STORMWATER MANAGEMENT PROGRAM ANNUAL REPORT

PERMIT YEAR TEN

March 2012 – March 2013

SUBMITTED IN ACCORDANCE WITH THE REQUIREMENTS OF
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

PERMIT NUMBER ALR040003

CITY OF AUBURN

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEMS (NPDES)
PERMIT NUMBER ALR040003
MUNICIPAL STORMWATER PROGRAM ANNUAL REPORT

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly fathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for fathering the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations.

_____

Bill Ham, Jr.
Mayor, City of Auburn
144 Tichenor Avenue
Auburn, Alabama 36830
(334) 501-7260

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City Manager, City of Auburn
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Date

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I. INTRODUCTION

In response to the National Pollutant Discharge Elimination System (NPDES) Phase II Stormwater Regulations, the City of Auburn (City) applied for and received an NPDES permit for stormwater discharges from the Alabama Department of Environmental Management (ADEM) on May 14, 2003. The initial permit expired in March 2008 and was reissued by ADEM effective February 1, 2011.

This report is being submitted to the ADEM pursuant to Part V; paragraph C of NPDES Permit ALR040003.

This annual report is the City's tenth report, and second under the reissued permit, and covers the reporting period from March 2012 through March 2013. The stormwater program outlined in this report is patterned after the program submitted to and approved by ADEM in March 2003 in the City of Auburn's Notice of Intent (NOI) and in accordance with the City's Stormwater Management Plan that was updated and submitted to ADEM in July 2011.

II. SITE DESCRIPTION

The City of Auburn is located in East Central Alabama. A map of the City is provided in Appendix B. The city limits encompass an area of approximately 58.75 square miles (37,600 acres) as of January 2013. The current population of Auburn is approximately 53,380 per the 2010 U.S. Census. There are approximately 350 miles of creeks and streams flowing through Auburn. From the most recent City storm drainage system inventory, the storm drainage system contains approximately 122 linear miles of storm pipe. The City is updating its stormwater infrastructure inventory on a routine basis using the City's survey crew, as well as private surveyors. The City approved thirteen (13) residential/commercial plats in 2013 as compared to seven (7) plats in 2012.

III. KNOWN OR SUSPECTED WATER QUALITY PROBLEMS

The City's storm sewer system discharges into streams located in four primary watersheds, including Moore's Mill Creek (Southeast), Saugahatchee Creek (North), Chewacla Creek (South) and Parkerson's Mill Creek (Southwest).

Moore's Mill Creek was placed on the draft 303(d) list in 1998 and was listed on the final 303(d) list in 2002, 2004, 2006, 2008, 2010 and 2012. Known water quality concerns within the jurisdictional area were identified as stream siltation resulting from sedimentation deriving from local development within the Moore's Mill Creek watershed and in-stream erosion.

The Saugahatchee Embayment, where Saugahatchee Creek discharges into Yates Lake, was placed on the final 303(d) list in 1996, 1998, 2000, 2002, 2004, 2006 and 2008. The Embayment was listed on the 303(d) list primarily for nutrient enrichment. ADEM and the USEPA issued the final Total Maximum Daily Load (TMDL) for nutrients and organic enrichment/dissolved oxygen for Pepperell Branch and the Saugahatchee Embayment in April 2008. Implementation of the stormwater TMDL is addressed in the City's Phase II Permit that was issued on February 1, 2011 and the City's updated Stormwater Management Plan that was submitted to ADEM in July 2011.

Parkerson's Mill Creek, from its source to Chewacla Creek, was placed on the final 303(d) list in 2008 and 2010. Known water quality concerns within the jurisdictional area were identified as pathogens resulting from urban runoff and storm sewers. A TMDL for Parkerson's Mill Creek was issued by ADEM in September 2011. Implementation of this stormwater TMDL is addressed in the City's Phase II Permit issued on February 1, 2011 and the City's updated Stormwater Management Plan that was submitted to ADEM in July 2011.

IV. RESPONSIBLE PARTY

The City's Stormwater Management Program (SWMP) is composed of several programs operating under various departments within the City's organization. Components of the SWMP are as follows:

- Environmental Services Department – Operates the recycling and composting program; Operates and manages the street sweeping program; Hosts the annual Household Hazardous Waste Collection Day program;

- Parks and Recreation Department – Hosts annual Earth Day activities and conducts the annual Arbor Day Tree Giveaway program; Manages the City's Greenway/Greenspace Program;

- Planning Department – Assists with reviewing and approving low impact development projects; Manages CompPlan 2030 and future land use planning efforts;

- Public Safety Department, Codes Enforcement Division – Monitors residential and commercial construction;

- Public Works Department – Performs maintenance of stormwater infrastructure and assists with inspections of residential and commercial construction; Performs annual detention pond inspections;

- Water Resource Management Department – Monitors residential and commercial construction and conducts erosion and sediment control inspections; Manages water quality sampling program; Manages public education and outreach program; Assists the Public Works Department with annual detention pond inspections; Manages overall SWMP and compliance with Phase II Stormwater Permit.

When the City began its Phase II program, coordination and implementation of the individual SWMP was the responsibility of the Public Works Department. In October 2005, management of the stormwater program was transferred from the Public Works Department to the Water Resource Management Department, under a newly created Watershed Division. The intent of the move was to manage water supply operations, wastewater operations, and stormwater operations from a watershed perspective for all components that impact water quality within the City.

The person responsible for the coordination and implementation of the individual SWMP is as follows:

Matt R. Dunn, P.E., Watershed Division Manager
Water Resource Management Department
City of Auburn
1501 West Samford Avenue
Auburn, AL 36832
(334) 501-3077
mdunn@auburnalabama.org

V. STORMWATER MANAGEMENT PROGRAM COMPONENTS

The Phase II stormwater regulations require operators of small Municipal Separate Storm Sewer Systems (MS4s) in urbanized areas to develop and implement stormwater management programs employing best management practices (BMPs) to adequately address six minimum control measures. The control measures include:

- Public Education and Outreach;
- Public Involvement/Participation;
- Illicit Discharge Detection and Elimination;
- Construction Site Stormwater Runoff Control;
- Post-Construction Stormwater Management; and
- Pollution Prevention/Good Housekeeping for Municipal Operations.

In March 2003, the City submitted to ADEM a Notice of Intent (NOI) to implement a SWMP under the Phase II stormwater regulations. The City updated its SWMP in 2011 to comply with the reissued Phase II Permit and submitted it to ADEM in July 2011. The goals and details of the City's program are outlined in the updated SWMP. At the end of permit year ten, and the second year under the reissued permit, all program components outlined in the SWMP have been implemented.

VI. PUBLIC EDUCATION AND OUTREACH ON STORMWATER IMPACTS

A. Articles in the City Newsletter "Open Line"

Open Line is a monthly newsletter mailed to Auburn citizens through their utility bill. Articles and messages contained in the newsletter reach a large and diverse group of citizens. The goal for articles in Open Line is to produce two (2) articles per year. During the tenth permit year, a total of fifteen (15) articles were published in which stormwater issues were highlighted or affected:

- *City of Auburn Receives 'Quality of Life Award' – March 2012*
- *City of Auburn Supports Smart Yards Incentive Program – March 2012*
- *March 24th Proclaimed "The Big Event Day" – March 2012*
- *Auburn CityFest 2012 – April 2012*
- *2012 Household Hazardous Waste Collection Day – April 2012*
- *City of Auburn Receives State Planning Award – April 2012*
- *The City of Auburn Sets the Standard Nationally – June 2012*
- *Drought Conditions Persist – June 2012*
- *Renew Opelika Road Public Meeting, June 27-29 – July 2012*
- *Water Conservation Tips for Auburn Residents – July 2012*
- *Citizens Provide Input for Renew Opelika Road – September 2012*
- *Final Renew Opelika Road Public Meeting Set for October – October 2012*
- *City Launches New Improved GIS Interactive Map – November 2012*
- *Grease Recycling – November 2012*
- *Grease Recycling – December 2012*

Income Tax Forms Available at Auburn Public Library

A variety of income tax forms are available at the Auburn Public Library. Federal tax forms, information, and frequently asked tax questions are also available on the Internal Revenue Service website at www.irs.gov.

Public Hearing Community Development Block Grant (CDBG) 2012 Action Plan

City of Auburn

The City of Auburn wants your input to develop the 2012 CDBG Action Plan, which defines how the City will use Community Development Block Grant funding from the Department of Housing and Urban Development. A public hearing will be held to obtain citizen input about housing and community development needs to help ensure that funding is used to benefit low to moderate-income citizens of Auburn. The hearing provides an opportunity for citizens to guide the FY2012 Action Plan as it is developed.

The public hearing will be held on Monday, March 5, 2012 at 10:00 am at the Boykin Community Center (Meeting Room C) located at 400 Boykin Street. Please direct all questions regarding the public hearing to the Community Development Office at (334) 501-7290.

March 24th Proclaimed "The Big Event Day"

Auburn Mayor Bill Ham has declared Saturday, March 24th as "The Big Event Day" in the City of Auburn. The Big Event is a student run volunteer day hosted by Auburn University's Student Government Association (SGA) that encourages college students and faculty to thank the community for providing a thriving environment to live and learn. With support from the *All Auburn All Orange* Initiative, this one-day service project has expanded to become an Auburn tradition of giving back to the surrounding community and thanking them for making Auburn an incredible place to live. Last year's Big Event included over 1,700 students and faculty members completing over seventy-five service projects. If your business, church, household, or organization would like to request student volunteers for The Big Event, please fill out the application included in the February Open Line, online at www.auburnalabama.org/openline and return it to the SGA by February 17th.

BIG event AUBURN UNIVERSITY 2012

Daylight Saving Time Begins March 11

Daylight Saving Time begins Sunday, March 11. Remember to move your clocks up one hour Saturday night and change the batteries in your smoke detectors.

City of Auburn Supports Smart Yards Incentive Program

The Saugahatchee Watershed Management Plan (SWaMP) is pleased to offer the Smart Yards Incentive Program to City of Auburn residents located in the Saugahatchee Watershed in the northern region of Auburn. The Smart Yards Incentive Program is made possible through a partnership between the City of Auburn and SWaMP, and is funded by an EPA Region 4 watershed restoration grant awarded by the Alabama Department of Environmental Management.

Through the Smart Yards Incentive Program, qualifying Auburn residents can apply for funding for landscape improvements to reduce stormwater runoff from their property. These improvements, also recognized as stormwater best management practices, can include rain gardens, bioswales, stream bank or riparian zone restorations, and other stormwater runoff management improvements. There projects not only benefit your property but can benefit other properties while perserving our water resources.

If you live near the Saugahatchee Watershed and are interested in this opportunity to improve your property and help protect our streams, go to www.swamp.auburn.edu, or contact SWaMP by phone at 844-4785, or by email at neweems@auburn.edu. You can also contact the City of Auburn's Water Resource Management Department at 334-501-3077 or mdunn@auburnalabama.org for more information.

MEETING SCHEDULE

MARCH

2 **Tree Commission,** 11:30 a.m., Chamber of Commerce Conference Room, 714 East Glenn Avenue

5 **Cemeteries Advisory Board,** 4:00 p.m., Dean Road Recreation Center, 307 South Dean Road

6 **Parks & Recreation Advisory Board,** 5:15 p.m., Dean Road Recreation Center, 307 South Dean Road

City Council, 7 p.m., Council Chamber, 141 North Ross Street

7 **Board of Zoning Adjustment,** 4:30 p.m., Council Chamber, 141 North Ross Street

8 **Planning Commission,** 5 p.m., Council Chamber, 141 North Ross Street

13 **Greenspace Advisory Board,** Noon, Dean Road Recreation Center, 122 Tichenor Avenue

Historic Preservation Commission, 4 p.m., Development Services Building, 171 North Ross Street

Board of Education, 6 p.m., AHS Multi-Media Room, 405 South Dean Road

20 **City Council,** 7 p.m., Council Chamber, 141 North Ross Street

22 **Water Works Board,** 4 p.m., Water Board Conference Room, 1501 West Samford Avenue

27 **Library Board,** 7 p.m., Library Board Room, 172 East Thach Avenue

Bicycle Committee, 7 p.m., Development Services Building, 171 North Ross Street

Meeting times and places are subject to change.

For more information, including a map of City meeting locations, please visit www.auburnalabama.org/boards.

Copies of these articles can be downloaded from the City's website at http://www.auburnalabama.org/openline/.

B. Brochure Publications

Pamphlets and brochures are an effective way to present and explain stormwater issues. Unlike other communication vehicles, pamphlets and brochures can be distributed in many locations without requiring staffing and the location of distribution can specifically target the audience you are trying to reach. The goal for brochure publications is to produce two (2) brochures per year. During the tenth permit year, two (2) brochures were published with several other brochures made available for distribution by the City. Brochures provided by the City over the past year include:

Brochures published by the **A**uburn, **L**ee County, **O**pelika, **A**uburn University and **S**miths Station (ALOAS) Citizen Advisory Group:

- Parkerson Mill Creek Watershed (Local Watershed Series)
- Emerging Contaminants

Copies of these brochures can be downloaded from the City's website at: http://www.auburnalabama.org/wrm-watershed/Default.aspx?PageID=211

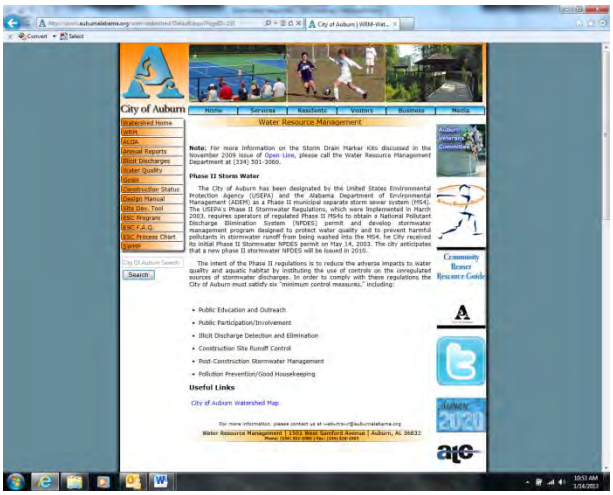
Additional Brochures Distributed:

- Washing Cars (Alabama Clean Water Partnership (ALCWP))
- Changing Oil (ALCWP)
- Pets (ALCWP)
- Fertilizing (ALCWP)
- Saugahatchee Creek Watershed: Past, Present and Future (Saugahatchee Watershed Management Plan Group (SWaMP))
- Fats, Oils and Grease Recycling Program (City of Auburn)
- ALOAS brochures from previous years

C. Website

Citizens can go to the City's website to obtain information on items of local interest. The web page is accessible 24 hours per day and can serve citizens that do not have the time or the ability to physically meet with staff during normal working hours.

The goal for the website was to develop a Phase II Stormwater section on the existing website in 2003 and post that website in 2004. This goal was met a year early when the Phase II Stormwater website was posted in March 2003. City stormwater policies, ordinances, design manuals and links to related sites (ADEM and EPA) have been posted and are available to the public.



The City's Stormwater website was moved from the Public Works Department home page to the Water Resource Management Department home page in 2005. The Stormwater website was updated in 2011 to include water quality sampling data reports as well as additional ALOAS brochures. In 2012, the Stormwater website was visited 647 times.

For more information on the website please visit:

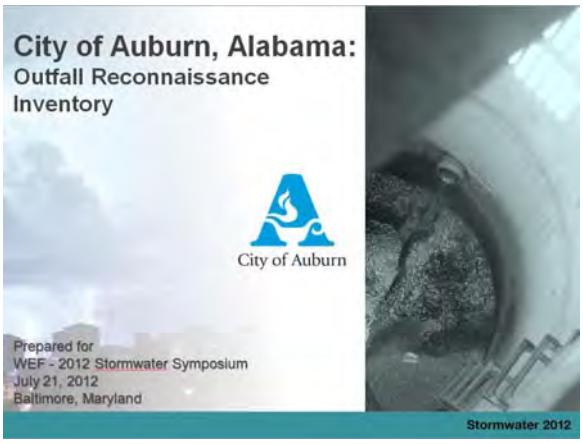
http://www.auburnalabama.org/wrm-watershed

D. Public Presentations

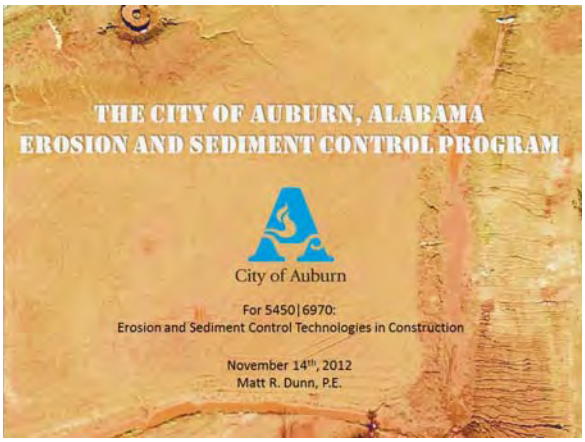
The City provides staff and/or resources to perform presentations for various groups and public meetings. Typically presentations are offered in PowerPoint format and the topics are chosen by the organization requesting the information.

Seven (7) presentations were made during the tenth permit year. Presentations were given at various conferences and to various groups, including the Soil and Water Conservation Society (Al-GA-FL Chapters), Save Our Saugahatchee/Friends of Chewacla, Water Environment Federation, Alabama Association of Floodplain Managers, the Parkerson Mill Creek Stakeholder group, Auburn University and City officials.

Presentations prepared and provided by City staff over the past year include:



- The Role of Volunteers in Managing the City of Auburn's Stormwater Program; Soil and Water Conservation Society(AL-GA-FL Chapters) Annual Conference; Eufaula, AL (May 2012);
- City of Auburn Water Resource Management Department Initiatives; Save Our Saugahatchee/Friends of Chewacla; Auburn, AL (June 2012)
- Water Resource Management Department Initiatives; Office of the City Manager; Auburn, AL (July 2012)
- City of Auburn, Alabama: Outfall Reconnaissance Inventory; Water Environment Federation Stormwater Symposium; Baltimore, MD (July 2012)



- City of Auburn, Alabama: Outfall Reconnaissance Inventory; Alabama Association of Floodplain Managers Annual Conference; Auburn, AL (October 2012)
- Parkerson Mill Creek – A Summary of the City of Auburn Outfall Reconnaissance Inventory; Parkerson Mill Creek Stakeholders Meeting; Auburn University, AL (October 2012), and;
- The City of Auburn, Alabama Erosion and Sediment Control Program; Auburn University Civil Engineering class; Auburn University, AL (November 2012).

E. Workshops Hosted

In an effort to educate contractors, developers, engineers, and staff, the City has initiated a series of workshops. The content of the workshops focuses on local stormwater issues of concern. Workshops hosted by the City over the past year include:

- **Erosion and Sediment Control Workshop (December 2012)** – The City hosted its tenth annual Erosion and Sediment Control Workshop on December 13, 2012. The purpose of the Workshop is to educate and interact with local engineers, developers and contractors who are governed by the City's Erosion and Sediment Control Ordinance, the ADEM stormwater regulations, and the United States Environmental Protection Agency (EPA) regulations. This past year's keynote speaker was Mr. Mike Mitchell from EPA's Region 4 office in Atlanta, Georgia. Mr. Mitchell's presentation focused on various stormwater initiatives currently taking place at EPA including the Construction Effluent Limit Guidelines and the upcoming Stormwater Rulemaking. A field demonstration of the latest technologies in erosion and sediment control was provided by a local erosion and sediment control contractor. Approximately 60 - 70 developers, contractors, engineers and City personnel attended the workshop.

- **Materials Handling/Spill Prevention Workshop (June 2011)** – The Water Resource Management Department sponsored a Materials Handling and Spill Prevention workshop in June 2011. This workshop targets City employees who deal with fuels and chemicals on a daily basis and provides basic information on the proper management, handling and disposal of potentially hazardous chemicals. This training is provided through coordination with the Auburn University Department of Risk Management and Safety. This training will be provided on a bi-annual basis or as regulations change.

F. Composting and Recycling Center/Household Grease Recycling Program

The City of Auburn has been operating a curbside recycling program since 1987. In addition to curbside recycling, the City maintains a drop-off center for recyclables. The *RecycleAuburn* drop-off center is located across from the Fleet Services Complex at 365-A North Donahue Drive. These operations allow citizens of Auburn to recycle waste instead of disposing of it in the landfill. The Water Resource Management Department initiated a Household Grease Recycling Program in 2009 with containers and bins located at the recycling center. This program provides citizens with a mechanism to properly dispose of household grease and is targeted at reducing potential sanitary sewer overflows. In 2011, the Water Resource Management Department launched a curbside household grease recycling program that provides residents with an opportunity to collect their household grease and have it picked up by City personnel at their residence. Approximately 2,260 gallons of used cooking oil/grease have been collected since implementation of the program began in March 2009. For more information on our household grease recycling program, please visit:

http://www.auburnalabama.org/wrm-sewer/Default.aspx?PageID=186.

In addition, the City maintains a Compost Demonstration Site that serves as an example of how homeowners can easily incorporate a home composting operation into a normal backyard setting. The site features six backyard compost units. The units range from a simple pile to a concrete bin.

The exhibits take the public through the process of how to compost and recycle materials for garden use and encourage these practices. For more information on recycling of waste, please visit:

http://www.auburnalabama.org/es/.

G. Storm Drain Marking Project

In cooperation with the Auburn University Sustainability Initiative, the City initiated a storm drain marking program in 2007. School children within the City of Auburn were asked to submit designs for the original markers that were to be placed in the Saugahatchee Creek, Town Creek and Moore's Mill Creek watersheds. A number of the students' designs were selected for use. In 2010, the City of Auburn solicited new marker designs from children in the local school system. Winners were selected in April 2010 and had the opportunity to meet Mayor Ham to showcase their artwork. The local newspaper also ran an article on the project in April 2010. The City initiated a new marker design competition with the local schools in late 2012 and winners will be announced in Spring 2013. In 2009, the City developed a storm drain marking kit program that allows citizens to pick up a bag of materials containing all of the items needed to mark storm drains in their neighborhoods. Once the drains are marked, the citizen returns any unused materials to the Water Resource Management Department as well as a map showing the storm drains that were marked. In 2012, markers were installed by a variety of local interest groups including the Auburn High School JROTC, Save Our Saugahatchee, the Auburn University Student Government Association, and a number of interested local citizens. In 2012, approximately 286 markers were installed. Since implementation of the program began approximately 1,406 markers have been installed, representing approximately 46 percent of all the documented storm drains in the City of Auburn. During 2012, the City also hosted its third Storm Drain Marker Design Competition. This competition invites all 3rd – 5th grade elementary students to compete in designing the City's next storm drain markers. Winning designs have been chosen and awards will be given to the winning designers in March 2013. Each student will receive their award (a copy of the storm drain marker they designed and a newspaper article published in the local paper) during a special presentation with the Mayor at City Hall.

H. Ogletree Elementary School Earth Day Field Activities

On April 17, 2012, Water Resource Management staff participated in the third annual Ogletree Elementary School Conservation Week (Earth Day-Centered activities). This event is an all-day natural resource education and outreach initiative organized by the teachers of Ogletree Elementary School for 3rd – 5th grade students. It is typically held at Chewacla State Park, but was held at the school in 2012 due to inclement weather. Water Resource Management staff gave presentations to the students and teachers about watershed and stormwater management, water quality and water quality monitoring, and aquatic biology. Students and their teachers were given a basic, hands-on introduction to water quality monitoring, along with information about non-point source and point source pollution prevention and reduction.

I. Streamside Classroom Initiative

In an effort to educate and raise awareness in our community about the need to protect local streams, the City of Auburn, ALOAS (citizen stormwater advisory committee), Save Our Saugahatchee (S.O.S.) and Auburn City Schools have joined together to provide streamside classroom activities. This past year's event was held May 2 – 3, 2012 along Swingle Creek in Auburn. Students from local middle schools combine classroom instruction with hands on field activities to conduct water chemistry and a biological assessment of a local stream. The program, geared to sixth graders, focuses on providing students with a background in the type of habitat expected to sustain a healthy stream. The students conduct a chemical analysis of the stream and compare the results with that of a biological assessment of the same stream. The City of Auburn participates by providing funding for transportation of the students to and from the stream site as well as for having appropriate restroom facilities on site.

Students discovered a wide diversity of macroinvertebrates in the stream while doing the bioassessment this past year. The students were able to determine that water quality in Swingle Creek was good based on the results of the bioassessment.

VII. PUBLIC INVOLVEMENT/PARTICIPATION

A. Citizens Advisory Committee

Both the EPA and ADEM recommend that the public be included in developing, implementing, and reviewing stormwater management programs through the establishment of a citizens advisory committee. Communities that allow citizens representing diverse backgrounds and interests to participate in such a committee are far more likely to gain community support through implementation.

ALOAS CITIZENS STORMWATER ADVISORY COMMITTEE (2001-present) - **ALOAS** is a Citizens' Advisory Committee that serves **A**uburn, **L**ee County, **O**pelika, **A**uburn University and **S**miths Station. It meets on a quarterly basis to review and provide public input on current policies, brochure content, educational material, and proposed ordinances. Prior to 2012, the Citizens Advisory Group was known as ALOA. In 2012, the City of Smiths Station joined the group and the group renamed itself ALOAS to include the addition of Smiths Station.

In 2012, ALOAS produced two brochures. The two brochures produced were titled *The Parkerson Mill Creek Watershed* and *Emerging Contaminants*. These brochures are available to the citizens of Auburn and can be obtained at City Hall, the Bailey-Alexander Water and Sewer Complex or by contacting the Water Resource Management Department at (334) 501-3077. The brochures can also be downloaded from the City's website at http://www.auburnalabama.org/wrm-watershed.

B. Watershed Organizations

Regional watershed organizations bring together representatives from utilities, private industry, environmental awareness groups, farmers and branches of government to coordinate individual efforts, share information and plan for water resource and aquatic life protection. The regional approach allows participating entities to coordinate individual efforts in order to maximize limited resources.

Lower Tallapoosa River Basin/Clean Water Partnership (2001-present) - The City actively participates in the Lower Tallapoosa River Basin Clean Water Partnership and on technical sub-committees to assist and guide the development and implementation of a watershed management plan. The organization meets on a quarterly basis. In 2012, as a member of the Clean Water Partnership (CWP), the

City participated in quarterly meetings and also participated in the 2012 Lower Tallapoosa River Basin CWP State of Our Watershed Conference.

Saugahatchee Watershed Management Plan Group (SWaMP) (February 2004 – present) - Over the course of the past year, the City of Auburn has actively participated in the SWaMP group along with other stakeholders in the Saugahatchee Creek watershed to continue Phase II implementation of a watershed management plan for the watershed that encompasses parts of Lee, Macon and Tallapoosa Counties. The current stakeholder group is made up of representatives from the Cities of Auburn and Opelika, MeadWestvaco, Inc., Save Our Saugahatchee (S.O.S.), the Natural Resources Conservation Service (NRCS), the Alabama Cooperative Extension Service (ACES), the Lower Tallapoosa River Basin Clean Water Partnership (LTCWP) and Auburn University. The plan was finalized and submitted to the ADEM in March 2005. The SWaMP group received Phase I implementation funding from ADEM in 2007. SWaMP completed the first three (3) years of implementation (Phase I) in January 2010. Funding for Phase I of the implementation plan expired in 2010 and SWaMP applied for, and was awarded, a Phase II implementation program grant in January 2011. A final report on Phase I Implementation was submitted to the ADEM in March 2010. The Phase II Implementation period covers two (2) years. An update on SWaMP activities completed in 2012 can be found below:

- Smart Yards Incentive Program – Implementation of a program to provide funding assistance to homeowners in Auburn to install landscape BMPs on their property aimed at reducing stormwater runoff and potential pollutant contributions. SWaMP worked with approximately 10 homeowners in the past year to install stormwater BMPs on their property.
- Rain Garden Workshop (July 2012) – Workshop involved installing a rain garden at a local residence in Auburn. Participants were educated on the importance of stormwater management, as well as the proper design, installation and maintenance of a rain garden.
- Lawn Care and Landscape Management Workshop (September 2012) – Hosted in conjunction with the City of Auburn's Greenspace Advisory Board. Topics that were discussed at the workshop included native and drought tolerant plants, proper fertilization practices and other various topics.

- Rain Garden Certification Workshop (December 2012) – This 1.5 day workshop was hosted by the Alabama Cooperative Extension System, SWaMP, the Parkerson Mill Creek Project and the Mill Creek Project. This workshop offered participants detailed design and construction procedures for rain gardents. At the end of the workshop, participants could take an exam and had the opportunity to obtain certification as a Certified Rain Garden Professional in Alabama.

Parkerson Mill Creek Watershed Management Plan Group (March 2010 – present) - Parkerson Mill Creek was placed on Alabama's 303(d) List of Impaired Waters for pathogens in 2007 and a pathogen TMDL for the Parkerson Mill Creek Watershed was subsequently approved by ADEM in July 2011. Beginning in March 2010, the City has actively participated as a stakeholder in the development of the Parkerson Mill Creek Watershed Management Plan for the past three (3) years. This Plan was made possible through a Clean Water Act Section 319(h) grant from the United States EPA and ADEM. The Plan's purpose is to outline a framework of BMP's for restoring water quality in Parkerson Mill Creek by addressing impacts from non-point source pollution (stormwater runoff). The Plan was submitted to ADEM for approval in late 2010 and implementation funding was received from ADEM in 2011. The City will continue to be involved as a stakeholder in the implementation of the Parkerson Mill Creek Watershed Management Plan. An update on Parkerson Mill Creek Watershed Management Plan activities completed in 2012 can be found below:

- Pet Waste Campaign – Initiated on campus during football season to promote proper disposal of pet waste. Two hundred fifty bags were passed out to tailgaters throughout the season.
- Alabama Smarts Yards Lawn Care and Landscape Management Workshop (March 2012)
- IMPACT Student Volunteer Organization – Partnered with IMPACT students during spring and fall semesters to remove invasive plants along Parkerson Mill Creek.

- LID Design Workshop – (May 2012) – Assisted with promoting and sponsoring of workshop
- Water Fun Day (June 2012) – Partnered with School of Forestry and Wildlife Science to promote water resource protection, water conservation, etc.
- Rain Garden Workshop (July 2012) – 18 attendees attended this workshop sponsored by Parkerson Mill Watershed Management Plan group.
- Plant Science Center Rain Garden Workshop (October 2012) – 20 attendees
- Dudley Hall Rain Garden and Rain Water Harvesting Project (December 2012) – The group provided funding for the installation of a rain garden and rainwater harvesting system at Dudley Hall on the Auburn University campus.
- Raptor Center Rain Garden, Rainwater Harvesting and Swale Project (December 2012) – The group provided funding for the installation of a rain garden, rainwater harvesting system and swale at the Auburn University Raptor Center. Another rain garden is planned and the location and design is currently being finalized.

C. City of Auburn Earth Week 2012/Household Hazardous Waste Collection Day

Earth Day is a week-long event in the City of Auburn. Over the last several years, City departments have worked to create and implement a week of environmental activities and events aimed at educating citizens of all ages of the importance of protecting our environment. In conjunction with Earth Week 2012, the City hosted its 10th Annual Household Hazardous Waste Collection Day. This annual event is a favorite among Auburn residents. Each year, the City allows its customers to drop off hazardous household chemicals at a collection site free of charge. The items are then disposed of in a safe manner, eliminating the possibility of these items being improperly dumped in local creeks and streams. The 2012 Household Hazardous Waste Collection Day yielded approximately 15,000 pounds (7.5 tons) of waste collected! Additional Earth Week 2012 activities included:

- Educational Activities for 2nd Graders (NRCS – Enviroscape model, Auburn Water Board flocculation experiment, Recycling Demonstration, Weston Inc. – Flower planting activity, Auburn University stream enhancement and aquatic microorganism activity);
- Educational Demonstration for Auburn High School students, and;
- Various public library activities centered around Earth Week.

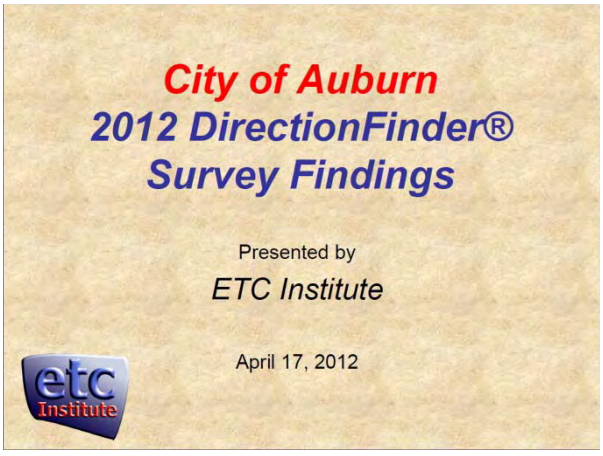
D. Website Hotline

In an effort to provide the general public with an additional means of reporting potential erosion control violations, the City launched the "On-Line Hotline" in March 2003. Citizens now have the ability to log on to the website 24 hours a day and provide information on suspected violations. The information is forwarded to the Water Resource Management Department and an investigation is initiated. The website hotline has proven to be a valuable tool over the course of the past ten years by assisting City personnel in responding to citizens' concerns. For more information concerning the hotline, please visit http://www.auburnalabama.org/wrm-watershed/.

E. Arbor Day Tree Give Away

The planting of trees improves water quality by reducing stormwater runoff and erosion while facilitating nutrient removal. In celebration of Alabama's Arbor Day and to encourage the reforestation of the City's urban landscape, the City's Tree Commission sponsors a tree giveaway. The Commission gave away 750 Cherrybark Oak and 750 Dogwood seedlings at the annual 2012 Arbor Day Tree Giveaway. The City also gave away 1,000 Dogwood seedlings at the 2012 Christmas parade.

F. City of Auburn Citizen Survey



The citizen survey is an annual survey of a statistical cross section of randomly selected members of the community. The survey asks questions on issues of governmental performance and community priorities and is a means of encouraging citizens to participate in local government. In 2012, the survey contained several questions that directly impacted stormwater quality issues. The questions covered issues such as storm drainage system efficiencies, stormwater quality, trash collection, yard waste disposal, recycling, natural resource protection, greenspace initiatives and future growth planning. As it relates to stormwater management, approximately 70 percent of those surveyed were either satisfied or very satisfied with the City's quality of performance in this area. This was a 2 percent decrease from 2011 when the satisfaction rate was 72 percent, but it represented a 14 percent increase from 2006

(56 percent satisfaction) and it was also 8 percent above the national average of 62 percent.

To view the Citizen survey, please visit: http://www.auburnalabama.org/survey.

G. Newspaper Articles

Newspaper articles covering local stormwater/environmental issues are a means for disseminating information to a large and diverse group of residents most directly impacted by these issues. Informative articles provide the reader with an independent point of view. The reader is not forced to rely on information generated by a single source (i.e. City through the newsletter Open Line or brochures).

The City is fortunate to have a local daily publication. The Opelika-Auburn News is a regional daily newspaper that covers local events and is widely read by residents of Lee County. A weekly newspaper publication, the Auburn Villager, began circulation in 2007. Three (3) documented articles and editorials were published in the last year that directly dealt with stormwater/environmental issues, although there may have been others not documented by the City. A listing of articles and publication dates is included in Appendix C of this report.

H. Greenspace Advisory Board/Greenspace Master Plan

The Auburn Greenspace Advisory Board (GAB) was created by a City Council resolution in 2002. Its objective was to identify potential areas for future property acquisitions for parks, recreation facility projects, and greenways. Once identified, these properties could be purchased and/or protected from development.

In 2003, the GAB recommended a Greenspace/Greenway Master Plan for the City. It was adopted in December 2003 by the City Council and has been utilized by the Planning Commission in connection with approval of projects. The GAB revised the initial Plan to include a vast expansion of the proposed greenspace/greenway areas. This first amendment to the Greenspace/Greenway Master Plan was adopted by the City Council in October 2004.

This plan has resulted in the acquisition of several hundred acres of property located in environmentally sensitive areas. The greenspace/greenway areas include proposed bikeways and trails along existing and new roads and along waterways located within the City's growth boundary. Areas along waterways may be improved with natural trails and will be preserved by the dedication of conservation easements in developments or the acquisition of property by the City. The GAB discussed a possible greenway from Shelton Mill Road to a new elementary school being constructed near the intersection of East University Drive and North College Street in

2012. Information regarding this proposed greenway has been forwarded to the school system for consideration.

In 2012, the City completed a project to connect a trail from Town Creek Park to a newly built subdivision located nearby. The GAB also sponsored two workshops in 2012. The first workshop focused on identification and removal of invasive plants. The second workshop focused on lawn care, selection of native plants and trees for landscaping and pruning. Approximately thirty (30) people attended the invasive plant workshop while approximately forty (40) attended the lawn care workshop. A copy of the current Greenspace/Greenway Master Plan is included in Appendix D of this report.

I. Auburn Interactive Growth Model

In 2007 – 2008, the City, through its Planning Department, contracted with a firm to develop the Auburn Interactive Growth Model (AIGM), a tool the City utilizes to make informed planning decisions. Detailed inventories were conducted for current development such as housing unit by type, population by age groups and retail space by gross area. A demographic forecasting model was developed as well as models for other uses that will provide guidance for future land use allocations. The AIGM also forecasts the spatial distribution of the population over time and the apportionment of land uses necessary to meet the needs of the population. The Planning Department updates the AIGM annually. Since its initial completion, the AIGM's population projections have been used in projecting water and sewer demand, future traffic, regional growth, school growth and as the foundation of the Future Land Use Plan component of CompPlan 2030. In FY 2013, the AIGM will be used in conjunction with the Downtown Master Plan as well as the Parks, Recreation and Culture Master Plan.

J. CompPlan 2030

In 2009, the City's Planning Department began development of CompPlan 2030, a comprehensive plan to guide future development in Auburn. CompPlan 2030 focuses on the following key areas: current and future land use; how land use and the built environment affects our natural resources, schools, parks, utilities, civic facilities and transportation. The Plan provides guidance for future planning based on public input, analysis of current and future conditions, and best practices. A series of public meetings was held in 2009 and 2010 to allow citizens to share their ideas for Auburn's future, giving citizens a voice in the development of the plan. The Future Land Use Plan provides parcel-level recommendations for the type and scale of new development for the next twenty years, and is the product of a strategy to promote infill development and growth in downtown Auburn. The Future Land Use Plan element of CompPlan 2030 replaces the 2004 Future Land Use Plan. The Natural Systems and Utility sections of CompPlan 2030 provide recommendations for water conservation and stormwater management. The plan was adopted by the Auburn City Council on October 4, 2011.

K. Renew Opelika Road

Renew Opelika Road is the corridor plan for Opelika Road. During the CompPlan 2030 process, the Opelika Road area was identified as one of the City's most important commercial corridors, and as a prime candidate for reinvestment. A new plan for the corridor is needed because a successful corridor depends on the quality of the public realm and the businesses, institutions and residences that are adjacent to it. The Opelika Road corridor, in its current condition, does not possess a character that reflects as well on the community as it could. In addition, the Corridor Plan emphasizes the importance of focusing on infill development, and the Opelika Road corridor contains a large number of infill sites.

The City has retained Design Workshop, Inc. to provide planning services to develop the Renew Opelika Road plan. Key to the planning process has been an extensive process of public engagement. Hundreds of people have participated, either in one of three public meeting opportunities or through online surveys.

The final outcome of Renew Opelika Road will be a plan to guide the future development of Opelika Road and help ensure the area's future commercial vitality. The plan will help answer questions of how the community and City can support

Auburn's existing businesses and attract new destinations for residents. The plan will also illustrate the most effective way to improve traffic flow, pedestrian accessibility and the overall look and feel that citizens envision for the Auburn community.

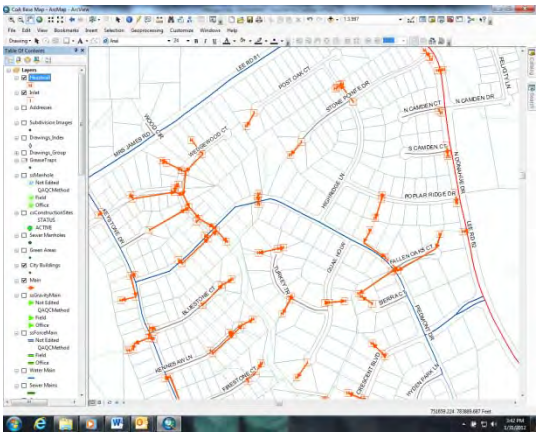
Adoption of the plan by City Council is anticipated in Spring 2013. Plan implementation will begin immediately following plan adoption.

L. Lee County Water Festival

On May 10 and 11, 2012, the ninth annual Lee County Water Festival was held on the campus of Auburn University. Over 1,500 fourth graders from schools in the Lee County area attended the two-day event. The primary purpose of the event is to educate young people on the importance of our water resources and the role each of us plays in conserving our water. During the event, students learned about water filtration, aquifers, and the water cycle through hands-on activities such as building an edible aquifer, making a water cycle bracelet, and building a mini-filtration unit. Volunteers from the City of Auburn, the Auburn Water Works Board, the City of Opelika, and other local groups helped make last year's event a huge success. The Auburn Water Works Board also helped to sponsor the 2012 Water Festival by providing a monetary donation in the amount of $3,000. Planning is currently underway for the 2013 Water Festival to be held at Auburn University on March 14 and 15, 2013.

VIII. ILLICIT DISCHARGE DETECTION AND ELIMINATION

A. Storm Sewer Mapping



The City of Auburn completed the initial mapping of its storm sewer system in 2003. The mapping is maintained in a Geographical Information Systems Database (GIS). Detailed information on pipe size, pipe material, direction of flow, inlets, manholes, bridges, box culverts, detention ponds, and headwalls are maintained in the City's GIS database. The City is currently working to collect stormwater infrastructure data in new subdivisions utilizing City survey crews and outside surveyors. In 2012, City survey crews mapped approximately 16.2 miles of stormwater infrastructure. GIS files are updated on a regular basis as new work is added or as old work is modified to current standards. The latest revisions of the maps can be obtained through the Public Works Department located at 171 North Ross Street.

B. Illicit Discharge Ordinance

The Environmental Protection Agency (EPA) recommends municipalities implement an ordinance that provides the means to identify and enforce correction of illicit discharges. In the City's NOI, submitted to ADEM in March 2003, the stated goal was to develop and implement an Illicit Discharge Ordinance by December 2005. This goal was met two years ahead of schedule.

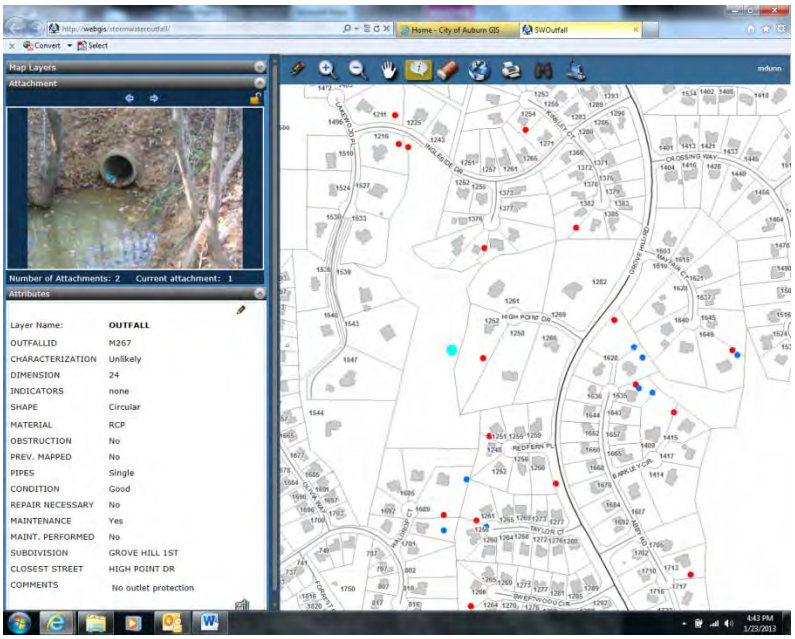
A draft copy of the Illicit Discharge Ordinance was reviewed by the **ALOA** Citizens Advisory Committee in November of 2003. A revised draft was forwarded to the City Attorney and Municipal Judge for review in December 2003. The Auburn City Council adopted the Illicit Discharge Ordinance on January 20, 2004.

The City of Auburn has responded to several cases of illicit discharges over the past year. These cases involved illicit discharges of sanitary sewer overflows, private liftstation overflows, illegal disposal of grass clippings and storm/sanitary sewer cross

connections. In each instance, the illicit discharge was traced back to its source and the violator was given a warning and notified of the City's Illicit Discharge Ordinance. The proper officials were notified of the issue and proper clean-up was conducted.

C. Stormwater Outfall Reconnaissance Inventory

In 2009, the Water Resource Management Department began a stormwater outfall reconnaissance inventory (ORI) program. The purpose of this ORI program is to walk each watershed (six total), conduct an inspection of each stormwater outfall and prepare detailed documentation of each stormwater outfall in that basin. City staff are able to document any current illicit discharges and provide more detailed location information concerning existing outfalls. The City's ORI program is being patterned on recommendations outlined in the *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments* (Center for Watershed Protection and Dr. Robert Pitt, October 2004). The City's goal is to inspect each watershed on a 5 - 6 year rotation. In calendar year 2012, staff surveyed approximately seventy-five (75) miles of stream and documented three hundred eighty-two (382) stormwater outfalls. In addition, staff documented approximately two hundred one (201) concerns or potential concerns and inspected approximately fifty (50) sanitary sewer aerial creek crossings in 2012 as part of the ORI program. To date, the Department has inspected approximately two hundred twenty-five (225) miles of stream and documented approximately nine hundred twenty (920) stormwater outfalls in the Saugahatchee, Parkerson Mill and Moore's Mill Creek Watersheds. Staff have also inspected approximately one hundred fifty (150) sanitary sewer aerial creek crossings and identified approximately six hundred (600) concerns or potential concerns during the ORI program.



The Water Resource Management Department collaborated with the City's Information Technology (IT) Department GIS Division in 2010 to develop a stormwater outfall tracking tool that allows for easy management, access and viewing of data collected during the ORI program. Staff are currently utilizing this tool. A screenshot of this tool can be seen above.

The City gave a presentation on its ORI program at the Water Environment Federation's 1st Annual Stormwater Syposium in Baltimore, Maryland in July 2012. The ORI program is just one example of the measures the City has taken in creating and sustaining an efficient, effective and innovative stormwater management program, with the ultimate goal of protecting our local water resources.

D. Illicit Discharge Hotline and Reporting Form


City of Auburn
Illicit Discharge Notification Form

Incident/Discharge Information

Description of Discharge

In 2008, the Water Resource Management Department developed an illicit discharge reporting form that residents can download, complete and e-mail back to the Department upon discovering a potential illicit discharge. This document is located on the Illicit Discharge Website, giving residents instant and 24-hour access to the form. This form assists the Department in tracking and responding to illicit discharges. This form can be downloaded from the City's website at http://www.auburnalabama.org/wrm-watershed/. No forms were submitted in 2012.

E. Public Education on Illicit Discharges and Improper Disposal

The Alabama Clean Water Partnership, in association with ADEM and other environmental groups, has produced a series of public service announcements featuring the "Nerdy Man". The City of Auburn has obtained materials for distribution from the Clean Water Partnership and provides them free to the public through its information centers located at City Hall, the Bailey-Alexander Water and Sewer Complex and the Development Services Building. These materials can also be obtained by contacting the Water Resource Management Department at (334) 501-3074. The City also routinely places articles in the City newsletter, Open Line, to educate citizens on illicit discharges.

F. Inspection of Drainage System

The Public Works Department conducts routine inspections of its drainage system in order to maintain free flowing conditions. During this process, key stream sections, bridges, and culverts are inspected and routine maintenance is conducted. As areas are identified for maintenance, the work is listed on the maintenance schedule and a crew is assigned to perform the task. Water Resource Management staff are also documenting areas of concern during ORI inspections. These areas of concern are documented and placed in the stormwater outfall tracking database.

G. Hazardous Waste Emergency Response Team

The City has entered into an agreement with the City of Opelika to share some of the cost of operating an emergency response vehicle equipped to handle hazardous waste spills. The agreement provides the City with the ability to properly identify and address hazardous or potentially hazardous spills.

H. Water Sampling Program

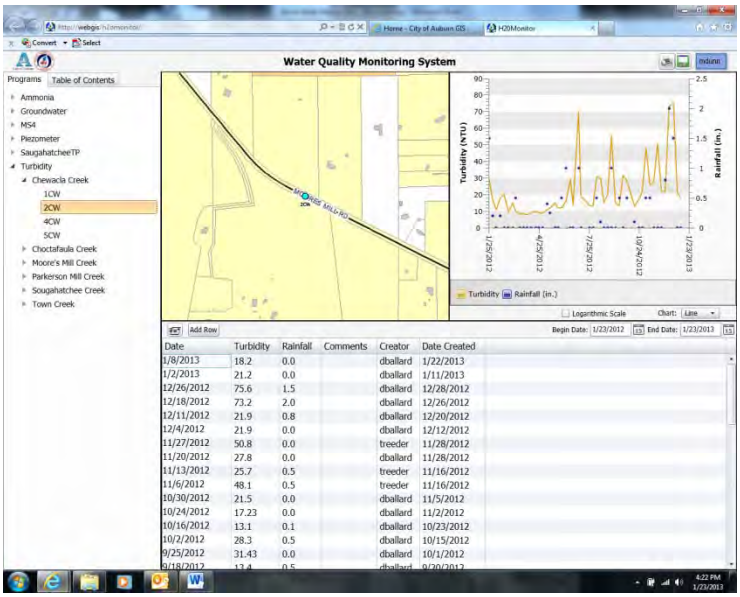
In 2004, the City of Auburn began a water-sampling program in an effort to analyze the effectiveness of stormwater best management practices (BMPs) on active construction sites within the City. This program has been significantly expanded over the past 9 years to include more in-depth water quality monitoring.

The City conducts weekly, monthly, and quarterly sampling for a wide variety of parameters that includes turbidity, dissolved oxygen, temperature, specific conductivity, total dissolved solids, pH, fecal coliform and salinity. Routine physical, physiochemical and bacteriological monitoring is conducted to document critical water quality trends within surrounding watersheds and also to locate potential sources of unauthorized pollution and contamination. Excessive pollutant loading can lead to loss of fish and wildlife habitat, loss of recreational use, human health hazards and higher water treatment costs. Both grab samples and real-time monitoring via two Hach Hydrolab multi-parameter probes have been incorporated into the sampling program.

In 2007, the City began a MS4 sampling program to analyze various pollutant parameters for varying land use categories in the City. Five sampling locations representing low-density residential, medium-density residential, high-density residential, commercial and industrial land uses are monitored on a quarterly basis as weather permits.

In 2009, the City purchased five (5) Global Water composite samplers. These samplers were launched beginning in the fall of 2009 in sub-basins within the Saugahatchee Creek watershed to evaluate total phosphorus (TP) concentration from stormwater runoff. Two (2) of these composite samples are currently being deployed on a quarterly basis in an "upstream" location and "downstream" location on main-stem Saugahatchee Creek to evaluate TP concentration as the stream comes in to the City and as it leaves the City's jurisdiction. This is being done as part of the City's stormwater Total Maximum Daily Load Implementation Plan to target "hot spot" areas for implementing stormwater BMPs to address total phosphorus.

The City has developed a water quality website where residents and other interested parties can view reports of recent water quality data. The website address to view these reports is http://www.auburnalabama.org/wrm-watershed/waterqual.aspx. In 2008, the Water Resource Management Department, in conjunction with the City's IT Department, created a GIS database to track and trend all water quality data collected in-house and through outside sources. In 2012, the Water Resource Management Department worked with the City's IT Department to create a new GIS Water Quality Database that houses all of the Department's various water quality monitoring programs. The Database provides a central storage repository for all of the Department's water quality data making it easier to locate, manage and analyze data. A screenshot from the database is located in this section.



In 2012, staff worked to construct ten (10) permanent monitoring locations for the Hydrolabs in five (5) watersheds in Auburn (Saugahatchee Creek, Parkerson Mill Creek, Moores Mill Creek, Town Creek and Chewacla Creek). These permanent monitoring locations allow for long-term deployment of the Hydrolabs thereby enabling staff to evaluate longer term data trends. The two (2) Hydrolabs have been launched on Parkerson Mill Creek since July 2012. The intent is to monitor each watershed on a yearly rotation and to reduce downtime with equipment. In 2012, the City also entered into a bench serve agreement with Hach Hydromet to ensure the proper maintenance and calibration of the Hydrolabs throughout the year.

In 2012, the City collected 1,973 turbidity samples (40 routine sampling sites), more than 207,000 water quality data points using two HACH Hydromet Hydrolab DS5 multi-parameter sondes, collected and analyzed 5 MS4 "first flush" samples for BOD, COD, TSS, Sulfide, Copper, Zinc, Oil and Total Phosphorus, and collected and analyzed 4 composite samples for total phosphorus in Saugahatchee Creek. In addition to routine programs, the City also analyzed 20 samples for ammonia and/or e-coli leading to the confirmation and repair of 2 sanitary sewer concerns in 2012. The City has collected over 13,900 turbidity samples since launching the routine turbidity monitoring program in 2006.

For additional information concerning the City's Water Quality Monitoring Program, please see the 2012 Annual Water Quality Monitoring Report included in Appendix E. This Water Quality Monitoring Report is being submitted in accordance with Part V of NPDES General Permit ALR040003 that was issued effective February 1, 2011.

IX. CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

A. Erosion and Sediment Control Ordinance

The City, in conjunction with the City of Opelika and Auburn University, adopted the Erosion and Sediment Control Policy drafted by the ALOA Citizens Advisory Committee in 2003. The policy provides for a regional set of rules that can be applied to contractors, developers and engineers in the area.

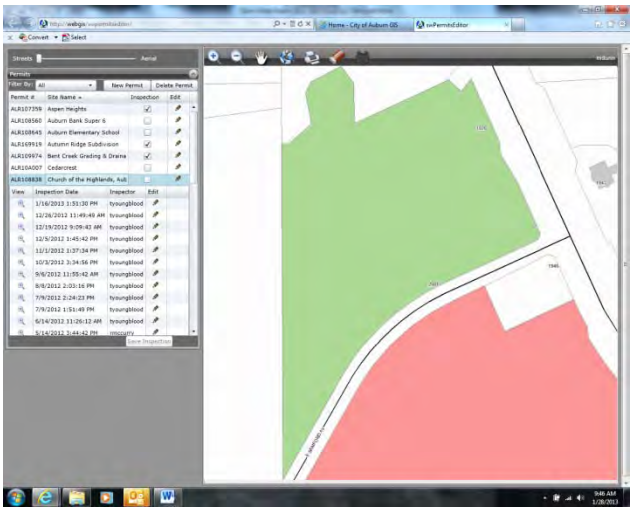
The Auburn City Council approved additions to the City's Erosion and Sediment Control Ordinance in 2005 to establish protocol for enforcement of the Ordinance and to enable City personnel to issue citations to developers/contractors in violation of the Ordinance. The enforcement mechanisms have proven to be a valuable tool in ensuring compliance with the Ordinance.

B. Erosion Control Inspections

The City, in an effort to patrol the management of erosion and sediment control measures on active construction sites, initiated a construction site inspection program in 2003. The inspection program is designed to identify deficiencies in erosion control and initiate corrective action. Approximately 555 site inspections were performed in 2012. This is an increase from the 450 inspections that were conducted the previous year. This increase in inspections is primarily attributed to an increase in development activity. In addition to the 555 inspections, 5 Notices of Violation (NOVs) were issued and 1 stop work order was issued. The City's Water Resource Management Department maintains copies of the inspection reports in an electronic format.

C. Erosion Control Inspection Software

In 2011, staff from the City's Water Resource Management Department and Information Technology Department created an electronic erosion and sediment control inspection software program. This software gives staff the ability to fill out electronic copies of the erosion control inspection checklist using handheld units while in the field performing inspections. Once the inspection is completed, the report and photos can be uploaded to a desktop PC using a desktop version of the software. The desktop software has the capability to automatically generate letters and photos for mailing to the permit holder. This inspection software, which includes both the field software and the desktop software, has saved staff considerable time in performing inspections during the past year and provides staff with the ability to communicate deficiencies to the permit holder in a timelier manner. A screenshot of the desktop application is included in this section.



D. Residential Erosion Control

The City's Public Safety Department Codes Enforcement Division conducts an initial site inspection for all building construction in Auburn. Lots requesting the initial inspection must have a construction entrance and other necessary best management practices (BMPs) in place prior to authorized foundation construction. Deficiencies noted during the initial inspection are relayed to the building permit applicant for correction.

The City's Public Safety Department Codes Enforcement Division also maintains a database of complaints received in association with erosion resulting from residential construction. The complaints are routed to enforcement officers or to Water Resource Management Department staff who investigate the complaint and pursue corrective actions with the responsible parties. Water Resource Management Department personnel also do routine checks of home construction in Auburn to ensure compliance with the City's Erosion and Sediment Control Ordinance.

E. Added Elements to Erosion and Sediment Control

In an effort to utilize the latest in erosion and sediment control technology, the City requires engineers to use polyacrylamide (PAM) and other flocculants on certain developments within the City. PAM is essentially a soil stabilization BMP. Flocculants work to settle solids from turbid water and aid in stabilizing soils to support grass seed so that a suitable vegetative cover may be established. Flocculants can be applied through a hydraseeding application or in storm drains via "floc blocks". Flocculants such as PAM are required on any development discharging directly to a receiving stream as well as on developments in the Moore's Mill Creek watershed, which is currently listed as impaired due to sediment.

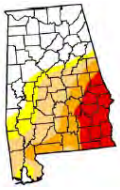
In conjunction with approval of the Water Resource Management Design and Construction Manual (discussed in Section X of report), the City changed the permitting process whereby erosion and sediment control BMPs are installed effective January 1, 2011. The City now issues an Erosion and Sediment Control Permit that allows for minimal clearing to install the approved BMPs onsite. This minimizes the clearing and grading work that sometimes occurred in the past prior to getting all of the site BMPs installed.

F. Sediment Basin Design

The City revised its standard erosion and sediment control details in 2010 to include a more detailed sediment basin design. The Alabama Handbook was revised in 2009 to include significant changes in design guidelines for sediment basins. The primary changes revolve around the use of baffles during construction and Faircloth skimmers for basin dewatering. The City has implemented this change in its standard details, as well as in its requirements for new developments within the City. In addition, the new construction stormwater general permit issued by ADEM in 2011 promotes the using of skimming devices by requiring mechanisms that dewater from the top of the basin

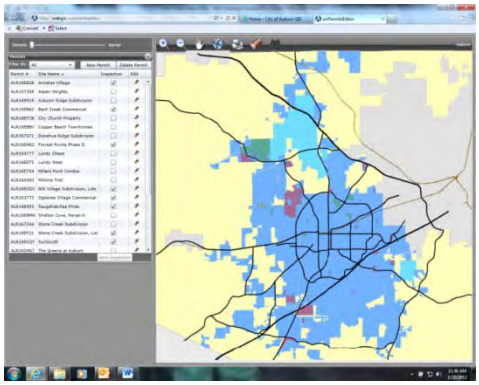
G. Rainfall Data Collection

In 2005, the City began maintaining historical rainfall data records. The data is obtained through a subscription to the Agricultural Weather Information System (AWIS) website. AWIS records daily weather data from the NOAA weather station at the Auburn University Regional Airport. The City collects the data on a routine basis and enters it into an Excel spreadsheet, enabling the City to analyze rainfall patterns and trends. The City has AWIS data dating back to 1976. The City records daily rainfall data at its two water pollution control facilities. In addition, the Auburn Water Works Board also has rain gauges located at Lake Ogletree and the James Estes Water Treatment Plant that provide daily rainfall records. In 2008, the City contracted with a local consultant (RainWave) to provide real-time rainfall data utilizing Doppler radar imagery at five predetermined locations selected by the City. Additionally, in 2008, the City created a GIS rainfall distribution analysis tool that allows staff to map rainfall patterns across the City. The real-time rainfall data and the rainfall distribution analysis tool allows staff to perform erosion and sediment control inspections more efficiently. There was a wide variability in rainfall reported across the City in 2012, from a low of 37 inches reported on the Auburn University campus to a high of 43.8 inches reported at the Auburn-Opelika Airport. Additional details regarding rainfall in 2012 can be found in the Stormwater Water Quality Monitoring Report included in Appendix E of this report.



H. ADEM Construction Stormwater Permit Tracking Tool

In 2010, the Water Resource Management Department worked with assistance from the City's Information Technology Department to create a GIS-based tool that allows tracking of ADEM construction stormwater permits for developments within the City of Auburn. The tracking tool generates automatic emails that are sent to staff on a bi-weekly basis with notifications of expired permits, permits that are within thirty (30) days of expiration and

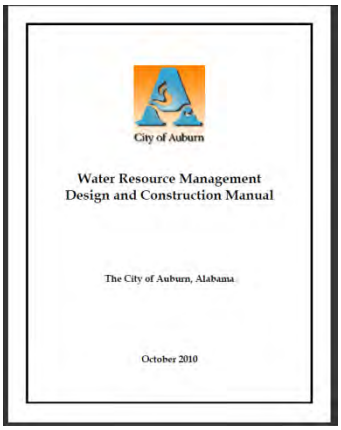


permits that are within sixty (60) days of expiration. This allows staff to track permits in an efficient manner and to send notifications to permit holders who have expired permits or permits nearing expiration. In 2011, the permit tracking tool was incorporated into the Erosion and Sediment Control Software described earlier in this section.

X. POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

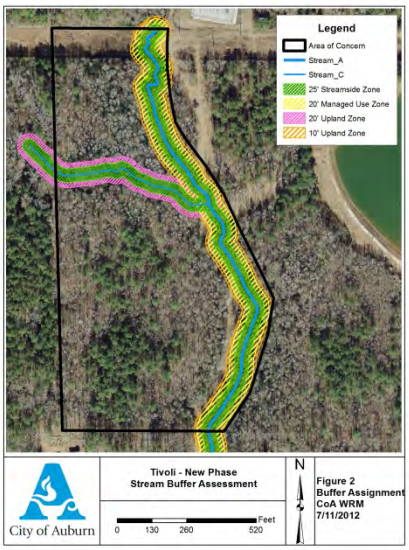
A. Stormwater Management Manual and Engineering Design Manuals

In April 2003, the City of Auburn published a Stormwater Design Manual that effectively addressed stormwater runoff controls required for sites greater than one acre. The manual identified project requirements and specifications for new infrastructure and also addressed the requirements for stormwater system sizing and stormwater runoff control/detention. During its implementation, the manual proved to be a very successful tool for the City and developers. The Water Resource Management Department contracted with CH2M Hill to develop an Engineering Design Manual in 2008 that includes engineering design criteria for sewer and water infrastructure, as well as stormwater BMPs for water quality protection such as rain gardens and stormwater wetlands. The Water Resource Management Design Manual also simplifies the City's regulations regarding restrictions on development in steep slope areas. The Public Works Department also developed a comprehensive Engineering Design Manual. The Stormwater Design Manual has been updated and included as an appendix in the Public Works Manual. Both the Public Works and Water Resource Management Design and Construction Manuals were adopted by the City Council in November 2010 and became effective on January 1, 2011. Revisions/amendments to the Manuals were adopted in 2011 and 2013.



B. Stream Buffer Regulations

As part of the Erosion and Sediment Control Ordinance adopted by the City Council in July 2002, a minimum 25-foot non-disturbed vegetative buffer zone was required for new developments on "blue line" streams and creeks identified on USGS 7.5 minute topographic maps. In May 2006, the City Council adopted new Stream Buffer regulations. The 2006 buffer regulations were based on a managed-use type buffer rather than a strict non-disturbed buffer approach. The 2006 regulations implement a 3-zoned buffer (streamside zone, managed use zone and upland zone) with the width of the buffer being based on the drainage



area of the stream. A copy of the 2006 regulations can be found under Article IV in the City's Zoning Ordinance on the City's website. Approximately 580 - 630 acres of riparian corridors have been set aside since the adoption of the new regulations. In 2012, the City evaluated stream buffers on ten (10) properties, resulting in approximately thirty-one (31) acres of riparian buffer protection. The table below provides the City's current stream buffer requirements.

Stream Buffer Requirements				
Drainage Area (Watershed) Designation	**Streamside Zone**	**Managed Use Zone**	**Upland Zone**	**Total Buffer Width on each side of Stream**
< 100 acres	25 feet	None	10 feet	35 feet
≥ 100 acres and ≤ 300 acres	25 feet	None	20 feet	45 feet
≥ 300 acres and ≤ 640 acres	25 feet	20 feet	10 feet	55 feet
≥ 640 acres	25 feet	50 feet	25 feet	100 feet

C. Detention Pond Inspections

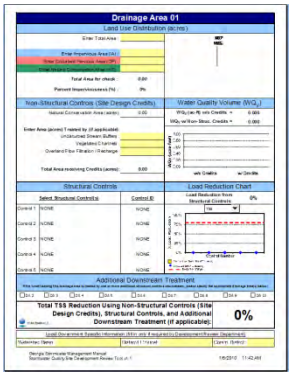
Existing detention ponds need periodic inspections to evaluate the maintenance and operation of these vital components of the City's drainage system. Because vast quantities of stormwater are collected and passed through these detention ponds every year, inspections of these facilities can identify potential problems and illicit discharges.

The Public Works Department and the Water Resource Management Department conduct annual inspections of all detention ponds (public and private) listed in the stormwater database. Upon inspection, the owner of the pond is notified of any corrective action needed. Enforcement measures are taken if the owner does not address the items listed in the report. Approximately two hundred seventy (270) detention ponds were inspected by the City in 2012.

D. Conservation Subdivision Regulations

In 2006, staff members from the Planning Department, Water Resource Management Department, Public Works Department and Parks and Recreation Department began developing conservation subdivision regulations to aid in the protection of local water resources. These regulations were approved by the Auburn City Council in 2007. The regulations promote water resource protection through the setting aside of open space and concentrating development away from water resources. The ordinance and subdivision regulations promote the use of low impact design concepts to protect natural resources in the Auburn area. These regulations can be downloaded from the City's website at http://www.auburnalabama.org/pl/. While development interest for conservation subdivisions has not been strong to this point, the City continues to promote conservation subdivisions and low impact development principles for developments within the City of Auburn.

E. Site Development Review Tool



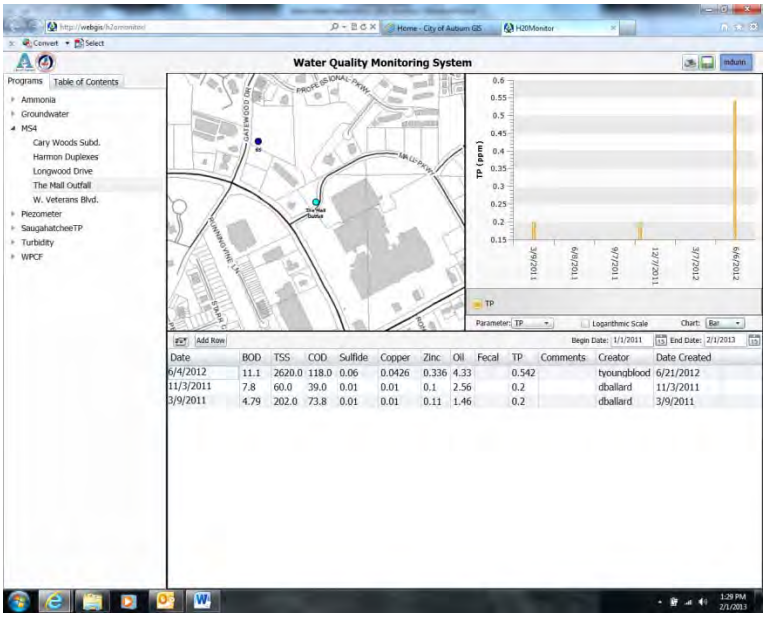
In 2006, the Water Resource Management Department contracted with CH2M Hill to develop a Site Development Review Tool (Tool) that could be utilized by local engineers when designing stormwater BMPs on developments within the City. This Tool was modeled on a similar tool created by CH2M Hill for Gwinnett County, Georgia.

The Tool was developed using a Microsoft Excel platform and can be used by engineers and developers to design and incorporate structural stormwater BMPs for developments within Auburn's planning jurisdiction boundaries and to maximize the efficiency of runoff pollutant management following construction of developments. This Tool can also be used to meet the target pollutant removal efficiencies outlined in the City's Conservation Subdivision Regulations.

The Tool provides pollutant removal estimates for site specific conditions based on removal efficiencies for a variety of stormwater BMPs including detention ponds, bioretention areas (i.e. rain gardens) and stormwater wetlands. This Tool analyzes a variety of stormwater pollutants including nutrients (phosphorus and nitrogen) and total suspended solids. City staff utilize the Tool during the plan review process to analyze development impacts on water quality within its water supply protection area (Lake Ogletree watershed). This Tool is also used by engineers when submitting water quality plans for developments located in the Saugahatchee Creek Watershed as part of its compliance with the total phosphorus TMDL for the Saugahatchee Creek watershed. A copy of the Tool can be downloaded at http://www.auburnalabama.org/wrm-watershed.

F. MS4 Outfall Water Quality Monitoring

In 2007, the Water Resource Management Department initiated a program to evaluate and compare post-construction runoff water quality from various types of development. The types of development analyzed include low, medium and high density residential, commercial and industrial. Samples are collected each quarter during rainfall events and then delivered to a local lab to be analyzed for a variety of pollutants such as E-coli, suspended solids, nutrients and oils and grease. Staff attempt to collect "first flush" samples in an effort to obtain the most representative runoff samples. This data is used by Water Resource Management staff to develop trends, document illicit discharges and to make future decisions regarding post-construction stormwater BMPs. Due to the timing of rain events in 2012, staff were only able to collect samples for the summer quarter of 2012. In 2012, five (5) first flush samples were collected and analyzed for a total of forty (40) data points across eight (8) parameters. Interesting data trends have developed for certain land-use categories and certain parameters. For instance, higher total phosphorus values can be seen downstream of golf courses and some residential areas during the spring when fertilizer use begins to increase. Other data trends such as higher metal values (copper and zinc) downstream of commercial parking lots and automobile repair shops can also be seen. In 2012, all MS4 data was transferred into the new Water Quality Monitoring Database discussed earlier in this report. A screenshot from the MS4 portion of the database can be seen above. Additional information on the City's MS4 outfall water quality monitoring program can be found in the 2012 Annual Water Quality Monitoring Report found in Appendix E. In 2012



G. Composite Stormwater Sampling Program

In 2009, the Water Resource Management Department began a program to analyze total phosphorus (TP) concentration in stormwater runoff from sub-basins in the Saugahatchee Creek watershed. This program was initiated in an effort to begin

collecting background TP concentration data in anticipation of monitoring requirements associated with the Saugahatchee Creek TP TMDL. Five (5) composite samplers were launched in 2010 in five (5) sub-basins in the Saugahatchee Creek watershed. Each sub-basin was characterized by a certain primary land use category. Two (2) of these composite samples are currently being deployed on a quarterly basis in an "upstream" location and "downstream" location on main-stem Saugahatchee Creek to evaluate TP concentration as the stream comes in to the City and as it leaves the City's jurisdiction. This is being done as part of the City's stormwater Total Maximum Daily Load Implementation Plan to target "hot spot" areas for implementing stormwater BMPs to address total phosphorus. The samplers are triggered by rainfall and/or flow. The samplers are currently set to pull samples at a rate of 400 ml every 5 minutes, for a total of 1-gallon mixed composite in 45 minutes. The sampler is activated only after both rain (a minimum ¾" rain event) and flow (wet) sensors are triggered and the samples are only collected if the qualifying event has been at least 72-hours after a previous rain event. A total of four (4) composite samples were pulled in 2012. Additional information on the City's composite stormwater sampling program can be found in the 2012 Annual Water Quality Monitoring Report found in Appendix E.

H. Moton Stormwater Planter

The City of Auburn Water Resource Management and Public Works Departments, in coordination with the Auburn Housing Authority, have designed and are working to install the City's first "Green Streets" project on Slaughter Avenue immediately west of Boykin Street. This project will be partially funded through a grant from the Saugahatchee Watershed Management Plan (SWaMP) and will include the construction of an infiltration planter along Slaughter Avenue to treat stormwater runoff from both the roadway and the adjacent Moton Housing Development. While serving as a low impact development/green infrastructure demonstration project, this project will also improve water quality in Saugahatchee Creek by reducing non-point source pollution. Although construction was delayed for logistical reasons, construction is anticipated to begin in March 2013 and will be completed by early Spring 2013. For more information concerning this project, please contact Daniel Ballard at dballard@auburnalabama.org or by phone at 334-501-7367.

XI. POLLUTION PREVENTION/GOOD HOUSEKEEPING FOR MUNICIPAL OPERATIONS

A. Stormwater Management Training

The City of Auburn continues to develop a training program that provides the Water Resource Management Department and other City departments with information on the proper methods for implementing site control measures on all municipal projects. City personnel also attend a variety of stormwater/water quality related conferences, workshops and seminars annually.

Training opportunities in 2012 included:

- **Alabama's Water Environment Association Annual Conference (April 2012)** – This 4-day conference sponsored by Alabama's Water Environment Association, state membership association of the Water Environment Federation (WEF), focuses on stormwater, water quality, and wastewater treatment issues. Three (3) City personnel attended the 2012 conference, attending technical sessions as well as vendor exhibits.

- **WEF Stormwater Symposium (July 2012)** – In July 2012, WEF hosted its first annual Stormwater Symposium in Baltimore, Maryland. The City was among a select group chosen to give a presentation at this symposium. The City's presentation focused on its ORI program as described earlier in this report. One (1) City employee attended this symposium.

- **WEFTEC 2012 (October 2012)** – This 4-day conference, sponsored by the Water Environment Federation, is one of the premier water quality conferences in the world. WEFTEC 2012 was held in New Orleans, Louisiana. One (1) City employee attended this conference and attended technical sessions related to watershed protection, water quality, stormwater BMPs and wastewater treatment.

- **Erosion and Sediment Control Workshop (December 2012)** – The City of Auburn hosted a workshop for developers, contractors, engineers and City personnal to educate attendees on the City's Erosion and Sediment Control Program, as well as federal and state regulations. Over sixty (60) developers, contractors, engineers, and City personnel attended the workshop.

B. Spill Response and Prevention Training

The City of Auburn has developed an in-house spill response training program. The Water Resource Management Department sponsored its fourth Materials Handling

and Spill Prevention Workshop in June 2011. This workshop targets City employees who deal with fuels and chemicals on a daily basis and provides basic information on the proper management, handling and disposal of potentially hazardous chemicals. Twelve (12) City personnel attended this workshop in 2011. The City will collaborate with Auburn University to schedule this training on either a bi-annual basis or as regulations change.

C. Risk Management Manual

The City's Human Resources Department has developed a manual outlining specific requirements/policies for dealing with hazardous chemicals. Topic 12 (titled Hazard Communication Program) of the City's Risk Management Manual specifically requires City personnel to receive training on hazardous chemicals used. Safety Data Sheets (SDS) identifying personal protective equipment, permissible exposure limits (PEL) and Threshold Limit Values (TLV) are required for all hazardous chemicals used. The Hazard Communication Program was adopted as part of the Risk Management Manual.

D. Municipal Operations Recycling

It has been standard policy to encourage individual Departments to participate in the City's recycling program. Recyclable waste generated through City activities is collected and processed through the City's recycling center located on Donahue Drive.

E. Street Sweeping

Regular street sweeping has been proven as an effective means to reduce overall pollutant loading from roads and storm sewer systems. The Environmental Services Department of the City currently performs street sweeping measures on a monthly basis throughout numerous roadways within the City. One (1) mechanical and two (2) regenerative-air/vacuum sweepers are used to perform this service. Regular street sweeping measures such as these have been shown to reduce total phosphorus loading from roadways by 1.4 to 20 percent and total suspended solids by 4 to 45 percent, with variability seen in frequency of sweeping and machine type (Breault et. al., 2003). In 2012, the Environmental Services Department swept approximately 13,170 miles of streets and parking lots within the City, thereby removing approximately 535 tons of leaves and debris from the road.

F. Alabama Certified Pesticides Applicator

The Parks and Recreation Department of the City maintains trained and certified personnel in the application of pesticides, including restricted-use pesticides.

Although qualified to do so, the Parks and Recreation Department has not used any restricted-use pesticides in the previous decade. In order to maintain certification with the State of Alabama, the staff must document and complete 30 continuing education units (CEUs) over a three-year period. CEUs are earned at various conferences and workshops such as the Alabama Turfgrass Conference, Alabama Department of Transportation workshop, the Sports Turf Short Course and the Alabama Urban Forestry Association's Annual Conference. The CEUs cover the application of pesticides, information on the proper use of fertilizers and other chemicals typically used to maintain athletic fields, and best management practices for trees/shrubs/turf that are intended to reduce the need for pesticides, fertilizers and irrigation.

XII. STORMWATER INFRASTRUCTURE IMPROVEMENTS

In 2012, the Public Works Department continued to make considerable progress toward installing, rehabilitating and upgrading stormwater infrastructure within the City of Auburn. A listing of projects completed in 2012, as well as projects under construction and design, is included below.

A. Stormwater Infrastructure Projects Completed

Projects completed in permit year ten include:

- Payne Street Drainage Project – This project involved the cured-in-place pipe (CIPP) lining of 226 linear feet (LF) of 54-inch corrugated metal storm pipe that was corroded and causing damage to an existing parking lot. A new stormwater junction box was added as part of the project's scope.

- Opelika Road Drainage Project – This project involved the CIPP lining of 565 LF of 18-inch concrete pipe with unreinforced joints and some cracking under a newly constructed deceleration lane.

- Glenn Avenue Improvements Project – This project involved the installation of 238 LF of 42-inch reinforced concrete pipe (RCP), 436 LF of 36-inch RCP, 74 LF of 24-inch RCP, 141 LF of 15-inch RCP, 36 LF of 36-inch x 23-inch RCP and 127 LF of 44-inch x 27-inch RCP. This project will also include constructing seven single wing inlets, four double wing inlets and five junction boxes.

- Cary Creek Parkway Project – This project involved the installation of 494 LF of 24-inch RCP, 118 LF of 18-inch RCP and 655 LF of 15-inch RCP. This project also included constructing seven single wing inlets and two double wing inlets.

B. Stormwater Infrastructure Projects Under Construction

- South College Street and Shug Jordan Parkway Widening Project – This project will involve the installation of 44 LF of 24-inch RCP and 10 LF of 18-inch RCP. The project also includes the installation of one single wing inlet and three double wing inlets.

C. Stormwater Infrastructure Projects Under Design and/or Consideration

- Opelika Road at Guthries – This project will involve the installation of 150 LF of 48-inch RCP, 170 LF of 30-inch RCP, 15 LF of 24-inch RCP, 40 LF of 18-inch RCP, 7 single wing inlets and one headwall.

- Auburn Technology Park from Cox Road to Riley Street (West Veterans Boulevard and Thistle Lane) – This project will consist of the installation of 75 LF of 36-inch RCP, 72 LF of 30-inch RCP, 51 LF of 24-inch RCP, 150 LF of 18-inch RCP, 505 LF of 15-inch RCP and 54 LF of 9 feet x 40 feet open bottom culvert. This project will also include constructing six single wing inlets, four double wing inlets and four junction boxes.

- Moores Mill Road Resurfacing Project – This project will consist of the installation of 67 LF of 24-inch RCP, 37 LF of 18-inch RCP and 45 LF of 15-inch RCP. This project will also include removal and replacement of the existing triple barrel 8 feet x 6 feet culvert, constructing two single wing inlets, four double wing inlets and two junction boxes.

D. Sanitary Sewer Rehabilitation Projects

In 2012, the Water Resource Management Department completed construction of the Southside Sewer Interceptor Rehabilitation Project which consisted of repairing aging sanitary sewer infrastructure within the City of Auburn using a cured-in-place pipe (CIPP) trenchless rehabilitation technology. This project involved the CIPP lining of over 16,000 LF of 24-inch and 30-inch sanitary sewer main along with necessary manhole rehabilitation. In 2012, the City also completed the rehabilitation of aging sanitary sewer infrastructure on Glenn Avenue between North Donahue Drive and Toomer Street using a pipe bursting trenchless technology. This project included pipe bursting approximately 2,270 LF of 6-inch and 8-inch vitrified clay pipe (VCP) sanitary sewer main. In early 2013, the Water Resource Management Department also completed construction of the Southside Sewer Basin 12 Rehabilitation Project, near Janet Drive and Heard Avenue, which consisted of rehabilitating approximately 4,260 LF of 8-inch sanitary sewer main and 1,050 LF of 15-inch sanitary sewer main using CIPP

technology. The primary purpose of these projects is to rehabilitate aging infrastructure, prevent sanitary sewer overflows (SSOs) and reduce inflow and infiltration (I/I). The City plans to design and construct additional sanitary sewer improvements in 2013 and will also be doing additional sewer system evaluation surveys (SSESs) in 2013 to identify potential I/I issues. The water quality of the City's local water resources can be improved through the City's efforts to target and reduce SSOs and excessive I/I. Efforts to rehabilitate aging infrastructure have reduced sanitary sewer overflows by over 60 percent since 2006.

XIII. PROGRAM EVALUATION

Now in its tenth permit year, and second under the 2012 permit, the Stormwater Management Program for the City of Auburn continues to have a positive impact on stormwater management and water resource protection in the City as evidenced by trends in stormwater quality data collected by the City and public awareness of the importance of stormwater management. The goals outlined in the City's Stormwater Management Plan have been achieved at the end of this tenth permit year.

The City continues to have a strong construction stormwater management program that empowers staff to issue notices of violation, citations and/or stop work orders in cases where Best Management Practices (BMPs) are not implemented or if BMPs are deemed deficient. In 2012, the City conducted 555 erosion and sediment control inspections, issued 5 72-hr NOVs and 1 stop work order. The City continues to strengthen its water quality sampling program to evaluate stormwater impacts on local water resources and to analyze the effectiveness of stormwater BMPs for construction and post-construction stormwater management. In 2012, the City's Water Resource Management Department worked with the City's IT Department to create a comprehensive water quality monitoring database to house all of the data from the City's various water quality monitoring programs. This database allows staff to be more efficient and effective at locating and analyzing data when needed. In 2012, the City analyzed 4 composite stormwater samples in an effort to collect background water quality data (primarily total phosphorus) associated with the Saugahatchee Watershed TMDL. The City continues to evaluate land use effects on post-construction stormwater quality through its MS4 stormwater sampling program. In 2012, the City collected 5 MS4 first flush samples for a total of 40 data points across 8 parameters. The City strengthened its Illicit Discharge Detection and Elimination Program in 2012 through continued implementation of the Outfall Reconnaissance Inventory (ORI) program. To date, approximately 225 miles of stream have been inspected and approximately 920 stormwater outfalls have been documented through the ORI program. In 2012, staff completed ORI work in the Parkerson Mill Creek watershed and began work in the Moore's Mill Creek watershed. It is anticipated that ORI work in Moore's Mill Creek watershed will be completed in Spring 2013. The City has received numerous accolades for its innovative ORI program. Staff gave a presentation on the ORI program at the Water Environment Federation's 1st annual Stormwater Symposium in July 2012 in Baltimore, Maryland. Staff also gave a presentation on the ORI program to the Parkerson Mill Creek Watershed Management Plan group in 2012. The City continues to work toward improving post-construction stormwater runoff through the implementation of the new Water Resource Management Design and Construction

Manual as well as requirements for submitting stormwater quality plans for developments located in the Saugahatchee Creek Watershed and the Lake Ogletree Watershed. The City continues to invest in continuing public education and outreach and public involvement associated with the Stormwater Management Program through activities such as the storm drain marking program, Earth Day, the Lee County Water Festival, SWaMP, the PMCWMP group and education and outreach for the local schools in Auburn. The City also gave numerous presentations during the past year targeted at providing education and outreach on the City's Stormwater Management Program. In summary, the City has met or exceeded its goals for the 2012 - 2013 reporting year.

The overall evaluation of the tenth permit year has revealed several strengths and goals for the upcoming year.

A. Strengths

The strength of the City's Stormwater Management Program is primarily a result of the commitment and support of the Auburn City Council in protecting local natural resources as demonstrated in the formation of the Watershed Division to manage the stormwater program, increased enforcement of erosion and sediment control requirements and increased efforts and funding to evaluate stormwater quality. In addition, the City has a staff that is committed to managing an efficient and leading-edge stormwater management program that is a positive reflection on the City. The City also works to actively engage local environmental groups, concerned citizens and the local development community in its stormwater management program through its public education, outreach and involvement programs.

Other strengths include:

- The Water Resource Management Department coordinates all of the water quality programs (water treatment and distribution, wastewater collection and treatment and stormwater quality management) for the City allowing for a more holistic watershed management approach to managing our water resources;

- The teamwork of the Water Resource Management Department, Public Works Department and Public Safety Department in the construction stormwater management program allows for timely erosion and sediment control inspections and enforcement as well as a more efficient response to noted concerns and/or citizen complaints;

- More efficient erosion and sediment control inspections through the use of an erosion and sediment control inspection software program created through collaboration between the Water Resource Management Department and the Information Technology Department;

- A well established and expanding water quality sampling program to evaluate stream conditions, construction and post-construction stormwater runoff, stormwater outfalls and to detect and eliminate illicit discharges;

- Development of a comprehensive water quality monitoring database to house data from all of the City's various water quality monitoring programs;

- A comprehensive source water monitoring program to identify potential water quality concerns in the City's primary water source, Lake Ogletree;

- Real-time stream flow monitoring through contributions to the United States Geological Survey (USGS) to fund stream gauging stations on Chewacla Creek and Saugahatchee Creek;

- A cooperative relationship between the City and Auburn University to actively address water quality concerns within our MS4;

- A thorough documentation of all existing stormwater outfalls, as well as potential illicit discharges, through continued implementation of the Outfall Reconnaissance Inventory (ORI) program;

- Increased public awareness and involvement through activities and programs such as the storm drain marking program, the Lee County Water Festival, the FOG recycling program, SWaMP, Earth Day, the Parkerson Mill Creek Watershed Management Plan and education and outreach for the local schools;

- Promotion, education and implementation of low impact development/green infrastructure best management practices for local developments;

- Proactive evaluation and timely response to water quality-related issues and citizen concerns regarding stormwater quality;

- Proactive evaluation and timely response to erosion and sediment control issues and citizen concerns regarding erosion and sediment control;

- Increased public education and awareness through the publishing of monthly reports containing stormwater quality data on the City's website;

- The City's willingness to meet with other municipalities/government entities to share more about our stormwater management program;

- Continued implementation of our FOG grease trap inspection, maintenance and enforcement program to reduce the potential for SSOs;

- Continued efforts to identify and rehabilitate aging sanitary sewer infrastructure with the intent to reduce I/I and prevent potential SSOs.

B. Goals for the Upcoming Year

The City of Auburn takes pride in its Stormwater Management Program and feels as though the efforts that have been made over the past ten years have created a strong, viable and long-lasting program for the City that will have positive impacts on the City's natural resources. As the City strives to make its program even better, several program goals have been identified for the upcoming year by City personnel.

These goals include:

- Increasing public education and awareness through additional storm drain marking activities, involvement with our local schools and other education and outreach initiatives;

- Continuing the Outfall Reconnaissance Inventory Program to identify and inspect stormwater outfalls in the City of Auburn. In 2013, staff plan to complete ORI work in the Moore's Mill Creek watershed and begin work in the Town Creek watershed;

- Continuing implementation of the erosion and sediment control inspection software program;

- Continuing implementation of a comprehensive water quality monitoring database that houses data from the City's various water quality monitoring programs;

- Continuing implementation of the stormwater water quality best management practices outlined in the Water Resource Management Design and Construction Manual through promotion of green infrastructure;

APPENDIX A

2011 PHASE II STORMWATER PERMIT

LANCE R. LEFLEUR
DIRECTOR

ROBERT J. BENTLEY
GOVERNOR

Alabama Department of Environmental Management
adem.alabama.gov
1400 Coliseum Blvd. 36110-2400 ■ Post Office Box 301463
Montgomery, Alabama 36130-1463
(334) 271-7700 ■ FAX (334) 271-7950

January 31, 2011

Honorable Bill Ham, Jr.
Mayor, City of Auburn
1846 Hayden Avenue
Auburn, Alabama 36830

RE: Municipal Separate Storm Sewer System (MS4) Phase II General Permit
NPDES Number ALR040003
City of Auburn

Dear Mayor Ham:

The Alabama Department of Environmental Management has made a final determination to reissue General NPDES Permit No. ALR040000 for discharges from regulated small municipal separate storm sewers. The reissued permit is effective on February 1, 2011.

The Department notified the public of its tentative determination to reissue General NPDES Permit No. ALR040000 on May 18, 2010. Interest persons were provided the opportunity to submit comments on the Department's tentative decision through July 23, 2010. The Department also held a public hearing on July 23, 2010. In accordance with ADEM Admin Code r. 335-6-6-.21(7), a response to all comments received during the public comment permit and the public hearing are provided with the enclosed permit.

Based on your request, as evidenced by the submittal of a Notice of Intent, coverage under the General NPDES Permit Number ALR040003 is granted. The effective date of issuance coverage is February 1, 2011.

Coverage under this permit does not authorize the discharge of any pollutant or non-stormwater that is not specifically identified in the permit and by the Notice of Intent which resulted in granting this coverage.

You are responsible for compliance with all provisions of the permit including, but not limited to, the performance of any monitoring (if applicable), the submittal of any reports, and the preparation and implementation of any plans required by the permit. The Department is requesting the submittal of an updated Stormwater Management Plan (SWMP) within six months of the issuance of this permit.

If you have questions concerning this permit, please contact Marla Smith either by email at mssmith@adem.state.al.us or by phone at 334-270-5616.

Sincerely,
Vernon H Crockett

Vernon H. Crockett, Chief
Stormwater Management Branch
Water Division

VHC/mss

Enclosures

cc: Mr. Tom McGill/Environmental Protection Agency
Mr. Matt Dunn/City of Auburn

Birmingham Branch
110 Vulcan Road
Birmingham, AL 35209-4702
(205) 942-6168
(205) 941-1603 (FAX)

Decatur Branch
2715 Sandlin Road, S. W.
Decatur, AL 35603-1333
(256) 353-1713
(256) 340-9359 (FAX)

Mobile Branch
2204 Perimeter Road
Mobile, AL 36615-1131
(251) 450-3400
(251) 479-2593 (FAX)

Mobile-Coastal
4171 Commanders Drive
Mobile, AL 36615-1421
(251) 432-6533
(251) 432-6598 (FAX)

ADEM
Alabama Department of Environmental Management

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT GENERAL PERMIT

DISCHARGE AUTHORIZED: STORMWATER DISCHARGES FROM REGULATED SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS

AREA OF COVERAGE: THE STATE OF ALABAMA

PERMIT NUMBER: ALR040003

RECEIVING WATERS: ALL WATERS OF THE STATE OF ALABAMA

In accordance with and subject to the provisions of the Federal Water Pollution Control Act, as amended, 33 U.S.C. §§1251-1378 (the "FWPCA"), the Alabama Water Pollution Control Act, as amended, ***Code of Alabama 1975****, §§ 22-22-1 to 22-22-14 (the "AWPCA"), the Alabama Environmental Management Act, as amended,* ***Code of Alabama 1975****, §§22-22A-1 to 22-22A-15, and rules and regulations adopted thereunder, and subject further to the terms and conditions set forth in this permit, the Permittee is hereby authorized to discharge into the above-named receiving waters.*

ISSUANCE DATE: JANUARY 31, 2011

EFFECTIVE DATE: FEBRUARY 1, 2011

EXPIRATION DATE: JANUARY 31, 2016

Glenda L. Dean

Alabama Department of Environmental Management

Table of Contents

PART I Coverage Under This General Permit

A. Permit Coverage

This permit covers all the areas within the State of Alabama.

B. Eligibility

1. This permit authorizes discharges of storm water from small municipal separate storm sewer systems (MS4s), as defined in 40 CFR Part 122.26(b) (16). You are authorized to discharge under these terms and conditions of this general permit if you:
   (a) Own or operate a small MS4 within the permit area described in Section A,
   (b) Are not a "large" or "medium" MS4 as described in 40 CFR Part 122.26(b) (4) or (7),
   (c) Submit a Notice of Intent (NOI) in accordance with Part II of this permit, and
   (d) Either:
      (i) Are located fully or partially within an urbanized area as determined by the latest Decennial Census by the Bureau of Census, or
      (ii) Are designated for permit authorization by the Environmental Protection Agency (EPA) and the Department pursuant to 40 CFR Part 122.32(a) (2).
2. This permit authorizes the following non- storm water discharges provided: (1) they do not cause or contribute to a violation of water quality standards; (2) they have been determined not to be substantial contributors of pollutants to a particular small MS4 applying for coverage under this permit and that is implementing the storm water management program set forth in this permit:
   (a) Water line flushing
   (b) Landscape irrigation
   (c) Diverted stream flows
   (d) Uncontaminated ground water infiltration (Infiltration is defined as water other than wastewater that enters a sewer system, including foundation drains, from the ground through such means as defective pipes, pipe joints, connections, or manholes. Infiltration does not include, and is distinguished from, inflow.)
   (e) Uncontaminated pumped groundwater
   (f) Discharges from potable water sources
   (g) Foundation drains
   (h) Air conditioning condensate
   (i) Irrigation water (not consisting of treated, or untreated, wastewater)
   (j) Rising ground water
   (k) Springs
   (l) Water from crawl space pumps
   (m) Footing drains
   (n) Lawn watering runoff
   (o) Individual residential car washing
   (p) Residual street wash water
   (q) Discharge or flows from firefighting activities (including fire hydrant flushing)
   (r) Flows from riparian habitats and wetlands
   (s) Dechlorinated swimming pool discharges, and
   (t) Discharge authorized by and in compliance with a separate NPDES permit

C. Limitations of Coverage

The following discharges are not authorized by this permit:

1. Discharges that are mixed with sources of non- storm water unless such non-storm water discharges are:
   (a) In compliance with a separate NPDES permit, or
   (b) Determined by the Department not to be a significant contributor of pollutants to waters of the State.
2. Storm water discharges associated with industrial activity as defined in 40 CFR Part 122.26(b) (14) (i)-(ix) and (xi);
3. Storm water discharges associated with construction activity as defined in 40 CFR Part 122.26(b) (14) (x) or 40 CFR 122.26(b)(15) and subject to Alabama Department of Environmental Management (ADEM) Admin. Code r. 335-6-12;
4. Storm water discharges currently covered under another NPDES Permit;
5. Discharges to territorial seas, contiguous zone, and the oceans unless such discharges are in compliance with the ocean discharge criteria of 40 CFR Part 125, Subpart M;
6. Discharges that would cause or contribute to instream exceedances of water quality standards; Your storm water management program (SWMP) must include a description of the Best Management Practices (BMPs) that you will be using to ensure that this will not occur. The Department may require corrective action or an application for an individual permit or alternative general permit if an MS4 is determined to cause an instream exceedance of water quality standards;
7. Discharges of any pollutant into any water for which a total maximum daily load (TMDL) has been approved or developed by EPA unless your discharge is consistent with the TMDL; This eligibility condition applies at the time you submit a NOI for coverage. If conditions change after you have permit coverage, you may remain covered by the permit provided you comply with the applicable requirements of Part IV.D. You must incorporate any limitations, conditions and requirements applicable to your discharges, including monitoring frequency and reporting required, into your SWMP in order to be eligible for permit coverage. For discharges not eligible for coverage under this permit, you must apply for and receive an individual or other applicable general NPDES permit prior to discharging;
8. This permit does not relieve entities that cause illicit discharges, including spills, of oils or hazardous substances, from responsibilities and liabilities under State and Federal law and regulations pertaining to those discharges.

D. Obtaining Authorization

1. To be authorized to discharge storm water from small MS4s, you must submit a notice of intent (NOI) and a description of your SWMP in accordance with the deadlines presented in Part II of this permit.
2. You must submit the information required in Part II on the latest version of the NOI form (or photocopy thereof). Your NOI must be signed and dated in accordance with Part VI of this permit.
3. No discharge under the general permit may commence until the discharger receives the Department's acknowledgement of the notice of intent (NOI) and approval of the coverage of the discharge by the general permit. The Department may deny coverage under this permit and require submittal of an application for an individual NPDES permit based on a review of the NOI.

4. Where the operator changes, or where a new operator is added after submittal of an NOI under Part II, a new NOI must be submitted in accordance with Part II within thirty (30) days of the change or addition.
5. For areas annexed into your MS4 area after you received coverage under this general permit, the first annual report submitted after the annexation must include the updates to your SWMP, as appropriate.

Note: If the Department notifies the dischargers (directly, by the public notice, or by making information available on the Internet) of other NOI form options that become available at a later date (e.g., electronic submission of forms), you may take advantage of those options to satisfy the NOI use and submittal requirements in Part II.

E. Implementation

1. This permit requires implementation of the MS4 Program under the State and Federal NPDES Regulations. MS4s shall modify their programs if and when water quality considerations warrant greater attention or prescriptiveness in specific components of the municipal program.
2. If a small MS4 operator implements the six minimum control measures in Section 122.34(b) and the discharges are determined to cause or contribute to non-attainment of an applicable water quality standard as evidenced by the State of Alabama's 303(d) list or an EPA-approved or developed Total Maximum Daily Load (TMDL), the operator must tailor its BMPs within the scope of the six minimum control measures to address the pollutants of concern.
3. Existing MS4s, unless otherwise stated within this permit, shall implement each of the minimum control measures outlined in Part III.B. of this permit within 180 days. New MS4s, unless otherwise stated in this permit, shall implement the minimum control measures outlined in Part III.B. of this permit within 365 days of the effective date of coverage. However, where new or revised ordinances are required to implement any of the minimum control measures, such ordinances shall be enacted within 730 days from the effective date of coverage.

PART II Notice of Intent (NOI) Requirements

A. Deadlines for Applications

1. If you are automatically designated under 40 CFR Part 122.32(a)(1) or designated by the Department, then to request recoverage, you are required to submit an NOI or an application for an individual permit and a description of your SWMP within 90 days before the expiration of this permit.
2. If you are designated by the Department after the date of permit issuance, then you are required to submit an NOI or an application for an individual permit and a description of your SWMP within 180 days upon notification.
3. You are not prohibited from submitting an NOI after the dates provided in Part II.A. If a NOI is submitted after the dates provided in Part II.A, your authorization is only for discharges that occur after permit coverage is granted. The Department reserves the right to take appropriate enforcement actions for any unpermitted discharges.
4. Within six months of the date of issuance of coverage under this permit, all operators of regulated small MS4s shall submit a storm water management program (SWMP) Plan to the Department. A SWMP Plan can be submitted electronically in a .PDF format, or in another prescribed manner acceptable to the Department that contains all necessary components.

B. Continuation of the Expired General Permit

If this permit is not reissued or replaced prior to the expiration date, it will be administratively continued in accordance with the ADEM Admin. Code r. 335-6-6 and remain in force and effect if the Permittee re-applies for coverage as required under Part II of this Permit. Any Permittee who was granted permit coverage prior to the expiration date will automatically remain covered by the continued permit until the earlier of:

1. Reissuance or replacement of this permit, at which time you must comply with the Notice of Intent conditions of the new permit to maintain authorization to discharge; or
2. Issuance of an individual permit for your discharges; or
3. A formal permit decision by the Department not to reissue this general permit, at which time you must seek coverage under an alternative general permit or an individual permit.

C. Contents of the Notice of Intent

The Notice(s) of Intent must be signed in accordance with Part VI of this permit and must include the following information:

1. Information on the Permittee:
   (a) The name of the regulated entity, specifying the contact person and responsible official, mailing address, telephone number, and email address (optional); and
   (b) An indication of whether you are a Federal, State, County, Municipal or other public entity.
2. Information on the municipal separate storm sewer system:
   (a) The Urbanized Area or Core Municipality (if you are not located in an Urbanized Area) where your system is located; the name of your organization, county(ies), city(ies), or town(s) where your MS4 is located, and the latitude and longitude of an approximate center of your MS4;

(b) The name of the major receiving water(s) and an indication of whether any of your receiving waters are included on the latest 303(d) list, included in an EPA-approved Total Maximum Daily Load (TMDL), or otherwise designated by the Department as being impaired. If you have discharges to 303(d), or TMDL waters, a certification that your SWMP complies with the requirements of Part IV.D.;

(c) If you are relying on another governmental entity, regulated under the storm water regulations (40 CFR Part 122.26 & 122.32) to satisfy one or more of your permit obligations (see Part III), the identity of that entity(ies) and the elements(s) they will be implementing. The Permittee remains responsible for compliance if the other entity fails to fully perform the permit obligation, and may be subject to enforcement action if neither the Permittee nor the other entity fully performs the permit obligation; and

(d) If you are relying on the Department for enforcement of erosion and sediment controls on qualifying construction sites in accordance with Part III.B.4(c),

3. Information on your chosen best management practices (BMPs) and the measurable goals for each of the storm water minimum control measures in Part III of this permit, your time frame for implementing each of the BMPs, and the person or persons responsible for implementing or coordinating your SWMP.

D. Where to Submit

1. You are to submit your NOI or individual application, and SWMP or a description of your SWMP as allowed under Part II.A.2., signed in accordance with the signatory requirements of Section VI of this permit, to the Department at the following address:

Alabama Department of Environmental Management
Water Division
Post Office Box 301463
Montgomery, Alabama 36130-1463

Certified and Registered Mail shall be addressed to:

Alabama Department of Environmental Management
Water Division
1400 Coliseum Boulevard
Montgomery, Alabama 36110-2059

E. Co-Permittees Under a Single Notice of Intent (NOI)

You may partner with other MS4s to develop and implement your SWMP. You may also jointly submit an NOI with one or more MS4s. The description of your SWMP must clearly describe which permittees are responsible for implementing each of the control measures.

PART III Storm Water Management Program (SWMP) for Small MS4s

A. Requirements

1. You must develop, implement, and enforce a SWMP designed to reduce the discharge of pollutants from your small MS4 to the maximum extent practicable (MEP) to protect water quality and to satisfy the appropriate water quality requirements of the Clean Water Act. The SWMP should include management practices; control techniques and system, design, and engineering methods; and such other provisions as the Department may determine appropriate for the control of such pollutants as follows:
   (a) The BMPs that you or another entity will implement for each of the storm water minimum control measures (Any technical information developed for the SWMP associated with system, design, and engineering methods must be prepared by a professional engineer, presently registered to practice in the State as required by Alabama Department of Environmental Management (ADEM) Admin. Code r. 335-6-3.);
   (b) Coordination among entities covered under this small MS4 permit may be necessary to comply with the conditions of the SWMP. The SWMP shall include, where applicable, condition mechanisms among entities covered under this permit to encourage coordinated storm water related policies, programs, and projects within adjoining or shared areas. Entities covered under the small MS4 permit include: municipalities, transportation agencies, universities, colleges, hospitals, prisons, and military bases;
   (c) The measurable goals for each of the BMPs including, as appropriate, the months and years in which you will undertake required actions, including interim milestones and the frequency of the action. Information about developing measurable goals can be found on the USEPA's website: http:cfpub.epa.gov/npdes/stormwater/measureablegoals/part3.cfm;
   (d) The person or persons responsible for implementing or coordinating the BMPs for your SWMP, and
   (e) Subject to the five-year limitation noted under Part III.A.1.b. of this paragraph, extensions of milestones may be granted for good cause shown. Failure to implement effective BMPs is not good cause to extend milestones.
2. The SWMP must include the following information for each of the six minimum control measures described in Section III.B. of this permit:
   (a) The Permittee must develop a storm water management program designed to reduce the discharge of pollutants from your small municipal separate storm sewer system to the maximum extent practicable (MEP) to protect water quality and satisfy the appropriate requirements of the Clean Water Act.
   (b) The Permittee shall use all known, available, and reasonable methods of prevention, control and treatment (BMPs) to prevent and control storm water pollution from entering waters of the State of Alabama.

B. Minimum Control Measures

You shall consider the use of Low Impact Development (LID)/Green Infrastructure where feasible to assist in attaining the six minimum control measures. Information on Low Impact Development (LID)/Green Infrastructure is available on the following website: http://epa.gov/nps/lid. The six minimum control measures that must be included in your SWMP are:

1. Public Education and Outreach on Storm Water Impacts

(a) Permit requirement: The Permittee must implement a public education and outreach program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of discharges on water bodies and the steps that the public can take to reduce pollutants in storm water runoff to the maximum extent practicable. This program is the continuous implementation in the areas served by the MS4 as established in the previous permit cycle, if applicable.

(b) Documentation: The Permittee must document the methodology for the development of a storm water public education and outreach program. The rationale statement should be included in the SWMP and annual report and must address the overall public education program and the individual BMPs, measurable goals and responsible persons for your program. The rationale statement must include the following information, at a minimum:

(i) How the Permittee plans to inform individuals and households about the steps they can take to reduce storm water pollution.

(ii) How the Permittee plans to inform individuals and groups on how to become involved in the storm water program (with activities such as local stream, lake, and beach restoration activities).

(iii) Who are the target audiences for the education program who are likely to have significant storm water impacts (including commercial, industrial, and institutional entities) and why those target audiences were selected.

(iv) What are the target pollutant sources the Permittee's public education program is designed to address.

(v) What is the outreach strategy, including how the Permittee plans to inform the target audiences, the mechanisms and activities (e.g., printed brochures, newspapers, media, workshops, etc.) the Permittee will use to reach the target audiences, and how many people does the Permittee expect to reach by the Permittee's outreach strategy over the permit term.

(vi) Who is responsible for overall management and implementation of your storm water public education and outreach program and, if different, who is responsible for each of the BMPs identified for this program.

(vii) How will the Permittee evaluate the overall success of this minimum measure.

(c) Education and outreach efforts shall be prioritized to target the following audiences and subject areas:

(i) General Public

- General impacts of storm water flows into surface waters.
- Impacts from impervious surfaces.
- Source control BMPs and environmental stewardship actions and opportunities in the areas of pet waste, vehicle maintenance, landscaping, and rain water reuse.

(ii) General Public, Businesses, Including Home-Based and Mobile Businesses

- BMPs for use and storage of automotive chemicals, hazardous cleaning supplies, carwash soaps and other hazardous materials.
- Impacts of illicit discharges and how to report them.

(iii) Homeowners, Landscapers, and Property Managers

- Yard care techniques that protect water quality.
- BMPs for use and storage of pesticides and fertilizers.
- BMPs for carpet cleaning and auto repair and maintenance.
- Runoff reduction techniques, including site design, pervious paving, retention of forests, and mature trees.
- Storm water pond maintenance.

(iv) Engineers, Contractors, Developers, Review Staff, and Land Use Planners

- Technical standards for construction site sediment and erosion control.
- Runoff reduction techniques, including site design, pervious pavement, alternative parking lot design, retention of forests and mature trees.
- Storm water treatment and flow control BMPS.
- Impacts of increased storm water flows into receiving water bodies.

2. Public Involvement/Participation

The SWMP shall include ongoing activities for public involvement through mechanisms such as advisory councils, watershed associations, committees, participation on rate structures, stewardship programs, and environmental related activities. The Permittee shall implement a process to facilitate opportunities for direct action, education, and volunteer programs such as storm drain stenciling, urban stream cleanup, and volunteer monitoring.

(a) Permit requirement: The Permittee must at a minimum, comply with applicable State and local public notice requirements when implementing a public involvement/participation program.

(b) Documentation: The Permittee shall consider development of opportunities for the public to participate in the decision making process involving the development and update of the SWMP. The Permittee must document the methodology for the development of the public involvement/participation program. The methodology should include a rationale statement in the SWMP and annual report and must address the overall public involvement/participation program and document individual BMPs, measurable goals, and responsible persons for implementing the program. The rationale statement must include the following information, at a minimum:

(i) How the Permittee has involved the public in the development and submittal of the storm water management program.

(ii) What is the Permittee's plan to actively involve the public in the development and implementation of the program.

(iii) The target audiences for the public involvement program, including a description of the audiences' demographic characteristic. The Permittees are encouraged to actively involve all potentially affected stakeholder groups, including commercial and industrial businesses, trade associations, environmental groups, homeowners associations, and educational organizations, among others.

(iv) What are the types of public involvement activities included in the program. Where appropriate, consider the following types of public involvement activities:

- Citizen representative on a storm water management panel.
- Public hearings.
- Working with citizen volunteers willing to educate others about the program.
- Storm drain marking, stenciling, and tagging, volunteer monitoring or stream/lake/beach clean-up activities.

(v) Who is responsible for overall management and implementation of the Permittee's storm water public involvement/participation program and, if different, who is responsible for each of the BMPs identified for this program.

(vi) How the Permittee will evaluate the success of this minimum measure, including how the Permittee selected the measurable goal for each minimum measure.

(vii) The Permittee shall make their SWMP and their annual reports required under this permit available to the public when requested. The current SWMP and the latest annual report should be posted on the Permittee's website, if available. To comply with the posting requirement, if a Permittee does not maintain a website, they may submit the updated SWMP and annual report to the Department for electronic distribution when requested in accordance with the Department's public records process.

3. Illicit Discharge Detection and Elimination (IDDE)

(a) Permit requirement: The Permittee must:

(i) The SWMP shall include an ongoing program to detect and eliminate illicit discharges (as defined in 40 CFR Part 122.26(b)(2)) into the Permittee's small MS4, and improper disposal, including spills not under the purview of another responding authority, into the MS4 owned or operated by the Permittee, to the maximum extent practicable.

(ii) The Permittee's existing storm sewer map(s) that were created during the first permit cycle shall be updated on an annual basis and shall include the following: location of all outfalls and the names and location of all waters of the State that receive discharges from those outfalls; structural BMPs owned, operated, and maintained by boundaries of the Permittee's watershed. The Permittee may also opt to include land use on the map(s). In the process of updating the map(s) the following should be added: storm water outfalls which become known; an update of known connections to the MS4 authorized or allowed by the Permittee after the effective date of permit coverage; any geographic areas which may discharge storm water into the Permittee's MS4, which may not be located within the municipal boundary. Newly permitted MS4s must develop a storm sewer system map(s) with the following requirements as stated above in B.3.(a)(2);

(iii) To the extent allowable under State and local law, effectively prohibit, through ordinance, or other regulatory mechanism, non- storm water discharges into your storm sewer system that are not listed in Part I.B. and implement appropriate enforcement procedures and actions. The ordinance or other regulatory mechanism shall include escalating enforcement procedures and actions. The Permittee shall develop an enforcement strategy and implement the enforcement provisions of the ordinance or other regulatory mechanism. The ordinance or other regulatory mechanism shall be reviewed on an annual basis and updated when necessary;

(iv) The Permittee shall also implement a program to review and update their IDDE ordinance or other regulatory mechanism to prohibit and eliminate illegal discharges and/or dumping into the Permittee's MS4. The ordinance or other regulatory mechanism shall be reviewed on an annual basis and updated when necessary. Newly permitted MS4s shall develop the aforementioned program. This program shall include:

- Procedures for locating priority areas likely to have illicit discharges, including at a minimum, evaluating land uses associated with business/industrial activities present; areas where complaints have been registered in the past; and areas with storage of large quantities of materials that could result in spills;
- Field assessment activities, including visual inspections of priority outfalls identified in (a) above, during dry weather and for the purpose of verifying the outfall locations, identifying previously unknown outfalls, and detecting illicit discharges;

(v) Inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste;

(vi) Address the following categories of non-storm discharges or flows (i.e., illicit discharges) only if the Department identifies them as significant contributors of pollutants to your small MS4: water line flushing, landscape irrigation, diverted stream flows, rising ground waters, uncontaminated ground water infiltration (infiltration is defined as water other than wastewater that enters a sewer system, including foundation drains, from the ground through such means as defective pipes, pipe joints, connections, or manholes. Infiltration does not include, and is distinguished from, inflow), uncontaminated pumped ground water, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, springs, water from crawl space pumps, footing drains, lawn watering run-off, individual residential car washing, flows from riparian habitats and wetlands, discharge or flows from firefighting activities (to include fire hydrant flushing); dechlorinated swimming pool discharges, and residual street wash water, discharge authorized by and in compliance with a separate NPDES permit; and

(vii) The Permittee may also develop a list of other similar occasional incidental non-storm water discharges (e.g. non-commercial or charity car washes, etc.) that will not be addressed as illicit discharges. These non- storm water discharges must not be reasonably expected (based on information available to the permittees) to be significant sources of pollutants to the municipal separate storm sewer system, because of either the nature of the discharges or conditions you have established for allowing these discharges to your MS4 (e.g., a charity car wash with appropriate controls on frequency, proximity to impaired waterbodies, BMPs on the wash water, etc.). You must document in your SWMP any local controls or conditions placed on the discharges. The Permittee must include a provision prohibiting any individual non- storm water discharge that is determined to be contributing significant amounts of pollutants to your MS4.

(b) Documentation: The Permittee must document your methodology for the development of a storm water illicit discharge detection and elimination program. The rationale statement should be included in the SWMP and annual report and must address the overall illicit discharge detection and elimination program and the individual BMPs, measurable goals, and responsible persons for the Permittee's program. The rationale statement must include the following information, at a minimum:

(i) How the Permittee will develop a storm water map showing the location of all outfalls, to include the latitude and longitude, and the names and location of all receiving waters. Describe the sources of information the Permittee used for the maps, and how you plan to verify the outfall locations with field surveys. If already completed, describe how you developed this map. Also, the Permittee must submit an updated map with each annual report unless there are no changes to the map that was previously submitted. When there are no changes to the map, the annual report must state this.

(ii) The mechanism (ordinance or other regulatory mechanism) you will use to effectively prohibit illicit discharges into the MS4 and why you chose that mechanism. If the Permittee needs to develop this mechanism, describe the plan and a schedule to do so. If the ordinance or regulatory mechanism is already developed, include a copy of the relevant sections with the program.

(iii) The plan to ensure through appropriate enforcement procedures and actions that the illicit discharge ordinance (or other regulatory mechanism) is implemented.

(iv) The plan to detect and address illicit discharges to your system, including discharges from illegal dumping and spills. The Permittee's plan must include, to the extent practicable, dry weather field screening for non-storm water flows and field tests of chemical parameters you selected as indicators of discharge sources. The plan must also address on-site sewage disposal systems that flow into the storm drainage system. The description must address the following, at a minimum:

- Procedures for locating priority areas which includes areas with higher likelihood of illicit connections (e.g., areas with older sanitary sewer lines, for example) or ambient sampling to locate impacted reaches.
- Procedures for tracing the source of an illicit discharge, including the specific techniques you will use to detect the location of the source.
- Procedures for removing the source of the illicit discharge.
- Procedures for program evaluation and assessment.

(v) How the Permittee plans to inform the public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste. Include in the description how this plan will coordinate with the public education minimum measure and the pollution prevention/good housekeeping minimum measure programs.

(vi) Who is responsible for overall management and implementation of the illicit discharge detection and elimination program and, if different, who is responsible for each of the BMPs identified for this program.

(vii) How the Permittee will evaluate the success of this minimum measure, including how the Permittee selected the measurable goal for each minimum measure.

4. Construction Site Storm Water Runoff Control

(a) Within 730 days from the effective date of coverage under this permit, all Permittees must develop, implement, and enforce a program to reduce, to the maximum extent practicable, pollutants in any storm water runoff to the regulated MS4 from construction activities that result in a total land disturbance of greater than or equal to one acre and activities that disturb less than one acre but are part of a larger common plan of development or sale that would disturb one acre or more (hereinafter "qualifying construction sites").

(b) The SWMP must include the following components for construction site storm water runoff control:

(i) To the extent allowable under State law, an ordinance or other regulatory mechanism to require erosion and sediment controls, sanctions to ensure compliance, and to provide all other authorities needed to implement the requirements of Part III.B.4. of this permit.

(ii) A training program for MS4 site inspection staff in the identification of appropriate construction best management practices (example: QCI training in accordance with ADEM Admin Code. r. 335-6-12 or the Alabama Construction Site General Permit);

(iii) Procedures for the periodic inspection of qualifying construction sites to verify the use of appropriate erosion and sediment control practices that are consistent with the *Alabama Handbook for Erosion Control, Sediment Control, And Stormwater Management on Construction Sites and Urban Areas* published by the Alabama Soil and Water Conservation Committee (hereinafter the "Alabama Handbook"). The frequency and prioritization of inspection activities shall be documented in the SWMP and must include a minimum inspection frequency of once each month for priority construction sites.

(iv) Specific procedures for construction site plan (including erosion prevention and sediment controls) review and approval: The MS4 procedures must include an evaluation of plan completeness and overall BMP effectiveness.

(v) Procedures to notify ADEM of non-compliant construction sites discovered during periodic inspections. The notification must provide, at a minimum, the specific location of the construction project, the name and contact information from the owner or operator, and a summary of the site deficiencies.

(c) ADEM implements a State-wide NPDES construction storm water regulatory program. As provided by 40 CFR Part 122.35(b), the Permittee may rely on ADEM for the setting of standards for appropriate erosion controls and sediment controls for qualifying construction sites and for enforcement of such controls. If not relying on ADEM's program, then the Permittee must include the following, at a minimum, in its SWMP:

(i) Requirements for construction site operators to implement appropriate erosion and sediment control BMPs consistent with the *Alabama Handbook for Erosion Control, Sediment Control, And Stormwater Management on Construction Sites and Urban Areas* published by the Alabama Soil and Water Conservation Committee (hereinafter the "Alabama Handbook").

(ii) Requirements for construction site operators to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality.

(iii) Development and implementation of an enforcement strategy that includes escalating enforcement remedies to respond to issues of non-compliance.

(iv) An enforcement tracking system designed to record instances of non-compliance and the MS4's responding actions. The enforcement case documentation should include:

- Name of owner/operator;
- Location of construction project or industrial facility;
- Description of violation;
- Small MS4 General NPDES Permit
- Required schedule for returning to compliance;
- Description of enforcement response used, including escalated responses if repeat violations occur or violations are not resolved in a timely manner;
- Accompanying documentation of enforcement response (e.g., notices of noncompliance, notices of violations, etc.);
- Any referrals to different departments or agencies;
- Date violation was resolved.

(d) The Permittee must keep records of all inspections (i.e. inspection reports), site plan reviews and employee training required by Part III.4.(b).

(e) The Permittee must document the decision process for the development of a construction site storm water control program. The rationale statement should be included in the SWMP and annual report and must address the overall construction site storm water control program and the individual BMPs, measurable goals, and responsible persons for the Permittee's program. The rationale statement must include the following information, at a minimum:

(i) The mechanism (ordinance or other regulatory mechanism, as allowed in accordance with 40 CFR 122.34(b)(4)(ii)(A)),) the Permittee will use to require erosion and sediment controls at construction sites and why the Permittee chose that mechanism. If the Permittee needs to develop this mechanism, describe the plan and a schedule to do so. If the ordinance or regulatory mechanism is already developed, include a copy of the relevant sections within the SWMP description.

(ii) Plan to ensure compliance with the erosion and sediment control regulatory mechanism, including the sanctions and enforcement mechanisms the Permittee will use to ensure compliance. Describe the procedures for when the Permittee will use certain sanctions. Possible sanctions include non-monetary penalties (such a stop work orders), fines, bonding requirements, and/or permit denials for non-compliance.

(iii) The requirements for construction site operators to implement appropriate erosion and sediment control BMPs and control waste at construction sites that may cause adverse impacts to water quality. Such waste includes discarded building materials, concrete truck washouts, chemicals, litter, and sanitary waste.

(iv) The procedures for plan review, including the review of pre-construction site plans, which incorporate consideration of potential water quality impacts. For construction projects that discharge the pollutant or pollutants of concern to a water body that is listed on the State of Alabama's 303(d) list or has an EPA approved or EPA developed TMDL, you must follow the requirements of Part IV.D. of this permit.

(v) The procedures for receipt and consideration of information submitted by the public. Consider coordinating this requirement with the public education program.

(vi) The procedures for site inspection and enforcement of control measures, including how the Permittee will prioritize sites for inspection.

(vii) Who is responsible for overall management and implementation of the Permittee's construction site storm water control program and, if different, who is responsible of each of the BMPs identified for this program.

(viii) Describe how the Permittee will evaluate the success of this minimum measure, including how the Permittee selected the measurable goals for each of the BMPs.

5. Post-Construction Storm water management in new Development and Redevelopment

Post-Construction Stormwater Management refers to the activities that take place after construction occurs, and includes structural and non-structural controls to obtain permanent stormwater management over the life of the property's use. All Permittees must implement the requirements of Part III.B.5. within 730 days from the effective date of coverage.

(a) The Permittee shall develop and implement project review, approval, and enforcement procedures for new development and redevelopment projects that disturb greater than one acre, and projects less than one acre that are part of a larger common plan of development or sale. Further requirements for project review and approval are as follows:

(i) Develop procedures for the site-plan review and approval process and a required re-approval process when changes to post-construction controls are required.

(ii) Develop procedures for a post-construction process to demonstrate and document that post-construction stormwater measures have been installed per design specifications, which includes enforceable procedures for bringing noncompliant projects into compliance.

(b) The Permittee must develop and implement strategies which include a combination of structural and/or non-structural BMPs designed to ensure, to the maximum extent practicable, that the volume and velocity of pre-construction stormwater runoff is not significantly exceeded. A design rainfall event with an intensity up to that of a 2yr-24hr storm event shall be the basis for the design and implementation of post-construction BMPs.

(c) To the extent allowable under State law, the Permittee must develop and institute the use of an ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment projects.

(d) The Permittee must develop procedures for development site plan review and approval to ensure post-construction BMPs are addressed.

(e) The Permittee must ensure adequate long-term operation and maintenance of BMPs. The MS4 shall require a maintenance agreement and provide verification of maintenance provisions of post-construction management practices. These agreements shall allow the MS4, or its designee, to conduct inspections of the management practices and also account for transfer of responsibility in leases and/or deed transfers. Verification shall include one or more of the following as applicable:

(i) The developer's signed statement accepting responsibility for maintenance until the maintenance responsibility is legally transferred to another party; and/or

(ii) Written conditions in the sales or lease agreement that require the recipient to assume responsibility for maintenance; and/or

(iii) Written conditions in project conditions, covenants and restrictions for residential properties assigning maintenance responsibilities to a home owner's association, or other appropriate group, for maintenance of structural and treatment control management practices; and/or

(iv) Any other legally enforceable agreement that assigns permanent responsibility for maintenance of structural or treatment control management practices.

