

Nitrogen Transport and Connectivity in two Wetland-Rich Boreal sites in the Athabasca
Oil Sands Region, Canada

by

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BSc, Colorado State University, 2013

A Thesis Submitted in Partial Fulfillment
of the Requirements for the Degree of

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in the Department of Geography

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Supervisory Committee

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Abstract

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Development of the Athabasca Oil Sands Region (AOSR) has increased atmospheric nitrogen emissions, a trend which is expected to increase in the future. The area surrounding development is comprised of Boreal upland forests and peatlands. Improved understanding of the hydrological connectivity between Boreal peatlands and uplands is needed to predict the fate and transport of atmospheric N deposited across the region. Two field sites: Jack Pine High (JPH, located 45 km north of Fort McMurray) and Mariana Lakes (ML, located 100 km south of Fort McMurray) were instrumented with piezometers nests and water table wells for this study (n= 108 sampling locations). The wells were placed along transects that cover target landscape units (bog, fen, upland). Wells were sampled for water isotopes and geochemical parameters during the summers of 2011-2014 to characterize the baseline geochemistry of groundwater in the different landscape units. Inorganic (nitrate, ammonium) and organic forms of nitrogen (dissolved organic nitrogen), major and minor ions and water isotope tracers ($\delta^{18}\text{O}$, $\delta^2\text{H}$ and ^3H) were measured to identify the various forms of nitrogen in the different landscape units, as well as to assess connectivity and potential for nitrogen transport between the different units. At JPH surface and groundwater flow is from the uplands to the fen. There was little (<0.1-1.5 mg/L) nitrate, ammonium, or dissolved organic nitrate (DON) found throughout JPH. At ML nitrogen concentrations were higher (<0.1-30 mg/l) and concentrations of ammonium and DON increased at depths throughout ML. The

distribution of ^3H with depth within the peatland reveals limited connectivity between the peat and underlying mineral soils. Tritium sampling at ML indicates that at some locations the wetland residence time is greater than 50 years. Nitrogen movement out of peatlands may take longer due to conversions and storage. At ML nitrogen (NH_4 and DON) is produced and stored at depth in the wetlands. At JPH higher nitrogen concentrations are found in the shallow groundwater of the fen. Increases in nitrogen inputs to JPH and ML are likely to be utilized by plants, but dramatic changes to the peatland may cause stored nitrogen to become mobile.

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Dedication

This work is dedicated to all the teachers and mentors who have inspired and motivated me throughout my life.

Chapter 1: Introduction

The Athabasca Oil Sands Region (AOSR) includes large deposits of bitumen, a naturally occurring form of oil made up of heavy molecular weight hydrocarbons mixed with clay (Mossop, 1980). The AOSR is the largest of three major oil sand deposits in Alberta and is the second largest recoverable oil deposit in the world. The development of the AOSR has increased local nitrogen emission rates. The mining and extraction of crude oil as well as emissions from mining vehicles releases nitrogen (NO_x) into the atmosphere (Wieder et al. 2010). Increasing nitrogen in the ecosystem may lead to more plant growth initially, but over time causes a decrease in forest productivity (Allen, 2004). There is also a change in the forest ecosystem; more nitrophilous grasses and shrubs will begin to appear and there is a decline in lichen and mosses (Allen, 2004). The boreal forest in northern Alberta has traditionally been low in nitrogen meaning that an increase in nitrogen could cause large changes because the native vegetation is not adapted to higher rates of deposition. Nitrogen entering the soil can also leach calcium and magnesium from the soil leading to acidification (Allen, 2004).

The Cumulative Environmental Management Agency (CEMA) funded this nitrogen amendment study to understand increased nitrogen loading on the Boreal region of northern Alberta (CEMA 2008). The purpose of the overall study is to understand “the fate and effects of atmospherically deposited nitrogen in order to determine nitrogen crucial loads for sensitive boreal ecosystems in the Regional Municipality of Wood Buffalo” (Spink 2013, p8) A critical load is an estimate of the

level of a pollutant below which harmful effects should not occur according to the current level of knowledge. The effects of increased nitrogen on wetland rich regions in the AOSR are currently poorly understood (CEMA 2008). Nitrogen addition experiments were conducted during the growing seasons from 2011-2015 on bog, fen and upland sites. Nitrogen will be applied to the sites 5-7 times each growing season to a series of bog, fen, and upland plots within the study sites in the amounts of 5, 10, 15, 20, and 25 Kg N/Ha/yr as liquid ammonium nitrate. Researchers at the University of Victoria have been leading the hydrological connectivity component of this research with the goal of understanding the potential for groundwater or surface water flow to move nitrogen between bogs, fens and upland areas.

Objectives

The objectives of this thesis are to use geochemical and isotopic signatures to;

- a. To see if ^3H measurements can improve our understanding of connectivity between landscape units
- b. To determine the forms of nitrogen (NH_4 , NO_3 , NO_2 and DON) present in the different ecosystem types (fens, bogs and jackpine uplands) throughout the study sites
- c. To explore possible controls on nitrogen species concentrations
- d. To understand the potential nitrogen storage and transport within and out of the study sites based on the hydrological connectivity between the various landscape units.

Chapter 2: Background

2.1 Boreal Wetlands

Boreal forests cover 5.8 million km² of northern Canada (Cheskey et al. 2011). This very productive area contains the highest concentration of wetlands, lakes and rivers (Cheskey et al. 2011). Seasonally flooded swamps, saturated peatlands, and shallow marshes make up the wetlands of the Boreal forest and cover over 1 million km² (Cheskey et al. 2011). The wetlands that dominate northern Alberta are known as peatlands. These wetlands contain a thick organic soil layer known as peat. Peat is made up of dead and decaying plant material and can sometimes be meters deep (Levy et al. 2013). The excess of primary production in comparison to decomposition leads to peat accumulation (Wieder & Vitt 2006). Peatlands make up 3% of the World's landmass with almost half of that found in Canada (Wetlands International 2014). Peatlands are important for water retention and flood protection as peat soil can contain up to 90% water (Wetlands Alberta 2014). Peatlands influence the hydrology of a region owing to their ability to retain water (Trites & Bayley 2009a). These areas are carbon rich and provide a carbon sink for the area unless disturbed where they can become a large carbon source. In the AOSR there are two types of peatlands known as bogs and fens (Wetlands Alberta 2014).

2.2 Peatland Geochemistry

Bogs are formed in cool, poorly drained areas and are fed by precipitation (Wetlands Alberta 2014; Bourbonniere 2009). Since the main source of water for bogs is precipitation they are generally low in nutrients and strongly acidic (pH < 4.5) (Wetlands Alberta 2014). The pH of bog water is connected to the carboxylic acid content of the peat (Bourbonniere 2009). As the organic matter within the peat decays carboxylic functional groups dissociate from the peat and become part of the water chemistry (Chensworth 2006). Bogs are normally carpeted with spongy plants such as sphagnum and can be open or forested.

Fens differ from bogs in that they are fed by groundwater and have a higher concentration of nutrients and a lower acidity due to the contact with mineral components (Wetlands Alberta 2014; Bourbonniere 2009). Fens have an average surface pH of 5.6 (Blancher, 1987). Fens often have a higher pH than bogs due to connections with groundwater (Chensworth 2006). Minerals in the substrate underlying the fen also influence fen pH (Chensworth 2006). Due to the more basic pH fens can generate a wider range of vegetation including sedges and wildflowers (Wetlands Alberta 2014). They also have a high accumulation of peat and can be open and grassy or wooded. Fens are categorized as poor fens and rich fens based on their vegetation and geochemistry. Poor fens have less contact with underlying groundwater and therefore have less mineral input (Mitsch and Gosselink 1993). This leads to rich fen pore waters having higher cation concentrations than poor fens (Bendell-Young and Pick 1997).

The water chemistry of peatlands is controlled by the chemistry of precipitation, surface and subsurface waters, plant uptake, microbial processes of decomposition and mineralization, and cation exchange mechanisms (Vitt et al. 1995). Pore water chemistry can be used to indicate wetland function (Vitt et al. 1995). Water table levels and water chemistry are important in peatlands as chemical components are more mobile and reactive as a solution than as solids (Bourbonniere 2009).

Peatland water chemistry can change throughout the year and differ between bogs, poor and rich fens. For example, nitrate and phosphate concentrations increase when transitioning from bogs to poor fens to rich fens (Bourbonniere 2009). Certain nutrients such as NO_3 are highest in winter months due to lack of plant use (Bourbonniere 2009). Overall, even though rich fens have higher concentrations of nutrients than poor fens or bogs, peatlands are considered nutrient poor and may be a nutrient sink (Mitsch and Gosselink 1993).

Bog and fen peatland waters often have low inorganic nitrogen levels that are near or below detection but with organic nitrogen increasing with depth (Pearsall 1938; Vitt et al., 1995). Nitrogen storage concentrations have however been shown to decrease in the top 60 cm of peat, which is thought to be due to mineralization (Hemon 1983). Nitrogen accumulation in peatlands ranges from $0.2 \text{ g N/m}^2/\text{yr}$ to $1 \text{ g N/m}^2/\text{yr}$ (Loisel et al. 2014, Moore et al. 2004, Kuhry and Vitt 1996).

2.3 Stable Water Isotopes

Heavy water isotopes (^2H , ^{18}O) are detectable by mass spectrometry which separates the isotopes based on their mass (Clark and Fritz 1997). The results are expressed as a ratio (δ) of the sample ratio compared to the standard ratio in permil (‰) where the ratio is multiplied by 1000 (Clark and Fritz 1997). Water isotopes are referenced to Vienna Standard Mean Ocean Water (VSMOW). Stable water isotope ratios are plotted in δ - δ space (^2H vs ^{18}O) relative to the Global Meteoric Water Line (GMWL) which is defined by $\delta^2\text{H} = 8 \delta^{18}\text{O} + 10$ (Craig 1961).

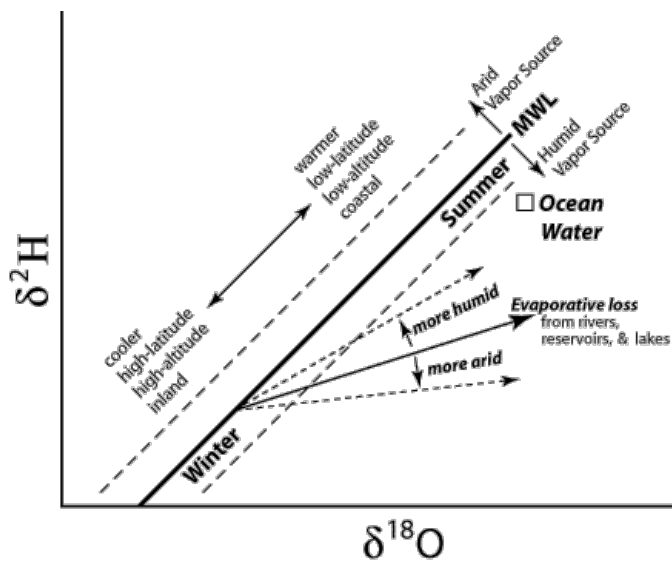


Figure 1. GMWL with indications of how different hydrological processes change the isotopic composition of water. From

<http://web.sahra.arizona.edu/programs/isotopes/oxygen.html#1>

Water isotope samples are often offset from the GMWL due to the temporal and spatial origin of different waters (Figure 1) (Dansgaard 1964). The isotopic signature of samples reflect their source and modification due to processes where the heavier or lighter isotopes are used preferentially (Clark and Fritz 1997).

Precipitation samples tend to become more depleted moving away from the equator, inwards across continents, and with increasing elevation. Surface waters signatures are due to the signatures of groundwater inputs, precipitation, evaporation, and evapotranspiration (Dansgaard 1964). The term fractionation is used to describe the preferential use of one stable isotope over another during kinetic or biochemical processes (Clark and Fritz 1997). For water isotopes, deuterium excess (d-excess) is also used to understand and describe the relative offset between a body of water and the GMWL which has a d-excess of 10 (Dansgaard 1964). D-excess values decrease with increasing evaporation and are expressed as $d\text{-excess} = \delta^2\text{H} - 8 * \delta^{18}\text{O}$ (Dansgaard 1964).

2.4 Tritium

Tritium is the only naturally occurring radioactive isotope of hydrogen containing two neutrons and a half-life of approximately 12.32 years. Tritium occurs naturally and makes up a small percentage of the hydrogen atoms in water. Tritium makes up approximately 10^{-16} percent of natural occurring hydrogen (Grosse et al. 1951). Tritium concentrations in this study are presented at tritium units (TU), where at TU is defined as 1 tritium atom per 10^{18} atoms of hydrogen (Grosse at al. 1951 Lucas and Unterweger 2000).

Tritium is formed by natural and artificial processes. Naturally produced tritium is generated through the interaction of cosmic radiation protons and neutrons with gases in the upper atmosphere (Casaletto at al. 1962, Dorfman and Hemmer 1954, Eisenbud and Gesell 1997, Suess 1958). Tritiated water is the most

common form of natural tritium found in the environment (Canadian Nuclear Safety Commission 2009). Tritium production along with its relatively short half-life has resulted in a global steady-state inventory of approximately 2.65 kg that does not accumulate over geological time scales (Lucas and Unterweger 2000). Nuclear weapons testing, nuclear reactors, fuel reprocessing plants, heavy water production facilities, and the commercial production of medical diagnostics, radiopharmaceuticals, luminous paints, and others are the main anthropogenic sources of tritium (Galeriu et al. 2005). During the 1960's, nuclear testing released high levels of tritium into the atmosphere. Water without tritium can be dated to before the 1960's, while water with tritium is originated sometimes after the 1960's (Rank 1992).

Current tritium levels in precipitation are now approximately the same level as before nuclear testing in the winter (~5 T.U.) and twice natural levels in the summer (Rank 1992). This seasonal difference in mid latitudes is due to jet current intensity that washes tritium from the stratosphere to the troposphere and is then precipitated out (Libby 1963, Taylor 1964, Taylor et al. 1963). Tritium concentrations are generally higher in precipitation from air masses from the north and west as opposed to those with trajectories from the south and east (Brown 1964). Storm intensities can also influence tritium concentrations with light, long duration precipitation even yielding higher tritium concentrations than short high intensity storms (Sejkora 2006). Within a year of being released to the lower atmosphere a large proportion of tritium can be found in the ocean with

approximately 20% entering soil water, lakes, rivers, and groundwater (NCRP 1979).

Studies in the late 1960's and early 1970's used tritium to determine how rapidly precipitation penetrates peatlands (e.g. Gorham and Hofstetter 1971). They found that ponded surface water on the peat had tritium levels around 1,000 tritium units (TU), but that groundwater sampled from 3 m below the peat surface only had tritium concentrations less than 12 TU (Gorham and Hofstetter 1971). They interpreted the tritium distribution as an indicator that precipitation falling on the peatland moves close to the surface (within the top 1.5 m) through lateral flow while the deeper part of the peat has a relatively stagnant mass of water (Gorham and Hofstetter 1971). Tritium reaching deeper levels of peat occurs mainly through molecular diffusion rather than water flow (Gorham and Hofstetter 1971). More recent studies have also used tritium to show that the shallow peatland waters have shorter residence times than deeper water (Mazeika et al. 2009).

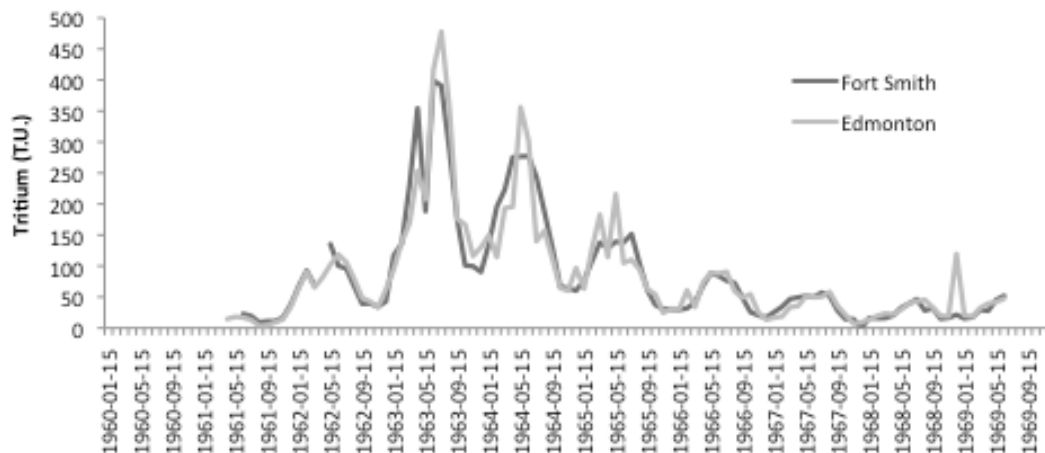


Figure 2. Tritium values in precipitation collected at Fort Smith, NWT and Edmonton, AB from 1961-1969. Values are decay corrected to indicate concentrations that would be measured in 20152

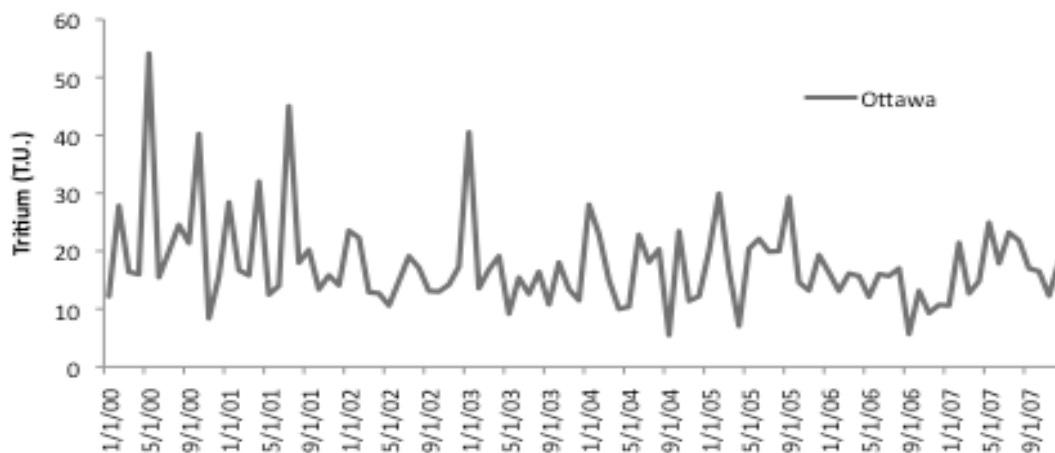


Figure 3. Tritium values for precipitation collected at Ottawa, ON from 2000 -2007. Values shown are not decay corrected and give an indication of modern precipitation values.3

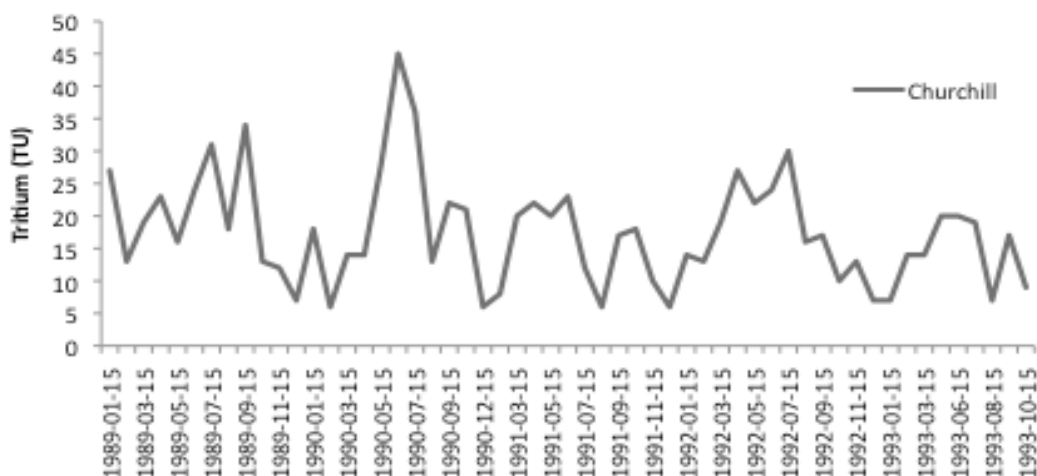


Figure 4. Tritium values for precipitation collected at Churchill, MB from 1989-1993. Values shown are not decay corrected and give an indication of modern precipitation values.

Precipitation values from Fort Smith, NWT and Edmonton, AB taken in the 1960's showed increased tritium levels from nuclear testing. These values were then decay simulated to show what these precipitation samples would be in 2015 (Figure 2). The modeled tritium values range from current values to 10-100 times higher than modern precipitation samples taken in Ottawa, ON (Figure 3). While Ottawa samples do not show the expected seasonal variation samples taken at similar latitude to Fort McMurray, in Churchill, MB show similar concentrations to modern Ottawa precipitation, but with higher concentrations occurring in the summer (Figure 4).

2.5 Nitrogen Critical Loads

Human activities such as agricultural fertilizing and fossil fuel combustion have led to an increase in global reactive nitrogen emission and deposition over the past century (Goodale et al. 2011, Pardo et al. 2014). It is predicted that in the next 50 years nitrogen deposition will continue to increase throughout the globe (Goodale et al. 2011). The nitrogen deposition rates across Canada and the United States are now reaching levels that may alter ecosystems (Pardo et al. 2014). There are already some ecosystems that have been altered due to an increase in nitrogen (Pardo et al. 2014). Changes in nitrogen mineralization, nitrification, and nitrate leaching rates are all indicators of altered nitrogen cycling (Pardo et al. 2014). One method of addressing these impacts is the nitrogen critical load approach (Pardo et al. 2014).

In the Boreal both productivity and decomposition rates are influenced by the amount of available nitrogen (Markham 2009). Knowledge of the nitrogen cycle in northern Alberta can increase understanding of anthropogenic changes such as the oil sands production as well as the effects of climate change on both the global nitrogen budget and the global carbon budget (Markham 2009). Ammonification, nitrification, volatilization, and denitrification make up the processes of the nitrogen cycle.

Nitrogen fixation is the conversion of atmospheric nitrogen (N_2) into NH_3 or NO_3 (Kendall & McDonald 1998, Korstad 2011). Nitrogen fixation can occur through human influences (creation of fertilizer) and bacteria (Kendall & McDonald 1998,

Korstad 2011). Peatland nitrogen fixation rates are correlated to peat moisture, temperature, and pH (Wieder & Vitt 2006). Ammonification also known as mineralization is the breakdown of amino acids into NH_3 and occurs through bacteria and fungi found in both soil and water (Kendall & McDonald 1998, Wieder & Vitt 2006).

Nitrification occurs when NH_3 is oxidized to NO_3 and then NO_2 (Korstad 2011). This is also a biological process aided by bacteria (Korstad 2011). Since this process involves oxidation (the adding of oxygen) it occurs under aerobic conditions (Korstad 2011). Denitrification is the reduction of NO_3 and NO_2 to N_2 by microbial activity (Wieder & Vitt 2006). Microorganisms and fungi break down NO_3 and NO_2 into gaseous N_2 that stays dissolved in the water or is released into the atmosphere (Korstad 2011).

A nitrogen critical load is the amount of nitrogen below which there are no detrimental ecological effects (Pardo et al. 2014, Posch et al. 2011). These are long term effects that are determined by current knowledge (Pardo et al. 2014). The critical load for a pollutant is reported as a flux, e.g. $\text{kg per ha}^{-1} \text{ yr}^{-1}$ (Pardo et al. 2014). European environmental regulators have used critical loads to decrease nitrogen and sulphur in air pollution (Pardo et al. 2014, Posch et al. 2011). No critical loads regulations are currently being applied in the AOSR, but some have been used in eastern Canada (Pardo et al. 2014, Posch et al. 2011).

There are three main methods for estimating critical loads: empirical, steady state, and dynamic modeling (Goodale et al. 2011, Pardo et al. 2014, Posch et al.

2011). The empirical method uses the results from detrimental ecosystem responses for a given nitrogen deposition (Pardo et al. 2014). These responses are then extrapolated to a larger region or similar ecosystem (Pardo et al. 2014). An advantage of the empirical approach is its use of measurable results within the ecosystem to nitrogen deposition (Pardo et al. 2014). This method fails to correctly estimate the amount of nitrogen a system can handle if steady state is not achieved (Pardo et al. 2014).

The steady state approach models effects based on net loss or accumulation estimations of both nitrogen inputs and outputs using a mass balance approach (Pardo et al. 2014). This is done by assuming current nitrogen inputs are at steady state in an ecosystem over the long term (Pardo et al. 2014). Steady state methods are not as likely to overestimate the critical load, but have a greater uncertainty with a lack of data (Pardo et al. 2014). They can also be ineffective in areas where the current nitrogen inputs and outputs are not in steady state. Dynamic modeling is another mass balance approach that uses time-dependent processes (Pardo et al. 2014). An issue that arises with all methods is a lack of data due to the difficulty to quantify total nitrogen deposition and attempting to determining loads in areas with few monitoring stations (Goodale et al. 2011). Currently most of the modeled nitrogen critical loads are considered to lack sufficient data to actually characterize changes to ecosystems and are therefore ineffective in many cases (Posch et al. 2011). Most nitrogen critical loads have been focused around empirical results, however, it is unknown how much data are needed to create accurate critical loads (Posch et al. 2011). Empirical studies from Europe have shown changes to the

nitrogen cycle with a little as $5 \text{ kg ha}^{-1} \text{ yr}^{-1}$ of nitrogen (Allen 2004). In many cases empirical critical loads have been used for large areas but empirical loads are best suited for use at the habitat or ecosystem level (Posch et al. 2011). The lack of data and understanding in the Boreal region leads to even more uncertainty in applying nitrogen critical loads.

2.6. Wetland Nitrogen

Nitrogen conservation in wetlands is controlled by biological processes that change as the succession of the ecosystems continues (Craft 1997). Removal of nitrogen depends on nutrient loading rate and wetland age (Craft 1997). Nitrogen retention in constructed wetlands begins once vegetation becomes established (1-3 years) (Craft 1997). After 5-10 years sufficient organic carbon accumulation provides the energy for denitrification (Craft 1997). Denitrification rates are often equal to the amount of nitrogen stored as organic matter ($5 \text{ gN/m}^2/\text{yr}$) (Craft 1997). Increases in nitrogen to the system results in more nitrogen stored in organic matter and even more denitrification (Craft 1997). The succession state of wetlands ecosystems affects the ability of a wetland to retain or remove nutrients with the most conservation occurring under climax conditions (Craft 1997). Mature forests however, do not retain nutrients as well as less mature forest systems (Craft 1997).

Nitrogen moving through a wetland does not always flow directly with the water flow (Kadlec et al. 2005). The biogeochemical cycling in wetlands can be complex and nitrogen may convert between species and be held in different storage

compartments (Howard-Williams 1985, Reddy and D'Angelo 1994). Nitrogen within the wetland may be stored in the surface, interstitial and groundwater, in live and dead plant material, microorganisms or invertebrates (Kadlec et al. 2005). Constructed wetland experiments with fairly quick residence times (4-5 days) have found that nitrogen residence times are much longer (120 days) (Kadlec et al. 2005).

DON is one of the least understood species within the nitrogen cycle and even less understood within wetlands. It has been shown that DON can be taken up by plant roots and mychorrhizal which may reduce the reliance of plants on microorganism to convert organic matter to inorganic forms of nitrogen (Streeter 2000). DON can be separated into two pools of nitrogen: low molecular weight (LWM) DON that is labile and fast cycling and high molecular weight (HMW) DON that is slow moving and recalcitrant (Jones et al. 2003). HMW DON is not biologically available or easily converted to useable forms of nitrogen (Jones et al. 2003). This process appears to only occur with low molecular weight (LMW) DON (Owen and Jones 2001).

Nitrogen cycling may also behave differently depending on wetland type. Ombrotrophic peatlands, i.e. bogs, are thought to have low nutrient availability due to the low input of nutrients from the atmosphere (Bridgham et al. 1998). Bogs depend on internal nutrient cycling within the ecosystem (Hemond 1983) and the insitu nutrient availability has been found to be higher in bogs than minerotrophic fens (Koerselman et al. 1993; Verhoeven et al. 1990; Waughman 1980). Though the nutrient pool in bogs is small compared to fens the nutrient pool is more labile and

can have higher turnover times than fen sites (Bridgham et al. 1998). However, bioavailability also differs based on time of year with DON being most biologically available in the fall (Wiegner and Seitzinger 2004). Some studies have found DON from wetlands to be less biologically available than DON from forests, but this does not appear to be true for all wetlands, which may be due to differences in vegetation, soils and underlying groundwater (Pellerin et al. 2004; Wiegner and Seitzinger 2004).

Wetlands also show a negative change with an increase in nitrogen (Allen 2004). In peatlands there is often a decrease in sphagnum production and a deterioration of the sphagnum present (Allen 2004). Bogs are also highly susceptible to eutrophication due to their water inputs coming solely from precipitation. Fens generally experience a loss of moss and overall decrease in species richness as a result of additional nitrogen (Allen 2004). Due to these nitrogen sensitivities, Boreal wetland studies are needed, particularly in the AOSR, to address the addition of nitrogen from oil sands development.

2.7. Study Area

The two study sites used for the critical loads study were chosen to represent natural, undisturbed conditions of typical boreal landscapes.

The Athabasca Oil Sands Region, AOSR, is in northern Alberta in the Boreal mixed wood ecoregion. The area is covered in extensive deciduous, mixed wood, coniferous forests, and peatlands. The first study site, Jack Pine High, JPH, is located 40 km north of Fort McMurray, Alberta (57.12N, -111.44W) (Figure 5). The second

site, Mariana Lakes, ML, is located 100 km southwest of Fort McMurray Alberta (55.89N, -112.09W) (Figure 5). Daily mean temperatures at Fort McMurray range from -19.8 to 16.6 degrees Celsius. Fort McMurray has an annual average precipitation of 464 mm, the majority of which (342 mm) falls during the summer season (Environment Canada 2014). Both sites are located in the Boreal plains ecozone, where the forested uplands are dominated by jackpine (*pinus banksiana*). Surrounding forests consist of trembling aspen (*populus tremuloides*), balsam poplar (*populus balsamifera*), white spruce (*picea glauca*), black spruce (*picea mariana*), and white birch (*betula papyrifera*).

The site at JPH is approximately 7 km² and is fairly flat, situated at approximately 331 - 336 m above sea level (masl) (Figure 6). JPH contains a rich fen that runs north-west to south-east through the site and is part of the Muskeg Watershed, which drains into the Athabasca River. The site is dominated by upland forest, consisting of a uniform jack pine forest with lichen, Labrador tea and blueberry floor vegetation. The fen at this site has changed throughout the study due to a clear cut on the western side of the fen and the addition of a beaver dam. The substrate is made up of a well-drained, nutrient poor sandy soil that is acid sensitive (Vallarino 2014). The fen has alders, paper birch, and sedge species. The mean hydraulic conductivity, measured using the Hvorslev method based on falling head tests, was 4.35×10^{-5} m/s in the uplands and 2.08×10^{-6} m/s in the fen (Vallarino 2014). Piezometer and water table locations and depths can be found in Appendix A.

The ML site is 23 km² and spans the elevation range of 699 to 703 masl (Figure 7). The site is a peatland complex, containing bog and wet and dry fen wetland components, as well as jackpine uplands. It is situated in the Mariana lakes area, located on the Stony Mountain Plateau. The peatlands are largely made up of sphagnum with the bogs containing black spruce and tamarack. The hydraulic conductivity of the peatlands is variable due to differing degrees of compaction and decomposition in the peat profile, but was found to be higher near the surface (Vallarino 2014). The hydraulic conductivity of the peatland ranged from 10⁻⁶ to 10⁻⁹ m/s (Vallarino 2014). Piezometer and water table locations and depths can be found in Appendix B.



Figure 5. The approximate locations (*circles*) of study sites: JPH, located 40km north of Fort McMurray, and ML, located 120km southwest of Fort McMurray, Alberta, Canada. Also shown are major water bodies (*blue*); and the Athabasca, Peace River, and Cold Lake Oil Sands Regions (*orange*). Source: modified from the personal work of Einstein, Norman (2006). Athabasca oil sands. *Wikipedia*. Accessed March 7th, 2014.



Figure 6. Study site JPH (57.12N, -111.44W) is instrumented with 11 piezometer nests (circles). The site is upland-dominated (in brown), bordered by a rich fen (in green).

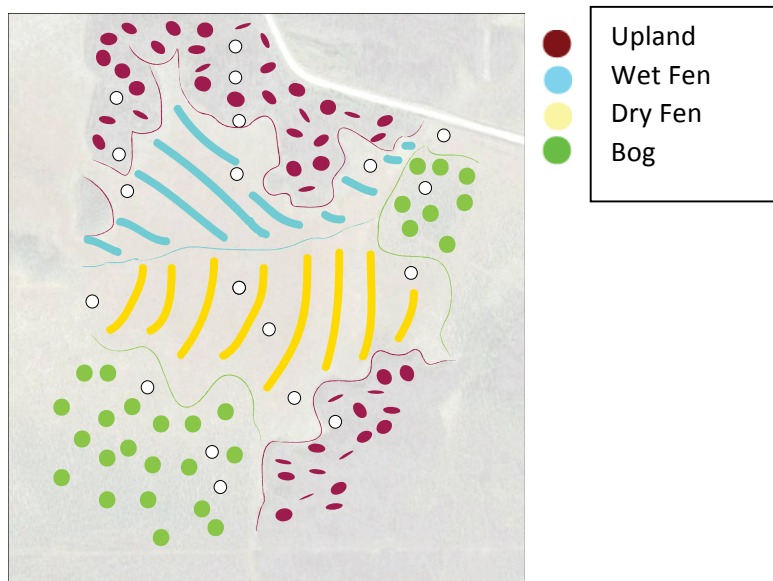


Figure 7. Study site ML (55.89 N, -112.09W) is instrumented with 19 piezometer nests (circles). The aerial photograph illustrates the mosaic of landscape units, including upland, fen, and bog areas.

2.8. Previous work at JPH and ML

The JPH and ML field sites were developed for use in previous studies using hydrological (Vallarino 2014) and geochemical tracers (Kusel, 2014) which were aimed at better understanding of the potential pathways for water and nutrients between uplands, fens and bogs. Previous fieldwork was conducted during the open water seasons from 2011 to 2012, and included sampling campaigns in June and August of 2011 and May, July, and September of 2012. A snow survey and two spring melt sampling campaigns were also done in March 2012 and April 2012 respectively.

These studies developed conceptual models for the potential hydrological connectivity between landscape units at the two sites (Figure 8).

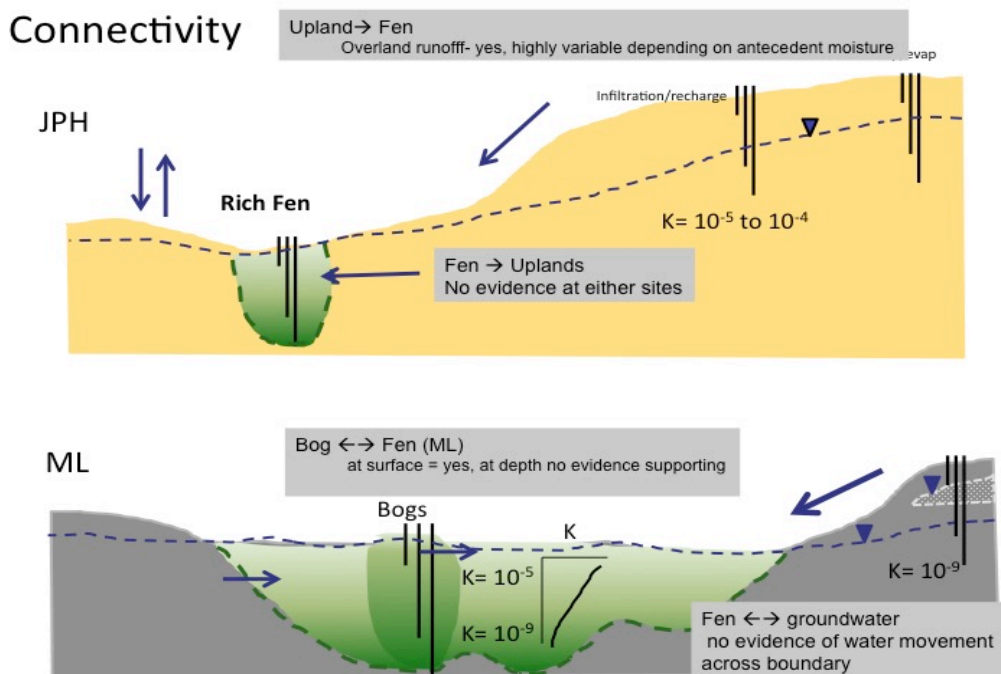


Figure 8. A conceptual model of connectivity for JPH (top) and ML (bottom) based on previous research at these sites. Arrows indicate potential movement of water and nutrients and average hydraulic conductivity values of both sites.

The digital elevation models and distribution of hydraulic heads at JPH suggest surface and groundwater flow are directed from the uplands towards the fen (Figure 8) (Vallarino 2014). Groundwater present in the deepest piezometer samples in the fen and upland areas have distinct isotopic and geochemical signatures with no seasonal variations. Seasonal variations are evident in groundwater sampled from water table wells and from shallow piezometers in the fen. Low isotopic variability of mid depth and deep upland samples as well as deep fen samples indicates well-mixed groundwater. Hydraulic conductivity ranges from 4.35×10^{-5} to 2.08×10^{-6} m/s with the upland and shallow fen having a higher hydraulic conductivity than the deep fen (Vallarino 2014). There is no evidence to

indicate flow from the fen towards the uplands. Overall the hydrological connectivity is driven by topography.

At ML overland flow may occur between the uplands and adjacent fen (Vallarino 2014). There were slightly higher total dissolved solutes and Ca concentration measured in shallow groundwater in the fens adjacent to upland areas, however, it is not clear if this is due to surface runoff from adjacent uplands or groundwater inflows from the adjacent upland areas (Kusel 2014). At ML the piezometer installed in the upland areas and at the deepest portions of the fen had low hydraulic conductivities compared with piezometer installed in shallow portions of the fen (Vallarino 2014). Higher concentrations near the fen-upland interface indicate evidence of groundwater inputs from mineral substrate to fen waters. The depth of peat increases with increasing distance away from the fen-upland interface. This means groundwater influence would be greatest near upland locations and decrease when moving away from the interface. Fill and spill events may cause surface flow from the bog to the adjacent fen (Vallarino 2014). With the exception of these possible fill and spill events there is little to no lateral movement of water from the bog to the adjacent fen. Surface waters move infiltrate in the fen as seen in the isotopic signatures and lateral hydraulic head gradients. This downward movement can also be seen in certain parameters such as DOC, NH_4 , and Ca. These parameters have lower concentrations at wet fen sites which indicate a flushing of the deeper pore waters by the dilute surface waters. Hydraulic conductivity values range from 5^{-5} to 2^{-9} m/s and generally decrease with depth (Vallarino 2014).

This thesis builds on these previous studies and aims to improve these conceptual models of the connectivity and potential for nitrogen movement between uplands, fens and bogs and the potential for nitrogen storage and transport.

Chapter 3: Methods

3.1 Instrumentation

This study used piezometer nests that were installed in 2012 at the two sites to provide information about the vertical and horizontal hydraulic gradients with depth within the different terrain units (uplands, fens, bogs etc.). Nineteen piezometers were available at ML and 12 were available at JPH. Each piezometer nest included 2 to 4 piezometers at depths ranging from 1.5 to 7m. The well nests were situated across targeted landscape units creating multiple transects. The nests were located so that they were adjacent to, but not disrupting, the experimental plots (Kusel 2014). A list of well depths and locations can be found in appendix A and appendix B for JPH and ML respectively.

The piezometers were constructed from PVC pipe or black iron pipe. Iron was used for the deeper wells while PVC was used for shallower wells. The iron wells were threaded into steel Solinst model 615 drive-point screen piezometer tips (Vallerino 2014). Shallow piezometers used PVC standpipe piezometer tips (Solinst 601). The piezometer tips were slotted screens and pitted with polyethylene sample tubing fed through the length of the well. A Nytex mesh was sewn to fit the length of the well to screen out sediment. A more detailed description of this method can be found in Tattrie (2011). Piezometers were installed using a portable hammer drill. For each piezometer nest the deepest well was placed into the lower permeability layer. This was completed by hammering the well into the point of refusal. Wooden platforms were built around the piezometer nests to reduce peat compression from sampling. The distance between the top of the well casing and the

ground surface was measured yearly to determine if the surface height of the peat had changed.

Shallow water table wells, approx. 1 m deep, were installed throughout the wetlands at both sites to provide continuous water table elevation measurements using pressure transducers. Nineteen water table wells were installed at ML and 7 were installed at JPH (Kusel 2014, Vallarino 2014). Some water table wells at JPH are no longer operational due to extreme increases in the water table of the fen due to flooding. Some of the water table wells were installed next to a piezometer nest, while others were installed on their own. Water table wells were placed in each landscape unit of interest and systematically along what was thought as main water tracks to attempt to gain coverage of the wetland.

The water table wells were pushed into the peat at ML and augured into the fen at JPH. The water table wells were made from 1 m long PVC pipe that was slotted and the bottom covered with Nytex mesh to avoid sediment flow into the wells. Since the surface of the peat can rise and fall, rebar was used to anchor the wells to the substrate for consistent water level measurements.

3.2 Meteorological Data

Four meteorological stations were installed, two at ML and two at JPH. At JPH one meteorological station was placed in the upland and one in the fen. These stations are operated and maintained by the University of Victoria and are programmed to collect data from May through October. At ML there is one meteorological station in the fen and one in the bog. These stations are also operational from May through October and are operated and maintained by the

University of Victoria. The meteorological stations at JPH and ML are placed close to the other study plots from groups in this project. The stations at JPH were installed in May 2012 and at ML they were installed in 2011 and then reinstalled in May 2012. All of the met stations were serviced and recalibrated in 2014 by a Campbell Scientific technician. These stations record relative humidity, incoming and reflected radiation, wind speed and direction, air pressure, air temperature at two heights and, soil temperature at three depths, and precipitation every half hour.

3.3 Hydrogeochemical Data

Samples were collected for geochemical and isotopic analysis throughout the open water season during 2013, and 2014. The water level was taken at all water table wells and piezometers prior to water sampling. Water samples were taken from rain collectors, water table wells, and piezometers. The number and types of samples analyzed throughout the course of this project can be found in appendix C and appendix D for JPH and ML respectively. Polyethylene tubing was inserted into the well tip and a portable Geotech Geopump™ peristaltic pump was used to extract water samples. Each well was purged of three well volumes before sampling, and precipitation samples were taken for individual events as well as bulk samples over the field season. Dedicated tubing was used for each well and sample bottles were pre-rinsed before collection. At sample locations with low volumes sample bottles were only pre-rinsed once. Snow samples were collected in 2013 using a standard federal snow sample corer and were used to characterize the isotopic composition of winter precipitation (Vallarino 2014).

Field parameters included temperature, pH, Eh, and conductivity, and they

were measured and recorded in the field using a hand-held Thermo Scientific Orion Star™ meter and probes. This meter uses a flow-through cell to ensure sample conditions are maintained during readings. The meter was calibrated daily for pH and conductivity using pH buffers solutions (pH 4.00, 7.00, 10.00) and a conductivity standard (1413 $\mu\text{S}/\text{cm}$). Major ion concentrations, such as nitrate, nitrite, sulfur, iron, and phosphorus were measured in the field using a portable Hach colorimeter. The alkalinity was taken using a hand-held digital titrator.

Water samples were collected and then measured at various laboratories. Water samples were collected and stored in clear HDPE bottles, with the exception of DOC samples which were stored in opaque bottles. Bottles were filled to minimize headspace and then stored at 4 °C and shipped on ice in coolers to the laboratories for analyses. Samples for cation analyses were also acidified with 16M nitric acid to a pH of 2 for preservation. Measured parameters include the isotopes of water (^2H , ^{18}O , ^{13}C , ^{15}N), dissolved organic carbon (DOC), dissolved organic nitrogen (DON), major ions, and trace metals. The fieldwork for the tritium sampling was carried out in October 2014.

3.4. Analytical Methods

Water samples for the stable isotopes of water (^2H and ^{18}O) and ^{13}C of dissolved inorganic carbon (DIC) were analyzed at AITF, Victoria. The isotopic samples were analyzed using a Delta V Advantage mass spectrometer and results are reported in per mil relative to Vienna Standard Mean Ocean Water (VSMOW) for

water isotopes and Vienna Pee Dee Belemnite (VPDB) for ^{13}C . Stable isotopes for ^{15}N and ^{13}C of particulate matter were also analyzed at AITF, Victoria using an isotope ratio mass spectrometer (IRMS) Thermo Finnigan 253. DOC and DON were analyzed at AITF, Vegreville (segmented flow analysis – acid digestion then persulphate UV digestion, followed by color loss measurement). Major ions and trace metals were analyzed at the University of Waterloo, Earth and Environmental Sciences Department, using ICP-MS X or ICP-OES iCAP 6500 systems for anions and cation and IC-OH or IC-CO₃ systems for trace metals. Enriched tritium was analyzed the University of Waterloo Environmental Isotopes Laboratory using an ICP-MS X or ICP-OES iCAP 6500 and IC-OH or IC-CO₃ systems respectively).

Chapter 4: Results

The results of the 2013-2014 sampling were combined with the 2010-2012 datasets to evaluate whether there were any changes in geochemical and isotopic parameters and to refine the baseline characterization. The 2013-2014 dataset also included ^3H which was not previously analyzed and a more complete suite of inorganic and organic forms of nitrogen. The results are grouped into three sections. The first section updates the baseline geochemical and isotopic characterization of precipitation, surface water and groundwater samples from the different landscape units at the two sites using the new 2013-2014 data. The second section presents the new tritium data. The third section focuses on the inorganic and organic nitrogen data as a nitrogen inventory for the two sites. The full 2011-2015 dataset is included in appendix H.

4.1 2013-2014 Geochemical results

The original baseline characterization used data from 2011-2012 to characterize the geochemical parameters across landscape units and at various depths. The first section of results updates the previous baseline geochemical characterization (described in Kusel 2014) by adding in data from the 2013 and 2014 field seasons. The sites will be characterized across landscape units and varying depths. Geochemical parameters measured across the different landscape units and at different depths include pH, Eh, electrical conductivity, dissolved organic carbon (DOC), sulphate (SO_4^-) and calcium (Ca). The second part of this

section will focus on water isotopes: ^2H , ^{18}O , and d-excess. All values and concentrations given are the average of field seasons from 2011-2014 unless otherwise stated.

The pH of groundwater in the upland areas at both JPH and ML was higher than any of the groundwater sampled from the fens or bogs (Table 1, Table 2). This is consistent with the greater buffering capacity and carbonate content in mineral soils typical of upland areas when compared with the more acidic groundwater expected in peatlands. In the uplands at ML the groundwater pH increased with depth from near neutral values at the shallowest piezometers to fairly high values at depth (7.06 to 10.8) (Table 2). At some ML upland locations (eg. MLP01A, MLP02A, MLP03A, MLP07A) pH values >12 were measured. The cause for these extreme values is not clear. The pH measured in groundwater in the shallowest portion of the (WT wells) rich-fen at JPH had higher pH (pH=5.87) than similar depths within the poor-fen (pH=4.48) or bogs (pH=4.28) at ML which is consistent with greater groundwater inputs at the JPH fen (Table 1). At both sites pH values were lowest in the shallowest portion of the peatlands, and increased at the deepest locations which are thought to be located within the underlying mineral soils (e.g. ML pH=4.28 to 6.75) (Table 2). JPH is slightly acidic at all depths and landscape units (5.87 to 6.77), while ML peatland landscape units are fairly acidic (pH ~ 4) and increase to a more neutral pH values at depth (pH ~ 7). Overall the pH at both sites are similar at depth to other peatland systems and range from similar to more acidic throughout the surface waters (Kane et al. 2010, Siegel and Glaser 1987, Vitt et al. 1995). Other peatlands sites have shown consistent pH with depth in bogs, not seen

at ML (Chensworth 2006). However, this difference may be due to the fact that the deepest fen piezometers at ML are inserted into the underlying substrate and not peat.

Groundwater in the upland areas of JPH was more oxidic (Eh ranging from 132 to -42.0 mV) than groundwater present in the fen areas (Eh ranging from 20 to -60 mV) (Table 1). In both the fen and the uplands at JPH shallow groundwater samples tended to be more oxidic and become more reducing with depth. At ML the groundwater in the upland areas were not as oxidic as JPH, consistent with the lower hydraulic conductivities. Within the fens and bogs at ML there was a trend of more reducing conditions at depth (Table 3), but the Eh values were not as negative as were observed at the deepest JPH piezometers.

The range of electrical conductivity (EC) values was greater at ML than at JPH. Conductivity values at the ML fen and bog range from 24 to 810 $\mu\text{S}/\text{cm}$ and 29 to 241 $\mu\text{S}/\text{cm}$ respectively (Table 2) (insufficient deep upland data were available to determine averages). At JPH conductivity values were between 41 and 85 $\mu\text{S}/\text{cm}$ in the uplands and between 74 and 192 $\mu\text{S}/\text{cm}$ in the fen (Table 1). The average EC values for the deepest piezometer samples in the fen at JPH comparable to the other peatland samples in the literature. The average EC values for the peatlands are within the range of other northern peatland studies (41- 61 mS/cm to 4,000 mS/cm in the underlying substrate) (Whitfield et al., 2010; Fraser et al., 2001). Exceptions to this are the deepest peatland samples from ML, which have higher EC values more consistent with groundwater in mineral soils.

Table 1. Average values of select geochemical parameters at the different landscape units throughout JPH. These data were taken throughout the open water seasons of 2013-2014. The shallow wells are approx. 1.5 m in depth, WT wells are approx. 0.5 m in depth and deep wells are >4 m in depth.

Physical Parameters	JPH upland shallow	JPH upland deep	JPH fen WT	JPH fen deep
pH	5.93 (n=55)	6.17 (n=55)	5.87 (n=36)	6.77 (n=55)
Eh (mV)	132	-42.0	20.0	-60.0
Conductivity (μ S/cm)	41.0	85.0	74.0	192
DOC (mg/L)	2.10	16.1	30.4	16.8
SO ₄ (mg/L)	8.59	2.58	5.92	0.580
Ca (mg/L)	3.91	8.03	7.38	23.3

Table 2. Average values of select geochemical parameters at the different landscape units throughout ML. These data were taken throughout the open water seasons of 2013-2014. The shallow wells are approx. 1.5 m in depth, WT wells are approx. 0.5 m in depth and deep wells are >4 m in depth.

Physical Parameters	ML upland shallow	ML upland deep	ML fen WT	ML fen deep	ML bog WT	ML Bog deep
pH	7.06	10.8	4.49	6.75	4.28	6.17
Eh (mV)	76.0	N/A	160	58.0	177	57.0
Conductivity (μ S/cm)	176	N/A	24.0	810	29.0	241
DOC (mg/L)	6.85	N/A	50.0	45.8	68.9	71.7
SO ₄ (mg/L)	5.39	267	1.32	62.4	1.31	53.3
Ca (mg/L)	13.3	240	1.1	53.0	1.1	62.4

In general, the concentrations of DOC were lower in the upland samples than in the fens or bogs (Table 1), likely due to the greater source of decaying organic matter in the peatlands than in the mineral soils. The DOC concentration in groundwater from the piezometers installed in the upland areas at JPH ranged from 2.1 to 16.1 mg/L and concentration in the fen ranged from 30.4 to 16.8 mg/L (Table 1). At JPH the DOC concentrations measured in the deepest fen samples are similar to that measured in the deep upland samples. At JPH highest DOC concentrations were measured in the shallow fen wells (31.7 mg/L). The DOC concentrations at ML fen sites also show an increase in the shallow wells while the bog sites show more limited DOC at shallow and medium depths but increased concentrations in the deepest wells. ML fen and bog sites range from 43.7 to 77.3 and 54.5 to 70.6 mg/L DOC respectively. At uplands sites the DOC increases with depth from 18.5 to 28.1 mg/L. Overall ML had higher DOC concentrations than JPH and concentrations were two to three times higher at ML peatland sites than ML upland sites. Other peatlands have a range of DOC from 11-60 mg/l (Whitfield et al. 2010, Kane et al 2010, Fraser 2001). These studies do not include upland DOC concentrations and most concentrations are from 0-3 m in depth in fens and bogs.

Sulphate concentrations increase with depth across all ML landscape units and decrease with depth across all JPH landscape units. Concentrations of sulphate in shallow ML wells range from 1.31 to 5.39 mg/L as compared to 53.3 to 267 mg/L for deep wells (Table 2). Sulphate concentrations at JPH ranged from 5.92 to 8.50 mg/L for shallow sites, and from 0.58 to 2.58 mg/L for the deep piezometers (Table

1). Sulphate concentrations are higher in the shallow groundwater at JPH than at ML.

At JPH the average calcium concentrations in groundwater increase with depth at both upland (3.91 to 8.03 mg/L) and fen sites (7.38 to 23.3 mg/L). At ML, the average calcium concentrations in groundwater increased with depth from 13.3 to 240 mg/L at upland sites. The Ca concentrations were low in the shallow fen and bog samples, but much higher in the deepest piezometers suspected to be installed partly or wholly within the underlying mineral soils. We observe an increase in calcium with depth which reveals interaction with groundwater (Bourbonniere 2009). The average Ca concentrations measured at JPH and ML in the shallow fen and bog units are within the range reported for other Boreal peatlands (Bourbonniere 2009, Chensworth 2006, Whitfield et al. 2010, Fraser et al. 2001).

Deuterium and ^{18}O concentrations for ML and JPH over the period of study can be found in Figure 9. Average deuterium concentrations at JPH decrease with depth in both upland and fen piezometer nests, with $\delta^2\text{H}$ values ranging from -142.7 to -149.8 per mil in the uplands and between -138.1 to -146.5 per mil in the fen (Figure 10). Fen sites show net depletion from WT wells to shallow wells, net enrichment between shallow and medium wells, and then net depletion towards the deeper wells. ML uplands wells show a slight enrichment in deuterium with depth from -141.2 to -139.8 (Figure 10). The ML fen deuterium values are constant with depth, but when fen sites are broken out into the wet fen and dry fen there are some differences. Deuterium concentrations in the wet fen are highest in the shallow wells then decreases with depth. Deuterium concentrations in the dry fen decrease

with depth. ML bog values also decrease with depth. JPH upland and fen values range from -18.3 to -19.1 per mil and -17.7 to -18.7 per mil respectively (Figure 10). ^{18}O values at JPH decrease with depth in the upland and increase with depth in the fen reaching similar values at depth. ML upland ^{18}O concentrations do not vary with depth ranging from -18.0 to -18.1 per mil. The fen also does not vary much with depth (-17.4 to -17.5 per mil). The bog, however, decreases with depth from -17.8 to -18.9 per mil. For bog-fen complexes in Northern Minnesota, water isotopes are less depleted than ML and JPH, but ML and JPH are similar to groundwater in that Northern Minnesota complex (Levy et al 2013). This is mostly likely due to the difference in latitude rather than hydrological processes. JPH upland d-excess values increase from shallow to mid-depth wells then decrease from mid-depth to deep ranging from 3.3 to 3.7 (Table 3). Fen d-excess values show the same trend, ranging from 2.6 to 3.3, and with water table values being higher than the shallow, mid-depth, and deep fen wells (Table 3). Wet fen and dry fen values also decrease with depth ranging from 0.96 to 3.2 and 3.2 to 4.3 respectively (Table 4). Bog d-excess values at ML increase with depth from 4.6 to 6.3 (Table 4). Surface water d-excess at other peatlands in Northern Alberta are within the same range as at ML and JPH (Whitfield et al., 2010). The similarities of ML and JPH in isotopic and geochemical composition to other Boreal peatlands in northern Alberta indicate these sites are typical and likely appropriate for use in determining nitrogen critical loads for the region.

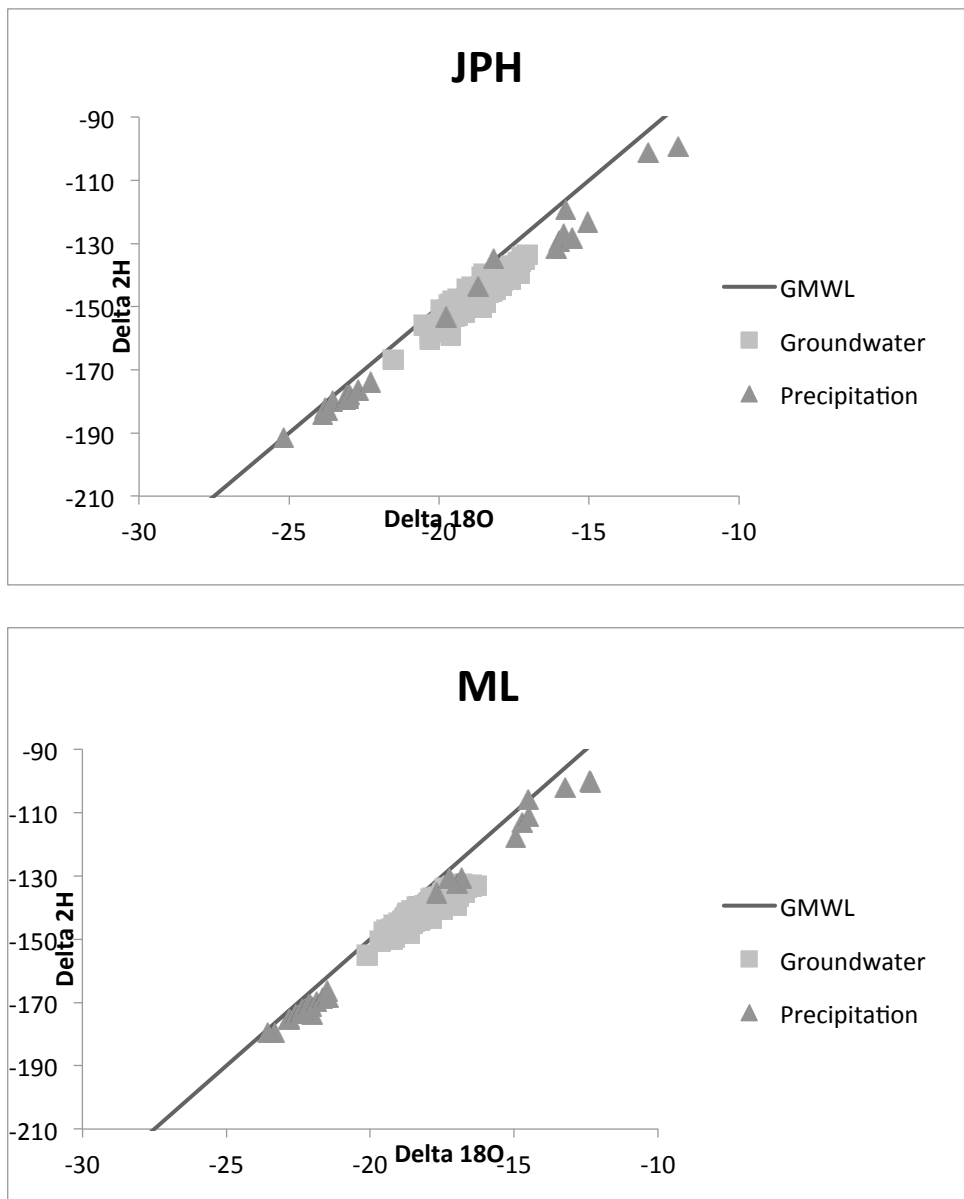


Figure 9. The delta-delta plot of groundwater and precipitation collected at JPH (top) and ML (bottom) from 2011-2015. The solid line indicates the global meteoric water line (GMWL).

Table 3. Average water isotope concentrations across JPH landscape units from 2013 to 2014. The shallow wells are approx. 1.5 m in depth, WT wells are approx. 0.5 m in depth and deep wells are >4 m in depth.

	JPH Upland Shallow	JPH Upland Deep	JPH Fen WT	JPH Fen Deep
^2H	-142.7	-149.8	-138.1	-146.5
^{18}O	-19.1	-18.3	-17.7	-18.7
d-excess	3.3	3.3	3.3	2.8

Table 4. Average water isotope concentrations across ML landscape units from 2013 to 2014. The shallow wells are approx. 1.5 m in depth, WT wells are approx. 0.5 m in depth and deep wells are >4 m in depth.

	ML Upland Shallow	ML Upland Deep	ML Fen WT	ML Fen Deep	ML Bog WT	ML Bog deep
^2H	-141.2	-138.9	-136.8	-136.8	-137.8	-145.0
^{18}O	-18.1	-18.0	-17.5	-17.4	-17.8	-18.9
d-excess	3.9	3.8	3.4	2.1	4.6	6.3

4.2 Tritium

The 3 snow samples obtained during the February 2015 snow sampling campaign ranged from 6.1 TU to 9.3TU. Tritium concentrations measured in groundwater at ML during the September 2014 sampling campaign ranged from below the detection limit (0.08 T.U.) to 17.0 T.U (Table 5). Tritium was found to decrease from shallow to deep wells throughout all landscape units. WT values come from the shallowest piezometers (<0.5 m) were found to be slightly lower than shallow well values, 12.5 vs. 14.5 TU (Table 5). Tritium analyses in porewater of peat in eastern Europe show similar values of tritium increasing reaching a maximum at 2-3 m then decreasing with depth with no detectable tritium below 4-5 m depth (Mazeika et al. 2009). The absence of detectable ^3H at ML10PA indicates that there is no post-1950s groundwater present at this depth. This piezometer was installed at the depth of refusal, and is thought to be located in the mineral soil. The vertical hydraulic gradients at this location indicate the potential for downward flow, so the absence of ^3H at this depth provides support for a lack of connectivity between the peat and underlying mineral soil. No current precipitation data for the area exists, but snow samples taken at ML and JPH are similar to wintertime tritium values taken from Churchill, MB from 1989-1993 (Figure 4). Before precipitation data from Churchill is corrected the wintertime tritium values are similar to slightly higher than current JPH and ML values. After the Churchill values are corrected for decay wintertime tritium values are similar to slightly lower than current JPH and ML wintertime values.

Table 5. Tritium concentrations from ML where wells samples were taken October 2014 and snow samples were taken February 2015.

Well	Depth (m)	Tritium (tritium units)
WTO	0.5	12.5
ML4B	2.79	16.1
ML4C	1.59	13.8
ML5B	4.56	3.9
ML5C	3.02	11.7
ML5D	1.61	14.1
ML10A	7.61	<0.8
ML10B	3.23	13.9
ML10C	1.7	14.8
ML12B	1.86	17.0
ML13A	2.95	9.2
ML13B	1.28	13.1
ML17C	1.16	11.4
ML19A	3.68	14.1
ML19B	1.44	15.5
MLBog	Snow	6.1
MLFen	Snow	6.9
MLUpland	Snow	9.3
JPH	Snow	11.2

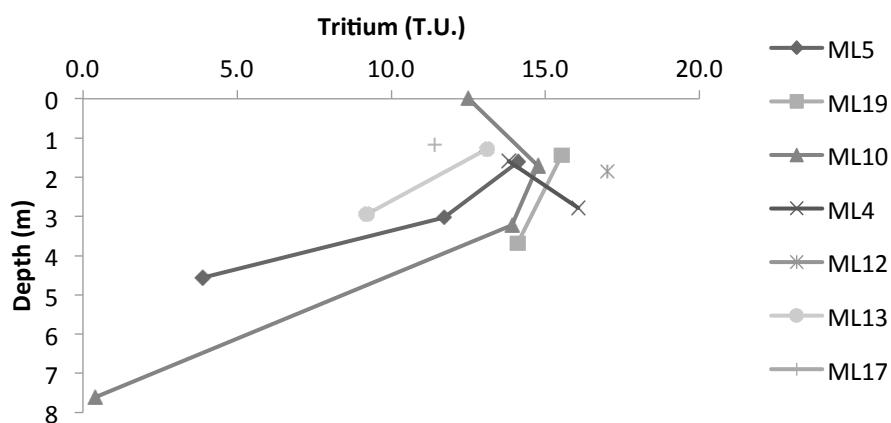


Figure 10. Tritium concentrations with depth from piezometer nests located in peatland landscape units at ML.

4.3. Nitrogen Inventory

The 2013-2014 sampling included the most comprehensive analyses of dissolved nitrogen species in groundwater at the two field sites and was used to develop a nitrogen inventory so that the concentrations and form of nitrogen at the different landscape units could be compared. All values and concentrations given are the average of field seasons from 2011-2014 unless otherwise stated.

Nitrogen concentrations measured at the water table wells throughout both sites from 2011 to 2014 did not show an increase in any of the nitrogen species (appendix F, appendix G), indicating that there was no migration of nitrogen off the application plots at ML. Similar conclusions were made based on the more detailed monitoring conducted on the boundaries of the nitrogen amendment plots operated at ML by Villanova University (Vitt pers. Comm. 2015). JPH also doesn't show an increase in NO_3 and NH_4 throughout the study period (appendix F, appendix G).

At JPH and ML the main species of nitrogen found in the surface water, rain, and snow were DON and NO_3 (Figure 12). Nitrogen inputs from snow remain low with concentrations ranging from 0.00 to 0.52 mg/L dissolved and particulate forms of nitrogen (Tables 6 and 7). At both sites the highest concentrations of nitrogen in the surface and groundwater is nitrate while nitrite is nonexistent. Overall slightly higher concentrations of nitrogen are found in snow samples at JPH than ML. At both JPH and ML summer nitrate precipitation concentrations are higher than winter. Ammonium winter precipitation concentrations are lower than summer at both sites. The concentrations of N measured in snow and rain at both sites are low.

Table 6. Average nitrogen species concentrations across JPH landscape units from 2011 to 2014. The shallow wells are approx. 1.5 m in depth, WT wells are approx. 0.5 m in depth and deep wells are >4 m in depth. Ammonium concentrations from 2011 were excluded due to uncertainty in sampling methods. Snow samples were taken March, 2015.

Nitrogen Species	JPH upland shallow	JPH upland deep	JPH fen WT	JPH fen deep	JPH Rain	JPH Snow
DON (mg/L)	0.19	0.72	1.48	0.47	N/A	0.07
NO ₂ ⁻ (mg/L)	0.24	0.07	0.00	0.00	0.00	0.00
NO ₃ ⁻ (mg/L)	1.12	2.67	0.82	1.18	0.10	0.08
NH ₄ ⁺ (mg/L)	0.09	0.07	0.03	0.12	0.01	0.51

Table 7. Average nitrogen species concentrations across ML landscape units from 2011 to 2014. The shallow wells are approx. 1.5 m in depth, WT wells are approx. 0.5 m in depth and deep wells are >4 m in depth. Ammonium concentrations from 2011 were excluded due to uncertainty in sampling methods. Snow samples were taken March, 2015.

Nitrogen Species	ML upland shallow	ML upland deep	ML fen WT	ML fen deep	ML bog WT	ML Bog deep	ML Rain	ML Snow
DON (mg/L)	2.12	10.2	0.070	24.0	0.850	13.3	0.82	0.04
NO ₂ ⁻ (mg/L)	N/A	5.00 ⁻⁴	4.00 ⁻³	2.60 ⁻³	1.00 ⁻³	1.40 ⁻³	0.00	0.00
NO ₃ ⁻ (mg/L)	0.480	1.70	1.12	0.320	1.02	0.320	1.00	0.12
NH ₄ ⁺ (mg/L)	0.220	0.420	0.070	23.6	0.850	12.7	0.015	0.32

4.3.1 JPH Nitrogen

The form and concentration of nitrogen species varied between the different sites, and landscape type depending on availability of nitrogen sources (e.g. decaying plant material) and processes that can alter its form (e.g. nitrification). The form that nitrogen takes in groundwater will depend on pH and redox potential, both of which vary with depth and hydraulic conductivity.

At JPH, the concentrations of both inorganic and organic nitrogen in groundwater increase with depth (Table 6, Figure 11). In upland areas at JPH average dissolved organic nitrogen (DON) concentrations increase with depth (0.19 to 0.72 mg/L). The opposite depth trend is evident in the fen wells with a decrease observed with depth (1.48 mg/L at the WT to 0.47 mg/L at depth). Nitrite concentrations at JPH upland sites decrease with increasing depth (0.24 to 0.07 mg/L) (Table 6). JPH fen nitrite concentrations were found to be below detection limit of 0.01 mg/L (Table 6).

Nitrite concentrations at JPH are highest all through the uplands and shallow and mid depth wells as there is no nitrite measured in the fen. Nitrate concentrations at JPH increase with depth at both the upland and fen ranging from 1.12 to 2.67 mg/L and 0.82 to 1.18 mg/L respectively. At JPH upland and fen sites ammonium concentrations range from 0.9 to 0.07 mg/L and 0.03 to 0.12 mg/L, respectively.

4.3.2 ML Nitrogen

At ML DON concentrations in groundwater increase with depth across all landscape units. Upland DON concentrations ranged from 2.12 to 10.2 mg/L, wet fen from 1.07 to 6.49 mg/L, dry fen from 0.88 to 22.18 mg/L, and bog from 1.58 to 11.07 mg/L (Table 7). At ML the deepest wells have the highest DON concentrations compared to other well depths, and dry fen sites have the highest DON concentrations of all landscape units (Figure 12). At ML nitrite concentrations decrease slightly at depth throughout the wet and dry fen from $4.00 \cdot 10^{-3}$ to $2.60 \cdot 10^{-3}$ mg/L and increase slightly at depth in the bog from $1.00 \cdot 10^{-3}$ to $1.40 \cdot 10^{-3}$ mg/L. At ML nitrite concentrations are highest at the WT level and in the wet fen. Extremely low concentrations of nitrite are found throughout the rest of the peatland and uplands. At ML nitrate concentrations increase with depth at upland sites 0.22 to .042 mg/L and decrease with depth in the bog and fen (1.02 to 0.32 mg/L and 1.12 to 0.32 mg/L respectively). Ammonium concentrations at ML range from 0.42 to 0.07 mg/L in the uplands, 0.07 to 23.6 mg/L in the fen, and 0.85 to 12.7 mg/L in the bog. The landscape unit and depth with the highest ammonium concentrations at ML are the dry fen and deep wells. At JPH the ammonium concentrations are similar throughout all depths and landscape units. At ML DON and ammonium follow similar trends of increasing with depth and the highest concentrations found in the dry fen.

4.3.3 Nitrogen Inventory Summary

The main species of nitrogen present in rain, and snow at both sites were DON and NO_3 (Figures 11, 12, and 13). At JPH the highest nitrate concentrations occur at the deepest wells while at ML the highest values occur in the shallows wells in the peatland and deep wells in the uplands. The dominant forms of N in groundwater at ML are DON and ammonium, whereas nitrate is the dominant N species present in groundwater at JPH. At ML and JPH concentrations of nitrite and ammonium remain low (0.00 to 0.015 mg/L), while DON and nitrate concentrations range from 0.10 to 1.00 mg/L (Table 6 and 7). At ML and JPH nitrate concentrations are highest at the upland sites. Shallow groundwater concentrations of nitrate at ML and JPH are higher than other Boreal peatlands in northern Alberta though they are similar to other Boreal peatlands in Alaska (Whitfield et al. 2010, Kane et al. 2010). Ammonium concentrations increase with depth at all JPH and ML landscape units. Ammonium concentrations in surface water throughout boreal peatlands in Alberta and Alaska are similar to those found at ML and JPH (Whitfield et al. 2010, Kane et al. 2010).

In general, the nitrogen concentrations at all JPH landscape units tended to be lower in both inorganic and organic forms of nitrogen than those found at ML. At JPH nitrogen tended to be present in its oxidized inorganic forms (NO_3), whereas at ML inorganic nitrogen tended to be present in its reduced form (NH_4). The higher hydraulic conductivities and sandy alluvial aquifer material at JPH would allow for oxygenated conditions, and would not have as much organic matter available for degradation than at the extensive peatlands present at ML. Dissolved organic nitrogen formed a much higher

percentages of the overall nitrogen inventory at ML than at JPH, which is consistent with the large sources of organic material present in the peatlands.

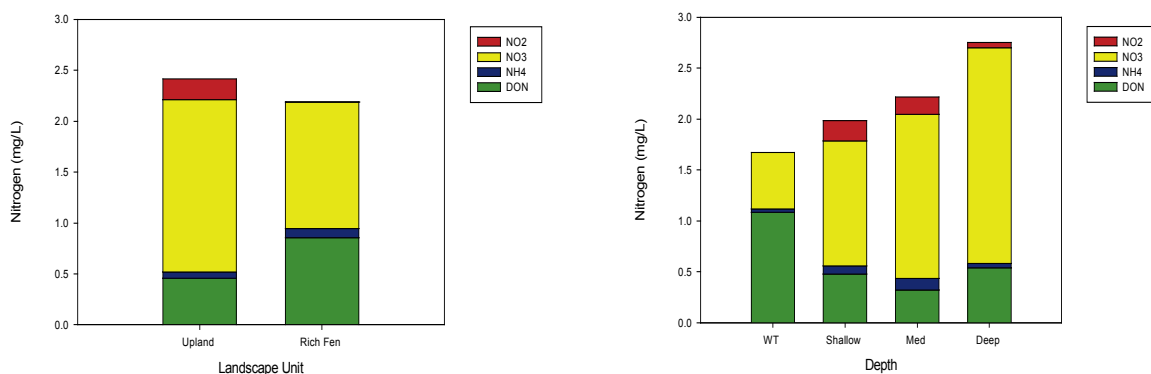


Figure 11. Nitrogen species concentrations at depths and landscape units for JPH. Values were averaged from 2011-2014 with the exception of NH_4^+ , where values were averaged from 2012-2014

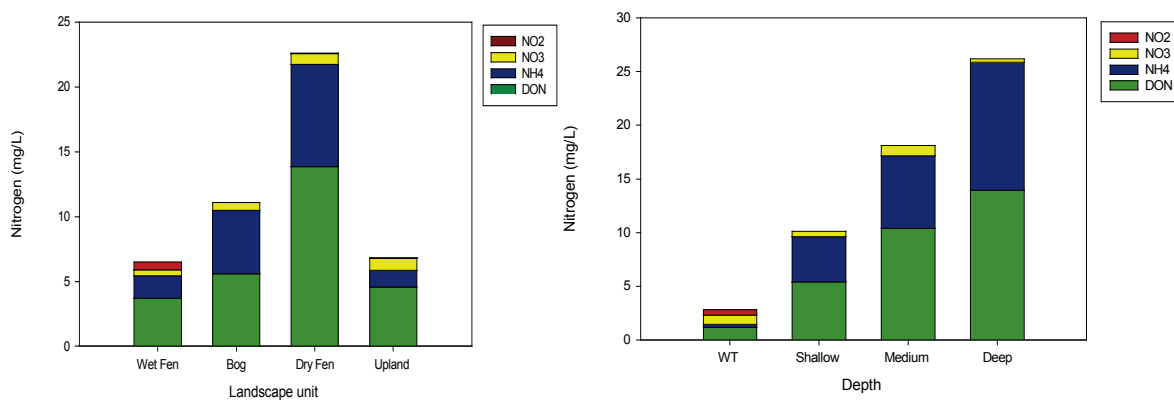


Figure 12. Nitrogen species concentrations separated by landscape unit and depths for ML. Values were averaged from 2011-2014 with the exception of NH_4^+ , where values were averaged from 2012-2014. Note that the scale for ML differs from JPH.

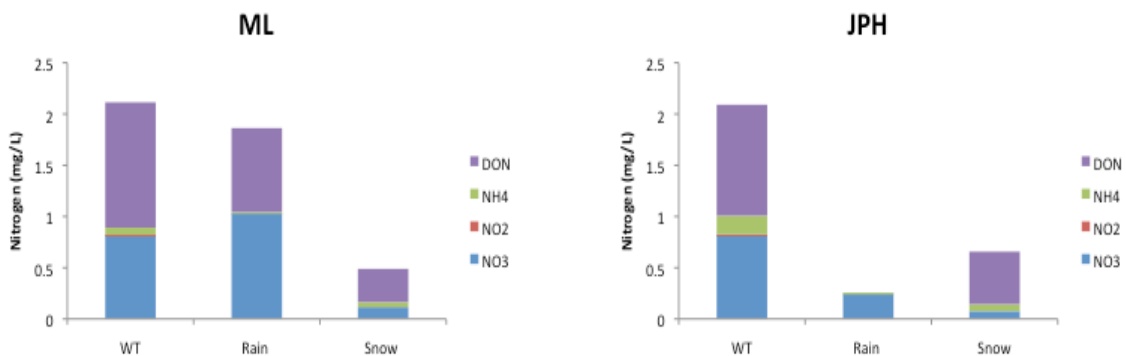


Figure 13. Nitrogen species concentrations separated by landscape unit and depth for ML and JPH. Values were averaged from 2011-2014 with the exception of NH_4^+ , where values were averaged from 2012-2014. Snow concentrations were taken March, 2015.

4.4 Spatial Distribution of Nitrogen at JPH

The distribution of nitrogen species were used to examine how nitrogen concentrations and speciation differ between landscape units. A transect from the uplands toward the fen was used to determine if there is a change in nitrogen species or concentrations as the landscape changes from upland to fen (Figure 14 A-A¹). Another transect that follows the flow of the fen was used to understand nitrogen characteristic changes within the fen (Figure 14 B-B¹). The main groundwater flow direction at JPH is to the northwest. Along transect A-A¹ the dominant flow direction is again to the northwest, but there is a component of flow from the upland towards the fen (Kusel 2014, Vallarino 2014). Transect B-B¹ is oriented along the main flow path for groundwater in the fen (Kusel 2014, Vallarino 2014). The contour plots shown below give an idea of where the nitrogen is within the field sites. However, these plots were based on a fairly limited number of sampling sites and therefore interpolations should be interpreted with caution.

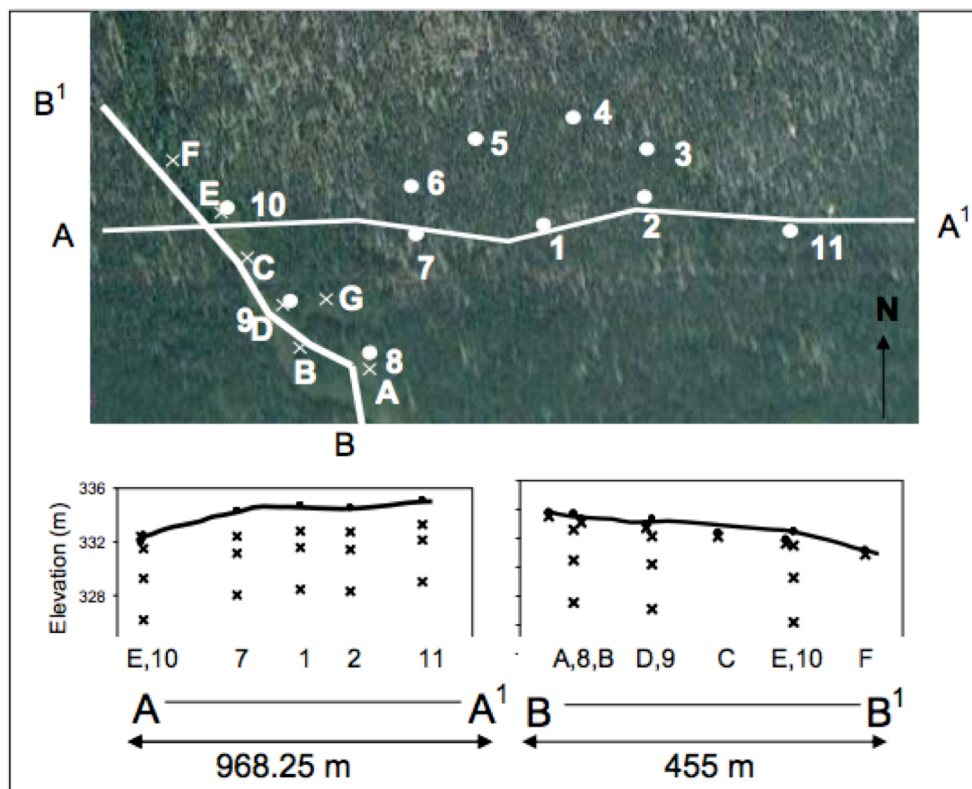


Figure 14. JPH plan view map (top) of transect A-A¹ (lower left) and B-B¹ (lower right). Transect A-A's runs from the fen towards the uplands including water well E, Fen well nest 10 and uplands nests 7, 1, 2, and 11. Transect B runs north should along the fen and includes water table wells A, B, D, C, E, and F and well nests 8, 9, and 10. The orientations of transects A-A¹ and B-B¹ have been simplified as E-W and N-S respectively. On the cross-section plots the x-axis is the longitude and the y-axis is the latitude. The x's are sampling elevations. The respective vertical exaggerations factors are 43.7 and 20.5. Figure developed by Caren Kusel.

