REPORT FOR THE SECOND YEAR OF FULL-SCALE NITRATE ADDITION (2015) IN THE HYPOLIMNION OF ONONDAGA LAKE

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DF	dilution factor
DO	dissolved oxygen
ft.	feet
ISUS	*In situ* ultraviolet spectrophotometer
Metro	Metropolitan Syracuse Wastewater Treatment Plant (located at the southern end of Onondaga Creek adjacent to the mouth of Onondaga Creek)
mg/L	milligram per liter
MT	metric ton
ng/L	nanogram per liter (0.001 ug/L)
NO_2-N	nitrite-nitrogen
NO_3-N	nitrate-nitrogen
NYSDEC	New York State Department of Environmental Conservation
SRP	soluble reactive phosphorus
SU	Syracuse University
SUNA	submersible ultraviolet nitrate analyzer
UFI	Upstate Freshwater Institute (based in Syracuse, NY)
ug/L	microgram per liter (0.001 mg/L)
USEPA	United States Environmental Protection Agency

GLOSSARY OF TERMS

Deep Water (Profundal) – Offshore zone within a water body where water depths are greater than the depth to which sunlight can penetrate to support aquatic plants, in contrast with the littoral zone closer to shore. In Onondaga Lake, the profundal zone thermally stratifies typically from May to October.

Epilimnion - The upper portion of the water column during summer stratification where water temperatures are warmer than lower waters (typically in the portion of Onondaga Lake where water depths exceed 30 ft. [9 meters]). Epilimnion waters are warmer than the underlying hypolimnion layers and mixed by wind and waves.

Hypolimnion - The lower portion of the water column during summer stratification where water temperatures are cooler than upper waters (typically in the portion of Onondaga Lake where water depths exceed 30 ft. [9 meters]). There is less mixing in the hypolimnion than in the epilimnion.

Methylmercury - An organic form of mercury, which can be created from inorganic mercury by bacteria in sediments and water. Methylmercury is a potential neurotoxin, and the form of mercury that can most easily bioaccumulate in organisms.

Thermocline - Located within the interval of water between the epilimnion and hypolimnion corresponding to the water depth of the maximum rate of decrease in temperature with respect to depth.

EXECUTIVE SUMMARY

Full-scale addition of nitrate in Onondaga Lake during 2015 successfully met its objective and resulted in the lowest methylmercury concentrations observed in the lake to date. Nitrate concentrations in the hypolimnion (i.e., water deeper than 30 ft.) were effectively maintained at concentrations sufficient to inhibit release of methylmercury from lake sediment to overlying waters during summer stratification. This marks the fifth consecutive summer stratification season of effective methylmercury control by nitrate. Methylmercury concentrations measured in the hypolimnion of Onondaga Lake during 2015 were near background levels. Nitrate was added during 2015 in accordance with an approved operations and monitoring plan that will continue to be implemented as needed (Parsons and UFI, 2014b).

Methylmercury is released from Onondaga Lake bottom sediment in the lake's profundal zone (called Sediment Management Unit (SMU) 8) if oxygen and nitrate become depleted from lower waters during summer stratification. Thermal stratification is a natural process in temperate lakes during the summer, resulting in warm, well-mixed upper waters and cool, isolated lower waters. Temperature-induced water density differences are the primary cause of lake stratification. Dissolved oxygen (DO) and nitrate become depleted in the isolated lower waters as stratification continues through the summer unless nitrate is added to the lake. Depletion of oxygen and nitrate takes place naturally as a result of bacterial decomposition of organic matter that, without adding nitrate, gradually leads to release of methylmercury from bottom sediments to overlying deep waters. If methylmercury is released to the water column, it eventually enters the food web where it can bioaccumulate in lake organisms. The presence of nitrate in the lower waters limits methylmercury release thereby limiting mercury bioaccumulation in aquatic life within Onondaga Lake. The presence of nitrate in lower waters also reduces the extent to which soluble reactive phosphorus is released from lake sediments.

Full-scale nitrate addition completed in 2015 consisted of multiple applications of a diluted calcium nitrate solution (hereafter called nitrate). Applications of nitrate in 2015 were completed during 28 non-consecutive days from July 9 through October 19, 2015. Equipment and procedures used to add nitrate were virtually the same as those used during the 2011-2013 pilot test and during the first year of full-scale addition in 2014. Nitrate was applied from a self-propelled barge that is approximately 40 ft. long and 24 ft. wide. The barge and associated delivery equipment were designed to dilute liquid nitrate received from a specialty supplier with near-surface lake water and apply the diluted nitrate near the bottom of the lake's profundal zone in a manner that achieves relative neutral buoyancy. Nitrate added to the lake was spread laterally throughout the entire profundal zone of the lake by natural hydrodynamic forces, as determined through extensive lake monitoring.

A potential water quality impact from adding nitrate is increased nitrite-nitrogen (NO_2-N) levels in the hypolimnion to concentrations above the applicable New York State water quality standard protective of warm-water fish propagation. As in 2011 through 2014, results from 2015 indicate that adding nitrate had no significant effect on nitrite concentrations in the lake.

SECTION 1

INTRODUCTION

This report describes activities and results from the second year of full-scale nitrate addition being conducted on behalf of Honeywell. The objective for adding nitrate is to maintain nitrate concentrations in the hypolimnion of Onondaga Lake sufficient to mitigate the release and/or production of methylmercury from low levels of mercury in the lake's profundal zone (i.e., deep water) sediment (Parsons and UFI, 2014b). Methylmercury is a substance that bioaccumulates in aquatic organisms and can make fish unsuitable for human consumption.

As Onondaga Lake surface water temperatures increase during spring and early summer months, the water column thermally stratifies with the warmer, less dense waters of the epilimnion overlying the colder, denser waters of the hypolimnion. The epilimnion and hypolimnion are separated at a water depth of approximately 30 ft. (9 meters) by the thermocline, which greatly limits transport between these layers. The hypolimnion is subject to depletion of dissolved oxygen followed by depletion of nitrate during the stratification period, which typically extends from mid-May through mid-to-late October. When concentrations of oxygen and nitrate are low, profundal sediments can release methylmercury to the water column. Methylmercury, if present in the profundal zone of the lake, can be transported to the upper waters primarily when lake waters mix in the fall at a time known as fall turnover. During summer periods in years prior to the nitrate addition pilot test, depletion of nitrate in lower waters resulted in higher methylmercury concentrations in those waters.

During 2007 and 2008, releases of methylmercury to the hypolimnion were found to be substantially lower than in prior years due primarily to elevated nitrate concentrations in the lake. The increase in nitrate was a consequence of wastewater treatment upgrades implemented at the Onondaga County Metropolitan Syracuse Wastewater Treatment Plant (Metro) located along the southern (upstream) shore of Onondaga Lake. Wastewater treated at Metro is discharged into the nearshore waters of the lake. In 2004, Onondaga County began operating a biologically-active filter system at Metro that converts ammonia in wastewater to nitrate. As a result, the available pool of nitrate in the hypolimnion at the start of summer stratification approximately doubled. In 2005, Onondaga County implemented an advanced phosphorous-removal system that resulted in decreased algal growth in the upper waters of the lake and reduced demand for oxygen and nitrate in the hypolimnion. As a consequence of Metro's additional wastewater treatment efforts, nitrate persisted in the Onondaga Lake hypolimnion for a significantly greater time during the summer months of 2007 and 2008, which inhibited the release of methylmercury from SMU 8 sediments (Upstate Freshwater Institute [UFI] and Syracuse University (SU), 2007; Todorova et al., 2009). The nitrate addition pilot test conducted successfully for three years from 2011 through 2013 further inhibited the release of methylmercury from profundal zone sediments.

The remedy for the Onondaga Lake bottom is described in a Record of Decision prepared by the New York Department of Environmental Conservation (NYSDEC) and the United States Environmental Protection Agency (USEPA) (2005). In 2014, following completion of the three-year nitrate addition pilot test, NYSDEC and USEPA issued an Explanation of Significant

Differences that specifies continuation of nitrate addition to the hypolimnion of Onondaga Lake as warranted during summer and early fall time periods (NYSDEC and USEPA, 2014).

During 2015, as during the pilot test completed from 2011-2013 and the first year of full-scale nitrate addition in 2014, liquid nitrate solution was diluted with upper lake waters and added directly to the lower waters at three locations in the profundal zone. One application location was in the northern basin of Onondaga Lake, and the other two application locations were in the southern basin of the lake (Figure 1). The three application locations used in 2015 were the same locations where nitrate was applied during 2011-2014

Nitrate was added to the lower, stratified waters of Onondaga Lake during 2015 as 28 non-consecutive, single-day applications from July 9 through October 19 (see Table 1). During each application day, a target one-day dose of liquid calcium nitrate solution[1] was applied at one of the three application locations.

Monitoring of lake conditions during 2015 provided the basis for assessing lake conditions directly and indirectly associated with nitrate addition. Three-dimensional monitoring of nitrate concentrations in the profundal zone of the lake was completed twice per week during the period of nitrate addition. Thirty-four (34) locations were monitored each week and a subset of 10 of those locations was monitored later in the week. In addition, surface water samples were collected at the South Deep location on 23 different dates from May 18 to November 17, 2015 and analyzed to confirm the effectiveness of adding nitrate.

Fall turnover, which marks the end of summer stratification, takes place in Onondaga Lake between mid-October and early November, depending on complex lake mixing and meteorological factors. In 2015, fall turnover of Onondaga Lake occurred on October 30 which was approximately one week earlier than in 2011 and 2013 and four days later than in 2012 and 2014.

This report for 2015 presents equipment information in Section 2, nitrate addition procedures and observations in Section 3, and a discussion and summary of results in Sections 4 and 5, respectively. Appendix A presents an example of daily monitoring information provided on the same day when field data were collected. Appendix B is a summary of nitrate concentrations observed one meter above the lake bottom. Appendix C is the Data Usability and Summary Report for relevant laboratory water quality data compiled in 2015. Appendix D presents water depth profile plots of dissolved oxygen, nitrate-nitrogen (NO_3-N), total mercury and methylmercury water concentrations. Appendix E presents total dissolved gas data for 2015.

No extreme events were encountered in 2015 that could have significantly affected quantities of nitrate added to the lake. Such extreme events include nitrification treatment at Metro going offline for a significant time during the spring or the lake not turning over in early spring following winter stratification. If either of these events would occur, the nitrate application system can be effectively implemented earlier in the year to meet program objectives (Parsons and UFI, 2014b).

[1] The liquid calcium nitrate used was labeled CN-8 by the supplier Yara Chemical, of Tampa, Florida

SECTION 2

NITRATE APPLICATION EQUIPMENT

2.1 DESIGN BASIS

Nitrate addition was initiated in 2015 prior to hypolimnetic nitrate-nitrogen concentrations falling below 1 milligram per liter (mg/L) at the 18-meter water depth and continued until a few weeks prior to fall turnover.

Nitrate additions were designed during the pilot test to be conducted at three predetermined locations in the lake (Figure 1). The three locations where nitrate was applied are referred to as North, South Location #1 (hereafter called South1), and South Location #2 (hereafter called South2). The desired minimum concentration of nitrate (1 mg/L) was identified based on frequent water quality monitoring of methylmercury and nitrate in the profundal zone of Onondaga Lake since 2006 and a historical review of methylmercury releases from Onondaga Lake profundal zone sediments. Based on these data, historical sediment nitrate demand, and an assessment of the potential for induced demand, the design demand was identified as 1.0 metric ton (MT) of nitrate-nitrogen per day or about 7.0 MT per week (Parsons and UFI, 2011). The design objectives and basis for delivering nitrate to the lower waters of the profundal zone in Onondaga Lake are presented in the approved plan for adding nitrate (Parsons and UFI, 2014b).

2.2 BARGE AND EQUIPMENT

The 2015 barge as well as piping and instrumentation on the barge and in the UFI monitoring boats were the same as used in 2014 (see Figures 2 through 4 in Parsons and UFI, 2014a). The application system is a modular barge comprised of three joined 8.5-ft. by 40-ft. sections that house the storage and delivery equipment. Nitrate was stored on the barge in two polyethylene holding tanks housed inside storage basins that provided secondary containment. Other equipment aboard the barge consisted of two dilution water pumps, two chemical pumps, a propulsion-driven power unit, a generator, a manifold for delivering dilution water and calcium nitrate to water depths up to 60 ft (18 meters), a shed for storage and protection, a portajon, and a deck crane. Each of the two dilution water pumps was equipped with a 12-inch diameter suction line and discharge line connected to a chemical feed pump and associated piping. The barge was specifically designed and constructed to include essential equipment while minimizing potential hazards and obstacles affecting system operations and optimizing operating work space and efficiency. For example, the barge was suitably protected from ground fault circuit interruption.

The 2015 barge equipment layout included the same types of equipment used during the three-year pilot test and year one of the full scale application. Each of the two dilution water pumps used during 2015 could efficiently pump to the hypolimnion a total of up to 3,500 gallons per minute of warmer, less dense dilution water from the lake's epilimnion mixed with the liquid nitrate that has a density of 1.48 to 1.49 times the density of lake water.

SECTION 3

NITRATE ADDITION PROCEDURES AND OBSERVATIONS

3.1 NITRATE APPLICATION SEQUENCE

The 2015 lake water quality monitoring work at the South Deep location conducted on behalf of Honeywell began on May 18 for mercury and continued through November 16. Measurements of dissolved oxygen, nitrate and other water quality parameters in the deep portion of Onondaga Lake prior to the first application provided information needed to determine when to start adding nitrate to the lake. Water quality measurements during the nitrate application period helped to guide how much nitrate to apply at each location. Field water quality monitoring was also conducted on October 19 and October 26, 2015 following the last application of nitrate in 2015 and prior to turnover and on November 3 and November 17, 2015 following lake turnover.

An onshore support zone for storing and refilling the nitrate holding tanks on the barge was located along the lake's western shoreline on Honeywell property. Onshore support included a 16,000-gallon portable nitrate holding tank fitted with secondary containment and associated pumps and hosing.

In 2015, nitrate was applied continuously at one of the three pre-determined locations for approximately four to seven hours during each application day. The duration of each application depended on how much nitrate was to be added that day and the extent of dilution needed to keep the nitrate near but above the lake bottom (i.e., increased dilution meant longer pumping times to apply the same volume of nitrate). A total of 28 applications of nitrate were completed during 2015, including 13 applications at South 1, five applications at the South 2, and 10 applications at the North location.

Each application of nitrate in 2015 involved the same three steps as during the pilot test and the first year of full-scale nitrate addition. First, the barge was moved and anchored at the designated application location. A concrete block anchoring system at each application location held the barge stationary for the duration of an application. Second, inflow and outflow piping with end-of-pipe diffusers was positioned deep within the lake water column. Third, the barge pumps provided water from the epilimnion that was mixed on the barge with full-strength nitrate. The extent of diluting nitrate with water from the epilimnion was guided during each application by in-lake monitoring. The resulting neutrally buoyant nitrate-water mixture was directed to the lower waters in the lake hypolimnion via the hoses and diffusers. Each application continued until the desired quantity of nitrate was applied to meet the anticipated nitrate demand in that portion of the lake at the desired dilution to achieve neutral buoyancy.

Tables 1 and 2 summarizes work completed as part of each 2015 nitrate application. In general, applications were conducted during two to three days each week, moving from location to location as directed by results from in-lake monitoring. The pace of applications was slower during July when nitrate was not applied due to relatively high nitrate concentrations observed in the hypolimnion at that time. Applications were not required during two time periods: between July 9 and July 23 and between July 23 and August 3. Table 2 provides operational information, including application location, target dilution factor (DF), lake water temperature and specific conductivity data, nitrate and dilution water flow rates, durations, and the total amount of calcium nitrate applied during each application of nitrate in 2015. A total of 56 MT of nitrate-nitrogen were added to the lower waters of Onondaga Lake during 2015 compared to 57 MT in 2014, 63 MT in 2013, 72 MT in 2012, and 88 MT in 2011. The reduction in nitrate applied from 2011-2015 was likely due to both improved efficiency of the nitrate applications and reduced sediment demand for nitrate. Continued future declines in the amount of nitrate added should not be assumed.

3.2 IN-LAKE MONITORING

The extent of in-lake monitoring completed in association with each 2015 application of nitrate is summarized in Tables 3 and 4. In-lake monitoring was conducted by UFI deploying an *in situ* ultraviolet spectrophotometer (ISUS) or a submersible ultraviolet nitrate analyzer (SUNA) from a boat. UFI provided near real-time feedback on the vertical position of added nitrate several times each day during which an application occurred. Figure 2 illustrates the 2015 lake monitoring locations.

The objective of in-lake monitoring was to observe and characterize the vertical and horizontal distribution of nitrate in the lake. Measurements of water depth, nitrate-nitrogen, sulfide, temperature, specific conductivity, turbidity and parameters associated with light penetration and primary productivity were collected every 0.25 meter vertically throughout the water column at 34 locations. These data were downloaded and processed, and a summary of the day's lake nitrate concentrations was provided the same day nitrate was applied. Each data summary included nitrate-nitrogen profiles at each monitoring location as well as bubble plots illustrating nitrate-nitrogen concentrations at particular depths within the hypolimnion, including one plot of all measurements taken 1 meter above the lake bottom across the footprint of the hypolimnion. A UFI monitoring boat was also used to collect nitrate data in the lake near the barge an hour or two after the start of each nitrate application to collect profiles to identify the effective water depth where the calcium nitrate solution was applied (see comments in Table 2).

The performance of ISUS-SUNA nitrate monitoring in Onondaga Lake has been compared with laboratory measurements of nitrate in Onondaga Lake water since 2006. Results from the ISUS-SUNA monitoring performed in 2015 were compared with nitrate measurements in UFI's laboratory of profundal zone water collected on the same date, and the comparison for 2015 again demonstrates that ISUS-SUNA measurements are reliable (Figure 3). The nitrate sensor was checked in distilled water routinely (Figure 3c) and re-calibrated or replaced when fell outside of acceptable limits (±0.028 mgN/L).

In addition to monitoring during each nitrate application, surface water samples were collected at South Deep on 23 different dates from May 18 to November 17, 2015 (Table 3) and analyzed for various water quality parameters including total mercury and methylmercury consistent with lake water monitoring efforts completed since 2008. Selected surface water samples from the 2-meter and 16-meter water depths were also analyzed for filtered (i.e., dissolved) total mercury. Surface water samples were collected weekly at South Deep from

June 30 through November 3, 2015. Collected surface water samples were analyzed for total mercury, methylmercury, and forms of nitrogen (i.e., nitrate, nitrite and ammonia). Samples collected from mid-June until later October in waters 14 meters and deeper were also analyzed for ferrous iron, manganese and soluble reactive phosphorus. Fixed-frequency monitoring focused on sample collection at the South Deep location because water quality at the South Deep location was determined to be representative of water quality conditions throughout Onondaga Lake's profundal zone.

SECTION 4

DISCUSSION OF 2015 NITRATE ADDITION RESULTS

The objective of adding nitrate is to maintain summertime nitrate-nitrogen levels in the lower hypolimnion (below the 14-meter water depth) at or above 1 mg/L, thereby limiting accumulations of methylmercury in hypolimnion waters. This section describes:

- Natural development of thermal stratification over time
- Oxygen and nitrate resources of the hypolimnion
- Effect of nitrate applications on nitrate levels
- Nitrite concentrations in lake water
- Other related monitoring from early July through mid-October 2015 when nitrate was being applied

4.1 THERMAL STRATIFICATION OBSERVED OVER TIME

The thermocline of a lake is located at the position of maximum temperature change with water depth and is the boundary between the epilimnion and the hypolimnion. Average thermocline depth is measured at the South Deep robotic monitoring location (ISUS-11 located on Figure 2).

Stratification became established by early May 2015, limiting further significant inputs of oxygen and nitrate from the epilimnion downward to the hypolimnion (below the 30-ft. water depth in Onondaga Lake). Stratification initiates an annual period of oxygen and nitrate depletion and locks in place the “ambient” oxygen and nitrate pools or supplies. The depth of the thermocline between the epilimnion and hypolimnion is relatively stable through July and August and then descends through September and more rapidly during October until the water column becomes effectively mixed in the vertical dimension, which in 2015 occurred on October 30.

4.2 DISSOLVED OXYGEN AND NITRATE OBSERVATIONS

Figures 4 and 5 present 2015 dissolved oxygen and nitrate-nitrogen concentrations at the South Deep location for four different water depths from mid-May through mid-November 2015. Figure 6 illustrates the depletion of the dissolved oxygen pool at the onset of stratification from mid-May to mid-July 2015, based on measurements from the UFI robotic buoy at the South Deep location. Most of the oxygen available in the hypolimnion during 2015 prior to lake stratification was consumed by the end of June.

Nitrate applications were successful again in 2015 in keeping the nitrate-nitrogen levels above 1 mg/L throughout the summer months and throughout the hypolimnion (Figure 5). The cumulative mass of nitrate-nitrogen applied in 2015 to the lower hypolimnion over time was 55 MT. The mass of nitrate-nitrogen in the hypolimnion prior to the start of stratification in early May 2015 was approximately 110 MT. Wastewater from Metro is the primary input of nitrate-nitrogen to the lake. A dry spring in the Onondaga Lake watershed translates to less dilution of

Metro effluent in the lake resulting in higher nitrate concentrations in the lake. Metro effluent contains on average of approximately 12 mg/L of nitrate-nitrogen. As a result of the density of the Metro effluent being similar to the density of the upper waters of Onondaga Lake, the Metro discharge typically enters the epilimnion or upper metalimnion, rather than they hypolimnion, during summer stratification.

Figure 7 presents volume-weighted average nitrate concentrations and mass in the hypolimnion before, during and following nitrate addition in 2015. The green triangles in Figure 7 are volume-weighted nitrate concentrations in mg/L as nitrogen, while the blue diamonds and red circles present mass of nitrogen. In general, the average rate of nitrate addition in 2015 was approximately 0.6 MT of nitrate-nitrogen per day (4 MT per week) throughout the application season, which was lower than the basis of design and average addition rate for 2008 through 2010 of 0.8 MT per day (5.6 MT per week). Figure 7 also illustrates the hypolimnion's response to applications of nitrate, with average nitrate concentrations stabilizing when applications of nitrate were ongoing. Only two nitrate applications were necessary prior to August 2015(see Table 1) when hypolimnion nitrate-nitrogen concentrations remained sufficiently high without adding nitrate. Applications were stopped for the year after October 19 in anticipation of fall turnover.

Figure 8 illustrates nitrate depletion rates in the hypolimnion of Onondaga Lake in 2015 represented by measurements in the South Basin and North Basin during May and June prior to applying nitrate and during the July period when no applications were needed. Nitrate depletion in the South Basin averaged 0.0086 mg/L of nitrate-nitrogen per day during May-June 2015 prior to commencing nitrate applications on July 9 compared to a depletion of 0.0087 mg/L of nitrate-nitrogen per day in the North Basin prior to applying nitrate. Nitrate depletions observed in both basins during July when nitrate was not applied were higher than depletion rates observed during May and June. However, the estimated nitrate depletion rates in July are somewhat uncertain because they are based on three observations. Nitrate depletion rates are typically higher when concentrations of nitrate in the hypolimnion are higher.

Table 7 presents lake conditions and observations on an annual basis for 2011 through 2015 that are important factors associated with adding nitrate. Spring turnover nitrate is the concentration of nitrate in lake waters as the waters begin to stratify, which typically takes place in May each year. The 2015 concentration of spring turnover nitrate was close to the average expected concentration assuming the Metro nitrification treatment unit is operating as planned. The term, shutdown, on Table 7 refers to a summertime period when nitrate did not need to be added.

Figure 9 presents the distribution of average nitrate concentrations in the hypolimnion from mid-April through October 2015. Areas of the lake with water depths less than 17.5 meters (57 ft.) were generally exposed to nitrate-nitrogen concentrations between 1 and 2 mg/L for most of the July to early October time period when nitrate was being applied. Sediments below the 18-meter (59-ft.) water depth were generally exposed to nitrate concentrations greater than 2 mg/L during the nitrate application period.

Figure 10 illustrates the spatial and temporal extent of the measured nitrate-nitrogen concentrations in 2015 at water depths 1 meter (3 ft.) above profundal zone sediments.

Concentrations of nitrate-nitrogen in these deepest waters generally ranged from 1.25 to 2.0 mg/L throughout the 2015 nitrate application period.

4.3 DILUTION AND DISPERSION OF APPLIED NITRATE

Because the specific gravity of the liquid calcium nitrate was 1.49 in 2015, which was consistent with specific gravity determinations for the nitrate added during the pilot test, significant dilution was required to produce a neutrally-buoyant, water-nitrate mixture, a characteristic essential to taking advantage of natural hydrodynamic forces that spread the nitrate around the lower depths of the lake. Once an appropriate dilution factor was identified for an application of nitrate from lake monitoring efforts, the same dilution factor was used as a starting point for the next application. Further minor adjustments to dilution and pump rates were made based on real-time lake monitoring to achieve a neutrally buoyant plume. Figure 11 illustrates epilimnion (dilution water) and hypolimnion water temperatures and dilution factors for the 2015 application time period.

During the summer of 2015, dispersion by natural hydrodynamic forces was again sufficient to distribute nitrate horizontally across the hypolimnion from the three application locations. Appendix A provides an example of the daily ISUS-SUNA data reports produced and issued by UFI to verify the application and distribution of the applied nitrate. Appendix B presents the bubble plots prepared by UFI illustrating conditions across the hypolimnion at a distance of 1 meter (3 ft.) above the lake bottom. The target nitrate-nitrogen concentration of 1 mg/L continued to be met in lower hypolimnion waters throughout the 2015 season, and minimal concentrations of methylmercury were observed in the lower waters. Again during the 2015 nitrate application season, the dilution water pumps were operated at their full capacity of approximately 3,500 gallons per minute.

Applications of nitrate were terminated for 2015 on October 19, based on an assessment of the size of the remaining nitrate pool in the hypolimnion and anticipated uptake of nitrate in lower waters of the lake through an estimated late turnover timeframe of early November. Approximately 84 MT of nitrate-nitrogen remained in the lake’s hypolimnion on October 19, 2015 (Figure 7), compared to 97 MT on October 14, 2014, 71 MT on October 10, 2011, 101 MT on October 4, 2012, and 70 MT on October 10, 2013, which was the last day of nitrate applications in those years.

The lowest surface water concentration of nitrate-nitrogen as measured by the laboratory at South Deep was 1.25 mgN/L on September 29, 2015 at a water depth of 12m. The lowest field nitrate-nitrogen concentration measured was 0.98 mgN/L on October 5, 2015 from Site 26 at a water depth of 12.5m. This was the only field nitrate-nitrogen concentration measured below 1.0 mgN/L.

4.4 SIGNIFICANCE OF 2015 NITRITE WATER CONCENTRATIONS

Nitrite-nitrogen (NO_2-N) concentrations measured in Onondaga Lake from 2006 through 2015 have been compared to the New York State surface water quality standard established to protect warm water fish from effects of nitrite (Figure 12). The surface water quality standard for nitrite (100 micrograms per liter as nitrogen) was exceeded on only three days during 2015, and the exceedances have been generally less significant since 2011 than before nitrate addition. Concentrations of nitrite remained below the New York State surface water quality standard in the upper waters where fish reside.

4.5 2015 LAKE WATER MERCURY CONCENTRATIONS

Methylmercury was not significantly released from underlying sediment to lower hypolimnion waters during the summer of 2015 when deep lake waters would be prone to methylmercury release in the absence of nitrate addition. This lack of methylmercury release from SMU 8 sediment demonstrates that nitrate addition was again effective in 2015 as it has been since being started in 2011. From the beginning of the 2015 nitrate applications on July 9 through turnover of the lake on October 30, the maximum concentration of methylmercury observed in the lower waters of the lake was 0.13 nanogram per liter or ng/L (where 1 ng/L is 0.000001 of mg/L) on October 20, 2015, at the 18-meter water depth (Table 5 and Figures 13 and 14). Figure 14 presents methylmercury and unfiltered total mercury results measured at South Deep over time at water depths of 2 meters (epilimnion), 12 meters (near the top of the hypolimnion), 16 meters (mid-to-lower hypolimnion), and 18 meters (bottom of the hypolimnion). Figure 14 shows the highest total mercury concentration (5.9 ng/L) measured in samples collected on October 20 coinciding with the approach of complete mixing of the water column at the time of fall turnover. Elevated total mercury concentrations in the hypolimnion during fall have been recurring and are likely related to sediment resuspension. Methylmercury concentrations have not shown similar increases in the fall.

Volume-weighted average hypolimnion water concentrations for dissolved oxygen, nitrate-nitrogen, and methylmercury for the summer-fall time period from 2007 through 2010 were compared to concentrations observed from 2011 through 2014. Methylmercury concentrations were considerably lower in the lake's hypolimnion in 2011 through 2015 compared to recent prior years (Figures 15 and 16). Low methylmercury concentrations in Onondaga Lake since 2011 are consistent with the higher nitrate concentrations (as a result of nitrate additions) in those years compared to recent prior years. Methylmercury concentrations in Onondaga Lake hypolimnion water have declined dramatically aided by the addition of nitrate. Methylmercury in the lower hypolimnion has been barely detectable since nitrate has been added beginning in 2011.

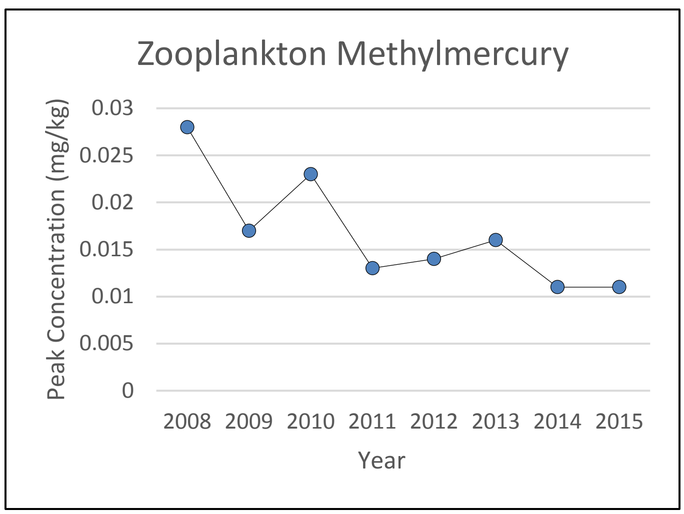
Table 6 summarizes dissolved mercury concentrations in samples collected in 2015 at the 2-meter water depth in the lake's epilimnion. None of the 13 dissolved mercury results for water samples collected in 2015 at the 2-meter water depth exceeded the New York State surface water quality standard for dissolved mercury (0.7 ng/L). None of the results from water samples collected every other week during September and October in the lake's hypolimnion at the 16-meter depth exceeded the New York State surface water quality standard for dissolved mercury.

The highest dissolved mercury concentration measured in 2015 was 0.62 ng/L from a sample collected on June 16 at the 2-meter water depth.

4.6 OTHER RELATED 2015 LAKE MONITORING

Other types of work completed in 2015 associated with nitrate addition were laboratory analyses for soluble reactive phosphorus, ferrous iron, and manganese in deep waters that are anoxic during the summer period. An additional benefit to maintaining nitrate levels in the hypolimnion during periods of anoxia is that release of phosphorus from deep lake sediments has been reduced (Figure 17). The presence of nitrate in waters near the lake bottom prevents the reduction of iron oxyhydroxides that is typical in anaerobic surface sediments, which in turn reduces the release of phosphorus bound to those compounds. The same mechanism preventing release of phosphorus from anaerobic lake sediment is thought to control the release of methylmercury from sediments (Matthews et al., 2013). Ferrous iron was largely not detected during 2015 in anoxic waters at the 18-meter water depth (the highest detected concentration was 6 ug/L and the limit of detection was 3.5 ug/L). Manganese concentrations at the 18-meter water depth increased from less than 1 mg/L in June to 3.0 mg/L in October.

Total mercury and methylmercury concentrations were measured in zooplankton collected at the South Deep location in 2015. The highest total mercury concentration observed in 2015 in zooplankton was 0.072 mg/kg (or parts per million) on a wet-weight basis observed on July 28. The highest methylmercury concentration observed in 2015 in zooplankton was 0.011 mg/kg on September 9 which continues to demonstrate how zooplankton methylmercury concentrations have declined as a result of adding nitrate to the lake. The trend graph on the right shows peak zooplankton methylmercury concentrations (in mg/kg based on wet-weight) from 2008 to 2015, illustrating this downward trend. The highest portion of methylmercury observed in 2015 as a percentage of total mercury was 34 percent on September 15. The full data set for total mercury and methylmercury analysis in zooplankton during 2015 is included in the Draft Onondaga Lake Tissue and Biological Monitoring Report for 2015 and 2016 (Parsons and Anchor QEA, 2017).



Water velocity meters were again deployed at two locations near the South Deep and North Deep locations and total dissolved gas was measured at the South Deep location. Water velocities were measured as water velocity vectors at a water depth approximately 1 meter above the lake bottom to monitor for significant water velocity magnitude and direction changes over time. Water velocity measurements showed no significant short-term changes and a peak velocity of less than 0.3 meters per second.

Total dissolved gas data are presented in Appendix E, and results from 2015 are consistent with prior year measurements.

SECTION 5

SUMMARY OF 2015 NITRATE ADDITION RESULTS

Results from the second year of full-scale nitrate addition (2015) showed successful delivery of sufficient quantities of liquid calcium nitrate to the lower hypolimnion of Onondaga Lake during summer stratification to meet the objective and thereby minimize methylmercury concentrations in deep waters of the lake. Nitrate-nitrogen concentration were maintained both vertically near the lake bottom and laterally throughout the bottom waters of the lake's profundal zone, thus inhibiting the release of methylmercury from profundal zone sediments. Methylmercury release from profundal zone sediment into the water column continues to be effectively controlled.

A total of 55 metric tons of nitrate-nitrogen were added to the hypolimnion of Onondaga Lake between July 9 and October 19, 2015. Sediment nitrate demand in the summer of 2015 was approximately 0.6 metric tons per day compared to the nitrate demand of 0.8 metric tons per day included in the earlier nitrate addition design on which applications of nitrate beginning in 2011 were based. Applications of nitrate continued uninterrupted at a typical pace of two to three applications per week with the exception of a two time periods when nitrate did not need to be applied: 14 days between July 9 and July 23 and 10 days between July 23 and August 3.

SECTION 6

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TABLES

TABLE 1
2015 NITRATE ADDITION SUMMARY

Date/Location[1]	Metric Tons (as N) of CN-8 Applied[2]	Application Water Depth[3] (feet)	Dilution Water to CN-8 Volume Ratio[4]	Date/Location	Metric Tons (as N) of CN-8 Applied[2]	Application Water Depth[3] (feet)	Dilution Water to CN-8 Volume Ratio[4]
July 9 / S1	2.25	57	344	October 1 / S2	2.21	56	531
July 23 / S1	2.25	57	393	October 5 / N	2.16	57	500
August 3 / N	2.22	55	416	October 7 / S1	2.22	59	590
August 5 / S1	2.25	57	394	October 8 / N	2.22	52	571
August 10 / S2	2.16	57	390	October 15 / N	2.19	52	568
August 12 / S1	2.17	57	399	October 16 / S1	1.34	59	565
August 17 / S2	2.22	57	431	October 19 / S1	0.69	59	191
August 20 / N	0.66	57	409				
August 21 / N	1.56	57	411				
August 24 / S1	2.27	57	401				
August 26 / S2	2.21	57	415				
August 31 / S1	2.16	57	395				
Sept 2 / N	2.19	56	403				
Sept 8 / S1	2.19	55	395				
Sept 10 / N	2.22	54	406				
Sept 15 / S1	2.22	55	449				
Sept 17 / N	2.22	57	467				
Sept 21 / S2	1.26	59	503				
Sept 23 / S1	2.22	59	523				
Sept 28 / N	2.22	53	458				
Sept 30 / S1	1.65	56	529				

Total nitrate applied = 55.8 Metric Tons

NOTES:

[1] S1 is the South Location 1, S2 is the South Location 2, and N is the North Location (see Figure 1).

[2] 2.3 metric tons = 4,800 gallons for CN-8 based on the density of CN-8.

[3] Water depth at the bottom of the 4-foot long diffuser at the lower end of each application pipe (same as target depth presented on Table 2).

[4] The ratio of dilution water to CN-8 is the flows of epilimnion water from Pump A and Pump B divided by flows of CN-8 from Chemical System A + Chemical System B (same as dilution factor presented on Table 2).

TABLE 2
Summary of 2015 Applications of Nitrate in Onondaga Lake

		*buoy used								
Date		7/9/2015	7/23/2015	8/3/2015	8/5/2015	8/10/2015	8/12/2015	8/17/2015	8/20/2015	8/21/2015
Location		South #1	South #1	North	South #1	South #2	South #1	South #2	North	North
Dilution Factor (epilimnion water flow divided by nitrate flow)		344	393	416	394	390	399	431	409	411
Nitrate Flow_gauge	gpm	12	11	10.5	11	11	10.75	10	10.25	10.5
Nitrate Flow_correction factor		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Nitrate Flow_actual	gpm	9.60	8.80	8.40	8.80	8.80	8.60	8.00	8.20	8.40
Epilimion Water Flow_System A	gpm	3091	3422	3468	3468	3421	3433	3445	3295	3434
Epilimion Water Flow_System B	gpm	3519	3490	3526	3466	3449	3429	3450	3406	3471
Water temperature_epilimnion	degrees C	22.4	23.6	24.7	23.9	24.3	22.8	24.9	25.3	24.9
Specific conductance_epilimnion	uS/cm	1437	1478	1493	1697	1713	1753	1728	1734	1727
Total Water Depth at Application Location	feet	64	64	59	63.5	63	63.5	63	59	59
Target Water Depth for Adding Nitrate	feet	57	57	55	57	57	57	57	57	57
Water Temperature _target depth	degrees C	8	9.5	11.2	8.7	10.9	9.5	9	9.2	10.8
Specific Conductance _target depth	uS/cm	1828	1650	1331	1848	2086	1865	1980	1832	2108
Start time_dosing	24-hour clock	A: 1030; B: 1100	1020	1135	0950	1140	0930	1120	1112	0911
Start Volume_Tank A	gallons	2569	2569	2569	2569	2569	2569	2569	2569	1880
Start Volume_Tank B	gallons	2569	2569	2569	2569	2569	2569	2569	2569	1880
End Volume_Tank A	gallons	219	219	251	219	313	313	251	1880	251
End Volume_Tank B	gallons	219	219	251	219	313	298	251	1880	251
Total Volume of CN-8 Applied	gallons	4700	4700	4637	4700	4512	4527	4637	1379	3259
Comments (nitrate flows are based on gauge readings)		Plume detected right at the bottom, no adjustments made. Leak detected at 12m. (Faulty hose)	1150 - UFI observed plume at 17.5m. No adjustments needed.		1045 - UFI says plume is a tad heavy. Will adjust chemical very slightly to try to raise it up a little	1250 - UFI says plume is around 17-17.5 m. No need for adjustments	1005 - UFI observed plume at bottome. Adjusted chemical to 10.5 gpm.		16.5-17, due to the wind Tony (UFI) was not sure, but said to keep it as is and when he gets to the office he will process the data and get back to Kelly if adjustments are needed.	Start addition @10.5; up from 10.25 per Tony (UFI). Continuation of injection from Thurs. stop due to weather.
End Time_dosing	24-hour clock	A: 1430; B: 1515	1430	A:1530, B:1545	1415	1550	1405	1554	1231	1223

Note:

1. Data in this table include initial setup readings of pumps and meters. Comments include changes during run time and final CN-8 flow.

Definitions:

1 CN-8: Liquid calcium nitrate provided by Yara Chemical. The density of CN-8 is 1.48 times the density of water.

2 Dilution factor is the ratio of dilution water flow from the lake epilimnion to flow of CN-8. The density of the water:CN-8 mixture varies daily with lake water temperature and salinity. Specific conductance values were measured to quantify salinity.

3 gpm: gallons per minute

4 uS/cm: Microsiemens per centimeter, or the unit of measure of specific conductance.

5 Start Volume and End Volume: Applies to CN-8.

6 Target Depth: The specific depth of release of the CN-8 as controlled by the length of individual hoses which were manually connected to the manifold prior to each application. Early on in the season the target depth identified by a height of 2-3m off of the bottom depending on what the specific water depth was at N, S1 or S2 on a given day. Where the target depths are not consistent with being 2 to 3 meters above the lake bottom, the target depths were based on monitoring within the hypolimnion at the N, S1 or S2 application locations and recent nitrate demand at each location.

7 MT NO3-N: Metric tons of nitrate-nitrogen. One metric ton is 1,000 kilograms or 2,240 pounds.

TABLE 2
Summary of 2015 Applications of Nitrate in Onondaga Lake

Date		8/24/2015	8/26/2015	8/31/2015	9/2/2015	9/8/2015	9/10/2015	9/15/2015	9/17/2015	9/21/2015
Location		South #1	South #2	South #1	North	South #1	North	South #1	North	South #2
Dilution Factor (epilimnion water flow divided by nitrate flow)		401	415	395	403	395	406	449	467	503
Nitrate Flow_gauge	gpm	10.75	10.25	10.75	10.5	10.75	10.5	9.5	9.25	8.5
Nitrate Flow_correction factor		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Nitrate Flow_actual	gpm	8.60	8.20	8.60	8.40	8.60	8.40	7.60	7.40	6.80
Epilimion Water Flow_System A	gpm	3400	3417	3407	3400	3397	3406	3410	3461	3387
Epilimion Water Flow_System B	gpm	3500	3385	3388	3375	3389	3421	3416	3451	3460
Water temperature_epilimnion	degrees C	24	23	23.2	23.3	26	24.2	21.65	22	21.1
Specific conductance_epilimnion	uS/cm	1788	1800	1835	1753	1880	1811	1882	1830	1805
Total Water Depth at Application Location	feet	63	64	63.8	59.7	63.4	57.8	62.8	63	63
Target Water Depth for Adding Nitrate	feet	57	57	57	56	55	54	55	57	59
Water Temperature _target depth	degrees C	9.1	9.4	9.1	10	9.7	8.84	8.9	10.1	9.2
Specific Conductance _target depth	uS/cm	1900	1871	1875	1871	1847	1858	1862	1388	1858
Start time_dosing	24-hour clock	1303	0920	1130	0945	1220	1130	0953	0900	1447
Start Volume_Tank A	gallons	2569	2569	2569	2569	2569	2569	2569	2569	2569
Start Volume_Tank B	gallons	2569	2569	2569	2569	2569	2569	2569	2569	2569
End Volume_Tank A	gallons	188	282	313	282	282	251	251	251	1253
End Volume_Tank B	gallons	219	251	313	282	282	251	251	251	1253
Total Volume of CN-8 Applied	gallons	4731	4606	4512	4574	4574	4637	4637	4637	2632
Comments (nitrate flows are based on gauge readings)		plume is good at 10.75	Needed to adjust plume to 10.5 @ 1024.	Pump "B" Baker Model:1233-P Baker #: 00000038029 Serial: 172018 Oil Pump: P550 779 #2366 Changed 6/3/15	Calibrated YSI Check oil in "B" Baker Pump Checked hose gaskets	UFI varified no adjustments needed @ 1330	Inlet pipe on Baker pump "B" was not sucking water. Run "A" only today.	Started at 10.75, 1055 UFI called to adjust to 10.25, 1205 called again to adjust to 9.5	Started CN8 at 9.5, adjusted to 9.25 per UFI	Started nitrate flow at 9.25, adjusted down to 8.5 per UFIs measurements
End Time_dosing	24-hour clock	1715	1400	1535	1430	1648	1455	1447		1800

Note:
1. Data in this table include initial setup readings of pumps and meters. Comments include changes during run time and final CN-8 flow.

Definitions:
1 CN-8: Liquid calcium nitrate provided by Yara Chemical. The density of CN-8 is 1.48 times the density of water.
2 Dilution factor is the ratio of dilution water flow from the lake epilimnion to flow of CN-8. The density of the water:CN-8 mixture varies daily with lake water temperature and salinity. Specific conductance values were measured to quantify salinity.
3 gpm: gallons per minute
4 uS/cm: Microsiemens per centimeter, or the unit of measure of specific conductance.
5 Start Volume and End Volume: Applies to CN-8.
6 Target Depth: The specific depth of release of the CN-8 as controlled by the length of individual hoses which were manually connected to the manifold prior to each application. Early on in the season the target depth identified by a height of 2-3m off of the bottom depending on what the specific water depth was at N, S1 or S2 on a given day. Where the target depths are not consistent with being 2 to 3 meters above the lake bottom, the target depths were based on monitoring within the hypolimnion at the N, S1 or S2 application locations and recent nitrate demand at each location.
7 MT NO3-N: Metric tons of nitrate-nitrogen. One metric ton is 1,000 kilograms or 2,240 pounds.

TABLE 2
Summary of 2015 Applications of Nitrate in Onondaga Lake

Date		9/23/2015	9/28/2015	9/30/2015	10/1/2015	10/5/2015	10/7/2015	10/8/2015	10/15/2015	10/16/2015	10/19/2015
Location		South #1	North	South #1	South #2	North	South #1	North	North	South #1	South #1
Dilution Factor (epilimnion water flow divided by nitrate flow)		526	458	529	531	500	590	571	568	565	191
Nitrate Flow_gauge	gpm	8	9.25	8	8	8.5	7.25	7.5	7.5	7.5	A:19 , B: 16.5
Nitrate Flow_correction factor		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Nitrate Flow_actual	gpm	6.40	7.40	6.40	6.40	6.80	5.80	6.00	6.00	6.00	A: 15.2 , B: 13.2
Epilimion Water Flow_System A	gpm	3397	3394	3405	3407	3397	3430	3435	3429	3393	3397
Epilimion Water Flow_System B	gpm	3340	3391	3369	3391	3400	3410	3419	3384	3387	3380
Water temperature_epilimnion	degrees C	20.6	20.9	20.2	19.6	16.9	17	16.9	15.7	15.4	14.1
Specific conductance_epilimnion	uS/cm	1794	1711	1926	1866	1898	1909	1899	1917	1930	1940
Total Water Depth at Application Location	feet	63	58.1	63	64	63	64	57.9	57.9	64	64
Target Water Depth for Adding Nitrate	feet	59	53	56	56	57	59	52	52	59	59
Water Temperature _target depth	degrees C	9.1	12.1	9.5	9.3	9.6	9.7	10.1	10	9.5	9.9
Specific Conductance _target depth	uS/cm	1317	2056	1859	1866	1864	1863	1887	1902	1891	1912
Start time_dosing	24-hour clock	1023	1210	0920	1113	1130	0911	0923	0920	1130	1600
Start Volume_Tank A	gallons	2569	2569	2569	2569	2569	2569	2569	2569	2569	1159
Start Volume_Tank B	gallons	2569	2569	2569	2569	2569	2569	2569	2569	2350	1191
End Volume_Tank A	gallons	251	251	846	251	313	251	251	282	1159	345
End Volume_Tank B	gallons	251	251	846	282	313	251	251	282	971	564
Total Volume of CN-8 Applied	gallons	4637	4637	3447	4606	4512	4637	4637	4574	2789	1441
Comments (nitrate flows are based on gauge readings)		Start CN8 flow at 8.5, decreased to 8 per UFI	No adjustments needed UFI 1225 New YSI from Pine, old one would not calibrate	0954 - UFI says plume is good no adjustments needed . 0955 leaking hose, had to shut down and fix. 1023 - hose fixed resumed dosing.	1146 - UFI says plume is too high reduced from 8.5 to 8; 1230 - UFI says plume is good	Started chemical at 9 decreased per UFI	Started chemcial at 7.5 decreased to 7.25 per UFI				
End Time_dosing	24-hour clock	1616	1718	1427	1708	1700	1549	1645	1600	1545	1700

Note:

1. Data in this table include initial setup readings of pumps and meters. Comments include changes during run time and final CN-8 flow.

Definitions:

1 CN-8: Liquid calcium nitrate provided by Yara Chemical. The density of CN-8 is 1.48 times the density of water.

2 Dilution factor is the ratio of dilution water flow from the lake epilimnion to flow of CN-8. The density of the water:CN-8 mixture varies daily with lake water temperature and salinity. Specific conductance values were measured to quantify salinity.

3 gpm: gallons per minute

4 uS/cm: Microsiemens per centimeter, or the unit of measure of specific conductance.

5 Start Volume and End Volume: Applies to CN-8.

6 Target Depth: The specific depth of release of the CN-8 as controlled by the length of individual hoses which were manually connected to the manifold prior to each application. Early on in the season the target depth identified by a height of 2-3m off of the bottom depending on what the specific water depth was at N, S1 or S2 on a given day. Where the target depths are not consistent with being 2 to 3 meters above the lake bottom, the target depths were based on monitoring within the hypolimnion at the N, S1 or S2 application locations and recent nitrate demand at each location.

7 MT NO3-N: Metric tons of nitrate-nitrogen. One metric ton is 1,000 kilograms or 2,240 pounds.

TABLE 3
ONONDAGA LAKE MONITORING SCOPE FOR 2015 NITRATE ADDITION

Date (Week of:)	South Deep Water column Samples	Field Nitrate Profiling 34 Locations	Zooplankton	Sediment Trap Mercury (10m water depth)	Dissolved Gas Measurements
18-May	3 depths	10 locations	□	○	-
25-May	-	-	-		⊙
1-Jun	3 depths	10 locations	-	○	-
15-Jun	3 depths	10 locations	□	○	-
22-Jun	-	10 locations	-		⊙
29-Jun	3 depths		□	○	-
6-Jul	4 depths		-	○	⊙
13-Jul	4 depths		□	○	-
20-Jul	4 depths		-		⊙
27-Jul	4 depths		□	○	-
3-Aug	4 depths	34 locations once per week	-		⊙
10-Aug	4 depths		□	○	-
17-Aug	4 depths		-		⊙
24-Aug	4 depths		□	○	-
31-Aug	4 depths		□	○	⊙
7-Sep	4 depths		□	○	-
14-Sep	4 depths		□	○	-
21-Sep	4 depths	10 locations once per week	□	○	⊙
28-Sep	4 depths		□	○	-
5-Oct	4 depths		□	○	⊙
12-Oct	4 depths		□	○	-
19-Oct	4 depths		□	○	⊙
26-Oct	4 depths		□	○	-
2-Nov	3 depths		□	○	⊙
16-Nov	3 depths	10 locations	□	○	-

Notes:
1. Sediment traps were deployed typically for seven days. Trap recovery dates are shown in this table.
2. Sediment trap results for 2015 are reported in the 2015 MNR Data Summary Report.
3. Fall turnover occurred on 30 October, 2015 after which only three water depths were collected.
4. From June 29 through November 2 field nitrate profiling was conducted weekly at 34 locations and 10 of the locations were monitored again later in the week. In addition, approximately five profiles were taken near the barge while nitrate was applied.