(f) The Permittee shall review and evaluate policies and ordinances related to building codes, or other local regulations, with a goal of identifying regulatory and policy impediments to the installation of green infrastructure and low-impact development techniques.

(g) The Permittee must document the decision process for the development of a post-construction SWMP. The rationale statement should be included in the SWMP and annual report and must address the overall post-construction SWMP and the individual BMPs, measurable goals, and responsible persons for the Permittee's program. The rationale statement must include the following information, at a minimum:

(i) The program to address storm water runoff from new development and redevelopment projects. Include in this description any specific priority areas for this program.

(ii) How the program will be specifically tailored for the Permittee's local community, minimize water quality impacts, and attempt to maintain pre-development runoff conditions.

(iii) Any non-structural BMPs in the program, including, as appropriate:

- Policies and ordinances that provide requirements and standards to direct growth to identified areas, protect sensitive areas such as wetlands and riparian areas, maintain and/or increase open space (including a dedicated funding source for open space acquisition), provide buffers along sensitive water bodies, minimize impervious surfaces, and minimize disturbance of soils and vegetation.
- Policies or ordinances that encourage infill development in higher density urban areas, and areas with existing storm sewer infrastructure.
- Education programs for developers and the public about project designs that minimize water quality impacts.
- Other measures such as: minimization of the percentage of impervious areas after development, and source control measures often thought as good housekeeping, preventative maintenance and spill prevention.

(iv) Any structural BMPs in the program, including, as appropriate:

- Storage practices such as wet ponds, and extended-detention outlet structures.

- Filtration practices such as grassed swales, bioretention cells, sand filters and filter strips.
- Infiltration practices such as infiltration basin and infiltration trenches.

(v) The mechanisms (ordinance or other regulatory mechanisms) the Permittee will use to address post-construction runoff from new development and redevelopments and the rationale for that mechanism. If the Permittee needs to develop a mechanism, describe the plan and a schedule to do so. If the ordinance or regulatory mechanism is already developed, include a copy of the relevant sections with the program.

(vi) How you will ensure the long-term operation and maintenance (O&M) of the selected BMPs. Options to help ensure that future O&M responsibilities are clearly identified include an agreement between the Permittee and another party such as the post-development landowners or regional authorities.

(vii) How the Permittee will evaluate the success of this minimum measure.

6. Pollution Prevention/Good Housekeeping for Municipal Operations

(a) The Permittee must develop and implement a program for pollution prevention/good housekeeping for municipal operations.

(b) The Permittee must develop and implement an employee training program that uses training materials that are available from EPA, the State or other organizations and is designed to prevent and reduce storm water pollution, to the maximum extent practicable, from activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, storm water system maintenance, and all other applicable municipal operations.

(c) Documentation: The Permittee must document the methodology for the development of a pollution prevention/good housekeeping program for municipal operations. The rationale statement should be included in the SWMP and annual report and must address both the overall pollution prevention/good housekeeping program; the individual BMPs measurable goals, and responsible persons for the Permittee's program. The rationale statement must include the following information, at a minimum:

(i) The operation and maintenance program to prevent or reduce pollutant runoff from the Permittee's municipal operations. The program should list the municipal operations and industrial activities that are impacted by this operation and maintenance program.

(ii) Any government employee training program the Permittee will use to prevent and reduce the storm water pollution from activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and storm water system maintenance. Describe any existing, available materials the Permittee plans to use. Describe how this training program will be coordinated with the outreach programs developed for the public information minimum measure and the illicit discharge minimum measure.

(iii) The program should address the following areas, at a minimum:

- Maintenance activities, maintenance schedules, and long-term inspection procedures for controls to reduce floatables and other pollutants to your MS4.
- Controls for reducing or eliminating the discharge of pollutants from streets, roads, highways, municipal parking lots, maintenance and storage yards, waste transfer stations, recycling collection centers, fleet or maintenance shops with outdoor storage areas, salt/sand storage locations, and snow disposal areas you operate.

- Procedures for the proper disposal of waste removed from your MS4 and your municipal operations, including materials such as dredge spoil, accumulated sediments, floatables, and other debris.
- Procedures to ensure that new flood management projects are assessed for impacts on water quality and existing projects are assessed for incorporation of additional water quality protection devices or practices.

(iv) Who is responsible for overall management and implementation of the Permittee's pollution prevention/good housekeeping program and, if different, who is responsible for each of the BMPs identified for this program.

(v) How the Permittee will evaluate the success of this minimum measure, including how you selected the measurable goals for each of the BMPs.

PART IV Special Conditions

A. Sharing Minimum Measure Responsibility and Coordination Between MS4s

1. If you are relying on another MS4 regulated under the storm water regulations or the Department to satisfy one or more of your permit obligations, you must note that fact in your storm water management program. This other entity must, in fact, implement the control measure(s); the measure of component thereof, must be at least as stringent as the corresponding NPDES permit requirement; and the other entity, unless it is the Department, must agree to implement the control measure on your behalf. This agreement between the two or more parties must be documented in writing in the storm water management plan and be retained by the Permittee for the duration of this permit, including any automatic extensions of the permit term. Except as provided by Part IV.A.2, the Permittee remains responsible for compliance with this Permit if the other entity fails to implement the permit requirement.
2. If the Permittee is relying on the Department for enforcement of erosion and sediment controls on qualifying construction sites and has included that information in the NOI as required by Part II.C.2.(d), the Permittee is not responsible for taking enforcement action or for implementing the requirements of Part III.B.4(c) of this permit in the event the Department receives notification of non-compliant construction sites from the Permittee as required by Part III.B.4(b)(v).
3. Coordination among entities covered under the small MS4 general permit may be necessary to comply with certain conditions of the SWMP. The SWMP shall include, when applicable:
   (a) Coordination mechanisms among entities covered under the small MS4 general permit to encourage coordinated storm water related policies, programs and projects within adjoining or shared areas. Entities covered under the small MS4 permit include, municipalities, transportation agencies, universities, colleges, hospitals, prisons, and military bases.
   (b) Coordination mechanisms shall specify roles and responsibilities for the control of pollutants between physically interconnected MS4s permittees covered by the small MS4 general permit.
   (c) Coordination mechanisms shall coordinate storm water management activities for shared water bodies among permittees to avoid conflicting plans, policies and regulations.
   (d) The SWMP shall include coordination mechanisms among departments within each Permittee to eliminate barriers to compliance with the terms of this permit.

B. Reviewing and Updating Storm Water Management Programs

1. SWMP Review: You must do an annual review of your SWMP in conjunction with preparation of the annual report required under Part V.
2. SWMP Update: You may change your SWMP during the life of the permit in accordance with the following procedures:
   (a) Changes adding (but not subtracting or replacing) components, controls, or requirements to the SWMP may be made at any time upon written notification to the Department. These changes must be documented in the annual report.
   (b) Changes replacing an ineffective or unfeasible components, control measures, or requirements specifically identified in the SWMP, with an alternate component, control measures, or requirements may be requested at any time. Unless denied by the Department, changes proposed in accordance with the criteria below shall be deemed approved and may be implemented sixty (60) days from submittal of the request. If the request is denied, the Department will send you a written response giving a reason for the decision. Your modification requests must include the following:

(i) An analysis of why the components, control measures or requirements is ineffective or infeasible (including cost prohibitive),

(ii) Expectations on the effectiveness of the replacement components, control measures or requirements, and

(iii) An analysis of why the replacement components, control measures or requirements are expected to achieve the goals of the components, control measures or requirements to be replaced.

(c) Change requests or notifications must be made in writing and signed in accordance with Part VI.

3. SWMP Updates Required by the Department: The SWMP shall be updated as part of the re-coverage process for subsequently issued MS4 general permits. In addition, the Department may require changes to the SWMP as needed to:

(a) Meet the conditions of the permit;

(b) Address impacts on receiving water quality caused, or contributed to, by discharges from the municipal separate storm sewer system;

(c) Include more stringent requirements necessary to comply with new Federal statutory or regulatory requirements; or

(d) Include such other conditions deemed necessary by the Department to comply with the goals and requirements of the Clean Water Act.

(e) Include additional control measures when a Total Maximum Daily Load (TMDL) and/or a 303(d) impairment has been specified for a receiving waterbody, if applicable or if the SWMP proves inadequate in reducing pollutants in storm water run-off;

(f) Changes requested by the Department must be made in writing, set forth the time schedule for you to develop the changes, and offer you the opportunity to propose alternative program changes to meet the objective of the requested modification. All changes required by the Department will be made in accordance with 40 CFR Part 124.5, 40 CFR Part 122.62, or as appropriate 40 CFR Part 122.63.

4. Transfer of Ownership, Operational Authority, or Responsibility for SWMP Implementation: You must implement the SWMP on all new areas added to your portion of the municipal separate storm sewer system (or for which you become responsible for implementation of storm water quality controls) as expeditiously as practicable, but not later than one (1) year from addition of the new areas. Implementation may be accomplished in a phased manner to allow additional time for controls that cannot be implemented immediately.

(a) Within ninety (90) days of a transfer of ownership, operational authority, or responsibility for SWMP implementation, you must have a plan for implementing your SWMP in all affected areas. The plan may include schedules for implementation. Information on all new annexed areas and any resulting updates required to the SWMP must be included in the annual report.

(b) Only those portions of the SWMPs specifically required as permit conditions shall be subject to the modification requirements of 40 CFR Part 124.5. Addition of components, controls, or requirements by the Permittee(s) and replacement of an ineffective or infeasible BMP implementing a required component of the SWMP with an alternate BMP expected to achieve the goals of the original BMP shall be considered minor changes to the SWMP and not modifications to the permit.

C. Discharge Compliance with Water Quality Standards

This general permit requires, at a minimum, that permittees develop, implement and enforce a storm water management program designed to reduce the discharge of pollutants to the maximum extent practicable. Full implementation of BMPs, using all known, available, and reasonable methods of prevention, control and treatment to prevent and control storm water pollution from

entering waters of the State of Alabama is considered an acceptable effort to reduce pollutants from the municipal storm drain system to the maximum extent practicable.

D. Discharge to Impaired Waters

1. 303(d) Listed Waters

   This permit does not authorize new sources or new discharges of pollutants of concern to impaired waters unless consistent with an EPA approved or EPA developed Total Maximum Daily Load (TMDL) and applicable State law. Impaired waters are those that do not meet applicable water quality standards and are identified on the State of Alabama's 303(d) list. Pollutants of concern are those pollutants for which the water body is listed as impaired and which contribute to the listed impairment.

   (a) You must determine whether the discharge from any part of the MS4 contributes to a waterbody that is included on the latest 303(d) list or designated by the Department as impaired or is included in an EPA approved or EPA developed TMDL. If you have discharges meeting this criterion, you must comply with Part IV.D., if you do not, Part IV.D. does not apply to you.

   (b) MS4s that discharge into a receiving water which is listed on the State of Alabama's 303(d) list of impaired waters, and with discharges that contain the pollutant(s) for which the water body is impaired, must within six (6) months of the Final 303(d) list approval, document in the SWMP how the BMPs will control the discharge of the pollutant(s) of concern, and must ensure that the discharge will not cause or contribute to the impairment. A monitoring plan to assess the effectiveness of the BMPs in achieving the wasteload allocations must also be included in the SWMP.

   (c) If your MS4 discharges to a waterbody described above, you must also determine whether a total maximum daily load (TMDL) has been developed by EPA or approved by EPA for the listed waterbody. If a TMDL is approved during this permit cycle by USEPA for any waterbody into which an MS4 discharges, the MS4 must review the applicable TMDL to see if it includes requirements for control of storm water discharges. Within six (6) months of the date of a final TMDL issuance,, the MS4 must notify the Department on how it will modify its storm water management program to include best management practices specifically targeted to achieve the wasteload allocations prescribed by the TMDL. The MS4 must include a monitoring component in the SWMP to assess the effectiveness of the BMPs in achieving the wasteload allocations.

2. Discharging into Waters with EPA Approved or EPA Developed TMDLs

   (a) Determine whether the EPA approved or EPA developed TMDL is for a pollutant likely to be found in storm water discharges from your MS4.

   (b) Determine whether the TMDL includes a pollutant allocation or other performance requirements specifically for storm water discharge from your MS4.

   (c) Determine whether the TMDL addresses a flow regime likely to occur during periods of storm water discharge.

   (d) After the determinations above have been made and if it is found that your MS4 must implement specific allocations provisions of the TMDL, assess whether the allocations are being met through implementation of existing storm water control measures or if additional control measures are necessary.

   (e) Involve the public in accordance with Part III.B.2. of a decision that existing storm water control measures are meeting the allocations or the additional control measures that you determine are necessary.

(f) Document all control measures currently being implemented or planned to be implemented. Also include a schedule of implementation for all planned controls. Document the calculations or other evidence that shows that the allocations will be met.

(g) If a TMDL contains requirements for control of pollutants from the MS4 storm water discharges, then the SWMP must include BMPs specifically targeted to achieve the wasteload allocations prescribed by the TMDL. A monitoring plan to assess the effectiveness of the BMPs in achieving the wasteload allocations must also be included in the SWMP. Implementation of the monitoring plan in accordance with Part V.A.2 will determine whether the storm water controls are adequate to meet the TMDL allocations.

(h) If the evaluation shows that additional or modified controls are necessary, describe the type and schedule for the control additions/revisions. Continue Paragraphs IV.D.2.d.-h. until two continuous monitoring cycles, as defined in the approved monitoring plan in accordance with Part V.A.2., show that the TMDL allocations are being met or that water quality (WQ) standards are being met.

E. Requiring an Individual Permit

The Department may require any person authorized by this permit to apply for and/or obtain an individual NPDES permit. When the Department requires application for an individual NPDES permit, the Department will notify the Permittee in writing that a permit application is required. This notification shall include a brief statement of the reasons for this decision, an application form and a statement setting a deadline for the Permittee to file the application.

PART V Monitoring, Recordkeeping, and Reporting

A. Monitoring

1. You must evaluate program compliance, the appropriateness of identified BMPs, and progress toward achieving identified measurable goals. If you discharge to an impaired water or to a water for which a TMDL has been approved by EPA, you may have monitoring requirements under Part IV.D.
2. When you conduct monitoring at your permitted small MS4, you are required to comply with the following:
   (a) Submit the monitoring plan. The proposed monitoring plan and any subsequent revision proposed must be submitted to the Department six (6) months from the date of coverage of this permit and annually, thereafter, concurrent with the SWMP Annual Report submittal for approval.
   (b) Representative monitoring. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.
   (c) Test Procedures. Analysis must be conducted according to test procedures approved by EPA under 40 CFR Part 136. When an EPA approved test procedure for analysis of a pollutant does not exist, the Director or his designee shall approve the procedure to be used.
3. Records of monitoring information shall include:
   (a) The date, exact place, and time of sampling or measurements;
   (b) The name(s) of the individual(s) who performed the sampling or measurements;
   (c) The date(s) analyses were performed;
   (d) The names of the individuals who performed the analyses;
   (e) The analytical techniques or methods used; and
   (f) The results of such analyses.
4. Discharge Monitoring Report. Monitoring results must be reported with the SWMP Annual Report and shall be reported in accordance with Part V.C.f. and the monitoring plan approved in Part V.A.2.a.

B. Record keeping

1. You must retain required records of all monitoring information, including, all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, copies of monitoring reports, a copy of the NPDES permit, and records of all data used to complete the application (NOI) for this permit, for a period of at least three years from the date of the sample, measurement, report or application, or for the term of this permit, whichever is longer. This period may be extended by request of the Department at any time.
2. You must submit your records to the Department only when specifically asked to do so. You must retain a description of the SWMP required by this permit (including a copy of the permit language) at a location accessible to the Department. You must make your records, including the notice of intent (NOI) and the description of the SWMP, available to the public if requested to do so in writing.

C. Reporting

1. You must submit annual reports to the Department each year by March 31st. Annual Reports should cover the year (April 1 through March 31) prior to the submittal date. (For example, Annual Reports submitted March 31, 2011 should cover the time period of April 1, 2010

through March 31, 2011). If an entity comes under coverage for the first time after the issuance of this permit, then the first annual report should cover from the time coverage begins until the required submittal date of March 31. The report must include:

(a) The status of your compliance with permit conditions, an assessment of the appropriateness of the identified BMPs, progress towards achieving the statutory goal of reducing the discharge of pollutants to the MEP, and the measurable goals for each of the minimum control measures;

(b) Results of information collected and analyzed, if any, during the reporting period, including any monitoring data used to assess the success of the program at reducing the discharge of pollutants to the MEP;

(c) A summary of the storm water activities you plan to undertake during the next reporting cycle (including an implementation schedule);

(d) Proposed changes to your SWMP, including changes to any BMPs or any identified measurable goals that apply to the program elements;

(e) Notice that you are relying on another government entity to satisfy some of your permit obligations (if applicable); and

(f) All monitoring results collected during the previous year in accordance with Part V, if applicable. The monitoring reports shall be submitted in a format acceptable to the Department.

PART VI Standard Permit Conditions

A. Duty to Comply

You must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of CWA and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

B. Continuation of the Expired General Permit

If this permit is not reissued or replaced prior to the expiration date, it will be administratively continued in accordance with the ADEM Admin. Code r. 335-6-6 and remain in force and effect if the permittee reapplies for coverage as required under Part II of this Permit. Any permittee who was granted permit coverage prior to the expiration date will automatically remain covered by the continued permit until the earlier of:

1. Reissuance or replacement of this permit, at which time you must comply with the Notice of Intent conditions of the new permit to maintain authorization to discharge; or
2. Issuance of an individual permit for your discharges; or
3. A formal permit decision by the Department not to reissue this general permit, at which time you must seek coverage under an alternative general permit or an individual permit.

C. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for you in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. Duty to Mitigate

You must take all reasonable steps to minimize or prevent any discharge in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

E. Duty to Provide Information

The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, suspending, or terminating the permit or to determine compliance with the permit. The permittee shall also furnish to the Director upon request, copies of records required to be kept by the permit.

F. Other Information

If you become aware that you have failed to submit any relevant facts in your Notice of Intent or submitted incorrect information in the Notice of Intent or in any other report to the Department, you must promptly submit such facts or information.

G. Signatory Requirements

All Notices of Intent, reports, certifications, or information submitted to the Department, or that this permit requires be maintained by you shall be signed and certified as follows:

1. Notice of Intent. All Notices of Intent shall be signed by a responsible official as set forth in ADEM Admin. Code r. 335-6-6-.09.

2. Reports and other information. All reports required by the permit and other information requested by the Department or authorized representative of the Department shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
   (a) Signed authorization. The authorization is made in writing by a person described above and submitted to the Department.
   (b) Authorization with specified responsibility. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of manager, operator, superintendent, or position of equivalent responsibility for environmental matters for the regulated entity.
3. Changes to authorization. If an authorization is no longer accurate because a different operator has the responsibility for the overall operation of the MS4, a new authorization satisfying the requirement of Part VI.G.2.b. above must be submitted to the Department prior to or together with any reports or information, and to be signed by an authorized representative.
4. Certification. Any person signing documents under Part VI.F.1-2. above shall make the following certification:

   "*I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*"

H. Property Rights

The issuance of this permit does not convey any property rights of any sort, or any exclusive privilege, nor it does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations

I. Proper Operation and Maintenance

You must at all time properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by you to achieve compliance with the conditions of this permit and with the conditions of your SWMP. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. Proper operation and maintenance requires the operation of backup or auxiliary facilities or similar systems, installed by you only when the operation is necessary to achieve compliance with the conditions of the permit.

J. Inspection and Entry

1. You must allow the Department or an authorized representative upon the presentation of credentials and other documents as may be required by law, to do any of the following:
   (a) Enter your premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;
   (b) Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit;
   (c) Inspect at reasonable times any facilities or equipment (including monitoring and control equipment) practices, or operations regulated or required under this permit; and
   (d) Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the CWA, any substances or parameters at any location.

K. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. Your filing of a request for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

L. Permit Transfers

This permit is not transferable to any person except after notice to the Department. The Department may require modification or revocation and reissuance of the permit to change the name of the Permittee and incorporate such other requirements as may be necessary under the Act.

M. Anticipated Noncompliance

You must give advance notice to the Department of any planned changes in the permitted small MS4 or activity which may result in noncompliance with this permit.

N. Compliance with Statutes and Rules

1. The permit is issued under ADEM Admin. Code r. 335-6-6. All provisions of this chapter that are applicable to this permit are hereby made a part of this permit.
2. This permit does not authorize the noncompliance with or violation of any laws of the State of Alabama or the United States of America or any regulations or rules implementing such laws.

O. Severability

The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall be affected thereby.

P. Bypass Prohibition

Bypass (see 40 CFR 122.41(m)) is prohibited and enforcement action may be taken against a regulated entity for a bypass; unless:

1. The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
2. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during the normal periods of equipment downtime. This condition is not satisfied if the regulated entity should, in the exercise of reasonable engineering judgment, have installed adequate backup equipment to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance.
3. The Permittee submits a written request for authorization to bypass to the Director at least ten (10) days prior to the anticipated bypass (if possible), the Permittee is granted such authorization, and the Permittee complies with any conditions imposed by the Director to minimize any adverse impact on human health or the environment resulting from the bypass.

The Permittee has the burden of establishing that each of the conditions of Part VI.O. have been met to qualify for an exception to the general prohibition against bypassing and an exemption, where applicable, from the discharge specified in this permit.

Q. Upset Conditions

An upset (see 40 CFR 122.41(n)) constitutes an affirmative defense to an action brought for noncompliance with technology-based permit limitations if a regulated entity shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence, that:

1. An upset occurred and the Permittee can identify the specific cause(s) of the upset;
2. The Permittee's facility was being properly operated at the time of the upset; and
3. The Permittee promptly took all reasonable steps to minimize any adverse impact on human health or the environment resulting from the upset.

The Permittee has the burden of establishing that each of the conditions of Part VI.P. of this permit have been met to qualify for an exemption from the discharge specified in this permit.

R. Procedures for Modification or Revocation

Permit modification or revocation will be conducted according to ADEM Admin. Code r. 335-6-6-.17.

S. Re-opener Clause

If there is evidence indicating potential or realized impacts on water quality due to storm water discharge covered by this permit, the regulated entity may be required to obtain an individual permit or an alternative general permit or the permit may be modified to include different limitations and/or requirements.

T. Definitions

All definitions contained in Part VI shall apply to this permit and are incorporated herein by reference. For convenience, simplified explanations of some regulatory/statutory definitions have been provided, but in the event of a conflict, the definition found in the Statute or Regulation takes precedence.

1. Best Management Practices (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the State. BMPs also include treatment requirements, operating procedures, and practices to control runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.
2. Control Measure as used in this permit, refers to any Best Management practice or other method used to prevent or reduce the discharge of pollutants to waters of the State.
3. CWA or The Act means the Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972) Pub.L. 92-500, as amended Pub. L. 95-217, Pub. L. 95-576, Pub. L. 96-483 and Pub. L. 97-117, 33 U.S.C. 1251 et.seq.
4. Discharge, when used without a qualifier, refers to "discharge of a pollutant" as defined as ADEM Admin. Code r. 335-6-6-.02(m).
5. Green Infrastructure refers to systems and practices that use or mimic natural processes to infiltrate, evapotranspirate (the return of water to the atmosphere either through evaporation or by plants), or reuse storm water or runoff on the site where it is generated.
6. Low Impact Development (LID) is an approach to land development (or re-development) that works with nature to manage storm water as close to its source as possible. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treat storm water as a resource rather than a waste product.

7. Illicit Connection means any man-made conveyance connecting an illicit discharge directly to municipal separate storm sewer.

8. Illicit Discharge is defined at 40 CFR Part 122.26(b)(2) and refers to any discharge to a municipal separate storm sewer that is not entirely composed of storm water, except discharges authorized under an NPDES permit (other than the NPDES permit for discharges from the MS4) and discharges resulting from fire fighting activities.

9. Indian Country, as defined in 18 USC 1151, means (a) all land within the limits of any Indian reservation under the jurisdiction of the United States Government, notwithstanding the issuance of any patent, and including rights-of-way running through the reservation; (b) all dependent Indian communities within the borders of the United States whether within the original or subsequently acquired territory thereof, and whether within or without the limits of a State, and (c) all Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same. This definition includes all land held in trust for an Indian tribe.

10. MEP is an acronym for "Maximum Extent Practicable," the technology-based discharge standard for municipal separate storm sewer systems to reduce pollutants in storm water discharges that was established by CWA Section 402(p). A discussion of MEP as it applies to small MS4s is found at 40 CFR Part 122.34.

11. MS4 is an acronym for "Municipal Separate Storm Sewer System" and is used to refer to either a large, medium, or small municipal separate storm sewer system. The term is used to refer to either the system operated by a single entity or a group of systems within an area that are operated by multiple entities.

12. Municipal Separate Storm System is defined at 40 CFR Part 122.26(b)(8) and means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States; (ii) Designed or used for collecting or conveying storm water; (iii) Which is not a combined sewer; and (iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined in ADEM Admin. Code r. 335-6-6-.02(nn).

13. NOI is an acronym for "Notice of Intent" to be covered by this permit and is the mechanism used to "register" for coverage under a general permit.

14. Department means the Alabama Department of Environmental Management or an authorized representative.

15. Priority construction site means any qualifying construction site in an area where the MS4 discharges to a waterbody which is listed on the most recently approved 303(d) list of impaired waters for turbidity, siltation, or sedimentation, any waterbody for which a TMDL has been finalized or approved by EPA for turbidity, siltation, or sedimentation, any waterbody assigned the Outstanding Alabama Water use classification in accordance with ADEM Admin. Code r. 335-6-10-.09, and any waterbody assigned a special designation in accordance with 335-6-10-.10.

16. Small municipal separate storm sewer system is defined at 40 CFR Part 122.26(b)(16) and refers to all separate storm sewers that are owned or operated by the United States, a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to water of the United States, but is not defined as "large" or "medium" municipal separate storm sewer system. This term includes systems similar to separate storm sewer systems in municipalities, such as systems at military bases, large

hospital or prison complexes, and highways and other thoroughfares. The term does not include separate storm sewers in very discrete areas, such as individual buildings.

17. Storm water is defined at 40 CFR Part 122.26(b) (13) and means storm water runoff, snow melt runoff, and surface runoff and drainage.
18. Storm Water Management Program (SWMP) refers to a comprehensive program to manage the quality of storm water discharged from the municipal separate storm sewer system.
19. SWMP is an acronym for "Storm Water Management Program."
20. Total Maximum Daily Load (TMDL) means the calculated maximum permissible pollutant loading to a waterbody at which water quality standards can be maintained. The sum of wasteload allocations (WLAs) and load allocations (LAs) for any given pollutant.
21. "You" and "Your" as used in this permit is intended to refer to the Permittee, the operator, or the discharger as the context indicates and that party's responsibilities (e.g., the city, the country, the flood control district, the U.S. Air Force, etc.).

RESPONSE TO COMMENTS AND SUMMARY OF CHANGES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT NO. ALR040000

January 31, 2011

Background

On May 18, 2010, the Alabama Department of Environmental Management (hereinafter "ADEM" or "the Department") proposed to reissue General NPDES Permit No. ALR040000 regulating stormwater discharges from regulated small municipal separate storm sewer systems, also known as "Phase II MS4s." The Department established a public comment period for the May 2010 draft permit from May 18, 2010 through July 23, 2010. A public hearing was held at ADEM's offices in Montgomery, Alabama on July 23, 2010.

On August 9, 2010, pursuant to the requirements of 40 CFR 123.44, the U.S. Environmental Protection Agency (hereinafter "EPA" or "the Agency") issued a formal objection to the May 2010 draft permit. On November 10, 2010, ADEM provided to EPA a revised draft permit and conditional request for public hearing on EPA's objection. On December 14, 2010, the Agency formally accepted ADEM's November 2010 draft permit and withdrew its objection.

The purpose for this document is to provide responses to technical and substantive comments received during both the public comment period and the public hearing, and to summarize the significant differences between today's final permit and the May/November 2010 drafts. Copies of the permit record outlining all written and oral comments received during the public comment period, as well as EPA's objection and ADEM's response can be reviewed/obtained by submitting a request to the Department's Public Records Officer via e-mail at records@adem.state.al.us, fax to 334-271-7950, or mailed to P.O. Box 301463, Montgomery, AL 36130-1463. These materials may also be viewed/downloaded online via the Department's eFile system available at http://edocs.adem.alabama.gov/eFile/.

Response to Comments

The following responses to comments on the draft permit are organized below by the general topic of the comments. As many of the comments received were similar in nature and substance, they are addressed collectively rather than individually.

Addition of "Guidance Provisions" as Permit Conditions

A number of comments objected to numerous conditions throughout the permit, perceiving them as "guidance provisions" not specifically mandated by the MS4 rules.

ADEM regulations require that NPDES permits issued to operators of Phase II MS4's include the appropriate provisions of 40 CFR 122.30-122.37[1]. ADEM rules further require that such permits include conditions and best management practices, on a case-by-case basis, to provide for and ensure compliance all applicable requirements and to carry out the purposes and intent of the Alabama Water Pollution Control Act (hereinafter "the AWPCA"[2]). Today's final permit is a general permit that applies the same basic standards to all Phase II MS4s statewide. In doing so, there is a need for some generality in certain permit conditions to ensure that Permittees have the flexibility to tailor their stormwater management programs to the maximum extent practicable. However, the specific conditions of 40 CFR 122.30 – 122.37 are not sufficient to provide clear, measurable, and enforceable standards by which compliance can be determined consistently and effectively. Where appropriate, based on best professional judgment, today's final permit includes specific conditions that are necessary to achieve compliance with applicable State and federal rules. This approach is not unprecedented. Municipalities and other Phase II Permittees are subject to other types of NPDES permits that may also include conditions that, based on based professional, are determined necessary to effectively carry-out the purposes and intent of the AWPCA.

A number of comments proffered the idea that compliance with these perceived "guidance conditions" is inconsistent with State law, pointing specifically to Act No. 95-775[3] and Act No. 97-931[4]. Discharges from MS4s are point source discharges for which a permit is required under Section 402 of the Clean Water Act, AWPCA, and ADEM regulations. The Department does not believe that the Alabama Legislature intended to prevent municipalities from complying with properly administered NPDES permits. Today's final permit requires municipalities to adopt controls and management practices to reduce the discharge of pollutants from their regulated MS4s to State waters. This requires that the MS4 identify and, in some cases inspect and control potential sources of pollutants, to maximum extent practicable, that may also be subject to regulation under ADEM's NPDES program (e.g. construction sites). However, today's final permit does not require municipalities to establish new effluent limits, standards, or controls on stormwater discharges into their regulated MS4s that are inconsistent with or more stringent than those effluent limits, standards, or controls to which such discharges may already be subject. As such, the Department does not interpret today's final permit as requiring municipalities to subject sites to "double regulation".

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[1] ADEM Admin Code R. 335-6-6-.11
[2] ADEM Admin Code R. 335-6-6-.14(1) and (3)(k)
[3] Ala. Code § 11-89C-9 et. seq.
[4] House Joint Resolution 144, September 23, 1997.

Implementation Schedule

A number of comments suggested the need for clarification of the permit's schedule of implementation for many of the required minimum control measures. EPA's objection to the May 2010 draft was in part based on its perception that "the permittees would not be obligated to fully comply with any requirements of permit until the end of the permit term."[5]

The Department agrees that some clarification of the permit's implementation schedule is needed. The table below summarizes the schedule for implementation of the minimum control measures required by today's final permit:

Permit Condition / Minimum Control Measure	Schedule of Implementation	
	Existing MS4s	New MS4s
Public Education and Outreach on Storm Water Impacts (Part III.B.1.)	180 days from the effective date of coverage under the Permit	365 days from the effective date of coverage under the Permit
Public Involvement / Participation (Part III.B.2.)	180 days from the effective date of coverage under the Permit	365 days from the effective date of coverage under the Permit
Illicit Discharge Detection and Elimination (Part III.B.3.)	180 days from the effective date of coverage under the Permit	365 days from the effective date of coverage under the Permit
Construction Site Runoff Control (Part III.B.4.)	730 days from the effective date of coverage under the Permit	
Post-Construction Storm Water Management in New Development and Redevelopment (Part III.B.5.)	730 days from the effective date of coverage under the Permit	
Pollution Prevention / Good Housekeeping for Municipal Operations	180 days from the effective date of coverage under the Permit	365 days from the effective date of coverage under the Permit
Enactment of required ordinances (all control measures)	730 days from the effective date of coverage under the Permit	

[5] J. Giattina, Letter to James McIndoe, August 9, 2010

Construction Site Runoff Control Measure (Part III.B.4.)

The May 2010 draft permit included a number of provisions requiring MS4s to develop, implement, and enforce a program to reduce pollutants in storm water runoff to the maximum extent practicable from construction activities that result in a land disturbance of greater than or equal to one acre, including activities that disturb less than one acre but are part of a larger common plan or development. The May 2010 draft also acknowledged that these activities are regulated by ADEM's NPDES Construction Program pursuant to ADEM Admin. Code chap. 335-6-12. In accordance with 40 CFR 122.35(b), the May 2010 draft allowed Permittees to rely on ADEM's program to establish and enforce applicable construction site erosion and sediment controls. Permittees would have been required to, at a minimum, inspect their systems and identify potential impacts from non-compliant construction sites. The Permittee would have had the option to address such sites through its own regulatory mechanisms, or refer the sites to the Department for potential enforcement under the State NPDES program. The May 2010 draft permit also included specific requirements that must be addressed in the Permittee's construction site stormwater program if not relying on the State program.

The Department received comments both in support of and in opposition to this approach. EPA also objected to this approach citing that "ADEM's state-wide NPDES construction stormwater regulatory program currently lacks any specific focus or additional initiatives and commitments in the MS4 jurisdictions" and further concluding that "enabling permittees to rely on the State's enforcement program does not fulfill the requirements the construction site stormwater runoff minimum control measure."[6]

In today's final permit, the Department has refined the extent to which Phase II Permittees may rely on ADEM's NPDES program for control of construction site runoff. To the extent allowable under State law, the Permittee must implement an ordinance or other appropriate regulatory mechanism under which the Permittee may require and enforce erosion and sediment controls on qualifying construction sites and sites which discharge stormwater runoff to its MS4. Today's permit does not, however, require the Permittee to adopt new effluent limits, standards, or practices that are inconsistent with or more stringent than those required by ADEM.

Permittees must provide training for appropriate municipal staff in the identification of proper construction best management practices (example: QCI training in accordance with ADEM Admin Code chap. 335-6-12 or the Alabama Construction Site General Permit). Permittees must also review construction site plans and conduct regular inspections of construction sites to verify the use of appropriate erosion and sediment control practices that are consistent with the *Alabama Handbook for Erosion Control, Sediment Control, And Stormwater Management on Construction Sites and Urban Areas* published by the Alabama Soil and Water Conservation Committee (hereinafter the "Alabama Handbook"). Although the frequency and prioritization of

[6] J. Giattina, Letter to James McIndoe, August 9, 2010

inspection activities may be different for each Permittee (as outlined in their stormwater management plans and subject to ADEM review, all Permittees must inspect priority construction sites once each month. Priority construction sites are those in the area of the Permittee's MS4 that discharge to an impaired water or which are affected by a total maximum daily load (hereinafter "TMDL") issued or approved by EPA. Finally, the Permittee must notify ADEM of non-compliant construction sites discovered during periodic inspections. The notification must provide, at a minimum, the specific location of the construction project, the name and contact information of the owner or operator, and a summary of the site deficiencies.

While the Permittee may rely on another entity (e.g. another municipal or county government, private contractor, etc.) to conduct these activities on the Permittee's behalf, these activities must be implemented independently from ADEM's NPDES Construction Program.
Under today's final permit, the Permittee may rely on ADEM to establish minimum standards for construction site erosion and sediment control practices through ADEM's NPDES program. The Permittee may also rely on ADEM to enforce these standards on construction sites within the Permittee's jurisdiction. Although the November 2010 draft permit requires the Permittee to maintain ordinances and or other regulatory mechanisms, the Permittee may choose to rely on ADEM to take enforcement actions against non-compliant construction sites subject to ADEM's permits and regulations.

While this approach increases the Permittee's role in ensuring that regulated construction sites employ best management practices for the control of erosion and loss of sediment, it also allows the continuous application of consistent State-wide standards for construction site operators. Because today's final permit does not require MS4s to adopt different or more stringent standards than ADEM's for erosion and sediment control, construction site operators are not being subjected to "double-regulation."

Post-Construction Stormwater Management in New Development and Redevelopment Control Measure (Part III.B.5.)

The Department received numerous comments from many different sources on Part III.B.5. of the May 2010 draft. EPA's objection to the permit was based, in part, on its belief that the May 2010 draft permit lacked any obligation to address compliance with post-construction BMPs at the planning/site plan review stage. EPA and other parties also objected to the lack of specific conditions requiring the implementation of Low Impact Development (hereinafter "LID") and Green Infrastructure management techniques.

Today's final permit clarifies that procedures for both site-plan review / approval and long-term post-construction maintenance must be addressed in the Permittee's Stormwater Management Plan.

Regarding the requirement to implement Green Infrastructure and LID techniques, the general permit supports and encourages these approaches along with other, more traditional means of

managing post-construction runoff. Today's final permit also includes a requirement that Permittees review and evaluate all policies, building codes, subdivision regulations, ordinances, etc. to address any barriers to the implementation of Green Infrastructure or LID. The Department believes that this is an important first step in widening the use of these significant tools.

Other comments expressed concern regarding the Department's selection of the area-appropriate 2yr/24hr storm event as basis for the design of post-construction stormwater controls. One commenter stated that, "The storage requirements to capture and treat [a 2yr/24hr storm] either through infiltration methods or other methods exceed the national standards, would require a large land and cost burden to the developer, and most importantly not provided adequate flow and volume control benefits for the frequently occurring storm events."

The 2yr/24hr storm event was selected for its consistency with the construction stormwater program and current use in the evaluation of pre- and post-construction hydrology conditions. The permit does not require the use of the 2yr/24hr storm event as a volumetric threshold for onsite detention or infiltration. Rather, the Permit requires that post-construction stormwater management be initiated/addressed when the proposed new development or redevelopment significantly alters the pre-construction hydrology (using the area-appropriate 2yr/24 storm as the basis for this determination). Any volumetric thresholds used for onsite detention / infiltration would need only be sufficient to equilibrate the pre- and post-construction hydrology to the maximum extent practicable.

The use of traditional onsite detention / infiltration systems is one of many methods of post-construction stormwater management. If post-construction stormwater management is considered early enough in the project design phase, simple alterations in the design, like avoiding steep slopes and reducing the amount of impervious surface added by the project can significantly reduce the change in hydrology potentially caused by the project. Where the design can't be altered, there are other effective and less-costly alternatives to the management of stormwater runoff, such as Green Infrastructure. With proper emphasis on stormwater management early in the design process, the Department believes that the use of costly high-volume detention / infiltration systems can, in many cases, be avoided.

A number of other comments addressed whether Permittees should be able to rely on ADEM's NPDES program for post-construction stormwater management. Some commenters supported this reliance while others suggested that ADEM's NPDES program is not adequate for this purpose.

Neither the May 2010 draft permit nor today's final permit includes any such provision allowing Permittees to rely on ADEM for implementation of the post-construction stormwater management minimum control measure. While ADEM's NPDES construction stormwater program does generally require post-construction BMPs where needed, coverage under the

program does not extend beyond the construction phase of the regulated project[7]. As such, ADEM's NPDES program is not currently structured to implement the post-construction stormwater management program required by 40 CFR 122.34(b)(5).

One comment objected to the provision found in today's final permit at Part III.B.5(g)(iii) which states in pertinent part:

> *...The rationale statement must include the following information, at a minimum:*
>
> *... (iii) Any non-structural BMPs in the programs, including as appropriate:*
> - *Policies and ordinances that provide requirements and standards to ... maintain and/or increase open space (including a dedicated funding source for open space acquisition)...*
>
> (Emphasis added)

The comment interpreted this provision as a mandate for separate funding mechanisms to support open-space acquisition. The Clean Water Act §402(p)(3)(B)(iii) mandates that all MS4 permits require "*controls to reduce the discharge of pollutants to the maximum extent practicable, including management practices, control techniques and system, design and engineering methods, and such other provisions as the Administrator or the State determines appropriate for the control of such pollutants*". (Emphasis added.) While the maintenance of open-space, particularly in sensitive areas and in impaired waters and associated watersheds is a natural control technique, it is not specifically mandated by today's final permit over other control techniques that may also be appropriate to achieve a reduction in the discharge of pollutants to the maximum extent practicable.

Sharing Minimum Measure Responsibility and Coordination Between MS4s

A number of comments raised concerns with the language of Part IV.A. of the May 2010 draft, which provided that:

> *If the other entity fails to implement the control measure on the Permittee's behalf, then the Permittee remains liable for any discharge within their jurisdiction due to that failure to implement. Additionally, the Permittee remains liable for the permit obligations if relying on the Department.*
>
> (Emphasis Added)

40 CFR § 122.35(b) provides that:

> *In some cases, the NPDES permitting authority may recognize, either in your individual NPDES permit or in an NPDES general permit, that another governmental entity is responsible under an NPDES permit for implementing one*

[7] ADEM Admin Code R. 335-6-12-.25(1) requires construction site operators to request termination of their NPDES registration upon completion of construction.

> *or more of the minimum control measures for your small MS4 or that the permitting authority itself is responsible. Where the permitting authority does so, you are not required to include such minimum control measure(s) in your storm water management program.*

EPA provides at 68 FR 68767, December 8 1999:

> *EPA does not believe that the small MS4 should be responsible in the situation where the NPDES permit issued to the small MS4 operator recognizes that the State agency that issues the permit is responsible for implementing a measure.*

Today's final permit provides that the Permittee may rely on the Department for a portion of the construction site runoff control measure after meeting certain conditions. Consistent with EPA's intent as indicated above, today's final permit also provides at Part IV.A.2 that, if the Permittee is relying on the Department for enforcement of erosion and sediment controls on qualifying construction sites, and has included that information in the NOI, the Permittee is not responsible for taking enforcement action or for implementing the requirements of Part III.B.4(c) in the event the Department receives notification of non-compliant construction sites from the Permittee as required by Part III.B.4(b)(v).

So-Called "BMP Defense" (Part IV.C.)

Part IV.C. of the May 2010 draft stated:

> *This general permit requires, at a minimum, that permittees develop, implement and enforce a storm water management program designed to reduce the discharge of pollutants to the maximum extent practicable. Full implementation of BMPs, using all known, available, and reasonable methods of prevention, control and treatment to prevent and control storm water pollution from entering waters of the State of Alabama is considered an acceptable effort to reduce pollutants from the municipal storm drain system to the maximum extent practicable.*

A number of comments referred to this provision as the "BMP Defense" and seemed to interpret it as excusing Permittees from meeting water quality standards if BMPs are implemented. Part IV.C. only seeks to acknowledge that, at present, implementation of best management practices is the method of reducing pollutants from being discharged to State waters via MS4s to the maximum extent practicable. This condition does not negate the applicability of water quality standards. Part VI.S. of today's final permit allows the Department to modify the permit or require the Permittee to obtain coverage under an individual permit or alternate general permit if there is evidence indicating potential or realized adverse impacts on water quality.

Monitoring, Recordkeeping, and Reporting (Part V)

One comment suggested the need for more specificity and guidance regarding required monitoring and the reporting of such monitoring. As described previously, today's final permit is

a general permit that applies the same basic standards to all Phase II MS4s statewide. The Department believes that there is a need for some generality in those permit conditions related to monitoring and reporting to ensure that Permittees have the flexibility to tailor their programs to the maximum extent practicable.

Comments from Citizens or Groups Located in Phase I Areas

The May 2010 draft, as well as today's final permit addresses stormwater discharges from regulated small MS4s. "Large" or "medium" MS4s as described in 40 CFR 122.26(b)(4) or (7) are excluded from coverage under this permit.

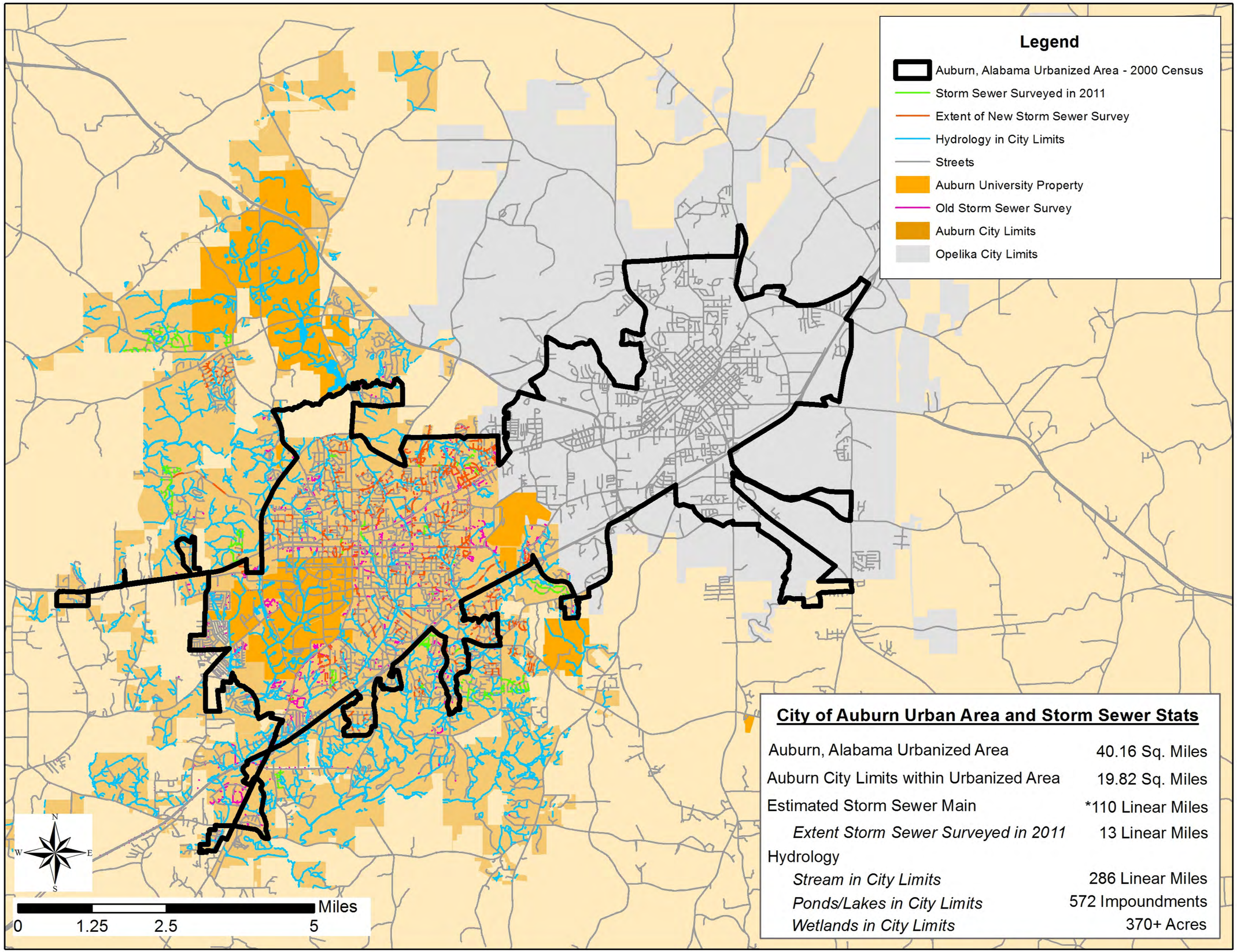
The Department received numerous comments from both individuals and groups seeking changes in stormwater controls for areas, watersheds, or specific State waters that are located in Large or Medium municipal jurisdictions. Although the Department appreciates these comments, today's final permit only addresses discharges from small MS4s. MS4 discharges in larger metropolitan areas are addressed by a separate individual permit.

Summary of Changes from the May 2010 Draft Permit

Part I.B.2.	Corrected typographical error
Part I.C.1.	Corrected typographical error
Part I.E.1.	Replaced "should" with "shall" in the second sentence to clarify that Permittees are required to modify their programs when water quality considerations warrant greater attention in specific components.
Part I.E.2.	Replaced "needs to" with "must" to clarify that Permittees must tailor BMPs to address pollutants of concern associated with an applicable TMDL or water-quality standard.
Part I.E.3.	Added to clarify the schedule of implementation described earlier.
Part II.C.2.(c) Part IV.A.1.	Added or revised language to clarify that the Permittee remains responsible for compliance with the Permit if it is relying on another entity for performance or a required activity and the other entity fails to perform that activity.
Part III.B.1(a)	Added reference to MEP standard.
Part III.A.1. Part III.B.1(a) Part III.B.2(a) Part III.B.3(a)(i)	Deleted duplicative language related to the schedule of implementation, which is described elsewhere in the Permit.
Part III.B.4. Part III.B.5.	Modifications to these conditions are described in the Response to Comments above.
Part III.B.6.	Modifications to address formatting and grammatical errors. Added reference to MEP standard.
Part IV.A.	Modifications to these conditions are described in the Response to Comments above.
Part IV.D.1(a)	Removed the phrase "directly or indirectly."
Part VI.T.15.	Added definition of "Priority Construction Site" which is referenced by the modified Part III.B.4.

APPENDIX B

URBANIZED AREA MAP


Legend
Auburn, Alabama Urbanized Area - 2000 Census
Storm Sewer Surveyed in 2011
Extent of New Storm Sewer Survey
Hydrology in City Limits
Streets
Auburn University Property
Old Storm Sewer Survey
Auburn City Limits
Opelika City Limits
N
W
E
S
Miles
0
1.25
2.5
5
City of Auburn Urban Area and Storm Sewer Stats
Auburn, Alabama Urbanized Area 40.16 Sq. Miles
Auburn City Limits within Urbanized Area 19.82 Sq. Miles
Estimated Storm Sewer Main *110 Linear Miles
Extent Storm Sewer Surveyed in 2011 13 Linear Miles
Hydrology
Stream in City Limits 286 Linear Miles
Ponds/Lakes in City Limits 572 Impoundments
Wetlands in City Limits 370+ Acres

APPENDIX C

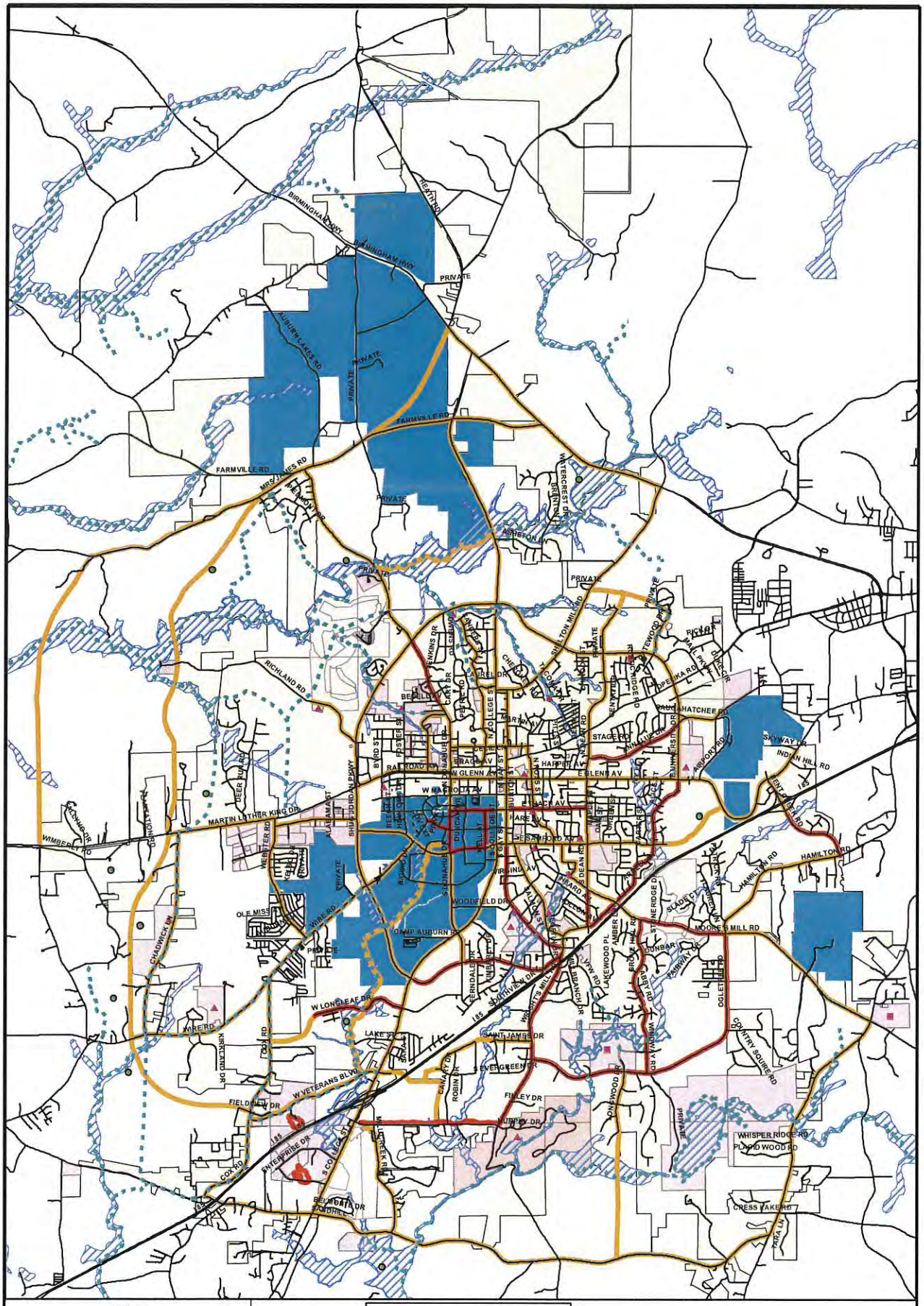
NEWSPAPER PUBLICATIONS LISTING

Publication Date by Month	Publication Date	Title	Editorial	Publication Source
	3/4/2011	Drought Conditions Worsen in Lee County	☐	Opelika-Auburn News
	3/29/2011	PROPERR LAWN CARE HELPFUL TO EVERYONE	☐	OPELIKA-AUBURN NEWS
May 2011				
	5/27/2011	Drought Conditions Worsen Across State	☐	Opelika-Auburn News
June 2011				
	6/1/2011	Rain Barrel Workshop Offered at Pioneer Park	☐	Opelika-Auburn News
	6/9/2011	As drough worsens, area cities take notice	☐	Opelika-Auburn News
	6/10/2011	Southern Lee County Now in Extreme Drought	☐	Opelika-Auburn News
	6/16/2011	Water Works asks for Voluntary Restrictions	☐	Auburn Villager
	6/17/2011	Dry Weather: Water Levels Falling - Extreme Drought Moves into Auburn, Opelika	☐	Opelika-Auburn News
September 2011				
	9/22/2011	Flooding Reported in Areas of Lee County	☐	Opelika-Auburn News
October 2011				
	10/7/2011	LEE COUNTY DROUGHT CONDITIONS REMAIN STAGNANT	☐	Opelika-Auburn News
November 2011				
	11/4/2011	Drought expands across Alabama	☐	Opelika-Auburn News
December 2011				
	12/16/2011	Extreme Drought Affects Lee County, Southeastern Alabama	☐	Opelika-Auburn News
January 2012				
	1/31/2012	Auburn University Watershed Project Receives Nearly $200,000	☐	Opelika-Auburn News
February 2012				
	2/25/2012	Streamside Repair Workshop: Participants Learn About Stream Stability	☐	Opelika-Auburn News

Publication Date by Month	Publication Date	Title	Editorial	Publication Source
July 2012				
	7/6/2012	Drought Worsening Across Alabama	☐	Opelika-Auburn News
August 2012				
	8/9/2012	Climate Stats Show Heat Not Too Bad	☐	Opelika-Auburn News
	8/28/2012	Isaac Strengthening	☐	Opelika-Auburn News
February 2013				
	2/11/2013	ADEM looks into sludge spill	☐	Opelika-Auburn News
	2/12/2013	Water group contacted following spill	☐	Opelika-Auburn News

APPENDIX D

GREEN SPACE AND GREEN WAY MASTER PLAN


LEGEND
GreenAreas
Greenways
Parks
Future Parks
Streets
BikePaths
Existing
Proposed
FloodPlain
CityProperty
GolfCourses
Chewacla State Park
Auburn University Property
CityLimits
GolfCourse
City of Auburn
Green Space and Green Way
Master Plan
2005
Miles
0
0.5
1
1.5
2
N
W
E
S
Map date: 2/09/2005
By Lisa Garza
Public Works, Mapping Assistant
from 2004 GIS data

APPENDIX E

2012 STORMWATER QUALITY MONITORING PLAN

CITY OF AUBURN, ALABAMA

Annual Surface Water Quality Monitoring Report

2012 Monitoring Year

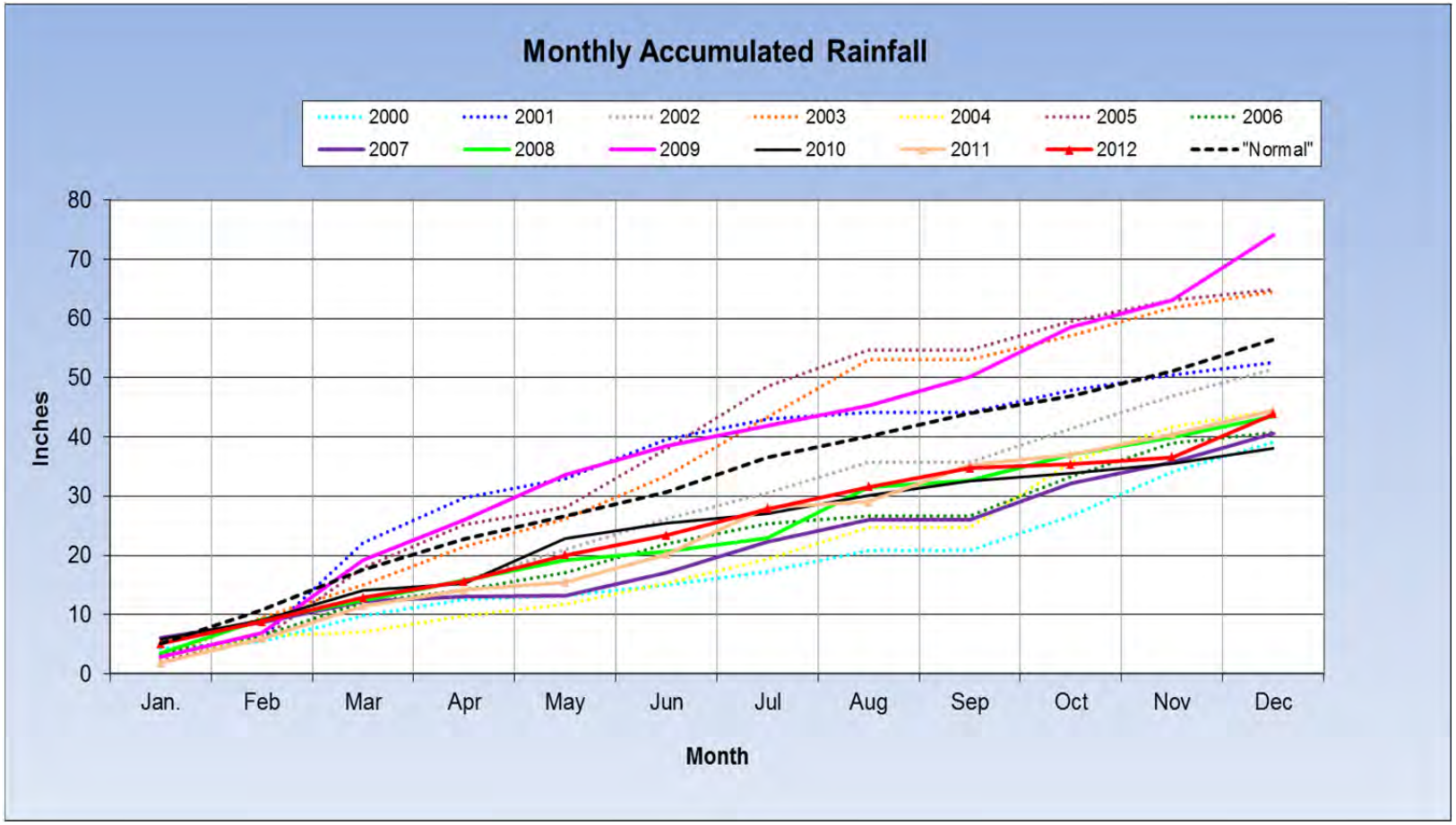
TABLE OF CONTENTS

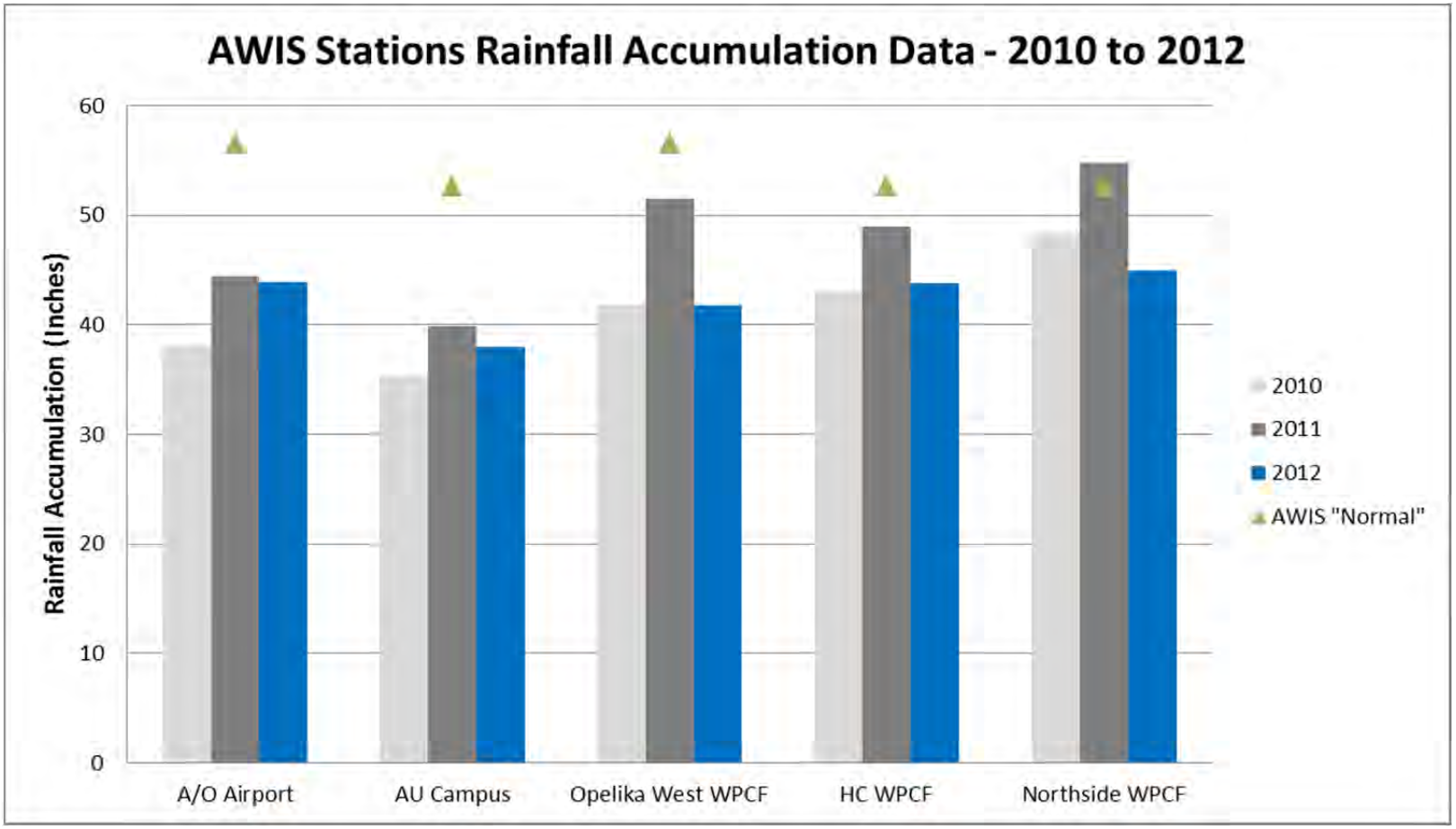
Introduction

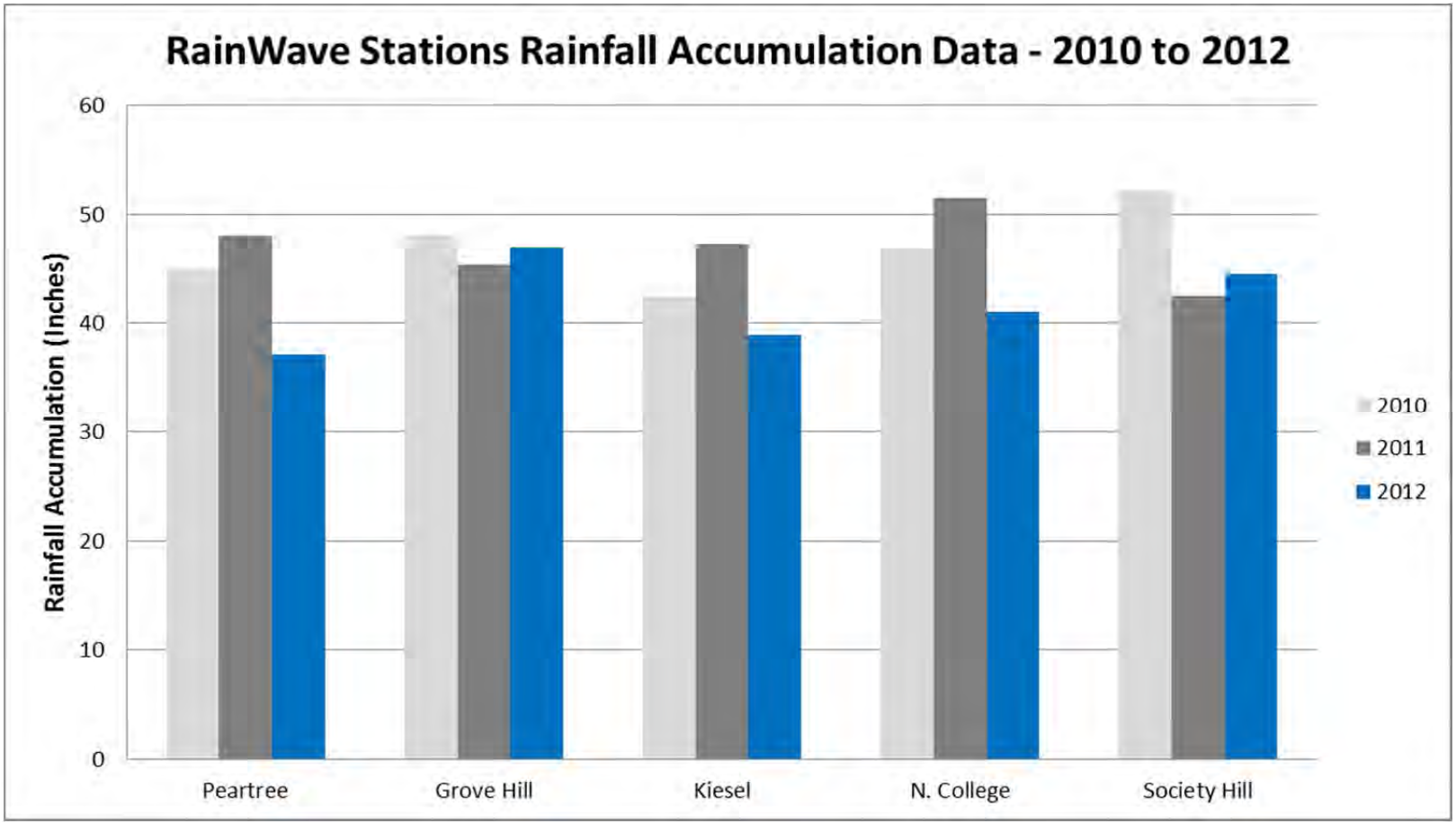
The City of Auburn has been voluntarily collecting water quality data on its various surrounding water resources since 1989. Although initial efforts were primarily concentrated on source water quality monitoring in the Lake Ogletree reservoir basin of Chewacla Creek, the City's water quality monitoring has expanded to include a wide variety of monitoring programs that are used to guide its efforts of assessment, protection, and, when necessary, restoration of water quality. These programs include monitoring for physical, chemical, mineral, and biological indicators of water quality, with many monitoring efforts managed and operated in-house. This report presents the results of the water quality monitoring and analysis for the calendar year 2012, and includes notes and comments by Water Resource Management Staff.

Notes on Precipitation Patterns in 2012

Weather patterns in North America during 2012 continued to be influenced by a meteorological event known as La Nina, a cold phase of the wider known El Nino Southern Oscillation (ENSO). Opposite of the increased precipitation that is often associated with ENSO, the La Nina phenomena resulted in widespread areas of drought in the southeastern United States, including much of the State of Alabama. Central Alabama, including the Auburn/Opelika area, was particularly affected by the La Nina phenomena, resulting in annual rainfall accumulation much below normal. The Auburn/Opelika area received approximately 43.89" of rainfall during the 2012 calendar year, which is 12.91" below normal (Agricultural Weather Information Service – Auburn/Opelika Airport Gauge). This deficit is reflected in the US Drought Monitor Index Data for 2012, which categorized much of Lee County as being in a "moderate" to "extreme" drought condition throughout the entire year. Drought conditions, such as those of 2011 and 2012, can affect surface water quality in a wide variety of ways, including, but not limited to decreased flows, increased ambient temperature, decreased dissolved oxygen, etc. Therefore, meteorological conditions should be accounted for in the interpretation of the data in this report.


Monthly Accumulated Rainfall
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
"Normal"
80
70
60
50
40
30
20
10
0
Inches
Jan.
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month


AWIS Stations Rainfall Accumulation Data - 2010 to 2012
Rainfall Accumulation (Inches)
60
50
40
30
20
10
0
A/O Airport
AU Campus
Opelika West WPCF
HC WPCF
Northside WPCF
2010
2011
2012
AWIS "Normal"


RainWave Stations Rainfall Accumulation Data - 2010 to 2012
Rainfall Accumulation (Inches)
60
50
40
30
20
10
0
Peartree
Grove Hill
Kiesel
N. College
Society Hill
2010
2011
2012

1.0 Turbidity Monitoring

1.1 Purpose

Sediment plays an important role in the biological, chemical, and physical health of streams, lakes, wetlands, and other waterbodies. However, excess siltation can cause increases in stream temperatures, decreases in the passage of light through the water column, decreased dissolved oxygen content, issues with color, clogging of fish and aquatic invertebrate gills, destruction of habitat, increased nutrient loading, channel and pond aggradation, and decreased recreational use. Therefore, it is important that we understand the various sources of sediment to these ecosystems and that we monitor and control any potential sources that would otherwise exceed the natural carrying capacity of the waterbody. Herein is the primary purpose for which the City of Auburn (hereafter the City) conducts weekly monitoring for turbidity. In addition, this weekly monitoring provides invaluable observations of other potential water quality concerns such as illegal dumping, illicit discharge violations, unauthorized construction activity, unauthorized stream buffer encroachment, etc. These data also support and enhance the effectiveness of the City's Construction Site Erosion and Sediment Control Inspection and Enforcement Program.

1.2 Definition and Methods

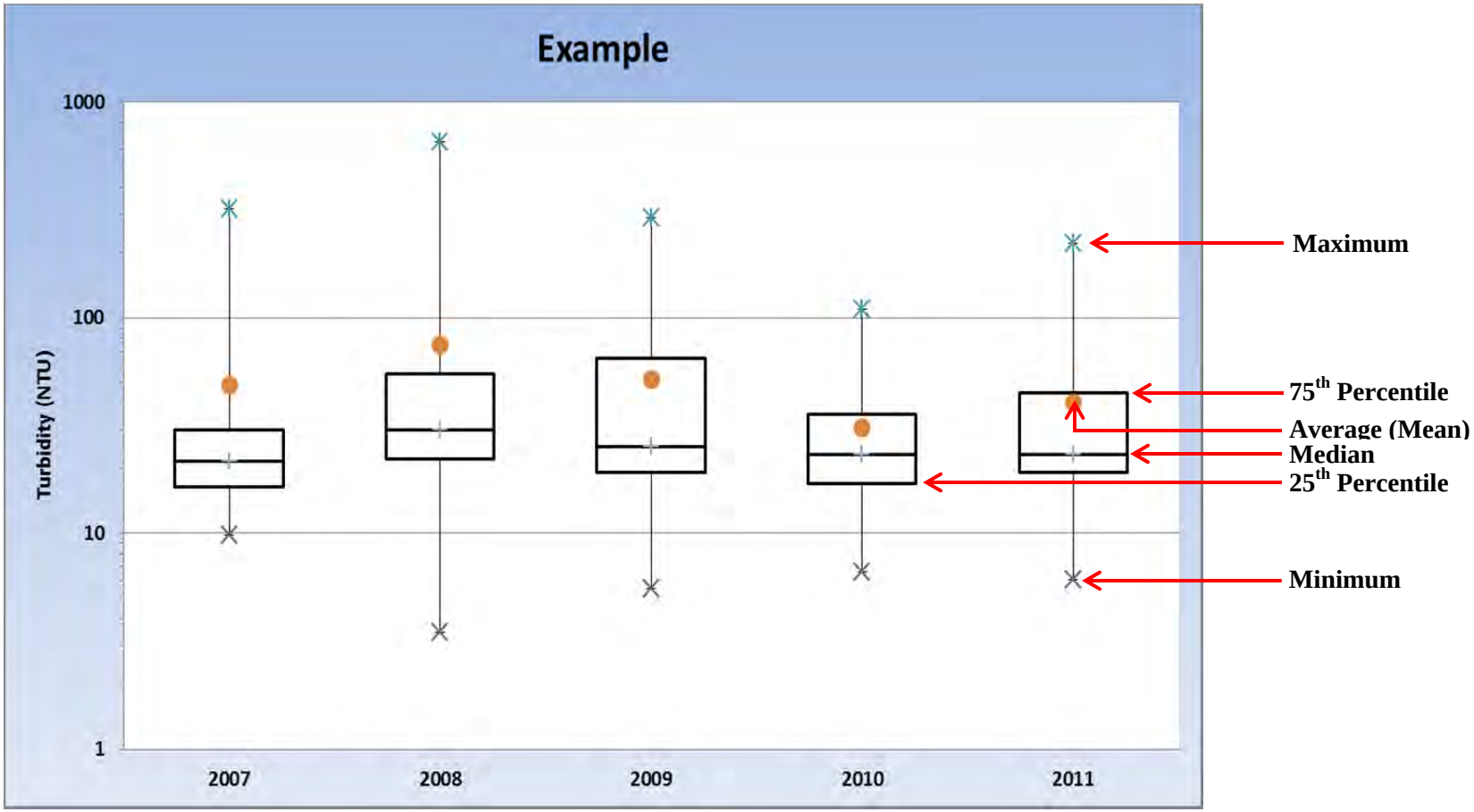
Turbidity is the measure of the degree of transparency of a fluid as it affects the ability of light to pass through. Although it is not a direct measurement of sediment or Total Suspended Solids within the water column, it has been identified as a useful surrogate indicator for monitoring sediment pollution in stormwater runoff from active construction sites and is often the monitoring parameter of choice for regulatory agencies. Currently, the Alabama Department of Environmental Management (ADEM) water quality criteria states that "*There shall be no turbidity of other than natural origin that will cause substantial visible contrast with the natural appearance of waters or interfere with any beneficial uses which they serve. Furthermore, in no case shall turbidity exceed 50 Nephelometric units above background*". Turbidity levels are most commonly measured using a turbidity meter which measures the amount of scattered light as it is passed through a sample at a 90° angle. The resulting numerical value is called a nephelometric turbidity unit (NTU) of which increasing values represent a decrease in light penetration through the sample. This is an EPA approved analytical method (EPA 180.1) and is the method chosen by the City to monitor for turbidity.

Turbidity monitoring locations were strategically chosen to allow for both monitoring of the effectiveness of erosion and sediment control at construction sites and also to analyze potential trends within each watershed. Each location is sampled on a weekly basis for assessment of seasonal baseline variations and, when possible, during storm events for indications of failing construction site best management practices (BMP's).

1.3 Results and Brief Discussion

The 2012 monitoring year represents the sixth full year that the City has conducted weekly sampling and turbidity analysis of 40 stations throughout its jurisdictional territory. At present, this amounts to over 13,900 unique data points for which to evaluate water quality. As with previous years, data from each individual watershed is evaluated independently by monitoring station and collectively as a representative watershed group. Each stations data is also evaluated against any neighboring upstream station, thereby assisting in the identification of potential sources of sediment.

In general, turbidity at the majority of all stations exhibited a sustained trend of decreasing values for the sixth consecutive year. These decreases are seen in the minimum, median, average, and maximum values. No single factor can independently be attributed to these decreases. Rather, it is more than likely a combination of rainfall intensity and accumulation patterns (effecting stream flows), decreased construction activity, increased stabilization of existing construction projects, increased professional education about erosion and sediment control, and increased erosion and sediment control inspection and enforcement that influenced this trend. In order to avoid any oversimplification, further data evaluation and discussion at a watershed and individual station-level is provided below.



Legend to Turbidity Charts

Chewacla Creek Watershed

Monitoring Station Locations:

Station 1CW – Station 1CW is located along Moore's Mill Road, immediately east of the entrance to Bent Brooke Subdivision.

Latitude *32, 35, 3.874 N*; Longitude *85, 25, 55.243 W*

Station 2CW – Station 2CW is located along Moore's Mill Road, between CR 107/Estate Drive and Society Hill Road.

Latitude *32, 34, 25.519 N*; Longitude *85, 25, 6.579 W*

Station 4CW – Station 4CW is located at the crossing of CR 027 with Chewacla Creek. 4CW is a reference station used to evaluate turbidity as it enters Auburn's Phase II jurisdiction and discharges to Lake Ogletree.

Latitude *32, 33, 21.85 N*; Longitude *85, 24, 46.51 W*

Station 5CW – Station 5CW is located ½ mile downstream of the Lake Ogletree spillway and upstream of the Martin-Marietta Quarry discharge. As with 4CW, 5CW is a reference station; monitored to evaluate turbidity within Chewacla Creek as it is discharged from Lake Ogletree and before it leaves Auburn's Phase II jurisdiction.

Latitude *32, 32, 52.236 N*; Longitude *85, 28, 1.713 W*

**See Insert for Maps of All Water Quality Monitoring Locations*

	1CW						2CW					
	2007	2008	2009	2010	2011	2012	2007	2008	2009	2010	2011	2012
MIN	9.80	3.46	5.50	6.60	6.10	5.89	7.03	3.33	3.50	2.20	6.20	7.80
MAX	320.00	650.00	290.00	110.00	220.00	300.00	500.00	900.00	150.00	45.00	75.00	75.60
AVG	48.69	74.92	51.93	30.55	40.41	31.27	53.56	50.12	22.93	11.26	20.11	22.59
MEDIAN	21.50	30.00	25.00	23.00	23.00	20.00	16.00	13.00	13.00	9.45	17.00	16.50

	4CW						5CW					
	2007	2008	2009	2010	2011	2012	2007	2008	2009	2010	2011	2012
MIN	4.33	4.70	3.70	3.90	4.40	2.50	1.40	0.95	1.30	1.10	1.30	0.93
MAX	400.00	1950.00	350.00	55.00	170.00	80.30	55.00	33.00	95.00	23.00	19.00	8.60
AVG	31.27	70.69	29.22	11.66	19.22	13.12	7.02	4.68	8.51	4.26	3.59	3.33
MEDIAN	16.50	18.00	13.00	9.50	13.50	11.00	3.50	3.40	4.20	3.00	2.50	2.92

Statistical Analysis of Turbidity Data for Chewacla Creek

Brief Discussion:

A total of 50 samples were collected and analyzed at each Chewacla Creek station in 2012, for a combined total of 200 samples. Station 1CW exhibited the highest annual statistical results for all categories except the annual minimum (2CW exhibited the greatest annual minimum). Station 1CW was the only station to exhibit turbidity in excess of 100 NTU. Potential factors contributing to elevated turbidity at 1CW during 2012 were runoff from upstream agricultural activity and from home site construction within the Tutton Hills Subdivision. It should be noted that Station 1CW has historically returned the highest annual median turbidity prior to the development of the Tutton Hills subdivision. Station 5CW exhibited the lowest annual statistical results for all categories. This station is downstream of Lake Olgetree and, therefore, turbidity data reflects the sediment removal provided therein.

Station Notes:

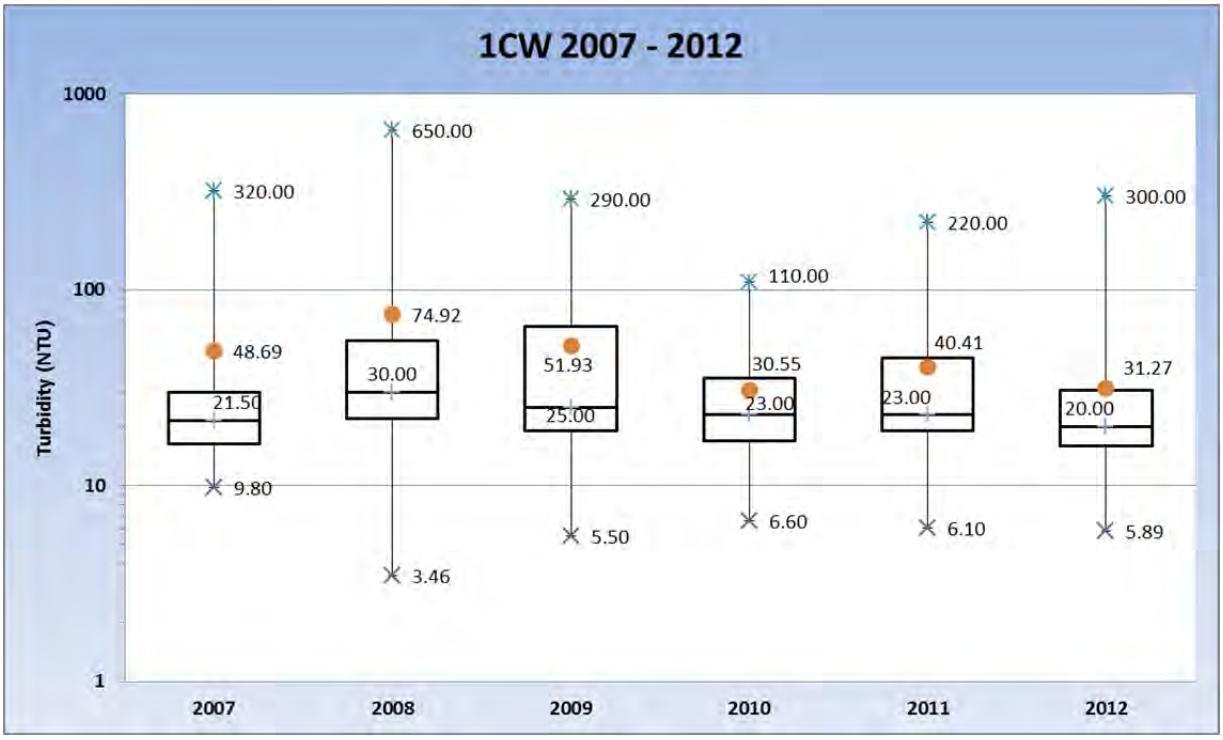
1CW – Station 1CW is located along Moore's Mill Road, immediately east of the entrance to Bent Brooke Subdivision. 1CW produced the highest annual median turbidity value for 2012 (20 NTU), which was a 3 NTU decrease from both the 2010 and 2011 monitoring years. This station has historically exhibited relatively higher values, with utility line construction, agricultural activities, and development of the Tutton Hills Subdivision (currently 99% built-out) all likely contributing to elevated turbidity. The decrease in median turbidity from 2008 to 2012 is a positive sign that a sediment load reduction is being achieved in this basin.

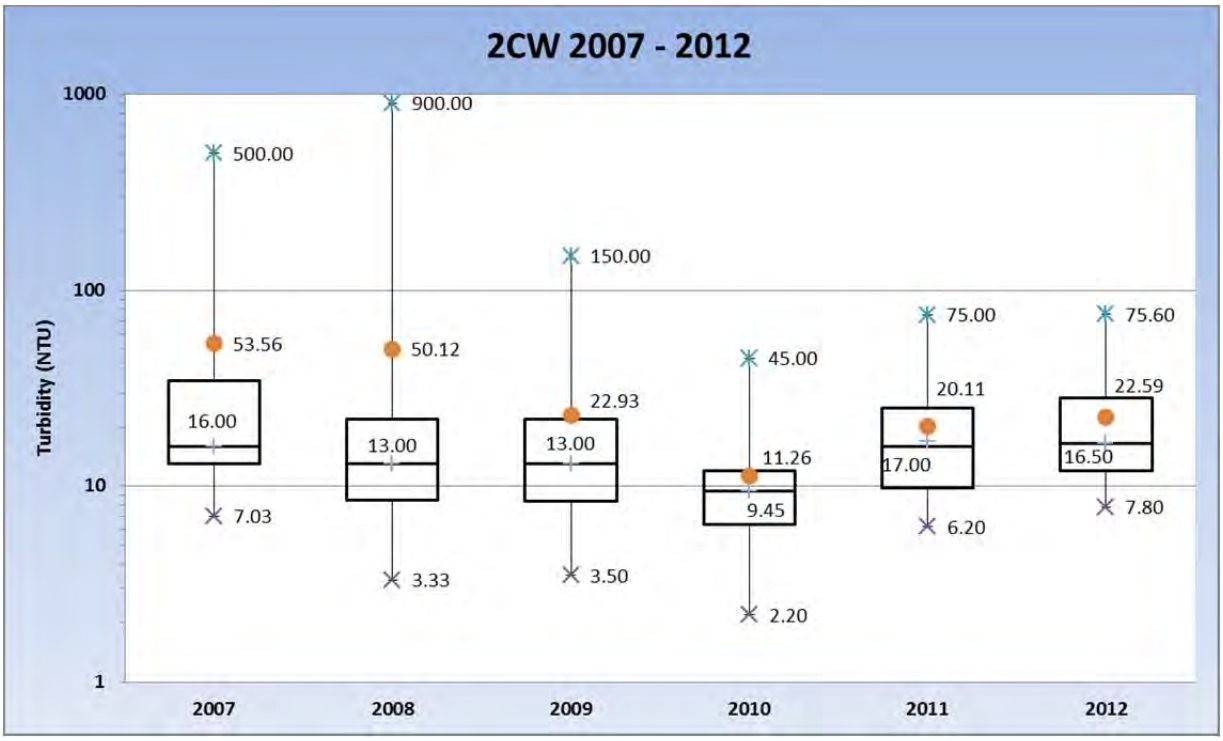
2CW – Station 2CW is located along Moore's Mill Road, between CR 107 and Society Hill Road. Annual turbidity results at 2CW returned a median value of 16.50 NTU for the 2012 monitoring year. This represents a decrease of 0.5 NTU from the 2011 monitoring year median, but still represents a 7.05 NTU increase from the 2010 monitoring year median. Though agricultural activities adjacent to this station are of continuing concern, completion and/or stabilization of the Nash Creek Subdivision likely influenced the decline in turbidity that was

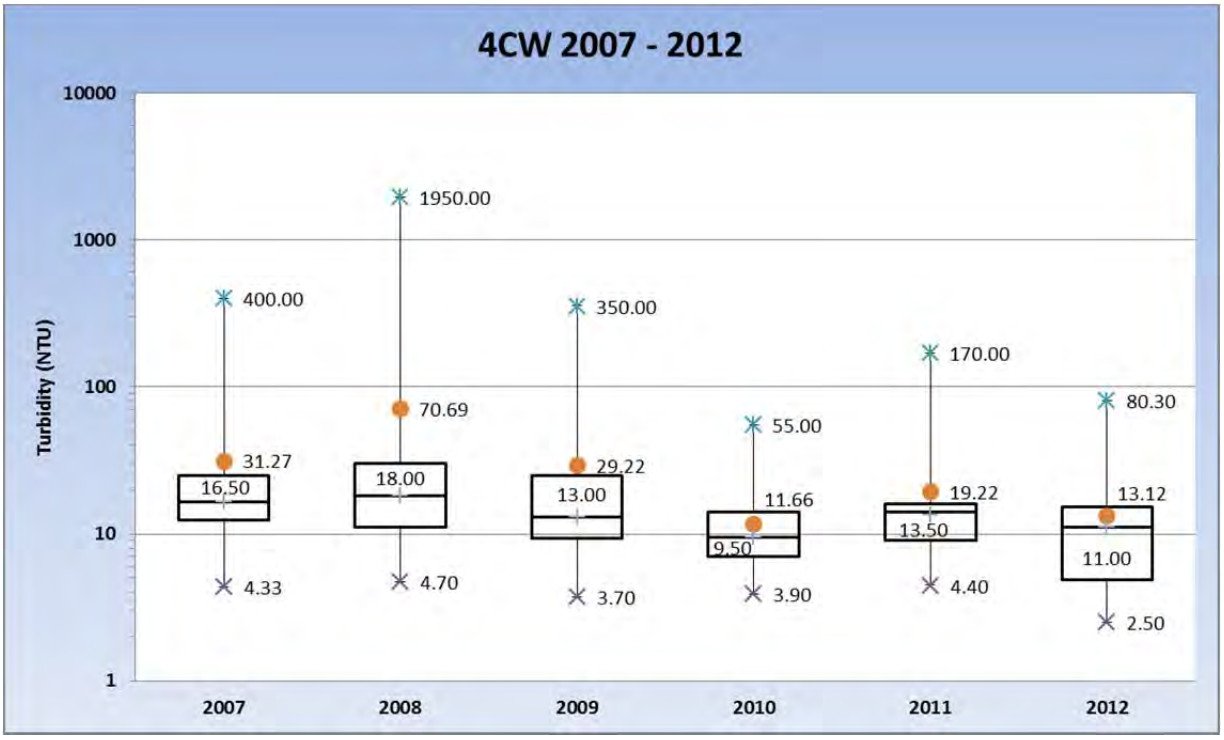
observed between the years of 2008-2010. Staff observations of beaver activity are believed to have contributed to the increased turbidity from 2010-2012 (beaver dam constructed several yards downstream and within culvert at crossing). Staff have also observed county road crews removing beaver dams at this location.

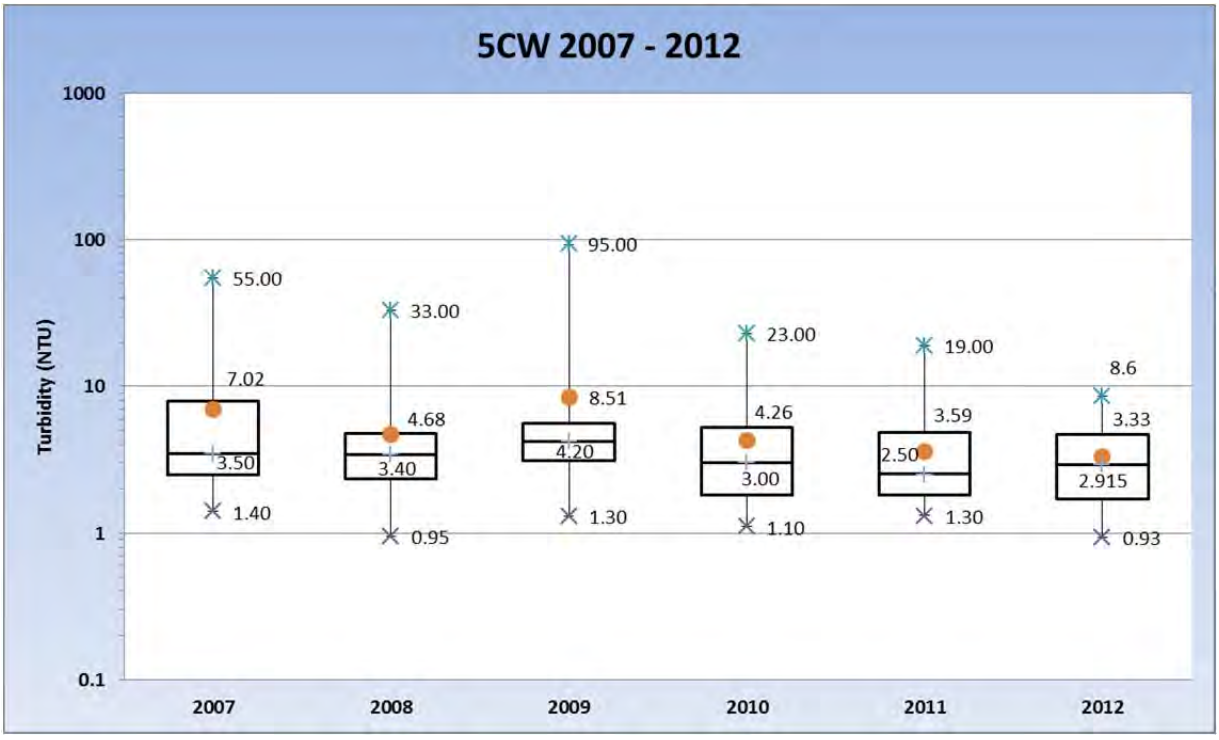
4CW – Station 4CW is located at the crossing of CR 027 with Chewacla Creek. 4CW is a reference station used to evaluate turbidity as it enters Auburn's Phase II jurisdiction and discharges to Lake Ogletree. Annual turbidity results at 4CW indicated a median value of 11.00 NTU for the 2012 monitoring year. This is a 2.5 NTU decrease from the 2011 monitoring year median and a 1.50 NTU increase from the 2010 monitoring year. The majority of the watershed serving station 4CW is within Opelika's jurisdiction. Agricultural practices and construction related activity are likely the major influencing factors on turbidity at this station.

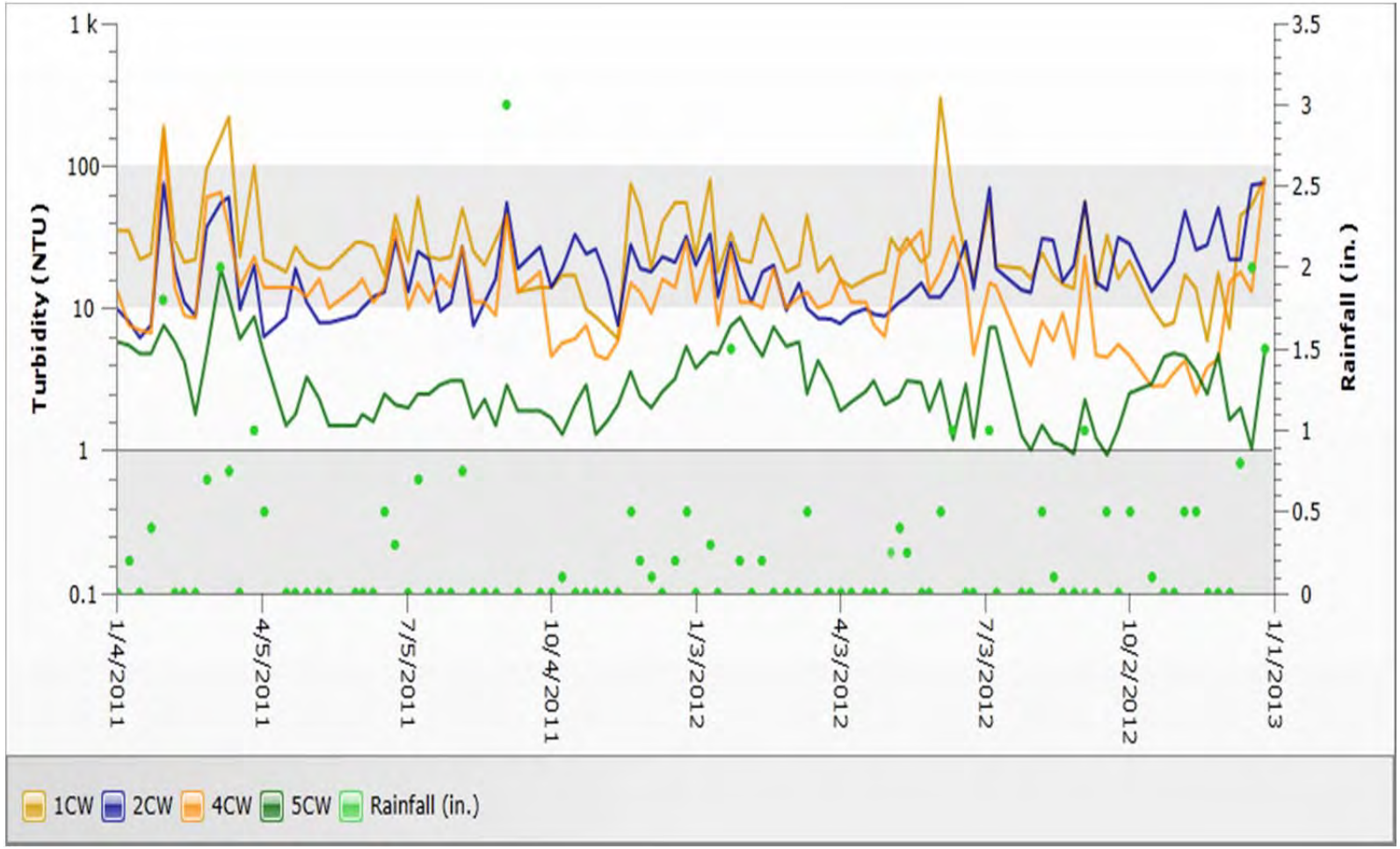
5CW – As with 4CW, 5CW is a reference station, monitored to evaluate turbidity within Chewacla Creek as it is discharged from Lake Ogletree and leaves Auburn's Phase II jurisdiction. This station consistently produces the lowest turbidity values, of which 2012 was no exception. The low values exhibited at this station are directly attributed to the TSS removal provided by Lake Ogletree. The 2012 median turbidity value for station 5CW was 2.92 NTU, which is 80%-90% less than the median values of the other Chewacla stations and is the lowest recorded annual median for this site.


1CW 2007 - 2012
Turbidity (NTU)
1000
100
10
1
2007
2008
2009
2010
2011
2012
320.00
650.00
290.00
110.00
220.00
300.00
48.69
74.92
51.93
30.55
40.41
31.27
21.50
30.00
25.00
23.00
23.00
20.00
9.80
3.46
5.50
6.60
6.10
5.89


2CW 2007 - 2012
Turbidity (NTU)
1000
100
10
1
2007
2008
2009
2010
2011
2012
500.00
900.00
150.00
45.00
75.00
75.60
53.56
50.12
22.93
11.26
20.11
22.59
16.00
13.00
13.00
9.45
17.00
16.50
7.03
3.33
3.50
2.20
6.20
7.80


4CW 2007 - 2012
Turbidity (NTU)
10000
1000
100
10
1
2007
2008
2009
2010
2011
2012
400.00
1950.00
350.00
170.00
80.30
55.00
31.27
70.69
29.22
19.22
13.12
11.66
16.50
18.00
13.00
13.50
11.00
9.50
4.33
4.70
3.70
3.90
4.40
2.50


5CW 2007 - 2012
Turbidity (NTU)
1000
100
10
1
0.1
2007
2008
2009
2010
2011
2012
55.00
33.00
95.00
23.00
19.00
8.6
7.02
4.68
8.51
4.26
3.59
3.33
3.50
3.40
4.20
3.00
2.50
2.915
1.40
0.95
1.30
1.10
1.30
0.93



Graph of Chewacla Creek Turbidity Data for 2011-2012 (Produced using the CoA GIS Water Quality Application)

Choctafaula Creek Watershed

Monitoring Station Locations:

Station 1CH – Station 1CH is located on main stem Choctafaula Creek along Wire Road, immediately east of Talheim Street.

Latitude *32, 34, 8.089 N*; Longitude *85, 32, 41.169 W*

Station 2CH – Station 2CH is located on an unnamed tributary of Choctafaula Creek as it crosses under Wire Road, immediately east of CR 57.

Latitude *32, 34, 3.928 N*; Longitude *85, 33, 21.503 W*

Station 4CH – Station 4CH is located on main stem Choctafaula Creek, as it crosses under Beehive Road, immediately west of the City of Auburn Tech Park West.

Latitude *32, 32, 51.901 N*; Longitude *85, 33, 19.138 W*

**See Insert for Maps of All Water Quality Monitoring Locations*

	1CH						2CH					
	2007	2008	2009	2010	2011	2012	2007	2008	2009	2010	2011	2012
MIN	0.62	1.20	1.40	1.10	2.10	2.46	1.27	1.07	1.30	0.98	1.20	0.91
MAX	55.00	115.00	370.00	28.00	65.00	32.43	240.00	110.00	350.00	24.00	130.00	88.30
AVG	8.92	10.37	20.15	6.91	8.64	7.67	15.02	8.61	13.92	4.44	8.48	7.95
MEDIAN	8.10	4.23	8.50	5.10	5.45	5.60	8.23	3.36	4.10	2.80	3.40	4.20

	4CH					
	2007	2008	2009	2010	2011	2012
MIN	0.87	1.00	2.20	1.10	3.40	1.60
MAX	180.00	270.00	90.00	45.00	55.00	33.20
AVG	14.46	23.25	17.73	7.85	10.08	7.74
MEDIAN	6.18	5.00	8.50	5.50	6.40	6.09

Statistical Analysis of Turbidity Data for Choctafaula Creek

Brief Discussion:

A total of 50 samples were obtained at each Choctafaula Creek station in 2012, for a combined total of 150 samples. Landcover within the Choctafaula Creek watershed consist of mostly forest and pasture, with relatively little urban/suburban development. This is generally reflected in the turbidity data, for which the Choctafaula stations often exhibit lower turbidity than the other surrounding streams. Noteworthy activity within this basin is the continued construction of the City of Auburn Technology Park West. This is an ongoing development located off Beehive Road, between Stations 1CH and 4CH. To date, there has been no recorded significant increase in turbidity downstream from the Auburn Technology Park West.

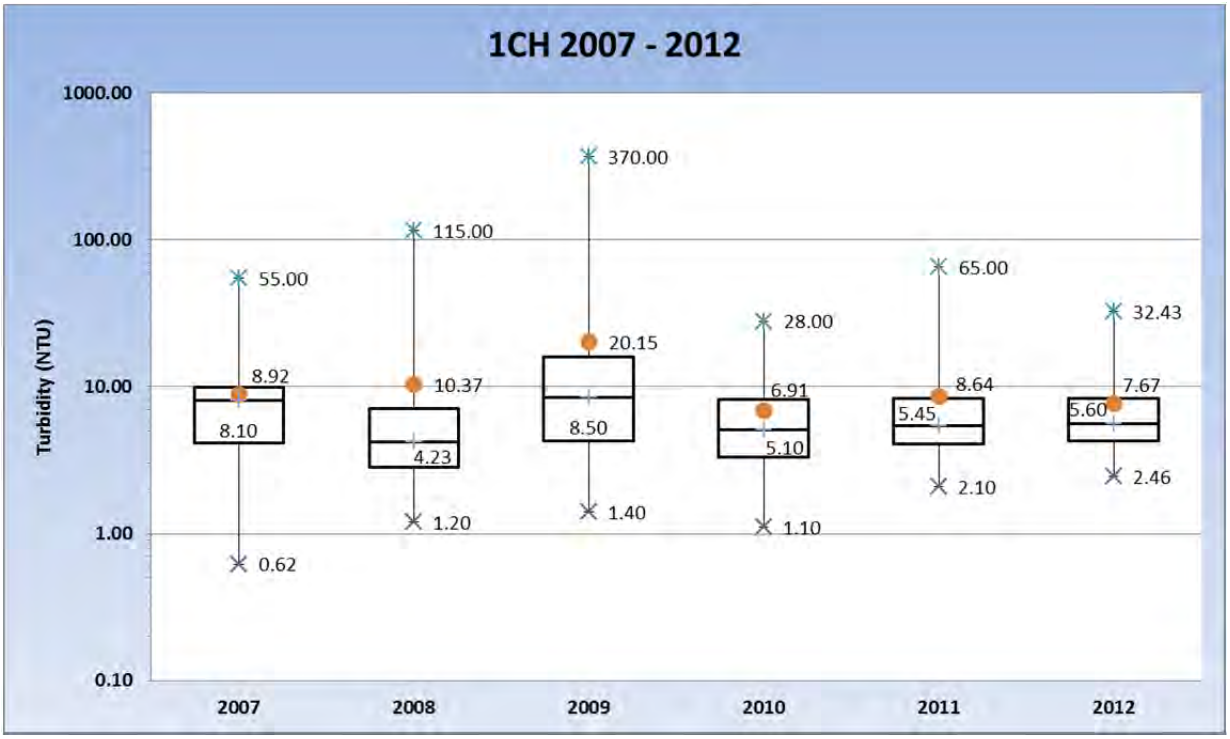
Station Notes:

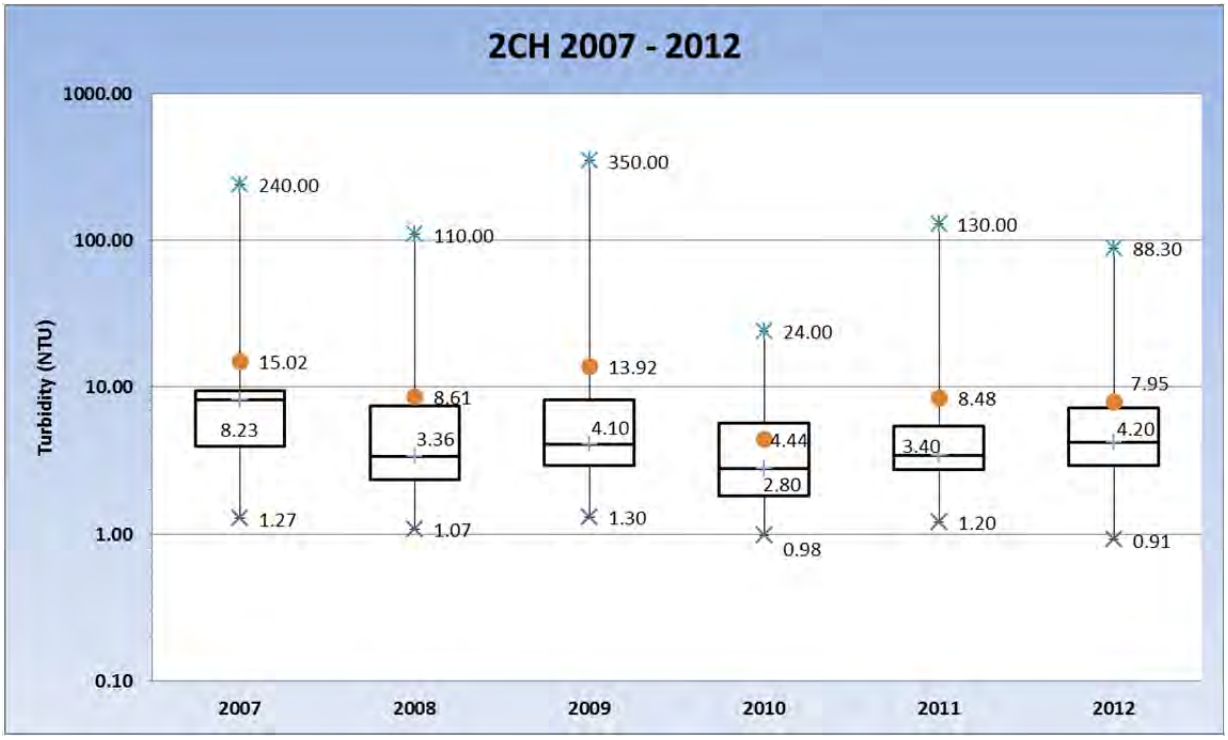
1CH – Station 1CH is located on main stem Choctafaula Creek along Wire Road/CR 137, immediately east of Talheim Street. Annual turbidity results at 1CH indicated a median value of 5.60 NTU for the 2012 monitoring year, representing a 0.15 NTU increase from 2011 and a 0.5 NTU increase from 2010. Although there was a slight increase of the median turbidity value at this station between 2011 and 2012, there was a 32.57 NTU decrease in the maximum value (65 NTU to 32.43 NTU, respectively). There were no major development activities upstream of this station within the City's Phase II jurisdiction.

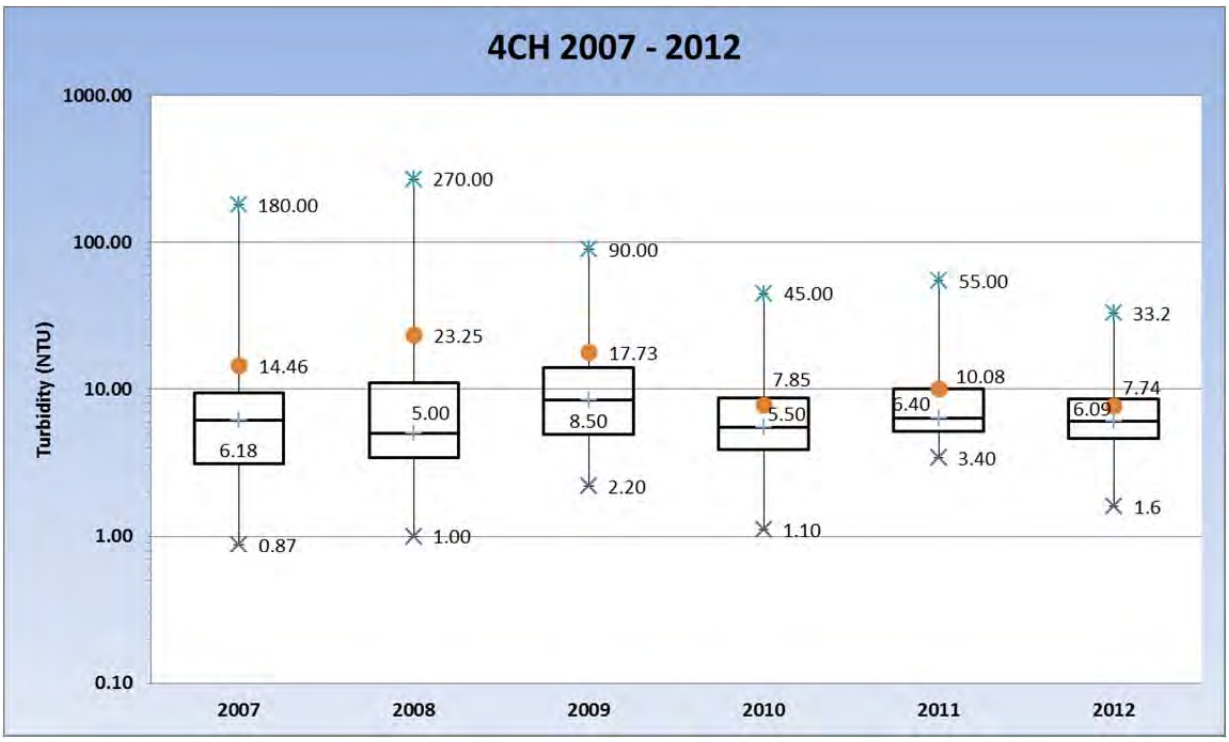
2CH – Station 2CH is located on an unnamed tributary of Choctafaula Creek that crosses under Wire Road immediately east of CR 57. Annual turbidity results at 2CH indicated a median value of 4.20 NTU for the 2012 monitoring year, representing a 0.80 NTU increase from 2011 and a 1.40 NTU increase from 2010. As with 1CH, 2CH receives flows from a mostly rural, forested basin and therefore generally exhibits low baseline and storm event turbidity values. There were no construction or development projects upstream of 2CH and within the City's Phase II

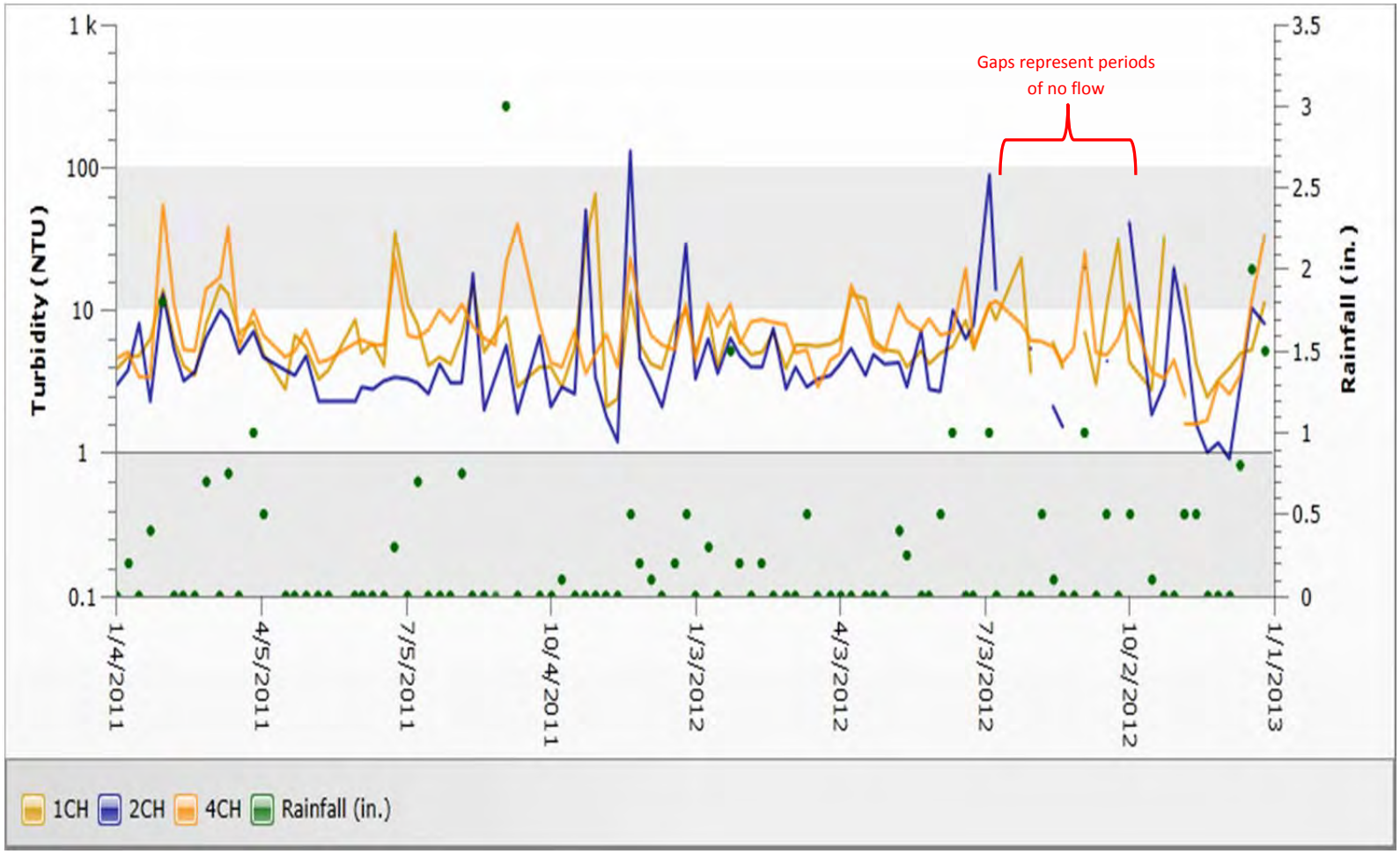
jurisdiction during 2012. As with previous years, this station returned the lowest minimum, average, and median statistical values amongst the Choctafaula stations.

4CH – Station 4CH is located on main stem Choctafaula Creek where it crosses under Beehive Road/CR 010, immediately west of the City of Auburn Technology Park West. Annual turbidity results at 4CH indicated a median value of 6.09 NTU for the 2012 monitoring year, representing a 0.31 NTU decrease from 2011 and a 0.59 NTU increase from 2010. This station also exhibited a decrease in the maximum returned turbidity value between 2011 and 2012 monitoring years, which were 55 NTU and 33.20 NTU respectively. Active construction and development activities upstream of this station during 2012 consisted of development within the Auburn Technology Park West.




2CH 2007 - 2012
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
240.00
15.02
8.23
1.27
110.00
8.61
3.36
1.07
350.00
13.92
4.10
1.30
24.00
4.44
2.80
0.98
130.00
8.48
3.40
1.20
88.30
7.95
4.20
0.91
2007
2008
2009
2010
2011
2012


4CH 2007 - 2012
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
180.00
14.46
6.18
0.87
270.00
23.25
5.00
1.00
90.00
17.73
8.50
2.20
45.00
7.85
5.50
1.10
55.00
10.08
6.40
3.40
33.2
7.74
6.09
1.6
2007
2008
2009
2010
2011
2012



Graph of Choctafaula Creek Turbidity Data for 2011-2012
(Produced using the CoA GIS Water Quality Application)

Moore's Mill Creek Watershed

Monitoring Station Locations:

1M – Station 1M is the furthest upstream monitoring location on Moore's Mill Creek (at Bent Creek Road).

Latitude *32, 36, 8.253 N*; Longitude *85, 25, 35.563 W*

2M – Station 2M, located on Moore's Mill Creek off Bonny Glen Road, is downstream of the unnamed tributary that services the Auburn University Regional Airport (AU Airport).

Latitude *32, 35, 50.808 N*; Longitude *85, 26, 9.911 W*

3M – Station 3M is located on Moore's Mill Creek at Moore's Mill Road.

Latitude *32, 35, 10.371 N*; Longitude *85, 26, 58.62 W*

4M – Station 4M is located on Moore's Mill Creek at Windway Road.

Latitude *32, 34, 4.675 N*; Longitude *85, 27, 12.574 W*

5M – This is the final downstream station on Moore's Mill Creek main stem, located at Ogletree Road.

Latitude *32, 33, 44.879 N*; Longitude *85, 27, 54.706 W*

6M – 6M is located on an UT of Moore's Mill Creek as it crosses under E. Samford Avenue, near E. University.

Latitude *32, 35, 55.716 N*; Longitude *85, 27, 7.252 W*

7M – 7M is also located on an UT of Moore's Mill Creek as it crosses under Jockish Road, just upstream of station 6M.

Latitude *32, 36, 0.433 N*; Longitude *85, 27, 2.378 W*

8M – 8M is located on Moore's Mill Creek immediately downstream of the confluence with the A/O Airport tributary.

Latitude 32, 36, 55.456 N; Longitude 85, 25, 55.456 W

**See Insert for Maps of All Water Quality Monitoring Locations*

	1M						2M					
	2007	2008	2009	2010	2011	2012	2007	2008	2009	2010	2011	2012
MIN	2.13	1.76	2.00	1.30	2.20	0.90	5.70	5.23	4.70	5.20	4.60	3.00
MAX	1100.00	566.67	65.00	39.00	39.00	28.00	1100.00	5150.00	310.00	40.00	45.00	31.00
AVG	67.32	35.27	17.01	9.56	9.07	8.10	91.56	200.40	29.51	11.79	14.00	10.51
MEDIAN	16.00	13.00	12.00	6.20	5.80	6.85	20.34	21.50	15.00	10.00	11.00	8.59

	3M						4M					
	2007	2008	2009	2010	2011	2012	2007	2008	2009	2010	2011	2012
MIN	3.33	3.20	4.40	2.10	3.30	2.40	3.37	5.23	4.20	2.80	4.20	2.81
MAX	717.00	2200.00	250.00	70.00	50.00	57.10	750.00	1100.00	200.00	90.00	95.00	110.00
AVG	55.42	82.11	30.75	10.90	11.33	11.53	58.31	73.42	29.02	14.33	14.66	13.69
MEDIAN	12.00	12.00	15.00	7.80	7.50	7.74	14.00	12.50	14.00	10.45	9.60	8.71

	5M						6M					
	2007	2008	2009	2010	2011	2012	2007	2008	2009	2010	2011	2012
MIN	2.03	4.36	4.90	3.40	2.00	1.67	0.63	0.87	1.70	1.90	1.90	1.05
MAX	483.33	3200.00	320.00	170.00	85.00	50.20	61.67	140.00	75.00	19.00	40.00	24.80
AVG	57.84	92.97	34.26	14.88	15.43	11.57	10.51	14.89	10.40	5.68	9.17	6.99
MEDIAN	13.50	12.00	14.00	7.90	9.50	8.45	6.90	6.42	6.20	4.45	5.80	5.70

	7M						8M					
	2007	2008	2009	2010	2011	2012	2007	2008	2009	2010	2011	2012
MIN	0.75	1.80	2.70	2.80	1.60	1.53	7.57	4.17	6.00	3.10	4.80	2.58
MAX	330.00	350.00	290.00	600.00	200.00	1225.00	1100.00	4200.00	500.00	38.00	42.00	94.00
AVG	39.41	42.60	34.20	35.03	23.11	53.03	105.81	199.15	42.78	10.02	12.87	14.92
MEDIAN	6.37	7.83	9.90	11.50	9.20	8.50	17.50	21.00	16.00	7.00	10.00	10.12

Statistical Analysis of Turbidity Data for Moore's Mill Creek

Brief Discussion:

A total of 50 samples were obtained at each Moore's Mill Creek station in 2012, for a combined total of 400 samples. Moore's Mill Creek remains on the ADEM list of impaired waters for siltation, with a TMDL expected to be drafted in 2017. Therefore, monitoring of turbidity within Moore's Mill Creek is of critical importance in determining the potential sources of excess sediment loading and in evaluating opportunities for protection, enhancement, and restoration. Although the annual minimum, maximum, and average for each station on Moore's Mill Creek are consistently greater than comparative stations in other watersheds, a decreasing trend has been recorded at every station (except 7M) for the last five consecutive years. These data are positive evidence that water quality is improving in Moore's Mill Creek and that increased efforts by the City to improve erosion and sediment control have potentially contributed to this improvement.

