STORMWATER MANAGEMENT PROGRAM ANNUAL REPORT

PERMIT YEAR

March 2015 – March 2016

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

PERMIT NUMBER ALR040003

City of Auburn

Home of Auburn University

CITY OF AUBURN

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (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 upon 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.

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Bill Ham, Jr.
Mayor, City of Auburn
144 Tichenor Avenue
Auburn, Alabama 36830
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FOREWORD:

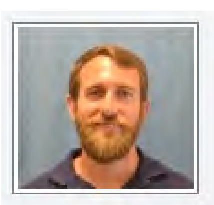
The mission of the Watershed Division of the Water Resource Management Department of the City of Auburn is, first and foremost, to protect, preserve, and restore the chemical, biological, and physical integrity of our local water resources. And, although the City's comprehensive Stormwater Management Program is managed by the Watershed Division, the long term success of the program will ultimately be determined by its ability to strengthen the resolve and desire of the entire community toward this same objective. This report is drafted with this understanding and therefore reflects the summary of the efforts of the community of Auburn as much as it does those of the staff of the City of Auburn. Although there are many success stories and much progress made in 2015, many challenges and concerns remain, not the least of which is the continued status of impairment of three of the City's principal water resources; Saugahatchee Creek (Nutrients), Parkerson's Mill Creek (Pathogens), and Moore's Mill Creek (Siltation). We will continue to improve upon and develop our Stormwater Management Plan in the coming years, focusing on building and expanding upon the program's strengths and identifying and implementing strategies for addressing threats to our local water resources.

WATERSHED DIVISION STAFF:

Daniel Ballard, PLA | Watershed Division Manager

Education: Bachelor of Science in Zoology & Master of Landscape Architecture

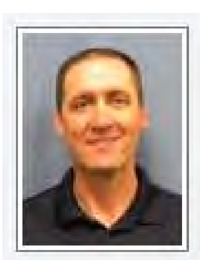
Certifications/Licensure: Registered Professional Landscape Architect, Alabama #772



Dustin "Dusty" Kimbrow | Watershed Program Coordinator

Education: Bachelor of Arts in Geography (magna cum laude) & Master of Science in Geography

Certifications/Licensure: Qualified Credentialed Inspector, Alabama



Ronald "Ron" McCurry | Stormwater Coordinator

Education: Bachelor of Science in Building Science & Master of Community Planning

Certifications/Licensure: Qualified Credentialed Inspector, Alabama

STORMWATER MANAGEMENT PROGRAM ANNUAL REPORT

City of Auburn

PERMIT YEAR

March 2015 - March 2016

PROGRAM EVALUATION & EXECUTIVE SUMMARY

The City of Auburn is now entering its thirteenth year as a regulated owner/operator of a small municipal separate storm sewer system, with the current reporting year representing the fifth and final under the existing Statewide General Permit ALR040003. Over nine of these past twelve years the City's Stormwater Management Program (SWMP) has generally been managed and operated with the same number of staff and with the same operational budget. Over this same time period the City's physical infrastructure and population has continued to experience rapid growth, with the population increasing by approximately 25% every ten years. This rapid urbanization, which began many years before the promulgation of Phase II of the NPDES program, has presented challenges to the City's SWMP, both in the form of legacy impacts to our water resources and in the form of the ever-evolving dynamics of the impacts of urban and suburban growth on local hydrologic conditions. The most outward physical evidence of these challenges is the continued status of impairment of three of the City's principal water resources; Saugahatchee Creek, Moore's Mill Creek, and Parkerson's Mill Creek. Furthermore, the diversity of impairment (nutrients, siltation, & pathogens respectively) between these waters highlights the complexity and uniqueness of the impacts of urbanization on our watersheds and underscores the need for prescriptive and strategic plans for protection, preservation, and restoration. The City's SWMP provides the framework for accomplishing this through both targeted regulations and policies (ex. requirement of Water Quality Plans for developments discharging to impaired waters) and through the implementation of other targeted structural and non-structural control measures as required by the City's MS4 Permit and/or as outlined in the City's Stormwater Management Plan or any of the three approved Watershed Management Plans.

This report outlines, in detail, how the City is operating its SWMP and how it records and documents measurable success. Additionally, this report demonstrates how innovation, partnerships, collaboration, and dedication to a common mission can and have permitted the City to expand the capacity of its SWMP services to a growing population at little to no increased costs for over a decade. These partnerships, many of which started in the formative years of the program, are the foundation of the City's SWMP and have grown to include Auburn University, Save our Saugahatchee (SOS), Friends of Chewacla Creek and Uphapee Creek (ChewUp), Alabama Water Watch (AWW), the City of Opelika, the City of Smiths Station, Lee County Highway Department, and Auburn City Schools. Some of the successes and accomplishments of the program in 2015, many of which would not be possible without these partners, include:

- Authored and distributed over 22 articles directly or indirectly related to stormwater and watershed management in the City's OpenLine Newsletter, which is distributed monthly to over 21,000 customers.

- Co-hosted three (3) Green Roof Workshops for local designers, engineers, developers, and students.

- Created a Public Water Quality Viewer Application, whereby citizens can view, graph, and download routine surface water quality data obtained by the City.

- Continued regular quarterly meetings of the ALOAS organization and authored and distributed two jointly produced educational brochures.

- Maintained a very active outreach presence by giving eight diverse presentations to a variety of different organizations.

- Maintained an active presence on the City's website and began looking at website improvements.

- Designed and constructed a 300 linear foot streambank and sewer stabilization project on Parkerson's Mill Creek.

- Cleaned over 14,000 miles of City streets with regenerative air street sweepers, accounting for nearly 800 tons of sediment, debris, and trash removed from City streets.

- Recycled over 14,000 pounds of household hazardous waste, over 2,400,000 pounds of newspaper, cardboard, glass, and plastic trash, and over 1,400 gallons of used cooking oil/grease.

- Co-hosted the 12th annual Erosion and Sediment Control Workshop through a collaboration with Auburn University, Lee County Highway Department, Smiths Station, and the City of Opelika. This workshop was attended by more than 80 local developers, designers, engineers, and contractors.

- Performed 1,108 Erosion and Sediment Control inspections, resulting in 536 enforcement letters and eleven 72-Hour Notices of Violation (NOV's).

- Fully developed an Erosion and Sediment Control Inspection tracking module in CityWorks to facilitate the inspection-to-enforcement process and improve record keeping.

- Purchased a LaMotte Smart3 Colorimeter to aid in the City's Illicit Discharge Detection and Elimination Program and began preparing a small laboratory to improve quality control and quality assurance of analyses.

- Supported and participated in numerous community education and outreach opportunities, including Earth Week, the Lee County Water Festival, storm drain marking, etc.

- Continued to implement numerous recommendations outlined in the Natural Systems section of the City's Comp Plan 2030.

- Installed two permanent stream gages; one on Chewacla Creek (with telemetry) and one on Nash Creek.

- Continued the weekly monitoring of 40 stations throughout the City for turbidity, adding dissolved oxygen, temperature, pH, and specific conductance in 2015.

- Continued continuous monitoring of upstream/downstream locations with two Hydrolab DS5 multiparameter water quality sondes.

- Implemented the first year of a five year in-sourcing Source Water Monitoring Plan.

- Continued to finance USGS stream gaging operations on both Saugahatchee and Chewacla Creeks.

- Completed the thirteenth year of conservation measures outlined in the Chewacla Creek Safe Harbor Agreement.

- Reduced sanitary sewer overflows (SSO's) by over 70% over the last six years.

Goals for the Upcoming Year

The Watershed Division regularly evaluates the effectiveness and efficiency of its operations, both from a permit compliance perspective as well as a mission/objectives perspective. This allows staff to identify elements of the SWMP that are working, those that are not, and those that need or warrant modification. Staff work to continue those services that they determine effective, eliminate those that are not, and establish goals for improving those that could be. Below is a list of items determined as goals for 2016.

- Continue to increase public education and awareness through additional storm drain marking activities, involvement with our local schools and other education and outreach initiatives;
- Begin the strategic water quality screening of the City's stormwater outfalls (flowing) that were surveyed and assessed during the initial Outfall Reconnaissance Inventory field survey;
- Implement the CityWorks Erosion and Sediment Control Inspection Module and continue improvements in lot-level erosion and sediment control inspections;
- Continue to improve and promote the City's Water Quality Monitoring Public Viewer Application;
- Complete the revisions to the City's Water Quality Monitoring Plan and submit to the ADEM;
- Continue the implementation and enhancement of the City's comprehensive water quality monitoring database that houses data from the City's various water quality monitoring programs;
- Continue promotion and implementation of low impact development/green infrastructure principles and best management practices;
- Continue the City's newly created quarterly Lunch & Learn program;
- Implement the City of Auburn Rainwater Harvesting Program;
- and, design and install at least one green infrastructure element on City property.

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 permit (ALR040003) was modified on February 24th, 2012 and is included in this report.

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 twelfth report, and fifth (final) under the reissued permit, and covers the reporting period from March 2015 through March 2016. 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 (updated and submitted to ADEM in November 2015).

II. SITE DESCRIPTION

The City of Auburn is located in East Central Alabama. A map of the City is provided in Appendix B. The Auburn, Alabama urbanized area encompasses 50.27 square miles per the 2010 U.S. Census. Approximately 26.80 square miles of the Auburn City Limits are located within this urbanized area. The current population of Auburn is approximately 60,258 per the 2014 U.S. Census estimate. There are approximately 286 miles of creeks and streams flowing through Auburn, approximately 667 lakes, ponds, and other open waters, and +/- 370 acres of wetland. From the most recent City storm drainage system inventory, the storm drainage system contains approximately 126 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.

Geographic Context

The City of Auburn is situated within a unique transitional zone between the Piedmont and Coastal Plain physiographic regions of the Southeastern United States (see link below). More specifically, the City is located within the Level IV sub-ecoregion known as the Southern Outer Piedmont. This ecoregion is generally characterized as having lower elevations, less relief, and less precipitation than that exhibited in other regions of the Piedmont. Overstory cover type within this region consists mostly of mixed deciduous (oak, gum, hickory) and mixed coniferous (pines, firs, spruces, etc.) with the presence of numerous monotypic pine plantations scattered throughout. Specific to these transitional areas in the southeast is the presence of the "fall line", the geographic divide between the Piedmont and Coastal Plain. More information can be found at the link provided below. The City's presence within this transitional area between the piedmont and coastal plain regions provides for a unique hydrogeomorphic diversity of water features within a relatively small geographic area. This diversity is exemplified in the abundance and variety of stream channel features, varying substrate composition, and variety of aquatic habitats. For example, streams in central Auburn generally exhibit piedmont characteristics, such as strong riffle/pool complex formation and cobble/gravel substrate composition, yet they cascade to a coastal plain dynamic of long runs and sandy substrates as they flow to the western and southern extents of the City. Similarly, the topography of each of the contributing watersheds follows the same pattern of increasing coastal plain-like features to the west and south of the City.

Link to a map of Alabama's physiographic regions:

http://alabamamaps.ua.edu/contemporarymaps/alabama/physical/al_physio.pdf

III. KNOWN OR SUSPECTED WATER QUALITY PROBLEMS

The City's municipal separate storm sewer system (MS4) discharges into streams located in three primary (10-digit HUC) watersheds; Saugahatchee Creek Watershed, Uphapee Creek Watershed, and Chewacla Creek Watershed. Smaller watersheds of the Saugahatchee Creek Watershed to which portions of the City's MS4 discharge include the Loblockee Creek Watershed and the Little Loblockee Creek Watershed. Smaller watersheds of the Chewacla Creek Watershed to which portions of the City's MS4 discharge include Parkerson's Mill Creek, Moore's Mill Creek, and Town Creek. The only smaller watershed of the Uphapee Creek Watershed to which portions of the City's MS4 discharge include the Choctafaula Creek Watershed.

Moore's Mill Creek was placed on the draft 303(d) list in 1998 and has been listed on the final 303(d) lists from 2002 to present. 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 ADEM Draft 2016 303(d) list identifies Moore's Mill Creek as a Low Priority for TMDL development. The Moore's Mill Creek Watershed Management Plan was drafted and finalized in May of 2008.

The Saugahatchee Embayment, where Saugahatchee Creek discharges into Yates Lake, was placed on the final 303(d) lists from 1996 to 2008. The Embayment was listed on the 303(d) lists 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 (modified on February 24th, 2012) and the City's updated Stormwater Management Plan that was submitted to ADEM in July 2011. The Saugahatchee Watershed Management Plan was drafted and finalized in February of 2005.

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, storm sewers, and illicit discharges. A TMDL for Parkerson's'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 (modified on February 24th, 2012) and the City's updated Stormwater Management Plan that was submitted to ADEM in July 2011. The Parkerson's Mill Creek Watershed Management Plan was drafted and finalized in December of 2011.

IV. RESPONSIBLE PARTY

The City's Stormwater Management Program (SWMP) is implemented by several programs operating under various departments within the City's organization. Components of the SWMP and each department's respective responsibilities 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:

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Water Resource Management Department
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(334) 501-7367
dballard@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 twelve, and the fifth year under the reissued permit, all program components outlined in the SWMP have been implemented. The City submitted a new NOI and second revision of its SWMP to the ADEM in November 2015 and is currently awaiting finalization of the new Phase II Statewide General Permit.

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 current reporting year, a total of twenty two (22) articles were published in which stormwater related issues were highlighted or affected:

- *March 14th Big Event Day Proclaimed – February 2015*
- *Downtown Renovations (including Stormwater) – March 2015*
- *WRM Partners with Save our Saugahatchee – March 2015*
- *Flood protection and preparation information (11 separate articles) – April 2015*
- *Corner Construction (update) – May 2015*
- *Trash Amnesty Week Announced – May 2015*
- *Corner Construction (update) – July 2015*
- *Water Quality Monitoring Public Viewer – July 2015*
- *Corner Construction (update) – October 2015*
- *City of Auburn's Erosion and Sediment Control Ordinance – October 2015*
- *Proper Maintenance Practices for Landscaping – December 2015*
- *Christmas Tree and Holiday Box Recycling Program reminder– December 2015*

Copies of these articles can be downloaded from the City's website at:

http://www.auburnalabama.org/openline/.

Open Line

A Monthly Newsletter for City of Auburn Citizens

October 2015

City Council

Your Guide to the New Toomer's Corner Intersection

The fences are down and traffic is once more flowing through the Toomer's Corner intersection. Things are almost back to normal in the heart of downtown Auburn. It's all familiar. But it's also all new.

Once again, there are Auburn Oaks on the campus corner. New trees arrived in February with a crowd gathered to watch as they were planted. In a small setback, the tree on Magnolia Avenue struggled to become established, and ultimately was replaced with a new, healthy tree in July. The new Auburn Oaks will spend their freshman year getting acclimated to their new home on the plains. Until then, Auburn University asks that we refrain from rolling the trees until the 2017 football season.

Over the summer, Auburn University continued renovations affecting campus from the Corner all the way to Samford Hall. As this issue of Open Line is being written, there is still construction scaffolding around Samford Hall as necessary building maintenance finishes on Auburn University's most recognizable landmark.

Meanwhile, residents are rediscovering the City's most iconic corner. Many factors led to the new look and feel downtown. When the Auburn Oaks were removed, Auburn University began working on plans to recreate that area of campus to accommodate new trees. With years of Toomer's Corner celebrations in the books, AU had some ideas on how to improve their corner. Similarly, the City of Auburn has been analyzing downtown events and parking and listening to related public input for years. The results of those studies and related planning efforts led us to recent downtown parking and alleyway improvements. Intensive public input during the Downtown Master Plan process included comment and design suggestions to improve this vital area where town meets gown.

Important in the decision making process was the fact that there was aging water and sewer infrastructure under the Corner, under downtown sidewalks and under the parking area behind downtown businesses that needed to be replaced or improved. Downtown parking areas and sidewalks were old enough that they weren't built to ADA accessibility specifications. And it was evident to anyone who saw our downtown alleyways that they needed serious help. By using in-house expertise to design the elements and by addressing all of these issues in tandem, they were

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City of Auburn

Printed on Recycled Paper

New Toomer's Corner

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achieved in a more affordable and efficient way.

The Corner Intersection

The most obvious difference downtown is the intersection itself. Brick pavers have replaced asphalt with the entire intersection elevated so that it is even with the curb. The end result is an open plaza for downtown celebrations and events without the curbs and fencing that previously presented obstacles and trip hazards.

Wider sidewalks near the intersection allow for seat walls for downtown visitors to stop, rest and enjoy downtown. New LED lighting on light poles, under seat walls and along the curbs can be used to add a splash of color to add to the atmosphere of game day celebrations and community events. Crosswalks are now consistent with the look and feel of crosswalks along Magnolia Avenue and the renovated areas of Opelika Road, as well as complementing the campus corner.

"It's all about a sense of place," said Auburn's Assistant City Manager Kevin Cowper. "We wanted to make sure that downtown Auburn provided the sense of place that Auburn deserves, especially at this iconic location. We wanted residents and visitors alike to have a sense of arrival when they reach a place that reflects the unique history and traditions of downtown Auburn."

The Tiger Paw

According to Jeremy Henderson at The War Eagle Reader (thewareaglereader.com), the origin of the Tiger Paw at Toomer's Corner goes back to 1989, when the Auburn University Student Government Association (SGA) Spirit Committee took it upon themselves to give Toomer's Corner its very own Tiger Paw. After a brief encounter with law enforcement, City government and ALDOT, the SGA committee found that the Tiger Paw was officially sanctioned and supported by all parties by the next year and has been an Auburn landmark and tradition ever since.

But gone is the need for the SGA to gather in the Corner once or twice a year with paint rollers and leaf blowers to renew the Tiger Paw. Now, the paw is part of the corner, built into the brick paver structure of the intersection.

Some have asked us why the paw is color matched to the crosswalks instead of being an AU orange. Our project designers worked carefully with the manufacturers of the brick pavers to try to find orange pavers that would work, but found that none of the orange bricks available matched Auburn orange. Darker or more reddish oranges didn't work well in contrast to the red bricks surrounding the paw. The AU symbol previously painted into the tiger paw posed another logistical challenge for a physical version of the paw. Ultimately, the design team kept things basic, matching the paw to the crosswalks, keeping with the color scheme of the Corner intersection and campus corner, and making permanent the 26 year old Auburn tradition of a Tiger Paw in the Corner intersection.

Next Month: Learn about Auburn's refurbished alleyways • Find out when trees will return to the Corner

City Of Auburn's Erosion and Sediment Control Ordinance:

Properly designed, installed and maintained erosion and sediment control on construction sites is critical for protecting private and public property from damage. Unmitigated construction stormwater runoff can harm our local water resources with sediment that can cause ecological degradation, increased water treatment cost and loss of valuable recreational uses.

Good erosion and sediment control is as much about being a good neighbor, being a responsible citizen, and protecting our community as it is about protecting the environment. Please contact the City of Auburn's Watershed Division at (334) 501-7367 or email dballard@auburnalabama.org if you have any questions about the City's Erosion and Sediment Control Program or to notify us of any concerns you may have.

Board Vacancies

Three vacancies on the **Tree Commission** will be announced at the September 15, 2015 meeting and will be filled at the October 20, 2015 City Council Meeting.

VACANCY

One vacancy on the **Educational Building Authority** will be announced at the September 15, 2015 meeting and will be filled at the October 20, 2015 City Council Meeting.

Three vacancies on the **Building Board of Adjustments** were announced at the September 15, 2015 meeting and will be filled at the October 20, 2015 City Council Meeting.

Two vacancies on the **Parks& Recreation Advisory Board** will be announced at the October 20, 2015 meeting and will be filled at the November 7, 2015 City Council Meeting.

B. Brochure Publications

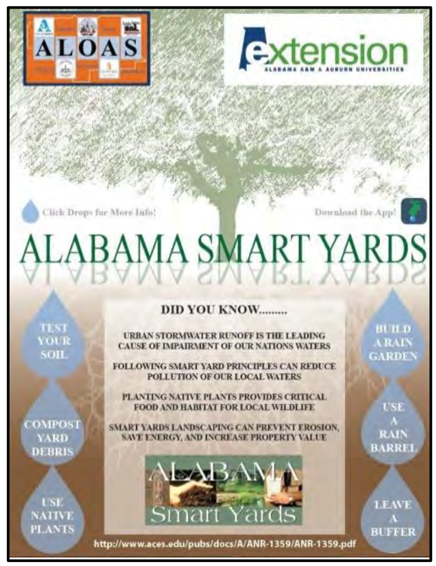
Pamphlets and brochures are an effective way to present and explain stormwater issues. Unlike other communication vehicles, pamphlets and brochures can be distributed in many locations without requiring staffing and the location of distribution can specifically target the audience you are trying to reach. The goal for brochure publications is to produce two (2) brochures per year. During the current reporting 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 the following brochures published by the **A**uburn, **L**ee County, **O**pelika, **A**uburn University and **S**miths Station (ALOAS) Citizen Advisory Group:

- Alabama SmartYards Manual
- The Little Uchee Watershed

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:

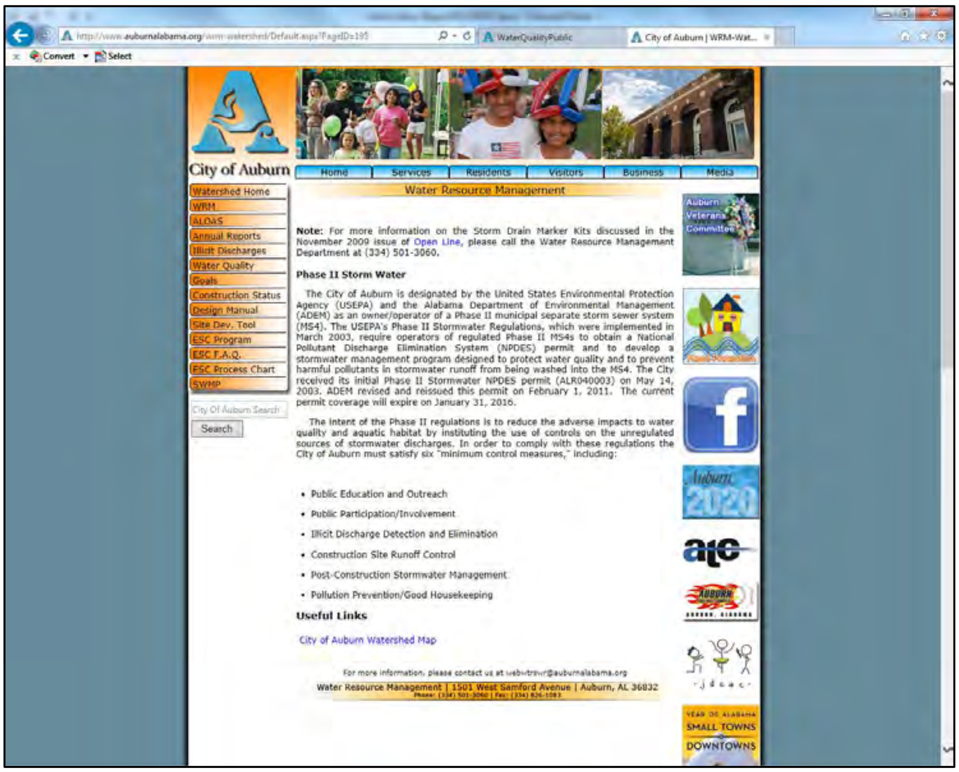
- Washing Cars (Alabama Clean Water Partnership (ALCWP))
- Changing Oil (ALCWP)
- Pets (ALCWP)
- Fertilizing (ALCWP)
- Saugahatchee Creek Watershed: Past, Present and Future (Saugahatchee Watershed Management Plan Group (SWaMP))
- Fats, Oils and Grease Recycling Program (City of Auburn)
- ALOAS brochures 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 2015 to include new ALOAS brochures and work was completed on a public viewer application for the City's various Water Quality Monitoring programs. **In 2015, the Stormwater website was visited 476 times by 328 unique users/viewers.**

For more information on the website please visit:

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

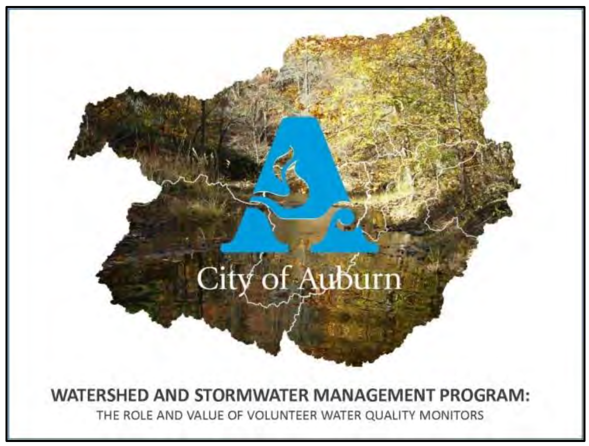
D. Public Water Quality Viewer Application

This application, developed and launched in 2015, allows the public to view water quality data from forty (40) monitoring locations on streams throughout the City. These stations are monitored weekly by Watershed Division staff using modern water quality monitoring equipment. Water quality parameters analyzed and presented include Turbidity, Dissolved Oxygen, Temperature, Specific Conductance, and pH. More information about these parameters can be found through various webpage links provided in the application. This application helps to provide transparency in our monitoring operations, facilitate educational and research opportunities for students and teachers, and provide an additional tool for citizens to become aware and involved in helping to preserve and protect our local water resources. This application can be found at:

http://webgis.auburnalabama.org/waterqualitypublic/

E. 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.



Eight (8) presentations were made during the current reporting year. Presentations were given to various groups, including a Mongolian delegation of public officials, Auburn University students from various departments, City officials, and public service organizations.

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

- Watershed and Stormwater Management Program: The Role and Value of Volunteer Water Quality Monitors (June 2015) – Given to Save our Saugahatchee
- Design Communications and Design Visualization (November 2015) – Given to Auburn University Biosystems Engineering Class

- Water Resource Management Department: Watershed and Stormwater Management Program (August 2015) – Given to City of Auburn Finance Department
- Our Local Water Resources (October 2015) – Given to Auburn High School Biology/Chemistry Classes
- Our Local Water Resources (September 2015) – Given to Auburn Girl Scouts
- Green Infrastructure in Auburn (August 2015) – Given to Auburn University Water Matters Class
- City of Auburn WRM Department (April 21, 2015 and October 15, 2015 respectively) – Given to Mongolian Delegation

F. Workshops/Training Hosted

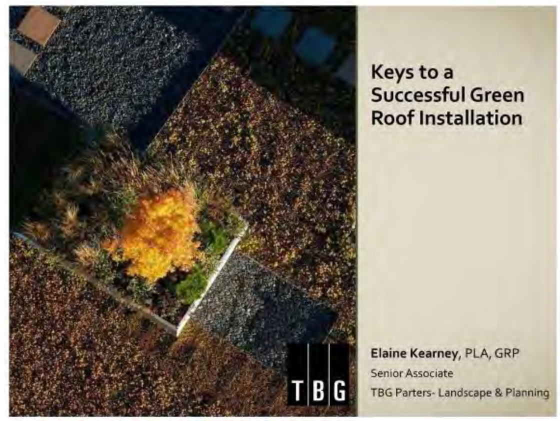
In an effort to educate contractors, developers, engineers, and staff, the City has initiated a series of workshops. The content of the workshops focuses on local stormwater issues of concern. Workshops/training hosted by the City over the past year include:

- **Erosion and Sediment Control Workshop (December 2015)** – The City collaborated with the ALOAS partners (Lee County Highway Department, City of Opelika, Auburn University, and the City of Smiths Station) to host its twelfth annual Erosion and Sediment Control Workshop on December 10, 2015. 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 speakers included Mr. Jeff Kitchens' from the ADEM and Mr. Skip Ragsdale from Sunshine Supplies, Inc. Mr. Kitchens presentation outlined the State Construction General Permit and highlighted several changes that contractors and developers should expect to see in the next permit cycle. Mr. Ragsdale's presentation gave a detailed summary of advances in erosion control and stabilization methods and materials. A field demonstration of the latest technologies in erosion and sediment control was provided by Twin Oaks Environmental, a local erosion and sediment control contractor. Additionally, Auburn University researchers gave a demonstration of their Stormwater Runoff Simulator. Approximately 80-90 developers, contractors, engineers and ALOAS members attended the workshop.

- **Materials Handling/Spill Prevention Training** – With the assistance of Mr. Tom McCauley, Auburn University's Environmental Risk Manager, the Water Resource

Management Department conducted an informal review of its applicable facilities for proper Spill Prevention, Control and Countermeasures (SPCC) in October 2013. The City began addressing some of the recommendations that resulted from that review in 2014, including improving general housekeeping, storage, & labeling procedures at the Bailey-Alexander Water and Sewer Complex, repainting of the above-ground fuel storage tanks at the Public Works Construction Division Facility, and annual training of two Public Works staff in Spill Prevention Control & Countermeasures. The City continued these improvements in 2015, including additional labeling of storage areas and training of staff.

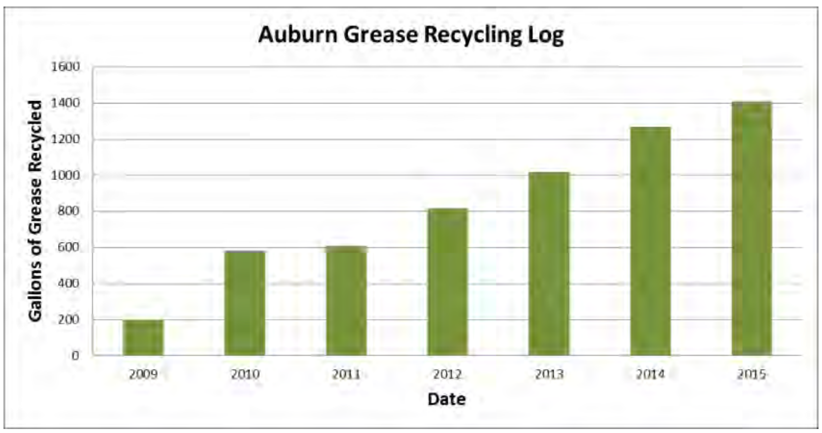
- **Quarterly Lunch & Learn Workshops** – The Water Resource Management Department hosted two "Lunch & Learn" Workshops in 2015. The Lunch and Learn Program is a new and ongoing education and outreach initiative (started in 2014), providing opportunities for staff from all City departments to learn about advances in research, technologies, and practices related to stormwater management. The first Lunch & Learn of 2015 invited staff to view a webinar on Green Infrastructure Implementation, while the second was a Green Roof Design Workshop series given by Elaine Kearney of the Columbia Green Group (multiple dates). Each of these workshops was attended by 12-14 City personnel, with opportunities for Q&A and general discussion accompanying each presentation.



- **Webcasts & Webinars –** The Water Resource Management Department regularly schedules and participates in online webinars and webcasts training opportunities. In 2015, stormwater and watershed-related webinars/webcasts attended by City staff included topics such as green infrastructure implementation, green roofs, climate resiliency for water resource managers, urban sustainability, and stormwater modeling software.

G. 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 6,002 gallons of used cooking oil/grease have been collected since implementation of the program began in March 2009, with 1,411 of those gallons collected in 2015. For more information on our household grease recycling program, please visit:

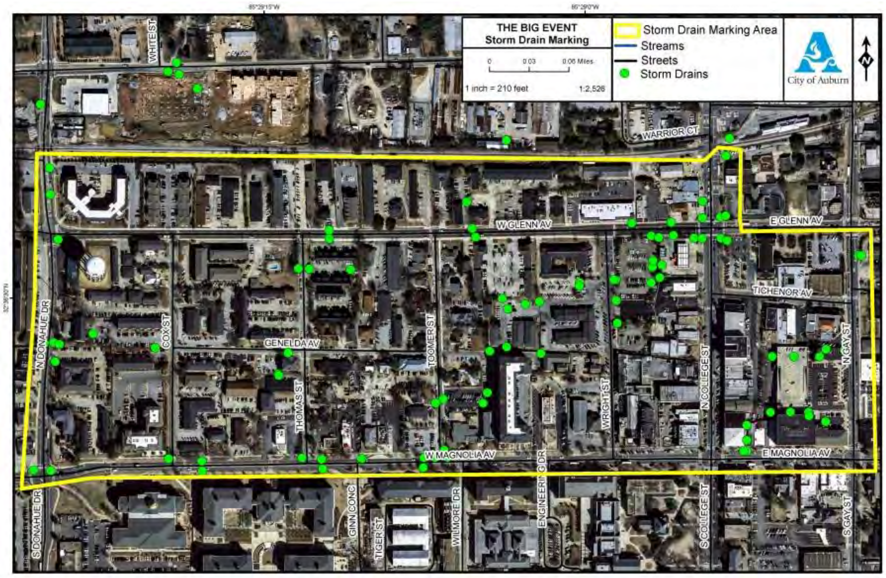
http://www.auburnalabama.org/wrm-sewer/Default.aspx?PageID=186.

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/.

H. 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. 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 2015, markers were installed by a variety of local interest groups including Auburn University Honors Students, Auburn University Service Learning Students, and JROTC sudents. During 2012 - 2013, the City 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. Winners were selected in March 2013 and each

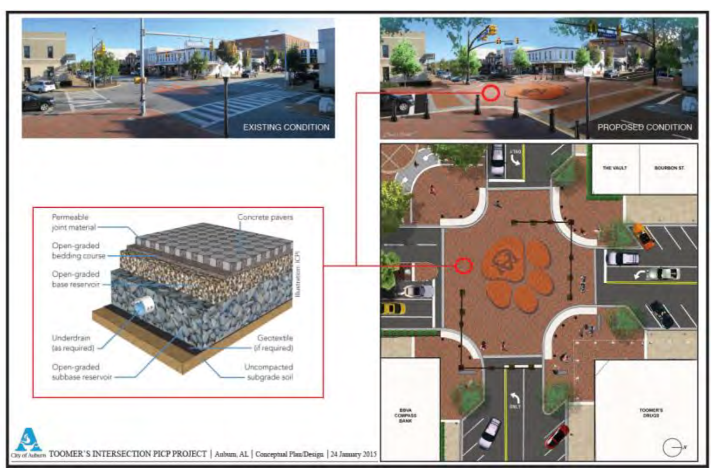


student received their award (a plaque with the storm drain marker they designed and a newspaper article published in the local paper) during a special presentation with the Mayor at City Hall. The City will continue to host these design competitions until all storm drains in the City have been marked. **In 2015, approximately 100 markers were installed**. Since implementation of the program began approximately **1,856** markers have been installed, representing approximately **57 percent** of all the documented storm drains in the City of Auburn.

I. Ogletree Elementary School Earth Day Field 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, and includes a variety of outdoor education and recreation activities. Water Resource Management staff have given presentations to the students and teachers about watershed and stormwater management, water quality and water quality monitoring, and aquatic biology. Students and their teachers are given a basic, hands-on introduction to water quality monitoring, along with information about non-point source and point source pollution prevention and reduction and tips on water conservation. The City participated in this three-day event from May 5th-7th of 2015.

J. Urban Sustainability Accelerator Initiative



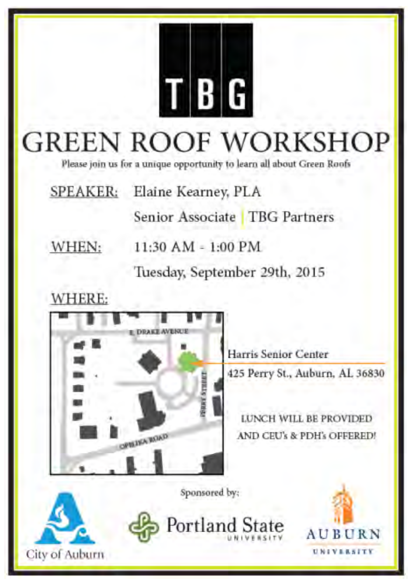
Throughout 2015 the City participated as one of three cities selected to the 2014/2015 Urban Sustainability Accelerator Program. In short, *"the Urban Sustainability Accelerator provides a year-long program of expert advice and assistance for participating cities in implementing an important sustainability project or program. Each city creates an "implementation team" with leaders from the public,* *private and nonprofit sectors. The implementation teams form a cohort group for mutual learning and support during the year. The year begins and ends with a convening of the teams each summer in Portland, Oregon."* The City chose this as a unique opportunity to incorporate sustainable development practices into the reconstruction of the iconic Toomer's intersection. Sustainable elements include the use of Permeable Interlocking Concrete Pavers, Silva-Cell Suspended Pavement System, more pedestrian friendly intersection, and increased streets trees with canopy.

K. Collaboration with Auburn City Schools Aquaculture Lab

In November of 2015 the City met with representatives from the Auburn High School Aquaculture Lab, Alabama Water Watch, and the Alabama Cooperative Extension Service to discuss opportunities for collaboration in local water quality monitoring and education. This first meeting was held so that all parties could gain a better understanding of each organization's existing operations, existing equipment and existing program offerings, and technical capacity in order to identify opportunities for collaboration and partnership. Opportunities for student involvement in local water quality monitoring efforts were identified and are currently being evaluated with respect to each party's roles and responsibilities. The City will continue to explore this opportunity in 2016.

L. Green Roof Workshop & Seminar

In cooperation with the Auburn University Office of Sustainability, the City of Auburn hosted two Green Roof Design Workshops and one Green Roof Design Seminar in 2015. These workshops presented methods for sizing and designing Green Roof Systems, detailed construction techniques, and gave participants the opportunity to interact with a leading expert in the field of Green Roof design and installation. Approximately 40 local designers, engineers, and architects attended these two workshops. The Green Roof Design Seminar offered the same educational opportunity to students of Auburn University and was held in Dudley Hall. Approximately 100 students attended this seminar.



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 encourage citizens representing diverse backgrounds and interests to participate in the development of stormwater management programs are far more likely to gain community support during the implementation process.

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. ALOAS meets quarterly throughout the year, with **four meetings held in 2015**.

In 2015, ALOAS produced two brochures. The two brochures produced were titled *Alabama SmartYards Manual* and *The Little Uchee Watershed* (part of a series). 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) 501-3060. The brochures can also be downloaded from the City's website at http://www.auburnalabama.org/wrm-watershed/Default.aspx?PageID=211.

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 expand upon individual efforts in order to maximize limited resources. These organizations also allow for the sharing of ideas, lessons-learned, and development of professional networks.

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 2015, as a member of the Clean Water Partnership (CWP), the City participated in quarterly meetings, gave a presentation titled "*City of Auburn Public Water Quality Viewer Application*" and also hosted three quarterly meetings of the CWP's Tallapoosa Steering Committee at the City of Auburn Hubert and Grace Harris Senior Center.

Save our Saugahatchee and Alabama Water Watch Citizen Water Quality Monitoring Program (2014 - Present) – Beginning is 2014, the City of Auburn, the City of Opelika, and the Lee County Highway Department have contributed $350 each to pay for material aid to the volunteer water quality monitoring programs operated by Save our Saugahatchee and the Alabama Water Watch organization. These funds are used for both physical-chemical monitoring of local waters as well as bacteriological monitoring used to guide illicit discharge detection and elimination efforts. In 2015, the City's contribution to these organizations financed routine monitoring of 24 sites in the Saugahatchee Watershed, resulting in 184 water quality monitoring events (including water chemistry and bacteriological monitoring). All data collected is made available to the public via the Alabama Water Watch Data Portal at:

www.alabamawaterwatch.org/water-data

Parkerson's Mill Creek Watershed Management Plan Group (March 2010 – present) - Parkerson's Mill Creek was placed on Alabama's 303(d) List of Impaired Waters for pathogens in 2007 and a pathogen TMDL for the Parkerson's 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's Mill Creek Watershed Management Plan for the past seven (7) 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's 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's Mill Creek Watershed Management Plan. An update on Parkerson's Mill Creek Watershed Management Plan activities completed in 2015 can be found below:

- Construction was completed in December 2015 for the City of Auburn Parkerson's Mill Creek Streambank and Sewer Stabilization Project (+/- 300 LF). Project components included one boulder vane structure with J-hook, one log vane structure, excavation of a lower flood bench, live-staking, and planting of native plant species.
- The Corley Courtyard Stormwater Education Plaza was completed in August 2014. Two- 6 foot deep, 1,500 ft2 bioretention cells were constructed and educational signs will be installed in Fall 2014. It will serve as an outdoor teaching classroom for Biosystems Engineering faculty, students, campus visitors, Extension workshops, and campus Sustainability Academic Program tours. An Honors College Biosystems Engineering student was responsible for the original design and concept as part of the honors college requirements and curriculum. Following drainage concerns related to high sodium concentrations in the bioretention media, **new media and plants were installed in 2015.**

- The PMC Group assisted with supporting of bacteriological monitoring in Parkerson's Mill Creek by Auburn University undergraduates students (ex. Sydney Smith), which in turn supported investigative illicit discharge detection and elimination activities for the City of Auburn and Auburn University.

For more information on the Parkerson's Mill Creek Watershed Management Plan, please visit http://www.aces.edu/waterquality/pmc.htm.

C. City of Auburn Earth Week 2015/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 2015, the City hosted its 11th 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 2015 Household Hazardous Waste Collection Day yielded approximately 14,000 pounds (7 tons) of waste collected!** Additional Earth Week 2015 activities included:

- Educational Activities for 2nd Graders including the NRCS Enviroscape model and other demonstrations
- Educational Demonstration for Auburn High School students, and;
- Various public library activities centered around Earth Week.

D. Website Hotline

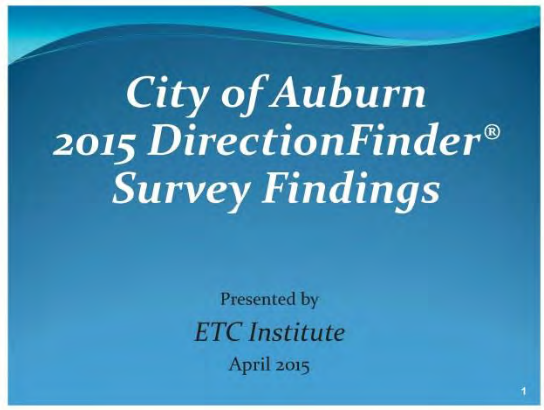
In an effort to provide the general public with an additional means of reporting potential erosion control violations, the City launched the "On-Line Hotline" in March 2003. Citizens now have the ability to log on to the website 24 hours a day and provide information on suspected violations. The information 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 twelve 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 Yellow Poplar seedlings and 750 Florida Maple seedlings** at the annual 2015 Arbor Day Tree Giveaway. The City also gave away **1,500 Dogwood seedlings** at the 2015 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 2015, the survey contained several questions that were directly or indirectly related to stormwater issues. The questions covered issues such as infrastructure maintenance, trash collection, yard waste disposal, recycling, natural resource protection, greenspace initiatives and future growth planning. Once again in 2015, the City received very high satisfaction levels in most areas.



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).

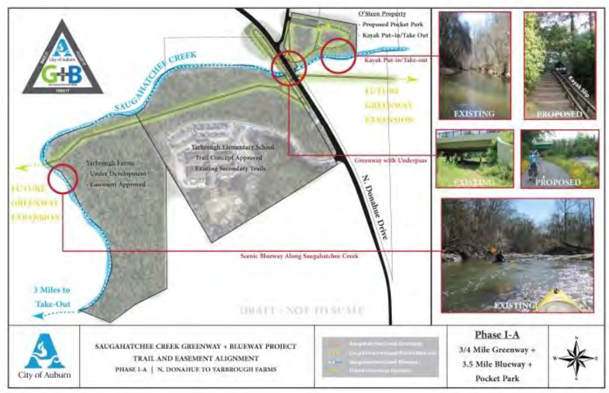
The City is fortunate to have a local daily publication. The Opelika-Auburn News is a regional daily newspaper that covers local events and is widely read by residents of Lee County. A weekly newspaper publication, the Auburn Villager, began circulation in 2007. Articles are documented in an Access database for reference purposes. 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 City acquired two properties dedicated as Greenspace in 2015; 4.5 acres along Saugahatchee Creek at N. Donahue Drive and 13 acres along an unnamed tributary of Moore's Mill Creek off Glenn Avenue. Additionally, the City continued its feasibility analysis, planning, and design work associated with a combined Blueway/Greenway along Saugahatchee Creek (general alignment as identified in Greenway Master Plan).



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 2015 the AIGM was used to project growth and demand as a part of the Downtown Master Plan. In FY 2016 the AIGM will be used in conjunction with the

Parks, Recreation and Culture Master Plan and the 5-year update to CompPlan 2030, the city's comprehensive 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, and 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 and City Departments are now working to integrate components of the Plan into their operations. In FY 2016, the Planning Department will spearhead the first 5-year update to CompPlan 2030. For more information on CompPlan 2030, please visit:

http://www.auburnalabama.org/Compplan2030.

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

The final outcome of Renew Opelika Road is a plan to guide the future development of Opelika Road and help ensure the area's future commercial vitality. The plan helps answer questions of how the community and City can support Auburn's existing businesses and attract new destinations for residents. The plan also illustrates the most effective way to improve traffic flow, pedestrian accessibility and the overall look and feel that citizens envision for the Auburn community. Several options regarding stormwater treatment along Opelika Road were included for public input during the planning process. The plan was adopted by Auburn City Council on August 20th, 2013. The first phase of implementation is complete and included changes to the zoning ordinance, changes to the future land use plan, and physical reconstruction of Opelika Road from North Gay Street to North Ross Street. The second phase is underway and includes reconstruction of the Opelika Road and East University Drive intersection. For more information on the Renew Opelika Road Plan, please visit:

http://www.auburnalabama.org/renew

L. Lee County Water Festival

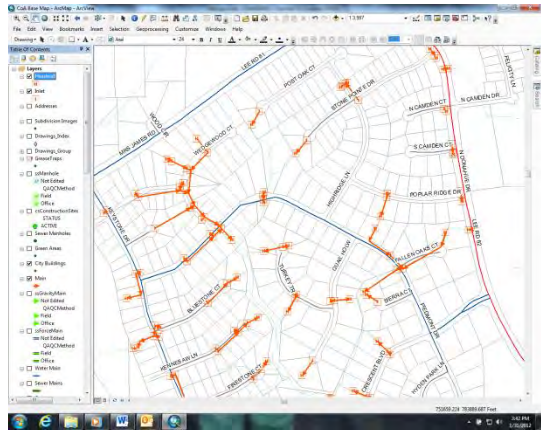
On March 19th and March 20th, 2015, the twelfth annual Lee County Water Festival was held on the campus of Auburn University. Over 900 fourth graders from schools in the Lee County area attended the one-day event. The primary purpose of the event is to educate young people on the importance of our water 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 this past year's event a huge success. **The Auburn Water Works Board also helped to sponsor the 2015 Water Festival by providing a monetary donation in the amount of $3,000**. Planning is currently underway for the 2016 Water Festival, which is scheduled to be held at the Beard-Eaves Memorial Coliseum at Auburn University on April 4th and 5th of 2016.

M. Felton Little Park Stream Cleanup Day

The City hosted a stream cleanup day at Felton Little Park on May 20, 2015. This effort was coordinated with student leaders who assist with the Auburn University Camp War Eagle Program for incoming freshman and parents. In total, 14 students participated in cleaning up trash and other debris from Town Creek as it flows through Felton Little Park (near downtown). Trash and debris were collected in bags and collected by the City's Environmental Services Department for proper disposal.

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 throughout the entire City Limits. In 2013, the City began a Utility Mapping Project utilizing City survey crews and several outside surveying firms. This project is anticipated to be completed in three (3) years, and is currently entering its third and final year of the initial inventory phase. **In 2015 the City surveyed over 204,847 linear feet (38.8 Miles) of storm sewer main.** 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.

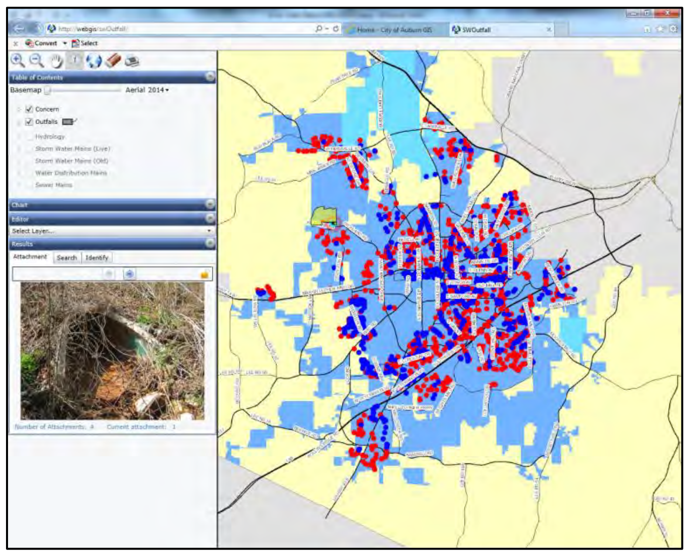
B. Illicit Discharge Ordinance

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 reported illicit discharges in 2015. These cases involved illicit discharges of sanitary sewer overflows, private sewer liftstation overflows, washing of paint into storm drains, dumping of asphalt into stream channels, and storm/sanitary sewer cross connections. In each instance, the illicit discharge was traced back to its source and the violator was given a notice of violation and informed of the penalties for violating the City's Illicit Discharge Ordinance. In each incident, the City was able to ensure proper cleanup and corrective actions taken.

C. Stormwater Outfall Reconnaissance Inventory



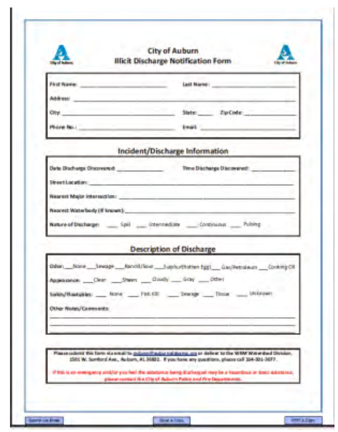
In 2009, the Water Resource Management Department began a stormwater outfall reconnaissance inventory (ORI) program. The purpose of this ORI program is to familiarize staff with all receiving waters within the City limits, conduct an inspection of each stormwater outfall and prepare detailed documentation of each stormwater outfall in that basin so that water quality concerns are documented and corrective actions planned. 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 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 2015 Watershed Division staff began planning for the second phase of its ORI Program. This included purchasing of a LaMotte Smart 3 Colorimeter for enhanced source identification and tracking, development of plans for a small laboratory at the WRM offices, and updates to the ORI tracking application. To date, the Department has inspected approximately **two hundred forty (240) miles of stream and documented approximately one thousand two hundred twenty-eight (1,228) stormwater outfalls** in the Saugahatchee, Parkerson's Mill, Moore's Mill and Town Creek Watersheds. Staff have also inspected approximately one hundred fifty (150) sanitary sewer aerial creek crossings and identified approximately eight hundred fifty eight (858) 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 from multiple departments can view the data assimilated by this application and can utilize that information to monitor progress at addressing concerns identified by field survey. This tool/application was updated in 2015 to include attribute fields for water quality data. A screenshot of this tool can be seen above

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. Staff will begin water quality screening of select outfalls in 2016.

D. Illicit Discharge Hotline and Reporting Form

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 2015.



City of Auburn
Illicit Discharge Notification Form

First Name: ______ Last Name: ______
Address: ______
City: ______ State: ____ Zip Code: ______
Phone No.: ______ Email: ______

Incident/Discharge Information

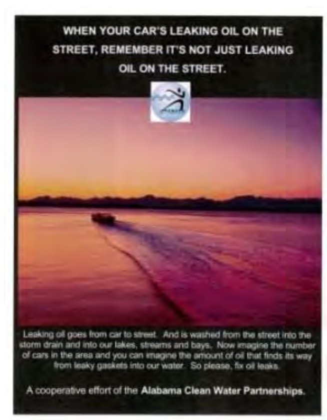
Date Discharge Discovered: ______ Time Discharge Discovered: ______
Street Location: ______
Nearest Major Intersection: ______
Nearest Waterbody (if known): ______
Nature of Discharge: ___ Spill ___ Intermediate ___ Continuous ___ Pulsing

Description of Discharge

Odor: ___ None ___ Sewage ___ Rancid/Sour ___ Sulphur (Rotten Egg) ___ Gas/Petroleum ___ Cooking Oil
Appearance: ___ Clear ___ Sheen ___ Cloudy ___ Gray ___ Other
Solids/Floatables: ___ None ___ Fish Kill ___ Sewage ___ Tissue ___ Unknown
Other Notes/Comments:

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

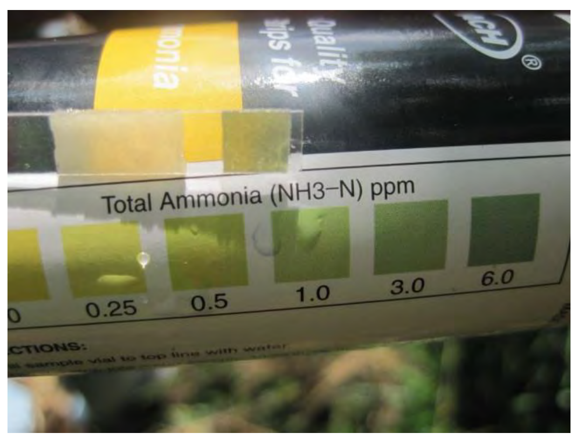
The Public Works Department conducts routine inspections of its drainage system in order to maintain free flowing conditions. During this process, key stream sections, bridges, and culverts are inspected and routine maintenance is conducted. As areas are identified for maintenance, the work is listed 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. **In 2015, the City's Public Works Department cleared/cleaned over 3.65 miles of storm sewer of debris, sediment, and trash.**

G. Hazardous Waste Emergency Response Team

The City maintains a mutual aid 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. This agreement was renewed in 2015.

H. Water Sampling Program

In 2004, the City of Auburn began a water quality monitoring 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 10 years to include a diverse range of monitoring programs and more in-depth water quality monitoring.



The water quality monitoring programs now includes 1) weekly monitoring of 40 permanent reference stations in local streams for turbidity, temperature, conductivity, dissolved oxygen, and pH, 2) continuous monitoring at two locations, rotated on an annual basis between 10 permanent reference stations, on principal streams for turbidity, temperature, pH, conductivity, ORP, dissolved oxygen, salinity, and TDS, 3) monitoring of ammonia concentrations to facilitate illicit discharge source identification and tracking, 4) monitoring of physical, nutrient, pathogen, and mineral parameters at 14 permanent stations in the City's source water watershed, 5) monitoring of physical, mineral, and biological parameters below the City's source water, 6) monitoring of nutrient and chemical parameters of first flush samples taken from five reference landcover sites, and 7) nutrient monitoring in Saugahatchee Creek. Monitoring associated with programs 6 and 7 have been temporarily ceased while staff evaluate the utility and effectiveness of the monitoring strategies.

In 2015, more than **1,160 turbidity samples** were collected and analyzed (40 permanent reference stations), bringing the total number of turbidity samples collected and analyzed since 2006 to **over 18,660**. Additionally, the City's continuous water quality monitoring performed via two HACH Hydrolab DS5 Water Quality Sondes generated over **200,000 unique water quality measurements**. Monitoring of ammonia concentration for the facilitating of illicit discharge identification and source tracking was performed at numerous locations in 2015, resulting in the identification, isolation, and repair of four (4) illicit discharges of sanitary sewage.

For additional information concerning the City's Water Quality Monitoring Program, please see the 2015 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 February 1, 2011 (revised on February 24, 2012).

IX. CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

A. Erosion and Sediment Control Ordinance

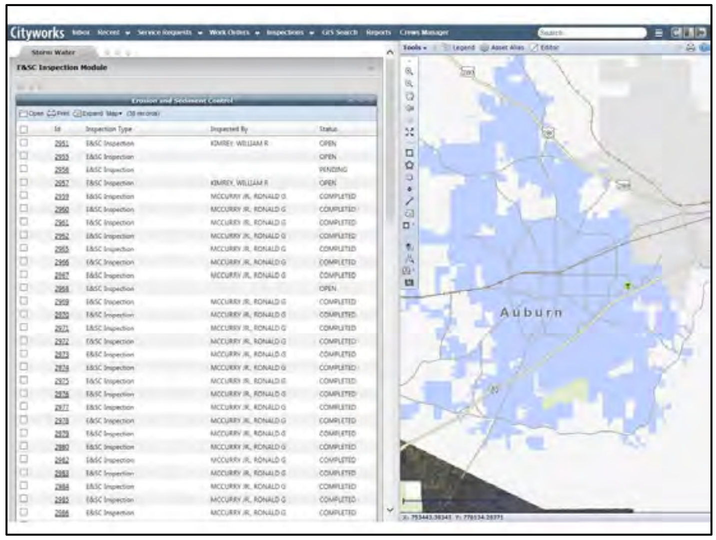
The City, in conjunction with the City of Opelika and Auburn University, adopted the Erosion and Sediment Control Policy drafted by the ALOA Citizens Advisory Committee in 2003. The policy provides for a regional set of rules that can be applied to contractors, developers and engineers in the area.

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 **1,108 site erosion and sediment control inspections** were performed in 2015, resulting in **536 enforcement letters and 11 72-Hour Notices of Violation**. The number of inspections performed is relative to development activity and annual rainfall intensity and accumulation patterns. The City's Water Resource Management Department maintains copies of the inspection reports in an electronic format.

C. Erosion Control Inspection Software



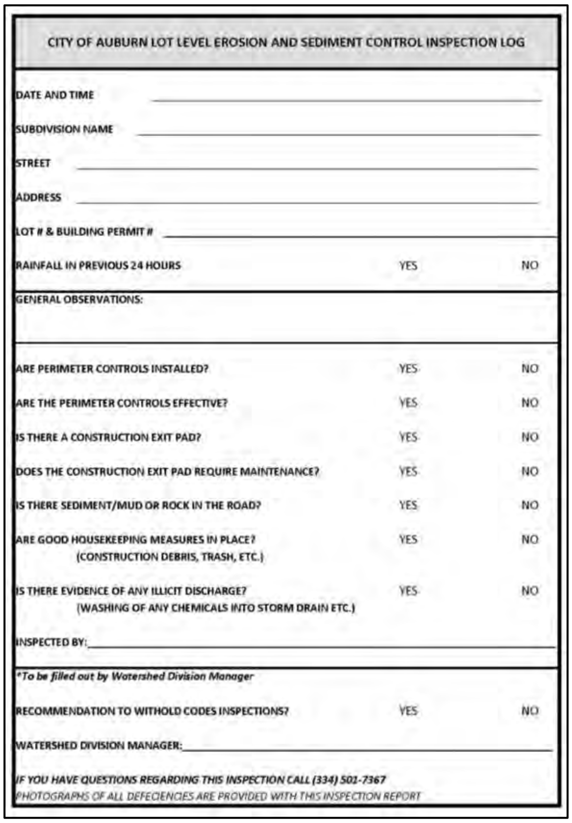
In 2011, staff from the City's Water Resource Management Department and Information Technology Department created an electronic erosion and sediment control inspection software program. This software gives staff the ability to fill out electronic copies of the erosion control inspection checklist using handheld units while in the field performing inspections. In 2015 Watershed Division staff began working with the City's IT staff to migrate the erosion and sediment control inspection and enforcement tracking into CityWorks, a GIS-centric asset management software. Watershed Division staff began training on this software in 2015 and plan to go live with this software in 2016.

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 authorize 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



CITY OF AUBURN LOT LEVEL EROSION AND SEDIMENT CONTROL INSPECTION LOG

DATE AND TIME ______

SUBDIVISION NAME ______

STREET ______

ADDRESS ______

LOT # & BUILDING PERMIT # ______

RAINFALL IN PREVIOUS 24 HOURS	YES	NO

GENERAL OBSERVATIONS:

ARE PERIMETER CONTROLS INSTALLED?	YES	NO
ARE THE PERIMETER CONTROLS EFFECTIVE?	YES	NO
IS THERE A CONSTRUCTION EXIT PAD?	YES	NO
DOES THE CONSTRUCTION EXIT PAD REQUIRE MAINTENANCE?	YES	NO
IS THERE SEDIMENT/MUD OR ROCK IN THE ROAD?	YES	NO
ARE GOOD HOUSEKEEPING MEASURES IN PLACE? (CONSTRUCTION DEBRIS, TRASH, ETC.)	YES	NO
IS THERE EVIDENCE OF ANY ILLICIT DISCHARGE? (WASHING OF ANY CHEMICALS INTO STORM DRAIN ETC.)	YES	NO

INSPECTED BY: ______

**To be filled out by Watershed Division Manager*

RECOMMENDATION TO WITHOLD CODES INSPECTIONS?	YES	NO

WATERSHED DIVISION MANAGER: ______

IF YOU HAVE QUESTIONS REGARDING THIS INSPECTION CALL (334) 501-7367
PHOTOGRAPHS OF ALL DEFECIENCIES ARE PROVIDED WITH THIS INSPECTION REPORT

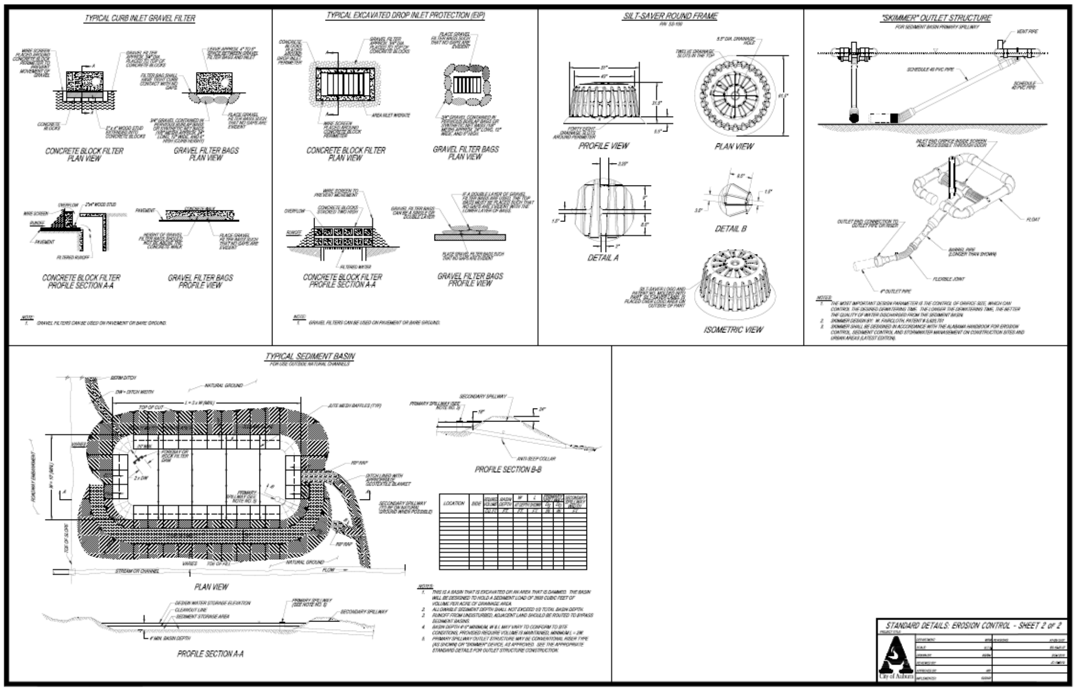
In 2015 the City began an effort to increase lot-level inspections of erosion and sediment control best management practices. Typically, the Watershed Division only conducts routine inspections of land disturbance activities equal to or great than one acre, with routine inspections ceasing once the development is complete (roads & utilities). Increasing lot-level inspections will begin to "close the gap" between initial land clearing activities and final build-out of a project.

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 the site BMPs installed.

F. Erosion and Sediment Control 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 skimming devices for basin dewatering from the surface of the water column. 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 water column in the basin.

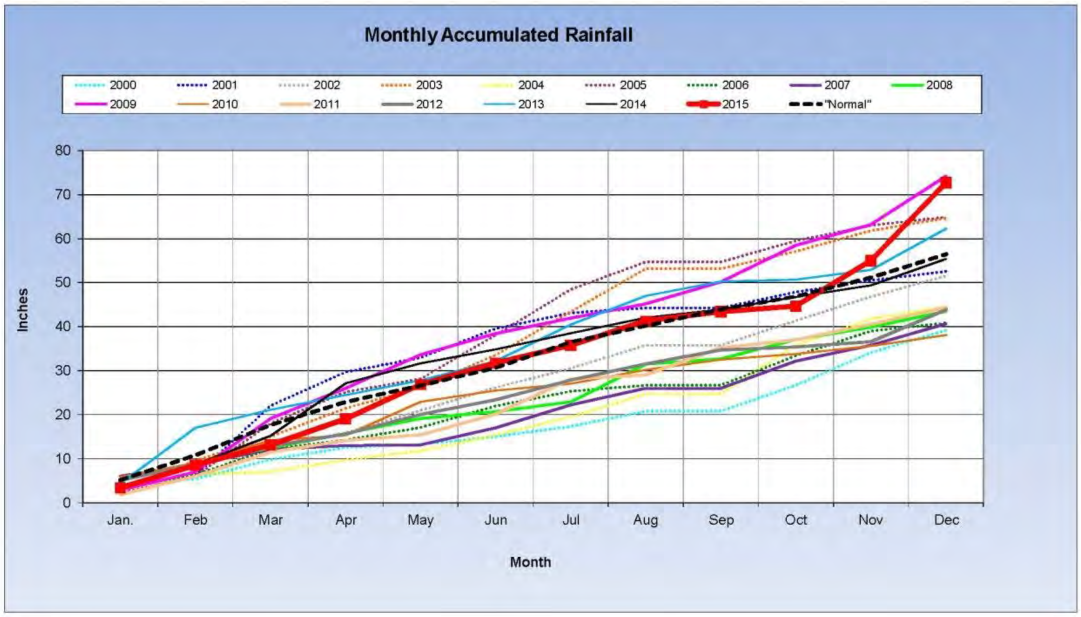
In 2013, the City also began allowing Georgia DOT Type C silt fence with a polypropylene mesh backing for reinforcement, commonly referred to as C-POP silt



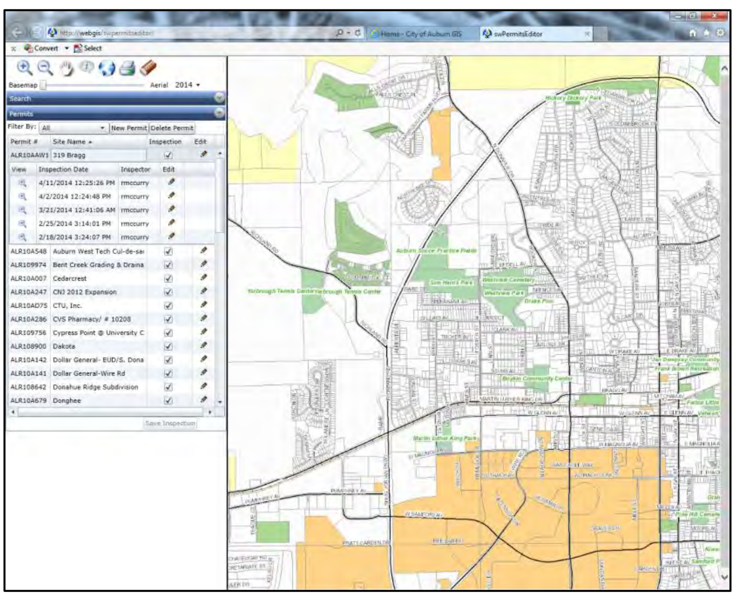
fence, as an approved alternative to Alabama DOT Type A silt fence. The C-POP silt fence is easier to install than Type A silt fence, thus helping to reduce costs, while still achieving adequate sediment capture.

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 2015, from a low of 56.85 inches reported at the City's Grovehill RainWave Station to a high of 72.45 inches reported at the City's H.C. Morgan WPCF. Additional details regarding rainfall in 2015 can be found in the Water Quality Monitoring Report included in Appendix E of this report.



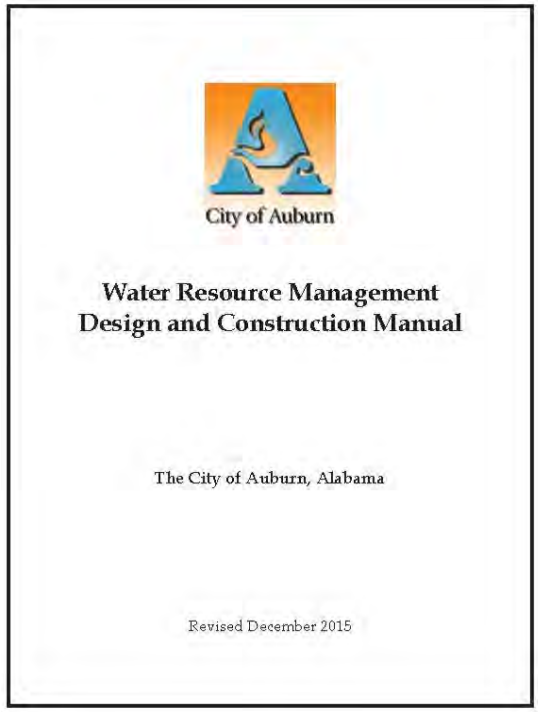
H. ADEM Construction Stormwater Permit Tracking Tool



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. This system is in the process of being replaced by CityWorks, with the completed transition scheduled for 2016.

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

A. Engineering Design and Construction Manuals


City of Auburn

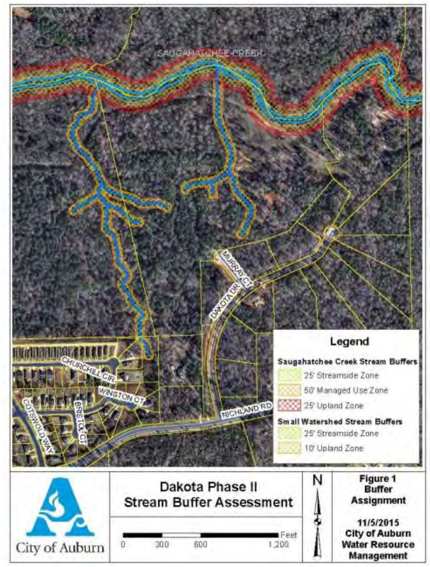
Water Resource Management
Design and Construction Manual

The City of Auburn, Alabama

Revised December 2015

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, 2013, 2014, and 2015. Reviews of these manuals are performed annually during the first fiscal quarter (October-December). 2015 Revisions included clarification to the applicability criteria for the City's Post-Development Stormwater Quality Criteria and Water Quality Plan submittal requirements.

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 656 acres of riparian corridors have been set aside since the adoption of the new regulations. **In 2015, the City evaluated stream buffers on ten (10) properties, resulting in approximately 10 acres of riparian buffer protection. Additionally, the City reviewed 46 development plans for compliance with the stream buffer ordinance.** 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

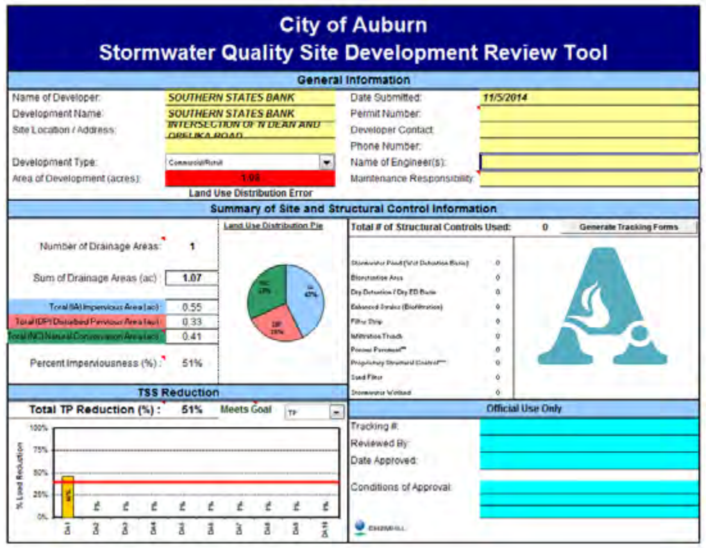
Existing detention ponds need periodic inspections to evaluate the maintenance and operation of these vital components of the City's drainage system. Because vast quantities of stormwater are collected and passed through these detention ponds every year, inspections of these facilities can identify potential 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 eighty eight (288) detention ponds were inspected by the City in 2015.**

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 developer 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. No samples were collected in 2015, as this program is going to be replaced by the City's Outfall Screening Program (scheduled for implementation in 2016).

G. Student Chapter of American Society of Civil Engineers Constructed Wetland

In 2015, the student chapter of the American Society of Civil Engineers (ASCE) of Auburn University worked to design and construct an Outdoor Civil Engineering Learning Lab (Auburn OutCELL) featuring educational displays and interactive exhibits meant to appeal to students of all ages. This project involved a collaborative effort with the City, which provided access to a city-owned site for developing the proposed learning center and design and construction feedback to the student-led team. The Auburn OutCELL will serve as a center where local K-12 students can come (free of charge) with family or school groups to interactively engage and learn about the various disciplines of civil engineering, specifically highlighting elements of environmental, geotechnical, hydraulics, hydrology, materials, structural, and transportation engineering.

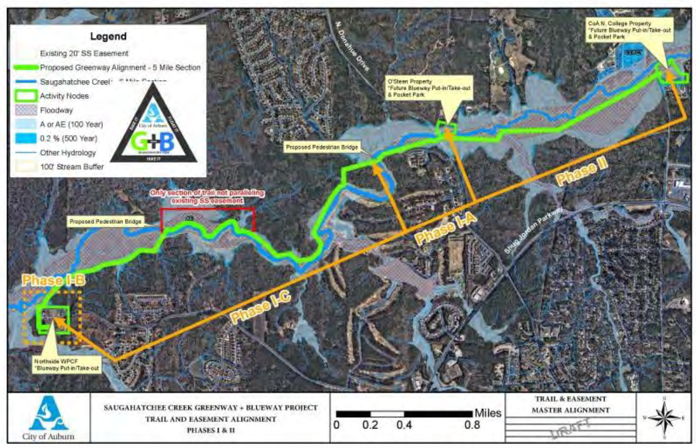
The main feature of Auburn OutCELL is a constructed stormwater wetland, which includes an improved sediment basin and constructed treatment wetland system. Not only does this stormwater treatment system provide an ideal setup for lessons on erosion control, water quality, watershed hydrology and native Alabama vegetation, but it also serves to actively improve the quality of stormwater flowing into the Saugahatchee Creek. The site's location just off the unpaved Miracle Road leads to extremely turbid stormwater flowing through the site, which formerly deposited large amounts of sediment into the Saugahatchee Creek.

H. Parkerson's Mill Creek Sewer and Stream Stabilization Project

The WRM Department, in coordination with Auburn University and the Alabama Cooperative Extension Service, completed construction of the Parkerson Mill Creek

Sewer and Stream Stabilization Project in December of 2015. This project involved cutting into the adjacent hillside for fill material and burying the exposed sanitary sewer infrastructure (which had become exposed through lateral migration of the channel), reshaping of approximately 300 linear feet of the east streambank and bed to establish a more stable channel geometry, construction of approximately 245 linear ft. of a bankfull flood bench to reduce velocities during overbank flows and provide riparian habitat, installation of a J-hook boulder vane structure and one (1) log vane structures to direct streamflow away from the sanitary sewer infrastructure, and planting native riparian vegetation throughout the project site. For more information please contact Dusty Kimbrow at dkimbrow@auburnalabama.org or by phone at 334-501-7362.

I. Saugahatchee Greenway + Blueway Project



Saugahatchee Creek is identified as a Primary Greenway Corridor in the City's Greenway and Greenspace Master Plan. In 2015 the City began performing the necessary feasibility assessments for the development of both a greenway and blueway component of this corridor. Staff have evaluated approximately six (6) miles of Saugahatchee for floatability and over six (6) miles of existing sanitary sewer easement for trail alignment. Additionally, the City purchased +/- 4.5 acres of property along Saugahatchee Creek at N. Donahue to be used as a future put-in/take-out location and pocket park along the greenway. Staff will continue planning and design of this project in 2016. 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 2015 included:

- **Alabama's Water Environment Association Annual Conference (April 2015)** – 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 employees (Matt Dunn, Mikel Thomspon, and Eric Carson) attended the 2015 conference, attending technical sessions as well as vendor exhibits.

- **Alabama Water Resources Conference (September 2015)** – In September 2015, three (3) City employees (Daniel Ballard, Dustin Kimbrow, and Ron McCurry) attended the 2015 Alabama Water Resources Conference held in Orange Beach, AL. This annual conference focuses on a variety of water resource issues in Alabama and provides an opportunity to network with others to discuss these issues.

- **WEFTEC 2015 (September 2015)** – This 4-day conference, sponsored by the Water Environment Federation, is one of the premier water quality conferences in the world. WEFTEC 2015 was held in Chicago, IL. Three (3) City employees (Matt Dunn, Eric Carson, and Tim Johnson) attended this conference and attended technical sessions related to watershed protection, water quality, stormwater BMPs and wastewater treatment.

- **Erosion and Sediment Control Workshop (December 2015)** – The ALOAS group hosted a workshop for developers, contractors, engineers and City personnel to educate attendees on good Erosion and Sediment Control practices, as well as federal and state regulations. Over eighty (80) developers, contractors, engineers, and City personnel attended the workshop.

- **ADEM Nonpoint Source Conference (January 2015 and January 2016)** - In January 2015 three (3) City employees (Daniel Ballard, Ron McCurry, and Dustin Kimbrow) attended ADEM's 26th annual Nonpoint Source Conference in Montgomery, AL. In January 2016 two (2) City employees (Ron McCurry and

Dustin Kimbrow) attended ADEM's 27th annual Nonpoint Source Conference in Montgomery, AL This one (1) day conference focuses on nonpoint source stormwater issues in Alabama.

- **Qualified Credentialed Inspector Training** – On average, 12 to 14 City employees maintain Qualified Credentialed Inspector (QCI) certification. This certification requires annual refresher training, for which all QCI certified personnel must perform in order to retain certification. In addition to QCI certified staff, the City has numerous professionals who qualify as Qualified Credentialed Professionals (QCP) through existing certifications.

- **Alabama-Mississippi Section of the American Water Works Association Conference** – In October of 2015 one City staff (Elisabeth Ingram) attended the Alabama-Mississippi Section of the American Water Works Association Conference.

- **ADEM Annual Surface Water Meeting and Conference** – In October 2015, four City staff (Tim Johnson, Rick McCarty, Dusty Kimbrow, and Alan Howard) attended the ADEM Annual Surface Water Meeting and Conference.

- **American Water Works Association Annual Conference** – In June 2015, one City staff (Elisabeth Ingram) attended the annual American Water Works Association Conference in Anaheim, Califorinia.

B. Spill Response and Prevention Training

The City of Auburn has developed an in-house spill response training program. Staff from Water Resource Management and Public Works' Construction Management and Fleet Services Divisions routinely inspect their respective facilities for proper containment and signage associated with storage of petroleum products. Additionally, staff attend annual training on Spill Prevention, Control, and Countermeasure (SPCC) to ensure that they are prepared to respond to discharges in an appropriate manner. In 2015, three (3) staff attended training directly related to SPCC. Additionally, Fleet Services installed an additional enclosed area for the storage of used oil filters.

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. **In 2015, the City recycled more than 1,200 tons of waste.**

2015 Calendar YR	
RecycleAuburn Tonnage Report	
Item	Total Tons
Newspaper	206.4
Green Glass	49.77
Clear Glass	108.25
Brown Glass	106.12
Aluminum Cans	38.86
Cardboard	371.49
Cardboard Downtown	75.6
Steel	10.82
Magazines/Telephone Books	79.39
Mixed Paper	73.43
Plastics	112.78
Computers/Electronics	No Data
Batteries	No Data
Scrap Metal	33.76
Downtown Grease	10.27
Total	**1276.94**
Monthly Average	**106.41**

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 2015, the Environmental Services Department swept approximately 14,302 miles of streets and parking lots within the City, thereby removing approximately 878.3 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 workshops, 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 2015, 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 2015, as well as projects under construction and design, is included below.

A. Stormwater Infrastructure Projects Completed

- Toomers Corner Intersection Improvement Project – This project involves the installation of 615 LF of underdrain, 340 LF of 15-inch RCP, and 10 grate inlets. The project also includes removal of 3 inlets/junction boxes.

B. Stormwater Infrastructure Projects Under Construction

- Renew Opelika Road Phase 1 – This project involved the installation of 200 LF of 24-inch RCP, 400 LF of 18-inch RCP, 3 single wing inlets, 10 double wing inlets, and 5 junction boxes. This work was previously identified as the Guthrie's Drainage project; however, the scope on that property was reduced and included in the Opelika Road Phase 1 project.

- North College Street Streetscape Project - This project involved the installation of 20 LF of 12-inch HDPE Pipe, 84 LF of 18-inch pipe, 2 junction boxes and 2 double wing inlets.

- Opelika Road and East University Drive Intersection Improvement Project – This project involved the installation of 307 LF of 18-inch Pipe, 131 LF of 24-inch Pipe, 11 LF 0f 30-inch Pipe, 262 LF of 36-inch pipe, 6 junction boxes, 5 single wing inlets, 3 double wing inlets, and 4 grate inlets. The project also includes removal of 770 LF of pipe, 8 inlets, and 4 junction boxes.

- South College Street and Longleaf Drive Intersection Improvement Project – This project involved the installation of 132 LF of 18-inch Pipe, 111 LF of 24-inch pipe, 2 junction boxes, 2 single wing inlets, and 1 grate inlet. The project also includes removal of 140 LF of pipe and 2 inlets.

- West Glenn Avenue Sidewalk – The project involved the conversion of old-style inlets to 12 standard inlets.

C. Stormwater Infrastructure Projects Under Design and/or Consideration

- Moores Mill Road Bridge Replacement Project - This project will involve the installation of 80 LF of 12-inch Slotted Drain Pipe, 3500 LF of 18-inch Pipe, 192 LF of 24-inch pipe, 117 LF of 30-inch pipe, 304 LF of 60-inch pipe, 31 LF of 44" x 27"-inch pipe, 297 LF of 59" x 36"-inch pipe, 8 junction boxes, 32 single wing inlets, 5 double wing inlets, and 19 headwalls. The project also includes removal of 1001 LF of pipe, 7 inlets, and 19 headwalls.

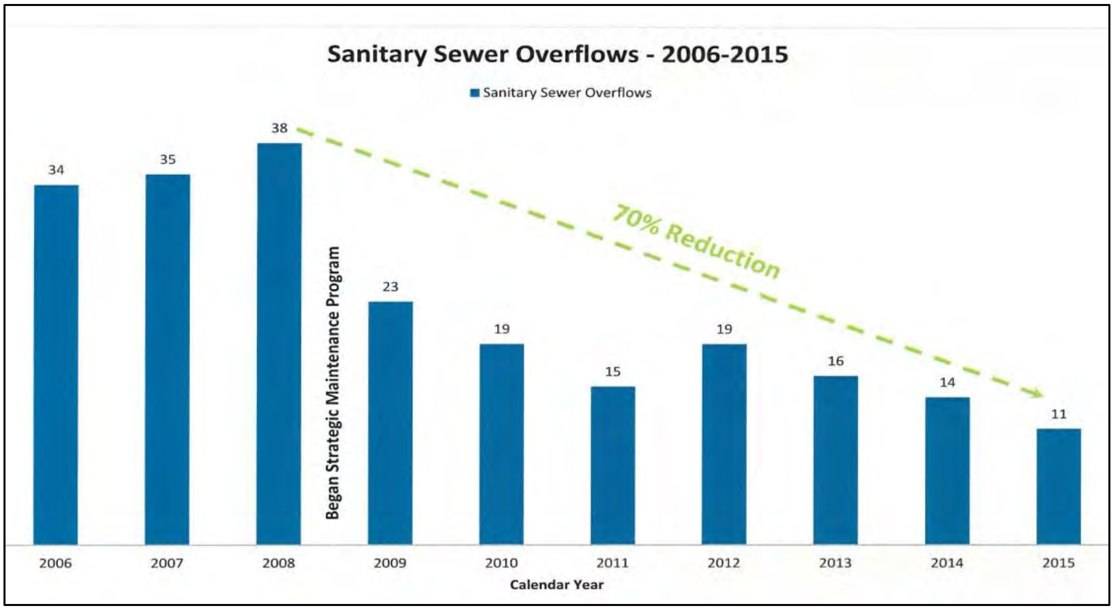
- North Donahue Drive Widening Project – This project will involve the installation of 316 LF of 15-inch Pipe, 195 LF of 18-inch Pipe, 7 LF of 24-inch pipe, 1 junction boxes, 6 single wing inlets, and 2 double wing inlets. The project also includes removal of 4 inlets.

- Auburn Technology Park West Annex Project - This project will involve the installation of 392 LF of 18-inch Pipe, 1068 LF of 15-inch Pipe, 2 junction boxes, 12 single wing inlets, 1 double wing inlets, and a bridge.

- Wire Road Widening Project – This project will involve the installation of 14 LF of 15-inch Pipe, 18 LF of 36-inch Pipe, 45 LF of 66-inch corrugated metal pipe, 3 single wing inlets, 1 double wing inlet, 1 36-incg headwall, and 1 66-inch headwall. The project also includes removal of 4 inlets.

D. Sanitary Sewer Rehabilitation Projects

Several years ago, the City began implementation of a program to identify and rehabilitate aging sanitary sewer infrastructure in the City of Auburn. The primary purpose of this program is to rehabilitate aging infrastructure, prevent sanitary sewer overflows (SSOs) and reduce inflow and infiltration (I/I). In 2015, the City completed construction of the Southside Sewer Basin 17 sanitary sewer rehabilitation project (vicinity of Woodfield Drive, North Gay Street, South College Street) to rehabilitate aging infrastructure and address I/I. The City also began construction of the Northside Sewer Basin 5 sanitary sewer rehabilitation project (vicinity of Foster Street, Byrd Street, Bedell Avenue, Highway 14 and Shug Jordan Parkway). This project will be completed in 2015. The City plans to design and construct additional sanitary sewer improvements in 2016 to address these 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 seventy (70) percent since 2006.**


Sanitary Sewer Overflows - 2006-2015
Sanitary Sewer Overflows
34
35
38
23
19
15
19
16
14
11
70% Reduction
Began Strategic Maintenance Program
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Calendar Year

APPENDIX A

2011 PHASE II STORMWATER PERMIT

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
MODIFICATION DATE:	FEBRUARY 24, 2012
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 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 descriptiou.

(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 qualifying new development and redevelopment projects. 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 applicatiou (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. Qualifying Construction Site means any construction activity that results in a total land disturbance of one or more acres and activities that disturb less than one acre but are part of a larger common plan of development or sale that would disturb one or more acres. Qualifying construction sites do not include land disturbances conducted by entities under the jurisdiction and supervision of the Alabama Public Service Commission.

17. Qualifying New Development and Redevelopment means any site after 730 days from the effective date of permit coverage that results from the disturbance of one acre or more of land or the disturbance of less than one acre of land if part of a larger common plan of development or sale that is greater than one acre. Qualifying new development and

redevelopment does not include land disturbances conducted by entities under the jurisdiction and supervision of the Alabama Public Service Commission.

18. 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.
19. 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.
20. 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.
21. SWMP is an acronym for "Storm Water Management Program."
22. 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.
23. "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.).

APPENDIX B

URBANIZED AREA MAP

Legend
Major Receiving Waters
Storm Sewer (Asset Inventory Ongoing)
Old Storm Sewer Survey
Hydrology in City Limits
Streets
Auburn, Alabama Urbanized Area - 2013 Census
Auburn University Property
Auburn City Limits
Opelika City Limits
Highway 280
Interstate 85
Saugahatchee Creek
Highway 14
Moore's Mill Creek
Parkerson Mill Creek
Town Creek
Choctafaula Creek
Chewacla Creek
N
S
E
W
Miles
0
0.75
1.5
3
City of Auburn Urban Area and Storm Sewer Stats
Auburn, Alabama Urbanized Area 50.27 Sq. Miles
Auburn City Limits within Urbanized Area 26.80 Sq. Miles
Estimated Storm Sewer Main *126 Linear Miles
Extent Storm Sewer Surveyed in 2015 38.8 Linear Miles
Hydrology
Stream in City Limits 286 Linear Miles
Ponds/Lakes in City Limits 667 Impoundments
Wetlands in City Limits 370+ Acres

APPENDIX C

NEWSPAPER PUBLICATIONS - 2015

With recent Auburn-Opelika rainfall, Experts stress awareness of potential flood conditions

Katherine Haas | Opelika-Auburn News | Posted: Saturday, May 30, 2015 6:00 am

Weather

Unrelenting rain and a possibly clogged storm drain flooded the yard of this Opelika home late this week.

After unrelenting rain showered the Lee County landscape Thursday, experts remind residents to be aware of potential flood conditions that can arise quickly and pose serious threats to safety.

The front yard, driveway and carport of Valarie Finley's Crestview Street home in Opelika was completely under water Friday morning, the resuot of Thursday's rainfall and a possibly clogged storm drain on her property.

The Lee County Emergency Management Agency reported that Auburn received 4.1 inches of rain and Opelika 3.8 inches of rain in a short period of time Thursday. Though LCEMA public information officer Rita Smith said the agency did not receive any calls related to serious flooding in the area, she still stressed that flooding can and does occur in low-lying areas. In light of recent flooding in Texas that has claimed around 20 lives and leaves others still missing, knowing what to do in the event of a flood is especially important, Smith added.

"When roads are really dry and it happens really fast, that water rises pretty quickly," Smith said.

Smith described the difference between a flash flood watch and a flash flood warning. A watch, she said, indicates that flooding or flash flooding is possible in an area. A warning means flooding is already occurring or will occur soon and quickly.

She also said to avoid low-lying areas such as bridges and to avoid driving altogether if possible during possible flooding conditions.

"If you don't have to be on the road, we don't want you on the road," Smith said. "We've got first responders that have to be out there — that also makes it more dangerous for them."

If a person is driving and comes across a flooded road and is unsure of how deep it is, he or she should not try to drive on it, Smith added. In less than two feet of water, cars can be swept away.

“If you do get caught on a flooded road and the waters are moving fast all around you, move to higher ground as soon as possible,” Smith said.

Smith also emphasized using extra caution at night, when it is difficult to see how much water might be on a road.

Also, when investigating an area that has been flooded such as around a home, be aware of the possibility of dangers such as snakes and other wildlife, downed power lines and debris.

“If something has flooded, you don’t want to go into it until it has been checked out,” Smith said.

For more information or to report dangerous conditions, call the LCEMA at 334-749-8161.

Miller: Benefits of Tree City USA

Tipi Colley Miller, columnist | Posted: Wednesday, December 16, 2015 10:00 am

I recently met with representatives from the Alabama Forestry Commission to discuss Tree City USA. This program has been around since 1976 and encourages communities to responsibly manage the trees within their city limits. Fortunately for you, Auburn and Opelika have been members of Tree City USA for at least 25 years.

tree city usa

There are four requirements that must be met for cities to receive this designation. One requirement is the city must spend $2 per capita on planting, care, removal of trees and tree educational efforts. For both Auburn and Opelika, much more money is spent considering trimming trees for utility purposes, maintenance of existing trees and volunteer's time educating the community about trees.

Why would a city want to be a Tree City USA? This program assists cities through education, grants and community improvement. It's no secret that cities that pay attention to their natural resources provide other positive quality of life activities. When our area experienced the ice storm in 2013 had our cities not been proactive in responsibly maintaining trees, we probably would have had more damage to houses, cars and utility lines. When you read about local groups honoring Arbor Day, students learning how to plant trees or municipalities trimming trees, know that our goal is to continue to make this community a wonderful place to live.

When I was growing up, my grandfather would place a homemade pecan pie on his trashcan after rolling it to the street each Friday morning. I was always proud of my grandparents for making this small gesture to show city employees how much they cared. The Opelika Solid Waste Department and Auburn Environmental Services have done a tremendous job ensuring the cleanliness of our city. With Christmas home tours, shows at public buildings and an increased amount of trash during the holiday season, these men and women have been very busy. I would like to share a few tips to make their jobs a little easier.

As the leaves invade our yards, many of you rake, sweep or blow your leaves to the curb. It is best for everyone if you keep the pile of yard debris on the grass in front of your house or business or bag the natural debris. After a hard rain storm, leaves are prone to wash away into street storm drains. If this continues, the drain will become clogged. Obviously a clogged storm drain results in water sitting on the road after a storm. I have also seen piles of yard waste encroach in the streets and become a driving hazard. One lane is blocked so the cars must yield to one another. You have probably never considered your yard debris as a potential driving hazard. Only leaves, sticks, soil and other natural items should be placed in your yard debris pile.

Don’t forget we will be collecting Christmas trees at the Opelika Depot on Jan. 2 for recycling.

Tipi Colley Miller is the director of Keep Opelika Beautiful Inc. and writes a weekly column. Contact her at kob@opelika.com.

Toomer’s Corner project on track for Aug. 17 completion

Katherine Haas | Opelika-Auburn News | Posted: Wednesday, August 5, 2015 7:28 pm

A construction project that has kept a key Auburn intersection closed throughout the summer is on schedule to be complete by the time Auburn University students return to campus for their first day of fall classes.

Auburn construction

Josh Durbin cuts felt to lay a new row of bricks in the street at Toomer's Corner Wednesday.

The Corner Construction project, which began in May and involves several aesthetic enhancements to the junction of College Street and Magnolia Avenue and the city’s three corners of the intersection, is scheduled to be finished on Aug. 17, with the intersection reopening no later than Aug. 16.

“Toomer’s Corner, it’s the iconic center of Auburn,” said Kevin Cowper, assistant city manager for the City of Auburn. “It means something to everybody that’s associated with Auburn University. So our aim was to make that space into a great community space where we could host gatherings and events.”

As part of the project, which is being completed by Auburn-based Bailey-Harris Construction, outdated infrastructure that existed beneath the intersection including drainage systems and water and sewer lines have been replaced. Another new underground element involved installing Silva Cells below ground that will facilitate the growth of new trees that will be planted along downtown sidewalks.

“Those are underground systems where the roots can grow into as opposed to causing problems with the sidewalks and growing into the water and sewer lines—it gives them space to grow,” Cowper explained. “The university did the same thing. So it’ll promote good tree health.”

In addition to the underground work, all of the concrete work for the project is now completed, including new curbs and gutters and sidewalks. Pedestrians will find that sidewalks on College Street and Magnolia Avenue leading up to the intersection appear wider, being that concrete landscape islands and parking meters have been removed.

Pedestrian lighting and street lighting has been reinstalled, and new traffic signal mast arms are up. In addition, brick seat walls have been built on all three of the city’s corners of the intersection, equipped with cell phone charging stations and upward LED lighting.

This week, crews are paving College Street and Magnolia Avenue leading up to the intersection, which will be followed by the installation of permanent concrete pavers on the corners and in the middle of the intersection in the shape of a tiger paw, which was previously a painted design. A webcam on the city’s website showed the outline of the new tiger paw on Tuesday morning.

“So really they are entering into the final stages of the project now,” Cowper said. “They’re working on asphalt this week; the paving crew is out there working to install the pavers. If you look at the webcam, you can see the outline of the tiger paw now. They’ll complete the intersection work and then they’ll move to the sidewalks.”

To alleviate some construction pains for downtown consumers, the city made downtown parking free all summer and opened the top two floors of the municipal parking deck to the public. The free parking will end when the roads are reopened, at which time the top two floors of the deck will again be reserved for leased spaces.

As the old mechanical parking meters have been removed up to the midblock point on College Street and Magnolia Avenue in downtown, two new electronic parking kiosks are being installed on each street and will be able to accept credit cards and debit cards in addition to cash. The city’s IT department is also working to create an app that will let drivers know which parking spaces are available at any given time.

“The whole system enables us to have much better enforcement of the time restrictions on the parking,” Cowper said. “Each parking space has a detector or a sensor in it that senses the vehicle and communicates with the parking meter so we know when a car is parked there.”

With some business-front parking spaces absorbed into the construction zone and roads and sidewalks closed at various times over the past few months, downtown vendors have spent the summer doing their best to deal with the changes happening to downtown.

“It’s hurt our business a little bit,” said Taylor Nelson, sales associate at The Locker Room. “I guess we’ve had to go out and make a little more business happen because a lot of people can’t or won’t come downtown and deal with all the parking because it’s hot too, so they don’t want to be walking forever.”

Nelson added that while he understands the city’s reasons for doing the project, he’s hoping the positives end up outweighing the negatives.

“I think because of the home football schedule that we have coming up, we’ll make up for it this fall, but … our fiscal year ended on the 31 st , so that doesn’t really help our past year,” Nelson said. “So yeah, it’ll look better and I think it’ll bring a lot more people downtown. It’s supposed to be a little more friendly for people walking around and everything, so just like everybody else, we’re ready for it to be finished.”

For others, construction was surprisingly not a huge blow to businesses.

“It’s actually been a little bit better than last summer, so (we’re) very positive,” said Ashton Lipscomb, manager of Wrapsody. “I think we had an upper hand maybe just because we are a gift store. People still need their gifts, and that’s been great, and now we have bid day coming up, so that’s going to be even better.”

Lipscomb added that the gift shop offered free delivery within Auburn city limits over the summer, but most customers were willing to come into the store once they realized what parking options were available to them.

“We’ve been positive, and I think that’s helped,” Lipscomb said. “Sometimes customers didn’t want to come downtown, and they’d call and ask us, and we would tell them where they can park.”

Other business leaders expressed that the construction woes were made better by the city’s cooperation with those who were affected by the project.

“The city worked really, really well with us,” said Jordan Hilliard, manager of Auburn Art. “They were in our store once to twice a week if not more just coming to update us, give us information, let us know what’s going to happen next if they were behind, so they’ve been really, really great about keeping us informed and making sure that we’re happy and that things aren’t too hard on us.”

Hilliard added that she and her coworkers are looking forward to seeing the finished product.

“We know there’s going to be some good coming out of it where it’s going to bring a bigger crowd this football season we believe because everyone’s going to be coming down to see all the progress and improvements,” she said. “Even though it was down a little bit this summer, we’re really looking forward to seeing what it’s going to be like in the future and who it brings in, so we think our sales will go up then to repay for some of that summer.

“We’re really excited to finally be able to go back to functioning normal again,” she added.

Saugahatchee stream cleanup scheduled for Saturday

Katherine Haas | Opelika-Auburn News | Posted: Thursday, April 9, 2015 10:42 pm

The phrase "spring cleaning" will extend to one of the Auburn area's local streams this Saturday.

Save Our Saugahatchee will host its annual Saugahatchee Stream Cleanup Saturday, April 11, starting at 8 a.m. The group has been holding the cleanup of the creek each spring for more than a decade.

"People somehow have the idea that the way to get rid of trash — hazardous things, even — is to throw it in the water," said Wendy Seesock, who serves on the board of directors for Save our Saugahatchee . "Water is not the place to dispose of waste."

Volunteers are encouraged to meet Saturday at Covenant Presbyterian Church in Auburn starting at 8 a.m. for assignments. Volunteers will be assigned to specific areas where roads cross over Saugahatchee Creek to be able to better access its waters.

"If people have a particular creek crossing of interest, they're welcome to do that," Seesock said.

Participants will be provided with trash bags and gloves, courtesy of Keep Opelika Beautiful.

"Lee County allows us to put trash that we pick up in the county Dumpsters, and sometimes they help us pick up the trash," added Barbara Estridge, treasurer for Save Our Saugahatchee .

Volunteers are encouraged to wear sturdy shoes and clothing for traversing the woods, as well as insect repellant.

"Mostly we're picking up bottles and plastic and pieces of cars from wrecks," Seesock said. "That kind of refuse that you see along the roadside."

Seesock explained that the cleanup typically has about 20 to 30 volunteers, depending if student groups join, and has historically been held in March. The group decided to wait until April this year in hopes of better weather.

"If they wanted to bring kids, it would be fun for children as long as they're supervised," she added. "(It would be) good to bring young people so they understand the consequences of heaving something out the window or letting things fly off the deck."

In addition to serving an educational purpose, the cleanup also helps maintain a standard of cleanliness in local creeks and tributaries that the public uses, Seesock said.

“The other good thing that we see is our sites have improved over the years that we’ve been doing this, and that’s exciting to me,” she said. “I think, ‘Wow, we’re making a dent.’”

Covenant Presbyterian Church is at 445 Shelton Road in Auburn .

Miller: How do you waste water?

Tipi Colley Miller | Columnist | Posted: Thursday, September 17, 2015 9:50 pm

How often are you guilty of wasting water? I know this isn't a glamorous topic or one that takes up much of your brainpower. I will admit to you some ways that I am guilty of wasting water and perhaps you can make your own list.

Sometimes when I water my potted plants, I get distracted, and the water overflows. This is very frustrating. I've wasted water, disrupted the soil in my pot and usually the side of the flowerpot is covered in soil. When I brush certain children's teeth, sometimes I forget to turn off the water between each time I rinse the toothbrush. After I rinse vegetables, I could use the water for indoor plants. Another careless way I waste water is when I'm running a bath for the children I let the water run until its warm instead of plugging the drain when I turn on the water. Do any of these statements sound familiar to you? What is on your list?

Recently, I was reading a newsletter published by the EPA, and it stated that a typical household uses 260 gallons per day. It is hard for my brain to even think of this much water. For the indoors, one area of the largest consumption of water is the laundry room. It is important to check the load level on the washing machine before each run. With some newer models, the machines detect the weight of the contents. In the kitchen, many dishwashers allow you to avoid pre-rinsing dishes before placing them in the dishwasher. This will also save you time!

What about outdoors? One of the most common mistakes in wasting water is watering your lawn or flowers in the middle of the day. The water is quickly evaporated so instead of your soil soaking up the water, your grass requires more water. A great way to encourage your soil to soak in water is aerating your grass. This allows water to reach the roots, not run off.

One statistic from the EPA states that 50 percent of the water used outdoors is wasted. What ways have you wasted water in your yard? Have you ever forgot to turn off the hose or accidently run the sprinkler system while it is raining?

You may have heard discussions on storm water management. Engineers with the city of Opelika have been working on storm water management pertaining to the roads, tearing down building and new construction. Storm water is when water runs off roofs, roads, parking lots or soil and picks up additives as it runs. These additives can be chemicals, litter, fertilizer or something else. Why does this matter to you? One reason is we want to monitor what goes into the river that ends up in the lake you swim in. Another reason is that the litter or debris from the storm water can clog drains. This creates overflowing water in streets and roadsides.

Tipi Colley Miller is the director of Keep Opelika Beautiful Inc. and writes a weekly column. Contact her at kob@opelika.com.

Local Girl Scout earns highest award

Special to the News | Posted: Tuesday, September 8, 2015 5:47 pm

Beth Prior has earned the highest award earned in Girl Scouting – the Girl Scout Gold Award.

After seeing many newspaper and online articles concerning the water quality of Parkerson Mill Creek, Prior wanted to investigate the water quality herself in hopes to better educate the citizens of Auburn about the creek and the extensive wildlife it holds. Searching for a project to earn her Girl Scout Gold Award, the Auburn High School senior thought this would be right up her alley.

The Gold Award is open only to Senior and Ambassador Girl Scouts and represents a "take action" project that challenges scouts to change the world through a seven-step process: identify the issue, investigate it thoroughly, get help and build a team, create a plan, present your plan and gather feedback, take action and educate and inspire others.

Local Girl Scout earns highest award

Beth Prior, a senior at Auburn High School, earned the Girl Scout Gold Award, the highest award earned in Girl Scouting.

For this project, with the help of Alabama Water Watch, Prior set up six different test sites around Parkerson Mill Creek. She evaluated erosion and bacteria levels in all six sites, and the damage she found that was being done to the fish, turtles and other creatures in the creek startled her. In an effort to correct the problem and educate the community, she submitted her findings in a report to Auburn University's Facilities Department and set up a table at three major events in the area. Her report outlined the extensive erosion and waste in the water, and she also used Google Earth to create a virtual map of the tests sites using GPS coordinates.

“Hopefully, my project will educate the citizens of Auburn on their local waterways. Mostly everyone thinks that Parkerson Mill Creek is just a drainage ditch and do not realize that there are fish, turtles and other creatures that live in it,” Prior said.

Prior continues to stay up-to-date on the current efforts in cleaning up Parkerson Mill Creek and hopes that her work will lead to greater wildlife protection in the area. She is now part of an elite group of women who have also earned their Girl Scout Gold Award.

Construction projects continuing for downtown Auburn

Katherine Haas | Opelika-Auburn News | Twitter | Posted: Saturday, August 22, 2015 8:22 am

Downtown Auburn

J.W. Young plays downtown Auburn Friday evening. Thousands of people turned out to celebrate the reopening of Toomer's Corner.

With a celebration in downtown Auburn Friday marking the completion of a summer-long improvements project to the Toomer's Corner intersection, other construction projects intended to improve and unite Auburn's urban core are under way or anticipated in the near future.

On Mitcham Avenue, a streetscape project aimed to coincide with the redevelopment of the historic Auburn Depot is in progress. The depot is being redeveloped into a seafood-centered restaurant by restaurateurs Matt and Jana Poirier, owners of The Hound in downtown Auburn. To be named The Depot, it's set to open the first week of September, according to its website.

The Mitcham Avenue Streetscape project involves the installation of new sidewalks connecting Mitcham Avenue to College and Gay streets, which are projected to be completed in the next week, according to assistant city manager Kevin Cowper.

"This project will provide a key streetscape link to connect downtown Auburn to Opelika Road, which is a principal component of the Auburn Downtown Plan and Renew Opelika Road corridor redevelopment plan," Cowper said.

In addition to sidewalks, the streetscape will encompass landscaping improvements that will help delineate parking at the new restaurant, street trees and pedestrian lighting to match that of other areas of the historic district. Cowper said Floyd Service Company is scheduled to begin work on the decorative lighting next week.

Another streetscape planned for downtown will be on North College Street near the Papa John's shopping center. According to Cowper, the redevelopment of an old gas station on the corner of Glenn Avenue and College Street into Live Oaks restaurant, which opened last winter, was the first phase of this project.

The North College Streetscape will involve reconstructing and adding more on-street parking outside of the strip of businesses adjacent to Live Oaks on North College Street, as well as sidewalk and drainage improvements. The project is included in the city's Fiscal Year '15 Streets Resurfacing and Subdivisions Completion project, but does not yet have a start date.

According to Cowper, the lighting additions and sidewalk improvements are necessary to foster a pedestrian-friendly environment downtown.

"A lot of our sidewalks are just old and absent in some cases," Cowper said. "The older stuff isn't ADA compliant. And a lot of the streets are dark, so there's great need to install some pedestrian lights. If you're going to have a walkable, living downtown, then you need to have the sidewalk and lighting facilities to support that."

Long-term, an improvements project is proposed for the intersection of College Street and Samford Avenue, aimed at helping the intersection accommodate traffic better, provide better pedestrian facilities and connect that area of College Street to the rest of downtown Auburn.

South College Street will be widened to add dual southbound through lanes and northbound and southbound right-turn deceleration lanes.

"You get to the intersection — one lane goes right to the campus, (one) lane goes left onto Samford, and one lane goes straight, so that's a real pinch point because you're just down to one," Cowper said. "When the project's done, you'll have two lanes going through, so that'll help facilitate the game-day traffic."

Samford Avenue will also be widened from Gay Street to South College Street to allow for the addition of three full lanes through that area.

"The project is needed to reduce congestion and improve safety at a significant intersection within the city of Auburn," Cowper said.

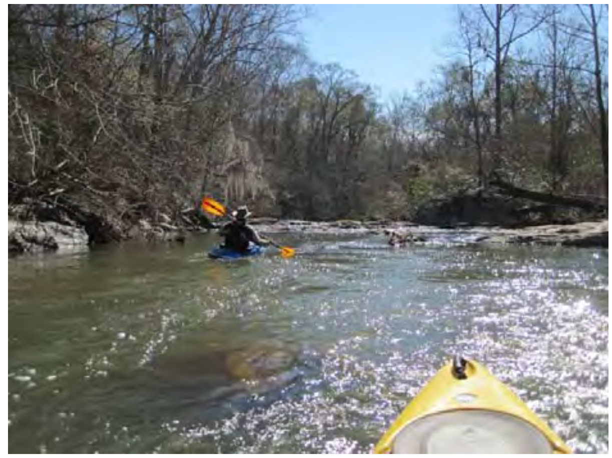
Also for the project, the storm water system along Gay Street and Samford Avenue will be upgraded along with the traffic signals at the Gay Street and Samford Avenue intersection. A sidewalk will also be added on the west side of South College Street from the intersection to Auburn University's Donald E. Davis Arboretum.

Tying in with the intersection project, a planned South College Streetscape from the Samford and College intersection to Thach Avenue will employ wider sidewalks, street trees, pedestrian and street lighting and a center median, as well as a mid-block crossing from Auburn University's campus to the Heart of Auburn retail center.

The Samford and College intersection project is slated to be complete by fiscal year 2017.

Auburn to develop trails, put-in and take-out on Saugahatchee Creek

Katherine Haas | Opelika-Auburn News | Twitter | Posted: Saturday, September 19, 2015 8:05 pm



Greenway

Kayakers paddle down a portion of Saugahatchee Creek. The City of Auburn made its first land purchase this week to pursue delvelopment of a Saugahatchee Greenway and Blueway.