The distribution of nitrogen species along the transect A-A¹ (Figure 15) shows the difference in N forms across the transition between sandy upland areas and the rich fen. The highest NH₄ concentrations are present in the mid-portion of

the fen, which is consistent with this area having reducing conditions. DON concentrations across JPH are generally much lower than those seen at ML, but the higher concentrations at shallow depth could be due to decaying leaf litter, or surficial organic decay. The higher DON concentrations measured at depth in the upland area adjacent to the rich-fen were interpreted as potentially indicating some connectivity between the fen and this area (Kusel 2014) or they could also indicate decay of buried organic matter (Figure 15). Nitrate concentrations are highest throughout the mid to deep wells in the uplands (Figure 15). Overall nitrate and ammonium concentrations were higher in the shallow fen than the uplands consistent with the greater availability of organic matter in the fen. DON concentrations are highest at depth in the uplands and the fen. Highest DON concentrations occur at near-fen wells, but are lower at piezometer 8 which is directly in the fen. This indicates that DON is not produced in the fen through the degradation of peat, but the DON comes from what is found in precipitation that has accumulated over the years.

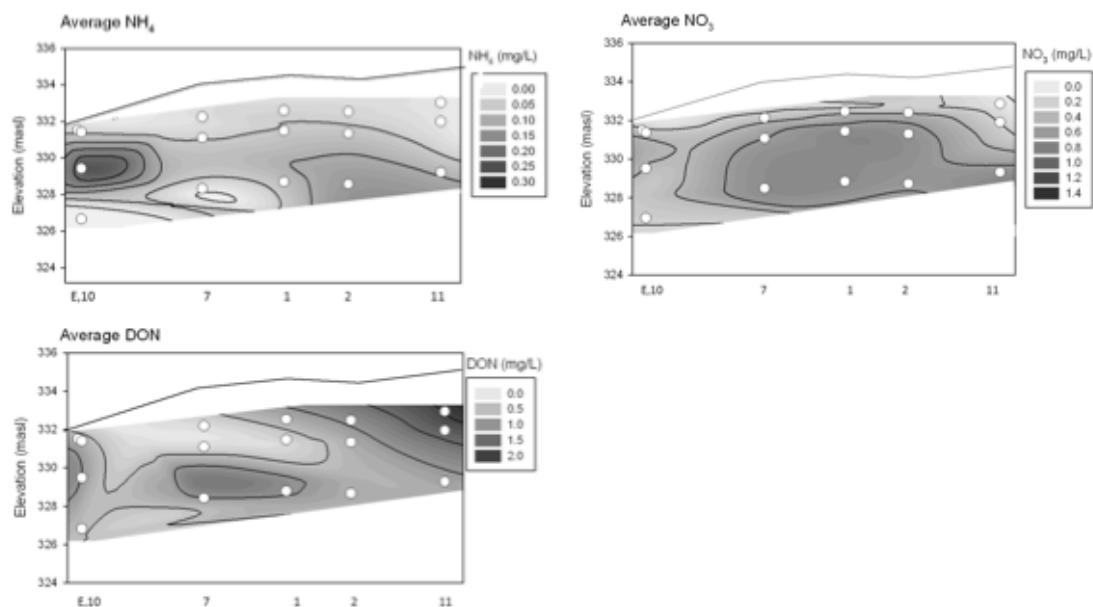


Figure 15. Transect A-A¹ nitrogen values are the average from 2013-2014. Nitrite is not included due to low concentrations

The distribution of n species along B-B¹ allows for closer examination of the distribution of N along the rich-fen. Groundwater flow within the fen is from B to B¹, and most N concentrations decrease along that transect. The highest ammonium concentrations seen along transect B-B¹ are seen in the shallow wells in the southern part of the fen (Figure 16), immediately downstream of a larger fen complex, as well as the shallow well in piezometer nest 8. As groundwater flows from the fen complex upstream of transect B-B¹, along the fen channel between the upland sandy areas the groundwater probably mixes more with more oxygenated water originating from the adjacent upland area, and this may account for the shift towards less reducing N species, and decreases in concentrations (Figure 16). DON concentrations are highest at mid-depth in the fen at B-B¹ possibly indicating decay

of organic matter within the peat at this location. DON concentrations were similar in both transects. From previous studies, it has been observed that nitrate entering the system may be converted to DON and leached out of the system when there is increased nitrogen loading (Bridgham et al. 1998).

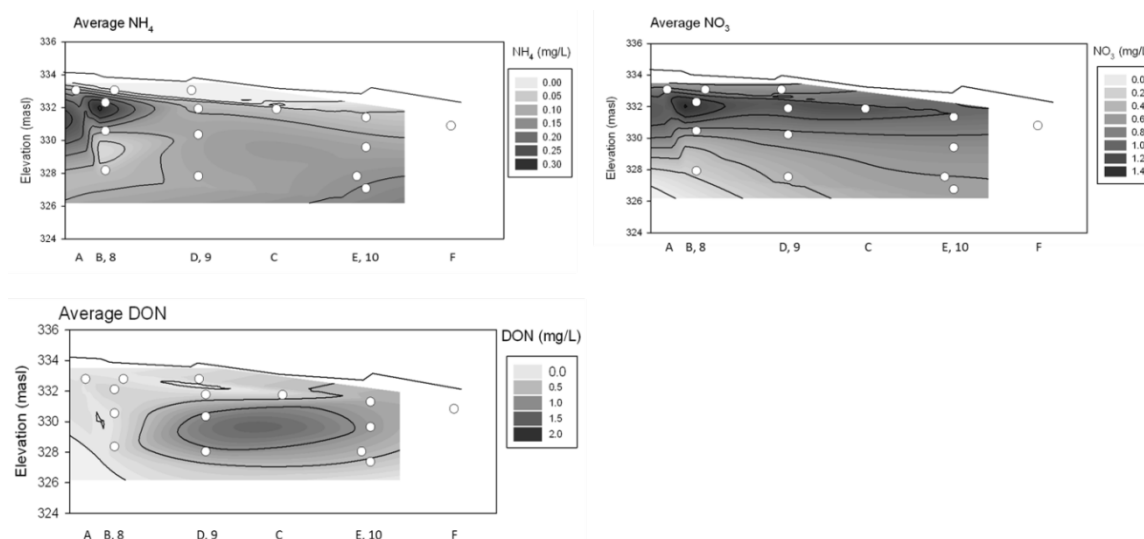


Figure 16. Transect B-B¹ nitrogen values are the average from 2013-2014. Nitrite is not included due to low concentrations

4.5 Spatial Distribution of Nitrogen at ML

Plan view (Figures 17-21) and depth profiles (Figure 22) were generated from the ML data to examine the distribution of nitrogen across the site and between the poor fen, bogs and uplands areas. Plan view maps were generated for specific depth intervals including; The water table wells (screened from the surface to 1 m depth), shallow depths (wells screened about 1.5 m below surface), and mid-

depth plots (wells screened approximately 3 m below the surface). The deepest wells were excluded due to a low sampling density. These plan view contour plots and depth transects are limited by the number of sampling sites and therefore interpolations need to be interpreted cautiously. The distribution of geochemical parameters and water isotopes were interpreted as indicating limited hydrological connection between the upland and peatland (Kusel 2014). Isotopic signatures show recharge to depth in the wet fen (Kusel 2014). During precipitation, fill and spill events from the bog to the surrounding fen may occur (Vallarino 2014).

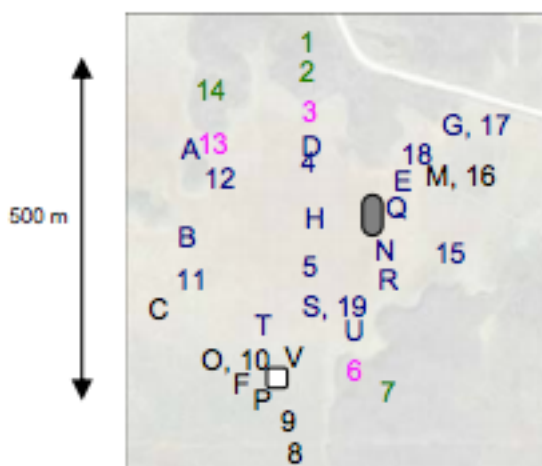


Figure 17. Left: Location of piezometer nests MLP 1 – 19 and water table wells A – H & M – V relative to the amendment sites in the bog (white solid square) and fen (grey solid oval). Upland – green, upland edge – pink, fen – blue, and bog – black. Image source: GoogleTMEarth. Figure modified from Kusel 2014.

Overall nitrogen concentrations are lowest in the WT wells compared to deeper wells (Figure 18). Nitrate and nitrite make up the largest portion of the

nitrogen species present with the highest concentrations occurring in the northwest section of the site, adjacent to the upland islands. Ammonium concentrations remain low throughout water table wells as would be expected given the oxygenated conditions near the surface. DON concentrations are slightly higher in the bog and outflow (northeast) section of the site.

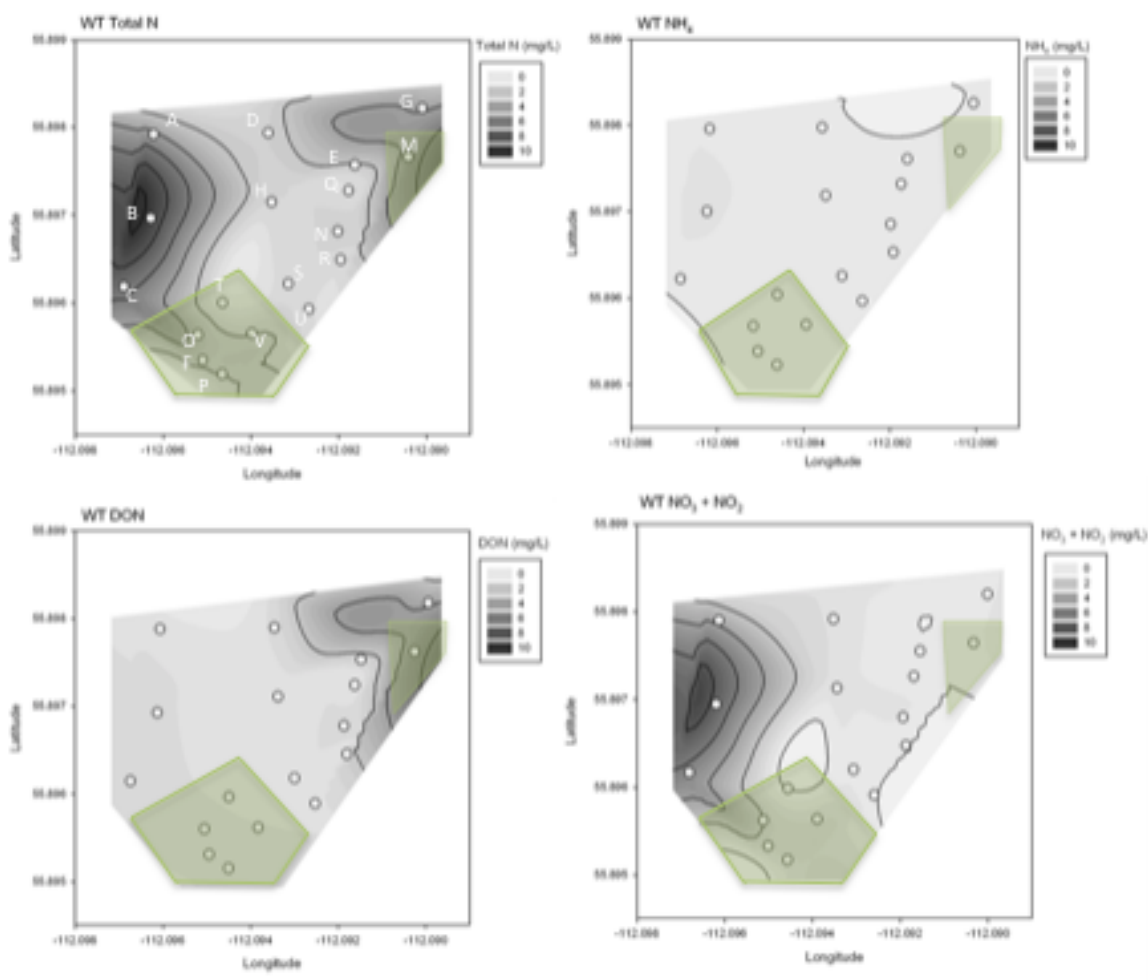


Figure 18. ML water table well plan view maps showing the distribution of Nitrogen species. The green areas indicate the bog landscape units. Darker shaded areas indicated increased nitrogen concentrations.

Nitrogen concentrations are higher in the shallower wells (Figure 19) than the water table wells (Figure 18). Organic forms of nitrogen species have the highest concentration (DON). Nitrate and nitrite concentrations are slightly higher in the northeast portion of the fen near the outlet. At shallow depths ammonium concentrations are highest in the fen. Low concentrations of all nitrogen species were found in the uplands. The bog also has lower concentrations of all nitrogen species than the wet and dry fen.

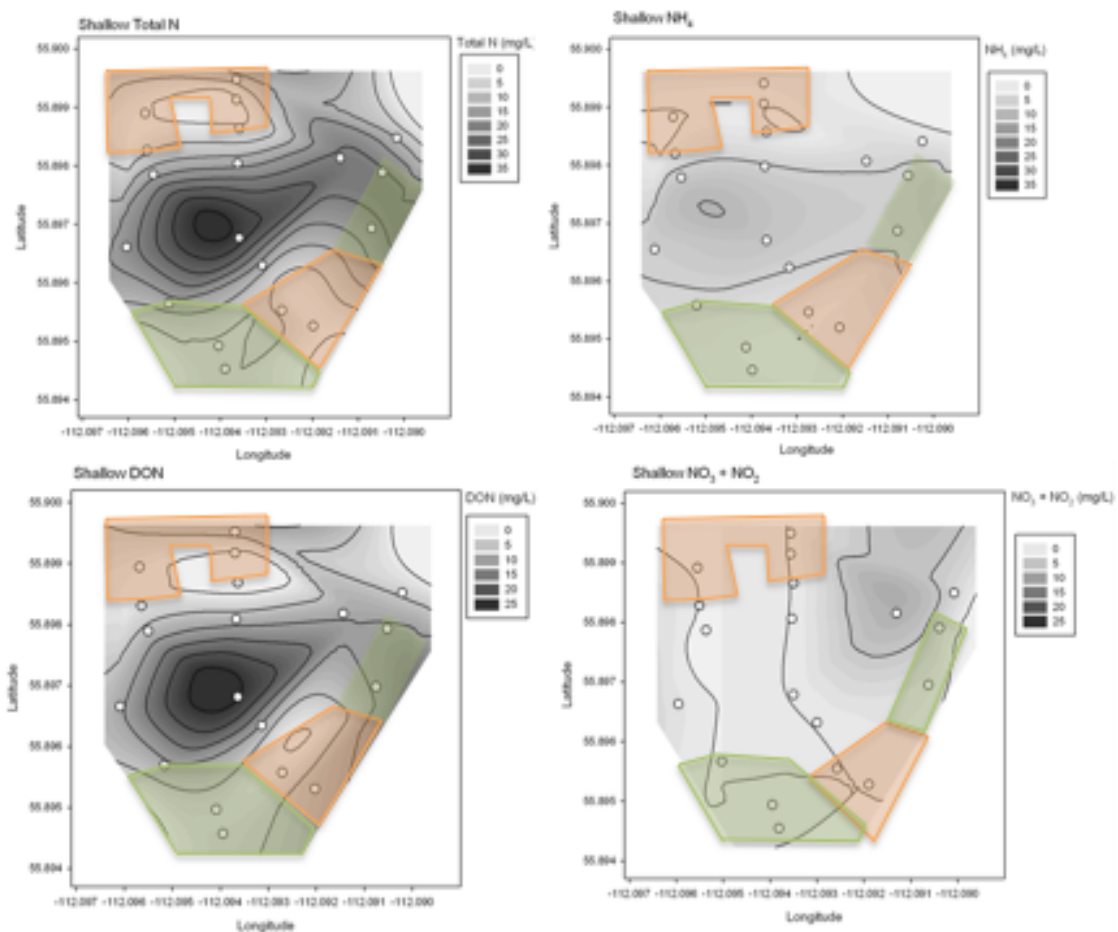


Figure 19. Plan view maps showing the distribution of nitrogen species concentrations from the data from shallow wells (1.5 m). The orange areas indicate uplands and the green areas indicate the bog. The remaining areas are fen. Darker shading indicates increased nitrogen concentrations.

The total nitrogen concentrations are higher in the mid-depth wells than deep and shallow wells (Figure 18, 19, and 20). Organic nitrogen (DON) is the dominant form of N, and DON concentrations are highest in the fen and parts of the bog. In general DON concentrations are higher in the dry fen than the wet fen. Ammonium concentrations are highest in the bog and near the outlet by MLP17. Nitrate and nitrite concentrations remain low throughout the site, but are slightly elevated in the bog in the southwest section of the site.

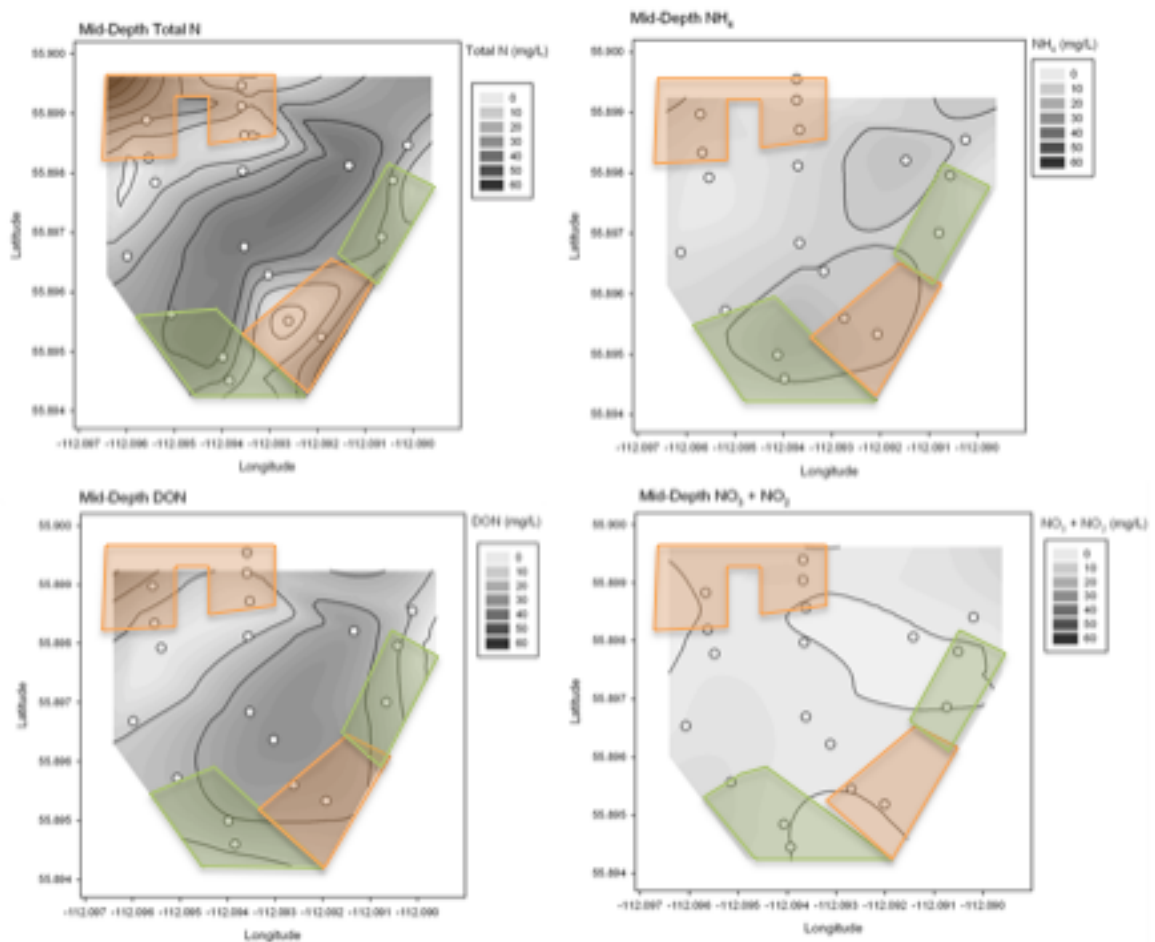


Figure 20. Contour plots of the distribution of N in groundwater at ML using data from the mid-depth piezometers (3m). The orange areas indicate uplands, green indicates bogs and the remaining areas are fen. Shaded areas indicated increased nitrogen concentrations.

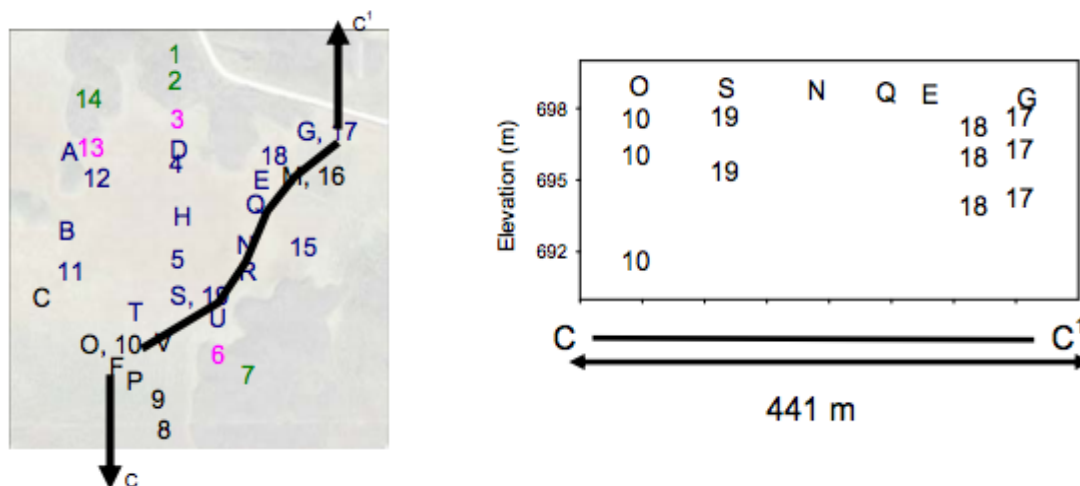


Figure 21. ML plan view map (left) of transect C-C1 ; well depths along the transect (right). Transect C-C1 includes water table well O – S – N – Q – E – G and piezometer nests 10 – 19 – 18 – 17. Sites are in the wet fen with the exception of well O and nest 10 (bog sites), Sites 19, S, and N are in the dry fen and the rest are wet fen. The simplified orientation of the transect is N-S. In the cross-section plot (right), the y-axis is sampling elevation and the x-axis is latitude, resulting in a vertical exaggeration factor of 20.4

At ML a transect from the bog towards the culvert near MLP17 was used to understand how nitrogen characteristics change with depth and between landscape units. This transect was chosen to cover multiple landscape units (Figure 21). Surface flow at ML is hypothesized to flow along this transect from well nest 10 towards well nest MLP17 (Vallarino 2014). Ammonium concentrations are highest at the deepest well in the bog and are lower at shallower depths, and moving towards well nest 17 (Figure 22). Nitrate concentrations are highest in the surface water of the bog and decrease moving downwards and towards well MLP17 (Figure 22). DON concentrations are highest at depth in the bog and fen, in the piezometers

thought to be installed in the mineral soil at the base of the peat (Figure 22). DON concentrations are slightly higher at MLP18. Nitrate concentrations are higher in the shallowest groundwater zones in the bog (Figure 22). Uptake of nitrate by vegetation, is increased in surface waters and appears to decrease along the flow path. This may be due to being taken up by vegetation.

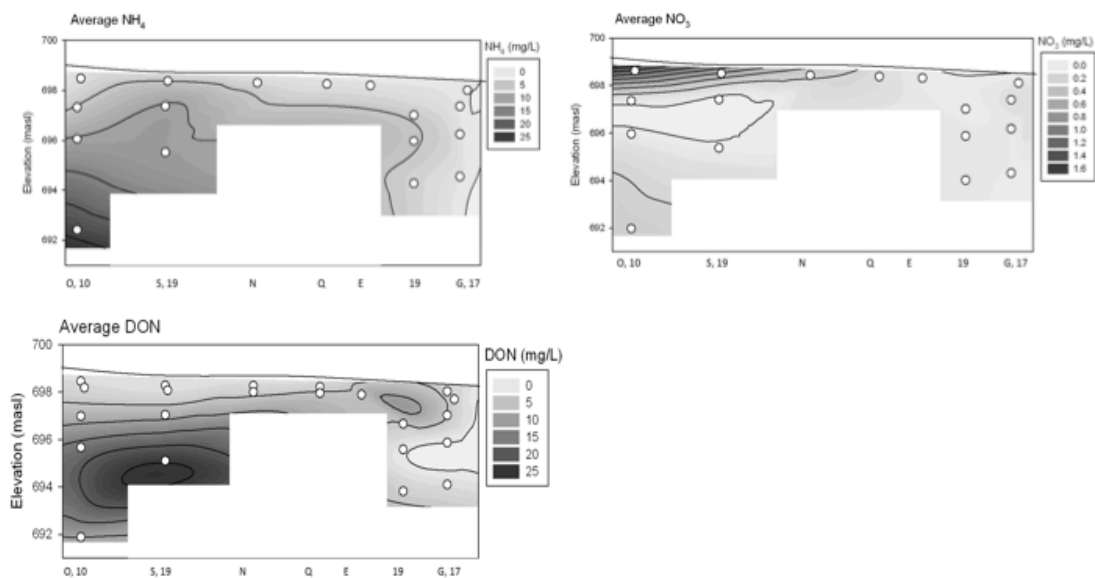


Figure 22. Transect C-C1, for nitrogen species across landscape units at ML. NH₄ (top left) NO₃ (top right) and DON (bottom left). NO₂ is not included due to low concentrations. Darker shading indicated increased nitrogen concentrations

4.6 Nitrogen Controls

Cross plots of nitrogen species and pH, Eh, ^{18}O and DOC were used to identify potential controls on the distribution of nitrogen in groundwater at the two sites (Figures 23-29). Water samples with very low concentrations of N would have very little N present to transform, so the scatter along the x axis at zero N concentrations is not surprising. There are no clear relationships between nitrate and ammonium concentrations and pH or Eh at JPH. pH is considered to be one of the controlling factors that determine if nitrogen is found as nitrate or ammonium with higher pH values typically associated with higher proportions of NO_3 instead of NH_4 . There are a few samples that appear to have higher NO_3 concentrations associated with higher pH values, however, this does not appear to be a major control at all JPH sites. Eh is also a typical controlling factor of nitrogen speciation with high ammonium concentrations typically associated with more reducing (more negative Eh values), but there does not seem to be a strong relationship between nitrate and ammonium and Eh at JPH. The concentrations of inorganic N at JPH may have been too low for consistent relationships with pH or Eh to develop. The majority of the higher nitrate concentrations occur when Eh values are higher than -100. Ammonium and ammonia are converted to nitrite and nitrate in more oxic conditions, in the presence of oxygen, alkalinity and microorganisms. There appears to be a positive correlation between DON and more enriched ^{18}O . The correlation between DON and ^{18}O indicate that DON may become more concentrated in evaporated waters. There

is also a positive correlation between DON and DOC, which is typical of northern peatlands (Kane et al. 2010).

At JPH the highest ammonium concentrations occur where alkalinity concentrations are low, but there is not a strong correlation between the two. This may indicate that alkalinity may be a factor in the conversion of ammonium to nitrate, but it is not the only controlling factor. The highest nitrate values occur at higher alkalinity, but there are also a number of low nitrate concentrations that occur at higher alkalinity. Ammonium and nitrate concentrations may need to reach a certain threshold before being influenced by alkalinity.

Ammonium and nitrate do not show a correlation with conductivity however DON increases with increasing conductivity. Conductivity measurements higher than 150 $\mu\text{S}/\text{cm}$ show decreasing DON concentrations.

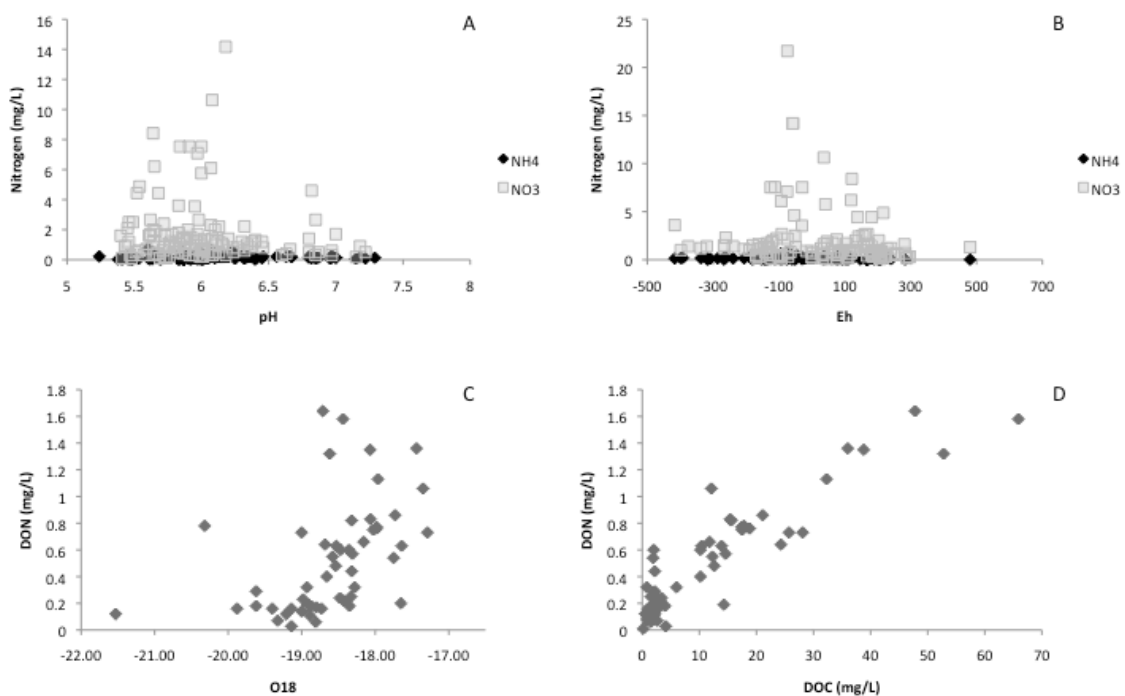


Figure 23. Cross-plots using groundwater data from JPH from 2012-2014. A.) Nitrogen vs. pH B.) Nitrogen vs. Eh C.) DON vs. ^{18}O and D.) DON vs. DOC.

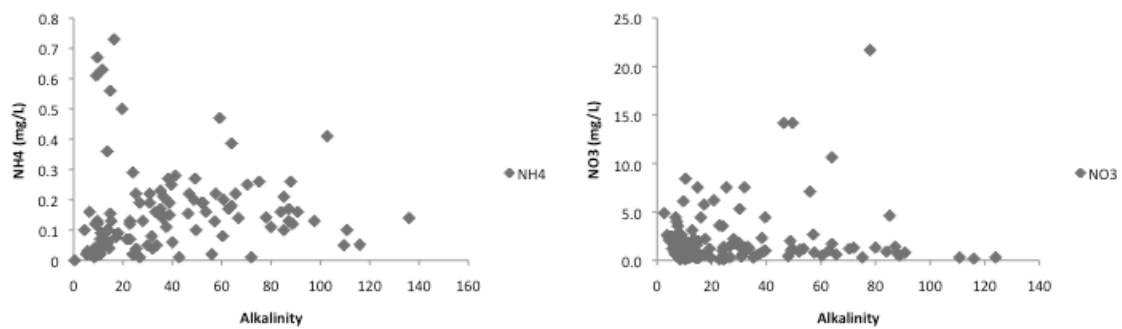


Figure 24. Cross-plots of NH₄ vs. Alkalinity (left) and NO₃ vs. Alkalinity (right) for JPH using all data from 2012-2014.

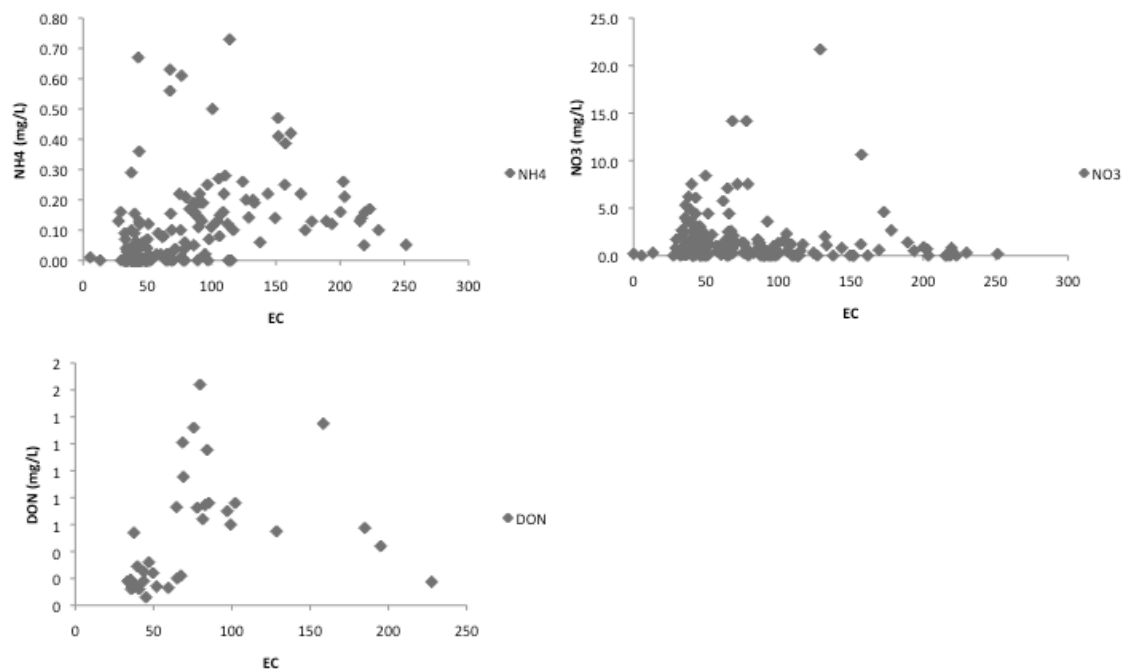


Figure 25. NH₄ vs. EC (top left), NO₃ vs. EC (top right), DON vs. EC (bottom left) for JPH using data from 2012-2014.

There also does not appear to be a correlation between nitrate, ammonium and pH at ML. The highest nitrate concentrations occur at a slightly lower pH than the highest ammonium concentrations, however this is more likely due to how the ammonium is spatially distributed rather than a distinct nitrogen control. Like JPH higher nitrate concentrations are found at Eh values of -100 or greater. At ML there is no correlation between DON and ¹⁸O. This indicates that there are multiple sources of DON and higher concentrations are not due entirely to evaporation. At the bog, dry fen and uplands there is no correlation between DON and DOC. In the wet fen there isn't a correlation between DON and DOC where DON concentrations are low, but there is a positive correlation at higher DON concentrations. The other landscape units do not show this correlatio

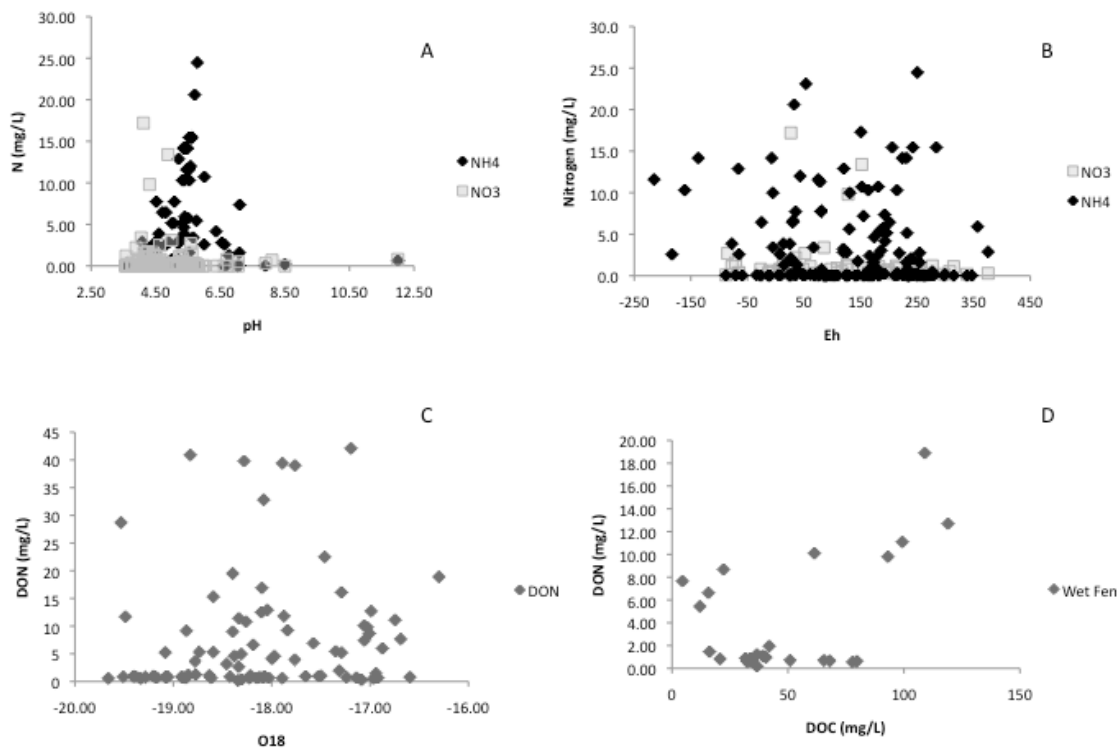


Figure 26. All plots are from ML from 2012-2014. A.) NH₄ and NO₃ (as mg/L N) vs. pH B.) Nitrogen vs. Eh C.) DON vs. ¹⁸O and D.) DON vs. DOC in the wet fen.

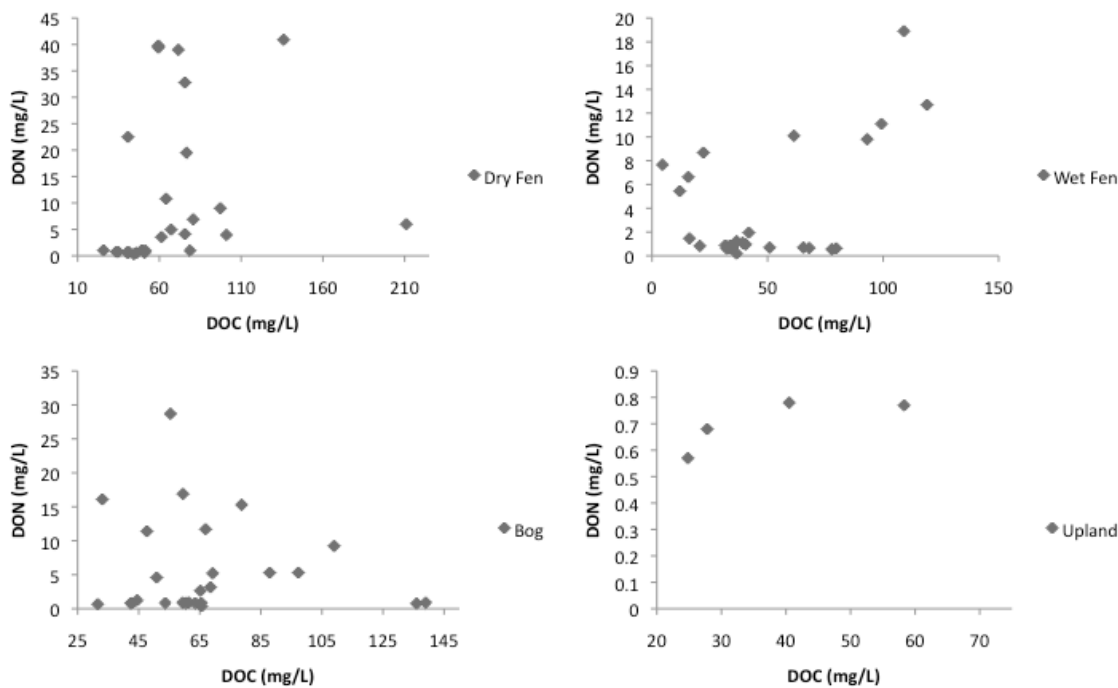


Figure 27. DON vs. DOC for each landscape unit (dry fen (top left), wet fen (top right), bog (bottom left), and uplands (bottom right)) at ML for data from 2012-2014

At ML the relationship between ammonium and nitrate with alkalinity are opposite to what was observed at JPH. ammonium concentrations increase with increasing alkalinity and the highest nitrate values occur at the lowest alkalinity. These differences may be due to the differing hydrology at both sites. The highest nitrate values occur in the uplands at JPH where there is groundwater influence and therefore higher alkalinity. At ML the nitrate values are highest in the water table wells of the peatland where there is little to no groundwater influence. Nitrate at ML is then used or converted before reaching depth. Ammonium and alkalinity increase with depth at ML leading to the correlation.

The concentrations of DON in groundwater increased with increasing EC with the exception of the groundwater samples with EC ranges typical for those found in mineral soils (Figure 27) highest EC values at each landscape unit. This change in correlation appears to occur at EC values greater than 300. Increased conductivity values indicated the influence of groundwater or contact with mineral soil. At Low EC concentrations ammonium concentrations increase with increasing EC across the wet fen, dry fen, and bog. At high EC concentrations the dry fen and bog also show increased ammonium. However, in the wet fen the ammonium concentrations are lowest where EC is higher. The low DON values in groundwater with higher EC values could indicate these wells at the interface between the peat and mineral soil. Another possibility is that the influence of groundwater impacts the storage of DON. An increase in ammonium with increased EC in the bog and dry fen could indicate the influence of groundwater creates conditions where

ammonium is the favoured nitrogen species. Overall the wet fen has the lowest ammonium and DON concentrations of the wetland landscape units and the most water flow which may lead to the difference in DON and ammonium at the highest EC concentrations. The wet fen at ML is the landscape unit most similar to the fen at JPH which may lead to this similarity. JPH and the wet fen at ML have the most water movement of these landscape units, contributing to this trend.

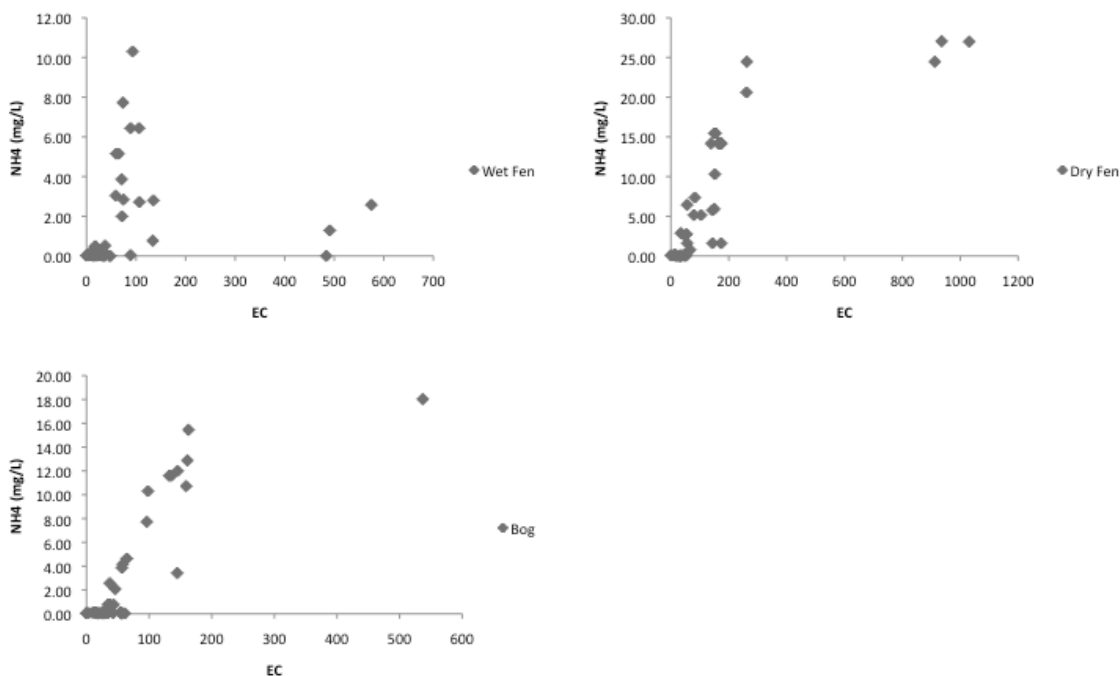


Figure 28. DON vs EC for ML landscape units wet fen (top right), dry fen (top left), and bog (bottom left).

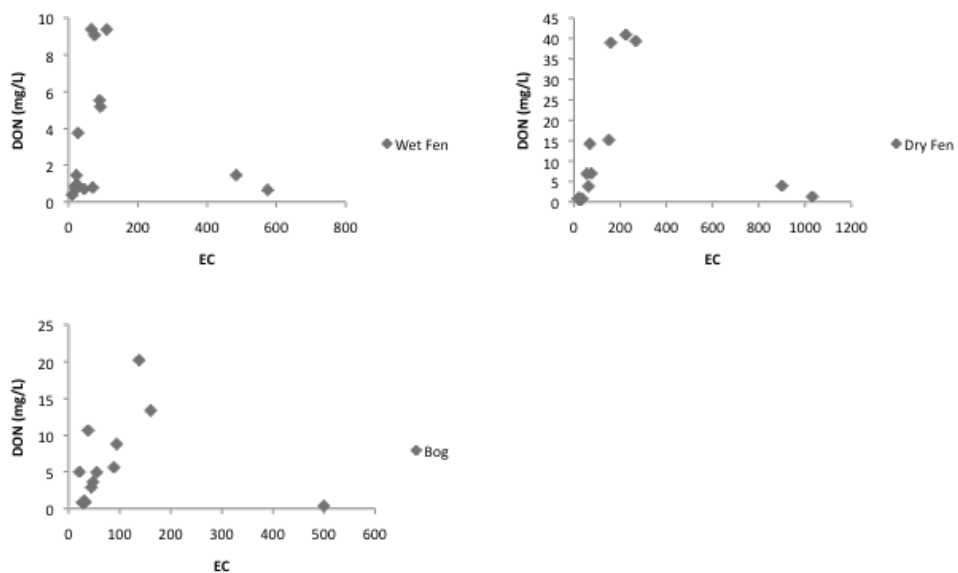


Figure 29. NH_4 vs EC for ML landscape units wet fen (top right), dry fen (top left), and bog (bottom left).

Chapter 5: Discussion

5.1 Tritium

Peak tritium concentrations at ML occur between 1.5 and 3 meters with highest occurring at 1.86 m. Two possible reasons for this peak are: (i) flushing of the catotelm/acrotelm by seasonally varying sources of precipitation, with higher tritium being associated with recharge of summer precipitation, or (ii) long-term, slow penetration of tritiated water from an upper mixed layer in the acrotelm to the underlying catotelm, as controlled by the limited hydraulic conductivity of compacted peat. Seasonal control of tritium concentration (i.e. i) would indicate shorter residence times of water in the peat down to 3m depth, whereas (ii) would suggest that the 1.86 m peak corresponds to the 1960s tritium peak.

If the elevated tritium at about 2 m depth is simply due to seasonal variations in precipitation, then this would require the 1.5-3 m zone to be characterized by high hydraulic conductivities and active flushing. The residence time within this zone would be on an annual time scale leading to variability in hydrologic and geochemical parameters such as ^{18}O and hydraulic head. The short residence time would not allow for nitrogen to accumulation and nitrogen concentrations for DON and NH_4 would be similar to precipitation, both rain and snow. Nitrate concentrations may be similar or lower due to uptake by vegetation. The average tritium concentrations of the active zone would be similar to annual precipitation averages. Measured hydraulic conductivity values would be moderately high to support this water movement.

If the high tritium concentrations are due to the presence of bomb peak water (ii) then one would expect the hydraulic and geochemical data for piezometers where elevated ^3H was detected to have limited seasonal variations and geochemical compositions similar to peatwater (e.g. ammonium and DON nitrogen concentrations would be higher than precipitation concentrations due to the increased residence time). Again nitrate concentrations would be lower due to uptake by vegetation. A lack of variability of parameters such as ^{18}O and hydraulic head would be seen due to the lack of connectivity with surface processes. The average concentration of tritium in the wetland would fall between decayed precipitation concentrations from 1960's and today. In this case one would expect the hydraulic conductivity of the 1.5-3 m zone to be fairly low, resulting in the slow movement of water throughout the peat. The wells with the highest tritium concentrations (15.5-17.1 TU), MLP04B, MLP12B, and MLP19B, are all between 1.4 and 2.8 m in depth. Rain and snow from ML have average ammonium concentrations of 0.015 and 0.52 mg/L respectively, and average DON concentrations of 0.04 and 0.82 mg/L respectively. The groundwater samples with elevated tritium have higher average concentrations of ammonium and DON than precipitation (NH_4 ranged from 3.5 – 6.3 mg/L and average DON concentrations ranged from 3.8 – 9.4 mg/L). These concentrations are considerably higher than precipitation suggesting that they cannot be due to the seasonal cycle of recharge. The geochemical compositions of the high tritium groundwaters are more consistent with long residence groundwater (ii) than with seasonal flushing (i).

Wells MLP04C, MLP05D, and MLP10D are also in this depth range with tritium values from 13.8-14.8 TU.

Further evidence that the elevated tritium at 2-3 m is due to bomb-age tritium can be garnered by looking at the relationship between tritium and certain nitrogen species, i.e. ammonium (Figure 30). Nitrate and DON concentrations are not correlated with tritium concentrations. Ammonium concentrations increase with decreasing tritium at well depths greater than 3 m (Figure 31). The opposite trend is seen at well depths from 1.5-3 m with increasing ammonium with increasing tritium. Sampling done at wells between 0-1.5 m have negligible ammonium except well 19B which has elevated tritium and ammonium. The increasing ammonium with increasing tritium between 1.5-3 m indicated that the ammonium is being stored and not seasonally flushed. Average rain and snow ammonium concentrations at ML are relatively low, 0.0 mg/L and 0.51 mg/L respectively. These low accumulation rates and increased ammonium at peak tritium values indicate the ammonium has been accumulating over time and is not flushed on an annual timescale.

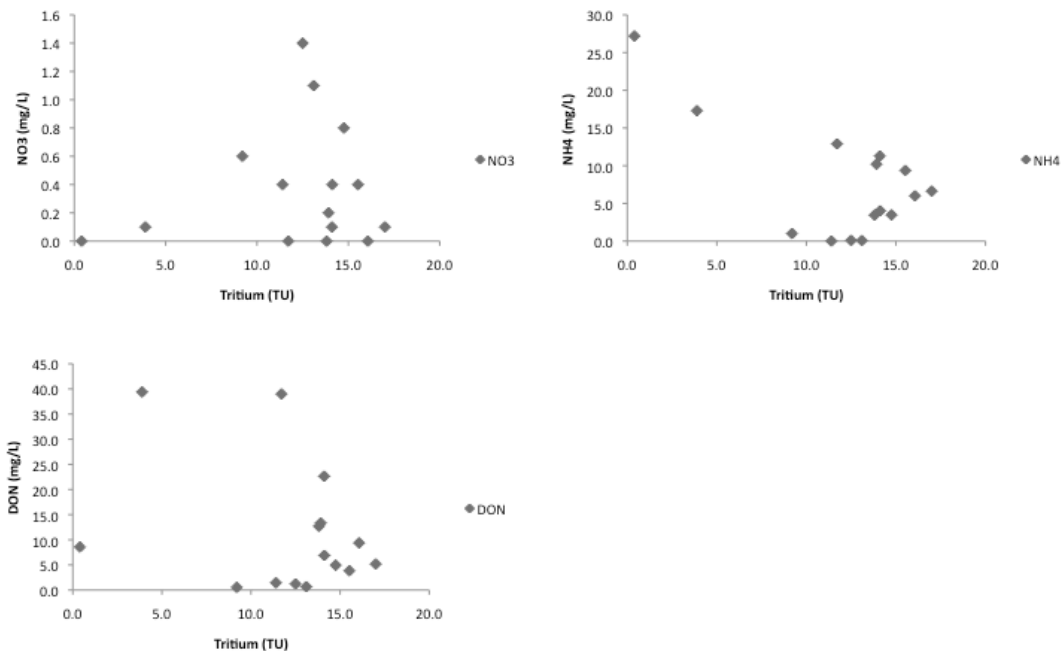


Figure 30. Tritium vs. NO₃ (top left), Tritium vs. NH₄ (top right), Tritium vs. DON (bottom left) for ML.

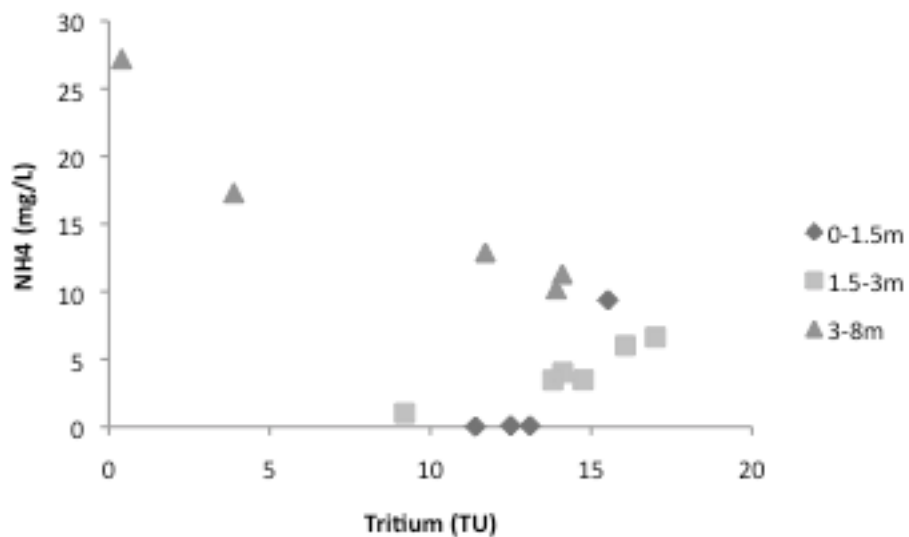


Figure 31. Tritium vs. NH₄ for selected depth levels. Tritium increase with increasing depth from 1.5 to 8 m and tritium decreases with increasing depth from 0-1.5 m.

Tritium concentrations at MLP13B and MLP17C were 13.1 and 11.4 TU respectively. At these locations the average NH_4 and DON concentrations in groundwater were also more similar to those measured in average precipitation with concentrations ranging from 0.02 to 0.018 mg/L and 0.7 to 1.5 mg/L respectively. This indicates that areas of slightly shallower depths may be better flushed.

Similar tritium studies on Boreal raised bogs found that the water in the top metre of peat ranged in age from months to years and increased to an age of approximately 20 years at a depth of 1.5 years (Sirin 2000). The bogs in this study were 8 m in depth and the mean residence time at this depth was found to be 100-150 years (Sirin 2000). A peatland in south-eastern Lithuania also showed increasing residence time with depth (Maz 2009). This peatland had peak tritium concentrations between 2-3 m that was determined to be water from nuclear testing (Maz 2009). These studies further support the theory that peak tritium concentrations at ML are from the 1960's indicating the peatland has a long residence time.

Determining whether the different landscape unit types are hydrologically connected will govern if there is potential for nitrogen transport between those units. Previous work at ML indicated limited connectivity between the peatlands (fens and bogs) and the underlying mineral soil or adjacent uplands. Elevated Ca values at depth were measured in piezometers screened in the mineral soils. At wells where both tritium and calcium were measured it was found that well MLP10A showed elevated Ca concentrations (Figure 32). This increased calcium and

lack of tritium is consistent with this piezometer sampling groundwater from the underlying mineralized substrate (not peat), and that the age of this groundwater is more than 50 years old. It is believed that this well is placed at the interface of the peatland and underlying substrate. Groundwater from this piezometer also has elevated NH_4 and DON concentrations likely originating from decaying plant material in the overlying peat. The next highest Ca concentration at well MLP5B has the second lowest tritium concentration. Both MLP10A and MLP5B have vertical hydraulic gradients indicating the potential for downward groundwater flow (appendix E) which indicates that the increase in Ca at MLP5B may occur through diffusion as MLP5B is placed above the peatland/underlying substrate interface.

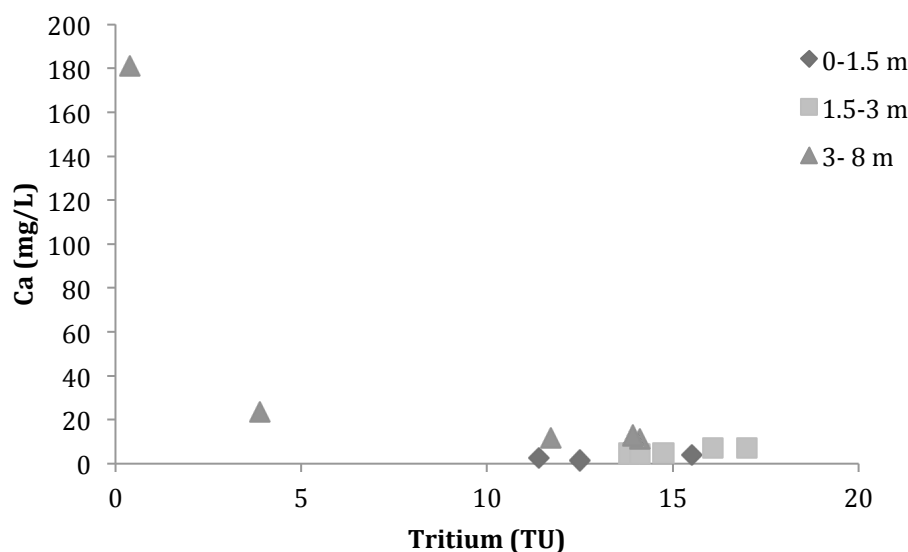


Figure 32. Calcium vs tritium at ML for select depth intervals (0-1.5 m, 1.5-3 m, 3-8 m). Lowest tritium values occur at the highest calcium concentration.

Previous work at ML has also found that DON, NH_4 , and Ca are lower in the wet fen than other peatland landscape units indicating the wet fen is better flushed

than the other landscape units. If the tritium peak is due to seasonal variation this would confirm that the wet fen is better flushed as the highest tritium values occur in the wet fen. However peak tritium values may not be captured in the other wetland landscape units due to the varying depths of the instrumentation. The other landscape units being less flushed would have longer residence times which may lead to more mixing and a lack of a seasonal tritium peak.

If the tritium peak is older and the results of nuclear testing the wet fen may still be more flushed but on a much longer time scale. Again values similar to those seen in the wet fen may occur in the other landscape units but are not captured with current instrumentation. The wet fen may also not have more water movement, but more water throughout and the lower concentrations of DON, NH_4 , and Ca are due to dilution and not being removed from the system. Differences in the underlying substrate throughout ML could also cause differences in Ca concentrations throughout the deepest wells.

5.2 Nitrogen Inventory

Estimates the total inventories of ammonium and DON throughout the peatland were done using a simple linear regression of the average nitrogen concentrations measured at depth (Table 8, Table 9). Both NH_4 and DON show increasing concentrations with depth, however DON does not show as strong of a correlation (Figure 33, Figure 34). These estimations did not consider peat stratigraphy or species specific development and productivity (Turnen et al. 2002). A porosity of 0.9 was used in accordance with Turchenek (1990). Nitrate and nitrite

storage calculations were excluded due to their low concentrations throughout the peat. Ammonium storage is expressed as g-N/m², while DON is expressed as g-DON/m².

Table 8. Linear regressions through ammonium vs depth data. Slope, intercept and r² values tabulated for all data, bog, dry fen, and wet fen for data from 2012-2014.

	all data	bog	dry fen	Wet fen
A) Linear regressions NH ₄ vs depth				
Slope	2.42	3.55	2.31	2.05
intercept	-0.78	-1.77	1.21	-0.73
r ²	0.47	0.81	0.58	0.75
Depth interval	N (g/m ²)			
0 – 3 m	5.72	6.52	9.13	4.54
0 – 5 m	18.2	23.9	23.7	15.1
0 – 7 m	37.4	51.2	44.8	31.3

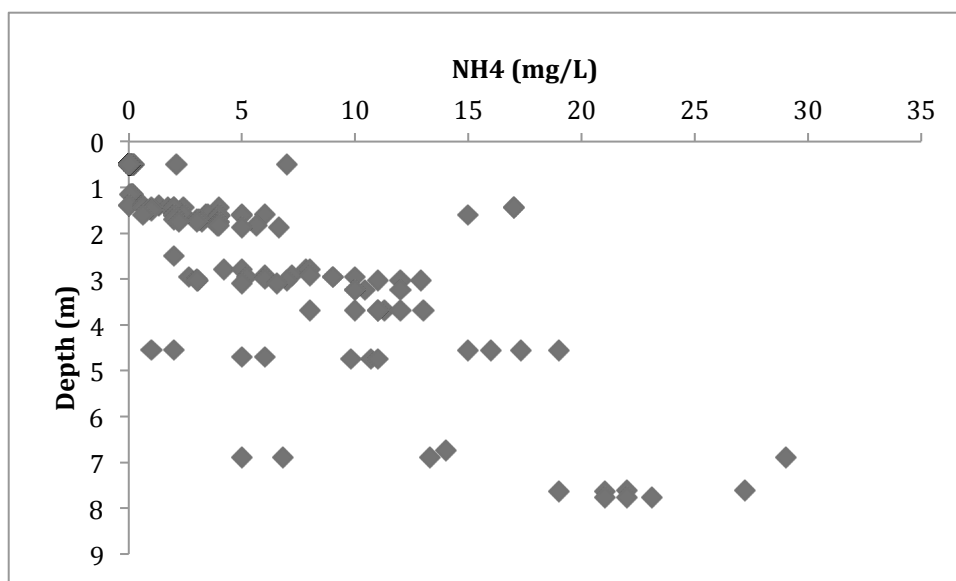


Figure 33. Ammonium concentrations vs sampling depth for data from 2012-2014.

Ammonium concentrations increase with depth.

In general, ammonium concentration increases with depth and vary across landscape units. The bog has the highest ammonium storage of 51.2 g-N/m² over the 7 m depth, while the wet fen shows the lowest storage of 31.3 g-N/m². The dry fen

lies between the two at 44.8 g-N/m². From 0-3 m the bog and the dry fen show similar storage of ammonium with 23.9 and 23.7 g-N/m², respectively. The dry fen also shows the highest ammonium storage from 0-3 m (9.13 g-N/m²). The wet fen has the lowest storage throughout all depths.

Table 9. Linear regressions through DON vs depth data. Slope, intercept and r² values tabulated for all data, bog, dry fen, and wet fen for data from 2013-2014.

	all data	bog	Dry fen	wet fen
A) Linear regressions DON vs depth				
Slope	2.59	1.65	4.24	1.55
intercept	2.13	2.59	2.49	1.53
r ²	0.31	0.30	0.54	0.26
Depth interval	DON (g/m ²)			
0 – 3 m	13.9	8.16	21.9	8.37
0 – 5 m	36.4	24.7	56.9	22.3
0 – 7 m	58.9	47.2	107	46.4

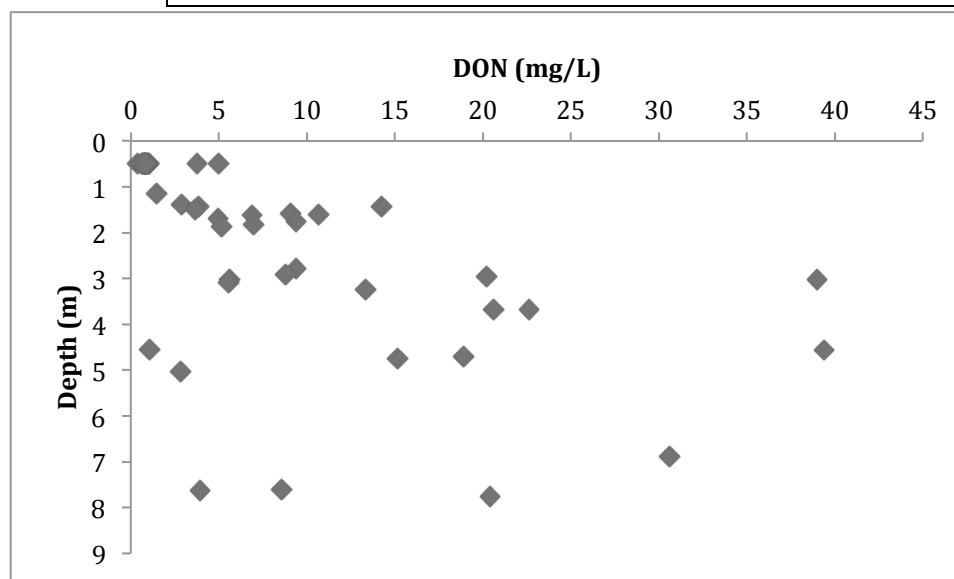


Figure 34. DON concentrations vs sampling depth for data from 2013-2014. DON concentrations increase with depth.

Overall the correlation between DON concentrations and depth are weaker than with ammonium. The bog and wet fen show similar DON storage throughout all depths and increasing with depth ranging from 8.16 g-DON/m² from 0-3 m to 47.2

g-DON/m² from 0-7m. The dry fen has DON storage values twice that of the bog and wet fen for all depths ranging from 21.9 g-DON/m² at 0-3 m to 107 g-DON/m² from 0-7 m.

It is estimated that northern peatlands store 10 Gt N and have the highest the highest N per unit area of all terrestrial ecosystems (Yu 2012, Novak et al 2011). Atmospheric inputs of nitrogen in the area are less than 2 gN/m²/yr (Vitt et al 1995). Bog and fen water often have inorganic nitrogen (NO₂, NO₃) levels at or below detection limits with increasing NH₄ and DON with depth (Pearsall 1938, Vitt *et al.*, 1995). Nitrogen concentrations at ML are similar to other peatlands in the region (Vitt et al 1995). The nitrogen that is deposited onto the peatland is immobilized in organic matter or present in pore waters as inorganic N (NO₂, NO₃, and NH₄) and as DON. The accumulation of ammonium with depth occurs due to the degradation of peat overtime where the NH₄ within the cell diffuses from within the cell onto cation exchange sites. However, the ammonium can be easily displaced by other ions especially at depth where there is groundwater influence.

Peatlands are generally a sink for inorganic N and a source of organic nitrogen (Petrone et al. 2007), but this is not always the case and peatlands can act as a sink or source for both organic and inorganic nitrogen (Devito et al. 1989). ML appears to be a source and sink of organic nitrogen. DON and NH₄ are produced at depth in the depth of the peatland and then remain there. However, the different landscape units have difference in their nitrogen inventories. Ammonium storage is highest in the bog while DON storage is highest in the dry fen. The wet fen has the lowest storage for both DON and NH₄. This could be due to increased water

movement in this landscape unit or due to a decrease in groundwater influence where the ammonium at depth is still bound to the peat through cation exchange. The wet fen and bog have similar DON storage.

This lack of storage in the bog and wet fen however may be due to different processes in these landscape units. Nitrogen storage and accumulation is impacted by vegetation and differences in vegetation between the landscape units may lead to differences in storage (Craft 1997). The concentrations of inorganic and organic N in the wet fen may differ from the dry fen due to several different factors. The first is that the wet fen has a higher water content than the dry fen (Shulba Pers Com 2015) and the low concentrations and therefore low inventory is due to dilution. The second is the difference in vegetation may cause nitrogen to be stored in plant material rather than pore water (Craft 1997). It has also been shown that plants can use LMW DON directly without converting it to nitrate or ammonium (Jones et al. 2004). The plants in the wet fen may preferentially use DON more than plants in the dry fen. The bog may also have this preferential use of LMW DON. Bogs have also been shown to have rapid turnover of nitrogen pools and are able to use more of the nitrogen in the nitrogen pool (Craft 1997). The lack of DON in the bog could then be due to its use by vegetation.

5.3 Nitrogen Transport

5.3.1 JPH

At JPH total N concentrations decrease rapidly with depth, indicating that nitrogen inputs are almost entirely utilized by plants in the near surface. The unused nitrogen is leached through the upland surface and is reduced to ammonium

at depth. Water flow and therefore nitrogen transport follows topography from the upland toward the fen. The residence time is a controlling factor for nitrogen transport and may change throughout the year. Snowmelt inputs in the early spring may flow through the fen with without being utilized due to high flow rates and low productivity. Nitrogen transport should follow the flow path of the water, but may be retarded relative to groundwater flow rates due to adsorption. Concentrations of nitrogen along the flow path may decrease due to plant utilization and degradation, or may increase if there are nitrogen source present in the subsurface (degradation of organic matter). Nitrogen may be converted to a different species and may be stored and released before exiting the system (Kadlec et al. 2005). Increases in nitrogen input to JPH may cause unused nitrogen to be converted to DON and leached out of the system (Bridgham et al. 1998). Overall at JPH when nitrogen exceeds capacity it will follow groundwater flow.

5.3.2 Nitrogen Storage and Transport ML

DON and NH_4 concentrations increase with decreasing K. This shows that there is accumulation of inorganic and organic nitrogen at depth in the fens and bogs at ML where the high concentrations of NH_4 and DON are not mobile due to low hydraulic conductivity. The deepest layers of the peat at ML have a large nitrogen inventory, but limited capacity for transport due to the low hydraulic conductivity. The opposite holds true with nitrate, it is present in low concentrations in shallow peat groundwater, because it is used or converted before it has a chance to accumulate. This zone also has higher hydraulic conductivities, and greater potential to

transport any nitrogen present. Previous studies have found that DOC can be transported vertically in the peat profile both upwards and downwards depending on flow and can lead to the accumulation of DOC at depth (Lapshina 2014). DON may similarly be transported vertically based on upwards or downwards flow. The higher DON concentrations in the dry fen as opposed to the other landscape units may be due to more DON being transported downward in this landscape unit or to increased DON production in this landscape unit.

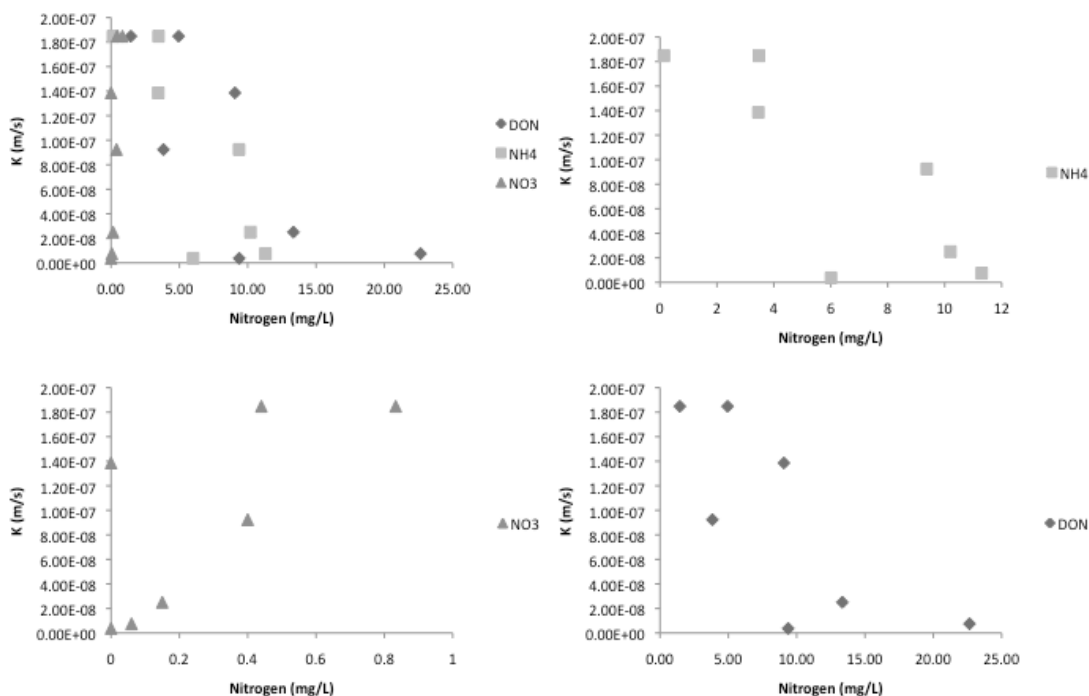


Figure 4. Nitrogen vs. hydraulic conductivity (K) values (m/s) at ML for hydraulic conductivity values taken in 2011 and 2012.

Nitrogen transport may at ML be slower than water transport, but should follow the flow paths. Changes in annual climate variables can also impact nitrogen transport. During drier years there is less water flow and connection between landscape units (Kusel 2014). Less water flow leads to less nitrogen transport and may cause the nitrogen to sink and unused nitrogen to be stored instead of transported out of the wetland. In this case the wetland may be more of a sink of nitrogen.

Snowmelt timing also changes nitrogen storage and transport. Lack of snow accumulation and slow snowmelt would lead to nitrogen being incorporated into the wetland rather than runoff. In contrast high snow accumulations with quick snowmelts lead to the majority of nitrogen stored in the snow to be exported from the system before being incorporated into the wetland.

Years with high precipitation both as snow and rain can lead to more nitrogen transport within and out of the system. Wet years could cause increased connectivity between landscape units due to runoff and more water in the top layer of the wetland (Kusel 2014). This top layer of the wetland is the most mobile and wet years could cause the nitrogen stored in this layer to be exported out of the system causing the wetland to act as a source of nitrogen. Studies have also suggested that long term increases in precipitation may flush porewater with precipitation and lead to increases in peat degradation (Morris and Waddington 2011). If this increase in connectivity were to occur at ML then nitrogen produced and stored at depth may become more mobile.

Due to climate change the wetland may have more or less wet and dry years which would impact nitrogen storage and transport within and out of the wetland. If there is increasing nitrogen due to industrial activity and an increase in precipitation and/or a quick snowmelt more nitrogen would be exported downstream.

While nitrogen appears to be stored at depth at ML it is not accurate to label it as a nitrogen sink. Since the DON and ammonium is produced by the degradation of peat the deep pools of nitrogen are more accurately defined as a source of nitrogen. However, due to low hydraulic conductivity values at depth there is likely little to no movement of this nitrogen pool. The amount of nitrogen stored at ML could also have consequences downstream if changes to the hydrology of the site mean the stored nitrogen was available for biological use and transport.

Increased nitrogen loading to wetlands leads to changes in vegetation, specifically a shift from mosses to vascular plants. This shift can lead to a decrease in the amount of peat accumulation. Less stored carbon may decrease the amount of denitrification that can occur (Craft 1997). This change leads to more nitrogen being released back into the atmosphere, being stored in the peatland, or exported downstream.

Previous work indicated an active layer of peat from the surface to approximately 2 meters deep. Tritium concentrations and seasonal and annual variability throughout this layer indicate that this is the most active layer in the wetland, but it far from homogenous. There appear to be pockets of stagnant water as well as areas that act as a conduit for water. Nitrogen that is produced or

deposited in this area may be transported out of the wetland or may remain in an area of slow to non-moving water.

Figure 36 shows an updated model of nitrogen transport at JPH and ML and possible changes in the future. At JPH increases in nitrogen that exceed uptake by vegetation would be transported downstream out of the site. Low hydraulic conductivity in the uplands at ML indicates that nitrogen deposited onto this landscape will not be transported downwards, but flow towards the peatland. The highest potential for movement in the peatland is in the first two metres, but this process appears to be highly variable. Nitrogen is also produced internally with the degradation of peat. The greater the layer of peat the higher DON and ammonium production. Areas with low k values also indicate nitrogen production. Where there is large peat accumulation and low flow the nitrogen produced is stored within the porewaters of the peat and not transported downstream. Changes to precipitation trends or excavation of the site could release this nitrogen.

Potential for N Movement

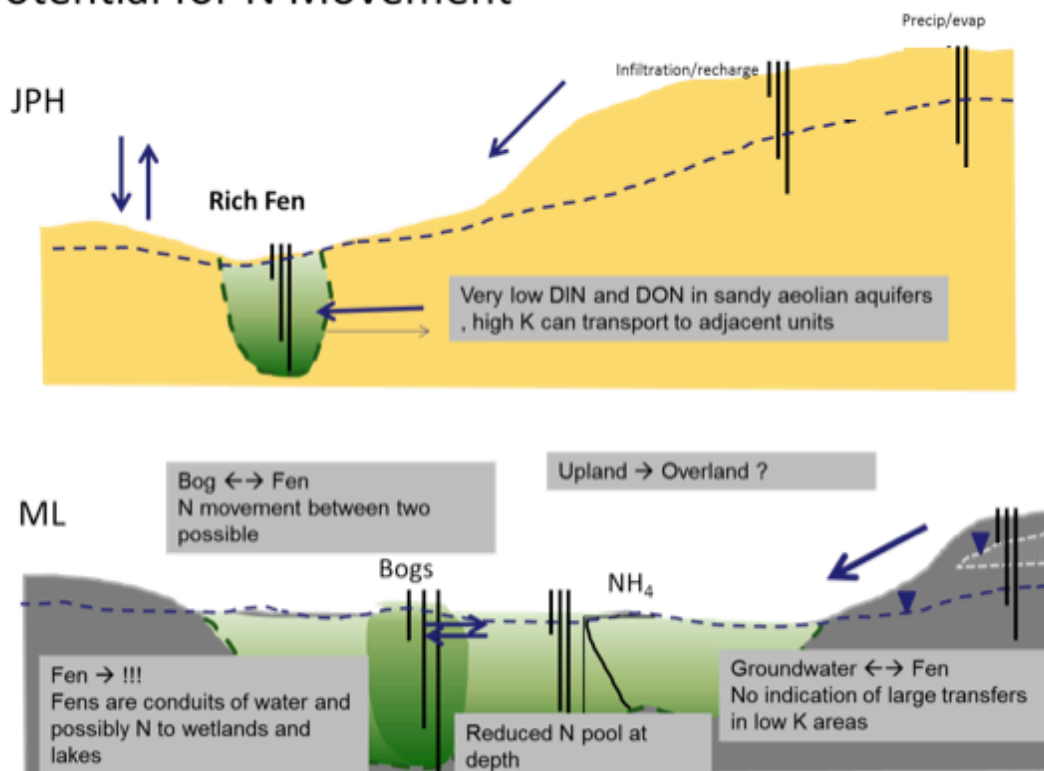


Figure 5. Updated potential for N movement at JPH (top) and ML (bottom). At JPH there is little nitrogen and nitrogen is transported from uplands to fen. At ML nitrogen concentrations increase with depth and remain relatively immobile.

Chapter 6 Conclusions

The purpose of this study was to further examine hydrological connectivity at two boreal wetland rich sites and how this impacts nitrogen and storage at these sites. This was done by examining geochemical and isotopic data collected from 2011-2015. The objectives of this study were: 1) to see if ^3H measurements can improve our understanding of connectivity between landscape units, 2) to determine the forms of nitrogen (NH_4 , NO_3 , NO_2 and DON) present in the different ecosystem types (fens, bogs and jackpine uplands) throughout the study sites, 3) to explore possible controls on nitrogen species concentrations, and 4) to understand the potential nitrogen storage and transport within and out of the study sites based on the hydrological connectivity between the various landscape units.