Station Notes:

1M – Station 1M is the furthest upstream monitoring location on Moore's Mill Creek at Bent Creek Road. This station is representative of water quality as it enters the City's Phase II jurisdiction. Annual turbidity results at 1M indicated a median value of 6.85 NTU for the 2012 monitoring year. This is a 1.05 NTU increase from the 2011 monitoring year median and a 0.65 NTU increase from the 2010 monitoring year. In general, statistical results for 2012 turbidity data at this station were similar to those observed in 2010 and 2011, which continue to imply improvements are being made in water quality. There are currently no active construction and/or development activities upstream of this site and that are within the City of Auburn MS4 jurisdiction.

2M – Station 2M, located on Moore's Mill Creek off Bonny Glen Road, is downstream of the unnamed tributary that services the southern half of the Auburn University Regional Airport. Annual turbidity results at 2M indicated a median value of 8.59 NTU for the 2012 monitoring year. This is a 2.41 NTU decrease from the 2011 monitoring year median and a 1.41 NTU decrease from the 2010 monitoring year. As with Station 1M, statistical results for 2012 turbidity data at Station 2M were similar to those observed in 2010 and 2011, which continue to imply improvements are being made in water quality. Construction and development sites most closely associated with this station during the 2012 calendar year were the continued construction associated with the Auburn University Regional Airport Terminal and Runways, White Oak Subdivision (home construction), and anything contributing to Stations 1M and 8M.

3M – Station 3M is located on Moore's Mill Creek at Moore's Mill Road. Annual turbidity results at 3M indicated a median value of 7.74 NTU for the 2012 monitoring year. This is a 0.24 NTU increase from the 2011 monitoring year median and a 0.06 NTU decrease from the 2010 monitoring year. Turbidity values at this station have generally declined since 2008. Construction and development sites most closely associated with this station during the 2012 calendar year were home construction at the Millwood Subdivision (formerly Millers Point), home construction at The Overlook Subdivision in Moore's Mill, and anything contributing to Stations 6M and 7M.

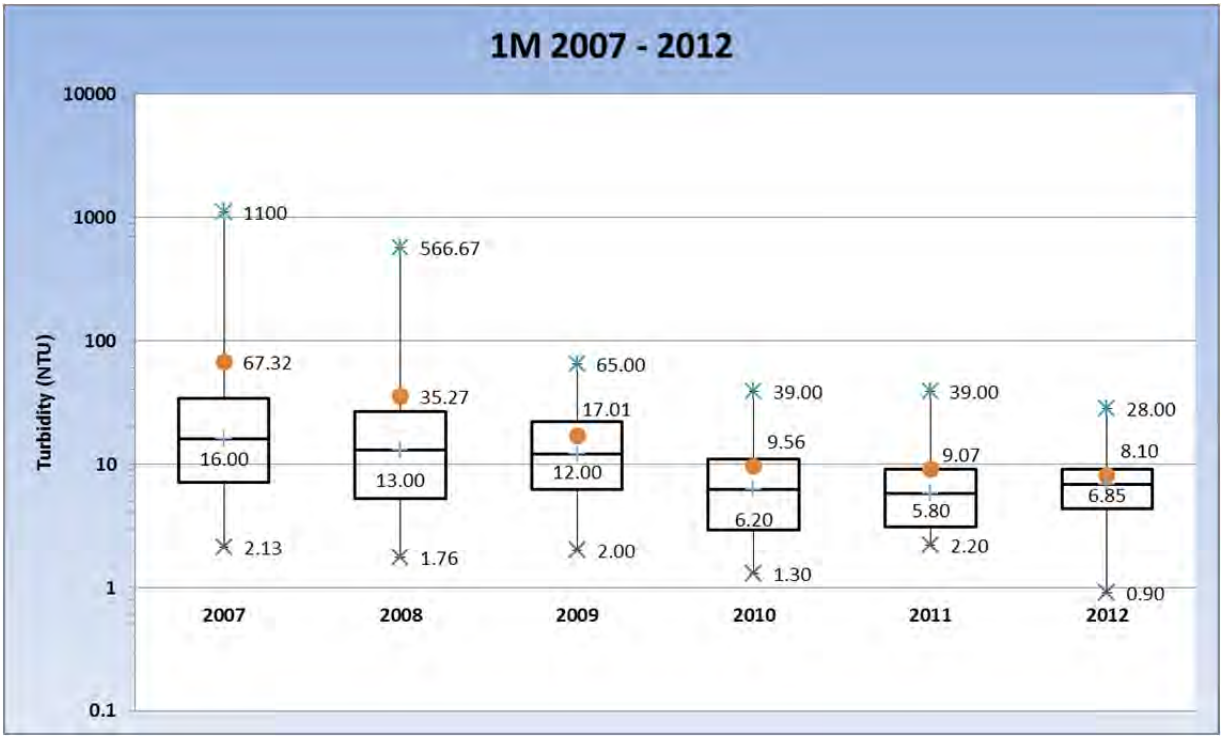
4M – Station 4M is located on Moore's Mill Creek at Windway Road. Annual turbidity results at 4M indicated a median value of 8.71 NTU for the 2012 monitoring year. This is a 0.89 NTU decrease from the 2011 monitoring year median and a 1.74 NTU decrease from the 2010 monitoring year. The 2012 median turbidity value was less than all previous years, yet minor increases were recorded in the maximum values from 2011-2012. Construction and development sites most closely associated with this station during the 2012 calendar year were commercial lot construction in the Ogletree Village Shopping Center, residential lot construction in the Moore's Mill Golf Club Subdivision, the Grove Hill Subdivision, residential lot construction in the Laurel Grove Subdivision, and anything contributing to Stations 1M-3M, 6M, and 7M.

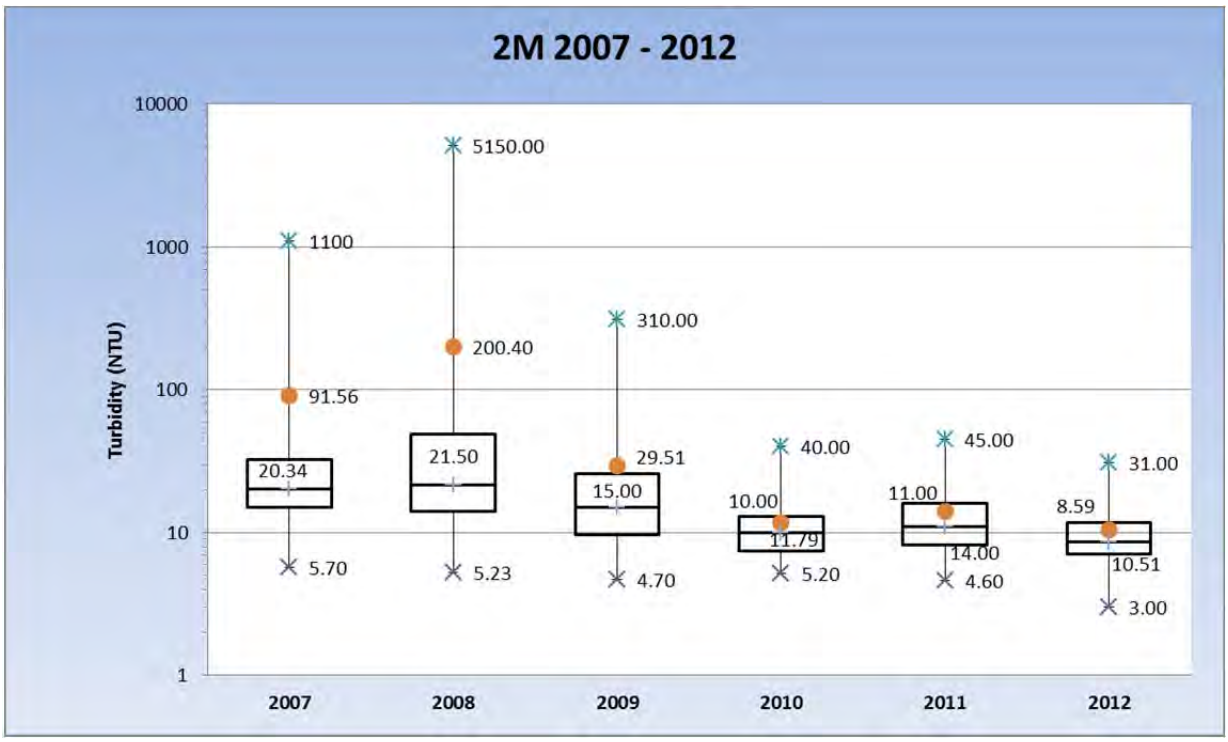
5M – This is the final downstream station on Moore's Mill Creek main stem located at Ogletree Road. Annual turbidity results at 5M indicated a median value of 8.45 NTU for the 2012 monitoring year. This is a 1.05 NTU decrease from the 2011 monitoring year median and a 0.55 NTU increase from the 2010 monitoring year. The 2012 maximum, minimum, and average turbidity values were less than all previous years. Construction and development sites most closely associated with this station during the 2012 calendar year were lot construction on the western half of Grove Hill Subdivision and anything contributing to Stations 1M-4M, 6M, and 7M.

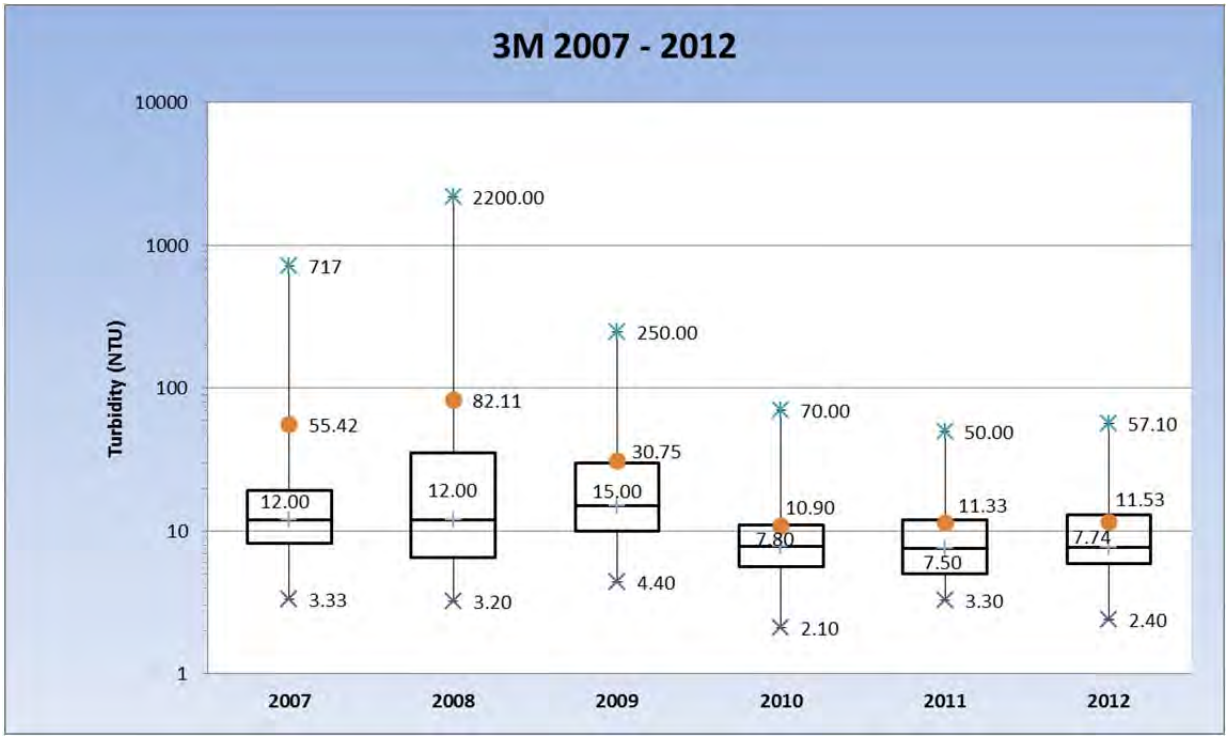
6M – Station 6M is located on an unnamed tributary of Moore's Mill Creek as it crosses under E. Samford Avenue, near E. University Drive. Annual turbidity results at 6M indicated a median value of 5.70 NTU for the 2012 monitoring year. This is a 0.10 NTU decrease from the 2011 monitoring year median and a 1.25 NTU increase from the 2010 monitoring year. Although this station exhibited a moderate increase in the maximum recorded turbidity from 2010-2011 (19 NTU to 40 NTU), a decrease was recorded from 2011-2012 (40 NTU to 24.80 NTU). There were no permitted construction or development activities upstream of this station during 2012.

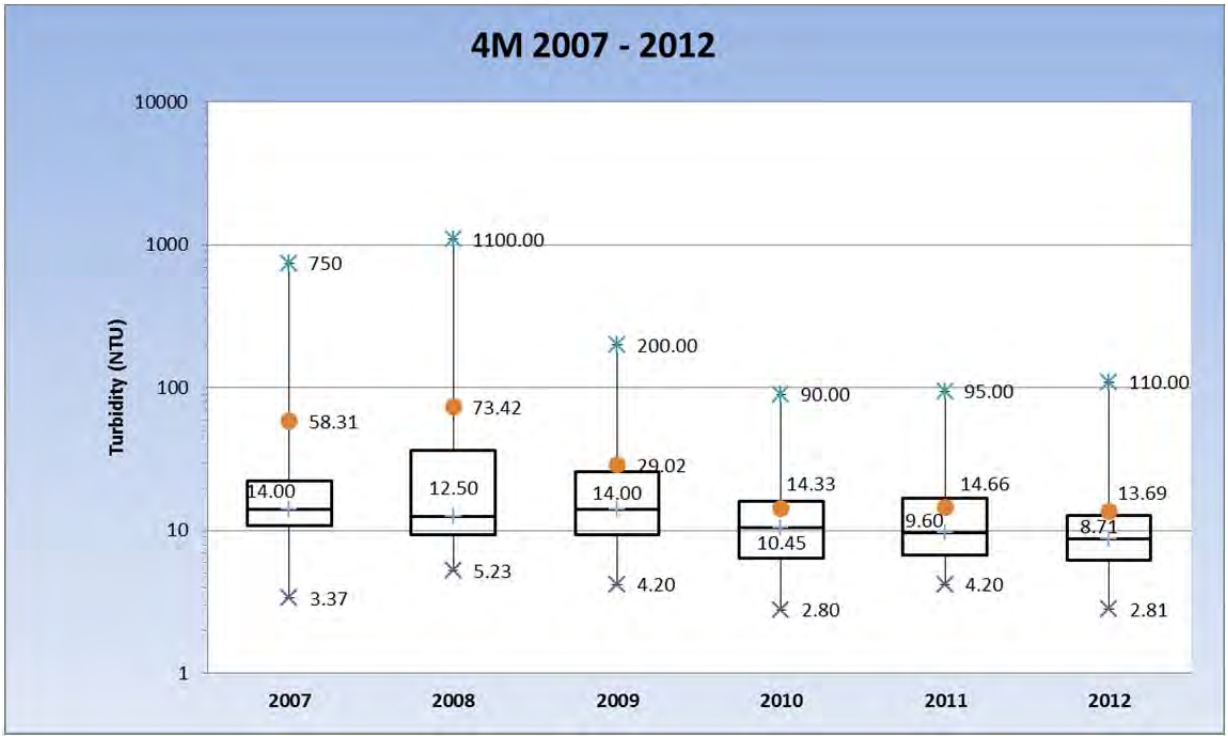
7M – Station 7M is also located on an unnamed tributary of Moore's Mill Creek as it crosses under Jockish Road just upstream of station M6. Annual turbidity results at 7M indicated a median value of 8.50 NTU for the 2012 monitoring year. This is a 0.70 NTU decrease from the 2011 monitoring year median and a 3.00 NTU decrease from the 2010 monitoring year. This station also exhibited a 1025 NTU increase in the annual maximum from 2011 to 2012 (200 NTU to 1225 NTU respectively). Development activity at the Church of the Highlands is the most likely cause for this increase. Construction and development sites that potentially contributed to elevated turbidity at this station during the 2012 calendar year were the Planet X borrow pit, the Church of the Highlands, and access expansion of the AU Airport.

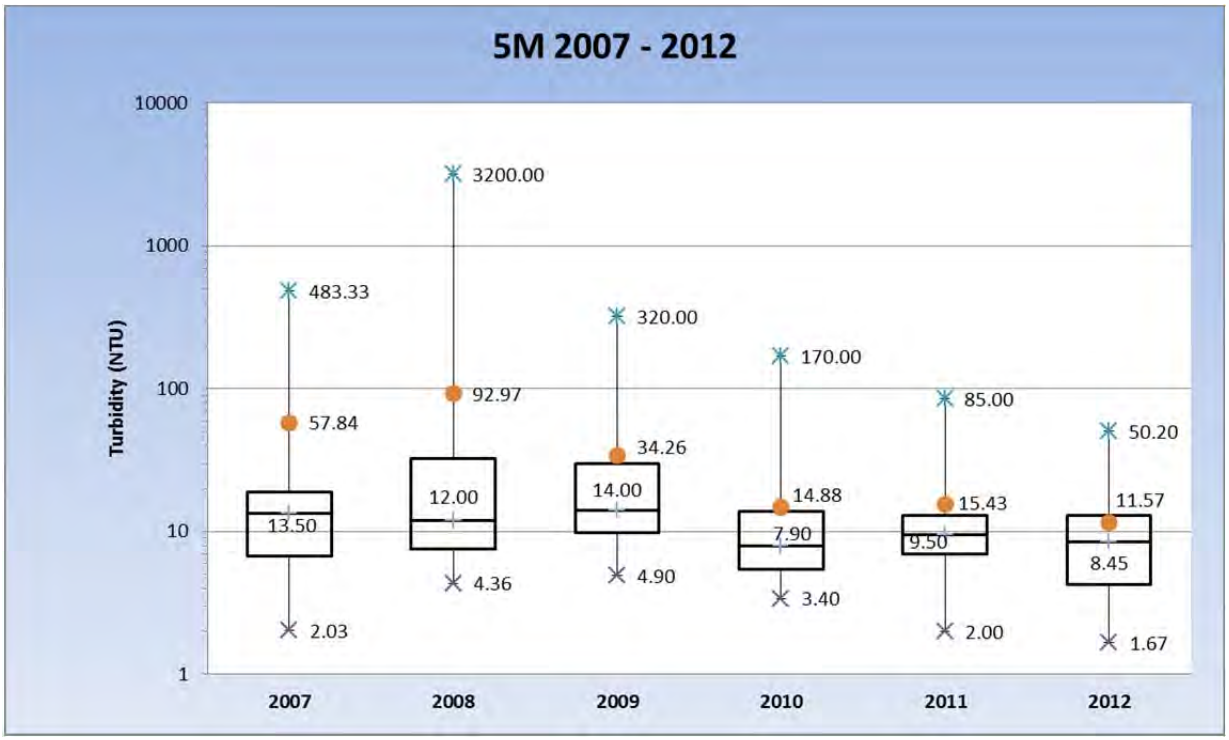
8M – 8M is located on Moore's Mill Creek immediately downstream of the confluence with the Auburn University Regional Airport tributary. Annual turbidity results at 8M indicated a median value of 10.12 NTU for the 2012 monitoring year. This is a 0.12 NTU increase from the 2011 monitoring year median and a 3.12 NTU increase from the 2010 monitoring year. Construction and development sites most closely associated with this station during the 2012 calendar year were the AU Airport Terminal, the East Glenn Borrow Pit, and anything contributing to Station 1M.

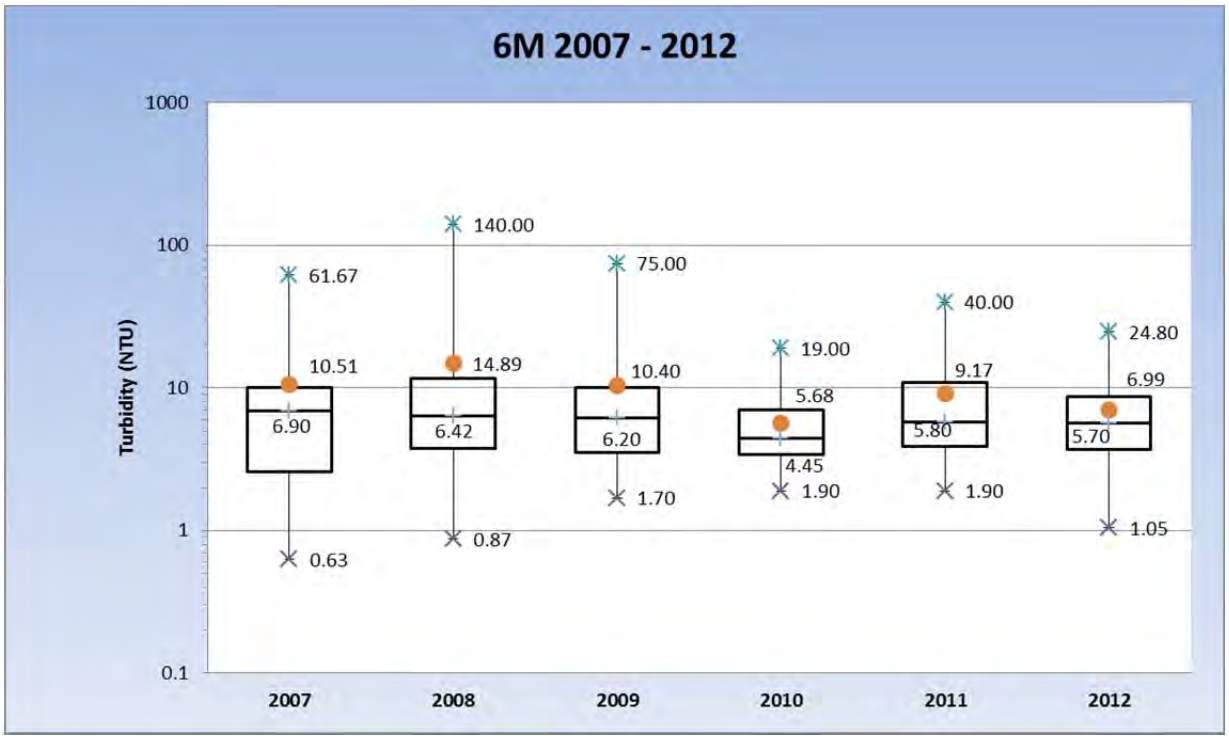

1M 2007 - 2012
Turbidity (NTU)
10000
1000
100
10
1
0.1
1100
67.32
16.00
2.13
566.67
35.27
13.00
1.76
65.00
17.01
12.00
2.00
39.00
9.56
6.20
1.30
39.00
9.07
5.80
2.20
28.00
8.10
6.85
0.90
2007
2008
2009
2010
2011
2012

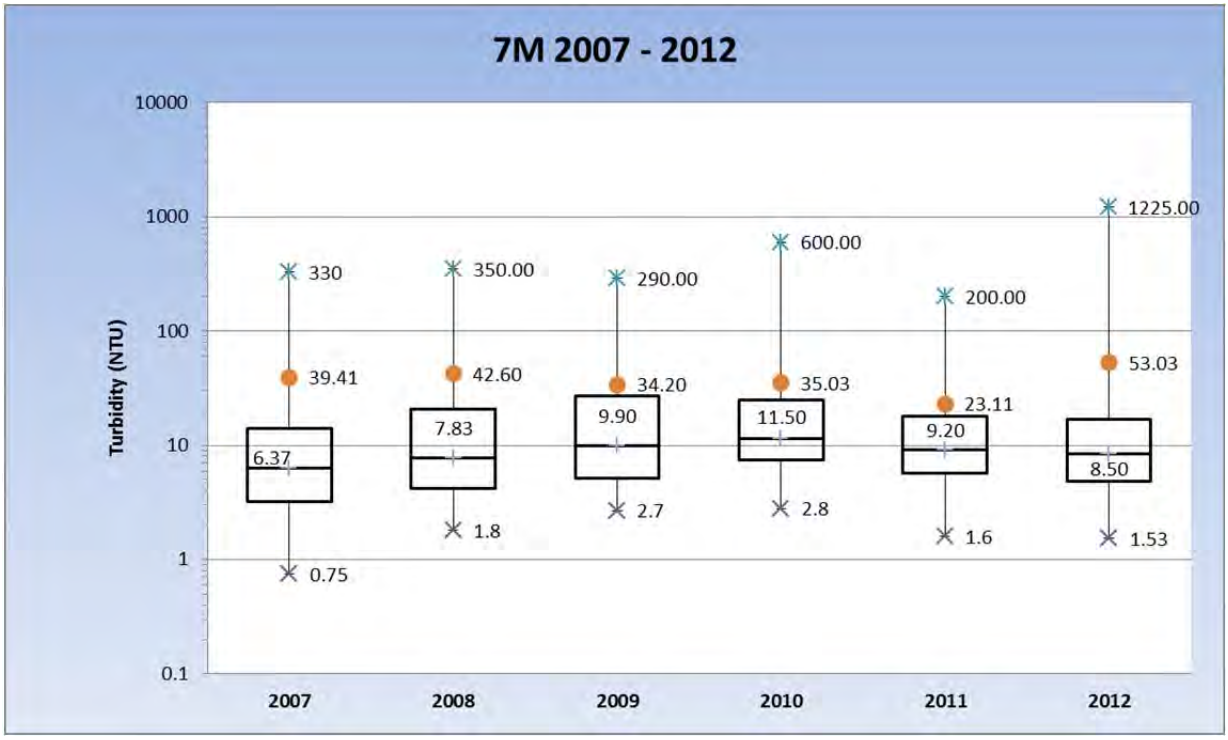

2M 2007 - 2012
Turbidity (NTU)
10000
1000
100
10
1
1100
91.56
20.34
5.70
5150.00
200.40
21.50
5.23
310.00
29.51
15.00
4.70
40.00
10.00
11.79
5.20
45.00
11.00
14.00
4.60
31.00
8.59
10.51
3.00
2007
2008
2009
2010
2011
2012

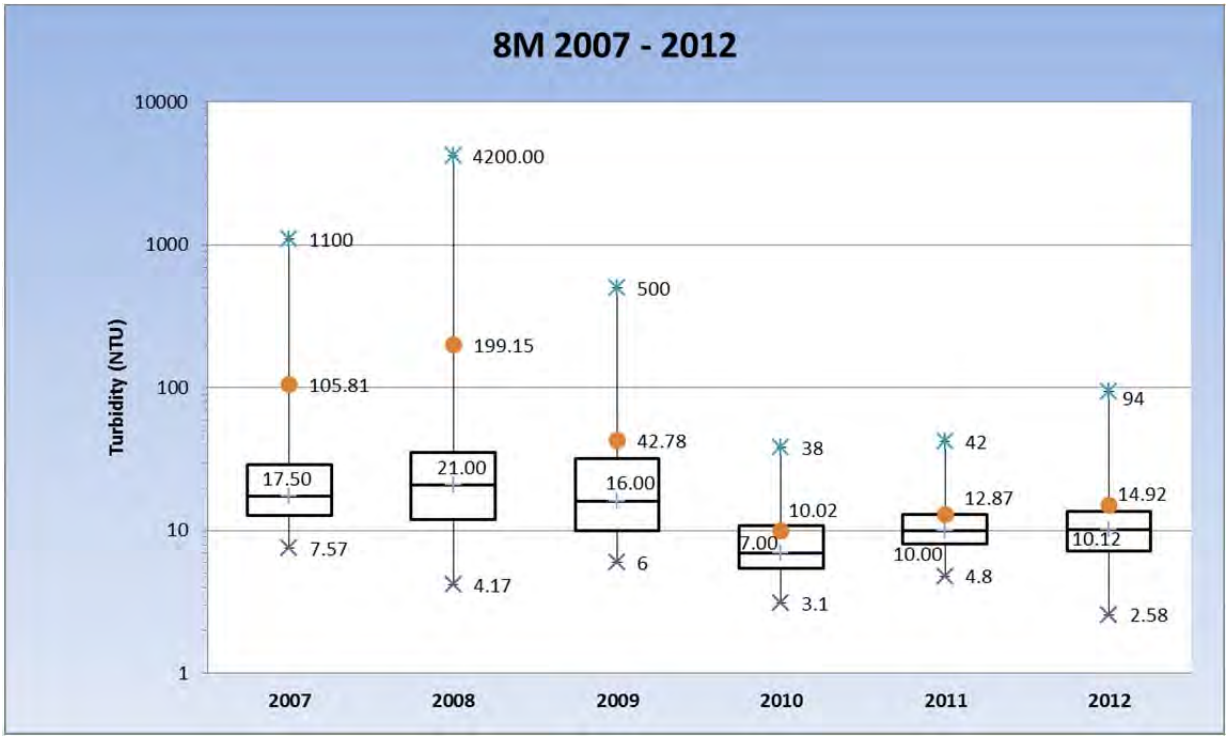

3M 2007 - 2012
Turbidity (NTU)
10000
1000
100
10
1
2007
2008
2009
2010
2011
2012
717
55.42
12.00
3.33
2200.00
82.11
12.00
3.20
250.00
30.75
15.00
4.40
70.00
10.90
7.80
2.10
50.00
11.33
7.50
3.30
57.10
11.53
7.74
2.40

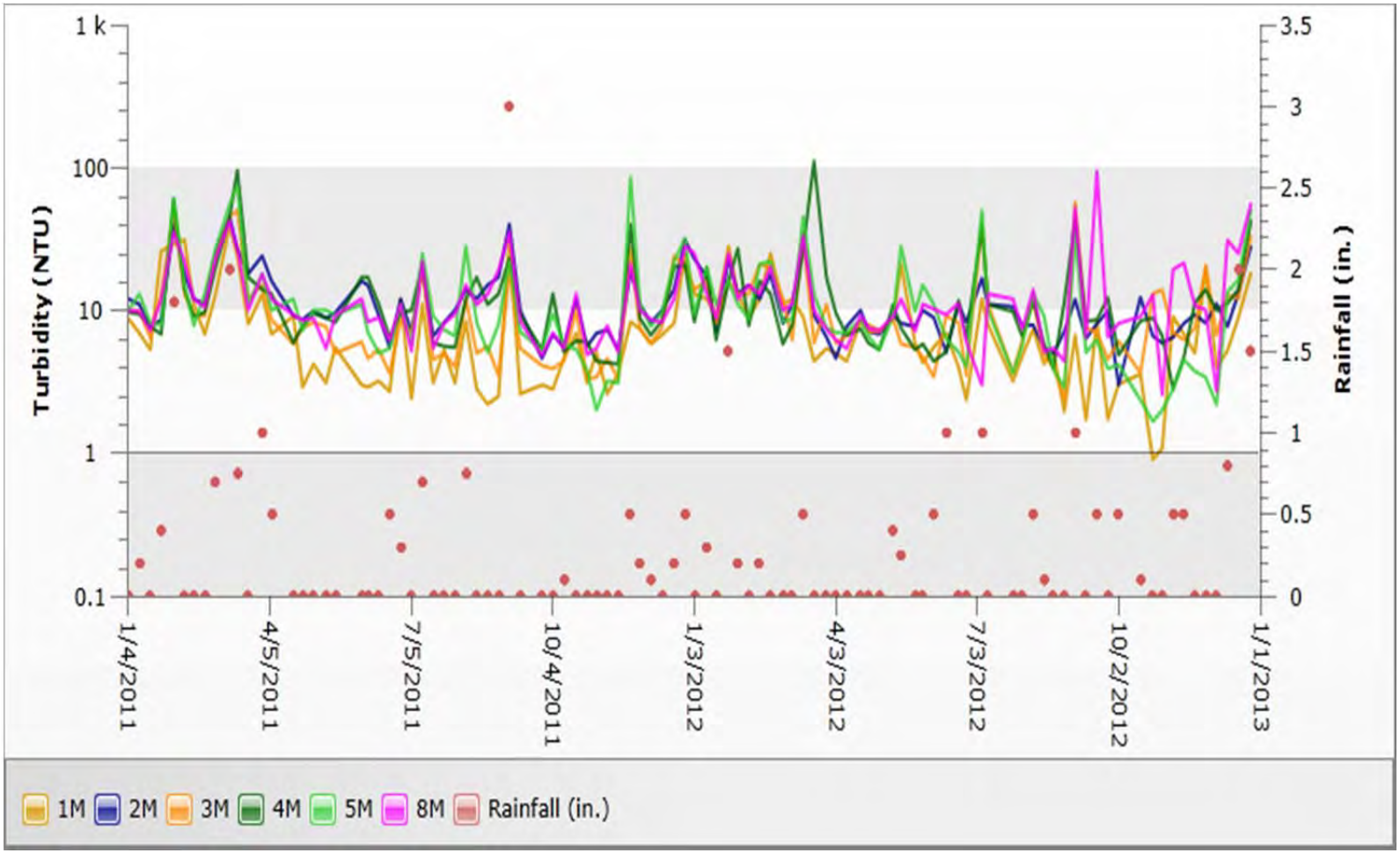

4M 2007 - 2012
Turbidity (NTU)
10000
1000
100
10
1
2007
2008
2009
2010
2011
2012
750
58.31
14.00
3.37
1100.00
73.42
12.50
5.23
200.00
29.02
14.00
4.20
90.00
14.33
10.45
2.80
95.00
14.66
9.60
4.20
110.00
13.69
8.71
2.81


5M 2007 - 2012
Turbidity (NTU)
10000
1000
100
10
1
3200.00
483.33
320.00
170.00
85.00
50.20
92.97
57.84
34.26
14.88
15.43
11.57
12.00
14.00
13.50
7.90
9.50
8.45
4.36
4.90
3.40
2.00
1.67
2.03
2007
2008
2009
2010
2011
2012

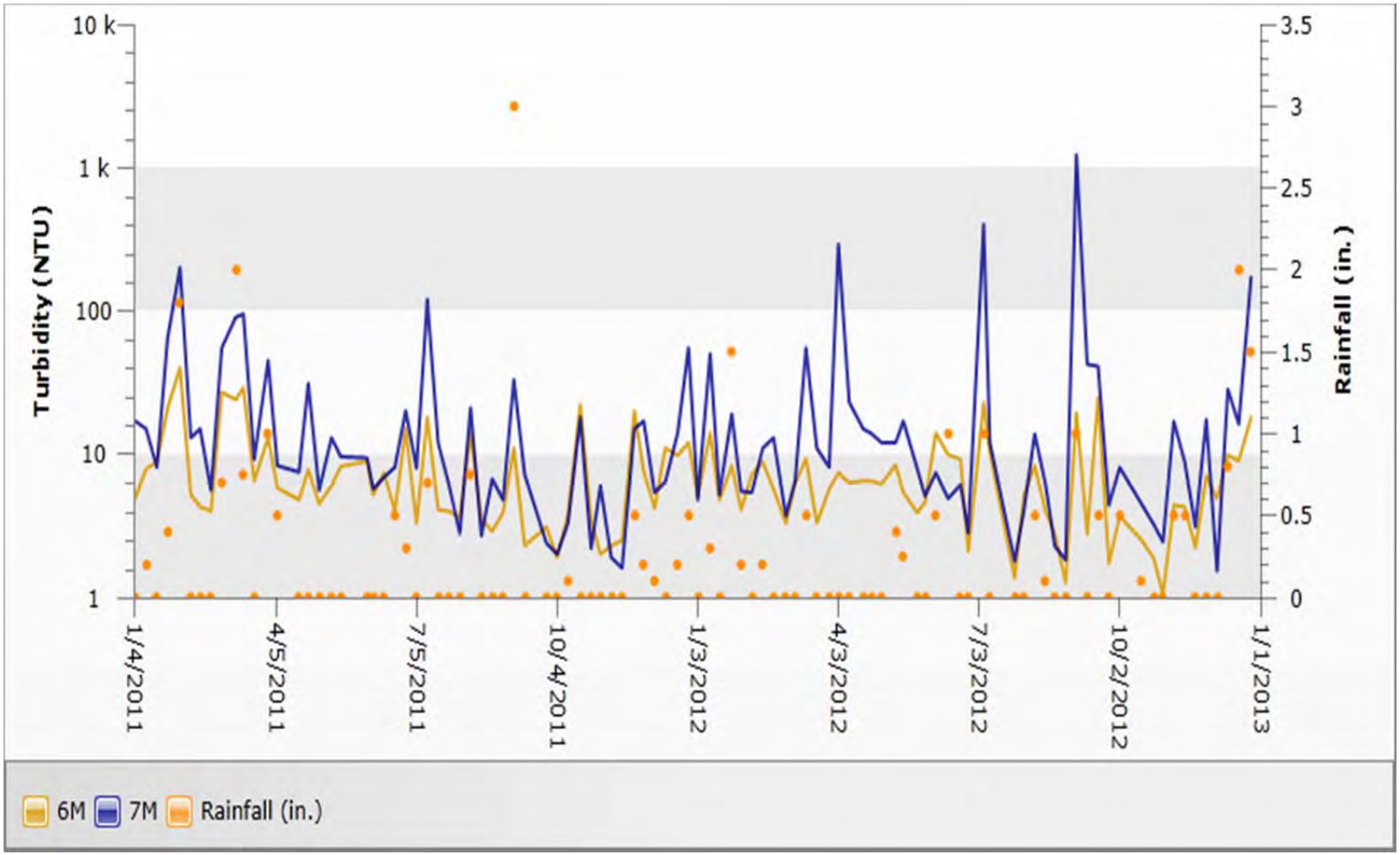

6M 2007 - 2012
Turbidity (NTU)
1000
100
10
1
0.1
140.00
75.00
61.67
40.00
24.80
19.00
10.51
14.89
10.40
9.17
6.99
5.68
6.90
6.42
6.20
5.80
5.70
4.45
1.70
1.90
1.90
1.05
0.87
0.63
2007
2008
2009
2010
2011
2012


7M 2007 - 2012
Turbidity (NTU)
10000
1000
100
10
1
0.1
330
39.41
6.37
0.75
350.00
42.60
7.83
1.8
290.00
34.20
9.90
2.7
600.00
35.03
11.50
2.8
200.00
23.11
9.20
1.6
1225.00
53.03
8.50
1.53
2007
2008
2009
2010
2011
2012


8M 2007 - 2012
Turbidity (NTU)
10000
1000
100
10
1
1100
105.81
17.50
7.57
4200.00
199.15
21.00
4.17
500
42.78
16.00
6
38
10.02
7.00
3.1
42
12.87
10.00
4.8
94
14.92
10.12
2.58
2007
2008
2009
2010
2011
2012



Graph of Moore's Mill Mainstem Turbidity Data for 2011-2012



Graph of Moore's Mill Tributaries Turbidity Data for 2011-2012

Parkerson Mill Creek Watershed

Monitoring Station Locations:

1P – Station 1P is the furthest upstream monitoring location on Parkerson Mill Creek (located at the Lem Morrison Road crossing).

Latitude *32, 35, 33.627 N*; Longitude *85, 29, 45.826 W*

2P – Station 2P is located on Parkerson Mill Creek main stem at the eastern most W. Longleaf Drive crossing.

Latitude *32, 34, 21.948 N*; Longitude *85, 30, 24.979 W*

3P – Station 3P is located on Parkerson Mill Creek main stem at the W. Veterans Boulevard crossing.

Latitude *32, 33, 44.574 N*; Longitude *85, 30, 25.114 W*

4P – Station 4P is the furthest downstream monitoring location on Parkerson Mill Creek main stem and is located at the CR 10/Sandhill Road crossing.

Latitude *32, 32, 13.799 N*; Longitude *85, 30, 21.591 W*

5P – Station 5P is located on Parkerson Mill Creek main stem just downstream of Station 1P, at the Shug Jordan Parkway Crossing.

Latitude *32, 35, 8.48 N*; Longitude *85, 30, 10.446 W*

6P – Station 6P is located on an unnamed tributary near the intersection of Wire and Webster Roads.

Latitude *32, 35, 3.567 N*; Longitude *85, 31, 0.914 W*

7P – Station 7P is located downstream of Station P6 at the western most crossing on W. Longleaf Drive.

Latitude *32, 34, 22.578 N*; Longitude *85, 30, 38.989 W*

**See Insert for Maps of All Water Quality Monitoring Locations*

	1P						2P					
	2007	2008	2009	2010	2011	2012	2007	2008	2009	2010	2011	2012
MIN	0.78	0.67	1.90	1.60	2.50	0.67	0.60	1.66	1.60	0.90	1.70	0.53
MAX	153.33	550.00	450.00	90.00	230.00	70.00	200.00	370.00	70.00	33.00	100.00	52.00
AVG	21.07	41.29	38.48	9.66	27.31	12.02	21.78	34.80	18.70	6.87	16.64	9.83
MEDIAN	8.24	10.00	15.00	4.20	9.60	8.53	7.48	8.38	12.00	5.40	6.60	6.79

	3P						4P					
	2007	2008	2009	2010	2011	2012	2007	2008	2009	2010	2011	2012
MIN	1.30	1.70	1.10	1.20	2.00	1.17	0.78	0.46	3.10	0.85	1.50	0.73
MAX	240.00	1800.00	80.00	65.00	85.00	700.00	333.33	330.00	150.00	38.00	130.00	163.00
AVG	28.08	71.16	16.53	7.97	14.86	23.04	31.63	37.58	24.02	8.68	18.11	12.59
MEDIAN	8.72	7.57	9.00	4.95	7.10	7.15	9.27	6.69	11.00	5.45	7.70	8.15

	5P						6P					
	2007	2008	2009	2010	2011	2012	2007	2008	2009	2010	2011	2012
MIN	0.40	0.70	2.50	1.20	2.30	0.53	0.83	1.40	1.30	2.10	1.80	1.40
MAX	160.00	450.00	360.00	29.00	100.00	45.00	220.00	220.00	60.00	17.00	33.00	51.40
AVG	20.07	39.02	36.77	6.94	18.78	10.35	27.33	24.97	9.70	5.21	8.42	7.30
MEDIAN	7.40	9.55	14.00	4.60	9.00	8.89	12.00	7.13	6.20	4.80	5.60	5.40

	7P					
	2007	2008	2009	2010	2011	2012
MIN	1.30	1.43	2.00	2.70	2.40	1.97
MAX	346.67	390.00	65.00	40.00	65.00	109.00
AVG	36.85	32.17	11.89	8.23	14.89	11.72
MEDIAN	11.00	7.57	6.30	5.80	9.25	6.64

Statistical Analysis of Turbidity Data for Parkerson Mill Creek

Station Notes:

1P – Station 1P is the furthest upstream monitoring location on Parkerson Mill Creek (Lem Morrison Road). Annual turbidity results at 1P indicated a median value of 8.53 NTU for the 2012 monitoring year. This is a 1.07 NTU decrease from the 2011 monitoring year median and a 4.33 NTU increase from the 2010 monitoring year. The increase in the median between 2010 and 2011 was likely associated with an increase in construction and development activities upstream from this monitoring station. Many of these sites were completed and/or stabilized during 2012. Construction and development sites most closely associated with this station during the 2012 calendar year were The Grove (apartment/condo housing development) and various projects on the campus of Auburn University.

2P – Station 2P is located at the eastern most W. Longleaf Drive crossing. Annual turbidity results at 2P indicated a median value of 6.79 NTU for the 2012 monitoring year. This is a 0.19 NTU increase from the 2011 monitoring year median and a 1.39 NTU increase from the 2010

monitoring year. Construction and development sites most closely associated with this station during the 2012 calendar year were all those contributing to Stations 1P and 5P.

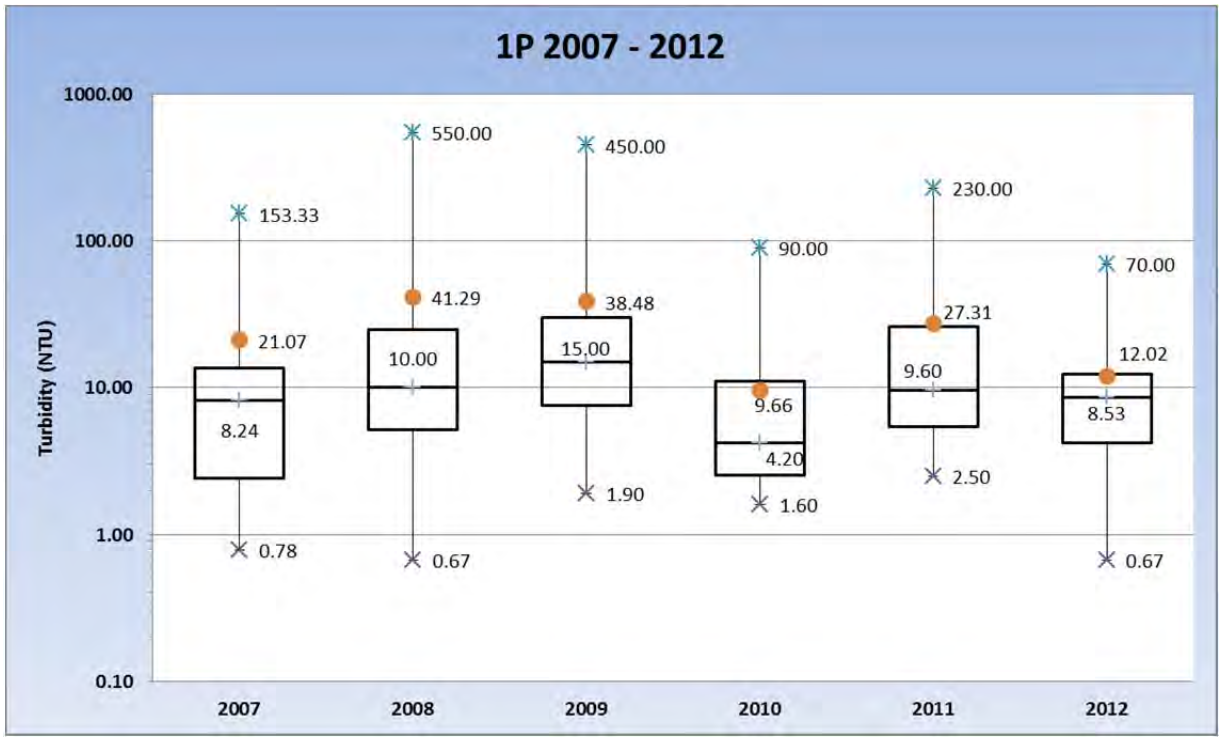
3P – Station 3P is located at the W. Veterans Boulevard crossing. Annual turbidity results at 3P indicated a median value of 7.15 NTU for the 2012 monitoring year. This is a 0.05 NTU increase from the 2011 monitoring year median and a 2.20 NTU increase from the 2010 monitoring year. Construction and development sites that potentially contributed to elevated turbidity at this station during the 2012 calendar year were the Lake Street Construction and Debris Landfill (Lee County MS4) and any sites contributing to Stations 1P, 2P, 5P, 6P, and 7P.

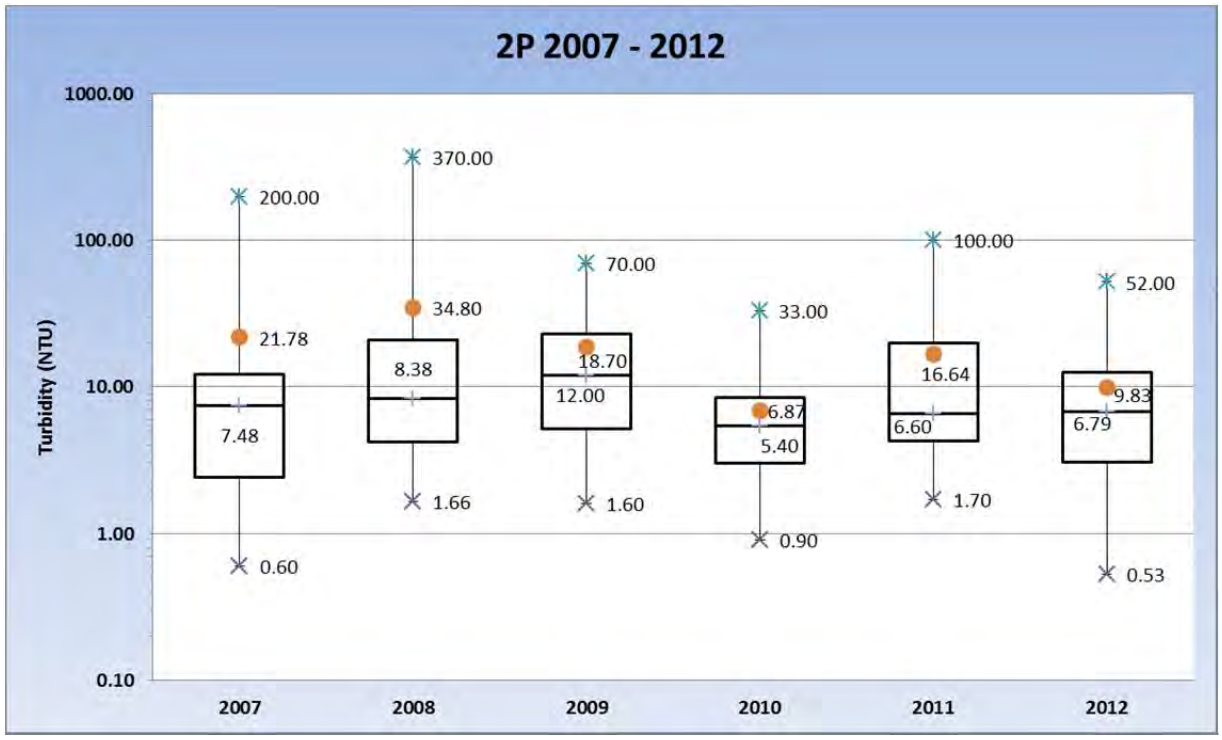
4P – Station 4P is the furthest downstream monitoring location on Parkerson Mill Creek main stem and is located at the CR 10/Sandhill Road crossing. Annual turbidity results at 4P indicated a median value of 8.15 NTU for the 2012 monitoring year. This is a 0.45 NTU increase from the 2011 monitoring year median and a 2.70 NTU increase from the 2010 monitoring year. Construction and development sites most closely associated with this station during the 2012 calendar year were the West Pace development and any sites contributing to Stations 1P-3P and 5P-7P.

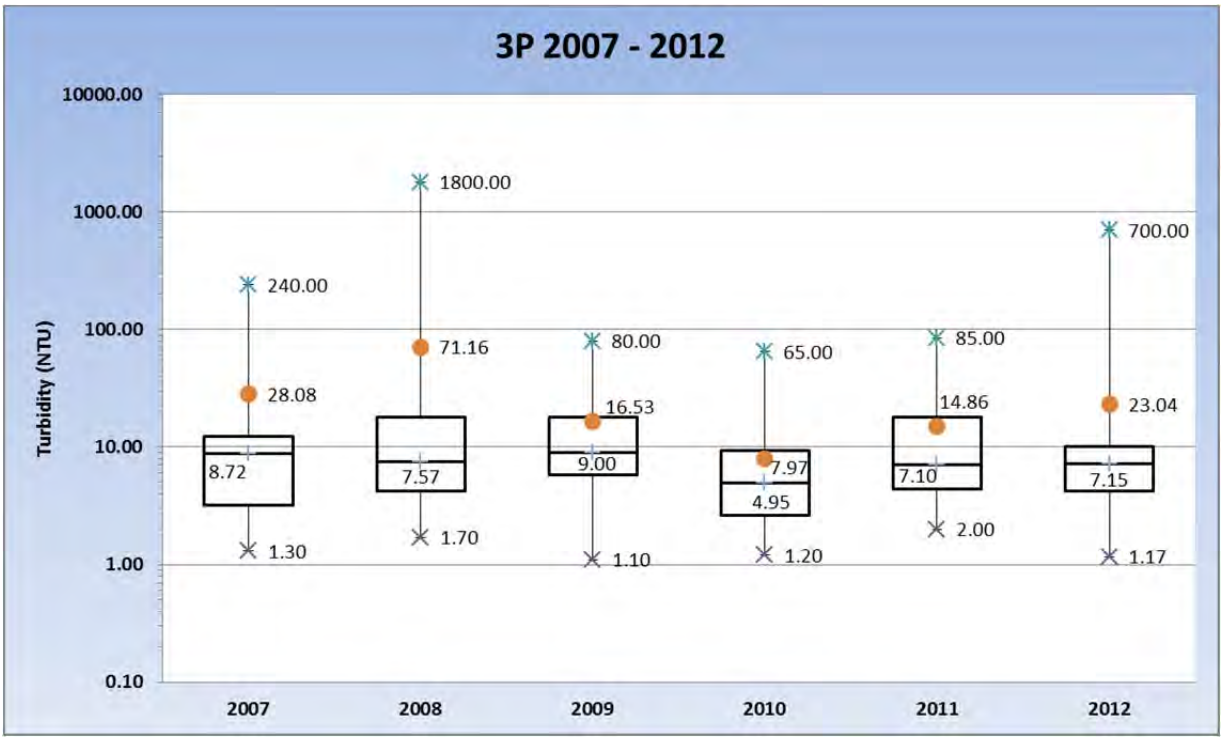
5P – Station 5P is located just downstream of Station 1P, at the Shug Jordan Parkway crossing. Annual turbidity results at 5P indicated a median value of 8.89 NTU for the 2012 monitoring year. This is a 0.11 NTU decrease from the 2011 monitoring year median and a 4.29 NTU increase from the 2010 monitoring year. Construction and development sites most closely associated with this station during the 2012 calendar year were only those also contributing to Station 1P.

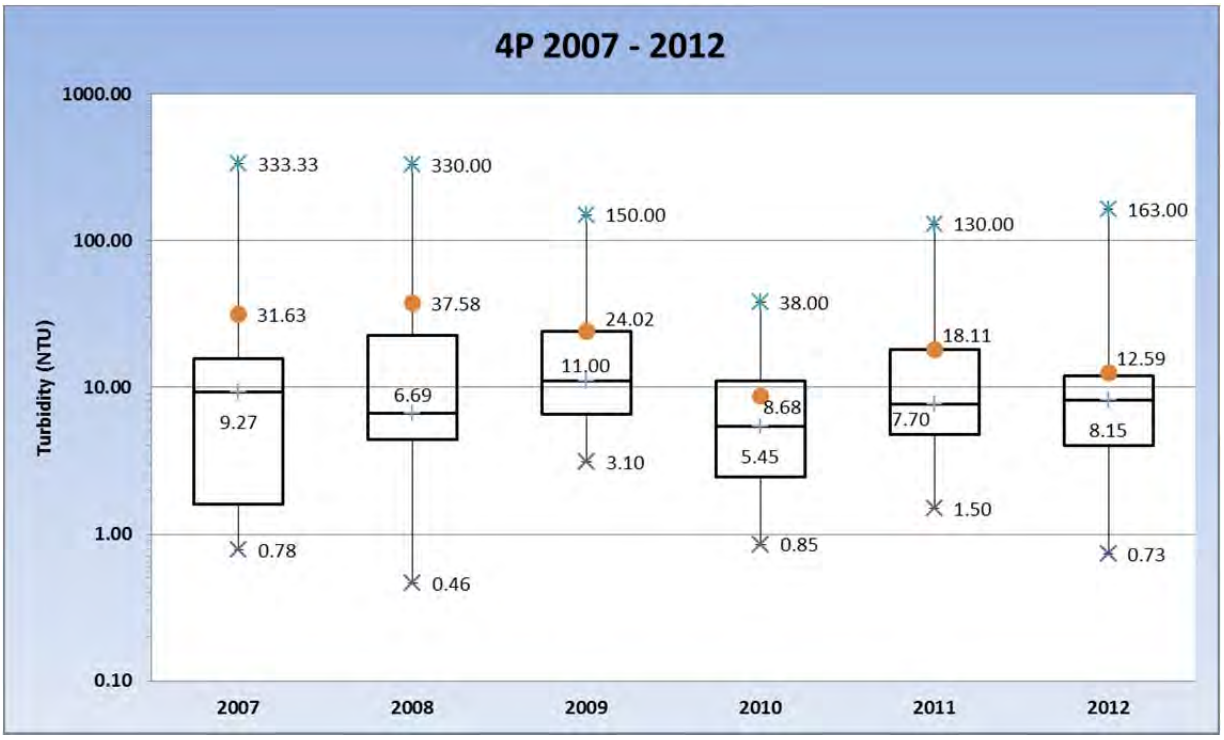
6P – Station 6P is located on an UT near the intersection of Wire Road and Webster Road. Annual turbidity results at 6P indicated a median value of 5.40 NTU for the 2012 monitoring year. This is a 0.20 NTU decrease from the 2011 monitoring year median and a 0.60 NTU increase from the 2010 monitoring year. Construction and development most closely associated with this station during the 2012 calendar year was the CNJ industrial expansion.

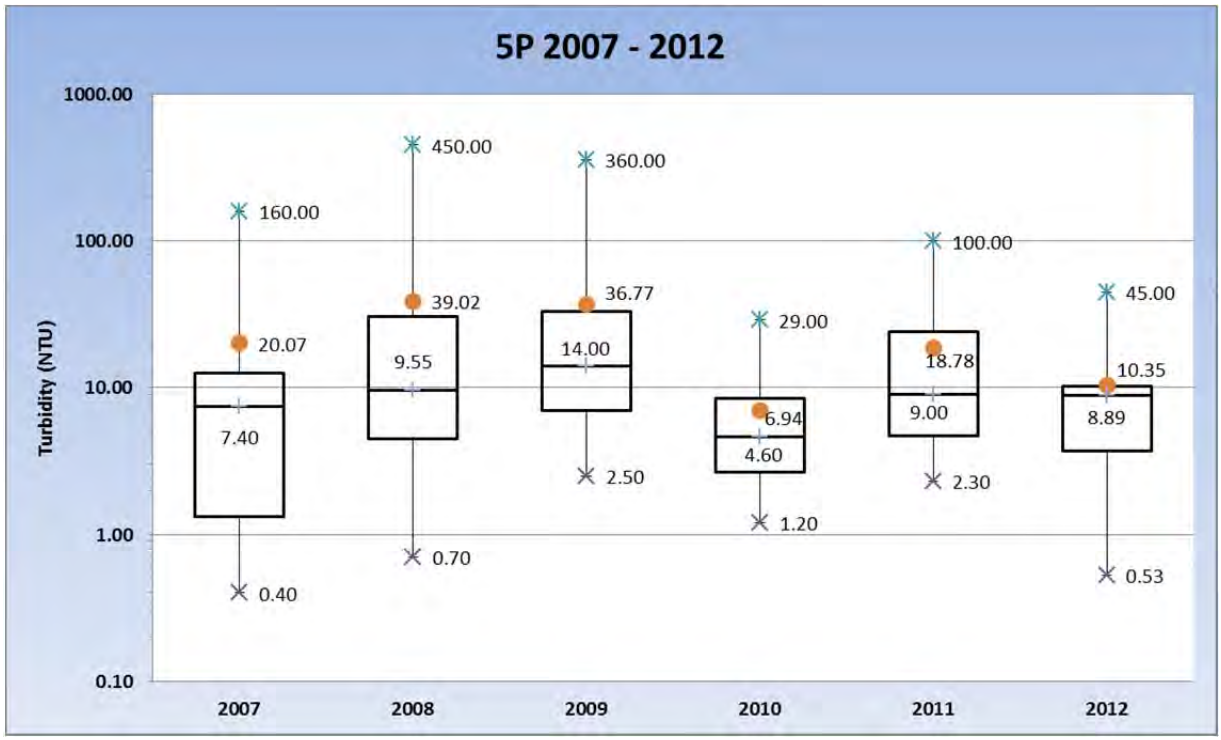
7P – Station 7P is located downstream of Station 6P at the western most crossing on W. Longleaf Drive. Annual turbidity results at 7P indicated a median value of 6.64 NTU for the 2012 monitoring year. This is a 2.61 NTU decrease from the 2011 monitoring year median and a 0.84 NTU increase from the 2010 monitoring year. Construction and development sites most closely associated with this station during the 2012 calendar year were the Madison Park Subdivision (stabilized) and anything contributing to 6P.

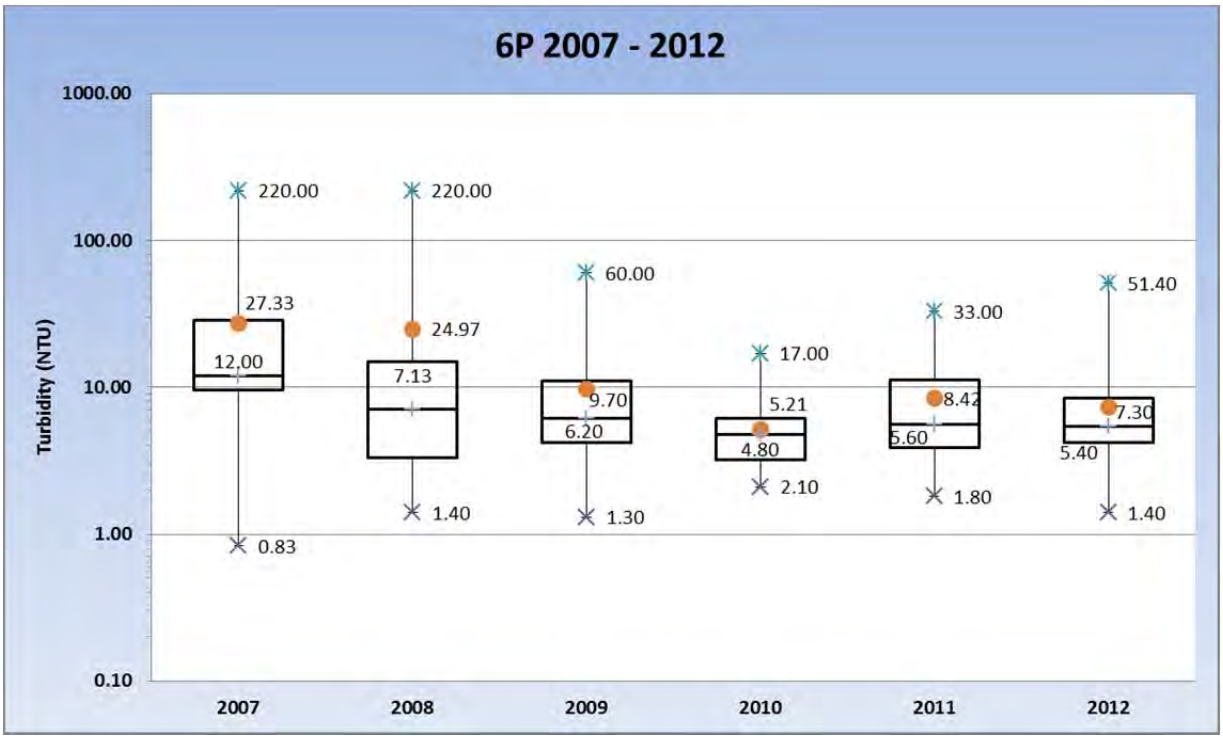

1P 2007 - 2012
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
153.33
21.07
8.24
0.78
550.00
41.29
10.00
0.67
450.00
38.48
15.00
1.90
90.00
9.66
4.20
1.60
230.00
27.31
9.60
2.50
70.00
12.02
8.53
0.67
2007
2008
2009
2010
2011
2012


2P 2007 - 2012
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
200.00
21.78
7.48
0.60
370.00
34.80
8.38
1.66
70.00
18.70
12.00
1.60
33.00
6.87
5.40
0.90
100.00
16.64
6.60
1.70
52.00
9.83
6.79
0.53
2007
2008
2009
2010
2011
2012


3P 2007 - 2012
Turbidity (NTU)
10000.00
1000.00
100.00
10.00
1.00
0.10
2007
2008
2009
2010
2011
2012
240.00
28.08
8.72
1.30
1800.00
71.16
7.57
1.70
80.00
16.53
9.00
1.10
65.00
7.97
4.95
1.20
85.00
14.86
7.10
2.00
700.00
23.04
7.15
1.17


4P 2007 - 2012
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
2007
2008
2009
2010
2011
2012
333.33
31.63
9.27
0.78
330.00
37.58
6.69
0.46
150.00
24.02
11.00
3.10
38.00
8.68
5.45
0.85
130.00
18.11
7.70
1.50
163.00
12.59
8.15
0.73


5P 2007 - 2012
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
2007
2008
2009
2010
2011
2012
160.00
20.07
7.40
0.40
450.00
39.02
9.55
0.70
360.00
36.77
14.00
2.50
29.00
6.94
4.60
1.20
100.00
18.78
9.00
2.30
45.00
10.35
8.89
0.53


6P 2007 - 2012
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
2007
2008
2009
2010
2011
2012
220.00
27.33
12.00
0.83
220.00
24.97
7.13
1.40
60.00
9.70
6.20
1.30
17.00
5.21
4.80
2.10
33.00
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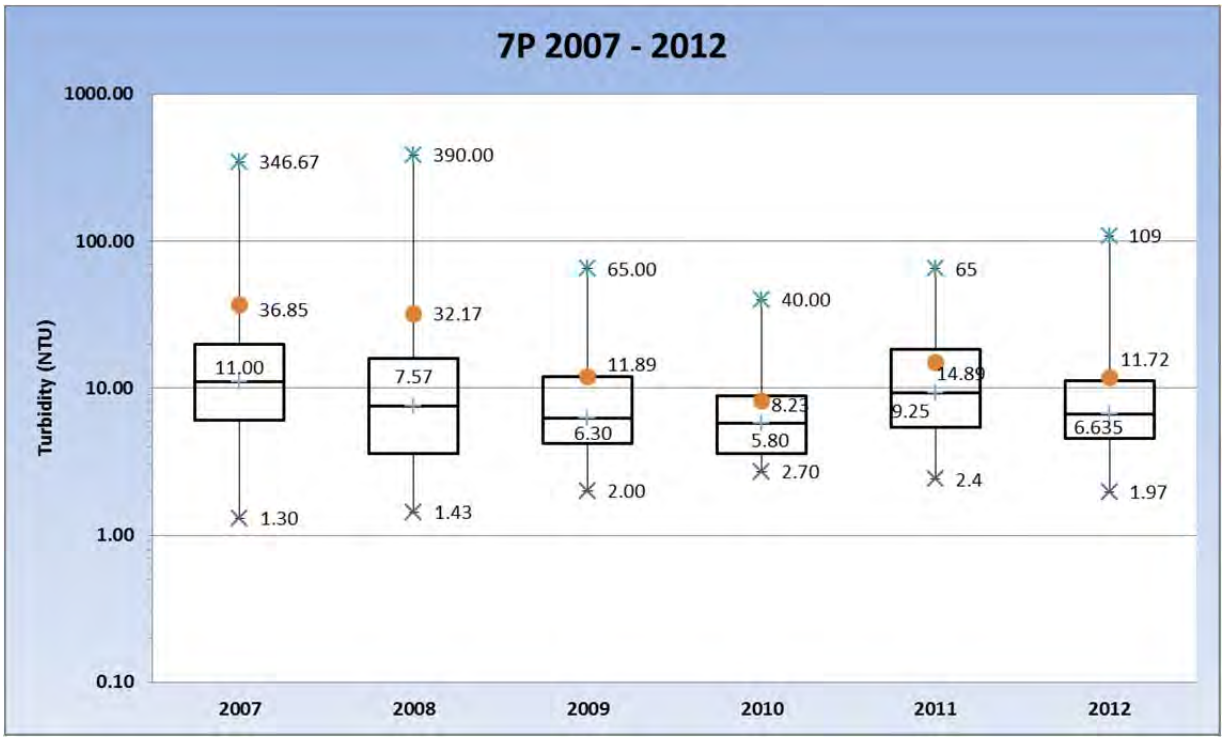
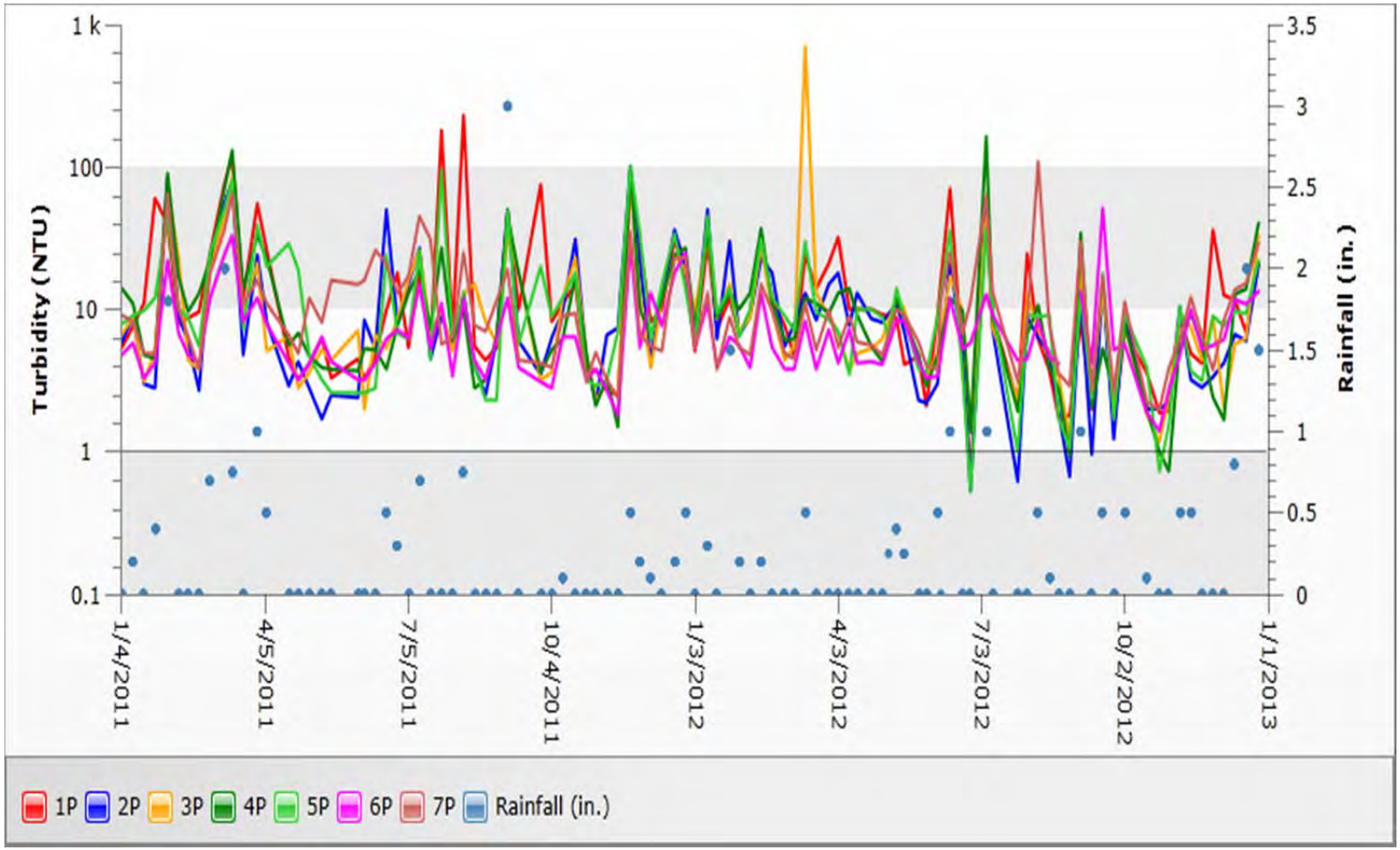
5.60
1.80
51.40
7.30
5.40
1.40


7P 2007 - 2012
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
346.67
36.85
11.00
1.30
390.00
32.17
7.57
1.43
65.00
11.89
6.30
2.00
40.00
8.23
5.80
2.70
65
14.89
9.25
2.4
109
11.72
6.635
1.97
2007
2008
2009
2010
2011
2012



Graph of Parkerson Mill Creek Turbidity Data for 2011-2012

Saugahatchee Creek Watershed

Monitoring Station Locations:

1S – Station 1S is the furthest upstream monitoring location on Saugahatchee Creek main stem and is located at the US Highway 280 crossing.

Latitude *32, 39, 28.708 N*; Longitude *85, 27, 33.229 W*

2S – Station 2S is located on Saugahatchee Creek main stem at the N. College Street/AL 147 crossing.

Latitude *32, 38, 54.075 N*; Longitude *85, 28, 56.552 W*

3S – Station 3S is located on Saugahatchee Creek main stem at the N. Donahue Drive/CR 182 crossing.

Latitude *32, 38, 32.179 N*; Longitude *85, 30, 14.658 W*

4S - Station 4S is the furthest downstream monitoring location on Saugahatchee Creek main stem and is located immediately upstream of the Northside Water Pollution Control Facility (WPCF).

Latitude *32, 37, 40.252 N*; Longitude *85, 32, 51.6 W*

5S – Station 5S is located along an unnamed tributary immediately west of the Northside WPCF.

Latitude *32, 37, 30.273 N*; Longitude *85, 32, 45.009 W*

6S – Station 6S is located on an unnamed tributary at the Gatewood Drive crossing near Uncle Bob's Storage (formerly A-Safe).

Latitude *32, 37, 48.368 N*; Longitude *85, 27, 7.52 W*

7S – Station 7S is located downstream of 15S along an unnamed tributary at the Shelton Mill Road crossing near The City Church (formerly Victory Prayer Center).

Latitude *32, 38, 10.933 N*; Longitude *85, 27, 56.368 W*

8S – Station 8S is located on a separate unnamed tributary as 7S, at the Shelton Mill Road crossing near the Covenant Presbyterian Church.

Latitude *32, 37, 30.543 N*; Longitude *85, 28, 27.074 W*

12S – Station 12S is located downstream of 8S near the intersection of N. College Street/AL 147 and Shug Jordan Parkway.

Latitude *32, 38, 10.167 N*; Longitude *85, 28, 54.883 W*

14S – Station 14S is located on an unnamed tributary at the discharge of the primary spillway of The Preserve pond, which is located off W. Farmville Road.

Latitude *32, 39, 28.523 N*; Longitude *85, 32, 13.711 W*

15S – Station 15S is located on an unnamed tributary near the existing stub-out for N. Dean Road, just downstream of 6S.

Latitude *32, 38, 6.51 N*; Longitude *85, 27, 34.675 W*

16S – Station 16S is located on the same unnamed tributary as 8S and 12S and is downstream of 12S along Shug Jordan Parkway.

Latitude *32, 38, 10.238 N*; Longitude *85, 29, 20.643 W*

17S – Station 17S is located on an unnamed tributary at the discharge of the primary spillway of the Shadow Woods pond (in Shadow Woods Subdivision off Mrs. James Road/CR 081).

Latitude *32, 39, 15.106 N*; Longitude *85, 32, 1.977 W*

18S – 18S is located on an unnamed tributary along Farmville Road, immediately downstream of Tuscany Hills.

Latitude *32, 39, 53.844 N*; Longitude *85, 28, 51.164 W*

**See Insert for Maps of All Water Quality Monitoring Locations*

	1S						2S					
	2007	2008	2009	2010	2011	2012	2007	2008	2009	2010	2011	2012
MIN	1.00	2.66	2.46	2.20	2.40	1.25	1.53	3.26	3.23	3.30	2.70	1.40
MAX	327.67	450.00	200.00	40.00	110.00	44.70	380.00	400.00	230.00	55.00	180.00	63.30
AVG	30.55	49.54	28.28	11.22	12.69	7.42	34.83	49.72	34.85	12.69	19.09	10.53
MEDIAN	10.50	8.85	12.00	7.80	6.40	5.29	11.00	9.80	14.00	9.50	8.00	7.30

	3S						4S					
	2007	2008	2009	2010	2011	2012	2007	2008	2009	2010	2011	2012
MIN	1.90	3.90	3.30	4.20	3.00	1.60	1.70	3.56	2.70	3.40	2.70	1.90
MAX	260.00	550.00	450.00	75.00	150.00	72.60	300.00	500.00	270.00	140.00	110.00	100.40
AVG	33.70	52.12	45.16	14.25	18.72	11.98	32.25	48.54	35.53	15.76	18.84	13.54
MEDIAN	11.00	10.50	14.00	10.25	9.10	8.65	10.50	8.10	13.00	8.60	9.60	9.15

	5S						6S					
	2007	2008	2009	2010	2011	2012	2007	2008	2009	2010	2011	2012
MIN	8.83	3.23	5.20	3.10	4.80	7.47	4.27	2.03	4.20	3.40	3.40	3.20
MAX	683.67	400.00	160.00	45.00	70.00	293.00	28.67	50.00	38.00	26.00	32.00	17.60
AVG	90.47	41.68	22.99	13.26	15.58	25.54	14.01	11.07	11.07	9.44	10.58	8.71
MEDIAN	22.33	13.50	12.00	10.60	11.00	12.00	13.00	8.54	9.20	8.10	9.70	8.01

	7S						8S					
	2007	2008	2009	2010	2011	2012	2007	2008	2009	2010	2011	2012
MIN	3.07	2.23	2.20	1.60	2.80	1.67	1.33	1.83	1.70	1.40	2.30	0.80
MAX	62.00	75.00	110.00	27.00	37.00	19.60	650.00	220.00	150.00	28.00	85.00	38.20
AVG	15.38	13.76	13.80	6.45	8.43	5.99	36.90	26.99	15.50	5.49	10.64	10.76
MEDIAN	10.00	7.05	8.40	5.40	6.00	5.50	9.49	8.43	7.90	4.55	5.20	7.29

	12S						14S					
	2007	2008	2009	2010	2011	2012	2007	2008	2009	2010	2011	2012
MIN	1.40	2.26	3.70	2.40	3.60	2.60	3.83	4.20	3.50	3.00	5.50	3.63
MAX	190.00	500.00	400.00	40.00	60.00	50.60	996.67	950.00	55.00	85.00	65.00	50.00
AVG	24.02	31.94	31.58	8.21	11.55	10.34	82.53	64.97	14.97	15.69	19.29	16.68
MEDIAN	14.00	7.93	13.00	6.85	7.30	7.75	30.50	14.50	11.00	13.00	16.00	12.90

	15S						16S					
	2007	2008	2009	2010	2011	2012	2007	2008	2009	2010	2011	2012
MIN	1.57	2.20	3.20	2.40	2.80	1.73	3.20	2.60	3.70	2.20	3.80	3.94
MAX	280.00	65.00	65.00	55.00	40.00	17.70	220.00	270.00	310.00	55.00	55.00	49.30
AVG	21.42	13.46	14.64	7.42	8.94	6.07	27.07	25.86	29.79	7.99	12.09	10.61
MEDIAN	13.00	8.57	10.00	5.50	6.30	5.35	13.00	7.48	10.60	5.75	7.80	7.00

	17S						18S					
	2007	2008	2009	2010	2011	2012	2007	2008	2009	2010	2011	2012
MIN	12.67	8.90	11.00	8.70	15.00	17.00	2.30	2.26	2.30	1.80	2.20	2.66
MAX	550.00	400.00	135.00	55.00	90.00	147.00	1100.00	360.00	200.00	29.00	33.00	30.50
AVG	80.01	56.91	25.37	23.84	36.58	34.99	56.92	30.39	16.00	5.49	6.66	6.54
MEDIAN	47.50	25.00	21.00	21.00	29.00	29.50	13.00	7.51	7.30	4.35	4.45	5.35

Statistical Analysis of Turbidity Data for Saugahatchee Creek

Station Notes:

1S – Station 1S is the furthest upstream monitoring location on Saugahatchee Creek (US Highway 280). Annual turbidity results at 1S indicated a median value of 5.29 NTU for the 2012 monitoring year. This is a 1.11 NTU decrease from the 2011 monitoring year median and a 2.51 NTU decrease from the 2010 monitoring year. All construction activities contributing to this station are located outside of the City's MS4 jurisdiction. .

2S – Station 2S is located at the N. College Street crossing. Annual turbidity results at 2S indicated a median value of 7.30 NTU for the 2012 monitoring year. This is a 0.70 NTU decrease from the 2011 monitoring year median and a 2.20 NTU decrease from the 2010 monitoring year. Construction and development sites most closely associated with this station during the 2012 calendar year were the Shelton Cove Subdivision, lot construction at Tuscany Village, lot construction in Ashton Lakes, lot construction in Tuscany Hills, and any sites contributing to 1S and 18S.

3S – Station 3S is located at the N. Donahue Drive crossing. Annual turbidity results at 3S indicated a median value of 8.65 NTU for the 2012 monitoring year. This is a 0.45 NTU decrease from the 2011 monitoring year median and a 1.60 NTU decrease from the 2010 monitoring year. Construction and development sites most closely associated with this station during the 2012 calendar year were any sites contributing to 1S, 2S, 6S, 7S, 8S, 12S, 15S, 16S, and 18S.

4S - Station 4S is the furthest downstream monitoring location on Saugahatchee Creek main stem and is located immediately upstream of the Northside WPCF. Annual turbidity results at 4S indicated a median value of 9.15 NTU for the 2012 monitoring year. This is a 0.45 NTU decrease from the 2011 monitoring year median and a 0.55 NTU decrease from the 2010 monitoring year. Construction and development sites most closely associated with this station during the 2012 calendar year were the Lundy West subdivision, lot construction at Yarborough Farms Subdivision, lot construction at Camden Ridge Subdivision, development of the Cypress Point Subdivision, and any sites contributing to 1S-3S, 6S, 7S, 8S, 12S, 15S, 16S, and 18S.

5S – Station 5S is located along an unnamed tributary west of the Northside WPCF. Annual turbidity results at 5S indicated a median value of 12.00 NTU for the 2012 monitoring year. This is a 1.00 NTU decrease from the 2011 monitoring year median and a 1.40 NTU decrease from the 2010 monitoring year. Construction and development sites most closely associated with this station during the 2012 calendar year were the Cotswold's Subdivision, the Lundy Chase Subdivision, and the Solamere Subdivision.

6S – Station 6S is located on an unnamed tributary at the Gatewood Drive crossing near Uncle Bob's Storage (formerly A-Safe). Annual turbidity results at 6S indicated a median value of 8.01 NTU for the 2012 monitoring year. This is a 1.69 NTU decrease from the 2011 monitoring year median and a 0.09 NTU decrease from the 2010 monitoring year. There were no active construction or development projects upstream from this station during 2012.

7S – Station 7S is located downstream of 15S along an unnamed tributary at the Shelton Mill Road crossing near The City Church (formerly Victory Prayer Center). Annual turbidity results at 7S indicated a median value of 5.50 NTU for the 2012 monitoring year. This is a 0.50 NTU decrease from the 2011 monitoring year median and a 0.10 NTU increase from the 2010 monitoring year. Construction and development sites most closely associated with this station during the 2012 calendar year were the development of the Grace Ridge Subdivision and any sites contributing to 6S and 15S.

8S – Station 8S is located on a separate unnamed tributary as 7S, at the Shelton Mill Road crossing near the Covenant Presbyterian Church. Annual turbidity results at 8S indicated a median value of 7.29 NTU for the 2012 monitoring year. This is a 1.09 NTU increase from the 2011 monitoring year median and a 2.74 NTU increase from the 2010 monitoring year. Construction and development sites most closely associated with this station during the 2012 calendar year were the Aspen Heights subdivision and commercial lot construction in the medical complex area off N. Dean Road.

12S – Station 12S is located downstream of 8S near the intersection of N. College Street and Shug Jordan Parkway. Annual turbidity results at 12S indicated a median value of 7.75 NTU for the 2012 monitoring year. This is a 0.45 NTU increase from the 2011 monitoring year median and a 0.90 NTU increase from the 2010 monitoring year. Construction and development sites most closely associated with this station during the 2012 calendar year were the Cary Creek Shopping Center, lot construction in the Copper Beech Apartment Complex, development of the Pick Elementary School, and any sites contributing to 6S, 7S, 8S, and 15S.

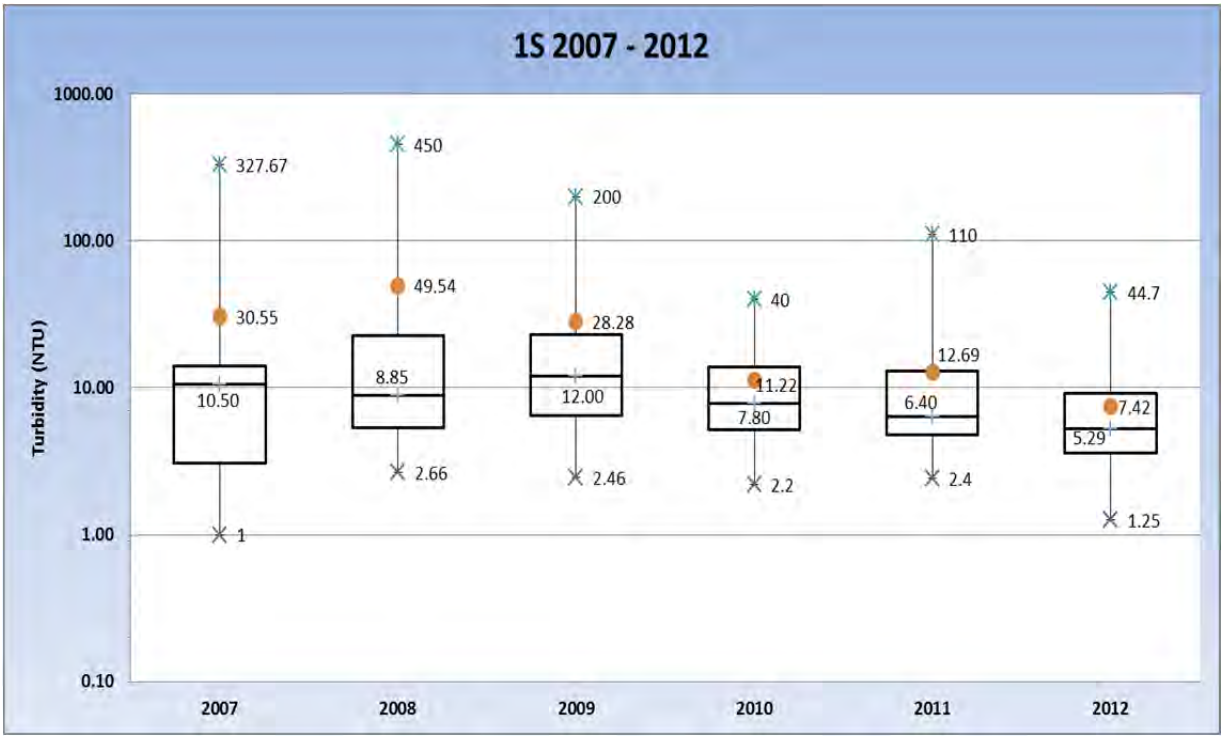
14S – 14S is located at the discharge of the primary spillway of The Preserve pond. Annual turbidity results at 14S indicated a median value of 12.90 NTU for the 2012 monitoring year. This is a 3.10 NTU decrease from the 2011 monitoring year median and a 0.10 NTU decrease from the 2010 monitoring year. Construction and development sites that potentially contributed to elevated turbidity at this station during the 2012 calendar year were lot construction at The Preserve Subdivision. The substantial decrease in all statistical turbidity values from late 2008-present is likely attributed to the filling of the main lake and the subsequent settling/treatment provided therein.

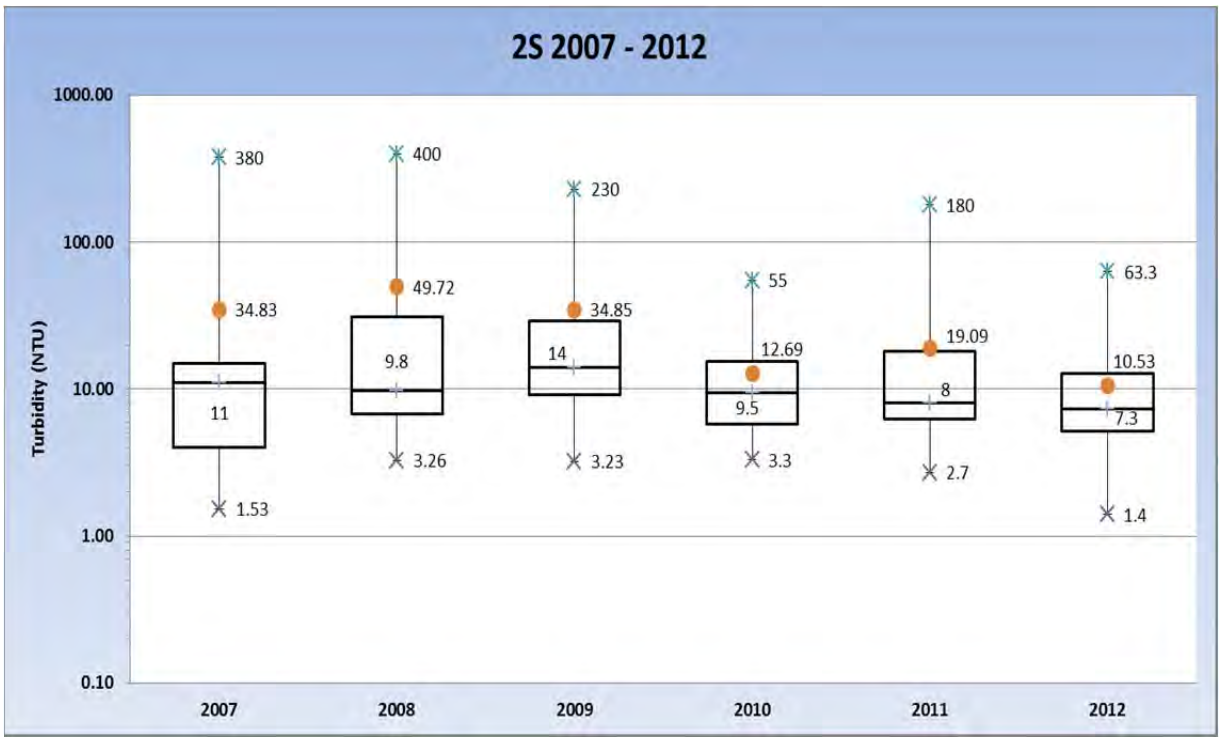
15S – 15S is located near the existing stubout for N. Dean Road, just downstream of 6S. Annual turbidity results at 15S indicated a median value of 5.35 NTU for the 2012 monitoring year. This is a 0.95 NTU decrease from the 2011 monitoring year median and a 0.15 NTU decrease from the 2010 monitoring year. Construction and development sites most closely associated with this station during the 2012 calendar year were lot development at Old Towne Station Subdivision, lot construction at The Gardens of Gatewood Subdivision, lot construction at Stone Creek Subdivision, and any sites contributing to 6S.

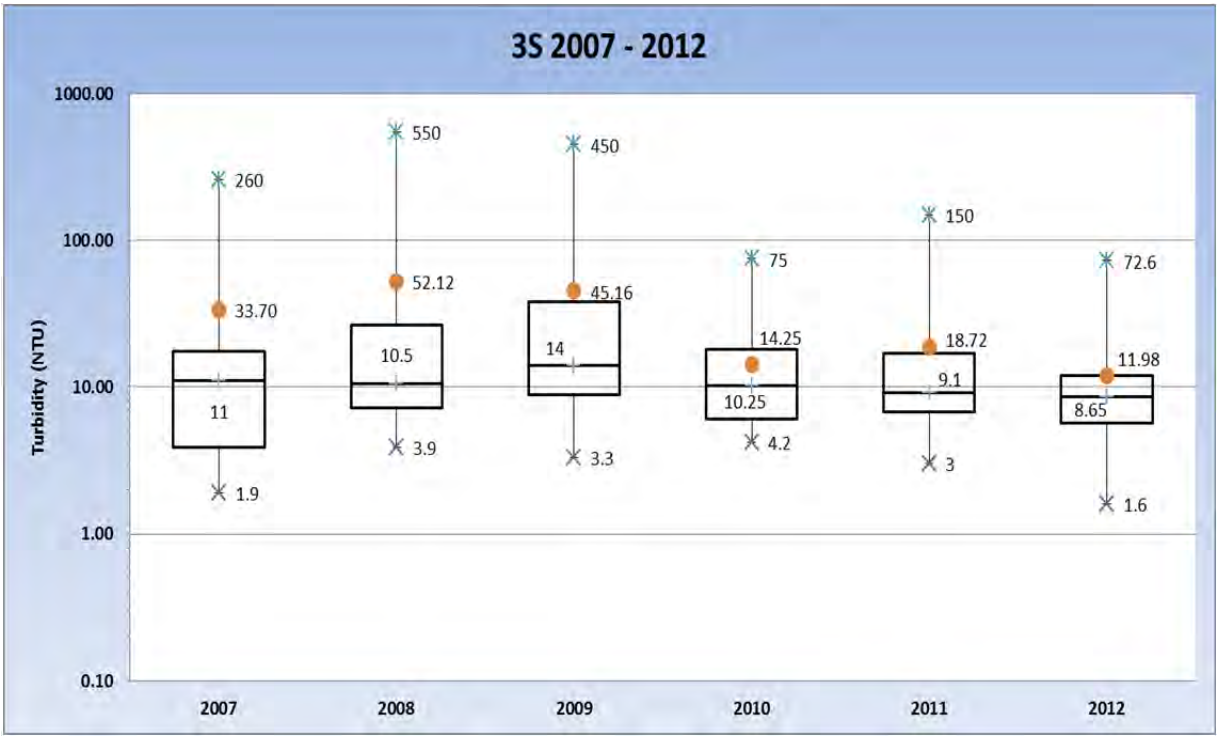
16S – 16S is located on the same unnamed tributary as 8S and 12S and is downstream of 12S along Shug Jordan Parkway. Annual turbidity results at 16S indicated a median value of 7.00 NTU for the 2012 monitoring year. This is a 0.80 NTU decrease from the 2011 monitoring year median and a 1.25 NTU increase from the 2010 monitoring year. There were no active construction or development projects between 16S and 12S during 2012. This station is immediately downstream of Station 12S, thus any construction and development sites associated with 12S potentially influence this station (as well as 8S).

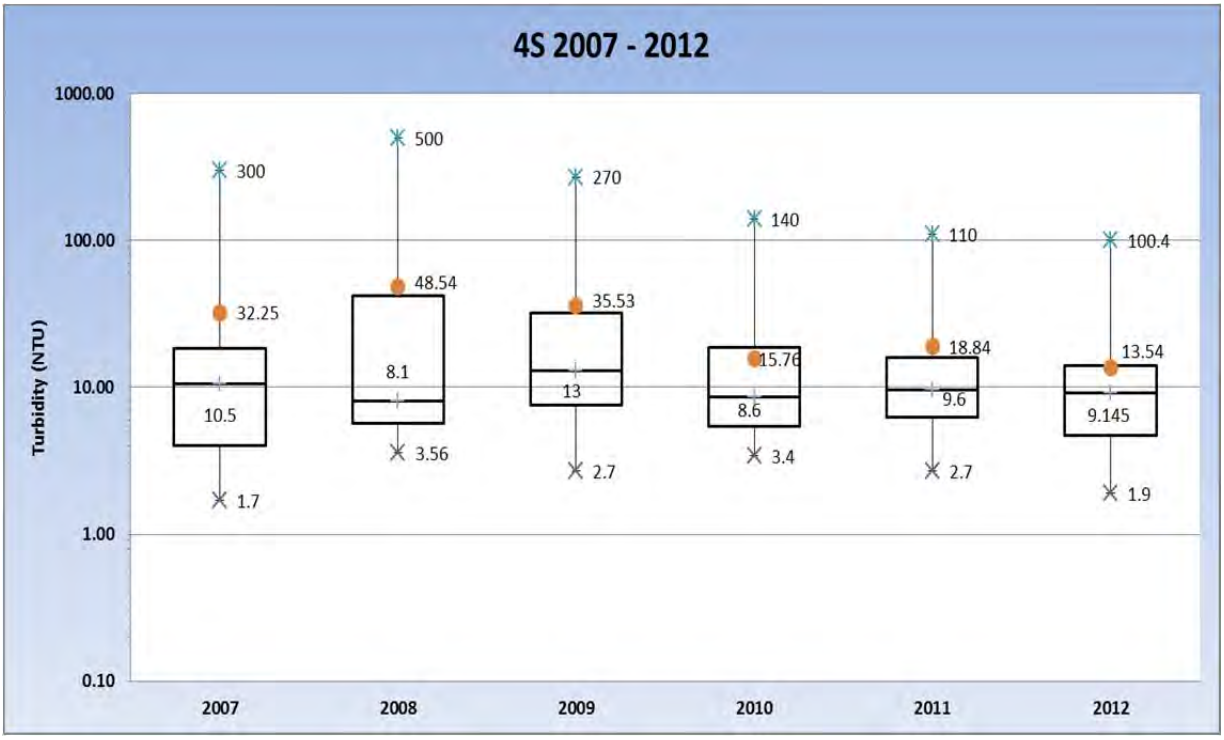
17S – 17S is located at the discharge of the primary spillway of the Shadow Woods subdivision pond. Annual turbidity results at 17S indicated a median value of 29.50 NTU for the 2012 monitoring year. This is a 0.50 NTU increase from the 2011 monitoring year median and a 8.50 NTU increase from the 2010 monitoring year. Construction and development sites most closely associated with this station during the 2012 calendar year were lot construction at Shadow Woods Subdivision.

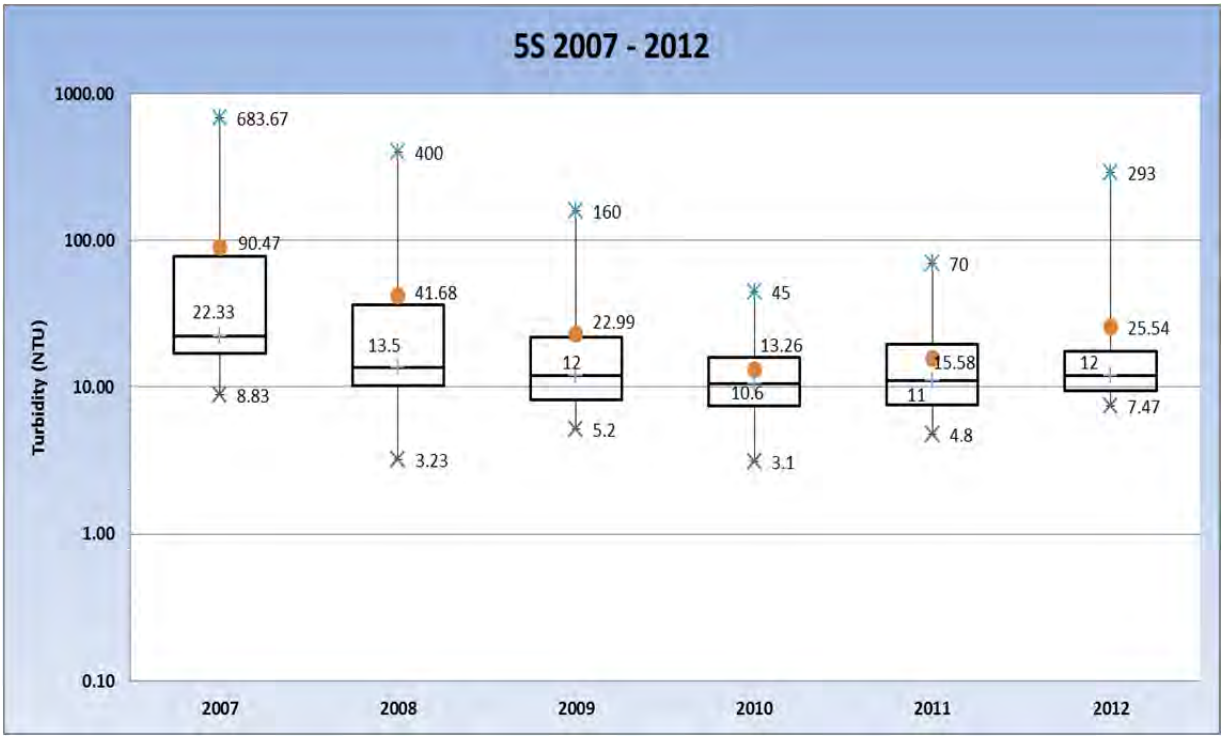
18S – 18S is located along Farmville Road on an unnamed tributary immediately downstream of Tuscany Hills. Annual turbidity results at 18S indicated a median value of 5.35 NTU for the 2012 monitoring year. This is a 0.90 NTU increase from the 2011 monitoring year median and a 1.00 NTU increase from the 2010 monitoring year.. Construction and development sites most closely associated with this station during the 2012 calendar year were lot construction at Tuscany Hills Subdivision.

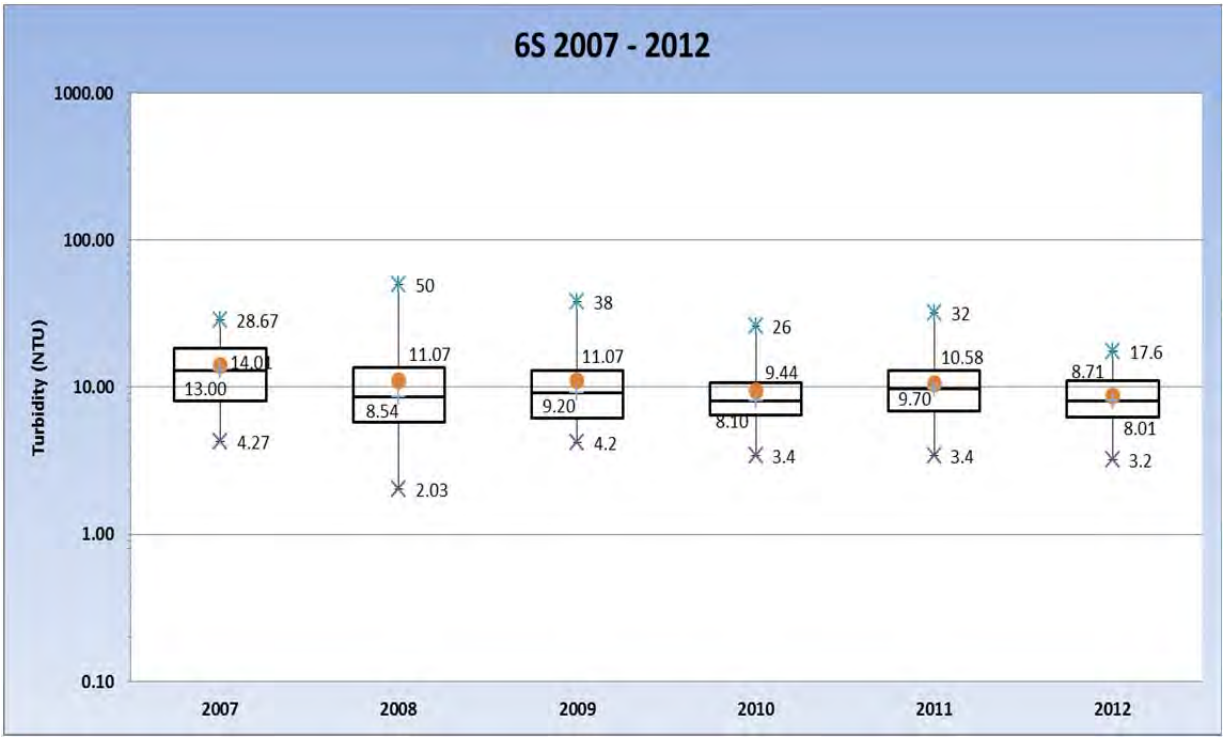

1S 2007 - 2012
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
2007
2008
2009
2010
2011
2012
327.67
30.55
10.50
1
450
49.54
8.85
2.66
200
28.28
12.00
2.46
40
11.22
7.80
2.2
110
12.69
6.40
2.4
44.7
7.42
5.29
1.25

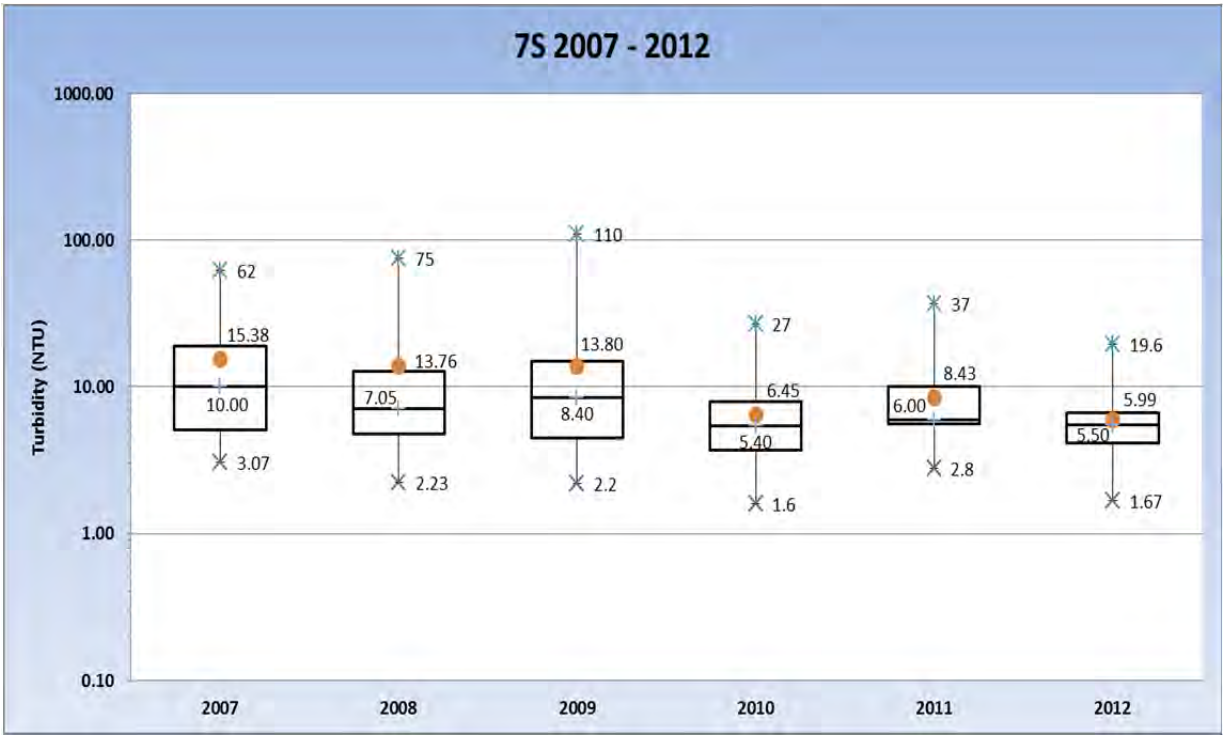

2S 2007 - 2012
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
2007
2008
2009
2010
2011
2012
380
34.83
11
1.53
400
49.72
9.8
3.26
230
34.85
14
3.23
55
12.69
9.5
3.3
180
19.09
8
2.7
63.3
10.53
7.3
1.4

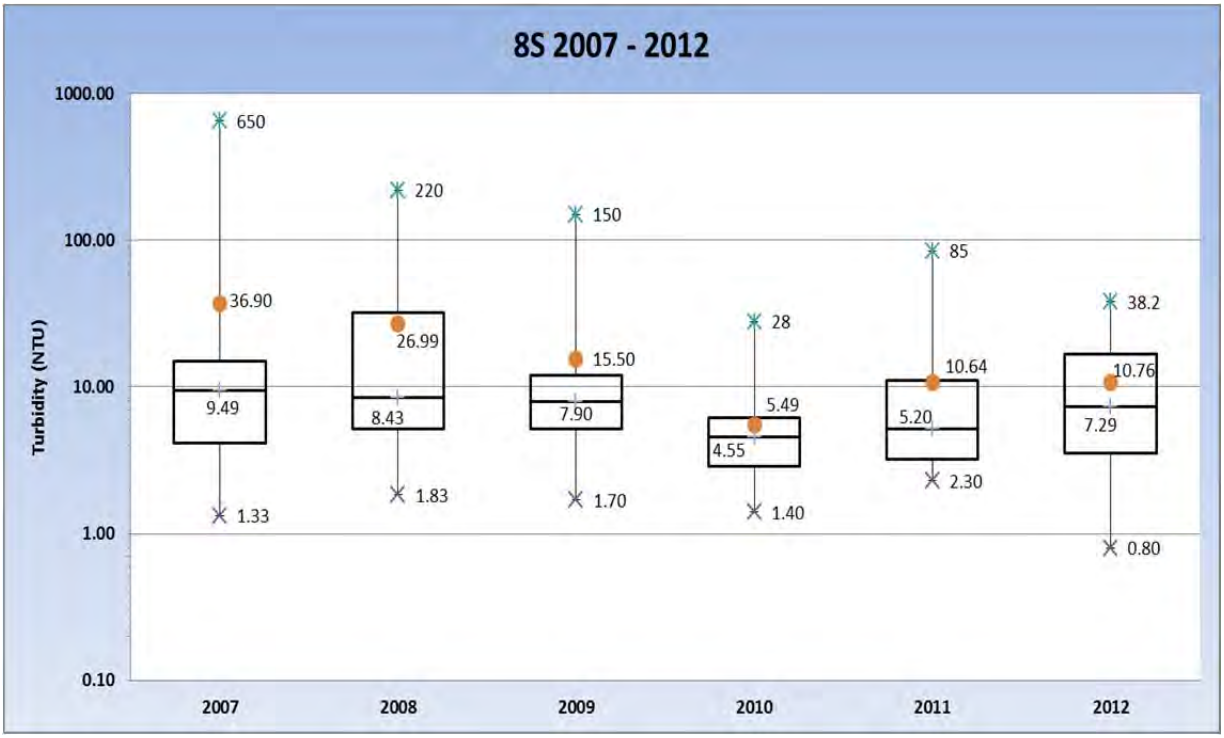

3S 2007 - 2012
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
2007
2008
2009
2010
2011
2012
260
33.70
11
1.9
550
52.12
10.5
3.9
450
45.16
14
3.3
75
14.25
10.25
4.2
150
18.72
9.1
3
72.6
11.98
8.65
1.6

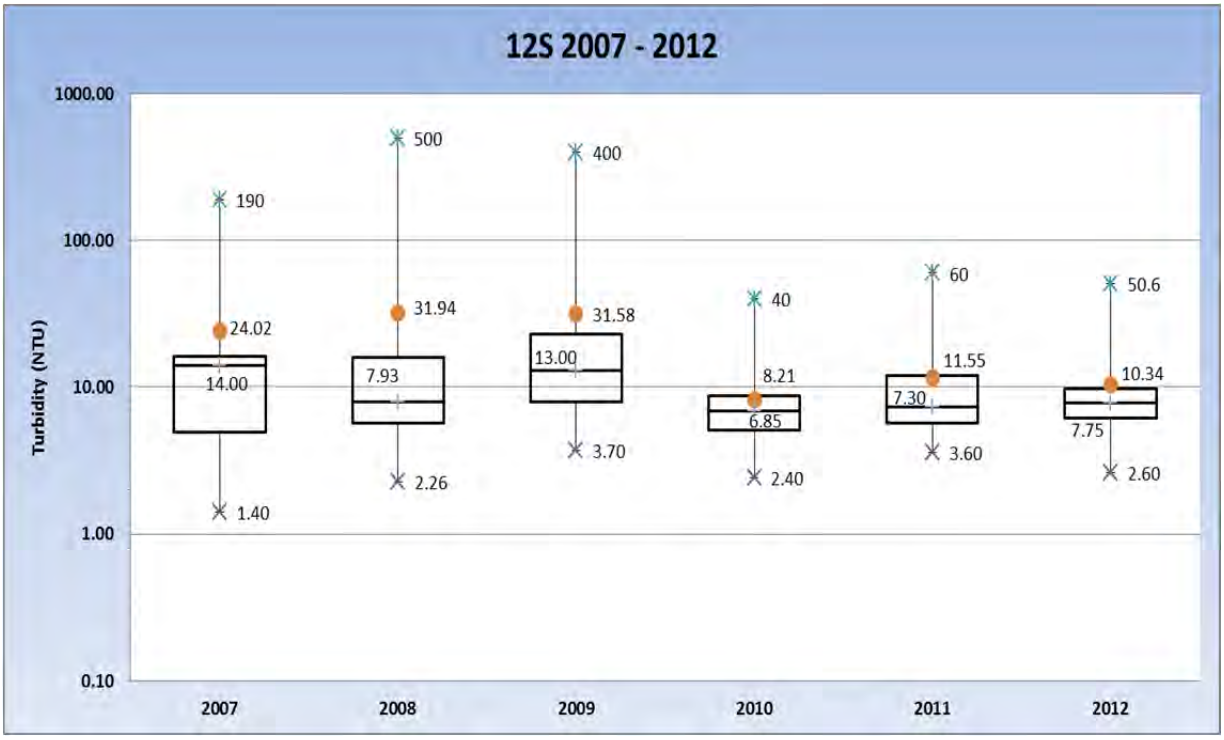

4S 2007 - 2012
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
2007
2008
2009
2010
2011
2012
300
32.25
10.5
1.7
500
48.54
8.1
3.56
270
35.53
13
2.7
140
15.76
8.6
3.4
110
18.84
9.6
2.7
100.4
13.54
9.145
1.9

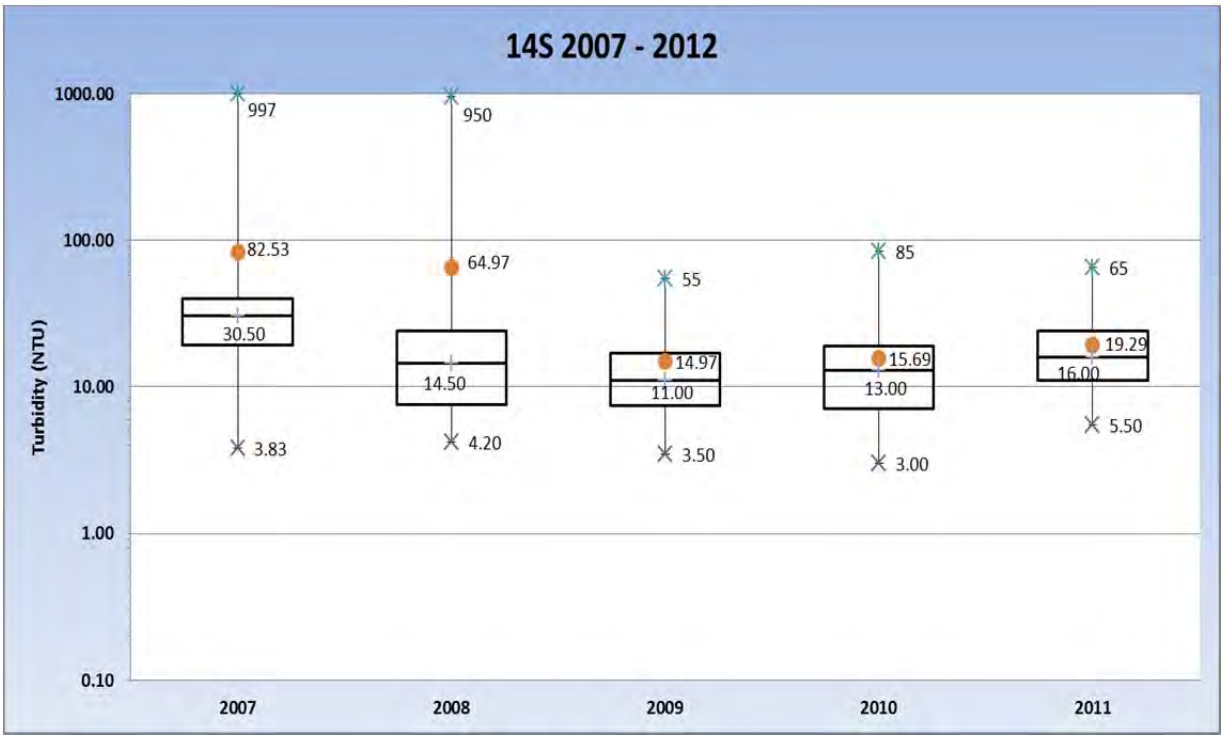

5S 2007 - 2012
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
683.67
90.47
22.33
8.83
400
41.68
13.5
3.23
160
22.99
12
5.2
45
13.26
10.6
3.1
70
15.58
11
4.8
293
25.54
12
7.47
2007
2008
2009
2010
2011
2012

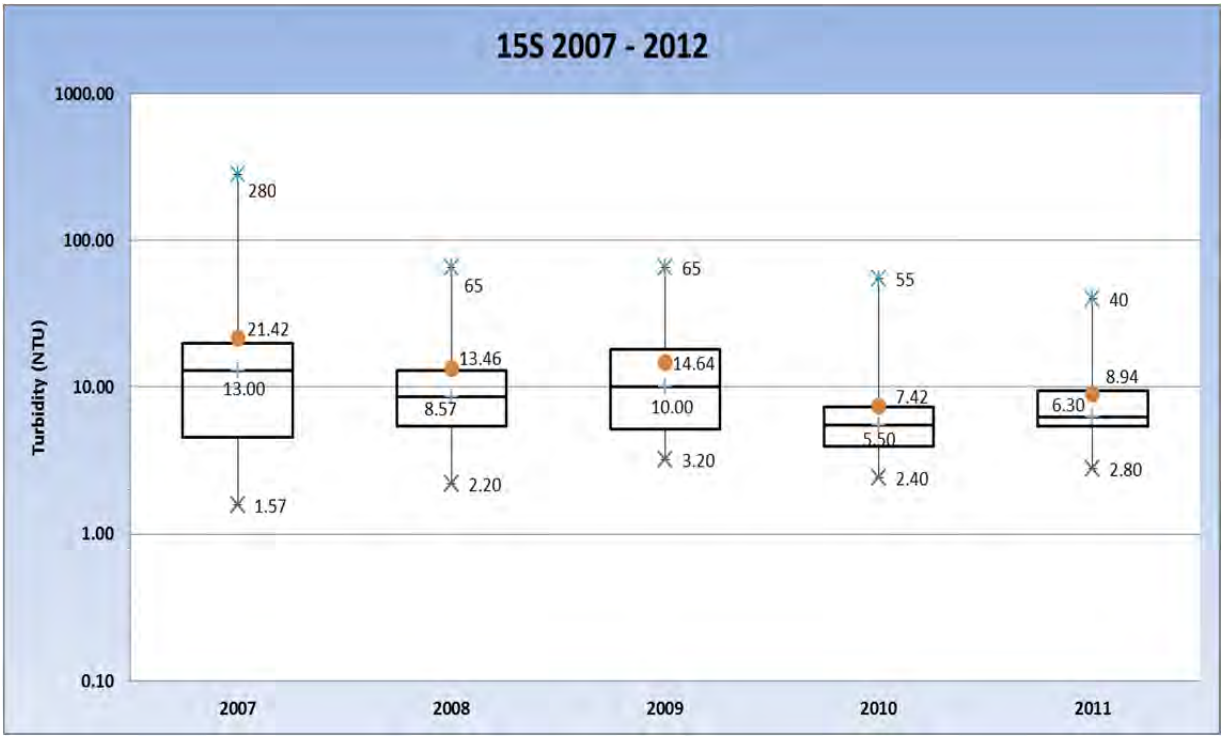

6S 2007 - 2012
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
28.67
14.01
13.00
4.27
50
11.07
8.54
2.03
38
11.07
9.20
4.2
26
9.44
8.10
3.4
32
10.58
9.70
3.4
17.6
8.71
8.01
3.2
2007
2008
2009
2010
2011
2012

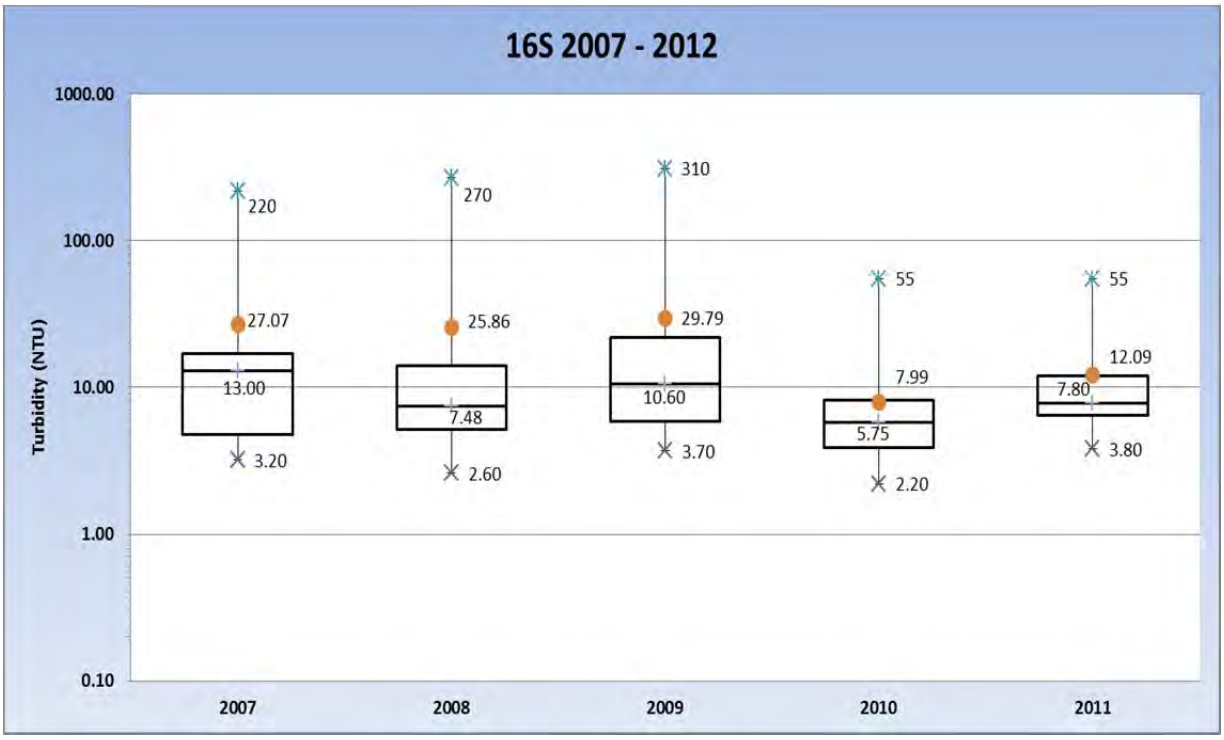

7S 2007 - 2012
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
2007
2008
2009
2010
2011
2012
62
15.38
10.00
3.07
75
13.76
7.05
2.23
110
13.80
8.40
2.2
27
6.45
5.40
1.6
37
8.43
6.00
2.8
19.6
5.99
5.50
1.67

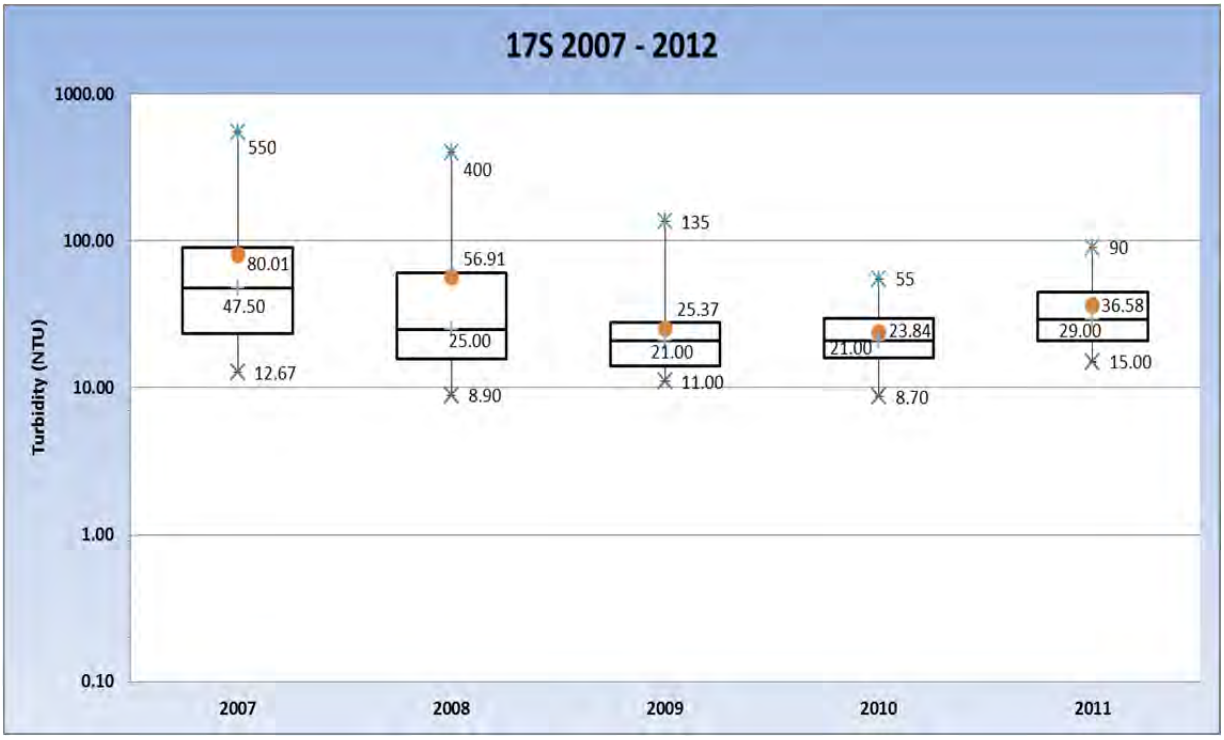

8S 2007 - 2012
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
2007
2008
2009
2010
2011
2012
650
36.90
9.49
1.33
220
26.99
8.43
1.83
150
15.50
7.90
1.70
28
5.49
4.55
1.40
85
10.64
5.20
2.30
38.2
10.76
7.29
0.80

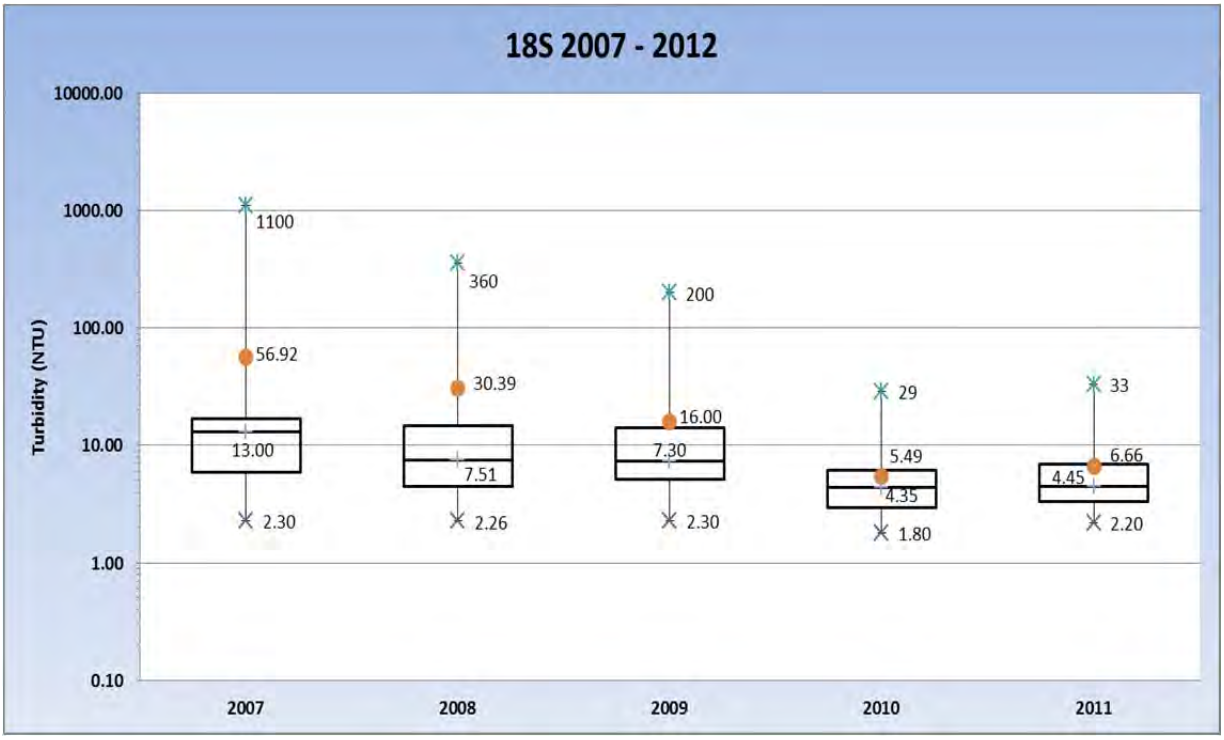

12S 2007 - 2012
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
2007
2008
2009
2010
2011
2012
190
24.02
14.00
1.40
500
31.94
7.93
2.26
400
31.58
13.00
3.70
40
8.21
6.85
2.40
60
11.55
7.30
3.60
50.6
10.34
7.75
2.60

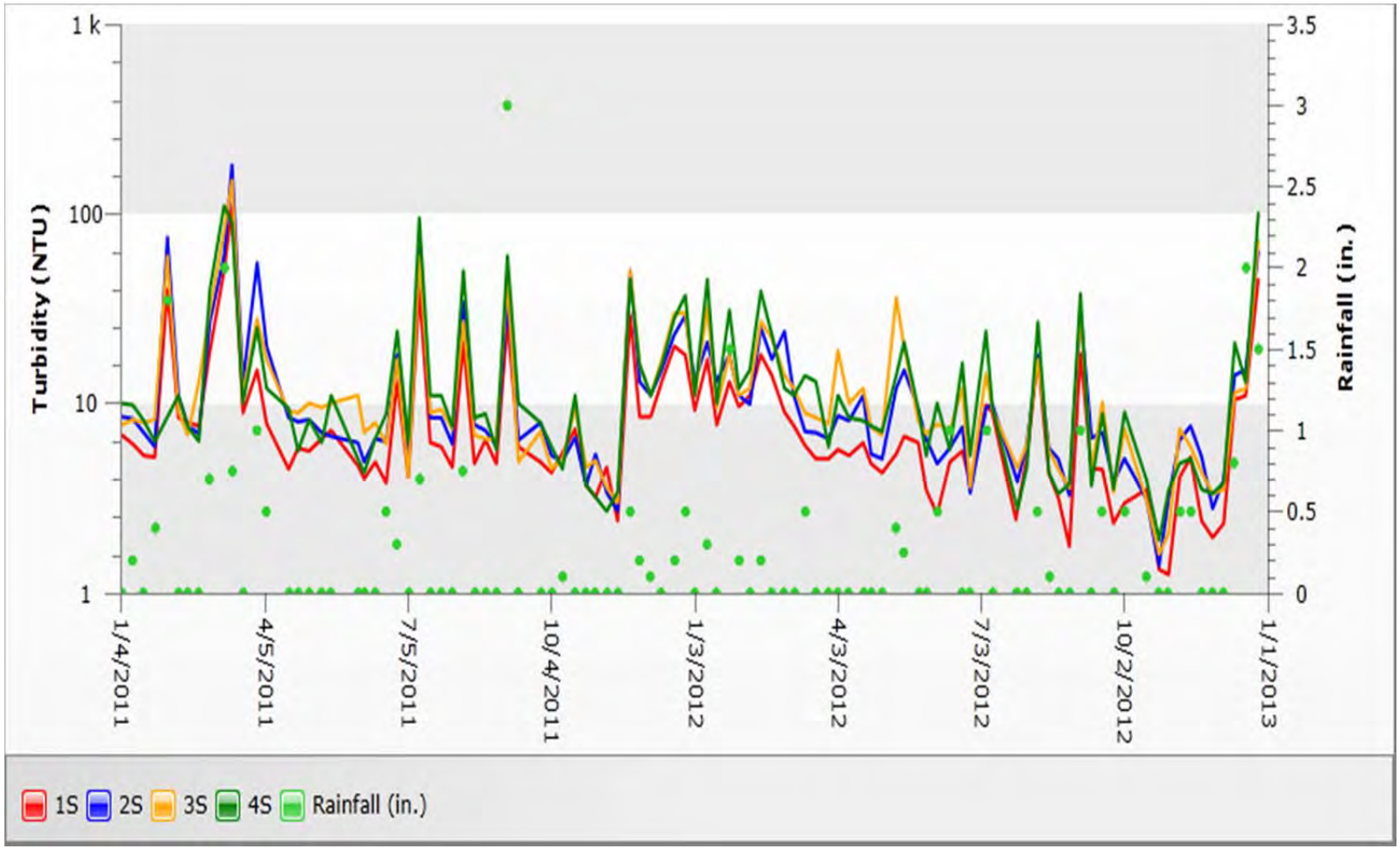

14S 2007 - 2012
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
2007
2008
2009
2010
2011
997
82.53
30.50
3.83
950
64.97
14.50
4.20
55
14.97
11.00
3.50
85
15.69
13.00
3.00
65
19.29
16.00
5.50


15S 2007 - 2012
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
2007
2008
2009
2010
2011
280
21.42
13.00
1.57
65
13.46
8.57
2.20
65
14.64
10.00
3.20
55
7.42
5.50
2.40
40
8.94
6.30
2.80

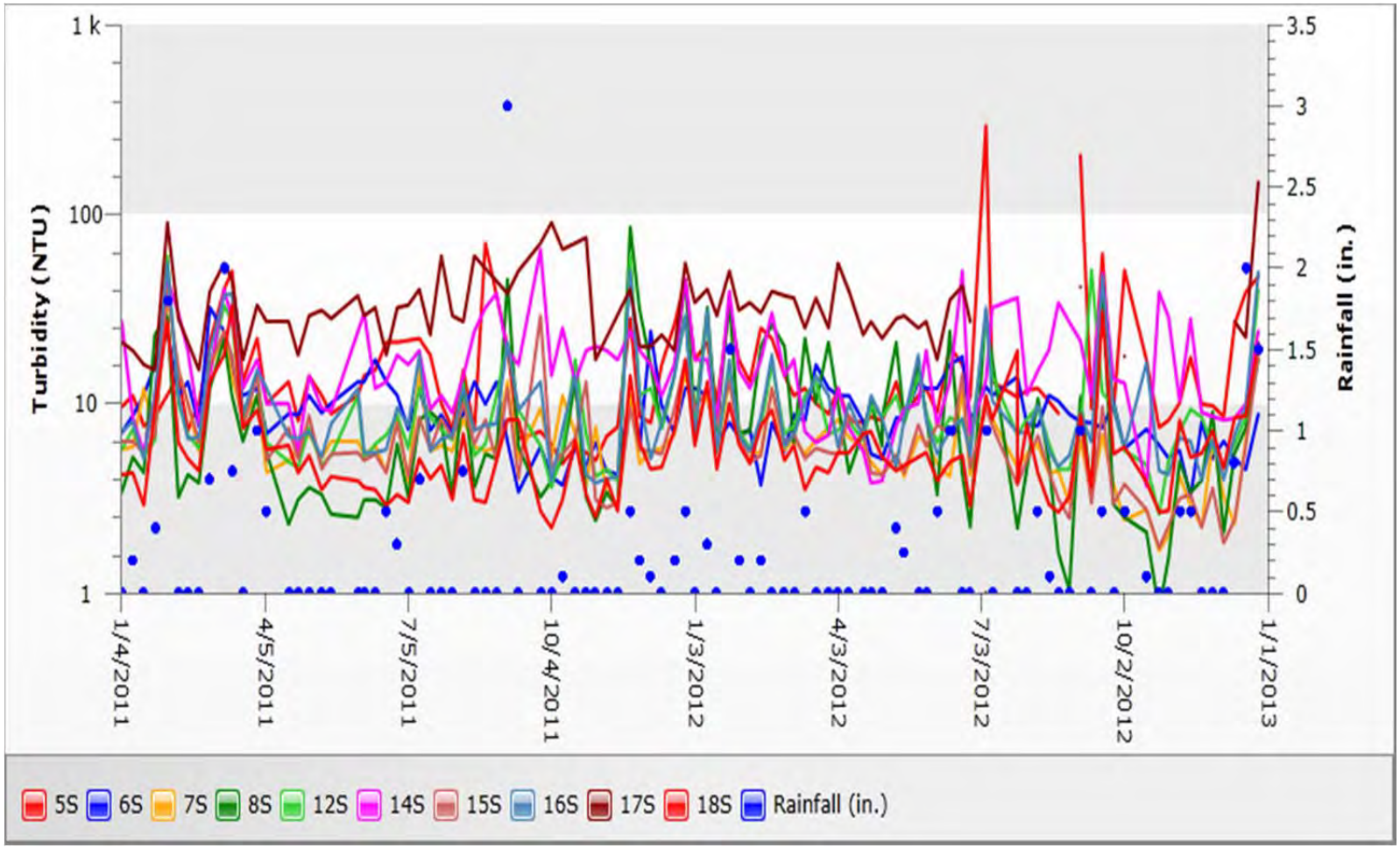

16S 2007 - 2012
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
2007
2008
2009
2010
2011
220
27.07
13.00
3.20
270
25.86
7.48
2.60
310
29.79
10.60
3.70
55
7.99
5.75
2.20
55
12.09
7.80
3.80


17S 2007 - 2012
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
550
80.01
47.50
12.67
400
56.91
25.00
8.90
135
25.37
21.00
11.00
55
23.84
21.00
8.70
90
36.58
29.00
15.00
2007
2008
2009
2010
2011


18S 2007 - 2012
Turbidity (NTU)
10000.00
1000.00
100.00
10.00
1.00
0.10
1100
56.92
13.00
2.30
360
30.39
7.51
2.26
200
16.00
7.30
2.30
29
5.49
4.35
1.80
33
6.66
4.45
2.20
2007
2008
2009
2010
2011



Graph of Saugahatchee Creek Mainstem Turbidity Data for 2011-2012



Graph of Saugahatchee Creek Mainstem Turbidity Data for 2011-2012

Town Creek Watershed

Monitoring Station Locations:

1T – Station 1T is located on Town Creek just upstream of the Samford Avenue crossing.