TABLE 4

SUMMARY OF 2015 ISUS-SUNA MEASUREMENTS FOR ONONDAGA LAKE NITRATE ADDITION

Measurement period	April 15 to November 16
Frequency of profiling	Typically two days per week (43 total monitoring days)
Vertical resolution	Measurements every 0.25 meters from lake surface to near bottom
Locations	34 locations were profiled once per week 10 locations were profiled once per week Barge support profiles until injection completion (10/15/15)
Total profiles	909
Total measurements of nitrate	50,624
Selected parameters and accuracy	Nitrate to plus or minus 0.028 mg/L as nitrogen (N)
	Sulfide to plus or minus 0.064 mg/L as sulfur (S)
	Water temperature to plus or minus 0.1 degree Celsius
	Specific conductance to plus or minus 3 microsiemens per centimeter

Notes: ISUS - in-situ ultraviolet spectrophotometer

SUNA - submersible ultraviolet nitrate analyzer

Other paramaters measured were turbidity, beam attenuation coefficient, backscattering, chlorophyll fluorescence, and photosynthetically-active irradiance.

TABLE 5

2015 MERCURY CONCENTRATIONS IN SURFACE WATER NEAR THE LAKE BOTTOM AT SOUTH DEEP

(Concentration (ng/l) at the 18-Meter Water Depth)

2015 SAMPLING DATE	TOTAL MERCURY	METHYL-MERCURY	
May 18	0.670	0.026	U
June 2	0.600	0.040	J
June 16	0.770	0.032	J
June 30	0.690	0.048	J
July 7	0.890	0.052	
July 14	0.970	0.040	J
July 21	0.820	0.054	
July 28	0.840	0.044	J
August 4	0.790	0.063	
August 11	0.970	0.086	
August 18	0.880	0.103	
August 25	1.020	0.080	J+
September 1	0.850	0.050	J+
September 9	0.990	0.068	
September 15	1.160	0.078	
September 22	1.880	0.114	
September 29	1.500	0.060	
October 6	4.360	0.114	
October 13	4.580	0.120	
October 20	5.910	0.130	
October 27	3.710	0.096	
November 3	4.390	0.097	
November 17	1.190	0.047	U

U - not detected at reporting limit specified
J - estimated concentration
J- - estimated concentration biased low
J+ - estimated concentration biased high

Note: Fall turnover occurred on October 30.

TABLE 6

2015 DISSOLVED MERCURY WATER CONCENTRATIONS: SOUTH DEEP LOCATION AT THE 2-METER WATER DEPTH

2015 SAMPLING DATE	DISSOLVED MERCURY, ng/L	
May 18	0.350	J
June 16	0.620	
June 30	0.310	J
July 14	0.220	J
July 28	0.300	J
August 11	0.230	J
August 25	0.200	J
September 9	0.230	J
September 22	0.190	J
October 6	0.210	J
October 20	0.200	J
November 3	0.080	U
November 17	0.290	J

* Exceeds New York State surface water quality standard of 0.7 ng/L for Class B/C waters, such as Onondaga Lake, based on human consumption of fish.

U - not detected at reporting limit indicated

J - estimated value

TABLE 7
KEY NITRATE ADDITION INTER-ANNUAL VARIATIONS IN ONONDAGA LAKE

Year	Spring Turnover Nitrate-N, mg/L	Metric Tons of Calcium-Nitrate Applied	Pre-application Nitrate-N Depletion Rates (mg/L/d) in the Southern Basin with 95% Confidence Intervals	Nitrate-N Depletion Rates (mg/L/d) in the Southern Basin During Mid-Season Shutdown with 95% Confidence Intervals	Duration of Summer Stratification, days
2011	2.0	88	0.0079±0.0005	0.0138±0.0018	184
2012	2.6	72	0.0118±0.0013	No Shutdown	163
2013	2.9	63	0.0154±0.0042	0.0196±0.0013	178
2014	2.3	57	0.0077±0.0008	0.0132±0.0059	167
2015	*2.5*	*56*	*0.0086±0.0020*	*0.0122±0.33**	*180 (5/3-10/30)*

* No additions between July 10 and July 22. However, only three griddings were completed between the addition dates (July 9 and July 23) resulting in very large 95% Confidence Intervals

Note: During the years from 2007 through 2010 prior to adding nitrate, nearly all of the hypolimnion surface water methylmercury concentrations at the 18-meter water depth above 0.5 nanograms per liter were observed when nitrate-N was less than 0.5 mg/L.

FIGURES

Date Revised: 11/12/2013 10:06:07 AM

Path: Q:\GIS\GIS_Lake\Baseline_Monitor\MXDs\2011_NitrateInjectLocs.mxd

2015 Nitrate Application Locations

Bathymetry Contours For Water Depth

10 Foot Intervals

30 Foot Water Depth Contour

0 1,200 2,400 4,800 7,200

Feet

Figure 1

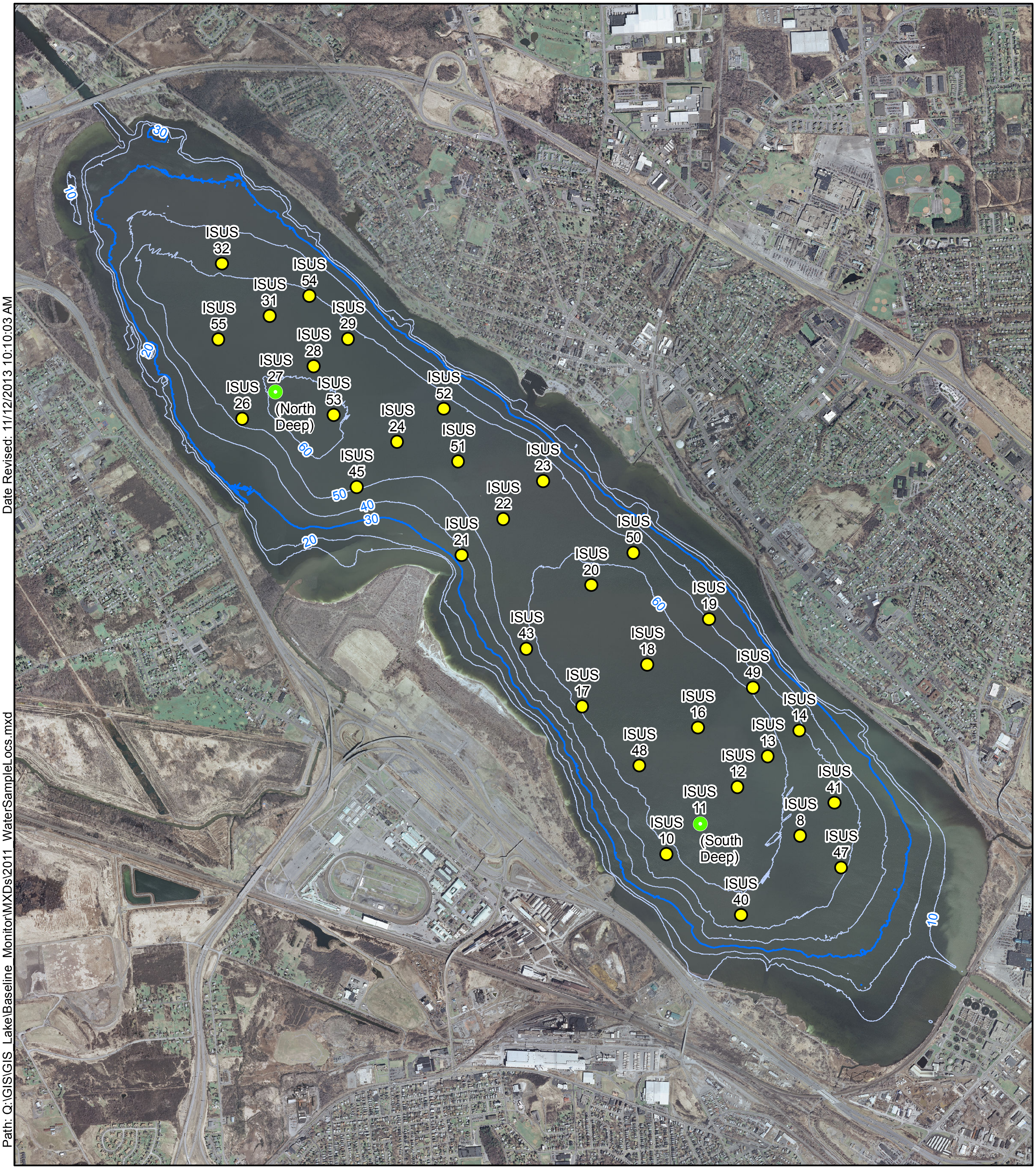
Honeywell

Onondaga Lake
Syracuse, New York

2015 Nitrate Application Locations

PARSONS

301 Plainfield Road, Suite 350; Syracuse NY 13212 Phone:(315)451-9560



Date Revised: 11/12/2013 10:10:03 AM

Path: Q:\GIS\GIS_Lake\Baseline_Monitor\MXDs\2011_WaterSampleLocs.mxd

North Deep and South Deep

ISUS-SUNA Monitoring Location

Bathymetry Contours For Water Depth

10 Foot Intervals

30 Foot Water Depth Contour

0 1,200 2,400 4,800 7,200

Feet

Figure 2

Honeywell

Onondaga Lake
Syracuse, New York

2015 ISUS-SUNA
Monitoring Locations

PARSONS

301 Plainfield Road, Suite 350; Syracuse NY 13212 Phone:(315)451-9560

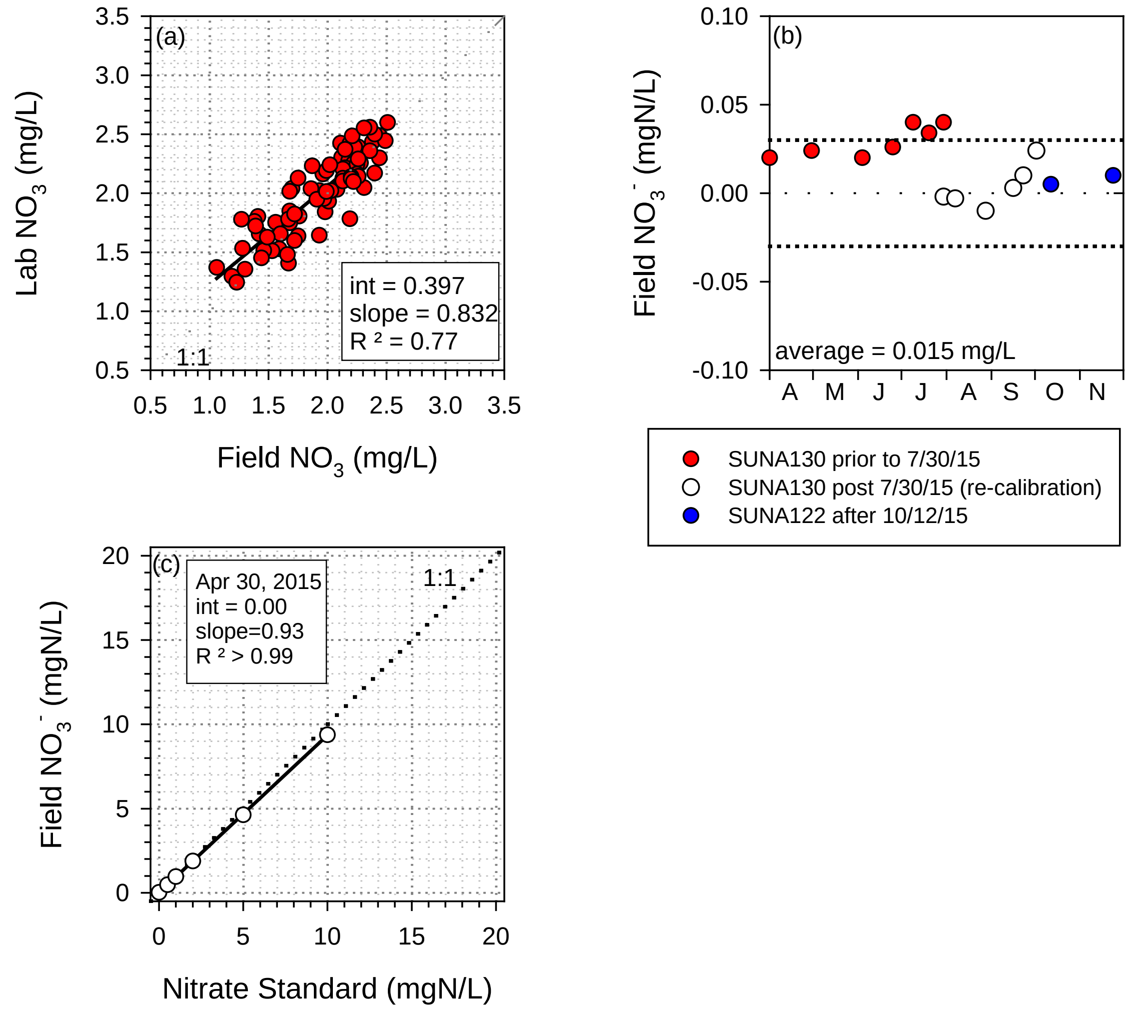


Figure 3. Comparison of Paired 2015 Field and Laboratory Surface Water Results for Nitrate (NO_3^-): (a) all paired field and lab data from South Deep, (b) time series of distilled water laboratory checks with the zero line and upper and lower bounds of field instrument NO_3^- accuracy (±0.028 mgN/L), and (c) field instrument verification with laboratory nitrate standards (initial spring verification).

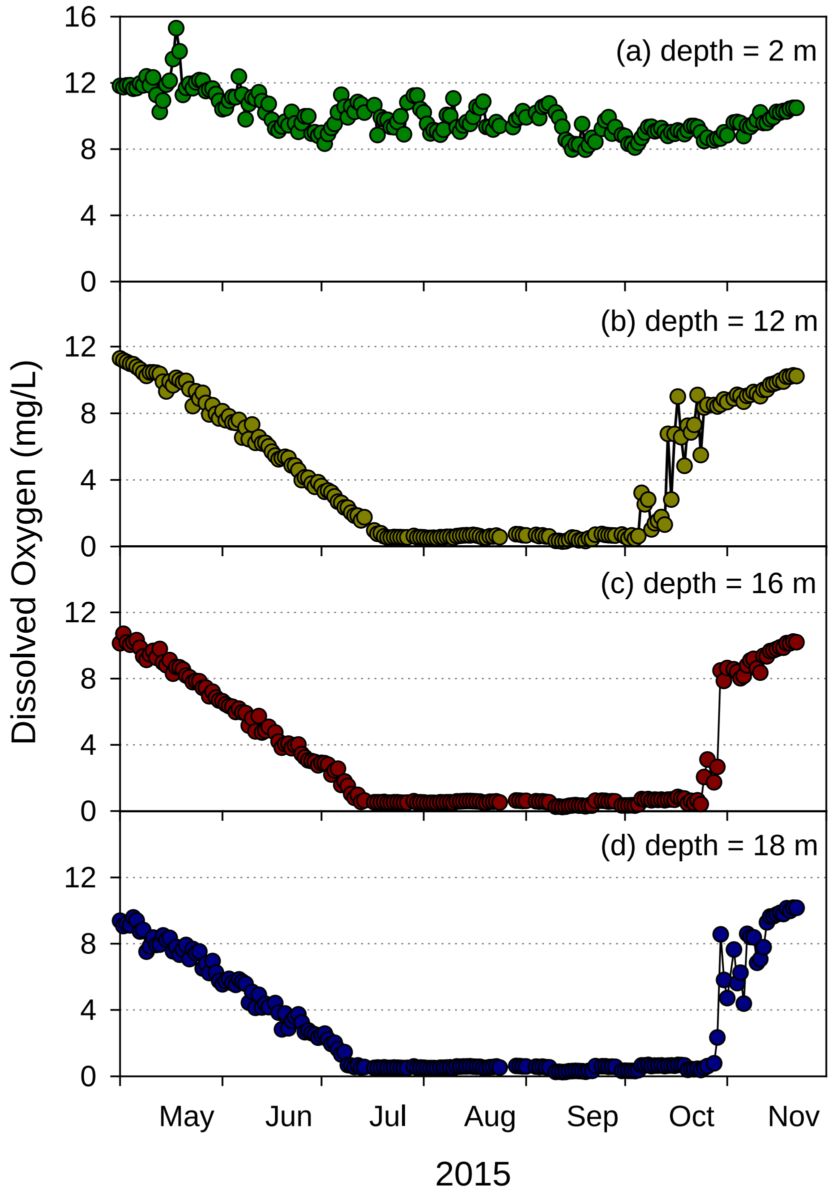


Figure 4. Measurements of Dissolved Oxygen from the Onondaga Lake South Deep Buoy in 2015: (a) 2, (b) 12, (c) 16, and (d) 18-Meter Water Depths.

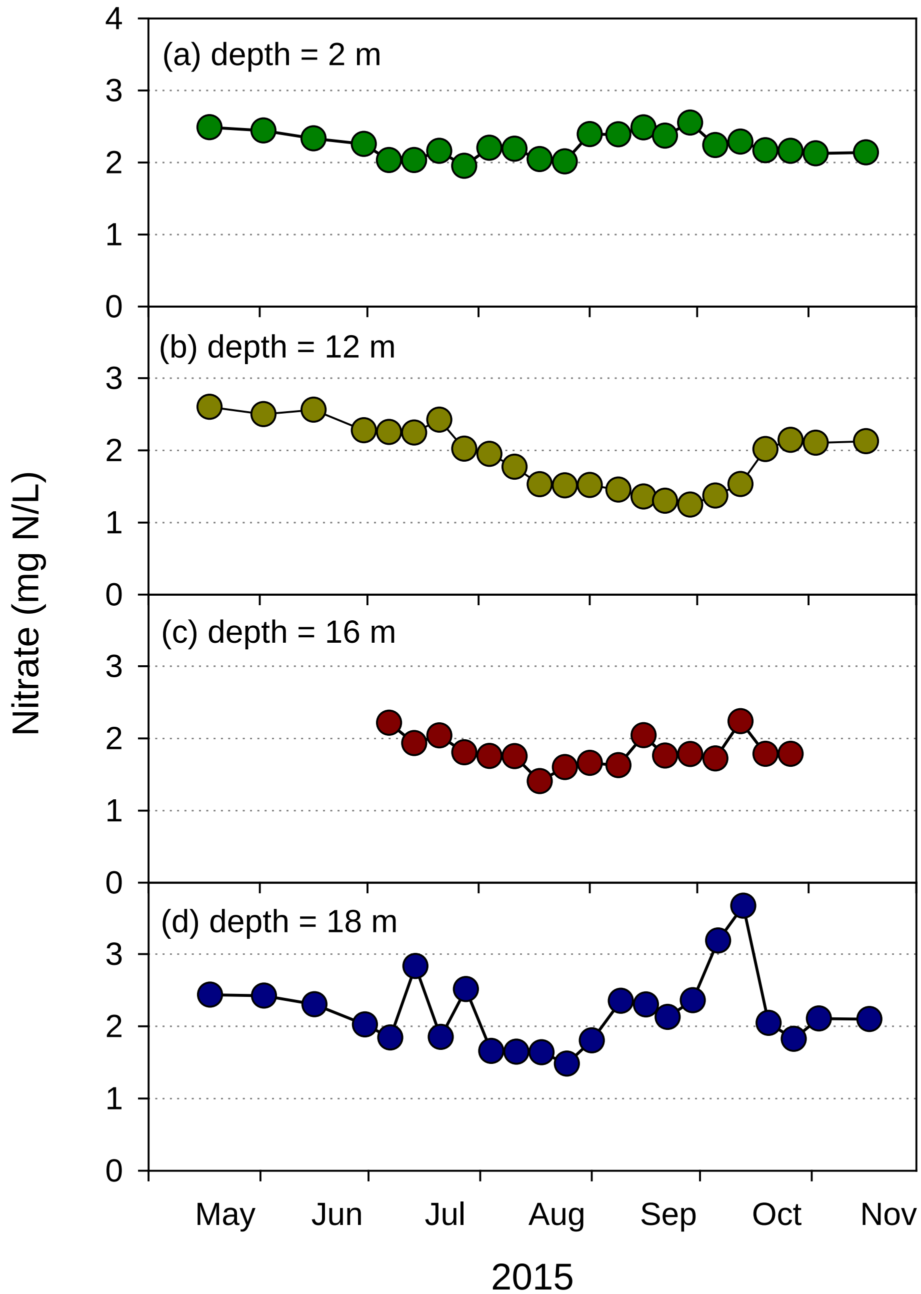


Figure 5. Laboratory Measurements of Nitrate at Onondaga Lake South Deep in 2015: (a) 2, (b) 12, (c) 16, and (d) 18-Meter Water Depths.

Figure 6
Dissolved Oxygen Masss in Onondaga Lake Hypolimnion During 2015 Stratification

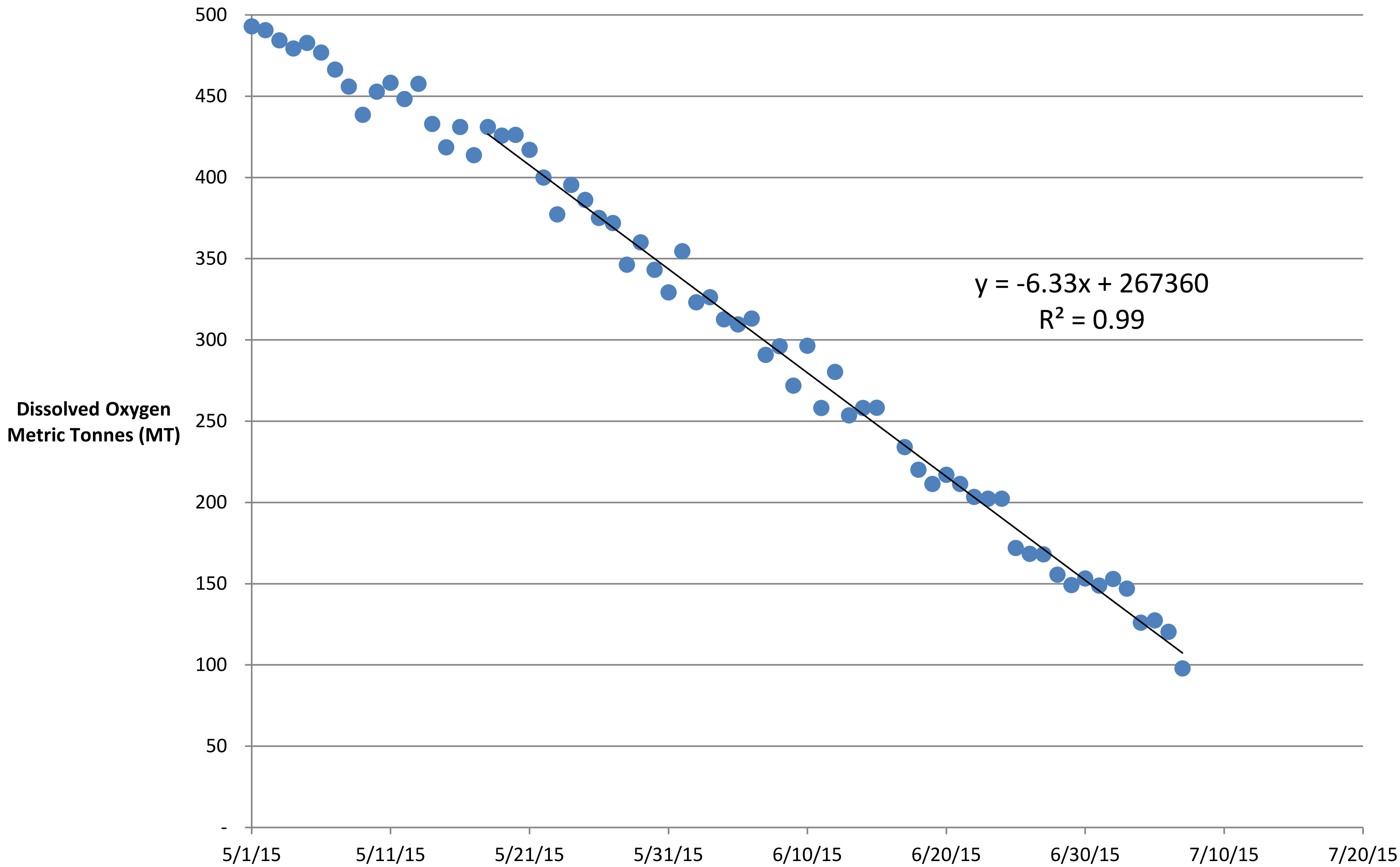
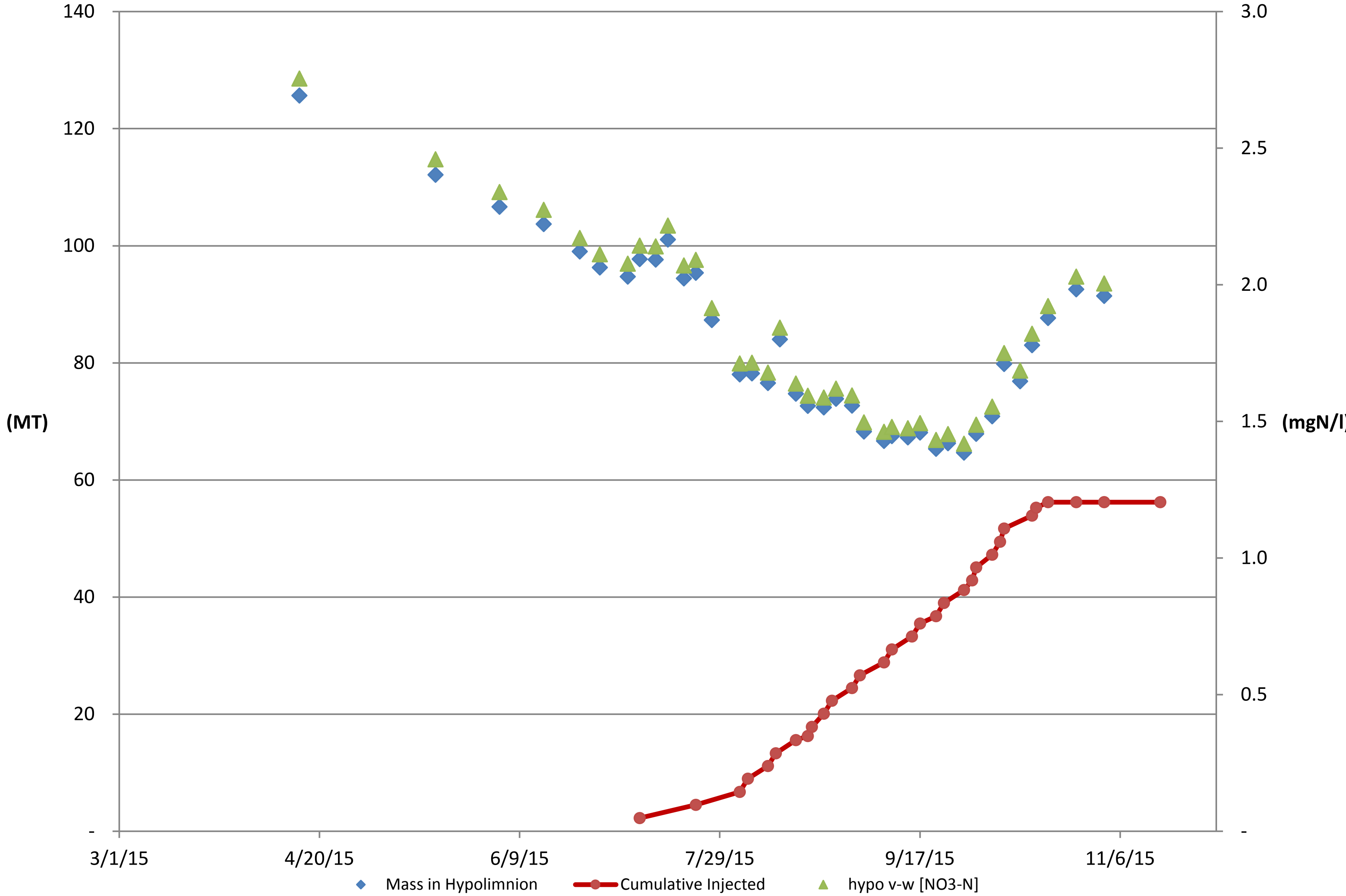


Figure 7
2015 Volume-Weighted Hypolimnetic Average Nitrate Concentration (below Thermocline) and Cumulative Mass of Nitrate-Nitrogen Applied



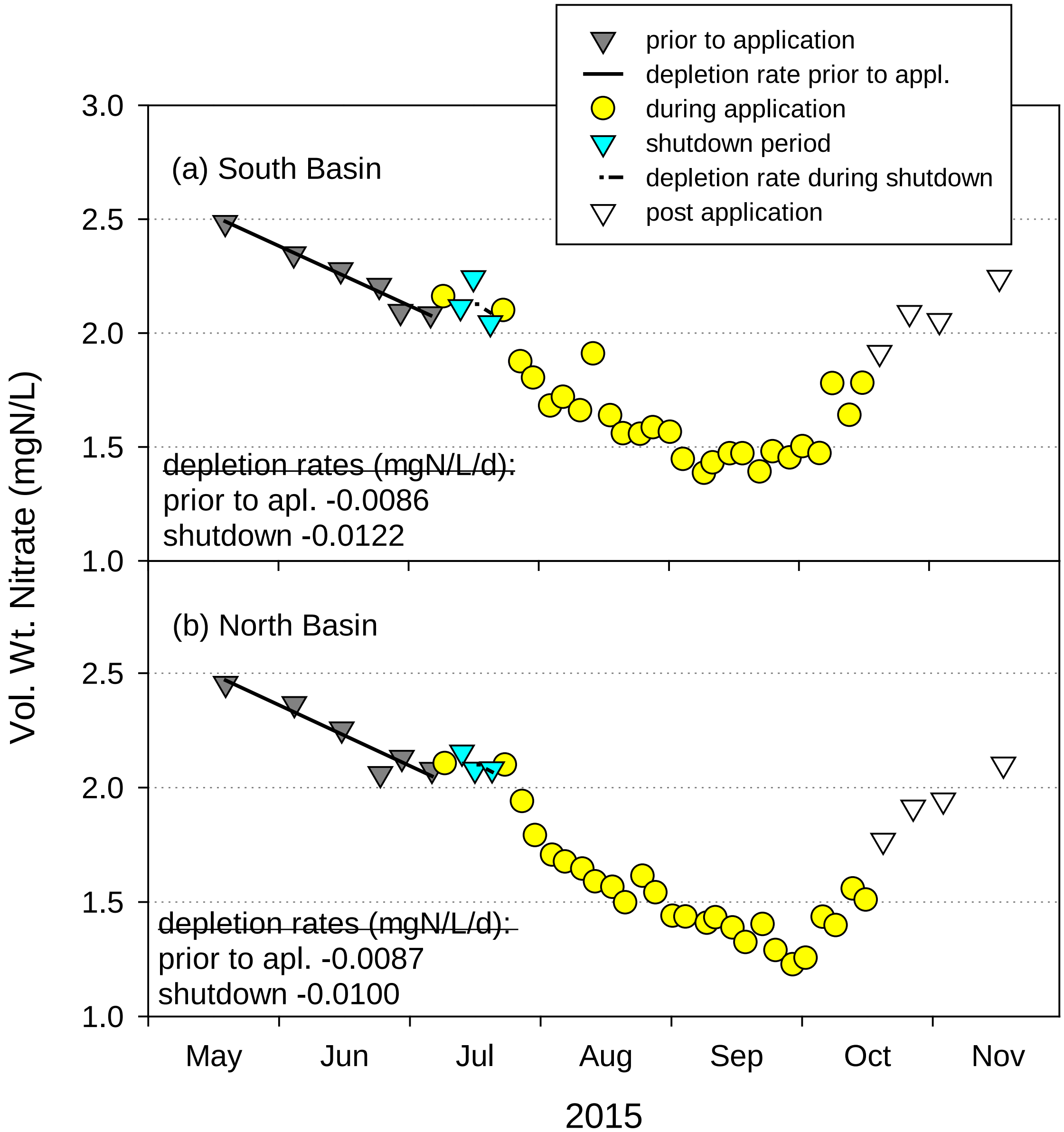
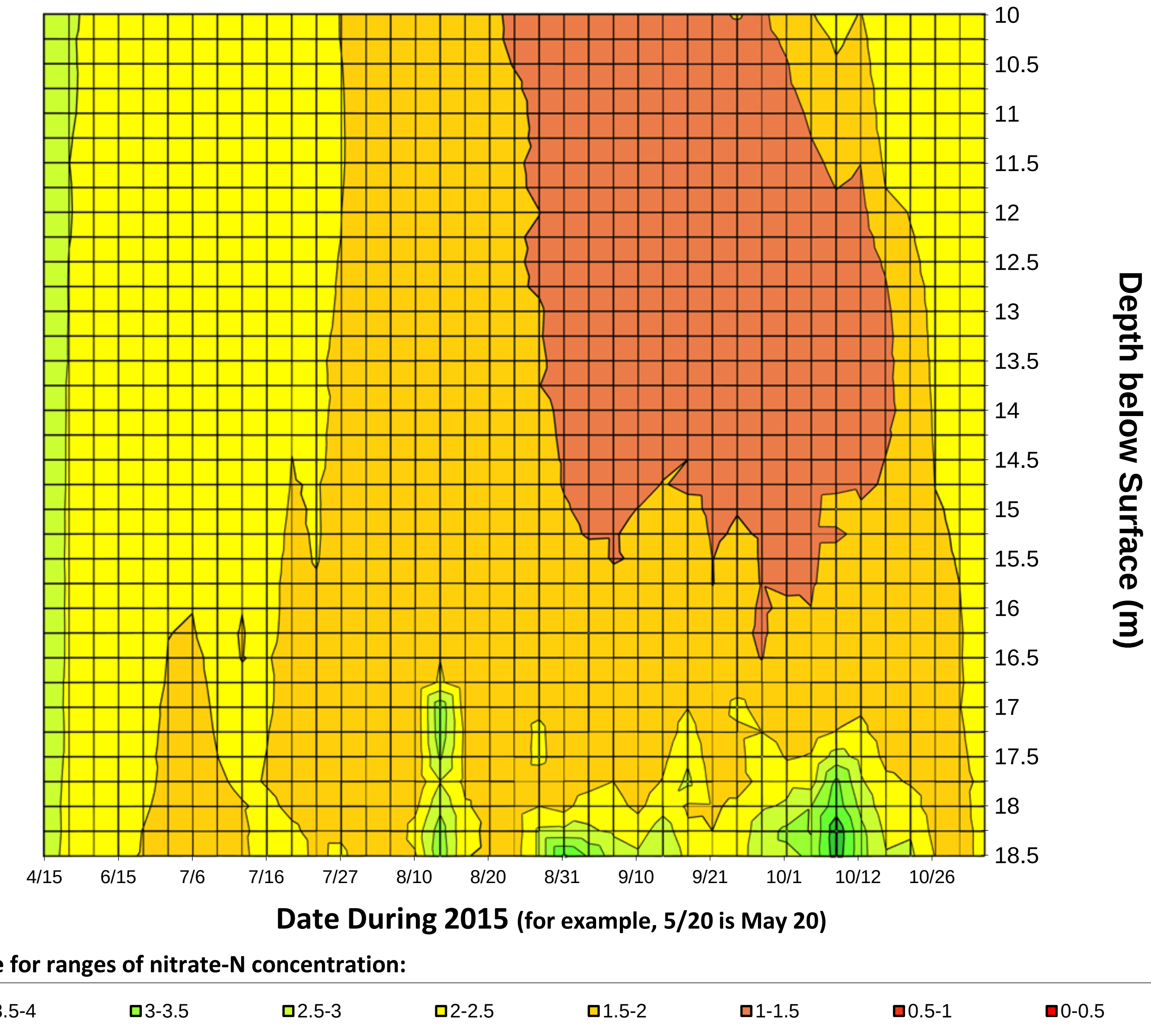


Figure 8. Nitrate Depletion Rates in the Hypolimnion (10 to 19-Meter Water Depths) of Onondaga Lake in 2015: (a) South Basin and (b) North Basin. Volume-weighted concentrations for the north and south basins were determined from field nitrate profiles and the respective water volumes of the basins.

Figure 9
Hypolimnetic Nitrate Profile (mgN/L) Througout the 2015 Application Season



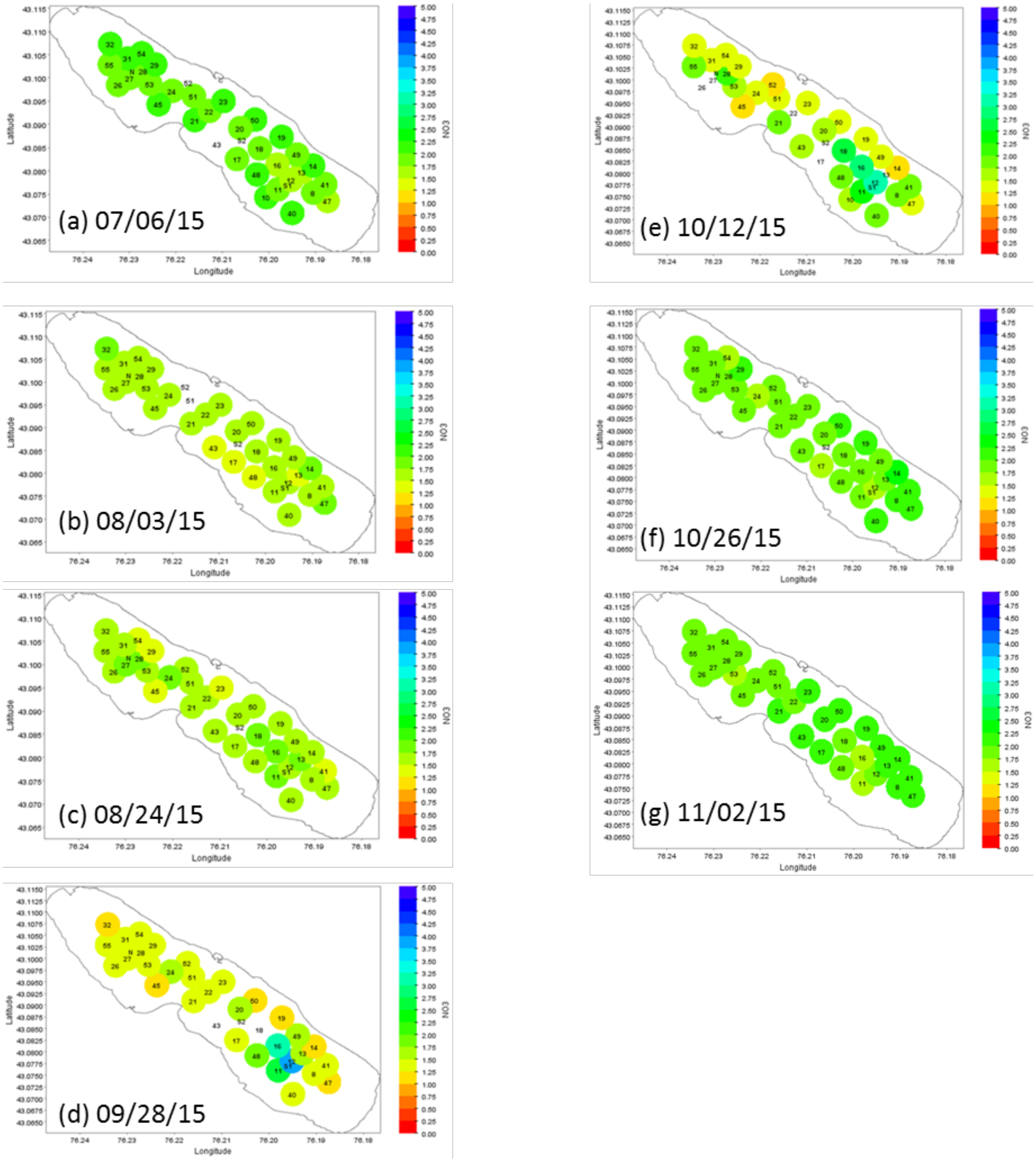
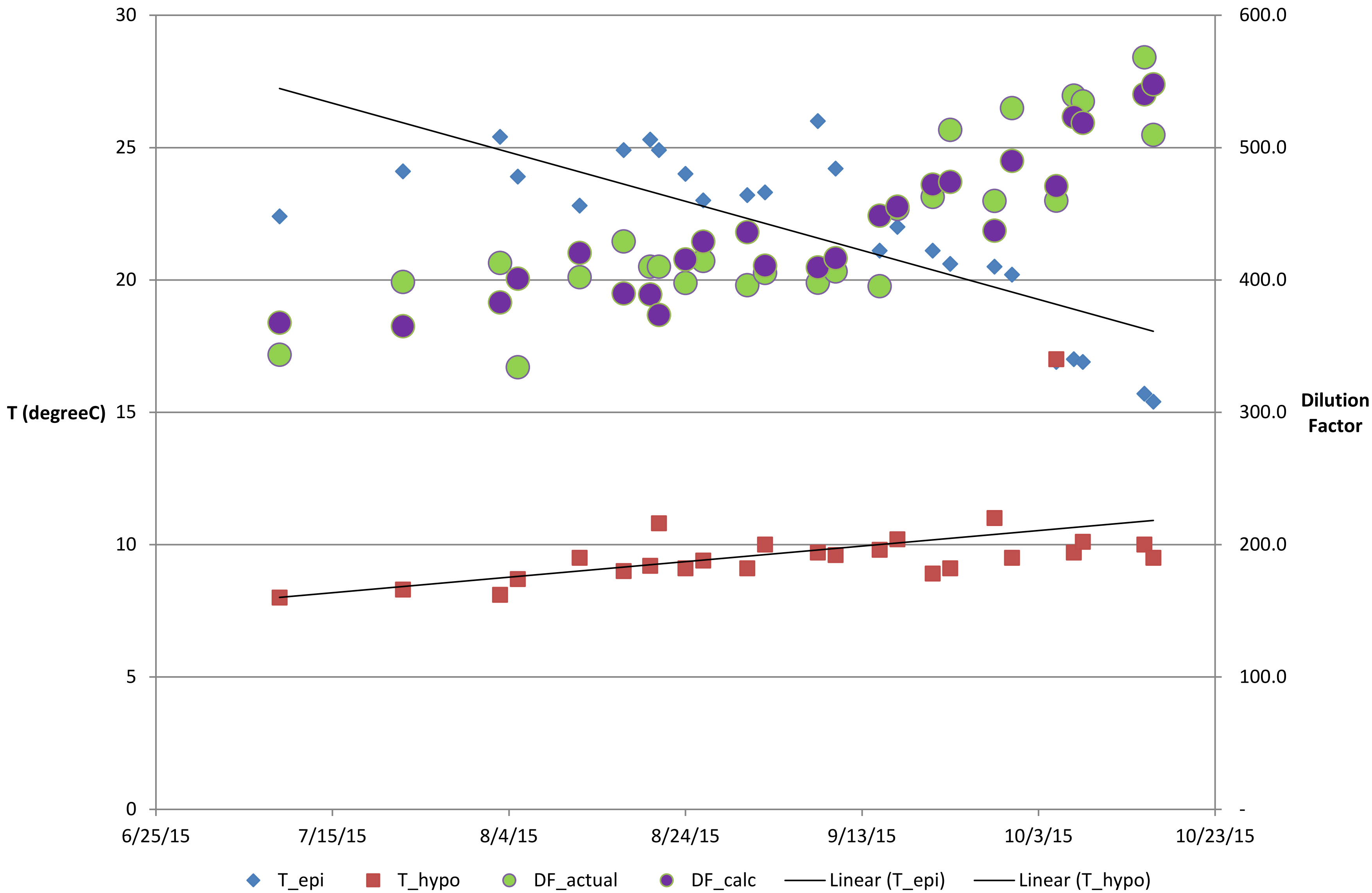


Figure 10. Representative Plan-view Plots of Nitrate Concentrations (mgN/L) One Meter above the Lake Bottom for Onondaga Lake in 2015: (a) July 6, (b) August 3, (c) August 24, (d) September 28, (e) October 12, (f) October 26, and (g) November 2.

Figure 11
2015 Epilimnion and Hypolimnion Temperatures and Dilution Factors



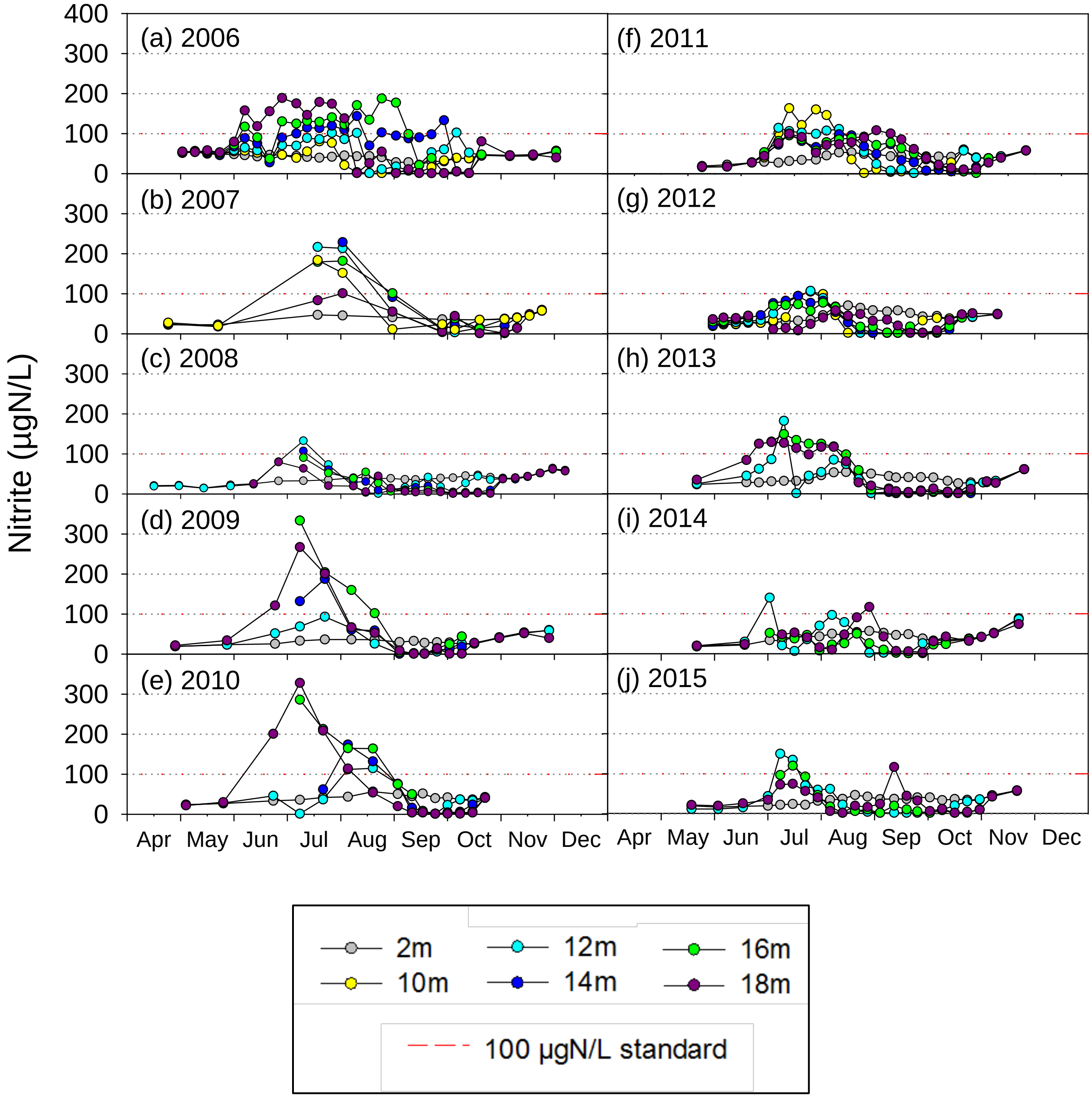


Figure 12. Time Series of Nitrite-Nitrogen (NO_2^--N) for Onondaga Lake at South Deep for Six Different Water Depths, 2006 Through 2015 (panels a-j, respectively). Note: The ambient water quality standard for nitrite applicable to warm-water fisheries is 100 micrograms per liter (µgN/L) as nitrogen (red-dashed line).

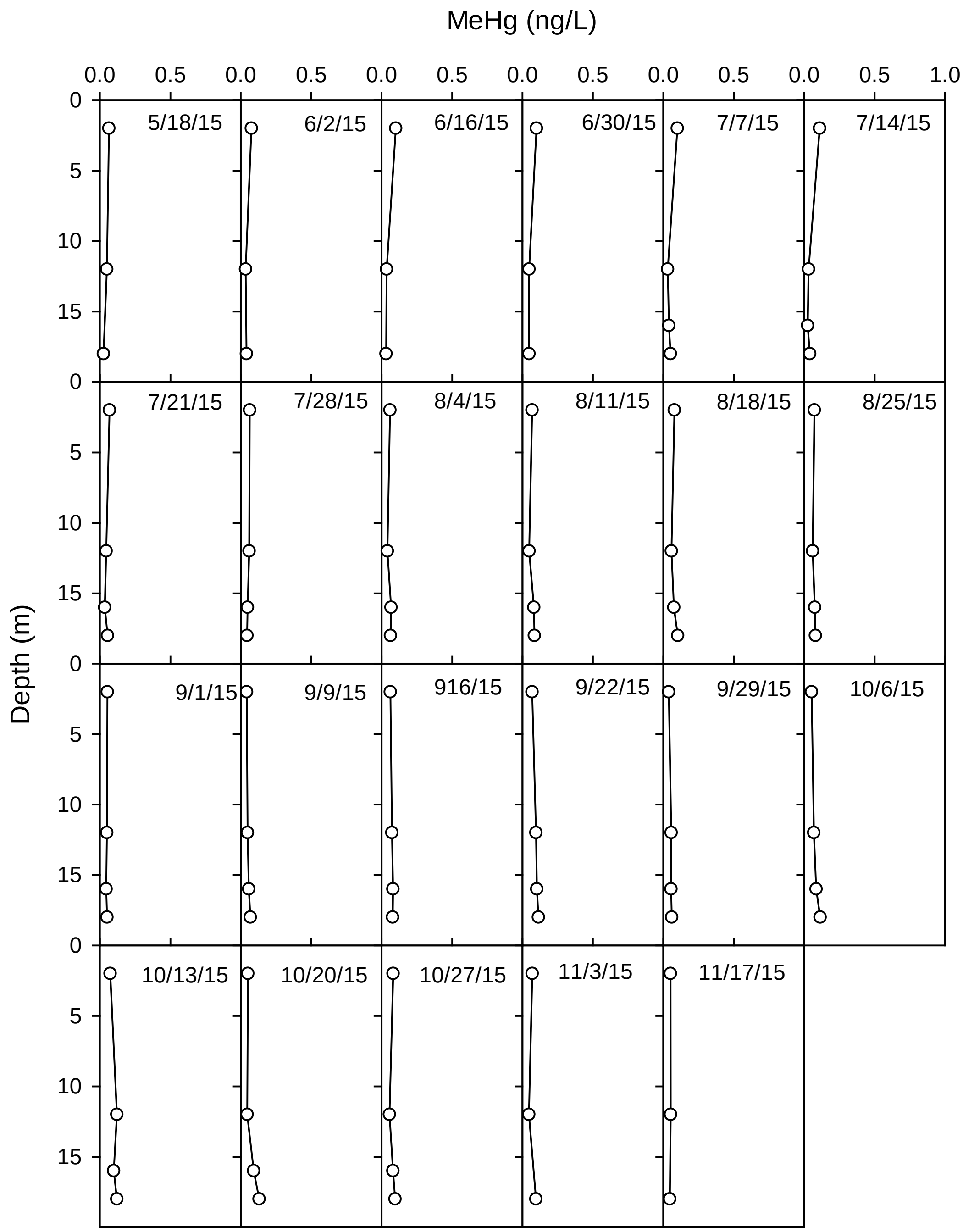


Figure 13. Vertical Profiles of Methylmercury (MeHg) Concentrations in Onondaga Lake Waters Measured at the South Deep Location: May 18 through November 17, 2015.