With manmade development rising in Auburn on nearly every vista, the city is taking steps to preserve some of its untouched landscape and in doing so, to make its natural assets better accessible to citizens.

The city of Auburn has made its first financial investment in the Saugahatchee Greenway and Blueway Project, a venture that will create 4.5 miles of trails and access to 4.5 miles of navigable water on Saugahatchee Creek for canoeing and kayaking.

Last Tuesday, the City Council approved the purchase of 4.53 acres of land on North Donahue Drive which could serve as a trailhead, a small park and parking area for a canoe/kayak put-in on Saugahatchee Creek, according to Parks and Recreation Director Becky Richardson.

Richardson said the city started considering developing greenways, which can be trails or undeveloped linear land, in the early 2000s, at which time the city created a Greenspace Task Force and then a Greenspace Advisory Committee, which devised a Greenspace Master Plan.

“They recommended a number of priority greenways,” Richardson said.

Since that time, greenways have been developed parallel to Shell Toomer Parkway and through Town Creek Park from East University Drive to Wrights Mill Road.

The Saugahatchee Creek area was another greenway identified in the master plan, but one that wasn’t as easy to begin developing until recently.

“At the time, there really wasn’t a lot of development going on, so it was maybe property owners weren’t ready to decide what they were going to do with the property or whether they wanted to donate easements or trails or whatever,” Richardson explained. “And in recent years, the properties out off of Richland Road and off of Donahue have really started to develop, and so there's been some interest," she said, adding that the city has received two easements thus far and a commitment on another.

The trail will run from the property off North Donahue to the city's former sewage treatment plant off Richland Road, generally running parallel to the creek but deviating from it at points. Richardson said the north side of town was purposely chosen as the city's next focus point as far as greenways.

"It's been determined in several studies that we've done that the north side is underserved compared to other parts of town as far as parks and greenspace," she said.

Richardson added that the trail will most likely be developed in segments.

"We're in the process now of determining the actual best route for the trails, and that's an ongoing thing that our in-house surveyors and folks are working on, and then once we get those, we can go back and acquire additional easements as needed, and then hopefully get the funding to be able to do some segments," she said.

Richardson said the greenways will help open doors to outdoor recreational opportunities favored by many in the community.

"One of the reasons we saw them as being a good source of recreational opportunities is greenways are really linear, passive parks, and walking and biking are very popular," she said. "When we did our recent needs assessment survey, trails came back as number one on the wish list, and so we feel like we're on the right track with it."

With greenway development in the works, the blueway portion of the project is also progressing to the point of allowing Auburn's first city-owned public creek access for canoers and kayakers.

Dan Ballard with the city's Water Resource Management department said the city was approached by the Alabama Scenic River Trail, a non-profit organization that works to determine and delineate navigable waterways throughout the state, to look into whether Saugahatchee Creek was navigable.

Over the past year, members of the city's Water Resource Management Department floated Saughatchee Creek from North Donahue Drive to the city's property at the end of Richland Road to assess whether it would be easily navigable for the public.

"We knew it was from (Lee Road) 188 to Yates Reservoir," Ballard explained. "Nobody knew much whether the extension to Opelika and Auburn was navigable. It's a big creek, but its' not a river. But there's only one way to find out."

Ballard and others conducted a series of test floats on Saugahatchee Creek, starting with a float from North College to North Donahue in August 2014 and from North Donahue to the end of Richland Road in January.

Ballard said the floats were intended to assess flow conditions, safety levels, whether there were obstructions in the creek and whether any improvements were needed to make Saugahatchee Creek navigable.

The results the team found were almost ideal.

“It’s a beautiful float in its current condition and requires little to no improvement in the stream,” Ballard said. “We can float it as it was or as it is now.”

The float from North Donahue to the end of Richland Road, where a put-in/take-out facility could eventually be built, takes about three hours, according to Ballard.

“There’s a good bit of variability,” Ballard said of the three-hour trip. “It’s mostly slow-moving stream. These are not rapids. It’s an easy float. It would be what we would consider a family-friendly float under certain conditions.”

Ballard added that a put-in in addition to a takeout at the Richland Road site downstream from North Donahue could allow more advanced canoers and kayakers to continue to stops at Lee Road 188 and the Yates Reservoir.

“It’s a unique opportunity to not just get people to interact with local water resources, but understand their importance in our quality of life,” Ballard said. “It’s a beautiful creek. I think this is something the whole community will benefit from.”

Auburn resident concerned about mud tracked onto South College

Katherine Haas | Opelika-Auburn News | Posted: Saturday, January 24, 2015 12:02 am

Muddy road

Robert Ward talks about mud and the traffic hazard and environmental danger it poses on Highway 29 south of Auburn.

Robert M. Ward has lived on the same land on Cecil Ward Road off South College Street in Auburn for his entire life.

With one way for himself and his family to travel in and out of town, Ward has made it clear that he has a muddy issue.

“I don’t want their mud,” Ward said. “I’m fed up with it. I don’t want it anymore.”

Ward says that after heavy rain, trucks, including ones driven by Auburn city workers, track mud as they roll in and out of the unpaved driveway of Sand Hill Recycling at the intersection of South College Street and Persimmon Drive. The mud then accumulates on the roadway, making it dangerous for cars passing through.

“If you get a lot of mud out there, there’s so much traffic coming through there, it’ll pound that mud, and it’ll impregnate it into the surface of the concrete, and they’ll just leave it like that,” Ward said. “So the next rain that comes by, you’re making a slick mess. And it’s a matter of time before somebody gets T-boned right through here, someone coming from out of town not knowing about this situation. It’s a matter of time before somebody gets killed up there.”

The slick roadway isn't the only problem, Ward said. Once the mud accumulates, he said, street sweepers brush it to the sides of the road, where it flows into Parkerson Mill Creek. That creek connects to Chewacla Creek on his property, where he says federally-protected mussels live.

“I’ve got about ¾ mile of Chewacla Creek, and I’ve got less than a quarter mile of Parkerson Mill,” Ward explained. “So their mud is coming across my property killing environmentally protected animals. I don’t want it.”

Ward has questioned why the facility is not required to put up a silt fence or to pave its driveway.

“If mud was so good for the road, why don’t they put it out on the interstate every time it rains?”

Ward, who said the issue has been apparent to him ever since Sand Hill Recycling was established on the site of a former asphalt plant, spoke about it at an Auburn City Council meeting in April 2011 and again on Jan. 6 of this year.

At the meeting, City Manager Charlie Duggan informed Ward that the facility is not in the city.

“It’s in the county, and therefore it’s not under my jurisdiction,” Duggan said.

Lee County administrator Roger Rendleman said Friday in an email that he understood that Ward was planning to speak on the issue at Monday's Lee County Commission meeting; however, Rendleman said he had no comment on the issue at that time.

Though it is not in the city, Auburn Environmental Services Director Tim Woody explained that both the city and Auburn University use the facility for the disposal of inert construction and demolition debris, including yard waste, and have for the past 15 years.

"More than 70 percent of that material is woody debris," Woody said. "They're able to use a tub grinder — a grinding machine — and they can grind it into mulch."

Because the city uses the facility, Ward suggested that the city is still part of the problem though the facility is outside city limits.

"I have cited on more than one occasion to the city of Auburn … and showed them where nobody's been in compliance with this, and at that time (they) made it abundantly clear that that was in the county and therefore they washed their hands of it," Ward said. "I explained to them that those were city trucks. Our city trucks are bringing mud onto the highway, whether it's in the county or not."

Woody said the issue has been brought to the city's attention before and that the city has contacted Sand Hill Recycling to relay the complaint as a courtesy.

"Anywhere that you have a landfill and big trucks driving off of a road onto an unpaved surface, there is going to be some mud residue," Woody said. "I understand Mr. Ward's concerns, but it's up to the facility to make sure as part of their operations — to make sure the remnants of that material is cleaned up."

Woody added that the Alabama Department of Environmental Management (ADEM) sets regulations for transfer stations like Sand Hill to prevent runoff from damaging stormwater systems or nearby lakes or streams.

"As far as those permits, they are required to make sure their operations don't endanger the surrounding environment," Woody said. "So we would expect any of those companies that we deal with to comply with the conditions of their permits."

Lynn Battle, spokesperson for ADEM, confirmed Friday that ADEM workers visited the site last week to evaluate the issue and determine whether the facility was in compliance with its permits.

"We have inspected, but we have not compiled any information related to the inspection yet," Battle said. "All I know is that this week the site has been inspected."

Battle said recycling sites such as Sand Hill Recycling are typically evaluated on a case-by-case basis, meaning there are no overriding specifications for all.

"Right now we're awaiting the compilation of the inspection report," she added.

However, Ward is not convinced that ADEM will help the problem.

"They asked me the other night in the meeting, 'Why don't you call ADEM?'" Ward said. "They're a toothless tiger. They know that."

For Ward, the solution is not for the facility to be shut down.

"I never said that place was ugly and needed to be closed down, and I'm not," he said. "That's my neighbor's property. But he is going to abide by the state and federal laws. That mud is coming across my property. I don't want it on my property.

"If they gravel and asphalt it, I believe that would curtail almost all of the mud getting on there," he continued.

Another solution, he said, would be for it to move elsewhere.

"I don't think you would see this facility built anywhere else around Auburn in anybody's neighborhood."

Efforts to reach owners of Sand Hill Recycling were not successful as of Friday afternoon.

Auburn Fire Division lights up lawn with landscaping project at Station 1

Katherine Haas | Opelika-Auburn News | Posted: Monday, April 13, 2015 4:49 pm

Auburn Fire Station Landscape

The Auburn Fire Division has undertaken a landscaping project at Station 1, having provided all of the labor for the city-funded project in-house. Lt. Cody Carlson designed a fire hydrant-themed water feature for the station.

Firefighters at Auburn Fire Division's Station 1 have been busy lately, but not always with extinguishing fiery blazes.

For the past four months, AFD firefighters have been working hard to enhance the landscape surrounding Station 1 located on the corner of Ross Street and Magnolia Avenue. The project, which has involved the addition of new sidewalks, planting new foliage and cleaning up around monuments on display on the fire station's lawn, was much needed to update the previously out-of-date grounds, according to AFD Lt. Jason Brown.

"It was older. Out-of-date may be the best term for it," Brown said of the fire station, which dates to 1964. "As far as the grass area, we had plenty of grass of course, but the grounds needed a new facelift—more up-to-date. And we've done that. That's for sure."

Brown, along with other members of the division, have provided the labor for the city-funded project, often spending entire days devoted to it.

"At one time on a Saturday, we had 15 people out here working, and it was an all-day event," Brown recalled. "We were installing the irrigation system before they laid the sod and put the new dirt in."

The project was initiated by a need to make the facility ADA compliant, said AFD Chief John Lankford.

"There wasn't really good access for handicapped people visiting the fire station," Lankford said. "So the sidewalks were chopped and ramps made, and a handicap parking spot in the rear with the sidewalk coming around the side."

Sidewalk work also included the addition of a pathway that cuts diagonally across the station's lawn from Ross Street to Magnolia Avenue. That particular sidewalk was constructed in response to the 160 Ross student housing development, which features more than 600 beds, that will shortly open across the street from the station.

“We envisioned them (students) walking to campus and cutting across our yard,” Lankford said. “So the other push or the other reason to do this is to give them access, because we knew they weren’t going to walk to the corner and then come up. So they have a nice walking path.”

In addition, the project has involved the installation of a larger and taller flag pole, which now stands above a monument to AFD’s one fallen firefighter Capt. Roger Brookshire, who died in the line of duty in 1977.

A water feature designed by Lt. Cody Carlson is being constructed outside of the doorway leading into the station and will display a fire hydrant surrounded by streams of water. The station’s iconic true-to-size tiger statue that stands on the lawn was also moved to be better displayed among a showcase of tall ornamental grasses and is also scheduled to be repainted as part of the project.

“The tiger is a huge attraction,” Lankford said. “Everyone brings their kids up here and puts them on top and takes a picture.”

Another significant feature of the project involves a citywide “green” initiative for rainwater collection. Firefighters have installed rain barrels along the side of the station building. The barrels will be connected to drain pipes to collect rainwater from the building’s roof, and the water will then be used to water plants and grass.

The look of the rain barrels will be softened with lattice, muscadine vines and blueberry bushes, Brown added.

“It’ll be for the individuals that work here. If there’s different things they want to use them for as far as cooking or whatever, then they can come out here,” he said.

While some monuments and statues have been moved, the AFD made sure not to disturb one memorable tribute to the department’s former mascot, a dog named “Plug.” Plug’s fire hydrant sits on Station 1’s lawn in memory of the department dog.

“(This project) certainly shows the firefighters’ dedication to their hard work and desire to make this station look nice,” Lankford said. “I commend them for that because it wouldn’t have gotten done without them.”

Brown said those working on the project have received compliments and thanks from citizens and those passing by as the project has progressed.

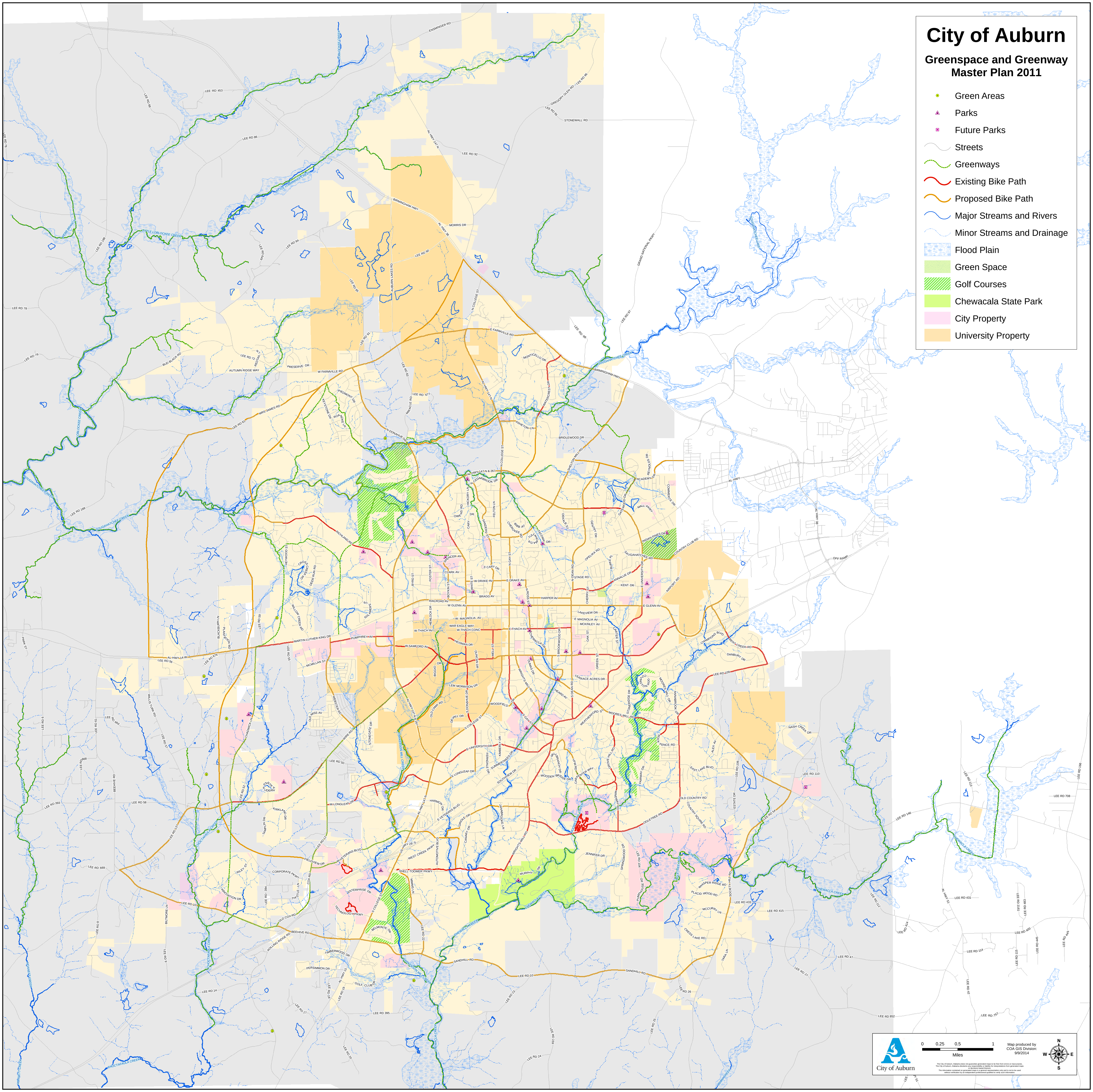
“That’s rewarding for us that people notice us out here doing the work and putting in the time, because the majority of the time when people see us, a lot of times it’s their worst day,” Brown said.

Brown estimates that the project should be completed in about three weeks.

“The biggest thing, the grounds needed a new face,” Brown said. “And one of the biggest things is that we were able to do it ourselves, put our hands on it, so that whether it’s 10 years, five years, whatever down the road, and we come by here after we’ve retired and gone, then we can tell our kids, ‘Hey, we had a part in that. We did that.’”

APPENDIX D

GREEN SPACE AND GREEN WAY MASTER PLAN


City of Auburn
Greenspace and Greenway Master Plan 2011
Green Areas
Parks
Future Parks
Streets
Greenways
Existing Bike Path
Proposed Bike Path
Major Streams and Rivers
Minor Streams and Drainage
Flood Plain
Green Space
Golf Courses
Chewacala State Park
City Property
University Property
City of Auburn
0 0.25 0.5 1
Miles
Map produced by COA GIS Division: 9/9/2014
N
W E
S

APPENDIX E

2015 STORMWATER QUALITY MONITORING REPORT

CITY OF AUBURN, ALABAMA

Annual Surface Water Quality Monitoring Report

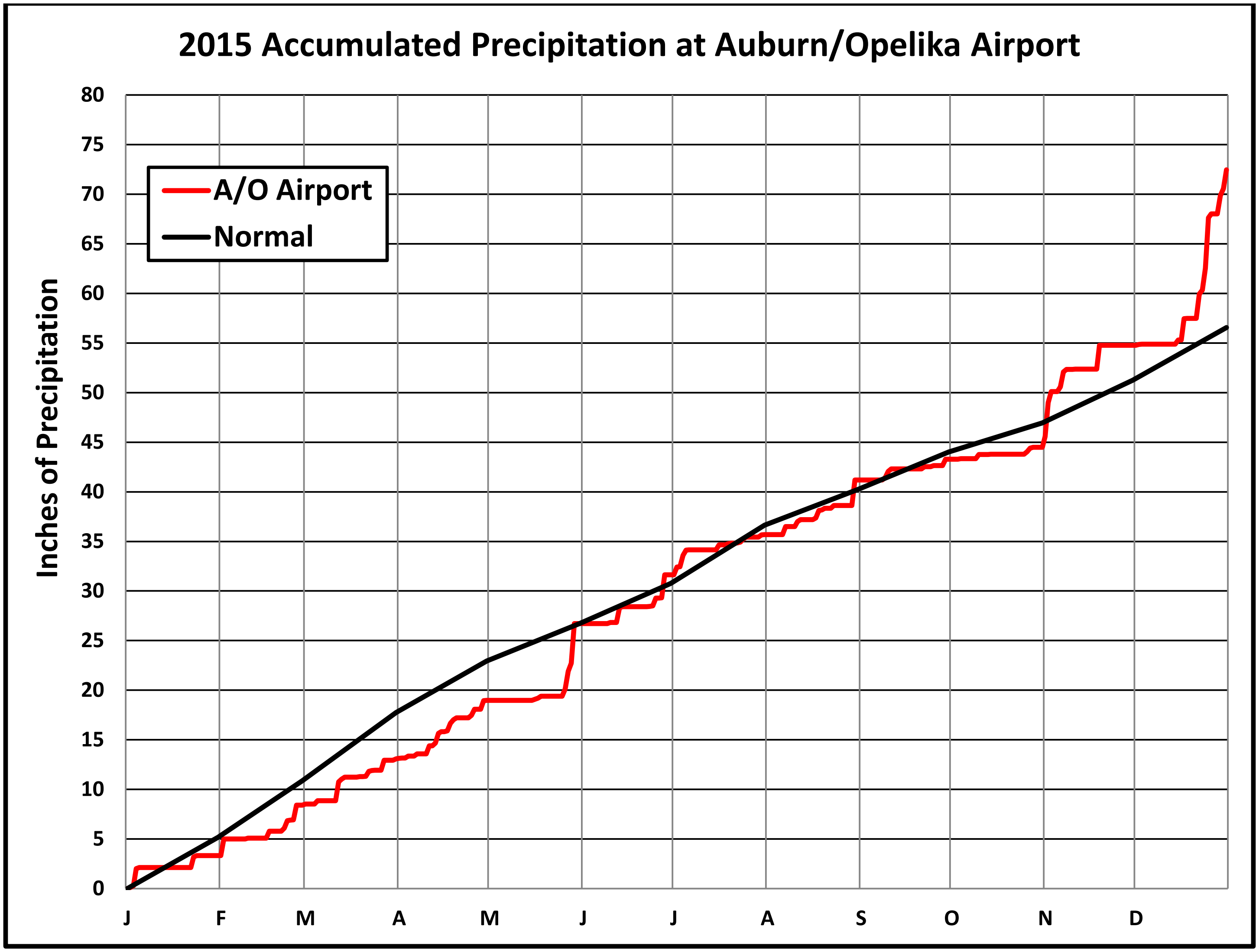
2015 Monitoring Year

Table of Contents

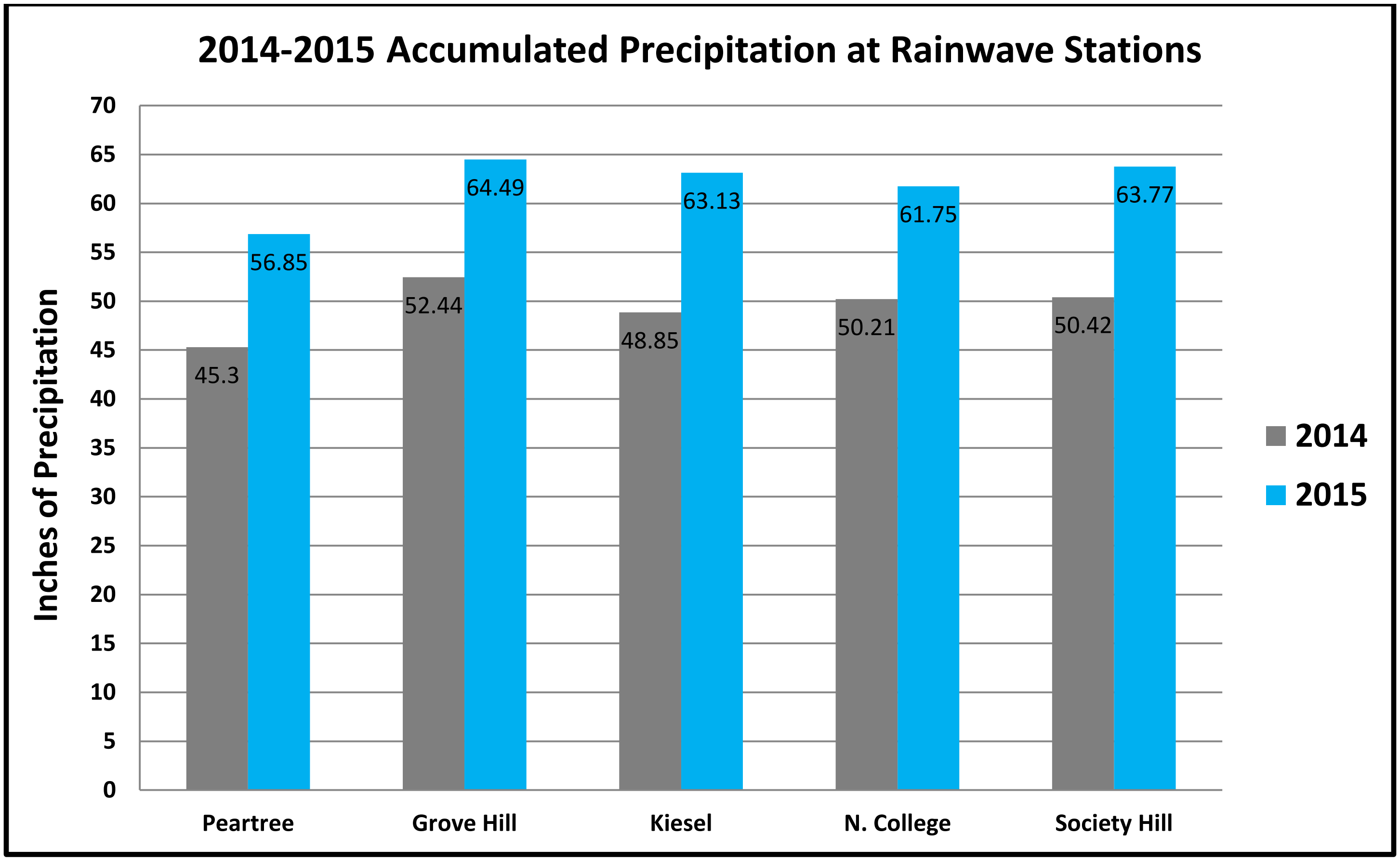
1.0 Introduction

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 2015, and includes notes and comments by Water Resource Management Staff.

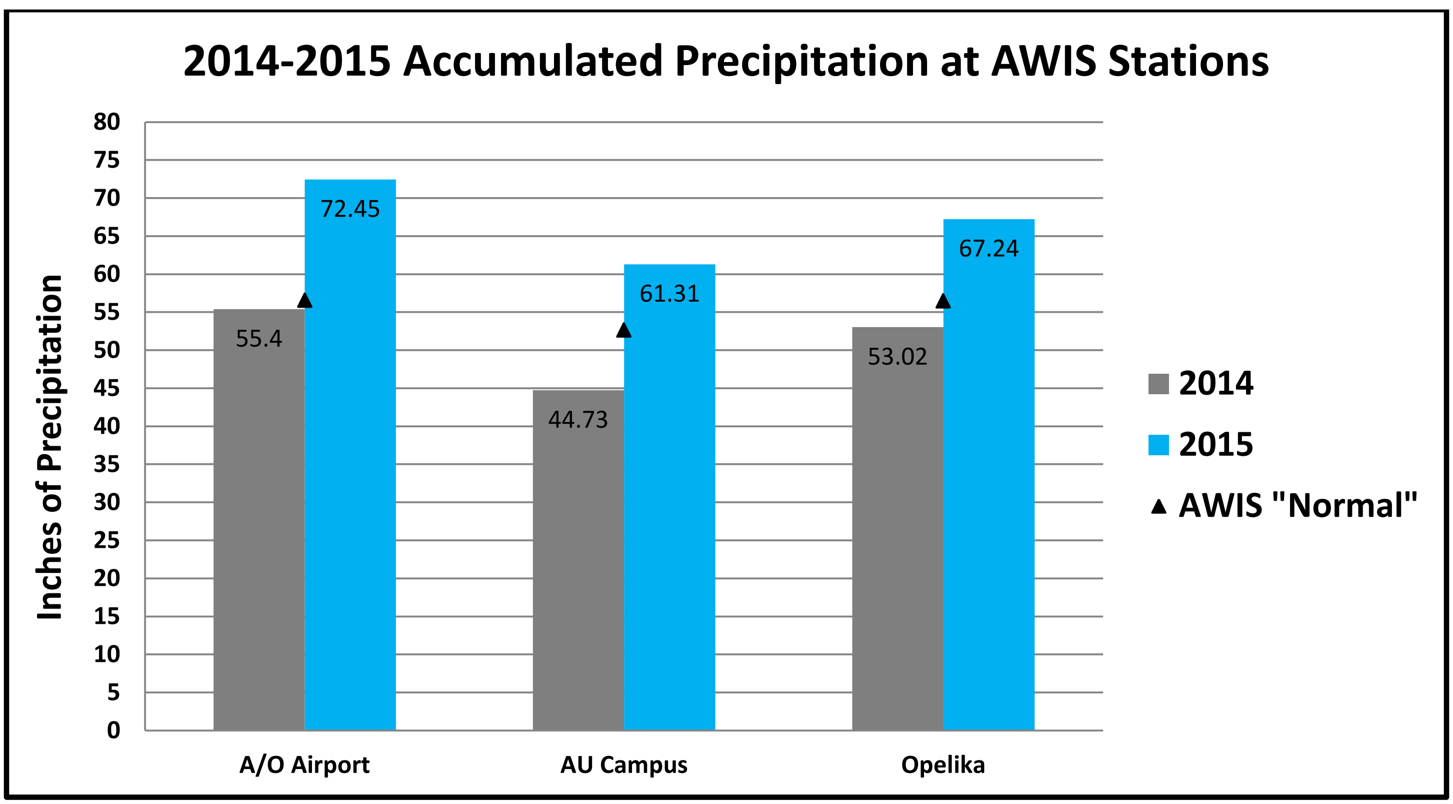
1.1 Precipitation Data 2015



Monthly Accumulated Precipitation at Auburn/Opelika Airport



2014 – 2015 Accumulated Precipitation at Rainwave Stations



2013-2014 Accumulated Precipitation at AWIS Stations

2.0 Water Quality Monitoring

2.1 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, 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. Therein 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.

2.2 Definitions and Methods

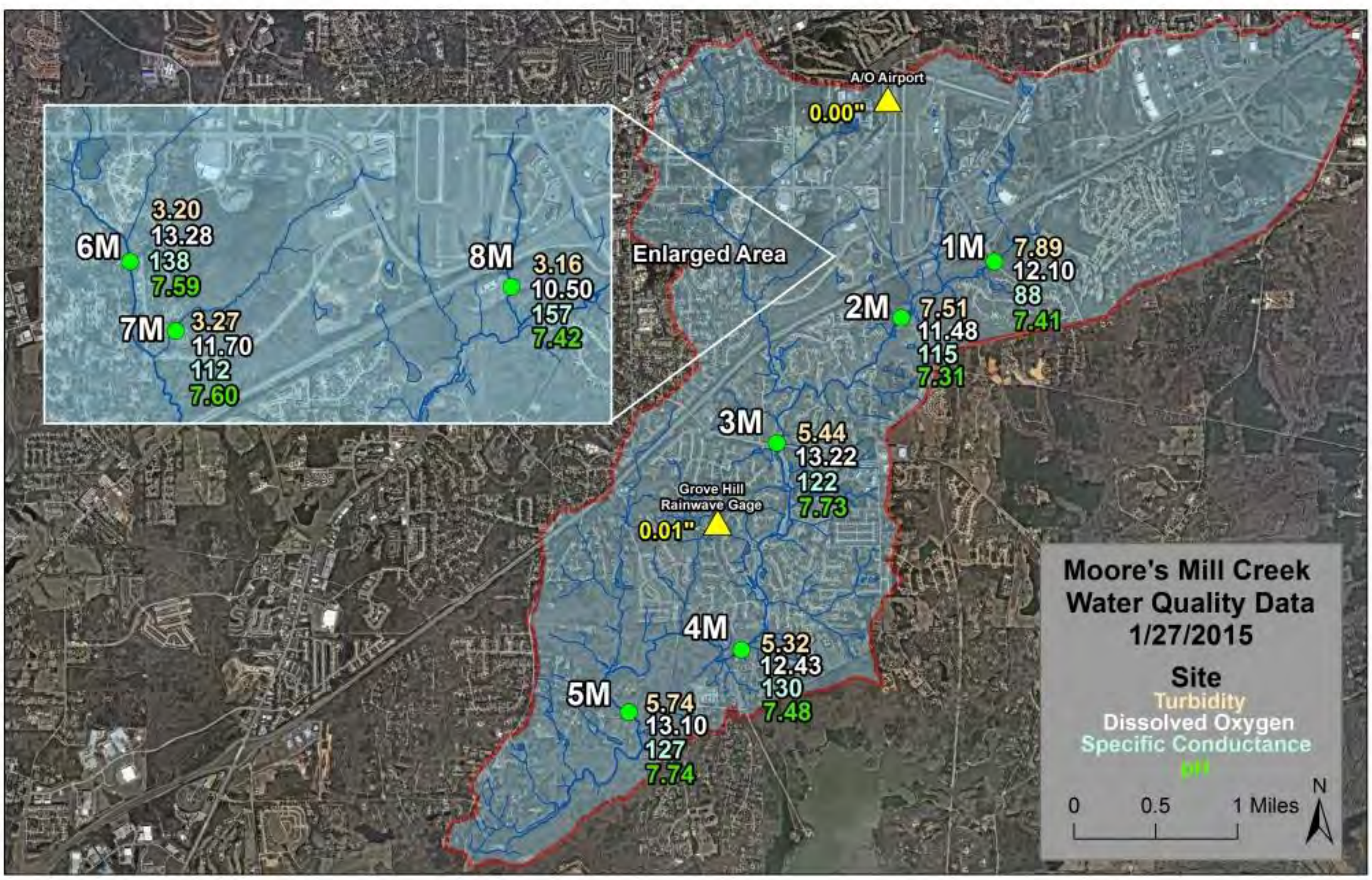
Turbidity is the measure of the degree of transparency of a fluid as it affects the ability of light to pass through. Although it is not a direct measurement of sediment or Total Suspended Solids (TSS) within the water column, it has been identified as a useful surrogate indicator for monitoring sediment 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. The City uses a LaMotte 2020 WE turbidimeter to measure turbidity.

The 2015 monitoring year represents the tenth full year that the City has conducted weekly turbidity measurements at 40 stations throughout its MS4 jurisdiction. As with previous years, data from each individual watershed is evaluated independently by monitoring station and collectively as a representative watershed group. Each station's data is also evaluated against any neighboring upstream station, thereby assisting in the identification of potential sources of sediment. 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).

The City began measuring physical and chemical parameters at each station in September 2014 using a YSI Professional Plus water quality meter http://www.ysi.com/productsdetail.php?Professional-Plus-18. These data are presented in map format on a watershed scale to staff in the Water Resource Management department on a weekly basis. Presenting the data on a map allows Water Resource Management (WRM) staff to observe both trends and anomalies in a geospatial context. WRM staff use these data to develop water quality "signatures" for each site, dependent upon both season and antecedent precipitation. In addition to turbidity, the following parameters are collected on a weekly basis:

- Water 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.
- 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".
- Specific Conductance – 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.

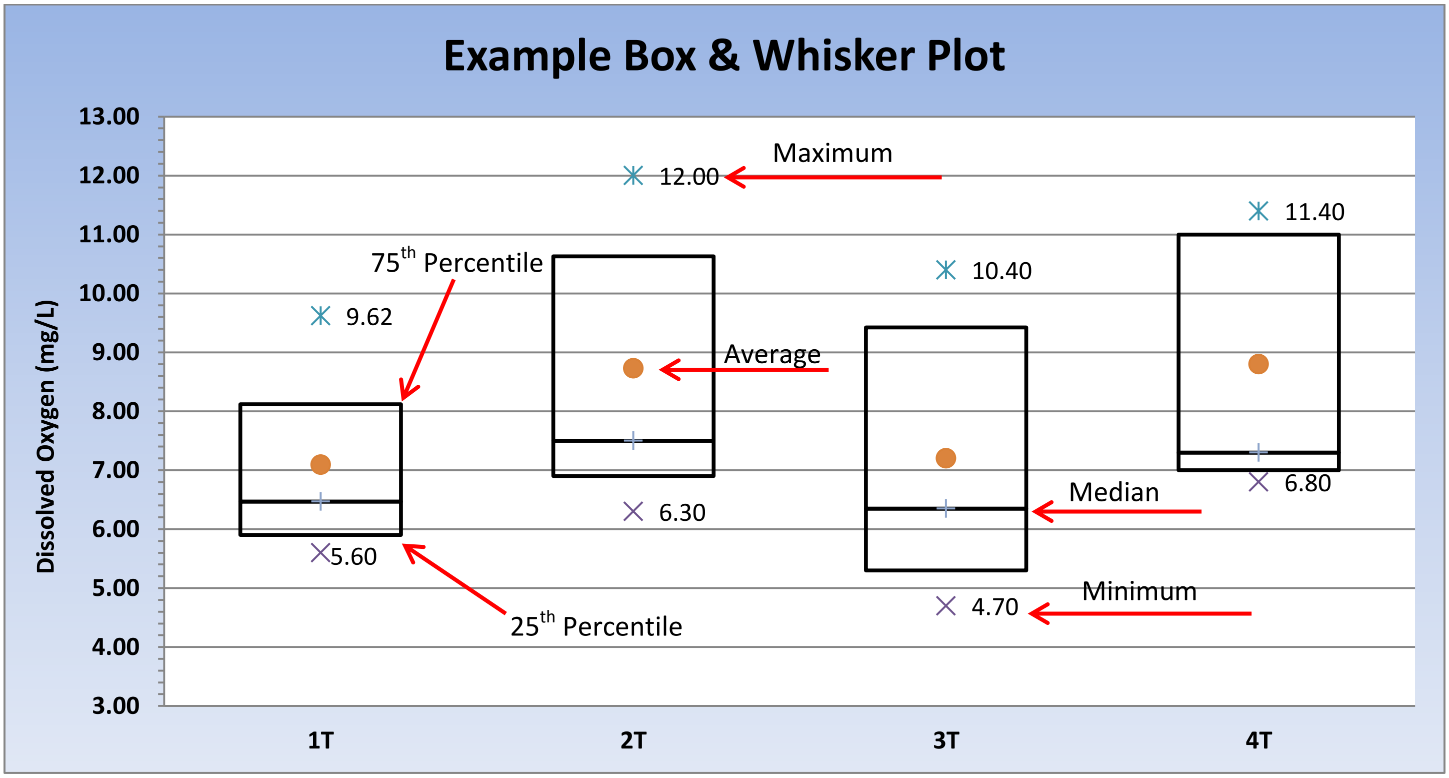
Quality control/quality assurance is an integral part of a successful water quality monitoring program. In order to develop a dependable database of water quality measurements for each sample site, WRM Staff calibrate all water quality instruments prior to field use. A detailed calibration log is filled out each time an instrument is calibrated. WRM staff also utilize field sheets to document sample site characteristics and observations such as stream color, geomorphic setting (riffle, pool, etc.), channel substrate and grain size, sample site location relative to the road crossing, sample time, and weather conditions.



Example of a Weekly Water Quality Map distributed to WRM Staff

2.3 Turbidity Summary 2015

In general, turbidity at the majority of all stations exhibited a sustained trend of decreasing values for the ninth 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 (affecting stream flows), decreased construction activity and/or patterns of construction, 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.



Example Box and Whisker Plot

2.4 Water Quality Monitoring Sites

Chewacla Creek Watershed

A total of 565 independent water quality measurements were collected in the Chewacla Creek watershed in 2015.

Monitoring Station Locations and Notes:

Station 1CW – Latitude *32, 35, 3.874 N*; Longitude *85, 25, 55.243 W*. Station 1CW is located along Moore's Mill Road, immediately east of the entrance to Bent Brooke Subdivision.

Station 2CW – Latitude *32, 34, 25.519 N*; Longitude *85, 25, 6.579 W*. Station 2CW is located along Moore's Mill Road, between CR 107/Estate Drive and Society Hill Road.

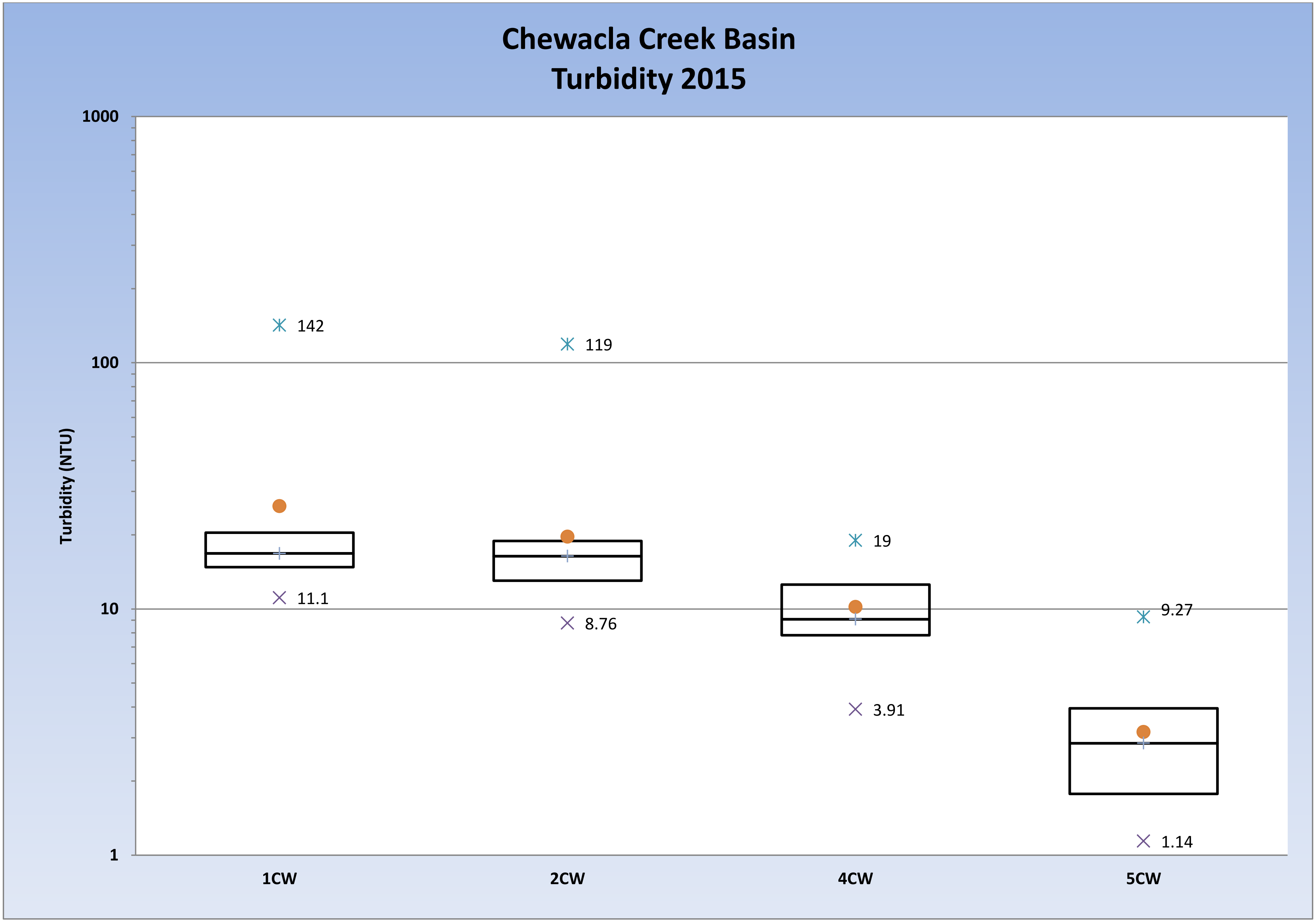
Station 4CW – Latitude *32, 33, 21.85 N*; Longitude *85, 24, 46.51 W*. Station 4CW is located at the crossing of CR 027 with Chewacla Creek. 4CW is a reference station used to evaluate turbidity as it enters Auburn's Phase II jurisdiction and discharges to Lake Ogletree.

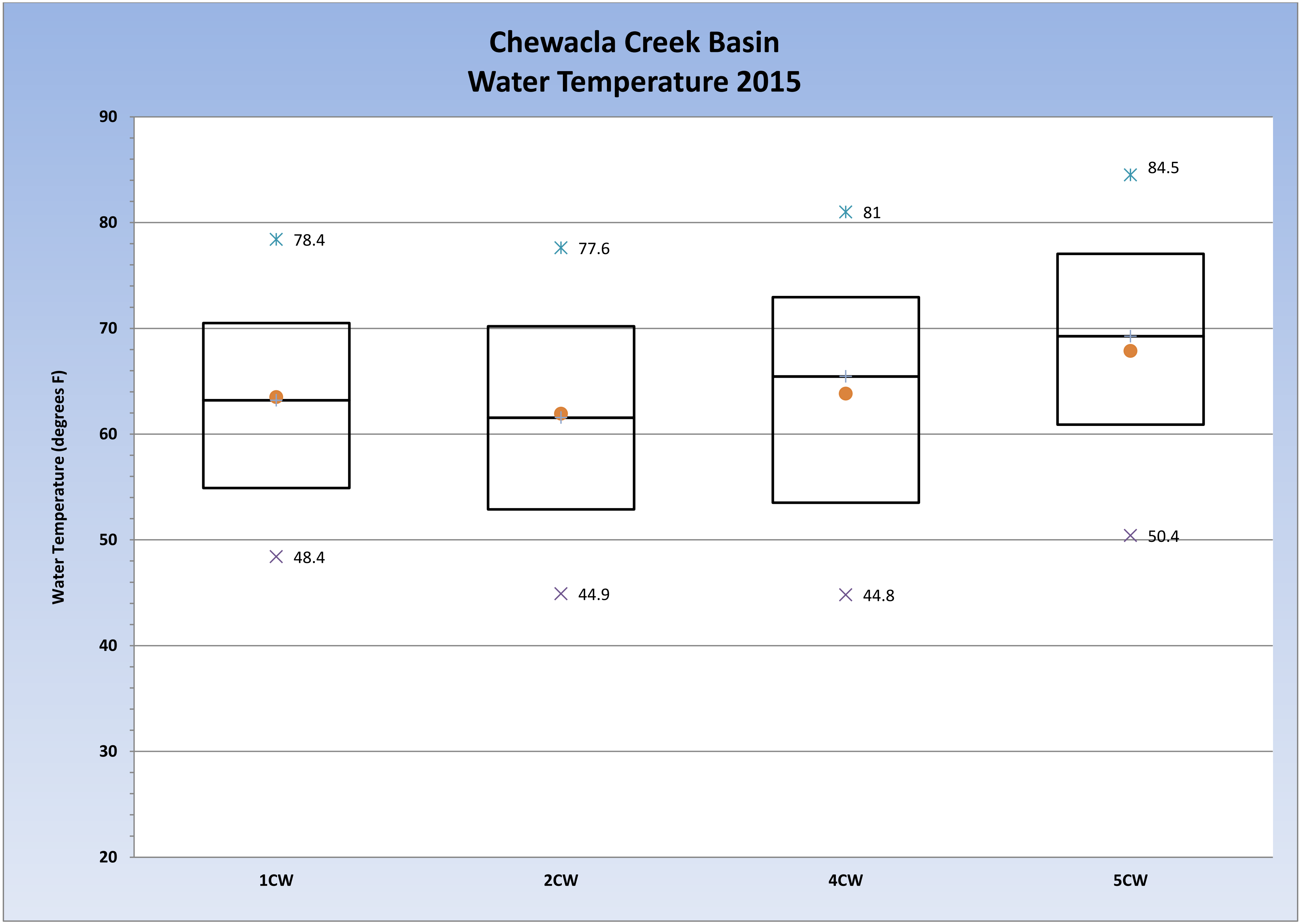
Station 5CW – Latitude *32, 32, 52.236 N*; Longitude *85, 28, 1.713 W*. Station 5CW is located ½ mile downstream of the Lake Ogletree spillway and upstream of the Martin-Marietta Quarry discharge. 5CW is also a reference station monitored to evaluate turbidity within Chewacla Creek as it is discharged from Lake Ogletree, and before it leaves Auburn's Phase II jurisdiction. The relatively low values exhibited at this station can be attributed to the TSS removal provided by Lake Ogletree. Beaver activity near this station, as observed by staff, is a potential contributor to elevated turbidity during both baseflow and storm event monitoring.

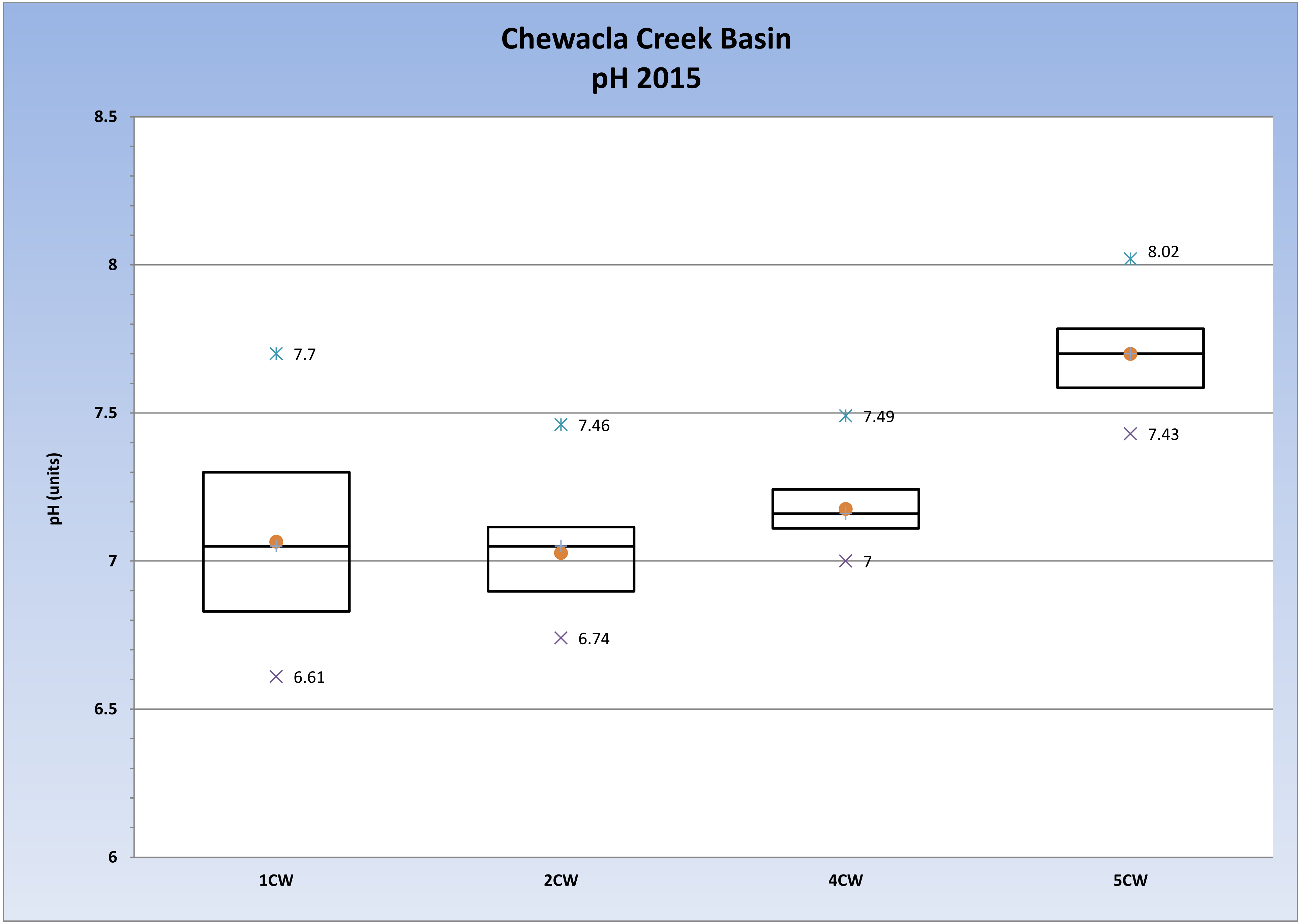
**See Insert for Maps of All Water Quality Monitoring Locations*

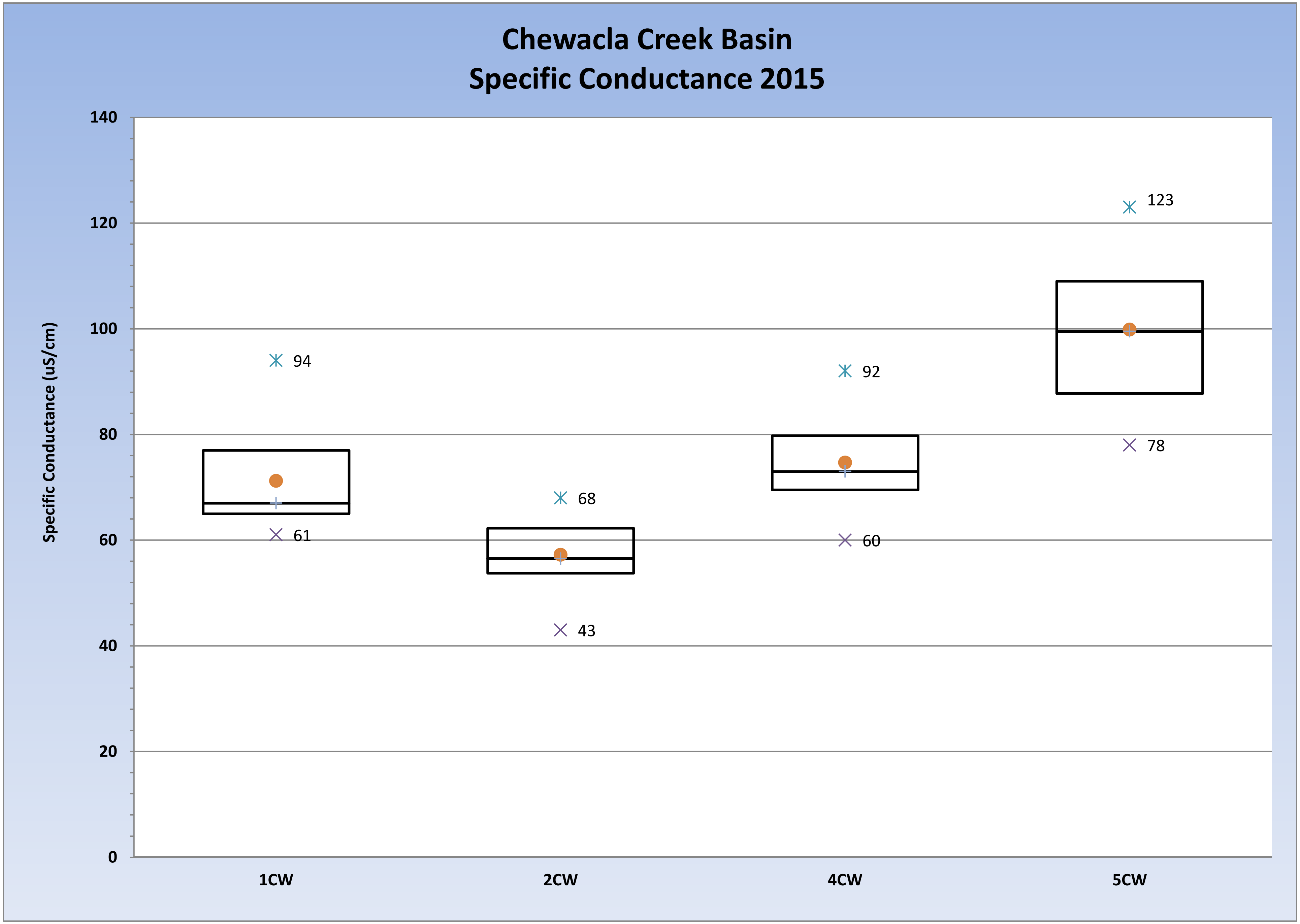
Nine Year Statistical Analysis of Turbidity Data for the Chewacla Creek Watershed

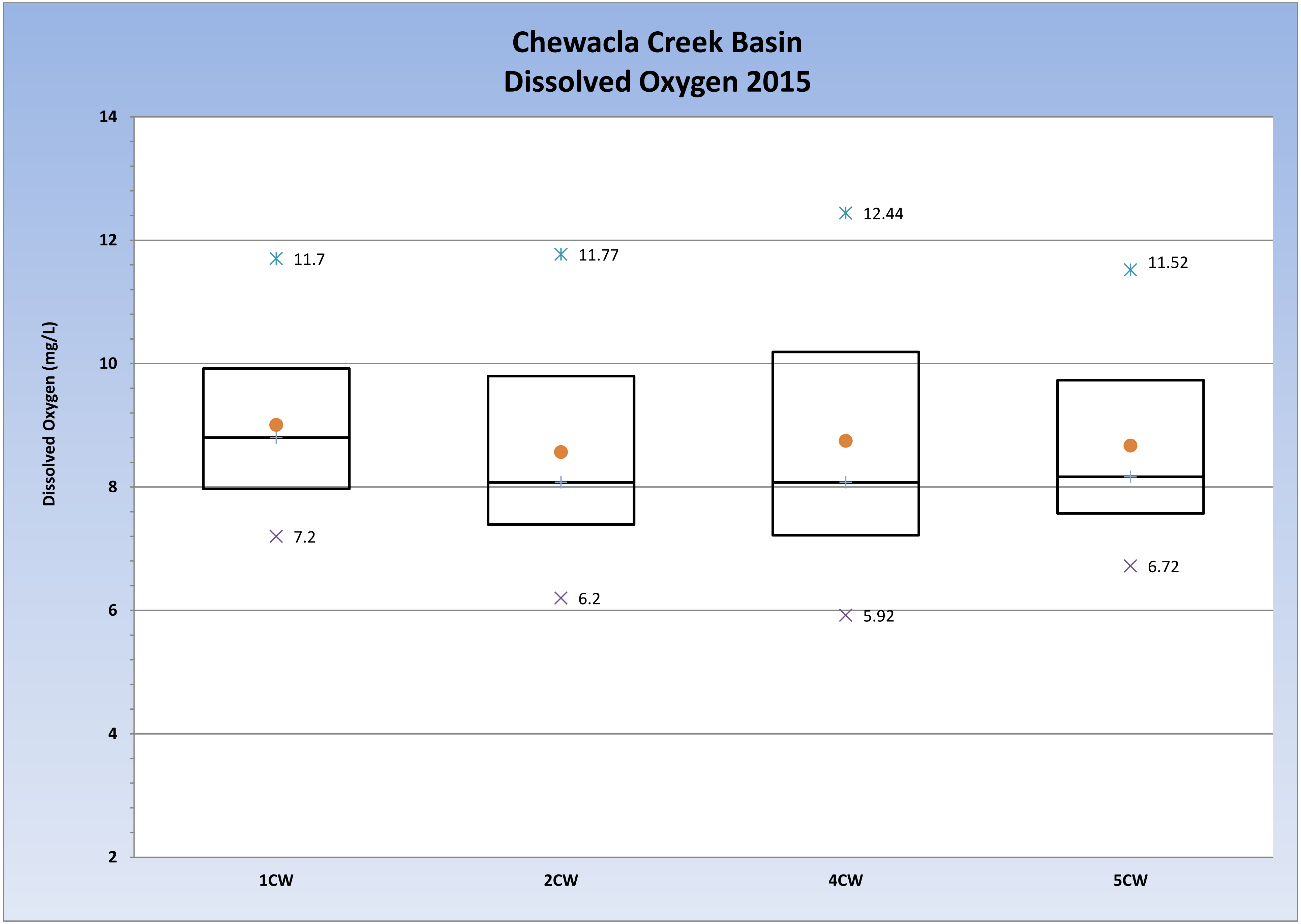
	1CW								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	9.80	3.46	5.50	6.60	6.10	5.89	5.35	8.68	11.1
MAX	320.00	650.00	290.00	110.00	220.00	300.00	59.90	176.00	142
AVG	48.69	74.92	51.93	30.55	40.41	31.27	18.82	23.67	26.17
MEDIAN	21.50	30.00	25.00	23.00	23.00	20.00	14.00	14.90	16.8
	2CW								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	7.03	3.33	3.50	2.20	6.20	7.80	8.09	10.25	8.76
MAX	500.00	900.00	150.00	45.00	75.00	75.60	1145.00	3000	119
AVG	53.56	50.12	22.93	11.26	20.11	22.59	49.96	104.32	19.64
MEDIAN	16.00	13.00	13.00	9.45	17.00	16.50	19.80	23.4	16.39
	4CW								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	4.33	4.70	3.70	3.90	4.40	2.50	3.04	2.54	3.91
MAX	400.00	1950.00	350.00	55.00	170.00	80.30	50.60	63.50	19
AVG	31.27	70.69	29.22	11.66	19.22	13.12	10.52	10.91	10.2
MEDIAN	16.50	18.00	13.00	9.50	13.50	11.00	8.03	7.36	9.09
	5CW								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	1.40	0.95	1.30	1.10	1.30	0.93	0.52	0.1	1.14
MAX	55.00	33.00	95.00	23.00	19.00	8.60	28.17	57.03	9.27
AVG	7.02	4.68	8.51	4.26	3.59	3.33	5.21	6.90	3.17
MEDIAN	3.50	3.40	4.20	3.00	2.50	2.92	2.63	2.05	2.85

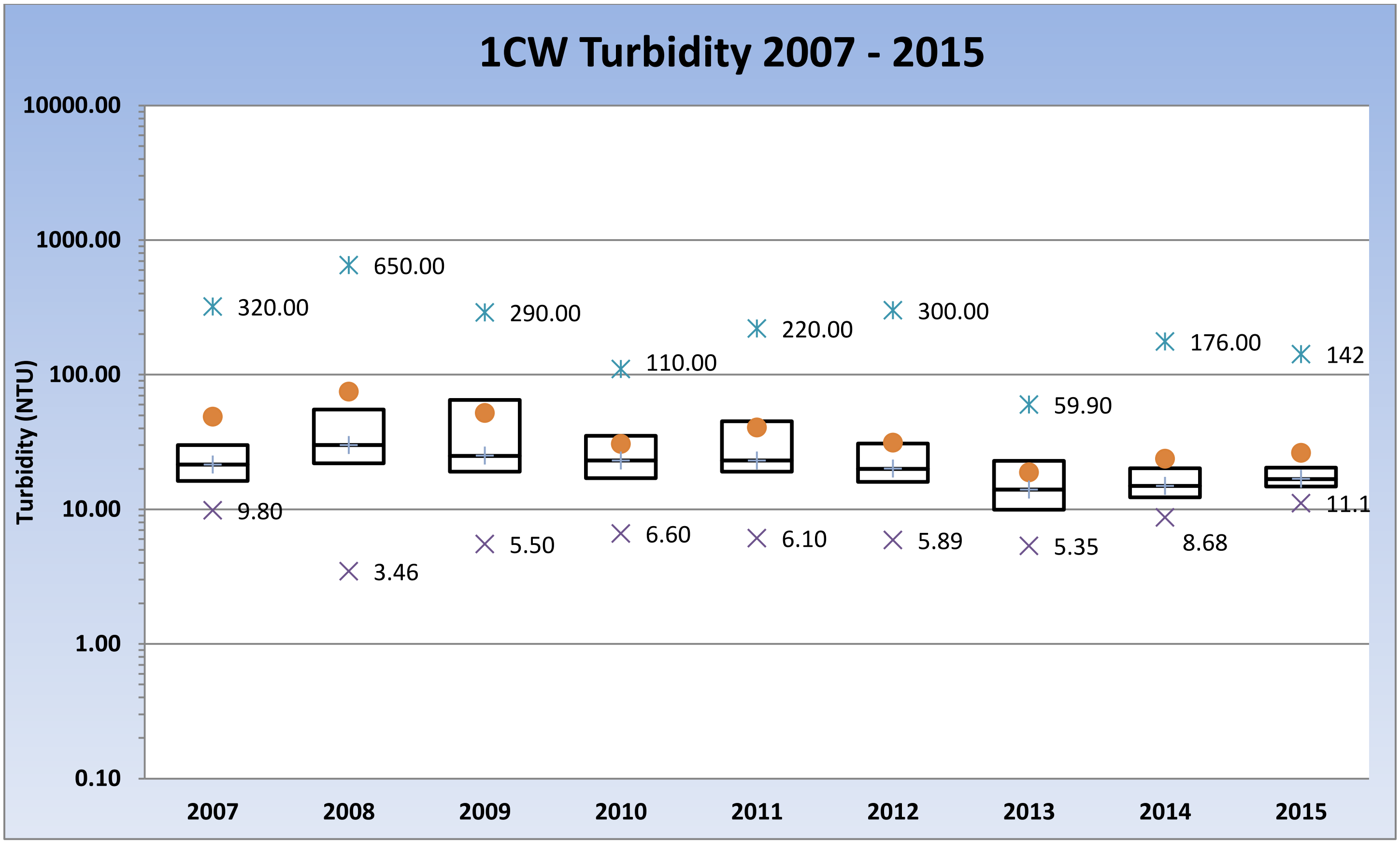

Chewacla Creek Basin
Turbidity 2015
Turbidity (NTU)
1000
100
10
1
142
119
19
9.27
11.1
8.76
3.91
1.14
1CW
2CW
4CW
5CW

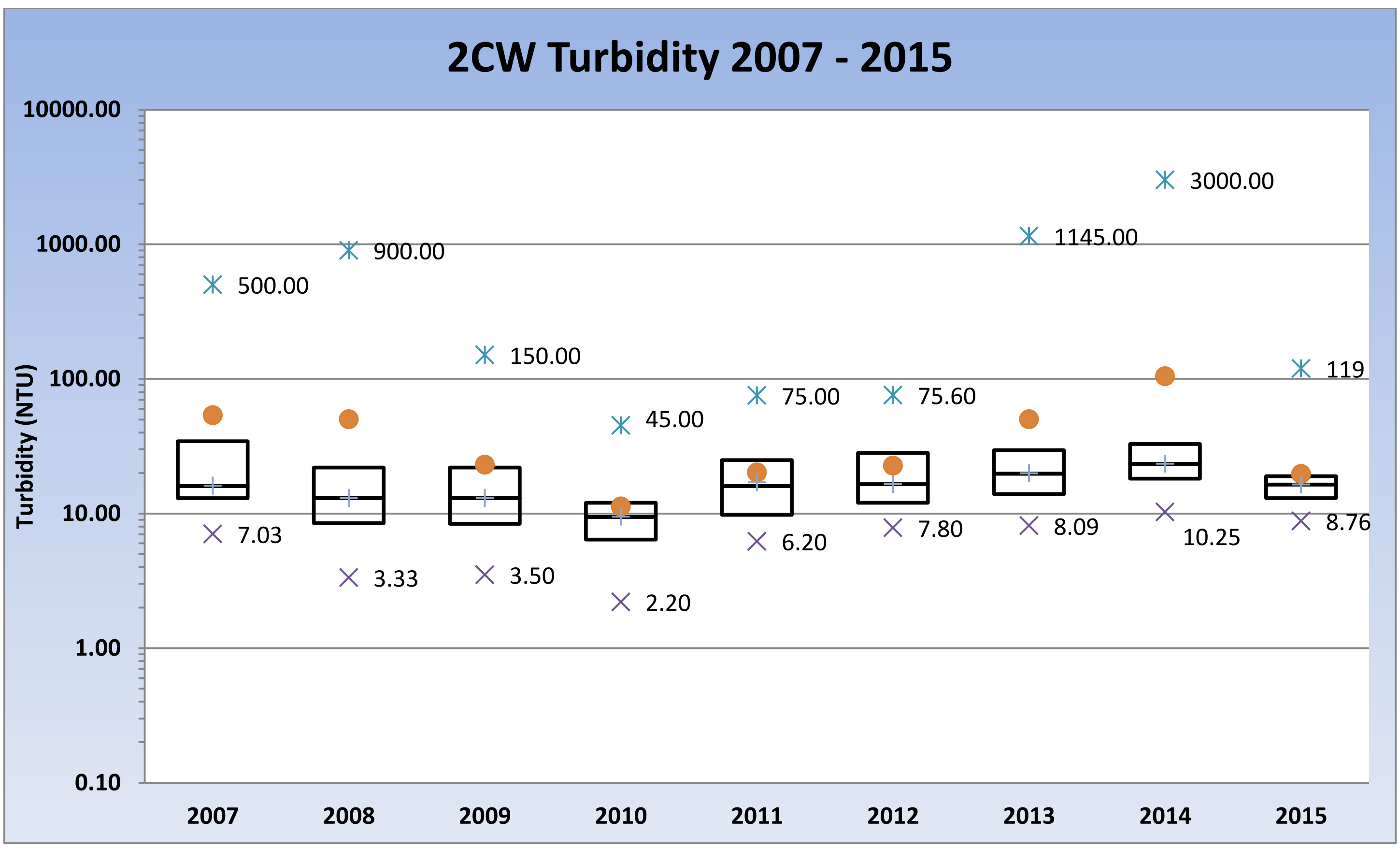

Chewacla Creek Basin
Water Temperature 2015
Water Temperature (degrees F)
90
80
70
60
50
40
30
20
78.4
48.4
77.6
44.9
81
44.8
84.5
50.4
1CW
2CW
4CW
5CW

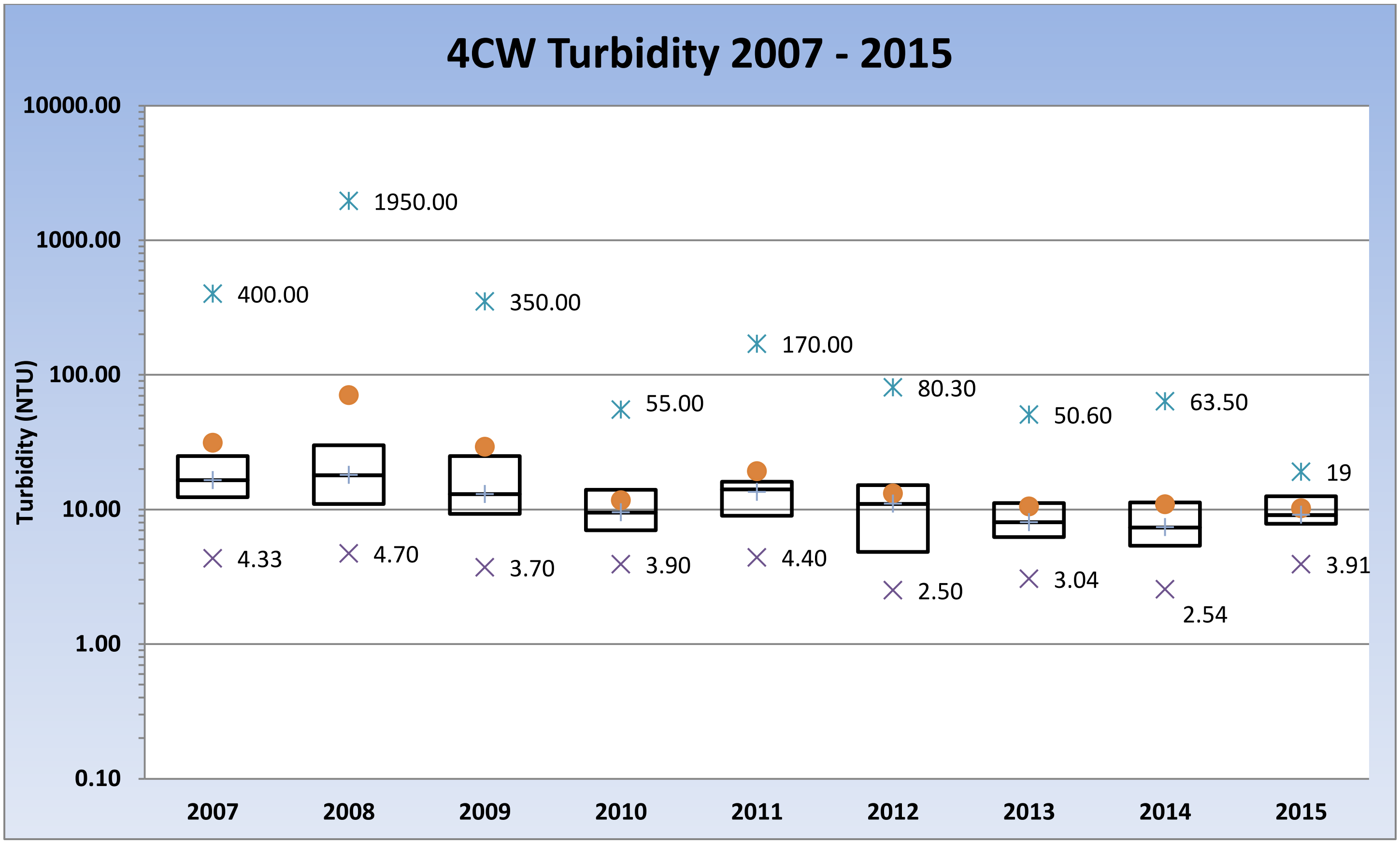

Chewacla Creek Basin
pH 2015
pH (units)
8.5
8
7.5
7
6.5
6
7.7
6.61
7.46
6.74
7.49
7
8.02
7.43
1CW
2CW
4CW
5CW

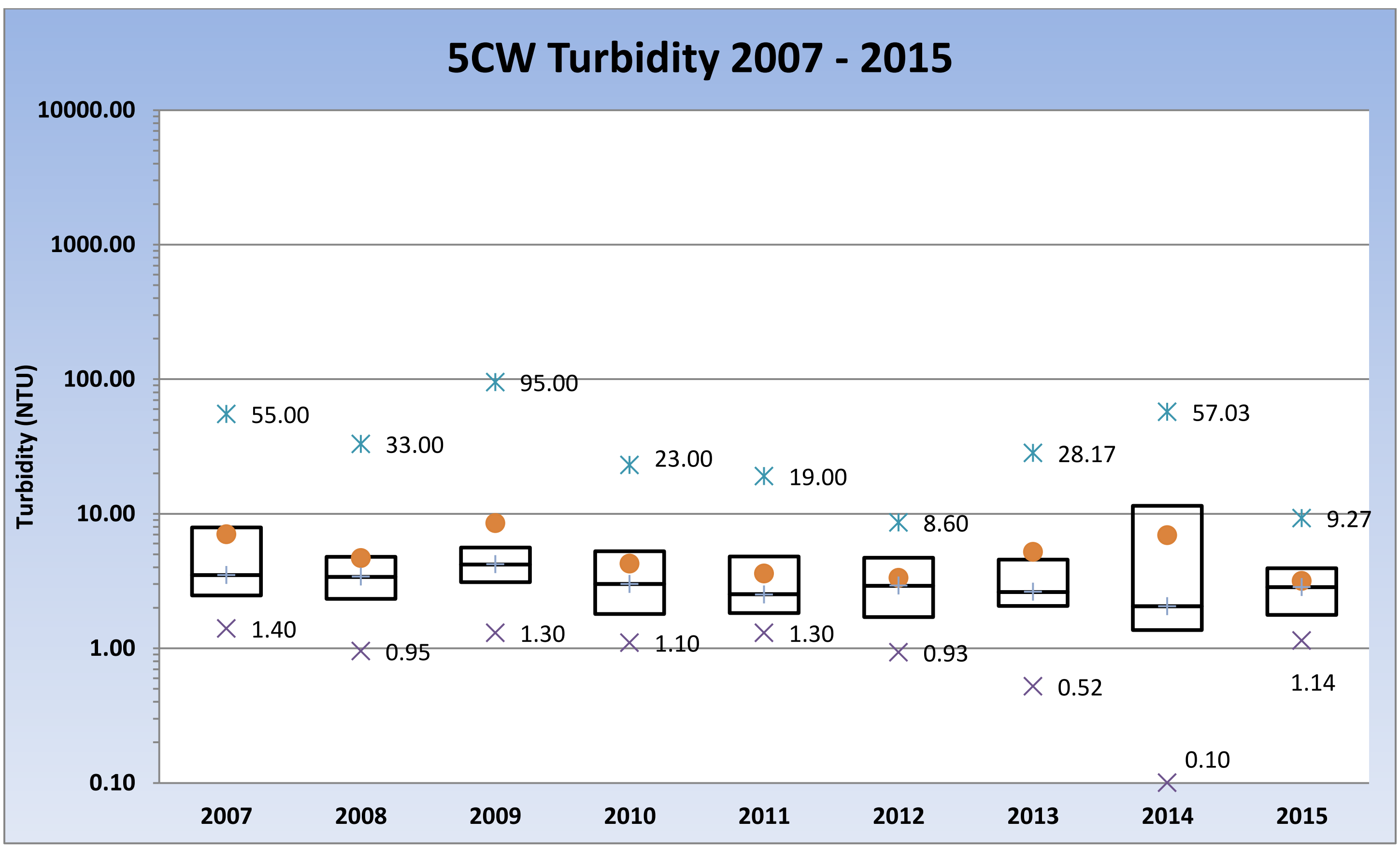

Chewacla Creek Basin
Specific Conductance 2015
Specific Conductance (uS/cm)
140
120
100
80
60
40
20
0
94
61
68
43
92
60
123
78
1CW
2CW
4CW
5CW

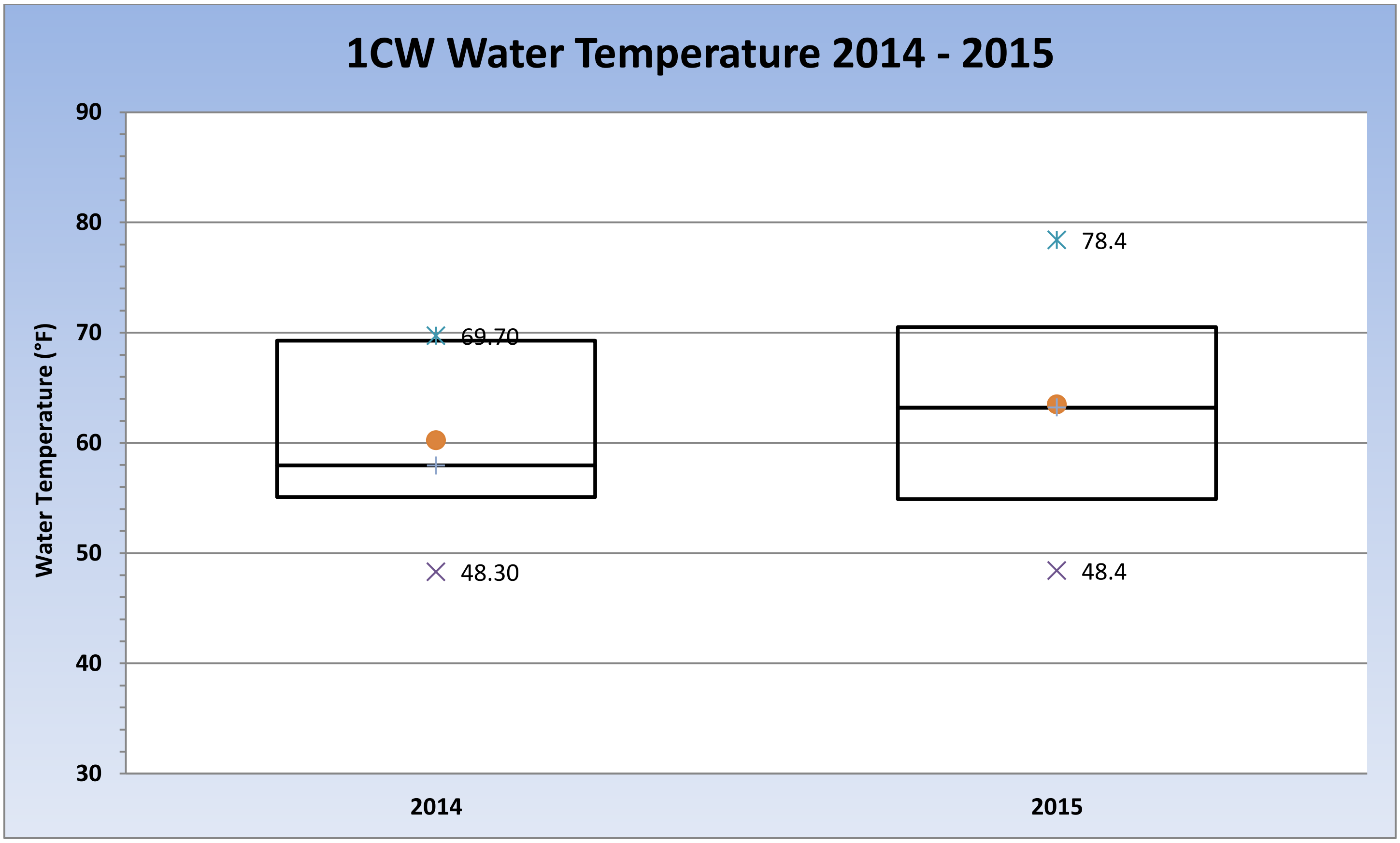

Chewacla Creek Basin
Dissolved Oxygen 2015
Dissolved Oxygen (mg/L)
14
12
10
8
6
4
2
11.7
7.2
11.77
6.2
12.44
5.92
11.52
6.72
1CW
2CW
4CW
5CW

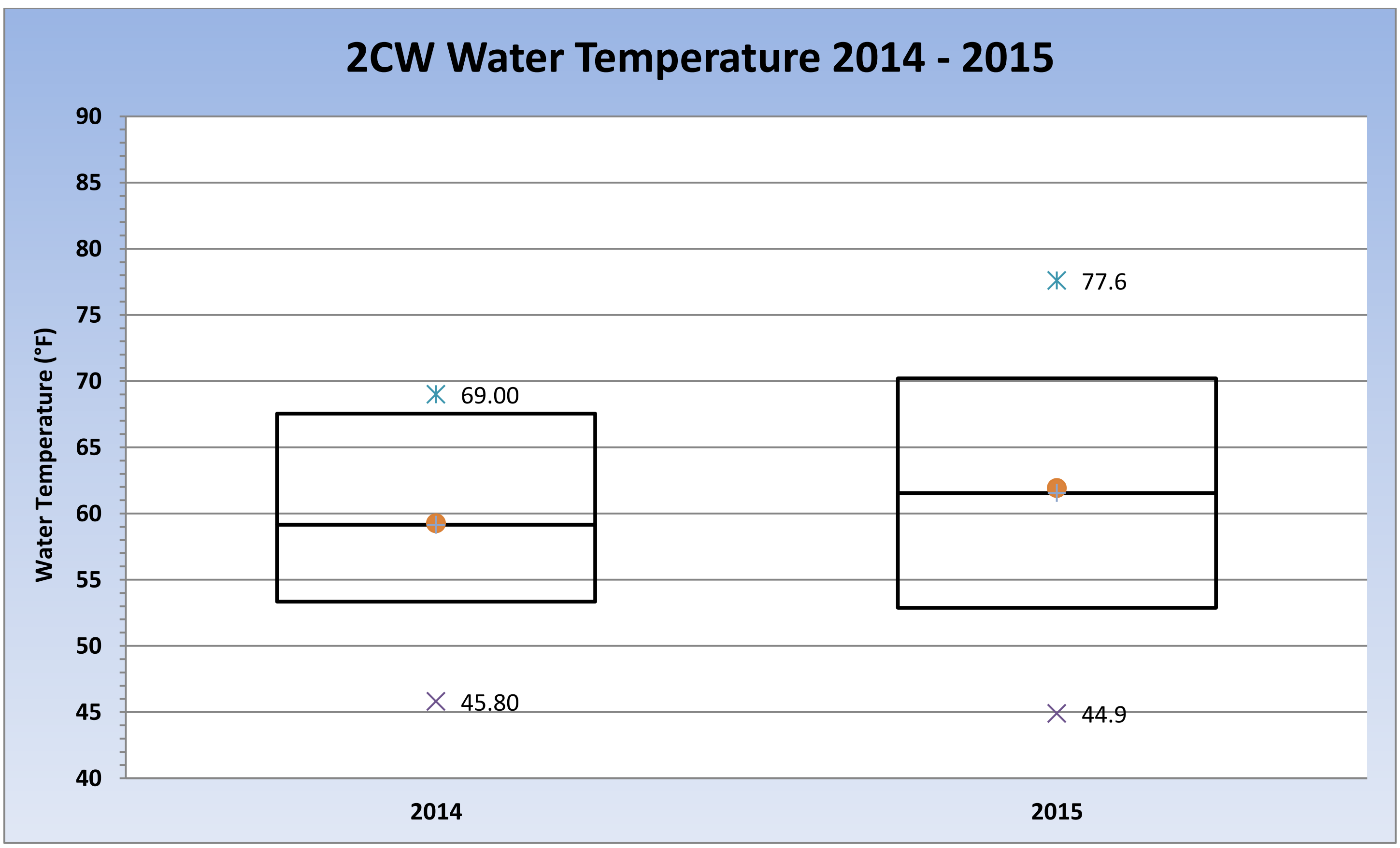

1CW Turbidity 2007 - 2015
10000.00
1000.00
100.00
10.00
1.00
0.10
Turbidity (NTU)
320.00
650.00
290.00
110.00
220.00
300.00
59.90
176.00
142
9.80
3.46
5.50
6.60
6.10
5.89
5.35
8.68
11.1
2007
2008
2009
2010
2011
2012
2013
2014
2015

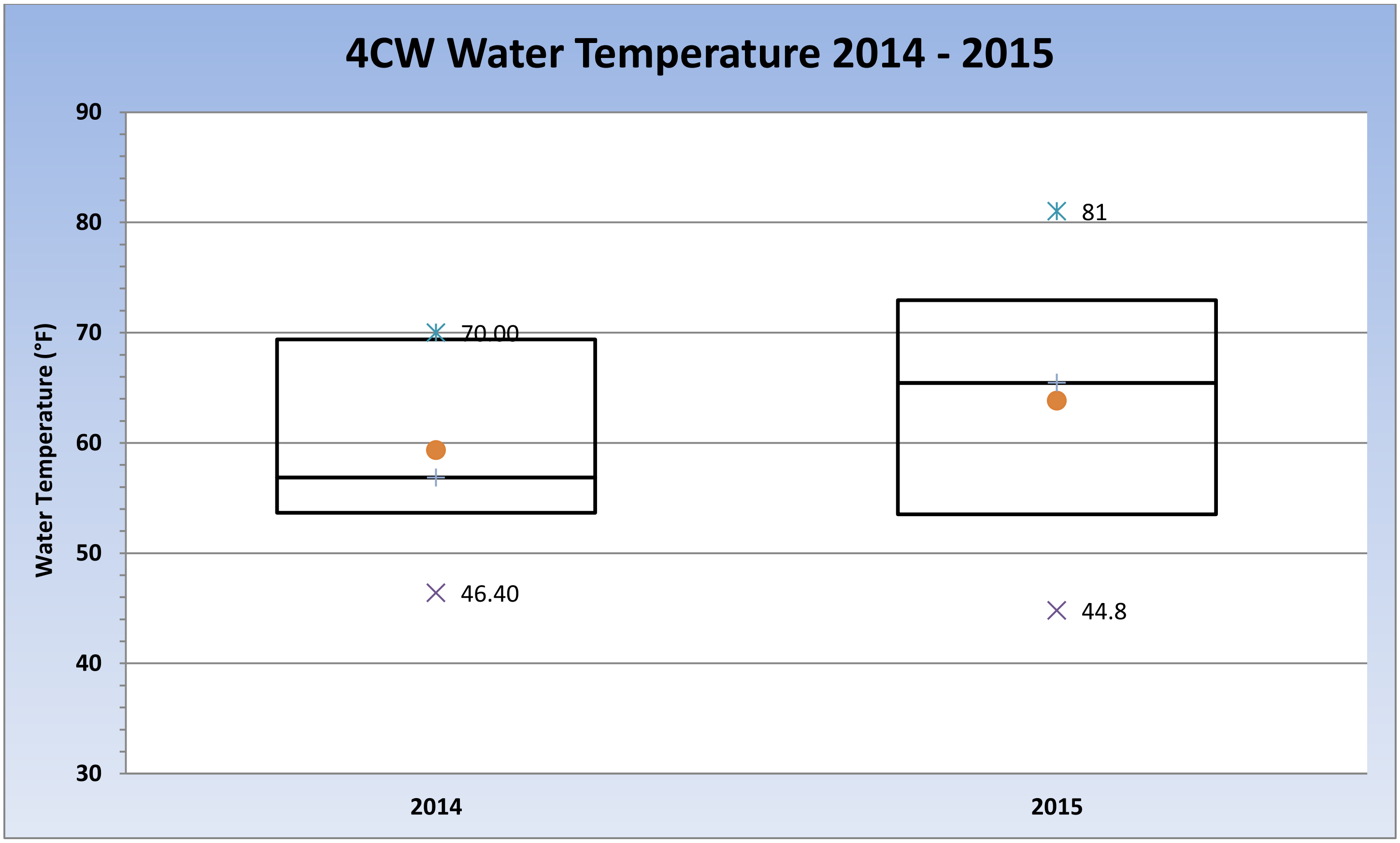

2CW Turbidity 2007 - 2015
10000.00
1000.00
100.00
10.00
1.00
0.10
Turbidity (NTU)
500.00
900.00
150.00
45.00
75.00
75.60
1145.00
3000.00
119
7.03
3.33
3.50
2.20
6.20
7.80
8.09
10.25
8.76
2007
2008
2009
2010
2011
2012
2013
2014
2015

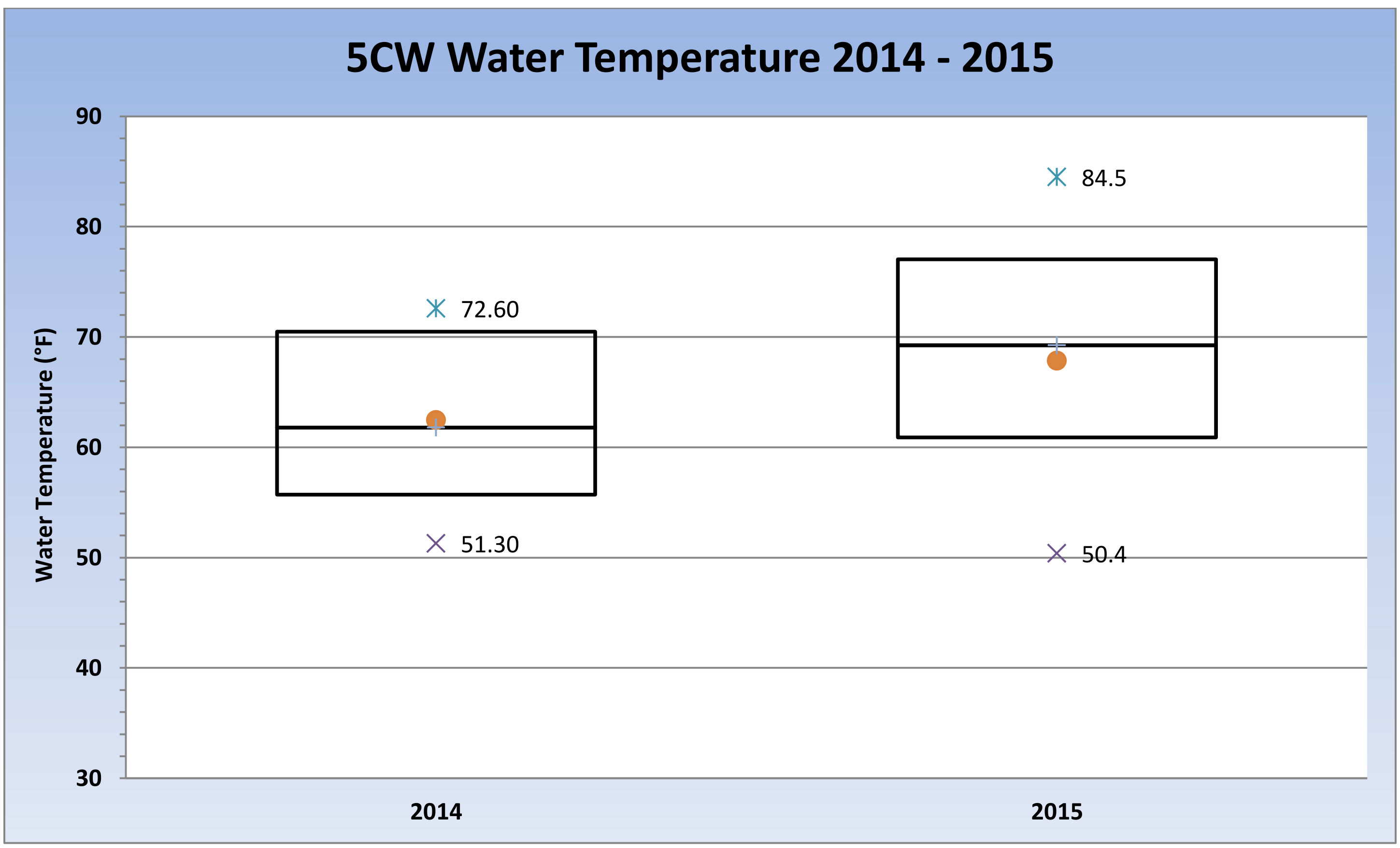

4CW Turbidity 2007 - 2015
Turbidity (NTU)
10000.00
1000.00
100.00
10.00
1.00
0.10
400.00
1950.00
350.00
55.00
170.00
80.30
50.60
63.50
19
4.33
4.70
3.70
3.90
4.40
2.50
3.04
2.54
3.91
2007
2008
2009
2010
2011
2012
2013
2014
2015

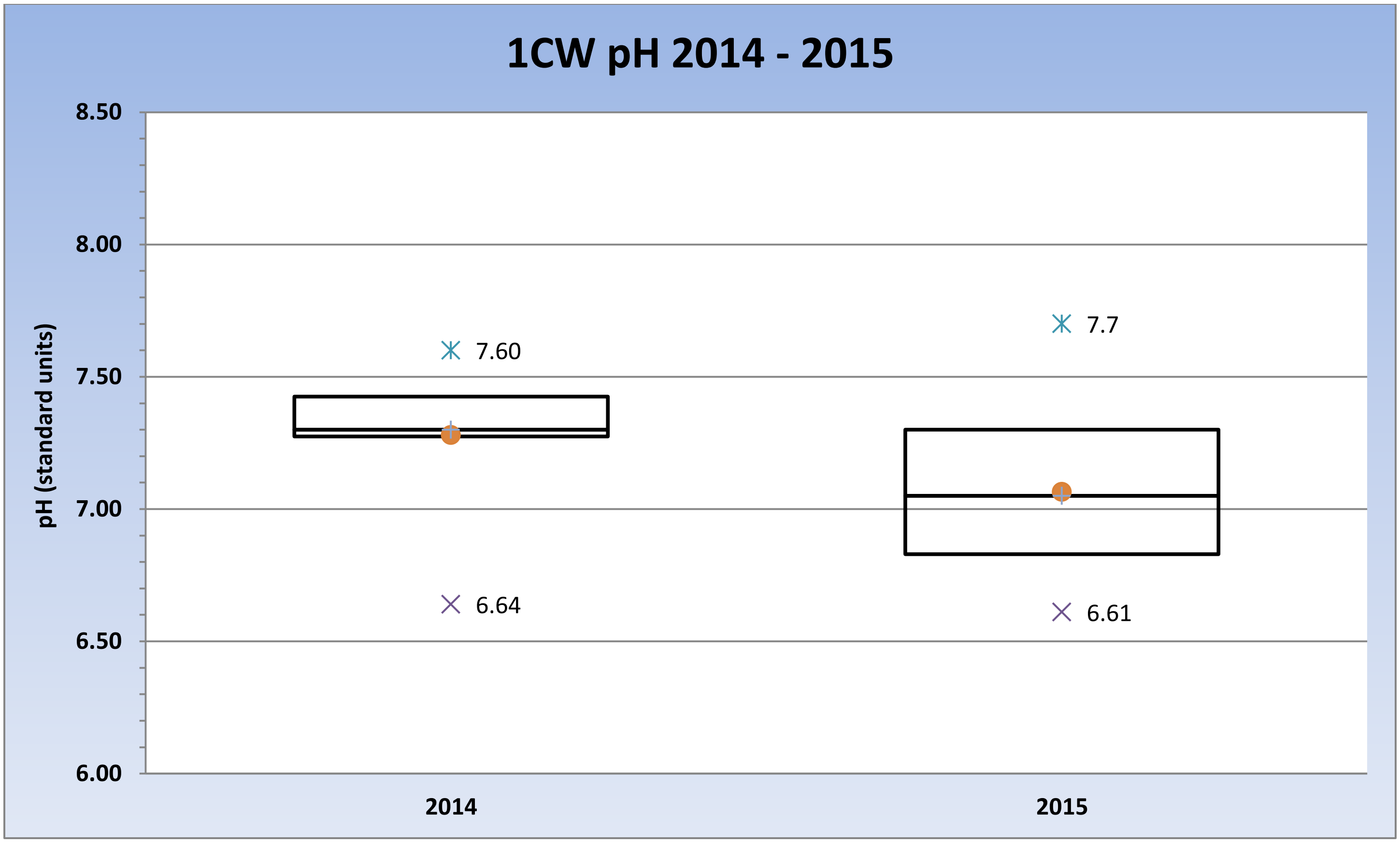

5CW Turbidity 2007 - 2015
Turbidity (NTU)
10000.00
1000.00
100.00
10.00
1.00
0.10
55.00
33.00
95.00
23.00
19.00
8.60
28.17
57.03
9.27
1.40
0.95
1.30
1.10
1.30
0.93
0.52
0.10
1.14
2007
2008
2009
2010
2011
2012
2013
2014
2015

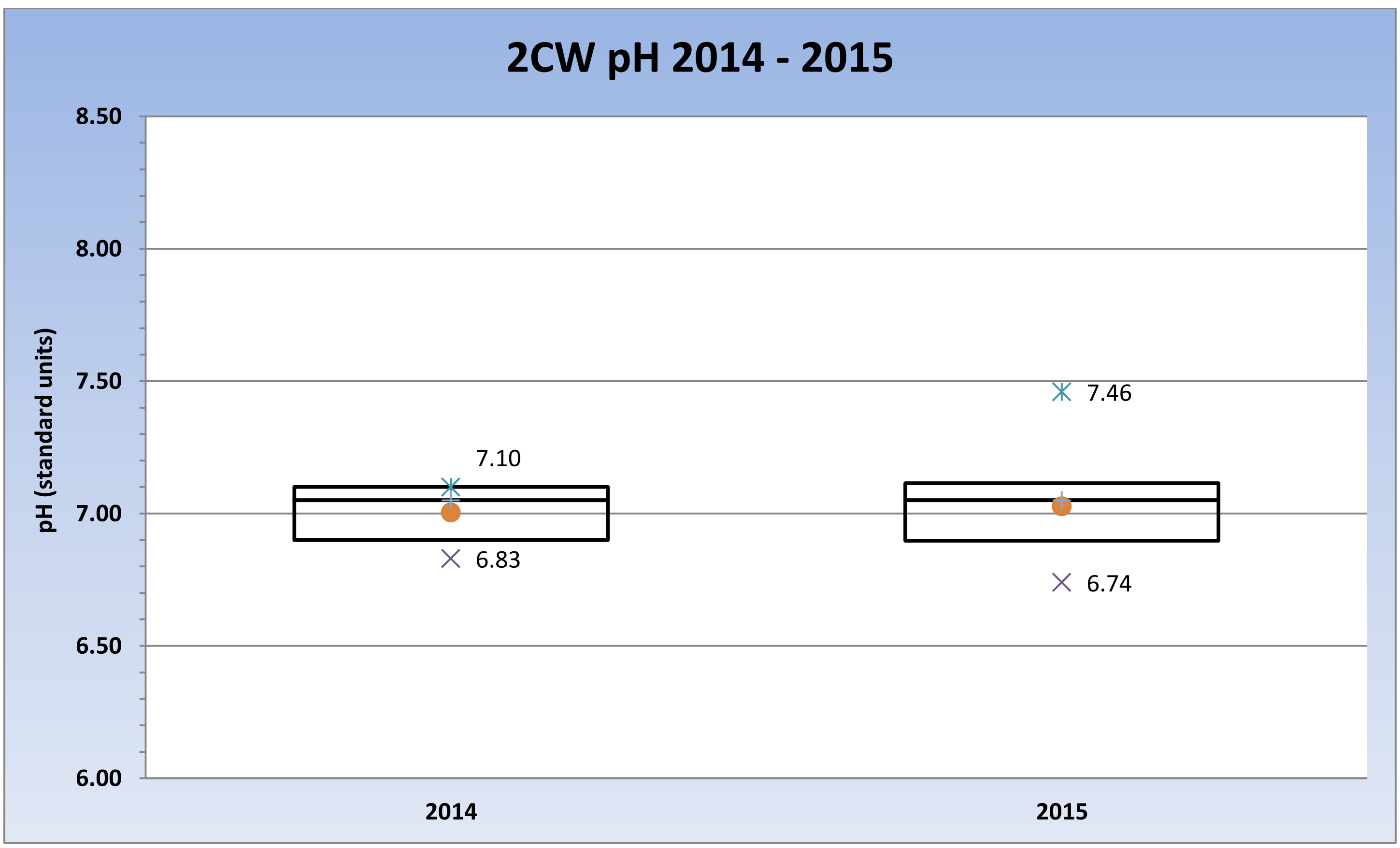

1CW Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
69.70
48.30
78.4
48.4
2014
2015

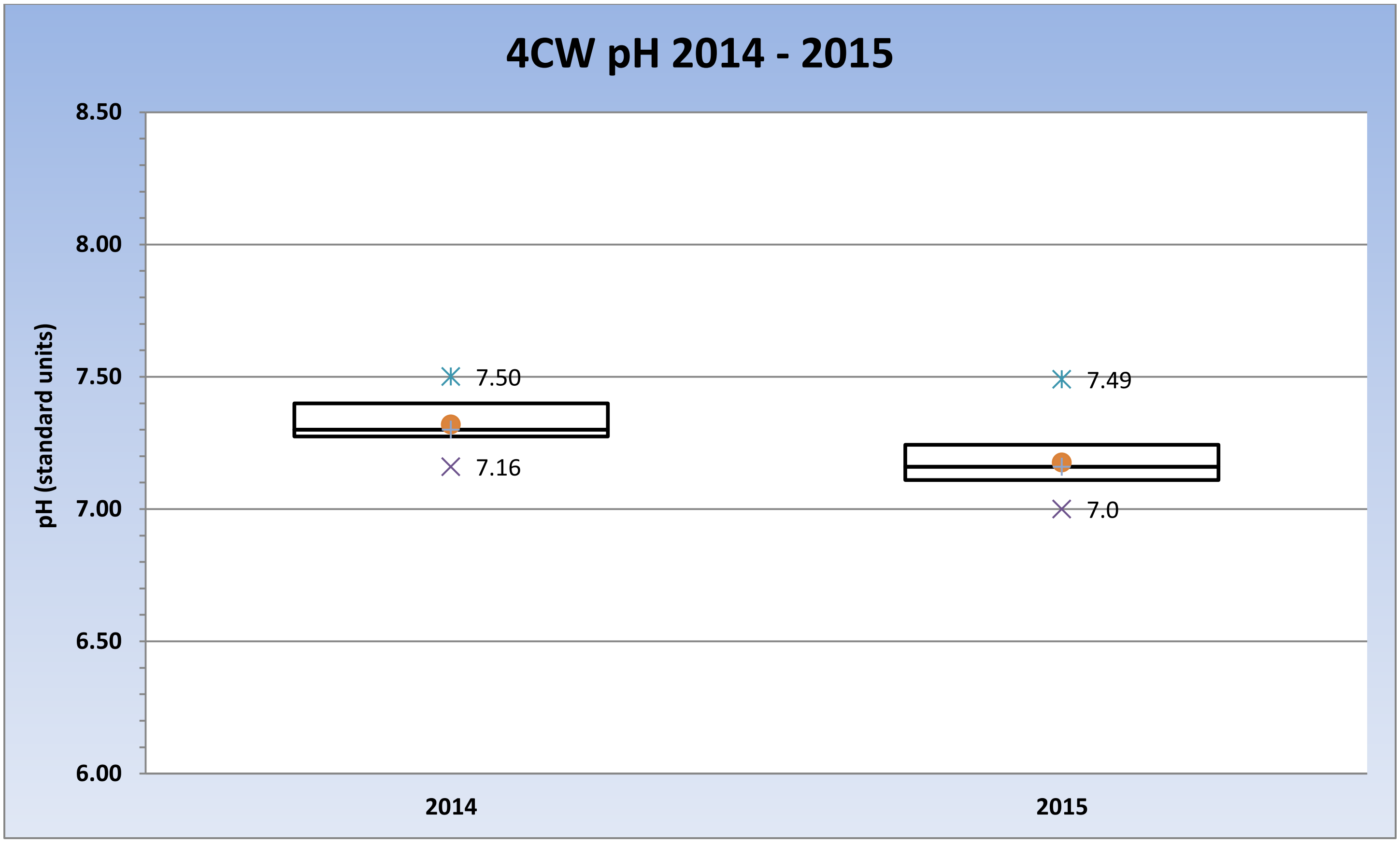

2CW Water Temperature 2014 - 2015
Water Temperature (°F)
90
85
80
75
70
65
60
55
50
45
40
69.00
45.80
77.6
44.9
2014
2015

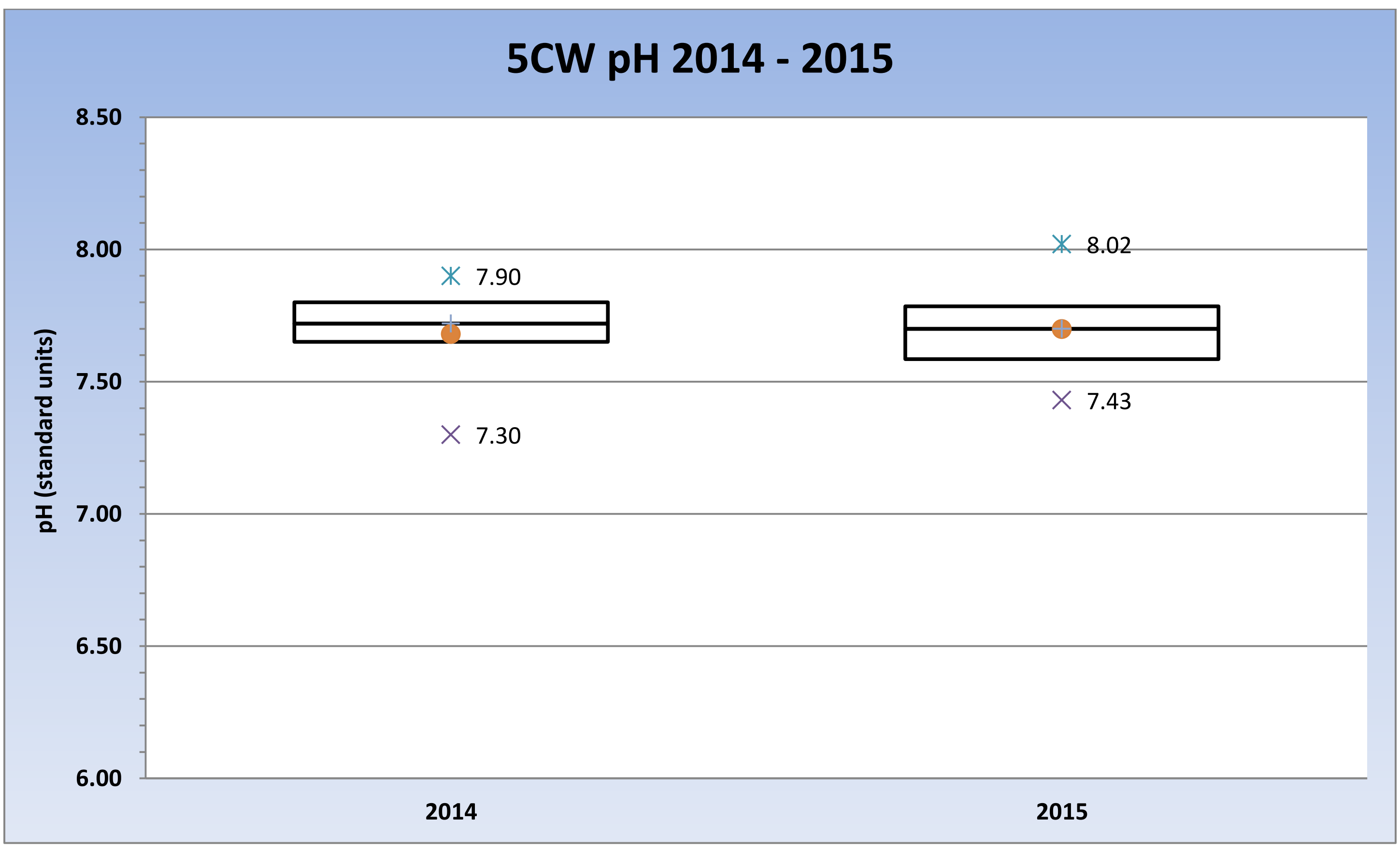

4CW Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
81
70.00
46.40
44.8
2014
2015