Latitude *32, 35, 55.414 N*; Longitude *85, 28, 18.325 W*

2T – Station 2T is located on Town Creek at the crossing of Gay Street.

Latitude *32, 35, 3.724 N*; Longitude *85, 28, 27.539 W*

3T – Station 3T is located on Town Creek at the crossing of East University Drive.

Latitude *32, 34, 46.858 N*; Longitude *85, 28, 42.094 W*

4T - Station 4T is located on Town Creek at the crossing of Shell-Toomer Parkway.

Latitude *32, 39, 53.844 N*; Longitude *85, 28, 51.164 W*

*See Insert for Maps of All Water Quality Monitoring Locations

	1T						2T					
	2007	2008	2009	2010	2011	2012	2007	2008	2009	2010	2011	2012
Minimum	1.35	1.69	2.50	1.80	1.20	0.64	1.57	2.13	2.88	2.10	1.30	0.73
Maximum	45.33	58.58	26.50	26.13	35.00	22.50	63.41	61.90	26.63	27.88	32.00	23.30
Average	9.89	8.83	7.04	4.10	5.66	4.94	11.27	10.00	8.13	4.52	6.30	5.41
Median	3.80	3.63	2.25	2.38	3.10	3.21	3.36	4.69	3.78	2.33	3.80	3.50

	3T						4T					
	2007	2008	2009	2010	2011	2012	2007	2008	2009	2010	2011	2012
Minimum	1.75	2.31	3.65	2.45	1.30	1.21	1.08	2.28	3.50	1.90	1.30	0.57
Maximum	54.92	56.22	46.25	42.13	41.00	21.90	59.00	70.55	43.25	39.35	39.00	32.30
Average	11.70	10.48	10.38	5.51	8.36	5.29	11.91	11.72	10.46	5.10	7.92	6.21
Median	4.60	4.77	5.95	2.88	5.10	3.95	4.32	5.18	5.70	3.05	4.80	4.45

Statistical Analysis of Turbidity Data for Town Creek

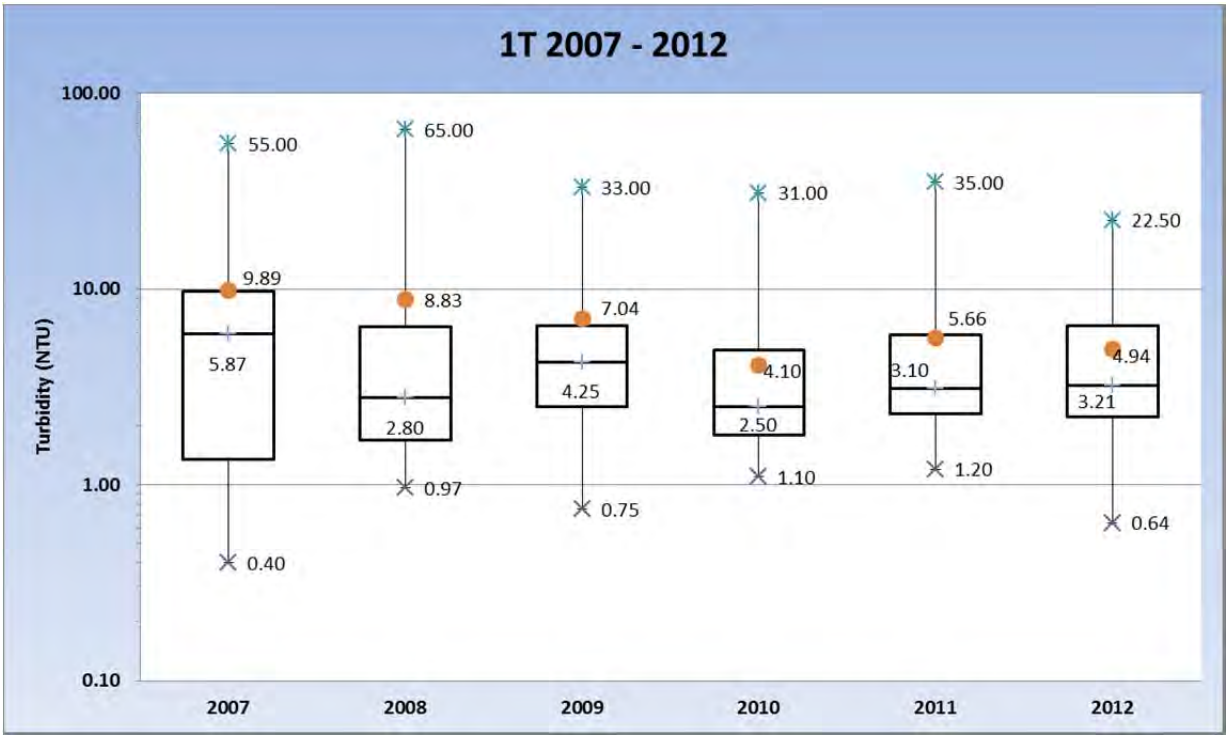
Station Notes:

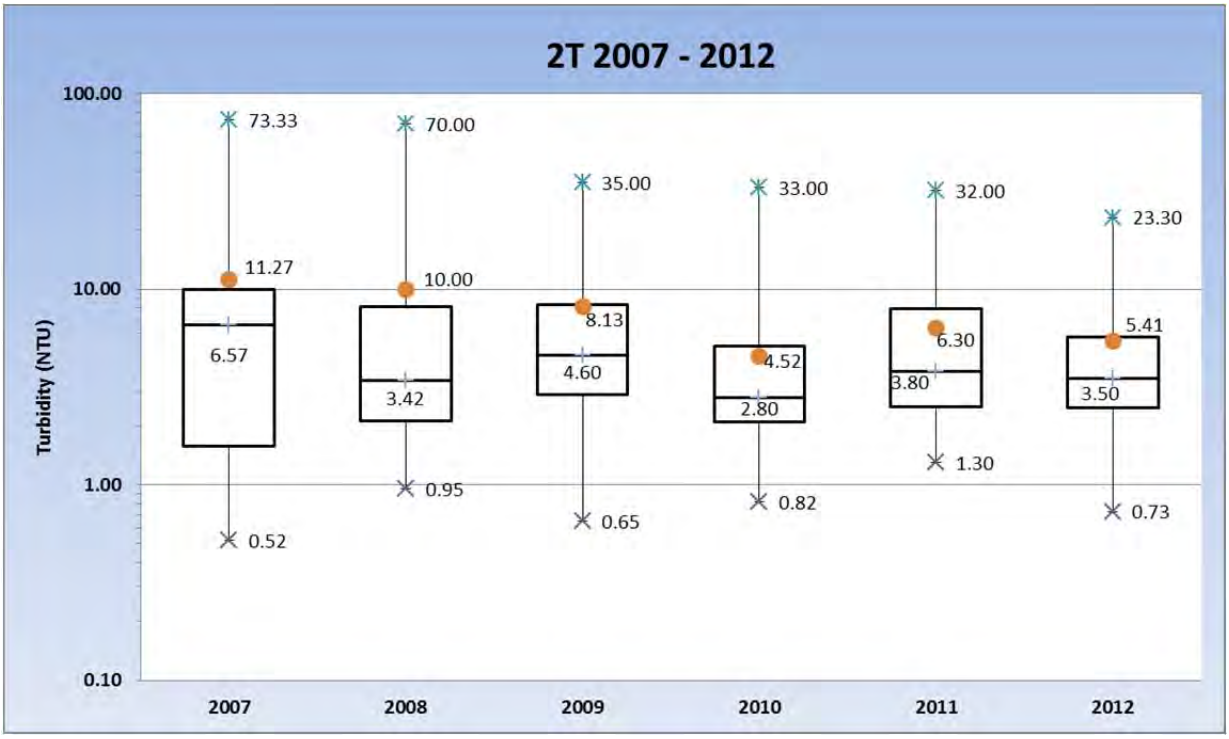
1T – Station 1T is located on Town Creek just upstream of the Samford Avenue. crossing. Annual turbidity results at 1T indicated a median value of 3.21 NTU for the 2012 monitoring year. This is a 0.10 NTU increase from the 2011 monitoring year median and a 0.83 NTU increase from the 2010 monitoring year. Construction and development sites that potentially contributed to elevated turbidity at this station during the 2012 calendar year were development of the Frank Brown Senior Center, development of the Cedar Crest Subdivision, and expansion of the Auburn Bank.

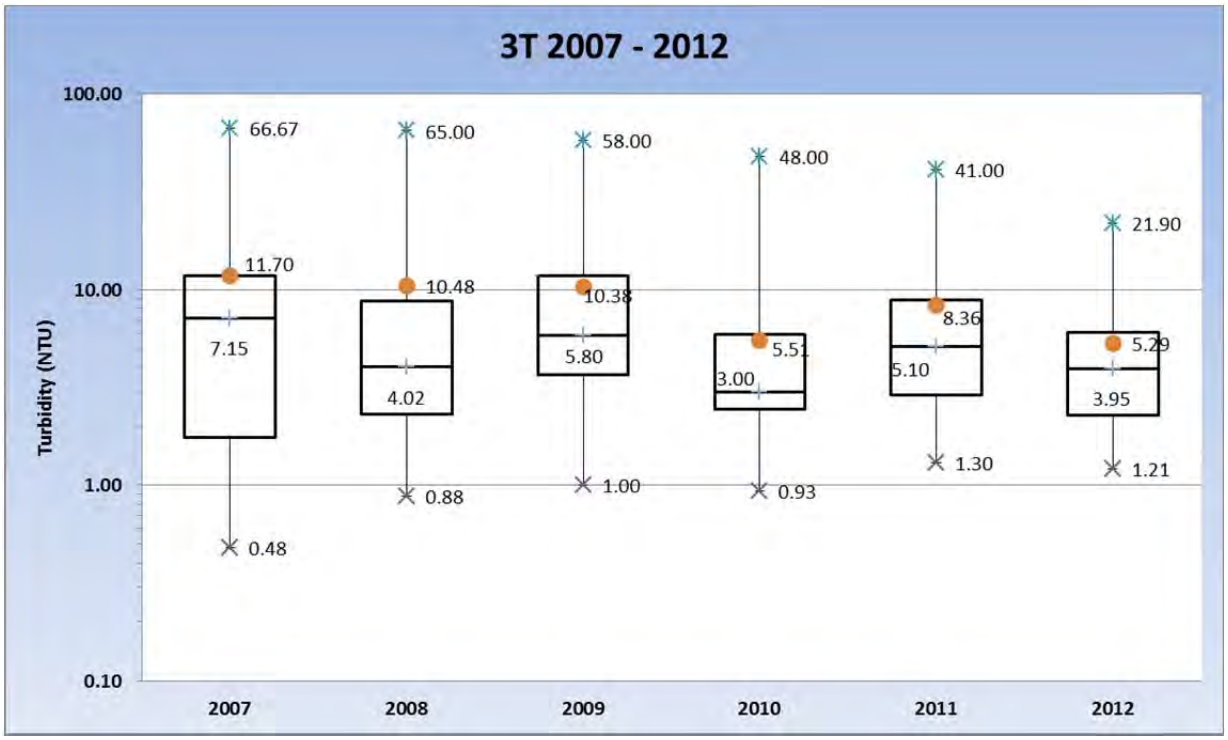
2T – Station 2T is located on Town Creek at the crossing of Gay Street. Annual turbidity results at 2T indicated a median value of 3.50 NTU for the 2012 monitoring year. This is a 0.30 NTU decrease from the 2011 monitoring year median and a 1.17 NTU increase from the 2010 monitoring year. Construction and development sites that potentially contributed to elevated turbidity at this station during the 2012 calendar year were any sites contributing to station 1T.

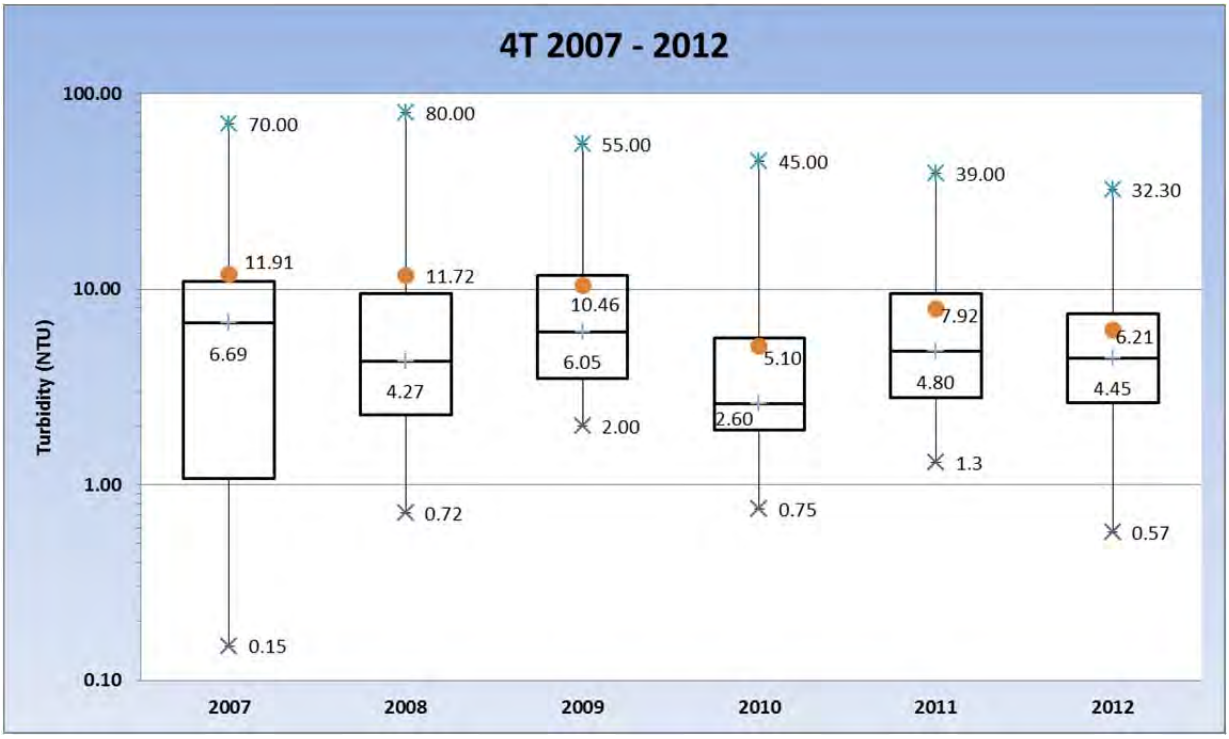
3T – Station 3T is located on Town Creek at the crossing of East University Drive Annual turbidity results at 3T indicated a median value of 3.95 NTU for the 2012 monitoring year. This is a 1.15 NTU decrease from the 2011 monitoring year median and a 1.07 NTU increase from the 2010 monitoring year. Construction and development sites that potentially contributed to elevated turbidity at this station during the 2012 calendar year were lot construction within the Town Creek Subdivision and any sites contributing to stations 1T and 2T.

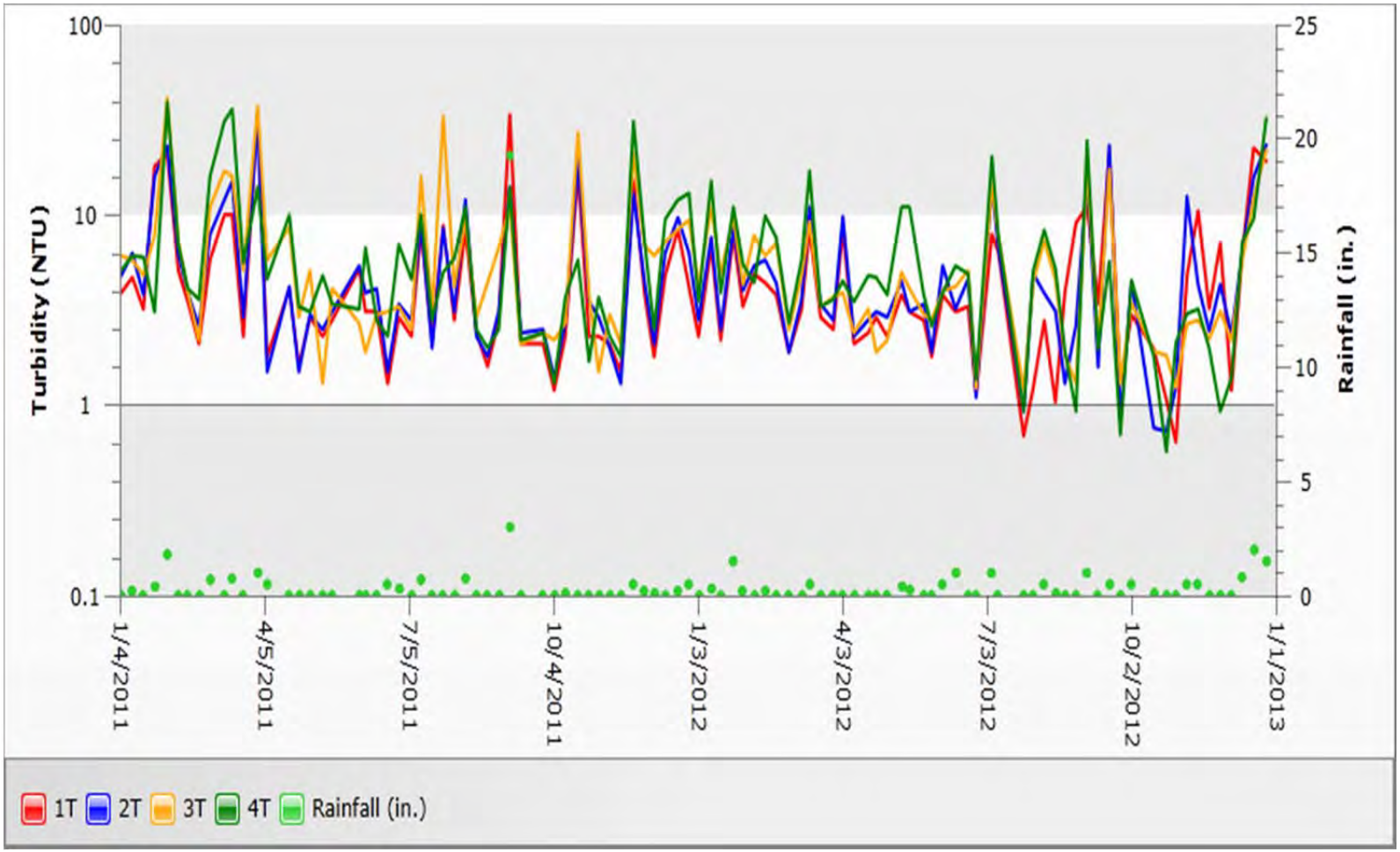
4T - Station 4T is located on Town Creek at the crossing of Shell Toomer Parkway. Annual turbidity results at 4T indicated a median value of 4.45 NTU for the 2012 monitoring year. This is a 0.35 NTU decrease from the 2011 monitoring year median and a 1.40 NTU increase from the 2010 monitoring year. Construction and development sites that potentially contributed to elevated turbidity at this station during the 2012 calendar year were any sites contributing to stations 1T, 2T, and 3T.


1T 2007 - 2012
Turbidity (NTU)
100.00
10.00
1.00
0.10
55.00
9.89
5.87
0.40
65.00
8.83
2.80
0.97
33.00
7.04
4.25
0.75
31.00
4.10
2.50
1.10
35.00
5.66
3.10
1.20
22.50
4.94
3.21
0.64
2007
2008
2009
2010
2011
2012


2T 2007 - 2012
Turbidity (NTU)
100.00
10.00
1.00
0.10
73.33
11.27
6.57
0.52
70.00
10.00
3.42
0.95
35.00
8.13
4.60
0.65
33.00
4.52
2.80
0.82
32.00
6.30
3.80
1.30
23.30
5.41
3.50
0.73
2007
2008
2009
2010
2011
2012


3T 2007 - 2012
Turbidity (NTU)
100.00
10.00
1.00
0.10
66.67
11.70
7.15
0.48
65.00
10.48
4.02
0.88
58.00
10.38
5.80
1.00
48.00
5.51
3.00
0.93
41.00
8.36
5.10
1.30
21.90
5.29
3.95
1.21
2007
2008
2009
2010
2011
2012


4T 2007 - 2012
Turbidity (NTU)
100.00
10.00
1.00
0.10
70.00
11.91
6.69
0.15
80.00
11.72
4.27
0.72
55.00
10.46
6.05
2.00
45.00
5.10
2.60
0.75
39.00
7.92
4.80
1.3
32.30
6.21
4.45
0.57
2007
2008
2009
2010
2011
2012



Graph of Town Creek Turbidity Data for 2011-2012

2.0 Multiparameter Monitoring/Profiling

2.1 Purpose

There is no single water quality parameter available to determine the health of a waterbody. Rather, the overall health of aquatic ecosystems is determined by a wide range of biological, chemical, physiochemical, and physical characteristics. Furthermore, these characteristics often vary from region-to-region, stream-to-stream, season-to-season, and day-to-day (diurnal patterns). Therefore, the City has committed itself to trying to better understand each of its major receiving waters by monitoring year-round. Monitoring throughout the year is performed to determine if the various waterbodies are attaining State Water Quality across multiple parameters and to determine if, when, and where causes for concern may exist. The water quality sondes utilized in this multiparameter monitoring may also be operated as secondary devices for detection and tracing of illicit discharges.

2.2 Definition and Methods

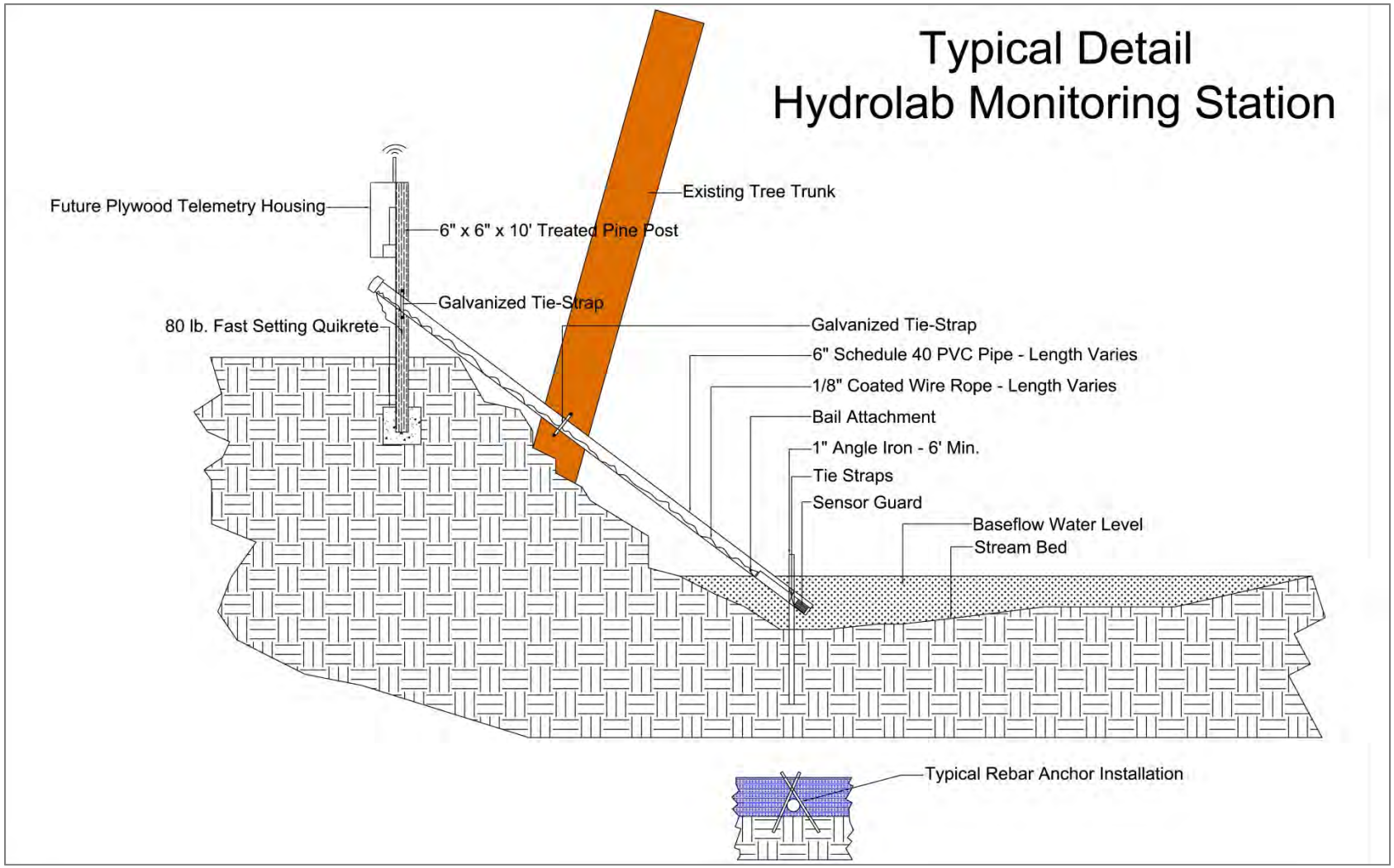
The Water Resource Management Department is equipped with two Hach Hydrolab DS5 Multiparameter Water Quality Sondes (Hydrolab). These Hydrolab units allow for the monitoring of multiple water quality parameters and are capable of being launched unattended for extended periods of time to conduct linear, in-situ sampling. In years past, both sondes were launched simultaneously at an upstream and downstream location within the City's Phase II jurisdictional territory for a period of 72 hours and with a logging interval of one reading per 20 minutes (equal to 72 readings per 24 hours). However, in 2012 the Water Resource Management Department constructed 10 permanent stations for which to perform long-term deployment of the hydrolabs, starting with Parkerson Mill Creek. Each deployment will last one calendar year, for which the monitoring of Parkerson Mill started on July 27, 2012. Each sonde is cleaned and data downloaded once per week. Parameters that the Hydrolab measures and records are temperature, pH, turbidity, dissolved oxygen, conductivity, salinity, oxidation-reduction potential, total dissolved solids, and resistance. The sondes will analyze these water quality parameters at an interval of 20 minutes/logging for one full year. Each individual probe uses EPA approved methods for analysis of each parameter. Analyzing each parameter individually and collectively over extended periods of time allows for a holistic analysis of water quality. These parameters are defined as:

- Temperature – A measure of how hot or cool a substance is. For most designated uses, State Water Quality Criteria requires that temperature not exceed 90° Fahrenheit.
- pH – A measure of how basic or how acidic a substance is. For most designated uses, State Water Quality Criteria requires pH to be between 6.0 and 8.5.
- Turbidity – A measure of the degree of transparency of a fluid as it affects the ability of light to pass through.
- Dissolved Oxygen – A measure of the concentration of oxygen in its dissolved form within a substance. For most designated uses, State Water Quality Criteria requires dissolved oxygen to be a minimum of 5 mg/L except under "extreme conditions".

- Conductivity – A measure of a substance's ability to pass an electrical current. There are currently no State Water Quality Criteria for conductivity. Conductivity is directly correlated to the amount of dissolved ions within a substance and is a useful indicator of potential illicit discharges.
- Salinity – A measure of the abundance of salt within a substance. There are currently no State Water Quality Criteria for salinity.
- Oxidation-Reduction Potential (ORP) – Represents the tendency of a substance to either gain or lose electrons. For example, a higher reduction potential expresses a tendency to gain electrons. As it is influenced by the amount of molecular oxygen, a low ORP value can indicate a high biological oxygen demand (BOD) and/or heterotrophic bacteria number. There are currently no State Water Quality Criteria for oxidation-reduction potential.
- Total Dissolved Solids – A measure of the amount of solids dissolved within a solution. There are currently no State Water Quality Criteria for total dissolved solids.
- Resistance – A measure of the degree of which a substance resists passage of an electrical current. Resistivity is the polar opposite of Conductivity and decreases as dissolved ion content increases. There are currently no State Water Quality Criteria for resistance.

*Information regarding individual sensor range, accuracy, and resolution and analytical method can be found at http://www.hydrolab.com/web/ott_hach.nsf/id/pa_datasonde_5.html.

Hydrolab DS5 Sonde in Parkerson Mill Creek – Representative of Typical Deployment

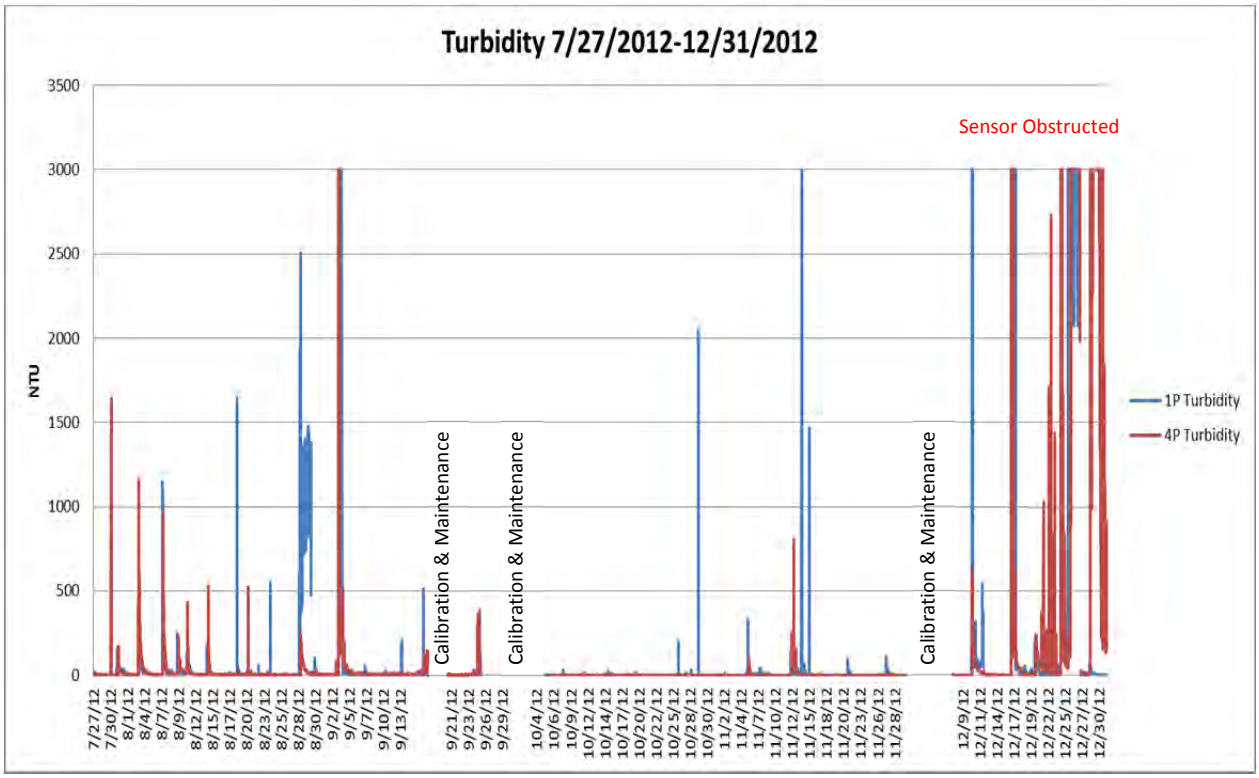


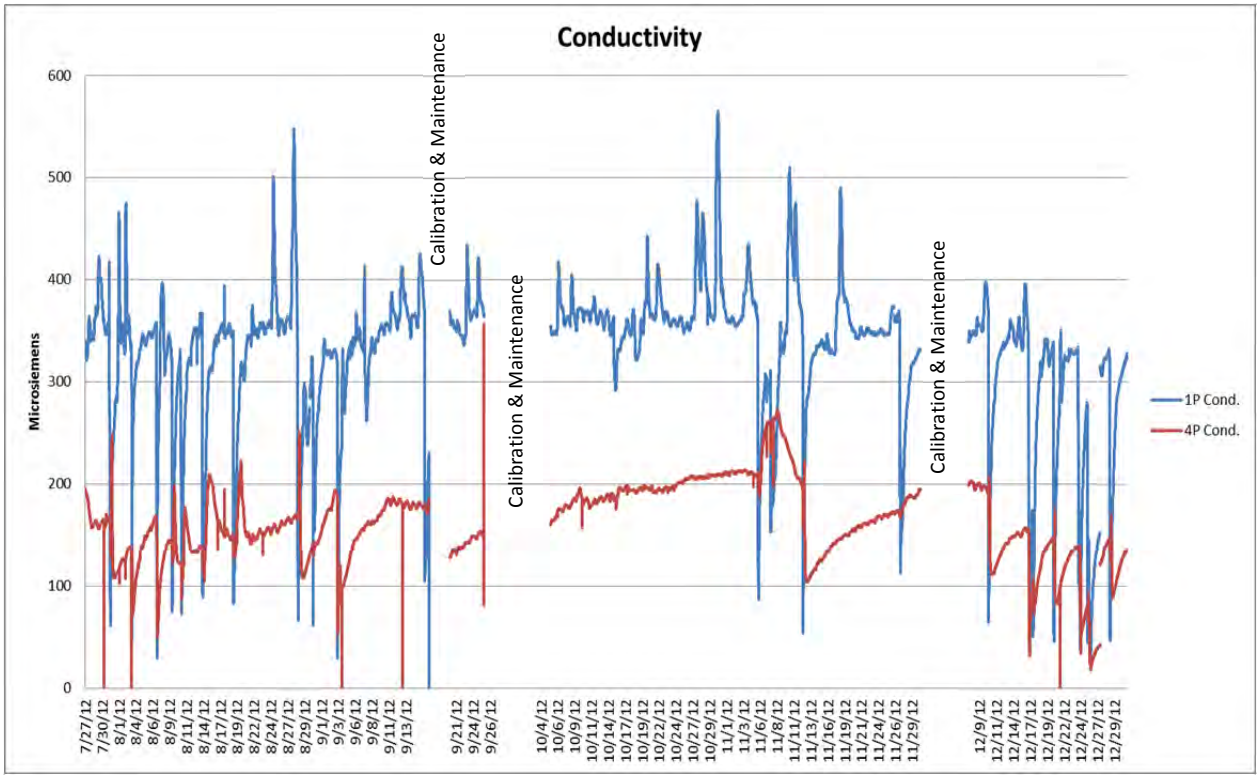
Hydrolab DS5 Sonde Monitoring Station – Detail of Typical Installation (with future telemetry module shown)

2.3 Results and Brief Discussion

The results below represent all data obtained via the City of Auburn's Hydrolab DS5 Multiparameter Water Quality Sondes during the 2012 monitoring year. As noted above, the Water Resource Management Department began a long-term water quality monitoring study of each of its principal receiving waters in 2012, beginning with Parkerson Mill Creek. To complete this study, a total of 10 permanent launch stations were constructed; an upstream and downstream station on Saugahatchee, Moore's Mill, Parkerson Mill, Chewacla, and Town Creeks. The first of these receiving waters to be studied is Parkerson Mill Creek, on which monitoring began on July 27th, 2012. The following data are for July 27th, 2012 to December 31st, 2012. As seen below, there were several occasions at Station 1P and several occasions at 4P (though fewer and less extreme) in which dissolved oxygen concentration dropped below the State Water Quality Criteria of 5 mg/L. These excursions occurred during storm events and, at this point, it is unclear whether excessive sediment and resultant obstruction of the LDO sensor caused a malfunction. Additionally, there were several occasions at both stations during which pH exceeded State Water Quality Criteria of both the minimum of 6.0 SU and the maximum of 8.5 SU. As these data include both baseline and storm event data, a best effort has been made to separate out "blocks" of data that span appreciable storm events. This helps managers to better understand the primary influences on water quality during both wet and dry weather periods.

Cumulative Data Review




Conductivity
Microsiemens
600
500
400
300
200
100
0
Calibration & Maintenance
Calibration & Maintenance
Calibration & Maintenance
1P Cond.
4P Cond.
7/27/12
7/30/12
8/1/12
8/4/12
8/6/12
8/9/12
8/11/12
8/14/12
8/17/12
8/19/12
8/22/12
8/24/12
8/27/12
8/29/12
9/1/12
9/3/12
9/6/12
9/8/12
9/11/12
9/13/12
9/21/12
9/24/12
9/26/12
10/4/12
10/6/12
10/9/12
10/11/12
10/14/12
10/17/12
10/19/12
10/22/12
10/24/12
10/27/12
10/29/12
11/1/12
11/3/12
11/6/12
11/8/12
11/11/12
11/13/12
11/16/12
11/19/12
11/21/12
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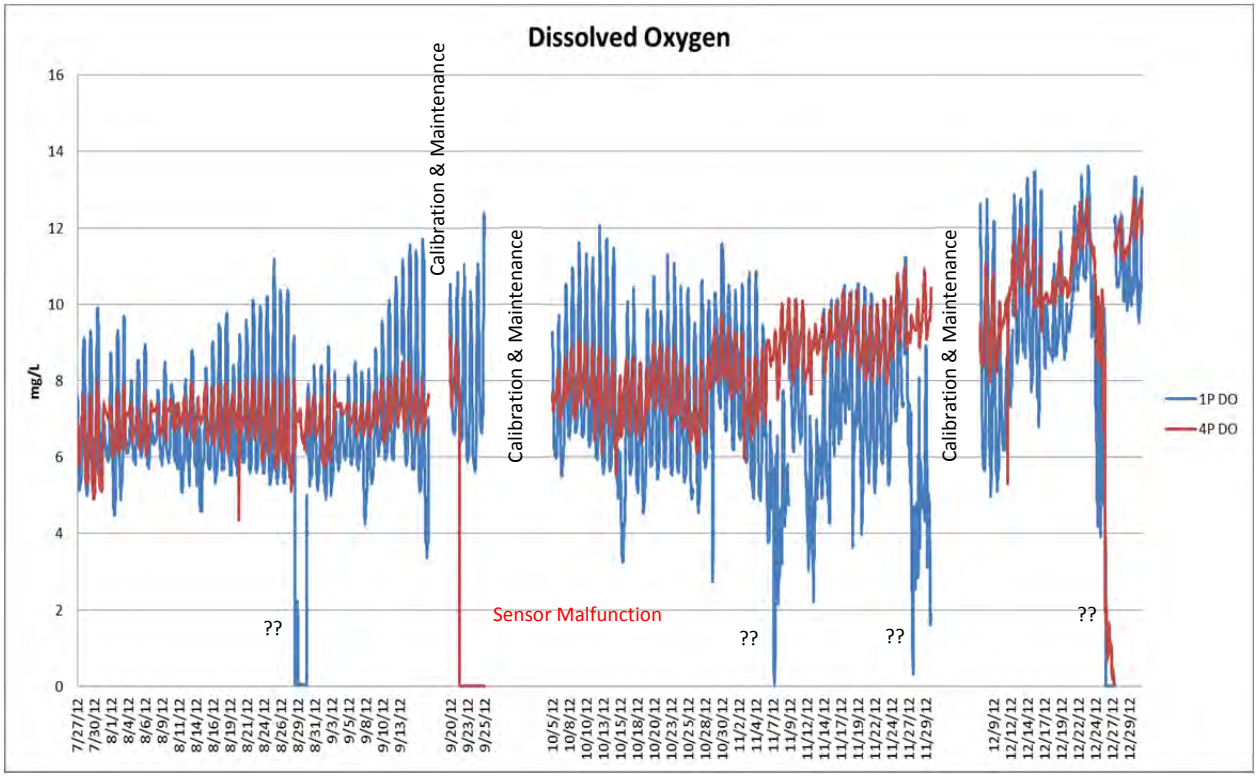
12/22/12
12/24/12
12/27/12
12/29/12


Dissolved Oxygen
mg/L
16
14
12
10
8
6
4
2
0
Calibration & Maintenance
Calibration & Maintenance
Calibration & Maintenance
??
Sensor Malfunction
??
??
??
1P DO
4P DO
7/27/12
7/30/12
8/1/12
8/4/12
8/6/12
8/9/12
8/11/12
8/14/12
8/16/12
8/19/12
8/21/12
8/24/12
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8/29/12
8/31/12
9/3/12
9/5/12
9/8/12
9/10/12
9/13/12
9/20/12
9/23/12
9/25/12
10/5/12
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11/4/12
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11/9/12
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11/14/12
11/17/12
11/19/12
11/22/12
11/24/12
11/27/12
11/29/12
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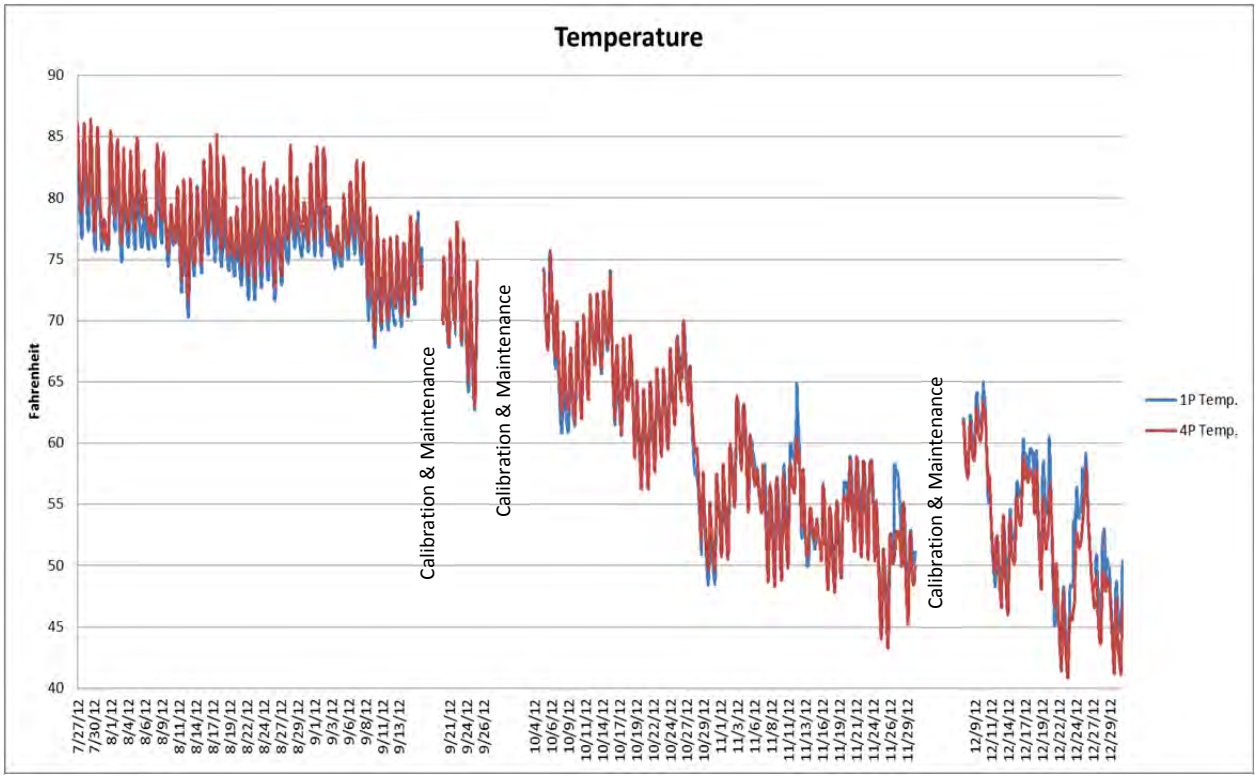
12/22/12
12/24/12
12/27/12
12/29/12


Temperature
Fahrenheit
90
85
80
75
70
65
60
55
50
45
40
Calibration & Maintenance
Calibration & Maintenance
Calibration & Maintenance
1P Temp.
4P Temp.
7/27/12
7/30/12
8/1/12
8/4/12
8/6/12
8/9/12
8/11/12
8/14/12
8/17/12
8/19/12
8/22/12
8/24/12
8/27/12
8/29/12
9/1/12
9/3/12
9/6/12
9/8/12
9/11/12
9/13/12
9/21/12
9/24/12
9/26/12
10/4/12
10/6/12
10/9/12
10/11/12
10/14/12
10/17/12
10/19/12
10/22/12
10/24/12
10/27/12
10/29/12
11/1/12
11/3/12
11/6/12
11/8/12
11/11/12
11/13/12
11/16/12
11/19/12
11/21/12
11/24/12
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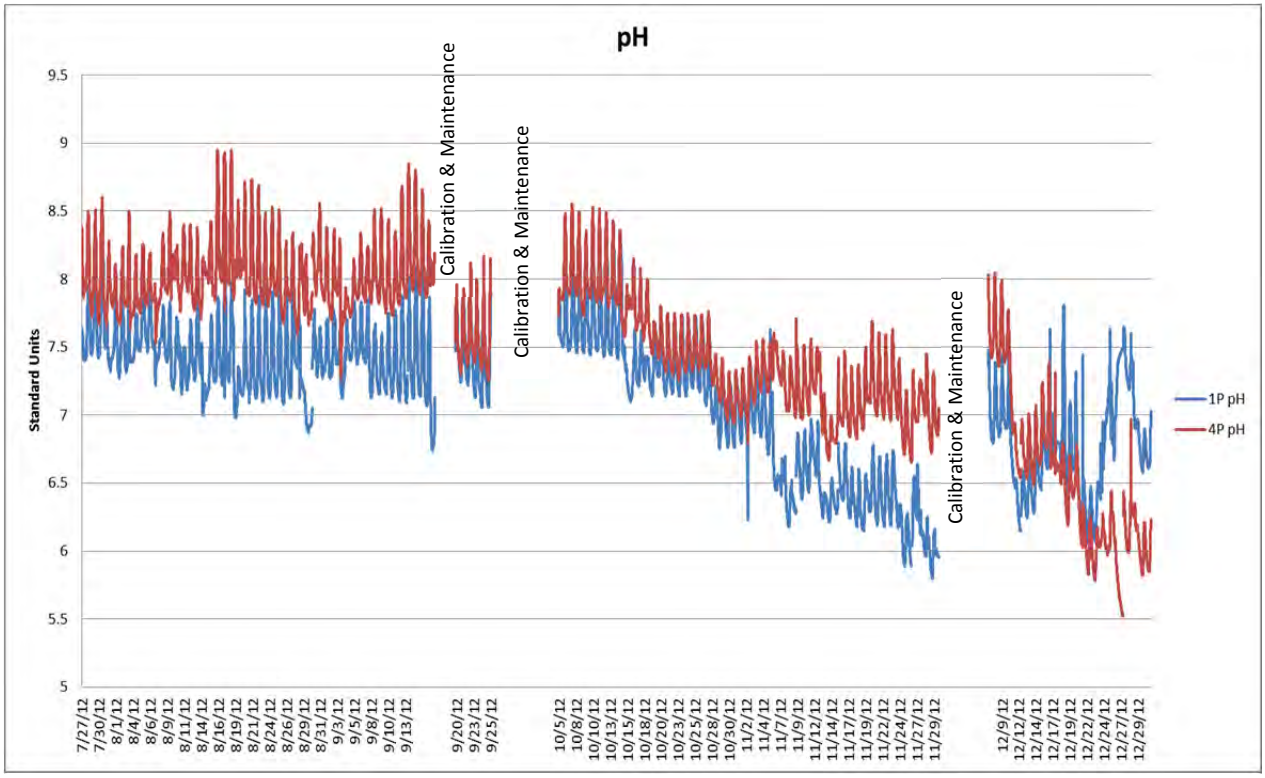
12/24/12
12/27/12
12/29/12


pH
Standard Units
9.5
9
8.5
8
7.5
7
6.5
6
5.5
5
Calibration & Maintenance
Calibration & Maintenance
Calibration & Maintenance
1P pH
4P pH
7/27/12
7/30/12
8/1/12
8/4/12
8/6/12
8/9/12
8/11/12
8/14/12
8/16/12
8/19/12
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10/30/12
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11/4/12
11/7/12
11/9/12
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11/19/12
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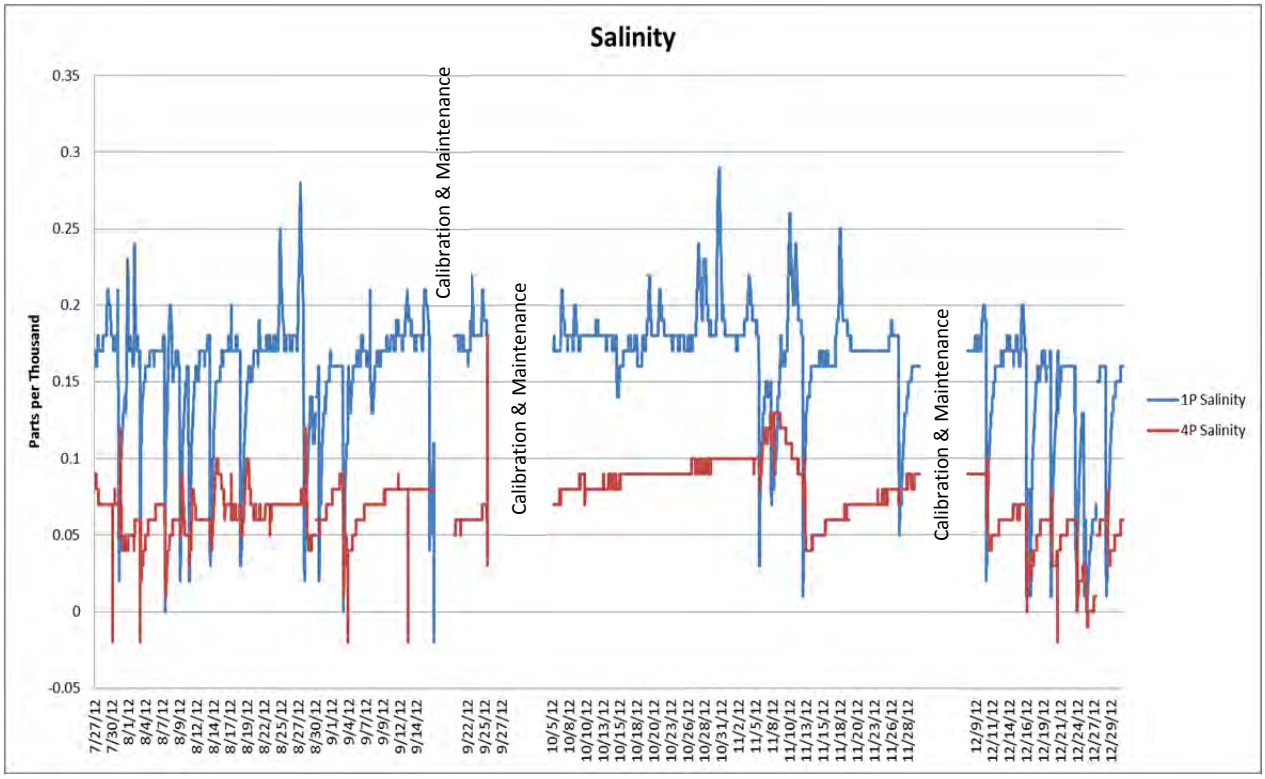
12/27/12
12/29/12


Salinity
Parts per Thousand
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
-0.05
Calibration & Maintenance
Calibration & Maintenance
Calibration & Maintenance
1P Salinity
4P Salinity
7/27/12
7/30/12
8/1/12
8/4/12
8/7/12
8/9/12
8/12/12
8/14/12
8/17/12
8/19/12
8/22/12
8/25/12
8/27/12
8/30/12
9/1/12
9/4/12
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9/14/12
9/22/12
9/25/12
9/27/12
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10/8/12
10/10/12
10/13/12
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10/23/12
10/26/12
10/28/12
10/31/12
11/2/12
11/5/12
11/8/12
11/10/12
11/13/12
11/15/12
11/18/12
11/20/12
11/23/12
11/26/12
11/28/12
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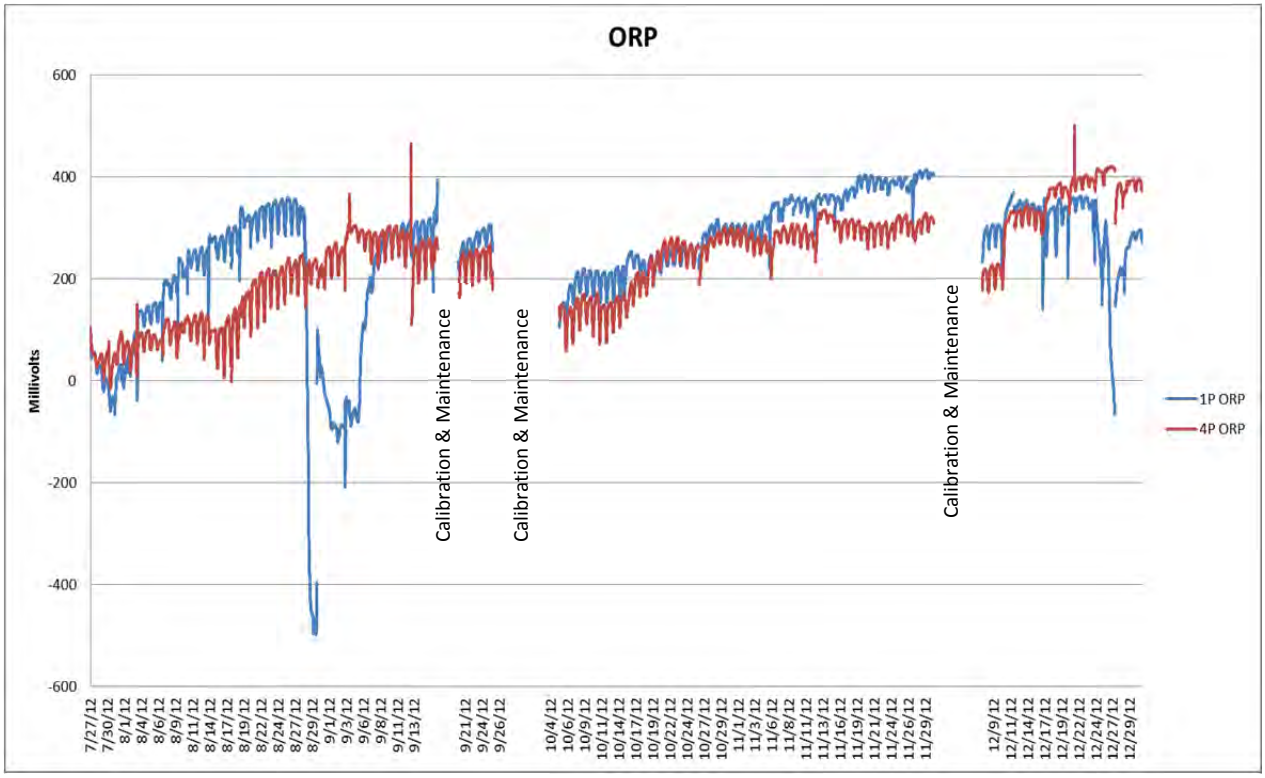
12/21/12
12/24/12
12/27/12
12/29/12


ORP
Millivolts
600
400
200
0
-200
-400
-600
Calibration & Maintenance
Calibration & Maintenance
Calibration & Maintenance
1P ORP
4P ORP
7/27/12
7/30/12
8/1/12
8/4/12
8/6/12
8/9/12
8/11/12
8/14/12
8/17/12
8/19/12
8/22/12
8/24/12
8/27/12
8/29/12
9/1/12
9/3/12
9/6/12
9/8/12
9/11/12
9/13/12
9/21/12
9/24/12
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10/6/12
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10/11/12
10/14/12
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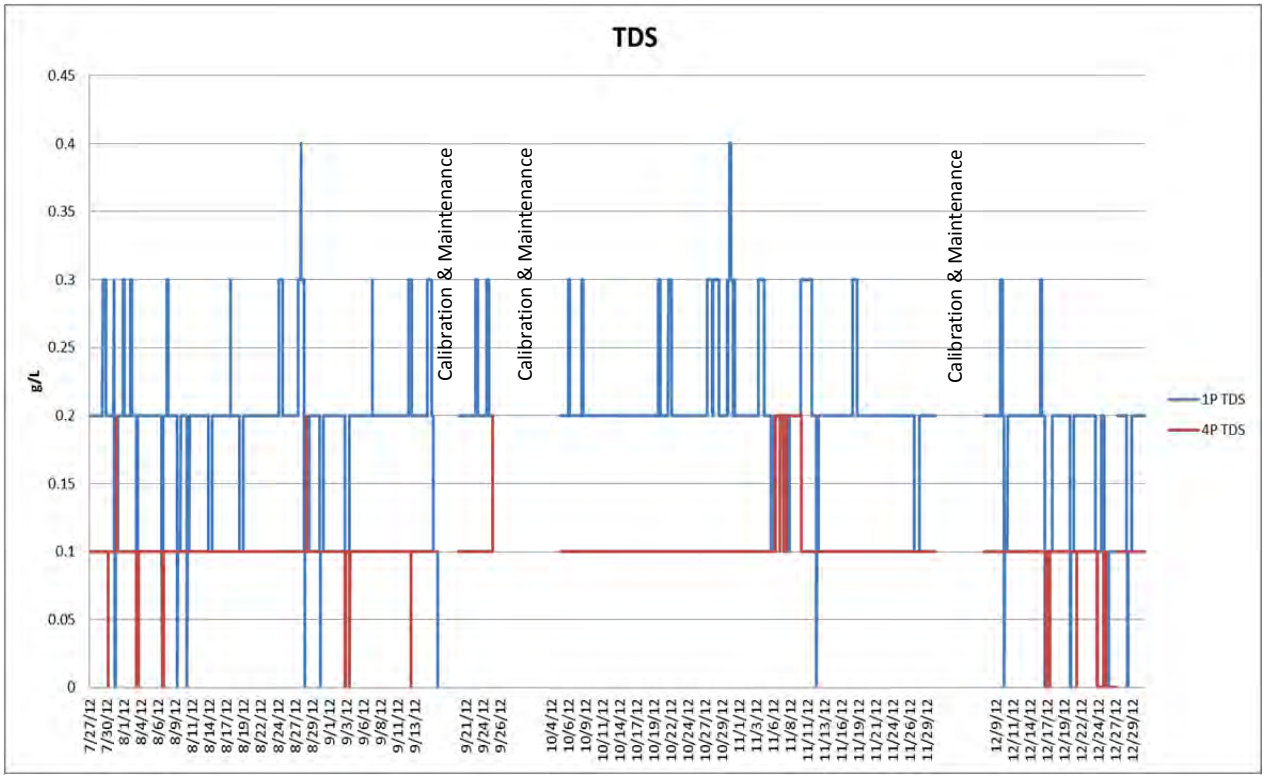
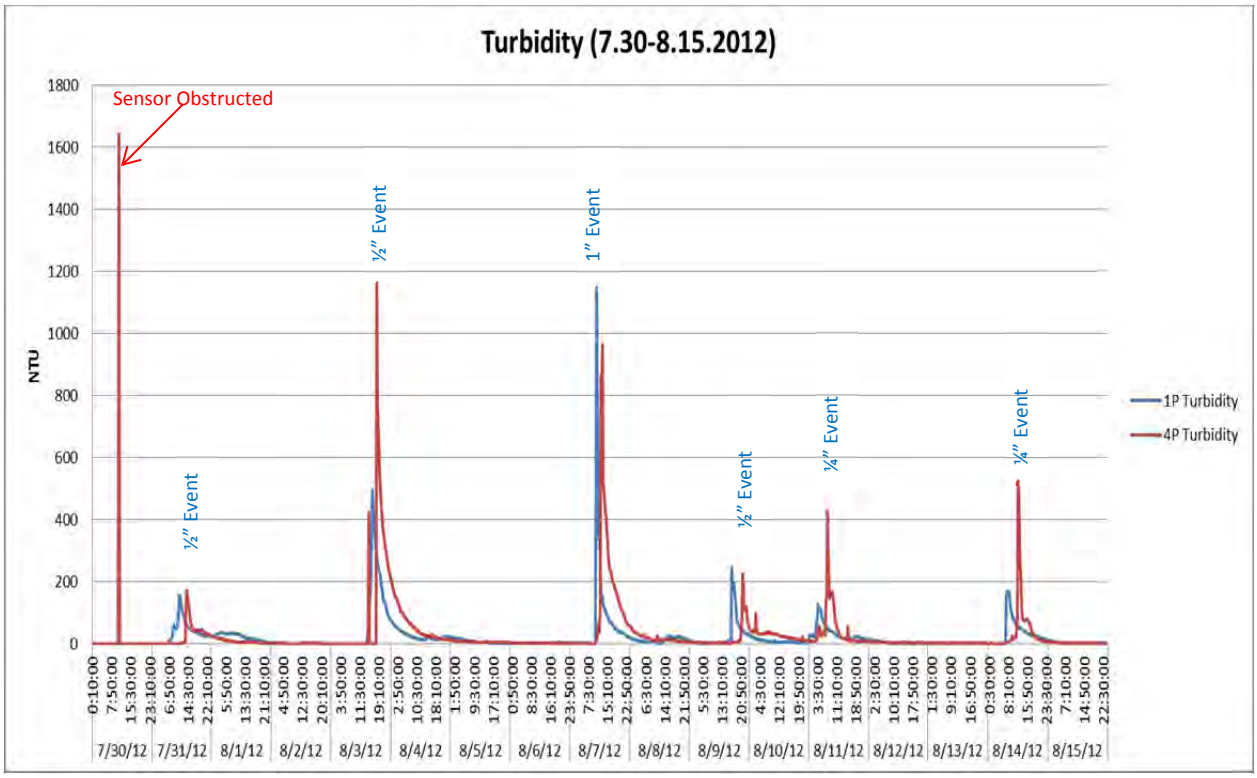
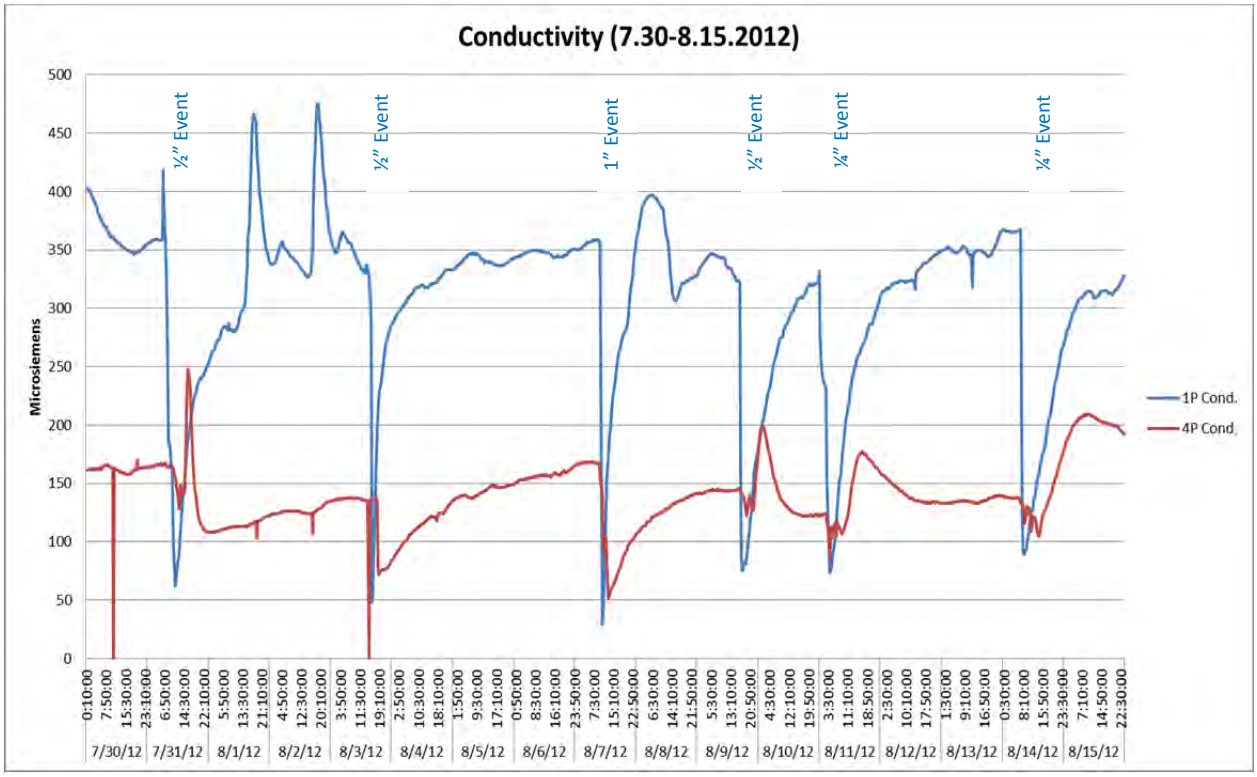
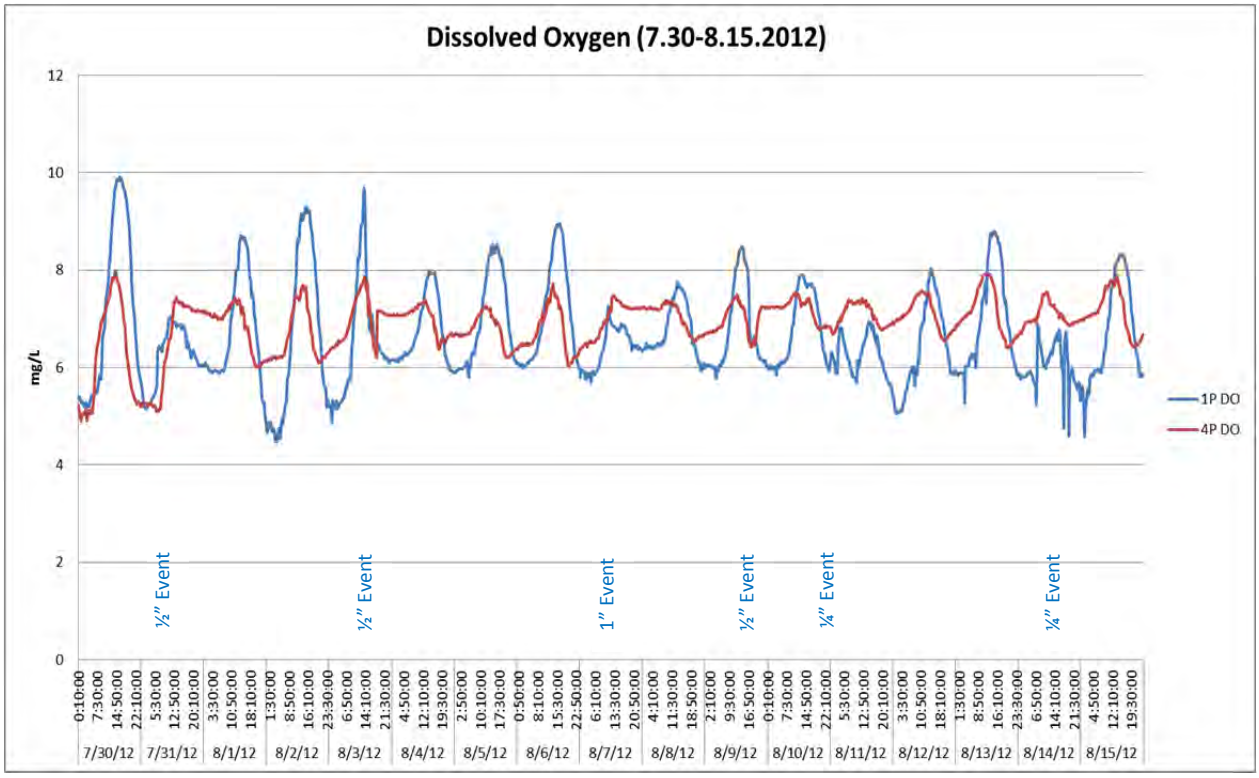
12/14/12
12/17/12
12/19/12
12/22/12
12/24/12
12/27/12
12/29/12

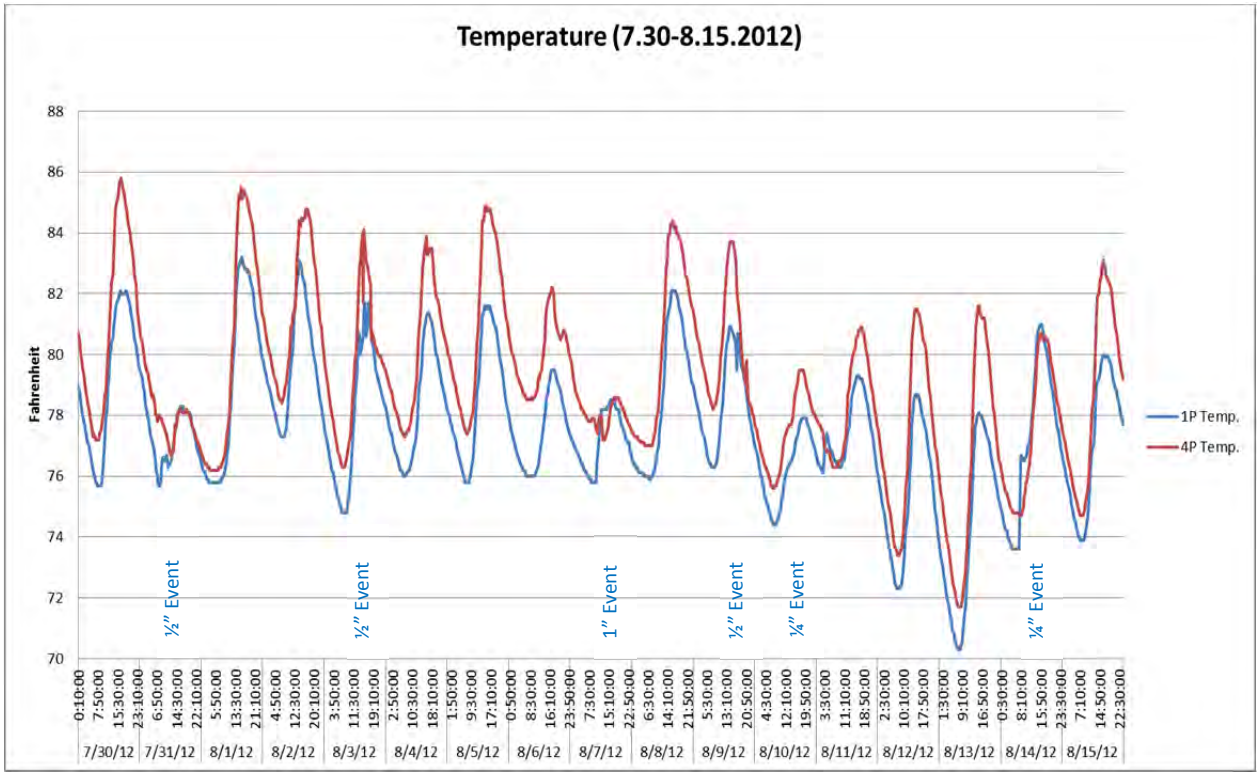

TDS
g/L
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
Calibration & Maintenance
Calibration & Maintenance
Calibration & Maintenance
1P TDS
4P TDS
7/27/12
7/30/12
8/1/12
8/4/12
8/6/12
8/9/12
8/11/12
8/14/12
8/17/12
8/19/12
8/22/12
8/24/12
8/27/12
8/29/12
9/1/12
9/3/12
9/6/12
9/8/12
9/11/12
9/13/12
9/21/12
9/24/12
9/26/12
10/4/12
10/6/12
10/9/12
10/11/12
10/14/12
10/17/12
10/19/12
10/22/12
10/24/12
10/27/12
10/29/12
11/1/12
11/3/12
11/6/12
11/8/12
11/11/12
11/13/12
11/16/12
11/19/12
11/21/12
11/24/12
11/26/12
11/29/12
12/9/12
12/11/12
12/14/12
12/17/12
12/19/12
12/22/12
12/24/12
12/27/12
12/29/12

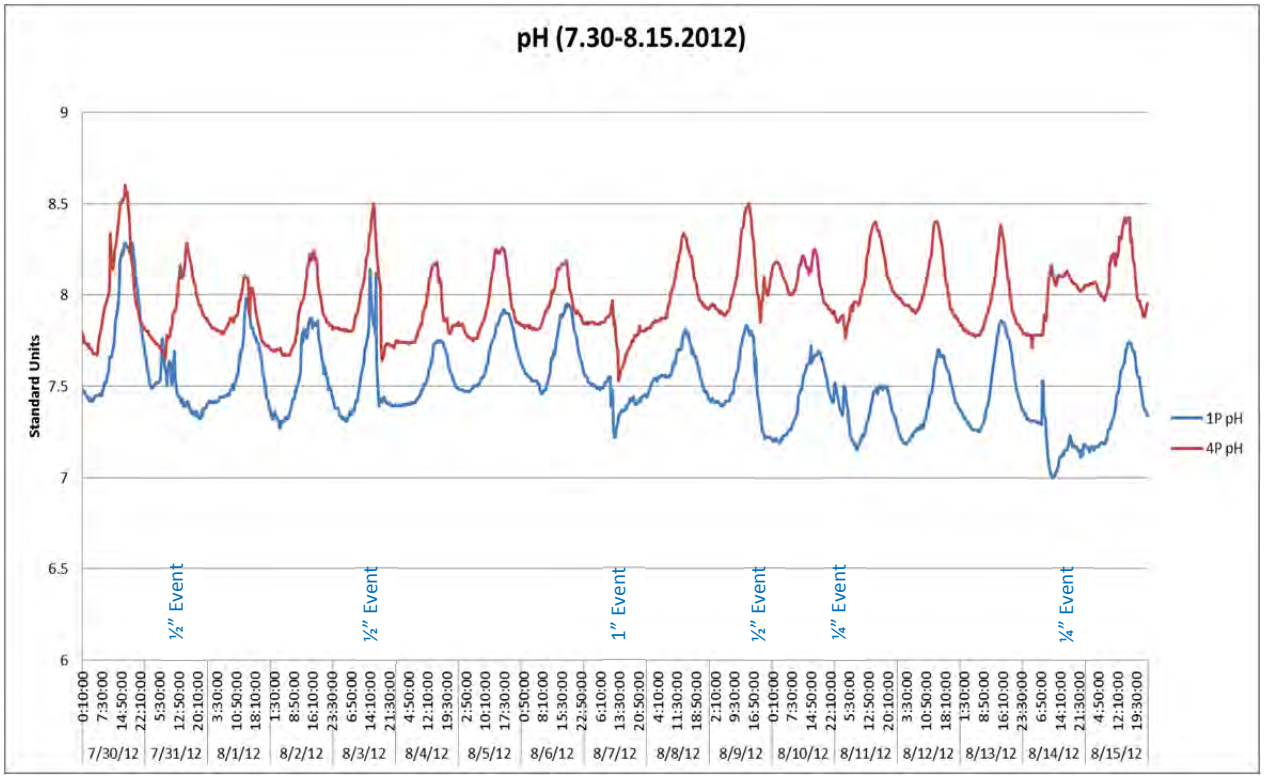
Storm Event Data – 7/30/2012-8/15/2012

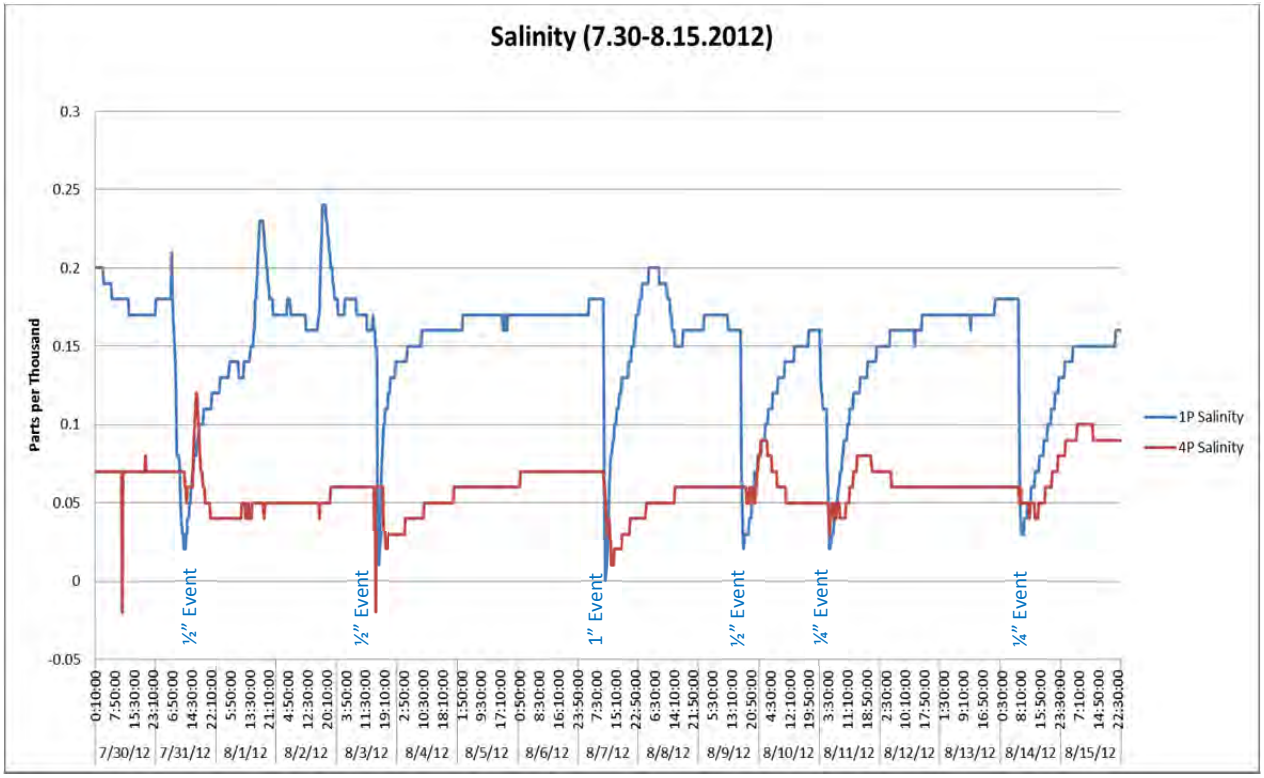


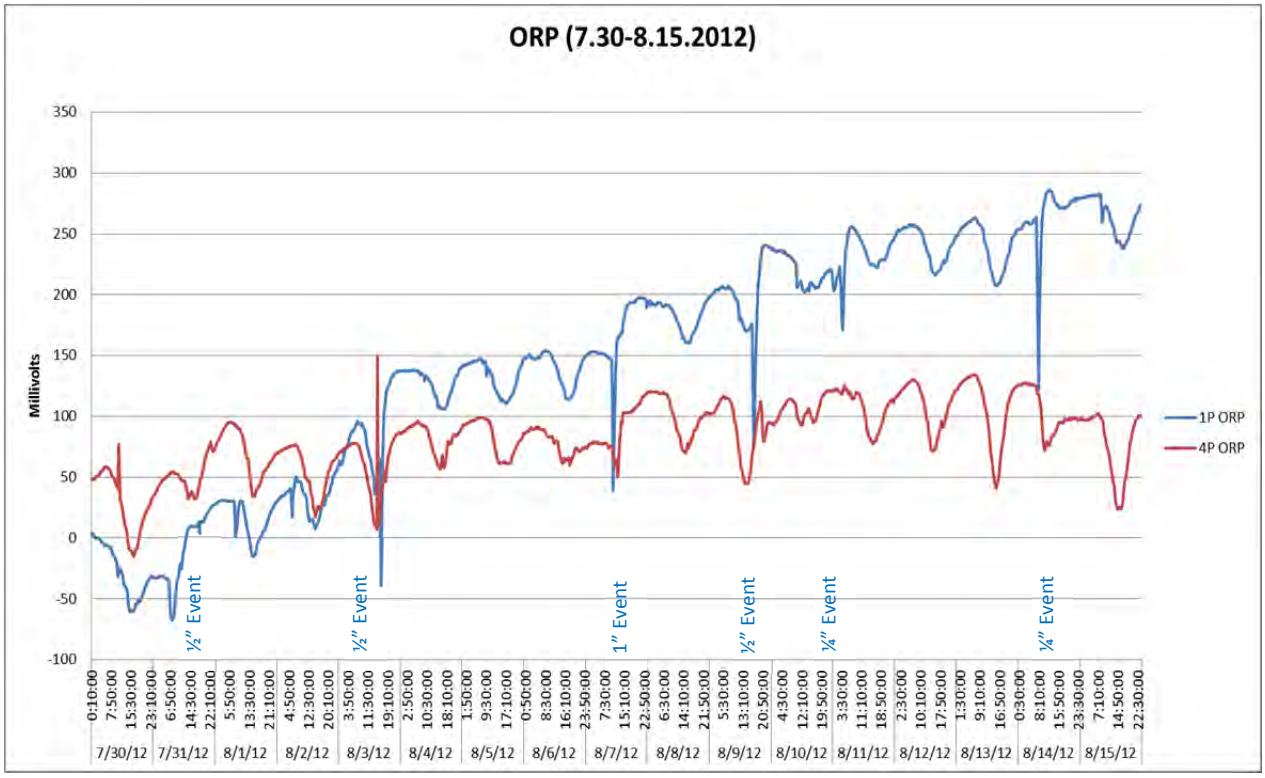


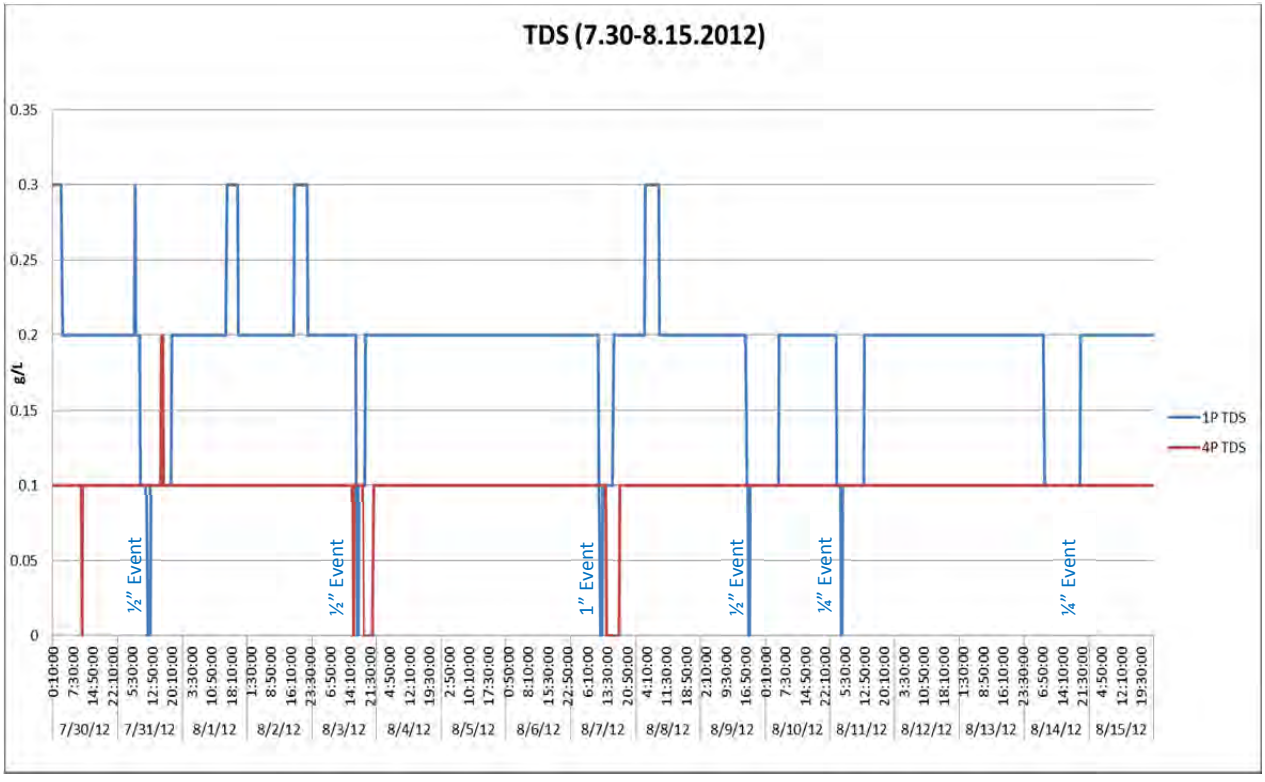

Dissolved Oxygen (7.30-8.15.2012)
mg/L
1P DO
4P DO
½" Event
½" Event
1" Event
½" Event
¼" Event
¼" Event


Temperature (7.30-8.15.2012)
Fahrenheit
1P Temp.
4P Temp.
½" Event
½" Event
1" Event
½" Event
¼" Event
¼" Event

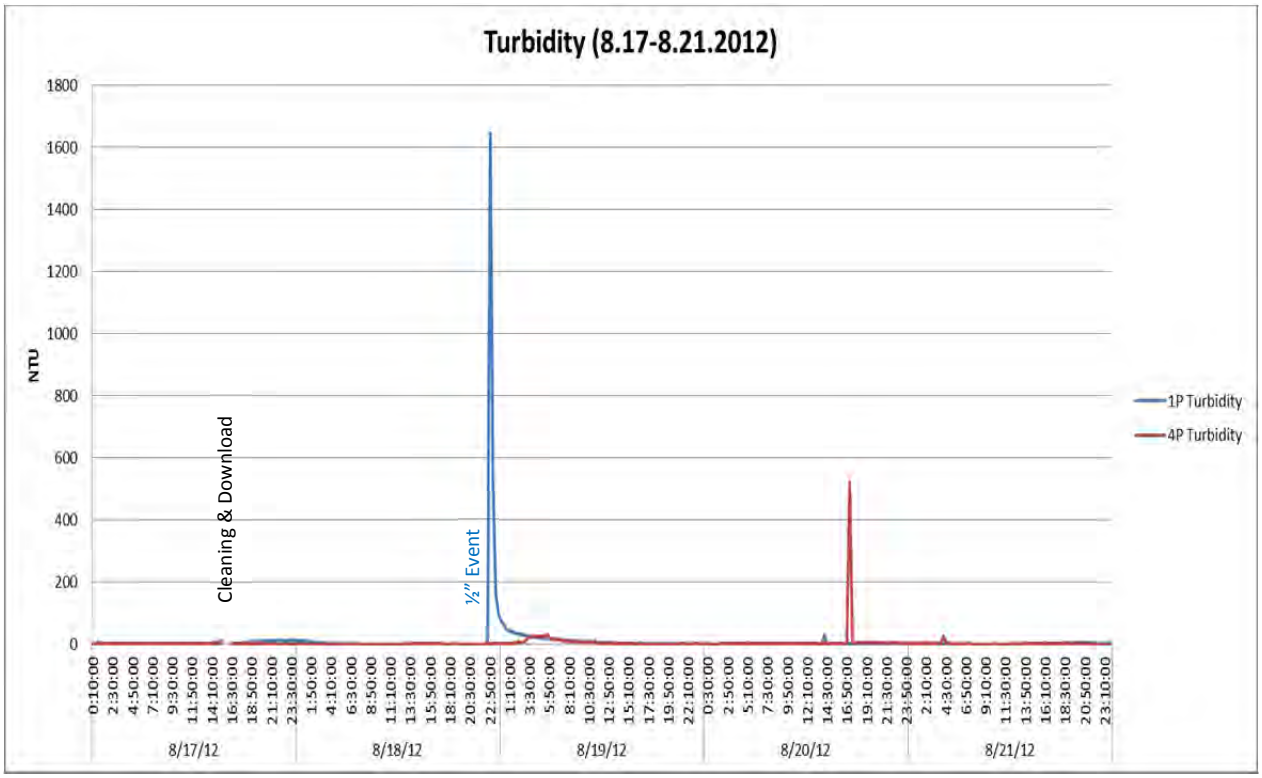

pH (7.30-8.15.2012)
Standard Units
9
8.5
8
7.5
7
6.5
6
½" Event
½" Event
1" Event
½" Event
¼" Event
¼" Event
1P pH
4P pH
7/30/12
7/31/12
8/1/12
8/2/12
8/3/12
8/4/12
8/5/12
8/6/12
8/7/12
8/8/12
8/9/12
8/10/12
8/11/12
8/12/12
8/13/12
8/14/12
8/15/12

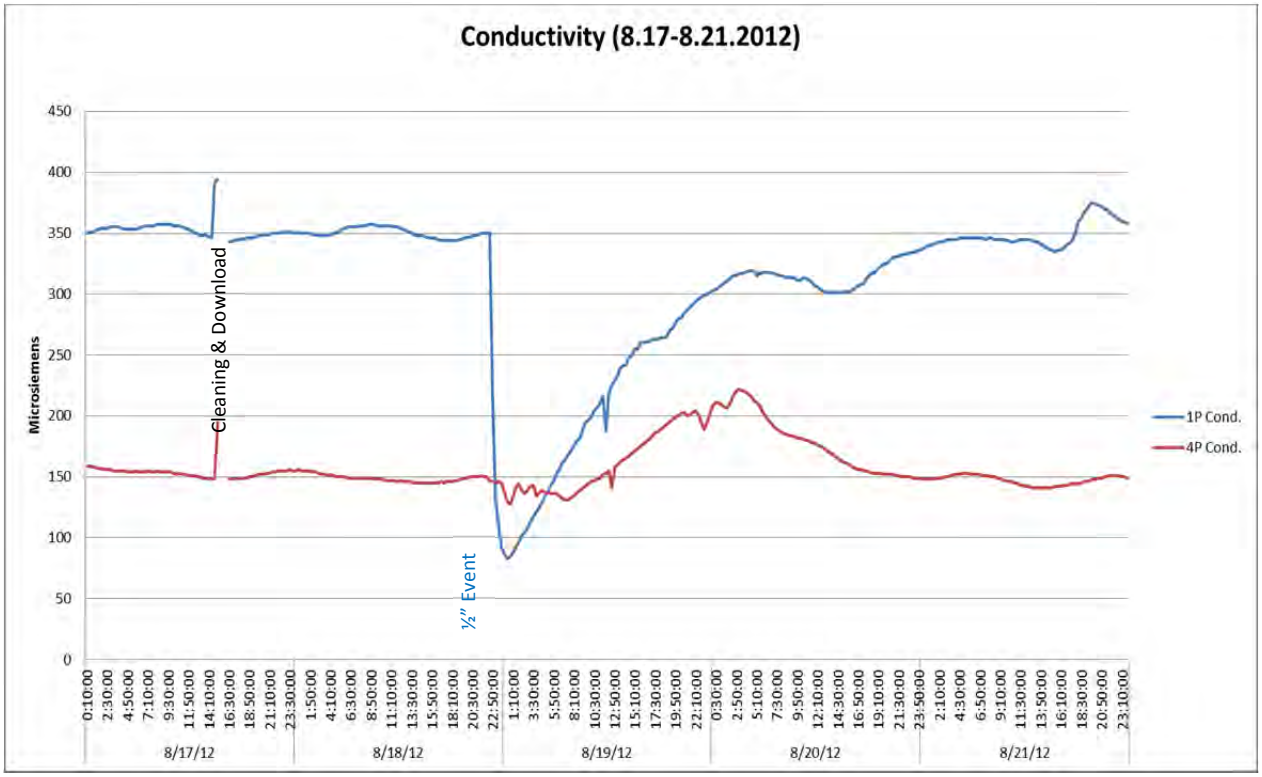

Salinity (7.30-8.15.2012)
Parts per Thousand
0.3
0.25
0.2
0.15
0.1
0.05
0
-0.05
½" Event
½" Event
1" Event
½" Event
¼" Event
¼" Event
1P Salinity
4P Salinity
7/30/12
7/31/12
8/1/12
8/2/12
8/3/12
8/4/12
8/5/12
8/6/12
8/7/12
8/8/12
8/9/12
8/10/12
8/11/12
8/12/12
8/13/12
8/14/12
8/15/12

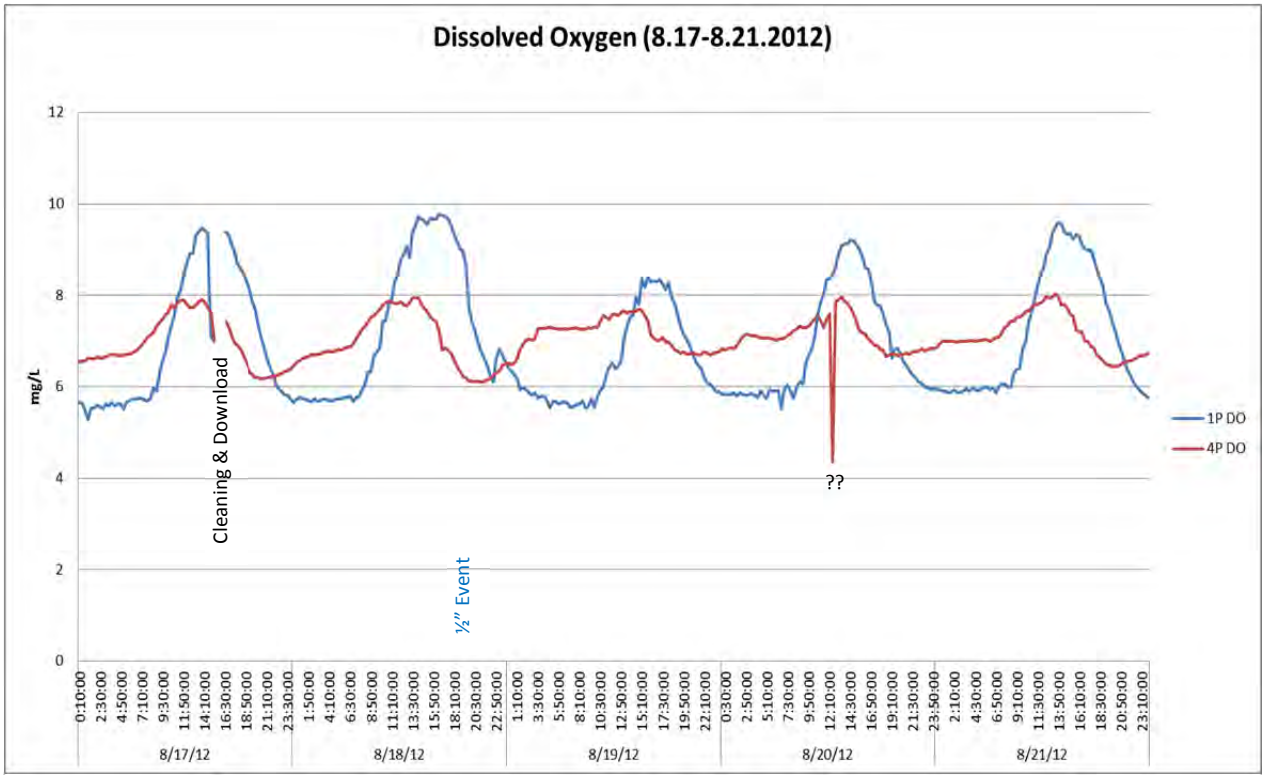

ORP (7.30-8.15.2012)
Millivolts
350
300
250
200
150
100
50
0
-50
-100
½" Event
½" Event
1" Event
½" Event
¼" Event
¼" Event
1P ORP
4P ORP
7/30/12
7/31/12
8/1/12
8/2/12
8/3/12
8/4/12
8/5/12
8/6/12
8/7/12
8/8/12
8/9/12
8/10/12
8/11/12
8/12/12
8/13/12
8/14/12
8/15/12

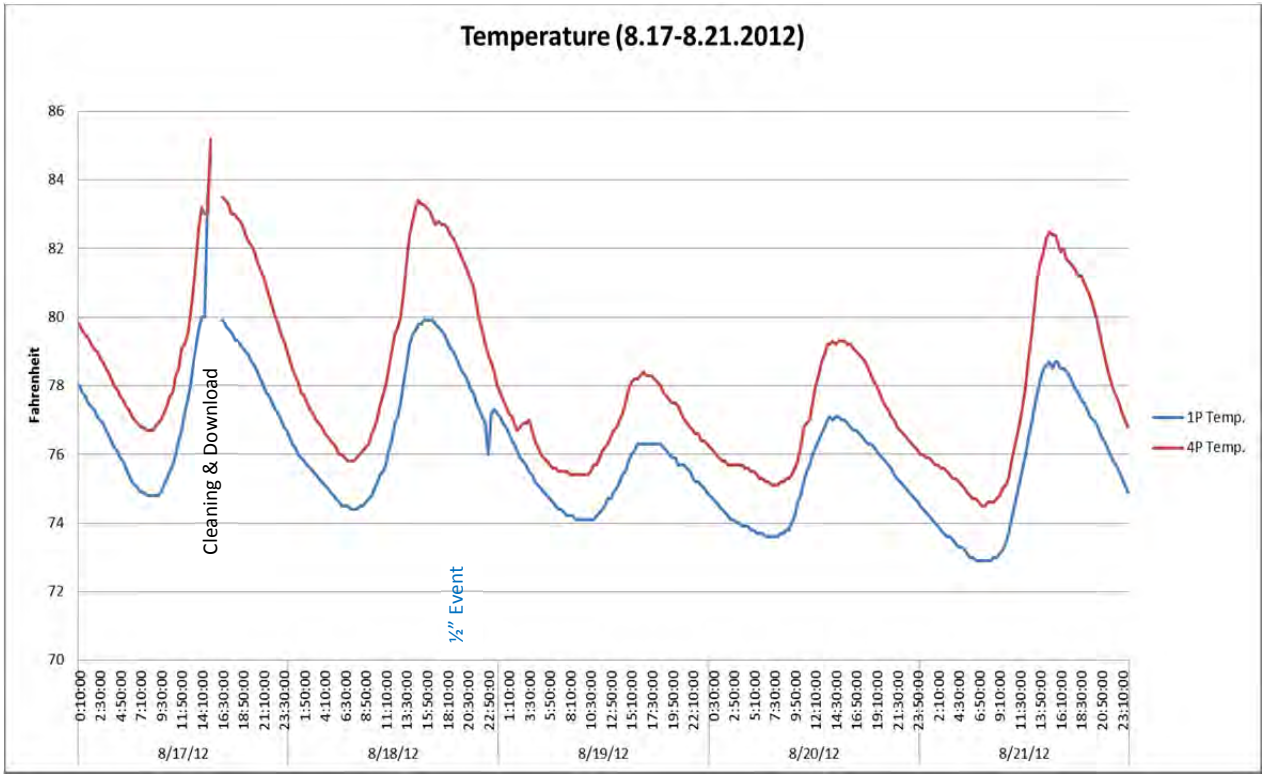

TDS (7.30-8.15.2012)
g/L
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
½" Event
½" Event
1" Event
½" Event
¼" Event
¼" Event
1P TDS
4P TDS
7/30/12
7/31/12
8/1/12
8/2/12
8/3/12
8/4/12
8/5/12
8/6/12
8/7/12
8/8/12
8/9/12
8/10/12
8/11/12
8/12/12
8/13/12
8/14/12
8/15/12

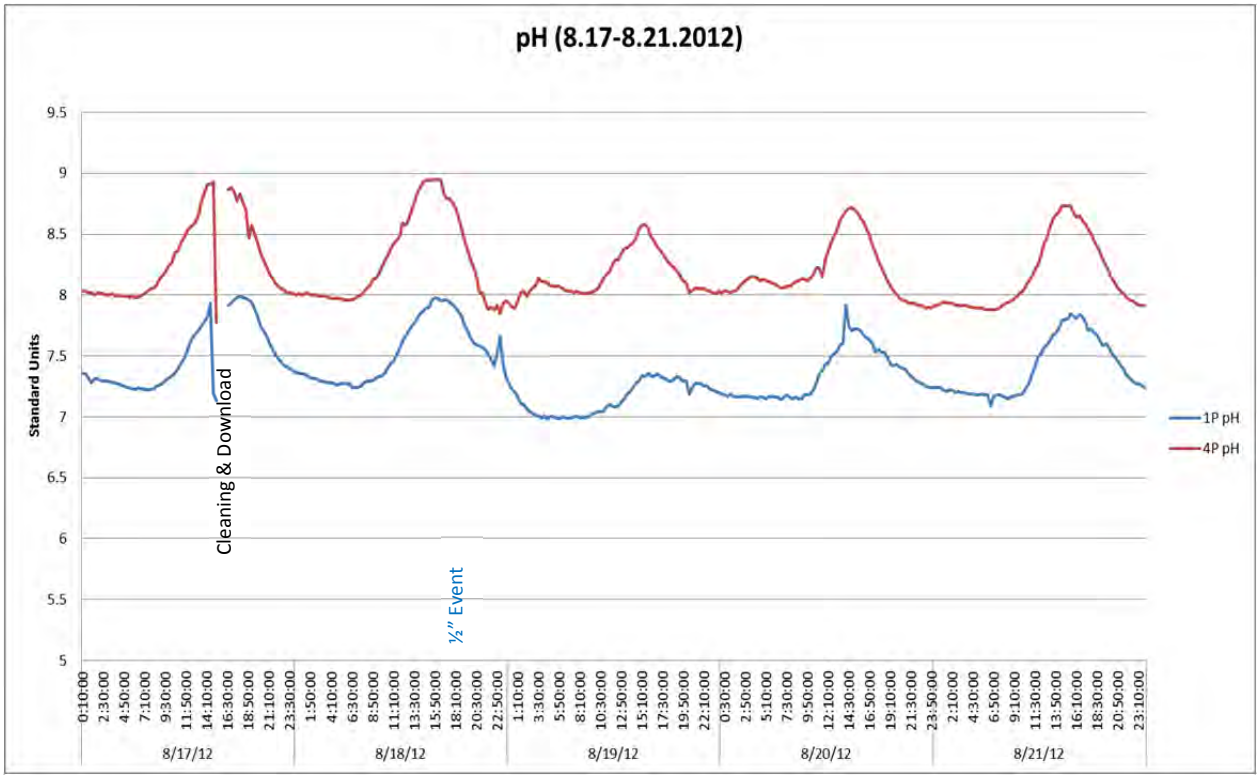
Storm Event Data – 8/17/2012-8/21/2012

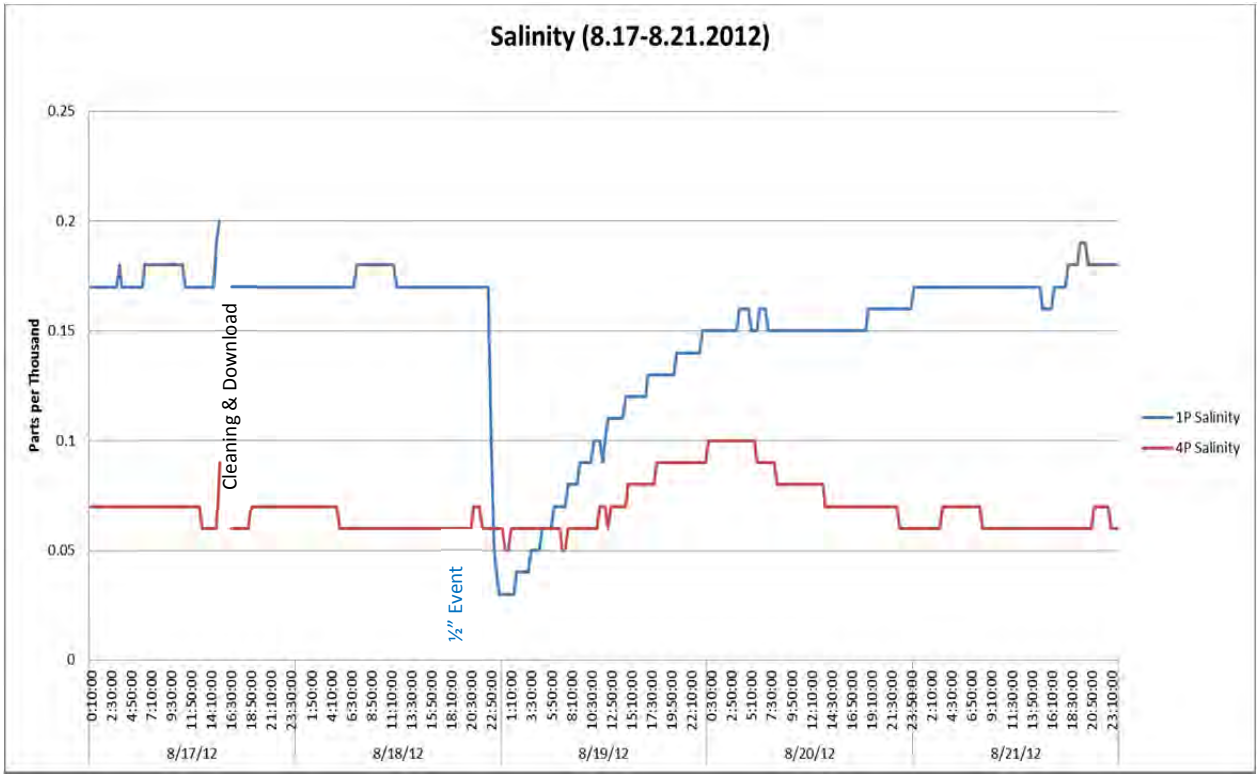


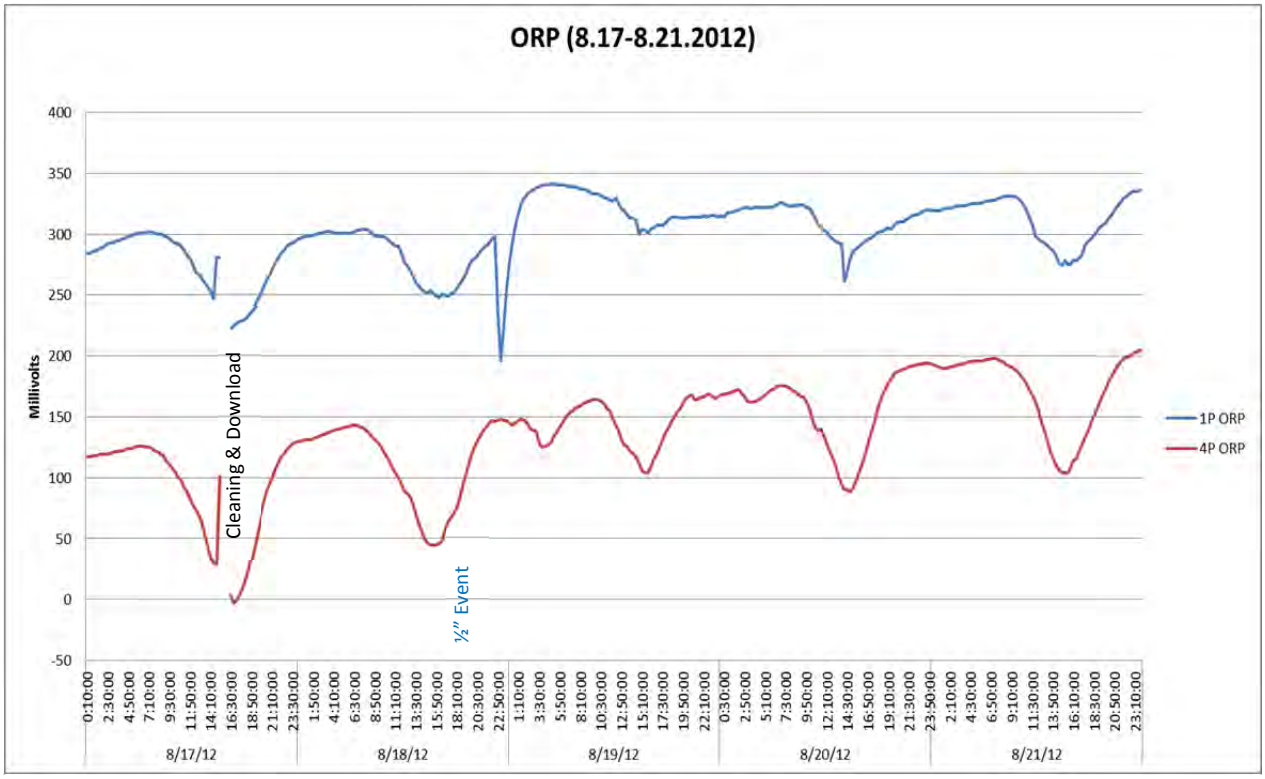


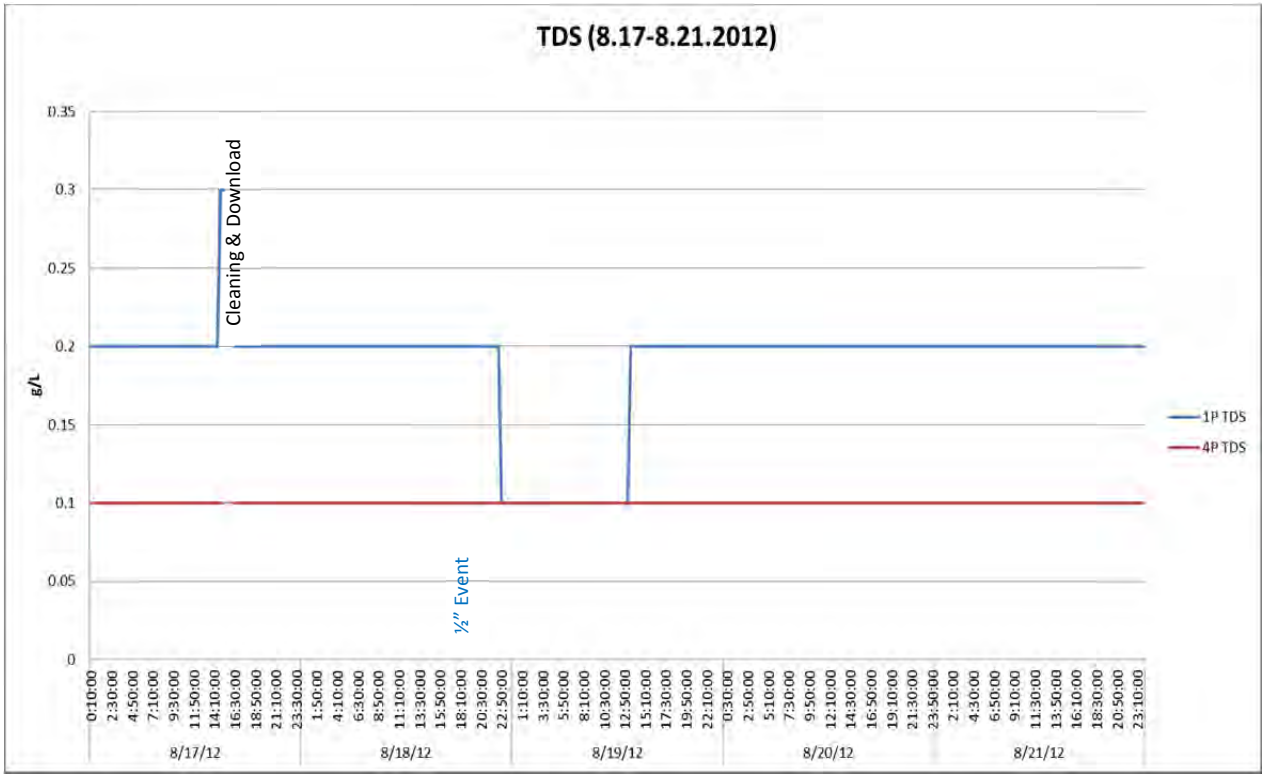

Dissolved Oxygen (8.17-8.21.2012)
mg/L
12
10
8
6
4
2
0
Cleaning & Download
½" Event
??
1P DO
4P DO
0:10:00
2:30:00
4:50:00
7:10:00
9:30:00
11:50:00
14:10:00
16:30:00
18:50:00
21:10:00
23:30:00
1:50:00
4:10:00
6:30:00
8:50:00
11:10:00
13:30:00
15:50:00
18:10:00
20:30:00
22:50:00
1:10:00
3:30:00
5:50:00
8:10:00
10:30:00
12:50:00
15:10:00
17:30:00
19:50:00
22:10:00
0:30:00
2:50:00
5:10:00
7:30:00
9:50:00
12:10:00
14:30:00
16:50:00
19:10:00
21:30:00
23:50:00
2:10:00
4:30:00
6:50:00
9:10:00
11:30:00
13:50:00
16:10:00
18:30:00
20:50:00
23:10:00
8/17/12
8/18/12
8/19/12
8/20/12
8/21/12