1) To see if ^3H measurements can improve our understanding of connectivity between landscape units

Tritium values were helpful in understanding the hydrology of ML as a whole. They support the previous estimates of hydraulic conductivity, and showed that hydraulic conductivities decrease with depth and that below about 3 m groundwater in the peat is old (pre-1950) and not well flushed. Water sampled at 1.5-3 metres depth was consistent with bomb peak water and therefore likely greater than 50 years old. However the peat is not uniform. There are areas at the same depth with average tritium and higher variability indicating more of a seasonal signal. Past research has concluded that the activity zone is from 0-2 m and

after that there is little variability in isotopic and geochemical signatures. While these layers are not uniform and there appear to be flow paths and pockets of stagnations within the active zone, the top two meters of peat are still the most active in terms of water and nutrient movement.

2) To determine the forms of nitrogen (NH_4 , NO_3 , NO_2 and DON) present in the different ecosystem types (fens, bogs and jackpine uplands) throughout the study sites

At JPH nitrogen concentrations are lower overall compared to ML. Nitrite concentrations are zero or below detection limits throughout the uplands and fen. Nitrate is found through the upland and the fen at all depths. DON is found in the medium and deep wells in both the upland and the fen and NH_4 concentrations are highest in the fen surface waters.

At ML there is also little nitrite throughout the upland and peatland. Low concentrations of all nitrogen species are found within the uplands. The majority of the nitrate is found at the surface of the peatland and is then used or transformed before it reaches depth. DON and NH_4 concentrations are highest in the deepest wells where it is produced in situ.

3) To explore possible controls on nitrogen species concentrations

The possible nitrogen controls examined in this study did not show any correlation between nitrogen species and pH, alkalinity, or Eh at JPH. At JPH alkalinity and pH

are correlated. At ML ammonium and pH are correlated. pH is an indication of groundwater which in turn determines how much ammonium is disassociated from the peat and becomes part of the porewater. Interactions between nitrogen species and other geochemical parameters may complex and are unable to be separated into correlations.

4) To understand the potential nitrogen storage and transport within and out of the study sites based on the hydrological connectivity between the various landscape units.

JPH

At JPH it is believed that excess nitrogen at significant concentrations in groundwater will not occur in the uplands due to plant use. Any excess nitrogen entering the system in the uplands will then follow hydrological flow paths towards the fen and then flow northward along the fen and out of the site under oxygenated conditions. Nitrogen produced within the fen or entering from groundwater may be stored there, but current low nitrogen concentrations indicate that it is more likely that the nitrogen will follow hydrological flow paths along the fen. This lack of nitrogen found at JPH may mean that increased nitrogen deposition at JPH not used by vegetation will flow out of the site. This nitrogen may be deposited outside of the study site and cause changes to the vegetation where it is deposited.

ML

At ML DON and ammonium are stored at depth. However they are not stored equally or in the same landscape units. This means that wetlands cannot be treated as a whole when it comes to nitrogen storage. While DON and ammonium are stored at depth the peatland should not be thought of as a sink for nitrogen because it is produced in the same location it stored. The peatland is a non-moving source of nitrogen. This may change if the nature of the wetland and the nitrogen becomes mobile. The transportation rates of nitrogen are longer than water residence times throughout the wetland as seen by the increased concentrations of nitrogen in the surface water as compared to precipitation and snow nitrogen concentrations.

6.1 Future Recommendations

The following are suggestions to build upon this and previous work at these sites. These suggestions are intended to target improvement in understanding of the hydrology and nitrogen transport of boreal peatlands.

JPH

At JPH it would be beneficial to complete a GPR analysis similar to ML. While there is reasonably certainty of the underlying geology GPR could be used to confirm geology as well as better understand the peatland depth and structure. Sampling of tritium in conjunction with ^{18}O and ^2H over several months/years could be used to understand residence times. While it is currently thought that residence

times at JPH are shorter than ML, changes in tritium, ^{18}O and ^2H could be used to determine if the residence time is on the scale of months or years. Adding ^{15}N to the uplands and tracing its path towards the fen and movement in the fen would provide a better understanding of nitrogen residence times. Research indicated nitrogen; ammonium in particular, has longer residence times in wetlands than water due to nitrogen transformation and storage. This would increase understanding of residence times in both the upland and fen and help understand the timeframe of how increased nitrogen concentrations interact with the system.

JPH has changed as a site over the course of this study. A large cut-block to the west of the fen in 2013 and a beaver dam on the northern end of the instrumented section of the fen appear to have changed how much water is in the fen and if that water is moving along the surface. Further study could examine if the site still functions as a wet fen and what any changes might mean for nitrogen addition to areas of forest disturbance. Discontinuation of the site due to disturbance and beaver dam activity may be warranted.

ML

At ML a full tritium sampling should be done to better understand residence times. In addition to sampling all current piezometer nests for tritium a peat core could be used to sample tritium on a smaller scale to examine peaks that may be missed with the limited depths of the piezometer nests. This additional tritium could confirm the hypothesis that the tritium peak seen from 1.5-3 meters is from

nuclear testing. It would also give more insight into the how hydrologically connected the surface of the peatland is with the depths of the peatland. Cores taken in each landscape unit would be beneficial to explore if different landscape units show different peak depths.

While there are currently hydraulic conductivity values for ML further measurements should be taken to include a greater percentage of the piezometer nests and to examine discrepancies between past sampling data. A set of conductivity measurements taken at set depths e.g. every 0.5 -1 m could be taken to give a more accurate sense of how hydraulic conductivity changes with depth throughout the peatland.

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Appendix A

JPH Instrumentation (location, depth, vegetation)

	Vegetation	Latitude	Longitude	Elevation (masl)	Well Depth (m)	Years of operation
Water Table Wells						
JPHA	fen	57.1193	-111.4436	333.81	0.00	2011-2015
JPHB	fen	57.1196	-111.4452	333.39	0.00	2011-2015
JPHC	fen	57.1211	-111.4464	332.40	0.00	2011-2013
JPHD	fen	57.1203	-111.4456	333.01	0.00	2011-2013
JPHE	fen	57.1218	-111.4469	331.92	0.00	2011-2013
JPHF	fen	57.1226	-111.4480	331.17	0.00	2011-2013
JPHG	fen	57.1204	-111.4446	333.29	0.00	2011-2013
Piezometer Nests						
Drivepoints are classified as Steel (S) or PVC (PVC)						
JPHP01A (S)	upland	57.1216	-111.4398	334.72	6.26	2011-2015
JPHP01B (S)	upland	57.1216	-111.4398	334.72	3.14	2011-2015
JPHP01C (S)	upland	57.1216	-111.4398	334.72	1.91	2011-2015
JPHP02A (S)	upland	57.1220	-111.4375	334.54	6.22	2011-2015
JPHP02B (S)	upland	57.1220	-111.4375	334.54	3.12	2011-2015
JPHP02C (S)	upland	57.1220	-111.4375	334.54	1.80	2011-2015
JPHP03A (S)	upland	57.1228	-111.4375	335.27	6.23	2011-2015
JPHP03B (S)	upland	57.1228	-111.4375	335.27	2.95	2011-2015
JPHP03C (S)	upland	57.1228	-111.4375	335.27	2.77	2011-2015
JPHP04A (S)	upland	57.1233	-111.4391	334.61	6.24	2011-2015
JPHP04B (S)	upland	57.1233	-111.4391	334.61	3.12	2011-2015
JPHP04C (S)	upland	57.1233	-111.4391	334.61	2.49	2011-2015
JPHP05A (S)	upland	57.1230	-111.4413	334.25	6.22	2011-2015
JPHP05B (S)	upland	57.1230	-111.4413	334.25	3.14	2011-2015
JPHP05C (S)	upland	57.1230	-111.4413	334.25	2.44	2011-2015
JPHP06A (S)	upland	57.1222	-111.4427	334.23	6.24	2011-2015
JPHP06B (S)	upland	57.1222	-111.4427	334.23	3.15	2011-2015
JPHP06C (S)	upland	57.1222	-111.4427	334.23	2.13	2011-2015
JPHP07A (S)	upland	57.1214	-111.4426	334.31	6.28	2011-2015
JPHP07B (S)	upland	57.1214	-111.4426	334.31	3.17	2011-2015
JPHP07C (S)	upland	57.1214	-111.4426	334.31	1.90	2011-2015
JPHP08A (S)	fen	57.1196	-111.4436	333.68	6.14	2011-2015
JPHP08B (S)	fen	57.1196	-111.4436	333.68	3.20	2011-2015
JPHP08C (PVC)	fen	57.1196	-111.4436	333.68	1.09	2011-2015
JPHP09A (S)	fen	57.1204	-111.4454	333.33	6.23	2011-2015
JPHP09B (S)	fen	57.1204	-111.4454	333.33	3.13	2011-2015
JPHP09C (PVC)	fen	57.1204	-111.4454	333.33	1.20	2011-2015
JPHP10A (S)	fen	57.1219	-111.4468	332.47	6.28	2011-2015
JPHP10B (S)	fen	57.1219	-111.4468	332.47	3.20	2011-2015
JPHP10C (PVC)	fen	57.1219	-111.4468	332.47	0.98	2011-2015
JPHP11A (S)	upland	57.1215	-111.4343	335.10	6.07	2011-2015
JPHP11B (S)	upland	57.1215	-111.4343	335.10	2.96	2011-2015
JPHP11C (S)	upland	57.1215	-111.4343	335.10	1.81	2011-2015
JPHP12 (PVC)	upland	57.1242	-111.4411	331.00	2.63	2011-2014

Appendix B: ML Instrumentation (location, depth, vegetation)

	Vegetation	Latitude	Longitude	Elevation (masl)	Well Depth (m)	Years of Operation
Water Table Wells						
MLA	fen	55.8982	-112.0964	698.94	0.00	2011-2015
MLB	fen	55.8971	-112.0965	698.98	0.00	2011-2015
MLC	bog	55.8961	-112.0972	699.12	0.00	2011-2015
MLD	fen	55.8983	-112.0935	699.03	0.00	2011-2015
MLE	fen	55.8978	-112.0914	698.94	0.00	2011-2015
MLF	bog	55.8951	-112.0952	699.25	0.00	2011-2015
MLG	fen	55.8986	-112.0897	698.71	0.00	2011-2015
MLH	fen	55.8973	-112.0935	699.12	0.00	2011-2015
MLM	bog	55.8979	-112.0900	698.90	0.00	2011-2015
MLN	fen	55.8969	-112.0918	699.07	0.00	2011-2015
MLO	bog	55.8955	-112.0953	699.28	0.00	2011-2015
MLP	bog	55.8949	-112.0947	699.33	0.00	2011-2015
MLQ	fen	55.8975	-112.0915	699.01	0.00	2011-2015
MLR	fen	55.8965	-112.0917	699.04	0.00	2011-2015
MLS	fen	55.8962	-112.0930	699.15	0.00	2011-2015
MLT	fen	55.8959	-112.0947	699.14	0.00	2011-2015
MLU	fen	55.8958	-112.0925	699.11	0.00	2011-2015
MLV	bog	55.8955	-112.0940	699.42	0.00	2011-2015
Piezometer Nests						
Drivepoints are classified as Steel (S), Jumbo (J), or PVC (PVC)						
MLP01A (S)	upland	55.8996	-112.0936	701.00	2.12	2011-2015
MLP01B (J)	upland	55.8996	-112.0936	701.00	0.80	2011-2015
MLP02A (S)	upland	55.8992	-112.0936	703.06	4.17	2011-2015
MLP02B (J)	upland	55.8992	-112.0936	703.06	1.35	2011-2015
MLP03A (S)	edge	55.8987	-112.0936	699.45	2.82	2011-2015
MLP03B (J)	edge	55.8987	-112.0936	699.45	1.13	2011-2015
MLP04A (S)	fen	55.8981	-112.0936	699.08	4.70	2011-2015
MLP04B (J)	fen	55.8981	-112.0936	699.08	2.79	2011-2015
MLP04C (J)	fen	55.8981	-112.0936	699.08	1.59	2011-2015
MLP05A (S)	fen	55.8967	-112.0936	699.13	6.89	2011-2015
MLP05B (J)	fen	55.8967	-112.0936	699.13	4.56	2011-2015
MLP05C (J)	fen	55.8967	-112.0936	699.13	3.02	2011-2015
MLP05D (J)	fen	55.8967	-112.0936	699.13	1.61	2011-2015
MLP06A (S)	edge	55.8953	-112.0925	699.10	2.22	2011-2015
MLP06B (S)	edge	55.8953	-112.0925	699.10	1.45	2011-2015
MLP07A (S)	upland	55.8950	-112.0917	701.21	4.44	2011-2015
MLP07B (S)	upland	55.8950	-112.0917	701.21	1.40	2011-2015
MLP08A (S)	bog	55.8942	-112.0939	699.25	2.95	2011-2015
MLP08B (S)	bog	55.8942	-112.0939	699.25	1.50	2011-2015
MLP09A (S)	bog	55.8947	-112.0941	699.13	3.02	2011-2015
MLP09B (J)	bog	55.8947	-112.0941	699.13	1.39	2011-2015
MLP10A (S)	bog	55.8955	-112.0953	699.29	7.61	2011-2015
MLP10B (S)	bog	55.8955	-112.0953	699.29	3.23	2011-2015

	Vegetation	Latitude	Longitude	Elevation (masl)	Well Depth (m)	Years of Operation
Piezometer Nests Cont.						
MLP10C (J)	bog	55.8955	-112.0953	699.29	1.70	2011-2015
MLP11A (S)	fen	55.8965	-112.0964	699.09	7.76	2011-2015
MLP11B (J)	fen	55.8965	-112.0964	699.09	4.74	2011-2015
MLP11C (J)	fen	55.8965	-112.0964	699.09	1.83	2011-2015
MLP12A (S)	fen	55.8979	-112.0957	699.04	3.10	2011-2015
MLP12B (J)	fen	55.8979	-112.0957	699.04	1.86	2011-2015
MLP13A (S)	edge	55.8983	-112.0959	699.28	2.95	2011-2015
MLP13B (J)	edge	55.8983	-112.0959	699.28	1.28	2011-2015
MLP14A (S)	upland	55.8990	-112.0959	700.78	2.17	2011-2015
MLP14B (J)	upland	55.8990	-112.0959	700.78	0.92	2011-2015
MLP15A (S)	fen	55.8969	-112.0902	698.97	7.64	2011-2015
MLP15B (S)	fen	55.8969	-112.0902	698.97	3.68	2011-2015
MLP15C (PVC)	fen	55.8969	-112.0902	698.97	1.44	2011-2015
MLP16A (S)	bog	55.8979	-112.0900	698.78	6.74	2011-2015
MLP16B (S)	bog	55.8979	-112.0900	698.78	2.91	2011-2015
MLP16C (PVC)	bog	55.8979	-112.0900	698.78	1.60	2011-2015
MLP17A (S)	fen	55.8985	-112.0896	698.79	4.55	2011-2015
MLP17B (S)	fen	55.8985	-112.0896	698.79	2.50	2011-2015
MLP17C (PVC)	fen	55.8985	-112.0896	698.79	1.16	2011-2015
MLP18A (S)	fen	55.8982	-112.0910	698.96	5.04	2011-2015
MLP18B (S)	fen	55.8982	-112.0910	698.96	3.00	2011-2015
MLP18C (PVC)	fen	55.8982	-112.0910	698.96	1.75	2011-2015
MLP19A (S)	fen	55.8962	-112.0930	699.08	3.68	2011-2015
MLP19B (J)	fen	55.8962	-112.0930	699.08	1.44	2011-2015

Appendix C: JPH Sampling Details

JPH	Number of samples analyzed										
	number of sampling sites = 44 12 piezometer nests = 34 sampling sites 7 water table wells = 7 sampling sites open water, rain collector, weir = 3 sampling sites										
Fieldwork Campaign	July 2011	Aug 2011	Mar 2012	Apr 2012	May-June 2012	July-Aug 2012	Sep 2012	June 2013	June 2014	Oct 2014	March 2015
SUBMITTED FOR LAB ANALYSIS:											
Water Isotopes (^{18}O , ^2H) ¹	40	43	12	3	45	49	45	45	45		
DIC (^{13}C) ¹	40	43			43	49	44				
Particulates (C:N, ^{13}C , ^{15}N) ¹		40	11	3		44	29				
Nitrates (^{15}N , ^{18}O) ²						44	44				
DOC ³		43		3	38		42	45	45		
Major ions ⁴		42		3	36	2	42	45	45		
Trace metals ⁴		42		3	36	2	42	45	45		
Tritium ⁵											
FIELDWORK:											
Alkalinity		42			38	43	32	45	45		
pH		41			35	39	35	45	45		
Temp		41			35	39	40	45	45		
Eh		41			35	39	36				
Conductivity		41			34	38	37				
COLORIMETRY FIELDWORK:											
Sulphide		33			34	9	35	12			
Nitrogen, Ammonium		35			37	39	41				4
Iron		42			36	39	40	45			
Phosphate		41			36	38	40	45			

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Nitrate		41			38	39	42	45			4
Nitrite		32			38	36	39				
Sulphate		40			38	39	40				

Appendix D: ML Sampling Details

ML	Number of samples analyzed										
	number of sampling sites = 69 19 piezometer nests = 47 sampling sites 18 water table wells = 18 sampling sites open water, rain collector, weir = 3 sampling sites										
Fieldwork Campaign	July 2011	Aug 2011	Mar 2012	Apr 2012	May-June 2012	July-Aug 2012	Sep 2012	June 2013	June 2014	Oct 2014	Mar 2015
SUBMITTED FOR LAB ANALYSIS:											
Water Isotopes (¹⁸ O, ² H) ⁵	48	61	18	6	75	74	67	73	65		
DIC (¹³ C) ¹	48	60			74	70	62				
Particulates (C:N, ¹³ C, ¹⁵ N) ¹		58	18	2		60	40				
Nitrates (¹⁵ N, ¹⁸ O) ⁶						54	64				
DOC ⁷		47		1	38		51	50	43		
Major ions ⁸		45		1	54	3	54	74	70		
Trace metals ⁴		45		1	54	3	54	74	70		
Tritium ⁹										15	
FIELDWORK:											
Alkalinity		67			38	56	40	43	50		
pH		42			40	35	37	42	47		
Temp		42			40	35	37	42	47		
Eh		42			38	29	35	37			
Conductivity		41			39	33	37	42			
COLORIMETRY FIELDWORK:											
Sulphide		31			32	0	21	12			
Nitrogen, Ammonium		42			36	33	55	46			7
Iron		42			32	31	42	60			
Phosphate		42			32	31	42	55			
Nitrate		34			35	31	53	55			7
Nitrite		4			32	30	41		56		7
Sulphate		25			31	32	39	55			

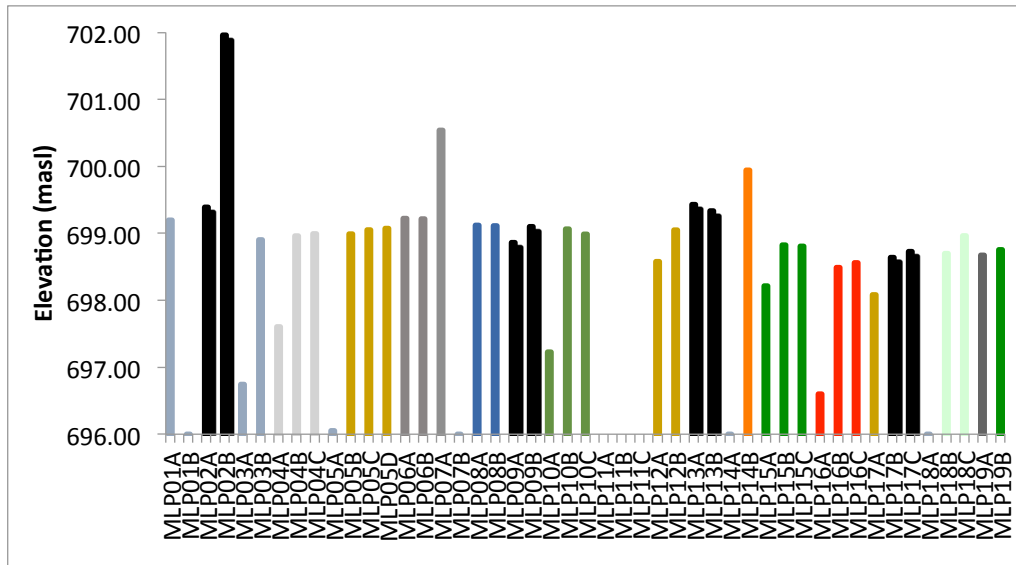
⁵ Alberta Innovates Technology Futures, Victoria

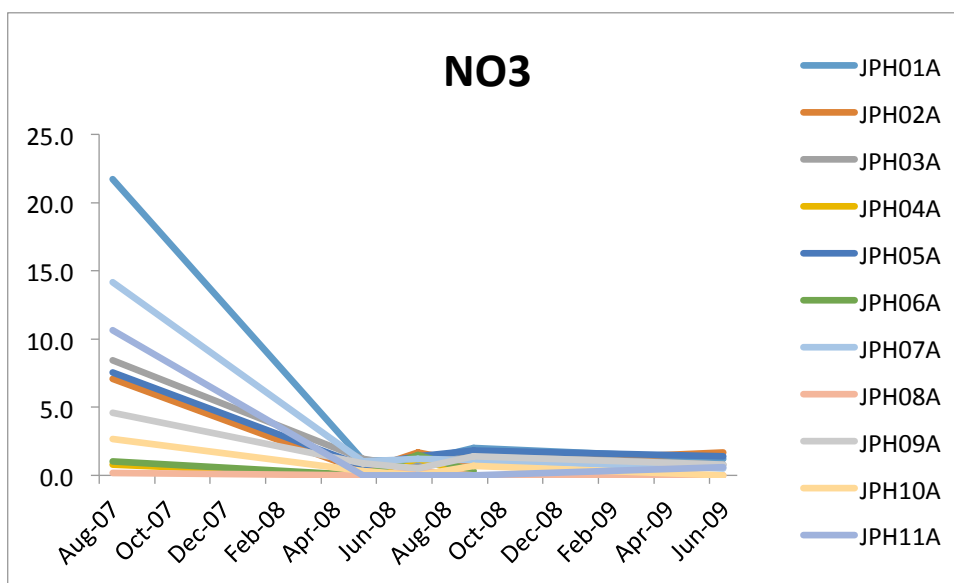
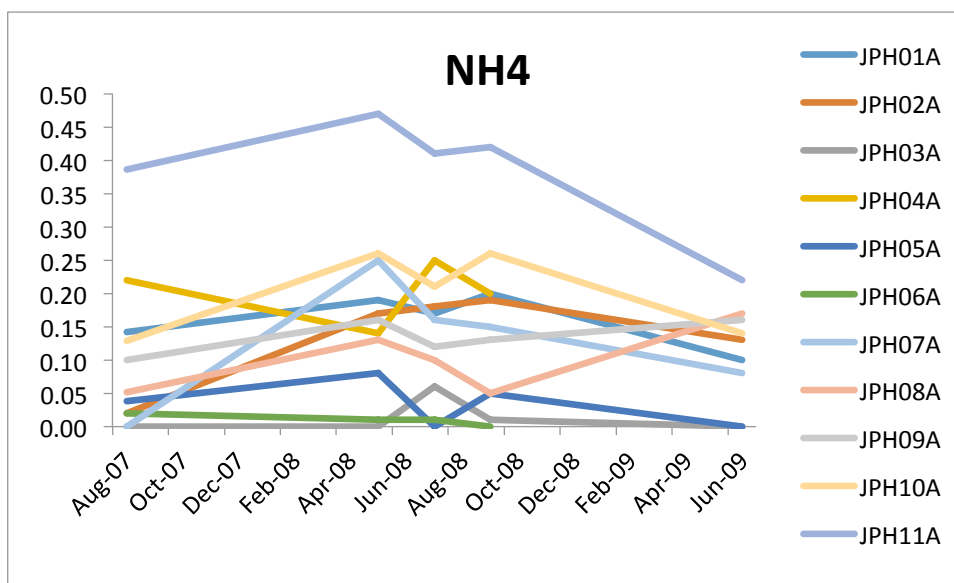
⁶ Isotope Science Laboratory, University of Calgary

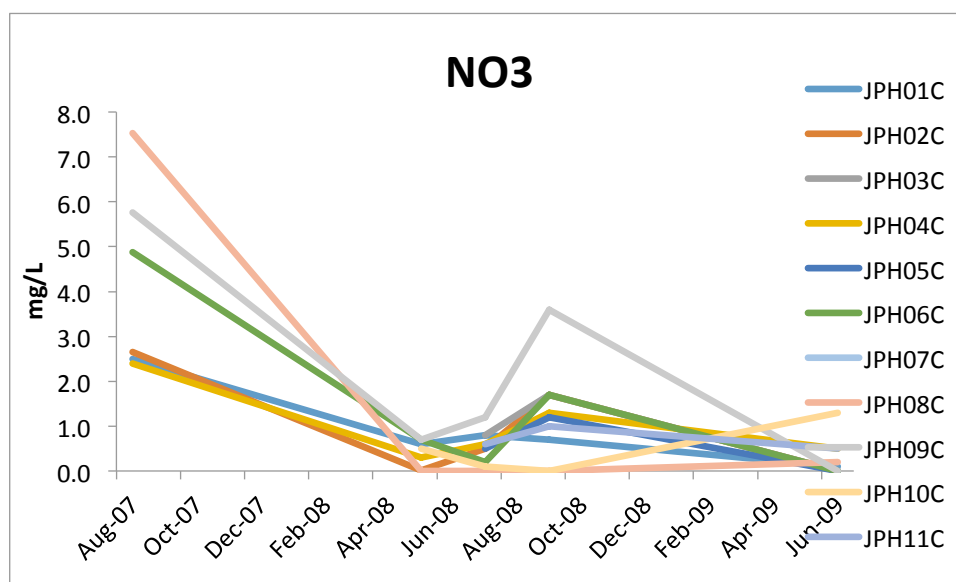
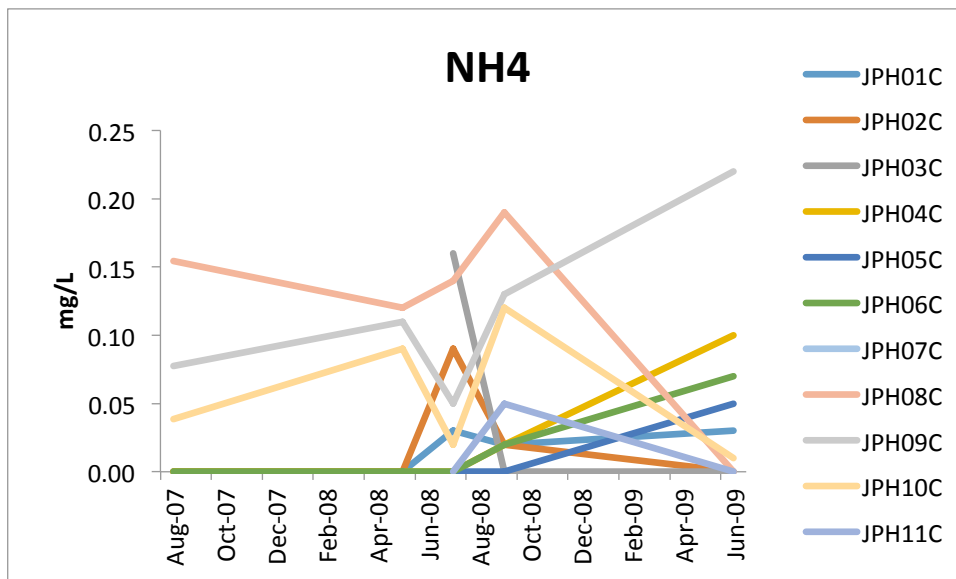
⁷ Alberta Innovates Technology Futures, Vegreville

⁸ Dept of Earth and Environmental Sciences, University of Waterloo

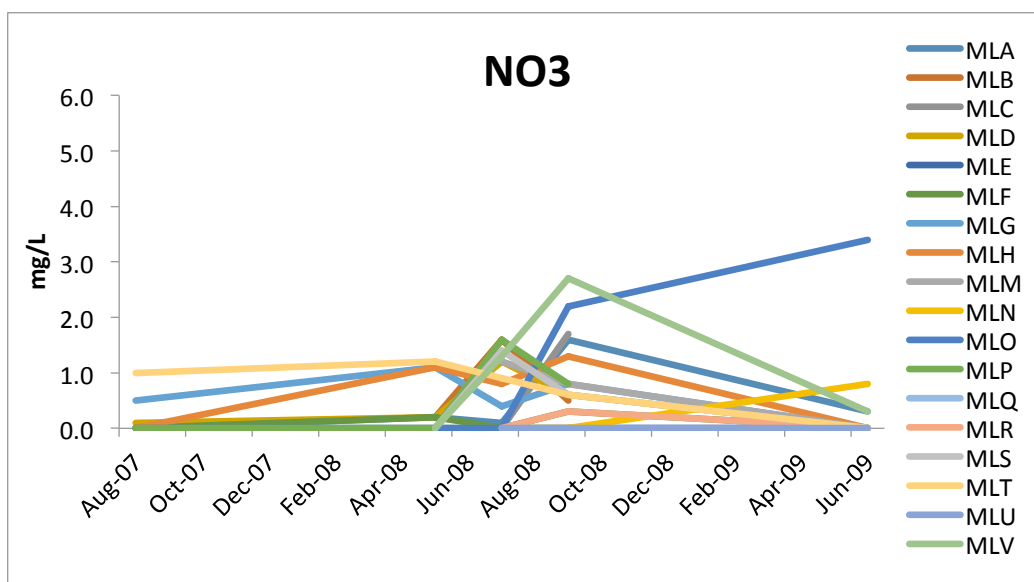
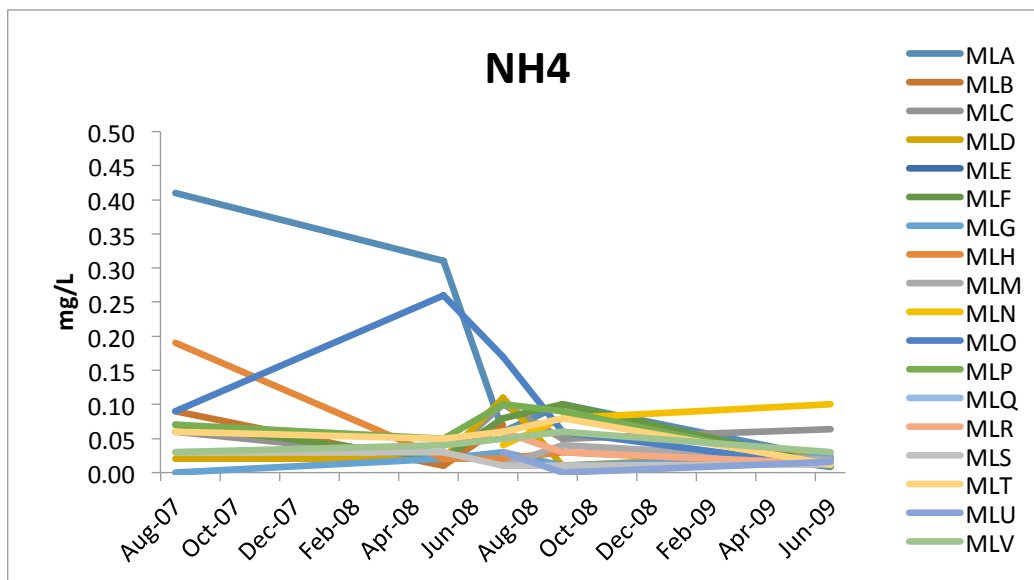
Appendix E: Hydraulic Head 2015

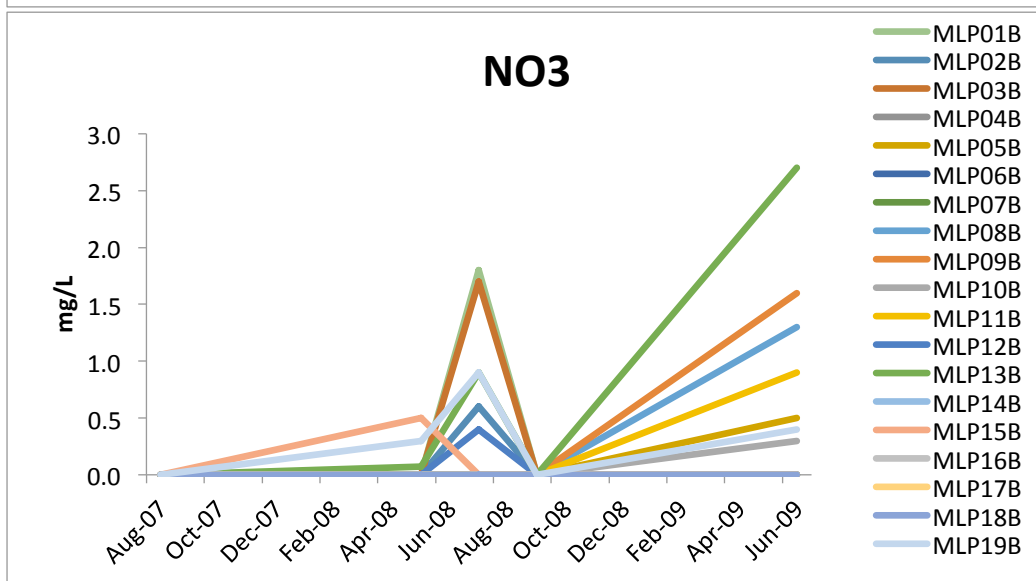
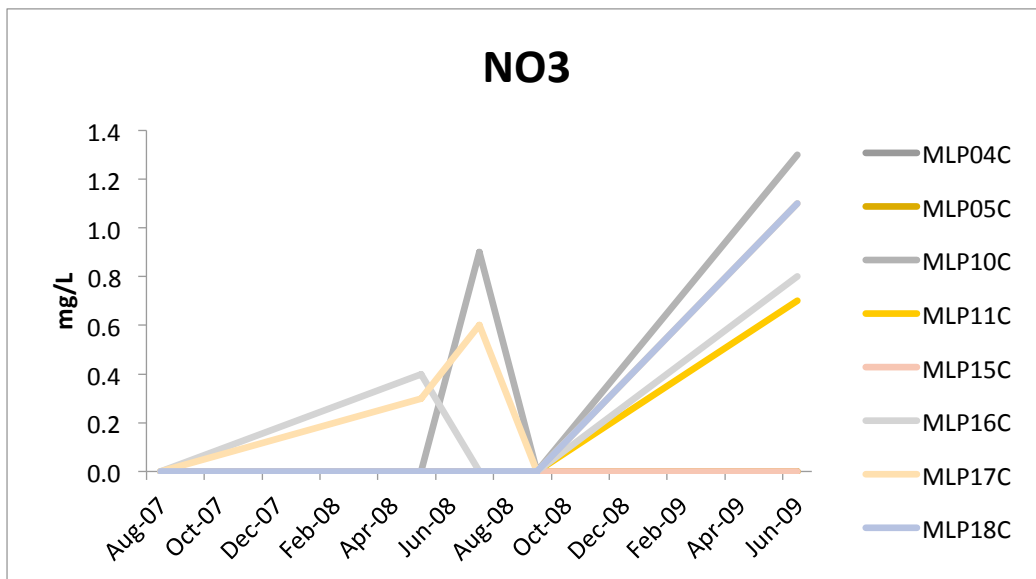






Appendix G: ML Changes in Nitrogen





Appendix H: 2011-2014 Full Data Set

				Fieldwork (ThermoOrion-5 & Flowthrough Cells; Digital Titration)				
Site ID	Site ID	Sample ID	sample date	Temperature	pH	Eh	Conductivity	Alkalinity
			Units	C	--	mV	μ S/cm	mg/L CaCO ₃
			Precision	0.1	0.002	0.2	0.1	0.4
			DL (QL)					
	JPHA	<i>WT</i>						
JPHA	Jul-11	JPH11_077	1-Jul-11	--	--	--	--	--
JPHA	Aug-11	JPH11_034	17-Aug-11	15.1	5.65	41	46	14
JPHA	May-12	JPH12-023	25-May-12	6.3	5.47	211	76	14
JPHA	Jul-12	JPH12_074	19-Jul-12	16.1	6.25	83	138	40
JPHA	Sep-12	JPH12_157	5-Sep-12	15.6	5.38	-60	66	8
JPHA	Jun-13	JPH13_038	13-Jun-13	~16	--	--	--	--
JPHA	Jun-14	JPH14-036	15-Jun-14	16.2	6.63	--	--	17
	JPHB	<i>WT</i>						
JPHB	Jul-11	JPH11_078	1-Jul-11	--	--	--	--	--
JPHB	Aug-11	JPH11_035	17-Aug-11	15.4	5.85	-10	32	11
JPHB	May-12	JPH12-026	25-May-12	--	--	--	--	--

JPHB	Jul-12	JPH12_079	19-Jul-12	16.9	5.66	124	97	7
JPHB	Sep-12	JPH12_156	5-Sep-12	14.0	5.40	-64	65	5
JPHB	Jun-13	--	--	--	--	--	--	--
JPHB	Jun-14	JPH14_026	6/11/14	17.5	6.45	--	--	14
JPHC		<i>WT</i>						
JPHC	Jul-11	JPH11_079	1-Jul-11	--	--	--	--	--
JPHC	Aug-11	JPH11_036	17-Aug-11	15.0	5.95	-30	38	24
JPHC	May-12	JPH12-028	25-May-12	3.0	5.98	186	68	12
JPHC	Jul-12	--	--	--	--	--	--	--
JPHC	Sep-12	JPH12_150	5-Sep-12	13.0	5.64	-162	101	20
JPHC	Jun-13	JPH13_030	13-Jun-13	15.2	4.97	534	113	33
JPHC	GONE!	--	--	--	--	--	--	--
JPHD		<i>WT</i>						
JPHD	Jul-11	JPH11_080	1-Jul-11	--	--	--	--	--
JPHD	Aug-11	JPH11_037	17-Aug-11	16.0	5.90	-119	43	15
JPHD	May-12	JPH12-027	25-May-12	4.4	5.86	219	77	9
JPHD	Jul-12	JPH12_084	19-Jul-12	16.2	5.70	93	95	7
JPHD	Sep-12	JPH12_154	5-Sep-12	15.1	5.46	-51	65	5
JPHD	Jun-13	JPH13_034	13-Jun-13	17.1	6.05	-54	98	22
JPHD	GONE!	--	--	--	--	--	--	--

JPHE		<i>WT</i>						
JPHE	Jul-11	JPH11_081	1-Jul-11	--	--	--	--	--
JPHE	Aug-11	JPH11_038	17-Aug-11	14.1	6.13	-75	44	14
JPHE	May-12	JPH12-029	25-May-12	2.3	5.54	242	67	4
JPHE	Jul-12	JPH12_085	19-Jul-12	15.7	5.49	169	95	6
JPHE	Sep-12	JPH12_146	4-Sep-12	13.1	5.46	-153	70	6
JPHE	GONE!	--	--	--	--	--	--	--
JPHF		<i>WT</i>						
JPHF	Jul-11	JPH11_082	1-Jul-11	--	--	--	--	--
JPHF	Aug-11	JPH11_039	17-Aug-11	15.2	6.07	-93	43	10
JPHF	May-12	JPH12-032	26-May-12	8.4	6.23	-66	68	15
JPHF	Jul-12	JPH12_090	19-Jul-12	15.2	5.60	-75	114	16
JPHF	Sep-12	JPH12_144	4-Sep-12	14.4	5.45	76	69	4
JPHF	Jun-13	JPH13_026	11-Jun-13	15.1	6.6	691	89	120
JPHF	GONE!	--	--	--	--	--	--	--
JPHG		<i>WT</i>						
JPHG	Jul-11	JPH11_083	1-Jul-11	--	--	--	--	--
JPHG	Aug-11	JPH11_040	17-Aug-11	15.8	5.95	-20	28	10
JPHG	May-12	JPH12-025	25-May-12	6.3	6.06	226	92	27
JPHG	Jul-12	JPH12_080	19-Jul-12	17.0	5.69	171	79	7

JPHG	Sep-12	JPH12_155	5-Sep-12	13.7	5.51	-91	79	13
JPHG	Jun-13	JPH13_039	13-Jun-13	~16	--	--	--	--
JPHG	GONE!	--	--	--	--	--	--	--
JPHP01A		3						
JPHP01A	Jul-11	JPH11_044	1-Jul-11	--	--	--	--	--
JPHP01A	Aug-11	JPH11_001	14-Aug-11	12.4	6.06	-74	129	78
JPHP01A	May-12	JPH12-064	28-May-12	7.4	6.15	-164	133	52
JPHP01A	Jul-12	JPH12_107	22-Jul-12	10.2	6.10	-398	0	63
JPHP01A	Sep-12	JPH12_120	2-Sep-12	8.8	6.10	203	132	49
JPHP01A	Jun-13	JPH13_013	7-Jun-13	11.8	6.45	36	117	50
JPHP01A	Jun-14	JPH14_020	10-Jun-14	11.8	6.84	--	--	54
JPHP01B		2						
JPHP01B	Jul-11	JPH11_045	1-Jul-11	--	--	--	--	--
JPHP01B	Aug-11	JPH11_002	14-Aug-11	13.0	5.54	131	34	8
JPHP01B	May-12	JPH12-066	28-May-12	10.0	5.59	120	33	8
JPHP01B	Jul-12	JPH12_108	22-Jul-12	11.3	5.53	112	33	8
JPHP01B	Sep-12	JPH12_121	2-Sep-12	10.7	5.73	281	39	8
JPHP01B	Jun-13	JPH13_014	7-Jun-13	6.4	5.95	240	39	11
JPHP01B	Jun-14	JPH14-021	11-Jun-14	10.7	6.77	--	--	10
JPHP01C		1						

JPHP01C	Jul-11	JPH11_046	1-Jul-11	--	--	--	--	--
JPHP01C	Aug-11	JPH11_003	14-Aug-11	15.4	5.49	155	35	7
JPHP01C	May-12	JPH12-067	28-May-12	13.2	5.71	183	39	7
JPHP01C	Jul-12	JPH12_109	22-Jul-12	16.0	5.87	209	38	10
JPHP01C	Sep-12	JPH12_122	2-Sep-12	12.7	6.01	283	35	9
JPHP01C	Jun-13	JPH13_015	7-Jun-13	8.1	5.69	76	37	10
JPJP01C	Jun-14	JPH14_022	11-Jun-14	10.3	6.09	--	--	9
JPHP02A		3						
JPHP02A	Jul-11	JPH11_047	1-Jul-11	--	--	--	--	--
JPHP02A	Aug-11	JPH11_004	14-Aug-11	10.5	5.97	-75	65	56
JPHP02A	May-12	JPH12-061	28-May-12	9.2	6.08	-157	83	35
JPHP02A	Jul-12	JPH12_104	22-Jul-12	8.2	5.97	64	86	64
JPHP02A	Sep-12	JPH12_123	2-Sep-12	8.5	5.45	-17	88	52
JPHP02A	Jun-13	JPH13_023	11-Jun-13	10.2	7	47	104	28
JPJP02A	Jun-14	JPH14_017	11-Jun-14	13	6.45	--	--	43
JPHP02B		2						
JPHP02B	Jul-11	JPH11_048	1-Jul-11	--	--	--	--	--
JPHP02B	Aug-11	JPH11_005	14-Aug-11	12.1	5.65	119	38	21
JPHP02B	May-12	JPH12-063	28-May-12	8.4	5.64	133	33	8
JPHP02B	Jul-12	JPH12_105	22-Jul-12	10.9	5.64	190	34	10

JPHP02B	Sep-12	JPH12_124	2-Sep-12	10.4	--	168	--	8
JPHP02B	Jun-13	JPH13_024	11-Jun-13	9.3	6.6	106	43	124
JPHP02B	Jun-14	JPH14_018	11-Jun-14	12.3	6.29	--	--	10
JPHP02C		<i>1</i>						
JPHP02C	Jul-11	JPH11_049	1-Jul-11	--	--	--	--	--
JPHP02C	Aug-11	JPH11_006	14-Aug-11	14.6	5.62	162	41	9
JPHP02C	May-12	JPH12-065	28-May-12	--	--	--	--	8
JPHP02C	Jul-12	JPH12_106	22-Jul-12	14.7	5.82	203	40	12
JPHP02C	Sep-12	JPH12_125	2-Sep-12	12.4	--	171	--	10
JPHP02C	Jun-13	JPH13_025	11-Jun-13	11.1	7.1	47	114	16
JPHP02C	Jun-14	JPH14_019	11-Jun-14	13.3	6.3	--	--	9
JPHP03A		<i>3</i>						
JPHP03A	Jul-11	JPH11_050	1-Jul-11	--	--	--	--	--
JPHP03A	Aug-11	JPH11_007	14-Aug-11	10.2	5.64	121	50	10
JPHP03A	May-12	JPH12-059	28-May-12	8.8	5.77	228	41	12
JPHP03A	Jul-12	JPH12_101	22-Jul-12	8.0	6.32	79	42	13
JPHP03A	Sep-12	JPH12_136	4-Sep-12	9.6	5.86	-179	44	--
JPHP03A	Jun-13	JPH13_020	9-Jun-13	12.5	5.8	198	50	14
JPHP03A	Jun-14	JPH14_014	11-Jun-14	11.7	6.49	--	--	19
JPHP03B		<i>2</i>						

JPHP03B	Jul-11	JPH11_051	1-Jul-11	--	--	--	--	--
JPHP03B	Aug-11	JPH11_008	14-Aug-11	13.1	5.52	181	43	7
JPHP03B	May-12	JPH12-060	28-May-12	10.0	5.57	295	32	8
JPHP03B	Jul-12	JPH12_102	22-Jul-12	11.7	5.74	43	33	23
JPHP03B	Sep-12	JPH12_137	4-Sep-12	11.8	5.40	-161	35	--
JPHP03B	Jun-13	JPH13_021	9-Jun-13	12	5.8	173	41	18
JPHP03B	Jun-14	JPH_015	11-Jun-14	9.4	5.89	--	--	10
JPHP03C		<i>1</i>						
JPHP03C	Jul-11	JPH11_052	1-Jul-11	--	--	--	--	--
JPHP03C	Aug-11	JPH11_009	14-Aug-11	18.3	5.98	169	33	7
JPHP03C	May-12	JPH12-062	28-May-12	--	--	--	--	--
JPHP03C	Jul-12	JPH12_103	22-Jul-12	12.9	6.02	65	29	6
JPHP03C	Sep-12	JPH12_139	4-Sep-12	13.4	5.78	-137	30	--
JPHP03C	Jun-13	JPH13_022	9-Jun-13	12.1	5.8	162	42	21
JPHP03C	Jun-14	JPH14_016	11-Jun-14	11.1	6.31	--	--	13
JPHP04A		<i>3</i>						
JPHP04A	Jul-11	JPH11_053	1-Jul-11	--	--	--	--	--
JPHP04A	Aug-11	JPH11_010	14-Aug-11	11.2	6.04	-63	66	40
JPHP04A	May-12	JPH12-056	28-May-12	7.0	6.46	87	144	58
JPHP04A	Jul-12	JPH12_098	21-Jul-12	8.2	6.33	-286	149	67

JPHP04A	Sep-12	JPH12_138	4-Sep-12	9.5	6.30	-266	157	70
JPHP04A	Jun-13	JPH13_017	9-Jun-13	12.8	6.8	101	127	61
JPHP04A	Jun-14	JPH14_011	11-Jun-14	11.4	6.55	--	--	41
JPHP04B		2						
JPHP04B	Jul-11	JPH11_054	1-Jul-11	--	--	--	--	--
JPHP04B	Aug-11	JPH11_011	14-Aug-11	13.6	5.89	101	46	13
JPHP04B	May-12	JPH12-057	28-May-12	9.8	5.96	297	46	12
JPHP04B	Jul-12	JPH12_099	21-Jul-12	11.1	5.91	1	46	15
JPHP04B	Sep-12	JPH12_141	4-Sep-12	11.4	5.83	-123	45	12
JPHP04B	Jun-13	JPH13_018	9-Jun-13	12.5	6.8	182	115	17
JPHP04B	Jun-14	JPH14_012	11-Jun-14	9	6.14	--	--	17
JPHP04C		1						
JPHP04C	Jul-11	JPH11_055	1-Jul-11	--	--	--	--	--
JPHP04C	Aug-11	JPH11_012	14-Aug-11	13.9	5.72	141	41	9
JPHP04C	May-12	JPH12-058	28-May-12	13.7	5.94	295	13	9
JPHP04C	Jul-12	JPH12_100	21-Jul-12	11.9	5.88	26	42	9
JPHP04C	Sep-12	JPH12_142	4-Sep-12	12.5	5.99	-143	43	7
JPHP04C	Jun-13	JPH13_019	9-Jun-13	8.8	6.1	186	38	14
JPHP04C	Jun-14	JPH14_013	11-Jun-14	11.1	6.49	--	--	15
JPHP05A		3						

JPHP05A	Jul-11	JPH11_056	1-Jul-11	--	--	--	--	--
JPHP05A	Aug-11	JPH11_013	15-Aug-11	11.3	5.91	-29	72	25
JPHP05A	May-12	JPH12-040	27-May-12	8.0	6.00	4	63	32
JPHP05A	Jul-12	JPH12_095	21-Jul-12	7.1	5.87	-375	70	30
JPHP05A	Sep-12	JPH12_133	3-Sep-12	7.8	--	--	--	30
JPHP05A	Jun-13	JPH13_007	6-Jun-13	9.8	5.89	180	66	24
JPHP05A	Jun-14	JPH14_007	11-Jun-14	12.8	6.23	--	--	27
JPHP05B		<i>2</i>						
JPHP05B	Jul-11	JPH11_057	1-Jul-11	--	--	--	--	--
JPHP05B	Aug-11	JPH11_014	15-Aug-11	13.1	5.51	153	36	30
JPHP05B	May-12	JPH12-041	27-May-12	10.3	5.67	168	33	8
JPHP05B	Jul-12	JPH12_096	21-Jul-12	10.9	5.72	31	38	9
JPHP05B	Sep-12	JPH12_134	3-Sep-12	9.4	--	--	--	9
JPHP05B	Jun-13	JPH13_008	6-Jun-13	7.9	5.41	208	35	8
JPHP05B	Jun-14	JPH14_008	11-Jun-14	13.1	6.22	--	--	9
JPHP05C		<i>1</i>						
JPHP05C	Jul-11	JPH11_058	1-Jul-11	--	--	--	--	--
JPHP05C	Aug-11	JPH11_015	15-Aug-11	15.6	5.95	216	40	8
JPHP05C	May-12	JPH12-043	27-May-12	--	--	--	--	--
JPHP05C	Jul-12	JPH12_097	21-Jul-12	12.9	6.24	80	33	7

JPHP05C	Sep-12	JPH12_135	3-Sep-12	10.0	--	--	--	--
JPHP05C	Jun-13	JPH13_009	6-Jun-13	7.5	5.87	61	46	11
JPHP05C	Jun-14	JPH14_009	11-Jun-14	11.6	6.3	--	--	17
JPHP06A		3						
JPHP06A	Jul-11	JPH11_059	1-Jul-11	--	--	--	--	--
JPHP06A	Aug-11	JPH11_016	15-Aug-11	10.8	5.79	-5	54	28
JPHP06A	May-12	JPH12-042	27-May-12	8.4	5.84	148	57	24
JPHP06A	Jul-12	JPH12_092	21-Jul-12	8.5	5.83	-317	6	43
JPHP06A	Sep-12	JPH12_129	3-Sep-12	7.4	5.92	-267	63	27
JPHP06A	Jun-13	JPH13_004	6-Jun-13	12	6.18	185	69	25
JPHP06A	Jun-14	JPH14_004	11-Jun-14	13.1	6.08	--	--	26
JPHP06B		-						
JPHP06B	Jul-11	JPH11_060	1-Jul-11	--	--	--	--	--
JPHP06B	Aug-11	JPH11_017	15-Aug-11	18.2	5.92	182	58	48
JPHP06B	May-12	JPH12-044	27-May-12	14.7	5.81	179	48	14
JPHP06B	Jul-12	JPH12_093	21-Jul-12	11.7	5.83	28	53	19
JPHP06B	Sep-12	JPH12_131	3-Sep-12	9.3	5.61	36	50	14
JPHP06B	Jun-13	JPH13_005	6-Jun-13	9	6.01	204	51	11
JPHP06B	Jun-14	JPH14_005	11-Jun-14	10.9	6.55	--	--	20
JPHP06C		1						

JPHP06C	Jul-11	JPH11_061	1-Jul-11	--	--	--	--	--
JPHP06C	Aug-11	JPH11_018	15-Aug-11	16.2	5.54	217	39	3
JPHP06C	May-12	JPH12-047	27-May-12	--	--	--	--	7
JPHP06C	Jul-12	JPH12_094	21-Jul-12	12.1	5.76	111	43	23
JPHP06C	Sep-12	JPH12_132	3-Sep-12	9.8	5.62	105	43	7
JPHP06C	Jun-13	JPH13_006	6-Jun-13	9.1	5.7	179	50	11
JPHP06C	Jun-14	JPH14_006	11-Jun-14	11.9	5.95	--	--	11
JPHP07A		3						
JPHP07A	Jul-11	JPH11_062	1-Jul-11	--	--	--	--	--
JPHP07A	Aug-11	JPH11_019	15-Aug-11	11.7	6.10	-57	78	50
JPHP07A	May-12	JPH12-046	27-May-12	9.0	6.16	128	97	40
JPHP07A	Jul-12	JPH12_110	22-Jul-12	8.8	6.12	-337	109	54
JPHP07A	Sep-12	JPH12_127	3-Sep-12	8.3	6.38	-206	107	--
JPHP07A	Jun-13	JPH13_001	6-Jun-13	10.4	7.22	35	106	60
JPHP07A	Jun-14	JPH14_001	11-Jun-14	9.6	6.39	--	--	42
JPHP07B		2						
JPHP07B	Jul-11	JPH11_063	1-Jul-11	--	--	--	--	--
JPHP07B	Aug-11	JPH11_020	15-Aug-11	13.6	5.54	178	47	8
JPHP07B	May-12	JPH12-048	27-May-12	10.0	5.64	241	40	9
JPHP07B	Jul-12	JPH12_111	22-Jul-12	13.4	5.43	91	44	11

JPHP07B	Sep-12	JPH12_128	3-Sep-12	9.4	5.66	46	43	--
JPHP07B	Jun-13	JPH13_002	6-Jun-13	9.4	5.76	66	44	9
JPHP07B	Jun-14	JPH14_002	11-Jun-14	8.2	5.84	--	--	17
JPHP07C		<i>1</i>						
JPHP07C	Jul-11	JPH11_064	1-Jul-11	--	--	--	--	--
JPHP07C	Aug-11	JPH11_021	15-Aug-11	17.4	6.02	159	43	9
JPHP07C	May-12	JPH12-050	27-May-12	--	--	--	--	--
JPHP07C	Jul-12	JPH12_112	22-Jul-12	14.9	6.27	210	39	10
JPHP07C	Sep-12	JPH12_130	3-Sep-12	--	--	--	--	--
JPHP07C	Jun-13	JPH13_003	6-Jun-13	9.3	5.99	116	41	12
JPHP07C	Jun-14	JPH14_003	11-Jun-14	10.2	5.95	--	--	13
JPHP08A		<i>3</i>						
JPHP08A	Jul-11	JPH11_065	1-Jul-11	--	--	--	--	--
JPHP08A	Aug-11	JPH11_022	17-Aug-11	9.7	7.15	-125	251	116
JPHP08A	May-12	JPH12-049	27-May-12	9.1	7.29	-91	215	98
JPHP08A	Jul-12	JPH12_075	19-Jul-12	8.7	6.85	-100	230	111
JPHP08A	Sep-12	JPH12_159	5-Sep-12	10.1	6.96	-136	219	110
JPHP08A	Jun-13	JPH13_035	13-Jun-13	10.4	6.67	-184	223	87
JPHP08A	Jun-14	JPH14_033	15-Jun-14	15.8	7.27	--	--	99
JPHP08B		<i>2</i>						

JPHP08B	Jul-11	JPH11_066	1-Jul-11	--	--	--	--	--
JPHP08B	Aug-11	JPH11_023	17-Aug-11	12.2	6.00	-112	79	32
JPHP08B	May-12	JPH12-051	27-May-12	9.4	6.08	-132	75	31
JPHP08B	Jul-12	JPH12_076	19-Jul-12	8.9	6.10	-118	80	36
JPHP08B	Sep-12	JPH12_160	5-Sep-12	13.0	6.15	--	--	39
JPHP08B	Jun-13	JPH13_036	13-Jun-13	10.2	--	-45	--	35
JPHP08B	Jun-14	JPH14_034	15-Jun-14	10.9	6.41	--	--	34
JPHP08C		<i>1</i>						
JPHP08C	Jul-11	JPH11_067	1-Jul-11	--	--	--	--	--
JPHP08C	Aug-11	JPH11_024	17-Aug-11	14.9	5.84	-125	40	15
JPHP08C	May-12	JPH12-052	27-May-12	10.1	5.95	-101	51	10
JPHP08C	Jul-12	JPH12_077	19-Jul-12	11.6	5.72	-178	90	36
JPHP08C	Sep-12	JPH12_161	6-Sep-12	13.0	5.71	-392	93	39
JPHP08C	Jun-13	JPH13_037	13-Jun-13	12.5	--	-168	--	24
JPHP08C	Jun-14	JPH14_035	15-Jun-14	12.2	6.4	--	--	27
JPHP09A		<i>3</i>						
JPHP09A	Jul-11	JPH11_068	1-Jul-11	--	--	--	--	--
JPHP09A	Aug-11	JPH11_025	17-Aug-11	9.5	6.82	-54	173	85
JPHP09A	May-12	JPH12-037	26-May-12	6.0	7.18	-3	200	84
JPHP09A	Jul-12	JPH12_081	19-Jul-12	5.9	6.87	-169	194	89

JPHP09A	Sep-12	JPH12_151	5-Sep-12	8.0	6.80	-239	189	87
JPHP09A	Jun-13	JPH13_031	13-Jun-13	9.6	6.36	-138	220	91
JPHP09A	Jun-14	JPH14_27	11-Jun-14	12.4	7.21	--	--	88
JPHP09B		<i>2</i>						
JPHP09B	Jul-11	JPH11_069	1-Jul-11	--	--	--	--	--
JPHP09B	Aug-11	JPH11_026	17-Aug-11	13.5	6.32	-108	49	18
JPHP09B	May-12	JPH12-038	26-May-12	5.7	6.63	-102	86	31
JPHP09B	Jul-12	JPH12_082	19-Jul-12	7.4	6.41	-159	88	36
JPHP09B	Sep-12	JPH12_152	5-Sep-12	9.3	6.20	-319	87	33
JPHP09B	Jun-13	JPH13_032	13-Jun-13	8	6.07	-262	106	38
JPHP09B	Jun-14	JPH14_028	11-Jun-14	9.8	6.87	--	--	41
JPHP09C		<i>1</i>						
JPHP09C	Jul-11	JPH11_070	1-Jul-11	--	--	--	--	--
JPHP09C	Aug-11	JPH11_027	17-Aug-11	14.0	6.00	41	62	17
JPHP09C	May-12	JPH12-039	26-May-12	5.5	6.02	-74	90	38
JPHP09C	Jul-12	JPH12_083	19-Jul-12	9.8	5.96	-136	86	34
JPHP09C	Sep-12	JPH12_153	5-Sep-12	11.5	5.83	-416	92	23
JPHP09C	Jun-13	JPH13_033	13-Jun-13	10.9	5.86	-154	91	25
JPHP09C	Jun-14	JPH14_029	11-Jun-14	8.2	6.34	--	--	54
JPHP10A		<i>3</i>						

JPHP10A	Jul-11	JPH11_071	1-Jul-11	--	--	--	--	--
JPHP10A	Aug-11	JPH11_028	15-Aug-11	8.5	6.85	-91	178	57
JPHP10A	May-12	JPH12-034	26-May-12	7.1	6.97	-73	124	75
JPHP10A	Jul-12	JPH12_086	19-Jul-12	6.4	6.56	-94	204	85
JPHP10A	Sep-12	JPH12_147	4-Sep-12	9.5	6.66	-140	203	88
JPHP10A	Jun-13	JPH13_027	11-Jun-13	9.5	7	42	217	136
JPHP10A	Jun-14	JPH14_023	11-Jun-14	11.3	7.05	--	--	100
JPHP10B		<i>2</i>						
JPHP10B	Jul-11	JPH11_072	1-Jul-11	--	--	--	--	--
JPHP10B	Aug-11	JPH11_029	15-Aug-11	11.7	6.18	-58	68	46
JPHP10B	May-12	JPH12-035	26-May-12	5.3	6.17	-102	111	41
JPHP10B	Jul-12	JPH12_087	19-Jul-12	6.2	5.24	-125	110	47
JPHP10B	Sep-12	JPH12_148	5-Sep-12	9.1	6.34	-189	--	49
JPHP10B	Jun-13	JPH13_028	11-Jun-13	8.8	6.4	-50	100	80
JPHP10B	Jun-14	JPH14_024	11-Jun-14	10.2	6.52	--	--	48
JPHP10C		<i>1</i>						
JPHP10C	Jul-11	JPH11_073	1-Jul-11	--	--	--	--	--
JPHP10C	Aug-11	JPH11_030	15-Aug-11	13.5	6.01	-79	37	10
JPHP10C	May-12	JPH12-036	26-May-12	7.2	6.04	-129	58	18
JPHP10C	Jul-12	JPH12_088	19-Jul-12	10.4	5.48	-93	60	24

JPHP10C	Sep-12	JPH12_149	5-Sep-12	11.7	5.74	-309	112	23
JPHP10C	Jun-13	JPH13_029	11-Jun-13	10.7	6.4	481	76	72
JPHP10C	Jun-14	JPH14_025	11-Jun-14	11.4	6.32	--	--	30
JPHP11A		3						
JPHP11A	Jul-11	JPH11_074	1-Jul-11	--	--	--	--	--
JPHP11A	Aug-11	JPH11_031	14-Aug-11	12.4	6.08	36	157	64
JPHP11A	May-12	JPH12-053	27-May-12	8.4	6.07	-45	152	59
JPHP11A	Jul-12	JPH12_070	17-Jul-12	10.5	6.21	111	152	103
JPHP11A	Sep-12	JPH12_162	6-Sep-12	8.2	6.24	80	162	--
JPHP11A	Jun-13	JPH13_010	7-Jun-13	6.4	6.97	205	169	66
JPHP11A	Jun-14	JPH14_030	15-Jun-14	19	6.27	--	--	83
JPHP11B		2						
JPHP11B	Jul-11	JPH11_075	1-Jul-11	--	--	--	--	--
JPHP11B	Aug-11	JPH11_032	14-Aug-11	14.1	5.68	139	51	16
JPHP11B	May-12	JPH12-054	27-May-12	10.7	5.76	112	44	12
JPHP11B	Jul-12	JPH12_071	17-Jul-12	11.9	5.99	288	44	15
JPHP11B	Sep-12	JPH12_163	6-Sep-12	10.2	5.73	201	47	--
JPHP11B	Jun-13	JPH13_011	7-Jun-13	7.7	6.34	240	48	13
JPHP11B	Jun-14	JPH14_031	15-Jun-14	18.1	6.48	--	--	17
JPHP11C		1						

JPHP11C	Jul-11	JPH11_076	1-Jul-11	--	--	--	--	--
JPHP11C	Aug-11	JPH11_033	14-Aug-11	21.8	5.52	199	36	7
JPHP11C	May-12	JPH12-055	27-May-12	--	--	--	--	--
JPHP11C	Jul-12	JPH12_072	17-Jul-12	16.7	6.00	256	37	8
JPHP11C	Sep-12	JPH12_164	6-Sep-12	12.6	6.00	165	39	--
JPHP11C	Jun-13	JPH13_012	7-Jun-13	10.6	6.13	251	38	12
JPHP11C	Jun-14	JPH14_033	15-Jun-14	16.5	5.96	--	--	9
JPHP12		<i>1</i>						
JPHP12	Jul-12	JPH12_113	22-Jul-12	--	--	--	--	--
JPHP12	Sep-12	JPH12_143	4-Sep-12	--	--	--	--	--
JPHP12	Jun-13	JPH13_016	7-Jun-13	--	--	--	--	--
JPHP12	Jun-14	JPH14_010	11-Jun-14	--	--	--	--	33
Surface Water at JPHA								
Surface Water at JPHA	Aug-11	JPH11_042	17-Aug-11	--	--	--	--	200
Surface Water at JPHA	Apr-12	JPH12_022_014	14-Apr-12	--	--	--	--	--
Surface Water at JPHA	May-12	JPH12-024	25-May-12	25.1	6.21	260	52	5
Surface Water at JPHA	Jul-12	JPH12_116	3-Aug-12	--	--	--	--	42

Surface Water at JPHA	Jul-12	JPH12_078	19-Jul-12	--	--	--	--	8
Surface Water at JPHA	Sep-12	JPH12_158	5-Sep-12	--	--	--	--	8
JPH Weir								
JPH Weir	Aug-11	JPH11_041	15-Aug-11	17.1	6.13	140	43	14
JPH Weir	Apr-12	JPH12_021_018	14-Apr-12	--	--	--	--	--
JPH Weir	Apr-12	JPH12_020_016	14-Apr-12	--	--	--	--	--
JPH Weir	May-12	JPH12-033	26-May-12	14.6	6.03	166	48	11
JPH Weir	Jul-12	JPH12_089	19-Jul-12	--	--	--	--	8
JPH Weir	Jul-12	JPH12_117	3-Aug-12	--	--	--	--	22
JPH Weir	Sep-12	JPH12_145	4-Sep-12	14.8	6.16	-136	78	14
JPH Rain Events								
JPH Rain Events	15-Aug-11	JPH11_043	15-Aug-11	--	--	--	--	--
JPH Rain Events	5-Jun-12	JPH12-068	5-Jun-12	--	--	--	--	6
JPH Rain Events	17-Jul-12	JPH12_069	17-Jul-12	--	--	--	--	--
JPH Rain Events	13-Sep-12	JPH12_165	13-Sep-12	--	--	--	--	--
JPH Bulk Rain								

JPH Bulk Rain	(April - May 2012)	JPH12-030	25-May-12	--	--	--	--	--
JPH Bulk Rain	(5 June - 17July 2012)	JPH12_073	17-Jul-12	--	--	--	--	--
JPH Bulk Rain	(5 June - 17July 2012)	JPH12_091	19-Jul-12	--	--	--	--	--
JPH Bulk Rain	(10days)	JPH12_114	31-Jul-12	--	--	--	--	--
JPH Bulk Rain	(17 July - 3 Aug)	JPH12_115	3-Aug-12	--	--	--	--	--
JPH Bulk Rain	(17 July - 2 Sep)	JPH12_126	2-Sep-12	--	--	--	--	--
RAIN	Jun-13	JPH13_040	13-Jun-13	--	--	--	--	--
Snow Survey								
Snow Survey	JPHA	JPH12_007	13-Mar-12	--	--	--	--	--
Snow Survey	JPHE	JPH12_008	13-Mar-12	--	--	--	--	--
Snow Survey	JPHG	JPH12_005	13-Mar-12	--	--	--	--	--
Snow Survey	JPHP1	JPH12_010	13-Mar-12	--	--	--	--	--
Snow Survey	JPHP2	JPH12_011	13-Mar-12	--	--	--	--	--
Snow Survey	JPHP3	JPH12_001	13-Mar-12	--	--	--	--	--
Snow Survey	JPHP4	JPH12_002	13-Mar-12	--	--	--	--	--
Snow Survey	JPHP5	JPH12_003	13-Mar-12	--	--	--	--	--
Snow Survey	JPHP6	JPH12_004	13-Mar-12	--	--	--	--	--
Snow Survey	JPHP7	JPH12_009	13-Mar-12	--	--	--	--	--
Snow Survey	JPHP8	JPH12_006	13-Mar-12	--	--	--	--	--

Snow Survey	JPHP11	JPH12_012	13-Mar-12	--	--	--	--	--
	Snow Sampling							
Snow Sampling		JPH	8-Feb-15	--	--	--	--	--
Snow Sampling		JPH15S_001	23-Mar-15	--	--	--	--	--
Snow Sampling		JPH15S_002	23-Mar-15	--	--	--	--	--
Snow Sampling		JPH15S_003	23-Mar-15	--	--	--	--	--
Snow Sampling		JPH15S_004	23-Mar-15	--	--	--	--	--
	MLA							
		<i>WT</i>						
MLA	Jul-11	ML11_095	1-Jul-11	--	--	--	--	--
MLA	Aug-11	ML11_044	24-Aug-11	--	--	--	--	--
MLA	May-12	ML12-067	9-Jun-12	12.7	4.46	215	17	0
MLA	Jul-12	ML12_175	30-Jul-12	20.9	4.03	-88	1	0
MLA	Sep-12	ML12_212	8-Sep-12	18.1	4.49	24	15	2
MLA	Jun-13	ML13_062	18-Jun-13	26	4.14	--	8	0
MLA	Jun-14	ML14_045	13-Jun-14	17.6	3.88	--	--	0
	MLB							
		<i>WT</i>						
MLB	Jul-11	ML11_096	1-Jul-11	--	--	--	--	--
MLB	Aug-11	ML11_045	21-Aug-11	17.1	7.06	184	44	1
MLB	May-12	ML12-064	9-Jun-12	11.0	4.22	250	31	0
MLB	Jul-12	ML12_172	30-Jul-12	18.4	3.83	-71	8	0

MLB	Sep-12	ML12_209	8-Sep-12	14.4	3.65	116	0	0
MLB	Jun-13	ML13_059	18-Jun-13	20.5	4.14	27	26	6
MLB	Jun-14	ML14_054	14-Jun-14	16.7	4.09	--	--	0
MLC		<i>WT</i>						
MLC	Jul-11	ML11_097	1-Jul-11	--	--	--	--	--
MLC	Aug-11	ML11_046	21-Aug-11	17.1	7.07	172	42	4
MLC	May-12	ML12-060	9-Jun-12	12.1	4.29	238	27	0
MLC	Jul-12	ML12_168	30-Jul-12	17.7	4.15	--	25	0
MLC	Sep-12	ML12_205	8-Sep-12	12.4	3.60	241	0	0
MLC	Jun-13	ML13_058	18-Jun-13	16	4.83	128	61	28
MLC	Jun-14	ML14-055	14-Jun-14	17.7	4.06	--	--	72
MLD		<i>WT</i>						
MLD	Jul-11	ML11_098	1-Jul-11	--	--	--	--	--
MLD	Aug-11	ML11_047	19-Aug-11	14.2	4.21	263	23	--
MLD	May-12	ML12-039	7-Jun-12	13.0	4.33	338	32	0
MLD	Jul-12	ML12_164	28-Jul-12	18.2	4.05	213	22	0
MLD	Sep-12	ML12_220	8-Sep-12	17.8	3.79	25	0	0
MLD	Jun-13	ML13_049	17-Jun-13	20.8	4.15	104	14	0
MLD	Jun-14	--	--	--	--	--	--	--
MLE		<i>WT</i>						

MLE	Jul-11	ML11_099	1-Jul-11	--	--	--	--	--
MLE	Aug-11	ML11_048	19-Aug-11	13.1	4.19	233	7	2
MLE	May-12	ML12-098	11-Jun-12	11.7	4.37	241	18	0
MLE	Jul-12	ML12_114	24-Jul-12	17.3	4.42	245	34	0
MLE	Sep-12	ML12_243	10-Sep-12	12.5	5.57	-24	29	0
MLE	Jun-13	ML13_037	16-Jun-13	13.8	5.83	69	47	29
MLE	Jun-14	ML14_041	12-Jun-14	18.2	4.2	--	--	0
	MLF	<i>WT</i>						
MLF	Jul-11	ML11_100	1-Jul-11	--	--	--	--	--
MLF	Aug-11	ML11_049	21-Aug-11	17.5	4.25	215	29	
MLF	May-12	ML12-055	9-Jun-12	11.4	4.31	298	27	0
MLF	Jul-12	ML12_145	27-Jul-12	16.9	3.83	--	15	0
MLF	Sep-12	ML12_197	7-Sep-12	14.0	3.76	69	14	0
MLF	Jun-13	ML13_045	17-Jun-13	14.7	4.81	141	60	0
MLF	Jun-14	ML14_61	14-Jun-14	17.9	3.9	--	--	0
	MLG	<i>WT</i>						
MLG	Jul-11	ML11_101	1-Jul-11	--	--	--	--	--
MLG	Aug-11	ML11_050	19-Aug-11	14.8	4.17	307	35	
MLG	May-12	ML12-074	10-Jun-12	14.3	4.08	182	15	0
MLG	Jul-12	ML12_128	25-Jul-12	18.0	4.22	110	14	4

MLG	Sep-12	ML12_232	9-Sep-12	17.0	4.52	-26	19	2
MLG	Jun-13	ML13_038	16-Jun-13	12.1	--	--	--	14
MLG	Jun-14	ML14_034	12-Jun-14	20.2	4.14	--	--	6
MLG	Oct-14	ML14W_025	26-Oct-14	--	--	--	--	--
MLH		<i>WT</i>						
MLH	Jul-11	ML11_102	1-Jul-11	--	--	--	--	--
MLH	Aug-11	ML11_051	19-Aug-11	12.5	3.95	299	13	
MLH	May-12	ML12-043	7-Jun-12	11.4	4.12	315	35	0
MLH	Jul-12	ML12_131	25-Jul-12	16.2	3.78	98	19	0
MLH	Sep-12	ML12_253	12-Sep-12	--	--	--	--	0
MLH	Jun-13	ML13_033	16-Jun-13	17.2	4.32	156	20	4
MLH	Jun-14	ML14_048	13-Jun-14	22.9	3.51	--	--	0
MLM		<i>WT</i>						
MLM	Jul-11	ML11_103	1-Jul-11	--	--	--	--	--
MLM	Aug-11	ML11_052	19-Aug-11	14.1	4.10	279	20	
MLM	May-12	ML12-079	11-Jun-12	11.6	4.16	246	19	0
MLM	Jul-12	ML12_121	24-Jul-12	15.5	4.04	128	19	0
MLM	Sep-12	ML12_228	9-Sep-12	15.8	3.99	8	17	0
MLM	Jun-13	ML13_007	10-Jun-13	12.1	4.5	234	32	10
MLM	Jun-14	ML14_025	7-Jun-14	12.9	4.14	--	--	0

	MLN	<i>WT</i>						
MLN	Jul-11	ML11_104	1-Jul-11	--	--	--	--	--
MLN	Aug-11	ML11_053	19-Aug-11	15.0	4.29	277	20	
MLN	May-12	ML12-096	11-Jun-12	11.6	4.33	218	22	0
MLN	Jul-12	ML12_110	18-Jul-12	16.4	4.54	211	26	6
MLN	Sep-12	ML12_245	10-Sep-12	12.3	4.83	-34	33	0
MLN	Jun-13	ML13_022	14-Jun-13	21	4.28	125	28	3
MLN	Jun-14	ML14_032	12-Jun-14	18.1	4.04	--	--	0
	MLO	<i>WT</i>						
MLO	Jul-11	ML11_105	1-Jul-11	--	--	--	--	--
MLO	Aug-11	ML11_054	21-Aug-11	17.5	6.70	145	55	2
MLO	May-12	ML12-056	9-Jun-12	15.0	4.47	251	40	7
MLO	Jul-12	ML12_144	27-Jul-12	18.3	4.11	246	31	30
MLO	Sep-12	ML12_199	7-Sep-12	16.3	3.56	35	0	0
MLO	Jun-13	ML13_050	17-Jun-13	19.9	4.06	86	30	0
MLO	Jun-14	ML14_059	14-Jun-14	23.2	3.65	--	--	16
MLO	Oct-14	ML14W_012	26-Oct-14	2.9	6.06	--	--	--
	MLP	<i>WT</i>						
MLP	Jul-11	ML11_106	1-Jul-11	--	--	--	--	--
MLP	Aug-11	ML11_055	21-Aug-11	16.5	3.89	261	31	

MLP	May-12	ML12-054	9-Jun-12	9.0	4.05	270	32	0
MLP	Jul-12	ML12_146	27-Jul-12	17.1	3.79	--	34	0
MLP	Sep-12	ML12_196	7-Sep-12	13.4	3.67	48	10	0
MLP	Jun-13	ML13_044	17-Jun-13	--	--	--	--	--
MLP	Jun-13	ML13_043	17-Jun-13	15.1	4.42	164	55	0
MLP	Jun-14	ML14_060	14-Jun-14	17.9	3.92	--	--	--
	MLQ	<i>WT</i>						
MLQ	Jul-11	ML11_107	1-Jul-11	--	--	--	--	--
MLQ	Aug-11	ML11_056	19-Aug-11	13.3	5.00	236	37	3
MLQ	May-12	ML12-097	11-Jun-12	11.3	4.09	236	30	0
MLQ	Jul-12	ML12_113	24-Jul-12	17.0	3.97	235	19	0
MLQ	Jul-12	ML12_111	18-Jul-12	--	--	--	--	--
MLQ	Sep-12	ML12_244	10-Sep-12	12.4	4.43	50	39	0
MLQ	Jun-13	ML13_023	14-Jun-13	21	7.05	264	48	0
MLQ	Jun-14	ML14_033	12-Jun-14	19.6	4.06	--	--	0
	MLR	<i>WT</i>						
MLR	Jul-11	ML11_108	1-Jul-11	--	--	--	--	--
MLR	Aug-11	ML11_057	19-Aug-11	13.8	4.27	277	18	
MLR	May-12	ML12-095	11-Jun-12	11.2	4.49	220	22	0
MLR	Jul-12	ML12_109	18-Jul-12	16.3	4.67	--	27	5

MLR	Sep-12	ML12_246	10-Sep-12	11.7	4.81	-13	31	0
MLR	Jun-13	ML13_021	14-Jun-13	18.5	5.14	--	22	7
MLR	Jun-14	ML14_031	12-Jun-14	17.9	4.19	--	--	0
MLS		<i>WT</i>						
MLS	Jul-11	ML11_109	1-Jul-11	--	--	--	--	--
MLS	Aug-11	ML11_058	21-Aug-11	16.8	4.17	347	21	--
MLS	May-12	ML12-048	7-Jun-12	17.0	4.65	233	28	0
MLS	Jul-12	ML12_137	26-Jul-12	--	--	--	--	0
MLS	Sep-12	ML12_235	9-Sep-12	20.0	4.27	-11	44	0
MLS	Jun-13	ML13_026	15-Jun-13	16.8	5.42	89	52	0
MLS	Jun-14	ML14_008	5-Jun-14	7.7	5.37	--	--	--
MLS	Oct-14	ML14W_008	26-Oct-14	1.6	5.02	--	--	--
MLT		<i>WT</i>						
MLT	Jul-11	ML11_110	1-Jul-11	--	--	--	--	--
MLT	Aug-11	ML11_059	24-Aug-11	--	--	--	--	
MLT	May-12	ML12-053	9-Jun-12	11.2	3.98	277	30	0
MLT	Jul-12	ML12_147	27-Jul-12	17.9	3.79	156	19	0
MLT	Sep-12	ML12_203	8-Sep-12	13.8	3.58	5	0	0
MLT	Jun-13	ML13_054	17-Jun-13	20	4.17	91	34	0
MLT	Jun-14	ML14_050	13-Jun-14	16.6	3.74	--	--	--