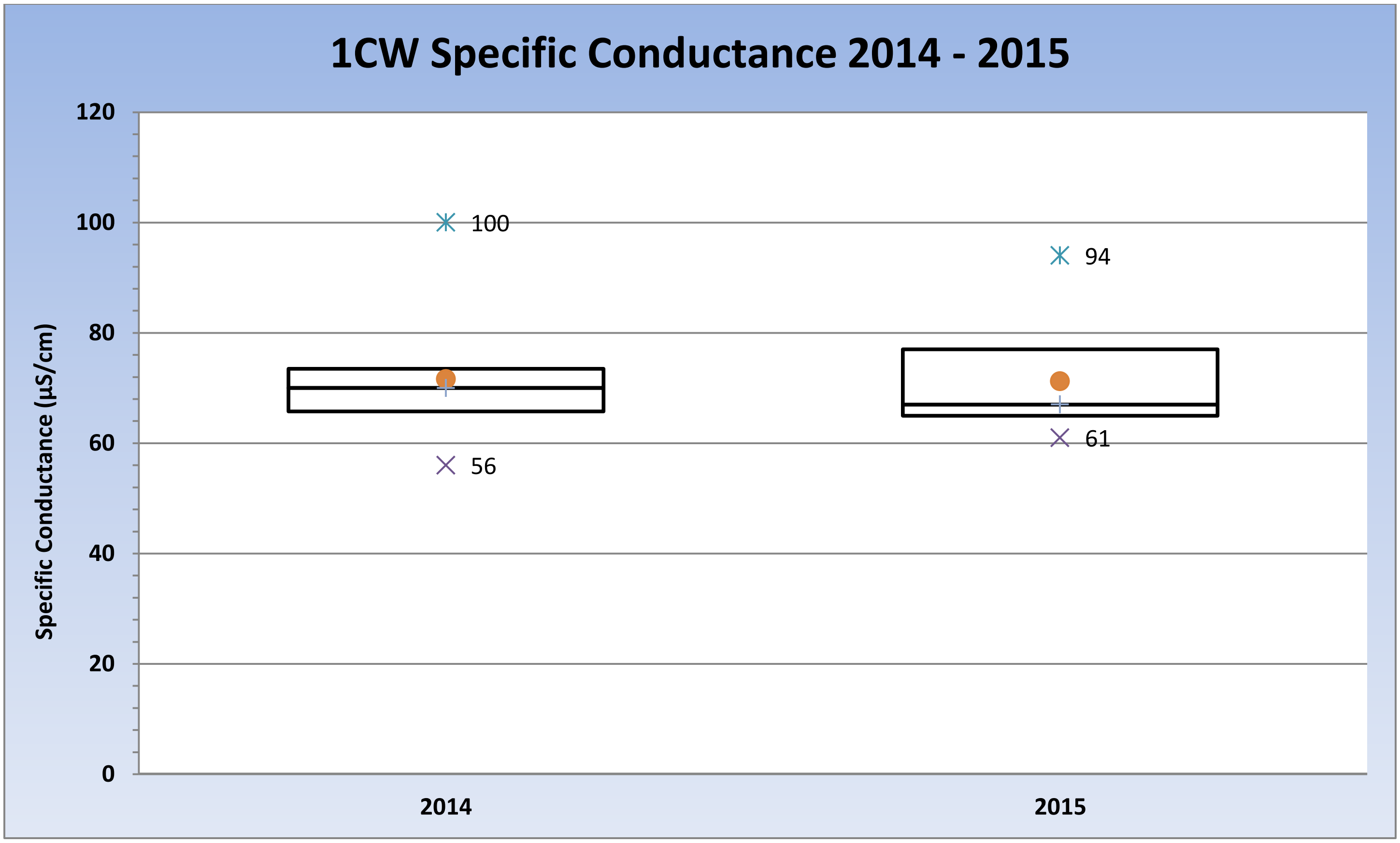

5CW Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
84.5
72.60
51.30
50.4
2014
2015


1CW pH 2014 - 2015
pH (standard units)
8.50
8.00
7.50
7.00
6.50
6.00
7.60
6.64
7.7
6.61
2014
2015

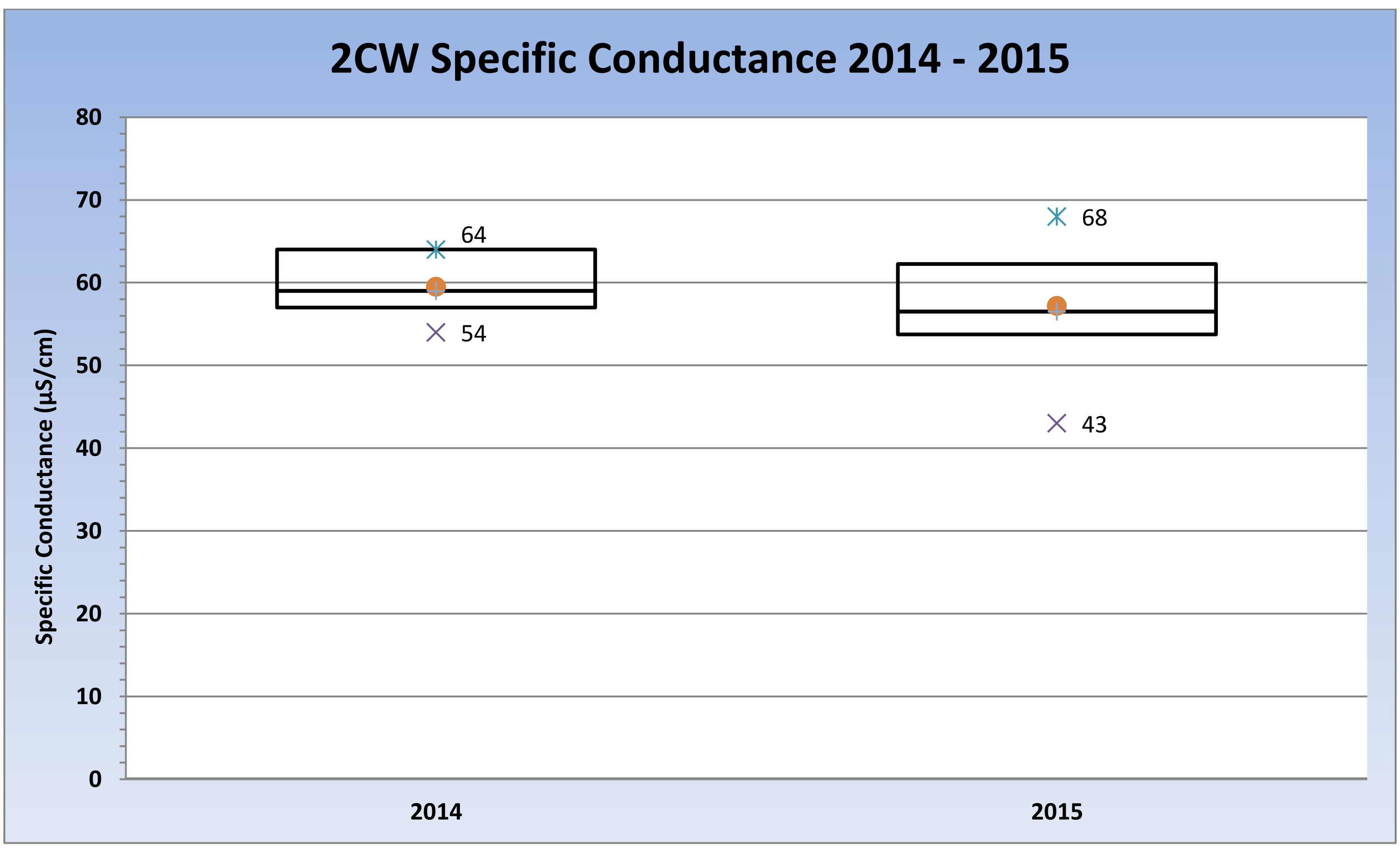

2CW pH 2014 - 2015
pH (standard units)
8.50
8.00
7.50
7.00
6.50
6.00
7.10
6.83
7.46
6.74
2014
2015


4CW pH 2014 - 2015
8.50
8.00
7.50
7.00
6.50
6.00
pH (standard units)
7.50
7.16
7.49
7.0
2014
2015

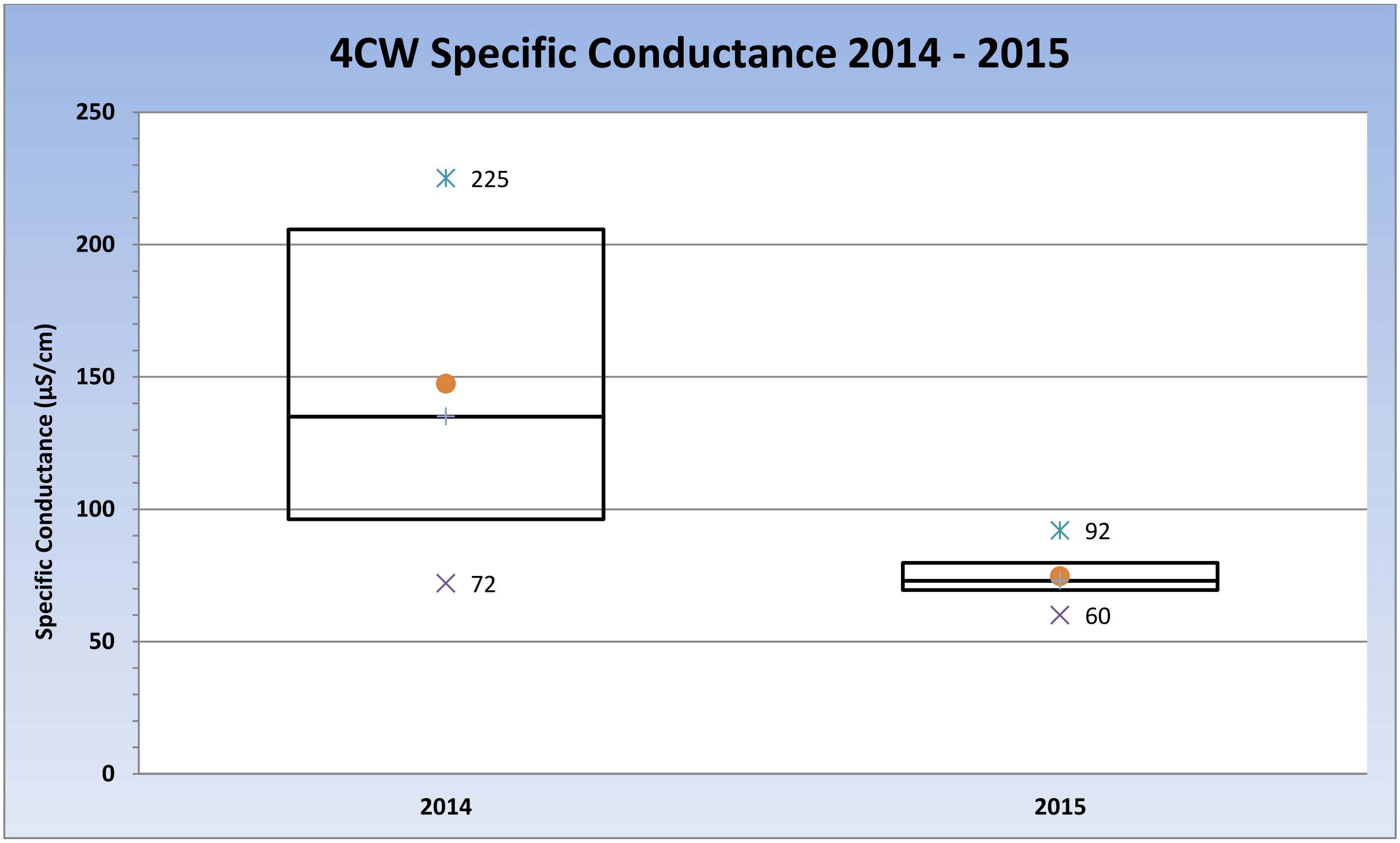

5CW pH 2014 - 2015
8.50
8.00
7.50
7.00
6.50
6.00
pH (standard units)
7.90
7.30
8.02
7.43
2014
2015

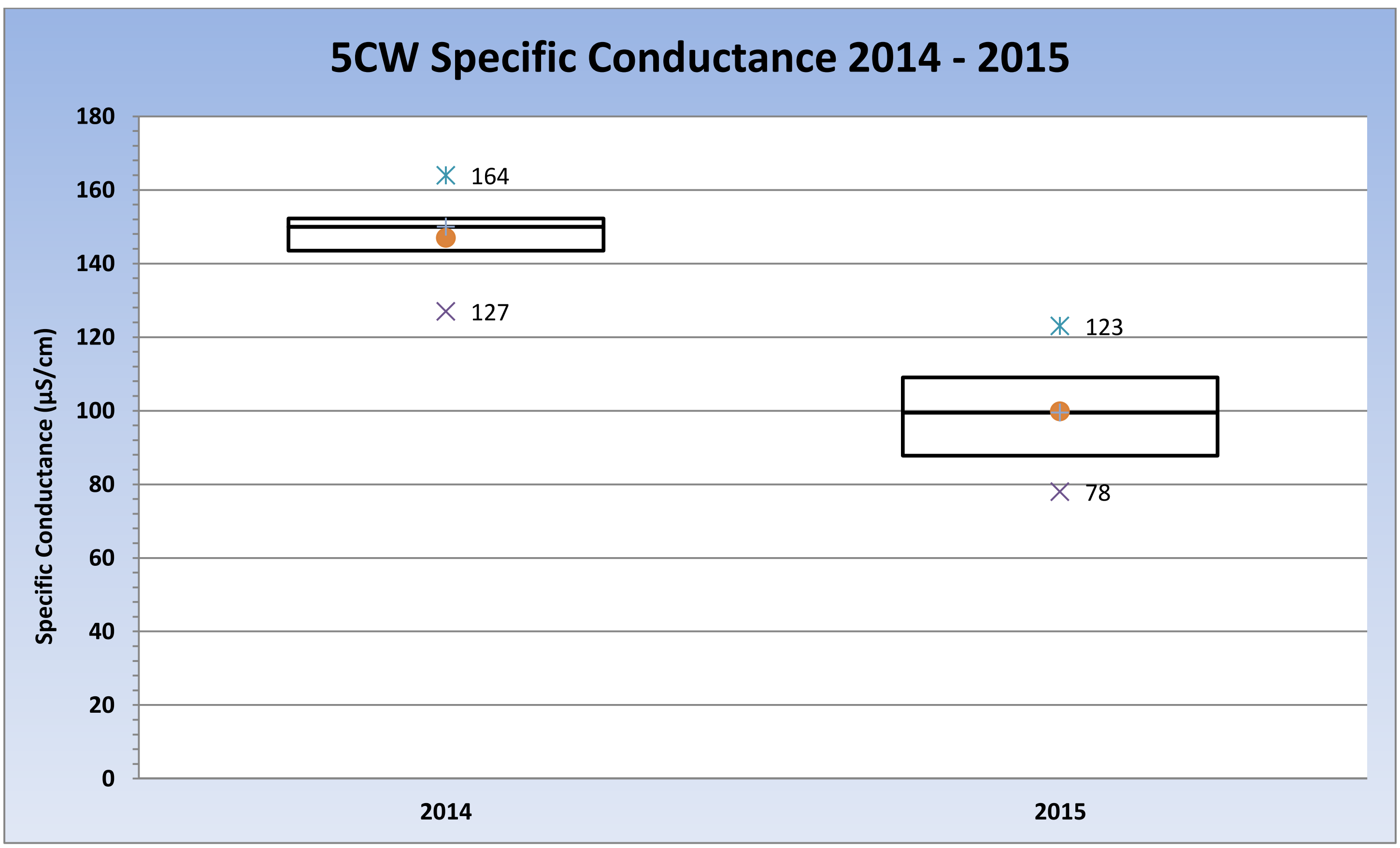


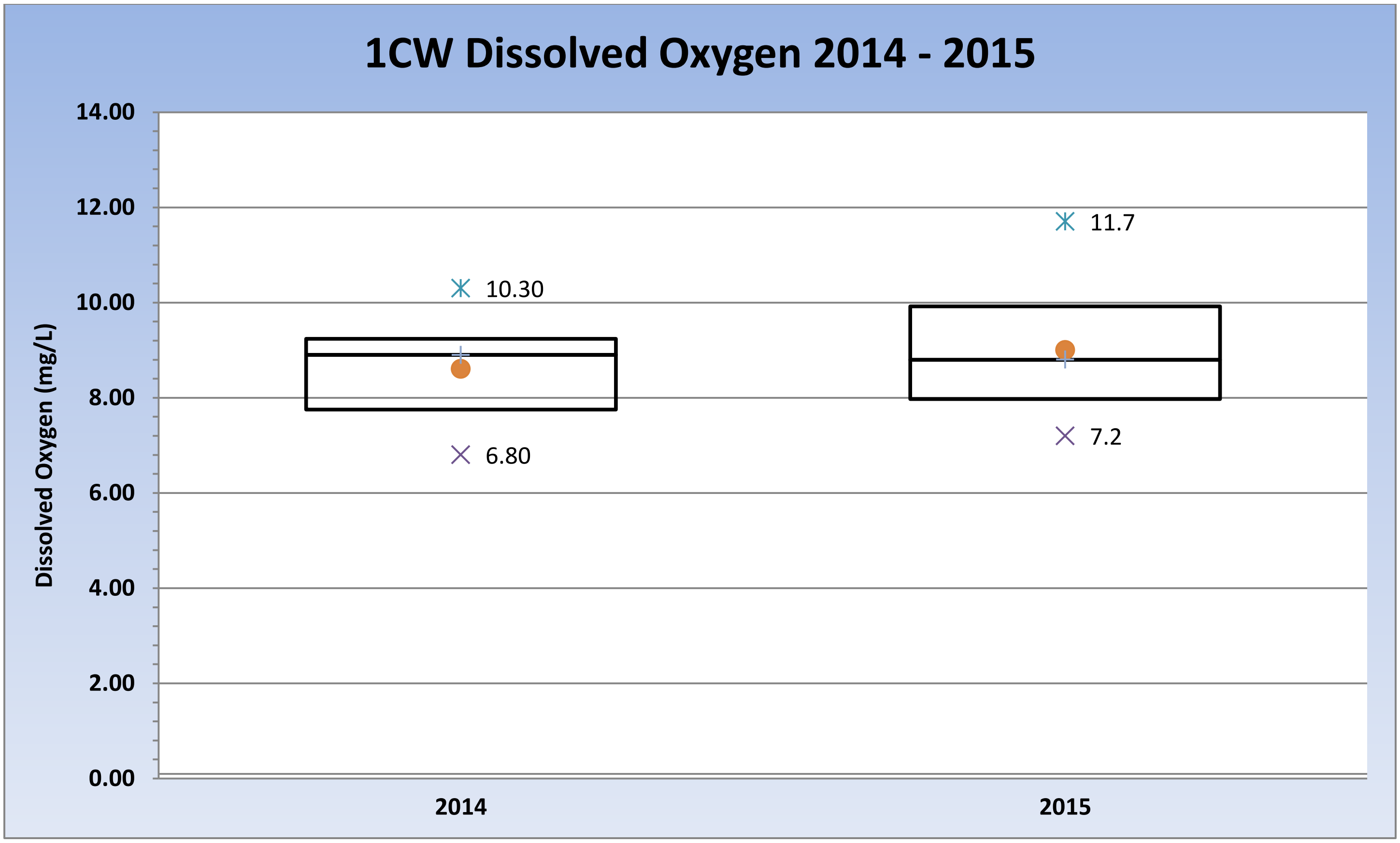
1CW Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
120
100
80
60
40
20
0
100
56
94
61
2014
2015

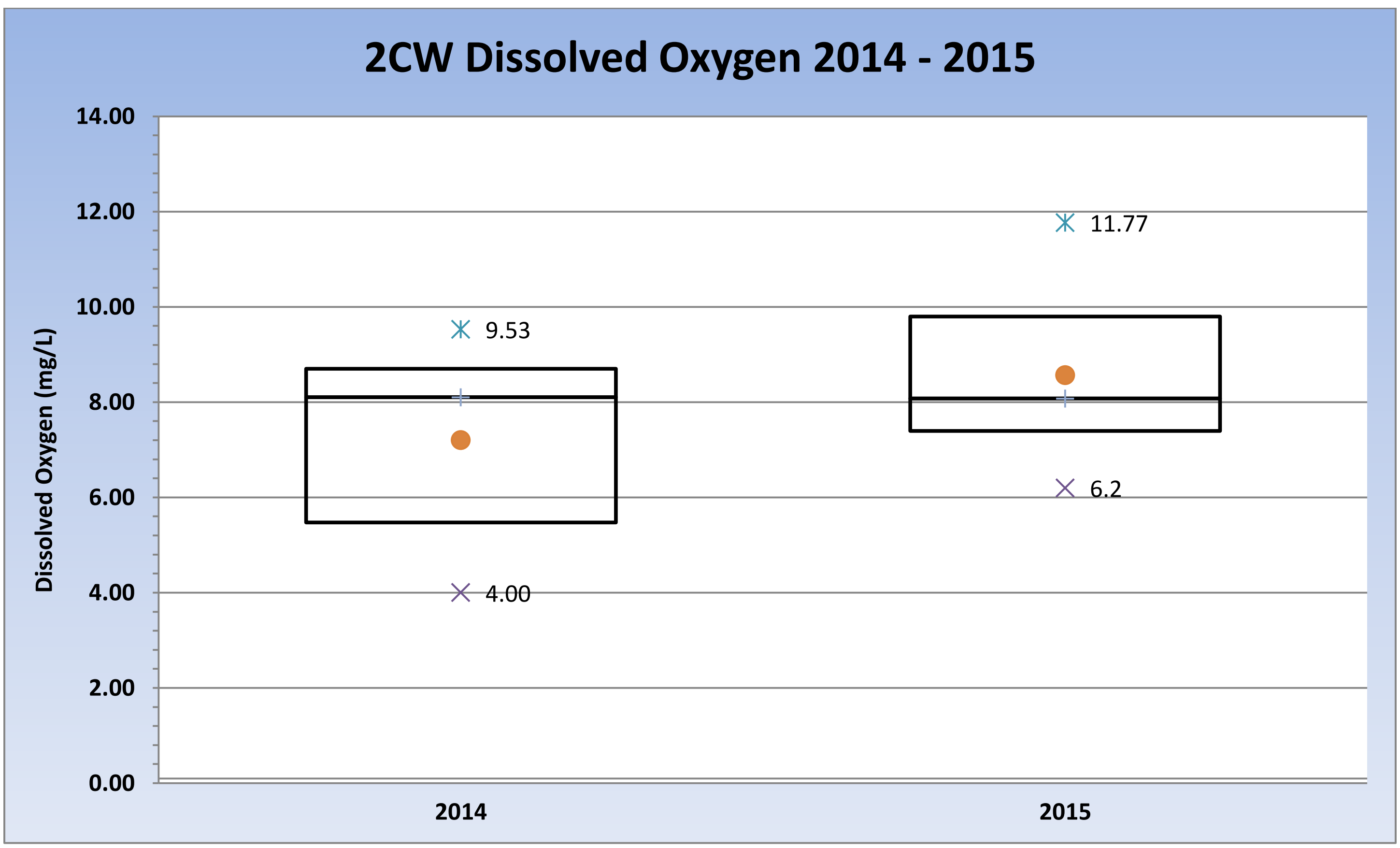


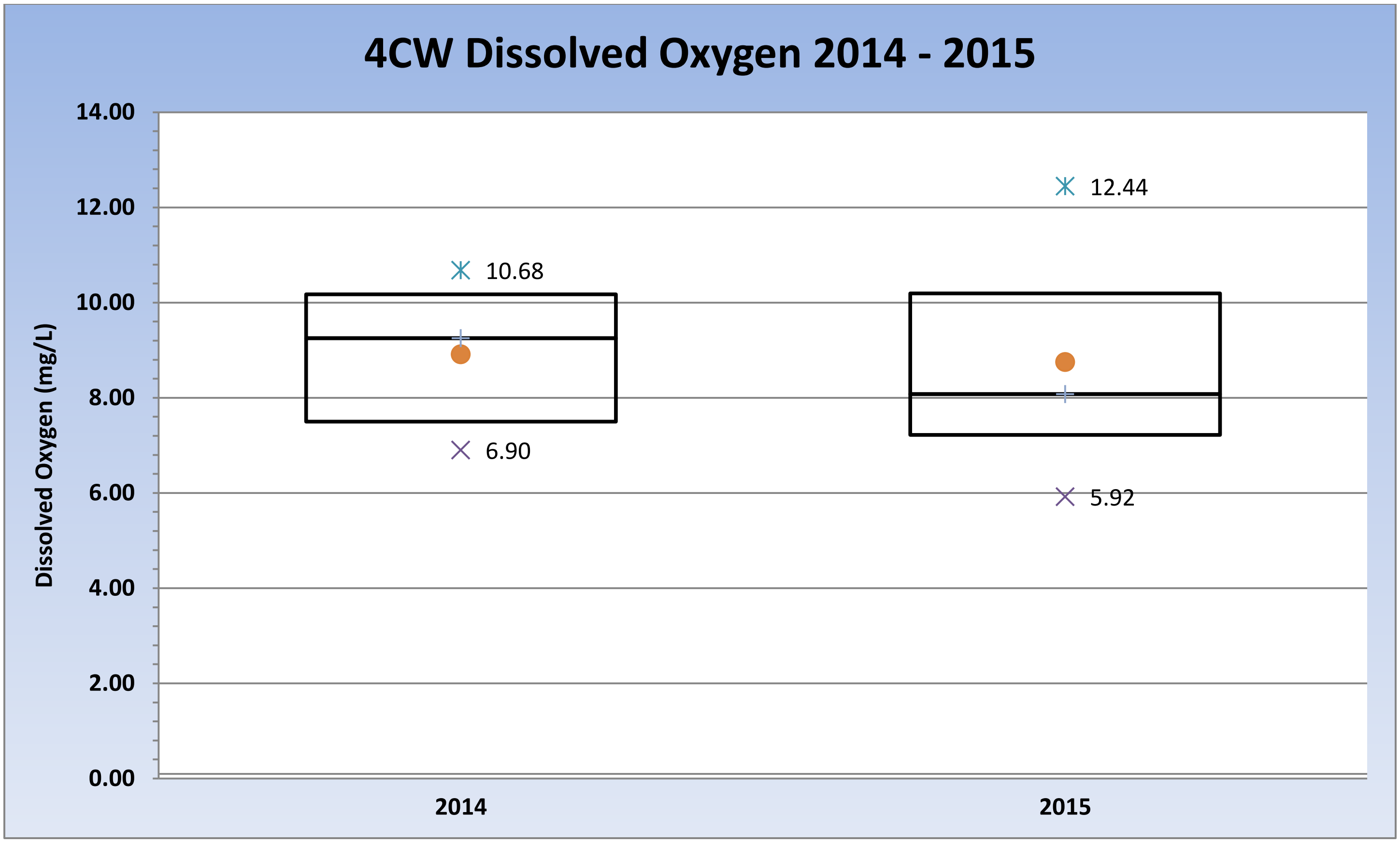
2CW Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
80
70
60
50
40
30
20
10
0
64
54
68
43
2014
2015

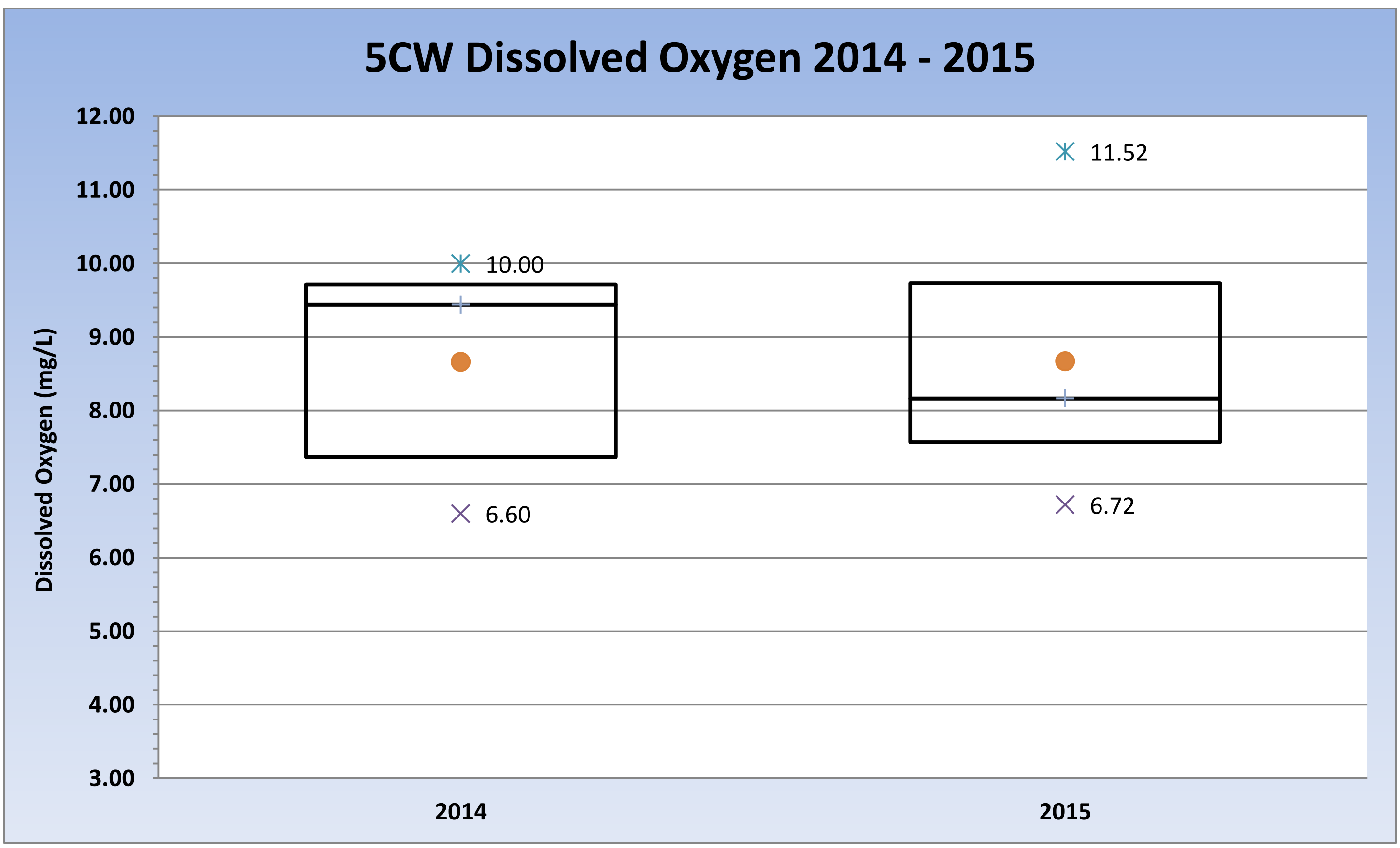

4CW Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
250
200
150
100
50
0
225
72
92
60
2014
2015


5CW Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
180
160
140
120
100
80
60
40
20
0
164
127
123
78
2014
2015


1CW Dissolved Oxygen 2014 - 2015
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Dissolved Oxygen (mg/L)
10.30
6.80
11.7
7.2
2014
2015


2CW Dissolved Oxygen 2014 - 2015
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Dissolved Oxygen (mg/L)
9.53
4.00
11.77
6.2
2014
2015


4CW Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
10.68
6.90
12.44
5.92
2014
2015


5CW Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
10.00
6.60
11.52
6.72
2014
2015

Choctafaula Creek Watershed

A total of 453 independent water quality measurements were collected in the Choctafaula Creek watershed in 2015. Landcover within the Choctafaula Creek watershed consists of mostly forest and pasture, with relatively little urban/suburban development. This is generally reflected in the turbidity data, as the Choctafaula stations often exhibit lower turbidity than the other streams within the City's MS4 jurisdiction. 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.

Monitoring Station Locations and Notes:

Station 1CH – Latitude *32, 34, 8.089 N*; Longitude *85, 32, 41.169 W.* Station 1CH is located on main stem Choctafaula Creek along Wire Road, immediately east of Talheim Street.

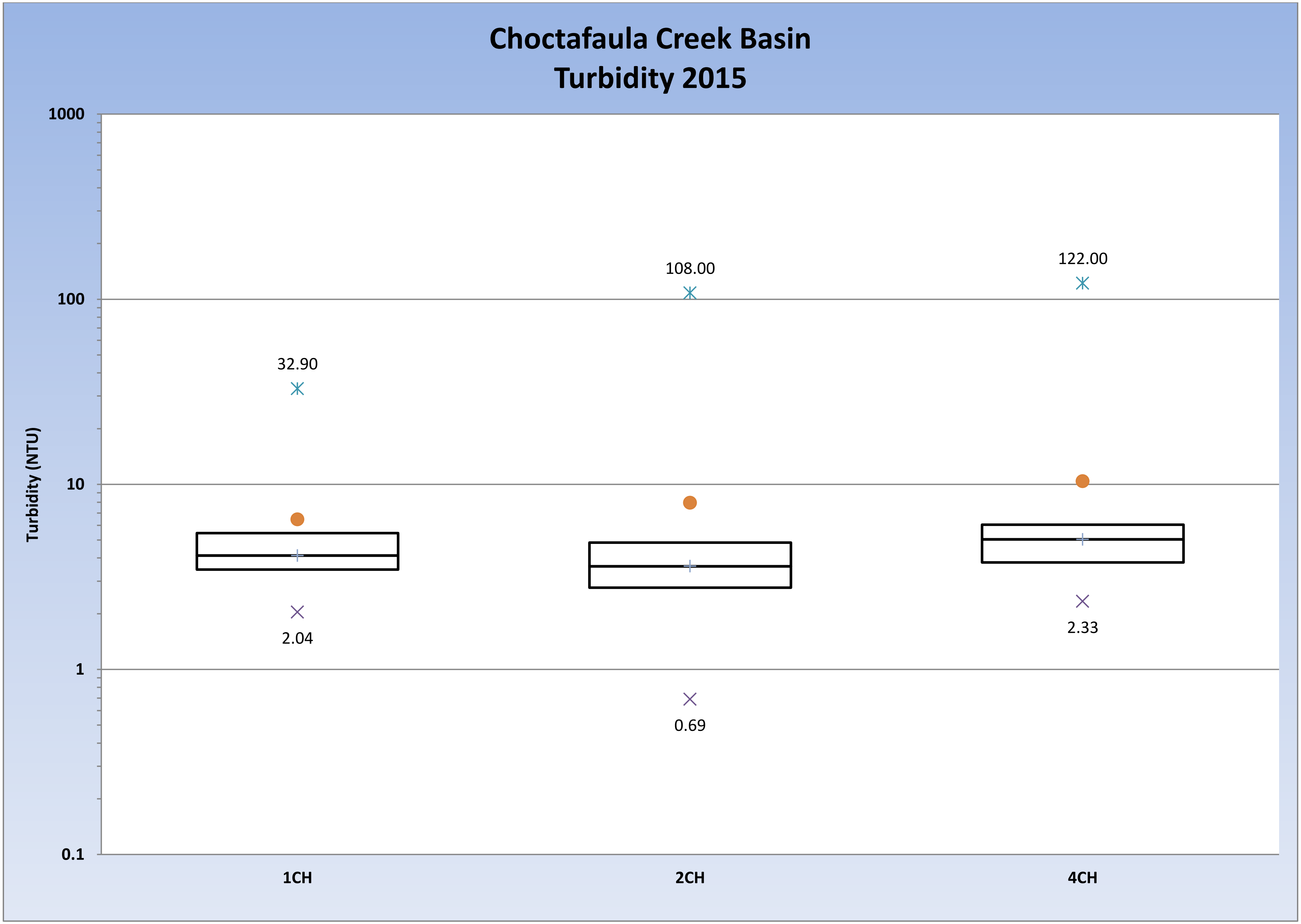
Station 2CH – Latitude *32, 34, 3.928 N*; Longitude *85, 33, 21.503 W.* Station 2CH is located on an unnamed tributary of Choctafaula Creek as it crosses under Wire Road, immediately east of CR 57. 2CH also receives flow from a mostly rural, forested basin and therefore generally exhibits low baseline and storm event turbidity values.

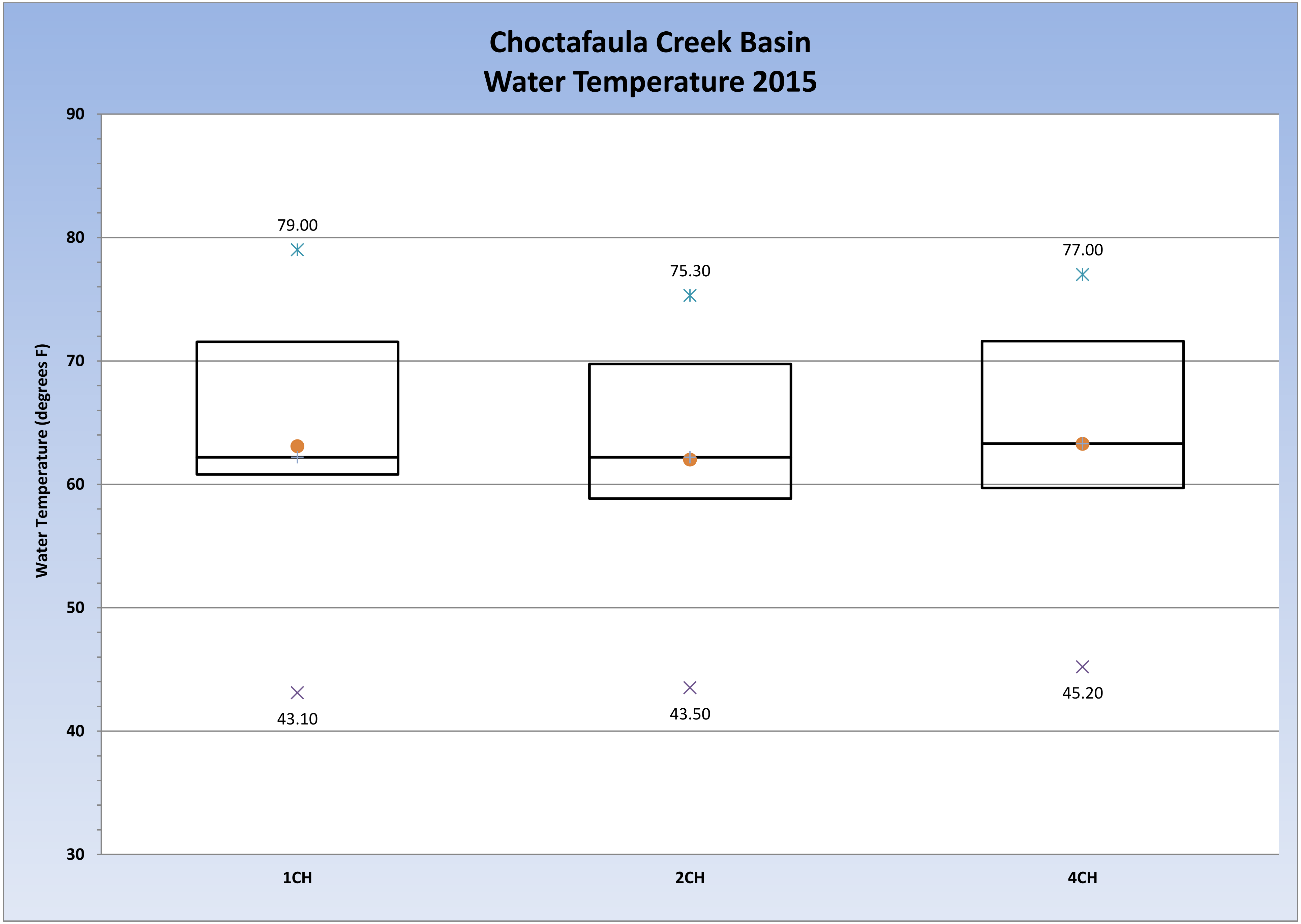
Station 4CH – Latitude *32, 32, 51.901 N*; Longitude *85, 33, 19.14 W.* Station 4CH is located on main stem Choctafaula Creek, as it crosses under Beehive Road, immediately west of the City of Auburn Tech Park West.

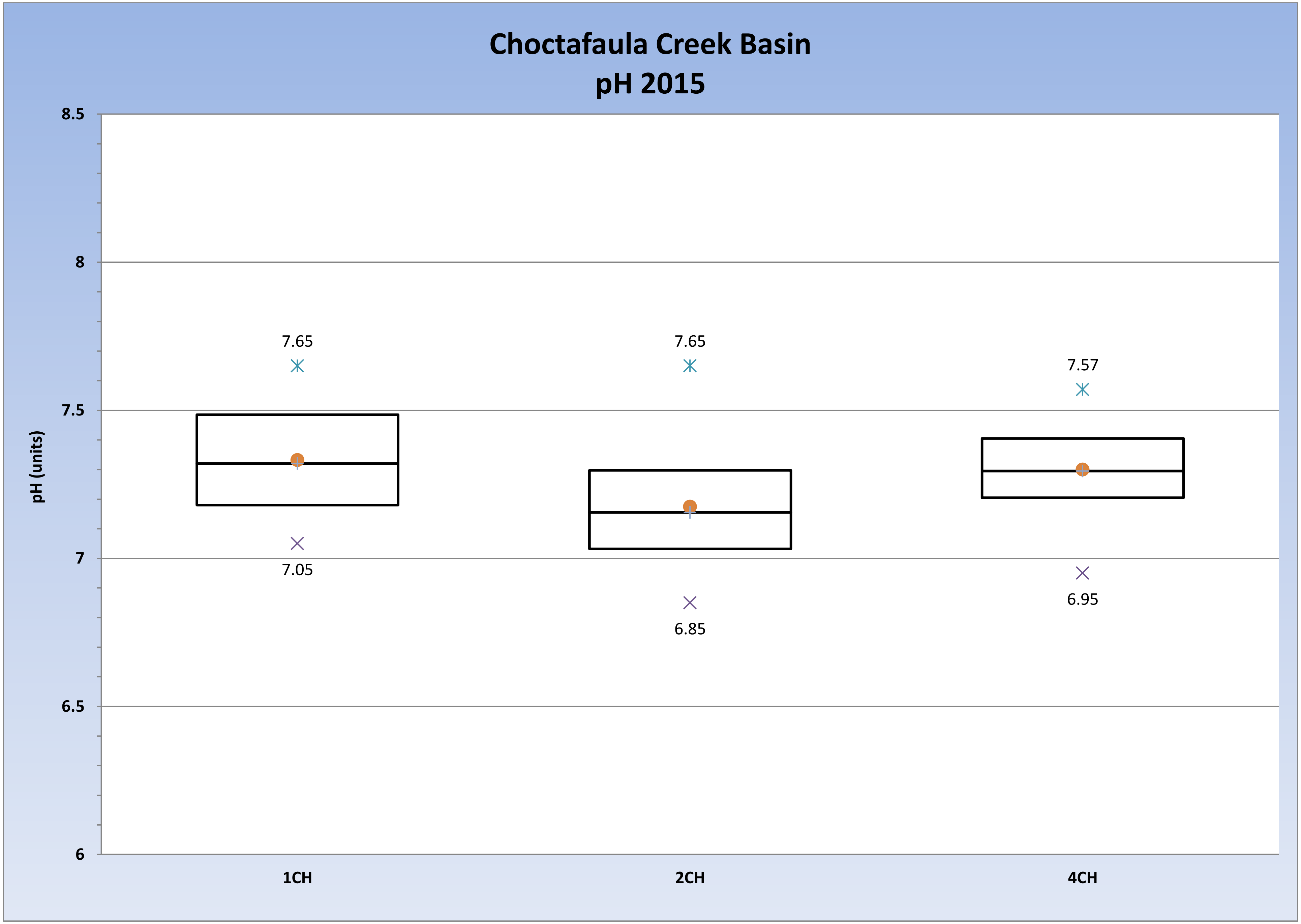
**See Insert for Maps of All Water Quality Monitoring Locations*

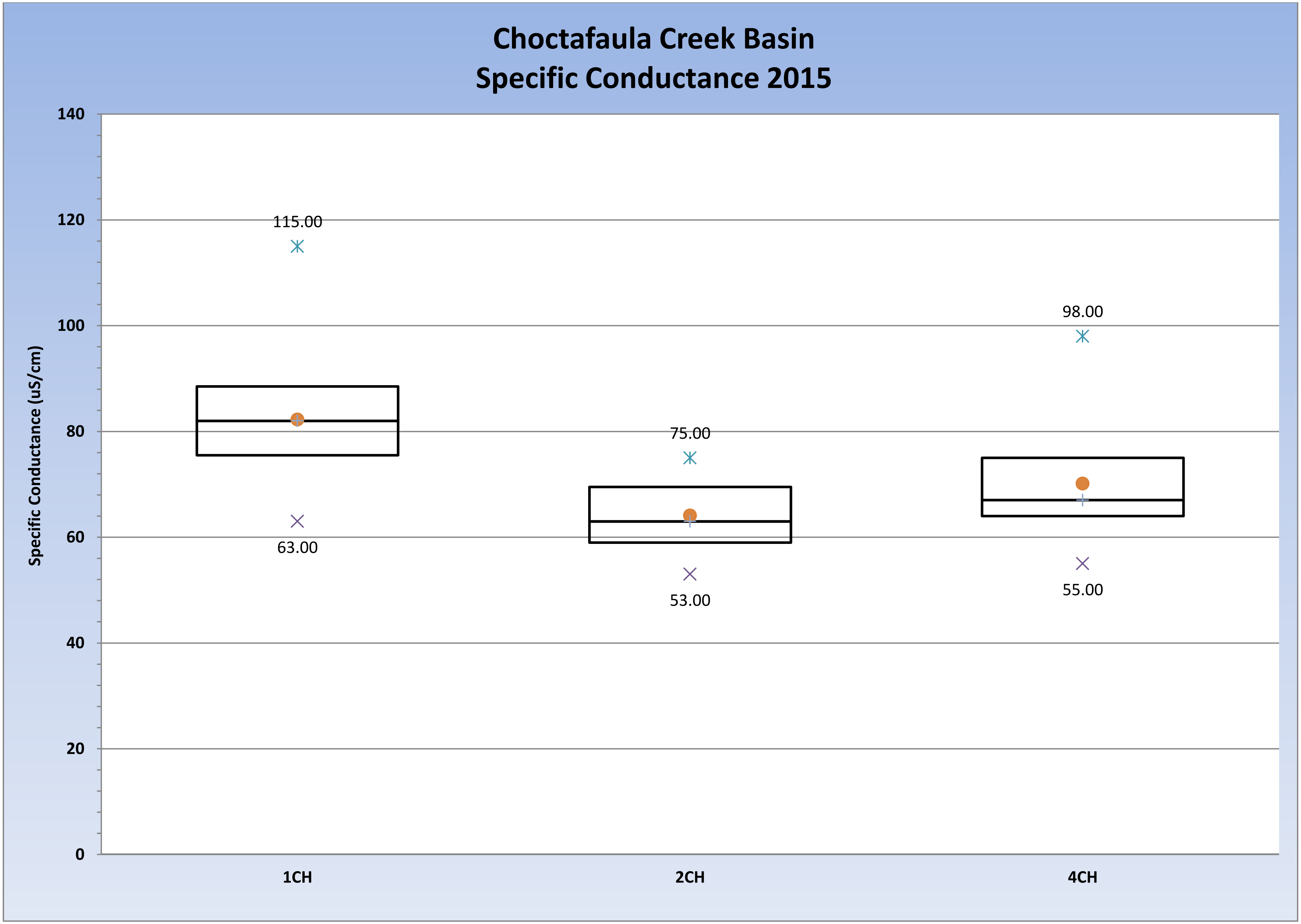
Nine Year Statistical Analysis of Turbidity Data for the Choctafaula Creek Watershed

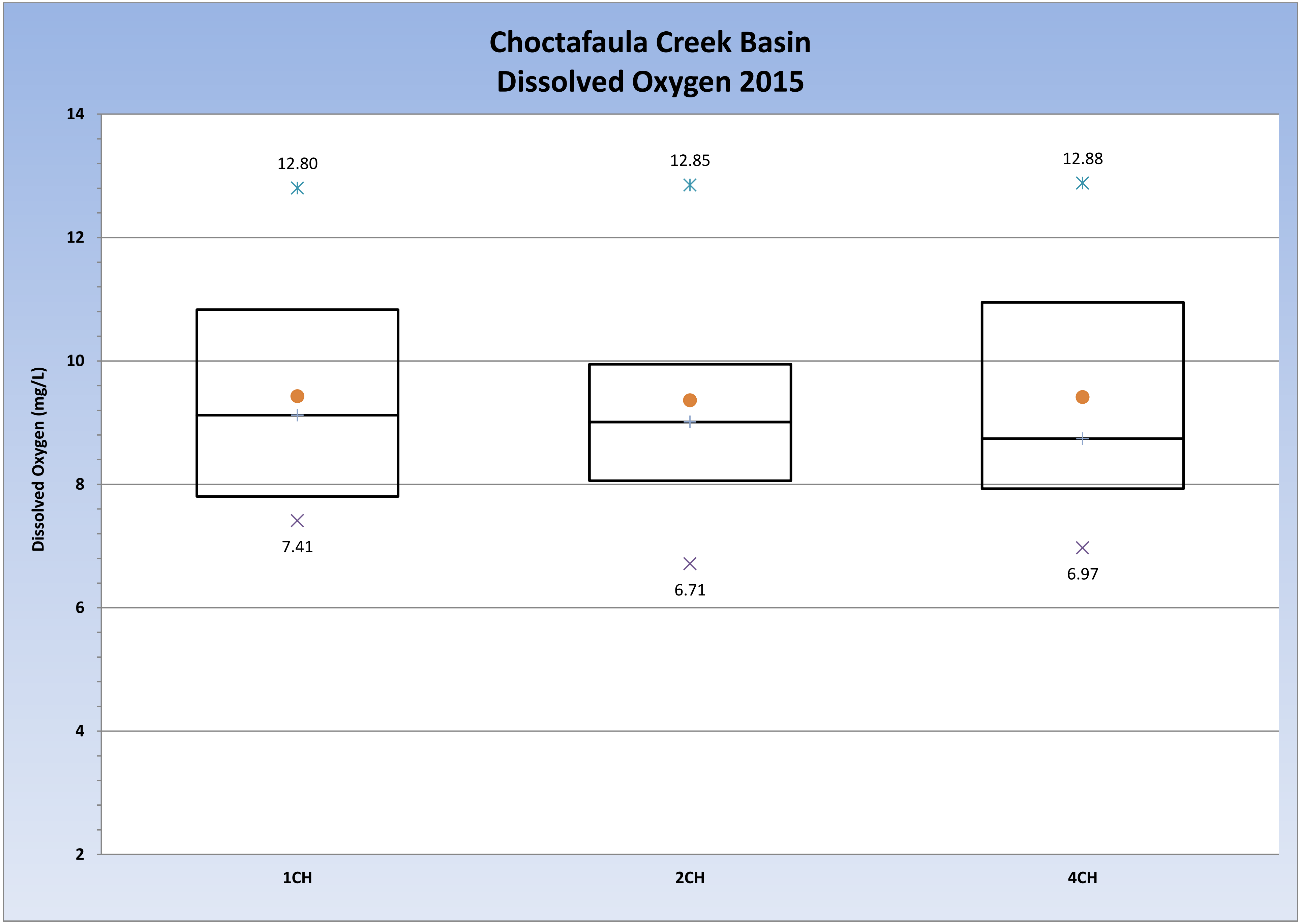
	1CH								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	0.62	1.20	1.40	1.10	2.10	2.46	1.01	1.11	2.04
MAX	55.00	115.00	370.00	28.00	65.00	32.43	12.20	39.00	32.9
AVG	8.92	10.37	20.15	6.91	8.64	7.67	4.38	6.07	6.46
MEDIAN	8.10	4.23	8.50	5.10	5.45	5.60	3.90	4.63	4.12
	2CH								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	1.27	1.07	1.30	0.98	1.20	0.91	0.23	0.10	0.69
MAX	240.00	110.00	350.00	24.00	130.00	88.30	11.40	111.00	108
AVG	15.02	8.61	13.92	4.44	8.48	7.95	3.46	9.28	7.95
MEDIAN	8.23	3.36	4.10	2.80	3.40	4.20	2.88	3.31	3.61
	4CH								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	0.87	1.00	2.20	1.10	3.40	1.60	1.27	1.53	2.33
MAX	180.00	270.00	90.00	45.00	55.00	33.20	21.00	121.00	122
AVG	14.46	23.25	17.73	7.85	10.08	7.74	5.21	10.06	10.4
MEDIAN	6.18	5.00	8.50	5.50	6.40	6.09	3.79	5.24	5.04

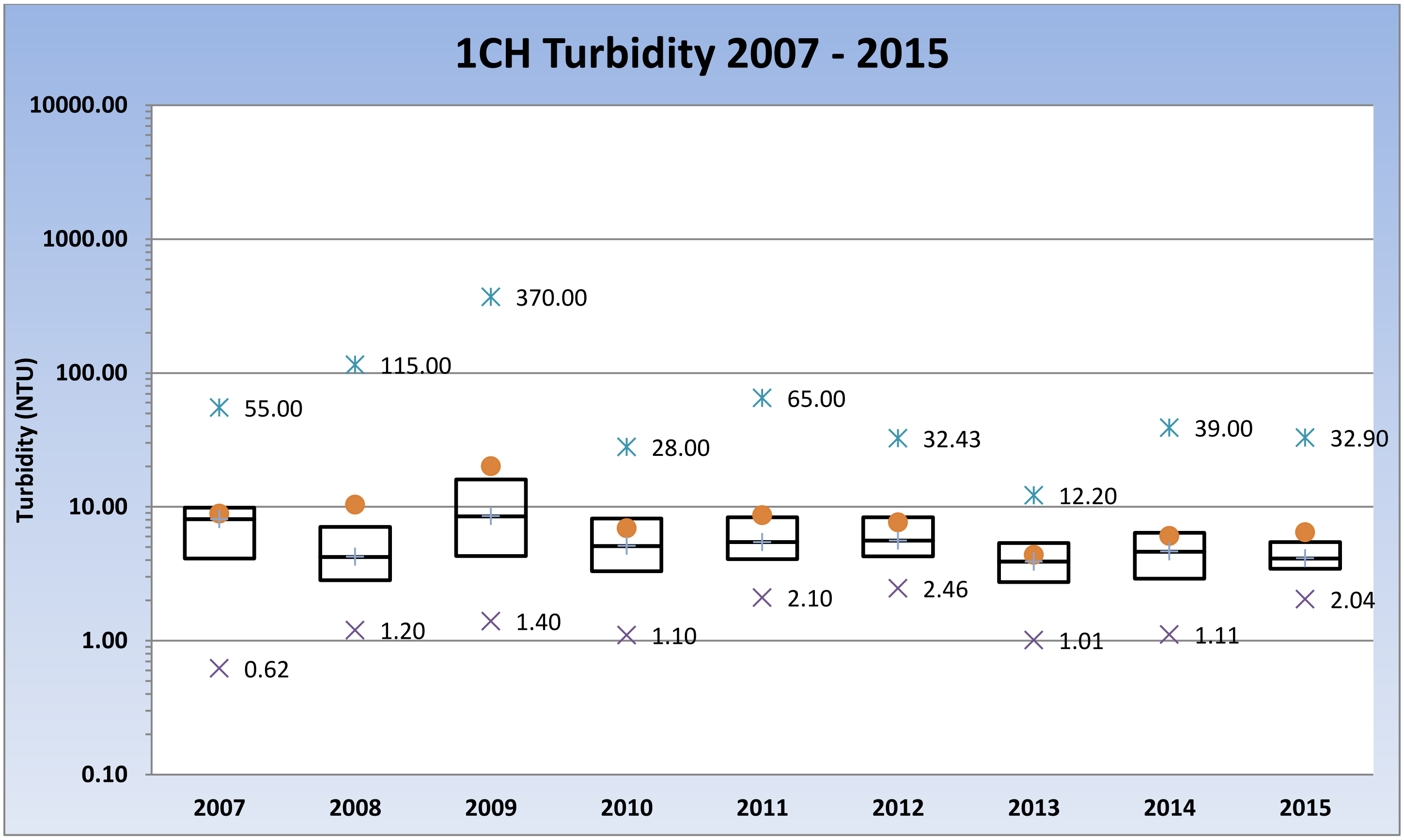

Choctafaula Creek Basin
Turbidity 2015
Turbidity (NTU)
1000
100
10
1
0.1
32.90
108.00
122.00
2.04
0.69
2.33
1CH
2CH
4CH

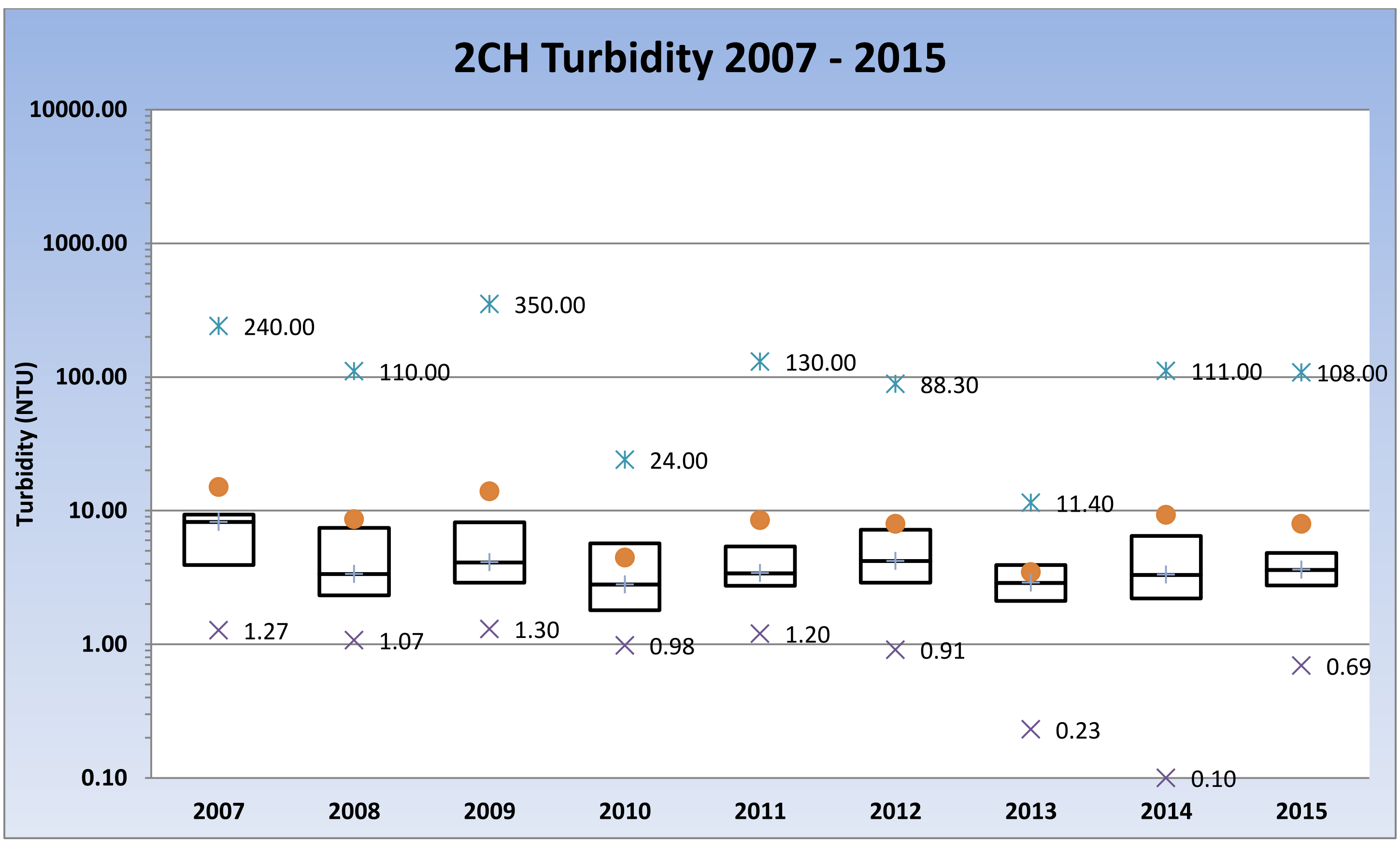

Choctafaula Creek Basin
Water Temperature 2015
Water Temperature (degrees F)
90
80
70
60
50
40
30
79.00
75.30
77.00
43.10
43.50
45.20
1CH
2CH
4CH

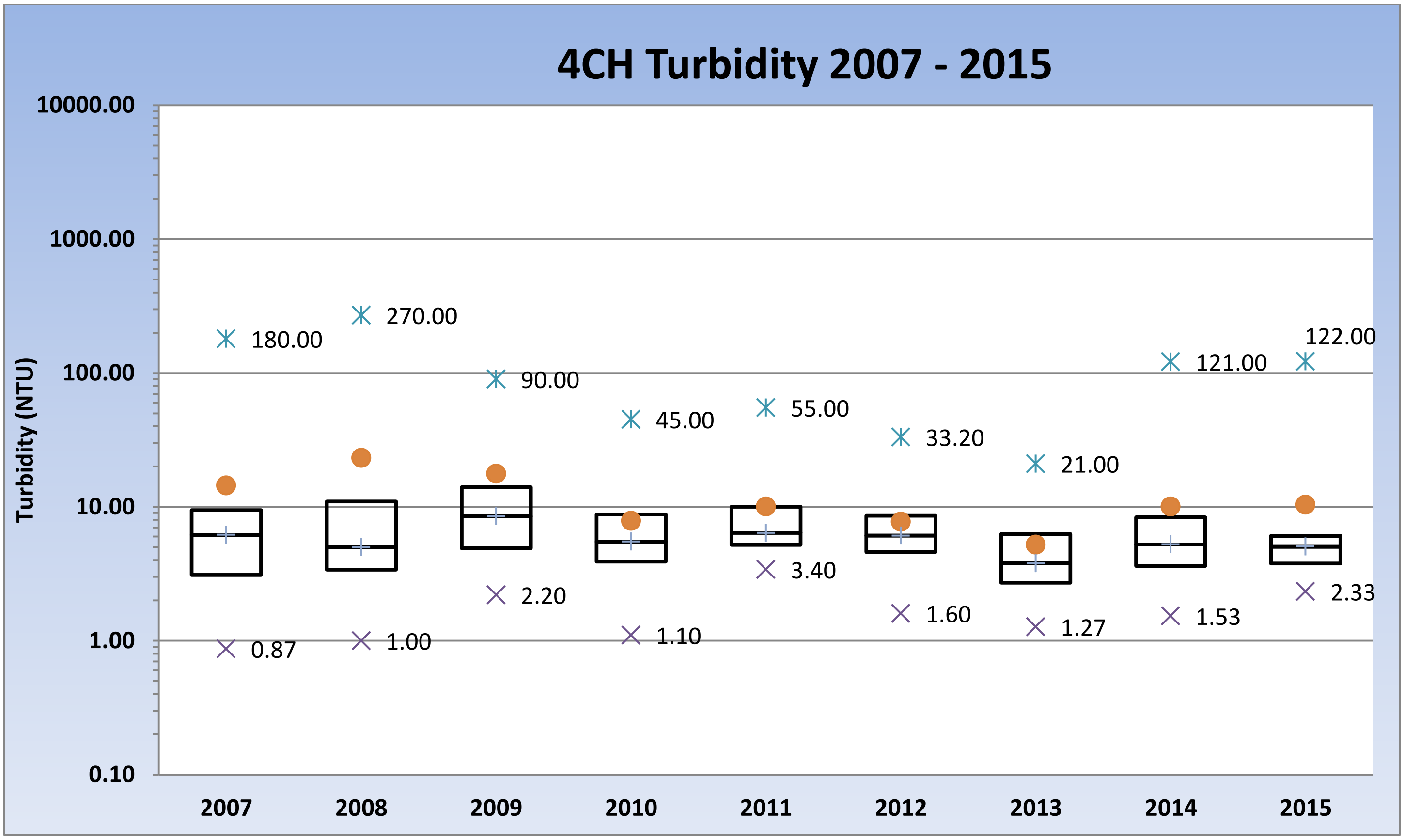

Choctafaula Creek Basin
pH 2015
pH (units)
8.5
8
7.5
7
6.5
6
7.65
7.65
7.57
7.05
6.85
6.95
1CH
2CH
4CH

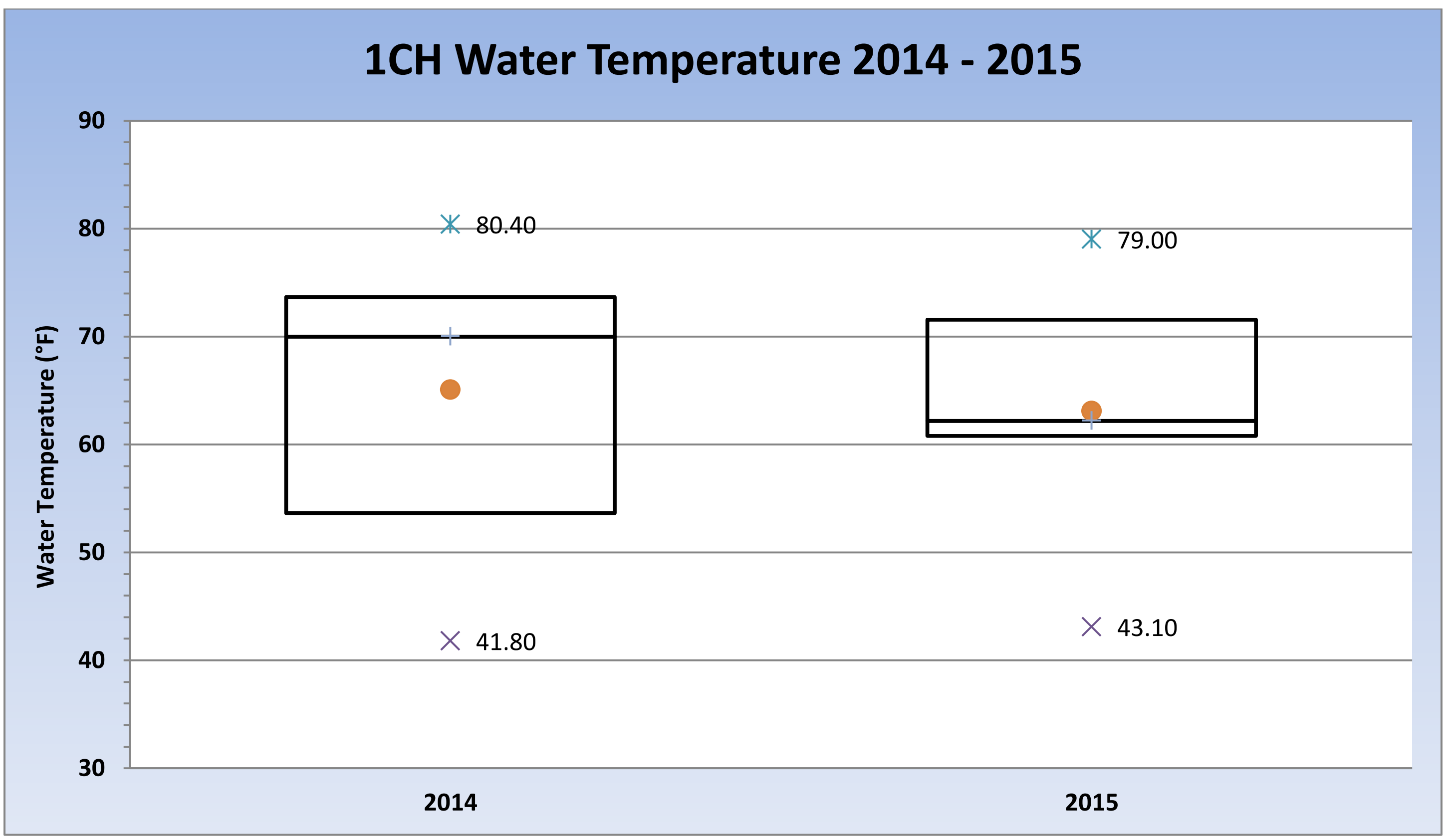

Choctafaula Creek Basin
Specific Conductance 2015
Specific Conductance (uS/cm)
140
120
100
80
60
40
20
0
115.00
63.00
75.00
53.00
98.00
55.00
1CH
2CH
4CH

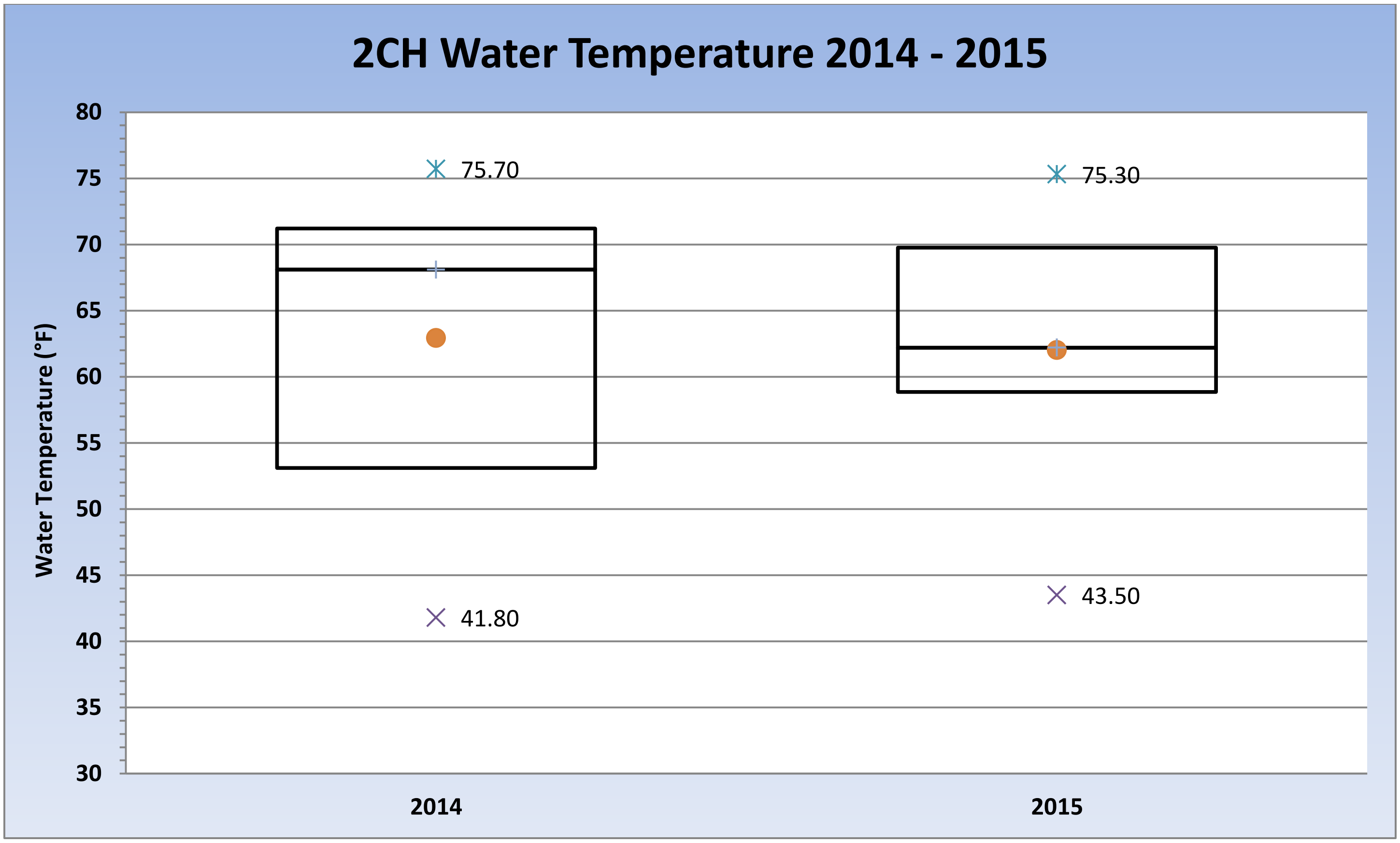

Choctafaula Creek Basin
Dissolved Oxygen 2015
Dissolved Oxygen (mg/L)
14
12
10
8
6
4
2
12.80
12.85
12.88
7.41
6.71
6.97
1CH
2CH
4CH

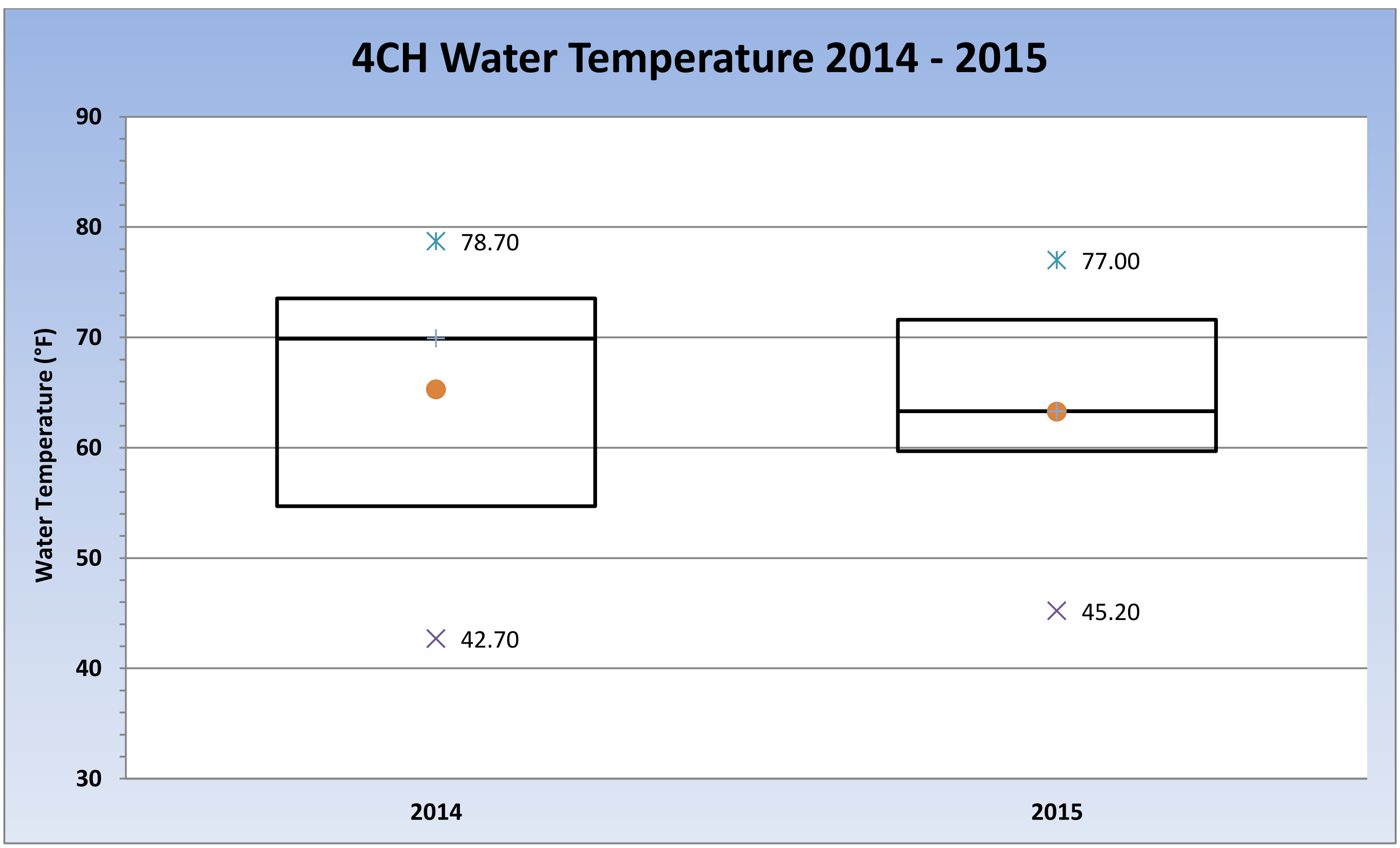

1CH Turbidity 2007 - 2015
Turbidity (NTU)
10000.00
1000.00
100.00
10.00
1.00
0.10
55.00
0.62
115.00
1.20
370.00
1.40
28.00
1.10
65.00
2.10
32.43
2.46
12.20
1.01
39.00
1.11
32.90
2.04
2007
2008
2009
2010
2011
2012
2013
2014
2015

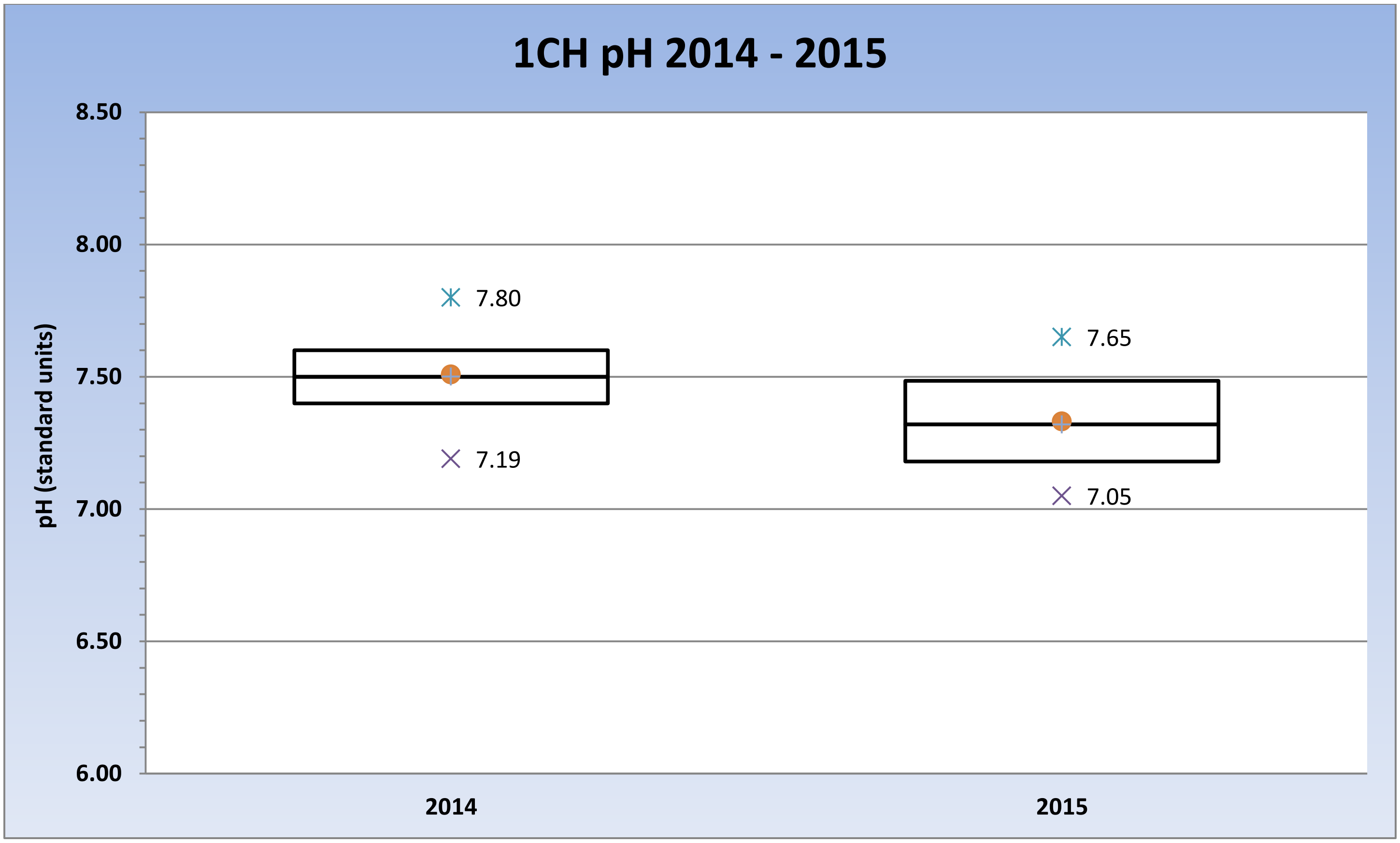

2CH Turbidity 2007 - 2015
Turbidity (NTU)
10000.00
1000.00
100.00
10.00
1.00
0.10
240.00
1.27
110.00
1.07
350.00
1.30
24.00
0.98
130.00
1.20
88.30
0.91
11.40
0.23
111.00
0.10
108.00
0.69
2007
2008
2009
2010
2011
2012
2013
2014
2015

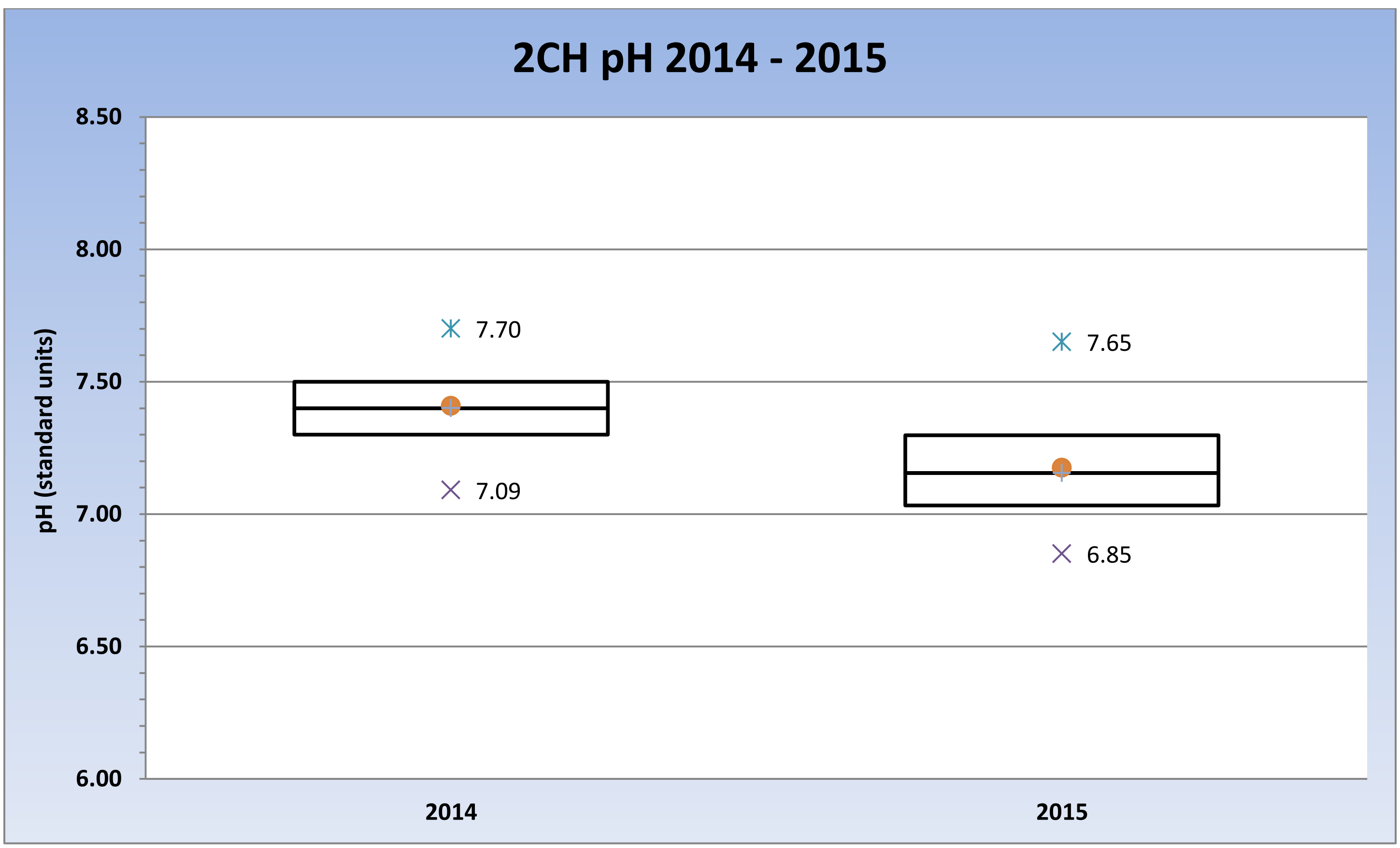

4CH Turbidity 2007 - 2015
Turbidity (NTU)
10000.00
1000.00
100.00
10.00
1.00
0.10
180.00
270.00
90.00
45.00
55.00
33.20
21.00
121.00
122.00
0.87
1.00
2.20
1.10
3.40
1.60
1.27
1.53
2.33
2007
2008
2009
2010
2011
2012
2013
2014
2015

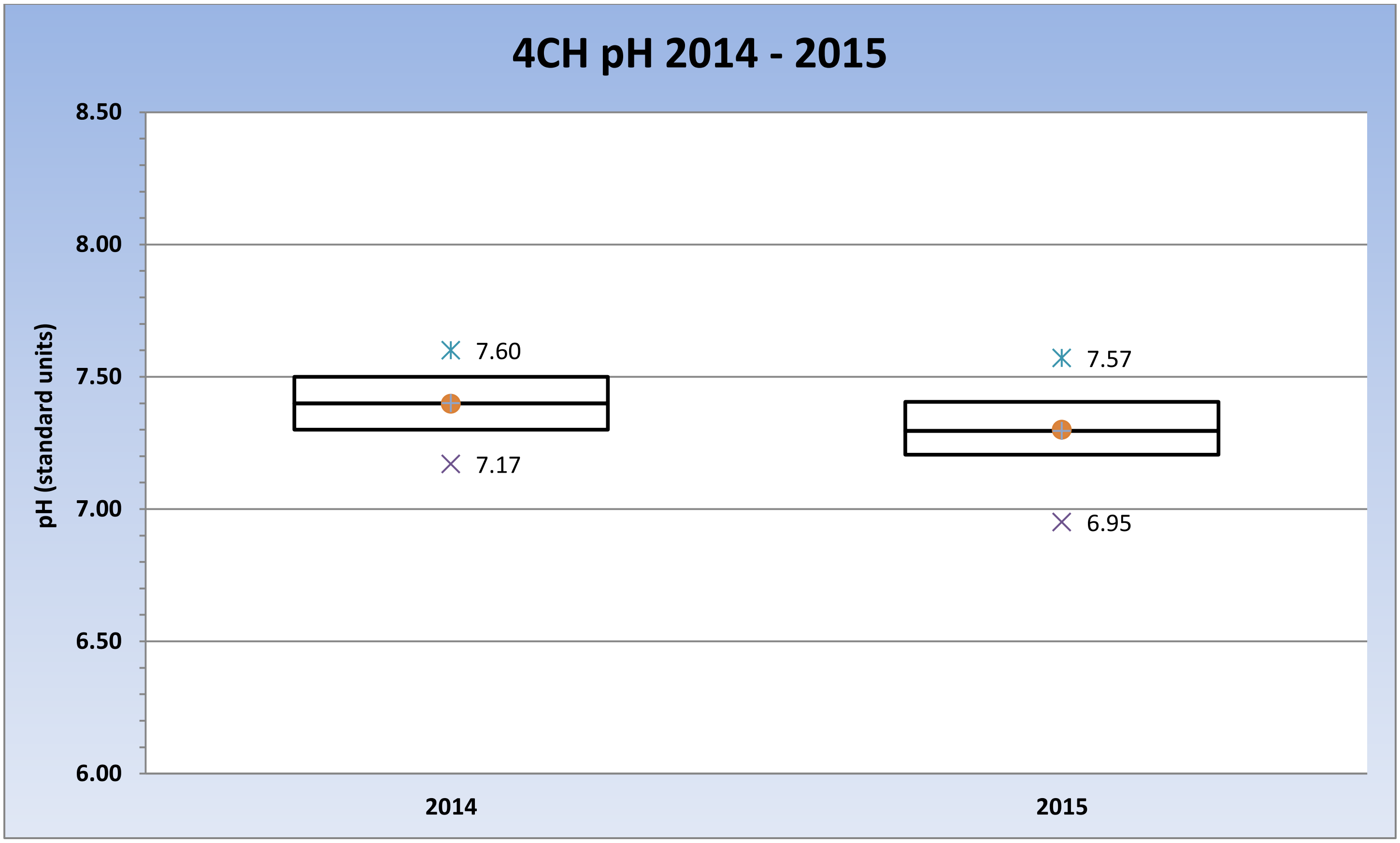

1CH Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
80.40
79.00
41.80
43.10
2014
2015

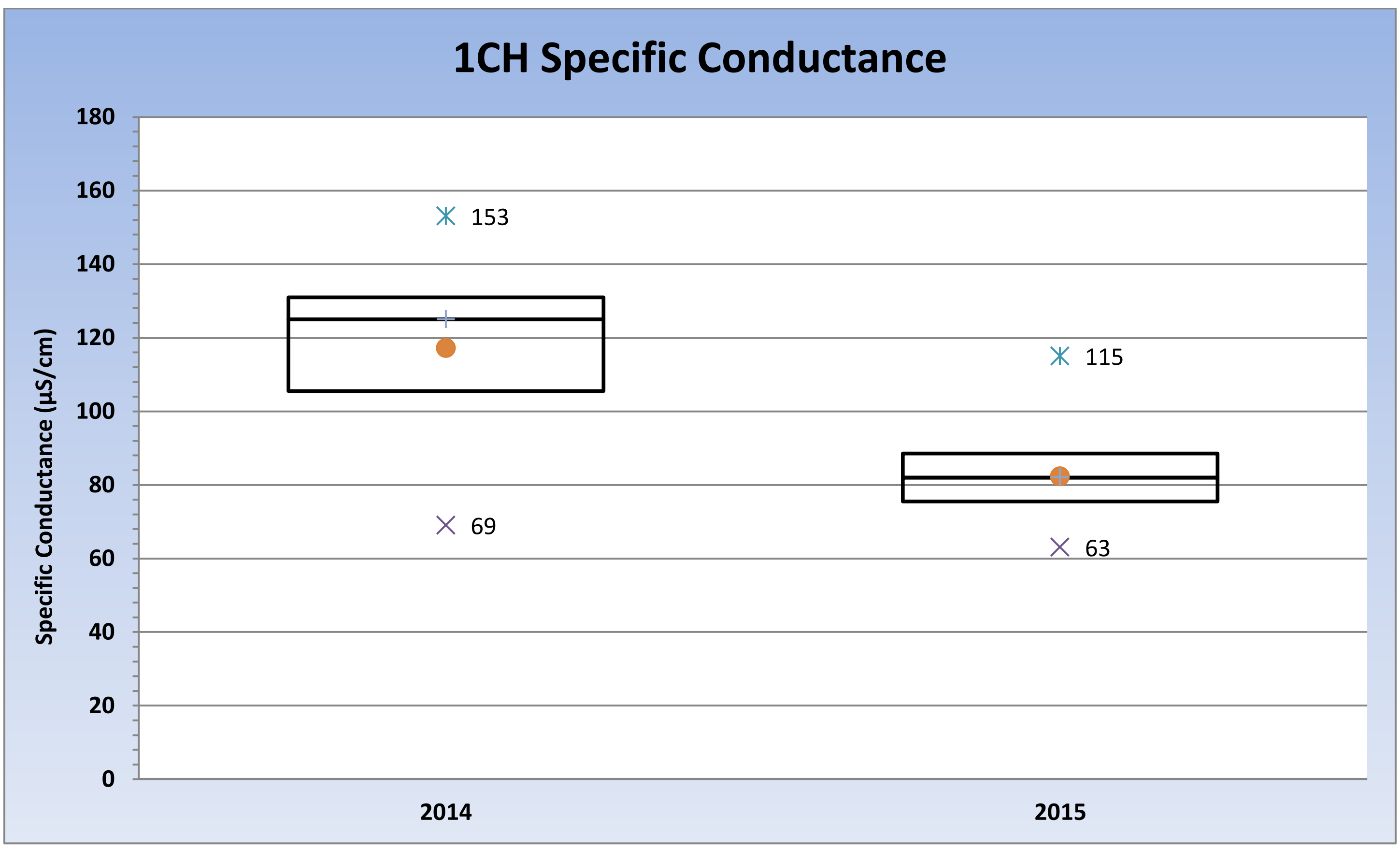

2CH Water Temperature 2014 - 2015
Water Temperature (°F)
80
75
70
65
60
55
50
45
40
35
30
75.70
75.30
41.80
43.50
2014
2015

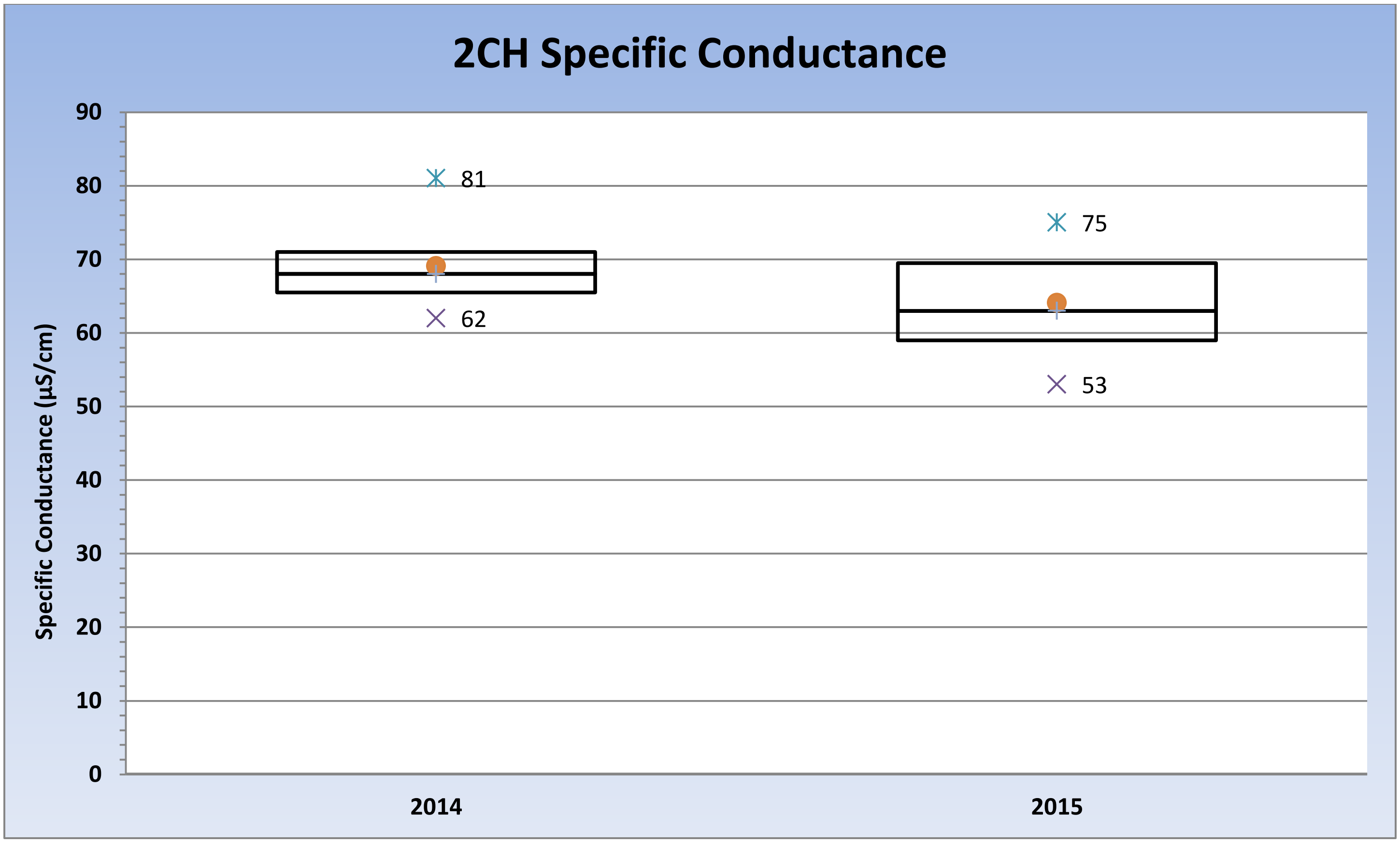

4CH Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
78.70
77.00
42.70
45.20
2014
2015

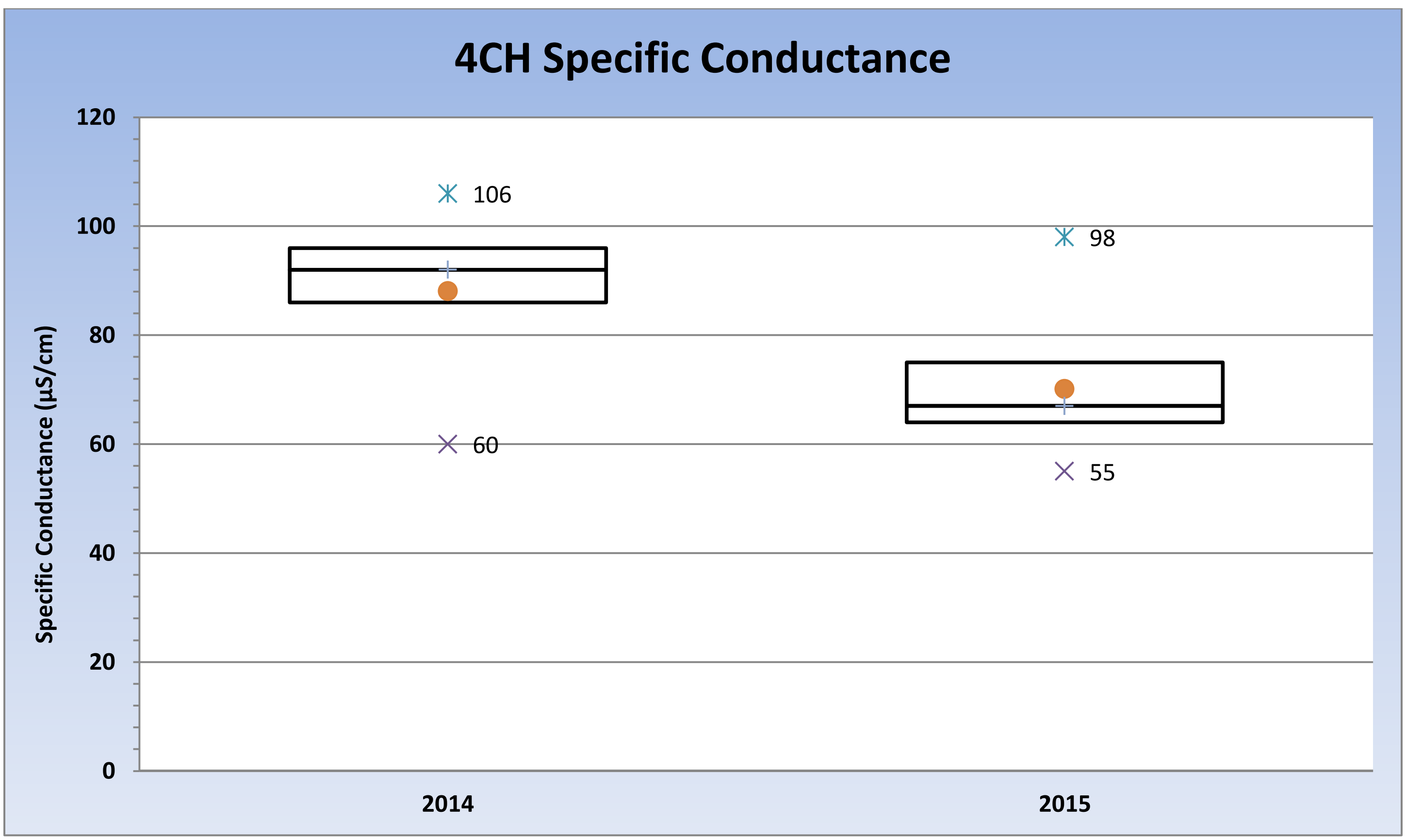

1CH pH 2014 - 2015
8.50
8.00
7.50
7.00
6.50
6.00
pH (standard units)
7.80
7.19
7.65
7.05
2014
2015

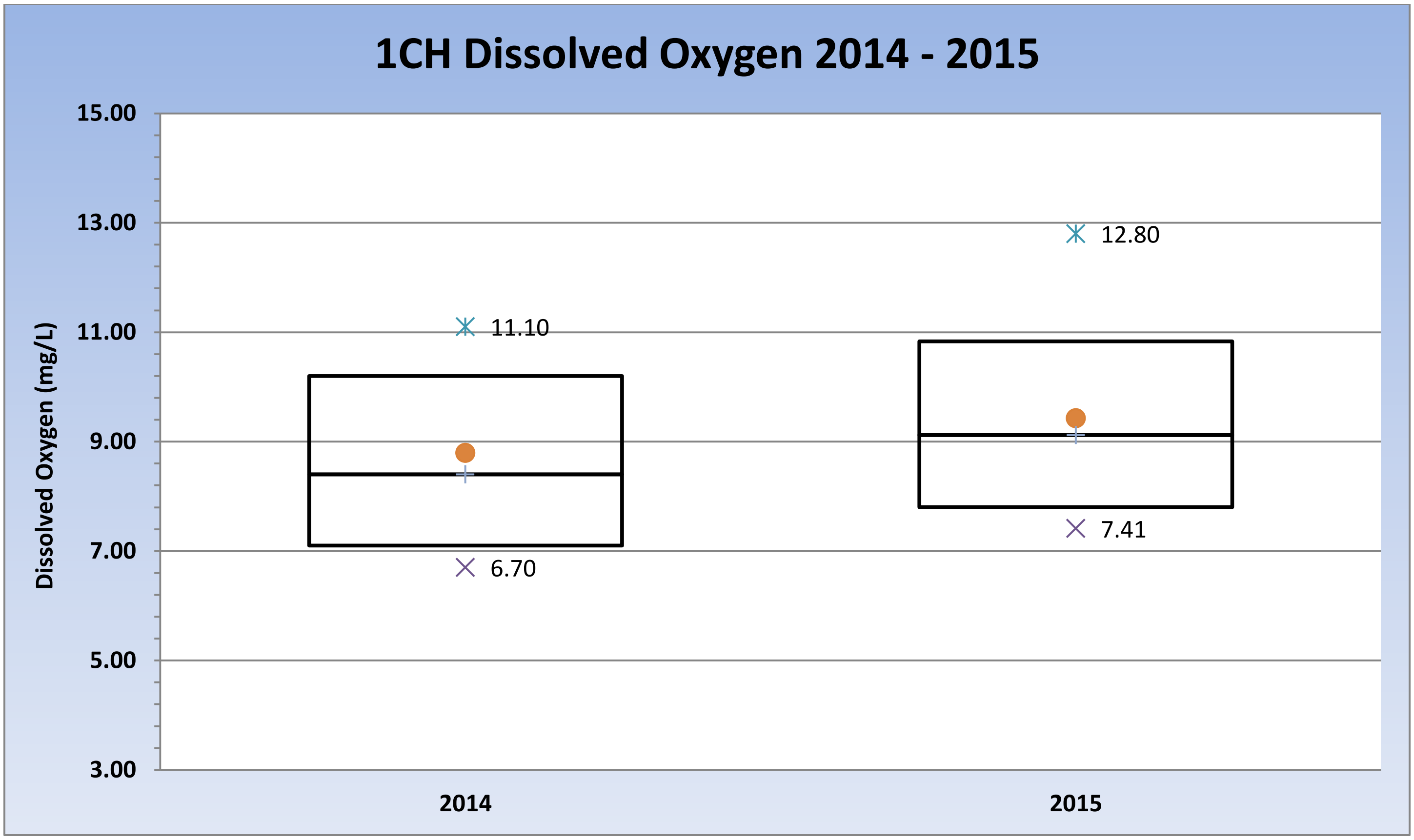

2CH pH 2014 - 2015
8.50
8.00
7.50
7.00
6.50
6.00
pH (standard units)
7.70
7.09
7.65
6.85
2014
2015

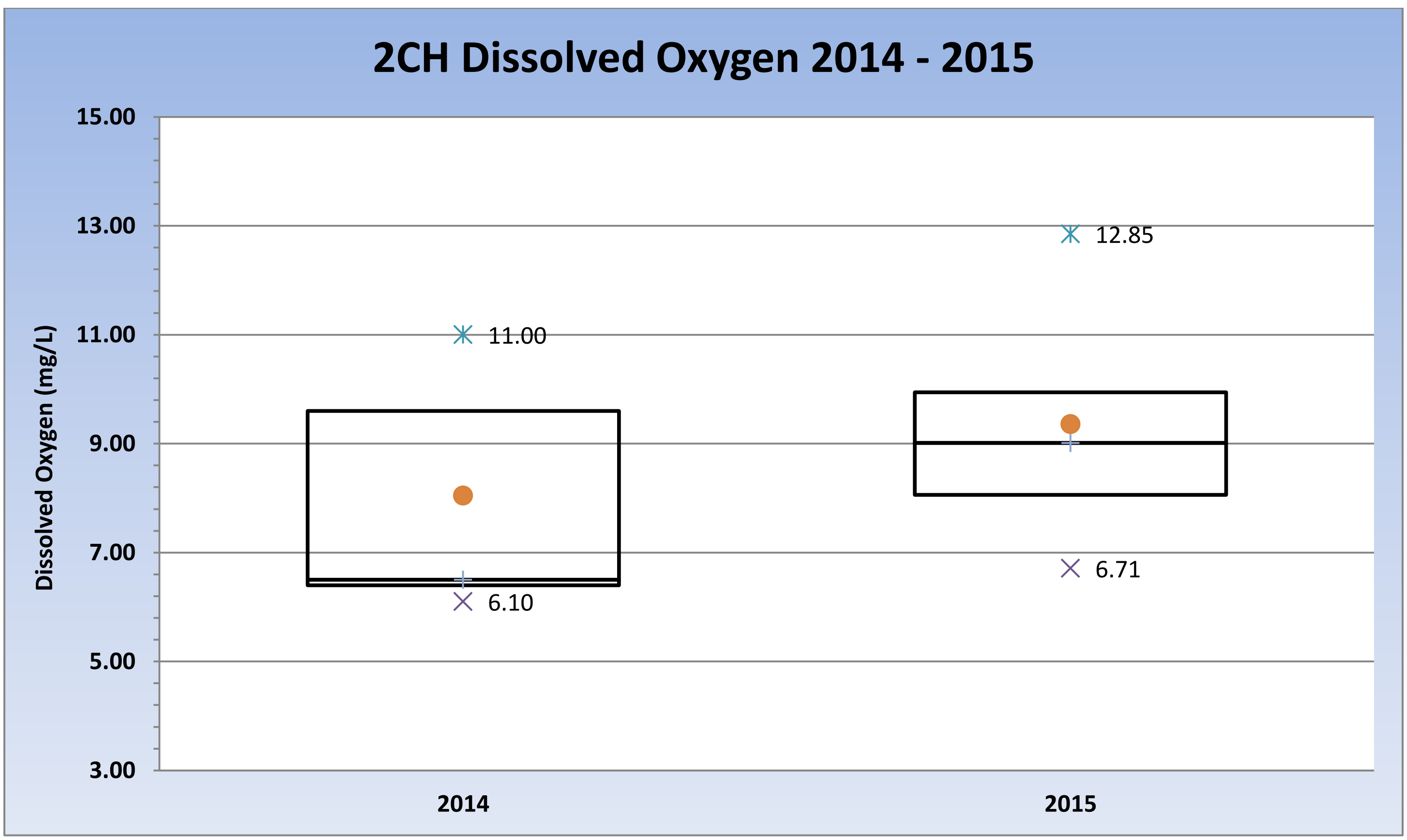

4CH pH 2014 - 2015
pH (standard units)
8.50
8.00
7.50
7.00
6.50
6.00
7.60
7.17
7.57
6.95
2014
2015

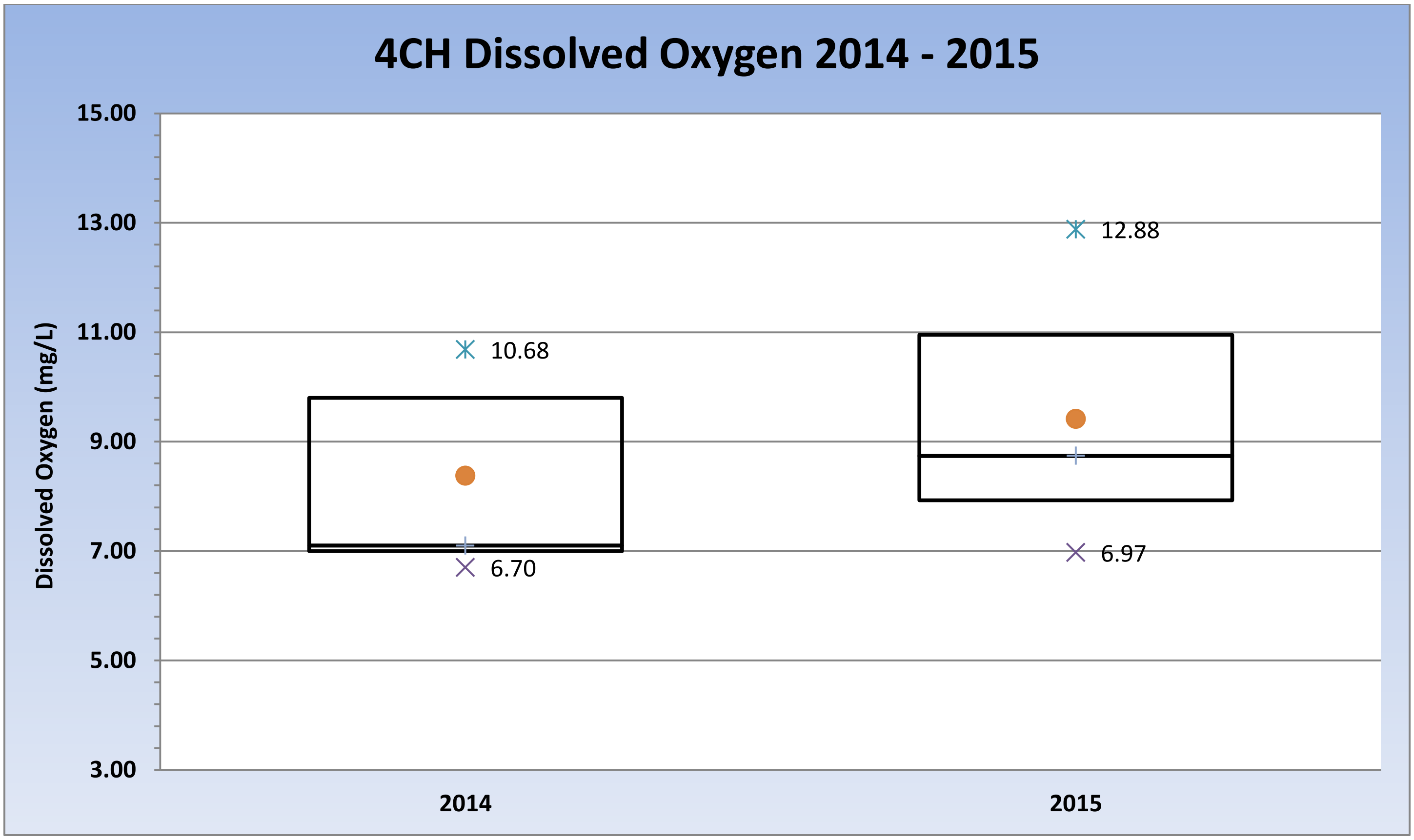

1CH Specific Conductance
Specific Conductance (µS/cm)
180
160
140
120
100
80
60
40
20
0
153
69
115
63
2014
2015


2CH Specific Conductance
Specific Conductance (µS/cm)
90
80
70
60
50
40
30
20
10
0
81
62
75
53
2014
2015


4CH Specific Conductance
Specific Conductance (µS/cm)
120
100
80
60
40
20
0
106
60
98
55
2014
2015


1CH Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
15.00
13.00
11.00
9.00
7.00
5.00
3.00
11.10
6.70
12.80
7.41
2014
2015


2CH Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
15.00
13.00
11.00
9.00
7.00
5.00
3.00
11.00
6.10
12.85
6.71
2014
2015



Moore's Mill Creek Watershed

A total of 1131 independent water quality measurements were collected in the Moore's Mill Creek watershed in 2015.