Temperature (8.17-8.21.2012)
Fahrenheit
86
84
82
80
78
76
74
72
70
Cleaning & Download
½" Event
1P Temp.
4P Temp.
0:10:00
2:30:00
4:50:00
7:10:00
9:30:00
11:50:00
14:10:00
16:30:00
18:50:00
21:10:00
23:30:00
1:50:00
4:10:00
6:30:00
8:50:00
11:10:00
13:30:00
15:50:00
18:10:00
20:30:00
22:50:00
1:10:00
3:30:00
5:50:00
8:10:00
10:30:00
12:50:00
15:10:00
17:30:00
19:50:00
22:10:00
0:30:00
2:50:00
5:10:00
7:30:00
9:50:00
12:10:00
14:30:00
16:50:00
19:10:00
21:30:00
23:50:00
2:10:00
4:30:00
6:50:00
9:10:00
11:30:00
13:50:00
16:10:00
18:30:00
20:50:00
23:10:00
8/17/12
8/18/12
8/19/12
8/20/12
8/21/12

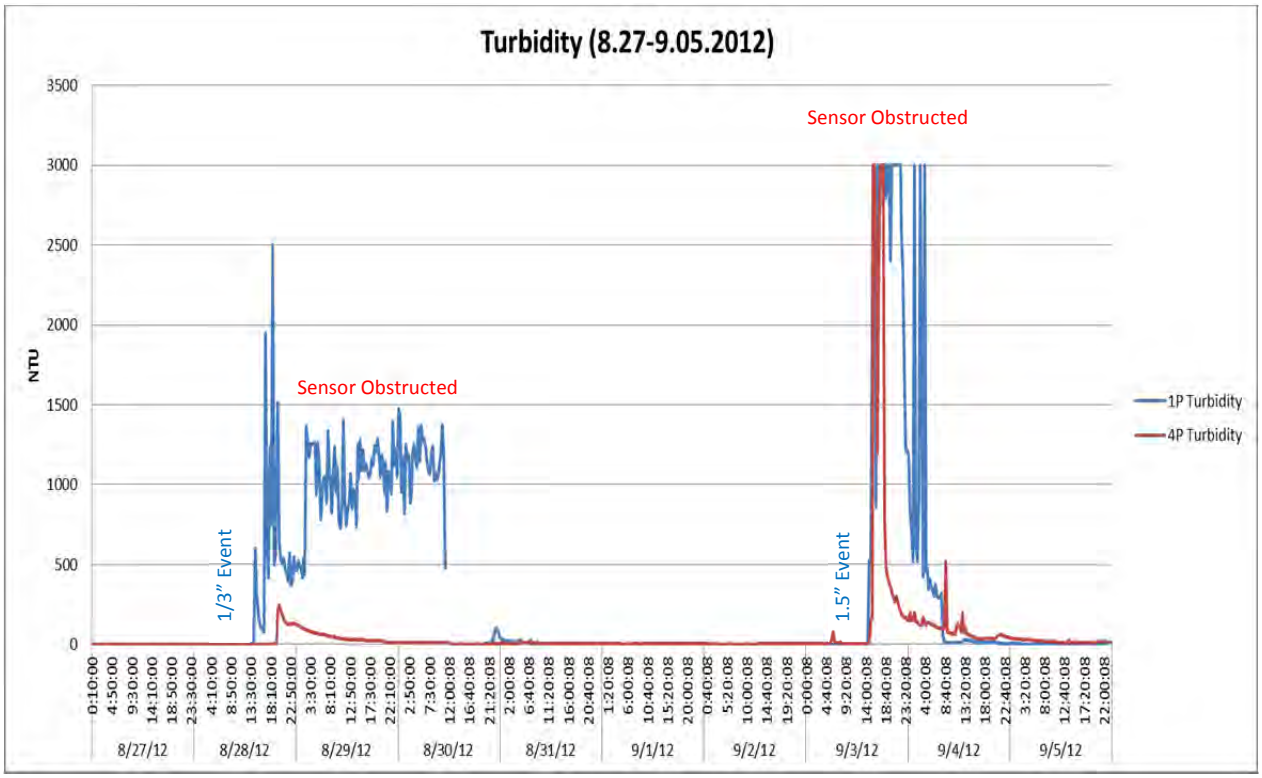

pH (8.17-8.21.2012)
Standard Units
9.5
9
8.5
8
7.5
7
6.5
6
5.5
5
Cleaning & Download
½" Event
1P pH
4P pH
8/17/12
8/18/12
8/19/12
8/20/12
8/21/12

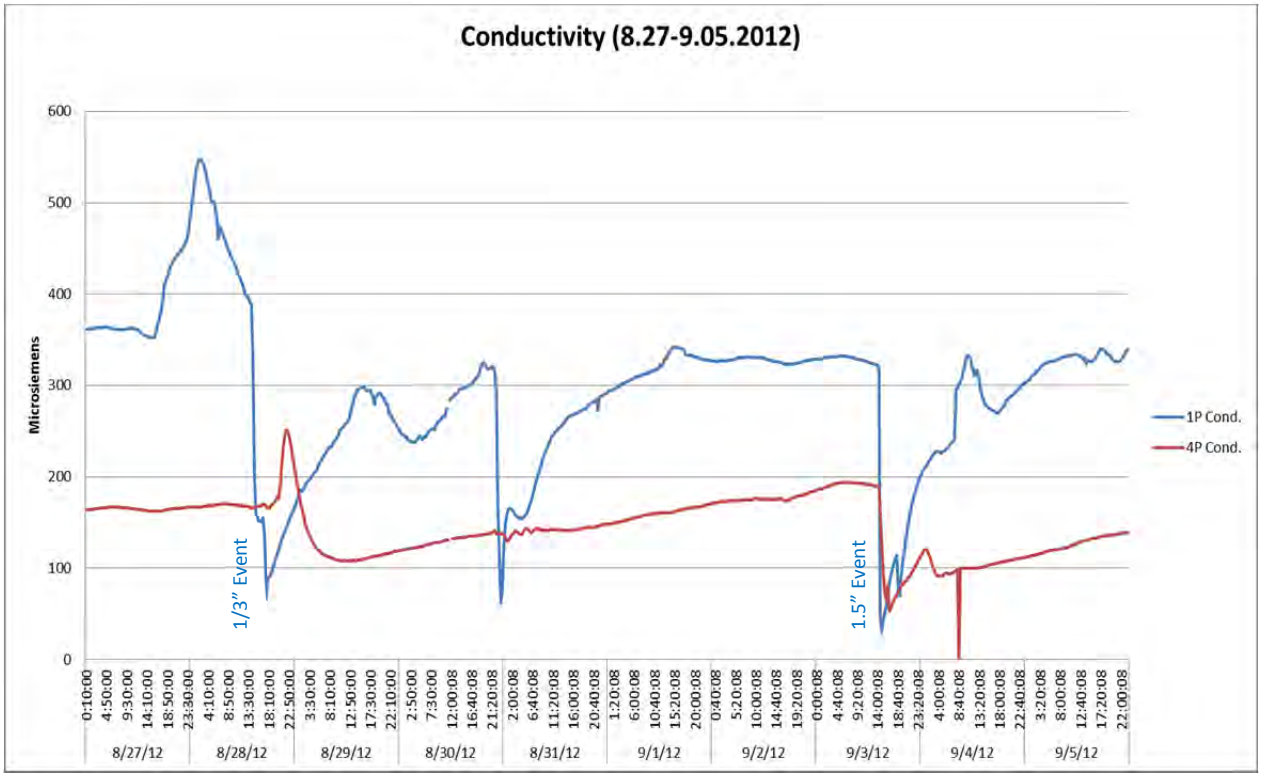

Salinity (8.17-8.21.2012)
Parts per Thousand
0.25
0.2
0.15
0.1
0.05
0
Cleaning & Download
½" Event
1P Salinity
4P Salinity
8/17/12
8/18/12
8/19/12
8/20/12
8/21/12

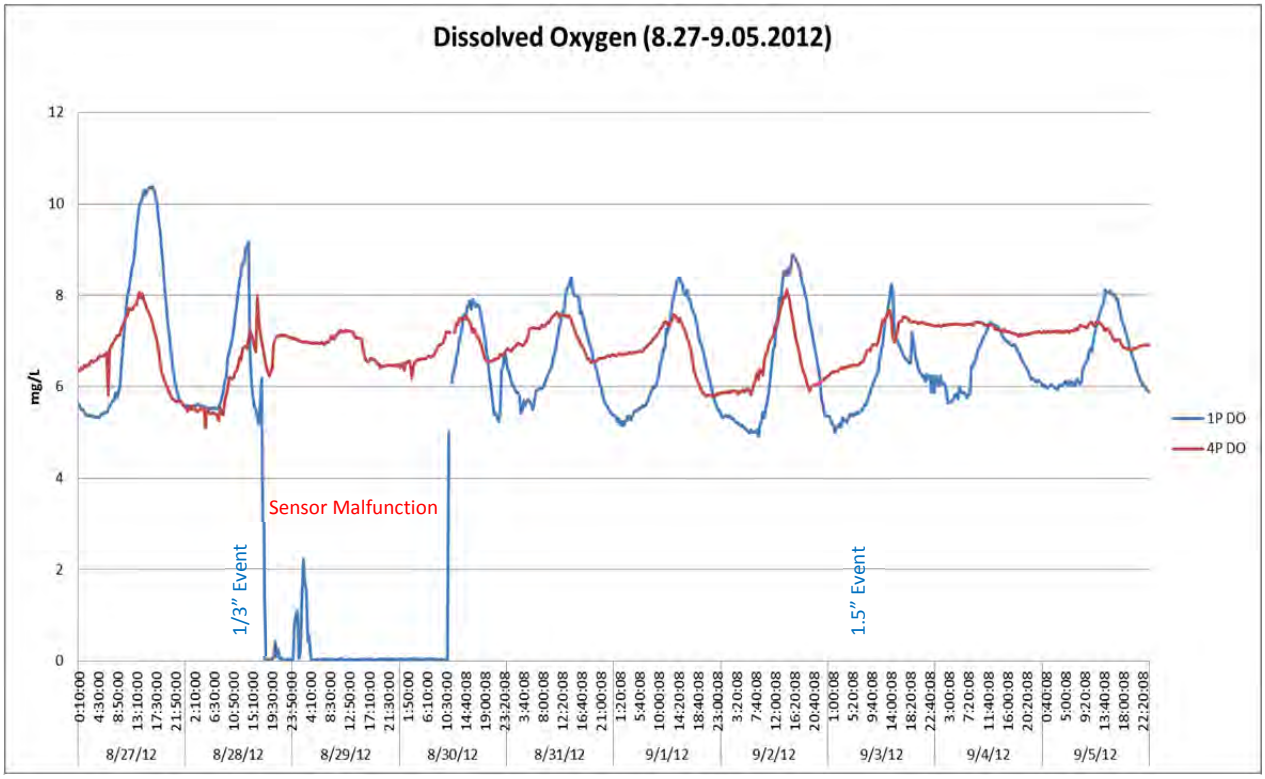

ORP (8.17-8.21.2012)
Millivolts
400
350
300
250
200
150
100
50
0
-50
Cleaning & Download
½" Event
1P ORP
4P ORP
8/17/12
8/18/12
8/19/12
8/20/12
8/21/12

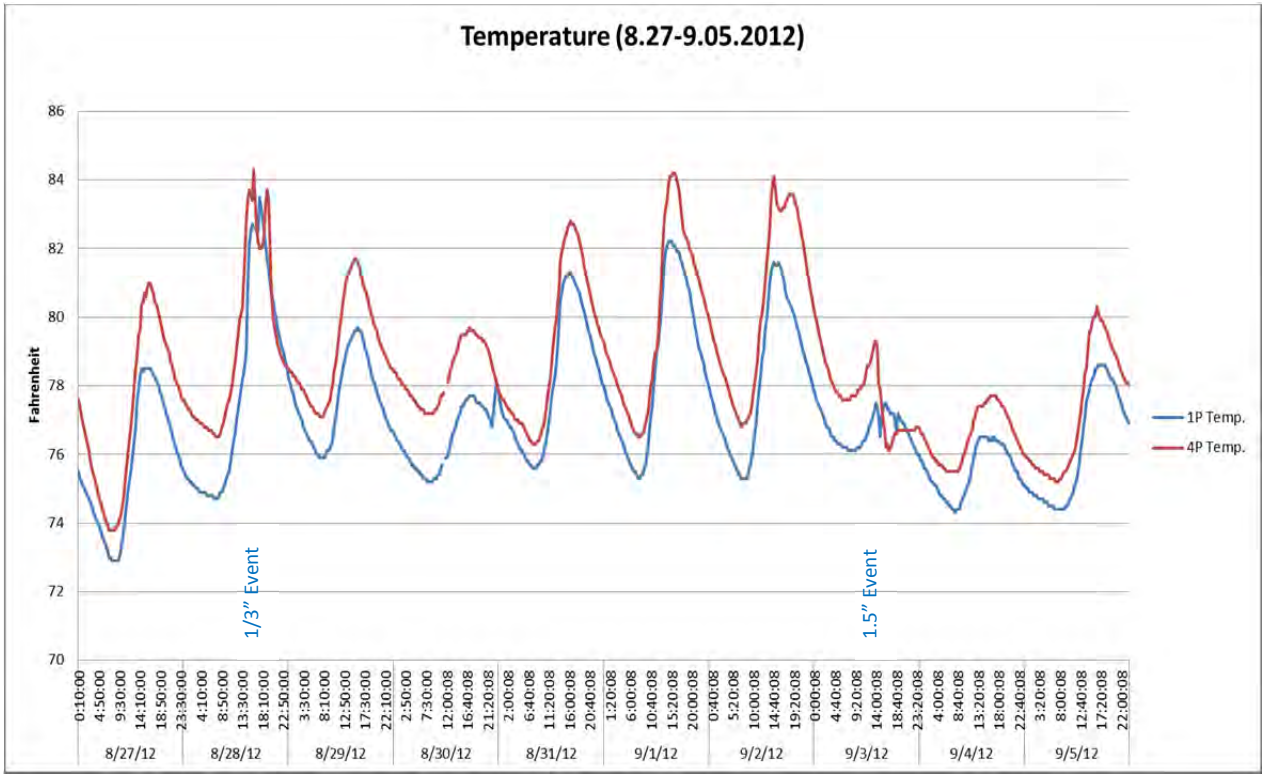

TDS (8.17-8.21.2012)
g/L
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
Cleaning & Download
½" Event
1P TDS
4P TDS
8/17/12
8/18/12
8/19/12
8/20/12
8/21/12

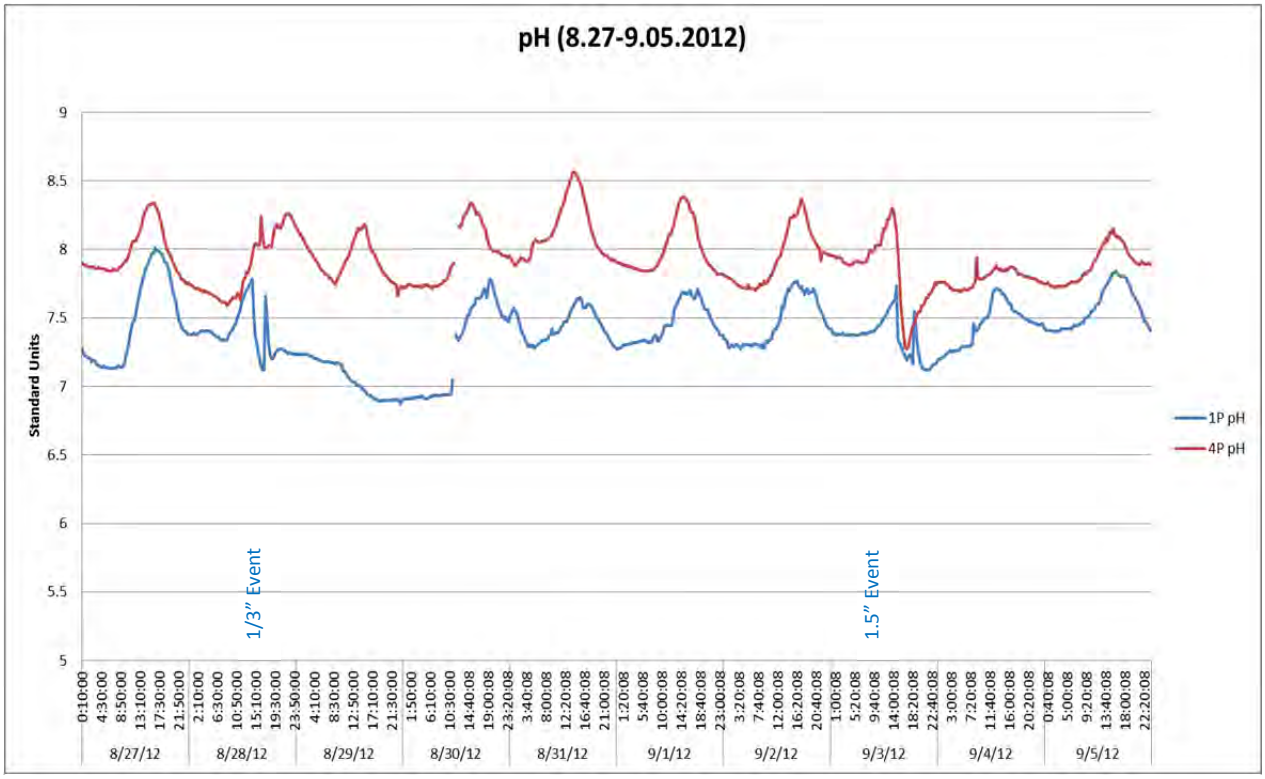
Storm Event Data – 8/27/2012-9/05/2012

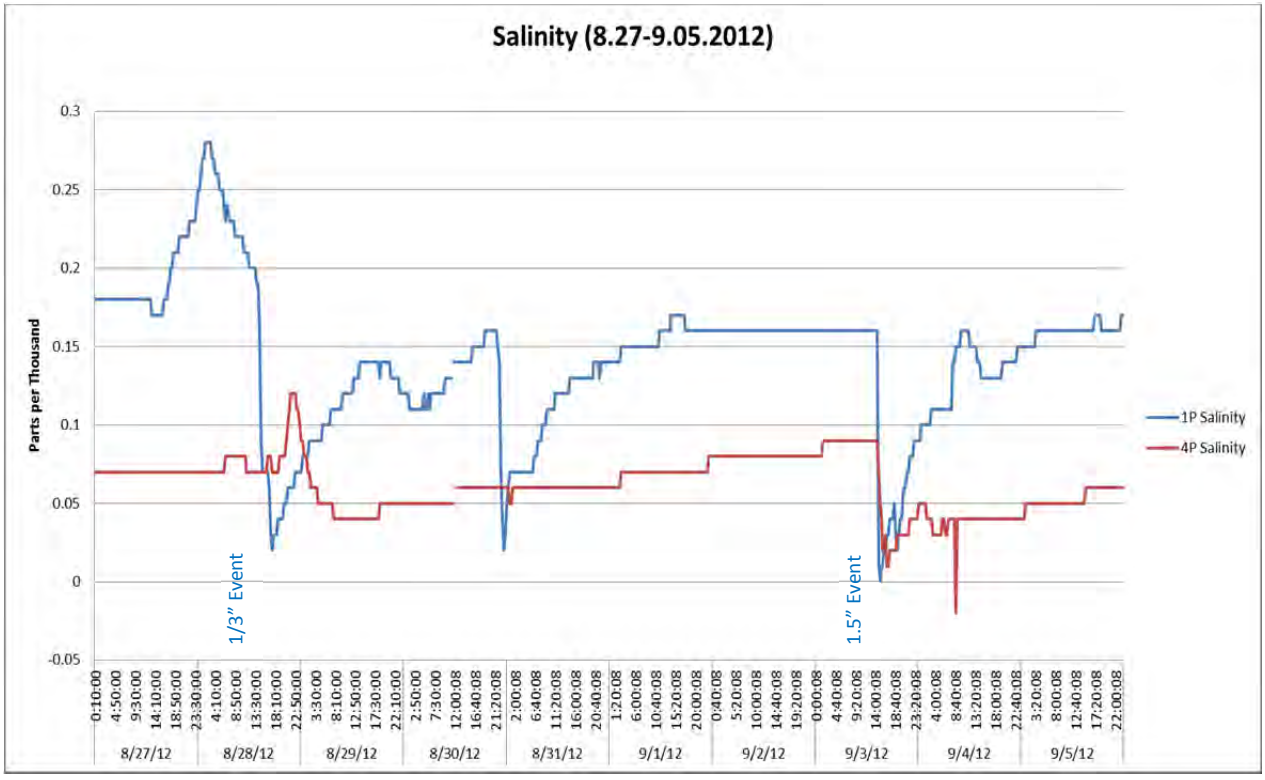


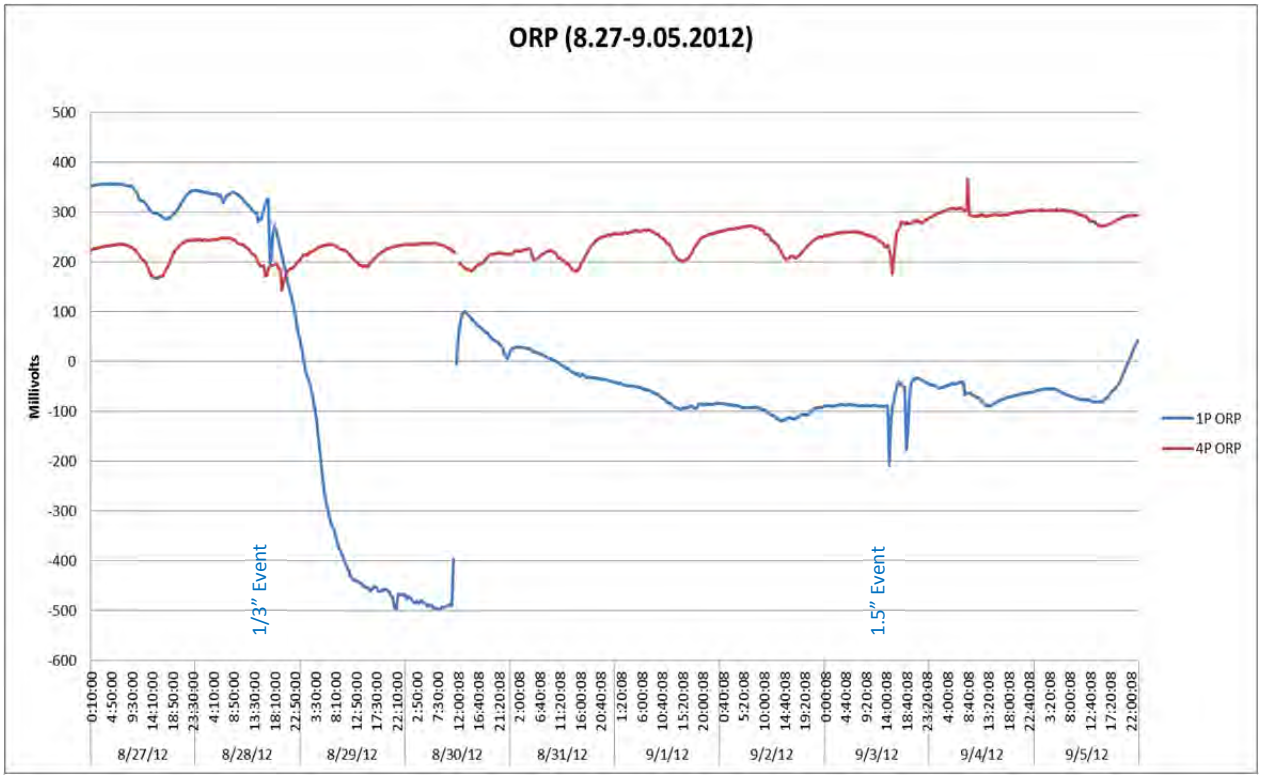


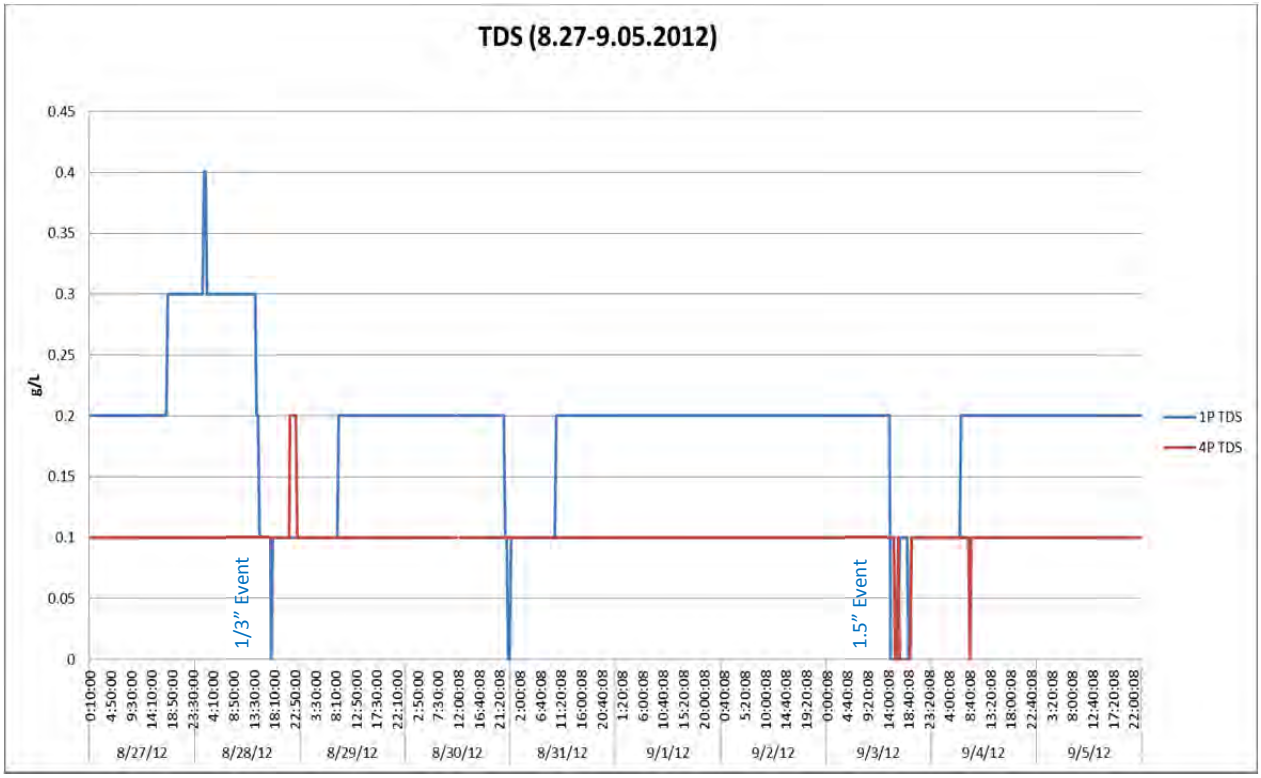

Dissolved Oxygen (8.27-9.05.2012)
mg/L
12
10
8
6
4
2
0
Sensor Malfunction
1/3" Event
1.5" Event
1P DO
4P DO
8/27/12
8/28/12
8/29/12
8/30/12
8/31/12
9/1/12
9/2/12
9/3/12
9/4/12
9/5/12


Temperature (8.27-9.05.2012)
Fahrenheit
86
84
82
80
78
76
74
72
70
1/3" Event
1.5" Event
1P Temp.
4P Temp.
8/27/12
8/28/12
8/29/12
8/30/12
8/31/12
9/1/12
9/2/12
9/3/12
9/4/12
9/5/12

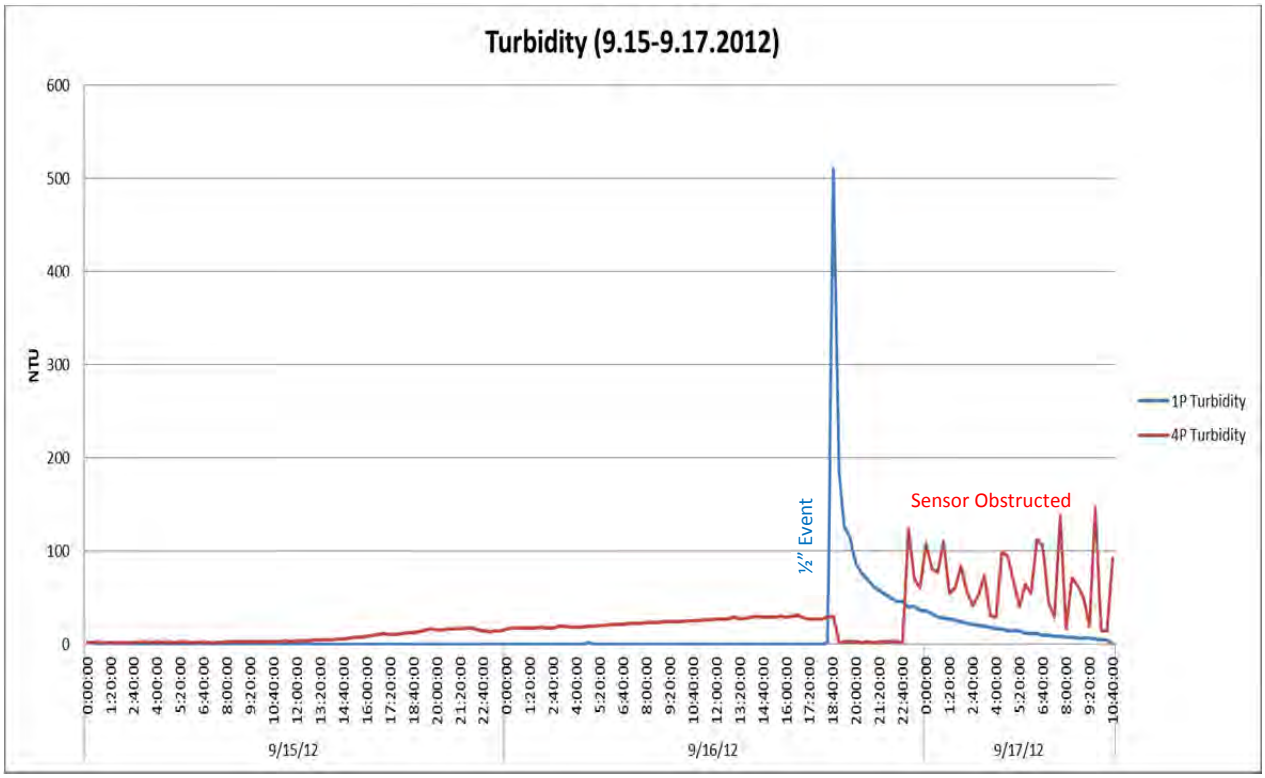

pH (8.27-9.05.2012)
Standard Units
9
8.5
8
7.5
7
6.5
6
5.5
5
1/3" Event
1.5" Event
1P pH
4P pH
8/27/12
8/28/12
8/29/12
8/30/12
8/31/12
9/1/12
9/2/12
9/3/12
9/4/12
9/5/12

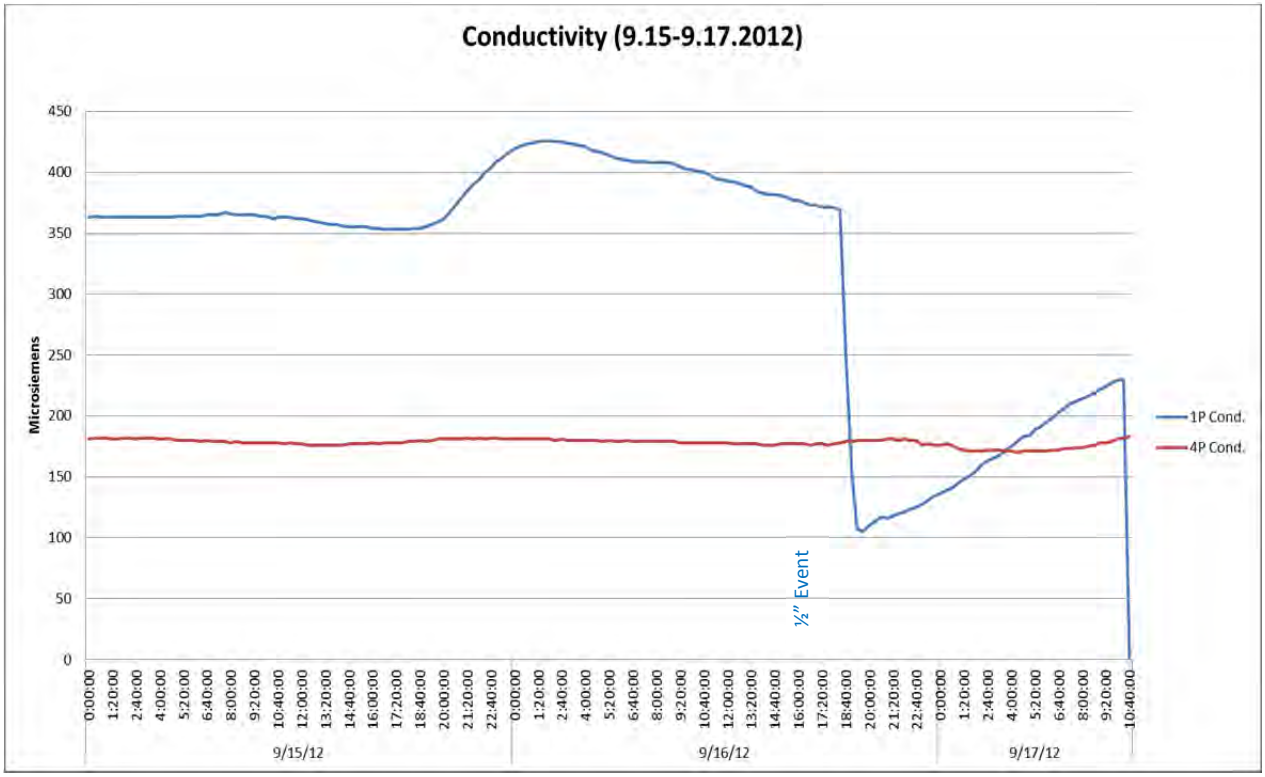

Salinity (8.27-9.05.2012)
Parts per Thousand
0.3
0.25
0.2
0.15
0.1
0.05
0
-0.05
1/3" Event
1.5" Event
1P Salinity
4P Salinity
8/27/12
8/28/12
8/29/12
8/30/12
8/31/12
9/1/12
9/2/12
9/3/12
9/4/12
9/5/12

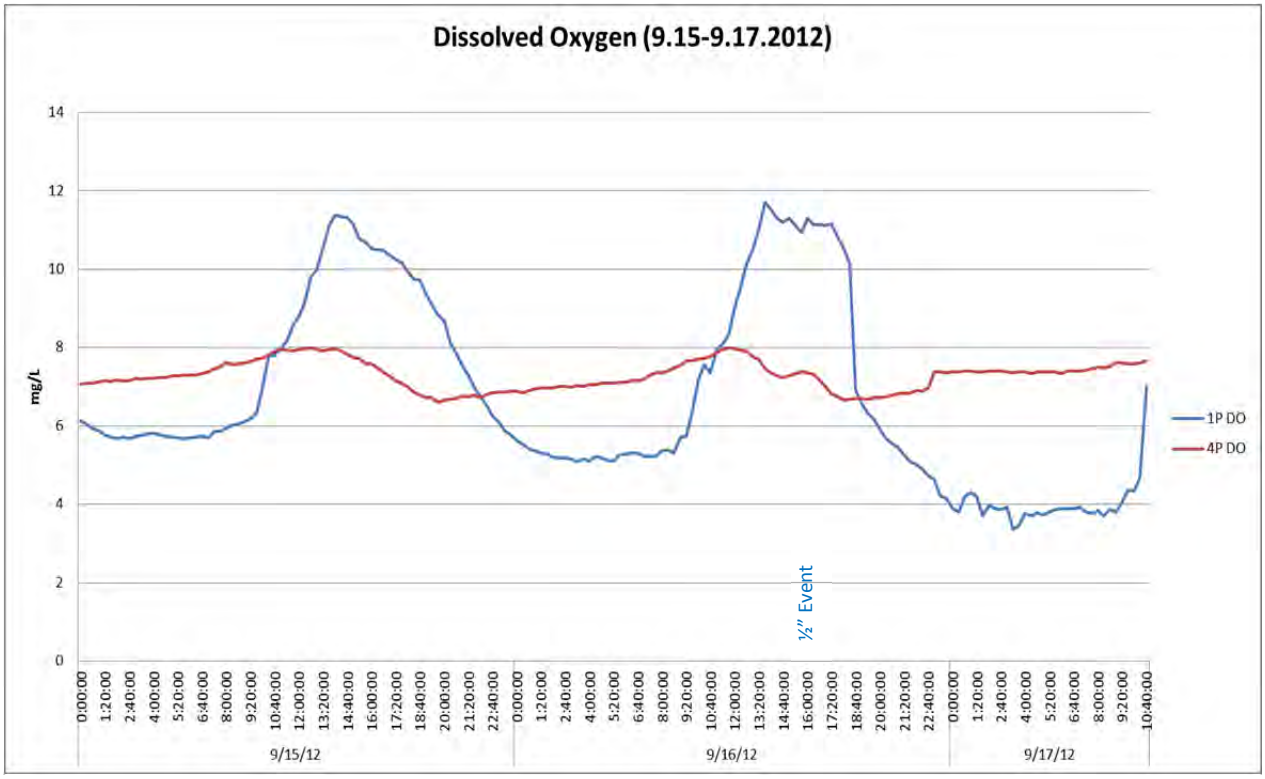

ORP (8.27-9.05.2012)
Millivolts
500
400
300
200
100
0
-100
-200
-300
-400
-500
-600
1/3" Event
1.5" Event
1P ORP
4P ORP
8/27/12
8/28/12
8/29/12
8/30/12
8/31/12
9/1/12
9/2/12
9/3/12
9/4/12
9/5/12

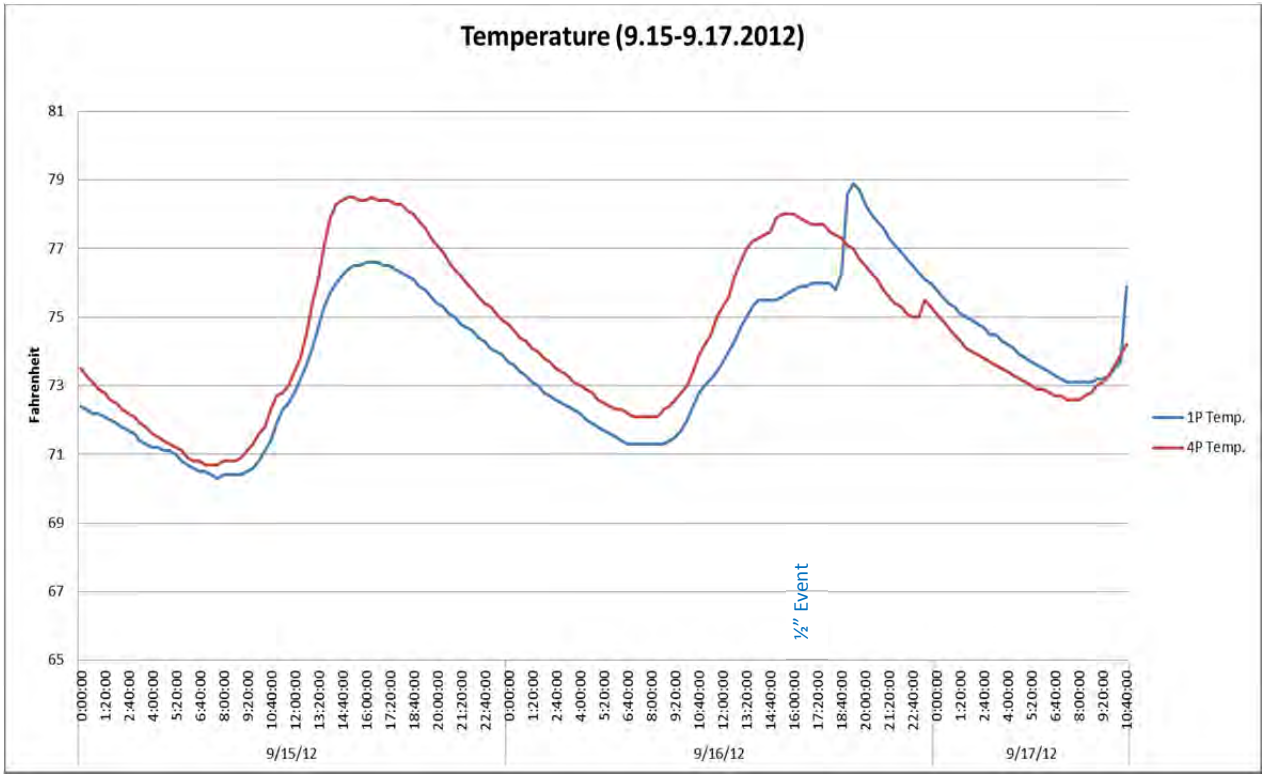

TDS (8.27-9.05.2012)
g/L
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
1/3" Event
1.5" Event
1P TDS
4P TDS
8/27/12
8/28/12
8/29/12
8/30/12
8/31/12
9/1/12
9/2/12
9/3/12
9/4/12
9/5/12

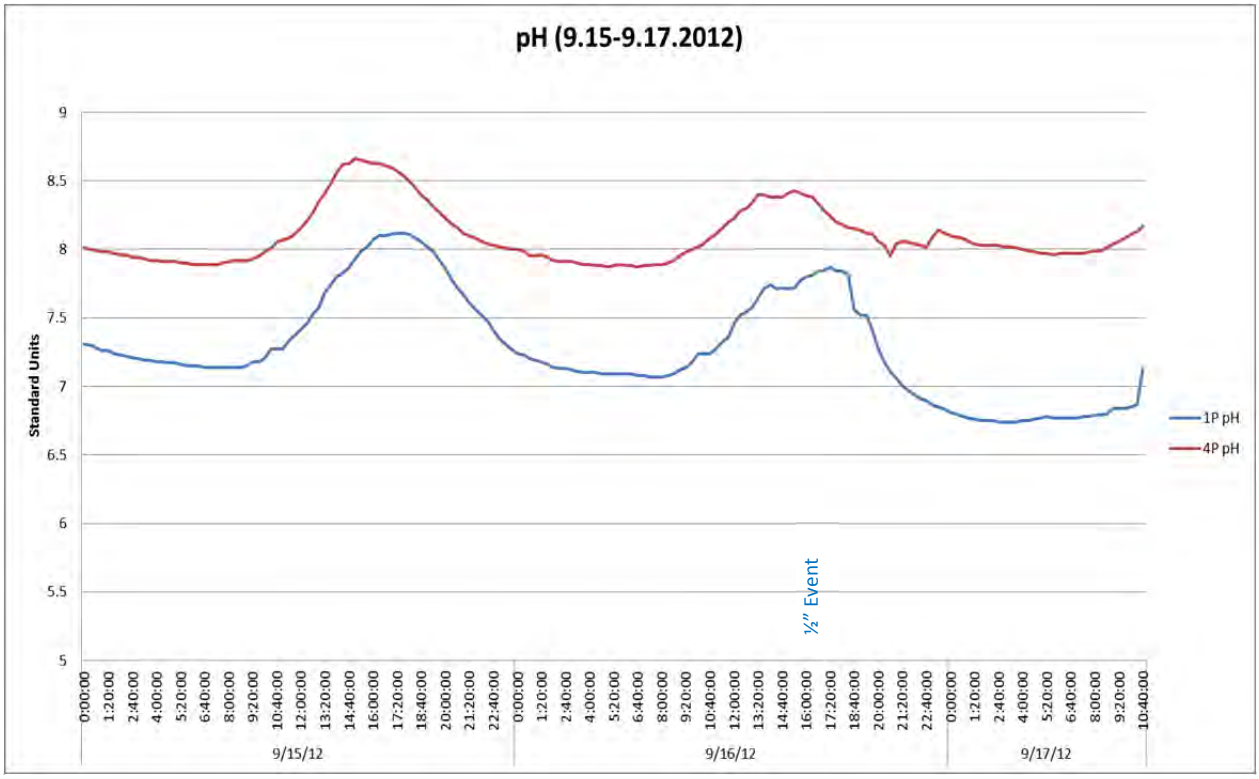
Storm Event Data – 9/15/2012-9/17/2012

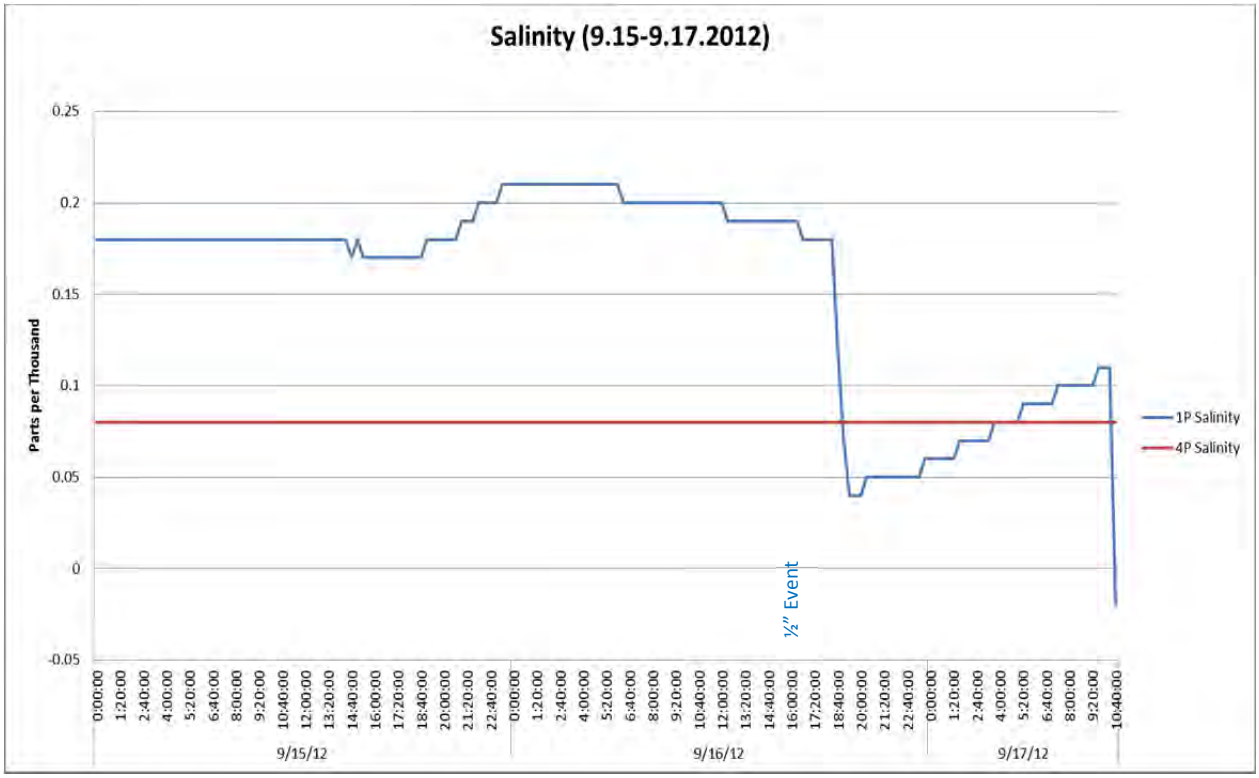


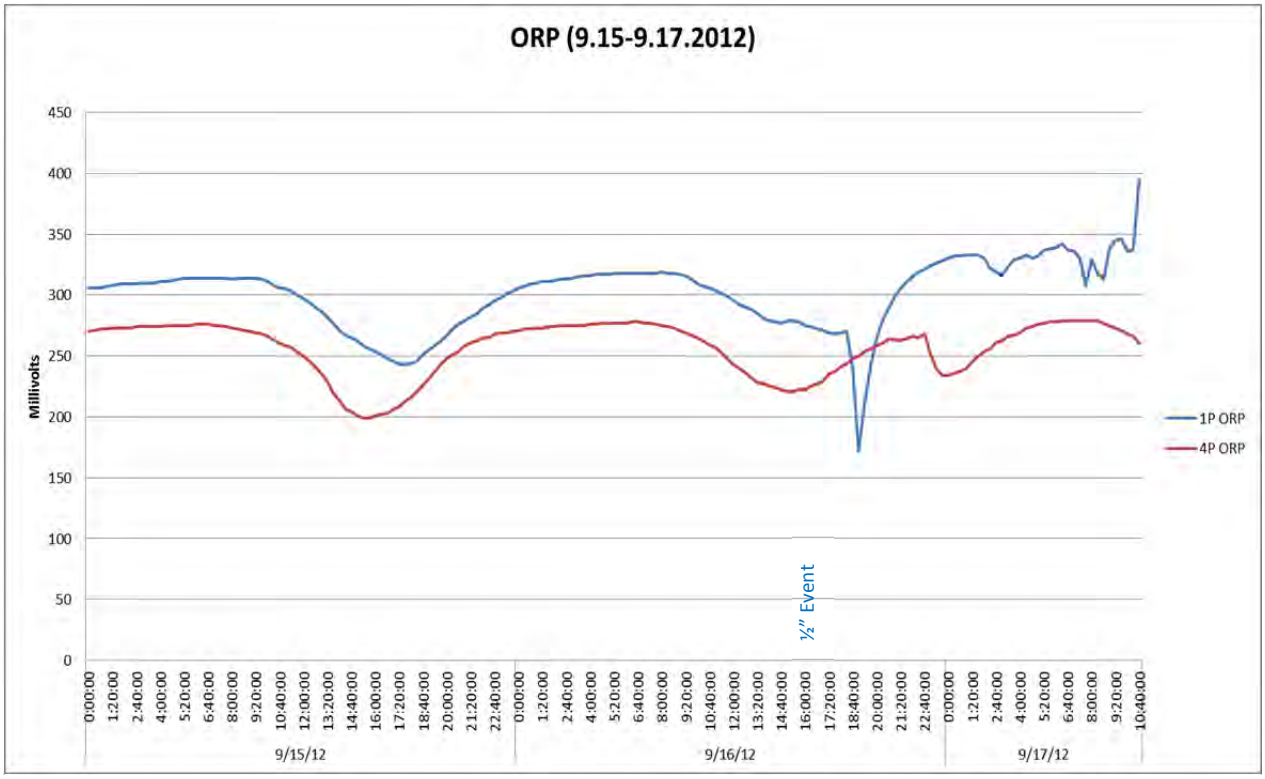


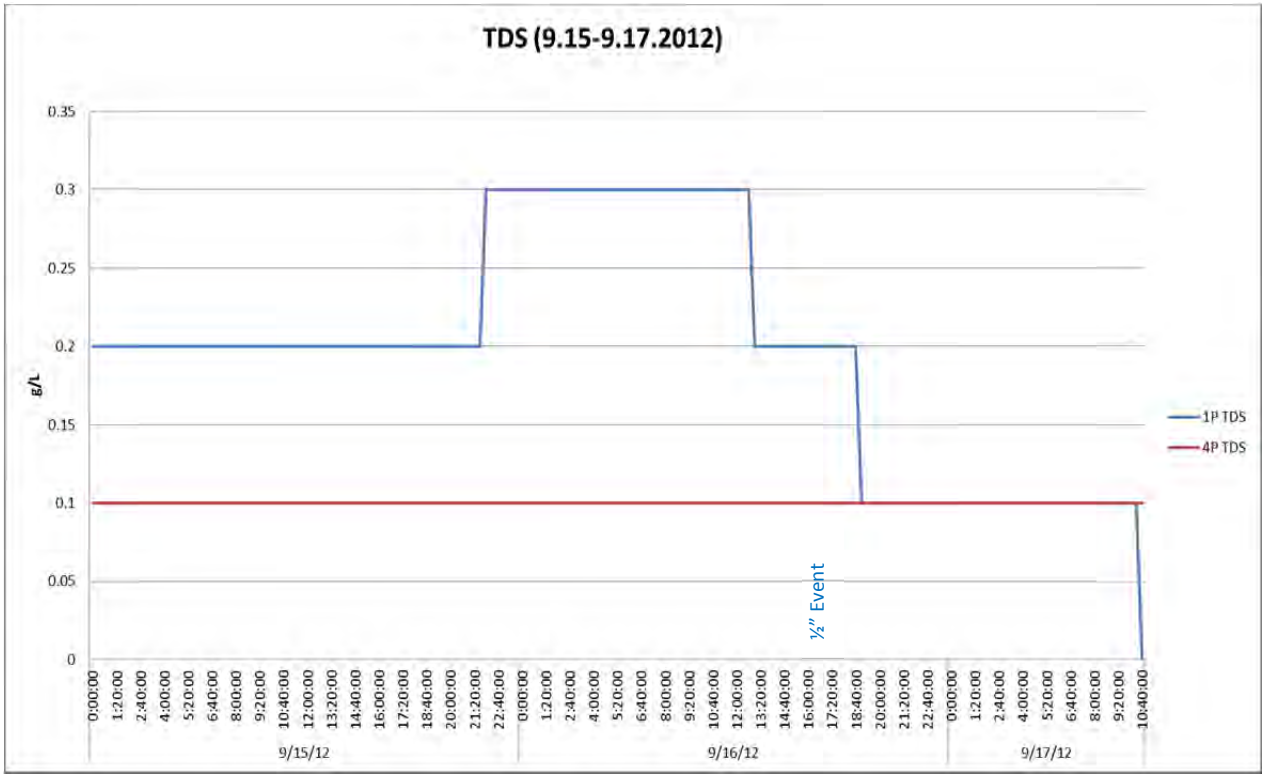

Dissolved Oxygen (9.15-9.17.2012)
mg/L
14
12
10
8
6
4
2
0
½" Event
1P DO
4P DO
9/15/12
9/16/12
9/17/12


Temperature (9.15-9.17.2012)
Fahrenheit
81
79
77
75
73
71
69
67
65
½" Event
1P Temp.
4P Temp.
9/15/12
9/16/12
9/17/12

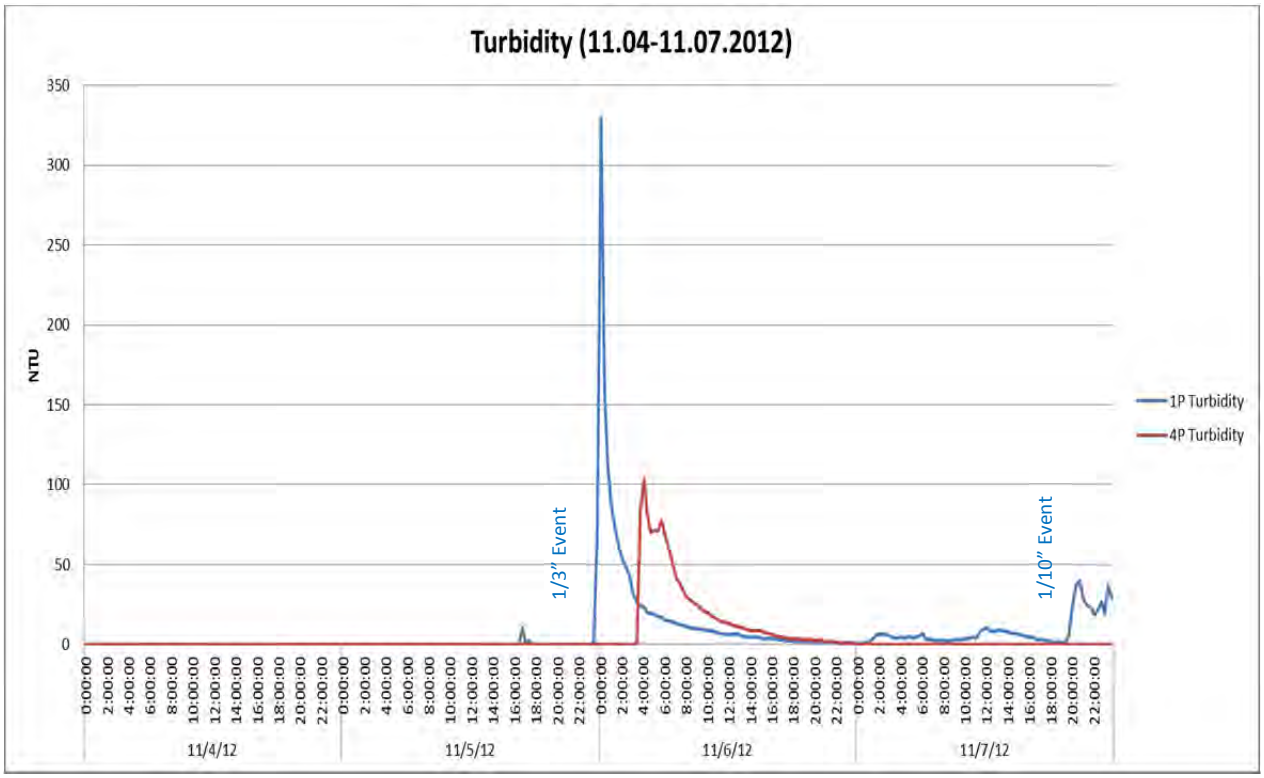

pH (9.15-9.17.2012)
Standard Units
9
8.5
8
7.5
7
6.5
6
5.5
5
½" Event
1P pH
4P pH
9/15/12
9/16/12
9/17/12

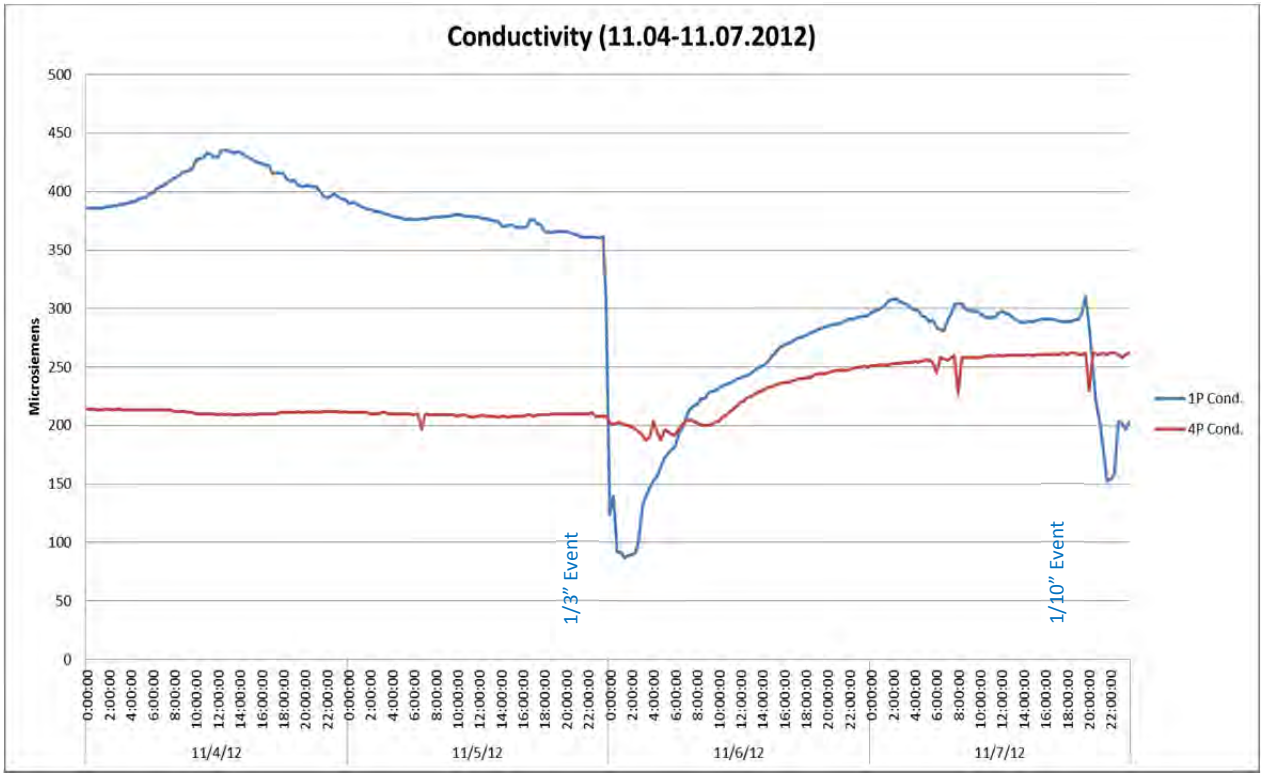

Salinity (9.15-9.17.2012)
Parts per Thousand
0.25
0.2
0.15
0.1
0.05
0
-0.05
½" Event
1P Salinity
4P Salinity
9/15/12
9/16/12
9/17/12

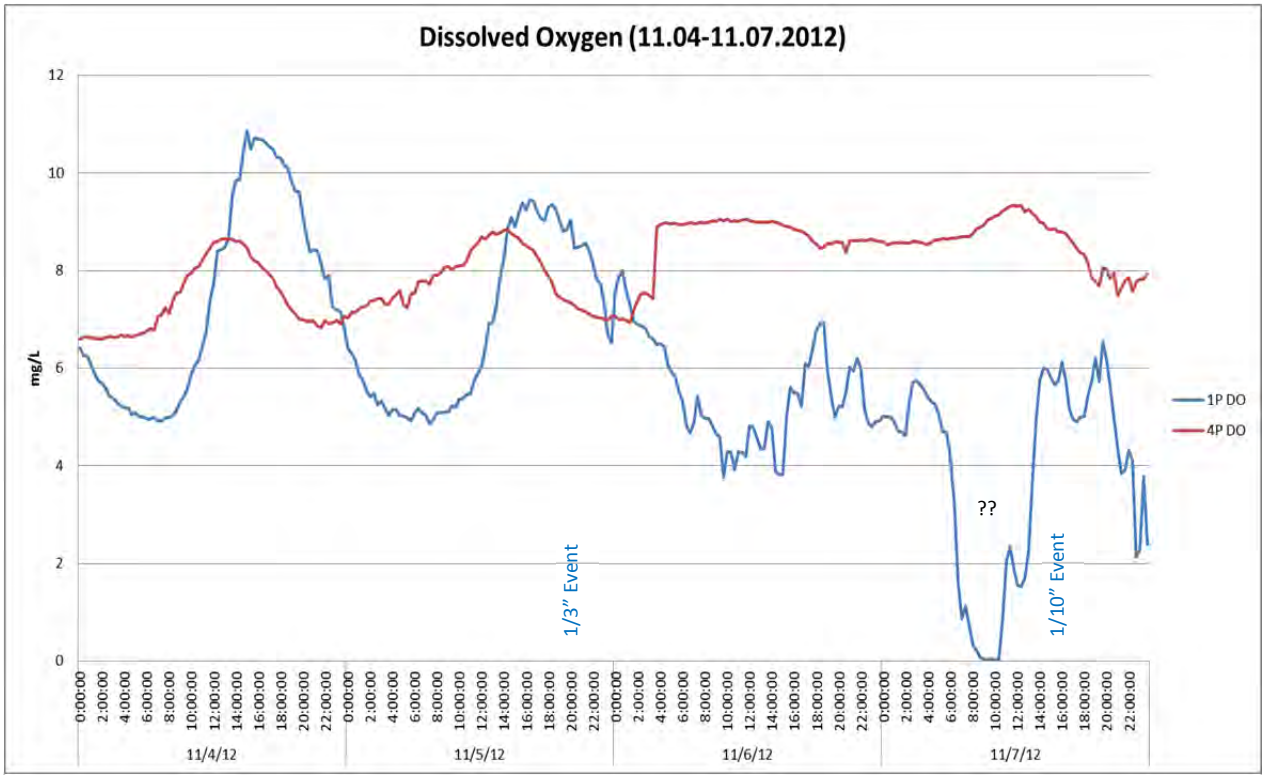

ORP (9.15-9.17.2012)
Millivolts
450
400
350
300
250
200
150
100
50
0
½" Event
1P ORP
4P ORP
9/15/12
9/16/12
9/17/12

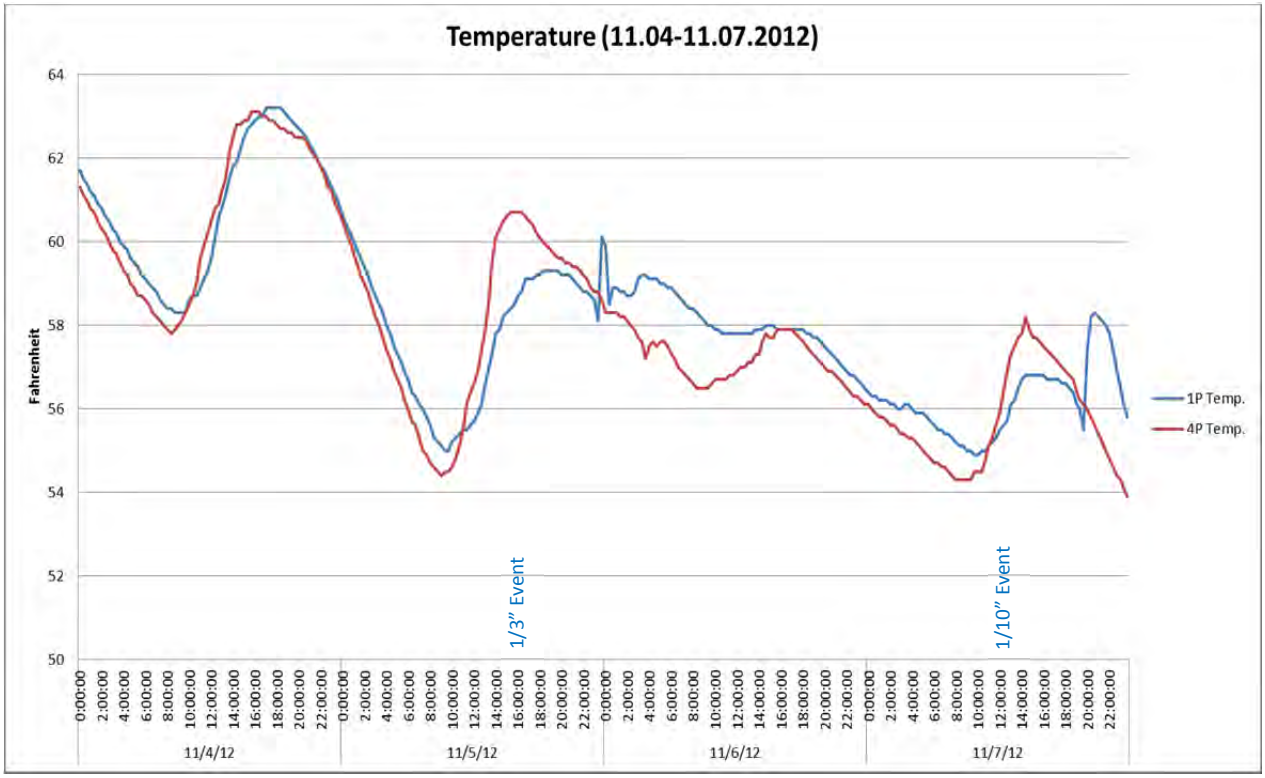

TDS (9.15-9.17.2012)
g/L
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
½" Event
1P TDS
4P TDS
9/15/12
9/16/12
9/17/12

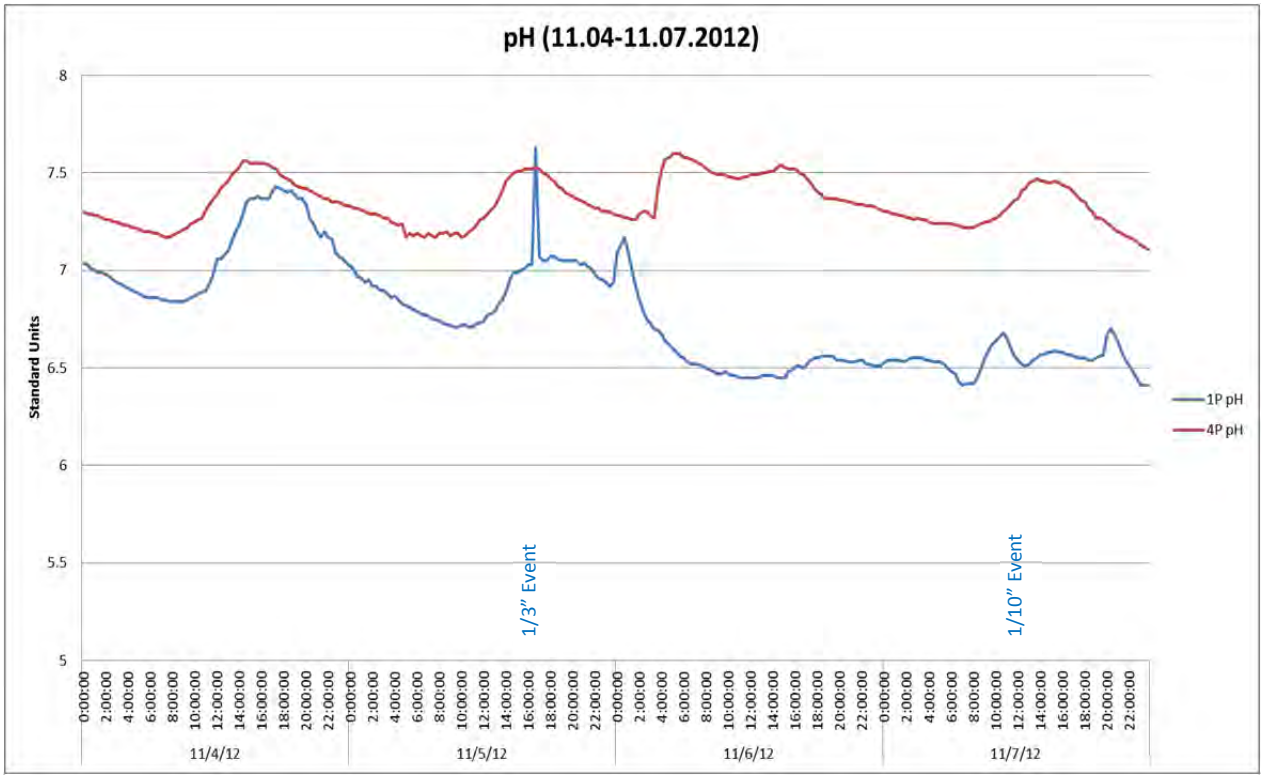
Storm Event Data – 11/04/2012-11/07/2012

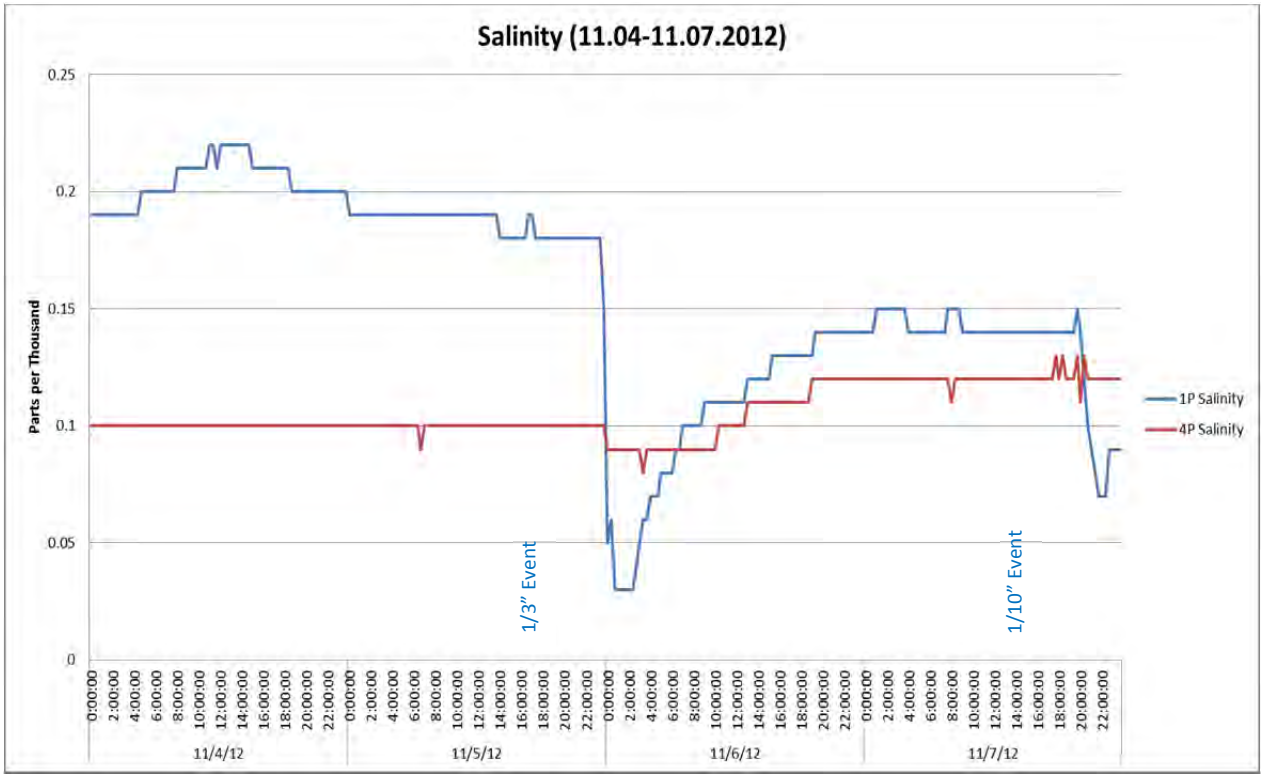


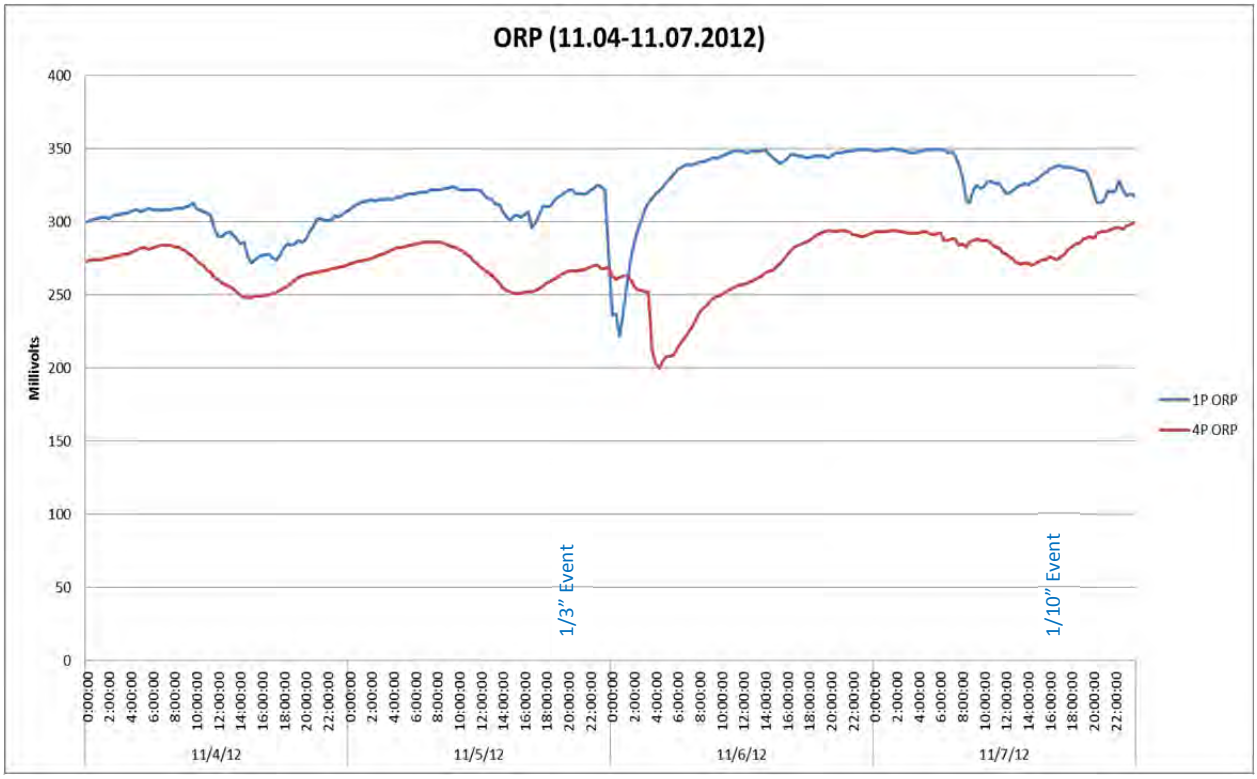


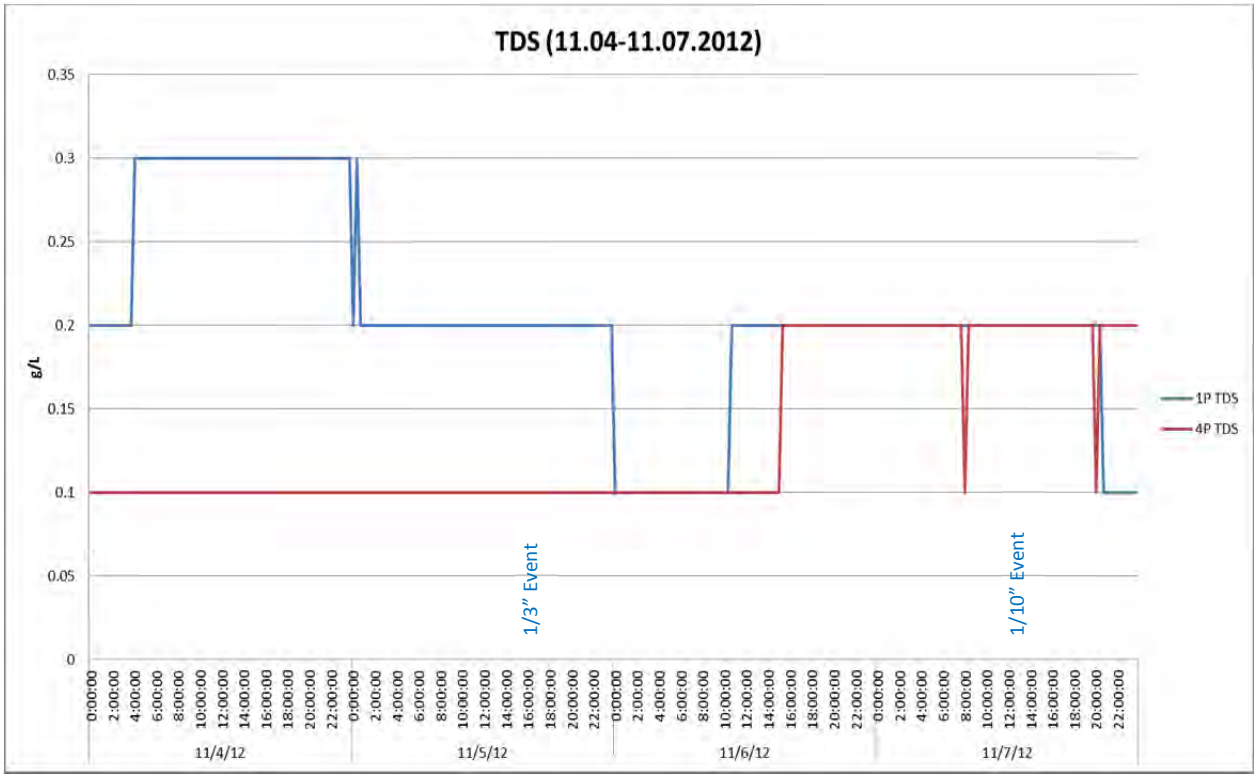

Dissolved Oxygen (11.04-11.07.2012)
mg/L
12
10
8
6
4
2
0
1P DO
4P DO
??
1/3" Event
1/10" Event
11/4/12
11/5/12
11/6/12
11/7/12


Temperature (11.04-11.07.2012)
Fahrenheit
64
62
60
58
56
54
52
50
1P Temp.
4P Temp.
1/3" Event
1/10" Event
11/4/12
11/5/12
11/6/12
11/7/12

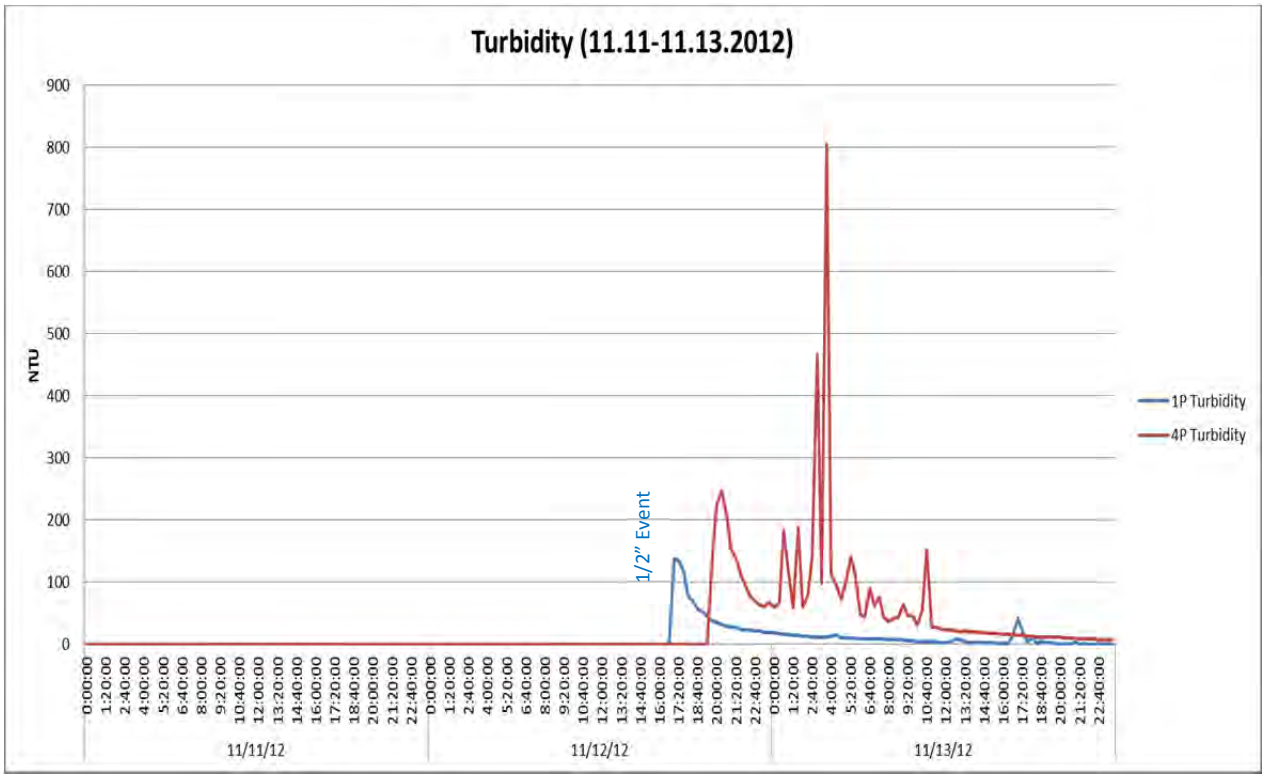

pH (11.04-11.07.2012)
Standard Units
8
7.5
7
6.5
6
5.5
5
1/3" Event
1/10" Event
11/4/12
11/5/12
11/6/12
11/7/12
1P pH
4P pH

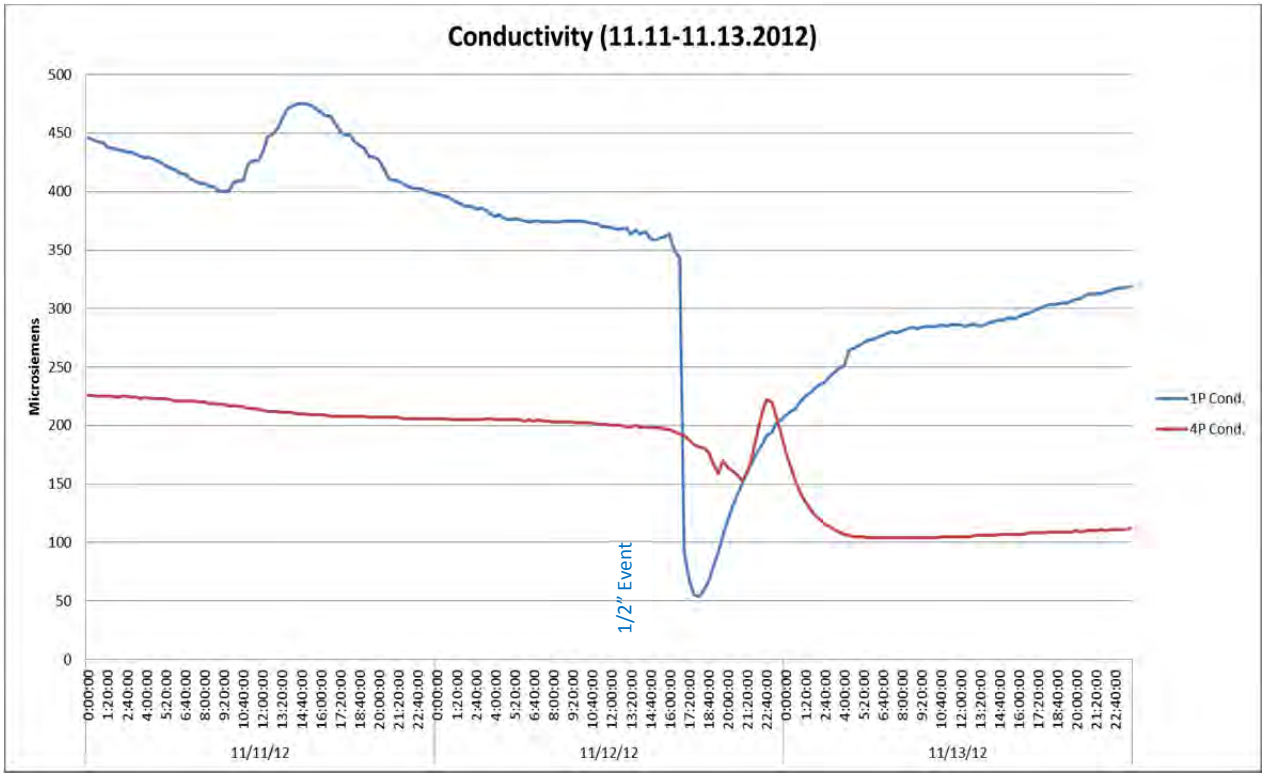

Salinity (11.04-11.07.2012)
Parts per Thousand
0.25
0.2
0.15
0.1
0.05
0
1/3" Event
1/10" Event
11/4/12
11/5/12
11/6/12
11/7/12
1P Salinity
4P Salinity

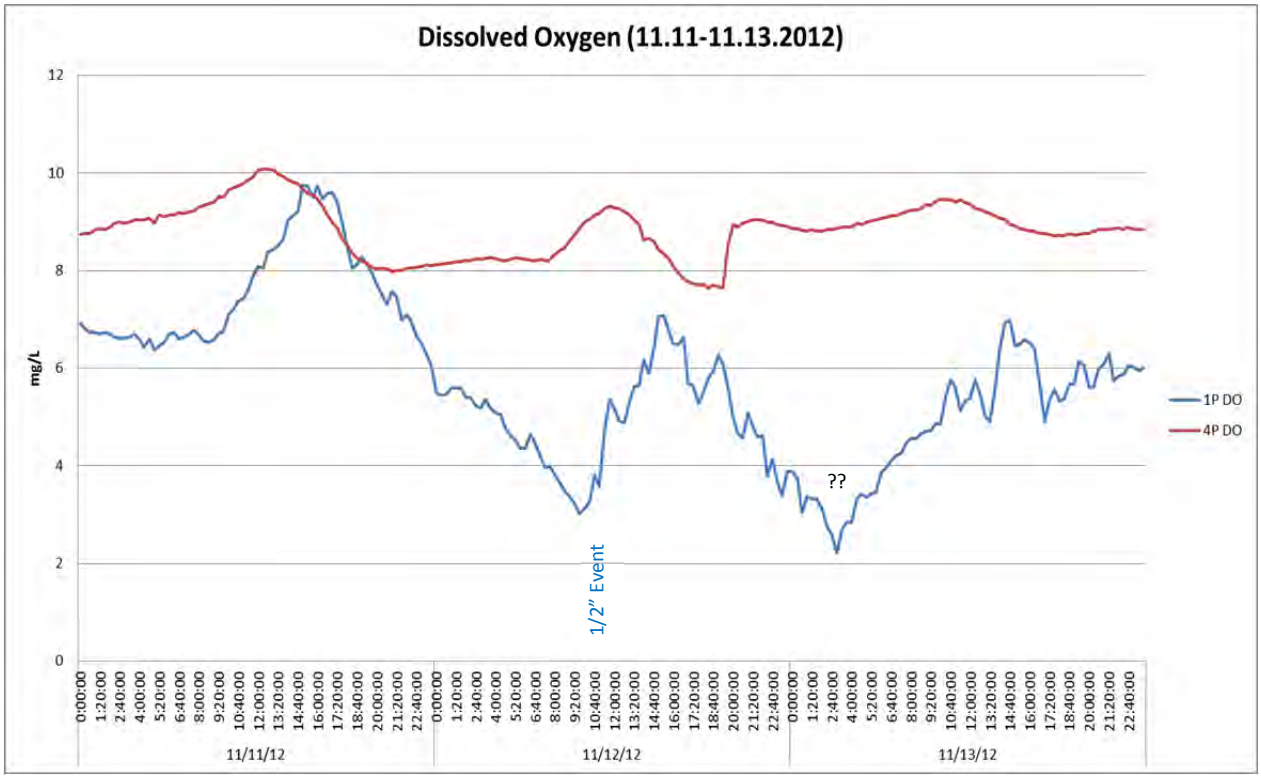

ORP (11.04-11.07.2012)
Millivolts
400
350
300
250
200
150
100
50
0
1/3" Event
1/10" Event
11/4/12
11/5/12
11/6/12
11/7/12
1P ORP
4P ORP

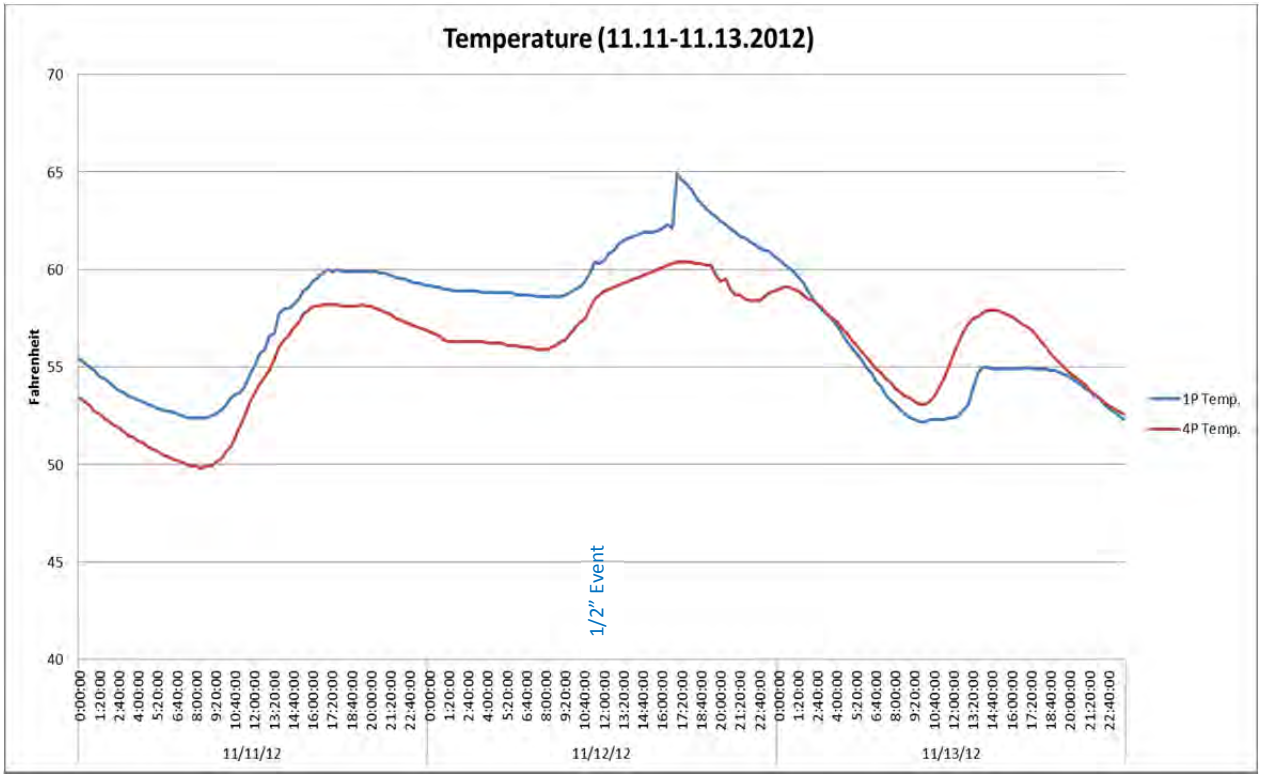

TDS (11.04-11.07.2012)
g/L
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
1/3" Event
1/10" Event
11/4/12
11/5/12
11/6/12
11/7/12
1P TDS
4P TDS

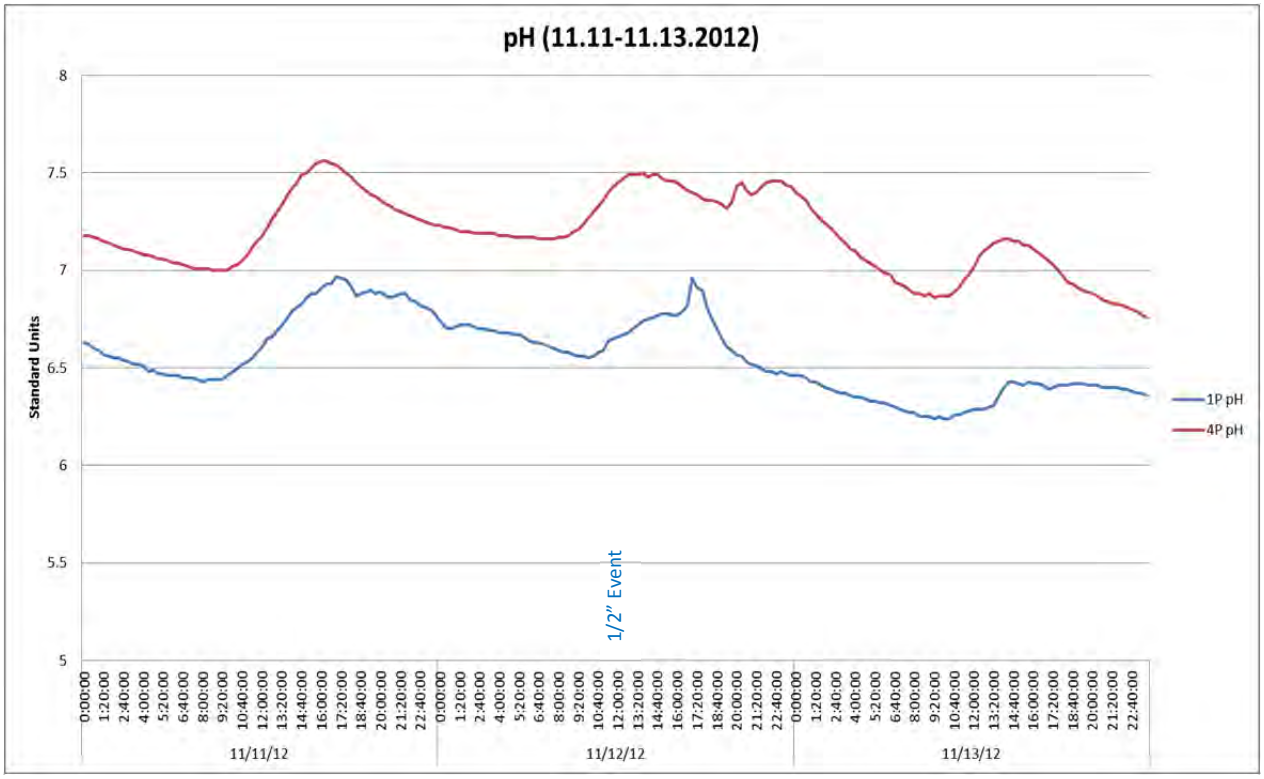
Storm Event Data – 11/11/2012-11/13/2012

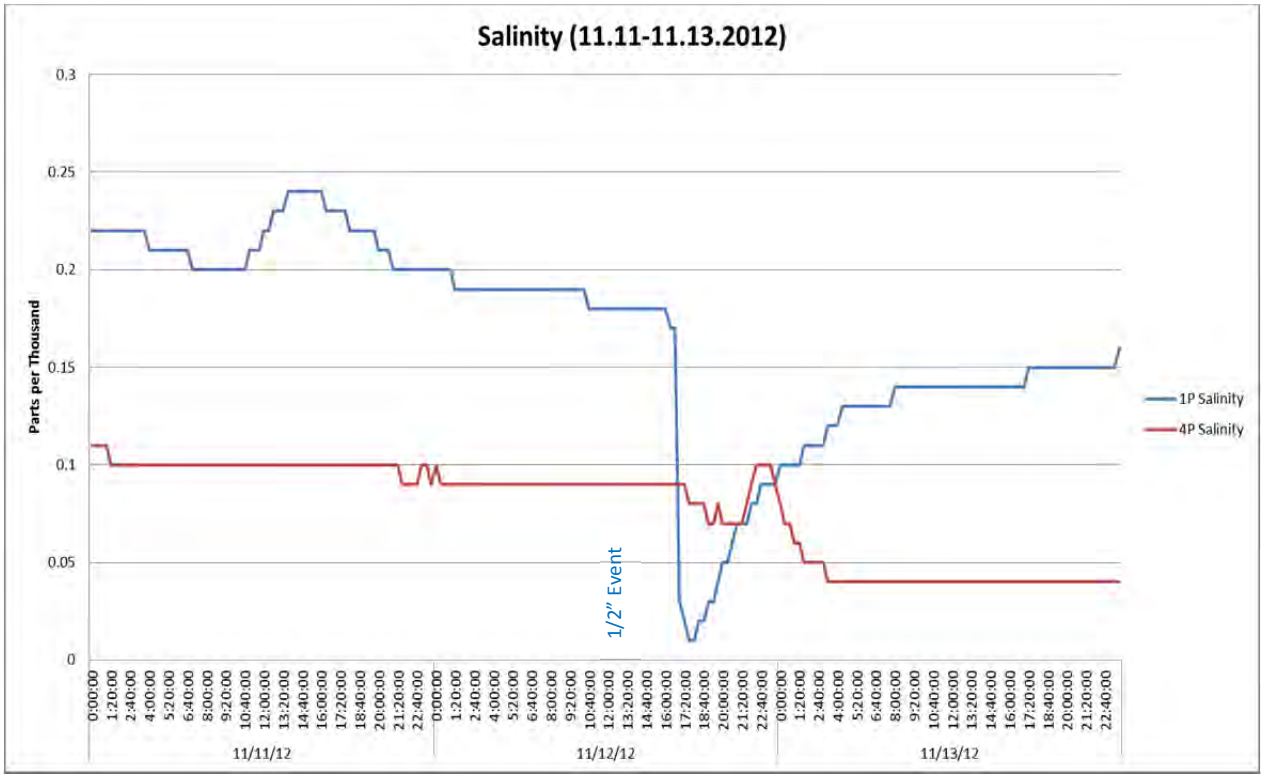


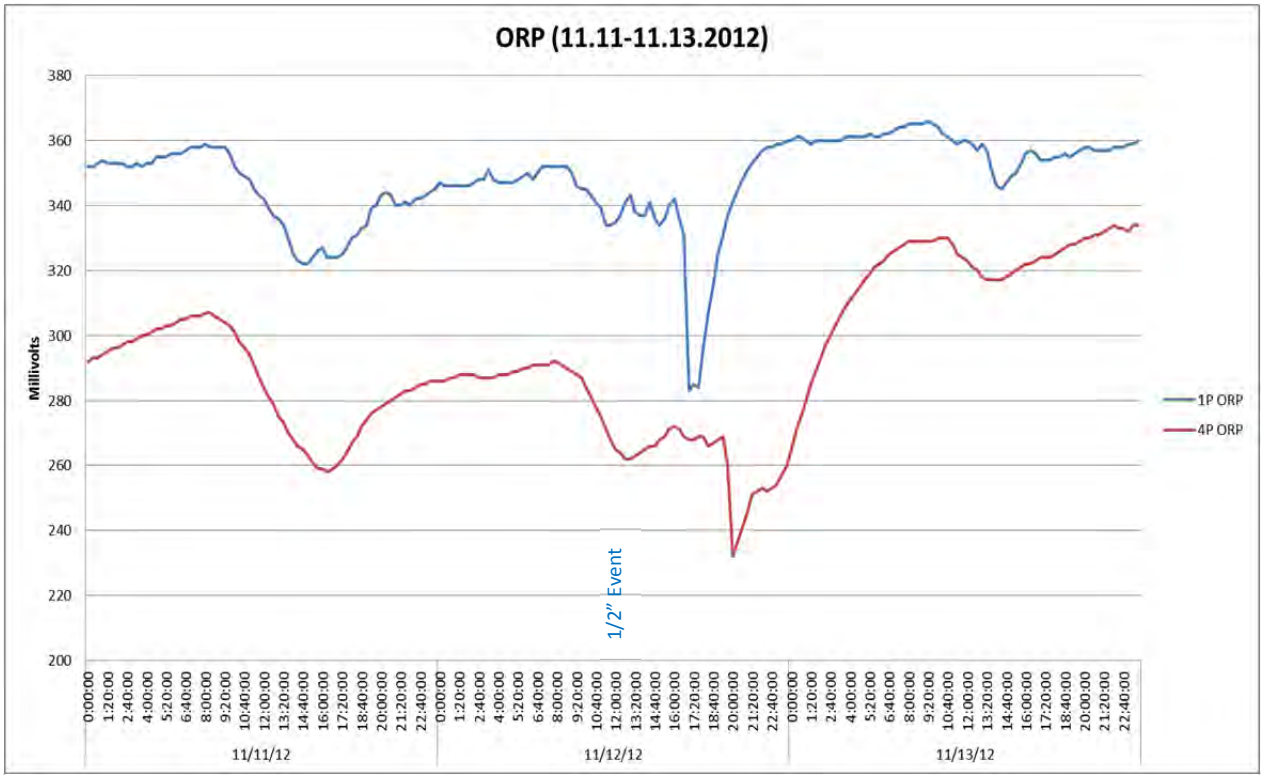


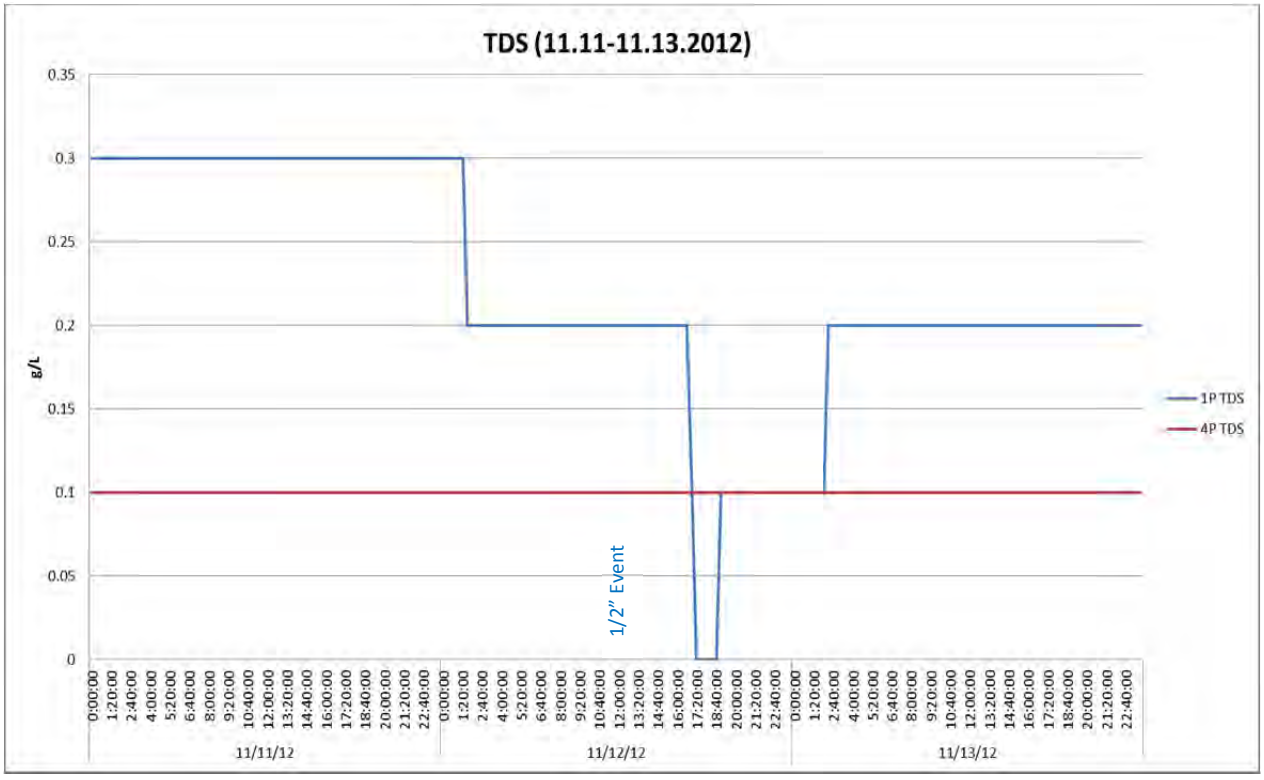

Dissolved Oxygen (11.11-11.13.2012)
mg/L
12
10
8
6
4
2
0
??
1/2" Event
1P DO
4P DO
11/11/12
11/12/12
11/13/12


Temperature (11.11-11.13.2012)
Fahrenheit
70
65
60
55
50
45
40
1/2" Event
1P Temp.
4P Temp.
11/11/12
11/12/12
11/13/12

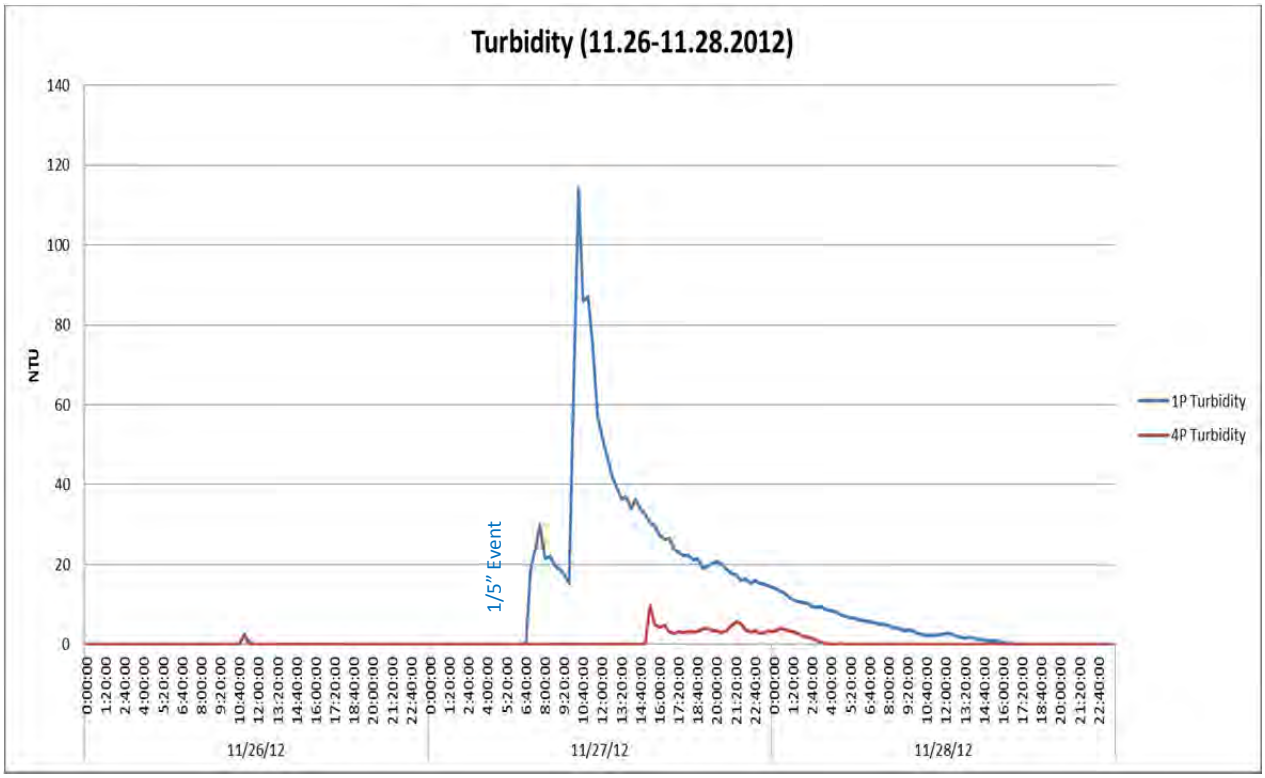

pH (11.11-11.13.2012)
Standard Units
8
7.5
7
6.5
6
5.5
5
1/2" Event
11/11/12
11/12/12
11/13/12
1P pH
4P pH

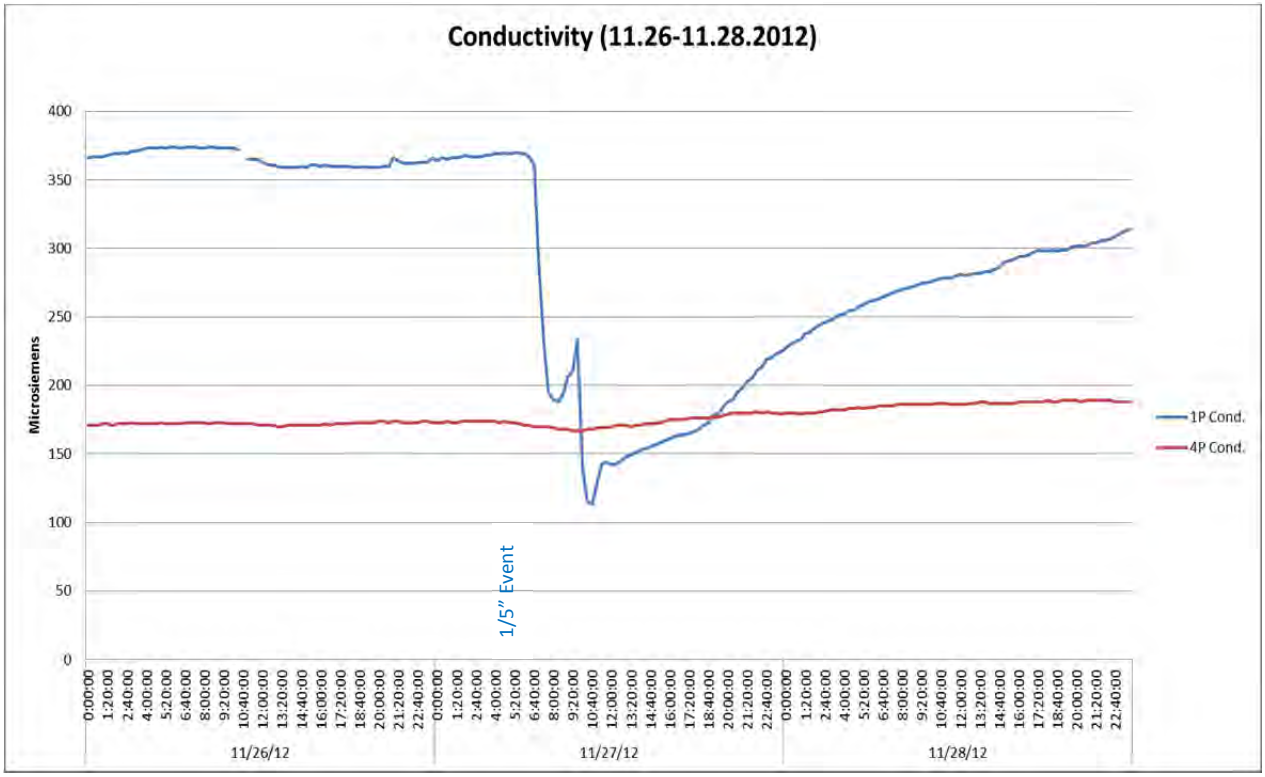

Salinity (11.11-11.13.2012)
Parts per Thousand
0.3
0.25
0.2
0.15
0.1
0.05
0
1/2" Event
11/11/12
11/12/12
11/13/12
1P Salinity
4P Salinity

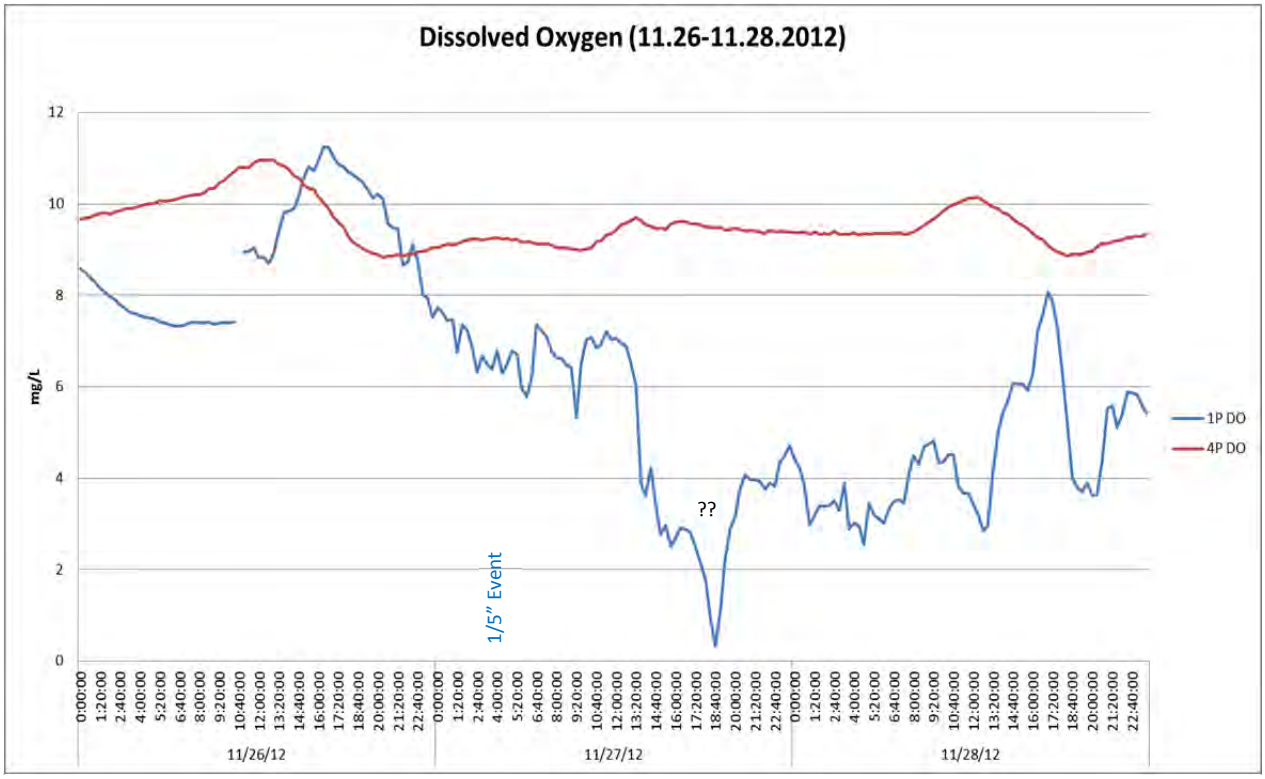

ORP (11.11-11.13.2012)
Millivolts
380
360
340
320
300
280
260
240
220
200
1/2" Event
11/11/12
11/12/12
11/13/12
1P ORP
4P ORP

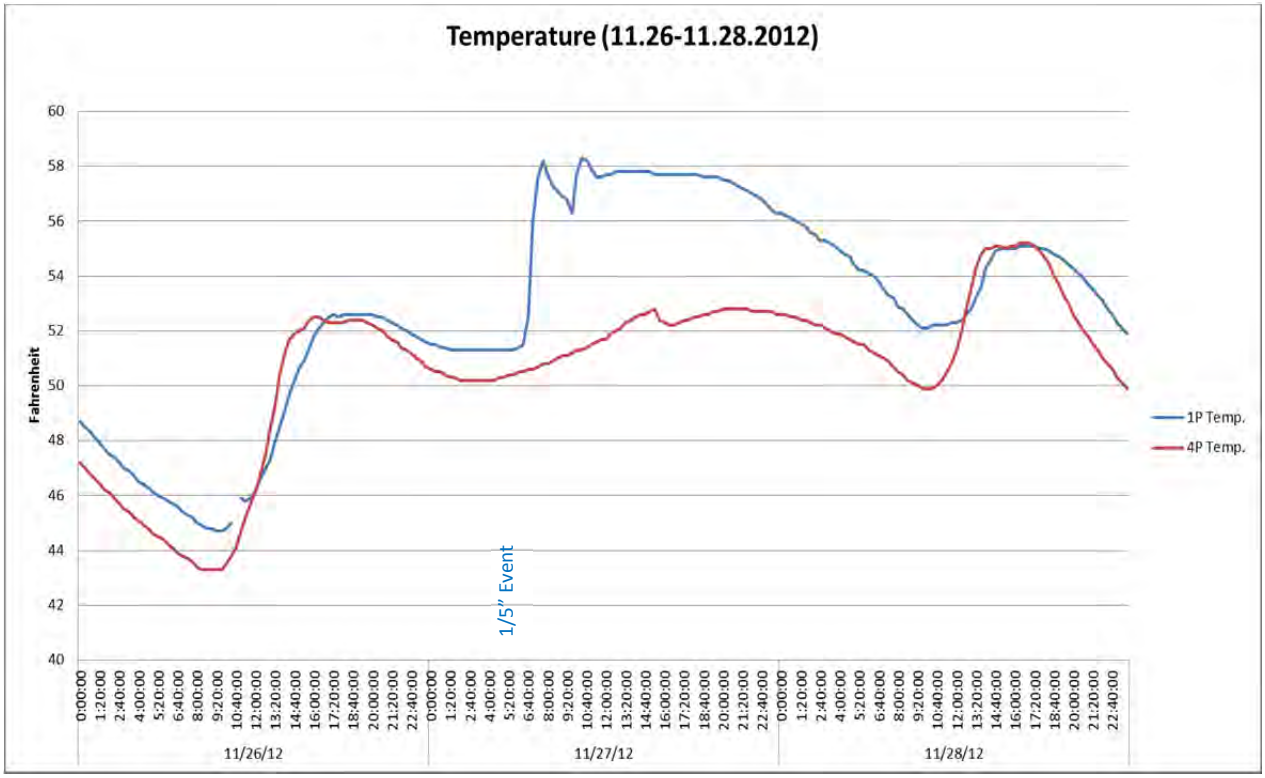

TDS (11.11-11.13.2012)
g/L
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
1/2" Event
11/11/12
11/12/12
11/13/12
1P TDS
4P TDS