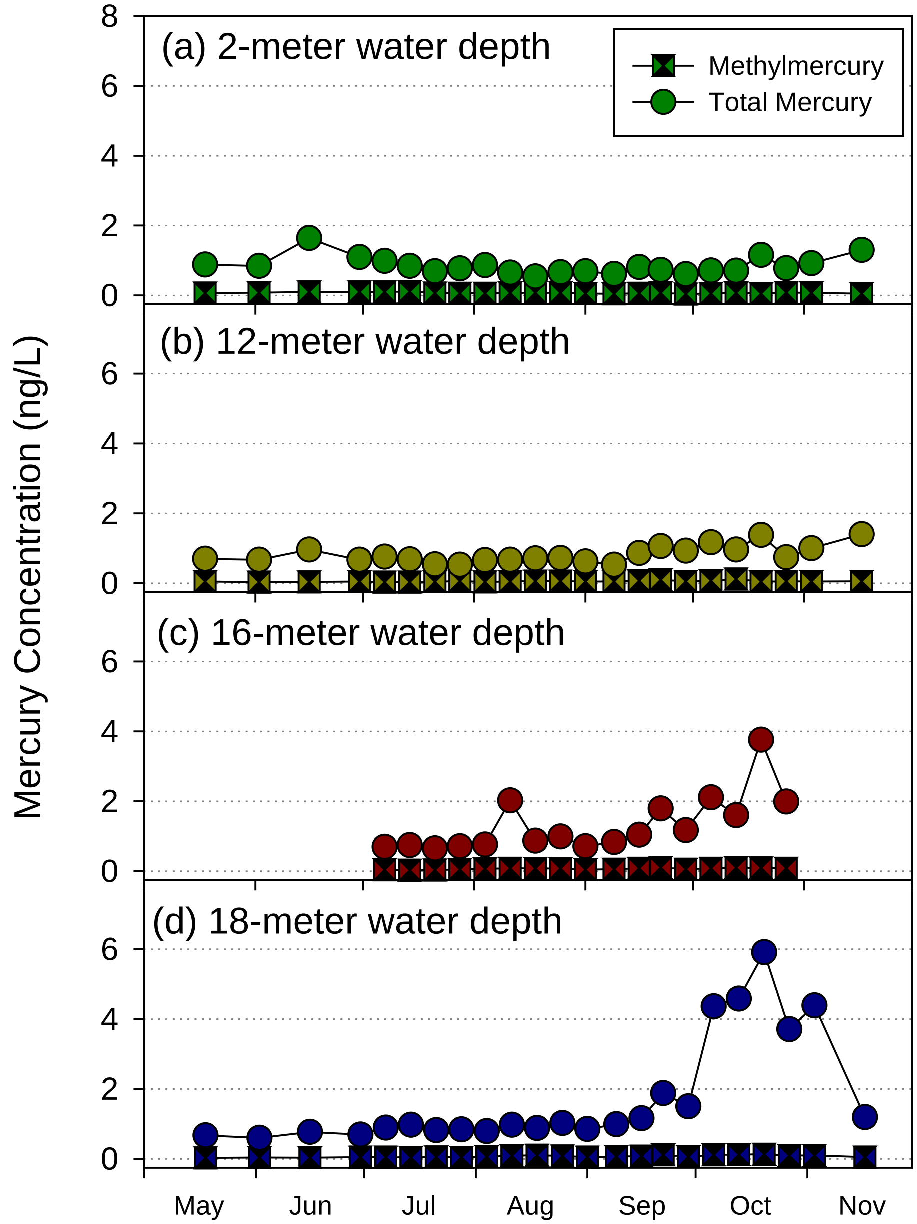


Figure 14. Total Mercury and Methylmercury Concentrations in Onondaga Lake at the South Deep Location in 2015: (a) 2, (b) 12, (c) 16, and (d) 18-Meter Water Depths.

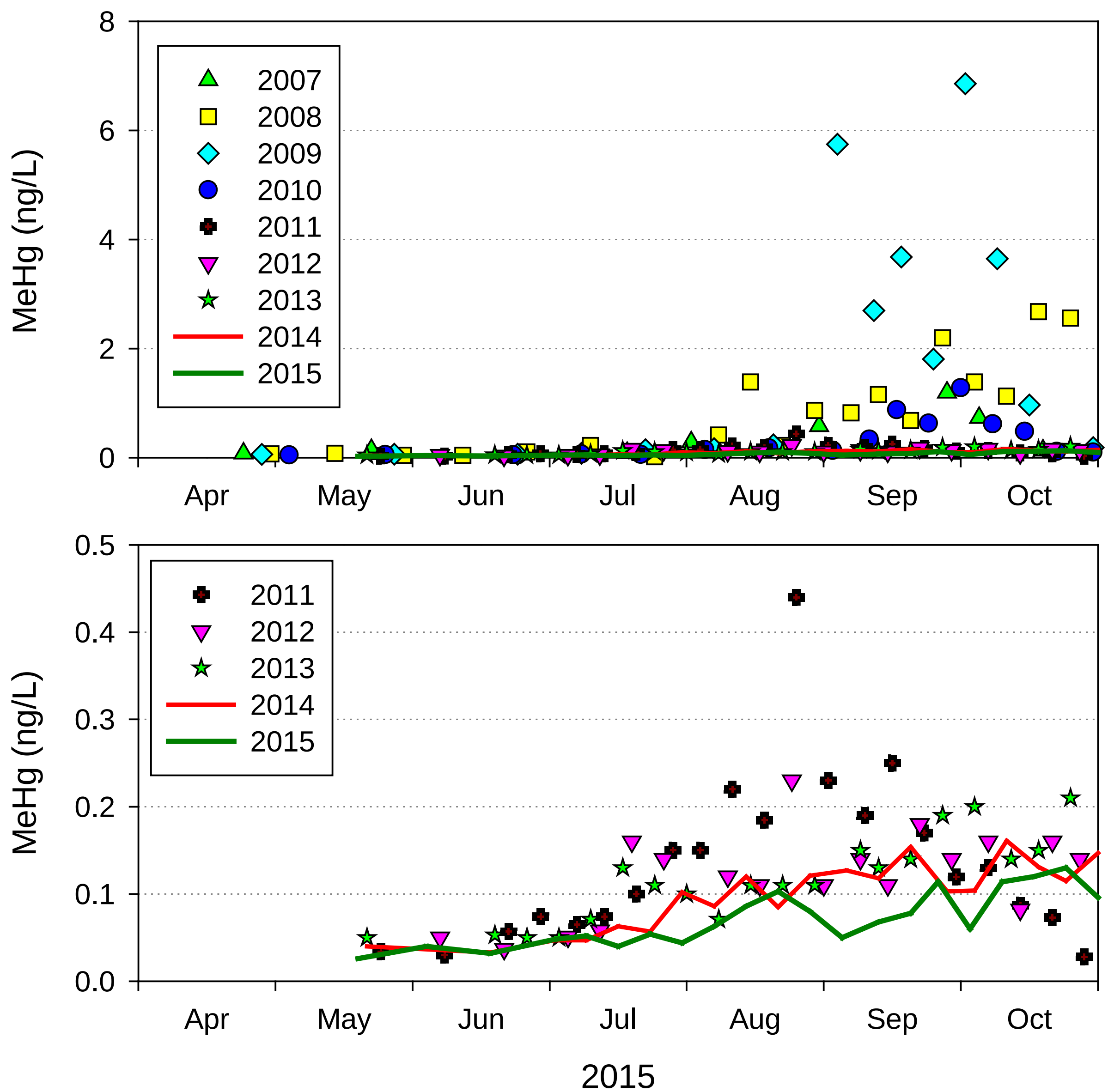


Figure 15a. Time Series of Methylmercury Concentrations for the 18-meter Water Depth at the South Deep Location, 2007-2015. Bottom panel: 2011-2015 only.

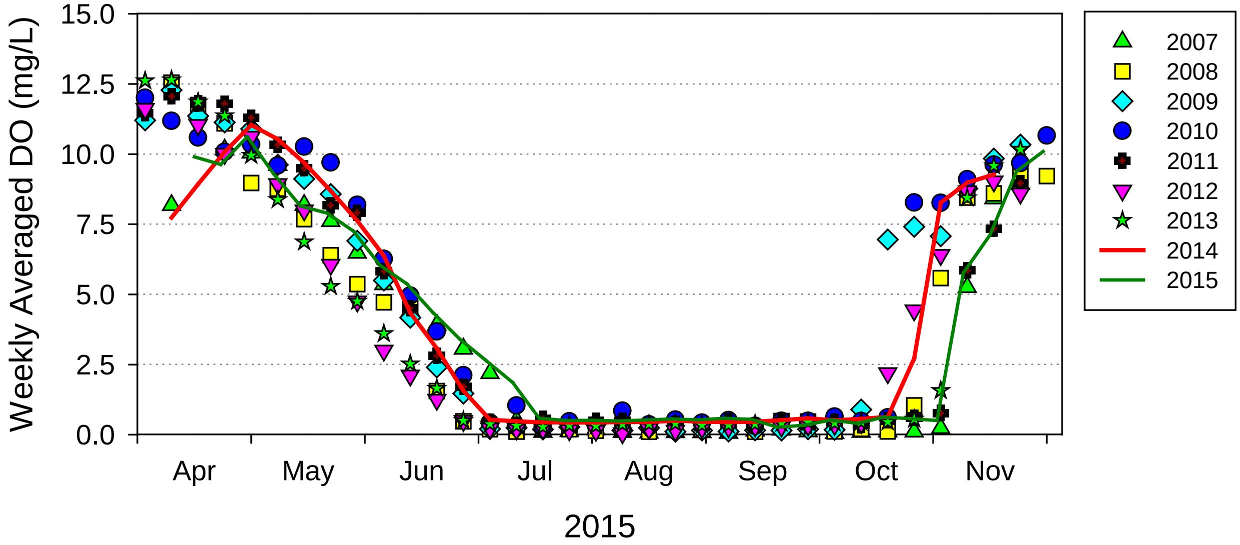


Figure 15b. Time Series of Dissolved Oxygen Concentrations for the 18-meter Water Depth at the South Deep Location, 2007-2015. Concentrations were weekly averaged from daily measurements.

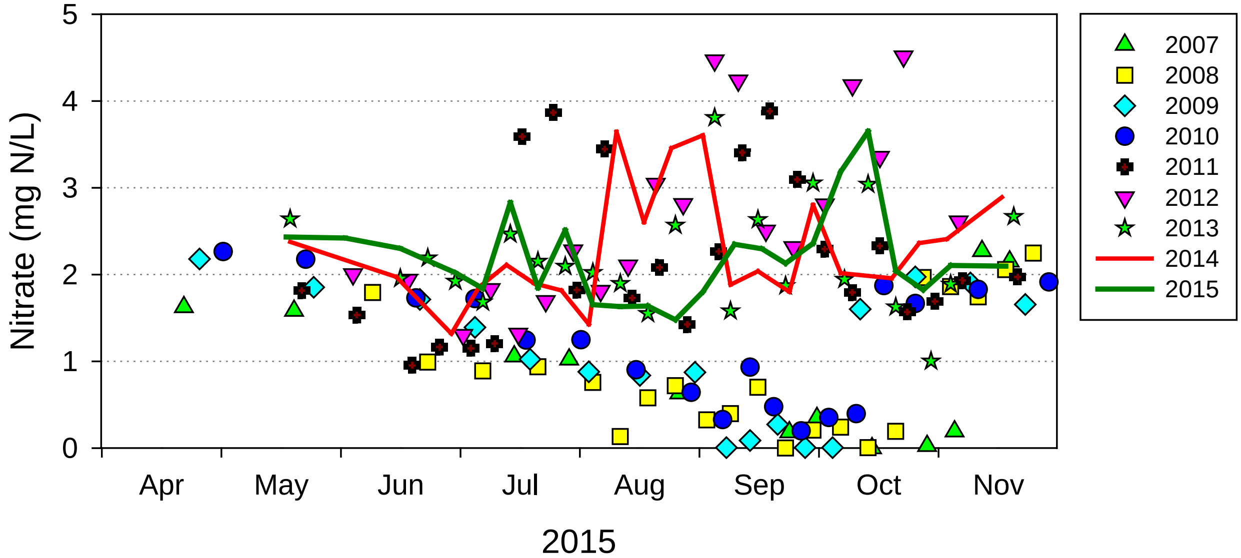


Figure 15c. Time Series of Nitrate Concentrations for the 18-meter Water Depth at the South Deep Location, 2007-2015.

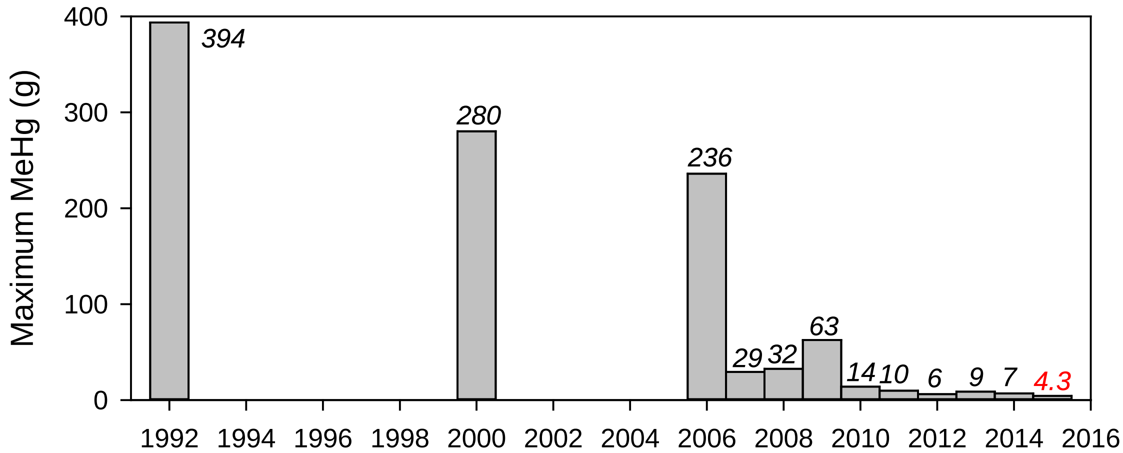


Figure 16. Annual Maximum Mass of Methylmercury (MeHg) in the Hypolimnion (10 to 19-meter water depth) of Onondaga Lake from 1992 through 2015.

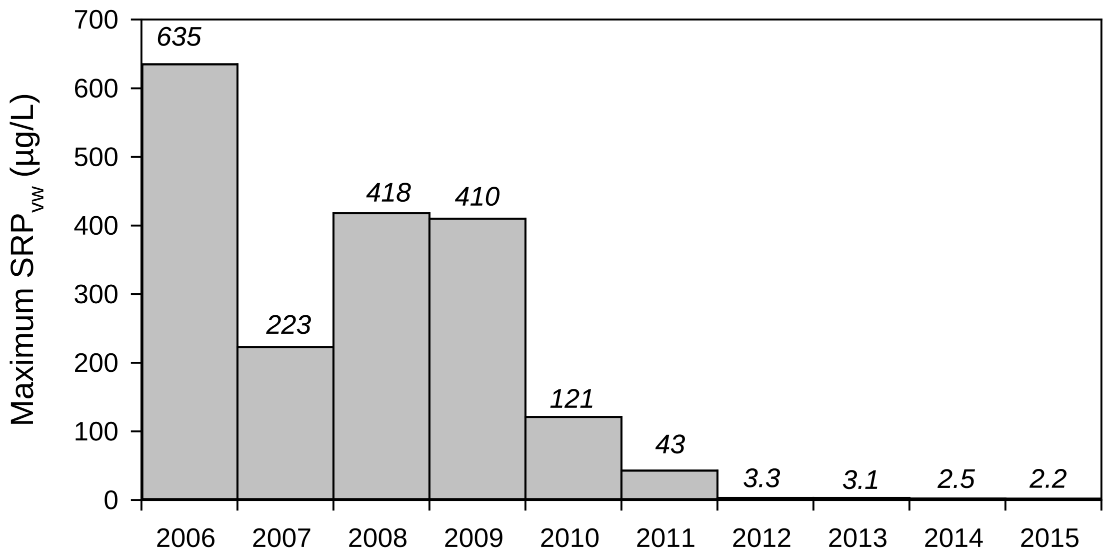


Figure 17. Annual Maximum Volume-Weighted Concentrations of Soluble Reactive Phosphorus (SRP) in the Lower Hypolimnion of Onondaga Lake (14 to 19-meter water depth) from 2006 through 2015.

APPENDIX A

EXAMPLE 2015 ISUS ONE-DAY DATA REPORT

Onondaga Lake Nitrate Monitoring Summary: Current Status of Nitrate Conditions in Onondaga Lake

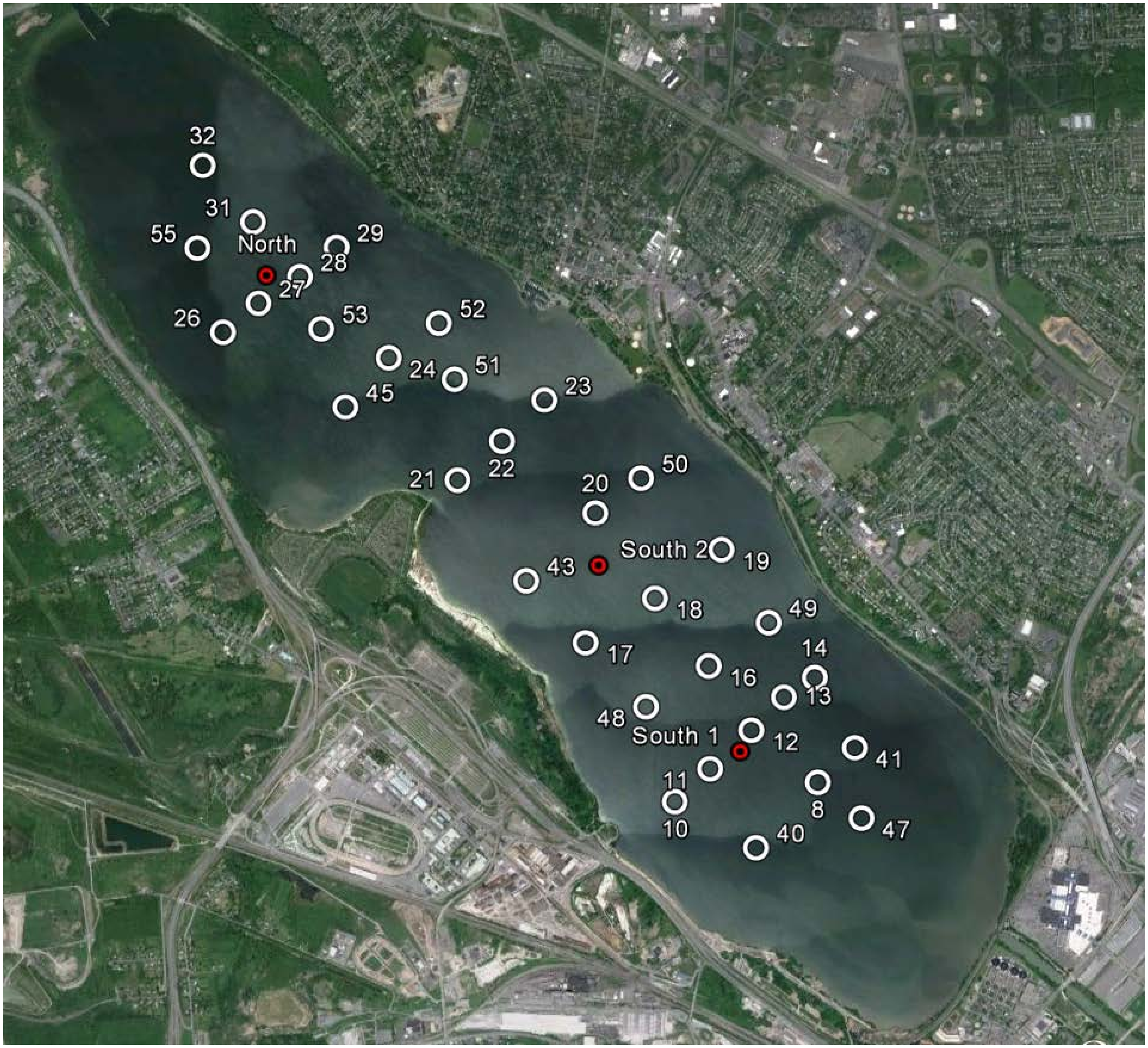
Full Scale Nitrate Addition Year 2

September 28, 2015

Provisional Data Summary
for discussion purposes only

Submitted: for internal use only
Anthony R. Prestigiacomo
Research Scientist

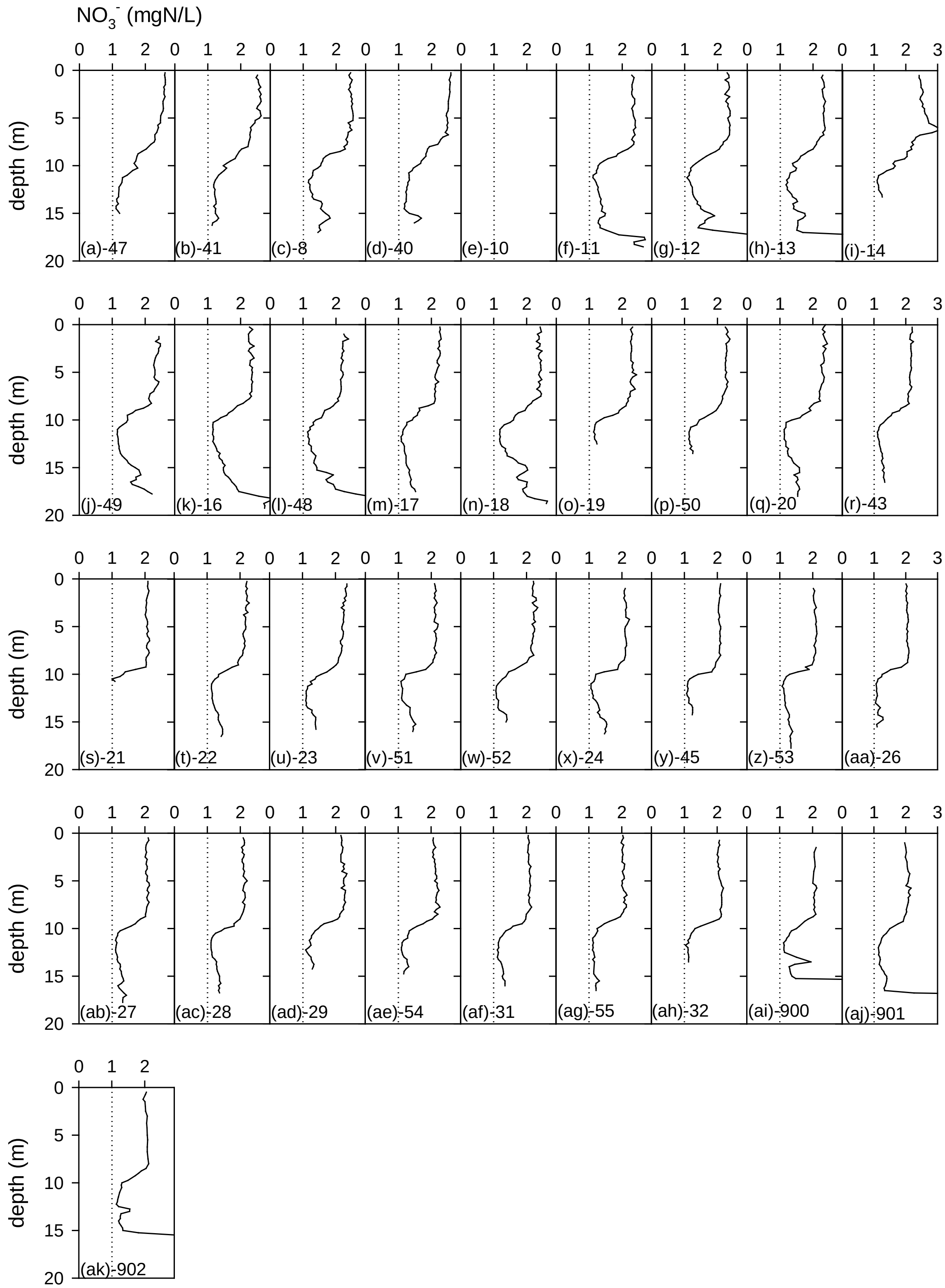
Gridding Locations



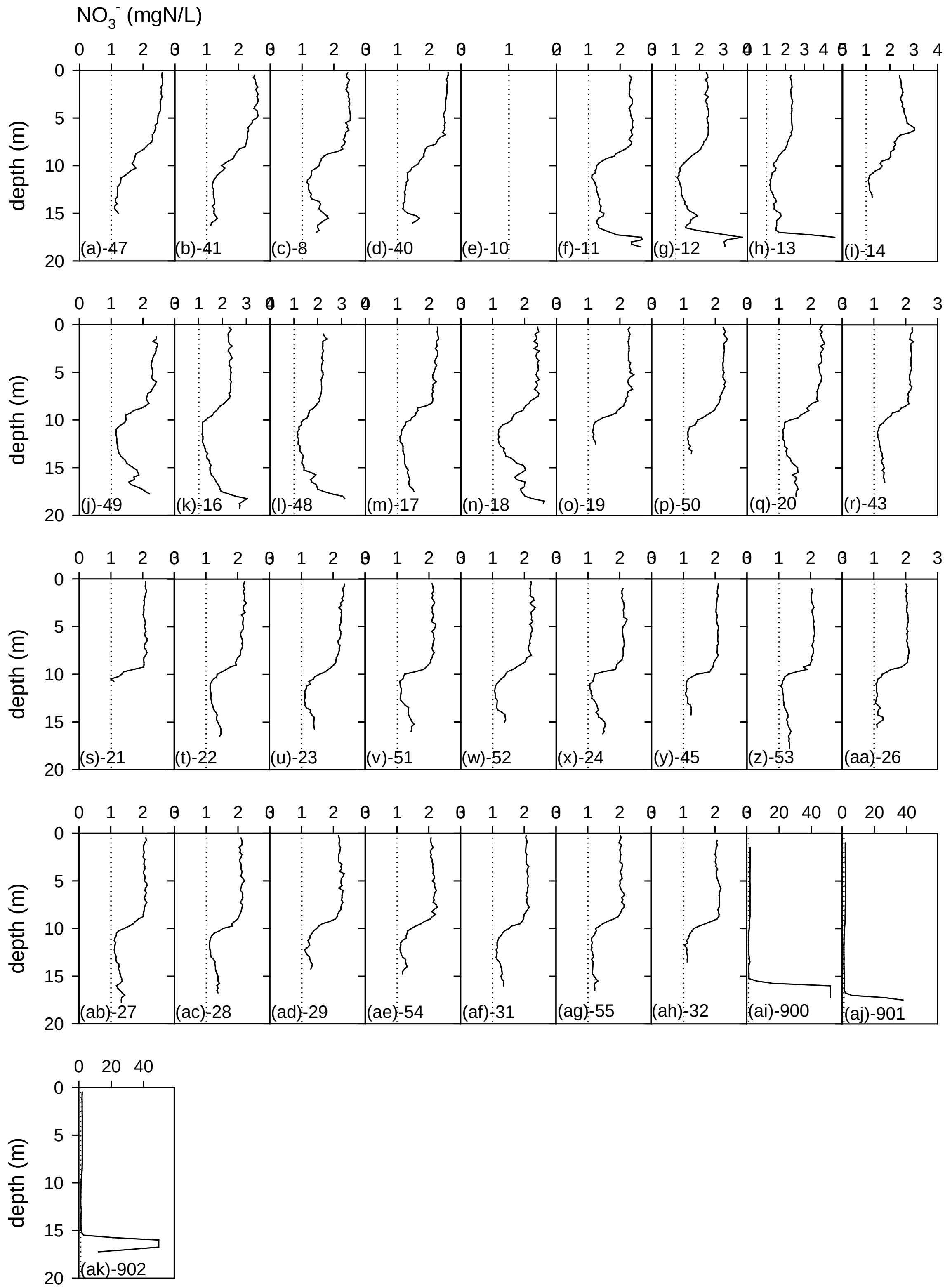
Today's injection: **N**

white circle: gridding loocation
red circle: injection site

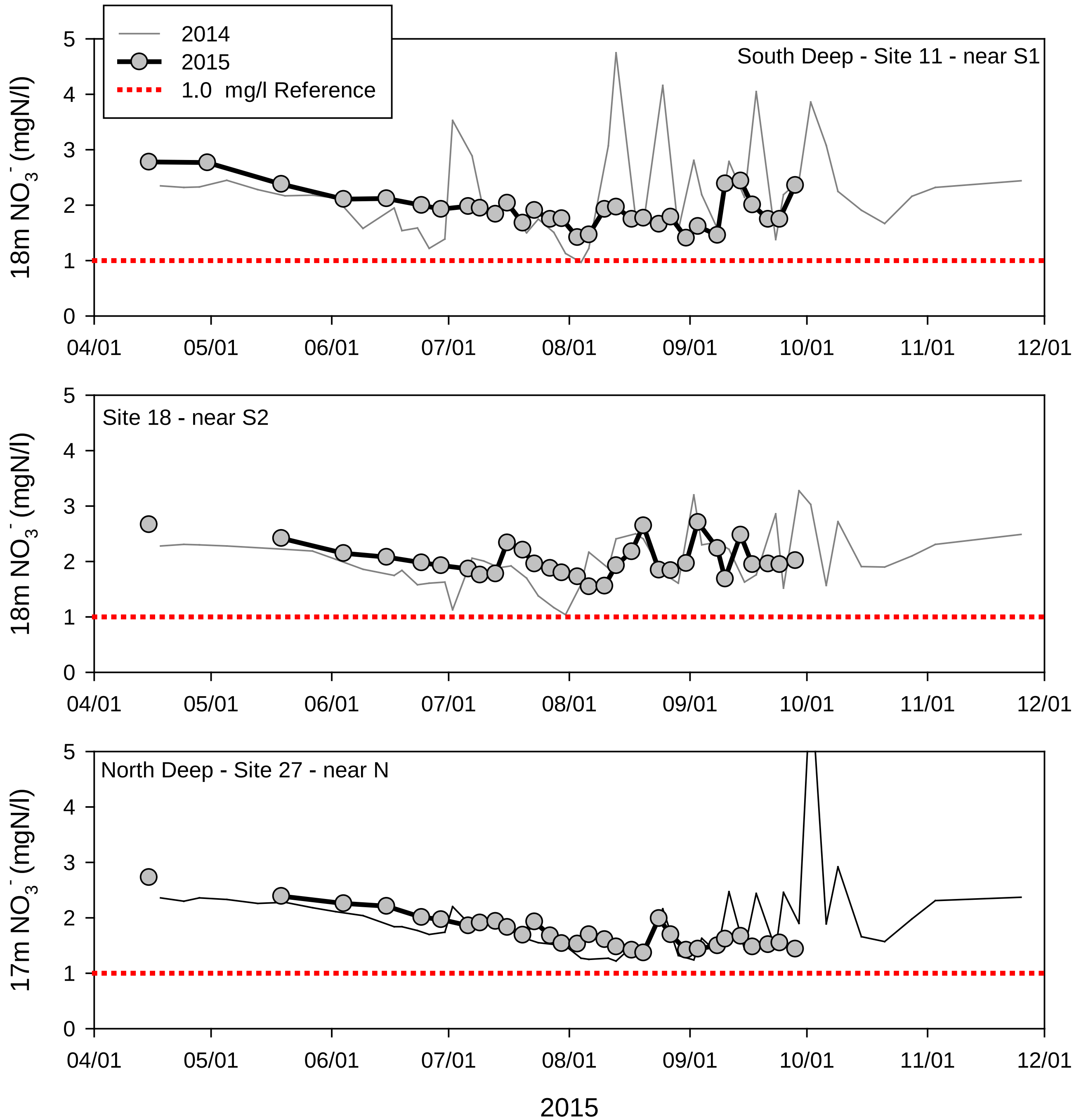
Nitrate Profiles at Each Gridding Location (0-3 mgN/L)



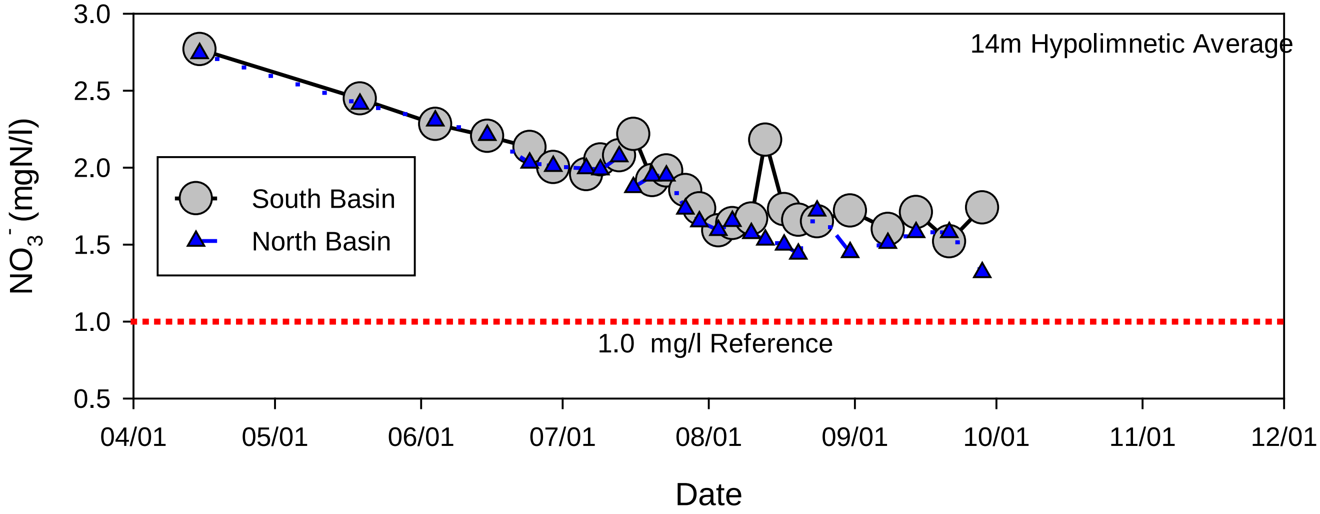
Nitrate Profiles at Each Gridding Location (Autoscale mgN/L)



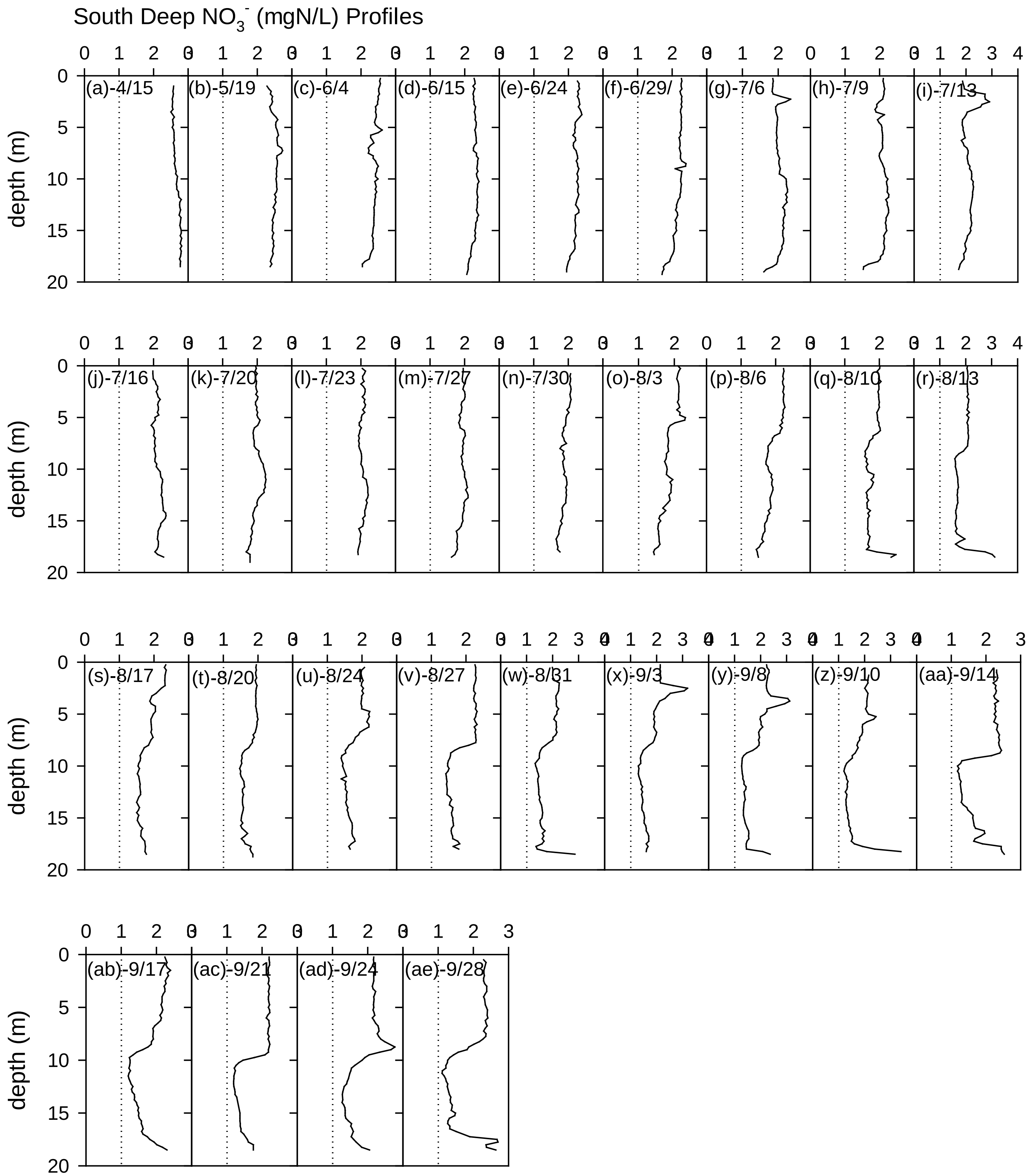
Nitrate Time Series at South Deep - 18m, Site 18 - 18m, North Deep - 17m



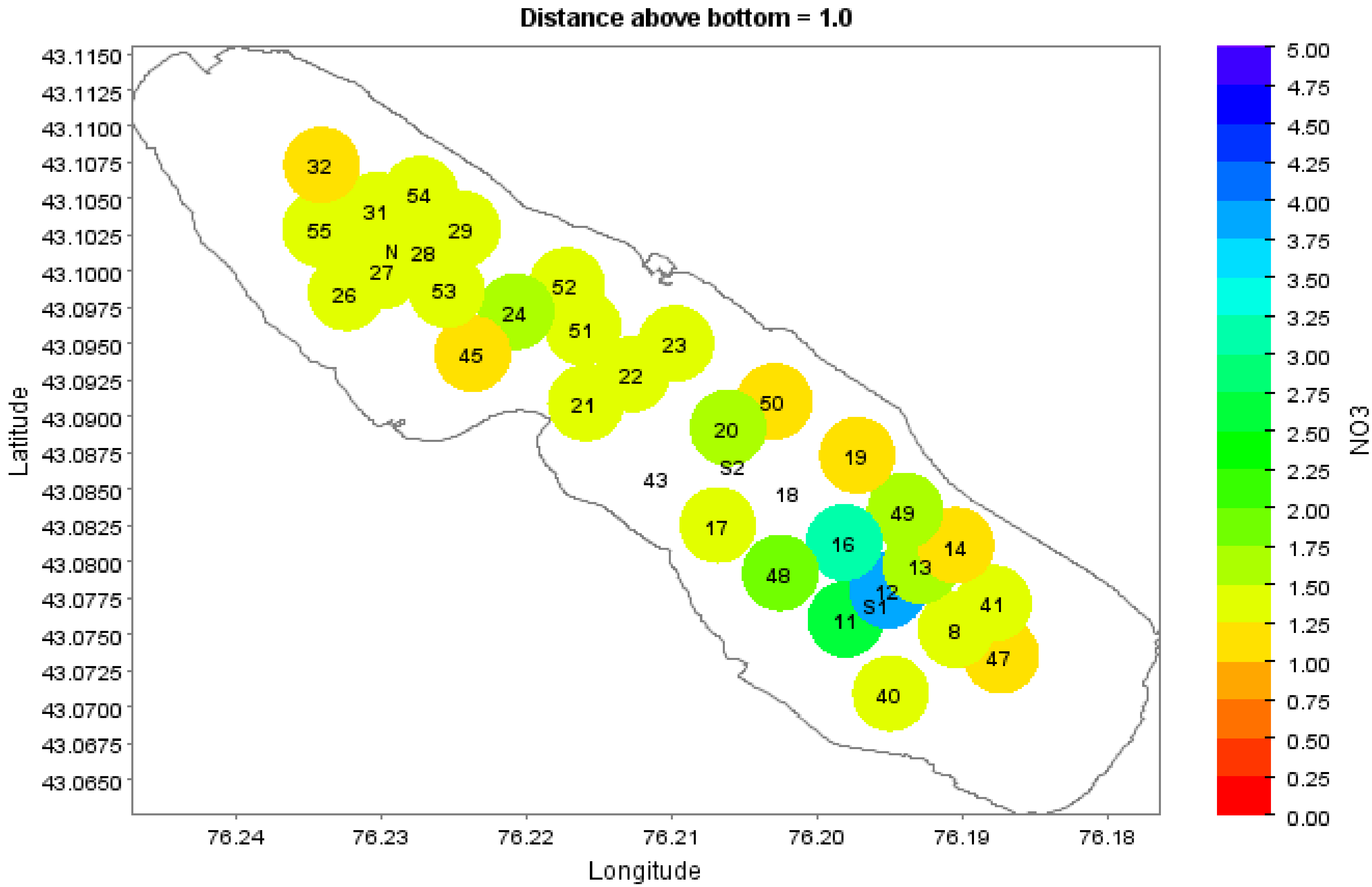
Nitrate Time Series, Hypolimnetic Basin Average



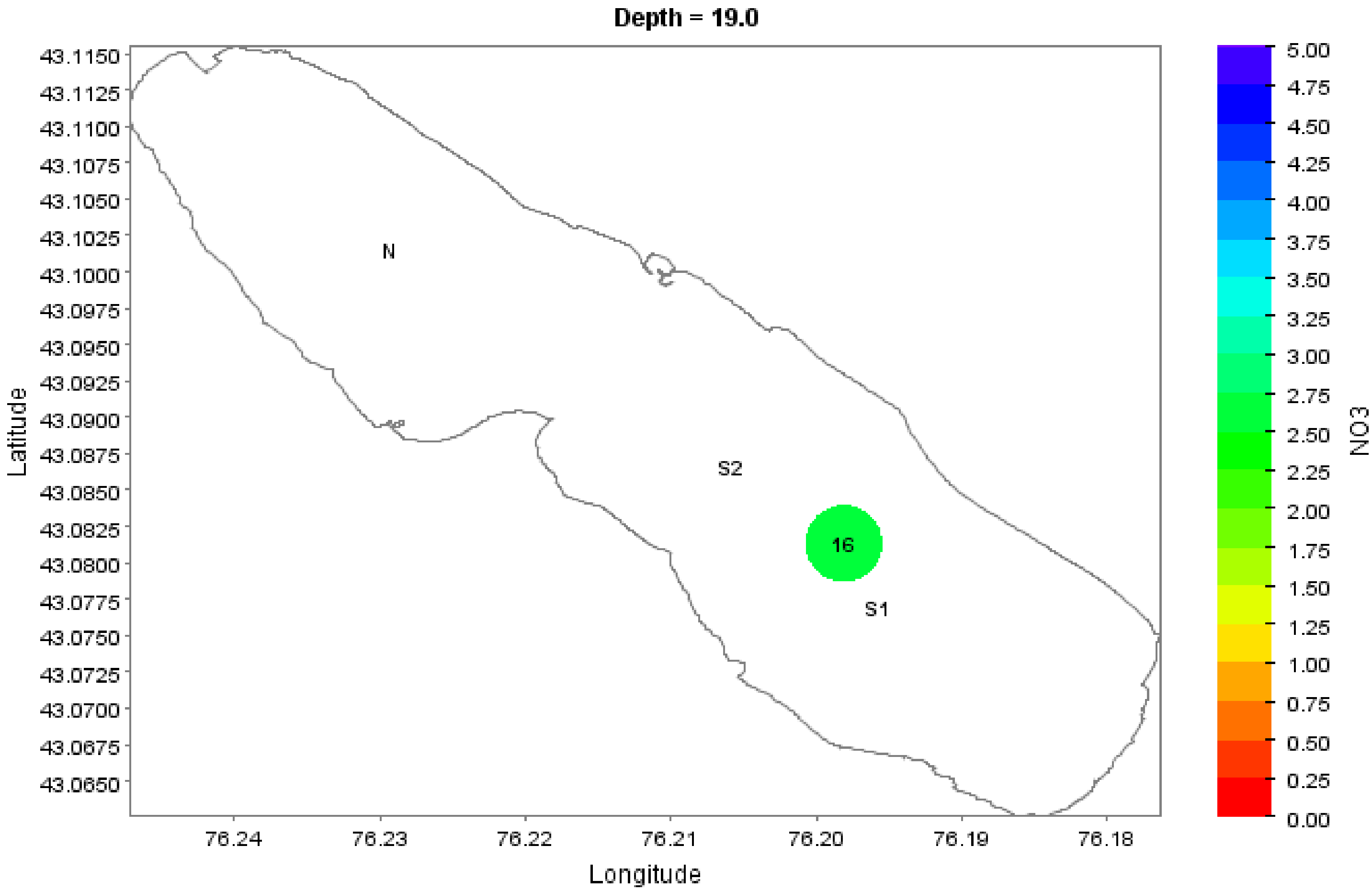
Nitrate Profiles at South Deep



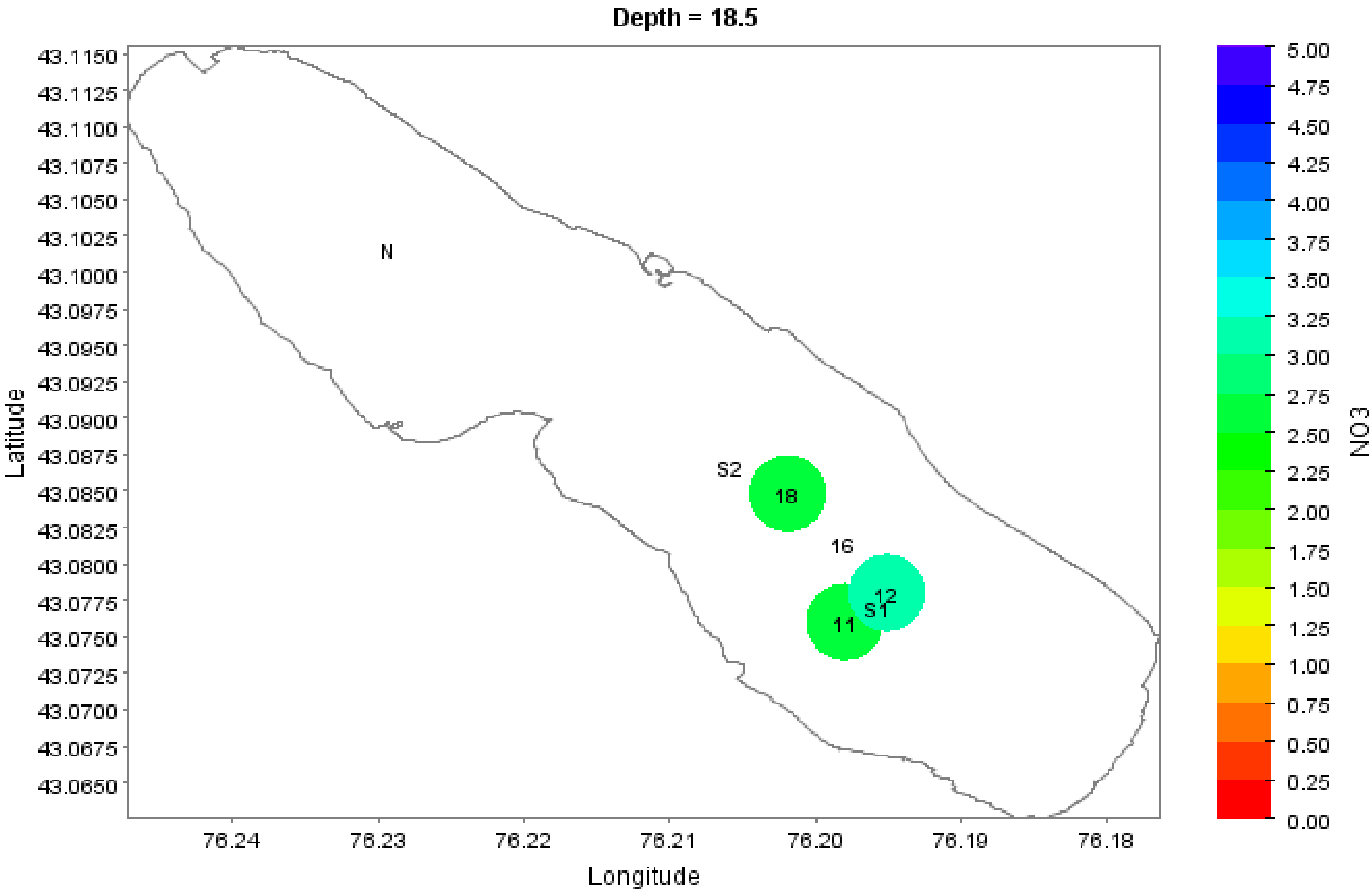
Color Bubble Plots at ~1.0 m off Bottom, Nitrate (mgN/L)



