34	0.05	0.11	0.34
P1	10-20	20.06	8.71	1206	9.32	0.00	0.44	11.54	0.00	<0.01	<0.01	0.15	0.04	<0.01	0.13
P1	20-30	20.77	7.38	1529	5.13	4.09	0.00	0.00	0.00	<0.01	<0.01	0.15	0.05	<0.01	0.12
P1	30-40	28.59	4.21	2111	4.45	6.57	0.00	0.00	8.51	0.06	<0.01	0.33	0.07	0.07	0.31
P1	40-50	49.36	5.76	4730	5.96	2.64	0.00	0.00	0.00	0.77	<0.01	1.72	0.22	0.23	1.67
P1	50-60	54.98	6.48	5400	6.81	0.00	1.51	3.42	0.00	1.24	1.24	2.98	0.35	0.33	2.88
P2	0-10	22.34	8.13	1008	9.61	0.00	2.74	32.03	0.00	<0.01	<0.01	0.76	0.05	0.17	0.41
P2	10-20	19.97	8.11	1240	8.42	0.00	0.60	4.56	0.00	<0.01	<0.01	0.12	0.03	0.02	0.12
P2	20-30	20.52	5.40	1924	5.09	3.67	0.00	0.00	0.00	<0.01	<0.01	0.17	0.04	<0.01	0.10
P2	30-40	21.53	4.59	2290	4.85	5.76	0.00	0.00	0.00	0.01	<0.01	0.22	0.03	-	0.15
P2	40-50	25.41	5.87	2710	6.43	0.71	0.00	0.00	0.00	0.13	<0.01	0.46	0.06	-	0.45
P2	50-60	53.27	6.46	5090	6.98	0.00	1.71	4.31	0.00	1.20	<0.01	2.06	0.22	-	2.03
P3	0-10	25.73	7.76	773	9.20	0.00	0.53	16.95	0.00	<0.01	<0.01	0.33	0.05	0.11	0.30
P3	10-20	20.24	7.39	1162	7.55	0.00	0.38	3.92	0.00	<0.01	<0.01	0.13	0.02	<0.01	0.09
P3	20-30	20.96	6.30	1409	5.36	3.38	0.00	0.00	0.00	<0.01	<0.01	0.14	0.02	0.02	0.14
P3	30-40	24.45	4.00	1906	4.53	5.38	0.00	0.00	0.00	0.11	<0.01	0.37	0.06	-	0.36
P3	40-50	47.16	5.11	3400	5.19	4.53	0.00	0.00	0.00	0.73	<0.01	1.24	0.14	-	1.24
P3	50-60	55.60	6.29	4150	6.43	1.78	0.00	0.00	0.00	1.13	<0.01	2.36	0.26	-	2.28
Q1	0-10	23.14	4.93	937	4.92	3.18	0.00	0.00	0.00	<0.01	<0.01	0.20	0.02	0.03	0.16
Q1	10-20	17.77	3.87	1221	4.46	7.33	0.00	0.00	18.85	<0.01	<0.01	0.15	0.03	<0.01	0.13
Q1	20-30	21.17	3.74	1608	4.29	8.60	0.00	0.00	10.57	0.13	<0.01	0.22	0.04	<0.01	0.18
Q1	30-40	27.23	4.88	1884	4.98	3.17	0.00	0.00	0.00	0.13	<0.01	0.47	0.06	0.06	0.42
Q1	40-50	57.61	5.74	2970	6.36	2.75	0.00	0.00	0.00	0.95	<0.01	1.98	0.22	0.18	1.88
Q1	50-60	52.53	6.91	2750	6.62	0.00	1.29	2.11	0.00	0.81	<0.01	2.29	0.27	0.39	2.18
Q2	0-10	22.46	6.70	736	6.21	3.06	0.00	0.00	0.00	<0.01	<0.01	0.38	0.04	0.12	0.31
Q2	10-20	19.23	4.07	940	4.42	5.05	0.00	0.00	0.00	<0.01	<0.01	0.20	0.03	0.01	0.15
Q2	20-30	20.79	4.04	1293	4.51	4.70	0.00	0.00	0.00	<0.01	<0.01	0.16	0.02	<0.01	0.10
Q2	30-40	31.92	4.97	2400	5.04	3.34	0.00	0.00	0.00	0.26	<0.01	0.83	0.10	-	0.80
Q2	40-50	51.95	5.83	3780	6.31	3.31	0.00	0.00	0.00	0.58	<0.01	1.74	0.18	-	1.64
Q2	50-60	56.23	7.20	2680	7.90	0.00	1.52	12.36	0.00	1.34	<0.01	2.34	0.25	-	2.17

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-5 (continued). Acid sulfate characteristics of the Waltowa soil materials at field sampling, August 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (μS/cm)	pH_{KCl}	TAA (mol $H^+ t^{-1}$)	ANC ($\%CaCO_3$)	TAAlk (mol $OH^- t^{-1}$)	Retained acidity (mol $H^+ t^{-1}$)	Chromium Reducible Sulfur ($\%S_{CR}$)	Acid Volatile Sulfide ($\%S_{AV}$)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
Q3	0-10	21.96	7.62	1011	8.32	0.00	0.60	7.52	0.00	<0.01	<0.01	0.78	0.07	0.05	0.44
Q3	10-20	20.02	4.22	1139	4.41	5.51	0.00	0.00	7.91	<0.01	<0.01	0.20	0.04	0.04	0.17
Q3	20-30	21.39	3.94	1297	4.17	6.73	0.00	0.00	16.91	<0.01	<0.01	0.23	0.04	<0.01	0.19
Q3	30-40	55.19	4.68	4500	4.46	12.83	0.00	0.00	69.27	0.87	<0.01	2.63	0.30	-	2.47
Q3	40-50	56.23	5.79	3900	6.04	3.31	0.00	0.00	0.00	0.83	<0.01	2.80	0.30	-	2.69
Q3	50-60	52.08	6.87	1990	6.91	0.00	1.35	4.29	0.00	1.07	<0.01	2.36	0.25	-	2.22
R1	0-10	18.46	8.27	498	9.66	0.00	1.00	31.70	0.00	<0.01	<0.01	0.30	0.02	0.03	0.14
R1	10-20	18.35	8.42	807	8.44	0.00	0.34	2.54	0.00	<0.01	<0.01	0.09	0.02	<0.01	0.04
R1	20-30	17.72	7.12	1313	7.29	0.00	0.30	3.94	0.00	<0.01	<0.01	0.11	0.03	<0.01	0.06
R1	30-40	19.13	4.80	1859	4.65	3.18	0.00	0.00	0.00	<0.01	<0.01	0.13	0.02	<0.01	0.12
R1	40-50	18.44	4.54	2053	4.71	3.15	0.00	0.00	0.00	0.06	<0.01	0.14	0.03	<0.01	0.10
R1	50-60	50.03	4.16	4150	5.70	2.78	0.00	0.00	0.00	0.62	<0.01	1.09	0.13	0.16	1.04
R1	60-70	62.77	6.73	5420	7.18	0.00	1.67	5.44	0.00	1.08	<0.01	2.99	0.33	0.38	2.80
R2	0-10	20.43	8.51	647	9.68	0.00	1.38	41.13	0.00	<0.01	<0.01	0.33	0.03	0.05	0.18
R2	10-20	19.40	8.81	845	8.88	0.00	0.34	6.53	0.00	<0.01	<0.01	0.10	0.02	<0.01	0.04
R2	20-30	20.63	8.11	1662	7.02	0.00	0.46	1.89	0.00	0.05	<0.01	0.16	0.03	<0.01	0.13
R2	30-40	21.05	4.78	2470	4.51	5.29	0.00	0.00	0.00	<0.01	<0.01	0.20	0.03	-	0.15
R2	40-50	21.58	5.15	2450	5.18	2.88	0.00	0.00	0.00	<0.01	<0.01	0.18	0.04	-	0.16
R2	50-60	50.41	6.76	6670	7.14	0.00	1.29	5.17	0.00	0.13	<0.01	1.93	0.22	-	1.77
R2	60-70	57.58	7.23	6510	7.58	0.00	1.73	8.35	0.00	1.10	<0.01	3.37	0.37	-	3.23
R3	0-10	18.13	8.44	649	9.52	0.00	0.91	41.06	0.00	<0.01	<0.01	0.55	0.05	0.10	0.40
R3	10-20	19.27	8.52	1100	8.55	0.00	0.42	4.03	0.00	<0.01	<0.01	0.09	0.02	<0.01	0.04
R3	20-30	18.94	8.37	1544	8.53	0.00	0.47	4.59	0.00	<0.01	<0.01	0.08	0.02	<0.01	0.02
R3	30-40	23.25	7.88	2004	7.45	0.00	0.54	3.55	0.00	<0.01	<0.01	0.14	0.03	-	0.09
R3	40-50	22.10	7.34	2290	5.97	2.78	0.00	0.00	0.00	0.12	<0.01	0.24	0.04	-	0.19
R3	50-60	40.97	7.23	5530	7.08	0.00	0.77	4.51	0.00	0.42	<0.01	1.23	0.13	-	1.14

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-6. HCl extractable metal/metalloid content of the Waltowa soil materials at field sampling, August 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)#	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
P1	0-10	446.43	222.44	0.01	0.45	0.71	0.01	0.48	1.06	23.28	0.55	0.07	1.86
P1	10-20	317.20	123.01	0.01	0.49	0.99	<0.01	0.19	1.11	6.79	0.61	0.05	0.24
P1	20-30	342.53	88.63	<0.01	0.84	0.67	<0.01	0.04	1.10	4.68	0.27	0.04	0.01
P1	30-40	515.43	167.69	0.01	1.01	0.76	0.01	0.06	1.94	10.11	0.53	0.07	0.29
P1	40-50	988.71	592.14	0.02	2.75	1.76	0.02	0.34	5.60	61.80	2.49	0.20	2.44
P1	50-60	861.97	1030.06	0.03	5.14	2.46	0.02	0.62	7.78	81.82	2.74	0.35	3.54
P2	0-10	406.74	189.33	0.01	0.42	0.79	0.01	0.33	1.19	20.65	0.57	0.06	0.15
P2	10-20	272.17	104.12	<0.01	0.50	0.85	<0.01	0.11	1.03	3.98	0.48	0.04	<0.01
P2	20-30	434.67	92.10	<0.01	0.74	0.55	<0.01	0.05	1.08	3.79	0.27	0.04	0.19
P2	30-40	455.87	273.04	0.01	0.69	0.62	0.01	0.09	1.53	8.01	0.61	0.09	0.54
P2	40-50	346.73	291.86	0.01	0.97	1.06	0.01	0.22	2.10	26.79	1.12	0.10	0.75
P2	50-60	511.59	720.01	0.02	3.24	2.09	0.02	0.57	6.05	57.43	2.23	0.26	2.61
P3	0-10	624.96	198.36	0.01	0.55	1.20	0.01	0.14	1.16	18.63	0.52	0.05	1.17
P3	10-20	528.29	140.65	0.01	0.43	1.09	<0.01	0.10	1.08	9.21	0.56	0.06	0.67
P3	20-30	409.79	111.54	<0.01	0.88	0.73	<0.01	0.06	0.98	8.57	0.39	0.04	0.83
P3	30-40	692.04	276.23	0.01	1.18	1.07	0.01	0.16	1.91	12.14	0.51	0.08	0.93
P3	40-50	792.50	521.85	0.01	2.24	1.63	0.02	0.34	4.11	36.21	1.74	0.18	1.73
P3	50-60	762.80	919.65	0.02	4.79	2.35	0.02	0.58	7.63	69.56	2.57	0.32	2.48
Q1	0-10	256.92	150.81	0.01	0.52	0.49	<0.01	0.25	0.92	7.56	0.36	0.04	0.28
Q1	10-20	234.66	133.05	0.01	0.42	0.18	<0.01	0.12	0.84	6.02	0.24	0.04	0.42
Q1	20-30	308.39	176.08	0.01	0.71	0.27	<0.01	0.15	1.22	10.69	0.35	0.05	0.42
Q1	30-40	382.94	317.45	0.01	0.87	1.11	0.01	0.19	1.91	26.31	0.85	0.09	1.29
Q1	40-50	977.13	599.48	0.02	2.99	1.81	0.02	0.34	6.38	68.27	2.88	0.28	2.30
Q1	50-60	1122.91	909.96	0.02	4.41	2.28	0.02	0.44	7.40	67.47	2.62	0.34	2.67
Q2	0-10	487.56	158.42	0.01	0.73	0.92	0.01	0.10	1.13	33.39	0.92	0.06	0.57
Q2	10-20	378.07	114.29	0.01	0.86	0.49	<0.01	0.09	1.01	5.42	0.19	0.04	0.07
Q2	20-30	227.63	98.51	0.01	0.63	0.20	<0.01	0.18	0.86	8.60	0.24	0.04	0.21
Q2	30-40	719.05	343.01	0.01	1.78	1.33	0.01	0.18	3.47	38.91	2.01	0.12	1.81

** See Table 9-1 in Appendix 1 for further details on the treatment.*

 # The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

Table 9-6 (continued). HCl extractable metal/metalloid content of the Waltowa soil materials at field sampling, August 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)[#]	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
Q2	40-50	1091.93	649.97	0.02	3.56	1.84	0.01	0.36	6.14	70.48	2.33	0.28	2.53
Q2	50-60	807.48	709.44	0.02	4.11	2.09	0.02	0.42	6.77	76.25	2.58	0.31	2.91
Q3	0-10	675.76	237.40	0.01	1.02	1.25	0.01	0.17	1.73	36.02	0.93	0.06	1.04
Q3	10-20	272.05	112.33	0.01	0.73	0.27	<0.01	0.09	1.07	6.31	0.22	0.04	0.70
Q3	20-30	323.50	199.18	0.01	0.72	0.26	<0.01	0.12	1.28	8.77	0.25	0.05	0.68
Q3	30-40	1264.08	761.09	0.02	4.59	1.78	0.03	0.34	8.19	77.41	4.89	0.35	3.80
Q3	40-50	1338.66	774.92	0.02	4.90	1.97	0.02	0.45	8.68	109.75	4.11	0.38	3.61
Q3	50-60	682.80	844.09	0.03	5.09	2.31	0.02	0.55	7.82	89.28	3.01	0.35	2.70
R1	0-10	404.11	103.28	<0.01	0.55	0.60	<0.01	0.25	0.79	11.05	0.41	0.04	0.43
R1	10-20	345.90	79.64	0.01	0.36	0.81	<0.01	0.08	0.70	8.82	0.39	0.05	1.83
R1	20-30	389.97	166.69	0.01	0.53	0.88	<0.01	0.11	1.03	10.00	0.62	0.06	0.06
R1	30-40	263.32	94.85	<0.01	0.76	0.32	<0.01	0.07	0.95	4.30	0.26	0.04	0.06
R1	40-50	307.04	119.62	0.01	0.59	0.71	0.01	0.07	1.07	9.67	0.77	0.06	0.26
R1	50-60	1070.96	460.03	0.01	2.95	1.56	0.01	0.26	4.10	57.00	1.47	0.19	2.60
R1	60-70	1265.62	1057.99	0.03	4.65	2.46	0.02	0.47	8.66	92.81	2.92	0.43	3.40
R2	0-10	523.95	162.93	0.01	0.70	0.87	<0.01	0.28	0.97	15.10	0.52	0.06	0.22
R2	10-20	369.73	78.36	<0.01	0.44	0.80	<0.01	0.06	0.65	14.61	0.40	0.05	0.05
R2	20-30	485.73	129.50	0.01	1.11	0.86	<0.01	0.05	1.10	9.47	0.54	0.07	0.10
R2	30-40	373.11	164.38	0.01	1.25	0.68	0.01	0.07	1.31	8.03	0.45	0.06	0.47
R2	40-50	419.41	118.89	<0.01	0.81	0.88	<0.01	0.15	1.07	16.76	0.58	0.07	0.24
R2	50-60	1578.18	616.40	0.02	4.11	1.98	0.01	0.27	6.27	71.97	1.99	0.38	2.13
R2	60-70	1671.28	1193.91	0.03	4.77	2.44	0.02	0.54	9.24	111.14	2.96	0.46	3.23
R3	0-10	646.22	218.53	0.01	1.25	1.09	0.01	0.18	1.69	31.38	0.70	0.06	0.55
R3	10-20	413.00	94.27	<0.01	0.44	0.90	<0.01	0.03	0.66	17.42	0.43	0.05	0.09
R3	20-30	375.74	85.54	<0.01	0.52	0.93	<0.01	0.05	0.67	6.37	0.36	0.07	0.07
R3	30-40	452.79	145.05	0.01	0.81	1.07	<0.01	0.06	1.29	7.17	0.63	0.08	0.21
R3	40-50	291.96	149.44	0.01	1.52	0.96	0.01	0.08	1.40	9.79	0.49	0.07	0.37
R3	50-60	931.93	564.98	0.02	2.92	1.75	0.01	0.29	4.27	43.94	1.50	0.25	1.76

** See Table 9-1 in Appendix 1 for further details on the treatment.*

[#] *The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)*

Table 9-7. Acid sulfate characteristics of the Waltowa soil materials at field sampling, November 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH$_{KCl}$	TAA (mol H$^+$ t^{-1})	ANC (%CaCO$_3$)	TAAlk (mol OH$^-$ t^{-1})	Retained acidity (mol H$^+$ t^{-1})	Chromium Reducible Sulfur (%S$_{CR}$)	Acid Volatile Sulfide (%S$_{AV}$)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
GG1	0-10	28.01	7.99	714	8.97	0.00	0.27	17.23	0.00	<0.01	<0.01	0.25	0.04	0.12	0.20
GG1	10-20	20.60	6.80	1279	5.44	3.60	0.00	0.00	0.00	<0.01	<0.01	0.13	0.03	0.05	0.07
GG1	20-30	24.62	4.30	1583	4.51	3.68	0.00	0.00	0.00	0.02	<0.01	0.21	0.04	0.11	0.11
GG1	30-40	30.68	4.63	2880	4.67	4.98	0.00	0.00	0.00	0.08	<0.01	0.51	0.07	0.34	0.46
GG1	40-50	53.59	7.08	6670	7.91	0.00	2.05	30.92	0.00	0.99	<0.01	2.37	0.26	1.71	2.11
GG1	50-60	52.83	6.42	6190	6.39	2.70	0.00	0.00	0.00	1.24	<0.01	2.68	0.30	2.24	2.51
GG1	60-70	52.35	6.78	5930	6.86	0.00	0.63	3.49	0.00	0.91	<0.01	2.28	0.25	1.74	2.13
GG2	0-10	25.15	8.22	904	8.80	0.00	0.31	9.53	0.00	<0.01	<0.01	0.18	0.03	0.08	0.11
GG2	10-20	22.79	7.90	854	7.10	0.00	0.44	1.77	0.00	<0.01	<0.01	0.12	0.03	0.07	0.07
GG2	20-30	22.84	7.45	1477	6.79	0.00	0.34	0.51	0.00	<0.01	<0.01	0.15	0.03	0.10	0.10
GG2	30-40	26.15	5.98	1980	5.15	2.41	0.00	0.00	0.00	0.11	<0.01	-	-	-	-
GG2	40-50	55.99	5.79	4580	5.55	2.68	0.00	0.00	0.00	1.20	<0.01	-	-	-	-
GG2	50-60	56.21	6.46	4930	6.02	2.89	0.00	0.00	0.00	1.08	<0.01	-	-	-	-
GG2	60-70	54.73	6.69	3840	6.32	2.52	0.00	0.00	0.00	1.18	<0.01	-	-	-	-
GG3	0-10	30.99	8.31	1531	9.00	0.00	2.69	48.15	0.00	<0.01	<0.01	1.83	0.15	0.64	1.07
GG3	10-20	22.33	7.91	1099	7.22	0.00	0.05	1.19	0.00	<0.01	<0.01	0.13	0.03	0.08	0.08
GG3	20-30	22.15	4.74	1310	4.68	3.42	0.00	0.00	0.00	<0.01	<0.01	0.16	0.04	0.06	0.10
GG3	30-40	28.48	5.42	3150	4.91	2.70	0.00	0.00	0.00	0.11	<0.01	-	-	-	-
GG3	40-50	55.74	6.40	6810	6.55	0.00	0.66	2.44	0.00	1.10	<0.01	-	-	-	-
GG3	50-60	55.19	6.39	4430	6.10	2.57	0.00	0.00	0.00	1.15	<0.01	-	-	-	-
GG3	60-70	57.43	7.11	6090	7.20	0.00	0.68	4.69	0.00	1.19	<0.01	-	-	-	-
FF1	0-10	25.71	7.21	462	6.38	1.30	0.00	0.00	0.00	<0.01	<0.01	0.23	0.04	0.10	0.18
FF1	10-20	24.03	5.26	908	4.96	2.72	0.00	0.00	0.00	<0.01	<0.01	0.14	0.03	0.06	0.12
FF1	20-30	22.58	4.04	1191	4.44	5.82	0.00	0.00	4.08	<0.01	<0.01	0.17	0.04	0.12	0.15
FF1	30-40	31.77	4.15	1874	4.44	6.61	0.00	0.00	0.00	0.20	<0.01	0.35	0.06	0.29	0.33
FF1	40-50	56.51	5.89	3960	6.14	2.18	0.00	0.00	0.00	0.79	<0.01	1.59	0.18	1.26	1.56
FF1	50-60	55.62	6.71	3680	6.79	0.00	0.67	4.24	0.00	0.73	<0.01	2.25	0.25	1.74	2.09
FF1	60-70	63.07	6.69	3895	6.56	0.00	0.69	3.14	0.00	1.21	<0.01	2.41	0.26	1.96	2.29
FF2	0-10	20.79	6.10	736	5.34	3.89	0.00	0.00	0.00	<0.01	<0.01	0.26	0.04	0.09	0.19
FF2	10-20	20.01	3.97	1050	4.43	6.54	0.00	0.00	18.09	<0.01	<0.01	0.12	0.04	0.05	0.07

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-7 (continued). Acid sulfate characteristics of the Waltowa soil materials at field sampling, November 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH$_{KCl}$	TAA (mol H$^+$ t^{-1})	ANC (%CaCO$_3$)	TAAlk (mol OH$^-$ t^{-1})	Retained acidity (mol H$^+$ t^{-1})	Chromium Reducible Sulfur (%S$_{CR}$)	Acid Volatile Sulfide (%S$_{AV}$)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
FF2	20-30	22.90	3.77	1385	4.16	7.71	0.00	0.00	0.00	<0.01	<0.01	0.18	0.04	0.12	0.12
FF2	30-40	24.76	3.85	1663	4.17	8.10	0.00	0.00	0.00	0.04	<0.01	-	-	-	-
FF2	40-50	44.30	5.40	4210	5.34	3.13	0.00	0.00	0.00	0.46	<0.01	-	-	-	-
FF2	50-60	60.54	6.88	3970	7.55	0.00	1.58	27.41	0.00	0.62	<0.01	-	-	-	-
FF2	60-70	55.78	7.26	3230	7.78	0.00	2.04	30.74	0.00	1.00	<0.01	-	-	-	-
FF3	0-10	23.80	7.95	792	8.69	0.00	0.27	12.92	0.00	<0.01	<0.01	0.12	0.03	0.23	0.58
FF3	10-20	21.14	5.91	930	5.27	3.05	0.00	0.00	0.00	<0.01	<0.01	0.15	0.03	0.07	0.07
FF3	20-30	23.01	4.21	939	4.62	4.40	0.00	0.00	0.00	<0.01	<0.01	0.17	0.04	0.07	0.07
FF3	30-40	35.99	4.09	3170	4.18	13.74	0.00	0.00	0.00	0.16	<0.01	-	-	-	-
FF3	40-50	63.59	5.57	5500	5.57	4.83	0.00	0.00	0.00	0.31	<0.01	-	-	-	-
FF3	50-60	59.24	6.38	4340	6.28	2.27	0.00	0.00	0.00	1.16	<0.01	-	-	-	-
FF3	60-70	57.00	6.65	4170	6.63	0.00	0.69	2.48	0.00	1.03	<0.01	-	-	-	-
EE1	0-10	21.80	8.25	732	8.88	0.00	0.24	5.40	0.00	<0.01	<0.01	0.11	0.03	0.04	0.05
EE1	10-20	20.34	7.75	849	6.69	0.00	0.19	0.44	0.00	<0.01	<0.01	0.10	0.03	0.06	0.07
EE1	20-30	18.69	6.22	1517	5.55	1.95	0.00	0.00	0.00	<0.01	<0.01	0.10	0.03	0.06	0.07
EE1	30-40	19.44	4.43	1447	4.65	3.20	0.00	0.00	0.00	<0.01	<0.01	0.17	0.04	0.12	0.15
EE1	40-50	22.07	4.26	1629	4.60	4.16	0.00	0.00	0.00	0.17	<0.01	0.18	0.04	0.10	0.14
EE1	50-60	32.34	5.76	3530	5.57	2.84	0.00	0.00	0.00	0.15	<0.01	0.85	0.11	0.65	0.79
EE1	60-70	45.86	6.28	4240	6.11	2.47	0.00	0.00	0.00	0.10	<0.01	1.48	0.17	0.90	1.37
EE2	0-10	24.55	8.57	668	9.43	0.00	0.79	21.36	0.00	<0.01	<0.01	0.30	0.04	0.09	0.20
EE2	10-20	20.50	8.37	797	7.42	0.00	0.12	1.99	0.00	<0.01	<0.01	0.09	0.03	0.05	0.08
EE2	20-30	20.92	7.20	1236	6.32	2.00	0.00	0.00	0.00	<0.01	<0.01	0.17	0.04	0.07	0.12
EE2	30-40	22.60	5.82	1669	5.53	2.45	0.00	0.00	0.00	0.04	<0.01	-	-	-	-
EE2	40-50	25.75	4.58	2650	4.72	4.32	0.00	0.00	0.00	0.20	<0.01	-	-	-	-
EE2	50-60	43.40	6.30	5940	6.37	1.52	0.00	0.00	0.00	0.46	<0.01	-	-	-	-
EE2	60-70	59.63	7.05	6460	7.33	0.00	1.19	6.38	0.00	0.71	<0.01	-	-	-	-

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-7 (continued). Acid sulfate characteristics of the Waltowa soil materials at field sampling, November 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol $H^+ t^{-1}$)	ANC (%$CaCO_3$)	TAAlk (mol $OH^- t^{-1}$)	Retained acidity (mol $H^+ t^{-1}$)	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
EE3	0-10	26.90	8.59	562	9.29	0.00	2.18	29.12	0.00	0.01	<0.01	0.64	0.06	0.22	0.36
EE3	10-20	22.96	8.58	500	7.71	0.00	0.15	1.96	0.00	<0.01	<0.01	0.08	0.06	0.02	0.03
EE3	20-30	20.67	8.11	1081	6.95	0.00	0.22	1.47	0.00	<0.01	<0.01	0.11	0.03	0.04	0.11
EE3	30-40	21.57	8.03	797	7.48	0.00	0.20	1.89	0.00	<0.01	<0.01	-	-	-	-
EE3	40-50	25.02	6.96	1702	6.26	2.11	0.00	0.00	0.00	0.03	<0.01	-	-	-	-
EE3	50-60	51.94	6.62	6130	6.49	0.42	0.00	0.00	0.00	0.75	<0.01	-	-	-	-
EE3	60-70	65.43	6.72	9610	6.70	0.00	n.a.	1.43	0.00	0.93	<0.01	-	-	-	-

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-8. HCl extractable metal/metalloid content of the Waltowa soil materials at field sampling, November 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)[#]	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
GG1	0-10	413.81	110.23	0.01	0.57	1.08	<0.01	0.51	2.12	10.64	0.82	0.06	0.70
GG1	10-20	332.62	72.67	<0.01	0.74	0.97	<0.01	0.21	1.61	8.30	0.53	0.06	0.50
GG1	20-30	402.41	80.28	<0.01	0.66	0.40	<0.01	0.21	1.71	8.40	0.63	0.05	0.58
GG1	30-40	552.73	162.26	0.01	1.19	0.91	0.02	0.18	3.04	23.87	1.34	0.13	1.64
GG1	40-50	932.67	506.29	0.03	3.17	2.46	0.02	0.65	8.86	106.06	3.15	0.33	3.56
GG1	50-60	862.51	734.61	0.03	3.91	2.79	0.02	0.95	9.85	108.80	3.28	0.39	4.26
GG1	60-70	635.47	633.94	0.03	2.95	2.59	0.02	0.93	8.83	88.19	3.10	0.37	3.70
GG2	0-10	429.52	76.45	<0.01	0.44	1.00	<0.01	0.36	1.11	15.19	0.52	0.06	0.61
GG2	10-20	637.66	77.48	<0.01	0.67	1.30	<0.01	0.24	1.15	19.03	0.51	0.07	0.54
GG2	20-30	388.06	90.86	<0.01	0.71	1.08	<0.01	0.35	1.41	11.60	0.71	0.07	0.45
GG2	30-40	631.64	138.50	0.01	1.62	1.29	0.01	0.30	2.37	15.32	0.82	0.11	1.06
GG2	40-50	1018.86	508.97	0.02	3.66	2.34	0.02	0.77	7.18	87.14	2.96	0.30	3.06
GG2	50-60	722.36	638.89	0.03	4.42	2.73	0.02	0.76	8.79	86.56	3.09	0.33	3.48
GG2	60-70	667.40	621.46	0.03	3.74	2.68	0.02	0.97	8.89	86.91	3.08	0.32	3.91
GG3	0-10	1242.07	191.04	0.02	1.35	1.77	0.01	0.69	3.41	61.35	2.00	0.14	1.82
GG3	10-20	280.25	78.55	0.01	0.58	0.95	<0.01	0.18	1.35	7.80	0.79	0.06	0.93
GG3	20-30	341.83	70.56	0.01	0.82	0.46	<0.01	0.14	1.27	6.50	0.33	0.06	0.84
GG3	30-40	403.28	190.50	0.01	1.30	1.21	0.01	0.69	3.78	26.14	2.36	0.12	2.26
GG3	40-50	712.05	591.74	0.02	3.75	2.45	0.02	0.86	8.57	110.48	3.19	0.33	4.28
GG3	50-60	736.48	696.67	0.03	4.40	2.75	0.02	0.89	9.13	96.46	3.09	0.33	3.89
GG3	60-70	555.96	663.98	0.03	4.44	2.73	0.02	0.90	8.98	88.92	3.02	0.36	3.82
FF1	0-10	425.35	100.20	<0.01	0.57	0.95	<0.01	0.31	1.27	16.39	0.82	0.05	0.84
FF1	10-20	262.99	68.39	<0.01	0.73	0.42	<0.01	0.21	1.07	5.90	0.25	0.03	0.18
FF1	20-30	255.96	79.23	<0.01	0.68	0.22	<0.01	0.16	1.44	8.50	0.24	0.04	0.54
FF1	30-40	452.19	153.84	0.01	1.05	0.80	0.01	0.39	2.30	19.03	1.30	0.10	1.38
FF1	40-50	722.40	410.16	0.02	3.12	2.13	0.01	0.57	6.71	86.26	2.65	0.25	2.97
FF1	50-60	746.38	595.89	0.03	3.28	2.41	0.02	0.86	8.43	95.51	3.02	0.31	3.73
FF1	60-70	533.63	812.07	0.03	3.53	2.73	0.02	1.24	8.59	107.14	3.52	0.33	4.06

** See Table 9-1 in Appendix 1 for further details on the treatment.*

[#] The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

Table 9-8 (continued). HCl extractable metal/metalloid content of the Waltowa soil materials at field sampling, November 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)#	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
FF2	0-10	435.68	141.36	0.01	0.73	0.85	0.01	0.39	1.40	19.00	0.97	0.07	1.16
FF2	10-20	218.95	65.55	<0.01	0.50	0.14	<0.01	0.18	1.11	11.04	0.25	0.04	0.35
FF2	20-30	272.07	84.36	<0.01	0.51	0.32	<0.01	0.18	1.31	14.83	0.34	0.05	0.62
FF2	30-40	282.84	137.31	0.01	0.54	0.50	0.01	0.18	2.24	20.17	0.63	0.08	0.79
FF2	40-50	1096.01	543.03	0.02	2.56	1.70	0.05	0.49	7.23	110.50	4.51	0.31	4.27
FF2	50-60	1806.27	489.27	0.03	3.75	2.39	0.02	0.49	11.03	179.34	4.51	0.34	4.12
FF2	60-70	1423.80	551.26	0.03	3.65	2.60	0.02	0.60	10.25	142.87	3.60	0.33	3.87
FF3	0-10	819.54	124.76	0.01	0.94	1.23	0.01	0.35	2.40	36.27	1.23	0.08	1.38
FF3	10-20	374.86	89.63	0.02	0.67	0.72	<0.01	0.21	1.52	10.80	0.42	0.05	0.84
FF3	20-30	234.20	61.92	0.01	0.65	0.20	<0.01	0.14	1.83	7.30	0.25	0.04	0.79
FF3	30-40	843.14	241.51	0.02	2.64	1.84	0.02	0.31	6.42	39.38	2.57	0.18	2.23
FF3	40-50	1473.57	460.24	0.03	4.19	2.35	0.02	0.65	11.41	140.07	5.04	0.38	4.31
FF3	50-60	955.54	587.04	0.03	4.49	2.55	0.02	0.73	9.90	119.62	3.68	0.35	3.85
FF3	60-70	729.24	640.53	0.03	3.83	2.71	0.02	0.83	9.81	98.90	3.36	0.34	3.69
EE1	0-10	370.97	88.10	<0.01	0.43	0.84	<0.01	0.16	0.70	7.43	0.30	0.05	0.48
EE1	10-20	299.33	98.27	<0.01	0.48	0.83	<0.01	0.18	0.78	12.80	0.60	0.07	0.52
EE1	20-30	200.41	69.75	<0.01	0.65	0.37	<0.01	0.23	0.77	5.10	0.28	0.05	0.66
EE1	30-40	237.83	106.47	0.01	0.79	0.51	0.01	0.21	1.27	6.67	1.44	0.07	1.51
EE1	40-50	310.46	126.02	<0.01	0.74	0.78	0.01	0.23	1.06	16.16	0.79	0.10	1.01
EE1	50-60	722.92	314.85	0.01	2.38	1.53	0.01	0.52	3.35	53.65	1.46	0.25	2.17
EE1	60-70	895.76	439.77	0.02	2.61	2.01	0.01	0.37	4.83	75.43	1.81	0.34	2.50
EE2	0-10	500.70	99.88	<0.01	0.69	1.00	<0.01	0.14	1.05	17.50	0.51	0.06	0.49
EE2	10-20	329.41	69.22	<0.01	0.41	0.86	<0.01	0.13	0.75	13.01	0.46	0.06	0.56
EE2	20-30	454.16	118.62	<0.01	0.91	0.90	<0.01	0.06	1.29	12.72	0.59	0.07	0.54
EE2	30-40	328.69	124.55	<0.01	1.03	0.62	0.01	0.07	1.15	15.37	0.60	0.08	0.89
EE2	40-50	606.05	158.72	0.01	1.86	1.17	<0.01	0.40	1.79	34.26	0.97	0.14	1.21
EE2	50-60	1095.35	526.36	0.02	4.11	1.91	0.02	0.42	5.43	79.48	1.89	0.43	2.65
EE2	60-70	1663.26	1056.99	0.04	5.66	2.40	0.02	0.61	8.69	133.34	3.01	0.67	3.85

** See Table 9-1 in Appendix 1 for further details on the treatment.*

 # The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

Table 9-8 (continued). HCl extractable metal/metalloid content of the Waltowa soil materials at field sampling, November 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)#	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
EE3	0-10	662.32	152.27	0.01	1.66	0.94	0.01	0.12	1.48	38.92	0.85	0.08	0.77
EE3	10-20	362.32	66.65	<0.01	0.43	0.75	<0.01	0.10	0.66	8.24	0.37	0.04	0.55
EE3	20-30	477.74	82.53	0.01	0.44	1.08	<0.01	0.08	1.19	14.95	0.54	0.06	3.11
EE3	30-40	652.98	84.81	<0.01	0.60	1.12	<0.01	0.12	1.18	11.49	0.51	0.07	0.51
EE3	40-50	454.49	130.40	<0.01	1.16	1.20	0.01	0.22	1.98	15.81	0.95	0.09	0.87
EE3	50-60	953.98	471.83	0.02	3.25	2.11	0.01	0.54	6.09	70.24	2.32	0.30	2.28
EE3	60-70	1729.18	849.85	0.04	3.67	2.90	0.02	0.75	11.00	161.52	3.70	0.55	4.10

** See Table 9-1 in Appendix 1 for further details on the treatment.*

 # The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

Table 9-9. Acid sulfate characteristics of the Waltowa soil materials at field sampling, February 2011.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC ($\%CaCO_3$)	TAAlk (mol OH^- t^{-1})	Retained acidity (mol H^+ t^{-1})	Chromium Reducible Sulfur ($\%S_{CR}$)	Acid Volatile Sulfide ($\%S_{AV}$)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
PP1	0-10	23.69	8.38	551	9.45	0.00	1.99	18.85	0.00	0.03	0.03	0.49	0.03	0.19	0.27
PP1	10-20	20.70	7.33	844	6.35	1.96	0.00	0.00	0.00	<0.01	<0.01	0.12	0.02	0.02	0.06
PP1	20-30	22.62	4.57	1375	4.82	2.89	0.00	0.00	0.00	<0.01	<0.01	0.21	0.03	0.11	0.13
PP1	30-40	31.66	4.32	2300	4.55	4.88	0.00	0.00	0.00	0.03	<0.01	0.39	0.05	0.13	0.31
PP1	40-50	58.50	4.20	7880	4.30	18.77	0.00	0.00	0.00	0.98	<0.01	2.76	0.33	2.05	2.37
PP1	50-60	60.02	5.78	9480	5.57	3.10	0.00	0.00	0.00	0.78	<0.01	2.91	0.34	2.26	2.52
PP1	60-70	59.11	6.35	7220	6.17	2.89	0.00	0.00	0.00	1.12	<0.01	2.39	0.27	1.74	2.05
PP2	0-10	24.80	8.33	870	9.15	0.00	1.21	8.53	0.00	<0.01	<0.01	0.26	0.03	0.03	0.17
PP2	10-20	21.48	7.98	960	7.47	0.00	1.19	1.38	0.00	<0.01	<0.01	0.13	0.02	0.03	0.05
PP2	20-30	21.92	7.56	1076	7.00	0.00	1.20	1.73	0.00	<0.01	<0.01	0.17	0.03	0.07	0.09
PP2	30-40	25.75	5.31	1565	5.12	2.65	0.00	0.00	0.00	0.04	<0.01	-	-	-	-
PP2	40-50	58.37	4.28	6760	4.29	14.89	0.00	0.00	8.75	0.80	<0.01	-	-	-	-
PP2	50-60	59.05	5.40	6620	5.24	5.95	0.00	0.00	0.00	1.33	<0.01	-	-	-	-
PP2	60-70	60.28	6.13	4890	6.19	2.61	0.00	0.00	0.00	1.10	<0.01	-	-	-	-
PP3	0-10	35.95	8.52	816	9.51	0.00	3.38	43.09	0.00	0.03	0.02	-	-	-	-
PP3	10-20	26.13	8.72	603	8.46	0.00	1.08	4.02	0.00	<0.01	<0.01	-	-	-	-
PP3	20-30	21.37	7.18	1553	5.12	3.14	0.00	0.00	0.00	0.03	<0.01	-	-	-	-
PP3	30-40	31.94	4.48	2610	4.64	6.31	0.00	0.00	0.00	0.09	<0.01	-	-	-	-
PP3	40-50	65.33	4.96	7730	4.98	4.15	0.00	0.00	0.00	0.83	<0.01	-	-	-	-
PP3	50-60	62.79	5.22	8970	5.22	4.11	0.00	0.00	0.00	1.51	<0.01	-	-	-	-
PP3	60-70	60.94	6.12	6550	6.01	2.77	0.00	0.00	0.00	1.18	<0.01	-	-	-	-
QQ1	0-10	24.66	7.85	637	8.30	0.00	1.11	3.79	0.00	0.02	0.02	0.44	0.04	0.13	0.32
QQ1	10-20	21.74	4.43	983	4.70	3.77	0.00	0.00	0.00	<0.01	<0.01	0.25	0.03	0.10	0.15
QQ1	20-30	22.31	3.86	1083	4.44	5.60	0.00	0.00	7.86	<0.01	<0.01	0.17	0.02	0.04	0.09
QQ1	30-40	24.62	3.80	3850	4.12	19.74	0.00	0.00	0.00	0.04	<0.01	0.86	0.10	0.71	0.67
QQ1	40-50	34.80	4.51	2102	4.81	5.12	0.00	0.00	0.00	0.18	<0.01	0.57	0.06	0.18	0.39
QQ1	50-60	63.67	5.44	6400	5.76	3.15	0.00	0.00	0.00	0.99	<0.01	2.61	0.31	0.23	2.26
QQ1	60-70	60.81	6.32	4080	6.21	2.98	0.00	0.00	0.00	0.93	<0.01	2.34	0.29	0.08	2.07
QQ2	0-10	21.05	7.14	343	8.76	0.00	0.97	1.45	0.00	0.03	0.02	0.21	0.02	<0.01	0.12
QQ2	10-20	22.52	5.93	953	5.56	3.77	0.00	0.00	0.00	<0.01	<0.01	0.20	0.02	0.02	0.12

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-9 (continued). Acid sulfate characteristics of the Waltowa soil materials at field sampling, February 2011.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol $H^+ t^{-1}$)	ANC ($\%CaCO_3$)	TAAlk (mol $OH^- t^{-1}$)	Retained acidity (mol $H^+ t^{-1}$)	Chromium Reducible Sulfur ($\%S_{CR}$)	Acid Volatile Sulfide ($\%S_{AV}$)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
QQ2	20-30	22.45	5.02	655	5.12	2.66	0.00	0.00	0.00	<0.01	<0.01	0.31	0.01	0.02	0.09
QQ2	30-40	35.76	6.89	2960	8.85	0.00	0.93	15.30	0.00	0.08	<0.01	-	-	-	-
QQ2	40-50	54.67	5.27	5820	5.22	5.36	0.00	0.00	0.00	0.69	<0.01	-	-	-	-
QQ2	50-60	59.08	5.42	6230	5.27	4.28	0.00	0.00	0.00	0.63	<0.01	-	-	-	-
QQ2	60-70	60.43	6.37	4850	6.33	2.52	0.00	0.00	0.00	1.00	<0.01	-	-	-	-
QQ3	0-10	36.66	8.28	803	8.99	0.00	1.28	12.55	0.00	0.02	0.02	0.39	0.03	0.03	0.27
QQ3	10-20	23.30	7.51	492	6.28	1.92	0.00	0.00	0.00	<0.01	<0.01	0.12	0.02	<0.01	0.10
QQ3	20-30	21.15	5.37	738	5.04	2.87	0.00	0.00	0.00	<0.01	<0.01	0.19	0.02	<0.01	0.12
QQ3	30-40	26.11	4.85	1094	4.90	2.91	0.00	0.00	0.00	0.22	<0.01	-	-	-	-
QQ3	40-50	30.93	5.68	2370	6.66	0.00	1.26	1.51	0.00	0.13	<0.01	-	-	-	-
QQ3	50-60	58.73	5.81	5050	6.24	3.63	0.00	0.00	0.00	0.69	<0.01	-	-	-	-
QQ3	60-70	57.75	6.54	4770	6.61	0.00	1.66	1.85	0.00	0.97	<0.01	-	-	-	-
RR1	0-10	23.94	8.48	788	9.53	0.00	2.11	27.72	0.00	<0.01	<0.01	0.32	0.02	<0.01	0.10
RR1	10-20	19.37	7.24	1139	6.24	2.52	0.00	0.00	0.00	<0.01	<0.01	0.12	0.02	<0.01	0.07
RR1	20-30	19.55	6.62	1256	6.37	2.03	0.00	0.00	0.00	<0.01	<0.01	0.15	0.02	<0.01	0.07
RR1	30-40	19.64	4.57	1475	4.88	2.67	0.00	0.00	0.00	0.09	<0.01	0.16	0.03	0.02	0.14
RR1	40-50	25.61	3.81	2880	4.42	7.52	0.00	0.00	15.02	0.45	<0.01	0.33	0.04	0.12	0.24
RR1	50-60	58.44	5.08	8270	5.17	4.40	0.00	0.00	0.00	0.77	<0.01	1.92	0.23	1.40	1.61
RR1	60-70	66.40	6.07	10590	6.20	2.66	0.00	0.00	0.00	0.82	<0.01	3.23	0.39	2.67	2.86
RR2	0-10	22.85	8.02	710	9.02	0.00	1.16	7.58	0.00	0.01	0.01	0.15	0.02	<0.01	0.06
RR2	10-20	19.01	7.97	840	8.41	0.00	0.09	3.17	0.00	<0.01	<0.01	0.10	0.01	<0.01	0.01
RR2	20-30	20.38	7.29	1602	6.44	1.16	0.00	0.00	0.00	<0.01	<0.01	0.18	0.02	0.02	0.10
RR2	30-40	20.13	4.93	1781	4.89	2.93	0.00	0.00	0.00	0.02	<0.01	-	-	-	-
RR2	40-50	23.74	4.23	1749	4.63	4.98	0.00	0.00	0.00	0.12	<0.01	-	-	-	-
RR2	50-60	63.82	6.36	8700	6.56	0.00	1.77	1.90	0.00	0.85	<0.01	-	-	-	-
RR2	60-70	60.64	6.42	6440	6.34	2.47	0.00	0.00	0.00	0.95	<0.01	-	-	-	-

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-9 (continued). Acid sulfate characteristics of the Waltowa soil materials at field sampling, February 2011.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol $H^+ t^{-1}$)	ANC (%$CaCO_3$)	TAAlk (mol $OH^- t^{-1}$)	Retained acidity (mol $H^+ t^{-1}$)	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
RR3	0-10	25.13	8.31	711	9.29	0.00	1.48	15.20	0.00	0.02	0.02	0.28	0.03	0.06	0.21
RR3	10-20	20.25	8.72	902	8.62	0.00	1.09	3.15	0.00	<0.01	<0.01	0.10	0.01	<0.01	0.02
RR3	20-30	21.90	8.20	1216	7.74	0.00	1.29	1.43	0.00	0.04	<0.01	0.25	0.02	0.07	0.14
RR3	30-40	22.78	7.08	1940	7.18	0.00	0.34	1.85	0.00	0.05	<0.01	-	-	-	-
RR3	40-50	40.14	6.96	2532	6.48	0.35	0.00	0.00	0.00	0.12	<0.01	-	-	-	-
RR3	50-60	65.34	6.65	9270	6.35	2.42	0.00	0.00	0.00	0.86	<0.01	-	-	-	-
RR3	60-70	63.05	6.57	9970	6.24	3.15	0.00	0.00	0.00	1.02	<0.01	-	-	-	-

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-10. HCl extractable metal/metalloid content of the Waltowa soil materials at field sampling, February 2011.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)[#]	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
PP1	0-10	643.59	150.06	0.01	0.69	1.18	0.01	0.32	1.14	18.89	0.60	0.05	0.89
PP1	10-20	368.36	101.61	0.01	0.73	0.90	<0.01	0.04	1.06	9.01	0.42	0.04	0.51
PP1	20-30	445.06	129.29	0.01	0.69	0.63	<0.01	0.09	1.22	9.95	0.30	0.03	0.44
PP1	30-40	459.37	158.86	0.01	0.98	1.02	0.01	0.06	1.88	15.19	0.62	0.07	0.57
PP1	40-50	1828.43	582.81	0.02	4.74	2.10	0.02	0.39	6.04	108.03	2.75	0.31	2.87
PP1	50-60	1218.42	860.04	0.03	4.99	2.56	0.02	0.65	6.81	86.59	2.89	0.34	2.72
PP1	60-70	945.62	877.43	0.03	3.67	2.53	0.02	0.77	6.78	70.97	2.61	0.31	2.24
PP2	0-10	600.22	150.80	0.01	0.72	1.18	<0.01	0.29	1.00	15.60	0.53	0.06	0.93
PP2	10-20	545.88	138.30	0.01	0.54	1.30	<0.01	0.17	0.95	12.48	0.48	0.06	0.46
PP2	20-30	624.03	149.24	0.01	0.80	1.28	0.01	0.14	1.30	13.22	0.70	0.07	0.38
PP2	30-40	435.95	157.19	0.01	1.35	1.18	0.01	0.15	1.60	14.48	0.65	0.08	0.84
PP2	40-50	1434.34	577.27	0.02	3.98	2.20	0.02	0.33	5.24	74.00	2.12	0.26	2.34
PP2	50-60	1060.99	843.33	0.03	5.11	2.72	0.02	0.62	6.62	91.02	2.50	0.29	2.14
PP2	60-70	841.19	838.22	0.03	3.84	2.61	0.02	0.81	7.07	81.43	2.57	0.31	3.04
PP3	0-10	875.14	192.41	0.01	0.76	1.12	0.01	0.36	1.43	32.16	0.76	0.06	0.45
PP3	10-20	343.13	130.71	0.01	0.57	1.09	<0.01	0.26	1.06	6.86	0.64	0.05	0.55
PP3	20-30	303.49	93.90	<0.01	0.73	0.80	<0.01	0.05	1.21	4.41	0.29	0.05	0.40
PP3	30-40	575.55	196.96	0.01	1.51	1.26	0.02	0.08	2.50	24.33	1.65	0.11	1.40
PP3	40-50	1197.52	619.01	0.02	4.22	2.19	0.02	0.46	6.23	95.15	2.76	0.29	2.46
PP3	50-60	1176.28	880.36	0.03	5.03	2.62	0.02	0.62	6.88	102.01	2.62	0.31	2.81
PP3	60-70	900.02	854.55	0.03	4.02	2.63	0.02	0.69	6.88	85.39	2.59	0.31	2.76
QQ1	0-10	595.38	143.21	0.01	0.94	0.81	0.01	0.40	1.13	24.15	0.76	0.05	0.95
QQ1	10-20	386.04	117.82	0.01	0.70	0.36	<0.01	0.08	1.13	5.40	0.18	0.03	0.80
QQ1	20-30	278.35	90.22	0.01	0.46	0.27	<0.01	0.05	1.10	5.93	0.20	0.04	0.66
QQ1	30-40	400.11	389.34	0.01	1.38	1.26	0.06	0.17	3.05	18.73	1.55	0.17	2.53
QQ1	40-50	447.74	297.32	0.01	1.12	0.96	0.02	0.35	1.95	26.67	1.74	0.12	1.49
QQ1	50-60	1670.62	627.60	0.03	5.04	2.30	0.02	0.39	6.71	113.70	2.66	0.32	2.84
QQ1	60-70	1101.27	725.82	0.03	4.11	2.62	0.02	0.35	7.20	83.46	2.49	0.30	2.83

** See Table 9-1 in Appendix 1 for further details on the treatment.*

[#] *The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)*

Table 9-10 (continued). HCl extractable metal/metalloid content of the Waltowa soil materials at field sampling, February 2011.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)#	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
QQ2	0-10	469.69	135.79	0.01	0.65	0.97	0.01	0.70	1.02	12.20	1.09	0.04	0.89
QQ2	10-20	425.08	90.50	0.01	0.80	0.64	<0.01	0.10	0.96	5.12	0.19	0.03	0.34
QQ2	20-30	309.11	75.31	0.01	0.62	0.46	<0.01	0.09	0.96	6.23	0.14	0.03	0.56
QQ2	30-40	685.03	237.52	0.01	1.03	0.83	0.02	0.11	2.18	30.55	1.02	0.10	0.84
QQ2	40-50	1257.92	537.96	0.03	4.17	2.22	0.02	0.40	5.65	108.61	2.37	0.27	2.63
QQ2	50-60	1288.04	707.84	0.03	4.39	2.41	0.02	0.75	6.24	105.56	2.84	0.32	3.34
QQ2	60-70	740.72	798.23	0.03	3.94	2.64	0.02	0.71	6.62	89.20	2.78	0.32	2.48
QQ3	0-10	605.96	101.10	0.01	0.71	0.95	0.01	0.20	0.99	16.69	0.64	0.05	0.98
QQ3	10-20	366.54	82.76	0.01	0.63	0.65	<0.01	0.10	1.02	3.57	0.23	0.03	0.52
QQ3	20-30	420.40	94.02	0.01	0.61	0.49	<0.01	0.27	0.97	4.17	0.33	0.03	0.51
QQ3	30-40	352.47	116.52	0.01	0.81	0.75	0.01	0.04	1.22	12.22	0.57	0.05	0.99
QQ3	40-50	662.64	178.33	0.01	1.40	1.20	0.01	0.17	2.21	39.57	1.09	0.09	1.04
QQ3	50-60	1131.65	553.75	0.03	4.05	2.16	0.02	0.47	6.53	127.47	3.18	0.27	2.31
QQ3	60-70	857.97	778.61	0.03	4.84	2.68	0.02	0.61	6.67	103.95	2.56	0.29	2.25
RR1	0-10	336.16	77.27	0.01	0.33	0.83	<0.01	0.14	0.64	10.54	0.27	0.03	0.21
RR1	10-20	259.70	59.76	<0.01	0.53	0.51	<0.01	0.04	0.68	3.72	0.13	0.02	0.23
RR1	20-30	254.83	63.09	<0.01	0.54	0.39	<0.01	0.10	0.62	4.76	0.15	0.03	0.90
RR1	30-40	223.92	90.61	<0.01	0.67	0.60	0.01	0.06	0.84	4.13	0.40	0.05	0.55
RR1	40-50	333.36	153.87	0.01	1.08	0.86	0.01	0.13	1.32	15.52	1.46	0.09	1.19
RR1	50-60	1451.22	468.82	0.02	3.40	2.17	0.02	0.30	5.22	103.95	2.01	0.30	2.06
RR1	60-70	1902.04	926.03	0.04	4.01	2.73	0.02	0.44	7.52	139.36	2.69	0.46	3.26
RR2	0-10	370.43	71.89	<0.01	0.38	0.87	<0.01	0.12	0.59	11.85	0.35	0.04	2.21
RR2	10-20	355.75	73.77	0.01	0.39	0.93	<0.01	0.09	0.67	16.05	0.49	0.05	0.03
RR2	20-30	444.34	117.41	0.01	0.82	0.95	<0.01	0.21	1.16	16.60	0.70	0.05	0.26
RR2	30-40	301.59	107.84	0.01	1.10	0.81	0.01	0.16	1.26	8.73	0.53	0.06	0.18
RR2	40-50	379.97	103.10	0.01	0.75	0.82	<0.01	0.07	1.13	16.13	0.77	0.07	0.72
RR2	50-60	1502.70	749.04	0.03	4.47	2.59	0.02	0.55	6.26	99.96	2.41	0.38	2.41
RR2	60-70	1268.48	799.92	0.03	4.57	2.76	0.02	0.40	6.93	102.35	2.52	0.36	2.60

** See Table 9-1 in Appendix 1 for further details on the treatment.*

 # The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

Table 9-10 (continued). HCl extractable metal/metalloid content of the Waltowa soil materials at field sampling, February 2011.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)#	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
RR3	0-10	518.73	84.82	0.01	0.67	0.93	<0.01	0.22	0.98	13.97	0.49	0.05	0.48
RR3	10-20	324.80	62.38	<0.01	0.37	0.95	<0.01	0.16	0.54	9.82	0.45	0.05	0.05
RR3	20-30	494.69	144.21	0.01	0.81	1.32	0.01	0.11	1.49	11.24	0.81	0.08	0.51
RR3	30-40	300.96	120.91	0.01	1.25	1.13	0.01	0.10	1.39	14.46	0.60	0.08	0.48
RR3	40-50	394.57	136.08	0.01	1.05	1.15	0.01	0.08	1.55	21.87	0.62	0.08	0.68
RR3	50-60	1283.46	738.29	0.03	3.39	2.58	0.02	0.48	5.74	93.95	2.20	0.35	2.06
RR3	60-70	1360.58	834.27	0.03	4.13	2.81	0.02	0.44	6.82	102.01	2.50	0.41	2.47

** See Table 9-1 in Appendix 1 for further details on the treatment.*

 # The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

Table 9-11. Acid sulfate characteristics of the Poltalloch soil materials at field sampling, May 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol $H^+ t^{-1}$)	ANC (%$CaCO_3$)	TAAlk (mol $OH^- t^{-1}$)	Retained acidity (mol $H^+ t^{-1}$)	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
I1	0-10	11.75	4.42	514	5.19	33.08	0.00	0.00	0.00	0.00	<0.01	0.08	0.02	0.08	0.08
I1	10-20	15.79	4.35	808	5.41	2.25	0.00	0.00	0.00	0.00	<0.01	0.08	0.02	0.05	0.05
I1	20-30	16.87	3.81	1077	4.68	5.13	0.00	0.00	0.00	0.07	<0.01	0.06	0.02	0.02	0.03
I1	30-40	19.04	3.99	1157	4.83	5.15	0.00	0.00	0.00	0.04	<0.01	0.07	0.03	0.01	0.03
I1	40-50	18.45	4.04	983	4.74	6.41	0.00	0.00	0.00	0.03	<0.01	0.11	0.02	0.04	0.08
I1	50-60	21.91	4.06	1055	4.66	4.44	0.00	0.00	0.00	0.12	<0.01	0.17	0.03	0.01	0.13
I1	60-70	37.88	3.90	2074	4.19	14.41	0.00	0.00	18.41	0.62	<0.01	0.55	0.06	0.14	0.55
I1	70-80	28.15	3.82	1881	4.18	12.58	0.00	0.00	26.69	0.62	<0.01	0.45	0.05	-	0.42
I2	0-10	9.96	4.09	704	4.84	3.58	0.00	0.00	0.00	n.a.	<0.01	0.13	0.02	0.06	0.11
I2	10-20	15.57	4.18	643	4.91	2.90	0.00	0.00	0.00	<0.01	<0.01	0.08	<0.01	0.03	0.04
I2	20-30	17.46	4.26	690	5.11	4.31	0.00	0.00	0.00	<0.01	<0.01	0.05	<0.01	0.02	0.02
I2	30-40	17.24	3.86	814	4.72	4.85	0.00	0.00	0.00	0.05	<0.01	0.09	<0.01	-	-
I2	40-50	18.06	3.92	963	4.71	4.69	0.00	0.00	0.00	0.09	<0.01	0.09	<0.01	-	-
I2	50-60	19.89	3.82	1037	4.39	6.31	0.00	0.00	6.62	0.06	<0.01	0.15	0.01	-	-
I2	60-70	28.26	4.05	1726	4.47	7.00	0.00	0.00	21.12	0.17	<0.01	0.48	0.05	-	-
I2	70-80	42.58	4.36	2660	4.38	8.69	0.00	0.00	40.25	0.90	<0.01	0.80	0.07	-	-
I3	0-10	9.38	5.41	1241	5.99	2.35	0.00	0.00	0.00	<0.01	<0.01	0.05	0.02	<0.01	<0.01
I3	10-20	13.41	4.72	879	5.68	2.80	0.00	0.00	0.00	<0.01	<0.01	0.06	<0.01	0.02	0.02
I3	20-30	17.08	4.03	1563	4.89	2.66	0.00	0.00	0.00	0.05	<0.01	0.06	<0.01	0.01	0.02
I3	30-40	17.83	4.31	1508	5.17	3.11	0.00	0.00	0.00	0.03	<0.01	0.07	0.01	-	-
I3	40-50	17.93	4.14	1842	4.88	3.13	0.00	0.00	0.00	0.08	<0.01	0.09	0.02	-	-
I3	50-60	17.71	4.33	1686	4.98	2.89	0.00	0.00	0.00	0.04	<0.01	0.15	0.02	-	-
J1	0-10	7.60	5.02	594	5.83	2.52	0.00	0.00	0.00	<0.01	<0.01	0.06	0.01	0.02	0.02
J1	10-20	12.80	5.59	677	6.25	2.46	0.00	0.00	0.00	<0.01	<0.01	0.06	0.01	0.05	0.05
J1	20-30	14.79	4.10	955	5.19	2.58	0.00	0.00	0.00	0.03	<0.01	0.06	0.01	0.06	0.06
J1	30-40	17.77	3.84	1107	4.67	5.07	0.00	0.00	0.00	0.07	<0.01	0.12	0.01	0.02	0.07
J1	40-50	19.20	4.23	1097	4.83	3.15	0.00	0.00	0.00	0.05	<0.01	0.18	0.02	0.01	0.12
J1	50-60	22.70	4.51	1248	4.77	4.98	0.00	0.00	0.00	0.70	<0.01	0.27	0.03	0.03	0.23
J1	60-70	21.18	3.79	1283	4.50	7.19	0.00	0.00	0.00	0.26	<0.01	0.26	0.03	<0.01	0.20
J2	0-10	8.90	4.24	355	5.18	3.00	0.00	0.00	0.00	0.02	<0.01	0.11	0.01	0.06	0.08

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-11 (continued). Acid sulfate characteristics of the Poltalloch soil materials at field sampling, May 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol $H^+ t^{-1}$)	ANC (%$CaCO_3$)	TAAlk (mol $OH^- t^{-1}$)	Retained acidity (mol $H^+ t^{-1}$)	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
J2	10-20	13.38	4.88	624	6.06	2.70	0.00	0.00	0.00	<0.01	<0.01	0.06	0.01	0.02	0.02
J2	20-30	17.95	4.06	1048	5.12	3.06	0.00	0.00	0.00	0.03	<0.01	0.05	0.02	0.06	0.07
J2	30-40	17.75	3.89	1084	4.88	4.82	0.00	0.00	0.00	0.08	<0.01	0.07	0.02	-	-
J2	40-50	16.46	4.20	953	5.01	3.15	0.00	0.00	0.00	0.03	<0.01	0.06	0.02	-	-
J2	50-60	20.29	4.05	1245	4.60	9.00	0.00	0.00	0.00	0.09	<0.01	0.23	0.04	-	-
J2	60-70	23.42	4.16	1458	4.59	6.52	0.00	0.00	0.00	0.38	<0.01	0.28	0.04	-	-
J2	70-80	22.48	4.23	1626	4.61	6.14	0.00	0.00	0.00	0.36	<0.01	0.26	0.04	-	-
J3	0-10	8.09	4.75	773	5.72	2.78	0.00	0.00	0.00	0.01	<0.01	0.09	0.02	0.02	0.03
J3	10-20	14.29	4.50	822	5.26	2.54	0.00	0.00	0.00	<0.01	<0.01	0.07	0.01	0.08	0.07
J3	20-30	17.13	4.03	1051	4.90	2.91	0.00	0.00	0.00	<0.01	<0.01	0.07	0.02	0.04	0.04
J3	30-40	16.63	4.00	1058	4.87	4.81	0.00	0.00	0.00	0.05	<0.01	0.06	0.02	-	-
J3	40-50	19.60	4.07	1082	4.68	6.16	0.00	0.00	0.00	0.15	<0.01	0.11	0.03	-	-
J3	50-60	18.11	4.19	1005	4.76	3.15	0.00	0.00	0.00	0.07	<0.01	0.12	0.02	-	-
K1	0-10	7.59	5.80	620	6.46	2.25	0.00	0.00	0.00	<0.01	<0.01	0.13	0.02	0.07	0.09
K1	10-20	15.31	5.76	742	5.28	3.11	0.00	0.00	0.00	<0.01	<0.01	0.07	0.02	0.06	0.07
K1	20-30	16.04	4.28	910	5.15	2.66	0.00	0.00	0.00	<0.01	<0.01	0.06	0.02	0.04	0.05
K1	30-40	22.63	4.20	1006	4.90	4.47	0.00	0.00	0.00	0.03	<0.01	0.08	0.01	0.02	0.04
K1	40-50	18.10	5.05	1281	5.59	3.01	0.00	0.00	0.00	0.09	<0.01	0.10	0.02	0.01	0.05
K1	50-60	18.15	4.27	1135	4.94	3.39	0.00	0.00	0.00	0.12	<0.01	0.12	0.03	0.02	0.08
K2	0-10	4.05	6.45	180	6.89	0.00	0.26	2.07	0.00	<0.01	<0.01	0.10	0.03	0.08	0.09
K2	10-20	9.29	6.51	283	6.57	0.00	0.19	4.21	0.00	<0.01	<0.01	0.08	0.01	0.06	0.07
K2	20-30	12.54	4.44	593	5.27	2.59	0.00	0.00	0.00	<0.01	<0.01	0.06	0.02	0.02	0.03
K2	30-40	17.21	3.94	843	4.72	4.60	0.00	0.00	0.00	<0.01	<0.01	0.07	0.01	-	-
K2	40-50	18.02	4.01	790	4.74	5.46	0.00	0.00	0.00	0.07	<0.01	0.07	0.03	-	-
K2	50-60	16.49	4.53	814	5.19	3.12	0.00	0.00	0.00	0.05	<0.01	0.07	0.04	-	-
K2	60-70	22.78	3.99	1597	4.55	7.60	0.00	0.00	0.00	0.76	<0.01	0.23	0.07	-	-

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-11 (continued). Acid sulfate characteristics of the Poltalloch soil materials at field sampling, May 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH$_{KCl}$	TAA (mol H$^+$ t^{-1})	ANC (%CaCO$_3$)	TAAlk (mol OH$^-$ t^{-1})	Retained acidity (mol H$^+$ t^{-1})	Chromium Reducible Sulfur (%S$_{CR}$)	Acid Volatile Sulfide (%S$_{AV}$)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
K3	0-10	6.68	6.54	554	8.32	0.00	0.31	1.92	0.00	<0.01	<0.01	0.17	0.04	0.11	0.14
K3	10-20	12.66	4.50	672	5.31	3.10	0.00	0.00	0.00	<0.01	<0.01	0.09	0.05	0.08	0.10
K3	20-30	16.18	4.30	765	5.23	2.89	0.00	0.00	0.00	<0.01	<0.01	0.06	0.04	0.04	0.04
K3	30-40	16.08	4.07	1174	4.87	3.13	0.00	0.00	0.00	0.02	<0.01	0.07	0.04	-	-
K3	40-50	16.89	4.19	1048	5.01	3.09	0.00	0.00	0.00	0.06	<0.01	0.07	0.03	-	-
K3	50-60	17.17	4.15	1269	4.89	2.42	0.00	0.00	0.00	<0.01	<0.01	0.06	0.02	-	-
K3	60-70	21.66	4.70	2155	5.58	2.51	0.00	0.00	0.00	0.24	<0.01	0.27	0.05	-	-

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-12. HCl extractable metal/metalloid content of the Poltalloch soil materials at field sampling, May 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)#	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
I1	0-10	103.26	65.94	<0.01	0.35	0.25	<0.01	0.61	0.55	2.40	0.43	0.02	0.50
I1	10-20	117.20	80.01	<0.01	0.35	0.24	<0.01	0.40	0.32	3.43	0.28	0.02	0.21
I1	20-30	252.84	66.98	<0.01	0.25	0.30	<0.01	0.16	0.31	8.76	0.32	0.04	0.19
I1	30-40	177.39	112.68	<0.01	0.22	0.39	<0.01	0.14	0.42	9.74	0.37	0.04	0.40
I1	40-50	173.76	108.14	<0.01	0.26	0.38	<0.01	0.11	0.54	9.60	0.29	0.04	0.54
I1	50-60	298.65	217.00	0.01	0.61	0.86	0.01	0.19	0.84	14.63	0.45	0.05	0.95
I1	60-70	688.35	581.00	0.01	1.78	1.64	0.01	0.42	1.82	35.03	1.16	0.13	2.65
I1	70-80	609.63	492.28	0.01	1.88	1.52	0.01	0.46	1.68	31.46	1.11	0.12	2.44
I2	0-10	136.52	94.92	<0.01	0.43	0.21	<0.01	0.27	0.46	3.83	0.20	0.02	0.50
I2	10-20	134.43	110.29	<0.01	0.45	0.27	<0.01	0.15	0.41	2.83	0.10	0.02	0.32
I2	20-30	104.28	85.18	0.01	0.17	0.29	<0.01	0.24	0.43	3.36	0.22	0.03	0.42
I2	30-40	175.79	100.31	<0.01	0.31	0.45	0.01	0.22	0.49	10.58	0.42	0.03	0.62
I2	40-50	191.89	173.03	0.01	0.40	0.65	0.01	0.33	0.59	15.81	0.47	0.04	8.21
I2	50-60	306.75	166.06	<0.01	0.57	0.86	<0.01	0.33	0.94	19.63	0.58	0.06	0.98
I2	60-70	551.19	468.88	0.01	1.08	1.38	0.01	0.54	1.73	36.73	1.05	0.11	2.05
I2	70-80	912.29	852.31	0.01	1.71	1.82	0.02	0.81	2.55	54.75	1.79	0.21	3.70
I3	0-10	107.20	83.12	<0.01	0.72	0.23	0.01	0.29	0.43	2.17	0.20	0.03	0.24
I3	10-20	104.69	53.27	<0.01	0.32	0.14	<0.01	0.16	0.24	1.26	0.08	0.02	0.16
I3	20-30	148.10	66.10	<0.01	0.51	0.30	<0.01	0.10	0.30	4.05	0.25	0.03	0.35
I3	30-40	111.86	74.98	<0.01	0.44	0.24	<0.01	0.08	0.31	4.36	0.28	0.05	1.08
I3	40-50	173.57	118.68	<0.01	0.64	0.38	<0.01	0.13	0.50	6.49	0.28	0.05	0.51
I3	50-60	160.61	130.77	<0.01	0.44	0.43	<0.01	0.23	0.63	7.00	0.32	0.04	0.71
J1	0-10	65.79	45.37	<0.01	0.38	0.19	<0.01	0.17	0.28	1.48	0.12	0.02	0.45
J1	10-20	149.78	66.78	<0.01	0.40	0.24	<0.01	0.12	0.31	1.89	0.07	0.03	0.24
J1	20-30	166.99	70.27	<0.01	0.23	0.30	<0.01	0.15	0.44	3.84	0.21	0.03	0.57
J1	30-40	226.15	124.48	<0.01	0.38	0.58	<0.01	0.23	0.54	10.31	0.35	0.04	0.77
J1	40-50	259.04	205.60	<0.01	0.53	0.87	0.01	0.41	0.81	12.99	0.60	0.06	1.25
J1	50-60	367.22	300.48	<0.01	0.92	1.20	0.01	0.51	1.30	20.68	0.94	0.09	4.18

** See Table 9-1 in Appendix 1 for further details on the treatment.*

 # The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

Table 9-12 (continued). HCl extractable metal/metalloid content of the Poltalloch soil materials at field sampling, May 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)#	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
J1	60-70	518.44	331.60	0.03	1.90	1.35	0.01	0.54	1.32	25.66	0.90	0.09	2.88
J2	0-10	116.75	72.28	0.01	0.30	0.24	<0.01	0.39	0.40	2.37	0.29	0.02	0.37
J2	10-20	88.24	51.14	<0.01	0.43	0.15	<0.01	0.16	0.35	2.12	0.09	0.02	0.38
J2	20-30	118.09	67.67	0.01	0.29	0.33	<0.01	0.09	0.58	4.31	0.17	0.03	0.24
J2	30-40	176.25	102.45	<0.01	0.41	0.41	0.01	0.15	0.46	6.45	0.33	0.03	0.66
J2	40-50	187.08	117.35	<0.01	0.31	0.42	<0.01	0.23	0.34	6.13	0.36	0.03	0.51
J2	50-60	486.70	306.65	0.01	0.81	0.95	0.01	0.31	1.00	15.64	0.80	0.08	1.52
J2	60-70	485.29	332.37	0.01	0.96	1.07	0.01	0.34	1.06	19.19	0.73	0.08	1.73
J2	70-80	367.76	269.95	<0.01	1.22	0.97	0.01	0.50	1.06	13.98	1.06	0.07	1.77
J3	0-10	117.96	61.66	<0.01	0.57	0.20	<0.01	0.30	0.39	3.22	0.20	0.02	0.45
J3	10-20	82.46	58.06	<0.01	0.39	0.13	<0.01	0.22	0.34	2.66	0.16	0.02	0.55
J3	20-30	148.87	55.51	<0.01	0.20	0.31	<0.01	0.14	0.46	10.44	0.40	0.02	0.28
J3	30-40	173.90	109.33	<0.01	0.23	0.47	0.01	0.25	0.42	10.42	0.55	0.03	0.71
J3	40-50	248.42	165.28	<0.01	0.35	0.50	<0.01	0.18	0.55	10.72	0.60	0.04	1.44
J3	50-60	222.85	138.51	<0.01	0.36	0.54	<0.01	0.20	0.57	8.50	0.36	0.05	0.88
K1	0-10	234.83	91.48	<0.01	0.29	0.40	<0.01	0.29	0.54	15.28	0.57	0.04	0.67
K1	10-20	204.59	109.76	<0.01	0.44	0.29	<0.01	0.19	0.57	4.48	0.16	0.02	0.46
K1	20-30	254.12	48.53	<0.01	0.34	0.17	<0.01	0.10	0.32	2.21	0.10	0.02	0.23
K1	30-40	242.62	118.75	0.01	0.57	0.48	<0.01	0.14	0.52	6.08	0.20	0.04	0.39
K1	40-50	322.82	142.08	0.01	0.99	0.63	<0.01	0.10	0.62	14.92	0.47	0.05	1.02
K1	50-60	321.21	125.66	<0.01	0.66	0.61	<0.01	0.19	0.59	15.92	0.39	0.04	1.22
K2	0-10	153.14	95.75	0.01	0.21	0.38	<0.01	0.17	0.56	16.05	0.39	0.03	0.81
K2	10-20	170.38	93.09	0.01	0.65	0.22	<0.01	0.18	1.43	12.05	0.34	0.10	0.56
K2	20-30	96.49	59.31	<0.01	0.60	0.15	<0.01	0.22	0.48	2.28	0.20	0.05	0.34
K2	30-40	139.82	134.31	0.01	0.39	0.41	<0.01	0.23	0.72	5.67	0.33	0.03	0.50
K2	40-50	286.59	168.16	0.01	0.98	0.53	<0.01	0.39	0.51	7.57	0.41	0.04	0.76
K2	50-60	162.85	210.78	0.01	0.51	0.42	0.01	0.34	0.42	9.04	0.58	0.08	0.96
K2	60-70	549.17	298.85	0.01	2.45	1.15	0.01	0.27	1.04	37.02	0.96	0.07	1.38

** See Table 9-1 in Appendix 1 for further details on the treatment.*

 # The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

Table 9-12 (continued). HCl extractable metal/metalloid content of the Poltalloch soil materials at field sampling, May 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)#	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
K3	0-10	198.63	113.05	0.01	0.42	0.49	0.01	0.19	0.70	26.44	0.67	0.04	0.66
K3	10-20	142.41	60.89	<0.01	1.30	0.15	<0.01	0.26	0.66	1.98	0.26	0.04	0.53
K3	20-30	138.57	58.90	<0.01	0.76	0.16	<0.01	0.15	0.48	1.84	0.43	0.02	0.47
K3	30-40	217.21	113.13	0.01	0.85	0.46	0.01	0.17	0.61	4.82	0.33	0.03	0.68
K3	40-50	175.55	86.95	<0.01	1.08	0.44	0.01	0.16	0.50	7.41	0.68	0.04	0.63
K3	50-60	135.12	124.77	<0.01	1.06	0.51	0.01	0.43	0.44	7.44	0.71	0.04	1.18
K3	60-70	477.78	286.20	0.01	3.40	1.18	0.01	0.55	1.21	24.92	0.99	0.07	1.33

** See Table 9-1 in Appendix 1 for further details on the treatment.*
 # The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