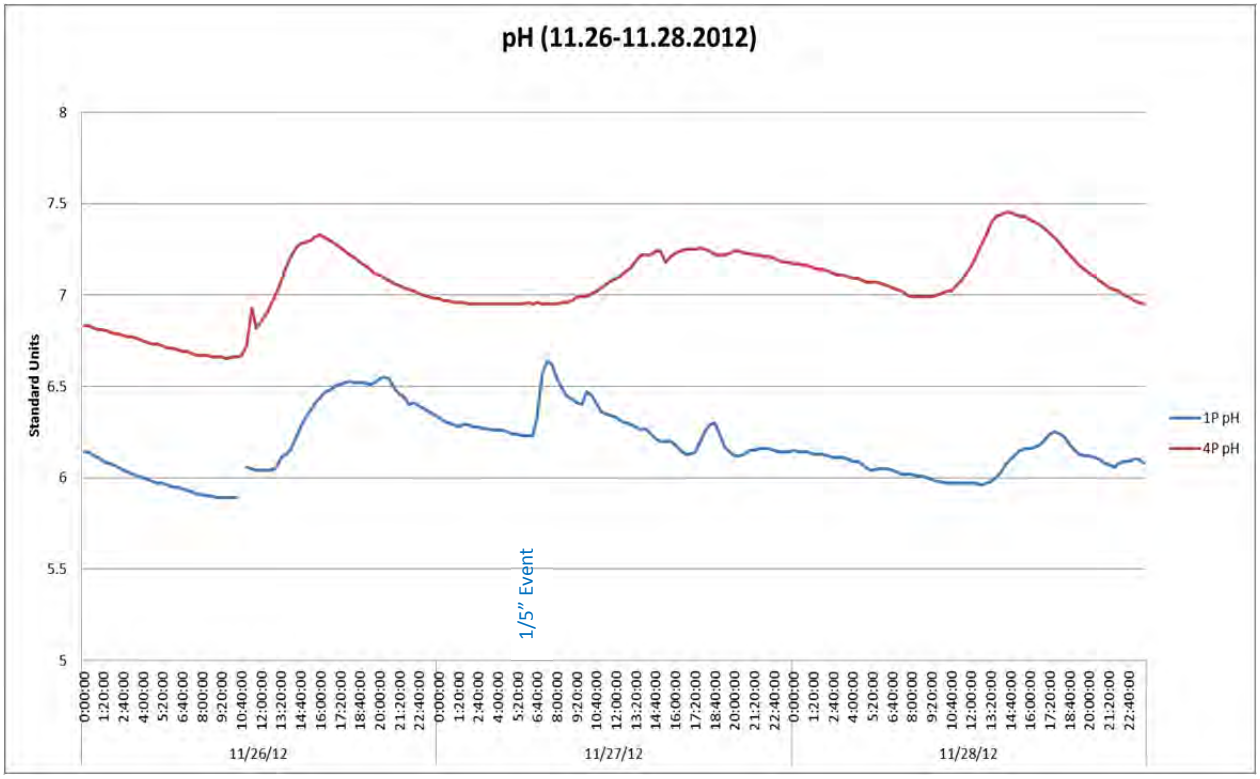
Storm Event Data – 11/26/2012-11/28/2012

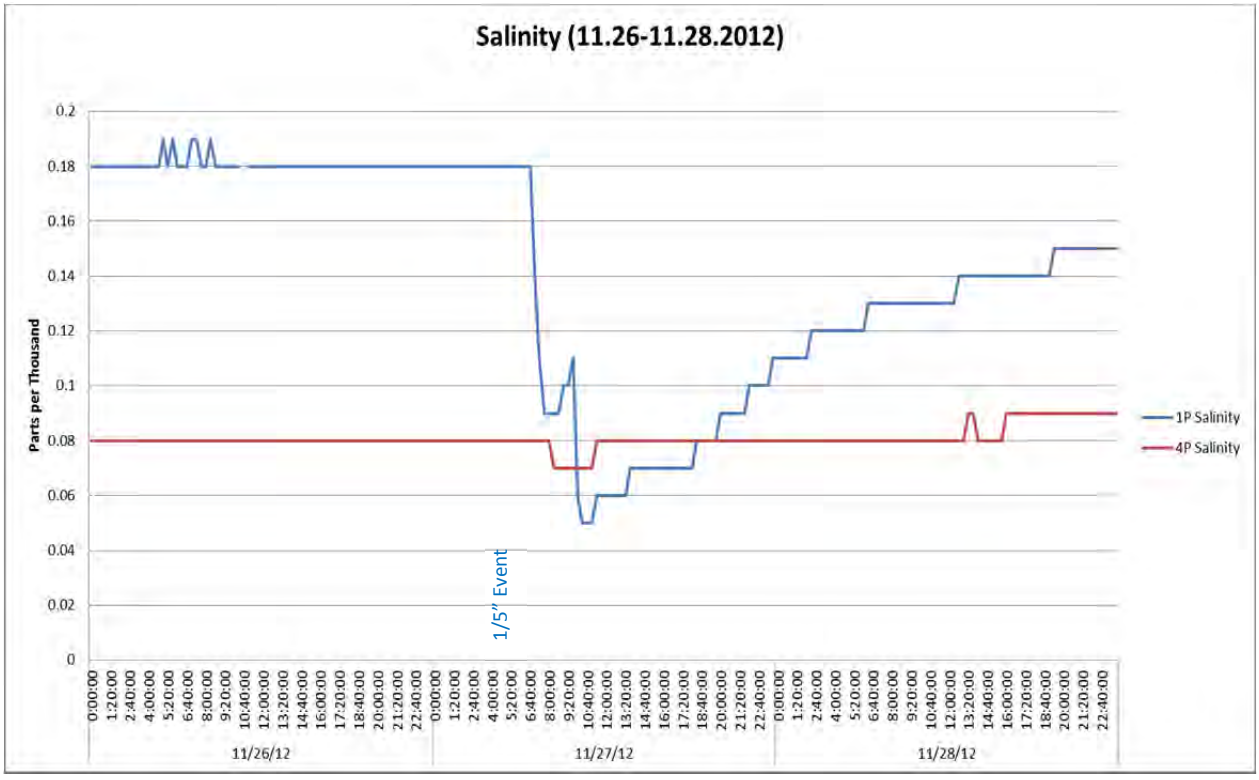


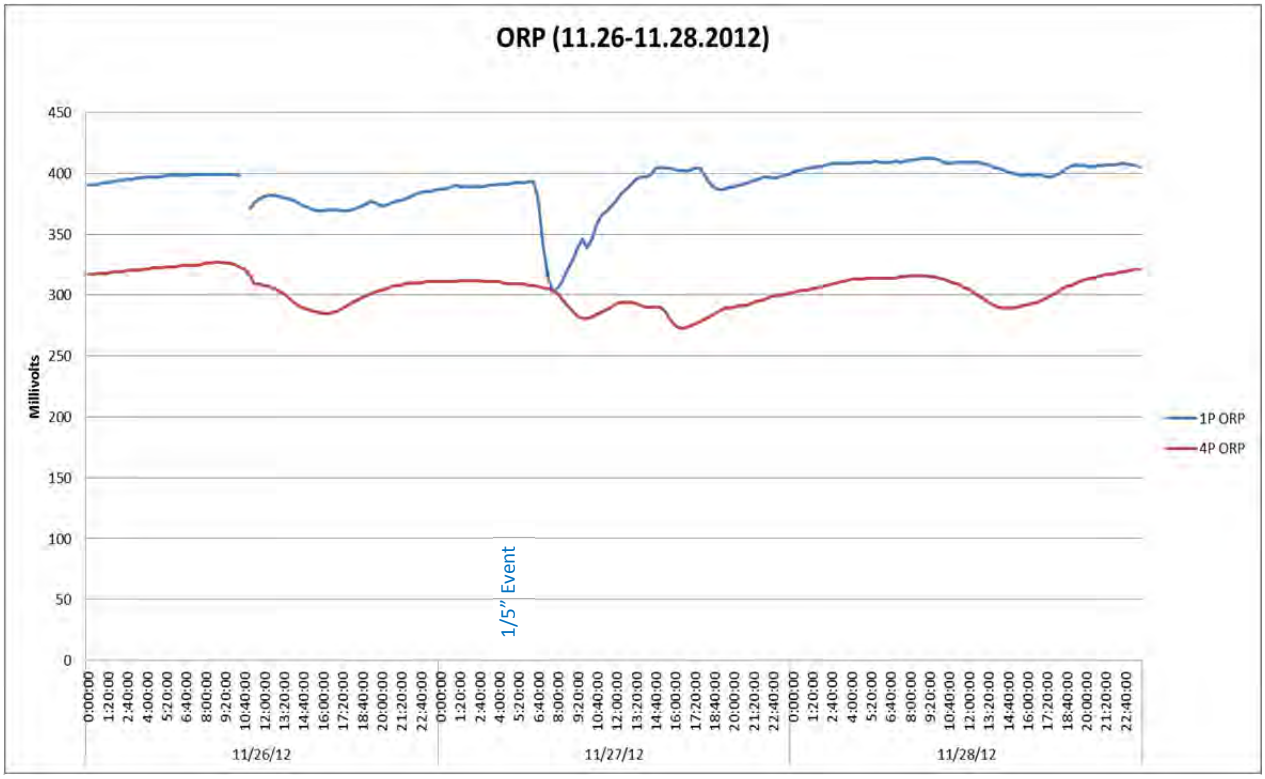


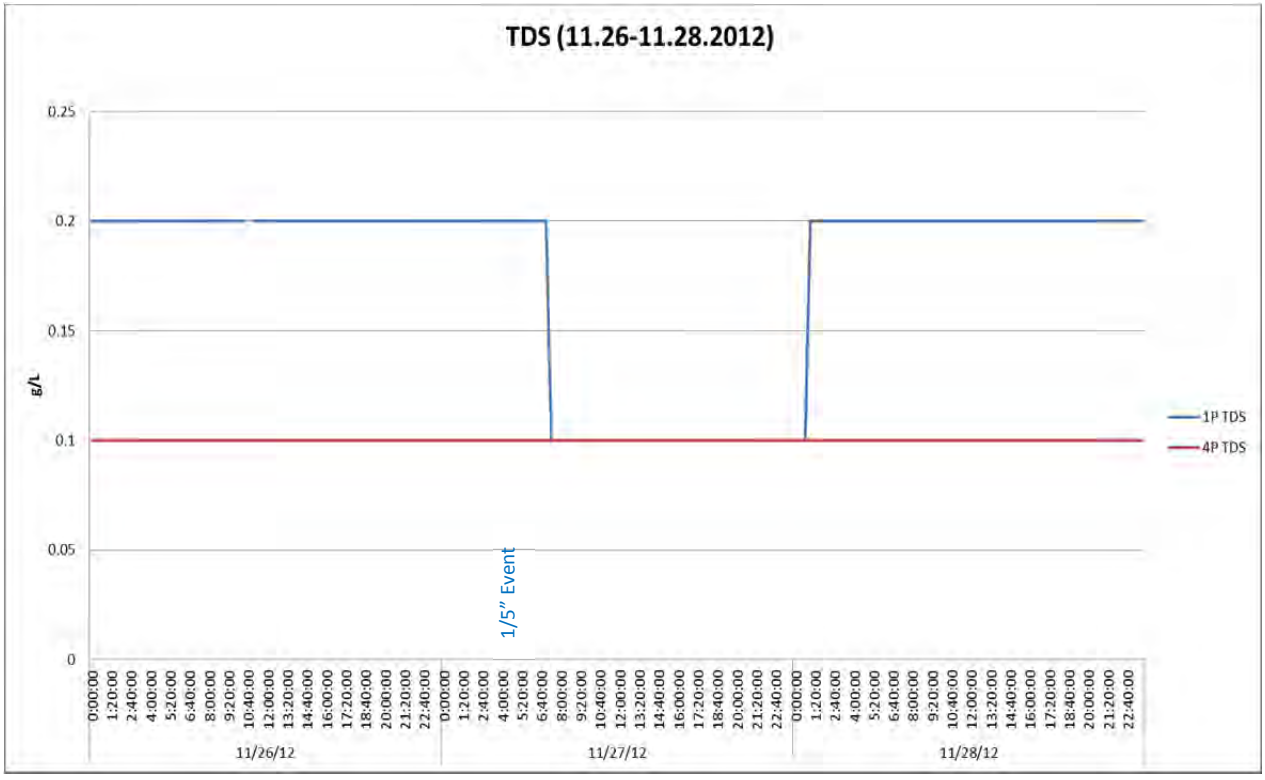

Dissolved Oxygen (11.26-11.28.2012)
mg/L
12
10
8
6
4
2
0
??
1/5" Event
1P DO
4P DO
11/26/12
11/27/12
11/28/12


Temperature (11.26-11.28.2012)
Fahrenheit
60
58
56
54
52
50
48
46
44
42
40
1/5" Event
1P Temp.
4P Temp.
11/26/12
11/27/12
11/28/12

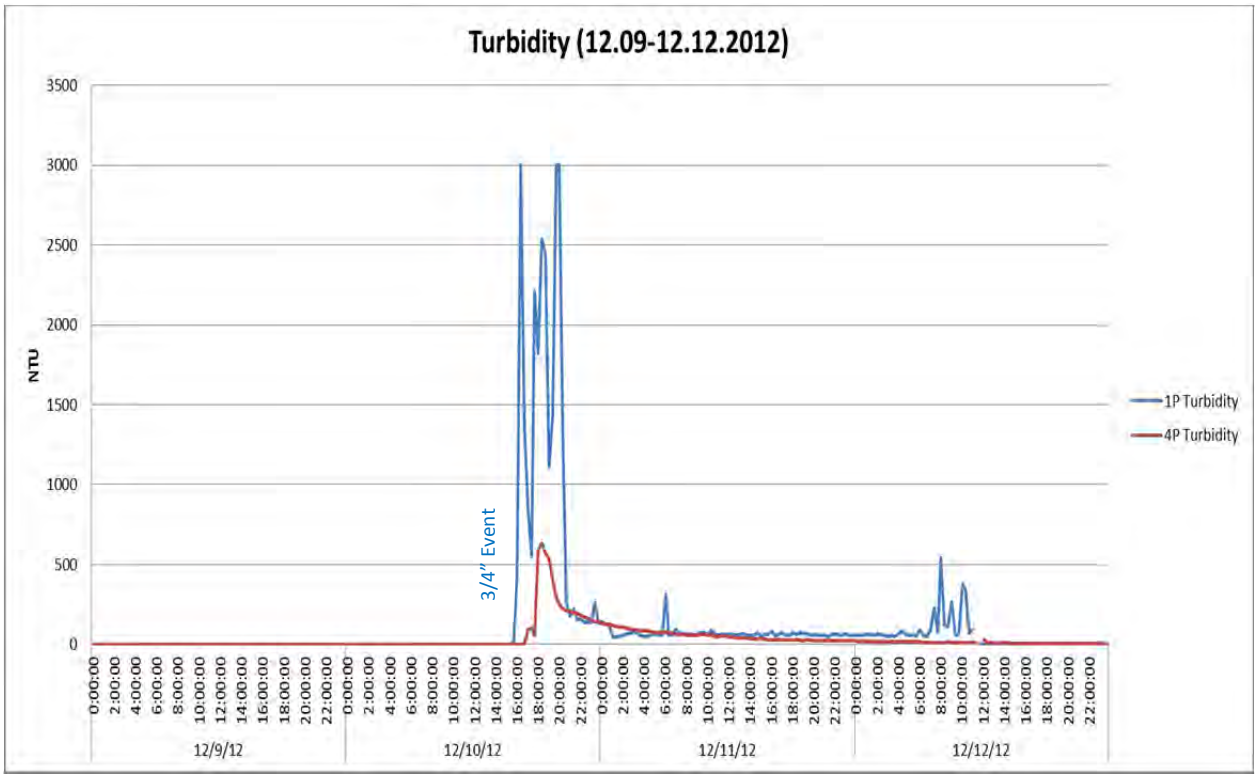

pH (11.26-11.28.2012)
Standard Units
8
7.5
7
6.5
6
5.5
5
1P pH
4P pH
1/5" Event
11/26/12
11/27/12
11/28/12

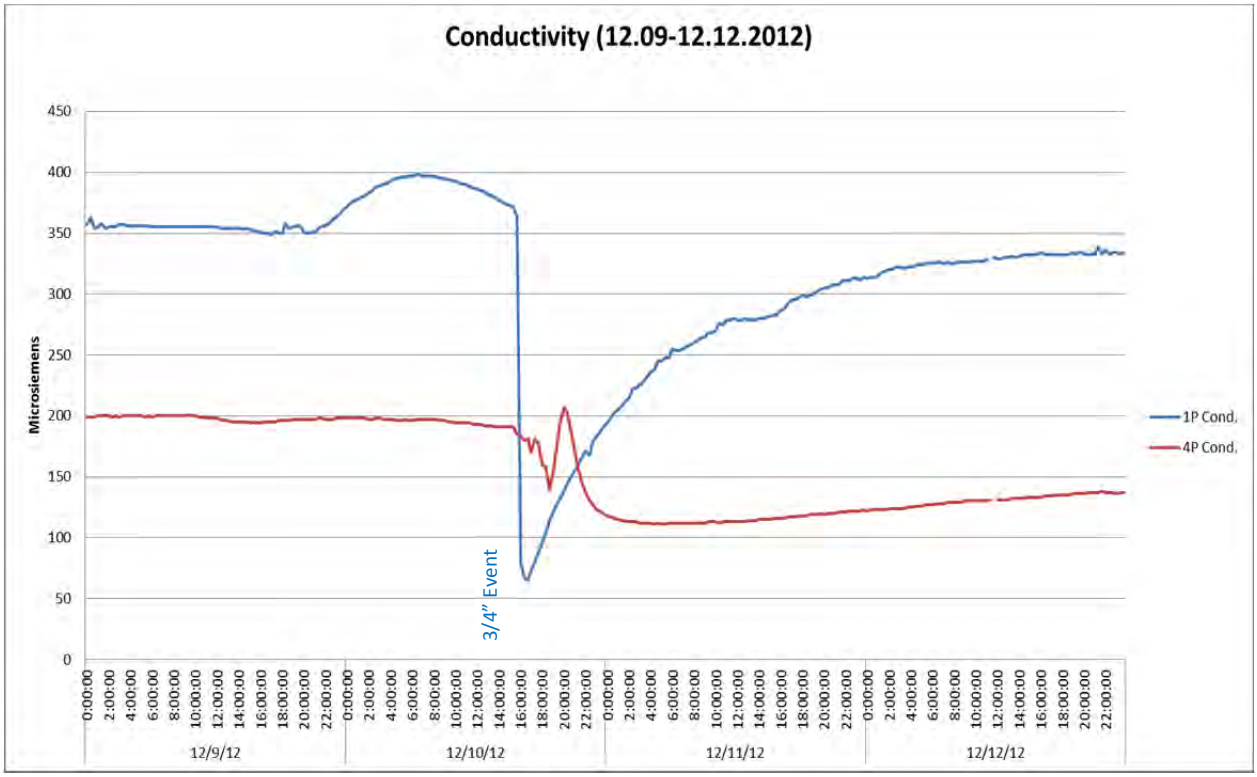

Salinity (11.26-11.28.2012)
Parts per Thousand
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
1P Salinity
4P Salinity
1/5" Event
11/26/12
11/27/12
11/28/12

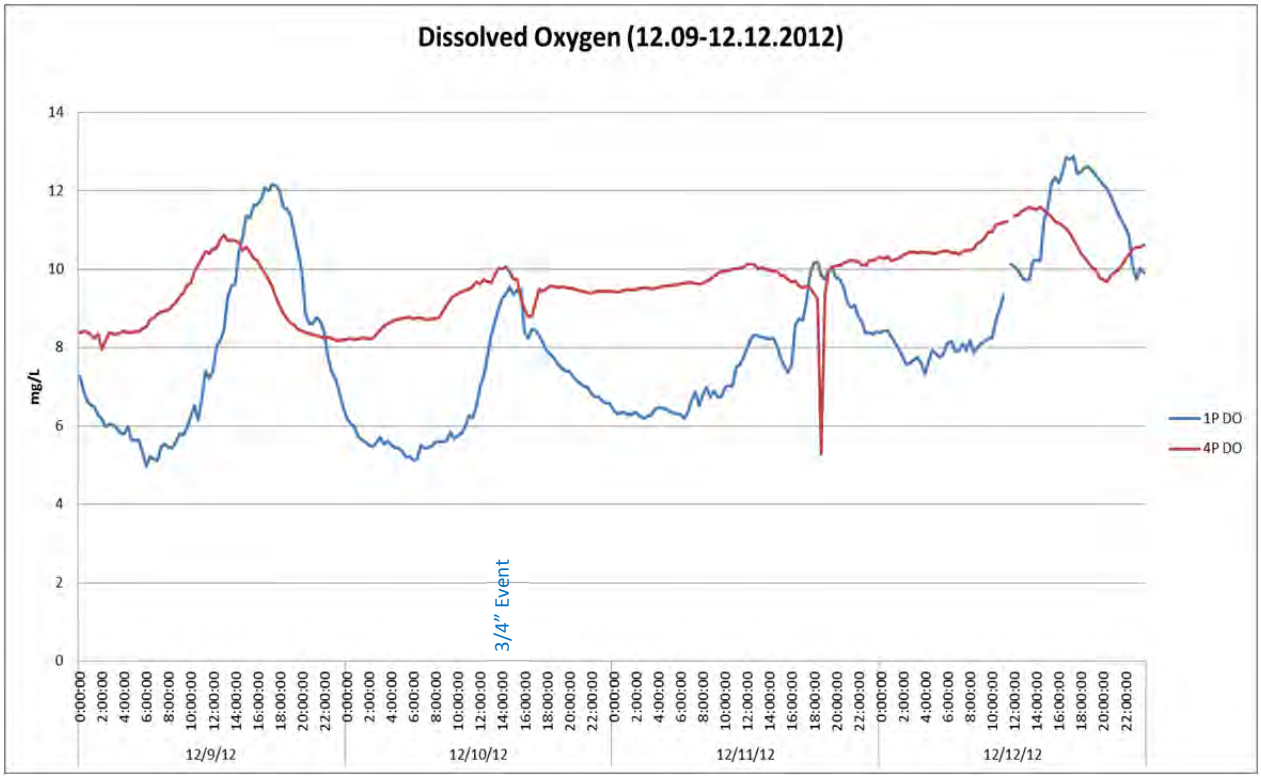

ORP (11.26-11.28.2012)
Millivolts
450
400
350
300
250
200
150
100
50
0
1/5" Event
11/26/12
11/27/12
11/28/12
1P ORP
4P ORP

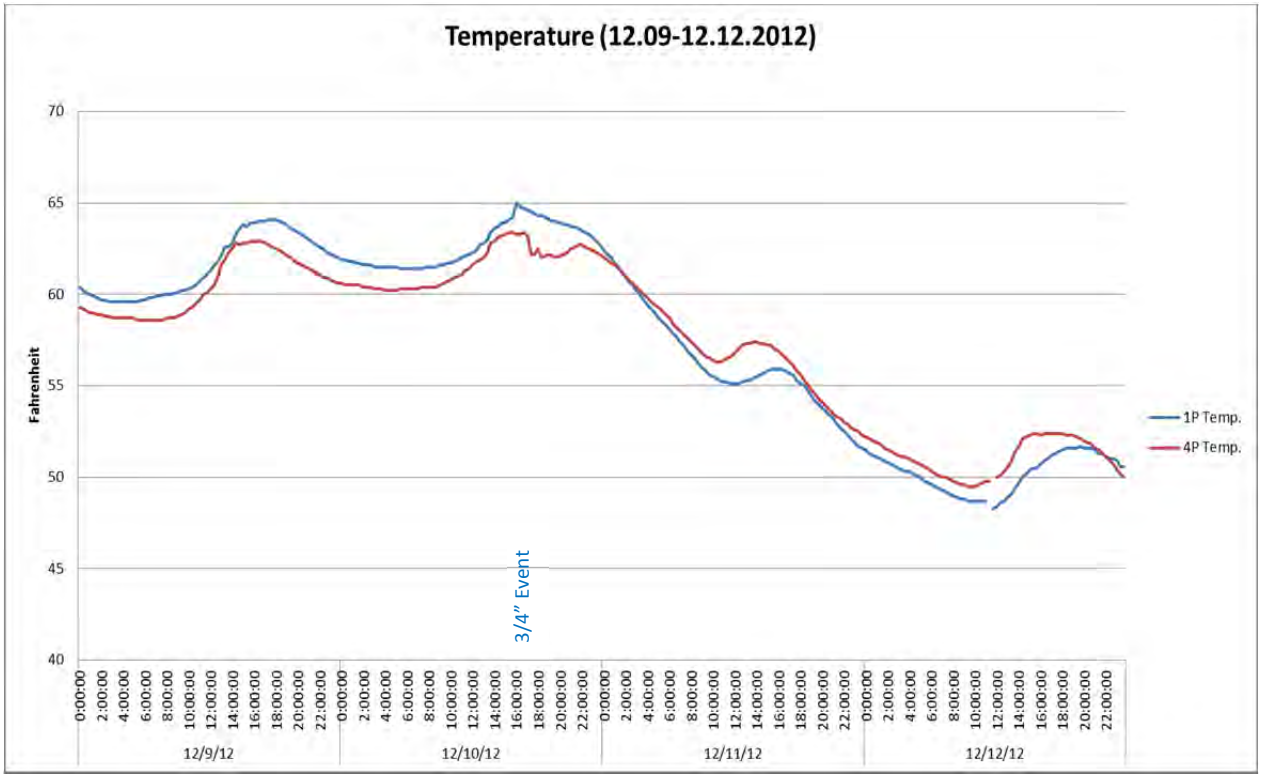

TDS (11.26-11.28.2012)
g/L
0.25
0.2
0.15
0.1
0.05
0
1/5" Event
11/26/12
11/27/12
11/28/12
1P TDS
4P TDS

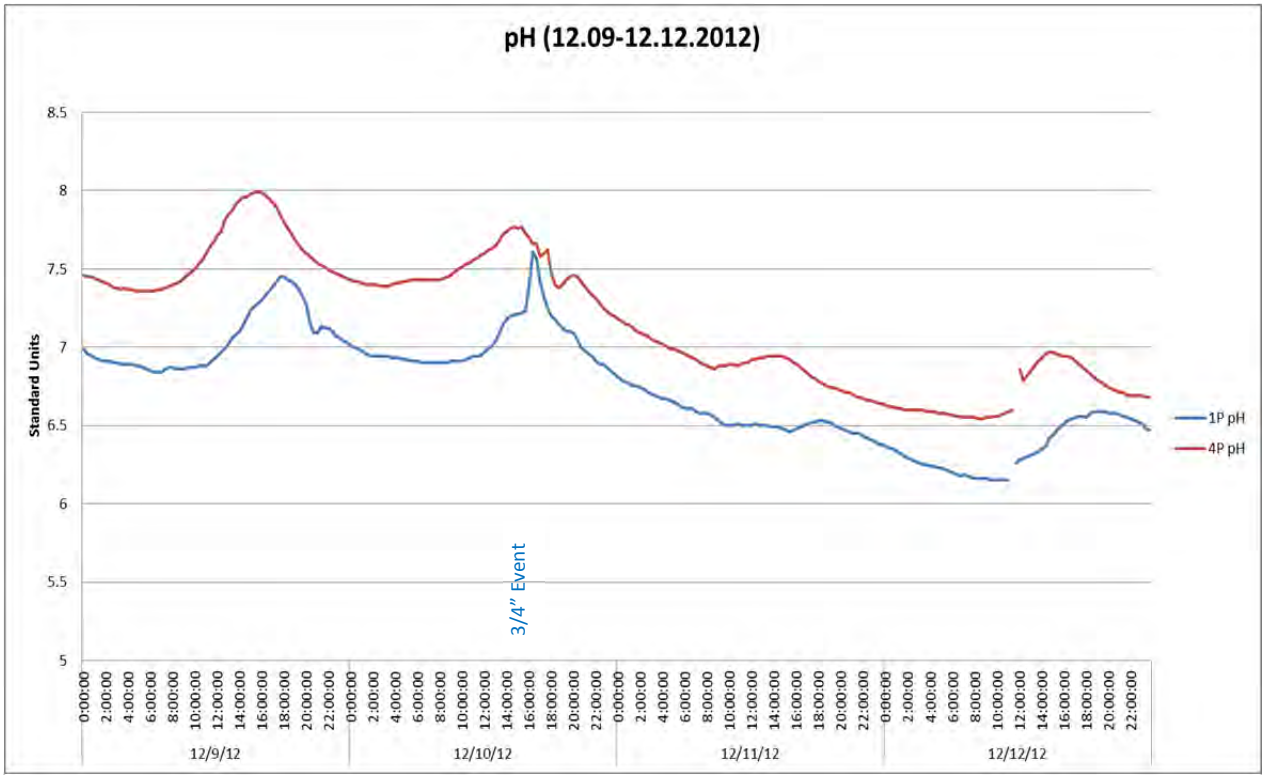
Storm Event Data – 12/09/2012-12/12/2012

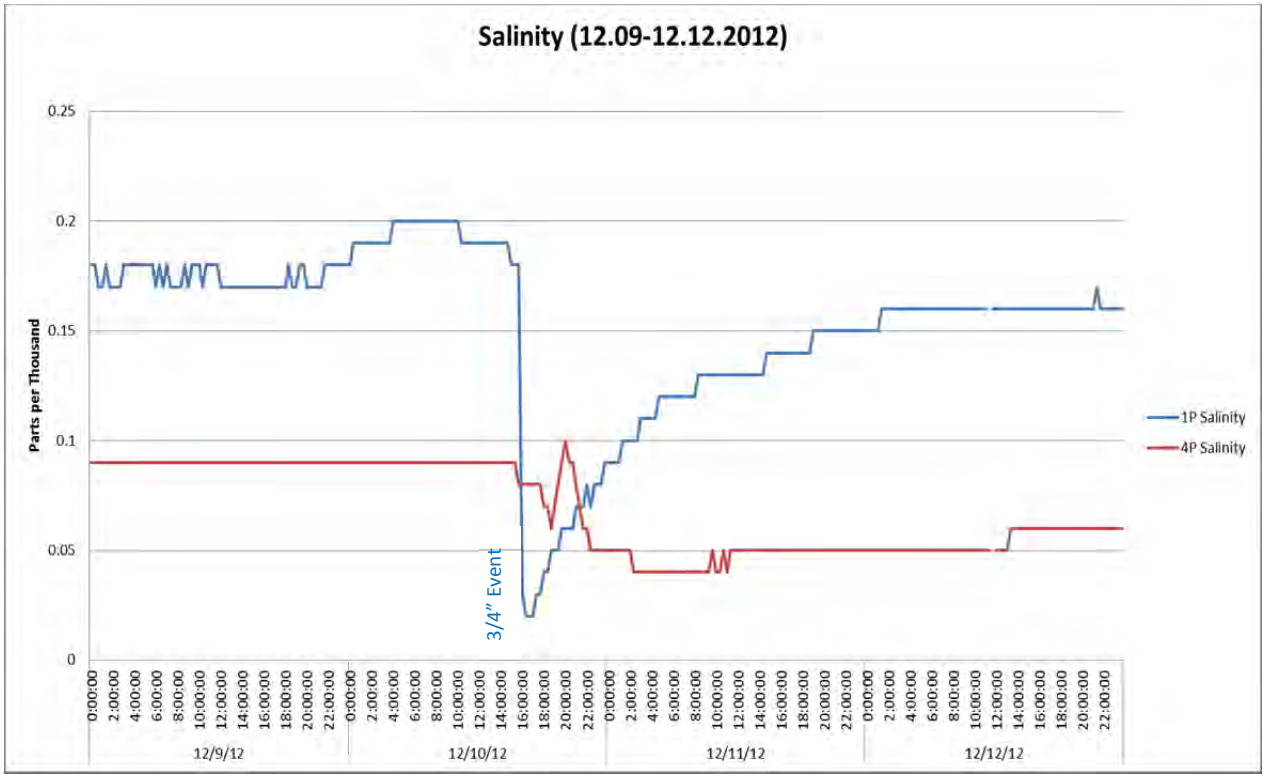


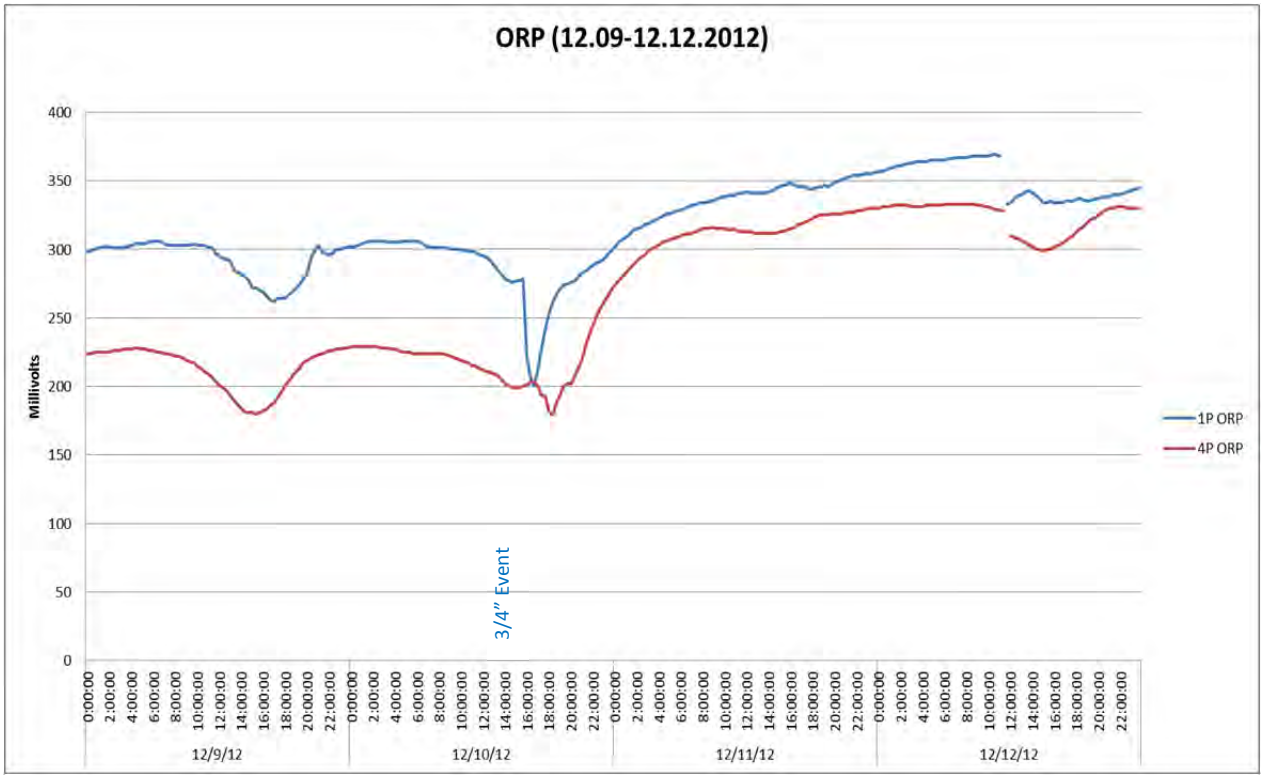


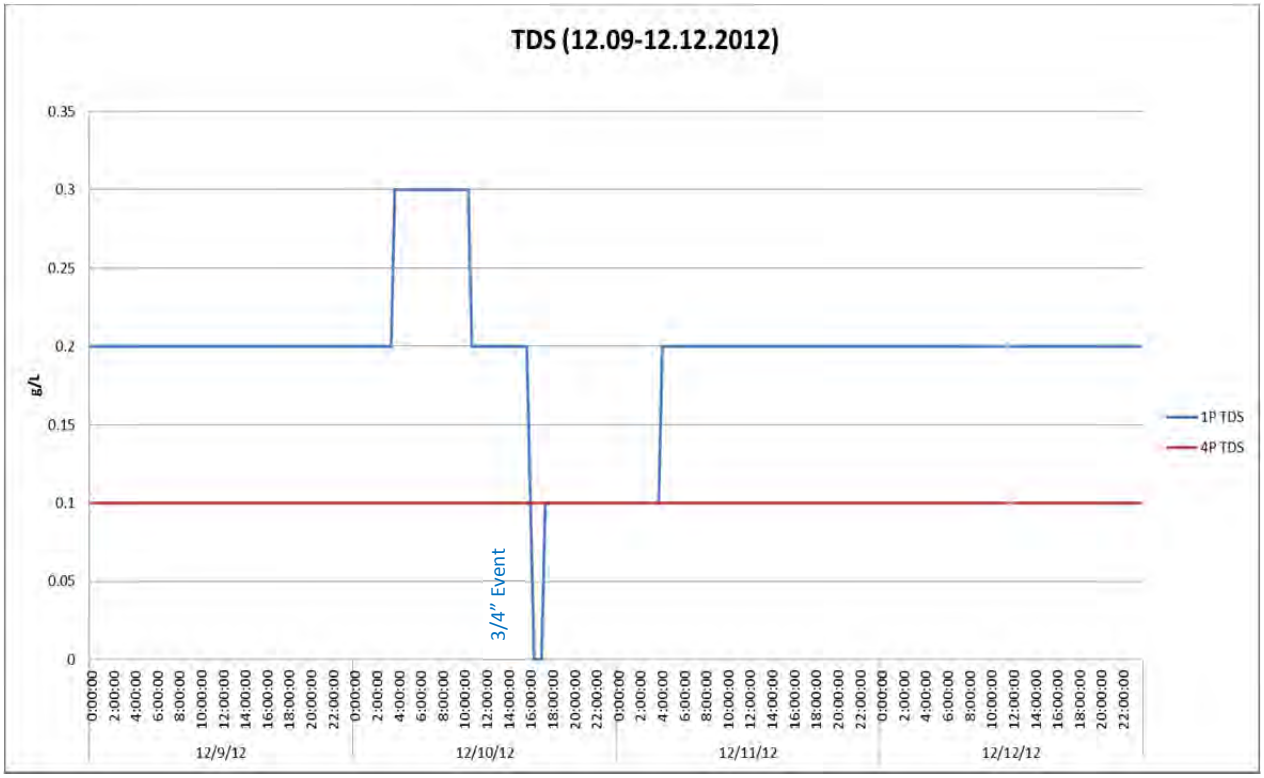

Dissolved Oxygen (12.09-12.12.2012)
mg/L
14
12
10
8
6
4
2
0
3/4" Event
1P DO
4P DO
12/9/12
12/10/12
12/11/12
12/12/12


Temperature (12.09-12.12.2012)
Fahrenheit
70
65
60
55
50
45
40
3/4" Event
1P Temp.
4P Temp.
12/9/12
12/10/12
12/11/12
12/12/12

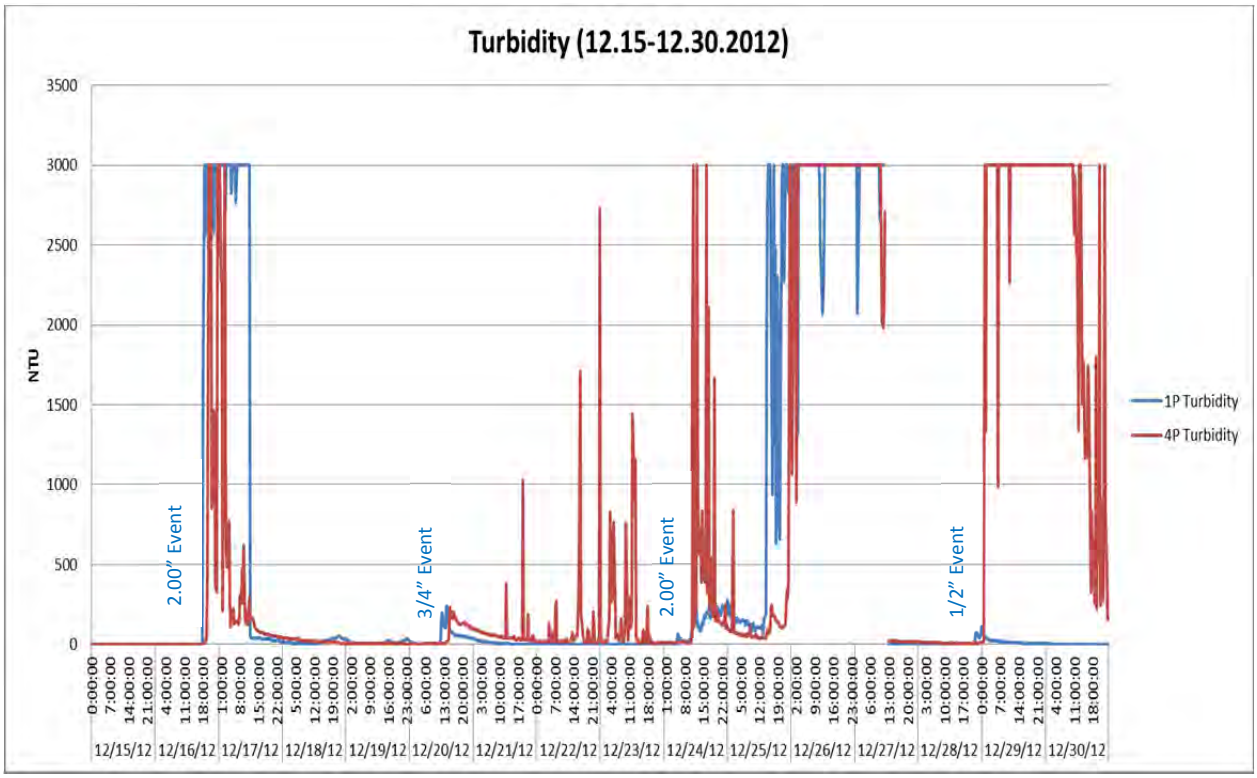

pH (12.09-12.12.2012)
Standard Units
8.5
8
7.5
7
6.5
6
5.5
5
3/4" Event
1P pH
4P pH
12/9/12
12/10/12
12/11/12
12/12/12

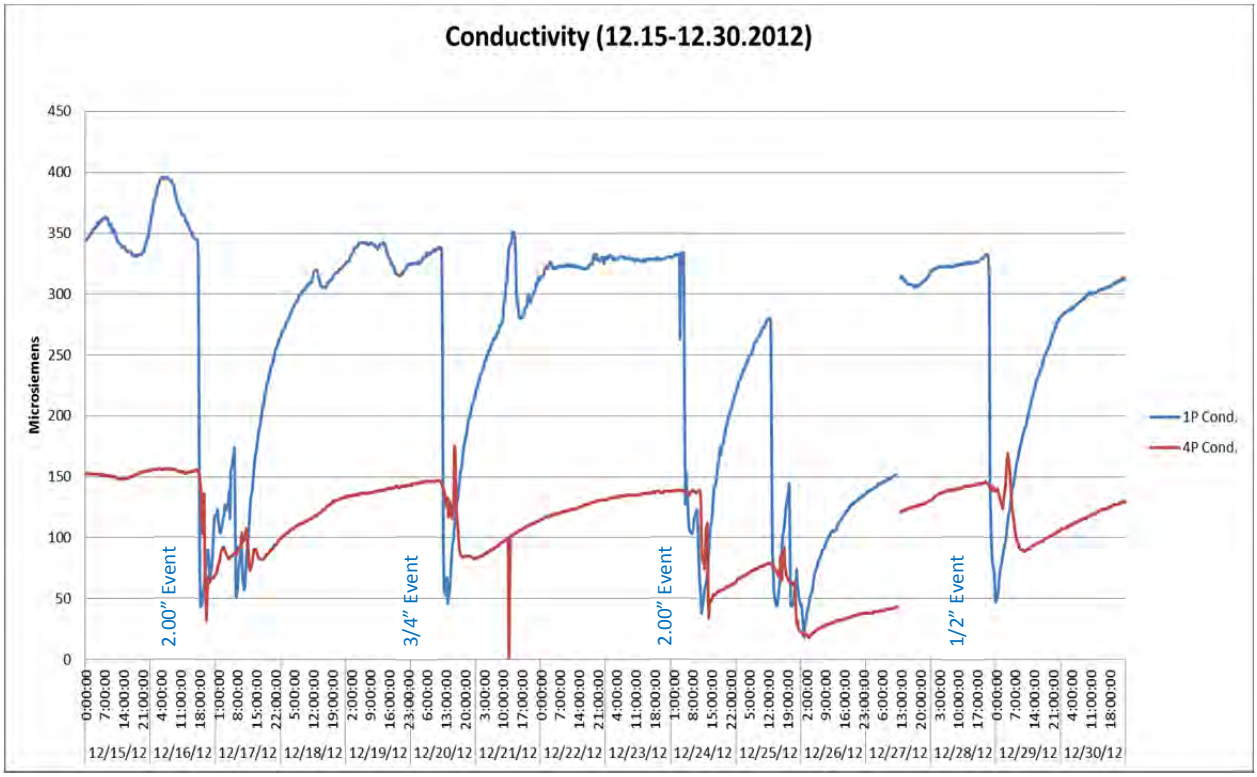

Salinity (12.09-12.12.2012)
Parts per Thousand
0.25
0.2
0.15
0.1
0.05
0
3/4" Event
1P Salinity
4P Salinity
12/9/12
12/10/12
12/11/12
12/12/12

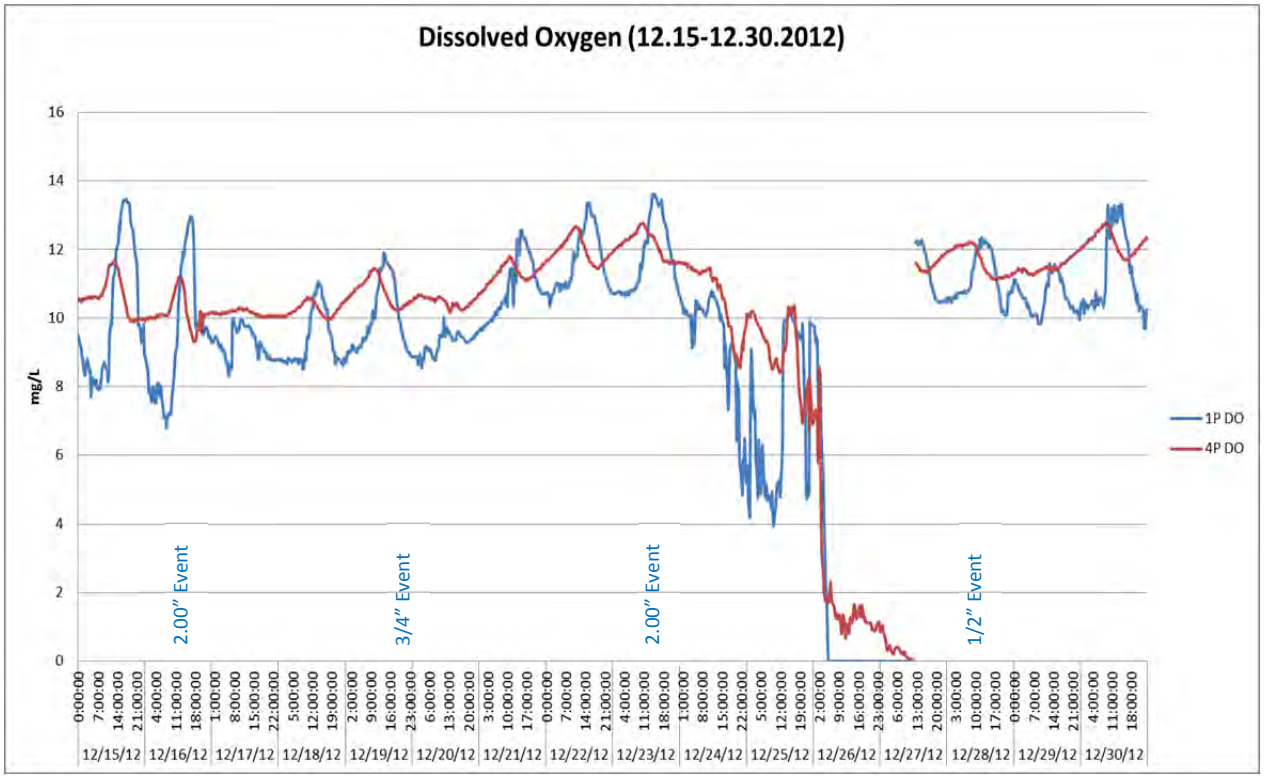

ORP (12.09-12.12.2012)
Millivolts
400
350
300
250
200
150
100
50
0
3/4" Event
12/9/12
12/10/12
12/11/12
12/12/12
1P ORP
4P ORP

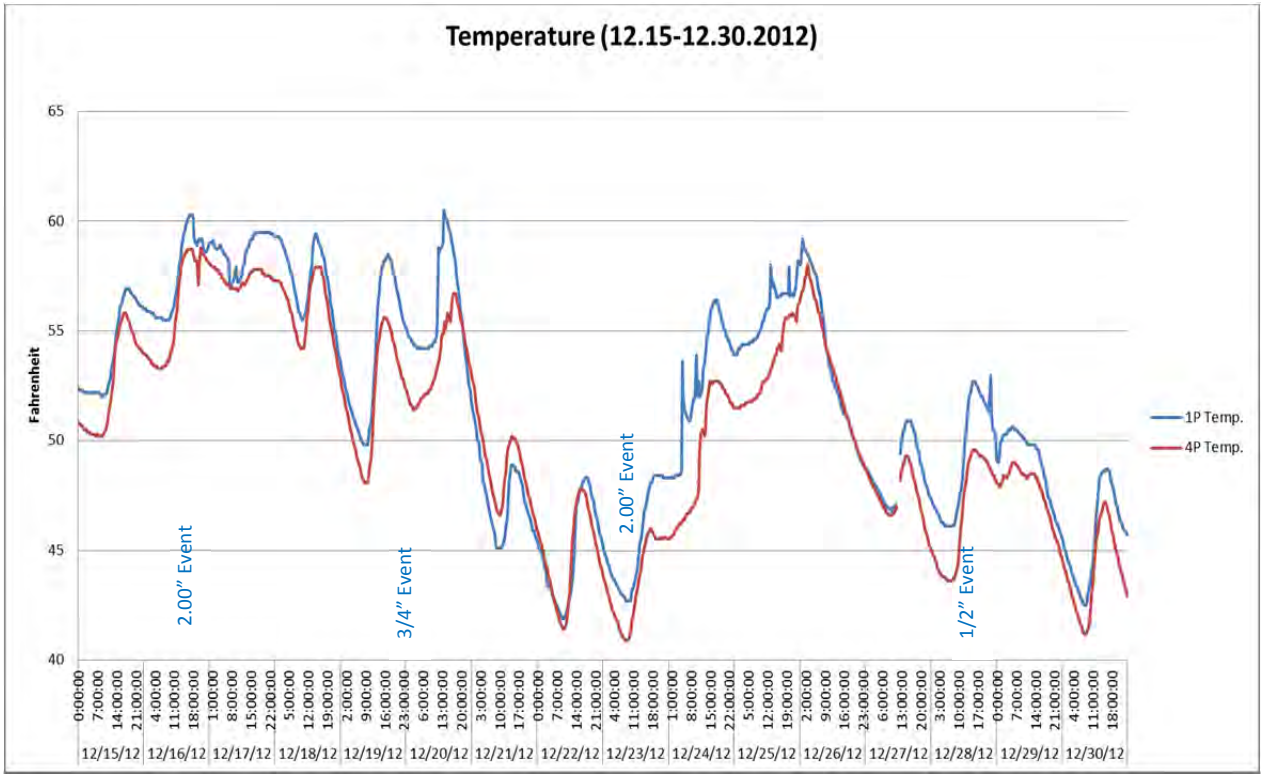

TDS (12.09-12.12.2012)
g/L
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
3/4" Event
12/9/12
12/10/12
12/11/12
12/12/12
1P TDS
4P TDS

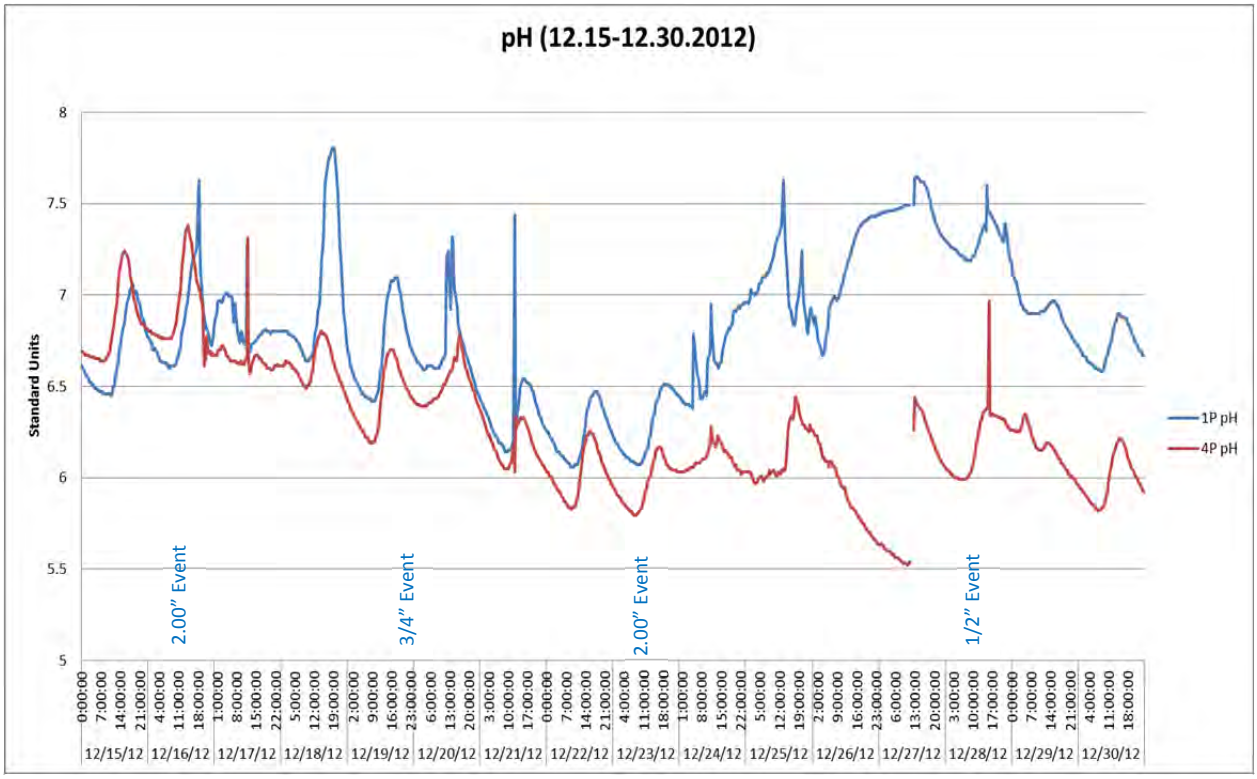
Storm Event Data – 12/15/2012-12/30/2012

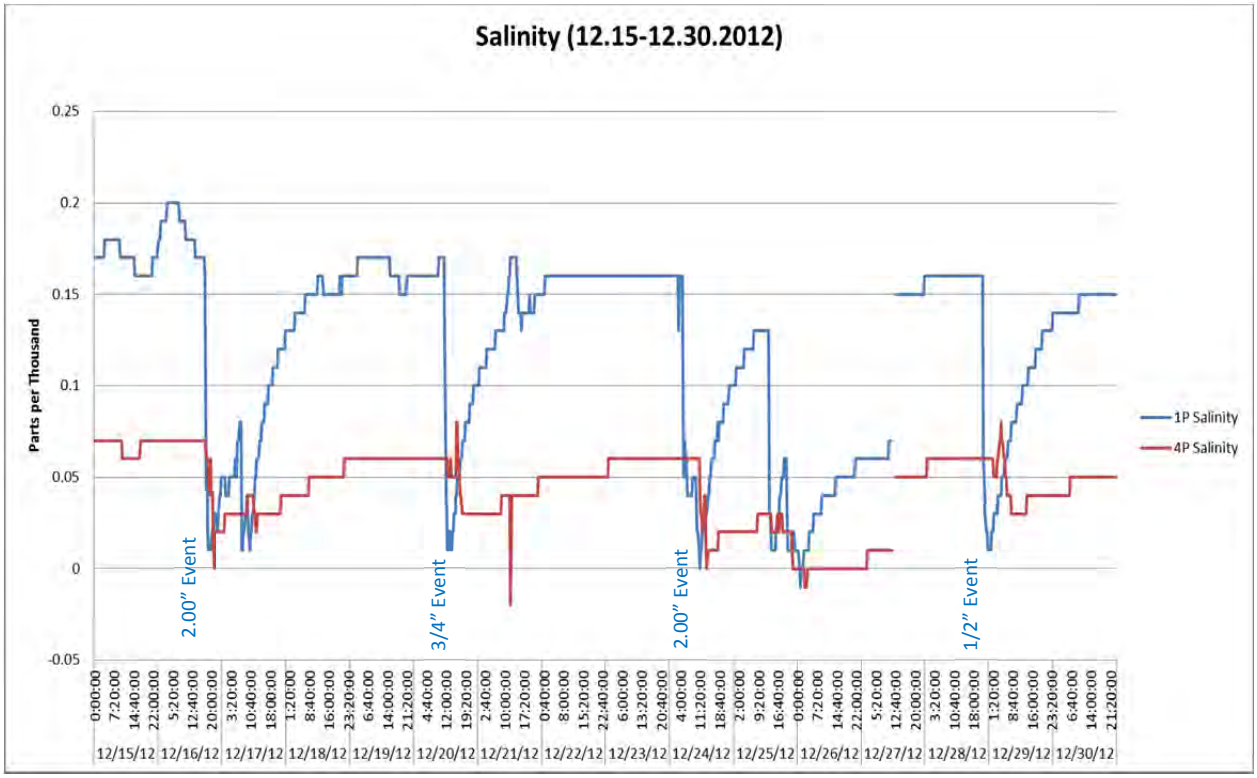





Dissolved Oxygen (12.15-12.30.2012)
mg/L
16
14
12
10
8
6
4
2
0
2.00" Event
3/4" Event
2.00" Event
1/2" Event
1P DO
4P DO
12/15/12
12/16/12
12/17/12
12/18/12
12/19/12
12/20/12
12/21/12
12/22/12
12/23/12
12/24/12
12/25/12
12/26/12
12/27/12
12/28/12
12/29/12
12/30/12


Temperature (12.15-12.30.2012)
Fahrenheit
65
60
55
50
45
40
2.00" Event
3/4" Event
2.00" Event
1/2" Event
1P Temp.
4P Temp.
12/15/12
12/16/12
12/17/12
12/18/12
12/19/12
12/20/12
12/21/12
12/22/12
12/23/12
12/24/12
12/25/12
12/26/12
12/27/12
12/28/12
12/29/12
12/30/12


pH (12.15-12.30.2012)
Standard Units
8
7.5
7
6.5
6
5.5
5
2.00" Event
3/4" Event
2.00" Event
1/2" Event
1P pH
4P pH
12/15/12
12/16/12
12/17/12
12/18/12
12/19/12
12/20/12
12/21/12
12/22/12
12/23/12
12/24/12
12/25/12
12/26/12
12/27/12
12/28/12
12/29/12
12/30/12


Salinity (12.15-12.30.2012)
Parts per Thousand
0.25
0.2
0.15
0.1
0.05
0
-0.05
2.00" Event
3/4" Event
2.00" Event
1/2" Event
1P Salinity
4P Salinity
12/15/12
12/16/12
12/17/12
12/18/12
12/19/12
12/20/12
12/21/12
12/22/12
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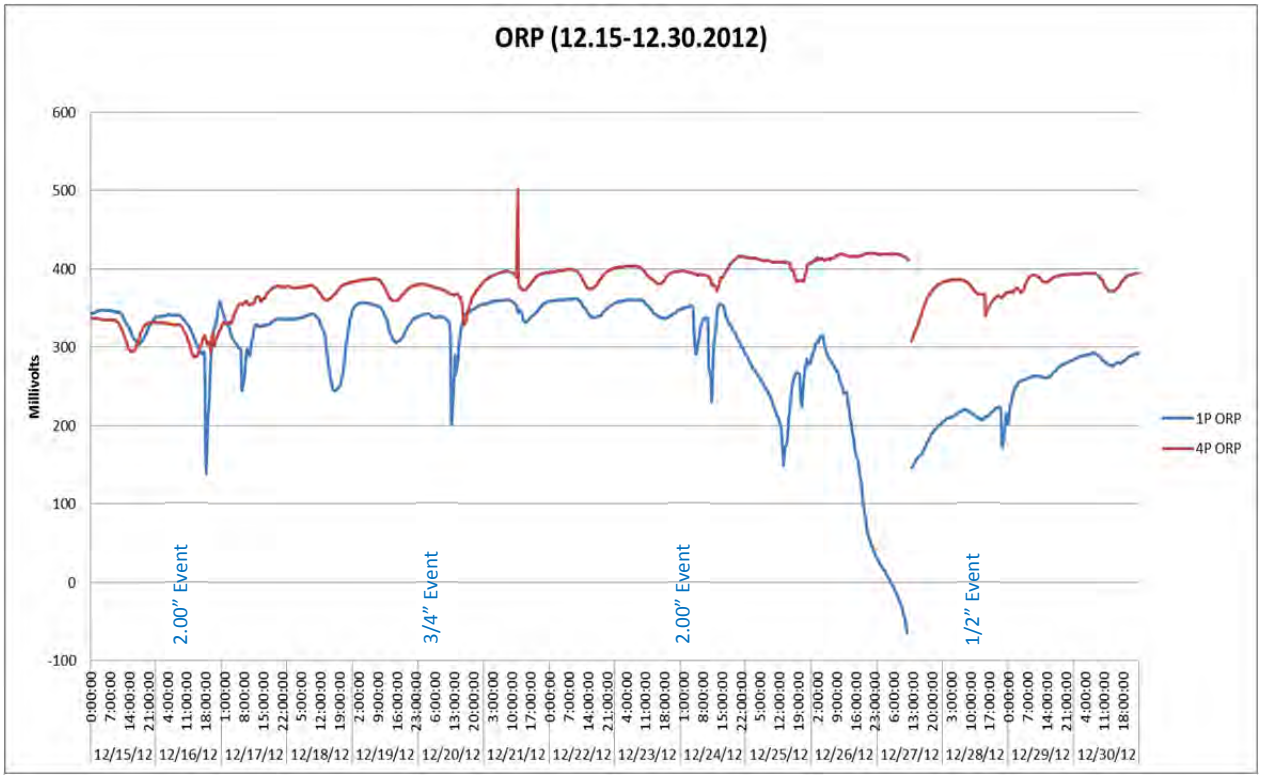
12/27/12
12/28/12
12/29/12
12/30/12


ORP (12.15-12.30.2012)
Millivolts
600
500
400
300
200
100
0
-100
2.00" Event
3/4" Event
2.00" Event
1/2" Event
1P ORP
4P ORP
12/15/12
12/16/12
12/17/12
12/18/12
12/19/12
12/20/12
12/21/12
12/22/12
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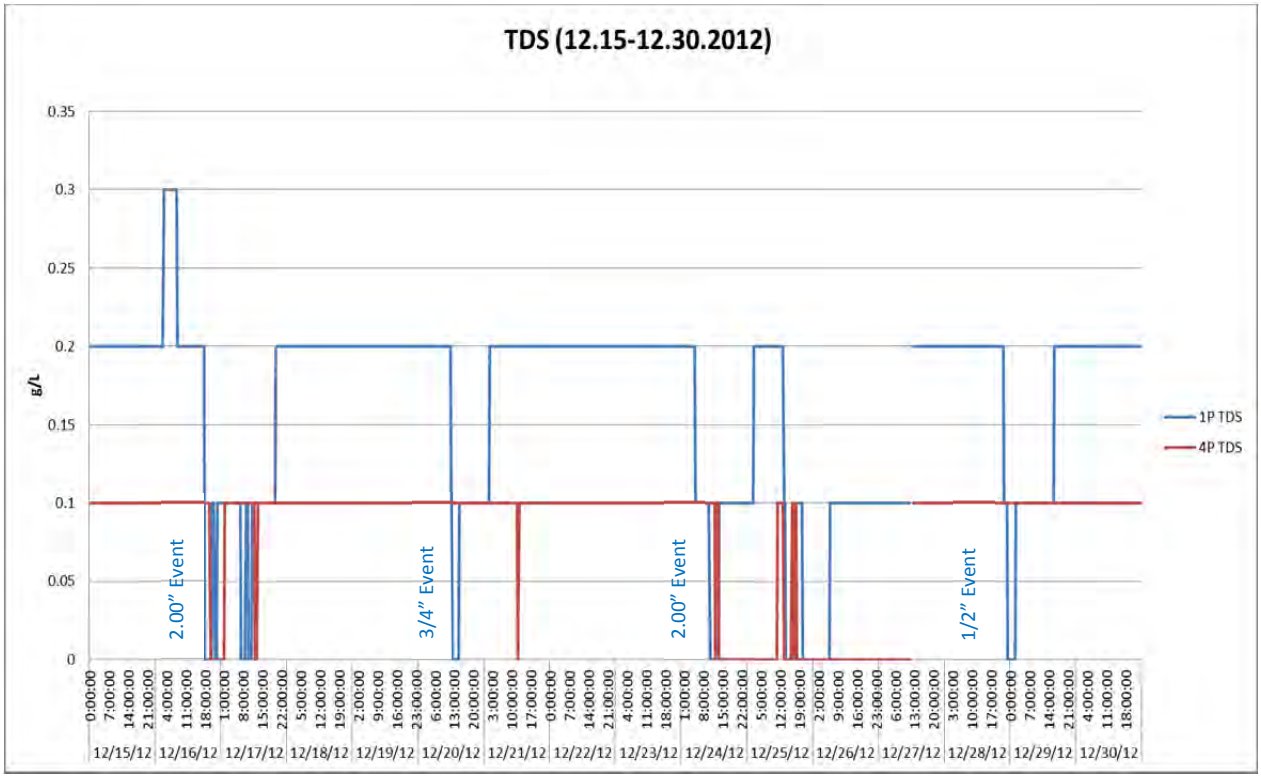
12/27/12
12/28/12
12/29/12
12/30/12


TDS (12.15-12.30.2012)
g/L
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
2.00" Event
3/4" Event
2.00" Event
1/2" Event
1P TDS
4P TDS
12/15/12
12/16/12
12/17/12
12/18/12
12/19/12
12/20/12
12/21/12
12/22/12
12/23/12
12/24/12
12/25/12
12/26/12
12/27/12
12/28/12
12/29/12
12/30/12

3.0 MS4 Monitoring

3.1 Purpose

To expand its Water Quality Sampling Program, the City began performing quarterly stormwater monitoring of its Municipal Separate Storm Sewer (MS4) in June of 2007. The purpose of this monitoring is to develop a better understanding of the relationship between local landuse/landcover types and various stormwater pollutants. Currently, only Phase I municipalities (population of 100,000+) are required to perform this type of monitoring. Five monitoring locations are monitored to evaluate stormwater quality across distinct and discernible landuse types that include low, medium, and high density residential, commercial/retail, and industrial. Parameters that are currently monitored for are BOD, COD, TSS, sulfide, copper, zinc, and oil and grease (fecal coliform discontinued in 2009). Total phosphorus (TP) was added to this list in 2008 to supplement background monitoring for implementation of the Saugahatchee TMDL. In general, a "best effort" is made to capture "first flush" events, as they are most likely to carry the highest concentration of pollutants. Once the samples are obtained they are then stored on ice and transferred to the contracted lab for analysis. All results are reviewed individually and collectively for comparative analysis and all data is reviewed against "average" values reported in the Nationwide Urban Runoff Program (NURP).

3.2 Definition and Methods

As noted above, the MS4 monitoring provides information on the concentrations of BOD, COD, TSS, sulfide, copper, zinc, oil and grease, and total phosphorus (fecal coliform analysis discontinued). Analysis for fecal coliform was discontinued in 2009 when the ADEM established E-Coli as the indicator organism for establishing water quality criteria for pathogens. Definitions of each and the analytical method of each are outlined below.

- Biological Oxygen Demand (BOD) – A measure of how much oxygen is consumed by the microorganisms that are present in decaying organic matter in the water. The analytical method currently used by the contracted laboratory is Standard Method 5210B.
- Carbonaceous Oxygen Demand (COD) – A measure of the capacity of water to consume oxygen during the decomposition of organic matter and the oxidation of inorganic chemicals, such as ammonia and nitrite. The analytical method currently used by the contracted laboratory is HACH 8000 (Reactor Digestion).
- Total Suspended Solids –A measure of the total dry weight of undissolved materials suspended in the water column. The analytical method currently used by the contracted laboratory is Standard Method 2540 D Modified.
- Sulfide – The analytical method currently used by the contracted laboratory is Standard Method 4500 S=D.
- Copper - The analytical method currently used by the contracted laboratory is EPA 200.7.

- Zinc - The analytical method currently used by the contracted laboratory is EPA 200.7.
- Oil and Grease - The analytical method currently used by the contracted laboratory is EPA 1664A.
- Total Phosphorus - The analytical method currently used by the contracted laboratory is EPA 365.4.

3.3 Monitoring Stations and Locations

West Veterans Boulevard. – Classified as Industrial Corridor

Latitude *32, 33, 22.718 N*; Longitude *85, 30, 52.971 W*

Longwood Drive – Classified as Low Density Residential

Latitude *32, 33, 21.648 N;* Longitude *85, 27, 33.131 W*

Cary Woods Subdivision – Classified as Medium Density Residential

Latitude *32, 37, 58.146 N;* Longitude *85, 29, 19.352* W

Harmon Duplexes – Classified as High Density Residential

Latitude *32, 33, 55.256 N;* Longitude *85, 29, 47.87 W*

The Mall Outfall – Classified as Commercial/Retail Corridor

Latitude *32, 37, 41.126 N;* Longitude *85, 26, 58.923 W*

**See Insert for Maps of All Water Quality Monitoring Locations*

3.4 Results and Brief Discussion

The City makes a best-effort to collect four quarters (for seasonal comparison) of MS4 data per seasonal year, yet only two were collected for 2012 (winter quarter collected 1/30/2013). Weather patterns, laboratory operating hours, and staff schedules determine whether or not it is possible to obtain a sample during each quarter. The data collected in 2012 is largely similar to that obtained during previous monitoring with respect to pollutant concentrations. Cary Woods, the medium density residential site, consistently returns higher values for BOD, COD, and Total Phosphorus, as indicated by the median value of these parameters compared to other stations of the same. It is believed that these parameters are primarily influenced by individual residential yard maintenance activities. Zinc and Copper are consistently higher at the Mall Outfall, which represents the commercial/retail monitoring station. These are also reflected in the median values of these parameters for this station compared to the others. This is believed to be influenced primarily by the density of parking lots and high volume of vehicle traffic in the contributing basin (i.e. brake dust, tire wear, auto repair facilities, etc.). These data will continue to help the City better understand the different types of non-point source pollution and their respective association with various landuse/landcover scenarios, which will ultimately aid in the strategic deployment of BMP's.

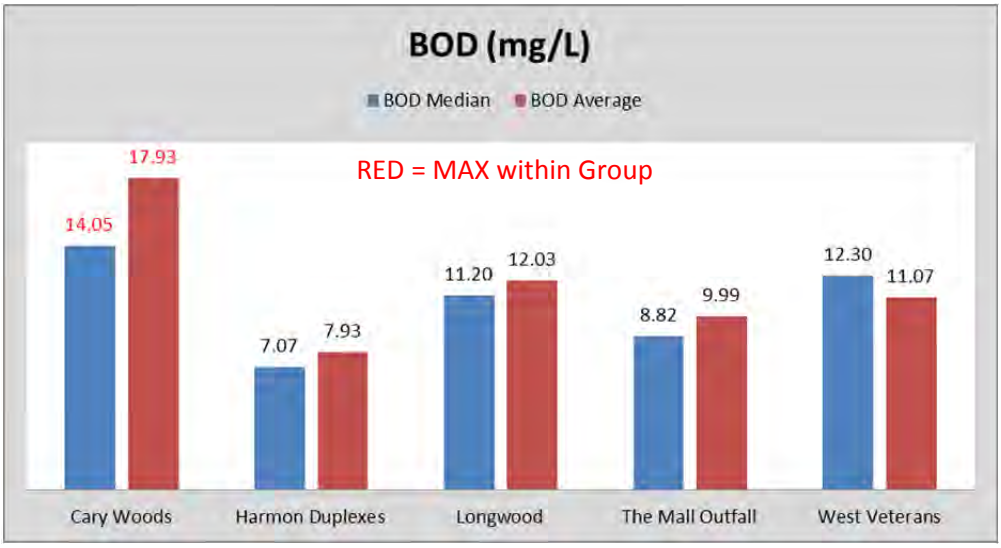
West Veterans									
DATE	BOD	TSS	COD	SULFIDE	COPPER	ZINC	OIL&GREASE	FECAL_(CFU	TP
06/19/07	14.00	30.40	179.00	0.00	0.03	0.15	11.90	30.00	N/A
11/26/07	0.00	19.00	5.00	0.00	0.00	0.04	0.00	1220.00	N/A
01/16/08	12.00	28.30	48.70	0.01	0.00	0.05	3.10	1320.00	N/A
05/15/08	23.80	155.00	219.00	0.01	0.01	0.16	7.82	200.00	N/A
07/22/08	19.00	127.00	111.00	0.00	0.01	0.17	4.42	660.00	N/A
10/17/08	23.50	86.70	135.00	0.01	0.01	0.09	2.27	7200.00	N/A
01/28/09	2.33	44.00	21.50	0.00	0.00	0.08	4.00	0.00	0.14
05/06/09	4.75	285.00	43.50	0.02	0.01	0.08	1.88	150.00	0.35
07/28/09	12.60	107.00	173.00	0.01	0.01	0.14	1.71	3760.00	0.29
10/27/09	4.27	40.00	78.30	0.05	0.00	0.04	1.41	40.00	0.10
08/02/10	18.70	260.00	313.00	0.18	0.01	0.29	2.12	N/A	0.39
11/15/10	4.01	29.00	53.30	0.01	0.00	0.02	1.67	N/A	0.10
03/09/11	4.09	178.00	43.80	0.02	0.00	0.02	1.67	N/A	0.20
11/03/11	13.20	96.70	204.00	0.01	0.01	0.09	1.54	N/A	0.54
06/04/12	18.70	160.00	178.00	0.01	0.01	0.11	3.69	N/A	0.00
01/30/13	2.15	81.00	32.50	0.01	0.00	0.06	2.11	N/A	0.00
MAX	23.80	285.00	313.00	0.18	0.03	0.29	11.90	7200.00	0.54
MED	12.30	91.70	94.65	0.01	0.01	0.08	2.12	430.00	0.17
AVG	11.07	107.94	114.91	0.02	0.01	0.10	3.21	1458.00	0.21

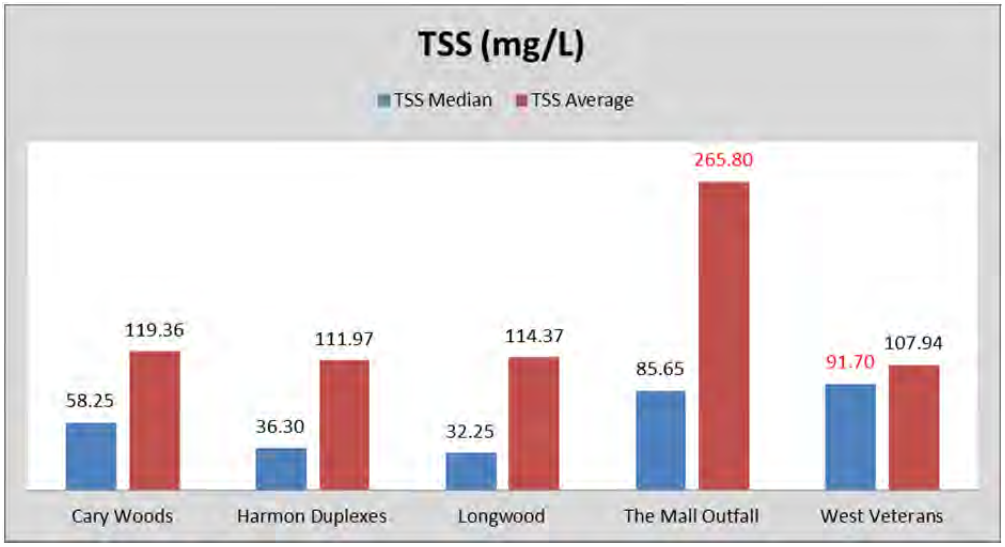
Longwood									
DATE	BOD	TSS	COD	SULFIDE	COPPER	ZINC	OIL&GREASE	FECAL_(CFU	TP
06/19/07	14.00	65.00	115.00	0.00	0.04	0.20	10.40	4650.00	N/A
11/26/07	0.80	16.00	10.30	0.00	0.00	0.03	3.60	2050.00	N/A
01/16/08	12.20	24.30	70.40	0.05	0.00	0.03	2.25	550.00	N/A
05/15/08	22.30	133.00	514.00	0.08	0.01	0.18	3.90	2200.00	N/A
07/22/08	19.40	17.60	209.00	0.01	0.01	0.40	2.11	23050.00	N/A
10/17/08	10.40	6.67	49.80	0.01	0.00	0.03	0.96	0.00	N/A
01/28/09	3.40	12.00	26.50	0.02	0.00	0.02	2.61	0.00	0.04
05/06/09	3.12	6.00	18.50	0.02	0.00	0.02	1.41	80.00	0.10
07/28/09	22.40	785.00	130.00	0.05	0.04	0.47	3.37	30600.00	0.50
10/27/09	2.41	47.50	45.80	0.04	0.00	0.01	1.41	0.00	0.60
08/02/10	12.00	50.00	83.30	0.13	0.00	0.01	1.31	N/A	0.10
11/15/10	5.18	14.00	23.10	0.02	0.00	0.00	1.31	N/A	0.10
03/09/11	13.20	530.00	184.00	0.01	0.01	0.06	1.31	N/A	0.45
11/03/11	9.60	6.00	29.00	0.01	0.00	0.02	1.63	N/A	0.20
06/04/12	39.40	76.60	266.00	0.02	0.01	0.12	3.33	N/A	0.00
01/30/13	2.60	40.20	85.00	0.01	0.00	0.01	1.29	N/A	0.00
MAX	39.40	785.00	514.00	0.13	0.04	0.47	10.40	30600.00	0.60
MED	11.20	32.25	76.85	0.02	0.00	0.03	1.87	1300.00	0.10
AVG	12.03	114.37	116.23	0.03	0.01	0.10	2.64	6318.00	0.21

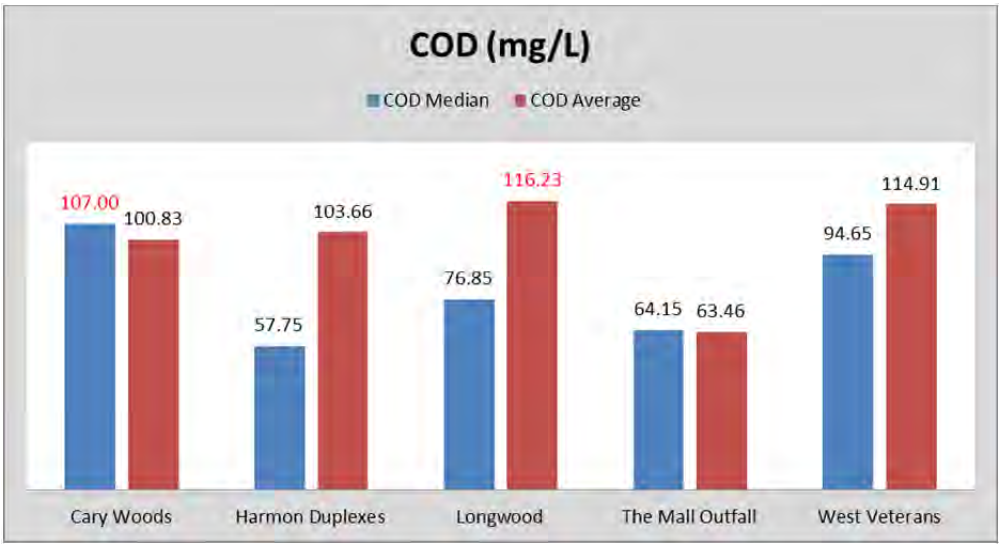
Cary Woods									
DATE	BOD	TSS	COD	SULFIDE	COPPER	ZINC	OIL&GREASE	FECAL_(CFU	TP
06/19/07	14.00	39.20	127.00	0.00	0.03	0.13	8.10	5000.00	N/A
11/26/07	9.20	10.00	29.00	0.00	0.02	0.04	0.00	3840.00	N/A
01/16/08	14.10	16.50	36.60	0.01	0.00	0.00	1.92	450.00	N/A
05/15/08	3.25	68.40	45.70	0.00	0.00	0.01	10.90	4940.00	N/A
07/22/08	8.92	35.80	39.00	0.01	0.02	0.01	3.75	25200.00	N/A
10/17/08	36.10	97.50	112.00	0.02	0.01	0.07	1.75	25600.00	N/A
01/28/09	3.32	44.00	14.00	0.00	0.01	0.04	2.43	40.00	0.16
05/06/09	15.80	565.00	139.00	0.03	0.01	0.16	3.16	50.00	0.74
07/28/09	43.90	170.00	270.00	0.06	0.01	0.10	2.68	43000.00	0.63
10/27/09	14.20	105.00	131.00	0.09	0.01	0.05	1.87	6000.00	0.30
08/02/10	36.40	255.00	231.00	0.12	0.02	0.24	0.00	N/A	1.00
11/15/10	30.60	118.00	118.00	0.03	0.01	0.06	4.53	N/A	0.30
03/09/11	12.20	297.00	131.00	0.01	0.01	0.06	1.31	N/A	0.44
11/03/11	20.90	28.00	102.00	0.01	0.02	0.04	1.93	N/A	0.30
06/04/12	12.00	12.30	48.00	0.02	0.01	0.01	0.00	N/A	0.00
01/30/13	12.00	48.10	40.00	0.03	0.01	0.02	1.84	N/A	0.00
MAX	43.90	565.00	270.00	0.12	0.03	0.24	10.90	43000.00	1.00
MED	14.05	58.25	107.00	0.01	0.01	0.05	1.93	4970.00	0.30
AVG	17.93	119.36	100.83	0.03	0.01	0.06	2.89	11412.00	0.39

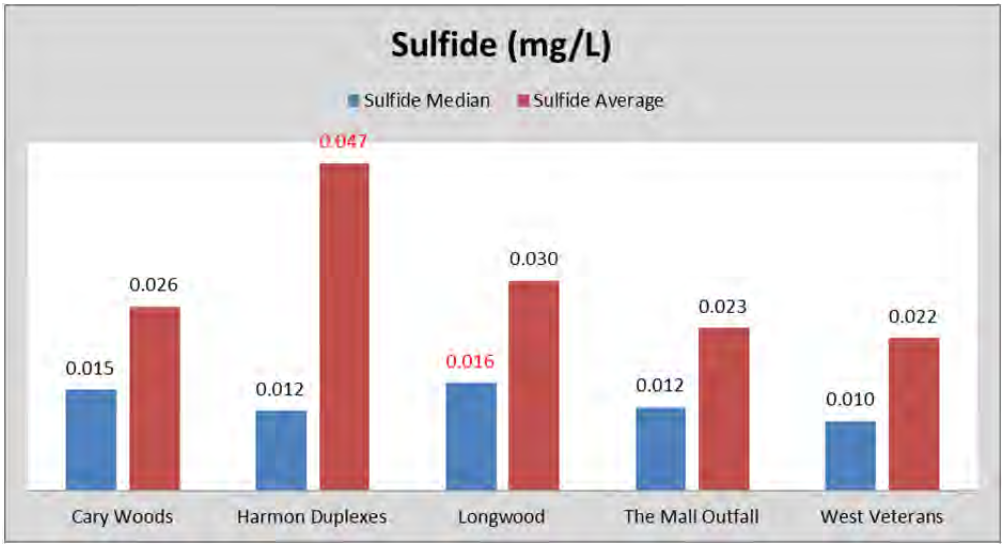
Harmon Duplexes									
DATE	BOD	TSS	COD	SULFIDE	COPPER	ZINC	OIL&GREASE	FECAL_(CFU	TP
06/19/07	10.30	34.40	111.00	0.00	0.03	0.12	6.40	5000.00	N/A
11/26/07	0.10	7.00	11.00	0.00	0.00	0.03	0.00	8400.00	N/A
01/16/08	12.00	34.30	29.40	0.02	0.01	0.02	2.20	550.00	N/A
05/15/08	6.41	50.50	75.20	0.01	0.00	0.06	5.85	440.00	N/A
07/22/08	13.30	53.50	95.80	0.01	0.00	0.08	5.85	6080.00	N/A
10/17/08	16.10	56.70	82.30	0.00	0.01	0.07	3.86	10400.00	N/A
01/28/09	2.00	26.00	10.00	0.00	0.00	0.03	3.48	60.00	0.04
05/06/09	4.56	118.00	33.50	0.02	0.00	0.05	2.33	140.00	0.10
07/28/09	7.23	38.00	40.30	0.01	0.00	0.03	1.41	4980.00	0.34
10/27/09	6.91	160.00	143.00	0.15	0.01	0.12	3.65	60.00	0.22
08/02/10	8.78	1050.00	588.00	0.43	0.07	1.02	2.53	N/A	12.90
11/15/10	3.83	18.50	25.80	0.02	0.00	0.04	1.59	N/A	0.18
03/09/11	2.00	33.30	33.80	0.02	0.01	0.03	1.31	N/A	0.20
11/03/11	12.50	46.70	96.50	0.01	0.01	0.15	1.54	N/A	0.31
06/04/12	18.90	30.00	248.00	0.05	0.00	0.11	2.15	N/A	0.36
01/30/13	2.00	34.60	35.00	0.00	0.00	0.01	2.78	N/A	0.00
MAX	18.90	1050.00	588.00	0.43	0.07	1.02	6.40	10400.00	12.90
MED	7.07	36.30	57.75	0.01	0.00	0.05	2.43	2765.00	0.21
AVG	7.93	111.97	103.66	0.05	0.01	0.12	2.93	3611.00	1.46

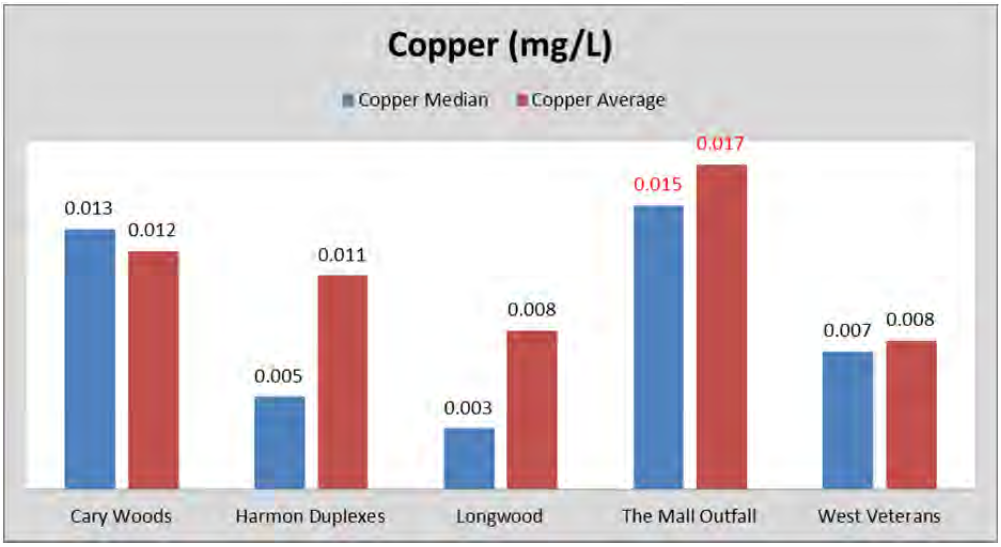
The Mall Outfall									
DATE	BOD	TSS	COD	SULFIDE	COPPER	ZINC	OIL&GREASE	FECAL_(CFU	TP
06/19/07	6.60	59.20	70.00	0.00	0.05	0.30	7.00	5000.00	N/A
10/23/07	2.90	56.40	6.00	0.00	0.02	0.00	3.20	16700.00	N/A
01/16/08	22.10	42.00	51.10	0.02	0.00	0.09	5.18	30000.00	N/A
05/15/08	20.00	84.60	112.00	0.02	0.02	0.15	4.19	4480.00	N/A
07/22/08	13.20	23.90	27.70	0.01	0.03	0.09	1.82	12600.00	N/A
10/17/08	14.10	86.70	74.80	0.01	0.01	0.15	2.79	29040.00	N/A
01/28/09	4.49	26.00	26.50	0.00	0.01	0.09	2.27	0.00	0.25
05/06/09	6.36	150.00	56.00	0.01	0.02	0.09	2.62	100.00	0.75
07/28/09	13.10	360.00	108.00	0.02	0.02	0.18	2.05	23850.00	0.37
10/27/09	6.53	96.00	88.30	0.08	0.01	0.09	3.58	2900.00	0.10
08/02/10	13.40	210.00	60.80	0.11	0.02	0.23	0.00	N/A	0.22
11/15/10	9.84	64.00	35.80	0.00	0.00	0.01	2.71	N/A	0.10
03/09/11	4.79	202.00	73.80	0.01	0.01	0.11	1.46	N/A	0.20
11/03/11	7.80	60.00	39.00	0.01	0.01	0.10	2.56	N/A	0.20
06/04/12	11.10	2620.00	118.00	0.06	0.04	0.34	4.33	N/A	0.54
01/30/13	3.58	112.00	67.50	0.01	0.01	0.07	3.46	N/A	0.00
MAX	22.10	2620.00	118.00	0.11	0.05	0.34	7.00	30000.00	0.75
MED	8.82	85.65	64.15	0.01	0.01	0.10	2.75	8800.00	0.21
AVG	9.99	265.80	63.46	0.02	0.02	0.13	3.08	12467.00	0.27

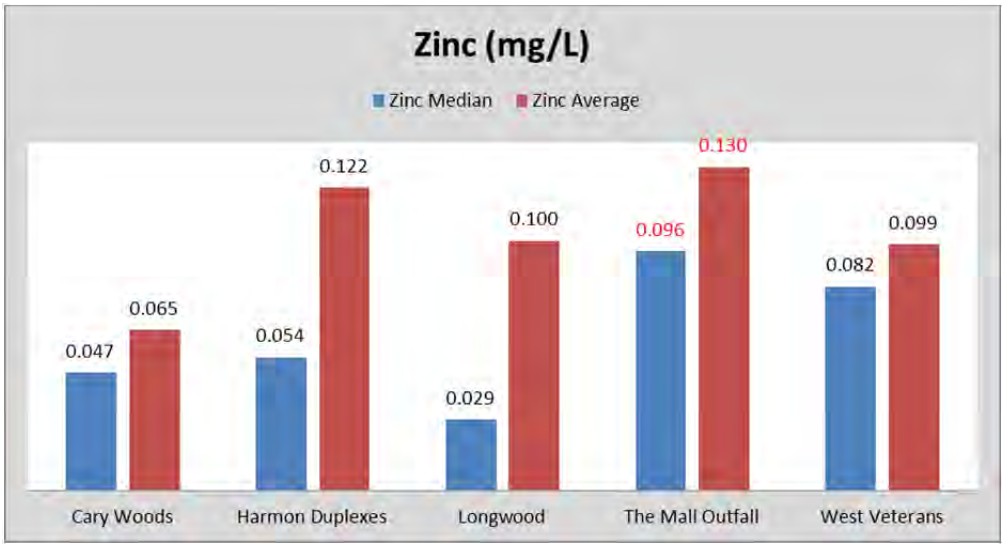

BOD (mg/L)
BOD Median
BOD Average
RED = MAX within Group
14.05
17.93
7.07
7.93
11.20
12.03
8.82
9.99
12.30
11.07
Cary Woods
Harmon Duplexes
Longwood
The Mall Outfall
West Veterans

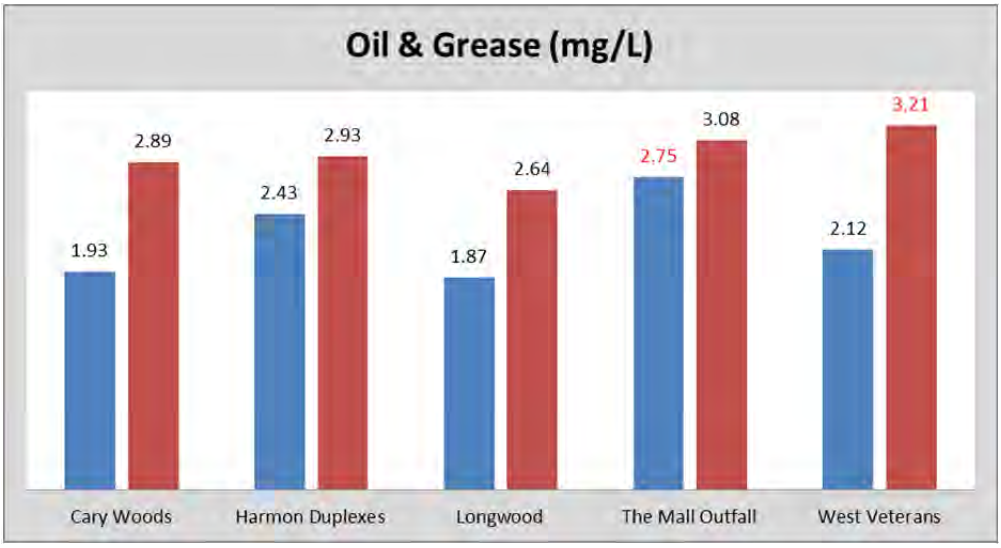

TSS (mg/L)
TSS Median
TSS Average
58.25
119.36
36.30
111.97
32.25
114.37
85.65
265.80
91.70
107.94
Cary Woods
Harmon Duplexes
Longwood
The Mall Outfall
West Veterans

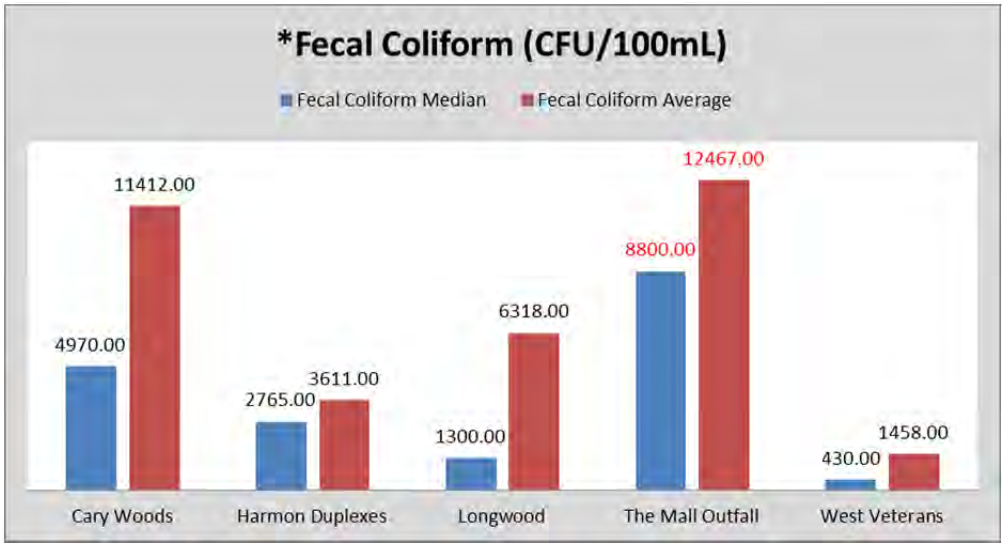

COD (mg/L)
COD Median
COD Average
107.00
100.83
57.75
103.66
76.85
116.23
64.15
63.46
94.65
114.91
Cary Woods
Harmon Duplexes
Longwood
The Mall Outfall
West Veterans

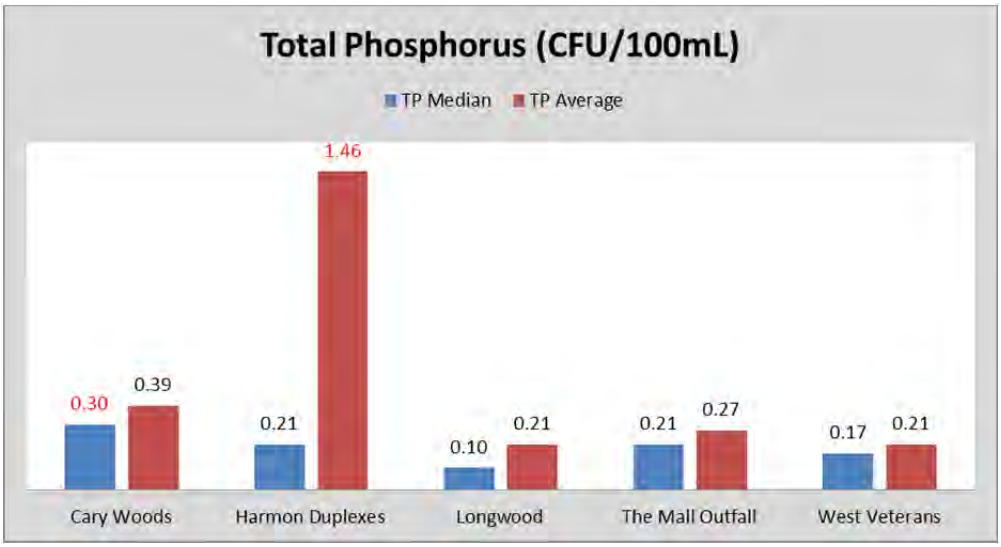

Sulfide (mg/L)
Sulfide Median
Sulfide Average
0.015
0.026
0.012
0.047
0.016
0.030
0.012
0.023
0.010
0.022
Cary Woods
Harmon Duplexes
Longwood
The Mall Outfall
West Veterans

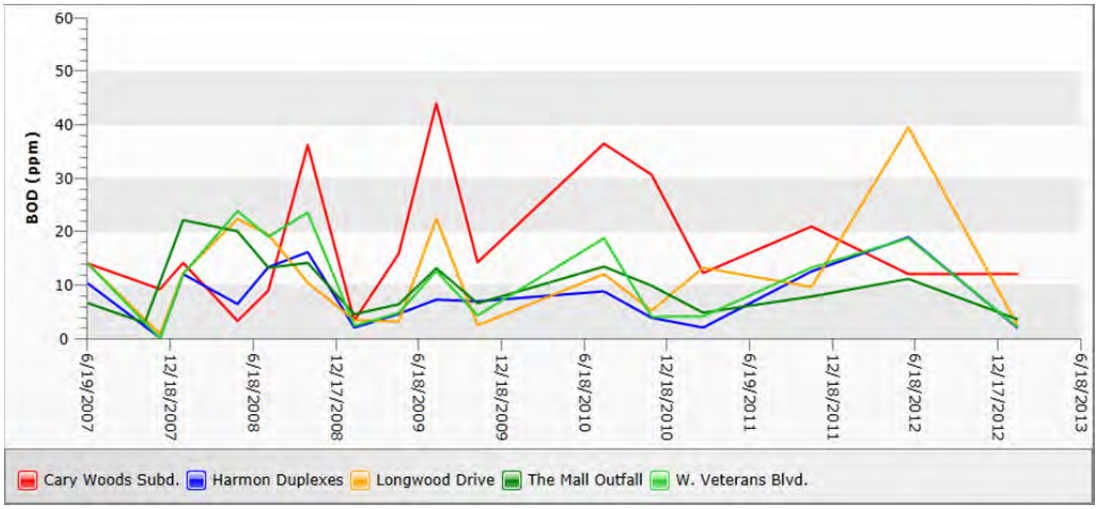

Copper (mg/L)
Copper Median
Copper Average
0.013
0.012
0.005
0.011
0.003
0.008
0.015
0.017
0.007
0.008
Cary Woods
Harmon Duplexes
Longwood
The Mall Outfall
West Veterans

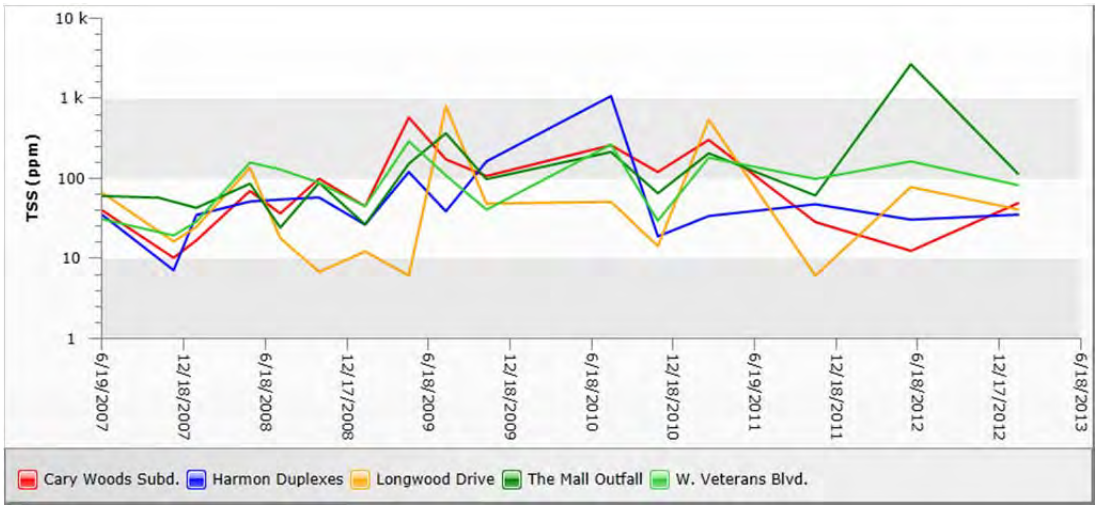

Zinc (mg/L)
Zinc Median
Zinc Average
0.047
0.065
0.054
0.122
0.029
0.100
0.096
0.130
0.082
0.099
Cary Woods
Harmon Duplexes
Longwood
The Mall Outfall
West Veterans

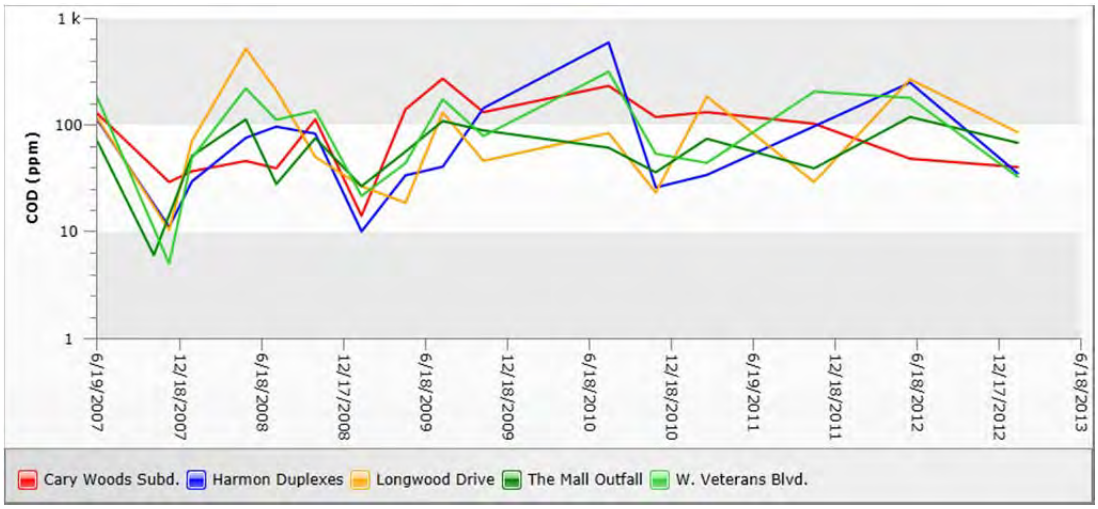

Oil & Grease (mg/L)
1.93
2.89
2.43
2.93
1.87
2.64
2.75
3.08
2.12
3.21
Cary Woods
Harmon Duplexes
Longwood
The Mall Outfall
West Veterans

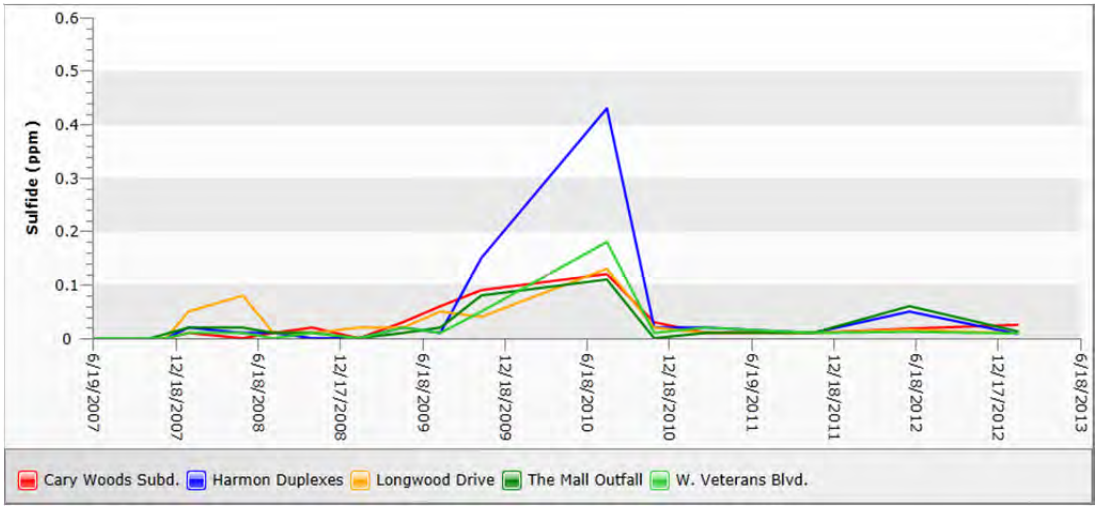

*Fecal Coliform (CFU/100mL)
Fecal Coliform Median
Fecal Coliform Average
4970.00
11412.00
2765.00
3611.00
1300.00
6318.00
8800.00
12467.00
430.00
1458.00
Cary Woods
Harmon Duplexes
Longwood
The Mall Outfall
West Veterans

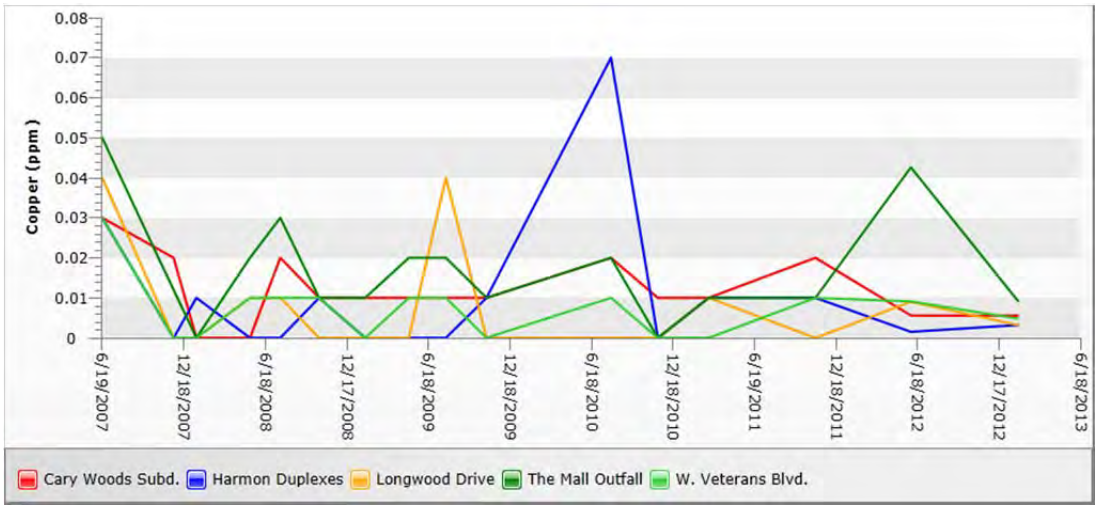

Total Phosphorus (CFU/100mL)
TP Median
TP Average
0.30
0.39
0.21
1.46
0.10
0.21
0.21
0.27
0.17
0.21
Cary Woods
Harmon Duplexes
Longwood
The Mall Outfall
West Veterans

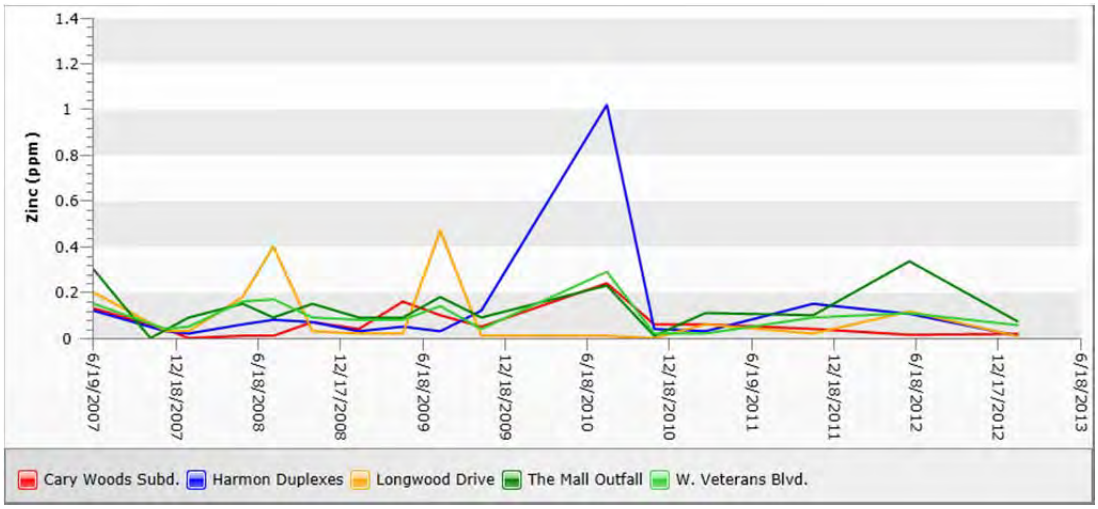

BOD (ppm)
60
50
40
30
20
10
0
6/19/2007
12/18/2007
6/18/2008
12/17/2008
6/18/2009
12/18/2009
6/18/2010
12/18/2010
6/19/2011
12/18/2011
6/18/2012
12/17/2012
6/18/2013
Cary Woods Subd.
Harmon Duplexes
Longwood Drive
The Mall Outfall
W. Veterans Blvd.

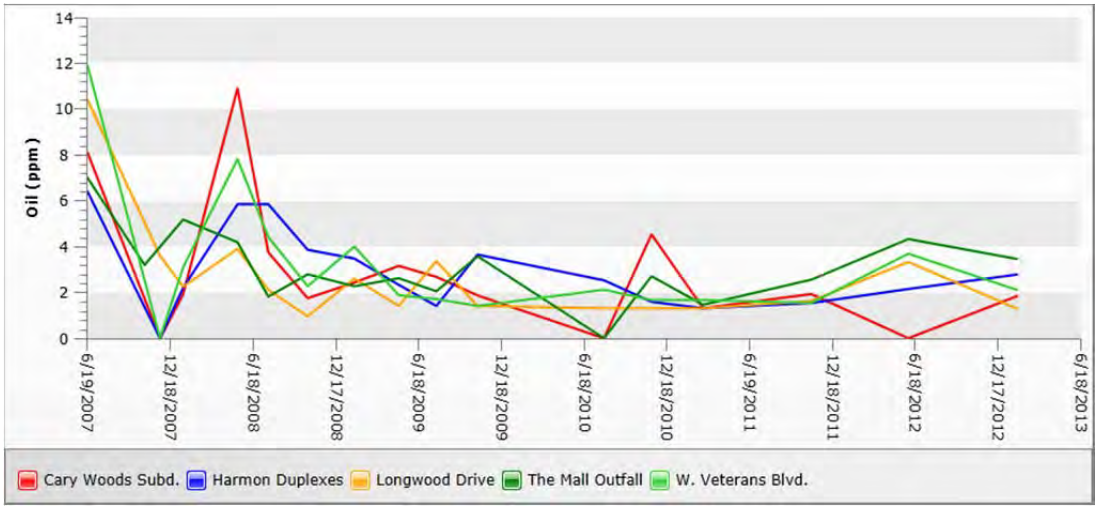

TSS (ppm)
10 k
1 k
100
10
1
6/19/2007
12/18/2007
6/18/2008
12/17/2008
6/18/2009
12/18/2009
6/18/2010
12/18/2010
6/19/2011
12/18/2011
6/18/2012
12/17/2012
6/18/2013
Cary Woods Subd.
Harmon Duplexes
Longwood Drive
The Mall Outfall
W. Veterans Blvd.

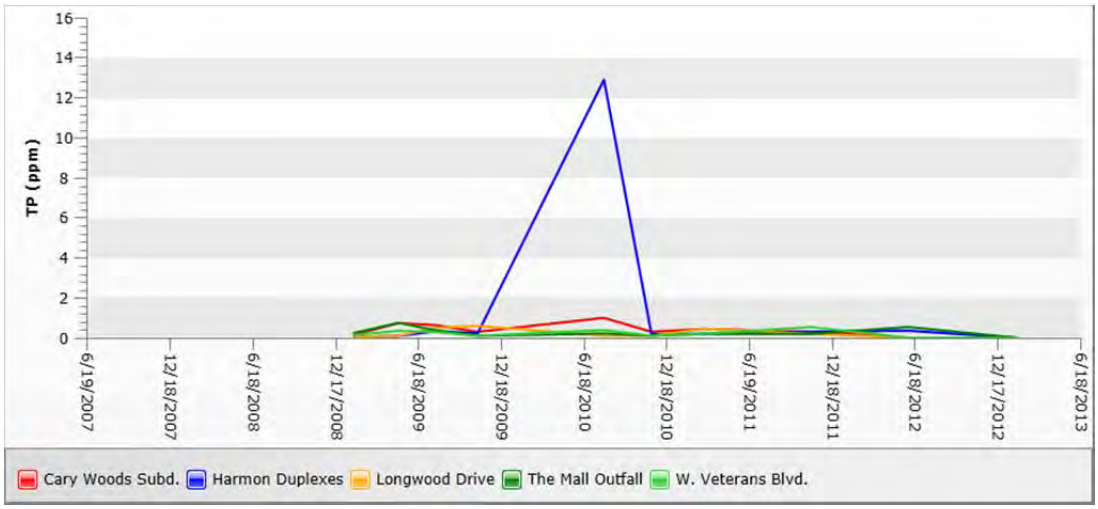

COD (ppm)
1 k
100
10
1
6/19/2007
12/18/2007
6/18/2008
12/17/2008
6/18/2009
12/18/2009
6/18/2010
12/18/2010
6/19/2011
12/18/2011
6/18/2012
12/17/2012
6/18/2013
Cary Woods Subd.
Harmon Duplexes
Longwood Drive
The Mall Outfall
W. Veterans Blvd.


Sulfide (ppm)
0.6
0.5
0.4
0.3
0.2
0.1
0
6/19/2007
12/18/2007
6/18/2008
12/17/2008
6/18/2009
12/18/2009
6/18/2010
12/18/2010
6/19/2011
12/18/2011
6/18/2012
12/17/2012
6/18/2013
Cary Woods Subd.
Harmon Duplexes
Longwood Drive
The Mall Outfall
W. Veterans Blvd.


Copper (ppm)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
6/19/2007
12/18/2007
6/18/2008
12/17/2008
6/18/2009
12/18/2009
6/18/2010
12/18/2010
6/19/2011
12/18/2011
6/18/2012
12/17/2012
6/18/2013
Cary Woods Subd.
Harmon Duplexes
Longwood Drive
The Mall Outfall
W. Veterans Blvd.


Zinc (ppm)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
6/19/2007
12/18/2007
6/18/2008
12/17/2008
6/18/2009
12/18/2009
6/18/2010
12/18/2010
6/19/2011
12/18/2011
6/18/2012
12/17/2012
6/18/2013
Cary Woods Subd.
Harmon Duplexes
Longwood Drive
The Mall Outfall
W. Veterans Blvd.


Oil (ppm)
14
12
10
8
6
4
2
0
6/19/2007
12/18/2007
6/18/2008
12/17/2008
6/18/2009
12/18/2009
6/18/2010
12/18/2010
6/19/2011
12/18/2011
6/18/2012
12/17/2012
6/18/2013
Cary Woods Subd.
Harmon Duplexes
Longwood Drive
The Mall Outfall
W. Veterans Blvd.


TP (ppm)
16
14
12
10
8
6
4
2
0
6/19/2007
12/18/2007
6/18/2008
12/17/2008
6/18/2009
12/18/2009
6/18/2010
12/18/2010
6/19/2011
12/18/2011
6/18/2012
12/17/2012
6/18/2013
Cary Woods Subd.
Harmon Duplexes
Longwood Drive
The Mall Outfall
W. Veterans Blvd.

4.0 WPCF Dissolved Oxygen Monitoring

4.1 Purpose

As an expansion of the Water Resource Management Department's water quality monitoring program, staff began collecting in-stream dissolved oxygen data upstream and downstream of both WPCF's effluent discharge points beginning in August of 2006. This monitoring provides valuable data assuring that the effluent discharged from Auburn's WPCFs is not causing decreases in the dissolved oxygen content of Parkerson Mill or Saugahatchee Creek during the critical summer months. Monitoring is performed on a frequent basis (almost daily) using a YSI (Clark Cell) and/or Hach (LDO) dissolved oxygen probe at points both upstream and downstream of each effluent discharge location.

4.2 Definition and Methods

As noted above, dissolved oxygen measurements are taken via a YSI (Clark Cell) and/or HACH (Luminescent Dissolved Oxygen) probe.

- Dissolved Oxygen – This is the amount of oxygen that has been dissolved in the water column, which comes from both the atmosphere and photosynthesis by aquatic plants.

4.3 Monitoring Stations and Locations

Northside WPCF Upstream

Latitude *32, 37, 41.517 N*; Longitude *85, 32, 44.26 W*

Northside WPCF Downstream

Latitude *32, 37, 41.121 N;* Longitude *85, 32, 45.365 W*

H.C. Morgan WPCF Upstream

Latitude *32, 32, 9.89 N;* Longitude *85, 30, 20.443* W

H.C. Morgan WPCF Downstream

Latitude *32, 33, 9.077 N;* Longitude *85, 30, 19.699 W*

4.4 Results and Brief Discussion

As with previous years, monitoring of dissolved oxygen at the H.C. Morgan WPCF during the 2012 calendar year indicated a positive influence on in-stream dissolved oxygen levels during the critical summer months. Little to no upstream-to-downstream difference was noted during this same time period at the Northside WPCF. Only minor upstream-to-downstream decreases in dissolved oxygen were documented during the colder winter months, with levels still well above State Water Quality Criteria. Additionally, 2012 data continued to support a trend of increasing average dissolved oxygen in both Parkerson Mill Creek and Saugahatchee Creek for the last seven years.