	MLU	<i>WT</i>						
MLU	Jul-11	ML11_111	1-Jul-11	--	--	--	--	--
MLU	Aug-11	ML11_060	21-Aug-11	16.7	4.44	225	28	
MLU	May-12	ML12-086	11-Jun-12	9.9	4.60	202	25	5
MLU	Jul-12	ML12_108	18-Jul-12	16.5	4.62	254	28	0
MLU	Sep-12	ML12_186	1-Sep-12	12.0	4.51	261	28	0
MLU	Jun-13	ML13_025	15-Jun-13	16.4	7.05	105	35	22
MLU	Jun-14	ML14_049	13-Jun-14	18.1	4.08	--	--	6
	MLV	<i>WT</i>						
MLV	Jul-11	ML11_112	1-Jul-11	--	--	--	--	--
MLV	Aug-11	ML11_061	21-Aug-11	17.5	3.92	261	28	
MLV	May-12	ML12-052	9-Jun-12	7.7	4.14	263	28	0
MLV	Jul-12	ML12_148	27-Jul-12	14.9	3.78	127	19	0
MLV	Sep-12	ML12_198	7-Sep-12	15.7	3.59	52	3	0
MLV	Jun-13	ML13_042	17-Jun-13	13.9	4.45	171	56	0
MLV	Jun-14	--	--	--	--	--	--	--
	MLP01A	2						
MLP01A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP01A	Aug-11	--	--	--	--	--	--	
MLP01A	May-12	ML12-033	7-Jun-12	--	12.00	--	--	--

MLP01A	Jul-12	--	--	--	--	--	--	--
MLP01A	Sep-12	--	--	--	--	--	--	--
MLP01A	Jun-13	--	--	--	--	--	--	--
MLP01A	Jun-14	ML14_016	7-Jun-14	--	--	--	--	--
MLP01B		<i>1</i>						
MLP01B	Jul-11	ML11_065	1-Jul-11	--	--	--	--	--
MLP01B	Aug-11	ML11_001	24-Aug-11	--	--	--	--	--
MLP01B	May-12	ML12-034	7-Jun-12	--	--	--	--	--
MLP01B	Jul-12	ML12_160	28-Jul-12	--	--	--	--	14
MLP01B	Sep-12	ML12_238	9-Sep-12	--	--	--	--	--
MLP01B	Jun-13	ML13_008	12-Jun-13	--	--	--	--	22
MLP01B	Jun-14	ML14_017	7-Jun-14	13.1	6.22	--	--	10
MLP02A		<i>2</i>						
MLP02A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP02A	Aug-11	ML11_002	24-Aug-11	--	--	--	--	--
MLP02A	May-12	ML12-035	7-Jun-12	--	12.00	--	--	--
MLP02A	Jul-12	ML12_161	28-Jul-12	--	12.00	--	--	--
MLP02A	Sep-12	--	--	--	--	--	--	--
MLP02A	Jun-13	ML13_009	12-Jun-13	--	~8.5	--	--	--
MLP02A	Jun-14	ML14_018	7-Jun-14	--	--	--	--	--

MLP02B		<i>1</i>						
MLP02B	Jul-11	ML11_066	1-Jul-11	--	--	--	--	--
MLP02B	Aug-11	ML11_003	24-Aug-11	--	--	--	--	--
MLP02B	May-12	ML12-036	7-Jun-12	--	--	--	--	--
MLP02B	Jul-12	ML12_162	28-Jul-12	--	--	--	--	12
MLP02B	Sep-12	ML12_237	9-Sep-12	--	--	--	--	--
MLP02B	Jun-13	ML13_010	12-Jun-13	11.4	7.9	76	176	13
MLP02B	Jun-14	ML14_019	7-Jun-14	--	--	--	--	12
MLP03A		<i>2</i>						
MLP03A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP03A	Aug-11	--	--	--	--	--	--	--
MLP03A	May-12	ML12-037	7-Jun-12	--	12.00	--	--	--
MLP03A	Jul-12	--	--	--	--	--	--	--
MLP03A	Sep-12	--	--	--	--	--	--	--
MLP03A	Jun-13	ML13_011	12-Jun-13	--	~12	--	--	--
MLP03A	Jun-14	ML14_020	7-Jun-14	--	--	--	--	--
MLP03B		<i>1</i>						
MLP03B	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP03B	Aug-11	ML11_004	24-Aug-11	--	--	--	--	--
MLP03B	May-12	ML12-038	7-Jun-12	--	--	--	--	--

MLP03B	Jul-12	ML12_163	28-Jul-12	--	--	--	--	33
MLP03B	Sep-12	ML12_236	9-Sep-12	--	--	--	--	--
MLP03B	Jun-13	ML13_012	12-Jun-13	--	~5	--	--	27
MLP03B	Jun-14	ML14_021	7-Jun-14	--	--	--	--	28
MLP04A		3						
MLP04A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP04A	Aug-11	ML11_005	19-Aug-11	--	--	--	--	--
MLP04A	May-12	ML12-042	7-Jun-12	--	--	--	--	--
MLP04A	Jul-12	ML12_157	27-Jul-12	--	--	--	--	150
MLP04A	Sep-12	ML12_217	8-Sep-12	--	--	--	--	--
MLP04A	Jun-13	ML13_046	17-Jun-13	--	--	--	--	348
MLP04A	Jun-14	ML14_013	7-Jun-14			--	--	193
MLP04A	Oct-14	ML14W_013	27-Oct-14	--	--	--	--	--
MLP04B		2						
MLP04B	Jul-11	ML11_067	1-Jul-11	--	--	--	--	--
MLP04B	Aug-11	ML11_006	19-Aug-11	12.6	5.20	219	107	36
MLP04B	May-12	ML12-041	7-Jun-12	13.5	5.54	214	93	36
MLP04B	Jul-12	ML12_158	27-Jul-12	12.1	5.23	113	111	44
MLP04B	Sep-12	ML12_218	8-Sep-12	16.1	4.82	-25	106	37
MLP04B	Jun-13	ML13_047	17-Jun-13	15.5	5.54	81	134	50

MLP04B	Jun-14	ML14_014	7-Jun-14	12.3	5.51	--	--	38
MLP04B	Oct-14	ML14W_014	26-Oct-14	6.4	5.65	--	--	--
MLP04C		<i>1</i>						
MLP04C	Jul-11	ML11_068	1-Jul-11	--	--	--	--	--
MLP04C	Aug-11	ML11_007	19-Aug-11	15.1	4.56	241	71	4
MLP04C	May-12	ML12-040	7-Jun-12	--	--	--	--	8
MLP04C	Jul-12	ML12_159	27-Jul-12	16.7	4.66	48	72	10
MLP04C	Sep-12	ML12_219	8-Sep-12	17.4	4.52	80	73	--
MLP04C	Jun-13	ML13_048	17-Jun-13	12.9	4.97	67	84	19
MLP04C	Jun-14	ML14_015	7-Jun-14	10.6	4.89	--	--	0
MLP04C	Oct-14	ML14W_015	27-Oct-14	5.7	5.18	--	--	--
MLP05A		<i>3</i>						
MLP05A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP05A	Aug-11	ML11_008	19-Aug-11	--	--	--	--	--
MLP05A	May-12	ML12-047	7-Jun-12	--	--	--	--	--
MLP05A	Jul-12	ML12_132	25-Jul-12	--	--	--	--	--
MLP05A	Sep-12	ML12_249	12-Sep-12	--	--	--	--	--
MLP05A	Jun-13	ML13_029	16-Jun-13	--	--	--	--	772
MLP05A	Jun-14	ML14_009	6-Jun-14	--	--	--	--	--
MLP05A	Oct-14	ML14W001	26-Oct-14	6.4	8.2	--	--	--

MLP05B		<i>2</i>						
MLP05B	Jul-11	ML11_069	1-Jul-11	--	--	--	--	--
MLP05B	Aug-11	ML11_009	19-Aug-11	12.4	5.76	185	--	112
MLP05B	May-12	ML12-046	7-Jun-12	9.8	5.79	250	263	106
MLP05B	Jul-12	ML12_133	25-Jul-12	11.8	5.71	33	261	126
MLP05B	Sep-12	ML12_250	12-Sep-12	--	--	--	--	127
MLP05B	Jun-13	ML13_030	16-Jun-13	8.8	5.8	151	280	136
MLP05B	Jun-14	ML14_010	6-Jun-14	7.2	5.96	--	--	--
MLP05B	Oct-14	ML14W_002	26-Oct-14	4.9	6.2	--	268	--
MLP05C		<i>1</i>						
MLP05C	Jul-11	ML11_070	1-Jul-11	--	--	--	--	--
MLP05C	Aug-11	ML11_010	19-Aug-11	12.7	5.50	191	144	20
MLP05C	May-12	ML12-045	7-Jun-12	9.8	5.62	284	154	56
MLP05C	Jul-12	ML12_134	25-Jul-12	12.4	5.48	-137	164	64
MLP05C	Sep-12	ML12_251	12-Sep-12	--	--	--	--	64
MLP05C	Jun-13	ML13_031	16-Jun-13	8.5	5.44	120	178	67
MLP05C	Jun-14	ML14_011	6-Jun-14	9.13	6.16	--	--	--
MLP05C	Oct-14	ML14W_003	26-Oct-14	3.3	5.8	--	160	--
MLP05D		<i>1</i>						
MLP05D	Jul-11	ML11_071	1-Jul-11	--	--	--	--	--

MLP05D	Aug-11	ML11_011	19-Aug-11	11.3	4.24	231	57	--
MLP05D	May-12	ML12-044	7-Jun-12	--	--	--	--	11
MLP05D	Jul-12	ML12_135	25-Jul-12	15.2	4.71	30	56	0
MLP05D	Sep-12	ML12_252	12-Sep-12	--	--	--	--	8
MLP05D	Jun-13	ML13_032	16-Jun-13	--	--	--	--	29
MLP05D	Jun-14	ML14_012	6-Jun-14	7.1	4.73	--	--	--
MLP05D	Oct-14	ML14W_004	26-Oct-14	4.2	5.17	--	56	--
MLP06A		<i>2</i>						
MLP06A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP06A	Aug-11	ML11_012	21-Aug-11	17.5	6.77	27	304	--
MLP06A	May-12	ML12-088	11-Jun-12	--	--	--	--	--
MLP06A	Jul-12	ML12_154	27-Jul-12	--	--	--	--	252
MLP06A	Sep-12	ML12_189	7-Sep-12	--	--	--	--	--
MLP06A	Jun-13	ML13_019	14-Jun-13	--	8.3	--	406	168
MLP06A	Jun-14	ML14_029	12-Jun-14	21.9	7.91	--	--	--
MLP06A	Oct-14	ML14W_020	27-Oct-14	--	--	--	--	--
MLP06B		<i>1</i>						
MLP06B	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP06B	Aug-11	ML11_013	21-Aug-11	18.0	6.52	65	311	--
MLP06B	May-12	ML12-087	11-Jun-12	--	--	--	--	--

MLP06B	Jul-12	ML12_155	27-Jul-12	--	--	--	--	137
MLP06B	Sep-12	ML12_190	7-Sep-12	--	--	--	--	--
MLP06B	Jun-13	ML13_020	14-Jun-13	--	--	--	--	86
MLP06B	Jun-14	ML14_030	12-Jun-14	19.1	8.3	--	--	--
MLP06B	Oct-14	ML14W_021	27-Oct-14	--	--	--	--	--
MLP07A		<i>2</i>						
MLP07A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP07A	Aug-11	ML11_014	21-Aug-11	--	--	--	--	--
MLP07A	May-12	ML12-090	11-Jun-12	--	--	--	--	--
MLP07A	Jul-12	--	--	--	--	--	--	--
MLP07A	Sep-12	--	--	--	--	--	--	--
MLP07A	Jun-13	ML13_017	14-Jun-13	--	~12	--	--	--
MLP07A	Jun-14	--	--	--	--	--	--	--
MLP07B		<i>1</i>						
MLP07B	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP07B	Aug-11	ML11_015	21-Aug-11	--	--	--	--	--
MLP07B	May-12	ML12-089	11-Jun-12	--	--	--	--	--
MLP07B	Jul-12	--	--	--	--	--	--	--
MLP07B	Sep-12	ML12_191	7-Sep-12	--	--	--	--	--
MLP07B	Jun-13	ML13_018	14-Jun-13	--	~5.5	--	--	--

MLP07B	Jun-14	--	--	--	--	--	--	--
MLP08A		<i>2</i>						
MLP08A	Jul-11	ML11_072	1-Jul-11	--	--	--	--	--
MLP08A	Aug-11	ML11_016	21-Aug-11	13.7	5.58	43	145	48
MLP08A	May-12	ML12-092	11-Jun-12	9.6	5.55	170	133	50
MLP08A	Jul-12	ML12_151	27-Jul-12	12.7	5.46	-215	132	59
MLP08A	Sep-12	ML12_192	7-Sep-12	12.9	5.53	75	135	49
MLP08A	Jun-13	ML13_015	14-Jun-13	13.7	5.66	-5	145	78
MLP08A	Jun-14	ML14_001	5-Jun-14	5.9	5.69	--	--	59
MLP08B		<i>1</i>						
MLP08B	Jul-11	ML11_073	1-Jul-11	--	--	--	--	--
MLP08B	Aug-11	ML11_017	21-Aug-11	16.0	4.60	209	48	--
MLP08B	May-12	ML12-091	11-Jun-12	--	--	--	--	--
MLP08B	Jul-12	ML12_153	27-Jul-12	--	--	--	--	4
MLP08B	Sep-12	ML12_193	7-Sep-12	--	--	--	--	--
MLP08B	Jun-13	ML13_016	14-Jun-13	--	--	--	--	--
MLP08B	Jun-14	ML14_002	5-Jun-14	8.1	5.18	--	--	--
MLP09A		<i>2</i>						
MLP09A	Jul-11	ML11_074	1-Jul-11	--	--	--	--	--
MLP09A	Aug-11	ML11_018	21-Aug-11	15.7	5.41	147	89	--

MLP09A	May-12	ML12-094	11-Jun-12	--	--	--	--	--
MLP09A	Jul-12	ML12_149	27-Jul-12	--	--	--	--	31
MLP09A	Sep-12	ML12_194	7-Sep-12	--	--	--	--	--
MLP09A	Jun-13	ML13_013	14-Jun-13	--	--	--	--	33
MLP09A	Jun-14	ML14_003	5-Jun-14	7.5	6.08	--	--	--
MLP09B		<i>1</i>						
MLP09B	Jul-11	ML11_075	1-Jul-11	--	--	--	--	--
MLP09B	Aug-11	ML11_019	21-Aug-11	15.4	4.18	239	46	--
MLP09B	May-12	ML12-093	11-Jun-12	10.2	5.44	142	38	--
MLP09B	Jul-12	ML12_150	27-Jul-12	16.9	4.25	--	--	0
MLP09B	Sep-12	ML12_195	7-Sep-12	13.4	4.40	--	57	--
MLP09B	Jun-13	ML13_014	14-Jun-13	12.7	4.36	37	38	3
MLP09B	Jun-14	ML14-004	5-Jun-14	6.6	4.5	--	--	--
MLP10A		<i>3</i>						
MLP10A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP10A	Aug-11	ML11_020	21-Aug-11	--	--	--	--	--
MLP10A	May-12	ML12-059	9-Jun-12	12.1	7.61	14	--	--
MLP10A	Jul-12	ML12_141	27-Jul-12	--	--	--	--	--
MLP10A	Sep-12	ML12_202	7-Sep-12	--	--	--	--	--
MLP10A	Jun-13	ML13_051	17-Jun-13	--	--	--	--	580

MLP10A	Jun-14	ML14_056	14-Jun-14	--	7.51	--	--	453
MLP10A	Oct-14	ML14W_009	26-Oct-14	2.8	7.47	--	--	--
MLP10B		<i>2</i>						
MLP10B	Jul-11	ML11_076	1-Jul-11	--	--	--	--	--
MLP10B	Aug-11	ML11_021	21-Aug-11	16.9	6.01	181	159	128
MLP10B	May-12	ML12-058	9-Jun-12	15.7	5.62	242	163	58
MLP10B	Jul-12	ML12_142	27-Jul-12	16.6	5.71	163	160	64
MLP10B	Sep-12	ML12_201	7-Sep-12	14.6	5.21	-66	161	71
MLP10B	Jun-13	ML13_052	17-Jun-13	--	--	--	--	67
MLP10B	Jun-14	ML14_057	14-Jun-14	18.8	5.79	--	--	52
MLP10B	Oct-14	ML14W_010	26-Oct-14	3.9	6.1	--	--	--
MLP10C		<i>1</i>						
MLP10C	Jul-11	ML11_077	1-Jul-11	--	--	--	--	--
MLP10C	Aug-11	ML11_022	21-Aug-11	17.1	6.37	193	58	35
MLP10C	May-12	ML12-057	9-Jun-12	--	--	--	--	12
MLP10C	Jul-12	ML12_143	27-Jul-12	14.9	4.87	240	58	11
MLP10C	Sep-12	ML12_200	7-Sep-12	16.7	4.60	14	57	--
MLP10C	Jun-13	ML13_053	17-Jun-13	15.8	5.73	25	47	21
MLP10C	Jun-14	ML14_058	14-Jun-14	14.2	5.5	--	--	16
MLP10C	Oct-14	ML14W_011	26-Oct-14	4.7	5.43	--	--	--

MLP11A		3						
MLP11A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP11A	Aug-11	ML11_023	21-Aug-11	--	--	--	--	--
MLP11A	May-12	ML12-063	9-Jun-12	12.1	7.84	--	1031	--
MLP11A	Jul-12	ML12_169	30-Jul-12	--	--	--	--	544
MLP11A	Sep-12	ML12_206	8-Sep-12	--	--	--	--	--
MLP11A	Jun-13	ML13_055	18-Jun-13	17.7	7.88	54	5220	680
MLP11A	Jun-14	ML14_51	14-Jun-14	16.3	7.76	--	--	558
MLP11B		2						
MLP11B	Jul-11	ML11_078	1-Jul-11	--	--	--	--	--
MLP11B	Aug-11	ML11_024	21-Aug-11	15.0	7.09	173	144	60
MLP11B	May-12	ML12-062	9-Jun-12	10.1	5.46	231	139	49
MLP11B	Jul-12	ML12_170	30-Jul-12	17.5	5.31	4	140	59
MLP11B	Sep-12	ML12_207	8-Sep-12	13.0	5.06	216	144	54
MLP11B	Jun-13	ML13_056	18-Jun-13	9.9	5.94	152	190	62
MLP11B	Jun-14	ML14_052	14-Jun-14	13.9	5.66	--	--	57
MLP11C		1						
MLP11C	Jul-11	ML11_079	1-Jul-11	--	--	--	--	--
MLP11C	Aug-11	ML11_025	21-Aug-11	16.5	7.10	193	83	16
MLP11C	May-12	ML12-061	9-Jun-12	12.8	5.33	194	79	16

MLP11C	Jul-12	ML12_171	30-Jul-12	18.9	4.93	-31	--	16
MLP11C	Sep-12	ML12_208	8-Sep-12	15.9	4.88	199	71	19
MLP11C	Jun-13	ML13_057	18-Jun-13	12.8	5.58	130	69	26
MLP11C	Jun-14	ML14_053	14-Jun-14	14	5.45	--	--	24
MLP12A		<i>2</i>						
MLP12A	Jul-11	ML11_080	1-Jul-11	--	--	--	--	--
MLP12A	Aug-11	ML11_026	24-Aug-11	--	--	--	--	--
MLP12A	May-12	ML12-066	9-Jun-12	--	--	--	--	--
MLP12A	Jul-12	ML12_173	30-Jul-12	--	--	--	--	41
MLP12A	Sep-12	ML12_210	8-Sep-12	--	--	--	--	--
MLP12A	Jun-13	ML13_060	18-Jun-13	--	6.4	--	89	50
MLP12A	Jun-14	ML14_046	13-Jun-14	21.3	6.59	--	--	48
MLP12A	Oct-14	ML14W_016	27-Oct-14	--	--	--	--	--
MLP12B		<i>1</i>						
MLP12B	Jul-11	ML11_081	1-Jul-11	--	--	--	--	--
MLP12B	Aug-11	ML11_027	24-Aug-11	--	--	--	--	24
MLP12B	May-12	ML12-065	9-Jun-12	11.0	5.18	201	89	22
MLP12B	Jul-12	ML12_174	30-Jul-12	15.2	5.10	-65	94	30
MLP12B	Sep-12	ML12_211	8-Sep-12	14.5	4.62	-59	89	31
MLP12B	Jun-13	ML13_061	18-Jun-13	14.8	5.46	31	95	44

MLP12B	Jun-14	M114_047	13-Jun-14	20.2	5.58	--	--	23
MLP12B	Oct-14	ML14W_017	27-Oct-14	5.3	5.7	--	92	--
MLP13A		<i>2</i>						
MLP13A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP13A	Aug-11	ML11_028	24-Aug-11	--	--	--	--	--
MLP13A	May-12	ML12-069	9-Jun-12	--	--	--	--	--
MLP13A	Jul-12	ML12_176	30-Jul-12	--	--	--	--	--
MLP13A	Sep-12	ML12_213	8-Sep-12	--	--	--	--	--
MLP13A	Jun-13	ML13_063	18-Jun-13	--	--	--	--	209
MLP13A	Jun-14	M114_043	13-Jun-14	--	--	--	--	--
MLP13A	Oct-14	ML14W_018	27-Oct-14	--	--	--	--	--
MLP13B		<i>1</i>						
MLP13B	Jul-11	ML11_082	1-Jul-11	--	--	--	--	--
MLP13B	Aug-11	ML11_029	24-Aug-11	--	--	--	--	96
MLP13B	May-12	ML12-068	9-Jun-12	14.5	5.92	109	236	--
MLP13B	Jul-12	ML12_177	30-Jul-12	19.2	5.61	--	--	93
MLP13B	Sep-12	ML12_214	8-Sep-12	19.0	5.69	-85	253	--
MLP13B	Jun-13	ML13_064	18-Jun-13	--	6.3	--	195	51
MLP13B	Jun-14	M114_044	13-Jun-14	19.5	5.94	--	--	--
MLP13B	Oct-14	ML14W_019	27-Oct-14	4.6	6.13	--	228	--

	MLP14A	2						
MLP14A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP14A	Aug-11	--	--	--	--	--	--	--
MLP14A	May-12	--	--	--	--	--	--	--
MLP14A	Jul-12	--	--	--	--	--	--	--
MLP14A	Sep-12	ML12_215	8-Sep-12	--	--	--	--	--
MLP14A	Jun-13	ML13_065	18-Jun-13	--	7	--	--	--
MLP14A	Jun-14	--	--	--	--	--	--	--
	MLP14B	1						
MLP14B	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP14B	Aug-11	--	--	--	--	--	--	--
MLP14B	May-12	ML12-071	9-Jun-12	--	--	--	--	--
MLP14B	Jul-12	ML12_178	30-Jul-12	--	--	--	--	--
MLP14B	Sep-12	ML12_216	8-Sep-12	--	--	--	--	--
MLP14B	Jun-13	ML13_066	18-Jun-13	--	--	--	--	51
MLP14B	Jun-14	--	--	--	--	--	--	--
	MLP15A	3						
MLP15A	Jul-11	ML11_083	1-Jul-11	--	--	--	--	--
MLP15A	Aug-11	ML11_030	19-Aug-11	--	--	--	--	--
MLP15A	May-12	ML12-085	11-Jun-12	9.7	7.88	96	936	--

MLP15A	Jul-12	ML12_118	24-Jul-12	--	--	--	--	584
MLP15A	Sep-12	ML12_222	9-Sep-12	--	--	--	--	--
MLP15A	Jun-13	ML13_001	10-Jun-13	11.3	8.1	191	912	501
MLP15A	Jun-14	ML14_026	7-Jun-14	11.9	7.89		--	609
MLP15B		<i>2</i>						
MLP15B	Jul-11	ML11_084	1-Jul-11	--	--	--	--	--
MLP15B	Aug-11	ML11_031	19-Aug-11	11.3	5.53	254	174	60
MLP15B	May-12	ML12-084	11-Jun-12	10.4	5.47	165	165	65
MLP15B	Jul-12	ML12_119	24-Jul-12	14.6	5.42	224	170	70
MLP15B	Sep-12	ML12_223	9-Sep-12	14.6	5.36	-7	175	54
MLP15B	Jun-13	ML13_002	10-Jun-13	9.7	5.8	131	441	68
MLP15B	Jun-14	ML14_027	7-Jun-14	12.4	5.61	--	--	47
MLP15C		<i>1</i>						
MLP15C	Jul-11	ML11_085	1-Jul-11	--	--	--	--	--
MLP15C	Aug-11	ML11_032	19-Aug-11	12.5	4.47	255	54	2
MLP15C	May-12	ML12-083	11-Jun-12	10.5	5.70	--	52	--
MLP15C	Jul-12	ML12_120	24-Jul-12	--	--	--	--	7
MLP15C	Sep-12	ML12_224	9-Sep-12	17.4	5.02	--	104	--
MLP15C	Jun-13	ML13_003	10-Jun-13	--	5	166	67	17
MLP15C	Jun-14	ML14_028	7-Jun-14	10.6	4.97	--	--	9

MLP16A		3						
MLP16A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP16A	Aug-11	ML11_033	19-Aug-11	--	--	--	--	
MLP16A	May-12	ML12-082	11-Jun-12	9.9	7.34	103	846	--
MLP16A	Jul-12	ML12_122	25-Jul-12	--	--	--	--	--
MLP16A	Sep-12	ML12_225	9-Sep-12	--	--	--	--	--
MLP16A	Jun-13	ML13_004	10-Jun-13	--	5.3	177	306	26
MLP16A	Jun-14	MI14_022	6-7--14	--	--	--	--	420
MLP16B		2						
MLP16B	Jul-11	ML11_086	1-Jul-11	--	--	--	--	--
MLP16B	Aug-11	ML11_034	19-Aug-11	10.2	5.37	174	64	28
MLP16B	May-12	ML12-081	11-Jun-12	12.5	5.22	209	93	30
MLP16B	Jul-12	ML12_123	25-Jul-12	9.8	5.33	164	98	26
MLP16B	Sep-12	ML12_226	9-Sep-12	14.7	5.08	35	96	32
MLP16B	Jun-13	ML13_005	10-Jun-13	10.5	5.6	155	119	43
MLP16B	Jun-14	MI14_023	7-Jun-14	--	--	--	--	24
MLP16C		1						
MLP16C	Jul-11	ML11_087	1-Jul-11	--	--	--	--	--
MLP16C	Aug-11	ML11_035	19-Aug-11	11.6	4.20	233	34	--
MLP16C	May-12	ML12-080	11-Jun-12	--	--	--	--	14

MLP16C	Jul-12	ML12_124	25-Jul-12	--	--	--	--	0
MLP16C	Sep-12	ML12_227	9-Sep-12	16.0	4.49	8	37	6
MLP16C	Jun-13	ML13_006	10-Jun-13	10.9	5.2	180	43	7
MLP16C	Jun-14	ML14_024	7-Jun-14	1.09	4.7	--	--	0
MLP17A		3						
MLP17A	Jul-11	ML11_088	1-Jul-11	--	--	--	--	--
MLP17A	Aug-11	ML11_036	19-Aug-11	12.5	6.55	125	135	128
MLP17A	May-12	ML12-073	10-Jun-12	10.9	6.77	15	491	190
MLP17A	Jul-12	ML12_125	25-Jul-12	9.3	6.62	-139	484	192
MLP17A	Sep-12	ML12_229	9-Sep-12	--	6.63	-183	575	230
MLP17A	Jun-13	ML13_039	16-Jun-13	9.4	--	--	--	138
MLP17A	Jun-14	ML14_035	12-Jun-14	15.2	6.7	--	--	227
MLP17A	Oct-14	ML14W_022	27-Oct-14	--	--	--	--	--
MLP17B		2						
MLP17B	Jul-11	ML11_089	1-Jul-11	--	--	--	--	--
MLP17B	Aug-11	ML11_037	19-Aug-11	12.3	5.58	180	45	26
MLP17B	May-12	ML12-072	10-Jun-12	--	--	--	--	--
MLP17B	Jul-12	ML12_126	25-Jul-12	--	--	--	--	--
MLP17B	Sep-12	ML12_230	9-Sep-12	--	6.00	--	--	--
MLP17B	Jun-13	ML13_041	16-Jun-13	--	--	--	--	--

MLP17B	Jun-14	ML14_036	--	--	--	--	--	--
MLP17B	Oct-14	ML14W_023	27-Oct-14	--	--	--	--	--
MLP17C		<i>1</i>						
MLP17C	Jul-11	ML11_090	1-Jul-11	--	--	--	--	--
MLP17C	Aug-11	ML11_038	19-Aug-11	12.9	4.33	243	9	3
MLP17C	May-12	ML12-070	10-Jun-12	11.1	4.27	192	20	0
MLP17C	Jul-12	ML12_127	25-Jul-12	15.3	4.57	159	30	0
MLP17C	Sep-12	ML12_231	9-Sep-12	19.1	4.28	61	20	0
MLP17C	Jun-13	ML13_040	16-Jun-13	12.3	5.41	--	34	13
MLP17C	Jun-14	ML14_037	7-Jun-14	16.2	4.55	--	--	0
MLP17C	Oct-14	ML14W_024	27-Oct-14	4.3	4.77	--	23	--
MLP18A		<i>3</i>						
MLP18A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP18A	Aug-11	ML11_039	19-Aug-11	--	--	--	--	--
MLP18A	May-12	ML12-077	10-Jun-12	--	--	--	--	--
MLP18A	Jul-12	ML12_115	24-Jul-12	--	--	--	--	--
MLP18A	Sep-12	--	--	--	--	--	--	--
MLP18A	Jun-13	ML13_034	16-Jun-13	--	--	--	--	--
MLP18A	Jun-14	ML14_038	12-Jun-14	--	--	--	--	--
MLP18B		<i>2</i>						

MLP18B	Jul-11	ML11_091	1-Jul-11	--	--	--	--	--
MLP18B	Aug-11	ML11_040	19-Aug-11	14.5	5.67	135	70	
MLP18B	May-12	ML12-076	10-Jun-12	--	--	--	--	--
MLP18B	Jul-12	ML12_116_165	24-Jul-12	--	--	--	--	--
MLP18B	Sep-12	ML12_241	10-Sep-12	--	--	--	--	--
MLP18B	Jun-13	ML13_035	16-Jun-13	--	--	--	--	--
MLP18B	Jun-14	ML14_039	12-Jun-14	18.2	6.78	--	--	69
MLP18C		<i>1</i>						
MLP18C	Jul-11	ML11_092	1-Jul-11	--	--	--	--	--
MLP18C	Aug-11	ML11_041	19-Aug-11	11.8	5.23	186	59	18
MLP18C	May-12	ML12-075	10-Jun-12	8.6	5.05	196	60	17
MLP18C	Jul-12	ML12_117_166	24-Jul-12	13.0	5.01	232	65	22
MLP18C	Sep-12	ML12_242	10-Sep-12	11.3	5.38	-78	71	19
MLP18C	Jun-13	ML13_036	16-Jun-13	9.2	4.9	120	74	29
MLP18C	Jun-14	ML14_040	12-Jun-14	16.6	5.51	--	--	24
MLP19A		<i>2</i>						
MLP19A	Jul-11	ML11_093	1-Jul-11	--	--	--	--	--
MLP19A	Aug-11	ML11_042	21-Aug-11	15.9	5.40	357	150	52
MLP19A	May-12	ML12-051	9-Jun-12	11.4	5.54	206	150	46
MLP19A	Jul-12	ML12_138	26-Jul-12	--	--	--	--	69

MLP19A	Sep-12	ML12_233	9-Sep-12	17.1	5.39	-161	152	58
MLP19A	Jun-13	ML13_027	15-Jun-13	--	5.63	79	207	58
MLP19A	Jun-14	ML14_005	5-Jun-14	8.7	5.47	--	--	44
MLP19A	Oct-14	ML14W_005	26-Oct-14	3.1	5.73	--	165	--
MLP19B		<i>l</i>						
MLP19B	Jul-11	ML11_094	1-Jul-11	--	--	--	--	--
MLP19B	Aug-11	ML11_043	21-Aug-11	16.2	4.08	376	34	--
MLP19B	May-12	ML12-049	7-Jun-12	--	--	--	--	0
MLP19B	Jul-12	ML12_139	26-Jul-12	--	--	--	--	0
MLP19B	Sep-12	ML12_234	9-Sep-12	20.7	4.82	-65	48	--
MLP19B	Jun-13	ML13_028	15-Jun-13	15.9	5.57	145	107	3
MLP19B	Jun-14	ML14_006	5-Jun-14	6.6	4.42	--	--	--
MLP19B	Oct-14	ML14W_006	26-Oct-14	3.7	4.61	--	63	--
ML Highway 63 Weir								
ML Highway 63 Weir	Apr-12	ML12_028_019	13-Apr-12	--	--	--	--	--
ML Highway 63 Weir	Apr-12	ML 12_020_021	15-Apr-12	--	--	--	--	--
ML Highway 63 Weir	Aug-11	ML11_063	11-Aug-11	--	--	--	--	10

ML Highway 63 Weir	May-12	ML12-078	10-Jun-12	--	--	--	--	--
ML Highway 63 Weir	May-12	ML12-101	12-Jun-12	--	--	--	--	--
ML Highway 63 Weir	May-12	ML12-030	4-Jun-12	--	--	--	--	--
ML Highway 63 Weir	May-12	ML12-031	4-Jun-12	--	--	--	--	--
ML Highway 63 Weir	Jul-12	ML12_136	25-Jul-12	--	--	--	--	0
ML Highway 63 Weir	Jul-12	ML12_140	26-Jul-12	--	--	--	--	--
ML Highway 63 Weir	Jul-12	ML12_185	4-Aug-12	--	--	--	--	--
ML Highway 63 Weir	Jul-12	--	--	--	--	--	--	--
ML Highway 63 Weir	Sep-12	ML12_188	1-Sep-12	12.9	4.30	274	24	0
ML Highway 63 Weir	Sep-12	ML12_247	10-Sep-12	--	--	--	--	0
ML Highway 63 Weir	Jun-13	ML13_067	20-Jun-13	--	--	--	--	6
	ML Access Road Culvert							

ML Access Road Culvert	Aug-11	ML11_062	11-Aug-11	--	--	--	--	10
ML Access Road Culvert	Apr-12	ML12_026	13-Apr-12	--	--	--	--	--
ML Access Road Culvert	Apr-12	ML12_027	13-Apr-12	--	--	--	--	--
ML Access Road Culvert	May-12	ML12-100	11-Jun-12	15.1	4.18	226	14	0
ML Access Road Culvert	May-12	ML12-104	12-Jun-12	--	--	--	--	--
ML Access Road Culvert	Jul-12	ML12_112	18-Jul-12	--	--	--	--	0
ML Access Road Culvert	Jul-12	ML12_183	4-Aug-12	--	--	--	--	--
ML Access Road Culvert	Sep-12	ML12_240	10-Sep-12	--	--	--	--	--
ML Access Road Culvert	Jun-13	ML13_024	14-Jun-13	20	--	--	--	7
ML Access Road Culvert (E)								
ML Access Road Culvert (E)	Jul-12	ML12_179	30-Jul-12	--	--	--	--	--
ML Access Road Culvert	Jul-12	ML12_184	4-Aug-12	--	--	--	--	--

(E) ML Access Road Culvert (E)	Sep-12	ML12_239	10-Sep-12	--	--	--	--	0
ML Rain Events								
ML Rain Events	18-Aug-11	ML11_064	18-Aug-11	--	--	--	--	--
ML Rain Events	12-Jun-12	ML12-102	12-Jun-12	--	--	--	--	--
ML Rain Events	12-Jun-12	ML12-103	12-Jun-12	--	--	--	--	--
ML Rain Events	25-Jul-12	ML12_130	25-Jul-12	--	--	--	--	6
ML Rain Events	27-Jul-12	ML12_156	27-Jul-12	--	--	--	--	--
ML Rain Events	29-Jul-12	ML12_167	29-Jul-12	--	--	--	--	--
ML Rain Events	25-Jul-12	ML12_129	25-Jul-12	--	--	--	--	3
ML Rain Events	4-Aug-12	ML12_182	4-Aug-12	--	--	--	--	--
ML Rain Events	7-Sep-12	ML12_204	7-Sep-12	--	--	--	--	3
ML Bulk Rain								
ML Bulk Rain	(April to June 2012)	ML12-050	7-Jun-12	--	--	--	--	--
ML Bulk Rain	(May - 18 July 2012)	ML12_107	18-Jul-12	--	--	--	--	29
ML Bulk Rain	(17 July - 1 Sept 2012)	ML12_187	1-Sep-12	--	--	--	--	2
ML Bulk Rain	2012	ML12_248	12-Sep-12	--	--	--	--	4
ML Bulk Rain	summer2014	ML14_007	2-Jun-14	--	--	--	--	--

ML Bulk Rain	jun-nov 2014	ML14W_007	26-Oct-14	1.3	5.02	--	--	--
	Snow Survey							
Snow Survey	MLA	ML12_012	13-Mar-12	--	--	--	--	--
Snow Survey	MLE	ML12_015	13-Mar-12	--	--	--	--	--
Snow Survey	MLO	ML12_004	13-Mar-12	--	--	--	--	--
Snow Survey	MLU	ML12_008	13-Mar-12	--	--	--	--	--
Snow Survey	MLP1	ML12_001	13-Mar-12	--	--	--	--	--
Snow Survey	MLP2	ML12_002	13-Mar-12	--	--	--	--	--
Snow Survey	MLP3	ML12_003	13-Mar-12	--	--	--	--	--
Snow Survey	MLP4	ML12_005	13-Mar-12	--	--	--	--	--
Snow Survey	MLP5	ML12_006	13-Mar-12	--	--	--	--	--
Snow Survey	MLP6	ML12_009	13-Mar-12	--	--	--	--	--
Snow Survey	MLP12	ML12_013	13-Mar-12	--	--	--	--	--
Snow Survey	MLP13	ML12_011	13-Mar-12	--	--	--	--	--
Snow Survey	MLP14	ML12_010	13-Mar-12	--	--	--	--	--
Snow Survey	MLP16	ML12_017	13-Mar-12	--	--	--	--	--
Snow Survey	MLP17	ML12_018	13-Mar-12	--	--	--	--	--
Snow Survey	MLP18	ML12_016	13-Mar-12	--	--	--	--	--
Snow Survey	MLP19	ML12_007	13-Mar-12	--	--	--	--	--
Snow Survey	ML SHED	ML12_014	13-Mar-12	--	--	--	--	--

Snow Sampling		ML Bog	9-Feb-15	--	--	--	--	--
Snow Sampling		ML Fen	9-Feb-15	--	--	--	--	--
Snow Sampling		ML Upland	9-Feb-15	--	--	--	--	--
Snow Sampling		ML15S_001	24-Mar-15	--	--	--	--	--
Snow Sampling		ML15S_002	24-Mar-15	--	--	--	--	--
Snow Sampling		ML15S_003	24-Mar-15	--	--	--	--	--
Snow Sampling		ML15S_004	24-Mar-15	--	--	--	--	--
Snow Sampling		ML15S_005	24-Mar-15	--	--	--	--	--
Snow Sampling		ML15S_006	24-Mar-15	--	--	--	--	--
Snow Sampling		ML15S_007	24-Mar-15	--	--	--	--	--

Site ID	Site ID	Sample ID	sample date	DOC (AITF Vegreville)	Water Isotopes (AITF Victoria)		
				DOC	2H	18O	d-excess
			Units	mg/L	permil	permil	
			precision	0.8	1	0.2	1
			DL (QL)	0.2			
	JPHA	<i>WT</i>					

JPHA	Jul-11	JPH11_077	1-Jul-11	--	-137.7	-17.39	1.4
JPHA	Aug-11	JPH11_034	17-Aug-11	45.6	-128.5	-16.33	2.1
JPHA	May-12	JPH12-023	25-May-12	7.5	-163.8	-20.91	3.5
JPHA	Jul-12	JPH12_074	19-Jul-12	--	-134.1	-16.77	0.1
JPHA	Sep-12	JPH12_157	5-Sep-12	26.5	-113.3	-14.96	6.4
JPHA	Jun-13	JPH13_038	13-Jun-13	51.8	-146.1	-18.81	4.39
JPHA	Jun-14	JPH14-036	15-Jun-14	24.3	-146.3	-18.68	3.18
JPHB		<i>WT</i>					
JPHB	Jul-11	JPH11_078	1-Jul-11	--	-140.9	-17.93	2.5
JPHB	Aug-11	JPH11_035	17-Aug-11	24.0	-144.0	-18.46	3.7
JPHB	May-12	JPH12-026	25-May-12	--	-140.3	-17.85	2.5
JPHB	Jul-12	JPH12_079	19-Jul-12	--	-135.8	-17.53	4.4
JPHB	Sep-12	JPH12_156	5-Sep-12	23.4	-117.4	-15.38	5.6
JPHB	Jun-13	--	--	--	--	--	--
JPHB	Jun-14	JPH14_026	6/11/14	28.1	-148.2	-19.00	3.8
JPHC		<i>WT</i>					
JPHC	Jul-11	JPH11_079	1-Jul-11	--	-139.3	-17.47	0.5
JPHC	Aug-11	JPH11_036	17-Aug-11	39.6	-146.2	-18.78	4.0
JPHC	May-12	JPH12-028	25-May-12	19.9	-148.4	-18.95	3.2
JPHC	Jul-12	--	--	--	--	--	--

JPHC	Sep-12	JPH12_150	5-Sep-12	61.8	-133.7	-17.03	2.6
JPHC	Jun-13	JPH13_030	13-Jun-13	47.8	-147.1	-18.71	2.61
JPHC	GONE!	--	--	--	--	--	--
JPHD <i>WT</i>							
JPHD	Jul-11	JPH11_080	1-Jul-11	--	-142.9	-18.01	1.2
JPHD	Aug-11	JPH11_037	17-Aug-11	26.7	-137.3	-17.74	4.6
JPHD	May-12	JPH12-027	25-May-12	21.1	-135.5	-17.15	1.7
JPHD	Jul-12	JPH12_084	19-Jul-12	--	-136.7	-17.62	4.3
JPHD	Sep-12	JPH12_154	5-Sep-12	22.5	-117.5	-15.24	4.5
JPHD	Jun-13	JPH13_034	13-Jun-13	52.8	-145.5	-18.62	3.43
JPHD	GONE!	--	--	--	--	--	--
JPHE <i>WT</i>							
JPHE	Jul-11	JPH11_081	1-Jul-11	--	-144.8	-18.55	3.6
JPHE	Aug-11	JPH11_038	17-Aug-11	19.5	-145.9	-18.76	4.1
JPHE	May-12	JPH12-029	25-May-12	17.9	-137.6	-17.64	3.5
JPHE	Jul-12	JPH12_085	19-Jul-12	--	-135.4	-17.22	2.4
JPHE	Sep-12	JPH12_146	4-Sep-12	17.2	-116.1	-15.26	5.9
JPHE	GONE!	--	--	--	--	--	--
JPHF <i>WT</i>							
JPHF	Jul-11	JPH11_082	1-Jul-11	--	-148.0	-18.98	3.8

JPHF	Aug-11	JPH11_039	17-Aug-11	29.5	-153.9	-19.94	5.6
JPHF	May-12	JPH12-032	26-May-12	5.0	-147.2	-18.66	2.1
JPHF	Jul-12	JPH12_090	19-Jul-12	--	-134.2	-17.16	3.1
JPHF	Sep-12	JPH12_144	4-Sep-12	27.9	-112.1	-14.70	5.5
JPHF	Jun-13	JPH13_026	11-Jun-13	50.8	-147.7	-18.70	1.96
JPHF	GONE!	--	--	--	--	--	--
JPHG		<i>WT</i>					
JPHG	Jul-11	JPH11_083	1-Jul-11	--	-137.9	-17.50	2.1
JPHG	Aug-11	JPH11_040	17-Aug-11	29.8	-136.1	-17.28	2.1
JPHG	May-12	JPH12-025	25-May-12	22.3	-143.5	-18.18	1.9
JPHG	Jul-12	JPH12_080	19-Jul-12	--	-132.0	-16.98	3.8
JPHG	Sep-12	JPH12_155	5-Sep-12	21.9	-118.7	-15.26	3.4
JPHG	Jun-13	JPH13_039	13-Jun-13	46.4	-143.6	-18.62	5.30
JPHG	GONE!	--	--	--	--	--	--
JPHP01A		<i>3</i>					
JPHP01A	Jul-11	JPH11_044	1-Jul-11	--	-141.8	-18.01	2.2
JPHP01A	Aug-11	JPH11_001	14-Aug-11	26.5	-139.7	-17.93	3.7
JPHP01A	May-12	JPH12-064	28-May-12	30.5	-140.3	-17.89	2.8
JPHP01A	Jul-12	JPH12_107	22-Jul-12	--	-139.5	-18.51	8.5
JPHP01A	Sep-12	JPH12_120	2-Sep-12	77.1	-139.1	-18.01	5.0

JPHP01A	Jun-13	JPH13_013	7-Jun-13	24.6	-140.4	-17.94	3.08
JPHP01A	Jun-14	JPH14_020	10-Jun-14	18.8	-140.3	-17.98	3.54
JPHP01B		2					
JPHP01B	Jul-11	JPH11_045	1-Jul-11	--	-150.5	-19.20	3.1
JPHP01B	Aug-11	JPH11_002	14-Aug-11	0.9	-148.5	-19.16	4.8
JPHP01B	May-12	JPH12-066	28-May-12	1.2	-146.9	-18.79	3.4
JPHP01B	Jul-12	JPH12_108	22-Jul-12	--	-147.1	-18.79	3.2
JPHP01B	Sep-12	JPH12_121	2-Sep-12	1.1	-147.1	-18.95	4.5
JPHP01B	Jun-13	JPH13_014	7-Jun-13	2	-148.8	-18.96	2.83
JPHP01B	Jun-14	JPH14-021	11-Jun-14	0.5	-149.9	-19.21	3.78
JPHP01C		1					
JPHP01C	Jul-11	JPH11_046	1-Jul-11	--	-152.7	-19.38	2.3
JPHP01C	Aug-11	JPH11_003	14-Aug-11	2.3	-148.2	-18.95	3.4
JPHP01C	May-12	JPH12-067	28-May-12	2.5	-151.2	-19.31	3.4
JPHP01C	Jul-12	JPH12_109	22-Jul-12	--	-149.5	-18.96	2.2
JPHP01C	Sep-12	JPH12_122	2-Sep-12	2.0	-152.4	-19.56	4.1
JPHP01C	Jun-13	JPH13_015	7-Jun-13	2.4	-147.5	-18.57	0.98
JPHP01C	Jun-14	JPH14_022	11-Jun-14	1.9	-153.4	-19.88	5.64
JPHP02A		3					
JPHP02A	Jul-11	JPH11_047	1-Jul-11	--	-142.4	-18.17	2.9

JPHP02A	Aug-11	JPH11_004	14-Aug-11	18.8	-141.2	-18.04	3.2
JPHP02A	May-12	JPH12-061	28-May-12	19.9	-140.6	-17.93	2.8
JPHP02A	Jul-12	JPH12_104	22-Jul-12	--	-140.7	-18.58	7.9
JPHP02A	Sep-12	JPH12_123	2-Sep-12	53.8	-140.4	-17.97	3.4
JPHP02A	Jun-13	JPH13_023	11-Jun-13	17.5	-142.1	-18.03	2.09
JJP02A	Jun-14	JPH14_017	11-Jun-14	17.4	-140.6	-17.98	3.24
JPHP02B		<i>2</i>					
JPHP02B	Jul-11	JPH11_048	1-Jul-11	--	-148.8	-19.01	3.2
JPHP02B	Aug-11	JPH11_005	14-Aug-11	1.2	-149.2	-19.00	2.8
JPHP02B	May-12	JPH12-063	28-May-12	1.3	-148.9	-19.10	3.9
JPHP02B	Jul-12	JPH12_105	22-Jul-12	--	-149.0	-19.62	7.9
JPHP02B	Sep-12	JPH12_124	2-Sep-12	0.9	-148.0	-19.07	4.5
JPHP02B	Jun-13	JPH13_024	11-Jun-13	1.6	-147.3	-18.89	3.79
JPHP02B	Jun-14	JPH14_018	11-Jun-14	2.7	-148.6	-19.40	6.60
JPHP02C		<i>1</i>					
JPHP02C	Jul-11	JPH11_049	1-Jul-11	--	-147.1	-18.90	4.2
JPHP02C	Aug-11	JPH11_006	14-Aug-11	0.2	-149.4	-18.96	2.2
JPHP02C	May-12	JPH12-065	28-May-12	2.2	-149.3	-19.17	4.0
JPHP02C	Jul-12	JPH12_106	22-Jul-12	--	-151.3	-19.80	7.1
JPHP02C	Sep-12	JPH12_125	2-Sep-12	2.3	-149.2	-19.06	3.3

JPHP02C	Jun-13	JPH13_025	11-Jun-13	1.7	-149.6	-18.80	0.77
JPHP02C	Jun-14	JPH14_019	11-Jun-14	2.9	-147.0	-18.98	4.84
JPHP03A		3					
JPHP03A	Jul-11	JPH11_050	1-Jul-11	--	-147.3	-18.65	1.9
JPHP03A	Aug-11	JPH11_007	14-Aug-11	1.2	-147.3	-18.63	1.8
JPHP03A	May-12	JPH12-059	28-May-12	1.5	-146.0	-18.60	2.8
JPHP03A	Jul-12	JPH12_101	22-Jul-12	--	-146.9	-18.67	2.4
JPHP03A	Sep-12	JPH12_136	4-Sep-12	1.2	-145.5	-18.57	3.1
JPHP03A	Jun-13	JPH13_020	9-Jun-13	1.2	-147.3	-18.72	2.49
JPHP03A	Jun-14	JPH14_014	11-Jun-14	1.5	-146.7	-18.81	3.78
JPHP03B		2					
JPHP03B	Jul-11	JPH11_051	1-Jul-11	--	-149.6	-19.25	4.5
JPHP03B	Aug-11	JPH11_008	14-Aug-11	1.3	-149.2	-19.18	4.2
JPHP03B	May-12	JPH12-060	28-May-12	1.4	-149.1	-19.20	4.6
JPHP03B	Jul-12	JPH12_102	22-Jul-12	--	-149.6	-19.66	7.7
JPHP03B	Sep-12	JPH12_137	4-Sep-12	1.2	-147.6	-18.91	3.7
JPHP03B	Jun-13	JPH13_021	9-Jun-13	1.5	-150.3	-19.15	2.92
JPHP03B	Jun-14	JPH_015	11-Jun-14	1.5	-148.3	-19.14	4.82
JPHP03C		1					
JPHP03C	Jul-11	JPH11_052	1-Jul-11	--	-148.1	-19.02	4.0

JPHP03C	Aug-11	JPH11_009	14-Aug-11	1.4	-147.8	-18.82	2.8
JPHP03C	May-12	JPH12-062	28-May-12	--	-154.3	-19.76	3.8
JPHP03C	Jul-12	JPH12_103	22-Jul-12	--	-155.7	-20.52	8.4
JPHP03C	Sep-12	JPH12_139	4-Sep-12	1.3	-154.4	-19.65	2.9
JPHP03C	Jun-13	JPH13_022	9-Jun-13	1.4	-147.7	-18.73	2.19
JPHP03C	Jun-14	JPH14_016	11-Jun-14	1.6	-142.7	-18.35	4.10
JPHP04A		3					
JPHP04A	Jul-11	JPH11_053	1-Jul-11	--	-141.4	-18.09	3.3
JPHP04A	Aug-11	JPH11_010	14-Aug-11	8.5	-141.6	-18.17	3.8
JPHP04A	May-12	JPH12-056	28-May-12	19.3	-140.9	-18.06	3.5
JPHP04A	Jul-12	JPH12_098	21-Jul-12	--	-140.6	-18.13	4.4
JPHP04A	Sep-12	JPH12_138	4-Sep-12	21.8	-140.0	-17.91	3.3
JPHP04A	Jun-13	JPH13_017	9-Jun-13	11.8	-141.9	-18.16	3.36
JPHP04A	Jun-14	JPH14_011	11-Jun-14	2.2	-143.2	-18.32	3.36
JPHP04B		2					
JPHP04B	Jul-11	JPH11_054	1-Jul-11	--	-147.7	-18.99	4.2
JPHP04B	Aug-11	JPH11_011	14-Aug-11	0.2	-148.5	-18.96	3.2
JPHP04B	May-12	JPH12-057	28-May-12	2.0	-149.5	-19.08	3.1
JPHP04B	Jul-12	JPH12_099	21-Jul-12	--	-150.4	-19.26	3.6
JPHP04B	Sep-12	JPH12_141	4-Sep-12	1.7	-150.8	-19.27	3.4

JPHP04B	Jun-13	JPH13_018	9-Jun-13	2.6	-150.8	-19.33	3.80
JPHP04B	Jun-14	JPH14_012	11-Jun-14	14.3	-147.7	-18.91	3.58
JPHP04C		<i>1</i>					
JPHP04C	Jul-11	JPH11_055	1-Jul-11	--	-150.4	-19.22	3.3
JPHP04C	Aug-11	JPH11_012	14-Aug-11	2.0	-146.5	-18.76	3.5
JPHP04C	May-12	JPH12-058	28-May-12	2.9	-153.0	-19.48	2.9
JPHP04C	Jul-12	JPH12_100	21-Jul-12	--	-154.3	-19.73	3.5
JPHP04C	Sep-12	JPH12_142	4-Sep-12	3.3	-155.7	-20.05	4.7
JPHP04C	Jun-13	JPH13_019	9-Jun-13	3.1	-139.1	-17.65	2.15
JPHP04C	Jun-14	JPH14_013	11-Jun-14	4	-151.5	-19.62	5.46
JPHP05A		<i>3</i>					
JPHP05A	Jul-11	JPH11_056	1-Jul-11	--	-143.8	-18.31	2.7
JPHP05A	Aug-11	JPH11_013	15-Aug-11	4.5	-142.7	-18.33	3.9
JPHP05A	May-12	JPH12-040	27-May-12	5.6	-143.2	-18.22	2.6
JPHP05A	Jul-12	JPH12_095	21-Jul-12	--	-143.8	-18.89	7.3
JPHP05A	Sep-12	JPH12_133	3-Sep-12	5.8	-142.5	-18.27	3.6
JPHP05A	Jun-13	JPH13_007	6-Jun-13	4.2	-144.6	-18.12	0.31
JPHP05A	Jun-14	JPH14_007	11-Jun-14	2.9	-143.9	-18.43	3.54
JPHP05B		<i>2</i>					
JPHP05B	Jul-11	JPH11_057	1-Jul-11	--	-149.8	-19.11	3.1

JPHP05B	Aug-11	JPH11_014	15-Aug-11	1.2	-148.0	-19.01	4.1
JPHP05B	May-12	JPH12-041	27-May-12	1.3	-149.1	-19.19	4.4
JPHP05B	Jul-12	JPH12_096	21-Jul-12	--	-148.0	-19.55	8.3
JPHP05B	Sep-12	JPH12_134	3-Sep-12	1.3	-147.8	-19.04	4.5
JPHP05B	Jun-13	JPH13_008	6-Jun-13	1.6	-149.8	-19.15	3.41
JPHP05B	Jun-14	JPH14_008	11-Jun-14	1	-145.9	-18.73	3.94
JPHP05C		<i>1</i>					
JPHP05C	Jul-11	JPH11_058	1-Jul-11	--	-151.6	-19.15	1.6
JPHP05C	Aug-11	JPH11_015	15-Aug-11	2.4	-147.4	-18.73	2.4
JPHP05C	May-12	JPH12-043	27-May-12	--	-152.6	-19.54	3.7
JPHP05C	Jul-12	JPH12_097	21-Jul-12	--	-151.1	-19.94	8.4
JPHP05C	Sep-12	JPH12_135	3-Sep-12	2.4	-151.5	-19.49	4.4
JPHP05C	Jun-13	JPH13_009	6-Jun-13	2.2	-143.1	-18.03	1.15
JPHP05C	Jun-14	JPH14_009	11-Jun-14	2.2	-159.3	-19.62	-2.34
JPHP06A		<i>3</i>					
JPHP06A	Jul-11	JPH11_059	1-Jul-11	--	-144.4	-18.40	2.8
JPHP06A	Aug-11	JPH11_016	15-Aug-11	3.9	-145.4	-18.37	1.5
JPHP06A	May-12	JPH12-042	27-May-12	6.5	-144.1	-18.51	4.0
JPHP06A	Jul-12	JPH12_092	21-Jul-12	--	-144.5	-19.06	8.0
JPHP06A	Sep-12	JPH12_129	3-Sep-12	4.8	-144.5	-18.47	3.2

JPHP06A	Jun-13	JPH13_004	6-Jun-13	4.1	-145.8	-18.48	2.01
JPHP06A	Jun-14	JPH14_004	11-Jun-14	3.4	-144.9	-18.48	2.94
JPHP06B							
JPHP06B	Jul-11	JPH11_060	1-Jul-11	--	-147.1	-18.70	2.5
JPHP06B	Aug-11	JPH11_017	15-Aug-11	2.1	-147.7	-18.67	1.6
JPHP06B	May-12	JPH12-044	27-May-12	1.6	-147.2	-18.86	3.7
JPHP06B	Jul-12	JPH12_093	21-Jul-12	--	-147.6	-19.38	7.5
JPHP06B	Sep-12	JPH12_131	3-Sep-12	1.3	-147.0	-18.72	2.8
JPHP06B	Jun-13	JPH13_005	6-Jun-13	1.3	-148.9	-18.91	2.37
JPHP06B	Jun-14	JPH14_005	11-Jun-14	1.5	-147.1	-19.00	4.90
JPHP06C							
JPHP06C	Jul-11	JPH11_061	1-Jul-11	--	-147.9	-18.81	2.6
JPHP06C	Aug-11	JPH11_018	15-Aug-11	2.1	-148.9	-18.94	2.6
JPHP06C	May-12	JPH12-047	27-May-12	2.8	-149.9	-19.45	5.7
JPHP06C	Jul-12	JPH12_094	21-Jul-12	--	-151.2	-19.74	6.7
JPHP06C	Sep-12	JPH12_132	3-Sep-12	1.9	-150.4	-19.23	3.5
JPHP06C	Jun-13	JPH13_006	6-Jun-13	2.3	-147.1	-18.80	3.27
JPHP06C	Jun-14	JPH14_006	11-Jun-14	1.5	-142.9	-18.33	3.74
JPHP07A							
JPHP07A	Jul-11	JPH11_062	1-Jul-11	--	-143.8	-18.26	2.2

JPHP07A	Aug-11	JPH11_019	15-Aug-11	13.1	-143.0	-18.21	2.6
JPHP07A	May-12	JPH12-046	27-May-12	11.5	-143.5	-18.27	2.7
JPHP07A	Jul-12	JPH12_110	22-Jul-12	--	-142.8	-18.21	2.9
JPHP07A	Sep-12	JPH12_127	3-Sep-12	39.0	-142.2	-18.20	3.3
JPHP07A	Jun-13	JPH13_001	6-Jun-13	12.7	-144.2	-18.27	1.98
JPHP07A	Jun-14	JPH14_001	11-Jun-14	2	-143.2	-18.47	4.56
JPHP07B		<i>2</i>					
JPHP07B	Jul-11	JPH11_063	1-Jul-11	--	-148.0	-18.90	3.2
JPHP07B	Aug-11	JPH11_020	15-Aug-11	1.3	-148.5	-18.95	3.1
JPHP07B	May-12	JPH12-048	27-May-12	1.3	-146.7	-18.83	3.9
JPHP07B	Jul-12	JPH12_111	22-Jul-12	--	-146.6	-18.67	2.8
JPHP07B	Sep-12	JPH12_128	3-Sep-12	1.3	-145.9	-18.60	2.9
JPHP07B	Jun-13	JPH13_002	6-Jun-13	1.8	-147.8	-18.90	3.38
JPHP07B	Jun-14	JPH14_002	11-Jun-14	1.9	-146.3	-18.87	4.66
JPHP07C		<i>1</i>					
JPHP07C	Jul-11	JPH11_064	1-Jul-11	--	-147.9	-18.81	2.6
JPHP07C	Aug-11	JPH11_021	15-Aug-11	1.1	-148.2	-18.76	1.8
JPHP07C	May-12	JPH12-050	27-May-12	--	-158.0	-20.30	4.4
JPHP07C	Jul-12	JPH12_112	22-Jul-12	--	-152.0	-19.24	1.9
JPHP07C	Sep-12	JPH12_130	3-Sep-12	--	-149.6	-19.26	4.5

JPHP07C	Jun-13	JPH13_003	6-Jun-13	2.1	-141.2	-17.67	0.20
JPHP07C	Jun-14	JPH14_003	11-Jun-14	2.3	-166.7	-21.53	5.54
JPHP08A		3					
JPHP08A	Jul-11	JPH11_065	1-Jul-11	--	-148.3	-19.08	4.4
JPHP08A	Aug-11	JPH11_022	17-Aug-11	6.4	-149.2	-18.94	2.4
JPHP08A	May-12	JPH12-049	27-May-12	6.8	-148.4	-19.10	4.4
JPHP08A	Jul-12	JPH12_075	19-Jul-12	--	-148.3	-18.51	-0.2
JPHP08A	Sep-12	JPH12_159	5-Sep-12	8.4	-148.1	-18.99	3.8
JPHP08A	Jun-13	JPH13_035	13-Jun-13	6	-149.3	-18.93	2.11
JPHP08A	Jun-14	JPH14_033	15-Jun-14	4.1	-150.0	-19.14	3.12
JPHP08B		2					
JPHP08B	Jul-11	JPH11_066	1-Jul-11	--	-142.3	-18.20	3.3
JPHP08B	Aug-11	JPH11_023	17-Aug-11	11.6	-141.6	-18.11	3.4
JPHP08B	May-12	JPH12-051	27-May-12	17.3	-143.4	-18.43	4.0
JPHP08B	Jul-12	JPH12_076	19-Jul-12	--	-143.3	-17.91	0.0
JPHP08B	Sep-12	JPH12_160	5-Sep-12	20.7	-142.6	-18.46	5.1
JPHP08B	Jun-13	JPH13_036	13-Jun-13	15.6	-144.1	-18.32	2.51
JPHP08B	Jun-14	JPH14_034	15-Jun-14	10.4	-143.4	-18.53	4.84
JPHP08C		1					
JPHP08C	Jul-11	JPH11_067	1-Jul-11	--	-135.1	-17.14	2.0

JPHP08C	Aug-11	JPH11_024	17-Aug-11	22.6	-143.8	-18.34	2.9
JPHP08C	May-12	JPH12-052	27-May-12	17.5	-156.3	-19.85	2.5
JPHP08C	Jul-12	JPH12_077	19-Jul-12	--	-139.5	-17.33	-0.9
JPHP08C	Sep-12	JPH12_161	6-Sep-12	41.5	-143.8	-18.54	4.6
JPHP08C	Jun-13	JPH13_037	13-Jun-13	36	-137.1	-17.44	2.45
JPHP08C	Jun-14	JPH14_035	15-Jun-14	12.1	-136.1	-17.35	2.70
JPHP09A		3					
JPHP09A	Jul-11	JPH11_068	1-Jul-11	--	-147.3	-18.82	3.3
JPHP09A	Aug-11	JPH11_025	17-Aug-11	10.5	-146.5	-18.54	1.9
JPHP09A	May-12	JPH12-037	26-May-12	10.2	-146.2	-18.53	2.1
JPHP09A	Jul-12	JPH12_081	19-Jul-12	--	-146.3	-18.62	2.7
JPHP09A	Sep-12	JPH12_151	5-Sep-12	8.9	-145.6	-18.49	2.3
JPHP09A	Jun-13	JPH13_031	13-Jun-13	12.6	-146.6	-18.54	1.71
JPHP09A	Jun-14	JPH14_27	11-Jun-14	10.2	-146.3	-18.66	2.98
JPHP09B		2					
JPHP09B	Jul-11	JPH11_069	1-Jul-11	--	-141.2	-17.93	2.3
JPHP09B	Aug-11	JPH11_026	17-Aug-11	16.3	-140.6	-17.82	1.9
JPHP09B	May-12	JPH12-038	26-May-12	25.6	-140.5	-18.01	3.6
JPHP09B	Jul-12	JPH12_082	19-Jul-12	--	-141.0	-18.14	4.1
JPHP09B	Sep-12	JPH12_152	5-Sep-12	26.9	-140.6	-17.99	3.3

JPHP09B	Jun-13	JPH13_032	13-Jun-13	21.1	-140.3	-17.73	1.57
JPHP09B	Jun-14	JPH14_028	11-Jun-14	13.9	-139.2	-17.64	1.92
JPHP09C		<i>1</i>					
JPHP09C	Jul-11	JPH11_070	1-Jul-11	--	-155.2	-19.95	4.3
JPHP09C	Aug-11	JPH11_027	17-Aug-11	20.4	-146.3	-18.48	1.6
JPHP09C	May-12	JPH12-039	26-May-12	17.1	-140.2	-17.82	2.4
JPHP09C	Jul-12	JPH12_083	19-Jul-12	--	-140.5	-17.93	3.0
JPHP09C	Sep-12	JPH12_153	5-Sep-12	24.6	-134.4	-17.24	3.5
JPHP09C	Jun-13	JPH13_033	13-Jun-13	65.9	-148.7	-18.44	-1.24
JPHP09C	Jun-14	JPH14_029	11-Jun-14	25.7	-135.8	-17.29	2.52
JPHP10A		<i>3</i>					
JPHP10A	Jul-11	JPH11_071	1-Jul-11	--	-144.4	-18.43	3.1
JPHP10A	Aug-11	JPH11_028	15-Aug-11	6.0	-144.8	-18.38	2.2
JPHP10A	May-12	JPH12-034	26-May-12	9.4	-144.6	-18.33	2.0
JPHP10A	Jul-12	JPH12_086	19-Jul-12	--	-143.9	-18.49	4.0
JPHP10A	Sep-12	JPH12_147	4-Sep-12	9.2	-143.3	-18.37	3.7
JPHP10A	Jun-13	JPH13_027	11-Jun-13	10.2	-145.2	-18.36	1.65
JPHP10A	Jun-14	JPH14_023	11-Jun-14	12.3	-144.3	-18.58	4.34
JPHP10B		<i>2</i>					
JPHP10B	Jul-11	JPH11_072	1-Jul-11	--	-140.8	-17.91	2.5

JPHP10B	Aug-11	JPH11_029	15-Aug-11	4.7	-142.3	-17.98	1.5
JPHP10B	May-12	JPH12-035	26-May-12	19.6	-141.7	-17.89	1.4
JPHP10B	Jul-12	JPH12_087	19-Jul-12	--	-141.3	-18.24	4.6
JPHP10B	Sep-12	JPH12_148	5-Sep-12	20.7	-140.7	-18.07	3.9
JPHP10B	Jun-13	JPH13_028	11-Jun-13	15.4	-140.2	-18.06	4.35
JPHP10B	Jun-14	JPH14_024	11-Jun-14	14.6	-142.9	-18.31	3.58
JPHP10C		<i>1</i>					
JPHP10C	Jul-11	JPH11_073	1-Jul-11	--	-150.0	-19.05	2.4
JPHP10C	Aug-11	JPH11_030	15-Aug-11	31.3	-145.8	-18.68	3.7
JPHP10C	May-12	JPH12-036	26-May-12	29.6	-143.7	-18.39	3.4
JPHP10C	Jul-12	JPH12_088	19-Jul-12	--	-141.5	-18.10	3.3
JPHP10C	Sep-12	JPH12_149	5-Sep-12	81.0	-133.5	-17.05	2.9
JPHP10C	Jun-13	JPH13_029	11-Jun-13	32.3	-139.3	-17.96	4.37
JPHP10C	Jun-14	JPH14_025	11-Jun-14	17.8	-160.5	-20.32	2.06
JPHP11A		<i>3</i>					
JPHP11A	Jul-11	JPH11_074	1-Jul-11	--	-140.5	-17.91	2.7
JPHP11A	Aug-11	JPH11_031	14-Aug-11	35.1	-140.6	-17.96	3.1
JPHP11A	May-12	JPH12-053	27-May-12	36.5	-141.6	-18.02	2.5
JPHP11A	Jul-12	JPH12_070	17-Jul-12	--	-141.4	-17.63	-0.3
JPHP11A	Sep-12	JPH12_162	6-Sep-12	40.0	-139.6	-18.02	4.6

JPHP11A	Jun-13	JPH13_010	7-Jun-13	53.1	-142.0	-17.99	1.98
JPHP11A	Jun-14	JPH14_030	15-Jun-14	38.8	-141.3	-18.07	3.26
JPHP11B		<i>2</i>					
JPHP11B	Jul-11	JPH11_075	1-Jul-11	--	-145.0	-18.37	1.9
JPHP11B	Aug-11	JPH11_032	14-Aug-11	1.6	-145.4	-18.47	2.4
JPHP11B	May-12	JPH12-054	27-May-12	1.6	-145.0	-18.24	0.9
JPHP11B	Jul-12	JPH12_071	17-Jul-12	--	-145.0	-18.26	1.1
JPHP11B	Sep-12	JPH12_163	6-Sep-12	2.8	-143.9	-18.39	3.2
JPHP11B	Jun-13	JPH13_011	7-Jun-13	1.5	-145.1	-18.26	0.93
JPHP11B	Jun-14	JPH14_031	15-Jun-14	0.8	-144.7	-18.28	1.54
JPHP11C		<i>1</i>					
JPHP11C	Jul-11	JPH11_076	1-Jul-11	--	-146.7	-18.78	3.6
JPHP11C	Aug-11	JPH11_033	14-Aug-11	1.9	-148.5	-18.87	2.5
JPHP11C	May-12	JPH12-055	27-May-12	--	-149.8	-19.00	2.2
JPHP11C	Jul-12	JPH12_072	17-Jul-12	--	-150.1	-18.57	-1.6
JPHP11C	Sep-12	JPH12_164	6-Sep-12	2.2	-146.2	-18.61	2.7
JPHP11C	Jun-13	JPH13_012	7-Jun-13	2.2	-151.7	-19.14	1.45
JPHP11C	Jun-14	JPH14_033	15-Jun-14	1.9	-138.0	-17.75	4.00
JPHP12		<i>1</i>					
JPHP12	Jul-12	JPH12_113	22-Jul-12	--	-137.1	-17.61	3.8

JPHP12	Sep-12	JPH12_143	4-Sep-12	--	-145.6	-18.76	4.5
JPHP12	Jun-13	JPH13_016	7-Jun-13	--	-146.3	-18.60	2.6
JPHP12	Jun-14	JPH14_010	11-Jun-14	--	--	--	--
Surface Water at JPHA							
Surface Water at JPHA	Aug-11	JPH11_042	17-Aug-11	55.4	-118.8	-13.47	-11.1
Surface Water at JPHA	Apr-12	JPH12_022_014	14-Apr-12	13.6	-160.8	-20.79	5.5
Surface Water at JPHA	May-12	JPH12-024	25-May-12	27.2	-135.0	-15.89	-7.9
Surface Water at JPHA	Jul-12	JPH12_116	3-Aug-12	--	-133.6	-17.50	6.4
Surface Water at JPHA	Jul-12	JPH12_078	19-Jul-12	--	-135.6	-17.00	0.4
Surface Water at JPHA	Sep-12	JPH12_158	5-Sep-12	26.5	-117.6	-15.50	6.4
JPH Weir							
JPH Weir	Aug-11	JPH11_041	15-Aug-11	22.9	-145.5	-18.63	3.5
JPH Weir	Apr-12	JPH12_021_018	14-Apr-12	20.5	-144.6	-18.51	3.5
JPH Weir	Apr-12	JPH12_020_016	14-Apr-12	25.7	-162.5	-20.42	0.8
JPH Weir	May-12	JPH12-033	26-May-12	12.2	-153.2	-19.40	2.0
JPH Weir	Jul-12	JPH12_089	19-Jul-12	--	-135.2	-17.44	4.3

JPH Weir	Jul-12	JPH12_117	3-Aug-12	--	-140.4	-18.37	6.6
JPH Weir	Sep-12	JPH12_145	4-Sep-12	26.3	-131.2	-17.01	4.9
JPH Rain Events							
JPH Rain Events	15-Aug-11	JPH11_043	15-Aug-11	5.1	-101.3	-13.03	2.9
JPH Rain Events	5-Jun-12	JPH12-068	5-Jun-12	--	-128.3	-15.56	-3.9
JPH Rain Events	17-Jul-12	JPH12_069	17-Jul-12	--	-129.2	-15.98	-1.3
JPH Rain Events	13-Sep-12	JPH12_165	13-Sep-12	4.4	-119.4	-15.78	6.9
JPH Bulk Rain							
JPH Bulk Rain	(April - May 2012)	JPH12-030	25-May-12	3.0	-153.5	-19.76	4.6
JPH Bulk Rain	(5 June - 17July 2012)	JPH12_073	17-Jul-12	--	-131.7	-16.09	-3.0
JPH Bulk Rain	(5 June - 17July 2012)	JPH12_091	19-Jul-12	--	-143.7	-18.71	5.9
JPH Bulk Rain	(10days)	JPH12_114	31-Jul-12	--	-123.2	-15.04	-2.9
JPH Bulk Rain	(17 July - 3 Aug)	JPH12_115	3-Aug-12	--	-127.0	-15.84	-0.3
JPH Bulk Rain	(17 July - 2 Sep)	JPH12_126	2-Sep-12	--	-99.2	-12.03	-3.0
RAIN	Jun-13	JPH13_040	13-Jun-13	--	-134.7	-18.19	10.80
Snow Survey							

Snow Survey	JPHA	JPH12_007	13-Mar-12	--	-184.0	-23.88	7.0
Snow Survey	JPHE	JPH12_008	13-Mar-12	--	-179.9	-23.53	8.4
Snow Survey	JPHG	JPH12_005	13-Mar-12	--	-191.5	-25.20	10.0
Snow Survey	JPHP1	JPH12_010	13-Mar-12	--	-178.5	-23.01	5.6
Snow Survey	JPHP2	JPH12_011	13-Mar-12	--	-183.0	-23.71	6.7
Snow Survey	JPHP3	JPH12_001	13-Mar-12	--	-177.9	-22.99	6.0
Snow Survey	JPHP4	JPH12_002	13-Mar-12	--	-179.5	-23.11	5.4
Snow Survey	JPHP5	JPH12_003	13-Mar-12	--	-173.9	-22.27	4.3
Snow Survey	JPHP6	JPH12_004	13-Mar-12	--	-176.5	-22.69	5.0
Snow Survey	JPHP7	JPH12_009	13-Mar-12	--	-179.1	-23.01	4.9
Snow Survey	JPHP8	JPH12_006	13-Mar-12	--	-182.2	-23.80	8.2
Snow Survey	JPHP11	JPH12_012	13-Mar-12	--	-178.1	-23.08	6.5
Snow Sampling							
Snow Sampling		JPH	8-Feb-15	--	--	--	--
Snow Sampling		JPH15S_001	23-Mar-15	--	-173.4	-22.73	8.409288212
Snow Sampling		JPH15S_002	23-Mar-15	--	-177.1	-23.27	9.126593246
Snow Sampling		JPH15S_003	23-Mar-15	--	-192.9	-25.06	7.520614018
Snow Sampling		JPH15S_004	23-Mar-15	--	-203.7	-26.52	8.446150408
MLA							
MLA	Jul-11	ML11_095	1-Jul-11	--	-137.6	-17.51	2.5

MLA	Aug-11	ML11_044	24-Aug-11	47.9	-132.9	-17.06	3.6
MLA	May-12	ML12-067	9-Jun-12	36.2	-140.1	-18.03	4.2
MLA	Jul-12	ML12_175	30-Jul-12	--	-133.9	-16.96	1.8
MLA	Sep-12	ML12_212	8-Sep-12	33.0	-115.9	-15.01	4.1
MLA	Jun-13	ML13_062	18-Jun-13	36.6	-144.3	-18.34	2.42
MLA	Jun-14	ML14_045	13-Jun-14	32.4	-144.1	-18.23	1.74
MLB		<i>WT</i>					
MLB	Jul-11	ML11_096	1-Jul-11	--	-139.0	-17.72	2.8
MLB	Aug-11	ML11_045	21-Aug-11	54.1	-138.5	-17.76	3.6
MLB	May-12	ML12-064	9-Jun-12	53.3	-137.9	-17.64	3.2
MLB	Jul-12	ML12_172	30-Jul-12	--	-128.3	-16.51	3.9
MLB	Sep-12	ML12_209	8-Sep-12	40.5	-119.0	-15.27	3.2
MLB	Jun-13	ML13_059	18-Jun-13	49.4	-143.1	-18.22	2.63
MLB	Jun-14	ML14_054	14-Jun-14	51.5	-138.4	-17.66	2.84
MLC		<i>WT</i>					
MLC	Jul-11	ML11_097	1-Jul-11	--	-145.0	-18.70	4.5
MLC	Aug-11	ML11_046	21-Aug-11	59.8	-139.6	-18.15	5.6
MLC	May-12	ML12-060	9-Jun-12	52.5	-140.6	-18.08	4.0
MLC	Jul-12	ML12_168	30-Jul-12	--	-139.9	-18.19	5.7
MLC	Sep-12	ML12_205	8-Sep-12	50.3	-120.1	-15.65	5.2

MLC	Jun-13	ML13_058	18-Jun-13	65.5	-147.6	-19.08	5.02
MLC	Jun-14	ML14-055	14-Jun-14	42.9	-142.5	-18.42	4.92
MLD		<i>WT</i>					
MLD	Jul-11	ML11_098	1-Jul-11	--	-136.0	-17.48	3.9
MLD	Aug-11	ML11_047	19-Aug-11	53.3	-130.9	-17.10	5.9
MLD	May-12	ML12-039	7-Jun-12	43.9	-127.8	-16.38	3.3
MLD	Jul-12	ML12_164	28-Jul-12	--	-132.6	-16.99	3.3
MLD	Sep-12	ML12_220	8-Sep-12	38.1	-118.9	-15.32	3.6
MLD	Jun-13	ML13_049	17-Jun-13	33.7	-141.1	-18.07	3.51
MLD	Jun-14	--	--	--	--	--	--
MLE		<i>WT</i>					
MLE	Jul-11	ML11_099	1-Jul-11	--	-134.3	-16.92	1.1
MLE	Aug-11	ML11_048	19-Aug-11	52.8	-132.0	-16.92	3.4
MLE	May-12	ML12-098	11-Jun-12	42.2	-132.3	-16.62	0.7
MLE	Jul-12	ML12_114	24-Jul-12	--	-130.2	-16.33	0.4
MLE	Sep-12	ML12_243	10-Sep-12	48.0	-133.0	-16.74	1.0
MLE	Jun-13	ML13_037	16-Jun-13	31.7	-145.6	-18.51	2.53
MLE	Jun-14	ML14_041	12-Jun-14	15.7	-143.4	-18.19	2.09
MLF		<i>WT</i>					
MLF	Jul-11	ML11_100	1-Jul-11	--	-139.6	-17.99	4.3

MLF	Aug-11	ML11_049	21-Aug-11	74.5	-136.2	-17.89	6.9
MLF	May-12	ML12-055	9-Jun-12	61.1	-137.9	-17.79	4.4
MLF	Jul-12	ML12_145	27-Jul-12	--	-135.8	-17.77	6.3
MLF	Sep-12	ML12_197	7-Sep-12	74.1	-118.8	-15.67	6.5
MLF	Jun-13	ML13_045	17-Jun-13	59.4	-147.6	-19.40	7.61
MLF	Jun-14	ML14_61	14-Jun-14	53.7	-146.8	-18.92	4.49
MLG		<i>WT</i>					
MLG	Jul-11	ML11_101	1-Jul-11	--	-140.8	-17.94	2.8
MLG	Aug-11	ML11_050	19-Aug-11	40.4	-125.9	-16.31	4.6
MLG	May-12	ML12-074	10-Jun-12	40.5	-136.1	-17.63	4.9
MLG	Jul-12	ML12_128	25-Jul-12	--	-135.5	-17.25	2.5
MLG	Sep-12	ML12_232	9-Sep-12	36.1	-124.2	-15.86	2.7
MLG	Jun-13	ML13_038	16-Jun-13	33.7	-148.3	-18.89	2.82
MLG	Jun-14	ML14_034	12-Jun-14	50.9	-146.7	-18.90	4.54
MLG	Oct-14	ML14W_025	26-Oct-14	--	--	--	--
MLH		<i>WT</i>					
MLH	Jul-11	ML11_102	1-Jul-11	--	-140.5	-17.86	2.4
MLH	Aug-11	ML11_051	19-Aug-11	41.1	-133.1	-17.25	4.9
MLH	May-12	ML12-043	7-Jun-12	47.3	-136.9	-17.41	2.4
MLH	Jul-12	ML12_131	25-Jul-12	--	-119.9	-15.37	3.1