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 in particular 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.

Monitoring Station Locations and Notes:

1M – Latitude *32, 36, 8.253 N*; Longitude *85, 25, 35.563 W*. Station 1M is the farthest upstream monitoring location on Moore's Mill Creek, and is located at Bent Creek Road. This station is representative of water quality as it enters the City's Phase II jurisdiction. There are currently no active construction or development activities upstream of this site within the City's MS4 jurisdiction.

2M – Latitude *32, 35, 50.808 N*; Longitude *85, 26, 9.911 W*. Station 2M is located on Moore's Mill Creek off Bonny Glen Road. 2M is downstream of the unnamed tributary that drains the Auburn University Regional Airport (AUO).

3M – Latitude *32, 35, 10.371 N*; Longitude *85, 26, 58.62 W*. Station 3M is located on Moore's Mill Creek at Moore's Mill Road.

4M – Latitude *32, 34, 4.675 N*; Longitude *85, 27, 12.574 W.* Station 4M is located on Moore's Mill Creek at Windway Road.

5M – Latitude *32, 33, 44.879 N*; Longitude *85, 27, 54.706 W.* Station 5M is the final downstream station on Moore's Mill Creek at Ogletree Road.

6M – Latitude *32, 36, 11.560 N*; Longitude *85, 27, 11.520 W.* 6M is located on an unnamed tributary to Moore's Mill Creek as it crosses under Old Mill Rd. near East University Dr.

7M – Latitude *32, 36, 0.433 N*; Longitude *85, 27, 2.378 W.* 7M is also located on an unnamed tributary to Moore's Mill Creek as it crosses under Jockish Road.

8M – Latitude 32, 36*, 8.200 N*; Longitude *85, 25, 56.680 W*. 8M is located on an unnamed tributary to Moore's Mill Creek at Champions Blvd below AUO Airport.

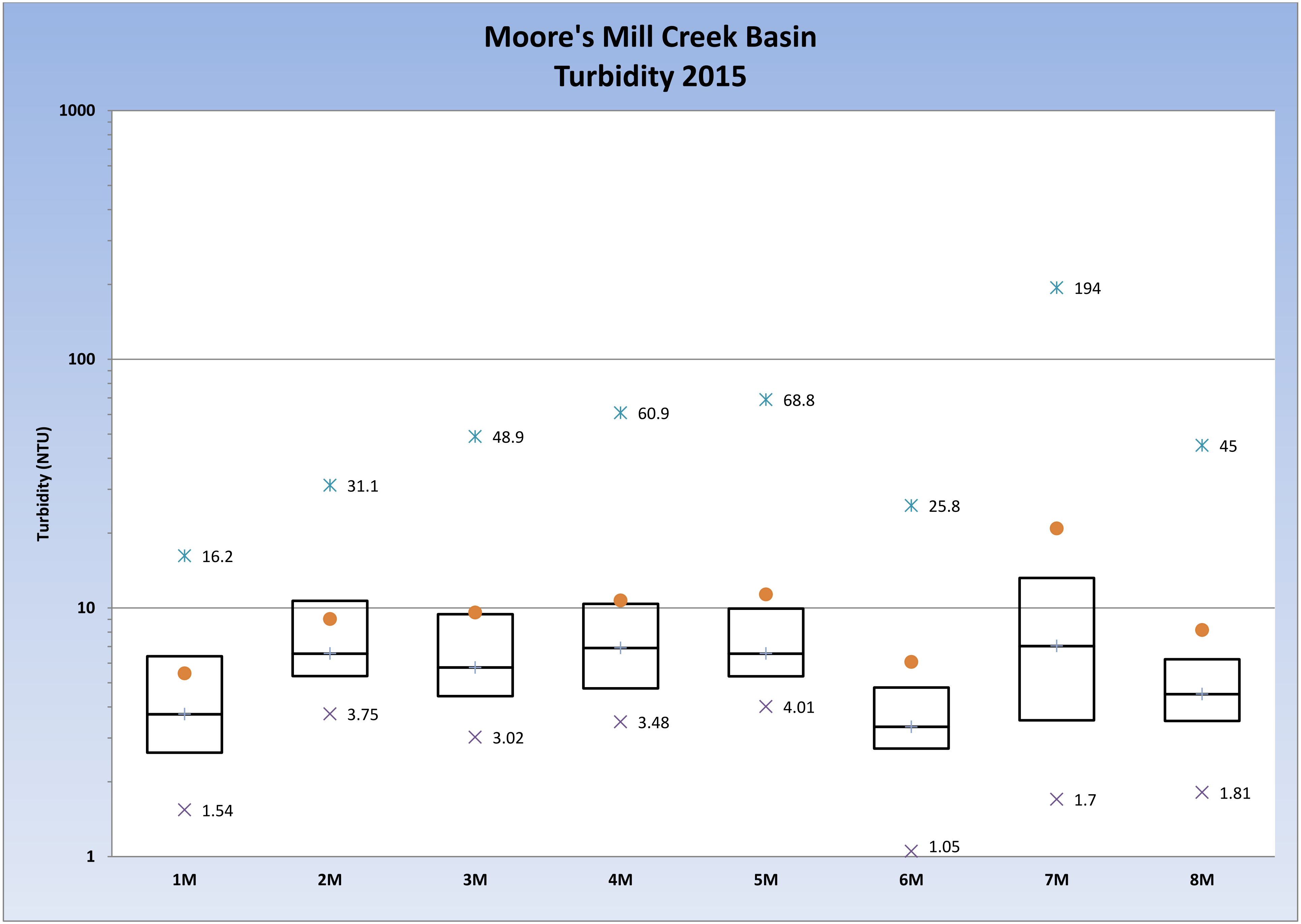
**See Insert for Maps of All Water Quality Monitoring Locations*

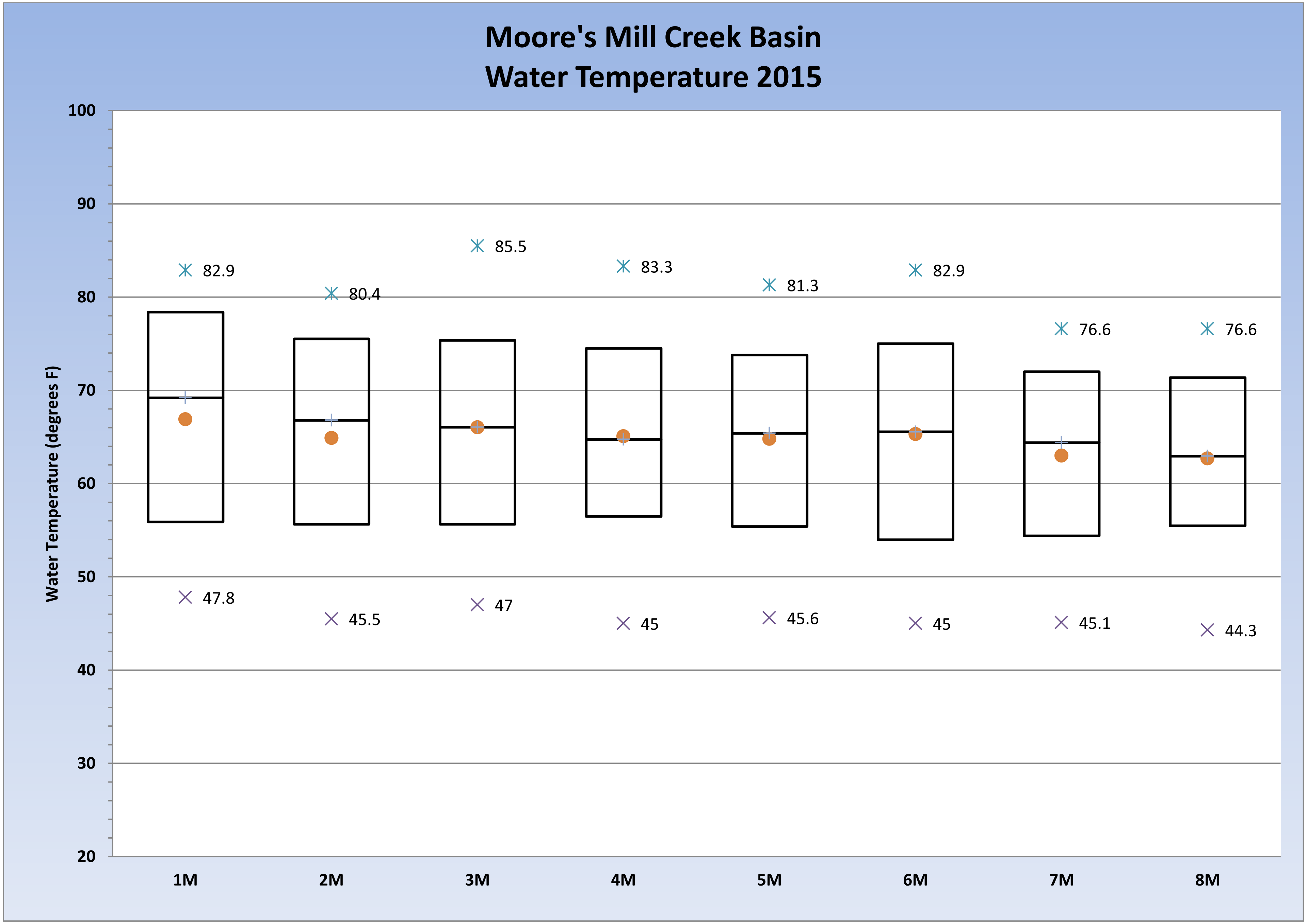
Nine Year Statistical Analysis of Turbidity Data for Moore's Mill Creek

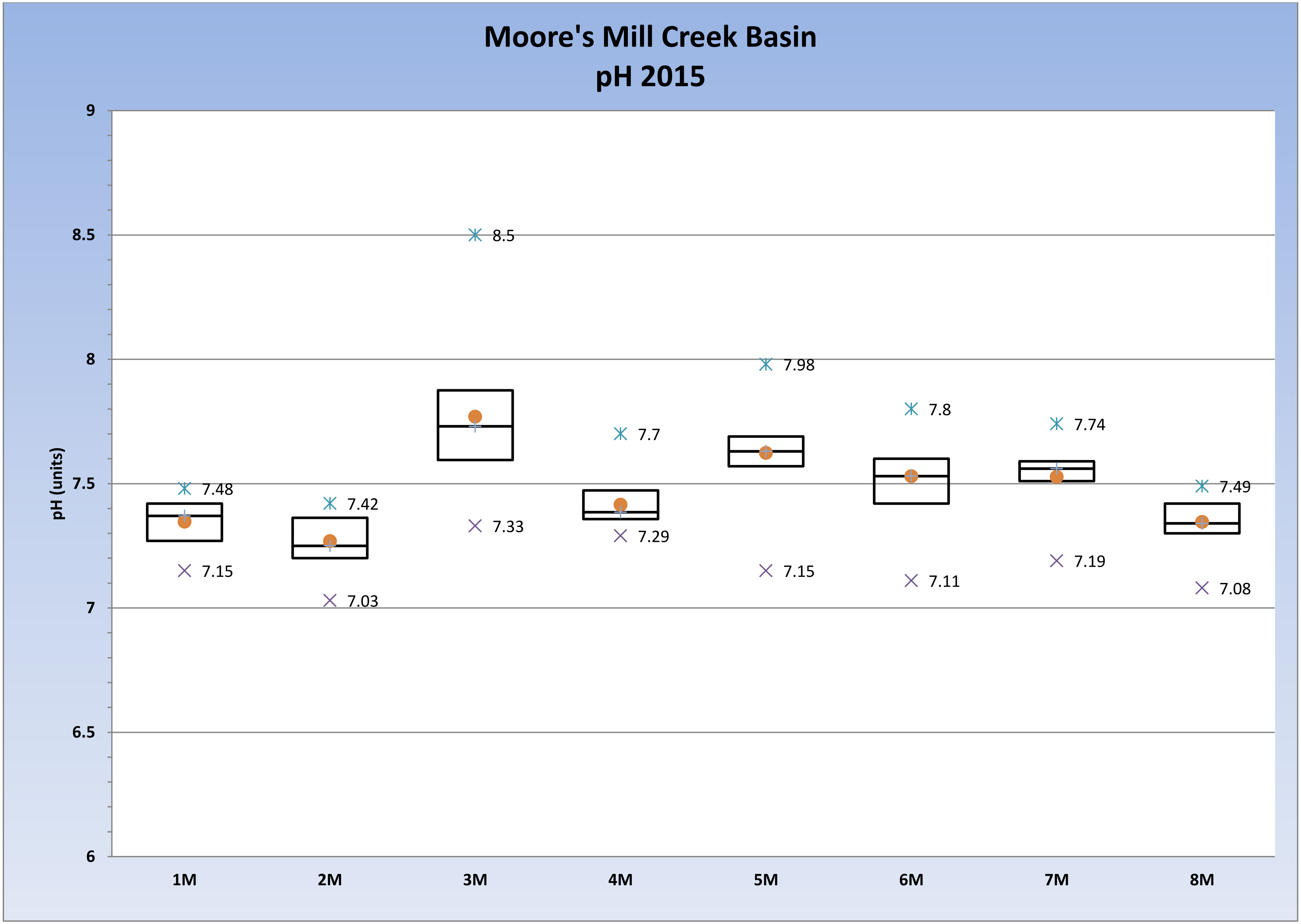
	1M								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	2.13	1.76	2.00	1.30	2.20	0.90	1.67	0.75	1.54
MAX	1100.00	566.67	65.00	39.00	39.00	28.00	27.37	52.00	16.2
AVG	67.32	35.27	17.01	9.56	9.07	8.10	7.39	7.36	5.46
MEDIAN	16.00	13.00	12.00	6.20	5.80	6.85	5.27	4.15	3.74
	2M								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	5.70	5.23	4.70	5.20	4.60	3.00	2.79	1.76	3.75
MAX	1100.00	5150.00	310.00	40.00	45.00	31.00	53.00	64.00	31.1
AVG	91.56	200.40	29.51	11.79	14.00	10.51	8.80	10.24	9.03
MEDIAN	20.34	21.50	15.00	10.00	11.00	8.59	6.10	8.39	6.55
	3M								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	3.33	3.20	4.40	2.10	3.30	2.40	2.16	1.59	3.02
MAX	717.00	2200.00	250.00	70.00	50.00	57.10	30.20	84.30	48.9
AVG	55.42	82.11	30.75	10.90	11.33	11.53	6.76	10.51	9.59
MEDIAN	12.00	12.00	15.00	7.80	7.50	7.74	4.49	5.19	5.76
	4M								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	3.37	5.23	4.20	2.80	4.20	2.81	3.01	2.37	3.48
MAX	750.00	1100.00	200.00	90.00	95.00	110.00	34.80	153.00	60.9
AVG	58.31	73.42	29.02	14.33	14.66	13.69	8.19	12.80	10.7
MEDIAN	14.00	12.50	14.00	10.45	9.60	8.71	5.84	6.47	6.91
	5M								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	2.03	4.36	4.90	3.40	2.00	1.67	2.53	3.78	4.01
MAX	483.33	3200.00	320.00	170.00	85.00	50.20	31.77	205.00	68.8
AVG	57.84	92.97	34.26	14.88	15.43	11.57	8.17	14.55	11.34
MEDIAN	13.50	12.00	14.00	7.90	9.50	8.45	5.72	6.87	6.55

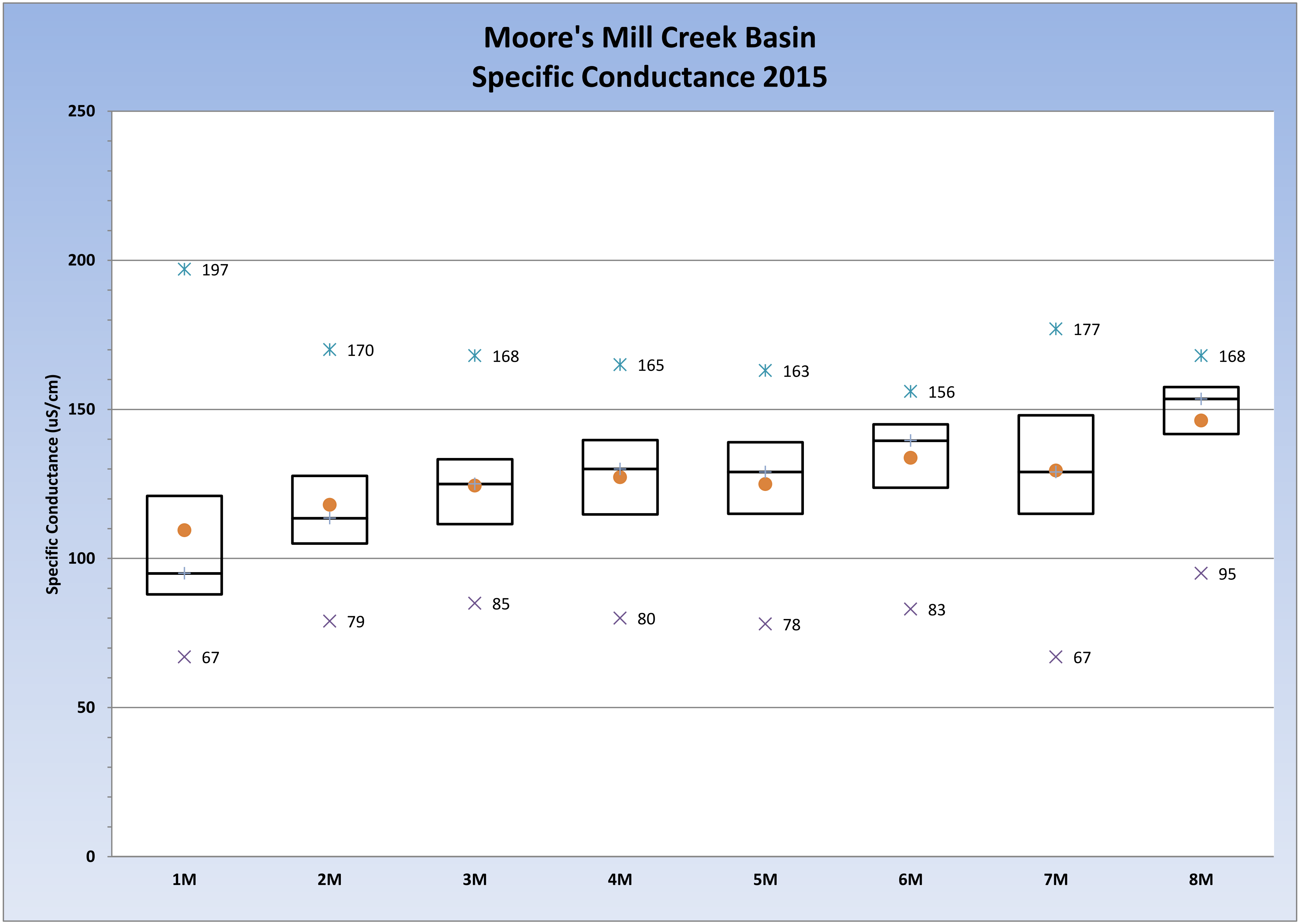
Nine Year Statistical Analysis of Turbidity Data for Moore's Mill Creek Tributaries

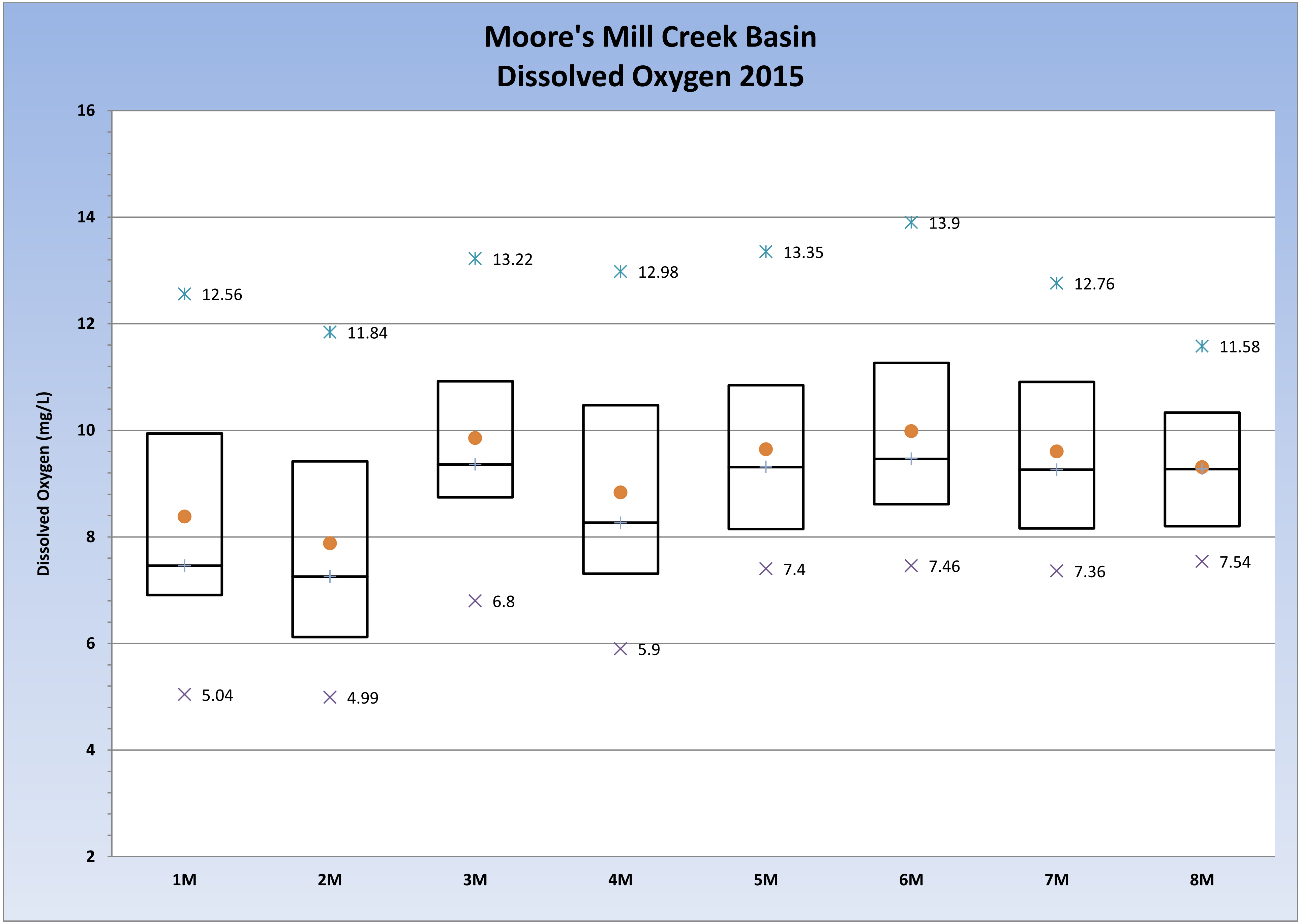
	6M								
	2007	2008	2009	2010	2011	2012	2013	2014	2015
MIN	0.63	0.87	1.70	1.90	1.90	1.05	0.19	0.17	1.05
MAX	61.67	140.00	75.00	19.00	40.00	24.80	76.00	194.00	25.8
AVG	10.51	14.89	10.40	5.68	9.17	6.99	6.26	9.95	6.06
MEDIAN	6.90	6.42	6.20	4.45	5.80	5.70	3.30	3.83	3.33
	7M								
	2007	2008	2009	2010	2011	2012	2013	2014	2015
MIN	0.75	1.80	2.70	2.80	1.60	1.53	1.11	0.10	1.7
MAX	330.00	350.00	290.00	600.00	200.00	1225.00	147.00	293.00	194
AVG	39.41	42.60	34.20	35.03	23.11	53.03	9.64	12.26	20.9
MEDIAN	6.37	7.83	9.90	11.50	9.20	8.50	4.40	2.92	7.03
	8M								
	2007	2008	2009	2010	2011	2012	2013	2014	2015
MIN	7.57	4.17	6.00	3.10	4.80	2.58	2.37	1.67	1.81
MAX	1100.00	4200.00	500.00	38.00	42.00	94.00	38.00	192.00	45
AVG	105.81	199.15	42.78	10.02	12.87	14.92	8.73	14.40	8.16
MEDIAN	17.50	21.00	16.00	7.00	10.00	10.12	5.58	6.33	4.5

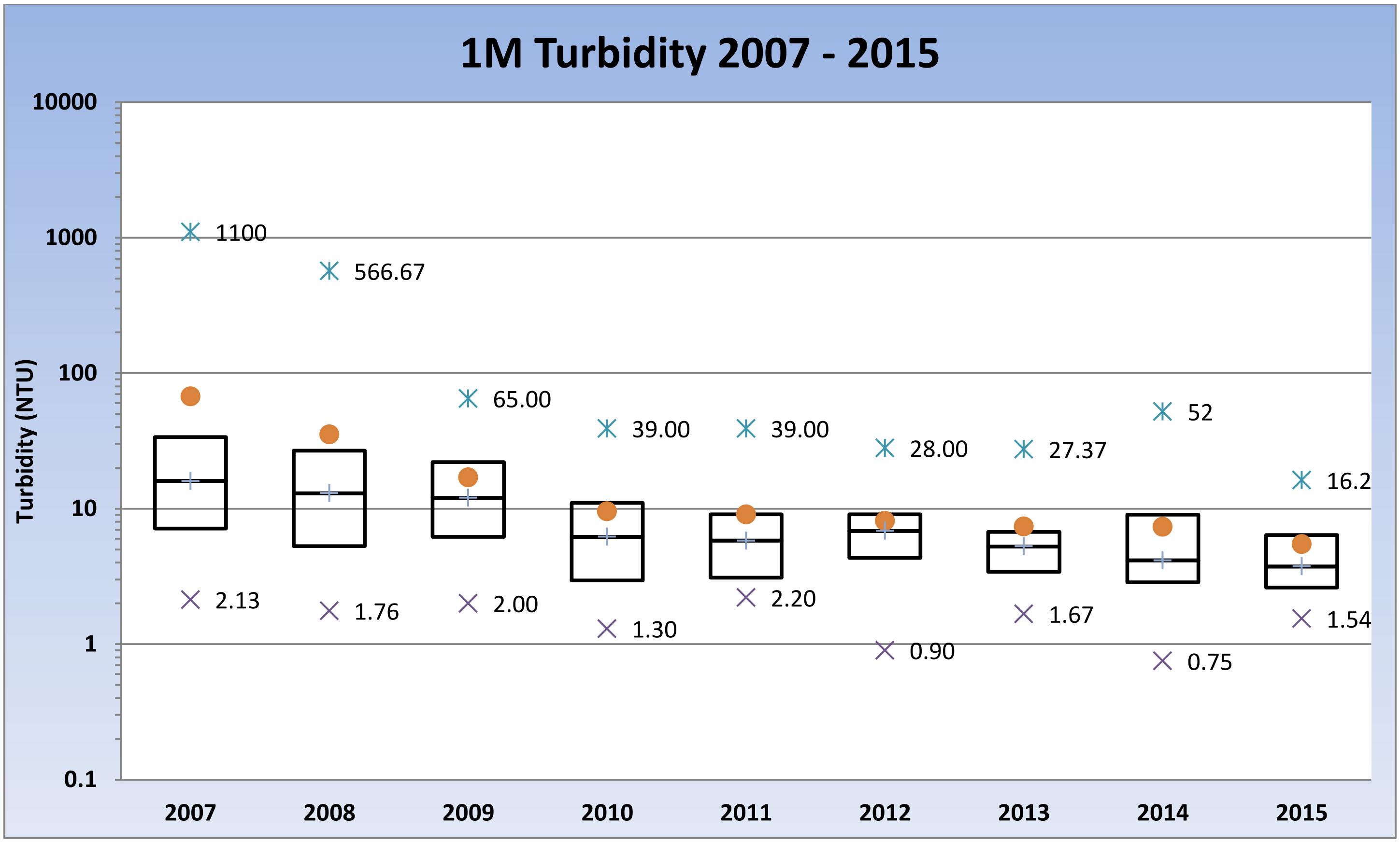

Moore's Mill Creek Basin
Turbidity 2015
Turbidity (NTU)
1000
100
10
1
1M
2M
3M
4M
5M
6M
7M
8M
16.2
31.1
48.9
60.9
68.8
25.8
194
45
1.54
3.75
3.02
3.48
4.01
1.05
1.7
1.81

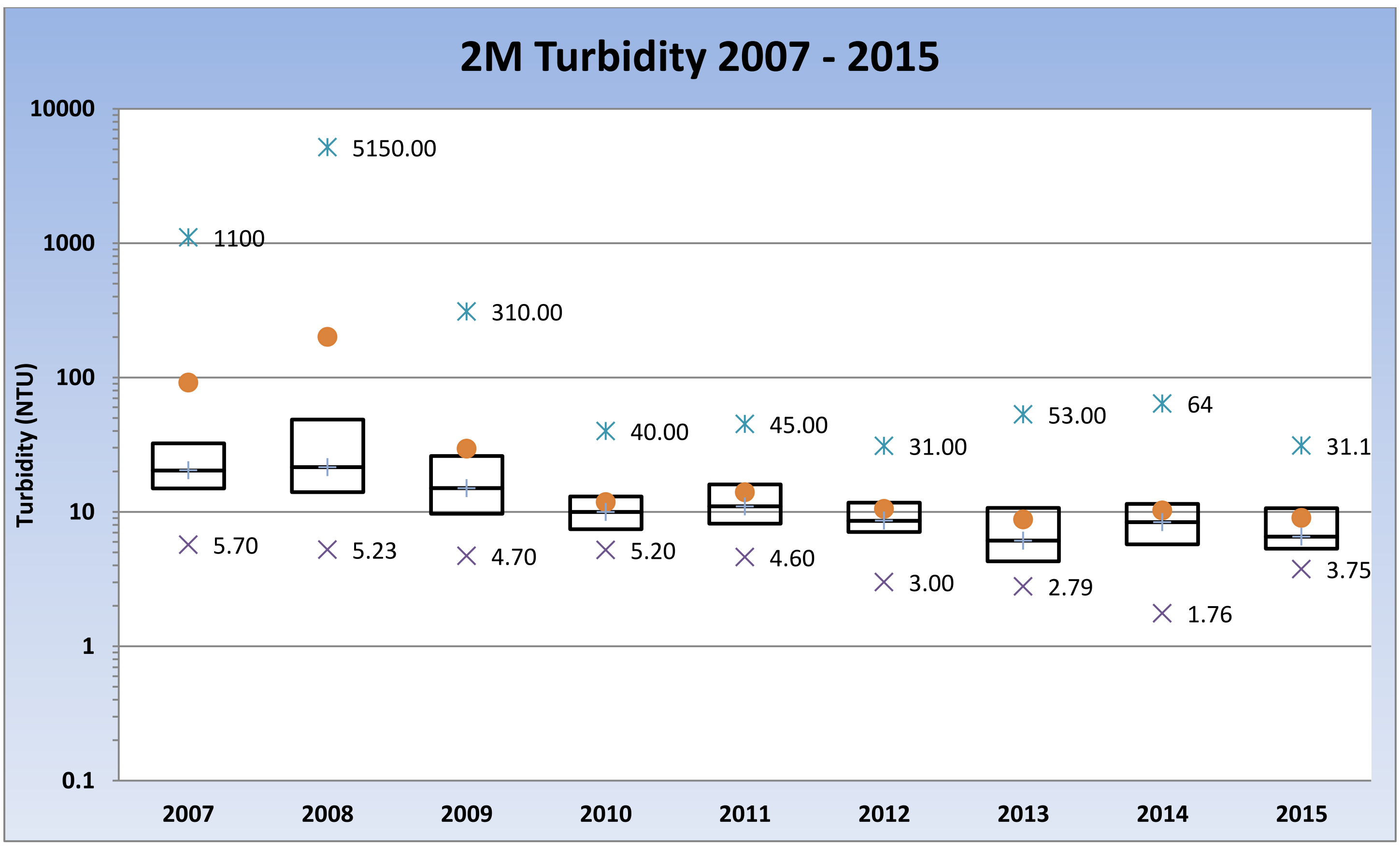

Moore's Mill Creek Basin
Water Temperature 2015
Water Temperature (degrees F)
100
90
80
70
60
50
40
30
20
82.9
80.4
85.5
83.3
81.3
82.9
76.6
76.6
47.8
45.5
47
45
45.6
45
45.1
44.3
1M
2M
3M
4M
5M
6M
7M
8M

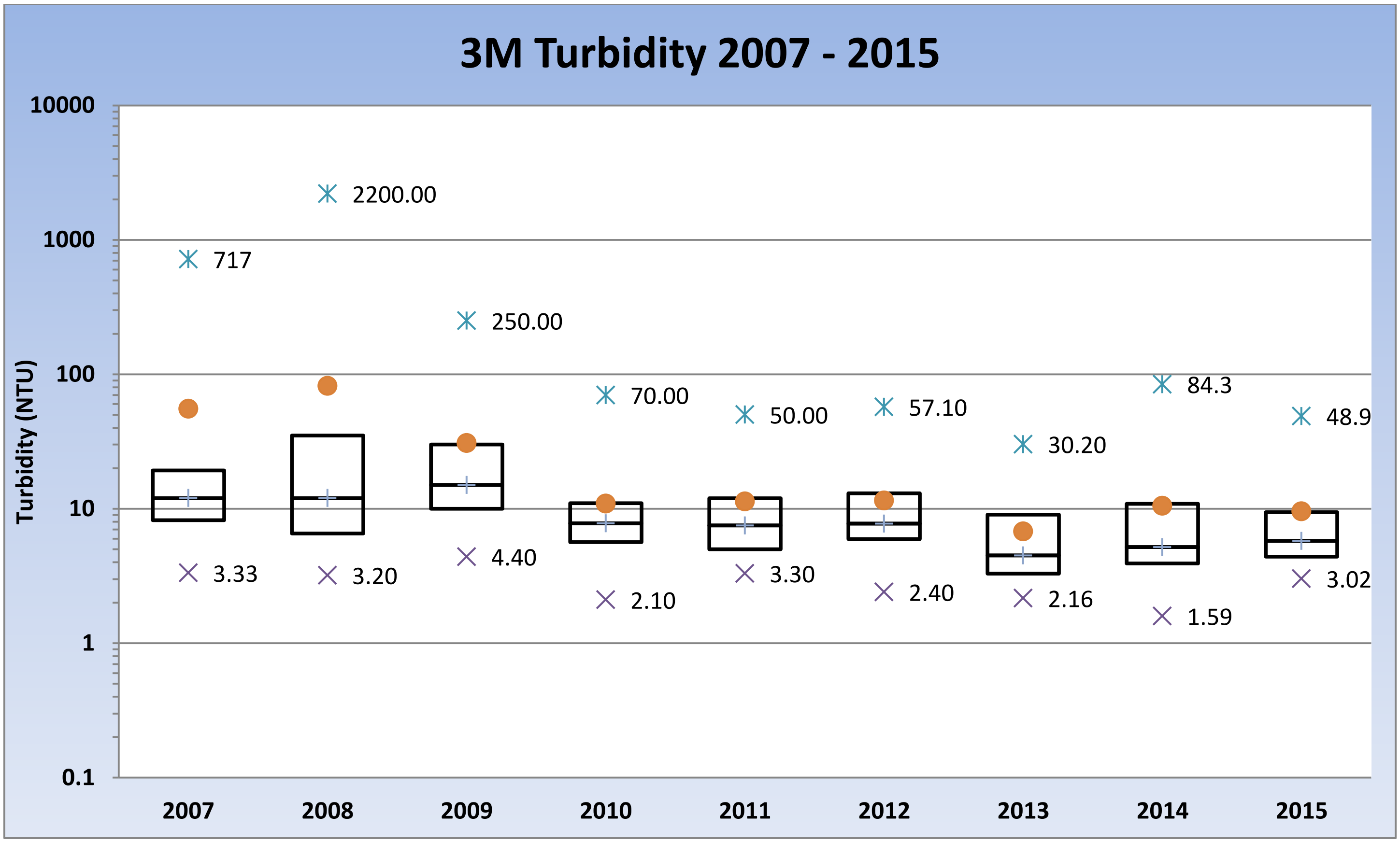

Moore's Mill Creek Basin
pH 2015
pH (units)
9
8.5
8
7.5
7
6.5
6
1M
2M
3M
4M
5M
6M
7M
8M
7.48
7.15
7.42
7.03
8.5
7.33
7.7
7.29
7.98
7.15
7.8
7.11
7.74
7.19
7.49
7.08

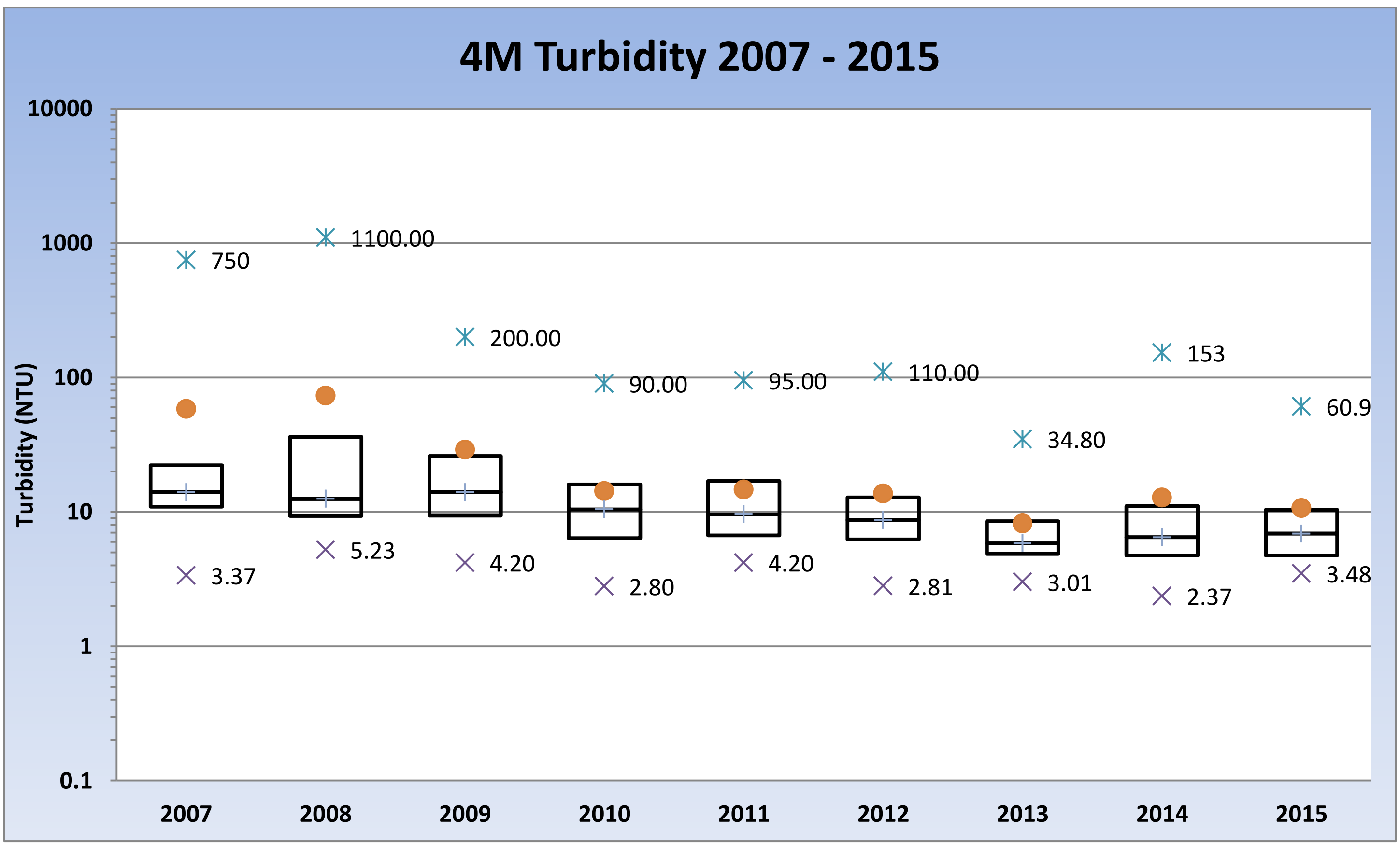

Moore's Mill Creek Basin
Specific Conductance 2015
Specific Conductance (uS/cm)
250
200
150
100
50
0
197
170
168
165
163
156
177
168
67
79
85
80
78
83
67
95
1M
2M
3M
4M
5M
6M
7M
8M

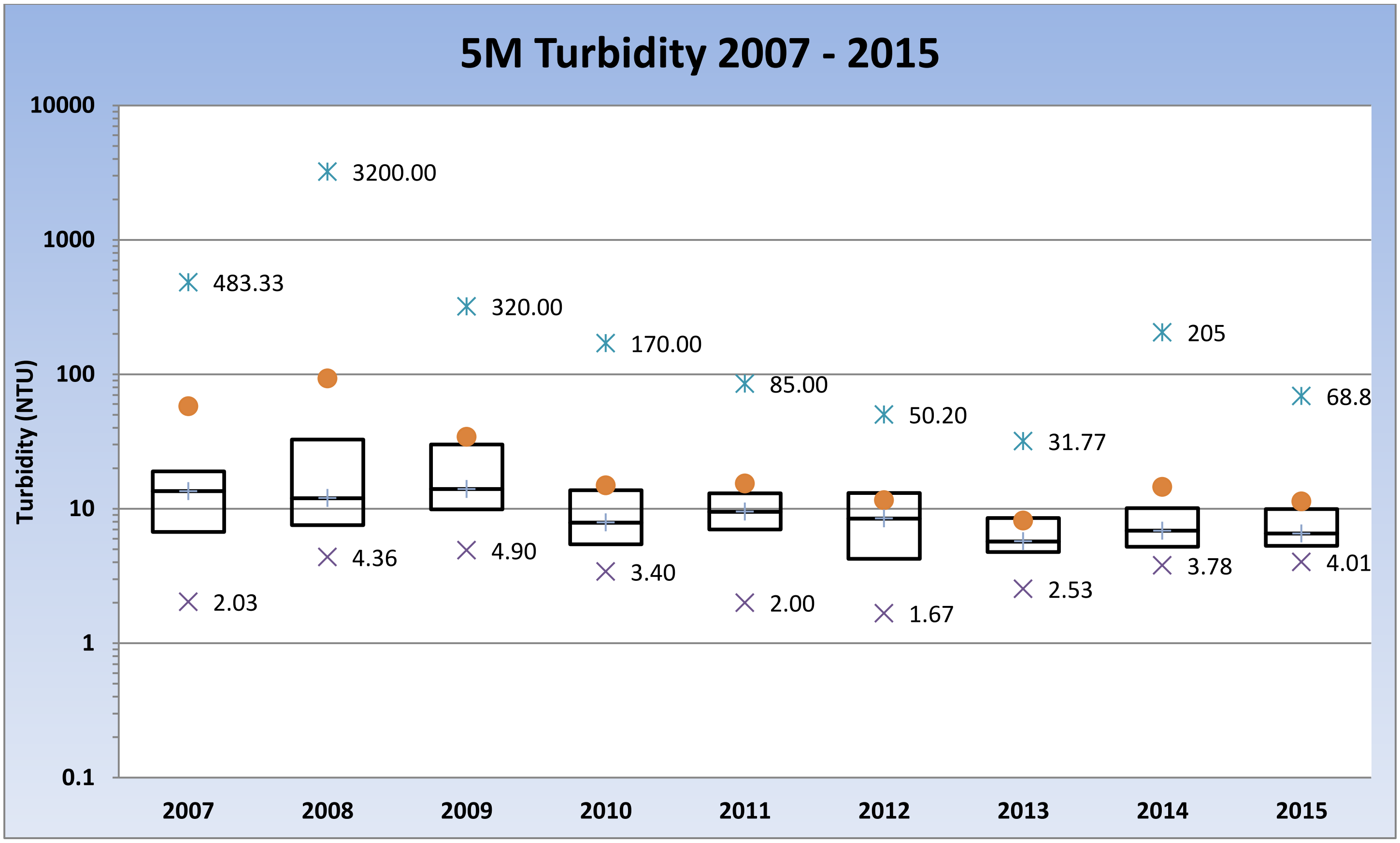

Moore's Mill Creek Basin
Dissolved Oxygen 2015
Dissolved Oxygen (mg/L)
16
14
12
10
8
6
4
2
12.56
11.84
13.22
12.98
13.35
13.9
12.76
11.58
5.04
4.99
6.8
5.9
7.4
7.46
7.36
7.54
1M
2M
3M
4M
5M
6M
7M
8M

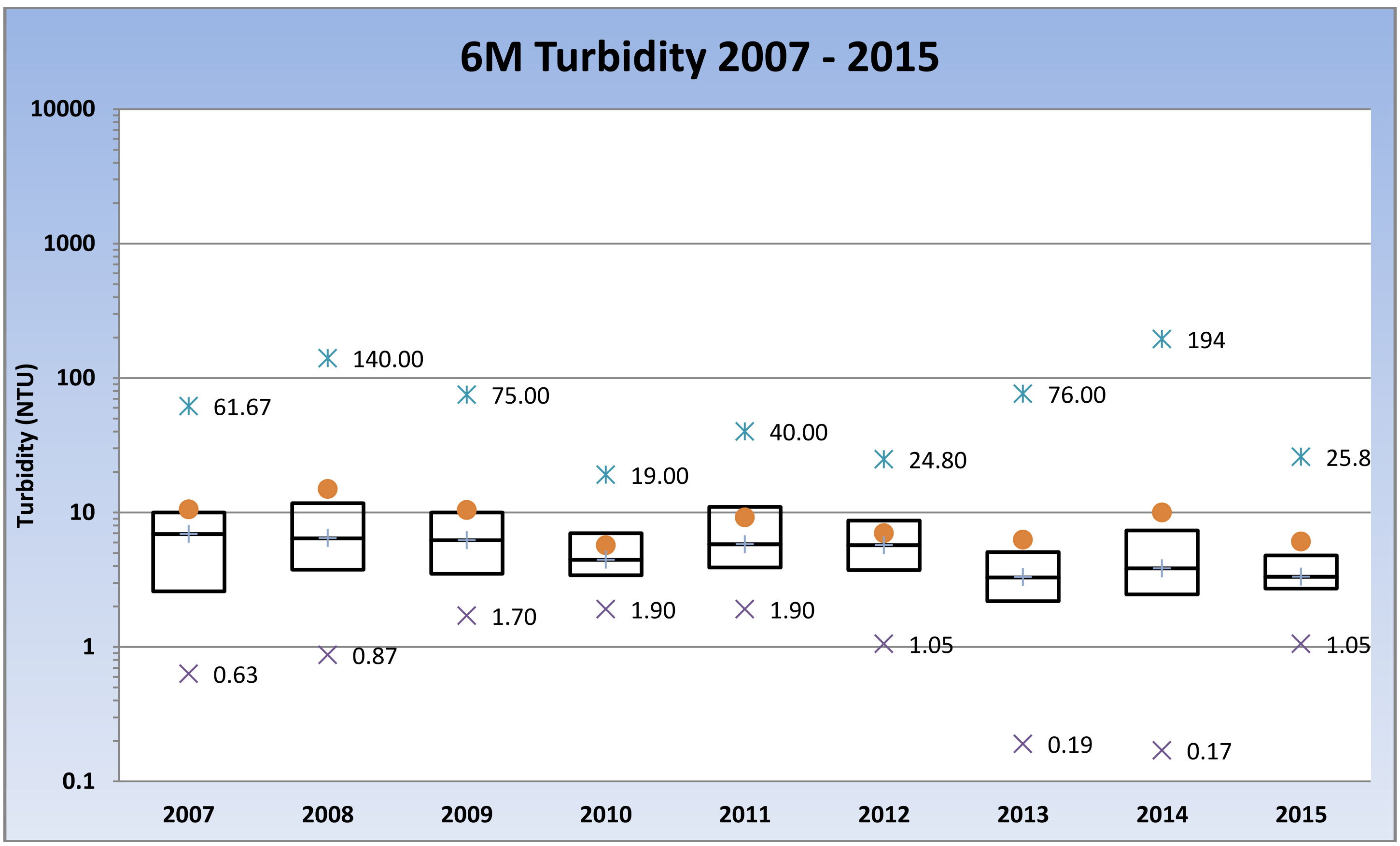

1M Turbidity 2007 - 2015
Turbidity (NTU)
10000
1000
100
10
1
0.1
1100
566.67
65.00
39.00
39.00
28.00
27.37
52
16.2
2.13
1.76
2.00
1.30
2.20
0.90
1.67
0.75
1.54
2007
2008
2009
2010
2011
2012
2013
2014
2015

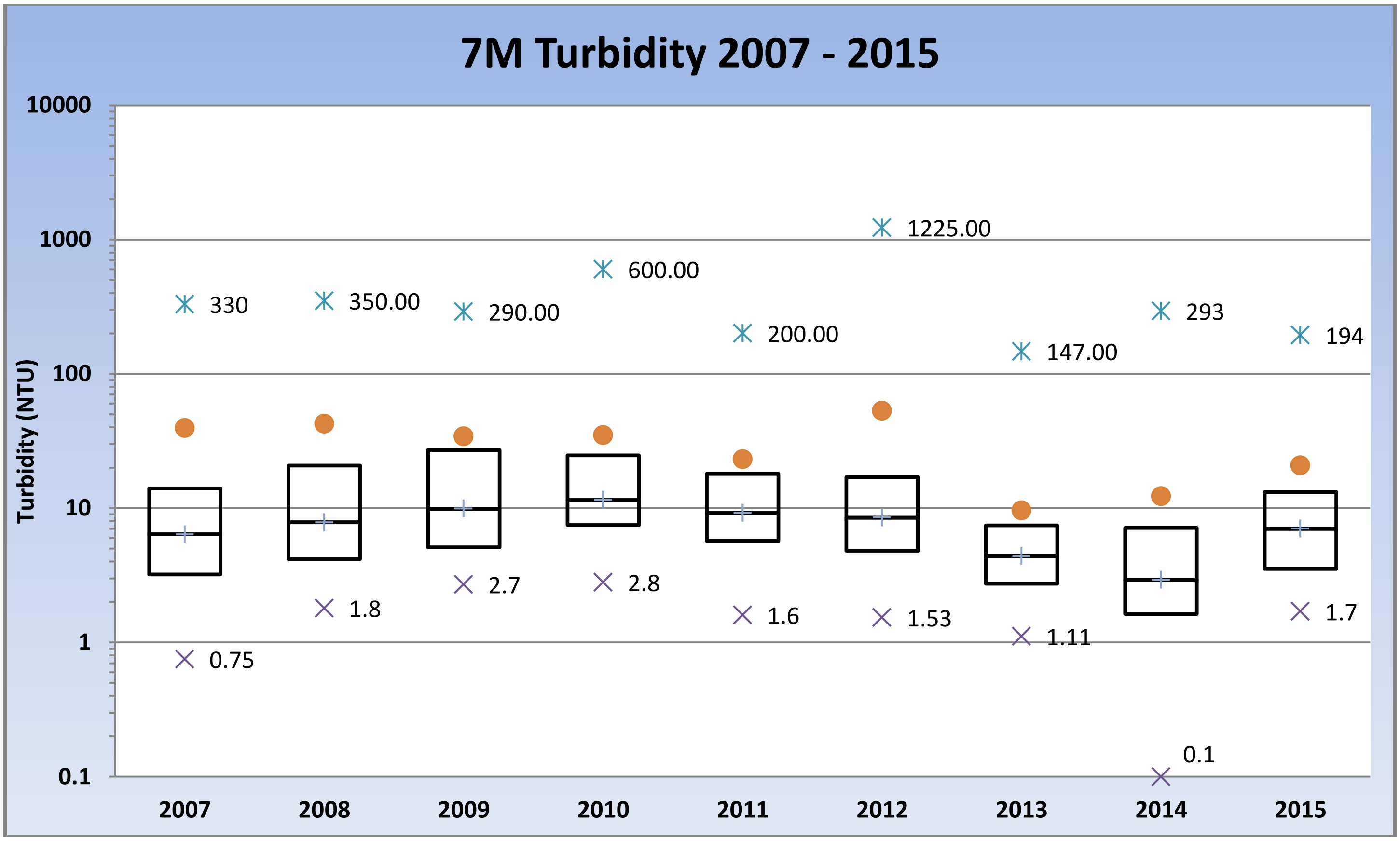

2M Turbidity 2007 - 2015
Turbidity (NTU)
10000
1000
100
10
1
0.1
5150.00
1100
310.00
40.00
45.00
31.00
53.00
64
31.1
5.70
5.23
4.70
5.20
4.60
3.00
2.79
1.76
3.75
2007
2008
2009
2010
2011
2012
2013
2014
2015

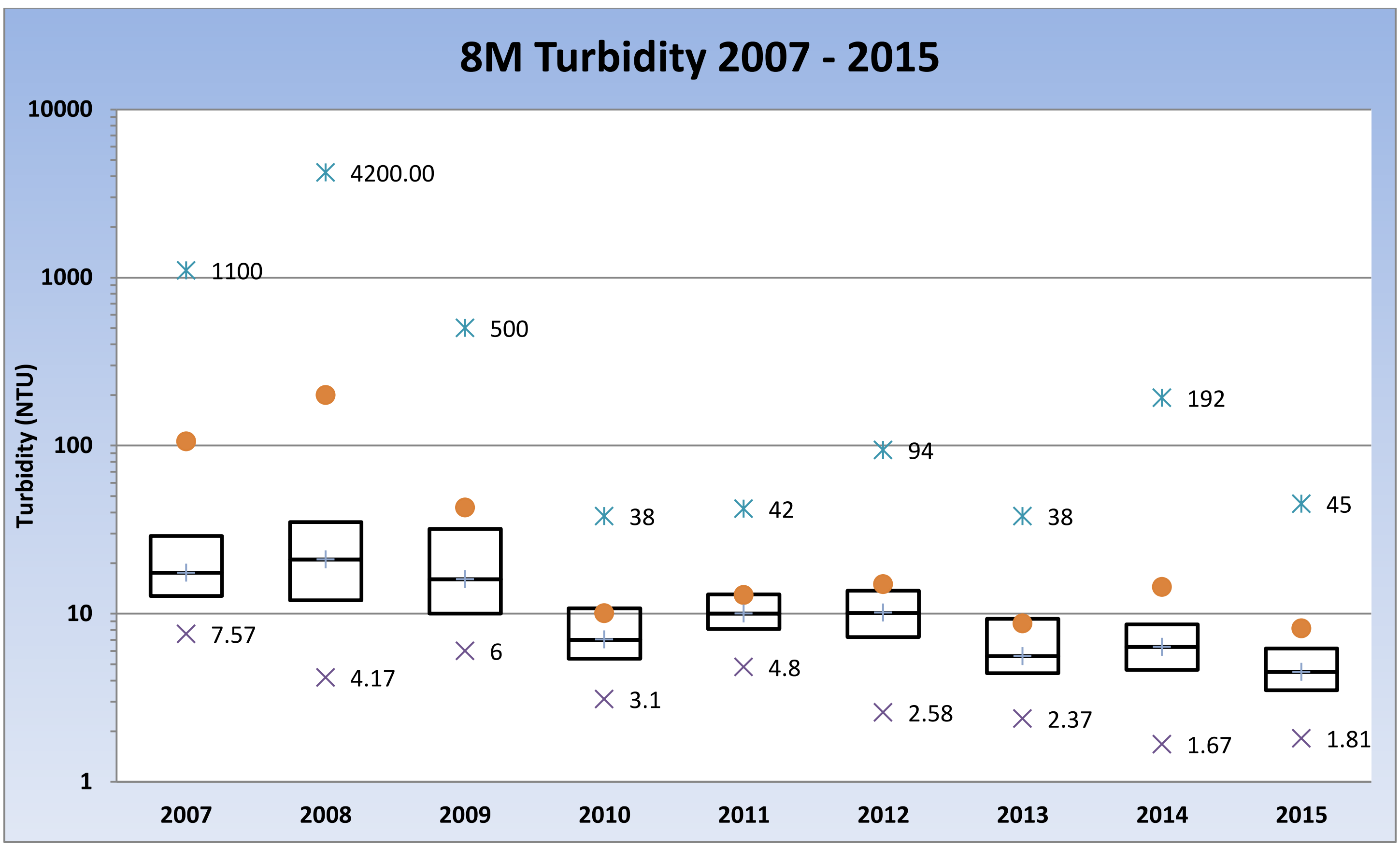

3M Turbidity 2007 - 2015
Turbidity (NTU)
10000
1000
100
10
1
0.1
2007
2008
2009
2010
2011
2012
2013
2014
2015
717
2200.00
250.00
70.00
50.00
57.10
30.20
84.3
48.9
3.33
3.20
4.40
2.10
3.30
2.40
2.16
1.59
3.02

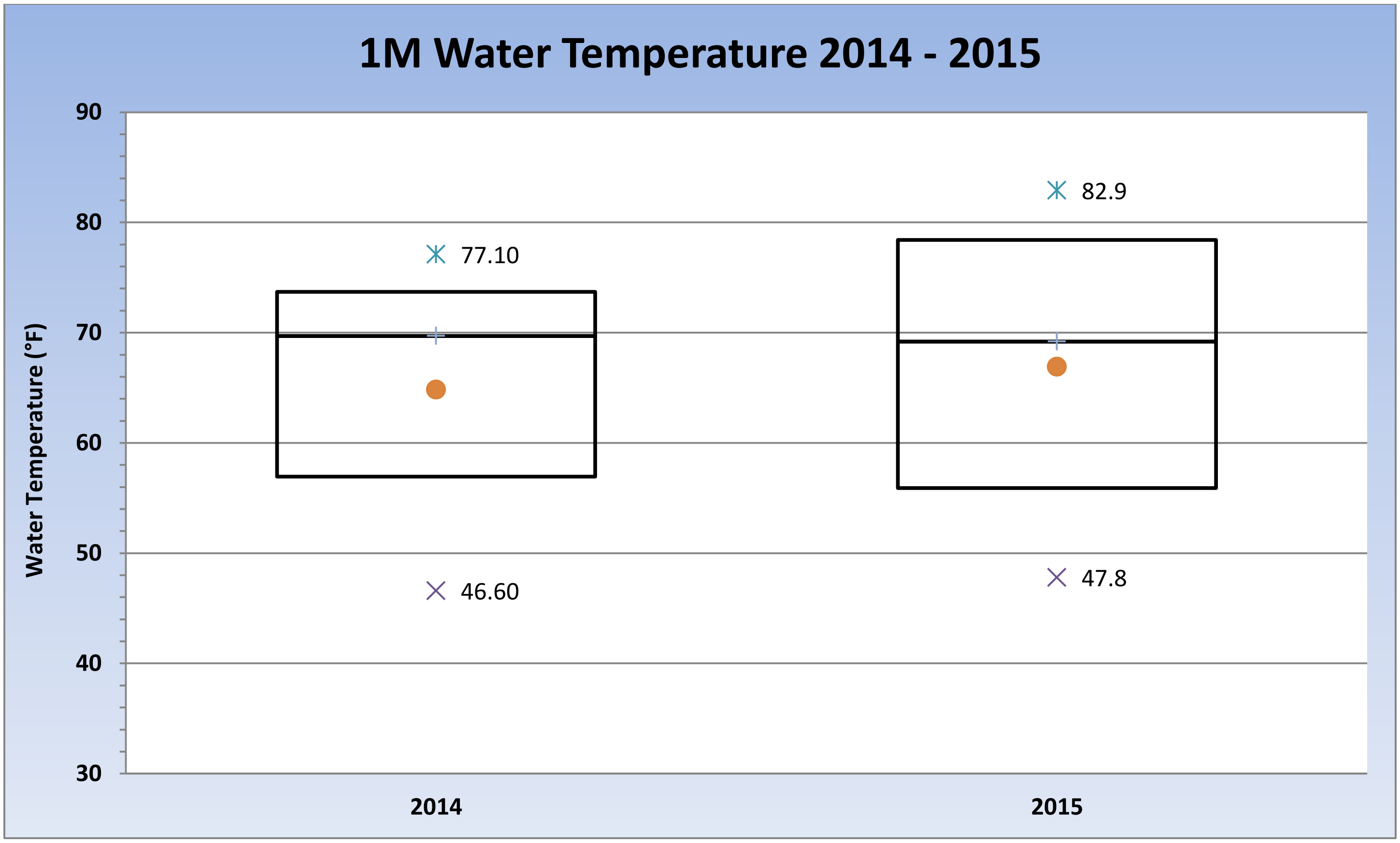

4M Turbidity 2007 - 2015
Turbidity (NTU)
10000
1000
100
10
1
0.1
2007
2008
2009
2010
2011
2012
2013
2014
2015
750
1100.00
200.00
90.00
95.00
110.00
34.80
153
60.9
3.37
5.23
4.20
2.80
4.20
2.81
3.01
2.37
3.48

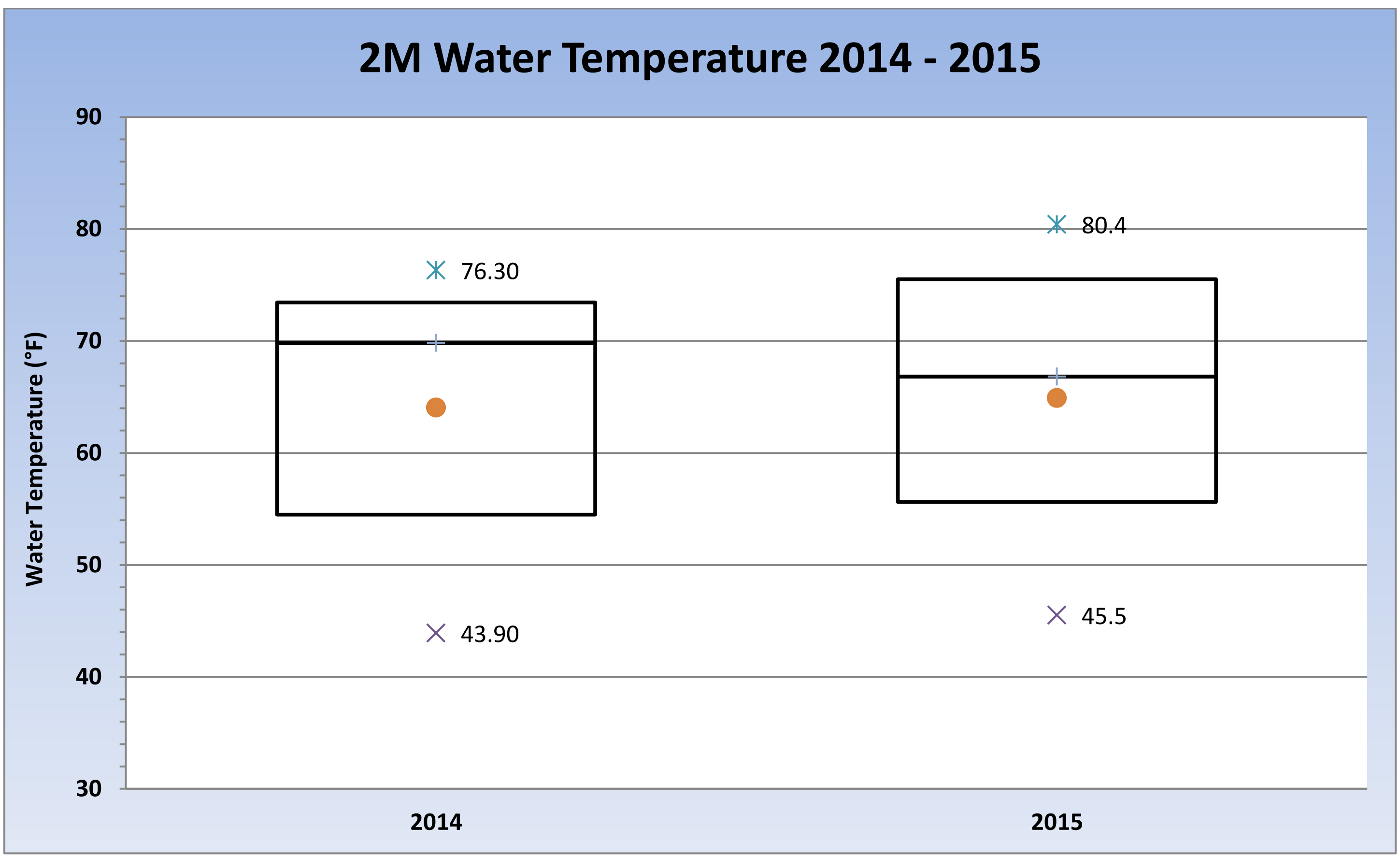

5M Turbidity 2007 - 2015
Turbidity (NTU)
10000
1000
100
10
1
0.1
3200.00
483.33
320.00
170.00
85.00
50.20
31.77
205
68.8
4.36
4.90
3.40
2.03
2.00
1.67
2.53
3.78
4.01
2007
2008
2009
2010
2011
2012
2013
2014
2015

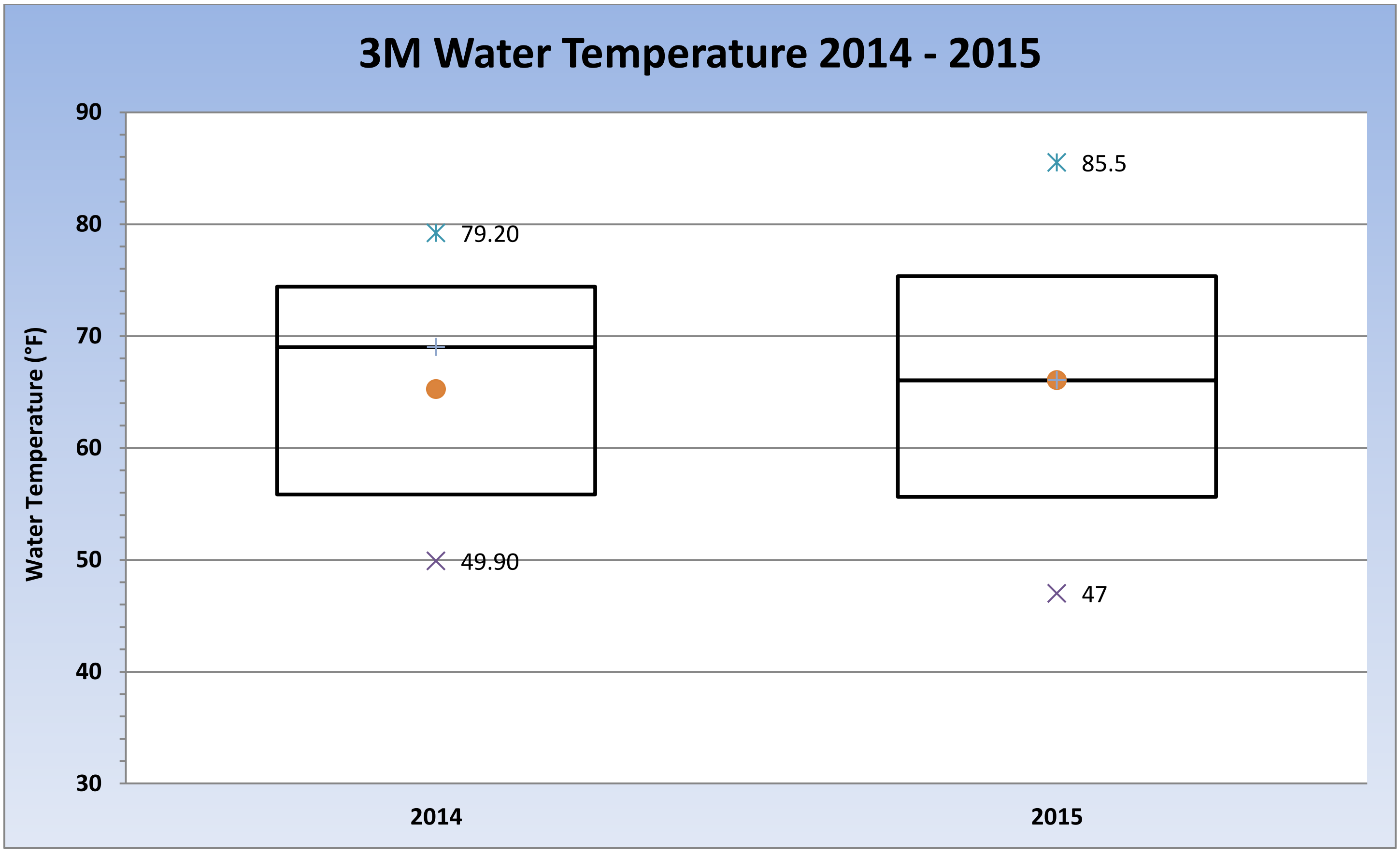

6M Turbidity 2007 - 2015
Turbidity (NTU)
10000
1000
100
10
1
0.1
140.00
61.67
75.00
19.00
40.00
24.80
76.00
194
25.8
1.70
1.90
1.90
0.63
0.87
1.05
1.05
0.19
0.17
2007
2008
2009
2010
2011
2012
2013
2014
2015

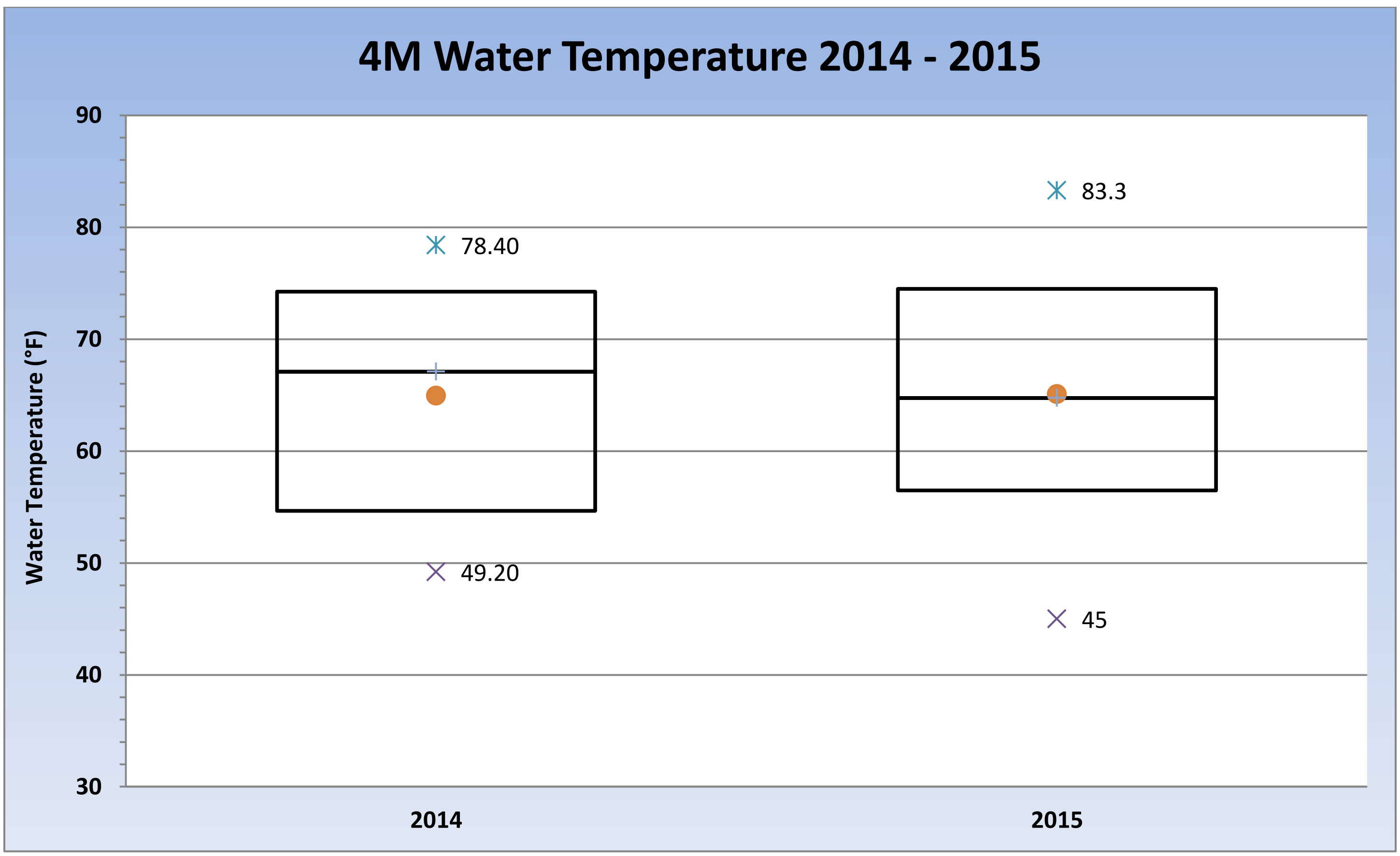

7M Turbidity 2007 - 2015
Turbidity (NTU)
10000
1000
100
10
1
0.1
330
350.00
290.00
600.00
200.00
1225.00
147.00
293
194
0.75
1.8
2.7
2.8
1.6
1.53
1.11
0.1
1.7
2007
2008
2009
2010
2011
2012
2013
2014
2015

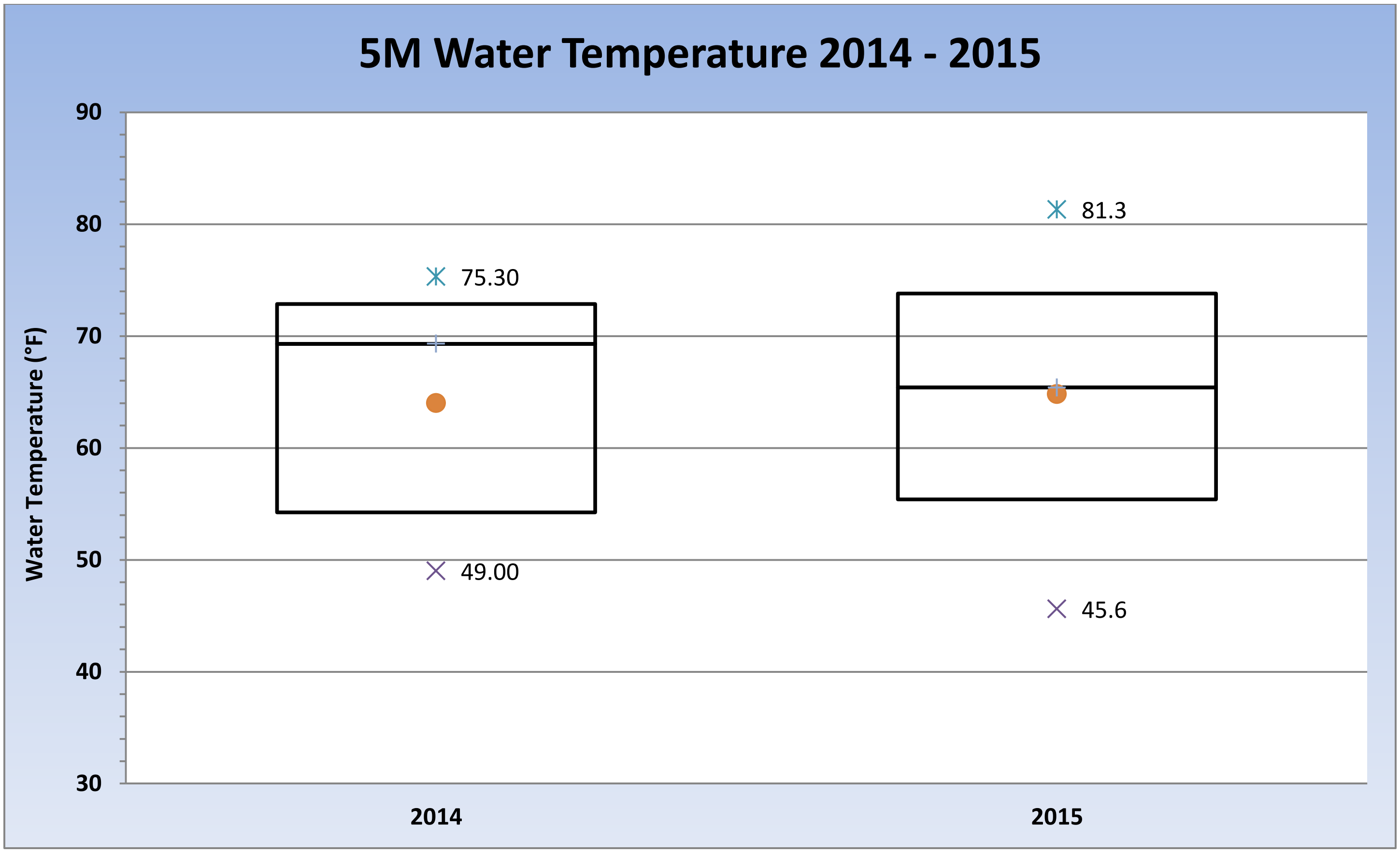

8M Turbidity 2007 - 2015
Turbidity (NTU)
10000
1000
100
10
1
1100
4200.00
500
38
42
94
38
192
45
7.57
4.17
6
3.1
4.8
2.58
2.37
1.67
1.81
2007
2008
2009
2010
2011
2012
2013
2014
2015

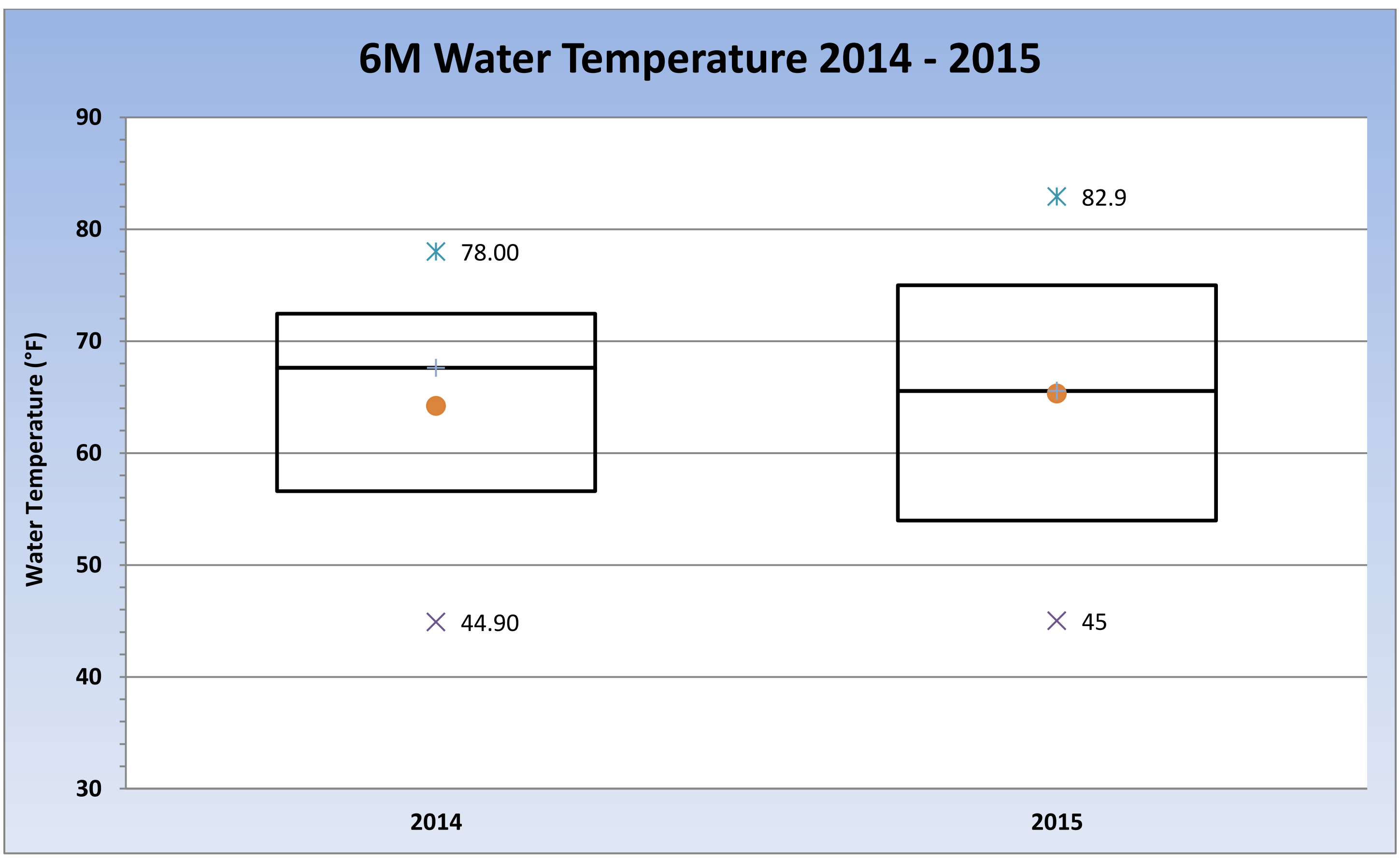

1M Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
77.10
46.60
82.9
47.8
2014
2015

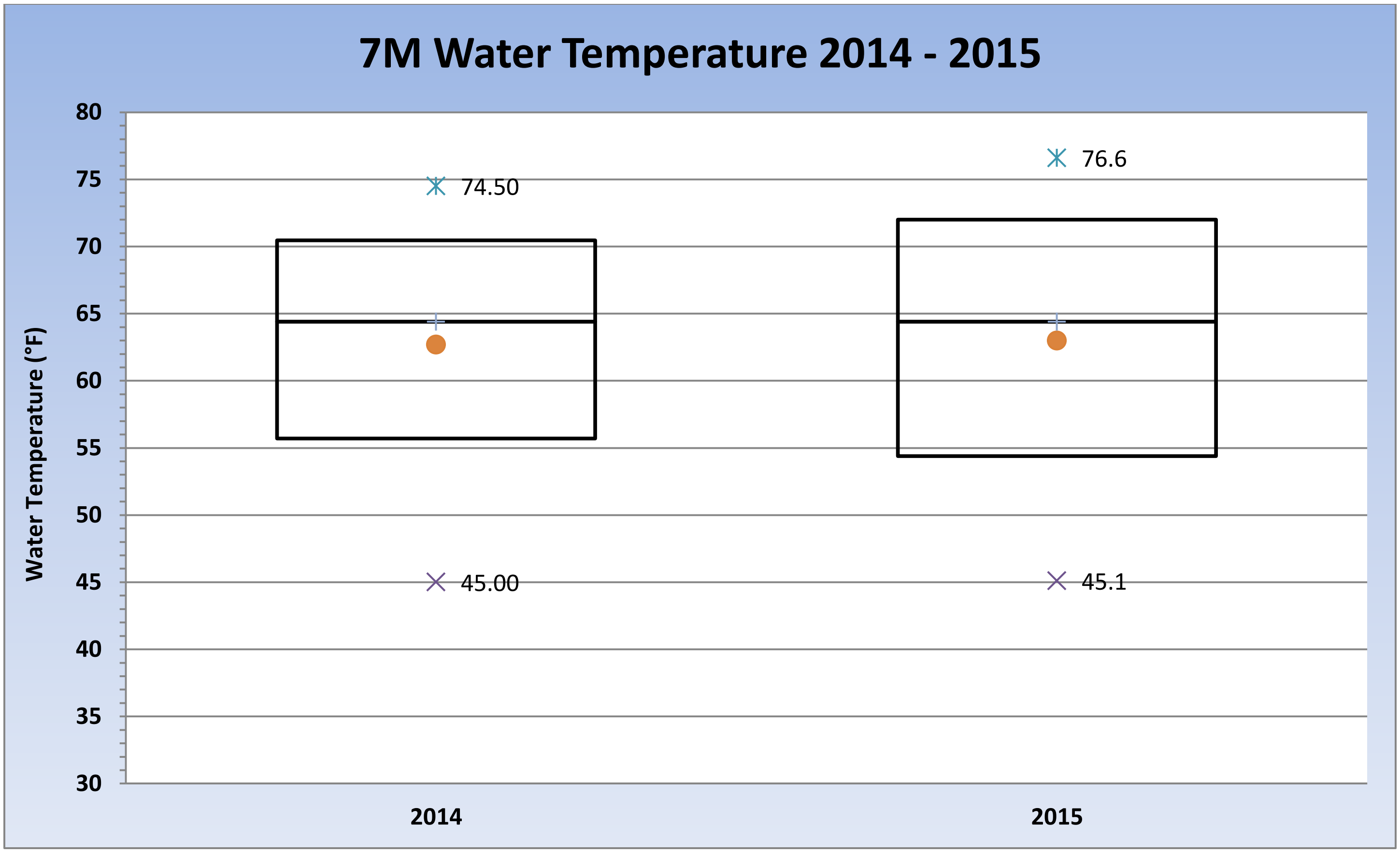

2M Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
76.30
43.90
80.4
45.5
2014
2015

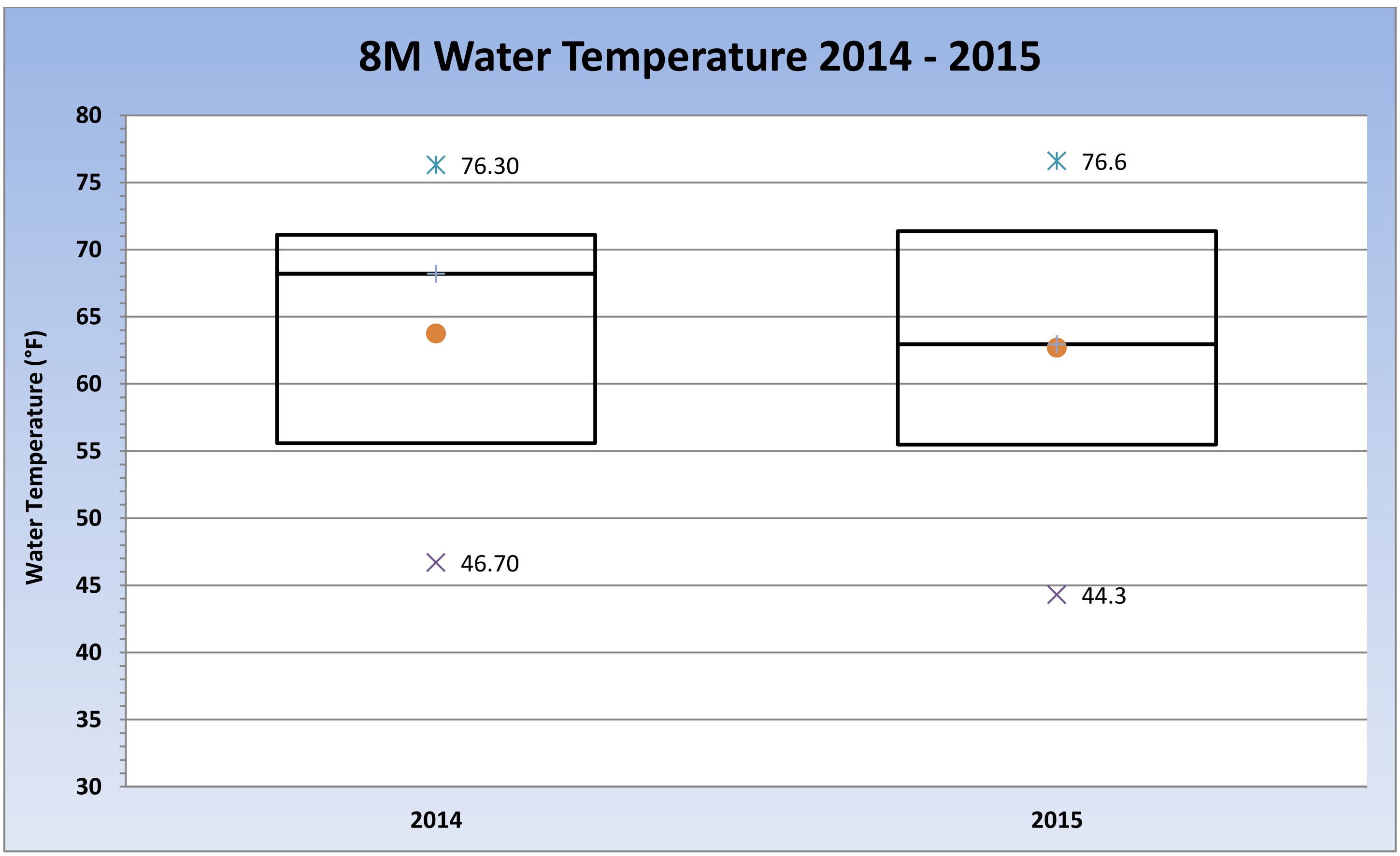

3M Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
79.20
49.90
85.5
47
2014
2015

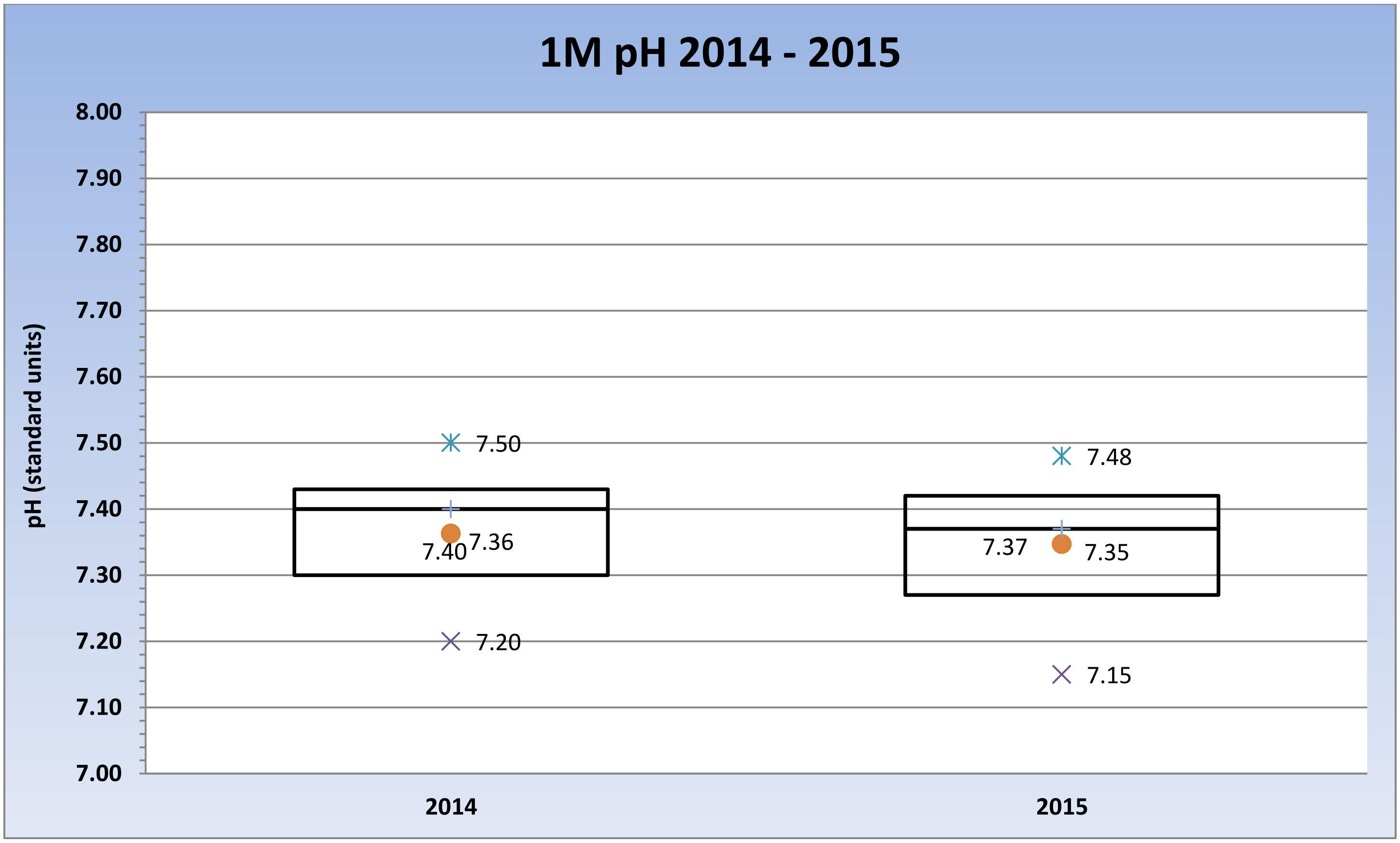

4M Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
78.40
49.20
83.3
45
2014
2015

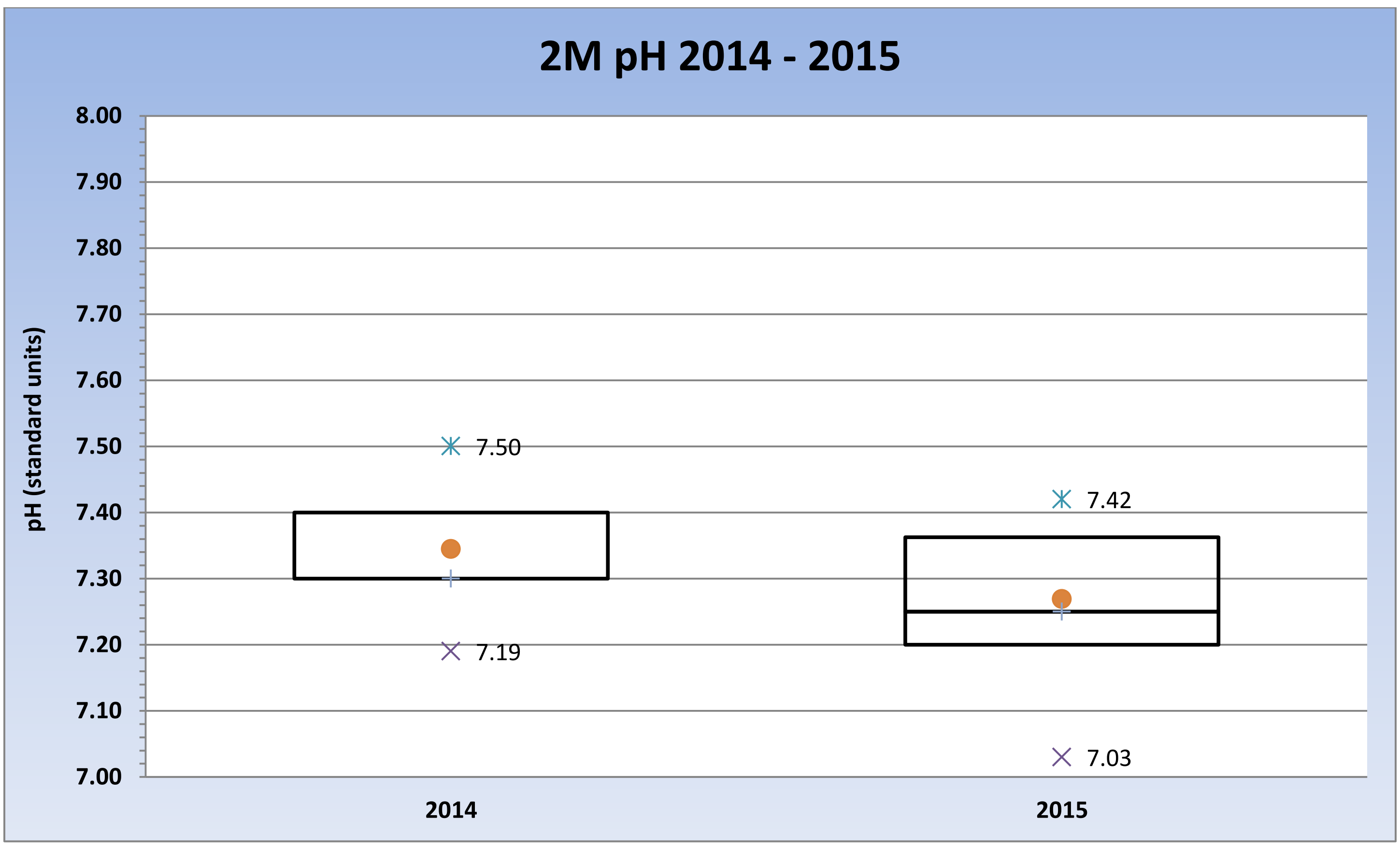

5M Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
75.30
49.00
81.3
45.6
2014
2015

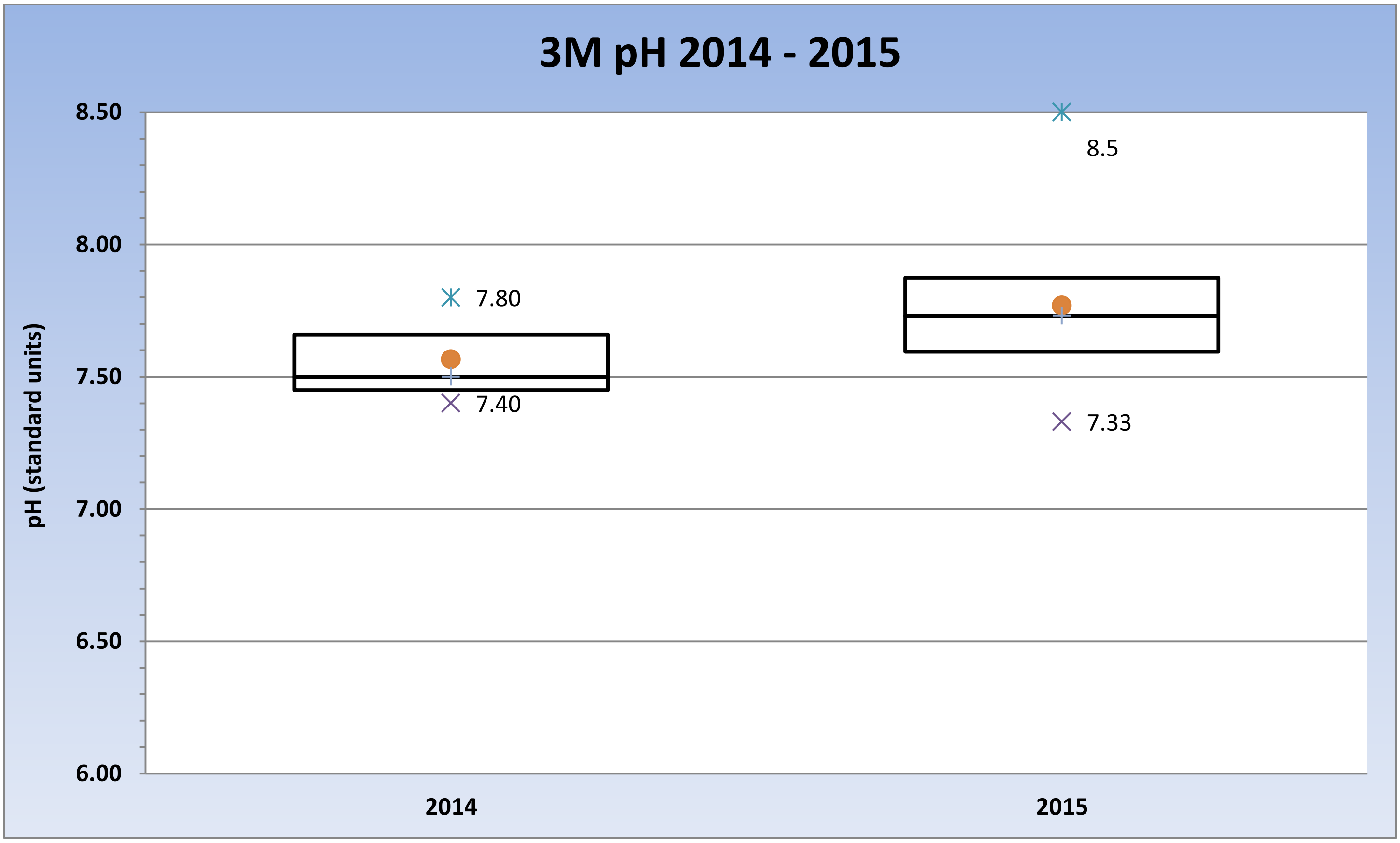

6M Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
78.00
44.90
82.9
45
2014
2015


7M Water Temperature 2014 - 2015
Water Temperature (°F)
80
75
70
65
60
55
50
45
40
35
30
74.50
45.00
76.6
45.1
2014
2015

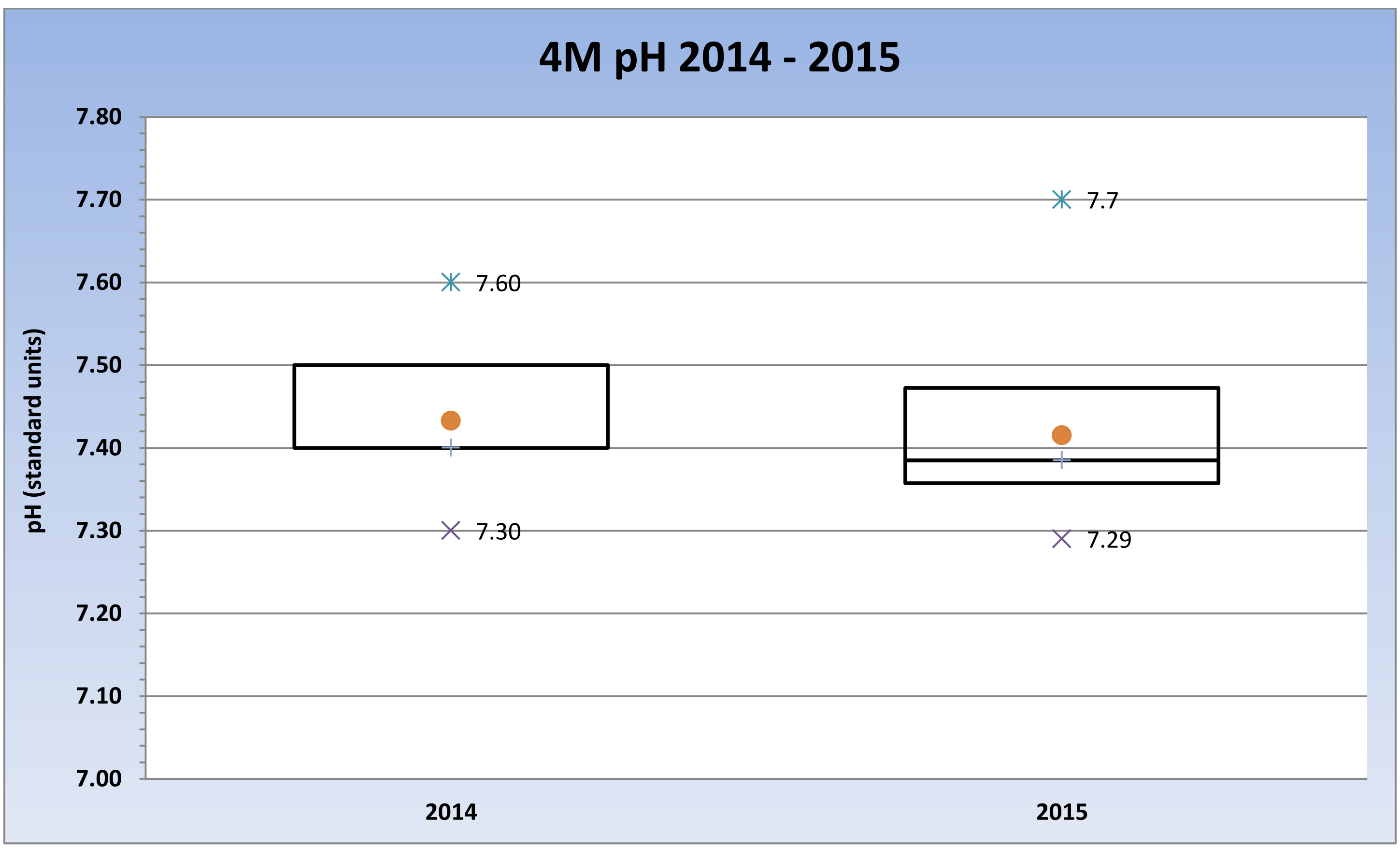

8M Water Temperature 2014 - 2015
Water Temperature (°F)
80
75
70
65
60
55
50
45
40
35
30
76.30
46.70
76.6
44.3
2014
2015


1M pH 2014 - 2015
pH (standard units)
8.00
7.90
7.80
7.70
7.60
7.50
7.40
7.30
7.20
7.10
7.00
7.50
7.40
7.36
7.20
7.48
7.37
7.35
7.15
2014
2015

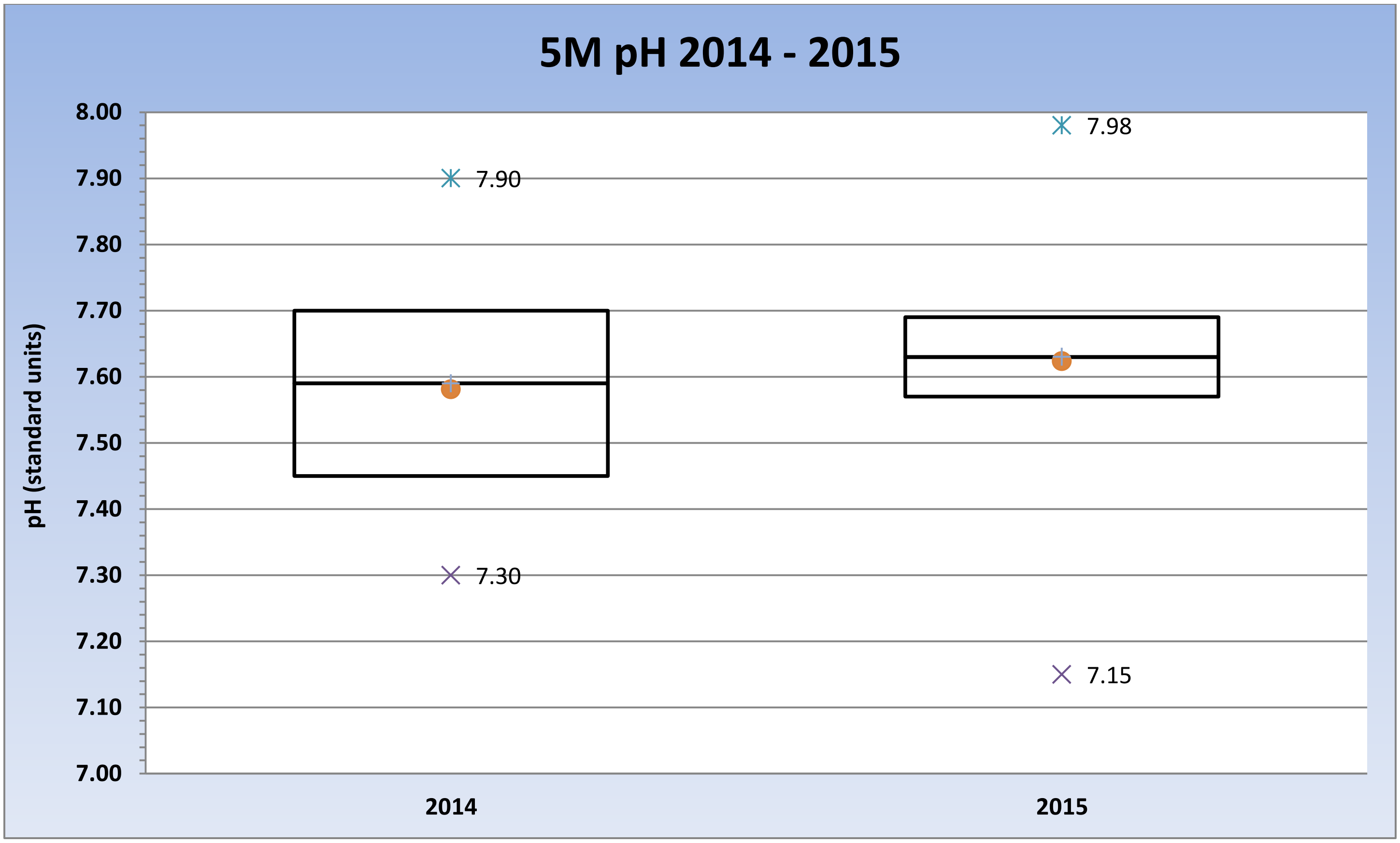

2M pH 2014 - 2015
pH (standard units)
8.00
7.90
7.80
7.70
7.60
7.50
7.40
7.30
7.20
7.10
7.00
7.50
7.19
7.42
7.03
2014
2015