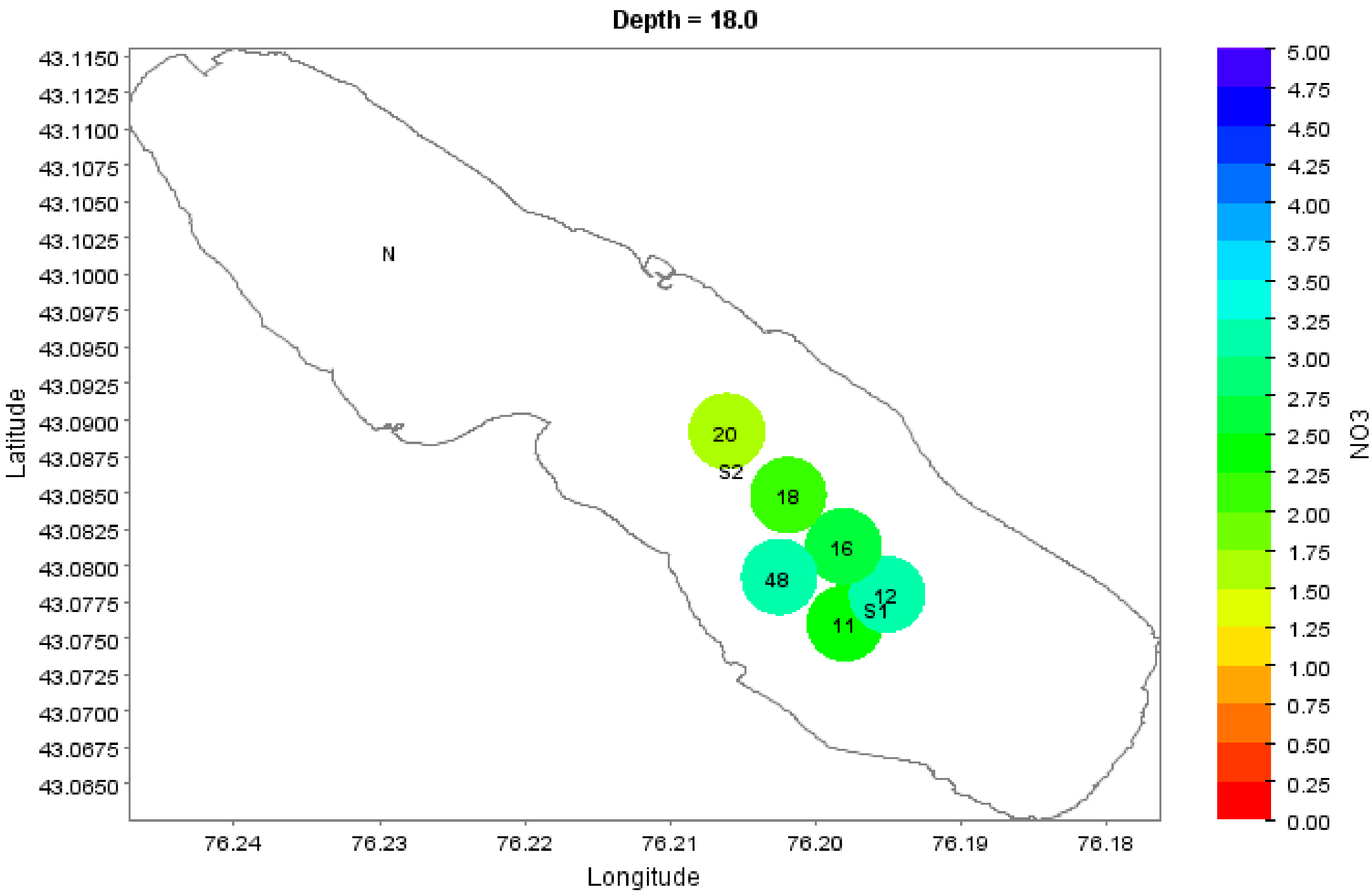
Color Bubble Plots at 19m, Nitrate (mgN/L)



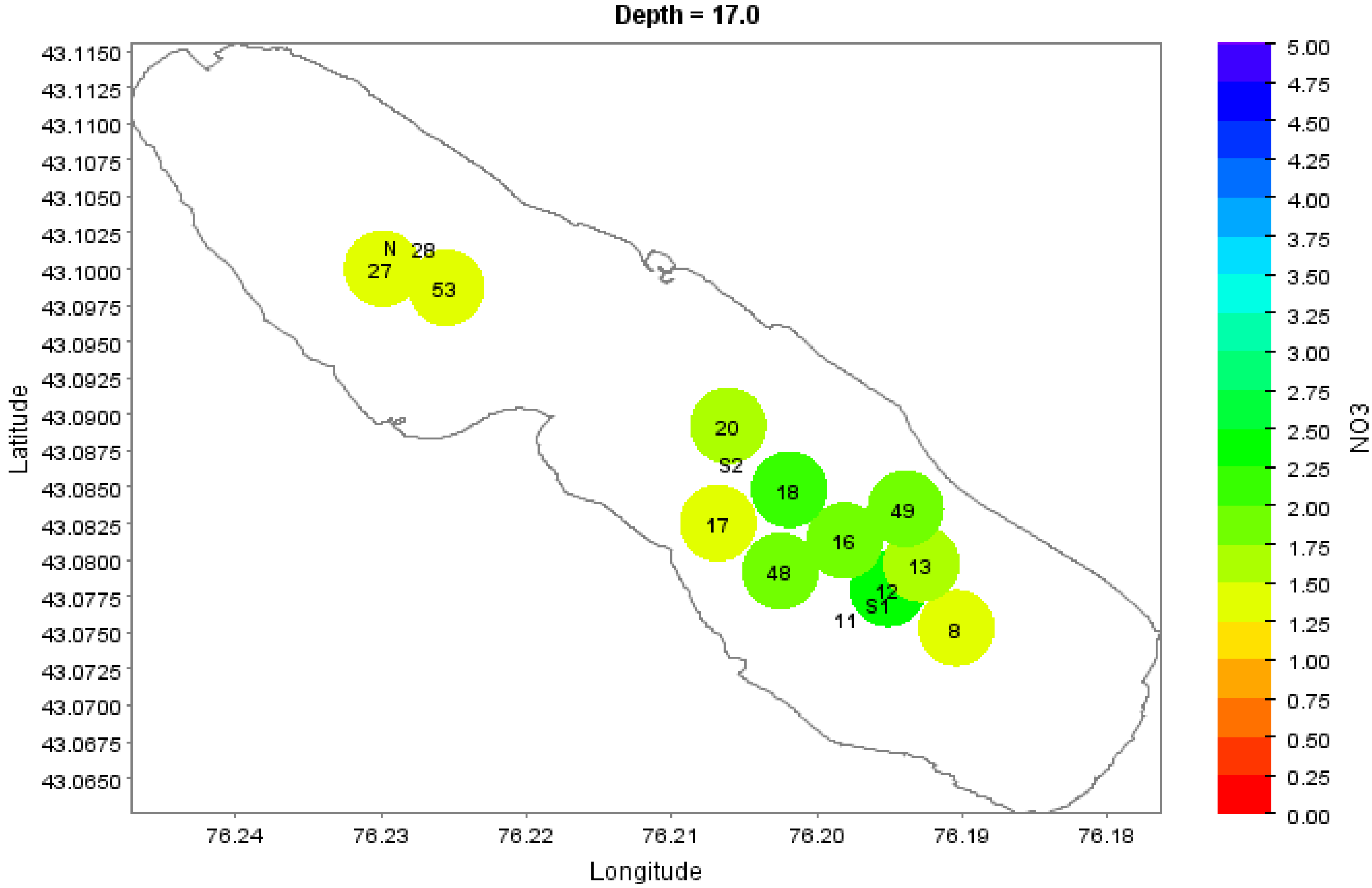
Color Bubble Plots at 18.5m, Nitrate (mgN/L)



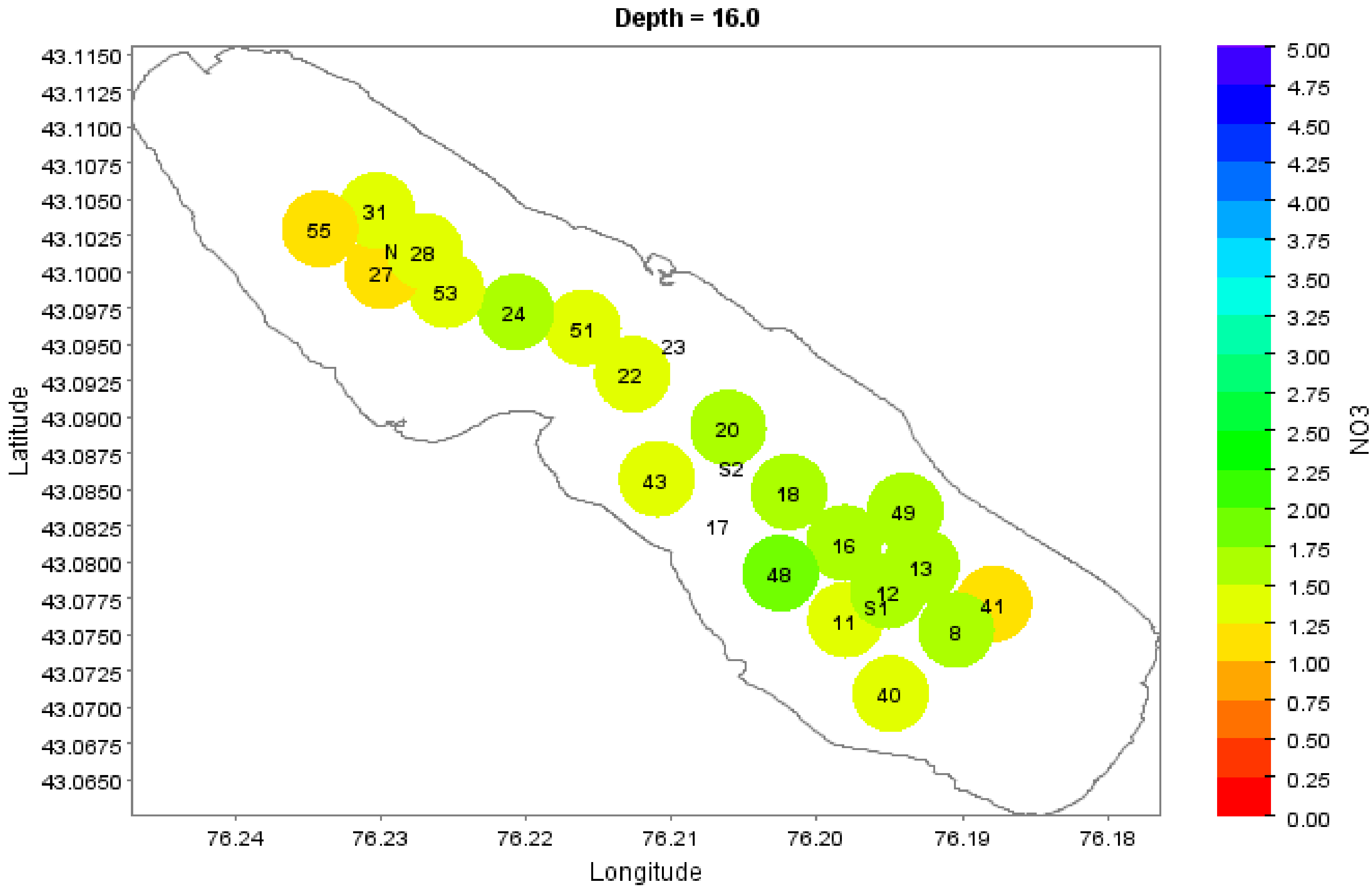
Color Bubble Plots at 18m, Nitrate (mgN/L)



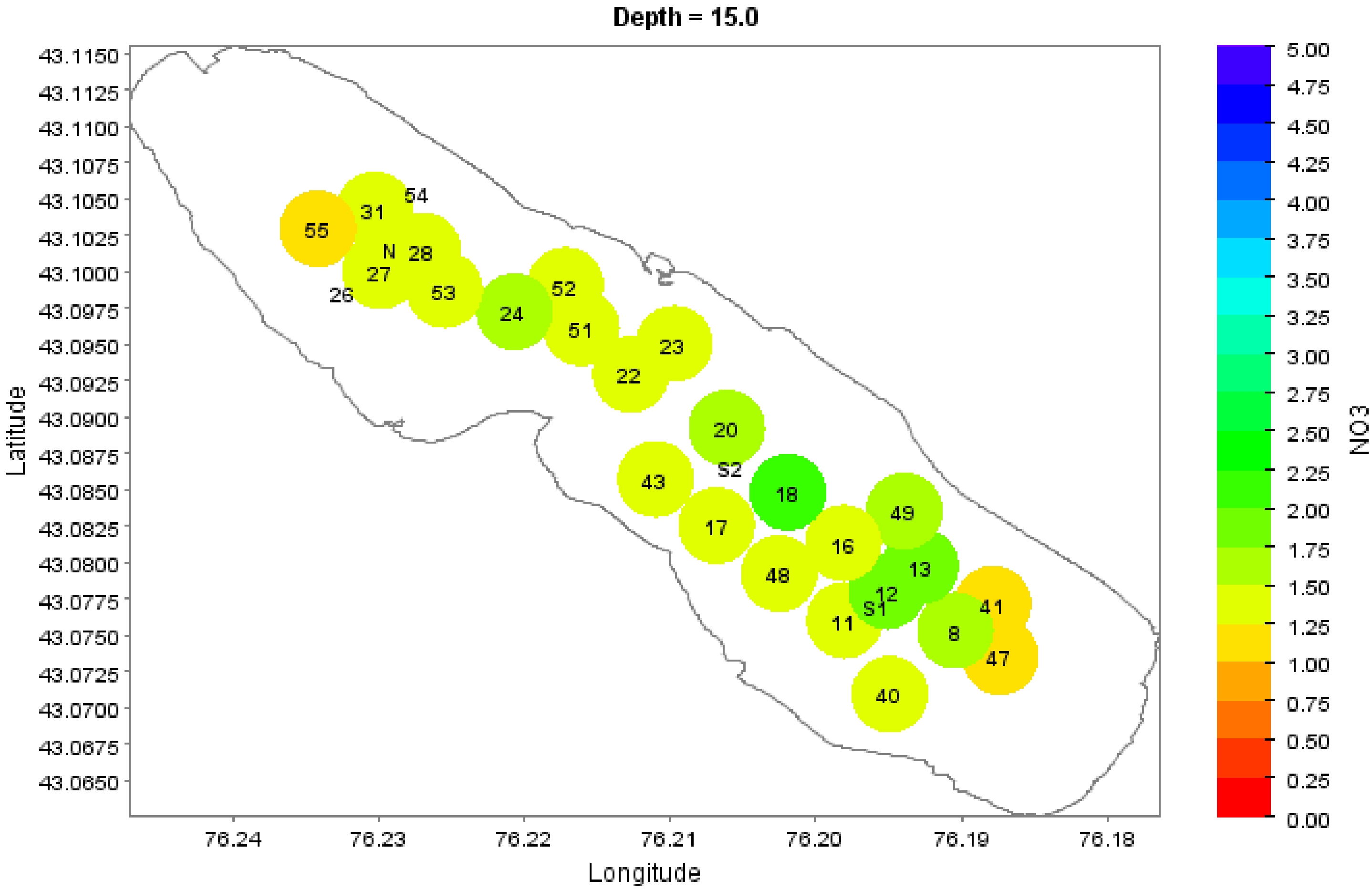
Color Bubble Plots at 17m, Nitrate (mgN/L)



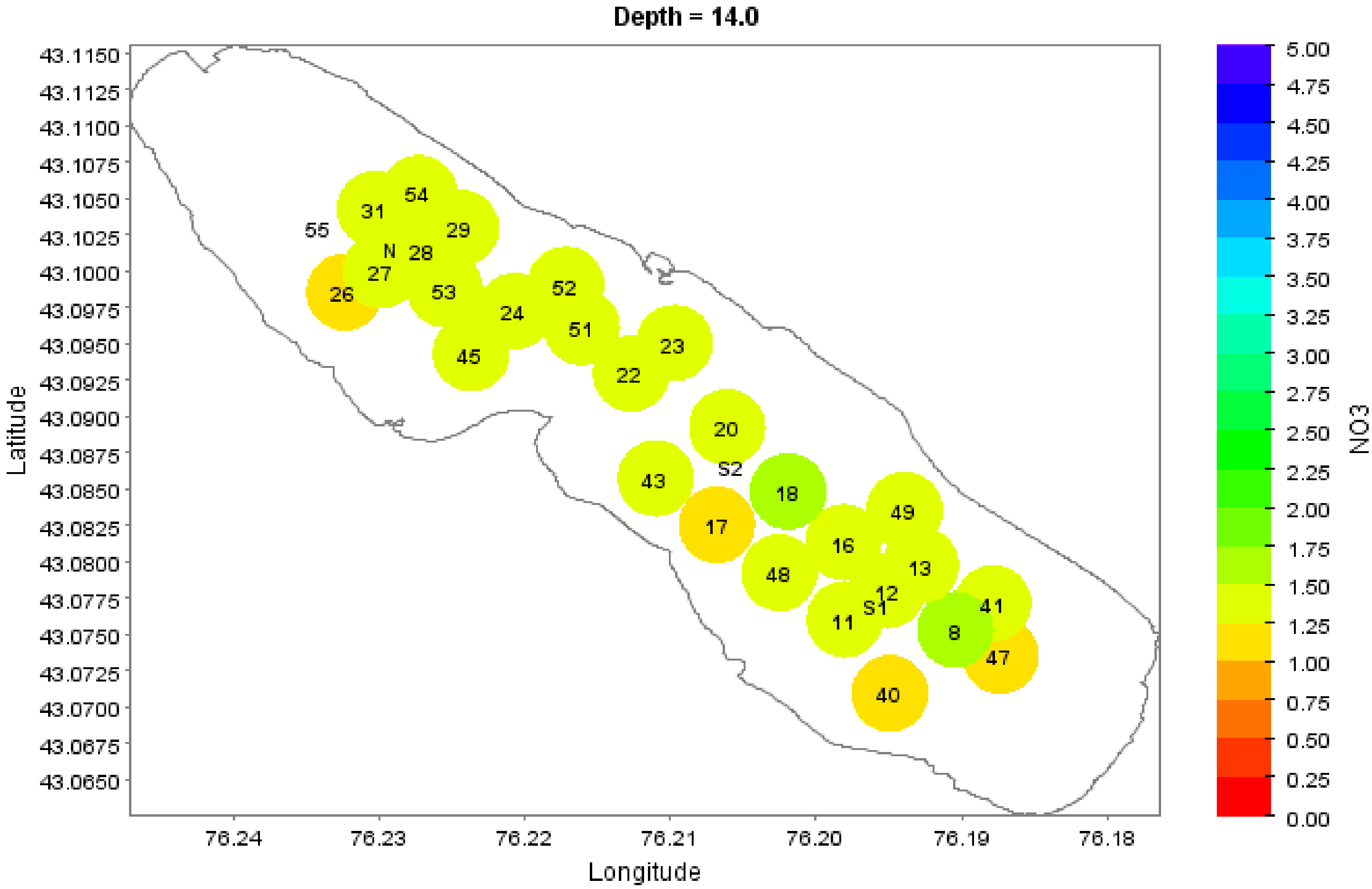
Color Bubble Plots at 16m, Nitrate (mgN/L)



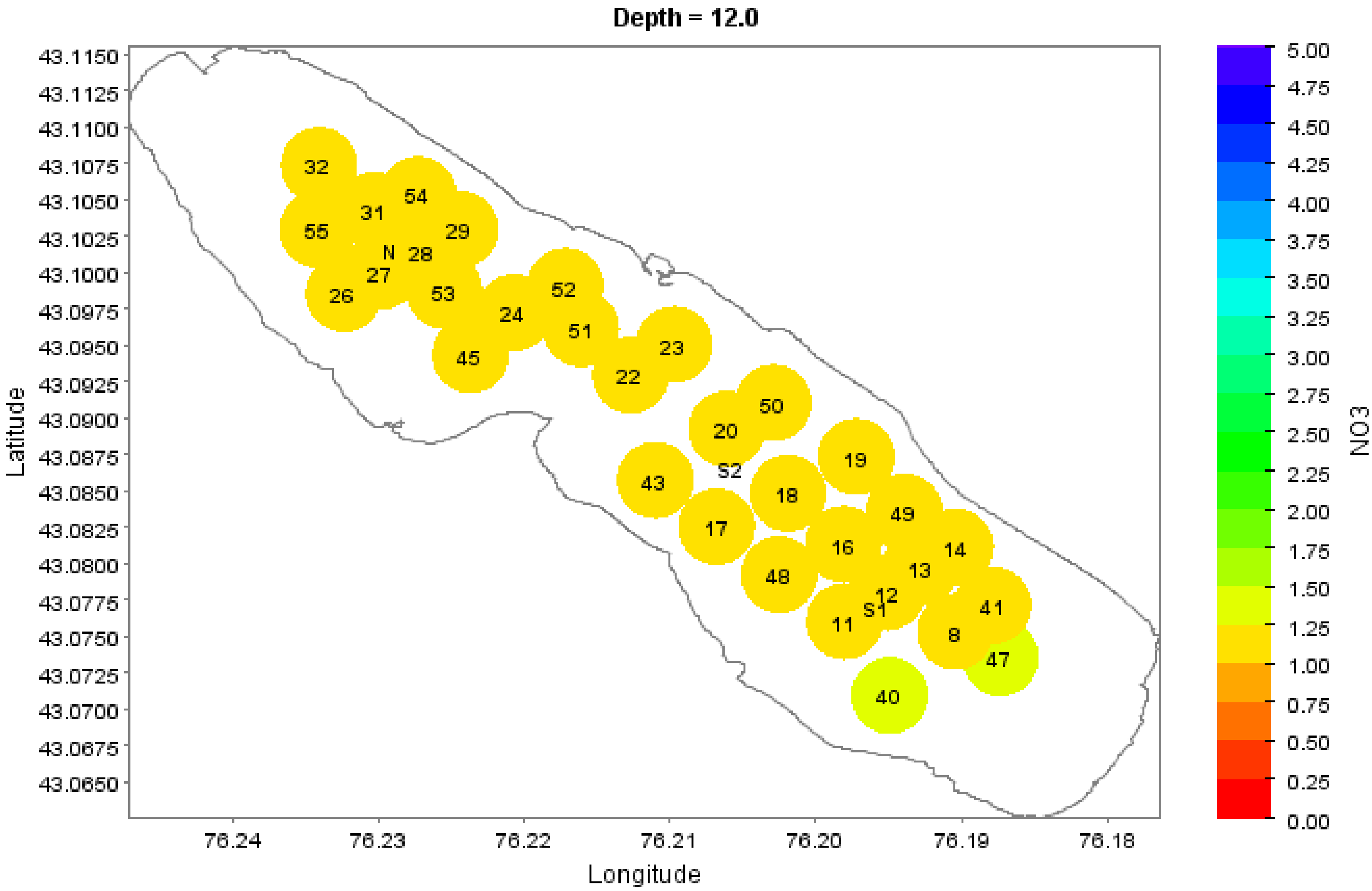
Color Bubble Plots at 15m, Nitrate (mgN/L)



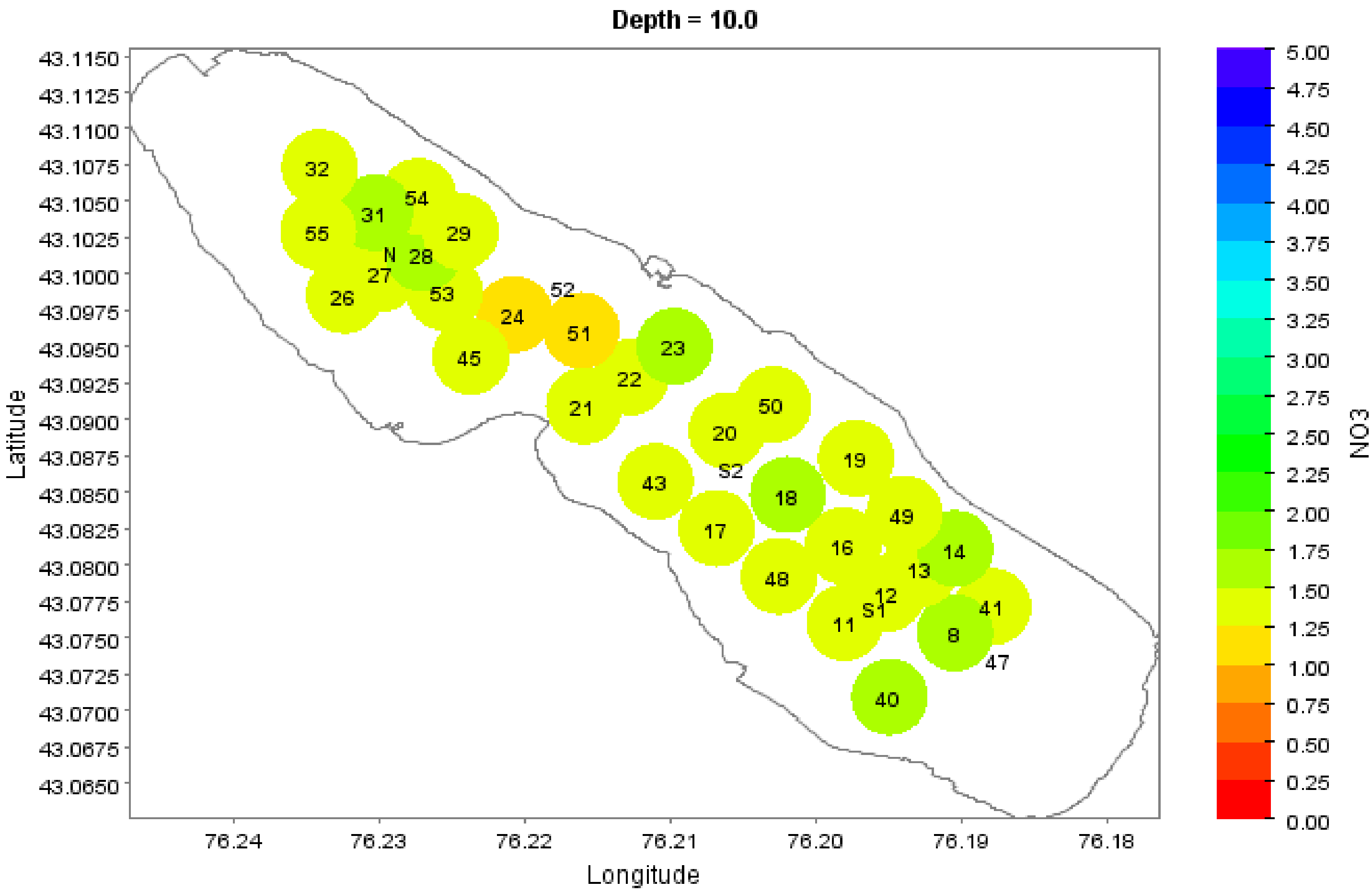
Color Bubble Plots at 14m, Nitrate (mgN/L)



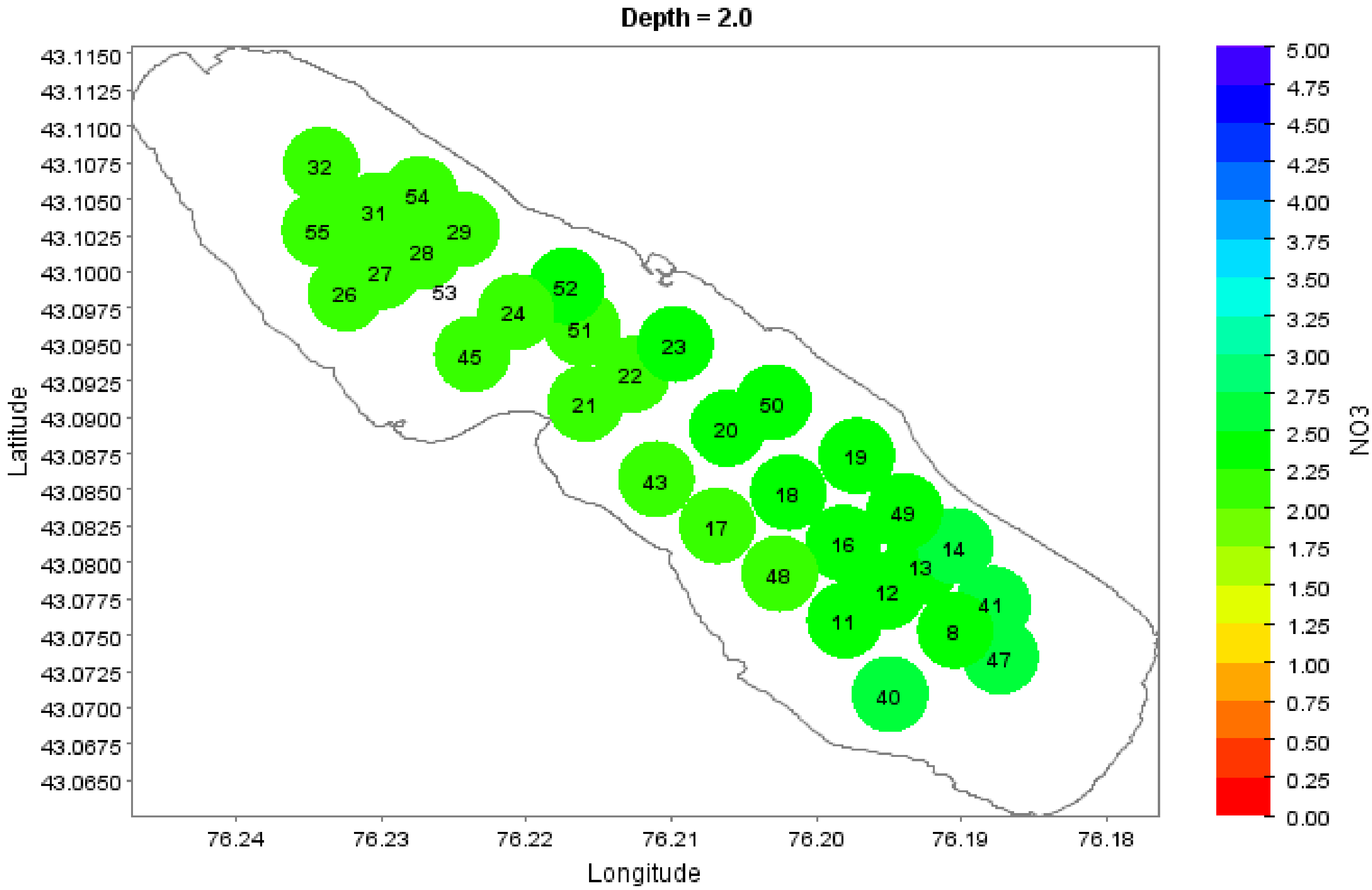
Color Bubble Plots at 12m, Nitrate (mgN/L)



Color Bubble Plots at 10m, Nitrate (mgN/L)



Color Bubble Plots at 2m, Nitrate (mgN/L)



APPENDIX B

ONONDAGA LAKE GRIDDING SUMMARY USING AN IN-SITU ULTRAVIOLET SPECTROPHOTOMETER – ONE METER OFF BOTTOM WEEKLY SUMMARY – MAY 19 THROUGH NOVEMBER 16, 2015

Onondaga Lake Gridding Summary Using an In-Situ Ultraviolet Spectrophotometer

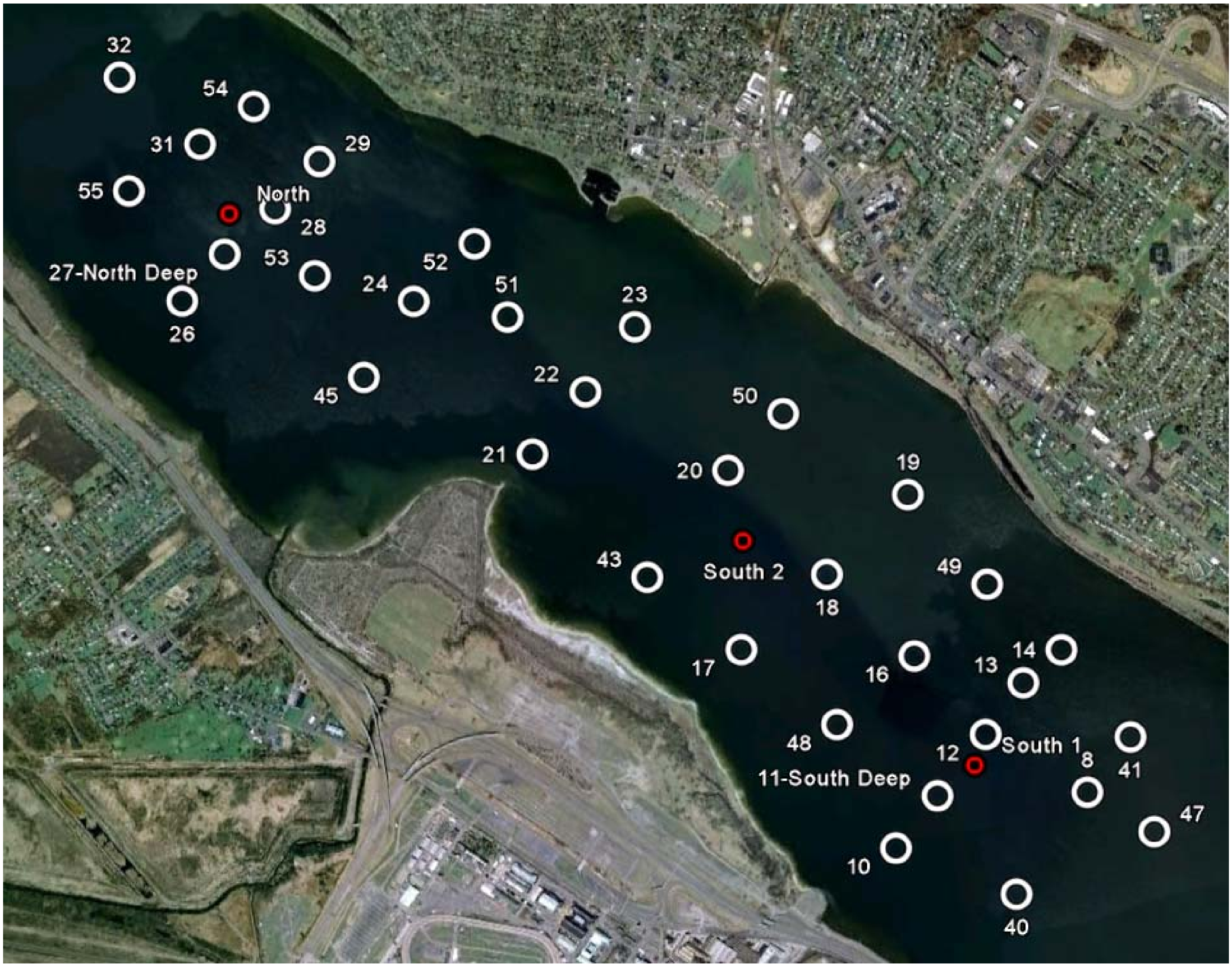
Full Scale Nitrate Addition Year 2

One Meter Off Bottom Weekly Summary:

May 19 through November 16, 2015

UPSTATE FRESHWATER INSTITUTE

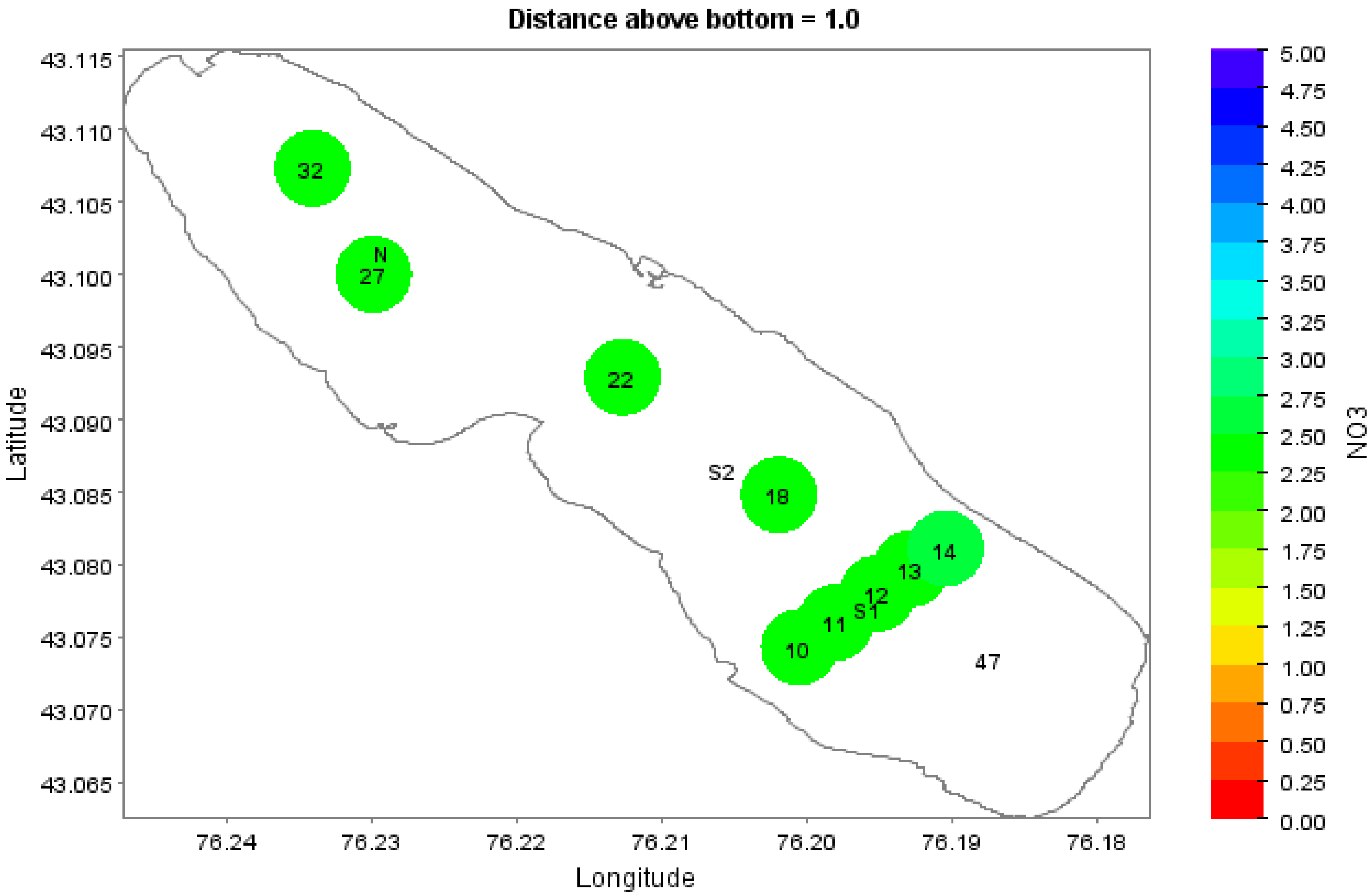
Gridding Locations



white circle: gridding loocation
red circle: injection site

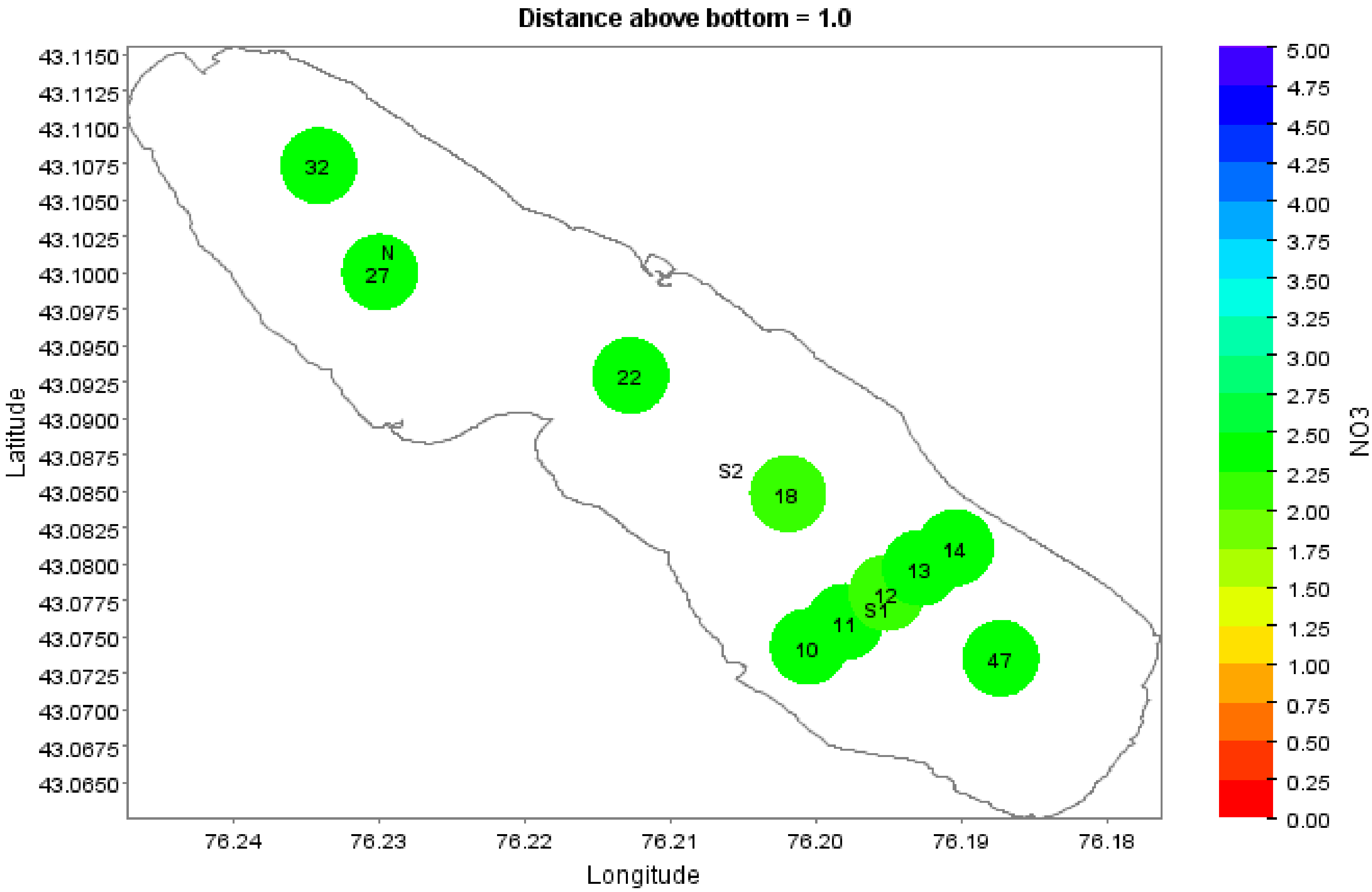
Color Bubble Plots at ~1.0 m off Bottom, Nitrate (mgN/L)

May 19, 2015



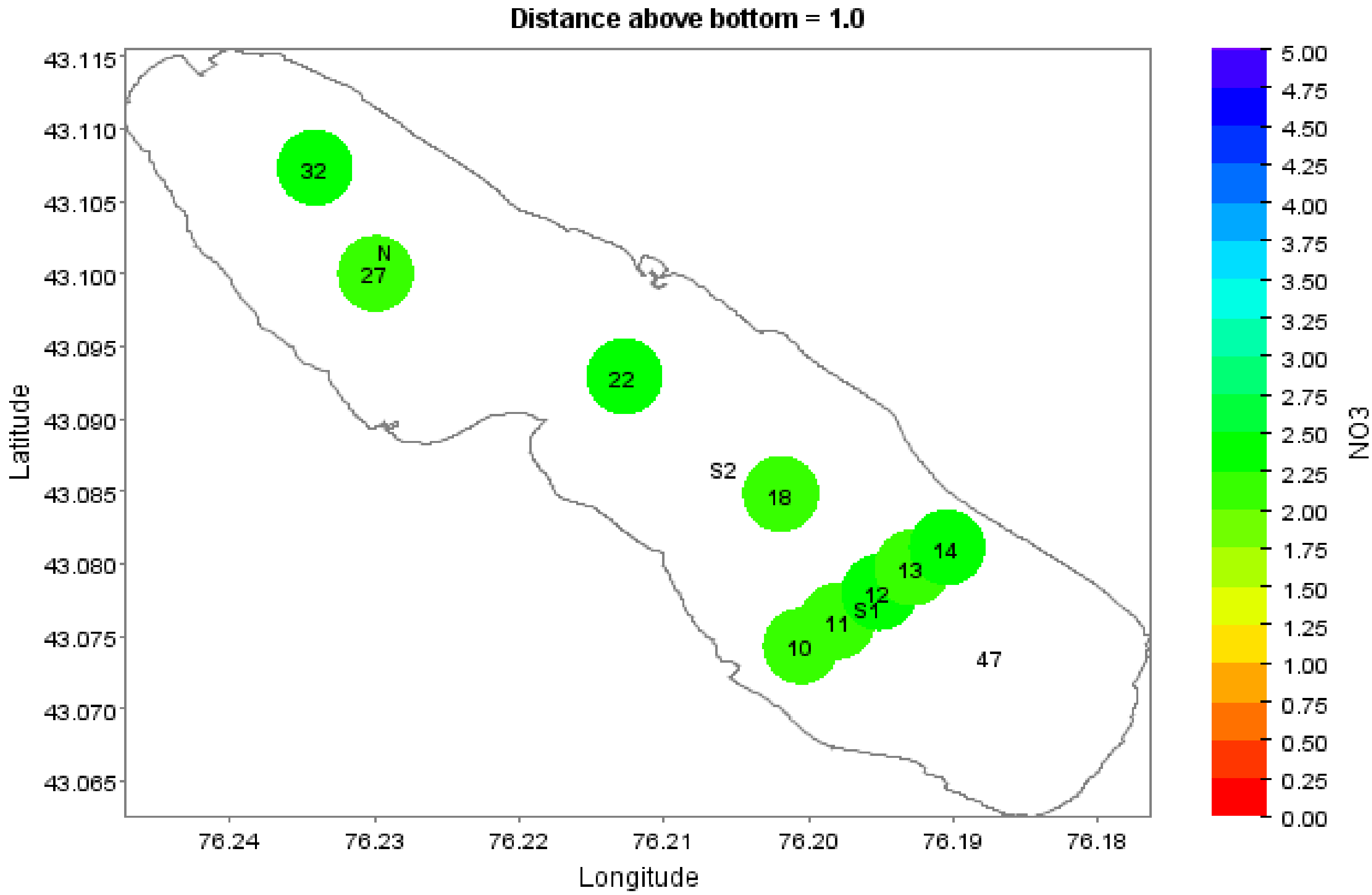
Color Bubble Plots at ~1.0 m off Bottom, Nitrate (mgN/L)

June 4, 2015



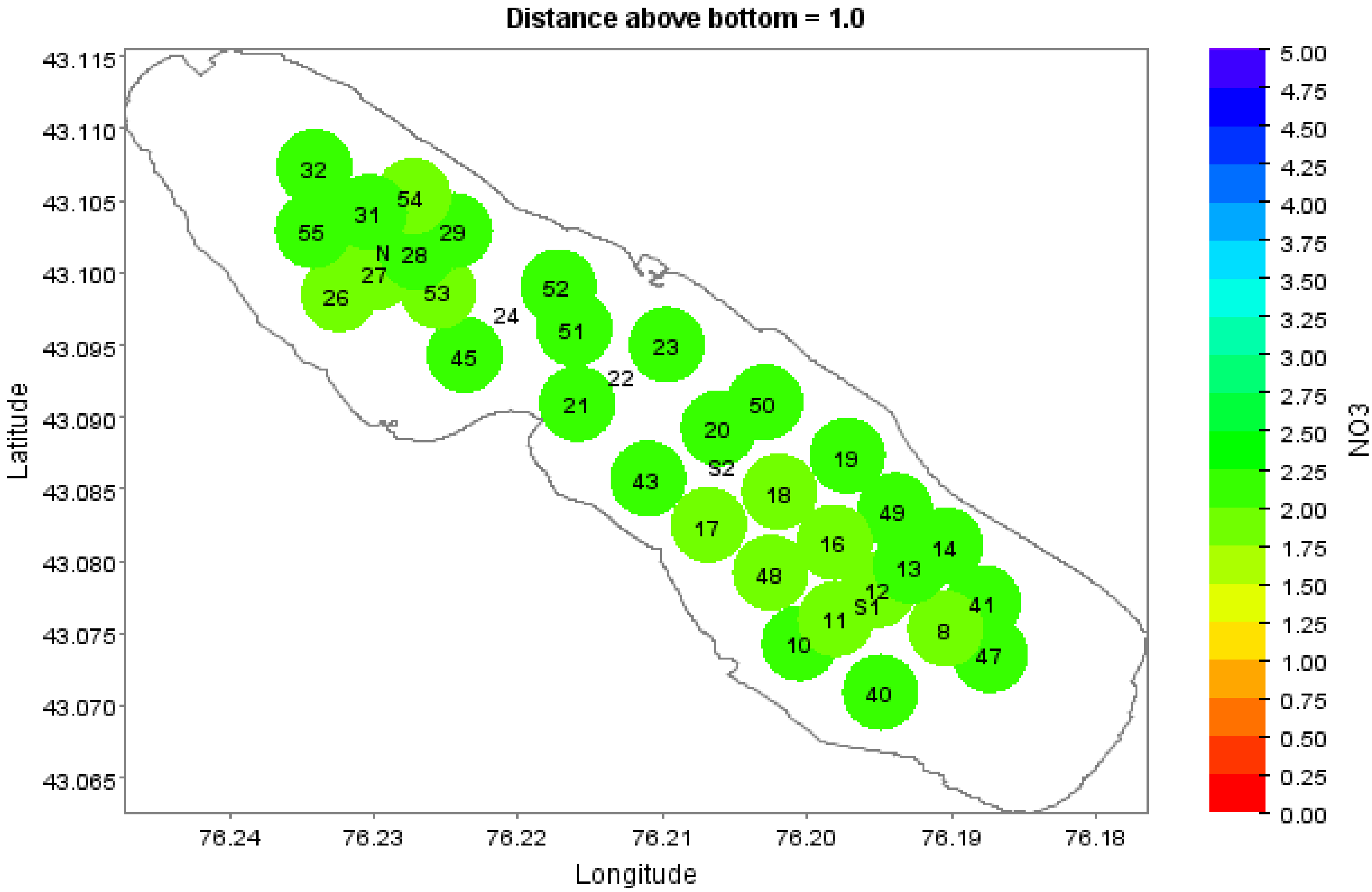
Color Bubble Plots at ~1.0 m off Bottom, Nitrate (mgN/L)