MLH	Sep-12	ML12_253	12-Sep-12	49.8	-121.2	-15.67	4.2
MLH	Jun-13	ML13_033	16-Jun-13	41.5	-142.3	-18.15	2.92
MLH	Jun-14	ML14_048	13-Jun-14	50.9	-142.1	-17.89	1.03
MLM		<i>WT</i>					
MLM	Jul-11	ML11_103	1-Jul-11	--	-134.4	-17.23	3.4
MLM	Aug-11	ML11_052	19-Aug-11	52.0	-133.1	-17.13	3.9
MLM	May-12	ML12-079	11-Jun-12	46.4	-137.1	-17.37	1.8
MLM	Jul-12	ML12_121	24-Jul-12	--	-135.0	-17.17	2.4
MLM	Sep-12	ML12_228	9-Sep-12	34.7	-116.9	-14.86	2.0
MLM	Jun-13	ML13_007	10-Jun-13	136	-136.1	-17.24	1.84
MLM	Jun-14	ML14_025	7-Jun-14	109	-141.1	-17.84	1.60
MLN		<i>WT</i>					
MLN	Jul-11	ML11_104	1-Jul-11	--	-143.6	-18.29	2.7
MLN	Aug-11	ML11_053	19-Aug-11	53.3	-132.8	-17.05	3.6
MLN	May-12	ML12-096	11-Jun-12	45.6	-136.7	-17.37	2.2
MLN	Jul-12	ML12_110	18-Jul-12	--	-135.2	-16.98	0.7
MLN	Sep-12	ML12_245	10-Sep-12	43.6	-120.2	-15.52	3.9
MLN	Jun-13	ML13_022	14-Jun-13	65.5	-149.0	-19.17	4.30
MLN	Jun-14	ML14_032	12-Jun-14	39.2	-146.1	-18.63	2.97
MLO		<i>WT</i>					

MLO	Jul-11	ML11_105	1-Jul-11	--	-142.7	-18.39	4.5
MLO	Aug-11	ML11_054	21-Aug-11	80.1	-137.9	-18.10	6.9
MLO	May-12	ML12-056	9-Jun-12	66.4	-139.5	-18.04	4.8
MLO	Jul-12	ML12_144	27-Jul-12	--	-139.7	-18.21	6.0
MLO	Sep-12	ML12_199	7-Sep-12	75.5	-114.6	-15.16	6.7
MLO	Jun-13	ML13_050	17-Jun-13	60.4	-148.2	-19.19	5.29
MLO	Jun-14	ML14_059	14-Jun-14	44.5	-144.1	-18.77	6.04
MLO	Oct-14	ML14W_012	26-Oct-14	--	--	--	
MLP		<i>WT</i>					
MLP	Jul-11	ML11_106	1-Jul-11	--	-141.6	-18.21	4.1
MLP	Aug-11	ML11_055	21-Aug-11	88.4	-136.8	-17.68	4.7
MLP	May-12	ML12-054	9-Jun-12	66.4	-140.1	-18.11	4.7
MLP	Jul-12	ML12_146	27-Jul-12	--	-133.7	-17.44	5.8
MLP	Sep-12	ML12_196	7-Sep-12	70.8	-115.1	-15.07	5.5
MLP	Jun-13	ML13_044	17-Jun-13	61.4	-148.1	-19.41	7.20
MLP	Jun-13	ML13_043	17-Jun-13	139	-149.4	-19.38	5.69
MLP	Jun-14	ML14_060	14-Jun-14	42.4	-149.5	-19.28	4.76
MLQ		<i>WT</i>					
MLQ	Jul-11	ML11_107	1-Jul-11	--	-136.5	-17.17	0.9
MLQ	Aug-11	ML11_056	19-Aug-11	62.0	-133.1	-17.01	3.0

MLQ	May-12	ML12-097	11-Jun-12	47.3	-137.9	-17.48	1.9
MLQ	Jul-12	ML12_113	24-Jul-12	--	-133.8	-16.84	0.9
MLQ	Jul-12	ML12_111	18-Jul-12	--	-134.8	-16.96	0.9
MLQ	Sep-12	ML12_244	10-Sep-12	44.9	-128.0	-16.42	3.4
MLQ	Jun-13	ML13_023	14-Jun-13	79.7	-145.5	-18.61	3.42
MLQ	Jun-14	ML14_033	12-Jun-14	20.7	-151.4	-19.05	1.04
MLR		<i>WT</i>					
MLR	Jul-11	ML11_108	1-Jul-11	--	-141.3	-17.99	2.6
MLR	Aug-11	ML11_057	19-Aug-11	55.9	-137.4	-17.95	6.3
MLR	May-12	ML12-095	11-Jun-12	42.2	-139.7	-17.92	3.6
MLR	Jul-12	ML12_109	18-Jul-12	--	-138.1	-18.28	8.1
MLR	Sep-12	ML12_246	10-Sep-12	38.3	-117.0	-15.38	6.0
MLR	Jun-13	ML13_021	14-Jun-13	34.7	-149.0	-19.34	5.78
MLR	Jun-14	ML14_031	12-Jun-14	36.6	-147.7	-18.85	3.12
MLS		<i>WT</i>					
MLS	Jul-11	ML11_109	1-Jul-11	--	-144.2	-18.55	4.2
MLS	Aug-11	ML11_058	21-Aug-11	60.9	-144.8	-18.37	2.1
MLS	May-12	ML12-048	7-Jun-12	54.2	-140.2	-18.15	5.0
MLS	Jul-12	ML12_137	26-Jul-12	--	-140.2	-18.13	4.8
MLS	Sep-12	ML12_235	9-Sep-12	58.9	-121.8	-15.87	5.2

MLS	Jun-13	ML13_026	15-Jun-13	34.7	-147.1	-19.08	5.51
MLS	Jun-14	ML14_008	5-Jun-14	8.1	--	--	--
MLS	Oct-14	ML14W_008	26-Oct-14	--	--	--	--
MLT		<i>WT</i>					
MLT	Jul-11	ML11_110	1-Jul-11	--	-142.0	-18.24	3.9
MLT	Aug-11	ML11_059	24-Aug-11	67.5	-136.5	-18.03	7.8
MLT	May-12	ML12-053	9-Jun-12	56.8	-140.7	-18.17	4.6
MLT	Jul-12	ML12_147	27-Jul-12	--	-128.0	-16.68	5.5
MLT	Sep-12	ML12_203	8-Sep-12	63.9	-122.4	-15.77	3.8
MLT	Jun-13	ML13_054	17-Jun-13	78.7	-149.0	-19.20	4.66
MLT	Jun-14	ML14_050	13-Jun-14	40.3	-147.4	-18.87	3.56
MLU		<i>WT</i>					
MLU	Jul-11	ML11_111	1-Jul-11	--	-138.8	-17.92	4.6
MLU	Aug-11	ML11_060	21-Aug-11	53.1	-144.7	-17.91	-1.4
MLU	May-12	ML12-086	11-Jun-12	48.1	-140.2	-18.21	5.4
MLU	Jul-12	ML12_108	18-Jul-12	--	-138.5	-18.34	8.3
MLU	Sep-12	ML12_186	1-Sep-12	54.8	-138.7	-18.12	6.2
MLU	Jun-13	ML13_025	15-Jun-13	33.7	-139.1	-18.09	5.56
MLU	Jun-14	ML14_049	13-Jun-14	46.1	-149.4	-19.33	1.03
MLV		<i>WT</i>					

MLV	Jul-11	ML11_112	1-Jul-11	--	-143.8	-18.70	5.8
MLV	Aug-11	ML11_061	21-Aug-11	66.2	-153.5	-18.03	-9.3
MLV	May-12	ML12-052	9-Jun-12	55.9	-140.8	-18.25	5.2
MLV	Jul-12	ML12_148	27-Jul-12	--	-130.7	-16.87	4.2
MLV	Sep-12	ML12_198	7-Sep-12	61.6	-115.1	-15.19	6.4
MLV	Jun-13	ML13_042	17-Jun-13	63.5	-149.9	-19.51	6.12
MLV	Jun-14	--	--	--	--	--	--
MLP01A		2					
MLP01A	Jul-11	--	1-Jul-11	--	--	--	--
MLP01A	Aug-11	--	--	--	--	--	--
MLP01A	May-12	ML12-033	7-Jun-12	--	-143.5	-18.48	4.3
MLP01A	Jul-12	--	--	--	--	--	--
MLP01A	Sep-12	--	--	--	--	--	--
MLP01A	Jun-13	--	--	--	--	--	--
MLP01A	Jun-14	ML14_016	7-Jun-14	20.2	--	--	--
MLP01B		1					
MLP01B	Jul-11	ML11_065	1-Jul-11	--	-155.1	-20.10	5.7
MLP01B	Aug-11	ML11_001	24-Aug-11	--	-150.0	-19.23	3.8
MLP01B	May-12	ML12-034	7-Jun-12	--	-149.4	-19.14	3.8
MLP01B	Jul-12	ML12_160	28-Jul-12	--	-145.0	-18.52	3.2

MLP01B	Sep-12	ML12_238	9-Sep-12	7.4	-143.7	-18.51	4.3
MLP01B	Jun-13	ML13_008	12-Jun-13	5.7	-134.0	-17.41	5.24
MLP01B	Jun-14	ML14_017	7-Jun-14	--	-144.3	-18.87	6.60
MLP02A		2					
MLP02A	Jul-11	--	1-Jul-11	--	--	--	--
MLP02A	Aug-11	ML11_002	24-Aug-11	--	-138.2	-17.55	2.2
MLP02A	May-12	ML12-035	7-Jun-12	--	-140.4	-18.16	4.9
MLP02A	Jul-12	ML12_161	28-Jul-12	--	-139.0	-17.66	2.3
MLP02A	Sep-12	--	--	--	--	--	--
MLP02A	Jun-13	ML13_009	12-Jun-13	--	--	--	--
MLP02A	Jun-14	ML14_018	7-Jun-14	--	--	--	--
MLP02B		1					
MLP02B	Jul-11	ML11_066	1-Jul-11	--	-132.1	-17.05	4.3
MLP02B	Aug-11	ML11_003	24-Aug-11	--	-137.1	-17.43	2.3
MLP02B	May-12	ML12-036	7-Jun-12	--	-144.9	-18.99	7.0
MLP02B	Jul-12	ML12_162	28-Jul-12	--	-137.3	-17.52	2.9
MLP02B	Sep-12	ML12_237	9-Sep-12	6.5	-134.8	-17.09	1.9
MLP02B	Jun-13	ML13_010	12-Jun-13	7.8	-135.4	-17.27	2.75
MLP02B	Jun-14	ML14_019	7-Jun-14	--	-150.7	-19.66	6.53
MLP03A		2					

MLP03A	Jul-11	--	1-Jul-11	--	--	--	--
MLP03A	Aug-11	--	--	--	--	--	--
MLP03A	May-12	ML12-037	7-Jun-12	--	-145.3	-18.89	5.9
MLP03A	Jul-12	--	--	--	--	--	--
MLP03A	Sep-12	--	--	--	--	--	--
MLP03A	Jun-13	ML13_011	12-Jun-13	--	--	--	--
MLP03A	Jun-14	ML14_020	7-Jun-14	58.3	-142.1	-18.12	2.864355097
MLP03B		<i>1</i>					
MLP03B	Jul-11	--	1-Jul-11	--	--	--	--
MLP03B	Aug-11	ML11_004	24-Aug-11	--	-148.0	-18.66	1.3
MLP03B	May-12	ML12-038	7-Jun-12	--	-146.2	-18.67	3.2
MLP03B	Jul-12	ML12_163	28-Jul-12	--	-143.9	-18.24	2.1
MLP03B	Sep-12	ML12_236	9-Sep-12	--	-138.0	-17.72	3.7
MLP03B	Jun-13	ML13_012	12-Jun-13	11.1	-143.1	-18.40	4.08
MLP03B	Jun-14	ML14_021	7-Jun-14	--	--	--	--
MLP04A		<i>3</i>					
MLP04A	Jul-11	--	1-Jul-11	--	--	--	--
MLP04A	Aug-11	ML11_005	19-Aug-11	--	-135.0	-16.90	0.2
MLP04A	May-12	ML12-042	7-Jun-12	--	-132.5	-16.33	-1.8
MLP04A	Jul-12	ML12_157	27-Jul-12	--	-130.9	-16.49	1.0

MLP04A	Sep-12	ML12_217	8-Sep-12	--	-133.4	-16.47	-1.6
MLP04A	Jun-13	ML13_046	17-Jun-13	68.5	-131.3	-16.26	-1.20
MLP04A	Jun-14	ML14_013	7-Jun-14	109	-130.9	-16.30	-0.52
MLP04A	Oct-14	ML14W_013	27-Oct-14	--	--	--	--
MLP04B		<i>2</i>					
MLP04B	Jul-11	ML11_067	1-Jul-11	--	-134.3	-16.90	0.9
MLP04B	Aug-11	ML11_006	19-Aug-11	77.1	-135.2	-16.71	-1.5
MLP04B	May-12	ML12-041	7-Jun-12	89.5	-134.1	-16.77	0.1
MLP04B	Jul-12	ML12_158	27-Jul-12	--	-132.8	-16.76	1.2
MLP04B	Sep-12	ML12_218	8-Sep-12	68.0	-133.7	-16.65	-0.5
MLP04B	Jun-13	ML13_047	17-Jun-13	99.3	-133.8	-16.75	0.19
MLP04B	Jun-14	ML14_014	7-Jun-14	4.5	-133.2	-16.69	0.30
MLP04B	Oct-14	ML14W_014	26-Oct-14	--	--	--	--
MLP04C		<i>1</i>					
MLP04C	Jul-11	ML11_068	1-Jul-11	--	-133.8	-16.88	1.2
MLP04C	Aug-11	ML11_007	19-Aug-11	119.0	-136.4	-16.92	-1.0
MLP04C	May-12	ML12-040	7-Jun-12	121.0	-132.4	-16.66	0.8
MLP04C	Jul-12	ML12_159	27-Jul-12	--	-133.7	-16.75	0.3
MLP04C	Sep-12	ML12_219	8-Sep-12	108.0	-134.5	-16.92	0.9
MLP04C	Jun-13	ML13_048	17-Jun-13	119	-134.8	-16.99	1.15

MLP04C	Jun-14	ML14_015	7-Jun-14	12	-135.4	-17.35	3.41
MLP04C	Oct-14	ML14W_015	27-Oct-14	--	--	--	--
MLP05A		3					
MLP05A	Jul-11	--	1-Jul-11	--	--	--	--
MLP05A	Aug-11	ML11_008	19-Aug-11	--	-137.8	-17.65	3.4
MLP05A	May-12	ML12-047	7-Jun-12	--	-138.5	-17.71	3.2
MLP05A	Jul-12	ML12_132	25-Jul-12	--	-139.4	-17.87	3.5
MLP05A	Sep-12	ML12_249	12-Sep-12	--	-133.5	-17.17	3.8
MLP05A	Jun-13	ML13_029	16-Jun-13	--	-138.1	-17.19	-0.59
MLP05A	Jun-14	ML14_009	6-Jun-14	--	--	--	--
MLP05A	Oct-14	ML14W001	26-Oct-14	--	--	--	--
MLP05B		2					
MLP05B	Jul-11	ML11_069	1-Jul-11	--	-138.3	-17.77	3.9
MLP05B	Aug-11	ML11_009	19-Aug-11	67.1	-138.4	-17.60	2.4
MLP05B	May-12	ML12-046	7-Jun-12	70.8	-138.8	-17.75	3.2
MLP05B	Jul-12	ML12_133	25-Jul-12	--	-138.8	-17.78	3.4
MLP05B	Sep-12	ML12_250	12-Sep-12	56.8	-138.2	-17.83	4.4
MLP05B	Jun-13	ML13_030	16-Jun-13	59.4	-138.4	-17.89	4.73
MLP05B	Jun-14	ML14_010	6-Jun-14	45	--	--	--
MLP05B	Oct-14	ML14W_002	26-Oct-14	--	--	--	--

MLP05C		<i>1</i>					
MLP05C	Jul-11	ML11_070	1-Jul-11	--	-139.3	-17.83	3.3
MLP05C	Aug-11	ML11_010	19-Aug-11	73.9	-137.9	-17.62	3.0
MLP05C	May-12	ML12-045	7-Jun-12	84.1	-138.8	-17.67	2.5
MLP05C	Jul-12	ML12_134	25-Jul-12	--	-138.8	-17.74	3.2
MLP05C	Sep-12	ML12_251	12-Sep-12	64.9	-137.0	-17.81	5.5
MLP05C	Jun-13	ML13_031	16-Jun-13	71.6	-138.7	-17.76	3.40
MLP05C	Jun-14	ML14_011	6-Jun-14	7	--	--	--
MLP05C	Oct-14	ML14W_003	26-Oct-14	--	--	--	--
MLP05D		<i>1</i>					
MLP05D	Jul-11	ML11_071	1-Jul-11	--	-139.4	-17.87	3.6
MLP05D	Aug-11	ML11_011	19-Aug-11	71.6	-137.9	-17.54	2.5
MLP05D	May-12	ML12-044	7-Jun-12	52.4	-138.6	-17.57	2.0
MLP05D	Jul-12	ML12_135	25-Jul-12	--	-137.0	-17.61	3.9
MLP05D	Sep-12	ML12_252	12-Sep-12	99.4	-137.2	-17.78	5.0
MLP05D	Jun-13	ML13_032	16-Jun-13	80.7	-137.2	-17.58	3.42
MLP05D	Jun-14	ML14_012	6-Jun-14	56	--	--	--
MLP05D	Oct-14	ML14W_004	26-Oct-14	--	--	--	--
MLP06A		<i>2</i>					
MLP06A	Jul-11	--	1-Jul-11	--	--	--	--

MLP06A	Aug-11	ML11_012	21-Aug-11	6.2	-141.5	-18.10	3.3
MLP06A	May-12	ML12-088	11-Jun-12	--	-141.4	-18.44	6.1
MLP06A	Jul-12	ML12_154	27-Jul-12	--	-140.7	-18.11	4.2
MLP06A	Sep-12	ML12_189	7-Sep-12	--	-140.4	-18.18	5.0
MLP06A	Jun-13	ML13_019	14-Jun-13	--	-141.1	-18.3	5.59
MLP06A	Jun-14	ML14_029	12-Jun-14	--	-140.7	-18.0	3.68
MLP06A	Oct-14	ML14W_020	27-Oct-14	--	--	--	--
MLP06B		<i>1</i>					
MLP06B	Jul-11	--	1-Jul-11	--	--	--	--
MLP06B	Aug-11	ML11_013	21-Aug-11	20.8	-140.0	-18.04	4.4
MLP06B	May-12	ML12-087	11-Jun-12	--	-142.0	-18.29	4.4
MLP06B	Jul-12	ML12_155	27-Jul-12	--	-140.7	-18.14	4.4
MLP06B	Sep-12	ML12_190	7-Sep-12	--	-141.0	-18.17	4.3
MLP06B	Jun-13	ML13_020	14-Jun-13	--	-146.7	-18.87	4.30
MLP06B	Jun-14	ML14_030	12-Jun-14	--	-139.9	-17.97	3.87
MLP06B	Oct-14	ML14W_021	27-Oct-14	--	--	--	--
MLP07A		<i>2</i>					
MLP07A	Jul-11	--	1-Jul-11	--	--	--	--
MLP07A	Aug-11	ML11_014	21-Aug-11	--	-139.9	-17.92	3.5
MLP07A	May-12	ML12-090	11-Jun-12	--	-142.8	-18.18	2.6

MLP07A	Jul-12	--	--	--	--	--	--
MLP07A	Sep-12	--	--	--	--	--	--
MLP07A	Jun-13	ML13_017	14-Jun-13	--	--	--	--
MLP07A	Jun-14	--	--	--	--	--	--
MLP07B		<i>1</i>					
MLP07B	Jul-11	--	1-Jul-11	--	--	--	--
MLP07B	Aug-11	ML11_015	21-Aug-11	--	-141.5	-18.00	2.5
MLP07B	May-12	ML12-089	11-Jun-12	--	-143.3	-18.26	2.8
MLP07B	Jul-12	--	--	--	--	--	--
MLP07B	Sep-12	ML12_191	7-Sep-12	--	-144.2	-18.30	2.2
MLP07B	Jun-13	ML13_018	14-Jun-13	--	-142.0	-18.15	3.23
MLP07B	Jun-14	--	--	--	--	--	--
MLP08A		<i>2</i>					
MLP08A	Jul-11	ML11_072	1-Jul-11	--	-148.7	-19.45	6.9
MLP08A	Aug-11	ML11_016	21-Aug-11	50.7	-146.5	-19.02	5.6
MLP08A	May-12	ML12-092	11-Jun-12	52.4	-148.4	-19.32	6.2
MLP08A	Jul-12	ML12_151	27-Jul-12	--	-147.3	-19.43	8.1
MLP08A	Sep-12	ML12_192	7-Sep-12	47.1	-147.0	-19.42	8.4
MLP08A	Jun-13	ML13_015	14-Jun-13	55.4	-147.9	-19.53	8.35
MLP08A	Jun-14	ML14_001	5-Jun-14	66.9	-148.5	-19.49	7.35

MLP08B		<i>1</i>					
MLP08B	Jul-11	ML11_073	1-Jul-11	--	-148.5	-19.27	5.7
MLP08B	Aug-11	ML11_017	21-Aug-11	59.8	-144.0	-18.61	4.9
MLP08B	May-12	ML12-091	11-Jun-12	--	-145.5	-18.81	5.0
MLP08B	Jul-12	ML12_153	27-Jul-12	--	-143.7	-18.81	6.8
MLP08B	Sep-12	ML12_193	7-Sep-12	--	-145.0	-18.85	5.8
MLP08B	Jun-13	ML13_016	14-Jun-13	--	-145.0	-18.86	5.88
MLP08B	Jun-14	ML14_002	5-Jun-14	--	-144.3	-18.78	5.96
MLP09A		<i>2</i>					
MLP09A	Jul-11	ML11_074	1-Jul-11	--	-146.9	-19.24	7.0
MLP09A	Aug-11	ML11_018	21-Aug-11	53.6	-146.2	-19.06	6.3
MLP09A	May-12	ML12-094	11-Jun-12	--	-146.7	-19.16	6.6
MLP09A	Jul-12	ML12_149	27-Jul-12	--	-145.7	-19.18	7.8
MLP09A	Sep-12	ML12_194	7-Sep-12	48.0	-147.2	-19.15	6.0
MLP09A	Jun-13	ML13_013	14-Jun-13	--	--	--	--
MLP09A	Jun-14	ML14_003	5-Jun-14	--	-146.7	-19.08	5.998594006
MLP09B		<i>1</i>					
MLP09B	Jul-11	ML11_075	1-Jul-11	--	-144.3	-18.88	6.7
MLP09B	Aug-11	ML11_019	21-Aug-11	74.4	-142.3	-18.28	4.0
MLP09B	May-12	ML12-093	11-Jun-12	--	-142.4	-18.48	5.5

MLP09B	Jul-12	ML12_150	27-Jul-12	--	-141.8	-18.45	5.8
MLP09B	Sep-12	ML12_195	7-Sep-12	63.0	-142.2	-18.45	5.4
MLP09B	Jun-13	ML13_014	14-Jun-13	68.5	-141.2	-18.46	6.42
MLP09B	Jun-14	ML14-004	5-Jun-14	65.2	-141.1	-18.34	5.63
MLP10A		3					
MLP10A	Jul-11	--	1-Jul-11	--	--	--	--
MLP10A	Aug-11	ML11_020	21-Aug-11	--	-141.2	-18.56	7.3
MLP10A	May-12	ML12-059	9-Jun-12	--	-142.5	-18.52	5.7
MLP10A	Jul-12	ML12_141	27-Jul-12	--	-142.7	-18.59	6.1
MLP10A	Sep-12	ML12_202	7-Sep-12	--	-141.8	-18.51	6.2
MLP10A	Jun-13	ML13_051	17-Jun-13	97.3	-143.6	-18.74	6.30
MLP10A	Jun-14	ML14_056	14-Jun-14	--	-143.3	-17.87	-0.33
MLP10A	Oct-14	ML14W_009	26-Oct-14	--	--	--	--
MLP10B		2					
MLP10B	Jul-11	ML11_076	1-Jul-11	--	-142.3	-18.73	7.5
MLP10B	Aug-11	ML11_021	21-Aug-11	54.4	-141.2	-18.49	6.7
MLP10B	May-12	ML12-058	9-Jun-12	54.2	-141.3	-18.33	5.3
MLP10B	Jul-12	ML12_142	27-Jul-12	--	-141.6	-18.68	7.9
MLP10B	Sep-12	ML12_201	7-Sep-12	51.2	-142.4	-18.63	6.7
MLP10B	Jun-13	ML13_052	17-Jun-13	78.7	-143.1	-18.59	5.62

MLP10B	Jun-14	ML14_057	14-Jun-14	47.7	-142.4	-18.33	4.29
MLP10B	Oct-14	ML14W_010	26-Oct-14	--	--	--	--
MLP10C		<i>1</i>					
MLP10C	Jul-11	ML11_077	1-Jul-11	--	-143.4	-18.78	6.9
MLP10C	Aug-11	ML11_022	21-Aug-11	64.5	-140.7	-18.28	5.6
MLP10C	May-12	ML12-057	9-Jun-12	30.3	-142.2	-18.24	3.8
MLP10C	Jul-12	ML12_143	27-Jul-12	--	-141.2	-18.54	7.1
MLP10C	Sep-12	ML12_200	7-Sep-12	65.3	-142.0	-18.54	6.3
MLP10C	Jun-13	ML13_053	17-Jun-13	87.9	-142.9	-18.59	5.83
MLP10C	Jun-14	ML14_058	14-Jun-14	50.9	-142.0	-18.38	5.03
MLP10C	Oct-14	ML14W_011	26-Oct-14	--	--	--	--
MLP11A		<i>3</i>					
MLP11A	Jul-11	--	1-Jul-11	--	--	--	--
MLP11A	Aug-11	ML11_023	21-Aug-11	--	-140.5	-18.13	4.5
MLP11A	May-12	ML12-063	9-Jun-12	--	-141.5	-18.44	6.1
MLP11A	Jul-12	ML12_169	30-Jul-12	--	-140.9	-18.27	5.2
MLP11A	Sep-12	ML12_206	8-Sep-12	--	-142.2	-18.19	3.3
MLP11A	Jun-13	ML13_055	18-Jun-13	59.4	-141.8	-18.28	4.42
MLP11A	Jun-14	ML14_51	14-Jun-14	25.8	-140.5	-17.50	-0.55
MLP11B		<i>2</i>					

MLP11B	Jul-11	ML11_078	1-Jul-11	--	-141.3	-18.34	5.4
MLP11B	Aug-11	ML11_024	21-Aug-11	60.1	-139.8	-18.26	6.2
MLP11B	May-12	ML12-062	9-Jun-12	67.3	-141.3	-18.41	6.0
MLP11B	Jul-12	ML12_170	30-Jul-12	--	-139.9	-18.24	6.0
MLP11B	Sep-12	ML12_207	8-Sep-12	54.8	-141.5	-18.26	4.6
MLP11B	Jun-13	ML13_056	18-Jun-13	76.6	-141.8	-18.40	5.42
MLP11B	Jun-14	ML14_052	14-Jun-14	64.1	-141.4	-18.26	4.69
MLP11C		<i>1</i>					
MLP11C	Jul-11	ML11_079	1-Jul-11	--	-144.2	-18.78	6.1
MLP11C	Aug-11	ML11_025	21-Aug-11	75.5	-140.0	-18.36	6.9
MLP11C	May-12	ML12-061	9-Jun-12	43.0	-141.9	-18.39	5.2
MLP11C	Jul-12	ML12_171	30-Jul-12	--	-140.5	-18.31	6.0
MLP11C	Sep-12	ML12_208	8-Sep-12	73.1	-141.6	-18.19	3.9
MLP11C	Jun-13	ML13_057	18-Jun-13	97.3	-142.2	-18.40	4.98
MLP11C	Jun-14	ML14_053	14-Jun-14	67.2	-139.9	-18.31	6.53
MLP12A		<i>2</i>					
MLP12A	Jul-11	ML11_080	1-Jul-11	--	-144.4	-18.46	3.2
MLP12A	Aug-11	ML11_026	24-Aug-11	--	-136.9	-17.38	2.2
MLP12A	May-12	ML12-066	9-Jun-12	--	-137.4	-17.29	1.0
MLP12A	Jul-12	ML12_173	30-Jul-12	--	-135.9	-17.23	1.9

MLP12A	Sep-12	ML12_210	8-Sep-12	--	-136.4	-17.13	0.6
MLP12A	Jun-13	ML13_060	18-Jun-13	--	--	--	--
MLP12A	Jun-14	ML14_046	13-Jun-14	--	-135.1	-17.06	1.32001265
MLP12A	Oct-14	ML14W_016	27-Oct-14	--	--	--	--
MLP12B							
<i>1</i>							
MLP12B	Jul-11	ML11_081	1-Jul-11	--	-134.0	-17.04	2.3
MLP12B	Aug-11	ML11_027	24-Aug-11	71.0	-135.8	-17.08	0.9
MLP12B	May-12	ML12-065	9-Jun-12	52.4	-135.6	-17.16	1.7
MLP12B	Jul-12	ML12_174	30-Jul-12	--	-133.1	-16.72	0.6
MLP12B	Sep-12	ML12_211	8-Sep-12	72.2	-134.7	-16.79	-0.4
MLP12B	Jun-13	ML13_061	18-Jun-13	93.1	-136.1	-17.03	0.13
MLP12B	Jun-14	ML14_047	13-Jun-14	77.8	-135.3	-16.97	0.43
MLP12B	Oct-14	ML14W_017	27-Oct-14	--	--	--	--
MLP13A							
<i>2</i>							
MLP13A	Jul-11	--	1-Jul-11	--	--	--	0.0
MLP13A	Aug-11	ML11_028	24-Aug-11	--	-138.2	-17.78	4.0
MLP13A	May-12	ML12-069	9-Jun-12	--	-137.0	-17.75	5.0
MLP13A	Jul-12	ML12_176	30-Jul-12	--	-136.6	-17.56	3.9
MLP13A	Sep-12	ML12_213	8-Sep-12	--	-137.7	-17.59	3.0
MLP13A	Jun-13	ML13_063	18-Jun-13	--	-137.9	-17.63	3.22

MLP13A	Jun-14	MI14_043	13-Jun-14	27.8	-136.1	-17.49	3.83
MLP13A	Oct-14	ML14W_018	27-Oct-14	--	--	--	--
MLP13B		<i>1</i>					
MLP13B	Jul-11	ML11_082	1-Jul-11	--	-128.1	-16.73	5.7
MLP13B	Aug-11	ML11_029	24-Aug-11	41.4	-136.5	-17.51	3.6
MLP13B	May-12	ML12-068	9-Jun-12	--	-136.2	-17.42	3.1
MLP13B	Jul-12	ML12_177	30-Jul-12	--	-136.1	-17.44	3.4
MLP13B	Sep-12	ML12_214	8-Sep-12	18.8	-137.3	-17.41	1.9
MLP13B	Jun-13	ML13_064	18-Jun-13	40.5	-137.8	-17.61	3.08
MLP13B	Jun-14	MI14_044	13-Jun-14	24.8	-134.3	-17.31	4.19
MLP13B	Oct-14	ML14W_019	27-Oct-14	--	--	--	--
MLP14A		<i>2</i>					
MLP14A	Jul-11	--	1-Jul-11	--	--	--	--
MLP14A	Aug-11	--	--	--	--	--	--
MLP14A	May-12	--	--	--	--	--	--
MLP14A	Jul-12	--	--	--	--	--	--
MLP14A	Sep-12	ML12_215	8-Sep-12	--	-135.5	-17.37	3.5
MLP14A	Jun-13	ML13_065	18-Jun-13	--	--	--	--
MLP14A	Jun-14	--	--	--	--	--	--
MLP14B		<i>1</i>					

MLP14B	Jul-11	--	1-Jul-11	--	--	--	--
MLP14B	Aug-11	--	--	--	--	--	--
MLP14B	May-12	ML12-071	9-Jun-12	--	-141.9	-18.40	5.3
MLP14B	Jul-12	ML12_178	30-Jul-12	--	-138.2	-17.73	3.6
MLP14B	Sep-12	ML12_216	8-Sep-12	--	-144.7	-18.58	3.9
MLP14B	Jun-13	ML13_066	18-Jun-13	--	-143.5	-18.59	5.22
MLP14B	Jun-14	--	--	--	--	--	--
MLP15A		3					
MLP15A	Jul-11	ML11_083	1-Jul-11	--	-134.8	-17.11	2.2
MLP15A	Aug-11	ML11_030	19-Aug-11	--	-138.8	-17.51	1.3
MLP15A	May-12	ML12-085	11-Jun-12	--	-139.3	-17.65	1.8
MLP15A	Jul-12	ML12_118	24-Jul-12	--	-139.3	-17.51	0.8
MLP15A	Sep-12	ML12_222	9-Sep-12	33.9	-138.7	-17.59	2.0
MLP15A	Jun-13	ML13_001	10-Jun-13	63.5	-139.3	-17.01	-3.21
MLP15A	Jun-14	ML14_026	7-Jun-14	101	-139.5	-17.76	2.65
MLP15B		2					
MLP15B	Jul-11	ML11_084	1-Jul-11	--	-136.3	-17.19	1.2
MLP15B	Aug-11	ML11_031	19-Aug-11	73.7	-135.5	-17.28	2.7
MLP15B	May-12	ML12-084	11-Jun-12	81.4	-136.6	-17.33	2.0
MLP15B	Jul-12	ML12_119	24-Jul-12	--	-135.4	-17.28	2.8

MLP15B	Sep-12	ML12_223	9-Sep-12	72.2	-136.1	-17.32	2.4
MLP15B	Jun-13	ML13_002	10-Jun-13	136	-146.6	-18.83	4.06
MLP15B	Jun-14	ML14_027	7-Jun-14	44.5	-135.7	-17.09	0.94
MLP15C		<i>1</i>					
MLP15C	Jul-11	ML11_085	1-Jul-11	--	-128.7	-16.65	4.5
MLP15C	Aug-11	ML11_032	19-Aug-11	126.0	-133.9	-17.31	4.6
MLP15C	May-12	ML12-083	11-Jun-12	--	-139.4	-17.84	3.4
MLP15C	Jul-12	ML12_120	24-Jul-12	--	-134.8	-17.21	2.9
MLP15C	Sep-12	ML12_224	9-Sep-12	95.1	-135.4	-17.31	3.1
MLP15C	Jun-13	ML13_003	10-Jun-13	211	-131.9	-16.87	3.11
MLP15C	Jun-14	ML14_028	7-Jun-14	40.8	-135.8	-17.46	3.87
MLP16A		<i>3</i>					
MLP16A	Jul-11	--	1-Jul-11	--	--	--	--
MLP16A	Aug-11	ML11_033	19-Aug-11	--	-141.9	-18.64	7.2
MLP16A	May-12	ML12-082	11-Jun-12	--	-143.5	-18.59	5.2
MLP16A	Jul-12	ML12_122	25-Jul-12	--	-143.1	-18.71	6.6
MLP16A	Sep-12	ML12_225	9-Sep-12	--	-142.7	-18.59	6.0
MLP16A	Jun-13	ML13_004	10-Jun-13	169	-143.1	-18.72	6.64
MLP16A	Jun-14	ML14_022	6-7--14	65.6	-141.5	-18.31	5.00
MLP16B		<i>2</i>					

MLP16B	Jul-11	ML11_086	1-Jul-11	--	-140.1	-17.96	3.6
MLP16B	Aug-11	ML11_034	19-Aug-11	59.6	-140.1	-18.18	5.4
MLP16B	May-12	ML12-081	11-Jun-12	56.8	-140.9	-18.20	4.8
MLP16B	Jul-12	ML12_123	25-Jul-12	--	-140.6	-18.21	5.1
MLP16B	Sep-12	ML12_226	9-Sep-12	51.6	-141.1	-17.98	2.7
MLP16B	Jun-13	ML13_005	10-Jun-13	59.5	-140.5	-18.10	4.25
MLP16B	Jun-14	ML14_023	7-Jun-14	31.6	-140.0	-18.03	4.19
MLP16C		<i>1</i>					
MLP16C	Jul-11	ML11_087	1-Jul-11	--	-134.6	-17.20	3.0
MLP16C	Aug-11	ML11_035	19-Aug-11	61.4	-135.6	-17.48	4.2
MLP16C	May-12	ML12-080	11-Jun-12	34.5	-138.6	-17.46	1.0
MLP16C	Jul-12	ML12_124	25-Jul-12	--	-135.5	-17.35	3.3
MLP16C	Sep-12	ML12_227	9-Sep-12	56.1	-135.9	-17.12	1.1
MLP16C	Jun-13	ML13_006	10-Jun-13	69.2	-135.5	-17.29	2.84
MLP16C	Jun-14	ML14_024	7-Jun-14	33.1	-135.7	-17.29	2.65
MLP17A		<i>3</i>					
MLP17A	Jul-11	ML11_088	1-Jul-11	--	-123.9	-16.08	4.7
MLP17A	Aug-11	ML11_036	19-Aug-11	16.8	-133.0	-17.15	4.2
MLP17A	May-12	ML12-073	10-Jun-12	12.6	-133.8	-16.95	1.7
MLP17A	Jul-12	ML12_125	25-Jul-12	--	-134.4	-17.03	1.8

MLP17A	Sep-12	ML12_229	9-Sep-12	20.9	-133.9	-16.84	0.9
MLP17A	Jun-13	ML13_039	16-Jun-13	16.2	-133.8	-16.94	1.71
MLP17A	Jun-14	ML14_035	12-Jun-14	68	-133.9	-16.92	1.51
MLP17A	Oct-14	ML14W_022	27-Oct-14	--	--	--	--
MLP17B		2					
MLP17B	Jul-11	ML11_089	1-Jul-11	--	-133.4	-17.06	3.1
MLP17B	Aug-11	ML11_037	19-Aug-11	37.8	-134.1	-17.32	4.5
MLP17B	May-12	ML12-072	10-Jun-12	--	-132.8	-16.92	2.6
MLP17B	Jul-12	ML12_126	25-Jul-12	--	-133.2	-16.97	2.6
MLP17B	Sep-12	ML12_230	9-Sep-12	--	-133.5	-16.86	1.4
MLP17B	Jun-13	ML13_041	16-Jun-13	--	-136.8	-17.44	2.77
MLP17B	Jun-14	ML14_036	--	--	-133.7	-17.14	3.38
MLP17B	Oct-14	ML14W_023	27-Oct-14	--	--	--	--
MLP17C		1					
MLP17C	Jul-11	ML11_090	1-Jul-11	--	-136.2	-17.23	1.7
MLP17C	Aug-11	ML11_038	19-Aug-11	45.3	-136.8	-17.63	4.3
MLP17C	May-12	ML12-070	10-Jun-12	39.6	-133.9	-17.02	2.2
MLP17C	Jul-12	ML12_127	25-Jul-12	--	-136.2	-17.36	2.7
MLP17C	Sep-12	ML12_231	9-Sep-12	39.6	-130.7	-16.99	5.2
MLP17C	Jun-13	ML13_040	16-Jun-13	40.5	-136.7	-17.52	3.45

MLP17C	Jun-14	ML14_037	7-Jun-14	41.9	-135.6	-17.31	2.85
MLP17C	Oct-14	ML14W_024	27-Oct-14	--	--	--	--
MLP18A		3					
MLP18A	Jul-11	--	1-Jul-11	--	--	--	--
MLP18A	Aug-11	ML11_039	19-Aug-11	--	-139.4	-17.85	3.4
MLP18A	May-12	ML12-077	10-Jun-12	--	-132.8	-16.46	-1.1
MLP18A	Jul-12	ML12_115	24-Jul-12	--	-133.1	-16.31	-2.6
MLP18A	Sep-12	--	--	--	--	--	--
MLP18A	Jun-13	ML13_034	16-Jun-13	--	-132.7	--	--
MLP18A	Jun-14	ML14_038	12-Jun-14	--	--	--	--
MLP18B		2					
MLP18B	Jul-11	ML11_091	1-Jul-11	--	-135.2	-17.00	0.8
MLP18B	Aug-11	ML11_040	19-Aug-11	--	-133.6	-16.71	0.1
MLP18B	May-12	ML12-076	10-Jun-12	--	-132.3	-16.65	0.9
MLP18B	Jul-12	ML12_116_165	24-Jul-12	--	-132.0	-16.35	-1.2
MLP18B	Sep-12	ML12_241	10-Sep-12	--	-132.4	-16.83	2.2
MLP18B	Jun-13	ML13_035	16-Jun-13	--	-131.8	-16.66	1.51
MLP18B	Jun-14	ML14_039	12-Jun-14	--	-132.2	-16.59	0.56
MLP18C		1					
MLP18C	Jul-11	ML11_092	1-Jul-11	--	-132.7	-16.84	2.0

MLP18C	Aug-11	ML11_041	19-Aug-11	56.2	-135.0	-17.10	1.8
MLP18C	May-12	ML12-075	10-Jun-12	57.6	-135.2	-17.17	2.2
MLP18C	Jul-12	ML12_117_166	24-Jul-12	--	-132.9	-16.80	1.5
MLP18C	Sep-12	ML12_242	10-Sep-12	49.4	-134.2	-17.04	2.1
MLP18C	Jun-13	ML13_036	16-Jun-13	61.4	-134.0	-17.06	2.43
MLP18C	Jun-14	ML14_040	12-Jun-14	22.2	-133.1	-17.01	2.96
MLP19A		2					
MLP19A	Jul-11	ML11_093	1-Jul-11	--	-140.9	-18.20	4.7
MLP19A	Aug-11	ML11_042	21-Aug-11	59.8	-138.6	-17.92	4.8
MLP19A	May-12	ML12-051	9-Jun-12	61.3	-140.2	-18.14	4.9
MLP19A	Jul-12	ML12_138	26-Jul-12	--	-139.4	-18.10	5.4
MLP19A	Sep-12	ML12_233	9-Sep-12	60.7	-140.0	-18.12	5.0
MLP19A	Jun-13	ML13_027	15-Jun-13	75.6	-139.8	-18.08	4.84
MLP19A	Jun-14	ML14_005	5-Jun-14	--	-139.6	-18.10	5.21
MLP19A	Oct-14	ML14W_005	26-Oct-14	--	--	--	--
MLP19B		1					
MLP19B	Jul-11	ML11_094	1-Jul-11	--	-140.4	-18.21	5.3
MLP19B	Aug-11	ML11_043	21-Aug-11	84.9	-137.3	-17.89	5.8
MLP19B	May-12	ML12-049	7-Jun-12	64.6	-139.9	-18.16	5.4
MLP19B	Jul-12	ML12_139	26-Jul-12	--	-138.5	-17.95	5.1

MLP19B	Sep-12	ML12_234	9-Sep-12	81.1	-138.9	-17.92	4.4
MLP19B	Jun-13	ML13_028	15-Jun-13	75.6	-138.7	-18.00	5.25
MLP19B	Jun-14	ML14_006	5-Jun-14	61.3	--	--	--
MLP19B	Oct-14	ML14W_006	26-Oct-14	73.5	--	--	--
ML Highway 63 Weir							
ML Highway 63 Weir	Apr-12	ML12_028_019	13-Apr-12	--	-151.5	-19.40	3.7
ML Highway 63 Weir	Apr-12	ML 12_020_021	15-Apr-12	27.0	--	--	--
ML Highway 63 Weir	Aug-11	ML11_063	11-Aug-11	44.2	--	--	--
ML Highway 63 Weir	May-12	ML12-078	10-Jun-12	--	-133.1	-16.86	1.8
ML Highway 63 Weir	May-12	ML12-101	12-Jun-12	--	-133.2	-16.78	1.0
ML Highway 63 Weir	May-12	ML12-030	4-Jun-12	42.2	-133.3	-16.90	1.9
ML Highway 63 Weir	May-12	ML12-031	4-Jun-12	--	-133.4	-16.81	1.1
ML Highway 63 Weir	Jul-12	ML12_136	25-Jul-12	--	-119.1	-15.26	3.0
ML Highway 63 Weir	Jul-12	ML12_140	26-Jul-12	--	-121.0	-15.59	3.7

ML Highway 63 Weir	Jul-12	ML12_185	4-Aug-12	--	-122.6	-15.51	1.5
ML Highway 63 Weir	Jul-12	--	--	--	--	--	--
ML Highway 63 Weir	Sep-12	ML12_188	1-Sep-12	40.9	-108.7	-15.04	11.6
ML Highway 63 Weir	Sep-12	ML12_247	10-Sep-12	38.7	-115.3	-14.87	3.7
ML Highway 63 Weir	Jun-13	ML13_067	20-Jun-13	40.5	-145.0	-18.54	3.36
ML Access Road Culvert							
ML Access Road Culvert	Aug-11	ML11_062	11-Aug-11	45.3	--	--	--
ML Access Road Culvert	Apr-12	ML12_026	13-Apr-12	--	-155.1	-19.78	3.1
ML Access Road Culvert	Apr-12	ML12_027	13-Apr-12	--	-155.2	-19.94	4.3
ML Access Road Culvert	May-12	ML12-100	11-Jun-12	--	-134.1	-17.12	2.8
ML Access Road Culvert	May-12	ML12-104	12-Jun-12	--	-135.0	-17.14	2.1
ML Access Road Culvert	Jul-12	ML12_112	18-Jul-12	--	-128.4	-16.01	-0.3

ML Access Road Culvert	Jul-12	ML12_183	4-Aug-12	--	-119.7	-15.51	4.4
ML Access Road Culvert	Sep-12	ML12_240	10-Sep-12	35.6	-113.7	-14.68	3.8
ML Access Road Culvert	Jun-13	ML13_024	14-Jun-13	189	-147.4	-19.20	6.20
ML Access Road Culvert (E)							
ML Access Road Culvert (E)	Jul-12	ML12_179	30-Jul-12	--	-120.8	-15.70	4.8
ML Access Road Culvert (E)	Jul-12	ML12_184	4-Aug-12	--	-121.9	-15.95	5.7
ML Access Road Culvert (E)	Sep-12	ML12_239	10-Sep-12	37.8	-114.3	-14.79	4.1
ML Rain Events							
ML Rain Events	18-Aug-11	ML11_064	18-Aug-11	--	--	--	--
ML Rain Events	12-Jun-12	ML12-102	12-Jun-12	--	-100.2	-12.39	-1.0
ML Rain Events	12-Jun-12	ML12-103	12-Jun-12	--	-100.3	-12.35	-1.5
ML Rain Events	25-Jul-12	ML12_130	25-Jul-12	--	-87.3	-11.58	5.4
ML Rain Events	27-Jul-12	ML12_156	27-Jul-12	--	-88.7	-11.06	-0.3
ML Rain Events	29-Jul-12	ML12_167	29-Jul-12	--	-117.8	-14.94	1.7

ML Rain Events	25-Jul-12	ML12_129	25-Jul-12	--	-113.3	-14.71	4.4
ML Rain Events	4-Aug-12	ML12_182	4-Aug-12	--	-132.4	-16.98	3.4
ML Rain Events	7-Sep-12	ML12_204	7-Sep-12	1.7	-105.9	-14.52	10.2
ML Bulk Rain							
ML Bulk Rain	(April to June 2012)	ML12-050	7-Jun-12	--	-130.8	-16.84	4.0
ML Bulk Rain	(May - 18 July 2012)	ML12_107	18-Jul-12	--	-130.7	-17.24	7.3
ML Bulk Rain	(17 July - 1 Sept 2012)	ML12_187	1-Sep-12	2.9	-102.1	-13.23	3.8
ML Bulk Rain	2012	ML12_248	12-Sep-12	2.0	-111.1	-14.50	4.8
ML Bulk Rain	summer2014	ML14_007	2-Jun-14	--	-135.6	-17.71	--
ML Bulk Rain	jun-nov 2014	ML14W_007	26-Oct-14	--	--	--	--
Snow Survey							
Snow Survey	MLA	ML12_012	13-Mar-12	--	-169.7	-21.86	5.2
Snow Survey	MLE	ML12_015	13-Mar-12	--	-168.6	-21.65	4.6
Snow Survey	MLO	ML12_004	13-Mar-12	--	-170.5	-22.15	6.7
Snow Survey	MLU	ML12_008	13-Mar-12	--	-172.0	-22.30	6.4
Snow Survey	MLP1	ML12_001	13-Mar-12	--	-175.1	-22.81	7.4
Snow Survey	MLP2	ML12_002	13-Mar-12	--	-173.8	-22.01	2.3
Snow Survey	MLP3	ML12_003	13-Mar-12	--	-171.3	-22.03	4.9
Snow Survey	MLP4	ML12_005	13-Mar-12	--	-166.4	-21.49	5.6

Snow Survey	MLP5	ML12_006	13-Mar-12	--	-179.7	-23.32	6.8
Snow Survey	MLP6	ML12_009	13-Mar-12	--	-172.8	-22.36	6.1
Snow Survey	MLP12	ML12_013	13-Mar-12	--	-175.3	-22.82	7.3
Snow Survey	MLP13	ML12_011	13-Mar-12	--	-172.9	-22.37	6.1
Snow Survey	MLP14	ML12_010	13-Mar-12	--	-173.5	-22.58	7.1
Snow Survey	MLP16	ML12_017	13-Mar-12	--	-179.6	-23.56	8.9
Snow Survey	MLP17	ML12_018	13-Mar-12	--	-171.0	-22.09	5.7
Snow Survey	MLP18	ML12_016	13-Mar-12	--	-173.5	-22.42	5.9
Snow Survey	MLP19	ML12_007	13-Mar-12	--	-171.9	-22.37	7.0
Snow Survey	ML SHED	ML12_014	13-Mar-12	--	-168.4	-21.46	3.2
Snow Sampling		ML Bog	9-Feb-15	--	--	--	--
Snow Sampling		ML Fen	9-Feb-15	--	--	--	--
Snow Sampling		ML Upland	9-Feb-15	--	--	--	--
Snow Sampling		ML15S_001	24-Mar-15	--	-153.7903569	19.67427829	3.603869415
Snow Sampling		ML15S_002	24-Mar-15	--	-170.0905777	22.31051296	8.393525941
Snow Sampling		ML15S_003	24-Mar-15	--	-146.6541422	19.07393058	5.937302419
Snow Sampling		ML15S_004	24-Mar-15	--	-149.1558083	-	8.553398689

						19.71365088	
Snow Sampling		ML15S_005	24-Mar-15	--	-151.3498265	-	6.259812095
Snow Sampling		ML15S_006	24-Mar-15	--	-156.7139565	19.70120482	9.952098759
Snow Sampling		ML15S_007	24-Mar-15	--	-151.1812676	-	7.582682525

Site ID	Site ID	Sample ID	sample date	DIC (AITF Victoria)	Particulate Matter (AITF Victoria)			
				13C	DIC	15N	13C	C/N
			units	permil	mg/L CaCO ₃	permil	permil	
			precision	0.3	theoretical	0.04	0.15	0.83
			DL (QL)					
	JPHA	WT						
JPHA	Jul-11	JPH11_077	1-Jul-11	-15.99	37.6	--	--	--
JPHA	Aug-11	JPH11_034	17-Aug-11	-13.22	27.3	1.3	-29.07	18.8
JPHA	May-12	JPH12-023	25-May-12	-18.31	153.4	--	--	--
JPHA	Jul-12	JPH12_074	19-Jul-12	-19.80	214.2	1.3	-28.25	18.9
JPHA	Sep-12	JPH12_157	5-Sep-12	-23.86	75.2	3.1	-28.42	8.2
JPHA	Jun-13	JPH13_038	13-Jun-13	-15.36	--	--	--	--
JPHA	Jun-14	JPH14-036	15-Jun-14	--	--	--	--	--

JPHB		<i>WT</i>						
JPHB	Jul-11	JPH11_078	1-Jul-11	-16.40	44.9	--	--	--
JPHB	Aug-11	JPH11_035	17-Aug-11	-14.42	28.3	--	-29.01	--
JPHB	May-12	JPH12-026	25-May-12	-21.26	127.9	--	--	--
JPHB	Jul-12	JPH12_079	19-Jul-12	-21.18	54.2	2.9	-28.75	12.7
JPHB	Sep-12	JPH12_156	5-Sep-12	-21.92	36.5	--	-28.29	--
JPHB	Jun-13	--	--	--	--	--	--	--
JPHB	Jun-14	JPH14_026	6/11/14	--	--	--	--	--
JPHC		<i>WT</i>						
JPHC	Jul-11	JPH11_079	1-Jul-11	-11.72	70.1	--	--	--
JPHC	Aug-11	JPH11_036	17-Aug-11	-14.63	36.7	1.1	-28.38	13.0
JPHC	May-12	JPH12-028	25-May-12	-21.93	50.7	--	--	--
JPHC	Jul-12	--	--	--	--	--	--	--
JPHC	Sep-12	JPH12_150	5-Sep-12	-21.23	160.1	--	-28.76	--
JPHC	Jun-13	JPH13_030	13-Jun-13	-19.83	--	--	--	--
JPHC	GONE!	--	--	--	--	--	--	--
JPHD		<i>WT</i>						
JPHD	Jul-11	JPH11_080	1-Jul-11	-14.01	49.5	--	--	--
JPHD	Aug-11	JPH11_037	17-Aug-11	-11.89	38.5	1.4	-28.44	13.8
JPHD	May-12	JPH12-027	25-May-12	-22.39	63.8	--	--	--

JPHD	Jul-12	JPH12_084	19-Jul-12	-20.84	76.9	--	-28.60	--
JPHD	Sep-12	JPH12_154	5-Sep-12	-21.33	60.3	--	-29.10	--
JPHD	Jun-13	JPH13_034	13-Jun-13	-15.67	--	--	--	--
JPHD	GONE!	--	--	--	--	--	--	--
JPHE		<i>WT</i>						
JPHE	Jul-11	JPH11_081	1-Jul-11	-20.29	45.1	--	--	--
JPHE	Aug-11	JPH11_038	17-Aug-11	-9.75	40.2	-0.6	-29.03	15.3
JPHE	May-12	JPH12-029	25-May-12	-22.18	34.3	--	--	--
JPHE	Jul-12	JPH12_085	19-Jul-12	-21.65	60.0	--	-27.66	--
JPHE	Sep-12	JPH12_146	4-Sep-12	-23.05	45.2	--	-27.85	--
JPHE	GONE!	--	--	--	--	--	--	--
JPHF		<i>WT</i>						
JPHF	Jul-11	JPH11_082	1-Jul-11	-11.82	61.4	--	--	--
JPHF	Aug-11	JPH11_039	17-Aug-11	-17.50	45.0	0.9	-28.69	16.9
JPHF	May-12	JPH12-032	26-May-12	-22.22	88.1	--	--	--
JPHF	Jul-12	JPH12_090	19-Jul-12	-22.44	159.3	0.1	-28.22	7.6
JPHF	Sep-12	JPH12_144	4-Sep-12	-24.03	45.9	2.2	-27.96	7.9
JPHF	Jun-13	JPH13_026	11-Jun-13	-17.61	--	--	--	--
JPHF	GONE!	--	--	--	--	--	--	--
JPHG		<i>WT</i>						

JPHG	Jul-11	JPH11_083	1-Jul-11	-14.85	41.2	--	--	--
JPHG	Aug-11	JPH11_040	17-Aug-11	-16.01	11.8	1.3	-27.90	11.7
JPHG	May-12	JPH12-025	25-May-12	-20.55	97.6	--	--	--
JPHG	Jul-12	JPH12_080	19-Jul-12	-21.32	68.0	1.5	-28.24	10.5
JPHG	Sep-12	JPH12_155	5-Sep-12	-23.27	134.1	1.9	-28.35	7.7
JPHG	Jun-13	JPH13_039	13-Jun-13	-15.40	--	--	--	--
JPHG	GONE!	--	--	--	--	--	--	--
JPHP01A		3						
JPHP01A	Jul-11	JPH11_044	1-Jul-11	-6.48	89.6	--	--	--
JPHP01A	Aug-11	JPH11_001	14-Aug-11	-8.59	105.1	--	-46.34	--
JPHP01A	May-12	JPH12-064	28-May-12	-12.56	260.8	--	--	--
JPHP01A	Jul-12	JPH12_107	22-Jul-12	-13.09	260.2	--	-29.58	--
JPHP01A	Sep-12	JPH12_120	2-Sep-12	-13.82	347.3	--	-29.30	--
JPHP01A	Jun-13	JPH13_013	7-Jun-13	-14.34	--	--	--	--
JPHP01A	Jun-14	JPH14_020	10-Jun-14	-12.23	--	--	--	--
JPHP01B		2						
JPHP01B	Jul-11	JPH11_045	1-Jul-11	-12.74	14.4	--	--	--
JPHP01B	Aug-11	JPH11_002	14-Aug-11	-17.82	25.4	--	-27.66	--
JPHP01B	May-12	JPH12-066	28-May-12	-21.96	55.4	--	--	--
JPHP01B	Jul-12	JPH12_108	22-Jul-12	-21.41	82.8	--	-29.77	--

JPHP01B	Sep-12	JPH12_121	2-Sep-12	-22.65	43.5	--	-31.57	--
JPHP01B	Jun-13	JPH13_014	7-Jun-13	-23.02	--	--	--	--
JPHP01B	Jun-14	JPH14-021	11-Jun-14	-20.07	--	--	--	--
JPHP01C		<i>1</i>						
JPHP01C	Jul-11	JPH11_046	1-Jul-11	-12.36	19.0	--	--	--
JPHP01C	Aug-11	JPH11_003	14-Aug-11	-17.32	22.2	--	-27.78	--
JPHP01C	May-12	JPH12-067	28-May-12	-19.81	33.4	--	--	--
JPHP01C	Jul-12	JPH12_109	22-Jul-12	-18.39	58.1	--	--	--
JPHP01C	Sep-12	JPH12_122	2-Sep-12	-20.46	5.8	--	-33.39	--
JPHP01C	Jun-13	JPH13_015	7-Jun-13	-22.66	--	--	--	--
JPJP01C	Jun-14	JPH14_022	11-Jun-14	-22.37	--	--	--	--
JPHP02A		<i>3</i>						
JPHP02A	Jul-11	JPH11_047	1-Jul-11	-10.51	79.4	--	--	--
JPHP02A	Aug-11	JPH11_004	14-Aug-11	-12.73	79.4	--	-35.18	--
JPHP02A	May-12	JPH12-061	28-May-12	-16.03	170.3	--	--	--
JPHP02A	Jul-12	JPH12_104	22-Jul-12	-16.61	193.5	--	-29.38	--
JPHP02A	Sep-12	JPH12_123	2-Sep-12	-16.50	216.8	--	--	--
JPHP02A	Jun-13	JPH13_023	11-Jun-13	-17.46	--	--	--	--
JPJP02A	Jun-14	JPH14_017	11-Jun-14	-15.94	--	--	--	--
JPHP02B		<i>2</i>						

JPHP02B	Jul-11	JPH11_048	1-Jul-11	-13.20	17.0	--	--	--
JPHP02B	Aug-11	JPH11_005	14-Aug-11	-16.97	20.4	--	-26.40	--
JPHP02B	May-12	JPH12-063	28-May-12	-21.43	53.8	--	--	--
JPHP02B	Jul-12	JPH12_105	22-Jul-12	-21.35	78.9	--	-31.45	--
JPHP02B	Sep-12	JPH12_124	2-Sep-12	-22.32	50.0	--	--	--
JPHP02B	Jun-13	JPH13_024	11-Jun-13	-23.50	--	--	--	--
JPHP02B	Jun-14	JPH14_018	11-Jun-14	-20.46	--	--	--	--
JPHP02C		<i>1</i>						
JPHP02C	Jul-11	JPH11_049	1-Jul-11	-25.34	50.3	--	--	--
JPHP02C	Aug-11	JPH11_006	14-Aug-11	-16.20	20.2	--	-28.40	--
JPHP02C	May-12	JPH12-065	28-May-12	-19.20	38.1	--	--	--
JPHP02C	Jul-12	JPH12_106	22-Jul-12	-19.35	62.4	--	-27.58	--
JPHP02C	Sep-12	JPH12_125	2-Sep-12	-20.92	70.4	--	--	--
JPHP02C	Jun-13	JPH13_025	11-Jun-13	-21.91	--	--	--	--
JPHP02C	Jun-14	JPH14_019	11-Jun-14	-21.24	--	--	--	--
JPHP03A		<i>3</i>						
JPHP03A	Jul-11	JPH11_050	1-Jul-11	-13.24	30.0	--	--	--
JPHP03A	Aug-11	JPH11_007	14-Aug-11	-15.78	24.7	--	-27.27	--
JPHP03A	May-12	JPH12-059	28-May-12	-20.33	69.1	--	--	--
JPHP03A	Jul-12	JPH12_101	22-Jul-12	-20.10	93.9	--	-27.90	--

JPHP03A	Sep-12	JPH12_136	4-Sep-12	-21.72	81.5	--	--	--
JPHP03A	Jun-13	JPH13_020	9-Jun-13	-22.19	--	--	--	--
JPHP03A	Jun-14	JPH14_014	11-Jun-14	-18.91	--	--	--	--
JPHP03B		2						
JPHP03B	Jul-11	JPH11_051	1-Jul-11	-13.58	19.3	--	--	--
JPHP03B	Aug-11	JPH11_008	14-Aug-11	-17.09	23.2	--	-26.99	--
JPHP03B	May-12	JPH12-060	28-May-12	-21.57	50.5	--	--	--
JPHP03B	Jul-12	JPH12_102	22-Jul-12	-21.03	69.8	--	-31.20	--
JPHP03B	Sep-12	JPH12_137	4-Sep-12	-22.15	43.1	--	--	--
JPHP03B	Jun-13	JPH13_021	9-Jun-13	-23.09	--	--	--	--
JPHP03B	Jun-14	JPH_015	11-Jun-14	-21.17	--	--	--	--
JPHP03C		1						
JPHP03C	Jul-11	JPH11_052	1-Jul-11	-12.39	17.5	--	--	--
JPHP03C	Aug-11	JPH11_009	14-Aug-11	-14.32	16.5	--	--	--
JPHP03C	May-12	JPH12-062	28-May-12	-18.98	19.8	--	--	--
JPHP03C	Jul-12	JPH12_103	22-Jul-12	-17.77	49.0	--	--	--
JPHP03C	Sep-12	JPH12_139	4-Sep-12	-21.06	18.6	--	--	--
JPHP03C	Jun-13	JPH13_022	9-Jun-13	-22.52	--	--	--	--
JPHP03C	Jun-14	JPH14_016	11-Jun-14	-20.91	--	--	--	--
JPHP04A		3						

JPHP04A	Jul-11	JPH11_053	1-Jul-11	-10.31	68.7	--	--	--
JPHP04A	Aug-11	JPH11_010	14-Aug-11	-12.52	100.9	--	-31.80	--
JPHP04A	May-12	JPH12-056	28-May-12	-9.98	226.7	--	--	--
JPHP04A	Jul-12	JPH12_098	21-Jul-12	-10.96	295.2	--	-29.35	--
JPHP04A	Sep-12	JPH12_138	4-Sep-12	-11.65	522.2	--	-28.08	--
JPHP04A	Jun-13	JPH13_017	9-Jun-13	-16.37	--	--	--	--
JPHP04A	Jun-14	JPH14_011	11-Jun-14	-14.66	--	--	--	--
JPHP04B		<i>2</i>						
JPHP04B	Jul-11	JPH11_054	1-Jul-11	-14.36	23.5	--	--	--
JPHP04B	Aug-11	JPH11_011	14-Aug-11	-17.14	38.5	--	-26.60	--
JPHP04B	May-12	JPH12-057	28-May-12	-19.97	67.4	--	--	--
JPHP04B	Jul-12	JPH12_099	21-Jul-12	-19.36	100.6	--	-30.20	--
JPHP04B	Sep-12	JPH12_141	4-Sep-12	-21.29	80.6	--	-29.57	--
JPHP04B	Jun-13	JPH13_018	9-Jun-13	-18.75	--	--	--	--
JPHP04B	Jun-14	JPH14_012	11-Jun-14	-20.33	--	--	--	--
JPHP04C		<i>1</i>						
JPHP04C	Jul-11	JPH11_055	1-Jul-11	-13.55	23.1	--	--	--
JPHP04C	Aug-11	JPH11_012	14-Aug-11	-16.02	27.5	--	-27.29	--
JPHP04C	May-12	JPH12-058	28-May-12	-18.78	31.0	--	--	--
JPHP04C	Jul-12	JPH12_100	21-Jul-12	-17.87	60.5	--	-35.50	--

JPHP04C	Sep-12	JPH12_142	4-Sep-12	-18.08	27.9		-29.20	--
JPHP04C	Jun-13	JPH13_019	9-Jun-13	-22.31	--	--	--	--
JPHP04C	Jun-14	JPH14_013	11-Jun-14	20.63	--	--	--	--
JPHP05A		3						
JPHP05A	Jul-11	JPH11_056	1-Jul-11	-12.18	46.7	--	--	--
JPHP05A	Aug-11	JPH11_013	15-Aug-11	-14.60	56.1	--	-29.19	--
JPHP05A	May-12	JPH12-040	27-May-12	-17.31	168.0	--	--	--
JPHP05A	Jul-12	JPH12_095	21-Jul-12	-17.11	181.0	--	--	--
JPHP05A	Sep-12	JPH12_133	3-Sep-12	-18.53	192.6		-29.82	--
JPHP05A	Jun-13	JPH13_007	6-Jun-13	-18.32	--	--	--	--
JPHP05A	Jun-14	JPH14_007	11-Jun-14	-17.03	--	--	--	--
JPHP05B		2						
JPHP05B	Jul-11	JPH11_057	1-Jul-11	-14.50	18.6	--	--	--
JPHP05B	Aug-11	JPH11_014	15-Aug-11	-16.83	23.8	--	-26.28	--
JPHP05B	May-12	JPH12-041	27-May-12	-22.03	65.2	--	--	--
JPHP05B	Jul-12	JPH12_096	21-Jul-12	-21.49	96.0	--	--	--
JPHP05B	Sep-12	JPH12_134	3-Sep-12	-22.87	57.7	--	-31.24	--
JPHP05B	Jun-13	JPH13_008	6-Jun-13	-22.49	--	--	--	--
JPHP05B	Jun-14	JPH14_008	11-Jun-14	-20.92	--	--	--	--
JPHP05C		1						

JPHP05C	Jul-11	JPH11_058	1-Jul-11	-15.55	38.5	--	--	--
JPHP05C	Aug-11	JPH11_015	15-Aug-11	-15.17	19.3	--	-27.22	--
JPHP05C	May-12	JPH12-043	27-May-12	-20.65	31.2	--	--	--
JPHP05C	Jul-12	JPH12_097	21-Jul-12	-17.74	49.8	--	-27.70	--
JPHP05C	Sep-12	JPH12_135	3-Sep-12	-19.29	-1.7	--	--	--
JPHP05C	Jun-13	JPH13_009	6-Jun-13	-22.10	--	--	--	--
JPHP05C	Jun-14	JPH14_009	11-Jun-14	-20.73	--	--	--	--
JPHP06A		3						
JPHP06A	Jul-11	JPH11_059	1-Jul-11	-11.32	40.4	--	--	--
JPHP06A	Aug-11	JPH11_016	15-Aug-11	-14.47	56.1	--	-31.60	--
JPHP06A	May-12	JPH12-042	27-May-12	-17.52	145.5	--	--	--
JPHP06A	Jul-12	JPH12_092	21-Jul-12	-17.19	138.9	--	-28.80	--
JPHP06A	Sep-12	JPH12_129	3-Sep-12	-18.64	256.1	--	-29.68	--
JPHP06A	Jun-13	JPH13_004	6-Jun-13	-18.84	--	--	--	--
JPHP06A	Jun-14	JPH14_004	11-Jun-14	-17.09	--	--	--	--
JPHP06B		-						
JPHP06B	Jul-11	JPH11_060	1-Jul-11	-15.21	36.4	--	--	--
JPHP06B	Aug-11	JPH11_017	15-Aug-11	-15.11	30.8	--	-27.30	--
JPHP06B	May-12	JPH12-044	27-May-12	-20.95	76.7	--	--	--
JPHP06B	Jul-12	JPH12_093	21-Jul-12	-20.13	85.4	--	-28.82	--

JPHP06B	Sep-12	JPH12_131	3-Sep-12	-21.92	51.1	--	-35.58	--
JPHP06B	Jun-13	JPH13_005	6-Jun-13	-22.19	--	--	--	--
JPHP06B	Jun-14	JPH14_005	11-Jun-14	-20.13	--	--	--	--
JPHP06C		<i>1</i>						
JPHP06C	Jul-11	JPH11_061	1-Jul-11	-12.43	23.6	--	--	--
JPHP06C	Aug-11	JPH11_018	15-Aug-11	-17.82	28.4	--	-26.90	--
JPHP06C	May-12	JPH12-047	27-May-12	-20.09	26.2	--	--	--
JPHP06C	Jul-12	JPH12_094	21-Jul-12	-19.83	58.9	--	--	--
JPHP06C	Sep-12	JPH12_132	3-Sep-12	-20.36	--	--	--	--
JPHP06C	Jun-13	JPH13_006	6-Jun-13	-23.04	--	--	--	--
JPHP06C	Jun-14	JPH14_006	11-Jun-14	-21.36	--	--	--	--
JPHP07A		<i>3</i>						
JPHP07A	Jul-11	JPH11_062	1-Jul-11	-10.69	84.7	--	--	--
JPHP07A	Aug-11	JPH11_019	15-Aug-11	-13.43	130.3	--	--	--
JPHP07A	May-12	JPH12-046	27-May-12	-17.02	182.7	--	--	--
JPHP07A	Jul-12	JPH12_110	22-Jul-12	-15.70	203.2	--	-28.87	--
JPHP07A	Sep-12	JPH12_127	3-Sep-12	-17.15	398.6	-7.3	-29.00	13.1
JPHP07A	Jun-13	JPH13_001	6-Jun-13	-17.01	--	--	--	--
JPHP07A	Jun-14	JPH14_001	11-Jun-14	15.41	--	--	--	--
JPHP07B		<i>2</i>						

JPHP07B	Jul-11	JPH11_063	1-Jul-11	-8.24	47.9	--	--	--
JPHP07B	Aug-11	JPH11_020	15-Aug-11	-16.26	36.2	--	-26.33	--
JPHP07B	May-12	JPH12-048	27-May-12	-21.21	61.3	--	--	--
JPHP07B	Jul-12	JPH12_111	22-Jul-12	-21.25	102.6	--	--	--
JPHP07B	Sep-12	JPH12_128	3-Sep-12	-22.99	152.8	--	--	--
JPHP07B	Jun-13	JPH13_002	6-Jun-13	-22.68	--	--	--	--
JPHP07B	Jun-14	JPH14_002	11-Jun-14	-15.40	--	--	--	--
JPHP07C		<i>1</i>						
JPHP07C	Jul-11	JPH11_064	1-Jul-11	-11.91	14.8	--	--	--
JPHP07C	Aug-11	JPH11_021	15-Aug-11	-15.53	22.5	--	-27.28	--
JPHP07C	May-12	JPH12-050	27-May-12	-22.40	16.0	--	--	--
JPHP07C	Jul-12	JPH12_112	22-Jul-12	-20.96	51.1	--	--	--
JPHP07C	Sep-12	JPH12_130	3-Sep-12	-17.47	31.3	--	--	--
JPHP07C	Jun-13	JPH13_003	6-Jun-13	-22.22	--	--	--	--
JPHP07C	Jun-14	JPH14_003	11-Jun-14	-19.98	--	--	--	--
JPHP08A		<i>3</i>						
JPHP08A	Jul-11	JPH11_065	1-Jul-11	-11.96	206.0	--	--	--
JPHP08A	Aug-11	JPH11_022	17-Aug-11	-12.54	225.6	--	-27.58	--
JPHP08A	May-12	JPH12-049	27-May-12	-12.03	317.8	--	--	--
JPHP08A	Jul-12	JPH12_075	19-Jul-12	-12.27	362.2	--	-24.67	--

JPHP08A	Sep-12	JPH12_159	5-Sep-12	-12.33	316.9	--	-22.40	--
JPHP08A	Jun-13	JPH13_035	13-Jun-13	-12.14	--	--	--	--
JPHP08A	Jun-14	JPH14_033	15-Jun-14	-8.86	--	--	--	--
JPHP08B		2						
JPHP08B	Jul-11	JPH11_066	1-Jul-11	-12.53	50.9	--	--	--
JPHP08B	Aug-11	JPH11_023	17-Aug-11	-13.25	66.3	--	-33.52	--
JPHP08B	May-12	JPH12-051	27-May-12	-18.79	159.1	--	--	--
JPHP08B	Jul-12	JPH12_076	19-Jul-12	-19.38	208.7	--	-28.10	--
JPHP08B	Sep-12	JPH12_160	5-Sep-12	-19.77	217.6	--	-28.24	--
JPHP08B	Jun-13	JPH13_036	13-Jun-13	-20.15	--	--	--	--
JPHP08B	Jun-14	JPH14_034	15-Jun-14	-17.19	--	--	--	--
JPHP08C		1						
JPHP08C	Jul-11	JPH11_067	1-Jul-11	-14.91	46.6	--	--	--
JPHP08C	Aug-11	JPH11_024	17-Aug-11	-15.80	31.4	--	-28.21	--
JPHP08C	May-12	JPH12-052	27-May-12	-19.79	36.2	--	--	--
JPHP08C	Jul-12	JPH12_077	19-Jul-12	-16.45	231.2	0.9	-28.49	17.4
JPHP08C	Sep-12	JPH12_161	6-Sep-12	-13.55	261.0	--	-28.96	--
JPHP08C	Jun-13	JPH13_037	13-Jun-13	-19.08	--	--	--	--
JPHP08C	Jun-14	JPH14_035	15-Jun-14	-14.95	--	--	--	--
JPHP09A		3						

JPHP09A	Jul-11	JPH11_068	1-Jul-11	-12.99	163.2	--	--	--
JPHP09A	Aug-11	JPH11_025	17-Aug-11	-13.92	153.2	--	-33.86	--
JPHP09A	May-12	JPH12-037	26-May-12	-16.20	242.5	--	--	--
JPHP09A	Jul-12	JPH12_081	19-Jul-12	-16.87	221.0	--	-25.90	--
JPHP09A	Sep-12	JPH12_151	5-Sep-12	-17.46	201.5		-28.00	--
JPHP09A	Jun-13	JPH13_031	13-Jun-13	-15.76	--	--	--	--
JPHP09A	Jun-14	JPH14_27	11-Jun-14	-17.27	--	--	--	--
JPHP09B		<i>2</i>						
JPHP09B	Jul-11	JPH11_069	1-Jul-11	-13.84	26.1	--	--	--
JPHP09B	Aug-11	JPH11_026	17-Aug-11	-13.55	28.4	--	-28.89	--
JPHP09B	May-12	JPH12-038	26-May-12	-18.71	122.6	--	--	--
JPHP09B	Jul-12	JPH12_082	19-Jul-12	-18.83	123.0	--	-27.54	--
JPHP09B	Sep-12	JPH12_152	5-Sep-12	-19.28	139.8	--	-27.68	--
JPHP09B	Jun-13	JPH13_032	13-Jun-13	-20.84	--	--	--	--
JPHP09B	Jun-14	JPH14_028	11-Jun-14	-16.00	--	--	--	--
JPHP09C		<i>1</i>						
JPHP09C	Jul-11	JPH11_070	1-Jul-11	-16.89	20.4	--	--	--
JPHP09C	Aug-11	JPH11_027	17-Aug-11	-17.05	42.3	--	-28.10	--
JPHP09C	May-12	JPH12-039	26-May-12	-21.18	224.5	--	--	--
JPHP09C	Jul-12	JPH12_083	19-Jul-12	-20.63	228.3	--	-28.20	--

JPHP09C	Sep-12	JPH12_153	5-Sep-12	-23.45	108.7	--	-28.24	--
JPHP09C	Jun-13	JPH13_033	13-Jun-13	-20.76	--	--	--	--
JPHP09C	Jun-14	JPH14_029	11-Jun-14	-15.67	--	--	--	--
JPHP10A		3						
JPHP10A	Jul-11	JPH11_071	1-Jul-11	-12.91	153.0	--	--	--
JPHP10A	Aug-11	JPH11_028	15-Aug-11	-12.79	144.8	--	-29.53	--
JPHP10A	May-12	JPH12-034	26-May-12	-15.98	244.8	--	--	--
JPHP10A	Jul-12	JPH12_086	19-Jul-12	-14.52	261.2	--	-26.76	--
JPHP10A	Sep-12	JPH12_147	4-Sep-12	-15.47	289.6	--	-25.05	--
JPHP10A	Jun-13	JPH13_027	11-Jun-13	-15.96	--	--	--	--
JPHP10A	Jun-14	JPH14_023	11-Jun-14	-13.26	--	--	--	--
JPHP10B		2						
JPHP10B	Jul-11	JPH11_072	1-Jul-11	-13.74	66.7	--	--	--
JPHP10B	Aug-11	JPH11_029	15-Aug-11	-14.40	86.5	--	-27.91	--
JPHP10B	May-12	JPH12-035	26-May-12	-18.14	191.0	--	--	--
JPHP10B	Jul-12	JPH12_087	19-Jul-12	-18.16	210.4	--	--	--
JPHP10B	Sep-12	JPH12_148	5-Sep-12	-18.26	236.8	--	-28.19	--
JPHP10B	Jun-13	JPH13_028	11-Jun-13	-22.92	--	--	--	--
JPHP10B	Jun-14	JPH14_024	11-Jun-14	-16.04	--	--	--	--
JPHP10C		1						

JPHP10C	Jul-11	JPH11_073	1-Jul-11	-16.94	21.9	--	--	--
JPHP10C	Aug-11	JPH11_030	15-Aug-11	-16.01	33.9	--	-27.29	--
JPHP10C	May-12	JPH12-036	26-May-12	-19.02	98.1	--	--	--
JPHP10C	Jul-12	JPH12_088	19-Jul-12	-15.59	120.5	--	-27.47	--
JPHP10C	Sep-12	JPH12_149	5-Sep-12	-21.55	105.7	--	-27.45	--
JPHP10C	Jun-13	JPH13_029	11-Jun-13	-23.05	--	--	--	--
JPHP10C	Jun-14	JPH14_025	11-Jun-14	-17.51	--	--	--	--
JPHP11A		3						
JPHP11A	Jul-11	JPH11_074	1-Jul-11	-6.75	154.6	--	--	--
JPHP11A	Aug-11	JPH11_031	14-Aug-11	-7.75	146.9	-6.0	-44.25	8.4
JPHP11A	May-12	JPH12-053	27-May-12	-11.09	279.4	--	--	--
JPHP11A	Jul-12	JPH12_070	17-Jul-12	-11.81	276.1	--	-28.81	--
JPHP11A	Sep-12	JPH12_162	6-Sep-12	-11.78	276.1	--	--	--
JPHP11A	Jun-13	JPH13_010	7-Jun-13	-12.34	--	--	--	--
JPHP11A	Jun-14	JPH14_030	15-Jun-14	-10.75	--	--	--	--
JPHP11B		2						
JPHP11B	Jul-11	JPH11_075	1-Jul-11	-13.44	25.8	--	--	--
JPHP11B	Aug-11	JPH11_032	14-Aug-11	-16.12	37.8	--	-26.50	--
JPHP11B	May-12	JPH12-054	27-May-12	-20.03	83.7	--	--	--
JPHP11B	Jul-12	JPH12_071	17-Jul-12	-20.28	113.3	--	-28.00	--