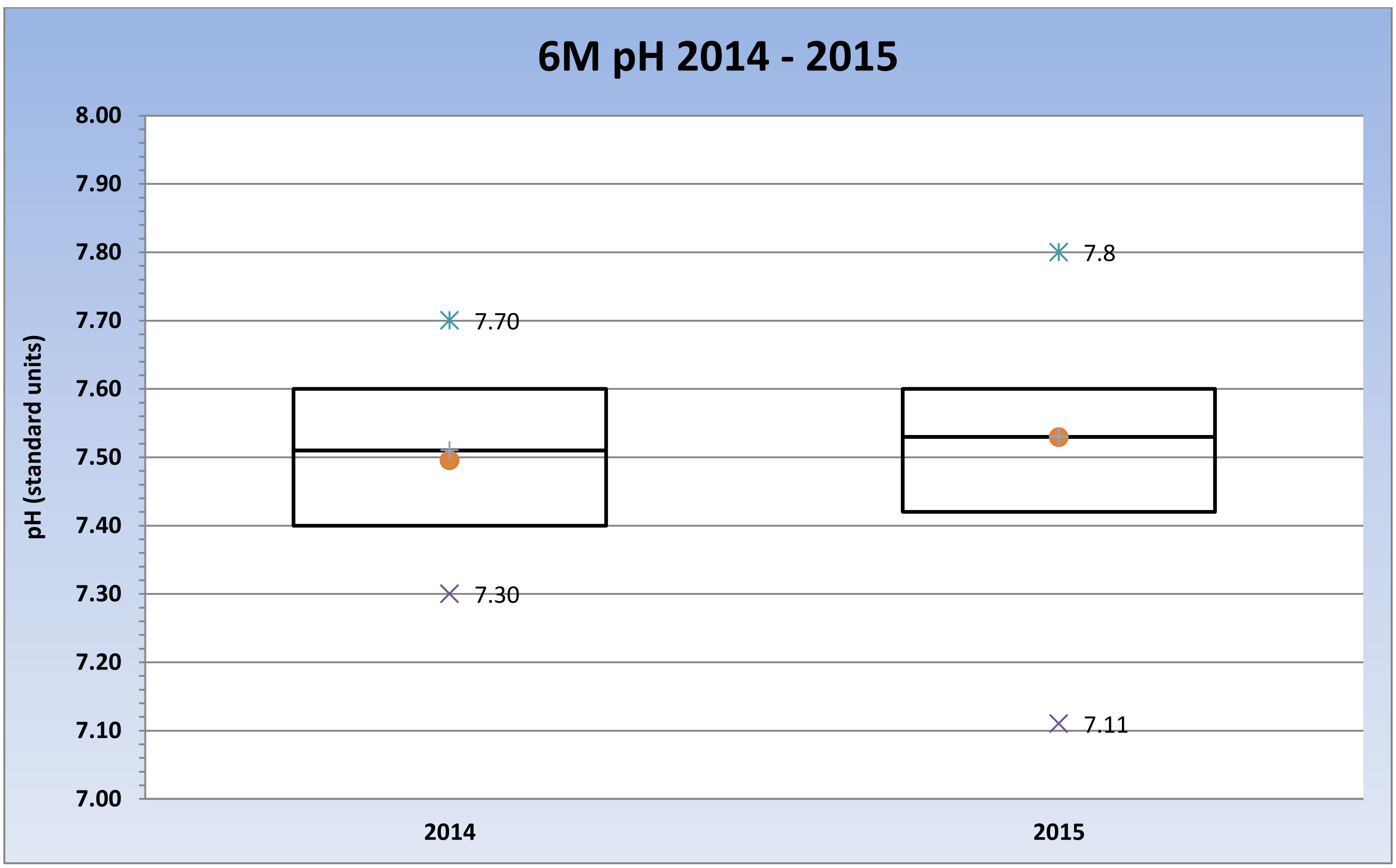


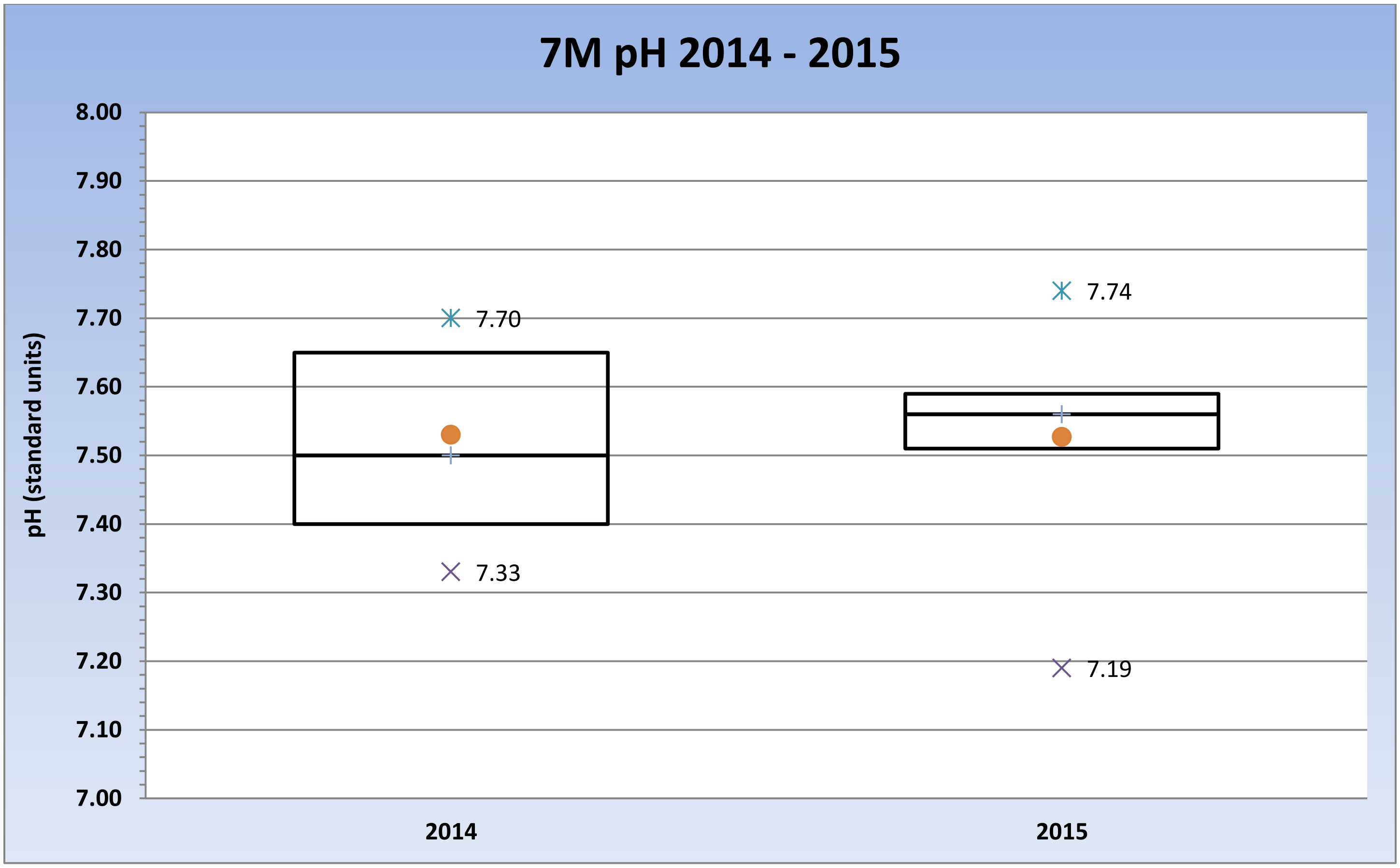
3M pH 2014 - 2015
pH (standard units)
8.50
8.00
7.50
7.00
6.50
6.00
8.5
7.80
7.40
7.33
2014
2015



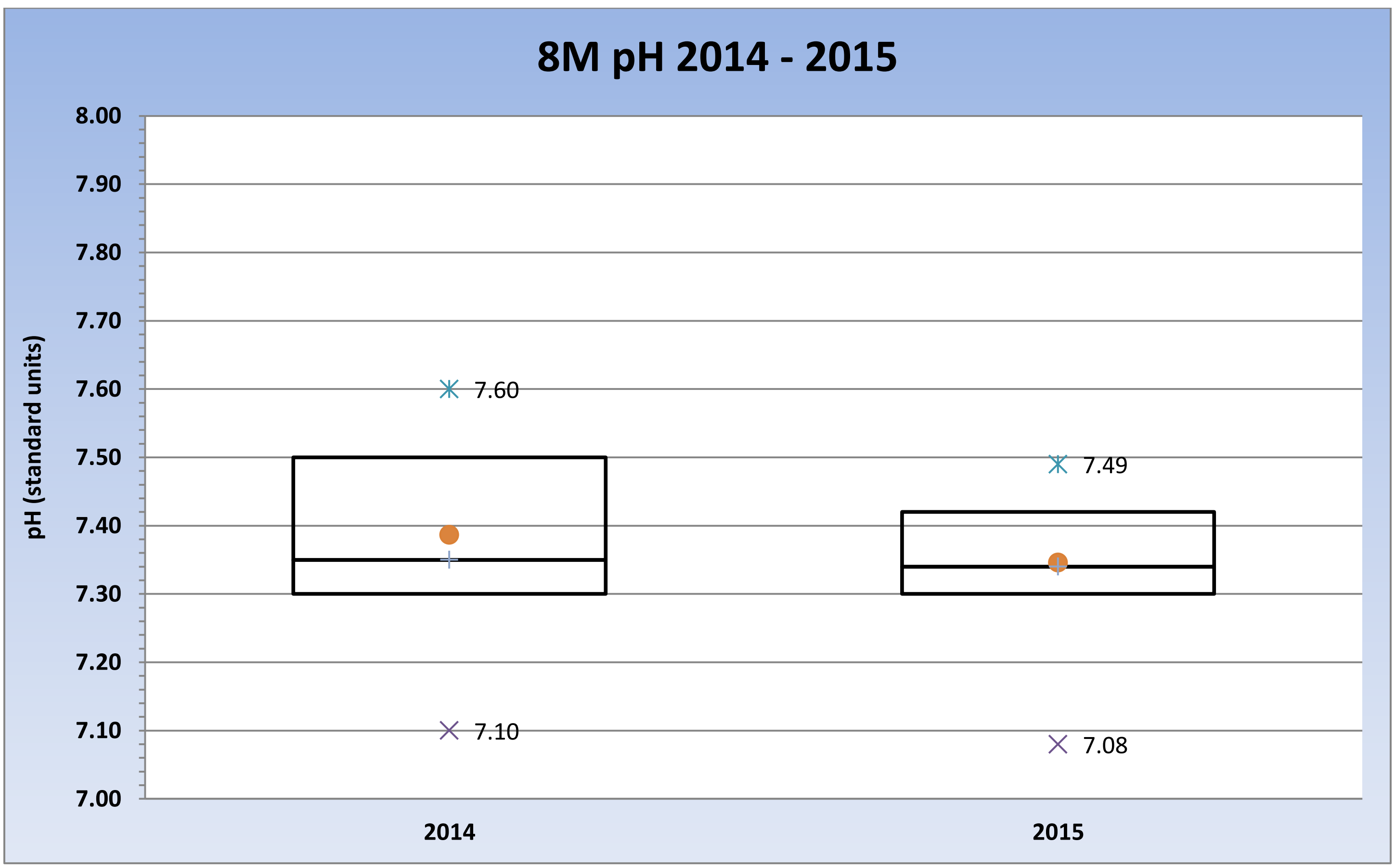
4M pH 2014 - 2015
pH (standard units)
7.80
7.70
7.60
7.50
7.40
7.30
7.20
7.10
7.00
7.7
7.60
7.30
7.29
2014
2015


5M pH 2014 - 2015
pH (standard units)
8.00
7.90
7.80
7.70
7.60
7.50
7.40
7.30
7.20
7.10
7.00
7.90
7.30
7.98
7.15
2014
2015

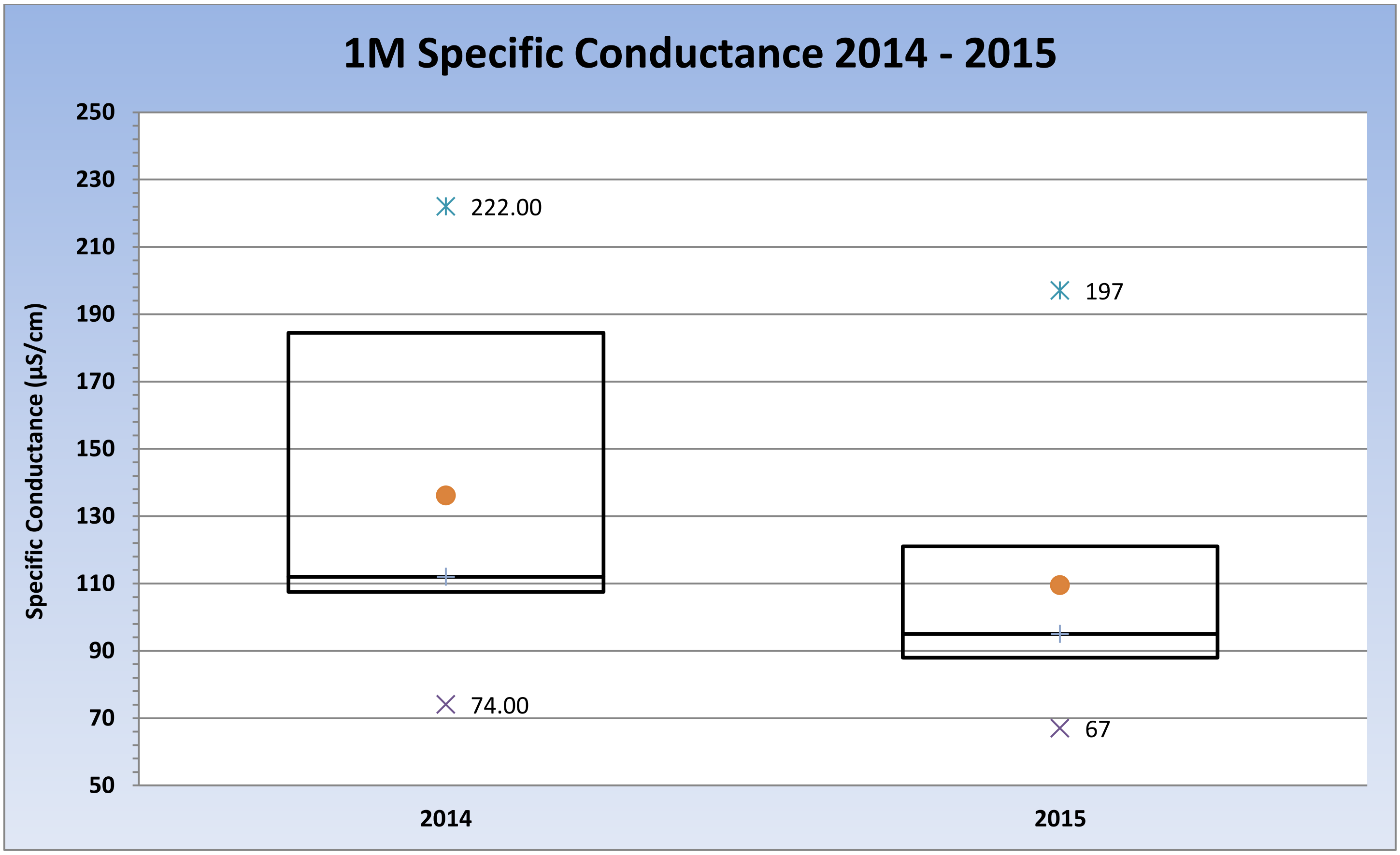

6M pH 2014 - 2015
pH (standard units)
8.00
7.90
7.80
7.70
7.60
7.50
7.40
7.30
7.20
7.10
7.00
7.70
7.30
7.8
7.11
2014
2015

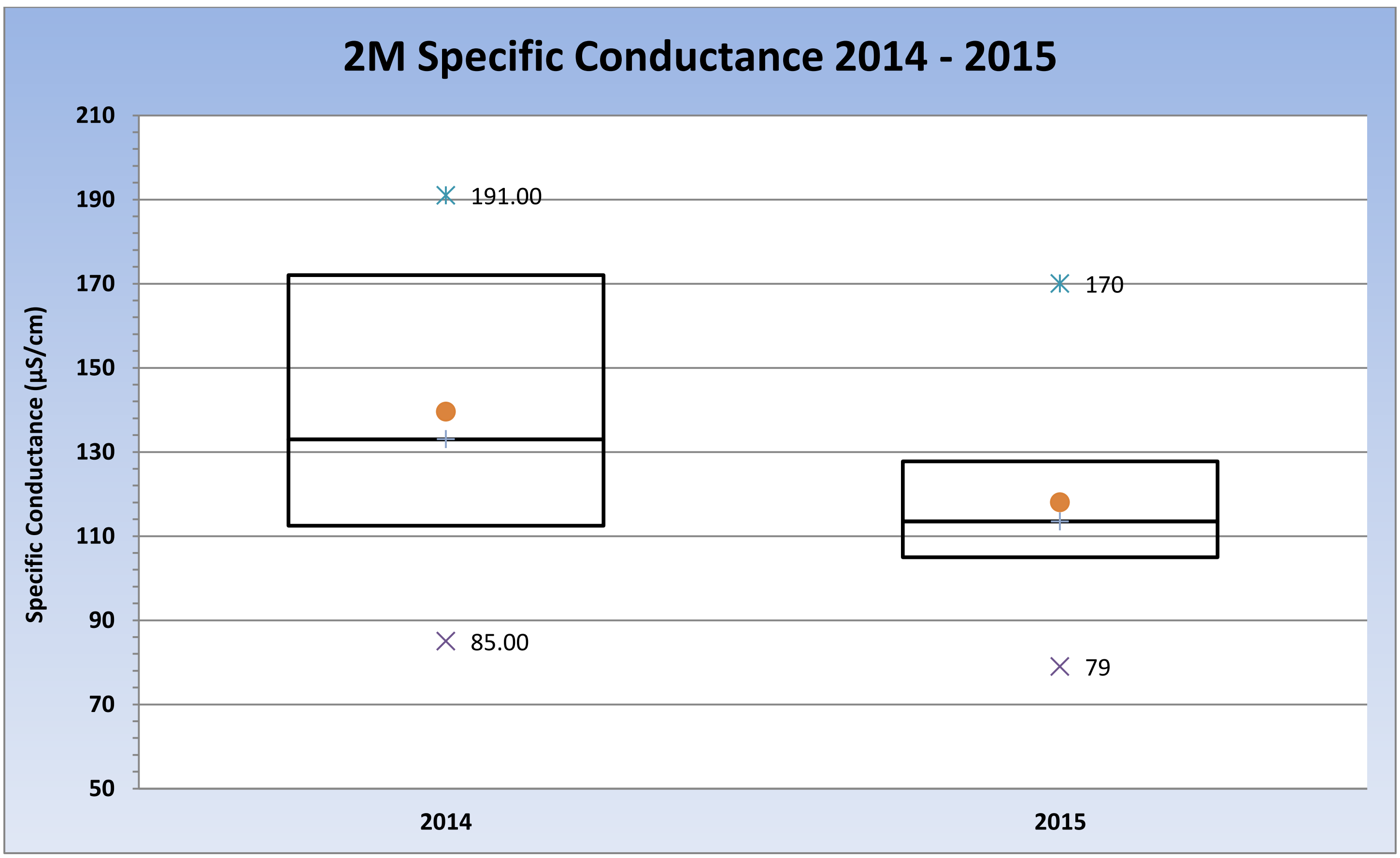


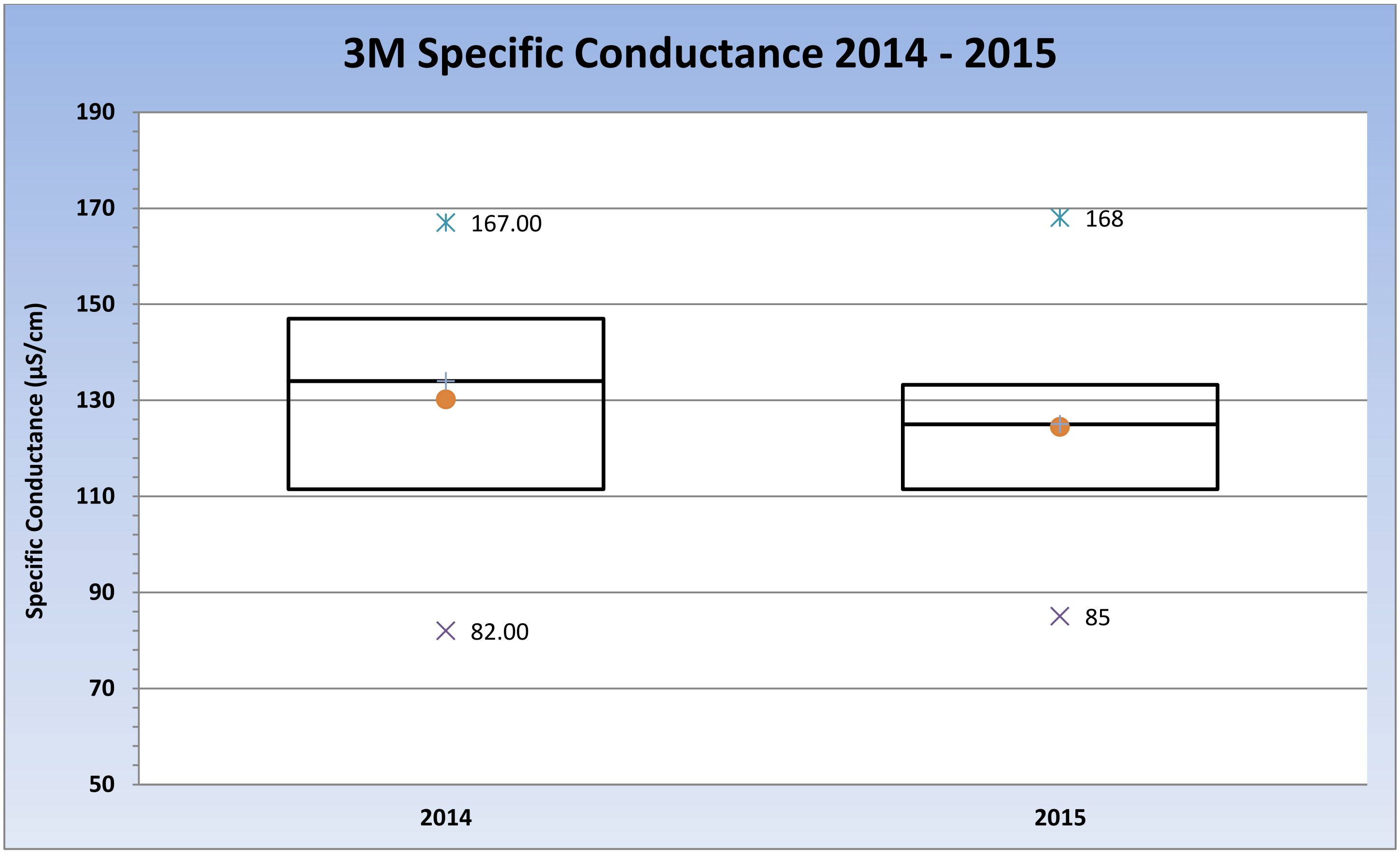
7M pH 2014 - 2015
pH (standard units)
8.00
7.90
7.80
7.70
7.60
7.50
7.40
7.30
7.20
7.10
7.00
7.70
7.33
7.74
7.19
2014
2015

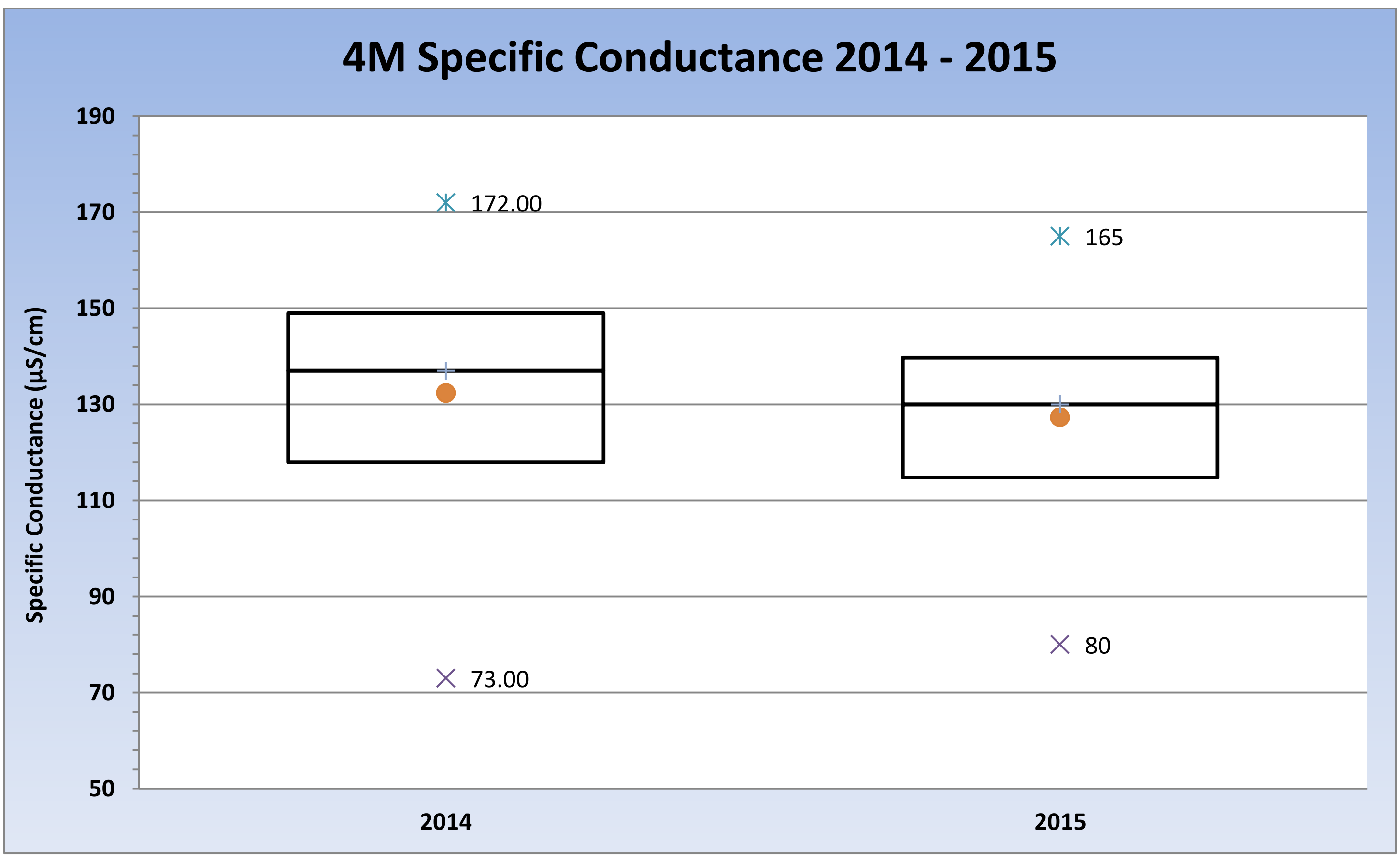


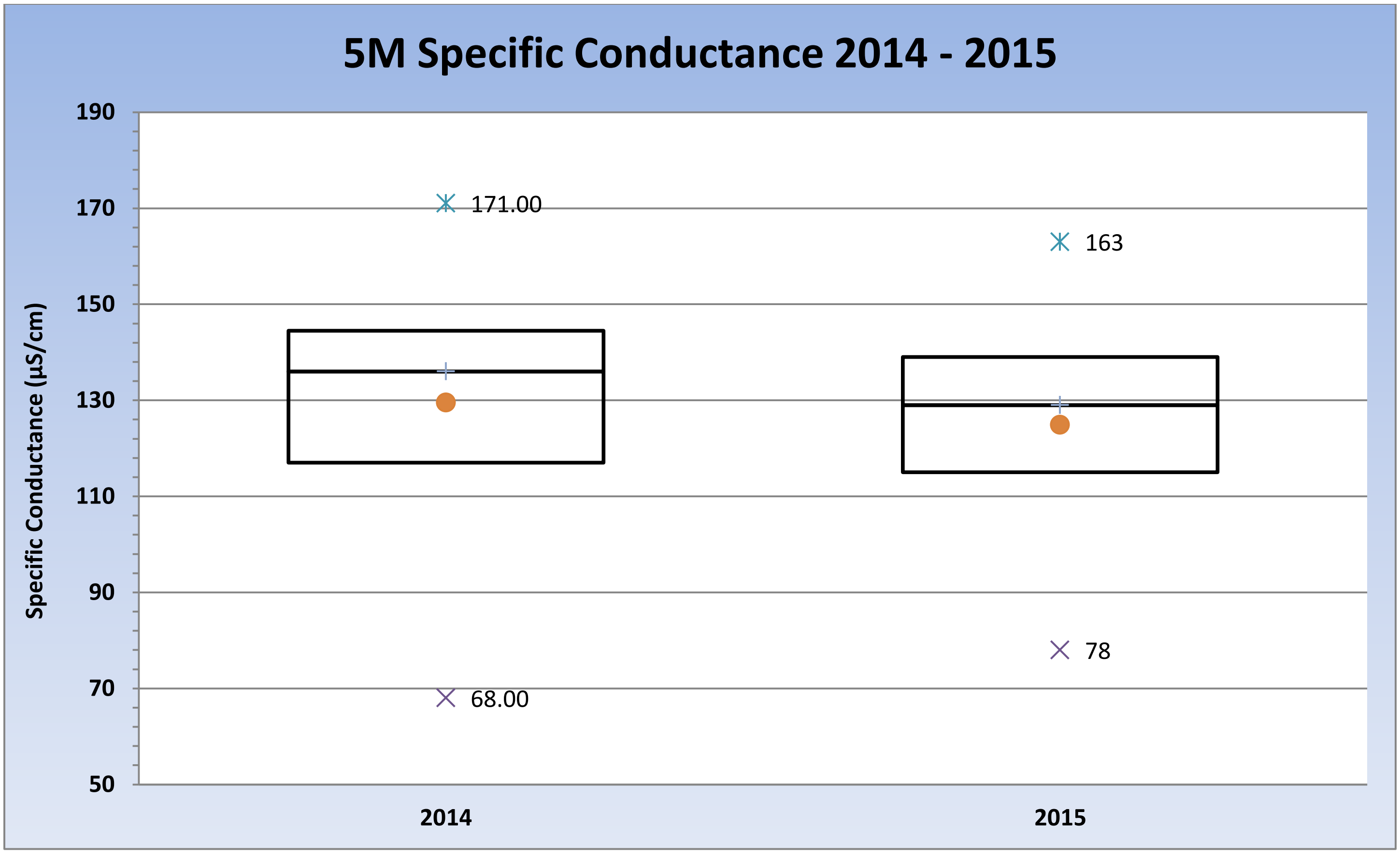
8M pH 2014 - 2015
pH (standard units)
8.00
7.90
7.80
7.70
7.60
7.50
7.40
7.30
7.20
7.10
7.00
7.60
7.10
7.49
7.08
2014
2015

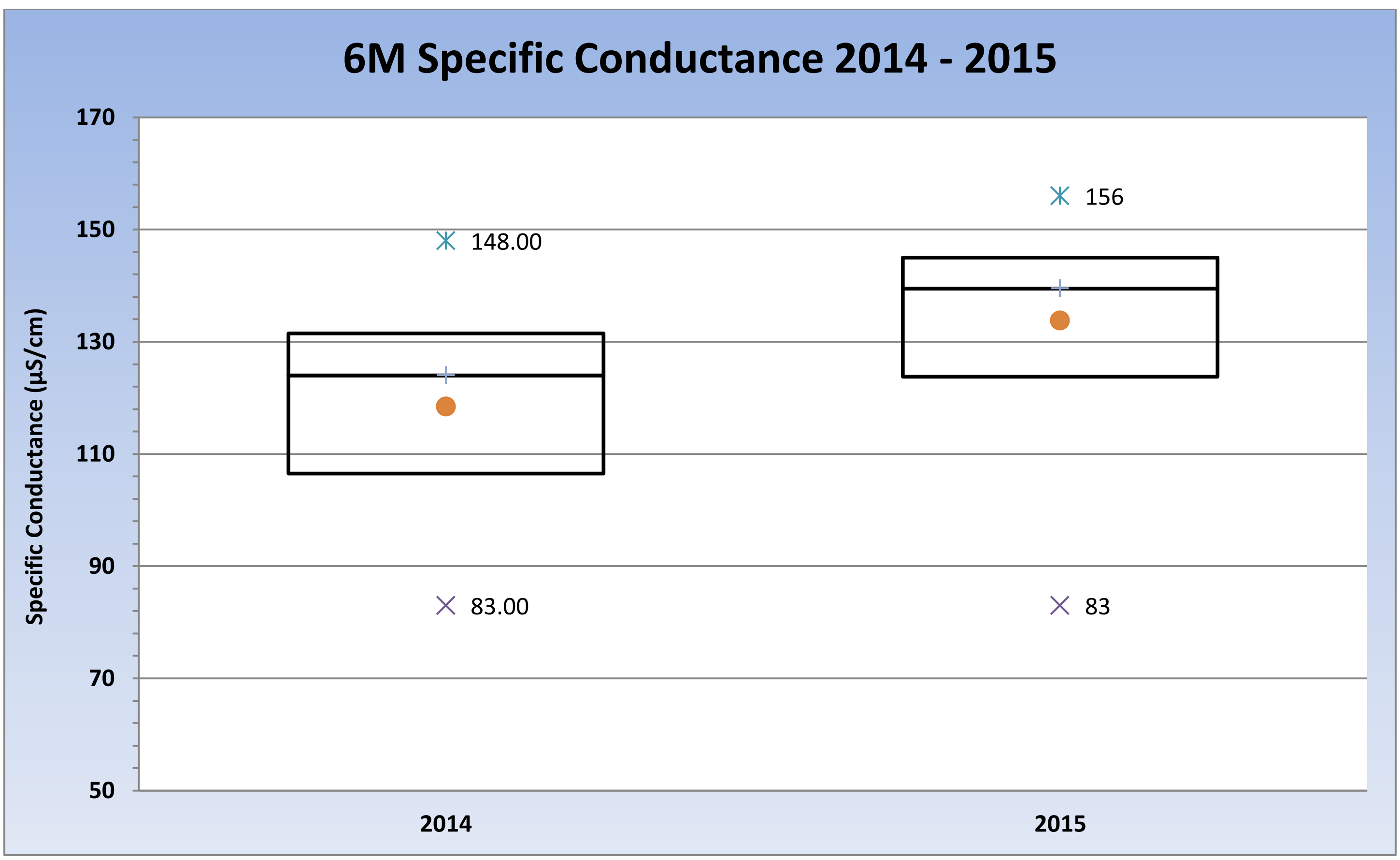

1M Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
250
230
210
190
170
150
130
110
90
70
50
222.00
74.00
197
67
2014
2015

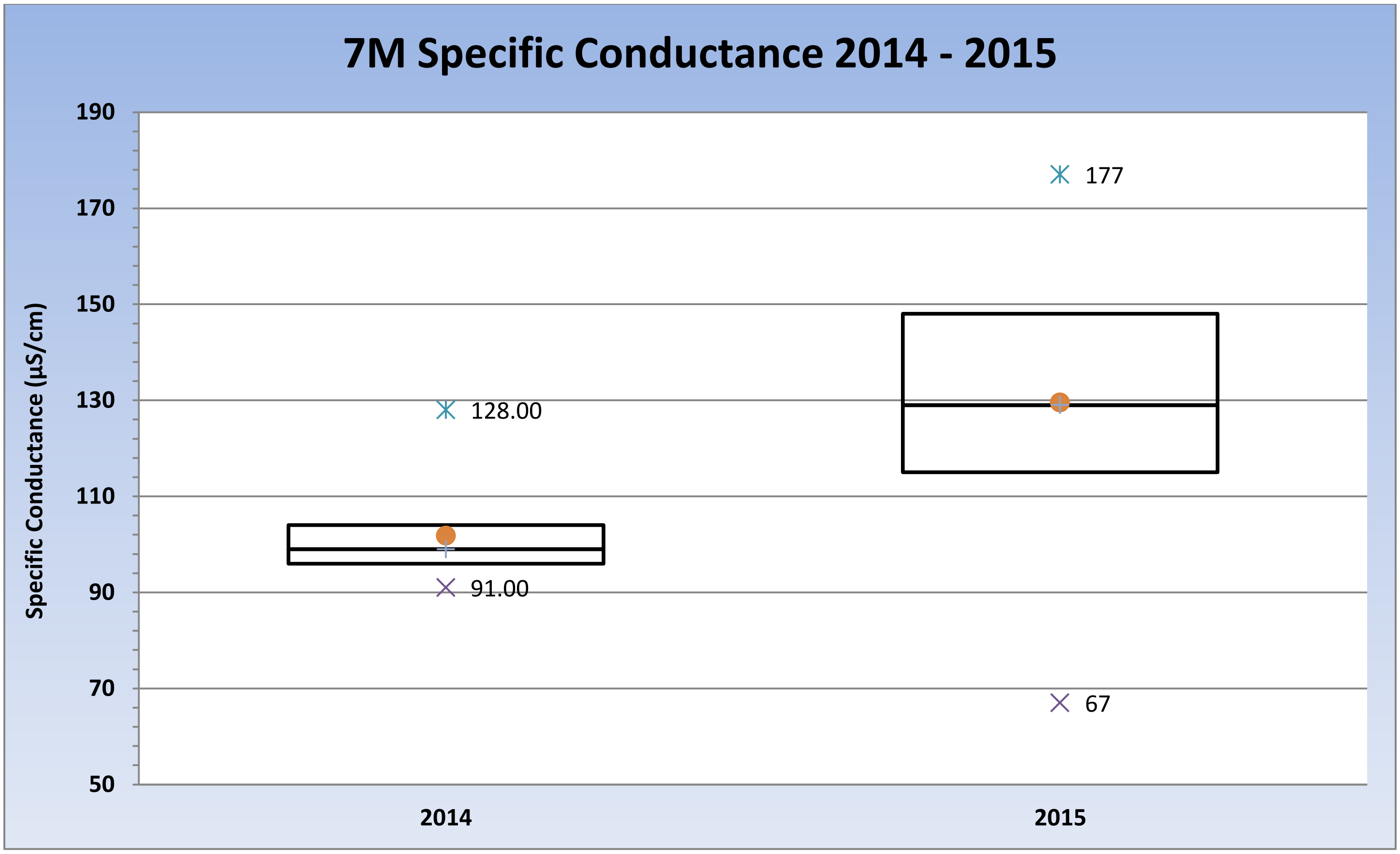

2M Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
210
190
170
150
130
110
90
70
50
191.00
85.00
170
79
2014
2015

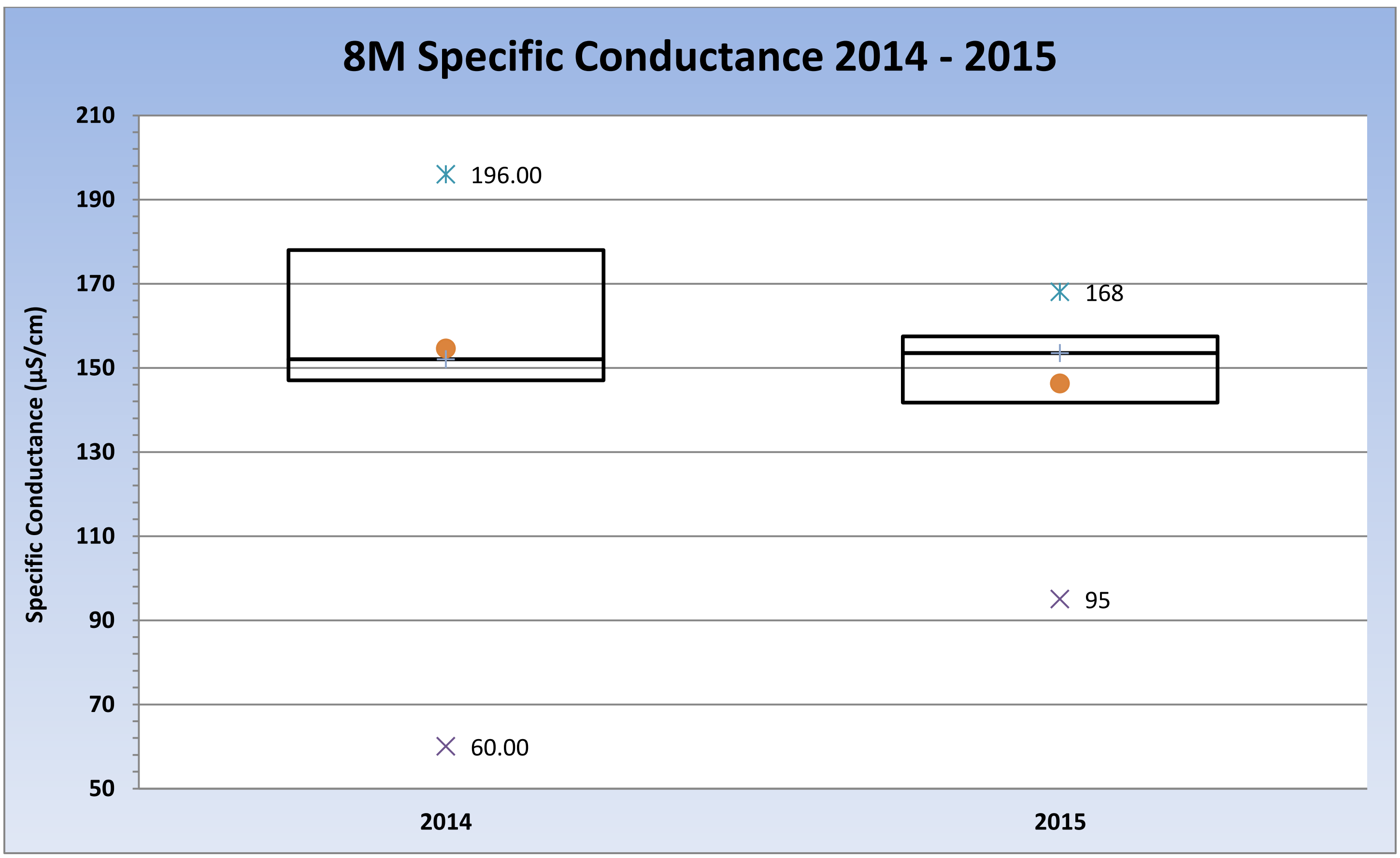

3M Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
190
170
150
130
110
90
70
50
167.00
82.00
168
85
2014
2015

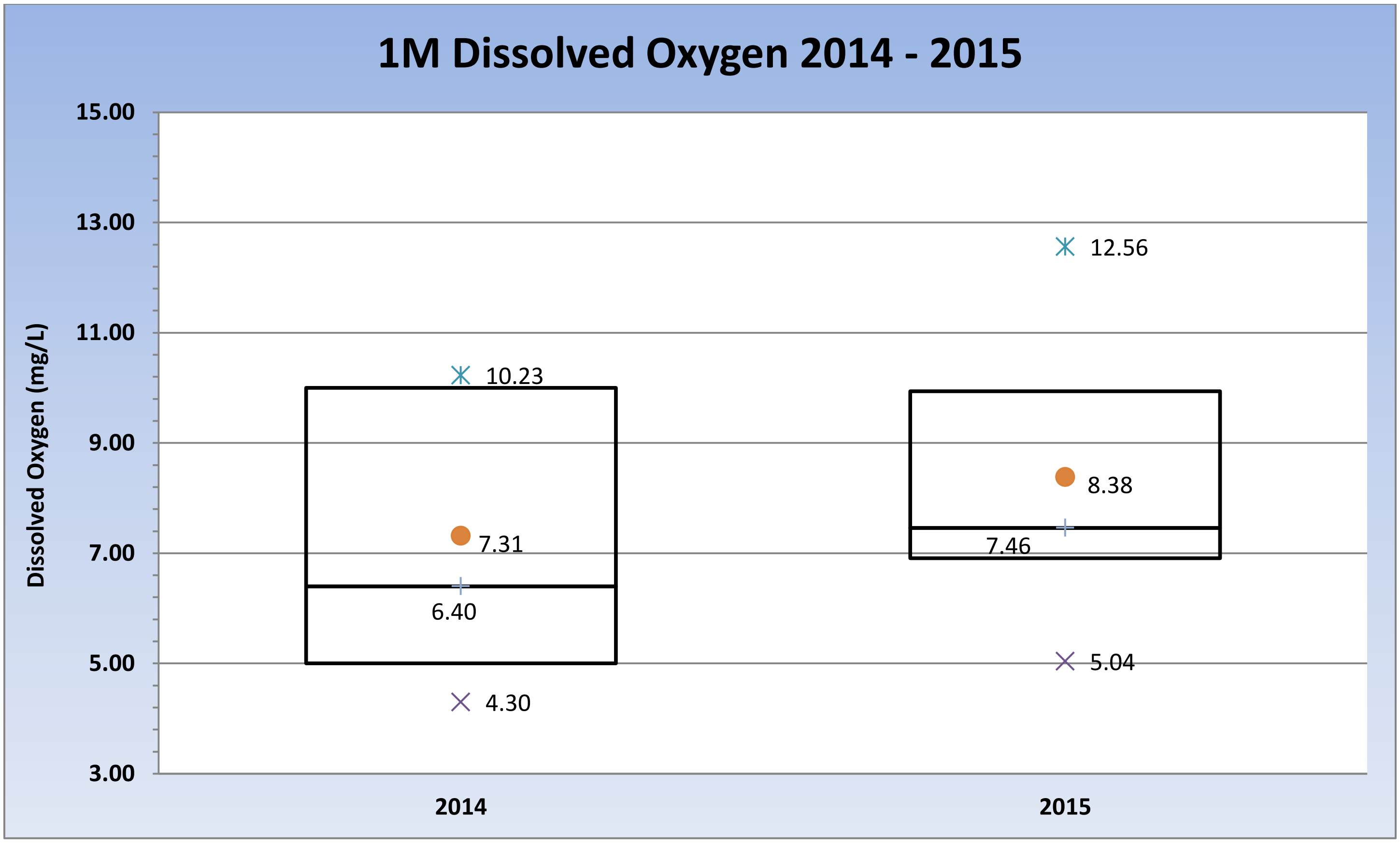

4M Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
190
170
150
130
110
90
70
50
172.00
73.00
165
80
2014
2015

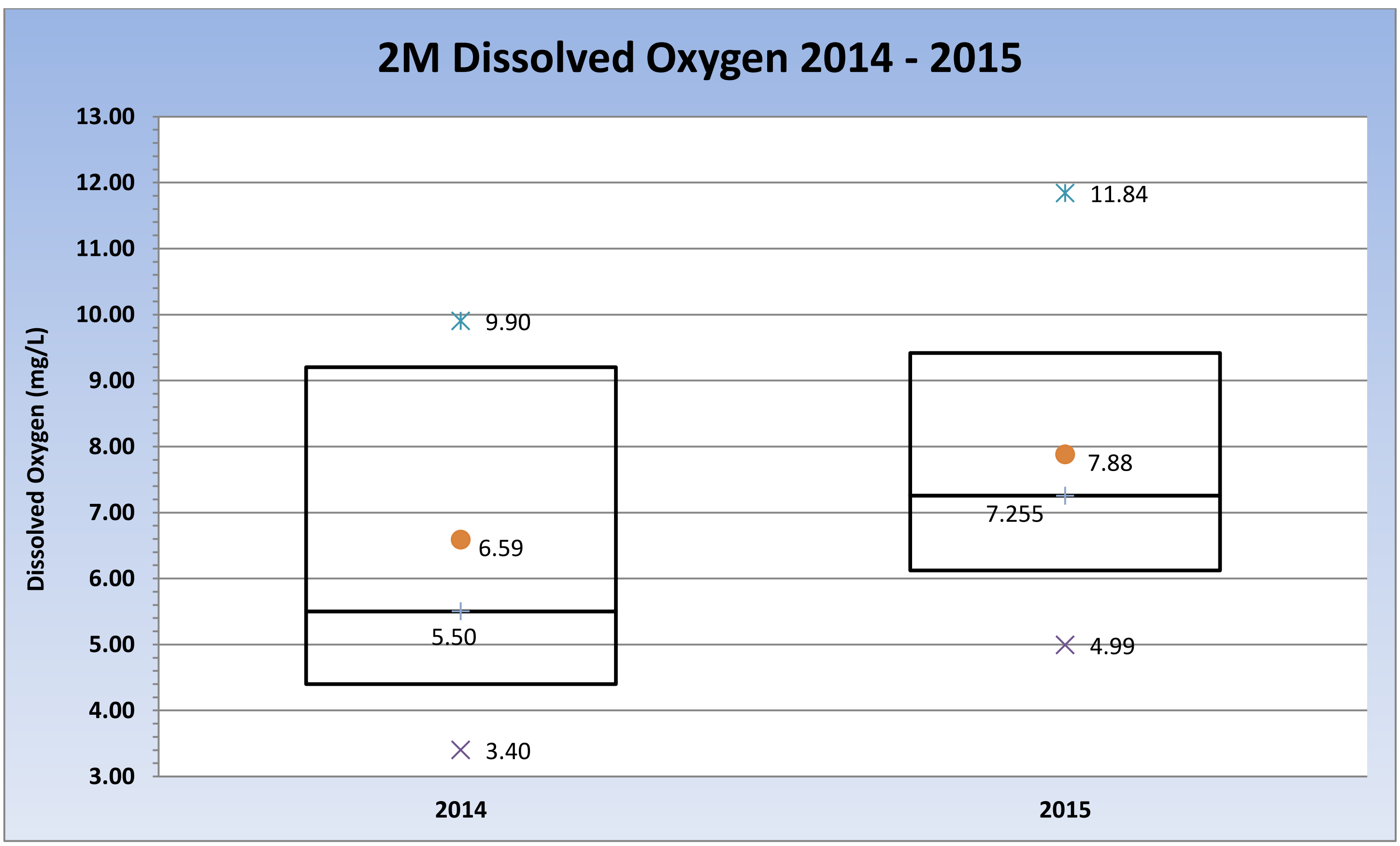

5M Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
190
170
150
130
110
90
70
50
171.00
68.00
163
78
2014
2015

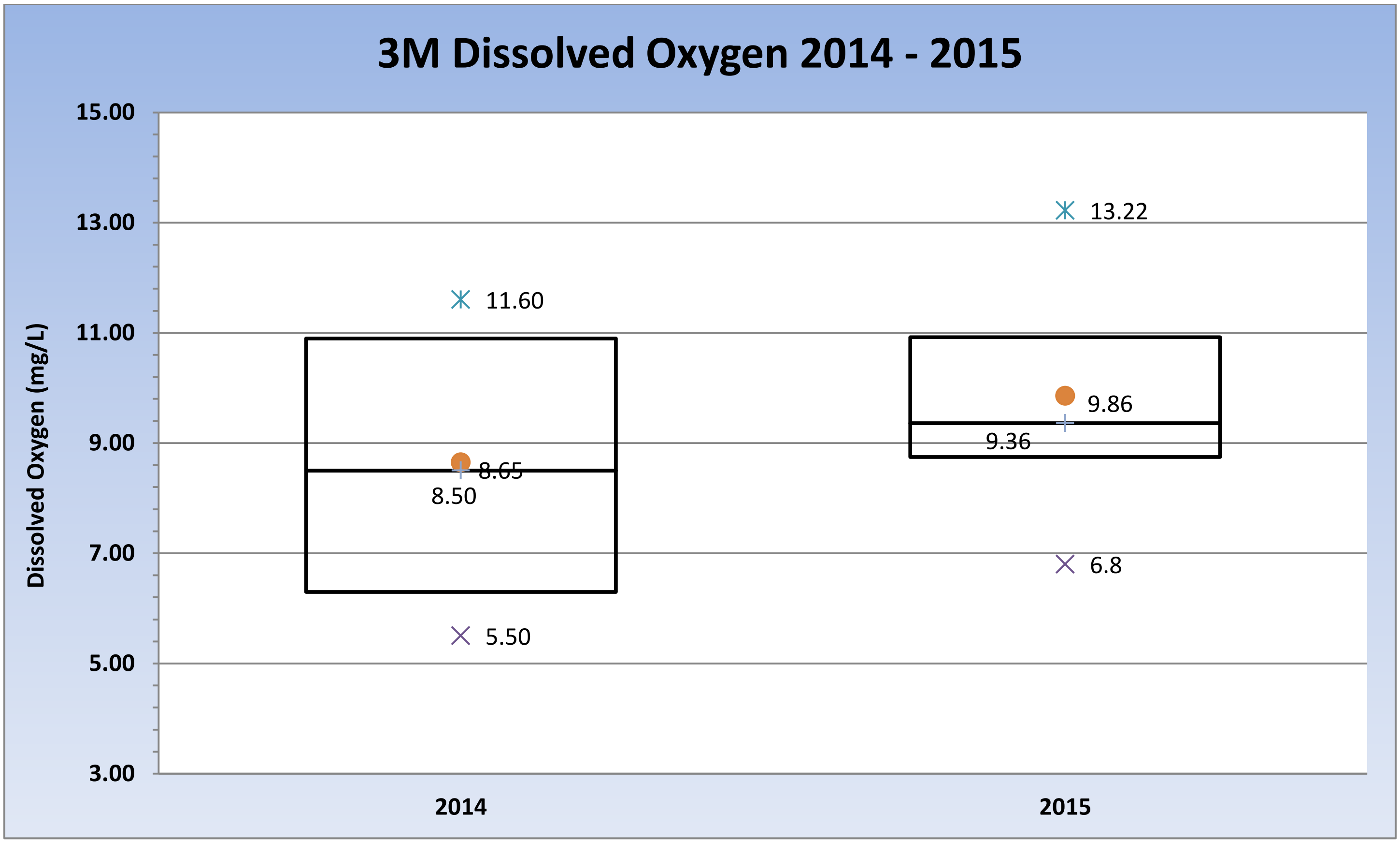

6M Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
170
150
130
110
90
70
50
148.00
83.00
156
83
2014
2015

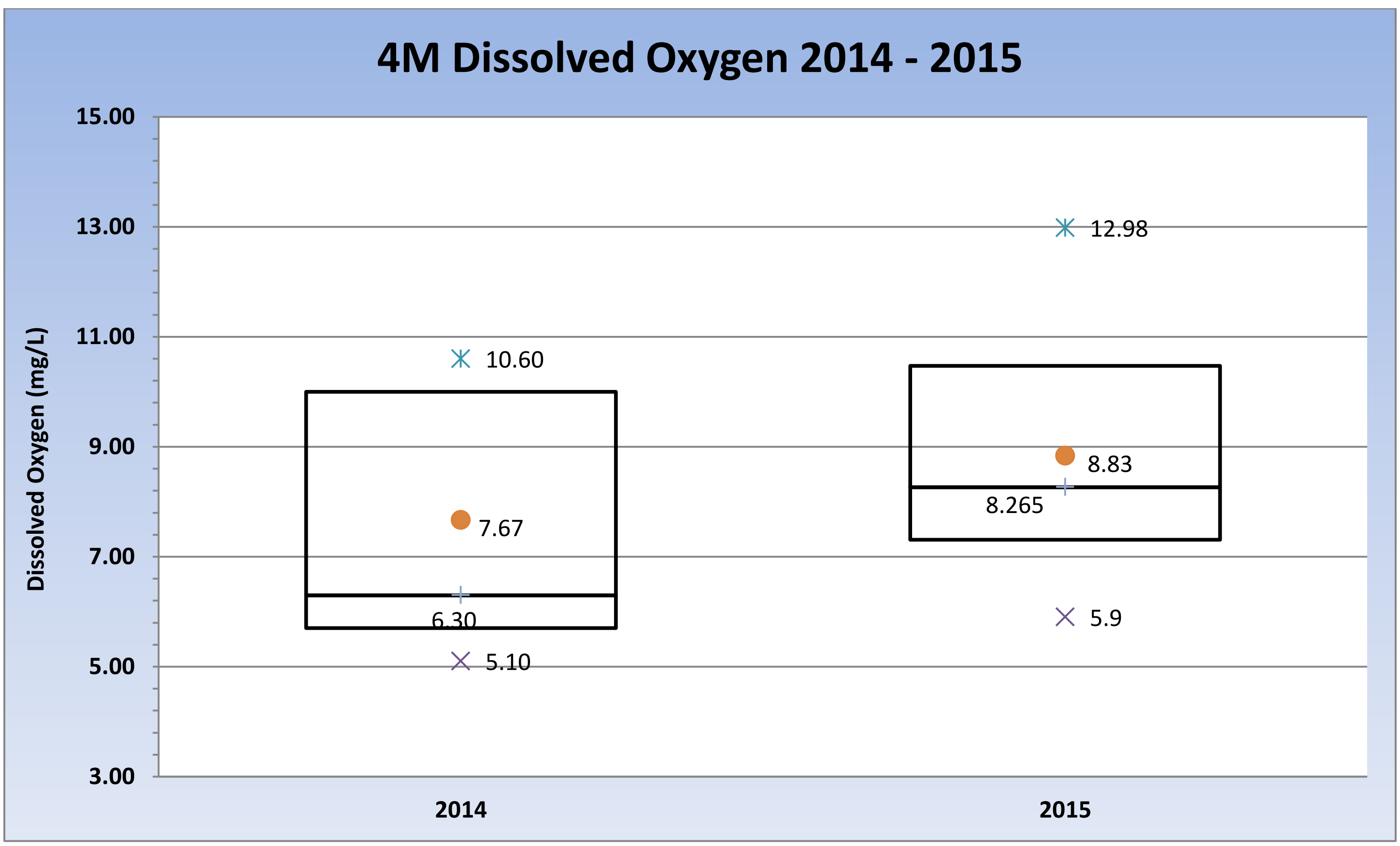

7M Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
190
170
150
130
110
90
70
50
128.00
91.00
177
67
2014
2015

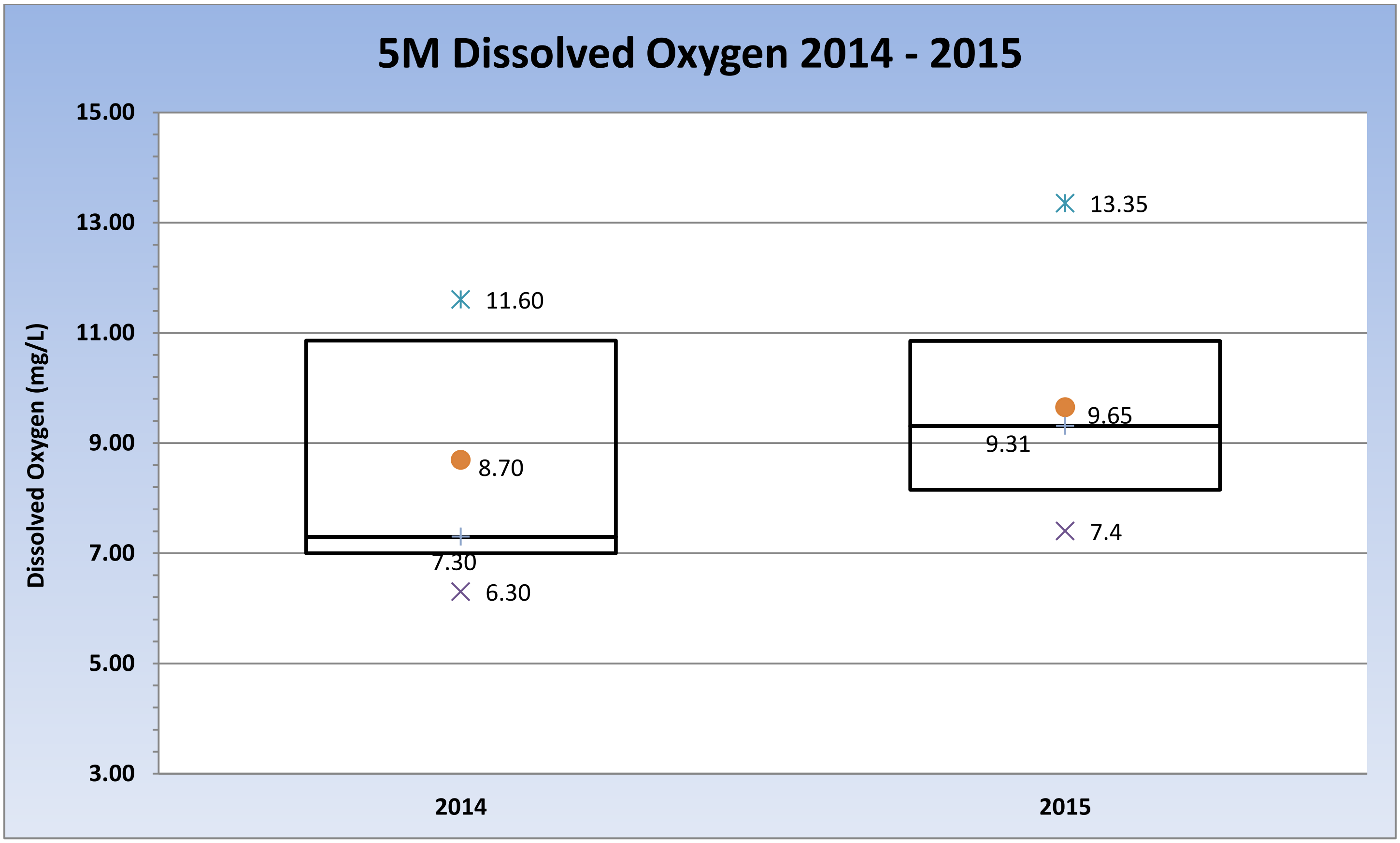

8M Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
210
190
170
150
130
110
90
70
50
196.00
60.00
168
95
2014
2015

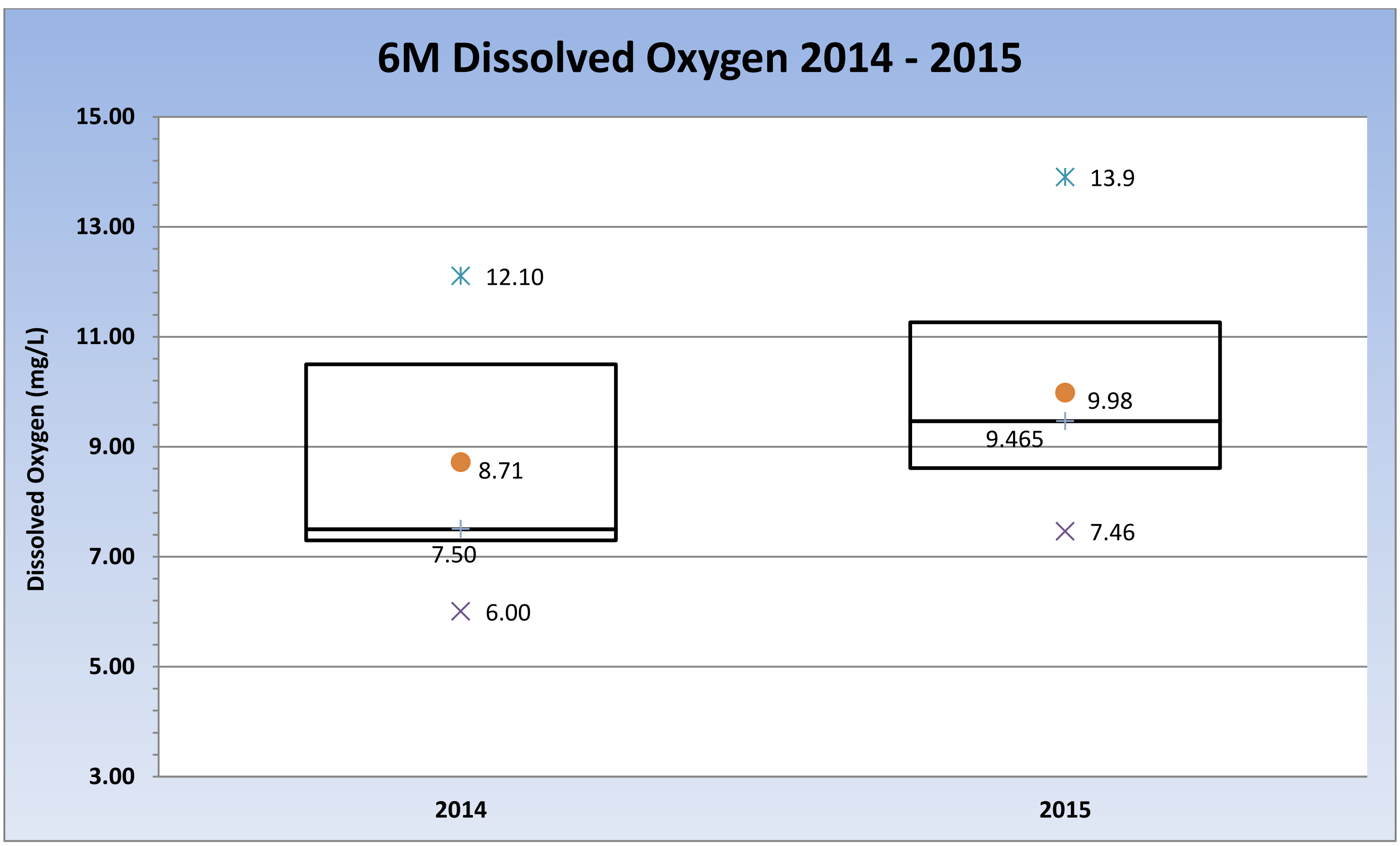

1M Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
15.00
13.00
11.00
9.00
7.00
5.00
3.00
10.23
7.31
6.40
4.30
12.56
8.38
7.46
5.04
2014
2015

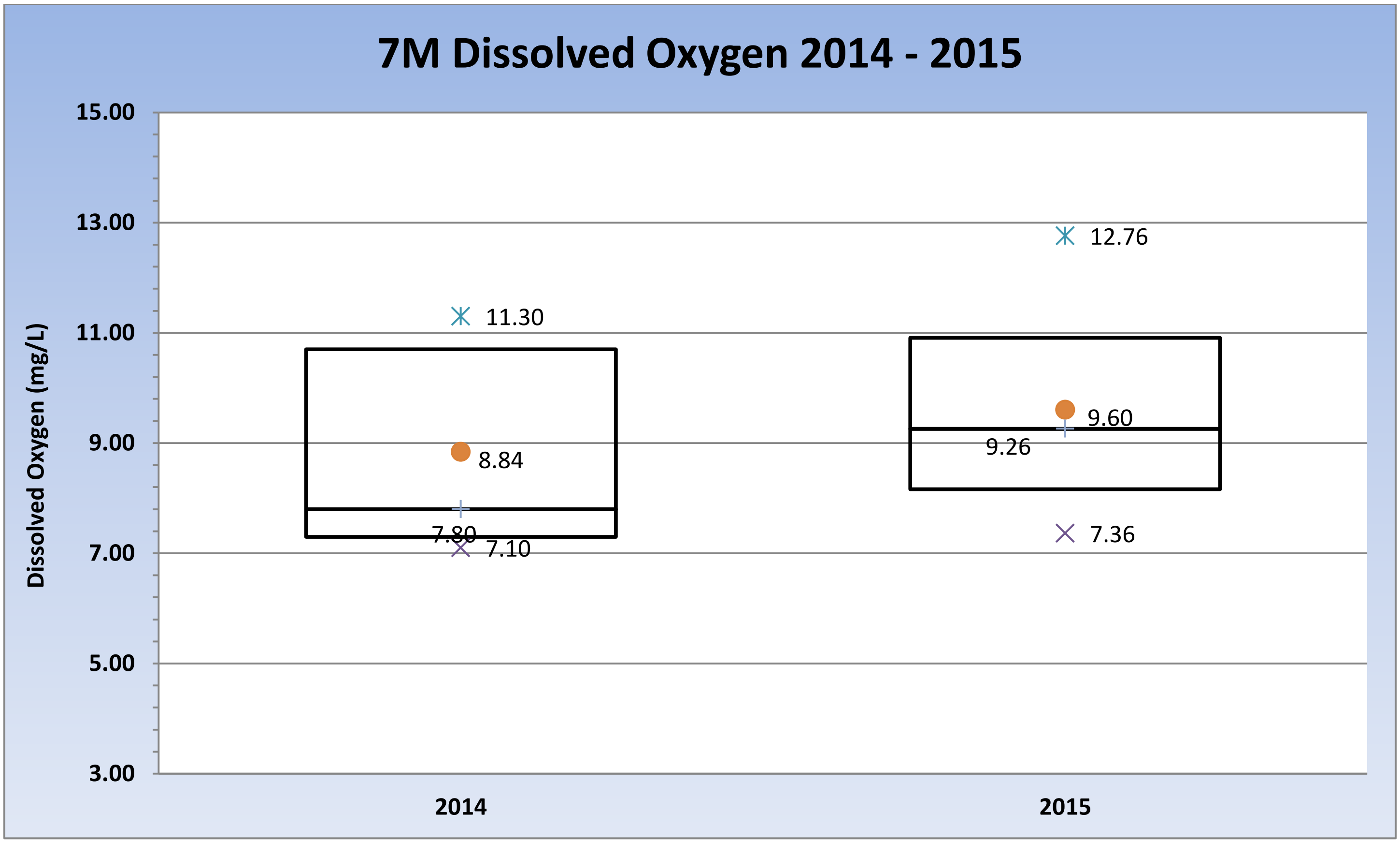

2M Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
9.90
6.59
5.50
3.40
11.84
7.88
7.255
4.99
2014
2015

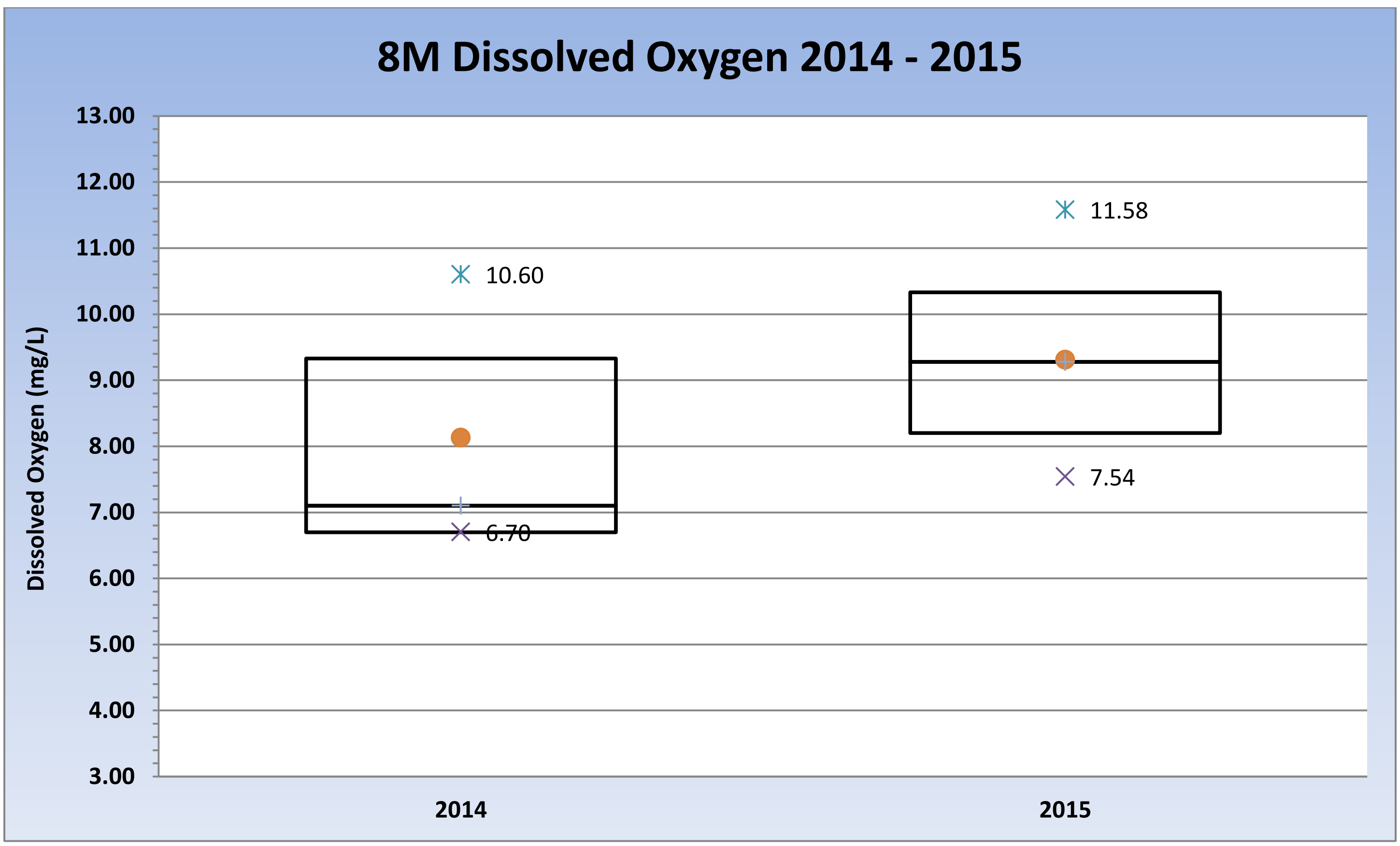

3M Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
15.00
13.00
11.00
9.00
7.00
5.00
3.00
11.60
8.65
8.50
5.50
13.22
9.86
9.36
6.8
2014
2015


4M Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
15.00
13.00
11.00
9.00
7.00
5.00
3.00
10.60
7.67
6.30
5.10
12.98
8.83
8.265
5.9
2014
2015


5M Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
15.00
13.00
11.00
9.00
7.00
5.00
3.00
11.60
8.70
7.30
6.30
13.35
9.65
9.31
7.4
2014
2015


6M Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
15.00
13.00
11.00
9.00
7.00
5.00
3.00
12.10
8.71
7.50
6.00
13.9
9.98
9.465
7.46
2014
2015


7M Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
15.00
13.00
11.00
9.00
7.00
5.00
3.00
11.30
8.84
7.80
7.10
12.76
9.60
9.26
7.36
2014
2015


8M Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
10.60
6.70
11.58
7.54
2014
2015

Parkerson's Mill Creek Watershed

A total of 1063 independent water quality measurements were collected in the Parkerson's Mill Creek watershed in 2015.

Monitoring Station Locations and Notes:

1P – Latitude *32, 35, 33.627 N*; Longitude *85, 29, 45.826 W.* Station 1P is the furthest upstream monitoring location on Parkerson's Mill Creek (located at the Lem Morrison Road crossing).

2P – Latitude *32, 34, 21.948 N*; Longitude *85, 30, 24.979 W.* Station 2P is located on Parkerson's Mill Creek main stem at the eastern most W. Longleaf Drive crossing.

3P – Latitude *32, 33, 44.574 N*; Longitude *85, 30, 25.114 W.* Station 3P is located on Parkerson's Mill Creek main stem at the W. Veterans Boulevard crossing.

4P – Latitude *32, 32, 13.799 N*; Longitude *85, 30, 21.591 W.* Station 4P is the furthest downstream monitoring location on Parkerson's Mill Creek main stem and is located at the CR 10/Sandhill Road crossing.

5P – Latitude *32, 35, 8.48 N*; Longitude *85, 30, 10.446 W.* Station 5P is located on Parkerson's Mill Creek main stem just downstream of Station 1P, at the Shug Jordan Parkway Crossing.

6P – Latitude *32, 35, 3.567 N*; Longitude *85, 31, 0.914 W.* Station 6P is located on an unnamed tributary near the intersection of Wire and Webster Roads.

7P – Latitude *32, 34, 22.578 N*; Longitude *85, 30, 38.989 W.* Station 7P is located downstream of Station P6 at the western most crossing on W. Longleaf Drive.

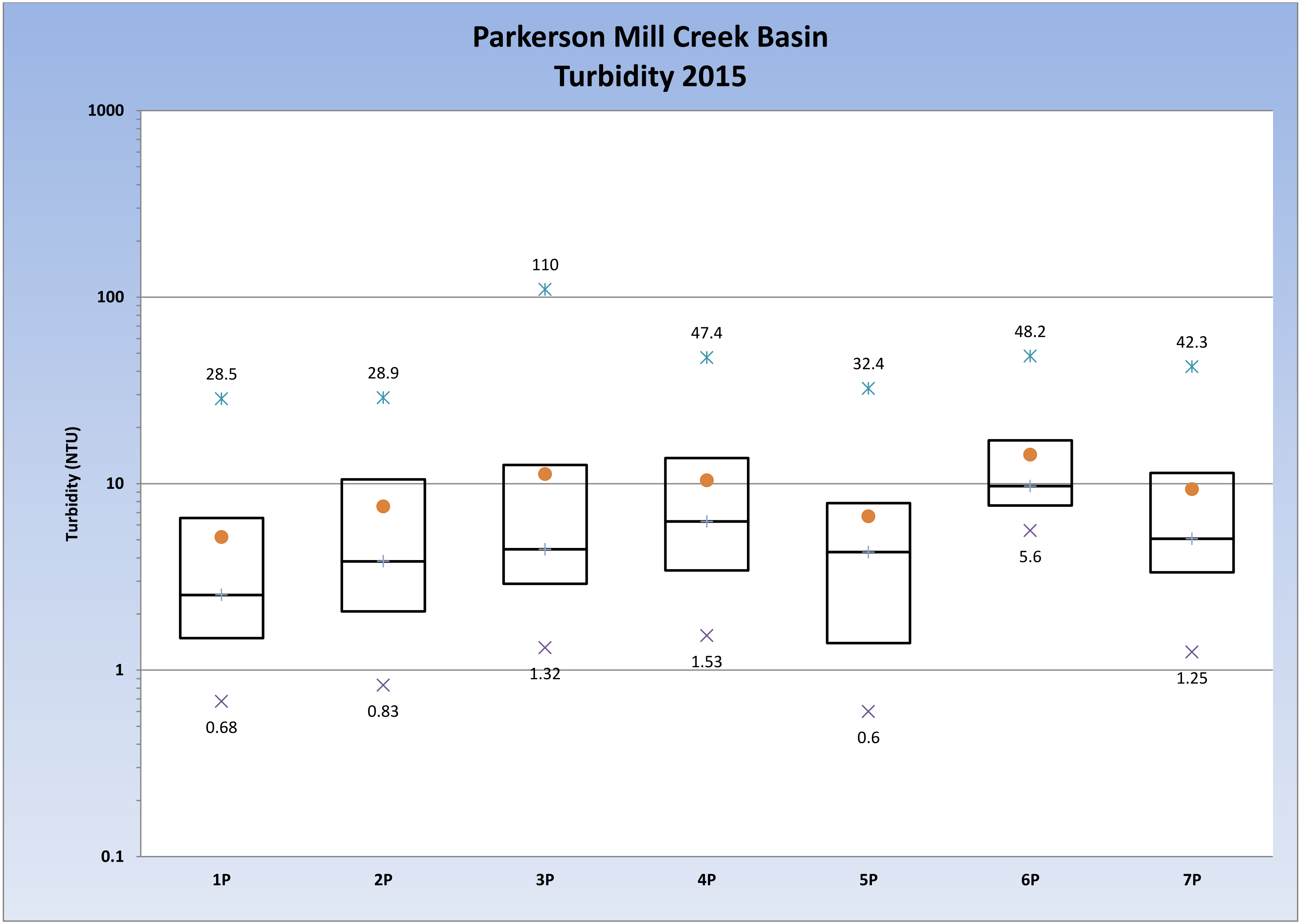
**See Insert for Maps of All Water Quality Monitoring Locations*

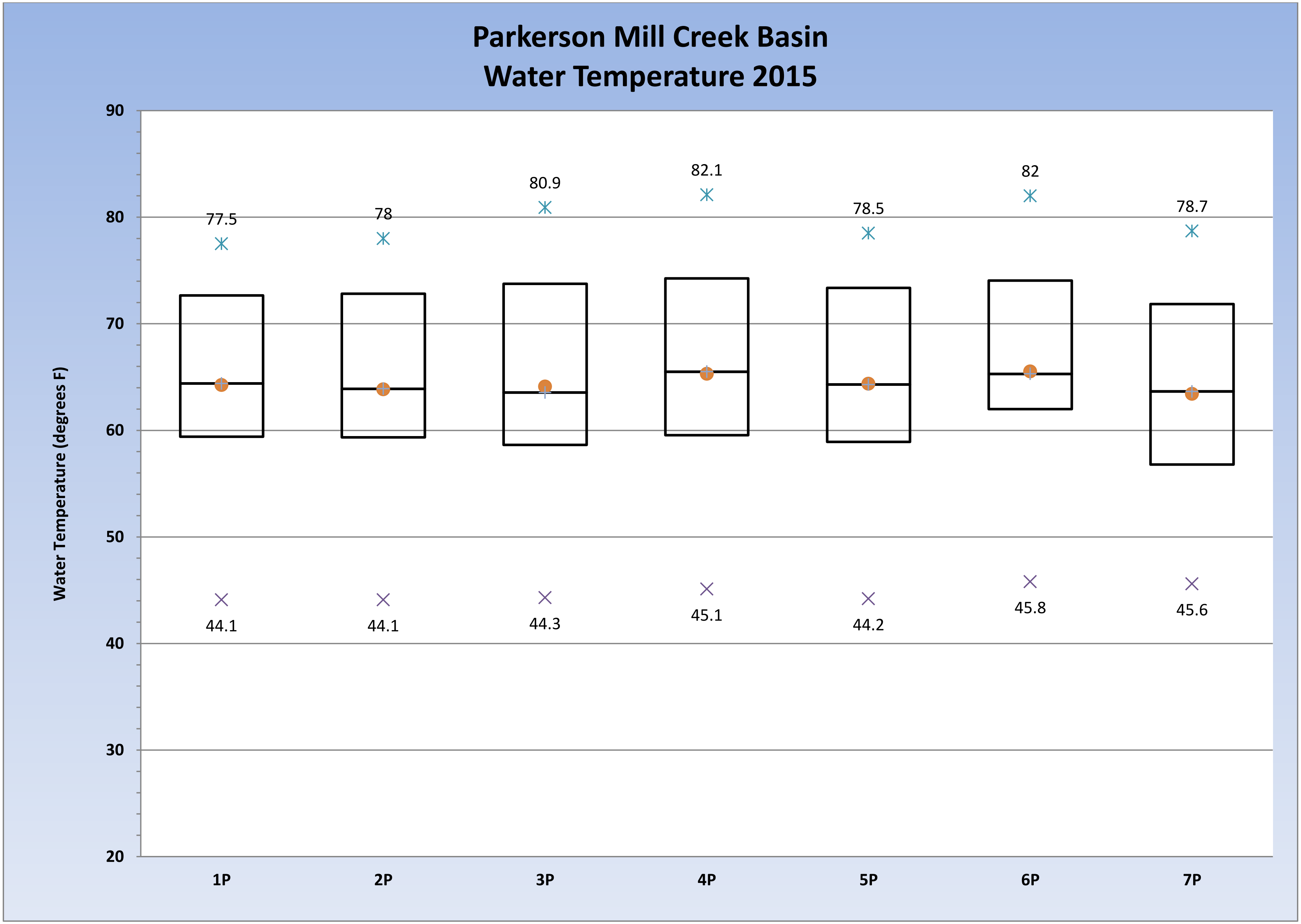
Nine Year Statistical Analysis of Turbidity Data for Parkerson's Mill Creek

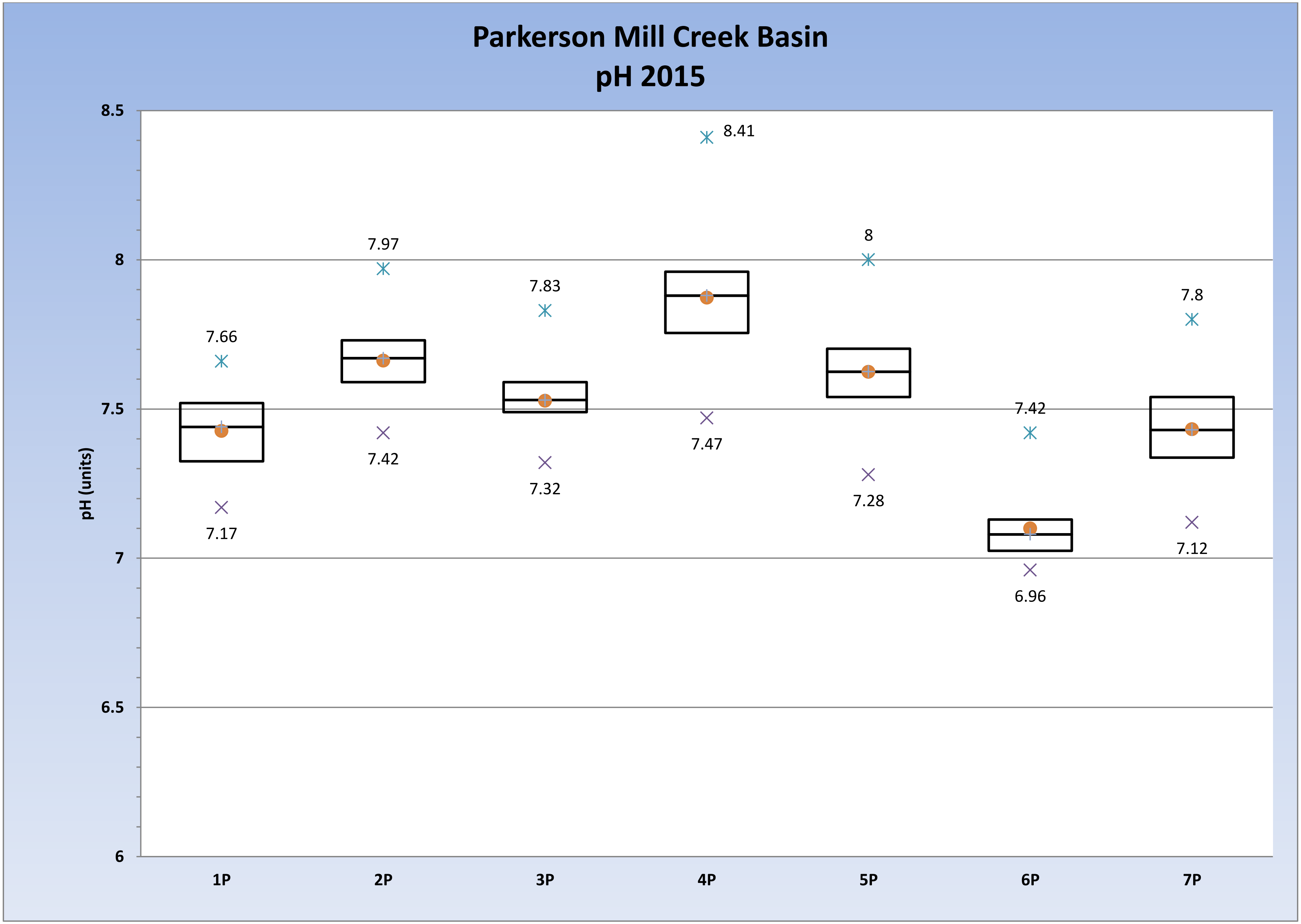
	1P								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	0.78	0.67	1.90	1.60	2.50	0.67	0.22	0.00	0.68
MAX	153.33	550.00	450.00	90.00	230.00	70.00	14.90	38.10	28.5
AVG	21.07	41.29	38.48	9.66	27.31	12.02	4.24	5.53	5.16
MEDIAN	8.24	10.00	15.00	4.20	9.60	8.53	2.77	2.85	2.53
	2P								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	0.60	1.66	1.60	0.90	1.70	0.53	0.47	0.10	0.83
MAX	200.00	370.00	70.00	33.00	100.00	52.00	14.90	78.10	28.9
AVG	21.78	34.80	18.70	6.87	16.64	9.83	4.43	8.55	7.54
MEDIAN	7.48	8.38	12.00	5.40	6.60	6.79	2.51	4.33	3.84
	3P								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	1.30	1.70	1.10	1.20	2.00	1.17	0.69	0.12	1.32
MAX	240.00	1800.00	80.00	65.00	85.00	700.00	16.70	73.30	110
AVG	28.08	71.16	16.53	7.97	14.86	23.04	5.74	10.48	11.24
MEDIAN	8.72	7.57	9.00	4.95	7.10	7.15	3.60	4.92	4.45
	4P								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	0.78	0.46	3.10	0.85	1.50	0.73	0.30	1.00	1.53
MAX	333.33	330.00	150.00	38.00	130.00	163.00	24.20	160.00	47.4
AVG	31.63	37.58	24.02	8.68	18.11	12.59	6.55	14.96	10.41
MEDIAN	9.27	6.69	11.00	5.45	7.70	8.15	4.50	6.40	6.26
	5P								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	0.40	0.70	2.50	1.20	2.30	0.53	0.27	0.00	0.60
MAX	160.00	450.00	360.00	29.00	100.00	45.00	16.87	75.00	32.4
AVG	20.07	39.02	36.77	6.94	18.78	10.35	4.96	7.90	6.68
MEDIAN	7.40	9.55	14.00	4.60	9.00	8.89	2.53	4.32	4.29

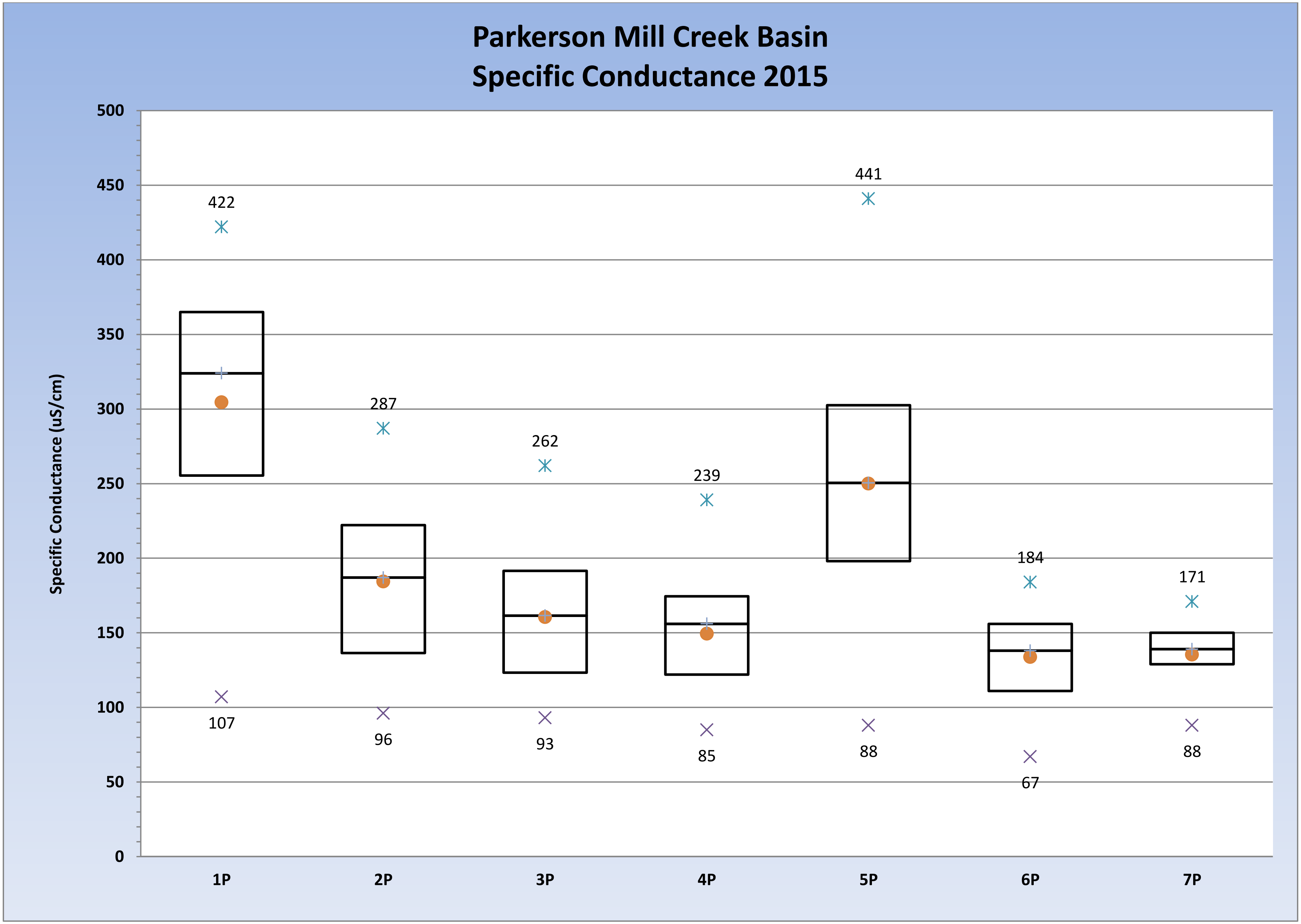
Nine Year Statistical Analysis of Turbidity Data for Parkerson's Mill Creek Tributaries

	6P								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	0.83	1.40	1.30	2.10	1.80	1.40	2.94	4.28	5.6
MAX	220.00	220.00	60.00	17.00	33.00	51.40	36.83	57.30	48.2
AVG	27.33	24.97	9.70	5.21	8.42	7.30	11.66	11.88	14.3
MEDIAN	12.00	7.13	6.20	4.80	5.60	5.40	10.93	8.13	9.7
	7P								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	1.30	1.43	2.00	2.70	2.40	1.97	1.40	0.45	1.25
MAX	346.67	390.00	65.00	40.00	65.00	109.00	23.00	148.00	42.3
AVG	36.85	32.17	11.89	8.23	14.89	11.72	6.45	11.94	9.34
MEDIAN	11.00	7.57	6.30	5.80	9.25	6.64	5.40	5.58	5.06

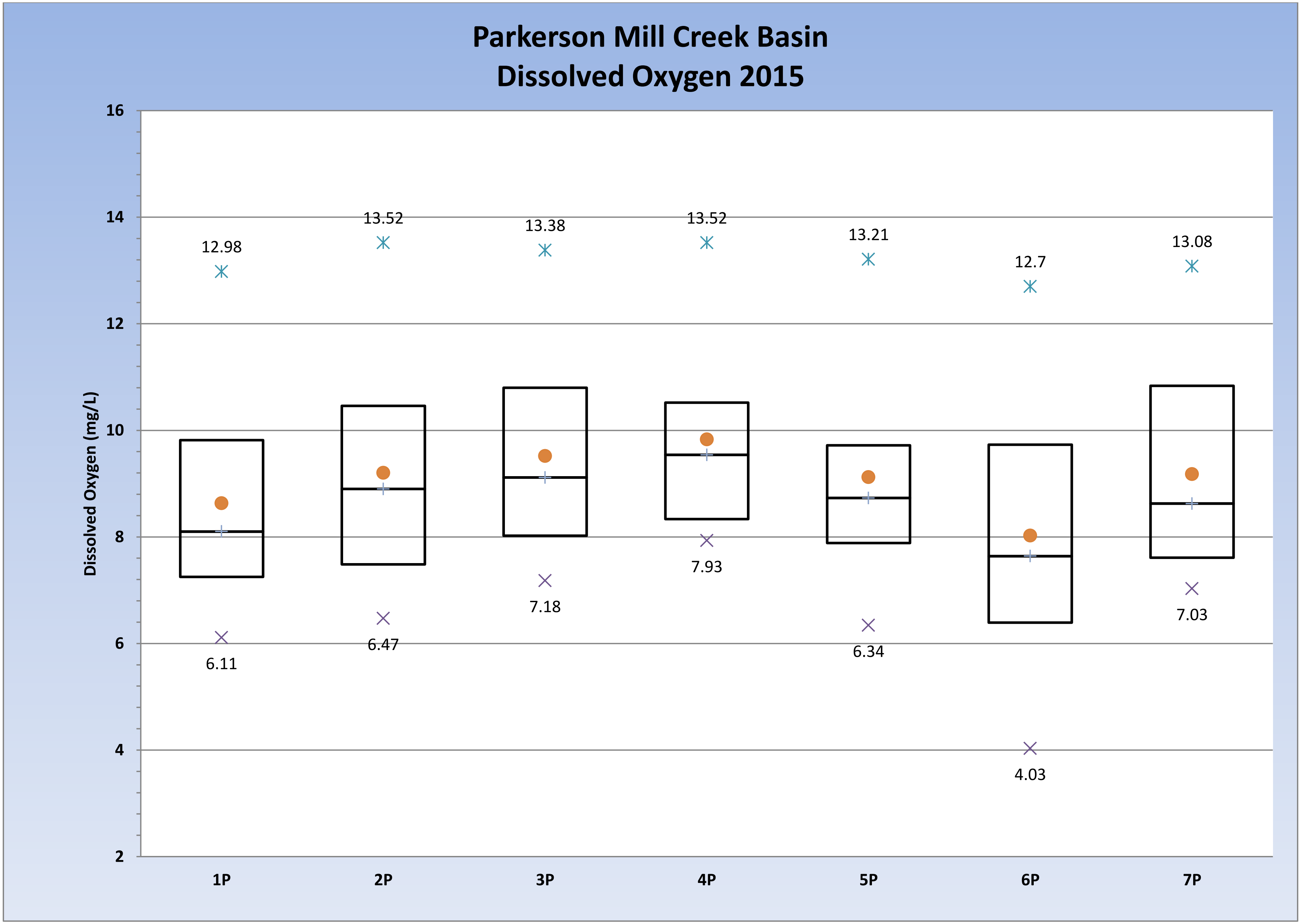

Parkerson Mill Creek Basin
Turbidity 2015
Turbidity (NTU)
1000
100
10
1
0.1
110
28.5
28.9
47.4
32.4
48.2
42.3
5.6
1.32
1.53
1.25
0.68
0.83
0.6
1P
2P
3P
4P
5P
6P
7P

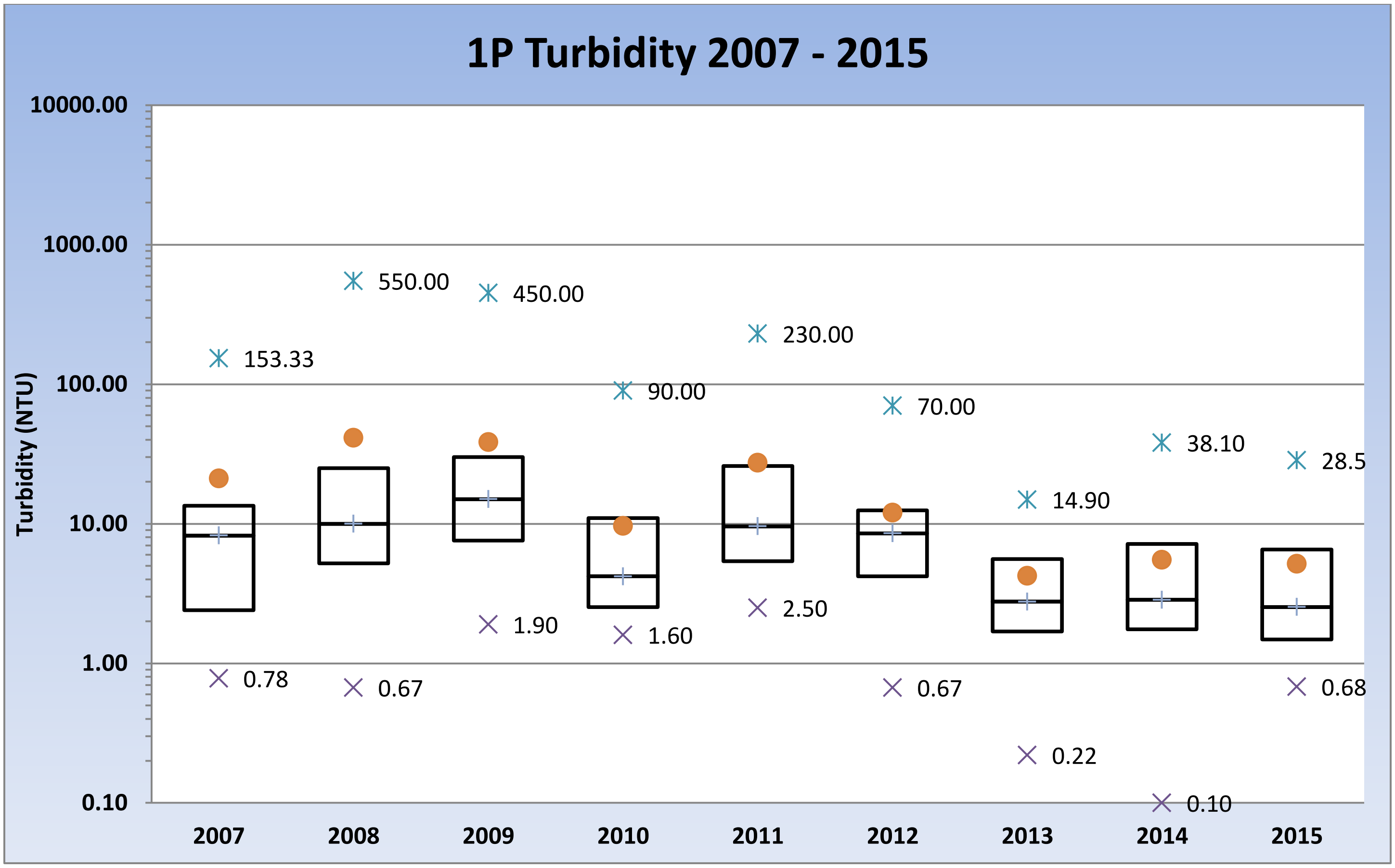

Parkerson Mill Creek Basin
Water Temperature 2015
Water Temperature (degrees F)
90
80
70
60
50
40
30
20
77.5
78
80.9
82.1
78.5
82
78.7
44.1
44.1
44.3
45.1
44.2
45.8
45.6
1P
2P
3P
4P
5P
6P
7P

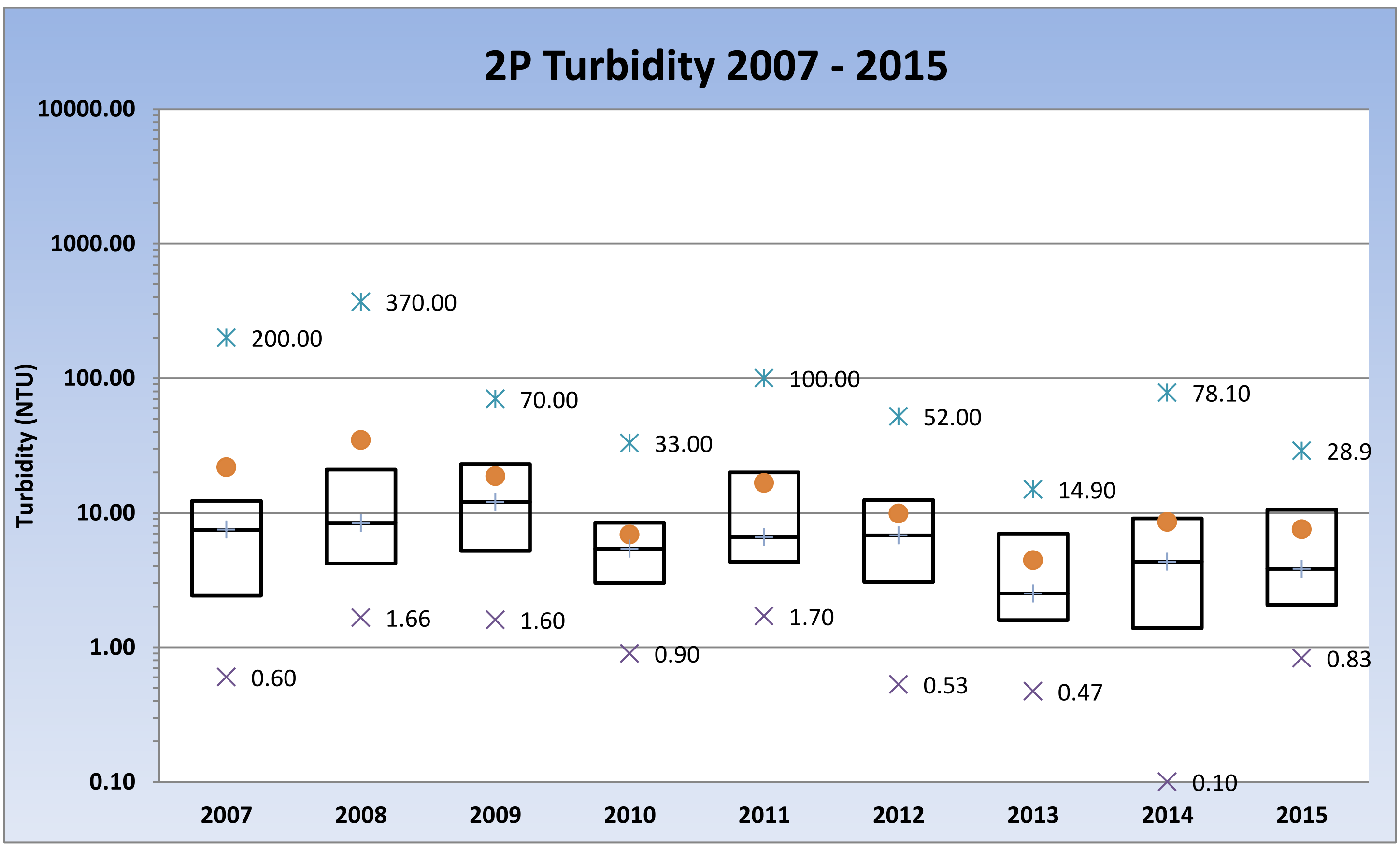

Parkerson Mill Creek Basin
pH 2015
8.5
8
7.5
7
6.5
6
pH (units)
1P
2P
3P
4P
5P
6P
7P
7.66
7.17
7.97
7.42
7.83
7.32
8.41
7.47
8
7.28
7.42
6.96
7.8
7.12