Table 9-13. Acid sulfate characteristics of the Poltalloch soil materials at field sampling, August 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol $H^+ t^{-1}$)	ANC ($\%CaCO_3$)	TAAlk (mol $OH^- t^{-1}$)	Retained acidity (mol $H^+ t^{-1}$)	Chromium Reducible Sulfur ($\%S_{CR}$)	Acid Volatile Sulfide ($\%S_{AV}$)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
X1	0-10	20.65	6.77	345	8.04	0.00	0.49	4.80	0.00	<0.01	<0.01	0.22	0.02	0.09	0.15
X1	10-20	19.22	6.43	260	6.55	0.00	0.47	1.48	0.00	0.01	0.01	0.08	0.01	0.06	0.07
X1	20-30	16.67	4.55	408	5.13	3.79	0.00	0.00	0.00	<0.01	<0.01	0.06	0.01	0.02	0.03
X1	30-40	19.18	4.30	777	5.14	3.00	0.00	0.00	0.00	<0.01	<0.01	0.06	0.01	0.02	0.03
X1	40-50	18.38	3.85	1252	4.53	5.41	0.00	0.00	0.00	0.04	<0.01	0.05	0.02	0.03	0.04
X1	50-60	21.38	3.79	890	4.68	5.57	0.00	0.00	0.00	0.05	<0.01	0.05	<0.01	0.03	0.04
X2	0-10	21.03	6.62	488	7.83	0.00	0.42	2.45	0.00	<0.01	<0.01	0.10	0.01	0.07	0.08
X2	10-20	11.74	4.80	713	5.39	3.50	0.00	0.00	0.00	<0.01	<0.01	0.05	0.01	0.02	0.03
X2	20-30	20.08	3.62	1478	4.40	7.27	0.00	0.00	13.83	0.08	<0.01	0.07	0.01	0.03	0.04
X2	30-40	18.33	3.84	1316	4.58	5.57	0.00	0.00	0.00	0.06	<0.01	0.08	0.01	-	0.03
X2	40-50	18.67	3.91	1287	4.68	5.05	0.00	0.00	0.00	0.10	<0.01	0.08	<0.01	-	0.05
X2	50-60	19.30	3.88	1404	4.50	5.53	0.00	0.00	12.12	0.11	<0.01	0.10	0.01	-	0.08
X2	60-70	21.85	3.90	1639	4.44	5.09	0.00	0.00	18.15	0.19	<0.01	0.11	0.02	-	0.11
X3	0-10	19.56	2.09	650	6.83	0.00	0.48	1.78	0.00	<0.01	<0.01	0.15	0.02	0.06	0.13
X3	10-20	18.97	7.38	1065	7.19	0.00	0.46	1.73	0.00	<0.01	<0.01	0.05	0.01	0.05	0.05
X3	20-30	19.03	5.33	1090	5.77	3.76	0.00	0.00	0.00	<0.01	<0.01	0.06	0.02	0.02	0.04
X3	30-40	19.29	4.23	1182	4.91	3.37	0.00	0.00	0.00	<0.01	<0.01	0.08	0.01	-	0.07
X3	40-50	19.75	4.88	1156	5.50	3.26	0.00	0.00	0.00	0.03	<0.01	0.07	0.02	-	0.07
X3	50-60	20.48	6.49	1094	8.48	0.00	0.92	2.48	0.00	0.09	<0.01	0.13	0.02	-	0.10
X3	60-70	27.44	6.89	1483	7.73	0.00	0.57	3.55	0.00	0.72	<0.01	0.29	0.04	-	0.23
W1	0-10	19.43	7.43	729	7.13	0.00	0.42	3.24	0.00	<0.01	<0.01	0.11	0.02	0.04	0.07
W1	10-20	20.43	6.97	538	5.85	3.32	0.00	0.00	0.00	<0.01	<0.01	0.09	0.01	0.01	0.05
W1	20-30	20.14	6.49	1026	6.11	3.06	0.00	0.00	0.00	<0.01	<0.01	0.07	0.01	<0.01	0.01
W1	30-40	17.73	7.03	1043	8.56	0.00	0.48	4.13	0.00	<0.01	<0.01	0.06	0.02	0.01	0.02
W1	40-50	18.74	7.31	1267	7.52	0.00	0.52	3.92	0.00	<0.01	<0.01	0.05	0.02	0.03	0.03
W1	50-60	18.86	7.24	1391	7.36	0.00	0.57	4.44	0.00	<0.01	<0.01	0.06	0.02	0.03	0.04
W1	60-70	39.36	7.61	1930	8.18	0.00	0.72	5.47	0.00	0.29	<0.01	0.26	0.05	0.06	0.25

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-13 (continued). Acid sulfate characteristics of the Poltalloch soil materials at field sampling, August 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH$_{KCl}$	TAA (mol H$^+$ t^{-1})	ANC (%CaCO$_3$)	TAAlk (mol OH$^-$ t^{-1})	Retained acidity (mol H$^+$ t^{-1})	Chromium Reducible Sulfur (%S$_{CR}$)	Acid Volatile Sulfide (%S$_{AV}$)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
W2	0-10	18.94	7.58	309	6.88	0.00	0.43	2.64	0.00	<0.01	<0.01	0.10	0.03	0.03	0.06
W2	10-20	17.34	7.08	324	6.24	3.10	0.00	0.00	0.00	<0.01	<0.01	0.05	0.01	<0.01	0.01
W2	20-30	17.86	4.69	656	5.21	3.37	0.00	0.00	0.00	<0.01	<0.01	0.04	0.02	0.02	0.02
W2	30-40	18.27	4.19	1160	4.88	3.36	0.00	0.00	0.00	0.02	<0.01	0.06	0.02	-	0.04
W2	40-50	18.08	4.51	1389	5.59	2.19	0.00	0.00	0.00	0.08	<0.01	0.01	0.01	-	0.05
W2	50-60	19.39	6.24	1402	7.67	0.00	0.59	3.24	0.00	0.08	<0.01	0.08	0.03	-	0.05
W2	60-70	20.03	6.24	1762	6.23	2.35	0.00	0.00	0.00	0.14	<0.01	0.12	0.04	-	0.08
W3	0-10	20.91	7.03	333	6.86	0.00	0.46	3.97	0.00	<0.01	<0.01	0.13	0.02	0.06	0.09
W3	10-20	17.70	5.39	380	5.48	3.32	0.00	0.00	0.00	<0.01	<0.01	0.07	0.01	0.02	0.04
W3	20-30	16.86	4.45	574	5.14	2.60	0.00	0.00	0.00	<0.01	<0.01	0.04	<0.01	0.04	0.04
W3	30-40	17.93	4.27	907	5.09	3.06	0.00	0.00	0.00	0.04	0.01	0.03	0.01	-	0.01
W3	40-50	20.24	4.19	817	4.91	3.34	0.00	0.00	0.00	0.03	<0.01	0.09	0.03	-	0.03

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-14. HCl extractable metal/metalloid content of the Poltalloch soil materials at field sampling, August 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)#	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
X1	0-10	243.25	117.98	0.01	0.30	0.42	<0.01	0.11	0.56	17.46	0.45	0.04	0.48
X1	10-20	117.73	64.74	<0.01	0.22	0.31	<0.01	0.06	0.82	8.45	0.31	0.04	0.05
X1	20-30	81.31	47.58	<0.01	0.59	0.12	<0.01	<0.01	0.39	2.11	0.06	0.06	0.02
X1	30-40	108.97	50.19	<0.01	0.46	0.12	<0.01	0.03	0.49	2.46	0.10	0.03	0.03
X1	40-50	164.42	67.68	<0.01	0.37	0.36	<0.01	0.10	0.44	7.65	0.26	0.03	0.80
X1	50-60	169.05	88.15	<0.01	0.37	0.41	0.01	0.08	0.30	14.39	0.49	0.04	0.18
X2	0-10	145.09	60.73	<0.01	0.30	0.32	<0.01	0.03	0.85	10.69	0.31	0.04	0.21
X2	10-20	108.96	44.95	<0.01	0.62	0.16	<0.01	<0.01	1.09	1.95	0.08	0.06	2.35
X2	20-30	269.25	98.01	0.01	0.72	0.43	<0.01	0.04	1.14	15.47	0.67	0.06	0.39
X2	30-40	194.29	92.09	<0.01	0.63	0.36	0.01	0.03	0.81	19.45	0.72	0.05	0.71
X2	40-50	164.29	125.13	<0.01	0.74	0.43	<0.01	0.04	0.77	13.35	0.48	0.06	0.96
X2	50-60	249.12	129.87	<0.01	1.52	0.57	<0.01	0.08	0.78	13.99	0.47	0.06	1.19
X2	60-70	266.13	142.47	<0.01	2.30	0.67	<0.01	0.15	0.91	14.04	0.47	0.06	0.79
X3	0-10	252.35	140.78	0.01	0.43	0.61	<0.01	0.19	0.81	9.43	0.43	0.04	0.39
X3	10-20	201.07	80.84	<0.01	0.43	0.30	<0.01	0.12	0.59	7.42	0.23	0.03	0.61
X3	20-30	127.68	47.55	<0.01	0.24	0.17	<0.01	0.11	0.47	1.54	0.17	0.02	0.38
X3	30-40	220.09	124.00	<0.01	0.54	0.56	<0.01	0.07	0.63	13.74	0.35	0.04	0.58
X3	40-50	266.56	101.42	<0.01	0.60	0.46	<0.01	0.07	0.50	8.09	0.34	0.04	0.61
X3	50-60	246.61	148.40	<0.01	0.44	0.35	<0.01	0.11	0.42	7.55	0.23	0.04	0.86
X3	60-70	448.76	426.62	<0.01	0.46	0.43	0.01	0.48	0.51	7.44	0.49	0.08	1.26
W1	0-10	156.84	75.14	0.01	0.20	0.30	<0.01	0.13	0.50	21.60	0.51	0.04	1.16
W1	10-20	172.56	66.86	<0.01	1.54	0.22	<0.01	0.20	0.50	3.50	0.26	0.03	5.10
W1	20-30	146.50	50.58	<0.01	1.32	0.22	<0.01	0.05	0.39	1.30	0.09	0.02	0.28
W1	30-40	183.96	58.01	<0.01	1.20	0.30	<0.01	0.09	0.45	4.68	0.36	0.04	0.86
W1	40-50	115.76	71.19	<0.01	0.90	0.31	<0.01	0.08	0.40	9.38	0.36	0.04	0.55
W1	50-60	136.47	140.68	<0.01	0.93	0.50	<0.01	0.10	0.46	8.28	0.23	0.04	0.37
W1	60-70	215.68	315.44	<0.01	2.06	0.77	0.01	0.30	0.88	14.88	0.64	0.09	0.94

** See Table 9-1 in Appendix 1 for further details on the treatment.*

 # The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

Table 9-14 (continued). HCl extractable metal/metalloid content of the Poltalloch soil materials at field sampling, August 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)[#]	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
W2	0-10	176.66	81.39	<0.01	0.24	0.31	<0.01	0.08	0.59	19.13	0.58	0.04	0.38
W2	10-20	167.74	48.16	<0.01	0.83	0.21	<0.01	0.02	0.74	6.43	0.26	0.07	0.09
W2	20-30	175.47	40.44	<0.01	1.30	0.14	<0.01	0.02	0.38	1.92	0.08	0.03	0.04
W2	30-40	98.84	73.55	<0.01	0.61	0.40	<0.01	0.04	0.45	6.74	0.25	0.02	0.44
W2	40-50	160.40	113.50	<0.01	1.01	0.38	<0.01	0.03	0.46	10.79	0.46	0.05	0.38
W2	50-60	167.36	124.27	<0.01	1.22	0.46	<0.01	0.07	0.49	11.60	0.27	0.04	0.21
W2	60-70	205.42	130.38	<0.01	1.77	0.61	<0.01	0.16	0.66	11.38	0.38	0.06	0.65
W3	0-10	163.22	70.46	<0.01	0.26	0.33	<0.01	0.09	0.54	15.08	0.54	0.04	0.25
W3	10-20	153.98	44.31	<0.01	0.69	0.20	<0.01	0.01	0.42	3.97	0.12	0.03	0.12
W3	20-30	65.42	45.74	<0.01	0.75	0.14	<0.01	<0.01	0.43	1.51	0.08	0.02	<0.01
W3	30-40	76.74	55.20	0.01	0.40	0.34	<0.01	<0.01	0.30	6.08	0.36	0.03	1.02
W3	40-50	95.41	73.68	<0.01	0.59	0.34	<0.01	0.01	0.35	8.27	0.51	0.04	0.28

** See Table 9-1 in Appendix 1 for further details on the treatment.*

[#] *The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)*

Table 9-15. Acid sulfate characteristics of the Poltalloch soil materials at field sampling, November 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol $H^+ t^{-1}$)	ANC (%$CaCO_3$)	TAAlk (mol $OH^- t^{-1}$)	Retained acidity (mol $H^+ t^{-1}$)	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
HH1	0-10	19.20	8.14	178	8.73	0.00	0.31	4.49	0.00	0.03	<0.01	0.13	0.03	<0.01	0.09
HH1	10-20	19.15	8.13	143	6.70	0.00	0.10	1.23	0.00	<0.01	<0.01	0.08	0.02	<0.01	0.02
HH1	20-30	19.59	5.98	302	5.07	2.34	0.00	0.00	0.00	<0.01	<0.01	0.07	0.02	<0.01	0.02
HH1	30-40	20.10	3.97	617	4.53	4.95	0.00	0.00	0.00	<0.01	<0.01	0.07	0.02	<0.01	0.02
HH1	40-50	21.18	4.27	1068	4.64	3.81	0.00	0.00	0.00	0.08	<0.01	0.05	0.02	<0.01	0.02
HH1	50-60	19.46	3.92	1003	4.42	6.35	0.00	0.00	23.09	0.08	<0.01	0.09	0.03	<0.01	0.06
HH1	60-70	23.46	4.20	1370	4.51	5.40	0.00	0.00	0.00	0.10	<0.01	0.11	0.03	<0.01	0.07
HH2	0-10	14.08	6.44	148	8.75	0.00	0.17	6.32	0.00	<0.01	<0.01	0.10	0.02	<0.01	0.04
HH2	10-20	18.53	4.17	466	4.61	3.18	0.00	0.00	0.00	<0.01	<0.01	0.08	0.02	<0.01	0.02
HH2	20-30	20.92	4.31	975	4.66	3.13	0.00	0.00	0.00	0.02	<0.01	0.10	0.02	<0.01	0.03
HH2	30-40	21.10	6.94	836	7.08	0.00	0.80	2.11	0.00	0.13	<0.01	-	-	-	-
HH2	40-50	19.93	6.32	953	6.61	0.00	0.34	1.54	0.00	0.06	<0.01	-	-	-	-
HH2	50-60	21.61	5.52	1261	4.89	2.67	0.00	0.00	0.00	0.21	<0.01	-	-	-	-
HH2	60-70	28.55	5.30	1395	5.84	2.54	0.00	0.00	0.00	0.54	<0.01	-	-	-	-
HH3	0-10	21.42	6.61	229	6.46	1.22	0.00	0.00	0.00	<0.01	<0.01	0.11	0.02	<0.01	0.05
HH3	10-20	4.79	6.64	409	6.19	2.18	0.00	0.00	0.00	<0.01	<0.01	0.06	0.02	<0.01	0.01
HH3	20-30	26.31	4.42	411	4.75	2.68	0.00	0.00	0.00	<0.01	<0.01	0.06	0.02	<0.01	0.03
HH3	30-40	21.30	4.05	667	4.53	4.37	0.00	0.00	0.00	<0.01	<0.01	-	-	-	-
HH3	40-50	11.64	6.33	926	6.65	0.00	0.26	2.14	0.00	0.05	<0.01	-	-	-	-
HH3	50-60	20.32	4.50	924	4.78	2.71	0.00	0.00	0.00	0.14	<0.01	-	-	-	-
HH3	60-70	21.57	4.40	2680	4.36	8.60	0.00	0.00	0.00	0.08	<0.01	-	-	-	-
II1	0-10	19.08	6.25	250	6.08	2.04	0.00	0.00	0.00	<0.01	<0.01	0.09	0.02	<0.01	0.01
II1	10-20	19.91	6.70	528	8.92	0.00	0.31	3.27	0.00	<0.01	<0.01	0.06	0.02	<0.01	0.03
II1	20-30	20.54	7.26	721	7.92	0.00	0.05	1.96	0.00	0.01	<0.01	0.09	0.02	<0.01	<0.01
II1	30-40	22.17	7.33	660	7.06	0.00	0.00	1.75	0.00	0.10	<0.01	0.10	0.02	<0.01	0.01
II1	40-50	22.62	7.63	696	7.70	0.00	0.33	1.94	0.00	0.16	<0.01	0.09	0.02	<0.01	0.05
II1	50-60	22.96	7.94	1116	8.82	0.00	0.56	4.31	0.00	0.12	<0.01	0.12	0.02	<0.01	0.06
II1	60-70	36.05	7.55	1997	8.10	0.00	0.18	5.14	0.00	0.55	<0.01	0.39	0.02	0.19	0.28

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-15 (continued). Acid sulfate characteristics of the Poltalloch soil materials at field sampling, November 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH$_{KCl}$	TAA (mol $H^+ t^{-1}$)	ANC (%$CaCO_3$)	TAAlk (mol $OH^- t^{-1}$)	Retained acidity (mol $H^+ t^{-1}$)	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
II2	0-10	21.06	7.94	114	6.79	0.00	0.37	1.21	0.00	<0.01	<0.01	0.09	0.03	0.00	0.07
II2	10-20	21.08	7.49	384	6.61	0.00	0.29	0.35	0.00	<0.01	<0.01	0.10	0.03	0.00	0.02
II2	20-30	21.54	6.94	463	5.45	1.82	0.36	0.00	0.00	<0.01	<0.01	0.11	0.03	0.00	0.04
II2	30-40	21.85	7.80	612	9.50	0.00	0.30	15.47	0.00	0.03	<0.01	-	-	-	-
II2	40-50	20.15	8.42	935	8.18	0.00	0.30	2.20	0.00	<0.01	<0.01	-	-	-	-
II2	50-60	20.87	8.39	1094	8.76	0.00	0.39	4.00	0.00	0.07	<0.01	-	-	-	-
II2	60-70	24.81	8.02	1685	8.05	0.00	0.48	3.61	0.00	0.14	<0.01	-	-	-	-
II3	0-10	19.90	8.28	133	6.88	0.00	0.36	1.34	0.00	<0.01	<0.01	0.04	0.03	0.00	0.06
II3	10-20	19.43	7.35	304	5.38	2.96	0.00	0.00	0.00	<0.01	<0.01	0.05	0.02	0.00	0.01
II3	20-30	20.14	5.07	694	4.98	1.94	0.00	0.00	0.00	<0.01	<0.01	0.08	0.03	0.00	0.01
II3	30-40	16.74	5.07	642	4.87	2.70	0.00	0.00	0.00	0.01	<0.01	-	-	-	-
II3	40-50	21.59	6.08	721	6.25	1.84	0.00	0.00	0.00	0.08	<0.01	-	-	-	-
II3	50-60	29.14	7.09	1893	7.77	0.00	0.16	4.24	0.00	0.35	<0.01	-	-	-	-
II3	60-70	26.22	7.62	2008	8.38	0.00	0.13	5.53	0.00	0.33	<0.01	-	-	-	-

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-16. HCl extractable metal/metalloid content of the Poltalloch soil materials at field sampling, November 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)#	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
HH1	0-10	208.95	60.32	<0.01	0.23	0.50	<0.01	0.39	0.70	17.59	0.59	0.03	0.41
HH1	10-20	291.80	39.76	<0.01	0.38	0.34	<0.01	0.28	0.81	7.90	0.41	0.02	0.18
HH1	20-30	177.97	35.87	<0.01	0.59	0.25	<0.01	0.23	1.94	5.30	0.19	0.03	0.51
HH1	30-40	152.68	37.90	0.01	0.73	0.20	<0.01	0.17	1.63	10.56	0.63	0.04	0.15
HH1	40-50	213.90	44.66	<0.01	0.77	0.28	0.01	0.29	0.59	10.29	0.87	0.04	0.79
HH1	50-60	197.23	76.99	<0.01	1.06	0.45	<0.01	0.17	0.73	12.24	1.24	0.06	0.94
HH1	60-70	168.98	71.84	<0.01	1.40	0.44	<0.01	0.18	0.67	12.50	1.23	0.06	0.95
HH2	0-10	153.92	51.84	<0.01	0.35	0.22	<0.01	0.25	0.55	17.28	0.49	0.03	0.66
HH2	10-20	249.94	39.50	<0.01	0.58	0.21	<0.01	0.16	0.63	13.17	0.20	0.02	0.27
HH2	20-30	322.39	57.98	<0.01	0.93	0.37	<0.01	0.24	0.62	16.06	0.42	0.04	0.49
HH2	30-40	336.37	43.15	<0.01	0.72	0.26	<0.01	0.21	0.55	12.72	0.32	0.04	0.46
HH2	40-50	218.30	41.90	<0.01	0.55	0.30	<0.01	0.15	0.50	15.20	0.29	0.04	0.67
HH2	50-60	351.04	133.61	<0.01	0.67	0.55	<0.01	0.22	0.86	18.29	0.50	0.07	1.36
HH2	60-70	385.70	131.45	0.02	0.93	0.52	<0.01	0.15	0.75	13.05	0.44	0.07	1.16
HH3	0-10	182.92	55.35	0.01	0.19	0.41	<0.01	0.14	0.63	14.33	0.63	0.02	0.95
HH3	10-20	154.45	37.14	0.01	0.27	0.28	<0.01	0.09	1.35	7.90	0.30	0.03	0.47
HH3	20-30	126.58	26.70	0.01	0.57	0.09	<0.01	0.05	1.01	3.40	0.11	0.10	0.41
HH3	30-40	154.25	30.70	0.01	0.39	0.14	<0.01	0.08	0.86	3.90	0.19	0.03	0.30
HH3	40-50	267.25	110.13	<0.01	0.42	0.24	0.01	0.20	0.52	11.45	0.95	0.06	1.12
HH3	50-60	175.59	49.80	<0.01	0.47	0.25	<0.01	0.06	0.43	16.91	1.86	0.05	0.87
HH3	60-70	779.78	202.92	<0.01	2.63	1.15	0.01	0.21	1.65	63.78	0.99	0.11	1.53
II1	0-10	200.39	42.69	<0.01	0.48	0.29	<0.01	0.09	0.68	14.01	0.33	0.02	0.53
II1	10-20	167.68	37.70	<0.01	0.54	0.24	<0.01	0.06	0.54	11.02	0.22	0.02	0.32
II1	20-30	185.47	49.74	<0.01	0.89	0.28	<0.01	0.09	0.48	78.97	0.41	0.03	0.59
II1	30-40	101.86	69.72	<0.01	0.86	0.34	<0.01	0.11	0.55	17.62	0.24	0.03	0.59
II1	40-50	105.67	92.54	<0.01	0.61	0.37	<0.01	0.27	0.59	13.37	0.42	0.04	1.07
II1	50-60	96.61	86.48	<0.01	0.62	0.42	<0.01	0.21	0.79	13.76	0.40	0.04	0.60
II1	60-70	377.32	291.03	<0.01	1.30	1.22	0.01	0.47	1.65	28.01	1.11	0.13	1.49

** See Table 9-1 in Appendix 1 for further details on the treatment.*

 # The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

Table 9-16 (continued). HCl extractable metal/metalloid content of the Poltalloch soil materials at field sampling, November 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)[#]	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
II2	0-10	214.81	65.19	<0.01	0.22	0.34	<0.01	0.26	0.64	13.39	0.85	0.03	0.51
II2	10-20	189.15	52.27	<0.01	0.93	0.32	<0.01	0.07	0.62	8.80	0.41	0.02	0.34
II2	20-30	205.72	55.49	<0.01	1.09	0.29	<0.01	0.08	0.60	7.00	0.30	0.02	0.37
II2	30-40	547.76	39.42	0.01	2.78	0.34	<0.01	0.07	0.89	78.39	0.86	0.04	0.36
II2	40-50	78.92	33.63	<0.01	0.58	0.20	<0.01	0.07	0.37	13.23	0.42	0.03	0.33
II2	50-60	102.09	71.32	0.01	0.91	0.39	<0.01	0.10	1.15	13.35	0.36	0.04	0.61
II2	60-70	208.49	136.00	<0.01	1.77	0.75	<0.01	0.21	1.38	17.41	0.63	0.08	0.92
II3	0-10	182.68	49.45	<0.01	0.25	0.34	<0.01	0.06	1.08	8.30	0.51	0.02	0.44
II3	10-20	151.12	19.44	0.01	0.67	0.14	<0.01	0.03	0.88	3.00	0.10	0.01	0.45
II3	20-30	55.06	27.46	<0.01	0.38	0.13	<0.01	0.03	1.26	2.60	0.13	0.02	0.29
II3	30-40	67.12	26.68	<0.01	0.30	0.28	<0.01	0.05	1.02	5.40	0.35	0.02	0.31
II3	40-50	127.94	71.08	<0.01	0.71	0.30	<0.01	0.07	0.98	7.70	0.73	0.05	0.60
II3	50-60	366.08	244.43	<0.01	3.01	0.84	0.01	0.36	1.48	26.15	1.12	0.12	1.95
II3	60-70	250.68	207.09	<0.01	2.27	0.74	0.01	0.37	1.41	16.15	0.69	0.11	1.15

** See Table 9-1 in Appendix 1 for further details on the treatment.*

[#] *The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)*

Table 9-17. Acid sulfate characteristics of the Poltalloch soil materials at field sampling, February 2011.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol $H^+ t^{-1}$)	ANC ($\%CaCO_3$)	TAAlk (mol $OH^- t^{-1}$)	Retained acidity (mol $H^+ t^{-1}$)	Chromium Reducible Sulfur ($\%S_{CR}$)	Acid Volatile Sulfide ($\%S_{AV}$)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
XX1	0-10	18.15	5.68	132	5.79	2.03	0.00	0.00	0.00	<0.01	<0.01	0.13	0.02	<0.01	0.12
XX1	10-20	17.57	5.28	165	5.59	1.95	0.00	0.00	0.00	<0.01	<0.01	0.08	0.01	<0.01	0.08
XX1	20-30	18.64	4.25	391	4.99	2.43	0.00	0.00	0.00	<0.01	<0.01	0.09	0.01	<0.01	0.07
XX1	30-40	19.49	3.60	858	4.61	6.00	0.00	0.00	0.00	0.05	<0.01	0.08	0.02	<0.01	0.04
XX1	40-50	19.36	3.62	1262	4.68	5.81	0.00	0.00	0.00	0.05	<0.01	0.05	0.01	<0.01	0.02
XX1	50-60	20.17	3.62	1253	4.56	6.55	0.00	0.00	0.00	0.07	<0.01	0.11	0.02	<0.01	0.08
XX2	0-10	18.31	6.15	349	6.90	0.00	0.05	2.21	0.00	<0.01	<0.01	0.12	0.02	<0.01	0.04
XX2	10-20	20.62	4.05	804	4.73	4.04	0.00	0.00	0.00	0.05	<0.01	0.09	0.02	<0.01	0.04
XX2	20-30	9.34	3.82	808	4.68	4.78	0.00	0.00	0.00	0.05	<0.01	0.07	0.02	<0.01	0.05
XX2	30-40	11.96	5.60	913	6.91	0.00	0.07	1.69	0.00	0.05	<0.01	-	-	-	-
XX2	40-50	34.66	5.51	1056	6.48	2.93	0.00	0.00	0.00	0.09	<0.01	-	-	-	-
XX2	50-60	24.65	4.42	2109	5.30	3.33	0.00	0.00	0.00	0.19	<0.01	-	-	-	-
XX3	0-10	18.74	7.00	78	7.10	0.00	0.10	1.57	0.00	<0.01	<0.01	0.09	0.01	<0.01	0.06
XX3	10-20	19.07	5.85	409	5.68	2.50	0.00	0.00	0.00	<0.01	<0.01	0.06	0.02	<0.01	0.03
XX3	20-30	18.80	3.78	565	4.85	2.90	0.00	0.00	0.00	0.05	<0.01	0.06	0.02	<0.01	0.03
XX3	30-40	19.00	3.45	1167	4.57	5.89	0.00	0.00	0.00	0.09	<0.01	-	-	-	-
XX3	40-50	20.10	3.22	1811	4.16	14.01	0.00	0.00	9.82	<0.01	<0.01	-	-	-	-
XX3	50-60	19.90	3.55	1547	4.39	6.37	0.00	0.00	0.00	0.16	<0.01	-	-	-	-
WW1	0-10	20.25	5.16	228	5.35	2.64	0.00	0.00	0.00	<0.01	<0.01	0.09	0.02	<0.01	0.05
WW1	10-20	18.60	4.98	616	5.30	2.55	0.00	0.00	0.00	<0.01	<0.01	0.05	0.02	<0.01	0.02
WW1	20-30	20.14	6.70	1537	7.66	0.00	0.07	2.32	0.00	0.03	<0.01	0.08	0.02	<0.01	0.02
WW1	30-40	17.30	5.46	1046	5.53	2.48	0.00	0.00	0.00	0.04	<0.01	0.06	0.02	<0.01	0.02
WW1	40-50	22.93	5.98	1267	6.09	2.22	0.00	0.00	0.00	0.08	<0.01	0.11	0.02	0.01	0.06
WW1	50-60	25.65	5.54	1748	6.33	2.38	0.00	0.00	0.00	0.21	<0.01	0.20	0.03	0.05	0.16
WW2	0-10	19.79	6.70	109	6.39	1.56	0.00	0.00	0.00	<0.01	<0.01	0.15	0.02	<0.01	0.10
WW2	10-20	17.75	6.12	326	6.01	1.98	0.00	0.00	0.00	<0.01	<0.01	0.08	0.02	<0.01	0.04
WW2	20-30	18.73	4.36	364	5.22	1.66	0.00	0.00	0.00	<0.01	<0.01	0.05	0.01	<0.01	0.04
WW2	30-40	19.31	3.75	641	4.79	3.97	0.00	0.00	0.00	0.05	<0.01	-	-	-	-
WW2	40-50	20.29	4.48	1176	5.27	2.92	0.00	0.00	0.00	0.08	<0.01	-	-	-	-
WW2	50-60	20.51	5.86	1328	6.64	0.00	0.06	1.47	0.00	0.07	<0.01	-	-	-	-

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-17 (continued). Acid sulfate characteristics of the Poltalloch soil materials at field sampling, February 2011.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC (%$CaCO_3$)	TAAlk (mol OH^- t^{-1})	Retained acidity (mol H^+ t^{-1})	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
WW3	0-10	22.88	6.22	117	6.22	2.10	0.00	0.00	0.00	<0.01	<0.01	0.10	0.02	<0.01	0.09
WW3	10-20	18.72	4.48	520	5.08	2.82	0.00	0.00	0.00	<0.01	<0.01	0.06	0.02	<0.01	0.04
WW3	20-30	19.44	4.38	902	5.08	2.67	0.00	0.00	0.00	<0.01	<0.01	0.07	0.02	<0.01	0.03
WW3	30-40	19.16	4.07	1192	5.04	2.65	0.00	0.00	0.00	0.06	<0.01	-	-	-	-
WW3	40-50	21.24	3.68	1862	4.54	6.10	0.00	0.00	0.00	0.39	<0.01	-	-	-	-
WW3	50-60	28.90	4.29	3090	5.01	3.15	0.00	0.00	0.00	0.10	<0.01	-	-	-	-

Table 9-18. HCl extractable metal/metalloid content of the Poltalloch soil materials at field sampling, February 2011.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)#	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
XX1	0-10	172.24	59.70	<0.01	0.20	0.33	<0.01	0.08	0.80	7.47	0.44	0.03	0.51
XX1	10-20	209.73	34.42	<0.01	0.66	0.22	<0.01	0.09	0.66	5.79	0.18	0.04	0.32
XX1	20-30	103.92	39.19	<0.01	0.40	0.07	<0.01	0.11	0.58	4.12	0.15	0.03	0.34
XX1	30-40	156.86	61.05	<0.01	0.26	0.36	<0.01	0.08	0.57	9.89	0.36	0.03	0.17
XX1	40-50	199.99	74.20	<0.01	0.35	0.35	<0.01	0.11	0.49	14.71	0.42	0.03	0.36
XX1	50-60	263.32	106.03	<0.01	0.74	0.36	<0.01	0.07	0.57	32.61	0.52	0.05	0.69
XX2	0-10	145.41	49.71	<0.01	0.41	0.14	<0.01	0.07	0.41	6.72	0.17	0.02	0.65
XX2	10-20	171.98	63.81	0.01	0.80	0.17	<0.01	0.08	0.51	7.36	0.17	0.02	0.32
XX2	20-30	213.07	126.87	<0.01	0.70	0.32	0.01	0.18	0.43	14.24	0.31	0.03	0.58
XX2	30-40	120.33	124.54	<0.01	0.55	0.18	<0.01	0.11	0.35	9.36	0.51	0.04	1.33
XX2	40-50	146.64	49.76	<0.01	0.59	0.28	<0.01	0.11	0.31	12.92	0.64	0.03	0.39
XX2	50-60	528.97	219.13	0.01	2.61	1.24	0.01	0.12	1.67	38.72	0.78	0.09	1.40
XX3	0-10	200.22	52.33	<0.01	0.60	0.33	<0.01	0.22	0.55	7.43	0.66	0.03	0.55
XX3	10-20	173.36	31.15	<0.01	0.97	0.15	<0.01	0.09	0.43	3.52	0.13	0.03	0.14
XX3	20-30	457.20	38.83	<0.01	1.32	0.22	<0.01	0.16	0.44	7.29	0.33	0.03	0.42
XX3	30-40	425.21	69.93	<0.01	1.90	0.24	<0.01	0.13	0.44	16.05	0.57	0.05	0.54
XX3	40-50	404.21	129.50	<0.01	1.91	0.27	<0.01	0.11	0.71	46.89	0.91	0.06	1.03
XX3	50-60	254.13	98.14	<0.01	2.81	0.48	<0.01	0.11	0.67	11.51	0.44	0.05	0.83
WW1	0-10	160.92	83.06	<0.01	0.86	0.23	<0.01	0.12	0.50	2.61	0.21	0.03	0.52
WW1	10-20	108.80	38.69	<0.01	1.28	0.16	<0.01	0.09	0.35	2.53	0.13	0.02	0.18
WW1	20-30	604.04	69.63	<0.01	1.63	0.27	<0.01	0.02	0.54	12.05	0.76	0.05	0.32
WW1	30-40	118.09	41.90	<0.01	0.74	0.28	<0.01	0.04	0.35	15.56	0.64	0.03	0.16
WW1	40-50	148.56	76.30	<0.01	1.34	0.58	<0.01	0.07	0.51	18.01	0.32	0.04	6.77
WW1	50-60	253.36	167.15	0.01	1.99	0.89	<0.01	0.13	0.94	29.58	0.53	0.06	0.62
WW2	0-10	172.56	70.92	<0.01	0.27	0.31	<0.01	0.09	0.59	5.60	0.52	0.04	0.48
WW2	10-20	168.83	37.80	<0.01	0.68	0.19	<0.01	0.04	0.45	4.21	0.15	0.02	0.33
WW2	20-30	70.46	28.66	<0.01	0.33	0.06	<0.01	0.03	0.37	2.79	0.10	0.02	0.11
WW2	30-40	128.70	56.49	<0.01	0.37	0.35	<0.01	0.05	0.45	9.32	0.30	0.03	0.33

** See Table 9-1 in Appendix 1 for further details on the treatment.*

 # The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

Table 9-18 (continued). HCl extractable metal/metalloid content of the Poltalloch soil materials at field sampling, February 2011.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)#	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
WW2	40-50	247.96	154.90	<0.01	1.32	0.52	<0.01	0.11	0.68	22.55	0.82	0.05	0.83
WW2	50-60	185.99	68.75	<0.01	1.06	0.48	<0.01	0.09	0.47	15.17	0.28	0.04	0.36
WW3	0-10	166.90	52.04	<0.01	0.20	0.32	<0.01	0.07	0.59	7.22	0.38	0.03	0.66
WW3	10-20	193.05	40.08	<0.01	1.06	0.13	<0.01	0.06	0.40	3.75	0.10	0.04	0.30
WW3	20-30	72.48	33.55	<0.01	0.45	0.18	<0.01	0.05	0.37	4.33	0.17	0.02	0.13
WW3	30-40	115.57	51.13	<0.01	0.67	0.35	<0.01	0.07	0.55	9.52	0.53	0.03	0.40
WW3	40-50	222.85	90.09	<0.01	1.34	0.41	<0.01	0.03	0.78	35.40	0.50	0.05	0.46
WW3	50-60	429.27	176.98	0.01	2.44	1.14	0.01	0.11	1.38	52.10	0.86	0.08	1.04

** See Table 9-1 in Appendix 1 for further details on the treatment.*

 # The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

Table 9-19. Acid sulfate characteristics of the Tolderol soil materials at field sampling, May 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol $H^+ t^{-1}$)	ANC ($\%CaCO_3$)	TAAlk (mol $OH^- t^{-1}$)	Retained acidity (mol $H^+ t^{-1}$)	Chromium Reducible Sulfur ($\%S_{CR}$)	Acid Volatile Sulfide ($\%S_{AV}$)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
E1	0-10	5.67	3.54	244	4.19	9.98	0.00	0.00	2.13	<0.01	<0.01	0.14	0.01	0.09	0.09
E1	10-20	8.58	3.58	177	4.08	11.42	0.00	0.00	0.51	<0.01	<0.01	0.16	0.01	0.05	0.12
E1	20-30	11.84	3.61	171	4.31	8.25	0.00	0.00	0.37	<0.01	<0.01	0.07	0.01	0.03	0.04
E1	30-40	15.97	3.83	193	4.53	5.31	0.00	0.00	0.00	<0.01	<0.01	0.04	0.01	0.01	0.01
E1	40-50	21.03	3.60	401	4.17	14.80	0.00	0.00	3.05	0.04	<0.01	0.09	0.01	0.07	0.07
E1	50-60	20.67	3.73	630	5.46	19.73	0.00	0.00	0.00	0.12	0.01	0.07	0.01	0.04	0.06
E1	60-70	20.03	3.86	642	4.42	12.18	0.00	0.00	3.67	0.08	<0.01	0.06	0.02	0.05	0.05
E1	70-80	23.68	3.74	621	4.24	19.46	0.00	0.00	3.59	0.14	<0.01	0.11	0.01	0.06	0.09
E2	0-10	6.10	3.75	172	4.36	7.85	0.00	0.00	1.96	<0.01	<0.01	0.09	0.01	<0.01	0.06
E2	10-20	10.74	3.78	128	4.44	6.78	0.00	0.00	0.45	<0.01	<0.01	0.05	0.02	-	0.03
E2	20-30	15.95	3.84	186	4.63	4.87	0.00	0.00	0.00	<0.01	<0.01	0.05	0.01	-	0.04
E2	30-40	19.04	3.76	319	4.44	6.52	0.00	0.00	0.97	<0.01	<0.01	0.05	0.02	-	0.02
E2	40-50	21.61	3.74	405	4.46	7.96	0.00	0.00	1.14	0.02	<0.01	0.05	0.03	-	0.04
E2	50-60	22.07	3.67	574	4.22	13.46	0.00	0.00	1.67	0.08	<0.01	0.06	0.03	-	0.05
E2	60-70	24.04	3.70	617	4.92	7.58	0.00	0.00	0.00	0.09	<0.01	0.08	0.03	-	0.05
E2	70-80	22.09	3.68	595	4.10	19.05	0.00	0.00	2.79	0.24	<0.01	0.10	0.03	-	0.07
E3	0-10	8.59	3.71	425	4.40	8.16	0.00	0.00	1.20	<0.01	<0.01	0.07	0.03	0.03	0.03
E3	10-20	11.47	3.87	372	4.57	5.79	0.00	0.00	0.00	<0.01	<0.01	0.04	0.02	0.01	0.02
E3	20-30	14.51	3.82	376	4.51	6.81	0.00	0.00	0.00	<0.01	<0.01	0.05	0.02	0.02	0.02
E3	30-40	19.58	3.53	389	4.29	10.30	0.00	0.00	2.84	<0.01	<0.01	0.09	0.02	-	0.06
E3	40-50	21.36	5.62	466	4.56	7.80	0.00	0.00	0.00	<0.01	<0.01	0.04	0.02	-	0.01
E3	50-60	22.42	3.59	701	4.12	17.21	0.00	0.00	2.26	0.19	<0.01	0.10	0.03	-	0.07
E3	60-70	23.43	3.85	589	4.45	8.75	0.00	0.00	4.79	<0.01	<0.01	0.04	0.02	-	0.03
D1	0-10	4.46	3.79	220	4.35	7.04	0.00	0.00	1.83	<0.01	<0.01	0.11	0.02	0.03	0.06
D1	10-20	10.38	3.98	95	4.53	5.01	0.00	0.00	0.00	<0.01	<0.01	0.05	0.02	<0.01	0.02
D1	20-30	15.02	3.87	179	4.54	5.70	0.00	0.00	0.00	<0.01	<0.01	0.05	0.02	0.01	0.02
D1	30-40	19.80	3.94	313	4.58	4.88	0.00	0.00	0.00	<0.01	<0.01	0.06	0.02	0.01	0.02
D1	40-50	21.59	4.00	475	4.56	6.66	0.00	0.00	0.00	<0.01	<0.01	0.05	0.02	<0.01	0.03
D1	50-60	23.27	3.79	882	4.11	18.69	0.00	0.00	4.73	0.16	<0.01	0.12	0.02	0.05	0.08
D1	60-70	30.32	3.77	1278	3.90	31.75	0.00	0.00	15.40	0.35	<0.01	0.33	0.04	0.21	0.24

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-19 (continued). Acid sulfate characteristics of the Tolderol soil materials at field sampling, May 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC ($\%CaCO_3$)	TAAlk (mol OH^- t^{-1})	Retained acidity (mol H^+ t^{-1})	Chromium Reducible Sulfur ($\%S_{CR}$)	Acid Volatile Sulfide ($\%S_{AV}$)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
D1	70-80	31.47	4.49	1312	4.02	15.57	0.00	0.00	21.93	0.32	<0.01	0.25	0.03		0.20
D2	0-10	10.96	3.68	231	4.23	9.29	0.00	0.00	0.75	<0.01	<0.01	0.11	0.01	0.07	0.08
D2	10-20	14.12	3.66	163	4.21	8.71	0.00	0.00	0.07	<0.01	<0.01	0.08	0.02	0.03	0.05
D2	20-30	19.78	3.56	337	4.26	11.41	0.00	0.00	21.03	<0.01	<0.01	0.09	0.02	0.04	0.06
D2	30-40	23.20	3.59	567	4.13	12.07	0.00	0.00	3.16	0.03	<0.01	0.09	0.03	-	0.08
D2	40-50	22.88	3.79	701	4.23	13.83	0.00	0.00	4.47	0.12	<0.01	0.10	0.04	-	0.06
D2	50-60	21.72	4.02	688	4.43	9.27	0.00	0.00	5.39	0.06	<0.01	0.06	0.02	-	0.04
D2	60-70	23.78	4.07	1066	4.15	13.70	0.00	0.00	11.69	0.14	<0.01	0.14	0.03	-	0.10
D2	70-80	24.84	7.95	1041	9.49	0.00	0.95	21.30	0.00	0.15	<0.01	0.24	0.04	-	0.09
D3	0-10	9.42	4.02	192	4.64	5.29	0.00	0.00	0.00	<0.01	<0.01	0.08	0.03	0.01	0.03
D3	10-20	11.41	3.65	240	4.59	8.30	0.00	0.00	0.00	<0.01	<0.01	0.11	<0.01	0.03	0.06
D3	20-30	21.70	3.34	770	4.12	21.22	0.00	0.00	5.19	<0.01	<0.01	0.16	0.02	0.02	0.11
D3	30-40	20.40	3.75	574	4.41	10.11	0.00	0.00	2.72	<0.01	<0.01	0.05	0.01	-	0.05
D3	40-50	22.02	3.58	816	4.14	17.52	0.00	0.00	4.70	0.06	<0.01	0.11	<0.01	-	0.09
D3	50-60	22.10	3.85	782	4.23	15.68	0.00	0.00	5.86	0.09	<0.01	0.11	0.01	-	0.09
D3	60-70	27.22	4.44	1002	4.18	11.38	0.00	0.00	14.65	0.19	<0.01	0.19	0.01	-	0.15
D3	70-80	25.53	7.10	796	6.37	3.06	0.00	0.00	0.00	0.13	<0.01	0.13	0.02	-	0.11
D3	80-90	21.57	7.26	671	7.41	0.00	0.33	4.49	0.00	0.17	<0.01	0.11	0.01	-	0.09
F1	0-10	8.36	4.35	272	4.79	3.42	0.00	0.00	0.00	<0.01	<0.01	0.13	0.03	0.08	0.07
F1	10-20	9.40	4.39	174	4.57	3.88	0.00	0.00	0.00	<0.01	<0.01	0.13	0.02	0.07	0.10
F1	20-30	12.83	4.16	246	4.83	3.13	0.00	0.00	0.00	<0.01	<0.01	0.05	0.04	0.02	0.02
F1	30-40	18.85	4.25	427	4.90	3.12	0.00	0.00	0.00	0.01	0.01	0.04	0.04	0.01	0.01
F1	40-50	25.36	3.81	880	4.32	13.56	0.00	0.00	11.58	0.15	<0.01	0.16	0.04	0.12	0.12
F1	50-60	25.01	3.85	809	4.30	13.38	0.00	0.00	80.18	0.25	<0.01	0.13	0.04	0.09	0.09
F1	60-70	21.41	4.51	642	4.85	3.69	0.00	0.00	0.00	0.05	<0.01	0.04	0.03	0.02	0.02
F1	70-80	21.75	5.27	747	4.92	3.10	0.00	0.00	0.00	0.11	<0.01	0.07	0.04	-	0.04
F2	0-10	5.96	4.66	309	5.14	2.86	0.00	0.00	0.00	<0.01	<0.01	0.11	0.04	<0.01	0.06
F2	10-20	10.69	4.18	180	4.86	4.08	0.00	0.00	0.00	0.03	<0.01	0.08	0.04	0.04	0.04
F2	20-30	17.38	3.89	445	4.76	4.67	0.00	0.00	0.00	0.05	<0.01	0.05	0.04	0.01	0.01
F2	30-40	20.97	3.63	734	4.45	17.27	0.00	0.00	29.47	0.05	<0.01	0.06	0.04	-	0.03

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-19 (continued). Acid sulfate characteristics of the Tolderol soil materials at field sampling, May 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol $H^+ t^{-1}$)	ANC ($\%CaCO_3$)	TAAlk (mol $OH^- t^{-1}$)	Retained acidity (mol $H^+ t^{-1}$)	Chromium Reducible Sulfur ($\%S_{CR}$)	Acid Volatile Sulfide ($\%S_{AV}$)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
F2	40-50	20.57	3.95	633	4.64	10.70	0.00	0.00	0.00	0.07	<0.01	0.05	0.03	-	0.01
F2	50-60	22.95	4.09	629	4.76	9.70	0.00	0.00	0.00	0.07	<0.01	0.04	0.02	-	0.03
F2	60-70	28.61	4.03	1003	4.22	22.38	0.00	0.00	1.92	0.41	<0.01	0.24	0.03	-	0.19
F2	70-80	24.98	4.41	786	5.57	3.63	0.00	0.00	0.00	0.19	<0.01	0.10	0.02	-	0.06
F3	0-10	3.55	4.64	220	5.22	3.15	0.00	0.00	0.00	<0.01	<0.01	0.12	0.02	0.01	0.07
F3	10-20	14.55	3.77	510	4.39	22.15	0.00	0.00	34.45	<0.01	<0.01	0.20	0.03	0.15	0.15
F3	20-30	25.27	3.64	919	4.18	22.99	0.00	0.00	2.29	<0.01	<0.01	0.27	0.05	0.09	0.21
F3	30-40	22.29	3.66	759	4.52	9.08	0.00	0.00	0.00	<0.01	<0.01	0.10	0.02	0.07	0.07
F3	40-50	21.91	3.77	708	4.56	8.77	0.00	0.00	0.00	0.08	<0.01	0.08	0.03	0.05	0.05
F3	50-60	21.38	3.96	672	4.76	6.52	0.00	0.00	0.00	0.09	<0.01	0.04	0.04	0.03	0.03
F3	60-70	25.18	3.98	780	4.40	11.63	0.00	0.00	27.25	0.17	<0.01	0.12	0.05	0.08	0.08
F3	70-80	22.02	4.40	722	4.77	3.90	0.00	0.00	0.00	0.12	<0.01	0.06	<0.01	-	0.02

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-20. HCl extractable metal/metalloid content of the Tolderol soil materials at field sampling, May 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)[#]	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
E1	0-10	132.58	100.80	<0.01	0.58	0.15	<0.01	0.30	0.44	3.10	0.29	0.01	0.65
E1	10-20	245.30	137.77	<0.01	0.85	0.08	<0.01	0.15	0.59	2.70	0.17	0.01	0.76
E1	20-30	122.47	96.36	<0.01	0.63	0.08	<0.01	0.10	0.40	1.90	0.11	0.01	0.61
E1	30-40	77.50	59.51	<0.01	0.33	0.08	<0.01	0.12	0.43	2.00	0.12	0.01	0.50
E1	40-50	180.65	152.08	<0.01	0.39	0.20	<0.01	0.19	0.83	12.67	0.42	0.02	0.44
E1	50-60	223.64	236.85	<0.01	0.31	0.31	0.01	0.27	0.56	19.93	1.15	0.04	1.04
E1	60-70	197.83	191.29	<0.01	0.25	0.32	<0.01	0.23	0.54	18.45	1.15	0.04	1.46
E1	70-80	259.17	259.58	<0.01	0.38	0.47	<0.01	0.21	2.80	23.87	1.68	0.06	1.93
E2	0-10	114.95	87.47	<0.01	0.43	0.09	<0.01	0.12	1.48	2.60	0.13	0.01	0.69
E2	10-20	108.93	82.78	0.01	0.39	0.09	<0.01	0.09	0.45	1.70	0.09	0.01	0.51
E2	20-30	88.21	70.68	<0.01	0.44	0.19	<0.01	0.67	0.26	2.90	0.56	0.01	0.60
E2	30-40	84.96	77.64	<0.01	0.64	0.18	<0.01	0.37	0.20	5.10	0.34	0.01	0.37
E2	40-50	115.02	95.68	<0.01	0.33	0.23	<0.01	0.32	1.42	8.10	0.34	0.01	0.50
E2	50-60	279.61	153.63	<0.01	0.27	0.41	0.01	0.31	0.71	17.08	1.17	0.02	0.59
E2	60-70	323.65	177.96	<0.01	0.29	0.39	<0.01	0.24	0.73	21.08	1.49	0.04	1.02
E2	70-80	347.83	221.98	<0.01	0.29	0.40	<0.01	0.31	0.96	26.80	1.37	0.05	1.45
E3	0-10	103.73	81.26	<0.01	0.55	0.12	<0.01	0.23	0.26	4.70	0.26	0.01	0.62
E3	10-20	102.35	73.29	<0.01	0.25	0.13	<0.01	0.24	0.27	5.20	0.26	0.01	0.49
E3	20-30	96.43	64.52	<0.01	0.27	0.13	<0.01	0.31	0.25	5.00	0.29	0.01	0.88
E3	30-40	174.54	119.32	<0.01	0.50	0.13	<0.01	0.21	0.42	7.90	0.27	0.02	0.75
E3	40-50	123.36	91.99	<0.01	0.22	0.11	<0.01	0.23	0.37	7.10	0.27	0.02	0.38
E3	50-60	377.03	234.31	<0.01	0.46	0.45	0.01	0.30	0.80	24.34	1.44	0.04	0.85
E3	60-70	209.12	130.77	<0.01	0.19	0.32	<0.01	0.20	0.40	13.57	0.96	0.03	0.74
D1	0-10	120.10	89.78	<0.01	0.56	0.18	<0.01	0.44	0.35	3.70	0.48	0.01	0.62
D1	10-20	84.19	51.80	<0.01	0.37	0.10	<0.01	0.22	0.17	1.40	0.21	0.01	0.36
D1	20-30	82.26	47.55	<0.01	0.34	0.11	<0.01	0.19	0.29	1.60	0.21	0.01	0.29
D1	30-40	82.82	53.99	<0.01	0.41	0.11	<0.01	0.13	0.22	3.70	0.26	0.01	0.40
D1	40-50	97.53	66.30	<0.01	0.28	0.10	<0.01	0.11	0.37	6.20	0.41	0.01	0.24

** See Table 9-1 in Appendix 1 for further details on the treatment.*

[#] The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

Table 9-20 (continued). HCl extractable metal/metalloid content of the Tolderol soil materials at field sampling, May 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)[#]	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
D1	50-60	290.76	202.95	<0.01	0.36	0.44	0.03	0.24	0.92	16.47	1.96	0.04	1.35
D1	60-70	501.39	424.83	0.01	0.60	0.90	0.01	0.21	2.33	39.62	3.58	0.14	3.53
D1	70-80	572.78	252.87	0.01	0.76	1.06	0.01	0.19	1.96	42.93	1.45	0.10	1.56
D2	0-10	140.66	101.77	<0.01	0.86	0.14	<0.01	0.22	0.64	4.00	0.39	0.01	2.73
D2	10-20	143.09	76.39	<0.01	0.48	0.09	<0.01	0.09	0.63	2.30	0.21	0.01	0.63
D2	20-30	194.83	121.81	<0.01	0.49	0.13	<0.01	0.17	0.68	4.80	0.35	0.02	0.69
D2	30-40	184.26	118.89	<0.01	0.24	0.15	<0.01	0.07	0.78	8.80	0.39	0.02	0.49
D2	40-50	376.54	138.49	<0.01	0.12	0.35	0.01	0.13	0.60	18.93	0.82	0.03	0.77
D2	50-60	255.97	118.60	0.01	0.09	0.30	<0.01	0.06	0.45	16.41	1.11	0.03	0.89
D2	60-70	361.83	184.60	<0.01	0.25	0.46	<0.01	0.02	0.83	33.50	1.20	0.08	1.70
D2	70-80	255.92	127.97	<0.01	0.04	0.37	<0.01	0.16	0.67	19.82	0.63	0.05	0.76
D3	0-10	116.27	60.58	<0.01	0.44	0.09	<0.01	0.09	0.29	3.20	0.21	0.01	1.08
D3	10-20	147.30	114.38	<0.01	0.49	0.15	<0.01	0.15	0.55	4.10	0.22	0.01	0.80
D3	20-30	240.40	236.12	0.01	0.84	0.12	<0.01	0.15	1.24	14.17	0.47	0.03	1.00
D3	30-40	145.42	136.70	<0.01	0.39	0.07	<0.01	0.13	0.31	11.00	0.38	0.02	0.67
D3	40-50	259.77	228.68	<0.01	0.29	0.24	<0.01	0.54	1.09	20.32	1.62	0.04	0.97
D3	50-60	257.03	291.33	<0.01	0.24	0.43	0.01	0.28	0.96	21.41	1.26	0.06	1.53
D3	60-70	336.63	292.14	0.01	0.50	0.80	<0.01	0.22	1.18	38.94	1.26	0.09	1.87
D3	70-80	234.30	233.91	<0.01	0.39	0.71	<0.01	0.84	0.99	20.58	0.86	0.06	0.95
D3	80-90	260.18	186.96	<0.01	0.36	0.67	<0.01	0.50	1.05	17.54	0.78	0.05	0.80
F1	0-10	126.86	99.70	<0.01	0.16	0.52	<0.01	0.42	0.86	6.50	0.45	0.02	0.51
F1	10-20	41.46	76.38	<0.01	0.02	0.32	<0.01	0.28	0.36	3.80	0.21	0.01	0.34
F1	20-30	67.70	49.78	<0.01	0.11	0.15	<0.01	0.27	0.32	2.10	0.18	0.01	0.45
F1	30-40	80.98	50.32	<0.01	0.20	0.11	<0.01	0.24	0.22	3.10	0.22	0.01	0.71
F1	40-50	468.07	227.26	0.01	0.34	0.37	0.01	0.23	0.75	13.81	0.79	0.05	1.22
F1	50-60	552.31	202.63	<0.01	0.26	0.47	0.01	0.30	0.73	15.51	1.10	0.05	1.29
F1	60-70	126.31	73.41	<0.01	0.11	0.32	<0.01	0.21	0.33	6.00	0.80	0.03	0.66
F1	70-80	153.86	96.82	<0.01	0.24	0.51	<0.01	0.19	0.89	9.20	0.53	0.04	1.04

** See Table 9-1 in Appendix 1 for further details on the treatment.*

[#] *The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)*

Table 9-20 (continued). HCl extractable metal/metalloid content of the Tolderol soil materials at field sampling, May 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)#	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
F2	0-10	130.65	64.39	<0.01	0.15	0.39	<0.01	0.35	0.33	5.00	0.37	0.02	0.54
F2	10-20	86.28	64.47	<0.01	0.11	0.33	<0.01	0.30	0.30	1.70	0.19	0.01	0.40
F2	20-30	105.05	76.97	<0.01	0.36	0.17	<0.01	0.26	0.38	3.20	0.20	0.02	1.01
F2	30-40	303.69	151.10	<0.01	0.36	0.32	0.01	0.23	0.35	17.01	0.78	0.02	0.82
F2	40-50	305.22	160.46	<0.01	0.18	0.36	0.01	0.24	0.24	16.52	0.71	0.04	1.65
F2	50-60	218.63	118.57	<0.01	0.13	0.28	<0.01	0.14	0.29	12.77	0.83	0.04	1.03
F2	60-70	606.85	267.24	<0.01	0.59	0.54	0.01	0.16	1.02	48.94	1.96	0.11	2.53
F2	70-80	289.99	164.16	<0.01	0.27	0.47	<0.01	0.22	0.53	23.01	0.70	0.05	1.20
F3	0-10	156.50	78.96	<0.01	0.14	0.40	<0.01	0.47	0.34	14.30	0.60	0.02	1.00
F3	10-20	228.05	254.53	0.01	0.57	0.73	<0.01	0.29	0.98	6.30	0.47	0.05	0.78
F3	20-30	309.94	397.68	0.01	1.03	0.90	<0.01	0.36	1.52	9.50	0.77	0.08	1.19
F3	30-40	203.49	147.80	0.01	1.12	0.22	<0.01	0.31	1.61	4.30	0.54	0.04	1.10
F3	40-50	296.19	113.05	<0.01	0.37	0.33	0.01	0.21	0.43	5.70	1.15	0.03	1.29
F3	50-60	273.06	80.56	<0.01	0.21	0.23	0.01	0.19	0.22	4.40	0.79	0.02	0.97
F3	60-70	381.27	161.93	<0.01	0.32	0.35	0.01	0.16	0.75	12.13	1.08	0.06	1.42
F3	70-80	158.46	83.25	<0.01	0.22	0.28	<0.01	0.10	0.43	5.90	0.38	0.03	0.57

** See Table 9-1 in Appendix 1 for further details on the treatment.*

 # The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

Table 9-21. Acid sulfate characteristics of the Tolderol soil materials at field sampling, August 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC ($\%CaCO_3$)	TAAlk (mol OH^- t^{-1})	Retained acidity (mol H^+ t^{-1})	Chromium Reducible Sulfur ($\%S_{CR}$)	Acid Volatile Sulfide ($\%S_{AV}$)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
S1	0-10	20.08	3.94	300	4.70	4.83	0.00	0.00	0.00	<0.01	<0.01	0.14	0.01	0.04	0.12
S1	10-20	20.11	3.75	271	4.60	5.35	0.00	0.00	0.00	<0.01	<0.01	0.06	0.01	0.04	0.04
S1	20-30	19.37	3.84	237	4.73	4.60	0.00	0.00	0.00	<0.01	<0.01	0.05	0.01	0.02	0.04
S1	30-40	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
S1	40-50	23.00	3.60	436	4.18	13.36	0.00	0.00	15.51	0.09	<0.01	0.07	0.01	0.07	0.07
S1	50-60	24.12	3.62	670	4.17	14.76	0.00	0.00	7.56	0.13	<0.01	0.09	0.01	0.07	0.07
S2	0-10	21.22	3.74	374	4.31	9.66	0.00	0.00	10.93	<0.01	<0.01	0.10	0.02	0.06	0.10
S2	10-20	13.59	3.61	374	4.30	10.21	0.00	0.00	14.39	<0.01	<0.01	0.07	0.02	0.06	0.06
S2	20-30	20.86	3.58	423	4.29	10.94	0.00	0.00	15.46	<0.01	<0.01	0.12	0.02	0.07	0.11
S2	30-40	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
S2	40-50	24.51	3.61	739	4.08	21.69	0.00	0.00	4.47	0.15	<0.01	0.14	0.02	0.08	0.12
S2	50-60	21.66	4.07	617	4.53	9.12	0.00	0.00	0.00	0.10	<0.01	0.08	0.01	0.03	0.05
S2	60-70	23.59	4.34	575	4.90	4.79	0.00	0.00	0.00	0.02	<0.01	0.03	0.01	0.02	0.02
S3	0-10	21.80	3.92	244	4.39	5.83	0.00	0.00	7.83	<0.01	<0.01	0.09	0.01	0.05	0.08
S3	10-20	22.59	3.64	90	4.21	9.24	0.00	0.00	8.77	<0.01	<0.01	0.16	0.01	0.06	0.12
S3	20-30	23.45	3.85	312	4.41	6.61	0.00	0.00	6.90	<0.01	<0.01	0.06	<0.01	0.01	0.04
S3	30-40	20.89	4.21	351	4.96	3.34	0.00	0.00	0.00	<0.01	<0.01	0.04	<0.01	<0.01	0.03
S3	40-50	22.32	6.98	791	9.49	0.00	0.71	13.54	0.00	0.01	<0.01	0.14	0.01	0.02	0.05
S3	50-60	25.91	7.58	633	9.39	0.00	3.23	20.46	0.00	0.16	<0.01	0.67	<0.01	0.04	0.15
T1	0-10	20.43	5.42	304	5.82	3.32	0.00	0.00	0.00	<0.01	<0.01	0.12	<0.01	0.01	0.09
T1	10-20	20.13	7.30	381	6.74	0.00	0.32	8.88	0.00	<0.01	<0.01	0.14	0.01	0.03	0.08
T1	20-30	21.03	4.46	458	4.90	3.38	0.00	0.00	0.00	<0.01	<0.01	0.07	<0.01	0.03	0.08
T1	30-40	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
T1	40-50	22.23	3.84	595	4.42	5.27	0.00	0.00	8.92	0.05	<0.01	0.04	<0.01	0.02	0.04
T1	50-60	23.29	3.79	713	4.36	8.70	0.00	0.00	4.10	0.13	<0.01	0.06	0.01	0.04	0.07
T2	0-10	21.16	4.95	260	5.05	3.38	0.00	0.00	0.00	<0.01	<0.01	0.10	0.01	<0.01	0.08
T2	10-20	20.13	4.17	307	4.82	2.91	0.00	0.00	0.00	<0.01	<0.01	0.05	0.01	0.03	0.05
T2	20-30	21.13	3.85	467	4.49	6.26	0.00	0.00	11.35	0.01	<0.01	0.06	0.01	0.03	0.08
T2	30-40	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
T2	40-50	23.98	3.62	939	4.02	15.39	0.00	0.00	12.89	0.26	<0.01	0.15	0.01	0.09	0.13

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-21 (continued). Acid sulfate characteristics of the Tolderol soil materials at field sampling, August 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol $H^+ t^{-1}$)	ANC ($\%CaCO_3$)	TAAlk (mol $OH^- t^{-1}$)	Retained acidity (mol $H^+ t^{-1}$)	Chromium Reducible Sulfur ($\%S_{CR}$)	Acid Volatile Sulfide ($\%S_{AV}$)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
T2	50-60	23.90	3.80	868	4.16	10.65	0.00	0.00	0.00	0.18	<0.01	0.11	<0.01	0.08	0.09
T3	0-10	21.79	4.96	206	5.30	2.36	0.00	0.00	0.00	<0.01	<0.01	0.08	<0.01	<0.01	0.10
T3	10-20	19.37	4.36	254	5.03	3.07	0.00	0.00	0.00	<0.01	<0.01	0.04	0.01	0.05	0.05
T3	20-30	20.43	4.00	355	4.64	4.70	0.00	0.00	0.00	<0.01	<0.01	0.06	<0.01	0.04	0.05
T3	30-40	20.68	3.77	550	4.35	8.20	0.00	0.00	12.99	0.03	<0.01	0.08	0.01	0.04	0.07
T3	40-50	21.90	4.01	596	4.65	4.85	0.00	0.00	0.00	0.03	<0.01	0.03	<0.01	0.01	0.04
T3	50-60	22.32	4.24	566	4.81	4.74	0.00	0.00	0.00	0.04	<0.01	0.02	<0.01	<0.01	0.04

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-22. HCl extractable metal/metalloid content of the Tolderol soil materials at field sampling, August 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)[#]	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
S1	0-10	155.89	127.67	<0.01	0.63	0.26	<0.01	0.22	0.64	3.10	0.28	0.02	3.83
S1	10-20	108.66	84.03	<0.01	0.43	0.15	<0.01	0.12	0.51	2.90	0.14	0.02	0.63
S1	20-30	85.33	74.03	<0.01	0.31	0.15	<0.01	0.11	0.51	3.80	0.11	0.01	0.46
S1	30-40	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
S1	40-50	359.09	175.61	<0.01	0.39	0.18	<0.01	0.22	1.47	14.65	0.55	0.03	0.86
S1	50-60	297.41	203.47	<0.01	0.37	0.41	0.01	0.23	1.17	25.77	1.29	0.05	1.16
S2	0-10	139.11	116.49	<0.01	0.69	0.12	<0.01	0.13	0.71	4.00	0.19	0.02	1.02
S2	10-20	130.85	106.23	<0.01	0.54	0.10	<0.01	0.13	0.89	4.30	0.22	0.02	0.80
S2	20-30	149.16	120.87	<0.01	0.48	0.09	<0.01	0.15	1.07	5.20	0.25	0.02	0.84
S2	30-40	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
S2	40-50	535.37	233.75	<0.01	0.42	0.34	0.01	0.34	1.17	17.44	1.13	0.06	1.12
S2	50-60	265.28	162.54	<0.01	0.39	0.30	<0.01	0.24	0.76	10.24	1.09	0.04	1.04
S2	60-70	121.29	97.52	<0.01	0.24	0.29	<0.01	0.13	0.62	10.67	0.81	0.05	1.06
S3	0-10	113.15	60.27	<0.01	0.49	0.08	<0.01	0.13	0.52	2.50	0.12	0.01	0.61
S3	10-20	145.20	91.37	<0.01	0.46	0.11	<0.01	0.18	0.74	4.20	0.17	0.02	0.56
S3	20-30	112.45	52.87	<0.01	0.45	0.08	<0.01	0.08	0.61	3.50	0.10	0.01	0.41
S3	30-40	84.22	35.01	<0.01	0.24	0.09	<0.01	0.05	0.41	3.10	0.07	0.01	0.26
S3	40-50	294.08	102.72	<0.01	0.41	0.26	<0.01	0.13	0.59	7.40	0.52	0.03	0.45
S3	50-60	521.08	146.77	<0.01	0.06	0.38	0.01	0.23	0.99	33.25	1.42	0.07	0.65
T1	0-10	187.91	82.46	<0.01	0.16	0.43	<0.01	0.04	0.50	5.10	0.34	0.03	0.93
T1	10-20	129.74	73.91	0.01	0.17	0.39	<0.01	0.01	0.61	5.80	0.31	0.03	0.37
T1	20-30	35.76	61.90	<0.01	0.07	0.37	<0.01	<0.01	0.59	2.60	0.19	0.02	0.43
T1	30-40	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
T1	40-50	149.60	56.50	<0.01	0.26	0.14	<0.01	<0.01	0.44	3.90	0.53	0.02	0.59
T1	50-60	283.41	91.20	<0.01	0.28	0.21	0.01	0.04	0.65	6.40	0.98	0.03	1.03
T2	0-10	142.95	57.26	<0.01	0.15	0.37	<0.01	0.02	0.44	3.20	0.20	0.02	0.81
T2	10-20	65.36	64.23	<0.01	0.07	0.33	<0.01	0.08	0.46	2.50	0.17	0.02	0.43
T2	20-30	130.52	67.96	<0.01	0.42	0.15	<0.01	0.03	0.58	5.40	0.22	0.02	0.49

** See Table 9-1 in Appendix 1 for further details on the treatment.*

[#] *The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)*

Table 9-22 (continued). HCl extractable metal/metalloid content of the Tolderol soil materials at field sampling, August 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)#	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
T2	30-40	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
T2	40-50	435.81	181.83	<0.01	0.40	0.44	0.01	0.09	0.87	26.94	1.15	0.06	1.31
T2	50-60	369.78	125.35	<0.01	0.27	0.46	<0.01	0.05	0.81	26.32	0.80	0.04	0.93
T3	0-10	125.28	61.73	<0.01	0.14	0.32	<0.01	0.04	0.79	3.50	0.23	0.02	0.76
T3	10-20	26.86	51.34	<0.01	0.03	0.28	<0.01	0.03	0.38	2.90	0.12	0.01	0.37
T3	20-30	71.93	59.06	<0.01	0.30	0.21	<0.01	0.04	0.70	3.80	0.16	0.02	0.54
T3	30-40	148.07	87.21	<0.01	0.53	0.15	<0.01	0.07	0.75	6.90	0.28	0.02	0.60
T3	40-50	122.54	57.75	<0.01	0.12	0.16	<0.01	0.05	0.58	5.10	0.37	0.02	0.37
T3	50-60	99.96	61.10	<0.01	0.06	0.24	<0.01	0.04	0.39	5.80	0.43	0.02	0.51

** See Table 9-1 in Appendix 1 for further details on the treatment.*

 # The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

Table 9-23. Acid sulfate characteristics of the Tolderol soil materials at field sampling, November 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol $H^+ t^{-1}$)	ANC ($\%CaCO_3$)	TAAlk (mol $OH^- t^{-1}$)	Retained acidity (mol $H^+ t^{-1}$)	Chromium Reducible Sulfur ($\%S_{CR}$)	Acid Volatile Sulfide ($\%S_{AV}$)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
BB1	0-10	19.09	6.00	107	5.56	1.63	0.00	0.00	0.00	<0.01	<0.01	0.09	0.01	0.02	0.06
BB1	10-20	19.89	6.22	105	4.99	1.53	0.00	0.00	0.00	<0.01	<0.01	0.11	0.01	0.02	0.07
BB1	20-30	18.76	4.41	116	4.66	3.43	0.00	0.00	0.00	<0.01	<0.01	0.08	0.01	0.02	0.05
BB1	30-40	22.37	3.98	145	4.53	4.35	0.00	0.00	0.00	<0.01	<0.01	0.10	0.01	0.01	0.07
BB1	40-50	25.00	3.63	266	4.35	7.36	0.00	0.00	4.54	0.11	<0.01	0.08	0.01	0.03	0.05
BB1	50-60	25.51	3.68	236	4.35	8.27	0.00	0.00	0.00	<0.01	<0.01	0.08	0.01	0.04	0.07
BB1	60-70	25.12	3.92	225	4.53	6.44	0.00	0.00	0.00	0.03	<0.01	0.10	0.01	0.05	0.05
BB2	0-10	22.07	4.70	132	4.59	4.74	0.00	0.00	0.00	<0.01	<0.01	0.21	0.01	0.07	0.14
BB2	10-20	20.68	4.00	238	4.58	4.65	0.00	0.00	0.00	<0.01	<0.01	0.12	0.01	0.01	0.08
BB2	20-30	22.30	4.08	206	4.64	3.86	0.00	0.00	0.00	<0.01	<0.01	0.12	0.02	0.01	0.04
BB2	30-40	21.96	3.95	353	4.55	4.48	0.00	0.00	0.00	<0.01	<0.01	-	-	-	-
BB2	40-50	24.75	4.16	210	4.71	2.94	0.00	0.00	0.00	<0.01	<0.01	-	-	-	-
BB2	50-60	26.73	7.45	807	8.42	0.00	0.80	37.67	0.00	0.21	<0.01	-	-	-	-
BB2	60-70	28.37	7.71	668	8.91	0.00	1.04	8.71	0.00	0.09	<0.01	-	-	-	-
BB3	0-10	23.50	5.67	116	5.10	2.38	0.00	0.00	0.00	<0.01	<0.01	0.17	0.02	0.06	0.11
BB3	10-20	22.06	4.16	211	4.70	3.68	0.00	0.00	0.00	<0.01	<0.01	0.13	0.01	0.03	0.08
BB3	20-30	23.18	4.04	258	4.63	5.45	0.00	0.00	0.00	<0.01	<0.01	0.09	0.01	0.02	0.06
BB3	30-40	24.05	3.97	207	4.69	6.58	0.00	0.00	0.00	<0.01	<0.01	-	-	-	-
BB3	40-50	21.86	3.92	319	4.43	6.60	0.00	0.00	9.65	0.02	<0.01	-	-	-	-
BB3	50-60	28.35	3.44	794	3.78	33.33	0.00	0.00	0.00	0.10	<0.01	-	-	-	-
BB3	60-70	24.78	3.97	335	4.54	5.21	0.00	0.00	0.00	0.06	<0.01	-	-	-	-
AA1	0-10	18.98	6.08	152	5.58	2.94	0.00	0.00	0.00	<0.01	<0.01	0.15	0.01	0.04	0.12
AA1	10-20	16.58	4.88	135	4.85	2.86	0.00	0.00	0.00	<0.01	<0.01	0.10	0.01	0.04	0.07
AA1	20-30	17.13	4.25	238	4.62	4.21	0.00	0.00	0.00	<0.01	<0.01	0.07	0.01	0.05	0.06
AA1	30-40	21.53	4.24	354	4.66	4.33	0.00	0.00	0.00	<0.01	<0.01	0.09	0.01	0.04	0.06
AA1	40-50	22.04	3.88	543	4.38	8.50	0.00	0.00	3.56	0.16	<0.01	0.15	0.02	0.05	0.09
AA1	50-60	23.27	4.26	444	4.66	5.18	0.00	0.00	0.00	0.07	<0.01	0.09	0.01	0.05	0.08
AA1	60-70	25.22	3.92	913	4.26	7.86	0.00	0.00	0.00	0.18	<0.01	0.17	0.02	0.09	0.13

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-23 (continued). Acid sulfate characteristics of the Tolderol soil materials at field sampling, November 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol $H^+ t^{-1}$)	ANC (%$CaCO_3$)	TAAlk (mol $OH^- t^{-1}$)	Retained acidity (mol $H^+ t^{-1}$)	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
AA2	0-10	18.05	5.98	129	5.59	2.85	0.00	0.00	0.00	<0.01	<0.01	0.15	0.01	<0.01	0.12
AA2	10-20	18.83	6.14	127	5.57	3.42	0.00	0.00	0.00	<0.01	<0.01	0.13	0.01	0.05	0.09
AA2	20-30	20.11	5.25	143	4.95	2.95	0.00	0.00	0.00	<0.01	<0.01	0.12	0.01	0.06	0.06
AA2	30-40	21.48	4.42	186	4.67	3.16	0.00	0.00	0.00	<0.01	<0.01	-	-	-	-
AA2	40-50	26.29	3.94	401	4.43	4.91	0.00	0.00	2.07	0.04	<0.01	-	-	-	-
AA2	50-60	25.92	4.08	453	4.50	5.74	0.00	0.00	0.00	0.08	<0.01	-	-	-	-
AA2	60-70	26.40	4.10	635	4.56	4.56	0.00	0.00	0.00	0.08	<0.01	-	-	-	-
AA3	0-10	19.46	6.01	141	5.62	1.83	0.00	0.00	0.00	<0.01	<0.01	0.12	0.01	0.10	0.10
AA3	10-20	19.64	5.02	107	4.97	2.62	0.00	0.00	0.00	<0.01	<0.01	0.07	<0.01	0.02	0.09
AA3	20-30	18.11	5.51	148	5.23	2.51	0.00	0.00	0.00	<0.01	<0.01	0.13	0.01	0.01	0.10
AA3	30-40	21.81	4.44	126	4.69	3.70	0.00	0.00	0.00	<0.01	<0.01	-	-	-	-
AA3	40-50	24.33	3.88	235	4.35	7.58	0.00	0.00	6.51	0.09	<0.01	-	-	-	-
AA3	50-60	25.94	3.82	272	4.38	7.22	0.00	0.00	1.97	0.07	<0.01	-	-	-	-
AA3	60-70	24.12	4.00	269	4.56	6.14	0.00	0.00	0.00	0.06	<0.01	-	-	-	-

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-24. HCl extractable metal/metalloid content of the Tolderol soil materials at field sampling, November 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)[#]	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
BB1	0-10	93.30	53.37	<0.01	0.23	0.28	<0.01	0.19	0.46	0.94	0.13	0.01	0.46
BB1	10-20	72.88	51.28	<0.01	0.36	0.12	<0.01	0.27	0.45	0.57	0.14	0.01	0.50
BB1	20-30	80.03	50.86	<0.01	0.41	0.13	<0.01	0.21	0.52	0.55	0.14	0.01	0.40
BB1	30-40	122.91	50.22	<0.01	0.39	0.13	<0.01	0.49	0.86	1.69	2.73	0.01	1.39
BB1	40-50	174.68	84.46	<0.01	0.15	0.38	0.01	0.23	0.77	7.25	1.27	0.01	0.41
BB1	50-60	191.08	86.24	<0.01	0.17	0.32	0.01	0.20	0.65	9.45	1.13	0.02	0.41
BB1	60-70	136.21	78.77	<0.01	0.15	0.25	<0.01	0.20	0.68	6.81	1.00	0.03	0.97
BB2	0-10	232.72	71.80	<0.01	0.50	0.33	<0.01	0.22	0.67	1.71	0.21	0.01	0.68
BB2	10-20	93.93	45.01	<0.01	0.37	0.11	<0.01	0.36	0.56	1.83	2.83	0.01	1.58
BB2	20-30	84.86	41.32	<0.01	0.40	0.07	<0.01	0.30	0.51	1.87	3.41	0.01	1.16
BB2	30-40	89.78	51.78	<0.01	0.62	0.08	<0.01	0.41	0.67	3.10	5.57	0.01	1.55
BB2	40-50	103.31	45.09	<0.01	0.43	0.08	<0.01	0.15	0.42	2.26	0.16	0.01	0.24
BB2	50-60	430.04	305.62	<0.01	0.63	0.33	0.01	0.30	1.08	18.77	0.95	0.07	0.88
BB2	60-70	396.85	134.62	<0.01	<0.01	0.29	<0.01	0.20	0.59	22.74	0.67	0.05	0.29
BB3	0-10	208.03	67.05	<0.01	0.33	0.29	<0.01	0.07	0.60	2.24	0.17	0.01	1.16
BB3	10-20	111.87	58.23	<0.01	0.33	0.09	<0.01	0.04	0.54	2.05	0.36	0.01	0.47
BB3	20-30	92.91	56.41	<0.01	0.26	0.09	<0.01	0.09	0.55	3.54	0.16	0.01	0.36
BB3	30-40	139.21	75.04	<0.01	0.15	0.24	<0.01	0.13	0.53	7.13	0.93	0.03	0.78
BB3	40-50	229.94	89.55	<0.01	0.62	0.12	<0.01	0.14	0.70	6.44	0.21	0.01	0.53
BB3	50-60	618.43	383.52	0.02	0.52	0.83	0.01	0.43	1.35	32.62	1.22	0.08	1.52
BB3	60-70	158.13	62.63	<0.01	0.28	0.22	<0.01	0.17	0.41	8.58	0.79	0.02	0.38
AA1	0-10	151.35	66.34	<0.01	0.17	0.69	<0.01	0.12	0.63	1.82	0.24	0.01	0.97
AA1	10-20	40.23	63.19	<0.01	0.02	0.34	<0.01	0.10	0.69	1.87	0.12	0.01	0.65
AA1	20-30	78.96	60.16	<0.01	0.33	0.14	<0.01	0.10	0.54	2.58	0.12	0.02	0.71
AA1	30-40	136.78	60.88	<0.01	0.41	0.11	<0.01	0.14	0.57	4.23	0.20	0.02	0.68
AA1	40-50	293.93	129.36	<0.01	0.21	0.18	0.01	0.21	0.50	8.23	0.51	0.03	0.94
AA1	50-60	126.54	103.10	<0.01	0.04	0.16	<0.01	0.17	0.45	8.24	0.61	0.03	0.72
AA1	60-70	185.72	146.76	<0.01	0.18	0.44	<0.01	0.15	0.80	21.34	0.65	0.07	1.02