June 16, 2015



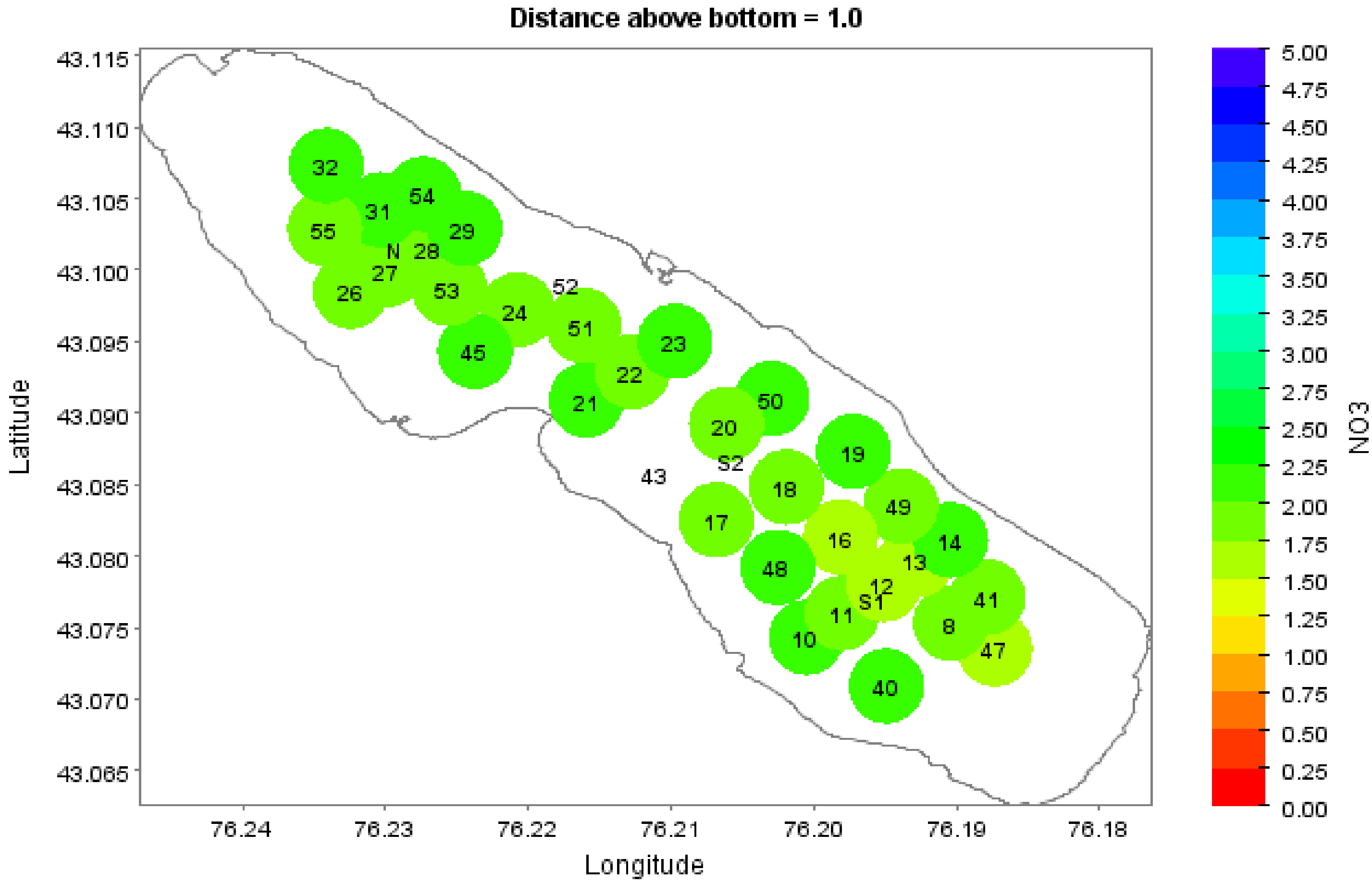
Color Bubble Plots at ~1.0 m off Bottom, Nitrate (mgN/L)

June 29, 2015



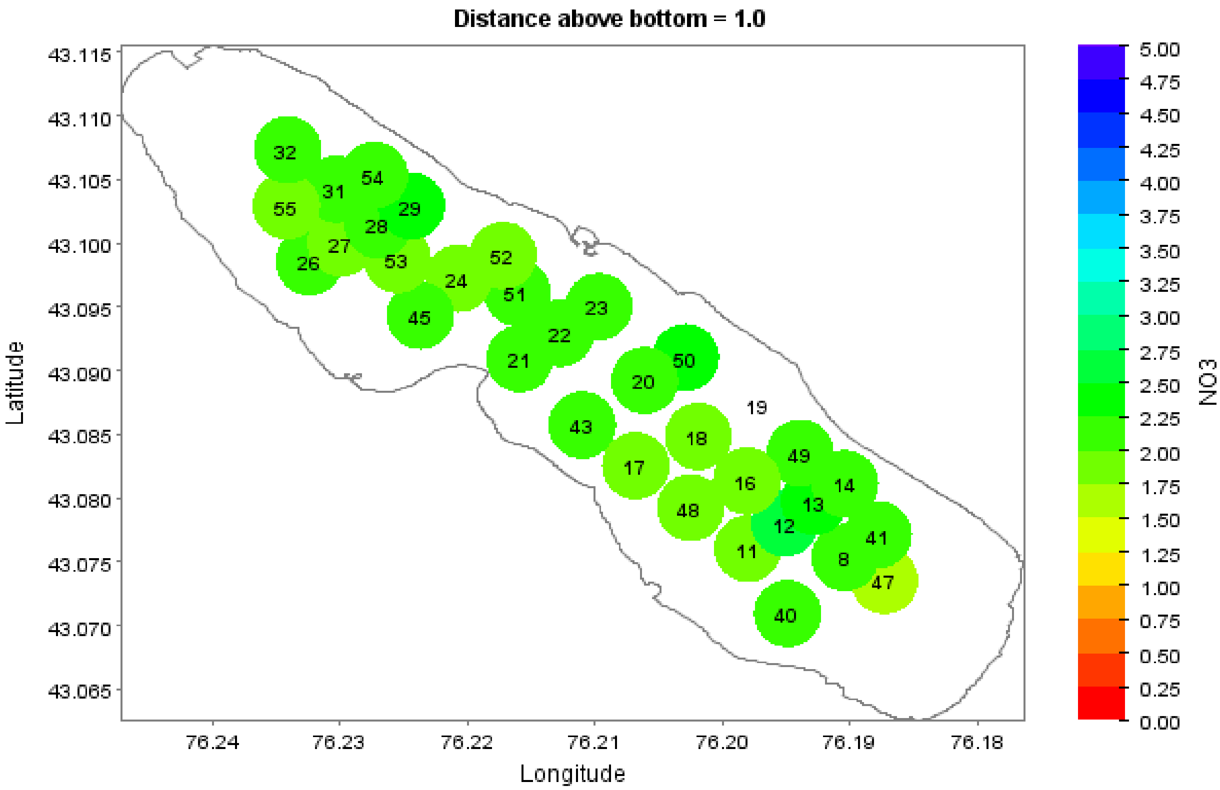
Color Bubble Plots at ~1.0 m off Bottom, Nitrate (mgN/L)

July 6, 2015



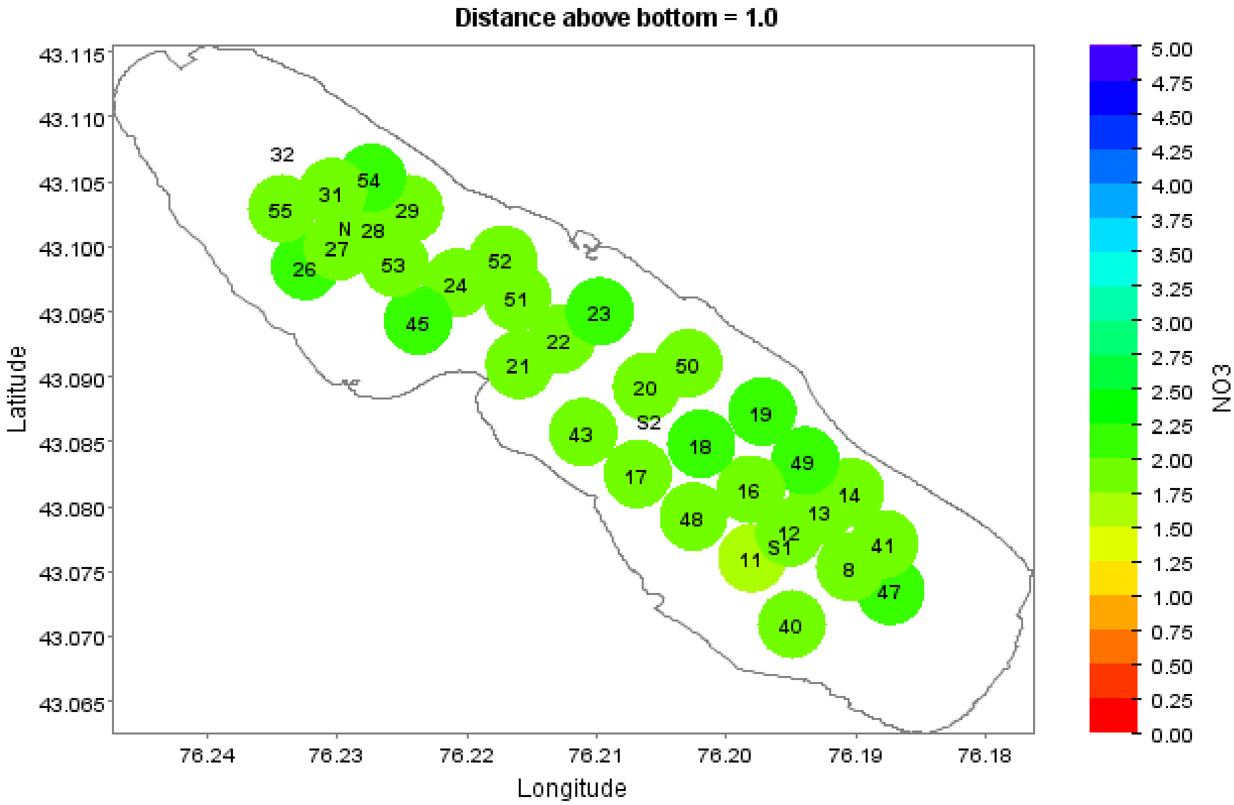
Color Bubble Plots at ~1.0 m off Bottom, Nitrate (mgN/L)

July 13, 2015



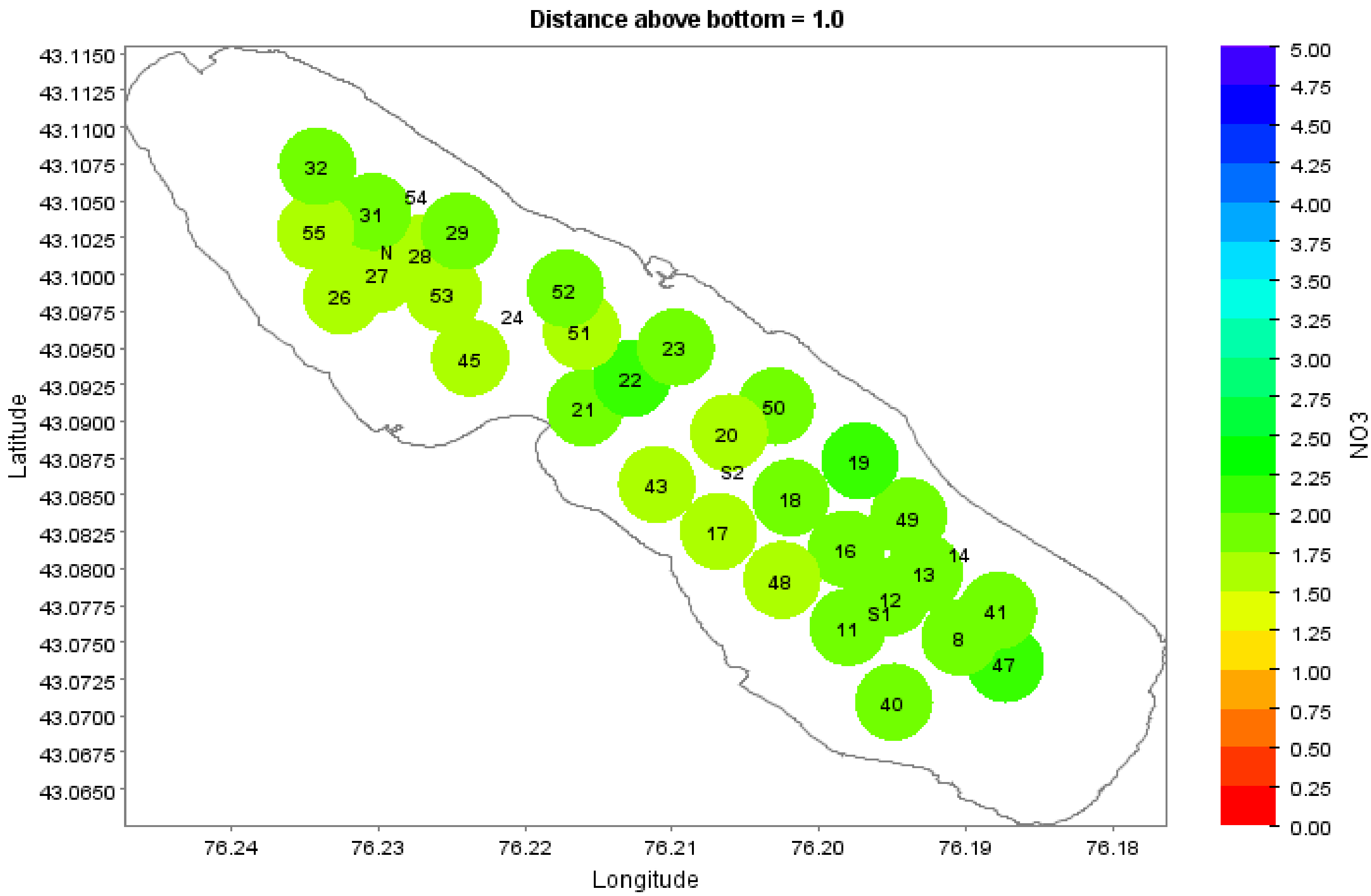
Color Bubble Plots at ~1.0 m off Bottom, Nitrate (mgN/L)

July 20, 2015



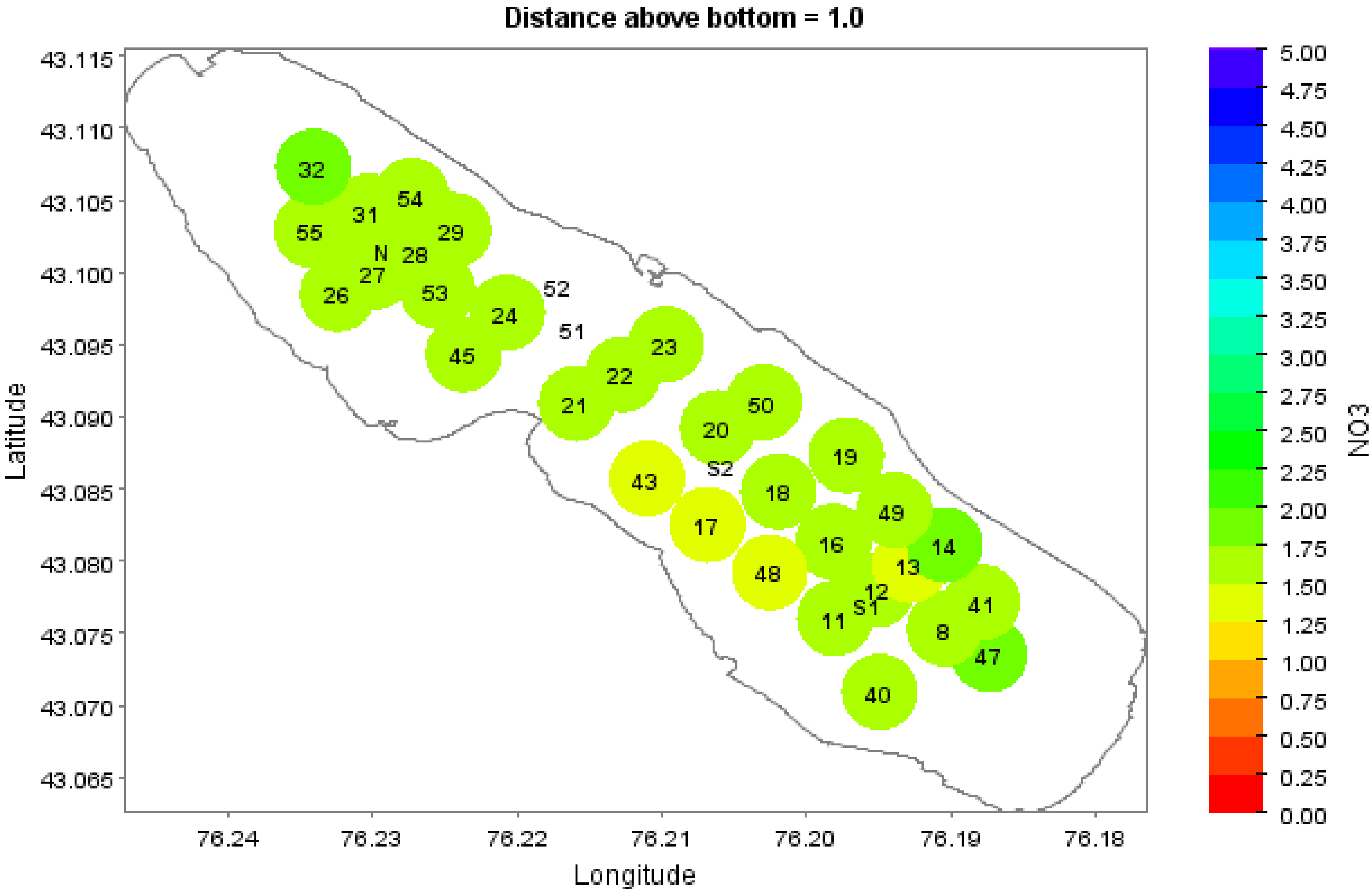
Color Bubble Plots at ~1.0 m off Bottom, Nitrate (mgN/L)

July 27, 2015



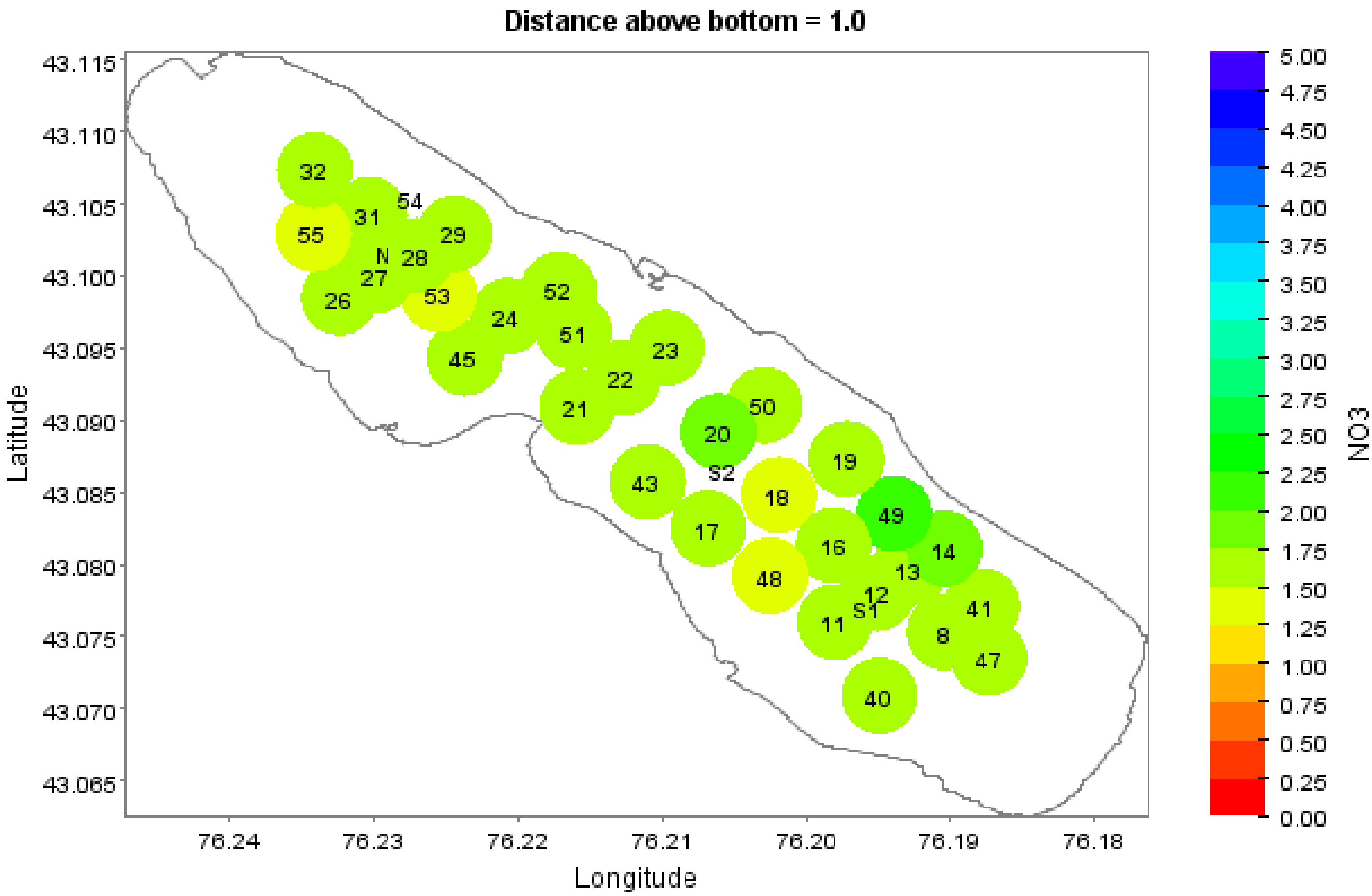
Color Bubble Plots at ~1.0 m off Bottom, Nitrate (mgN/L)

August 3, 2015



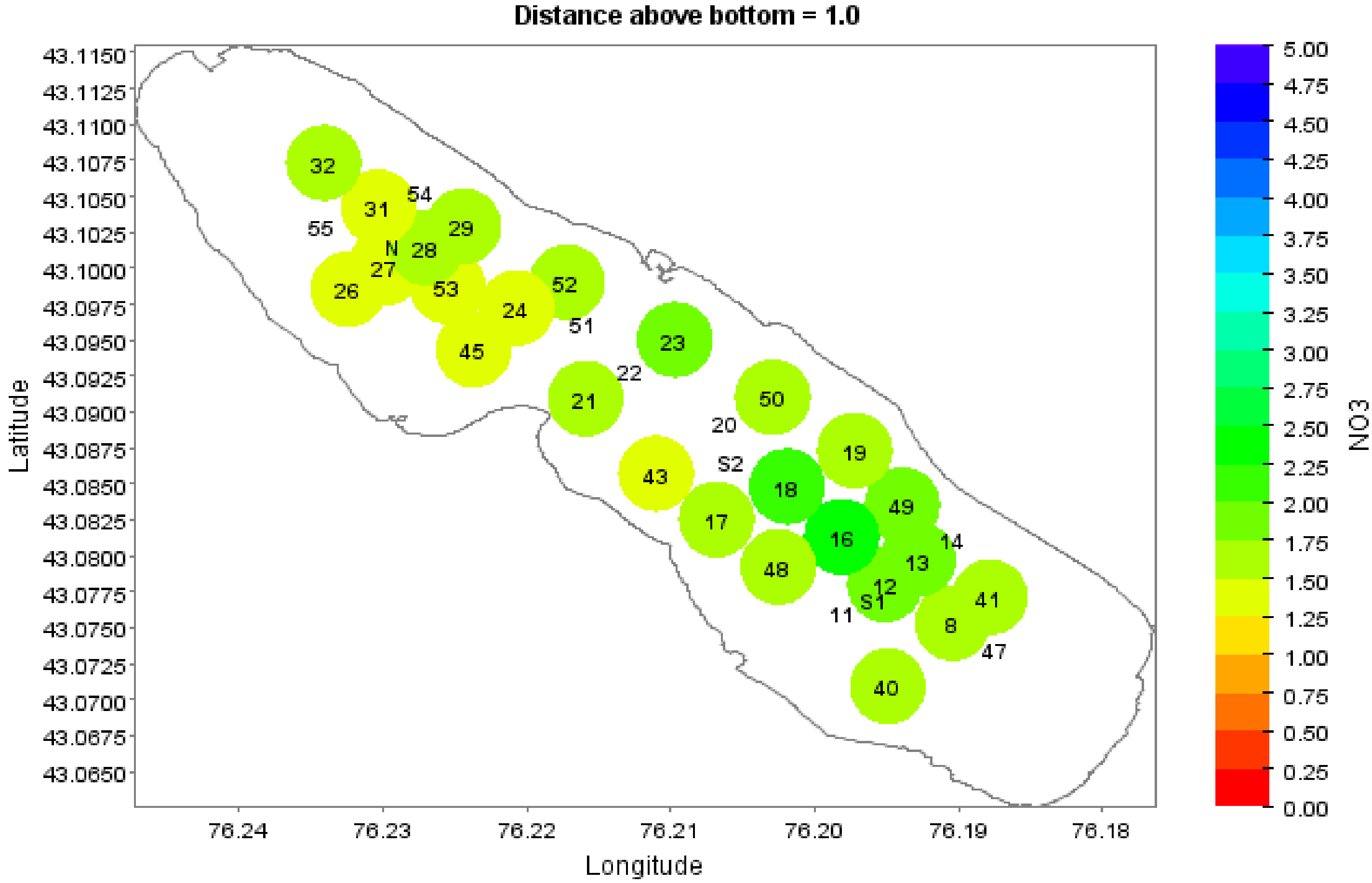
Color Bubble Plots at ~1.0 m off Bottom, Nitrate (mgN/L)

August 10, 2015



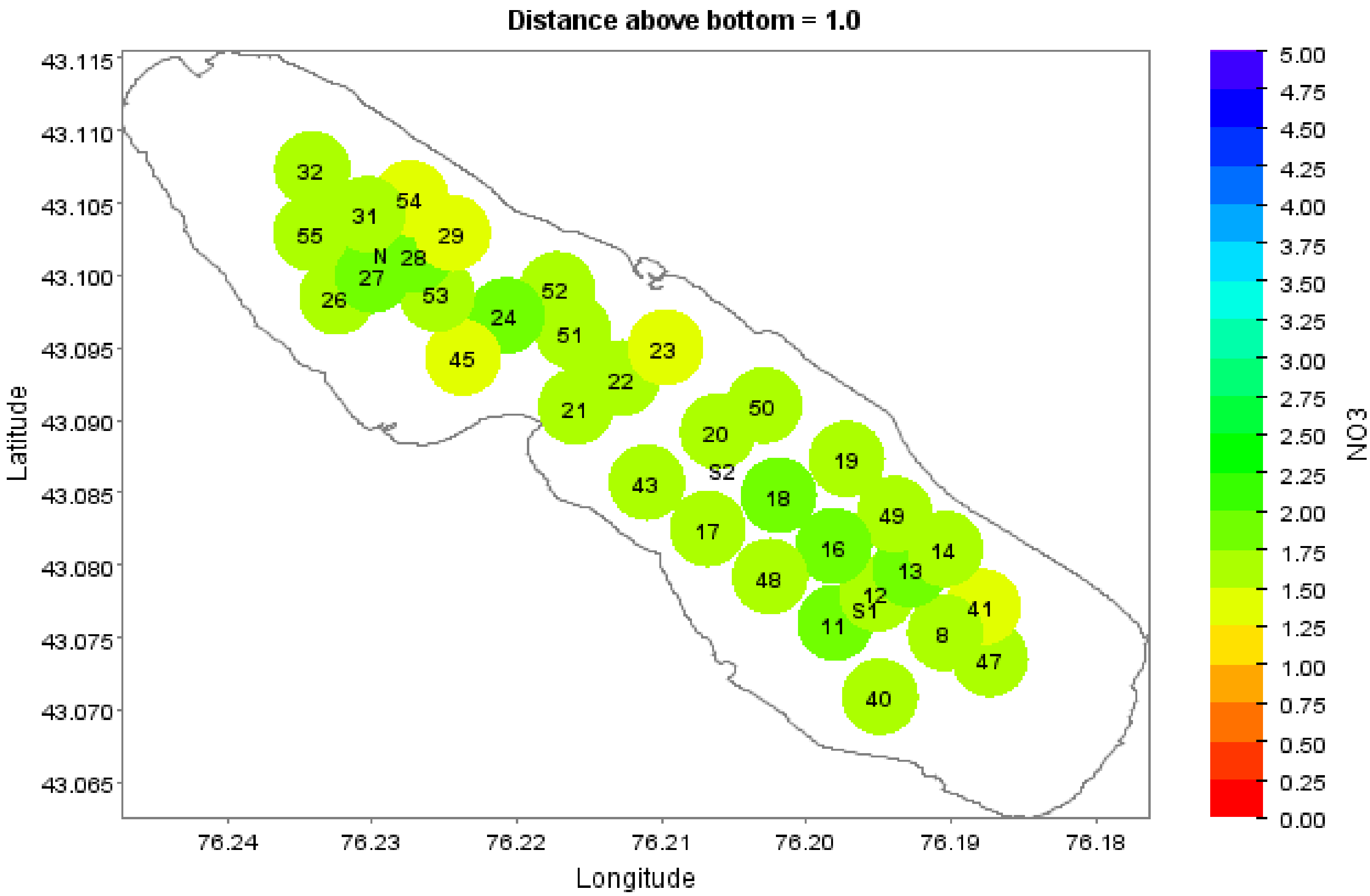
Color Bubble Plots at ~1.0 m off Bottom, Nitrate (mgN/L)

August 17, 2015



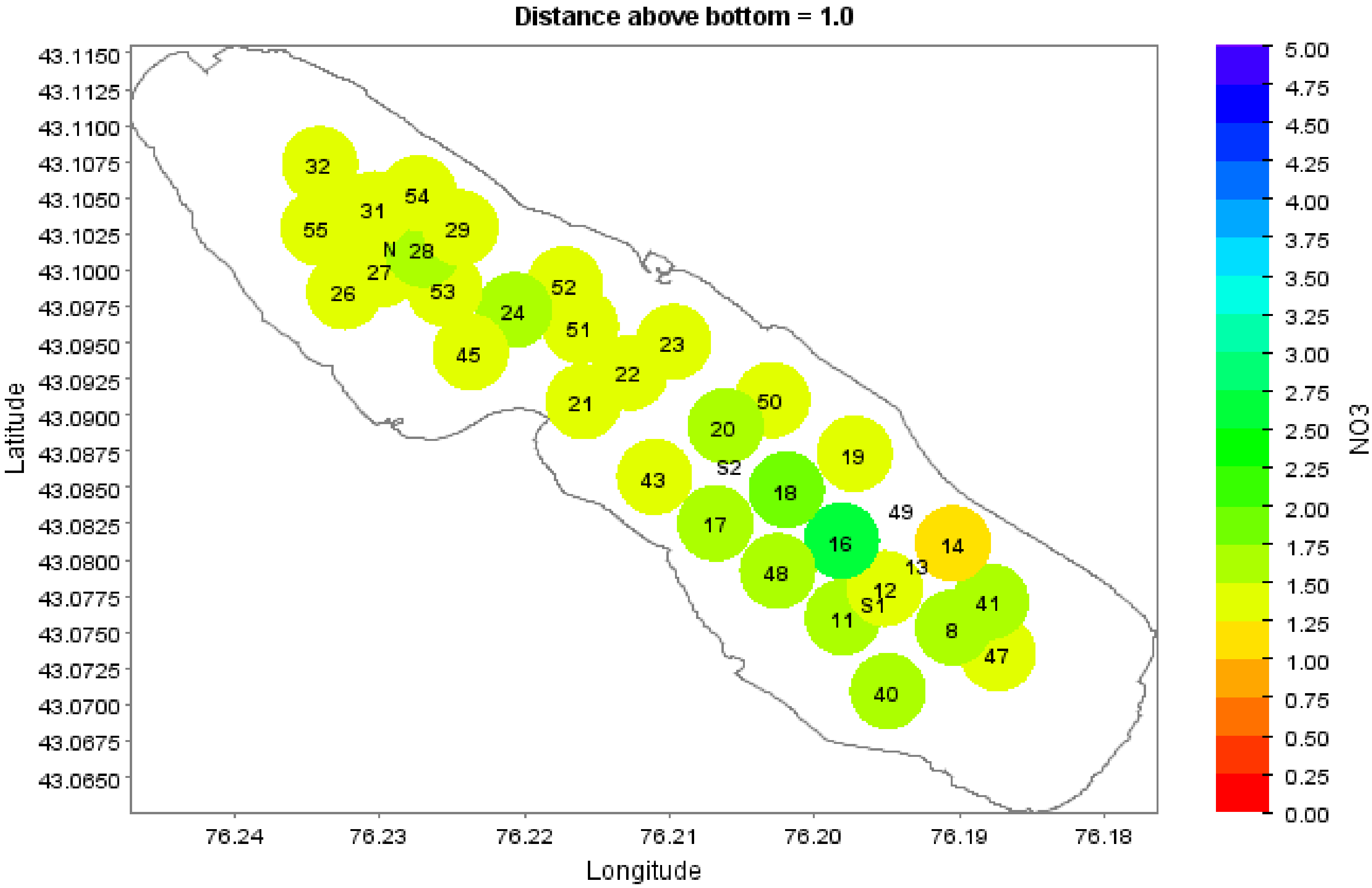
Color Bubble Plots at ~1.0 m off Bottom, Nitrate (mgN/L)

August 24, 2015



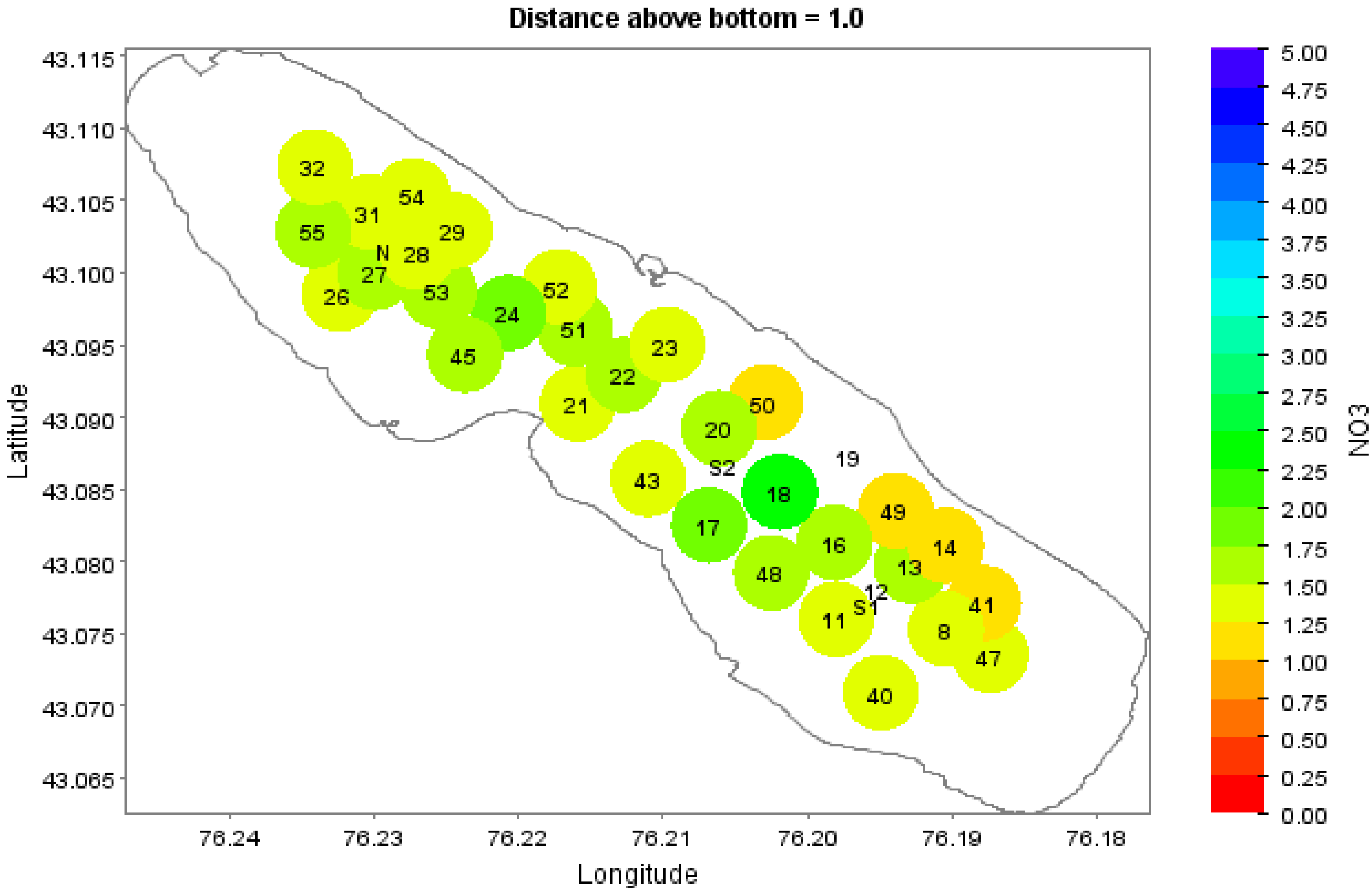
Color Bubble Plots at ~1.0 m off Bottom, Nitrate (mgN/L)

August 31, 2015



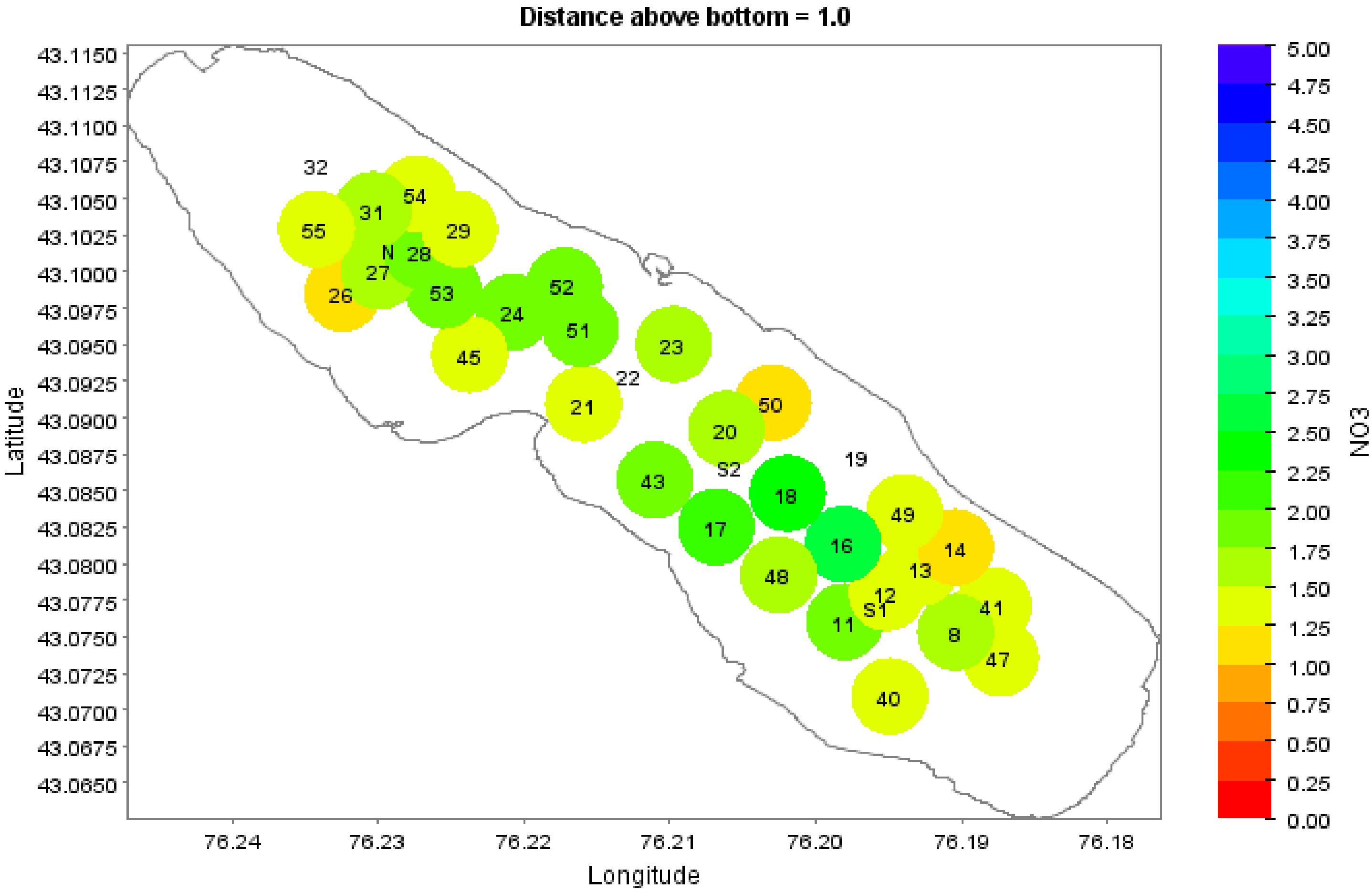
Color Bubble Plots at ~1.0 m off Bottom, Nitrate (mgN/L)

September 8, 2015



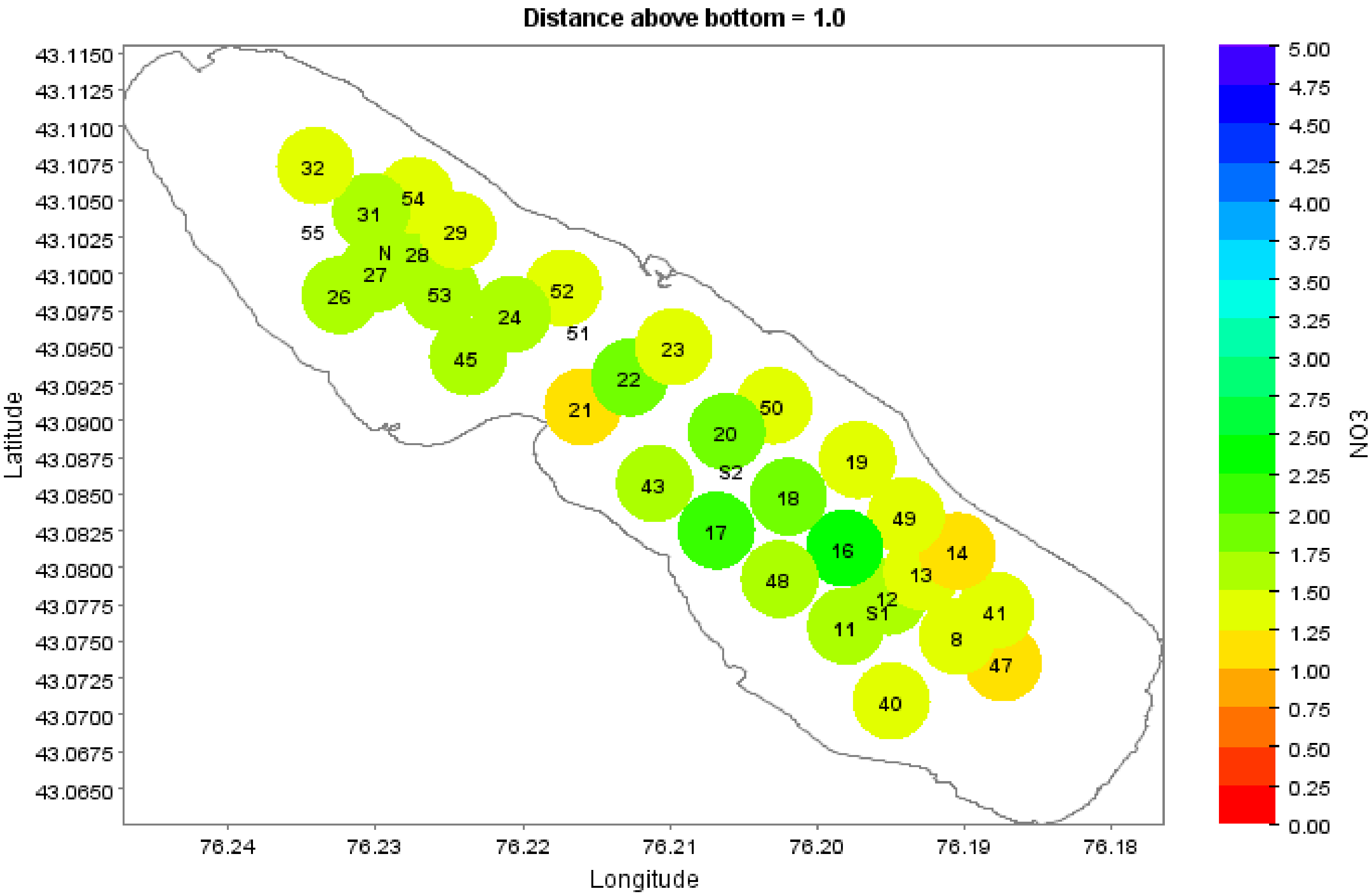
Color Bubble Plots at ~1.0 m off Bottom, Nitrate (mgN/L)

September 14, 2015



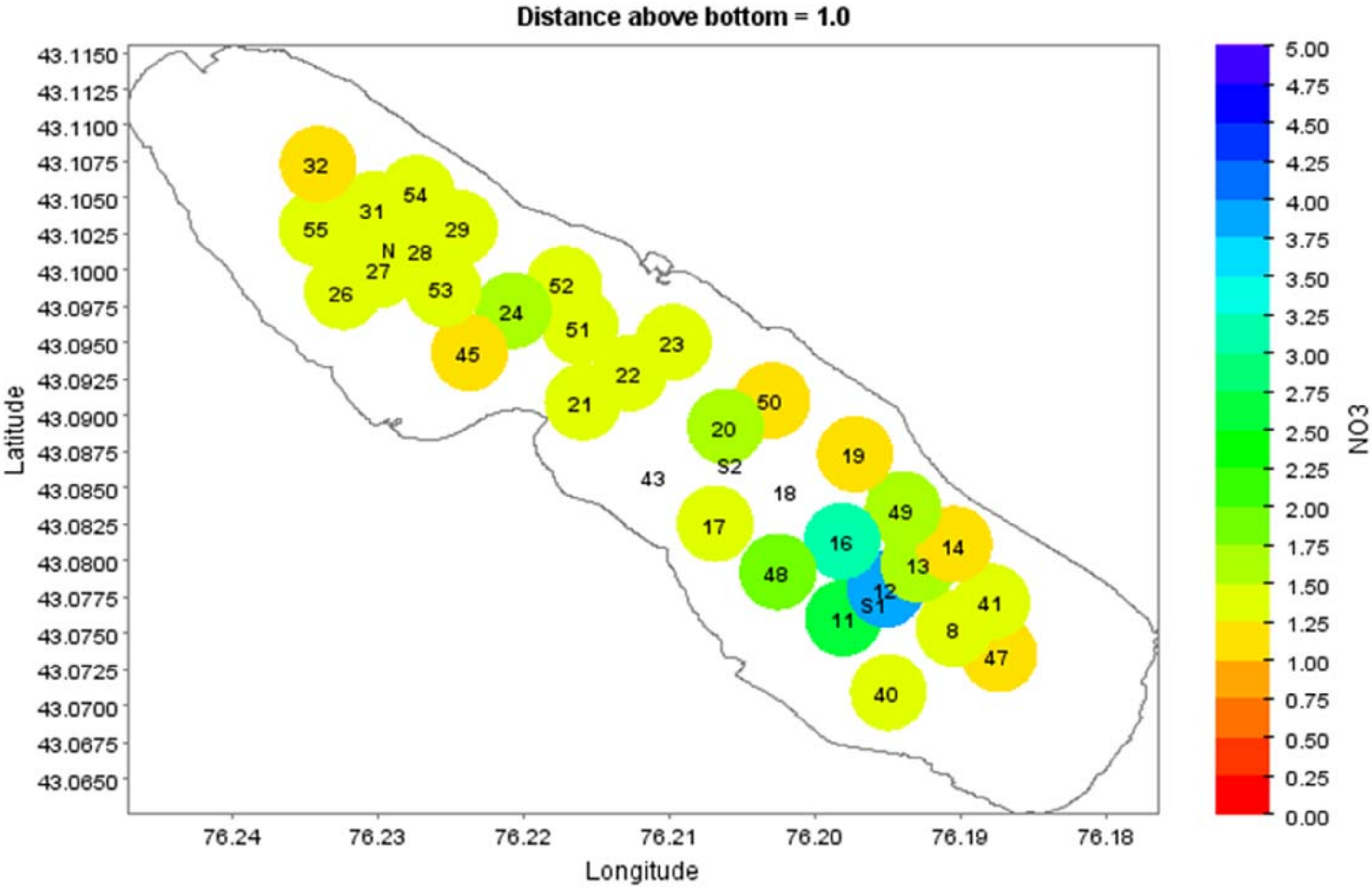
Color Bubble Plots at ~1.0 m off Bottom, Nitrate (mgN/L)

September 21, 2015



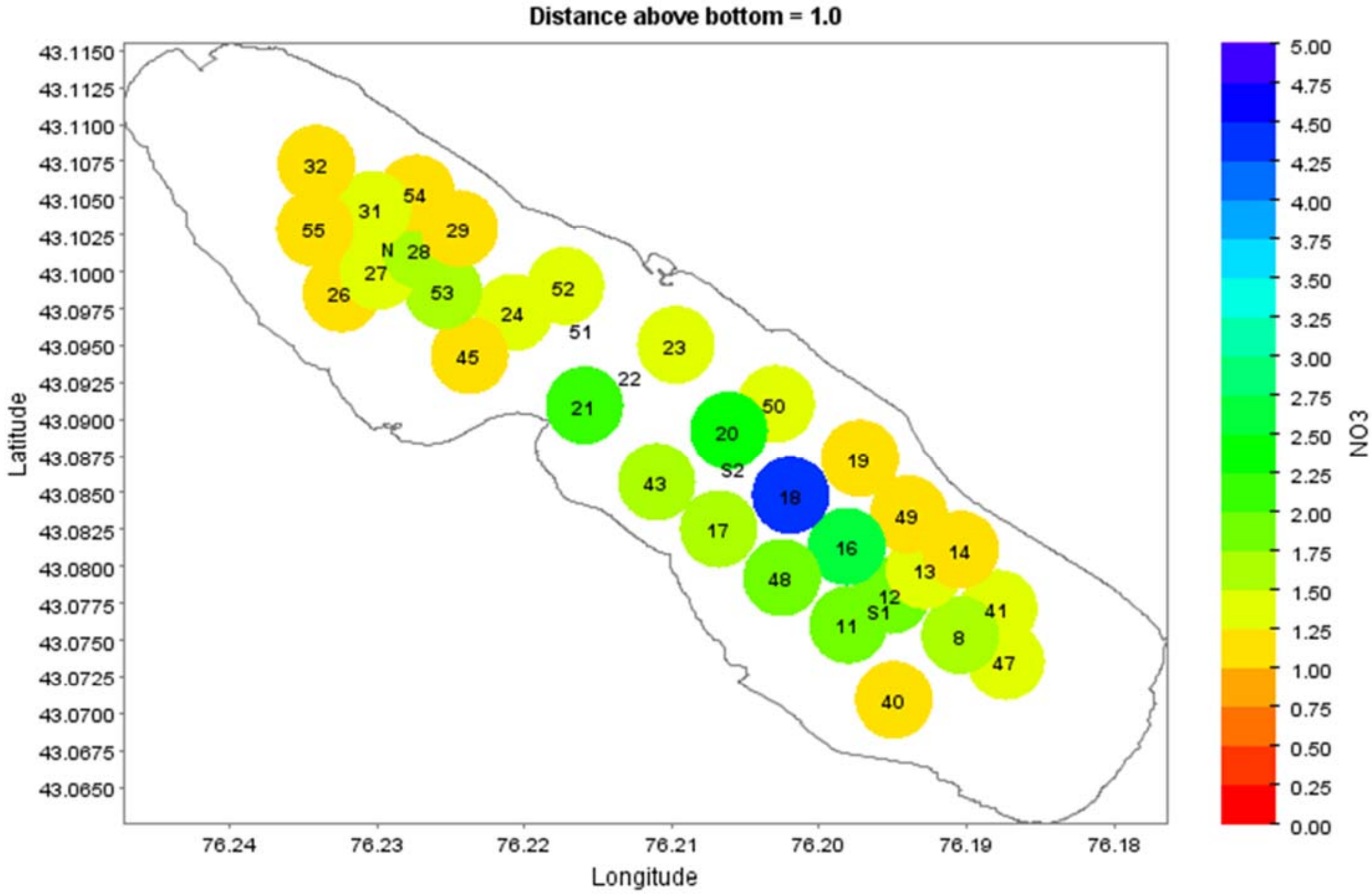
Color Bubble Plots at ~1.0 m off Bottom, Nitrate (mgN/L)