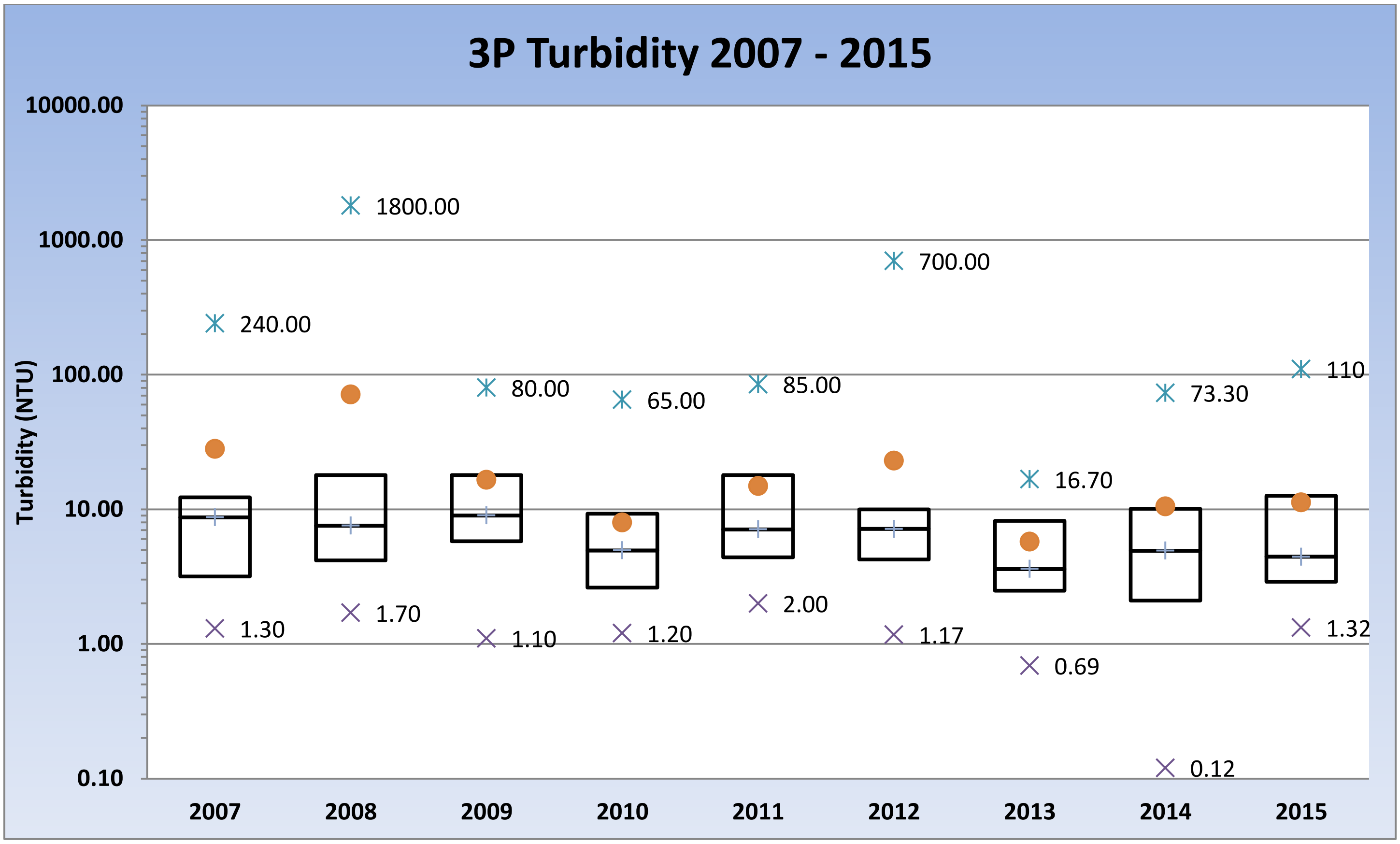


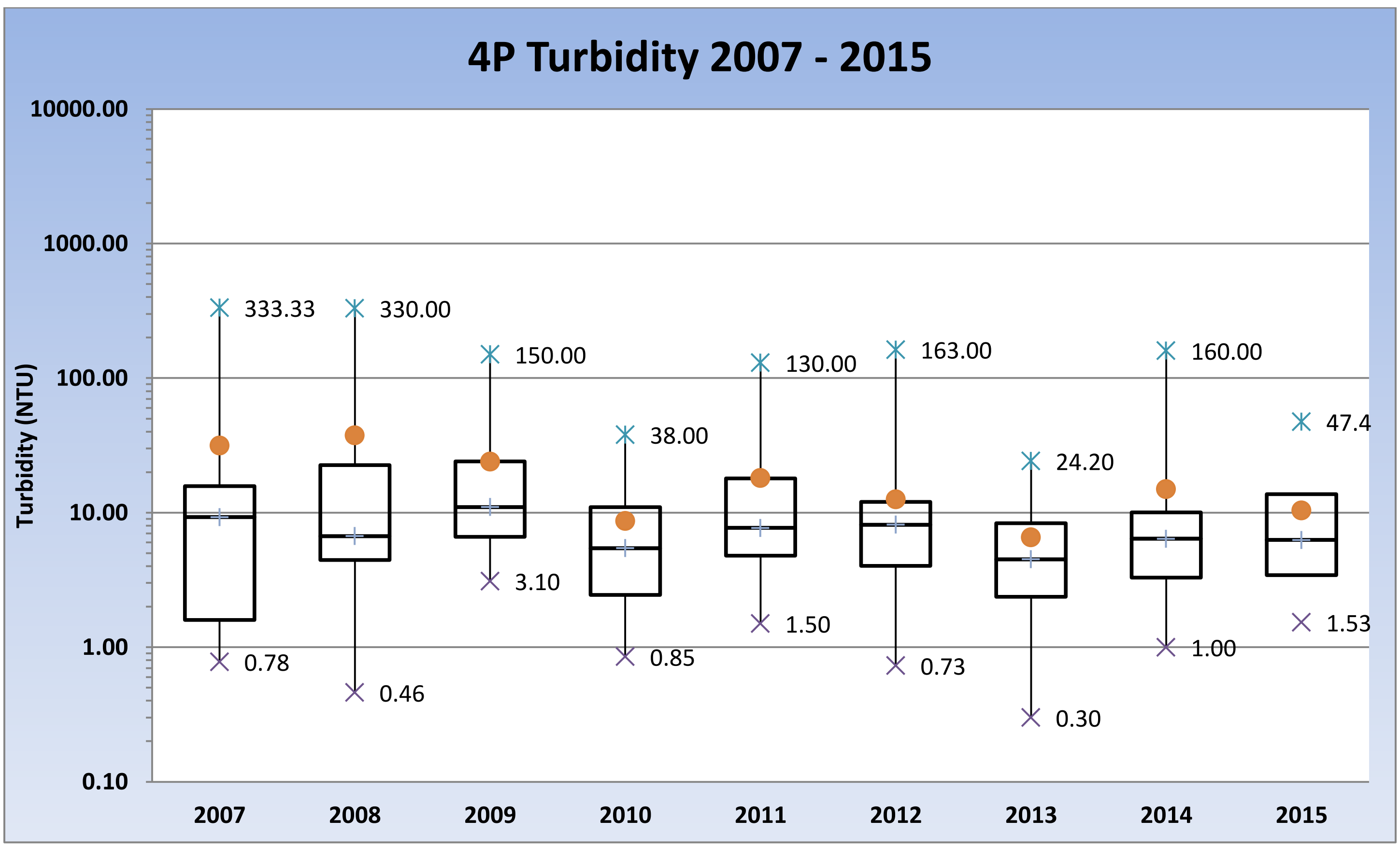
Parkerson Mill Creek Basin
Specific Conductance 2015
Specific Conductance (uS/cm)
500
450
400
350
300
250
200
150
100
50
0
1P
2P
3P
4P
5P
6P
7P
422
107
287
96
262
93
239
85
441
88
184
67
171
88

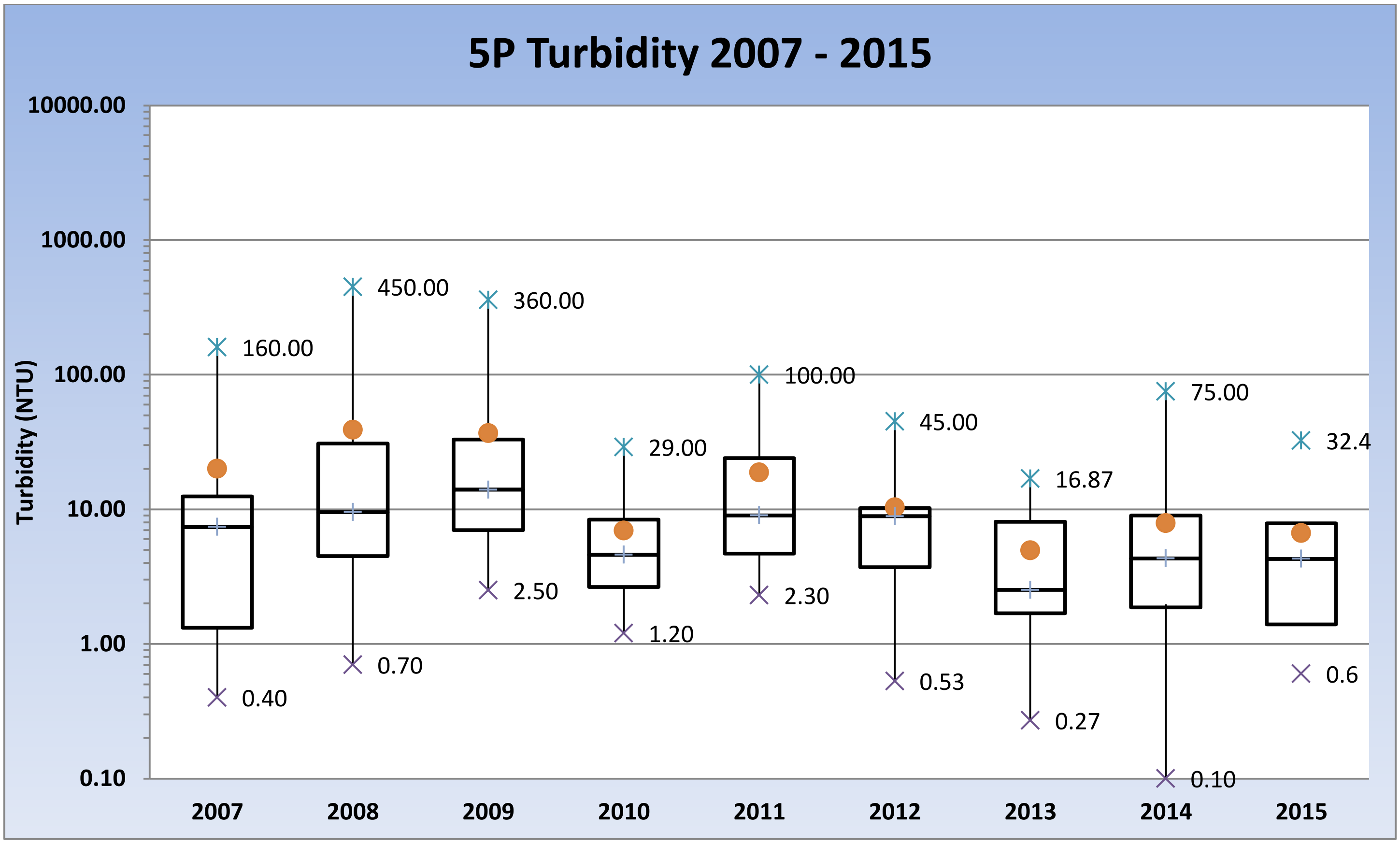

Parkerson Mill Creek Basin
Dissolved Oxygen 2015
Dissolved Oxygen (mg/L)
16
14
12
10
8
6
4
2
12.98
13.52
13.38
13.52
13.21
12.7
13.08
6.11
6.47
7.18
7.93
6.34
4.03
7.03
1P
2P
3P
4P
5P
6P
7P

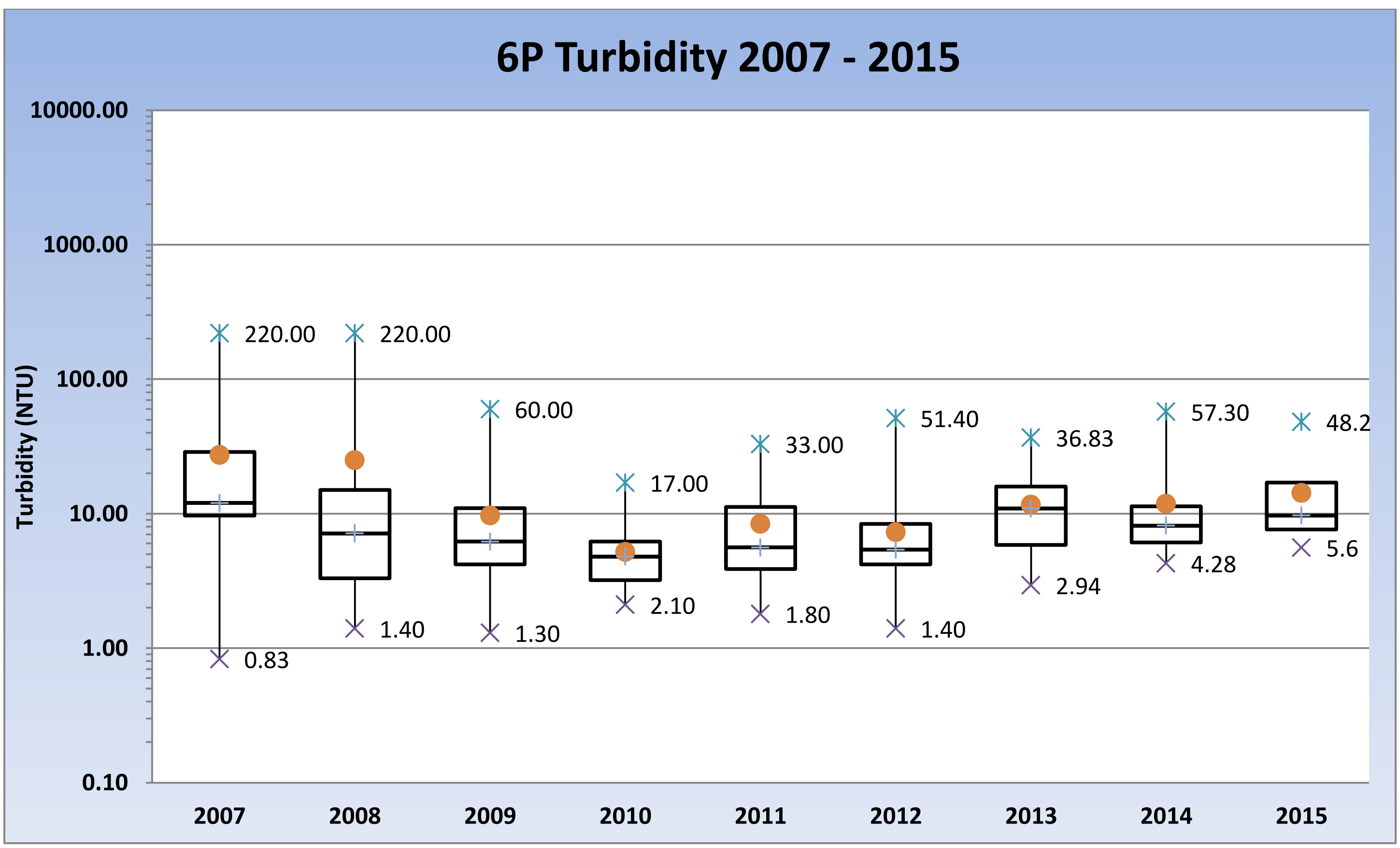

1P Turbidity 2007 - 2015
10000.00
1000.00
100.00
10.00
1.00
0.10
Turbidity (NTU)
153.33
550.00
450.00
90.00
230.00
70.00
14.90
38.10
28.5
0.78
0.67
1.90
1.60
2.50
0.67
0.22
0.10
0.68
2007
2008
2009
2010
2011
2012
2013
2014
2015

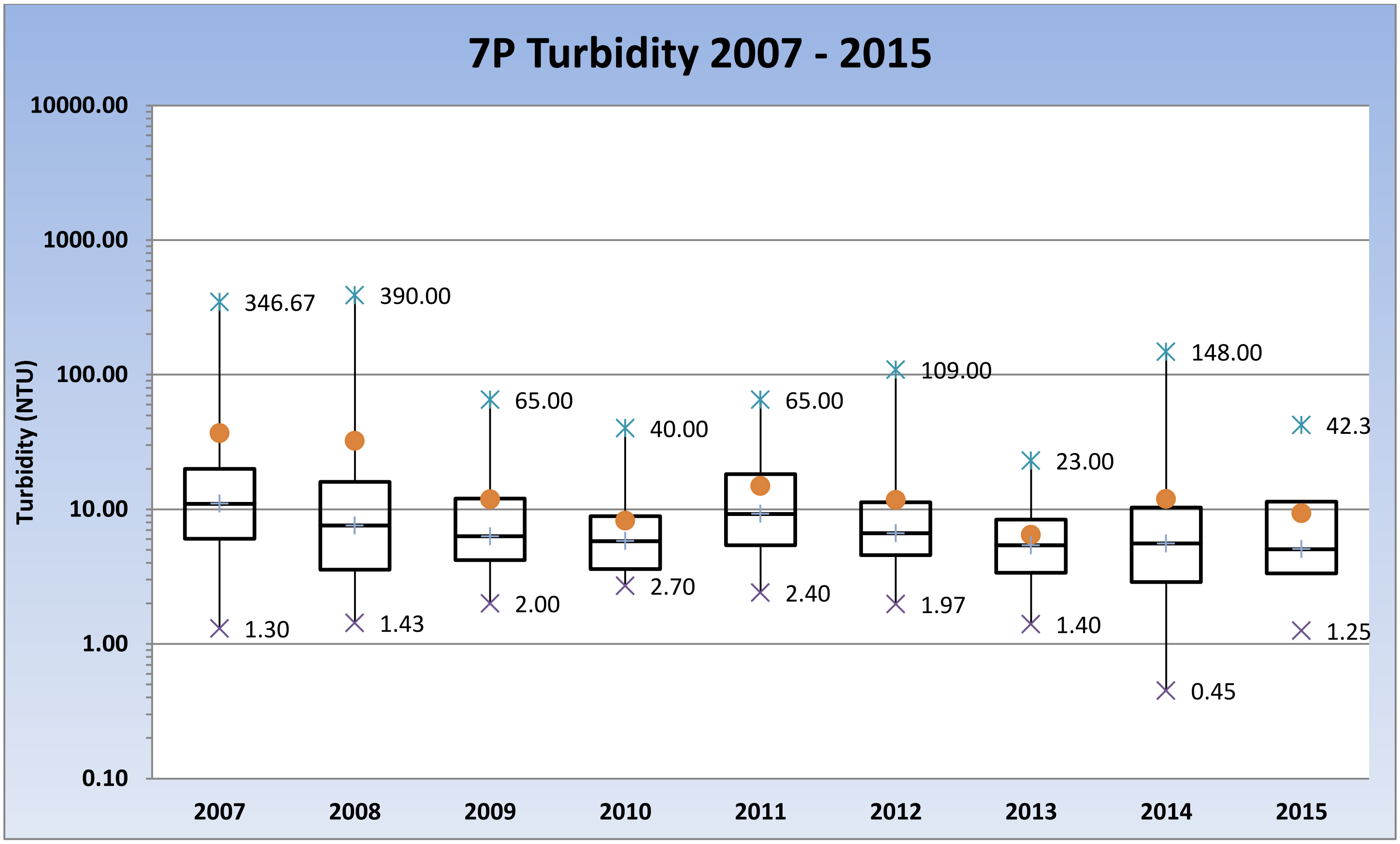

2P Turbidity 2007 - 2015
10000.00
1000.00
100.00
10.00
1.00
0.10
Turbidity (NTU)
200.00
370.00
70.00
33.00
100.00
52.00
14.90
78.10
28.9
0.60
1.66
1.60
0.90
1.70
0.53
0.47
0.10
0.83
2007
2008
2009
2010
2011
2012
2013
2014
2015

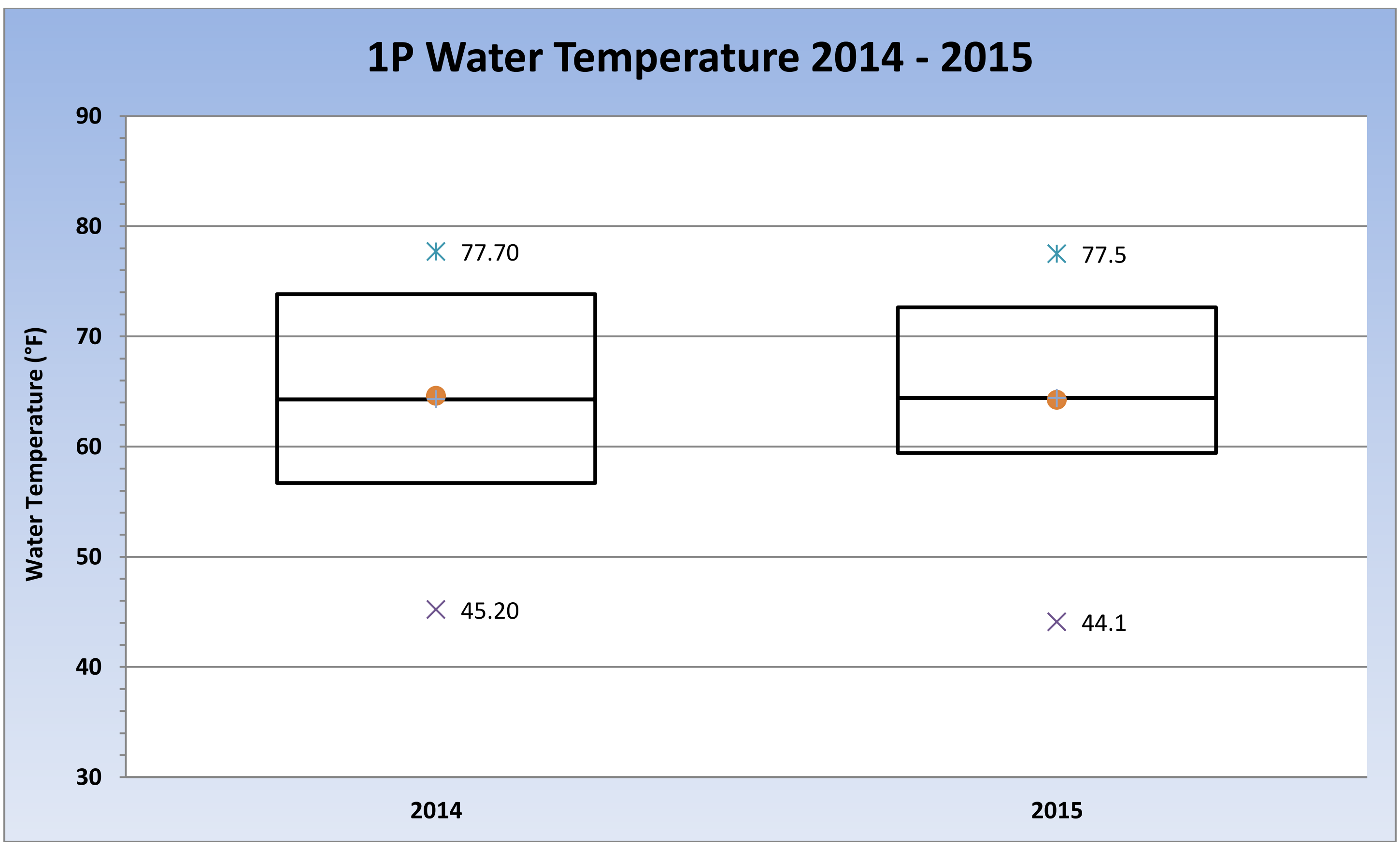

3P Turbidity 2007 - 2015
10000.00
1000.00
100.00
10.00
1.00
0.10
Turbidity (NTU)
1800.00
700.00
240.00
80.00
65.00
85.00
110
73.30
16.70
1.30
1.70
1.10
1.20
2.00
1.17
0.69
1.32
0.12
2007
2008
2009
2010
2011
2012
2013
2014
2015

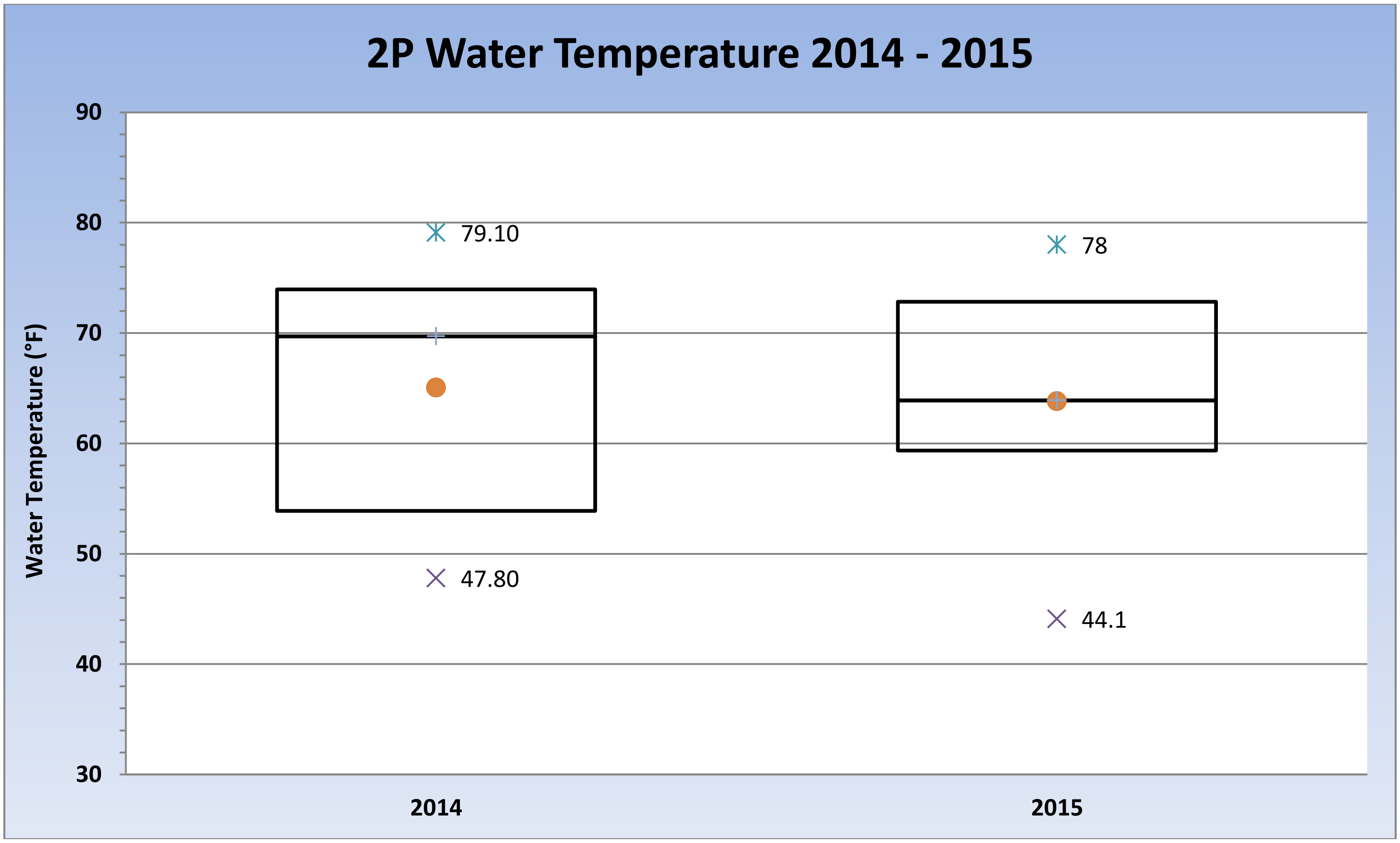

4P Turbidity 2007 - 2015
10000.00
1000.00
100.00
10.00
1.00
0.10
Turbidity (NTU)
333.33
330.00
150.00
130.00
163.00
160.00
38.00
47.4
24.20
3.10
0.78
0.46
0.85
1.50
0.73
0.30
1.00
1.53
2007
2008
2009
2010
2011
2012
2013
2014
2015

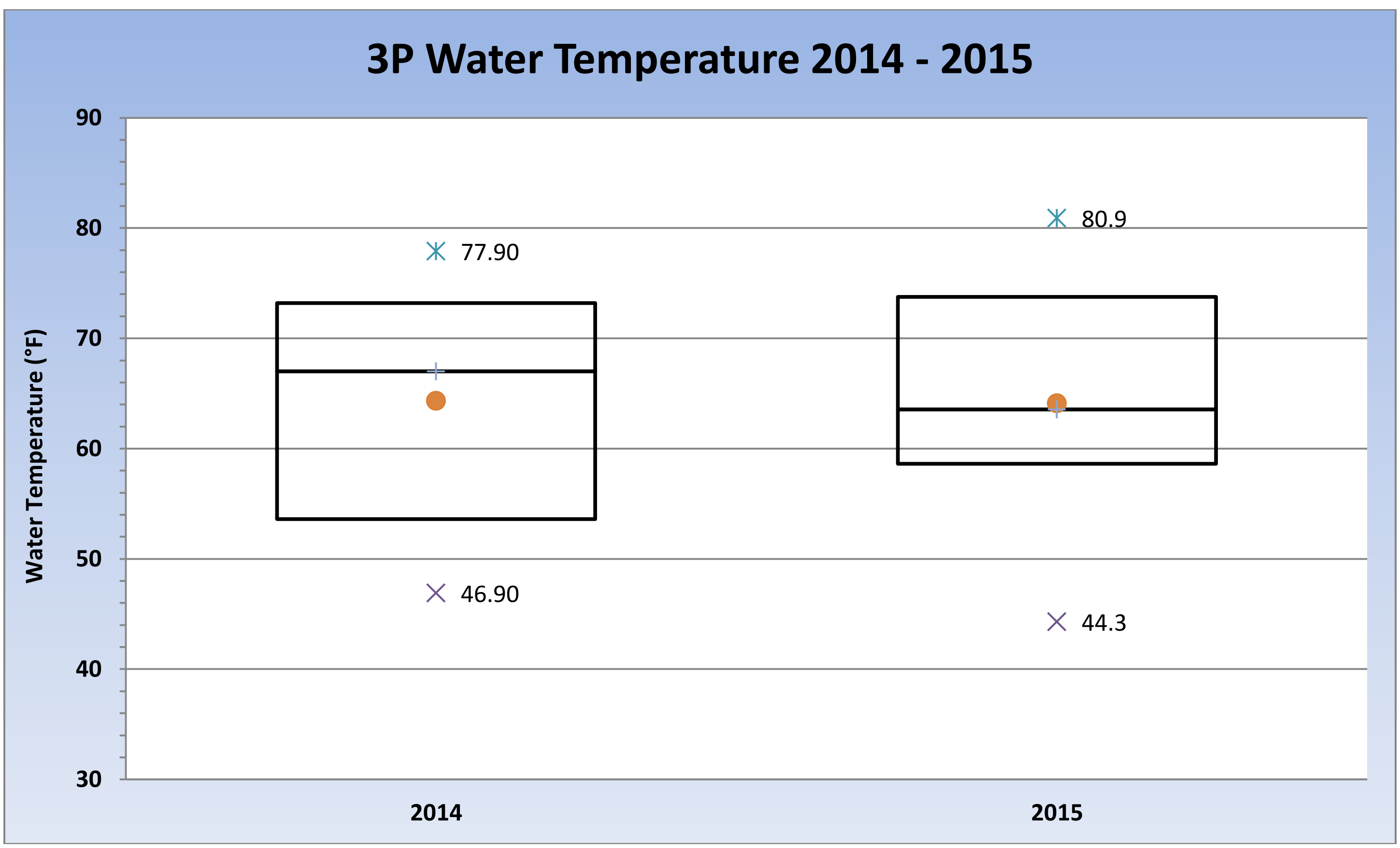

5P Turbidity 2007 - 2015
Turbidity (NTU)
10000.00
1000.00
100.00
10.00
1.00
0.10
160.00
450.00
360.00
29.00
100.00
45.00
16.87
75.00
32.4
0.40
0.70
2.50
1.20
2.30
0.53
0.27
0.10
0.6
2007
2008
2009
2010
2011
2012
2013
2014
2015

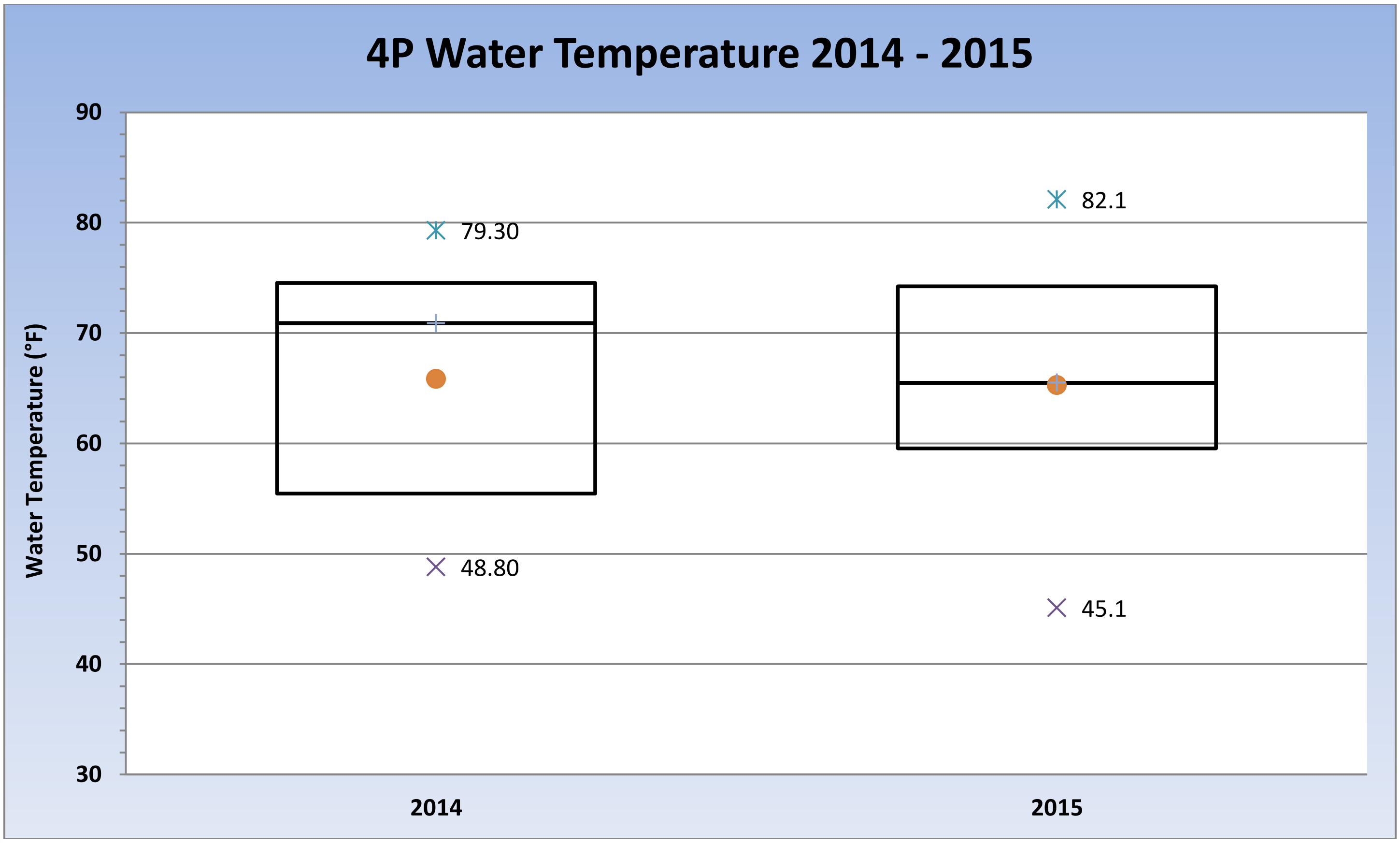

6P Turbidity 2007 - 2015
Turbidity (NTU)
10000.00
1000.00
100.00
10.00
1.00
0.10
220.00
220.00
60.00
17.00
33.00
51.40
36.83
57.30
48.2
0.83
1.40
1.30
2.10
1.80
1.40
2.94
4.28
5.6
2007
2008
2009
2010
2011
2012
2013
2014
2015

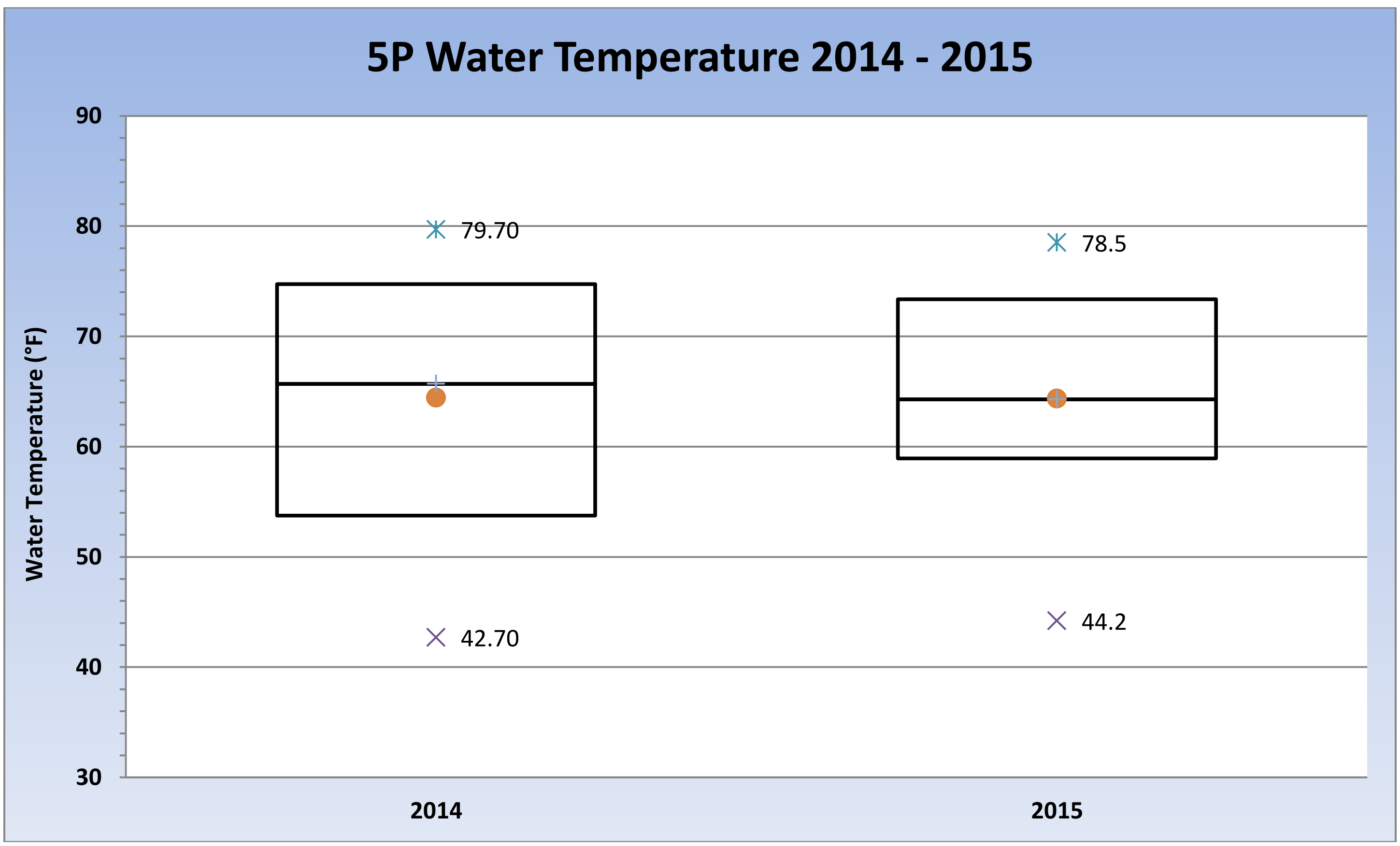

7P Turbidity 2007 - 2015
Turbidity (NTU)
10000.00
1000.00
100.00
10.00
1.00
0.10
346.67
390.00
65.00
40.00
65.00
109.00
23.00
148.00
42.3
1.30
1.43
2.00
2.70
2.40
1.97
1.40
0.45
1.25
2007
2008
2009
2010
2011
2012
2013
2014
2015

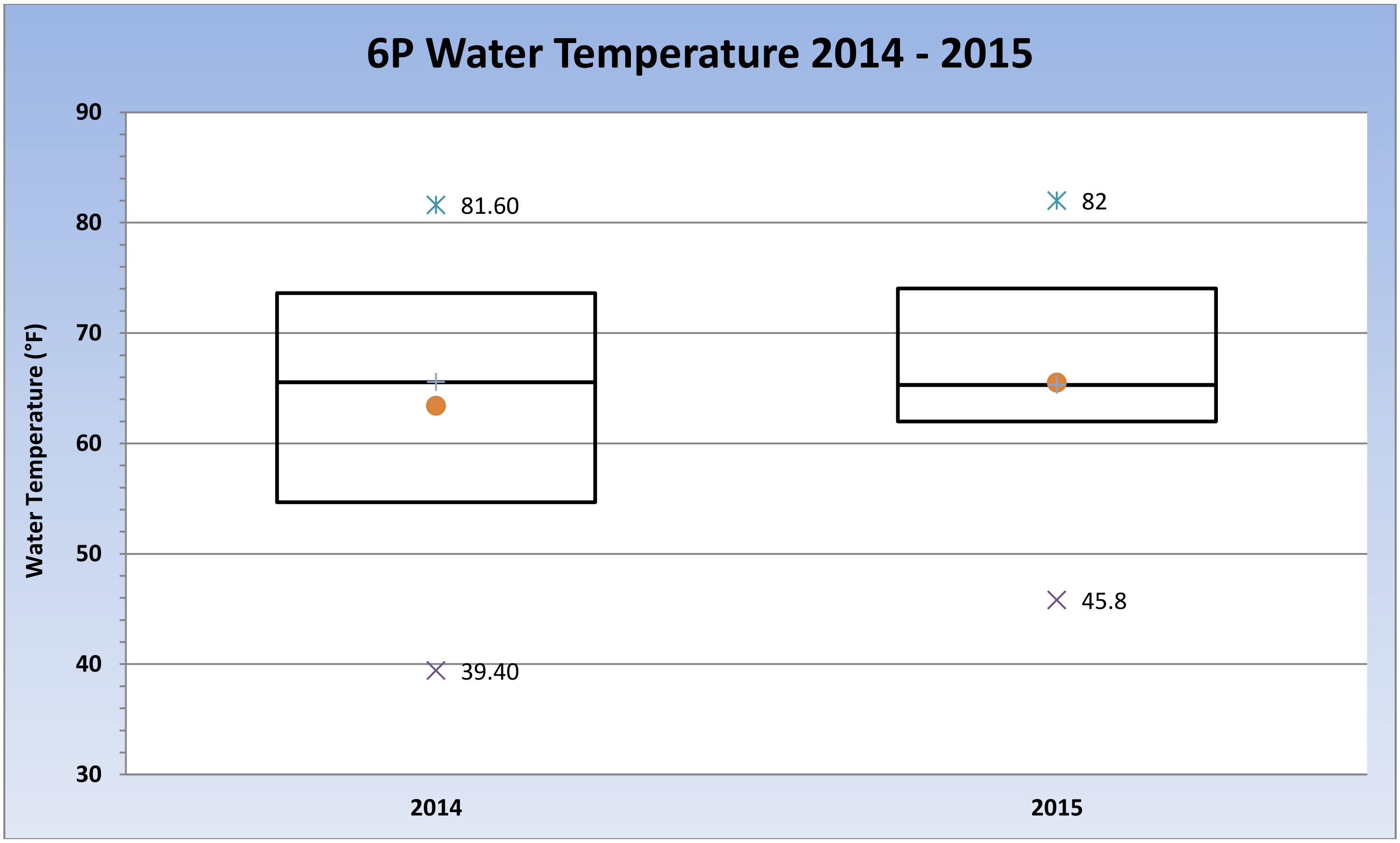

1P Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
77.70
77.5
45.20
44.1
2014
2015

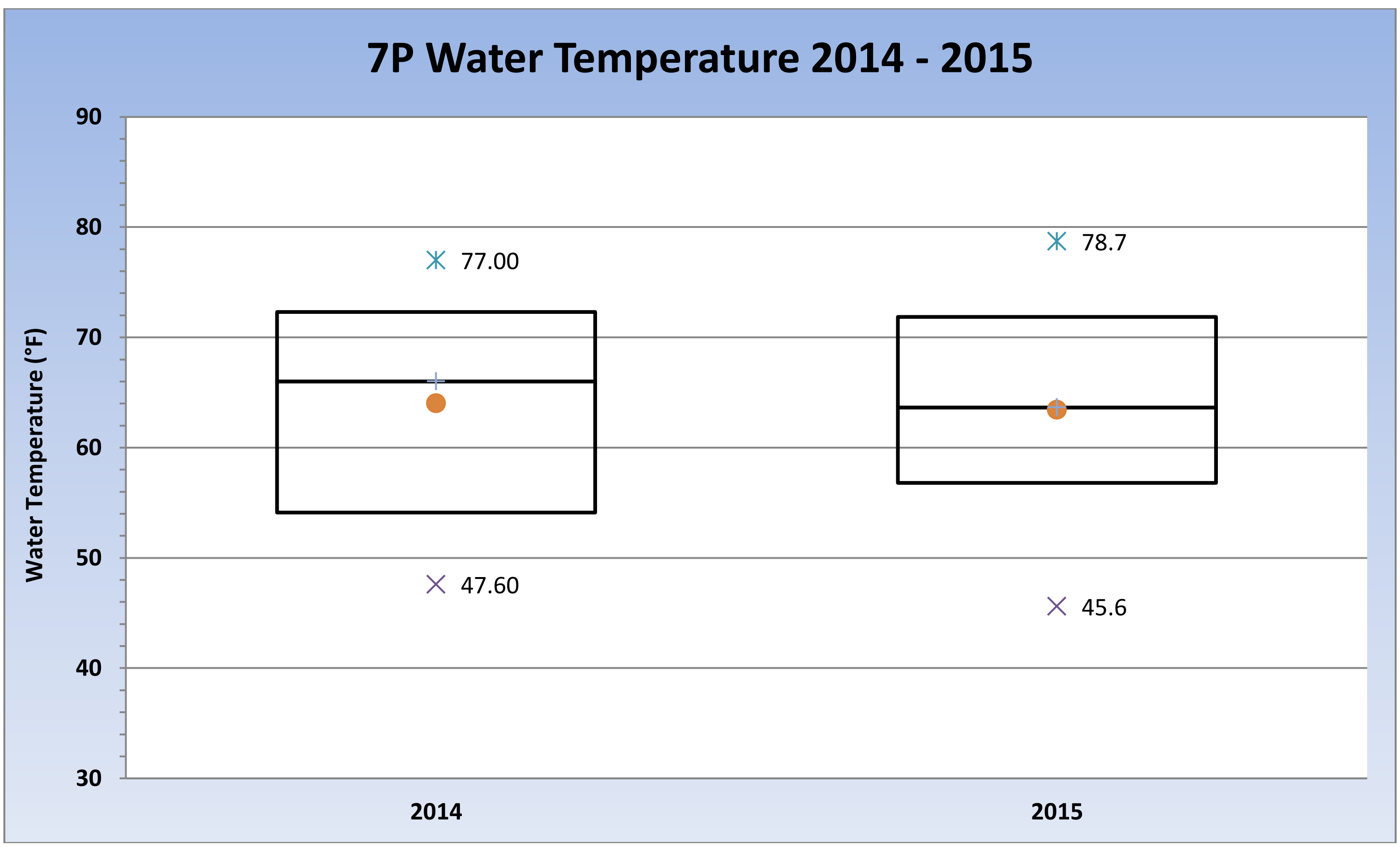

2P Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
79.10
47.80
78
44.1
2014
2015

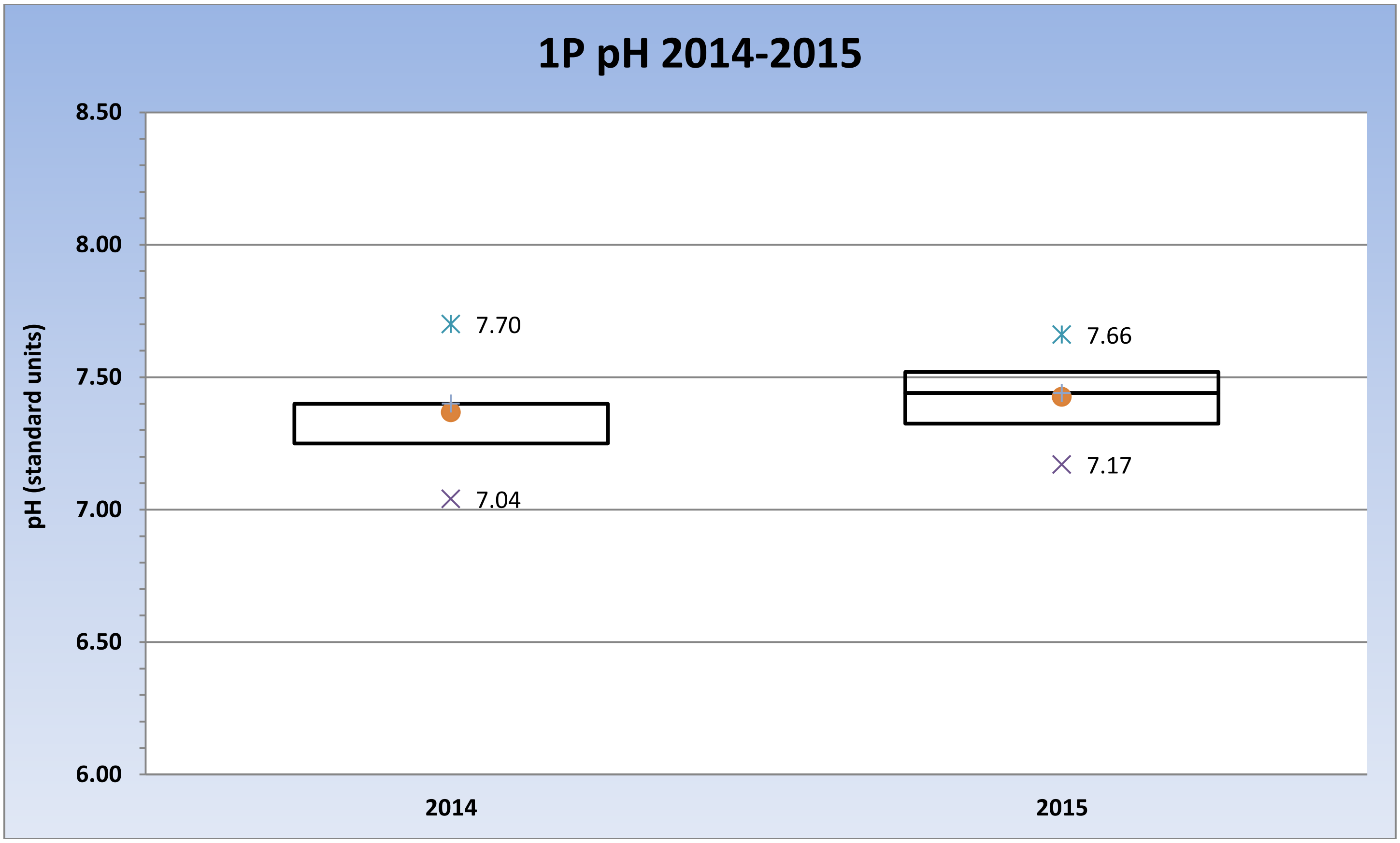

3P Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
77.90
46.90
80.9
44.3
2014
2015

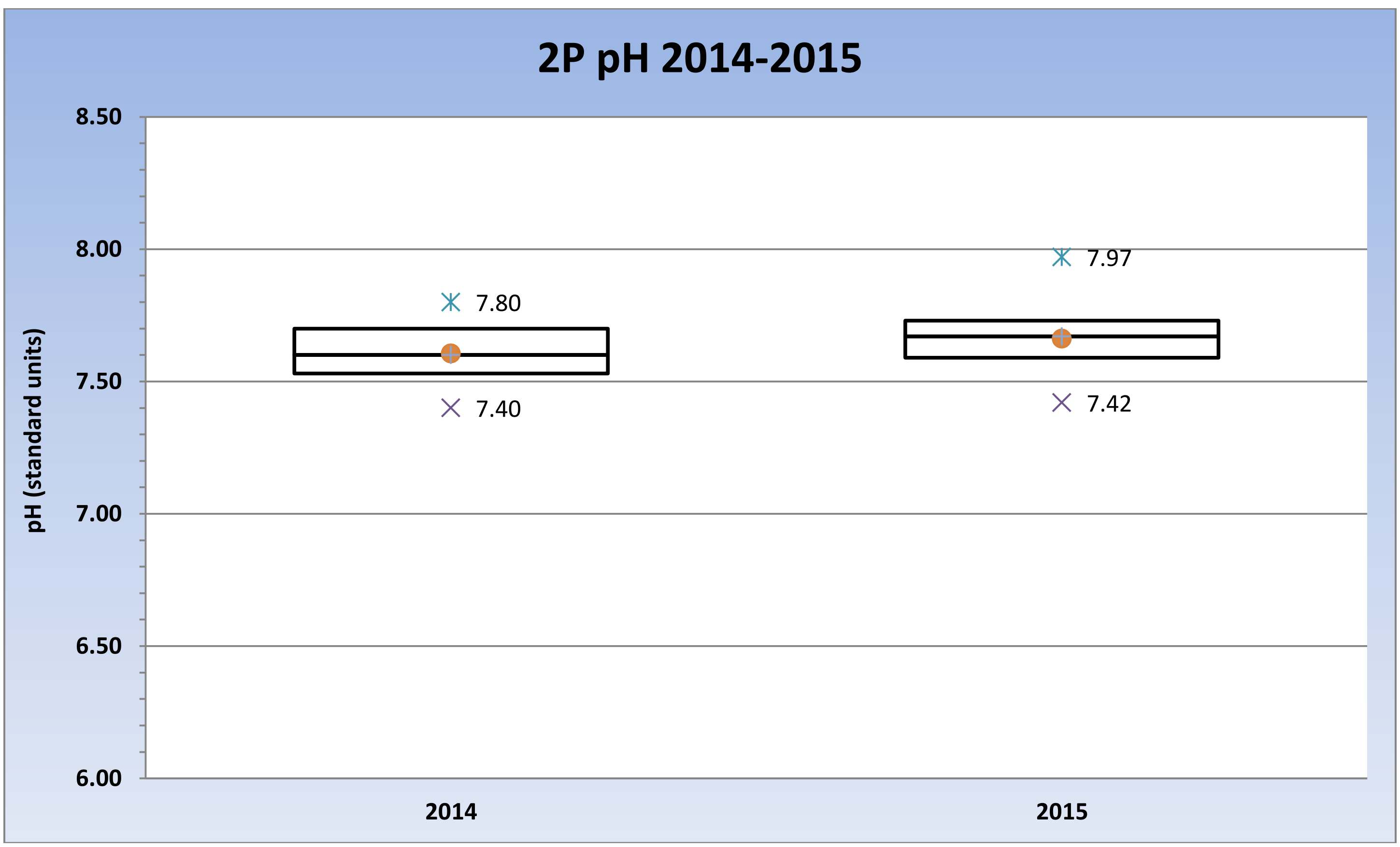

4P Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
79.30
48.80
82.1
45.1
2014
2015

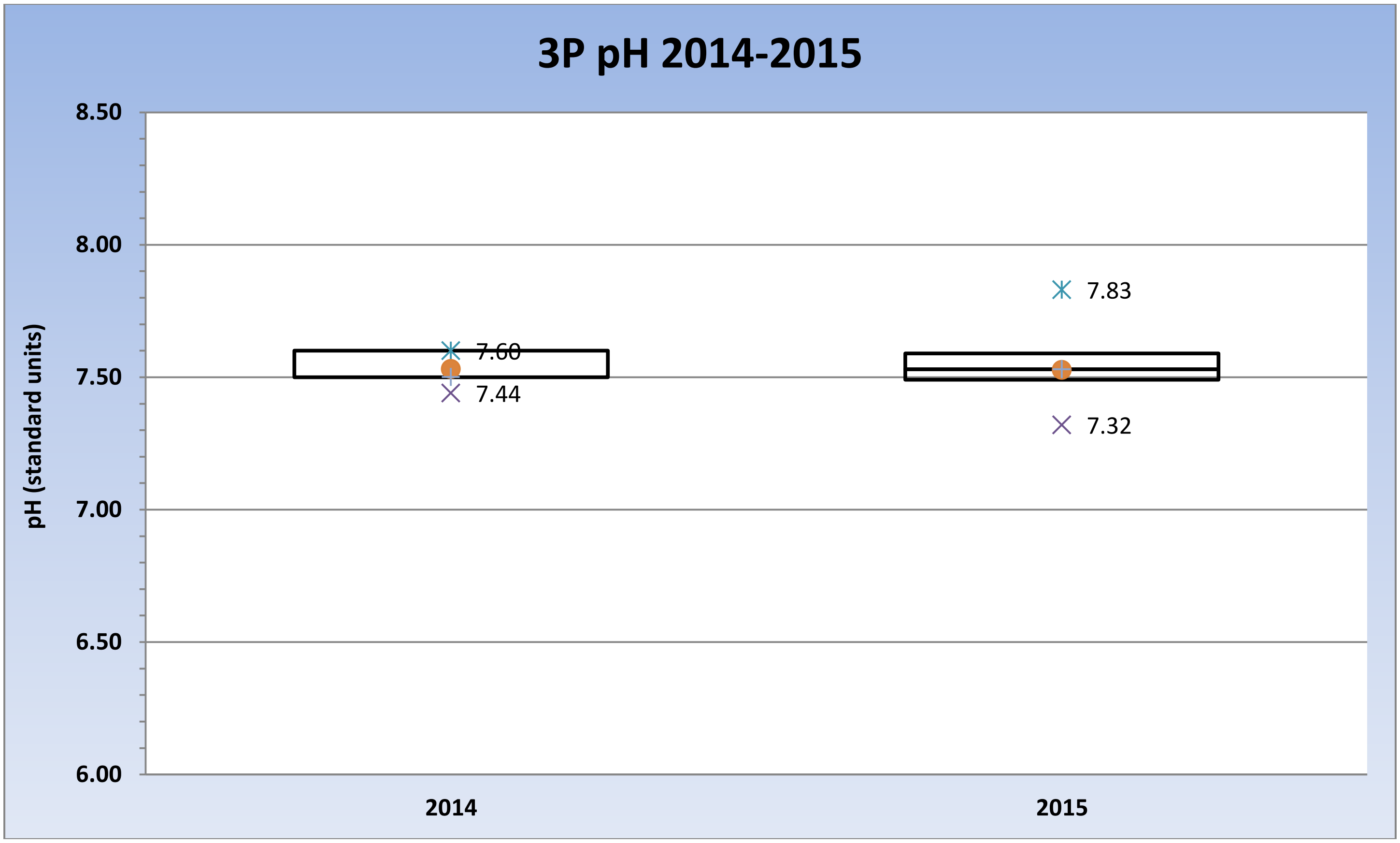

5P Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
79.70
42.70
78.5
44.2
2014
2015

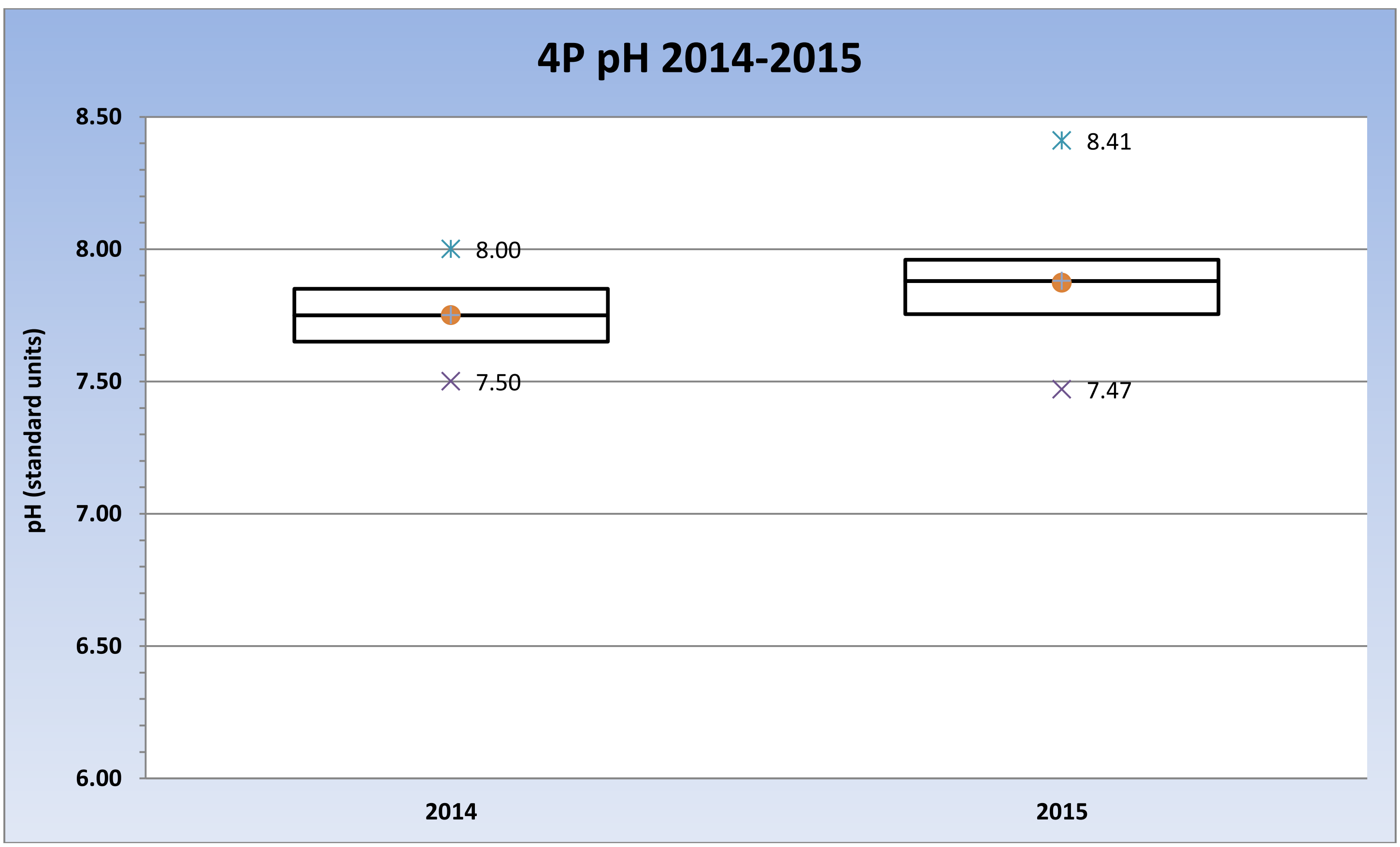

6P Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
81.60
82
45.8
39.40
2014
2015

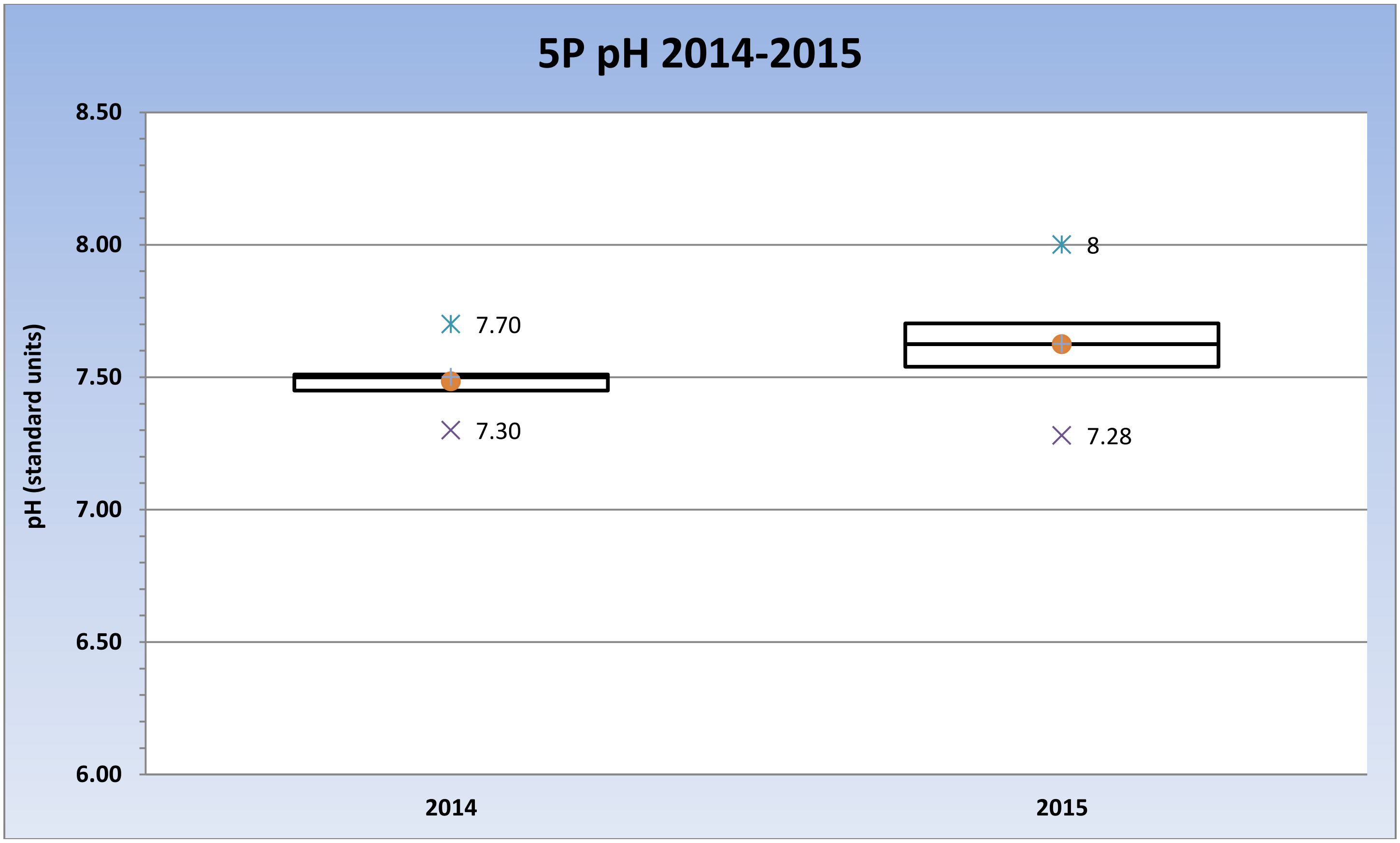

7P Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
77.00
78.7
47.60
45.6
2014
2015


1P pH 2014-2015
8.50
8.00
7.50
7.00
6.50
6.00
pH (standard units)
7.70
7.04
7.66
7.17
2014
2015

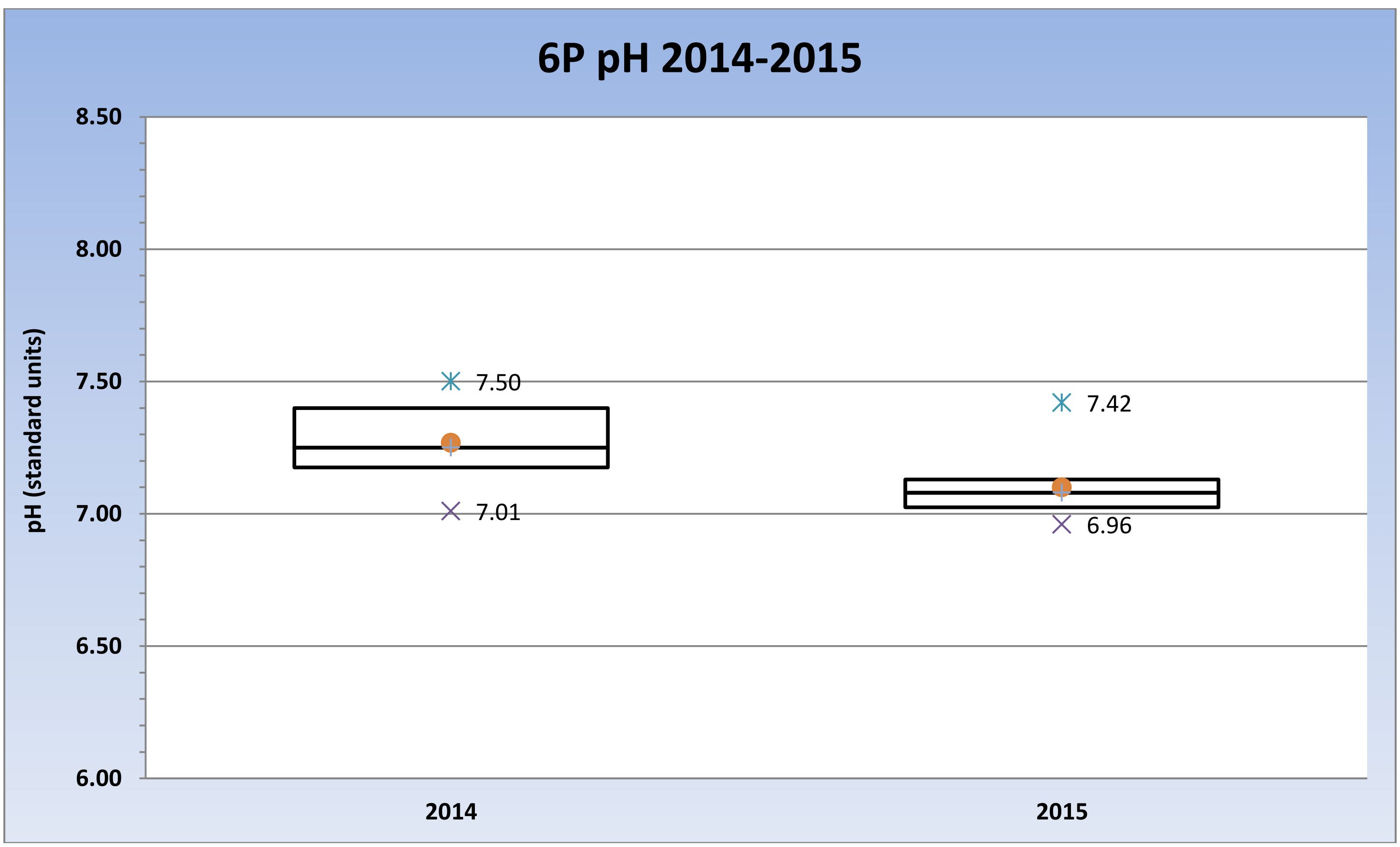

2P pH 2014-2015
8.50
8.00
7.50
7.00
6.50
6.00
pH (standard units)
7.80
7.40
7.97
7.42
2014
2015


3P pH 2014-2015
pH (standard units)
8.50
8.00
7.50
7.00
6.50
6.00
7.60
7.44
7.83
7.32
2014
2015

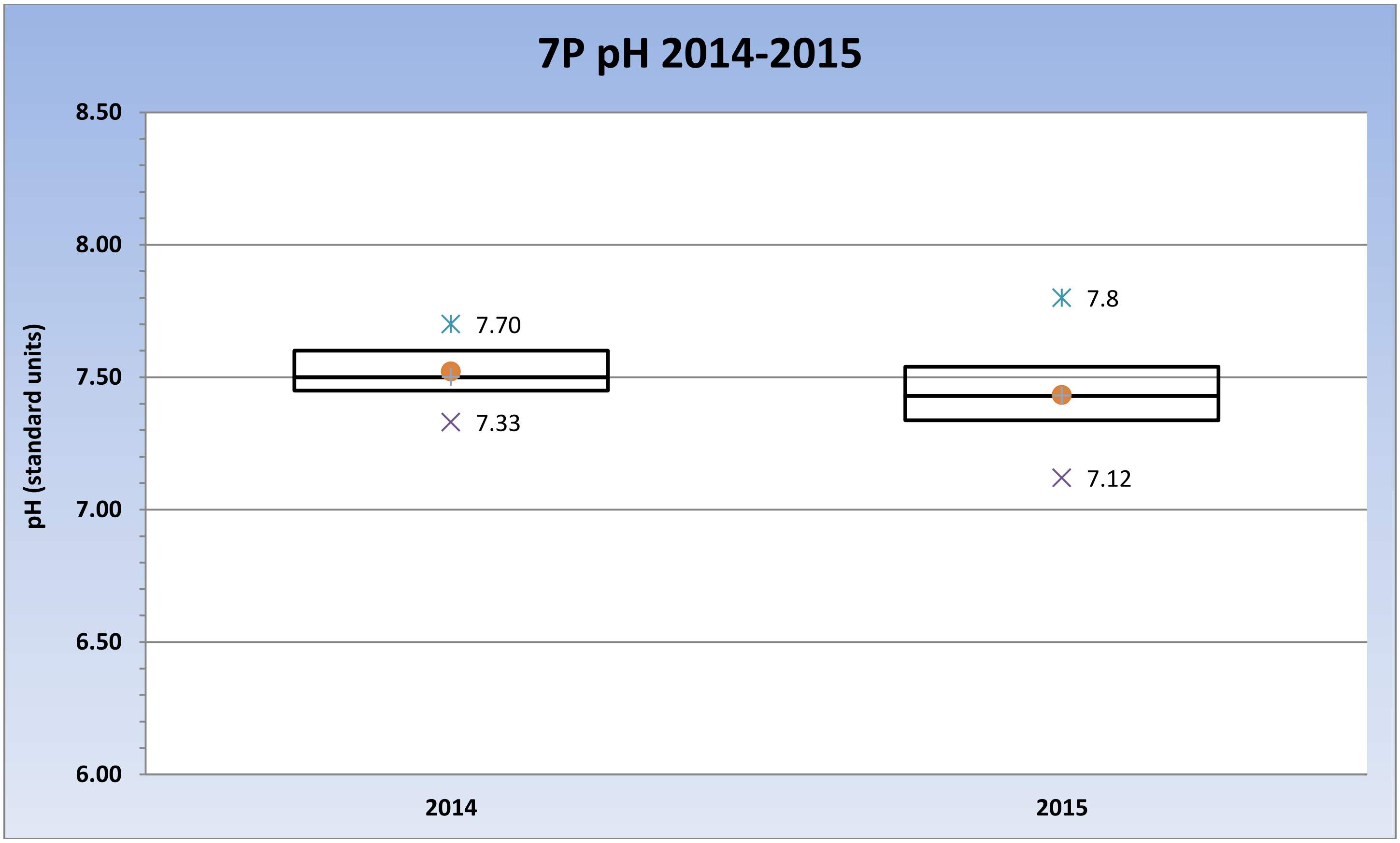

4P pH 2014-2015
pH (standard units)
8.50
8.00
7.50
7.00
6.50
6.00
8.00
7.50
8.41
7.47
2014
2015

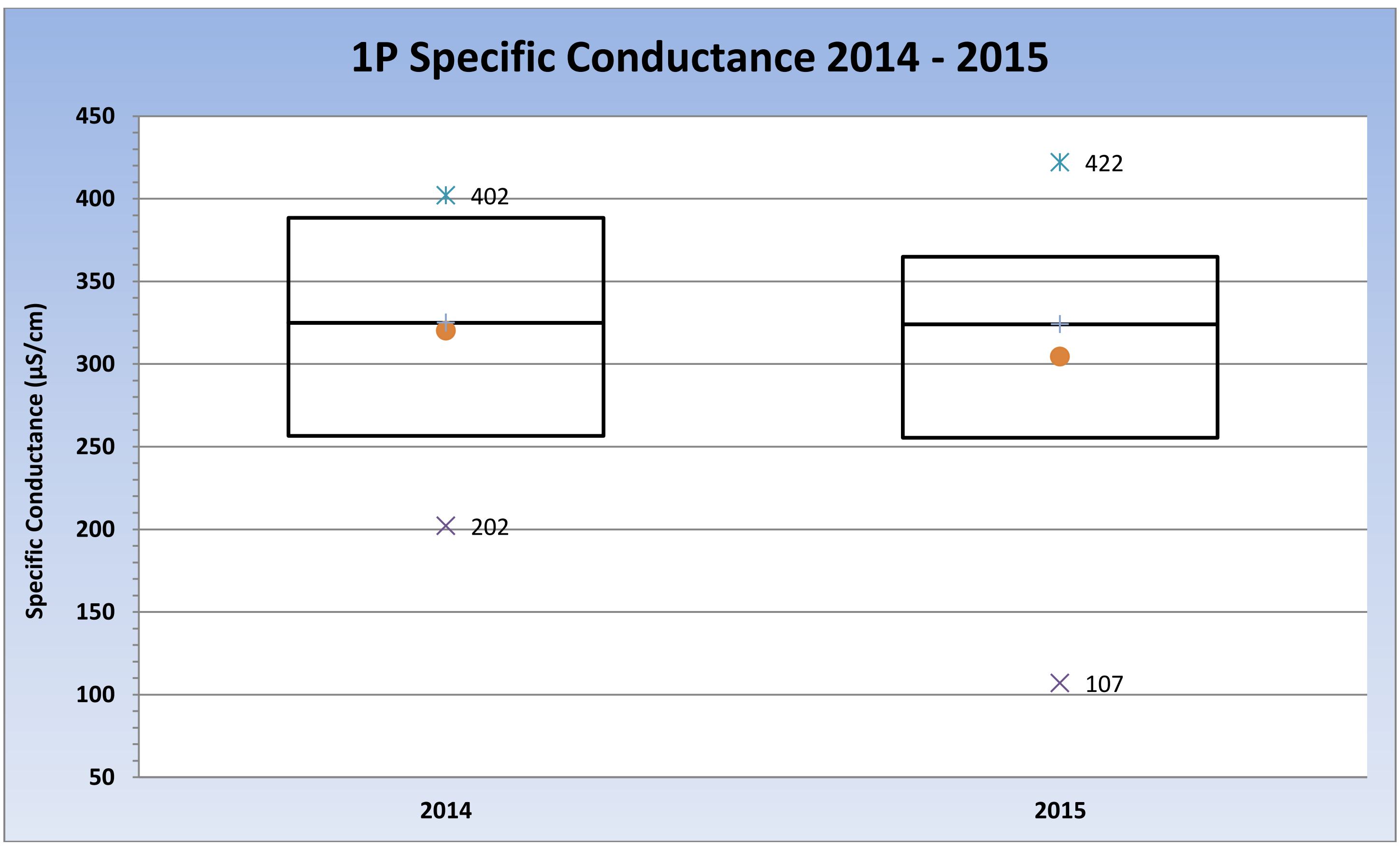


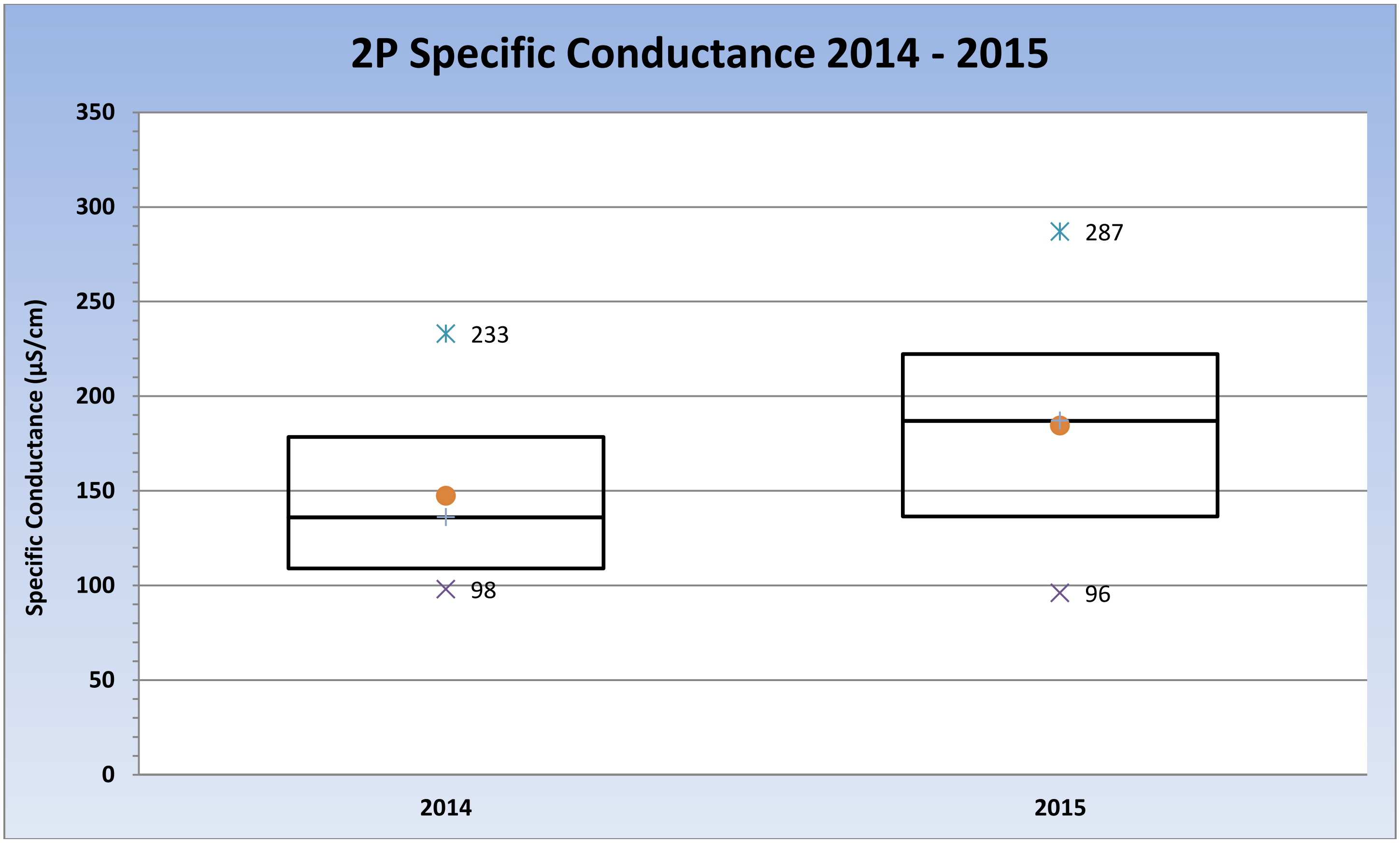
5P pH 2014-2015
8.50
8.00
7.50
7.00
6.50
6.00
pH (standard units)
7.70
7.30
8
7.28
2014
2015

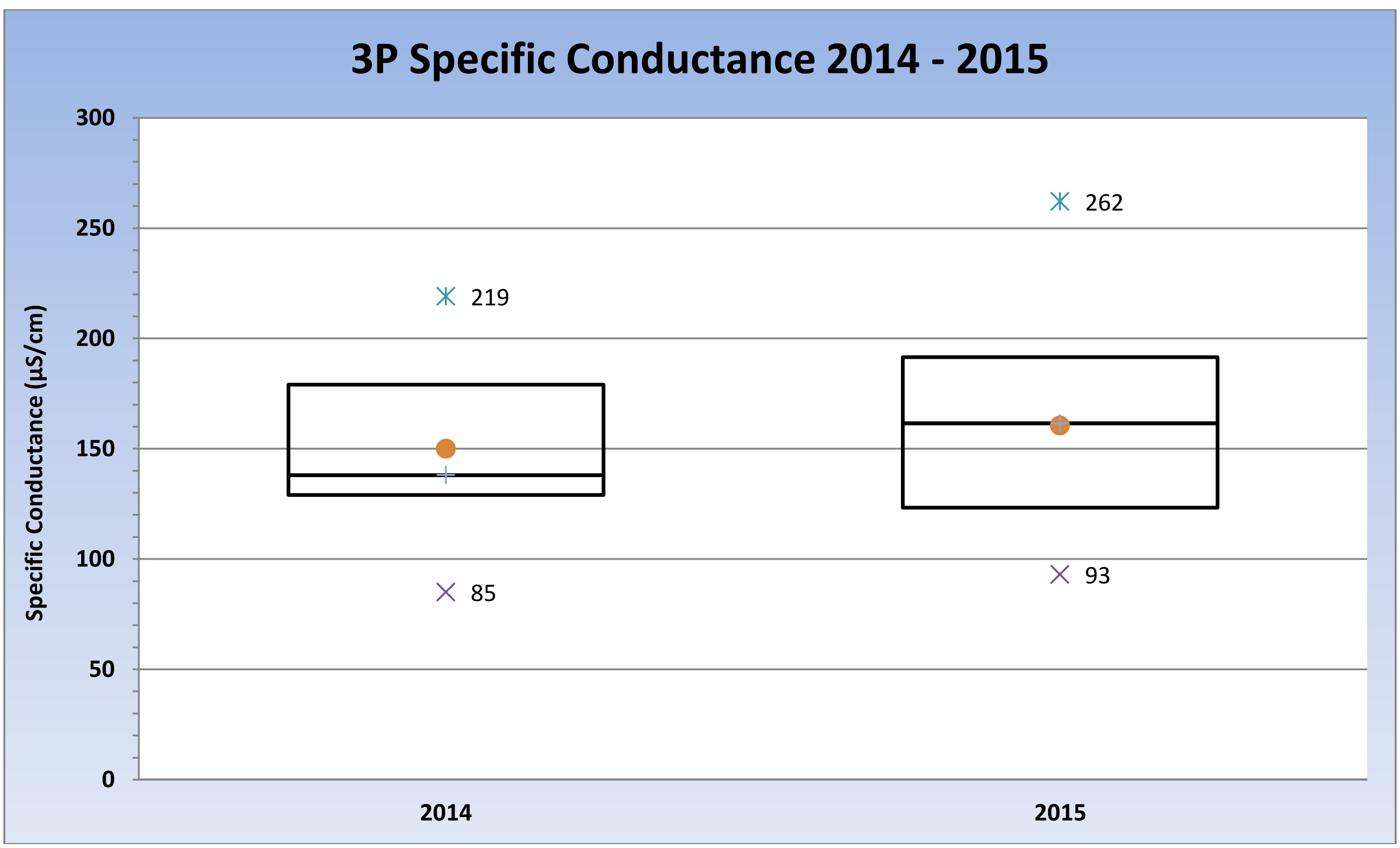


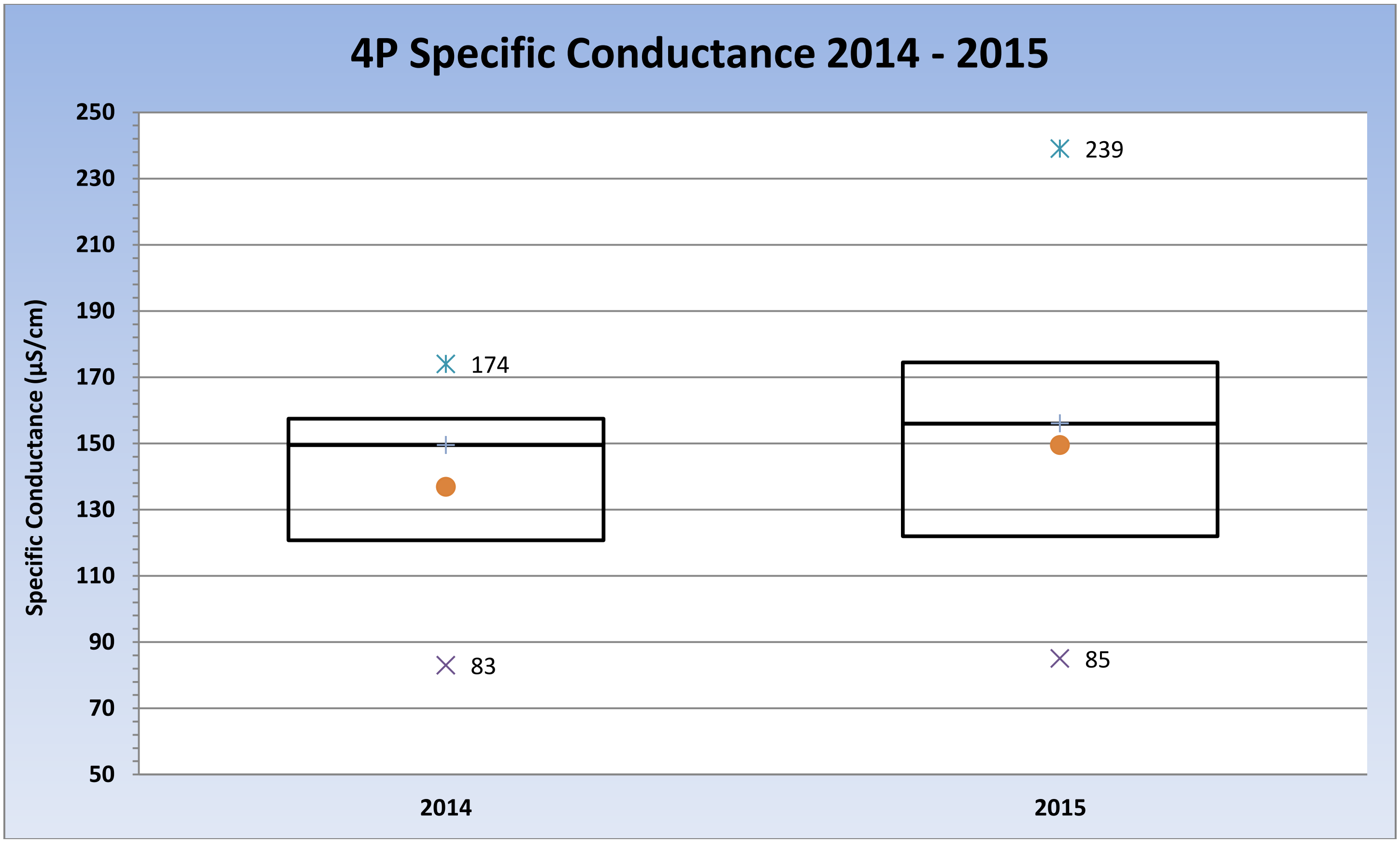
6P pH 2014-2015
8.50
8.00
7.50
7.00
6.50
6.00
pH (standard units)
7.50
7.01
7.42
6.96
2014
2015

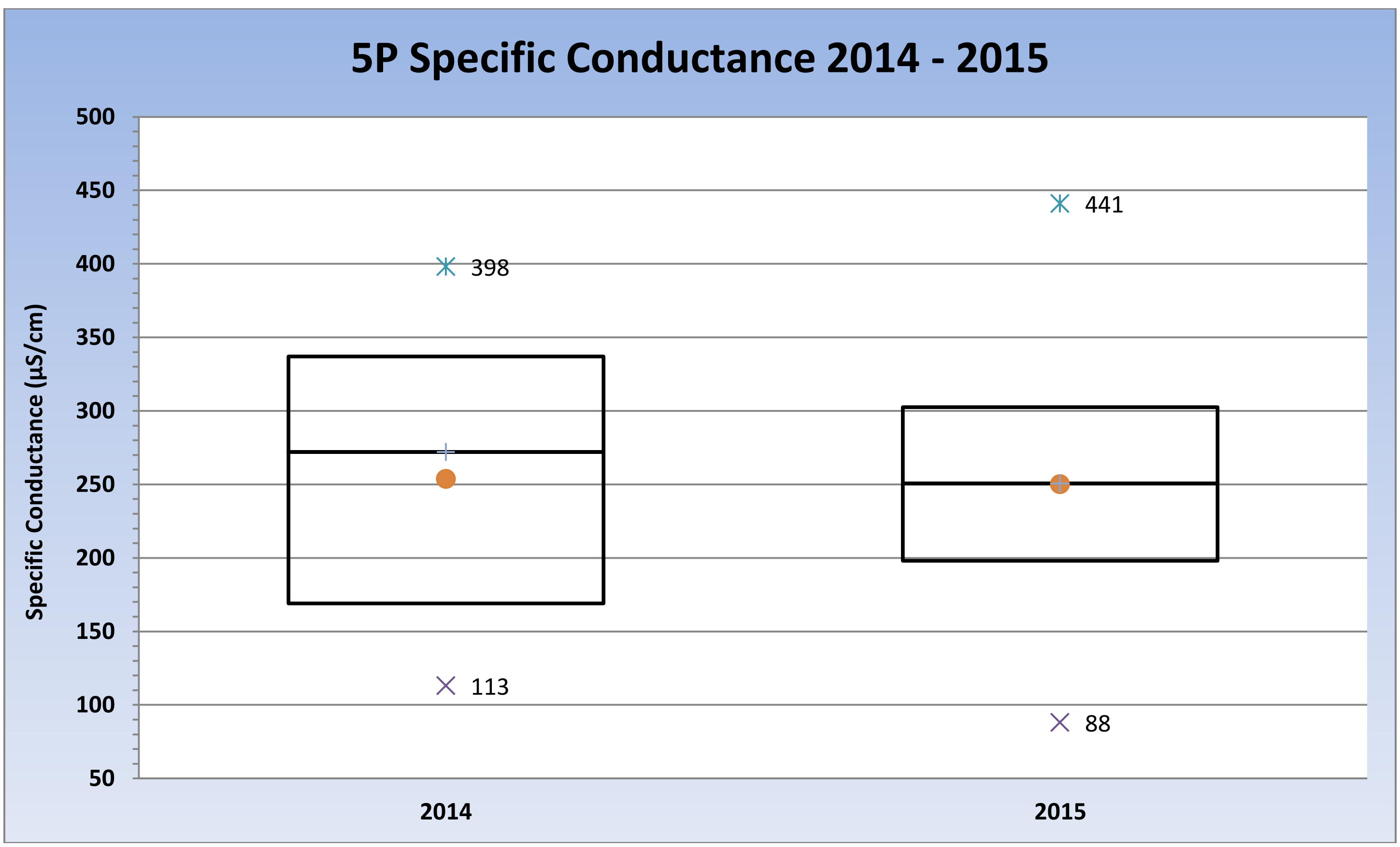

7P pH 2014-2015
pH (standard units)
8.50
8.00
7.50
7.00
6.50
6.00
7.70
7.33
7.8
7.12
2014
2015

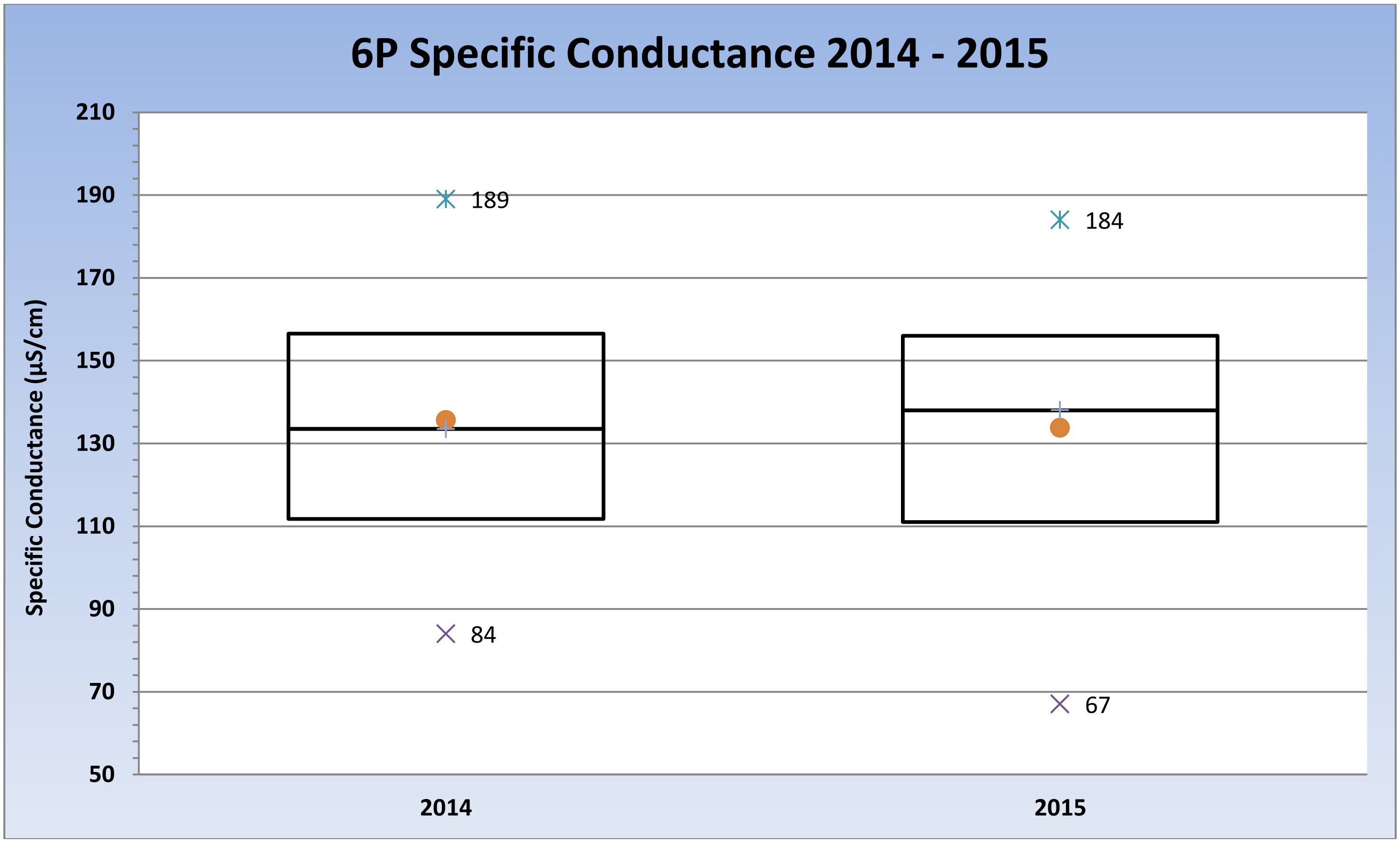

1P Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
450
400
350
300
250
200
150
100
50
402
202
422
107
2014
2015

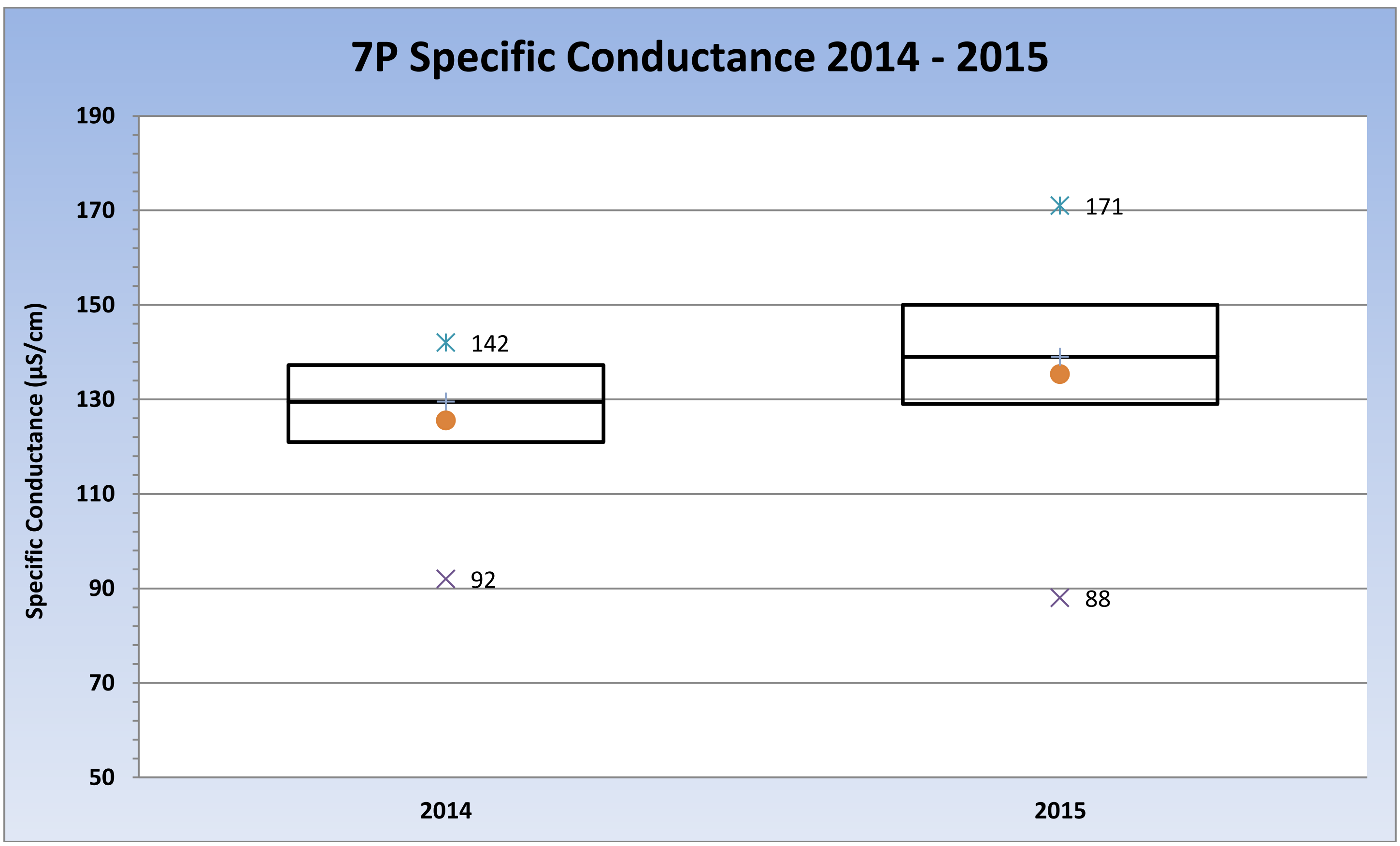

2P Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
350
300
250
200
150
100
50
0
2014
2015
233
98
287
96

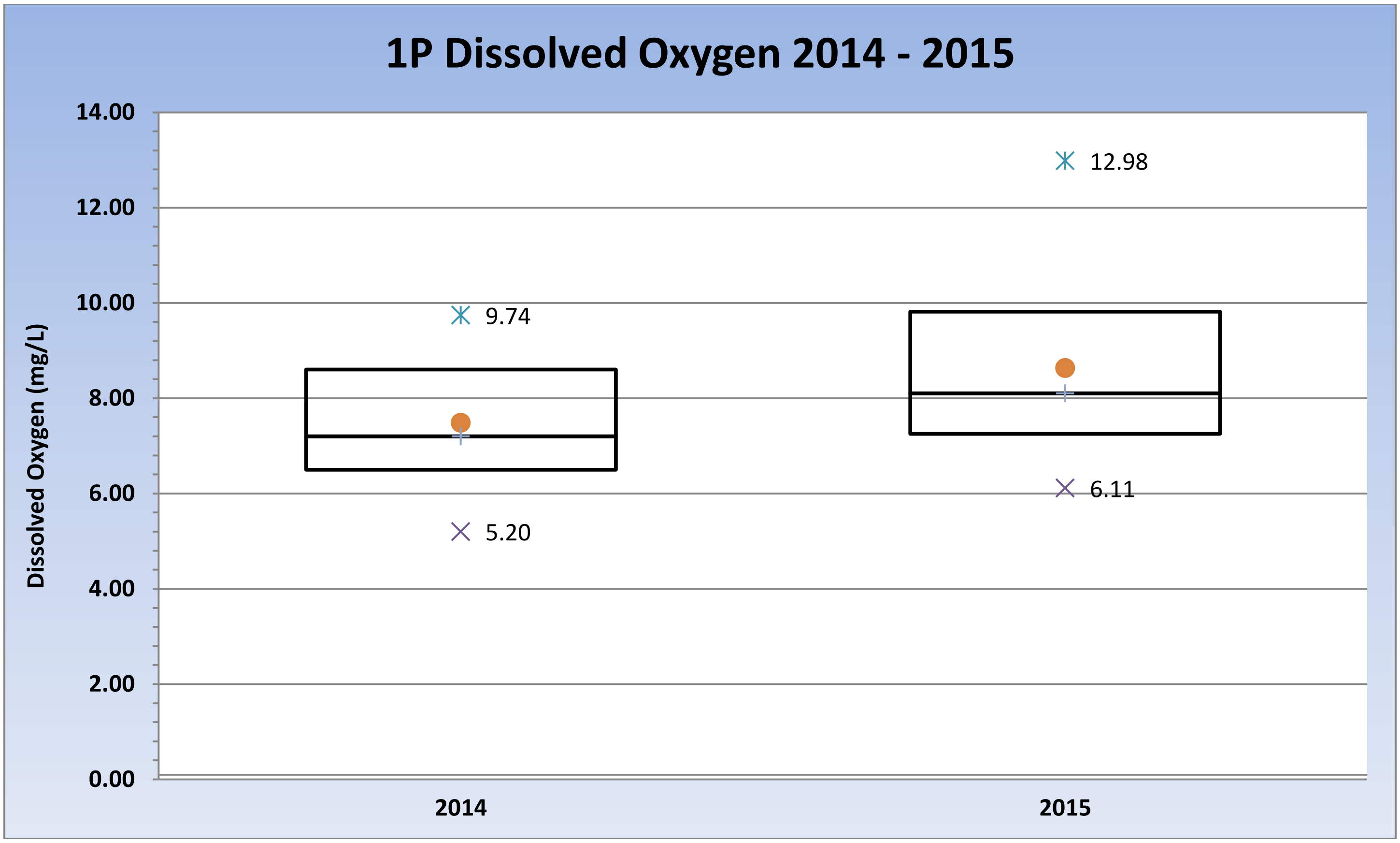

3P Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
300
250
200
150
100
50
0
2014
2015
219
85
262
93

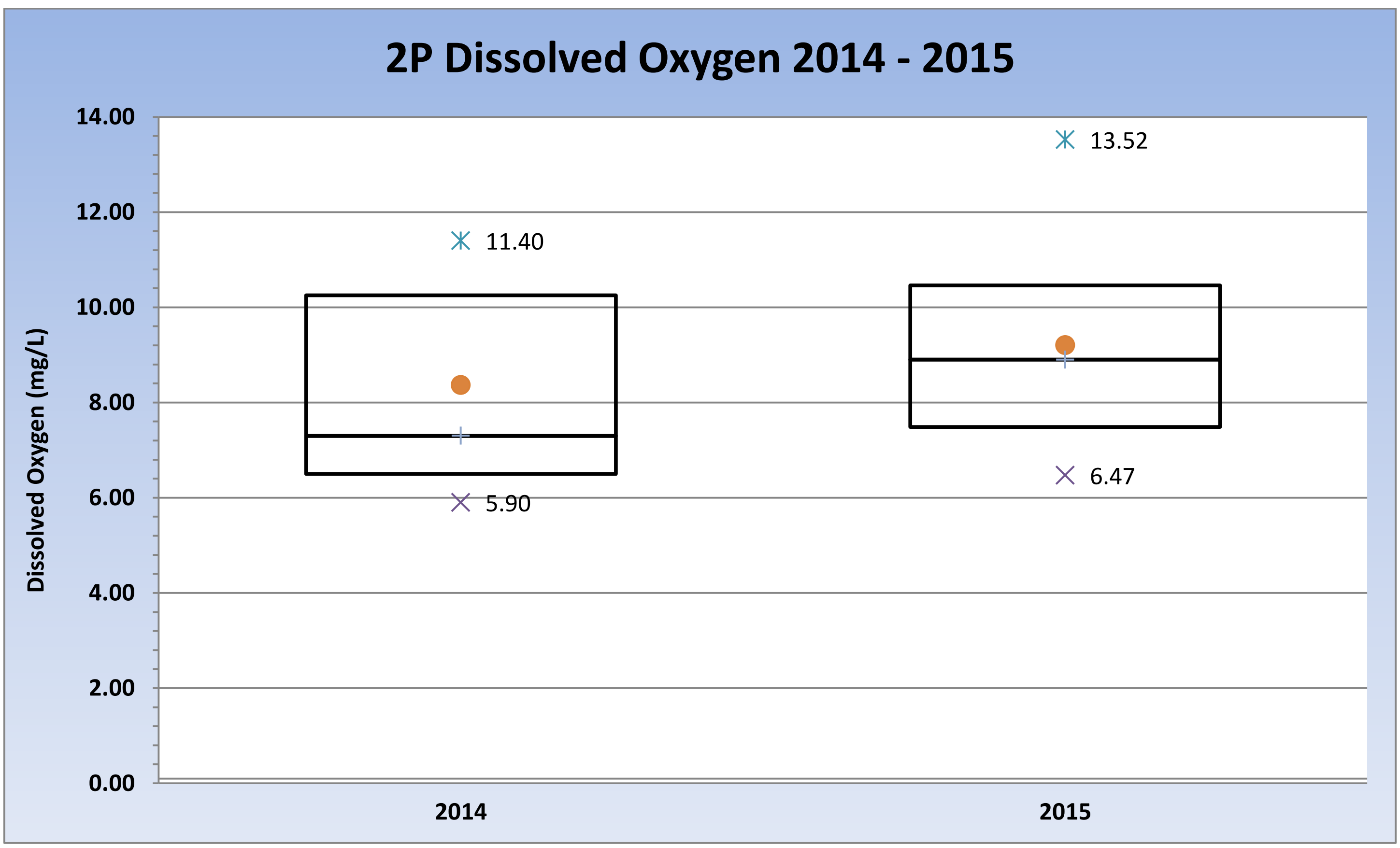

4P Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
250
230
210
190
170
150
130
110
90
70
50
174
83
239
85
2014
2015