** See Table 9-1 in Appendix 1 for further details on the treatment.*

[#] The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

Table 9-24 (continued). HCl extractable metal/metalloid content of the Tolderol soil materials at field sampling, November 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)#	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
AA2	0-10	115.51	59.61	<0.01	0.11	0.42	<0.01	0.30	0.55	1.40	0.47	0.02	0.59
AA2	10-20	49.03	59.56	<0.01	0.06	1.09	<0.01	0.22	0.50	1.50	0.16	0.02	0.22
AA2	20-30	32.85	68.91	0.01	0.04	0.32	<0.01	0.17	0.52	1.36	0.15	0.02	0.50
AA2	30-40	68.23	57.93	<0.01	0.12	0.20	<0.01	0.22	0.60	1.04	0.11	0.01	0.63
AA2	40-50	221.35	73.03	<0.01	0.28	0.17	0.01	0.21	0.56	2.95	0.86	0.02	0.81
AA2	50-60	166.15	88.59	<0.01	0.22	0.15	<0.01	0.24	0.52	4.32	0.89	0.04	1.00
AA2	60-70	133.57	78.77	<0.01	0.09	0.16	<0.01	0.19	0.49	6.10	0.36	0.05	0.78
AA3	0-10	114.19	65.78	<0.01	0.17	0.40	<0.01	0.31	0.54	0.95	0.29	0.02	0.47
AA3	10-20	59.30	48.44	<0.01	0.09	0.17	<0.01	0.28	0.45	1.22	0.14	0.01	0.28
AA3	20-30	68.25	59.42	<0.01	0.13	0.32	<0.01	0.21	0.59	1.45	0.10	0.02	0.21
AA3	30-40	73.57	43.89	<0.01	0.61	0.08	<0.01	0.19	0.44	0.95	0.10	0.01	0.48
AA3	40-50	185.84	92.76	<0.01	0.46	0.15	0.01	0.21	0.63	3.12	0.56	0.02	0.58
AA3	50-60	377.95	85.86	<0.01	0.15	0.25	<0.01	0.16	0.38	4.23	0.64	0.02	0.54
AA3	60-70	126.43	99.03	0.01	0.19	0.28	<0.01	0.10	0.50	5.50	0.69	0.04	0.73

** See Table 9-1 in Appendix 1 for further details on the treatment.*
 # The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

Table 9-25. Acid sulfate characteristics of the Tolderol soil materials at field sampling, February 2011.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol $H^+ t^{-1}$)	ANC ($\%CaCO_3$)	TAAlk (mol $OH^- t^{-1}$)	Retained acidity (mol $H^+ t^{-1}$)	Chromium Reducible Sulfur ($\%S_{CR}$)	Acid Volatile Sulfide ($\%S_{AV}$)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
SS1	0-10	21.07	4.22	131	4.44	5.52	0.00	0.00	3.75	<0.01	<0.01	0.13	0.02	<0.01	0.07
SS1	10-20	19.62	3.79	232	4.51	5.77	0.00	0.00	0.00	<0.01	<0.01	0.08	<0.01	<0.01	0.03
SS1	20-30	23.06	3.51	487	4.06	16.00	0.00	0.00	9.31	<0.01	<0.01	0.14	0.01	0.05	0.07
SS1	30-40	21.94	3.76	373	4.51	7.28	0.00	0.00	0.00	<0.01	<0.01	0.08	0.01	<0.01	0.06
SS1	40-50	24.44	3.49	608	4.21	16.72	0.00	0.00	7.16	0.12	<0.01	0.10	0.02	<0.01	0.08
SS1	50-60	22.51	3.79	461	4.43	9.70	0.00	0.00	0.00	0.08	<0.01	0.08	0.01	<0.01	0.08
SS1	60-70	24.20	3.73	536	4.36	8.64	0.00	0.00	2.62	0.08	<0.01	0.11	0.02	0.02	0.08
SS2	0-10	22.29	4.28	164	4.49	4.59	0.00	0.00	6.75	<0.01	<0.01	0.14	0.02	0.01	0.10
SS2	10-20	23.38	3.61	327	4.11	11.20	0.00	0.00	14.73	<0.01	<0.01	0.15	0.01	0.03	0.13
SS2	20-30	23.31	3.53	464	4.03	16.10	0.00	0.00	19.27	<0.01	<0.01	0.14	0.02	0.01	0.10
SS2	30-40	26.41	3.34	861	3.99	27.76	0.00	0.00	13.71	0.05	<0.01	-	-	-	-
SS2	40-50	22.73	3.55	772	4.29	15.46	0.00	0.00	1.99	0.09	<0.01	-	-	-	-
SS2	50-60	26.35	3.55	965	4.19	19.01	0.00	0.00	5.61	0.17	<0.01	-	-	-	-
SS2	60-70	28.25	3.62	1054	4.18	15.70	0.00	0.00	2.10	0.26	<0.01	-	-	-	-
SS3	0-10	23.66	5.13	52	5.08	2.40	0.00	0.00	0.00	<0.01	<0.01	0.13	0.02	<0.01	0.07
SS3	10-20	19.39	4.50	68	4.82	4.20	0.00	0.00	0.00	<0.01	<0.01	0.05	0.02	<0.01	0.02
SS3	20-30	19.21	4.07	87	4.46	6.74	0.00	0.00	6.88	<0.01	<0.01	0.10	0.02	0.03	0.10
SS3	30-40	21.22	4.02	108	4.81	2.68	0.00	0.00	0.00	<0.01	<0.01	-	-	-	-
SS3	40-50	21.17	3.97	127	4.77	3.93	0.00	0.00	0.00	<0.01	<0.01	-	-	-	-
SS3	50-60	20.24	3.90	181	4.68	4.59	0.00	0.00	0.00	<0.01	<0.01	-	-	-	-
SS3	60-70	21.21	3.81	222	4.55	5.44	0.00	0.00	0.00	0.02	<0.01	-	-	-	-
TT1	0-10	19.68	5.44	141	5.79	2.40	0.00	0.00	0.00	<0.01	<0.01	0.11	0.02	<0.01	0.10
TT1	10-20	21.12	5.72	349	5.74	2.52	0.00	0.00	0.00	<0.01	<0.01	0.09	0.02	<0.01	0.09
TT1	20-30	21.51	4.74	503	5.15	2.58	0.00	0.00	0.00	<0.01	<0.01	0.08	0.01	<0.01	0.09
TT1	30-40	21.48	4.28	375	4.81	2.68	0.00	0.00	0.00	<0.01	<0.01	0.08	0.01	<0.01	0.07
TT1	40-50	22.75	3.49	592	4.40	7.91	0.00	0.00	0.66	0.14	<0.01	0.07	0.03	<0.01	0.06
TT1	50-60	23.31	3.52	691	4.48	6.57	0.00	0.00	4.55	0.11	<0.01	0.08	0.02	<0.01	0.03
TT1	60-70	25.04	3.69	775	4.37	8.21	0.00	0.00	2.57	0.22	<0.01	0.11	0.03	<0.01	0.12

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-25 (continued). Acid sulfate characteristics of the Tolderol soil materials at field sampling, February 2011.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol $H^+ t^{-1}$)	ANC (%$CaCO_3$)	TAAlk (mol $OH^- t^{-1}$)	Retained acidity (mol $H^+ t^{-1}$)	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
TT2	0-10	18.17	5.48	92	5.92	2.51	0.00	0.00	0.00	<0.01	<0.01	0.08	0.01	<0.01	0.05
TT2	10-20	20.27	4.78	239	4.89	2.89	0.00	0.00	0.00	<0.01	<0.01	0.12	0.01	0.08	0.09
TT2	20-30	20.09	4.30	376	5.02	2.61	0.00	0.00	0.00	<0.01	<0.01	0.05	0.02	<0.01	0.03
TT2	30-40	22.44	3.32	825	4.16	14.84	0.00	0.00	13.73	0.19	<0.01	-	-	-	-
TT2	40-50	22.26	3.61	597	4.46	7.99	0.00	0.00	1.51	0.14	<0.01	-	-	-	-
TT2	50-60	22.74	3.88	558	4.71	6.10	0.00	0.00	0.00	0.06	<0.01	-	-	-	-
TT2	60-70	22.72	3.85	585	4.58	9.88	0.00	0.00	0.00	0.05	<0.01	-	-	-	-
TT3	0-10	18.59	5.22	96	5.57	2.36	0.00	0.00	0.00	<0.01	<0.01	0.10	0.01	<0.01	0.07
TT3	10-20	20.59	4.27	224	4.60	4.63	0.00	0.00	0.00	<0.01	<0.01	0.14	0.03	<0.01	0.11
TT3	20-30	20.08	3.95	358	4.71	3.40	0.00	0.00	0.00	<0.01	<0.01	0.07	0.02	<0.01	0.06
TT3	30-40	23.66	3.82	539	4.44	7.00	0.00	0.00	15.97	<0.01	<0.01	-	-	-	-
TT3	40-50	21.13	4.02	450	4.76	4.73	0.00	0.00	0.00	0.01	<0.01	-	-	-	-
TT3	50-60	22.55	3.87	385	4.75	4.56	0.00	0.00	0.00	0.04	<0.01	-	-	-	-
TT3	60-70	21.50	3.95	548	4.83	4.31	0.00	0.00	0.00	0.03	<0.01	-	-	-	-

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-26. HCl extractable metal/metalloid content of the Tolderol soil materials at field sampling, February 2011.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)#	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
SS1	0-10	221.79	94.09	<0.01	0.39	0.19	<0.01	0.20	0.53	3.41	0.22	0.03	1.12
SS1	10-20	127.80	79.10	<0.01	0.34	0.07	<0.01	0.09	0.33	3.36	0.13	0.02	0.49
SS1	20-30	259.69	188.71	<0.01	0.84	0.09	<0.01	0.16	0.69	9.41	0.24	0.04	1.00
SS1	30-40	145.75	100.89	<0.01	0.29	0.08	<0.01	0.17	0.40	6.37	0.18	0.02	0.26
SS1	40-50	262.47	198.64	<0.01	0.34	0.56	<0.01	0.26	0.68	18.63	0.91	0.04	1.11
SS1	50-60	183.51	132.98	<0.01	0.23	0.41	<0.01	0.20	0.47	14.12	1.06	0.05	1.04
SS1	60-70	228.71	111.75	<0.01	0.35	0.50	<0.01	0.16	0.69	21.06	0.59	0.06	0.98
SS2	0-10	230.46	86.91	0.01	0.40	0.18	<0.01	0.15	0.58	3.34	0.21	0.03	1.58
SS2	10-20	239.56	164.98	0.01	0.93	0.11	<0.01	0.17	0.90	5.82	0.22	0.03	1.09
SS2	20-30	207.21	197.76	0.01	0.75	0.11	<0.01	0.22	0.75	7.69	0.29	0.03	1.00
SS2	30-40	318.86	320.61	0.01	0.56	0.44	0.01	0.33	0.97	21.19	0.60	0.05	1.24
SS2	40-50	229.52	204.91	<0.01	0.26	0.52	0.01	0.33	0.68	16.08	0.81	0.04	1.01
SS2	50-60	321.62	262.98	0.01	0.37	0.63	<0.01	0.19	0.85	23.64	1.01	0.07	1.53
SS2	60-70	297.33	239.19	0.01	0.56	0.74	<0.01	0.11	0.97	29.24	0.78	0.09	1.35
SS3	0-10	217.98	69.97	<0.01	0.27	0.35	<0.01	0.09	0.40	2.03	0.13	0.02	1.14
SS3	10-20	109.44	56.32	<0.01	0.11	0.19	<0.01	0.12	0.34	0.99	0.10	0.02	0.29
SS3	20-30	152.89	86.05	<0.01	0.57	0.11	<0.01	0.08	0.50	1.72	0.08	0.02	0.94
SS3	30-40	90.12	49.34	<0.01	0.22	0.06	<0.01	0.12	0.40	1.18	0.12	0.02	0.29
SS3	40-50	87.39	36.98	<0.01	0.16	0.05	<0.01	0.09	0.31	1.57	0.11	0.01	0.37
SS3	50-60	104.75	58.79	<0.01	0.29	0.06	<0.01	0.06	0.41	2.46	0.08	0.02	0.43
SS3	60-70	363.77	48.39	<0.01	0.16	0.22	<0.01	0.13	0.61	3.86	0.21	0.02	0.72
TT1	0-10	153.70	86.11	<0.01	0.15	0.44	<0.01	0.20	0.46	2.84	0.36	0.03	1.06
TT1	10-20	64.27	50.52	<0.01	0.09	0.35	<0.01	0.17	0.57	2.82	0.20	0.02	1.53
TT1	20-30	79.44	59.37	<0.01	0.10	0.21	<0.01	0.15	0.53	2.36	0.21	0.03	0.64
TT1	30-40	79.78	58.56	<0.01	0.13	0.22	<0.01	0.15	0.39	2.27	0.22	0.02	0.50
TT1	40-50	314.46	79.13	<0.01	0.40	0.18	<0.01	0.14	0.57	4.73	1.05	0.03	0.83
TT1	50-60	252.71	86.68	<0.01	0.20	0.22	0.01	0.07	0.43	6.52	0.66	0.04	1.03
TT1	60-70	290.23	110.98	0.01	0.17	0.27	<0.01	0.15	0.56	9.65	0.68	0.05	0.87

** See Table 9-1 in Appendix 1 for further details on the treatment.*

 # The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

Table 9-26 (continued). HCl extractable metal/metalloid content of the Tolderol soil materials at field sampling, February 2011.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)#	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
TT2	0-10	77.10	48.24	<0.01	0.10	0.40	<0.01	0.17	0.49	1.98	0.22	0.02	0.46
TT2	10-20	43.41	85.55	<0.01	0.03	0.35	<0.01	0.24	0.76	2.96	0.24	0.02	0.63
TT2	20-30	58.73	51.45	<0.01	0.17	0.13	<0.01	0.11	0.39	2.84	0.13	0.02	7.34
TT2	30-40	395.68	150.63	<0.01	0.43	0.34	<0.01	0.15	0.60	15.99	0.61	0.04	4.98
TT2	40-50	207.36	105.83	<0.01	0.12	0.30	<0.01	0.12	0.47	11.28	0.54	0.04	0.59
TT2	50-60	137.99	90.52	<0.01	0.06	0.23	<0.01	0.27	0.41	9.14	0.75	0.03	0.91
TT2	60-70	142.81	124.45	<0.01	0.10	0.27	<0.01	0.09	0.47	11.84	0.38	0.04	0.67
TT3	0-10	157.08	62.13	<0.01	0.18	0.38	<0.01	0.21	0.51	2.39	0.36	0.03	0.75
TT3	10-20	93.11	80.31	<0.01	0.22	0.24	<0.01	0.26	0.75	3.10	0.25	0.02	0.69
TT3	20-30	105.63	60.53	<0.01	0.50	0.24	0.01	0.09	0.45	3.22	0.14	0.02	0.46
TT3	30-40	124.31	95.92	<0.01	0.39	0.08	<0.01	0.12	0.49	4.97	0.18	0.03	0.74
TT3	40-50	165.91	60.02	<0.01	0.16	0.11	<0.01	0.13	0.40	4.28	0.15	0.03	0.27
TT3	50-60	123.60	62.74	<0.01	0.12	0.23	0.01	0.09	0.37	7.22	0.29	0.03	0.34
TT3	60-70	152.84	61.35	<0.01	0.09	0.20	<0.01	0.12	0.38	5.60	0.22	0.03	0.38

** See Table 9-1 in Appendix 1 for further details on the treatment.*

 # The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

Table 9-27. Acid sulfate characteristics of the Campbell Park soil materials at field sampling, May 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH$_{KCl}$	TAA (mol H$^+$ t^{-1})	ANC (%CaCO$_3$)	TAAlk (mol OH$^-$ t^{-1})	Retained acidity (mol H$^+$ t^{-1})	Chromium Reducible Sulfur (%S$_{CR}$)	Acid Volatile Sulfide (%S$_{AV}$)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
G1	0-10	21.63	3.23	2558	4.12	36.04	0.00	0.00	0.00	<0.01	<0.01	0.43	0.03	0.24	0.38
G1	10-20	23.81	3.03	1405	3.96	36.04	0.00	0.00	10.52	<0.01	<0.01	0.39	0.04	0.22	0.33
G1	20-30	20.90	3.02	1343	4.11	26.29	0.00	0.00	0.00	<0.01	<0.01	0.26	0.02	0.15	0.24
G1	30-40	26.44	2.97	1642	3.91	54.24	0.00	0.00	0.00	<0.01	<0.01	0.50	0.03	-	0.37
G1	40-50	31.49	3.03	1638	3.72	41.74	0.00	0.00	50.89	0.01	<0.01	0.65	0.05	-	0.55
G1	50-60	23.97	4.43	869	5.72	3.34	0.00	0.00	0.00	0.07	<0.01	0.26	0.01	-	0.22
G2	0-10	15.15	3.76	2070	4.48	10.94	0.00	0.00	0.00	<0.01	<0.01	0.23	0.01	0.12	0.18
G2	10-20	19.88	3.39	1316	4.25	16.06	0.00	0.00	27.86	<0.01	<0.01	0.27	0.01	0.17	0.21
G2	20-30	23.17	3.25	1580	4.05	24.10	0.00	0.00	16.21	<0.01	<0.01	0.52	0.05	0.32	0.44
G2	30-40	19.53	6.96	1392	8.77	0.00	0.62	16.75	0.00	0.17	<0.01	0.24	0.03		0.16
G3	0-10	16.09	3.86	2728	4.71	13.99	0.00	0.00	0.00	<0.01	<0.01	0.16	0.05	0.12	0.12
G3	10-20	22.44	3.20	1457	4.14	24.30	0.00	0.00	20.70	<0.01	<0.01	0.34	0.03	0.15	0.33
G3	20-30	28.34	3.05	1726	3.97	29.92	0.00	0.00	4.44	<0.01	<0.01	0.52	0.04	0.28	0.46
G3	30-40	16.16	3.61	773	4.48	23.85	0.00	0.00	16.49	0.14	<0.01	0.08	<0.01	-	0.05
G3	40-50	16.66	3.99	632	4.63	9.89	0.00	0.00	0.00	0.14	<0.01	0.04	<0.01	-	0.02
G3	50-60	18.60	4.06	770	4.65	9.96	0.00	0.00	0.00	0.15	<0.01	0.04	<0.01	-	0.03
G3	60-70	18.90	4.05	869	4.54	13.63	0.00	0.00	0.00	0.27	<0.01	0.09	<0.01	-	0.05
G3	70-80	18.60	4.21	859	4.49	11.68	0.00	0.00	28.85	0.30	<0.01	0.09	<0.01	-	0.08
H1	0-10	14.49	3.56	2889	4.46	17.50	0.00	0.00	22.27	<0.01	<0.01	0.26	0.03	0.08	0.21
H1	10-20	20.26	3.34	1278	4.26	16.43	0.00	0.00	0.00	<0.01	<0.01	0.32	0.03	0.14	0.28
H1	20-30	25.28	3.22	1382	4.19	23.09	0.00	0.00	0.00	0.03	<0.01	0.28	0.03	0.17	0.25
H1	30-40	26.39	3.32	1285	4.16	28.84	0.00	0.00	0.00	0.20	<0.01	0.28	0.03	0.20	0.27
H1	40-50	42.91	3.91	1579	4.11	26.30	0.00	0.00	6.83	0.81	<0.01	0.85	0.08	0.68	0.75
H1	50-60	45.67	6.83	1947	6.20	2.62	0.00	0.00	0.00	1.02	<0.01	1.29	0.11	1.03	1.21
H1	60-70	51.74	7.06	2089	6.00	3.04	0.00	0.00	0.00	0.91	<0.01	1.46	0.12	1.38	1.38
H1	70-80	42.66	6.79	1990	5.65	3.08	0.00	0.00	0.00	0.70	<0.01	1.26	0.10	-	1.24

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-27 (continued). Acid sulfate characteristics of the Campbell Park soil materials at field sampling, May 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol $H^+ t^{-1}$)	ANC ($\%CaCO_3$)	TAAlk (mol $OH^- t^{-1}$)	Retained acidity (mol $H^+ t^{-1}$)	Chromium Reducible Sulfur ($\%S_{CR}$)	Acid Volatile Sulfide ($\%S_{AV}$)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
H2	0-10	15.85	3.54	963	4.39	15.82	0.00	0.00	21.59	<0.01	<0.01	0.33	0.03	0.16	0.23
H2	10-20	19.74	3.48	1033	4.12	15.76	0.00	0.00	18.08	<0.01	<0.01	0.27	0.01	0.07	0.20
H2	20-30	24.78	3.31	1403	4.21	22.43	0.00	0.00	0.00	<0.01	<0.01	0.28	0.02	0.10	0.26
H2	30-40	31.12	3.56	1749	4.25	34.56	0.00	0.00	0.00	0.27	<0.01	0.43	0.03	-	0.38
H2	40-50	34.93	3.86	1802	4.32	24.11	0.00	0.00	0.00	0.45	<0.01	0.49	0.03	-	0.47
H2	50-60	38.33	5.89	1762	4.75	6.77	0.00	0.00	0.00	0.72	<0.01	0.58	0.04	-	0.53
H2	60-70	38.50	6.97	1573	4.77	7.54	0.00	0.00	0.00	0.75	<0.01	0.58	0.05	-	0.54
H2	70-80	48.84	7.36	2100	6.32	2.68	0.00	0.00	0.00	0.92	<0.01	1.05	0.09	-	1.01
H3	0-10	12.79	3.82	2026	4.69	9.58	0.00	0.00	0.00	<0.01	<0.01	0.21	0.01	0.09	0.17
H3	10-20	20.79	3.47	1245	4.15	14.06	0.00	0.00	17.85	<0.01	<0.01	0.26	0.01	0.15	0.21
H3	20-30	25.18	3.30	1403	3.98	21.21	0.00	0.00	15.83	0.01	<0.01	0.35	<0.01	0.19	0.30
H3	30-40	38.12	3.15	2202	3.74	38.98	0.00	0.00	19.68	0.15	<0.01	0.74	0.04	-	0.70
H3	40-50	42.74	4.65	2193	4.20	13.04	0.00	0.00	6.13	0.78	<0.01	0.80	0.05	-	0.76
H3	50-60	50.35	7.06	2969	6.00	4.43	0.00	0.00	0.00	0.80	<0.01	1.16	0.09	-	1.17
H3	60-70	50.40	7.01	3860	5.94	3.17	0.00	0.00	0.00	0.89	<0.01	1.16	0.09	-	1.08
H3	70-80	51.75	6.92	4370	6.30	4.04	0.00	0.00	0.00	0.93	<0.01	1.82	0.16	-	1.76

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-28. HCl extractable metal/metalloid content of the Campbell Park soil materials at field sampling, May 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)[#]	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
G1	0-10	492.80	406.78	0.01	1.42	0.09	<0.01	0.26	1.71	31.45	0.93	0.06	1.09
G1	10-20	569.70	351.14	0.01	1.25	0.16	<0.01	0.28	1.40	21.57	0.62	0.04	1.10
G1	20-30	398.66	303.24	0.01	0.83	0.16	<0.01	0.29	1.14	18.85	0.53	0.03	0.99
G1	30-40	656.90	436.94	0.01	1.38	0.13	<0.01	0.31	1.67	28.87	0.74	0.05	1.17
G1	40-50	885.03	535.97	0.01	1.03	0.15	<0.01	0.33	2.35	27.06	0.63	0.07	2.42
G1	50-60	226.20	194.80	<0.01	0.49	0.35	<0.01	0.24	1.11	10.18	0.82	0.04	1.03
G2	0-10	183.83	152.82	<0.01	0.55	0.21	<0.01	0.12	1.06	15.38	0.42	0.05	0.75
G2	10-20	608.11	176.70	0.01	0.61	0.17	0.01	0.28	1.16	10.88	0.52	0.03	2.50
G2	20-30	456.61	257.56	0.01	0.84	0.21	<0.01	0.23	1.22	13.19	0.40	0.04	1.08
G2	30-40	576.34	373.43	<0.01	1.36	0.62	<0.01	0.47	0.80	18.43	1.51	0.08	0.38
G3	0-10	216.97	220.60	<0.01	0.42	0.13	<0.01	0.23	0.88	20.09	0.73	0.05	0.77
G3	10-20	392.90	206.54	0.01	0.82	0.11	<0.01	0.15	1.34	12.92	0.37	0.03	0.80
G3	20-30	628.17	365.62	0.01	1.56	0.15	<0.01	0.29	1.48	18.76	0.43	0.03	1.31
G3	30-40	277.47	168.86	<0.01	0.42	0.39	<0.01	0.23	0.75	9.72	0.29	0.02	0.63
G3	40-50	204.39	146.77	<0.01	0.34	0.46	<0.01	0.30	0.20	8.40	0.30	0.02	0.39
G3	50-60	248.60	176.45	<0.01	0.36	0.42	<0.01	0.44	0.26	8.40	0.65	0.02	0.60
G3	60-70	244.24	266.68	<0.01	0.50	0.44	<0.01	0.28	1.12	15.22	0.69	0.06	0.52
G3	70-80	329.52	269.21	<0.01	0.62	0.52	<0.01	0.33	0.45	18.81	0.52	0.09	0.40
H1	0-10	201.70	211.41	0.01	0.95	0.10	<0.01	0.11	1.42	20.95	0.76	0.06	0.23
H1	10-20	258.99	214.22	0.01	0.63	0.11	<0.01	0.15	1.45	12.00	0.40	0.03	0.66
H1	20-30	309.89	251.92	0.01	0.61	0.14	<0.01	0.19	1.66	12.86	0.45	0.04	0.51
H1	30-40	382.77	347.06	0.01	0.65	0.50	0.01	0.23	2.07	16.76	0.90	0.05	0.71
H1	40-50	700.87	555.65	0.01	1.69	1.65	0.01	0.22	4.36	49.77	2.60	0.19	2.44
H1	50-60	440.66	711.71	0.01	2.52	2.16	0.02	1.04	5.43	62.46	2.80	0.21	2.42
H1	60-70	541.62	682.79	0.01	2.64	1.97	0.01	0.80	5.81	58.46	2.63	0.19	2.44
H1	70-80	588.47	605.12	0.01	2.65	1.74	0.01	0.69	4.82	57.51	2.28	0.18	2.05

** See Table 9-1 in Appendix 1 for further details on the treatment.*

[#] *The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)*

Table 9-28 (continued). HCl extractable metal/metalloid content of the Campbell Park soil materials at field sampling, May 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)[#]	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
H2	0-10	262.61	202.28	0.01	0.64	0.16	<0.01	0.32	1.27	10.64	0.52	0.03	0.73
H2	10-20	212.04	147.56	<0.01	0.96	0.09	<0.01	0.19	1.15	8.20	0.41	0.02	0.47
H2	20-30	308.62	213.77	0.01	1.15	0.09	<0.01	0.17	1.26	14.56	0.49	0.03	0.84
H2	30-40	313.58	446.25	0.01	0.83	0.47	0.01	0.29	2.31	26.34	1.45	0.07	1.84
H2	40-50	375.49	431.41	0.01	1.22	1.12	0.01	0.19	2.77	34.56	1.97	0.13	2.21
H2	50-60	462.49	395.42	0.01	1.79	1.58	0.01	0.44	3.41	46.21	1.68	0.14	1.72
H2	60-70	434.15	550.11	0.01	1.94	1.67	0.01	0.73	3.36	34.34	1.72	0.14	1.89
H2	70-80	389.86	633.35	0.01	2.41	2.00	0.01	0.83	4.18	43.84	2.28	0.18	1.95
H3	0-10	137.55	157.64	<0.01	0.36	0.15	<0.01	0.18	1.17	17.48	0.53	0.07	0.59
H3	10-20	213.58	193.83	0.01	0.63	0.60	0.02	0.17	1.00	9.95	0.33	0.04	0.25
H3	20-30	342.76	235.62	0.01	0.36	0.44	<0.01	0.33	1.25	14.71	0.55	0.04	1.06
H3	30-40	909.38	496.24	0.01	0.53	0.84	<0.01	0.30	2.86	28.31	0.98	0.09	1.87
H3	40-50	640.75	476.57	0.01	1.29	1.88	0.01	0.44	3.90	37.86	1.79	0.16	2.05
H3	50-60	444.59	600.52	0.01	2.18	1.97	0.01	0.59	4.10	43.74	2.11	0.24	2.08
H3	60-70	504.49	580.58	0.01	2.14	1.82	0.01	0.77	3.95	42.90	2.18	0.20	1.87
H3	70-80	554.54	830.69	0.01	2.44	2.26	0.02	0.71	4.93	49.16	2.63	0.26	2.84

** See Table 9-1 in Appendix 1 for further details on the treatment.*

[#] *The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)*

Table 9-29. Acid sulfate characteristics of the Campbell Park soil materials at field sampling, August 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol $H^+ t^{-1}$)	ANC ($\%CaCO_3$)	TAAlk (mol $OH^- t^{-1}$)	Retained acidity (mol $H^+ t^{-1}$)	Chromium Reducible Sulfur ($\%S_{CR}$)	Acid Volatile Sulfide ($\%S_{AV}$)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
Y1	0-10	24.77	3.53	1565	4.08	15.21	0.00	0.00	29.26	<0.01	<0.01	0.32	0.03	0.16	0.29
Y1	10-20	23.24	3.43	1521	4.00	19.69	0.00	0.00	24.49	<0.01	<0.01	0.23	0.03	0.13	0.18
Y1	20-30	28.88	3.33	1550	3.86	31.36	0.00	0.00	28.94	0.11	<0.01	0.36	0.04	0.23	0.32
Y1	30-40	40.23	3.47	1864	3.78	39.85	0.00	0.00	1.52	0.57	<0.01	0.64	0.08	0.48	0.53
Y1	40-50	40.24	5.11	1566	4.18	11.38	0.00	0.00	0.00	0.80	0.02	0.68	0.09	0.40	0.59
Y1	50-60	49.67	6.69	1849	5.53	3.37	0.00	0.00	0.00	1.25	<0.01	1.48	0.16	1.30	1.35
Y1	60-70	50.90	6.79	1852	5.58	3.59	0.00	0.00	0.00	1.10	<0.01	1.92	0.19	1.46	1.74
Y2	0-10	21.73	3.69	1125	4.27	9.39	0.00	0.00	13.41	<0.01	<0.01	0.25	0.04	0.13	0.18
Y2	10-20	21.53	3.54	1361	4.17	13.85	0.00	0.00	13.92	<0.01	<0.01	0.25	0.05	0.10	0.18
Y2	20-30	27.17	3.27	1613	3.87	25.51	0.00	0.00	19.30	0.07	<0.01	0.35	0.05	0.21	0.26
Y2	30-40	31.97	3.36	1585	3.76	38.40	0.00	0.00	1.99	0.44	<0.01	0.51	0.07	0.40	0.49
Y2	40-50	45.28	5.12	2147	4.32	10.57	0.00	0.00	6.67	1.21	<0.01	1.21	0.13	1.01	1.10
Y2	50-60	44.10	5.76	2226	5.03	3.16	0.00	0.00	0.00	0.95	<0.01	1.17	0.11	0.66	1.11
Y2	60-70	31.96	6.13	1303	4.90	2.89	0.00	0.00	0.00	0.31	<0.01	0.47	0.05	0.30	0.44
Y3	0-10	18.92	3.90	893	4.36	8.53	0.00	0.00	10.97	<0.01	<0.01	0.16	0.03	0.04	0.11
Y3	10-20	20.22	3.65	916	4.30	7.78	0.00	0.00	20.61	<0.01	<0.01	0.17	0.02	0.14	0.14
Y3	20-30	25.75	3.55	1124	3.97	17.47	0.00	0.00	14.25	0.12	<0.01	0.30	0.02	0.16	0.23
Y3	30-40	38.65	4.41	1858	4.01	18.25	0.00	0.00	0.40	0.79	<0.01	0.77	0.07	0.54	0.64
Y3	40-50	41.64	5.90	2153	4.94	3.64	0.00	0.00	0.00	0.96	<0.01	1.31	0.12	0.92	1.23
Y3	50-60	52.01	6.46	2705	5.74	3.12	0.00	0.00	0.00	1.53	<0.01	1.74	0.15	1.46	1.66
Y3	60-70	58.09	6.75	3288	6.38	3.79	0.00	0.00	0.00	1.55	<0.01	3.17	0.27	2.78	3.10
Z1	0-10	16.60	4.79	532	5.05	4.13	0.00	0.00	0.00	<0.01	<0.01	0.16	0.02	0.04	0.11
Z1	10-20	17.16	3.89	768	4.37	6.37	0.00	0.00	11.44	<0.01	<0.01	0.20	0.02	0.14	0.15
Z1	20-30	21.96	3.53	1145	4.03	15.56	0.00	0.00	15.84	0.02	<0.01	0.30	0.04	0.22	0.22
Z1	30-40	28.75	3.46	1502	3.89	35.11	0.00	0.00	2.23	0.36	<0.01	0.39	0.05	0.16	0.33
Z1	40-50	39.50	4.61	1540	4.19	10.62	0.00	0.00	8.45	0.83	<0.01	0.56	0.06	0.37	0.49
Z1	50-60	48.04	5.99	1863	5.03	3.40	0.00	0.00	0.00	1.03	<0.01	1.31	0.12	1.06	1.18
Z1	60-70	57.44	6.38	2535	5.16	5.57	0.00	0.00	0.00	1.71	<0.01	2.87	0.25	2.64	2.64

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-29 (continued). Acid sulfate characteristics of the Campbell Park soil materials at field sampling, August 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol $H^+ t^{-1}$)	ANC (%$CaCO_3$)	TAAlk (mol $OH^- t^{-1}$)	Retained acidity (mol $H^+ t^{-1}$)	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
Z2	0-10	17.22	7.22	872	7.01	0.00	0.29	4.08	0.00	<0.01	<0.01	0.16	0.01	0.03	0.11
Z2	10-20	21.19	3.97	1192	4.37	6.25	0.00	0.00	14.99	<0.01	<0.01	0.25	0.03	0.12	0.19
Z2	20-30	27.37	3.65	1660	4.15	9.83	0.00	0.00	26.24	<0.01	<0.01	0.33	0.04	0.19	0.28
Z2	30-40	26.92	3.64	1505	3.97	16.52	0.00	0.00	13.05	0.12	<0.01	0.37	0.05	0.28	0.28
Z2	40-50	38.10	3.86	1919	3.83	23.52	0.00	0.00	7.95	0.46	<0.01	0.74	0.09	-	0.62
Z2	50-60	45.64	5.65	2680	4.45	7.29	0.00	0.00	2.39	1.00	<0.01	1.03	0.11	-	0.92
Z2	60-65	50.32	5.40	2001	4.34	8.98	0.00	0.00	10.38	1.32	<0.01	1.58	0.16	-	1.49
Z3	0-10	16.86	7.15	366	7.35	0.00	0.31	3.13	0.00	<0.01	<0.01	0.15	0.03	0.02	0.09
Z3	10-20	18.63	4.41	701	4.70	3.39	0.00	0.00	0.00	<0.01	<0.01	0.18	0.03	0.08	0.13
Z3	20-30	19.61	3.87	1173	4.34	6.48	0.00	0.00	18.80	<0.01	<0.01	0.22	0.04	0.10	0.18
Z3	30-40	25.75	3.63	1390	4.10	13.27	0.00	0.00	9.82	0.06	<0.01	0.28	0.04	-	0.25
Z3	40-50	32.27	3.95	1521	4.06	14.36	0.00	0.00	0.00	0.44	<0.01	0.46	0.06	-	0.41
Z3	50-60	43.78	5.95	1534	4.08	13.73	0.00	0.00	1.36	1.06	<0.01	0.90	0.09	-	0.85
Z3	60-70	53.00	6.63	1763	5.73	3.11	0.00	0.00	0.00	1.52	<0.01	1.79	0.17	-	1.61

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-30. HCl extractable metal/metalloid content of the Campbell Park soil materials at field sampling, August 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)[#]	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
Y1	0-10	181.88	177.43	<0.01	0.57	0.14	<0.01	0.13	1.39	14.81	0.61	0.04	3.68
Y1	10-20	216.31	170.76	<0.01	0.59	0.08	<0.01	0.16	1.00	15.91	0.67	0.04	1.63
Y1	20-30	413.77	374.74	0.01	0.80	0.20	<0.01	0.29	2.57	27.47	1.10	0.06	1.60
Y1	30-40	474.18	485.27	0.02	1.22	0.99	0.01	0.23	4.07	39.28	2.16	0.12	2.60
Y1	40-50	458.53	381.88	0.01	1.82	1.53	0.01	0.30	3.77	49.24	2.08	0.13	2.43
Y1	50-60	679.95	619.77	0.01	3.43	2.00	0.02	0.64	5.40	72.63	2.93	0.23	2.73
Y1	60-70	749.23	616.55	0.01	3.41	1.88	0.02	0.61	5.36	73.40	2.92	0.23	2.48
Y2	0-10	141.50	119.50	0.01	0.40	0.20	<0.01	0.41	1.64	8.70	0.76	0.03	1.03
Y2	10-20	193.19	135.32	<0.01	0.26	0.10	<0.01	0.14	1.36	13.32	0.51	0.03	0.70
Y2	20-30	389.38	226.36	0.01	0.59	0.11	<0.01	0.17	1.72	17.65	0.66	0.05	0.77
Y2	30-40	553.92	385.43	0.01	0.71	0.62	0.01	0.21	3.10	28.53	1.42	0.08	1.81
Y2	40-50	688.57	532.64	0.02	2.64	1.99	0.02	0.45	5.27	72.56	2.81	0.20	3.21
Y2	50-60	654.32	471.29	0.01	2.75	1.62	0.01	0.45	4.36	59.08	2.15	0.18	2.16
Y2	60-70	318.31	201.89	<0.01	0.97	0.84	<0.01	0.23	2.04	24.98	0.98	0.08	0.77
Y3	0-10	121.36	88.71	<0.01	0.31	0.14	<0.01	0.28	1.27	5.40	0.50	0.02	2.87
Y3	10-20	138.83	108.93	<0.01	0.27	0.12	<0.01	0.14	0.92	6.40	0.31	0.03	0.64
Y3	20-30	294.47	184.71	0.01	0.25	0.34	<0.01	0.16	1.85	13.68	0.67	0.04	1.00
Y3	30-40	427.03	410.71	0.01	1.67	1.41	0.01	0.18	3.72	43.28	2.83	0.18	2.90
Y3	40-50	744.93	550.39	0.01	3.53	1.92	0.01	0.52	4.93	72.91	3.08	0.22	2.70
Y3	50-60	787.32	661.35	0.01	3.66	2.04	0.02	0.66	5.42	72.19	3.01	0.25	2.76
Y3	60-70	708.10	803.83	0.01	2.99	2.22	0.02	0.71	6.78	65.71	4.03	0.29	2.87
Z1	0-10	159.99	146.38	0.01	0.34	0.29	<0.01	0.34	0.90	5.20	0.57	0.04	0.53
Z1	10-20	105.63	65.26	<0.01	0.33	0.09	<0.01	0.08	0.79	5.30	0.26	0.02	0.54
Z1	20-30	228.74	132.64	0.01	0.28	0.10	<0.01	0.12	1.13	9.50	0.49	0.03	0.55
Z1	30-40	418.18	310.52	0.01	0.61	0.85	0.01	0.19	1.95	21.47	1.32	0.07	1.31
Z1	40-50	370.21	320.64	0.01	1.66	1.37	0.01	0.23	3.03	43.27	1.83	0.14	1.97
Z1	50-60	681.61	537.88	0.01	3.04	2.02	0.02	0.54	4.78	70.88	2.37	0.20	2.50
Z1	60-70	1106.29	815.70	0.01	4.85	2.25	0.02	0.83	6.76	101.33	3.93	0.31	3.29

** See Table 9-1 in Appendix 1 for further details on the treatment.*

[#] *The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)*

Table 9-30 (continued). HCl extractable metal/metalloid content of the Campbell Park soil materials at field sampling, August 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)#	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
Z2	0-10	300.95	187.73	<0.01	0.46	0.48	0.01	0.45	1.05	32.90	1.19	0.05	1.85
Z2	10-20	181.43	68.16	<0.01	0.44	0.15	<0.01	0.10	0.84	4.70	0.25	0.02	0.68
Z2	20-30	175.59	92.12	<0.01	0.31	0.09	<0.01	0.10	0.83	7.10	0.28	0.04	0.57
Z2	30-40	244.07	191.08	0.01	0.54	0.43	<0.01	0.16	2.04	15.20	0.85	0.06	0.86
Z2	40-50	440.57	318.12	0.01	1.08	1.46	0.01	0.16	3.33	42.00	1.71	0.13	2.03
Z2	50-60	639.35	474.01	0.01	2.38	1.88	0.01	0.36	4.31	69.08	2.57	0.20	3.10
Z2	60-65	586.12	685.15	0.01	3.49	2.06	0.02	0.68	5.00	76.14	2.82	0.25	4.30
Z3	0-10	251.60	145.42	<0.01	0.31	0.42	<0.01	0.32	0.95	37.01	0.97	0.03	1.42
Z3	10-20	124.43	58.74	<0.01	0.38	0.28	<0.01	0.08	0.80	3.00	0.19	0.02	0.42
Z3	20-30	120.12	72.10	<0.01	0.39	0.08	<0.01	0.10	0.68	3.40	0.27	0.02	0.49
Z3	30-40	183.30	135.24	0.01	0.23	0.20	<0.01	0.10	1.15	7.10	0.46	0.03	0.43
Z3	40-50	286.72	231.37	0.01	0.73	1.10	0.01	0.12	3.06	24.64	1.44	0.08	1.43
Z3	50-60	486.21	490.30	0.01	2.34	1.93	0.01	0.50	4.16	52.21	2.12	0.17	2.20
Z3	60-70	698.22	747.67	0.01	3.86	2.15	0.02	0.71	5.06	74.69	2.88	0.25	2.89

** See Table 9-1 in Appendix 1 for further details on the treatment.*

 # The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

Table 9-31. Acid sulfate characteristics of the Campbell Park soil materials at field sampling, November 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol $H^+ t^{-1}$)	ANC ($\%CaCO_3$)	TAAlk (mol $OH^- t^{-1}$)	Retained acidity (mol $H^+ t^{-1}$)	Chromium Reducible Sulfur ($\%S_{CR}$)	Acid Volatile Sulfide ($\%S_{AV}$)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
CC1	0-10	23.67	4.72	507	4.65	5.88	0.00	0.00	0.00	<0.01	<0.01	0.27	0.03	0.13	0.21
CC1	10-20	23.03	3.63	591	4.06	12.76	0.00	0.00	10.44	<0.01	<0.01	0.26	0.05	0.16	0.21
CC1	20-30	26.76	3.42	988	3.92	19.36	0.00	0.00	10.02	0.17	<0.01	0.36	0.08	0.14	0.31
CC1	30-40	40.67	3.43	1455	3.73	27.98	0.00	0.00	0.00	0.69	<0.01	0.63	0.09	0.63	0.63
CC1	40-50	49.63	3.53	2393	4.16	16.41	0.00	0.00	0.00	1.23	<0.01	1.38	0.17	1.36	1.38
CC1	50-60	54.86	5.04	2303	4.60	4.40	0.00	0.00	0.00	1.01	<0.01	1.22	0.13	1.09	1.22
CC1	60-70	32.31	4.80	1663	4.48	6.28	0.00	0.00	0.00	0.35	<0.01	0.95	0.10	0.78	0.95
CC2	0-10	23.41	5.40	637	4.95	2.88	0.00	0.00	0.00	<0.01	<0.01	0.24	0.05	0.09	0.21
CC2	10-20	29.09	3.64	843	4.07	1.10	0.00	0.00	6.16	<0.01	<0.01	0.27	0.05	0.18	0.27
CC2	20-30	25.01	3.42	1316	3.94	15.84	0.00	0.00	6.75	0.05	<0.01	0.33	0.06	0.23	0.32
CC2	30-40	37.26	3.39	1946	3.72	34.61	0.00	0.00	0.00	0.55	<0.01	-	-	-	-
CC2	40-50	39.64	4.25	2280	4.11	11.79	0.00	0.00	0.00	0.73	<0.01	-	-	-	-
CC2	50-60	45.04	5.24	2397	4.86	2.80	0.00	0.00	0.00	0.90	<0.01	-	-	-	-
CC2	60-70	45.90	5.14	3500	4.75	10.02	0.00	0.00	0.00	0.69	<0.01	-	-	-	-
CC3	0-10	21.86	5.78	674	4.86	4.13	0.00	0.00	0.00	<0.01	<0.01	0.29	0.05	0.18	0.29
CC3	10-20	23.65	3.50	1105	3.99	15.88	0.00	0.00	6.09	<0.01	<0.01	0.30	0.05	0.10	0.25
CC3	20-30	31.85	3.34	1299	3.74	26.26	0.00	0.00	11.00	0.01	<0.01	0.39	0.05	0.34	0.34
CC3	30-40	37.48	3.36	1732	3.65	40.19	0.00	0.00	0.00	0.54	<0.01	-	-	-	-
CC3	40-50	45.85	4.05	3000	4.09	25.43	0.00	0.00	2.53	1.00	<0.01	-	-	-	-
CC3	50-60	53.71	5.36	2760	4.94	3.92	0.00	0.00	0.00	1.22	<0.01	-	-	-	-
CC3	60-70	55.25	5.10	3980	4.74	4.28	0.00	0.00	0.00	1.07	<0.01	-	-	-	-
DD1	0-10	21.24	6.90	563	6.47	0.43	0.00	0.00	0.00	<0.01	<0.01	0.24	0.04	0.12	0.19
DD1	10-20	22.26	3.70	910	4.12	9.81	0.00	0.00	6.11	<0.01	<0.01	0.33	0.06	0.17	0.20
DD1	20-30	22.52	3.59	1180	3.95	14.59	0.00	0.00	6.98	<0.01	<0.01	0.29	0.05	0.20	0.27
DD1	30-40	31.41	3.45	1374	4.18	6.83	0.00	0.00	13.95	0.22	<0.01	0.35	0.06	0.30	0.30
DD1	40-50	31.23	3.56	1777	3.78	32.87	0.00	0.00	0.00	0.52	<0.01	0.54	0.07	0.48	0.52
DD1	50-60	44.47	4.38	2840	4.19	12.44	0.00	0.00	0.00	0.96	<0.01	0.96	0.11	0.80	0.82
DD1	60-70	48.68	5.52	2980	5.19	3.59	0.00	0.00	0.00	1.00	<0.01	1.60	0.16	1.56	1.55

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-31 (continued). Acid sulfate characteristics of the Campbell Park soil materials at field sampling, November 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC (%$CaCO_3$)	TAAlk (mol OH^- t^{-1})	Retained acidity (mol H^+ t^{-1})	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
DD2	0-10	21.03	7.66	520	6.83	0.00	0.02	2.45	0.00	<0.01	<0.01	0.17	0.03	0.03	0.13
DD2	10-20	23.92	3.88	1244	4.53	8.82	0.00	0.00	0.00	<0.01	<0.01	0.25	0.04	0.18	0.21
DD2	20-30	21.91	3.69	1333	4.48	6.62	0.00	0.00	15.05	<0.01	<0.01	0.29	0.04	0.14	0.22
DD2	30-40	26.76	3.55	1546	4.11	17.14	0.00	0.00	0.00	0.22	<0.01	-	-	-	-
DD2	40-50	26.27	3.63	1579	3.97	23.19	0.00	0.00	0.00	0.31	<0.01	-	-	-	-
DD2	50-60	34.63	4.41	1265	4.36	5.86	0.00	0.00	0.00	0.60	<0.01	-	-	-	-
DD2	60-70	47.67	5.27	2240	4.84	3.91	0.00	0.00	0.00	1.07	<0.01	-	-	-	-
DD3	0-10	19.28	7.27	550	6.72	0.00	0.35	2.22	0.00	<0.01	<0.01	0.15	0.04	0.08	0.12
DD3	10-20	20.31	4.69	914	4.39	5.82	0.00	0.00	0.00	<0.01	<0.01	0.16	0.04	0.07	0.19
DD3	20-30	23.30	3.73	1261	4.20	7.96	0.00	0.00	0.62	<0.01	<0.01	0.24	0.05	0.12	0.20
DD3	30-40	24.23	3.51	1565	4.02	16.67	0.00	0.00	0.94	0.06	<0.01	-	-	-	-
DD3	40-50	26.25	3.51	1724	3.95	23.83	0.00	0.00	0.00	0.28	<0.01	-	-	-	-
DD3	50-60	41.33	4.04	1841	4.21	9.94	0.00	0.00	2.21	0.70	<0.01	-	-	-	-
DD3	60-70	39.30	5.01	2304	4.68	6.30	0.00	0.00	0.00	0.69	<0.01	-	-	-	-

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-32. HCl extractable metal/metalloid content of the Campbell Park soil materials at field sampling, November 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)[#]	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
CC1	0-10	193.85	129.40	<0.01	0.49	0.16	<0.01	0.16	0.81	6.96	0.27	0.03	0.59
CC1	10-20	205.88	122.69	<0.01	0.26	0.07	<0.01	0.12	0.69	6.27	0.23	0.02	0.42
CC1	20-30	319.90	223.39	0.01	0.40	0.14	<0.01	0.24	1.38	11.94	0.39	0.04	0.80
CC1	30-40	515.71	413.79	0.01	0.87	0.95	0.02	0.26	2.90	26.62	0.99	0.11	1.63
CC1	40-50	755.15	893.45	0.02	3.97	2.15	0.02	0.77	5.18	77.94	2.64	0.35	3.22
CC1	50-60	727.80	719.25	0.01	4.35	1.87	0.01	0.73	4.09	74.30	2.01	0.27	2.21
CC1	60-70	575.05	496.89	0.01	2.71	1.46	0.01	0.52	3.08	52.07	1.52	0.17	1.54
CC2	0-10	198.39	108.53	<0.01	0.39	0.33	<0.01	0.28	0.75	5.47	0.29	0.03	0.64
CC2	10-20	181.27	128.22	<0.01	0.23	0.10	<0.01	0.15	0.78	6.96	0.24	0.03	0.52
CC2	20-30	323.60	217.33	0.01	0.33	0.24	<0.01	0.27	1.15	11.87	0.51	0.05	0.98
CC2	30-40	598.40	475.36	0.01	1.15	1.55	0.02	0.43	2.74	28.40	1.39	0.14	2.06
CC2	40-50	606.97	645.97	0.01	2.78	1.79	0.02	0.74	4.15	53.69	2.70	0.29	3.46
CC2	50-60	502.64	664.18	0.01	3.07	1.93	0.01	0.83	3.83	53.43	2.00	0.25	2.34
CC2	60-70	797.83	867.82	0.01	5.08	2.06	0.02	1.10	4.91	72.26	2.68	0.33	2.75
CC3	0-10	253.32	152.10	<0.01	0.44	0.29	<0.01	0.32	0.96	7.14	0.35	0.04	0.97
CC3	10-20	276.22	184.50	0.01	0.59	0.08	<0.01	0.27	0.99	11.85	0.42	0.04	0.91
CC3	20-30	446.21	286.80	0.01	0.47	0.67	0.03	0.35	1.11	14.41	0.43	0.05	0.99
CC3	30-40	584.94	464.36	0.01	0.82	1.02	0.01	0.33	2.69	26.69	0.99	0.11	1.70
CC3	40-50	637.62	718.78	0.03	3.72	1.94	0.02	0.55	4.54	70.76	2.40	0.33	3.29
CC3	50-60	626.74	818.94	0.02	4.13	2.20	0.01	0.76	4.63	73.74	2.38	0.34	2.52
CC3	60-70	951.91	920.54	0.02	6.41	2.21	0.02	0.81	5.44	96.64	2.85	0.37	2.98
DD1	0-10	285.74	249.34	0.01	0.65	0.44	<0.01	0.27	0.94	16.72	0.72	0.07	1.30
DD1	10-20	180.07	124.97	<0.01	0.48	0.09	<0.01	0.18	0.70	5.13	0.19	0.02	0.76
DD1	20-30	216.16	179.18	0.01	0.32	0.11	<0.01	0.22	0.99	7.76	0.27	0.04	0.47
DD1	30-40	367.68	305.99	0.01	0.40	0.59	<0.01	0.31	1.78	14.90	0.72	0.06	1.14
DD1	40-50	480.33	519.24	0.01	1.35	1.35	0.01	0.38	2.68	31.99	1.73	0.15	2.42
DD1	50-60	500.80	660.62	0.01	3.01	1.90	0.01	0.56	4.21	74.37	2.36	0.32	3.14
DD1	60-70	620.16	877.91	0.01	4.15	2.34	0.02	0.89	5.07	82.45	2.70	0.33	2.76

* See Table 9-1 in Appendix 1 for further details on the treatment.

[#] The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

Table 9-32 (continued). HCl extractable metal/metalloid content of the Campbell Park soil materials at field sampling, November 2010.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)#	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
DD2	0-10	315.52	254.44	<0.01	0.55	0.69	<0.01	0.34	1.02	13.61	0.85	0.07	1.76
DD2	10-20	178.24	116.20	<0.01	0.41	0.13	<0.01	0.17	0.69	7.13	0.22	0.04	0.89
DD2	20-30	170.50	158.08	0.01	0.24	0.19	<0.01	0.19	1.00	8.64	0.32	0.04	0.73
DD2	30-40	259.17	229.78	<0.01	0.70	0.83	0.01	0.26	1.20	14.89	0.90	0.06	1.00
DD2	40-50	335.51	356.23	0.01	1.51	1.02	0.01	0.36	1.72	27.59	1.38	0.12	2.18
DD2	50-60	245.06	261.37	0.01	1.39	1.02	0.01	0.41	1.80	31.44	0.92	0.11	1.88
DD2	60-70	572.86	704.47	0.01	3.88	2.17	0.01	0.78	4.34	65.58	2.20	0.29	2.65
DD3	0-10	326.14	185.06	<0.01	0.61	0.57	<0.01	0.31	0.79	21.25	0.84	0.05	0.75
DD3	10-20	217.63	84.88	<0.01	0.48	0.25	<0.01	0.17	0.64	7.26	0.23	0.04	0.52
DD3	20-30	161.15	122.77	<0.01	0.35	0.09	<0.01	0.17	0.70	6.04	0.29	0.03	0.53
DD3	30-40	266.79	255.07	0.02	0.51	0.78	0.03	0.29	1.70	9.64	0.40	0.06	0.69
DD3	40-50	371.92	388.99	0.01	1.22	1.12	0.01	0.37	2.17	23.68	1.37	0.11	1.86
DD3	50-60	399.30	471.75	0.01	2.20	1.47	0.01	0.40	3.16	43.47	1.92	0.22	2.66
DD3	60-70	598.52	765.37	0.02	3.61	2.21	0.01	0.81	4.48	71.58	2.18	0.27	2.93

** See Table 9-1 in Appendix 1 for further details on the treatment.*

 # The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

Table 9-33. Acid sulfate characteristics of the Campbell Park soil materials at field sampling, February 2011.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol $H^+ t^{-1}$)	ANC ($\%CaCO_3$)	TAAlk (mol $OH^- t^{-1}$)	Retained acidity (mol $H^+ t^{-1}$)	Chromium Reducible Sulfur ($\%S_{CR}$)	Acid Volatile Sulfide ($\%S_{AV}$)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
YY1	0-10	19.56	6.55	470	6.60	0.00	0.02	3.56	0.00	<0.01	<0.01	0.20	0.02	<0.01	0.09
YY1	10-20	18.77	3.66	713	4.42	7.97	0.00	0.00	9.57	<0.01	<0.01	0.24	0.03	0.02	0.14
YY1	20-30	29.21	3.07	2031	3.90	32.76	0.00	0.00	2.06	0.03	<0.01	0.40	0.06	0.21	0.35
YY1	30-40	45.37	3.12	2600	3.72	49.53	0.00	0.00	0.00	0.67	<0.01	0.70	0.08	0.41	0.56
YY1	40-50	41.10	3.47	4110	4.09	19.80	0.00	0.00	3.56	0.61	<0.01	0.85	0.10	0.38	0.73
YY1	50-60	58.92	4.83	5530	4.66	7.94	0.00	0.00	0.00	0.89	<0.01	1.56	0.15	1.11	1.31
YY1	60-70	60.73	4.38	4830	4.29	15.32	0.00	0.00	0.00	1.06	<0.01	1.69	0.16	1.02	1.46
YY2	0-10	24.92	4.84	686	5.46	2.85	0.00	0.00	0.00	<0.01	<0.01	0.36	0.05	0.08	0.21
YY2	10-20	23.45	3.52	926	4.18	12.42	0.00	0.00	6.08	<0.01	<0.01	0.29	0.04	0.06	0.22
YY2	20-30	35.30	3.38	1203	4.01	22.18	0.00	0.00	0.14	0.06	<0.01	0.45	0.05	0.23	0.34
YY2	30-40	54.91	3.10	4300	3.53	10.56	0.00	0.00	0.00	0.97	<0.01	-	-	-	-
YY2	40-50	61.93	4.19	3840	4.09	22.70	0.00	0.00	0.00	1.04	<0.01	-	-	-	-
YY2	50-60	59.06	4.12	3710	4.06	19.12	0.00	0.00	0.00	1.00	<0.01	-	-	-	-
YY2	60-70	31.56	4.18	1498	4.58	4.86	0.00	0.00	0.00	0.22	<0.01	-	-	-	-
YY3	0-10	25.76	4.22	892	4.45	7.63	0.00	0.00	10.17	<0.01	<0.01	0.45	0.06	0.20	0.30
YY3	10-20	25.70	3.43	1254	4.11	14.48	0.00	0.00	22.03	<0.01	<0.01	0.40	0.05	0.16	0.31
YY3	20-30	23.12	3.48	1019	4.18	14.45	0.00	0.00	19.97	<0.01	<0.01	0.32	0.05	0.06	0.21
YY3	30-40	33.87	3.42	2041	4.02	26.72	0.00	0.00	8.51	0.51	<0.01	-	-	-	-
YY3	40-50	44.22	4.14	2205	4.25	10.79	0.00	0.00	8.56	0.94	<0.01	-	-	-	-
YY3	50-60	56.30	4.62	3390	4.47	9.40	0.00	0.00	15.58	0.91	<0.01	-	-	-	-
YY3	60-70	61.55	4.15	3460	4.17	17.79	0.00	0.00	13.14	1.18	<0.01	-	-	-	-
ZZ1	0-10	24.04	5.60	355	5.12	2.59	0.00	0.00	0.00	<0.01	<0.01	0.18	0.04	0.01	0.14
ZZ1	10-20	20.55	3.72	721	4.53	7.06	0.00	0.00	0.00	<0.01	<0.01	0.18	0.04	0.01	0.12
ZZ1	20-30	25.72	3.43	1482	4.51	9.30	0.00	0.00	0.00	<0.01	<0.01	0.35	0.06	0.10	0.27
ZZ1	30-40	30.81	3.14	1442	3.83	35.57	0.00	0.00	6.41	0.35	<0.01	-	-	-	-
ZZ1	40-50	46.45	3.43	2990	3.88	34.29	0.00	0.00	5.01	0.66	<0.01	-	-	-	-
ZZ1	50-60	50.56	4.07	3100	4.16	14.45	0.00	0.00	15.30	0.89	<0.01	-	-	-	-
ZZ1	60-70	57.13	4.41	4150	4.34	11.61	0.00	0.00	0.00	1.15	0.12	-	-	-	-

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-33 (continued). Acid sulfate characteristics of the Campbell Park soil materials at field sampling, February 2011.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH$_{KCl}$	TAA (mol H$^+$ t^{-1})	ANC (%CaCO$_3$)	TAAlk (mol OH$^-$ t^{-1})	Retained acidity (mol H$^+$ t^{-1})	Chromium Reducible Sulfur (%S$_{CR}$)	Acid Volatile Sulfide (%S$_{AV}$)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
ZZ2	0-10	23.43	7.01	340	7.02	0.00	0.05	2.47	0.00	0.01	0.01	0.20	0.04	<0.01	0.14
ZZ2	10-20	21.82	3.99	1155	4.72	4.77	0.00	0.00	0.00	<0.01	<0.01	0.22	0.04	0.01	0.14
ZZ2	20-30	23.19	3.54	951	4.31	10.61	0.00	0.00	11.41	0.07	<0.01	0.28	0.04	0.11	0.23
ZZ2	30-40	26.02	3.39	1299	4.21	13.70	0.00	0.00	4.21	0.28	<0.01	-	-	-	-
ZZ2	40-50	53.08	3.74	3420	4.04	20.11	0.00	0.00	0.00	0.98	<0.01	-	-	-	-
ZZ2	50-60	47.24	3.98	3950	4.08	19.27	0.00	0.00	7.72	0.69	<0.01	-	-	-	-
ZZ2	60-70	64.24	4.87	3770	4.62	9.96	0.00	0.00	0.00	1.22	<0.01	-	-	-	-
ZZ3	0-10	17.64	6.38	581	6.43	0.85	0.00	0.00	0.00	<0.01	<0.01	0.15	0.03	<0.01	0.09
ZZ3	10-20	19.37	4.21	938	5.08	2.69	0.00	0.00	0.00	<0.01	<0.01	0.27	0.04	0.04	0.25
ZZ3	20-30	26.64	3.50	1670	4.07	14.87	0.00	0.00	20.96	0.25	<0.01	0.43	0.06	0.14	0.34
ZZ3	30-40	30.26	3.24	1579	3.98	24.77	0.00	0.00	10.95	0.24	<0.01	-	-	-	-
ZZ3	40-50	36.66	3.63	1853	4.12	18.62	0.00	0.00	0.00	0.38	<0.01	-	-	-	-
ZZ3	50-60	55.69	4.51	3690	4.51	7.28	0.00	0.00	0.00	1.04	<0.01	-	-	-	-
ZZ3	60-70	54.40	4.75	2890	4.57	7.84	0.00	0.00	0.00	0.78	<0.01	-	-	-	-

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-34. HCl extractable metal/metalloid content of the Campbell Park soil materials at field sampling, February 2011.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)$^{\#}$	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
YY1	0-10	207.59	55.70	<0.01	0.19	0.24	<0.01	0.17	0.56	3.47	0.22	0.02	0.75
YY1	10-20	138.74	78.25	<0.01	0.16	0.06	<0.01	0.09	0.52	4.88	0.20	0.02	0.39
YY1	20-30	602.65	306.88	0.01	0.81	0.43	<0.01	0.24	1.68	2<0.01	0.77	0.05	0.81
YY1	30-40	685.07	520.52	0.02	0.79	0.89	0.01	0.39	2.81	32.46	1.02	0.10	1.41
YY1	40-50	726.60	590.85	0.02	2.28	2.06	0.02	0.55	4.07	62.93	2.46	0.20	2.99
YY1	50-60	729.55	728.14	0.02	3.14	2.57	0.02	1.12	4.78	84.15	2.69	0.21	2.35
YY1	60-70	912.92	638.22	0.01	4.41	2.34	0.02	0.62	4.74	92.42	2.40	0.20	2.52
YY2	0-10	265.68	114.85	<0.01	0.37	0.24	<0.01	0.12	0.96	6.20	0.31	0.02	0.83
YY2	10-20	193.87	126.55	0.01	0.18	0.07	<0.01	0.13	0.76	8.87	0.31	0.02	0.71
YY2	20-30	319.81	254.87	0.01	0.35	0.21	<0.01	0.16	1.36	17.19	0.65	0.05	0.75
YY2	30-40	1242.67	864.81	0.02	1.48	1.86	0.01	0.54	5.20	75.39	1.98	0.17	3.50
YY2	40-50	752.90	646.31	0.02	2.87	2.40	0.02	0.61	5.26	106.64	2.96	0.21	3.56
YY2	50-60	1028.77	659.54	0.02	5.00	2.35	0.02	0.80	5.00	120.02	2.53	0.21	2.46
YY2	60-70	357.26	240.07	0.01	1.13	0.81	0.01	0.34	1.81	36.24	0.95	0.06	2.38
YY3	0-10	319.81	144.95	<0.01	0.49	0.21	<0.01	0.15	1.10	7.88	0.29	0.03	1.67
YY3	10-20	262.66	171.99	<0.01	0.39	0.07	<0.01	0.15	0.86	12.56	0.37	0.03	1.03
YY3	20-30	268.58	192.08	0.01	0.35	0.17	<0.01	0.19	0.96	13.33	0.41	0.03	0.62
YY3	30-40	404.62	404.12	0.01	1.41	1.06	0.01	0.28	2.53	33.35	1.72	0.10	2.35
YY3	40-50	505.52	441.13	0.01	2.13	1.81	0.01	0.50	3.61	66.34	1.68	0.14	2.30
YY3	50-60	721.60	671.13	0.02	3.04	2.47	0.02	0.80	5.06	89.33	2.51	0.20	2.67
YY3	60-70	1053.94	719.49	0.02	5.34	2.51	0.02	0.85	5.37	108.49	2.76	0.22	2.62
ZZ1	0-10	289.55	132.19	<0.01	0.48	0.38	<0.01	0.38	1.00	5.74	0.48	0.03	0.72
ZZ1	10-20	135.20	86.71	<0.01	0.14	0.06	<0.01	0.12	0.62	5.28	0.20	0.02	0.75
ZZ1	20-30	276.65	179.24	<0.01	0.25	0.07	<0.01	0.15	0.93	14.00	0.37	0.03	0.94
ZZ1	30-40	690.88	343.35	0.01	1.12	0.89	0.02	0.33	2.38	27.56	1.54	0.06	1.27
ZZ1	40-50	517.20	528.82	0.01	1.63	1.38	0.01	0.43	3.28	45.60	2.06	0.14	2.62
ZZ1	50-60	638.03	564.95	0.02	2.40	2.07	0.01	0.66	4.33	88.41	2.15	0.16	2.84
ZZ1	60-70	799.91	727.70	0.02	2.73	2.48	0.02	0.78	5.20	88.73	2.57	0.19	2.65

** See Table 9-1 in Appendix 1 for further details on the treatment.*

$^{\#}$ *The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)*

Table 9-34 (continued). HCl extractable metal/metalloid content of the Campbell Park soil materials at field sampling, February 2011.

Profile ID* (TreatmentCode, Core)	Depth Range (cm)	Iron (mg/Kg)	Aluminium (mg/Kg)	Silver (mg/Kg)	Arsenic (mg/Kg)	Lead (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Zinc (mg/Kg)
SQG-Low (Trigger value)#	-	n.a.	n.a.	1	20	50	1.5	80	65	n.a.	21	n.a.	200
ZZ2	0-10	369.40	195.27	<0.01	0.46	0.50	<0.01	0.19	1.01	10.74	1.04	0.06	2.04
ZZ2	10-20	165.49	88.16	0.01	0.27	0.12	<0.01	0.09	0.52	7.78	0.21	0.02	0.83
ZZ2	20-30	213.54	134.88	0.01	0.34	0.09	<0.01	0.11	1.47	10.94	0.30	0.03	0.48
ZZ2	30-40	310.83	157.61	<0.01	0.61	0.40	0.01	0.15	1.23	13.90	0.68	0.03	0.77
ZZ2	40-50	561.54	459.41	0.01	2.05	1.63	0.01	0.37	3.75	64.14	2.34	0.16	3.42
ZZ2	50-60	741.95	574.43	0.02	3.28	2.26	0.02	0.76	5.14	110.81	14.30	0.18	4.63
ZZ2	60-70	887.33	853.68	0.02	3.74	2.70	0.02	0.89	6.09	94.27	3.95	0.21	3.31
ZZ3	0-10	297.51	141.81	<0.01	0.40	0.38	<0.01	0.25	0.71	6.15	0.52	0.03	0.82
ZZ3	10-20	232.71	88.20	<0.01	0.42	0.26	<0.01	0.14	0.77	7.74	0.28	0.03	0.56
ZZ3	20-30	258.62	187.68	0.01	0.53	0.11	<0.01	0.19	1.51	11.08	0.39	0.04	1.05
ZZ3	30-40	516.67	261.08	0.01	0.71	0.60	0.01	0.25	1.85	19.47	0.79	0.03	0.99
ZZ3	40-50	374.41	294.87	0.01	1.28	0.90	0.01	0.28	2.18	29.61	1.44	0.08	3.77
ZZ3	50-60	691.13	687.22	0.02	2.53	2.41	0.02	0.77	5.62	97.76	2.42	0.19	3.18
ZZ3	60-70	632.02	627.69	0.02	2.32	2.02	0.01	0.78	4.64	66.17	2.21	0.16	2.59

** See Table 9-1 in Appendix 1 for further details on the treatment.*

 # The ANZECC sediment quality guidelines (SQG) are for total metal concentrations (ANZECC/ARMCANZ 2000)

APPENDIX 3. Sediment Properties (Columns Trials).