JPHP11B	Sep-12	JPH12_163	6-Sep-12	-21.42	87.1	--	--	--
JPHP11B	Jun-13	JPH13_011	7-Jun-13	-21.83	--	--	--	--
JPHP11B	Jun-14	JPH14_031	15-Jun-14	-19.24	--	--	--	--
JPHP11C		<i>I</i>						
JPHP11C	Jul-11	JPH11_076	1-Jul-11	-6.00	24.1	--	--	--
JPHP11C	Aug-11	JPH11_033	14-Aug-11	-17.14	26.0	--	-27.09	--
JPHP11C	May-12	JPH12-055	27-May-12	-17.55	15.9	--	--	--
JPHP11C	Jul-12	JPH12_072	17-Jul-12	-19.38	59.4	--	-27.34	--
JPHP11C	Sep-12	JPH12_164	6-Sep-12	-20.01	73.3	--	--	--
JPHP11C	Jun-13	JPH13_012	7-Jun-13	-22.04	--	--	--	--
JPHP11C	Jun-14	JPH14_033	15-Jun-14	-15.72	--	--	--	--
JPHP12		<i>I</i>						
JPHP12	Jul-12	JPH12_113	22-Jul-12	-19.88	105.9	--	--	--
JPHP12	Sep-12	JPH12_143	4-Sep-12	-15.43	87.9	--	--	--
JPHP12	Jun-13	JPH13_016	7-Jun-13	-12.51	--	--	--	--
JPHP12	Jun-14	JPH14_010	11-Jun-14	--	--	--	--	--
Surface Water at JPHA								
Surface Water at JPHA	Aug-11	JPH11_042	17-Aug-11	-18.55	21.3	-0.2	-29.85	15.6
Surface Water	Apr-12	JPH12_022_014	14-Apr-12	--	--	0.5	-30.11	8.3

at JPHA								
Surface Water at JPHA	May-12	JPH12-024	25-May-12	too dilute	14.5	--	--	--
Surface Water at JPHA	Jul-12	JPH12_116	3-Aug-12	-16.46	201.2	1.2	-29.25	18.3
Surface Water at JPHA	Jul-12	JPH12_078	19-Jul-12	-19.99	57.4	--	-28.71	--
Surface Water at JPHA	Sep-12	JPH12_158	5-Sep-12	-20.39	38.0	2.9	-28.36	10.0
JPH Weir								
JPH Weir	Aug-11	JPH11_041	15-Aug-11	-14.42	32.2	--	--	--
JPH Weir	Apr-12	JPH12_021_018	14-Apr-12	--	--	-2.2	-30.48	22.7
JPH Weir	Apr-12	JPH12_020_016	14-Apr-12	--	--	-0.3	-27.75	13.7
JPH Weir	May-12	JPH12-033	26-May-12	-18.23	68.0	--	--	--
JPH Weir	Jul-12	JPH12_089	19-Jul-12	-21.41	42.2	6.4	-24.21	6.1
JPH Weir	Jul-12	JPH12_117	3-Aug-12	-21.22	128.1	--	--	--
JPH Weir	Sep-12	JPH12_145	4-Sep-12	-19.28	79.7	0.0	-28.79	16.9
JPH Rain Events								
JPH Rain Events	15-Aug-11	JPH11_043	15-Aug-11	-19.74	11.1	--	--	--
JPH Rain Events	5-Jun-12	JPH12-068	5-Jun-12	-24.01	108.5	--	--	--

JPH Rain Events	17-Jul-12	JPH12_069	17-Jul-12	-23.70	54.9	4.0	-26.52	8.0
JPH Rain Events	13-Sep-12	JPH12_165	13-Sep-12	-13.35	31.0	--	--	--
JPH Bulk Rain								
JPH Bulk Rain	(April - May 2012)	JPH12-030	25-May-12	too dilute	17.1	--	--	--
JPH Bulk Rain	(5 June - 17July 2012)	JPH12_073	17-Jul-12	-18.69	36.3	--	--	--
JPH Bulk Rain	(5 June - 17July 2012)	JPH12_091	19-Jul-12	-20.61	42.1	--	--	--
JPH Bulk Rain	(10days)	JPH12_114	31-Jul-12	-22.85	69.0	--	--	--
JPH Bulk Rain	(17 July - 3 Aug)	JPH12_115	3-Aug-12	-24.54	125.3	2.1	-29.22	17.5
JPH Bulk Rain	(17 July - 2 Sep)	JPH12_126	2-Sep-12	--	-20.4	--	--	--
RAIN	Jun-13	JPH13_040	13-Jun-13	-18.57	--	--	--	--
Snow Survey								
Snow Survey	JPHA	JPH12_007	13-Mar-12	--	--	0.3	-26.05	23.6
Snow Survey	JPHE	JPH12_008	13-Mar-12	--	--	-5.8	-28.30	25.7
Snow Survey	JPHG	JPH12_005	13-Mar-12	--	--	-4.6	-28.15	31.0
Snow Survey	JPHP1	JPH12_010	13-Mar-12	--	--	-2.6	-28.09	32.8
Snow Survey	JPHP2	JPH12_011	13-Mar-12	--	--	-2.8	-28.42	27.0
Snow Survey	JPHP3	JPH12_001	13-Mar-12	--	--	-2.3	-26.22	33.3

Snow Survey	JPHP4	JPH12_002	13-Mar-12	--	--	-4.1	-28.32	24.5
Snow Survey	JPHP5	JPH12_003	13-Mar-12	--	--	--	--	--
Snow Survey	JPHP6	JPH12_004	13-Mar-12	--	--	-3.2	-28.16	23.4
Snow Survey	JPHP7	JPH12_009	13-Mar-12	--	--	-3.6	-28.44	25.3
Snow Survey	JPHP8	JPH12_006	13-Mar-12	--	--	-3.0	-28.60	34.1
Snow Survey	JPHP11	JPH12_012	13-Mar-12	--	--	-2.0	-27.14	35.4
Snow Sampling								
Snow Sampling		JPH	8-Feb-15	--	--	--	--	--
Snow Sampling		JPH15S_001	23-Mar-15	--	--	--	--	--
Snow Sampling		JPH15S_002	23-Mar-15	--	--	--	--	--
Snow Sampling		JPH15S_003	23-Mar-15	--	--	--	--	--
Snow Sampling		JPH15S_004	23-Mar-15	--	--	--	--	--
MLA								
		<i>WT</i>						
MLA	Jul-11	ML11_095	1-Jul-11	-10.83	28.5	--	--	--
MLA	Aug-11	ML11_044	24-Aug-11	1.96	140.5	-5.6	-34.56	7.8
MLA	May-12	ML12-067	9-Jun-12	-2.01	245.7	--	--	--
MLA	Jul-12	ML12_175	30-Jul-12	-1.16	193.6	0.7	-39.86	9.8
MLA	Sep-12	ML12_212	8-Sep-12	-6.77	95.9	--	-29.24	--
MLA	Jun-13	ML13_062	18-Jun-13	-13.27	--	--	--	--
MLA	Jun-14	ML14_045	13-Jun-14	--	--	--	--	--

MLB		<i>WT</i>						
MLB	Jul-11	ML11_096	1-Jul-11	-11.42	26.3	--	--	--
MLB	Aug-11	ML11_045	21-Aug-11	-5.64	113.7	-2.4	-28.20	9.5
MLB	May-12	ML12-064	9-Jun-12	-11.32	146.1	--	--	--
MLB	Jul-12	ML12_172	30-Jul-12	-12.03	109.0	-0.3	-30.53	10.2
MLB	Sep-12	ML12_209	8-Sep-12	-12.52	68.3	-1.0	-30.93	9.6
MLB	Jun-13	ML13_059	18-Jun-13	-13.68	--	--	--	--
MLB	Jun-14	ML14_054	14-Jun-14	--	--	--	--	--
MLC		<i>WT</i>						
MLC	Jul-11	ML11_097	1-Jul-11	-12.62	90.0	--	--	--
MLC	Aug-11	ML11_046	21-Aug-11	-13.75	123.4	-3.8	-27.41	9.8
MLC	May-12	ML12-060	9-Jun-12	-13.99	100.2	--	--	--
MLC	Jul-12	ML12_168	30-Jul-12	-8.54	103.5	0.4	-31.37	11.0
MLC	Sep-12	ML12_205	8-Sep-12	-17.06	72.8	--	-30.01	--
MLC	Jun-13	ML13_058	18-Jun-13	-14.23	--	--	--	--
MLC	Jun-14	ML14-055	14-Jun-14	--	--	--	--	--
MLD		<i>WT</i>						
MLD	Jul-11	ML11_098	1-Jul-11	-11.70	43.3	--	--	--
MLD	Aug-11	ML11_047	19-Aug-11	0.93	206.6	-1.5	-36.55	7.7
MLD	May-12	ML12-039	7-Jun-12	too dilute	83.8	--	--	--

MLD	Jul-12	ML12_164	28-Jul-12	-4.86	123.0	0.2	-34.03	7.7
MLD	Sep-12	ML12_220	8-Sep-12	-6.39	173.0	-0.7	-29.37	9.3
MLD	Jun-13	ML13_049	17-Jun-13	-6.98	--	--	--	--
MLD	Jun-14	--	--	--	--	--	--	--
MLE		<i>WT</i>						
MLE	Jul-11	ML11_099	1-Jul-11	-1.71	98.4	--	--	--
MLE	Aug-11	ML11_048	19-Aug-11	-0.20	158.0	-2.2	-27.13	10.1
MLE	May-12	ML12-098	11-Jun-12	-6.53	178.8	--	--	--
MLE	Jul-12	ML12_114	24-Jul-12	-10.39	151.1	-0.3	-33.23	8.8
MLE	Sep-12	ML12_243	10-Sep-12	4.01	528.5	0.1	-27.74	14.3
MLE	Jun-13	ML13_037	16-Jun-13	-2.99	--	--	--	--
MLE	Jun-14	ML14_041	12-Jun-14	--	--	--	--	--
MLF		<i>WT</i>						
MLF	Jul-11	ML11_100	1-Jul-11	-20.11	44.5	--	--	--
MLF	Aug-11	ML11_049	21-Aug-11	-12.06	110.0	-4.7	-30.94	9.8
MLF	May-12	ML12-055	9-Jun-12	-18.47	68.1	--	--	--
MLF	Jul-12	ML12_145	27-Jul-12	-13.45	130.6	-0.3	-30.73	10.1
MLF	Sep-12	ML12_197	7-Sep-12	-12.89	100.1	--	-29.13	--
MLF	Jun-13	ML13_045	17-Jun-13	-16.08	--	--	--	--
MLF	Jun-14	ML14_61	14-Jun-14	--	--	--	--	--

MLG		<i>WT</i>						
MLG	Jul-11	ML11_101	1-Jul-11	-16.33	41.6	--	--	--
MLG	Aug-11	ML11_050	19-Aug-11	-14.62	58.7	-1.2	-27.67	10.5
MLG	May-12	ML12-074	10-Jun-12	-17.47	40.1	--	--	--
MLG	Jul-12	ML12_128	25-Jul-12	0.37	176.5	0.6	-33.46	11.8
MLG	Sep-12	ML12_232	9-Sep-12	-1.31	190.9	-0.3	-29.32	13.2
MLG	Jun-13	ML13_038	16-Jun-13	-0.14	--	--	--	--
MLG	Jun-14	ML14_034	12-Jun-14	--	--	--	--	--
MLG	Oct-14	ML14W_025	26-Oct-14	--	--	--	--	--
MLH		<i>WT</i>						
MLH	Jul-11	ML11_102	1-Jul-11	-16.02	76.3	--	--	--
MLH	Aug-11	ML11_051	19-Aug-11	-9.68	92.8	-1.1	-33.04	10.2
MLH	May-12	ML12-043	7-Jun-12	-15.31	115.2	--	--	--
MLH	Jul-12	ML12_131	25-Jul-12	-21.36	79.5	0.2	-29.88	11.0
MLH	Sep-12	ML12_253	12-Sep-12	-10.88	147.5	-0.4	-31.72	11.3
MLH	Jun-13	ML13_033	16-Jun-13	-17.30	--	--	--	--
MLH	Jun-14	ML14_048	13-Jun-14	--	--	--	--	--
MLM		<i>WT</i>						
MLM	Jul-11	ML11_103	1-Jul-11	-18.91	144.6	--	--	--
MLM	Aug-11	ML11_052	19-Aug-11	-14.33	150.8	-6.1	-30.22	9.1

MLM	May-12	ML12-079	11-Jun-12	-5.82	175.3	--	--	--
MLM	Jul-12	ML12_121	24-Jul-12	-8.99	188.5	0.9	-29.35	12.5
MLM	Sep-12	ML12_228	9-Sep-12	-8.88	67.3	1.2	-27.39	16.5
MLM	Jun-13	ML13_007	10-Jun-13	4.36	--	--	--	--
MLM	Jun-14	ML14_025	7-Jun-14	--	--	--	--	--
MLN		<i>WT</i>						
MLN	Jul-11	ML11_104	1-Jul-11	-10.46	121.7	--	--	--
MLN	Aug-11	ML11_053	19-Aug-11	-5.73	106.6	-1.2	-29.38	13.2
MLN	May-12	ML12-096	11-Jun-12	-8.32	197.8	--	--	--
MLN	Jul-12	ML12_110	18-Jul-12	-7.59	185.3	-0.7	-30.30	11.3
MLN	Sep-12	ML12_245	10-Sep-12	-4.60	187.2	--	-28.96	--
MLN	Jun-13	ML13_022	14-Jun-13	-16.25	--	--	--	--
MLN	Jun-14	ML14_032	12-Jun-14	--	--	--	--	--
MLO		<i>WT</i>						
MLO	Jul-11	ML11_105	1-Jul-11	-16.84	91.5	--	--	--
MLO	Aug-11	ML11_054	21-Aug-11	-10.08	147.7	-3.0	-34.09	8.7
MLO	May-12	ML12-056	9-Jun-12	-2.51	329.1	--	--	--
MLO	Jul-12	ML12_144	27-Jul-12	-0.73	296.8	0.7	-28.26	15.5
MLO	Sep-12	ML12_199	7-Sep-12	-18.11	42.1	-1.2	-28.89	11.0
MLO	Jun-13	ML13_050	17-Jun-13	-17.88	--	--	--	--

MLO	Jun-14	ML14_059	14-Jun-14	--	--	--	--	--
MLO	Oct-14	ML14W_012	26-Oct-14	--	--	--	--	--
MLP		<i>WT</i>						
MLP	Jul-11	ML11_106	1-Jul-11	-18.63	78.1	--	--	--
MLP	Aug-11	ML11_055	21-Aug-11	-22.63	169.3	-3.0	-29.19	12.2
MLP	May-12	ML12-054	9-Jun-12	-17.27	74.9	--	--	--
MLP	Jul-12	ML12_146	27-Jul-12	-17.93	104.3	1.5	-28.57	11.5
MLP	Sep-12	ML12_196	7-Sep-12	-19.67	60.0	--	-28.33	--
MLP	Jun-13	ML13_044	17-Jun-13	-20.94	--	--	--	--
MLP	Jun-13	ML13_043	17-Jun-13	-21.35	--	--	--	--
MLP	Jun-14	ML14_060	14-Jun-14	--	--	--	--	--
MLQ		<i>WT</i>						
MLQ	Jul-11	ML11_107	1-Jul-11	-9.64	48.6	--	--	--
MLQ	Aug-11	ML11_056	19-Aug-11	2.89	193.9	-4.9	-27.17	9.8
MLQ	May-12	ML12-097	11-Jun-12	-3.73	207.6	--	--	--
MLQ	Jul-12	ML12_113	24-Jul-12	-8.70	125.5	-1.5	-30.33	9.9
MLQ	Jul-12	ML12_111	18-Jul-12	-7.39	--	--	--	--
MLQ	Sep-12	ML12_244	10-Sep-12	-0.10	301.8	-1.8	-30.13	9.7
MLQ	Jun-13	ML13_023	14-Jun-13	-16.34	--	--	--	--
MLQ	Jun-14	ML14_033	12-Jun-14	--	--	--	--	--

MLR		<i>WT</i>						
MLR	Jul-11	ML11_108	1-Jul-11	-9.42	55.2	--	--	--
MLR	Aug-11	ML11_057	19-Aug-11	-5.02	115.5	-2.8	-28.35	10.5
MLR	May-12	ML12-095	11-Jun-12	-9.09	115.6	--	--	--
MLR	Jul-12	ML12_109	18-Jul-12	-5.95	166.4	-0.5	-30.78	9.6
MLR	Sep-12	ML12_246	10-Sep-12	-8.08	139.7	-1.1	-28.90	11.1
MLR	Jun-13	ML13_021	14-Jun-13	-11.14	--	--	--	--
MLR	Jun-14	ML14_031	12-Jun-14	--	--	--	--	--
MLS		<i>WT</i>						
MLS	Jul-11	ML11_109	1-Jul-11	-17.25	51.0	--	--	--
MLS	Aug-11	ML11_058	21-Aug-11	-9.76	115.4	-3.1	-28.71	9.8
MLS	May-12	ML12-048	7-Jun-12	-6.02	342.7	--	--	--
MLS	Jul-12	ML12_137	26-Jul-12	-4.88	217.0	0.4	-32.56	9.7
MLS	Sep-12	ML12_235	9-Sep-12	-9.13	80.6	--	-30.58	--
MLS	Jun-13	ML13_026	15-Jun-13	-11.42	--	--	--	--
MLS	Jun-14	ML14_008	5-Jun-14	--	--	--	--	--
MLS	Oct-14	ML14W_008	26-Oct-14	--	--	--	--	--
MLT		<i>WT</i>						
MLT	Jul-11	ML11_110	1-Jul-11	-18.54	47.6	--	--	--
MLT	Aug-11	ML11_059	24-Aug-11	-15.71	113.4	-3.7	-27.54	13.0

MLT	May-12	ML12-053	9-Jun-12	-7.19	139.9	--	--	--
MLT	Jul-12	ML12_147	27-Jul-12	-18.51	83.7	--	-29.12	--
MLT	Sep-12	ML12_203	8-Sep-12	-12.57	129.1	--	-29.29	--
MLT	Jun-13	ML13_054	17-Jun-13	-18.85	--	--	--	--
MLT	Jun-14	ML14_050	13-Jun-14	--	--	--	--	--
MLU		<i>WT</i>						
MLU	Jul-11	ML11_111	1-Jul-11	-11.37	68.9	--	--	--
MLU	Aug-11	ML11_060	21-Aug-11	-6.20	185.5	-2.4	-26.63	10.1
MLU	May-12	ML12-086	11-Jun-12	-5.64	366.8	--	--	--
MLU	Jul-12	ML12_108	18-Jul-12	-6.96	246.6	0.0	-28.39	8.6
MLU	Sep-12	ML12_186	1-Sep-12	2.75	477.3		-26.52	
MLU	Jun-13	ML13_025	15-Jun-13	-6.77	--	--	--	--
MLU	Jun-14	ML14_049	13-Jun-14	--	--	--	--	--
MLV		<i>WT</i>						
MLV	Jul-11	ML11_112	1-Jul-11	-16.47	27.8	--	--	--
MLV	Aug-11	ML11_061	21-Aug-11	-13.33	89.6	-3.4	-27.22	11.5
MLV	May-12	ML12-052	9-Jun-12	-17.75	87.0	--	--	--
MLV	Jul-12	ML12_148	27-Jul-12	-19.49	89.1	--	-28.76	--
MLV	Sep-12	ML12_198	7-Sep-12	-20.55	65.8	0.2	-27.76	10.1
MLV	Jun-13	ML13_042	17-Jun-13	-22.16	--	--	--	--

MLV	Jun-14	--	--	--	--	--	--	--
MLP01A		2						
MLP01A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP01A	Aug-11	--	--	--	--	--	--	--
MLP01A	May-12	ML12-033	7-Jun-12	--	--	--	--	--
MLP01A	Jul-12	--	--	--	--	--	--	--
MLP01A	Sep-12	--	--	--	--	--	--	--
MLP01A	Jun-13	--	--	--	--	--	--	--
MLP01A	Jun-14	ML14_016	7-Jun-14	--	--	--	--	--
MLP01B		1						
MLP01B	Jul-11	ML11_065	1-Jul-11	-20.50	164.0	--	--	--
MLP01B	Aug-11	ML11_001	24-Aug-11	-18.71	62.8	5.1	-24.75	11.1
MLP01B	May-12	ML12-034	7-Jun-12	-17.22	32.6	--	--	--
MLP01B	Jul-12	ML12_160	28-Jul-12	-16.40	139.0	--	-24.99	--
MLP01B	Sep-12	ML12_238	9-Sep-12	-18.61	87.5	--	--	--
MLP01B	Jun-13	ML13_008	12-Jun-13	-14.24	--	--	--	--
MLP01B	Jun-14	ML14_017	7-Jun-14	--	--	--	--	--
MLP02A		2						
MLP02A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP02A	Aug-11	ML11_002	24-Aug-11	-21.67	29.1	--	--	--

MLP02A	May-12	ML12-035	7-Jun-12	-18.39	55.5	--	--	--
MLP02A	Jul-12	ML12_161	28-Jul-12	-24.77	77.0	--	--	--
MLP02A	Sep-12	--	--	--	--	--	--	--
MLP02A	Jun-13	ML13_009	12-Jun-13	--	--	--	--	--
MLP02A	Jun-14	ML14_018	7-Jun-14	--	--	--	--	--
MLP02B		<i>1</i>						
MLP02B	Jul-11	ML11_066	1-Jul-11	-15.69	23.6	--	--	--
MLP02B	Aug-11	ML11_003	24-Aug-11	-21.99	120.8	-8.1	-24.77	6.8
MLP02B	May-12	ML12-036	7-Jun-12	-20.53	30.8	--	--	--
MLP02B	Jul-12	ML12_162	28-Jul-12	-19.43	163.5	0.0	-25.36	8.7
MLP02B	Sep-12	ML12_237	9-Sep-12	-21.46	92.0	--	--	--
MLP02B	Jun-13	ML13_010	12-Jun-13	-20.10	--	--	--	--
MLP02B	Jun-14	ML14_019	7-Jun-14	--	--	--	--	--
MLP03A		<i>2</i>						
MLP03A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP03A	Aug-11	--	--	--	--	--	--	--
MLP03A	May-12	ML12-037	7-Jun-12	-16.84	6.5	--	--	--
MLP03A	Jul-12	--	--	--	--	--	--	--
MLP03A	Sep-12	--	--	--	--	--	--	--
MLP03A	Jun-13	ML13_011	12-Jun-13	--	--	--	--	--

MLP03A	Jun-14	ML14_020	7-Jun-14	--	--	--	--	--
MLP03B		<i>1</i>						
MLP03B	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP03B	Aug-11	ML11_004	24-Aug-11	-19.29	101.4	--	--	--
MLP03B	May-12	ML12-038	7-Jun-12	-21.32	229.6	--	--	--
MLP03B	Jul-12	ML12_163	28-Jul-12	-17.12	124.0	--	-25.27	--
MLP03B	Sep-12	ML12_236	9-Sep-12	-19.77	151.6	--	--	--
MLP03B	Jun-13	ML13_012	12-Jun-13	-19.33	--	--	--	--
MLP03B	Jun-14	ML14_021	7-Jun-14	--	--	--	--	--
MLP04A		<i>3</i>						
MLP04A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP04A	Aug-11	ML11_005	19-Aug-11	-2.17	153.6	--	--	--
MLP04A	May-12	ML12-042	7-Jun-12	14.89	951.4	--	--	--
MLP04A	Jul-12	ML12_157	27-Jul-12	8.31	827.0	--	-23.94	--
MLP04A	Sep-12	ML12_217	8-Sep-12	12.88	1078.0	--	--	--
MLP04A	Jun-13	ML13_046	17-Jun-13	15.62	--	--	--	--
MLP04A	Jun-14	ML14_013	7-Jun-14	--	--	--	--	--
MLP04A	Oct-14	ML14W_013	27-Oct-14	--	--	--	--	--
MLP04B		<i>2</i>						
MLP04B	Jul-11	ML11_067	1-Jul-11	4.25	110.5	--	--	--

MLP04B	Aug-11	ML11_006	19-Aug-11	9.69	243.7	-3.9	-25.88	13.8
MLP04B	May-12	ML12-041	7-Jun-12	7.25	708.6	--	--	--
MLP04B	Jul-12	ML12_158	27-Jul-12	9.90	501.5	--	-27.80	--
MLP04B	Sep-12	ML12_218	8-Sep-12	8.94	814.5	-6.8	-29.84	14.0
MLP04B	Jun-13	ML13_047	17-Jun-13	8.09	--	--	--	--
MLP04B	Jun-14	ML14_014	7-Jun-14	--	--	--	--	--
MLP04B	Oct-14	ML14W_014	26-Oct-14	--	--	--	--	--
MLP04C		<i>1</i>						
MLP04C	Jul-11	ML11_068	1-Jul-11	8.46	167.2	--	--	--
MLP04C	Aug-11	ML11_007	19-Aug-11	4.82	199.0	-6.8	-24.75	7.8
MLP04C	May-12	ML12-040	7-Jun-12	3.11	463.2	--	--	--
MLP04C	Jul-12	ML12_159	27-Jul-12	4.87	384.5	--	-32.95	--
MLP04C	Sep-12	ML12_219	8-Sep-12	6.21	588.3	--	--	--
MLP04C	Jun-13	ML13_048	17-Jun-13	5.08	--	--	--	--
MLP04C	Jun-14	ML14_015	7-Jun-14	--	--	--	--	--
MLP04C	Oct-14	ML14W_015	27-Oct-14	--	--	--	--	--
MLP05A		<i>3</i>						
MLP05A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP05A	Aug-11	ML11_008	19-Aug-11	6.97	931.8	0.0	-27.57	22.5
MLP05A	May-12	ML12-047	7-Jun-12	9.98	1322.8	--	--	--

MLP05A	Jul-12	ML12_132	25-Jul-12	8.62	943.3	--	--	--
MLP05A	Sep-12	ML12_249	12-Sep-12	--	1088.7	--	--	--
MLP05A	Jun-13	ML13_029	16-Jun-13	17.75	--	--	--	--
MLP05A	Jun-14	ML14_009	6-Jun-14	--	--	--	--	--
MLP05A	Oct-14	ML14W001	26-Oct-14	--	--	--	--	--
MLP05B		<i>2</i>						
MLP05B	Jul-11	ML11_069	1-Jul-11	2.19	371.9	--	--	--
MLP05B	Aug-11	ML11_009	19-Aug-11	6.86	493.4	-4.6	-42.40	11.1
MLP05B	May-12	ML12-046	7-Jun-12	7.38	1192.2	--	--	--
MLP05B	Jul-12	ML12_133	25-Jul-12	8.91	797.2	--	--	--
MLP05B	Sep-12	ML12_250	12-Sep-12	8.65	800.3	-7.3	-25.80	10.4
MLP05B	Jun-13	ML13_030	16-Jun-13	8.46	--	--	--	--
MLP05B	Jun-14	ML14_010	6-Jun-14	--	--	--	--	--
MLP05B	Oct-14	ML14W_002	26-Oct-14	--	--	--	--	--
MLP05C		<i>1</i>						
MLP05C	Jul-11	ML11_070	1-Jul-11	2.51	304.4	--	--	--
MLP05C	Aug-11	ML11_010	19-Aug-11	0.24	420.4	-5.9	-26.30	9.0
MLP05C	May-12	ML12-045	7-Jun-12	8.07	699.7	--	--	--
MLP05C	Jul-12	ML12_134	25-Jul-12	8.69	596.2	--	--	--
MLP05C	Sep-12	ML12_251	12-Sep-12	2.72	501.1	-10.5	-24.42	9.3

MLP05C	Jun-13	ML13_031	16-Jun-13	4.59	--	--	--	--
MLP05C	Jun-14	ML14_011	6-Jun-14	--	--	--	--	--
MLP05C	Oct-14	ML14W_003	26-Oct-14	--	--	--	--	--
MLP05D		<i>1</i>						
MLP05D	Jul-11	ML11_071	1-Jul-11	-7.96	141.9	--	--	--
MLP05D	Aug-11	ML11_011	19-Aug-11	1.51	274.5	-7.5	-26.03	8.4
MLP05D	May-12	ML12-044	7-Jun-12	-0.04	295.7	--	--	--
MLP05D	Jul-12	ML12_135	25-Jul-12	2.86	389.2	-8.3	-27.92	9.3
MLP05D	Sep-12	ML12_252	12-Sep-12	5.94	537.7	-8.0	-31.16	7.6
MLP05D	Jun-13	ML13_032	16-Jun-13	-2.95	--	--	--	--
MLP05D	Jun-14	ML14_012	6-Jun-14	--	--	--	--	--
MLP05D	Oct-14	ML14W_004	26-Oct-14	--	--	--	--	--
MLP06A		<i>2</i>						
MLP06A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP06A	Aug-11	ML11_012	21-Aug-11	-14.94	342.9	--	--	--
MLP06A	May-12	ML12-088	11-Jun-12	-16.35	606.5	--	--	--
MLP06A	Jul-12	ML12_154	27-Jul-12	-12.93	389.7	--	-27.44	--
MLP06A	Sep-12	ML12_189	7-Sep-12	-8.57	516.3	--	--	--
MLP06A	Jun-13	ML13_019	14-Jun-13	-13.34	--	--	--	--
MLP06A	Jun-14	ML14_029	12-Jun-14	--	--	--	--	--

MLP06A	Oct-14	ML14W_020	27-Oct-14	--	--	--	--	--
MLP06B		<i>1</i>						
MLP06B	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP06B	Aug-11	ML11_013	21-Aug-11	-14.24	402.3	0.6	-26.55	17.5
MLP06B	May-12	ML12-087	11-Jun-12	-5.53	508.2	--	--	--
MLP06B	Jul-12	ML12_155	27-Jul-12	-13.95	528.7	--	-28.00	--
MLP06B	Sep-12	ML12_190	7-Sep-12	-2.95	652.4	--	--	--
MLP06B	Jun-13	ML13_020	14-Jun-13	-12.23	--	--	--	--
MLP06B	Jun-14	ML14_030	12-Jun-14	--	--	--	--	--
MLP06B	Oct-14	ML14W_021	27-Oct-14	--	--	--	--	--
MLP07A		<i>2</i>						
MLP07A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP07A	Aug-11	ML11_014	21-Aug-11	--	--	--	--	--
MLP07A	May-12	ML12-090	11-Jun-12	too dilute	15.3	--	--	--
MLP07A	Jul-12	--	--	--	--	--	--	--
MLP07A	Sep-12	--	--	--	--	--	--	--
MLP07A	Jun-13	ML13_017	14-Jun-13	--	--	--	--	--
MLP07A	Jun-14	--	--	--	--	--	--	--
MLP07B		<i>1</i>						
MLP07B	Jul-11	--	1-Jul-11	--	--	--	--	--

MLP07B	Aug-11	ML11_015	21-Aug-11	-17.53	115.7	--	--	--
MLP07B	May-12	ML12-089	11-Jun-12	-17.97	121.3	--	--	--
MLP07B	Jul-12	--	--	--	--	--	--	--
MLP07B	Sep-12	ML12_191	7-Sep-12	-15.68	212.2	--	--	--
MLP07B	Jun-13	ML13_018	14-Jun-13	-16.06	--	--	--	--
MLP07B	Jun-14	--	--	--	--	--	--	--
MLP08A		2						
MLP08A	Jul-11	ML11_072	1-Jul-11	9.73	121.1	--	--	--
MLP08A	Aug-11	ML11_016	21-Aug-11	-0.07	180.2	-13.4	-62.86	6.4
MLP08A	May-12	ML12-092	11-Jun-12	3.22	482.0	--	--	--
MLP08A	Jul-12	ML12_151	27-Jul-12	5.00	272.8	0.1	-28.17	21.0
MLP08A	Sep-12	ML12_192	7-Sep-12	8.25	603.6	--	-28.31	--
MLP08A	Jun-13	ML13_015	14-Jun-13	6.95	--	--	--	--
MLP08A	Jun-14	ML14_001	5-Jun-14	--	--	--	--	--
MLP08B		1						
MLP08B	Jul-11	ML11_073	1-Jul-11	-4.62	61.9	--	--	--
MLP08B	Aug-11	ML11_017	21-Aug-11	-5.78	128.1	-1.7	-45.00	12.9
MLP08B	May-12	ML12-091	11-Jun-12	-5.97	282.5	--	--	--
MLP08B	Jul-12	ML12_153	27-Jul-12	-9.39	131.4	-1.0	-27.59	15.3
MLP08B	Sep-12	ML12_193	7-Sep-12	0.20	199.6	--	--	--

MLP08B	Jun-13	ML13_016	14-Jun-13	-18.35	--	--	--	--
MLP08B	Jun-14	ML14_002	5-Jun-14	--	--	--	--	--
MLP09A		2						
MLP09A	Jul-11	ML11_074	1-Jul-11	4.17	73.1	--	--	--
MLP09A	Aug-11	ML11_018	21-Aug-11	1.34	419.0	-3.7	-30.42	12.7
MLP09A	May-12	ML12-094	11-Jun-12	-0.77	250.1	--	--	--
MLP09A	Jul-12	ML12_149	27-Jul-12	-0.89	243.9	-1.1	-27.60	18.6
MLP09A	Sep-12	ML12_194	7-Sep-12	8.21	143.9	--	--	--
MLP09A	Jun-13	ML13_013	14-Jun-13	--	--	--	--	--
MLP09A	Jun-14	ML14_003	5-Jun-14	--	--	--	--	--
MLP09B		1						
MLP09B	Jul-11	ML11_075	1-Jul-11	-7.93	61.7	--	--	--
MLP09B	Aug-11	ML11_019	21-Aug-11	-4.81	127.8	-2.6	-24.36	10.1
MLP09B	May-12	ML12-093	11-Jun-12	-0.25	350.5	--	--	--
MLP09B	Jul-12	ML12_150	27-Jul-12	-0.24	139.3	--	-25.28	--
MLP09B	Sep-12	ML12_195	7-Sep-12	2.39	258.6	--	--	--
MLP09B	Jun-13	ML13_014	14-Jun-13	2.18	--	--	--	--
MLP09B	Jun-14	ML14-004	5-Jun-14	--	--	--	--	--
MLP10A		3						
MLP10A	Jul-11	--	1-Jul-11	--	--	--	--	--

MLP10A	Aug-11	ML11_020	21-Aug-11	3.51	520.2	-0.3	-25.64	20.9
MLP10A	May-12	ML12-059	9-Jun-12	8.28	818.0	--	--	--
MLP10A	Jul-12	ML12_141	27-Jul-12	7.84	1042.2	--	--	--
MLP10A	Sep-12	ML12_202	7-Sep-12	7.92	1361.5	--	--	--
MLP10A	Jun-13	ML13_051	17-Jun-13	14.25	--	--	--	--
MLP10A	Jun-14	ML14_056	14-Jun-14	--	--	--	--	--
MLP10A	Oct-14	ML14W_009	26-Oct-14	--	--	--	--	--
MLP10B		<i>2</i>						
MLP10B	Jul-11	ML11_076	1-Jul-11	11.03	228.7	--	--	--
MLP10B	Aug-11	ML11_021	21-Aug-11	5.56	221.2	-10.1	-41.26	7.0
MLP10B	May-12	ML12-058	9-Jun-12	5.66	546.5	--	--	--
MLP10B	Jul-12	ML12_142	27-Jul-12	4.57	266.1	-8.4	-36.48	8.2
MLP10B	Sep-12	ML12_201	7-Sep-12	4.86	601.3	--	-31.54	--
MLP10B	Jun-13	ML13_052	17-Jun-13	-1.30	--	--	--	--
MLP10B	Jun-14	ML14_057	14-Jun-14	--	--	--	--	--
MLP10B	Oct-14	ML14W_010	26-Oct-14	--	--	--	--	--
MLP10C		<i>1</i>						
MLP10C	Jul-11	ML11_077	1-Jul-11	-7.68	130.3	--	--	--
MLP10C	Aug-11	ML11_022	21-Aug-11	0.14	156.7	-4.2	-27.02	14.4
MLP10C	May-12	ML12-057	9-Jun-12	1.89	379.8	--	--	--

MLP10C	Jul-12	ML12_143	27-Jul-12	2.79	199.6	--	-29.18	--
MLP10C	Sep-12	ML12_200	7-Sep-12	4.25	593.9	--	--	--
MLP10C	Jun-13	ML13_053	17-Jun-13	-0.68	--	--	--	--
MLP10C	Jun-14	ML14_058	14-Jun-14	--	--	--	--	--
MLP10C	Oct-14	ML14W_011	26-Oct-14	--	--	--	--	--
MLP11A		3						
MLP11A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP11A	Aug-11	ML11_023	21-Aug-11	3.19	682.8	-0.3	-26.99	16.0
MLP11A	May-12	ML12-063	9-Jun-12	6.96	816.7	--	--	--
MLP11A	Jul-12	ML12_169	30-Jul-12	7.97	1241.1	-5.5	-24.18	16.1
MLP11A	Sep-12	ML12_206	8-Sep-12	8.65	1349.9	--	--	--
MLP11A	Jun-13	ML13_055	18-Jun-13	8.52	--	--	--	--
MLP11A	Jun-14	ML14_51	14-Jun-14	--	--	--	--	--
MLP11B		2						
MLP11B	Jul-11	ML11_078	1-Jul-11	0.88	285.5	--	--	--
MLP11B	Aug-11	ML11_024	21-Aug-11	8.10	348.7	-5.4	-26.02	9.4
MLP11B	May-12	ML12-062	9-Jun-12	7.33	878.8	--	--	--
MLP11B	Jul-12	ML12_170	30-Jul-12	5.46	311.9	-1.7	-27.44	17.2
MLP11B	Sep-12	ML12_207	8-Sep-12	7.50	749.1	-4.0	-27.15	9.6
MLP11B	Jun-13	ML13_056	18-Jun-13	6.79	--	--	--	--

MLP11B	Jun-14	ML14_052	14-Jun-14	--	--	--	--	--
MLP11C		<i>1</i>						
MLP11C	Jul-11	ML11_079	1-Jul-11	-2.51	122.9	--	--	--
MLP11C	Aug-11	ML11_025	21-Aug-11	4.37	293.6	-6.8	-25.55	7.6
MLP11C	May-12	ML12-061	9-Jun-12	2.47	283.6	--	--	--
MLP11C	Jul-12	ML12_171	30-Jul-12	6.05	365.5	--	-31.74	--
MLP11C	Sep-12	ML12_208	8-Sep-12	7.87	515.9	-6.3	-29.56	8.3
MLP11C	Jun-13	ML13_057	18-Jun-13	4.63	--	--	--	--
MLP11C	Jun-14	ML14_053	14-Jun-14	--	--	--	--	--
MLP12A		<i>2</i>						
MLP12A	Jul-11	ML11_080	1-Jul-11	-11.21	49.6	--	--	--
MLP12A	Aug-11	ML11_026	24-Aug-11	10.14	267.6	-2.6	-27.25	18.7
MLP12A	May-12	ML12-066	9-Jun-12	6.42	682.3	--	--	--
MLP12A	Jul-12	ML12_173	30-Jul-12	10.09	383.6	-4.5	-25.97	16.8
MLP12A	Sep-12	ML12_210	8-Sep-12	10.86	438.5	--	--	--
MLP12A	Jun-13	ML13_060	18-Jun-13	--	--	--	--	--
MLP12A	Jun-14	ML14_046	13-Jun-14	--	--	--	--	--
MLP12A	Oct-14	ML14W_016	27-Oct-14	--	--	--	--	--
MLP12B		<i>1</i>						
MLP12B	Jul-11	ML11_081	1-Jul-11	-7.18	299.0	--	--	--

MLP12B	Aug-11	ML11_027	24-Aug-11	-1.28	311.6	-4.6	-26.77	10.8
MLP12B	May-12	ML12-065	9-Jun-12	7.95	573.8	--	--	--
MLP12B	Jul-12	ML12_174	30-Jul-12	7.12	488.7	-7.3	-30.79	8.6
MLP12B	Sep-12	ML12_211	8-Sep-12	9.46	403.2	-7.3	-30.34	7.4
MLP12B	Jun-13	ML13_061	18-Jun-13	5.59	--	--	--	--
MLP12B	Jun-14	ML14_047	13-Jun-14	--	--	--	--	--
MLP12B	Oct-14	ML14W_017	27-Oct-14	--	--	--	--	--
MLP13A		<i>2</i>						
MLP13A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP13A	Aug-11	ML11_028	24-Aug-11	-25.44	174.1	--	--	--
MLP13A	May-12	ML12-069	9-Jun-12	-20.53	1014.9	--	--	--
MLP13A	Jul-12	ML12_176	30-Jul-12	-18.14	973.3	--	-25.54	--
MLP13A	Sep-12	ML12_213	8-Sep-12	-17.32	994.3	--	--	--
MLP13A	Jun-13	ML13_063	18-Jun-13	-13.90	--	--	--	--
MLP13A	Jun-14	ML14_043	13-Jun-14	--	--	--	--	--
MLP13A	Oct-14	ML14W_018	27-Oct-14	--	--	--	--	--
MLP13B		<i>1</i>						
MLP13B	Jul-11	ML11_082	1-Jul-11	-14.40	200.2	--	--	--
MLP13B	Aug-11	ML11_029	24-Aug-11	-13.87	351.9	3.6	-26.15	18.3
MLP13B	May-12	ML12-068	9-Jun-12	-16.88	863.5	--	--	--

MLP13B	Jul-12	ML12_177	30-Jul-12	-12.57	451.7	--	-25.48	--
MLP13B	Sep-12	ML12_214	8-Sep-12	-15.49	979.4	--	--	--
MLP13B	Jun-13	ML13_064	18-Jun-13	-15.96	--	--	--	--
MLP13B	Jun-14	ML14_044	13-Jun-14	--	--	--	--	--
MLP13B	Oct-14	ML14W_019	27-Oct-14	--	--	--	--	--
MLP14A		<i>2</i>						
MLP14A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP14A	Aug-11	--	--	--	--	--	--	--
MLP14A	May-12	--	--	--	--	--	--	--
MLP14A	Jul-12	--	--	--	--	--	--	--
MLP14A	Sep-12	ML12_215	8-Sep-12	-18.62	110.9	--	--	--
MLP14A	Jun-13	ML13_065	18-Jun-13	--	--	--	--	--
MLP14A	Jun-14	--	--	--	--	--	--	--
MLP14B		<i>1</i>						
MLP14B	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP14B	Aug-11	--	--	--	--	--	--	--
MLP14B	May-12	ML12-071	9-Jun-12	-15.22	52.6	--	--	--
MLP14B	Jul-12	ML12_178	30-Jul-12	-15.19	72.8	--	--	--
MLP14B	Sep-12	ML12_216	8-Sep-12	-14.92	123.1	--	--	--
MLP14B	Jun-13	ML13_066	18-Jun-13	-13.87	--	--	--	--

MLP14B	Jun-14	--	--	--	--	--	--	--
MLP15A		3						
MLP15A	Jul-11	ML11_083	1-Jul-11	8.29	691.0	--	--	--
MLP15A	Aug-11	ML11_030	19-Aug-11	3.86	1112.9	0.6	-58.09	15.0
MLP15A	May-12	ML12-085	11-Jun-12	14.26	1357.5	--	--	--
MLP15A	Jul-12	ML12_118	24-Jul-12	11.89	899.7	-4.0	-16.57	29.1
MLP15A	Sep-12	ML12_222	9-Sep-12	12.84	1325.2	--	--	--
MLP15A	Jun-13	ML13_001	10-Jun-13	19.04	--	--	--	--
MLP15A	Jun-14	ML14_026	7-Jun-14	--	--	--	--	--
MLP15B		2						
MLP15B	Jul-11	ML11_084	1-Jul-11	9.59	274.5	--	--	--
MLP15B	Aug-11	ML11_031	19-Aug-11	5.28	225.7	-3.8	-31.22	14.0
MLP15B	May-12	ML12-084	11-Jun-12	4.63	516.9	--	--	--
MLP15B	Jul-12	ML12_119	24-Jul-12	6.84	499.9	-3.6	-28.04	13.7
MLP15B	Sep-12	ML12_223	9-Sep-12	11.78	312.8	-4.3	-27.90	12.4
MLP15B	Jun-13	ML13_002	10-Jun-13	8.25	--	--	--	--
MLP15B	Jun-14	ML14_027	7-Jun-14	--	--	--	--	--
MLP15C		1						
MLP15C	Jul-11	ML11_085	1-Jul-11	-11.16	205.3	--	--	--
MLP15C	Aug-11	ML11_032	19-Aug-11	-2.52	299.3	-5.7	-26.83	7.3

MLP15C	May-12	ML12-083	11-Jun-12	0.46	616.3	--	--	--
MLP15C	Jul-12	ML12_120	24-Jul-12	2.81	477.3	-3.8	-27.93	9.6
MLP15C	Sep-12	ML12_224	9-Sep-12	4.77	590.8	--	--	--
MLP15C	Jun-13	ML13_003	10-Jun-13	2.39	--	--	--	--
MLP15C	Jun-14	ML14_028	7-Jun-14	--	--	--	--	--
MLP16A		3						
MLP16A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP16A	Aug-11	ML11_033	19-Aug-11	-3.86	504.8	-1.0	-27.46	11.2
MLP16A	May-12	ML12-082	11-Jun-12	5.84	594.5	--	--	--
MLP16A	Jul-12	ML12_122	25-Jul-12	8.70	1034.9	--	-26.11	--
MLP16A	Sep-12	ML12_225	9-Sep-12	10.49	1101.9	--	--	--
MLP16A	Jun-13	ML13_004	10-Jun-13	5.46	--	--	--	--
MLP16A	Jun-14	ML14_022	6-7--14	--	--	--	--	--
MLP16B		2						
MLP16B	Jul-11	ML11_086	1-Jul-11	4.68	100.7	--	--	--
MLP16B	Aug-11	ML11_034	19-Aug-11	0.65	149.3	-5.3	-35.65	8.0
MLP16B	May-12	ML12-081	11-Jun-12	3.22	459.7	--	--	--
MLP16B	Jul-12	ML12_123	25-Jul-12	1.66	344.0	-1.6	-28.17	13.2
MLP16B	Sep-12	ML12_226	9-Sep-12	8.21	678.8	-0.8	-27.49	12.7
MLP16B	Jun-13	ML13_005	10-Jun-13	3.22	--	--	--	--

MLP16B	Jun-14	ML14_023	7-Jun-14	--	--	--	--	--
MLP16C		<i>1</i>						
MLP16C	Jul-11	ML11_087	1-Jul-11	-10.11	331.1	--	--	--
MLP16C	Aug-11	ML11_035	19-Aug-11	-1.78	211.4	-4.6	-25.62	7.1
MLP16C	May-12	ML12-080	11-Jun-12	1.16	241.7	--	--	--
MLP16C	Jul-12	ML12_124	25-Jul-12	5.92	298.3	-4.1	-27.01	9.7
MLP16C	Sep-12	ML12_227	9-Sep-12	7.00	566.4	-3.0	-29.86	8.5
MLP16C	Jun-13	ML13_006	10-Jun-13	3.68	--	--	--	--
MLP16C	Jun-14	ML14_024	7-Jun-14	--	--	--	--	--
MLP17A		<i>3</i>						
MLP17A	Jul-11	ML11_088	1-Jul-11	8.92	150.2	--	--	--
MLP17A	Aug-11	ML11_036	19-Aug-11	6.67	226.8	-2.7	-26.93	14.7
MLP17A	May-12	ML12-073	10-Jun-12	4.43	553.5	--	--	--
MLP17A	Jul-12	ML12_125	25-Jul-12	4.84	318.1	0.4	-26.97	37.2
MLP17A	Sep-12	ML12_229	9-Sep-12	5.59	959.2	--	-26.74	--
MLP17A	Jun-13	ML13_039	16-Jun-13	2.96	--	--	--	--
MLP17A	Jun-14	ML14_035	12-Jun-14	--	--	--	--	--
MLP17A	Oct-14	ML14W_022	27-Oct-14	--	--	--	--	--
MLP17B		<i>2</i>						
MLP17B	Jul-11	ML11_089	1-Jul-11	1.47	124.8	--	--	--

MLP17B	Aug-11	ML11_037	19-Aug-11	0.57	194.1	-0.1	-27.62	10.9
MLP17B	May-12	ML12-072	10-Jun-12	0.93	90.2	--	--	--
MLP17B	Jul-12	ML12_126	25-Jul-12	4.64	242.1	0.5	-27.58	14.2
MLP17B	Sep-12	ML12_230	9-Sep-12	4.68	206.7	--	--	--
MLP17B	Jun-13	ML13_041	16-Jun-13	-0.67	--	--	--	--
MLP17B	Jun-14	ML14_036	--	--	--	--	--	--
MLP17B	Oct-14	ML14W_023	27-Oct-14	--	--	--	--	--
MLP17C		<i>1</i>						
MLP17C	Jul-11	ML11_090	1-Jul-11	-4.53	77.2	--	--	--
MLP17C	Aug-11	ML11_038	19-Aug-11	-5.58	170.8	-2.7	-24.87	11.7
MLP17C	May-12	ML12-070	10-Jun-12	1.79	257.6	--	--	--
MLP17C	Jul-12	ML12_127	25-Jul-12	1.16	220.1	--	-29.45	--
MLP17C	Sep-12	ML12_231	9-Sep-12	2.40	300.7	-6.5	-26.70	7.7
MLP17C	Jun-13	ML13_040	16-Jun-13	-0.53	--	--	--	--
MLP17C	Jun-14	ML14_037	7-Jun-14	--	--	--	--	--
MLP17C	Oct-14	ML14W_024	27-Oct-14	--	--	--	--	--
MLP18A		<i>3</i>						
MLP18A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP18A	Aug-11	ML11_039	19-Aug-11	-13.08	43.0	--	--	--
MLP18A	May-12	ML12-077	10-Jun-12	-6.45	335.7	--	--	--

MLP18A	Jul-12	ML12_115	24-Jul-12	2.03	310.4	--	--	--
MLP18A	Sep-12	--	--	--	--	--	--	--
MLP18A	Jun-13	ML13_034	16-Jun-13	-1.06	--	--	--	--
MLP18A	Jun-14	ML14_038	12-Jun-14	--	--	--	--	--
MLP18B		<i>2</i>						
MLP18B	Jul-11	ML11_091	1-Jul-11	2.33	141.8	--	--	--
MLP18B	Aug-11	ML11_040	19-Aug-11	6.94	293.6	--	-27.74	--
MLP18B	May-12	ML12-076	10-Jun-12	3.68	261.8	--	--	--
MLP18B	Jul-12	ML12_116_165	24-Jul-12	9.46	425.0	1.2	-27.41	18.7
MLP18B	Sep-12	ML12_241	10-Sep-12	16.46	430.9	--	--	--
MLP18B	Jun-13	ML13_035	16-Jun-13	41.43	--	--	--	--
MLP18B	Jun-14	ML14_039	12-Jun-14	--	--	--	--	--
MLP18C		<i>1</i>						
MLP18C	Jul-11	ML11_092	1-Jul-11	5.05	123.5	--	--	--
MLP18C	Aug-11	ML11_041	19-Aug-11	4.39	184.4	-6.7	-25.08	6.6
MLP18C	May-12	ML12-075	10-Jun-12	6.96	569.8	--	--	--
MLP18C	Jul-12	ML12_117_166	24-Jul-12	7.04	484.9	-5.2	-29.42	8.7
MLP18C	Sep-12	ML12_242	10-Sep-12	8.14	607.0	-6.7	-33.45	7.4
MLP18C	Jun-13	ML13_036	16-Jun-13	1.56	--	--	--	--
MLP18C	Jun-14	ML14_040	12-Jun-14	--	--	--	--	--

MLP19A		<i>2</i>						
MLP19A	Jul-11	ML11_093	1-Jul-11	10.86	182.6	--	--	--
MLP19A	Aug-11	ML11_042	21-Aug-11	7.31	232.4	-4.7	-33.07	11.0
MLP19A	May-12	ML12-051	9-Jun-12	7.85	869.6	--	--	--
MLP19A	Jul-12	ML12_138	26-Jul-12	4.04	459.8	-6.3	-29.09	8.7
MLP19A	Sep-12	ML12_233	9-Sep-12	10.55	252.0	-3.5	-27.58	14.4
MLP19A	Jun-13	ML13_027	15-Jun-13	7.34	--	--	--	--
MLP19A	Jun-14	ML14_005	5-Jun-14	--	--	--	--	--
MLP19A	Oct-14	ML14W_005	26-Oct-14	--	--	--	--	--
MLP19B		<i>1</i>						
MLP19B	Jul-11	ML11_094	1-Jul-11	-11.07	162.0	--	--	--
MLP19B	Aug-11	ML11_043	21-Aug-11	-1.84	276.4	-5.9	-26.17	10.8
MLP19B	May-12	ML12-049	7-Jun-12	2.11	513.5	--	--	--
MLP19B	Jul-12	ML12_139	26-Jul-12	2.17	365.5	-7.9	-29.59	8.2
MLP19B	Sep-12	ML12_234	9-Sep-12	3.78	427.6	--	--	--
MLP19B	Jun-13	ML13_028	15-Jun-13	3.06	--	--	--	--
MLP19B	Jun-14	ML14_006	5-Jun-14	--	--	--	--	--
MLP19B	Oct-14	ML14W_006	26-Oct-14	--	--	--	--	--
ML Highway 63 Weir								

ML Highway 63 Weir	Apr-12	ML12_028_019	13-Apr-12	--	--	--	-27.84	--
ML Highway 63 Weir	Apr-12	ML 12_020_021	15-Apr-12	--	--	--	-27.65	--
ML Highway 63 Weir	Aug-11	ML11_063	11-Aug-11	--	--	--	-28.00	--
ML Highway 63 Weir	May-12	ML12-078	10-Jun-12	-20.40	11.6	--	--	--
ML Highway 63 Weir	May-12	ML12-101	12-Jun-12	-22.21	26.6	--	--	--
ML Highway 63 Weir	May-12	ML12-030	4-Jun-12	too dilute	7.4	--	--	--
ML Highway 63 Weir	May-12	ML12-031	4-Jun-12	too dilute	9.0	--	--	--
ML Highway 63 Weir	Jul-12	ML12_136	25-Jul-12	-17.47	43.6	--	--	--
ML Highway 63 Weir	Jul-12	ML12_140	26-Jul-12	-15.86	40.7	--	--	--
ML Highway 63 Weir	Jul-12	ML12_185	4-Aug-12	--	39.4	--	--	--
ML Highway 63 Weir	Jul-12	--	--	--	--	--	--	--
ML Highway 63 Weir	Sep-12	ML12_188	1-Sep-12	-23.95	24.5	--	-28.18	--

ML Highway 63 Weir	Sep-12	ML12_247	10-Sep-12	--	41.1	--	-28.40	--
ML Highway 63 Weir	Jun-13	ML13_067	20-Jun-13	too low	--	--	--	--
ML Access Road Culvert								
ML Access Road Culvert	Aug-11	ML11_062	11-Aug-11	--	--	-1.6	-28.55	27.9
ML Access Road Culvert	Apr-12	ML12_026	13-Apr-12	--	--	--	--	--
ML Access Road Culvert	Apr-12	ML12_027	13-Apr-12	--	--	--	--	--
ML Access Road Culvert	May-12	ML12-100	11-Jun-12	-16.41	79.7	--	--	--
ML Access Road Culvert	May-12	ML12-104	12-Jun-12	-17.48	94.9	--	--	--
ML Access Road Culvert	Jul-12	ML12_112	18-Jul-12	-19.30	45.8	--	--	--
ML Access Road Culvert	Jul-12	ML12_183	4-Aug-12	-20.05	62.3	--	--	--
ML Access Road Culvert	Sep-12	ML12_240	10-Sep-12	-21.07	33.3	--	--	--
ML Access Road Culvert	Jun-13	ML13_024	14-Jun-13	too low	--	--	--	--

ML Access Road Culvert (E)								
ML Access Road Culvert (E)	Jul-12	ML12_179	30-Jul-12	--	37.9	--	--	--
ML Access Road Culvert (E)	Jul-12	ML12_184	4-Aug-12	-20.09	65.3	--	--	--
ML Access Road Culvert (E)	Sep-12	ML12_239	10-Sep-12	-22.31	30.3	--	-27.83	--
ML Rain Events								
ML Rain Events	18-Aug-11	ML11_064	18-Aug-11	--	--	-4.1	-24.80	8.3
ML Rain Events	12-Jun-12	ML12-102	12-Jun-12	-23.11	60.2	--	--	--
ML Rain Events	12-Jun-12	ML12-103	12-Jun-12	-23.22	56.1	--	--	--
ML Rain Events	25-Jul-12	ML12_130	25-Jul-12	-16.09	39.6	-1.4	-26.78	9.6
ML Rain Events	27-Jul-12	ML12_156	27-Jul-12	-21.34	47.6	--	--	--
ML Rain Events	29-Jul-12	ML12_167	29-Jul-12	--	--	--	--	--
ML Rain	25-Jul-12	ML12_129	25-Jul-12	-17.92	60.4	--	-27.28	--

Events									
ML Rain Events	4-Aug-12	ML12_182	4-Aug-12	--	41.2	--	--	--	--
ML Rain Events	7-Sep-12	ML12_204	7-Sep-12	--	9.0	-0.3	-27.95	8.9	
ML Bulk Rain									
ML Bulk Rain	(April to June 2012)	ML12-050	7-Jun-12	-20.86	11.3	--	--	--	
ML Bulk Rain	(May - 18 July 2012)	ML12_107	18-Jul-12	-19.09	43.9	-0.5	-27.39	9.6	
ML Bulk Rain	(17 July - 1 Sept 2012)	ML12_187	1-Sep-12	--	9.7	-1.8	-28.08	9.4	
ML Bulk Rain	2012	ML12_248	12-Sep-12	--	28.5	-1.8	-27.41	10.8	
ML Bulk Rain	summer2014	ML14_007	2-Jun-14	--	--	--	--	--	
ML Bulk Rain	jun-nov 2014	ML14W_007	26-Oct-14	--	--	--	--	--	
Snow Survey									
Snow Survey	MLA	ML12_012	13-Mar-12	--	--	--	-27.56	--	
Snow Survey	MLE	ML12_015	13-Mar-12	--	--	--	-28.30	--	
Snow Survey	MLO	ML12_004	13-Mar-12	--	--	--	-27.66	--	
Snow Survey	MLU	ML12_008	13-Mar-12	--	--	--	-24.00	--	
Snow Survey	MLP1	ML12_001	13-Mar-12	--	--	--	-26.32	--	
Snow Survey	MLP2	ML12_002	13-Mar-12	--	--	--	-26.14	--	

Snow Survey	MLP3	ML12_003	13-Mar-12	--	--	--	-27.01	--
Snow Survey	MLP4	ML12_005	13-Mar-12	--	--	--	-27.17	--
Snow Survey	MLP5	ML12_006	13-Mar-12	--	--	--	-27.15	--
Snow Survey	MLP6	ML12_009	13-Mar-12	--	--	--	-27.08	--
Snow Survey	MLP12	ML12_013	13-Mar-12	--	--	--	-26.35	--
Snow Survey	MLP13	ML12_011	13-Mar-12	--	--	-2.6	-26.26	13.2
Snow Survey	MLP14	ML12_010	13-Mar-12	--	--	--	-25.75	--
Snow Survey	MLP16	ML12_017	13-Mar-12	--	--	--	-26.95	--
Snow Survey	MLP17	ML12_018	13-Mar-12	--	--	--	-26.93	--
Snow Survey	MLP18	ML12_016	13-Mar-12	--	--	--	-28.07	--
Snow Survey	MLP19	ML12_007	13-Mar-12	--	--	--	-27.64	--
Snow Survey	ML SHED	ML12_014	13-Mar-12	--	--	--	-25.87	--
Snow Sampling		ML Bog	9-Feb-15	--	--	--	--	--
Snow Sampling		ML Fen	9-Feb-15	--	--	--	--	--
Snow Sampling		ML Upland	9-Feb-15	--	--	--	--	--
Snow Sampling		ML15S_001	24-Mar-15	--	--	--	--	--
Snow Sampling		ML15S_002	24-Mar-15	--	--	--	--	--
Snow Sampling		ML15S_003	24-Mar-15	--	--	--	--	--
Snow Sampling		ML15S_004	24-Mar-15	--	--	--	--	--

Snow Sampling	ML15S_005	24-Mar-15	--	--	--	--	--
Snow Sampling	ML15S_006	24-Mar-15	--	--	--	--	--
Snow Sampling	ML15S_007	24-Mar-15	--	--	--	--	--

Site ID	Site ID	Sample ID	sample date	Hach Colorimetry (Fieldwork)						
				H2S	NH4	Fe	PO4-3	NO3	NO2	SO4
			units				mg/L			
			precision	0.01	0.02 (5 H)	0.017	0.05	0.2	0.00100	0.5
			DL (QL)	0.02	0.02 (1 H)	0.03	0.05	0.2	0.005 (2 H)	4.9
	JPHA	<i>WT</i>								
JPHA	Jul-11	JPH11_077	1-Jul-11	--	--	--	--	--	--	--
JPHA	Aug-11	JPH11_034	17-Aug-11	--	0.06	0.03	0.01	0.0	--	0
JPHA	May-12	JPH12-023	25-May-12	0.02	0.10	2.06	0.00	0.3	0.00000	11
JPHA	Jul-12	JPH12_074	19-Jul-12	--	0.06	> 3.30	0.00	0.0	0.00000	0
JPHA	Sep-12	JPH12_157	5-Sep-12	0.00	0.02	0.27	0.08	0.0	0.00000	5
JPHA	Jun-13	JPH13_038	13-Jun-13	--	0.03	0.13	0	0.0	--	0
JPHA	Jun-14	JPH14-036	15-Jun-14	--	--	0.02	--	--	--	--
	JPHB	<i>WT</i>								
JPHB	Jul-11	JPH11_078	1-Jul-11	--	--	--	--	--	--	--
JPHB	Aug-11	JPH11_035	17-Aug-11	0.01	0.09	0.01	0.00	0.0	0.00000	0
JPHB	May-12	JPH12-026	25-May-12	--	--	--	--	--	--	--

JPHB	Jul-12	JPH12_079	19-Jul-12	--	0.00	0.02	0.07	0.0	0.00000	0
JPHB	Sep-12	JPH12_156	5-Sep-12	0.00	0.00	0.07	0.06	0.0	0.00000	4
JPHB	Jun-13	--	--	--	--	--	--	--	--	--
JPHB	Jun-14	JPH14_026	6/11/14	--	--	0.00	--	--	--	--
JPHC		<i>WT</i>								
JPHC	Jul-11	JPH11_079	1-Jul-11	--	--	--	--	--	--	--
JPHC	Aug-11	JPH11_036	17-Aug-11	0.01	0.29	0.13	0.18	3.5	0.00000	0
JPHC	May-12	JPH12-028	25-May-12	0.02	0.63	0.12	0.00	0.7	0.00000	12
JPHC	Jul-12	--	--	--	--	--	--	--	--	--
JPHC	Sep-12	JPH12_150	5-Sep-12	0.10	0.50	2.28	0.43	0.3	0.00000	--
JPHC	Jun-13	JPH13_030	13-Jun-13	--	0	2.64	0.44	0.0	--	0
JPHC	GONE!	--	--	--	--	--	--	--	--	--
JPHD		<i>WT</i>								
JPHD	Jul-11	JPH11_080	1-Jul-11	--	--	--	--	--	--	--
JPHD	Aug-11	JPH11_037	17-Aug-11	--	0.13	0.03	0.06	2.0	--	0
JPHD	May-12	JPH12-027	25-May-12	0.02	0.61	0.00	0.04	0.4	0.00000	15
JPHD	Jul-12	JPH12_084	19-Jul-12	--	0.02	0.06	0.03	0.0	0.00000	0
JPHD	Sep-12	JPH12_154	5-Sep-12	0.00	0.02	0.60	0.19	2.5	0.00000	0
JPHD	Jun-13	JPH13_034	13-Jun-13	0.03	0.07	0.72	0	0.0	--	0
JPHD	GONE!	--	--	--	--	--	--	--	--	--

JPHE		<i>WT</i>								
JPHE	Jul-11	JPH11_081	1-Jul-11	--	--	--	--	--	--	--
JPHE	Aug-11	JPH11_038	17-Aug-11	--	0.36	0.06	0.15	2.2	--	0
JPHE	May-12	JPH12-029	25-May-12	0.01	--	0.02	0.01	2.6	0.00000	15
JPHE	Jul-12	JPH12_085	19-Jul-12	--	0.02	0.00	0.07	0.0	0.00000	0
JPHE	Sep-12	JPH12_146	4-Sep-12	--	0.03	0.25	0.20	1.2	0.01600	8
JPHE	GONE!	--	--	--	--	--	--	--	--	--
JPHF		<i>WT</i>								
JPHF	Jul-11	JPH11_082	1-Jul-11	--	--	--	--	--	--	--
JPHF	Aug-11	JPH11_039	17-Aug-11	--	0.67	0.17	0.37	6.1	--	0
JPHF	May-12	JPH12-032	26-May-12	0.16	0.56	2.72	0.01	0.8	0.00000	12
JPHF	Jul-12	JPH12_090	19-Jul-12	--	0.73	> 3.30	0.09	0.0	0.00000	0
JPHF	Sep-12	JPH12_144	4-Sep-12	0.01	0.10	0.36	0.15	2.1	0.00400	7
JPHF	Jun-13	JPH13_026	11-Jun-13	0.02	0	3.48	0.06	0.0	--	0
JPHF	GONE!	--	--	--	--	--	--	--	--	--
JPHG		<i>WT</i>								
JPHG	Jul-11	JPH11_083	1-Jul-11	--	--	--	--	--	--	--
JPHG	Aug-11	JPH11_040	17-Aug-11	--	0.13	0.06	0.03	0.0	--	1
JPHG	May-12	JPH12-025	25-May-12	0.02	0.19	0.33	0.00	0.3	0.00000	0
JPHG	Jul-12	JPH12_080	19-Jul-12	--	0.00	0.04	0.09	0.0	0.00000	0

JPHG	Sep-12	JPH12_155	5-Sep-12	0.01	0.06	0.84	0.13	0.5	0.00000	7
JPHG	Jun-13	JPH13_039	13-Jun-13	--	0.02	0.18	0	0.0	--	0
JPHG	GONE!	--	--	--	--	--	--	--	--	--
JPHP01A		3								
JPHP01A	Jul-11	JPH11_044	1-Jul-11	--	--	--	--	--	--	--
JPHP01A	Aug-11	JPH11_001	14-Aug-11	0.01	0.14	1.70	1.26	21.7	0.00000	1
JPHP01A	May-12	JPH12-064	28-May-12	0.33	0.19	1.94	0.62	1.1	0.00000	0
JPHP01A	Jul-12	JPH12_107	22-Jul-12	--	0.17	> 3.30	0.80	1.0	0.00000	0
JPHP01A	Sep-12	JPH12_120	2-Sep-12	0.36	0.20	1.96	0.87	2.0	0.02000	2
JPHP01A	Jun-13	JPH13_013	7-Jun-13	--	0.1	7.88	0.73	1.2	--	0
JPHP01A	Jun-14	JPH14_020	10-Jun-14	--	--	1.38	--	--	--	--
JPHP01B		2								
JPHP01B	Jul-11	JPH11_045	1-Jul-11	--	--	--	--	--	--	--
JPHP01B	Aug-11	JPH11_002	14-Aug-11	0.00	--	0.07	0.09	2.7	1.00000	3
JPHP01B	May-12	JPH12-066	28-May-12	0.00	0.00	0.23	0.00	0.7	0.00000	3
JPHP01B	Jul-12	JPH12_108	22-Jul-12	--	0.04	0.38	0.21	0.6	0.04400	3
JPHP01B	Sep-12	JPH12_121	2-Sep-12	0.03	0.00	0.38	0.60	1.6	0.09000	2
JPHP01B	Jun-13	JPH13_014	7-Jun-13	--	0.05	0.62	0.15	0.7	--	4
JPHP01B	Jun-14	JPH14-021	11-Jun-14	--	--	0.14	--	--	--	--
JPHP01C		1								

JPHP01C	Jul-11	JPH11_046	1-Jul-11	--	--	--	--	--	--	--
JPHP01C	Aug-11	JPH11_003	14-Aug-11	--	0.00	0.02	0.01	2.5	--	4
JPHP01C	May-12	JPH12-067	28-May-12	0.00	0.00	0.00	0.04	0.6	0.00400	3
JPHP01C	Jul-12	JPH12_109	22-Jul-12	--	0.03	0.01	0.16	0.8	0.08400	4
JPHP01C	Sep-12	JPH12_122	2-Sep-12	--	0.02	0.00	0.08	0.7	0.00000	4
JPHP01C	Jun-13	JPH13_015	7-Jun-13	--	0.03	0.09	0.05	0.1	--	4
JPJP01C	Jun-14	JPH14_022	11-Jun-14	--	--	0.03	--	--	--	--
JPHP02A		3								
JPHP02A	Jul-11	JPH11_047	1-Jul-11	--	--	--	--	--	--	--
JPHP02A	Aug-11	JPH11_004	14-Aug-11	0.00	0.02	2.60	2.48	7.1	0.00000	0
JPHP02A	May-12	JPH12-061	28-May-12	0.30	0.17	2.83	0.47	0.3	0.00000	0
JPHP02A	Jul-12	JPH12_104	22-Jul-12	--	0.18	> 3.30	0.41	1.7	0.00000	0
JPHP02A	Sep-12	JPH12_123	2-Sep-12	0.29	0.19	1.79	0.48	0.9	0.00000	0
JPHP02A	Jun-13	JPH13_023	11-Jun-13	0.25	0.13	7.50	0.49	1.7	--	0
JPJP02A	Jun-14	JPH14_017	11-Jun-14	--	--	2.02	--	--	--	--
JPHP02B		2								
JPHP02B	Jul-11	JPH11_048	1-Jul-11	--	--	--	--	--	--	--
JPHP02B	Aug-11	JPH11_005	14-Aug-11	0.00	0.00	0.10	0.06	6.2	0.00000	3
JPHP02B	May-12	JPH12-063	28-May-12	0.00	0.00	0.23	0.04	2.0	0.00600	2
JPHP02B	Jul-12	JPH12_105	22-Jul-12	--	0.03	0.39	0.20	0.8	0.06300	3

JPHP02B	Sep-12	JPH12_124	2-Sep-12	0.02	0.02	0.17	0.10	1.4	0.01200	3
JPHP02B	Jun-13	JPH13_024	11-Jun-13	0.02	0	0.49	0.37	0.3	--	5
JPHP02B	Jun-14	JPH14_018	11-Jun-14	--	--	0.39	--	--	--	--
JPHP02C		<i>1</i>								
JPHP02C	Jul-11	JPH11_049	1-Jul-11	--	--	--	--	--	--	--
JPHP02C	Aug-11	JPH11_006	14-Aug-11	0.00	0.00	0.06	0.21	2.7	1.00000	4
JPHP02C	May-12	JPH12-065	28-May-12	--	0.00	--	0.01	0.0	0.00000	4
JPHP02C	Jul-12	JPH12_106	22-Jul-12	--	0.09	0.07	0.12	0.5	0.10200	4
JPHP02C	Sep-12	JPH12_125	2-Sep-12	0.00	0.02	0.03	0.11	1.7	0.00000	6
JPHP02C	Jun-13	JPH13_025	11-Jun-13	--	0	0.00	0.2	0.0	--	3
JPHP02C	Jun-14	JPH14_019	11-Jun-14	--	--	0.03	--	--	--	--
JPHP03A		<i>3</i>								
JPHP03A	Jul-11	JPH11_050	1-Jul-11	--	--	--	--	--	--	--
JPHP03A	Aug-11	JPH11_007	14-Aug-11	0.01	0.00	0.11	0.00	8.4	1.00000	4
JPHP03A	May-12	JPH12-059	28-May-12	0.04	0.00	0.33	0.11	1.2	0.00000	3
JPHP03A	Jul-12	JPH12_101	22-Jul-12	--	0.06	0.50	0.25	0.6	0.09800	3
JPHP03A	Sep-12	JPH12_136	4-Sep-12	0.02	0.01	0.34	0.08	1.5	0.04600	4
JPHP03A	Jun-13	JPH13_020	9-Jun-13	--	0	0.33	1.06	0.8	--	21
JPHP03A	Jun-14	JPH14_014	11-Jun-14	--	--	0.32	--	--	--	--
JPHP03B		<i>2</i>								

JPHP03B	Jul-11	JPH11_051	1-Jul-11	--	--	--	--	--	--	--
JPHP03B	Aug-11	JPH11_008	14-Aug-11	0.00	0.00	0.00	0.15	4.4	1.00000	4
JPHP03B	May-12	JPH12-060	28-May-12	0.00	0.00	0.31	0.01	0.3	0.00300	3
JPHP03B	Jul-12	JPH12_102	22-Jul-12	--	0.07	0.13	0.06	0.1	0.07200	3
JPHP03B	Sep-12	JPH12_137	4-Sep-12	0.00	0.00	0.00	0.07	1.6	0.03000	3
JPHP03B	Jun-13	JPH13_021	9-Jun-13	--	0	0.00	0.13	0.0	--	11
JPHP03B	Jun-14	JPH_015	11-Jun-14	--	--	0.00	--	--	--	--
JPHP03C		<i>1</i>								
JPHP03C	Jul-11	JPH11_052	1-Jul-11	--	--	--	--	--	--	--
JPHP03C	Aug-11	JPH11_009	14-Aug-11	0.00	0.00	0.00	0.09	2.7	0.00000	6
JPHP03C	May-12	JPH12-062	28-May-12	--	--	--	--	--	--	--
JPHP03C	Jul-12	JPH12_103	22-Jul-12	--	0.16	0.01	0.09	0.8	0.09300	3
JPHP03C	Sep-12	JPH12_139	4-Sep-12	0.01	0.00	0.00	0.11	1.7	0.01800	2
JPHP03C	Jun-13	JPH13_022	9-Jun-13	--	0	0.00	0.1	0.0	--	22
JPHP03C	Jun-14	JPH14_016	11-Jun-14	--	--	0.00	--	--	--	--
JPHP04A		<i>3</i>								
JPHP04A	Jul-11	JPH11_053	1-Jul-11	--	--	--	--	--	--	--
JPHP04A	Aug-11	JPH11_010	14-Aug-11	0.00	--	1.53	0.25	4.4	0.00000	0
JPHP04A	May-12	JPH12-056	28-May-12	0.04	0.22	2.41	0.37	0.8	0.00000	0
JPHP04A	Jul-12	JPH12_098	21-Jul-12	--	0.14	> 3.30	0.36	0.0	0.04200	0

JPHP04A	Sep-12	JPH12_138	4-Sep-12	0.05	0.25	2.91	0.51	1.2	0.01200	2
JPHP04A	Jun-13	JPH13_017	9-Jun-13	--	0.2	6.00	0.51	0.0	--	2
JPHP04A	Jun-14	JPH14_011	11-Jun-14	--	--	1.80	--	--	--	--
JPHP04B		2								
JPHP04B	Jul-11	JPH11_054	1-Jul-11	--	--	--	--	--	--	--
JPHP04B	Aug-11	JPH11_011	14-Aug-11	0.00	--	0.37	0.09	3.1	1.00000	4
JPHP04B	May-12	JPH12-057	28-May-12	0.00	0.00	0.42	0.05	0.3	0.00000	3
JPHP04B	Jul-12	JPH12_099	21-Jul-12	--	0.00	0.46	0.09	0.3	0.03800	3
JPHP04B	Sep-12	JPH12_141	4-Sep-12	0.02	0.00	0.25	0.11	1.8	0.04700	4
JPHP04B	Jun-13	JPH13_018	9-Jun-13	--	0	0.28	0.22	0.5	--	0
JPHP04B	Jun-14	JPH14_012	11-Jun-14	--	--	0.37	--	--	--	--
JPHP04C		1								
JPHP04C	Jul-11	JPH11_055	1-Jul-11	--	--	--	--	--	--	--
JPHP04C	Aug-11	JPH11_012	14-Aug-11	--	0.00	0.02	0.04	2.4	--	4
JPHP04C	May-12	JPH12-058	28-May-12	0.00	0.00	0.00	0.06	0.3	0.00000	4
JPHP04C	Jul-12	JPH12_100	21-Jul-12	--	0.00	0.18	0.07	0.6	0.02800	5
JPHP04C	Sep-12	JPH12_142	4-Sep-12	0.03	0.02	0.04	0.12	1.3	0.06500	5
JPHP04C	Jun-13	JPH13_019	9-Jun-13	--	0.1	0.01	0.36	0.5	--	9
JPHP04C	Jun-14	JPH14_013	11-Jun-14	--	--	0.32	--	--	--	--
JPHP05A		3								

JPHP05A	Jul-11	JPH11_056	1-Jul-11	--	--	--	--	--	--	--
JPHP05A	Aug-11	JPH11_013	15-Aug-11	0.00	0.04	1.41	0.09	7.5	0.00000	1
JPHP05A	May-12	JPH12-040	27-May-12	0.13	0.08	2.41	0.52	0.7	0.00000	0
JPHP05A	Jul-12	JPH12_095	21-Jul-12	--	0.00	2.78	0.36	1.4	0.06900	0
JPHP05A	Sep-12	JPH12_133	3-Sep-12	0.11	0.05	2.47	0.35	1.8	0.00000	0
JPHP05A	Jun-13	JPH13_007	6-Jun-13	--	0	2.35	0.42	1.4	--	1
JPHP05A	Jun-14	JPH14_007	11-Jun-14	--	--	2.09	--	--	--	--
JPHP05B		<i>2</i>								
JPHP05B	Jul-11	JPH11_057	1-Jul-11	--	--	--	--	--	--	--
JPHP05B	Aug-11	JPH11_014	15-Aug-11	0.00	--	0.18	0.21	5.3	0.00000	3
JPHP05B	May-12	JPH12-041	27-May-12	0.01	0.00	0.29	0.23	0.4	0.00300	2
JPHP05B	Jul-12	JPH12_096	21-Jul-12	--	0.00	0.37	0.19	0.2	0.06100	3
JPHP05B	Sep-12	JPH12_134	3-Sep-12	0.01	0.04	0.39	0.10	1.4	0.00000	2
JPHP05B	Jun-13	JPH13_008	6-Jun-13	--	0.01	0.01	0.19	0.1	--	4
JPHP05B	Jun-14	JPH14_008	11-Jun-14	--	--	0.00	--	--	--	--
JPHP05C		<i>1</i>								
JPHP05C	Jul-11	JPH11_058	1-Jul-11	--	--	--	--	--	--	--
JPHP05C	Aug-11	JPH11_015	15-Aug-11	0.00	--	0.03	0.12	3.5	1.00000	2
JPHP05C	May-12	JPH12-043	27-May-12	--	--	--	--	--	--	--
JPHP05C	Jul-12	JPH12_097	21-Jul-12	--	0.00	0.11	0.10	0.5	0.07000	3