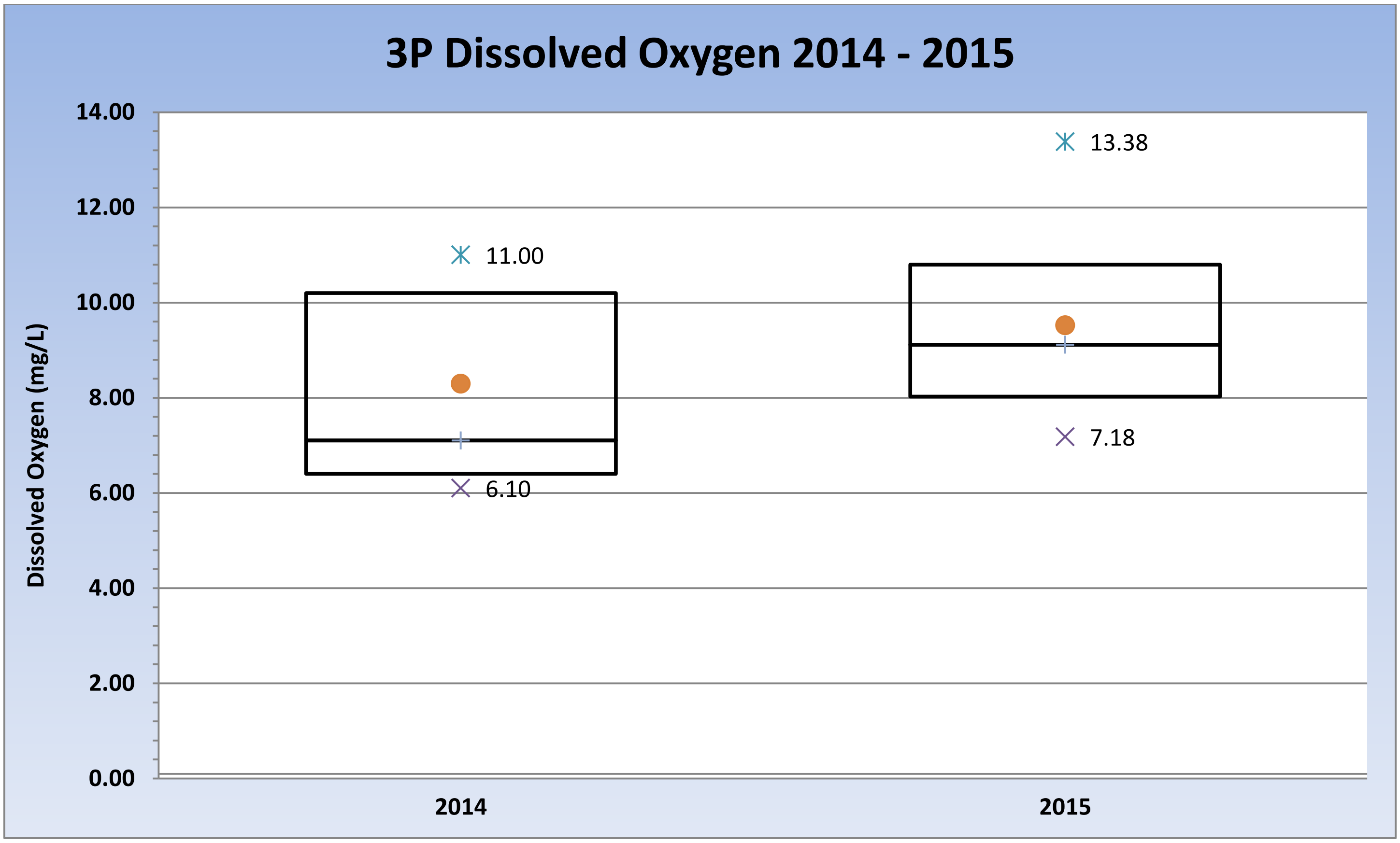

5P Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
500
450
400
350
300
250
200
150
100
50
398
113
441
88
2014
2015

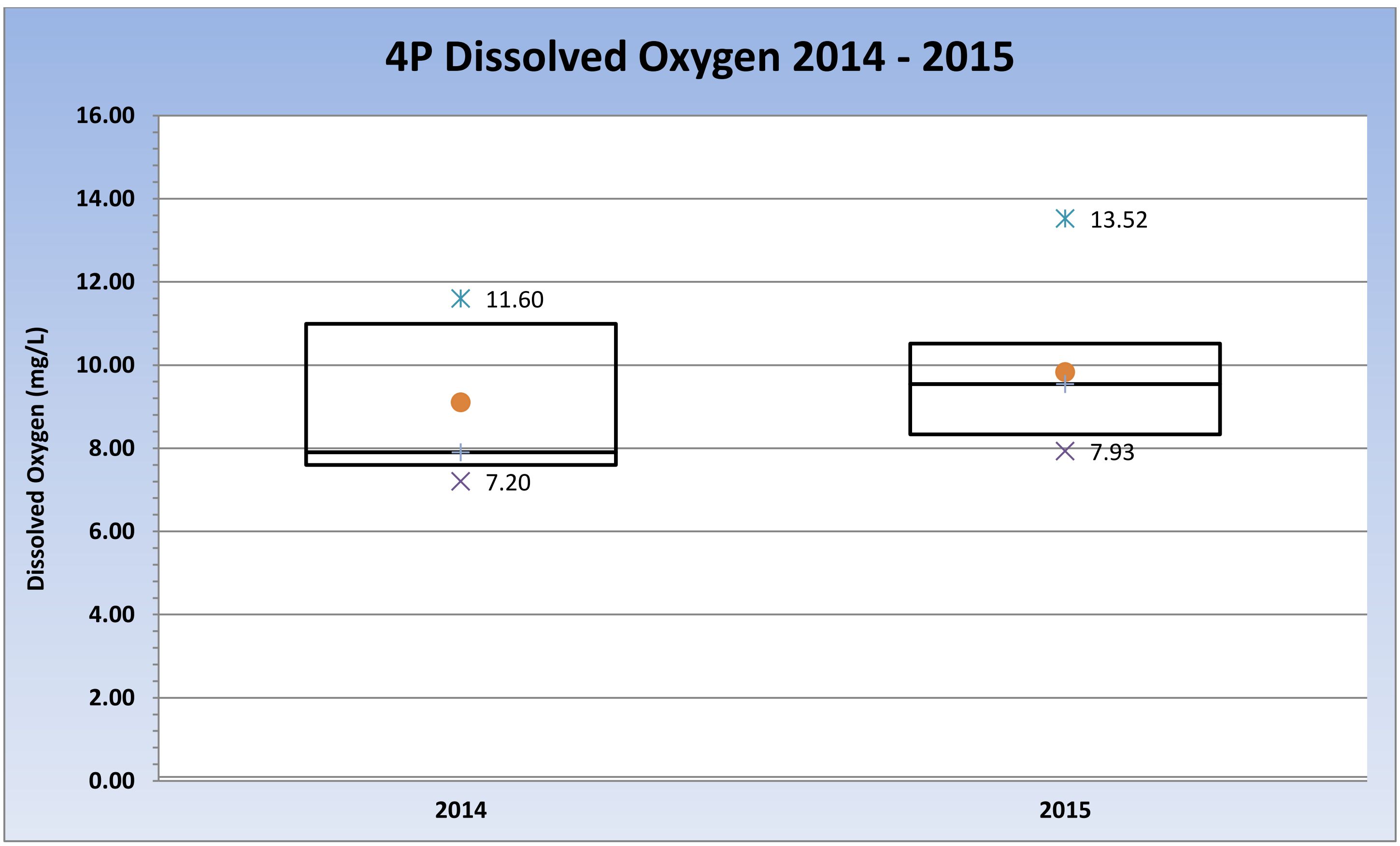

6P Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
210
190
170
150
130
110
90
70
50
189
184
84
67
2014
2015

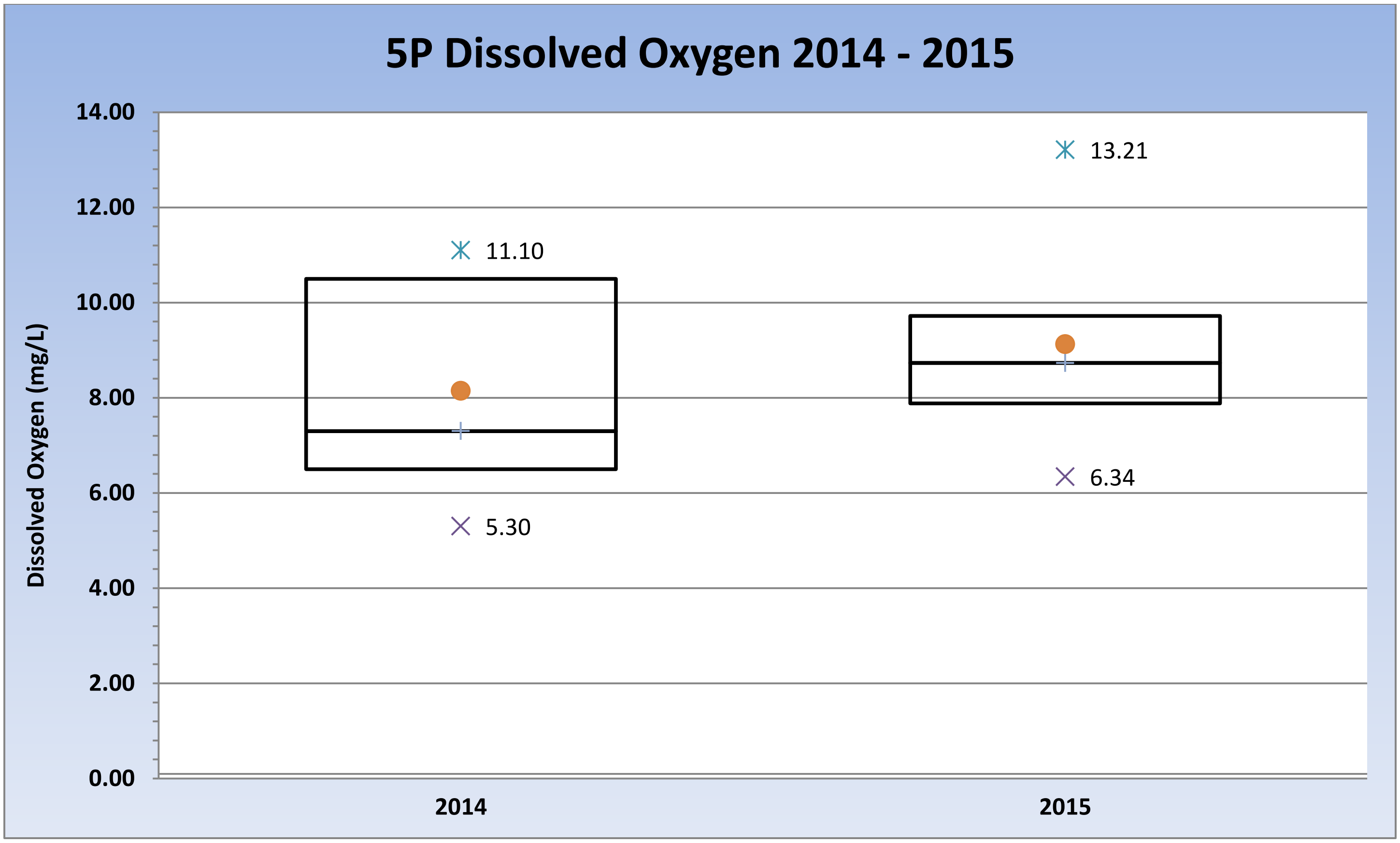

7P Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
190
170
150
130
110
90
70
50
171
142
92
88
2014
2015

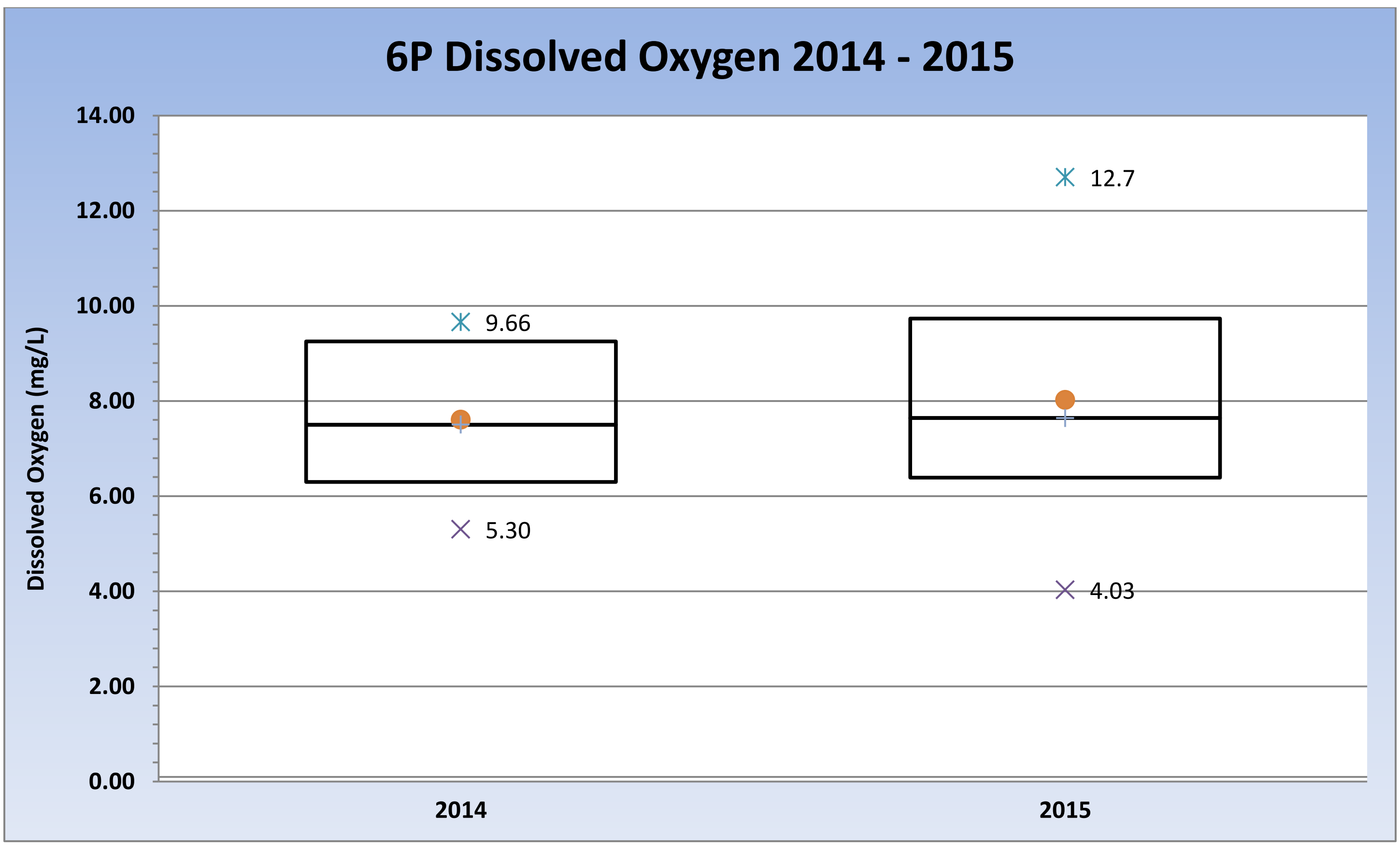

1P Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
9.74
5.20
12.98
6.11
2014
2015

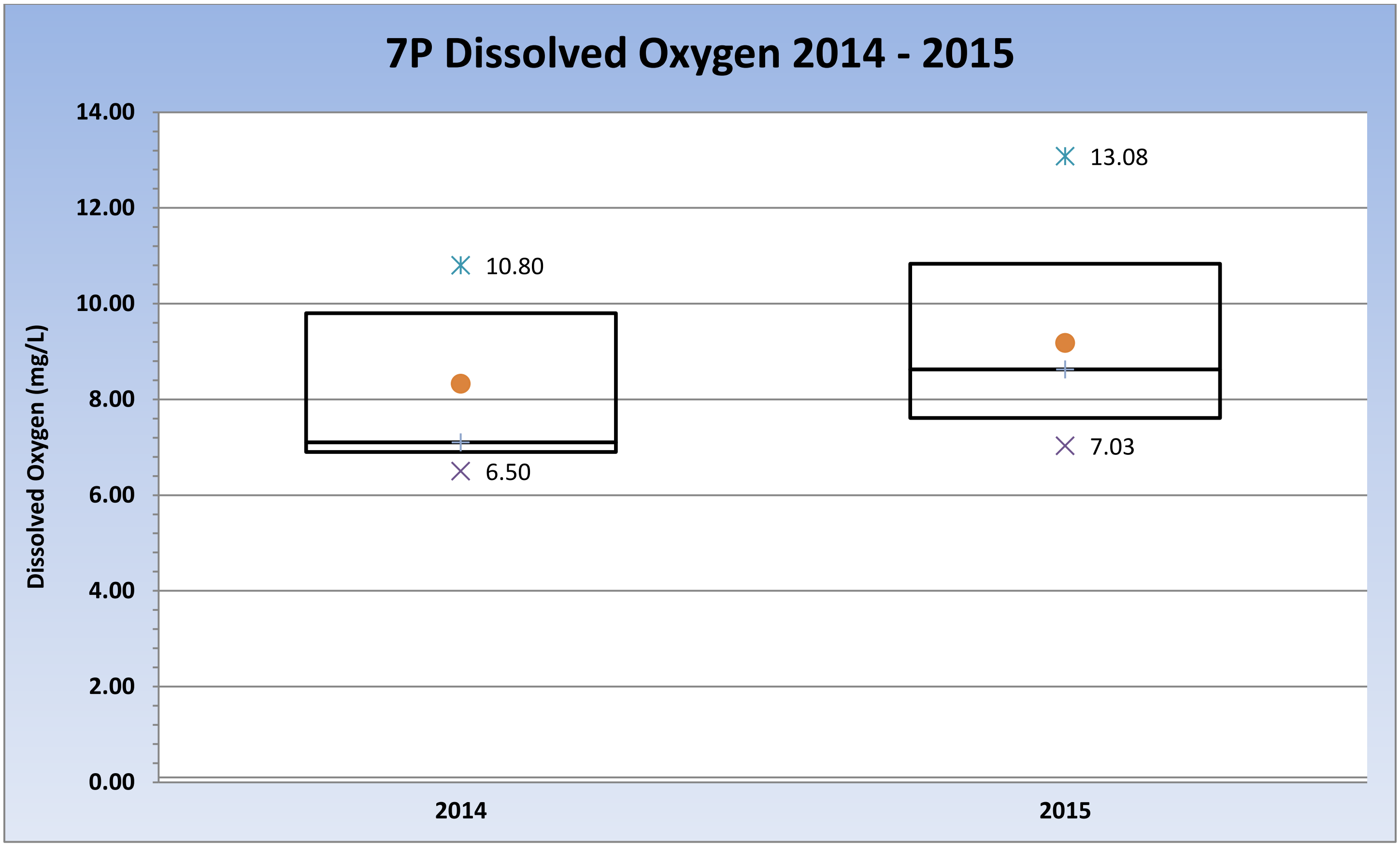

2P Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
11.40
5.90
13.52
6.47
2014
2015


3P Dissolved Oxygen 2014 - 2015
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Dissolved Oxygen (mg/L)
13.38
11.00
7.18
6.10
2014
2015


4P Dissolved Oxygen 2014 - 2015
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Dissolved Oxygen (mg/L)
13.52
11.60
7.93
7.20
2014
2015


5P Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
11.10
5.30
13.21
6.34
2014
2015


6P Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
9.66
5.30
12.7
4.03
2014
2015



Saugahatchee Creek Watershed

A total of 2000 independent water quality measurements were collected in the Saugahatchee Creek watershed in 2015.

Monitoring Station Locations and Notes:

1S – Latitude *32, 39, 28.708 N*; Longitude *85, 27, 33.229 W*. Station 1S is the furthest upstream monitoring location on Saugahatchee Creek main stem and is located at the US Highway 280 crossing. All construction activities contributing to this station are located outside of the City's MS4 jurisdiction.

2S – Latitude *32, 38, 54.075 N*; Longitude *85, 28, 56.552 W*. Station 2S is located on Saugahatchee Creek main stem at the N. College Street/AL 147 crossing.

3S – Latitude *32, 38, 32.179 N*; Longitude *85, 30, 14.658 W*. Station 3S is located on Saugahatchee Creek main stem at the N. Donahue Drive/CR 182 crossing.

4S - Latitude *32, 37, 40.252 N*; Longitude *85, 32, 51.6 W* 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).

5S – Latitude *32, 37, 30.273 N*; Longitude *85, 32, 45.009 W*. Station 5S is located on an unnamed tributary to Saugahatchee Creek immediately west of the Northside Water Pollution Control Facility.

6S – Latitude *32, 37, 48.368 N*; Longitude *85, 27, 7.52 W.* Station 6S is located on an unnamed tributary at the Gatewood Drive crossing near Uncle Bob's Storage.

7S – Latitude *32, 38, 10.933 N*; Longitude *85, 27, 56.368 W.* Station 7S is located downstream of 15S on an unnamed tributary to Saugahatchee Creek at the Shelton Mill Road crossing near The City Church (formerly Victory Prayer Center).

8S – Latitude *32, 37, 30.543 N*; Longitude *85, 28, 27.074 W.* Station 8S is located on an unnamed tributary to Saugahatchee Creek at the Shelton Mill Road crossing near the Covenant Presbyterian Church.

12S – Latitude *32, 38, 10.167 N*; Longitude *85, 28, 54.883 W.* Station 12S is located on an unnamed tributary to Saugahatchee Creek downstream of 8S near the intersection of N. College Street/AL 147 and Shug Jordan Parkway.

14S – Latitude *32, 39, 28.523 N*; Longitude *85, 32, 13.711 W.* Station 14S is located on W. Farmville Road on an unnamed tributary to Loblockee Creek at the discharge of the primary spillway of The Preserve pond.

15S – Latitude *32, 38, 6.51 N*; Longitude *85, 27, 34.675 W.* Station 15S is located on an unnamed tributary to Saugahatchee Creek at N. Dean Road, just downstream of 6S.

16S – Latitude *32, 38, 10.238 N*; Longitude *85, 29, 20.643 W.* Station 16S is located on the same unnamed tributary as 8S and 12S and is downstream of 12S along Shug Jordan Parkway.

17S – Latitude *32, 39, 15.106 N*; Longitude *85, 32, 1.977 W.* 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).

18S – Latitude *32, 39, 53.844 N*; Longitude *85, 28, 51.164 W.* 18S is located on an unnamed tributary along Farmville Road, immediately downstream of Tuscany Hills.

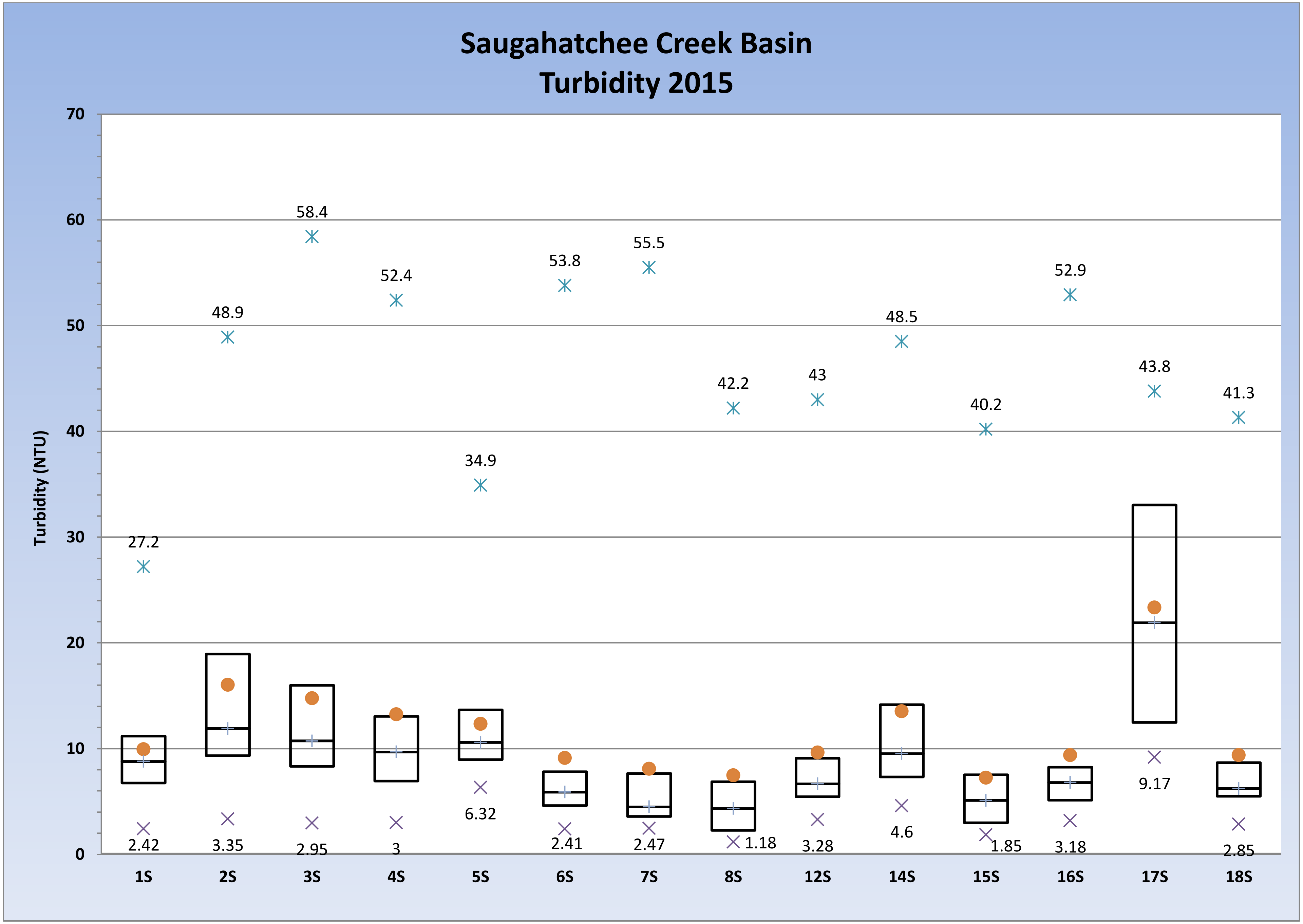
**See Insert for Maps of All Water Quality Monitoring Locations*

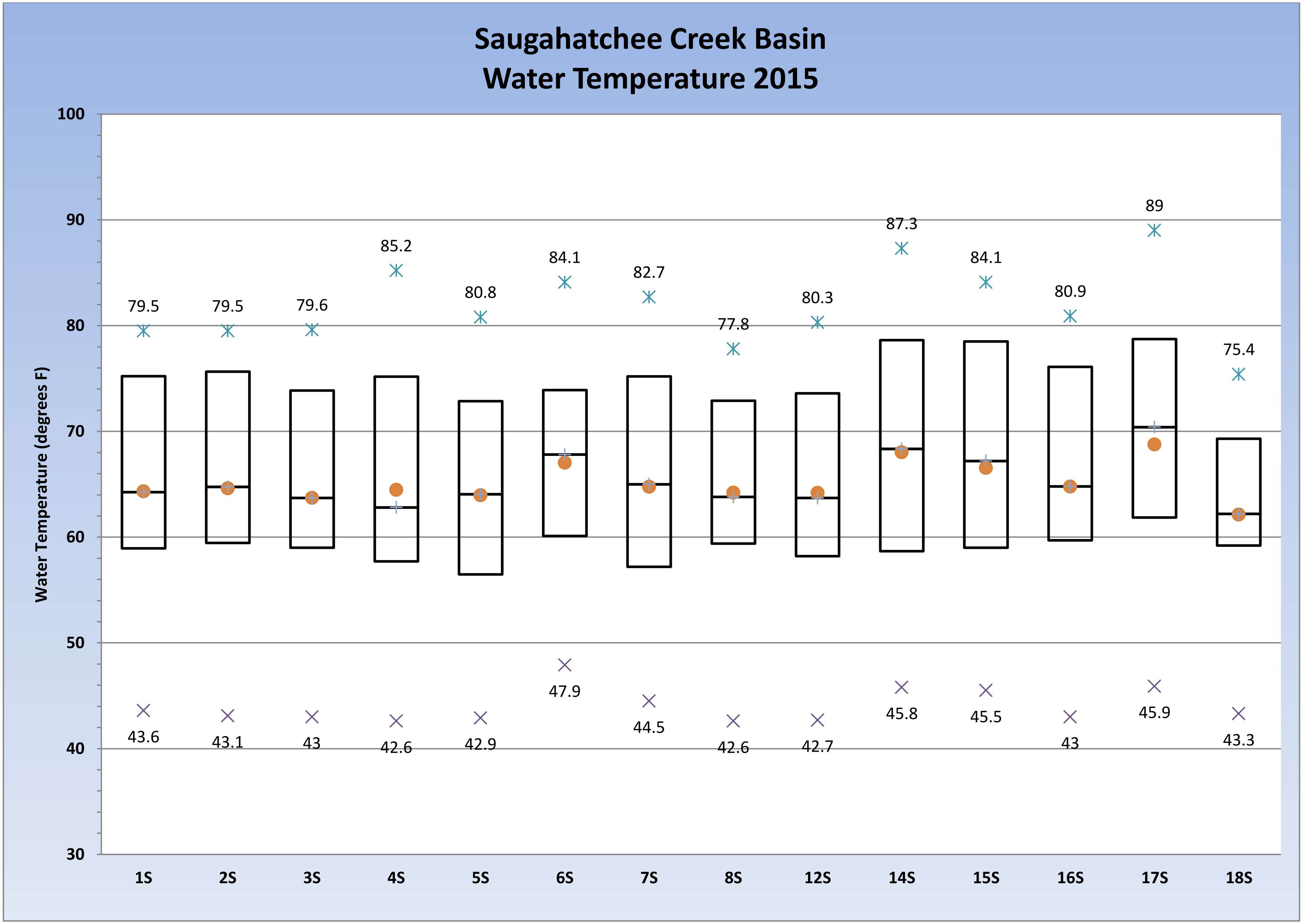
Nine Year Statistical Analysis of Turbidity Data for Saugahatchee Creek

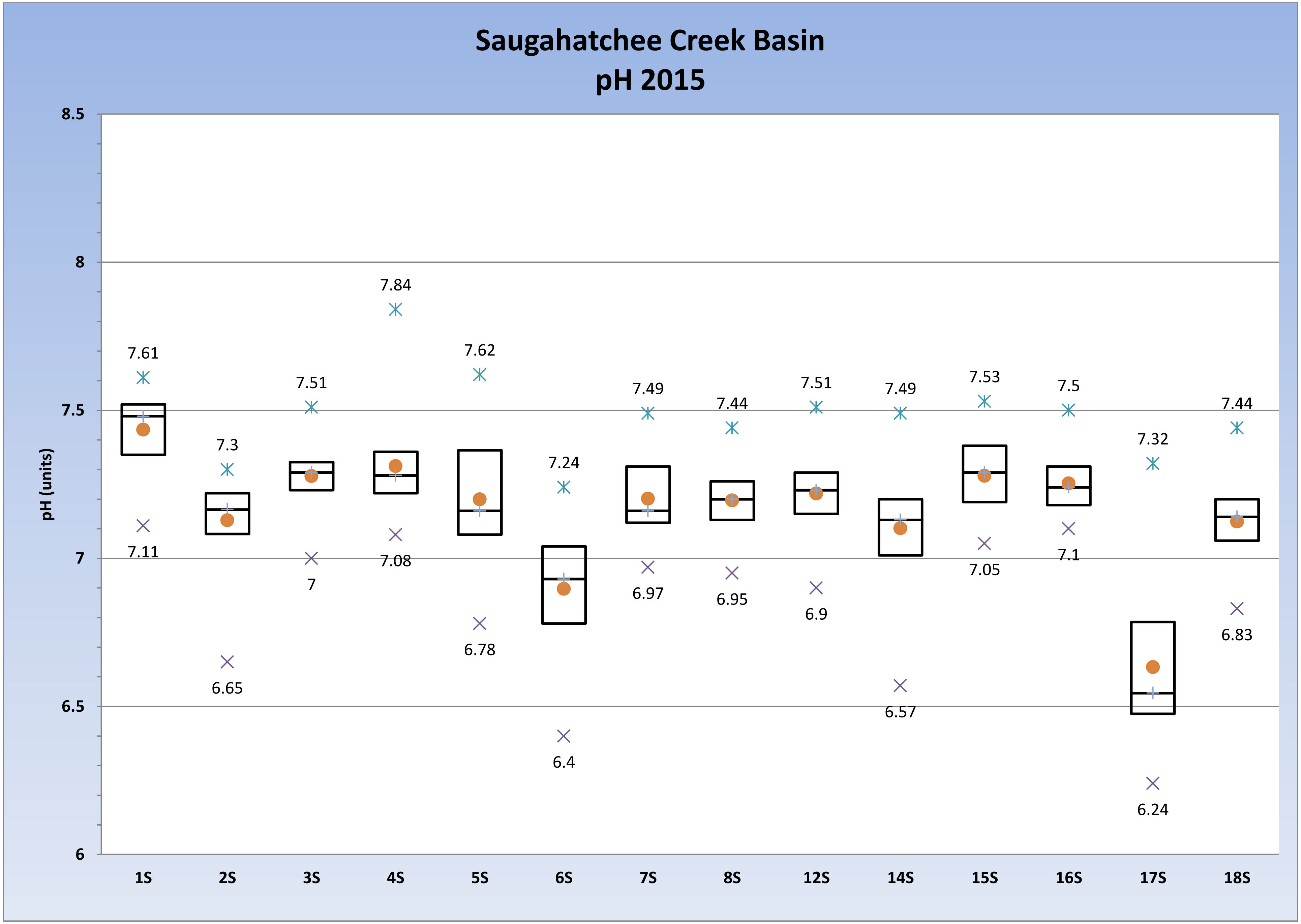
	1S								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	1.00	2.66	2.46	2.20	2.40	1.25	2.16	2.03	2.42
MAX	327.67	450.00	200.00	40.00	110.00	44.70	20.57	88.50	27.2
AVG	30.55	49.54	28.28	11.22	12.69	7.42	6.71	11.44	9.95
MEDIAN	10.50	8.85	12.00	7.80	6.40	5.29	5.47	7.86	8.78
	2S								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	1.53	3.26	3.23	3.30	2.70	1.40	2.59	2.51	3.35
MAX	380.00	400.00	230.00	55.00	180.00	63.30	37.10	180.00	48.9
AVG	34.83	49.72	34.85	12.69	19.09	10.53	9.28	19.00	16.04
MEDIAN	11.00	9.80	14.00	9.50	8.00	7.30	6.67	11.50	11.9
	3S								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	1.90	3.90	3.30	4.20	3.00	1.60	1.97	2.49	2.95
MAX	260.00	550.00	450.00	75.00	150.00	72.60	45.27	299.00	58.4
AVG	33.70	52.12	45.16	14.25	18.72	11.98	10.53	22.86	14.77
MEDIAN	11.00	10.50	14.00	10.25	9.10	8.65	8.40	11.85	10.72
	4S								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	1.70	3.56	2.70	3.40	2.70	1.90	1.53	1.77	3
MAX	300.00	500.00	270.00	140.00	110.00	100.40	52.80	441.00	52.4
AVG	32.25	48.54	35.53	15.76	18.84	13.54	11.31	27.21	13.25
MEDIAN	10.50	8.10	13.00	8.60	9.60	9.15	8.79	10.52	9.69

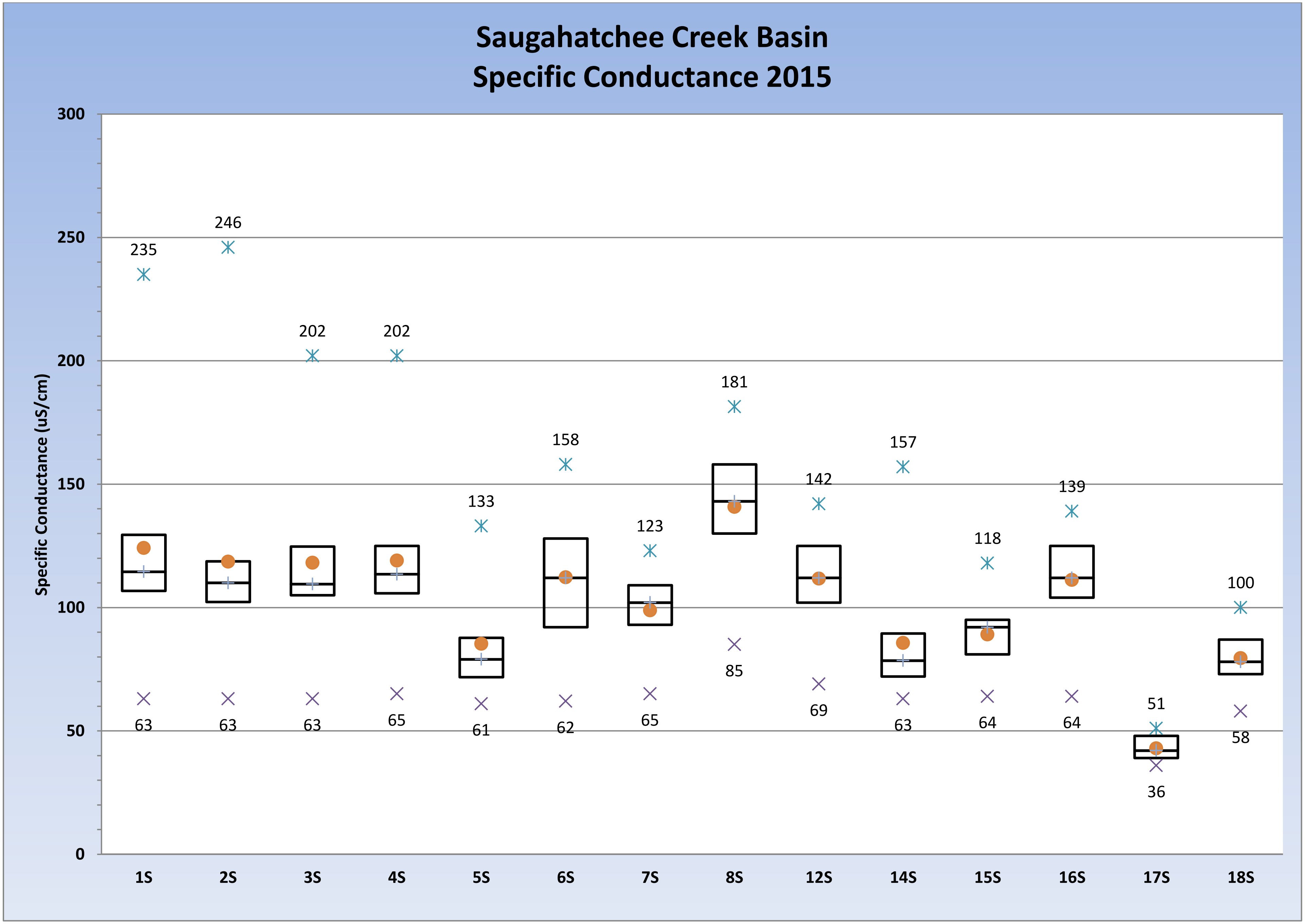
	5S								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	**8.83**	3.23	5.20	3.10	4.80	7.47	2.56	2.79	6.32
MAX	**683.67**	400.00	160.00	45.00	70.00	293.00	40.47	54.30	34.9
AVG	**90.47**	41.68	22.99	13.26	15.58	25.54	9.78	13.94	12.33
MEDIAN	**22.33**	13.50	12.00	10.60	11.00	12.00	7.34	11.00	10.58
	6S								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	4.27	2.03	4.20	3.40	3.40	3.20	2.17	1.09	2.41
MAX	28.67	50.00	38.00	26.00	32.00	17.60	65.00	58.40	53.8
AVG	14.01	11.07	11.07	9.44	10.58	8.71	7.41	6.50	9.13
MEDIAN	13.00	8.54	9.20	8.10	9.70	8.01	5.37	4.46	5.89
	7S								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	**3.07**	2.23	2.20	1.60	2.80	1.67	1.61	1.67	2.47
MAX	**62.00**	75.00	110.00	27.00	37.00	19.60	19.60	22.20	55.5
AVG	**15.38**	13.76	13.80	6.45	8.43	5.99	5.57	6.76	8.09
MEDIAN	**10.00**	7.05	8.40	5.40	6.00	5.50	4.48	5.76	4.49
	8S								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	1.33	1.83	1.70	1.40	2.30	0.80	0.89	1.00	1.18
MAX	650.00	220.00	150.00	28.00	85.00	38.20	24.57	178.00	42.2
AVG	36.90	26.99	15.50	5.49	10.64	10.76	5.47	11.46	7.48
MEDIAN	9.49	8.43	7.90	4.55	5.20	7.29	3.42	4.43	4.33
	12S								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	**1.40**	2.26	3.70	2.40	3.60	2.60	3.19	1.51	3.28
MAX	**190.00**	500.00	400.00	40.00	60.00	50.60	37.70	258.00	43
AVG	**24.02**	31.94	31.58	8.21	11.55	10.34	8.77	15.99	9.62
MEDIAN	**14.00**	7.93	13.00	6.85	7.30	7.75	6.90	7.09	6.67
	14S								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	3.83	4.20	3.50	3.00	5.50	3.63	1.95	0.56	4.6
MAX	996.67	950.00	55.00	85.00	65.00	50.00	32.40	55.60	48.5
AVG	82.53	64.97	14.97	15.69	19.29	16.68	7.98	13.73	13.54
MEDIAN	30.50	14.50	11.00	13.00	16.00	12.90	5.86	9.76	9.52
	15S								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	**1.57**	2.20	3.20	2.40	2.80	1.73	2.16	0.88	1.85
MAX	**280.00**	65.00	65.00	55.00	40.00	17.70	17.43	23.60	40.2
AVG	**21.42**	13.46	14.64	7.42	8.94	6.07	5.62	7.11	7.25
MEDIAN	**13.00**	8.57	10.00	5.50	6.30	5.35	4.32	5.69	5.1

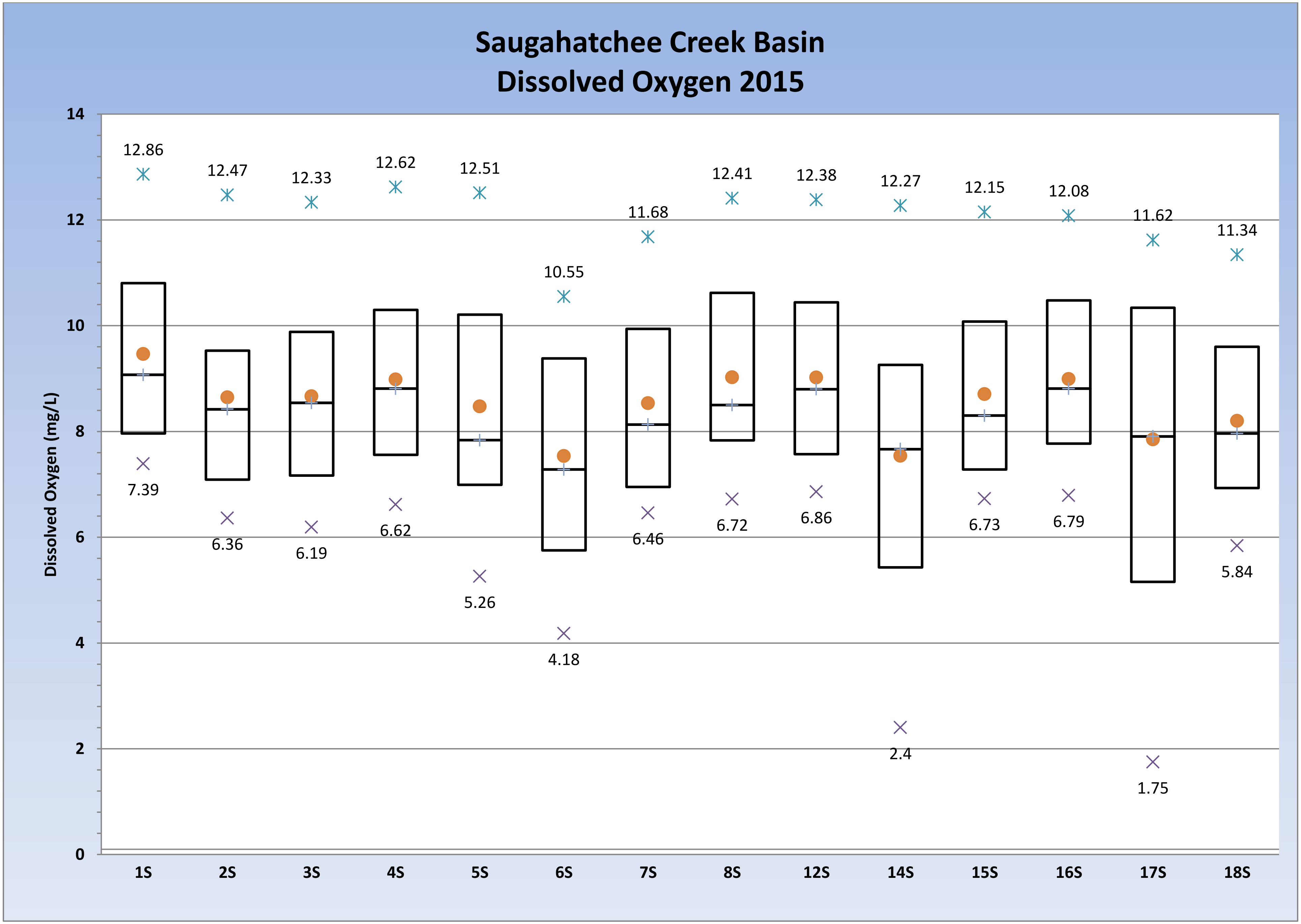
	16S								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	3.20	2.60	3.70	2.20	3.80	3.94	1.44	1.38	3.18
MAX	220.00	270.00	310.00	55.00	55.00	49.30	29.13	49.50	52.9
AVG	27.07	25.86	29.79	7.99	12.09	10.61	8.20	9.73	9.39
MEDIAN	13.00	7.48	10.60	5.75	7.80	7.00	5.38	7.23	6.79
	17S								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	**12.67**	8.90	11.00	8.70	15.00	17.00	4.56	6.40	9.17
MAX	**550.00**	400.00	135.00	55.00	90.00	147.00	60.47	116.00	43.8
AVG	**80.01**	56.91	25.37	23.84	36.58	34.99	23.43	30.12	23.3
MEDIAN	**47.50**	25.00	21.00	21.00	29.00	29.50	20.37	23.14	21.9
	18S								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	2.30	2.26	2.30	1.80	2.20	2.66	2.98	2.00	2.85
MAX	1100.00	360.00	200.00	29.00	33.00	30.50	57.43	42.60	41.3
AVG	56.92	30.39	16.00	5.49	6.66	6.54	8.18	7.77	9.39
MEDIAN	13.00	7.51	7.30	4.35	4.45	5.35	6.13	5.75	6.23


Saugahatchee Creek Basin
Turbidity 2015
Turbidity (NTU)
0
10
20
30
40
50
60
70
27.2
48.9
58.4
52.4
34.9
53.8
55.5
42.2
43
48.5
40.2
52.9
43.8
41.3
2.42
3.35
2.95
3
6.32
2.41
2.47
1.18
3.28
4.6
1.85
3.18
9.17
2.85
1S
2S
3S
4S
5S
6S
7S
8S
12S
14S
15S
16S
17S
18S

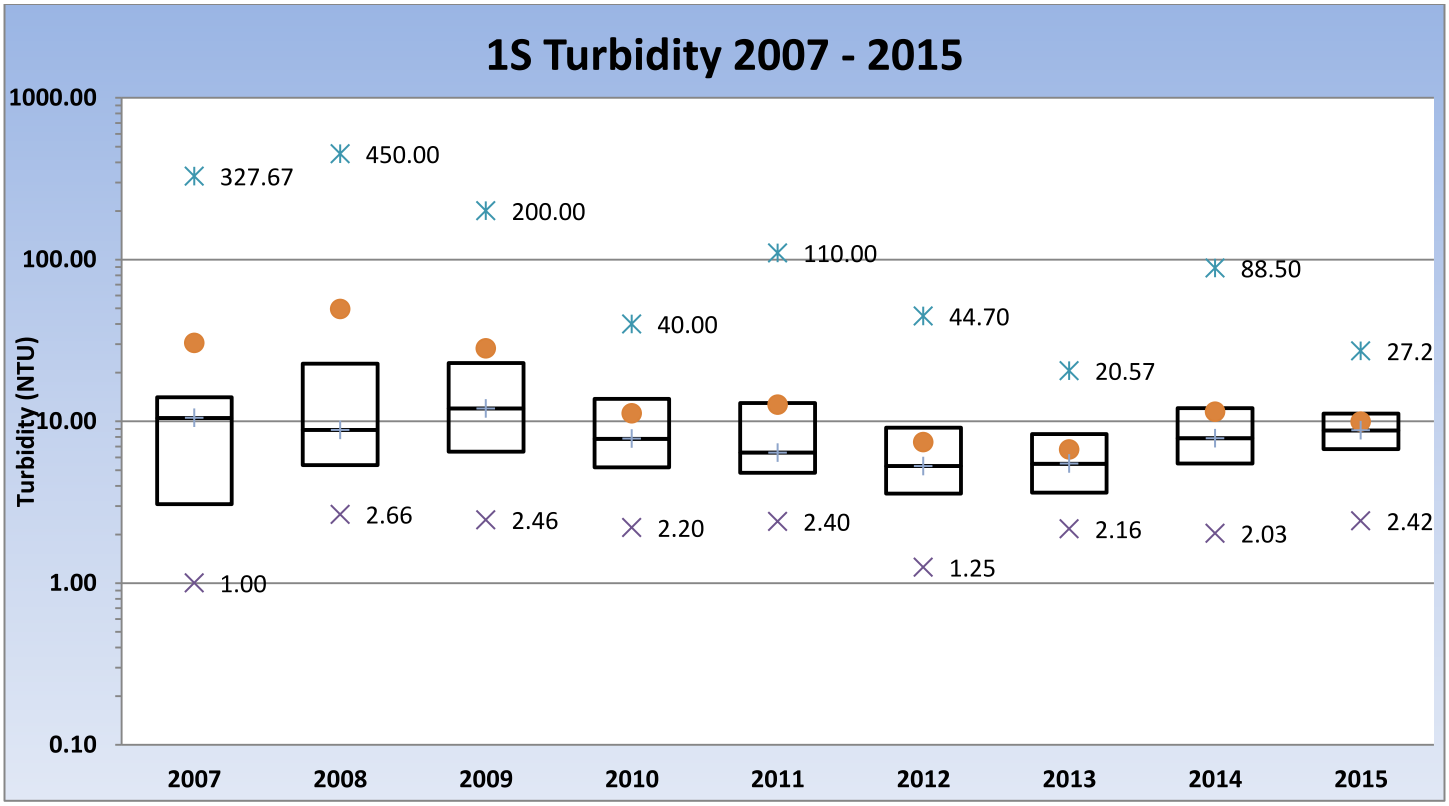

Saugahatchee Creek Basin
Water Temperature 2015
Water Temperature (degrees F)
100
90
80
70
60
50
40
30
79.5
79.5
79.6
85.2
80.8
84.1
82.7
77.8
80.3
87.3
84.1
80.9
89
75.4
43.6
43.1
43
42.6
42.9
47.9
44.5
42.6
42.7
45.8
45.5
43
45.9
43.3
1S
2S
3S
4S
5S
6S
7S
8S
12S
14S
15S
16S
17S
18S

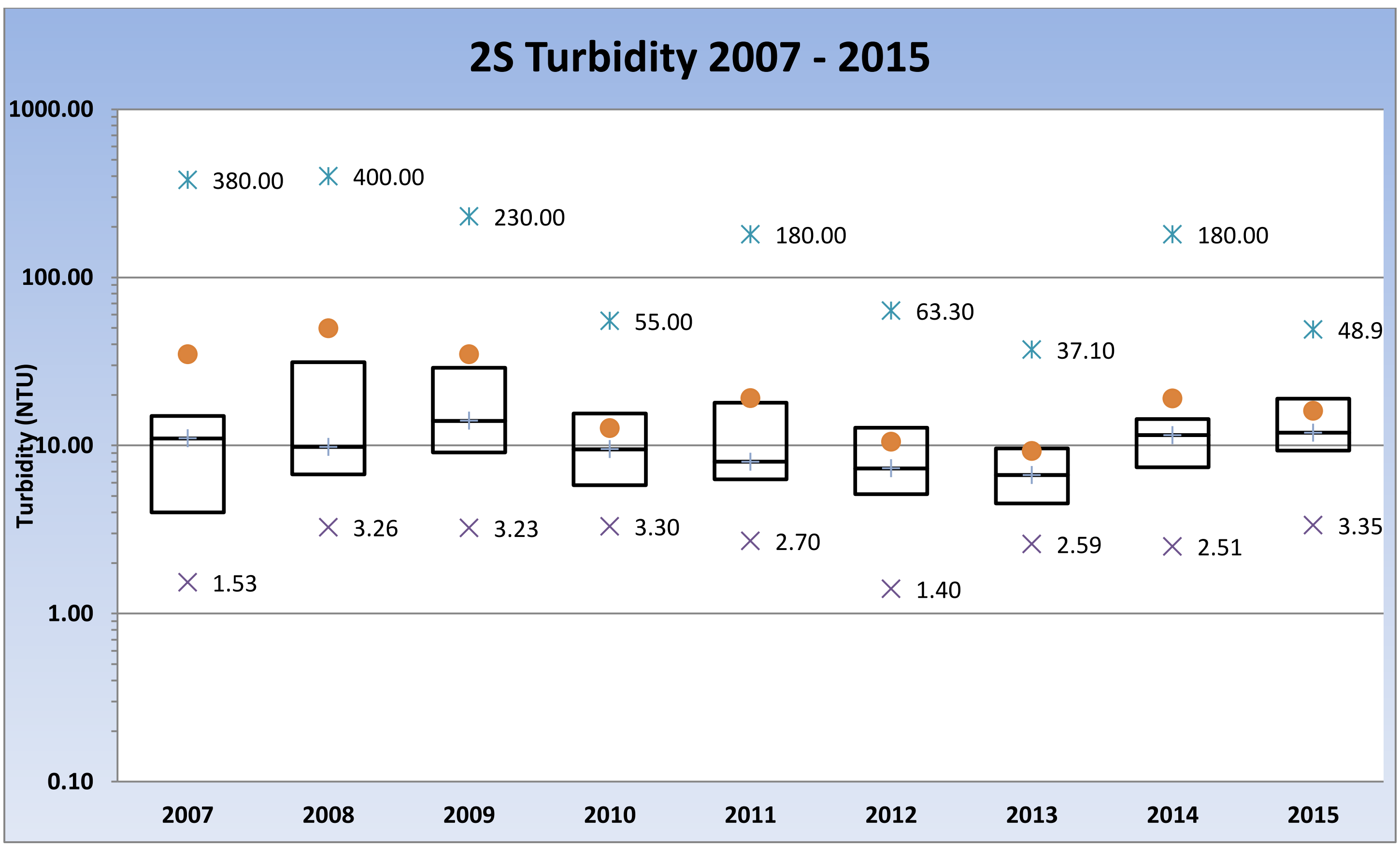

Saugahatchee Creek Basin
pH 2015
pH (units)
8.5
8
7.5
7
6.5
6
1S
2S
3S
4S
5S
6S
7S
8S
12S
14S
15S
16S
17S
18S
7.61
7.11
7.3
6.65
7.51
7
7.84
7.08
7.62
6.78
7.24
6.4
7.49
6.97
7.44
6.95
7.51
6.9
7.49
6.57
7.53
7.05
7.5
7.1
7.32
6.24
7.44
6.83

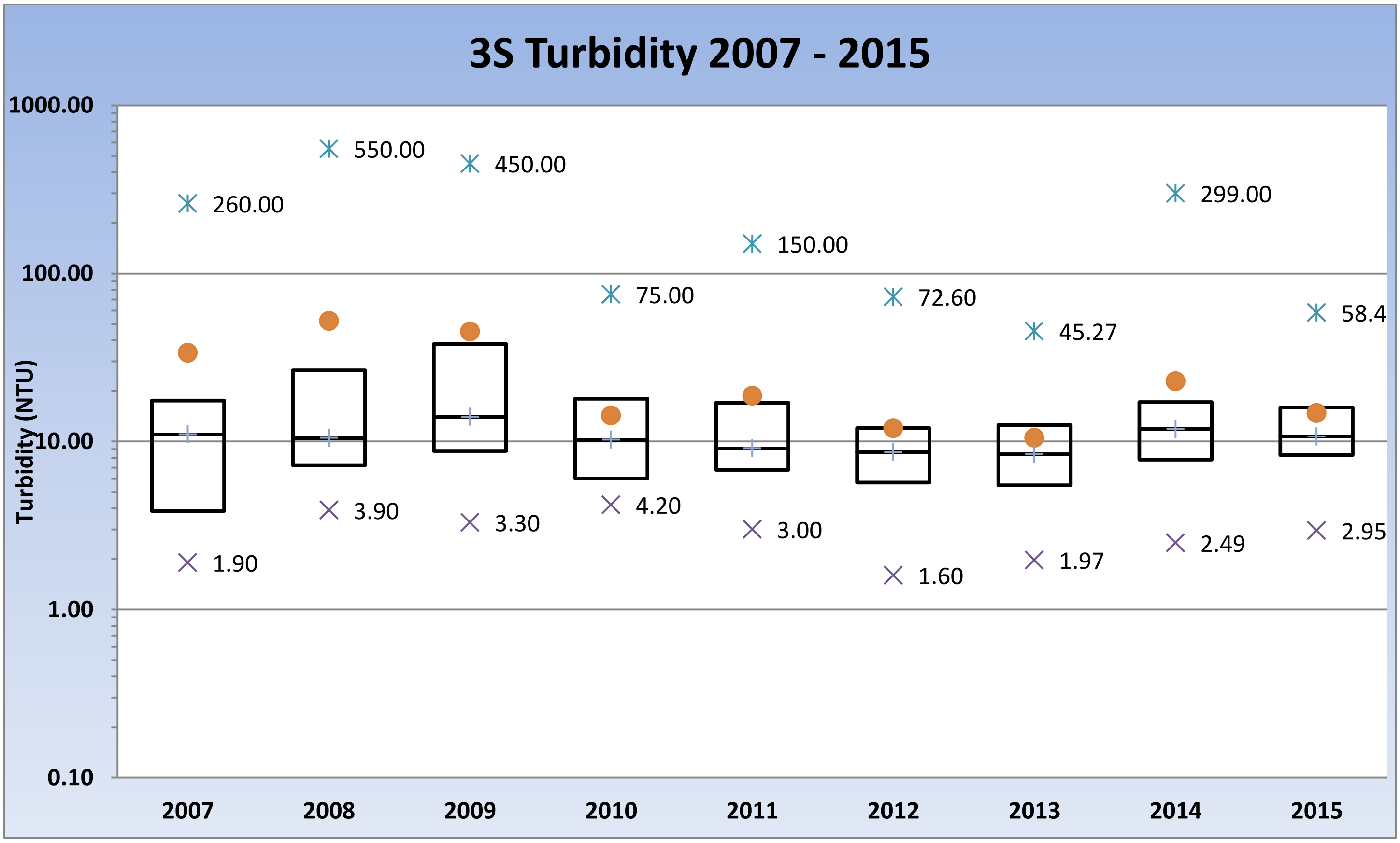

Saugahatchee Creek Basin
Specific Conductance 2015
Specific Conductance (uS/cm)
300
250
200
150
100
50
0
1S
2S
3S
4S
5S
6S
7S
8S
12S
14S
15S
16S
17S
18S
235
246
202
202
133
158
123
181
142
157
118
139
51
100
63
63
63
65
61
62
65
85
69
63
64
64
36
58



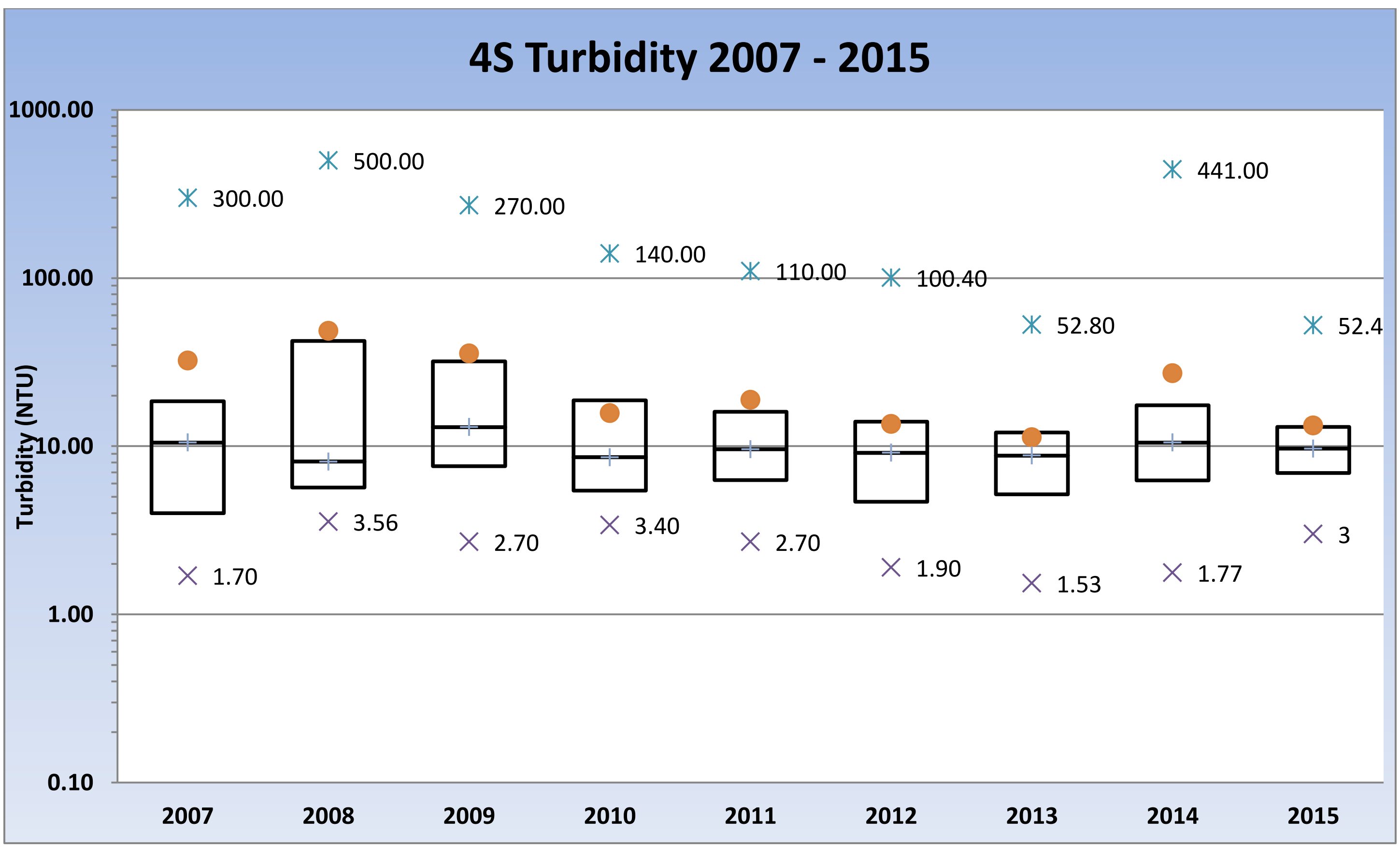
Saugahatchee Creek Basin
Dissolved Oxygen 2015
Dissolved Oxygen (mg/L)
0
2
4
6
8
10
12
14
12.86
12.47
12.33
12.62
12.51
10.55
11.68
12.41
12.38
12.27
12.15
12.08
11.62
11.34
7.39
6.36
6.19
6.62
5.26
4.18
6.46
6.72
6.86
2.4
6.73
6.79
1.75
5.84
1S
2S
3S
4S
5S
6S
7S
8S
12S
14S
15S
16S
17S
18S


1S Turbidity 2007 - 2015
1000.00
100.00
10.00
1.00
0.10
Turbidity (NTU)
327.67
450.00
200.00
110.00
88.50
40.00
44.70
20.57
27.2
2.66
2.46
2.20
2.40
2.16
2.03
2.42
1.00
1.25
2007
2008
2009
2010
2011
2012
2013
2014
2015

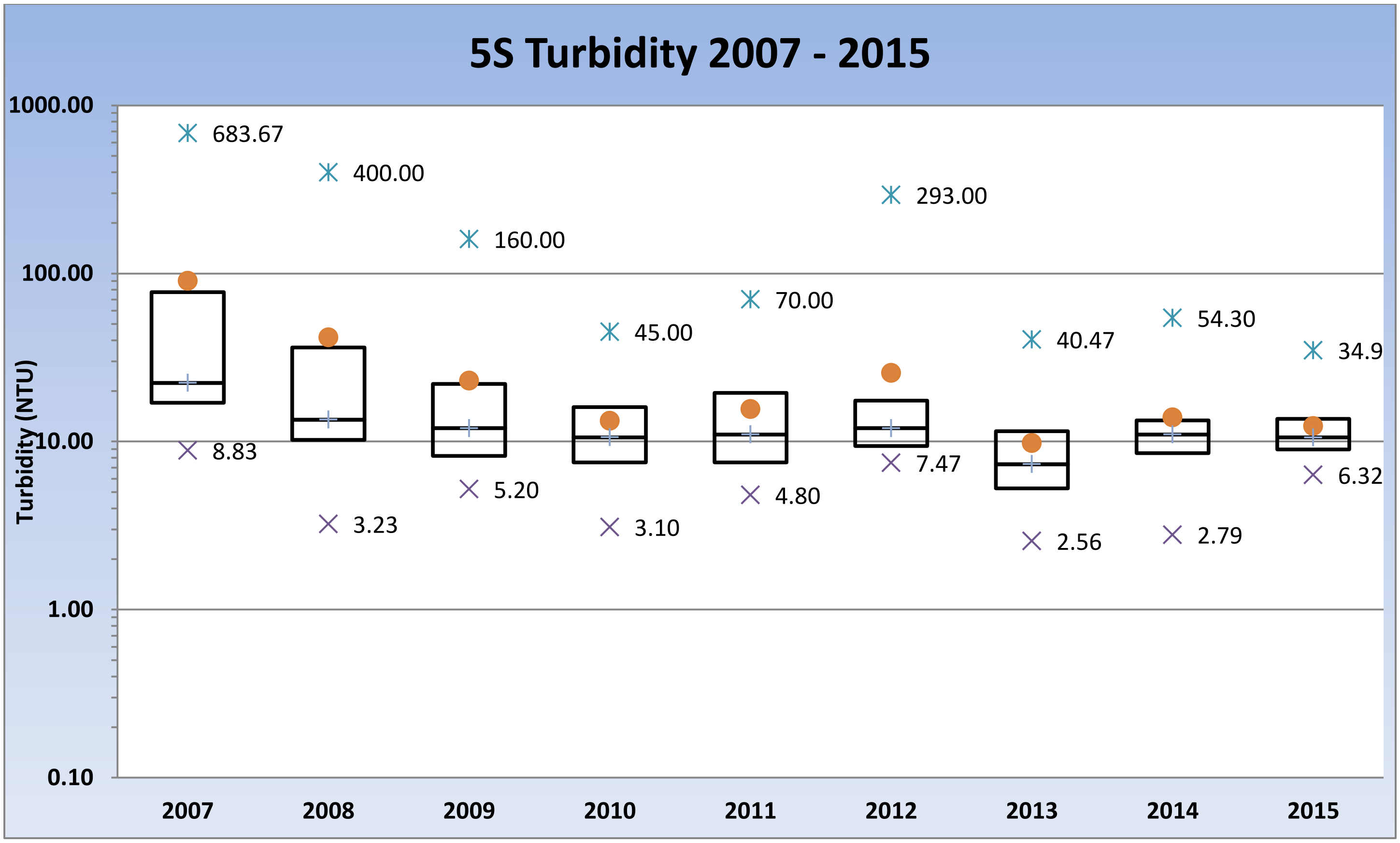

2S Turbidity 2007 - 2015
1000.00
100.00
10.00
1.00
0.10
Turbidity (NTU)
380.00
400.00
230.00
180.00
180.00
55.00
63.30
37.10
48.9
3.26
3.23
3.30
2.70
2.59
2.51
3.35
1.53
1.40
2007
2008
2009
2010
2011
2012
2013
2014
2015

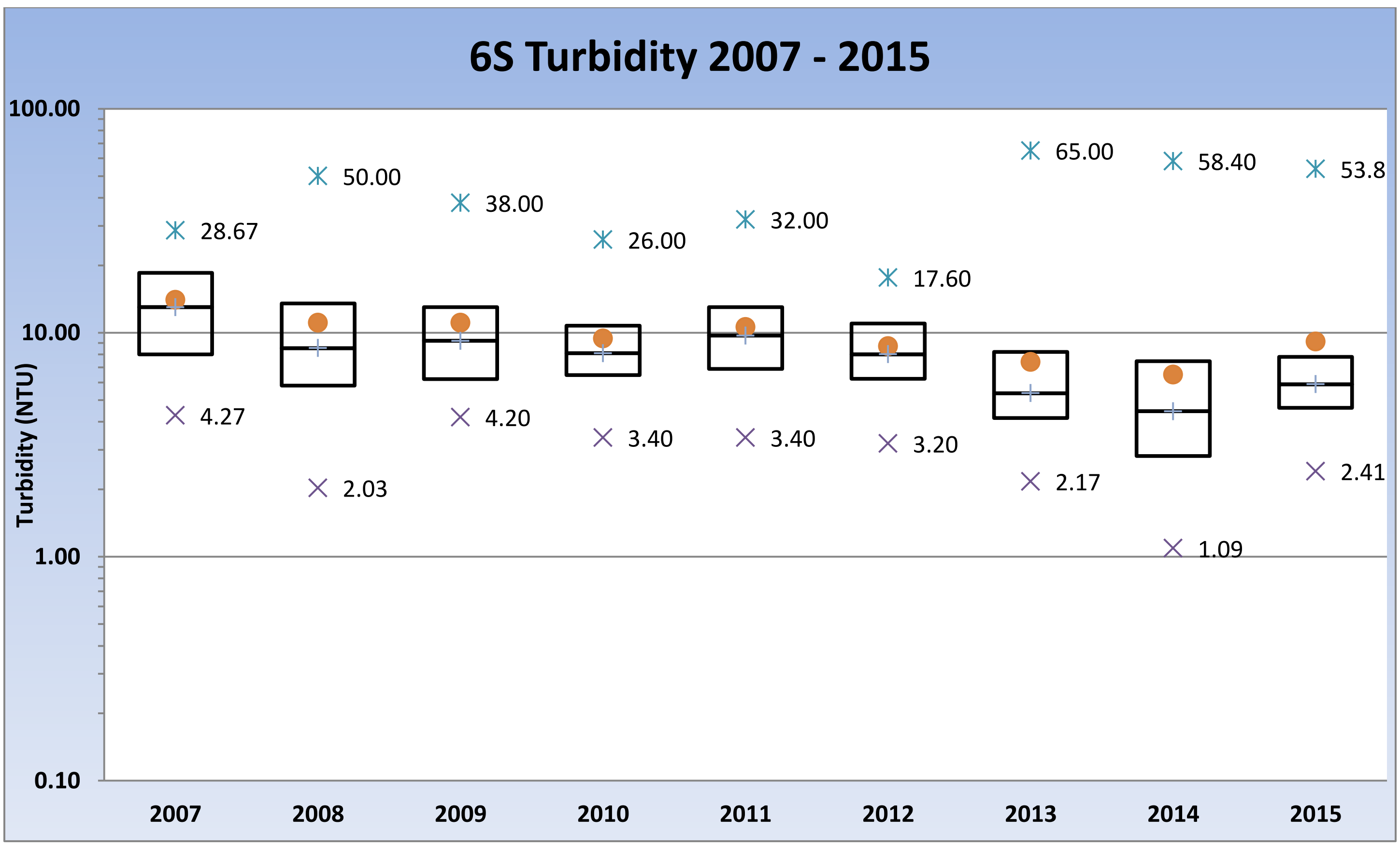


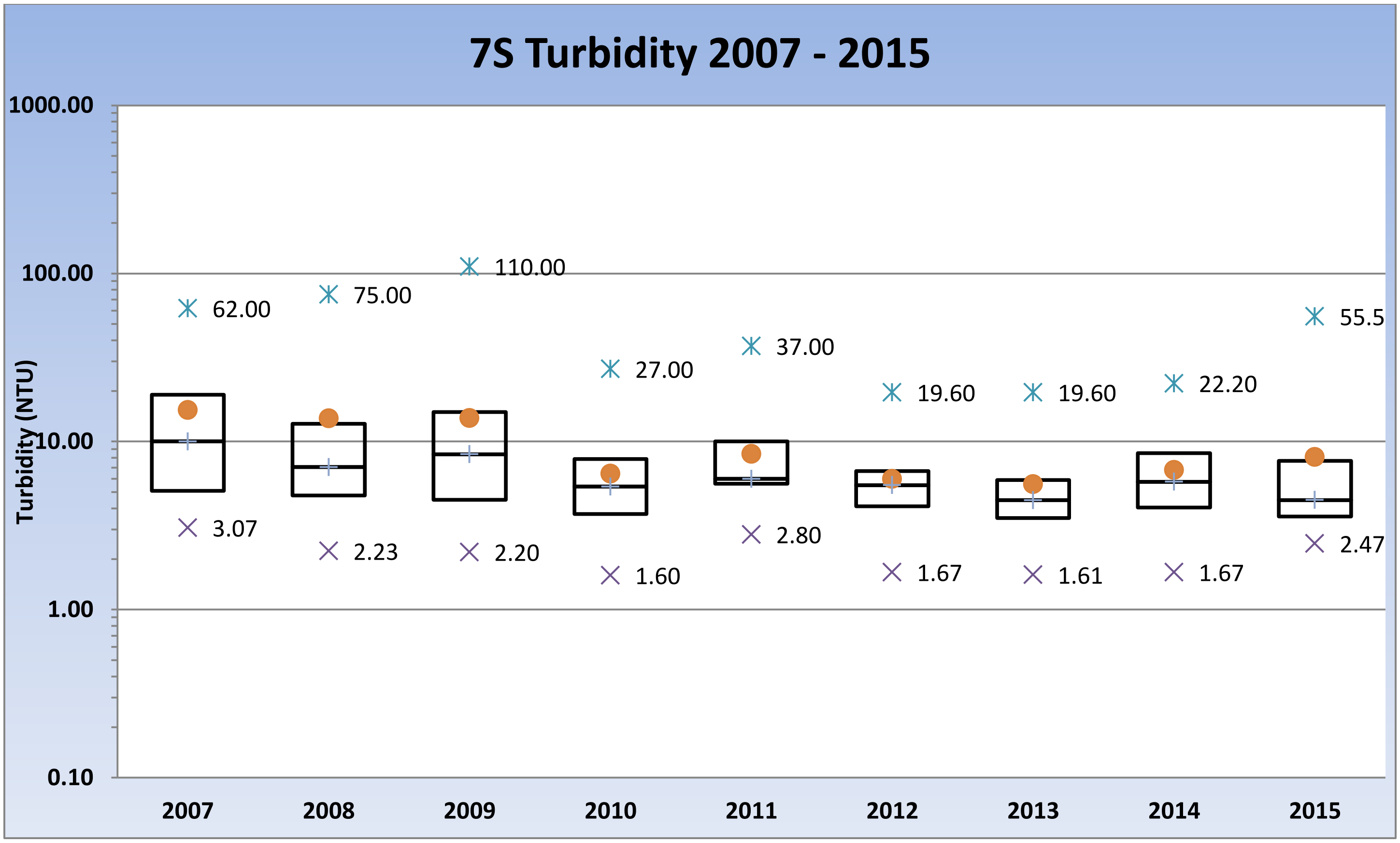
3S Turbidity 2007 - 2015
1000.00
100.00
10.00
1.00
0.10
Turbidity (NTU)
260.00
550.00
450.00
150.00
75.00
72.60
45.27
299.00
58.4
3.90
3.30
4.20
3.00
1.90
1.60
1.97
2.49
2.95
2007
2008
2009
2010
2011
2012
2013
2014
2015

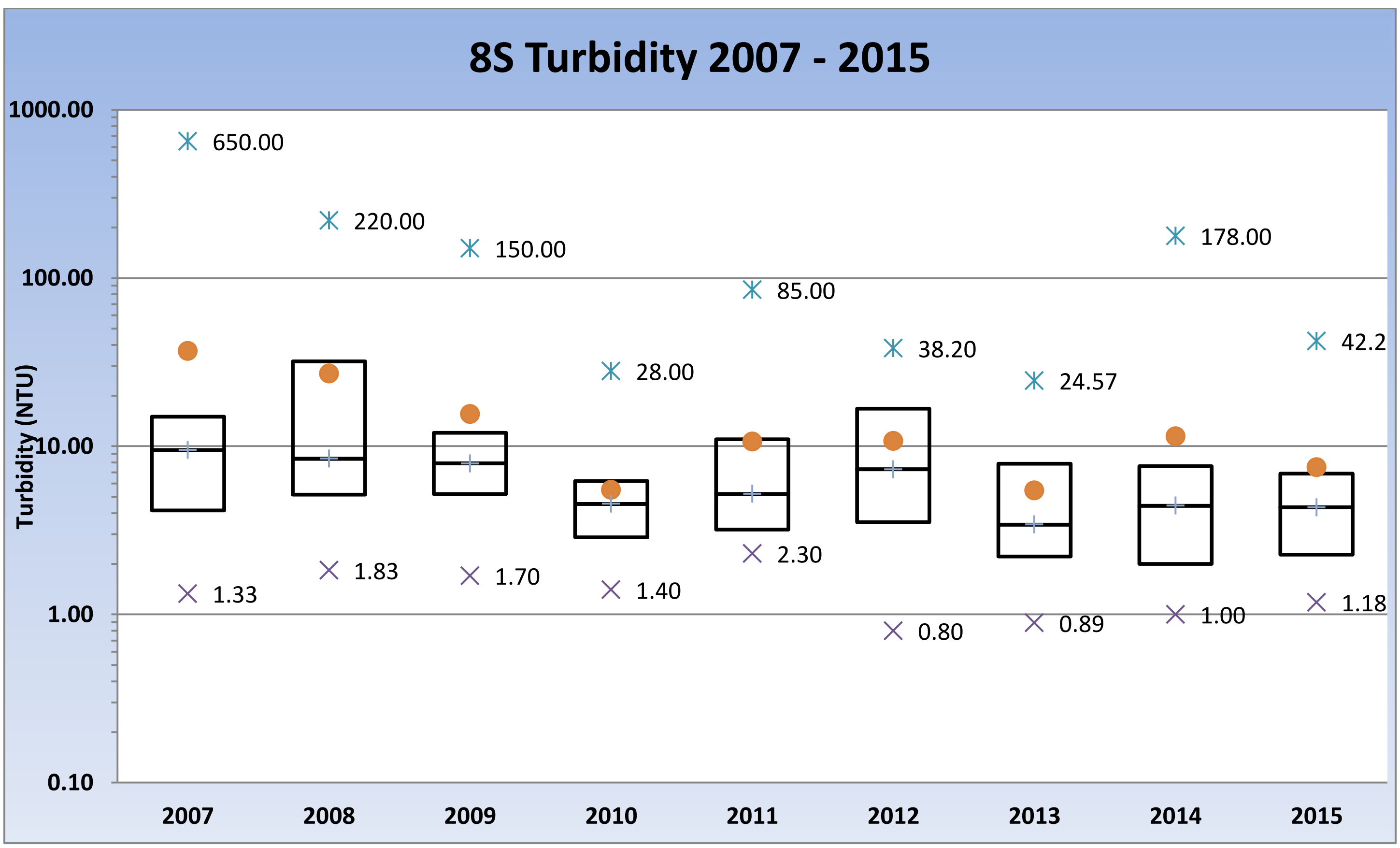


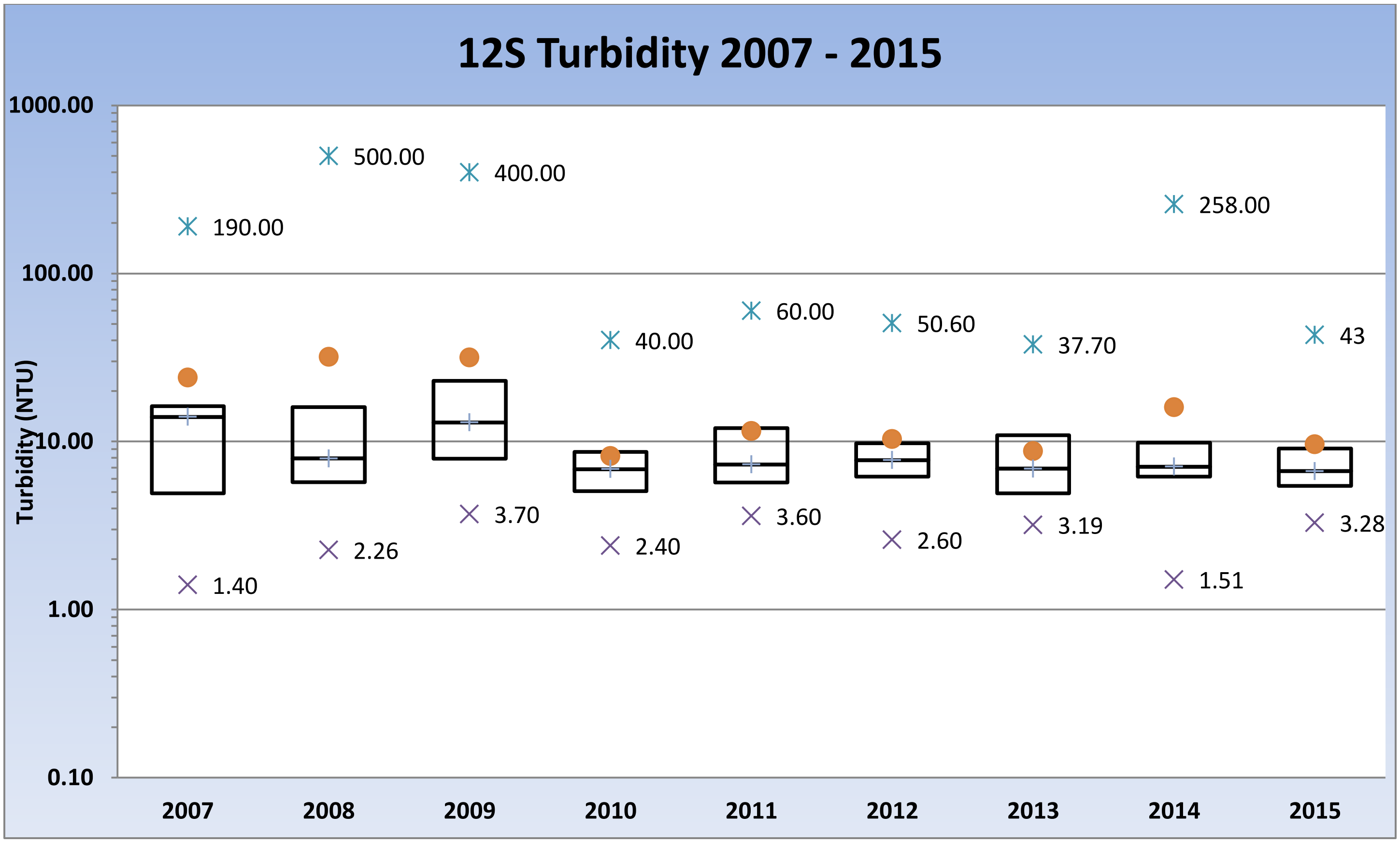
4S Turbidity 2007 - 2015
1000.00
100.00
10.00
1.00
0.10
Turbidity (NTU)
300.00
500.00
270.00
140.00
110.00
100.40
52.80
441.00
52.4
3.56
2.70
3.40
2.70
1.70
1.90
1.53
1.77
3
2007
2008
2009
2010
2011
2012
2013
2014
2015

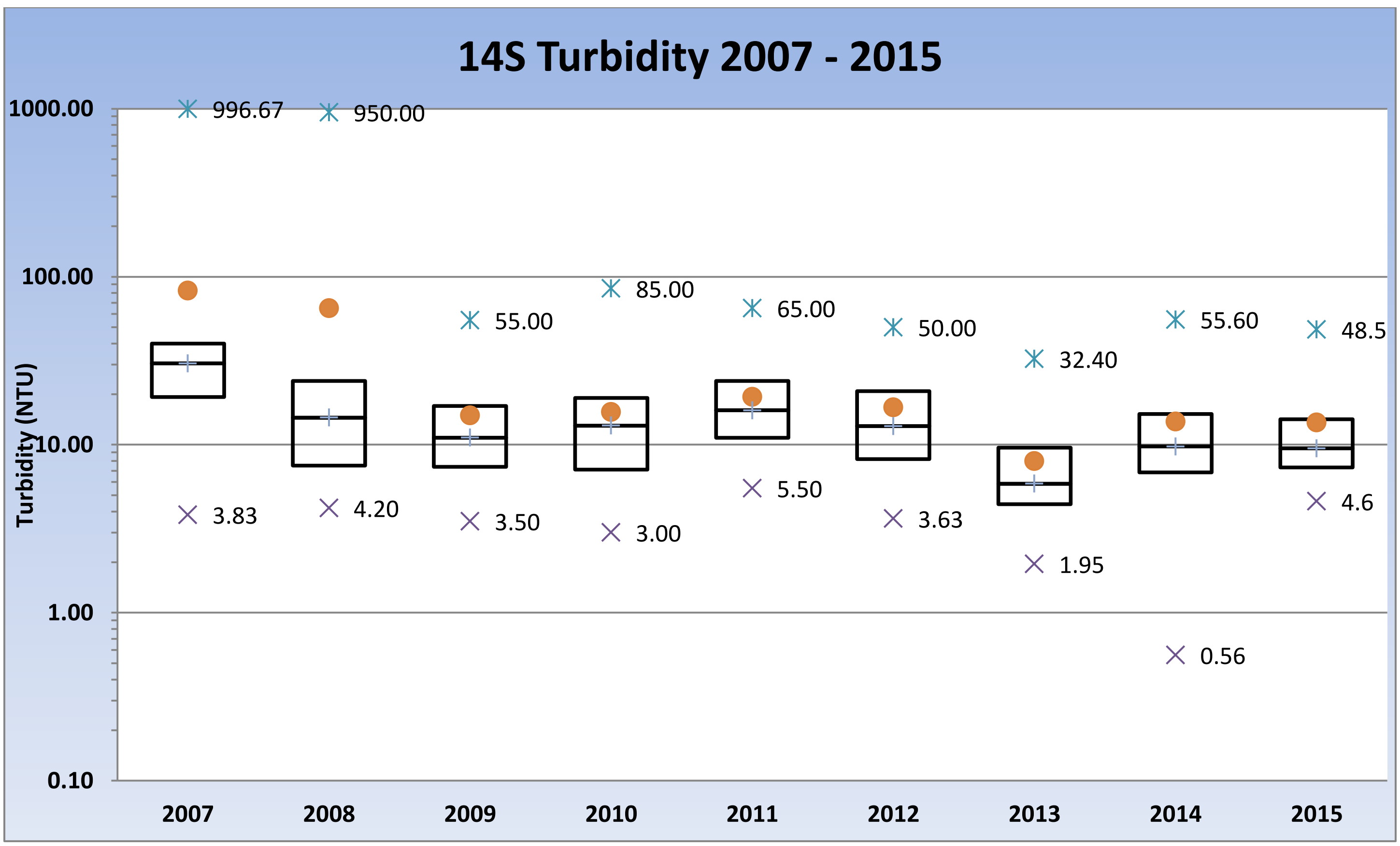

5S Turbidity 2007 - 2015
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
683.67
400.00
160.00
45.00
70.00
293.00
40.47
54.30
34.9
8.83
3.23
5.20
3.10
4.80
7.47
2.56
2.79
6.32
2007
2008
2009
2010
2011
2012
2013
2014
2015

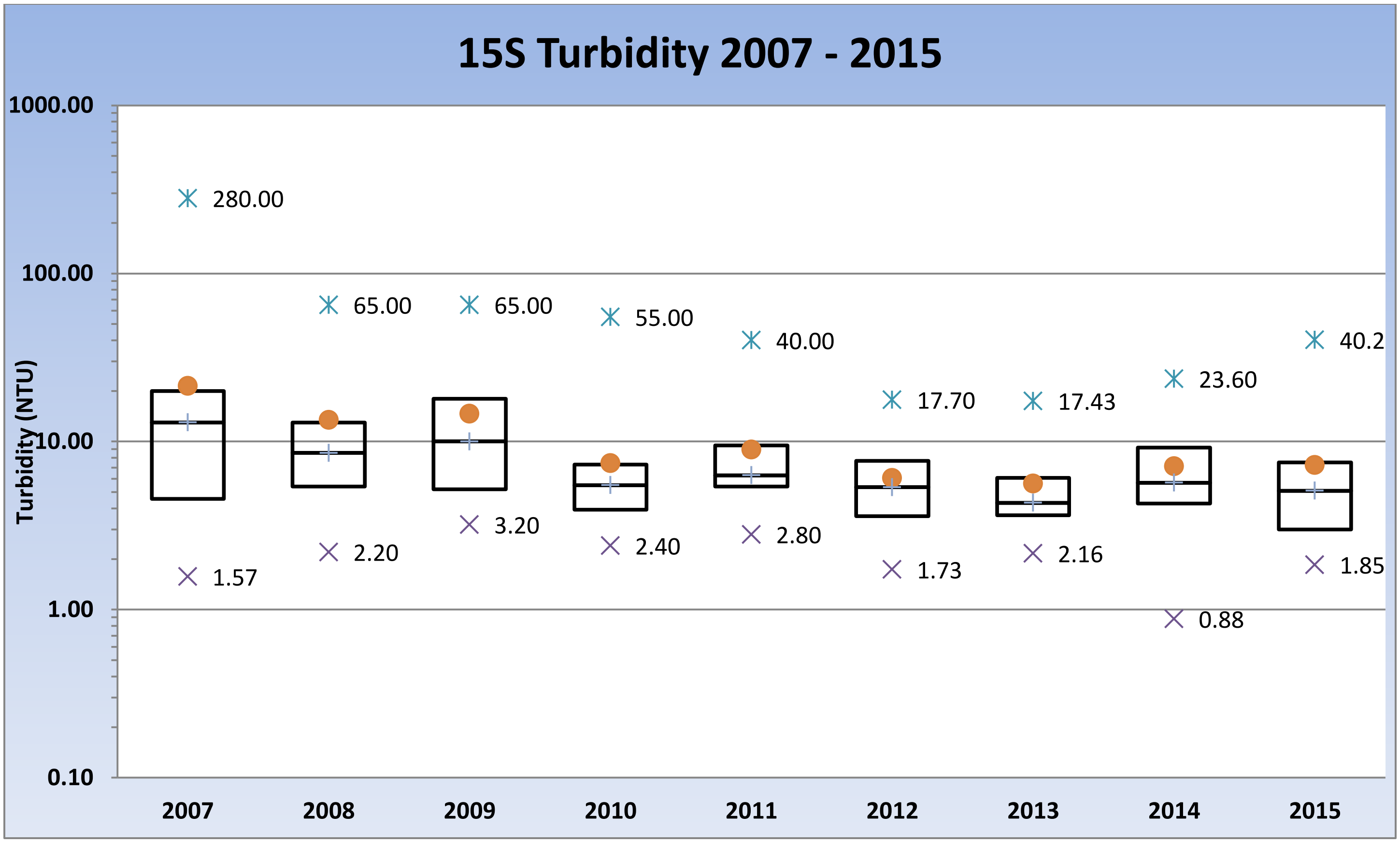

6S Turbidity 2007 - 2015
Turbidity (NTU)
100.00
10.00
1.00
0.10
28.67
50.00
38.00
26.00
32.00
17.60
65.00
58.40
53.8
4.27
2.03
4.20
3.40
3.40
3.20
2.17
1.09
2.41
2007
2008
2009
2010
2011
2012
2013
2014
2015

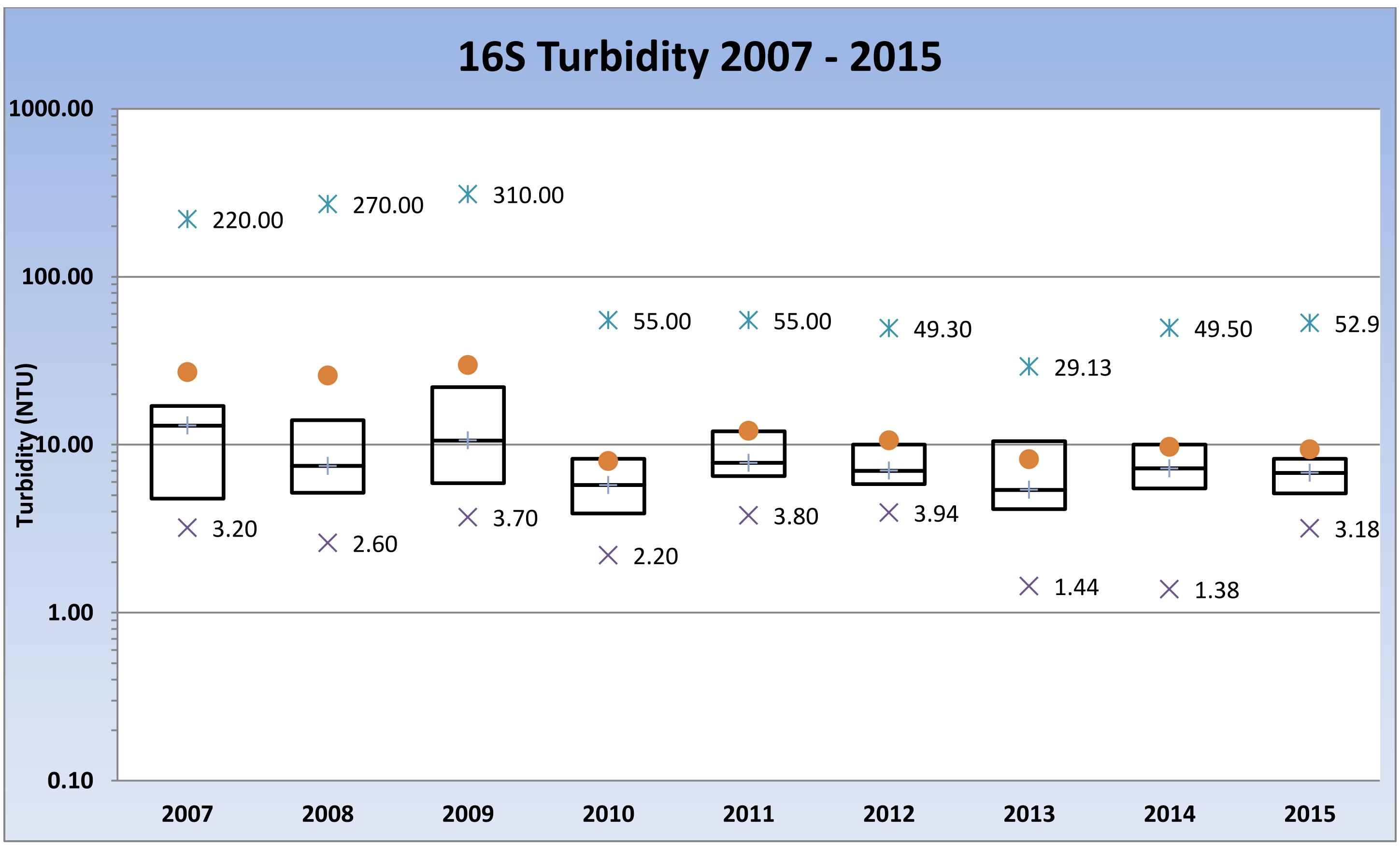

7S Turbidity 2007 - 2015
1000.00
100.00
10.00
1.00
0.10
Turbidity (NTU)
62.00
75.00
110.00
27.00
37.00
19.60
19.60
22.20
55.5
3.07
2.23
2.20
1.60
2.80
1.67
1.61
1.67
2.47
2007
2008
2009
2010
2011
2012
2013
2014
2015

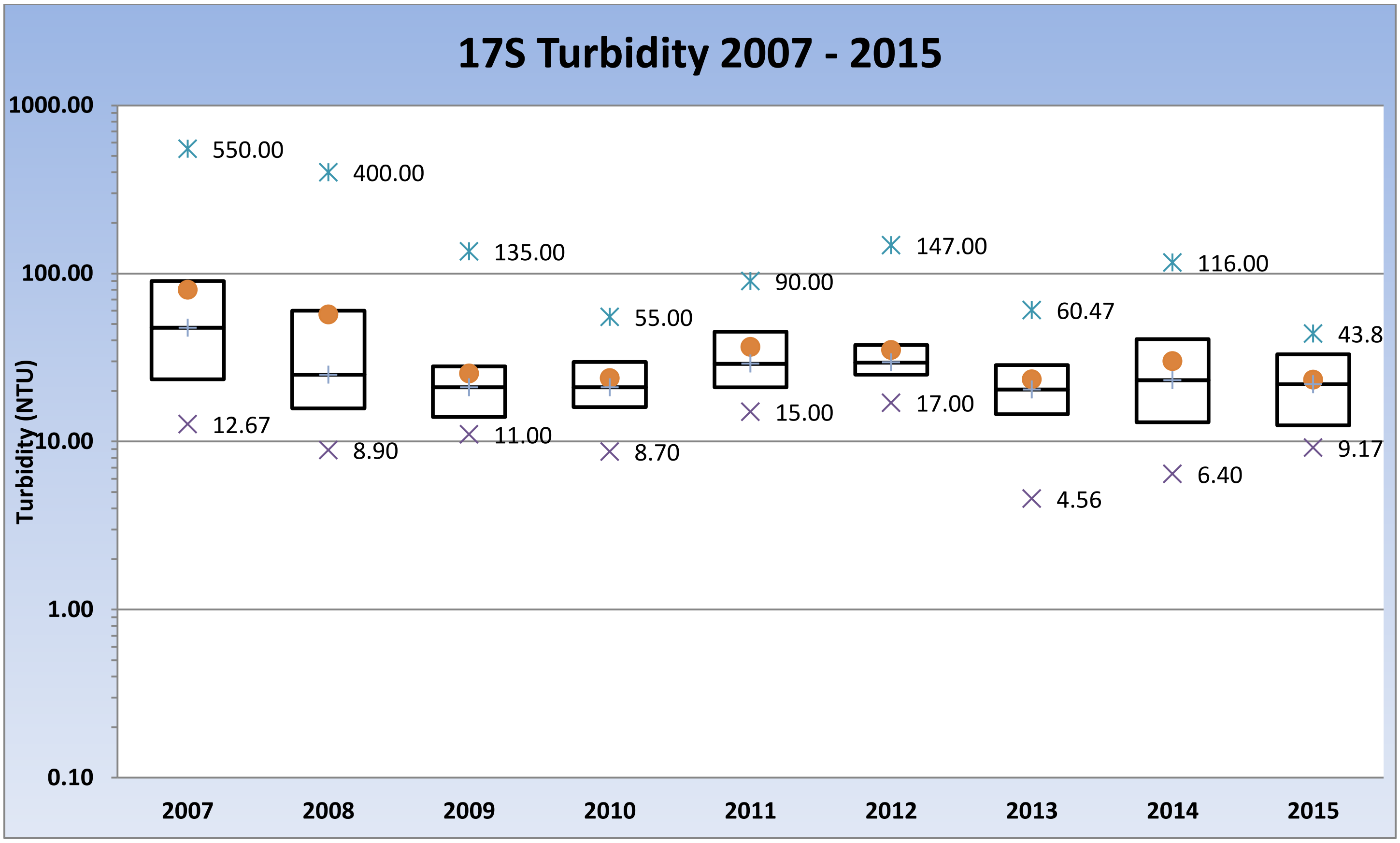

8S Turbidity 2007 - 2015
1000.00
100.00
10.00
1.00
0.10
Turbidity (NTU)
650.00
220.00
150.00
28.00
85.00
38.20
24.57
178.00
42.2
1.33
1.83
1.70
1.40
2.30
0.80
0.89
1.00
1.18
2007
2008
2009
2010
2011
2012
2013
2014
2015


12S Turbidity 2007 - 2015
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
190.00
500.00
400.00
40.00
60.00
50.60
37.70
258.00
43
1.40
2.26
3.70
2.40
3.60
2.60
3.19
1.51
3.28
2007
2008
2009
2010
2011
2012
2013
2014
2015

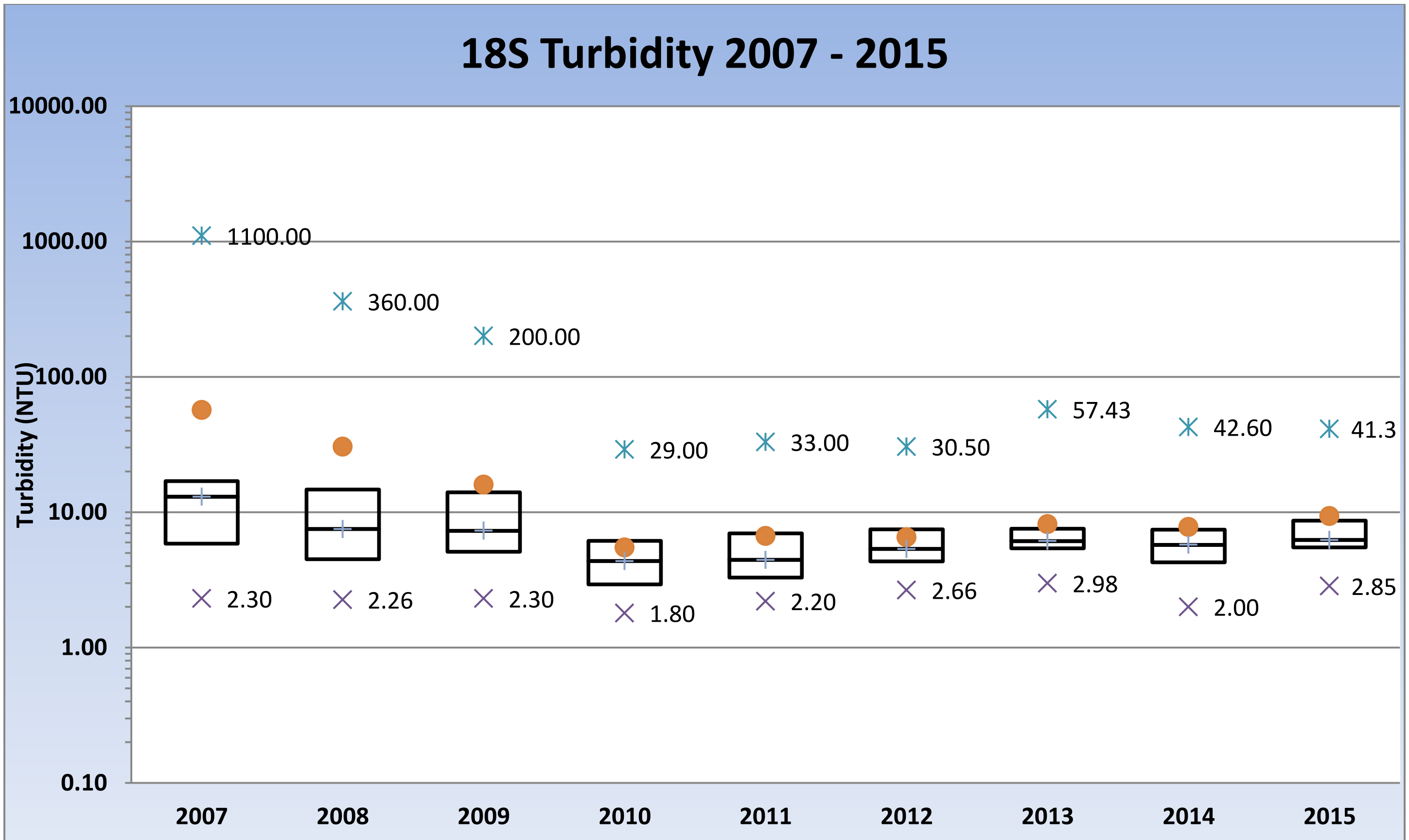

14S Turbidity 2007 - 2015
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
996.67
950.00
55.00
85.00
65.00
50.00
32.40
55.60
48.5
3.83
4.20
3.50
3.00
5.50
3.63
1.95
0.56
4.6
2007
2008
2009
2010
2011
2012
2013
2014
2015

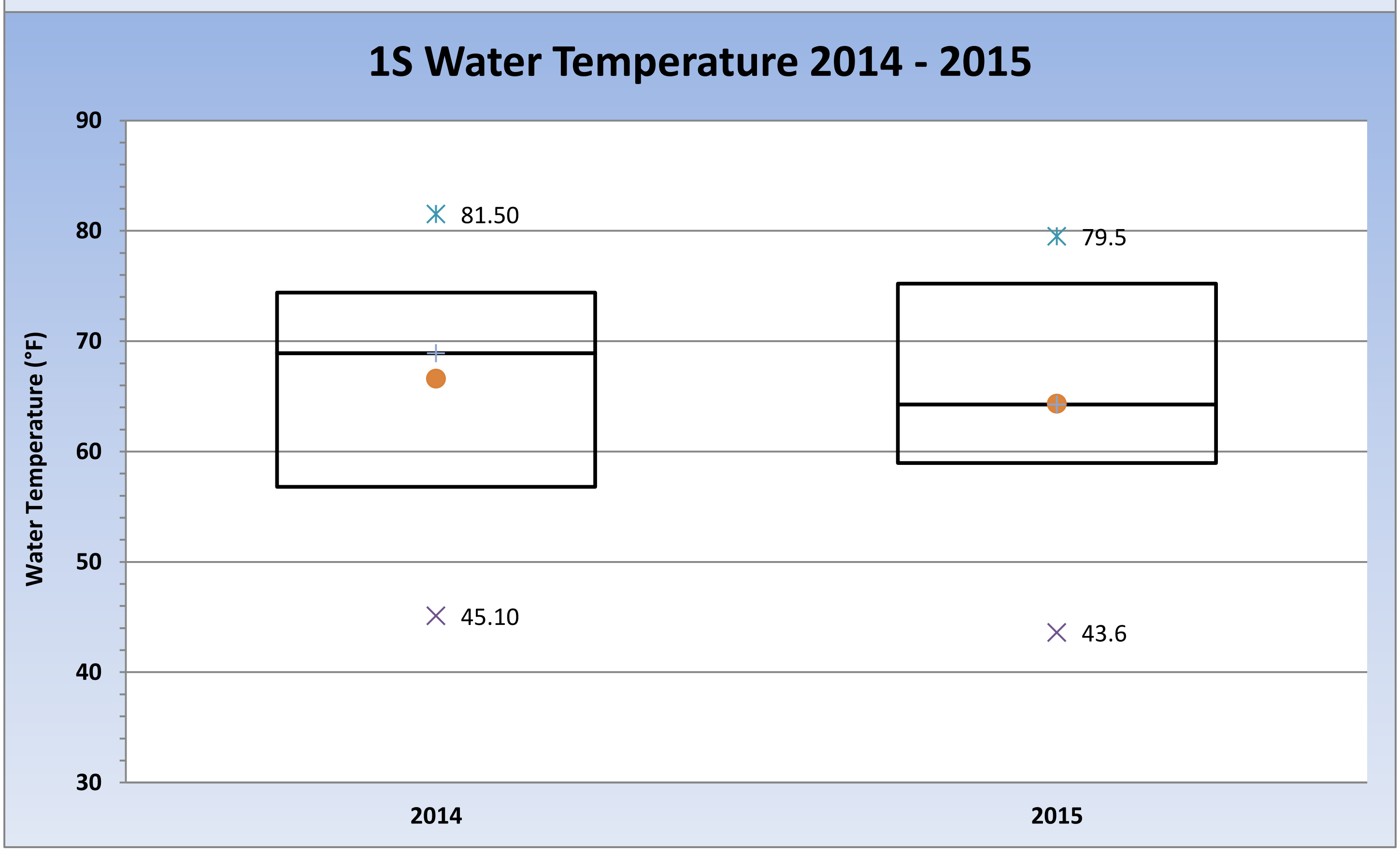

15S Turbidity 2007 - 2015
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
2007
2008
2009
2010
2011
2012
2013
2014
2015
280.00
65.00
65.00
55.00
40.00
17.70
17.43
23.60
40.2
1.57
2.20
3.20
2.40
2.80
1.73
2.16
0.88
1.85