Table 9-35. Acid sulfate characteristics of the Waltowa soil materials at the completion of the six week columns experiment, May 2010.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC ($\%CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur ($\%S_{CR}$)	Acid Volatile Sulfide ($\%S_{AV}$)	Total C (%C)	Total N (%N)
C1.1	0-4	28.18	8.56	441	9.27	0.00	3.01	21.32	<0.01	<0.01	1.10	0.07
	4-8	24.45	9.22	366	9.60	0.00	0.50	17.24	<0.01	<0.01	0.21	0.02
	8-15	19.20	8.89	581	8.18	0.00	0.10	2.47	<0.01	<0.01	0.12	0.01
C1.2	0-4	27.52	8.78	407	9.33	0.00	3.40	26.33	0.01	<0.01	1.19	0.07
	4-8	20.86	9.21	8	9.65	0.00	0.74	26.99	<0.01	<0.01	0.23	0.02
	8-15	21.11	8.70	788	8.07	0.00	0.07	2.45	<0.01	<0.01	0.13	0.01
C2.1	0-4	13.40	8.04	1143	8.49	0.00	2.24	17.08	0.03	<0.01	2.67	0.28
	4-8	21.65	9.11	431	9.58	0.00	0.40	15.84	<0.01	<0.01	0.14	0.02
	8-15	52.30	8.66	519	7.98	0.00	0.10	2.26	<0.01	<0.01	0.09	0.01
C2.2	0-4	40.22	7.98	716	8.62	0.00	2.37	40.62	0.03	<0.01	2.23	0.23
	4-8	22.02	8.97	250	9.45	0.00	0.27	14.86	<0.01	<0.01	0.15	0.01
	8-15	21.68	8.18	526	8.07	0.00	0.09	3.40	<0.01	<0.01	0.10	0.01
C3.1	0-4	50.94	8.30	777	8.48	0.00	2.64	21.77	0.03	<0.01	2.32	0.22
	4-8	23.24	9.16	235	9.44	0.00	0.30	13.23	<0.01	<0.01	0.22	0.02
	8-15	16.29	8.88	490	8.33	0.00	0.14	2.71	<0.01	<0.01	0.10	0.01
C3.2	0-4	32.92	8.30	1064	8.48	0.00	4.65	33.16	0.06	0.02	3.97	0.38
	4-8	35.22	8.84	577	9.52	0.00	1.21	31.45	<0.01	<0.01	0.42	0.02
	8-15	21.15	8.75	548	8.06	0.00	0.18	3.18	<0.01	<0.01	0.10	0.01
A1.1	0-4	26.09	7.48	182	6.41	1.87	0.00	0.00	<0.01	<0.01	0.51	0.05
	4-8	19.21	6.62	196	5.95	3.06	0.00	0.00	<0.01	<0.01	0.12	0.02
	8-15	18.05	4.57	604	4.43	4.53	0.00	0.00	<0.01	<0.01	0.15	0.02
A1.2	0-4	27.22	6.44	170	6.74	0.00	0.14	1.83	<0.01	<0.01	0.58	0.06
	4-8	20.96	6.65	64	5.76	3.13	0.00	0.00	<0.01	<0.01	0.12	0.01
	8-15	17.95	5.77	86	4.96	2.11	0.00	0.00	<0.01	<0.01	0.15	0.01
A2.1	0-4	25.47	8.16	368	8.78	0.00	0.54	11.46	0.01	<0.01	1.17	0.12
	4-8	18.63	6.84	174	6.48	0.93	0.00	0.00	<0.01	<0.01	0.10	0.01
	8-15	21.13	6.80	475	5.65	3.13	0.00	0.00	<0.01	<0.01	0.10	0.01
A2.2	0-4	29.24	7.48	210	8.88	0.00	0.31	11.53	0.02	<0.01	0.52	0.05
	4-8	21.82	7.97	163	7.71	0.00	0.05	2.32	<0.01	<0.01	0.15	0.02
	8-15	20.85	7.70	386	7.05	0.00	0.03	0.54	<0.01	<0.01	0.14	0.01

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-35 (continued). Acid sulfate characteristics of the Waltowa soil materials at the completion of the six week columns experiment, May 2010.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC ($\%CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur ($\%S_{CR}$)	Acid Volatile Sulfide ($\%S_{AV}$)	Total C (%C)	Total N (%N)
A3.1	0-4	31.50	7.91	401	8.60	0.00	0.35	6.20	0.01	0.01	0.72	0.07
	4-8	21.05	8.33	307	7.33	0.00	0.08	1.80	0.05	<0.01	0.11	0.01
	8-15	19.53	6.30	705	5.58	2.88	0.00	0.00	<0.01	<0.01	0.16	0.02
A3.2	0-4	33.60	7.67	394	8.67	0.00	0.37	10.91	0.02	<0.01	0.88	0.09
	4-8	20.64	7.64	180	7.23	0.00	0.03	1.75	<0.01	<0.01	0.11	0.01
	8-15	20.96	7.31	341	6.44	2.12	0.00	0.00	0.02	<0.01	0.12	0.01
B1.1	0-4	23.41	8.83	200	9.34	0.00	0.81	19.39	0.01	<0.01	0.35	0.03
	4-8	20.61	9.12	171	8.12	0.00	0.09	2.17	<0.01	<0.01	0.09	0.01
	8-15	19.54	9.15	247	7.73	0.00	0.11	2.32	<0.01	<0.01	0.09	0.01
B1.2	0-4	22.32	8.29	182	9.47	0.00	1.44	30.58	0.02	<0.01	0.45	0.03
	4-8	22.13	8.99	144	9.12	0.00	0.20	7.03	<0.01	<0.01	0.10	0.01
	8-15	18.84	8.68	372	7.54	0.00	0.08	2.16	<0.01	<0.01	0.10	0.01
B2.1	0-4	27.37	8.80	411	9.21	0.00	1.34	17.77	0.02	<0.01	0.75	0.07
	4-8	21.04	9.20	254	9.17	0.00	0.15	5.38	<0.01	<0.01	0.10	0.01
	8-15	21.78	9.15	484	8.73	0.00	0.09	2.86	<0.01	<0.01	0.08	0.01
B2.2	0-4	26.86	8.66	311	9.04	0.00	3.41	31.12	0.02	<0.01	1.44	0.13
	4-8	18.74	9.35	106	6.69	0.00	0.76	2.51	<0.01	<0.01	0.24	0.01
	8-15	18.82	9.15	92	8.23	0.00	0.09	2.41	<0.01	<0.01	0.10	0.01
B3.1	0-4	27.72	8.49	287	9.10	0.00	0.95	15.03	0.05	<0.01	0.92	0.08
	4-8	19.08	9.38	178	9.58	0.00	0.26	15.51	0.03	<0.01	0.12	0.01
	8-15	18.72	9.26	289	9.08	0.00	0.12	4.45	<0.01	<0.01	0.07	0.01
B3.2	0-4	39.37	8.40	384	7.73	0.00	1.22	20.57	0.08	<0.01	1.39	0.13
	4-8	24.53	8.37	178	9.26	0.00	0.21	15.07	0.03	<0.01	0.20	0.02
	8-15	19.77	8.78	218	9.49	0.00	0.22	13.23	0.03	<0.01	0.11	0.01

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-36. Acid sulfate characteristics of the Waltowa soil materials at the completion of the six week columns experiment, August 2010.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC (%$CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)
P1.1	0-4	38.31	8.36	567	8.85	0.00	10.52	83.90	0.02	<0.01	3.07	0.19
	4-8	19.80	9.26	255	9.58	0.00	6.02	55.24	<0.01	<0.01	1.40	0.03
	8-15	19.04	9.14	379	8.11	0.00	0.13	2.40	<0.01	<0.01	0.11	0.04
P1.2	0-4	38.31	8.51	308	9.14	0.00	10.81	100.97	0.01	0.01	2.23	0.13
	4-8	19.80	9.06	108	9.24	0.00	0.38	15.41	<0.01	<0.01	0.13	0.02
	8-15	19.04	8.61	90	6.95	0.00	0.17	1.86	<0.01	<0.01	0.09	0.03
P2.1	0-4	30.94	8.61	337	9.05	0.00	2.59	19.76	0.01	<0.01	1.34	0.11
	4-8	18.86	9.10	168	9.09	0.00	0.29	7.96	<0.01	<0.01	0.14	0.03
	8-15	18.56	8.95	216	7.05	0.00	0.14	2.03	<0.01	<0.01	0.10	0.02
P2.2	0-4	30.94	8.70	488	9.33	0.00	3.20	44.36	0.01	0.01	1.48	0.11
	4-8	18.86	9.27	525	9.50	0.00	0.13	21.91	<0.01	<0.01	0.19	0.02
	8-15	18.56	9.19	766	8.43	0.00	0.44	3.68	<0.01	<0.01	0.10	0.02
P3.1	0-4	64.70	7.70	840	7.88	0.00	2.88	24.96	0.08	<0.01	6.49	0.62
	4-8	29.47	8.87	146	9.42	0.00	2.22	24.90	<0.01	<0.01	0.62	0.04
	8-15	19.38	8.75	84	7.62	0.00	0.17	2.27	<0.01	<0.01	0.11	0.01
P3.2	0-4	64.70	8.27	493	8.76	0.00	6.46	49.65	0.06	0.01	3.06	0.23
	4-8	29.47	9.13	115	9.66	0.00	0.90	31.32	<0.01	<0.01	0.22	0.01
	8-15	19.38	8.27	73	6.89	0.00	0.57	2.35	<0.01	<0.01	0.11	0.01
Q1.1	0-4	25.40	7.70	137	5.81	2.44	0.00	0.00	<0.01	<0.01	0.35	0.04
	4-8	19.93	7.51	90	5.30	1.87	0.00	0.00	<0.01	<0.01	0.11	0.02
	8-15	18.46	5.38	116	4.63	2.68	0.00	0.00	<0.01	<0.01	0.11	0.01
Q1.2	0-4	25.40	7.62	322	6.56	0.00	0.53	1.68	0.01	0.01	0.42	0.05
	4-8	19.93	7.72	494	6.73	0.00	0.51	2.01	<0.01	<0.01	0.13	0.02
	8-15	18.46	4.20	1065	4.64	5.17	0.00	0.00	<0.01	<0.01	0.13	0.01
Q2.1	0-4	31.65	6.51	315	6.29	1.75	0.00	0.00	<0.01	<0.01	0.49	0.04
	4-8	21.37	6.96	404	6.59	0.00	0.18	0.25	<0.01	<0.01	0.15	0.02
	8-15	22.01	5.85	1077	5.28	2.52	0.00	0.00	<0.01	<0.01	0.21	0.03
Q2.2	0-4	31.65	6.30	324	6.17	2.18	0.00	0.00	0.03	0.02	1.04	0.09
	4-8	21.37	6.94	299	6.59	0.00	0.45	0.17	<0.01	<0.01	0.14	0.02
	8-15	22.01	6.32	551	5.77	2.41	0.00	0.00	<0.01	<0.01	0.24	0.03

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-36 (continued). Acid sulfate characteristics of the Waltowa soil materials at the completion of the six week columns experiment, August 2010.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC (%$CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)
Q3.1	0-4	58.78	7.58	1682	7.97	0.00	2.10	15.15	0.08	0.02	4.72	0.48
	4-8	23.32	8.26	430	7.83	0.00	0.22	2.26	<0.01	<0.01	0.12	0.01
	8-15	20.87	7.78	864	6.58	0.00	0.13	2.58	<0.01	<0.01	0.10	0.02
Q3.2	0-4	58.78	7.65	633	8.14	0.00	1.04	12.29	0.03	0.01	2.36	0.23
	4-8	23.32	7.90	219	6.92	0.00	0.46	2.12	<0.01	<0.01	0.17	0.01
	8-15	20.87	7.49	419	6.76	0.00	0.01	2.00	<0.01	<0.01	0.13	0.02
R1.1	0-4	23.02	8.86	255	9.27	0.00	5.25	5.11	0.01	<0.01	1.15	0.04
	4-8	18.55	9.16	249	8.90	0.00	0.23	70.31	<0.01	<0.01	0.09	0.02
	8-15	19.46	9.19	526	8.77	0.00	0.20	4.56	<0.01	<0.01	0.08	0.01
R1.2	0-4	23.02	8.33	256	9.33	0.00	1.42	33.11	<0.01	<0.01	0.65	0.05
	4-8	18.55	8.68	307	7.99	0.00	0.09	2.84	<0.01	<0.01	0.11	0.02
	8-15	19.46	9.32	531	8.78	0.00	0.11	5.91	<0.01	<0.01	0.07	0.01
R2.1	0-4	29.91	8.78	489	9.19	0.00	2.93	19.19	0.03	<0.01	1.07	0.08
	4-8	20.46	9.16	544	8.72	0.00	0.22	2.75	<0.01	<0.01	0.09	0.01
	8-15	19.88	9.23	730	8.64	0.00	0.18	2.06	<0.01	<0.01	0.09	0.02
R2.2	0-4	29.91	8.79	496	9.21	0.00	6.85	75.74	0.03	<0.01	2.34	0.15
	4-8	20.46	9.38	258	9.41	0.00	0.27	15.79	<0.01	<0.01	0.11	0.01
	8-15	19.88	9.40	521	8.78	0.00	0.16	5.06	<0.01	<0.01	0.10	0.01
R3.1	0-4	31.61	8.49	540	8.83	0.00	1.68	14.27	0.03	<0.01	1.82	0.16
	4-8	22.42	9.12	319	9.15	0.00	0.22	5.88	<0.01	<0.01	0.11	0.02
	8-15	19.59	9.35	571	8.59	0.00	0.22	2.55	<0.01	<0.01	0.07	0.01
R3.2	0-4	31.61	8.77	497	8.90	0.00	1.56	18.75	0.05	0.01	1.36	0.12
	4-8	22.42	9.35	295	8.56	0.00	0.12	3.63	<0.01	<0.01	0.08	0.02
	8-15	19.59	9.34	585	8.31	0.00	0.02	1.84	<0.01	<0.01	0.06	0.01

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-37. Acid sulfate characteristics of the Waltowa soil materials at the completion of the six week columns experiment, November 2010.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH$_{KCl}$	TAA (mol H$^+$ t^{-1})	ANC (%CaCO$_3$)	TAAlk (mol OH$^-$ t^{-1})	Chromium Reducible Sulfur (%S$_{CR}$)	Acid Volatile Sulfide (%S$_{AV}$)	Total C (%C)	Total N (%N)
GG1.1	0-4	30.09	8.51	427	9.00	0.00	2.20	23.21	0.01	<0.01	1.26	0.10
	4-8	19.51	8.96	261	8.40	0.00	0.05	3.53	<0.01	<0.01	0.17	0.04
	8-15	19.77	8.83	361	7.28	0.00	0.02	1.33	<0.01	<0.01	0.12	0.02
GG1.2	0-4	34.21	8.13	570	9.00	0.00	3.02	19.22	0.04	0.02	1.05	0.09
	4-8	21.04	8.34	444	8.74	0.00	0.19	3.78	<0.01	<0.01	0.17	0.02
	8-15	18.69	8.10	431	7.66	0.00	0.13	2.39	<0.01	<0.01	0.12	0.02
GG2.1	0-4	35.21	8.50	421	8.99	0.00	1.56	15.14	0.03	0.01	1.61	0.14
	4-8	23.47	9.09	408	9.45	0.00	5.10	51.44	0.01	0.01	1.07	0.05
	8-15	20.68	9.30	448	8.82	0.00	0.04	4.08	<0.01	<0.01	0.12	0.02
GG2.2	0-4	43.35	7.96	440	8.95	0.00	1.61	15.57	0.04	0.01	1.58	0.14
	4-8	21.92	8.81	252	9.44	0.00	1.42	2.51	0.02	0.02	0.44	0.03
	8-15	21.28	8.78	364	7.54	0.00	0.24	21.99	<0.01	<0.01	0.12	0.03
GG3.1	0-4	42.67	8.46	741	8.44	0.00	3.61	15.36	0.03	<0.01	2.40	0.22
	4-8	20.40	9.03	454	9.53	0.00	1.06	25.40	<0.01	<0.01	0.31	0.02
	8-15	19.98	8.69	732	7.65	0.00	0.03	1.78	<0.01	<0.01	0.12	0.03
GG3.2	0-4	46.91	8.13	824	8.60	0.00	1.49	10.88	0.09	0.03	2.12	0.21
	4-8	21.77	8.43	407	8.28	0.00	0.25	2.56	<0.01	<0.01	0.16	0.02
	8-15	20.19	8.62	619	8.13	0.00	0.26	2.76	<0.01	<0.01	0.12	0.02
FF1.1	0-4	24.06	7.92	451	6.63	0.00	0.52	1.52	<0.01	<0.01	0.47	0.04
	4-8	20.59	7.86	361	7.27	0.00	0.13	2.26	0.02	<0.01	0.14	<0.01
	8-15	20.50	7.92	486	7.02	0.00	0.14	1.13	<0.01	<0.01	0.14	0.01
FF1.2	0-4	49.22	5.70	503	5.18	5.37	0.00	0.00	0.05	0.01	3.47	0.34
	4-8	21.85	6.22	113	5.75	2.30	0.00	0.00	0.02	<0.01	0.15	0.01
	8-15	21.26	6.30	87	5.72	2.36	0.00	0.00	<0.01	<0.01	0.15	0.02
FF2.1	0-4	32.69	6.45	315	5.68	3.11	0.00	0.00	<0.01	<0.01	1.07	0.10
	4-8	21.54	7.10	199	6.44	1.61	0.00	0.00	<0.01	<0.01	0.15	0.01
	8-15	20.25	6.75	336	6.00	2.36	0.00	0.00	<0.01	<0.01	0.14	0.02
FF2.2	0-4	33.78	6.39	241	6.03	1.38	0.00	0.00	0.02	<0.01	0.83	0.08
	4-8	21.26	6.77	160	6.32	2.01	0.00	0.00	<0.01	<0.01	0.15	0.01
	8-15	19.01	6.63	242	6.09	2.23	0.00	0.00	<0.01	<0.01	0.15	0.01

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-37 (continued). Acid sulfate characteristics of the Waltowa soil materials at the completion of the six week columns experiment, November 2010.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC (%$CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)
FF3.1	0-4	47.64	7.62	902	7.89	0.00	1.17	6.99	0.10	0.04	3.32	0.34
	4-8	20.23	8.22	279	7.42	0.00	0.08	2.27	0.02	<0.01	0.12	0.01
	8-15	20.05	8.29	369	7.41	0.00	0.12	2.32	<0.01	<0.01	0.11	0.01
FF3.2	0-4	39.60	7.85	450	8.03	0.00	0.98	5.67	0.03	<0.01	2.50	0.25
	4-8	20.56	7.38	187	8.03	0.00	0.18	1.66	0.01	<0.01	0.11	0.01
	8-15	20.69	7.18	292	6.62	0.00	0.06	0.32	<0.01	<0.01	0.10	0.01
EE1.1	0-4	41.05	7.75	630	8.75	0.00	1.60	18.58	0.07	0.04	1.58	0.13
	4-8	19.48	8.57	400	7.98	0.00	0.12	2.54	<0.01	<0.01	0.10	0.01
	8-15	19.46	8.89	545	7.91	0.00	0.17	2.62	<0.01	<0.01	0.09	<0.01
EE1.2	0-4	37.97	7.77	894	8.57	0.00	1.70	16.54	0.09	0.05	1.89	0.19
	4-8	20.24	8.22	307	8.69	0.00	0.04	3.96	<0.01	<0.01	0.13	0.01
	8-15	19.53	8.17	460	8.06	0.00	0.11	2.62	<0.01	<0.01	0.08	0.01
EE2.1	0-4	62.38	7.75	1696	8.17	0.00	4.17	26.69	0.27	0.14	5.07	0.53
	4-8	27.43	8.83	429	9.50	0.00	0.76	22.43	<0.01	<0.01	0.24	<0.01
	8-15	20.37	8.87	506	8.28	0.00	0.27	2.00	<0.01	<0.01	0.10	0.01
EE2.2	0-4	42.61	7.83	1061	8.43	0.00	3.26	22.34	0.08	0.03	3.19	0.31
	4-8	18.88	8.44	445	9.06	0.00	0.24	6.96	<0.01	<0.01	0.11	0.01
	8-15	20.12	8.42	613	8.14	0.00	0.23	2.38	<0.01	<0.01	0.10	0.01
EE3.1	0-4	63.73	7.86	1608	8.25	0.00	5.58	18.80	0.25	0.10	4.82	0.46
	4-8	21.97	8.90	409	9.57	0.00	8.51	98.00	<0.01	<0.01	1.31	0.02
	8-15	18.68	9.22	340	8.67	0.00	0.21	3.64	<0.01	<0.01	0.08	<0.01
EE3.2	0-4	43.38	8.06	529	8.79	0.00	6.30	33.84	0.05	<0.01	2.59	0.17
	4-8	19.44	8.86	116	9.57	0.00	0.68	21.01	<0.01	<0.01	0.21	<0.01
	8-15	18.05	8.77	187	8.12	0.00	0.14	2.63	<0.01	<0.01	0.09	<0.01

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-38. Acid sulfate characteristics of the Waltowa soil materials at the completion of the six week columns experiment, February 2011.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH$_{KCl}$	TAA (mol H$^+$ t^{-1})	ANC (%CaCO$_3$)	TAAlk (mol OH$^-$ t^{-1})	Chromium Reducible Sulfur (%S$_{CR}$)	Acid Volatile Sulfide (%S$_{AV}$)	Total C (%C)	Total N (%N)
PP1.1	0-4	57.82	8.19	946	8.55	0.00	2.14	24.85	0.41	0.32	1.64	0.16
	4-8	25.51	8.31	621	9.14	0.00	0.65	21.19	0.12	0.08	0.32	0.03
	8-15	19.20	8.49	632	7.60	0.00	0.18	2.34	0.10	0.09	0.13	0.01
PP1.2	0-4	35.57	7.66	1151	9.00	0.00	3.18	21.39	0.12	0.07	0.75	0.07
	4-8	24.79	8.19	436	9.10	0.00	0.27	10.81	0.05	0.03	0.17	0.02
	8-15	20.33	8.47	550	8.33	0.00	0.17	3.76	0.02	<0.01	0.12	0.01
PP2.1	0-4	39.70	8.17	1176	8.38	0.00	2.82	23.33	0.23	0.14	2.33	0.22
	4-8	21.00	8.57	453	9.43	0.00	3.08	46.11	0.04	0.02	0.52	0.02
	8-15	19.27	8.83	424	8.34	0.00	0.13	3.15	0.01	<0.01	0.09	0.01
PP2.2	0-4	50.99	8.07	1198	8.84	0.00	6.10	42.77	0.37	0.22	3.20	0.26
	4-8	21.24	8.58	382	9.17	0.00	0.30	11.11	0.02	0.01	0.12	0.01
	8-15	20.22	8.71	457	8.20	0.00	0.15	3.26	<0.01	<0.01	0.11	0.01
PP3.1	0-4	40.52	8.55	514	8.97	0.00	34.62	285.06	0.10	0.06	5.50	0.15
	4-8	17.05	8.58	510	9.59	0.00	14.89	202.87	0.03	0.02	1.76	0.02
	8-15	19.00	8.82	232	9.05	0.00	13.82	13.43	<0.01	<0.01	0.11	0.02
PP3.2	0-4	42.72	8.36	1052	9.17	0.00	21.58	137.42	0.11	0.06	3.92	0.15
	4-8	23.05	8.83	473	9.71	0.00	6.71	89.40	0.03	0.02	0.92	0.03
	8-15	20.32	8.96	414	9.05	0.00	0.69	8.41	0.01	<0.01	0.12	0.02
QQ1.1	0-4	26.83	7.63	514	5.92	2.38	0.00	0.00	0.05	0.02	0.27	0.02
	4-8	20.09	7.73	506	6.41	1.29	0.00	0.00	<0.01	<0.01	0.14	0.02
	8-15	18.16	7.41	558	5.61	2.24	0.00	0.00	<0.01	<0.01	0.10	0.02
QQ1.2	0-4	26.12	7.20	466	6.08	1.64	0.00	0.00	0.04	0.03	0.30	0.04
	4-8	19.82	8.36	430	6.24	2.15	0.00	0.00	<0.01	<0.01	0.12	0.01
	8-15	19.15	7.47	375	6.42	2.07	0.00	0.00	<0.01	<0.01	0.10	0.02
QQ2.1	0-4	40.69	6.54	772	5.83	2.42	0.00	0.00	0.11	0.07	0.51	0.06
	4-8	20.67	6.94	341	6.85	0.00	0.51	2.61	0.03	0.01	0.13	0.02
	8-15	19.29	6.50	741	6.60	0.00	0.51	2.35	<0.01	<0.01	0.12	0.02
QQ2.2	0-4	40.29	7.58	967	6.78	0.00	0.61	2.15	0.15	0.10	1.35	0.14
	4-8	21.66	6.68	463	5.93	2.42	0.00	0.00	0.03	0.01	0.13	0.02
	8-15	20.78	7.69	469	6.42	1.74	0.00	0.00	<0.01	<0.01	0.21	0.02

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-38 (continued). Acid sulfate characteristics of the Waltowa soil materials at the completion of the six week columns experiment, February 2011.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC (%$CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)
QQ3.1	0-4	26.99	6.83	719	7.86	0.00	0.46	5.53	0.08	0.05	0.55	0.07
	4-8	20.03	7.33	301	6.93	0.00	0.36	2.44	0.01	<0.01	0.15	0.02
	8-15	19.45	7.27	446	6.81	0.00	0.47	0.59	<0.01	<0.01	0.12	0.02
QQ3.2	0-4	5.63	7.38	548	8.10	0.00	0.47	4.79	0.09	0.06	0.55	0.06
	4-8	20.02	7.75	393	6.92	0.00	0.42	2.32	<0.01	<0.01	0.16	0.02
	8-15	20.21	7.54	427	6.81	0.00	0.33	0.37	<0.01	<0.01	0.12	0.02
R1.1	0-4	29.18	7.44	544	9.43	0.00	4.87	46.51	0.04	0.02	0.76	0.04
	4-8	18.56	7.88	443	8.71	0.00	0.47	5.84	<0.01	<0.01	0.08	0.01
	8-15	17.34	7.86	631	7.81	0.00	0.47	2.36	<0.01	<0.01	0.07	0.01
RR1.2	0-4	25.28	8.40	620	9.31	0.00	1.17	22.49	0.04	0.03	0.53	0.04
	4-8	19.73	8.24	400	7.92	0.00	0.47	2.53	<0.01	<0.01	0.09	0.01
	8-15	19.04	8.48	635	7.61	0.00	0.49	2.49	<0.01	<0.01	0.07	<0.01
RR2.1	0-4	32.13	7.87	956	9.26	0.00	2.31	30.14	0.14	0.08	1.05	0.08
	4-8	20.33	8.35	552	9.44	0.00	0.60	15.74	<0.01	<0.01	0.10	0.01
	8-15	18.37	8.56	627	8.59	0.00	0.51	4.05	<0.01	<0.01	0.09	0.02
RR2.2	0-4	34.04	8.10	1031	9.11	0.00	1.17	19.62	0.11	0.07	1.01	0.09
	4-8	19.89	8.61	325	7.85	0.00	0.16	2.11	0.01	<0.01	0.07	0.01
	8-15	20.18	8.61	438	7.54	0.00	0.13	2.00	<0.01	<0.01	0.10	0.01
RR3.1	0-4	38.54	8.28	745	8.99	0.00	2.75	27.24	0.15	0.08	2.44	0.20
	4-8	22.38	8.54	342	8.97	0.00	0.39	6.14	<0.01	<0.01	0.13	0.02
	8-15	22.23	8.56	526	8.30	0.00	0.51	3.11	<0.01	<0.01	0.13	0.02
RR3.2	0-4	56.25	8.25	1290	8.62	0.00	4.04	32.35	0.27	0.15	3.65	0.29
	4-8	24.23	8.67	353	9.39	0.00	0.32	14.72	0.04	0.03	0.18	0.02
	8-15	19.67	8.99	306	8.19	0.00	0.18	2.86	0.01	<0.01	0.10	0.01

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-39. Acid sulfate characteristics of the Poltalloch soil materials at the completion of the six week columns experiment, May 2010.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC (%$CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)
I1.1	0-4	19.03	4.52	115	4.76	2.64	0.00	0.00	<0.01	<0.01	0.08	0.02
	4-8	17.41	4.34	169	4.73	2.95	0.00	0.00	<0.01	<0.01	0.05	0.01
	8-15	17.77	4.32	353	4.93	2.86	0.00	0.00	<0.01	<0.01	0.06	0.02
I1.2	0-4	21.50	4.38	464	5.54	3.60	0.00	0.00	<0.01	<0.01	0.06	0.01
	4-8	17.99	4.31	312	5.25	3.58	0.00	0.00	<0.01	<0.01	0.05	0.01
	8-15	18.13	4.66	93	5.30	2.13	0.00	0.00	<0.01	<0.01	0.07	0.01
I2.1	0-4	20.12	4.73	80	4.93	2.94	0.00	0.00	<0.01	<0.01	0.11	0.02
	4-8	18.62	4.24	121	4.69	3.43	0.00	0.00	<0.01	<0.01	0.07	0.01
	8-15	17.90	4.04	155	4.48	4.67	0.00	0.00	<0.01	<0.01	0.08	0.01
I2.2	0-4	19.75	4.34	178	4.85	2.89	0.00	0.00	<0.01	<0.01	0.09	0.02
	4-8	18.79	4.08	476	4.89	3.51	0.00	0.00	<0.01	<0.01	0.17	0.02
	8-15	17.77	3.97	1147	4.61	4.46	0.00	0.00	<0.01	<0.01	0.12	0.02
I3.1	0-4	18.61	4.77	340	5.45	2.89	0.00	0.00	<0.01	<0.01	0.04	0.01
	4-8	15.33	5.04	758	5.64	2.87	0.00	0.00	<0.01	<0.01	0.03	0.02
	8-15	16.71	4.96	1101	5.65	2.83	0.00	0.00	<0.01	<0.01	0.04	0.02
I3.2	0-4	20.23	5.09	82	5.68	2.75	0.00	0.00	<0.01	<0.01	0.03	0.01
	4-8	16.61	4.97	211	5.85	3.30	0.00	0.00	<0.01	<0.01	0.07	0.02
	8-15	16.62	4.93	566	5.84	2.39	0.00	0.00	<0.01	<0.01	0.03	0.02
J1.1	0-4	19.89	5.34	112	5.59	3.06	0.00	0.00	<0.01	<0.01	0.05	0.02
	4-8	16.81	4.93	243	5.40	2.93	0.00	0.00	<0.01	<0.01	0.05	0.02
	8-15	15.86	5.25	519	5.68	3.15	0.00	0.00	<0.01	<0.01	0.03	0.01
J1.2	0-4	19.95	5.25	80	5.94	3.03	0.00	0.00	<0.01	<0.01	0.04	0.01
	4-8	18.78	4.76	144	5.63	3.24	0.00	0.00	<0.01	<0.01	0.05	0.02
	8-15	16.69	4.72	298	5.65	3.05	0.00	0.00	<0.01	<0.01	0.04	0.01
J2.1	0-4	20.05	4.65	119	4.74	2.68	0.00	0.00	<0.01	<0.01	0.17	0.03
	4-8	18.70	4.17	258	4.67	2.68	0.00	0.00	<0.01	<0.01	0.11	0.02
	8-15	19.20	4.12	347	4.63	3.20	0.00	0.00	<0.01	<0.01	0.07	0.02
J2.2	0-4	21.47	4.52	99	4.83	2.88	0.00	0.00	<0.01	<0.01	0.18	0.03
	4-8	20.28	4.27	153	4.86	2.87	0.00	0.00	<0.01	<0.01	0.13	0.03
	8-15	19.41	4.23	370	5.05	3.09	0.00	0.00	<0.01	<0.01	0.17	0.02

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-39 (continued). Acid sulfate characteristics of the Poltalloch soil materials at the completion of the six week columns experiment, May 2010.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC (%$CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)
J3.1	0-4	19.31	4.57	163	5.01	2.90	0.00	0.00	<0.01	<0.01	0.06	0.02
	4-8	17.73	4.66	505	5.36	3.18	0.00	0.00	<0.01	<0.01	0.04	0.01
	8-15	16.27	4.33	905	4.82	2.94	0.00	0.00	<0.01	<0.01	0.09	0.03
J3.2	0-4	18.77	4.81	68	5.46	2.84	0.00	0.00	<0.01	<0.01	0.85	0.05
	4-8	17.48	4.43	337	5.14	3.28	0.00	0.00	<0.01	<0.01	0.07	0.03
	8-15	15.55	4.19	616	4.79	2.86	0.00	0.00	<0.01	<0.01	0.08	0.03
K1.1	0-4	21.88	6.15	598	7.04	0.00	0.15	1.07	<0.01	<0.01	0.29	0.05
	4-8	21.79	6.22	567	6.52	0.00	0.08	1.53	<0.01	<0.01	1.02	0.05
	8-15	18.77	6.26	469	6.78	0.00	0.24	0.39	<0.01	<0.01	0.09	0.02
K1.2	0-4	23.19	6.21	1416	7.19	0.00	0.10	2.38	<0.01	<0.01	0.21	0.04
	4-8	17.83	6.40	188	6.74	0.00	0.08	2.42	<0.01	<0.01	0.09	0.02
	8-15	18.05	6.36	322	8.26	0.00	0.14	5.27	<0.01	<0.01	0.10	0.02
K2.1	0-4	20.91	6.35	146	6.75	0.00	0.02	1.35	<0.01	<0.01	0.13	0.03
	4-8	20.27	6.43	558	7.44	0.00	0.08	2.12	<0.01	<0.01	0.10	0.02
	8-15	18.88	6.65	359	8.28	0.00	0.05	2.74	<0.01	<0.01	0.06	0.01
K2.2	0-4	21.27	6.78	57	6.76	0.00	0.05	2.65	<0.01	<0.01	0.13	0.02
	4-8	18.66	7.46	208	8.51	0.00	0.12	7.11	<0.01	<0.01	0.12	0.02
	8-15	20.08	6.74	245	7.06	0.00	0.77	2.54	<0.01	<0.01	0.10	0.02
K3.1	0-4	18.28	6.93	219	8.80	0.00	0.09	4.03	<0.01	<0.01	0.13	0.02
	4-8	18.79	7.32	372	9.10	0.00	0.27	4.54	<0.01	<0.01	0.10	0.02
	8-15	18.89	6.74	642	5.70	3.66	0.00	0.00	<0.01	<0.01	0.15	0.02
K3.2	0-4	19.77	7.31	147	8.25	0.00	0.05	5.99	<0.01	<0.01	0.11	0.02
	4-8	18.65	7.41	140	7.06	0.00	0.04	2.87	<0.01	<0.01	0.08	0.02
	8-15	18.61	7.11	440	6.94	0.00	0.14	1.44	<0.01	<0.01	0.07	0.02

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-40. Acid sulfate characteristics of the Poltalloch soil materials at the completion of the six week columns experiment, August 2010.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC (%$CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)
X1.1	0-4	19.11	7.27	75	6.20	1.28	0.00	0.00	<0.01	<0.01	0.17	0.01
	4-8	15.88	7.41	59	6.32	1.04	0.00	0.00	<0.01	<0.01	0.10	0.02
	8-15	16.29	7.72	87	6.97	0.00	0.21	1.25	<0.01	<0.01	0.07	0.01
X1.2	0-4	19.11	8.38	110	7.54	0.00	0.17	1.17	<0.01	<0.01	0.19	0.02
	4-8	15.88	8.93	118	8.64	0.00	0.19	4.10	<0.01	<0.01	0.14	0.02
	8-15	16.29	8.94	133	7.32	0.00	0.09	1.96	<0.01	<0.01	0.08	0.01
X2.1	0-4	22.31	7.88	136	7.05	0.00	0.25	1.35	<0.01	<0.01	0.22	0.02
	4-8	19.18	8.63	162	7.87	0.00	0.20	1.24	<0.01	<0.01	0.09	0.01
	8-15	19.24	7.28	281	8.87	0.00	0.26	3.97	<0.01	<0.01	0.07	0.02
X2.2	0-4	22.31	7.41	159	7.28	0.00	0.10	0.98	<0.01	<0.01	0.25	0.03
	4-8	19.18	8.57	183	7.84	0.00	0.20	2.47	<0.01	<0.01	0.11	0.01
	8-15	19.24	8.95	364	8.88	0.00	0.68	5.44	<0.01	<0.01	0.10	0.02
X3.1	0-4	19.28	6.96	95	8.51	0.00	0.18	3.11	<0.01	<0.01	0.15	0.02
	4-8	18.41	8.20	175	8.93	0.00	0.27	4.33	<0.01	<0.01	0.11	0.01
	8-15	17.80	7.85	281	6.42	0.30	0.00	0.00	<0.01	<0.01	0.04	0.01
X3.2	0-4	19.28	9.06	119	8.75	0.00	0.64	4.03	<0.01	<0.01	0.14	0.01
	4-8	18.41	9.11	187	8.97	0.00	0.66	6.33	<0.01	<0.01	0.08	0.01
	8-15	17.80	8.10	312	6.43	0.67	0.00	0,00	<0.01	<0.01	0.04	0.01
W1.1	0-4	20.57	6.90	152	7.01	0.00	0.11	0.19	<0.01	<0.01	0.15	0.04
	4-8	18.92	7.36	191	6.87	0.00	0.20	1.46	<0.01	<0.01	0.10	0.03
	8-15	17.75	7.17	448	6.41	0.46	0.00	0.00	<0.01	<0.01	0.05	0.03
W1.2	0-4	20.57	6.60	70	6.38	1.72	0.00	0.00	<0.01	<0.01	0.14	0.04
	4-8	18.92	6.99	69	6.84	0.00	0.04	0.70	<0.01	<0.01	0.10	0.04
	8-15	17.75	6.78	59	6.25	2.37	0.00	0.00	<0.01	<0.01	0.06	0.03
W2.1	0-4	20.82	7.37	69	5.98	1.57	0.00	0.00	<0.01	<0.01	0.11	0.04
	4-8	17.84	7.39	77	6.89	0.00	0.14	1.72	<0.01	<0.01	0.12	0.04
	8-15	16.37	7.64	59	6.38	1.17	0.00	0.00	<0.01	<0.01	0.07	0.03
W2.2	0-4	20.82	6.35	104	6.68	0.00	0.09	0.28	<0.01	<0.01	0.11	0.04
	4-8	17.84	7.42	124	7.17	0.00	0.27	1.10	<0.01	<0.01	0.09	0.04
	8-15	16.37	7.36	208	6.90	0.00	0.09	1.34	<0.01	<0.01	0.07	0.06

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-40 (continued). Acid sulfate characteristics of the Poltalloch soil materials at the completion of the six week columns experiment, August 2010.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC (%$CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)
W3.1	0-4	11.38	7.44	103	6.07	2.11	0.00	0.00	<0.01	<0.01	0.10	0.05
	4-8	16.64	7.40	52	6.29	1.67	0.00	0.00	<0.01	<0.01	0.13	0.03
	8-15	15.74	7.47	49	6.42	1.29	0.00	0.00	<0.01	<0.01	0.07	0.02
W3.2	0-4	11.38	7.52	61	6.73	0.00	0.10	0.47	<0.01	<0.01	0.09	0.02
	4-8	16.64	8.14	95	7.76	0.00	0.16	1.80	<0.01	<0.01	n/s	n/s
	8-15	15.74	8.33	105	7.06	0.00	0.10	1.80	<0.01	<0.01	0.07	0.01

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-41. Acid sulfate characteristics of the Poltalloch soil materials at the completion of the six week columns experiment, November 2010.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC (%$CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)
HH1.1	0-4	22.33	8.79	94	7.28	0.00	0.09	1.63	0.02	<0.01	0.13	0.01
	4-8	18.39	9.06	84	8.62	0.00	0.19	3.39	<0.01	<0.01	0.13	0.01
	8-15	18.30	8.89	118	7.29	0.00	0.00	1.16	<0.01	<0.01	0.06	<0.01
HH1.2	0-4	20.34	8.40	83	7.22	0.00	0.12	2.10	<0.01	<0.01	0.14	0.02
	4-8	18.03	8.39	87	8.62	0.00	0.18	2.93	<0.01	<0.01	0.09	0.02
	8-15	18.03	8.78	128	9.06	0.00	0.29	6.96	<0.01	<0.01	0.10	0.01
HH2.1	0-4	21.63	8.57	88	6.39	2.27	0.00	0.00	<0.01	<0.01	0.07	0.01
	4-8	18.90	9.26	176	8.77	0.00	0.19	3.08	<0.01	<0.01	0.06	0.01
	8-15	17.98	8.67	364	6.46	1.22	0.00	0.00	<0.01	<0.01	0.04	0.01
HH2.2	0-4	20.15	8.43	124	6.58	0.00	0.16	0.20	<0.01	<0.01	0.11	0.02
	4-8	18.60	8.29	220	6.92	0.00	0.15	1.71	<0.01	<0.01	0.06	0.02
	8-15	18.65	6.25	439	6.27	2.12	0.00	0.00	<0.01	<0.01	0.04	0.01
HH3.1	0-4	19.00	8.09	49	5.83	1.64	0.00	0.00	<0.01	<0.01	0.13	0.02
	4-8	18.61	8.07	62	6.49	0.11	0.00	0.00	<0.01	<0.01	0.09	0.02
	8-15	18.48	8.33	204	6.82	0.00	0.17	1.22	<0.01	<0.01	0.07	<0.01
HH3.2	0-4	18.15	6.68	78	6.03	2.31	0.00	0.00	<0.01	<0.01	0.12	0.01
	4-8	18.84	7.10	122	6.32	1.65	0.00	0.00	<0.01	<0.01	0.08	0.01
	8-15	18.66	8.03	215	6.63	0.00	0.18	1.03	<0.01	<0.01	0.06	0.01
II1.1	0-4	16.96	7.28	94	6.33	1.48	0.00	0.00	<0.01	<0.01	0.11	0.01
	4-8	17.59	7.29	183	6.43	0.77	0.00	0.00	<0.01	<0.01	0.06	0.01
	8-15	18.36	7.75	274	7.86	0.00	0.16	2.30	<0.01	<0.01	0.07	0.02
II1.2	0-4	16.77	7.02	96	6.05	2.10	0.00	0.00	<0.01	<0.01	0.12	0.02
	4-8	19.16	7.52	181	6.49	0.23	0.00	0.00	<0.01	<0.01	0.08	0.01
	8-15	19.20	7.77	278	6.59	0.00	0.22	1.21	<0.01	<0.01	0.06	0.02
II2.1	0-4	18.49	7.43	95	6.56	0.00	0.09	1.86	<0.01	<0.01	0.13	0.01
	4-8	18.89	7.63	96	6.48	0.75	0.00	0.00	<0.01	<0.01	0.10	0.02
	8-15	17.91	7.45	147	6.38	1.50	0.00	0.00	<0.01	<0.01	0.08	0.02
II2.2	0-4	20.24	7.35	77	6.30	1.70	0.00	0.00	<0.01	<0.01	0.15	0.03
	4-8	18.36	8.09	127	6.68	0.00	0.26	0.52	<0.01	<0.01	0.11	0.02
	8-15	18.17	8.01	249	7.22	0.00	0.22	2.12	<0.01	<0.01	0.08	0.02

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-41 (continued). Acid sulfate characteristics of the Poltalloch soil materials at the completion of the six week columns experiment, November 2010.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC (%$CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)
II3.1	0-4	18.25	7.14	93	6.12	2.43	0.00	0.00	<0.01	<0.01	0.13	0.02
	4-8	17.57	7.92	148	6.37	1.90	0.00	0.00	<0.01	<0.01	0.08	0.01
	8-15	18.44	7.62	230	6.13	1.60	0.00	0.00	<0.01	<0.01	0.05	0.02
II3.2	0-4	17.39	7.26	83	6.29	2.21	0.00	0.00	<0.01	<0.01	0.09	0.01
	4-8	18.29	8.16	119	7.00	0.00	0.18	1.04	<0.01	<0.01	0.11	0.02
	8-15	18.03	8.17	186	6.75	0.00	0.21	1.44	<0.01	<0.01	0.07	0.01

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-42. Acid sulfate characteristics of the Poltalloch soil materials at the completion of the six week columns experiment, February 2011.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol $H^+ t^{-1}$)	ANC (%$CaCO_3$)	TAAlk (mol $OH^- t^{-1}$)	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)
XX1.1	0-4	19.30	6.23	52	6.31	1.86	0.00	0.00	<0.01	<0.01	0.08	0.02
	4-8	18.29	6.07	182	6.64	0.00	0.42	0.22	<0.01	<0.01	0.06	0.01
	8-15	17.63	6.06	107	5.89	2.32	0.00	0.00	<0.01	<0.01	0.05	0.01
XX1.2	0-4	18.26	5.62	87	6.02	2.17	0.00	0.00	<0.01	<0.01	0.08	0.02
	4-8	17.96	6.95	151	6.61	0.00	0.50	1.48	<0.01	<0.01	0.07	0.02
	8-15	17.05	5.44	171	5.82	2.74	0.00	0.00	<0.01	<0.01	0.10	0.01
XX2.1	0-4	19.79	6.72	102	8.74	0.00	0.58	4.54	<0.01	<0.01	0.12	0.01
	4-8	18.88	6.88	112	7.11	0.00	0.32	0.48	<0.01	<0.01	0.04	0.01
	8-15	18.68	6.76	81	6.35	1.87	0.00	0.00	<0.01	<0.01	0.05	0.01
XX2.2	0-4	18.52	7.78	121	9.27	0.00	0.64	13.69	<0.01	<0.01	0.08	0.01
	4-8	17.38	6.36	98	6.68	0.00	0.39	1.08	<0.01	<0.01	0.05	0.01
	8-15	18.11	7.24	498	6.14	2.03	0.00	0.00	<0.01	<0.01	0.04	0.01
XX3.1	0-4	21.36	6.73	69	7.20	0.00	0.40	0.97	<0.01	<0.01	0.08	0.01
	4-8	17.76	6.98	71	7.27	0.00	0.41	2.14	<0.01	<0.01	0.11	0.01
	8-15	18.29	6.85	76	6.32	2.21	0.00	0.00	<0.01	<0.01	0.04	0.01
XX3.2	0-4	19.62	6.64	51	6.74	0.00	0.12	2.27	<0.01	<0.01	0.08	0.02
	4-8	18.11	7.74	116	8.35	0.00	0.41	4.05	<0.01	<0.01	0.07	0.01
	8-15	17.26	6.22	77	6.15	2.22	0.00	0.00	<0.01	<0.01	0.08	0.01
WW1.1	0-4	23.45	6.44	169	6.42	1.68	0.00	0.00	<0.01	<0.01	0.06	0.01
	4-8	21.01	5.31	241	5.30	2.68	0.00	0.00	<0.01	<0.01	0.09	0.01
	8-15	18.60	4.83	227	5.32	2.30	0.00	0.00	<0.01	<0.01	0.06	<0.01
WW1.2	0-4	21.95	6.31	113	6.98	0.00	0.37	2.02	<0.01	<0.01	0.07	0.01
	4-8	19.21	5.51	110	5.74	2.41	0.00	0.00	<0.01	<0.01	0.08	0.01
	8-15	18.07	5.26	206	5.53	2.41	0.00	0.00	<0.01	<0.01	0.05	0.01
WW2.1	0-4	19.87	5.48	82	5.91	1.74	0.00	0.00	<0.01	<0.01	0.11	0.02
	4-8	19.34	5.61	108	5.83	1.88	0.00	0.00	<0.01	<0.01	0.08	0.02
	8-15	18.56	5.67	88	6.19	2.15	0.00	0.00	<0.01	<0.01	0.05	0.02
WW2.2	0-4	22.47	6.21	85	6.04	2.31	0.00	0.00	<0.01	<0.01	0.12	0.02
	4-8	18.33	6.08	139	6.13	1.67	0.00	0.00	<0.01	<0.01	0.10	0.02
	8-15	16.94	6.27	103	6.44	0.39	0.00	0.00	<0.01	<0.01	0.05	0.01

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-42 (continued). Acid sulfate characteristics of the Poltalloch soil materials at the completion of the six week columns experiment, February 2011.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC ($\%CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur ($\%S_{CR}$)	Acid Volatile Sulfide ($\%S_{AV}$)	Total C (%C)	Total N (%N)
WW3.1	0-4	21.52	5.92	58	5.96	2.65	0.00	0.00	<0.01	<0.01	0.09	0.02
	4-8	17.55	5.73	97	5.95	2.27	0.00	0.00	<0.01	<0.01	0.09	0.01
	8-15	17.31	6.09	137	6.40	0.75	0.00	0.00	<0.01	<0.01	0.05	0.01
WW3.2	0-4	23.20	6.31	95	6.25	2.10	0.00	0.00	<0.01	<0.01	0.09	0.02
	4-8	17.04	6.19	185	6.40	1.74	0.00	0.00	<0.01	<0.01	0.07	0.02
	8-15	16.76	5.08	292	6.03	2.25	0.00	0.00	<0.01	<0.01	0.04	0.01

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-43. Acid sulfate characteristics of the Tolderol soil materials at the completion of the six week columns experiment, May 2010.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC ($\%CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur ($\%S_{CR}$)	Acid Volatile Sulfide ($\%S_{AV}$)	Total C (%C)	Total N (%N)
E1.1	0-4	22.62	3.89	89	4.08	13.37	0.00	0.00	<0.01	<0.01	0.35	0.03
	4-8	17.16	3.63	156	3.97	16.03	0.00	0.00	0.01	0.01	0.32	0.04
	8-15	22.66	3.80	205	4.25	9.45	0.00	0.00	0.02	0.02	0.15	0.02
E1.2	0-4	20.59	4.38	101	4.39	7.10	0.00	0.00	<0.01	<0.01	0.15	0.02
	4-8	21.81	4.16	117	4.53	5.67	0.00	0.00	<0.01	<0.01	0.08	0.01
	8-15	22.06	4.15	113	4.66	4.54	0.00	0.00	<0.01	<0.01	0.07	0.01
E2.1	0-4	21.50	4.50	70	4.68	4.30	0.00	0.00	<0.01	<0.01	0.10	0.01
	4-8	21.66	4.21	90	4.55	5.26	0.00	0.00	<0.01	<0.01	0.08	0.01
	8-15	22.59	4.86	88	4.99	4.50	0.00	0.00	<0.01	<0.01	0.09	0.01
E2.2	0-4	20.31	4.60	49	4.60	4.71	0.00	0.00	<0.01	<0.01	0.16	0.02
	4-8	20.00	4.22	71	4.44	6.33	0.00	0.00	<0.01	<0.01	0.11	0.02
	8-15	21.71	4.21	83	4.63	5.16	0.00	0.00	<0.01	<0.01	0.05	0.01
E3.1	0-4	22.94	4.26	119	4.61	4.72	0.00	0.00	<0.01	<0.01	0.09	0.02
	4-8	21.20	4.10	164	4.65	4.84	0.00	0.00	<0.01	<0.01	0.07	0.01
	8-15	21.96	4.03	250	4.68	4.85	0.00	0.00	<0.01	<0.01	0.06	0.01
E3.2	0-4	23.33	3.95	172	4.19	11.85	0.00	0.00	<0.01	<0.01	0.13	0.02
	4-8	21.75	3.83	245	4.28	9.00	0.00	0.00	<0.01	<0.01	0.10	0.01
	8-15	21.55	3.86	314	4.45	7.32	0.00	0.00	<0.01	<0.01	0.07	0.01
D1.1	0-4	29.55	4.53	81	4.70	5.10	0.00	0.00	<0.01	<0.01	0.10	0.01
	4-8	23.28	4.53	94	4.77	4.50	0.00	0.00	<0.01	<0.01	0.05	0.00
	8-15	21.63	4.19	86	4.93	2.93	0.00	0.00	<0.01	<0.01	0.04	0.00
D1.2	0-4	20.65	8.01	74	5.01	5.53	0.00	0.00	<0.01	<0.01	0.10	0.01
	4-8	24.25	5.15	90	4.70	4.56	0.00	0.00	<0.01	<0.01	0.07	0.01
	8-15	22.49	4.64	95	4.88	4.05	0.00	0.00	<0.01	<0.01	0.05	0.00
D2.1	0-4	22.61	4.64	66	4.67	5.12	0.00	0.00	0.01	0.01	0.08	0.01
	4-8	22.06	4.00	96	4.31	9.91	0.00	0.00	<0.01	<0.01	0.11	0.01
	8-15	17.77	4.01	83	4.55	5.14	0.00	0.00	<0.01	<0.01	0.07	0.01
D2.2	0-4	23.32	4.48	97	4.36	8.04	0.00	0.00	<0.01	<0.01	0.12	0.01
	4-8	21.74	4.27	115	4.42	7.16	0.00	0.00	<0.01	<0.01	0.10	0.01
	8-15	23.63	4.18	123	4.54	6.21	0.00	0.00	<0.01	<0.01	0.06	0.01

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-43 (continued). Acid sulfate characteristics of the Tolderol soil materials at the completion of the six week columns experiment, May 2010.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC (%$CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)
D3.1	0-4	21.70	4.87	43	4.99	2.94	0.00	0.00	<0.01	<0.01	0.05	0.00
	4-8	22.46	4.33	50	4.82	2.94	0.00	0.00	<0.01	<0.01	0.05	0.00
	8-15	22.38	4.22	85	4.77	4.50	0.00	0.00	<0.01	<0.01	0.04	0.00
D3.2	0-4	22.91	4.64	91	4.75	4.49	0.00	0.00	<0.01	<0.01	0.07	0.00
	4-8	20.88	4.32	137	4.90	4.35	0.00	0.00	<0.01	<0.01	0.05	0.00
	8-15	19.87	4.01	238	4.46	6.65	0.00	0.00	<0.01	<0.01	0.07	0.00
F1.1	0-4	20.82	5.19	79	5.62	2.36	0.00	0.00	<0.01	<0.01	0.14	0.02
	4-8	22.75	5.30	94	5.53	2.34	0.00	0.00	<0.01	<0.01	0.10	0.01
	8-15	21.23	5.54	108	5.62	2.67	0.00	0.00	<0.01	<0.01	0.09	0.01
F1.2	0-4	21.79	5.08	77	5.68	3.18	0.00	0.00	<0.01	<0.01	0.12	0.01
	4-8	22.55	5.44	65	5.66	2.39	0.00	0.00	<0.01	<0.01	0.10	0.01
	8-15	21.41	5.63	69	5.74	2.80	0.00	0.00	<0.01	<0.01	0.08	0.01
F2.1	0-4	20.79	5.56	95	5.90	2.48	0.00	0.00	<0.01	<0.01	0.14	0.01
	4-8	20.76	5.79	117	6.09	2.62	0.00	0.00	<0.01	<0.01	0.10	0.01
	8-15	20.13	5.80	198	6.25	2.70	0.00	0.00	<0.01	<0.01	0.08	0.01
F2.2	0-4	25.30	5.63	91	6.29	1.68	0.00	0.00	<0.01	<0.01	0.14	0.01
	4-8	20.21	5.98	152	6.52	0.00	0.16	0.06	<0.01	<0.01	0.11	0.01
	8-15	16.88	5.73	246	5.75	2.84	0.00	0.00	<0.01	<0.01	0.07	0.01
F3.1	0-4	23.08	5.91	70	6.01	2.82	0.00	0.00	<0.01	<0.01	0.13	0.01
	4-8	20.48	5.93	105	6.06	2.63	0.00	0.00	<0.01	<0.01	0.13	0.01
	8-15	21.59	6.03	153	6.27	2.52	0.00	0.00	<0.01	<0.01	0.10	0.01
F3.2	0-4	21.06	7.17	95	5.84	2.77	0.00	0.00	<0.01	<0.01	0.12	0.01
	4-8	20.59	7.02	116	6.15	2.83	0.00	0.00	<0.01	<0.01	0.11	0.01
	8-15	21.47	6.52	153	6.09	2.48	0.00	0.00	<0.01	<0.01	0.13	0.02

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-44. Acid sulfate characteristics of the Tolderol soil materials at the completion of the six week columns experiment, August 2010.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC (%$CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)
S1.1	0-4	21.06	6.74	81	4.74	3.96	0.00	0.00	<0.01	<0.01	0.11	0.02
	4-8	19.87	4.34	111	4.39	7.49	0.00	0.00	<0.01	<0.01	0.19	0.03
	8-15	19.63	4.16	147	4.38	7.55	0.00	0.00	<0.01	<0.01	0.11	0.02
S1.2	0-4	21.06	9.46	664	5.27	2.37	0.00	0.00	<0.01	<0.01	0.09	0.02
	4-8	19.87	4.50	93	4.68	4.39	0.00	0.00	<0.01	<0.01	0.09	0.01
	8-15	19.63	4.18	141	4.51	6.07	0.00	0.00	<0.01	<0.01	0.08	0.01
S2.1	0-4	20.19	5.06	68	4.79	2.72	0.00	0.00	<0.01	<0.01	0.09	0.02
	4-8	19.21	4.23	103	4.34	8.72	0.00	0.00	<0.01	<0.01	0.09	0.01
	8-15	19.08	4.17	106	4.35	7.69	0.00	0.00	<0.01	<0.01	0.10	0.02
S2.2	0-4	20.19	4.71	89	4.61	5.58	0.00	0.00	<0.01	<0.01	0.08	0.02
	4-8	19.21	4.07	166	4.32	9.45	0.00	0.00	<0.01	<0.01	0.12	0.02
	8-15	19.08	4.00	198	4.39	8.04	0.00	0.00	<0.01	<0.01	0.07	0.01
S3.1	0-4	25.16	4.35	120	4.41	6.10	0.00	0.00	<0.01	<0.01	0.14	0.03
	4-8	11.24	3.98	193	4.26	8.12	0.00	0.00	<0.01	<0.01	0.14	0.04
	8-15	19.37	3.97	206	4.33	7.19	0.00	0.00	<0.01	<0.01	0.08	0.02
S3.2	0-4	25.16	4.48	102	4.42	5.84	0.00	0.00	<0.01	<0.01	0.17	0.02
	4-8	11.24	3.95	159	4.13	12.72	0.00	0.00	<0.01	<0.01	0.25	0.04
	8-15	19.37	3.88	203	4.27	8.73	0.00	0.00	<0.01	<0.01	0.16	0.03
T1.1	0-4	21.90	7.05	86	5.67	2.32	0.00	0.00	<0.01	<0.01	0.16	0.03
	4-8	19.37	6.85	104	5.99	2.03	0.00	0.00	<0.01	<0.01	0.11	0.02
	8-15	18.71	6.98	90	6.05	2.17	0.00	0.00	<0.01	<0.01	0.10	0.01
T1.2	0-4	21.90	5.78	68	5.88	2.27	0.00	0.00	<0.01	<0.01	0.24	0.03
	4-8	19.37	6.03	57	5.96	1.98	0.00	0.00	<0.01	<0.01	0.10	0.02
	8-15	18.71	6.43	60	6.16	1.43	0.00	0.00	<0.01	<0.01	0.10	0.01
T2.1	0-4	21.99	6.39	70	5.40	2.14	0.00	0.00	<0.01	<0.01	0.15	0.02
	4-8	18.76	6.63	70	5.81	1.72	0.00	0.00	<0.01	<0.01	0.09	0.01
	8-15	18.97	6.69	118	5.83	1.93	0.00	0.00	<0.01	<0.01	0.06	0.01
T2.2	0-4	21.99	6.37	73	5.99	2.74	0.00	0.00	<0.01	<0.01	0.15	0.03
	4-8	18.76	6.54	95	6.20	1.51	0.00	0.00	<0.01	<0.01	0.07	0.03
	8-15	18.97	6.48	106	6.13	2.81	0.00	0.00	<0.01	<0.01	0.05	0.02

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-44 (continued). Acid sulfate characteristics of the Tolderol soil materials at the completion of the six week columns experiment, August 2010.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC ($\%CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur ($\%S_{CR}$)	Acid Volatile Sulfide ($\%S_{AV}$)	Total C (%C)	Total N (%N)
T3.1	0-4	19.48	6.27	86	5.43	2.47	0.00	0.00	<0.01	<0.01	0.11	0.01
	4-8	19.47	6.17	145	5.69	2.28	0.00	0.00	<0.01	<0.01	0.08	0.01
	8-15	19.18	6.12	227	5.58	2.15	0.00	0.00	<0.01	<0.01	0.07	0.01
T3.2	0-4	19.48	6.13	57	6.15	2.58	0.00	0.00	<0.01	<0.01	0.11	0.02
	4-8	19.47	6.43	51	6.05	2.67	0.00	0.00	<0.01	<0.01	0.08	0.01
	8-15	19.18	6.42	46	5.91	2.66	0.00	0.00	<0.01	<0.01	0.11	0.01

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-45. Acid sulfate characteristics of the Tolderol soil materials at the completion of the six week columns experiment, November 2010.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC (%$CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)
BB1.1	0-4	23.25	5.50	66	5.30	1.97	0.00	0.00	<0.01	<0.01	0.12	0.03
	4-8	20.57	4.39	151	4.68	4.88	0.00	0.00	<0.01	<0.01	0.10	0.03
	8-15	20.66	4.01	231	4.38	9.69	0.00	0.00	<0.01	<0.01	0.12	0.04
BB1.2	0-4	22.43	5.30	107	5.01	2.87	0.00	0.00	<0.01	<0.01	0.13	0.02
	4-8	0.15	4.77	134	4.68	5.77	0.00	0.00	<0.01	<0.01	0.09	0.03
	8-15	20.82	4.24	252	4.34	10.23	0.00	0.00	<0.01	<0.01	0.15	0.02
BB2.1	0-4	22.78	5.24	104	5.18	2.12	0.00	0.00	<0.01	<0.01	0.23	0.02
	4-8	21.66	4.40	167	4.66	5.12	0.00	0.00	<0.01	<0.01	0.17	0.04
	8-15	19.80	4.28	185	4.70	4.75	0.00	0.00	<0.01	<0.01	0.15	0.03
BB2.2	0-4	21.38	5.54	86	5.35	2.37	0.00	0.00	<0.01	<0.01	0.16	0.03
	4-8	20.93	4.73	163	4.48	5.72	0.00	0.00	<0.01	<0.01	0.18	0.03
	8-15	17.83	4.58	166	4.71	3.96	0.00	0.00	<0.01	<0.01	0.09	0.02
BB3.1	0-4	23.13	5.21	74	5.17	2.61	0.00	0.00	<0.01	<0.01	0.16	0.03
	4-8	19.95	4.25	120	4.48	6.95	0.00	0.00	<0.01	<0.01	0.16	0.03
	8-15	20.34	4.12	150	4.53	5.79	0.00	0.00	<0.01	<0.01	0.13	0.02
BB3.2	0-4	22.90	4.61	89	4.52	6.23	0.00	0.00	<0.01	<0.01	0.13	0.03
	4-8	18.96	5.40	90	5.00	3.44	0.00	0.00	<0.01	<0.01	0.18	0.03
	8-15	19.12	4.52	117	4.67	5.69	0.00	0.00	<0.01	<0.01	0.11	0.03
AA1.1	0-4	22.29	4.94	172	5.12	3.17	0.00	0.00	<0.01	<0.01	0.13	0.02
	4-8	22.44	4.75	257	5.08	3.15	0.00	0.00	<0.01	<0.01	0.14	0.02
	8-15	19.29	5.21	282	5.42	2.40	0.00	0.00	<0.01	<0.01	0.08	0.01
AA1.2	0-4	22.69	5.37	91	5.46	2.35	0.00	0.00	<0.01	<0.01	0.14	0.02
	4-8	19.91	6.72	144	6.57	0.00	0.19	1.89	0.02	<0.01	0.13	0.02
	8-15	19.28	5.66	135	5.57	2.56	0.00	0.00	<0.01	<0.01	0.09	0.03
AA2.1	0-4	22.43	5.64	72	5.67	2.40	0.00	0.00	<0.01	<0.01	0.13	0.03
	4-8	20.39	5.35	158	5.49	2.62	0.00	0.00	<0.01	<0.01	0.09	0.03
	8-15	19.37	4.95	219	5.99	3.22	0.00	0.00	<0.01	<0.01	0.09	0.03
AA2.2	0-4	19.74	5.97	88	5.82	2.64	0.00	0.00	<0.01	<0.01	0.09	0.04
	4-8	19.25	7.31	204	8.01	0.00	0.16	4.06	<0.01	<0.01	0.12	0.04
	8-15	19.15	6.26	224	6.02	2.34	0.00	0.00	<0.01	<0.01	0.12	0.02

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-45 (continued). Acid sulfate characteristics of the Tolderol soil materials at the completion of the six week columns experiment, November 2010.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC (%$CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)
AA3.1	0-4	21.96	4.94	144	5.16	2.94	0.00	0.00	<0.01	<0.01	0.12	0.04
	4-8	21.34	4.71	204	5.17	2.89	0.00	0.00	<0.01	<0.01	0.09	0.03
	8-15	19.16	4.88	218	5.37	2.87	0.00	0.00	<0.01	<0.01	0.07	0.03
AA3.2	0-4	22.10	5.67	98	5.42	2.90	0.00	0.00	<0.01	<0.01	0.11	0.03
	4-8	21.44	5.38	181	5.37	2.53	0.00	0.00	<0.01	<0.01	0.08	0.03
	8-15	20.52	5.26	211	5.36	2.83	0.00	0.00	<0.01	<0.01	0.06	0.02

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-46. Acid sulfate characteristics of the Tolderol soil materials at the completion of the six week columns experiment, February 2011.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC (%$CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)
SS1.1	0-4	23.80	5.77	82	5.90	2.78	0.00	0.00	<0.01	<0.01	0.16	0.02
	4-8	22.11	4.77	110	5.13	3.52	0.00	0.00	<0.01	<0.01	0.18	0.02
	8-15	18.89	4.22	121	4.79	4.87	0.00	0.00	<0.01	<0.01	0.30	0.02
SS1.2	0-4	22.75	8.16	66	6.24	1.92	0.00	0.00	<0.01	<0.01	0.06	0.01
	4-8	20.96	6.34	96	5.02	2.63	0.00	0.00	<0.01	<0.01	0.09	0.01
	8-15	19.04	4.33	124	4.79	4.79	0.00	0.00	<0.01	<0.01	0.07	0.01
SS2.1	0-4	24.31	5.36	81	5.35	2.46	0.00	0.00	<0.01	<0.01	0.13	0.02
	4-8	21.73	5.50	78	4.81	4.24	0.00	0.00	<0.01	<0.01	0.10	0.01
	8-15	20.63	4.06	270	4.52	7.85	0.00	0.00	<0.01	<0.01	0.12	0.02
SS2.2	0-4	24.60	6.73	70	5.84	2.29	0.00	0.00	<0.01	<0.01	0.12	0.01
	4-8	21.95	4.54	122	4.85	4.84	0.00	0.00	<0.01	<0.01	0.10	0.01
	8-15	20.77	4.31	187	4.63	6.16	0.00	0.00	<0.01	<0.01	0.09	0.01
SS3.1	0-4	18.16	4.92	89	5.12	1.63	0.00	0.00	<0.01	<0.01	0.13	0.01
	4-8	21.40	4.19	142	4.47	6.02	0.00	0.00	<0.01	<0.01	0.14	0.02
	8-15	22.12	4.06	164	4.55	5.23	0.00	0.00	<0.01	<0.01	0.18	0.02
SS3.2	0-4	23.38	5.39	74	5.83	2.20	0.00	0.00	<0.01	<0.01	0.06	0.01
	4-8	22.02	4.20	141	4.67	4.60	0.00	0.00	<0.01	<0.01	0.14	0.02
	8-15	21.51	4.31	1636	4.69	4.58	0.00	0.00	<0.01	<0.01	0.16	0.01
TT1.1	0-4	19.76	5.47	48	6.07	2.14	0.00	0.00	<0.01	<0.01	0.09	0.02
	4-8	19.26	5.51	108	5.93	2.16	0.00	0.00	<0.01	<0.01	0.10	<0.01
	8-15	18.18	5.57	119	5.99	2.61	0.00	0.00	<0.01	<0.01	0.08	<0.01
TT1.2	0-4	22.09	5.09	80	5.68	2.13	0.00	0.00	<0.01	<0.01	0.10	0.01
	4-8	19.88	4.91	134	5.50	2.33	0.00	0.00	<0.01	<0.01	0.10	0.01
	8-15	19.80	5.89	136	6.25	1.67	0.00	0.00	0.01	<0.01	0.09	0.01
TT2.1	0-4	24.07	5.91	105	6.08	2.16	0.00	0.00	<0.01	<0.01	0.09	0.01
	4-8	20.04	6.06	112	6.31	1.98	0.00	0.00	0.02	<0.01	0.07	<0.01
	8-15	19.89	6.08	123	6.37	1.20	0.00	0.00	<0.01	<0.01	0.07	<0.01
TT2.2	0-4	20.69	6.04	70	6.18	2.04	0.00	0.00	<0.01	<0.01	0.08	<0.01
	4-8	18.06	6.18	101	6.33	1.87	0.00	0.00	0.01	<0.01	0.08	<0.01
	8-15	18.49	6.24	155	6.20	2.08	0.00	0.00	<0.01	<0.01	0.09	<0.01

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-46 (continued). Acid sulfate characteristics of the Tolderol soil materials at the completion of the six week columns experiment, February 2011.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC (%$CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)
TT3.1	0-4	23.21	6.08	98	6.15	2.23	0.00	0.00	<0.01	<0.01	0.09	<0.01
	4-8	19.73	5.68	139	5.80	2.29	0.00	0.00	<0.01	<0.01	0.10	0.01
	8-15	19.52	5.83	159	6.14	1.94	0.00	0.00	<0.01	<0.01	0.08	<0.01
TT3.2	0-4	0.53	6.26	72	6.11	1.48	0.00	0.00	<0.01	<0.01	0.11	0.01
	4-8	20.93	6.00	99	5.95	2.47	0.00	0.00	<0.01	<0.01	0.11	0.01
	8-15	19.11	7.26	177	8.74	0.00	0.00	6.92	<0.01	<0.01	0.10	<0.01

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-47. Acid sulfate characteristics of the Campbell Park soil materials at the completion of the six week columns experiment, May 2010.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC (%$CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)
G1.1	0-4	22.63	3.72	679	4.35	8.81	0.00	0.00	<0.01	<0.01	0.23	0.03
	4-8	20.10	3.51	1175	4.24	12.26	0.00	0.00	<0.01	<0.01	0.29	0.06
	8-15	22.22	3.37	1447	4.02	19.50	0.00	0.00	<0.01	<0.01	0.36	0.06
G1.2	0-4	23.23	4.09	247	4.15	10.12	0.00	0.00	<0.01	<0.01	0.24	0.03
	4-8	23.55	3.73	625	4.02	15.07	0.00	0.00	<0.01	<0.01	0.43	0.05
	8-15	21.76	3.52	1234	3.95	14.59	0.00	0.00	<0.01	<0.01	0.39	0.05
G2.1	0-4	23.00	3.62	758	4.12	13.12	0.00	0.00	<0.01	<0.01	0.32	0.04
	4-8	19.71	3.68	1110	4.39	8.58	0.00	0.00	<0.01	<0.01	0.18	0.03
	8-15	20.33	3.50	1375	4.20	12.53	0.00	0.00	<0.01	<0.01	0.26	0.04
G2.2	0-4	22.60	3.92	273	4.32	9.38	0.00	0.00	<0.01	<0.01	0.22	0.03
	4-8	21.27	3.74	680	4.11	10.39	0.00	0.00	<0.01	<0.01	0.28	0.03
	8-15	22.13	3.60	1182	4.07	14.95	0.00	0.00	<0.01	<0.01	0.29	0.04
G3.1	0-4	20.42	3.75	520	4.32	8.94	0.00	0.00	0.02	0.02	0.20	0.02
	4-8	18.57	3.60	917	4.28	9.53	0.00	0.00	<0.01	<0.01	0.19	0.03
	8-15	19.63	3.42	1480	4.10	13.19	0.00	0.00	<0.01	<0.01	0.23	0.03
G3.2	0-4	21.83	5.07	86	4.80	4.56	0.00	0.00	<0.01	<0.01	0.23	0.03
	4-8	20.43	4.28	84	4.32	7.91	0.00	0.00	<0.01	<0.01	0.22	0.02
	8-15	21.39	3.67	381	4.02	12.86	0.00	0.00	<0.01	<0.01	0.29	0.03
H1.1	0-4	23.82	3.73	478	4.34	10.00	0.00	0.00	<0.01	<0.01	0.25	0.03
	4-8	14.57	3.60	826	4.28	11.22	0.00	0.00	<0.01	<0.01	0.26	0.03
	8-15	19.80	3.55	1037	4.24	13.28	0.00	0.00	<0.01	<0.01	0.24	0.03
H1.2	0-4	27.60	3.87	247	4.14	12.44	0.00	0.00	<0.01	<0.01	0.30	0.03
	4-8	23.79	3.66	391	4.07	12.82	0.00	0.00	<0.01	<0.01	0.31	0.03
	8-15	22.10	3.52	753	3.96	17.81	0.00	0.00	<0.01	<0.01	0.32	0.03
H2.1	0-4	21.16	4.13	175	4.51	7.58	0.00	0.00	<0.01	<0.01	0.22	0.02
	4-8	21.00	3.89	310	4.43	6.76	0.00	0.00	<0.01	<0.01	0.19	0.02
	8-15	19.84	3.64	565	3.96	11.27	0.00	0.00	<0.01	<0.01	0.20	0.02
H2.2	0-4	21.25	3.91	330	4.35	9.38	0.00	0.00	<0.01	<0.01	0.22	0.02
	4-8	19.08	3.85	581	4.45	7.71	0.00	0.00	<0.01	<0.01	0.14	0.01
	8-15	20.11	3.66	780	4.20	12.03	0.00	0.00	<0.01	<0.01	0.21	0.02

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-47 (continued). Acid sulfate characteristics of the Campbell Park soil materials at the completion of the six week columns experiment, May 2010.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC ($\%CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur ($\%S_{CR}$)	Acid Volatile Sulfide ($\%S_{AV}$)	Total C (%C)	Total N (%N)
H3.1	0-4	20.67	4.65	105	5.24	2.91	0.00	0.00	<0.01	<0.01	0.22	0.02
	4-8	19.44	4.00	228	4.09	7.64	0.00	0.00	<0.01	<0.01	0.22	0.02
	8-15	21.97	3.67	606	4.24	9.39	0.00	0.00	<0.01	<0.01	0.26	0.03
H3.2	0-4	22.40	3.84	640	4.32	8.86	0.00	0.00	<0.01	<0.01	0.24	0.05
	4-8	21.88	3.73	1095	4.28	9.39	0.00	0.00	<0.01	<0.01	0.25	0.05
	8-15	22.15	3.71	1378	4.13	13.73	0.00	0.00	<0.01	<0.01	0.29	0.07

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-48. Acid sulfate characteristics of the Campbell Park soil materials at the completion of the six week columns experiment, August 2010.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC ($\%CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur ($\%S_{CR}$)	Acid Volatile Sulfide ($\%S_{AV}$)	Total C (%C)	Total N (%N)
Y1.1	0-4	22.59	4.73	87	4.36	8.39	0.00	0.00	<0.01	<0.01	0.31	0.03
	4-8	26.04	4.01	139	4.08	14.56	0.00	0.00	<0.01	<0.01	0.39	0.04
	8-15	21.60	4.04	112	4.15	12.25	0.00	0.00	<0.01	<0.01	0.27	0.03
Y1.2	0-4	22.59	6.05	77	4.88	3.09	0.00	0.00	<0.01	<0.01	0.28	0.03
	4-8	26.04	4.42	82	4.48	7.28	0.00	0.00	<0.01	<0.01	0.29	0.03
	8-15	21.60	3.88	182	4.07	20.44	0.00	0.00	<0.01	<0.01	0.46	0.04
Y2.1	0-4	25.05	3.96	356	4.22	11.11	0.00	0.00	<0.01	<0.01	0.28	0.03
	4-8	22.22	3.91	704	4.27	10.28	0.00	0.00	<0.01	<0.01	0.36	0.04
	8-15	25.04	3.63	1444	4.11	15.07	0.00	0.00	<0.01	<0.01	0.37	0.04
Y2.2	0-4	25.05	5.67	76	4.74	3.41	0.00	0.00	<0.01	<0.01	0.28	0.03
	4-8	22.22	4.22	103	4.26	9.38	0.00	0.00	<0.01	<0.01	0.36	0.04
	8-15	25.04	3.95	141	4.16	13.87	0.00	0.00	<0.01	<0.01	0.33	0.03
Y3.1	0-4	19.86	5.12	63	4.73	2.67	0.00	0.00	<0.01	<0.01	0.18	0.02
	4-8	17.29	4.44	71	4.42	6.19	0.00	0.00	<0.01	<0.01	0.17	0.02
	8-15	21.02	4.02	123	4.16	10.74	0.00	0.00	<0.01	<0.01	0.22	0.03
Y3.2	0-4	19.86	4.47	81	4.49	5.35	0.00	0.00	<0.01	<0.01	0.21	0.02
	4-8	17.29	4.13	109	4.38	7.14	0.00	0.00	<0.01	<0.01	0.22	0.03
	8-15	21.02	3.89	214	4.33	7.75	0.00	0.00	<0.01	<0.01	0.24	0.04
Z1.1	0-4	19.37	5.71	220	6.01	1.67	0.00	0.00	<0.01	<0.01	0.18	0.03
	4-8	18.26	6.16	181	6.01	1.83	0.00	0.00	<0.01	<0.01	0.13	0.02
	8-15	19.75	4.60	249	4.54	4.12	0.00	0.00	<0.01	<0.01	0.26	0.03
Z1.2	0-4	19.37	5.67	141	5.96	2.51	0.00	0.00	<0.01	<0.01	0.23	0.03
	4-8	18.26	6.04	160	6.22	1.57	0.00	0.00	<0.01	<0.01	0.13	0.02
	8-15	19.75	4.64	458	4.92	2.51	0.00	0.00	<0.01	<0.01	0.18	0.03
Z2.1	0-4	20.92	6.22	214	6.21	1.98	0.00	0.00	<0.01	<0.01	0.18	0.02
	4-8	18.33	6.33	230	5.92	1.92	0.00	0.00	<0.01	<0.01	0.13	0.02
	8-15	24.18	4.47	511	4.47	3.93	0.00	0.00	<0.01	<0.01	0.40	0.04
Z2.2	0-4	20.92	6.00	238	6.34	1.25	0.00	0.00	<0.01	<0.01	0.21	0.03
	4-8	18.33	5.85	540	6.05	1.05	0.00	0.00	<0.01	<0.01	0.14	0.03
	8-15	24.18	4.35	1089	4.65	4.70	0.00	0.00	<0.01	<0.01	0.31	0.04

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-48 (continued). Acid sulfate characteristics of the Campbell Park soil materials at the completion of the six week columns experiment, August 2010.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC (%$CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)
Z3.1	0-4	17.86	7.08	165	8.25	0.00	0.21	2.60	<0.01	<0.01	0.14	0.02
	4-8	16.94	7.05	761	8.13	0.00	0.67	2.30	<0.01	<0.01	0.18	0.02
	8-15	17.03	7.09	501	6.67	0.00	1.41	0.15	<0.01	<0.01	0.13	0.02
Z3.2	0-4	17.86	6.04	59	6.15	0.94	0.00	0.00	<0.01	<0.01	0.11	0.01
	4-8	16.94	6.74	91	7.17	0.00	0.63	1.62	<0.01	<0.01	0.18	0.02
	8-15	17.84	6.85	139	6.74	0.00	0.62	1.43	<0.01	<0.01	0.20	0.02

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-49. Acid sulfate characteristics of the Campbell Park soil materials at the completion of the six week columns experiment, November 2010.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC (%$CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)
CC1.1	0-4	26.47	7.56	451	7.85	0.00	0.28	4.44	0.01	<0.01	0.43	0.06
	4-8	20.63	4.23	514	4.53	8.07	0.00	0.00	<0.01	<0.01	0.32	0.08
	8-15	22.54	3.94	736	4.38	9.73	0.00	0.00	<0.01	<0.01	0.27	0.06
CC1.2	0-4	25.74	6.46	332	6.28	2.26	0.00	0.00	0.01	<0.01	0.36	0.05
	4-8	24.61	4.18	459	4.42	8.54	0.00	0.00	<0.01	<0.01	0.26	0.04
	8-15	19.34	3.98	682	4.44	9.01	0.00	0.00	<0.01	<0.01	0.22	0.04
CC2.1	0-4	25.22	7.06	398	7.03	0.00	0.17	2.47	<0.01	<0.01	0.27	0.04
	4-8	20.85	4.29	442	7.11	0.00	0.06	2.95	<0.01	<0.01	0.20	0.03
	8-15	19.78	4.00	676	4.44	7.08	0.00	0.00	<0.01	<0.01	0.20	0.03
CC2.2	0-4	24.32	5.06	382	4.75	4.25	0.00	0.00	<0.01	<0.01	0.20	0.03
	4-8	19.10	6.96	269	7.39	0.00	0.10	2.91	<0.01	<0.01	0.18	0.04
	8-15	20.36	4.28	646	4.44	7.82	0.00	0.00	<0.01	<0.01	0.19	0.03
CC3.1	0-4	25.85	6.72	322	6.81	0.00	0.15	1.02	<0.01	<0.01	0.35	0.04
	4-8	21.09	4.21	307	4.42	7.40	0.00	0.00	<0.01	<0.01	0.26	0.04
	8-15	21.86	3.89	568	4.31	10.66	0.00	0.00	<0.01	<0.01	0.29	0.04
CC3.2	0-4	26.63	6.82	434	6.82	0.00	0.08	2.58	<0.01	<0.01	0.38	0.05
	4-8	24.71	4.14	621	4.37	9.29	0.00	0.00	<0.01	<0.01	0.32	0.03
	8-15	24.19	3.87	868	4.22	15.56	0.00	0.00	<0.01	<0.01	0.30	0.04
H1.1	0-4	21.71	7.67	223	8.03	0.00	0.22	4.59	<0.01	<0.01	0.24	0.02
	4-8	19.99	6.58	316	5.79	2.62	0.00	0.00	<0.01	<0.01	0.15	0.03
	8-15	18.81	4.27	611	4.69	6.83	0.00	0.00	<0.01	<0.01	0.19	0.02
DD1.2	0-4	22.00	7.33	244	5.41	1.51	0.00	0.00	<0.01	<0.01	0.28	0.04
	4-8	20.62	6.77	375	5.69	1.36	0.00	0.00	<0.01	<0.01	0.17	0.02
	8-15	21.00	4.50	679	4.69	5.04	0.00	0.00	<0.01	<0.01	0.20	0.02
DD2.1	0-4	23.27	7.62	302	9.10	0.00	0.37	14.15	<0.01	<0.01	0.35	0.04
	4-8	20.10	7.35	539	6.67	0.00	0.26	2.14	<0.01	<0.01	0.20	0.03
	8-15	17.79	6.47	827	5.83	2.64	0.00	0.00	<0.01	<0.01	0.16	0.02
DD2.2	0-4	27.05	7.45	409	9.13	0.00	0.52	21.65	<0.01	<0.01	0.50	0.05
	4-8	20.47	6.85	573	6.34	2.45	0.00	0.00	<0.01	<0.01	0.27	0.03
	8-15	21.95	5.98	817	5.74	2.29	0.00	0.00	<0.01	<0.01	0.21	0.02

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-49 (continued). Acid sulfate characteristics of the Campbell Park soil materials at the completion of the six week columns experiment, November 2010.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC (%$CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)
DD3.1	0-4	21.87	8.27	280	9.30	0.00	0.47	16.49	<0.01	<0.01	0.30	0.03
	4-8	19.26	8.09	628	8.87	0.00	0.23	5.70	<0.01	<0.01	0.17	0.02
	8-15	18.30	7.74	641	6.41	2.12	0.00	0.00	<0.01	<0.01	0.15	0.01
DD3.2	0-4	23.19	7.84	161	9.26	0.00	0.11	11.90	0.02	0.02	0.18	0.02
	4-8	20.51	7.42	389	9.24	0.00	0.15	12.14	<0.01	<0.01	0.17	0.02
	8-15	18.18	6.25	516	6.12	2.60	0.00	0.00	<0.01	<0.01	0.15	0.02

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-50. Acid sulfate characteristics of the Campbell Park soil materials at the completion of the six week columns experiment, February 2010.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC (%$CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)
YY1.1	0-4	20.52	5.57	361	5.68	2.47	0.00	0.00	<0.01	<0.01	0.19	0.02
	4-8	21.03	4.27	443	4.63	5.52	0.00	0.00	<0.01	<0.01	0.25	0.03
	8-15	23.26	3.61	1088	4.15	13.88	0.00	0.00	<0.01	<0.01	0.33	0.04
YY1.2	0-4	21.94	4.99	343	5.15	2.59	0.00	0.00	<0.01	<0.01	0.24	0.03
	4-8	21.36	4.28	397	4.71	4.63	0.00	0.00	<0.01	<0.01	0.26	0.04
	8-15	22.63	3.68	777	4.21	11.44	0.00	0.00	<0.01	<0.01	0.50	0.04
YY2.1	0-4	21.34	5.18	379	6.08	2.55	0.00	0.00	<0.01	<0.01	0.20	0.02
	4-8	20.08	4.43	504	4.80	4.06	0.00	0.00	<0.01	<0.01	0.21	0.03
	8-15	22.17	3.78	733	4.39	8.32	0.00	0.00	<0.01	<0.01	0.28	0.03
YY2.2	0-4	23.36	5.46	387	5.70	2.41	0.00	0.00	<0.01	<0.01	0.21	0.03
	4-8	22.05	4.27	544	4.67	4.59	0.00	0.00	<0.01	<0.01	0.24	0.03
	8-15	22.76	3.58	1093	4.30	12.31	0.00	0.00	<0.01	<0.01	0.27	0.03
YY3.1	0-4	22.30	5.02	309	5.45	2.44	0.00	0.00	<0.01	<0.01	0.16	0.02
	4-8	19.75	4.48	494	4.70	4.12	0.00	0.00	<0.01	<0.01	0.22	0.02
	8-15	21.73	3.79	611	4.23	9.27	0.00	0.00	<0.01	<0.01	0.27	0.03
YY3.2	0-4	21.77	5.12	301	5.20	2.35	0.00	0.00	0.02	0.02	0.19	0.02
	4-8	20.93	4.94	155	4.81	2.67	0.00	0.00	<0.01	<0.01	0.24	0.02
	8-15	22.82	4.22	157	4.33	7.28	0.00	0.00	<0.01	<0.01	0.31	0.03
ZZ1.1	0-4	18.54	6.23	117	6.79	0.00	0.41	1.14	<0.01	<0.01	0.09	0.01
	4-8	17.85	6.27	241	6.19	2.25	0.00	0.00	<0.01	<0.01	0.10	0.01
	8-15	16.94	5.32	544	5.45	2.28	0.00	0.00	<0.01	<0.01	0.13	0.02
ZZ1.2	0-4	21.05	5.51	302	5.76	2.27	0.00	0.00	0.01	0.01	0.16	0.02
	4-8	20.77	5.17	391	5.49	2.67	0.00	0.00	<0.01	<0.01	0.17	0.02
	8-15	19.09	4.69	490	5.00	2.61	0.00	0.00	<0.01	<0.01	0.18	0.02
ZZ2.1	0-4	24.04	7.14	428	8.26	0.00	0.47	4.26	0.01	0.01	0.26	0.03
	4-8	21.93	7.39	432	7.41	0.00	0.43	2.62	<0.01	<0.01	0.26	0.02
	8-15	18.45	7.04	663	6.17	2.19	0.00	0.00	<0.01	<0.01	0.17	0.02
ZZ2.2	0-4	19.73	6.79	378	8.20	0.00	0.16	4.35	0.02	0.02	0.12	0.02
	4-8	18.56	6.25	382	6.79	0.00	0.18	2.80	0.01	0.01	0.18	0.02
	8-15	18.92	6.30	577	6.87	0.00	0.05	2.24	<0.01	<0.01	0.15	0.02

** See Table 9-1 in Appendix 1 for further details on the treatment.*

Table 9-50 (continued). Acid sulfate characteristics of the Campbell Park soil materials at the completion of the six week columns experiment, February 2010.