September 28, 2015



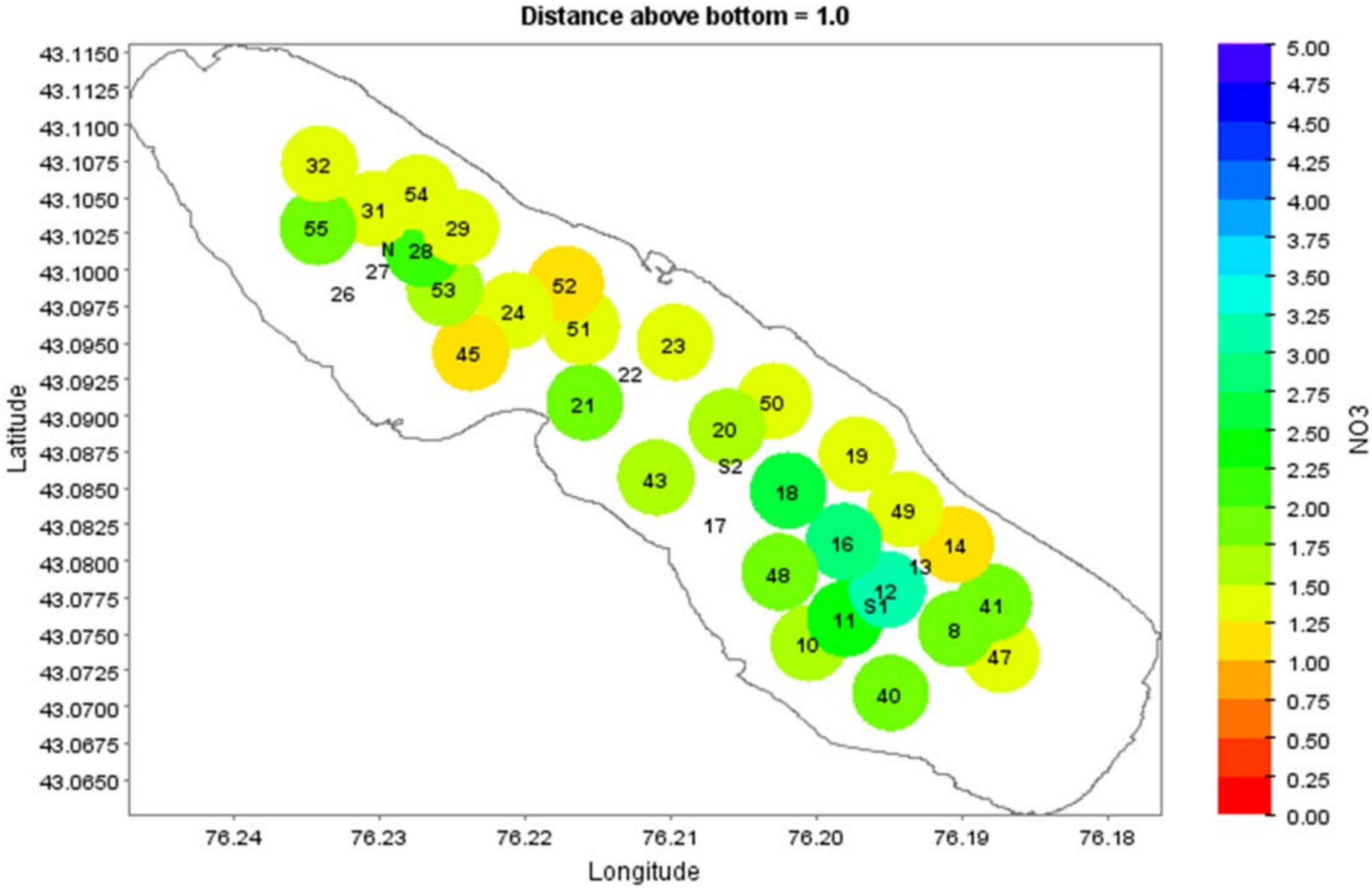
Color Bubble Plots at ~1.0 m off Bottom, Nitrate (mgN/L)

October 5, 2015



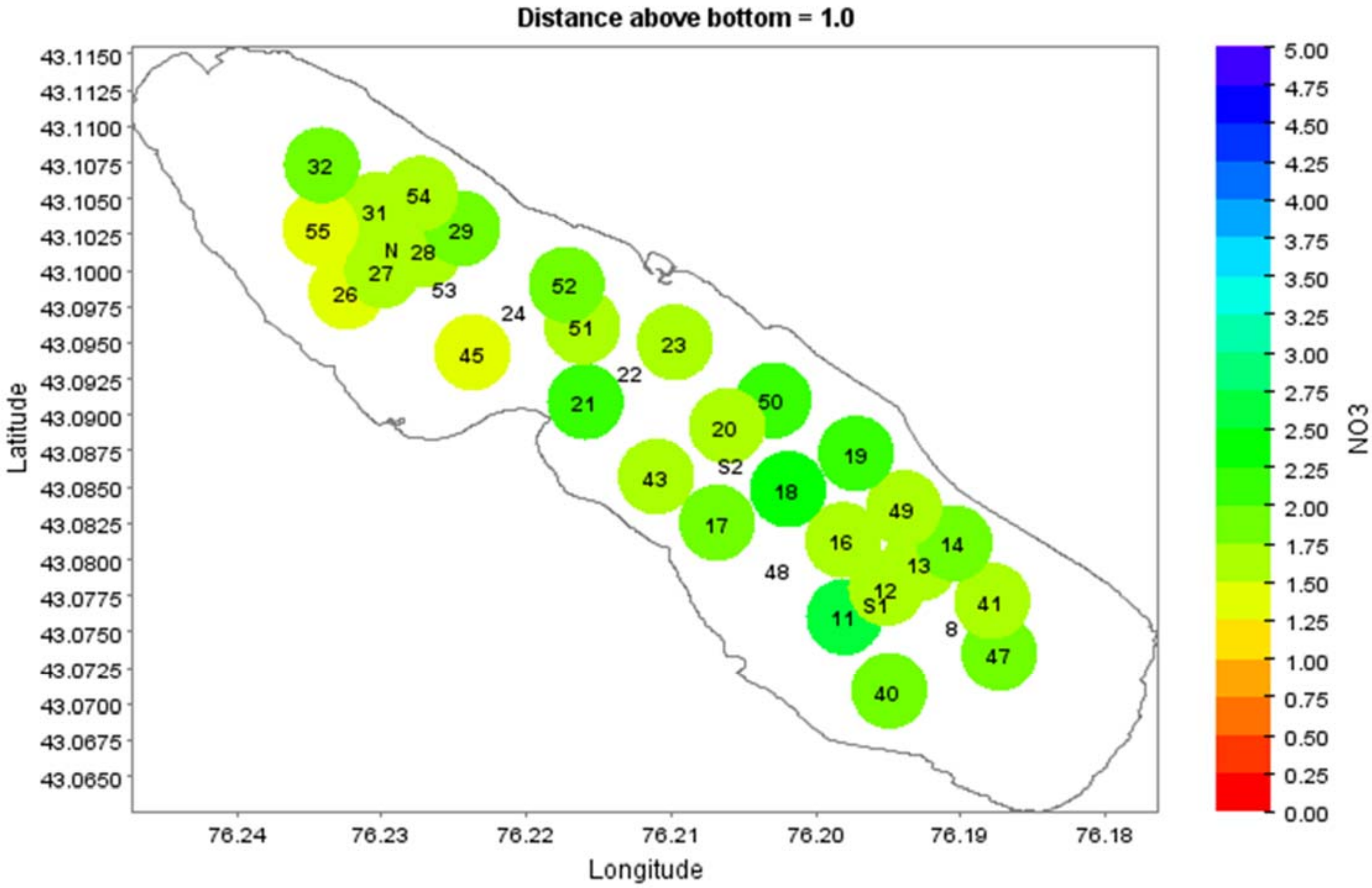
Color Bubble Plots at ~1.0 m off Bottom, Nitrate (mgN/L)

October 12, 2015



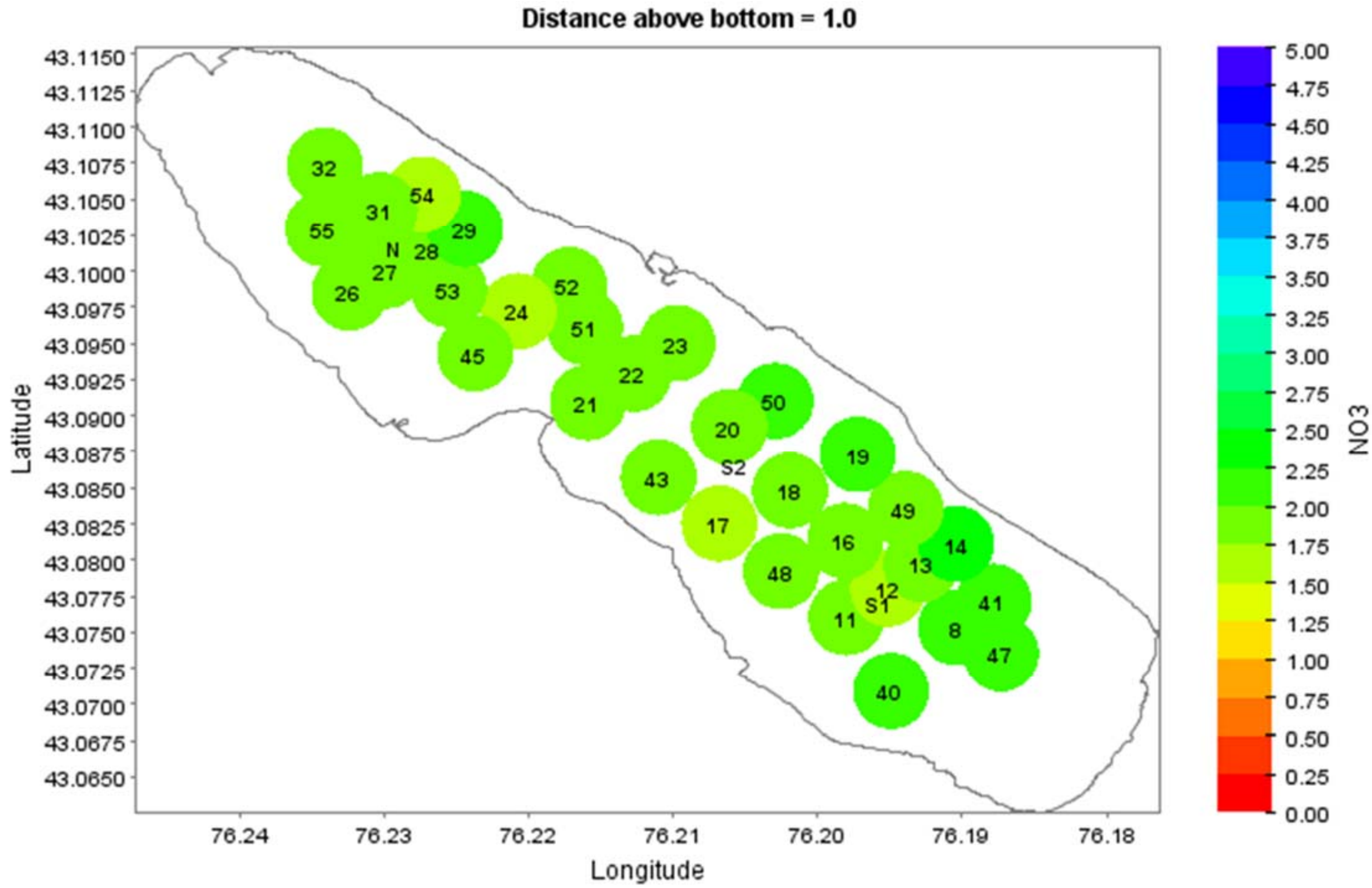
Color Bubble Plots at ~1.0 m off Bottom, Nitrate (mgN/L)

October 19, 2015



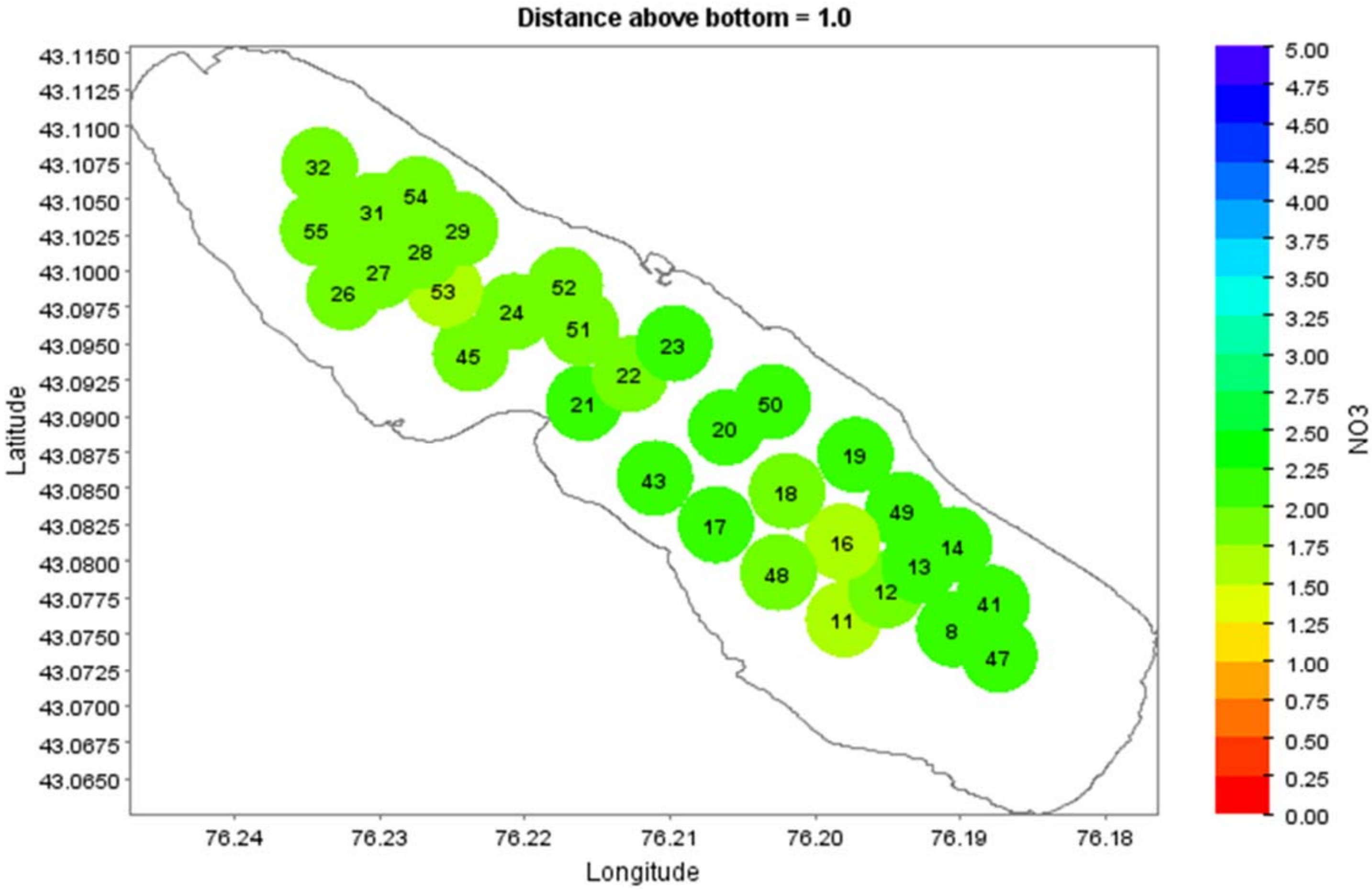
Color Bubble Plots at ~1.0 m off Bottom, Nitrate (mgN/L)

October 26, 2015



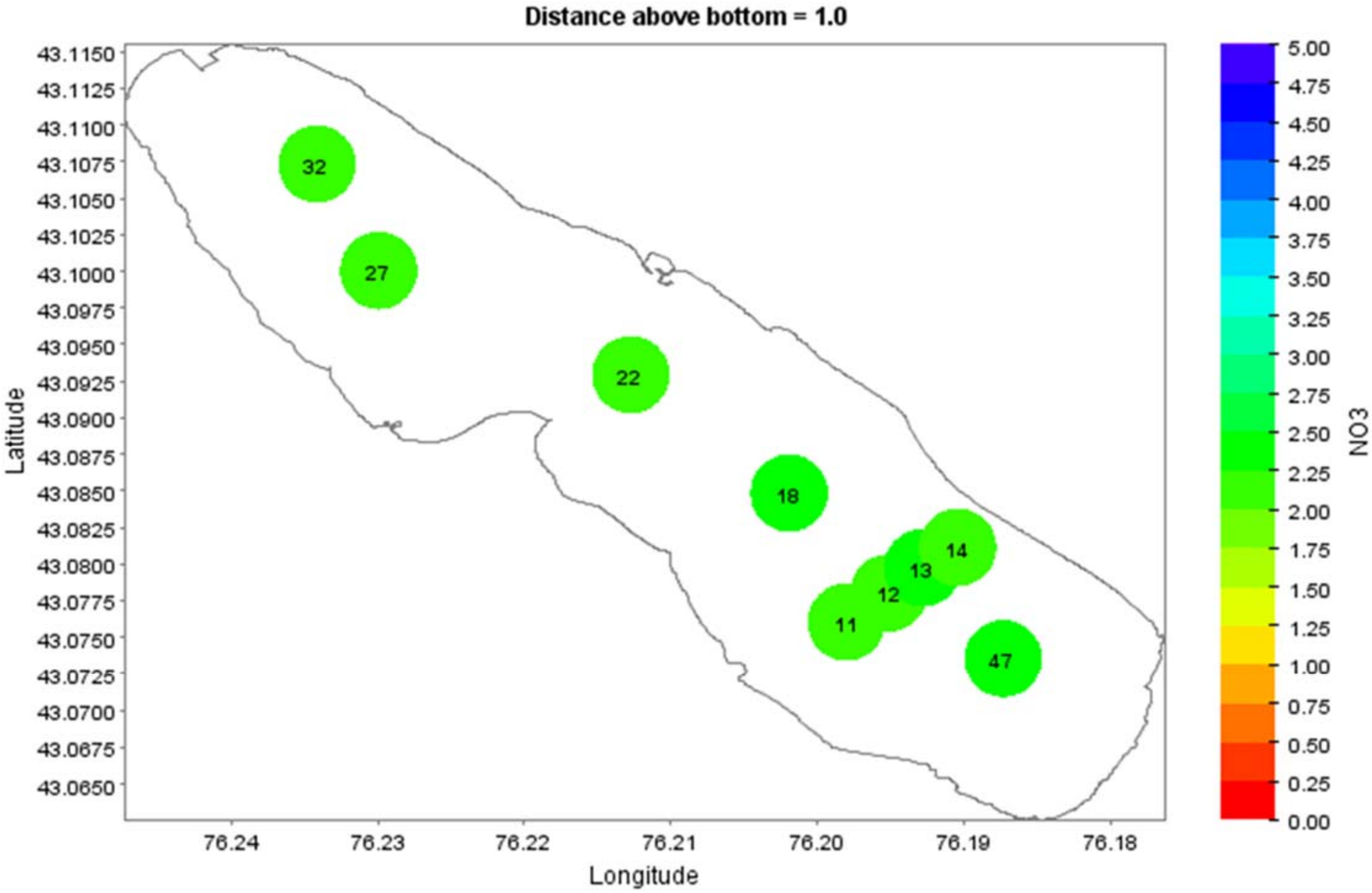
Color Bubble Plots at ~1.0 m off Bottom, Nitrate (mgN/L)

November 2, 2015



Color Bubble Plots at ~1.0 m off Bottom, Nitrate (mgN/L)

November 16, 2015



APPENDIX C

DATA USABILITY AND SUMMARY REPORT: ONONDAGA LAKE 2015 SURFACE WATER MONITORING ASSOCIATED WITH NITRATE ADDITION

APPENDIX C:

DATA USABILITY SUMMARY REPORT

ONONDAGA LAKE 2015 SURFACE WATER MONITORING ASSOCIATED WITH NITRATE ADDITION

Prepared For:

Honeywell

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MARCH 2016

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LIST OF ATTACHMENTS

SECTION C1

DATA USABILITY SUMMARY

Surface water and sediment trap samples were collected as part of the 2015 nitrate addition sampling in the hypolimnion efforts for Onondaga Lake from May 18, 2015 through November 17, 2015. Analytical results from these samples were validated and reviewed by Parsons for usability with respect to the following requirements:

- Operations and Monitoring Plan for Adding Nitrate Full Scale to the Hypolimnion of Onondaga Lake (Parsons and UFI, 2015);
- Quality Assurance Project Plan (QAPP) for Onondaga Lake Construction and Post-Construction Media Monitoring (Surface Water, Biota and Sediment) (Parsons. Anchor QEA and Upstate Freshwater Institute [UFI] 2012); and
- USEPA Region II Standard Operating Procedures (SOPs) for inorganic data review (see Section C2 for citations).

Upstate Freshwater Institute (UFI) in Syracuse, New York collected all of the samples reported herein.

The analytical laboratories for this project were Eurofins – Lancaster, Eurofins – Frontier, and UFI. These laboratories are certified by the State of New York to conduct laboratory analyses for this project through the National Environmental Laboratory Accreditation Conference (NELAC) and the New State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP).

C1.1 LABORATORY DATA PACKAGES

The laboratory data package turnaround time, defined as the time from sample receipt by the laboratory to receipt of the analytical data packages by Parsons, was 7 to 62 days for the samples.

The data packages received from the laboratories were paginated, complete, and overall were of good quality. Comments on specific quality control (QC) and other requirements are discussed in detail in the attached data validation report which is summarized by sample media in Section C2.

C1.2 SAMPLING AND CHAIN-OF-CUSTODY

The samples were collected, shipped under a chain-of-custody (COC) record, and received at the laboratories within one to two days of sampling. All samples were received intact and in good condition at the laboratories.

C1.3 LABORATORY ANALYTICAL METHODS

The surface water samples were collected from the site and analyzed for total and/or dissolved low level mercury, methyl mercury, ferrous iron, dissolved manganese, nitrite, nitrate-nitrite, reactive phosphate, and/or ammonia. Summaries of deviations from the Work Plan, QAPP, or USEPA Region II SOPs concerning these laboratory analyses are presented in Subsections C1.3.1 through C1.3.3. The data qualifications resulting from the data validation review and statements on the laboratory analytical precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS) are discussed for each analytical method by media in Section C2. The laboratory data were reviewed and may be qualified with the following validation flags:

"U" - not detected at the value given

"UJ" - estimated and not detected at the value given

"J" - estimated at the value given

"J+" - estimated biased high at the value given

"J-" - estimated biased low at the value given

"N" - presumptive evidence at the value given

"R" - unusable value

The validated laboratory data were tabulated and are presented in Attachment A.

C1.3.1 Low Level Mercury Analysis

Surface water sample results reported herein were analyzed by Eurofins for low level mercury using the USEPA 1631E analytical method. Certain reported results for the low level mercury samples were considered not detected based upon blank contamination. The reported low level mercury analytical results were considered 100% complete (i.e., usable) for the data presented by Eurofins. PARCCS requirements were met.

C1.3.2 Methyl Mercury Analysis

Surface water sample results reported herein were analyzed by Eurofins for methyl mercury using the USEPA 1630 analytical method. Certain reported results for the methyl mercury samples were qualified as estimated based upon laboratory control sample recoveries, matrix spike recoveries, and field duplicate precision. The reported methyl mercury analytical results were considered 100% complete (i.e., usable) for the data presented by Eurofins. PARCCS requirements were met.

C1.3.3 Other Surface Water Analyses

Surface water sample results for other parameters reported herein were analyzed by UFI for ferrous iron, dissolved manganese, nitrite, nitrate-nitrite, reactive phosphate, and/or ammonia using the UFI SOP, USEPA SW-846 6010C, USEPA 353.2, USEPA 353.2, SM4500, and USEPA 350.1 analytical methods, respectively. Certain reported results for these parameters were qualified as estimated based upon field duplicate precision and improper sample preparation. The reported analytical results for these parameters were considered 100% complete (i.e., usable) for the data presented by UFI. PARCCS requirements were met.

SECTION C2

DATA VALIDATION REPORTS

C2.1 SURFACE WATER SAMPLES

Data review has been completed for data packages generated by Eurofins and UFI containing surface water sample results collected from the site. The specific samples contained in these data packages, the analyses performed, and the validated laboratory data were tabulated and are presented in Attachment A. All of these samples were shipped under a COC record and received intact by the analytical laboratory.

Data validation was performed for all samples in accordance with the project work plan and QAPP as well as the USEPA Region II SOP HW-2c, Revision 15 “Mercury and Cyanide Data Validation”. This data validation and usability report is presented by analysis type.

C2.1.1 Total and Dissolved Low Level Mercury

The following items were reviewed for compliancy in the low level mercury analysis:

- Custody documentation
- Holding times
- Initial and continuing calibration verifications
- Initial and continuing calibration, laboratory preparation blank, field blank contamination
- Matrix spike / matrix spike duplicate (MS/MSD) recoveries
- Laboratory duplicate precision
- Laboratory control sample (LCS) recoveries
- Field duplicate precision
- Sample result verification and identification
- Quantitation limits
- Data completeness

These items were considered compliant and acceptable in accordance with the validation protocols with the exception of blank contamination as discussed below.

Blank Contamination

Field blanks and equipment blanks associated with project samples contained total mercury at a concentration ranging 0.08-1.06 ng/L; laboratory preparation blanks associated with project samples contained total mercury at a concentration ranging 0.08-0.5 ng/L; and laboratory continuing calibration blanks associated with project samples contained total mercury at a concentration ranging 0.0005-0.32 ng/L. Validation qualification of associated sample results was not required.

Usability

All total and dissolved mercury sample results were considered usable following data validation.

Summary

The quality assurance objectives for measurement data included considerations for precision, accuracy, representativeness, completeness, comparability, and sensitivity. The total and dissolved low level mercury data presented by Eurofins were 100% complete (i.e., usable). The validated low level mercury laboratory data are tabulated and presented in Attachment A.

C2.1.2 Methyl Mercury

The following items were reviewed for compliancy in the methyl mercury analysis:

- Custody documentation
- Holding times
- Surrogate recoveries
- Initial and continuing calibration verifications
- Initial and continuing calibration, laboratory preparation blank, and field blank contamination
- Matrix spike / matrix spike duplicate (MS/MSD) recoveries
- Laboratory duplicate precision
- Laboratory control sample (LCS) recoveries
- Field duplicate precision
- Sample result verification and identification
- Quantitation limits
- Data completeness

These items were considered compliant and acceptable in accordance with the validation protocols with the exception of blank contamination, matrix spike recoveries, LCS recoveries, and field duplicate precision as discussed below.

Blank Contamination

The laboratory preparation blank associated with project samples collected on 6/30/15, 9/16/15, 9/29/15, 10/20/15, 10/27/15, 11/3/15, and 11/17/15 contained methyl mercury at a concentration ranging 0.026-0.11 ng/L; initial calibration blanks associated with project samples contained methyl mercury at a concentration ranging 0.005-0.015 ng/L; continuing calibration blanks associated with project samples contained methyl mercury at a concentration ranging 0.002-0.17 ng/L; and field and equipment blanks associated with project samples contained methyl mercury at a concentration ranging 0.027-0.126 ng/L. Therefore, sample results less than validation action concentrations were considered not detected and qualified “U” for the affected samples.

Matrix Spike Recoveries

All matrix spike recoveries were considered acceptable and within the 65-130%R QC limit with the exception of the high matrix spike recovery for methyl mercury associated with samples OL-2320-01 (145%R) and OL-2366-01 (163%R, 141%R). Therefore, positive results for these samples were considered estimated, possibly biased high, and qualified “J+”.

LCS Recoveries

All LCS recoveries were considered acceptable and within the 70-130%R QC limit with the exception of the high methyl mercury LCS recovery (133%R, 134%R) associated with samples collected on 6/2/15, 6/16/15, 8/25/15, and 9/1/15. Therefore, methyl mercury results were considered estimated, possibly biased high, with positive results qualified “J+” for the affected samples.

Field Duplicate Precision

All field duplicate precision results were considered acceptable with the exception of the methyl mercury precision for the field duplicate pairs OL-2301-01/-02 (59%RPD), OL-2333-01/-02 (48%RPD), OL-2338-01/-02 (52%RPD), and OL-2388-01/-02 (44%RPD). Therefore, the methyl mercury results for these samples were considered estimated and qualified “J”.

Usability

All methyl mercury sample results were considered usable following data validation.

Summary

The quality assurance objectives for measurement data included considerations for precision, accuracy, representativeness, completeness, comparability, and sensitivity. The methyl mercury data presented by Eurofins were 100% complete (i.e., usable). The validated methyl mercury laboratory data are tabulated and presented in Attachment A.

C2.1.3 Ferrous Iron, Dissolved Manganese, Nitrite, Nitrate-Nitrite, Reactive Phosphate, and Ammonia

All custody documentation, holding times, matrix spike recoveries, laboratory duplicate precision, laboratory control sample recoveries, laboratory method blank contamination, QC field blank contamination, initial and continuing calibration verifications, field duplicate precision, and quantitation limits were reviewed for compliance. Validation qualification of the sample results for these parameters was not required with the exception of the following:

- The ammonia results for certain samples collected on 5/18/15, 7/21/15, 7/28/15, 8/4/15, 8/11/15, 8/18/15, 8/25/15, 9/1/15, 9/9/15, 9/16/15, 9/22/15, 9/29/15, 10/13/15, and 10/20/15; the reactive phosphate results for certain samples collected on 8/11/15 and 9/9/15; and the nitrite results for certain samples collected on 8/18/15 were considered not detected and qualified "U" based upon similar concentrations detected in the associated laboratory blanks and/or field blanks.

- The positive nitrite results for samples collected on 8/18/15, 8/25/15, and 9/9/15 were considered estimated, possibly biased high, and qualified "J+" based upon a high continuing calibration verification recoveries (111%R, 115%R, 112%R; QC limit 90-110%R).

- The reactive phosphate result for sample OL-2309-08 was considered estimated and qualified "J" based upon improper preparation at the laboratory.

- The ammonia results for sample OL-2349-01 and its field duplicate OL-2349-02 were considered estimated and qualified "J" based upon poor field duplicate precision (102%RPD).

The quality assurance objectives for measurement data included considerations for precision, accuracy, representativeness, completeness, comparability, and sensitivity. The data for these parameters presented by UFI were 100% complete (i.e., usable). The validated laboratory data are tabulated and presented in Attachment A.

ATTACHMENT A

VALIDATED LABORATORY DATA

							Parameter	FERROUS IRON (II)		MANGANESE		MERCURY		MERCURY, DISSOLVED		METHYL MERCURY		NITRITE	
							Method	UFI-22BIPY FE		SW9010		E1630		E1630		E1631		E353.2	
							Filtered	N		Y		N		Y		N		Y	
							Units	ug/l		mg/L		ug/l		ug/l		ug/l		mg/L	
Location ID	Field Sample ID	Depth (ft)	Sampled	SDG	Matrix	Purpose	Sample Type												
DEEP_S	OL-2300-01	6.6 - 6.6	05/18/2015	UFI CHM 2015-014	WATER	REG	W-SW											0.02	
DEEP_S	OL-2300-02	6.6 - 6.6	05/18/2015	UFI CHM 2015-014	WATER	FD	W-SW											0.02	
DEEP_S	OL-2300-03	39.6 - 39.6	05/18/2015	UFI CHM 2015-014	WATER	REG	W-SW											0.012	J
DEEP_S	OL-2300-04	59.4 - 59.4	05/18/2015	UFI CHM 2015-014	WATER	REG	W-SW											0.022	
DEEP_S	OL-2301-01	6.6 - 6.6	05/18/2015	1505470	WATER	REG	W-SW					0.00082		0.00035	J	0.000045	J		
DEEP_S	OL-2301-02	6.6 - 6.6	05/18/2015	1505470	WATER	FD	W-SW					0.00094				0.000083	J		
DEEP_S	OL-2301-03	39.6 - 39.6	05/18/2015	1505470	WATER	REG	W-SW					0.0007				0.000049	J		
DEEP_S	OL-2301-04	59.4 - 59.4	05/18/2015	1505470	WATER	REG	W-SW					0.00067				0.000026	U		
DEEP_S	OL-2305-01	6.6 - 6.6	06/02/2015	UFI CHM 2015-016	WATER	REG	W-SW											0.017	
DEEP_S	OL-2305-02	6.6 - 6.6	06/02/2015	UFI CHM 2015-016	WATER	FD	W-SW											0.017	
DEEP_S	OL-2305-03	39.6 - 39.6	06/02/2015	UFI CHM 2015-016	WATER	REG	W-SW											0.012	J
DEEP_S	OL-2305-04	59.4 - 59.4	06/02/2015	UFI CHM 2015-016	WATER	REG	W-SW											0.02	
DEEP_S	OL-2306-01	6.6 - 6.6	06/02/2015	1506107	WATER	REG	W-SW					0.00086				0.000075			
DEEP_S	OL-2306-02	6.6 - 6.6	06/02/2015	1506107	WATER	FD	W-SW					0.00082				0.000075			
DEEP_S	OL-2306-03	39.6 - 39.6	06/02/2015	1506107	WATER	REG	W-SW					0.00067				0.000034	J		
DEEP_S	OL-2306-04	59.4 - 59.4	06/02/2015	1506107	WATER	REG	W-SW					0.0006				0.00004	J		
DEEP_S	OL-2309-01	6.6 - 6.6	06/16/2015	UFI CHM 2015-020	WATER	REG	W-SW											0.019	
DEEP_S	OL-2309-02	6.6 - 6.6	06/16/2015	UFI CHM 2015-020	WATER	FD	W-SW											0.019	
DEEP_S	OL-2309-03	39.6 - 39.6	06/16/2015	UFI CHM 2015-020	WATER	REG	W-SW											0.016	
DEEP_S	OL-2309-04	59.4 - 59.4	06/16/2015	UFI CHM 2015-020	WATER	REG	W-SW	17	U									0.026	
DEEP_S	OL-2309-05	46.2 - 46.2	06/16/2015	UFI CHM 2015-020	WATER	REG	W-SW	17	U										
DEEP_S	OL-2309-06	52.8 - 52.8	06/16/2015	UFI CHM 2015-020	WATER	REG	W-SW	17	U										
DEEP_S	OL-2309-07	59.4 - 59.4	06/16/2015	UFI CHM 2015-020	WATER	FD	W-SW	17	U										
DEEP_S	OL-2310-01	6.6 - 6.6	06/16/2015	1506456	WATER	REG	W-SW					0.00189		0.00062		0.000097			
DEEP_S	OL-2310-02	6.6 - 6.6	06/16/2015	1506456	WATER	FD	W-SW					0.00139				0.000104			
DEEP_S	OL-2310-03	39.6 - 39.6	06/16/2015	1506456	WATER	REG	W-SW					0.00096				0.000036	J		
DEEP_S	OL-2310-04	59.4 - 59.4	06/16/2015	1506456	WATER	REG	W-SW					0.00077				0.000032	J		
DEEP_S	OL-2313-01	46.2 - 46.2	06/16/2015	ONO01	WATER	REG	W-SW			0.0763									
DEEP_S	OL-2313-02	52.8 - 52.8	06/16/2015	ONO01	WATER	REG	W-SW			0.104									
DEEP_S	OL-2313-03	59.4 - 59.4	06/16/2015	ONO01	WATER	REG	W-SW			0.354									
DEEP_S	OL-2313-04	59.4 - 59.4	06/16/2015	ONO01	WATER	FD	W-SW			0.355									
DEEP_S	OL-2314-01	6.6 - 6.6	06/30/2015	UFI CHM 2015-024	WATER	REG	W-SW											0.02	
DEEP_S	OL-2314-02	6.6 - 6.6	06/30/2015	UFI CHM 2015-024	WATER	FD	W-SW											0.02	
DEEP_S	OL-2314-03	39.6 - 39.6	06/30/2015	UFI CHM 2015-024	WATER	REG	W-SW											0.044	
DEEP_S	OL-2314-04	59.4 - 59.4	06/30/2015	UFI CHM 2015-024	WATER	REG	W-SW	17	U									0.035	
DEEP_S	OL-2314-05	46.2 - 46.2	06/30/2015	UFI CHM 2015-024	WATER	REG	W-SW	17	U										
DEEP_S	OL-2314-06	52.8 - 52.8	06/30/2015	UFI CHM 2015-024	WATER	REG	W-SW	17	U										
DEEP_S	OL-2314-07	59.4 - 59.4	06/30/2015	UFI CHM 2015-024	WATER	REG	W-SW	17	U										
DEEP_S	OL-2315-01	6.6 - 6.6	06/30/2015	1507029	WATER	REG	W-SW					0.00117		0.00031	J	0.000114			
DEEP_S	OL-2315-02	6.6 - 6.6	06/30/2015	1507029	WATER	FD	W-SW					0.00102				0.000086			
DEEP_S	OL-2315-03	39.6 - 39.6	06/30/2015	1507029	WATER	REG	W-SW					0.00067				0.000048	J		
DEEP_S	OL-2315-04	59.4 - 59.4	06/30/2015	1507029	WATER	REG	W-SW					0.00069				0.000048	J		
DEEP_S	OL-2318-01	46.2 - 46.2	06/30/2015	ONO02	WATER	REG	W-SW			0.166									
DEEP_S	OL-2318-02	52.8 - 52.8	06/30/2015	ONO02	WATER	REG	W-SW			0.475									
DEEP_S	OL-2318-03	59.4 - 59.4	06/30/2015	ONO02	WATER	REG	W-SW			0.55									
DEEP_S	OL-2318-04	59.4 - 59.4	06/30/2015	ONO02	WATER	FD	W-SW			0.57									
DEEP_S	OL-2319-01	6.6 - 6.6	07/07/2015	UFI CHM 2015-025a	WATER	REG	W-SW											0.022	
DEEP_S	OL-2319-02	6.6 - 6.6	07/07/2015	UFI CHM 2015-025a	WATER	FD	W-SW											0.023	
DEEP_S	OL-2319-03	39.6 - 39.6	07/07/2015	UFI CHM 2015-025a	WATER	REG	W-SW											0.15	
DEEP_S	OL-2319-04	52.8 - 52.8	07/07/2015	UFI CHM 2015-025a	WATER	REG	W-SW											0.097	
DEEP_S	OL-2319-05	59.4 - 59.4	07/07/2015	UFI CHM 2015-025a	WATER	REG	W-SW											0.073	
DEEP_S	OL-2320-01	6.6 - 6.6	07/07/2015	1507180	WATER	REG	W-SW					0.00097				0.00011	J+		
DEEP_S	OL-2320-02	6.6 - 6.6	07/07/2015	1507180	WATER	FD	W-SW					0.001				0.00009			
DEEP_S	OL-2320-03	39.6 - 39.6	07/07/2015	1507180	WATER	REG	W-SW					0.00076				0.000032	J		
DEEP_S	OL-2320-04	52.8 - 52.8	07/07/2015	1507180	WATER	REG	W-SW					0.00069				0.00004	J		
DEEP_S	OL-2320-05	59.4 - 59.4	07/07/2015	1507180	WATER	REG	W-SW					0.00089				0.000052			
DEEP_S	OL-2324-01	6.6 - 6.6	07/14/2015	UFI CHM 2015-032	WATER	REG	W-SW											0.024	
DEEP_S	OL-2324-02	6.6 - 6.6	07/14/2015	UFI CHM 2015-032	WATER	FD	W-SW											0.025	
DEEP_S	OL-2324-03	39.6 - 39.6	07/14/2015	UFI CHM 2015-032	WATER	REG	W-SW											0.135	
DEEP_S	OL-2324-04	46.2 - 46.2	07/14/2015	UFI CHM 2015-032	WATER	REG	W-SW	17	U										
DEEP_S	OL-2324-05	52.8 - 52.8	07/14/2015	UFI CHM 2015-032	WATER	REG	W-SW	17	U									0.12	
DEEP_S	OL-2324-06	59.4 - 59.4	07/14/2015	UFI CHM 2015-032	WATER	REG	W-SW	17	U									0.075	

							Parameter	FERROUS IRON (II)		MANGANESE		MERCURY		MERCURY, DISSOLVED		METHYL MERCURY		NITRITE	
							Method	UFI-22BIPY FE		SW9010		E1630		E1630		E1631		E353.2	
							Filtered	N		Y		N		Y		N		Y	
							Units	ug/l		mg/L		ug/l		ug/l		ug/l		mg/L	
Location ID	Field Sample ID	Depth (ft)	Sampled	SDG	Matrix	Purpose	Sample Type												
DEEP_S	OL-2324-07	59.4 - 59.4	07/14/2015	UFI CHM 2015-032	WATER	FD	W-SW	17	U										
DEEP_S	OL-2325-01	6.6 - 6.6	07/14/2015	1507361	WATER	REG	W-SW					0.00091		0.00022	J	0.000114			
DEEP_S	OL-2325-02	6.6 - 6.6	07/14/2015	1507361	WATER	FD	W-SW					0.00077				0.000106			
DEEP_S	OL-2325-03	39.6 - 39.6	07/14/2015	1507361	WATER	REG	W-SW					0.00068				0.000032	J		
DEEP_S	OL-2325-04	52.8 - 52.8	07/14/2015	1507361	WATER	REG	W-SW					0.00074				0.000026	U		
DEEP_S	OL-2325-05	59.5 - 59.4	07/14/2015	1507361	WATER	REG	W-SW					0.00097				0.00004	J		
DEEP_S	OL-2328-01	46.2 - 46.2	07/14/2015	ONO03	WATER	REG	W-SW			0.741									
DEEP_S	OL-2328-02	52.8 - 52.8	07/14/2015	ONO03	WATER	REG	W-SW			0.953									
DEEP_S	OL-2328-03	59.4 - 59.4	07/14/2015	ONO03	WATER	REG	W-SW			1.39									
DEEP_S	OL-2328-04	59.4 - 59.4	07/14/2015	ONO03	WATER	FD	W-SW			1.38									
DEEP_S	OL-2329-01	6.6 - 6.6	07/21/2015	UFI CHM 2015-033	WATER	REG	W-SW											0.023	
DEEP_S	OL-2329-02	6.6 - 6.6	07/21/2015	UFI CHM 2015-033	WATER	FD	W-SW											0.022	
DEEP_S	OL-2329-03	39.6 - 39.6	07/21/2015	UFI CHM 2015-033	WATER	REG	W-SW											0.071	
DEEP_S	OL-2329-04	52.8 - 52.8	07/21/2015	UFI CHM 2015-033	WATER	REG	W-SW											0.093	
DEEP_S	OL-2329-05	59.4 - 59.4	07/21/2015	UFI CHM 2015-033	WATER	REG	W-SW											0.057	
DEEP_S	OL-2330-01	6.6 - 6.6	07/21/2015	1507555	WATER	REG	W-SW					0.0007				0.00007			
DEEP_S	OL-2330-02	6.6 - 6.6	07/21/2015	1507555	WATER	FD	W-SW					0.00067				0.000067			
DEEP_S	OL-2330-03	39.6 - 39.6	07/21/2015	1507555	WATER	REG	W-SW					0.00054				0.000044	J		
DEEP_S	OL-2330-04	52.8 - 52.8	07/21/2015	1507555	WATER	REG	W-SW					0.00065				0.000034	J		
DEEP_S	OL-2330-05	59.4 - 59.4	07/21/2015	1507555	WATER	REG	W-SW					0.00082				0.000054			
DEEP_S	OL-2332-01	6.6 - 6.6	07/28/2015	UFI CHM 2015-035	WATER	REG	W-SW											0.033	
DEEP_S	OL-2332-02	6.6 - 6.6	07/28/2015	UFI CHM 2015-035	WATER	FD	W-SW											0.032	
DEEP_S	OL-2332-03	39.6 - 39.6	07/28/2015	UFI CHM 2015-035	WATER	REG	W-SW											0.06	
DEEP_S	OL-2332-04	46.2 - 46.2	07/28/2015	UFI CHM 2015-035	WATER	REG	W-SW	17	U										
DEEP_S	OL-2332-05	52.8 - 52.8	07/28/2015	UFI CHM 2015-035	WATER	REG	W-SW	17	U									0.047	
DEEP_S	OL-2332-06	59.4 - 59.4	07/28/2015	UFI CHM 2015-035	WATER	REG	W-SW	17	U									0.041	
DEEP_S	OL-2332-07	59.4 - 59.4	07/28/2015	UFI CHM 2015-035	WATER	FD	W-SW	17	U										
DEEP_S	OL-2333-01	6.6 - 6.6	07/28/2015	1507714	WATER	REG	W-SW					0.00078		0.0003	J	0.000078	J		
DEEP_S	OL-2333-02	6.6 - 6.6	07/28/2015	1507714	WATER	FD	W-SW					0.00076				0.000048	J		
DEEP_S	OL-2333-03	39.6 - 39.6	07/28/2015	1507714	WATER	REG	W-SW					0.00053				0.000059			
DEEP_S	OL-2333-04	52.8 - 52.8	07/28/2015	1507714	WATER	REG	W-SW					0.00071				0.000048	J		
DEEP_S	OL-2333-05	59.4 - 59.4	07/28/2015	1507714	WATER	REG	W-SW					0.00084				0.000044	J		
DEEP_S	OL-2336-01	46.2 - 46.2	07/28/2015	ONO04	WATER	REG	W-SW			0.941									
DEEP_S	OL-2336-02	52.8 - 52.8	07/28/2015	ONO04	WATER	REG	W-SW			1.02									
DEEP_S	OL-2336-03	59.4 - 59.4	07/28/2015	ONO04	WATER	REG	W-SW			1.41									
DEEP_S	OL-2336-04	59.4 - 59.4	07/28/2015	ONO04	WATER	FD	W-SW			1.43									
DEEP_S	OL-2337-01	6.6 - 6.6	08/04/2015	UFI CHM 2015-041	WATER	REG	W-SW											0.034	
DEEP_S	OL-2337-02	6.6 - 6.6	08/04/2015	UFI CHM 2015-041	WATER	FD	W-SW											0.035	
DEEP_S	OL-2337-03	39.6 - 39.6	08/04/2015	UFI CHM 2015-041	WATER	REG	W-SW											0.062	
DEEP_S	OL-2337-04	52.8 - 52.8	08/04/2015	UFI CHM 2015-041	WATER	REG	W-SW											0.018	
DEEP_S	OL-2337-05	59.4 - 59.4	08/04/2015	UFI CHM 2015-041	WATER	REG	W-SW											0.007	J
DEEP_S	OL-2338-01	6.6 - 6.6	08/04/2015	1508074	WATER	REG	W-SW					0.00088				0.000044	J		
DEEP_S	OL-2338-02	6.6 - 6.6	08/04/2015	1508074	WATER	FD	W-SW					0.00085				0.000075	J		
DEEP_S	OL-2338-03	39.6 - 39.6	08/04/2015	1508074	WATER	REG	W-SW					0.00066				0.00004	J		
DEEP_S	OL-2338-04	52.8 - 52.8	08/04/2015	1508074	WATER	REG	W-SW					0.00076				0.000067			
DEEP_S	OL-2338-05	59.4 - 59.4	08/04/2015	1508074	WATER	REG	W-SW					0.00079				0.000063			
DEEP_S	OL-2341-01	6.6 - 6.6	08/11/2015	UFI CHM 2015-044	WATER	REG	W-SW											0.037	
DEEP_S	OL-2341-02	6.6 - 6.6	08/11/2015	UFI CHM 2015-044	WATER	FD	W-SW											0.038	
DEEP_S	OL-2341-03	39.6 - 39.6	08/11/2015	UFI CHM 2015-044	WATER	REG	W-SW											0.023	
DEEP_S	OL-2341-04	46.2 - 46.2	08/11/2015	UFI CHM 2015-044	WATER	REG	W-SW	17	U										
DEEP_S	OL-2341-05	52.8 - 52.8	08/11/2015	UFI CHM 2015-044	WATER	REG	W-SW	17	U									0.0154	U
DEEP_S	OL-2341-06	59.4 - 59.4	08/11/2015	UFI CHM 2015-044	WATER	REG	W-SW	17	U									0.0154	U
DEEP_S	OL-2341-07	59.4 - 59.4	08/11/2015	UFI CHM 2015-044	WATER	FD2	W-SW	17	U										
DEEP_S	OL-2342-01	6.6 - 6.6	08/11/2015	1508242	WATER	REG	W-SW					0.00068		0.00023	J	0.000071			
DEEP_S	OL-2342-02	6.6 - 6.6	08/11/2015	1508242	WATER	FD	W-SW					0.00062				0.000067			
DEEP_S	OL-2342-03	39.6 - 39.6	08/11/2015	1508242	WATER	REG	W-SW					0.00067				0.000048	J		
DEEP_S	OL-2342-04	52.8 - 52.8	08/11/2015	1508242	WATER	REG	W-SW					0.00202		0.00029	J	0.000082			
DEEP_S	OL-2342-05	59.4 - 59.4	08/11/2015	1508242	WATER	REG	W-SW					0.00097				0.000086			
DEEP_S	OL-2345-01	46.2 - 46.2	08/11/2015	ONO05	WATER	REG	W-SW			1.04									
DEEP_S	OL-2345-02	52.8 - 52.8	08/11/2015	ONO05	WATER	REG	W-SW			1.25									
DEEP_S	OL-2345-03	59.4 - 59.4	08/11/2015	ONO05	WATER	REG	W-SW			1.41									
DEEP_S	OL-2345-04	59.4 - 59.4	08/11/2015	ONO05	WATER	FD	W-SW			1.51									