JPHP05C	Sep-12	JPH12_135	3-Sep-12	--	0.00	0.00	0.05	1.2	--	4
JPHP05C	Jun-13	JPH13_009	6-Jun-13	--	0.05	0.00	0.16	0.0	--	5
JPHP05C	Jun-14	JPH14_009	11-Jun-14	--	--	0.01	--	--	--	--
JPHP06A		3								
JPHP06A	Jul-11	JPH11_059	1-Jul-11	--	--	--	--	--	--	--
JPHP06A	Aug-11	JPH11_016	15-Aug-11	0.00	--	3.04	0.12	2.2	1.00000	4
JPHP06A	May-12	JPH12-042	27-May-12	0.08	0.02	> 3.30	0.19	1.0	0.00000	1
JPHP06A	Jul-12	JPH12_092	21-Jul-12	--	0.01	> 3.30	--	0.0	0.00000	0
JPHP06A	Sep-12	JPH12_129	3-Sep-12	0.06	0.01	2.50	0.20	1.5	0.00000	2
JPHP06A	Jun-13	JPH13_004	6-Jun-13	--	0	3.19	0.35	0.3	--	2
JPHP06A	Jun-14	JPH14_004	11-Jun-14	--	--	2.14	--	--	--	--
JPHP06B		-								
JPHP06B	Jul-11	JPH11_060	1-Jul-11	--	--	--	--	--	--	--
JPHP06B	Aug-11	JPH11_017	15-Aug-11	0.00	--	0.07	0.12	0.4	0.00100	3
JPHP06B	May-12	JPH12-044	27-May-12	0.02	0.00	0.82	0.17	0.8	0.00000	5
JPHP06B	Jul-12	JPH12_093	21-Jul-12	--	0.00	0.87	0.94	1.2	0.04900	5
JPHP06B	Sep-12	JPH12_131	3-Sep-12	0.02	0.04	0.86	0.38	1.6	0.01100	4
JPHP06B	Jun-13	JPH13_005	6-Jun-13	--	0.02	0.59	0.3	0.2	--	5
JPHP06B	Jun-14	JPH14_005	11-Jun-14	--	--	0.31	--	--	--	--
JPHP06C		1								

JPHP06C	Jul-11	JPH11_061	1-Jul-11	--	--	--	--	--	--	--
JPHP06C	Aug-11	JPH11_018	15-Aug-11	0.00	0.00	0.18	0.09	4.9	1.00000	5
JPHP06C	May-12	JPH12-047	27-May-12	--	0.00	--	0.02	0.7	0.00500	5
JPHP06C	Jul-12	JPH12_094	21-Jul-12	--	0.00	0.02	0.45	0.2	0.03300	5
JPHP06C	Sep-12	JPH12_132	3-Sep-12	--	0.02	0.00	0.06	1.7	0.00700	5
JPHP06C	Jun-13	JPH13_006	6-Jun-13	--	0.07	0.06	0.11	0.0	--	9
JPHP06C	Jun-14	JPH14_006	11-Jun-14	--	--	--	--	--	--	--
JPHP07A		3								
JPHP07A	Jul-11	JPH11_062	1-Jul-11	--	--	--	--	--	--	--
JPHP07A	Aug-11	JPH11_019	15-Aug-11	0.01	0.00	1.27	1.38	14.2	0.00000	0
JPHP07A	May-12	JPH12-046	27-May-12	0.18	0.25	2.34	0.57	1.0	0.00000	0
JPHP07A	Jul-12	JPH12_110	22-Jul-12	--	0.16	> 3.30	0.81	1.2	0.02600	0
JPHP07A	Sep-12	JPH12_127	3-Sep-12	0.12	0.15	1.94	0.84	1.1	0.00000	0
JPHP07A	Jun-13	JPH13_001	6-Jun-13	--	0.08	3.30	0.65	0.5	--	0
JPHP07A	Jun-14	JPH14_001	11-Jun-14	--	--	3.15	--	--	--	--
JPHP07B		2								
JPHP07B	Jul-11	JPH11_063	1-Jul-11	--	--	--	--	--	--	--
JPHP07B	Aug-11	JPH11_020	15-Aug-11	0.00	--	0.08	0.18	2.7	0.00100	5
JPHP07B	May-12	JPH12-048	27-May-12	0.00	0.00	0.27	0.01	1.2	0.01200	5
JPHP07B	Jul-12	JPH12_111	22-Jul-12	--	0.00	0.40	0.17	0.9	0.03700	4

JPHP07B	Sep-12	JPH12_128	3-Sep-12	0.01	0.00	0.54	0.28	1.9	0.00800	4
JPHP07B	Jun-13	JPH13_002	6-Jun-13	--	0.12	0.27	0.36	0.8	--	8
JPHP07B	Jun-14	JPH14_002	11-Jun-14	--	--	0.00	--	--	--	--
JPHP07C		<i>1</i>								
JPHP07C	Jul-11	JPH11_064	1-Jul-11	--	--	--	--	--	--	--
JPHP07C	Aug-11	JPH11_021	15-Aug-11	0.00	0.00	0.09	0.09	1.3	0.00000	4
JPHP07C	May-12	JPH12-050	27-May-12	--	--	--	--	--	--	--
JPHP07C	Jul-12	JPH12_112	22-Jul-12	--	0.00	0.02	0.19	0.8	0.08000	4
JPHP07C	Sep-12	JPH12_130	3-Sep-12	--	--	--	--	--	--	--
JPHP07C	Jun-13	JPH13_003	6-Jun-13	--	0	0.05	0.15	0.0	--	3
JPHP07C	Jun-14	JPH14_003	11-Jun-14	--	--	0.01	--	--	--	--
JPHP08A		<i>3</i>								
JPHP08A	Jul-11	JPH11_065	1-Jul-11	--	--	--	--	--	--	--
JPHP08A	Aug-11	JPH11_022	17-Aug-11	0.00	0.05	0.02	0.15	0.2	0.00100	0
JPHP08A	May-12	JPH12-049	27-May-12	0.02	0.13	1.54	0.69	0.0	0.00000	0
JPHP08A	Jul-12	JPH12_075	19-Jul-12	0.01	0.10	1.28	0.68	0.3	0.00000	0
JPHP08A	Sep-12	JPH12_159	5-Sep-12	0.02	0.05	2.08	0.37	0.0	0.00000	0
JPHP08A	Jun-13	JPH13_035	13-Jun-13	0.05	0.17	6.10	0.67	0.0	--	0
JPHP08A	Jun-14	JPH14_033	15-Jun-14	--	--	0.72	--	--	--	--
JPHP08B		<i>2</i>								

JPHP08B	Jul-11	JPH11_066	1-Jul-11	--	--	--	--	--	--	--
JPHP08B	Aug-11	JPH11_023	17-Aug-11	0.00	0.04	0.59	0.09	7.5	0.00000	1
JPHP08B	May-12	JPH12-051	27-May-12	0.34	0.22	1.75	0.34	1.4	0.00000	0
JPHP08B	Jul-12	JPH12_076	19-Jul-12	0.23	0.21	2.81	0.47	0.5	0.00000	0
JPHP08B	Sep-12	JPH12_160	5-Sep-12	0.29	0.15	2.14	0.33	0.9	0.00000	0
JPHP08B	Jun-13	JPH13_036	13-Jun-13	0.36	0.23	2.98	0.39	0.0	--	0
JPHP08B	Jun-14	JPH14_034	15-Jun-14	--	--	0.94	--	--	--	--
JPHP08C		<i>1</i>								
JPHP08C	Jul-11	JPH11_067	1-Jul-11	--	--	--	--	--	--	--
JPHP08C	Aug-11	JPH11_024	17-Aug-11	0.01	0.15	0.35	0.98	7.5	0.00000	0
JPHP08C	May-12	JPH12-052	27-May-12	0.15	0.12	2.22	0.05	0.0	0.00000	3
JPHP08C	Jul-12	JPH12_077	19-Jul-12	0.17	0.14	> 3.30	0.17	0.0	0.00000	0
JPHP08C	Sep-12	JPH12_161	6-Sep-12	0.22	0.19	2.49	0.25	0.0	0.00000	0
JPHP08C	Jun-13	JPH13_037	13-Jun-13	0.51	0	6.36	0.05	0.2	--	0
JPHP08C	Jun-14	JPH14_035	15-Jun-14	--	--	0.76	--	--	--	--
JPHP09A		<i>3</i>								
JPHP09A	Jul-11	JPH11_068	1-Jul-11	--	--	--	--	--	--	--
JPHP09A	Aug-11	JPH11_025	17-Aug-11	--	0.10	0.02	0.26	4.6	--	0
JPHP09A	May-12	JPH12-037	26-May-12	0.05	0.16	2.00	0.69	0.9	0.00000	0
JPHP09A	Jul-12	JPH12_081	19-Jul-12	0.09	0.12	2.54	1.05	0.5	0.00000	0

JPHP09A	Sep-12	JPH12_151	5-Sep-12	0.08	0.13	2.42	0.85	1.4	0.01100	0
JPHP09A	Jun-13	JPH13_031	13-Jun-13	0.06	0.16	2.34	0.78	0.8	--	0
JPHP09A	Jun-14	JPH14_27	11-Jun-14	--	--	1.30	--	--	--	--
JPHP09B		2								
JPHP09B	Jul-11	JPH11_069	1-Jul-11	--	--	--	--	--	--	--
JPHP09B	Aug-11	JPH11_026	17-Aug-11	0.02	0.00	0.00	0.25	2.2	0.00000	0
JPHP09B	May-12	JPH12-038	26-May-12	0.27	0.19	> 3.30	0.50	0.4	0.00000	0
JPHP09B	Jul-12	JPH12_082	19-Jul-12	0.11	0.15	> 3.30	0.59	0.0	0.00000	0
JPHP09B	Sep-12	JPH12_152	5-Sep-12	0.23	0.16	2.23	0.74	1.4	0.00000	0
JPHP09B	Jun-13	JPH13_032	13-Jun-13	0.72	0.27	7.24	0.7	2.3	--	0
JPHP09B	Jun-14	JPH14_028	11-Jun-14	--	--	1.13	--	--	--	--
JPHP09C		1								
JPHP09C	Jul-11	JPH11_070	1-Jul-11	--	--	--	--	--	--	--
JPHP09C	Aug-11	JPH11_027	17-Aug-11	0.02	0.08	1.01	0.52	5.8	0.00000	0
JPHP09C	May-12	JPH12-039	26-May-12	0.27	0.11	2.67	0.15	0.7	0.00000	0
JPHP09C	Jul-12	JPH12_083	19-Jul-12	0.50	0.05	> 3.30	0.22	1.2	0.00000	0
JPHP09C	Sep-12	JPH12_153	5-Sep-12	0.80	0.13	3.00	0.23	3.6	0.00000	0
JPHP09C	Jun-13	JPH13_033	13-Jun-13	0.13	0.22	2.81	0.26	0.0	--	0
JPHP09C	Jun-14	JPH14_029	11-Jun-14	--	--	1.18	--	--	--	--
JPHP10A		3								

JPHP10A	Jul-11	JPH11_071	1-Jul-11	--	--	--	--	--	--	--
JPHP10A	Aug-11	JPH11_028	15-Aug-11	0.00	0.13	0.00	0.09	2.7	0.00000	0
JPHP10A	May-12	JPH12-034	26-May-12	0.08	0.26	2.81	0.45	0.3	0.00000	1
JPHP10A	Jul-12	JPH12_086	19-Jul-12	0.01	0.21	> 3.30	0.63	0.0	0.00000	0
JPHP10A	Sep-12	JPH12_147	4-Sep-12	0.08	0.26	3.15	0.54	0.7	0.00600	0
JPHP10A	Jun-13	JPH13_027	11-Jun-13	0.07	0.14	9.20	0.86	0.0	--	0
JPHP10A	Jun-14	JPH14_023	11-Jun-14	--	--	1.60	--	--	--	--
JPHP10B		<i>2</i>								
JPHP10B	Jul-11	JPH11_072	1-Jul-11	--	--	--	--	--	--	--
JPHP10B	Aug-11	JPH11_029	15-Aug-11	0.00	0.15	0.80	2.33	14.2	0.00000	1
JPHP10B	May-12	JPH12-035	26-May-12	0.13	0.28	3.24	0.73	0.0	0.00000	0
JPHP10B	Jul-12	JPH12_087	19-Jul-12	0.12	0.22	> 3.30	0.90	0.0	0.00000	0
JPHP10B	Sep-12	JPH12_148	5-Sep-12	0.12	0.27	2.89	0.90	1.0	0.00200	0
JPHP10B	Jun-13	JPH13_028	11-Jun-13	0.24	0.11	6.52	0.98	1.3	--	0
JPHP10B	Jun-14	JPH14_024	11-Jun-14	--	--	1.79	--	--	--	--
JPHP10C		<i>1</i>								
JPHP10C	Jul-11	JPH11_073	1-Jul-11	--	--	--	--	--	--	--
JPHP10C	Aug-11	JPH11_030	15-Aug-11	0.01	0.04	0.10	0.67	--	--	--
JPHP10C	May-12	JPH12-036	26-May-12	0.41	0.09	> 3.30	0.13	0.5	0.00000	0
JPHP10C	Jul-12	JPH12_088	19-Jul-12	0.71	0.02	> 3.30	0.34	0.1	0.00000	0

JPHP10C	Sep-12	JPH12_149	5-Sep-12	0.15	0.12	1.43	0.38	0.0	0.00000	0
JPHP10C	Jun-13	JPH13_029	11-Jun-13	0.34	0.01	4.65	0.31	1.3	--	0
JPHP10C	Jun-14	JPH14_025	11-Jun-14	--	--	1.57	--	--	--	--
JPHP11A		3								
JPHP11A	Jul-11	JPH11_074	1-Jul-11	--	--	--	--	--	--	--
JPHP11A	Aug-11	JPH11_031	14-Aug-11	0.01	0.39	0.07	1.20	10.6	0.00000	0
JPHP11A	May-12	JPH12-053	27-May-12	0.07	0.47	2.00	0.64	0.0	0.00000	0
JPHP11A	Jul-12	JPH12_070	17-Jul-12	--	0.41	> 3.30	0.68	0.0	--	0
JPHP11A	Sep-12	JPH12_162	6-Sep-12	0.05	0.42	1.21	0.81	0.0	0.00000	0
JPHP11A	Jun-13	JPH13_010	7-Jun-13	--	0.22	7.75	0.9	0.6	--	0
JPHP11A	Jun-14	JPH14_030	15-Jun-14	--	--	1.44	--	--	--	--
JPHP11B		2								
JPHP11B	Jul-11	JPH11_075	1-Jul-11	--	--	--	--	--	--	--
JPHP11B	Aug-11	JPH11_032	14-Aug-11	0.00	0.00	0.07	0.21	4.4	3.00000	4
JPHP11B	May-12	JPH12-054	27-May-12	0.01	0.00	0.67	0.05	1.0	0.00000	5
JPHP11B	Jul-12	JPH12_071	17-Jul-12	--	0.00	0.58	0.10	0.2	--	4
JPHP11B	Sep-12	JPH12_163	6-Sep-12	0.00	0.05	0.64	0.22	1.0	0.00000	3
JPHP11B	Jun-13	JPH13_011	7-Jun-13	--	0	0.34	0.17	0.0	--	4
JPHP11B	Jun-14	JPH14_031	15-Jun-14	--	--	0.19	--	--	--	--
JPHP11C		1								

JPHP11C	Jul-11	JPH11_076	1-Jul-11	--	--	--	--	--	--	--
JPHP11C	Aug-11	JPH11_033	14-Aug-11	0.00	--	0.00	0.18	4.0	2.00000	4
JPHP11C	May-12	JPH12-055	27-May-12	--	--	--	--	--	--	--
JPHP11C	Jul-12	JPH12_072	17-Jul-12	--	0.00	0.03	0.06	0.6	--	5
JPHP11C	Sep-12	JPH12_164	6-Sep-12	0.22	0.05	0.00	0.11	1.0	0.00000	4
JPHP11C	Jun-13	JPH13_012	7-Jun-13	--	0	0.02	0.17	0.5	--	5
JPHP11C	Jun-14	JPH14_033	15-Jun-14	--	--	0.13	--	--	--	--
JPHP12		<i>l</i>								
JPHP12	Jul-12	JPH12_113	22-Jul-12	--	--	--	--	--	--	--
JPHP12	Sep-12	JPH12_143	4-Sep-12	--	--	--	--	--	--	--
JPHP12	Jun-13	JPH13_016	7-Jun-13	--	--	--	--	--	--	--
JPHP12	Jun-14	JPH14_010	11-Jun-14	--	--	--	--	--	--	--
Surface Water at JPHA										
Surface Water at JPHA	Aug-11	JPH11_042	17-Aug-11	0.02	0.04	0.06	--	0.9	0.00000	--
Surface Water at JPHA	Apr-12	JPH12_022_014	14-Apr-12	--	--	--	--	--	--	--
Surface Water at JPHA	May-12	JPH12-024	25-May-12	--	0.02	0.11	--	0.6	0.00000	9
Surface Water at JPHA	Jul-12	JPH12_116	3-Aug-12	--	--	--	--	--	--	--

Surface Water at JPHA	Jul-12	JPH12_078	19-Jul-12	--	--	--	--	--	--	--
Surface Water at JPHA	Sep-12	JPH12_158	5-Sep-12	--	--	--	--	0.8	--	--
JPH Weir										
JPH Weir	Aug-11	JPH11_041	15-Aug-11	--	0.31	0.03	0.07	0.0	--	0
JPH Weir	Apr-12	JPH12_021_018	14-Apr-12	--	--	--	--	--	--	--
JPH Weir	Apr-12	JPH12_020_016	14-Apr-12	--	--	--	--	--	--	--
JPH Weir	May-12	JPH12-033	26-May-12	0.01	0.21	0.32	0.01	0.0	0.00000	0
JPH Weir	Jul-12	JPH12_089	19-Jul-12	--	--	--	--	--	--	--
JPH Weir	Jul-12	JPH12_117	3-Aug-12	--	--	--	--	--	--	--
JPH Weir	Sep-12	JPH12_145	4-Sep-12	--	0.20	2.50	0.11	0.7	0.00000	0
JPH Rain Events										
JPH Rain Events	15-Aug-11	JPH11_043	15-Aug-11	--	--	--	--	--	--	--
JPH Rain Events	5-Jun-12	JPH12-068	5-Jun-12	--	--	--	--	--	--	--
JPH Rain Events	17-Jul-12	JPH12_069	17-Jul-12	--	--	--	--	--	--	--
JPH Rain Events	13-Sep-12	JPH12_165	13-Sep-12	--	--	--	--	--	--	--
JPH Bulk Rain										

JPH Bulk Rain	(April - May 2012)	JPH12-030	25-May-12	--	0.00	0.03	--	0.4	0.00000	0
JPH Bulk Rain	(5 June - 17July 2012)	JPH12_073	17-Jul-12	--	--	--	--	--	--	--
JPH Bulk Rain	(5 June - 17July 2012)	JPH12_091	19-Jul-12	--	--	--	--	--	--	--
JPH Bulk Rain	(10days)	JPH12_114	31-Jul-12	--	--	--	--	--	--	--
JPH Bulk Rain	(17 July - 3 Aug)	JPH12_115	3-Aug-12	--	--	--	--	--	--	--
JPH Bulk Rain	(17 July - 2 Sep)	JPH12_126	2-Sep-12	--	0.01	--	--	0.1	--	0
RAIN	Jun-13	JPH13_040	13-Jun-13	--	--	--	--	--	--	--
Snow Survey										
Snow Survey	JPHA	JPH12_007	13-Mar-12	--	--	--	--	--	--	--
Snow Survey	JPHE	JPH12_008	13-Mar-12	--	--	--	--	--	--	--
Snow Survey	JPHG	JPH12_005	13-Mar-12	--	--	--	--	--	--	--
Snow Survey	JPHP1	JPH12_010	13-Mar-12	--	--	--	--	--	--	--
Snow Survey	JPHP2	JPH12_011	13-Mar-12	--	--	--	--	--	--	--
Snow Survey	JPHP3	JPH12_001	13-Mar-12	--	--	--	--	--	--	--
Snow Survey	JPHP4	JPH12_002	13-Mar-12	--	--	--	--	--	--	--
Snow Survey	JPHP5	JPH12_003	13-Mar-12	--	--	--	--	--	--	--
Snow Survey	JPHP6	JPH12_004	13-Mar-12	--	--	--	--	--	--	--
Snow Survey	JPHP7	JPH12_009	13-Mar-12	--	--	--	--	--	--	--
Snow Survey	JPHP8	JPH12_006	13-Mar-12	--	--	--	--	--	--	--

Snow Survey	JPHP11	JPH12_012	13-Mar-12	--	--	--	--	--	--	--
	Snow Sampling									
Snow Sampling		JPH	8-Feb-15	--	--	--	--	--	--	--
Snow Sampling		JPH15S_001	23-Mar-15	--	--	--	--	--	--	--
Snow Sampling		JPH15S_002	23-Mar-15	--	--	--	--	--	--	--
Snow Sampling		JPH15S_003	23-Mar-15	--	--	--	--	--	--	--
Snow Sampling		JPH15S_004	23-Mar-15	--	--	--	--	--	--	--
	MLA	<i>WT</i>								
MLA	Jul-11	ML11_095	1-Jul-11	--	--	--	--	--	--	--
MLA	Aug-11	ML11_044	24-Aug-11	0.00	0.41	0.92	0.00	0.0	--	--
MLA	May-12	ML12-067	9-Jun-12	0.01	0.31	2.72	0.05	0.2	0.00000	0
MLA	Jul-12	ML12_175	30-Jul-12	--	0.06	1.46	0.08	0.1	0.00000	0
MLA	Sep-12	ML12_212	8-Sep-12	--	0.10	0.79	0.08	1.6	0.00800	0
MLA	Jun-13	ML13_062	18-Jun-13	--	0.02	0.22	0.23	0.3	--	0
MLA	Jun-14	ML14_045	13-Jun-14	--	--	1.70	--	--	--	--
	MLB	<i>WT</i>								
MLB	Jul-11	ML11_096	1-Jul-11	--	--	--	--	--	--	--
MLB	Aug-11	ML11_045	21-Aug-11	0.02	0.09	0.64	0.00	--	--	--
MLB	May-12	ML12-064	9-Jun-12	0.00	0.01	1.97	0.12	0.2	0.00000	0
MLB	Jul-12	ML12_172	30-Jul-12	--	0.07	0.83	0.09	1.6	0.00600	0

MLB	Sep-12	ML12_209	8-Sep-12	0.01	--	1.47	0.13	0.5	0.00000	0
MLB	Jun-13	ML13_059	18-Jun-13	--	0.05	1.64	0.06	17.2	--	0
MLB	Jun-14	ML14_054	14-Jun-14	--	--	1.85	--	--	--	--
MLC		<i>WT</i>								
MLC	Jul-11	ML11_097	1-Jul-11	--	--	--	--	--	--	--
MLC	Aug-11	ML11_046	21-Aug-11	0.02	0.06	1.98	0.00	--	--	--
MLC	May-12	ML12-060	9-Jun-12	0.01	0.02	> 3.30	0.09	0.0	0.00000	0
MLC	Jul-12	ML12_168	30-Jul-12	--	0.10	2.24	0.04	0.0	0.00000	0
MLC	Sep-12	ML12_205	8-Sep-12	--	0.05	1.69	0.23	1.7	0.00000	0
MLC	Jun-13	ML13_058	18-Jun-13	--	0.03	5.35	0	9.8	--	0
MLC	Jun-14	ML14-055	14-Jun-14	--	--	2.20	--	--	--	--
MLD		<i>WT</i>								
MLD	Jul-11	ML11_098	1-Jul-11	--	--	--	--	--	--	--
MLD	Aug-11	ML11_047	19-Aug-11	--	0.02	0.13	0.10	0.1	--	0
MLD	May-12	ML12-039	7-Jun-12	0.02	0.02	0.44	0.09	0.2	0.00000	0
MLD	Jul-12	ML12_164	28-Jul-12	--	0.11	2.15	0.12	1.2	0.00000	0
MLD	Sep-12	ML12_220	8-Sep-12	--	0.01	0.67	0.16	0.6	0.00000	0
MLD	Jun-13	ML13_049	17-Jun-13	--	0	2.12	0.28	0.0	--	0
MLD	Jun-14	--	--	--	--	--	--	--	--	--
MLE		<i>WT</i>								

MLE	Jul-11	ML11_099	1-Jul-11	--	--	--	--	--	--	--
MLE	Aug-11	ML11_048	19-Aug-11	0.01	0.06	1.74	0.00	0.0	0.00000	0
MLE	May-12	ML12-098	11-Jun-12	--	--	--	--	--	--	--
MLE	Jul-12	ML12_114	24-Jul-12	--	0.00	> 3.30	0.05	0.0	0.00000	0
MLE	Sep-12	ML12_243	10-Sep-12	--	--	2.92	0.03	0.0	0.00000	0
MLE	Jun-13	ML13_037	16-Jun-13	--	0	2.09	0.11	0.0	--	0
MLE	Jun-14	ML14_041	12-Jun-14	--	--	1.75	--	--	--	--
MLF		<i>WT</i>								
MLF	Jul-11	ML11_100	1-Jul-11	--	--	--	--	--	--	--
MLF	Aug-11	ML11_049	21-Aug-11	0.04	0.07	> 3.30	0.00	0.0	--	0
MLF	May-12	ML12-055	9-Jun-12	0.01	0.02	3.20	0.24	0.2	0.00000	0
MLF	Jul-12	ML12_145	27-Jul-12	--	0.08	2.10	0.40	0.0	0.00000	0
MLF	Sep-12	ML12_197	7-Sep-12	0.03	0.10	1.52	0.59	0.3	0.00000	0
MLF	Jun-13	ML13_045	17-Jun-13	--	0.05	2.31	0.27	0.0	--	0
MLF	Jun-14	ML14_61	14-Jun-14	--	--	0.90	--	--	--	--
MLG		<i>WT</i>								
MLG	Jul-11	ML11_101	1-Jul-11	--	--	--	--	--	--	--
MLG	Aug-11	ML11_050	19-Aug-11	--	0.00	0.38	0.02	0.5	--	0
MLG	May-12	ML12-074	10-Jun-12	0.01	0.02	0.54	0.30	1.1	0.00000	0
MLG	Jul-12	ML12_128	25-Jul-12	--	0.03	2.27	0.23	0.4	0.00000	0

MLG	Sep-12	ML12_232	9-Sep-12	--	0.01	1.35	0.03	0.8	0.00000	--
MLG	Jun-13	ML13_038	16-Jun-13	--	0	3.18	0.09	0.0	--	0
MLG	Jun-14	ML14_034	12-Jun-14	--	--	0.34	--	--	--	--
MLG	Oct-14	ML14W_025	26-Oct-14	--	--	--	--	--	--	--
MLH		<i>WT</i>								
MLH	Jul-11	ML11_102	1-Jul-11	--	--	--	--	--	--	--
MLH	Aug-11	ML11_051	19-Aug-11	--	0.19	0.23	0.03	0.0	--	0
MLH	May-12	ML12-043	7-Jun-12	0.01	0.02	0.65	0.08	1.1	0.00000	0
MLH	Jul-12	ML12_131	25-Jul-12	--	0.02	0.30	0.10	0.8	0.00000	0
MLH	Sep-12	ML12_253	12-Sep-12	--	0.03	1.85	0.33	1.3	0.00000	0
MLH	Jun-13	ML13_033	16-Jun-13	--	0	2.05	0.01	0.0	--	0
MLH	Jun-14	ML14_048	13-Jun-14	--	--	1.37	--	--	--	--
MLM		<i>WT</i>								
MLM	Jul-11	ML11_103	1-Jul-11	--	--	--	--	--	--	--
MLM	Aug-11	ML11_052	19-Aug-11	0.02	0.06	0.03	0.08	0.0	0.00000	0
MLM	May-12	ML12-079	11-Jun-12	0.01	--	--	--	--	--	--
MLM	Jul-12	ML12_121	24-Jul-12	--	0.01	3.02	0.11	1.2	0.00000	0
MLM	Sep-12	ML12_228	9-Sep-12	--	0.04	1.35	0.02	0.8	0.00000	0
MLM	Jun-13	ML13_007	10-Jun-13	--	0.03	0.58	0.06	0.0	--	0
MLM	Jun-14	ML14_025	7-Jun-14	--	--	0.90	--	--	--	--

MLN		<i>WT</i>								
MLN	Jul-11	ML11_104	1-Jul-11	--	--	--	--	--	--	--
MLN	Aug-11	ML11_053	19-Aug-11	0.01	0.09	2.80	0.00	0.0	0.00000	0
MLN	May-12	ML12-096	11-Jun-12	--	--	--	--	--	--	--
MLN	Jul-12	ML12_110	18-Jul-12	--	0.04	2.95	0.00	0.0	0.00000	0
MLN	Sep-12	ML12_245	10-Sep-12	--	0.08	2.77	0.03	0.0	0.00000	0
MLN	Jun-13	ML13_022	14-Jun-13	--	0.1	0.29	0.14	0.8	--	1
MLN	Jun-14	ML14_032	12-Jun-14	--	--	1.83	--	--	--	--
MLO		<i>WT</i>								
MLO	Jul-11	ML11_105	1-Jul-11	--	--	--	--	--	--	--
MLO	Aug-11	ML11_054	21-Aug-11	0.03	0.09	1.30	0.0	0.0	--	0.0
MLO	May-12	ML12-056	9-Jun-12	0.01	0.26	> 3.30	1.90	0.0	0.00000	0
MLO	Jul-12	ML12_144	27-Jul-12	--	0.17	> 3.30	0.54	0.0	0.00000	0
MLO	Sep-12	ML12_199	7-Sep-12	0.03	0.06	0.75	0.11	2.2	0.00000	0
MLO	Jun-13	ML13_050	17-Jun-13	--	0.03	0.42	0.12	3.4	--	0
MLO	Jun-14	ML14_059	14-Jun-14	--	--	1.99	--	--	--	--
MLO	Oct-14	ML14W_012	26-Oct-14	--	--	--	--	--	--	--
MLP		<i>WT</i>								
MLP	Jul-11	ML11_106	1-Jul-11	--	--	--	--	--	--	--
MLP	Aug-11	ML11_055	21-Aug-11	0.03	0.07	0.78	0.07	0.0	--	--

MLP	May-12	ML12-054	9-Jun-12	0.02	0.05	1.85	0.61	0.0	0.00000	0
MLP	Jul-12	ML12_146	27-Jul-12	--	0.10	3.11	0.38	1.6	0.00000	0
MLP	Sep-12	ML12_196	7-Sep-12	0.04	0.09	1.56	0.84	0.8	0.00000	0
MLP	Jun-13	ML13_044	17-Jun-13	--	--	--	--	--	--	--
MLP	Jun-13	ML13_043	17-Jun-13	--	0.12	0.30	0.38	0.4	--	0
MLP	Jun-14	ML14_060	14-Jun-14	--	--	1.62	--	--	--	--
	MLQ	<i>WT</i>								
MLQ	Jul-11	ML11_107	1-Jul-11	--	--	--	--	--	--	--
MLQ	Aug-11	ML11_056	19-Aug-11	--	0.52	1.38	0.04	0.0	--	0
MLQ	May-12	ML12-097	11-Jun-12	--	--	--	--	--	--	--
MLQ	Jul-12	ML12_113	24-Jul-12	--	0.01	2.02	0.02	0.5	0.00000	0
MLQ	Jul-12	ML12_111	18-Jul-12	--	--	--	--	--	--	--
MLQ	Sep-12	ML12_244	10-Sep-12	--	0.08	1.34	0.10	0.0	0.00000	0
MLQ	Jun-13	ML13_023	14-Jun-13	--	0	0.95	0.07	0.2	--	0
MLQ	Jun-14	ML14_033	12-Jun-14	--	--	1.21	--	--	--	--
	MLR	<i>WT</i>								
MLR	Jul-11	ML11_108	1-Jul-11	--	--	--	--	--	--	--
MLR	Aug-11	ML11_057	19-Aug-11	--	0.50	1.35	0.19	0.0	--	0
MLR	May-12	ML12-095	11-Jun-12	--	--	--	--	--	--	--
MLR	Jul-12	ML12_109	18-Jul-12	--	0.06	3.80	0.00	0.0	0.00000	0

MLR	Sep-12	ML12_246	10-Sep-12	--	0.03	1.12	0.16	0.3	0.00000	0
MLR	Jun-13	ML13_021	14-Jun-13	--	0.2	1.96	0.02	0.0	--	0
MLR	Jun-14	ML14_031	12-Jun-14	--	--	2.16	--	--	--	--
MLS		<i>WT</i>								
MLS	Jul-11	ML11_109	1-Jul-11	--	--	--	--	--	--	--
MLS	Aug-11	ML11_058	21-Aug-11	0.02	0.03	2.35	0.00	--	--	--
MLS	May-12	ML12-048	7-Jun-12	0.02	0.03	2.58	0.00	0.0	0.00000	0
MLS	Jul-12	ML12_137	26-Jul-12	--	0.01	1.26	0.06	1.4	0.00000	0
MLS	Sep-12	ML12_235	9-Sep-12	--	0.01	1.52	0.09	0.6	0.00000	0
MLS	Jun-13	ML13_026	15-Jun-13	--	0	1.52	0.03	0.0	--	0
MLS	Jun-14	ML14_008	5-Jun-14	--	--	0.30	--	--	--	--
MLS	Oct-14	ML14W_008	26-Oct-14	--	--	--	--	--	--	--
MLT		<i>WT</i>								
MLT	Jul-11	ML11_110	1-Jul-11	--	--	--	--	--	--	--
MLT	Aug-11	ML11_059	24-Aug-11	0.01	0.06	1.71	0.02	1.0	--	--
MLT	May-12	ML12-053	9-Jun-12	0.02	0.05	1.63	0.15	1.2	0.00000	0
MLT	Jul-12	ML12_147	27-Jul-12	--	0.06	0.74	0.12	0.9	0.00000	0
MLT	Sep-12	ML12_203	8-Sep-12	--	0.08	1.16	0.27	0.6	0.00000	0
MLT	Jun-13	ML13_054	17-Jun-13	--	0.09	2.16	0.27	0.0	--	0
MLT	Jun-14	ML14_050	13-Jun-14	--	--	1.95	--	--	--	--

MLU		<i>WT</i>								
MLU	Jul-11	ML11_111	1-Jul-11	--	--	--	--	--	--	--
MLU	Aug-11	ML11_060	21-Aug-11	0.02	0.05	1.77	0.00	--	--	--
MLU	May-12	ML12-086	11-Jun-12	--	--	--	--	--	--	--
MLU	Jul-12	ML12_108	18-Jul-12	--	0.03	3.94	0.18	0.0	0.00000	0
MLU	Sep-12	ML12_186	1-Sep-12	0.02	0.00	2.02	0.39	0.0	0.00000	0
MLU	Jun-13	ML13_025	15-Jun-13	--	0	3.35	0	0.0	--	108
MLU	Jun-14	ML14_049	13-Jun-14	--	--	1.62	--	--	--	--
MLV		<i>WT</i>								
MLV	Jul-11	ML11_112	1-Jul-11	--	--	--	--	--	--	--
MLV	Aug-11	ML11_061	21-Aug-11	0.02	0.03	0.85	0.00	--	--	--
MLV	May-12	ML12-052	9-Jun-12	0.01	0.04	1.78	0.10	0.0	0.00000	0
MLV	Jul-12	ML12_148	27-Jul-12	--	0.05	1.82	0.10	1.3	0.00000	0
MLV	Sep-12	ML12_198	7-Sep-12	0.03	0.06	0.95	0.23	2.7	0.01800	0
MLV	Jun-13	ML13_042	17-Jun-13	--	0.03	0.00	0.14	0.3	--	0
MLV	Jun-14	--	--	--	--	--	--	--	--	--
MLP01A		2								
MLP01A	Jul-11	--	1-Jul-11	--	--	--	--	--	--	--
MLP01A	Aug-11	--	--	--	--	--	--	--	--	--
MLP01A	May-12	ML12-033	7-Jun-12	--	--	--	--	--	--	--

MLP01A	Jul-12	--	--	--	--	--	--	--	--	--
MLP01A	Sep-12	--	--	--	--	--	--	--	--	--
MLP01A	Jun-13	--	--	--	--	--	--	--	--	--
MLP01A	Jun-14	ML14_016	7-Jun-14	--	--	--	--	--	--	--
MLP01B		<i>1</i>								
MLP01B	Jul-11	ML11_065	1-Jul-11	--	--	--	--	--	--	--
MLP01B	Aug-11	ML11_001	24-Aug-11	--	--	--	--	--	--	--
MLP01B	May-12	ML12-034	7-Jun-12	--	0.00	--	0.34	1.8	0.00400	--
MLP01B	Jul-12	ML12_160	28-Jul-12	--	--	--	--	--	--	--
MLP01B	Sep-12	ML12_238	9-Sep-12	0.03	0.00	--	--	--	--	--
MLP01B	Jun-13	ML13_008	12-Jun-13	--	0.01	0.03	0.19	0.0	--	16
MLP01B	Jun-14	ML14_017	7-Jun-14	--	--	--	--	--	--	--
MLP02A		<i>2</i>								
MLP02A	Jul-11	--	1-Jul-11	--	--	--	--	--	--	--
MLP02A	Aug-11	ML11_002	24-Aug-11	--	--	--	--	--	--	--
MLP02A	May-12	ML12-035	7-Jun-12	--	0.64	--	0.10	0.3	--	--
MLP02A	Jul-12	ML12_161	28-Jul-12	--	--	--	--	--	--	--
MLP02A	Sep-12	--	--	--	--	--	--	--	--	--
MLP02A	Jun-13	ML13_009	12-Jun-13	--	0.19	--	--	3.1	--	368
MLP02A	Jun-14	ML14_018	7-Jun-14	--	--	--	--	--	--	--

MLP02B		<i>1</i>								
MLP02B	Jul-11	ML11_066	1-Jul-11	--	--	--	--	--	--	--
MLP02B	Aug-11	ML11_003	24-Aug-11	--	--	--	--	--	--	--
MLP02B	May-12	ML12-036	7-Jun-12	--	1.29	1.66	0.09	0.6	0.00400	--
MLP02B	Jul-12	ML12_162	28-Jul-12	--	--	--	--	--	--	--
MLP02B	Sep-12	ML12_237	9-Sep-12	0.00	0.00	--	--	--	--	--
MLP02B	Jun-13	ML13_010	12-Jun-13	--	0.02	0.04	0.13	0.0	--	2
MLP02B	Jun-14	ML14_019	7-Jun-14	--	--	--	--	--	--	--
MLP03A		<i>2</i>								
MLP03A	Jul-11	--	1-Jul-11	--	--	--	--	--	--	--
MLP03A	Aug-11	--	--	--	--	--	--	--	--	--
MLP03A	May-12	ML12-037	7-Jun-12	--	--	--	--	--	--	--
MLP03A	Jul-12	--	--	--	--	--	--	--	--	--
MLP03A	Sep-12	--	--	--	--	--	--	--	--	--
MLP03A	Jun-13	ML13_011	12-Jun-13	--	--	--	--	--	--	--
MLP03A	Jun-14	ML14_020	7-Jun-14	--	--	--	--	--	--	--
MLP03B		<i>1</i>								
MLP03B	Jul-11	--	1-Jul-11	--	--	--	--	--	--	--
MLP03B	Aug-11	ML11_004	24-Aug-11	--	--	--	--	--	--	--
MLP03B	May-12	ML12-038	7-Jun-12	--	0.01	0.03	0.20	1.7	0.00000	1

MLP03B	Jul-12	ML12_163	28-Jul-12	--	--	--	--	--	--	--
MLP03B	Sep-12	ML12_236	9-Sep-12	0.02	0.00	--	--	--	--	--
MLP03B	Jun-13	ML13_012	12-Jun-13	--	0.02	0.03	0.29	0.0	--	0
MLP03B	Jun-14	ML14_021	7-Jun-14	--	--	--	--	--	--	--
MLP04A		3								
MLP04A	Jul-11	--	1-Jul-11	--	--	--	--	--	--	--
MLP04A	Aug-11	ML11_005	19-Aug-11	--	--	--	--	--	--	--
MLP04A	May-12	ML12-042	7-Jun-12	--	6.44	--	0.00	0.0	--	10
MLP04A	Jul-12	ML12_157	27-Jul-12	--	--	--	--	--	--	--
MLP04A	Sep-12	ML12_217	8-Sep-12	--	--	--	--	--	--	--
MLP04A	Jun-13	ML13_046	17-Jun-13	--	--	--	--	--	--	--
MLP04A	Jun-14	ML14_013	7-Jun-14	--	--	--	--	--	--	--
MLP04A	Oct-14	ML14W_013	27-Oct-14	--	--	--	--	--	--	--
MLP04B		2								
MLP04B	Jul-11	ML11_067	1-Jul-11	--	--	--	--	--	--	--
MLP04B	Aug-11	ML11_006	19-Aug-11	0.01	2.72	2.13	1.28	0.0	--	0
MLP04B	May-12	ML12-041	7-Jun-12	0.03	10.30	2.57	1.67	0.0	0.00000	0
MLP04B	Jul-12	ML12_158	27-Jul-12	--	--	--	--	--	--	--
MLP04B	Sep-12	ML12_218	8-Sep-12	0.02	6.44	1.63	1.57	0.0	0.00000	0
MLP04B	Jun-13	ML13_047	17-Jun-13	--	0.77	2.66	1.48	0.0	--	0

MLP04B	Jun-14	ML14_014	7-Jun-14	--	--	2.05	--	--	--	--
MLP04B	Oct-14	ML14W_014	26-Oct-14	--	--	--	--	--	--	--
MLP04C		<i>1</i>								
MLP04C	Jul-11	ML11_068	1-Jul-11	--	--	--	--	--	--	--
MLP04C	Aug-11	ML11_007	19-Aug-11	0.03	2.00	0.68	0.94	0.0	--	0
MLP04C	May-12	ML12-040	7-Jun-12	0.04	6.44	0.76	1.15	0.0	0.00000	0
MLP04C	Jul-12	ML12_159	27-Jul-12	--	--	--	--	--	--	--
MLP04C	Sep-12	ML12_219	8-Sep-12	--	7.73	1.08	1.18	0.0	0.00000	0
MLP04C	Jun-13	ML13_048	17-Jun-13	--	limit	1.73	0.99	0.0	--	0
MLP04C	Jun-14	ML14_015	7-Jun-14	--	--	1.42	--	--	--	--
MLP04C	Oct-14	ML14W_015	27-Oct-14	--	--	--	--	--	--	--
MLP05A		<i>3</i>								
MLP05A	Jul-11	--	1-Jul-11	--	--	--	--	--	--	--
MLP05A	Aug-11	ML11_008	19-Aug-11	--	--	--	--	--	--	--
MLP05A	May-12	ML12-047	7-Jun-12	0.01	6.44	--	0.17	0.7	--	--
MLP05A	Jul-12	ML12_132	25-Jul-12	--	--	--	--	--	--	--
MLP05A	Sep-12	ML12_249	12-Sep-12	--	37.35	--	--	--	--	--
MLP05A	Jun-13	ML13_029	16-Jun-13	--	--	--	--	--	--	--
MLP05A	Jun-14	ML14_009	6-Jun-14	--	--	--	--	--	--	--
MLP05A	Oct-14	ML14W001	26-Oct-14	--	--	--	--	--	--	--

MLP05B		<i>2</i>								
MLP05B	Jul-11	ML11_069	1-Jul-11	--	--	--	--	--	--	--
MLP05B	Aug-11	ML11_009	19-Aug-11	0.02	5.44	0.04	1.53	0.0	--	0
MLP05B	May-12	ML12-046	7-Jun-12	0.03	24.47	0.50	2.41	0.0	0.00000	0
MLP05B	Jul-12	ML12_133	25-Jul-12	--	20.61	0.33	2.51	0.0	0.00000	0
MLP05B	Sep-12	ML12_250	12-Sep-12	--	19.32	0.31	2.33	0.5	0.00700	0
MLP05B	Jun-13	ML13_030	16-Jun-13	--	--	0.40	2.39	0.0	--	0
MLP05B	Jun-14	ML14_010	6-Jun-14	--	--	--	--	--	--	--
MLP05B	Oct-14	ML14W_002	26-Oct-14	--	--	--	--	--	--	--
MLP05C		<i>1</i>								
MLP05C	Jul-11	ML11_070	1-Jul-11	--	--	--	--	--	--	--
MLP05C	Aug-11	ML11_010	19-Aug-11	--	5.76	0.08	0.92	0.0	--	--
MLP05C	May-12	ML12-045	7-Jun-12	0.01	15.46	0.67	1.41	0.0	0.00000	0
MLP05C	Jul-12	ML12_134	25-Jul-12	--	14.17	0.73	1.58	0.0	0.00000	0
MLP05C	Sep-12	ML12_251	12-Sep-12	--	9.02	0.37	0.74	0.0	0.00000	0
MLP05C	Jun-13	ML13_031	16-Jun-13	--	--	0.92	1.57	0.0	--	0
MLP05C	Jun-14	ML14_011	6-Jun-14	--	--	--	--	--	--	--
MLP05C	Oct-14	ML14W_003	26-Oct-14	--	--	--	--	--	--	--
MLP05D		<i>1</i>								
MLP05D	Jul-11	ML11_071	1-Jul-11	--	--	--	--	--	--	--

MLP05D	Aug-11	ML11_011	19-Aug-11	0.02	1.60	0.26	0.77	0.0	--	0
MLP05D	May-12	ML12-044	7-Jun-12	0.02	2.58	0.23	0.22	0.3	0.00000	0
MLP05D	Jul-12	ML12_135	25-Jul-12	--	6.44	0.36	1.08	0.3	0.00000	0
MLP05D	Sep-12	ML12_252	12-Sep-12	--	5.15	0.40	0.89	1.3	0.00500	0
MLP05D	Jun-13	ML13_032	16-Jun-13	--	--	0.42	1.34	0.0	--	0
MLP05D	Jun-14	ML14_012	6-Jun-14	--	--	--	--	--	--	--
MLP05D	Oct-14	ML14W_004	26-Oct-14	--	--	--	--	--	--	--
MLP06A		2								
MLP06A	Jul-11	--	1-Jul-11	--	--	--	--	--	--	--
MLP06A	Aug-11	ML11_012	21-Aug-11	--	--	--	--	--	--	--
MLP06A	May-12	ML12-088	11-Jun-12	--	--	--	--	--	--	--
MLP06A	Jul-12	ML12_154	27-Jul-12	--	--	--	--	--	--	--
MLP06A	Sep-12	ML12_189	7-Sep-12	--	0.00	--	--	2.1	--	--
MLP06A	Jun-13	ML13_019	14-Jun-13	--	--	--	--	--	--	--
MLP06A	Jun-14	ML14_029	12-Jun-14	--	--	--	--	--	--	--
MLP06A	Oct-14	ML14W_020	27-Oct-14	--	--	--	--	--	--	--
MLP06B		1								
MLP06B	Jul-11	--	1-Jul-11	--	--	--	--	--	--	--
MLP06B	Aug-11	ML11_013	21-Aug-11	--	--	--	--	--	--	--
MLP06B	May-12	ML12-087	11-Jun-12	--	--	--	--	--	--	--

MLP06B	Jul-12	ML12_155	27-Jul-12	--	--	--	--	--	--	--
MLP06B	Sep-12	ML12_190	7-Sep-12	--	0.00	--	--	--	--	--
MLP06B	Jun-13	ML13_020	14-Jun-13	--	--	--	--	--	--	--
MLP06B	Jun-14	ML14_030	12-Jun-14	--	--	--	--	--	--	--
MLP06B	Oct-14	ML14W_021	27-Oct-14	--	--	--	--	--	--	--
MLP07A		<i>2</i>								
MLP07A	Jul-11	--	1-Jul-11	--	--	--	--	--	--	--
MLP07A	Aug-11	ML11_014	21-Aug-11	--	--	--	--	--	--	--
MLP07A	May-12	ML12-090	11-Jun-12	--	--	--	--	--	--	--
MLP07A	Jul-12	--	--	--	--	--	--	--	--	--
MLP07A	Sep-12	--	--	--	--	--	--	--	--	--
MLP07A	Jun-13	ML13_017	14-Jun-13	--	--	--	--	--	--	--
MLP07A	Jun-14	--	--	--	--	--	--	--	--	--
MLP07B		<i>1</i>								
MLP07B	Jul-11	--	1-Jul-11	--	--	--	--	--	--	--
MLP07B	Aug-11	ML11_015	21-Aug-11	--	--	--	--	--	--	--
MLP07B	May-12	ML12-089	11-Jun-12	--	--	--	--	--	--	--
MLP07B	Jul-12	--	--	--	--	--	--	--	--	--
MLP07B	Sep-12	ML12_191	7-Sep-12	--	--	--	--	--	--	--
MLP07B	Jun-13	ML13_018	14-Jun-13	--	--	--	--	--	--	--

MLP07B	Jun-14	--	--	--	--	--	--	--	--	--	
MLP08A		<i>2</i>									
MLP08A	Jul-11	ML11_072	1-Jul-11	--	--	--	--	--	--	--	
MLP08A	Aug-11	ML11_016	21-Aug-11	0.01	12.00	0.17	0.80	0.0	--	--	
MLP08A	May-12	ML12-092	11-Jun-12	--	--	--	--	--	--	--	
MLP08A	Jul-12	ML12_151	27-Jul-12	--	11.59	--	--	0.0	0.00000	0	
MLP08A	Sep-12	ML12_192	7-Sep-12	0.02	11.59	0.69	1.37	0.0	0.00000	0	
MLP08A	Jun-13	ML13_015	14-Jun-13	--	3.42	0.67	1.41	0.4	--	0	
MLP08A	Jun-14	ML14_001	5-Jun-14	--	--	0.10	--	--	--	--	
MLP08B		<i>1</i>									
MLP08B	Jul-11	ML11_073	1-Jul-11	--	--	--	--	--	--	--	
MLP08B	Aug-11	ML11_017	21-Aug-11	--	--	--	--	--	--	--	
MLP08B	May-12	ML12-091	11-Jun-12	--	--	--	--	--	--	--	
MLP08B	Jul-12	ML12_153	27-Jul-12	--	--	--	--	--	--	--	
MLP08B	Sep-12	ML12_193	7-Sep-12	--	1.29	--	--	1.3	--	--	
MLP08B	Jun-13	ML13_016	14-Jun-13	--	--	--	--	--	--	--	
MLP08B	Jun-14	ML14_002	5-Jun-14	--	--	--	--	--	--	--	
MLP09A		<i>2</i>									
MLP09A	Jul-11	ML11_074	1-Jul-11	--	--	--	--	--	--	--	
MLP09A	Aug-11	ML11_018	21-Aug-11	--	--	--	--	--	--	--	

MLP09A	May-12	ML12-094	11-Jun-12	--	--	--	--	--	--	--
MLP09A	Jul-12	ML12_149	27-Jul-12	--	--	--	--	--	--	--
MLP09A	Sep-12	ML12_194	7-Sep-12	--	3.86	1.08	0.30	0.0	0.00000	0
MLP09A	Jun-13	ML13_013	14-Jun-13	--	--	--	--	--	--	--
MLP09A	Jun-14	ML14_003	5-Jun-14	--	--	0.04	--	--	--	--
MLP09B		<i>1</i>								
MLP09B	Jul-11	ML11_075	1-Jul-11	--	--	--	--	--	--	--
MLP09B	Aug-11	ML11_019	21-Aug-11	0.02	2.08	0.31	0.18	0.0	--	--
MLP09B	May-12	ML12-093	11-Jun-12	--	--	--	--	--	--	--
MLP09B	Jul-12	ML12_150	27-Jul-12	--	--	--	--	--	--	--
MLP09B	Sep-12	ML12_195	7-Sep-12	0.01	0.00	0.47	0.52	1.6	0.00700	0
MLP09B	Jun-13	ML13_014	14-Jun-13	--	0.77	0.63	0.05	0.0	--	0
MLP09B	Jun-14	ML14-004	5-Jun-14	--	--	--	--	--	--	--
MLP10A		<i>3</i>								
MLP10A	Jul-11	--	1-Jul-11	--	--	--	--	--	--	--
MLP10A	Aug-11	ML11_020	21-Aug-11	--	--	--	--	--	--	--
MLP10A	May-12	ML12-059	9-Jun-12	0.00	--	--	--	--	--	--
MLP10A	Jul-12	ML12_141	27-Jul-12	--	--	--	--	--	--	--
MLP10A	Sep-12	ML12_202	7-Sep-12	--	28.34	--	--	0.0	--	--
MLP10A	Jun-13	ML13_051	17-Jun-13	--	--	--	0.71	0.0	--	0

MLP10A	Jun-14	ML14_056	14-Jun-14	--	--	2.70	--	--	--	--
MLP10A	Oct-14	ML14W_009	26-Oct-14	--	--	--	--	--	--	--
MLP10B		<i>2</i>								
MLP10B	Jul-11	ML11_076	1-Jul-11	--	--	--	--	--	--	--
MLP10B	Aug-11	ML11_021	21-Aug-11	--	10.72	0.14	1.10	--	--	--
MLP10B	May-12	ML12-058	9-Jun-12	0.00	15.46	0.12	1.78	0.0	0.00000	0
MLP10B	Jul-12	ML12_142	27-Jul-12	--	--	--	--	--	--	--
MLP10B	Sep-12	ML12_201	7-Sep-12	0.01	12.88	0.18	1.02	0.3	0.00000	0
MLP10B	Jun-13	ML13_052	17-Jun-13	--	--	--	--	--	--	--
MLP10B	Jun-14	ML14_057	14-Jun-14	--	--	0.51	--	--	--	--
MLP10B	Oct-14	ML14W_010	26-Oct-14	--	--	--	--	--	--	--
MLP10C		<i>1</i>								
MLP10C	Jul-11	ML11_077	1-Jul-11	--	--	--	--	--	--	--
MLP10C	Aug-11	ML11_022	21-Aug-11	--	4.16	0.15	0.50	--	--	--
MLP10C	May-12	ML12-057	9-Jun-12	0.00	2.58	0.28	0.31	0.9	0.00000	0
MLP10C	Jul-12	ML12_143	27-Jul-12	--	--	--	--	--	--	--
MLP10C	Sep-12	ML12_200	7-Sep-12	0.01	3.86	0.30	0.93	1.3	0.00000	0
MLP10C	Jun-13	ML13_053	17-Jun-13	--	limit	0.44	1.35	0.3	--	0
MLP10C	Jun-14	ML14_058	14-Jun-14	--	--	0.44	--	--	--	--
MLP10C	Oct-14	ML14W_011	26-Oct-14	--	--	--	--	--	--	--

MLP11A		3								
MLP11A	Jul-11	--	1-Jul-11	--	--	--	--	--	--	--
MLP11A	Aug-11	ML11_023	21-Aug-11	--	--	--	--	--	--	--
MLP11A	May-12	ML12-063	9-Jun-12	--	--	--	--	--	--	--
MLP11A	Jul-12	ML12_169	30-Jul-12	--	--	--	--	--	--	--
MLP11A	Sep-12	ML12_206	8-Sep-12	--	27.05		0.31	0.0	--	--
MLP11A	Jun-13	ML13_055	18-Jun-13	--	--	--	--	--	--	--
MLP11A	Jun-14	ML14_51	14-Jun-14	--	--	0.15	--	--	--	--
MLP11B		2								
MLP11B	Jul-11	ML11_078	1-Jul-11	--	--	--	--	--	--	--
MLP11B	Aug-11	ML11_024	21-Aug-11	--	1.60	0.33	1.17	--	--	0
MLP11B	May-12	ML12-062	9-Jun-12	0.00	14.17	0.74	1.77	0.0	0.00000	0
MLP11B	Jul-12	ML12_170	30-Jul-12	--	--	--	--	--	--	--
MLP11B	Sep-12	ML12_207	8-Sep-12	0.01	--	0.70	1.63	0.9	0.02800	0
MLP11B	Jun-13	ML13_056	18-Jun-13	--	limit	0.85	2.21	13.4	--	0
MLP11B	Jun-14	ML14_052	14-Jun-14	--	--	0.71	--	--	--	--
MLP11C		1								
MLP11C	Jul-11	ML11_079	1-Jul-11	--	--	--	--	--	--	--
MLP11C	Aug-11	ML11_025	21-Aug-11	--	7.36	0.23	0.44	--	--	0
MLP11C	May-12	ML12-061	9-Jun-12	0.02	5.15	0.41	0.18	0.0	0.00000	0

MLP11C	Jul-12	ML12_171	30-Jul-12	--	--	--	--	--	--	--
MLP11C	Sep-12	ML12_208	8-Sep-12	--	--	0.70	0.82	0.7	0.00000	0
MLP11C	Jun-13	ML13_057	18-Jun-13	--	limit	0.84	0.87	0.0	--	0
MLP11C	Jun-14	ML14_053	14-Jun-14	--	--	0.81	--	--	--	--
MLP12A		2								
MLP12A	Jul-11	ML11_080	1-Jul-11	--	--	--	--	--	--	--
MLP12A	Aug-11	ML11_026	24-Aug-11	--	--	--	--	--	--	--
MLP12A	May-12	ML12-066	9-Jun-12	--	--	--	--	--	--	--
MLP12A	Jul-12	ML12_173	30-Jul-12	--	--	--	--	--	--	--
MLP12A	Sep-12	ML12_210	8-Sep-12	--	6.44	--	--	0.7	--	--
MLP12A	Jun-13	ML13_060	18-Jun-13	--	--	--	6.76	2.5	--	--
MLP12A	Jun-14	ML14_046	13-Jun-14	--	--	1.70	--	--	--	--
MLP12A	Oct-14	ML14W_016	27-Oct-14	--	--	--	--	--	--	--
MLP12B		1								
MLP12B	Jul-11	ML11_081	1-Jul-11	--	--	--	--	--	--	--
MLP12B	Aug-11	ML11_027	24-Aug-11	0.00	9.12	2.21	1.00	0.0	--	--
MLP12B	May-12	ML12-065	9-Jun-12	0.02	6.44	2.39	0.73	0.4	0.00000	0
MLP12B	Jul-12	ML12_174	30-Jul-12	--	--	--	--	--	--	--
MLP12B	Sep-12	ML12_211	8-Sep-12	--	0.04	1.86	1.65	0.0	0.00000	0
MLP12B	Jun-13	ML13_061	18-Jun-13	--	limit	0.62	1.6	0.0	--	0

MLP12B	Jun-14	MI14_047	13-Jun-14	--	--	0.85	--	--	--	--
MLP12B	Oct-14	ML14W_017	27-Oct-14	--	--	--	--	--	--	--
MLP13A		<i>2</i>								
MLP13A	Jul-11	--	1-Jul-11	--	--	--	--	--	--	--
MLP13A	Aug-11	ML11_028	24-Aug-11	--	--	--	--	--	--	--
MLP13A	May-12	ML12-069	9-Jun-12	--	--	--	--	--	--	--
MLP13A	Jul-12	ML12_176	30-Jul-12	--	--	--	--	--	--	--
MLP13A	Sep-12	ML12_213	8-Sep-12	--	0.00	--	--	0.0	--	--
MLP13A	Jun-13	ML13_063	18-Jun-13	--	--	--	--	1.1	--	--
MLP13A	Jun-14	MI14_043	13-Jun-14	--	--	--	--	--	--	--
MLP13A	Oct-14	ML14W_018	27-Oct-14	--	--	--	--	--	--	--
MLP13B		<i>1</i>								
MLP13B	Jul-11	ML11_082	1-Jul-11	--	--	--	--	--	--	--
MLP13B	Aug-11	ML11_029	24-Aug-11	0.01	0.02	1.56	0.01	0.1	--	--
MLP13B	May-12	ML12-068	9-Jun-12	--	0.00	> 3.30	0.17	0.9	0.00000	0
MLP13B	Jul-12	ML12_177	30-Jul-12	--	--	--	--	--	--	--
MLP13B	Sep-12	ML12_214	8-Sep-12	0.12	0.00	> 3.30	1.12	2.7	0.00800	--
MLP13B	Jun-13	ML13_064	18-Jun-13	0.04	0	8.22	1.19	0.7	--	1
MLP13B	Jun-14	MI14_044	13-Jun-14	--	--	2.34	--	--	--	--
MLP13B	Oct-14	ML14W_019	27-Oct-14	--	--	--	--	--	--	--

	MLP14A	2								
MLP14A	Jul-11	--	1-Jul-11	--	--	--	--	--	--	--
MLP14A	Aug-11	--	--	--	--	--	--	--	--	--
MLP14A	May-12	--	--	--	--	--	--	--	--	--
MLP14A	Jul-12	--	--	--	--	--	--	--	--	--
MLP14A	Sep-12	ML12_215	8-Sep-12	--	--	--	--	--	--	--
MLP14A	Jun-13	ML13_065	18-Jun-13	--	--	--	--	--	--	--
MLP14A	Jun-14	--	--	--	--	--	--	--	--	--
	MLP14B	1								
MLP14B	Jul-11	--	1-Jul-11	--	--	--	--	--	--	--
MLP14B	Aug-11	--	--	--	--	--	--	--	--	--
MLP14B	May-12	ML12-071	9-Jun-12	--	--	--	--	--	--	--
MLP14B	Jul-12	ML12_178	30-Jul-12	--	--	--	--	--	--	--
MLP14B	Sep-12	ML12_216	8-Sep-12	--	--	--	--	--	--	--
MLP14B	Jun-13	ML13_066	18-Jun-13	--	--	--	--	0.0		--
MLP14B	Jun-14	--	--	--	--	--	--	--	--	--
	MLP15A	3								
MLP15A	Jul-11	ML11_083	1-Jul-11	--	--	--	--	--	--	--
MLP15A	Aug-11	ML11_030	19-Aug-11	--	--	--	--	--	--	--
MLP15A	May-12	ML12-085	11-Jun-12	--	--	--	--	--	--	--

MLP15A	Jul-12	ML12_118	24-Jul-12	--	27.05	> 3.30	0.00	0.0	0.00000	0
MLP15A	Sep-12	ML12_222	9-Sep-12	0.01	24.47	--	--	--	--	--
MLP15A	Jun-13	ML13_001	10-Jun-13	--	--	0.16	0.12	0.0	--	0
MLP15A	Jun-14	ML14_026	7-Jun-14	--	--	0.00	--	--	--	--
MLP15B		<i>2</i>								
MLP15B	Jul-11	ML11_084	1-Jul-11	--	--	--	--	--	--	--
MLP15B	Aug-11	ML11_031	19-Aug-11	0.02	1.60	0.14	0.81	0.5	--	0
MLP15B	May-12	ML12-084	11-Jun-12	--	--	--	--	--	--	--
MLP15B	Jul-12	ML12_119	24-Jul-12	--	14.17	0.41	1.32	0.0	0.00000	0
MLP15B	Sep-12	ML12_223	9-Sep-12	0.03	14.17	0.42	0.82	0.0	0.00000	0
MLP15B	Jun-13	ML13_002	10-Jun-13	--	--	0.37	1.23	0.0	--	0
MLP15B	Jun-14	ML14_027	7-Jun-14	--	--	0.79	--	--	--	--
MLP15C		<i>1</i>								
MLP15C	Jul-11	ML11_085	1-Jul-11	--	--	--	--	--	--	--
MLP15C	Aug-11	ML11_032	19-Aug-11	0.04	2.76	1.26	0.43	0.0	--	0
MLP15C	May-12	ML12-083	11-Jun-12	--	--	--	--	--	--	--
MLP15C	Jul-12	ML12_120	24-Jul-12	--	--	--	--	--	--	--
MLP15C	Sep-12	ML12_224	9-Sep-12	0.03	5.15	1.28	0.43	0.0	0.00000	0
MLP15C	Jun-13	ML13_003	10-Jun-13	--	0.77	0.91	0.21	0.0	--	0
MLP15C	Jun-14	ML14_028	7-Jun-14	--	--	0.92	--	--	--	--

MLP16A		3								
MLP16A	Jul-11	--	1-Jul-11	--	--	--	--	--	--	--
MLP16A	Aug-11	ML11_033	19-Aug-11	--	--	--	--	--	--	--
MLP16A	May-12	ML12-082	11-Jun-12	--	--	--	--	--	--	--
MLP16A	Jul-12	ML12_122	25-Jul-12	--	--	--	--	--	--	--
MLP16A	Sep-12	ML12_225	9-Sep-12	--	18.03	--	--	0.4	--	--
MLP16A	Jun-13	ML13_004	10-Jun-13	--	--	0.03	0	0.0	--	8
MLP16A	Jun-14	ML14_022	6-7--14	--	--	0.24	--	--	--	--
MLP16B		2								
MLP16B	Jul-11	ML11_086	1-Jul-11	--	--	--	--	--	--	--
MLP16B	Aug-11	ML11_034	19-Aug-11	0.01	4.64	0.18	0.84	0.0	--	0
MLP16B	May-12	ML12-081	11-Jun-12	--	--	--	--	--	--	--
MLP16B	Jul-12	ML12_123	25-Jul-12	--	10.30	0.92	1.48	0.0	0.00000	0
MLP16B	Sep-12	ML12_226	9-Sep-12	0.01	7.73	2.16	0.99	0.0	0.00000	0
MLP16B	Jun-13	ML13_005	10-Jun-13	--	--	1.41	1.27	0.0	--	0
MLP16B	Jun-14	ML14_023	7-Jun-14	--	--	1.03	--	--	--	--
MLP16C		1								
MLP16C	Jul-11	ML11_087	1-Jul-11	--	--	--	--	--	--	--
MLP16C	Aug-11	ML11_035	19-Aug-11	--	0.77	0.37	0.60	0.4	--	0
MLP16C	May-12	ML12-080	11-Jun-12	0.00	--	--	--	--	--	--

MLP16C	Jul-12	ML12_124	25-Jul-12	--	--	--	--	--	--	--
MLP16C	Sep-12	ML12_227	9-Sep-12	--	2.58	0.54	0.26	0.8	0.00000	0
MLP16C	Jun-13	ML13_006	10-Jun-13	--	0.77	0.48	0.07	0.0	--	0
MLP16C	Jun-14	ML14_024	7-Jun-14	--	--	0.56	--	--	--	--
MLP17A		3								
MLP17A	Jul-11	ML11_088	1-Jul-11	--	--	--	--	--	--	--
MLP17A	Aug-11	ML11_036	19-Aug-11	0.03	2.80	> 3.30	0.00	0 (0)	--	0
MLP17A	May-12	ML12-073	10-Jun-12	0.01	1.29	2.59	0.48	0.0	0.00000	0
MLP17A	Jul-12	ML12_125	25-Jul-12	--	0.00	> 3.30	--	--	--	0
MLP17A	Sep-12	ML12_229	9-Sep-12	--	2.58	--	--	0.0	--	--
MLP17A	Jun-13	ML13_039	16-Jun-13	--	--	7.65	2.86	0.0	--	0
MLP17A	Jun-14	ML14_035	12-Jun-14	--	--	7.20	--	--	--	--
MLP17A	Oct-14	ML14W_022	27-Oct-14	--	--	--	--	--	--	--
MLP17B		2								
MLP17B	Jul-11	ML11_089	1-Jul-11	--	--	--	--	--	--	--
MLP17B	Aug-11	ML11_037	19-Aug-11	--	--	--	--	--	--	--
MLP17B	May-12	ML12-072	10-Jun-12	--	--	--	--	--	--	--
MLP17B	Jul-12	ML12_126	25-Jul-12	--	--	--	--	--	--	--
MLP17B	Sep-12	ML12_230	9-Sep-12	--	2.58	--	--	0.0	--	--
MLP17B	Jun-13	ML13_041	16-Jun-13	--	--	--	--	--	--	--

MLP17B	Jun-14	ML14_036	--	--	--	--	--	--	--	--
MLP17B	Oct-14	ML14W_023	27-Oct-14	--	--	--	--	--	--	--
MLP17C		<i>1</i>								
MLP17C	Jul-11	ML11_090	1-Jul-11	--	--	--	--	--	--	--
MLP17C	Aug-11	ML11_038	19-Aug-11	0.00	0.21	0.27	0.03	0.3	0.00000	0
MLP17C	May-12	ML12-070	10-Jun-12	0.01	0.23	0.21	0.09	0.6	0.00000	0
MLP17C	Jul-12	ML12_127	25-Jul-12	--	0.21	0.39	0.13	0.0	0.00000	0
MLP17C	Sep-12	ML12_231	9-Sep-12	--	0.16	0.49	0.15	1.1	0.00900	0
MLP17C	Jun-13	ML13_040	16-Jun-13	--	0.1	0.44	0.08	0.2	--	0
MLP17C	Jun-14	ML14_037	7-Jun-14	--	--	0.60	--	--	--	--
MLP17C	Oct-14	ML14W_024	27-Oct-14	--	--	--	--	--	--	--
MLP18A		<i>3</i>								
MLP18A	Jul-11	--	1-Jul-11	--	--	--	--	--	--	--
MLP18A	Aug-11	ML11_039	19-Aug-11	--	--	--	--	--	--	--
MLP18A	May-12	ML12-077	10-Jun-12	--	--	--	--	--	--	--
MLP18A	Jul-12	ML12_115	24-Jul-12	--	--	--	--	--	--	--
MLP18A	Sep-12	--	--	--	--	--	--	--	--	--
MLP18A	Jun-13	ML13_034	16-Jun-13	--	--	--	--	--	--	--
MLP18A	Jun-14	ML14_038	12-Jun-14	--	--	--	--	--	--	--
MLP18B		<i>2</i>								

MLP18B	Jul-11	ML11_091	1-Jul-11	--	--	--	--	--	--	--
MLP18B	Aug-11	ML11_040	19-Aug-11	--	--	--	--	--	--	--
MLP18B	May-12	ML12-076	10-Jun-12	--	3.86	> 3.30	--	--	--	--
MLP18B	Jul-12	ML12_116_165	24-Jul-12	--	--	--	--	--	--	--
MLP18B	Sep-12	ML12_241	10-Sep-12	--	7.73	--	0.28	0.0	--	--
MLP18B	Jun-13	ML13_035	16-Jun-13	--	--	2.59	--	7.4	--	--
MLP18B	Jun-14	ML14_039	12-Jun-14	--	--	--	--	--	--	--
MLP18C		<i>1</i>								
MLP18C	Jul-11	ML11_092	1-Jul-11	--	--	--	--	--	--	--
MLP18C	Aug-11	ML11_041	19-Aug-11	0.00	3.04	0.84	0.47	0.0	--	0
MLP18C	May-12	ML12-075	10-Jun-12	0.01	5.15	1.85	0.48	0.0	0.00000	0
MLP18C	Jul-12	ML12_117_166	24-Jul-12	--	5.15	1.57	0.66	0.0	0.00000	0
MLP18C	Sep-12	ML12_242	10-Sep-12	--	3.86	0.97	0.62	1.1	0.00000	0
MLP18C	Jun-13	ML13_036	16-Jun-13	--	2.84	1.65	0.43	0.0	--	0
MLP18C	Jun-14	ML14_040	12-Jun-14	--	--	1.28	--	--	--	--
MLP19A		<i>2</i>								
MLP19A	Jul-11	ML11_093	1-Jul-11	--	--	--	--	--	--	--
MLP19A	Aug-11	ML11_042	21-Aug-11	0.02	5.92	0.14	1.05	0.0	--	0
MLP19A	May-12	ML12-051	9-Jun-12	0.02	15.46	0.08	1.46	0.3	0.00000	0
MLP19A	Jul-12	ML12_138	26-Jul-12	--	16.74	0.23	1.58	0.0	0.00000	0

MLP19A	Sep-12	ML12_233	9-Sep-12	0.03	10.30	0.27	0.43	0.0	0.00000	0
MLP19A	Jun-13	ML13_027	15-Jun-13	--	--	0.31	1.49	0.0	--	0
MLP19A	Jun-14	ML14_005	5-Jun-14	--	--	0.00	--	--	--	--
MLP19A	Oct-14	ML14W_005	26-Oct-14	--	--	--	--	--	--	--
MLP19B		<i>l</i>								
MLP19B	Jul-11	ML11_094	1-Jul-11	--	--	--	--	--	--	--
MLP19B	Aug-11	ML11_043	21-Aug-11	0.01	2.88	0.42	0.05	0.3	--	--
MLP19B	May-12	ML12-049	7-Jun-12	0.00	2.58	0.35	0.26	0.9	0.00000	0
MLP19B	Jul-12	ML12_139	26-Jul-12	--	1.29	--	--	--	--	--
MLP19B	Sep-12	ML12_234	9-Sep-12	--	2.58	0.48	0.29	0.4	0.00000	0
MLP19B	Jun-13	ML13_028	15-Jun-13	--	--	0.61	0.19	0.0	--	0
MLP19B	Jun-14	ML14_006	5-Jun-14	--	--	0.02	--	--	--	--
MLP19B	Oct-14	ML14W_006	26-Oct-14	--	--	--	--	--	--	--
ML Highway 63 Weir										
ML Highway 63 Weir	Apr-12	ML12_028_019	13-Apr-12	--	--	--	--	--	--	--
ML Highway 63 Weir	Apr-12	ML 12_020_021	15-Apr-12	--	--	--	--	--	--	--
ML Highway 63 Weir	Aug-11	ML11_063	11-Aug-11	0.02	0.03	0.17	0.03	0.3	--	0

ML Highway 63 Weir	May-12	ML12-078	10-Jun-12	--	--	--	--	--	--	0
ML Highway 63 Weir	May-12	ML12-101	12-Jun-12	--	--	--	--	--	--	--
ML Highway 63 Weir	May-12	ML12-030	4-Jun-12	0.02	0.03	0.32	0.06	0.0	0.00000	--
ML Highway 63 Weir	May-12	ML12-031	4-Jun-12	--	--	--	--	--	--	--
ML Highway 63 Weir	Jul-12	ML12_136	25-Jul-12	--	--	--	--	--	--	--
ML Highway 63 Weir	Jul-12	ML12_140	26-Jul-12	--	0.01	0.24	0.03	0.0	--	0
ML Highway 63 Weir	Jul-12	ML12_185	4-Aug-12	--	--	--	--	--	--	--
ML Highway 63 Weir	Jul-12	--	--	--	--	--	--	--	--	--
ML Highway 63 Weir	Sep-12	ML12_188	1-Sep-12	--	0.02	0.17	0.26	0.4	0.00000	0
ML Highway 63 Weir	Sep-12	ML12_247	10-Sep-12	--	--	--	--	--	--	--
ML Highway 63 Weir	Jun-13	ML13_067	20-Jun-13		0	0.39	0.04	0.0		0
	ML Access Road Culvert									

ML Access Road Culvert	Aug-11	ML11_062	11-Aug-11	0.06	0.04	0.08	0.15	0.0	--	--
ML Access Road Culvert	Apr-12	ML12_026	13-Apr-12	--	--	--	--	--	--	--
ML Access Road Culvert	Apr-12	ML12_027	13-Apr-12	--	--	--	--	--	--	--
ML Access Road Culvert	May-12	ML12-100	11-Jun-12	--	--	--	--	--	--	--
ML Access Road Culvert	May-12	ML12-104	12-Jun-12	--	--	--	--	--	--	--
ML Access Road Culvert	Jul-12	ML12_112	18-Jul-12	--	0.04	0.15	0.27	0.0	0.00000	0
ML Access Road Culvert	Jul-12	ML12_183	4-Aug-12	--	--	--	--	--	--	--
ML Access Road Culvert	Sep-12	ML12_240	10-Sep-12	--	--	--	--	--	--	--
ML Access Road Culvert	Jun-13	ML13_024	14-Jun-13		0.03	0.25	0.31	0.0		0
ML Access Road Culvert (E)										
ML Access Road Culvert (E)	Jul-12	ML12_179	30-Jul-12	--	--	--	--	--	--	--
ML Access Road Culvert	Jul-12	ML12_184	4-Aug-12	--	--	--	--	--	--	--

(E) ML Access Road Culvert (E)	Sep-12	ML12_239	10-Sep-12	--	--	--	--	--	--	--
ML Rain Events										
ML Rain Events	18-Aug-11	ML11_064	18-Aug-11	--	--	--	--	--	--	--
ML Rain Events	12-Jun-12	ML12-102	12-Jun-12	--	--	--	--	--	--	--
ML Rain Events	12-Jun-12	ML12-103	12-Jun-12	--	--	--	--	--	--	--
ML Rain Events	25-Jul-12	ML12_130	25-Jul-12	--	--	--	--	--	--	--
ML Rain Events	27-Jul-12	ML12_156	27-Jul-12	--	--	--	--	--	--	--
ML Rain Events	29-Jul-12	ML12_167	29-Jul-12	--	--	--	--	--	--	--
ML Rain Events	25-Jul-12	ML12_129	25-Jul-12	--	--	--	--	--	--	--
ML Rain Events	4-Aug-12	ML12_182	4-Aug-12	--	--	--	--	--	--	--
ML Rain Events	7-Sep-12	ML12_204	7-Sep-12	--	--	--	--	--	--	--
ML Bulk Rain										

ML Bulk Rain	(April to June 2012)	ML12-050	7-Jun-12	--	--	--	--	--	--	--
ML Bulk Rain	(May - 18 July 2012)	ML12_107	18-Jul-12	--	0.00	0.03	0.07	0.8	0.00000	0
ML Bulk Rain	(17 July - 1 Sept 2012)	ML12_187	1-Sep-12	--	0.03	--	--	1.4	--	--
ML Bulk Rain	2012	ML12_248	12-Sep-12	--	0.00	--	--	0.9	--	--
ML Bulk Rain	summer2014	ML14_007	2-Jun-14	--	--	--	--	--	--	--
ML Bulk Rain	jun-nov 2014	ML14W_007	26-Oct-14	--	--	--	--	--	--	--
Snow Survey										
Snow Survey	MLA	ML12_012	13-Mar-12	--	--	--	--	--	--	--
Snow Survey	MLE	ML12_015	13-Mar-12	--	--	--	--	--	--	--
Snow Survey	MLO	ML12_004	13-Mar-12	--	--	--	--	--	--	--
Snow Survey	MLU	ML12_008	13-Mar-12	--	--	--	--	--	--	--
Snow Survey	MLP1	ML12_001	13-Mar-12	--	--	--	--	--	--	--
Snow Survey	MLP2	ML12_002	13-Mar-12	--	--	--	--	--	--	--
Snow Survey	MLP3	ML12_003	13-Mar-12	--	--	--	--	--	--	--
Snow Survey	MLP4	ML12_005	13-Mar-12	--	--	--	--	--	--	--
Snow Survey	MLP5	ML12_006	13-Mar-12	--	--	--	--	--	--	--
Snow Survey	MLP6	ML12_009	13-Mar-12	--	--	--	--	--	--	--
Snow Survey	MLP12	ML12_013	13-Mar-12	--	--	--	--	--	--	--

Snow Survey	MLP13	ML12_011	13-Mar-12	--	--	--	--	--	--	--
Snow Survey	MLP14	ML12_010	13-Mar-12	--	--	--	--	--	--	--
Snow Survey	MLP16	ML12_017	13-Mar-12	--	--	--	--	--	--	--
Snow Survey	MLP17	ML12_018	13-Mar-12	--	--	--	--	--	--	--
Snow Survey	MLP18	ML12_016	13-Mar-12	--	--	--	--	--	--	--
Snow Survey	MLP19	ML12_007	13-Mar-12	--	--	--	--	--	--	--
Snow Survey	ML SHED	ML12_014	13-Mar-12	--	--	--	--	--	--	--
Snow Sampling		ML Bog	9-Feb-15	--	--	--	--	--	--	--
Snow Sampling		ML Fen	9-Feb-15	--	--	--	--	--	--	--
Snow Sampling		ML Upland	9-Feb-15	--	--	--	--	--	--	--
Snow Sampling		ML15S_001	24-Mar-15	--	--	--	--	--	--	--
Snow Sampling		ML15S_002	24-Mar-15	--	--	--	--	--	--	--
Snow Sampling		ML15S_003	24-Mar-15	--	--	--	--	--	--	--
Snow Sampling		ML15S_004	24-Mar-15	--	--	--	--	--	--	--
Snow Sampling		ML15S_005	24-Mar-15	--	--	--	--	--	--	--
Snow Sampling		ML15S_006	24-Mar-15	--	--	--	--	--	--	--
Snow Sampling		ML15S_007	24-Mar-15	--	--	--	--	--	--	--