Profile ID* (TreatmentCode, Core.Duplicate)	Depth Range (cm)	moisture content (%)	pH 1:5 soil:water	EC 1:5 soil:water (µS/cm)	pH_{KCl}	TAA (mol H^+ t^{-1})	ANC (%$CaCO_3$)	TAAlk (mol OH^- t^{-1})	Chromium Reducible Sulfur (%S_{CR})	Acid Volatile Sulfide (%S_{AV})	Total C (%C)	Total N (%N)
ZZ3.1	0-4	20.97	6.23	233	5.45	2.77	0.00	0.00	<0.01	0.01	0.14	0.02
	4-8	18.27	5.10	376	5.19	2.67	0.00	0.00	<0.01	<0.01	0.15	0.02
	8-15	19.76	4.52	666	4.81	3.90	0.00	0.00	<0.01	<0.01	0.25	0.03
ZZ3.2	0-4	18.84	6.94	113	6.66	0.00	0.05	1.67	<0.01	<0.01	0.15	0.02
	4-8	18.39	6.67	407	6.55	0.00	0.12	0.50	0.01	0.01	0.11	0.01
	8-15	21.13	5.60	537	5.36	2.30	0.00	0.00	<0.01	<0.01	0.22	0.02

** See Table 9-1 in Appendix 1 for further details on the treatment.*

APPENDIX 4. Data for sulfate reduction rate samples

Table 9-51. Mean total sulfate reduction rates for Campbell Park in August 2010 (in units of nmol/g/day).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
Control (no bioremediation)	1A	0 - 2.5	0.000	0.000	0.000	0.000	0.000
	2A	2.5 - 5	0.000	0.000	0.000	0.000	0.000
	3A	5 - 10	0.000	0.000	0.000	0.000	0.000
	4A	10 - 15	0.000	0.000	0.000	0.000	0.000
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	0.000	0.000	0.000	0.000	0.000
	2B	2.5 - 5	0.000	0.000	0.000	0.000	0.000
	3B	5 - 10	0.000	0.000	0.000	0.000	0.000
	4B	10 - 15	0.000	0.000	0.000	0.000	0.000
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000
2010 seeded with Bevy rye and *Puccinellia*	1A	0 - 2.5	0.000	0.000	0.000	0.000	0.000
	2A	2.5 - 5	0.000	0.000	0.000	0.000	0.000
	3A	5 - 10	0.000	0.000	0.000	0.000	0.000
	4A	10 - 15	0.000	0.000	0.000	0.000	0.000
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	0.000	0.000	0.000	0.000	0.000
	2B	2.5 - 5	0.000	0.000	0.000	0.000	0.000
	3B	5 - 10	0.000	0.000	0.000	0.000	0.000
	4B	10 - 15	0.000	0.000	0.000	0.000	0.000
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000

Note: Values shown as 0.000 are less than the method detection limit.

Table 9-52. Pore-water properties for Campbell Park in August 2010 (in units of mg/L).

Treatment	Sample	Depth (cm)	SO_4	Cl
Control (no bioremediation)	1A	0 - 2.5	3628.12	4397.65
	2A	2.5 - 5	4696.29	4466.43
	3A	5 - 10	5527.09	4596.70
	4A	10 - 15	4821.84	3903.01
	5A	15 - 20	4545.02	3272.46
	6A	20 - 30	3656.90	3349.78
	7A	30 - 40	3948.54	3146.36
	1B	0 - 2.5	5265.87	4809.33
	2B	2.5 - 5	5630.20	4723.50
	3B	5 - 10	5332.79	5571.31
	4B	10 - 15	5735.85	4721.79
	5B	15 - 20	7081.50	4448.36
	6B	20 - 30	5180.84	3904.69
	7B	30 - 40	5449.24	3662.79
2010 seeded with Bevy rye and *Puccinellia*	1A	0 - 2.5	592.77	365.07
	2A	2.5 - 5	1245.86	714.56
	3A	5 - 10	2509.31	1841.15
	4A	10 - 15	4054.54	3820.22
	5A	15 - 20	5128.59	5224.06
	6A	20 - 30	5986.44	6707.99
	7A	30 - 40	6576.53	7456.09
	1B	0 - 2.5	1774.47	661.67
	2B	2.5 - 5	2556.97	1159.90
	3B	5 - 10	2968.95	2763.20
	4B	10 - 15	3424.31	2844.20
	5B	15 - 20	4082.48	3124.83
	6B	20 - 30	7063.23	3448.88
	7B	30 - 40	5695.97	3158.03

Table 9-53. Sediment properties for Campbell Park in August 2010.

Treatment	Sample	Depth (cm)	pH (1:1 soil:water)	Hydrolysable C (%C)	Total Organic C (%C)
Control (no bioremediation)	1A	0 - 2.5	3.33	0.18	0.39
	2A	2.5 - 5	2.44	0.21	0.34
	3A	5 - 10	2.02	<0.01	0.15
	4A	10 - 15	1.92	0.14	0.55
	5A	15 - 20	1.93	0.08	0.34
	6A	20 - 30	2.16	0.03	0.57
	7A	30 - 40	2.86	0.01	0.41
	1B	0 - 2.5	3.52	0.10	0.22
	2B	2.5 - 5	2.69	0.01	0.12
	3B	5 - 10	2.46	0.04	0.14
	4B	10 - 15	2.30	0.05	0.17
	5B	15 - 20	2.13	0.11	0.35
	6B	20 - 30	2.26	0.11	0.31
	7B	30 - 40	2.60	<0.01	0.46
2010 seeded with Bevy rye and *Puccinellia*	1A	0 - 2.5	6.64	0.02	0.07
	2A	2.5 - 5	6.28	0.04	0.09
	3A	5 - 10	5.37	0.09	0.18
	4A	10 - 15	3.05	0.04	0.24
	5A	15 - 20	2.56	0.03	0.23
	6A	20 - 30	2.52	<0.01	0.20
	7A	30 - 40	2.47	0.04	0.21
	1B	0 - 2.5	7.04	0.03	0.05
	2B	2.5 - 5	6.83	<0.01	0.17
	3B	5 - 10	2.87	0.07	0.24
	4B	10 - 15	2.64	0.03	0.21
	5B	15 - 20	2.50	0.03	0.15
	6B	20 - 30	2.38	0.02	0.20
	7B	30 - 40	2.62	0.08	0.32

Table 9-54. Mean total sulfate reduction rates for Campbell Park in February 2011 (in units of nmol/g/day).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
Control (no bioremediation)	1A	0 - 2.5	8.334	5.376	8.012	7.241	1.623
	2A	2.5 - 5	0.000	0.488	0.250	0.246	0.244
	3A	5 - 10	0.000	0.677	0.000	0.226	0.391
	4A	10 - 15	0.349	2.383	2.267	1.666	1.142
	5A	15 - 20	0.000	0.633	0.000	0.211	0.365
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	6.383	7.721	5.732	6.612	1.014
	2B	2.5 - 5	2.490	5.893	3.375	3.919	1.765
	3B	5 - 10	2.549	0.000	1.744	1.431	1.303
	4B	10 - 15	4.160	0.000	1.548	1.903	2.103
	5B	15 - 20	0.000	2.507	0.000	0.836	1.448
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000
2010 seeded with Bevy rye and *Puccinellia*	1A	0 - 2.5	2.857	1.938	3.941	2.912	1.003
	2A	2.5 - 5	3.930	1.889	0.801	2.207	1.588
	3A	5 - 10	0.000	0.000	0.000	0.000	0.000
	4A	10 - 15	0.000	0.000	0.000	0.000	0.000
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	15.465	8.170	6.454	10.030	4.785
	2B	2.5 - 5	9.010	9.034	11.500	9.848	1.431
	3B	5 - 10	3.606	2.514	2.802	2.974	0.566
	4B	10 - 15	0.334	1.836	1.335	1.168	0.765
	5B	15 - 20	0.000	0.345	0.000	0.115	0.199
	6B	20 - 30	0.000	0.000	5.451	1.817	3.147
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000

Note: Values shown as 0.000 are less than the method detection limit.

Table 9-55. Mean AVS sulfate reduction rates for Campbell Park in February 2011 (in units of nmol/g/day).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
Control (no bioremediation)	1A	0 - 2.5	1.072	1.738	0.301	1.037	0.719
	2A	2.5 - 5	0.000	0.000	0.000	0.000	0.000
	3A	5 - 10	0.000	0.000	0.000	0.000	0.000
	4A	10 - 15	0.000	0.000	0.000	0.000	0.000
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	1.954	0.305	1.449	1.236	0.845
	2B	2.5 - 5	0.000	0.000	0.000	0.000	0.000
	3B	5 - 10	0.000	0.000	0.000	0.000	0.000
	4B	10 - 15	0.000	0.000	0.000	0.000	0.000
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000
2010 seeded with Bevy rye and *Puccinellia*	1A	0 - 2.5	0.162	0.129	1.417	0.569	0.734
	2A	2.5 - 5	0.484	0.000	0.272	0.252	0.242
	3A	5 - 10	0.000	0.000	0.000	0.000	0.000
	4A	10 - 15	0.000	0.000	0.000	0.000	0.000
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	1.945	1.175	0.814	1.312	0.578
	2B	2.5 - 5	1.133	1.074	2.691	1.632	0.917
	3B	5 - 10	0.021	0.000	0.000	0.007	0.012
	4B	10 - 15	0.000	0.000	0.000	0.000	0.000
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000

Note: Values shown as 0.000 are less than the method detection limit.

Table 9-56. Mean S^0 sulfate reduction rates for Campbell Park in February 2011 (in units of nmol/g/day).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
Control (no bioremediation)	1A	0 - 2.5	6.448	3.477	6.869	5.598	1.849
	2A	2.5 - 5	0.000	0.400	0.250	0.217	0.202
	3A	5 - 10	0.000	0.677	0.000	0.226	0.391
	4A	10 - 15	0.349	2.383	2.267	1.666	1.142
	5A	15 - 20	0.000	0.633	0.000	0.211	0.365
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	4.177	6.771	4.095	5.014	1.521
	2B	2.5 - 5	2.490	5.893	3.375	3.919	1.765
	3B	5 - 10	2.549	0.000	1.744	1.431	1.303
	4B	10 - 15	4.160	0.000	1.548	1.903	2.103
	5B	15 - 20	0.000	2.507	0.000	0.836	1.448
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000
2010 seeded with Bevy rye and *Puccinellia*	1A	0 - 2.5	2.695	1.809	2.335	2.280	0.446
	2A	2.5 - 5	3.446	1.889	0.529	1.955	1.460
	3A	5 - 10	0.000	0.000	0.000	0.000	0.000
	4A	10 - 15	0.000	0.000	0.000	0.000	0.000
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	13.389	6.995	5.629	8.671	4.142
	2B	2.5 - 5	7.623	7.800	8.556	7.993	0.495
	3B	5 - 10	3.585	2.514	2.802	2.967	0.554
	4B	10 - 15	0.334	1.836	1.335	1.168	0.765
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	5.451	1.817	3.147
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000

Note: Values shown as 0.000 are less than the method detection limit.

Table 9-57. Mean pyrite sulfate reduction rates for Campbell Park in February 2011 (in units of nmol/g/day).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
Control (no bioremediation)	1A	0 - 2.5	0.813	0.161	0.841	0.605	0.385
	2A	2.5 - 5	0.000	0.088	0.000	0.029	0.051
	3A	5 - 10	0.000	0.000	0.000	0.000	0.000
	4A	10 - 15	0.000	0.000	0.000	0.000	0.000
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	0.252	0.645	0.188	0.362	0.248
	2B	2.5 - 5	0.000	0.000	0.000	0.000	0.000
	3B	5 - 10	0.000	0.000	0.000	0.000	0.000
	4B	10 - 15	0.000	0.000	0.000	0.000	0.000
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000
2010 seeded with Bevy rye and *Puccinellia*	1A	0 - 2.5	0.000	0.000	0.189	0.063	0.109
	2A	2.5 - 5	0.000	0.000	0.000	0.000	0.000
	3A	5 - 10	0.000	0.000	0.000	0.000	0.000
	4A	10 - 15	0.000	0.000	0.000	0.000	0.000
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	0.131	0.000	0.011	0.047	0.073
	2B	2.5 - 5	0.254	0.159	0.254	0.222	0.055
	3B	5 - 10	0.000	0.000	0.000	0.000	0.000
	4B	10 - 15	0.000	0.000	0.000	0.000	0.000
	5B	15 - 20	0.000	0.345	0.000	0.115	0.199
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000

Note: Values shown as 0.000 are less than the method detection limit.

Table 9-58. Mean AVS contents for Campbell Park in February 2011 (in units of µmol/g).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
Control (no bioremediation)	1A	0 - 2.5	0.16	1.74	0.19	0.70	0.91
	2A	2.5 - 5	0.04	0.03	<0.01	0.02	0.02
	3A	5 - 10	<0.01	0.07	<0.01	0.02	0.04
	4A	10 - 15	0.28	<0.01	<0.01	0.09	0.16
	5A	15 - 20	<0.01	0.07	<0.01	0.02	0.04
	6A	20 - 30	0.03	<0.01	0.03	0.02	0.02
	7A	30 - 40	0.07	0.07	0.05	0.06	0.01
	1B	0 - 2.5	0.69	<0.01	0.25	0.31	0.35
	2B	2.5 - 5	0.94	1.03	1.68	1.22	0.41
	3B	5 - 10	0.19	0.13	<0.01	0.11	0.10
	4B	10 - 15	0.04	0.15	0.06	0.08	0.06
	5B	15 - 20	0.04	<0.01	<0.01	0.01	0.02
	6B	20 - 30	<0.01	<0.01	0.14	0.05	0.08
	7B	30 - 40	0.08	<0.01	0.16	0.08	0.08
2010 seeded with Bevy rye and *Puccinellia*	1A	0 - 2.5	0.23	0.09	0.40	0.24	0.15
	2A	2.5 - 5	0.31	<0.01	0.84	0.38	0.42
	3A	5 - 10	<0.01	0.03	<0.01	0.01	0.02
	4A	10 - 15	0.18	0.13	0.11	0.14	0.04
	5A	15 - 20	0.03	<0.01	<0.01	0.01	0.02
	6A	20 - 30	0.04	0.60	0.03	0.22	0.33
	7A	30 - 40	<0.01	0.07	0.04	0.04	0.04
	1B	0 - 2.5	10.68	1.86	0.48	4.34	5.53
	2B	2.5 - 5	0.95	3.03	5.50	3.16	2.28
	3B	5 - 10	0.57	<0.01	0.83	0.47	0.42
	4B	10 - 15	0.17	0.16	<0.01	0.11	0.09
	5B	15 - 20	0.07	0.07	0.07	0.07	<0.01
	6B	20 - 30	<0.01	0.05	<0.01	0.02	0.03
	7B	30 - 40	0.21	0.16	<0.01	0.12	0.11

Table 9-59. Mean CRS contents for Campbell Park in February 2011 (in units of μmol/g).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
Control (no bioremediation)	1A	0 - 2.5	1.17	1.84	1.53	1.51	0.34
	2A	2.5 - 5	1.87	3.26	2.46	2.53	0.70
	3A	5 - 10	1.53	1.32	0.82	1.22	0.36
	4A	10 - 15	1.58	1.19	0.83	1.20	0.38
	5A	15 - 20	9.99	10.94	12.84	11.26	1.45
	6A	20 - 30	13.21	24.97	<0.01	12.72	12.49
	7A	30 - 40	71.84	71.71	69.83	71.13	1.12
	1B	0 - 2.5	1.21	1.58	16.95	6.58	8.98
	2B	2.5 - 5	1.34	2.20	0.45	1.33	0.87
	3B	5 - 10	0.06	0.81	0.41	0.43	0.37
	4B	10 - 15	0.33	2.95	4.40	2.56	2.07
	5B	15 - 20	0.76	1.54	1.98	1.43	0.62
	6B	20 - 30	2.72	3.65	3.08	3.15	0.47
	7B	30 - 40	84.83	93.22	91.77	89.94	4.48
2010 seeded with Bevy rye and *Puccinellia*	1A	0 - 2.5	0.63	1.27	0.64	0.85	0.36
	2A	2.5 - 5	0.78	3.00	0.80	1.53	1.28
	3A	5 - 10	2.06	1.67	1.77	1.83	0.20
	4A	10 - 15	4.14	3.12	1.97	3.08	1.08
	5A	15 - 20	1.02	2.09	2.97	2.03	0.98
	6A	20 - 30	3.78	2.10	0.84	2.24	1.47
	7A	30 - 40	3.60	3.63	10.16	5.80	3.78
	1B	0 - 2.5	3.56	0.98	2.48	2.34	1.29
	2B	2.5 - 5	1.79	2.80	3.48	2.69	0.85
	3B	5 - 10	3.03	1.29	0.32	1.55	1.37
	4B	10 - 15	0.61	1.60	0.70	0.97	0.55
	5B	15 - 20	2.12	1.35	1.84	1.77	0.39
	6B	20 - 30	5.31	9.52	18.03	10.95	6.48
	7B	30 - 40	25.80	17.62	22.39	21.93	4.11

Table 9-60. Pore-water properties for Campbell Park in February 2011 (in units of mg/L).

Treatment	Sample	Depth (cm)	SO_4	Cl	Si	Al	Cd	Cr	Cu	Fe	Mn	Ni	Pb	Zn
Control (no bioremediation)	1A	0 - 2.5	613.11	1978.53	7.62	<0.01	<0.001	0.003	0.002	34.39	2.44	0.027	0.001	0.068
	2A	2.5 - 5	1270.52	2358.28	12.89	0.01	<0.001	0.002	0.004	262.83	3.31	0.069	<0.001	0.093
	3A	5 - 10	2188.35	2704.63	50.81	8.39	0.001	0.003	0.013	504.21	8.14	0.205	0.001	0.528
	4A	10 - 15	2761.93	3028.83	61.55	32.23	0.001	0.014	0.024	518.87	12.52	0.356	0.004	0.866
	5A	15 - 20	3763.95	3686.15	94.26	60.34	0.003	0.028	0.020	557.14	17.90	0.514	0.026	0.884
	6A	20 - 30	4071.39	4063.35	109.46	68.87	0.002	0.024	0.018	608.35	21.74	0.548	0.016	0.908
	7A	30 - 40	3024.41	3897.35	91.01	11.86	0.001	0.003	0.011	262.75	20.05	0.252	0.011	0.529
	1B	0 - 2.5	635.31	2198.96	5.39	0.04	<0.001	0.002	0.003	1.95	1.96	0.051	<0.001	0.119
	2B	2.5 - 5	1282.48	2751.74	9.46	0.02	<0.001	0.009	0.004	102.38	3.18	0.071	<0.001	0.123
	3B	5 - 10	2855.02	3172.70	55.47	16.77	0.001	0.014	0.016	533.98	11.74	0.298	0.002	0.670
	4B	10 - 15	5189.36	3450.88	93.91	111.23	0.002	0.036	0.088	733.45	25.48	0.803	0.001	1.433
	5B	15 - 20	6467.77	3495.50	111.03	181.87	0.003	0.051	0.082	910.63	34.81	0.957	0.002	1.455
	6B	20 - 30	7656.18	3897.08	138.08	227.49	0.004	0.057	0.070	593.53	41.94	1.128	0.006	1.477
	7B	30 - 40	5495.20	3213.62	127.31	130.89	0.005	0.032	0.018	696.59	34.37	0.746	0.038	1.256
2010 seeded with Bevy rye and *Puccinellia*	1A	0 - 2.5	673.08	2495.07	2.70	0.09	<0.001	0.002	0.003	0.49	0.27	0.108	<0.001	0.081
	2A	2.5 - 5	972.33	2898.62	3.86	0.04	<0.001	0.002	0.004	2.40	0.97	0.026	<0.001	0.065
	3A	5 - 10	3199.10	3603.49	32.15	0.67	<0.001	0.002	0.013	352.11	11.74	0.195	0.001	0.454
	4A	10 - 15	5523.98	3791.30	70.18	26.93	0.002	0.015	0.042	623.26	21.24	0.416	0.001	1.028
	5A	15 - 20	6935.32	4120.92	98.48	75.65	0.003	0.029	0.060	664.39	29.10	0.631	0.002	1.451
	6A	20 - 30	9065.23	4948.98	130.93	192.44	0.004	0.079	0.050	770.71	42.95	1.000	0.002	1.759
	7A	30 - 40	8902.73	4672.59	141.81	238.99	0.003	0.052	0.051	668.65	44.48	1.021	0.001	1.808
	1B	0 - 2.5	516.84	2746.22	12.19	0.64	<0.001	0.003	0.004	1.42	1.86	0.036	<0.001	0.062
	2B	2.5 - 5	623.02	2906.19	12.55	0.08	<0.001	0.002	0.003	4.26	2.21	0.037	<0.001	0.046
	3B	5 - 10	2555.61	3951.60	14.33	0.08	<0.001	0.001	0.008	109.23	7.57	0.034	<0.001	0.073
	4B	10 - 15	4507.14	4978.59	24.59	0.05	<0.001	0.002	0.013	414.31	12.45	0.113	<0.001	0.293
	5B	15 - 20	7661.74	6891.09	82.55	26.00	0.002	0.019	0.040	801.40	21.94	0.372	0.001	1.109
	6B	20 - 30	7517.99	7016.30	99.02	99.86	0.003	0.057	0.039	537.88	26.87	0.621	0.006	1.604
	7B	30 - 40	6917.65	6842.01	119.85	114.39	0.005	0.033	0.021	302.21	31.51	0.635	0.022	1.241

Table 9-61. Sediment properties for Campbell Park in February 2011.

Treatment	Sample	Depth (cm)	pH (1:1 soil:water)	Total S (mg/kg)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
Control (no bioremediation)	1A	0 - 2.5	6.32	415.63	0.28	0.03	0.13	0.28
	2A	2.5 - 5	6.07	362.50	0.32	0.03	0.17	0.31
	3A	5 - 10	3.77	315.63	0.23	0.02	0.04	0.18
	4A	10 - 15	3.18	499.38	0.29	0.02	0.04	0.25
	5A	15 - 20	3.07	650.00	0.24	0.03	0.07	0.23
	6A	20 - 30	2.94	1093.75	0.29	0.03	0.14	0.27
	7A	30 - 40	3.32	3056.25	0.32	0.04	0.03	0.31
	1B	0 - 2.5	6.73	171.88	0.11	0.01	0.05	0.08
	2B	2.5 - 5	6.02	243.13	0.18	0.02	0.04	0.15
	3B	5 - 10	3.31	570.00	0.30	0.04	0.01	0.24
	4B	10 - 15	2.79	514.38	0.13	0.02	0.08	0.13
	5B	15 - 20	2.65	956.25	0.42	0.05	0.08	0.33
	6B	20 - 30	2.66	1168.75	0.37	0.05	0.08	0.34
	7B	30 - 40	2.76	8312.50	0.78	0.09	0.27	0.75
2010 seeded with Bevy rye and *Puccinellia*	1A	0 - 2.5	7.21	186.25	0.07	0.01	0.05	0.05
	2A	2.5 - 5	6.38	161.25	0.09	0.01	0.05	0.05
	3A	5 - 10	4.98	206.88	0.15	0.03	0.06	0.10
	4A	10 - 15	3.18	806.25	0.32	0.04	0.14	0.25
	5A	15 - 20	2.89	1362.50	0.47	0.06	<0.01	0.38
	6A	20 - 30	2.68	1625.00	0.47	0.06	0.30	0.47
	7A	30 - 40	2.67	2012.50	0.43	0.05	0.16	0.37
	1B	0 - 2.5	6.68	643.75	0.53	0.06	0.24	0.40
	2B	2.5 - 5	6.54	471.88	0.35	0.04	0.15	0.27
	3B	5 - 10	5.85	186.25	0.14	0.02	0.04	0.11
	4B	10 - 15	5.58	303.75	0.19	0.03	0.06	0.14
	5B	15 - 20	3.21	887.50	0.32	0.04	0.14	0.25
	6B	20 - 30	3.00	1006.25	0.16	0.02	0.06	0.13
	7B	30 - 40	2.94	6375.00	0.76	0.08	0.28	0.74

Table 9-62. Mean total sulfate reduction rates for Poltalloch in August 2010 (in units of nmol/g/day).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
2010 planted *Juncus* into 2009 plantings of Bevy rye	1A	0 - 2.5	1.176	4.469	1.243	2.296	1.882
	2A	2.5 - 5	0.000	0.000	0.000	0.000	0.000
	3A	5 - 10	0.000	0.000	0.000	0.000	0.000
	4A	10 - 15	0.000	0.000	0.000	0.000	0.000
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	56.232	47.508	65.214	56.318	8.853
	2B	2.5 - 5	36.374	18.349	13.663	22.795	11.991
	3B	5 - 10	2.901	1.027	1.640	1.856	0.955
	4B	10 - 15	0.000	0.000	0.000	0.000	0.000
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000
2009 seedings of Bevy rye	1A	0 - 2.5	6.868	2.987	0.000	3.285	3.444
	2A	2.5 - 5	0.000	0.000	1.339	0.446	0.773
	3A	5 - 10	0.000	0.000	0.000	0.000	0.000
	4A	10 - 15	0.000	0.000	0.000	0.000	0.000
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	0.000	7.217	8.055	5.091	4.429
	2B	2.5 - 5	0.000	0.000	0.000	0.000	0.000
	3B	5 - 10	0.000	0.000	0.000	0.000	0.000
	4B	10 - 15	0.000	0.000	0.000	0.000	0.000
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000

Note: Values shown as 0.000 are less than the method detection limit.

Table 9-63. Pore-water properties for Poltalloch in August 2010 (in units of mg/L).

Treatment	Sample	Depth (cm)	SO_4	Cl
2010 planted *Juncus* into 2009 plantings of Bevy rye	1A	0 - 2.5	351.77	1343.74
	2A	2.5 - 5	1261.52	1824.75
	3A	5 - 10	1664.96	2797.35
	4A	10 - 15	2711.54	3677.59
	5A	15 - 20	3108.44	4142.07
	6A	20 - 30	3315.73	4869.65
	7A	30 - 40	4648.27	5576.11
	1B	0 - 2.5	4.22	856.90
	2B	2.5 - 5	107.85	694.64
	3B	5 - 10	1250.90	720.92
	4B	10 - 15	2591.71	3505.05
	5B	15 - 20	2036.47	1088.41
	6B	20 - 30	2351.62	1947.65
	7B	30 - 40	2998.64	2931.87
2009 seedings of Bevy rye	1A	0 - 2.5	15.65	881.73
	2A	2.5 - 5	284.77	706.94
	3A	5 - 10	1467.85	615.38
	4A	10 - 15	1475.93	601.18
	5A	15 - 20	1680.20	1025.71
	6A	20 - 30	2321.50	2476.81
	7A	30 - 40	3338.23	4222.89
	1B	0 - 2.5	7.98	1186.62
	2B	2.5 - 5	1301.78	1697.88
	3B	5 - 10	2380.20	2425.10
	4B	10 - 15	2847.51	3390.91
	5B	15 - 20	3066.32	4519.48
	6B	20 - 30	3892.98	5811.47
	7B	30 - 40	4269.90	6243.13

Table 9-64. Sediment properties for Poltalloch in August 2011.

Treatment	Sample	Depth (cm)	pH (1:1 soil:water)	Hydrolysable C (%C)	Total Organic C (%C)
2010 planted *Juncus* into 2009 plantings of Bevy rye	1A	0 - 2.5	7.07	0.14	0.29
	2A	2.5 - 5	6.79	0.04	0.16
	3A	5 - 10	6.64	0.02	0.07
	4A	10 - 15	6.44	0.02	0.10
	5A	15 - 20	5.80	0.02	0.07
	6A	20 - 30	3.35	0.02	0.04
	7A	30 - 40	3.23	0.02	0.04
	1B	0 - 2.5	6.68	0.10	0.20
	2B	2.5 - 5	5.94	0.07	0.18
	3B	5 - 10	3.41	0.06	0.10
	4B	10 - 15	3.55	0.04	0.06
	5B	15 - 20	3.91	0.01	0.07
	6B	20 - 30	6.17	<0.01	0.03
	7B	30 - 40	7.69	0.01	0.03
2009 seedings of Bevy rye	1A	0 - 2.5	6.68	0.12	0.23
	2A	2.5 - 5	6.46	0.10	0.14
	3A	5 - 10	6.31	0.02	0.06
	4A	10 - 15	6.09	0.02	0.04
	5A	15 - 20	4.90	0.05	0.08
	6A	20 - 30	4.60	0.05	0.05
	7A	30 - 40	3.58	0.03	0.05
	1B	0 - 2.5	6.73	0.06	0.13
	2B	2.5 - 5	6.82	0.03	0.06
	3B	5 - 10	6.62	0.04	0.19
	4B	10 - 15	6.48	0.02	0.03
	5B	15 - 20	5.83	0.04	0.06
	6B	20 - 30	2.99	0.03	0.06
	7B	30 - 40	2.53	0.02	0.04

Table 9-65. Mean total sulfate reduction rates for Poltalloch in February 2011 (in units of nmol/g/day).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
2010 planted *Juncus* into 2009 plantings of Bevy rye	1A	0 - 2.5	2.515	6.726	2.916	4.052	2.324
	2A	2.5 - 5	1.009	0.550	0.588	0.716	0.255
	3A	5 - 10	0.481	0.484	1.566	0.844	0.625
	4A	10 - 15	0.189	0.000	1.259	0.483	0.679
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	0.046	0.277	0.174	0.166	0.116
	2B	2.5 - 5	1.334	1.559	6.250	3.048	2.775
	3B	5 - 10	1.301	1.390	1.001	1.230	0.204
	4B	10 - 15	0.154	0.198	1.110	0.487	0.540
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000
2009 seedings of Bevy rye	1A	0 - 2.5	0.000	0.080	0.013	0.031	0.043
	2A	2.5 - 5	3.013	2.063	4.256	3.111	1.100
	3A	5 - 10	0.700	0.050	0.427	0.392	0.327
	4A	10 - 15	0.000	0.000	0.051	0.017	0.030
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	1.154	0.000	0.108	0.421	0.637
	7A	30 - 40	0.000	0.000	2.484	0.828	1.434
	1B	0 - 2.5	0.221	0.189	0.177	0.196	0.023
	2B	2.5 - 5	2.923	1.780	4.424	3.042	1.326
	3B	5 - 10	0.000	0.345	0.000	0.115	0.199
	4B	10 - 15	0.045	0.000	0.688	0.244	0.385
	5B	15 - 20	0.000	0.000	0.289	0.096	0.167
	6B	20 - 30	0.000	0.000	1.741	0.580	1.005
	7B	30 - 40	0.171	0.000	0.000	0.057	0.099

Note: Values shown as 0.000 are less than the method detection limit.

Table 9-66. Mean AVS sulfate reduction rates for Poltalloch in February 2011 (in units of nmol/g/day).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
2010 planted *Juncus* into 2009 plantings of Bevy rye	1A	0 - 2.5	0.013	0.194	0.107	0.105	0.091
	2A	2.5 - 5	0.152	0.120	0.004	0.092	0.078
	3A	5 - 10	0.000	0.000	0.000	0.000	0.000
	4A	10 - 15	0.000	0.000	0.000	0.000	0.000
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	0.000	0.000	0.000	0.000	0.000
	2B	2.5 - 5	0.241	0.164	1.321	0.575	0.647
	3B	5 - 10	0.370	0.000	0.000	0.123	0.213
	4B	10 - 15	0.000	0.000	0.000	0.000	0.000
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000
2009 seedings of Bevy rye	1A	0 - 2.5	0.000	0.000	0.000	0.000	0.000
	2A	2.5 - 5	0.006	0.106	0.133	0.082	0.067
	3A	5 - 10	0.000	0.000	0.000	0.000	0.000
	4A	10 - 15	0.000	0.000	0.000	0.000	0.000
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	0.000	0.000	0.000	0.000	0.000
	2B	2.5 - 5	0.062	0.093	0.083	0.079	0.016
	3B	5 - 10	0.000	0.000	0.000	0.000	0.000
	4B	10 - 15	0.045	0.000	0.000	0.015	0.026
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000

Note: Values shown as 0.000 are less than the method detection limit.

Table 9-67. Mean S^0 sulfate reduction rates for Poltalloch in February 2011 (in units of nmol/g/day).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
2010 planted *Juncus* into 2009 plantings of Bevy rye	1A	0 - 2.5	2.379	6.330	2.738	3.815	2.185
	2A	2.5 - 5	0.813	0.400	0.562	0.592	0.208
	3A	5 - 10	0.481	0.484	1.560	0.842	0.622
	4A	10 - 15	0.189	0.000	1.259	0.483	0.679
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	0.005	0.184	0.139	0.109	0.093
	2B	2.5 - 5	0.971	1.304	4.636	2.304	2.027
	3B	5 - 10	0.859	1.313	0.927	1.033	0.245
	4B	10 - 15	0.154	0.198	1.110	0.487	0.540
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000
2009 seedings of Bevy rye	1A	0 - 2.5	0.000	0.070	0.013	0.028	0.037
	2A	2.5 - 5	2.865	1.803	3.915	2.861	1.056
	3A	5 - 10	0.634	0.050	0.345	0.343	0.292
	4A	10 - 15	0.000	0.000	0.051	0.017	0.030
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	1.154	0.000	0.108	0.421	0.637
	7A	30 - 40	0.000	0.000	2.484	0.828	1.434
	1B	0 - 2.5	0.180	0.176	0.125	0.160	0.031
	2B	2.5 - 5	2.689	1.602	4.093	2.795	1.249
	3B	5 - 10	0.000	0.345	0.000	0.115	0.199
	4B	10 - 15	0.000	0.000	0.688	0.229	0.397
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	1.741	0.580	1.005
	7B	30 - 40	0.171	0.000	0.000	0.057	0.099

Note: Values shown as 0.000 are less than the method detection limit.

Table 9-68. Mean pyrite sulfate reduction rates for Poltalloch in February 2011 (in units of nmol/g/day).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
2010 planted *Juncus* into 2009 plantings of Bevy rye	1A	0 - 2.5	0.123	0.202	0.071	0.132	0.066
	2A	2.5 - 5	0.043	0.031	0.023	0.032	0.010
	3A	5 - 10	0.000	0.000	0.006	0.002	0.004
	4A	10 - 15	0.000	0.000	0.000	0.000	0.000
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	0.041	0.093	0.036	0.057	0.032
	2B	2.5 - 5	0.123	0.091	0.293	0.169	0.109
	3B	5 - 10	0.072	0.077	0.074	0.074	0.002
	4B	10 - 15	0.000	0.000	0.000	0.000	0.000
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000
2009 seedings of Bevy rye	1A	0 - 2.5	0.000	0.010	0.000	0.003	0.006
	2A	2.5 - 5	0.141	0.154	0.207	0.168	0.035
	3A	5 - 10	0.066	0.000	0.082	0.049	0.043
	4A	10 - 15	0.000	0.000	0.000	0.000	0.000
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	0.042	0.012	0.051	0.035	0.020
	2B	2.5 - 5	0.173	0.085	0.248	0.169	0.082
	3B	5 - 10	0.000	0.000	0.000	0.000	0.000
	4B	10 - 15	0.000	0.000	0.000	0.000	0.000
	5B	15 - 20	0.000	0.000	0.289	0.096	0.167
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000

Note: Values shown as 0.000 are less than the method detection limit.

Table 9-69. Mean AVS contents for Poltalloch in February 2011 (in units of μmol/g).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
2010 planted *Juncus* into 2009 plantings of Bevy rye	1A	0 - 2.5	0.21	<0.01	0.34	0.18	0.17
	2A	2.5 - 5	0.23	0.23	0.10	0.18	0.07
	3A	5 - 10	<0.01	<0.01	0.07	0.02	0.04
	4A	10 - 15	0.12	0.14	<0.01	0.08	0.07
	5A	15 - 20	0.03	<0.01	<0.01	0.01	0.02
	6A	20 - 30	<0.01	1.18	0.10	0.43	0.65
	7A	30 - 40	0.07	0.06	0.04	0.06	0.02
	1B	0 - 2.5	<0.01	<0.01	0.06	0.02	0.04
	2B	2.5 - 5	0.15	0.07	0.16	0.13	0.05
	3B	5 - 10	0.13	0.08	0.03	0.08	0.05
	4B	10 - 15	0.11	0.12	0.03	0.09	0.05
	5B	15 - 20	0.07	0.18	0.03	0.09	0.08
	6B	20 - 30	<0.01	0.05	<0.01	0.02	0.03
	7B	30 - 40	<0.01	<0.01	0.12	0.04	0.07
2009 seedings of Bevy rye	1A	0 - 2.5	0.17	0.11	<0.01	0.09	0.09
	2A	2.5 - 5	0.05	<0.01	0.05	0.03	0.03
	3A	5 - 10	0.15	0.15	0.03	0.11	0.07
	4A	10 - 15	<0.01	<0.01	<0.01	<0.01	<0.01
	5A	15 - 20	0.12	0.04	<0.01	0.05	0.06
	6A	20 - 30	0.03	0.03	<0.01	0.02	0.02
	7A	30 - 40	<0.01	0.03	<0.01	0.01	0.02
	1B	0 - 2.5	0.04	0.04	<0.01	0.02	0.02
	2B	2.5 - 5	0.05	<0.01	<0.01	0.02	0.03
	3B	5 - 10	0.03	<0.01	0.34	0.12	0.19
	4B	10 - 15	0.13	<0.01	<0.01	0.04	0.08
	5B	15 - 20	0.12	0.11	<0.01	0.08	0.07
	6B	20 - 30	0.06	<0.01	<0.01	0.02	0.04
	7B	30 - 40	0.06	<0.01	<0.01	0.02	0.04

Table 9-70. Mean CRS contents for Poltalloch in February 2011 (in units of μmol/g).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
2010 planted *Juncus* into 2009 plantings of Bevy rye	1A	0 - 2.5	0.79	3.82	0.37	1.66	1.88
	2A	2.5 - 5	1.66	6.53	1.44	3.21	2.87
	3A	5 - 10	0.49	0.28	0.41	0.40	0.11
	4A	10 - 15	0.71	0.61	1.13	0.82	0.28
	5A	15 - 20	0.11	3.95	1.79	1.95	1.92
	6A	20 - 30	4.67	4.98	2.50	4.05	1.35
	7A	30 - 40	7.39	4.61	6.87	6.29	1.48
	1B	0 - 2.5	2.22	1.83	0.90	1.65	0.68
	2B	2.5 - 5	2.89	2.11	0.67	1.89	1.13
	3B	5 - 10	0.89	1.87	1.33	1.36	0.49
	4B	10 - 15	0.92	2.18	1.33	1.48	0.64
	5B	15 - 20	2.74	1.98	0.63	1.78	1.07
	6B	20 - 30	2.62	1.83	3.68	2.71	0.93
	7B	30 - 40	1.62	5.57	7.97	5.06	3.21
2009 seedings of Bevy rye	1A	0 - 2.5	6.22	3.25	2.57	4.01	1.94
	2A	2.5 - 5	1.45	2.24	1.52	1.74	0.43
	3A	5 - 10	6.21	1.50	2.50	3.40	2.48
	4A	10 - 15	1.15	1.01	4.44	2.20	1.94
	5A	15 - 20	0.61	3.62	2.29	2.17	1.51
	6A	20 - 30	2.74	1.00	4.04	2.59	1.53
	7A	30 - 40	5.67	3.82	2.12	3.87	1.78
	1B	0 - 2.5	0.60	1.15	1.06	0.94	0.29
	2B	2.5 - 5	2.17	0.30	1.27	1.25	0.94
	3B	5 - 10	0.68	0.36	0.58	0.54	0.16
	4B	10 - 15	0.62	0.99	0.51	0.71	0.25
	5B	15 - 20	0.56	3.60	1.40	1.85	1.57
	6B	20 - 30	0.74	0.97	2.90	1.54	1.18
	7B	30 - 40	7.72	4.99	2.71	5.14	2.50

Table 9-71. Pore-water properties for Poltalloch in February 2011 (in units of mg/L).

Treatment	Sample	Depth (cm)	SO_4	Cl	Si	Al	Cd	Cr	Cu	Fe	Mn	Ni	Pb	Zn
2010 planted *Juncus* into 2009 plantings of Bevy rye	1A	0 - 2.5	75.29	158.91	6.11	0.20	<0.001	0.001	0.002	0.62	0.89	0.057	<0.001	0.036
	2A	2.5 - 5	65.70	248.54	7.18	0.11	<0.001	0.001	0.001	4.18	1.37	0.048	<0.001	0.066
	3A	5 - 10	178.50	582.90	15.83	0.05	<0.001	0.001	0.002	13.13	2.86	0.373	<0.001	0.049
	4A	10 - 15	1022.25	1194.84	9.99	0.01	<0.001	<0.001	0.003	38.12	7.73	0.058	<0.001	0.078
	5A	15 - 20	1651.48	1458.95	17.50	0.08	<0.001	0.001	0.012	106.61	6.92	0.098	<0.001	0.173
	6A	20 - 30	2937.13	3380.97	39.46	8.22	0.002	0.007	0.017	110.36	8.28	0.329	0.002	0.239
	7A	30 - 40	3872.00	4780.89	53.63	8.23	0.006	0.004	0.012	50.95	10.77	0.471	0.002	0.396
	1B	0 - 2.5	87.20	98.60	4.66	0.08	<0.001	<0.001	0.001	0.58	0.67	0.011	<0.001	0.038
	2B	2.5 - 5	104.29	236.63	6.16	0.05	<0.001	0.002	<0.001	1.96	1.40	0.022	<0.001	0.040
	3B	5 - 10	274.26	514.58	4.78	0.01	<0.001	0.001	0.001	2.67	2.00	0.040	<0.001	0.045
	4B	10 - 15	718.94	871.24	5.77	<0.01	<0.001	<0.001	0.005	0.08	3.70	0.022	<0.001	0.044
	5B	15 - 20	1551.03	1584.18	14.70	0.05	<0.001	<0.001	0.012	67.85	6.55	0.119	<0.001	0.280
	6B	20 - 30	2251.93	2471.52	28.47	4.96	<0.001	0.003	0.014	126.96	5.96	0.224	0.001	0.365
	7B	30 - 40	2346.58	3018.19	39.40	11.77	0.001	0.009	0.007	53.03	6.54	0.311	0.004	0.427
2009 seedings of Bevy rye	1A	0 - 2.5	75.51	82.03	7.20	0.73	<0.001	0.001	0.004	1.79	0.21	0.012	0.001	0.039
	2A	2.5 - 5	43.29	187.38	6.72	0.05	<0.001	<0.001	<0.001	1.46	3.01	0.065	<0.001	0.030
	3A	5 - 10	92.45	210.16	8.07	0.06	<0.001	<0.001	0.001	3.89	2.98	0.036	<0.001	0.061
	4A	10 - 15	177.69	421.81	8.66	0.03	<0.001	<0.001	0.002	5.26	4.51	0.032	<0.001	0.081
	5A	15 - 20	419.86	718.80	8.45	0.02	<0.001	<0.001	0.002	16.51	7.68	0.038	<0.001	0.085
	6A	20 - 30	2261.98	2843.23	37.56	9.16	0.001	0.004	0.018	154.86	11.08	0.163	0.001	0.606
	7A	30 - 40	1979.87	2264.11	39.03	14.66	0.001	0.007	0.012	83.13	8.59	0.190	0.001	0.368
	1B	0 - 2.5	81.34	80.06	5.56	0.19	<0.001	<0.001	0.002	1.04	0.39	0.071	<0.001	0.024
	2B	2.5 - 5	74.10	218.40	7.03	0.03	<0.001	0.001	0.001	1.29	4.08	0.039	<0.001	0.043
	3B	5 - 10	921.99	1119.78	5.05	0.01	<0.001	<0.001	0.003	2.40	9.48	0.031	<0.001	0.047
	4B	10 - 15	1876.15	2391.73	5.62	<0.01	<0.001	<0.001	0.007	<0.01	18.77	0.039	<0.001	0.047
	5B	15 - 20	2309.01	3006.46	6.67	<0.01	<0.001	0.001	0.009	0.03	19.05	0.034	<0.001	0.038
	6B	20 - 30	1939.75	2035.39	27.53	7.65	<0.001	0.003	0.037	183.95	13.34	0.119	<0.001	0.647
	7B	30 - 40	3383.10	4284.75	55.32	24.07	0.002	0.009	0.014	128.74	13.36	0.304	0.004	0.678

Table 9-72. Sediment properties for Poltalloch in February 2011.

Treatment	Sample	Depth (cm)	pH (1:1 soil:water)	Total S (mg/kg)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
2010 planted *Juncus* into 2009 plantings of Bevy rye	1A	0 - 2.5	7.16	136.25	0.08	0.02	0.03	0.04
	2A	2.5 - 5	6.79	119.38	0.12	0.02	0.07	0.09
	3A	5 - 10	6.49	128.75	0.20	0.02	0.06	0.09
	4A	10 - 15	6.18	94.38	0.05	0.01	0.01	0.01
	5A	15 - 20	5.77	166.88	0.04	<0.01	<0.01	0.01
	6A	20 - 30	3.50	398.13	0.03	0.01	0.02	0.02
	7A	30 - 40	3.66	76.25	0.03	<0.01	<0.01	<0.01
	1B	0 - 2.5	6.71	136.25	0.10	0.01	0.02	0.05
	2B	2.5 - 5	6.60	96.88	0.12	0.01	0.06	0.08
	3B	5 - 10	6.42	99.38	0.07	<0.01	0.05	0.05
	4B	10 - 15	5.92	137.50	0.03	<0.01	<0.01	<0.01
	5B	15 - 20	5.07	372.50	0.03	<0.01	0.01	0.01
	6B	20 - 30	3.30	506.25	0.06	<0.01	0.03	0.05
	7B	30 - 40	3.29	37.56	0.03	0.01	0.02	0.04
2009 seedings of Bevy rye	1A	0 - 2.5	6.34	113.13	0.05	<0.01	0.02	0.02
	2A	2.5 - 5	6.51	64.38	0.11	0.01	0.07	0.06
	3A	5 - 10	6.48	160.63	0.09	<0.01	0.01	0.01
	4A	10 - 15	5.92	171.25	0.04	0.01	0.02	0.03
	5A	15 - 20	5.37	196.25	0.03	0.01	0.01	0.01
	6A	20 - 30	3.10	598.13	0.05	0.01	<0.01	0.01
	7A	30 - 40	2.92	37.81	0.05	0.01	<0.01	0.02
	1B	0 - 2.5	6.67	1037.50	0.05	0.01	<0.01	0.01
	2B	2.5 - 5	6.25	66.25	0.07	0.01	0.03	0.03
	3B	5 - 10	6.35	78.13	0.15	0.01	0.03	0.07
	4B	10 - 15	6.31	110.00	0.13	<0.01	0.03	0.04
	5B	15 - 20	6.51	66.88	0.03	<0.01	0.01	0.01
	6B	20 - 30	3.17	199.38	0.06	<0.01	<0.01	0.04
	7B	30 - 40	2.98	528.75	0.04	<0.01	<0.01	0.02

Table 9-73. Mean total sulfate reduction rates for Tolderol in August 2010 (in units of nmol/g/day).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
Control (no bioremediation)	1A	0 - 2.5	0.000	0.000	0.000	0.000	0.000
	2A	2.5 - 5	0.000	0.000	0.000	0.000	0.000
	3A	5 - 10	0.000	0.000	0.000	0.000	0.000
	4A	10 - 15	0.000	0.000	0.000	0.000	0.000
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	0.000	0.000	0.000	0.000	0.000
	2B	2.5 - 5	0.000	0.000	0.000	0.000	0.000
	3B	5 - 10	0.000	0.000	0.000	0.000	0.000
	4B	10 - 15	0.000	0.000	0.000	0.000	0.000
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000
2010 planted *Juncus* into 2009 plantings of Bevy rye	1A	0 - 2.5	180.330	125.552	63.667	123.183	58.368
	2A	2.5 - 5	32.849	14.505	70.134	39.162	28.347
	3A	5 - 10	5.721	13.065	6.288	8.358	4.086
	4A	10 - 15	6.100	2.958	2.151	3.736	2.086
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	119.079	16.345	46.897	60.774	52.754
	2B	2.5 - 5	18.534	22.995	21.632	21.054	2.286
	3B	5 - 10	7.351	12.159	4.747	8.086	3.760
	4B	10 - 15	0.000	0.000	0.000	0.000	0.000
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000

Note: Values shown as 0.000 are less than the method detection limit.

Table 9-74. Pore-water properties for Tolderol in August 2010 (in units of mg/L).

Treatment	Sample	Depth (cm)	SO_4	Cl
Control (no bioremediation)	1A	0 - 2.5	699.49	911.82
	2A	2.5 - 5	473.59	770.34
	3A	5 - 10	643.13	571.83
	4A	10 - 15	829.82	394.46
	5A	15 - 20	1093.35	355.04
	6A	20 - 30	1606.24	394.92
	7A	30 - 40	2304.37	468.60
	1B	0 - 2.5	825.05	947.37
	2B	2.5 - 5	538.93	930.79
	3B	5 - 10	644.74	765.68
	4B	10 - 15	1049.09	679.07
	5B	15 - 20	1263.51	554.01
	6B	20 - 30	1791.53	616.61
	7B	30 - 40	2212.34	736.15
2010 planted *Juncus* into 2009 plantings of Bevy rye	1A	0 - 2.5	17.31	832.24
	2A	2.5 - 5	55.81	842.91
	3A	5 - 10	590.58	893.90
	4A	10 - 15	1077.24	1002.19
	5A	15 - 20	1027.65	1160.90
	6A	20 - 30	1471.75	1548.74
	7A	30 - 40	2349.87	2217.05
	1B	0 - 2.5	2593.73	1550.15
	2B	2.5 - 5	1599.14	1345.58
	3B	5 - 10	361.74	820.32
	4B	10 - 15	739.51	852.75
	5B	15 - 20	1209.11	1070.99
	6B	20 - 30	1608.30	1304.81
	7B	30 - 40	2910.98	1610.13

Table 9-75. Sediment properties for Tolderol in August 2010.

Treatment	Sample	Depth (cm)	pH (1:1 soil:water)	Hydrolysable C (%C)	Total Organic C (%C)
Control (no bioremediation)	1A	0 - 2.5	3.54	0.06	0.17
	2A	2.5 - 5	2.44	0.15	0.39
	3A	5 - 10	2.51	0.04	0.16
	4A	10 - 15	2.39	0.03	0.05
	5A	15 - 20	2.42	0.02	0.09
	6A	20 - 30	2.46	0.01	0.06
	7A	30 - 40	2.50	<0.01	0.03
	1B	0 - 2.5	5.65	0.06	0.13
	2B	2.5 - 5	3.40	0.03	0.08
	3B	5 - 10	2.76	0.04	0.09
	4B	10 - 15	2.54	0.02	0.09
	5B	15 - 20	2.46	0.04	0.06
	6B	20 - 30	2.85	0.02	0.03
	7B	30 - 40	5.52	0.01	0.03
2010 seeded with Bevy rye and *Puccinellia*	1A	0 - 2.5	6.57	0.14	0.20
	2A	2.5 - 5	6.55	0.08	0.10
	3A	5 - 10	6.36	0.07	0.08
	4A	10 - 15	6.33	0.06	0.09
	5A	15 - 20	5.50	0.05	0.07
	6A	20 - 30	3.97	0.07	0.07
	7A	30 - 40	3.15	0.04	0.08
	1B	0 - 2.5	6.63	n.a.	n.a.
	2B	2.5 - 5	6.30	0.17	0.19
	3B	5 - 10	6.10	0.02	0.04
	4B	10 - 15	3.95	0.04	0.05
	5B	15 - 20	3.27	0.01	0.04
	6B	20 - 30	3.14	0.02	0.04
	7B	30 - 40	3.19	0.01	0.06

Table 9-76. Mean total sulfate reduction rates for Tolderol in February 2011 (in units of nmol/g/day).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
Control (no bioremediation)	1A	0 - 2.5	0.000	0.036	0.081	0.039	0.040
	2A	2.5 - 5	0.038	0.000	0.110	0.049	0.056
	3A	5 - 10	0.104	0.032	0.069	0.069	0.036
	4A	10 - 15	0.000	0.000	0.032	0.011	0.019
	5A	15 - 20	0.142	0.000	0.000	0.047	0.082
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.112	0.000	0.037	0.064
	1B	0 - 2.5	0.036	0.195	0.012	0.081	0.099
	2B	2.5 - 5	0.105	0.146	0.113	0.122	0.022
	3B	5 - 10	0.000	0.000	0.000	0.000	0.000
	4B	10 - 15	0.775	0.000	0.010	0.261	0.444
	5B	15 - 20	0.005	0.070	0.263	0.113	0.134
	6B	20 - 30	0.118	0.029	0.000	0.049	0.061
	7B	30 - 40	0.000	0.000	0.733	0.244	0.423
2010 planted *Juncus* into 2009 plantings of Bevy rye	1A	0 - 2.5	1.723	2.059	0.631	1.471	0.746
	2A	2.5 - 5	4.773	4.259	1.559	3.530	1.727
	3A	5 - 10	0.275	1.246	1.221	0.914	0.553
	4A	10 - 15	2.074	4.711	2.853	3.213	1.355
	5A	15 - 20	1.957	3.823	3.237	3.006	0.954
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	2.109	2.729	1.491	2.110	0.619
	2B	2.5 - 5	0.890	0.970	1.290	1.050	0.212
	3B	5 - 10	0.687	0.754	0.695	0.712	0.037
	4B	10 - 15	0.215	0.000	0.000	0.072	0.124
	5B	15 - 20	0.000	0.331	3.788	1.373	2.098
	6B	20 - 30	0.000	0.000	0.092	0.031	0.053
	7B	30 - 40	1.028	0.797	0.000	0.608	0.539

Note: Values shown as 0.000 are less than the method detection limit.

Table 9-77. Mean AVS sulfate reduction rates for Tolderol in February 2011 (in units of nmol/g/day).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
Control (no bioremediation)	1A	0 - 2.5	0.000	0.000	0.000	0.000	0.000
	2A	2.5 - 5	0.000	0.000	0.000	0.000	0.000
	3A	5 - 10	0.000	0.000	0.000	0.000	0.000
	4A	10 - 15	0.000	0.000	0.000	0.000	0.000
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	0.000	0.011	0.000	0.004	0.006
	2B	2.5 - 5	0.034	0.042	0.000	0.025	0.022
	3B	5 - 10	0.000	0.000	0.000	0.000	0.000
	4B	10 - 15	0.000	0.000	0.000	0.000	0.000
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000
2010 planted *Juncus* into 2009 plantings of Bevy rye	1A	0 - 2.5	0.565	0.569	0.131	0.422	0.252
	2A	2.5 - 5	2.443	2.315	0.530	1.763	1.069
	3A	5 - 10	0.057	0.519	0.047	0.208	0.270
	4A	10 - 15	1.752	2.842	1.886	2.160	0.595
	5A	15 - 20	0.483	1.348	0.997	0.943	0.435
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	0.340	0.671	0.083	0.365	0.294
	2B	2.5 - 5	0.159	0.142	0.235	0.178	0.050
	3B	5 - 10	0.069	0.062	0.106	0.079	0.023
	4B	10 - 15	0.000	0.000	0.000	0.000	0.000
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000

Note: Values shown as 0.000 are less than the method detection limit.

Table 9-78. Mean S^0 sulfate reduction rates for Tolderol in February 2011 (in units of nmol/g/day).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
Control (no bioremediation)	1A	0 - 2.5	0.000	0.000	0.000	0.000	0.000
	2A	2.5 - 5	0.000	0.000	0.000	0.000	0.000
	3A	5 - 10	0.048	0.000	0.039	0.029	0.026
	4A	10 - 15	0.000	0.000	0.032	0.011	0.019
	5A	15 - 20	0.142	0.000	0.000	0.047	0.082
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.112	0.000	0.037	0.064
	1B	0 - 2.5	0.000	0.072	0.000	0.024	0.042
	2B	2.5 - 5	0.000	0.032	0.042	0.025	0.022
	3B	5 - 10	0.000	0.000	0.000	0.000	0.000
	4B	10 - 15	0.775	0.000	0.010	0.261	0.444
	5B	15 - 20	0.005	0.070	0.263	0.113	0.134
	6B	20 - 30	0.118	0.029	0.000	0.049	0.061
	7B	30 - 40	0.000	0.000	0.733	0.244	0.423
2010 planted *Juncus* into 2009 plantings of Bevy rye	1A	0 - 2.5	1.087	1.385	0.480	0.984	0.461
	2A	2.5 - 5	2.210	1.857	1.021	1.696	0.610
	3A	5 - 10	0.218	0.725	1.174	0.705	0.478
	4A	10 - 15	0.221	1.753	0.912	0.962	0.767
	5A	15 - 20	1.417	2.341	2.150	1.969	0.488
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	1.658	1.958	1.254	1.623	0.353
	2B	2.5 - 5	0.692	0.779	0.980	0.817	0.147
	3B	5 - 10	0.608	0.691	0.589	0.630	0.054
	4B	10 - 15	0.215	0.000	0.000	0.072	0.124
	5B	15 - 20	0.000	0.331	3.788	1.373	2.098
	6B	20 - 30	0.000	0.000	0.092	0.031	0.053
	7B	30 - 40	1.028	0.797	0.000	0.608	0.539

Note: Values shown as 0.000 are less than the method detection limit.

Table 9-79. Mean pyrite sulfate reduction rates for Tolderol in February 2011 (in units of nmol/g/day).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
Control (no bioremediation)	1A	0 - 2.5	0.000	0.036	0.081	0.039	0.040
	2A	2.5 - 5	0.038	0.000	0.110	0.049	0.056
	3A	5 - 10	0.056	0.032	0.031	0.040	0.014
	4A	10 - 15	0.000	0.000	0.000	0.000	0.000
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	0.036	0.112	0.012	0.053	0.052
	2B	2.5 - 5	0.071	0.072	0.071	0.072	0.001
	3B	5 - 10	0.000	0.000	0.000	0.000	0.000
	4B	10 - 15	0.000	0.000	0.000	0.000	0.000
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000
2010 planted *Juncus* into 2009 plantings of Bevy rye	1A	0 - 2.5	0.071	0.105	0.020	0.065	0.043
	2A	2.5 - 5	0.120	0.087	0.008	0.072	0.058
	3A	5 - 10	0.000	0.002	0.000	0.001	0.001
	4A	10 - 15	0.102	0.116	0.054	0.091	0.032
	5A	15 - 20	0.057	0.134	0.090	0.094	0.039
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	0.111	0.101	0.153	0.122	0.028
	2B	2.5 - 5	0.039	0.050	0.075	0.055	0.019
	3B	5 - 10	0.010	0.000	0.000	0.003	0.006
	4B	10 - 15	0.000	0.000	0.000	0.000	0.000
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000

Note: Values shown as 0.000 are less than the method detection limit.

Table 9-80. Mean AVS contents for Tolderol in February 2011 (in units of μmol/g).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
Control (no bioremediation)	1A	0 - 2.5	<0.01	0.05	0.04	0.03	0.03
	2A	2.5 - 5	<0.01	<0.01	0.03	0.01	0.02
	3A	5 - 10	0.11	0.09	0.13	0.11	0.02
	4A	10 - 15	0.11	<0.01	<0.01	0.04	0.06
	5A	15 - 20	0.13	0.04	0.04	0.07	0.05
	6A	20 - 30	0.09	<0.01	<0.01	0.03	0.05
	7A	30 - 40	<0.01	0.05	0.23	0.09	0.12
	1B	0 - 2.5	0.03	0.13	<0.01	0.05	0.07
	2B	2.5 - 5	0.20	0.24	0.09	0.17	0.08
	3B	5 - 10	<0.01	0.04	0.04	0.03	0.02
	4B	10 - 15	<0.01	<0.01	<0.01	<0.01	<0.01
	5B	15 - 20	<0.01	0.04	<0.01	0.01	0.03
	6B	20 - 30	0.03	<0.01	0.07	0.03	0.03
	7B	30 - 40	0.14	0.24	0.19	0.19	0.05
2010 planted *Juncus* into 2009 plantings of Bevy rye	1A	0 - 2.5	0.60	0.25	0.36	0.40	0.18
	2A	2.5 - 5	<0.01	2.24	0.85	1.03	1.13
	3A	5 - 10	0.76	0.78	0.58	0.71	0.11
	4A	10 - 15	2.04	1.29	0.79	1.37	0.63
	5A	15 - 20	1.11	0.92	1.07	1.03	0.10
	6A	20 - 30	0.16	0.27	0.11	0.18	0.08
	7A	30 - 40	1.11	0.39	0.25	0.59	0.46
	1B	0 - 2.5	0.57	0.33	0.36	0.42	0.13
	2B	2.5 - 5	0.20	0.40	0.55	0.38	0.18
	3B	5 - 10	0.68	1.00	0.79	0.82	0.17
	4B	10 - 15	0.11	0.20	0.06	0.12	0.07
	5B	15 - 20	<0.01	0.16	0.32	0.16	0.16
	6B	20 - 30	0.29	0.13	0.24	0.22	0.08
	7B	30 - 40	0.12	0.16	0.07	0.12	0.04

Table 9-81. Mean CRS contents for Tolderol in February 2011 (in units of μmol/g).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
Control (no bioremediation)	1A	0 - 2.5	1.06	5.58	0.96	2.53	2.64
	2A	2.5 - 5	1.14	3.10	1.50	1.91	1.04
	3A	5 - 10	0.54	0.74	0.61	0.63	0.10
	4A	10 - 15	3.64	4.02	3.14	3.60	0.44
	5A	15 - 20	1.76	1.16	1.87	1.59	0.38
	6A	20 - 30	3.68	1.99	0.90	2.19	1.40
	7A	30 - 40	12.34	<0.01	5.11	5.82	6.20
	1B	0 - 2.5	2.30	4.69	1.44	2.81	1.68
	2B	2.5 - 5	5.59	5.87	2.97	4.81	1.60
	3B	5 - 10	4.28	1.82	4.25	3.45	1.41
	4B	10 - 15	2.31	3.80	0.91	2.34	1.44
	5B	15 - 20	1.05	0.90	5.81	2.59	2.79
	6B	20 - 30	4.40	2.22	1.00	2.54	1.72
	7B	30 - 40	3.31	4.13	0.99	2.81	1.63
2010 planted *Juncus* into 2009 plantings of Bevy rye	1A	0 - 2.5	2.81	0.93	2.04	1.93	0.94
	2A	2.5 - 5	2.00	3.58	2.42	2.66	0.82
	3A	5 - 10	2.12	1.32	1.92	1.78	0.42
	4A	10 - 15	2.28	1.62	0.90	1.60	0.69
	5A	15 - 20	1.38	1.38	1.10	1.29	0.16
	6A	20 - 30	3.29	3.79	0.90	2.66	1.55
	7A	30 - 40	0.54	2.44	1.05	1.34	0.98
	1B	0 - 2.5	2.56	3.40	1.67	2.55	0.86
	2B	2.5 - 5	1.57	1.42	1.91	1.63	0.25
	3B	5 - 10	0.76	1.14	1.90	1.26	0.58
	4B	10 - 15	1.60	1.80	1.68	1.69	0.10
	5B	15 - 20	2.12	1.61	1.40	1.71	0.37
	6B	20 - 30	0.96	0.67	0.66	0.76	0.17
	7B	30 - 40	3.60	3.88	5.57	4.35	1.07

Table 9-82. Pore-water properties for Tolderol in February 2011 (in units of mg/L).

Treatment	Sample	Depth (cm)	SO_4	Cl	Si	Al	Cd	Cr	Cu	Fe	Mn	Ni	Pb	Zn
Control (no bioremediation)	1A	0 - 2.5	104.63	133.00	11.29	0.99	<0.001	0.001	0.011	4.34	0.12	0.007	0.001	0.004
	2A	2.5 - 5	111.73	91.46	8.14	0.13	<0.001	0.015	0.001	10.92	0.08	0.004	<0.001	0.012
	3A	5 - 10	191.61	136.13	8.24	0.03	<0.001	0.002	<0.001	24.72	0.25	0.013	<0.001	0.181
	4A	10 - 15	254.89	142.82	12.49	0.14	<0.001	0.001	0.002	45.56	0.49	0.020	<0.001	0.321
	5A	15 - 20	517.85	185.53	24.00	2.46	<0.001	0.003	0.016	97.64	2.11	0.078	<0.001	0.224
	6A	20 - 30	450.27	170.53	22.84	3.87	<0.001	0.005	0.033	61.26	2.06	0.101	0.001	0.246
	7A	30 - 40	1570.86	363.33	44.05	38.74	0.001	0.032	0.038	201.29	9.59	0.293	<0.001	0.439
	1B	0 - 2.5	82.07	91.56	4.68	0.28	<0.001	<0.001	0.001	0.71	0.08	0.004	<0.001	<0.001
	2B	2.5 - 5	142.08	113.20	5.66	0.07	<0.001	<0.001	<0.001	11.08	0.16	0.019	<0.001	0.111
	3B	5 - 10	171.03	119.89	7.83	0.03	<0.001	<0.001	<0.001	24.07	0.22	0.006	<0.001	0.171
	4B	10 - 15	187.47	139.31	8.29	0.07	<0.001	<0.001	0.002	26.28	0.37	0.017	<0.001	0.144
	5B	15 - 20	164.73	120.53	6.81	0.07	<0.001	0.002	0.001	22.37	0.30	0.013	<0.001	0.149
	6B	20 - 30	568.04	247.73	18.77	1.66	<0.001	0.001	0.023	50.80	2.27	0.054	<0.001	0.316
	7B	30 - 40	1234.15	447.56	24.89	3.24	<0.001	0.002	0.019	132.78	6.36	0.181	<0.001	0.755
2010 seeded with Bevy rye and Puccinellia	1A	0 - 2.5	128.51	165.34	3.53	0.05	<0.001	0.001	0.002	0.28	0.45	0.062	<0.001	<0.001
	2A	2.5 - 5	130.29	141.99	1.58	0.04	<0.001	0.001	0.001	0.20	0.17	0.150	<0.001	0.014
	3A	5 - 10	94.75	289.61	3.62	0.05	<0.001	0.001	0.001	0.66	0.94	0.044	<0.001	0.022
	4A	10 - 15	108.78	202.20	10.19	1.46	<0.001	0.002	0.005	1.20	0.89	0.147	0.002	0.039
	5A	15 - 20	79.52	333.61	4.87	0.01	<0.001	<0.001	<0.001	0.06	1.40	0.023	<0.001	<0.001
	6A	20 - 30	86.21	103.29	4.70	0.22	<0.001	0.001	0.002	0.16	0.37	0.018	<0.001	0.010
	7A	30 - 40	113.46	138.81	6.61	0.64	<0.001	0.001	0.006	0.37	0.32	0.009	0.001	0.018
	1B	0 - 2.5	99.95	104.91	2.16	0.02	<0.001	0.001	0.001	0.09	0.15	0.008	<0.001	0.034
	2B	2.5 - 5	83.61	138.67	1.86	0.08	<0.001	<0.001	0.001	0.13	0.06	0.010	<0.001	0.035
	3B	5 - 10	205.41	295.31	5.93	0.02	<0.001	<0.001	0.007	0.96	0.40	0.025	<0.001	0.057
	4B	10 - 15	480.34	437.90	20.98	0.53	0.001	0.001	0.006	24.13	2.66	0.059	0.001	0.222
	5B	15 - 20	1300.04	690.26	51.19	14.08	0.001	0.023	0.014	161.29	6.99	0.263	0.003	0.490
	6B	20 - 30	107.70	132.13	11.44	0.18	<0.001	<0.001	0.001	2.67	0.19	0.073	<0.001	0.263
	7B	30 - 40	1012.60	483.01	63.20	17.15	0.002	0.008	0.005	77.34	5.00	0.237	<0.001	0.577

Table 9-83. Sediment properties for Tolderol in February 2011.

Treatment	Sample	Depth (cm)	Total S (mg/kg)	pH (1:1 soil:water)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
Control (no bioremediation)	1A	0 - 2.5	101.88	5.76	0.17	0.02	0.05	0.15
	2A	2.5 - 5	66.88	4.69	0.14	0.01	0.04	0.11
	3A	5 - 10	56.06	6.21	0.07	<0.01	0.04	0.04
	4A	10 - 15	153.13	4.47	0.10	<0.01	0.04	0.07
	5A	15 - 20	326.88	3.28	0.09	<0.01	0.03	0.06
	6A	20 - 30	201.25	3.70	0.07	0.01	0.02	0.05
	7A	30 - 40	182.50	2.91	0.04	<0.01	0.01	0.02
	1B	0 - 2.5	61.44	6.19	0.07	<0.01	0.06	0.06
	2B	2.5 - 5	124.38	6.01	0.13	0.01	0.03	0.09
	3B	5 - 10	133.75	4.89	0.31	0.02	0.08	0.26
	4B	10 - 15	45.25	4.72	0.06	<0.01	0.03	0.04
	5B	15 - 20	254.38	4.07	0.05	<0.01	0.03	0.03
	6B	20 - 30	87.50	3.74	0.03	<0.01	0.02	0.04
	7B	30 - 40	111.88	3.65	0.06	<0.01	0.04	0.05
2010 seeded with Bevy rye and *Puccinellia*	1A	0 - 2.5	40.94	7.04	0.08	<0.01	0.06	0.05
	2A	2.5 - 5	68.75	6.70	0.08	<0.01	0.07	0.06
	3A	5 - 10	52.38	6.53	0.08	<0.01	0.08	0.08
	4A	10 - 15	79.38	6.86	0.12	0.02	0.08	0.10
	5A	15 - 20	54.31	6.73	0.09	0.01	0.08	0.09
	6A	20 - 30	35.50	6.78	0.07	0.01	0.02	0.02
	7A	30 - 40	38.31	6.54	0.07	<0.01	0.04	0.06
	1B	0 - 2.5	41.44	7.09	0.08	<0.01	0.06	0.06
	2B	2.5 - 5	78.75	7.08	0.08	0.01	0.05	0.06
	3B	5 - 10	98.75	6.13	0.08	0.01	0.04	0.04
	4B	10 - 15	33.81	4.76	0.07	<0.01	0.02	0.02
	5B	15 - 20	27.38	3.50	0.04	<0.01	<0.01	0.01
	6B	20 - 30	29.50	5.83	0.05	<0.01	0.02	0.02
	7B	30 - 40	1512.50	3.08	0.11	0.01	0.03	0.08

Table 9-84. Mean total sulfate reduction rates for Waltowa in August 2010 (in units of nmol/g/day).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
Established *Cotula*	1A	0 - 2.5	0.000	0.000	0.000	0.000	0.000
	2A	2.5 - 5	0.000	0.000	0.000	0.000	0.000
	3A	5 - 10	0.000	0.000	0.000	0.000	0.000
	4A	10 - 15	0.000	0.000	0.000	0.000	0.000
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	0.000	0.000	0.000	0.000	0.000
	2B	2.5 - 5	0.000	0.000	0.000	0.000	0.000
	3B	5 - 10	0.000	0.000	0.000	0.000	0.000
	4B	10 - 15	0.000	0.000	0.000	0.000	0.000
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000
Established *Juncus*	1A	0 - 2.5	0.000	0.000	0.000	0.000	0.000
	2A	2.5 - 5	0.000	0.000	0.000	0.000	0.000
	3A	5 - 10	0.000	0.000	0.000	0.000	0.000
	4A	10 - 15	0.000	0.000	0.000	0.000	0.000
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	0.000	0.000	0.000	0.000	0.000
	2B	2.5 - 5	0.000	0.000	0.000	0.000	0.000
	3B	5 - 10	0.000	0.000	0.000	0.000	0.000
	4B	10 - 15	0.000	0.000	0.000	0.000	0.000
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000
Established *Phragmites*	1A	0 - 2.5	8.058	23.593	26.521	19.391	9.923
	2A	2.5 - 5	0.000	0.000	0.000	0.000	0.000
	3A	5 - 10	0.000	0.000	0.000	0.000	0.000
	4A	10 - 15	0.000	0.000	0.000	0.000	0.000
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	0.000	0.000	0.000	0.000	0.000
	2B	2.5 - 5	0.000	0.000	0.000	0.000	0.000
	3B	5 - 10	0.000	0.000	0.000	0.000	0.000
	4B	10 - 15	0.000	0.000	0.000	0.000	0.000
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000

Note: Values shown as 0.000 are less than the method detection limit.

Table 9-85. Pore-water properties for Waltowa in August 2010 (in units of mg/L).

Treatment	Sample	Depth (cm)	SO_4	Cl
Established *Cotula*	1A	0 - 2.5	1091.17	1395.32
	2A	2.5 - 5	143.18	2253.70
	3A	5 - 10	1463.70	3129.36
	4A	10 - 15	2490.74	3870.74
	5A	15 - 20	3789.88	4844.07
	6A	20 - 30	4653.46	4967.04
	7A	30 - 40	4127.13	4751.55
	1B	0 - 2.5	706.08	2718.70
	2B	2.5 - 5	2830.98	4866.53
	3B	5 - 10	3566.19	5642.79
	4B	10 - 15	4816.33	6771.66
	5B	15 - 20	3942.73	8135.93
	6B	20 - 30	4939.90	6343.44
	7B	30 - 40	3196.98	5075.15
Established *Juncus*	1A	0 - 2.5	4.73	1805.46
	2A	2.5 - 5	429.67	2398.89
	3A	5 - 10	567.36	3256.40
	4A	10 - 15	764.50	4223.73
	5A	15 - 20	1557.98	6169.41
	6A	20 - 30	2865.46	8969.60
	7A	30 - 40	4514.98	10378.33
	1B	0 - 2.5	<0.5	2372.40
	2B	2.5 - 5	384.47	2512.32
	3B	5 - 10	424.07	3155.38
	4B	10 - 15	641.79	4718.72
	5B	15 - 20	1348.06	6794.58
	6B	20 - 30	3742.23	10287.89
	7B	30 - 40	5931.67	12088.24
Established *Phragmites*	1A	0 - 2.5	<0.5	3019.97
	2A	2.5 - 5	335.25	3279.90
	3A	5 - 10	1024.40	4077.36
	4A	10 - 15	1552.12	5136.86
	5A	15 - 20	2439.81	6772.98
	6A	20 - 30	3699.15	7996.87
	7A	30 - 40	2564.66	3848.57
	1B	0 - 2.5	<0.5	3787.37
	2B	2.5 - 5	453.98	4476.43
	3B	5 - 10	2162.77	5706.56
	4B	10 - 15	3092.06	7338.70
	5B	15 - 20	3922.12	8124.02
	6B	20 - 30	5030.02	9006.51
	7B	30 - 40	5242.00	9389.89

Table 9-86. Sediment properties for Waltowa in August 2010.