							Parameter	FERROUS IRON (II)		MANGANESE		MERCURY		MERCURY, DISSOLVED		METHYL MERCURY		NITRITE	
							Method	UFI-22BIPY FE		SW9010		E1630		E1630		E1631		E353.2	
							Filtered	N		Y		N		Y		N		Y	
							Units	ug/l		mg/L		ug/l		ug/l		ug/l		mg/L	
Location ID	Field Sample ID	Depth (ft)	Sampled	SDG	Matrix	Purpose	Sample Type												
DEEP_S	OL-2346-01	6.6 - 6.6	08/18/2015	UFI CHM 2015-045	WATER	REG	W-SW											0.047	J+
DEEP_S	OL-2346-02	6.6 - 6.6	08/18/2015	UFI CHM 2015-045	WATER	FD	W-SW											0.047	J+
DEEP_S	OL-2346-03	39.6 - 39.6	08/18/2015	UFI CHM 2015-045	WATER	REG	W-SW											0.0154	UJ
DEEP_S	OL-2346-04	52.8 - 52.8	08/18/2015	UFI CHM 2015-045	WATER	REG	W-SW											0.0154	UJ
DEEP_S	OL-2346-05	59.4 - 59.4	08/18/2015	UFI CHM 2015-045	WATER	REG	W-SW											0.02	J+
DEEP_S	OL-2347-01	6.6 - 6.6	08/18/2015	1508418	WATER	REG	W-SW					0.00053				0.000076			
DEEP_S	OL-2347-02	6.6 - 6.6	08/18/2015	1508418	WATER	FD	W-SW					0.00055				0.000082			
DEEP_S	OL-2347-03	39.6 - 39.6	08/18/2015	1508418	WATER	REG	W-SW					0.00071				0.000058			
DEEP_S	OL-2347-04	52.8 - 52.8	08/18/2015	1508418	WATER	REG	W-SW					0.00087				0.000076			
DEEP_S	OL-2347-05	59.4 - 59.4	08/18/2015	1508418	WATER	REG	W-SW					0.00088				0.000103			
DEEP_S	OL-2349-01	6.6 - 6.6	08/25/2015	UFI CHM 2015-048	WATER	REG	W-SW											0.043	J+
DEEP_S	OL-2349-02	6.6 - 6.6	08/25/2015	UFI CHM 2015-048	WATER	FD	W-SW											0.043	J+
DEEP_S	OL-2349-03	39.6 - 39.6	08/25/2015	UFI CHM 2015-048	WATER	REG	W-SW											0.005	J
DEEP_S	OL-2349-04	46.2 - 46.2	08/25/2015	UFI CHM 2015-048	WATER	REG	W-SW	17	U										
DEEP_S	OL-2349-05	52.8 - 52.8	08/25/2015	UFI CHM 2015-048	WATER	REG	W-SW	17	U									0.011	J
DEEP_S	OL-2349-06	59.4 - 59.4	08/25/2015	UFI CHM 2015-048	WATER	REG	W-SW	17	U									0.017	J+
DEEP_S	OL-2349-07	59.4 - 59.4	08/25/2015	UFI CHM 2015-048	WATER	FD2	W-SW	17	U										
DEEP_S	OL-2350-01	6.6 - 6.6	08/25/2015	1508585	WATER	REG	W-SW					0.00071		0.0002	J	0.000077	J+		
DEEP_S	OL-2350-02	6.6 - 6.6	08/25/2015	1508585	WATER	FD	W-SW					0.00061				0.000069	J+		
DEEP_S	OL-2350-03	39.6 - 39.6	08/25/2015	1508585	WATER	REG	W-SW					0.00072				0.00006	J+		
DEEP_S	OL-2350-04	52.8 - 52.8	08/25/2015	1508585	WATER	REG	W-SW					0.00099		0.00026	J	0.000075	J+		
DEEP_S	OL-2350-05	59.4 - 59.4	08/25/2015	1508585	WATER	REG	W-SW					0.00102				0.00008	J+		
DEEP_S	OL-2353-01	46.2 - 46.2	08/25/2015	ONO06	WATER	REG	W-SW			1.29									
DEEP_S	OL-2353-02	52.8 - 52.8	08/25/2015	ONO06	WATER	REG	W-SW			1.41									
DEEP_S	OL-2353-03	59.4 - 59.4	08/25/2015	ONO06	WATER	REG	W-SW			1.57									
DEEP_S	OL-2353-04	59.4 - 59.4	08/25/2015	ONO06	WATER	FD	W-SW			1.64									
DEEP_S	OL-2355-01	6.6 - 6.6	09/01/2015	UFI CHM 2015-050	WATER	REG	W-SW											0.037	
DEEP_S	OL-2355-02	6.6 - 6.6	09/01/2015	UFI CHM 2015-050	WATER	FD	W-SW											0.036	
DEEP_S	OL-2355-03	39.6 - 39.6	09/01/2015	UFI CHM 2015-050	WATER	REG	W-SW											0.0154	U
DEEP_S	OL-2355-04	52.8 - 52.8	09/01/2015	UFI CHM 2015-050	WATER	REG	W-SW											0.0154	U
DEEP_S	OL-2355-05	59.4 - 59.4	09/01/2015	UFI CHM 2015-050	WATER	REG	W-SW											0.025	
DEEP_S	OL-2356-01	6.6 - 6.6	09/01/2015	1509058	WATER	REG	W-SW					0.00068				0.000059	J+		
DEEP_S	OL-2356-02	6.6 - 6.6	09/01/2015	1509058	WATER	FD	W-SW					0.00069				0.000046	J		
DEEP_S	OL-2356-03	39.6 - 39.6	09/01/2015	1509058	WATER	REG	W-SW					0.00062				0.000049	J		
DEEP_S	OL-2356-04	52.8 - 52.8	09/01/2015	1509058	WATER	REG	W-SW					0.00071				0.000044	J		
DEEP_S	OL-2356-05	59.4 - 59.4	09/01/2015	1509058	WATER	REG	W-SW					0.00085				0.00005	J+		
DEEP_S	OL-2360-01	6.6 - 6.6	09/09/2015	UFI CHM 2015-055	WATER	REG	W-SW											0.037	J+
DEEP_S	OL-2360-02	6.6 - 6.6	09/09/2015	UFI CHM 2015-055	WATER	FD	W-SW											0.038	J+
DEEP_S	OL-2360-03	39.6 - 39.6	09/09/2015	UFI CHM 2015-055	WATER	REG	W-SW											0.0154	U
DEEP_S	OL-2360-04	46.2 - 46.2	09/09/2015	UFI CHM 2015-055	WATER	REG	W-SW	17	U										
DEEP_S	OL-2360-05	52.8 - 52.8	09/09/2015	UFI CHM 2015-055	WATER	REG	W-SW	17	U									0.02	J+
DEEP_S	OL-2360-06	59.4 - 59.4	09/09/2015	UFI CHM 2015-055	WATER	REG	W-SW	17	U									0.117	J+
DEEP_S	OL-2360-07	59.4 - 59.4	09/09/2015	UFI CHM 2015-055	WATER	FD	W-SW	17	U										
DEEP_S	OL-2361-01	6.6 - 6.6	09/09/2015	1509249	WATER	REG	W-SW					0.00067		0.00023	J	0.000043	J		
DEEP_S	OL-2361-02	6.6 - 6.6	09/09/2015	1509249	WATER	FD	W-SW					0.00055				0.000041	J		
DEEP_S	OL-2361-03	39.6 - 39.6	09/09/2015	1509249	WATER	REG	W-SW					0.00053				0.000048	J		
DEEP_S	OL-2361-04	52.8 - 52.8	09/09/2015	1509249	WATER	REG	W-SW					0.00083		0.00023	J	0.000057			
DEEP_S	OL-2361-05	59.4 - 59.4	09/09/2015	1509249	WATER	REG	W-SW					0.00099				0.000068			
DEEP_S	OL-2364-01	46.2 - 46.2	09/09/2015	ONO07	WATER	REG	W-SW			1.16									
DEEP_S	OL-2364-02	52.8 - 52.8	09/09/2015	ONO07	WATER	REG	W-SW			1.55									
DEEP_S	OL-2364-03	59.4 - 59.4	09/09/2015	ONO07	WATER	REG	W-SW			1.83									
DEEP_S	OL-2364-04	59.4 - 59.4	09/09/2015	ONO07	WATER	FD	W-SW			1.9									
DEEP_S	OL-2365-01	6.6 - 6.6	09/16/2015	UFI CHM 2015-059	WATER	REG	W-SW											0.037	
DEEP_S	OL-2365-02	6.6 - 6.6	09/16/2015	UFI CHM 2015-059	WATER	FD	W-SW											0.037	
DEEP_S	OL-2365-03	39.6 - 39.6	09/16/2015	UFI CHM 2015-059	WATER	REG	W-SW											0.0154	U
DEEP_S	OL-2365-04	52.8 - 52.8	09/16/2015	UFI CHM 2015-059	WATER	REG	W-SW											0.011	J
DEEP_S	OL-2365-05	59.4 - 59.4	09/16/2015	UFI CHM 2015-059	WATER	REG	W-SW											0.045	
DEEP_S	OL-2366-01	6.6 - 6.6	09/16/2015	1509384	WATER	REG	W-SW					0.00083				0.000067	J+		
DEEP_S	OL-2366-02	6.6 - 6.6	09/16/2015	1509384	WATER	FD	W-SW					0.00079				0.000056			
DEEP_S	OL-2366-03	39.6 - 39.6	09/16/2015	1509384	WATER	REG	W-SW					0.00086				0.000073			
DEEP_S	OL-2366-04	52.8 - 52.8	09/16/2015	1509384	WATER	REG	W-SW					0.00104				0.00008			
DEEP_S	OL-2366-05	59.4 - 59.4	09/16/2015	1509384	WATER	REG	W-SW					0.00116				0.000078			

							Parameter	FERROUS IRON (II)		MANGANESE		MERCURY		MERCURY, DISSOLVED		METHYL MERCURY		NITRITE	
							Method	UFI-22BIPY FE		SW9010		E1630		E1630		E1631		E353.2	
							Filtered	N		Y		N		Y		N		Y	
							Units	ug/l		mg/L		ug/l		ug/l		ug/l		mg/L	
Location ID	Field Sample ID	Depth (ft)	Sampled	SDG	Matrix	Purpose	Sample Type												
DEEP_S	OL-2369-01	6.6 - 6.6	09/22/2015	UFI CHM 2015-062	WATER	REG	W-SW											0.041	
DEEP_S	OL-2369-02	6.6 - 6.6	09/22/2015	UFI CHM 2015-062	WATER	FD	W-SW											0.041	
DEEP_S	OL-2369-03	39.6 - 39.6	09/22/2015	UFI CHM 2015-062	WATER	REG	W-SW											0.0154	U
DEEP_S	OL-2369-04	46.2 - 46.2	09/22/2015	UFI CHM 2015-062	WATER	REG	W-SW	17	U										
DEEP_S	OL-2369-05	16 - 16	09/22/2015	UFI CHM 2015-062	WATER	REG	W-SW	17	U									0.006	J
DEEP_S	OL-2369-06	52.8 - 52.8	09/22/2015	UFI CHM 2015-062	WATER	REG	W-SW	17	U									0.033	
DEEP_S	OL-2369-07	59.4 - 59.4	09/22/2015	UFI CHM 2015-062	WATER	FD	W-SW	17	U										
DEEP_S	OL-2370-01	6.6 - 6.6	09/22/2015	1509509	WATER	REG	W-SW					0.0008		0.00019	J	0.000067			
DEEP_S	OL-2370-02	6.6 - 6.6	09/22/2015	1509509	WATER	FD	W-SW					0.00065				0.000072			
DEEP_S	OL-2370-03	39.6 - 39.6	09/22/2015	1509509	WATER	REG	W-SW					0.00106				0.000097			
DEEP_S	OL-2370-04	52.8 - 52.8	09/22/2015	1509509	WATER	REG	W-SW					0.00179		0.00018	J	0.000103			
DEEP_S	OL-2370-05	59.4 - 59.4	09/22/2015	1509509	WATER	REG	W-SW					0.00188				0.000114			
DEEP_S	OL-2373-01	46.2 - 46.2	09/22/2015	ONO08	WATER	REG	W-SW			1.59									
DEEP_S	OL-2373-02	52.8 - 52.8	09/22/2015	ONO08	WATER	REG	W-SW			1.7									
DEEP_S	OL-2373-03	59.4 - 59.4	09/22/2015	ONO08	WATER	REG	W-SW			2.15									
DEEP_S	OL-2373-04	59.4 - 59.4	09/22/2015	ONO08	WATER	FD	W-SW			2.19									
DEEP_S	OL-2374-01	6.6 - 6.6	09/29/2015	UFI CHM 2015-065	WATER	REG	W-SW											0.041	
DEEP_S	OL-2374-02	6.6 - 6.6	09/29/2015	UFI CHM 2015-065	WATER	FD	W-SW											0.041	
DEEP_S	OL-2374-03	39.6 - 39.6	09/29/2015	UFI CHM 2015-065	WATER	REG	W-SW											0.0154	U
DEEP_S	OL-2374-04	52.8 - 52.8	09/29/2015	UFI CHM 2015-065	WATER	REG	W-SW											0.0154	U
DEEP_S	OL-2374-05	59.4 - 59.4	09/29/2015	UFI CHM 2015-065	WATER	REG	W-SW											0.007	J
DEEP_S	OL-2375-01	6.6 - 6.6	09/29/2015	1509700	WATER	REG	W-SW					0.00059				0.000045	J		
DEEP_S	OL-2375-02	6.6 - 6.6	09/29/2015	1509700	WATER	FD	W-SW					0.00062				0.000034	J		
DEEP_S	OL-2375-03	39.6 - 39.6	09/29/2015	1509700	WATER	REG	W-SW					0.00093				0.000057			
DEEP_S	OL-2375-04	52.8 - 52.8	09/29/2015	1509700	WATER	REG	W-SW					0.00117				0.000055			
DEEP_S	OL-2375-05	59.4 - 59.4	09/29/2015	1509700	WATER	REG	W-SW					0.0015				0.00006			
DEEP_S	OL-2378-01	6.6 - 6.6	10/06/2015	UFI CHM 2015-069	WATER	REG	W-SW											0.034	
DEEP_S	OL-2378-02	6.6 - 6.6	10/06/2015	UFI CHM 2015-069	WATER	FD	W-SW											0.034	
DEEP_S	OL-2378-03	39.6 - 39.6	10/06/2015	UFI CHM 2015-069	WATER	REG	W-SW											0.01	J
DEEP_S	OL-2378-04	46.2 - 46.2	10/06/2015	UFI CHM 2015-069	WATER	REG	W-SW	17	U										
DEEP_S	OL-2378-05	52.8 - 52.8	10/06/2015	UFI CHM 2015-069	WATER	REG	W-SW	17	U									0.009	J
DEEP_S	OL-2378-06	59.4 - 59.4	10/06/2015	UFI CHM 2015-069	WATER	REG	W-SW	17	U									0.012	J
DEEP_S	OL-2378-07	59.4 - 59.4	10/06/2015	UFI CHM 2015-069	WATER	FD	W-SW	17	U										
DEEP_S	OL-2379-01	6.6 - 6.6	10/06/2015	1510157	WATER	REG	W-SW					0.00076		0.00021	J	0.000042	J		
DEEP_S	OL-2379-02	6.6 - 6.6	10/06/2015	1510157	WATER	FD	W-SW					0.00066				0.000064			
DEEP_S	OL-2379-03	39.6 - 39.6	10/06/2015	1510157	WATER	REG	W-SW					0.00117				0.000069			
DEEP_S	OL-2379-04	52.8 - 52.8	10/06/2015	1510157	WATER	REG	W-SW					0.00211		0.00028	J	0.000085			
DEEP_S	OL-2379-05	59.4 - 59.4	10/06/2015	1510157	WATER	REG	W-SW					0.00436				0.000114			
DEEP_S	OL-2382-01	46.2 - 46.2	10/06/2015	ONO10	WATER	REG	W-SW			1.61									
DEEP_S	OL-2382-02	52.8 - 52.8	10/06/2015	ONO10	WATER	REG	W-SW			2.04									
DEEP_S	OL-2382-03	59.4 - 59.4	10/06/2015	ONO10	WATER	REG	W-SW			2.74									
DEEP_S	OL-2382-04	59.4 - 59.4	10/06/2015	ONO10	WATER	FD	W-SW			2.68									
DEEP_S	OL-2383-01	6.6 - 6.6	10/13/2015	UFI CHM 2015-070	WATER	REG	W-SW											0.037	
DEEP_S	OL-2383-02	6.6 - 6.6	10/13/2015	UFI CHM 2015-070	WATER	FD	W-SW											0.037	
DEEP_S	OL-2383-03	39.6 - 39.6	10/13/2015	UFI CHM 2015-070	WATER	REG	W-SW											0.021	
DEEP_S	OL-2383-04	52.8 - 52.8	10/13/2015	UFI CHM 2015-070	WATER	REG	W-SW											0.0154	U
DEEP_S	OL-2383-05	59.4 - 59.4	10/13/2015	UFI CHM 2015-070	WATER	REG	W-SW											0.0154	U
DEEP_S	OL-2384-01	6.6 - 6.6	10/13/2015	1510321	WATER	REG	W-SW					0.00065				0.000072			
DEEP_S	OL-2384-02	6.6 - 6.6	10/13/2015	1510321	WATER	FD	W-SW					0.00076				0.000074			
DEEP_S	OL-2384-03	39.6 - 39.6	10/13/2015	1510321	WATER	REG	W-SW					0.00096				0.00012			
DEEP_S	OL-2384-04	52.8 - 52.8	10/13/2015	1510321	WATER	REG	W-SW					0.0016				0.000098			
DEEP_S	OL-2384-05	59.4 - 59.4	10/13/2015	1510321	WATER	REG	W-SW					0.00458				0.00012			
DEEP_S	OL-2387-01	6.6 - 6.6	10/20/2015	UFI CHM 2015-072	WATER	REG	W-SW											0.035	
DEEP_S	OL-2387-02	6.6 - 6.6	10/20/2015	UFI CHM 2015-072	WATER	FD	W-SW											0.035	
DEEP_S	OL-2387-03	39.6 - 39.6	10/20/2015	UFI CHM 2015-072	WATER	REG	W-SW											0.031	
DEEP_S	OL-2387-04	46.2 - 46.2	10/20/2015	UFI CHM 2015-072	WATER	REG	W-SW	6	J										
DEEP_S	OL-2387-05	52.8 - 52.8	10/20/2015	UFI CHM 2015-072	WATER	REG	W-SW	17	U									0.0154	U
DEEP_S	OL-2387-06	59.4 - 59.4	10/20/2015	UFI CHM 2015-072	WATER	REG	W-SW	17	U									0.005	J
DEEP_S	OL-2387-07	59.4 - 59.4	10/20/2015	UFI CHM 2015-072	WATER	FD	W-SW	17	U										
DEEP_S	OL-2388-01	6.6 - 6.6	10/20/2015	1510483	WATER	REG	W-SW					0.00106		0.0002	J	0.000061	J		
DEEP_S	OL-2388-02	6.6 - 6.6	10/20/2015	1510483	WATER	FD	W-SW					0.00125				0.000039	J		
DEEP_S	OL-2388-03	39.6 - 39.6	10/20/2015	1510483	WATER	REG	W-SW					0.00138				0.000045	J		

							Parameter	FERROUS IRON (II)		MANGANESE		MERCURY		MERCURY, DISSOLVED		METHYL MERCURY		NITRITE	
							Method	UFI-22BIPY FE		SW9010		E1630		E1630		E1631		E353.2	
							Filtered	N		Y		N		Y		N		Y	
							Units	ug/l		mg/L		ug/l		ug/l		ug/l		mg/L	
Location ID	Field Sample ID	Depth (ft)	Sampled	SDG	Matrix	Purpose	Sample Type												
DEEP_S	OL-2388-04	52.8 - 52.8	10/20/2015	1510483	WATER	REG	W-SW					0.00376		0.00035	J	0.000092			
DEEP_S	OL-2388-05	59.4 - 59.4	10/20/2015	1510483	WATER	REG	W-SW					0.00591				0.00013			
DEEP_S	OL-2391-01	46.2 - 46.2	10/20/2015	ONO11	WATER	REG	W-SW			1.81									
DEEP_S	OL-2391-02	52.8 - 52.8	10/20/2015	ONO11	WATER	REG	W-SW			2.43									
DEEP_S	OL-2391-03	59.4 - 59.4	10/20/2015	ONO11	WATER	REG	W-SW			2.83									
DEEP_S	OL-2391-04	59.4 - 59.4	10/20/2015	ONO11	WATER	FD	W-SW			2.96									
DEEP_S	OL-2392-01	6.6 - 6.6	10/27/2015	UFI CHM 2015-078	WATER	REG	W-SW											0.036	
DEEP_S	OL-2392-02	6.6 - 6.6	10/27/2015	UFI CHM 2015-078	WATER	FD	W-SW											0.035	
DEEP_S	OL-2392-03	39.6 - 39.6	10/27/2015	UFI CHM 2015-078	WATER	REG	W-SW											0.036	
DEEP_S	OL-2392-04	46.2 - 46.2	10/27/2015	UFI CHM 2015-078	WATER	REG	W-SW	17	U										
DEEP_S	OL-2392-05	52.8 - 52.8	10/27/2015	UFI CHM 2015-078	WATER	REG	W-SW	17	U									0.011	J
DEEP_S	OL-2392-06	59.4 - 59.4	10/27/2015	UFI CHM 2015-078	WATER	REG	W-SW	17	U									0.01	J
DEEP_S	OL-2392-07	59.4 - 59.4	10/27/2015	UFI CHM 2015-078	WATER	FD	W-SW	17	U										
DEEP_S	OL-2393-01	6.6 - 6.6	10/27/2015	1510644	WATER	REG	W-SW					0.00075				0.000074			
DEEP_S	OL-2393-02	6.6 - 6.6	10/27/2015	1510644	WATER	FD	W-SW					0.0008				0.00009			
DEEP_S	OL-2393-03	39.6 - 39.6	10/27/2015	1510644	WATER	REG	W-SW					0.00074				0.000055			
DEEP_S	OL-2393-04	52.8 - 52.8	10/27/2015	1510644	WATER	REG	W-SW					0.00199				0.00008			
DEEP_S	OL-2393-05	59.4 - 59.4	10/27/2015	1510644	WATER	REG	W-SW					0.00371				0.000096			
DEEP_S	OL-2396-01	46.2 - 46.2	10/27/2015	ONO12	WATER	REG	W-SW			0.188									
DEEP_S	OL-2396-02	52.8 - 52.8	10/27/2015	ONO12	WATER	REG	W-SW			2.22									
DEEP_S	OL-2396-03	59.4 - 59.4	10/27/2015	ONO12	WATER	REG	W-SW			2.49									
DEEP_S	OL-2396-04	59.4 - 59.4	10/27/2015	ONO12	WATER	FD	W-SW			2.49									
DEEP_S	OL-2398-01	6.6 - 6.6	11/03/2015	UFI CHM 2015-079	WATER	REG	W-SW											0.046	
DEEP_S	OL-2398-02	6.6 - 6.6	11/03/2015	UFI CHM 2015-079	WATER	FD	W-SW											0.046	
DEEP_S	OL-2398-03	39.6 - 39.6	11/03/2015	UFI CHM 2015-079	WATER	REG	W-SW											0.046	
DEEP_S	OL-2398-04	59.4 - 59.4	11/03/2015	UFI CHM 2015-079	WATER	REG	W-SW											0.043	
DEEP_S	OL-2399-01	6.6 - 6.6	11/03/2015	1511084	WATER	REG	W-SW					0.00101		0.00008	U	0.000062	U		
DEEP_S	OL-2399-02	6.6 - 6.6	11/03/2015	1511084	WATER	FD	W-SW					0.00083				0.00008			
DEEP_S	OL-2399-03	39.6 - 39.6	11/03/2015	1511084	WATER	REG	W-SW					0.001				0.000047	J		
DEEP_S	OL-2399-04	59.4 - 59.4	11/03/2015	1511084	WATER	REG	W-SW					0.00439				0.000097			
DEEP_S	OL-2403-01	6.6 - 6.6	11/17/2015	UFI CHM 2015-082	WATER	REG	W-SW											0.059	
DEEP_S	OL-2403-02	6.6 - 6.6	11/17/2015	UFI CHM 2015-082	WATER	FD	W-SW											0.058	
DEEP_S	OL-2403-03	39.6 - 39.6	11/17/2015	UFI CHM 2015-082	WATER	REG	W-SW											0.057	
DEEP_S	OL-2403-04	59.4 - 59.4	11/17/2015	UFI CHM 2015-082	WATER	FD	W-SW											0.058	
DEEP_S	OL-2404-01	6.6 - 6.6	11/17/2015	1511394	WATER	REG	W-SW					0.00129		0.00029	J	0.000052	U		
DEEP_S	OL-2404-02	6.6 - 6.6	11/17/2015	1511394	WATER	FD	W-SW					0.00131				0.000051	U		
DEEP_S	OL-2404-03	39.6 - 39.6	11/17/2015	1511394	WATER	REG	W-SW					0.0014				0.000053	U		
DEEP_S	OL-2404-04	59.4 - 59.4	11/17/2015	1511394	WATER	REG	W-SW					0.00119				0.000047	U		

							Parameter	NITROGEN, AMMONIA (AS N)		NITROGEN, NITRATE-NITRITE		REACTIVE PHOSPHATE	
							Method	E350.1		E353.2		SM4500P-E	
							Filtered	Y		Y		N	
							Units	mg/L		mg/L		mg/L	
Location ID	Field Sample ID	Depth (ft)	Sampled	SDG	Matrix	Purpose	Sample Type						
DEEP_S	OL-2300-01	6.6 - 6.6	05/18/2015	UFI CHM 2015-014	WATER	REG	W-SW	0.051	U	2.503			
DEEP_S	OL-2300-02	6.6 - 6.6	05/18/2015	UFI CHM 2015-014	WATER	FD	W-SW	0.051	U	2.513			
DEEP_S	OL-2300-03	39.6 - 39.6	05/18/2015	UFI CHM 2015-014	WATER	REG	W-SW	0.122		2.611			
DEEP_S	OL-2300-04	59.4 - 59.4	05/18/2015	UFI CHM 2015-014	WATER	REG	W-SW	0.288		2.456			
DEEP_S	OL-2301-01	6.6 - 6.6	05/18/2015	1505470	WATER	REG	W-SW						
DEEP_S	OL-2301-02	6.6 - 6.6	05/18/2015	1505470	WATER	FD	W-SW						
DEEP_S	OL-2301-03	39.6 - 39.6	05/18/2015	1505470	WATER	REG	W-SW						
DEEP_S	OL-2301-04	59.4 - 59.4	05/18/2015	1505470	WATER	REG	W-SW						
DEEP_S	OL-2305-01	6.6 - 6.6	06/02/2015	UFI CHM 2015-016	WATER	REG	W-SW	0.051	U	2.484			
DEEP_S	OL-2305-02	6.6 - 6.6	06/02/2015	UFI CHM 2015-016	WATER	FD	W-SW	0.051	U	2.439			
DEEP_S	OL-2305-03	39.6 - 39.6	06/02/2015	UFI CHM 2015-016	WATER	REG	W-SW	0.17		2.512			
DEEP_S	OL-2305-04	59.4 - 59.4	06/02/2015	UFI CHM 2015-016	WATER	REG	W-SW	0.282		2.443			
DEEP_S	OL-2306-01	6.6 - 6.6	06/02/2015	1506107	WATER	REG	W-SW						
DEEP_S	OL-2306-02	6.6 - 6.6	06/02/2015	1506107	WATER	FD	W-SW						
DEEP_S	OL-2306-03	39.6 - 39.6	06/02/2015	1506107	WATER	REG	W-SW						
DEEP_S	OL-2306-04	59.4 - 59.4	06/02/2015	1506107	WATER	REG	W-SW						
DEEP_S	OL-2309-01	6.6 - 6.6	06/16/2015	UFI CHM 2015-020	WATER	REG	W-SW	0.027	J	2.394			
DEEP_S	OL-2309-02	6.6 - 6.6	06/16/2015	UFI CHM 2015-020	WATER	FD	W-SW	0.018	J	2.312			
DEEP_S	OL-2309-03	39.6 - 39.6	06/16/2015	UFI CHM 2015-020	WATER	REG	W-SW	0.159		2.575			
DEEP_S	OL-2309-04	59.4 - 59.4	06/16/2015	UFI CHM 2015-020	WATER	REG	W-SW	0.374		2.329		0.0006	J
DEEP_S	OL-2309-05	46.2 - 46.2	06/16/2015	UFI CHM 2015-020	WATER	REG	W-SW					0.0006	J
DEEP_S	OL-2309-06	52.8 - 52.8	06/16/2015	UFI CHM 2015-020	WATER	REG	W-SW					0.0008	J
DEEP_S	OL-2309-07	59.4 - 59.4	06/16/2015	UFI CHM 2015-020	WATER	FD	W-SW					0.0005	J
DEEP_S	OL-2310-01	6.6 - 6.6	06/16/2015	1506456	WATER	REG	W-SW						
DEEP_S	OL-2310-02	6.6 - 6.6	06/16/2015	1506456	WATER	FD	W-SW						
DEEP_S	OL-2310-03	39.6 - 39.6	06/16/2015	1506456	WATER	REG	W-SW						
DEEP_S	OL-2310-04	59.4 - 59.4	06/16/2015	1506456	WATER	REG	W-SW						
DEEP_S	OL-2313-01	46.2 - 46.2	06/16/2015	ONO01	WATER	REG	W-SW						
DEEP_S	OL-2313-02	52.8 - 52.8	06/16/2015	ONO01	WATER	REG	W-SW						
DEEP_S	OL-2313-03	59.4 - 59.4	06/16/2015	ONO01	WATER	REG	W-SW						
DEEP_S	OL-2313-04	59.4 - 59.4	06/16/2015	ONO01	WATER	FD	W-SW						
DEEP_S	OL-2314-01	6.6 - 6.6	06/30/2015	UFI CHM 2015-024	WATER	REG	W-SW	0.047		2.284			
DEEP_S	OL-2314-02	6.6 - 6.6	06/30/2015	UFI CHM 2015-024	WATER	FD	W-SW	0.047		2.271			
DEEP_S	OL-2314-03	39.6 - 39.6	06/30/2015	UFI CHM 2015-024	WATER	REG	W-SW	0.2		2.319			
DEEP_S	OL-2314-04	59.4 - 59.4	06/30/2015	UFI CHM 2015-024	WATER	REG	W-SW	0.482		2.057		0.001	J
DEEP_S	OL-2314-05	46.2 - 46.2	06/30/2015	UFI CHM 2015-024	WATER	REG	W-SW					0.0012	J
DEEP_S	OL-2314-06	52.8 - 52.8	06/30/2015	UFI CHM 2015-024	WATER	REG	W-SW					0.001	J
DEEP_S	OL-2314-07	59.4 - 59.4	06/30/2015	UFI CHM 2015-024	WATER	REG	W-SW					0.0012	J
DEEP_S	OL-2315-01	6.6 - 6.6	06/30/2015	1507029	WATER	REG	W-SW						
DEEP_S	OL-2315-02	6.6 - 6.6	06/30/2015	1507029	WATER	FD	W-SW						
DEEP_S	OL-2315-03	39.6 - 39.6	06/30/2015	1507029	WATER	REG	W-SW						
DEEP_S	OL-2315-04	59.4 - 59.4	06/30/2015	1507029	WATER	REG	W-SW						
DEEP_S	OL-2318-01	46.2 - 46.2	06/30/2015	ONO02	WATER	REG	W-SW						
DEEP_S	OL-2318-02	52.8 - 52.8	06/30/2015	ONO02	WATER	REG	W-SW						
DEEP_S	OL-2318-03	59.4 - 59.4	06/30/2015	ONO02	WATER	REG	W-SW						
DEEP_S	OL-2318-04	59.4 - 59.4	06/30/2015	ONO02	WATER	FD	W-SW						
DEEP_S	OL-2319-01	6.6 - 6.6	07/07/2015	UFI CHM 2015-025a	WATER	REG	W-SW	0.026	J	2.054			
DEEP_S	OL-2319-02	6.6 - 6.6	07/07/2015	UFI CHM 2015-025a	WATER	FD	W-SW	0.028	J	2.055			
DEEP_S	OL-2319-03	39.6 - 39.6	07/07/2015	UFI CHM 2015-025a	WATER	REG	W-SW	0.152		2.401			
DEEP_S	OL-2319-04	52.8 - 52.8	07/07/2015	UFI CHM 2015-025a	WATER	REG	W-SW	0.218		2.312			
DEEP_S	OL-2319-05	59.4 - 59.4	07/07/2015	UFI CHM 2015-025a	WATER	REG	W-SW	0.427		1.914			
DEEP_S	OL-2320-01	6.6 - 6.6	07/07/2015	1507180	WATER	REG	W-SW						
DEEP_S	OL-2320-02	6.6 - 6.6	07/07/2015	1507180	WATER	FD	W-SW						
DEEP_S	OL-2320-03	39.6 - 39.6	07/07/2015	1507180	WATER	REG	W-SW						
DEEP_S	OL-2320-04	52.8 - 52.8	07/07/2015	1507180	WATER	REG	W-SW						
DEEP_S	OL-2320-05	59.4 - 59.4	07/07/2015	1507180	WATER	REG	W-SW						
DEEP_S	OL-2324-01	6.6 - 6.6	07/14/2015	UFI CHM 2015-032	WATER	REG	W-SW	0.019	J	2.058			
DEEP_S	OL-2324-02	6.6 - 6.6	07/14/2015	UFI CHM 2015-032	WATER	FD	W-SW	0.024	J	2.055			
DEEP_S	OL-2324-03	39.6 - 39.6	07/14/2015	UFI CHM 2015-032	WATER	REG	W-SW	0.018	J	2.38			
DEEP_S	OL-2324-04	46.2 - 46.2	07/14/2015	UFI CHM 2015-032	WATER	REG	W-SW					0.0004	J
DEEP_S	OL-2324-05	52.8 - 52.8	07/14/2015	UFI CHM 2015-032	WATER	REG	W-SW	0.228		2.052		0.001	J
DEEP_S	OL-2324-06	59.4 - 59.4	07/14/2015	UFI CHM 2015-032	WATER	REG	W-SW	0.604		2.906		0.0011	J

							Parameter	NITROGEN, AMMONIA (AS N)		NITROGEN, NITRATE-NITRITE		REACTIVE PHOSPHATE	
							Method	E350.1		E353.2		SM4500P-E	
							Filtered	Y		Y		N	
							Units	mg/L		mg/L		mg/L	
Location ID	Field Sample ID	Depth (ft)	Sampled	SDG	Matrix	Purpose	Sample Type						
DEEP_S	OL-2324-07	59.4 - 59.4	07/14/2015	UFI CHM 2015-032	WATER	FD	W-SW					0.0017	
DEEP_S	OL-2325-01	6.6 - 6.6	07/14/2015	1507361	WATER	REG	W-SW						
DEEP_S	OL-2325-02	6.6 - 6.6	07/14/2015	1507361	WATER	FD	W-SW						
DEEP_S	OL-2325-03	39.6 - 39.6	07/14/2015	1507361	WATER	REG	W-SW						
DEEP_S	OL-2325-04	52.8 - 52.8	07/14/2015	1507361	WATER	REG	W-SW						
DEEP_S	OL-2325-05	59.5 - 59.4	07/14/2015	1507361	WATER	REG	W-SW						
DEEP_S	OL-2328-01	46.2 - 46.2	07/14/2015	ONO03	WATER	REG	W-SW						
DEEP_S	OL-2328-02	52.8 - 52.8	07/14/2015	ONO03	WATER	REG	W-SW						
DEEP_S	OL-2328-03	59.4 - 59.4	07/14/2015	ONO03	WATER	REG	W-SW						
DEEP_S	OL-2328-04	59.4 - 59.4	07/14/2015	ONO03	WATER	FD	W-SW						
DEEP_S	OL-2329-01	6.6 - 6.6	07/21/2015	UFI CHM 2015-033	WATER	REG	W-SW	0.018	J	2.191			
DEEP_S	OL-2329-02	6.6 - 6.6	07/21/2015	UFI CHM 2015-033	WATER	FD	W-SW	0.018	J	2.179			
DEEP_S	OL-2329-03	39.6 - 39.6	07/21/2015	UFI CHM 2015-033	WATER	REG	W-SW	0.051	U	2.492			
DEEP_S	OL-2329-04	52.8 - 52.8	07/21/2015	UFI CHM 2015-033	WATER	REG	W-SW	0.205		2.131			
DEEP_S	OL-2329-05	59.4 - 59.4	07/21/2015	UFI CHM 2015-033	WATER	REG	W-SW	0.656		1.906			
DEEP_S	OL-2330-01	6.6 - 6.6	07/21/2015	1507555	WATER	REG	W-SW						
DEEP_S	OL-2330-02	6.6 - 6.6	07/21/2015	1507555	WATER	FD	W-SW						
DEEP_S	OL-2330-03	39.6 - 39.6	07/21/2015	1507555	WATER	REG	W-SW						
DEEP_S	OL-2330-04	52.8 - 52.8	07/21/2015	1507555	WATER	REG	W-SW						
DEEP_S	OL-2330-05	59.4 - 59.4	07/21/2015	1507555	WATER	REG	W-SW						
DEEP_S	OL-2332-01	6.6 - 6.6	07/28/2015	UFI CHM 2015-035	WATER	REG	W-SW	0.023	J	1.984			
DEEP_S	OL-2332-02	6.6 - 6.6	07/28/2015	UFI CHM 2015-035	WATER	FD	W-SW	0.051	U	1.99			
DEEP_S	OL-2332-03	39.6 - 39.6	07/28/2015	UFI CHM 2015-035	WATER	REG	W-SW	0.049		2.081			
DEEP_S	OL-2332-04	46.2 - 46.2	07/28/2015	UFI CHM 2015-035	WATER	REG	W-SW					0.0015	U
DEEP_S	OL-2332-05	52.8 - 52.8	07/28/2015	UFI CHM 2015-035	WATER	REG	W-SW	0.241		1.853		0.0015	U
DEEP_S	OL-2332-06	59.4 - 59.4	07/28/2015	UFI CHM 2015-035	WATER	REG	W-SW	0.53		2.553		0.0015	U
DEEP_S	OL-2332-07	59.4 - 59.4	07/28/2015	UFI CHM 2015-035	WATER	FD	W-SW					0.0004	J
DEEP_S	OL-2333-01	6.6 - 6.6	07/28/2015	1507714	WATER	REG	W-SW						
DEEP_S	OL-2333-02	6.6 - 6.6	07/28/2015	1507714	WATER	FD	W-SW						
DEEP_S	OL-2333-03	39.6 - 39.6	07/28/2015	1507714	WATER	REG	W-SW						
DEEP_S	OL-2333-04	52.8 - 52.8	07/28/2015	1507714	WATER	REG	W-SW						
DEEP_S	OL-2333-05	59.4 - 59.4	07/28/2015	1507714	WATER	REG	W-SW						
DEEP_S	OL-2336-01	46.2 - 46.2	07/28/2015	ONO04	WATER	REG	W-SW						
DEEP_S	OL-2336-02	52.8 - 52.8	07/28/2015	ONO04	WATER	REG	W-SW						
DEEP_S	OL-2336-03	59.4 - 59.4	07/28/2015	ONO04	WATER	REG	W-SW						
DEEP_S	OL-2336-04	59.4 - 59.4	07/28/2015	ONO04	WATER	FD	W-SW						
DEEP_S	OL-2337-01	6.6 - 6.6	08/04/2015	UFI CHM 2015-041	WATER	REG	W-SW	0.051	U	2.223			
DEEP_S	OL-2337-02	6.6 - 6.6	08/04/2015	UFI CHM 2015-041	WATER	FD	W-SW	0.051	U	2.255			
DEEP_S	OL-2337-03	39.6 - 39.6	08/04/2015	UFI CHM 2015-041	WATER	REG	W-SW	0.093		2.01			
DEEP_S	OL-2337-04	52.8 - 52.8	08/04/2015	UFI CHM 2015-041	WATER	REG	W-SW	0.238		1.771			
DEEP_S	OL-2337-05	59.4 - 59.4	08/04/2015	UFI CHM 2015-041	WATER	REG	W-SW	0.395		1.662			
DEEP_S	OL-2338-01	6.6 - 6.6	08/04/2015	1508074	WATER	REG	W-SW						
DEEP_S	OL-2338-02	6.6 - 6.6	08/04/2015	1508074	WATER	FD	W-SW						
DEEP_S	OL-2338-03	39.6 - 39.6	08/04/2015	1508074	WATER	REG	W-SW						
DEEP_S	OL-2338-04	52.8 - 52.8	08/04/2015	1508074	WATER	REG	W-SW						
DEEP_S	OL-2338-05	59.4 - 59.4	08/04/2015	1508074	WATER	REG	W-SW						
DEEP_S	OL-2341-01	6.6 - 6.6	08/11/2015	UFI CHM 2015-044	WATER	REG	W-SW	0.051	U	2.204			
DEEP_S	OL-2341-02	6.6 - 6.6	08/11/2015	UFI CHM 2015-044	WATER	FD	W-SW	0.051	U	2.253			
DEEP_S	OL-2341-03	39.6 - 39.6	08/11/2015	UFI CHM 2015-044	WATER	REG	W-SW	0.173		1.793			
DEEP_S	OL-2341-04	46.2 - 46.2	08/11/2015	UFI CHM 2015-044	WATER	REG	W-SW					0.0008	J
DEEP_S	OL-2341-05	52.8 - 52.8	08/11/2015	UFI CHM 2015-044	WATER	REG	W-SW	0.401		1.754		0.0015	U
DEEP_S	OL-2341-06	59.4 - 59.4	08/11/2015	UFI CHM 2015-044	WATER	REG	W-SW	0.51		1.649		0.001	J
DEEP_S	OL-2341-07	59.4 - 59.4	08/11/2015	UFI CHM 2015-044	WATER	FD2	W-SW					0.0008	J
DEEP_S	OL-2342-01	6.6 - 6.6	08/11/2015	1508242	WATER	REG	W-SW						
DEEP_S	OL-2342-02	6.6 - 6.6	08/11/2015	1508242	WATER	FD	W-SW						
DEEP_S	OL-2342-03	39.6 - 39.6	08/11/2015	1508242	WATER	REG	W-SW						
DEEP_S	OL-2342-04	52.8 - 52.8	08/11/2015	1508242	WATER	REG	W-SW						
DEEP_S	OL-2342-05	59.4 - 59.4	08/11/2015	1508242	WATER	REG	W-SW						
DEEP_S	OL-2345-01	46.2 - 46.2	08/11/2015	ONO05	WATER	REG	W-SW						
DEEP_S	OL-2345-02	52.8 - 52.8	08/11/2015	ONO05	WATER	REG	W-SW						
DEEP_S	OL-2345-03	59.4 - 59.4	08/11/2015	ONO05	WATER	REG	W-SW						
DEEP_S	OL-2345-04	59.4 - 59.4	08/11/2015	ONO05	WATER	FD	W-SW						

							Parameter	**NITROGEN, AMMONIA (AS N)**		**NITROGEN, NITRATE-NITRITE**		**REACTIVE PHOSPHATE**	
							Method	**E350.1**		**E353.2**		**SM4500P-E**	
							Filtered	**Y**		**Y**		**N**	
							Units	**mg/L**		**mg/L**		**mg/L**	
Location ID	**Field Sample ID**	**Depth (ft)**	**Sampled**	**SDG**	**Matrix**	**Purpose**	**Sample Type**						
DEEP_S	OL-2346-01	6.6 - 6.6	08/18/2015	UFI CHM 2015-045	WATER	REG	W-SW	0.051	U	2.051			
DEEP_S	OL-2346-02	6.6 - 6.6	08/18/2015	UFI CHM 2015-045	WATER	FD	W-SW	0.051	U	2.137			
DEEP_S	OL-2346-03	39.6 - 39.6	08/18/2015	UFI CHM 2015-045	WATER	REG	W-SW	0.182		1.536			
DEEP_S	OL-2346-04	52.8 - 52.8	08/18/2015	UFI CHM 2015-045	WATER	REG	W-SW	0.514		1.413			
DEEP_S	OL-2346-05	59.4 - 59.4	08/18/2015	UFI CHM 2015-045	WATER	REG	W-SW	0.859		1.658			
DEEP_S	OL-2347-01	6.6 - 6.6	08/18/2015	1508418	WATER	REG	W-SW						
DEEP_S	OL-2347-02	6.6 - 6.6	08/18/2015	1508418	WATER	FD	W-SW						
DEEP_S	OL-2347-03	39.6 - 39.6	08/18/2015	1508418	WATER	REG	W-SW						
DEEP_S	OL-2347-04	52.8 - 52.8	08/18/2015	1508418	WATER	REG	W-SW						
DEEP_S	OL-2347-05	59.4 - 59.4	08/18/2015	1508418	WATER	REG	W-SW						
DEEP_S	OL-2349-01	6.6 - 6.6	08/25/2015	UFI CHM 2015-048	WATER	REG	W-SW	0.051	UJ	2.097			
DEEP_S	OL-2349-02	6.6 - 6.6	08/25/2015	UFI CHM 2015-048	WATER	FD	W-SW	0.102	J	2.018			
DEEP_S	OL-2349-03	39.6 - 39.6	08/25/2015	UFI CHM 2015-048	WATER	REG	W-SW	0.247		1.517			
DEEP_S	OL-2349-04	46.2 - 46.2	08/25/2015	UFI CHM 2015-048	WATER	REG	W-SW					0.0012	J
DEEP_S	OL-2349-05	52.8 - 52.8	08/25/2015	UFI CHM 2015-048	WATER	REG	W-SW	0.571		1.61		0.001	J
DEEP_S	OL-2349-06	59.4 - 59.4	08/25/2015	UFI CHM 2015-048	WATER	REG	W-SW	0.723		1.497		0.0012	J
DEEP_S	OL-2349-07	59.4 - 59.4	08/25/2015	UFI CHM 2015-048	WATER	FD2	W-SW					0.0012	J
DEEP_S	OL-2350-01	6.6 - 6.6	08/25/2015	1508585	WATER	REG	W-SW						
DEEP_S	OL-2350-02	6.6 - 6.6	08/25/2015	1508585	WATER	FD	W-SW						
DEEP_S	OL-2350-03	39.6 - 39.6	08/25/2015	1508585	WATER	REG	W-SW						
DEEP_S	OL-2350-04	52.8 - 52.8	08/25/2015	1508585	WATER	REG	W-SW						
DEEP_S	OL-2350-05	59.4 - 59.4	08/25/2015	1508585	WATER	REG	W-SW						
DEEP_S	OL-2353-01	46.2 - 46.2	08/25/2015	ONO06	WATER	REG	W-SW						
DEEP_S	OL-2353-02	52.8 - 52.8	08/25/2015	ONO06	WATER	REG	W-SW						
DEEP_S	OL-2353-03	59.4 - 59.4	08/25/2015	ONO06	WATER	REG	W-SW						
DEEP_S	OL-2353-04	59.4 - 59.4	08/25/2015	ONO06	WATER	FD	W-SW						
DEEP_S	OL-2355-01	6.6 - 6.6	09/01/2015	UFI CHM 2015-050	WATER	REG	W-SW	0.051	U	2.497			
DEEP_S	OL-2355-02	6.6 - 6.6	09/01/2015	UFI CHM 2015-050	WATER	FD	W-SW	0.051	U	2.36			
DEEP_S	OL-2355-03	39.6 - 39.6	09/01/2015	UFI CHM 2015-050	WATER	REG	W-SW	0.227		1.52			
DEEP_S	OL-2355-04	52.8 - 52.8	09/01/2015	UFI CHM 2015-050	WATER	REG	W-SW	0.501		1.661			
DEEP_S	OL-2355-05	59.4 - 59.4	09/01/2015	UFI CHM 2015-050	WATER	REG	W-SW	0.684		1.827			
DEEP_S	OL-2356-01	6.6 - 6.6	09/01/2015	1509058	WATER	REG	W-SW						
DEEP_S	OL-2356-02	6.6 - 6.6	09/01/2015	1509058	WATER	FD	W-SW						
DEEP_S	OL-2356-03	39.6 - 39.6	09/01/2015	1509058	WATER	REG	W-SW						
DEEP_S	OL-2356-04	52.8 - 52.8	09/01/2015	1509058	WATER	REG	W-SW						
DEEP_S	OL-2356-05	59.4 - 59.4	09/01/2015	1509058	WATER	REG	W-SW						
DEEP_S	OL-2360-01	6.6 - 6.6	09/09/2015	UFI CHM 2015-055	WATER	REG	W-SW	0.035	J	2.404			
DEEP_S	OL-2360-02	6.6 - 6.6	09/09/2015	UFI CHM 2015-055	WATER	FD	W-SW	0.037	J	2.453			
DEEP_S	OL-2360-03	39.6 - 39.6	09/09/2015	UFI CHM 2015-055	WATER	REG	W-SW	0.241		1.457			
DEEP_S	OL-2360-04	46.2 - 46.2	09/09/2015	UFI CHM 2015-055	WATER	REG	W-SW					0.0015	U
DEEP_S	OL-2360-05	52.8 - 52.8	09/09/2015	UFI CHM 2015-055	WATER	REG	W-SW	0.739		1.647		0.0016	
DEEP_S	OL-2360-06	59.4 - 59.4	09/09/2015	UFI CHM 2015-055	WATER	REG	W-SW	1.192		2.467		0.0024	
DEEP_S	OL-2360-07	59.4 - 59.4	09/09/2015	UFI CHM 2015-055	WATER	FD	W-SW					0.0025	
DEEP_S	OL-2361-01	6.6 - 6.6	09/09/2015	1509249	WATER	REG	W-SW						
DEEP_S	OL-2361-02	6.6 - 6.6	09/09/2015	1509249	WATER	FD	W-SW						
DEEP_S	OL-2361-03	39.6 - 39.6	09/09/2015	1509249	WATER	REG	W-SW						
DEEP_S	OL-2361-04	52.8 - 52.8	09/09/2015	1509249	WATER	REG	W-SW						
DEEP_S	OL-2361-05	59.4 - 59.4	09/09/2015	1509249	WATER	REG	W-SW						
DEEP_S	OL-2364-01	46.2 - 46.2	09/09/2015	ONO07	WATER	REG	W-SW						
DEEP_S	OL-2364-02	52.8 - 52.8	09/09/2015	ONO07	WATER	REG	W-SW						
DEEP_S	OL-2364-03	59.4 - 59.4	09/09/2015	ONO07	WATER	REG	W-SW						
DEEP_S	OL-2364-04	59.4 - 59.4	09/09/2015	ONO07	WATER	FD	W-SW						
DEEP_S	OL-2365-01	6.6 - 6.6	09/16/2015	UFI CHM 2015-059	WATER	REG	W-SW	0.063		2.515			
DEEP_S	OL-2365-02	6.6 - 6.6	09/16/2015	UFI CHM 2015-059	WATER	FD	W-SW	0.067		2.53			
DEEP_S	OL-2365-03	39.6 - 39.6	09/16/2015	UFI CHM 2015-059	WATER	REG	W-SW	0.336		1.36			
DEEP_S	OL-2365-04	52.8 - 52.8	09/16/2015	UFI CHM 2015-059	WATER	REG	W-SW	0.854		2.052			
DEEP_S	OL-2365-05	59.4 - 59.4	09/16/2015	UFI CHM 2015-059	WATER	REG	W-SW	1.144		2.344			
DEEP_S	OL-2366-01	6.6 - 6.6	09/16/2015	1509384	WATER	REG	W-SW						
DEEP_S	OL-2366-02	6.6 - 6.6	09/16/2015	1509384	WATER	FD	W-SW						
DEEP_S	OL-2366-03	39.6 - 39.6	09/16/2015	1509384	WATER	REG	W-SW						
DEEP_S	OL-2366-04	52.8 - 52.8	09/16/2015	1509384	WATER	REG	W-SW						
DEEP_S	OL-2366-05	59.4 - 59.4	09/16/2015	1509384	WATER	REG	W-SW						