Site ID	Site ID	Sample ID	sample date	ammonium-n	Nitrogen, Dissolved Organic	Particulate TKN	Nitrite+Nitrate	Tritium
			units	mg/L	mg/L			TU
			precision	0.0	0.1			0.8
			DL (QL)	0.06	0.01			
	JPHA	<i>WT</i>						
JPHA	Jul-11	JPH11_077	1-Jul-11	--	--	--	--	--
JPHA	Aug-11	JPH11_034	17-Aug-11	--	--	--	--	--
JPHA	May-12	JPH12-023	25-May-12	--	--	--	--	--
JPHA	Jul-12	JPH12_074	19-Jul-12	--	--	--	--	--
JPHA	Sep-12	JPH12_157	5-Sep-12	--	--	--	--	--
JPHA	Jun-13	JPH13_038	13-Jun-13	--	--	--	--	--
JPHA	Jun-14	JPH14-036	15-Jun-14	< 0.002	0.64	--	--	--
	JPHB	<i>WT</i>						
JPHB	Jul-11	JPH11_078	1-Jul-11	--	--	--	--	--
JPHB	Aug-11	JPH11_035	17-Aug-11	--	--	--	--	--
JPHB	May-12	JPH12-026	25-May-12	--	--	--	--	--
JPHB	Jul-12	JPH12_079	19-Jul-12	--	--	--	--	--
JPHB	Sep-12	JPH12_156	5-Sep-12	--	--	--	--	--
JPHB	Jun-13	--	--	--	--	--	--	--

JPHB	Jun-14	JPH14_026	6/11/14	0.002	0.73	--	--	--
JPHC		<i>WT</i>						
JPHC	Jul-11	JPH11_079	1-Jul-11	--	--	--	--	--
JPHC	Aug-11	JPH11_036	17-Aug-11	--	--	--	--	--
JPHC	May-12	JPH12-028	25-May-12	--	--	--	--	--
JPHC	Jul-12	--	--	--	--	--	--	--
JPHC	Sep-12	JPH12_150	5-Sep-12	--	--	--	--	--
JPHC	Jun-13	JPH13_030	13-Jun-13	0.088	1.64	--	--	--
JPHC	GONE!	--	--	--	--	--	--	--
JPHD		<i>WT</i>						
JPHD	Jul-11	JPH11_080	1-Jul-11	--	--	--	--	--
JPHD	Aug-11	JPH11_037	17-Aug-11	--	--	--	--	--
JPHD	May-12	JPH12-027	25-May-12	--	--	--	--	--
JPHD	Jul-12	JPH12_084	19-Jul-12	--	--	--	--	--
JPHD	Sep-12	JPH12_154	5-Sep-12	--	--	--	--	--
JPHD	Jun-13	JPH13_034	13-Jun-13	0.012	1.32	--	--	--
JPHD	GONE!	--	--	--	--	--	--	--
JPHE		<i>WT</i>						
JPHE	Jul-11	JPH11_081	1-Jul-11	--	--	--	--	--
JPHE	Aug-11	JPH11_038	17-Aug-11	--	--	--	--	--

JPHE	May-12	JPH12-029	25-May-12	--	--	--	--	--
JPHE	Jul-12	JPH12_085	19-Jul-12	--	--	--	--	--
JPHE	Sep-12	JPH12_146	4-Sep-12	--	--	--	--	--
JPHE	GONE!	--	--	--	--	--	--	--
JPHF		<i>WT</i>						
JPHF	Jul-11	JPH11_082	1-Jul-11	--	--	--	--	--
JPHF	Aug-11	JPH11_039	17-Aug-11	--	--	--	--	--
JPHF	May-12	JPH12-032	26-May-12	--	--	--	--	--
JPHF	Jul-12	JPH12_090	19-Jul-12	--	--	--	--	--
JPHF	Sep-12	JPH12_144	4-Sep-12	--	--	--	--	--
JPHF	Jun-13	JPH13_026	11-Jun-13	--	--	--	--	--
JPHF	GONE!	--	--	--	--	--	--	--
JPHG		<i>WT</i>						
JPHG	Jul-11	JPH11_083	1-Jul-11	--	--	--	--	--
JPHG	Aug-11	JPH11_040	17-Aug-11	--	--	--	--	--
JPHG	May-12	JPH12-025	25-May-12	--	--	--	--	--
JPHG	Jul-12	JPH12_080	19-Jul-12	--	--	--	--	--
JPHG	Sep-12	JPH12_155	5-Sep-12	--	--	--	--	--
JPHG	Jun-13	JPH13_039	13-Jun-13	--	--	--	--	--
JPHG	GONE!	--	--	--	--	--	--	--

JPHP01A		3							
JPHP01A	Jul-11	JPH11_044	1-Jul-11	--	--	--	--	--	--
JPHP01A	Aug-11	JPH11_001	14-Aug-11	--	--	--	--	--	--
JPHP01A	May-12	JPH12-064	28-May-12	--	--	--	--	--	--
JPHP01A	Jul-12	JPH12_107	22-Jul-12	--	--	--	--	--	--
JPHP01A	Sep-12	JPH12_120	2-Sep-12	--	--	--	--	--	--
JPHP01A	Jun-13	JPH13_013	7-Jun-13	--	--	--	--	--	--
JPHP01A	Jun-14	JPH14_020	10-Jun-14	0.004	0.76	--	--	--	--
JPHP01B		2							
JPHP01B	Jul-11	JPH11_045	1-Jul-11	--	--	--	--	--	--
JPHP01B	Aug-11	JPH11_002	14-Aug-11	--	--	--	--	--	--
JPHP01B	May-12	JPH12-066	28-May-12	--	--	--	--	--	--
JPHP01B	Jul-12	JPH12_108	22-Jul-12	--	--	--	--	--	--
JPHP01B	Sep-12	JPH12_121	2-Sep-12	--	--	--	--	--	--
JPHP01B	Jun-13	JPH13_014	7-Jun-13	--	--	--	--	--	--
JPHP01B	Jun-14	JPH14-021	11-Jun-14	0.001	0.12	--	--	--	--
JPHP01C		1							
JPHP01C	Jul-11	JPH11_046	1-Jul-11	--	--	--	--	--	--
JPHP01C	Aug-11	JPH11_003	14-Aug-11	--	--	--	--	--	--
JPHP01C	May-12	JPH12-067	28-May-12	--	--	--	--	--	--

JPHP01C	Jul-12	JPH12_109	22-Jul-12	--	--	--	--	--
JPHP01C	Sep-12	JPH12_122	2-Sep-12	--	--	--	--	--
JPHP01C	Jun-13	JPH13_015	7-Jun-13	--	--	--	--	--
JPJP01C	Jun-14	JPH14_022	11-Jun-14	0.002	0.16	--	--	--
JPHP02A		3						
JPHP02A	Jul-11	JPH11_047	1-Jul-11	--	--	--	--	--
JPHP02A	Aug-11	JPH11_004	14-Aug-11	--	--	--	--	--
JPHP02A	May-12	JPH12-061	28-May-12	--	--	--	--	--
JPHP02A	Jul-12	JPH12_104	22-Jul-12	--	--	--	--	--
JPHP02A	Sep-12	JPH12_123	2-Sep-12	--	--	--	--	--
JPHP02A	Jun-13	JPH13_023	11-Jun-13	0.128	0.75	--	--	--
JPJP02A	Jun-14	JPH14_017	11-Jun-14	0.101	0.77	--	--	--
JPHP02B		2						
JPHP02B	Jul-11	JPH11_048	1-Jul-11	--	--	--	--	--
JPHP02B	Aug-11	JPH11_005	14-Aug-11	--	--	--	--	--
JPHP02B	May-12	JPH12-063	28-May-12	--	--	--	--	--
JPHP02B	Jul-12	JPH12_105	22-Jul-12	--	--	--	--	--
JPHP02B	Sep-12	JPH12_124	2-Sep-12	--	--	--	--	--
JPHP02B	Jun-13	JPH13_024	11-Jun-13	0.003	0.11	--	--	--
JPHP02B	Jun-14	JPH14_018	11-Jun-14	0.002	0.16	--	--	--

JPHP02C		<i>1</i>							
JPHP02C	Jul-11	JPH11_049	1-Jul-11	--	--	--	--	--	--
JPHP02C	Aug-11	JPH11_006	14-Aug-11	--	--	--	--	--	--
JPHP02C	May-12	JPH12-065	28-May-12	--	--	--	--	--	--
JPHP02C	Jul-12	JPH12_106	22-Jul-12	--	--	--	--	--	--
JPHP02C	Sep-12	JPH12_125	2-Sep-12	--	--	--	--	--	--
JPHP02C	Jun-13	JPH13_025	11-Jun-13	0.002	0.17	--	--	--	--
JPHP02C	Jun-14	JPH14_019	11-Jun-14	0.002	0.23	--	--	--	--
JPHP03A		<i>3</i>							
JPHP03A	Jul-11	JPH11_050	1-Jul-11	--	--	--	--	--	--
JPHP03A	Aug-11	JPH11_007	14-Aug-11	--	--	--	--	--	--
JPHP03A	May-12	JPH12-059	28-May-12	--	--	--	--	--	--
JPHP03A	Jul-12	JPH12_101	22-Jul-12	--	--	--	--	--	--
JPHP03A	Sep-12	JPH12_136	4-Sep-12	--	--	--	--	--	--
JPHP03A	Jun-13	JPH13_020	9-Jun-13	--	--	--	--	--	--
JPHP03A	Jun-14	JPH14_014	11-Jun-14	0.001	0.06	--	--	--	--
JPHP03B		<i>2</i>							
JPHP03B	Jul-11	JPH11_051	1-Jul-11	--	--	--	--	--	--
JPHP03B	Aug-11	JPH11_008	14-Aug-11	--	--	--	--	--	--
JPHP03B	May-12	JPH12-060	28-May-12	--	--	--	--	--	--

JPHP03B	Jul-12	JPH12_102	22-Jul-12	--	--	--	--	--
JPHP03B	Sep-12	JPH12_137	4-Sep-12	--	--	--	--	--
JPHP03B	Jun-13	JPH13_021	9-Jun-13	--	--	--	--	--
JPHP03B	Jun-14	JPH_015	11-Jun-14	0.001	0.16	--	--	--
JPHP03C		<i>1</i>						
JPHP03C	Jul-11	JPH11_052	1-Jul-11	--	--	--	--	--
JPHP03C	Aug-11	JPH11_009	14-Aug-11	--	--	--	--	--
JPHP03C	May-12	JPH12-062	28-May-12	--	--	--	--	--
JPHP03C	Jul-12	JPH12_103	22-Jul-12	--	--	--	--	--
JPHP03C	Sep-12	JPH12_139	4-Sep-12	--	--	--	--	--
JPHP03C	Jun-13	JPH13_022	9-Jun-13	--	--	--	--	--
JPHP03C	Jun-14	JPH14_016	11-Jun-14	0.001	0.18	--	--	--
JPHP04A		<i>3</i>						
JPHP04A	Jul-11	JPH11_053	1-Jul-11	--	--	--	--	--
JPHP04A	Aug-11	JPH11_010	14-Aug-11	--	--	--	--	--
JPHP04A	May-12	JPH12-056	28-May-12	--	--	--	--	--
JPHP04A	Jul-12	JPH12_098	21-Jul-12	--	--	--	--	--
JPHP04A	Sep-12	JPH12_138	4-Sep-12	--	--	--	--	--
JPHP04A	Jun-13	JPH13_017	9-Jun-13	0.126	0.66	--	--	--
JPHP04A	Jun-14	JPH14_011	11-Jun-14	0.049	0.44	--	--	--

JPHP04B		<i>2</i>						
JPHP04B	Jul-11	JPH11_054	1-Jul-11	--	--	--	--	--
JPHP04B	Aug-11	JPH11_011	14-Aug-11	--	--	--	--	--
JPHP04B	May-12	JPH12-057	28-May-12	--	--	--	--	--
JPHP04B	Jul-12	JPH12_099	21-Jul-12	--	--	--	--	--
JPHP04B	Sep-12	JPH12_141	4-Sep-12	--	--	--	--	--
JPHP04B	Jun-13	JPH13_018	9-Jun-13	0.002	0.07	--	--	--
JPHP04B	Jun-14	JPH14_012	11-Jun-14	0.001	0.19	--	--	--
JPHP04C		<i>1</i>						
JPHP04C	Jul-11	JPH11_055	1-Jul-11	--	--	--	--	--
JPHP04C	Aug-11	JPH11_012	14-Aug-11	--	--	--	--	--
JPHP04C	May-12	JPH12-058	28-May-12	--	--	--	--	--
JPHP04C	Jul-12	JPH12_100	21-Jul-12	--	--	--	--	--
JPHP04C	Sep-12	JPH12_142	4-Sep-12	--	--	--	--	--
JPHP04C	Jun-13	JPH13_019	9-Jun-13	0.005	0.2	--	--	--
JPHP04C	Jun-14	JPH14_013	11-Jun-14	0.002	0.18	--	--	--
JPHP05A		<i>3</i>						
JPHP05A	Jul-11	JPH11_056	1-Jul-11	--	--	--	--	--
JPHP05A	Aug-11	JPH11_013	15-Aug-11	--	--	--	--	--
JPHP05A	May-12	JPH12-040	27-May-12	--	--	--	--	--

JPHP05A	Jul-12	JPH12_095	21-Jul-12	--	--	--	--	--
JPHP05A	Sep-12	JPH12_133	3-Sep-12	--	--	--	--	--
JPHP05A	Jun-13	JPH13_007	6-Jun-13	--	--	--	--	--
JPHP05A	Jun-14	JPH14_007	11-Jun-14	0.004	0.22	--	--	--
JPHP05B		<i>2</i>						
JPHP05B	Jul-11	JPH11_057	1-Jul-11	--	--	--	--	--
JPHP05B	Aug-11	JPH11_014	15-Aug-11	--	--	--	--	--
JPHP05B	May-12	JPH12-041	27-May-12	--	--	--	--	--
JPHP05B	Jul-12	JPH12_096	21-Jul-12	--	--	--	--	--
JPHP05B	Sep-12	JPH12_134	3-Sep-12	--	--	--	--	--
JPHP05B	Jun-13	JPH13_008	6-Jun-13	--	--	--	--	--
JPHP05B	Jun-14	JPH14_008	11-Jun-14	0.002	0.16	--	--	--
JPHP05C		<i>1</i>						
JPHP05C	Jul-11	JPH11_058	1-Jul-11	--	--	--	--	--
JPHP05C	Aug-11	JPH11_015	15-Aug-11	--	--	--	--	--
JPHP05C	May-12	JPH12-043	27-May-12	--	--	--	--	--
JPHP05C	Jul-12	JPH12_097	21-Jul-12	--	--	--	--	--
JPHP05C	Sep-12	JPH12_135	3-Sep-12	--	--	--	--	--
JPHP05C	Jun-13	JPH13_009	6-Jun-13	--	--	--	--	--
JPHP05C	Jun-14	JPH14_009	11-Jun-14	0.9	0.29	--	--	--

	JPHP06A	<i>3</i>						
JPHP06A	Jul-11	JPH11_059	1-Jul-11	--	--	--	--	--
JPHP06A	Aug-11	JPH11_016	15-Aug-11	--	--	--	--	--
JPHP06A	May-12	JPH12-042	27-May-12	--	--	--	--	--
JPHP06A	Jul-12	JPH12_092	21-Jul-12	--	--	--	--	--
JPHP06A	Sep-12	JPH12_129	3-Sep-12	--	--	--	--	--
JPHP06A	Jun-13	JPH13_004	6-Jun-13	--	--	--	--	--
JPHP06A	Jun-14	JPH14_004	11-Jun-14	0.001	0.24	--	--	--
	JPHP06B	<i>-</i>						
JPHP06B	Jul-11	JPH11_060	1-Jul-11	--	--	--	--	--
JPHP06B	Aug-11	JPH11_017	15-Aug-11	--	--	--	--	--
JPHP06B	May-12	JPH12-044	27-May-12	--	--	--	--	--
JPHP06B	Jul-12	JPH12_093	21-Jul-12	--	--	--	--	--
JPHP06B	Sep-12	JPH12_131	3-Sep-12	--	--	--	--	--
JPHP06B	Jun-13	JPH13_005	6-Jun-13	--	--	--	--	--
JPHP06B	Jun-14	JPH14_005	11-Jun-14	0.021	0.14	--	--	--
	JPHP06C	<i>1</i>						
JPHP06C	Jul-11	JPH11_061	1-Jul-11	--	--	--	--	--
JPHP06C	Aug-11	JPH11_018	15-Aug-11	--	--	--	--	--
JPHP06C	May-12	JPH12-047	27-May-12	--	--	--	--	--

JPHP06C	Jul-12	JPH12_094	21-Jul-12	--	--	--	--	--
JPHP06C	Sep-12	JPH12_132	3-Sep-12	--	--	--	--	--
JPHP06C	Jun-13	JPH13_006	6-Jun-13	--	--	--	--	--
JPHP06C	Jun-14	JPH14_006	11-Jun-14	0.006	0.25	--	--	--
JPHP07A		3						
JPHP07A	Jul-11	JPH11_062	1-Jul-11	--	--	--	--	--
JPHP07A	Aug-11	JPH11_019	15-Aug-11	--	--	--	--	--
JPHP07A	May-12	JPH12-046	27-May-12	--	--	--	--	--
JPHP07A	Jul-12	JPH12_110	22-Jul-12	--	--	--	--	--
JPHP07A	Sep-12	JPH12_127	3-Sep-12	--	--	--	--	--
JPHP07A	Jun-13	JPH13_001	6-Jun-13	--	--	--	--	--
JPHP07A	Jun-14	JPH14_001	11-Jun-14	0.101	0.6	--	--	--
JPHP07B		2						
JPHP07B	Jul-11	JPH11_063	1-Jul-11	--	--	--	--	--
JPHP07B	Aug-11	JPH11_020	15-Aug-11	--	--	--	--	--
JPHP07B	May-12	JPH12-048	27-May-12	--	--	--	--	--
JPHP07B	Jul-12	JPH12_111	22-Jul-12	--	--	--	--	--
JPHP07B	Sep-12	JPH12_128	3-Sep-12	--	--	--	--	--
JPHP07B	Jun-13	JPH13_002	6-Jun-13	--	--	--	--	--
JPHP07B	Jun-14	JPH14_002	11-Jun-14	0.008	0.18	--	--	--

JPHP07C		<i>1</i>						
JPHP07C	Jul-11	JPH11_064	1-Jul-11	--	--	--	--	--
JPHP07C	Aug-11	JPH11_021	15-Aug-11	--	--	--	--	--
JPHP07C	May-12	JPH12-050	27-May-12	--	--	--	--	--
JPHP07C	Jul-12	JPH12_112	22-Jul-12	--	--	--	--	--
JPHP07C	Sep-12	JPH12_130	3-Sep-12	--	--	--	--	--
JPHP07C	Jun-13	JPH13_003	6-Jun-13	--	--	--	--	--
JPHP07C	Jun-14	JPH14_003	11-Jun-14	0.008	0.12	--	--	--
JPHP08A		<i>3</i>						
JPHP08A	Jul-11	JPH11_065	1-Jul-11	--	--	--	--	--
JPHP08A	Aug-11	JPH11_022	17-Aug-11	--	--	--	--	--
JPHP08A	May-12	JPH12-049	27-May-12	--	--	--	--	--
JPHP08A	Jul-12	JPH12_075	19-Jul-12	--	--	--	--	--
JPHP08A	Sep-12	JPH12_159	5-Sep-12	--	--	--	--	--
JPHP08A	Jun-13	JPH13_035	13-Jun-13	0.121	0.32	--	--	--
JPHP08A	Jun-14	JPH14_033	15-Jun-14	0.054	0.029	--	--	--
JPHP08B		<i>2</i>						
JPHP08B	Jul-11	JPH11_066	1-Jul-11	--	--	--	--	--
JPHP08B	Aug-11	JPH11_023	17-Aug-11	--	--	--	--	--
JPHP08B	May-12	JPH12-051	27-May-12	--	--	--	--	--

JPHP08B	Jul-12	JPH12_076	19-Jul-12	--	--	--	--	--
JPHP08B	Sep-12	JPH12_160	5-Sep-12	--	--	--	--	--
JPHP08B	Jun-13	JPH13_036	13-Jun-13	0.177	0.82	--	--	--
JPHP08B	Jun-14	JPH14_034	15-Jun-14	0.022	0.63	--	--	--
JPHP08C		<i>1</i>						
JPHP08C	Jul-11	JPH11_067	1-Jul-11	--	--	--	--	--
JPHP08C	Aug-11	JPH11_024	17-Aug-11	--	--	--	--	--
JPHP08C	May-12	JPH12-052	27-May-12	--	--	--	--	--
JPHP08C	Jul-12	JPH12_077	19-Jul-12	--	--	--	--	--
JPHP08C	Sep-12	JPH12_161	6-Sep-12	--	--	--	--	--
JPHP08C	Jun-13	JPH13_037	13-Jun-13	0.255	1.36	--	--	--
JPHP08C	Jun-14	JPH14_035	15-Jun-14	0.171	1.06	--	--	--
JPHP09A		<i>3</i>						
JPHP09A	Jul-11	JPH11_068	1-Jul-11	--	--	--	--	--
JPHP09A	Aug-11	JPH11_025	17-Aug-11	--	--	--	--	--
JPHP09A	May-12	JPH12-037	26-May-12	--	--	--	--	--
JPHP09A	Jul-12	JPH12_081	19-Jul-12	--	--	--	--	--
JPHP09A	Sep-12	JPH12_151	5-Sep-12	--	--	--	--	--
JPHP09A	Jun-13	JPH13_031	13-Jun-13	0.139	0.48	--	--	--
JPHP09A	Jun-14	JPH14_27	11-Jun-14	0.077	0.4	--	--	--

JPHP09B		<i>2</i>						
JPHP09B	Jul-11	JPH11_069	1-Jul-11	--	--	--	--	--
JPHP09B	Aug-11	JPH11_026	17-Aug-11	--	--	--	--	--
JPHP09B	May-12	JPH12-038	26-May-12	--	--	--	--	--
JPHP09B	Jul-12	JPH12_082	19-Jul-12	--	--	--	--	--
JPHP09B	Sep-12	JPH12_152	5-Sep-12	--	--	--	--	--
JPHP09B	Jun-13	JPH13_032	13-Jun-13	0.157	0.86	--	--	--
JPHP09B	Jun-14	JPH14_028	11-Jun-14	0.083	0.63	--	--	--
JPHP09C		<i>1</i>						
JPHP09C	Jul-11	JPH11_070	1-Jul-11	--	--	--	--	--
JPHP09C	Aug-11	JPH11_027	17-Aug-11	--	--	--	--	--
JPHP09C	May-12	JPH12-039	26-May-12	--	--	--	--	--
JPHP09C	Jul-12	JPH12_083	19-Jul-12	--	--	--	--	--
JPHP09C	Sep-12	JPH12_153	5-Sep-12	--	--	--	--	--
JPHP09C	Jun-13	JPH13_033	13-Jun-13	0.114	1.58	--	--	--
JPHP09C	Jun-14	JPH14_029	11-Jun-14	0.053	0.73	--	--	--
JPHP10A		<i>3</i>						
JPHP10A	Jul-11	JPH11_071	1-Jul-11	--	--	--	--	--
JPHP10A	Aug-11	JPH11_028	15-Aug-11	--	--	--	--	--
JPHP10A	May-12	JPH12-034	26-May-12	--	--	--	--	--

JPHP10A	Jul-12	JPH12_086	19-Jul-12	--	--	--	--	--
JPHP10A	Sep-12	JPH12_147	4-Sep-12	--	--	--	--	--
JPHP10A	Jun-13	JPH13_027	11-Jun-13	0.193	0.6	--	--	--
JPHP10A	Jun-14	JPH14_023	11-Jun-14	0.158	0.55	--	--	--
JPHP10B		<i>2</i>						
JPHP10B	Jul-11	JPH11_072	1-Jul-11	--	--	--	--	--
JPHP10B	Aug-11	JPH11_029	15-Aug-11	--	--	--	--	--
JPHP10B	May-12	JPH12-035	26-May-12	--	--	--	--	--
JPHP10B	Jul-12	JPH12_087	19-Jul-12	--	--	--	--	--
JPHP10B	Sep-12	JPH12_148	5-Sep-12	--	--	--	--	--
JPHP10B	Jun-13	JPH13_028	11-Jun-13	0.129	0.83	--	--	--
JPHP10B	Jun-14	JPH14_024	11-Jun-14	0.116	0.57	--	--	--
JPHP10C		<i>1</i>						
JPHP10C	Jul-11	JPH11_073	1-Jul-11	--	--	--	--	--
JPHP10C	Aug-11	JPH11_030	15-Aug-11	--	--	--	--	--
JPHP10C	May-12	JPH12-036	26-May-12	--	--	--	--	--
JPHP10C	Jul-12	JPH12_088	19-Jul-12	--	--	--	--	--
JPHP10C	Sep-12	JPH12_149	5-Sep-12	--	--	--	--	--
JPHP10C	Jun-13	JPH13_029	11-Jun-13	0.118	1.13	--	--	--
JPHP10C	Jun-14	JPH14_025	11-Jun-14	0.002	0.78	--	--	--

	JPHP11A	3						
JPHP11A	Jul-11	JPH11_074	1-Jul-11	--	--	--	--	--
JPHP11A	Aug-11	JPH11_031	14-Aug-11	--	--	--	--	--
JPHP11A	May-12	JPH12-053	27-May-12	--	--	--	--	--
JPHP11A	Jul-12	JPH12_070	17-Jul-12	--	--	--	--	--
JPHP11A	Sep-12	JPH12_162	6-Sep-12	--	--	--	--	--
JPHP11A	Jun-13	JPH13_010	7-Jun-13	--	--	--	--	--
JPHP11A	Jun-14	JPH14_030	15-Jun-14	0.233	1.35	--	--	--
	JPHP11B	2						
JPHP11B	Jul-11	JPH11_075	1-Jul-11	--	--	--	--	--
JPHP11B	Aug-11	JPH11_032	14-Aug-11	--	--	--	--	--
JPHP11B	May-12	JPH12-054	27-May-12	--	--	--	--	--
JPHP11B	Jul-12	JPH12_071	17-Jul-12	--	--	--	--	--
JPHP11B	Sep-12	JPH12_163	6-Sep-12	--	--	--	--	--
JPHP11B	Jun-13	JPH13_011	7-Jun-13	--	--	--	--	--
JPHP11B	Jun-14	JPH14_031	15-Jun-14	0.001	0.32	--	--	--
	JPHP11C	1						
JPHP11C	Jul-11	JPH11_076	1-Jul-11	--	--	--	--	--
JPHP11C	Aug-11	JPH11_033	14-Aug-11	--	--	--	--	--
JPHP11C	May-12	JPH12-055	27-May-12	--	--	--	--	--

JPHP11C	Jul-12	JPH12_072	17-Jul-12	--	--	--	--	--
JPHP11C	Sep-12	JPH12_164	6-Sep-12	--	--	--	--	--
JPHP11C	Jun-13	JPH13_012	7-Jun-13	--	--	--	--	--
JPHP11C	Jun-14	JPH14_033	15-Jun-14	0.001	0.54	--	--	--
JPHP12		<i>1</i>						
JPHP12	Jul-12	JPH12_113	22-Jul-12	--	--	--	--	--
JPHP12	Sep-12	JPH12_143	4-Sep-12	--	--	--	--	--
JPHP12	Jun-13	JPH13_016	7-Jun-13	--	--	--	--	--
JPHP12	Jun-14	JPH14_010	11-Jun-14	--	4.5	--	--	--
Surface Water at JPHA								
Surface Water at JPHA	Aug-11	JPH11_042	17-Aug-11	--	--	--	--	--
Surface Water at JPHA	Apr-12	JPH12_022_014	14-Apr-12	--	--	--	--	--
Surface Water at JPHA	May-12	JPH12-024	25-May-12	--	--	--	--	--
Surface Water at JPHA	Jul-12	JPH12_116	3-Aug-12	--	--	--	--	--
Surface Water at JPHA	Jul-12	JPH12_078	19-Jul-12	--	--	--	--	--
Surface Water	Sep-12	JPH12_158	5-Sep-12	--	--	--	--	--

at JPHA								
	JPH Weir							
JPH Weir	Aug-11	JPH11_041	15-Aug-11	--	--	--	--	--
JPH Weir	Apr-12	JPH12_021_018	14-Apr-12	--	--	--	--	--
JPH Weir	Apr-12	JPH12_020_016	14-Apr-12	--	--	--	--	--
JPH Weir	May-12	JPH12-033	26-May-12	--	--	--	--	--
JPH Weir	Jul-12	JPH12_089	19-Jul-12	--	--	--	--	--
JPH Weir	Jul-12	JPH12_117	3-Aug-12	--	--	--	--	--
JPH Weir	Sep-12	JPH12_145	4-Sep-12	--	--	--	--	--
	JPH Rain Events							
JPH Rain Events	15-Aug-11	JPH11_043	15-Aug-11	--	--	--	--	--
JPH Rain Events	5-Jun-12	JPH12-068	5-Jun-12	--	--	--	--	--
JPH Rain Events	17-Jul-12	JPH12_069	17-Jul-12	--	--	--	--	--
JPH Rain Events	13-Sep-12	JPH12_165	13-Sep-12	--	--	--	--	--
	JPH Bulk Rain							
JPH Bulk Rain	(April - May 2012)	JPH12-030	25-May-12	--	--	--	--	--
JPH Bulk Rain	(5 June - 17July)	JPH12_073	17-Jul-12	--	--	--	--	--

	2012)							
JPH Bulk Rain	(5 June - 17July 2012)	JPH12_091	19-Jul-12	--	--	--	--	--
JPH Bulk Rain	(10days)	JPH12_114	31-Jul-12	--	--	--	--	--
JPH Bulk Rain	(17 July - 3 Aug)	JPH12_115	3-Aug-12	--	--	--	--	--
JPH Bulk Rain	(17 July - 2 Sep)	JPH12_126	2-Sep-12	--	--	--	--	--
RAIN	Jun-13	JPH13_040	13-Jun-13	--	--	--	--	--
Snow Survey								
Snow Survey	JPHA	JPH12_007	13-Mar-12	--	--	--	--	--
Snow Survey	JPHE	JPH12_008	13-Mar-12	--	--	--	--	--
Snow Survey	JPHG	JPH12_005	13-Mar-12	--	--	--	--	--
Snow Survey	JPHP1	JPH12_010	13-Mar-12	--	--	--	--	--
Snow Survey	JPHP2	JPH12_011	13-Mar-12	--	--	--	--	--
Snow Survey	JPHP3	JPH12_001	13-Mar-12	--	--	--	--	--
Snow Survey	JPHP4	JPH12_002	13-Mar-12	--	--	--	--	--
Snow Survey	JPHP5	JPH12_003	13-Mar-12	--	--	--	--	--
Snow Survey	JPHP6	JPH12_004	13-Mar-12	--	--	--	--	--
Snow Survey	JPHP7	JPH12_009	13-Mar-12	--	--	--	--	--
Snow Survey	JPHP8	JPH12_006	13-Mar-12	--	--	--	--	--
Snow Survey	JPHP11	JPH12_012	13-Mar-12	--	--	--	--	--

Snow Sampling								
Snow Sampling		JPH	8-Feb-15	--	--	--	--	11.2
Snow Sampling		JPH15S_001	23-Mar-15	0.061	0.36	0.362	0.1	--
Snow Sampling		JPH15S_002	23-Mar-15	0.089	0.46	0.464	0.06	--
Snow Sampling		JPH15S_003	23-Mar-15	0.052	0.39	0.391	0.08	--
Snow Sampling		JPH15S_004	23-Mar-15	0.068	0.84	0.844	0.07	--
MLA		WT						
MLA	Jul-11	ML11_095	1-Jul-11	--	--	--	--	--
MLA	Aug-11	ML11_044	24-Aug-11	--	--	--	--	--
MLA	May-12	ML12-067	9-Jun-12	--	--	--	--	--
MLA	Jul-12	ML12_175	30-Jul-12	--	--	--	--	--
MLA	Sep-12	ML12_212	8-Sep-12	--	--	--	--	--
MLA	Jun-13	ML13_062	18-Jun-13	0.009	0.19	--	--	--
MLA	Jun-14	ML14_045	13-Jun-14	0.047	0.59	--	--	--
MLB		WT						
MLB	Jul-11	ML11_096	1-Jul-11	--	--	--	--	--
MLB	Aug-11	ML11_045	21-Aug-11	--	--	--	--	--
MLB	May-12	ML12-064	9-Jun-12	--	--	--	--	--
MLB	Jul-12	ML12_172	30-Jul-12	--	--	--	--	--
MLB	Sep-12	ML12_209	8-Sep-12	--	--	--	--	--

MLB	Jun-13	ML13_059	18-Jun-13	2.1	1.08	--	--	--
MLB	Jun-14	ML14_054	14-Jun-14	0.025	0.94	--	--	--
MLC		<i>WT</i>						
MLC	Jul-11	ML11_097	1-Jul-11	--	--	--	--	--
MLC	Aug-11	ML11_046	21-Aug-11	--	--	--	--	--
MLC	May-12	ML12-060	9-Jun-12	--	--	--	--	--
MLC	Jul-12	ML12_168	30-Jul-12	--	--	--	--	--
MLC	Sep-12	ML12_205	8-Sep-12	--	--	--	--	--
MLC	Jun-13	ML13_058	18-Jun-13	0.064	0.85	--	--	--
MLC	Jun-14	ML14-055	14-Jun-14	0.001	0.86	--	--	--
MLD		<i>WT</i>						
MLD	Jul-11	ML11_098	1-Jul-11	--	--	--	--	--
MLD	Aug-11	ML11_047	19-Aug-11	--	--	--	--	--
MLD	May-12	ML12-039	7-Jun-12	--	--	--	--	--
MLD	Jul-12	ML12_164	28-Jul-12	--	--	--	--	--
MLD	Sep-12	ML12_220	8-Sep-12	--	--	--	--	--
MLD	Jun-13	ML13_049	17-Jun-13	0.029	0.86	--	--	--
MLD	Jun-14	--	--	--	--	--	--	--
MLE		<i>WT</i>						
MLE	Jul-11	ML11_099	1-Jul-11	--	--	--	--	--

MLE	Aug-11	ML11_048	19-Aug-11	--	--	--	--	--
MLE	May-12	ML12-098	11-Jun-12	--	--	--	--	--
MLE	Jul-12	ML12_114	24-Jul-12	--	--	--	--	--
MLE	Sep-12	ML12_243	10-Sep-12	--	--	--	--	--
MLE	Jun-13	ML13_037	16-Jun-13	0.029	0.88	--	--	--
MLE	Jun-14	ML14_041	12-Jun-14	--	6.63	--	--	--
MLF		<i>WT</i>						
MLF	Jul-11	ML11_100	1-Jul-11	--	--	--	--	--
MLF	Aug-11	ML11_049	21-Aug-11	--	--	--	--	--
MLF	May-12	ML12-055	9-Jun-12	--	--	--	--	--
MLF	Jul-12	ML12_145	27-Jul-12	--	--	--	--	--
MLF	Sep-12	ML12_197	7-Sep-12	--	--	--	--	--
MLF	Jun-13	ML13_045	17-Jun-13	0.011	0.89	--	--	--
MLF	Jun-14	ML14_61	14-Jun-14	0.025	0.84	--	--	--
MLG		<i>WT</i>						
MLG	Jul-11	ML11_101	1-Jul-11	--	--	--	--	--
MLG	Aug-11	ML11_050	19-Aug-11	--	--	--	--	--
MLG	May-12	ML12-074	10-Jun-12	--	--	--	--	--
MLG	Jul-12	ML12_128	25-Jul-12	--	--	--	--	--
MLG	Sep-12	ML12_232	9-Sep-12	--	--	--	--	--

MLG	Jun-13	ML13_038	16-Jun-13	0.023	0.71	--	--	--
MLG	Jun-14	ML14_034	12-Jun-14	0.011	0.7	--	--	--
MLG	Oct-14	ML14W_025	26-Oct-14	--	--	--	--	--
MLH		<i>WT</i>						
MLH	Jul-11	ML11_102	1-Jul-11	--	--	--	--	--
MLH	Aug-11	ML11_051	19-Aug-11	--	--	--	--	--
MLH	May-12	ML12-043	7-Jun-12	--	--	--	--	--
MLH	Jul-12	ML12_131	25-Jul-12	--	--	--	--	--
MLH	Sep-12	ML12_253	12-Sep-12	--	--	--	--	--
MLH	Jun-13	ML13_033	16-Jun-13	0.012	0.64	--	--	--
MLH	Jun-14	ML14_048	13-Jun-14	0.154	0.59	--	--	--
MLM		<i>WT</i>						
MLM	Jul-11	ML11_103	1-Jul-11	--	--	--	--	--
MLM	Aug-11	ML11_052	19-Aug-11	--	--	--	--	--
MLM	May-12	ML12-079	11-Jun-12	--	--	--	--	--
MLM	Jul-12	ML12_121	24-Jul-12	--	--	--	--	--
MLM	Sep-12	ML12_228	9-Sep-12	--	--	--	--	--
MLM	Jun-13	ML13_007	10-Jun-13	0.019	0.76	--	--	--
MLM	Jun-14	ML14_025	7-Jun-14	7	9.24	--	--	--
MLN		<i>WT</i>						

MLN	Jul-11	ML11_104	1-Jul-11	--	--	--	--	--
MLN	Aug-11	ML11_053	19-Aug-11	--	--	--	--	--
MLN	May-12	ML12-096	11-Jun-12	--	--	--	--	--
MLN	Jul-12	ML12_110	18-Jul-12	--	--	--	--	--
MLN	Sep-12	ML12_245	10-Sep-12	--	--	--	--	--
MLN	Jun-13	ML13_022	14-Jun-13	0.009	0.7	--	--	--
MLN	Jun-14	ML14_032	12-Jun-14	--	1.09	--	--	--
MLO		<i>WT</i>						
MLO	Jul-11	ML11_105	1-Jul-11	--	--	--	--	--
MLO	Aug-11	ML11_054	21-Aug-11	--	--	--	--	--
MLO	May-12	ML12-056	9-Jun-12	--	--	--	--	--
MLO	Jul-12	ML12_144	27-Jul-12	--	--	--	--	--
MLO	Sep-12	ML12_199	7-Sep-12	--	--	--	--	--
MLO	Jun-13	ML13_050	17-Jun-13	0.008	0.84	--	--	--
MLO	Jun-14	ML14_059	14-Jun-14	0.18	1.23	--	--	--
MLO	Oct-14	ML14W_012	26-Oct-14	--	--	--	--	12.5
MLP		<i>WT</i>						
MLP	Jul-11	ML11_106	1-Jul-11	--	--	--	--	--
MLP	Aug-11	ML11_055	21-Aug-11	--	--	--	--	--
MLP	May-12	ML12-054	9-Jun-12	--	--	--	--	--

MLP	Jul-12	ML12_146	27-Jul-12	--	--	--	--	--
MLP	Sep-12	ML12_196	7-Sep-12	--	--	--	--	--
MLP	Jun-13	ML13_044	17-Jun-13	0.009	0.91	--	--	--
MLP	Jun-13	ML13_043	17-Jun-13	0.013	0.89	--	--	--
MLP	Jun-14	ML14_060	14-Jun-14	0.016	0.79	--	--	--
MLQ		<i>WT</i>						
MLQ	Jul-11	ML11_107	1-Jul-11	--	--	--	--	--
MLQ	Aug-11	ML11_056	19-Aug-11	--	--	--	--	--
MLQ	May-12	ML12-097	11-Jun-12	--	--	--	--	--
MLQ	Jul-12	ML12_113	24-Jul-12	--	--	--	--	--
MLQ	Jul-12	ML12_111	18-Jul-12	--	--	--	--	--
MLQ	Sep-12	ML12_244	10-Sep-12	--	--	--	--	--
MLQ	Jun-13	ML13_023	14-Jun-13	0.012	0.63	--	--	--
MLQ	Jun-14	ML14_033	12-Jun-14	0.001	0.83	--	--	--
MLR		<i>WT</i>						
MLR	Jul-11	ML11_108	1-Jul-11	--	--	--	--	--
MLR	Aug-11	ML11_057	19-Aug-11	--	--	--	--	--
MLR	May-12	ML12-095	11-Jun-12	--	--	--	--	--
MLR	Jul-12	ML12_109	18-Jul-12	--	--	--	--	--
MLR	Sep-12	ML12_246	10-Sep-12	--	--	--	--	--

MLR	Jun-13	ML13_021	14-Jun-13	0.013	0.67	--	--	--
MLR	Jun-14	ML14_031	12-Jun-14	--	1.22	--	--	--
MLS		<i>WT</i>						
MLS	Jul-11	ML11_109	1-Jul-11	--	--	--	--	--
MLS	Aug-11	ML11_058	21-Aug-11	--	--	--	--	--
MLS	May-12	ML12-048	7-Jun-12	--	--	--	--	--
MLS	Jul-12	ML12_137	26-Jul-12	--	--	--	--	--
MLS	Sep-12	ML12_235	9-Sep-12	--	--	--	--	--
MLS	Jun-13	ML13_026	15-Jun-13	0.012	0.74	--	--	--
MLS	Jun-14	ML14_008	5-Jun-14	--	--	--	--	--
MLS	Oct-14	ML14W_008	26-Oct-14	--	--	--	--	--
MLT		<i>WT</i>						
MLT	Jul-11	ML11_110	1-Jul-11	--	--	--	--	--
MLT	Aug-11	ML11_059	24-Aug-11	--	--	--	--	--
MLT	May-12	ML12-053	9-Jun-12	--	--	--	--	--
MLT	Jul-12	ML12_147	27-Jul-12	--	--	--	--	--
MLT	Sep-12	ML12_203	8-Sep-12	--	--	--	--	--
MLT	Jun-13	ML13_054	17-Jun-13	0.012	0.99	--	--	--
MLT	Jun-14	ML14_050	13-Jun-14	0.009	0.63	--	--	--
MLU		<i>WT</i>						

MLU	Jul-11	ML11_111	1-Jul-11	--	--	--	--	--
MLU	Aug-11	ML11_060	21-Aug-11	--	--	--	--	--
MLU	May-12	ML12-086	11-Jun-12	--	--	--	--	--
MLU	Jul-12	ML12_108	18-Jul-12	--	--	--	--	--
MLU	Sep-12	ML12_186	1-Sep-12	--	--	--	--	--
MLU	Jun-13	ML13_025	15-Jun-13	0.016	0.75	--	--	--
MLU	Jun-14	ML14_049	13-Jun-14	0.015	0.56	--	--	--
	MLV	<i>WT</i>						
MLV	Jul-11	ML11_112	1-Jul-11	--	--	--	--	--
MLV	Aug-11	ML11_061	21-Aug-11	--	--	--	--	--
MLV	May-12	ML12-052	9-Jun-12	--	--	--	--	--
MLV	Jul-12	ML12_148	27-Jul-12	--	--	--	--	--
MLV	Sep-12	ML12_198	7-Sep-12	--	--	--	--	--
MLV	Jun-13	ML13_042	17-Jun-13	0.012	0.84	--	--	--
MLV	Jun-14	--	--	--	--	--	--	--
	MLP01A	2						
MLP01A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP01A	Aug-11	--	--	--	--	--	--	--
MLP01A	May-12	ML12-033	7-Jun-12	--	--	--	--	--
MLP01A	Jul-12	--	--	--	--	--	--	--

MLP01A	Sep-12	--	--	--	--	--	--	--
MLP01A	Jun-13	--	--	--	--	--	--	--
MLP01A	Jun-14	ML14_016	7-Jun-14	--	--	--	--	--
MLP01B		<i>1</i>						
MLP01B	Jul-11	ML11_065	1-Jul-11	--	--	--	--	--
MLP01B	Aug-11	ML11_001	24-Aug-11	--	--	--	--	--
MLP01B	May-12	ML12-034	7-Jun-12	--	--	--	--	--
MLP01B	Jul-12	ML12_160	28-Jul-12	--	--	--	--	--
MLP01B	Sep-12	ML12_238	9-Sep-12	--	--	--	--	--
MLP01B	Jun-13	ML13_008	12-Jun-13	--	--	--	--	--
MLP01B	Jun-14	ML14_017	7-Jun-14	4	9.15	--	--	--
MLP02A		<i>2</i>						
MLP02A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP02A	Aug-11	ML11_002	24-Aug-11	--	--	--	--	--
MLP02A	May-12	ML12-035	7-Jun-12	--	--	--	--	--
MLP02A	Jul-12	ML12_161	28-Jul-12	--	--	--	--	--
MLP02A	Sep-12	--	--	--	--	--	--	--
MLP02A	Jun-13	ML13_009	12-Jun-13	--	--	--	--	--
MLP02A	Jun-14	ML14_018	7-Jun-14	--	10.2	--	--	--
MLP02B		<i>1</i>						

MLP02B	Jul-11	ML11_066	1-Jul-11	--	--	--	--	--
MLP02B	Aug-11	ML11_003	24-Aug-11	--	--	--	--	--
MLP02B	May-12	ML12-036	7-Jun-12	--	--	--	--	--
MLP02B	Jul-12	ML12_162	28-Jul-12	--	--	--	--	--
MLP02B	Sep-12	ML12_237	9-Sep-12	--	--	--	--	--
MLP02B	Jun-13	ML13_010	12-Jun-13	--	--	--	--	--
MLP02B	Jun-14	ML14_019	7-Jun-14	--	0.56	--	--	--
MLP03A		2						
MLP03A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP03A	Aug-11	--	--	--	--	--	--	--
MLP03A	May-12	ML12-037	7-Jun-12	--	--	--	--	--
MLP03A	Jul-12	--	--	--	--	--	--	--
MLP03A	Sep-12	--	--	--	--	--	--	--
MLP03A	Jun-13	ML13_011	12-Jun-13	--	--	--	--	--
MLP03A	Jun-14	ML14_020	7-Jun-14	--	0.77	--	--	--
MLP03B		1						
MLP03B	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP03B	Aug-11	ML11_004	24-Aug-11	--	--	--	--	--
MLP03B	May-12	ML12-038	7-Jun-12	--	--	--	--	--
MLP03B	Jul-12	ML12_163	28-Jul-12	--	--	--	--	--

MLP03B	Sep-12	ML12_236	9-Sep-12	--	--	--	--	--
MLP03B	Jun-13	ML13_012	12-Jun-13	--	--	--	--	--
MLP03B	Jun-14	ML14_021	7-Jun-14	--	--	--	--	--
MLP04A		3						
MLP04A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP04A	Aug-11	ML11_005	19-Aug-11	--	--	--	--	--
MLP04A	May-12	ML12-042	7-Jun-12	--	--	--	--	--
MLP04A	Jul-12	ML12_157	27-Jul-12	--	--	--	--	--
MLP04A	Sep-12	ML12_217	8-Sep-12	--	--	--	--	--
MLP04A	Jun-13	ML13_046	17-Jun-13	--	--	--	--	--
MLP04A	Jun-14	ML14_013	7-Jun-14	6	18.9	--	--	--
MLP04A	Oct-14	ML14W_013	27-Oct-14	--	--	--	--	--
MLP04B		2						
MLP04B	Jul-11	ML11_067	1-Jul-11	--	--	--	--	--
MLP04B	Aug-11	ML11_006	19-Aug-11	--	--	--	--	--
MLP04B	May-12	ML12-041	7-Jun-12	--	--	--	--	--
MLP04B	Jul-12	ML12_158	27-Jul-12	--	--	--	--	--
MLP04B	Sep-12	ML12_218	8-Sep-12	--	--	--	--	--
MLP04B	Jun-13	ML13_047	17-Jun-13	7.81	11.10	--	--	--
MLP04B	Jun-14	ML14_014	7-Jun-14	4.2	7.66	--	--	--

MLP04B	Oct-14	ML14W_014	26-Oct-14	--	--	--	--	16.1
MLP04C		<i>1</i>						
MLP04C	Jul-11	ML11_068	1-Jul-11	--	--	--	--	--
MLP04C	Aug-11	ML11_007	19-Aug-11	--	--	--	--	--
MLP04C	May-12	ML12-040	7-Jun-12	--	--	--	--	--
MLP04C	Jul-12	ML12_159	27-Jul-12	--	--	--	--	--
MLP04C	Sep-12	ML12_219	8-Sep-12	--	--	--	--	--
MLP04C	Jun-13	ML13_048	17-Jun-13	3.41	12.70	--	--	--
MLP04C	Jun-14	ML14_015	7-Jun-14	3.5	5.44	--	--	--
MLP04C	Oct-14	ML14W_015	27-Oct-14	--	--	--	--	13.8
MLP05A		<i>3</i>						
MLP05A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP05A	Aug-11	ML11_008	19-Aug-11	--	--	--	--	--
MLP05A	May-12	ML12-047	7-Jun-12	--	--	--	--	--
MLP05A	Jul-12	ML12_132	25-Jul-12	--	--	--	--	--
MLP05A	Sep-12	ML12_249	12-Sep-12	--	--	--	--	--
MLP05A	Jun-13	ML13_029	16-Jun-13	13.3	42.10	--	--	--
MLP05A	Jun-14	ML14_009	6-Jun-14	6.8	19.1	--	--	--
MLP05A	Oct-14	ML14W001	26-Oct-14	--	--	--	--	--
MLP05B		<i>2</i>						

MLP05B	Jul-11	ML11_069	1-Jul-11	--	--	--	--	--
MLP05B	Aug-11	ML11_009	19-Aug-11	--	--	--	--	--
MLP05B	May-12	ML12-046	7-Jun-12	--	--	--	--	--
MLP05B	Jul-12	ML12_133	25-Jul-12	--	--	--	--	--
MLP05B	Sep-12	ML12_250	12-Sep-12	--	--	--	--	--
MLP05B	Jun-13	ML13_030	16-Jun-13	17.3	39.40	--	--	--
MLP05B	Jun-14	ML14_010	6-Jun-14	--	--	--	--	--
MLP05B	Oct-14	ML14W_002	26-Oct-14	--	--	--	--	3.9
MLP05C		<i>1</i>						
MLP05C	Jul-11	ML11_070	1-Jul-11	--	--	--	--	--
MLP05C	Aug-11	ML11_010	19-Aug-11	--	--	--	--	--
MLP05C	May-12	ML12-045	7-Jun-12	--	--	--	--	--
MLP05C	Jul-12	ML12_134	25-Jul-12	--	--	--	--	--
MLP05C	Sep-12	ML12_251	12-Sep-12	--	--	--	--	--
MLP05C	Jun-13	ML13_031	16-Jun-13	12.9	39.00	--	--	--
MLP05C	Jun-14	ML14_011	6-Jun-14	--	--	--	--	--
MLP05C	Oct-14	ML14W_003	26-Oct-14	--	--	--	--	11.7
MLP05D		<i>1</i>						
MLP05D	Jul-11	ML11_071	1-Jul-11	--	--	--	--	--
MLP05D	Aug-11	ML11_011	19-Aug-11	--	--	--	--	--

MLP05D	May-12	ML12-044	7-Jun-12	--	--	--	--	--
MLP05D	Jul-12	ML12_135	25-Jul-12	--	--	--	--	--
MLP05D	Sep-12	ML12_252	12-Sep-12	--	--	--	--	--
MLP05D	Jun-13	ML13_032	16-Jun-13	4.02	6.90	--	--	--
MLP05D	Jun-14	ML14_012	6-Jun-14	--	--	--	--	--
MLP05D	Oct-14	ML14W_004	26-Oct-14	--	--	--	--	14.7
MLP06A		<i>2</i>						
MLP06A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP06A	Aug-11	ML11_012	21-Aug-11	--	--	--	--	--
MLP06A	May-12	ML12-088	11-Jun-12	--	--	--	--	--
MLP06A	Jul-12	ML12_154	27-Jul-12	--	--	--	--	--
MLP06A	Sep-12	ML12_189	7-Sep-12	--	--	--	--	--
MLP06A	Jun-13	ML13_019	14-Jun-13	--	--	--	--	--
MLP06A	Jun-14	ML14_029	12-Jun-14	--	12.9	--	--	--
MLP06A	Oct-14	ML14W_020	27-Oct-14	--	--	--	--	--
MLP06B		<i>1</i>						
MLP06B	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP06B	Aug-11	ML11_013	21-Aug-11	--	--	--	--	--
MLP06B	May-12	ML12-087	11-Jun-12	--	--	--	--	--
MLP06B	Jul-12	ML12_155	27-Jul-12	--	--	--	--	--

MLP06B	Sep-12	ML12_190	7-Sep-12	--	--	--	--	--
MLP06B	Jun-13	ML13_020	14-Jun-13	--	--	--	--	--
MLP06B	Jun-14	ML14_030	12-Jun-14	--	4.59	--	--	--
MLP06B	Oct-14	ML14W_021	27-Oct-14	--	--	--	--	--
MLP07A		<i>2</i>						
MLP07A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP07A	Aug-11	ML11_014	21-Aug-11	--	--	--	--	--
MLP07A	May-12	ML12-090	11-Jun-12	--	--	--	--	--
MLP07A	Jul-12	--	--	--	--	--	--	--
MLP07A	Sep-12	--	--	--	--	--	--	--
MLP07A	Jun-13	ML13_017	14-Jun-13	--	--	--	--	--
MLP07A	Jun-14	--	--	--	--	--	--	--
MLP07B		<i>1</i>						
MLP07B	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP07B	Aug-11	ML11_015	21-Aug-11	--	--	--	--	--
MLP07B	May-12	ML12-089	11-Jun-12	--	--	--	--	--
MLP07B	Jul-12	--	--	--	--	--	--	--
MLP07B	Sep-12	ML12_191	7-Sep-12	--	--	--	--	--
MLP07B	Jun-13	ML13_018	14-Jun-13	--	--	--	--	--
MLP07B	Jun-14	--	--	--	--	--	--	--

MLP08A		<i>2</i>						
MLP08A	Jul-11	ML11_072	1-Jul-11	--	--	--	--	--
MLP08A	Aug-11	ML11_016	21-Aug-11	--	--	--	--	--
MLP08A	May-12	ML12-092	11-Jun-12	--	--	--	--	--
MLP08A	Jul-12	ML12_151	27-Jul-12	--	--	--	--	--
MLP08A	Sep-12	ML12_192	7-Sep-12	--	--	--	--	--
MLP08A	Jun-13	ML13_015	14-Jun-13	9.98	28.70	--	--	--
MLP08A	Jun-14	M114_001	5-Jun-14	5.2	11.7	--	--	--
MLP08B		<i>1</i>						
MLP08B	Jul-11	ML11_073	1-Jul-11	--	--	--	--	--
MLP08B	Aug-11	ML11_017	21-Aug-11	--	--	--	--	--
MLP08B	May-12	ML12-091	11-Jun-12	--	--	--	--	--
MLP08B	Jul-12	ML12_153	27-Jul-12	--	--	--	--	--
MLP08B	Sep-12	ML12_193	7-Sep-12	--	--	--	--	--
MLP08B	Jun-13	ML13_016	14-Jun-13	--	--	--	--	--
MLP08B	Jun-14	M114_002	5-Jun-14	--	3.64	--	--	--
MLP09A		<i>2</i>						
MLP09A	Jul-11	ML11_074	1-Jul-11	--	--	--	--	--
MLP09A	Aug-11	ML11_018	21-Aug-11	--	--	--	--	--
MLP09A	May-12	ML12-094	11-Jun-12	--	--	--	--	--

MLP09A	Jul-12	ML12_149	27-Jul-12	--	--	--	--	--
MLP09A	Sep-12	ML12_194	7-Sep-12	--	--	--	--	--
MLP09A	Jun-13	ML13_013	14-Jun-13	3.07	5.98	--	--	--
MLP09A	Jun-14	ML14_003	5-Jun-14	--	5.23	--	--	--
MLP09B		<i>1</i>						
MLP09B	Jul-11	ML11_075	1-Jul-11	--	--	--	--	--
MLP09B	Aug-11	ML11_019	21-Aug-11	--	--	--	--	--
MLP09B	May-12	ML12-093	11-Jun-12	--	--	--	--	--
MLP09B	Jul-12	ML12_150	27-Jul-12	--	--	--	--	--
MLP09B	Sep-12	ML12_195	7-Sep-12	--	--	--	--	--
MLP09B	Jun-13	ML13_014	14-Jun-13	1.31	3.16	--	--	--
MLP09B	Jun-14	ML14-004	5-Jun-14	0.001	2.65	--	--	--
MLP10A		<i>3</i>						
MLP10A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP10A	Aug-11	ML11_020	21-Aug-11	--	--	--	--	--
MLP10A	May-12	ML12-059	9-Jun-12	--	--	--	--	--
MLP10A	Jul-12	ML12_141	27-Jul-12	--	--	--	--	--
MLP10A	Sep-12	ML12_202	7-Sep-12	--	--	--	--	--
MLP10A	Jun-13	ML13_051	17-Jun-13	27.2	5.31	--	--	--
MLP10A	Jun-14	ML14_056	14-Jun-14	--	11.8	--	--	--

MLP10A	Oct-14	ML14W_009	26-Oct-14	--	--	--	--	<0.8
MLP10B		<i>2</i>						
MLP10B	Jul-11	ML11_076	1-Jul-11	--	--	--	--	--
MLP10B	Aug-11	ML11_021	21-Aug-11	--	--	--	--	--
MLP10B	May-12	ML12-058	9-Jun-12	--	--	--	--	--
MLP10B	Jul-12	ML12_142	27-Jul-12	--	--	--	--	--
MLP10B	Sep-12	ML12_201	7-Sep-12	--	--	--	--	--
MLP10B	Jun-13	ML13_052	17-Jun-13	10.4	15.30	--	--	--
MLP10B	Jun-14	ML14_057	14-Jun-14	10	11.40	--	--	--
MLP10B	Oct-14	ML14W_010	26-Oct-14	--	--	--	--	13.9
MLP10C		<i>1</i>						
MLP10C	Jul-11	ML11_077	1-Jul-11	--	--	--	--	--
MLP10C	Aug-11	ML11_022	21-Aug-11	--	--	--	--	--
MLP10C	May-12	ML12-057	9-Jun-12	--	--	--	--	--
MLP10C	Jul-12	ML12_143	27-Jul-12	--	--	--	--	--
MLP10C	Sep-12	ML12_200	7-Sep-12	--	--	--	--	--
MLP10C	Jun-13	ML13_053	17-Jun-13	3.85	5.30	--	--	--
MLP10C	Jun-14	ML14_058	14-Jun-14	3.1	4.59	--	--	--
MLP10C	Oct-14	ML14W_011	26-Oct-14	--	--	--	--	14.8
MLP11A		<i>3</i>						

MLP11A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP11A	Aug-11	ML11_023	21-Aug-11	--	--	--	--	--
MLP11A	May-12	ML12-063	9-Jun-12	--	--	--	--	--
MLP11A	Jul-12	ML12_169	30-Jul-12	--	--	--	--	--
MLP11A	Sep-12	ML12_206	8-Sep-12	--	--	--	--	--
MLP11A	Jun-13	ML13_055	18-Jun-13	23.1	39.80	--	--	--
MLP11A	Jun-14	ML14_51	14-Jun-14	22	1.03	--	--	--
MLP11B		2						
MLP11B	Jul-11	ML11_078	1-Jul-11	--	--	--	--	--
MLP11B	Aug-11	ML11_024	21-Aug-11	--	--	--	--	--
MLP11B	May-12	ML12-062	9-Jun-12	--	--	--	--	--
MLP11B	Jul-12	ML12_170	30-Jul-12	--	--	--	--	--
MLP11B	Sep-12	ML12_207	8-Sep-12	--	--	--	--	--
MLP11B	Jun-13	ML13_056	18-Jun-13	10.7	19.50	--	--	--
MLP11B	Jun-14	ML14_052	14-Jun-14	9.8	10.8	--	--	--
MLP11C		1						
MLP11C	Jul-11	ML11_079	1-Jul-11	--	--	--	--	--
MLP11C	Aug-11	ML11_025	21-Aug-11	--	--	--	--	--
MLP11C	May-12	ML12-061	9-Jun-12	--	--	--	--	--
MLP11C	Jul-12	ML12_171	30-Jul-12	--	--	--	--	--

MLP11C	Sep-12	ML12_208	8-Sep-12	--	--	--	--	--
MLP11C	Jun-13	ML13_057	18-Jun-13	5.63	9.00	--	--	--
MLP11C	Jun-14	ML14_053	14-Jun-14	3.9	4.96	--	--	--
MLP12A		<i>2</i>						
MLP12A	Jul-11	ML11_080	1-Jul-11	--	--	--	--	--
MLP12A	Aug-11	ML11_026	24-Aug-11	--	--	--	--	--
MLP12A	May-12	ML12-066	9-Jun-12	--	--	--	--	--
MLP12A	Jul-12	ML12_173	30-Jul-12	--	--	--	--	--
MLP12A	Sep-12	ML12_210	8-Sep-12	--	--	--	--	--
MLP12A	Jun-13	ML13_060	18-Jun-13	6.53	3.65	--	--	--
MLP12A	Jun-14	ML14_046	13-Jun-14	0.608	7.41	--	--	--
MLP12A	Oct-14	ML14W_016	27-Oct-14	--	--	--	--	--
MLP12B		<i>1</i>						
MLP12B	Jul-11	ML11_081	1-Jul-11	--	--	--	--	--
MLP12B	Aug-11	ML11_027	24-Aug-11	--	--	--	--	--
MLP12B	May-12	ML12-065	9-Jun-12	--	--	--	--	--
MLP12B	Jul-12	ML12_174	30-Jul-12	--	--	--	--	--
MLP12B	Sep-12	ML12_211	8-Sep-12	--	--	--	--	--
MLP12B	Jun-13	ML13_061	18-Jun-13	6.63	9.80	--	--	--
MLP12B	Jun-14	ML14_047	13-Jun-14	--	0.55	--	--	--

MLP12B	Oct-14	ML14W_017	27-Oct-14	--	--	--	--	17
MLP13A		2						
MLP13A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP13A	Aug-11	ML11_028	24-Aug-11	--	--	--	--	--
MLP13A	May-12	ML12-069	9-Jun-12	--	--	--	--	--
MLP13A	Jul-12	ML12_176	30-Jul-12	--	--	--	--	--
MLP13A	Sep-12	ML12_213	8-Sep-12	--	--	--	--	--
MLP13A	Jun-13	ML13_063	18-Jun-13	0.017	0.39	--	--	--
MLP13A	Jun-14	ML14_043	13-Jun-14	2	0.68	--	--	--
MLP13A	Oct-14	ML14W_018	27-Oct-14	--	--	--	--	9.2
MLP13B		1						
MLP13B	Jul-11	ML11_082	1-Jul-11	--	--	--	--	--
MLP13B	Aug-11	ML11_029	24-Aug-11	--	--	--	--	--
MLP13B	May-12	ML12-068	9-Jun-12	--	--	--	--	--
MLP13B	Jul-12	ML12_177	30-Jul-12	--	--	--	--	--
MLP13B	Sep-12	ML12_214	8-Sep-12	--	--	--	--	--
MLP13B	Jun-13	ML13_064	18-Jun-13	0.044	0.78	--	--	--
MLP13B	Jun-14	ML14_044	13-Jun-14	0.114	0.57	--	--	--
MLP13B	Oct-14	ML14W_019	27-Oct-14	--	--	--	--	13.1
MLP14A		2						

MLP14A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP14A	Aug-11	--	--	--	--	--	--	--
MLP14A	May-12	--	--	--	--	--	--	--
MLP14A	Jul-12	--	--	--	--	--	--	--
MLP14A	Sep-12	ML12_215	8-Sep-12	--	--	--	--	--
MLP14A	Jun-13	ML13_065	18-Jun-13	--	--	--	--	--
MLP14A	Jun-14	--	--	--	--	--	--	--
MLP14B		<i>1</i>						
MLP14B	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP14B	Aug-11	--	--	--	--	--	--	--
MLP14B	May-12	ML12-071	9-Jun-12	--	--	--	--	--
MLP14B	Jul-12	ML12_178	30-Jul-12	--	--	--	--	--
MLP14B	Sep-12	ML12_216	8-Sep-12	--	--	--	--	--
MLP14B	Jun-13	ML13_066	18-Jun-13	0.121	0.39	--	--	--
MLP14B	Jun-14	--	--	0.001	3.28	--	--	--
MLP15A		<i>3</i>						
MLP15A	Jul-11	ML11_083	1-Jul-11	--	--	--	--	--
MLP15A	Aug-11	ML11_030	19-Aug-11	--	--	--	--	--
MLP15A	May-12	ML12-085	11-Jun-12	--	--	--	--	--
MLP15A	Jul-12	ML12_118	24-Jul-12	--	--	--	--	--

MLP15A	Sep-12	ML12_222	9-Sep-12	--	--	--	--	--
MLP15A	Jun-13	ML13_001	10-Jun-13	--	--	--	--	--
MLP15A	Jun-14	ML14_026	7-Jun-14	0.023	3.95	--	--	--
MLP15B		<i>2</i>						
MLP15B	Jul-11	ML11_084	1-Jul-11	--	--	--	--	--
MLP15B	Aug-11	ML11_031	19-Aug-11	--	--	--	--	--
MLP15B	May-12	ML12-084	11-Jun-12	--	--	--	--	--
MLP15B	Jul-12	ML12_119	24-Jul-12	--	--	--	--	--
MLP15B	Sep-12	ML12_223	9-Sep-12	--	--	--	--	--
MLP15B	Jun-13	ML13_002	10-Jun-13	9.98	40.90	--	--	--
MLP15B	Jun-14	ML14_027	7-Jun-14	0.001	0.3	--	--	--
MLP15C		<i>1</i>						
MLP15C	Jul-11	ML11_085	1-Jul-11	--	--	--	--	--
MLP15C	Aug-11	ML11_032	19-Aug-11	--	--	--	--	--
MLP15C	May-12	ML12-083	11-Jun-12	--	--	--	--	--
MLP15C	Jul-12	ML12_120	24-Jul-12	--	--	--	--	--
MLP15C	Sep-12	ML12_224	9-Sep-12	--	--	--	--	--
MLP15C	Jun-13	ML13_003	10-Jun-13	2.41	5.98	--	--	--
MLP15C	Jun-14	ML14_028	7-Jun-14	17	22.5	--	--	--
MLP16A		<i>3</i>						

MLP16A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP16A	Aug-11	ML11_033	19-Aug-11	--	--	--	--	--
MLP16A	May-12	ML12-082	11-Jun-12	--	--	--	--	--
MLP16A	Jul-12	ML12_122	25-Jul-12	--	--	--	--	--
MLP16A	Sep-12	ML12_225	9-Sep-12	--	--	--	--	--
MLP16A	Jun-13	ML13_004	10-Jun-13	--	--	--	--	--
MLP16A	Jun-14	M114_022	6-7--14	--	0.36	--	--	--
MLP16B		<i>2</i>						
MLP16B	Jul-11	ML11_086	1-Jul-11	--	--	--	--	--
MLP16B	Aug-11	ML11_034	19-Aug-11	--	--	--	--	--
MLP16B	May-12	ML12-081	11-Jun-12	--	--	--	--	--
MLP16B	Jul-12	ML12_123	25-Jul-12	--	--	--	--	--
MLP16B	Sep-12	ML12_226	9-Sep-12	--	--	--	--	--
MLP16B	Jun-13	ML13_005	10-Jun-13	7.2	16.90	--	--	--
MLP16B	Jun-14	M114_023	7-Jun-14	0.001	0.66	--	--	--
MLP16C		<i>1</i>						
MLP16C	Jul-11	ML11_087	1-Jul-11	--	--	--	--	--
MLP16C	Aug-11	ML11_035	19-Aug-11	--	--	--	--	--
MLP16C	May-12	ML12-080	11-Jun-12	--	--	--	--	--
MLP16C	Jul-12	ML12_124	25-Jul-12	--	--	--	--	--

MLP16C	Sep-12	ML12_227	9-Sep-12	--	--	--	--	--
MLP16C	Jun-13	ML13_006	10-Jun-13	2.44	5.21	--	--	--
MLP16C	Jun-14	ML14_024	7-Jun-14	15	16.1	--	--	--
MLP17A		3						
MLP17A	Jul-11	ML11_088	1-Jul-11	--	--	--	--	--
MLP17A	Aug-11	ML11_036	19-Aug-11	--	--	--	--	--
MLP17A	May-12	ML12-073	10-Jun-12	--	--	--	--	--
MLP17A	Jul-12	ML12_125	25-Jul-12	--	--	--	--	--
MLP17A	Sep-12	ML12_229	9-Sep-12	--	--	--	--	--
MLP17A	Jun-13	ML13_039	16-Jun-13	0.804	1.46	--	--	--
MLP17A	Jun-14	ML14_035	12-Jun-14	0.008	0.66	--	--	--
MLP17A	Oct-14	ML14W_022	27-Oct-14	--	--	--	--	--
MLP17B		2						
MLP17B	Jul-11	ML11_089	1-Jul-11	--	--	--	--	--
MLP17B	Aug-11	ML11_037	19-Aug-11	--	--	--	--	--
MLP17B	May-12	ML12-072	10-Jun-12	--	--	--	--	--
MLP17B	Jul-12	ML12_126	25-Jul-12	--	--	--	--	--
MLP17B	Sep-12	ML12_230	9-Sep-12	--	--	--	--	--
MLP17B	Jun-13	ML13_041	16-Jun-13	--	--	--	--	--
MLP17B	Jun-14	ML14_036	--	--	0.7	--	--	--

MLP17B	Oct-14	ML14W_023	27-Oct-14	--	--	--	--	--
MLP17C		<i>1</i>						
MLP17C	Jul-11	ML11_090	1-Jul-11	--	--	--	--	--
MLP17C	Aug-11	ML11_038	19-Aug-11	--	--	--	--	--
MLP17C	May-12	ML12-070	10-Jun-12	--	--	--	--	--
MLP17C	Jul-12	ML12_127	25-Jul-12	--	--	--	--	--
MLP17C	Sep-12	ML12_231	9-Sep-12	--	--	--	--	--
MLP17C	Jun-13	ML13_040	16-Jun-13	0.083	0.96	--	--	--
MLP17C	Jun-14	ML14_037	7-Jun-14	0.194	1.95	--	--	--
MLP17C	Oct-14	ML14W_024	27-Oct-14	--	--	--	--	11.4
MLP18A		<i>3</i>						
MLP18A	Jul-11	--	1-Jul-11	--	--	--	--	--
MLP18A	Aug-11	ML11_039	19-Aug-11	--	--	--	--	--
MLP18A	May-12	ML12-077	10-Jun-12	--	--	--	--	--
MLP18A	Jul-12	ML12_115	24-Jul-12	--	--	--	--	--
MLP18A	Sep-12	--	--	--	--	--	--	--
MLP18A	Jun-13	ML13_034	16-Jun-13	--	--	--	--	--
MLP18A	Jun-14	ML14_038	12-Jun-14	--	2.81	--	--	--
MLP18B		<i>2</i>						
MLP18B	Jul-11	ML11_091	1-Jul-11	--	--	--	--	--

MLP18B	Aug-11	ML11_040	19-Aug-11	--	--	--	--	--
MLP18B	May-12	ML12-076	10-Jun-12	--	--	--	--	--
MLP18B	Jul-12	ML12_116_165	24-Jul-12	--	--	--	--	--
MLP18B	Sep-12	ML12_241	10-Sep-12	--	--	--	--	--
MLP18B	Jun-13	ML13_035	16-Jun-13	--	--	--	--	--
MLP18B	Jun-14	ML14_039	12-Jun-14	--	0.78	--	--	--
MLP18C		<i>1</i>						
MLP18C	Jul-11	ML11_092	1-Jul-11	--	--	--	--	--
MLP18C	Aug-11	ML11_041	19-Aug-11	--	--	--	--	--
MLP18C	May-12	ML12-075	10-Jun-12	--	--	--	--	--
MLP18C	Jul-12	ML12_117_166	24-Jul-12	--	--	--	--	--
MLP18C	Sep-12	ML12_242	10-Sep-12	--	--	--	--	--
MLP18C	Jun-13	ML13_036	16-Jun-13	3.23	10.10	--	--	--
MLP18C	Jun-14	ML14_040	12-Jun-14	--	8.68	--	--	--
MLP19A		<i>2</i>						
MLP19A	Jul-11	ML11_093	1-Jul-11	--	--	--	--	--
MLP19A	Aug-11	ML11_042	21-Aug-11	--	--	--	--	--
MLP19A	May-12	ML12-051	9-Jun-12	--	--	--	--	--
MLP19A	Jul-12	ML12_138	26-Jul-12	--	--	--	--	--
MLP19A	Sep-12	ML12_233	9-Sep-12	--	--	--	--	--

MLP19A	Jun-13	ML13_027	15-Jun-13	11.3	32.80	--	--	--
MLP19A	Jun-14	ML14_005	5-Jun-14	--	12.5	--	--	--
MLP19A	Oct-14	ML14W_005	26-Oct-14	--	--	--	--	--
MLP19B		<i>1</i>						
MLP19B	Jul-11	ML11_094	1-Jul-11	--	--	--	--	--
MLP19B	Aug-11	ML11_043	21-Aug-11	--	--	--	--	--
MLP19B	May-12	ML12-049	7-Jun-12	--	--	--	--	--
MLP19B	Jul-12	ML12_139	26-Jul-12	--	--	--	--	--
MLP19B	Sep-12	ML12_234	9-Sep-12	--	--	--	--	--
MLP19B	Jun-13	ML13_028	15-Jun-13	1.74	4.12	--	--	--
MLP19B	Jun-14	ML14_006	5-Jun-14	17	3.55	--	--	--
MLP19B	Oct-14	ML14W_006	26-Oct-14	--	--	--	--	--
ML Highway 63 Weir								
ML Highway 63 Weir	Apr-12	ML12_028_019	13-Apr-12	--	--	--	--	--
ML Highway 63 Weir	Apr-12	ML 12_020_021	15-Apr-12	--	--	--	--	--
ML Highway 63 Weir	Aug-11	ML11_063	11-Aug-11	--	--	--	--	--
ML Highway 63 Weir	May-12	ML12-078	10-Jun-12	--	--	--	--	--

ML Highway 63 Weir	May-12	ML12-101	12-Jun-12	--	--	--	--	--
ML Highway 63 Weir	May-12	ML12-030	4-Jun-12	--	--	--	--	--
ML Highway 63 Weir	May-12	ML12-031	4-Jun-12	--	--	--	--	--
ML Highway 63 Weir	Jul-12	ML12_136	25-Jul-12	--	--	--	--	--
ML Highway 63 Weir	Jul-12	ML12_140	26-Jul-12	--	--	--	--	--
ML Highway 63 Weir	Jul-12	ML12_185	4-Aug-12	--	--	--	--	--
ML Highway 63 Weir	Jul-12	--	--	--	--	--	--	--
ML Highway 63 Weir	Sep-12	ML12_188	1-Sep-12	--	--	--	--	--
ML Highway 63 Weir	Sep-12	ML12_247	10-Sep-12	--	--	--	--	--
ML Highway 63 Weir	Jun-13	ML13_067	20-Jun-13	0.026	0.69	--	--	--
ML Access Road Culvert								
ML Access Road Culvert	Aug-11	ML11_062	11-Aug-11	--	--	--	--	--

ML Access Road Culvert	Apr-12	ML12_026	13-Apr-12	--	--	--	--	--
ML Access Road Culvert	Apr-12	ML12_027	13-Apr-12	--	--	--	--	--
ML Access Road Culvert	May-12	ML12-100	11-Jun-12	--	--	--	--	--
ML Access Road Culvert	May-12	ML12-104	12-Jun-12	--	--	--	--	--
ML Access Road Culvert	Jul-12	ML12_112	18-Jul-12	--	--	--	--	--
ML Access Road Culvert	Jul-12	ML12_183	4-Aug-12	--	--	--	--	--
ML Access Road Culvert	Sep-12	ML12_240	10-Sep-12	--	--	--	--	--
ML Access Road Culvert	Jun-13	ML13_024	14-Jun-13	0.009	0.64	--	--	--
ML Access Road Culvert (E)								
ML Access Road Culvert (E)	Jul-12	ML12_179	30-Jul-12	--	--	--	--	--
ML Access Road Culvert (E)	Jul-12	ML12_184	4-Aug-12	--	--	--	--	--
ML Access Road Culvert	Sep-12	ML12_239	10-Sep-12	--	--	--	--	--

(E)								
	ML Rain Events							
ML Rain Events	18-Aug-11	ML11_064	18-Aug-11	--	--	--	--	--
ML Rain Events	12-Jun-12	ML12-102	12-Jun-12	--	--	--	--	--
ML Rain Events	12-Jun-12	ML12-103	12-Jun-12	--	--	--	--	--
ML Rain Events	25-Jul-12	ML12_130	25-Jul-12	--	--	--	--	--
ML Rain Events	27-Jul-12	ML12_156	27-Jul-12	--	--	--	--	--
ML Rain Events	29-Jul-12	ML12_167	29-Jul-12	--	--	--	--	--
ML Rain Events	25-Jul-12	ML12_129	25-Jul-12	--	--	--	--	--
ML Rain Events	4-Aug-12	ML12_182	4-Aug-12	--	--	--	--	--
ML Rain Events	7-Sep-12	ML12_204	7-Sep-12	--	--	--	--	--
	ML Bulk Rain							
ML Bulk Rain	(April to June 2012)	ML12-050	7-Jun-12	--	--	--	--	--
ML Bulk Rain	(May - 18 July 2012)	ML12_107	18-Jul-12	--	--	--	--	--
ML Bulk Rain	(17 July - 1 Sept 2012)	ML12_187	1-Sep-12	--	--	--	--	--
ML Bulk Rain	2012	ML12_248	12-Sep-12	--	--	--	--	--
ML Bulk Rain	summer2014	ML14_007	2-Jun-14	0.011	0.82	--	--	--
ML Bulk Rain	jun-nov 2014	ML14W_007	26-Oct-14	--	--	--	--	--

	Snow Survey							
Snow Survey	MLA	ML12_012	13-Mar-12	--	--	--	--	--
Snow Survey	MLE	ML12_015	13-Mar-12	--	--	--	--	--
Snow Survey	MLO	ML12_004	13-Mar-12	--	--	--	--	--
Snow Survey	MLU	ML12_008	13-Mar-12	--	--	--	--	--
Snow Survey	MLP1	ML12_001	13-Mar-12	--	--	--	--	--
Snow Survey	MLP2	ML12_002	13-Mar-12	--	--	--	--	--
Snow Survey	MLP3	ML12_003	13-Mar-12	--	--	--	--	--
Snow Survey	MLP4	ML12_005	13-Mar-12	--	--	--	--	--
Snow Survey	MLP5	ML12_006	13-Mar-12	--	--	--	--	--
Snow Survey	MLP6	ML12_009	13-Mar-12	--	--	--	--	--
Snow Survey	MLP12	ML12_013	13-Mar-12	--	--	--	--	--
Snow Survey	MLP13	ML12_011	13-Mar-12	--	--	--	--	--
Snow Survey	MLP14	ML12_010	13-Mar-12	--	--	--	--	--
Snow Survey	MLP16	ML12_017	13-Mar-12	--	--	--	--	--
Snow Survey	MLP17	ML12_018	13-Mar-12	--	--	--	--	--
Snow Survey	MLP18	ML12_016	13-Mar-12	--	--	--	--	--
Snow Survey	MLP19	ML12_007	13-Mar-12	--	--	--	--	--
Snow Survey	ML SHED	ML12_014	13-Mar-12	--	--	--	--	--

Snow Sampling	ML Bog	9-Feb-15	--	--	--	--	6.1
Snow Sampling	ML Fen	9-Feb-15	--	--	--	--	6.9
Snow Sampling	ML Upland	9-Feb-15	--	--	--	--	9.3
Snow Sampling	ML15S_001	24-Mar-15	0.055	0.31	0.115	0.1	--
Snow Sampling	ML15S_002	24-Mar-15	0.063	0.44	0.066	0.1	--
Snow Sampling	ML15S_003	24-Mar-15	0.042	0.18	0	0.12	--
Snow Sampling	ML15S_004	24-Mar-15	0.005	0.2	0.203	0.08	--
Snow Sampling	ML15S_005	24-Mar-15	< 0.002	0.24	0.241	0.08	--
Snow Sampling	ML15S_006	24-Mar-15	0.051	0.26	0	0.18	--
Snow Sampling	ML15S_007	24-Mar-15	0.081	0.64	0.643	0.15	--