Treatment	Sample	Depth (cm)	pH (1:1 soil:water)	Hydrolysable C (%C)	Total Organic C (%C)
Established *Cotula*	1A	0 - 2.5	6.12	1.50	5.31
	2A	2.5 - 5	3.42	0.11	0.18
	3A	5 - 10	3.21	0.05	0.13
	4A	10 - 15	2.72	0.04	0.10
	5A	15 - 20	2.65	0.06	0.11
	6A	20 - 30	2.67	0.05	0.18
	7A	30 - 40	3.49	0.11	0.54
	1B	0 - 2.5	5.16	0.47	1.43
	2B	2.5 - 5	5.83	0.07	0.16
	3B	5 - 10	4.53	0.05	0.11
	4B	10 - 15	3.26	0.03	0.10
	5B	15 - 20	3.18	0.02	0.10
	6B	20 - 30	3.29	0.01	0.11
	7B	30 - 40	6.37	0.10	0.39
Established *Juncus*	1A	0 - 2.5	7.17	0.60	1.37
	2A	2.5 - 5	6.81	0.09	0.17
	3A	5 - 10	6.99	0.02	0.09
	4A	10 - 15	6.57	0.02	0.06
	5A	15 - 20	6.61	0.04	0.10
	6A	20 - 30	6.77	0.08	0.21
	7A	30 - 40	3.96	0.07	0.12
	1B	0 - 2.5	7.14	0.69	3.21
	2B	2.5 - 5	6.78	0.11	0.23
	3B	5 - 10	6.89	0.04	0.06
	4B	10 - 15	6.83	0.02	0.05
	5B	15 - 20	6.87	0.02	0.05
	6B	20 - 30	6.33	0.02	0.17
	7B	30 - 40	4.11	0.06	0.24
Established *Phragmites*	1A	0 - 2.5	7.09	0.82	3.25
	2A	2.5 - 5	7.00	0.26	0.80
	3A	5 - 10	6.86	0.04	0.13
	4A	10 - 15	6.66	0.04	0.18
	5A	15 - 20	6.82	0.07	0.12
	6A	20 - 30	3.68	0.03	0.13
	7A	30 - 40	3.35	0.03	0.29
	1B	0 - 2.5	6.90	1.02	3.90
	2B	2.5 - 5	6.78	0.12	0.28
	3B	5 - 10	6.81	0.03	0.14
	4B	10 - 15	6.31	0.04	0.10
	5B	15 - 20	4.46	0.03	0.10
	6B	20 - 30	3.42	0.04	0.12
	7B	30 - 40	4.86	0.07	0.26

Table 9-87. Mean total sulfate reduction rates for Waltowa in February 2011 (in units of nmol/g/day).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
Established *Cotula*	1A	0 - 2.5	118.434	73.460	114.267	102.054	24.851
	2A	2.5 - 5	4.896	4.217	3.531	4.215	0.682
	3A	5 - 10	1.705	1.884	1.515	1.701	0.184
	4A	10 - 15	6.251	2.145	6.531	4.976	2.456
	5A	15 - 20	0.883	1.835	0.917	1.212	0.540
	6A	20 - 30	2.049	0.000	0.186	0.745	1.133
	7A	30 - 40	1.588	2.495	16.899	6.994	8.590
	1B	0 - 2.5	14.984	6.056	0.908	7.316	7.122
	2B	2.5 - 5	7.928	1.465	16.414	8.602	7.497
	3B	5 - 10	0.000	0.072	5.935	2.002	3.406
	4B	10 - 15	8.691	5.041	3.013	5.582	2.878
	5B	15 - 20	0.249	17.547	2.738	6.845	9.352
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000
Established *Juncus*	1A	0 - 2.5	7.813	44.676	13.900	22.129	19.761
	2A	2.5 - 5	3.792	4.537	3.422	3.917	0.568
	3A	5 - 10	1.596	1.580	0.000	1.059	0.917
	4A	10 - 15	1.367	0.375	0.094	0.612	0.669
	5A	15 - 20	3.671	4.177	2.626	3.492	0.791
	6A	20 - 30	0.528	2.114	0.363	1.002	0.967
	7A	30 - 40	1.138	1.105	1.551	1.265	0.248
	1B	0 - 2.5	10.975	8.720	9.804	9.833	1.128
	2B	2.5 - 5	2.344	2.827	5.480	3.550	1.688
	3B	5 - 10	0.668	0.223	3.880	1.590	1.996
	4B	10 - 15	0.179	1.434	0.000	0.537	0.781
	5B	15 - 20	3.192	11.241	10.388	8.274	4.421
	6B	20 - 30	0.000	0.199	0.000	0.066	0.115
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000
Established *Phragmites*	1A	0 - 2.5	272.517	221.490	242.119	245.376	25.669
	2A	2.5 - 5	4.469	8.106	6.337	6.304	1.819
	3A	5 - 10	0.161	0.000	0.000	0.054	0.093
	4A	10 - 15	0.000	0.000	0.000	0.000	0.000
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.751	2.881	1.211	1.494
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	59.877	49.923	105.140	71.647	29.430
	2B	2.5 - 5	2.119	2.334	1.648	2.034	0.351
	3B	5 - 10	1.158	0.089	0.344	0.530	0.559
	4B	10 - 15	0.000	0.546	0.000	0.182	0.315
	5B	15 - 20	0.000	1.576	0.000	0.525	0.910
	6B	20 - 30	0.000	0.669	0.803	0.491	0.430
	7B	30 - 40	2.872	1.267	0.000	1.380	1.439

Note: Values shown as 0.000 are less than the method detection limit.

Table 9-88. Mean AVS sulfate reduction rates for Waltowa in February 2011 (in units of nmol/g/day).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
Established *Cotula*	1A	0 - 2.5	29.976	28.199	20.663	26.280	4.944
	2A	2.5 - 5	1.909	1.697	1.425	1.677	0.243
	3A	5 - 10	1.511	1.090	0.972	1.191	0.283
	4A	10 - 15	0.312	0.000	0.224	0.179	0.161
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	1.972	2.688	0.559	1.740	1.084
	2B	2.5 - 5	3.605	0.959	10.226	4.930	4.773
	3B	5 - 10	0.000	0.000	0.000	0.000	0.000
	4B	10 - 15	0.000	0.000	0.000	0.000	0.000
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000
Established *Juncus*	1A	0 - 2.5	2.719	27.601	8.025	12.781	13.105
	2A	2.5 - 5	0.370	0.111	0.000	0.160	0.190
	3A	5 - 10	0.266	0.094	0.000	0.120	0.135
	4A	10 - 15	0.943	0.118	0.066	0.376	0.492
	5A	15 - 20	1.629	1.761	1.317	1.569	0.228
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.775	0.511	0.363	0.550	0.209
	1B	0 - 2.5	5.138	6.149	2.869	4.718	1.680
	2B	2.5 - 5	0.150	0.040	0.079	0.090	0.056
	3B	5 - 10	0.069	0.045	0.000	0.038	0.035
	4B	10 - 15	0.000	0.022	0.000	0.007	0.013
	5B	15 - 20	1.486	2.325	2.766	2.192	0.650
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000
Established *Phragmites*	1A	0 - 2.5	20.411	20.796	2.125	14.444	10.670
	2A	2.5 - 5	0.726	1.201	1.441	1.123	0.364
	3A	5 - 10	0.161	0.000	0.000	0.054	0.093
	4A	10 - 15	0.000	0.000	0.000	0.000	0.000
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	12.858	14.662	36.512	21.344	13.167
	2B	2.5 - 5	0.657	0.516	0.312	0.495	0.174
	3B	5 - 10	0.000	0.000	0.165	0.055	0.096
	4B	10 - 15	0.000	0.000	0.000	0.000	0.000
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000

Note: Values shown as 0.000 are less than the method detection limit.

Table 9-89. Mean S^0 sulfate reduction rates for Waltowa in February 2011 (in units of nmol/g/day).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
Established *Cotula*	1A	0 - 2.5	83.505	38.624	90.415	70.848	28.120
	2A	2.5 - 5	2.933	2.520	2.107	2.520	0.413
	3A	5 - 10	0.186	0.794	0.543	0.508	0.305
	4A	10 - 15	5.939	2.145	6.291	4.792	2.299
	5A	15 - 20	0.883	1.835	0.917	1.212	0.540
	6A	20 - 30	2.049	0.000	0.186	0.745	1.133
	7A	30 - 40	1.588	2.495	16.899	6.994	8.590
	1B	0 - 2.5	12.950	3.194	0.349	5.498	6.609
	2B	2.5 - 5	4.238	0.506	6.157	3.634	2.873
	3B	5 - 10	0.000	0.072	5.935	2.002	3.406
	4B	10 - 15	8.691	5.041	3.013	5.582	2.878
	5B	15 - 20	0.249	17.547	2.738	6.845	9.352
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000
Established *Juncus*	1A	0 - 2.5	5.094	15.772	5.610	8.825	6.021
	2A	2.5 - 5	3.422	4.426	3.422	3.757	0.579
	3A	5 - 10	1.330	1.486	0.000	0.939	0.817
	4A	10 - 15	0.319	0.222	0.028	0.190	0.148
	5A	15 - 20	1.777	2.416	1.216	1.803	0.601
	6A	20 - 30	0.528	2.114	0.363	1.002	0.967
	7A	30 - 40	0.363	0.594	1.188	0.715	0.426
	1B	0 - 2.5	5.499	2.196	6.689	4.795	2.328
	2B	2.5 - 5	2.194	2.788	5.401	3.461	1.706
	3B	5 - 10	0.599	0.178	3.880	1.553	2.027
	4B	10 - 15	0.179	1.411	0.000	0.530	0.769
	5B	15 - 20	1.706	8.916	7.595	6.072	3.838
	6B	20 - 30	0.000	0.199	0.000	0.066	0.115
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000
Established *Phragmites*	1A	0 - 2.5	233.386	188.381	227.195	216.321	24.393
	2A	2.5 - 5	3.479	6.736	4.838	5.018	1.636
	3A	5 - 10	0.000	0.000	0.000	0.000	0.000
	4A	10 - 15	0.000	0.000	0.000	0.000	0.000
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.751	2.881	1.211	1.494
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	45.511	33.945	62.163	47.206	14.185
	2B	2.5 - 5	1.462	1.818	1.336	1.539	0.250
	3B	5 - 10	1.158	0.089	0.178	0.475	0.593
	4B	10 - 15	0.000	0.546	0.000	0.182	0.315
	5B	15 - 20	0.000	1.576	0.000	0.525	0.910
	6B	20 - 30	0.000	0.669	0.803	0.491	0.430
	7B	30 - 40	2.872	1.267	0.000	1.380	1.439

Note: Values shown as 0.000 are less than the method detection limit.

Table 9-90. Mean pyrite sulfate reduction rates for Waltowa in February 2011 (in units of nmol/g/day).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
Established *Cotula*	1A	0 - 2.5	4.953	6.637	3.189	4.926	1.724
	2A	2.5 - 5	0.054	0.000	0.000	0.018	0.031
	3A	5 - 10	0.008	0.000	0.000	0.003	0.005
	4A	10 - 15	0.000	0.000	0.016	0.005	0.009
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	0.061	0.175	0.000	0.079	0.089
	2B	2.5 - 5	0.084	0.000	0.032	0.039	0.043
	3B	5 - 10	0.000	0.000	0.000	0.000	0.000
	4B	10 - 15	0.000	0.000	0.000	0.000	0.000
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000
Established *Juncus*	1A	0 - 2.5	0.000	1.303	0.265	0.523	0.689
	2A	2.5 - 5	0.000	0.000	0.000	0.000	0.000
	3A	5 - 10	0.000	0.000	0.000	0.000	0.000
	4A	10 - 15	0.104	0.035	0.000	0.046	0.053
	5A	15 - 20	0.265	0.000	0.094	0.120	0.134
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	0.339	0.375	0.247	0.320	0.066
	2B	2.5 - 5	0.000	0.000	0.000	0.000	0.000
	3B	5 - 10	0.000	0.000	0.000	0.000	0.000
	4B	10 - 15	0.000	0.000	0.000	0.000	0.000
	5B	15 - 20	0.000	0.000	0.028	0.009	0.016
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000
Established *Phragmites*	1A	0 - 2.5	18.721	12.313	12.799	14.611	3.568
	2A	2.5 - 5	0.264	0.170	0.059	0.164	0.103
	3A	5 - 10	0.000	0.000	0.000	0.000	0.000
	4A	10 - 15	0.000	0.000	0.000	0.000	0.000
	5A	15 - 20	0.000	0.000	0.000	0.000	0.000
	6A	20 - 30	0.000	0.000	0.000	0.000	0.000
	7A	30 - 40	0.000	0.000	0.000	0.000	0.000
	1B	0 - 2.5	1.508	1.315	6.465	3.096	2.919
	2B	2.5 - 5	0.000	0.000	0.000	0.000	0.000
	3B	5 - 10	0.000	0.000	0.000	0.000	0.000
	4B	10 - 15	0.000	0.000	0.000	0.000	0.000
	5B	15 - 20	0.000	0.000	0.000	0.000	0.000
	6B	20 - 30	0.000	0.000	0.000	0.000	0.000
	7B	30 - 40	0.000	0.000	0.000	0.000	0.000

Note: Values shown as 0.000 are less than the method detection limit.

Table 9-91. Mean AVS contents for Waltowa in February 2011 (in units of µmol/g).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
Established *Cotula*	1A	0 - 2.5	11.40	9.43	14.57	11.80	2.59
	2A	2.5 - 5	1.55	1.68	1.72	1.65	0.09
	3A	5 - 10	0.69	<0.01	0.68	0.46	0.40
	4A	10 - 15	0.78	0.74	0.84	0.79	0.05
	5A	15 - 20	0.14	0.06	0.20	0.14	0.07
	6A	20 - 30	0.04	0.11	0.13	0.09	0.05
	7A	30 - 40	0.09	<0.01	<0.01	0.03	0.05
	1B	0 - 2.5	1.26	1.07	1.36	1.23	0.15
	2B	2.5 - 5	1.32	0.75	1.12	1.07	0.29
	3B	5 - 10	0.35	0.15	0.73	0.41	0.29
	4B	10 - 15	<0.01	0.29	0.09	0.13	0.15
	5B	15 - 20	<0.01	0.23	0.09	0.11	0.12
	6B	20 - 30	0.24	0.11	0.04	0.13	0.10
	7B	30 - 40	0.20	0.13	0.06	0.13	0.07
Established *Juncus*	1A	0 - 2.5	1.99	5.96	1.49	3.15	2.45
	2A	2.5 - 5	0.43	0.36	0.16	0.32	0.14
	3A	5 - 10	0.37	0.23	0.17	0.25	0.10
	4A	10 - 15	0.38	0.14	0.13	0.22	0.14
	5A	15 - 20	0.59	0.92	0.47	0.66	0.23
	6A	20 - 30	0.26	0.74	0.67	0.56	0.26
	7A	30 - 40	0.64	0.50	0.39	0.51	0.13
	1B	0 - 2.5	5.95	4.79	4.42	5.06	0.80
	2B	2.5 - 5	1.26	1.63	1.79	1.56	0.27
	3B	5 - 10	1.62	0.72	0.43	0.92	0.62
	4B	10 - 15	0.39	1.13	0.39	0.64	0.43
	5B	15 - 20	2.01	4.77	1.75	2.84	1.67
	6B	20 - 30	0.25	0.36	0.23	0.28	0.07
	7B	30 - 40	0.17	0.20	0.18	0.18	0.02
Established *Phragmites*	1A	0 - 2.5	0.05	6.29	8.21	4.85	4.27
	2A	2.5 - 5	7.25	4.08	6.86	6.06	1.73
	3A	5 - 10	1.73	<0.01	0.15	0.63	0.96
	4A	10 - 15	0.22	0.31	0.17	0.24	0.07
	5A	15 - 20	0.15	0.21	0.20	0.19	0.03
	6A	20 - 30	0.23	0.26	0.41	0.30	0.10
	7A	30 - 40	0.44	0.12	0.30	0.29	0.16
	1B	0 - 2.5	0.43	14.38	11.25	8.69	7.32
	2B	2.5 - 5	10.18	3.99	2.70	5.62	4.00
	3B	5 - 10	2.08	0.68	0.64	1.13	0.82
	4B	10 - 15	0.63	0.29	0.18	0.37	0.23
	5B	15 - 20	0.74	0.27	0.28	0.43	0.26
	6B	20 - 30	0.31	0.27	0.19	0.26	0.06
	7B	30 - 40	0.27	0.21	<0.01	0.16	0.14

Table 9-92. Mean CRS contents for Waltowa in February 2011 (in units of µmol/g).

Treatment	Sample	Depth (cm)	Rep 1	Rep 2	Rep 3	Av.	S.D.
Established *Cotula*	1A	0 - 2.5	7.19	5.28	8.84	7.10	1.78
	2A	2.5 - 5	3.49	1.28	1.28	2.02	1.28
	3A	5 - 10	1.03	1.70	1.09	1.27	0.37
	4A	10 - 15	0.74	0.94	1.08	0.92	0.17
	5A	15 - 20	2.29	0.64	1.81	1.58	0.85
	6A	20 - 30	1.17	3.48	1.00	1.88	1.39
	7A	30 - 40	10.92	6.77	9.58	9.09	2.12
	1B	0 - 2.5	1.44	1.52	1.73	1.56	0.15
	2B	2.5 - 5	0.53	1.80	0.39	0.90	0.78
	3B	5 - 10	1.57	0.92	1.82	1.44	0.46
	4B	10 - 15	7.80	8.49	8.34	8.21	0.36
	5B	15 - 20	8.73	6.60	6.02	7.11	1.43
	6B	20 - 30	7.63	6.11	11.50	8.41	2.78
	7B	30 - 40	12.10	10.74	9.17	10.67	1.47
Established *Juncus*	1A	0 - 2.5	1.63	2.53	1.38	1.84	0.61
	2A	2.5 - 5	0.38	0.90	1.44	0.91	0.53
	3A	5 - 10	0.95	3.02	1.54	1.84	1.07
	4A	10 - 15	1.19	1.07	1.15	1.14	0.06
	5A	15 - 20	1.75	0.27	0.31	0.78	0.84
	6A	20 - 30	0.79	0.34	0.64	0.59	0.23
	7A	30 - 40	1.25	0.86	0.98	1.03	0.20
	1B	0 - 2.5	6.62	4.26	4.74	5.21	1.25
	2B	2.5 - 5	2.44	0.87	1.14	1.48	0.84
	3B	5 - 10	1.00	0.91	1.17	1.03	0.13
	4B	10 - 15	1.43	2.32	1.23	1.66	0.58
	5B	15 - 20	2.35	3.61	2.96	2.97	0.63
	6B	20 - 30	3.76	3.51	2.76	3.34	0.52
	7B	30 - 40	5.13	10.97	13.53	9.87	4.31
Established *Phragmites*	1A	0 - 2.5	5.70	6.61	5.19	5.83	0.72
	2A	2.5 - 5	2.49	1.27	1.49	1.75	0.65
	3A	5 - 10	2.53	3.86	1.44	2.61	1.21
	4A	10 - 15	2.21	1.26	1.44	1.63	0.51
	5A	15 - 20	1.92	1.31	2.05	1.76	0.39
	6A	20 - 30	2.18	1.31	1.99	1.83	0.45
	7A	30 - 40	5.37	4.46	7.87	5.90	1.77
	1B	0 - 2.5	5.60	8.65	6.50	6.92	1.57
	2B	2.5 - 5	4.38	3.49	1.69	3.19	1.37
	3B	5 - 10	2.30	1.38	1.45	1.71	0.51
	4B	10 - 15	0.89	0.22	0.13	0.41	0.42
	5B	15 - 20	0.53	1.07	0.85	0.82	0.27
	6B	20 - 30	5.78	1.50	1.56	2.95	2.46
	7B	30 - 40	30.39	31.83	<0.01	20.74	17.97

Table 9-93. Pore-water properties for Waltowa in February 2011 (in units of mg/L).

Treatment	Sample	Depth (cm)	SO_4	Cl	Si	Al	Cd	Cr	Cu	Fe	Mn	Ni	Pb	Zn
Established *Cotula*	1A	0 - 2.5	153.25	2149.09	16.31	0.05	<0.001	0.002	<0.001	0.55	1.54	0.037	<0.001	0.009
	2A	2.5 - 5	340.96	2330.20	14.12	0.07	<0.001	0.003	0.001	1.38	4.01	0.042	<0.001	0.034
	3A	5 - 10	419.02	2633.97	16.94	0.01	<0.001	0.003	0.001	20.03	5.54	0.073	<0.001	0.087
	4A	10 - 15	889.51	2877.11	8.82	<0.01	<0.001	0.001	0.002	23.84	4.99	0.087	<0.001	0.046
	5A	15 - 20	2054.75	3496.45	13.80	<0.01	<0.001	0.001	0.006	172.50	8.26	0.106	<0.001	0.084
	6A	20 - 30	3136.56	3750.84	19.12	0.29	<0.001	<0.001	0.009	305.90	12.18	0.082	<0.001	0.094
	7A	30 - 40	4230.36	5093.96	19.95	0.01	<0.001	0.002	0.013	119.80	22.83	0.182	<0.001	0.122
	1B	0 - 2.5	751.13	2123.65	15.35	0.02	<0.001	0.005	0.004	7.91	9.59	0.052	<0.001	0.066
	2B	2.5 - 5	960.33	2716.09	10.27	0.02	<0.001	0.001	0.002	28.18	3.13	0.039	<0.001	0.058
	3B	5 - 10	1692.82	3842.59	15.13	0.01	<0.001	0.001	0.005	93.17	4.92	0.052	<0.001	0.081
	4B	10 - 15	3285.62	4874.29	29.77	0.02	<0.001	0.003	0.011	412.96	10.93	0.174	<0.001	0.253
	5B	15 - 20	5369.07	6437.01	73.06	0.24	<0.001	0.005	0.019	896.92	19.15	0.243	<0.001	0.667
	6B	20 - 30	5056.00	6363.64	72.10	1.70	0.001	0.002	0.018	590.85	22.83	0.252	0.001	0.549
	7B	30 - 40	4110.70	6676.12	49.84	0.02	0.001	0.001	0.012	61.29	23.42	0.093	0.001	0.114
Established *Juncus*	1A	0 - 2.5	548.26	2734.63	18.89	<0.01	<0.001	0.003	0.002	1.12	1.22	0.026	<0.001	0.077
	2A	2.5 - 5	461.83	2019.41	4.47	0.01	<0.001	0.001	0.001	0.13	0.42	0.021	<0.001	0.020
	3A	5 - 10	469.86	2042.98	5.16	0.01	<0.001	<0.001	0.001	0.10	0.98	0.026	<0.001	0.028
	4A	10 - 15	403.44	3425.05	11.30	0.01	<0.001	0.003	0.001	0.65	3.63	0.090	<0.001	0.040
	5A	15 - 20	771.90	5677.54	12.65	<0.01	<0.001	0.005	0.003	0.61	4.32	0.050	<0.001	0.042
	6A	20 - 30	1659.52	7982.77	14.83	0.01	<0.001	0.014	0.006	0.91	3.91	0.048	<0.001	0.082
	7A	30 - 40	1809.92	8693.04	12.88	<0.01	<0.001	0.003	0.006	0.69	4.77	0.079	<0.001	0.033
	1B	0 - 2.5	478.41	2141.11	11.60	0.03	<0.001	0.002	0.001	0.27	0.62	0.017	<0.001	0.038
	2B	2.5 - 5	457.22	1911.05	4.92	<0.01	<0.001	0.001	0.001	0.19	0.35	0.020	<0.001	0.009
	3B	5 - 10	464.57	2502.25	6.80	<0.01	<0.001	0.002	0.001	0.07	1.18	0.027	<0.001	0.010
	4B	10 - 15	537.44	2994.12	8.51	0.01	<0.001	0.002	0.002	0.14	2.44	0.048	<0.001	0.020
	5B	15 - 20	1458.21	6317.93	12.70	0.01	<0.001	0.009	0.005	0.19	5.57	0.047	<0.001	0.045
	6B	20 - 30	1838.56	7466.44	14.50	0.02	<0.001	0.005	0.007	0.14	5.38	0.074	<0.001	0.052
	7B	30 - 40	4598.69	10686.83	14.73	0.14	0.001	0.002	0.013	9.53	13.17	0.049	<0.001	0.061
Established *Phragmites*	1A	0 - 2.5	149.45	1622.84	24.08	<0.01	<0.001	0.003	<0.001	0.35	1.61	0.013	<0.001	0.024
	2A	2.5 - 5	358.05	2780.99	40.03	0.02	<0.001	0.004	0.001	0.44	2.00	0.024	<0.001	0.030
	3A	5 - 10	1534.20	4237.15	15.37	<0.01	<0.001	0.003	0.004	13.79	6.52	0.056	<0.001	0.062
	4A	10 - 15	3035.18	5618.13	11.66	<0.01	<0.001	0.002	0.009	7.57	12.27	0.048	<0.001	0.074
	5A	15 - 20	3754.63	5504.45	17.60	<0.01	<0.001	0.002	0.012	64.05	20.95	0.109	<0.001	0.099
	6A	20 - 30	5632.33	7120.58	31.61	0.02	<0.001	<0.001	0.016	503.17	26.80	0.130	0.003	0.262
	7A	30 - 40	7192.73	9211.52	46.09	0.01	<0.001	0.001	0.021	486.73	30.35	0.106	<0.001	0.160
	1B	0 - 2.5	154.38	2780.42	46.17	<0.01	<0.001	0.006	0.001	1.86	1.86	0.020	<0.001	0.033
	2B	2.5 - 5	393.59	3939.80	20.58	0.01	<0.001	0.005	0.001	1.79	1.25	0.038	<0.001	0.052
	3B	5 - 10	709.86	4242.07	9.62	0.01	<0.001	0.004	0.002	0.58	2.25	0.058	<0.001	0.033
	4B	10 - 15	1508.57	5451.82	12.71	0.03	<0.001	0.004	0.006	4.81	4.81	0.059	<0.001	0.034
	5B	15 - 20	2889.57	7430.34	13.43	0.01	<0.001	0.005	0.009	0.23	2.64	0.050	<0.001	0.032
	6B	20 - 30	3060.49	6858.17	14.98	0.01	<0.001	0.003	0.777	2.49	3.41	0.042	<0.001	0.063
	7B	30 - 40	3259.06	6423.65	18.59	<0.01	<0.001	0.002	0.011	37.53	8.93	0.046	<0.001	0.056

Table 9-94. Sediment properties for Waltowa in February 2011.

Treatment	Sample	Depth (cm)	pH (1:1 soil:water)	Total S (mg/kg)	Total C (%C)	Total N (%N)	Hydrolysable C (%C)	Total Organic C (%C)
Established *Cotula*	1A	0 - 2.5	6.82	2581.25	3.38	0.29	1.21	3.11
	2A	2.5 - 5	6.68	205.00	0.13	0.01	0.09	0.10
	3A	5 - 10	6.52	203.75	0.20	0.01	0.05	0.13
	4A	10 - 15	6.39	149.38	0.11	<0.01	0.03	0.07
	5A	15 - 20	6.02	155.00	0.08	<0.01	0.02	0.05
	6A	20 - 30	5.86	366.25	0.14	0.01	0.10	0.15
	7A	30 - 40	6.04	1487.50	1.27	0.04	0.14	0.32
	1B	0 - 2.5	6.65	431.88	1.22	0.08	0.59	1.10
	2B	2.5 - 5	6.30	151.25	0.12	0.02	0.05	0.09
	3B	5 - 10	5.99	146.25	0.15	0.02	0.06	0.11
	4B	10 - 15	5.61	215.00	0.12	0.01	<0.01	0.08
	5B	15 - 20	4.80	662.50	0.27	0.03	0.07	0.20
	6B	20 - 30	4.03	737.50	0.33	0.02	<0.01	0.14
	7B	30 - 40	5.23	3350.00	1.38	0.15	0.51	1.27
Established *Juncus*	1A	0 - 2.5	6.77	762.00	1.38	0.11	0.60	1.04
	2A	2.5 - 5	6.81	120.63	0.12	<0.01	0.08	0.11
	3A	5 - 10	6.91	68.13	0.08	0.01	0.05	0.06
	4A	10 - 15	6.41	43.63	0.06	<0.01	<0.01	0.02
	5A	15 - 20	6.68	107.50	0.14	0.01	<0.01	0.11
	6A	20 - 30	6.41	169.38	0.13	0.01	<0.01	0.08
	7A	30 - 40	6.22	324.38	0.17	0.02	0.02	0.12
	1B	0 - 2.5	6.99	912.50	1.30	0.08	0.26	0.89
	2B	2.5 - 5	7.06	196.25	0.18	0.01	0.05	0.08
	3B	5 - 10	6.68	120.63	0.12	0.01	0.06	0.08
	4B	10 - 15	6.76	106.25	0.10	0.01	<0.01	0.03
	5B	15 - 20	6.61	126.88	0.11	0.01	0.01	0.06
	6B	20 - 30	6.34	218.75	0.12	0.01	0.01	0.08
	7B	30 - 40	5.92	681.25	0.13	0.01	0.07	0.12
Established *Phragmites*	1A	0 - 2.5	6.49	3856.25	5.93	0.52	1.11	4.99
	2A	2.5 - 5	6.40	737.50	0.74	0.06	0.52	0.69
	3A	5 - 10	6.25	211.25	0.21	0.01	0.07	0.17
	4A	10 - 15	5.96	189.38	0.09	<0.01	<0.01	0.06
	5A	15 - 20	5.86	403.75	0.21	0.01	0.03	0.13
	6A	20 - 30	5.66	485.63	0.30	0.03	<0.01	0.26
	7A	30 - 40	5.30	1412.50	0.34	0.03	0.06	0.31
	1B	0 - 2.5	6.36	2337.50	3.11	0.23	<0.01	2.81
	2B	2.5 - 5	6.61	185.63	0.17	0.01	0.10	0.12
	3B	5 - 10	6.56	112.50	0.11	<0.01	0.05	0.08
	4B	10 - 15	6.67	133.75	0.11	0.01	<0.01	0.10
	5B	15 - 20	6.29	159.38	0.13	0.01	<0.01	0.11
	6B	20 - 30	6.08	650.00	0.21	0.02	0.10	0.22
	7B	30 - 40	6.05	1025.00	0.31	0.03	<0.01	0.30

APPENDIX 5. Surface water and pore-water characteristics (Columns Trials).

Table 9-95. Summary of column surface water hydrochemical characteristics prior to inundation.

Parameter	Units	Value/Concentration
pH		7.10
Alkalinity	mmol/L	1.6
Ferrous Iron (Fe^{2+})	ppm	<0.01
Total Iron	ppm	<0.01
Dissolved Sulfide (S^{2-})	ppb	<30
Nitrate (NO_3^-)	ppm N	<0.01
Nitrite (NO_2^-)	ppm N	<0.01
Ammonia (NH_3)	ppm N	<0.01
Orthophosphate (PO_4^{3-})	ppm P	<0.01
Chloride (Cl^-)	ppm	171
Sulfate (SO_4^{2-})	ppm	50.7
Sodium (Na^+)	ppm	118
Potassium (K^+)	ppm	4.0
Calcium (Ca^{2+})	ppm	20.0
Magnesium (Mg^{2+})	ppm	15.0

Table 9-96. Selected water properties after inundation of the soil material at Waltowa site (i) *Phragmites*: pH and alkalinity.

		pH						Alkalinity (mmol/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	**SW**	7.70	0.10	8.04	0.12	8.06	0.10	12.0	0.7	6.7	0.2	15.9	1.4
	3-5	7.38	0.13	7.40	0.14	7.39	0.07	27.9	9.6	20.8	2.4	37.3	9.6
	10-12	7.32	0.10	7.21	0.12	7.24	0.07	20.8	1.5	13.7	4.1	37.8	3.3
August 2010	**SW**	7.17	0.28	7.41	0.25	7.56	0.19	6.5	4.4	6.5	4.2	7.2	4.3
	3-5	7.10	0.16	7.20	0.27	7.16	0.16	32.9	28.4	11.3	2.7	16.7	11.7
	10-12	7.01	0.27	7.05	0.21	7.06	0.14	26.8	20.0	13.9	5.0	22.1	16.9
November 2010	**SW**	7.26	0.24	7.67	0.23	7.45	0.16	3.9	2.2	7.7	3.0	11.1	7.0
	3-5	6.99	0.24	6.92	0.13	6.80	0.18	30.0	15.4	22.7	7.9	25.3	16.8
	10-12	6.88	0.12	6.94	0.34	6.67	0.11	34.7	12.5	30.0	7.1	45.9	14.0
February 2011	**SW**	7.37	0.16	7.59	0.07	7.74	0.07	4.8	1.3	6.5	1.7	8.2	2.5
	3-5	7.12	0.24	7.06	0.24	7.15	0.22	16.9	7.7	14.7	2.3	14.5	3.5
	10-12	6.75	0.13	6.84	0.11	6.90	0.07	24.5	7.5	26.3	10.8	30.5	10.9

Table 9-97. Selected water properties after inundation of the soil material at Waltowa site (i) *Phragmites*: Eh and EC.

		Eh* (mV)						EC (µS/cm)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	**SW**	406	8	304	4	316	36	893	121	1131	184	1330	248
	3-5	285	80	272	58	340	33	3283	654	2718	689	2362	500
	10-12	271	79	276	34	331	44	8128	1034	6987	1237	6078	916
August 2010	**SW**	201	105	211	111	199	102	888	441	869	488	821	520
	3-5	174	77	190	65	160	45	2354	2727	1747	1769	1552	1443
	10-12	165	31	180	32	155	21	3692	4043	2935	3184	2493	2420
November 2010	**SW**	160	46	136	103	121	18	1330	335	1104	316	966	363
	3-5	171	63	129	53	150	23	3876	2170	2389	1349	1963	1306
	10-12	123	20	105	33	144	17	5974	2258	4105	1483	4237	1477
February 2011	**SW**	205	98	206	93	252	76	2050	483	2002	674	2341	594
	3-5	109	73	170	28	240	43	4672	2068	3454	1087	3303	1196
	10-12	164	69	174	53	168	37	8172	3336	7248	3196	6911	2735

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-98. Selected water properties after inundation of the soil material at Waltowa site (i) *Phragmites*: Soluble Cl and SO_4.

		Cl (mg/L)						SO_4 (mg/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	SW	383	61	597	116	611	160	92	20	120	22	70	20
	3-5	1573	404	1413	423	1178	358	447	230	160	99	77	64
	10-12	5066	785	4364	1117	3702	770	1627	243	1278	377	1075	333
August 2010	SW	347	181	355	230	394	283	40	5	28	7	22	11
	3-5	1041	1403	842	1053	897	1142	71	115	16	17	10	10
	10-12	1818	2231	1581	1949	1664	2168	276	454	113	169	52	89
November 2010	SW	324	101	399	159	423	199	100	54	90	92	83	96
	3-5	1163	946	1025	777	949	763	398	520	221	423	165	363
	10-12	2296	1252	2400	1217	2404	1113	313	425	270	457	255	538
February 2011	SW	400	85	475	122	458	140	160	94	123	64	107	51
	3-5	985	548	797	347	664	317	167	125	51	46	59	45
	10-12	2210	1004	2035	1018	1873	907	34	45	10	10	16	3

Table 9-99. Selected water properties after inundation of the soil material at Waltowa site (i) *Phragmites*: Dissolved Fe^{2+} and Fe(Total).

		Fe^{2+} (mg/L)						Fe(Total) (mg/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	SW	<0.01	<0.01	0.25	0.09	0.26	0.12	0.09	0.23	0.26	0.10	0.79	0.69
	3-5	1.24	1.47	4.79	2.34	3.05	1.41	1.44	1.48	4.48	2.21	3.67	1.24
	10-12	<0.01	<0.01	0.65	1.34	0.47	0.26	<0.01	<0.01	0.66	1.24	1.53	1.12
August 2010	SW	0.54	0.28	0.56	0.37	0.77	0.59	0.53	0.27	0.62	0.37	0.66	0.59
	3-5	12.10	10.28	4.88	5.61	13.20	15.85	11.78	9.92	6.53	9.22	12.19	14.72
	10-12	20.06	19.27	5.69	5.23	9.44	8.06	18.54	16.52	7.19	6.84	8.66	7.38
November 2010	SW	0.31	0.27	0.37	0.55	0.51	0.71	0.14	0.22	0.26	0.41	0.38	0.59
	3-5	16.82	14.20	27.21	21.28	27.74	17.72	13.91	11.93	22.72	18.53	26.03	16.63
	10-12	31.13	14.17	54.85	24.52	58.77	24.35	26.38	11.78	44.11	18.81	53.82	25.46
February 2011	SW	0.18	0.21	0.14	0.09	0.03	0.02	0.26	0.25	0.14	0.09	0.07	0.02
	3-5	1.75	2.33	1.20	1.34	1.37	1.42	1.83	2.33	1.22	1.44	1.36	1.40
	10-12	34.87	51.05	38.32	40.44	32.97	26.15	37.39	53.88	39.59	41.11	32.35	25.80

Table 9-100. Selected water properties after inundation of the soil material at Waltowa site (i) *Phragmites*: Dissolved sulfide and selenium.

		Dissolved Sulfide (µg/L)						Dissolved Selenium (µg/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	SW	67	11	55	29	8	20	n/a		n/a		n/a	
	3-5	269	305	242	234	57	89	n/a		n/a		n/a	
	10-12	50	11	13	12	0	0	n/a		n/a		n/a	
August 2010	SW	57	47	146	123	114	173	n/a		n/a		n/a	
	3-5	14	10	23	18	28	63	n/a		n/a		n/a	
	10-12	18	12	7	9	<1	<1	n/a		n/a		n/a	
November 2010	SW	531	899	1277	2757	256	564	n/a		n/a		n/a	
	3-5	34	27	42	29	42	53	n/a		n/a		n/a	
	10-12	12	8	7	8	13	7	n/a		n/a		n/a	
February 2011	SW	16	22	20	26	25	16	2	<1	n/a		2	1
	3-5	2607	4420	1189	1636	230	213	3	1	n/a		3	1
	10-12	66	42	82	70	92	47	4	<1	n/a		5	2

Table 9-101. Selected water properties after inundation of the soil material at Waltowa site (ii) *Cotula*: pH and alkalinity.

		pH						Alkalinity (mmol/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	SW	7.64	0.17	7.63	0.32	7.66	0.29	12.4	1.6	6.6	1.9	13.1	5.6
	3-5	7.10	0.19	6.97	0.19	7.00	0.18	24.5	12.9	12.3	5.4	17.1	7.0
	10-12	6.33	0.51	6.43	0.38	6.67	0.27	13.6	5.0	8.4	2.7	18.0	8.0
August 2010	SW	6.69	0.33	7.23	0.12	7.56	0.19	5.2	1.3	8.4	8.2	9.9	2.2
	3-5	6.60	0.11	6.69	0.12	7.16	0.16	34.2	10.6	6.6	9.4	20.7	7.2
	10-12	5.95	0.90	6.04	0.89	7.06	0.14	8.0	4.3	5.9	4.5	12.9	6.3
November 2010	SW	7.37	0.19	7.31	0.40	7.33	0.38	2.5	1.1	4.2	1.9	5.6	2.7
	3-5	7.06	0.28	6.83	0.21	6.80	0.25	16.2	7.8	13.3	6.8	14.8	7.6
	10-12	6.78	0.23	6.83	0.44	6.56	0.19	16.0	9.6	13.6	6.7	14.4	8.0
February 2011	SW	7.23	0.30	7.62	0.19	7.78	0.23	3.9	0.7	4.9	0.6	5.7	0.6
	3-5	6.85	0.07	7.01	0.17	7.01	0.10	14.0	2.3	16.0	6.8	12.4	2.3
	10-12	6.59	0.15	6.67	0.19	6.70	0.17	12.8	3.0	12.9	3.1	15.4	4.2

Table 9-102. Selected water properties after inundation of the soil material at Waltowa site (ii) *Cotula*: Eh and EC.

		Eh* (mV)						EC (µS/cm)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	SW	426	10	307	117	227	147	645	181	808	174	898	263
	3-5	137	37	197	95	159	32	1673	987	1557	616	1552	694
	10-12	199	47	193	46	132	47	4916	2446	4289	1915	4097	1817
August 2010	SW	120	93	83	24	89	19	963	230	985	244	821	520
	3-5	100	20	104	22	122	16	3425	1642	2712	1160	1552	1443
	10-12	180	117	162	80	144	57	6425	3339	4586	2592	2493	2420
November 2010	SW	359	50	308	96	246	125	2732	3370	777	307	763	330
	3-5	201	80	158	31	195	49	2040	1438	1427	842	1188	521
	10-12	176	70	145	39	195	40	4166	2072	2649	1245	2610	1227
February 2011	SW	147	9	179	46	194	44	1783	233	1834	191	2074	159
	3-5	149	7	202	48	202	27	6258	865	4355	604	3694	411
	10-12	141	14	176	28	166	20	8900	447	7913	573	7373	698

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-103. Selected water properties after inundation of the soil material at Waltowa site (ii) *Cotula*: Soluble Cl and SO_4.

		Cl (mg/L)						SO_4 (mg/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	SW	249	76	353	108	348	125	53	10	71	13	32	14
	3-5	661	464	724	380	638	352	136	138	82	69	56	78
	10-12	2573	1412	2476	1281	2238	1089	1587	1242	1295	984	1127	797
August 2010	SW	380	113	424	136	503	193	74	32	45	25	24	16
	3-5	1491	975	1356	822	1303	728	268	241	96	132	69	114
	10-12	3052	1735	3115	1814	3077	1829	1940	1096	1662	1004	1522	1029
November 2010	SW	253	81	285	124	305	144	81	66	80	83	71	76
	3-5	539	464	500	356	461	221	322	432	73	97	13	11
	10-12	1378	832	1327	683	1290	659	259	206	279	218	271	230
February 2011	SW	380	38	440	25	415	27	156	77	134	69	131	64
	3-5	1530	283	1136	157	885	131	770	416	259	231	119	112
	10-12	2709	212	2765	225	2278	225	478	215	537	208	527	221

Table 9-104. Selected water properties after inundation of the soil material at Waltowa site (ii) *Cotula*: Dissolved Fe^{2+} and Fe(Total).

		Fe^{2+} (mg/L)						Fe(Total) (mg/L)					
		Week 2		**Week 4**		**Week 6**		**Week 2**		**Week 4**		**Week 6**	
	Depth (cm)	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**
May 2010	**SW**	0.76	0.59	0.39	0.16	0.43	0.18	<0.01	<0.01	0.32	0.14	0.39	0.20
	3-5	12.22	12.75	10.27	7.39	6.17	4.56	12.38	13.16	9.60	7.39	6.29	4.89
	10-12	58.74	47.23	153.83	154.35	147.61	145.40	61.70	44.26	148.31	134.17	155.65	144.73
August 2010	**SW**	0.53	0.22	0.82	0.55	1.24	0.64	0.52	0.26	0.79	0.66	1.11	0.60
	3-5	62.44	29.71	29.43	7.17	44.23	17.51	58.58	24.05	42.69	19.53	40.92	16.25
	10-12	426.43	202.15	245.57	172.43	275.66	145.05	352.11	121.78	304.61	139.99	262.84	133.54
November 2010	**SW**	0.44	0.25	0.41	0.29	0.30	0.14	0.18	0.18	0.14	0.21	0.09	0.09
	3-5	21.61	21.95	17.29	12.90	13.04	8.40	21.74	25.44	14.48	10.82	11.84	7.80
	10-12	39.34	44.86	48.97	50.11	47.58	44.49	39.56	39.62	38.66	42.03	41.17	42.75
February 2011	**SW**	0.17	0.18	0.14	0.21	0.05	0.09	0.22	0.21	0.19	0.22	0.07	0.09
	3-5	24.28	14.83	11.88	5.82	5.51	3.56	25.05	15.16	11.15	4.74	5.30	3.49
	10-12	93.15	49.05	99.81	46.16	84.03	46.07	95.33	51.14	99.22	52.38	80.89	45.76

Table 9-105. Selected water properties after inundation of the soil material at Waltowa site (ii) *Cotula*: Dissolved sulfide and selenium.

		Dissolved Sulfide (µg/L)						Dissolved Selenium (µg/L)					
		Week 2		**Week 4**		**Week 6**		**Week 2**		**Week 4**		**Week 6**	
	Depth (cm)	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**
May 2010	**SW**	78	41	76	55	54	47	n/a		n/a		n/a	
	3-5	160	76	120	48	47	28	n/a		n/a		n/a	
	10-12	137	81	137	60	159	143	n/a		n/a		n/a	
August 2010	**SW**	326	321	781	745	1002	1428	n/a		n/a		n/a	
	3-5	112	136	167	204	239	286	n/a		n/a		n/a	
	10-12	221	116	249	143	465	187	n/a		n/a		n/a	
November 2010	**SW**	9	11	8	6	7	10	n/a		n/a		n/a	
	3-5	86	85	82	60	182	273	n/a		n/a		n/a	
	10-12	72	67	75	55	94	77	n/a		n/a		n/a	
February 2011	**SW**	3	7	27	19	17	16	2	<1	n/a		1	<1
	3-5	22	24	95	57	42	28	4	<1	n/a		2	<1
	10-12	66	59	148	76	99	70	5	<1	n/a		5	<1

Table 9-106. Selected water properties after inundation of the soil material at Waltowa site (iii) *Juncus*: pH and alkalinity.

		pH						Alkalinity (mmol/L)					
		Week 2		**Week 4**		**Week 6**		**Week 2**		**Week 4**		**Week 6**	
	Depth (cm)	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**
May 2010	**SW**	7.81	0.15	8.07	0.14	8.06	0.13	12.8	3.2	6.9	1.9	11.4	3.1
	3-5	7.54	0.14	7.53	0.13	7.47	0.10	29.1	15.4	10.8	1.9	28.6	12.1
	10-12	7.45	0.18	7.39	0.21	7.35	0.13	22.3	4.9	13.8	4.1	35.7	12.4
August 2010	**SW**	7.33	0.16	7.53	0.17	7.68	0.22	8.4	1.5	17.1	9.2	12.2	1.3
	3-5	6.93	0.05	6.96	0.05	7.05	0.05	57.8	18.8	30.9	2.4	27.6	7.4
	10-12	6.92	0.03	6.97	0.03	7.06	0.05	49.3	13.2	33.2	15.0	38.9	2.9
November 2010	**SW**	7.61	0.22	7.84	0.06	7.67	0.13	3.3	0.6	5.9	1.4	9.0	2.4
	3-5	7.11	0.25	7.16	0.14	7.12	0.15	23.4	9.5	20.8	7.0	26.4	8.7
	10-12	6.93	0.20	7.04	0.16	6.96	0.14	12.0	-	20.3	5.6	28.8	7.9
February 2011	**SW**	7.23	0.11	7.48	0.36	7.76	0.16	5.1	1.5	6.1	2.1	7.0	1.9
	3-5	7.06	0.14	7.11	0.14	7.18	0.14	14.7	5.4	14.0	1.6	13.6	1.8
	10-12	6.90	0.18	6.95	0.16	6.99	0.17	15.0	0.3	15.9	2.5	19.3	3.5

Table 9-107. Selected water properties after inundation of the soil material at Waltowa site (iii) *Juncus*: Eh and EC.

		Eh* (mV)						EC (µS/cm)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	**SW**	419	14	223	14	256	37	671	336	815	340	919	394
	3-5	235	58	181	41	280	26	1040	645	1394	974	1675	1208
	10-12	241	46	192	53	227	72	1339	2017	4153	2480	2842	2651
August 2010	**SW**	93	17	88	14	68	17	1090	211	1179	237	1130	217
	3-5	84	12	88	15	104	34	4270	1122	3210	923	2373	750
	10-12	96	5	104	9	92	8	7287	1214	5472	830	4265	627
November 2010	**SW**	113	18	177	29	84	7	1291	225	1042	252	1087	289
	3-5	110	14	193	100	106	11	3542	1160	2076	801	2106	785
	10-12	112	25	131	87	109	9	4848	1520	3317	1063	3790	1326
February 2011	**SW**	134	39	141	24	174	41	1920	252	1899	183	2015	272
	3-5	142	14	152	26	191	43	5728	2341	4299	1350	3681	1172
	10-12	140	9	155	24	181	41	9830	1867	8528	1941	6932	2332

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-108. Selected water properties after inundation of the soil material at Waltowa site (iii) *Juncus*: Soluble Cl and SO_4.

		Cl (mg/L)						SO_4 (mg/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	**SW**	266	149	373	201	376	233	66	20	82	23	50	23
	3-5	609	572	628	569	785	727	175	141	73	38	54	51
	10-12	2272	1888	2400	1719	2415	1960	639	564	592	456	627	591
August 2010	**SW**	412	96	494	134	564	147	45	13	23	9	12	5
	3-5	1782	644	1675	627	1581	777	30	38	11	2	14	4
	10-12	3752	756	3412	691	3674	851	367	192	191	222	184	240
November 2010	**SW**	345	68	397	98	464	131	190	72	176	85	162	70
	3-5	1208	531	1013	451	974	403	822	438	311	220	127	89
	10-12	2242	908	2129	884	2175	872	329	294	375	289	386	252
February 2011	**SW**	409	51	500	145	405	78	148	60	102	43	111	50
	3-5	1468	584	1125	493	907	401	684	406	241	307	173	209
	10-12	3196	765	2863	1048	2423	915	508	297	501	393	499	447

Table 9-109. Selected water properties after inundation of the soil material at Waltowa site (iii) *Juncus*: Dissolved Fe^{2+} and Fe(Total).

		Fe^{2+} (mg/L)						Fe(Total) (mg/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	**SW**	<0.01	<0.01	0.24	0.19	0.19	0.09	<0.01	<0.01	0.19	0.16	0.15	0.12
	3-5	4.14	2.64	5.56	2.29	3.23	2.55	4.49	2.79	5.05	2.04	3.14	2.50
	10-12	1.62	1.47	4.20	2.93	2.09	1.10	2.74	2.67	5.64	5.40	2.12	1.10
August 2010	**SW**	0.61	0.28	1.36	0.58	1.82	0.87	0.59	0.28	1.36	0.61	1.59	0.81
	3-5	66.12	30.41	26.37	9.72	47.47	32.44	57.10	27.44	53.13	25.91	47.36	33.68
	10-12	43.23	12.19	10.82	5.09	30.13	12.35	31.11	11.98	21.40	9.86	30.52	12.54
November 2010	**SW**	0.12	0.09	0.07	0.05	0.11	0.12	0.01	0.02	<0.01	<0.01	<0.01	<0.01
	3-5	11.02	9.18	10.67	10.57	10.11	10.92	9.51	8.18	9.39	9.42	6.75	7.91
	10-12	17.29	13.93	20.92	16.17	21.84	18.81	15.78	12.61	18.50	14.47	21.38	15.27
February 2011	**SW**	0.15	0.19	0.15	0.14	0.12	0.14	0.16	0.20	0.11	0.26	0.14	0.14
	3-5	11.67	13.71	10.25	12.11	6.28	8.69	24.46	22.50	8.88	10.70	7.17	7.96
	10-12	30.42	28.52	31.04	37.14	30.73	29.69	30.55	28.83	25.94	30.62	29.53	29.91

Table 9-110. Selected water properties after inundation of the soil material at Waltowa site (iii) *Juncus*: Dissolved sulfide and selenium.

		Dissolved Sulfide (µg/L)						Dissolved Selenium (µg/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	SW	99	59	65	37	3	8	n/a		n/a		n/a	
	3-5	94	41	81	51	30	34	n/a		n/a		n/a	
	10-12	48	8	42	14	<1	<1	n/a		n/a		n/a	
August 2010	SW	185	221	198	95	177	114	n/a		n/a		n/a	
	3-5	7	17	62	15	38	80	n/a		n/a		n/a	
	10-12	2	4	42	19	<1	<1	n/a		n/a		n/a	
November 2010	SW	8	9	1	1	3	7	n/a		n/a		n/a	
	3-5	15	6	20	8	<1	<1	n/a		n/a		n/a	
	10-12	9	8	5	6	20	37	n/a		n/a		n/a	
February 2011	SW	699	1522	585	1303	22	21	2	<1	n/a		1	<1
	3-5	79	69	100	88	36	35	4	1	n/a		4	1
	10-12	30	23	33	23	8	12	5	<1	n/a		5	1

Table 9-111. Selected water properties after inundation of the soil material at Poltalloch site (i) control: pH and alkalinity.

		pH						Alkalinity (mmol/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	SW	7.09	0.19	6.35	0.27	6.14	1.07	1.2	0.3	3.8	4.0	11.7	1.1
	3-5	4.38	1.30	4.67	1.05	4.99	1.14	0.3	0.5	3.7	4.1	13.9	5.7
	10-12	3.22	0.52	3.78	0.80	3.84	1.04	0.2	0.4	3.0	4.1	12.2	3.5

Table 9-112. Selected water properties after inundation of the soil material at Poltalloch site (i) control: Eh and EC.

		Eh* (mV)						EC (µS/cm)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	SW	552	46	405	89	439	45	568	173	681	271	819	306
	3-5	553	93	400	141	405	63	2837	3146	2637	2566	2236	1844
	10-12	679	55	544	147	449	90	6771	5614	6923	5324	5996	4268

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-113. Selected water properties after inundation of the soil material at Poltalloch site (i) control: Soluble Cl and SO_4.

		Cl (mg/L)						SO_4 (mg/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	SW	245	90	365	145	349	176	96	45	144	53	116	62
	3-5	1545	1936	1380	1549	1178	1149	640	727	721	636	689	631
	10-12	4549	4513	4148	3812	3655	3243	1429	978	1470	825	1561	759

Table 9-114. Selected water properties after inundation of the soil material at Poltalloch site (i) control: Dissolved Fe^{2+} and Fe(Total).

		Fe^{2+} (mg/L)						Fe(Total) (mg/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	SW	1.24	0.01	1.11	0.05	0.14	0.28	<0.01	<0.01	0.06	0.04	0.33	0.47
	3-5	23.60	42.69	132.96	142.60	157.97	165.80	14.67	30.58	98.15	119.58	149.71	158.51
	10-12	19.43	40.06	162.95	172.25	230.26	214.53	13.63	28.91	107.44	120.68	219.75	197.00

Table 9-115. Selected water properties after inundation of the soil material at Poltalloch site (i) control: Dissolved sulfide.

		Dissolved Sulfide (µg/L)					
		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	SW	<1	<1	<!	<!	120	53
	3-5	15	20	86	138	416	341
	10-12	4	10	9	9	422	477

Table 9-116. Selected water properties after inundation of the soil material at Poltalloch site (ii) 2010 Bevy rye and *Puccinellia*: pH and alkalinity.

		pH						Alkalinity (mmol/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	SW	7.10	0.31	6.53	0.38	6.08	1.15	1.4	0.2	1.0	0.4	11.8	1.1
	3-5	4.12	1.24	4.56	0.93	4.94	1.19	0.4	1.0	0.8	0.8	13.8	4.3
	10-12	3.21	0.62	3.66	0.39	3.63	0.65	0.1	0.1	0.1	0.1	10.4	1.4

Table 9-117. Selected water properties after inundation of the soil material at Poltalloch site (ii) 2010 Bevy rye and *Puccinellia*: Eh and EC.

		Eh* (mV)						EC (µS/cm)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	SW	534	69	316	19	428	40	509	161	1606	2268	826	228
	3-5	525	145	432	130	416	79	2454	1036	2504	927	2049	739
	10-12	652	94	583	114	477	98	7301	3442	5826	3783	5491	1892

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-118. Selected water properties after inundation of the soil material at Poltalloch site (ii) 2010 Bevy rye and *Puccinellia*: Soluble Cl and SO_4.

		Cl (mg/L)						SO_4 (mg/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	SW	239	62	355	99	360	147	102	36	173	54	149	66
	3-5	1260	620	1199	521	997	382	670	297	777	425	706	463
	10-12	4459	2382	3852	1664	3253	1250	1906	967	1833	751	1845	704

Table 9-119. Selected water properties after inundation of the soil material at Poltalloch site (ii) 2010 Bevy rye and *Puccinellia*: Dissolved Fe^{2+} and Fe(Total).

		Fe^{2+} (mg/L)						Fe(Total) (mg/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	SW	1.27	0.02	1.28	0.33	1.75	4.18	<0.01	<0.01	0.25	0.34	1.67	3.99
	3-5	48.67	63.48	196.13	248.11	203.26	270.77	43.13	53.35	151.65	209.41	194.08	267.66
	10-12	31.63	56.05	151.57	238.21	241.31	359.16	14.57	21.72	126.88	198.10	217.80	322.81

Table 9-120. Selected water properties after inundation of the soil material at Poltalloch site (ii) 2010 Bevy rye and *Puccinellia*: Dissolved sulfide.

		Dissolved Sulfide (µg/L)					
		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	SW	19	15	<1	<1	122	11
	3-5	57	60	583	898	929	1222
	10-12	16	9	175	338	653	932

Table 9-121. Selected water properties after inundation of the soil material at Poltalloch site (iii) *Juncus* plantings in 2009 Bevy rye: pH and alkalinity.

		pH						Alkalinity (mmol/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	SW	7.52	0.09	6.98	0.12	7.71	0.04	3.3	0.4	4.0	0.6	21.8	4.6
	3-5	7.11	0.07	6.88	0.06	6.96	0.04	15.5	5.0	11.1	1.0	>25.0	-
	10-12	6.50	0.57	6.42	0.36	6.54	0.25	7.3	5.3	8.2	3.6	>25.0	-
August 2010	SW	7.44	0.10	7.54	0.08	7.66	0.09	3.9	0.9	6.3	2.4	5.3	1.3
	3-5	6.94	0.14	6.93	0.08	6.99	0.07	17.8	5.4	15.5	4.6	14.1	3.5
	10-12	6.75	0.23	6.71	0.20	6.88	0.15	15.0	6.2	17.3	7.3	17.4	6.5
November 2010	SW	7.35	0.21	7.50	0.18	7.32	0.14	1.1	0.3	1.3	0.4	1.1	0.5
	3-5	7.04	0.13	7.04	0.23	6.80	0.14	6.4	2.7	6.8	2.4	5.7	2.7
	10-12	6.78	0.32	6.75	0.21	6.63	0.18	10.1	7.8	8.2	4.7	9.1	5.4
February 2011	SW	7.37	0.13	7.39	0.14	7.40	0.14	1.6	0.2	1.9	0.2	1.7	0.2
	3-5	6.71	0.10	6.79	0.10	6.75	0.10	4.5	0.7	4.9	0.5	4.4	0.4
	10-12	6.35	0.29	6.47	0.23	6.45	0.14	4.1	2.3	4.4	1.9	4.4	1.8

Table 9-122. Selected water properties after inundation of the soil material at Poltalloch site (iii) *Juncus* plantings in 2009 Bevy rye: Eh and EC.

		Eh* (mV)						EC (µS/cm)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	SW	315	137	262	122	325	114	548	118	721	181	757	198
	3-5	227	50	185	30	319	77	1491	314	1609	328	1456	244
	10-12	236	50	168	37	259	45	3837	1681	4071	1530	2840	1717
August 2010	SW	105	10	131	34	108	21	529	57	668	84	656	89
	3-5	137	33	160	44	136	29	1399	441	1416	433	1272	377
	10-12	107	38	131	44	108	20	2507	1020	2789	1007	2370	846
November 2010	SW	245	83	322	31	175	49	763	69	958	1017	448	51
	3-5	202	66	230	59	209	29	1274	288	1570	1619	780	267
	10-12	203	109	221	82	192	30	2475	1079	2009	1019	1971	1172
February 2011	SW	182	65	133	14	143	13	927	97	951	100	999	80
	3-5	171	33	144	10	141	11	1700	692	1638	727	1733	616
	10-12	171	47	148	28	144	28	3356	2431	3541	2212	3410	2062

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-123. Selected water properties after inundation of the soil material at Poltalloch site (iii) *Juncus* plantings in 2009 Bevy rye: Soluble Cl and SO_4.

		Cl (mg/L)						SO_4 (mg/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	SW	178	27	248	47	228	59	145	96	212	127	170	152
	3-5	394	170	504	245	500	215	919	389	785	398	595	376
	10-12	1771	1195	1755	956	1611	859	1772	363	1858	295	1794	367
August 2010	SW	227	28	246	34	259	33	30	15	19	16	22	15
	3-5	563	190	561	196	551	188	39	46	9	7	11	5
	10-12	1125	509	1137	477	1129	482	692	498	604	425	560	355
November 2010	SW	198	15	207	20	214	22	58	14	63	18	76	21
	3-5	294	98	340	107	339	149	208	189	135	124	116	127
	10-12	937	735	931	694	875	682	709	601	715	607	758	651
February 2011	SW	181	12	192	13	124	31	60	6	74	9	94	16
	3-5	297	192	328	169	246	143	251	159	203	116	206	114
	10-12	788	689	771	616	599	541	611	555	659	493	685	491

Table 9-124. Selected water properties after inundation of the soil material at Poltalloch site (iii) *Juncus* plantings in 2009 Bevy rye: Dissolved Fe^{2+} and Fe(Total).

		Fe^{2+} (mg/L)						Fe(Total) (mg/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	SW	1.70	0.20	1.27	0.11	0.02	0.02	<0.01	<0.01	0.24	0.06	0.02	0.02
	3-5	9.07	7.61	4.93	1.20	3.99	2.69	5.72	5.22	4.68	1.96	3.89	2.97
	10-12	59.88	76.30	81.35	94.22	92.67	84.95	38.05	42.53	82.92	104.94	91.61	79.37
August 2010	SW	1.51	0.25	1.62	2.47	0.38	0.52	1.45	0.25	2.11	0.45	0.38	0.48
	3-5	12.70	15.23	6.15	7.90	14.44	11.96	12.25	15.19	12.07	13.87	13.92	11.56
	10-12	86.89	36.47	28.73	24.26	67.72	40.36	75.75	39.53	65.80	40.30	70.79	39.82
November 2010	SW	0.04	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	3-5	12.62	12.11	13.82	10.63	13.90	9.92	11.52	10.29	12.16	10.23	12.53	8.73
	10-12	18.07	19.50	25.31	20.23	29.04	22.29	15.35	16.56	20.59	18.03	26.73	20.69
February 2011	SW	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.03	0.05	0.09	0.02	0.05
	3-5	15.04	9.19	19.73	8.11	24.28	11.26	16.21	9.76	21.89	9.10	22.79	9.85
	10-12	88.75	57.94	101.46	55.10	100.73	55.72	94.45	60.24	107.56	58.82	92.50	47.17

Table 9-125. Selected water properties after inundation of the soil material at Poltalloch site (iii) *Juncus* plantings in 2009 Bevy rye: Dissolved sulfide and selenium.

		Dissolved Sulfide (µg/L)						Dissolved Selenium (µg/L)					
		Week 2		**Week 4**		**Week 6**		**Week 2**		**Week 4**		**Week 6**	
	Depth (cm)	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**
May 2010	**SW**	13	12	<1	<1	82	6	n/a		n/a		n/a	
	3-5	22	31	<1	<1	93	12	n/a		n/a		n/a	
	10-12	28	16	1	2	98	26	n/a		n/a		n/a	
August 2010	**SW**	<1	<1	<1	<1	134	86	n/a		n/a		n/a	
	3-5	<1	<1	<1	<1	134	109	n/a		n/a		n/a	
	10-12	<1	<1	<1	<1	224	37	n/a		n/a		n/a	
November 2010	**SW**	2	4	<1	<1	<1	<1	n/a		n/a		n/a	
	3-5	30	33	6	6	2	4	n/a		n/a		n/a	
	10-12	9	7	2	3	3	7	n/a		n/a		n/a	
February 2011	**SW**	5	9	25	12	11	3	1	<1	n/a		<1	<1
	3-5	9	9	51	12	12	10	2	<1	n/a		2	<1
	10-12	12	11	55	22	28	25	7	3	n/a		6	2

Table 9-126. Selected water properties after inundation of the soil material at additional Poltalloch site (iv) 2009 Bevy rye (no *Juncus*): pH and alkalinity.

		pH						Alkalinity (mmol/L)					
		Week 2		**Week 4**		**Week 6**		**Week 2**		**Week 4**		**Week 6**	
	Depth (cm)	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**
May 2010	**SW**	n/a		n/a		n/a		n/a		n/a		n/a	
	3-5	n/a		n/a		n/a		n/a		n/a		n/a	
	10-12	n/a		n/a		n/a		n/a		n/a		n/a	
August 2010	**SW**	7.29	0.14	7.50	0.17	7.57	0.20	2.7	0.9	9.4	2.4	3.7	1.7
	3-5	6.99	0.19	6.90	0.13	6.99	0.06	16.2	8.8	22.1	9.7	12.8	7.5
	10-12	6.89	0.16	6.78	0.23	6.95	0.09	12.5	6.6	22.9	10.5	14.7	7.3
November 2010	**SW**	7.38	0.09	7.40	0.21	7.27	0.06	1.1	0.1	1.5	0.3	1.5	0.3
	3-5	6.94	0.26	6.89	0.11	6.66	0.07	5.5	3.0	6.6	1.8	6.4	1.5
	10-12	6.67	0.21	6.68	0.08	6.61	0.07	9.6	5.4	9.1	2.9	11.2	3.6
February 2011	**SW**	7.21	0.18	7.29	0.22	7.16	0.46	1.4	0.2	1.6	0.2	1.5	0.4
	3-5	6.31	0.47	6.50	0.36	6.40	0.33	3.2	2.1	3.8	2.4	3.2	2.0
	10-12	5.81	1.14	5.94	1.11	6.01	0.95	4.4	3.5	4.7	3.6	4.9	4.0

Table 9-127. Selected water properties after inundation of the soil material at additional Poltalloch site (iv) 2009 Bevy rye (no *Juncus*): Eh and EC.

		Eh* (mV)						EC (µS/cm)					
		Week 2		**Week 4**		**Week 6**		**Week 2**		**Week 4**		**Week 6**	
	Depth (cm)	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**
May 2010	**SW**	n/a		n/a		n/a		n/a		n/a		n/a	
	3-5	n/a		n/a		n/a		n/a		n/a		n/a	
	10-12	n/a		n/a		n/a		n/a		n/a		n/a	
August 2010	**SW**	191	131	208	120	206	132	476	98	590	104	569	123
	3-5	100	22	119	47	131	37	1144	729	1130	645	974	552
	10-12	114	5	129	28	125	27	1401	1306	1554	1362	1274	1252
November 2010	**SW**	202	34	288	12	172	27	708	26	541	44	461	45
	3-5	174	54	189	36	182	16	1195	447	958	368	859	311
	10-12	149	49	161	19	171	16	2336	854	1936	735	2021	627
February 2011	**SW**	194	66	263	135	222	98	1852	2312	1004	98	1028	105
	3-5	211	63	241	119	211	79	1822	771	1797	667	2582	1949
	10-12	235	114	231	133	215	125	4030	2623	3376	2559	3863	1952

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-128. Selected water properties after inundation of the soil material at additional Poltalloch site (iv) 2009 Bevy rye (no *Juncus*): Soluble Cl and SO_4.

		Cl (mg/L)						SO_4 (mg/L)					
		Week 2		**Week 4**		**Week 6**		**Week 2**		**Week 4**		**Week 6**	
	Depth (cm)	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**
May 2010	**SW**	n/a		n/a		n/a		n/a		n/a		n/a	
	3-5	n/a		n/a		n/a		n/a		n/a		n/a	
	10-12	n/a		n/a		n/a		n/a		n/a		n/a	
August 2010	**SW**	203	37	226	54	227	42	45	9	39	15	52	15
	3-5	397	265	377	260	363	231	126	166	72	94	79	110
	10-12	554	556	603	629	569	558	414	824	391	778	408	800
November 2010	**SW**	192	12	206	15	208	21	54	7	58	10	68	11
	3-5	358	187	362	152	371	149	197	151	110	88	100	83
	10-12	898	473	877	370	840	332	680	340	692	298	748	291
February 2011	**SW**	192	14	204	28	153	19	66	8	83	5	103	5
	3-5	346	234	355	187	277	161	272	117	198	95	179	120
	10-12	978	717	913	629	781	559	653	451	644	401	676	407

Table 9-129. Selected water properties after inundation of the soil material at additional Poltalloch site (iv) 2009 Bevy rye (no *Juncus*): Dissolved Fe^{2+} and Fe(Total).

		Fe^{2+} (mg/L)						Fe(Total) (mg/L)					
		Week 2		**Week 4**		**Week 6**		**Week 2**		**Week 4**		**Week 6**	
	Depth (cm)	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**
May 2010	**SW**	n/a		n/a		n/a		n/a		n/a		n/a	
	3-5	n/a		n/a		n/a		n/a		n/a		n/a	
	10-12	n/a		n/a		n/a		n/a		n/a		n/a	
August 2010	**SW**	1.51	0.21	0.08	0.07	0.01	0.01	1.39	0.24	1.62	0.08	<0.01	<0.01
	3-5	46.18	33.33	9.00	4.88	32.65	21.32	36.76	30.47	24.66	16.92	33.74	22.55
	10-12	77.12	130.11	26.33	53.45	62.35	82.80	68.10	119.91	62.05	109.87	59.01	77.98
November 2010	**SW**	0.03	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	3-5	25.25	14.20	26.52	12.08	24.24	14.12	23.49	14.21	22.83	10.42	21.55	12.44
	10-12	50.19	20.63	68.31	31.88	73.77	30.36	44.09	17.96	55.47	28.13	69.58	29.62
February 2011	**SW**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04	0.03	0.02	0.02	0.08	0.17
	3-5	31.89	19.91	25.26	20.05	26.00	18.55	30.97	26.47	29.11	24.76	23.59	16.83
	10-12	52.34	50.15	51.56	52.90	55.95	46.20	55.46	53.56	59.85	56.87	52.47	46.45

Table 9-130. Selected water properties after inundation of the soil material at additional Poltalloch site (iv) 2009 Bevy rye (no *Juncus*): Dissolved sulfide and selenium.

		Dissolved Sulfide (µg/L)						Dissolved Selenium (µg/L)					
		Week 2		**Week 4**		**Week 6**		**Week 2**		**Week 4**		**Week 6**	
	Depth (cm)	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**
May 2010	**SW**	n/a		n/a		n/a		n/a		n/a		n/a	
	3-5	n/a		n/a		n/a		n/a		n/a		n/a	
	10-12	n/a		n/a		n/a		n/a		n/a		n/a	
August 2010	**SW**	4	11	<1	<1	<1	<1	n/a		n/a		n/a	
	3-5	9	7	<1	<1	<1	<1	n/a		n/a		n/a	
	10-12	2	5	<1	<1	<1	<1	n/a		n/a		n/a	
November 2010	**SW**	6	6	<1	<1	<1	<1	n/a		n/a		n/a	
	3-5	25	22	10	7	1	2	n/a		n/a		n/a	
	10-12	26	16	12	10	14	14	n/a		n/a		n/a	
February 2011	**SW**	5	7	48	13	11	11	<1	<1	n/a		<1	<1
	3-5	32	20	72	26	34	17	3	<1	n/a		1	<1
	10-12	21	18	77	31	39	26	5	2	n/a		4	2

Table 9-131. Selected water properties after inundation of the soil material at Tolderol site (i) control: pH and alkalinity.

		pH						Alkalinity (mmol/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	**SW**	6.79	0.68	5.90	0.53	5.35	1.26	0.7	0.4	0.5	0.4	2.1	4.0
	3-5	3.93	1.24	4.08	1.22	3.78	1.12	0.0	0.0	1.4	3.2	3.1	4.7
	10-12	2.88	0.21	2.95	0.34	3.07	0.29	0.0	0.0	1.4	3.1	3.0	4.1
August 2010	**SW**	5.54	1.03	6.56	0.41	6.60	0.45	1.4	0.2	2.5	3.9	0.9	0.3
	3-5	4.63	1.15	4.25	0.67	4.41	0.72	0.3	0.4	3.5	3.9	0.2	0.3
	10-12	3.16	0.38	3.21	0.24	3.28	0.22	0.0	0.0	3.3	3.6	0.0	0.0
November 2010	**SW**	6.55	0.40	7.14	0.15	6.61	0.22	1.0	0.1	0.9	0.2	0.7	0.3
	3-5	5.43	0.73	5.96	0.49	5.90	0.34	0.5	0.4	0.9	0.5	0.8	0.7
	10-12	3.34	0.19	3.44	0.14	3.59	0.22	0.0	0.0	0.0	0.0	0.0	0.0
February 2011	**SW**	6.92	0.39	6.78	0.40	6.86	0.32	1.2	0.3	1.1	0.3	1.0	0.2
	3-5	5.46	0.92	5.76	0.78	6.03	0.62	1.0	1.0	1.6	1.2	1.8	1.1
	10-12	4.53	1.23	4.67	1.22	4.79	1.15	0.8	1.1	1.0	1.2	1.0	1.3

Table 9-132. Selected water properties after inundation of the soil material at Tolderol site (i) control: Eh and EC.

		Eh* (mV)						EC (µS/cm)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	**SW**	467	75	444	63	456	93	439	55	496	156	571	179
	3-5	601	68	505	88	577	76	774	436	743	318	699	334
	10-12	667	65	580	56	578	36	1453	906	1349	828	1466	833
August 2010	**SW**	324	127	305	92	317	100	540	39	500	45	487	48
	3-5	448	101	407	76	388	83	920	274	792	169	681	123
	10-12	557	42	511	39	494	40	1596	535	1322	424	1126	325
November 2010	**SW**	457	144	368	110	273	64	876	96	517	62	483	63
	3-5	419	71	293	46	276	26	1345	452	772	228	663	132
	10-12	550	58	518	39	394	16	2250	754	1175	288	1169	284
February 2011	**SW**	249	81	258	70	268	37	847	15	852	12	900	31
	3-5	280	88	271	61	280	33	1324	136	1164	259	1206	118
	10-12	358	138	340	101	322	62	2262	504	2117	502	2112	541

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-133. Selected water properties after inundation of the soil material at Tolderol site (i) control: Soluble Cl and SO_4.

		Cl (mg/L)						SO_4 (mg/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	**SW**	163	17	214	22	194	25	113	45	156	47	144	61
	3-5	194	87	226	69	210	76	381	343	390	240	375	204
	10-12	287	267	374	260	334	247	757	694	989	578	1024	627
August 2010	**SW**	204	16	220	20	260	48	70	14	84	14	171	183
	3-5	306	82	288	52	271	36	279	100	331	92	311	93
	10-12	451	123	416	109	357	107	654	340	705	316	635	416
November 2010	**SW**	202	25	218	26	229	26	61	12	73	12	83	11
	3-5	346	117	297	83	293	64	235	127	197	84	222	47
	10-12	521	169	478	142	461	122	484	220	470	156	523	145
February 2011	**SW**	177	3	191	6	131	11	69	4	83	6	99	10
	3-5	195	47	222	18	151	18	263	106	246	49	224	42
	10-12	297	72	313	85	221	79	639	199	651	209	673	260

Table 9-134. Selected water properties after inundation of the soil material at Tolderol site (i) control: Dissolved Fe^{2+} and Fe(Total).

		Fe^{2+} (mg/L)						Fe(Total) (mg/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	**SW**	<0.01	<0.01	0.74	0.55	0.09	0.06	<0.01	<0.01	0.07	0.03	1.16	0.14
	3-5	3.95	8.48	13.38	19.68	16.14	24.66	4.37	7.93	12.18	19.67	14.89	15.85
	10-12	9.15	11.49	52.31	36.36	102.21	38.64	14.74	11.46	48.75	33.18	100.35	43.93
August 2010	**SW**	0.06	0.01	0.01	0.01	<0.01	<0.01	0.02	0.02	0.04	0.01	0.02	0.05
	3-5	43.71	19.89	43.16	31.16	76.95	26.71	41.58	18.81	73.13	23.42	71.74	24.47
	10-12	54.50	35.68	83.33	67.11	127.85	62.28	52.98	33.32	104.64	57.11	121.95	62.87
November 2010	**SW**	0.04	0.06	0.04	0.02	0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	3-5	9.04	9.40	23.92	15.83	34.78	20.21	7.64	8.18	20.38	12.77	26.33	17.26
	10-12	9.85	11.46	33.78	25.51	57.52	24.80	8.95	9.86	33.54	18.94	47.62	22.59
February 2011	**SW**	<0.01	<0.01	0.02	0.03	<0.01	<0.01	0.05	0.08	0.01	0.02	<0.01	<0.01
	3-5	45.40	24.32	54.58	19.57	50.72	18.35	51.83	24.99	57.86	23.90	53.25	20.04
	10-12	160.10	93.55	172.59	93.71	174.43	99.09	172.99	97.14	169.02	85.13	174.57	89.14

Table 9-135. Selected water properties after inundation of the soil material at Tolderol site (i) control: Dissolved sulfide and selenium.