Northside WPCF Dissolved Oxygen Monitoring Stations

H.C. Morgan WPCF Dissolved Oxygen Monitoring Stations

Northside WPCF DO Data

Northside WPCF DO Measurements				
Date	Upstream	Downstream	State MIN	Difference
01/01/12			5	0
01/02/12	10.71	10.26	5	-0.45
01/03/12			5	0
01/04/12	10.86	10.36	5	-0.5
01/05/12			5	0
01/06/12	10.19	10.24	5	0.05
01/07/12			5	0
01/08/12			5	0
01/09/12	9.61	6.54	5	-3.07
01/10/12			5	0
01/11/12			5	0
01/12/12			5	0
01/13/12	11.37	11.02	5	-0.35
01/14/12			5	0
01/15/12			5	0
01/16/12	11.33	10.77	5	-0.56
01/17/12			5	0
01/18/12	11.06	11.01	5	-0.05
01/19/12			5	0
01/20/12	10.43	10.38	5	-0.05
01/21/12			5	0
01/22/12			5	0
01/23/12			5	0
01/24/12			5	0
01/25/12	10.08	10.12	5	0.04
01/26/12			5	0
01/27/12	9.8	9.62	5	-0.18
01/28/12			5	0
01/29/12			5	0
01/30/12	10.39	10.46	5	0.07
01/31/12			5	0
02/01/12	10.2	10.16	5	-0.04
02/02/12			5	0
02/03/12	9.85	9.8	5	-0.05
02/04/12			5	0
02/05/12			5	0
02/06/12	9.81	9.73	5	-0.08
02/07/12			5	0
02/08/12			5	0
02/09/12			5	0
02/10/12	10.41	10.36	5	-0.05
02/11/12			5	0
02/12/12			5	0
02/13/12	10.56	10.61	5	0.05
02/14/12			5	0
02/15/12	10.52	10.6	5	0.08
02/16/12			5	0
02/17/12			5	0
02/18/12			5	0
02/19/12			5	0
02/20/12	10.41	10.47	5	0.06
02/21/12			5	0
02/22/12	10.22	10.4	5	0.18
02/23/12			5	0
02/24/12	10.52	10.62	5	0.1
02/25/12			5	0
02/26/12			5	0
02/27/12			5	0
02/28/12			5	0
02/29/12	10.19	10.11	5	-0.08

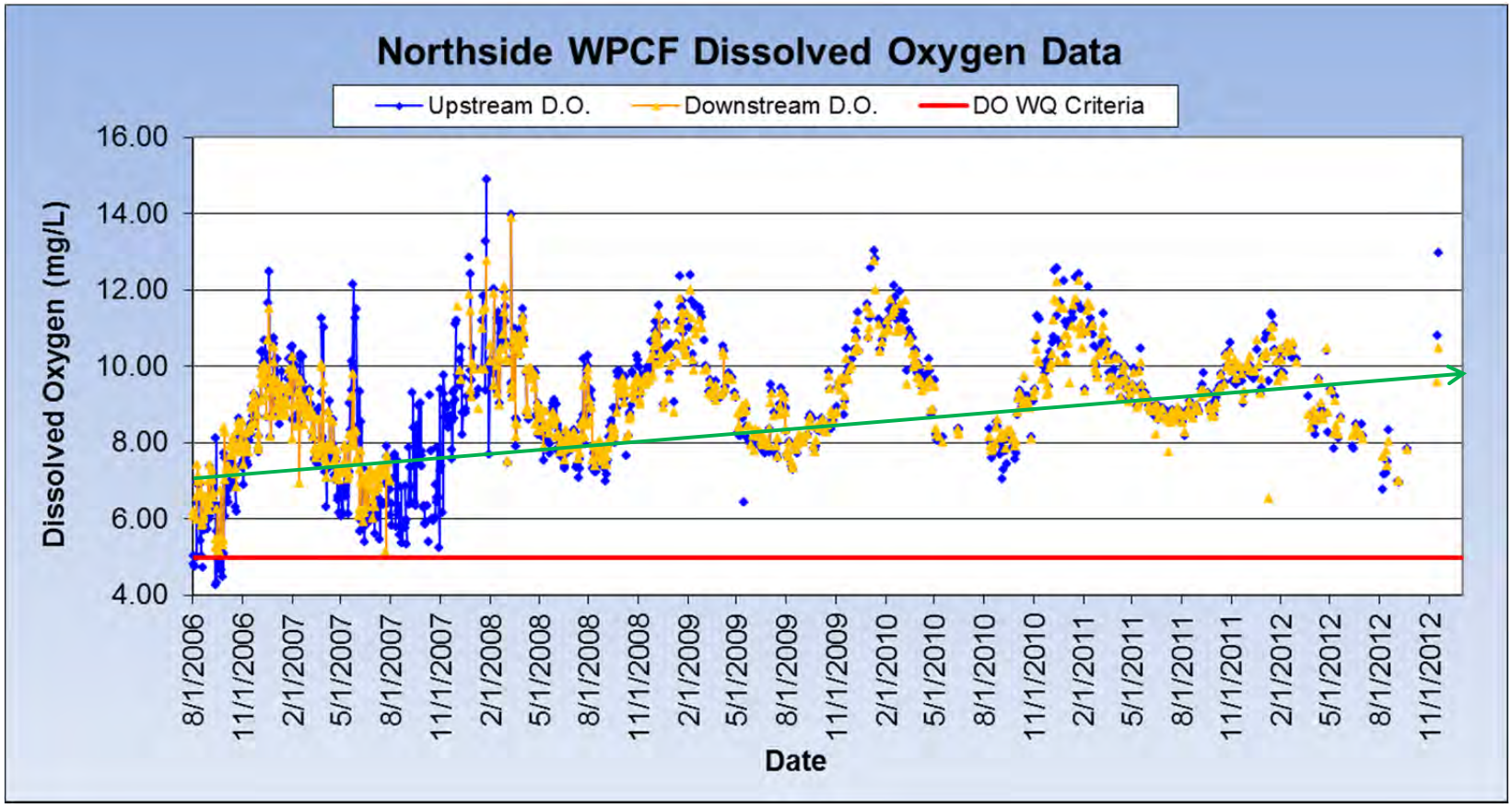
Northside WPCF DO Measurements				
Date	Upstream	Downstream	State MIN	Difference
03/01/12			5	0
03/02/12			5	0
03/03/12			5	0
03/04/12			5	0
03/05/12			5	0
03/06/12			5	0
03/07/12			5	0
03/08/12			5	0
03/09/12			5	0
03/10/12			5	0
03/11/12			5	0
03/12/12			5	0
03/13/12			5	0
03/14/12			5	0
03/15/12			5	0
03/16/12			5	0
03/17/12			5	0
03/18/12			5	0
03/19/12			5	0
03/20/12			5	0
03/21/12			5	0
03/22/12			5	0
03/23/12	9.21	8.73	5	-0.48
03/24/12			5	0
03/25/12			5	0
03/26/12	8.73	8.39	5	-0.34
03/27/12			5	0
03/28/12			5	0
03/29/12			5	0
03/30/12	8.55	8.61	5	0.06
03/31/12			5	0
04/01/12			5	0
04/02/12	8.38	8.84	5	0.46
04/03/12			5	0
04/04/12	8.2	8.56	5	0.36
04/05/12			5	0
04/06/12	8.53	8.69	5	0.16
04/07/12			5	0
04/08/12			5	0
04/09/12			5	0
04/10/12			5	0
04/11/12	9.68	9.64	5	-0.04
04/12/12			5	0
04/13/12			5	0
04/14/12			5	0
04/15/12			5	0
04/16/12	8.97	9.04	5	0.07
04/17/12			5	0
04/18/12	8.84	8.76	5	-0.08
04/19/12			5	0
04/20/12	8.7	8.61	5	-0.09
04/21/12			5	0
04/22/12			5	0
04/23/12			5	0
04/24/12			5	0
04/25/12	10.41	10.46	5	0.05
04/26/12			5	0
04/27/12	8.28	8.78	5	0.5
04/28/12			5	0
04/29/12			5	0
04/30/12			5	0

Northside WPCF DO Measurements				
Date	Upstream	Downstream	State MIN	Difference
05/01/12			5	0
05/02/12	9.4	9.36	5	-0.04
05/03/12			5	0
05/04/12	9.4	9.36	5	-0.04
05/05/12			5	0
05/06/12			5	0
05/07/12			5	0
05/08/12			5	0
05/09/12	7.84	8.23	5	0.39
05/10/12			5	0
05/11/12	9.22	9.08	5	-0.14
05/12/12			5	0
05/13/12			5	0
05/14/12	8.17	8.46	5	0.29
05/15/12			5	0
05/16/12	8.2	8.23	5	0.03
05/17/12			5	0
05/18/12	8.11	8.21	5	0.1
05/19/12			5	0
05/20/12			5	0
05/21/12	8.66	8.64	5	-0.02
05/22/12			5	0
05/23/12			5	0
05/24/12			5	0
05/25/12			5	0
05/26/12			5	0
05/27/12			5	0
05/28/12			5	0
05/29/12			5	0
05/30/12			5	0
05/31/12			5	0
06/01/12			5	0
06/02/12			5	0
06/03/12			5	0
06/04/12			5	0
06/05/12			5	0
06/06/12			5	0
06/07/12			5	0
06/08/12			5	0
06/09/12			5	0
06/10/12			5	0
06/11/12			5	0
06/12/12			5	0
06/13/12	7.9	8.17	5	0.27
06/14/12			5	0
06/15/12	7.84	8.19	5	0.35
06/16/12			5	0
06/17/12			5	0
06/18/12	8.48	8.42	5	-0.06
06/19/12			5	0
06/20/12	8.16	8.26	5	0.1
06/21/12			5	0
06/22/12			5	0
06/23/12			5	0
06/24/12			5	0
06/25/12			5	0
06/26/12			5	0
06/27/12			5	0
06/28/12			5	0
06/29/12	8.49	8.22	5	-0.27
06/30/12			5	0

Northside WPCF DO Measurements				
Date	Upstream	Downstream	State MIN	Difference
07/01/12			5	0
07/02/12	8.17	8.09	5	-0.08
07/03/12			5	0
07/04/12			5	0
07/05/12			5	0
07/06/12			5	0
07/07/12			5	0
07/08/12			5	0
07/09/12			5	0
07/10/12			5	0
07/11/12			5	0
07/12/12			5	0
07/13/12			5	0
07/14/12			5	0
07/15/12			5	0
07/16/12			5	0
07/17/12			5	0
07/18/12			5	0
07/19/12			5	0
07/20/12			5	0
07/21/12			5	0
07/22/12			5	0
07/23/12			5	0
07/24/12			5	0
07/25/12			5	0
07/26/12			5	0
07/27/12			5	0
07/28/12			5	0
07/29/12			5	0
07/30/12			5	0
07/31/12			5	0
08/01/12			5	0
08/02/12			5	0
08/03/12			5	0
08/04/12			5	0
08/05/12			5	0
08/06/12			5	0
08/07/12			5	0
08/08/12	6.78	7.64	5	0.86
08/09/12			5	0
08/10/12	7.18	7.62	5	0.44
08/11/12			5	0
08/12/12			5	0
08/13/12	7.19	7.79	5	0.6
08/14/12			5	0
08/15/12	7.51	7.38	5	-0.13
08/16/12			5	0
08/17/12	8.34	8.02	5	-0.32
08/18/12			5	0
08/19/12			5	0
08/20/12			5	0
08/21/12			5	0
08/22/12			5	0
08/23/12			5	0
08/24/12			5	0
08/25/12			5	0
08/26/12			5	0
08/27/12			5	0
08/28/12			5	0
08/29/12			5	0
08/30/12			5	0
08/31/12			5	0

Northside WPCF DO Measurements				
Date	Upstream	Downstream	State MIN	Difference
09/01/12			5	0
09/02/12			5	0
09/03/12			5	0
09/04/12			5	0
09/05/12	6.97	6.99	5	0.02
09/06/12			5	0
09/07/12	6.94	6.98	5	0.04
09/08/12			5	0
09/09/12			5	0
09/10/12			5	0
09/11/12			5	0
09/12/12			5	0
09/13/12			5	0
09/14/12			5	0
09/15/12			5	0
09/16/12			5	0
09/17/12			5	0
09/18/12			5	0
09/19/12			5	0
09/20/12			5	0
09/21/12	7.84	7.8	5	-0.04
09/22/12			5	0
09/23/12			5	0
09/24/12			5	0
09/25/12			5	0
09/26/12			5	0
09/27/12			5	0
09/28/12			5	0
09/29/12			5	0
09/30/12			5	0
10/01/12			5	0
10/02/12			5	0
10/03/12			5	0
10/04/12			5	0
10/05/12			5	0
10/06/12			5	0
10/07/12			5	0
10/08/12			5	0
10/09/12			5	0
10/10/12			5	0
10/11/12			5	0
10/12/12			5	0
10/13/12			5	0
10/14/12			5	0
10/15/12			5	0
10/16/12			5	0
10/17/12			5	0
10/18/12			5	0
10/19/12			5	0
10/20/12			5	0
10/21/12			5	0
10/22/12			5	0
10/23/12			5	0
10/24/12			5	0
10/25/12			5	0
10/26/12			5	0
10/27/12			5	0
10/28/12			5	0
10/29/12			5	0
10/30/12			5	0
10/31/12			5	0

Northside WPCF DO Measurements				
Date	Upstream	Downstream	State MIN	Difference
11/01/12			5	0
11/02/12			5	0
11/03/12			5	0
11/04/12			5	0
11/05/12			5	0
11/06/12			5	0
11/07/12			5	0
11/08/12			5	0
11/09/12			5	0
11/10/12			5	0
11/11/12			5	0
11/12/12			5	0
11/13/12			5	0
11/14/12			5	0
11/15/12			5	0
11/16/12	10.79	9.58	5	-1.21
11/17/12			5	0
11/18/12			5	0
11/19/12	12.97	10.47	5	-2.5
11/20/12			5	0
11/21/12			5	0
11/22/12			5	0
11/23/12			5	0
11/24/12			5	0
11/25/12			5	0
11/26/12			5	0
11/27/12			5	0
11/28/12			5	0
11/29/12			5	0
11/30/12			5	0
12/01/12			5	0
12/02/12			5	0
12/03/12			5	0
12/04/12			5	0
12/05/12			5	0
12/06/12			5	0
12/07/12			5	0
12/08/12			5	0
12/09/12			5	0
12/10/12			5	0
12/11/12			5	0
12/12/12			5	0
12/13/12			5	0
12/14/12			5	0
12/15/12			5	0
12/16/12			5	0
12/17/12			5	0
12/18/12			5	0
12/19/12			5	0
12/20/12			5	0
12/21/12			5	0
12/22/12			5	0
12/23/12			5	0
12/24/12			5	0
12/25/12			5	0
12/26/12			5	0
12/27/12			5	0
12/28/12			5	0
12/29/12			5	0
12/30/12			5	0
12/31/12			5	0


Northside WPCF Dissolved Oxygen Data
Upstream D.O.
Downstream D.O.
DO WQ Criteria
Dissolved Oxygen (mg/L)
16.00
14.00
12.00
10.00
8.00
6.00
4.00
8/1/2006
11/1/2006
2/1/2007
5/1/2007
8/1/2007
11/1/2007
2/1/2008
5/1/2008
8/1/2008
11/1/2008
2/1/2009
5/1/2009
8/1/2009
11/1/2009
2/1/2010
5/1/2010
8/1/2010
11/1/2010
2/1/2011
5/1/2011
8/1/2011
11/1/2011
2/1/2012
5/1/2012
8/1/2012
11/1/2012
Date

H.C. Morgan WPCF DO Data

H.C. Morgan WPCF DO Measurements				
Date	Upstream	Downstream	State MIN	Difference
1/1/12			5	0.00
1/2/12	11.16	9.70	5	-1.46
1/3/12	11.21	10.09	5	-1.12
1/4/12	12.48	9.30	5	-3.18
1/5/12	11.70	9.80	5	-1.90
1/6/12	11.60	9.90	5	-1.70
1/7/12			5	0.00
1/8/12			5	0.00
1/9/12	9.95	9.72	5	-0.23
1/10/12	9.63	9.67	5	0.04
1/11/12	10.13	9.51	5	-0.62
1/12/12	10.03	9.04	5	-0.99
1/13/12	12.07	10.48	5	-1.59
1/14/12			5	0.00
1/15/12			5	0.00
1/16/12	10.97	10.40	5	-0.57
1/17/12	10.71	10.01	5	-0.70
1/18/12	10.68	9.63	5	-1.05
1/19/12	10.39	9.00	5	-1.39
1/20/12	9.77	9.44	5	-0.33
1/21/12			5	0.00
1/22/12			5	0.00
1/23/12	10.08	9.68	5	-0.40
1/24/12	9.89	9.84	5	-0.05
1/25/12	10.31	9.50	5	-0.81
1/26/12	10.24	9.43	5	-0.81
1/27/12	10.09	9.76	5	-0.33
1/28/12			5	0.00
1/29/12			5	0.00
1/30/12	11.40	10.10	5	-1.30
1/31/12	10.00	9.03	5	-0.97
2/1/12	10.04	9.47	5	-0.57
2/2/12	9.54	9.33	5	-0.21
2/3/12	10.60	10.22	5	-0.38
2/4/12			5	0.00
2/5/12			5	0.00
2/6/12	10.31	9.40	5	-0.91
2/7/12	10.18	9.45	5	-0.73
2/8/12	11.25	9.63	5	-1.62
2/9/12	11.18	9.14	5	-2.04
2/10/12	11.52	9.54	5	-1.98
2/11/12			5	0.00
2/12/12			5	0.00
2/13/12	12.55	10.61	5	-1.94
2/14/12	11.82	11.44	5	-0.38
2/15/12	11.20	10.30	5	-0.90
2/16/12	10.20	10.07	5	-0.13
2/17/12	10.37	10.05	5	-0.32
2/18/12			5	0.00
2/19/12			5	0.00
2/20/12	11.11	10.30	5	-0.81
2/21/12	11.07	10.12	5	-0.95
2/22/12	10.67	9.92	5	-0.75
2/23/12	10.42	9.78	5	-0.64
2/24/12	9.34	9.20	5	-0.14
2/25/12			5	0.00
2/26/12			5	0.00
2/27/12	11.16	9.68	5	-1.48
2/28/12	10.51	10.00	5	-0.51
02/29/12	10.36	10.07	5	-0.29

H.C. Morgan WPCF DO Measurements				
Date	Upstream	Downstream	State MIN	Difference
3/1/12	10.33	10.07	5	-0.26
3/2/12	10.46	9.11	5	-1.35
3/3/12			5	0.00
3/4/12			5	0.00
3/5/12	10.21	9.10	5	-1.11
3/6/12	11.25	9.92	5	-1.33
3/7/12	11.28	9.36	5	-1.92
3/8/12	10.52	9.39	5	-1.13
3/9/12	9.86	9.56	5	-0.30
3/10/12			5	0.00
3/11/12			5	0.00
3/12/12	9.44	9.30	5	-0.14
3/13/12	9.73	9.44	5	-0.29
3/14/12	9.90	9.83	5	-0.07
3/15/12	9.70	9.31	5	-0.39
3/16/12	9.94	9.32	5	-0.62
3/17/12			5	0.00
3/18/12			5	0.00
3/19/12	10.06	9.27	5	-0.79
3/20/12	9.38	9.18	5	-0.20
3/21/12	9.10	9.11	5	0.01
3/22/12	9.05	9.08	5	0.03
3/23/12	8.84	8.88	5	0.04
3/24/12			5	0.00
3/25/12			5	0.00
3/26/12	9.66	9.47	5	-0.19
3/27/12	9.63	9.40	5	-0.23
3/28/12	9.90	9.16	5	-0.74
3/29/12	9.38	9.38	5	0.00
3/30/12	9.22	9.09	5	-0.13
3/31/12			5	0.00
4/1/12			5	0.00
4/2/12	9.11	9.00	5	-0.11
4/3/12	9.16	8.97	5	-0.19
4/4/12	9.01	8.93	5	-0.08
4/5/12	9.15	8.91	5	-0.24
4/6/12	9.52	8.99	5	-0.53
4/7/12			5	0.00
4/8/12			5	0.00
4/9/12	9.67	9.11	5	-0.56
4/10/12	9.75	9.26	5	-0.49
4/11/12	9.72	9.21	5	-0.51
4/12/12	10.40	9.22	5	-1.18
4/13/12	10.37	9.09	5	-1.28
4/14/12			5	0.00
4/15/12			5	0.00
4/16/12	9.01	8.93	5	-0.08
4/17/12	9.05	8.89	5	-0.16
4/18/12	9.36	9.09	5	-0.27
4/19/12	9.25	9.19	5	-0.06
4/20/12	9.16	8.88	5	-0.28
4/21/12			5	0.00
4/22/12			5	0.00
4/23/12	10.29	9.19	5	-1.10
4/24/12	10.57	9.33	5	-1.24
4/25/12	10.00	9.01	5	-0.99
4/26/12	9.32	8.91	5	-0.41
4/27/12	8.84	8.85	5	0.01
4/28/12			5	0.00
4/29/12			5	0
4/30/12	8.74	8.83	5	0.09

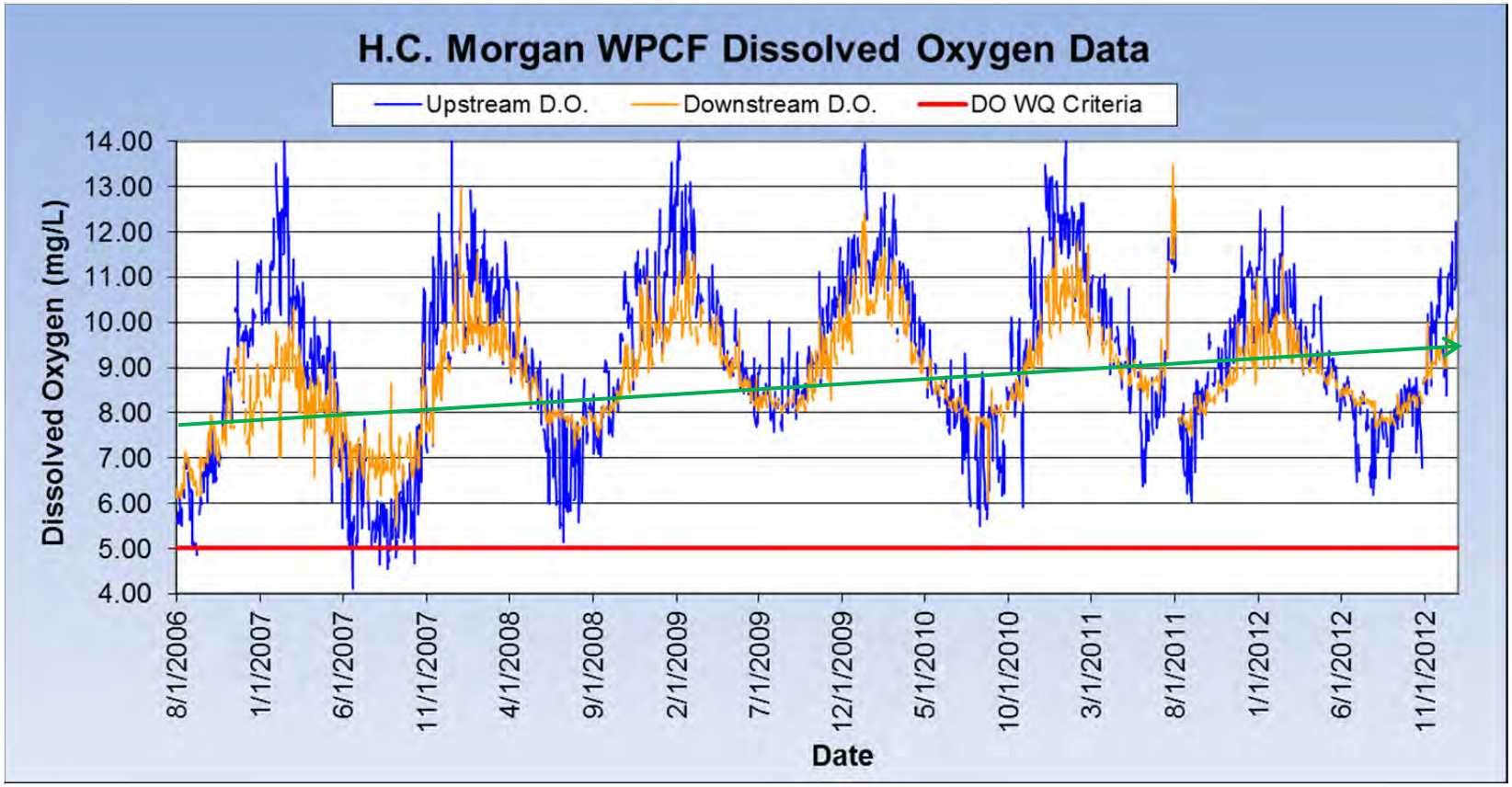
H.C. Morgan WPCF DO Data

H.C. Morgan WPCF DO Measurements				
Date	Upstream	Downstream	State MIN	Difference
5/1/12	8.60	8.71	5	0.11
5/2/12	8.55	8.72	5	0.17
5/3/12	8.90	8.69	5	-0.21
5/4/12	8.41	8.65	5	0.24
5/5/12			5	0.00
5/6/12			5	0.00
5/7/12	8.82	8.74	5	-0.08
5/8/12	9.02	8.73	5	-0.29
5/9/12	8.81	8.65	5	-0.16
5/10/12	9.37	8.82	5	-0.55
5/11/12	9.34	8.85	5	-0.49
5/12/12			5	0.00
5/13/12			5	0.00
5/14/12	9.15	8.99	5	-0.16
5/15/12	9.20	8.91	5	-0.29
5/16/12	9.02	8.77	5	-0.25
5/17/12	9.19	8.76	5	-0.43
5/18/12	8.92	8.77	5	-0.15
5/19/12			5	0.00
5/20/12			5	0.00
5/21/12	8.83	8.73	5	-0.10
5/22/12	8.67	8.62	5	-0.05
5/23/12	9.03	8.64	5	-0.39
5/24/12	8.26	8.67	5	0.41
5/25/12	8.44	8.55	5	0.11
5/26/12			5	0.00
5/27/12			5	0.00
5/28/12			5	0.00
5/29/12	7.85	8.39	5	0.54
5/30/12	8.44	8.49	5	0.05
5/31/12	8.06	8.36	5	0.30
6/1/12	8.52	8.49	5	-0.03
6/2/12			5	0.00
6/3/12			5	0.00
6/4/12	8.46	8.56	5	0.10
6/5/12	8.64	8.43	5	-0.21
6/6/12	8.34	8.37	5	0.03
6/7/12	8.18	8.47	5	0.29
6/8/12	8.15	8.50	5	0.35
6/9/12			5	0.00
6/10/12			5	0.00
6/11/12	8.60	8.48	5	-0.12
6/12/12	8.79	8.61	5	-0.18
6/13/12	8.64	8.47	5	-0.17
6/14/12	8.57	8.38	5	-0.19
6/15/12	8.69	8.52	5	-0.17
6/16/12			5	0.00
6/17/12			5	0.00
6/18/12	8.29	8.45	5	0.16
6/19/12	8.37	8.46	5	0.09
6/20/12	8.37	8.49	5	0.12
6/21/12	8.17	8.38	5	0.21
6/22/12	7.86	8.28	5	0.42
6/23/12			5	0.00
6/24/12			5	0.00
6/25/12	7.50	8.24	5	0.74
6/26/12	7.47	8.15	5	0.68
6/27/12	8.28	8.31	5	0.03
6/28/12	7.12	8.28	5	1.16
6/29/12	6.49	8.19	5	1.7
6/30/12			5	0

H.C. Morgan WPCF DO Measurements				
Date	Upstream	Downstream	State MIN	Difference
7/1/12			5	0.00
7/2/12	7.31	8.20	5	0.89
7/3/12	6.71	8.15	5	1.44
7/4/12			5	0.00
7/5/12	7.97	8.15	5	0.18
7/6/12	8.33	8.30	5	-0.03
7/7/12			5	0.00
7/8/12			5	0.00
7/9/12	8.25	8.25	5	0.00
7/10/12	8.21	8.27	5	0.06
7/11/12	8.46	8.42	5	-0.04
7/12/12	8.19	8.28	5	0.09
7/13/12	8.40	8.32	5	-0.08
7/14/12			5	0.00
7/15/12			5	0.00
7/16/12	7.78	8.19	5	0.41
7/17/12	7.60	8.23	5	0.63
7/18/12	8.08	8.23	5	0.15
7/19/12	7.77	8.30	5	0.53
7/20/12	7.65	8.23	5	0.58
7/21/12			5	0.00
7/22/12			5	0.00
7/23/12	6.72	8.25	5	1.53
7/24/12	6.36	8.19	5	1.83
7/25/12	6.83	8.19	5	1.36
7/26/12	6.56	8.13	5	1.57
7/27/12	7.87	8.25	5	0.38
7/28/12			5	0.00
7/29/12			5	0.00
7/30/12	6.20	8.16	5	1.96
7/31/12	6.87	8.23	5	1.36
8/1/12	8.00	8.25	5	0.25
8/2/12	6.56	7.70	5	1.14
8/3/12	6.89	7.77	5	0.88
8/4/12			5	0.00
8/5/12			5	0.00
8/6/12	7.13	7.78	5	0.65
8/7/12	7.13	7.70	5	0.57
8/8/12	7.85	7.81	5	-0.04
8/9/12	7.63	7.74	5	0.11
8/10/12	8.03	7.88	5	-0.15
8/11/12			5	0.00
8/12/12			5	0.00
8/13/12	8.08	7.96	5	-0.12
8/14/12	7.91	7.91	5	0.00
8/15/12	7.85	7.90	5	0.05
8/16/12	7.61	7.86	5	0.25
8/17/12	7.42	7.82	5	0.40
8/18/12			5	0.00
8/19/12			5	0.00
8/20/12	7.85	7.83	5	-0.02
8/21/12	7.65	7.81	5	0.16
8/22/12	7.59	7.89	5	0.30
8/23/12	7.38	7.87	5	0.49
8/24/12	7.24	7.84	5	0.60
8/25/12			5	0.00
8/26/12			5	0.00
8/27/12	7.05	7.84	5	0.79
8/28/12	6.55	7.74	5	1.19
08/29/12	7.56	7.77	5	0.21
08/30/12	7.15	7.81	5	0.66
08/31/12	8.01	7.97	5	-0.04

H.C. Morgan WPCF DO Measurements				
Date	Upstream	Downstream	State MIN	Difference
9/1/12			5	0.00
9/2/12			5	0.00
9/3/12	7.80	7.88	5	0.08
9/4/12	7.16	7.83	5	0.67
9/5/12	8.03	7.85	5	-0.18
9/6/12	8.08	7.75	5	-0.33
9/7/12	7.79	7.77	5	-0.02
9/8/12			5	0.00
9/9/12			5	0.00
9/10/12	8.15	7.97	5	-0.18
9/11/12	7.63	7.99	5	0.36
9/12/12	8.27	8.40	5	0.13
9/13/12	7.96	8.02	5	0.06
9/14/12	7.86	7.97	5	0.11
9/15/12			5	0.00
9/16/12			5	0.00
9/17/12	8.06	7.91	5	-0.15
9/18/12	7.88	7.86	5	-0.02
9/19/12	8.51	8.03	5	-0.48
9/20/12	8.24	8.17	5	-0.07
9/21/12	7.70	8.00	5	0.30
9/22/12			5	0.00
9/23/12			5	0.00
9/24/12	8.48	8.13	5	-0.35
9/25/12	8.61	8.23	5	-0.38
9/26/12	8.08	8.17	5	0.09
9/27/12	8.02	8.19	5	0.17
9/28/12	8.54	8.00	5	-0.54
9/29/12			5	0.00
9/30/12			5	0.00
10/1/12			5	0.00
10/2/12	8.40	8.06	5	-0.34
10/3/12	8.63	8.43	5	-0.20
10/4/12	8.74	8.21	5	-0.53
10/5/12	8.34	8.21	5	-0.13
10/6/12			5	0.00
10/7/12			5	0.00
10/8/12	8.52	8.31	5	-0.21
10/9/12	7.71	8.27	5	0.56
10/10/12	8.54	8.35	5	-0.19
10/11/12	8.60	8.38	5	-0.22
10/12/12	8.32	8.32	5	0.00
10/13/12			5	0.00
10/14/12			5	0.00
10/15/12	7.13	8.16	5	1.03
10/16/12	8.77	8.35	5	-0.42
10/17/12	8.22	8.31	5	0.09
10/18/12	7.42	8.13	5	0.71
10/19/12	7.62	8.20	5	0.58
10/20/12			5	0.00
10/21/12			5	0.00
10/22/12	8.36	8.44	5	0.08
10/23/12	7.80	8.47	5	0.67
10/24/12	7.56	8.35	5	0.79
10/25/12	7.54	8.33	5	0.79
10/26/12	6.78	8.19	5	1.41
10/27/12			5	0.00
10/28/12			5	0.00
10/29/12	8.64	8.64	5	0.00
10/30/12	8.78	8.71	5	-0.07
10/31/12	8.78	8.75	5	-0.03

H.C. Morgan WPCF DO Measurements				
Date	Upstream	Downstream	State MIN	Difference
11/1/12	8.53	8.73	5	0.20
11/2/12	8.44	8.80	5	0.36
11/3/12			5	0.00
11/4/12			5	0.00
11/5/12	8.40	8.77	5	0.37
11/6/12	10.18	10.01	5	-0.17
11/7/12	9.22	8.83	5	-0.39
11/8/12	9.61	8.93	5	-0.68
11/9/12	9.90	8.92	5	-0.98
11/10/12			5	0.00
11/11/12			5	0.00
11/12/12	8.58	8.77	5	0.19
11/13/12	10.43	9.04	5	-1.39
11/14/12	9.95	9.15	5	-0.80
11/15/12	10.02	9.08	5	-0.94
11/16/12	9.78	9.08	5	-0.70
11/17/12			5	0.00
11/18/12			5	0.00
11/19/12	10.04	9.13	5	-0.91
11/20/12	9.47	9.04	5	-0.43
11/21/12	9.64	9.14	5	-0.50
11/22/12	9.90	9.40	5	-0.50
11/23/12	10.36	9.27	5	-1.09
11/24/12			5	0.00
11/25/12			5	0.00
11/26/12	10.95	9.45	5	-1.50
11/27/12	10.10	9.15	5	-0.95
11/28/12	10.84	9.36	5	-1.48
11/29/12	11.18	9.32	5	-1.86
11/30/12	10.63	9.41	5	-1.22
12/1/12			5	0.00
12/2/12			5	0.00
12/3/12	9.39	9.22	5	-0.17
12/4/12	9.43	9.17	5	-0.26
12/5/12	9.01	9.01	5	0.00
12/6/12	8.85	9.00	5	0.15
12/7/12	8.79	9.07	5	0.28
12/8/12			5	0.00
12/9/12			5	0.00
12/10/12	8.38	8.99	5	0.61
12/11/12	10.19	9.27	5	-0.92
12/12/12	10.26	9.47	5	-0.79
12/13/12	10.93	9.72	5	-1.21
12/14/12	11.09	9.69	5	-1.40
12/15/12			5	0.00
12/16/12			5	0.00
12/17/12	10.36	9.63	5	-0.73
12/18/12	10.78	9.55	5	-1.23
12/19/12	11.30	9.55	5	-1.75
12/20/12	10.29	9.39	5	-0.90
12/21/12	11.78	9.79	5	-1.99
12/22/12			5	0.00
12/23/12			5	0.00
12/24/12	11.04	9.65	5	-1.39
12/25/12			5	0.00
12/26/12	10.72	9.76	5	-0.96
12/27/12	10.88	9.92	5	-0.96
12/28/12	12.22	10.07	5	-2.15
12/29/12			5	0.00
12/30/12			5	0
12/31/12	12.27	10.17	5	-2.1


H.C. Morgan WPCF Dissolved Oxygen Data
Upstream D.O.
Downstream D.O.
DO WQ Criteria
Dissolved Oxygen (mg/L)
14.00
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
8/1/2006
1/1/2007
6/1/2007
11/1/2007
4/1/2008
9/1/2008
2/1/2009
7/1/2009
12/1/2009
5/1/2010
10/1/2010
3/1/2011
8/1/2011
1/1/2012
6/1/2012
11/1/2012
Date

5.0 Sanitary Sewer Overflow Tracking

5.1 Purpose

Sanitary Sewer Overflows (SSO's) can occur for any number of reasons, the majority of which are from blockages due to fats, oils, grease (FOG) and/or debris, root intrusion blockages, and/or inflow and infiltration (I & I) that result in flows exceeding design capacities. Although many overflows may subside naturally, the underlying cause must be addressed to reduce the likelihood of reoccurring problems. With over 250 miles of sanitary sewer line, 5,500 manholes, and more than 50 square miles of area to cover it can be difficult to keep up with when and where overflows have occurred, which ones have been resolved, which ones are reoccurring problems, and which ones need additional attention. For this reason, the Water Resource Management Department developed a GIS tracking database to monitor SSO's and to identify areas that may need additional attention. SSO's are tracked by location, discharge, cause of blockage, receiving water body, WPCF, and reporting status (see table on next page). This database allows for efficient and timely identification and prioritization of where I & I analysis may be necessary as well as where rehabilitation and/or additional capacity may be needed.

5.2 Definition and Methods

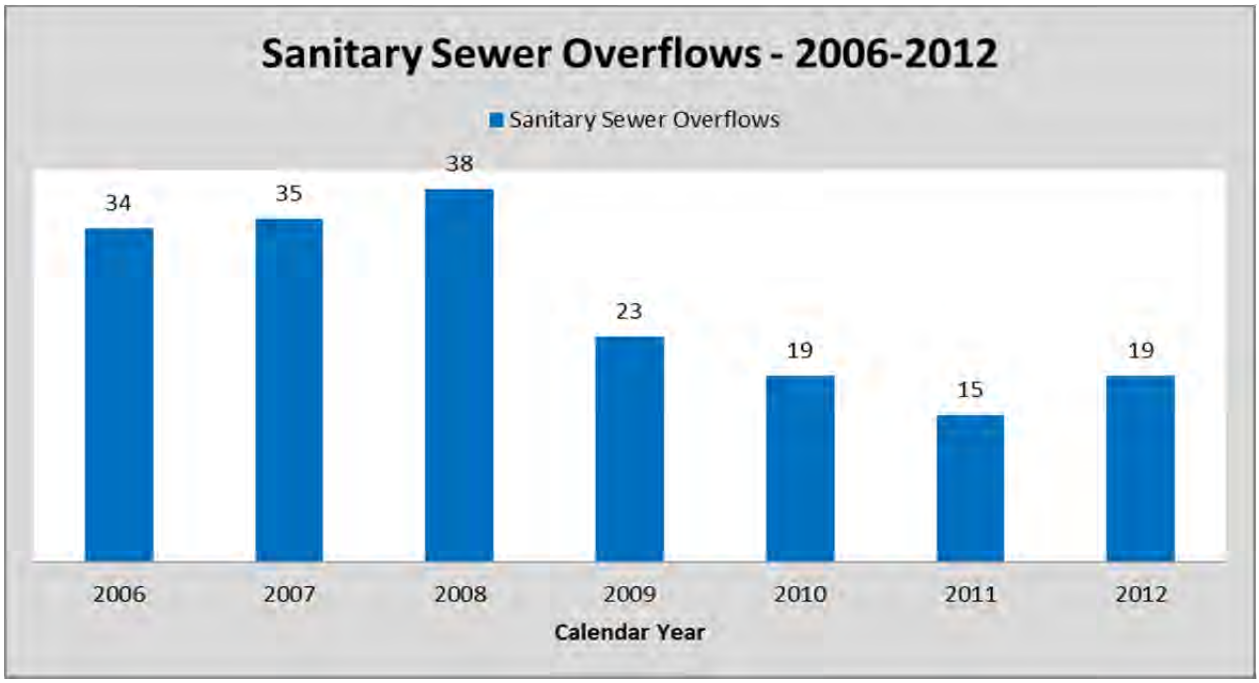
SSO's occur when untreated sanitary sewage is unintentionally discharged from sanitary sewer infrastructure. These SSO's may occur when there is a blockage in a sanitary sewer line and/or when the capacity of the sanitary sewer line is exceeded through internal or external factors. The Alabama Department of Environmental Management (ADEM) requires that owners of sanitary sewer utility infrastructure monitor for and report SSO's and the correction action(s) taken to address them. The City uses a geographic information system (GIS) database to track the occurrence of these SSO's, thus allowing for the analysis of trends and for the tracking of improvements once improvements have been made.

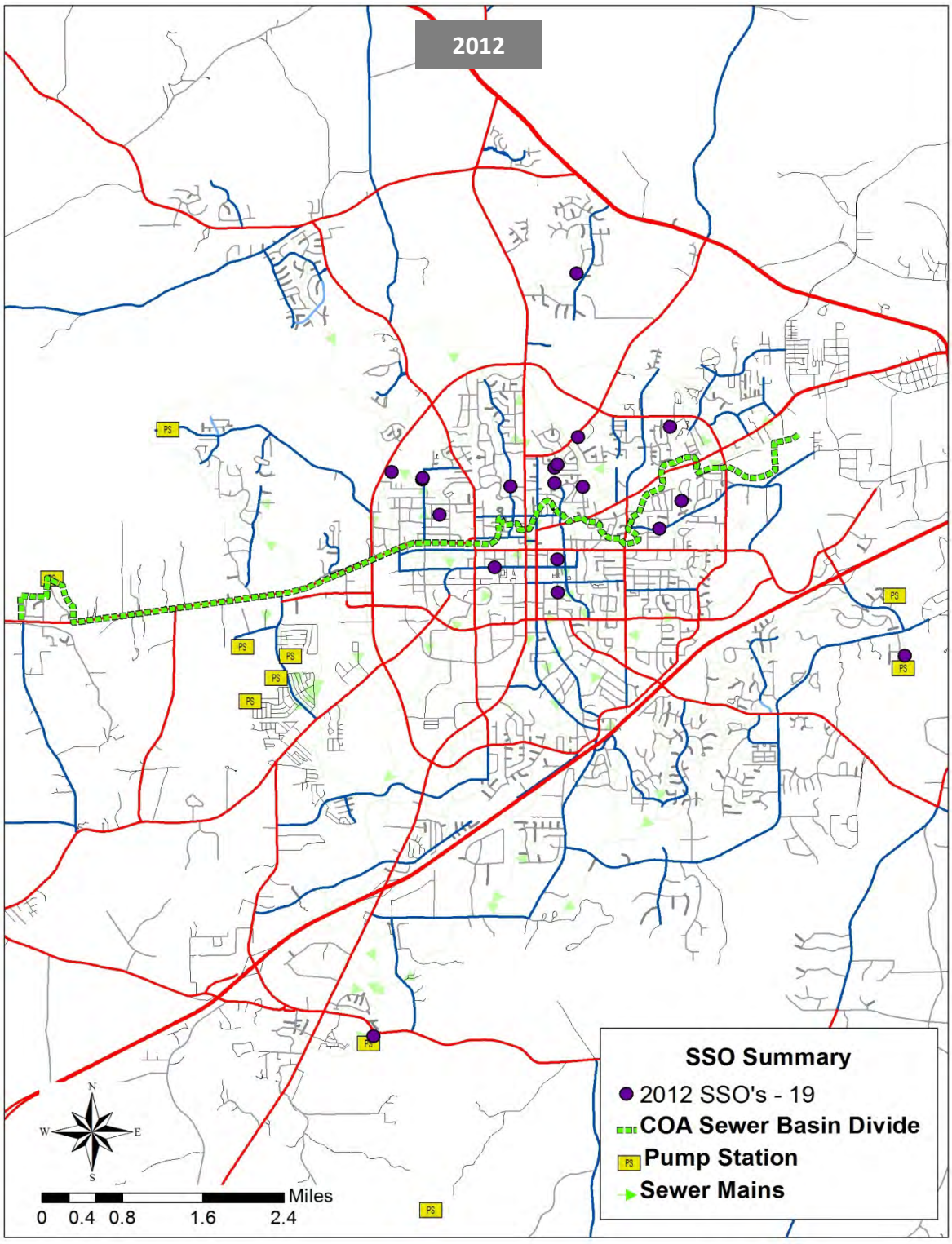
5.3 Results and Brief Discussion

The City of Auburn has aggressively sought to make improvements to its sanitary sewer conveyance and treatment infrastructure. These improvements include upgrades to the City's WPCF's, upsizing sanitary sewer lines to increase capacity, rehabilitation of sanitary sewer lines to address inflow and infiltration (I & I), and targeted root and grease treatment. By tracking and mapping the occurrence of SSO's, the City has been able to directly document the reductions attributed to these efforts. By 2010, a 50 percent reduction of SSO's had been documented. The number of SSO's in 2012, though slightly higher than 2011, provides continued evidence that the City's efforts having a positive impact.

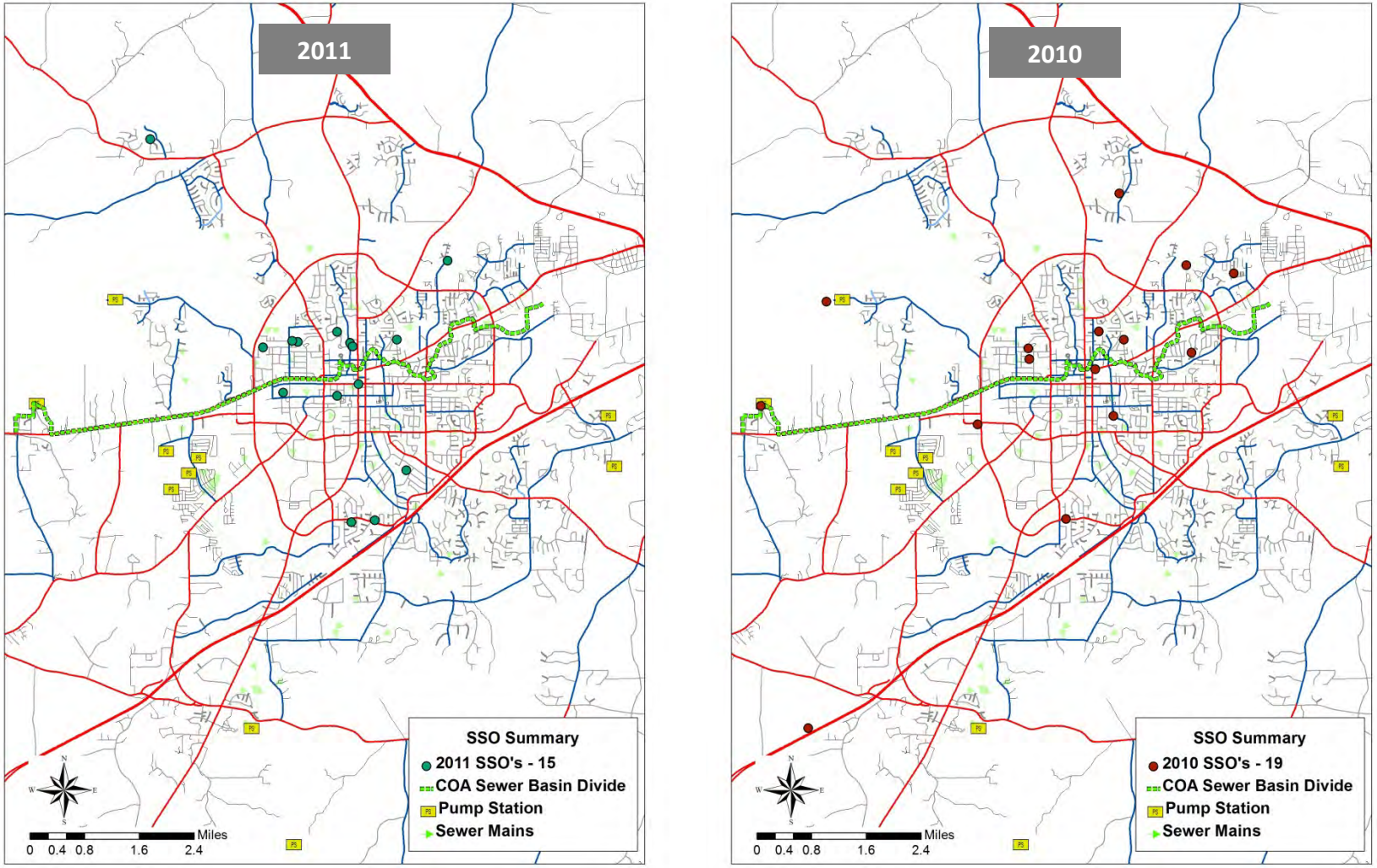
Location	Waterbody	Incidents	WWTP	Reportable	Cause	Date
1404 Shug Jordan Parkway	Saugahatchee Creek	6	Northside	Yes, Yes, Yes, Yes, No, Yes	Roots	11/29/05, 1/8/06, 3/4/06, 5/17/06, 12/18/09, 5/13/12
1127 Bond Avenue	Saugahatchee Creek	4	Northside	Yes, Yes, Yes, Yes	Grease	8/23/06, 6/3/07, 2/20/08, 7/17/12
Foster Street (SH Park)	Saugahatchee Creek	2	Northside	Yes, Yes	Grease	4/19/04, 10/9/12
633 Sanders Street	Saugahatchee Creek	2	Northside	Yes, Yes	Roots, Tissue/Debris	12/18/05, 11/17/12
504 Shelton Mill Road	Saugahatchee Creek	2	Northside	No, No	Roots, Tissue/Debris	12/16/2008, 2/22/12
616 Sandhill Road	Parkerson Mill Creek	2	Southside	Yes, Yes	Other, Other	2/28/2009, 3/9/12
637 Pitts Street	Saugahatchee Creek	3	Northside	Yes, No, No	Tissue/Debris	2/23/10, 6/9/11, 2/14/12
334 W. Magnolia Avn.	Parkerson Mill Creek	2	Southside	Yes, Yes	Tissue/Debris, Grease	1/19/11, 1/9/12
161 N. Ross Street	Town Creek	1		No	Grease	8/31/12
633 Burke Place	Moores Mill Creek	1	Southside	Yes	Tissue/Debris	11/8/12
1058 Birch Circle	Moores Mill Creek	1	Southside	Yes	Tissue/Debris	3/22/12
561 Hamilton Hills road	Chewacla Creek	1	Southside	Yes	Other	4/11/12
241 Payne Street	Town Creek	1	Southside	Yes	Grease	5/16/12
733 Carver Avenue	Saugahatchee Creek	1	Northside	No	Grease	11/11/12
2025 Brenton Lane	Saugahatchee Creek	1	Northside	No	Roots	10/27/12
664 Center Place	Saugahatchee Creek	1	Northside	Yes	Tissue/Debris	2/12/12
815 Cahaba Drive	Saugahatchee Creek	1	Northside	Yes	Roots	6/17/12
803 Cahaba Drive	Saugahatchee Creek	1	Northside	Yes	Tissue/Debris	7/23/12
850 Foster Street	Saugahatchee Creek	1	Northside	Yes	Other	2/6/12

Sanitary Sewer Overflows that Occurred in 2012

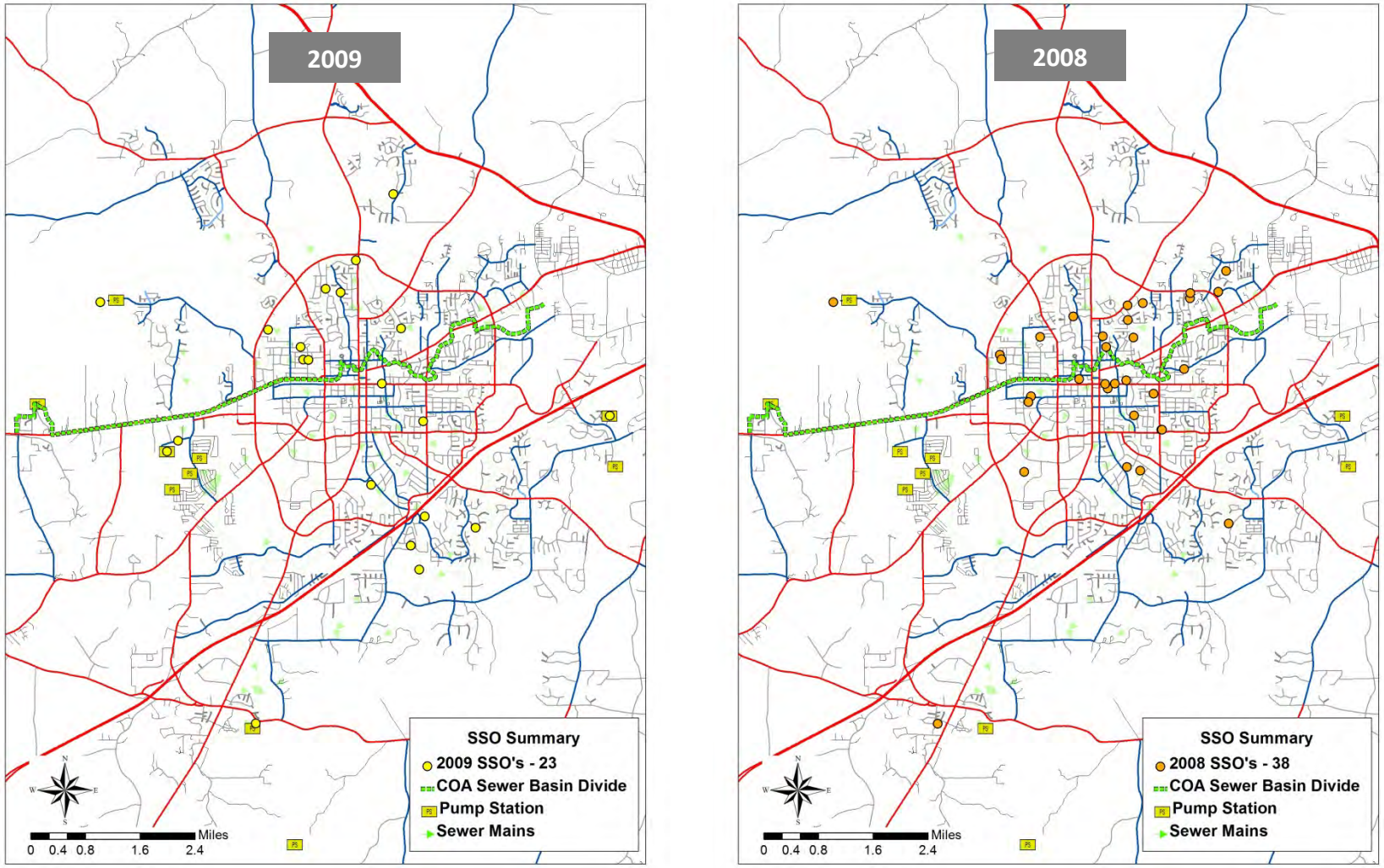




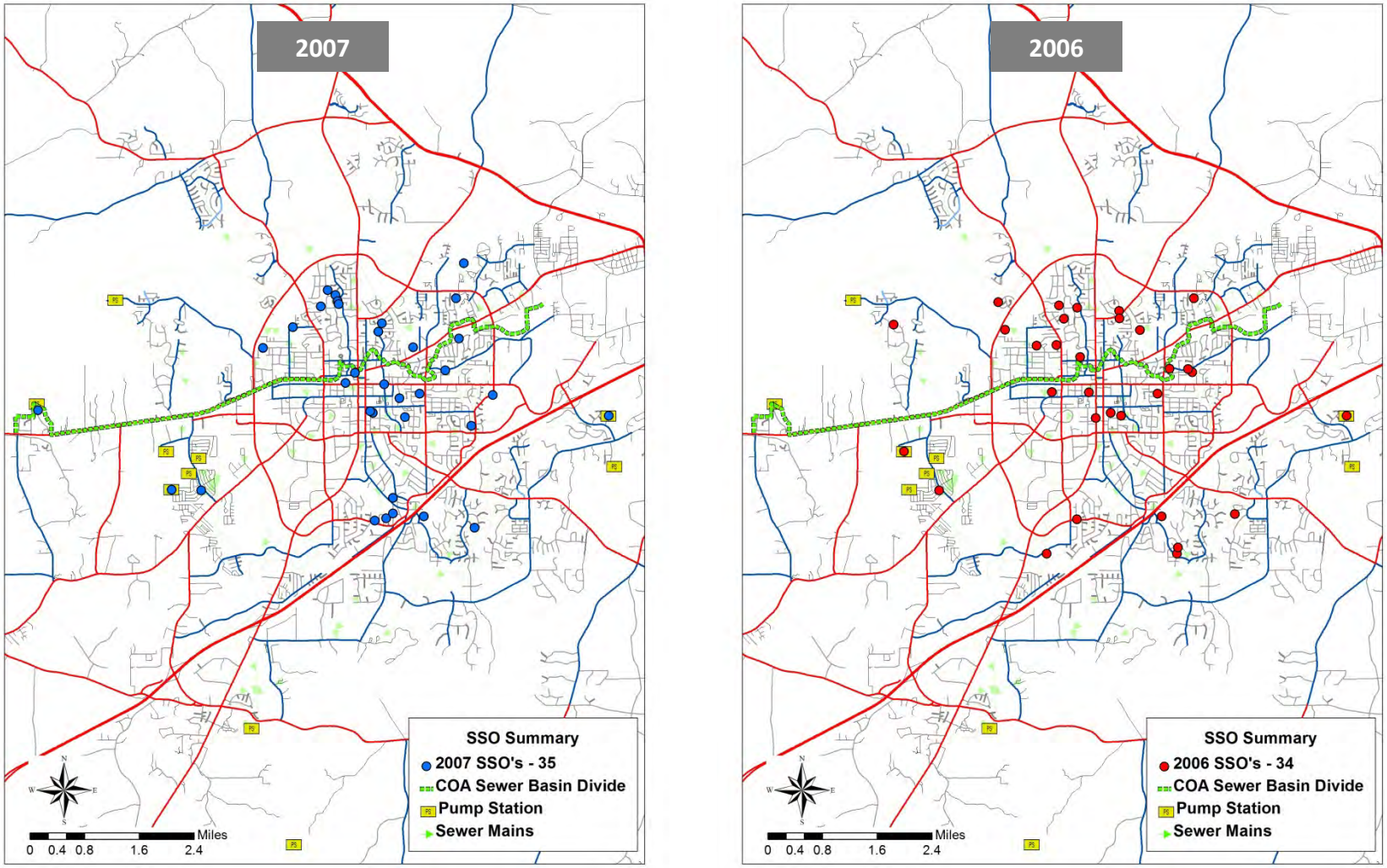
Map of Sanitary Sewer Overflows for 2012



Map of Sanitary Sewer Overflows for the 2010 and 2011 Calendar Years



Map of Sanitary Sewer Overflows for the 2008 and 2009 Calendar Years



Map of Sanitary Sewer Overflows for the 2006 and 2007 Calendar Years

6.0 Nutrient Monitoring (Saugahatchee TMDL)

6.1 Purpose

The Saugahatchee Creek Embayment was originally placed on the State's 303(d) list of impaired waterbodies in 1996 for Organic Enrichment/Dissolved Oxygen (OE/DO) and nutrients. It remained on the State's 303(d) list after each consecutive two-year water quality assessment until 2008, when a TMDL was finalized and approved by the EPA. Additionally, Pepperell Branch, an unnamed tributary of Saugahatchee Creek which originates in Opelika, also remained on the State's 303(d) list from 1998 to 2008 for nutrients (previous listings for unknown toxicity). At no time has the main stem of Saugahatchee Creek been added to the State's 303(d) list. In order to address water quality concerns within the Saugahatchee Embayment a watershed-based TMDL was created, which also addressed nutrient loading from Pepperell Branch. The final Saugahatchee Creek Watershed TMDL was issued in April of 2008, identifying Total Phosphorus (TP) as the primary pollutant of concern (expressed as Chlorophyll *a* to satisfy numeric target criteria of water quality in lakes). After the finalization of the TMDL, the Saugahatchee Creek Embayment of Yates Reservoir was downgraded from Category 5 impairment to a Category 4a waterbody.

Following the ADEM's *Nutrient Criteria Implementation Plan* (September 2007), Chlorophyll *a* is identified as the target water quality parameter for assessing cultural eutrophication within lakes and reservoirs. With TP identified as the limiting nutrient in controlling algal blooms and subsequent eutrophication, a 93% reduction (2.67 mg/l to 0.2 mg/l) in the growing season mean TP concentration discharging from the City of Auburn Northside WPCF was determined as necessary to obtain the target Chlorophyll *a* concentration of 12 *u*g/l within the Saugahatchee Embayment of Yates Reservoir. Additionally, a 50% reduction (0.19 mg/l to 0.1 mg/l) in TP concentrations in stormwater runoff was also identified as necessary to obtain target Chlorophyll *a* concentrations. Therefore, the City of Auburn is committed to monitoring for nutrients (TP) within its stormwater discharges to characterize landuse/landcover relationships to TP loading, identify potential sources of TP, and to identify which BMP's it should employ and where to best concentrate its control efforts.

6.2 Definition and Methods

Initial Characterization Study - All stormwater monitoring (and in-stream monitoring) associated with the initial characterization study was performed using Global Water WS750 automatic stormwater sampling equipment. These automatic stormwater sampling devices are equipped with composite sampling capabilities, which present the opportunity to evaluate event mean concentration (EMC) of TP during each storm event. The samplers are equipped with an optional rainfall accumulation and wet-sensor (level) trigger to allow for monitoring of various scenarios and triggering criteria. Typically, samplers were programmed to begin sampling within the first 30-minutes of a ¾ inch/24-hour storm event, thereafter retrieving and mixing 150

mL aliquots every 5 minutes until a one-gallon collection jar was filled. Samples were retrieved within 24 hours of the final sample and taken to a certified lab for analysis. All analysis has followed EPA approved methods for determination of TP concentrations (EPA 365.4).

Main Stem Baseline Monitoring – All sampling associated with the monitoring of TP in the main stem of Saugahatchee Creek is performed using Global Water WS750 automatic stormwater sampling equipment. All sampling associated with the main stem baseline monitoring occurred at least 72-hours or more after a measurable storm event. Typically, samplers were programmed to retrieve and mix 150 mL aliquots every hour for a 24-hour interval. Samples were retrieved within 24 hours of the final sample and taken to a certified lab for analysis. All analysis has followed EPA approved methods for determination of total phosphorus concentrations (EPA 365.4).

6.3 Monitoring Stations and Locations

Initial Characterization Study

Aubie Dr. – ***Predominantly High Density Residential with some Commercial/Retail***

Latitude *32, 37, 57.118 N*; Longitude *85, 26, 42.215 W*

Camden Ridge – ***Medium Density Residential***

Latitude *32, 38, 39.744 N;* Longitude *85, 31, 4.925 W*

Creekside Condos – ***Mixed Retail/Commercial/Residential***

Latitude *32, 36, 59.481 N;* Longitude *85, 28, 5.24* W

Flint's Crossing – ***Managed Turf***

Latitude *32, 37, 26.91 N;* Longitude *85, 26, 45.592 W*

Control - ***Forested***

Latitude *32, 33, 39.348 N;* Longitude *85, 30, 37.436 W*

Main Stem Baseline Monitoring

Upstream – Located on Saugahatchee Creek main stem and is located at the US Highway 280 crossing.

Latitude *32, 39, 28.708 N*; Longitude *85, 27, 33.229 W*

Downstream – Located on Saugahatchee Creek main stem, immediately downstream of the Northside WPCF.

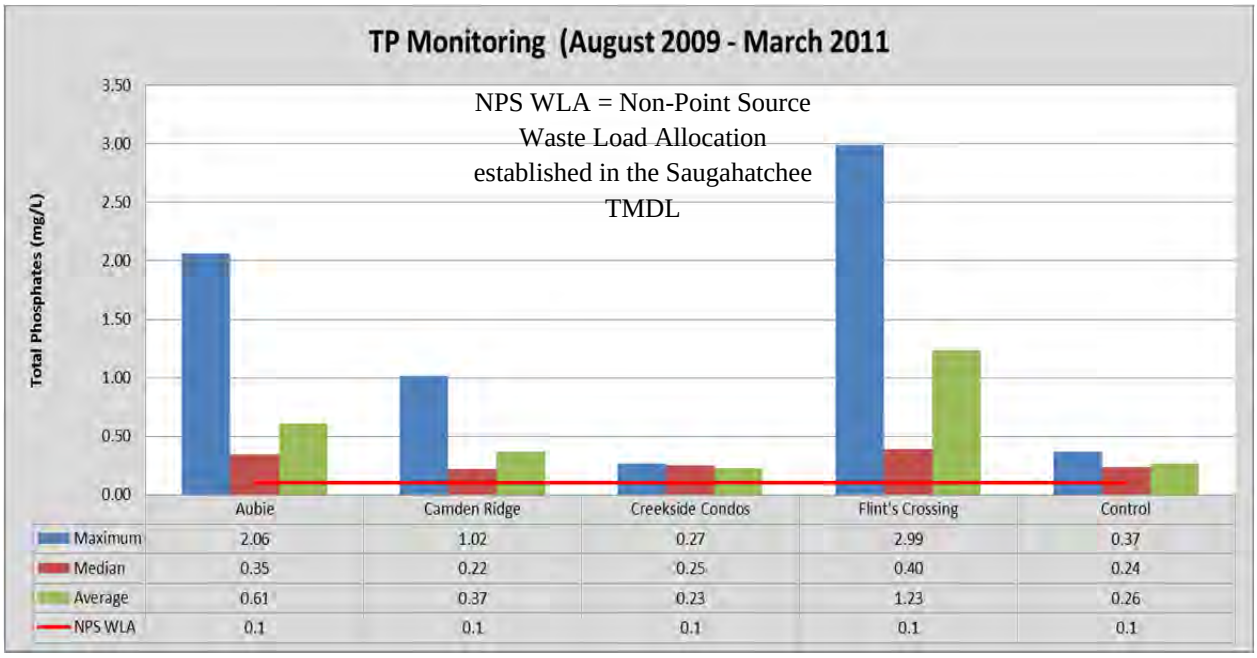
Latitude *32, 37, 40.252 N*; Longitude *85, 32, 51.6 W*

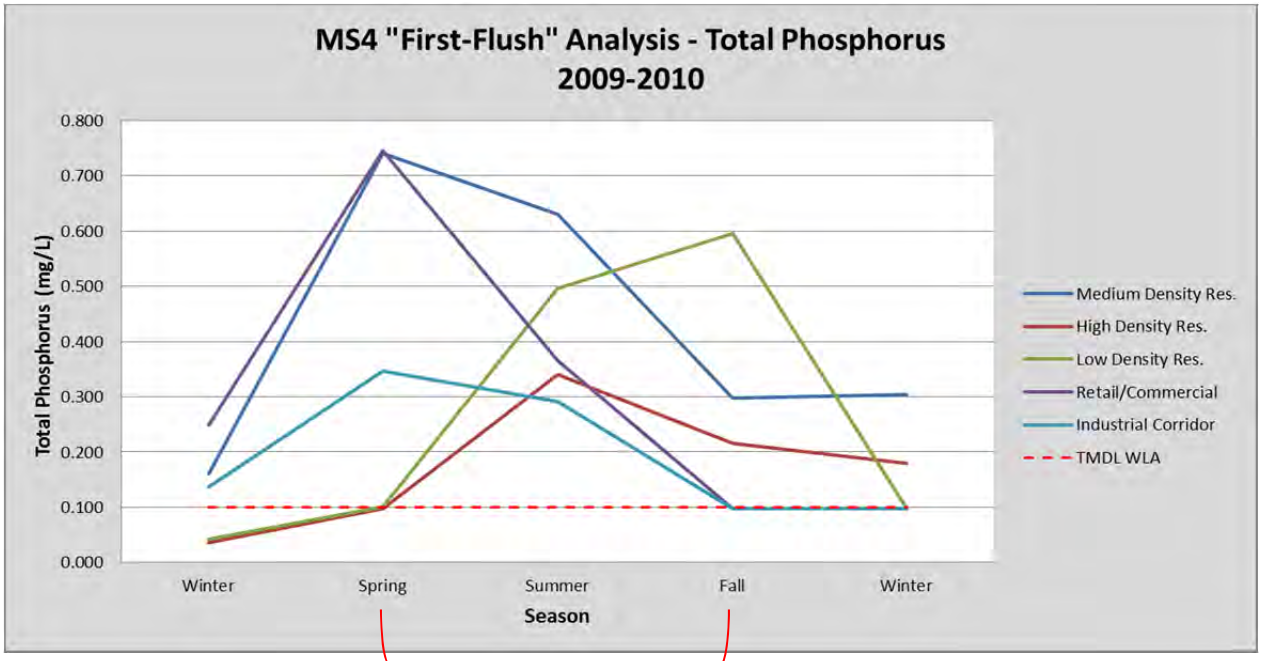
**See Insert for Maps of All Water Quality Monitoring Locations*

6.4 Results and Brief Discussion

Initial Characterization Study - After the finalization of the TMDL, initial monitoring efforts were designed to evaluate and characterize the relationship between local landuse/landcover scenarios with respect to TP in stormwater runoff. These data have enabled the City to characterize various landuse/landcover patterns according to their potential to contribute to nutrient pollution with the Saugahatchee Creek Watershed. The 2010 monitoring year was the second and final year of monitoring in association with the characterization study. The potential for high concentrations of Total Phosphorus were noticeably greater in the managed turf (Flint monitoring station) and high density/mixed development (Aubie monitoring station) landuse/landcover scenarios. Additionally, the collective data indicates an increase in Total Phosphorus concentrations during the Spring-Fall growing season. These data will allow the City to confidently concentrate its best management practices targeting Total Phosphorus in basins with similar landuse/landcover scenarios.

Total Phosphorus - Initial Characterization Study						
Date	**Sample Period**	**Aubie**	**Camden Ridge**	**Creekside Condos**	**Flint's Crossing**	**Control**
8/17/09	Sample 1	BDL	0.11	BDL	N/A	N/A
9/21/09	Sample 2	0.20	0.20	0.17	N/A	N/A
10/5/09	Sample 3	BDL	0.14	BDL	0.40	N/A
10/13/09	Sample 4	N/A	N/A	N/A	N/A	0.37
10/27/09	Sample 5	0.12	0.24	0.27	BDL	0.18
1/21/10	Sample 6	0.14	BDL	BDL	BDL	BDL
5/7/10	Sample 7	2.06	0.21	BDL	2.99	N/A
8/3/10	Sample 8	0.49	0.77	0.25	BDL	N/A
11/15/10	Sample 9	0.67	1.02	BDL	0.31	N/A
3/9/11	Sample 10	BDL	0.30	BDL	BDL	0.24
MAX		2.06	1.02	0.27	2.99	0.37
MED		0.35	0.22	0.25	0.40	0.24
AVG		0.61	0.37	0.23	1.23	0.26



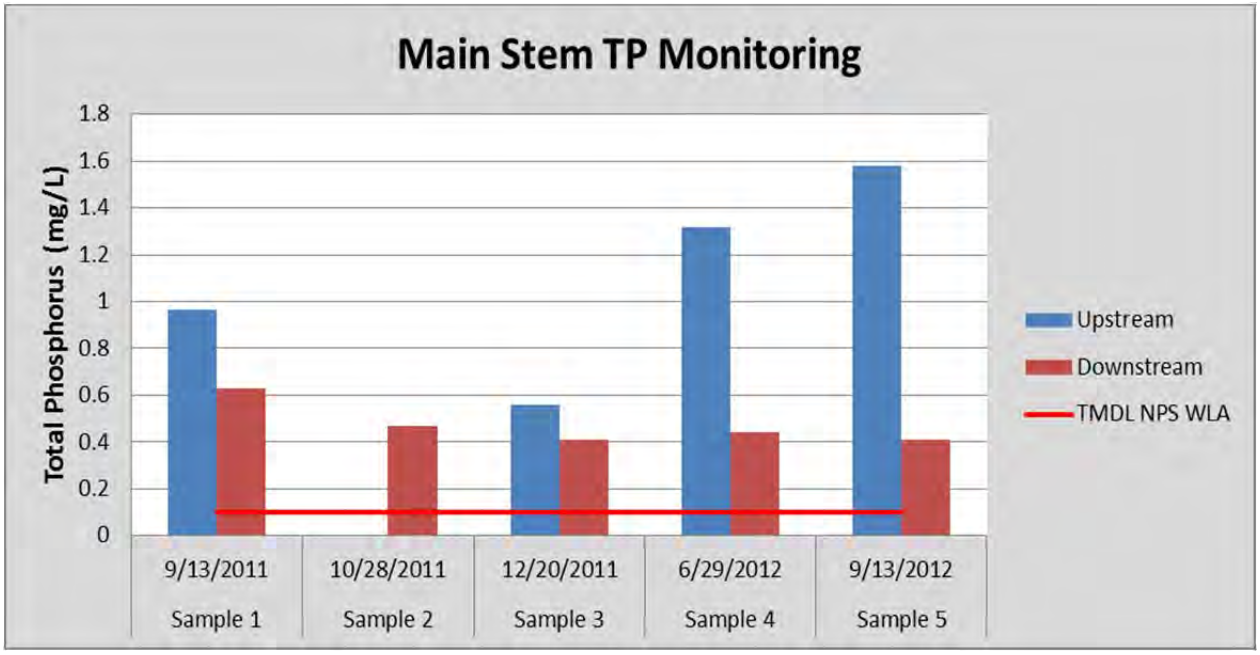


Increase during Growing Season

Mainstem Baseline Monitoring – Just as the characterization study was performed to analyze the relationship between landuse/landcover and TP in stormwater runoff, the transition to

baseline/baseflow monitoring of TP within the main stem of Saugahatchee Creek is being performed to better understand background (low-moderate flows) TP levels, both as Saugahatchee Creek enters and exits the City's Phase II jurisdiction. As of January 2013, a total of six 24-hour composite samples had been obtained at both the upstream and downstream monitoring stations. Although the dataset is still too small to confirm or eliminate any consistent trends with respect to TP concentrations entering and exiting the City's jurisdiction, four of the six sample sets indicate a higher TP concentration as Saugahatchee Creek enters the City limits at Highway 280. Of the twelve total samples, eleven were greater than the TMDL established NPS WLA of 0.1 mg/L TP.

Main Stem Saugahatchee TP Monitoring				
	Date	Upstream	Downstream	TMDL WLA
Sample 1	9/13/2011	0.963	0.629	0.1
Sample 2	10/28/2011	BDL	0.469	0.1
Sample 3	12/20/2011	0.557	0.412	0.1
Sample 4	6/29/2012	1.32	0.444	0.1
Sample 5	9/13/2012	1.58	0.408	0.1
Sample 6	2/21/2013	BDL	BDL	0.1



7.0 Ammonia (Nitrogen) Monitoring Program

7.1 Purpose

Parkerson Mill Creek was listed by the Alabama Department of Environmental Management (ADEM) as an impaired waterbody in 2008, with the cause of impairment identified as pathogens. Subsequently, the ADEM developed a Total Maximum Daily Load for Parkerson Mill Creek in September of 2011. The ADEM currently recognizes E-Coli as the indicator organism for purposes of evaluating bacteriological impairments of State waters. Furthermore, ADEM classifies the designated use of Parkerson Mill Creek to be Fish & Wildlife, for which bacteriological water quality criteria are:

(i) *In non-coastal waters, bacteria of the E. coli group shall not exceed a geometric mean of 548 colonies/100 ml; nor exceed a maximum of 2,507 colonies/100 ml in any sample. In coastal waters, bacteria of the enterococci group shall not exceed a maximum of 275 colonies/100 ml in any sample. The geometric mean shall be calculated from no less than five samples collected at a given station over a 30-day period at intervals not less than 24 hours.*

(ii) *For incidental water contact and recreation during June through September, the bacterial quality of water is acceptable when a sanitary survey by the controlling health authorities reveals no source of dangerous pollution and when the geometric mean E. coli organism density does not exceed 126 colonies/100 ml nor exceed a maximum of 487 colonies/100 ml in any sample in non-coastal waters. In coastal waters, bacteria of the enterococci group shall not exceed a geometric mean of 35 colonies/100 ml nor exceed a maximum of 158 colonies/100 ml in any sample. The geometric mean shall be calculated from no less than five samples collected at a given station over a 30-day period at intervals not less than 24 hours. When the geometric bacterial coliform organism density exceeds these levels, the bacterial water quality shall be considered acceptable only if a second detailed sanitary survey and evaluation discloses no significant public health risk in the use of the waters. Waters in the immediate vicinity of discharges of sewage or other wastes likely to contain*

Prior to the development of the TMDL, the City performed a side-by-side intensive monitoring study with the ADEM from April-November of 2010. The data obtained during this study supported the ADEM's listing of Parkerson Mill Creek as impaired. Furthermore, these data suggested that the majority of the pollutant loading was concentrated in the upper 1/3 of the Parkerson Mill Creek watershed. Thus, the City determined it would focus its efforts of source tracking and elimination in the headwaters and repeat the intensive study at a later date. As part of this source tracking effort, the City chose to use ammonia monitoring as a substitute for more costly and time-consuming E-Coli analysis. The results have been useful and informative,

helping to identify a number of private sanitary sewer concerns. The results of samples taken in 2012 are shown below.

7.2 Definition and Methods

Currently, the Water Resource Management Department performs ammonia (nitrogen) monitoring as needed and on a case-by-case basis. Monitoring is performed using HACH Ammonia (Nitrogen) Test Stips (http://www.hach.com/ammonia-nitrogen-test-strips-0-6-0-mg-l/product?id=7640211610), which have a range of 0-6 mg/L and present data in incremental steps of 0, 0.25, 0.5, 1.0, 3.0, and 6.0 mg/L. Staff follow the sampling procedures provided by the manufacturer. Typically, staff follow up on any sampling efforts which result in an ammonia (nitrogen) concentration above 0.5 mg/L. Follow may consist of one or more of the following; visual inspection of surround storm sewer and sanitary sewer, closed circuit television of the surround storm sewer and sanitary sewer, smoke testing of sanitary sewer, and dye testing of sanitary sewer (for confirmation of appropriate connection). Any findings of sanitary sewer discharge to the City's MS4 is immediately addressed using the most appropriate corrective action.

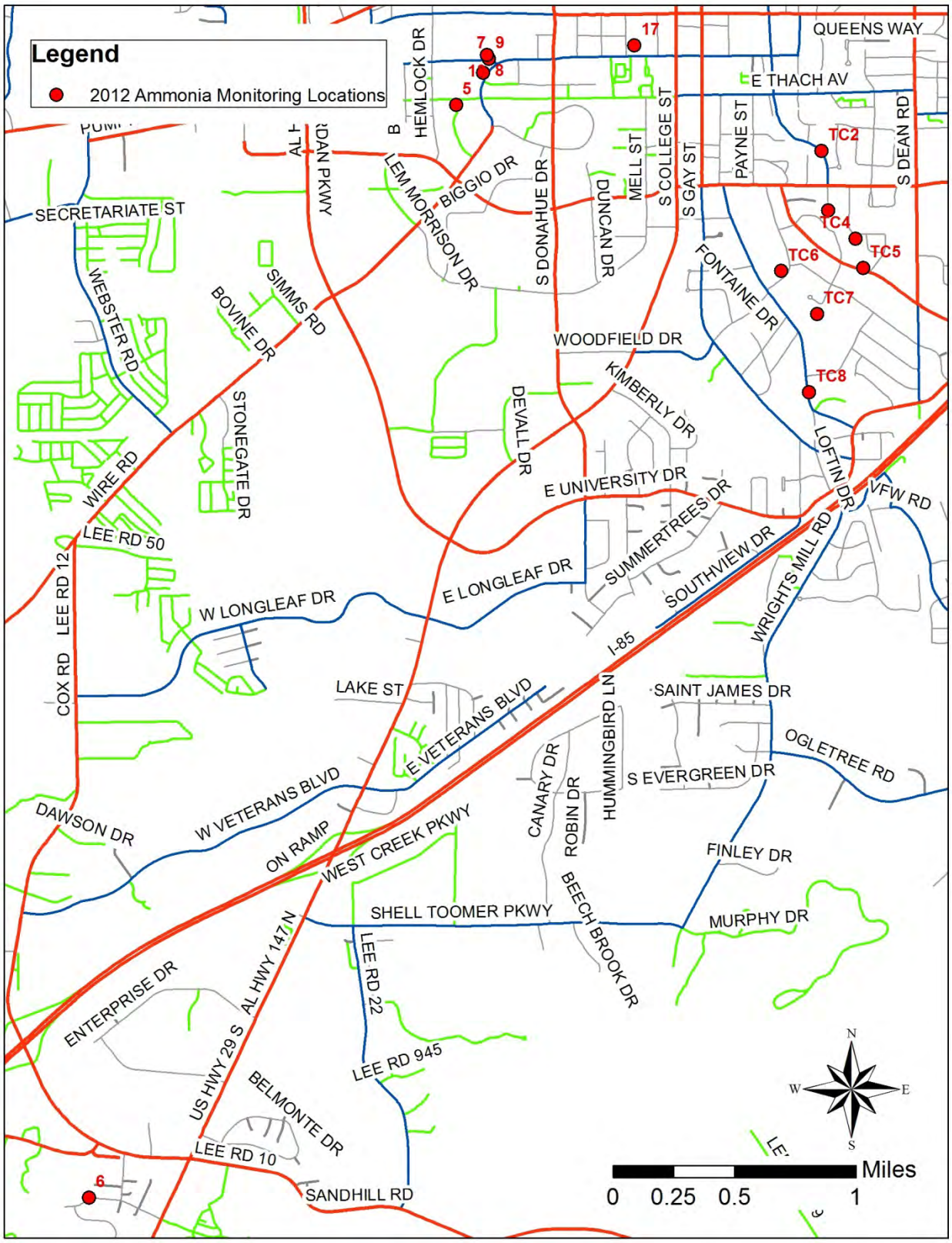
7.3 Monitoring Stations and Locations

*Monitoring stations are temporary and transient. See map below for 2012 sampling locations.

7.4 Results and Brief Discussion

No locations monitored for ammonia (nitrogen) during 2012 indicated a concentration above 0.5 mg/L. Three sites exhibited concentrations of 0.4 mg/L. Follow-up monitoring and inspection of these sites (TC4, TC5, and TC8) did not reveal any sanitary sewer or other water quality related concerns.

SiteName	Basin	Results (mg/L)	Date Sampled
4	Parkerson Mill Creek	0.18	3/7/2012
5	Parkerson Mill Creek	0.03	3/7/2012
6	Parkerson Mill Creek	0.08	3/7/2012
7	Parkerson Mill Creek	0.01	3/8/2012
8	Parkerson Mill Creek	0.02	3/8/2012
9	Parkerson Mill Creek	0.01	3/8/2012
13	Parkerson Mill Creek	0	8/24/2012
17	Parkerson Mill Creek	0	8/6/2012
TC2	Town Creek	0.2	8/24/2012
TC3	Town Creek	0.1	8/25/2012
TC4	Town Creek	0.4	8/26/2012
TC5	Town Creek	0.4	8/27/2012
TC6	Town Creek	0.2	8/28/2012
TC7	Town Creek	0.1	8/29/2012
TC8	Town Creek	0.4	8/30/2012


Legend
2012 Ammonia Monitoring Locations
7
9
10
8
5
17
QUEENS WAY
E THACH AV
HEMLOCK DR
S COLLEGE ST
S GAY ST
PAYNE ST
S DEAN RD
TC2
TC4
TC5
TC6
TC7
TC8
SECRETARIATE ST
LEM MORRISON DR
BIGGIO DR
S DONAHUE DR
DUNCAN DR
MELL ST
FONTAINE DR
WEBSTER RD
BOVINE DR
SIMMS RD
WOODFIELD DR
KIMBERLY DR
DEVALL DR
STONEGATE DR
WIRE RD
LOFTIN DR
VFW RD
E UNIVERSITY DR
SUMMERTREES DR
SOUTHVIEW DR
WRIGHTS MILL RD
LEE RD 50
LEE RD 12
E LONGLEAF DR
W LONGLEAF DR
I-85
COX RD
LAKE ST
E VETERANS BLVD
SAINT JAMES DR
HUMMINGBIRD LN
OGLETREE RD
S EVERGREEN DR
CANARY DR
ROBIN DR
W VETERANS BLVD
DAWSON DR
ON RAMP
WEST CREEK PKWY
FINLEY DR
SHELL TOOMER PKWY
MURPHY DR
BEECH BROOK DR
ENTERPRISE DR
AL HWY 147 N
LEE RD 22
US HWY 29 S
LEE RD 945
BELMONTE DR
LEE RD 10
6
SANDHILL RD
N
W
E
S
Miles
0
0.25
0.5
1

8.0 Source Water Monitoring Program (Lake Ogletree)

8.1 Purpose

The Lake Ogletree reservoir, located in southeast Auburn, Alabama, is the City of Auburn's primary drinking water source. At full pool its surface area is approximately 300 acres with a volumetric capacity of approximately 1.5 billion gallons of water. Chewacla Creek is the primary feeder stream of Lake Ogletree, which has a 33 square mile watershed (as delineated from the Lake Ogletree dam and spillway). Although mostly forested and agricultural lands, the Lake Ogletree watershed includes industrial, commercial/retail, and residential landuses, which should increase as the population of Lee County increases. Although a recently updated Source Water Assessment Program (SWAP) determined Lake Ogletree to be at low to moderate risk from stormwater-driven pollutants, it is imperative that water quality monitoring be performed to identify potential threats to water quality and to protect the health and vitality of Chewacla Creek and the encompassing watershed. Therefore, the Water Works Board of the City of Auburn is committed to performing monitoring and analysis of a wide range of physical, chemical, and mineral water quality parameters both in Lake Ogletree and its contributing watershed. The Water Works Board of the City of Auburn (AWWB) is currently entering its 23rd year of its Source Water Monitoring Program, which includes 40 biannual phases of water quality monitoring.

8.2 Definition and Methods

Currently in its 23rd year of biannual source water monitoring, the AWWB contracts with Suncrest Laboratories for biannual water quality sampling and analysis at various locations in the Lake Ogletree Watershed. Each biannual assessment includes three rounds of sampling at locations along main stem Chewacla Creek ("C-Sites"), its smaller tributaries ("T-Sites"), and Lake Ogletree ("L-Sites"). Parameters monitored at these locations include fecal coliforms, total coliforms, dissolved oxygen, chlorophyll a, pH, temperature, turbidity, conductivity, nutrients, and an array of minerals (including lead, copper, and zinc). Bound reports are submitted biannually as well and include a detailed "results and discussion" section. Reports are then reviewed for immediate areas of concern and data is then imported by the AWWB into a comprehensive report for trend analysis.

The past annual monitoring locations for the Source Water Monitoring Program have been refined based on assessed need to evaluate impacts from perceived areas of concern. Several sites have been included much more often than others and therefore present a much more detailed dataset to evaluate trends within Chewacla Creek, its tributaries, and/or Lake Ogletree. In general, most of the monitoring stations during 2012 exhibited values similar to previous results and/or followed similar trends with regards to water quality parameters. The following are the parameters which are included in this program and the method of analysis.

- Temperature – YSI Model 57 Oxygen Meter
- Dissolved Oxygen – YSI Model 57 Oxygen Meter
- pH – SM 4500-H+/EPA 150.1
- Chlorophyll a - Standard Method 10200 H
- Turbidity – Standard Method 2130
- Ammonia (as N) – EPA 350.1
- Nitrate+Nitrite – EPA 353.2
- Total Kjeldahl Nitrogen – EPA 351.2
- Total Phosphorus – EPA 365.4
- ICP Metals – Standard Method 3120 B
- Total Coliforms – Standard Method 9222 B
- Fecal Coliforms – Standard Method 9222 D
- Total Heterotrophic Bacteria – Standard Method 9222 C
- Minerals Analysis – Performed by Test America Laboratories, Inc. of Mobile, Alabama

8.3 Monitoring Stations and Locations (Active Only)

T11 – Station T11 is located on lower Robinson Creek at Moore's Mill Road (CR 146)

Latitude *32, 33, 48.221 N*; Longitude *85, 23, 23.423 W*

T12N – Station T12N is located upper Robinson Creek, just upstream of Highway 51 and downstream from an Opelika sanitary sewer lift station.

Latitude *32, 37, 1.72 N*; Longitude *85, 22, 9.316 W*

T19 – Station T19 is located on an unnamed tributary upstream of Emerald Lake.

Latitude *32, 35, 36.364 N*; Longitude *85, 20, 37.00 W*

T22 – Station T22 is located on upper Robinson Creek, just downstream of Highway 51 and downstream from three Opelika sanitary sewer lift stations.

Latitude *32, 36, 2.361 N*; Longitude *85, 22, 45.426 W*

T32 – Station T32 is located near the mouth of Nash Creek just before the confluence with Chewacla Creek.

Latitude *32, 33, 18.484 N*; Longitude *85, 25, 30.655 W*

T34 – Station T34 is located on Chewacla Creek, upstream of Station C8.

Latitude *32, 34, 32.672 N*; Longitude *85, 21, 49.692 W*

HQ1 – Station HQ1 is the effluent discharge from the SRM Aggregate Quarry.

Latitude *32, 35, 1.536 N*; Longitude *85, 20, 24.772 W*

C1 – Station C1 is located at the forebay of Lake Ogletree, immediately downstream of the Society Hill Road bridge crossing.

Latitude *32, 33, 20.161 N*; Longitude *85, 25, 36.026 W*

C2 – Station C2 is located at the bridge crossing of CR 027 with Chewacla Creek.

Latitude *32, 33, 21.387 N*; Longitude *85, 24, 46.384 W*

C5 – Station C5 is located at the bridge crossing of Lee Road. 112 with Chewacla Creek.

Latitude *32, 33, 6.291 N*; Longitude *85, 23, 41.151 W*

C7 – Station C7 is located at the bridge crossing of Highway 51 (Marvyn Parkway) with Chewacla Creek.

Latitude *32, 33, 41.868 N*; Longitude *85, 22, 20.559 W*

C8 – Station C8 is located upstream of the bridge crossing of CR 146 (Moores Mill Road) with Chewacla Creek.

Latitude *32, 34, 5.715 N*; Longitude *85, 21, 42.033 W*

L1 – Station L1 is located in Lake Ogletree, immediately northeast of the Lake Ogletree spillway.

Latitude *32, 32, 50.846 N*; Longitude *85, 26, 52.83 W*

L2 – Station L2 is located in Lake Ogletree near the water intake pump house.

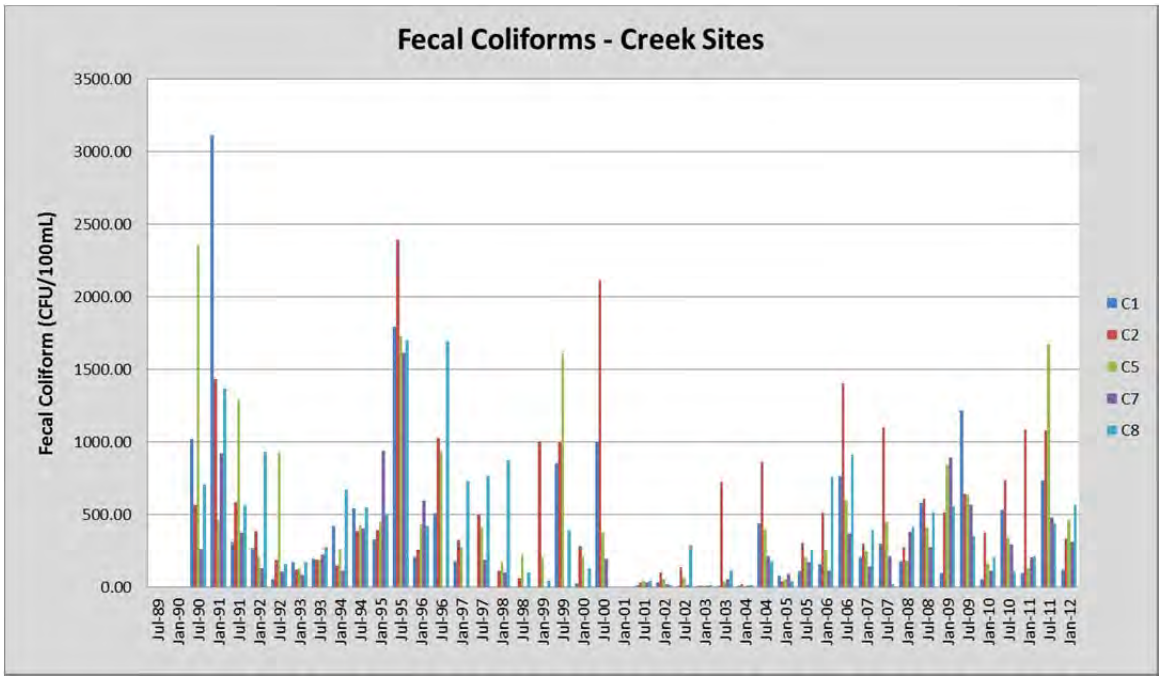
Latitude *32, 33, 5.626 N*; Longitude *85, 26, 45.038 W*

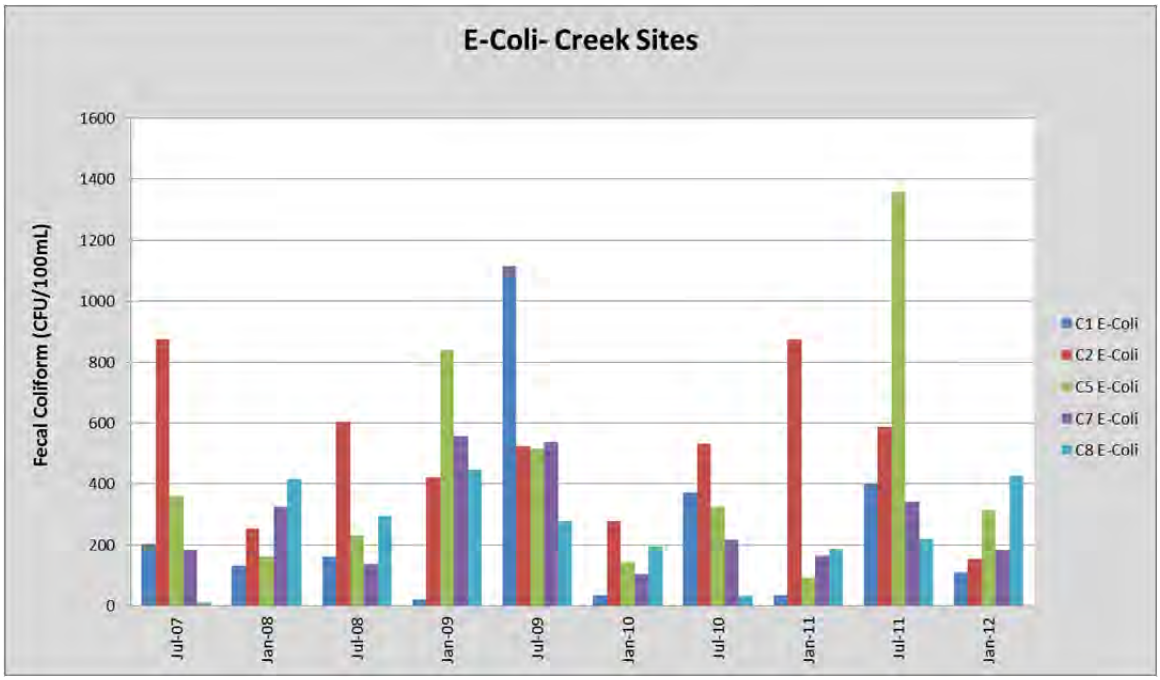
L5 – Station L5 is located along the northwest finger of Lake Ogletree, near the confluence with the East Lake/Green Chapel tributary.

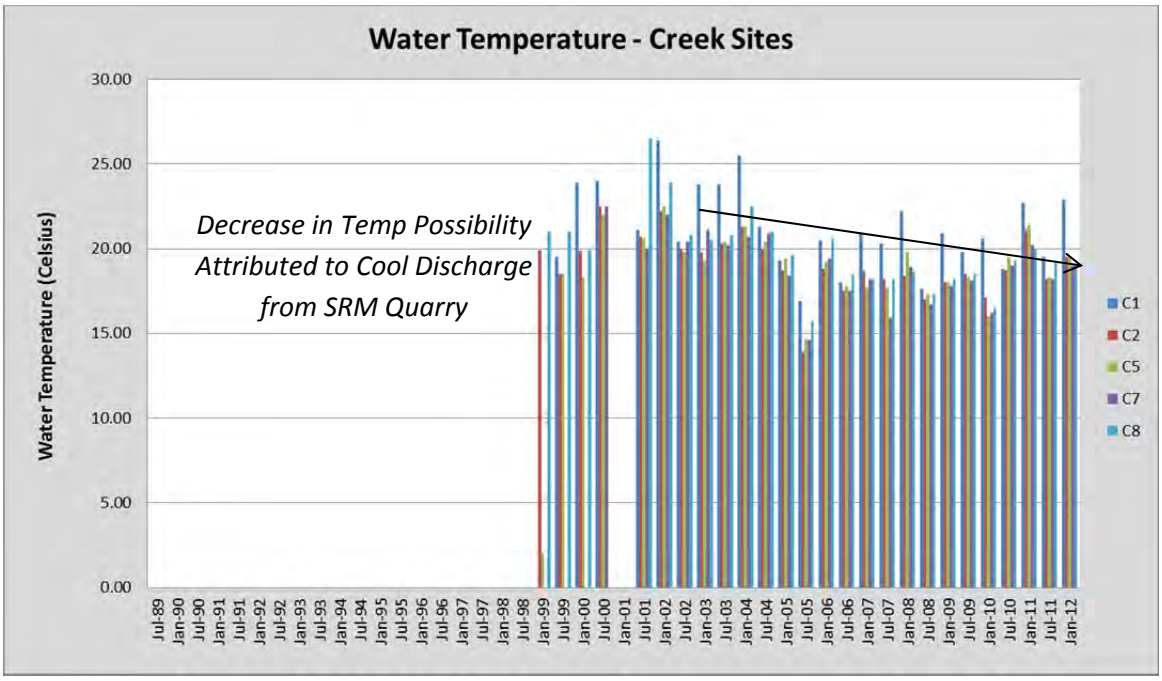
Latitude *32, 33, 37.961 N*; Longitude *85, 25, 38.369 W*

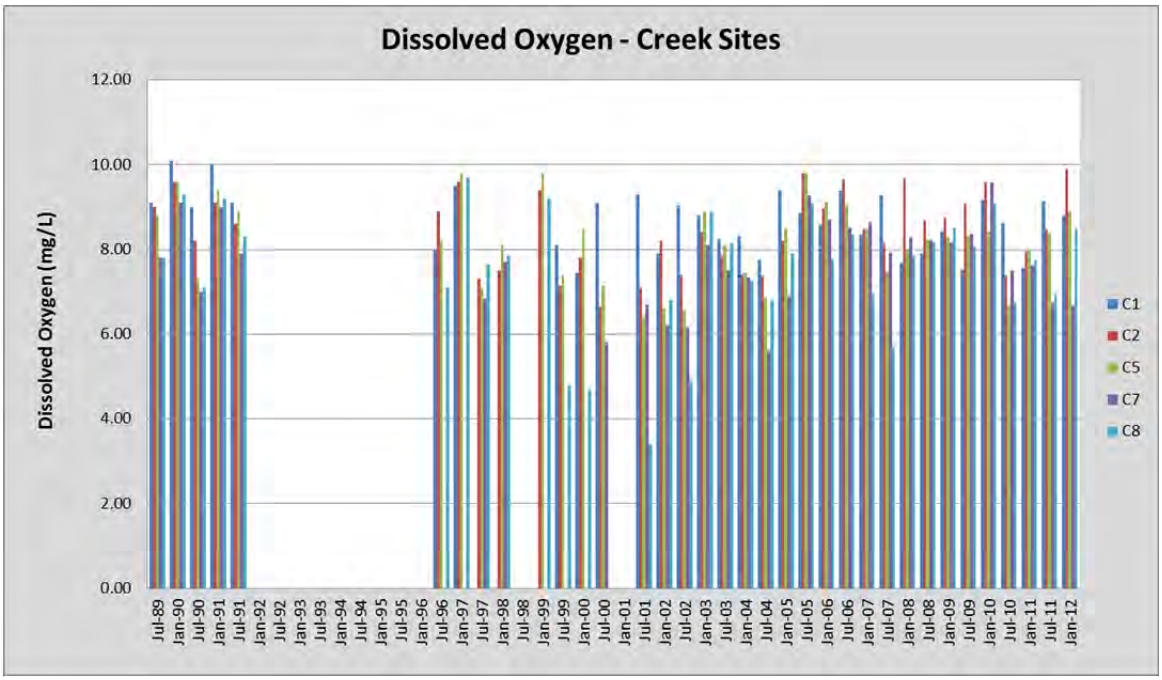
**See Insert for Maps of All Water Quality Monitoring Locations*

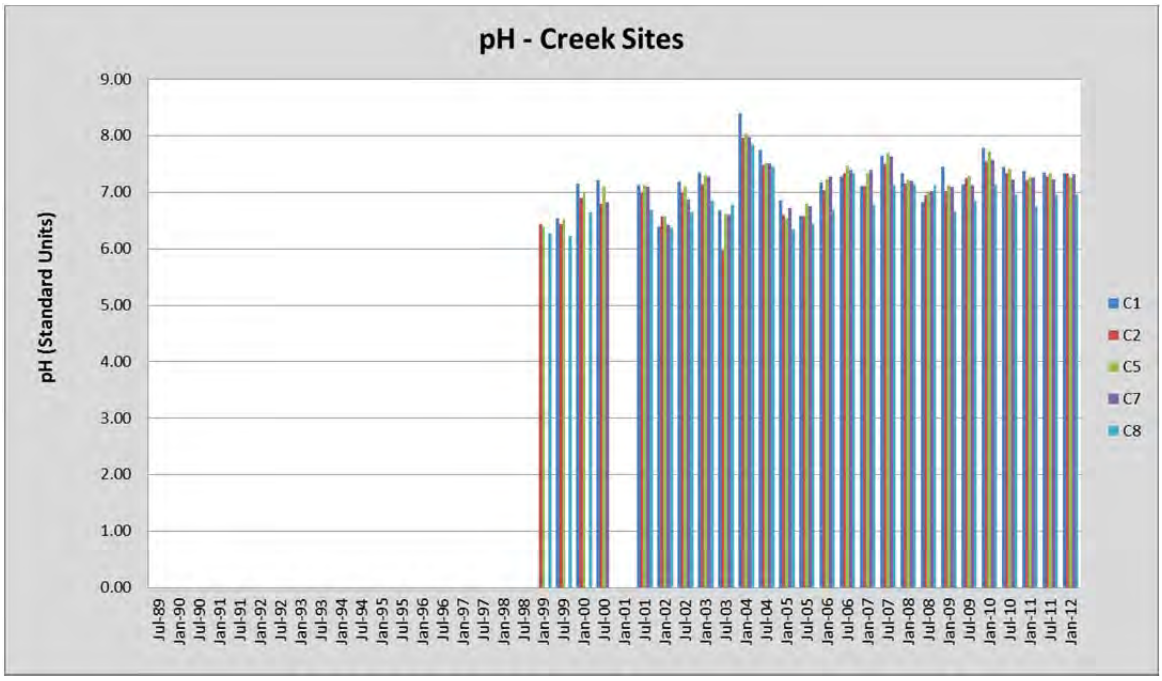
***Note: At the time of this report, the City had not received all of the 2012 monitoring results for its Source Water Monitoring Program. Data below is through June of 2012.*

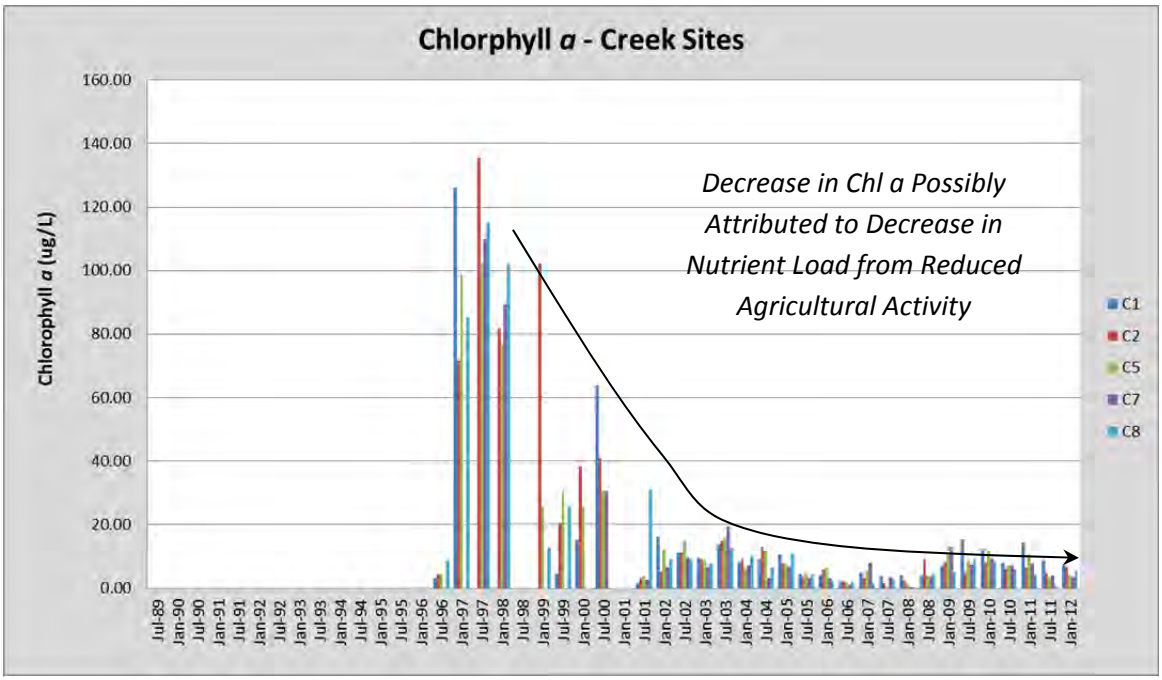

Fecal Coliforms - Creek Sites
Fecal Coliform (CFU/100mL)
3500.00
3000.00
2500.00
2000.00
1500.00
1000.00
500.00
0.00
Jul-89
Jan-90
Jul-90
Jan-91
Jul-91
Jan-92
Jul-92
Jan-93
Jul-93
Jan-94
Jul-94
Jan-95
Jul-95
Jan-96
Jul-96
Jan-97
Jul-97
Jan-98
Jul-98
Jan-99
Jul-99
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Jul-07
Jan-08
Jul-08
Jan-09
Jul-09
Jan-10
Jul-10
Jan-11
Jul-11
Jan-12
C1
C2
C5
C7
C8

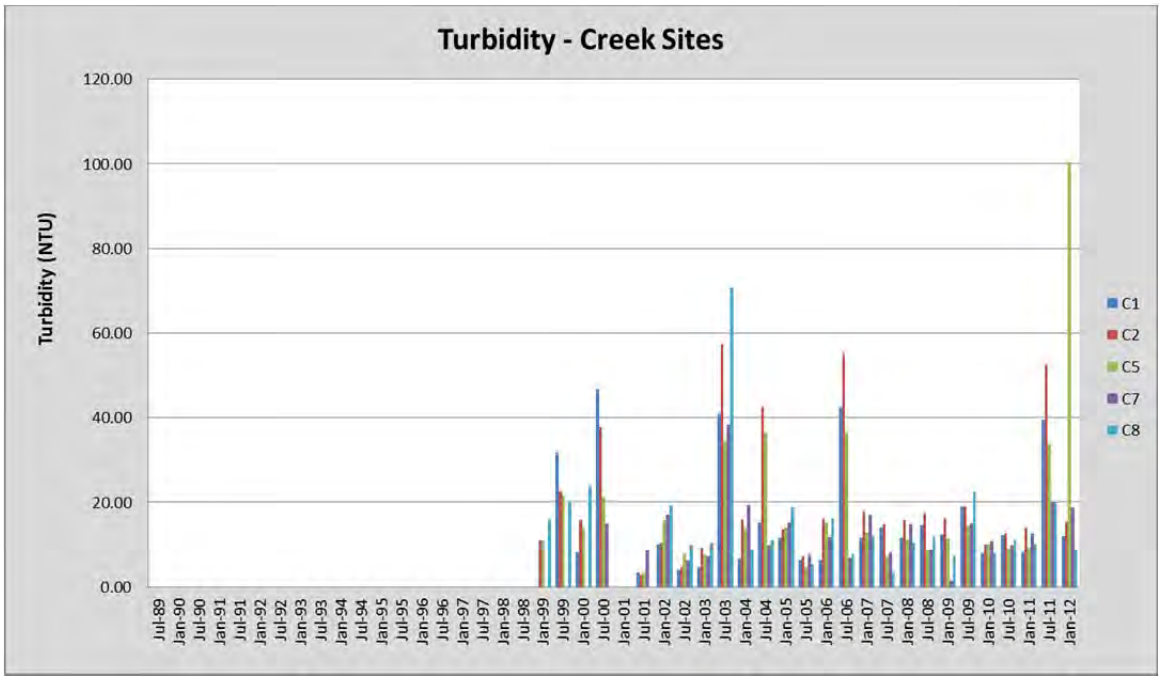

E-Coli- Creek Sites
Fecal Coliform (CFU/100mL)
1600
1400
1200
1000
800
600
400
200
0
Jul-07
Jan-08
Jul-08
Jan-09
Jul-09
Jan-10
Jul-10
Jan-11
Jul-11
Jan-12
C1 E-Coli
C2 E-Coli
C5 E-Coli
C7 E-Coli
C8 E-Coli

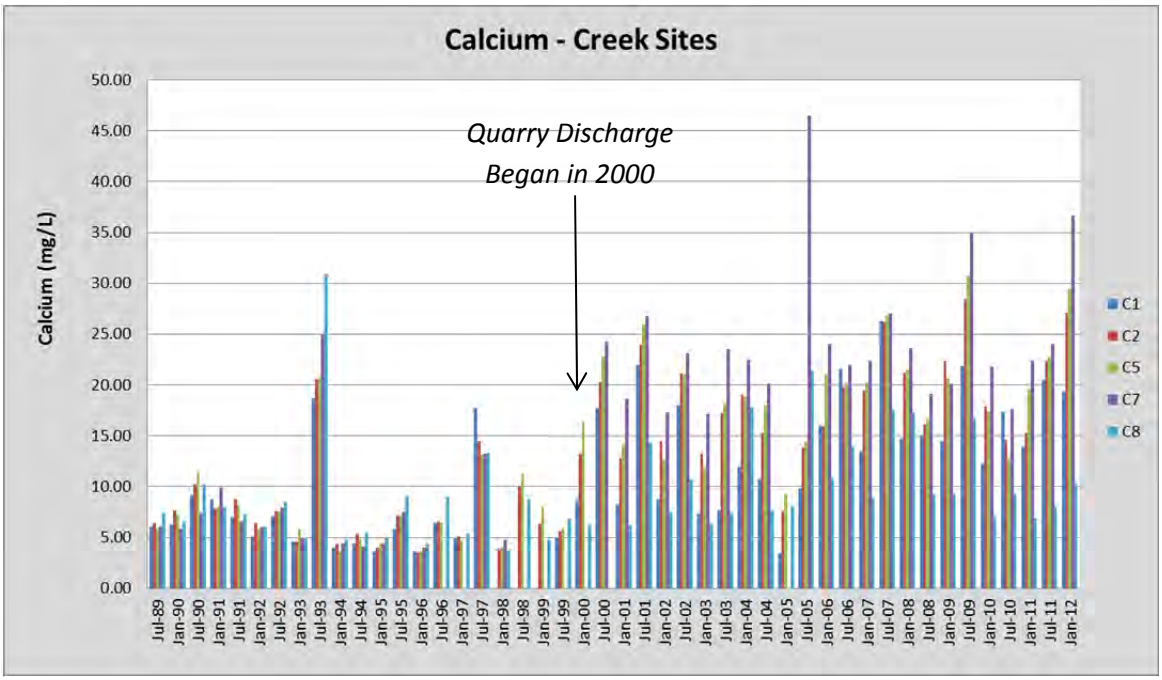

Water Temperature - Creek Sites
Water Temperature (Celsius)
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Decrease in Temp Possibility Attributed to Cool Discharge from SRM Quarry
C1
C2
C5
C7
C8
Jul-89 Jan-90 Jul-90 Jan-91 Jul-91 Jan-92 Jul-92 Jan-93 Jul-93 Jan-94 Jul-94 Jan-95 Jul-95 Jan-96 Jul-96 Jan-97 Jul-97 Jan-98 Jul-98 Jan-99 Jul-99 Jan-00 Jul-00 Jan-01 Jul-01 Jan-02 Jul-02 Jan-03 Jul-03 Jan-04 Jul-04 Jan-05 Jul-05 Jan-06 Jul-06 Jan-07 Jul-07 Jan-08 Jul-08 Jan-09 Jul-09 Jan-10 Jul-10 Jan-11 Jul-11 Jan-12

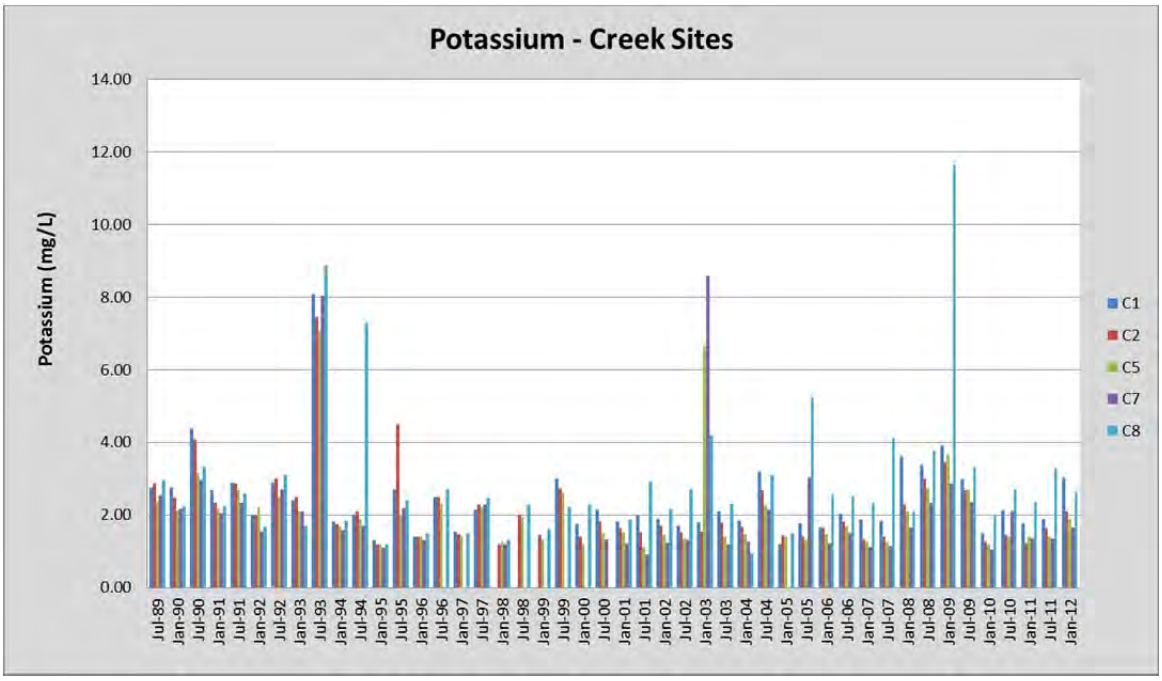

Dissolved Oxygen - Creek Sites
Dissolved Oxygen (mg/L)
12.00
10.00
8.00
6.00
4.00
2.00
0.00
C1
C2
C5
C7
C8
Jul-89 Jan-90 Jul-90 Jan-91 Jul-91 Jan-92 Jul-92 Jan-93 Jul-93 Jan-94 Jul-94 Jan-95 Jul-95 Jan-96 Jul-96 Jan-97 Jul-97 Jan-98 Jul-98 Jan-99 Jul-99 Jan-00 Jul-00 Jan-01 Jul-01 Jan-02 Jul-02 Jan-03 Jul-03 Jan-04 Jul-04 Jan-05 Jul-05 Jan-06 Jul-06 Jan-07 Jul-07 Jan-08 Jul-08 Jan-09 Jul-09 Jan-10 Jul-10 Jan-11 Jul-11 Jan-12

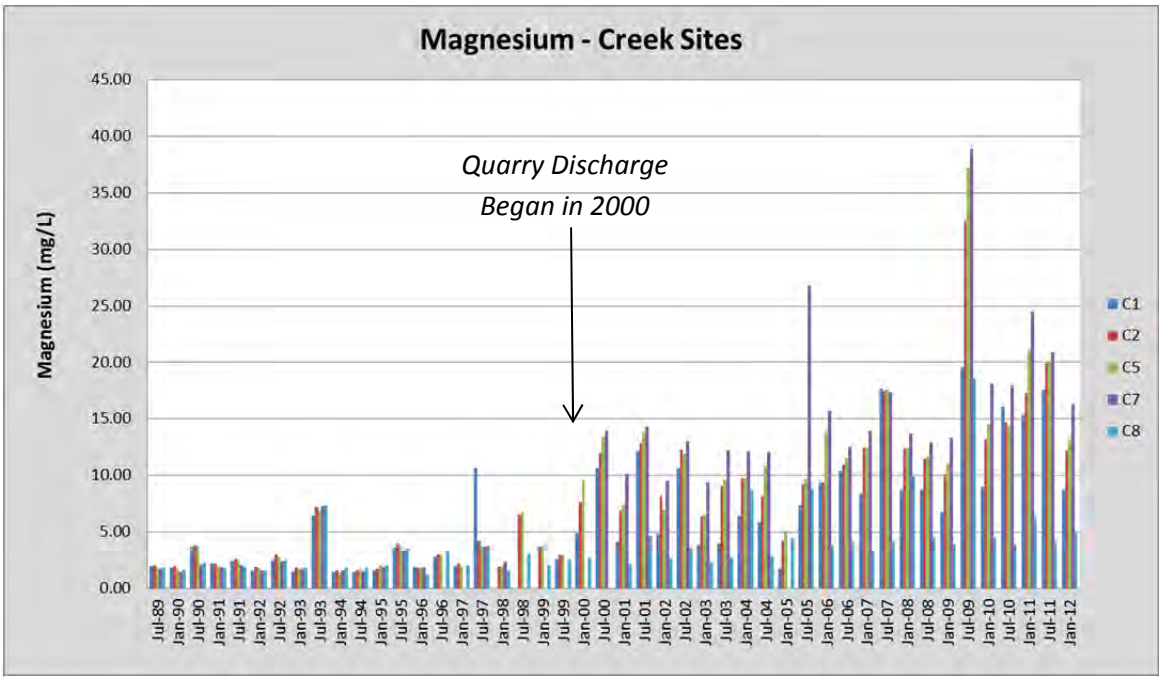

pH - Creek Sites
pH (Standard Units)
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
C1
C2
C5
C7
C8

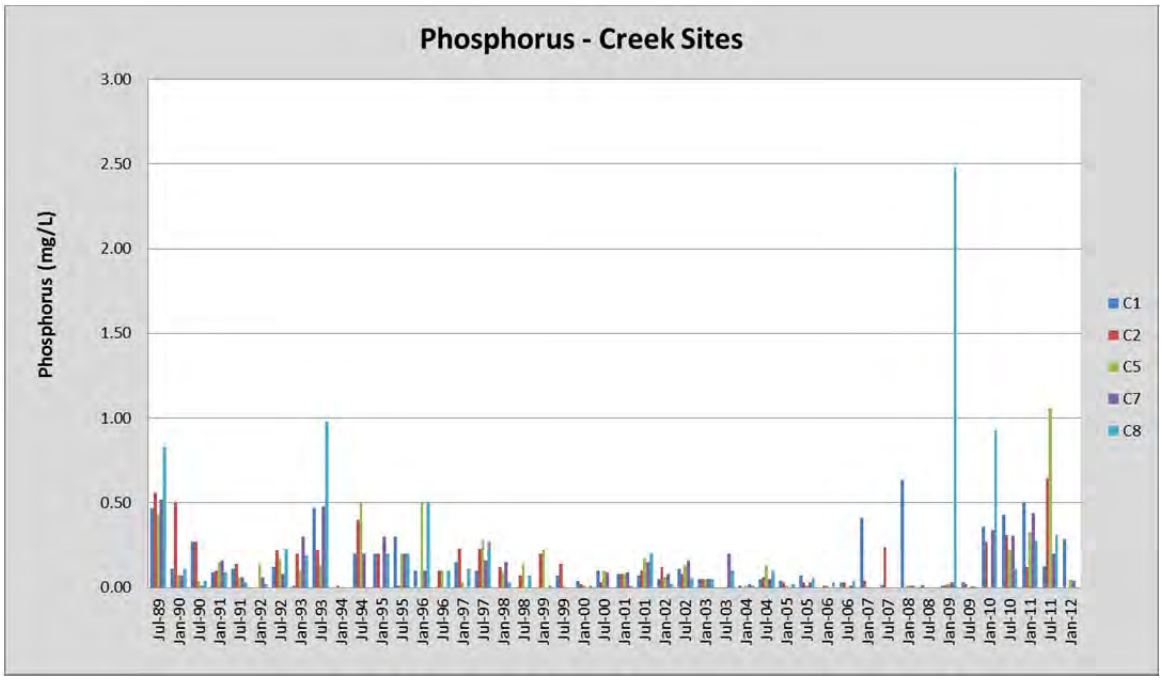

Chlorophyll a - Creek Sites
Chlorophyll a (ug/L)
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Decrease in Chl a Possibly Attributed to Decrease in Nutrient Load from Reduced Agricultural Activity
C1
C2
C5
C7
C8

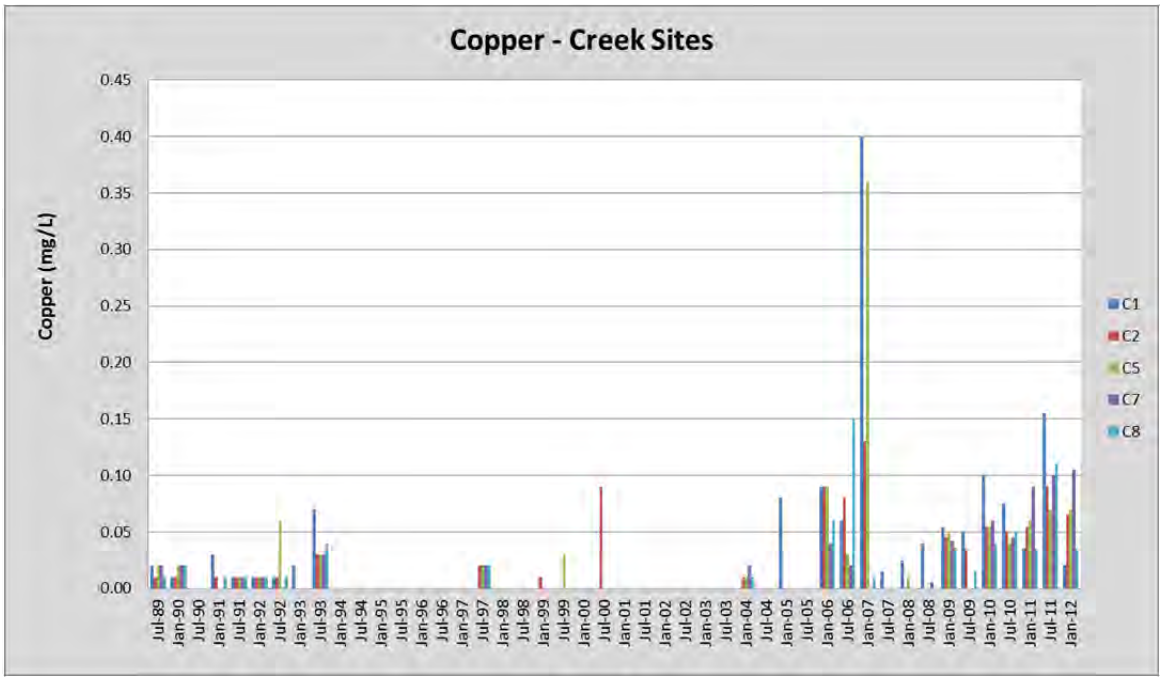

Turbidity - Creek Sites
Turbidity (NTU)
120.00
100.00
80.00
60.00
40.00
20.00
0.00
C1
C2
C5
C7
C8