							Parameter	NITROGEN, AMMONIA (AS N)		NITROGEN, NITRATE-NITRITE		REACTIVE PHOSPHATE	
							Method	E350.1		E353.2		SM4500P-E	
							Filtered	Y		Y		N	
							Units	mg/L		mg/L		mg/L	
Location ID	Field Sample ID	Depth (ft)	Sampled	SDG	Matrix	Purpose	Sample Type						
DEEP_S	OL-2369-01	6.6 - 6.6	09/22/2015	UFI CHM 2015-062	WATER	REG	W-SW	0.065		2.427			
DEEP_S	OL-2369-02	6.6 - 6.6	09/22/2015	UFI CHM 2015-062	WATER	FD	W-SW	0.063		2.398			
DEEP_S	OL-2369-03	39.6 - 39.6	09/22/2015	UFI CHM 2015-062	WATER	REG	W-SW	0.435		1.301			
DEEP_S	OL-2369-04	46.2 - 46.2	09/22/2015	UFI CHM 2015-062	WATER	REG	W-SW					0.0007	J
DEEP_S	OL-2369-05	16 - 16	09/22/2015	UFI CHM 2015-062	WATER	REG	W-SW	0.861		1.766		0.001	J
DEEP_S	OL-2369-06	52.8 - 52.8	09/22/2015	UFI CHM 2015-062	WATER	REG	W-SW	1.35		2.161		0.0023	
DEEP_S	OL-2369-07	59.4 - 59.4	09/22/2015	UFI CHM 2015-062	WATER	FD	W-SW					0.0024	
DEEP_S	OL-2370-01	6.6 - 6.6	09/22/2015	1509509	WATER	REG	W-SW						
DEEP_S	OL-2370-02	6.6 - 6.6	09/22/2015	1509509	WATER	FD	W-SW						
DEEP_S	OL-2370-03	39.6 - 39.6	09/22/2015	1509509	WATER	REG	W-SW						
DEEP_S	OL-2370-04	52.8 - 52.8	09/22/2015	1509509	WATER	REG	W-SW						
DEEP_S	OL-2370-05	59.4 - 59.4	09/22/2015	1509509	WATER	REG	W-SW						
DEEP_S	OL-2373-01	46.2 - 46.2	09/22/2015	ONO08	WATER	REG	W-SW						
DEEP_S	OL-2373-02	52.8 - 52.8	09/22/2015	ONO08	WATER	REG	W-SW						
DEEP_S	OL-2373-03	59.4 - 59.4	09/22/2015	ONO08	WATER	REG	W-SW						
DEEP_S	OL-2373-04	59.4 - 59.4	09/22/2015	ONO08	WATER	FD	W-SW						
DEEP_S	OL-2374-01	6.6 - 6.6	09/29/2015	UFI CHM 2015-065	WATER	REG	W-SW	0.036	J	2.577			
DEEP_S	OL-2374-02	6.6 - 6.6	09/29/2015	UFI CHM 2015-065	WATER	FD	W-SW	0.04	J	2.61			
DEEP_S	OL-2374-03	39.6 - 39.6	09/29/2015	UFI CHM 2015-065	WATER	REG	W-SW	0.415		1.25			
DEEP_S	OL-2374-04	52.8 - 52.8	09/29/2015	UFI CHM 2015-065	WATER	REG	W-SW	0.814		1.784			
DEEP_S	OL-2374-05	59.4 - 59.4	09/29/2015	UFI CHM 2015-065	WATER	REG	W-SW	0.993		2.366			
DEEP_S	OL-2375-01	6.6 - 6.6	09/29/2015	1509700	WATER	REG	W-SW						
DEEP_S	OL-2375-02	6.6 - 6.6	09/29/2015	1509700	WATER	FD	W-SW						
DEEP_S	OL-2375-03	39.6 - 39.6	09/29/2015	1509700	WATER	REG	W-SW						
DEEP_S	OL-2375-04	52.8 - 52.8	09/29/2015	1509700	WATER	REG	W-SW						
DEEP_S	OL-2375-05	59.4 - 59.4	09/29/2015	1509700	WATER	REG	W-SW						
DEEP_S	OL-2378-01	6.6 - 6.6	10/06/2015	UFI CHM 2015-069	WATER	REG	W-SW	0.063		2.292			
DEEP_S	OL-2378-02	6.6 - 6.6	10/06/2015	UFI CHM 2015-069	WATER	FD	W-SW	0.066		2.257			
DEEP_S	OL-2378-03	39.6 - 39.6	10/06/2015	UFI CHM 2015-069	WATER	REG	W-SW	0.385		1.38			
DEEP_S	OL-2378-04	46.2 - 46.2	10/06/2015	UFI CHM 2015-069	WATER	REG	W-SW					0.0009	J
DEEP_S	OL-2378-05	52.8 - 52.8	10/06/2015	UFI CHM 2015-069	WATER	REG	W-SW	0.999		1.73		0.002	
DEEP_S	OL-2378-06	59.4 - 59.4	10/06/2015	UFI CHM 2015-069	WATER	REG	W-SW	1.66		3.198		0.0029	
DEEP_S	OL-2378-07	59.4 - 59.4	10/06/2015	UFI CHM 2015-069	WATER	FD	W-SW					0.0029	
DEEP_S	OL-2379-01	6.6 - 6.6	10/06/2015	1510157	WATER	REG	W-SW						
DEEP_S	OL-2379-02	6.6 - 6.6	10/06/2015	1510157	WATER	FD	W-SW						
DEEP_S	OL-2379-03	39.6 - 39.6	10/06/2015	1510157	WATER	REG	W-SW						
DEEP_S	OL-2379-04	52.8 - 52.8	10/06/2015	1510157	WATER	REG	W-SW						
DEEP_S	OL-2379-05	59.4 - 59.4	10/06/2015	1510157	WATER	REG	W-SW						
DEEP_S	OL-2382-01	46.2 - 46.2	10/06/2015	ONO10	WATER	REG	W-SW						
DEEP_S	OL-2382-02	52.8 - 52.8	10/06/2015	ONO10	WATER	REG	W-SW						
DEEP_S	OL-2382-03	59.4 - 59.4	10/06/2015	ONO10	WATER	REG	W-SW						
DEEP_S	OL-2382-04	59.4 - 59.4	10/06/2015	ONO10	WATER	FD	W-SW						
DEEP_S	OL-2383-01	6.6 - 6.6	10/13/2015	UFI CHM 2015-070	WATER	REG	W-SW	0.056		2.322			
DEEP_S	OL-2383-02	6.6 - 6.6	10/13/2015	UFI CHM 2015-070	WATER	FD	W-SW	0.059		2.332			
DEEP_S	OL-2383-03	39.6 - 39.6	10/13/2015	UFI CHM 2015-070	WATER	REG	W-SW	0.463		1.553			
DEEP_S	OL-2383-04	52.8 - 52.8	10/13/2015	UFI CHM 2015-070	WATER	REG	W-SW	1.17		2.237			
DEEP_S	OL-2383-05	59.4 - 59.4	10/13/2015	UFI CHM 2015-070	WATER	REG	W-SW	1.696		3.669			
DEEP_S	OL-2384-01	6.6 - 6.6	10/13/2015	1510321	WATER	REG	W-SW						
DEEP_S	OL-2384-02	6.6 - 6.6	10/13/2015	1510321	WATER	FD	W-SW						
DEEP_S	OL-2384-03	39.6 - 39.6	10/13/2015	1510321	WATER	REG	W-SW						
DEEP_S	OL-2384-04	52.8 - 52.8	10/13/2015	1510321	WATER	REG	W-SW						
DEEP_S	OL-2384-05	59.4 - 59.4	10/13/2015	1510321	WATER	REG	W-SW						
DEEP_S	OL-2387-01	6.6 - 6.6	10/20/2015	UFI CHM 2015-072	WATER	REG	W-SW	0.1		2.191			
DEEP_S	OL-2387-02	6.6 - 6.6	10/20/2015	UFI CHM 2015-072	WATER	FD	W-SW	0.105		2.219			
DEEP_S	OL-2387-03	39.6 - 39.6	10/20/2015	UFI CHM 2015-072	WATER	REG	W-SW	0.181		2.047			
DEEP_S	OL-2387-04	46.2 - 46.2	10/20/2015	UFI CHM 2015-072	WATER	REG	W-SW					0.0022	
DEEP_S	OL-2387-05	52.8 - 52.8	10/20/2015	UFI CHM 2015-072	WATER	REG	W-SW	1.235		1.785		0.0019	
DEEP_S	OL-2387-06	59.4 - 59.4	10/20/2015	UFI CHM 2015-072	WATER	REG	W-SW	1.527		2.05		0.0028	
DEEP_S	OL-2387-07	59.4 - 59.4	10/20/2015	UFI CHM 2015-072	WATER	FD	W-SW					0.0028	
DEEP_S	OL-2388-01	6.6 - 6.6	10/20/2015	1510483	WATER	REG	W-SW						
DEEP_S	OL-2388-02	6.6 - 6.6	10/20/2015	1510483	WATER	FD	W-SW						
DEEP_S	OL-2388-03	39.6 - 39.6	10/20/2015	1510483	WATER	REG	W-SW						

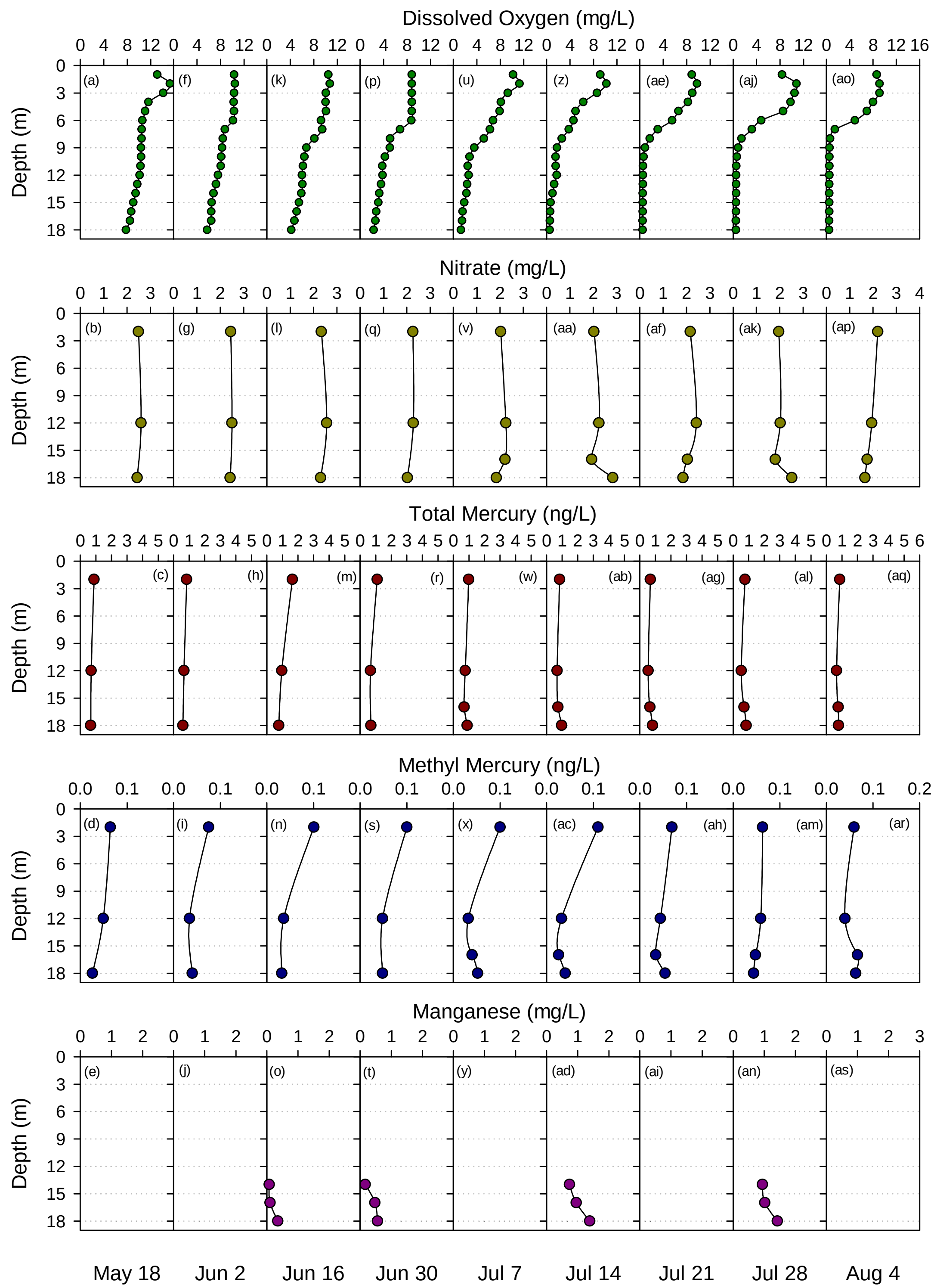
							Parameter	NITROGEN, AMMONIA (AS N)		NITROGEN, NITRATE-NITRITE		REACTIVE PHOSPHATE	
							Method	E350.1		E353.2		SM4500P-E	
							Filtered	Y		Y		N	
							Units	mg/L		mg/L		mg/L	
Location ID	**Field Sample ID**	**Depth (ft)**	**Sampled**	**SDG**	**Matrix**	**Purpose**	**Sample Type**						
DEEP_S	OL-2388-04	52.8 - 52.8	10/20/2015	1510483	WATER	REG	W-SW						
DEEP_S	OL-2388-05	59.4 - 59.4	10/20/2015	1510483	WATER	REG	W-SW						
DEEP_S	OL-2391-01	46.2 - 46.2	10/20/2015	ONO11	WATER	REG	W-SW						
DEEP_S	OL-2391-02	52.8 - 52.8	10/20/2015	ONO11	WATER	REG	W-SW						
DEEP_S	OL-2391-03	59.4 - 59.4	10/20/2015	ONO11	WATER	REG	W-SW						
DEEP_S	OL-2391-04	59.4 - 59.4	10/20/2015	ONO11	WATER	FD	W-SW						
DEEP_S	OL-2392-01	6.6 - 6.6	10/27/2015	UFI CHM 2015-078	WATER	REG	W-SW	0.238		2.214			
DEEP_S	OL-2392-02	6.6 - 6.6	10/27/2015	UFI CHM 2015-078	WATER	FD	W-SW	0.241		2.182			
DEEP_S	OL-2392-03	39.6 - 39.6	10/27/2015	UFI CHM 2015-078	WATER	REG	W-SW	0.249		2.179			
DEEP_S	OL-2392-04	46.2 - 46.2	10/27/2015	UFI CHM 2015-078	WATER	REG	W-SW					0.0007	J
DEEP_S	OL-2392-05	52.8 - 52.8	10/27/2015	UFI CHM 2015-078	WATER	REG	W-SW	1.158		1.794		0.001	J
DEEP_S	OL-2392-06	59.4 - 59.4	10/27/2015	UFI CHM 2015-078	WATER	REG	W-SW	1.24		1.834		0.001	J
DEEP_S	OL-2392-07	59.4 - 59.4	10/27/2015	UFI CHM 2015-078	WATER	FD	W-SW					0.001	J
DEEP_S	OL-2393-01	6.6 - 6.6	10/27/2015	1510644	WATER	REG	W-SW						
DEEP_S	OL-2393-02	6.6 - 6.6	10/27/2015	1510644	WATER	FD	W-SW						
DEEP_S	OL-2393-03	39.6 - 39.6	10/27/2015	1510644	WATER	REG	W-SW						
DEEP_S	OL-2393-04	52.8 - 52.8	10/27/2015	1510644	WATER	REG	W-SW						
DEEP_S	OL-2393-05	59.4 - 59.4	10/27/2015	1510644	WATER	REG	W-SW						
DEEP_S	OL-2396-01	46.2 - 46.2	10/27/2015	ONO12	WATER	REG	W-SW						
DEEP_S	OL-2396-02	52.8 - 52.8	10/27/2015	ONO12	WATER	REG	W-SW						
DEEP_S	OL-2396-03	59.4 - 59.4	10/27/2015	ONO12	WATER	REG	W-SW						
DEEP_S	OL-2396-04	59.4 - 59.4	10/27/2015	ONO12	WATER	FD	W-SW						
DEEP_S	OL-2398-01	6.6 - 6.6	11/03/2015	UFI CHM 2015-079	WATER	REG	W-SW	0.304		2.195			
DEEP_S	OL-2398-02	6.6 - 6.6	11/03/2015	UFI CHM 2015-079	WATER	FD	W-SW	0.311		2.151			
DEEP_S	OL-2398-03	39.6 - 39.6	11/03/2015	UFI CHM 2015-079	WATER	REG	W-SW	0.328		2.149			
DEEP_S	OL-2398-04	59.4 - 59.4	11/03/2015	UFI CHM 2015-079	WATER	REG	W-SW	0.399		2.149			
DEEP_S	OL-2399-01	6.6 - 6.6	11/03/2015	1511084	WATER	REG	W-SW						
DEEP_S	OL-2399-02	6.6 - 6.6	11/03/2015	1511084	WATER	FD	W-SW						
DEEP_S	OL-2399-03	39.6 - 39.6	11/03/2015	1511084	WATER	REG	W-SW						
DEEP_S	OL-2399-04	59.4 - 59.4	11/03/2015	1511084	WATER	REG	W-SW						
DEEP_S	OL-2403-01	6.6 - 6.6	11/17/2015	UFI CHM 2015-082	WATER	REG	W-SW	0.294		2.202			
DEEP_S	OL-2403-02	6.6 - 6.6	11/17/2015	UFI CHM 2015-082	WATER	FD	W-SW	0.299		2.196			
DEEP_S	OL-2403-03	39.6 - 39.6	11/17/2015	UFI CHM 2015-082	WATER	REG	W-SW	0.303		2.181			
DEEP_S	OL-2403-04	59.4 - 59.4	11/17/2015	UFI CHM 2015-082	WATER	FD	W-SW	0.3		2.156			
DEEP_S	OL-2404-01	6.6 - 6.6	11/17/2015	1511394	WATER	REG	W-SW						
DEEP_S	OL-2404-02	6.6 - 6.6	11/17/2015	1511394	WATER	FD	W-SW						
DEEP_S	OL-2404-03	39.6 - 39.6	11/17/2015	1511394	WATER	REG	W-SW						
DEEP_S	OL-2404-04	59.4 - 59.4	11/17/2015	1511394	WATER	REG	W-SW						

						Parameter	MERCURY		MERCURY		METHYL MERCURY	
						Method	E1630		E1630		E1631	
						Filtered	N		Y		N	
						Units	ug/l		ug/l		ug/l	
Location ID	Field Sample ID	Sampled	Depth (ft)	Matrix	Purpose	Sample Type	Result	Q	Result	Q	Result	Q
DEEP_S	OL-2301-01	05/18/2015	6.6 - 6.6	WATER	REG	W-SW	0.00082		0.00035	J	0.000045	J
DEEP_S	OL-2301-02	05/18/2015	6.6 - 6.6	WATER	FD	W-SW	0.00094				0.000083	J
DEEP_S	OL-2301-03	05/18/2015	39.6 - 39.6	WATER	REG	W-SW	0.0007				0.000049	J
DEEP_S	OL-2301-04	05/18/2015	59.4 - 59.4	WATER	REG	W-SW	0.00067				0.000026	U
DEEP_S	OL-2306-01	06/02/2015	6.6 - 6.6	WATER	REG	W-SW	0.00086				0.000075	
DEEP_S	OL-2306-02	06/02/2015	6.6 - 6.6	WATER	FD	W-SW	0.00082				0.000075	
DEEP_S	OL-2306-03	06/02/2015	39.6 - 39.6	WATER	REG	W-SW	0.00067				0.000034	J
DEEP_S	OL-2306-04	06/02/2015	59.4 - 59.4	WATER	REG	W-SW	0.0006				0.00004	J
DEEP_S	OL-2310-01	06/16/2015	6.6 - 6.6	WATER	REG	W-SW	0.00189		0.00062		0.000097	
DEEP_S	OL-2310-02	06/16/2015	6.6 - 6.6	WATER	FD	W-SW	0.00139				0.000104	
DEEP_S	OL-2310-03	06/16/2015	39.6 - 39.6	WATER	REG	W-SW	0.00096				0.000036	J
DEEP_S	OL-2310-04	06/16/2015	59.4 - 59.4	WATER	REG	W-SW	0.00077				0.000032	J
DEEP_S	OL-2315-01	06/30/2015	6.6 - 6.6	WATER	REG	W-SW	0.00117		0.00031	J	0.000114	
DEEP_S	OL-2315-02	06/30/2015	6.6 - 6.6	WATER	FD	W-SW	0.00102				0.000086	
DEEP_S	OL-2315-03	06/30/2015	39.6 - 39.6	WATER	REG	W-SW	0.00067				0.000048	J
DEEP_S	OL-2315-04	06/30/2015	59.4 - 59.4	WATER	REG	W-SW	0.00069				0.000048	J
DEEP_S	OL-2320-01	07/07/2015	6.6 - 6.6	WATER	REG	W-SW	0.00097				0.00011	J+
DEEP_S	OL-2320-02	07/07/2015	6.6 - 6.6	WATER	FD	W-SW	0.001				0.00009	
DEEP_S	OL-2320-03	07/07/2015	39.6 - 39.6	WATER	REG	W-SW	0.00076				0.000032	J
DEEP_S	OL-2320-04	07/07/2015	52.8 - 52.8	WATER	REG	W-SW	0.00069				0.00004	J
DEEP_S	OL-2320-05	07/07/2015	59.4 - 59.4	WATER	REG	W-SW	0.00089				0.000052	
DEEP_S	OL-2325-01	07/14/2015	6.6 - 6.6	WATER	REG	W-SW	0.00091		0.00022	J	0.000114	
DEEP_S	OL-2325-02	07/14/2015	6.6 - 6.6	WATER	FD	W-SW	0.00077				0.000106	
DEEP_S	OL-2325-03	07/14/2015	39.6 - 39.6	WATER	REG	W-SW	0.00068				0.000032	J
DEEP_S	OL-2325-04	07/14/2015	52.8 - 52.8	WATER	REG	W-SW	0.00074				0.000026	U
DEEP_S	OL-2325-05	07/14/2015	59.5 - 59.4	WATER	REG	W-SW	0.00097				0.00004	J
DEEP_S	OL-2330-01	07/21/2015	6.6 - 6.6	WATER	REG	W-SW	0.0007				0.00007	
DEEP_S	OL-2330-02	07/21/2015	6.6 - 6.6	WATER	FD	W-SW	0.00067				0.000067	
DEEP_S	OL-2330-03	07/21/2015	39.6 - 39.6	WATER	REG	W-SW	0.00054				0.000044	J
DEEP_S	OL-2330-04	07/21/2015	52.8 - 52.8	WATER	REG	W-SW	0.00065				0.000034	J
DEEP_S	OL-2330-05	07/21/2015	59.4 - 59.4	WATER	REG	W-SW	0.00082				0.000054	
DEEP_S	OL-2333-01	07/28/2015	6.6 - 6.6	WATER	REG	W-SW	0.00078		0.0003	J	0.000078	J
DEEP_S	OL-2333-02	07/28/2015	6.6 - 6.6	WATER	FD	W-SW	0.00076				0.000048	J
DEEP_S	OL-2333-03	07/28/2015	39.6 - 39.6	WATER	REG	W-SW	0.00053				0.000059	
DEEP_S	OL-2333-04	07/28/2015	52.8 - 52.8	WATER	REG	W-SW	0.00071				0.000048	J
DEEP_S	OL-2333-05	07/28/2015	59.4 - 59.4	WATER	REG	W-SW	0.00084				0.000044	J
DEEP_S	OL-2338-01	08/04/2015	6.6 - 6.6	WATER	REG	W-SW	0.00088				0.000044	J
DEEP_S	OL-2338-02	08/04/2015	6.6 - 6.6	WATER	FD	W-SW	0.00085				0.000075	J
DEEP_S	OL-2338-03	08/04/2015	39.6 - 39.6	WATER	REG	W-SW	0.00066				0.00004	J
DEEP_S	OL-2338-04	08/04/2015	52.8 - 52.8	WATER	REG	W-SW	0.00076				0.000067	
DEEP_S	OL-2338-05	08/04/2015	59.4 - 59.4	WATER	REG	W-SW	0.00079				0.000063	
DEEP_S	OL-2342-01	08/11/2015	6.6 - 6.6	WATER	REG	W-SW	0.00068		0.00023	J	0.000071	
DEEP_S	OL-2342-02	08/11/2015	6.6 - 6.6	WATER	FD	W-SW	0.00062				0.000067	
DEEP_S	OL-2342-03	08/11/2015	39.6 - 39.6	WATER	REG	W-SW	0.00067				0.000048	J
DEEP_S	OL-2342-04	08/11/2015	52.8 - 52.8	WATER	REG	W-SW	0.00202		0.00029	J	0.000082	
DEEP_S	OL-2342-05	08/11/2015	59.4 - 59.4	WATER	REG	W-SW	0.00097				0.000086	
DEEP_S	OL-2347-01	08/18/2015	6.6 - 6.6	WATER	REG	W-SW	0.00053				0.000076	
DEEP_S	OL-2347-02	08/18/2015	6.6 - 6.6	WATER	FD	W-SW	0.00055				0.000082	
DEEP_S	OL-2347-03	08/18/2015	39.6 - 39.6	WATER	REG	W-SW	0.00071				0.000058	
DEEP_S	OL-2347-04	08/18/2015	52.8 - 52.8	WATER	REG	W-SW	0.00087				0.000076	
DEEP_S	OL-2347-05	08/18/2015	59.4 - 59.4	WATER	REG	W-SW	0.00088				0.000103	
DEEP_S	OL-2350-01	08/25/2015	6.6 - 6.6	WATER	REG	W-SW	0.00071		0.0002	J	0.000077	J+
DEEP_S	OL-2350-02	08/25/2015	6.6 - 6.6	WATER	FD	W-SW	0.00061				0.000069	J+
DEEP_S	OL-2350-03	08/25/2015	39.6 - 39.6	WATER	REG	W-SW	0.00072				0.00006	J+
DEEP_S	OL-2350-04	08/25/2015	52.8 - 52.8	WATER	REG	W-SW	0.00099		0.00026	J	0.000075	J+
DEEP_S	OL-2350-05	08/25/2015	59.4 - 59.4	WATER	REG	W-SW	0.00102				0.00008	J+
DEEP_S	OL-2356-01	09/01/2015	6.6 - 6.6	WATER	REG	W-SW	0.00068				0.000059	J+
DEEP_S	OL-2356-02	09/01/2015	6.6 - 6.6	WATER	FD	W-SW	0.00069				0.000046	J
DEEP_S	OL-2356-03	09/01/2015	39.6 - 39.6	WATER	REG	W-SW	0.00062				0.000049	J
DEEP_S	OL-2356-04	09/01/2015	52.8 - 52.8	WATER	REG	W-SW	0.00071				0.000044	J
DEEP_S	OL-2356-05	09/01/2015	59.4 - 59.4	WATER	REG	W-SW	0.00085				0.00005	J+
DEEP_S	OL-2361-01	09/09/2015	6.6 - 6.6	WATER	REG	W-SW	0.00067		0.00023	J	0.000043	J
DEEP_S	OL-2361-02	09/09/2015	6.6 - 6.6	WATER	FD	W-SW	0.00055				0.000041	J
DEEP_S	OL-2361-03	09/09/2015	39.6 - 39.6	WATER	REG	W-SW	0.00053				0.000048	J
DEEP_S	OL-2361-04	09/09/2015	52.8 - 52.8	WATER	REG	W-SW	0.00083		0.00023	J	0.000057	
DEEP_S	OL-2361-05	09/09/2015	59.4 - 59.4	WATER	REG	W-SW	0.00099				0.000068	
DEEP_S	OL-2366-01	09/16/2015	6.6 - 6.6	WATER	REG	W-SW	0.00083				0.000067	J+
DEEP_S	OL-2366-02	09/16/2015	6.6 - 6.6	WATER	FD	W-SW	0.00079				0.000056	
DEEP_S	OL-2366-03	09/16/2015	39.6 - 39.6	WATER	REG	W-SW	0.00086				0.000073	
DEEP_S	OL-2366-04	09/16/2015	52.8 - 52.8	WATER	REG	W-SW	0.00104				0.00008	
DEEP_S	OL-2366-05	09/16/2015	59.4 - 59.4	WATER	REG	W-SW	0.00116				0.000078	
DEEP_S	OL-2370-01	09/22/2015	6.6 - 6.6	WATER	REG	W-SW	0.0008		0.00019	J	0.000067	
DEEP_S	OL-2370-02	09/22/2015	6.6 - 6.6	WATER	FD	W-SW	0.00065				0.000072	

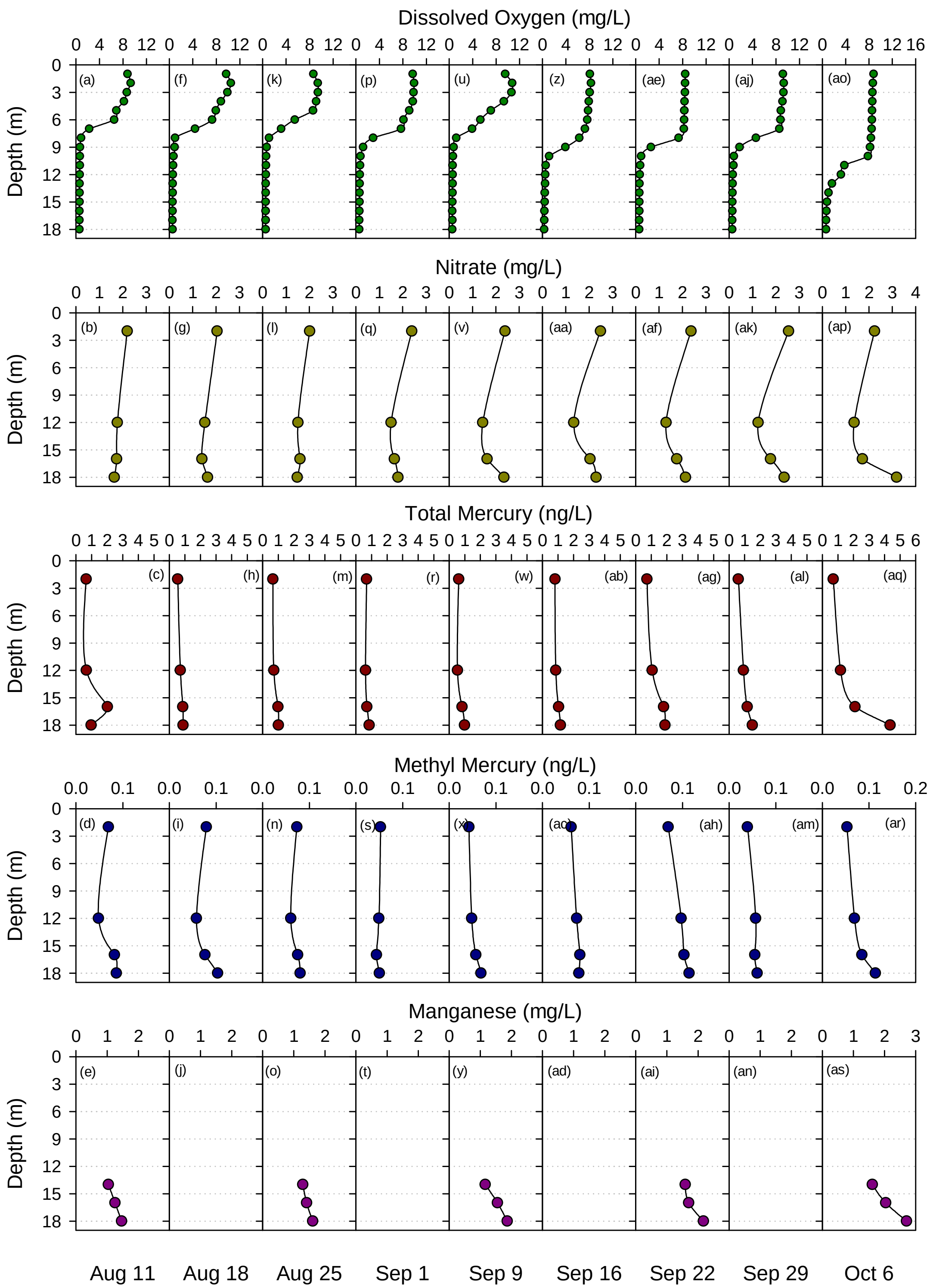
						Parameter	MERCURY		MERCURY		METHYL MERCURY	
						Method	E1630		E1630		E1631	
						Filtered	N		Y		N	
						Units	ug/l		ug/l		ug/l	
Location ID	Field Sample ID	Sampled	Depth (ft)	Matrix	Purpose	Sample Type	Result	Q	Result	Q	Result	Q
DEEP_S	OL-2370-03	09/22/2015	39.6 - 39.6	WATER	REG	W-SW	0.00106				0.000097	
DEEP_S	OL-2370-04	09/22/2015	52.8 - 52.8	WATER	REG	W-SW	0.00179		0.00018	J	0.000103	
DEEP_S	OL-2370-05	09/22/2015	59.4 - 59.4	WATER	REG	W-SW	0.00188				0.000114	
DEEP_S	OL-2375-01	09/29/2015	6.6 - 6.6	WATER	REG	W-SW	0.00059				0.000045	J
DEEP_S	OL-2375-02	09/29/2015	6.6 - 6.6	WATER	FD	W-SW	0.00062				0.000034	J
DEEP_S	OL-2375-03	09/29/2015	39.6 - 39.6	WATER	REG	W-SW	0.00093				0.000057	
DEEP_S	OL-2375-04	09/29/2015	52.8 - 52.8	WATER	REG	W-SW	0.00117				0.000055	
DEEP_S	OL-2375-05	09/29/2015	59.4 - 59.4	WATER	REG	W-SW	0.0015				0.00006	
DEEP_S	OL-2379-01	10/06/2015	6.6 - 6.6	WATER	REG	W-SW	0.00076		0.00021	J	0.000042	J
DEEP_S	OL-2379-02	10/06/2015	6.6 - 6.6	WATER	FD	W-SW	0.00066				0.000064	
DEEP_S	OL-2379-03	10/06/2015	39.6 - 39.6	WATER	REG	W-SW	0.00117				0.000069	
DEEP_S	OL-2379-04	10/06/2015	52.8 - 52.8	WATER	REG	W-SW	0.00211		0.00028	J	0.000085	
DEEP_S	OL-2379-05	10/06/2015	59.4 - 59.4	WATER	REG	W-SW	0.00436				0.000114	
DEEP_S	OL-2384-01	10/13/2015	6.6 - 6.6	WATER	REG	W-SW	0.00065				0.000072	
DEEP_S	OL-2384-02	10/13/2015	6.6 - 6.6	WATER	FD	W-SW	0.00076				0.000074	
DEEP_S	OL-2384-03	10/13/2015	39.6 - 39.6	WATER	REG	W-SW	0.00096				0.00012	
DEEP_S	OL-2384-04	10/13/2015	52.8 - 52.8	WATER	REG	W-SW	0.0016				0.000098	
DEEP_S	OL-2384-05	10/13/2015	59.4 - 59.4	WATER	REG	W-SW	0.00458				0.00012	
DEEP_S	OL-2388-01	10/20/2015	6.6 - 6.6	WATER	REG	W-SW	0.00106		0.0002	J	0.000061	J
DEEP_S	OL-2388-02	10/20/2015	6.6 - 6.6	WATER	FD	W-SW	0.00125				0.000039	J
DEEP_S	OL-2388-03	10/20/2015	39.6 - 39.6	WATER	REG	W-SW	0.00138				0.000045	J
DEEP_S	OL-2388-04	10/20/2015	52.8 - 52.8	WATER	REG	W-SW	0.00376		0.00035	J	0.000092	
DEEP_S	OL-2388-05	10/20/2015	59.4 - 59.4	WATER	REG	W-SW	0.00591				0.00013	
DEEP_S	OL-2393-01	10/27/2015	6.6 - 6.6	WATER	REG	W-SW	0.00075				0.000074	
DEEP_S	OL-2393-02	10/27/2015	6.6 - 6.6	WATER	FD	W-SW	0.0008				0.00009	
DEEP_S	OL-2393-03	10/27/2015	39.6 - 39.6	WATER	REG	W-SW	0.00074				0.000055	
DEEP_S	OL-2393-04	10/27/2015	52.8 - 52.8	WATER	REG	W-SW	0.00199				0.00008	
DEEP_S	OL-2393-05	10/27/2015	59.4 - 59.4	WATER	REG	W-SW	0.00371				0.000096	
DEEP_S	OL-2399-01	11/03/2015	6.6 - 6.6	WATER	REG	W-SW	0.00101		0.00008	U	0.000062	U
DEEP_S	OL-2399-02	11/03/2015	6.6 - 6.6	WATER	FD	W-SW	0.00083				0.00008	
DEEP_S	OL-2399-03	11/03/2015	39.6 - 39.6	WATER	REG	W-SW	0.001				0.000047	J
DEEP_S	OL-2399-04	11/03/2015	59.4 - 59.4	WATER	REG	W-SW	0.00439				0.000097	
DEEP_S	OL-2404-01	11/17/2015	6.6 - 6.6	WATER	REG	W-SW	0.00129		0.00029	J	0.000052	U
DEEP_S	OL-2404-02	11/17/2015	6.6 - 6.6	WATER	FD	W-SW	0.00131				0.000051	U
DEEP_S	OL-2404-03	11/17/2015	39.6 - 39.6	WATER	REG	W-SW	0.0014				0.000053	U
DEEP_S	OL-2404-04	11/17/2015	59.4 - 59.4	WATER	REG	W-SW	0.00119				0.000047	U

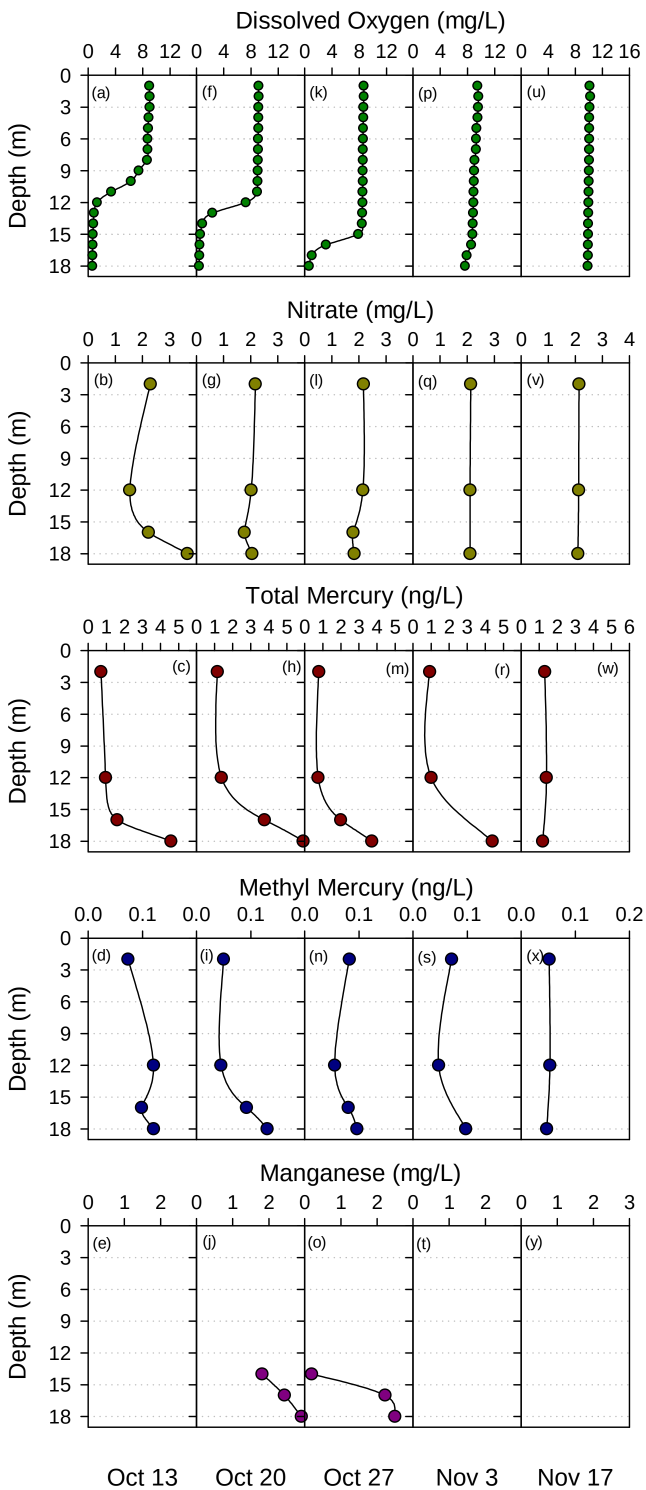
APPENDIX D

PLOTS OF DISSOLVED OXYGEN, NITRATE, TOTAL MERCURY AND METHYLMERCURY CONCENTRATIONS WITH DEPTH AT SOUTH DEEP FOR 2015



Dissolved Oxygen (mg/L)
Nitrate (mg/L)
Total Mercury (ng/L)
Methyl Mercury (ng/L)
Manganese (mg/L)
Depth (m)
May 18
Jun 2
Jun 16
Jun 30
Jul 7
Jul 14
Jul 21
Jul 28
Aug 4


Dissolved Oxygen (mg/L)
Nitrate (mg/L)
Total Mercury (ng/L)
Methyl Mercury (ng/L)
Manganese (mg/L)
Depth (m)
Aug 11
Aug 18
Aug 25
Sep 1
Sep 9
Sep 16
Sep 22
Sep 29
Oct 6



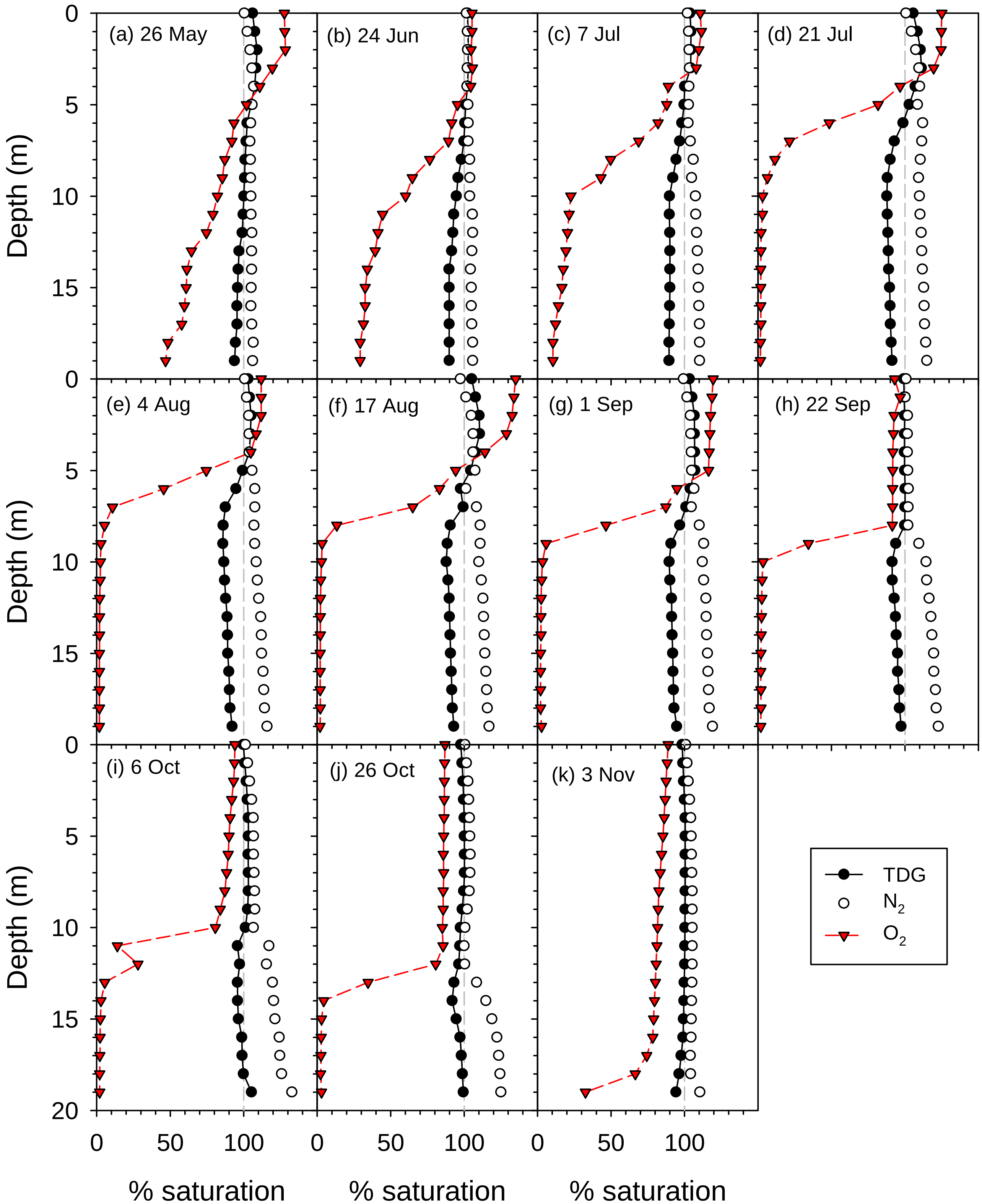
Dissolved Oxygen (mg/L)
Nitrate (mg/L)
Total Mercury (ng/L)
Methyl Mercury (ng/L)
Manganese (mg/L)
Depth (m)
(a)
(f)
(k)
(p)
(u)
(b)
(g)
(l)
(q)
(v)
(c)
(h)
(m)
(r)
(w)
(d)
(i)
(n)
(s)
(x)
(e)
(j)
(o)
(t)
(y)
Oct 13
Oct 20
Oct 27
Nov 3
Nov 17

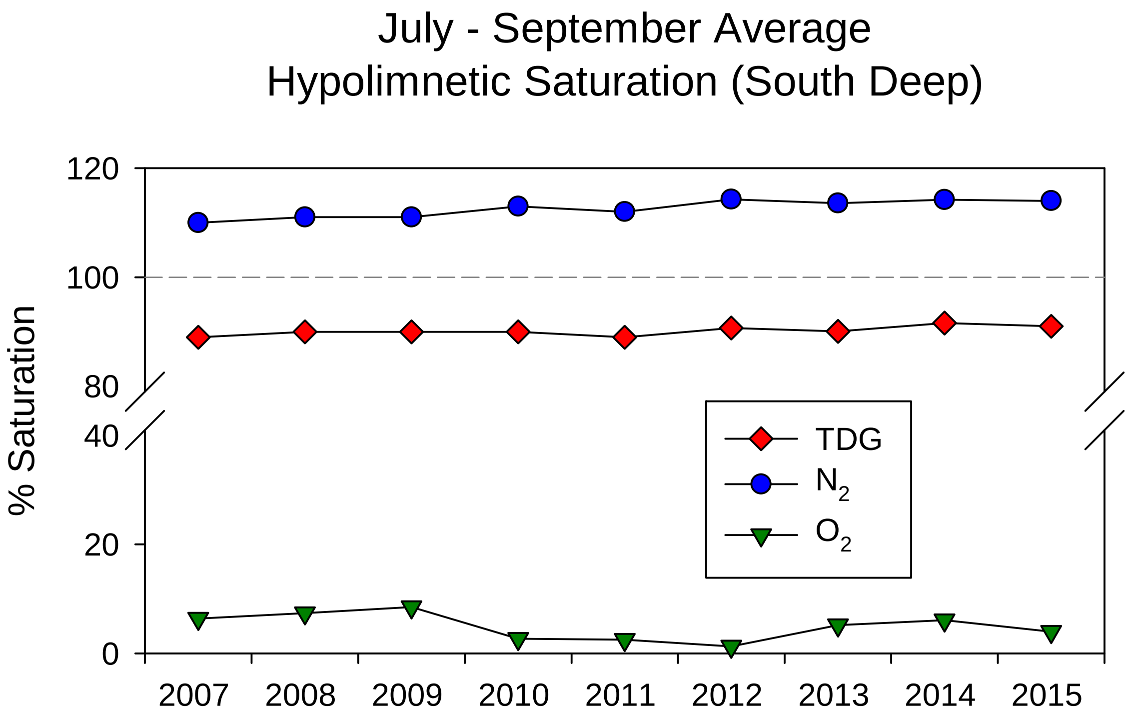
APPENDIX E

2015 TOTAL DISSOLVED GAS DATA

Measurements of total dissolved gas (TDG) were made as vertical profiles at the South Deep location of Onondaga Lake using an In-Situ Inc. total dissolved gas sensor. Parallel measurements of temperature and dissolved oxygen (O_2) were made with a Yellow Springs Instruments (YSI) multiprobe sonde. Nitrogen gas (N_2) was not measured directly, but was estimated as the difference between TDG and the partial pressure due to oxygen. Accordingly, the N_2 values reported here include lesser concentrations of other gases, most notably carbon dioxide (CO_2). Other gases present in smaller concentrations include argon and methane. The effect of these additional gases on percent saturation values calculated for N_2 appears to be negligible. Calculations were performed using a spreadsheet provided by In-Situ Inc. (In-Situ Inc. Extended Dissolved Gas Analysis, Version 2.0).

TDG data for 2015 are presented herein as is a summary of 2007-2015 TDG results. The vertical profiles measured in 2015 at South Deep depict N_2 levels that were near saturation in the upper waters and distinctly oversaturated in the lower waters during summer stratification. Higher N_2 levels in the hypolimnion are consistent with active denitrification, which is the bacterial conversion of nitrate to N_2. Despite oversaturation of N_2, TDG in the hypolimnion generally remained at or slightly below 100% saturation. This is a consequence of anoxic conditions (O_2 saturation ~0%) in the hypolimnion during the summer stratification interval. Time series of average hypolimnetic conditions for July through September show that levels of TDG, N_2, and O_2 have been consistent from 2007 through 2015.


(a) 26 May
(b) 24 Jun
(c) 7 Jul
(d) 21 Jul
(e) 4 Aug
(f) 17 Aug
(g) 1 Sep
(h) 22 Sep
(i) 6 Oct
(j) 26 Oct
(k) 3 Nov
Depth (m)
% saturation
TDG
N_2
O_2



July - September Average
Hypolimnetic Saturation (South Deep)
% Saturation
120
100
80
40
20
0
TDG
N2
O2
2007
2008
2009
2010
2011
2012
2013
2014
2015