		Dissolved Sulfide (µg/L)						Dissolved Selenium (µg/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	**SW**	4	10	17	16	10	15	n/a		n/a		n/a	
	3-5	1	1	20	13	13	9	n/a		n/a		n/a	
	10-12	4	9	44	31	50	39	n/a		n/a		n/a	
August 2010	**SW**	33	37	41	15	<1	<1	n/a		n/a		n/a	
	3-5	68	60	93	76	3	8	n/a		n/a		n/a	
	10-12	177	361	63	41	5	13	n/a		n/a		n/a	
November 2010	**SW**	<1	<1	<1	<1	<1	<1	n/a		n/a		n/a	
	3-5	8	10	52	52	112	106	n/a		n/a		n/a	
	10-12	1	2	4	7	7	12	n/a		n/a		n/a	
February 2011	**SW**	18	29	17	15	<1	<1	1	<1	n/a		<1	<1
	3-5	212	357	104	66	58	51	2	<1	n/a		<1	<1
	10-12	212	299	525	457	406	370	3	<1	n/a		3	<1

Table 9-136. Selected water properties after inundation of the soil material at Tolderol site (ii) 2010 Bevy rye and *Puccinellia*: pH and alkalinity.

		pH						Alkalinity (mmol/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	**SW**	7.36	0.06	6.91	0.67	6.83	0.43	5.0	4.3	1.0	0.2	0.8	0.1
	3-5	4.32	1.32	4.49	1.14	4.45	1.58	4.2	4.1	0.3	0.5	0.2	0.4
	10-12	3.03	0.08	3.14	0.16	3.12	0.12	3.6	3.9	0.0	0.0	0.0	0.0

Table 9-137. Selected water properties after inundation of the soil material at Tolderol site (ii) 2010 Bevy rye and *Puccinellia*: Eh and EC.

		Eh* (mV)						EC (µS/cm)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	**SW**	414	3	417	118	440	70	422	15	496	135	458	46
	3-5	604	50	572	45	552	98	603	221	546	151	576	144
	10-12	692	31	650	41	603	29	885	76	849	123	900	193

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-138. Selected water properties after inundation of the soil material at Tolderol site (ii) 2010 Bevy rye and *Puccinellia*: Soluble Cl and SO_4.

		Cl (mg/L)						SO_4 (mg/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	**SW**	161	4	213	30	181	15	90	19	127	36	107	21
	3-5	173	8	207	14	179	12	245	167	279	175	245	142
	10-12	205	64	231	40	196	42	439	113	543	121	523	148

Table 9-139. Selected water properties after inundation of the soil material at Tolderol site (ii) 2010 Bevy rye and *Puccinellia*: Dissolved Fe^{2+} and Fe(Total).

		Fe^{2+} (mg/L)						Fe(Total) (mg/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**
May 2010	**SW**	<0.01	<0.01	0.03	<0.01	0.10	0.07	<0.01	<0.01	0.11	0.02	1.15	0.20
	3-5	<0.01	<0.01	3.22	4.35	5.51	7.16	0.08	0.16	3.28	4.30	7.50	7.81
	10-12	0.34	0.84	10.00	17.41	31.55	32.01	0.84	1.06	9.99	16.42	30.49	33.83

Table 9-140. Selected water properties after inundation of the soil material at Tolderol site (ii) 2010 Bevy rye and *Puccinellia*: Dissolved sulfide.

		Dissolved Sulfide (µg/L)					
		Week 2		Week 4		Week 6	
	Depth (cm)	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**
May 2010	**SW**	43	15	17	10	51	49
	3-5	39	21	15	10	41	50
	10-12	45	37	27	13	37	32

Table 9-141. Selected water properties after inundation of the soil material at Tolderol site (iii) *Juncus* plantings in 2009 Bevy rye: pH and alkalinity.

		pH						Alkalinity (mmol/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**
May 2010	**SW**	7.05	0.36	7.08	0.31	7.38	0.15	2.5	0.6	9.8	0.3	20.4	2.7
	3-5	6.77	0.19	6.52	0.20	6.60	0.12	11.0	4.9	11.8	0.3	14.4	1.1
	10-12	5.97	0.74	6.09	0.58	6.33	0.38	3.8	4.7	10.4	1.5	15.5	5.3
August 2010	**SW**	6.41	0.51	7.25	0.23	7.25	0.22	2.7	0.2	8.7	0.2	3.2	1.0
	3-5	6.31	0.20	6.40	0.15	6.49	0.21	7.6	0.9	9.9	1.0	5.7	2.6
	10-12	6.31	0.25	6.37	0.21	6.51	0.21	6.2	4.6	9.0	0.6	6.5	4.4
November 2010	**SW**	6.94	0.35	7.24	0.23	6.88	0.17	0.9	0.1	0.8	0.2	0.7	0.4
	3-5	6.09	0.32	6.59	0.26	6.46	0.21	1.6	1.1	3.1	1.2	3.4	1.7
	10-12	5.89	0.47	6.26	0.22	6.21	0.20	1.8	1.4	2.7	0.9	3.2	1.2
February 2011	**SW**	6.93	0.71	7.02	0.22	7.14	0.09	1.5	0.3	1.3	0.2	1.1	0.2
	3-5	6.47	0.19	6.63	0.15	6.66	0.11	3.7	1.3	4.3	0.6	3.7	0.8
	10-12	6.43	0.22	6.45	0.23	6.50	0.19	4.2	1.2	4.1	1.3	3.9	1.4

Table 9-142. Selected water properties after inundation of the soil material at Tolderol site (iii) *Juncus* plantings in 2009 Bevy rye: Eh and EC.

		Eh* (mV)						EC (µS/cm)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**
May 2010	**SW**	413	133	254	165	257	67	479	50	515	68	508	76
	3-5	159	48	209	89	187	20	900	318	884	339	785	308
	10-12	256	115	218	115	222	61	1333	676	1357	621	1201	506
August 2010	**SW**	228	99	199	69	206	63	572	85	535	88	546	105
	3-5	194	18	199	15	197	12	1124	450	889	351	791	265
	10-12	198	42	197	38	189	30	1561	856	1236	574	1184	561
November 2010	**SW**	235	91	283	79	241	134	831	400	549	94	493	54
	3-5	207	51	169	21	193	29	2220	788	1016	309	850	259
	10-12	206	32	198	17	200	17	3034	235	1648	434	1565	453
February 2011	**SW**	242	119	209	10	262	14	921	102	882	31	924	42
	3-5	220	48	211	7	267	17	1571	127	1398	80	1347	88
	10-12	204	18	223	17	277	20	2608	325	2432	197	2356	230

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-143. Selected water properties after inundation of the soil material at Tolderol site (iii) *Juncus* plantings in 2009 Bevy rye: Soluble Cl and SO_4.

		Cl (mg/L)						SO_4 (mg/L)					
		Week 2		**Week 4**		**Week 6**		**Week 2**		**Week 4**		**Week 6**	
	Depth (cm)	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**
May 2010	**SW**	165	15	220	23	200	25	58	10	73	16	39	21
	3-5	281	111	320	108	296	126	159	123	63	35	14	15
	10-12	508	271	549	280	492	267	703	336	542	245	300	138
August 2010	**SW**	208	32	225	44	235	49	40	15	33	25	41	24
	3-5	420	201	418	197	382	171	41	86	40	70	41	68
	10-12	654	379	652	360	657	442	146	318	125	254	105	206
November 2010	**SW**	209	13	227	19	238	22	74	14	86	21	93	25
	3-5	468	159	412	122	391	109	540	338	317	168	222	111
	10-12	813	145	742	211	718	201	678	267	608	302	607	306
February 2011	**SW**	179	17	190	6	139	11	69	3	87	11	96	12
	3-5	274	50	280	31	202	33	269	98	153	64	100	33
	10-12	565	73	527	58	414	38	326	110	334	90	324	72

Table 9-144. Selected water properties after inundation of the soil material at Tolderol site (iii) *Juncus* plantings in 2009 Bevy rye: Dissolved Fe^{2+} and Fe(Total).

		Fe^{2+} (mg/L)						Fe(Total) (mg/L)					
		Week 2		**Week 4**		**Week 6**		**Week 2**		**Week 4**		**Week 6**	
	Depth (cm)	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**
May 2010	**SW**	3.07	1.07	1.85	0.41	0.84	0.65	0.66	0.75	0.73	0.34	1.42	0.74
	3-5	39.20	11.59	47.23	20.26	38.72	13.07	39.51	11.59	47.50	14.94	55.79	19.41
	10-12	61.24	47.62	77.30	55.17	36.98	23.45	58.43	53.35	66.28	47.71	45.28	30.95
August 2010	**SW**	0.51	0.43	0.69	0.58	0.36	0.43	0.71	0.55	1.25	0.74	0.46	0.42
	3-5	34.60	18.58	36.36	30.56	37.98	24.58	28.34	12.48	36.24	21.96	38.66	24.20
	10-12	38.40	31.90	17.61	10.33	32.89	30.28	29.29	21.63	39.43	32.82	35.58	35.22
November 2010	**SW**	0.02	0.02	0.04	0.04	0.04	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	3-5	104.49	96.85	72.22	65.51	57.49	33.47	89.57	83.80	62.90	57.68	48.68	30.34
	10-12	86.46	34.29	79.44	56.27	96.30	52.59	74.72	30.92	69.10	50.44	87.59	47.80
February 2011	**SW**	<0.01	<0.01	0.02	0.04	<0.01	<0.01	0.02	0.01	0.05	0.06	<0.01	<0.01
	3-5	28.71	20.58	24.43	26.34	10.23	9.54	32.97	23.87	27.40	25.45	10.47	9.43
	10-12	17.95	13.94	13.65	9.42	8.08	5.65	19.55	13.52	15.09	9.28	8.52	5.68

Table 9-145. Selected water properties after inundation of the soil material at Tolderol site (iii) *Juncus* plantings in 2009 Bevy rye: Dissolved sulfide and selenium.

		Dissolved Sulfide (µg/L)						Dissolved Selenium (µg/L)					
		Week 2		**Week 4**		**Week 6**		**Week 2**		**Week 4**		**Week 6**	
	Depth (cm)	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**
May 2010	**SW**	9	14	50	57	76	46	n/a		n/a		n/a	
	3-5	51	26	133	42	145	76	n/a		n/a		n/a	
	10-12	39	44	128	84	199	109	n/a		n/a		n/a	
August 2010	**SW**	24	31	<1	<1	<1	<1	n/a		n/a		n/a	
	3-5	42	42	16	26	61	69	n/a		n/a		n/a	
	10-12	48	58	70	95	306	348	n/a		n/a		n/a	
November 2010	**SW**	<1	<1	<1	<1	<1	<1	n/a		n/a		n/a	
	3-5	67	78	83	68	114	116	n/a		n/a		n/a	
	10-12	67	44	145	47	190	89	n/a		n/a		n/a	
February 2011	**SW**	11	10	37	19	<1	<1	<1	<1	n/a		<1	<1
	3-5	51	9	57	29	15	19	2	<1	n/a		1	<1
	10-12	145	88	164	69	74	57	3	<1	n/a		3	<1

Table 9-146. Selected water properties after inundation of the soil material at Campbell Park site (i) control: pH and alkalinity.

		pH						Alkalinity (mmol/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**
May 2010	**SW**	4.34	1.13	3.84	1.18	3.64	1.58	0.1	0.2	8.3	0.4	9.6	2.1
	3-5	2.61	0.13	2.99	0.26	3.27	1.31	0.0	0.0	7.6	0.5	8.4	1.7
	10-12	2.30	0.05	2.73	0.30	2.53	0.30	0.0	0.0	6.6	0.5	6.5	1.5
August 2010	**SW**	6.30	1.13	5.76	1.40	5.98	1.41	0.9	0.5	0.1	0.2	0.7	0.4
	3-5	3.86	1.01	4.35	1.14	4.73	1.19	0.1	0.1	0.0	0.0	0.2	0.2
	10-12	3.01	0.36	3.51	1.00	3.56	0.58	0.0	0.0	0.0	0.0	0.0	0.0
November 2010	**SW**	6.55	0.20	7.63	0.21	6.89	0.20	1.9	0.3	3.0	0.3	3.7	0.5
	3-5	6.27	0.29	6.53	0.20	6.49	0.09	3.6	1.5	4.9	1.3	6.7	1.4
	10-12	2.79	0.11	3.01	0.06	3.08	0.11	0.0	0.0	0.0	0.0	0.0	0.0
February 2011	**SW**	7.15	0.43	6.91	0.42	7.03	0.31	2.0	1.0	2.9	0.3	3.0	0.4
	3-5	6.50	0.23	6.50	0.16	6.42	0.15	5.1	1.5	4.9	1.1	4.3	1.1
	10-12	4.00	0.91	4.04	0.95	4.25	0.99	0.7	0.8	0.5	0.4	0.4	0.7

Table 9-147. Selected water properties after inundation of the soil material at Campbell Park site (i) control: Eh and EC.

		Eh* (mV)						EC (µS/cm)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**
May 2010	**SW**	552	115	682	54	637	81	1400	545	1748	935	2015	1039
	3-5	633	32	579	30	558	37	9327	3761	6435	3754	4789	2944
	10-12	698	35	605	21	577	12	12362	1732	10220	4253	8154	3821
August 2010	**SW**	415	173	436	157	397	135	520	227	600	377	567	274
	3-5	553	117	515	96	453	82	448	373	1262	1779	942	1302
	10-12	641	26	587	41	524	55	2332	3024	2507	3469	1913	3292
November 2010	**SW**	408	104	332	66	253	15	1307	151	985	105	915	89
	3-5	306	93	181	33	201	16	3735	782	2186	436	1781	437
	10-12	553	58	558	29	422	14	6545	551	4087	722	4662	636
February 2011	**SW**	189	51	214	77	196	23	1530	339	1805	215	1803	430
	3-5	171	23	223	76	154	18	4887	2169	4261	1505	3698	1246
	10-12	364	59	363	80	350	73	8038	3137	8071	2854	7335	2398

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-148. Selected water properties after inundation of the soil material at Campbell Park site (i) control: Soluble Cl and SO_4.

		Cl (mg/L)						SO_4 (mg/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**
May 2010	**SW**	697	361	834	437	915	521	554	234	609	365	751	533
	3-5	4619	2127	2799	1701	2254	1408	5638	2906	3537	2421	2942	2246
	10-12	6735	1454	4732	2135	4156	2000	6925	1273	5160	2236	5128	2707
August 2010	**SW**	260	137	268	192	268	165	87	60	101	91	92	79
	3-5	674	972	556	797	468	660	608	1133	490	893	320	616
	10-12	1239	1707	1060	1593	952	1709	1340	2304	1116	1972	1053	2229
November 2010	**SW**	346	43	419	61	450	57	92	10	108	13	124	15
	3-5	1307	424	1007	241	851	227	682	282	519	190	474	180
	10-12	2590	181	2480	204	2342	285	2040	629	2123	549	2254	613
February 2011	**SW**	330	85	379	104	340	111	84	22	111	33	164	45
	3-5	1247	579	1002	394	771	315	677	442	638	347	643	341
	10-12	2056	837	1742	631	1598	615	1473	805	1463	603	1800	681

Table 9-149. Selected water properties after inundation of the soil material at Campbell Park site (i) control: Dissolved Fe^{2+} and Fe(Total).

		Fe^{2+} (mg/L)						Fe(Total) (mg/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	**SW**	17.10	9.84	2.27	0.83	1.30	1.05	7.04	4.31	6.85	5.86	8.57	8.02
	3-5	86.86	26.83	197.45	112.77	154.20	106.42	73.53	19.36	149.02	86.58	150.75	98.36
	10-12	59.53	41.63	202.01	95.85	252.10	121.79	89.86	37.35	166.22	84.25	253.88	124.42
August 2010	**SW**	1.15	0.02	<0.01	<0.01	<0.01	<0.01	0.74	0.57	1.60	0.16	0.01	0.03
	3-5	7.50	7.91	15.92	27.59	12.66	22.43	5.96	8.22	22.41	38.68	12.11	21.49
	10-12	31.99	54.28	50.07	88.65	14.22	12.93	27.95	50.16	63.76	112.56	13.66	12.41
November 2010	**SW**	0.06	0.02	0.03	0.02	0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	3-5	11.62	6.74	43.44	16.30	65.85	23.18	9.90	5.83	38.21	12.56	50.81	21.96
	10-12	35.29	38.87	114.72	67.57	160.53	80.85	34.65	35.49	101.75	61.35	143.66	79.68
February 2011	**SW**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.01	0.02	0.02	<0.01	<0.01
	3-5	111.69	114.13	113.96	83.04	107.12	75.88	112.39	126.81	122.86	83.27	106.72	75.99
	10-12	328.49	221.59	380.79	191.45	406.11	169.88	341.94	226.58	408.54	206.90	381.43	147.31

Table 9-150. Selected water properties after inundation of the soil material at Campbell Park site (i) control: Dissolved sulfide and selenium.

		Dissolved Sulfide (µg/L)						Dissolved Selenium (µg/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	**SW**	1	3	19	15	31	49	n/a		n/a		n/a	
	3-5	6	7	25	16	44	63	n/a		n/a		n/a	
	10-12	5	13	8	10	35	51	n/a		n/a		n/a	
August 2010	**SW**	20	17	8	7	120	42	n/a		n/a		n/a	
	3-5	35	30	18	18	129	55	n/a		n/a		n/a	
	10-12	49	53	30	40	188	168	n/a		n/a		n/a	
November 2010	**SW**	2	4	<1	<1	58	23	n/a		n/a		n/a	
	3-5	5	8	29	21	25	18	n/a		n/a		n/a	
	10-12	18	15	20	15	<1	<1	n/a		n/a		n/a	
February 2011	**SW**	<1	1	34	7	5	6	1	<1	n/a		2	1
	3-5	46	33	138	46	56	28	4	1	n/a		3	2
	10-12	26	21	96	35	107	18	8	4	n/a		10	4

Table 9-151. Selected water properties after inundation of the soil material at Campbell Park site (ii) 2010 Bevy rye and *Puccinellia*: pH and alkalinity.

		pH						Alkalinity (mmol/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	**SW**	5.14	1.27	4.03	1.04	3.82	1.31	0.3	0.6	8.4	0.3	10.1	1.2
	3-5	3.23	0.96	3.04	0.52	3.04	0.31	0.0	0.1	8.0	0.3	9.0	0.7
	10-12	2.50	0.19	2.91	0.55	2.52	0.11	0.0	0.0	6.8	0.5	6.6	0.7
August 2010	**SW**	7.09	0.14	6.87	0.55	7.21	0.22	2.7	0.5	2.4	1.1	3.1	1.1
	3-5	6.69	0.21	6.53	0.17	6.82	0.13	12.2	5.7	13.6	7.0	12.9	5.1
	10-12	5.51	1.15	6.04	0.46	6.52	0.26	7.5	10.1	9.4	10.3	10.2	6.8
November 2010	**SW**	7.29	0.38	7.71	0.25	7.30	0.33	2.1	0.2	3.3	0.4	4.6	0.6
	3-5	6.86	0.27	6.94	0.19	6.85	0.15	11.1	4.1	11.4	2.7	16.0	4.8
	10-12	5.49	1.48	5.82	1.32	5.79	1.32	8.1	6.5	8.4	6.2	11.3	8.5
February 2011	**SW**	7.39	0.35	7.19	0.46	7.12	0.21	2.3	0.4	2.8	0.6	3.0	0.7
	3-5	6.75	0.27	6.86	0.16	6.76	0.23	10.0	3.2	9.9	2.6	10.4	2.9
	10-12	5.95	0.81	6.10	0.71	6.12	0.60	5.6	4.0	6.2	4.8	6.7	5.0

Table 9-152. Selected water properties after inundation of the soil material at Campbell Park site (ii) 2010 Bevy rye and *Puccinellia*: Eh and EC.

		Eh* (mV)						**EC (µS/cm)**					
		Week 2		**Week 4**		**Week 6**		**Week 2**		**Week 4**		**Week 6**	
	Depth (cm)	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**
May 2010	**SW**	602	44	641	59	606	80	871	428	1131	609	1239	642
	3-5	611	40	557	33	556	28	4258	3325	3429	2331	2804	1695
	10-12	719	55	605	19	578	14	7099	3606	6401	3900	6010	2281
August 2010	**SW**	238	174	181	100	183	142	494	97	581	334	725	198
	3-5	123	36	115	26	115	21	1869	1034	2091	936	1701	1035
	10-12	260	133	166	74	140	29	3004	1582	3191	1969	3117	1859
November 2010	**SW**	186	103	266	87	167	76	2299	2978	734	136	733	141
	3-5	135	23	147	78	141	22	3372	1226	2192	599	2073	539
	10-12	232	162	210	151	195	98	5728	730	4042	593	4698	399
February 2011	**SW**	144	37	132	36	173	67	1564	161	1922	179	1657	185
	3-5	140	18	145	16	182	60	6822	1174	4562	1530	4707	850
	10-12	182	66	174	51	184	42	9512	1247	9295	1091	8320	692

* Eh measurements are presented versus the standard hydrogen electrode

Table 9-153. Selected water properties after inundation of the soil material at Campbell Park site (ii) 2010 Bevy rye and *Puccinellia*: Soluble Cl and SO_4.

		Cl (mg/L)						**SO_4 (mg/L)**					
		Week 2		**Week 4**		**Week 6**		**Week 2**		**Week 4**		**Week 6**	
	Depth (cm)	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**
May 2010	**SW**	384	222	520	294	526	335	322	220	401	221	402	270
	3-5	1779	1748	1400	1080	1180	949	2386	1846	1923	1308	1620	1254
	10-12	3207	2041	2828	1614	2500	1323	3908	1885	3934	1702	3960	1571
August 2010	**SW**	229	68	238	85	273	103	94	29	108	47	112	52
	3-5	647	617	626	553	623	583	1378	646	1108	425	730	559
	10-12	1460	1061	1444	1232	1376	1161	1998	1071	1964	1070	1801	1097
November 2010	**SW**	265	48	295	61	340	71	64	14	67	20	82	24
	3-5	1073	599	902	360	895	289	721	430	591	338	615	369
	10-12	2495	326	2307	264	2282	244	2156	444	2111	331	2421	340
February 2011	**SW**	360	65	401	48	339	29	92	11	107	30	127	36
	3-5	1871	242	1410	229	1117	216	816	609	538	563	438	507
	10-12	2805	220	2472	141	2182	222	1563	846	1578	756	1754	868

Table 9-154. Selected water properties after inundation of the soil material at Campbell Park site (ii) 2010 Bevy rye and *Puccinellia*: Dissolved Fe^{2+} and Fe(Total).

		Fe^{2+} (mg/L)						**Fe(Total) (mg/L)**					
		Week 2		**Week 4**		**Week 6**		**Week 2**		**Week 4**		**Week 6**	
	Depth (cm)	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**	**Av.**	**S.D.**
May 2010	**SW**	6.78	8.56	2.28	2.05	0.54	0.67	2.83	4.45	3.02	4.53	2.47	3.13
	3-5	68.87	73.26	144.79	148.55	120.96	105.38	56.11	71.42	106.00	108.01	119.67	105.75
	10-12	34.15	33.64	134.44	89.36	202.69	108.32	41.12	32.10	110.64	78.40	192.90	101.88
August 2010	**SW**	1.59	0.44	0.47	0.61	0.35	0.65	0.80	0.77	2.08	0.65	0.16	0.23
	3-5	186.82	98.04	87.19	84.43	88.30	66.88	133.73	83.15	140.01	108.64	109.45	80.94
	10-12	225.90	153.67	195.59	168.59	229.01	119.28	145.71	130.23	252.80	188.34	242.70	121.37
November 2010	**SW**	0.09	0.06	0.06	0.05	0.03	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	3-5	21.43	26.52	37.18	32.30	35.60	28.21	18.86	23.68	35.36	30.35	23.94	25.73
	10-12	156.18	38.17	194.55	29.14	202.25	15.22	138.20	33.68	176.75	30.87	192.17	24.68
February 2011	**SW**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	0.02	0.05	0.08	<0.01	<0.01
	3-5	58.94	83.96	43.40	65.20	35.39	61.51	63.45	93.62	50.58	80.88	35.12	61.68
	10-12	247.94	191.25	256.61	192.00	239.09	181.44	258.09	195.87	274.13	205.96	238.38	180.51

Table 9-155. Selected water properties after inundation of the soil material at Campbell Park site (ii) 2010 Bevy rye and *Puccinellia*: Dissolved sulfide and selenium.

		Dissolved Sulfide (µg/L)						Dissolved Selenium (µg/L)					
		Week 2		Week 4		Week 6		Week 2		Week 4		Week 6	
	Depth (cm)	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.	Av.	S.D.
May 2010	SW	2	4	9	9	60	21	n/a		n/a		n/a	
	3-5	4	10	3	6	82	28	n/a		n/a		n/a	
	10-12	<1	<1	<1	<1	91	14	n/a		n/a		n/a	
August 2010	SW	35	9	15	11	66	16	n/a		n/a		n/a	
	3-5	121	22	70	22	247	101	n/a		n/a		n/a	
	10-12	114	44	119	53	591	239	n/a		n/a		n/a	
November 2010	SW	2	2	1	1	74	57	n/a		n/a		n/a	
	3-5	11	7	22	21	<1	<1	n/a		n/a		n/a	
	10-12	53	32	73	53	12	21	n/a		n/a		n/a	
February 2011	SW	1	4	10	17	1	2	2	<1	n/a		1	<1
	3-5	33	41	42	45	40	43	5	2	n/a		5	1
	10-12	110	80	163	116	163	121	8	2	n/a		9	3

Table 9-156. Nutrient analyses on column water after 6 weeks: Waltowa (May 2010). Figures shown are the mean (and standard deviation) values for duplicate analyses of three soil cores.

nutrient	unit	Initial Inundating Water	***Phragmites***			***Cotula***			***Juncus***		
			Surface	Pore T	Pore B	Surface	Pore T	Pore B	Surface	Pore T	Pore B
Ca	(mg/L)	32.7 (2.0)	65.5 (14.6)	105 (18.5)	233 (29.9)	48.4 (15.4)	77.0 (44.3)	179 (108)	43.1 (8.5)	65.6 (26.2)	115 (64.9)
Mg	(mg/L)	19.4 (0.6)	62.7 (13.1)	127.9 (32.7)	361 (68.7)	45.6 (15.7)	86.8 (50.3)	249 (138)	52.4 (18.3)	92.6 (53.5)	197 (141)
K	(mg/L)	5.7 (0.3)	38.8 (9.6)	48.4 (14.9)	105 (27.4)	28.1 (11.7)	37.8 (11.4)	51.9 (17.6)	15.9 (5.1)	26.6 (11.9)	63.4 (24.8)
Na	(mg/L)	141 (4.3)	574 (135)	998 (255)	2733 (466)	299 (106)	500 (249)	1597 (709)	319 (175)	541 (472)	1481 (1091)
NOx	(mg/L)	<0.1 (<0.1)	1.1 (0.6)	0.1 (0.1)	<0.1 (<0.1)	3.7 (5.8)	0.2 (0.2)	0.2 (0.1)	1.0 (1.6)	0.1 (<0.1)	<0.1 (<0.1)
Nitrate	(mg/L N)	<0.1 (<0.1)	1.0 (0.7)	0.1 (0.1)	<0.1 (<0.1)	2.5 (3.7)	0.2 (0.2)	0.2 (0.1)	1.0 (1.6)	0.1 (<0.1)	<0.1 (<0.1)
Nitrite	(mg/L N)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	1.2 (2.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)
Ammonia	(mg/L N)	<0.1 (<0.1)	0.6 (1.2)	6.3 (1.9)	4.6 (1.7)	0.2 (0.1)	8.0 (4.7)	9.1 (1.0)	0.1 (0.1)	5.3 (4.1)	4.8 (1.4)
Orthophosphate	(mg/L P)	<0.1 (<0.1)	5.6 (1.7)	5.9 (3.1)	0.1 (0.1)	5.5 (1.9)	2.6 (3.9)	0.1 (0.1)	1.4 (1.1)	1.0 (1.0)	<0.1 (<0.1)

Table 9-157. Nutrient analyses on column water after 6 weeks: Waltowa (August 2010). Figures shown are the mean (and standard deviation) values for duplicate analyses of three soil cores.

nutrient	unit	Initial Inundating Water	***Phragmites***			***Cotula***			***Juncus***		
			Surface	Pore T	Pore B	Surface	Pore T	Pore B	Surface	Pore T	Pore B
Ca	(mg/L)	24.3 (0.5)	40.6 (17.2)	67.3 (41.5)	73.6 (43.0)	67.5 (17.0)	120 (42.3)	204 (115)	69.0 (7.1)	109 (22.8)	159 (34.7)
Mg	(mg/L)	14.8 (0.2)	49.0 (28.2)	114 (110)	174 (191)	59.2 (17.2)	158.7 (73.3)	344 (191)	81.9 (13.8)	210 (76.5)	404 (75.9)
K	(mg/L)	4.5 (0.1)	23.2 (16.2)	30.1 (20.6)	35.2 (23.9)	39.4 (11.8)	32.4 (7.1)	37.6 (11.2)	30.3 (10.2)	38.7 (6.1)	43.0 (5.7)
Na	(mg/L)	118 (2.3)	315 (191)	646 (699)	1159 (1305)	392 (134)	914 (451)	1973 (1000)	444 (111)	1094 (448)	2277 (443)
NOx	(mg/L)	<0.1 (<0.1)	0.8 (1.0)	0.3 (0.2)	0.1 (0.1)	0.1 (<0.1)	0.4 (0.2)	2.8 (1.6)	0.1 (<0.1)	0.5 (0.3)	0.3 (0.1)
Nitrate	(mg/L N)	<0.1 (<0.1)	0.7 (0.8)	0.2 (0.2)	0.1 (0.1)	0.1 (<0.1)	0.4 (0.2)	2.4 (1.5)	0.1 (<0.1)	0.4 (0.3)	0.2 (0.1)
Nitrite	(mg/L N)	<0.1 (<0.1)	0.1 (0.2)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	0.1 (<0.1)	0.4 (0.2)	<0.1 (<0.1)	0.1 (0.1)	<0.1 (<0.1)
Ammonia	(mg/L N)	<0.1 (<0.1)	4.3 (3.7)	7.5 (4.4)	5.3 (3.0)	5.3 (2.3)	6.4 (2.4)	9.5 (2.8)	4.3 (3.6)	6.6 (4.7)	4.0 (2.0)
Orthophosphate	(mg/L P)	<0.1 (<0.1)	5.3 (3.7)	1.1 (1.0)	0.4 (0.5)	5.5 (3.3)	2.9 (4.6)	0.5 (0.6)	2.9 (1.3)	0.1 (0.1)	0.1 (<0.1)

Table 9-158. Nutrient analyses on column water after 6 weeks: Waltowa (November 2010). Figures shown are the mean (and standard deviation) values for duplicate analyses of three soil cores.

nutrient	unit	Initial Inundating Water	***Phragmites***			***Cotula***			***Juncus***		
			Surface	Pore T	Pore B	Surface	Pore T	Pore B	Surface	Pore T	Pore B
Ca	(mg/L)	22.8 (0.8)	66.0 (19.2)	117 (47.9)	190 (47.5)	45.3 (22.6)	69.0 (35.5)	112 (61.5)	76.8 (21.5)	131 (46.5)	174 (62.3)
Mg	(mg/L)	17.9 (0.5)	64.7 (23.7)	149 (94.3)	281 (92.4)	42.0 (19.8)	75.6 (35.6)	144 (67.9)	68.0 (21.0)	156 (54.9)	240 (83.5)
K	(mg/L)	4.7 (0.1)	25.7 (11.2)	32.3 (11.7)	48.9 (11.4)	18.2 (8.8)	25.0 (9.6)	36.1 (11.8)	23.8 (6.1)	35.1 (9.8)	42.2 (8.6)
Na	(mg/L)	145 (3.9)	358 (162)	731 (533)	1613 (609)	258 (118)	388 (178)	934 (436)	381 (107)	760 (296)	1490 (522)
NOx	(mg/L)	<0.1 (<0.1)	0.4 (0.5)	0.2 (0.1)	0.2 (0.1)	1.6 (1.5)	0.1 (<0.1)	0.3 (0.3)	2.4 (1.6)	<0.1 (<0.1)	0.2 (0.1)
Nitrate	(mg/L N)	<0.1 (<0.1)	0.4 (0.5)	0.2 (0.1)	0.2 (0.1)	1.4 (1.2)	0.1 (<0.1)	0.2 (0.2)	2.4 (1.6)	0.1 (0.1)	0.2 (0.1)
Nitrite	(mg/L N)	<0.1 (<0.1)	<0.1 (<0.1)	0.1 (<0.1)	0.1 (<0.1)	0.2 (0.3)	<0.1 (<0.1)	0.1 (0.2)	0.1 (0.1)	<0.1 (<0.1)	<0.1 (<0.1)
Ammonia	(mg/L N)	<0.1 (<0.1)	5.2 (5.8)	7.8 (6.8)	7.8 (4.3)	2.3 (2.4)	5.5 (2.0)	5.4 (2.4)	0.6 (0.9)	6.5 (2.3)	4.0 (1.4)
Orthophosphate	(mg/L P)	<0.1 (<0.1)	1.4 (1.6)	0.6 (0.7)	0.3 (0.4)	1.3 (0.9)	2.3 (3.0)	2.4 (3.1)	0.6 (0.3)	0.3 (0.5)	0.1 (0.1)

Table 9-159. Nutrient analyses on column water after 6 weeks: Waltowa (February 2011). Figures shown are the mean (and standard deviation) values for duplicate analyses of three soil cores.

nutrient	unit	Initial Inundating Water	***Phragmites***			***Cotula***			***Juncus***		
			Surface	Pore T	Pore B	Surface	Pore T	Pore B	Surface	Pore T	Pore B
Ca	(mg/L)	24.7 (1.7)	68.7 (20.7)	80.7 (19.7)	142 (56.1)	57.3 (10.6)	83.6 (29.8)	163 (34.3)	67.6 (12.6)	105 (41.3)	170 (58.1)
Mg	(mg/L)	17.7 (0.3)	67.2 (21.3)	102 (26.6)	235 (92.6)	59.4 (9.7)	117 (29.2)	225 (22.2)	58.6 (8.4)	128 (38.0)	271 (90.0)
K	(mg/L)	4.6 (<0.1)	22.9 (5.7)	30.1 (5.9)	57.9 (24.5)	21.9 (2.0)	29.4 (2.9)	36.6 (3.1)	20.5 (2.8)	30.0 (3.4)	40.9 (6.6)
Na	(mg/L)	141 (1.4)	454 (122)	623 (231)	1478 (615)	405 (28.9)	780 (101)	1688 (152)	406 (57.4)	793 (274)	1805 (528)
NOx	(mg/L)	0.1 (0.1)	0.9 (0.8)	0.1 (0.1)	<0.1 (<0.1)	0.7 (0.4)	0.1 (<0.1)	0.1 (0.1)	0.3 (0.3)	0.1 (<0.1)	0.1 (0.1)
Nitrate	(mg/L N)	0.1 (0.1)	0.7 (0.6)	0.1 (0.1)	<0.1 (<0.1)	0.6 (0.3)	<0.1 (<0.1)	0.1 (0.1)	0.2 (0.2)	<0.1 (<0.1)	0.1 (0.1)
Nitrite	(mg/L N)	<0.1 (<0.1)	0.2 (0.3)	<0.1 (<0.1)	<0.1 (<0.1)	0.1 (0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)
Ammonia	(mg/L N)	<0.1 (<0.1)	0.9 (0.9)	2.9 (3.3)	1.4 (3.0)	0.3 (0.3)	1.2 (1.2)	0.1 (0.1)	0.2 (0.2)	0.8 (1.0)	0.1 (0.1)
Orthophosphate	(mg/L P)	<0.1 (<0.1)	0.9 (0.9)	2.9 (3.3)	1.4 (3.0)	0.3 (0.3)	1.2 (1.2)	0.1 (0.1)	0.2 (0.2)	0.8 (1.0)	0.1 (0.1)

Table 9-160. Nutrient analyses on column water after 6 weeks: Poltalloch (May 2010). Figures shown are the mean (and standard deviation) values for duplicate analyses of three soil cores.

nutrient	unit	Initial Inundating Water	control			2010 Bevy rye/*Puccinellia*			2010 *Juncus* in 2009 Bevy rye		
			Surface	Pore T	Pore B	Surface	Pore T	Pore B	Surface	Pore T	Pore B
Ca	(mg/L)	32.7 (2.0)	55.2 (16.7)	113 (55.8)	244 (133)	58.1 (15.2)	109 (33.6)	269 (73.2)	134 (65.4)	320 (135)	611 (70.6)
Mg	(mg/L)	19.4 (0.6)	37.7 (10.4)	107 (95.4)	327 (216)	38.5 (13.6)	116 (55.2)	426 (196)	30.9 (8.8)	54.2 (12.6)	180 (81.8)
K	(mg/L)	5.7 (0.3)	13.1 (2.2)	36.3 (15.9)	50.2 (23.5)	12.9 (3.6)	33.9 (26.2)	40.8 (18.3)	11.9 (2.3)	19.1 (3.7)	46.7 (17.4)
Na	(mg/L)	141 (4.3)	306 (127)	831 (758)	2302 (1789)	285 (87.3)	686 (240)	1907 (620)	200 (39.0)	346 (152)	1140 (598)
NOx	(mg/L)	<0.1 (<0.1)	1.1 (0.7)	0.3 (0.1)	0.2 (0.1)	0.9 (0.8)	0.2 (0.1)	0.2 (0.1)	0.2 (0.3)	0.1 (<0.1)	0.3 (0.2)
Nitrate	(mg/L N)	<0.1 (<0.1)	0.8 (0.4)	0.2 (0.1)	0.1 (0.1)	0.6 (0.6)	0.2 (0.1)	0.1 (<0.1)	0.1 (0.2)	0.1 (<0.1)	0.2 (0.1)
Nitrite	(mg/L N)	<0.1 (<0.1)	0.3 (0.2)	0.1 (0.1)	0.1 (0.1)	0.2 (0.3)	<0.1 (<0.1)	0.1 (0.1)	<0.1 (<0.1)	<0.1 (<0.1)	0.1 (<0.1)
Ammonia	(mg/L N)	<0.1 (<0.1)	0.6 (0.9)	2.0 (2.3)	4.3 (4.5)	1.3 (1.3)	3.5 (2.8)	7.5 (4.7)	0.2 (0.2)	1.7 (0.7)	2.8 (1.0)
Orthophosphate	(mg/L P)	<0.1 (<0.1)	<0.1 (<0.1)	0.1 (0.1)	0.1 (0.2)	<0.1 (<0.1)	<0.1 (<0.1)	0.1 (0.1)	0.1 (0.1)	0.1 (0.1)	0.1 (0.1)

Table 9-161. Nutrient analyses on column water after 6 weeks: Poltalloch (August 2010). Figures shown are the mean (and standard deviation) values for duplicate analyses of three soil cores.

nutrient	unit	Initial Inundating Water	2010 *Juncus* in 2009 Bevy rye			2009 Bevy rye		
			Surface	Pore T	Pore B	Surface	Pore T	Pore B
Ca	(mg/L)	24.3 (0.5)	51.9 (10.6)	160 (56.5)	336 (115)	41.7 (16.6)	145 (133)	290 (275)
Mg	(mg/L)	14.8 (0.2)	27.5 (3.4)	53.6 (11.8)	98.0 (53.1)	25.6 (5.6)	44.4 (17.7)	51.6 (51.4)
K	(mg/L)	4.5 (0.1)	13.4 (4.2)	19.0 (6.4)	30.8 (10.7)	12.2 (5.5)	22.7 (13.1)	32.1 (25.9)
Na	(mg/L)	118 (2.3)	199 (27.6)	370 (125)	689 (284)	181 (41.6)	260 (141)	374 (333)
NOx	(mg/L)	<0.1 (<0.1)	0.1 (0.1)	0.2 (0.2)	0.3 (0.4)	0.7 (0.9)	0.2 (0.1)	0.2 (0.1)
Nitrate	(mg/L N)	<0.1 (<0.1)	0.1 (0.1)	0.2 (0.1)	0.2 (0.3)	0.5 (0.6)	0.1 (0.1)	0.1 (0.1)
Nitrite	(mg/L N)	<0.1 (<0.1)	<0.1 (<0.1)	0.1 (<0.1)	0.1 (0.1)	0.2 (0.3)	0.1 (<0.1)	<0.1 (<0.1)
Ammonia	(mg/L N)	<0.1 (<0.1)	0.7 (0.7)	2.2 (0.8)	1.9 (0.5)	0.3 (0.4)	1.6 (0.8)	1.2 (0.6)
Orthophosphate	(mg/L P)	<0.1 (<0.1)	0.4 (0.5)	0.4 (0.6)	<0.1 (<0.1)	<0.1 (<0.1)	0.1 (0.1)	0.1 (<0.1)

Table 9-162. Nutrient analyses on column water after 6 weeks: Poltalloch (November 2010). Figures shown are the mean (and standard deviation) values for duplicate analyses of three soil cores.

nutrient	unit	Initial Inundating Water	2010 *Juncus* in 2009 Bevy rye			2009 Bevy rye		
			Surface	Pore T	Pore B	Surface	Pore T	Pore B
Ca	(mg/L)	22.8 (0.8)	33.7 (7.6)	93.5 (37.4)	295 (165)	34.4 (1.1)	95.0 (26.2)	315 (117)
Mg	(mg/L)	17.9 (0.5)	21.9 (1.9)	38.0 (15.9)	98.8 (83.3)	21.9 (0.9)	37.8 (14.3)	80.8 (47.4)
K	(mg/L)	4.7 (0.1)	6.7 (1.7)	12.1 (4.1)	29.3 (12.5)	7.9 (2.1)	17.8 (9.1)	43.9 (12.9)
Na	(mg/L)	145 (3.9)	165 (13.8)	246 (95.5)	608 (432)	166 (14.7)	266 (100)	591 (234)
NOx	(mg/L)	<0.1 (<0.1)	0.2 (0.1)	0.1 (0.1)	0.2 (0.1)	0.2 (0.1)	0.3 (0.2)	0.3 (0.4)
Nitrate	(mg/L N)	<0.1 (<0.1)	0.2 (0.1)	0.1 (0.1)	0.1 (0.1)	0.2 (0.1)	0.2 (0.1)	0.2 (0.2)
Nitrite	(mg/L N)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	0.1 (0.1)	0.1 (0.2)
Ammonia	(mg/L N)	<0.1 (<0.1)	<0.1 (<0.1)	1.2 (0.7)	1.2 (0.6)	1.0 (2.4)	1.8 (0.6)	1.7 (0.8)
Orthophosphate	(mg/L P)	<0.1 (<0.1)	<0.1 (<0.1)	0.1 (<0.1)	0.1 (<0.1)	<0.1 (<0.1)	0.1 (0.1)	0.2 (0.2)

Table 9-163. Nutrient analyses on column water after 6 weeks: Poltalloch (February 2011). Figures shown are the mean (and standard deviation) values for duplicate analyses of three soil cores.

nutrient	unit	Initial Inundating Water	2010 *Juncus* in 2009 Bevy rye			2009 Bevy rye		
			Surface	Pore T	Pore B	Surface	Pore T	Pore B
Ca	(mg/L)	24.7 (1.7)	37.2 (6.6)	106 (31.6)	159 (101)	39.0 (5.0)	85.1 (25.9)	209 (69.4)
Mg	(mg/L)	17.7 (0.3)	20.8 (1.3)	38.0 (14.5)	80.3 (62.0)	20.9 (0.5)	31.2 (13.0)	81.4 (61.1)
K	(mg/L)	4.6 (<0.1)	10.4 (2.4)	18.2 (2.7)	38.4 (7.6)	9.3 (1.2)	16.0 (5.1)	36.7 (10.9)
Na	(mg/L)	141 (1.4)	157 (12.6)	231 (104)	514 (370)	166 (20.7)	244 (132)	612 (396)
NOx	(mg/L)	0.1 (0.1)	0.8 (0.6)	0.2 (0.1)	0.3 (0.1)	0.4 (0.1)	0.1 (0.1)	0.2 (0.1)
Nitrate	(mg/L N)	0.1 (0.1)	0.8 (0.6)	0.2 (0.1)	0.3 (0.1)	0.4 (0.1)	0.1 (0.1)	0.1 (0.1)
Nitrite	(mg/L N)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)
Ammonia	(mg/L N)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	0.1 (0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)
Orthophosphate	(mg/L P)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	0.1 (0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)

Table 9-164. Nutrient analyses on column water after 6 weeks: Tolderol (May 2010). Figures shown are the mean (and standard deviation) values for duplicate analyses of three soil cores.

nutrient	unit	Initial Inundating Water	control			2010 Bevy rye/*Puccinellia*			2010 *Juncus* in 2009 Bevy rye		
			Surface	Pore T	Pore B	Surface	Pore T	Pore B	Surface	Pore T	Pore B
Ca	(mg/L)	32.7 (2.0)	35.1 (11.4)	48.2 (22.7)	72.7 (31.9)	27.4 (4.9)	33.5 (13.3)	40.8 (15.5)	38.1 (6.9)	65.1 (23.8)	85.8 (38.5)
Mg	(mg/L)	19.4 (0.6)	26.1 (6.0)	40.8 (22.4)	100 (69.3)	21.0 (2.9)	29.8 (11.6)	58.5 (17.6)	30.6 (4.0)	51.4 (16.8)	95.8 (41.6)
K	(mg/L)	5.7 (0.3)	5.6 (0.4)	6.6 (2.0)	8.6 (4.4)	5.3 (0.6)	6.8 (2.4)	7.1 (3.5)	13.1 (3.1)	19.3 (7.3)	34.5 (14.7)
Na	(mg/L)	141 (4.3)	187 (26.9)	228 (84)	385 (253)	164 (19.7)	171 (21.2)	215 (43.0)	199 (23.4)	254 (81.7)	411 (196)
NOx	(mg/L)	<0.1 (<0.1)	1.1 (1.4)	0.4 (0.6)	0.2 (<0.1)	1.4 (0.8)	0.4 (0.6)	0.1 (0.1)	<0.1 (<0.1)	0.2 (0.1)	0.2 (0.2)
Nitrate	(mg/L N)	<0.1 (<0.1)	0.8 (0.9)	0.4 (0.5)	0.2 (<0.1)	1.1 (0.4)	0.3 (0.4)	0.1 (0.1)	<0.1 (<0.1)	0.2 (0.1)	0.2 (0.1)
Nitrite	(mg/L N)	<0.1 (<0.1)	0.3 (0.5)	0.1 (0.2)	<0.1 (<0.1)	0.3 (0.3)	0.1 (0.2)	<0.1 (<0.1)	<0.1 (<0.1)	0.1 (<0.1)	<0.1 (<0.1)
Ammonia	(mg/L N)	<0.1 (<0.1)	1.5 (1.5)	5.9 (4.1)	15.2 (8.6)	0.1 (<0.1)	2.3 (1.8)	5.5 (1.0)	0.2 (0.1)	1.1 (2.1)	5.1 (4.8)
Orthophosphate	(mg/L P)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	0.2 (0.3)	0.3 (0.2)	0.2 (0.3)

Table 9-165. Nutrient analyses on column water after 6 weeks: Tolderol (August 2010). Figures shown are the mean (and standard deviation) values for duplicate analyses of three soil cores.

nutrient	unit	Initial Inundating Water	control			2010 *Juncus* in 2009 Bevy rye		
			Surface	Pore T	Pore B	Surface	Pore T	Pore B
Ca	(mg/L)	24.3 (0.5)	30.1 (6.0)	29.0 (8.6)	54.3 (24.9)	30.0 (5.9)	42.0 (13.1)	52.6 (28.9)
Mg	(mg/L)	14.8 (0.2)	27.9 (8.8)	33.1 (9.5)	61.6 (36.4)	25.1 (6.0)	45.1 (17.1)	64.6 (35.9)
K	(mg/L)	4.5 (0.1)	11.0 (5.7)	15.2 (2.9)	11.6 (3.8)	9.1 (3.3)	14.4 (5.5)	118 (245)
Na	(mg/L)	118 (2.3)	200 (44.9)	214 (35.5)	303 (102)	188 (45.0)	269 (99.7)	406 (189)
NOx	(mg/L)	<0.1 (<0.1)	0.9 (0.4)	0.4 (0.1)	0.5 (0.2)	0.1 (0.1)	0.4 (0.2)	0.3 (0.2)
Nitrate	(mg/L N)	<0.1 (<0.1)	0.8 (0.4)	0.3 (0.1)	0.5 (0.2)	0.1 (0.1)	0.4 (0.2)	0.2 (0.1)
Nitrite	(mg/L N)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)
Ammonia	(mg/L N)	<0.1 (<0.1)	1.3 (3.0)	2.4 (1.0)	6.3 (4.4)	0.2 (0.1)	1.8 (1.3)	2.5 (1.7)
Orthophosphate	(mg/L P)	<0.1 (<0.1)	<0.1 (<0.1)	0.1 (0.1)	<0.1 (<0.1)	<0.1 (<0.1)	1.1 (1.1)	0.7 (0.9)

Table 9-166. Nutrient analyses on column water after 6 weeks: Tolderol (November 2010). Figures shown are the mean (and standard deviation) values for duplicate analyses of three soil cores.

nutrient	unit	Initial Inundating Water	**control**			**2010 *Juncus* in 2009 Bevy rye**		
			Surface	Pore T	Pore B	Surface	Pore T	Pore B
Ca	(mg/L)	22.8 (0.8)	26.4 (2.8)	32.8 (3.1)	50.5 (16.1)	28.1 (3.9)	47.5 (16.9)	90.8 (38.6)
Mg	(mg/L)	17.9 (0.5)	22.4 (2.6)	36.4 (6.1)	58.4 (17.4)	23.6 (3.1)	51.1 (19.6)	104 (41.5)
K	(mg/L)	4.7 (0.1)	8.8 (3.0)	14.8 (5.7)	22.3 (13.4)	8.0 (1.6)	12.7 (4.4)	23.9 (6.6)
Na	(mg/L)	145 (3.9)	172 (19.9)	225 (50.4)	382 (99.1)	176 (16.5)	288 (80.1)	524 (138)
NOx	(mg/L)	<0.1 (<0.1)	0.5 (0.2)	0.3 (0.1)	0.2 (0.1)	0.6 (0.4)	0.3 (0.2)	0.3 (0.1)
Nitrate	(mg/L N)	<0.1 (<0.1)	0.5 (0.2)	0.3 (0.2)	0.2 (0.1)	0.7 (0.4)	0.2 (0.1)	0.3 (0.1)
Nitrite	(mg/L N)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	0.1 (0.1)	0.1 (0.1)
Ammonia	(mg/L N)	<0.1 (<0.1)	<0.1 (<0.1)	1.1 (0.6)	4.7 (1.0)	<0.1 (<0.1)	3.0 (2.3)	6.2 (4.9)
Orthophosphate	(mg/L P)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	0.1 (0.1)	<0.1 (<0.1)	0.1 (0.1)	0.1 (<0.1)

Table 9-167. Nutrient analyses on column water after 6 weeks: Tolderol (February 2011). Figures shown are the mean (and standard deviation) values for duplicate analyses of three soil cores.

nutrient	unit	Initial Inundating Water	**control**			**2010 *Juncus* in 2009 Bevy rye**		
			Surface	Pore T	Pore B	Surface	Pore T	Pore B
Ca	(mg/L)	24.7 (1.7)	26.5 (1.3)	35.1 (4.0)	43.9 (18.3)	26.6 (2.8)	59.8 (5.6)	66.4 (16.5)
Mg	(mg/L)	17.7 (0.3)	20.0 (1.0)	28.6 (5.2)	55.0 (28.1)	21.5 (0.6)	34.1 (5.1)	79.4 (8.1)
K	(mg/L)	4.6 (<0.1)	9.3 (0.9)	16.5 (3.2)	32.5 (9.5)	7.6 (0.4)	11.4 (0.7)	21.2 (4.1)
Na	(mg/L)	141 (1.4)	158 (9.1)	179 (20.6)	269 (74.5)	156 (5.6)	204 (29.6)	386 (26.1)
NOx	(mg/L)	0.1 (0.1)	0.5 (0.1)	0.2 (0.1)	0.3 (0.1)	0.4 (<0.1)	0.1 (<0.1)	0.1 (<0.1)
Nitrate	(mg/L N)	0.1 (0.1)	0.5 (0.1)	0.2 (0.1)	0.2 (0.1)	0.4 (<0.1)	0.1 (<0.1)	0.1 (<0.1)
Nitrite	(mg/L N)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)
Ammonia	(mg/L N)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	0.1 (<0.1)	<0.1 (<0.1)	0.1 (0.1)	0.2 (0.2)
Orthophosphate	(mg/L P)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	0.1 (<0.1)	<0.1 (<0.1)	0.1 (0.1)	0.2 (0.2)

Table 9-168. Nutrient analyses on column water after 6 weeks: Campbell Park (May 2010). Figures shown are the mean (and standard deviation) values for duplicate analyses of three soil cores.

nutrient	unit	Initial Inundating Water	control			2010 Bevy rye/*Puccinellia*		
			Surface	Pore T	Pore B	Surface	Pore T	Pore B
Ca	(mg/L)	32.7 (2.0)	144 (101)	231 (175)	319 (169)	84.5 (39.1)	143 (56.6)	238 (71.1)
Mg	(mg/L)	19.4 (0.6)	142 (78.6)	457 (312)	778 (398)	80.9 (49.9)	249 (202)	527 (222)
K	(mg/L)	5.7 (0.3)	14.4 (6.4)	17.8 (7.0)	16.8 (9.2)	14.7 (9.7)	21.5 (18.1)	22.3 (24.6)
Na	(mg/L)	141 (4.3)	678 (348)	1410 (836)	2365 (1110)	413 (217)	832 (472)	1667 (601)
NOx	(mg/L)	<0.1 (<0.1)	0.1 (<0.1)	0.1 (<0.1)	0.1 (<0.1)	0.2 (0.4)	0.1 (0.1)	0.2 (<0.1)
Nitrate	(mg/L N)	<0.1 (<0.1)	0.1 (<0.1)	0.1 (<0.1)	0.1 (<0.1)	0.2 (0.4)	0.1 (0.1)	0.1 (0.2)
Nitrite	(mg/L N)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	0.1 (0.2)
Ammonia	(mg/L N)	<0.1 (<0.1)	9.9 (4.8)	21.1 (11.6)	35.5 (16.5)	6.0 (4.2)	11.8 (6.4)	24.9 (8.9)
Orthophosphate	(mg/L P)	<0.1 (<0.1)	0.2 (0.4)	0.1 (<0.1)	0.1 (<0.1)	<0.1 (<0.1)	0.1 (0.1)	0.3 (0.4)

Table 9-169. Nutrient analyses on column water after 6 weeks: Campbell Park (August 2010). Figures shown are the mean (and standard deviation) values for duplicate analyses of three soil cores.

nutrient	unit	Initial Inundating Water	control			2010 Bevy rye/*Puccinellia*		
			Surface	Pore T	Pore B	Surface	Pore T	Pore B
Ca	(mg/L)	24.3 (0.5)	23.0 (8.9)	28.6 (40.0)	55.9 (107)	59.8 (23.3)	318 (154)	398 (145)
Mg	(mg/L)	14.8 (0.2)	21.1 (14.4)	49.3 (89.2)	141 (296)	23.9 (10.2)	68.9 (78.0)	178 (146)
K	(mg/L)	4.5 (0.1)	6.3 (3.1)	9.0 (7.7)	12.2 (11.5)	13.1 (4.7)	21.7 (7.8)	28.2 (15.7)
Na	(mg/L)	118 (2.3)	164 (96.3)	270 (357)	508 (845)	165 (63.8)	341 (302)	747 (577)
NOx	(mg/L)	<0.1 (<0.1)	0.6 (0.6)	0.4 (0.2)	0.3 (0.4)	2.5 (4.2)	0.3 (0.3)	1.5 (1.2)
Nitrate	(mg/L N)	<0.1 (<0.1)	0.5 (0.4)	0.3 (0.2)	0.2 (0.3)	2.4 (4.0)	0.2 (0.3)	1.2 (1.0)
Nitrite	(mg/L N)	<0.1 (<0.1)	0.1 (0.2)	0.1 (<0.1)	0.1 (0.1)	0.1 (0.1)	0.1 (<0.1)	0.4 (0.3)
Ammonia	(mg/L N)	<0.1 (<0.1)	0.6 (1.1)	2.1 (3.6)	5.0 (8.6)	0.1 (0.1)	7.6 (4.0)	14.1 (5.3)
Orthophosphate	(mg/L P)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	0.1 (<0.1)	0.3 (0.3)

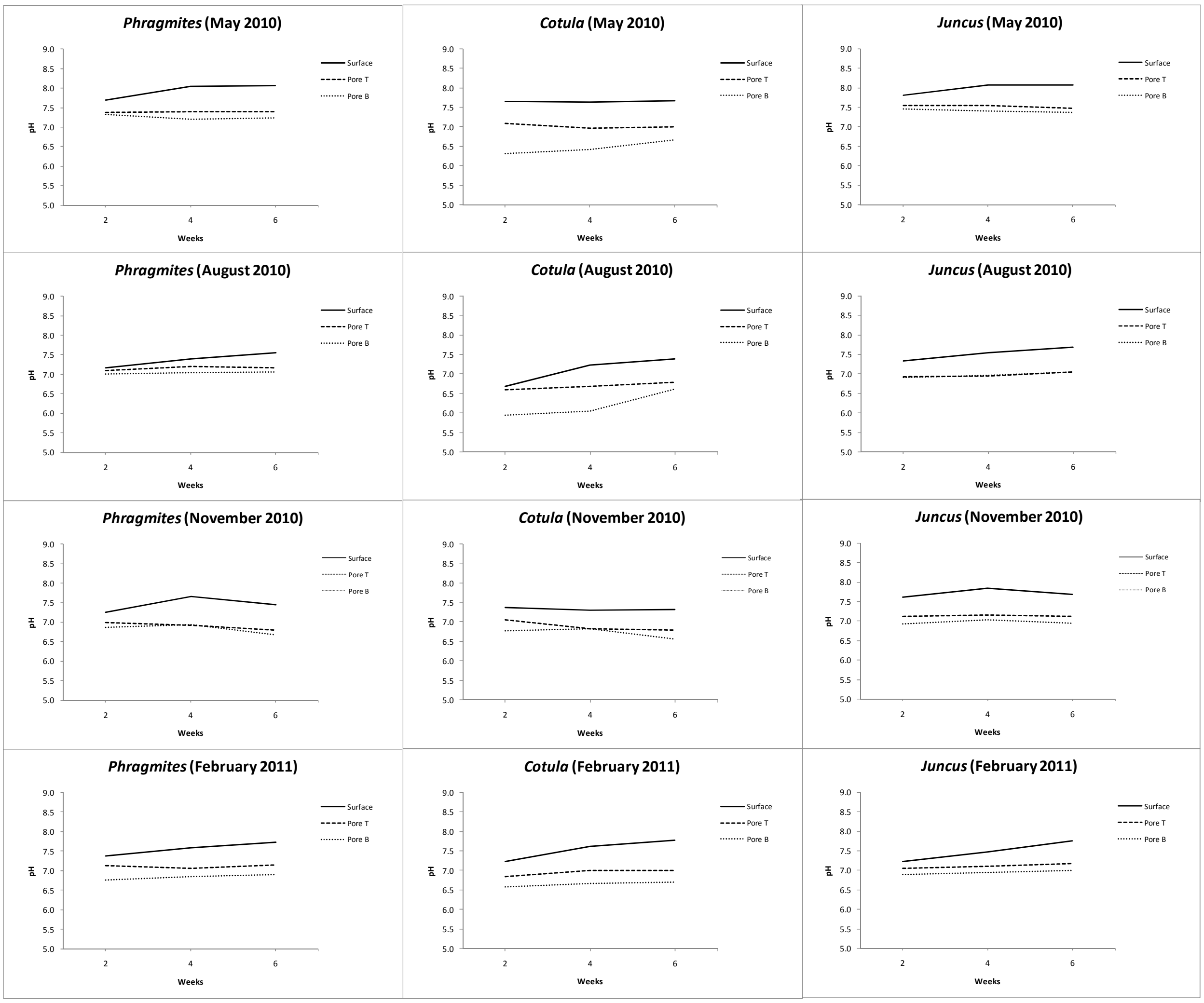
Table 9-170. Nutrient analyses on column water after 6 weeks: Campbell Park (November 2010). Figures shown are the mean (and standard deviation) values for duplicate analyses of three soil cores.

nutrient	unit	Initial Inundating Water	**control**			**2010 Bevy rye/*Puccinellia***		
			Surface	Pore T	Pore B	Surface	Pore T	Pore B
Ca	(mg/L)	22.8 (0.8)	52.6 (6.0)	86.4 (18.5)	157 (29.7)	45.8 (4.8)	232 (136)	498 (227)
Mg	(mg/L)	17.9 (0.5)	45.7 (5.2)	111 (31.2)	352 (69.0)	39.4 (6.2)	140 (38.5)	306 (56.3)
K	(mg/L)	4.7 (0.1)	21.2 (2.5)	35.6 (8.0)	40.1 (13.9)	13.7 (2.7)	27.6 (7.0)	43.5 (5.7)
Na	(mg/L)	145 (3.9)	334 (40.9)	618 (155)	1587 (156)	258 (59.5)	654 (204)	1540 (146)
NOx	(mg/L)	<0.1 (<0.1)	1.4 (0.3)	0.6 (0.4)	0.3 (0.1)	1.2 (0.5)	0.4 (0.4)	0.8 (0.4)
Nitrate	(mg/L N)	<0.1 (<0.1)	1.4 (0.3)	0.4 (0.2)	0.3 (0.1)	1.2 (0.5)	0.3 (0.2)	0.4 (0.3)
Nitrite	(mg/L N)	<0.1 (<0.1)	<0.1 (<0.1)	0.3 (0.1)	0.1 (0.1)	<0.1 (<0.1)	0.1 (0.2)	0.5 (0.3)
Ammonia	(mg/L N)	<0.1 (<0.1)	0.1 (<0.1)	5.6 (1.7)	11.7 (2.1)	<0.1 (<0.1)	6.7 (1.3)	14.9 (2.4)
Orthophosphate	(mg/L P)	<0.1 (<0.1)	<0.1 (<0.1)	0.3 (0.1)	0.1 (<0.1)	<0.1 (<0.1)	0.2 (0.1)	0.6 (0.4)

Table 9-171. Nutrient analyses on column water after 6 weeks: Campbell Park (February 2011). Figures shown are the mean (and standard deviation) values for duplicate analyses of three soil cores.

nutrient	unit	Initial Inundating Water	**control**			**2010 Bevy rye/*Puccinellia***		
			Surface	Pore T	Pore B	Surface	Pore T	Pore B
Ca	(mg/L)	24.7 (1.7)	57.8 (12.8)	81.7 (20.1)	121 (39.1)	43.8 (5.8)	97.1 (42.7)	214 (50.0)
Mg	(mg/L)	17.7 (0.3)	43.4 (10.6)	118 (43.1)	229 (85.9)	42.2 (3.1)	161 (55.2)	300 (67.9)
K	(mg/L)	4.6 (<0.1)	18.9 (5.4)	44.2 (14.6)	62.2 (12.4)	15.0 (1.4)	35.8 (4.7)	60.2 (6.6)
Na	(mg/L)	141 (1.4)	323 (82.4)	625 (214)	1187 (390)	318 (20.2)	879 (150)	1589 (150)
NOx	(mg/L)	0.1 (0.1)	0.7 (0.2)	0.3 (0.2)	0.2 (0.2)	0.7 (0.1)	0.2 (0.2)	0.4 (0.2)
Nitrate	(mg/L N)	0.1 (0.1)	0.7 (0.2)	0.2 (0.2)	0.2 (0.2)	0.7 (0.1)	0.1 (0.1)	0.2 (0.1)
Nitrite	(mg/L N)	<0.1 (<0.1)	<0.1 (<0.1)	0.1 (<0.1)	0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	0.2 (0.1)
Ammonia	(mg/L N)	<0.1 (<0.1)	<0.1 (<0.1)	0.1 (<0.1)	0.1 (<0.1)	<0.1 (<0.1)	0.1 (0.1)	0.1 (0.1)
Orthophosphate	(mg/L P)	<0.1 (<0.1)	<0.1 (<0.1)	0.1 (<0.1)	0.1 (<0.1)	<0.1 (<0.1)	0.1 (0.1)	0.1 (0.1)

APPENDIX 6. Graphical presentation of surface and pore-water analyses (Columns Trials).



Phragmites (May 2010)

Cotula (May 2010)

Juncus (May 2010)

Phragmites (August 2010)

Cotula (August 2010)

Juncus (August 2010)

Phragmites (November 2010)

Cotula (November 2010)

Juncus (November 2010)

Phragmites (February 2011)

Cotula (February 2011)

Juncus (February 2011)

Figure 9-1. Waltowa pH data for column trial surface and pore-waters (May 2010 – February 2011).

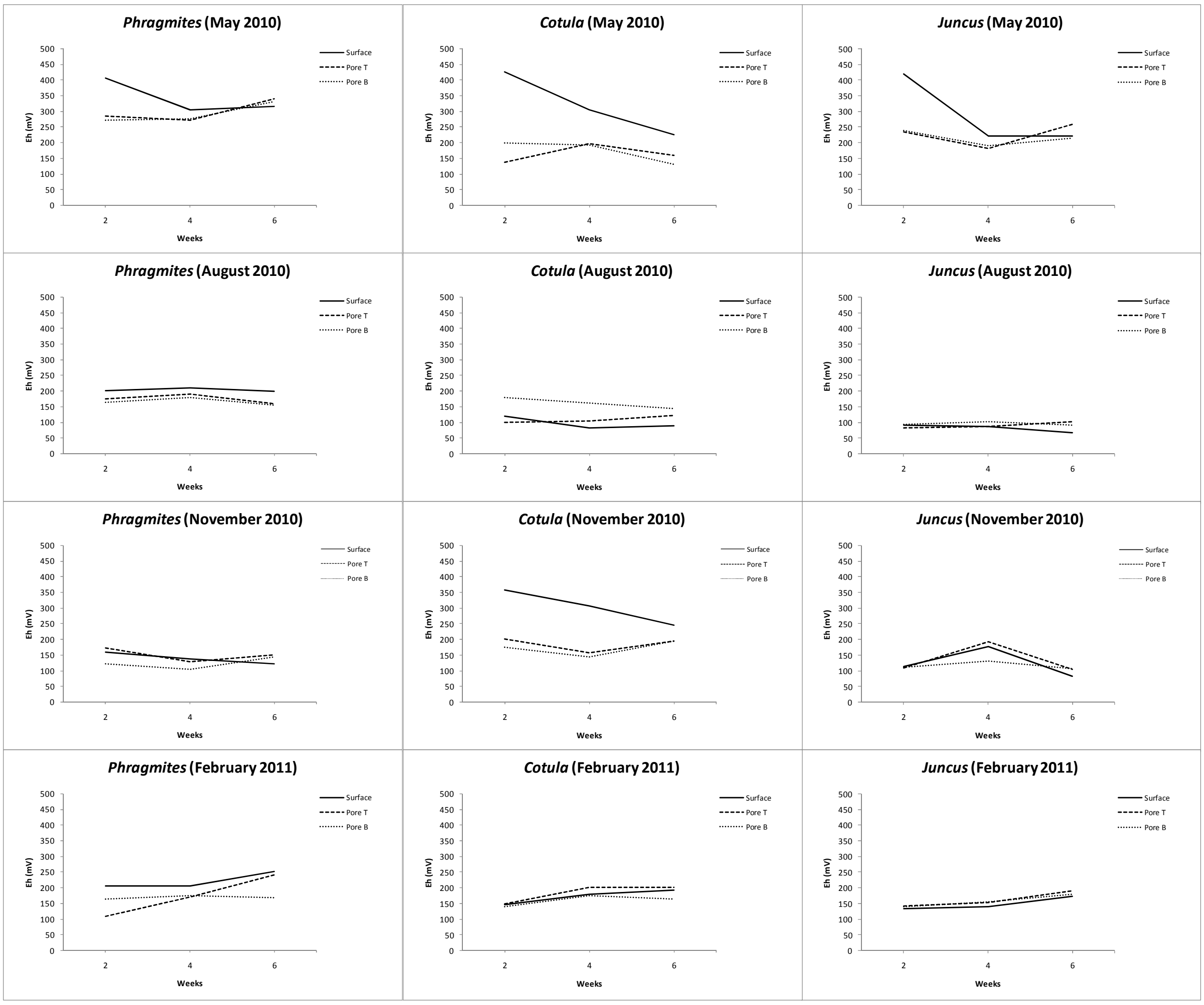


Figure 9-2. Waltowa redox potential (Eh) data for column trial surface and pore-waters (May 2010 – February 2011).

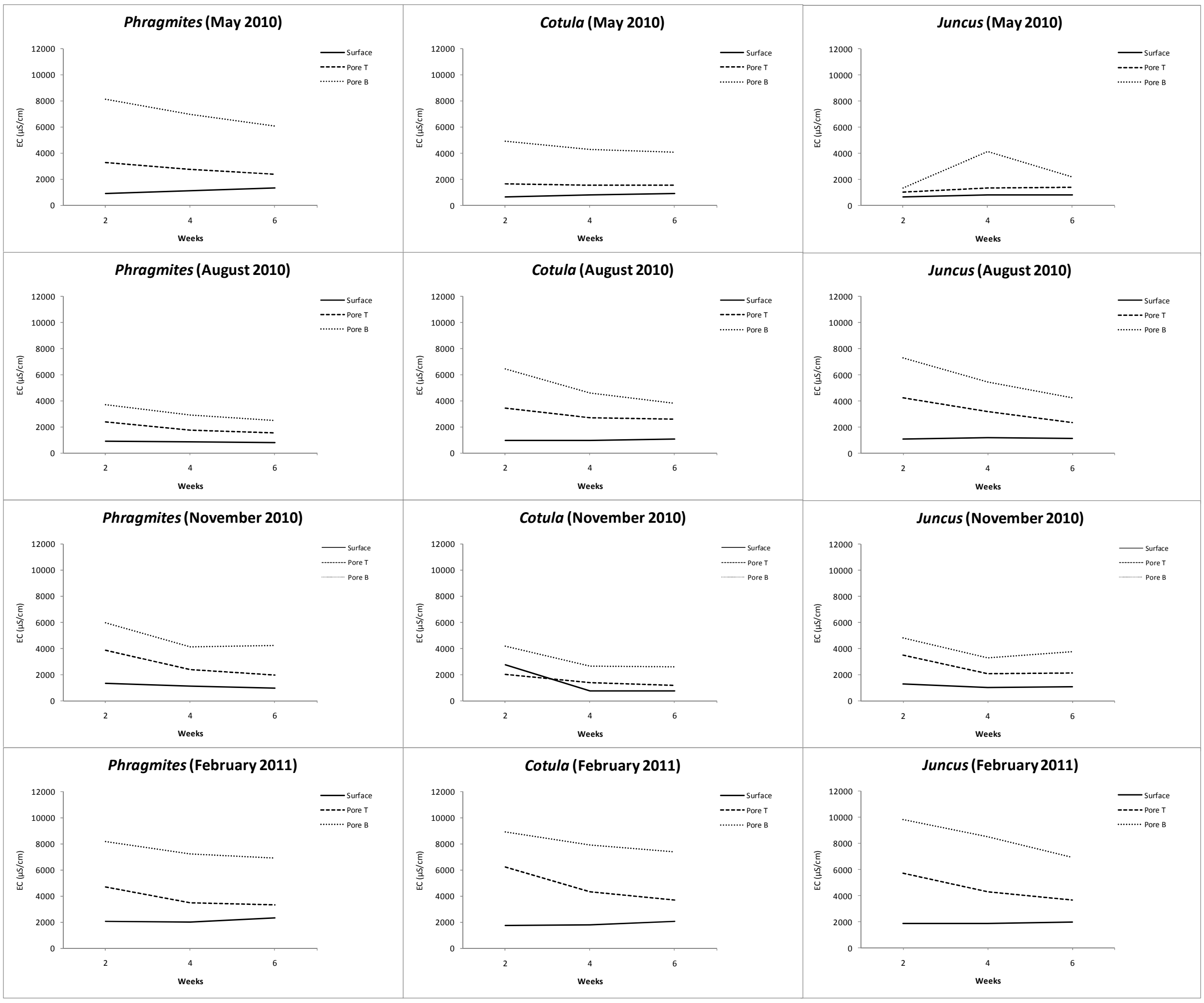


Figure 9-3. Waltowa electrical conductivity (EC) data for column trial surface and pore-waters (May 2010 – February 2011).

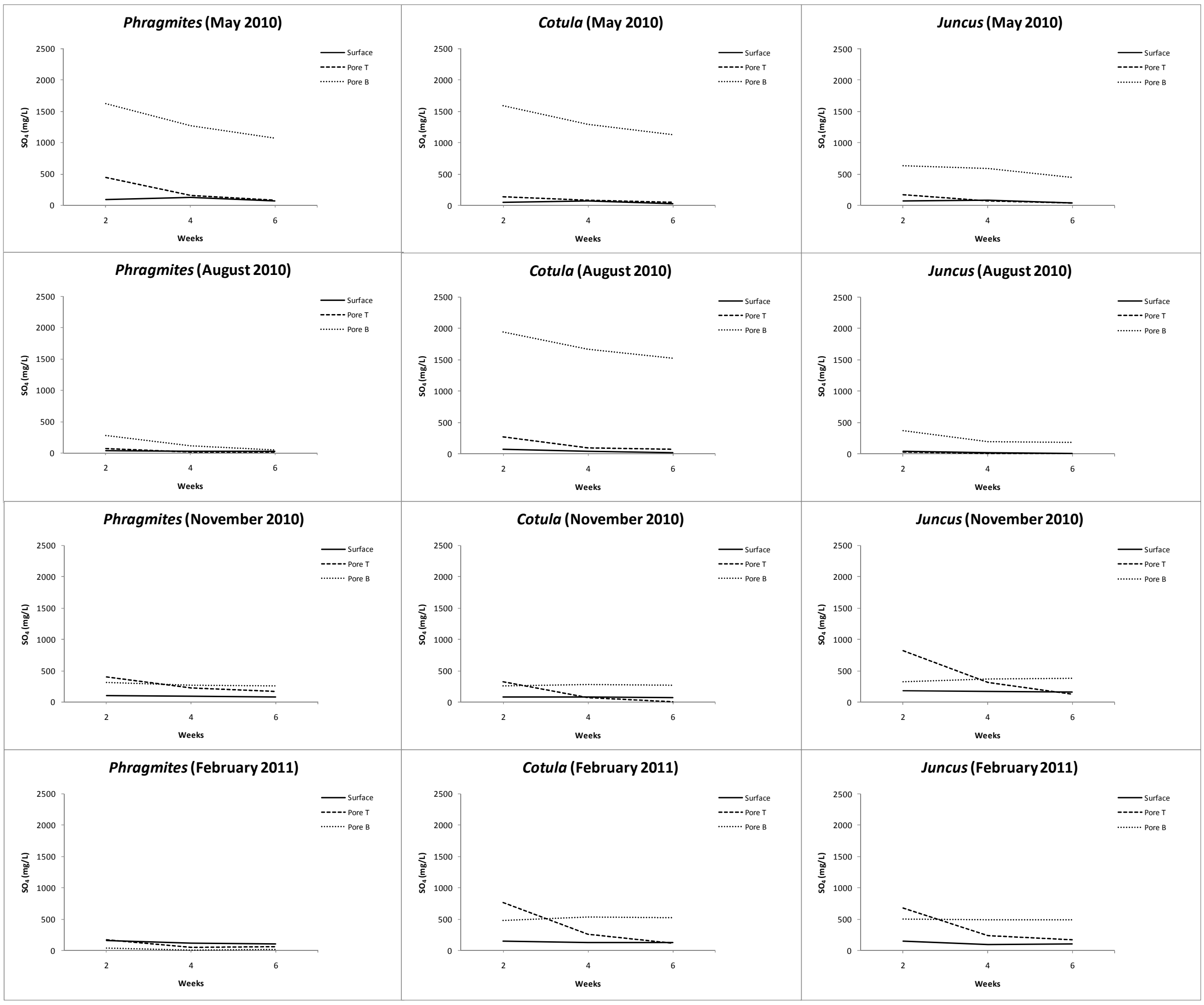


Figure 9-4. Waltowa sulfate (SO_4) data for column trial surface and pore-waters (May 2010 – February 2011).