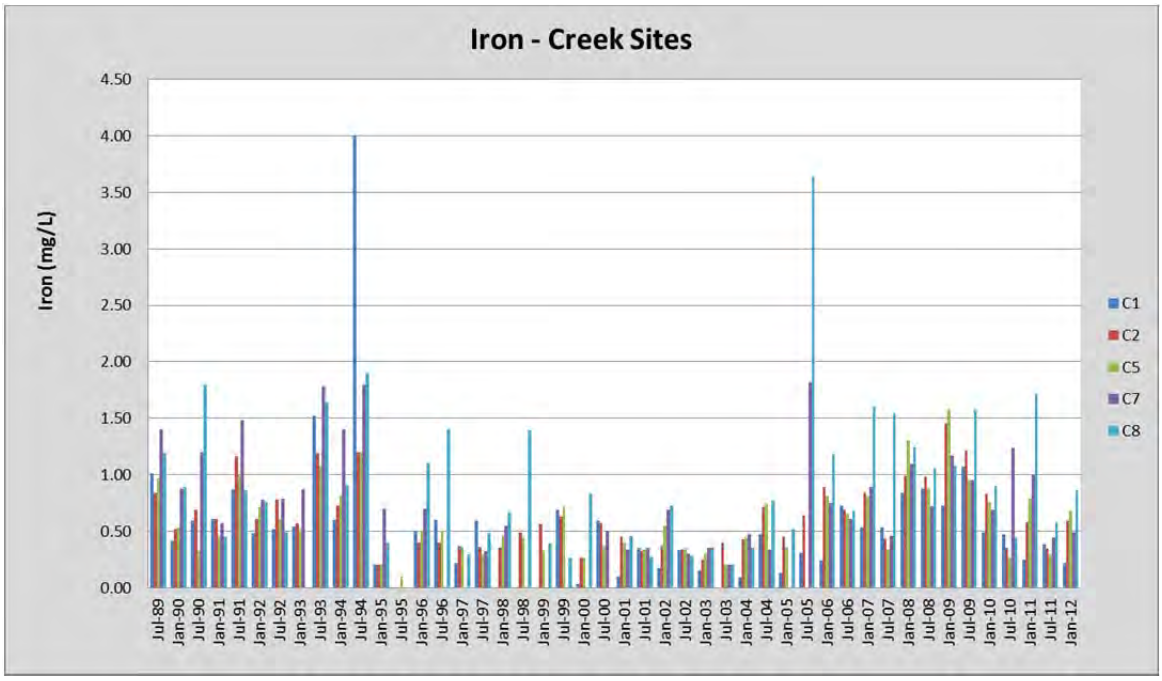

Calcium - Creek Sites
Calcium (mg/L)
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Quarry Discharge
Began in 2000
C1
C2
C5
C7
C8

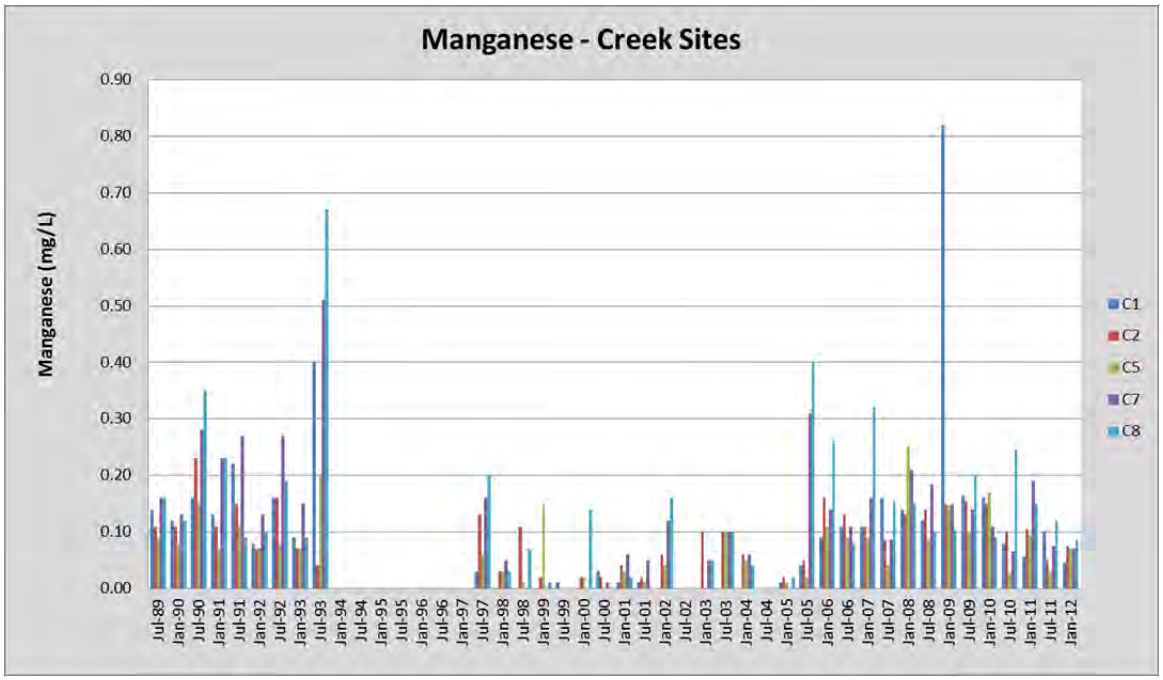

Potassium - Creek Sites
Potassium (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Jul-89 Jan-90 Jul-90 Jan-91 Jul-91 Jan-92 Jul-92 Jan-93 Jul-93 Jan-94 Jul-94 Jan-95 Jul-95 Jan-96 Jul-96 Jan-97 Jul-97 Jan-98 Jul-98 Jan-99 Jul-99 Jan-00 Jul-00 Jan-01 Jul-01 Jan-02 Jul-02 Jan-03 Jul-03 Jan-04 Jul-04 Jan-05 Jul-05 Jan-06 Jul-06 Jan-07 Jul-07 Jan-08 Jul-08 Jan-09 Jul-09 Jan-10 Jul-10 Jan-11 Jul-11 Jan-12
C1
C2
C5
C7
C8

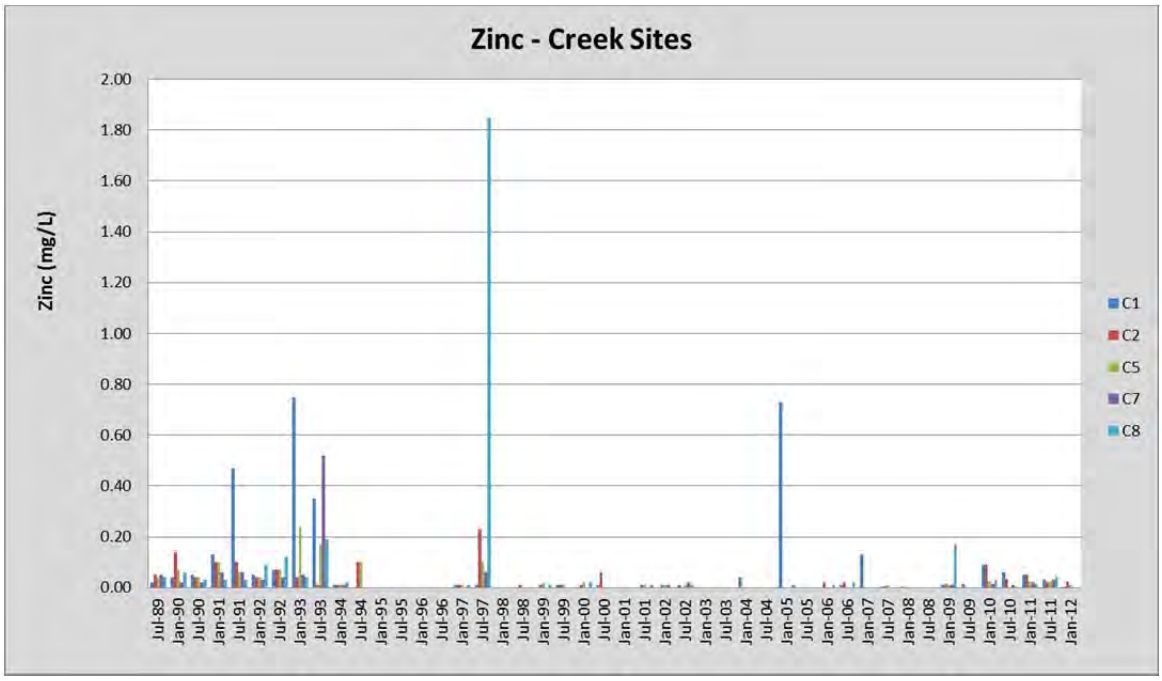

Magnesium - Creek Sites
Magnesium (mg/L)
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Quarry Discharge
Began in 2000
Jul-89 Jan-90 Jul-90 Jan-91 Jul-91 Jan-92 Jul-92 Jan-93 Jul-93 Jan-94 Jul-94 Jan-95 Jul-95 Jan-96 Jul-96 Jan-97 Jul-97 Jan-98 Jul-98 Jan-99 Jul-99 Jan-00 Jul-00 Jan-01 Jul-01 Jan-02 Jul-02 Jan-03 Jul-03 Jan-04 Jul-04 Jan-05 Jul-05 Jan-06 Jul-06 Jan-07 Jul-07 Jan-08 Jul-08 Jan-09 Jul-09 Jan-10 Jul-10 Jan-11 Jul-11 Jan-12
C1
C2
C5
C7
C8

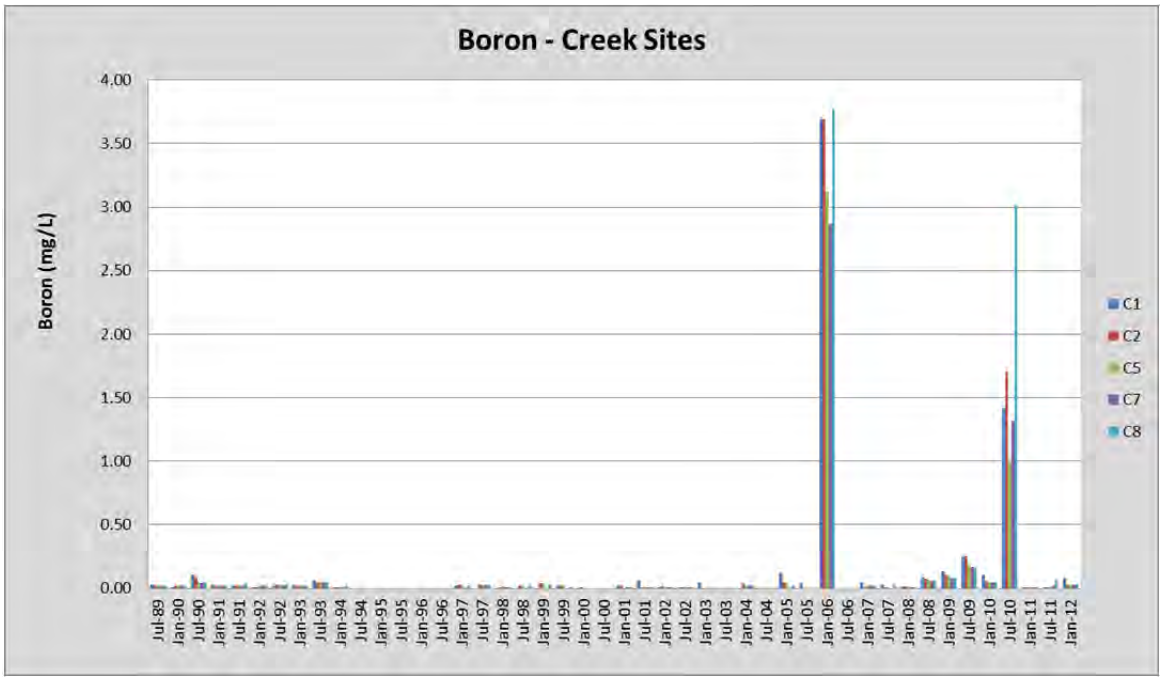

Phosphorus - Creek Sites
Phosphorus (mg/L)
3.00
2.50
2.00
1.50
1.00
0.50
0.00
C1
C2
C5
C7
C8

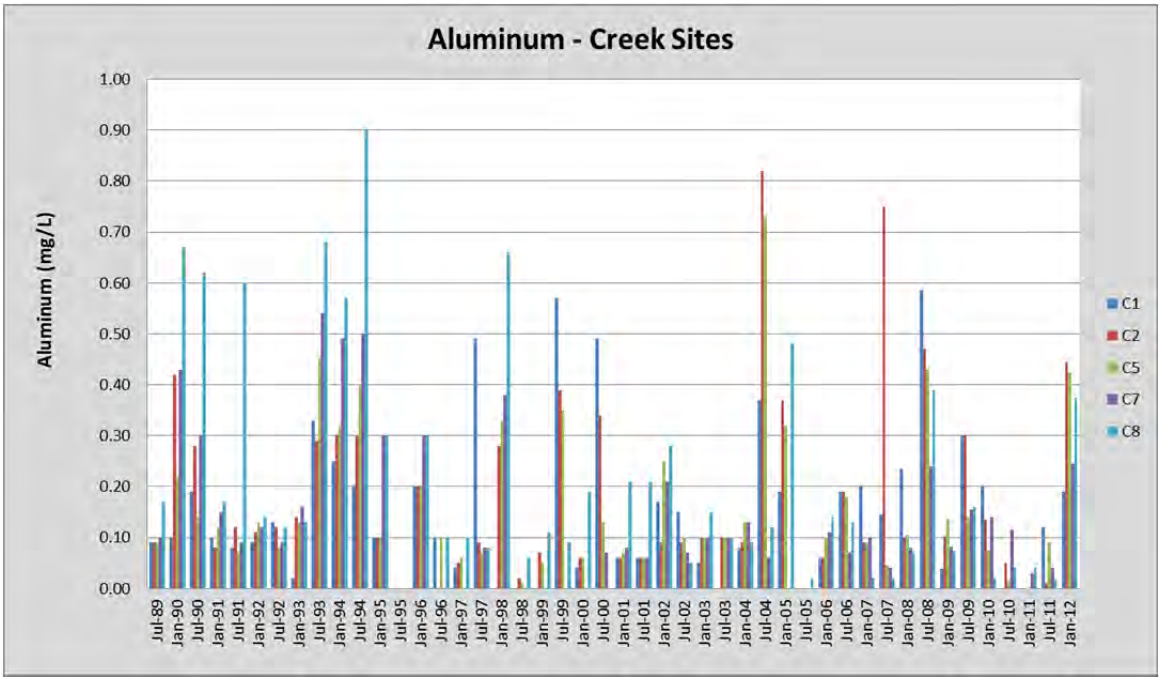

Copper - Creek Sites
Copper (mg/L)
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
C1
C2
C5
C7
C8

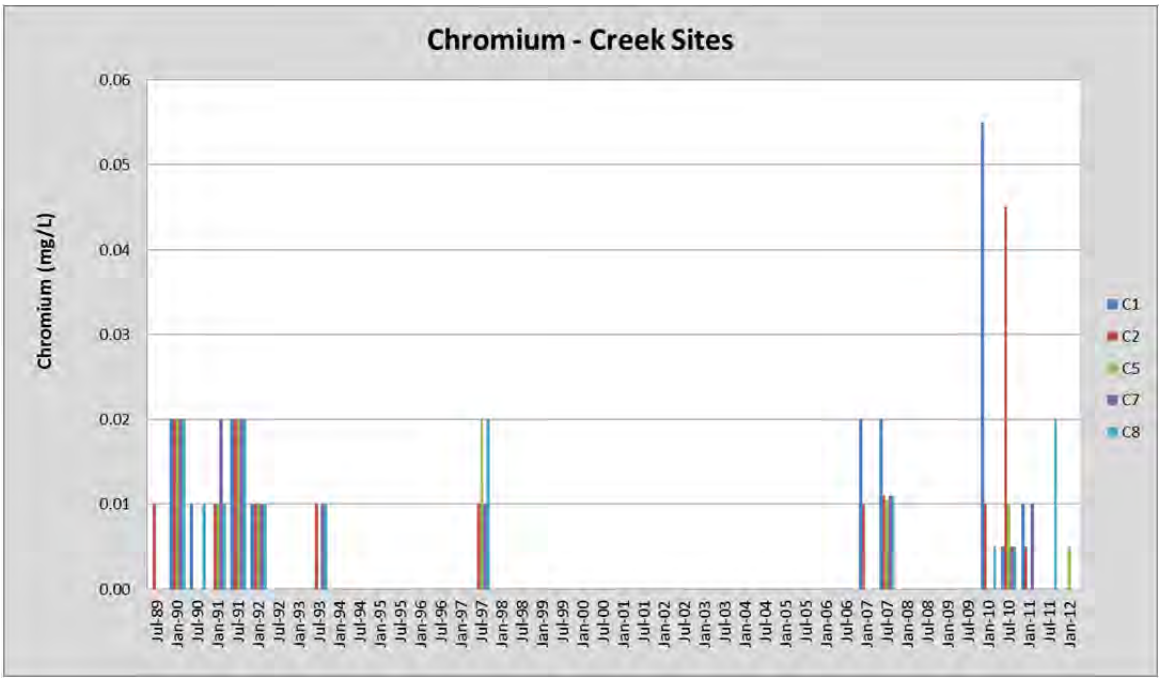

Iron - Creek Sites
Iron (mg/L)
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Jul-89 Jan-90 Jul-90 Jan-91 Jul-91 Jan-92 Jul-92 Jan-93 Jul-93 Jan-94 Jul-94 Jan-95 Jul-95 Jan-96 Jul-96 Jan-97 Jul-97 Jan-98 Jul-98 Jan-99 Jul-99 Jan-00 Jul-00 Jan-01 Jul-01 Jan-02 Jul-02 Jan-03 Jul-03 Jan-04 Jul-04 Jan-05 Jul-05 Jan-06 Jul-06 Jan-07 Jul-07 Jan-08 Jul-08 Jan-09 Jul-09 Jan-10 Jul-10 Jan-11 Jul-11 Jan-12
C1
C2
C5
C7
C8

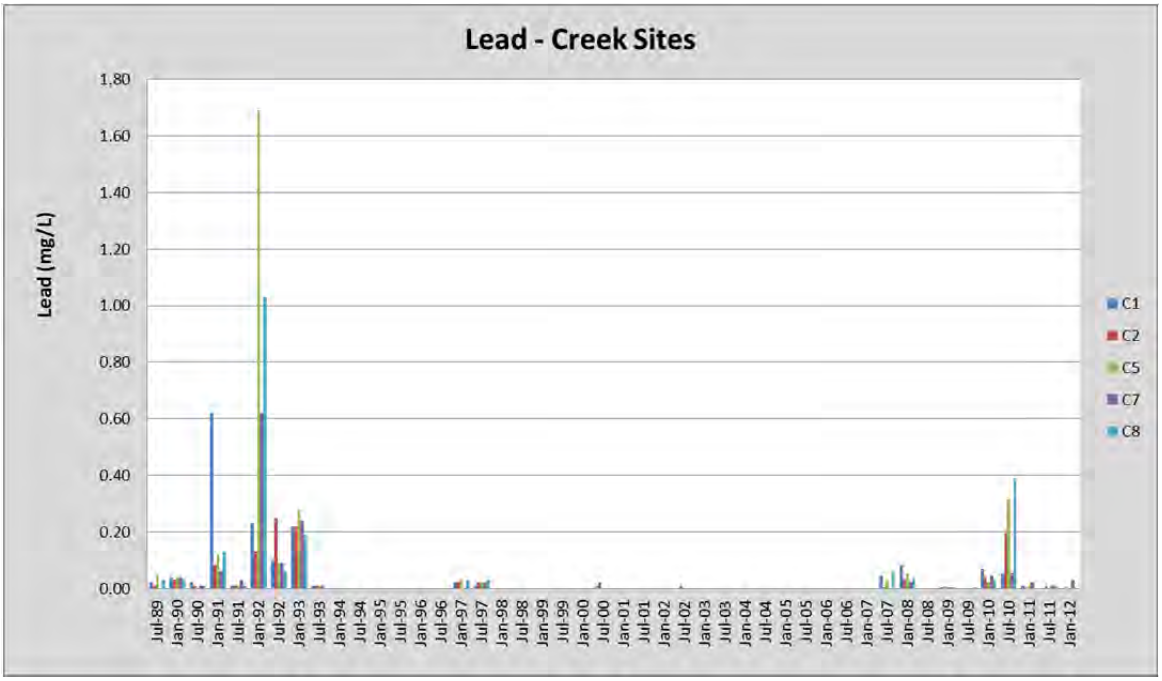

Manganese - Creek Sites
Manganese (mg/L)
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
Jul-89 Jan-90 Jul-90 Jan-91 Jul-91 Jan-92 Jul-92 Jan-93 Jul-93 Jan-94 Jul-94 Jan-95 Jul-95 Jan-96 Jul-96 Jan-97 Jul-97 Jan-98 Jul-98 Jan-99 Jul-99 Jan-00 Jul-00 Jan-01 Jul-01 Jan-02 Jul-02 Jan-03 Jul-03 Jan-04 Jul-04 Jan-05 Jul-05 Jan-06 Jul-06 Jan-07 Jul-07 Jan-08 Jul-08 Jan-09 Jul-09 Jan-10 Jul-10 Jan-11 Jul-11 Jan-12
C1
C2
C5
C7
C8

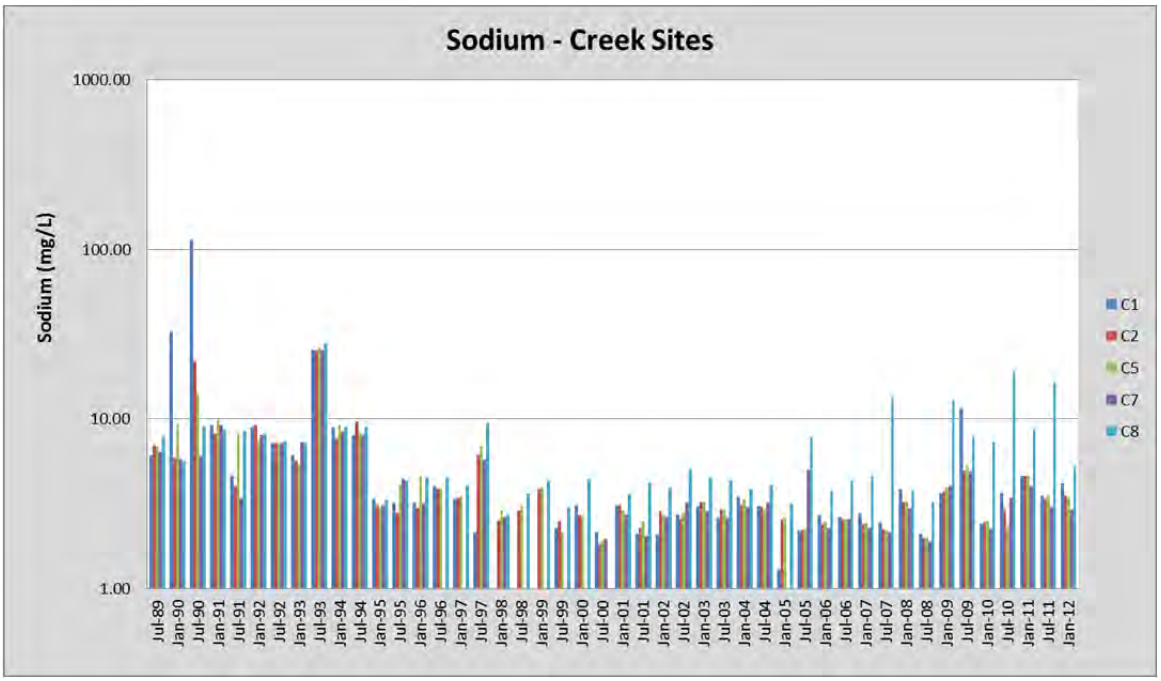

Zinc - Creek Sites
Zinc (mg/L)
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
C1
C2
C5
C7
C8

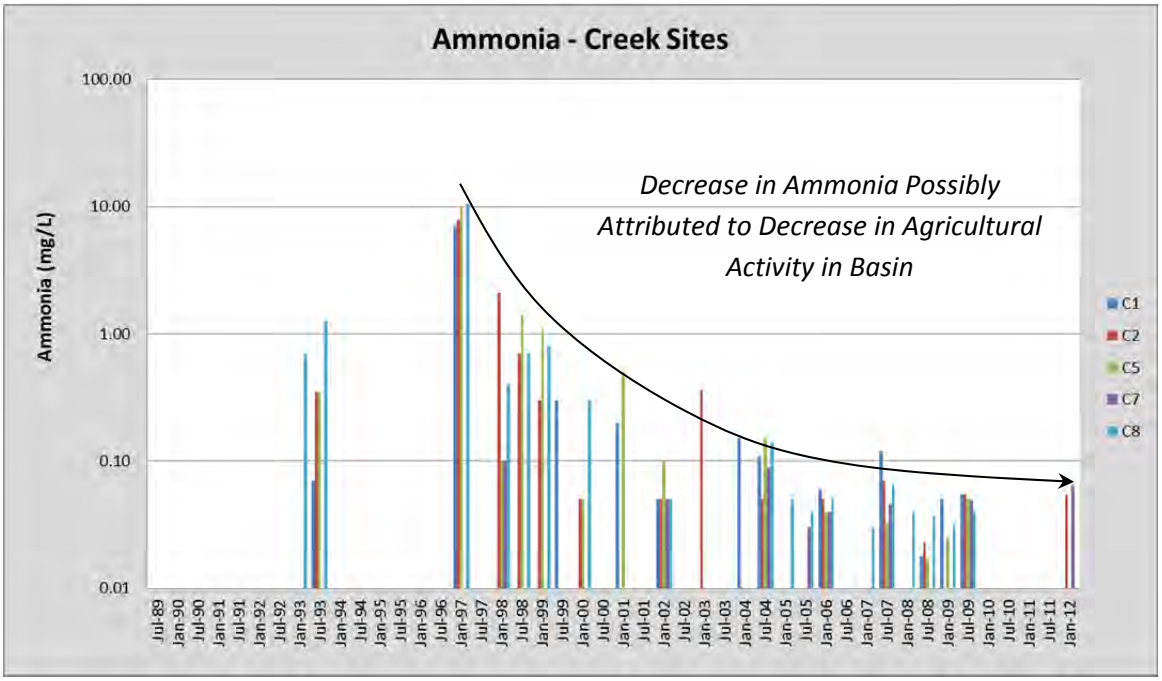

Boron - Creek Sites
Boron (mg/L)
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
C1
C2
C5
C7
C8

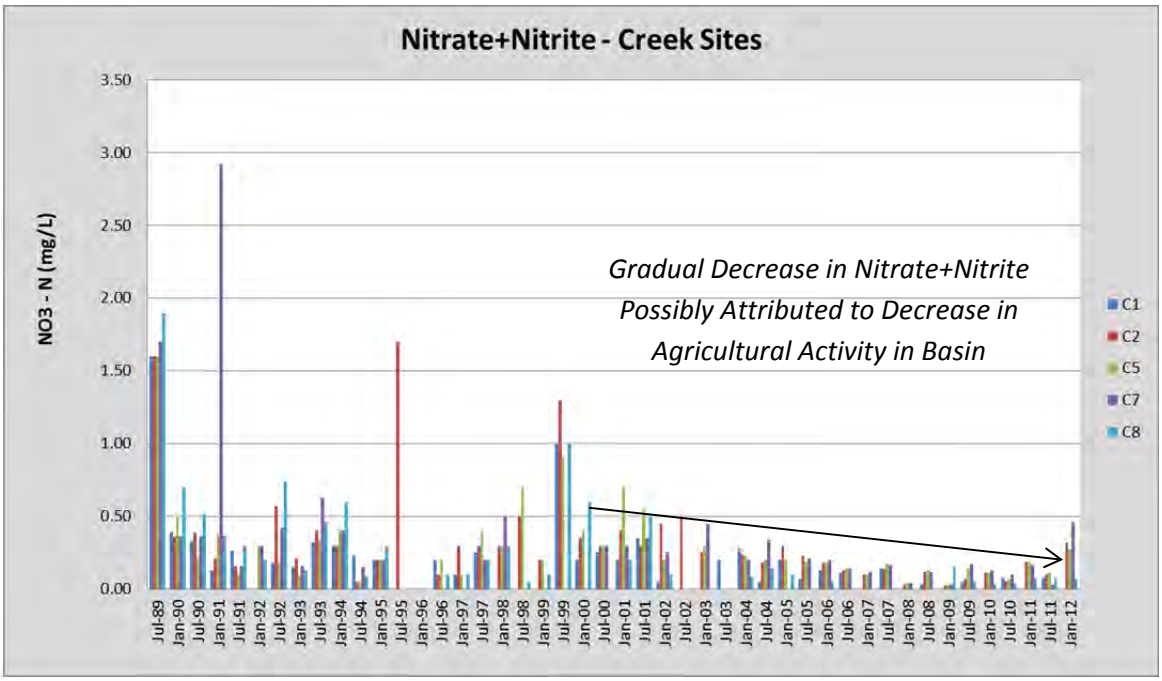

Aluminum - Creek Sites
Aluminum (mg/L)
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
C1
C2
C5
C7
C8

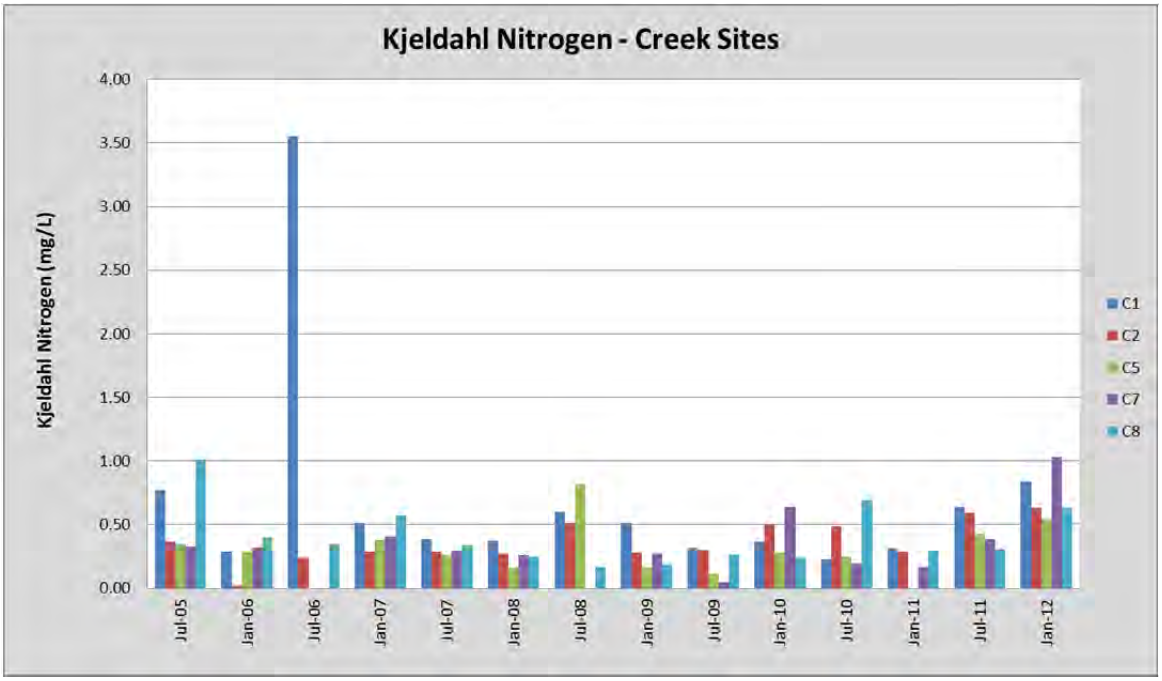

Chromium - Creek Sites
Chromium (mg/L)
0.06
0.05
0.04
0.03
0.02
0.01
0.00
C1
C2
C5
C7
C8

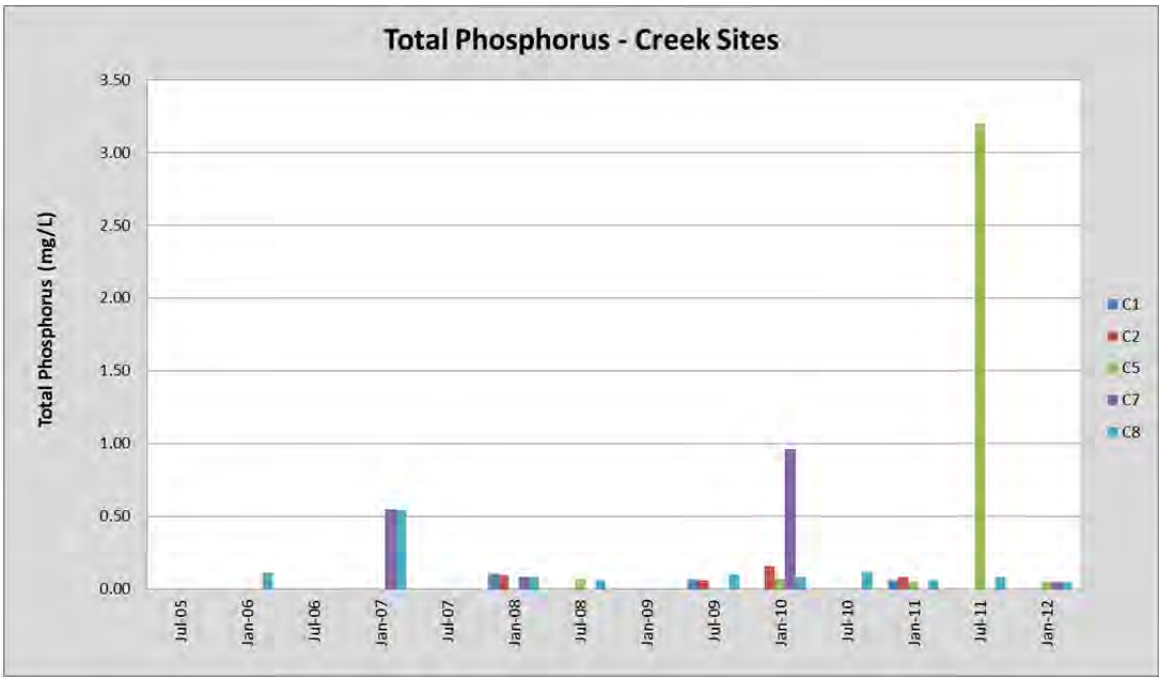

Lead - Creek Sites
Lead (mg/L)
1,80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
C1
C2
C5
C7
C8

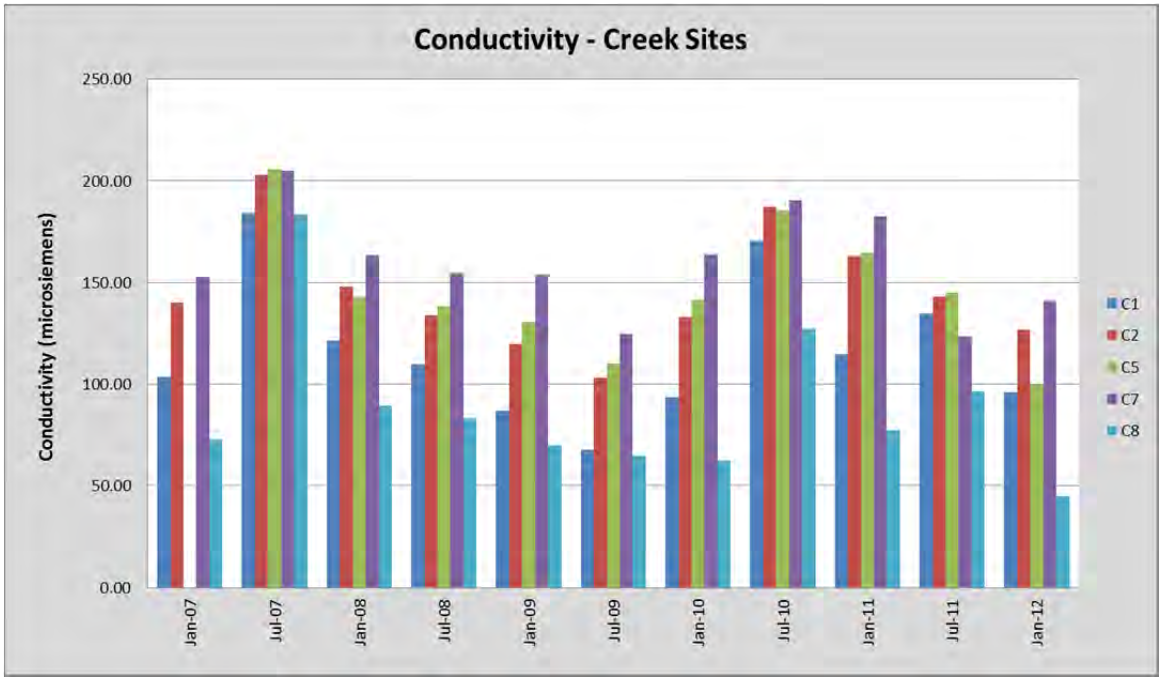

Sodium - Creek Sites
Sodium (mg/L)
1000.00
100.00
10.00
1.00
C1
C2
C5
C7
C8

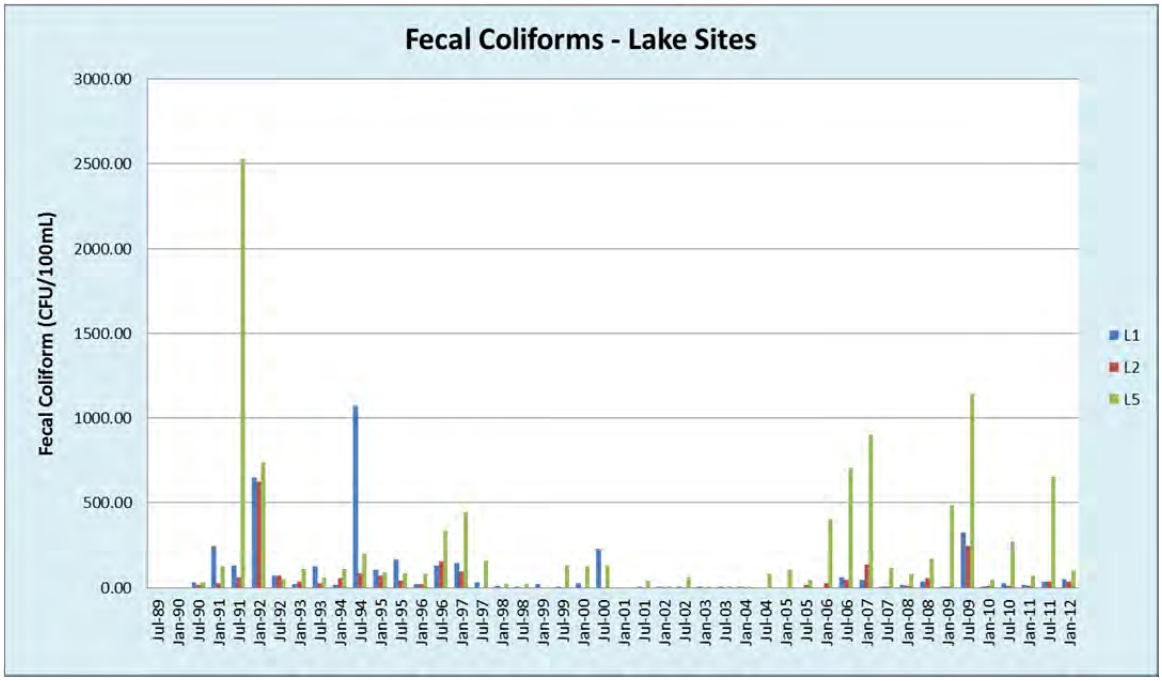

Ammonia - Creek Sites
Ammonia (mg/L)
100.00
10.00
1.00
0.10
0.01
Decrease in Ammonia Possibly Attributed to Decrease in Agricultural Activity in Basin
C1
C2
C5
C7
C8

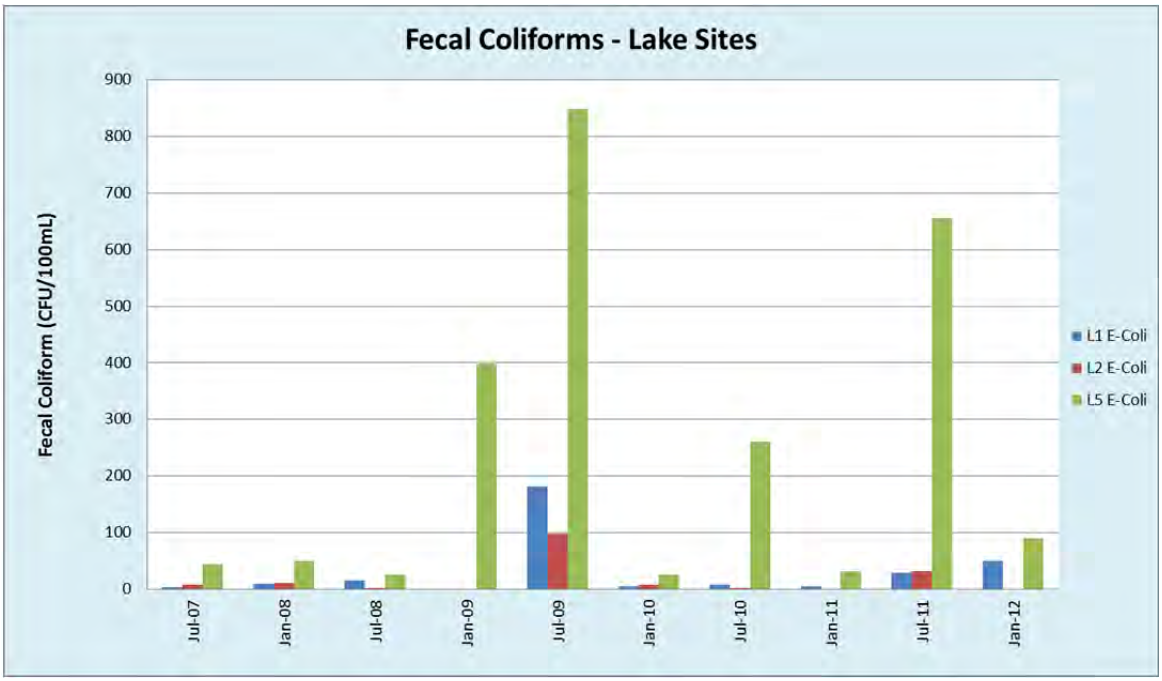

Nitrate+Nitrite - Creek Sites
NO3 - N (mg/L)
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Gradual Decrease in Nitrate+Nitrite Possibly Attributed to Decrease in Agricultural Activity in Basin
C1
C2
C5
C7
C8

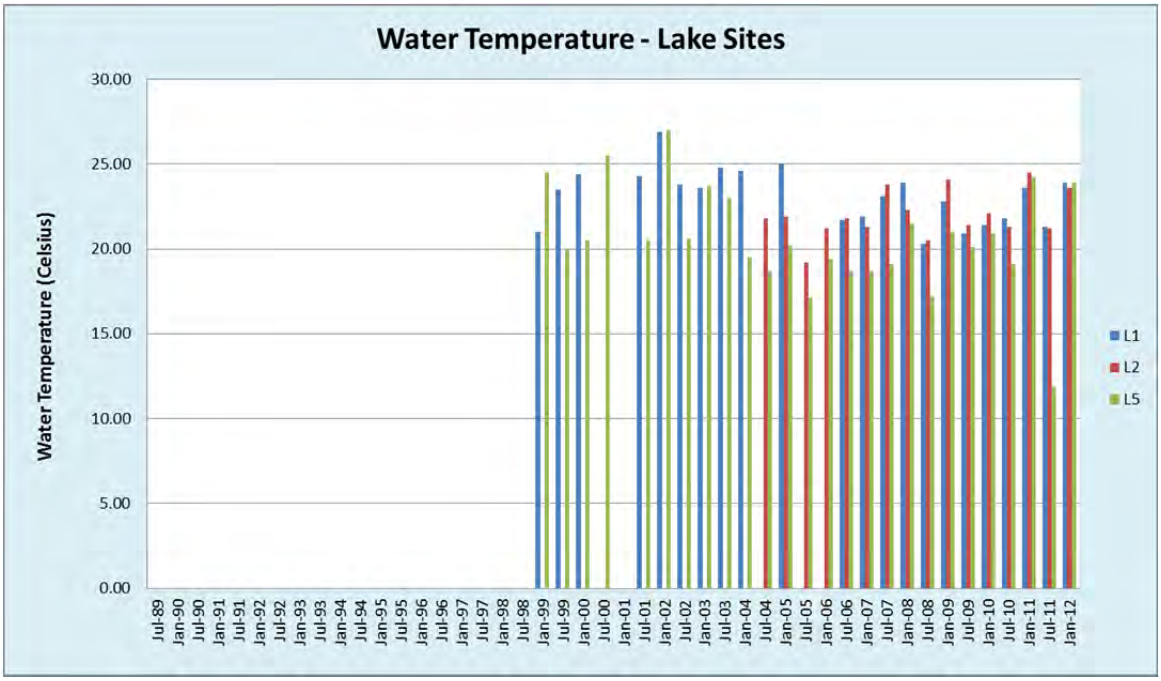

Kjeldahl Nitrogen - Creek Sites
Kjeldahl Nitrogen (mg/L)
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Jul-05
Jan-06
Jul-06
Jan-07
Jul-07
Jan-08
Jul-08
Jan-09
Jul-09
Jan-10
Jul-10
Jan-11
Jul-11
Jan-12
C1
C2
C5
C7
C8

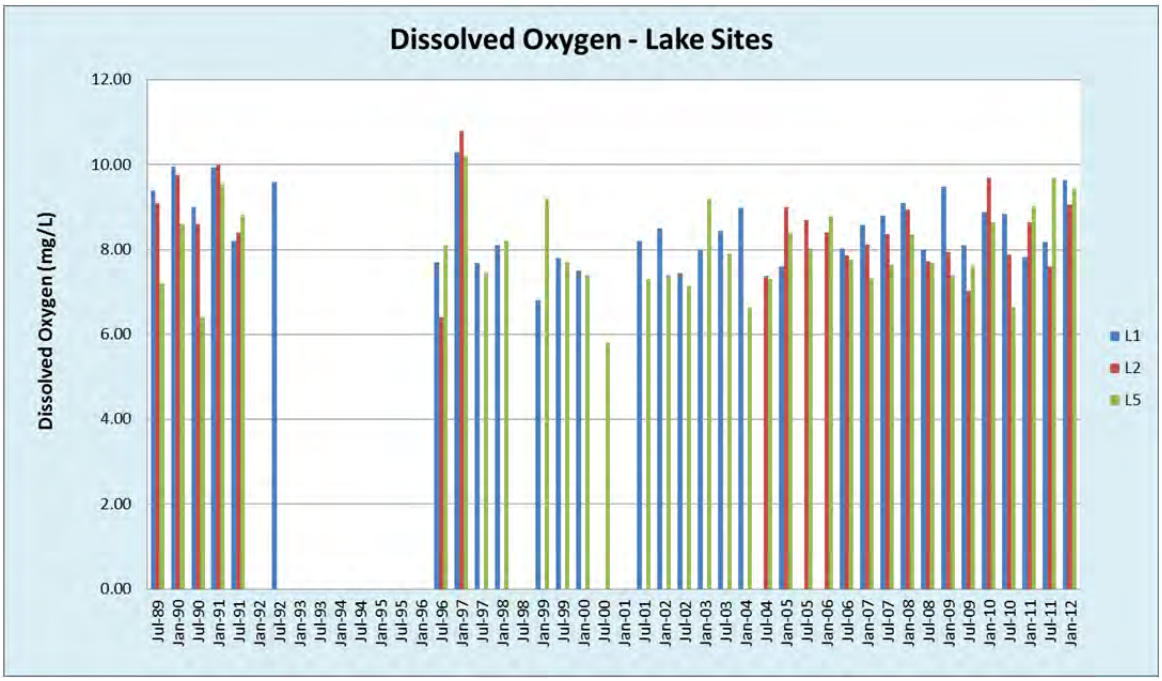

Total Phosphorus - Creek Sites
Total Phosphorus (mg/L)
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Jul-05
Jan-06
Jul-06
Jan-07
Jul-07
Jan-08
Jul-08
Jan-09
Jul-09
Jan-10
Jul-10
Jan-11
Jul-11
Jan-12
C1
C2
C5
C7
C8

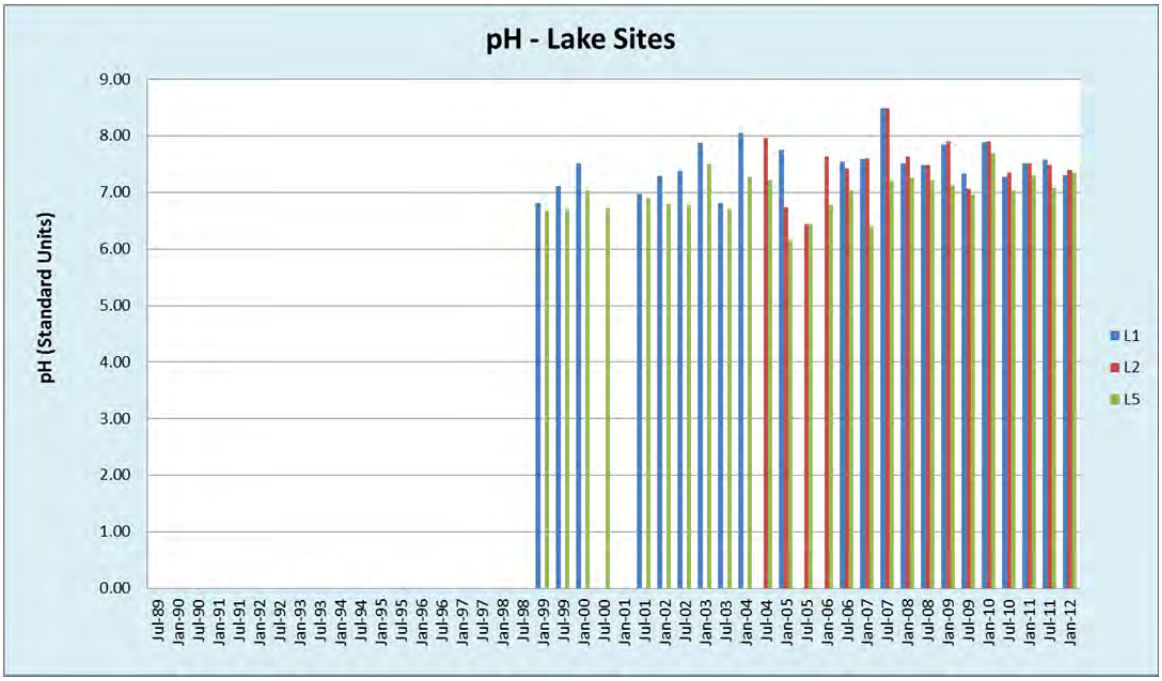

Conductivity - Creek Sites
Conductivity (microsiemens)
250.00
200.00
150.00
100.00
50.00
0.00
Jan-07
Jul-07
Jan-08
Jul-08
Jan-09
Jul-09
Jan-10
Jul-10
Jan-11
Jul-11
Jan-12
C1
C2
C5
C7
C8

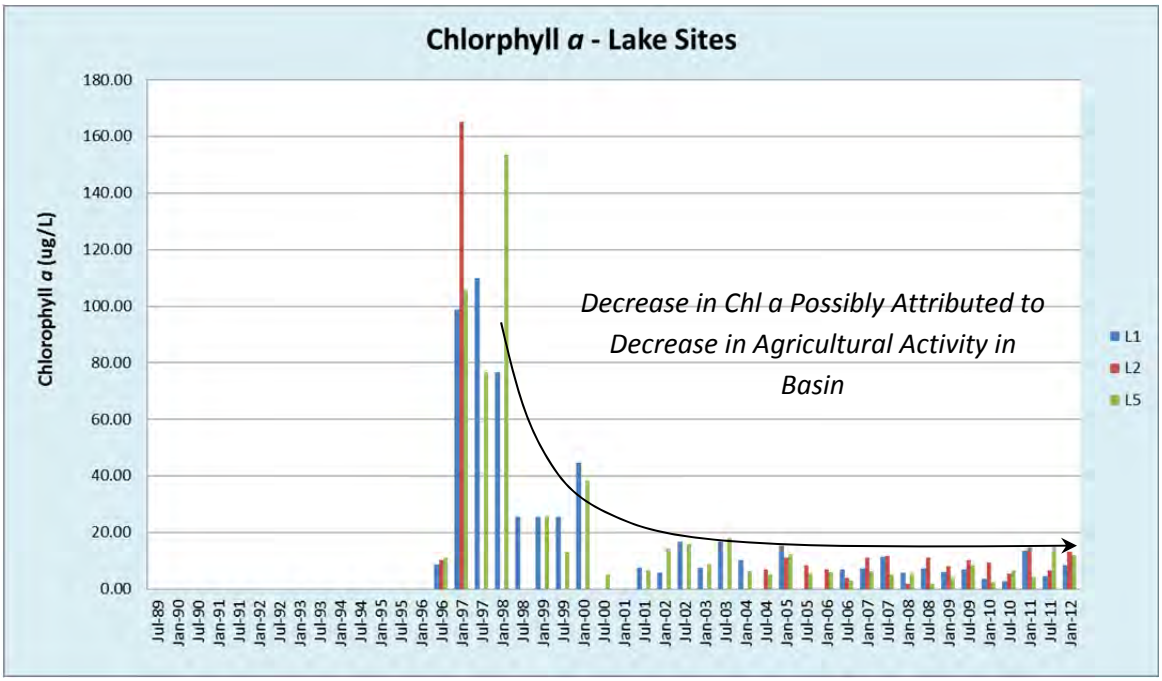

Fecal Coliforms - Lake Sites
Fecal Coliform (CFU/100mL)
3000.00
2500.00
2000.00
1500.00
1000.00
500.00
0.00
L1
L2
L5

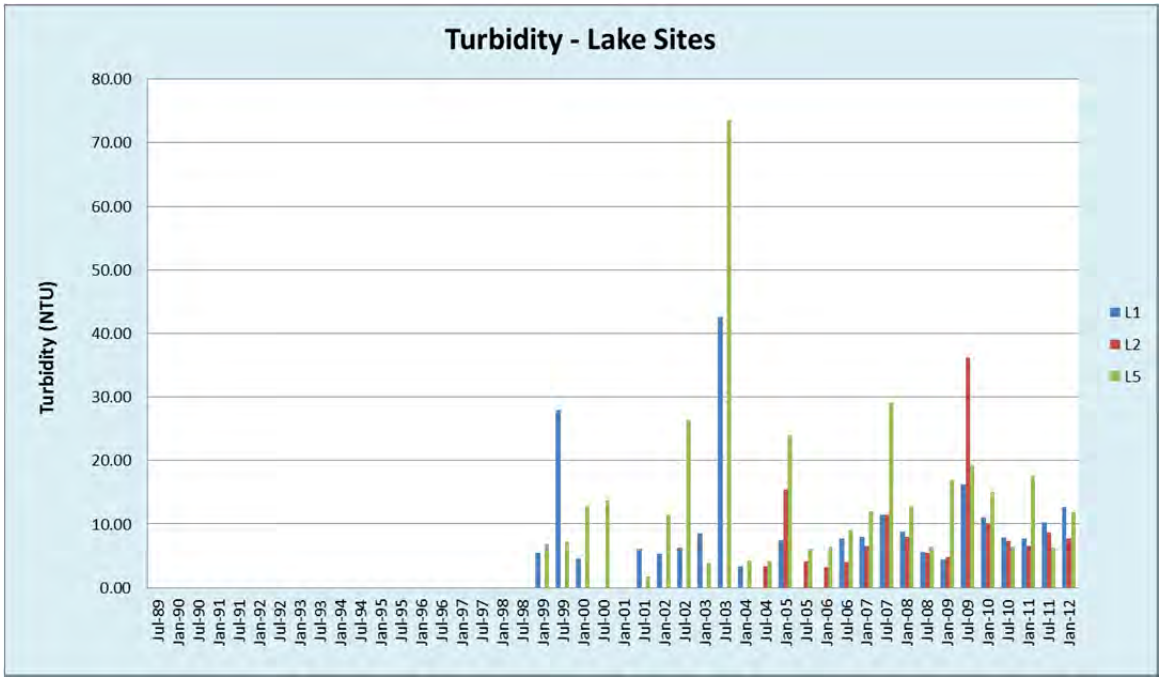

Fecal Coliforms - Lake Sites
Fecal Coliform (CFU/100mL)
900
800
700
600
500
400
300
200
100
0
L1 E-Coli
L2 E-Coli
L5 E-Coli
Jul-07
Jan-08
Jul-08
Jan-09
Jul-09
Jan-10
Jul-10
Jan-11
Jul-11
Jan-12


Water Temperature - Lake Sites
Water Temperature (Celsius)
30.00
25.00
20.00
15.00
10.00
5.00
0.00
L1
L2
L5


Dissolved Oxygen - Lake Sites
Dissolved Oxygen (mg/L)
12.00
10.00
8.00
6.00
4.00
2.00
0.00
L1
L2
L5


pH - Lake Sites
pH (Standard Units)
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
L1
L2
L5


Chlorphyll a - Lake Sites
Chlorophyll a (ug/L)
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Decrease in Chl a Possibly Attributed to Decrease in Agricultural Activity in Basin
L1
L2
L5


Turbidity - Lake Sites
Turbidity (NTU)
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
L1
L2
L5
Jul-89
Jan-90
Jul-90
Jan-91
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Jan-95
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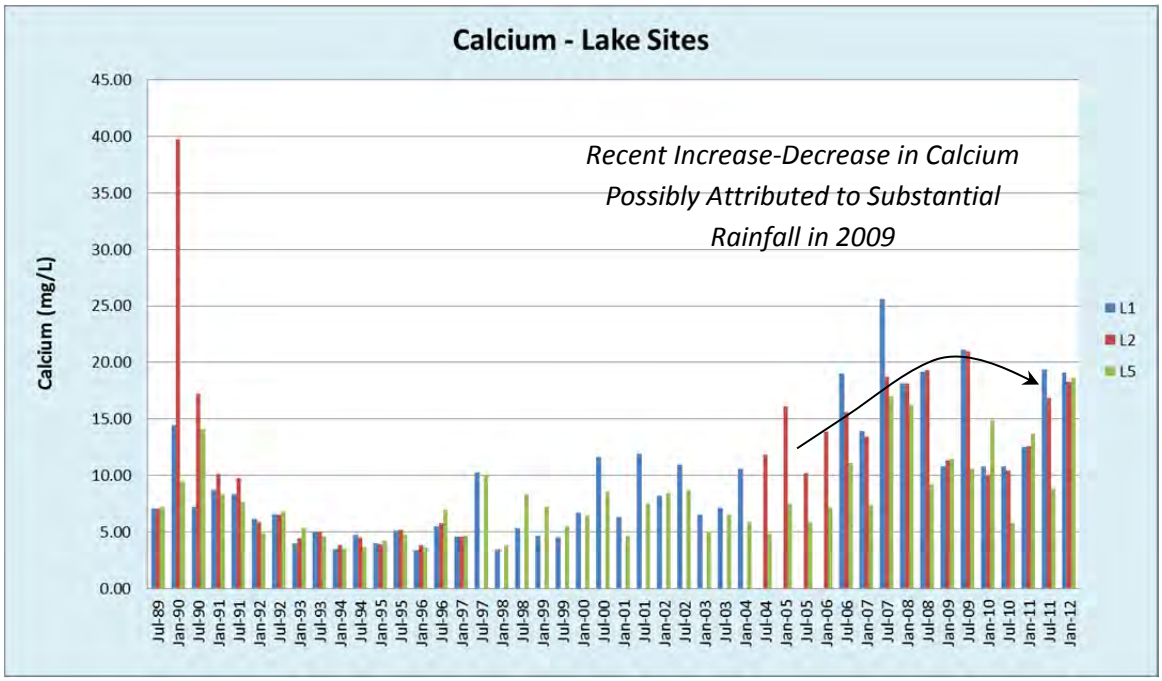
Calcium - Lake Sites
Calcium (mg/L)
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Recent Increase-Decrease in Calcium
Possibly Attributed to Substantial
Rainfall in 2009
L1
L2
L5
Jul-89
Jan-90
Jul-90
Jan-91
Jul-91
Jan-92
Jul-92
Jan-93
Jul-93
Jan-94
Jul-94
Jan-95
Jul-95
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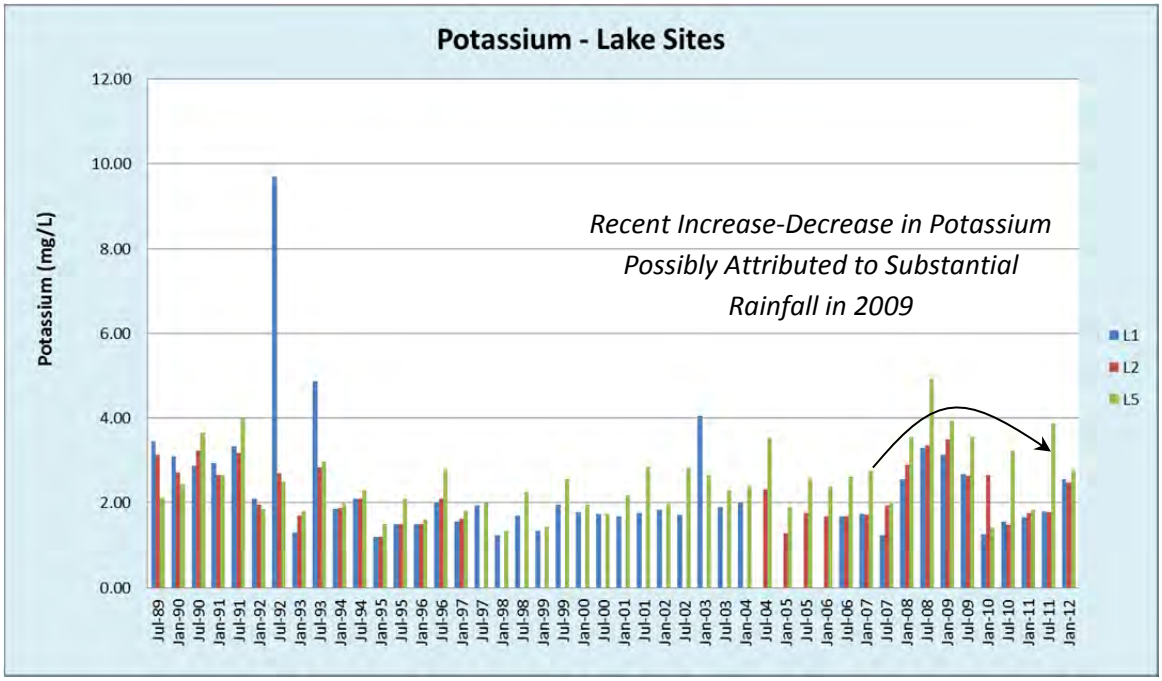
Potassium - Lake Sites
Potassium (mg/L)
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Recent Increase-Decrease in Potassium
Possibly Attributed to Substantial
Rainfall in 2009
L1
L2
L5
Jul-89
Jan-90
Jul-90
Jan-91
Jul-91
Jan-92
Jul-92
Jan-93
Jul-93
Jan-94
Jul-94
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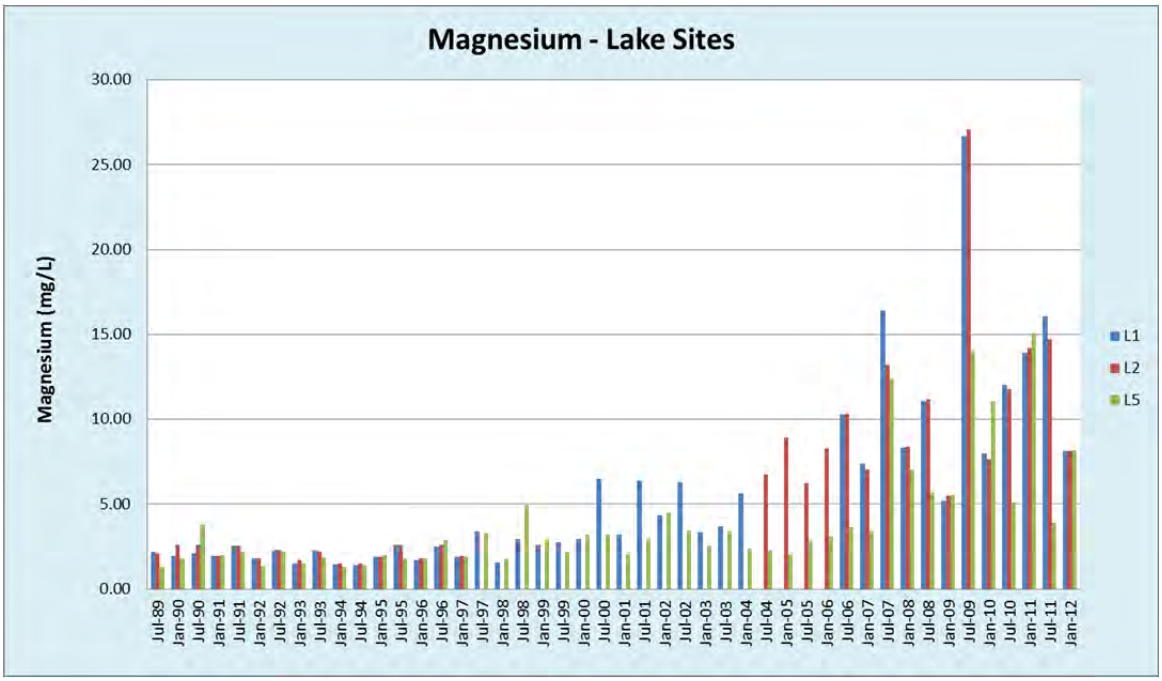
Magnesium - Lake Sites
Magnesium (mg/L)
30.00
25.00
20.00
15.00
10.00
5.00
0.00
L1
L2
L5
Jul-89
Jan-90
Jul-90
Jan-91
Jul-91
Jan-92
Jul-92
Jan-93
Jul-93
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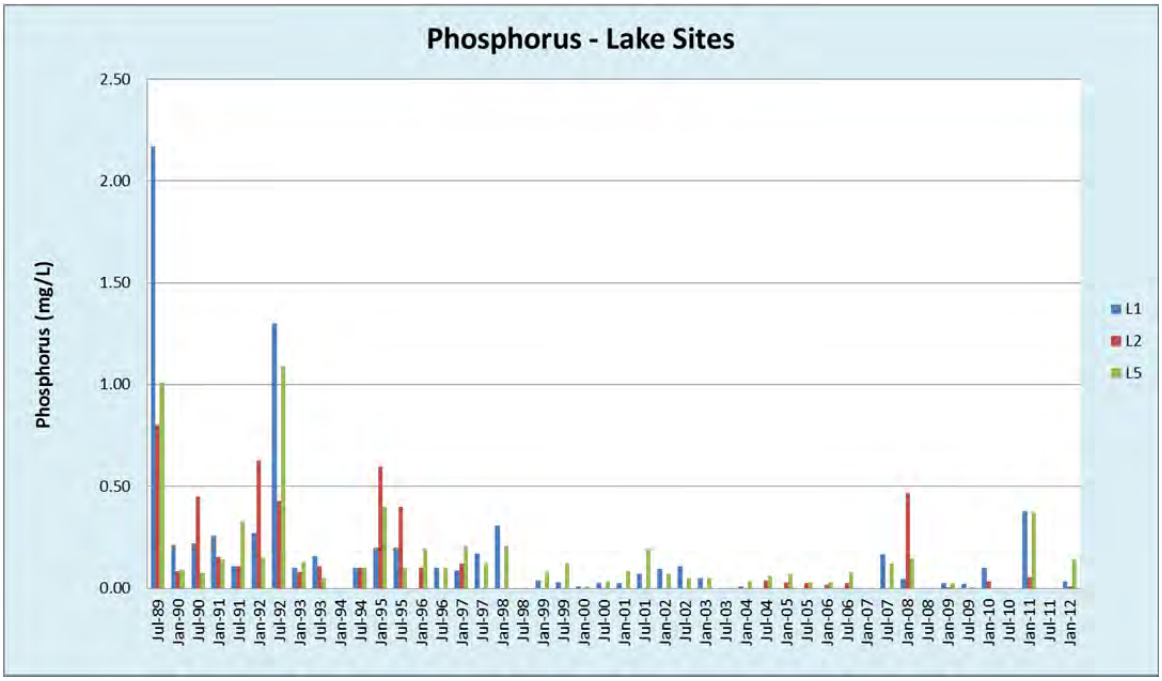
Phosphorus - Lake Sites
Phosphorus (mg/L)
2.50
2.00
1.50
1.00
0.50
0.00
L1
L2
L5
Jul-89
Jan-90
Jul-90
Jan-91
Jul-91
Jan-92
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Jul-94
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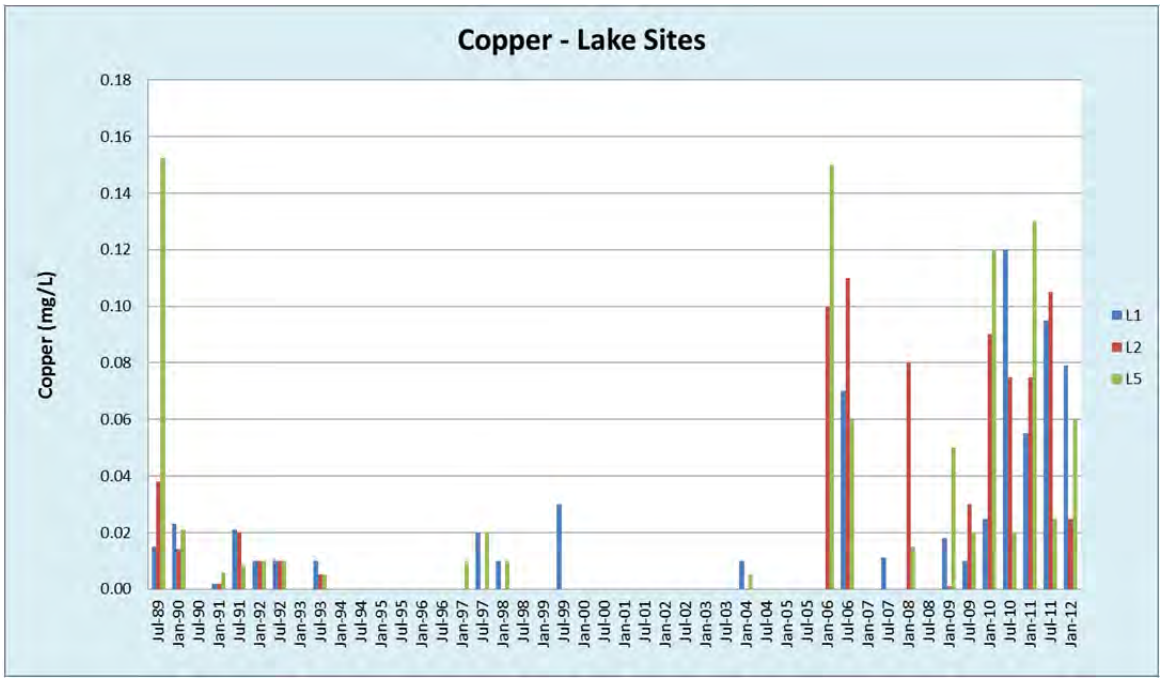
Copper - Lake Sites
Copper (mg/L)
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
L1
L2
L5
Jul-89
Jan-90
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Jan-92
Jul-92
Jan-93
Jul-93
Jan-94
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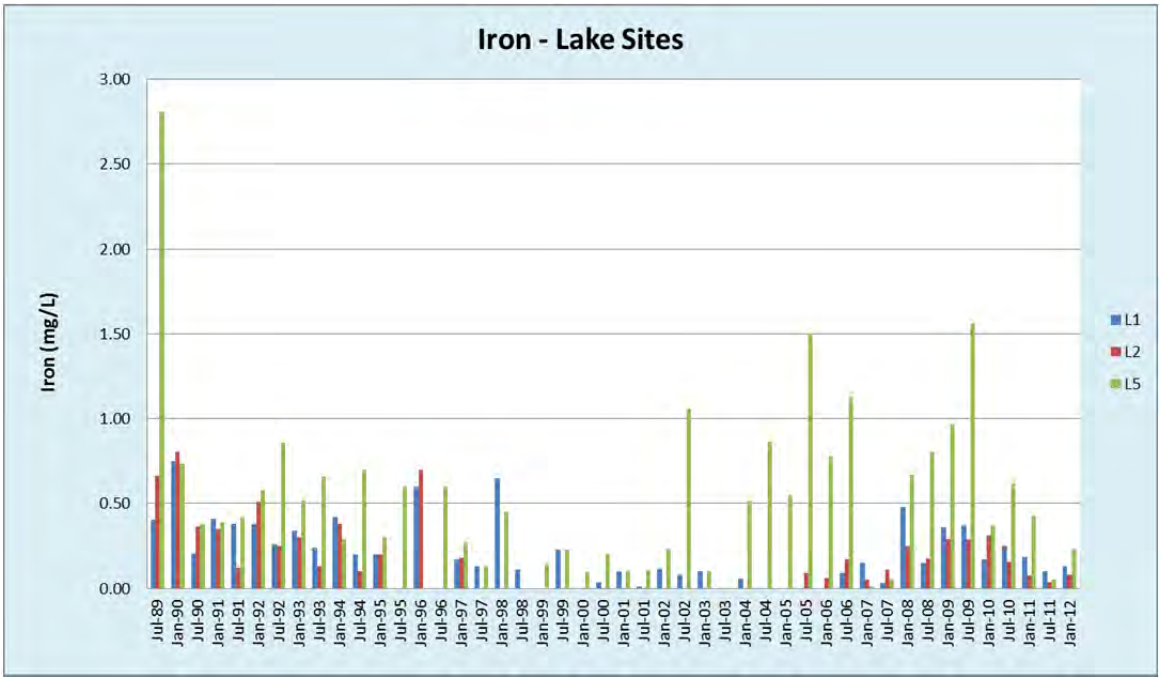
Iron - Lake Sites
Iron (mg/L)
3.00
2.50
2.00
1.50
1.00
0.50
0.00
L1
L2
L5
Jul-89
Jan-90
Jul-90
Jan-91
Jul-91
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Jan-94
Jul-94
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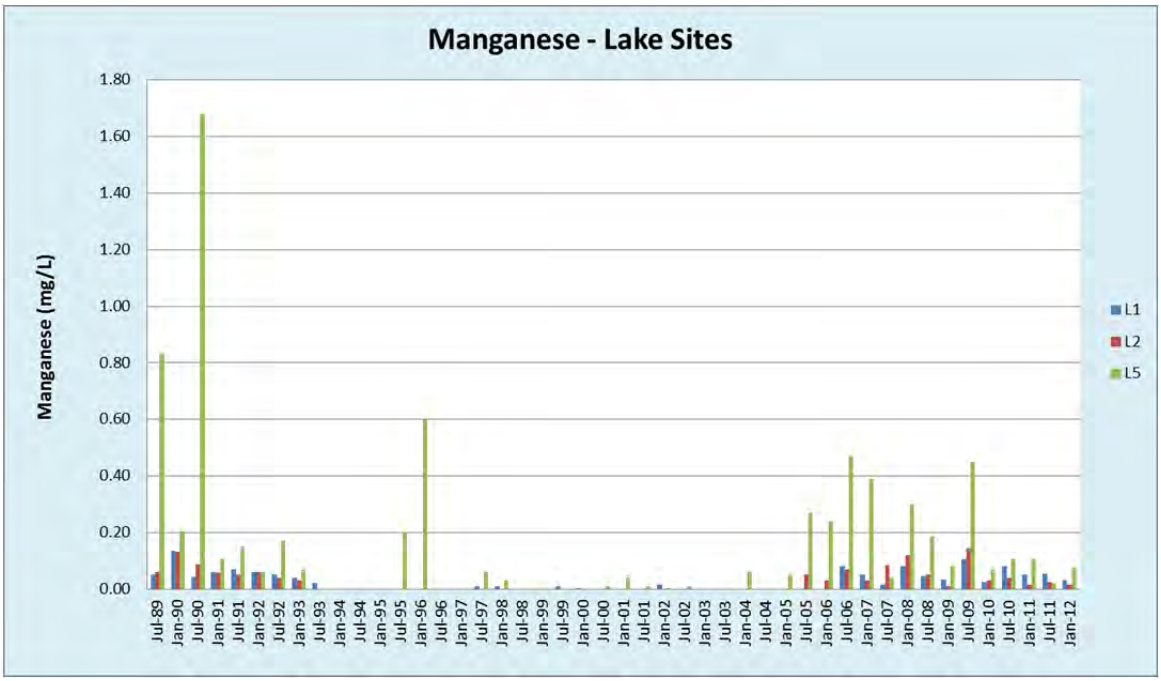
Manganese - Lake Sites
Manganese (mg/L)
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
L1
L2
L5
Jul-89
Jan-90
Jul-90
Jan-91
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Jan-92
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Jan-93
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Jan-94
Jul-94
Jan-95
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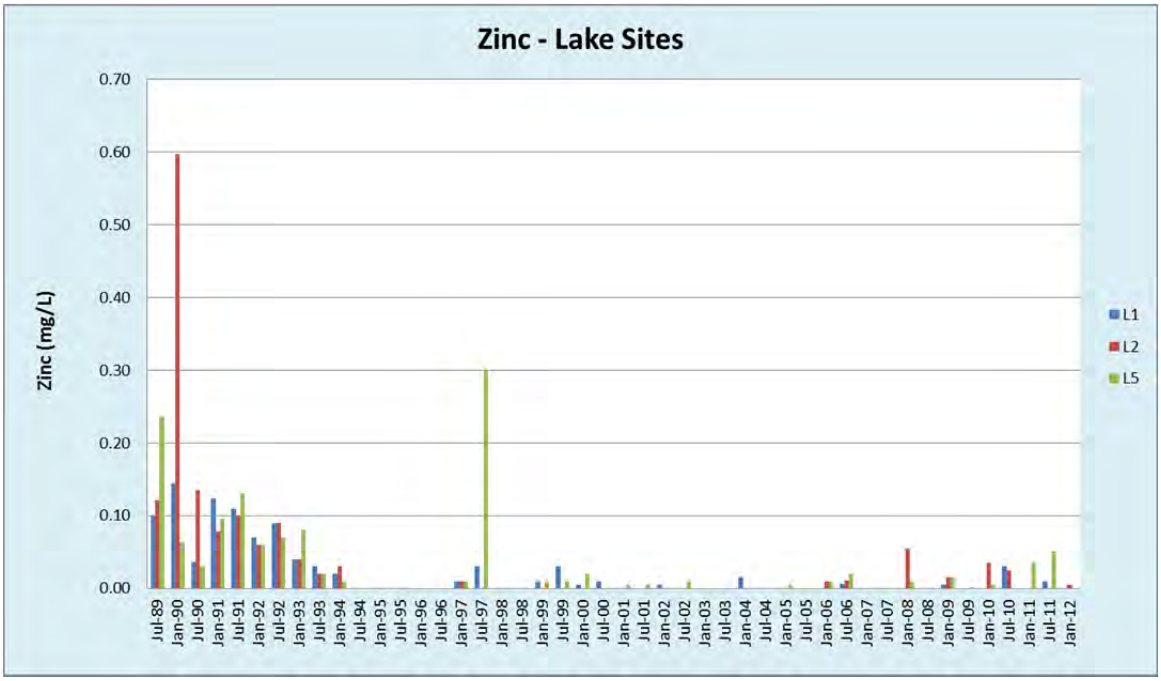
Zinc - Lake Sites
Zinc (mg/L)
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
L1
L2
L5
Jul-89
Jan-90
Jul-90
Jan-91
Jul-91
Jan-92
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Jan-93
Jul-93
Jan-94
Jul-94
Jan-95
Jul-95
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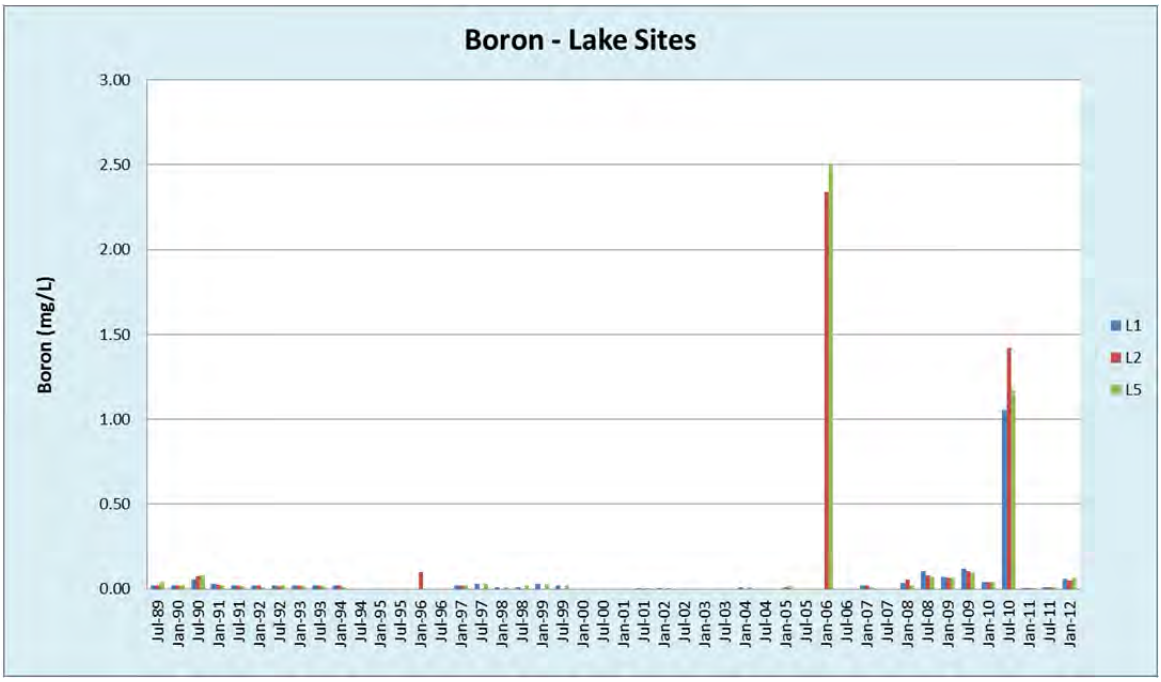
Boron - Lake Sites
Boron (mg/L)
3.00
2.50
2.00
1.50
1.00
0.50
0.00
L1
L2
L5
Jul-89
Jan-90
Jul-90
Jan-91
Jul-91
Jan-92
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Jan-93
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Jan-94
Jul-94
Jan-95
Jul-95
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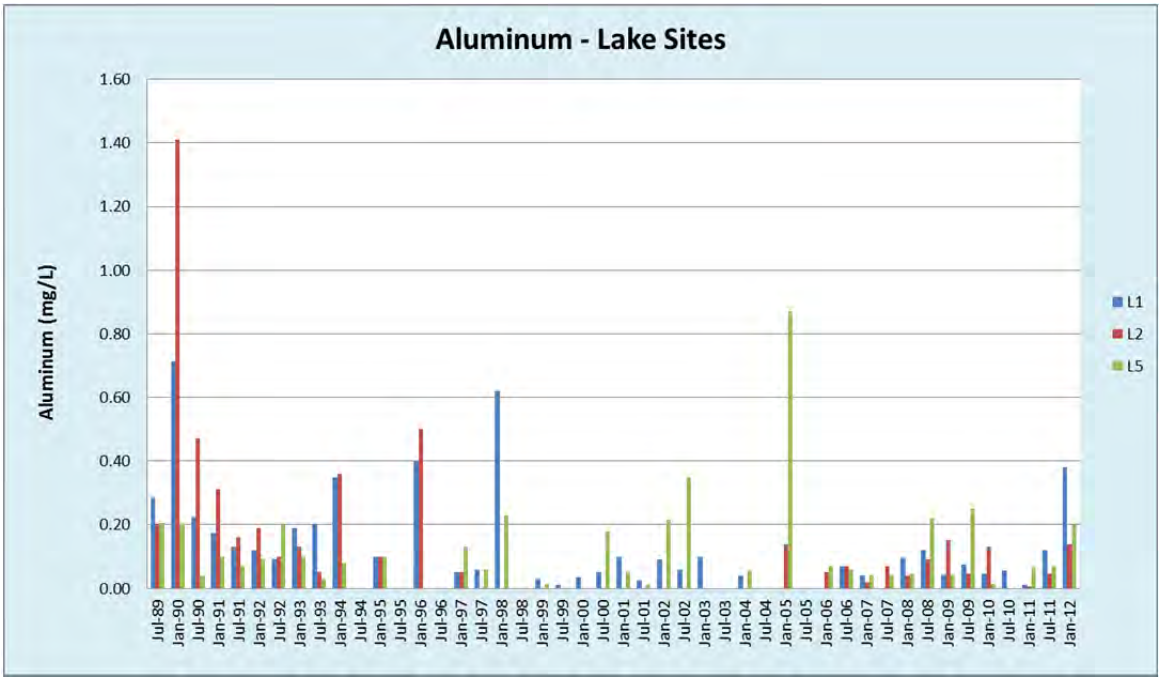
Aluminum - Lake Sites
Aluminum (mg/L)
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
L1
L2
L5
Jul-89
Jan-90
Jul-90
Jan-91
Jul-91
Jan-92
Jul-92
Jan-93
Jul-93
Jan-94
Jul-94
Jan-95
Jul-95
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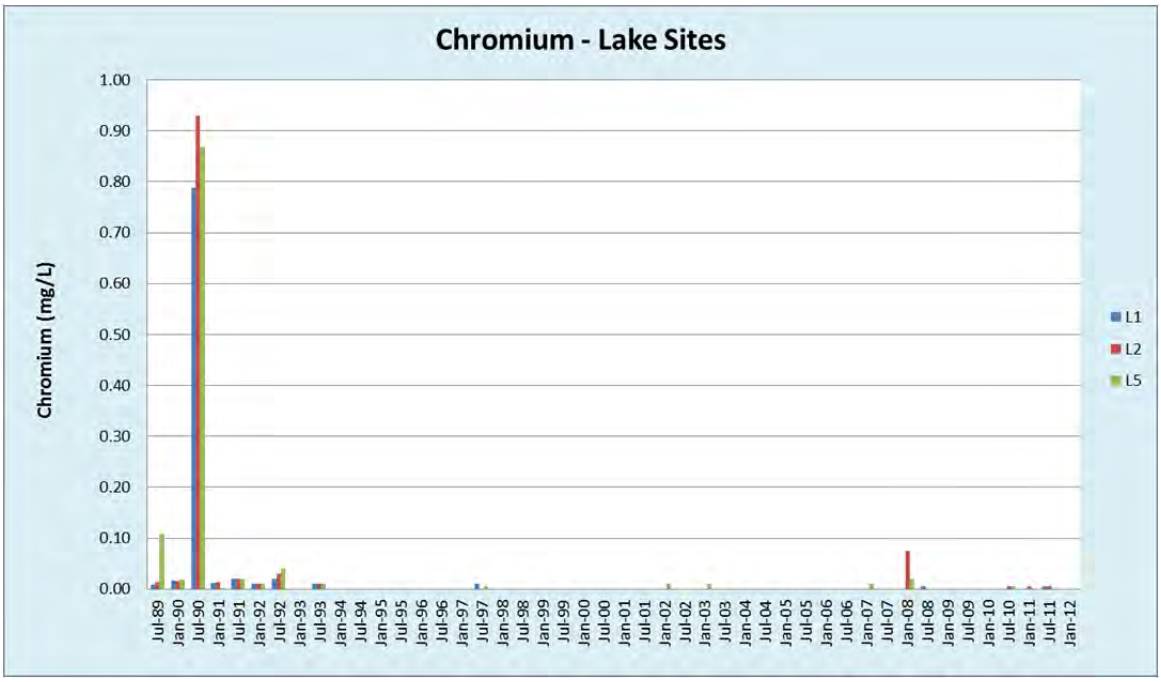
Chromium - Lake Sites
Chromium (mg/L)
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
L1
L2
L5
Jul-89
Jan-90
Jul-90
Jan-91
Jul-91
Jan-92
Jul-92
Jan-93
Jul-93
Jan-94
Jul-94
Jan-95
Jul-95
Jan-96
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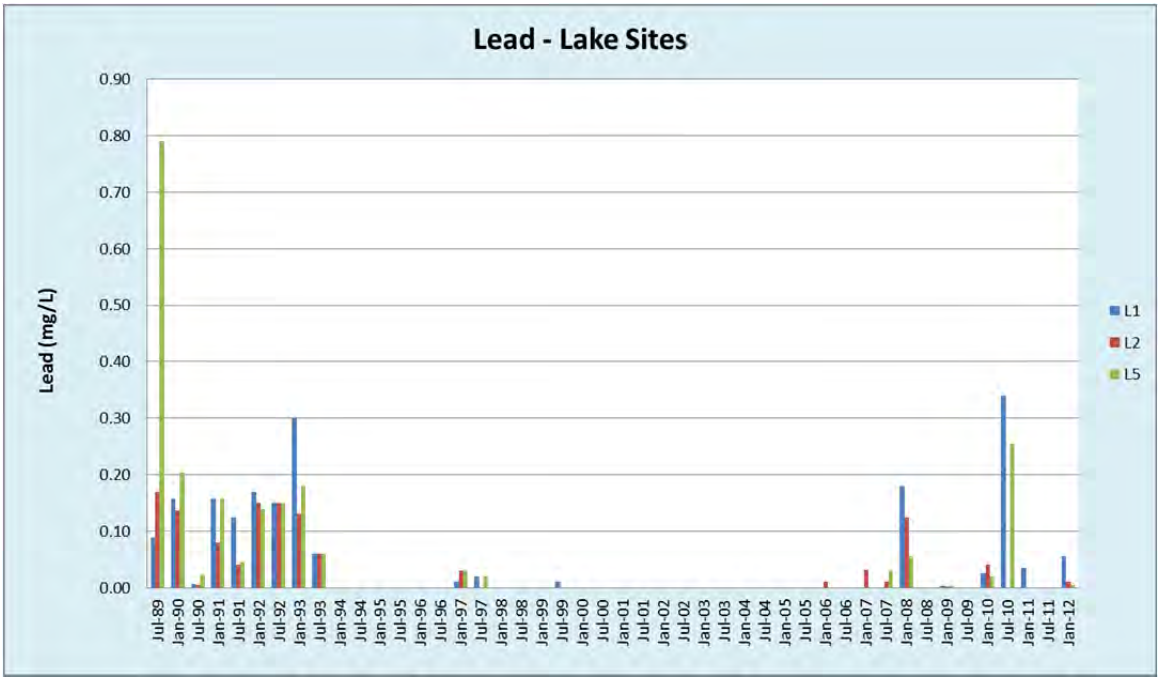
Lead - Lake Sites
Lead (mg/L)
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
L1
L2
L5
Jul-89
Jan-90
Jul-90
Jan-91
Jul-91
Jan-92
Jul-92
Jan-93
Jul-93
Jan-94
Jul-94
Jan-95
Jul-95
Jan-96
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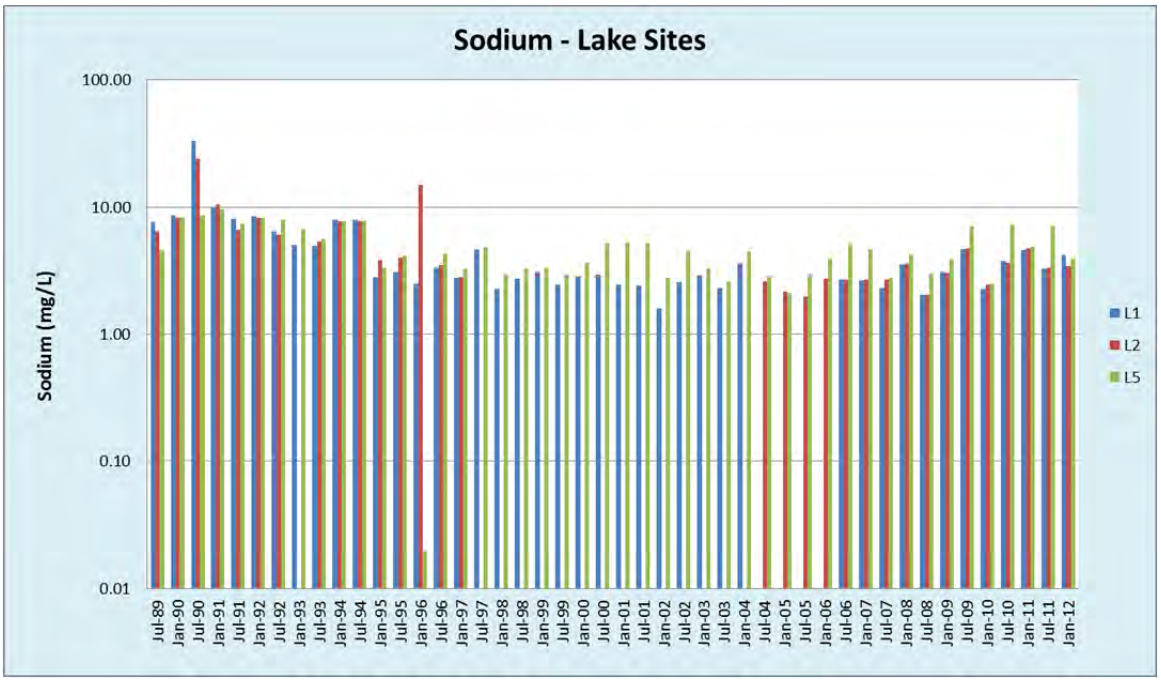
Sodium - Lake Sites
Sodium (mg/L)
100.00
10.00
1.00
0.10
0.01
L1
L2
L5
Jul-89
Jan-90
Jul-90
Jan-91
Jul-91
Jan-92
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Jan-93
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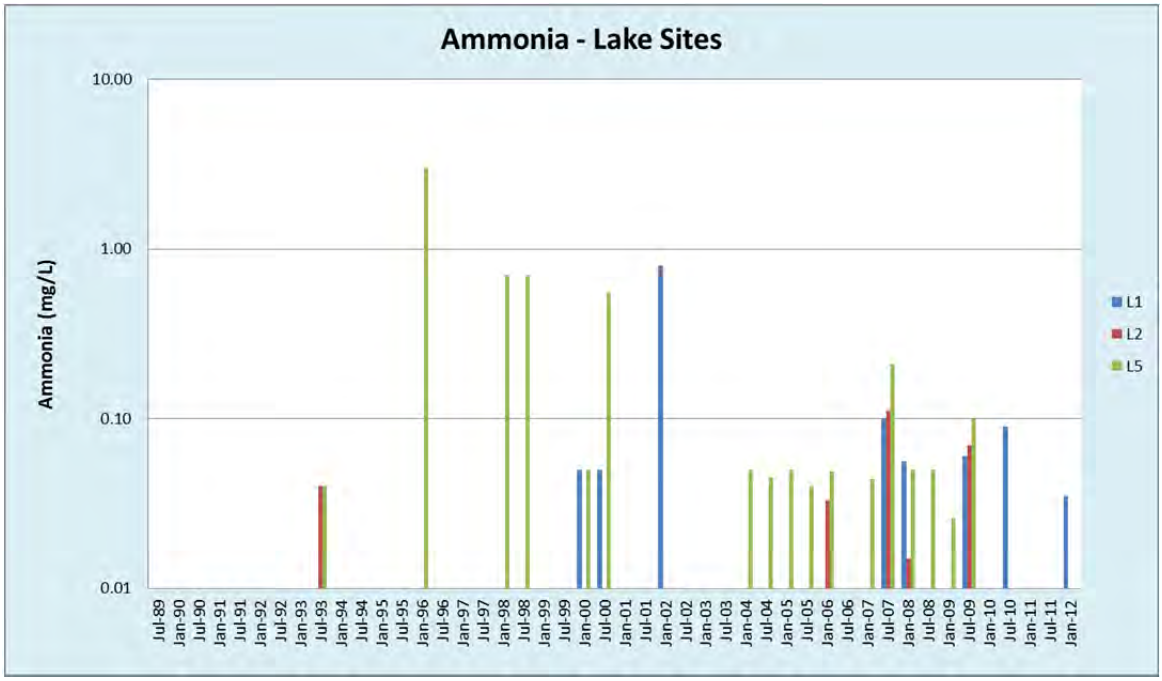
Ammonia - Lake Sites
Ammonia (mg/L)
10.00
1.00
0.10
0.01
L1
L2
L5
Jul-89
Jan-90
Jul-90
Jan-91
Jul-91
Jan-92
Jul-92
Jan-93
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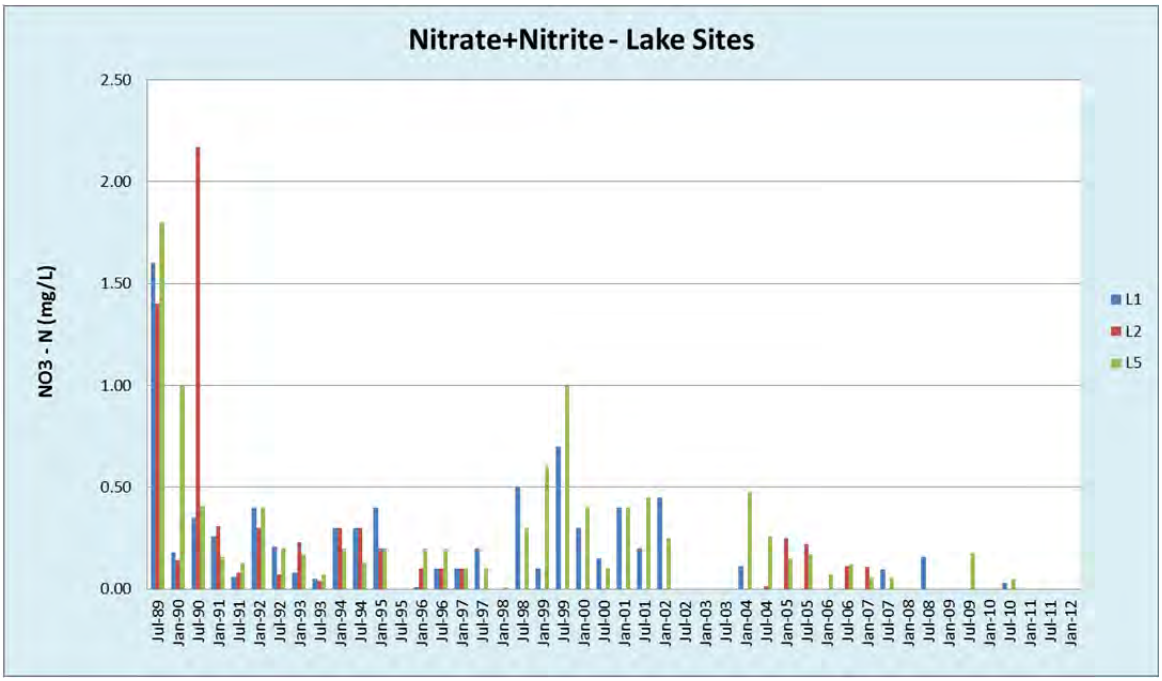
Nitrate+Nitrite - Lake Sites
NO3 - N (mg/L)
2.50
2.00
1.50
1.00
0.50
0.00
L1
L2
L5
Jul-89
Jan-90
Jul-90
Jan-91
Jul-91
Jan-92
Jul-92
Jan-93
Jul-93
Jan-94
Jul-94
Jan-95
Jul-95
Jan-96
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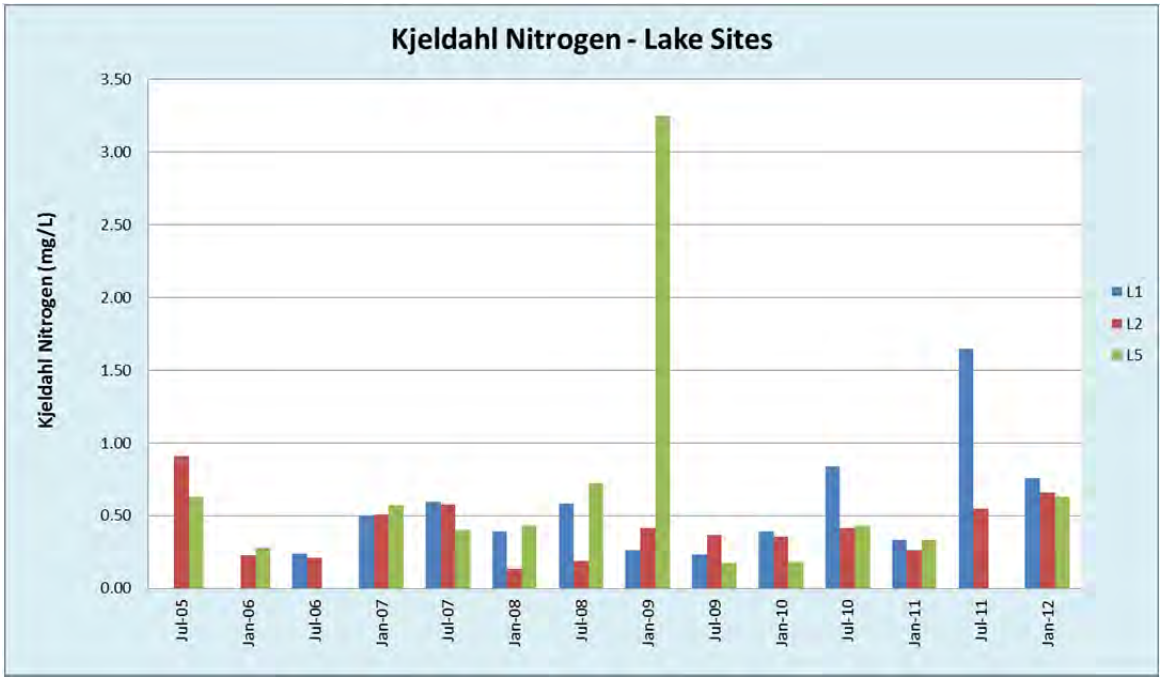
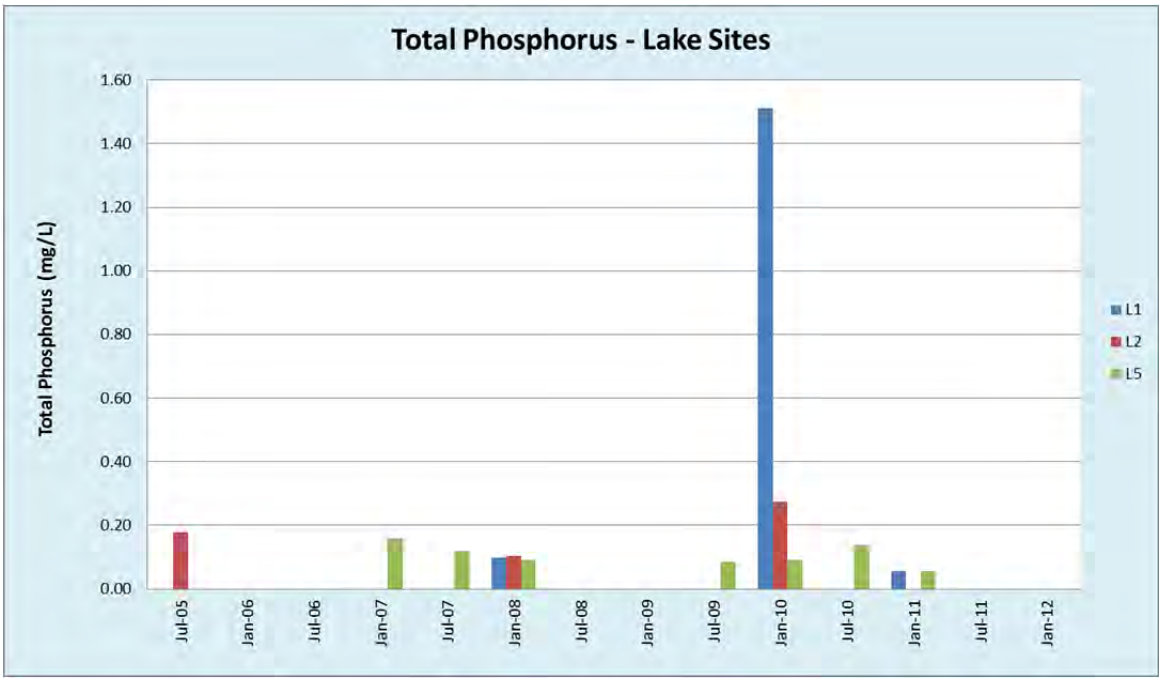

Kjeldahl Nitrogen - Lake Sites
Kjeldahl Nitrogen (mg/L)
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Jul-05
Jan-06
Jul-06
Jan-07
Jul-07
Jan-08
Jul-08
Jan-09
Jul-09
Jan-10
Jul-10
Jan-11
Jul-11
Jan-12
L1
L2
L5


Total Phosphorus - Lake Sites
Total Phosphorus (mg/L)
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Jul-05
Jan-06
Jul-06
Jan-07
Jul-07
Jan-08
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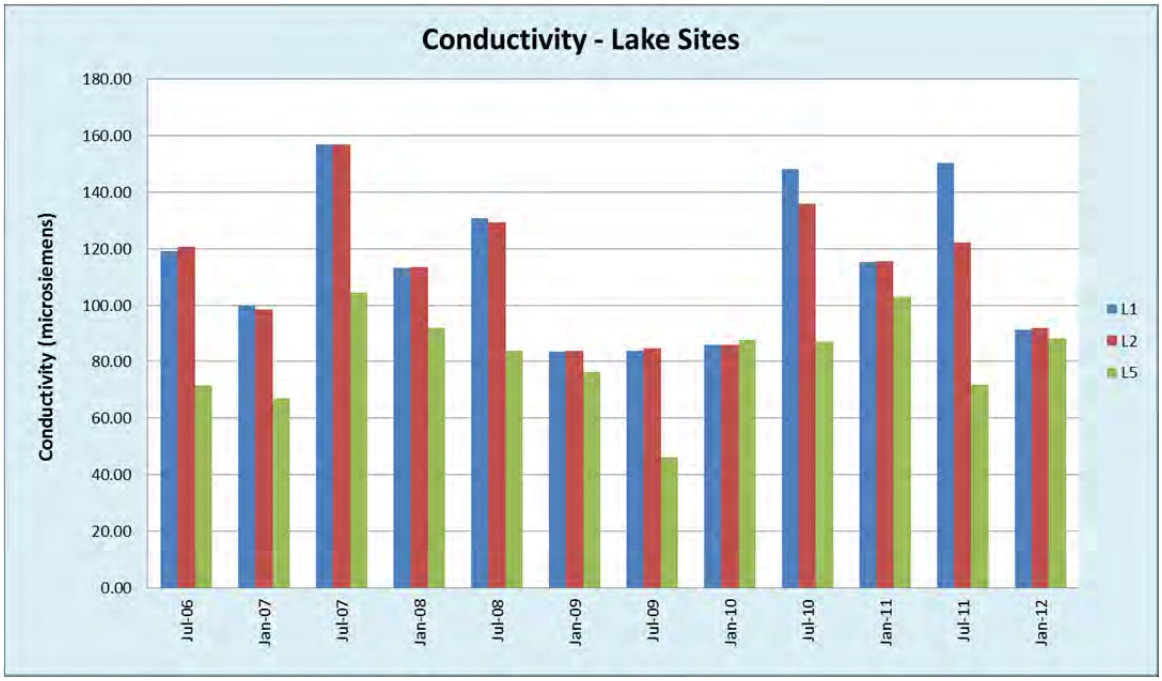
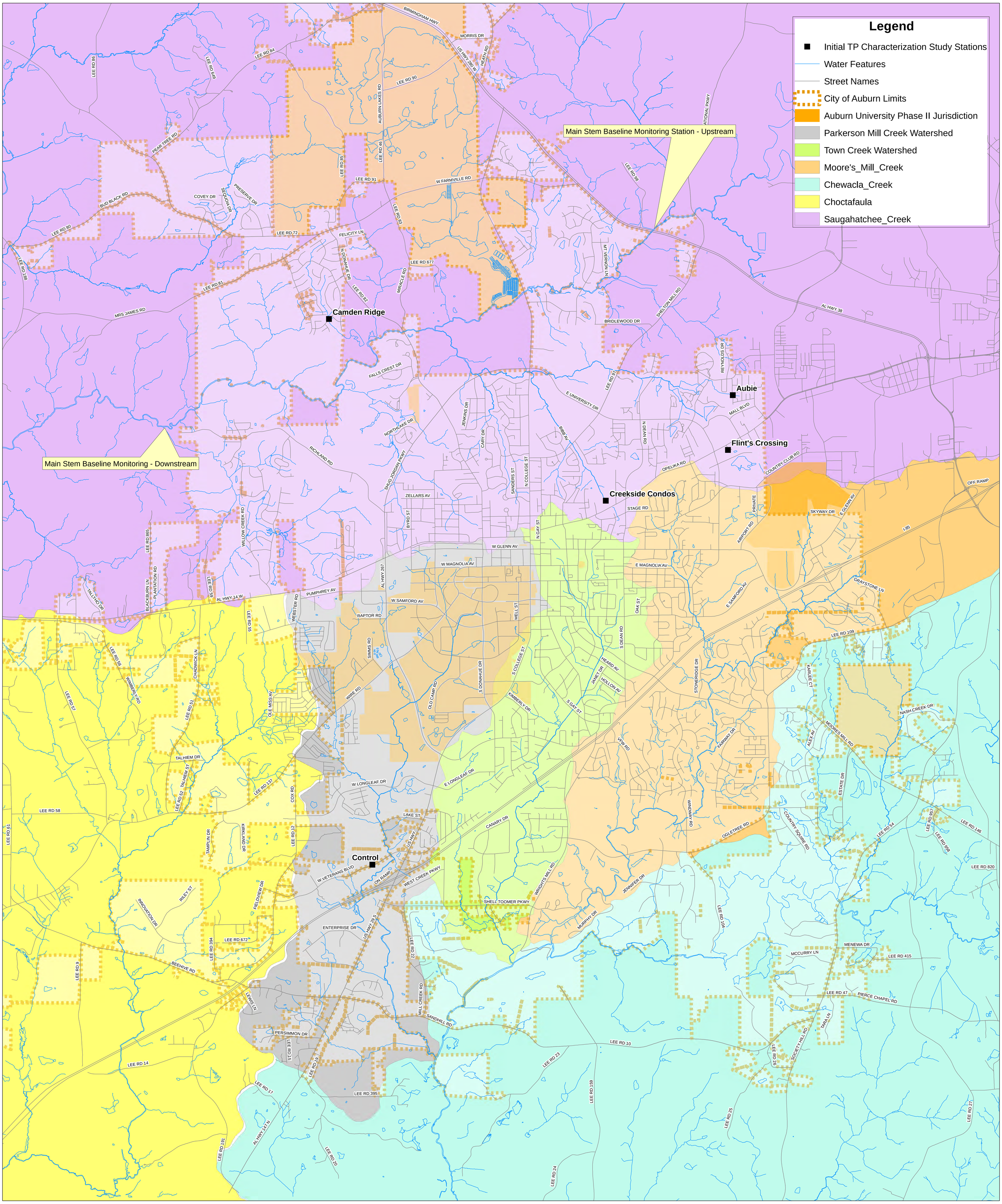
Jan-10
Jul-10
Jan-11
Jul-11
Jan-12
L1
L2
L5

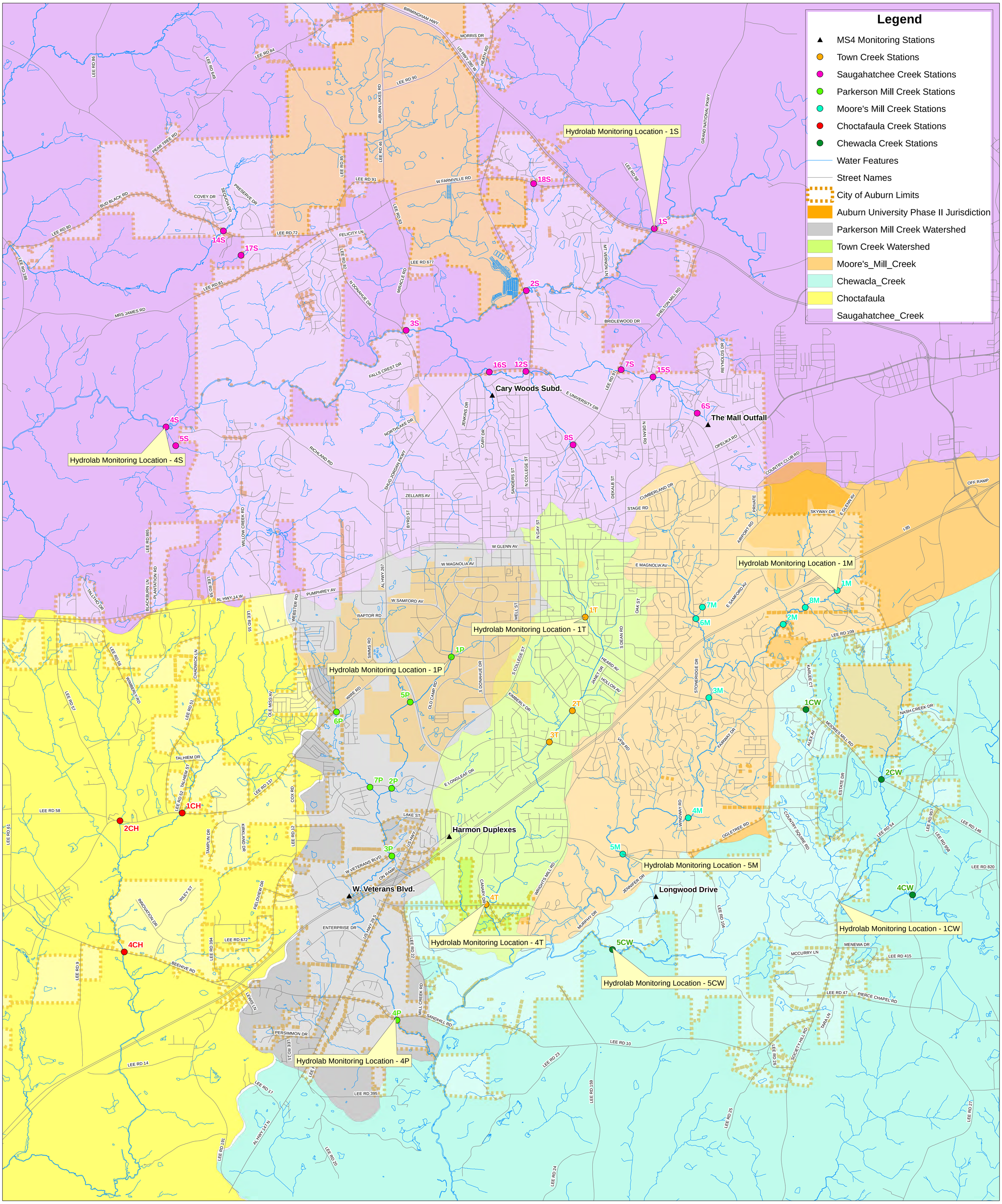

Conductivity - Lake Sites
Conductivity (microsiemens)
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Jul-06
Jan-07
Jul-07
Jan-08
Jul-08
Jan-09
Jul-09
Jan-10
Jul-10
Jan-11
Jul-11
Jan-12
L1
L2
L5



City of Auburn, Alabama
Total Phosphorus Monitoring

Disclaimer: The City of Auburn, Alabama does not guarantee this map to be free from error or innaccuracies. This map is for informational purposes only.

City of Auburn


Legend
MS4 Monitoring Stations
Town Creek Stations
Saugahatchee Creek Stations
Parkerson Mill Creek Stations
Moore's Mill Creek Stations
Choctafaula Creek Stations
Chewacla Creek Stations
Water Features
Street Names
City of Auburn Limits
Auburn University Phase II Jurisdiction
Parkerson Mill Creek Watershed
Town Creek Watershed
Moore's_Mill_Creek
Chewacla_Creek
Choctafaula
Saugahatchee_Creek
Hydrolab Monitoring Location - 1S
Hydrolab Monitoring Location - 1M
Hydrolab Monitoring Location - 1T
Hydrolab Monitoring Location - 1P
Hydrolab Monitoring Location - 4S
Hydrolab Monitoring Location - 5M
Hydrolab Monitoring Location - 4T
Hydrolab Monitoring Location - 1CW
Hydrolab Monitoring Location - 5CW
Hydrolab Monitoring Location - 4P
Cary Woods Subd.
The Mall Outfall
Harmon Duplexes
W. Veterans Blvd.
Longwood Drive
1S
2S
3S
4S
5S
6S
7S
8S
12S
15S
16S
17S
18S
1T
2T
3T
4T
1P
2P
3P
4P
5P
6P
7P
1M
2M
3M
4M
5M
6M
7M
8M
1CW
2CW
4CW
5CW
1CH
2CH
4CH
BIRMINGHAM HWY
MORRIS DR
US HWY 280 W
HEATH RD
LEE RD 84
LEE RD 86
LEE RD 649
LEE RD 90
AUBURN LAKES RD
LEE RD 46
LEE RD 85
LEE RD 91
W FARMVILLE RD
GRAND NATIONAL PKWY
LEE RD 98
PEAR TREE RD
BUD BLACK RD
COVEY DR
SEQUOIA DR
PRESERVE DR
LEE RD 80
LEE RD 72
FELICITY LN
LEE RD 83
LEE RD 677
MIRACLE RD
N DONAHUE DR
LEE RD 81
MRS JAMES RD
LEE RD 188
MT VERNON LN
SHELTON MILL RD
BRIDLEWOOD DR
FALLS CREST DR
LEE RD 97
E UNIVERSITY DR
REYNOLDS DR
NORTHLAKE DR
JENKINS DR
CARY DR
SANDERS ST
N COLLEGE ST
N DEAN RD
OPELIKA RD
COUNTRY CLUB RD
RICHLAND RD
SHUG JORDAN PKWY
ZELLARS AV
BYRD ST
DEKALB ST
CUMBERLAND DR
STAGE RD
PRIVATE
AIRPORT RD
SKYWAY DR
E GLENN AV
OFF RAMP
I-85
LEE RD 865
WILLOW CREEK RD
W GLENN AV
N GAY ST
W MAGNOLIA AV
E MAGNOLIA AV
BLACKBURN LN
PLANTATION RD
TALLYHO DR
LEE RD 59
AL HWY 14 W
PUMPHREY AV
AL HWY 267
E SAMFORD AV
LEE RD 109
WEBSTER RD
W SAMFORD AV
RAPTOR RD
MELL ST
OAK ST
S DEAN RD
LEE RD 55
SIMMS RD
S COLLEGE ST
HEARD AV
JANET DR
HOLLON AV
STONERIDGE DR
KARLEE CT
NASH CREEK DR
LEE RD 56
WIMBERLY RD
CHADWICK LN
LEE RD 57
LEE RD 51
OLE MISS AV
WIRE RD
OLD CAMP RD
S DONAHUE DR
KIMBERLY DR
VFW RD
FAIRWAY DR
ALEX AV
MOORES MILL RD
TALHIEM DR
TALHIEM ST
LEE RD 52
LEE RD 137
COX RD
E LONGLEAF DR
LEE RD 58
LEE RD 61
TAMPLIN DR
KIRKLAND DR
LEE RD 12
LAKE ST
US HWY
W VETERANS BLVD
ON RAMP
WINDWAY RD
OGLETREE RD
COUNTRY SQUIRE RD
LEE RD 957
LEE RD 54
LEE RD 998
LEE RD 146
LEE RD 820
INNOVATION DR
RILEY ST
FIELDVIEW DR
CANARY DR
WRIGHTS MILL RD
JENNIFER DR
LEE RD 104
MURPHY DR
ENTERPRISE DR
US HWY 29 S
LEE RD 672
LEE RD 394
LEE RD 22
MENEWA DR
MCCURRY LN
LEE RD 415
BEEHIVE RD
LEE RD 9
LEWIS LN
MILL CREEK RD
SANDHILL RD
LEE RD 47
PIERCE CHAPEL RD
PERSIMMON DR
LEE RD 15
LEE RD 10
LEE RD 14
LEE RD 23
LEE RD 26
SOCIETY HILL RD
TARA LN
LEE RD 17
LEE RD 395
LEE RD 159
LEE RD 25
LEE RD 27
AL HWY 147 N
LEE RD 191
LEE RD 20
LEE RD 24
N
S
E
W
0
0.5
1
2
Miles
City of Auburn, Alabama
Turbidity, Hydrolab, & MS4
Monitoring Locations
Disclaimer: The City of Auburn, Alabama does not guarantee this map to be free from error or innaccuracies. This map is for informational purposes only.
City of Auburn

Legend

- Source Water Monitoring Stations
- City of Auburn Limits
- Lake Ogletree Watershed
- Auburn University Phase II Jurisdiction
- Parkerson Mill Creek Watershed
- Town Creek Watershed
- Moore's_Mill_Creek
- Chewacla_Creek
- Choctafaula
- Saugahatchee_Creek

T12N, T14, T22, T28, T19, HQ1, T34, C8, T11, C7, T4, L5, C1, T32, C2, C5, L2, L1, Lake Ogletree

N W E S

0 0.5 1 2 Miles

City of Auburn, Alabama
Source Water Monitoring

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