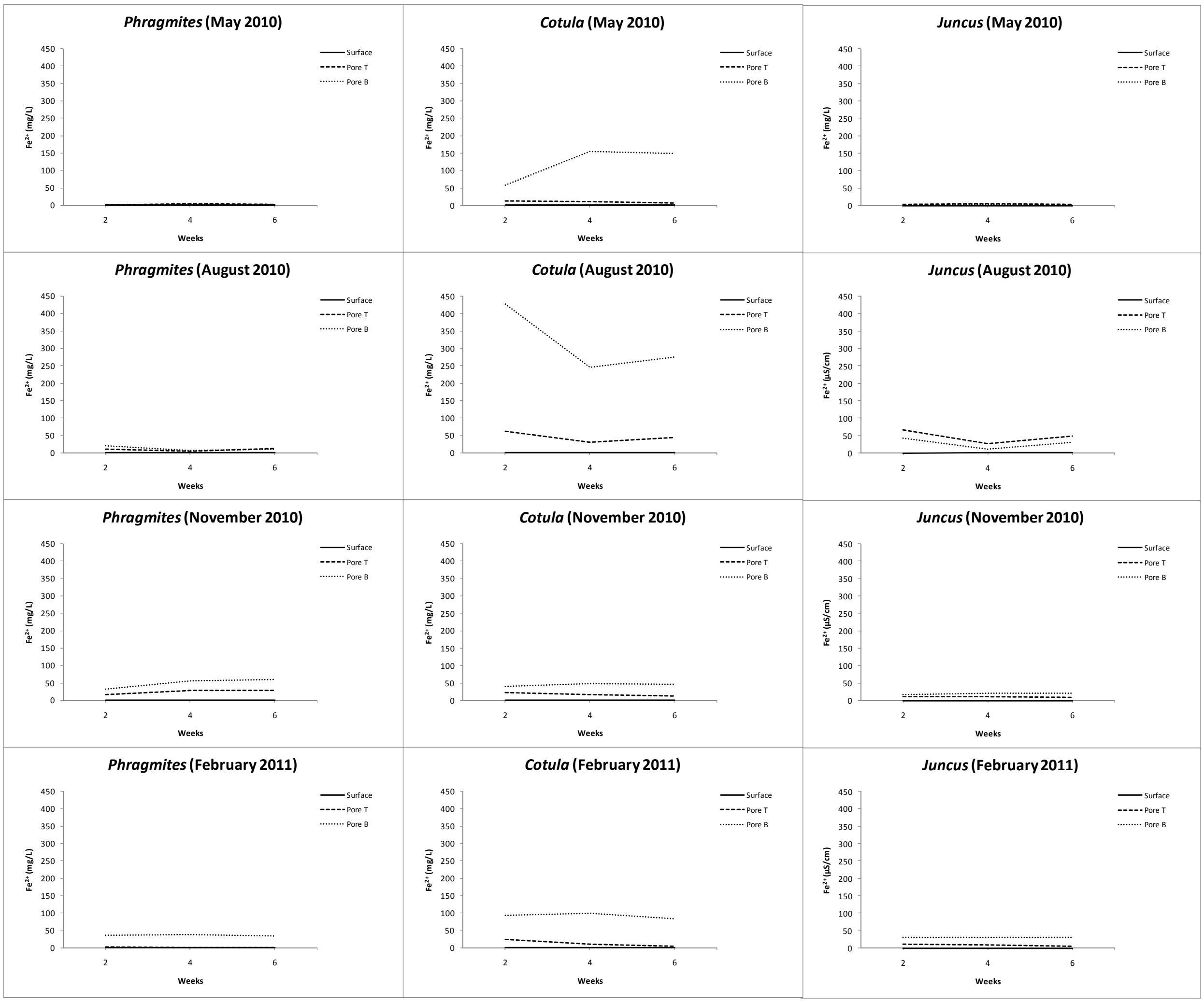


Figure 9-5. Waltowa ferrous iron (Fe^{2+}) data for column trial surface and pore-waters (May 2010 – February 2011).

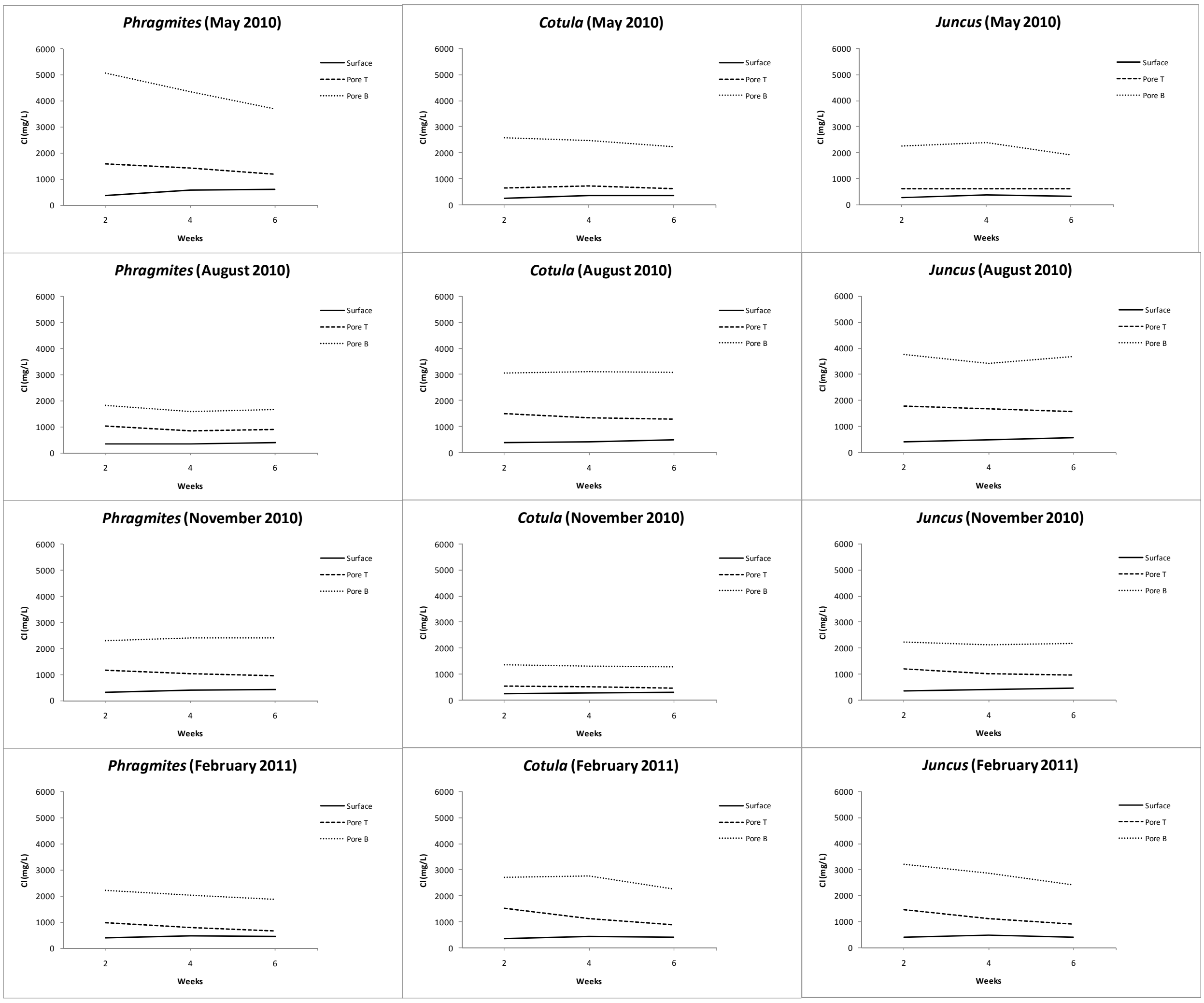


Figure 9-6. Waltowa chloride (Cl) data for column trial surface and pore-waters (May 2010 – February 2011).

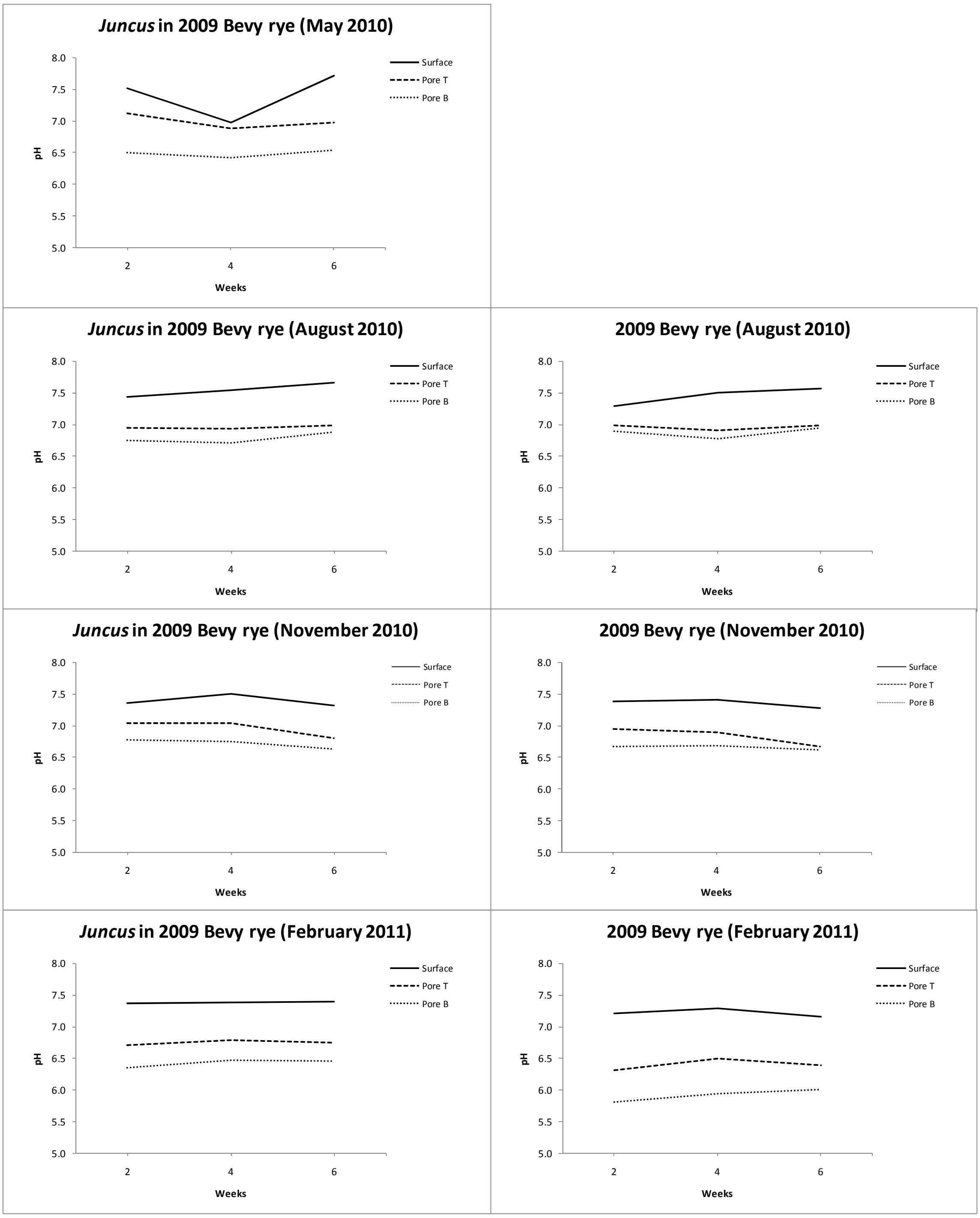


Figure 9-7. Poltalloch pH data for column trial surface and pore-waters (May 2010 – February 2011).

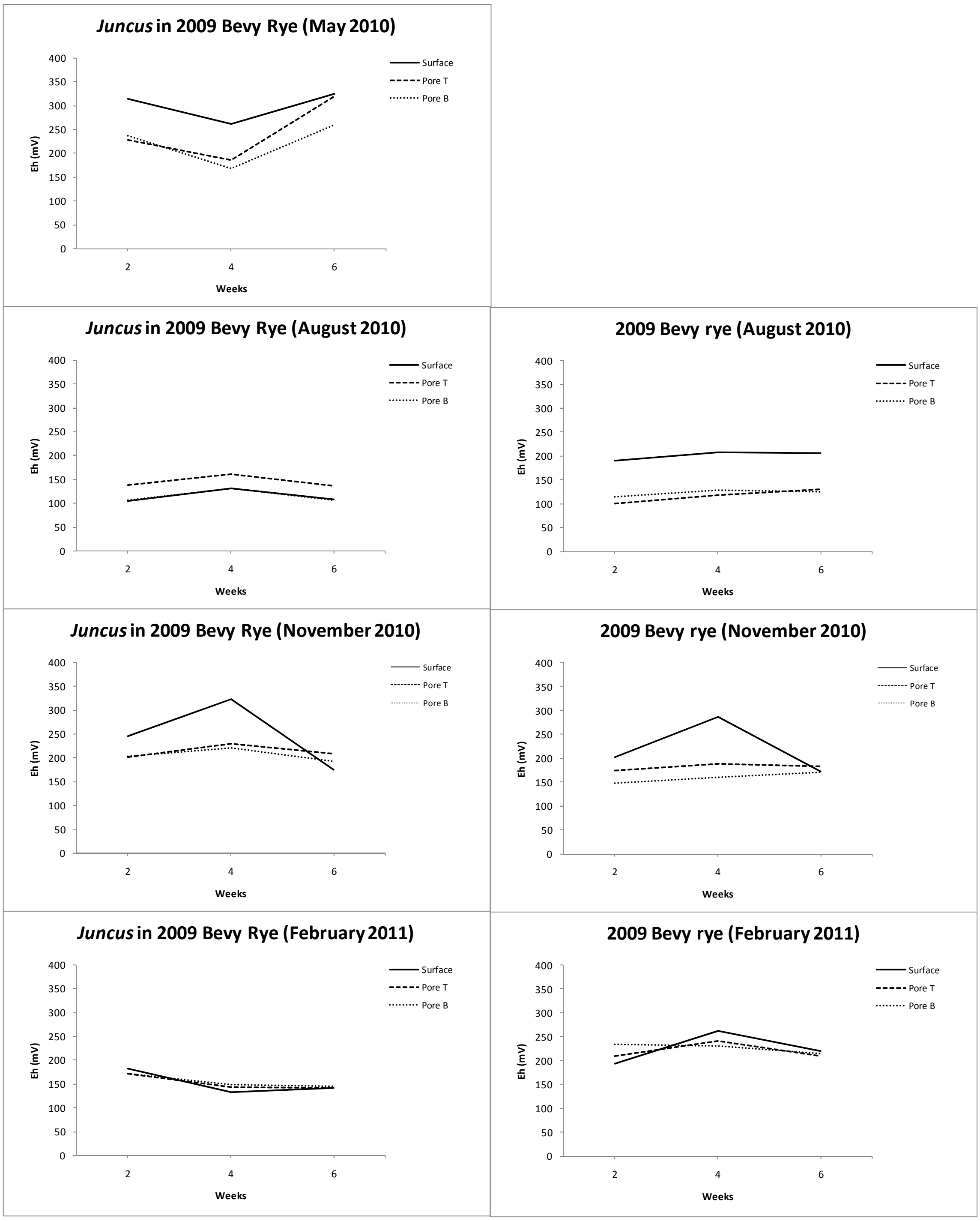


Figure 9-8. Poltalloch redox potential (Eh) data for column trial surface and pore-waters (May 2010 – February 2011).

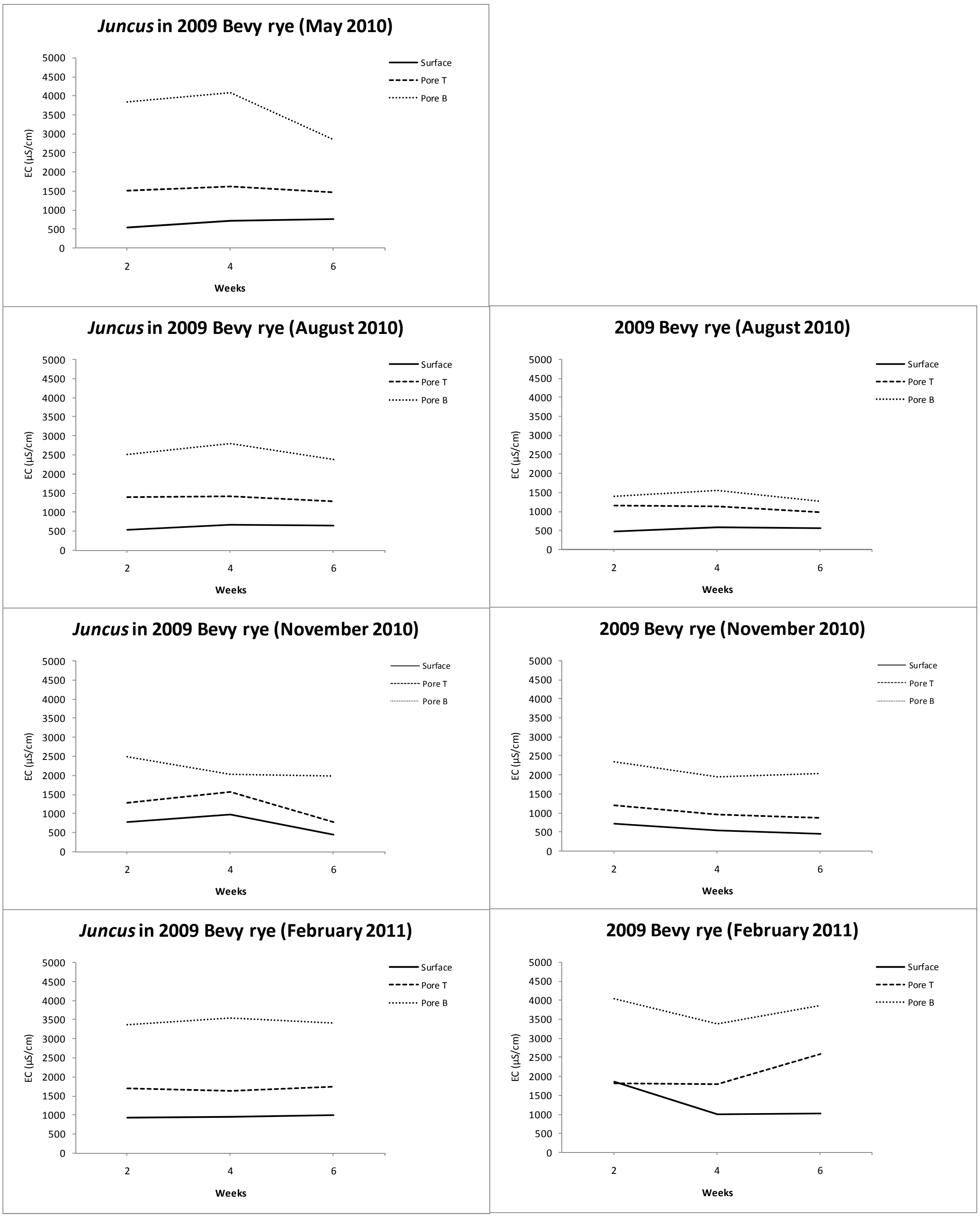


Figure 9-9. Poltalloch electrical conductivity (EC) data for column trial surface and pore-waters (May 2010 – February 2011).

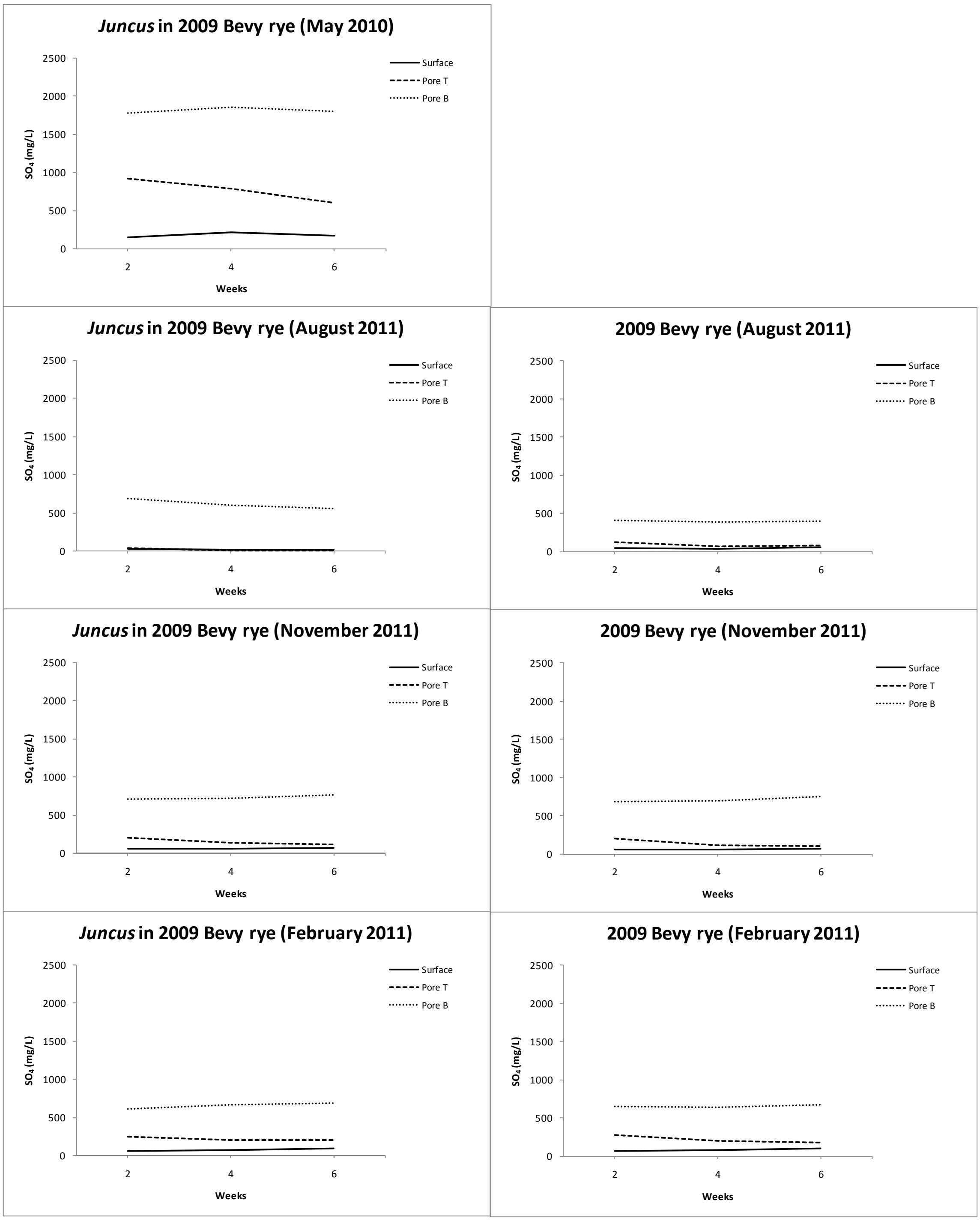


Figure 9-10. Poltalloch sulfate (SO_4) data for column trial surface and pore-waters (May 2010 – February 2011).

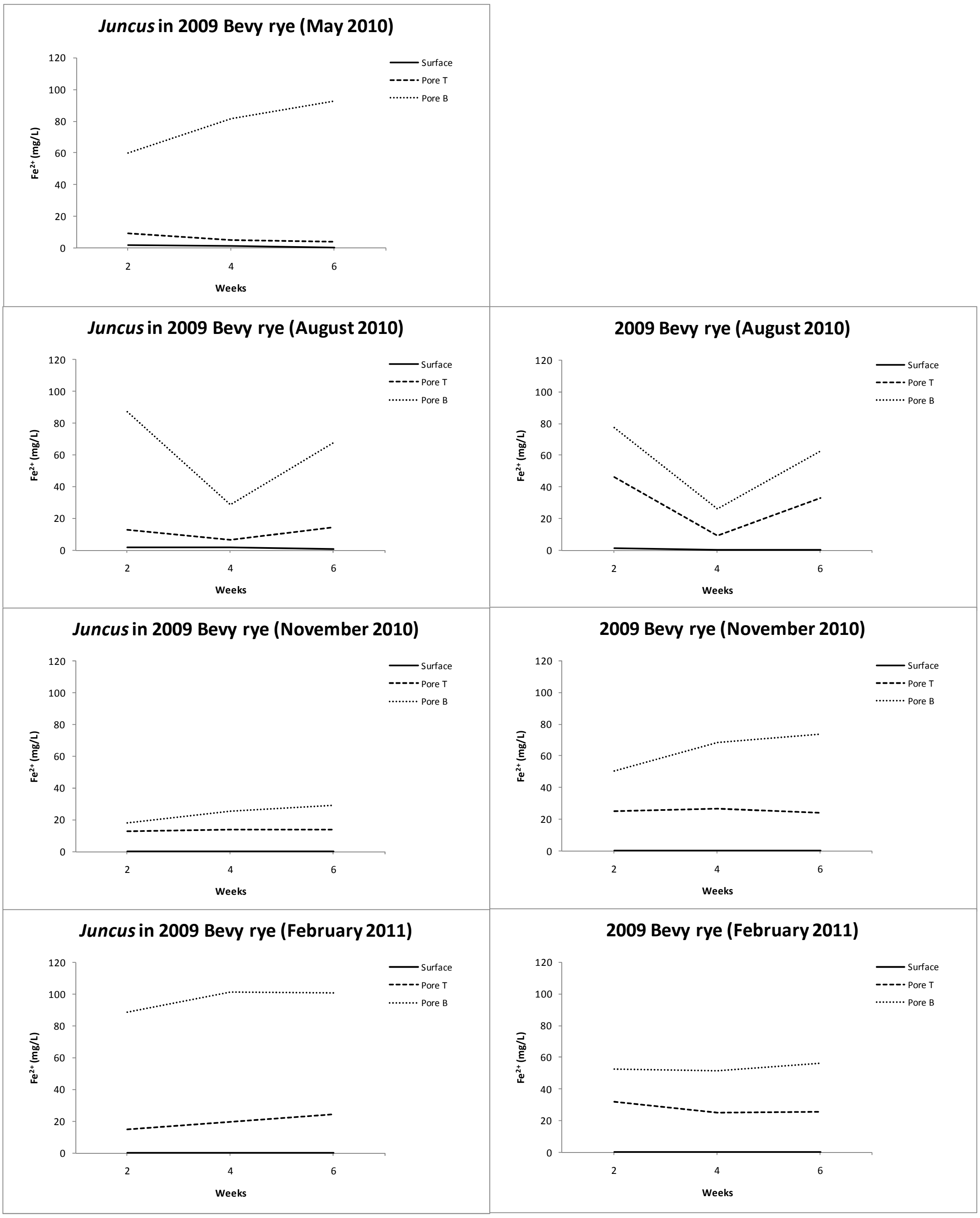


Figure 9-11. Poltalloch ferrous iron (Fe^{2+}) data for column trial surface and pore-waters (May 2010 – February 2011).

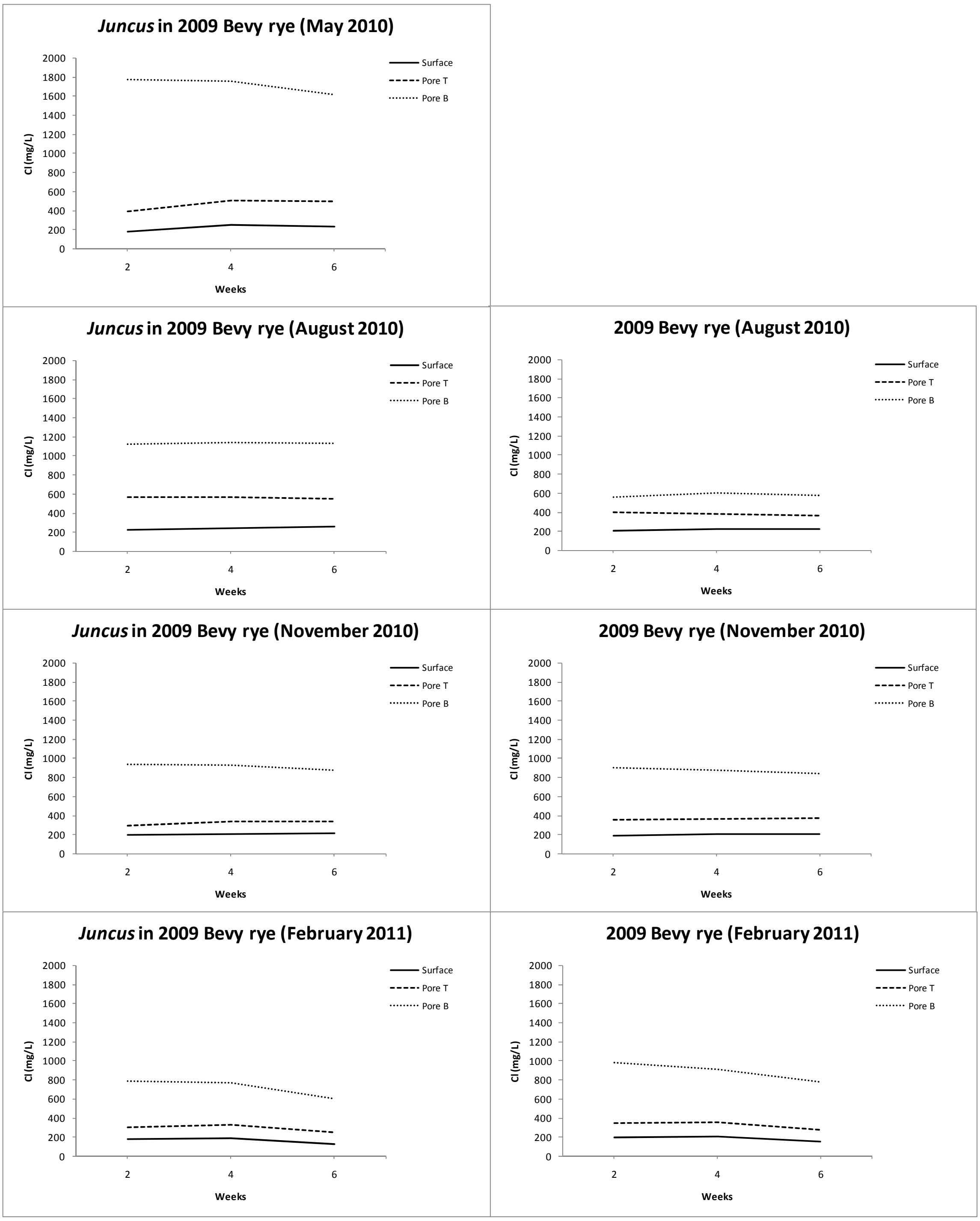


Figure 9-12. Poltalloch chloride (Cl) data for column trial surface and pore-waters (May 2010 – February 2011).

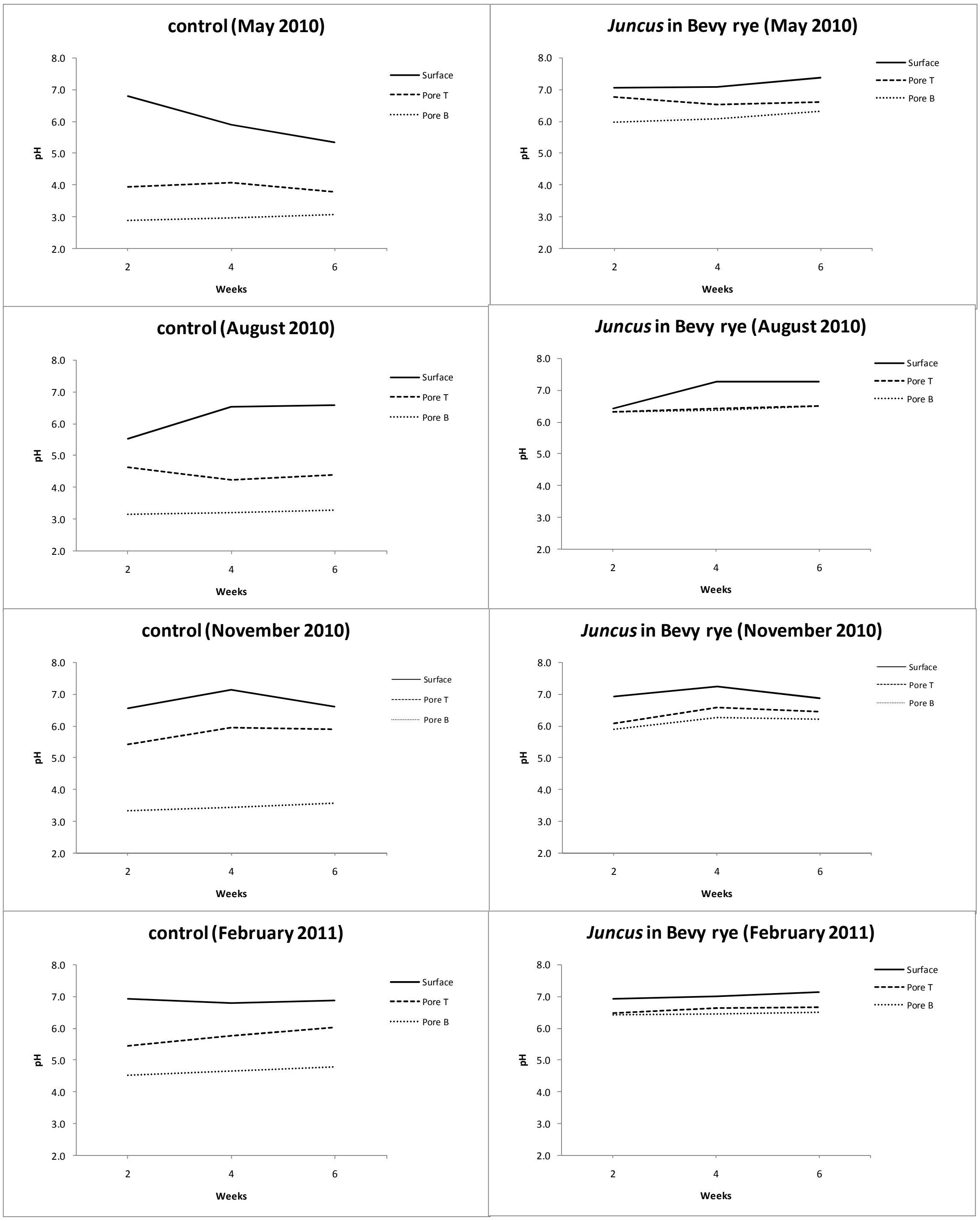


Figure 9-13. Tolderol pH data for column trial surface and pore-waters (May 2010 – February 2011).

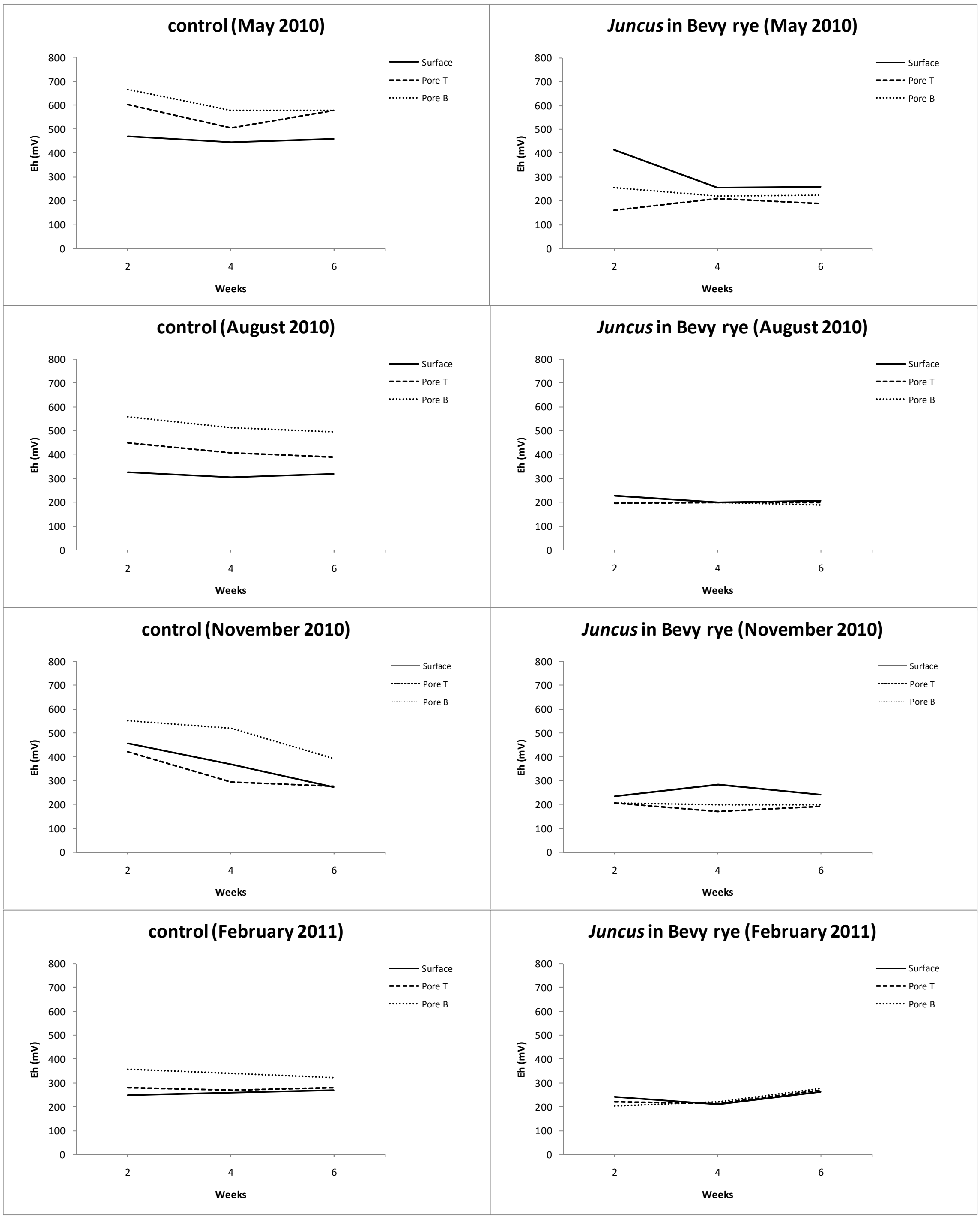


Figure 9-14. Tolderol redox potential (Eh) data for column trial surface and pore-waters (May 2010 – February 2011).

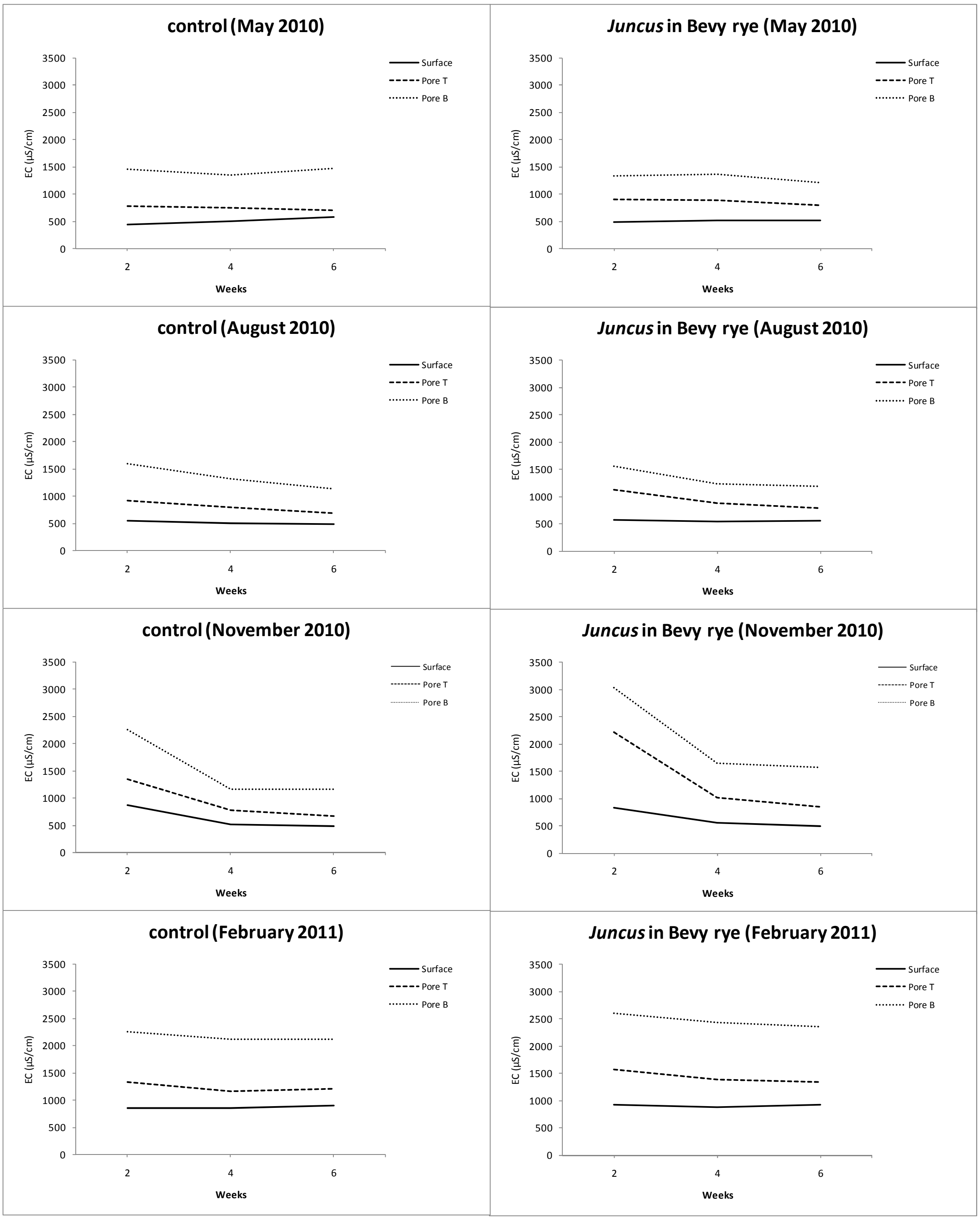
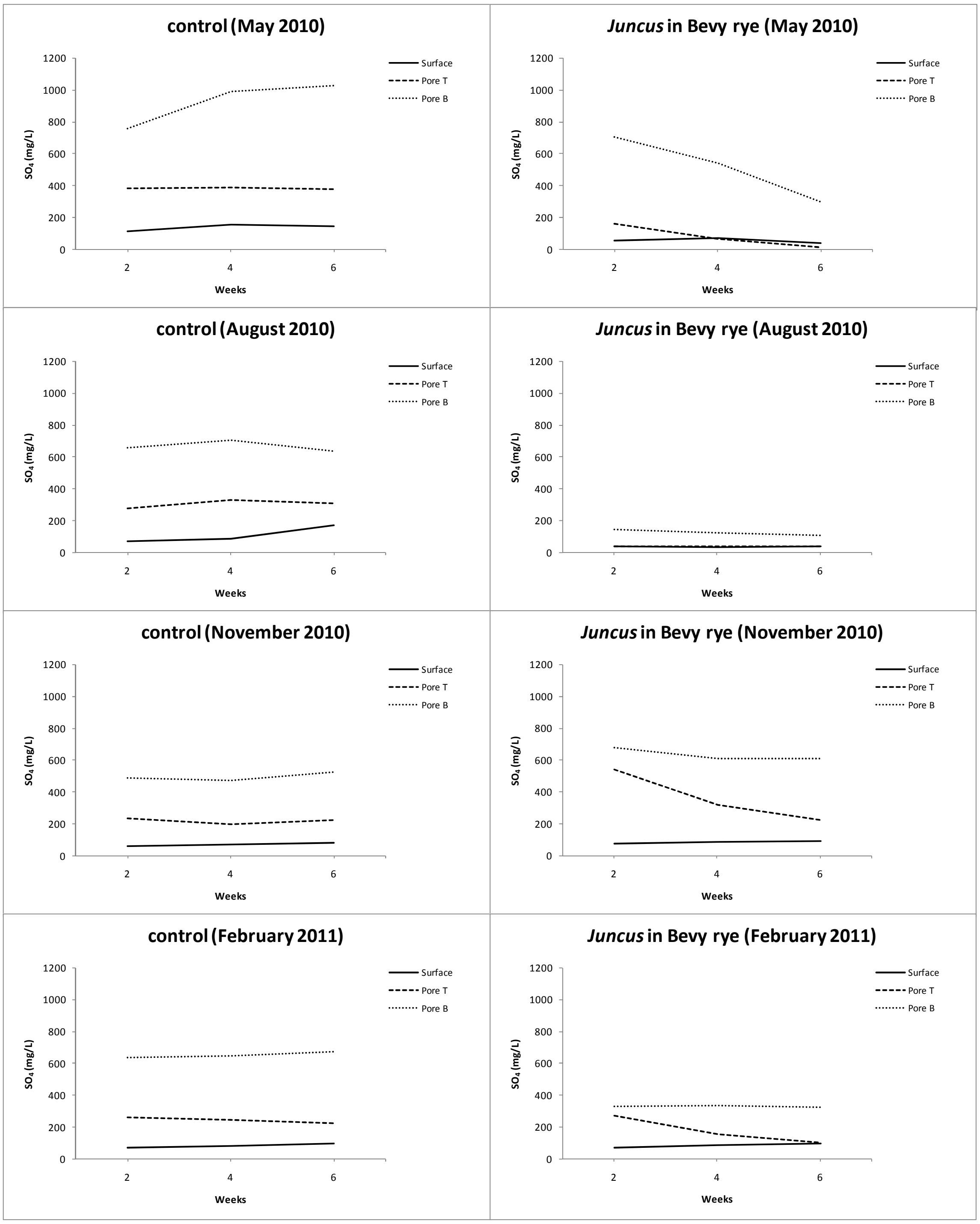


Figure 9-15. Tolderol electrical conductivity (EC) data for column trial surface and pore-waters (May 2010 – February 2011).



control (May 2010)

Juncus in Bevy rye (May 2010)

control (August 2010)

Juncus in Bevy rye (August 2010)

control (November 2010)

Juncus in Bevy rye (November 2010)

control (February 2011)

Juncus in Bevy rye (February 2011)

Figure 9-16. Tolderol sulfate (SO_4) data for column trial surface and pore-waters (May 2010 – February 2011).

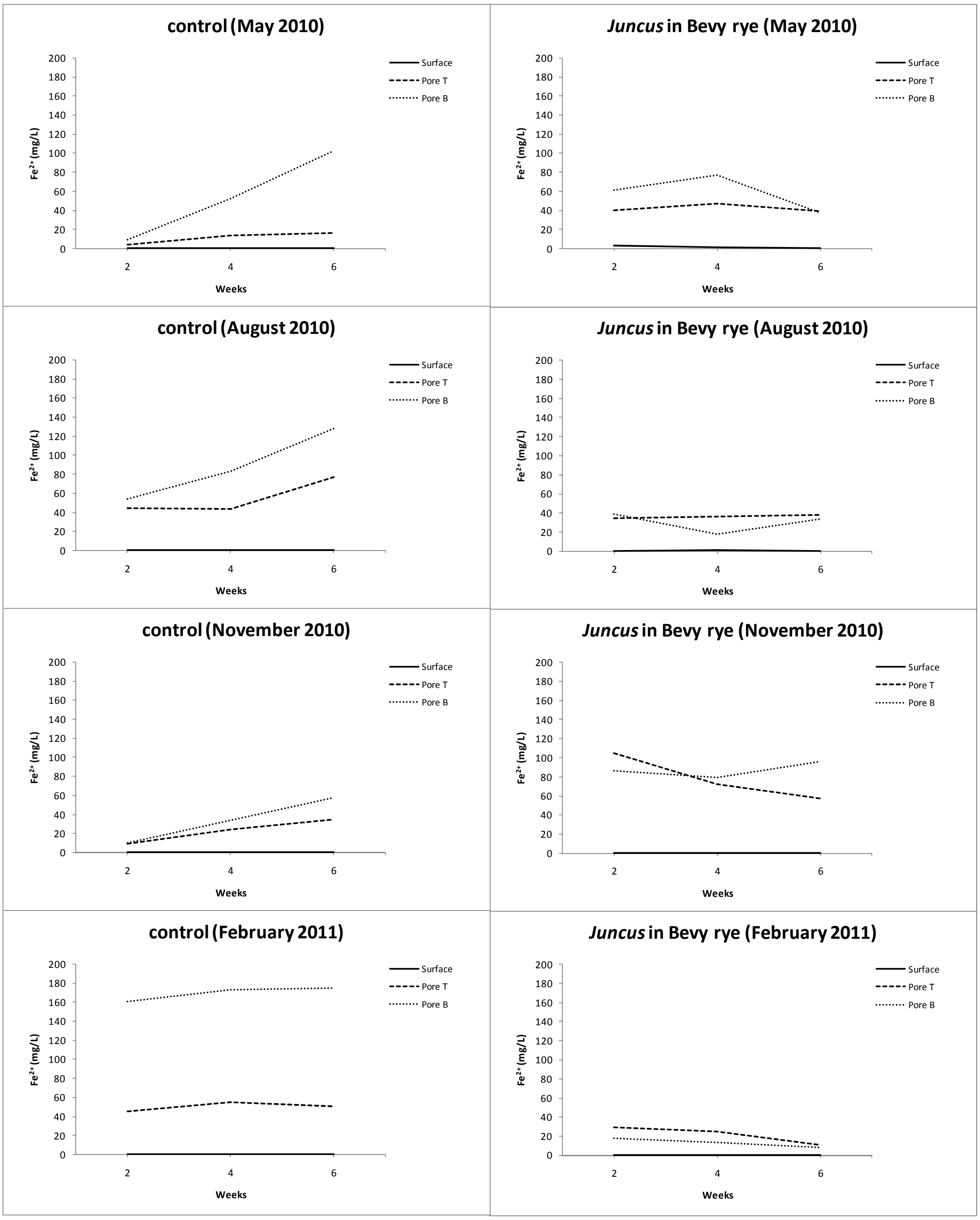
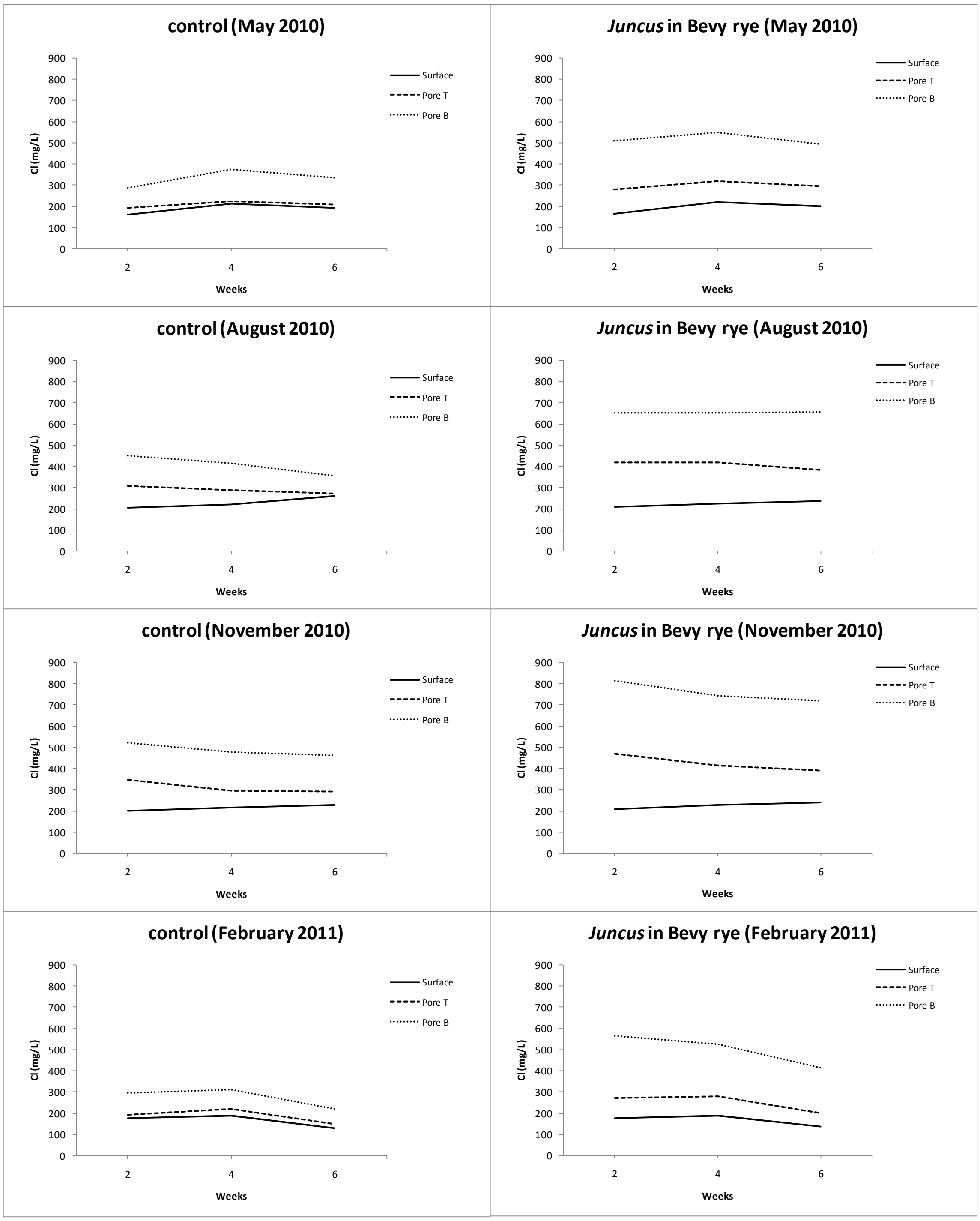


Figure 9-17. Tolderol ferrous iron (Fe^{2+}) data for column trial surface and pore-waters (May 2010 – February 2011).



control (May 2010)

Juncus in Bevy rye (May 2010)

control (August 2010)

Juncus in Bevy rye (August 2010)

control (November 2010)

Juncus in Bevy rye (November 2010)

control (February 2011)

Juncus in Bevy rye (February 2011)

Figure 9-18. Tolderol chloride (Cl) data for column trial surface and pore-waters (May 2010 – February 2011).

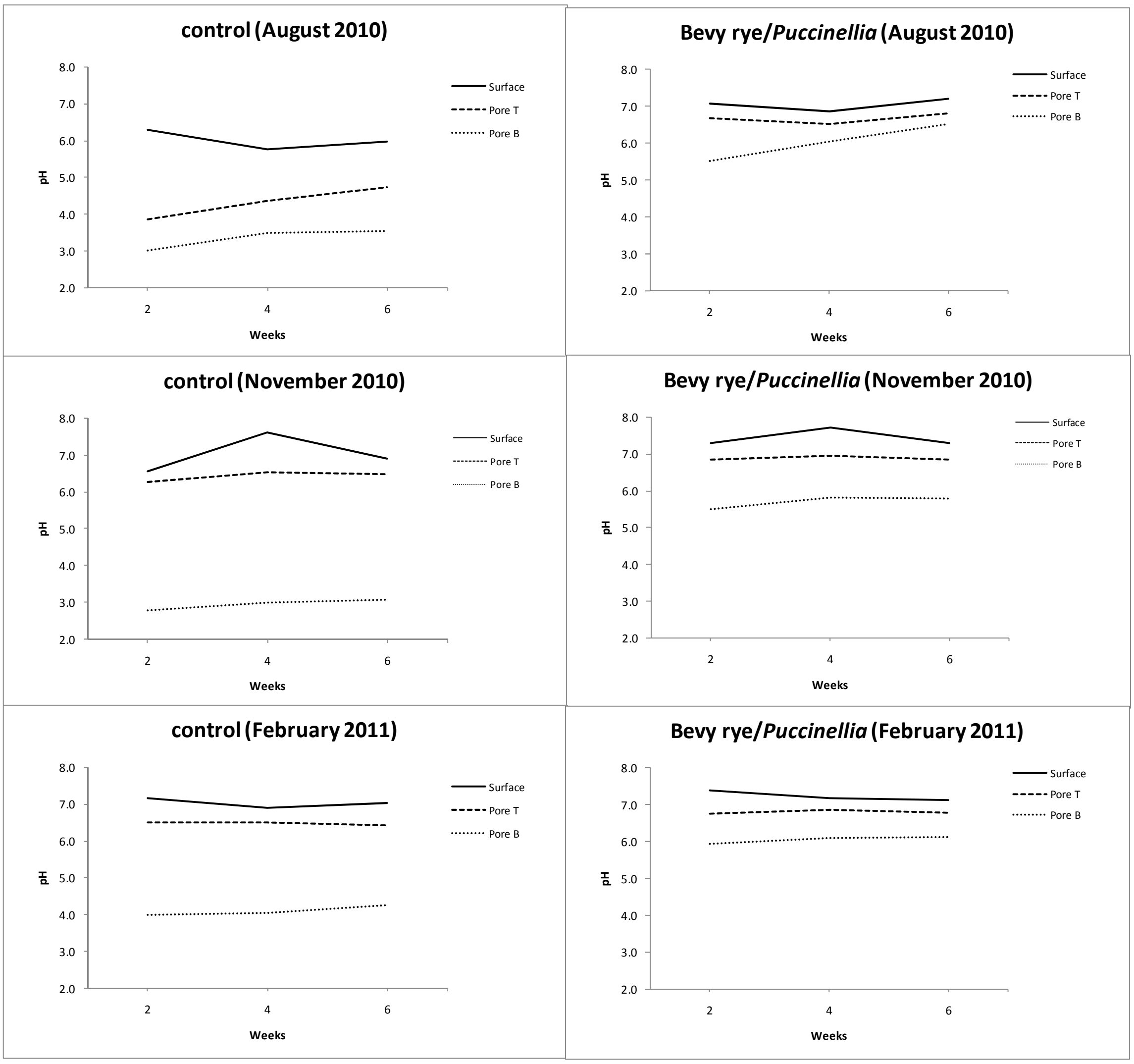


Figure 9-19. Campbell Park pH data for column trial surface and pore-waters (August 2010 – February 2011).

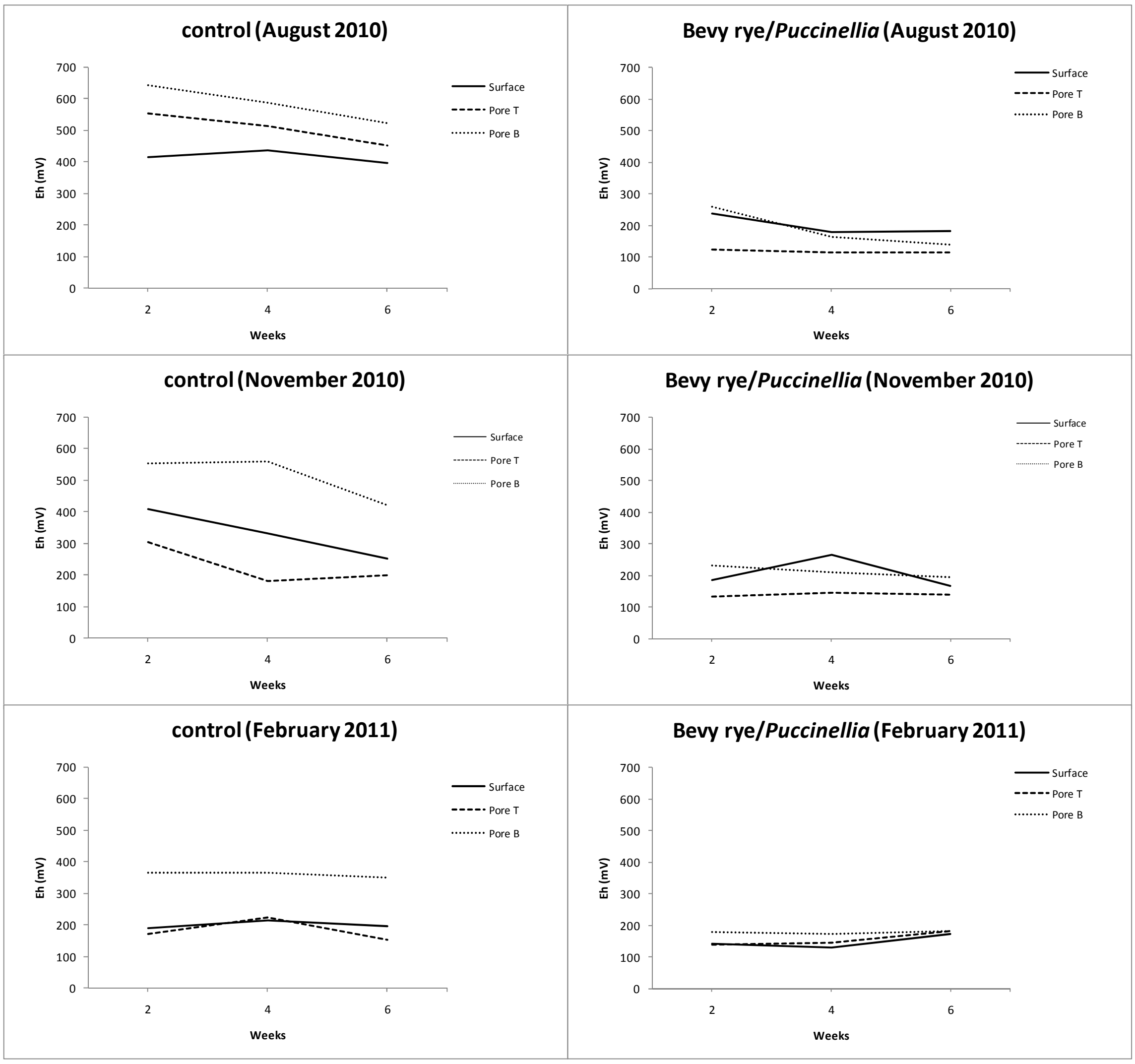


Figure 9-20. Campbell Park redox potential (Eh) data for column trial surface and pore-waters (August 2010 – February 2011).

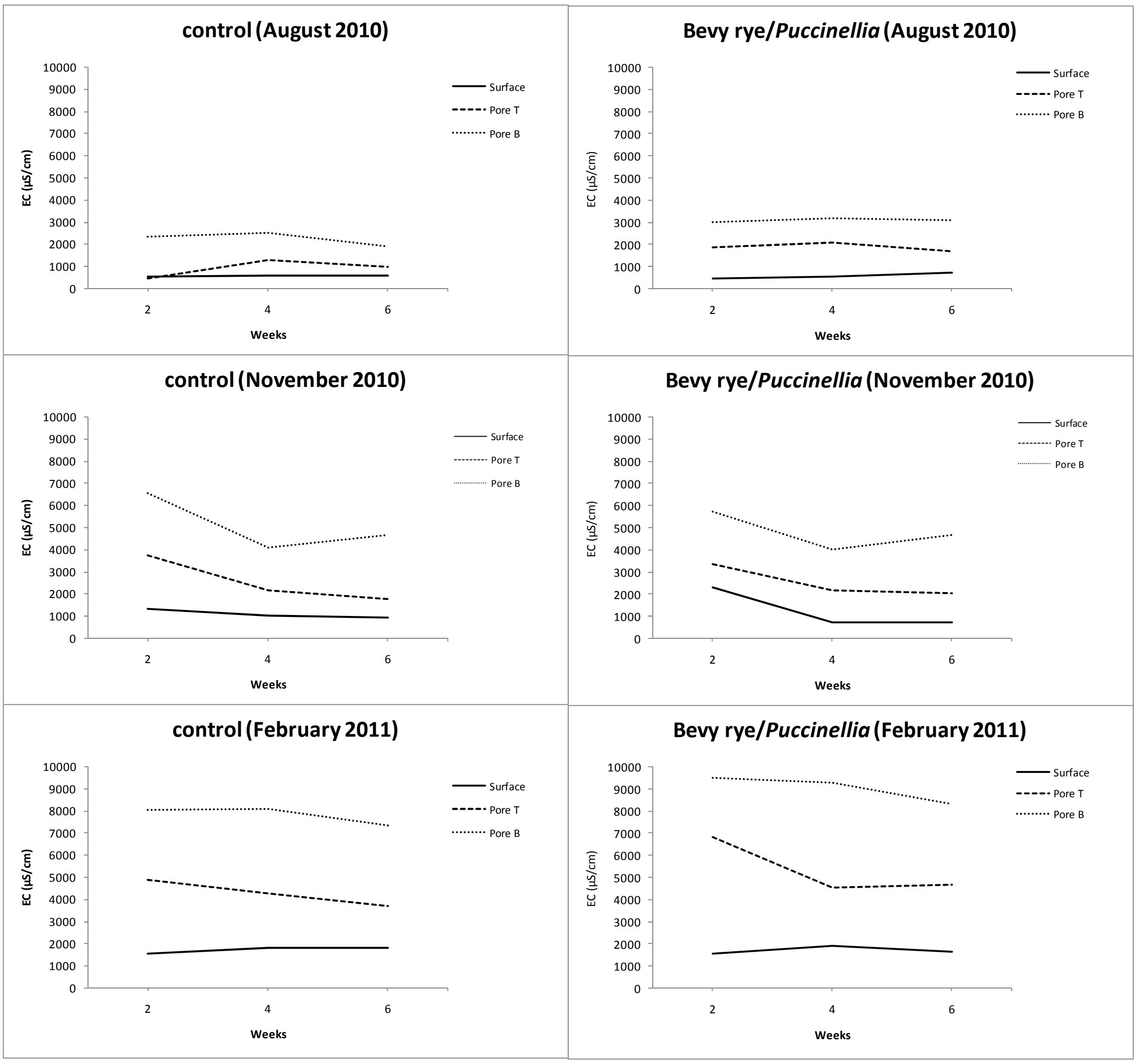
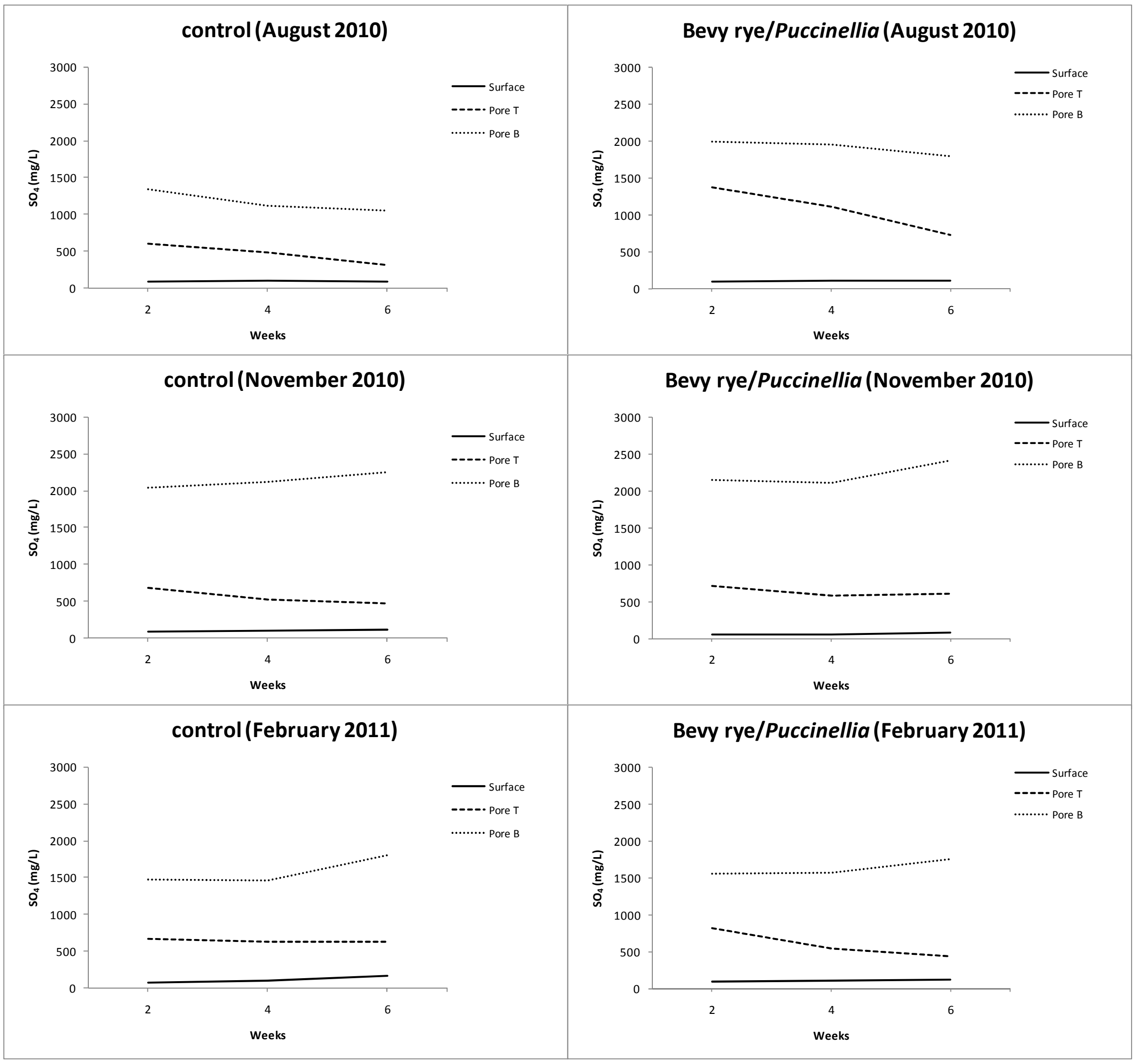


Figure 9-21. Campbell Park electrical conductivity (EC) data for column trial surface and pore-waters (August 2010 – February 2011).


control (August 2010)

Bevy rye/*Puccinellia* (August 2010)

control (November 2010)

Bevy rye/*Puccinellia* (November 2010)

control (February 2011)

Bevy rye/*Puccinellia* (February 2011)

Figure 9-22. Campbell Park sulfate (SO_4) data for column trial surface and pore-waters (August 2010 – February 2011).

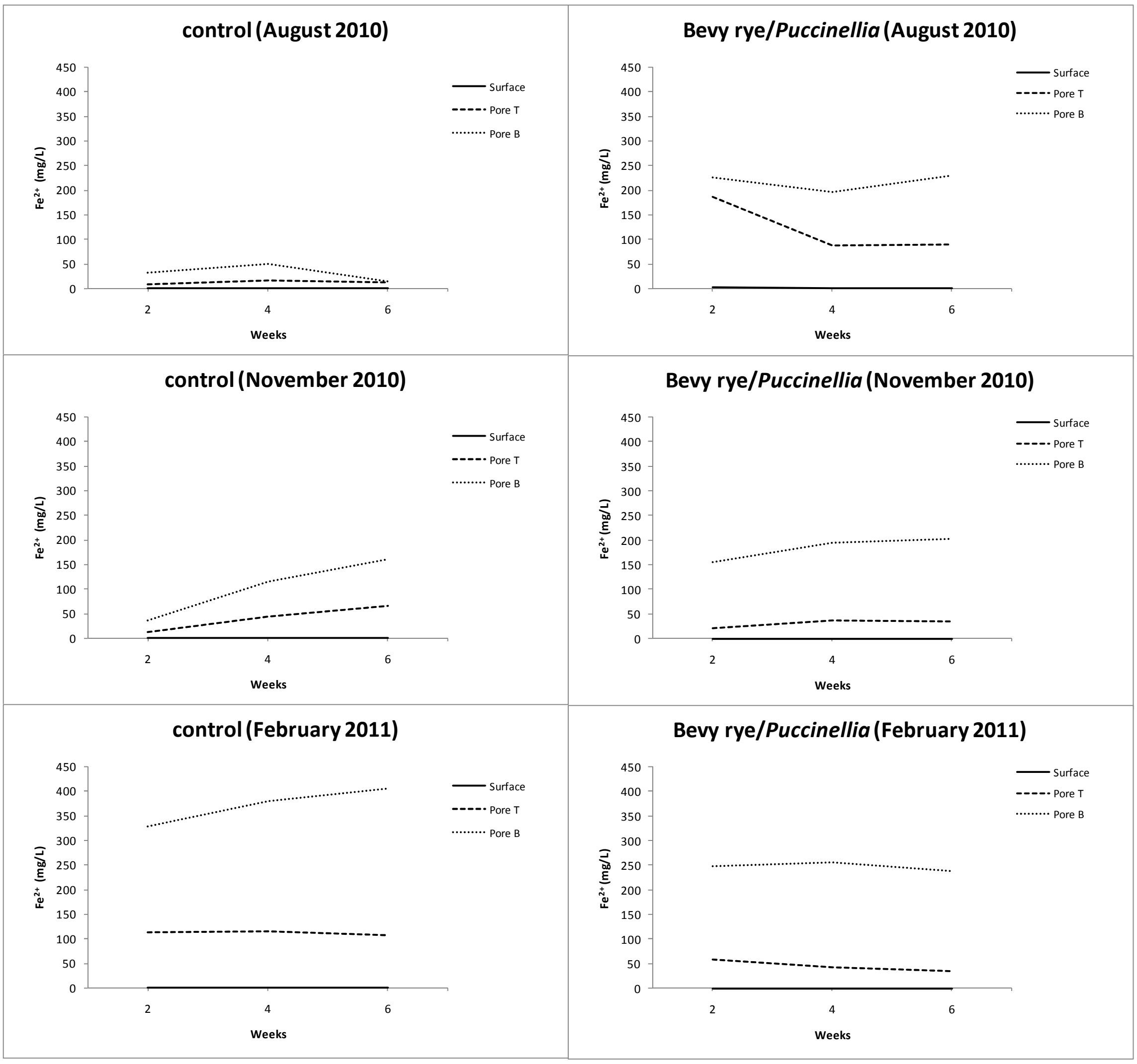


Figure 9-23. Campbell Park ferrous iron (Fe^{2+}) data for column trial surface and pore-waters (August 2010 – February 2011).

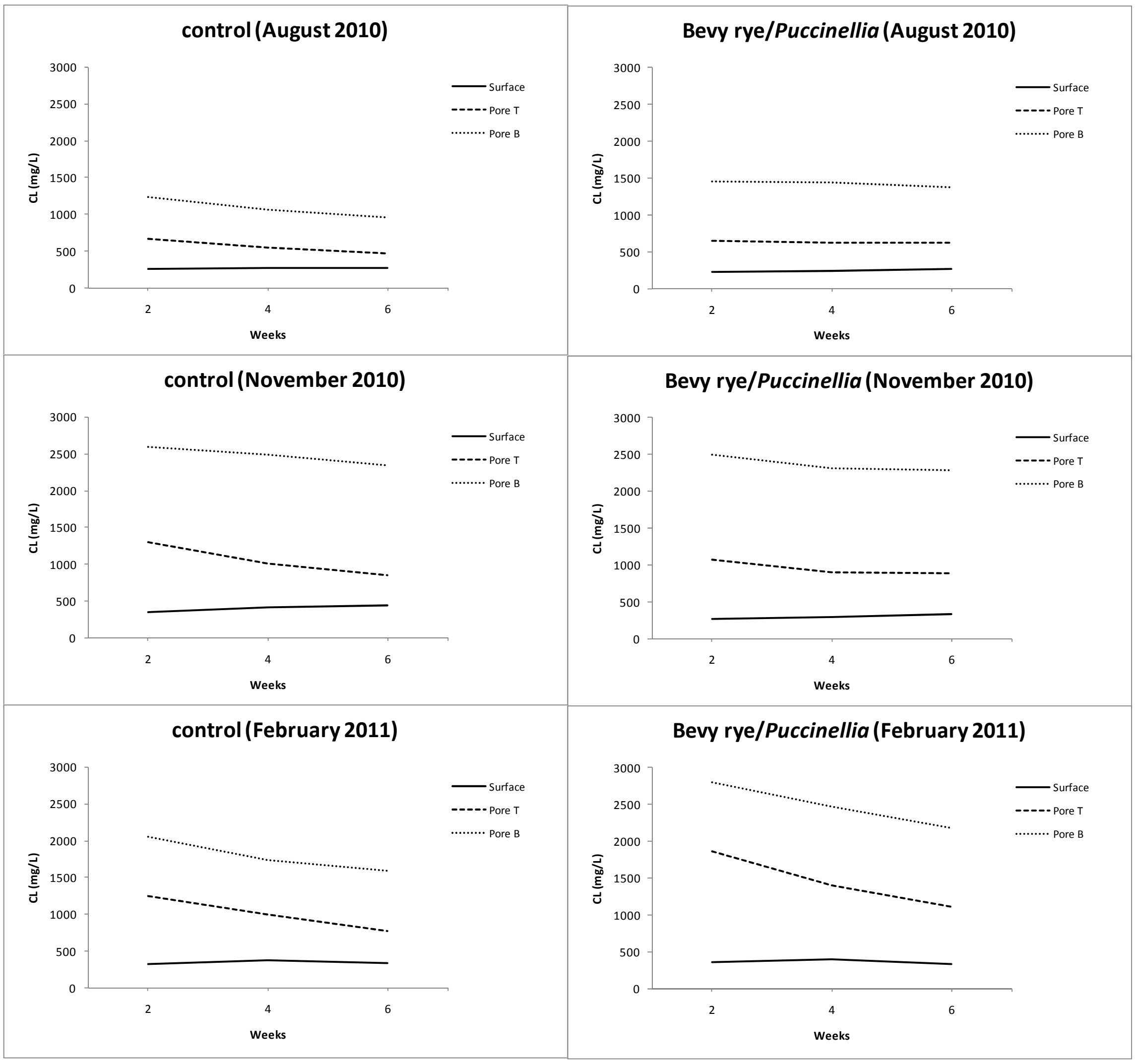


Figure 9-24. Campbell Park chloride (Cl) data for column trial surface and pore-waters (August 2010 – February 2011).

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Printed on recycled paper
July 2011
ISBN 978-1-921735-19-6