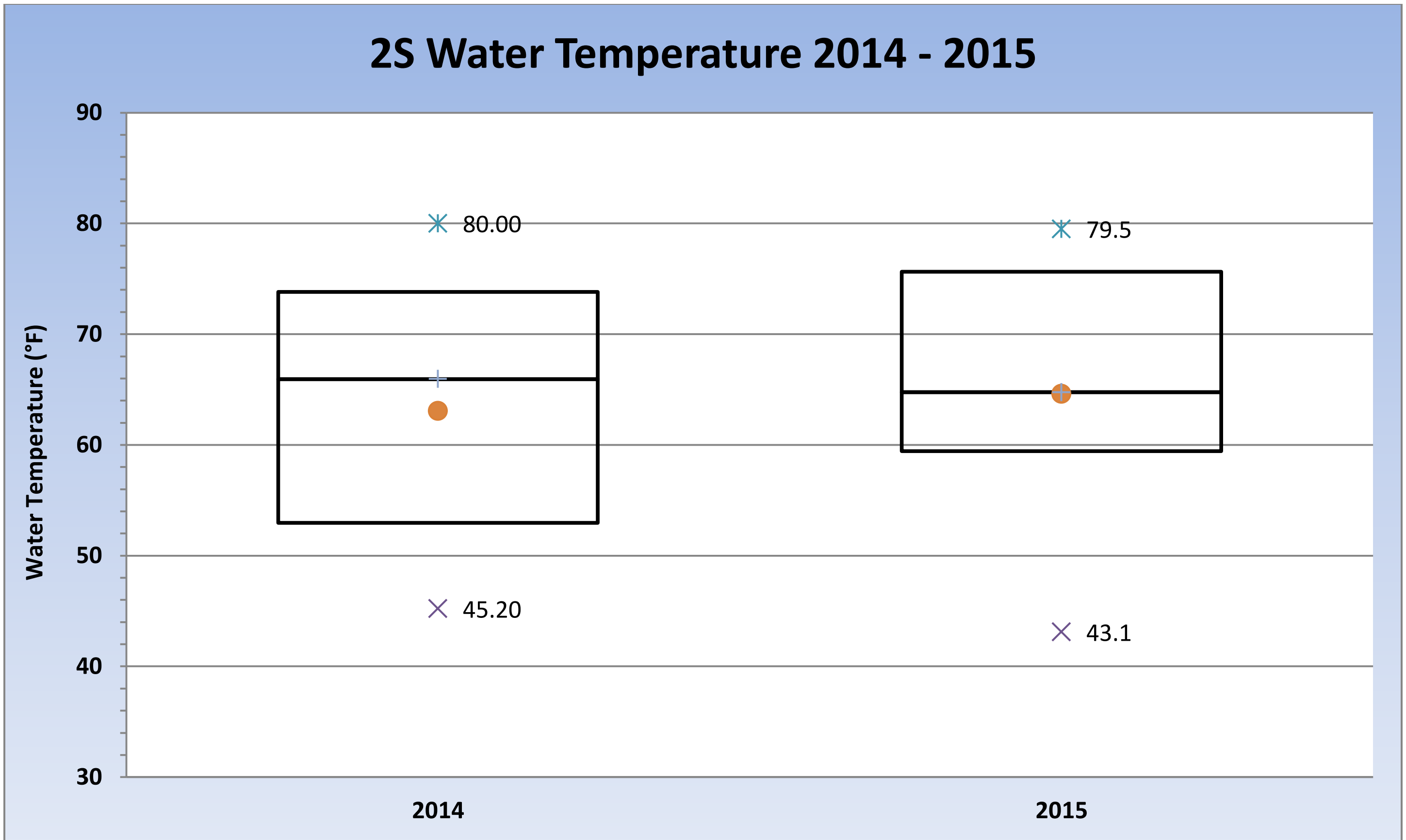

16S Turbidity 2007 - 2015
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
2007
2008
2009
2010
2011
2012
2013
2014
2015
220.00
270.00
310.00
55.00
55.00
49.30
29.13
49.50
52.9
3.20
2.60
3.70
2.20
3.80
3.94
1.44
1.38
3.18

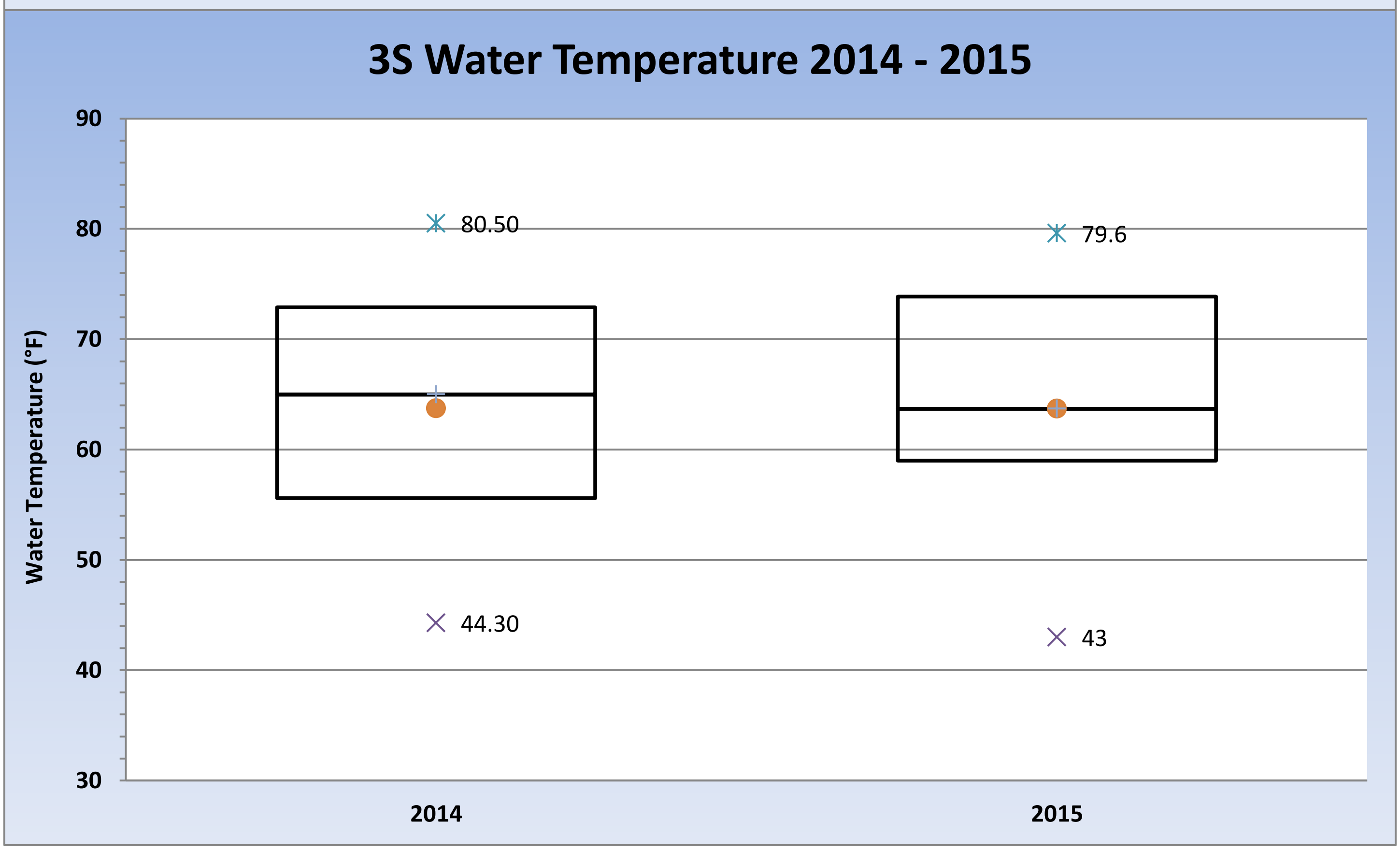


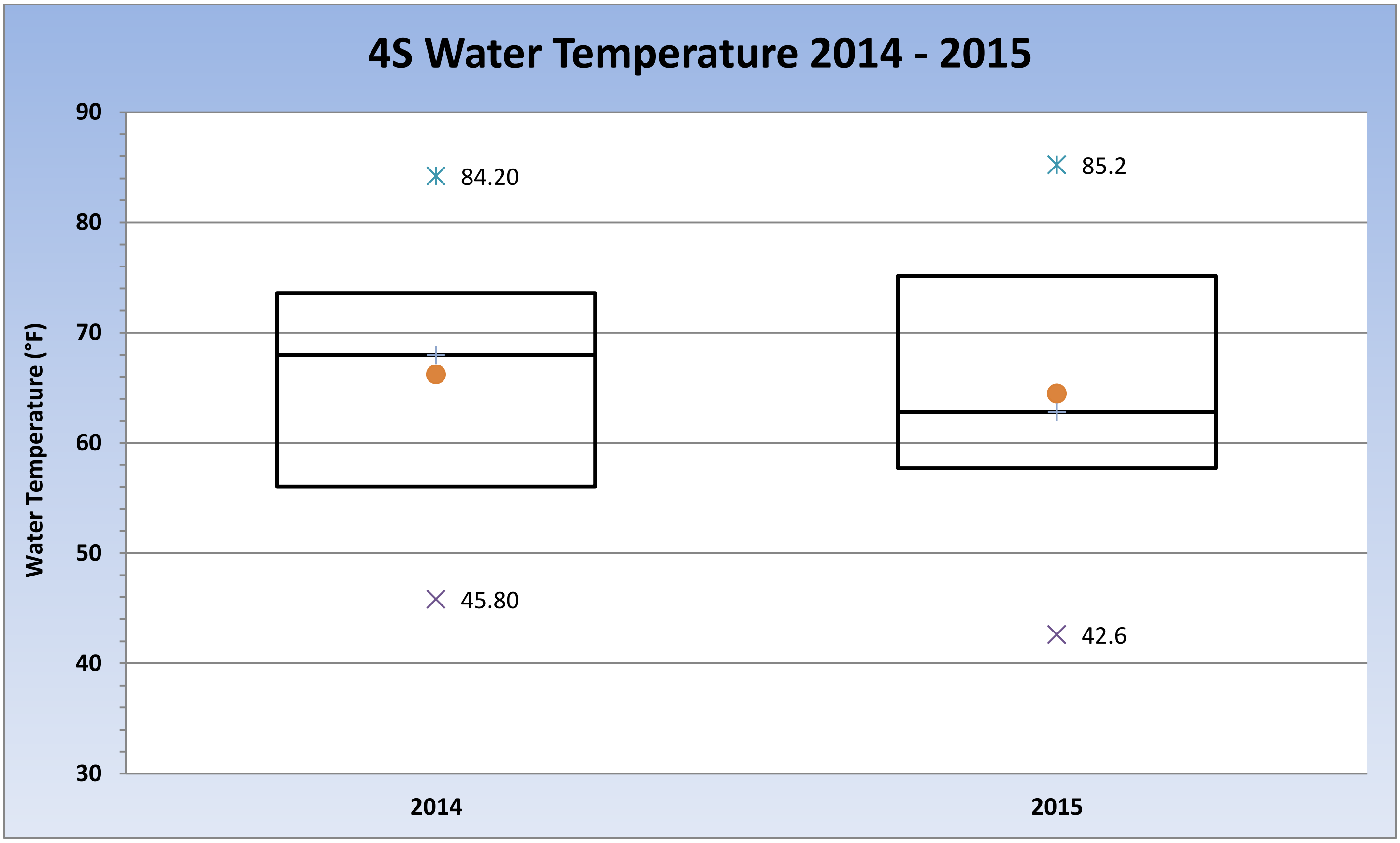
17S Turbidity 2007 - 2015
Turbidity (NTU)
1000.00
100.00
10.00
1.00
0.10
550.00
400.00
135.00
55.00
90.00
147.00
60.47
116.00
43.8
12.67
8.90
11.00
8.70
15.00
17.00
4.56
6.40
9.17
2007
2008
2009
2010
2011
2012
2013
2014
2015

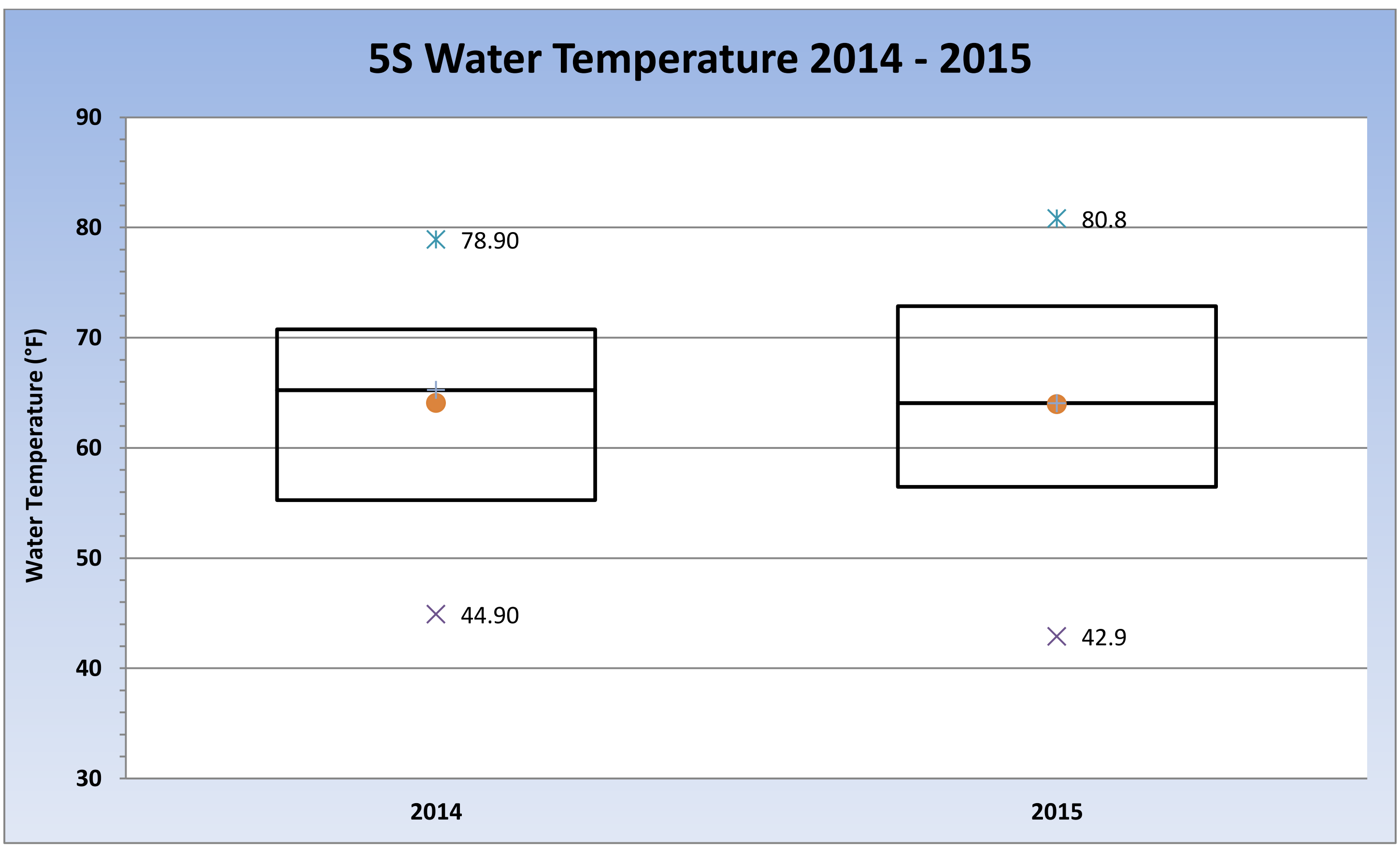

18S Turbidity 2007 - 2015
Turbidity (NTU)
10000.00
1000.00
100.00
10.00
1.00
0.10
1100.00
360.00
200.00
29.00
33.00
30.50
57.43
42.60
41.3
2.30
2.26
2.30
1.80
2.20
2.66
2.98
2.00
2.85
2007
2008
2009
2010
2011
2012
2013
2014
2015

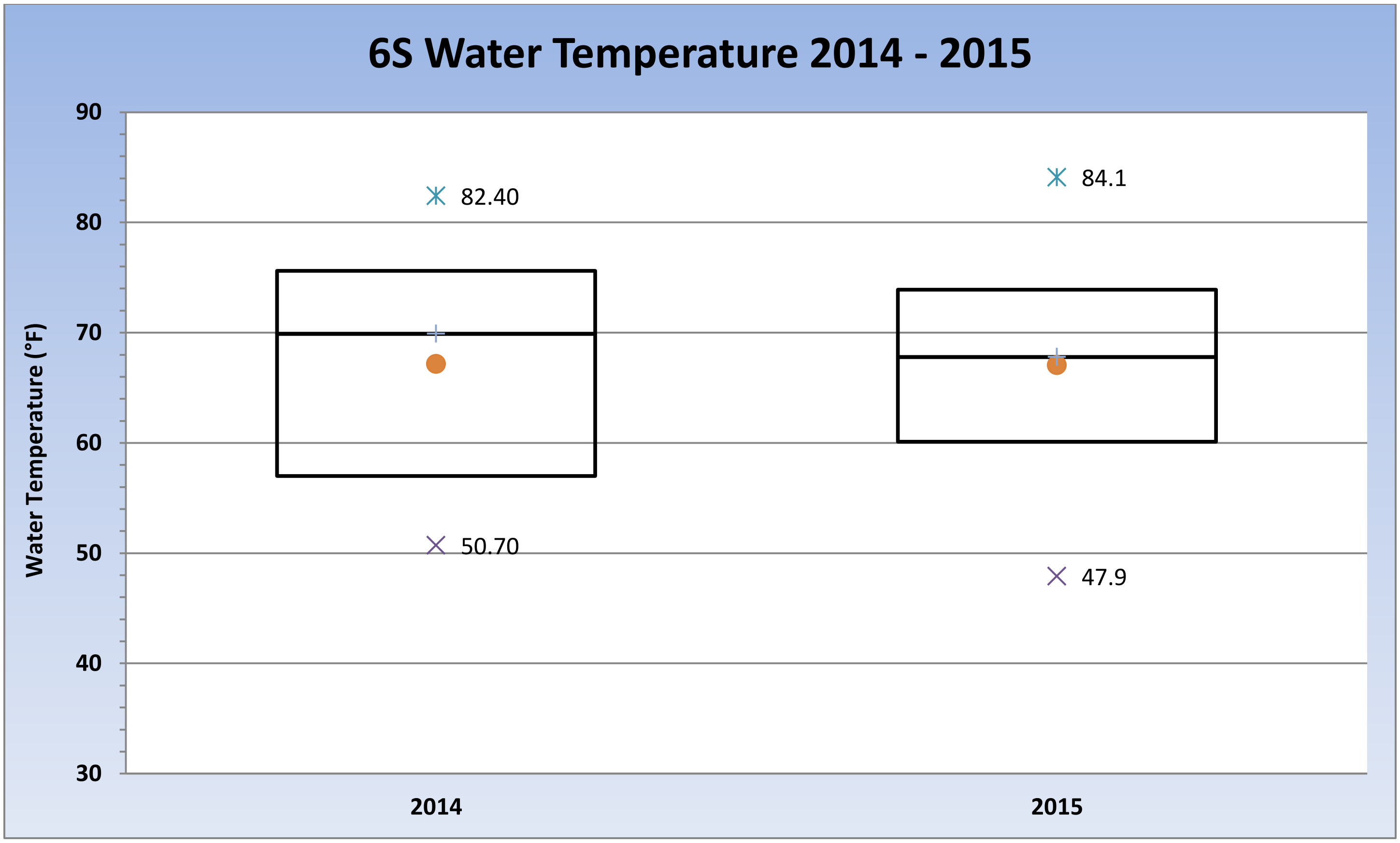

1S Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
81.50
79.5
45.10
43.6
2014
2015

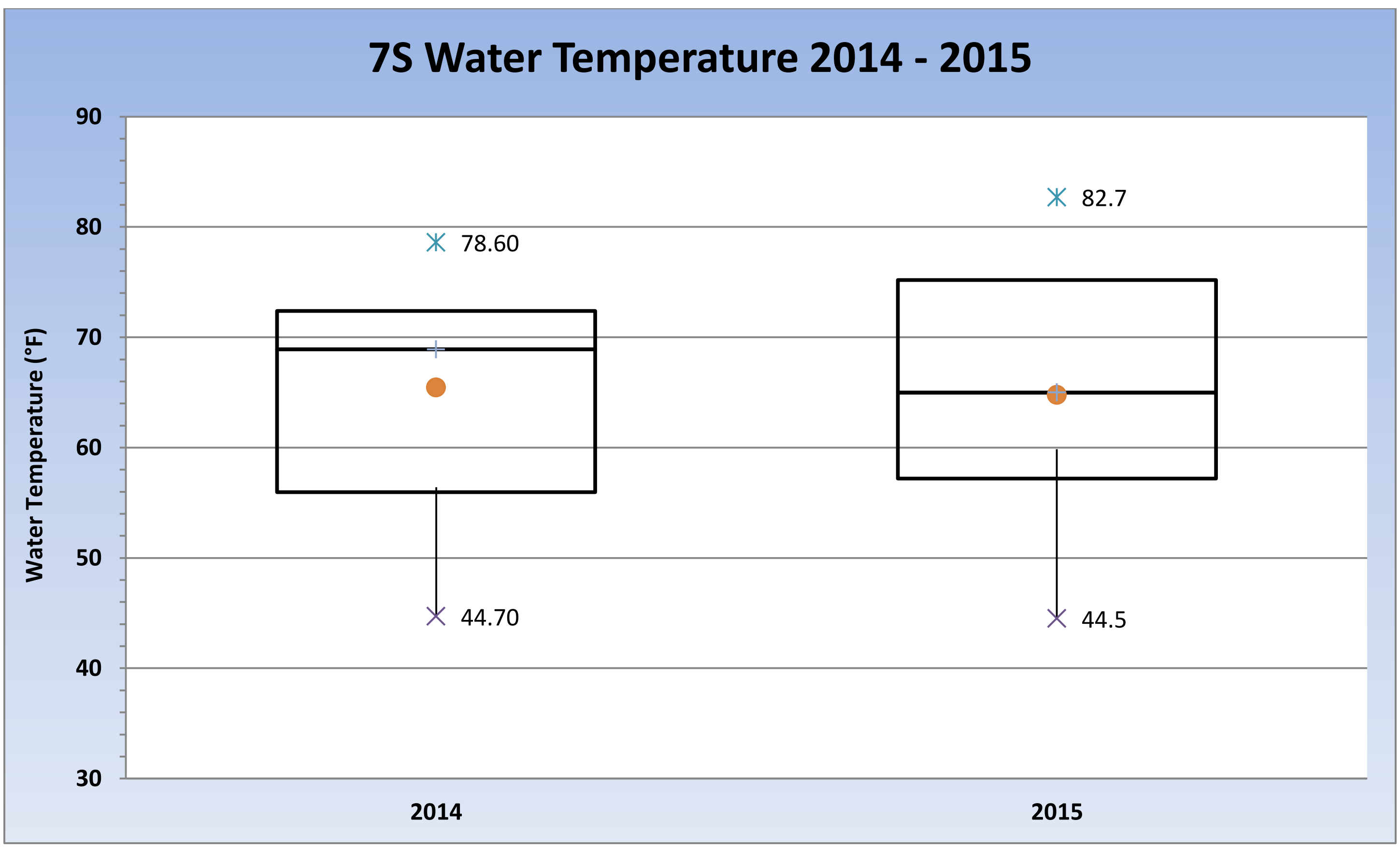

2S Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
80.00
45.20
79.5
43.1
2014
2015

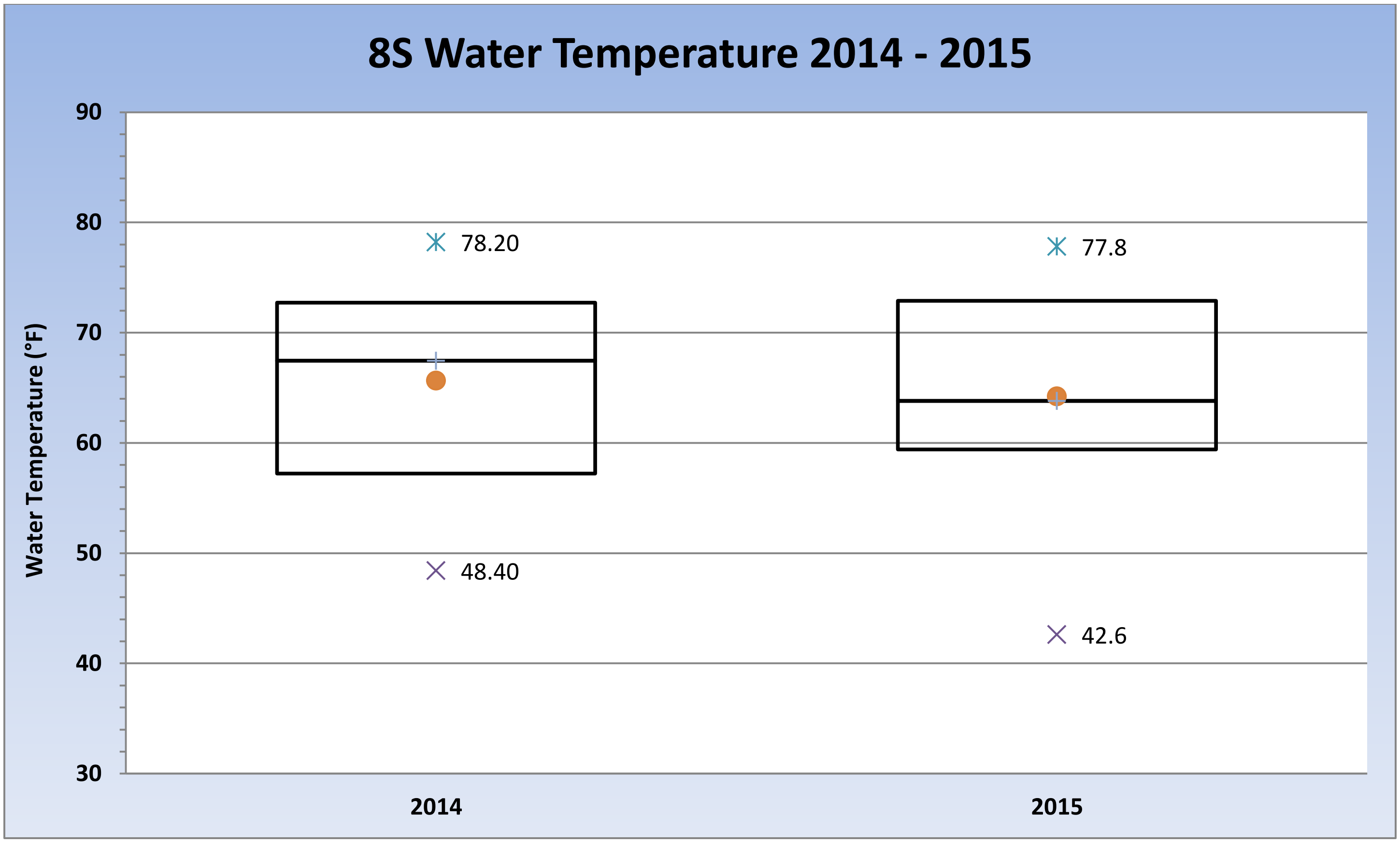

3S Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
80.50
44.30
79.6
43
2014
2015

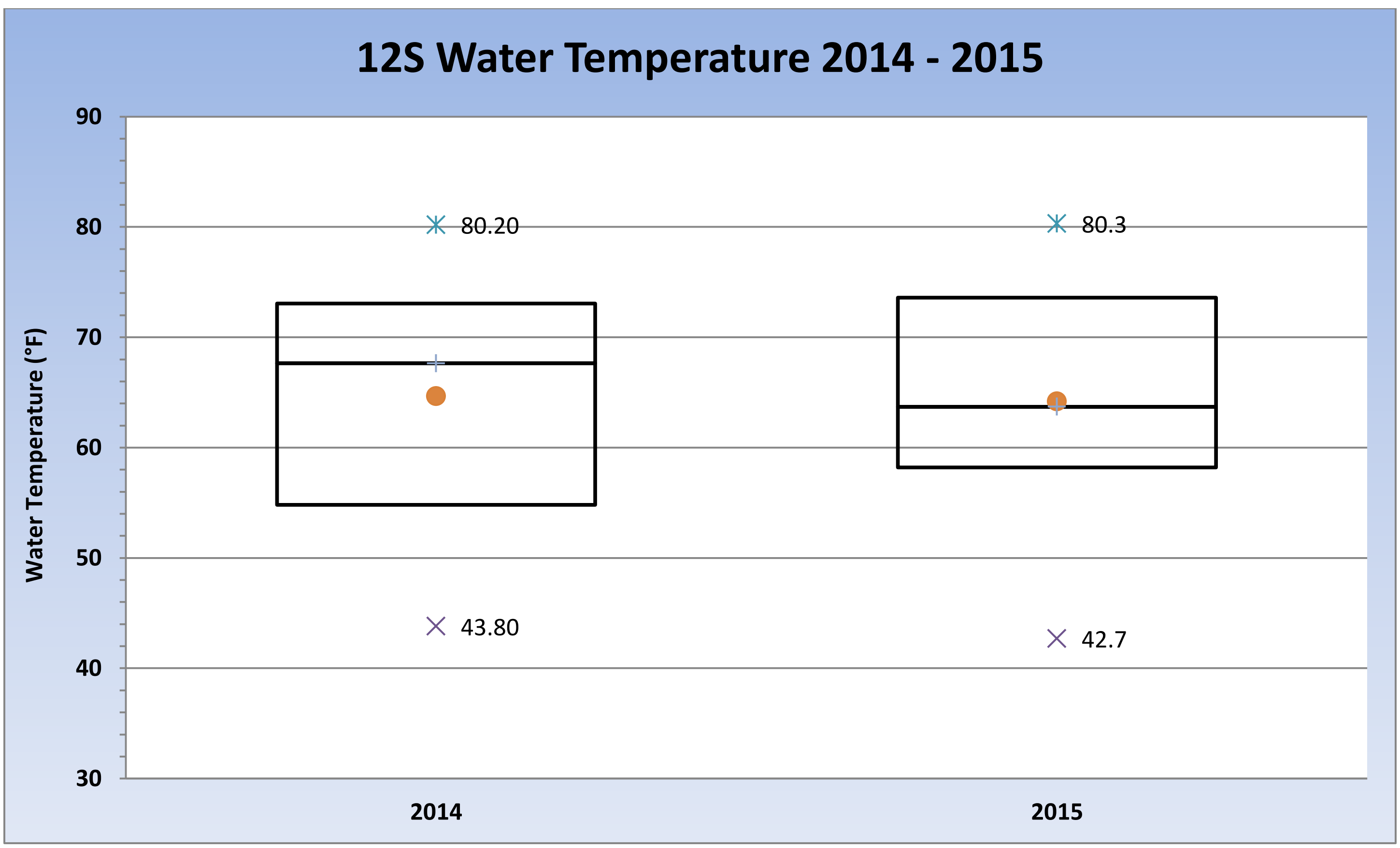

4S Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
84.20
45.80
85.2
42.6
2014
2015

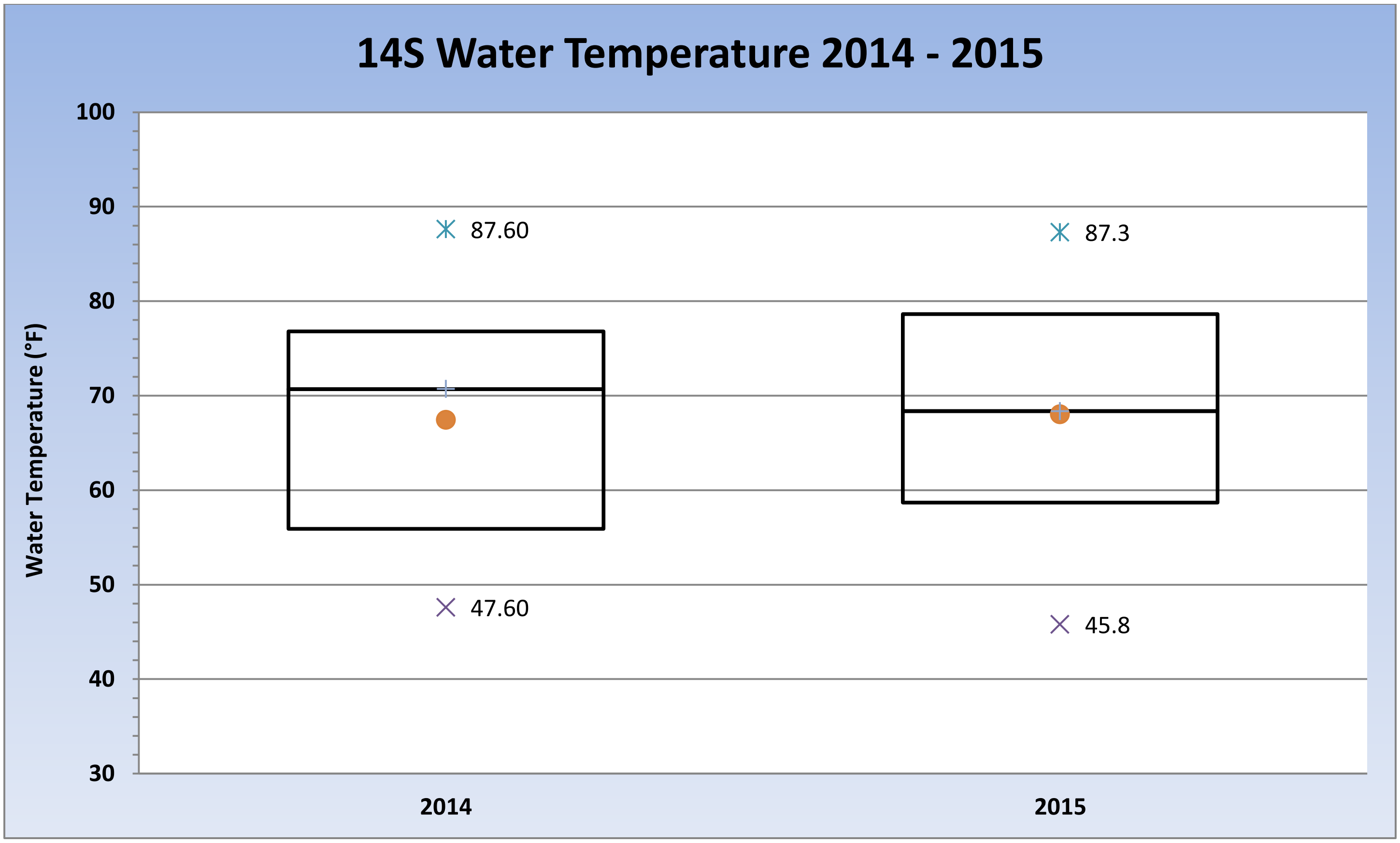

5S Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
78.90
44.90
80.8
42.9
2014
2015

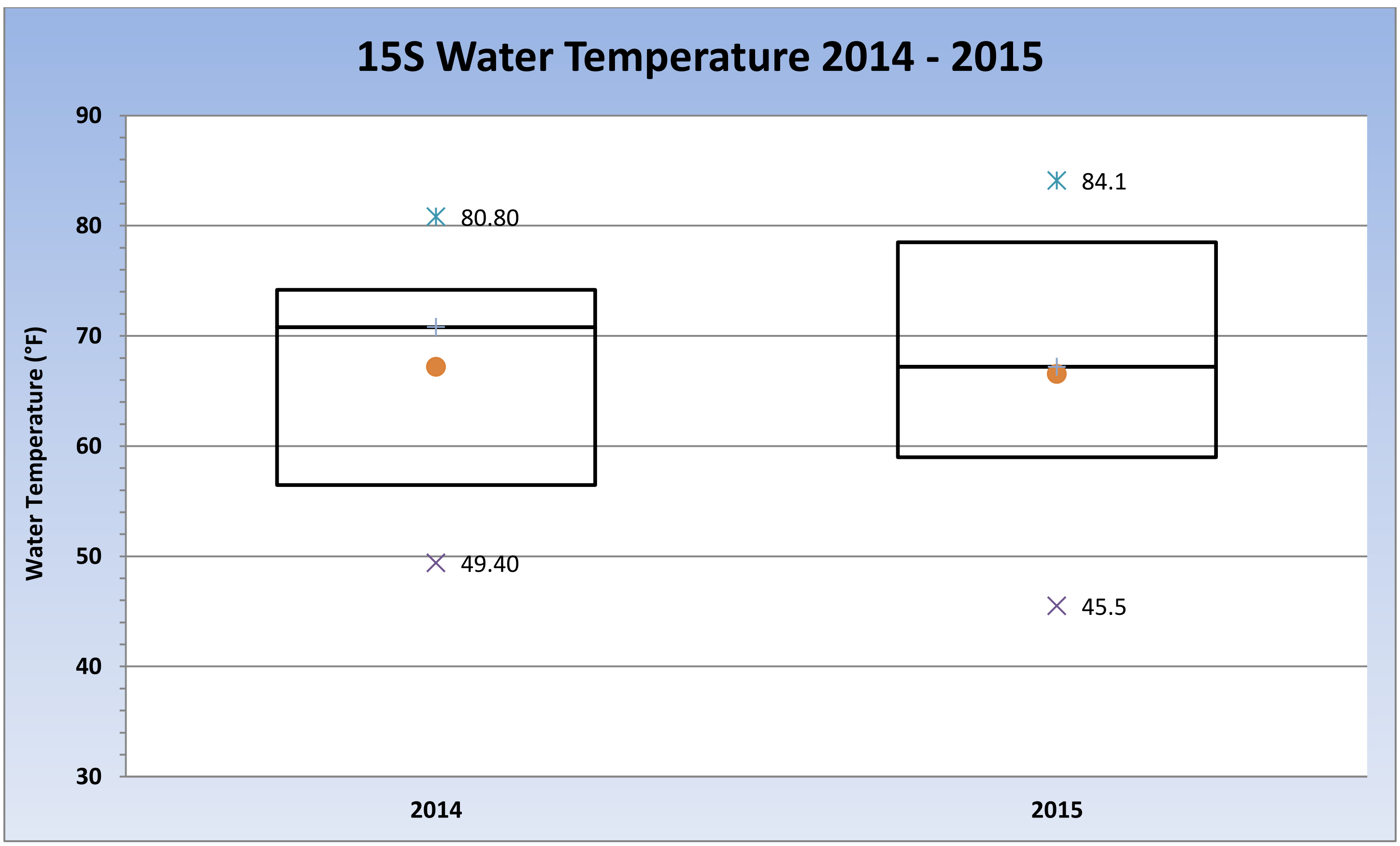

6S Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
82.40
50.70
84.1
47.9
2014
2015

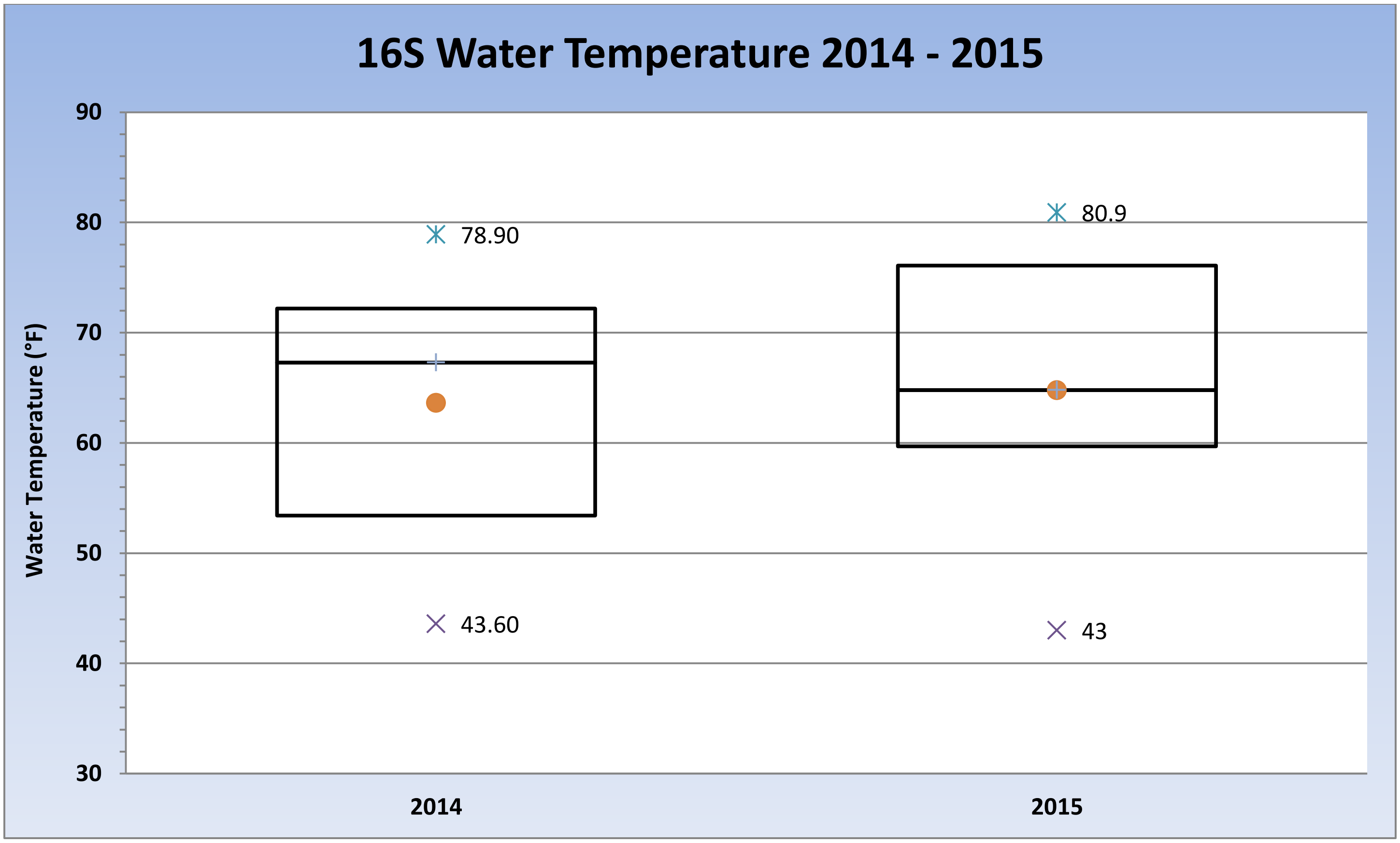

7S Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
78.60
44.70
82.7
44.5
2014
2015


8S Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
78.20
48.40
77.8
42.6
2014
2015

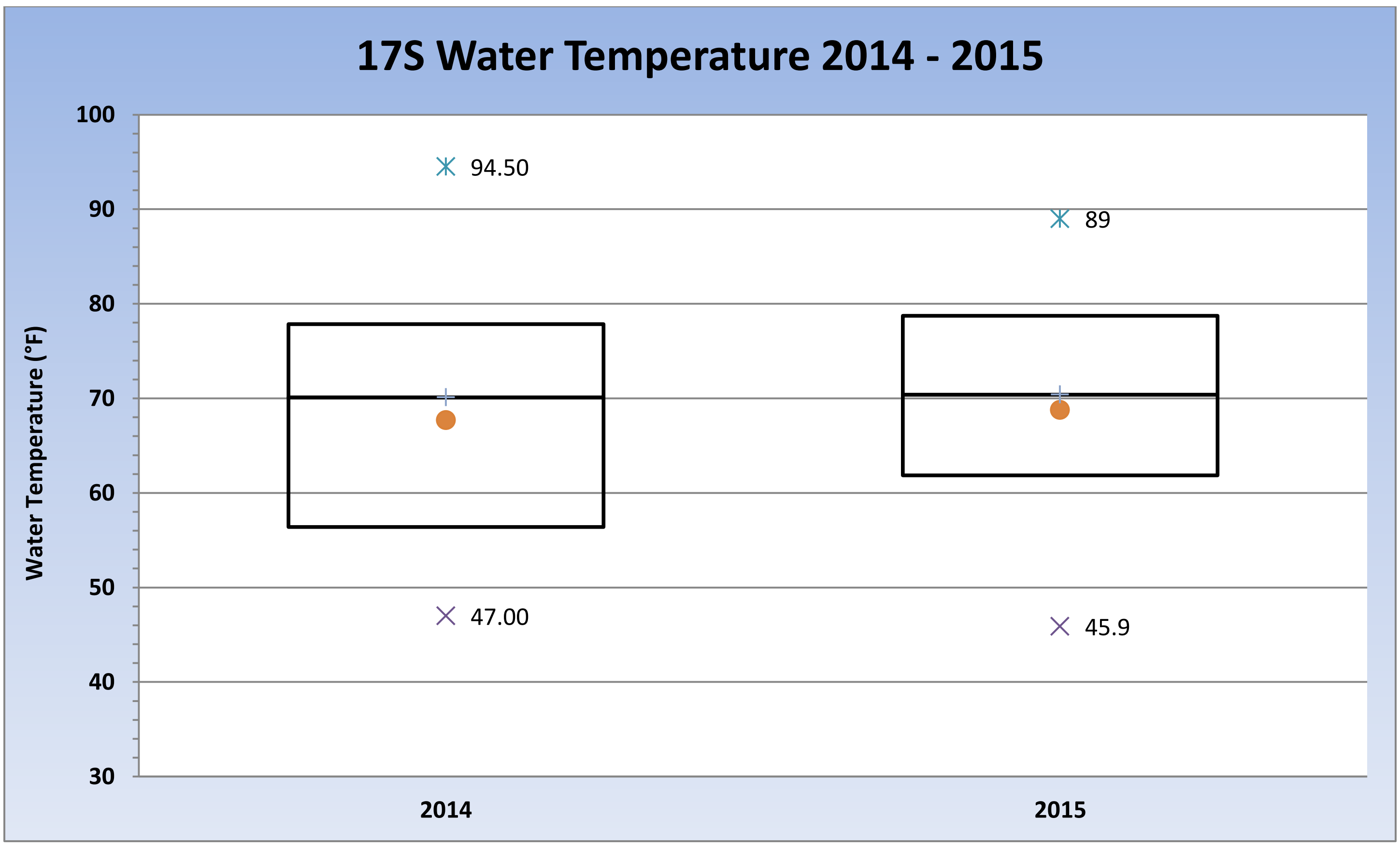

12S Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
80.20
43.80
80.3
42.7
2014
2015


14S Water Temperature 2014 - 2015
Water Temperature (°F)
100
90
80
70
60
50
40
30
87.60
47.60
87.3
45.8
2014
2015

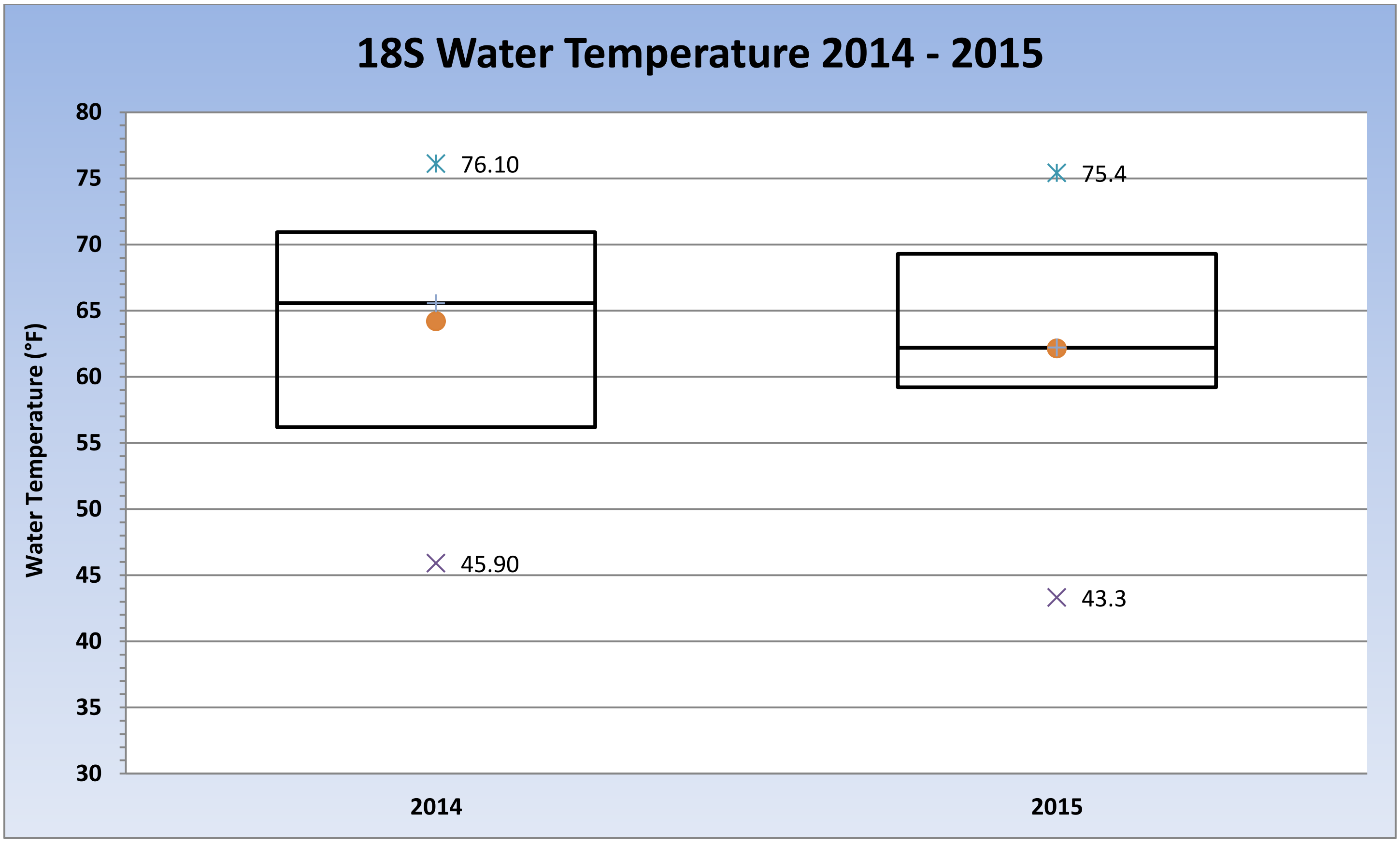

15S Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
80.80
49.40
84.1
45.5
2014
2015



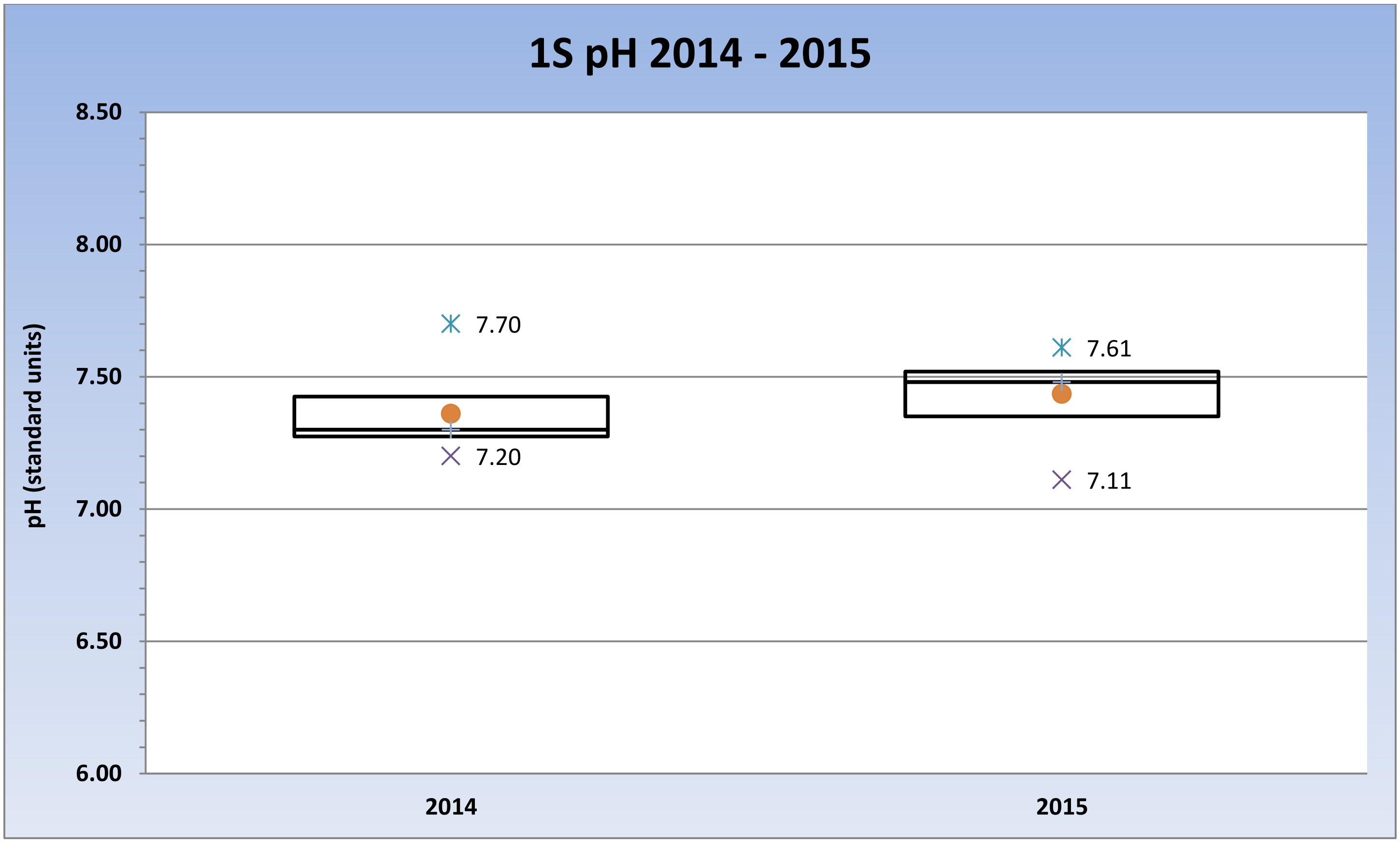
16S Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
78.90
80.9
43.60
43
2014
2015

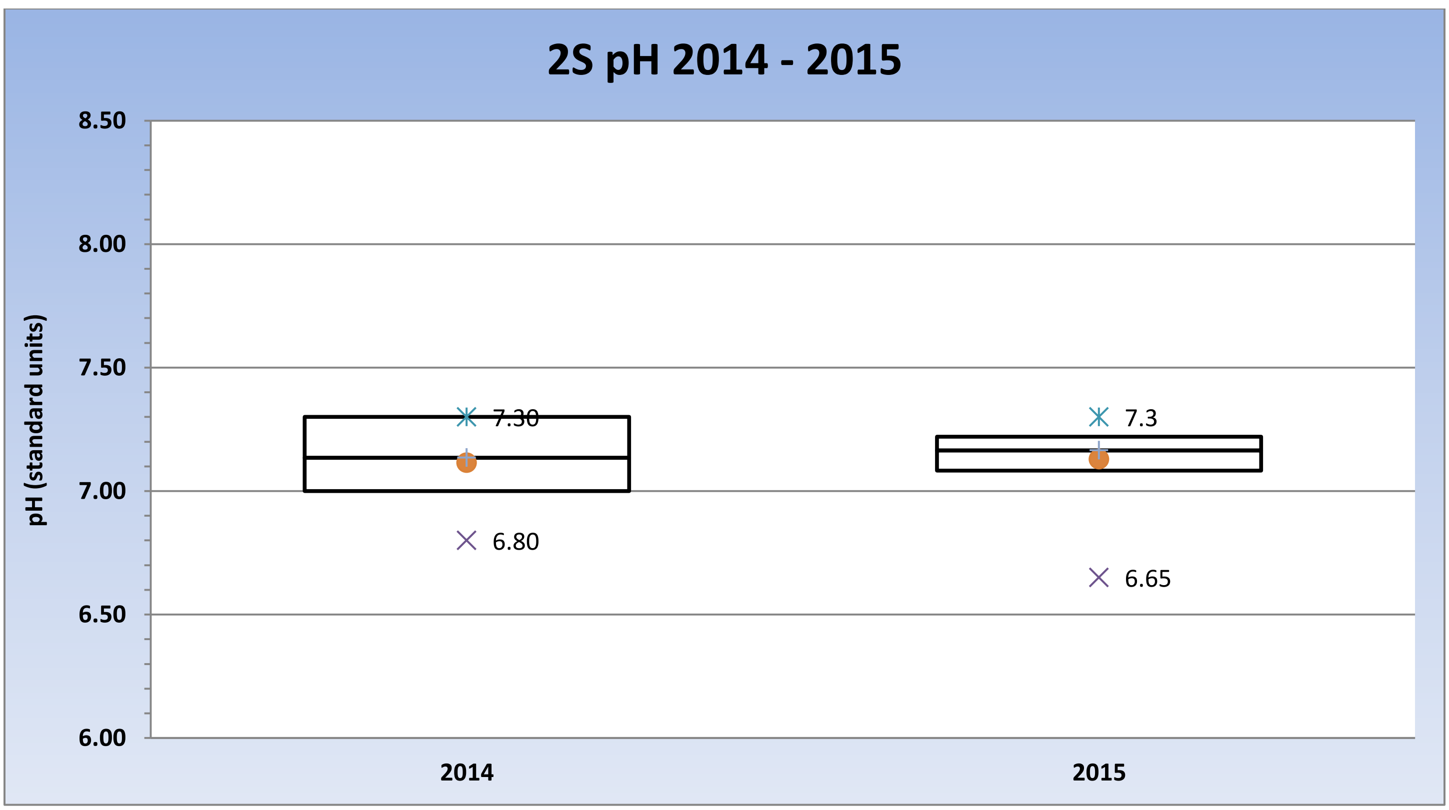


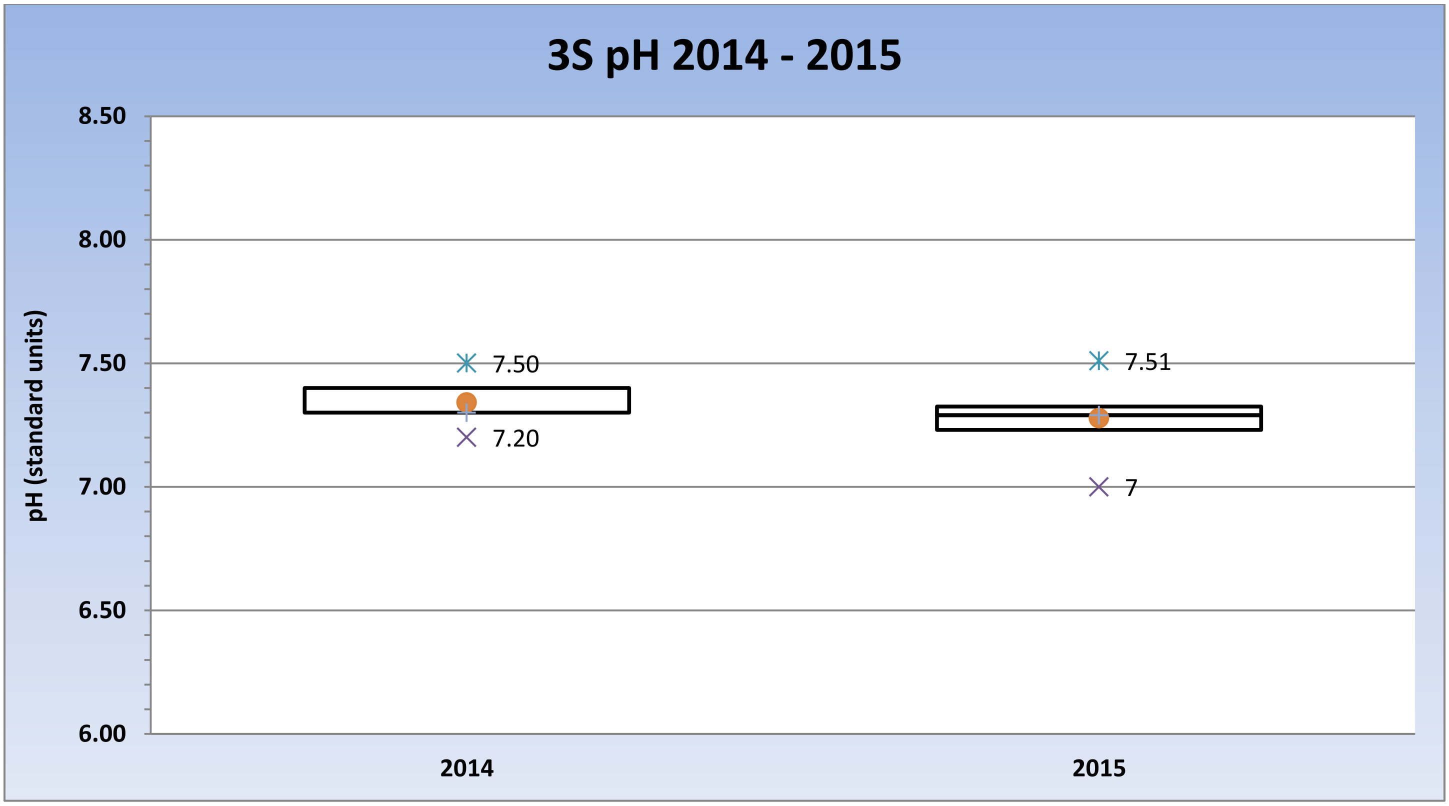
17S Water Temperature 2014 - 2015
Water Temperature (°F)
100
90
80
70
60
50
40
30
94.50
89
47.00
45.9
2014
2015

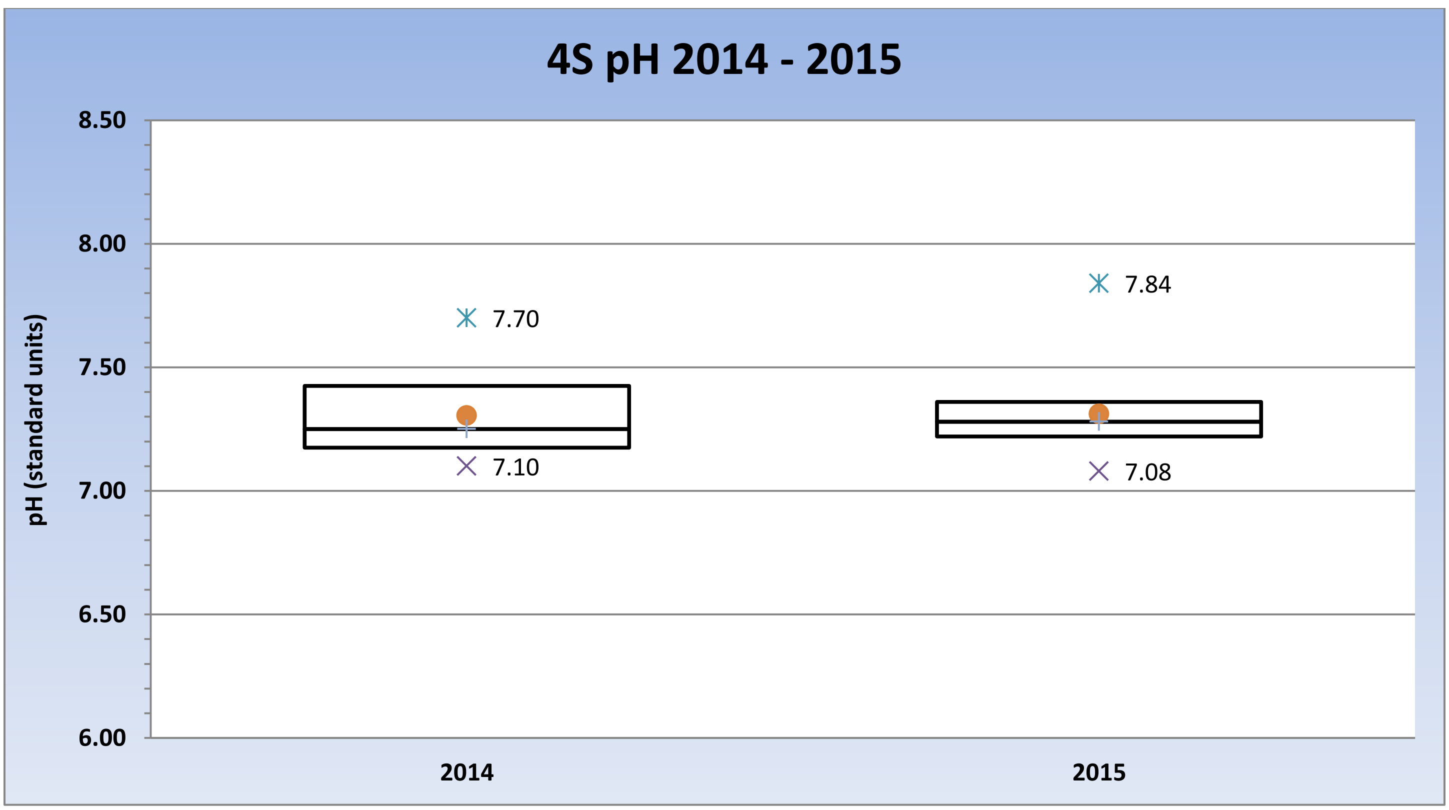


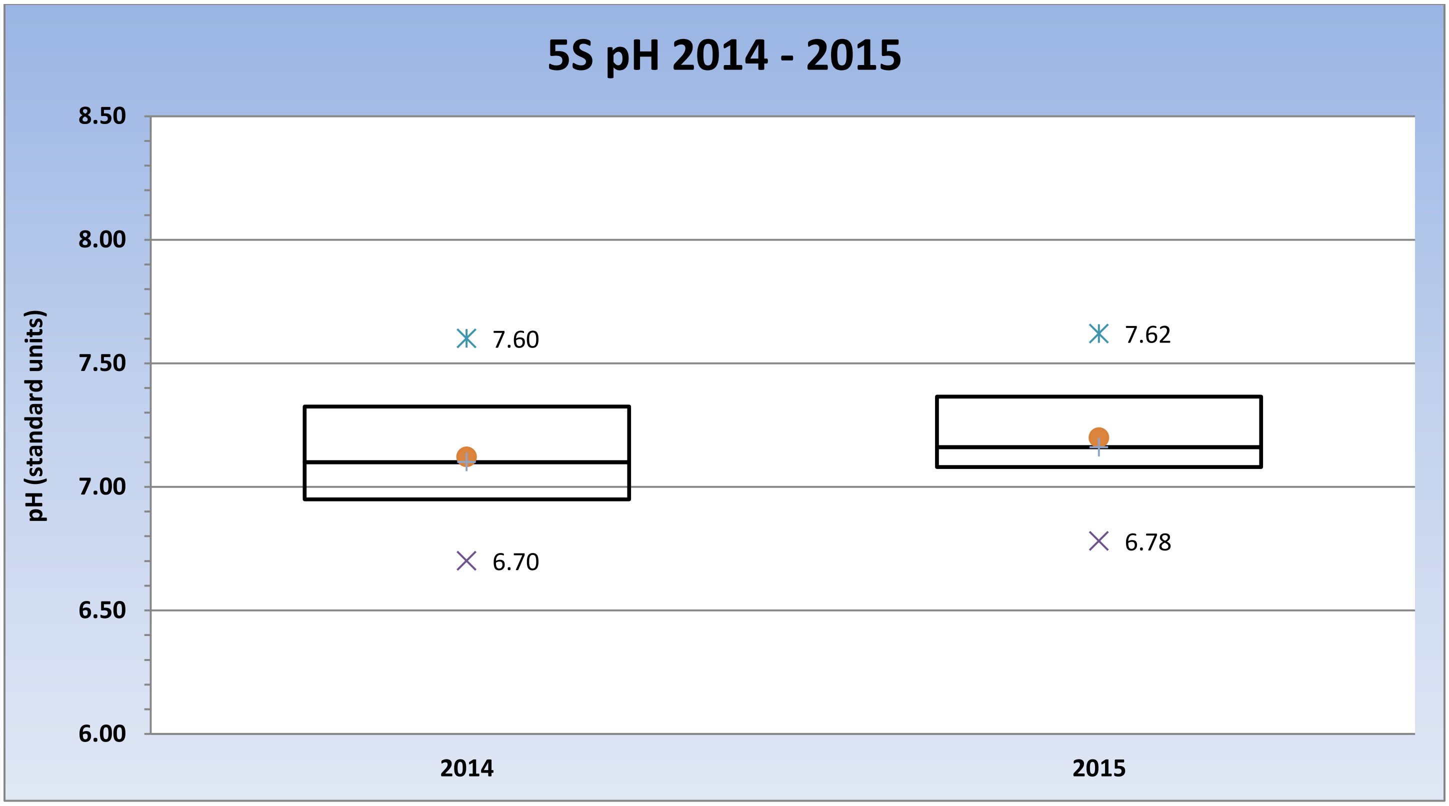
18S Water Temperature 2014 - 2015
Water Temperature (°F)
80
75
70
65
60
55
50
45
40
35
30
76.10
45.90
75.4
43.3
2014
2015

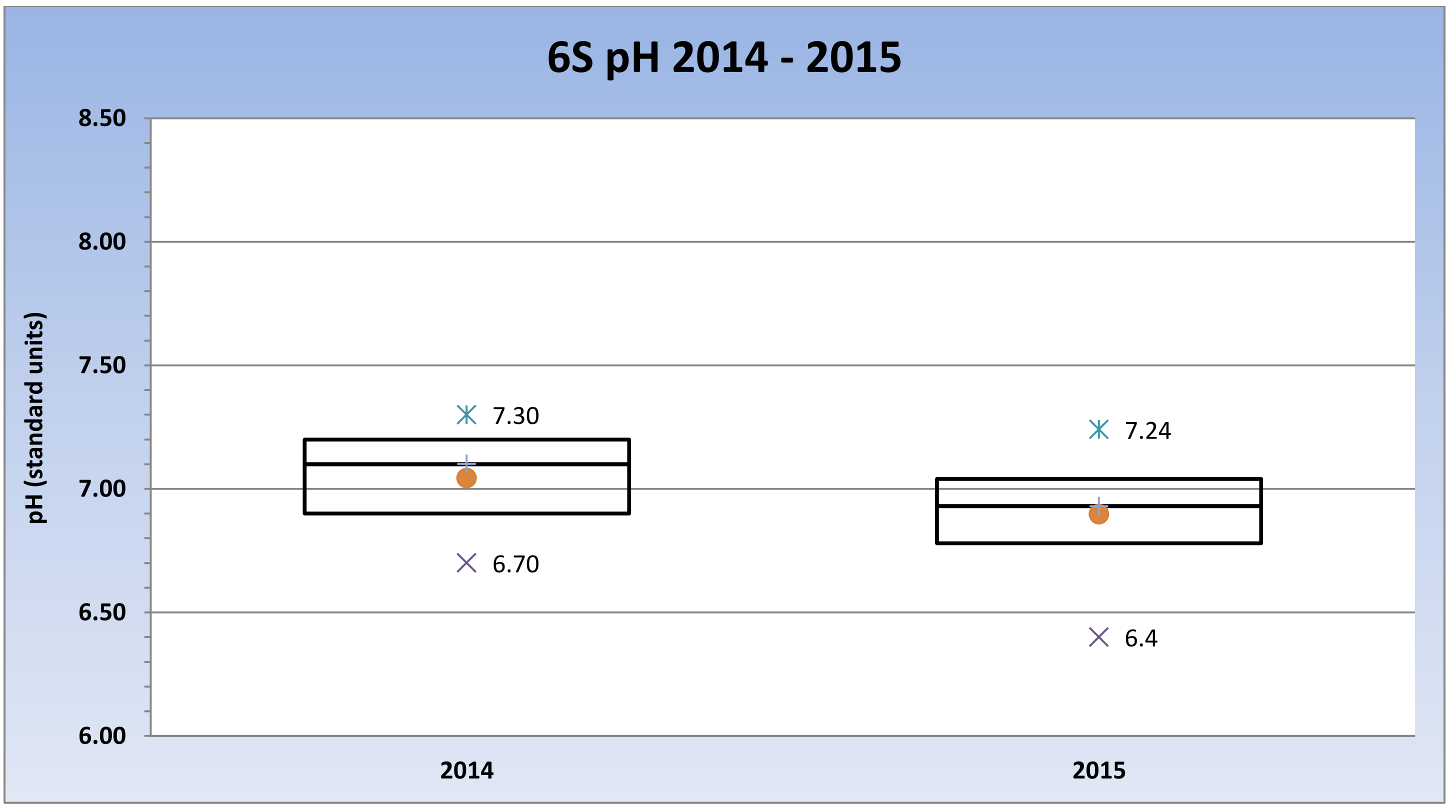

1S pH 2014 - 2015
8.50
8.00
7.50
7.00
6.50
6.00
pH (standard units)
7.70
7.20
7.61
7.11
2014
2015

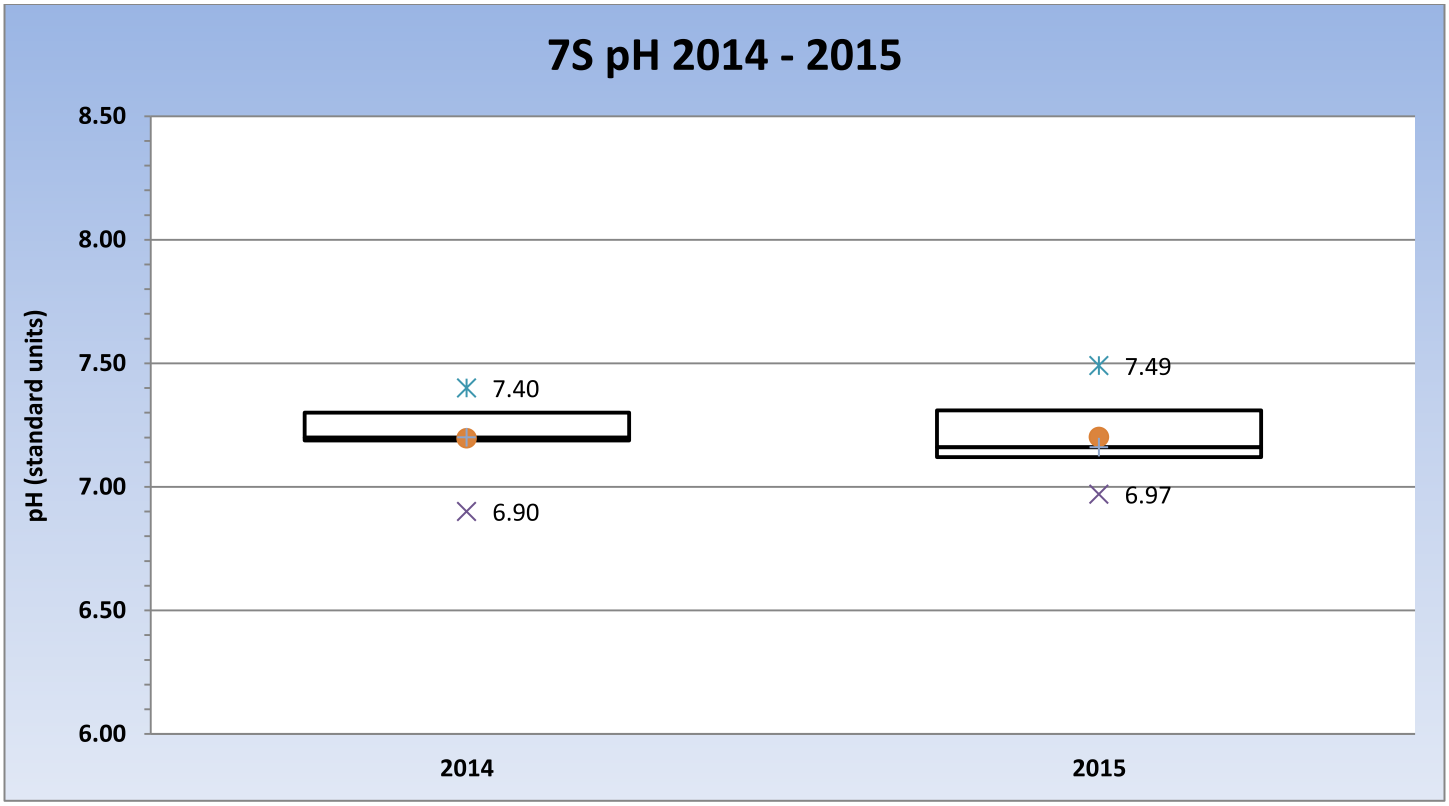

2S pH 2014 - 2015
8.50
8.00
7.50
7.00
6.50
6.00
pH (standard units)
7.30
6.80
7.3
6.65
2014
2015

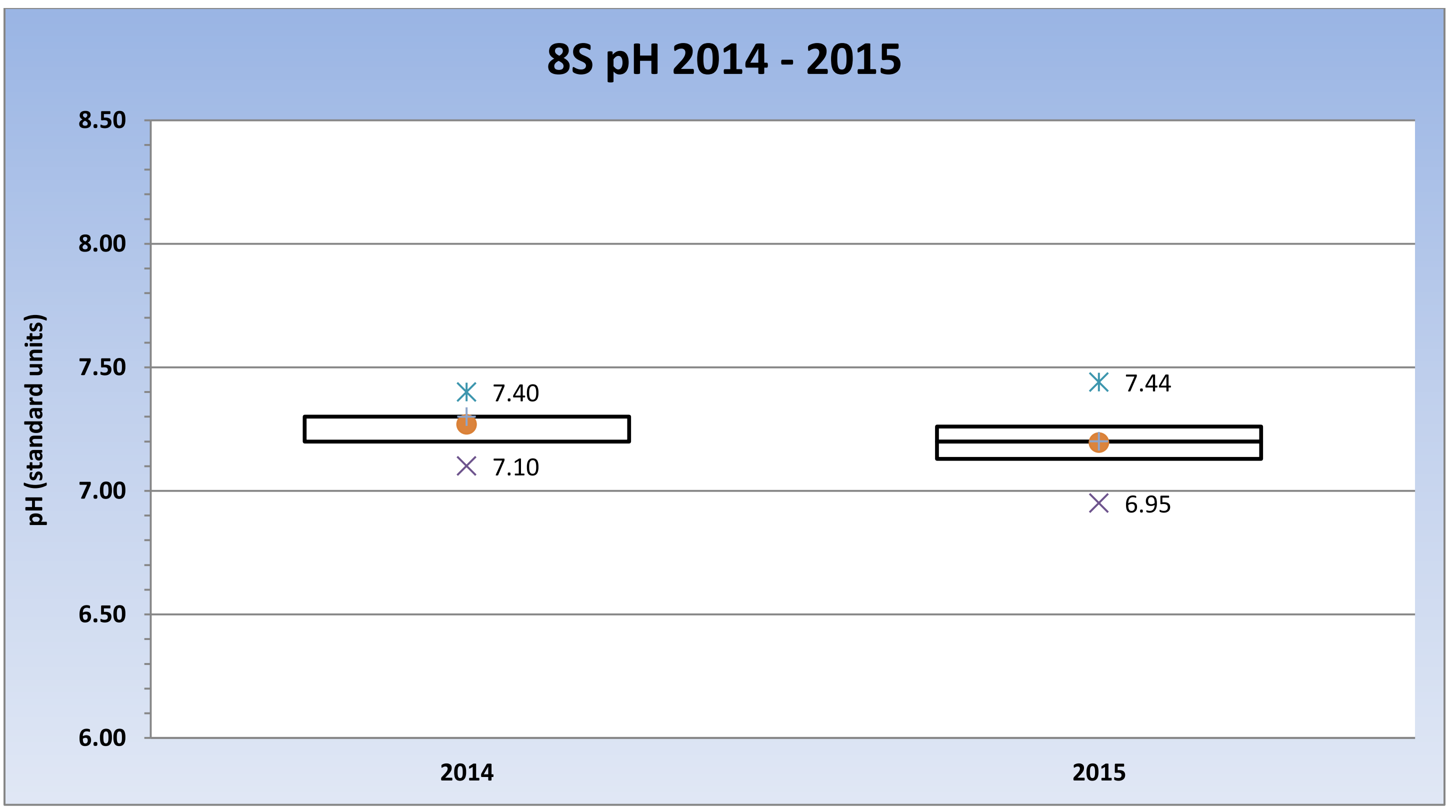

3S pH 2014 - 2015
pH (standard units)
8.50
8.00
7.50
7.00
6.50
6.00
7.50
7.20
7.51
7
2014
2015

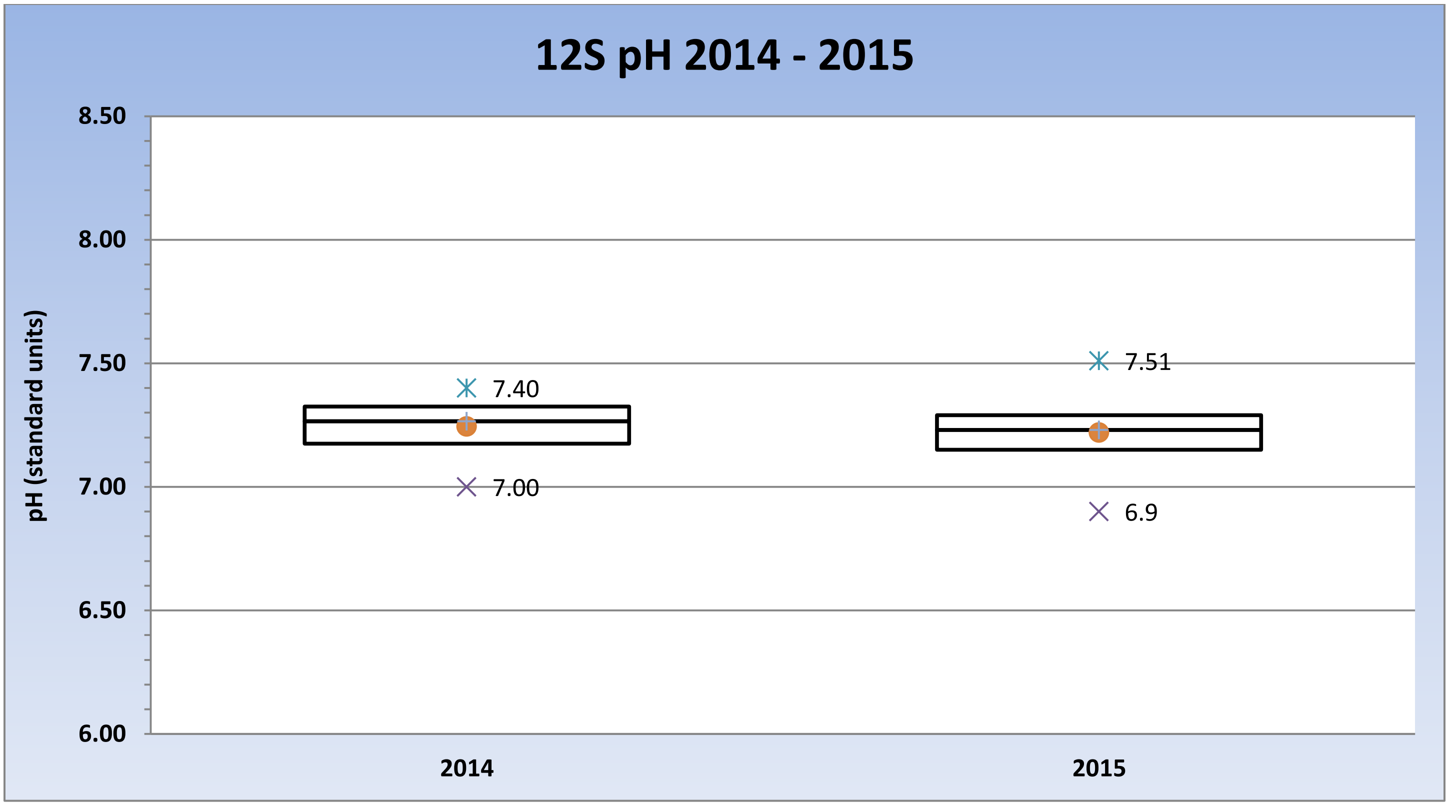

4S pH 2014 - 2015
pH (standard units)
8.50
8.00
7.50
7.00
6.50
6.00
7.70
7.10
7.84
7.08
2014
2015

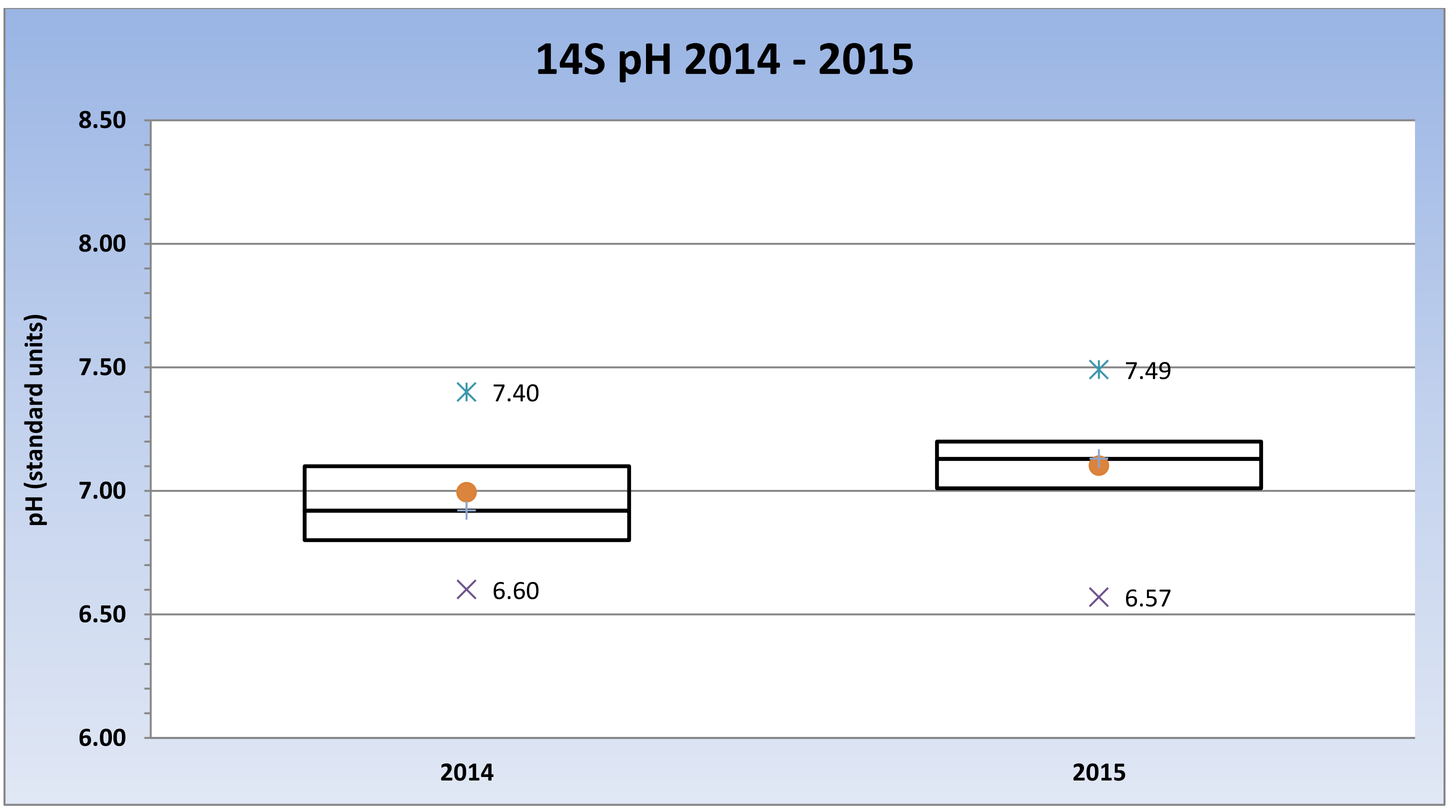

5S pH 2014 - 2015
pH (standard units)
8.50
8.00
7.50
7.00
6.50
6.00
7.60
6.70
7.62
6.78
2014
2015

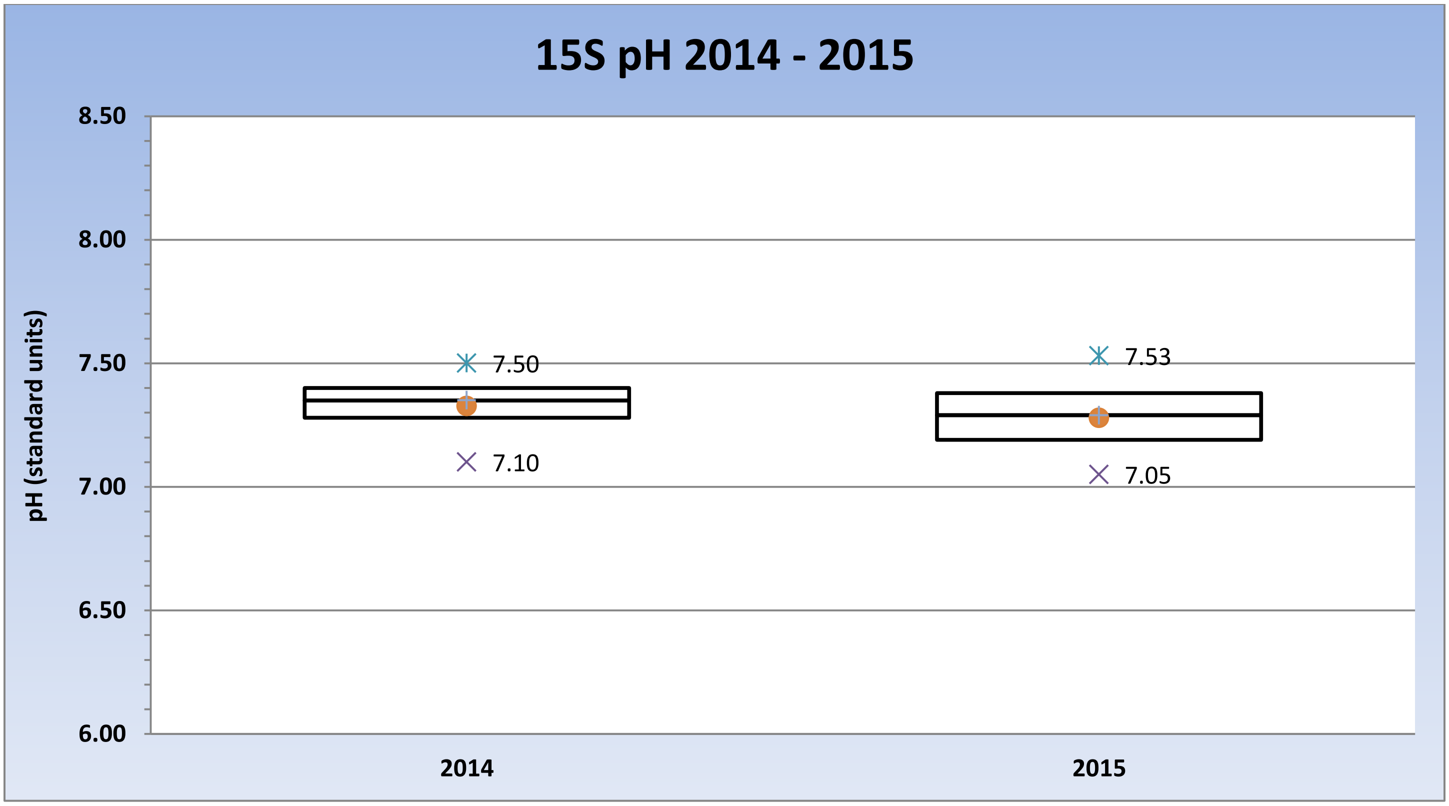

6S pH 2014 - 2015
pH (standard units)
8.50
8.00
7.50
7.00
6.50
6.00
7.30
6.70
7.24
6.4
2014
2015

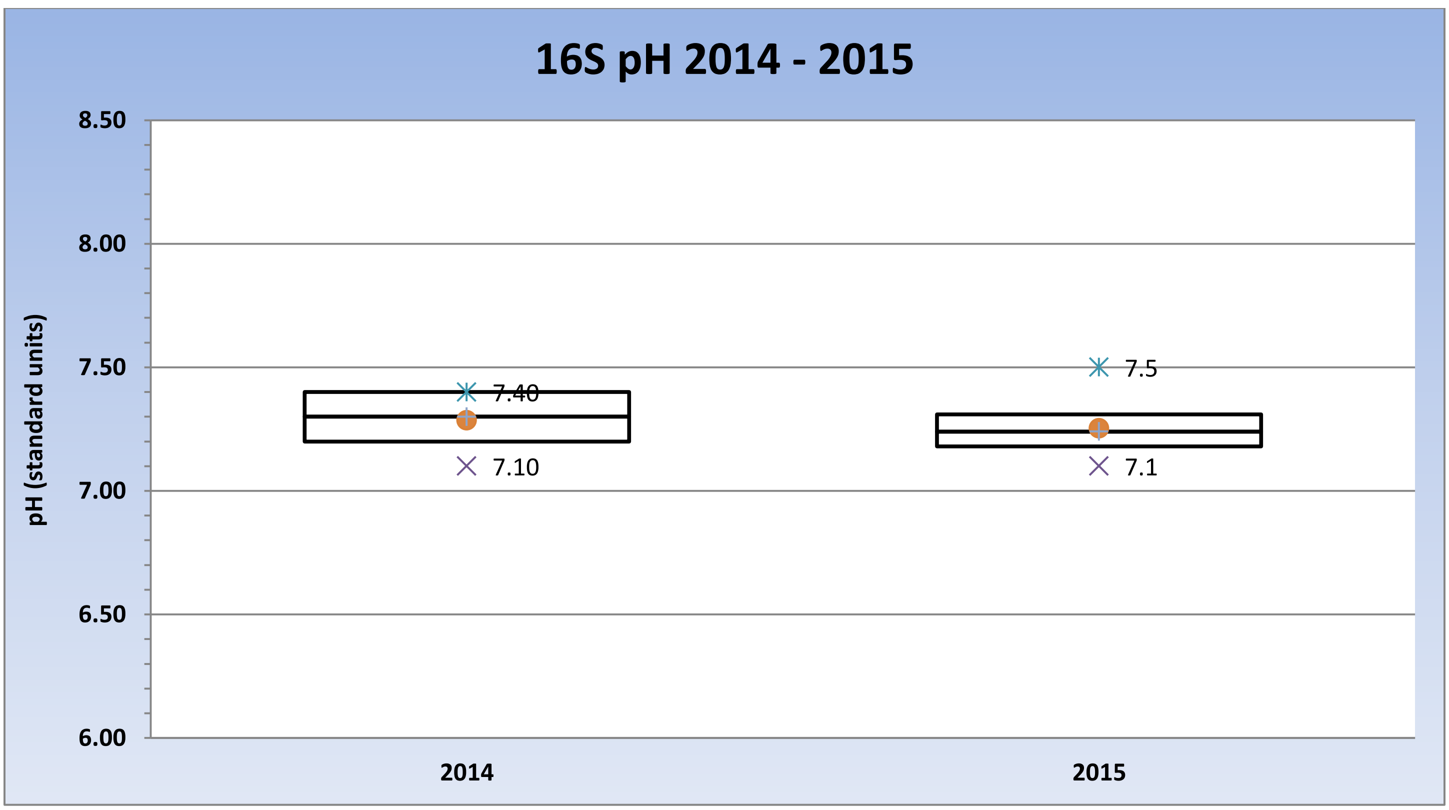

7S pH 2014 - 2015
8.50
8.00
7.50
7.00
6.50
6.00
pH (standard units)
7.40
6.90
7.49
6.97
2014
2015

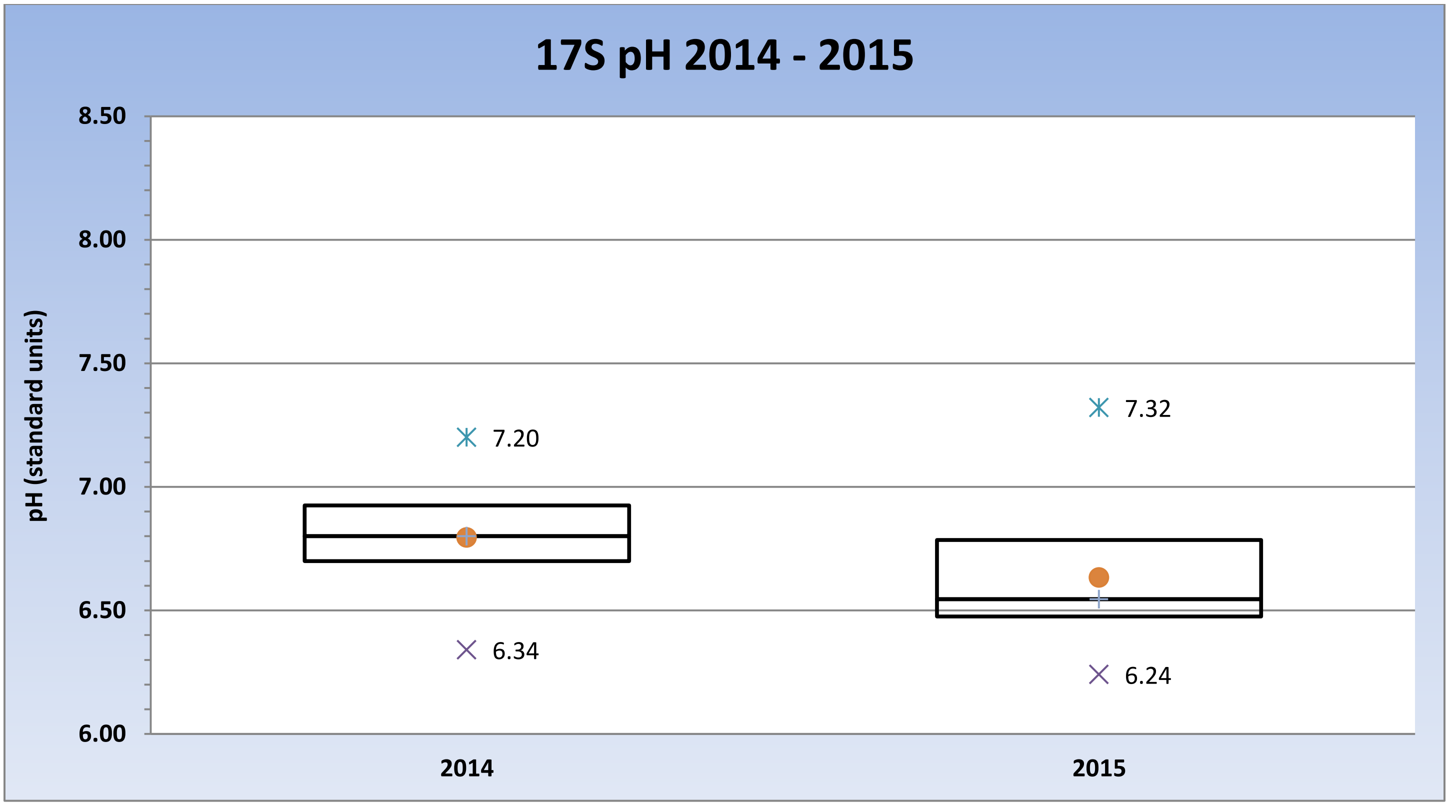

8S pH 2014 - 2015
8.50
8.00
7.50
7.00
6.50
6.00
pH (standard units)
7.40
7.10
7.44
6.95
2014
2015

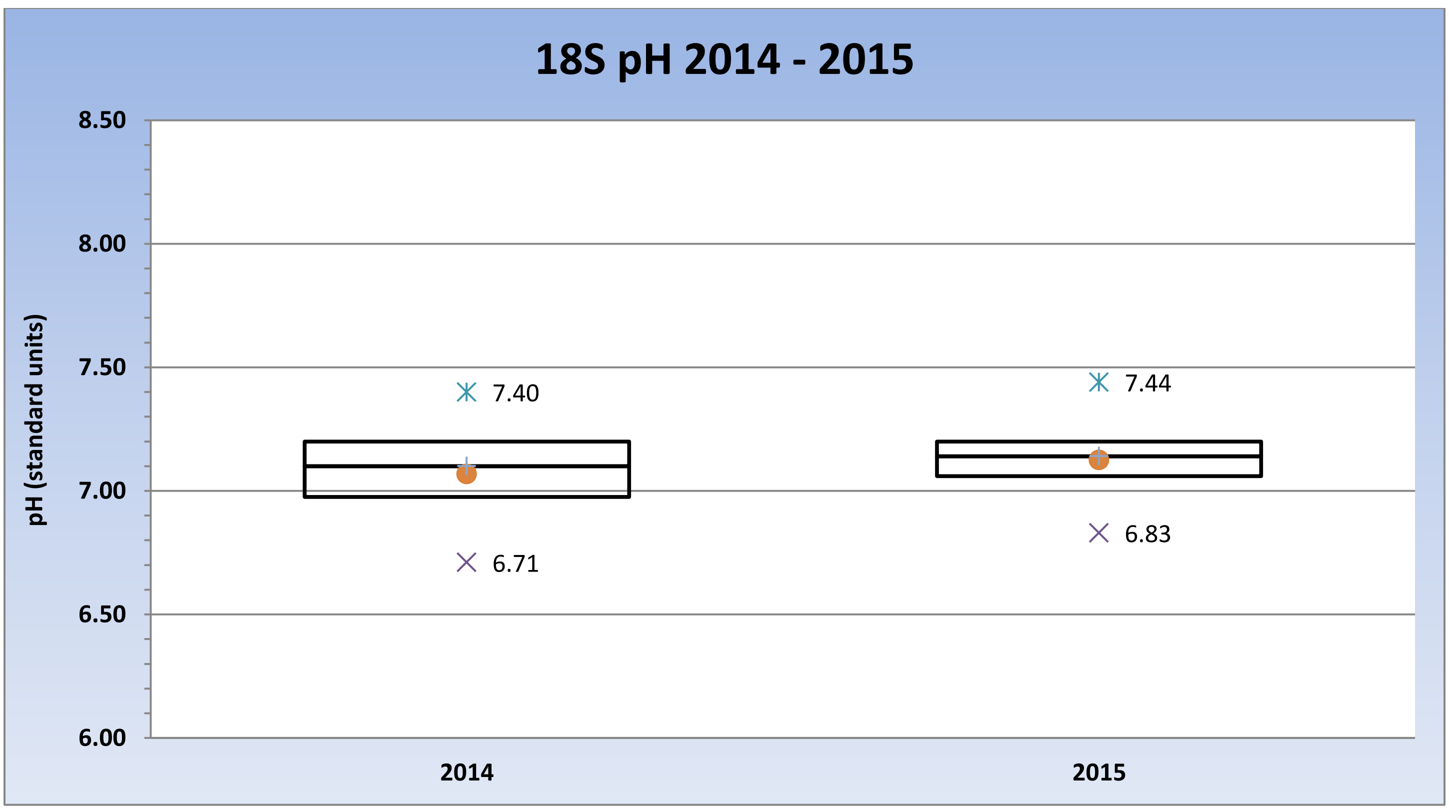

12S pH 2014 - 2015
pH (standard units)
8.50
8.00
7.50
7.00
6.50
6.00
7.40
7.00
7.51
6.9
2014
2015

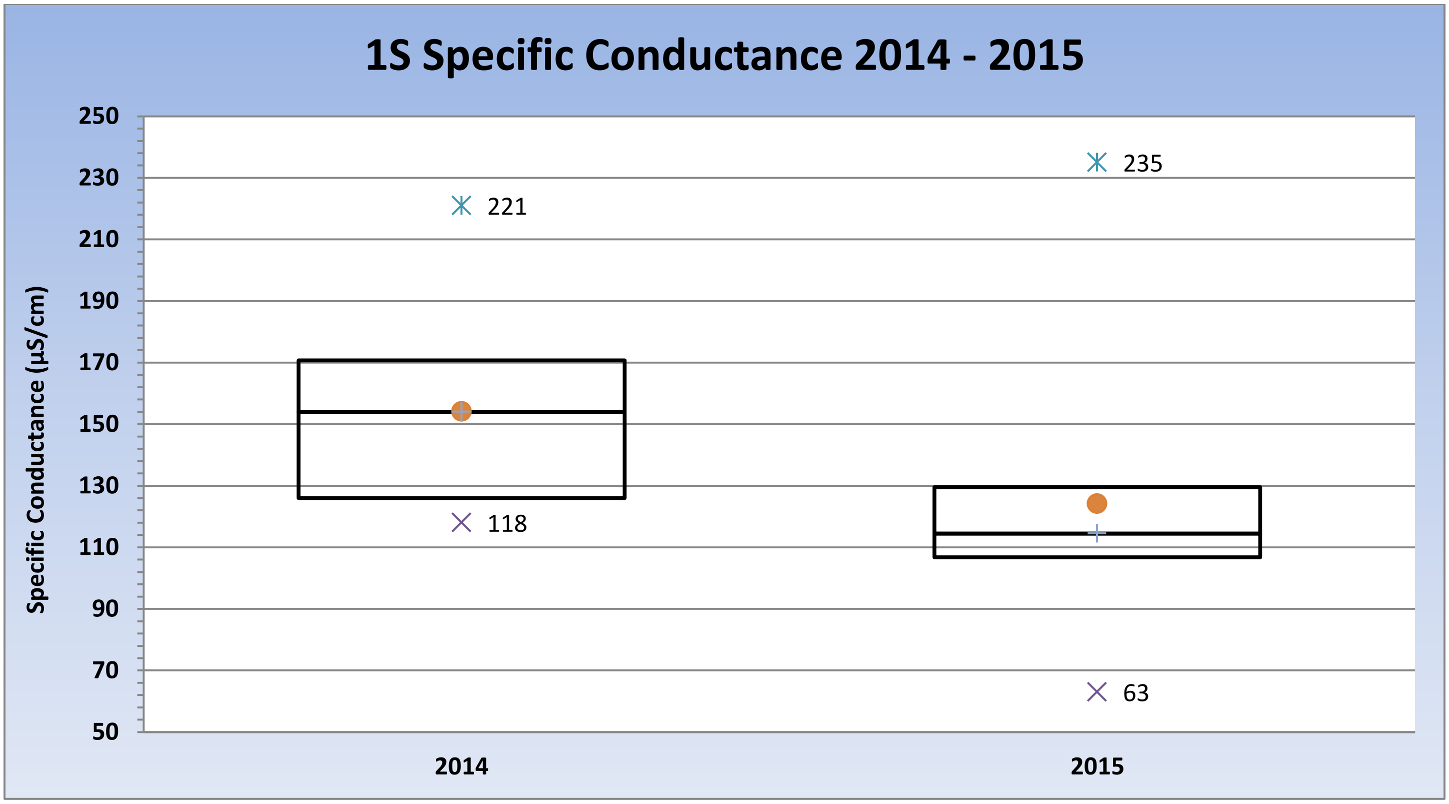

14S pH 2014 - 2015
pH (standard units)
8.50
8.00
7.50
7.00
6.50
6.00
7.40
6.60
7.49
6.57
2014
2015

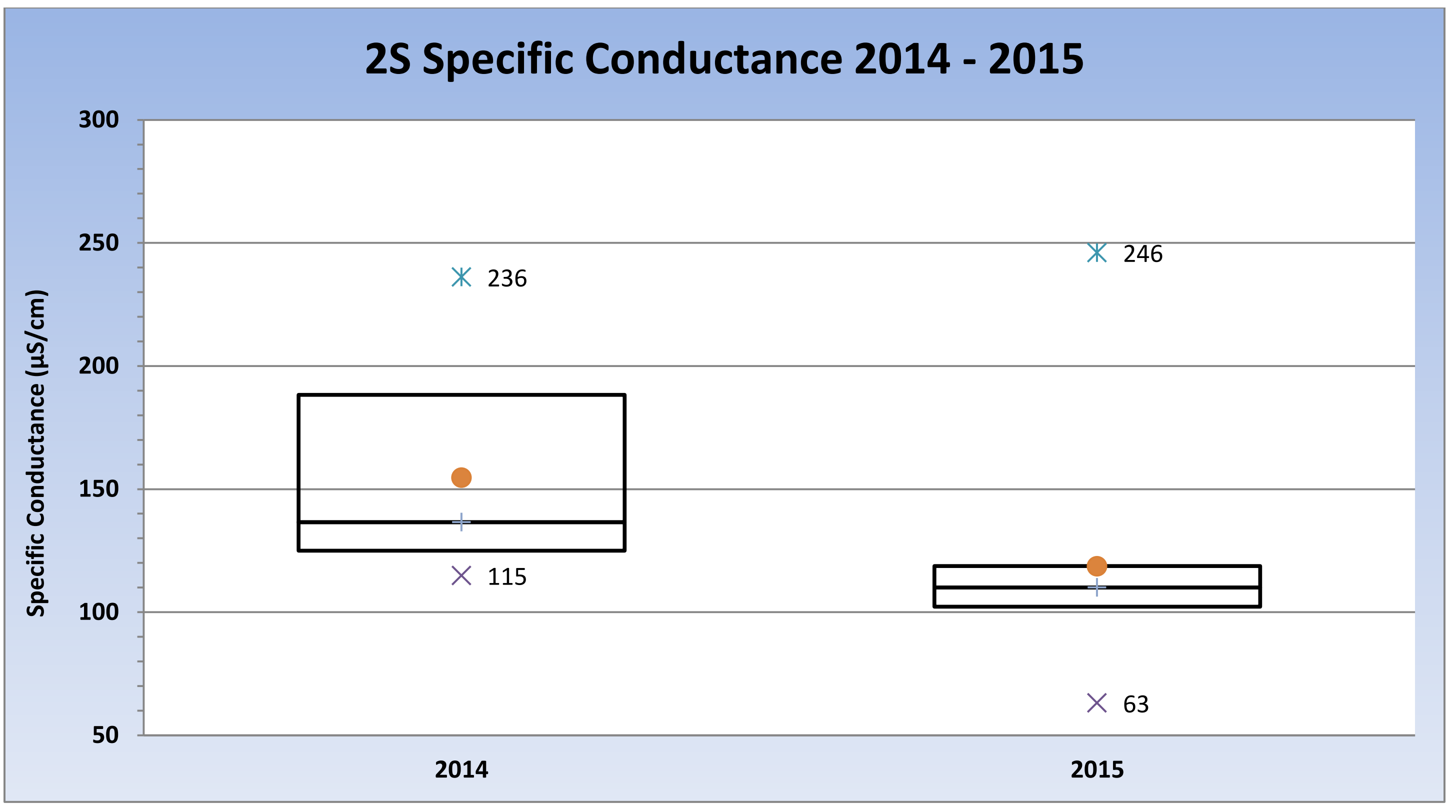

15S pH 2014 - 2015
pH (standard units)
8.50
8.00
7.50
7.00
6.50
6.00
7.50
7.10
7.53
7.05
2014
2015

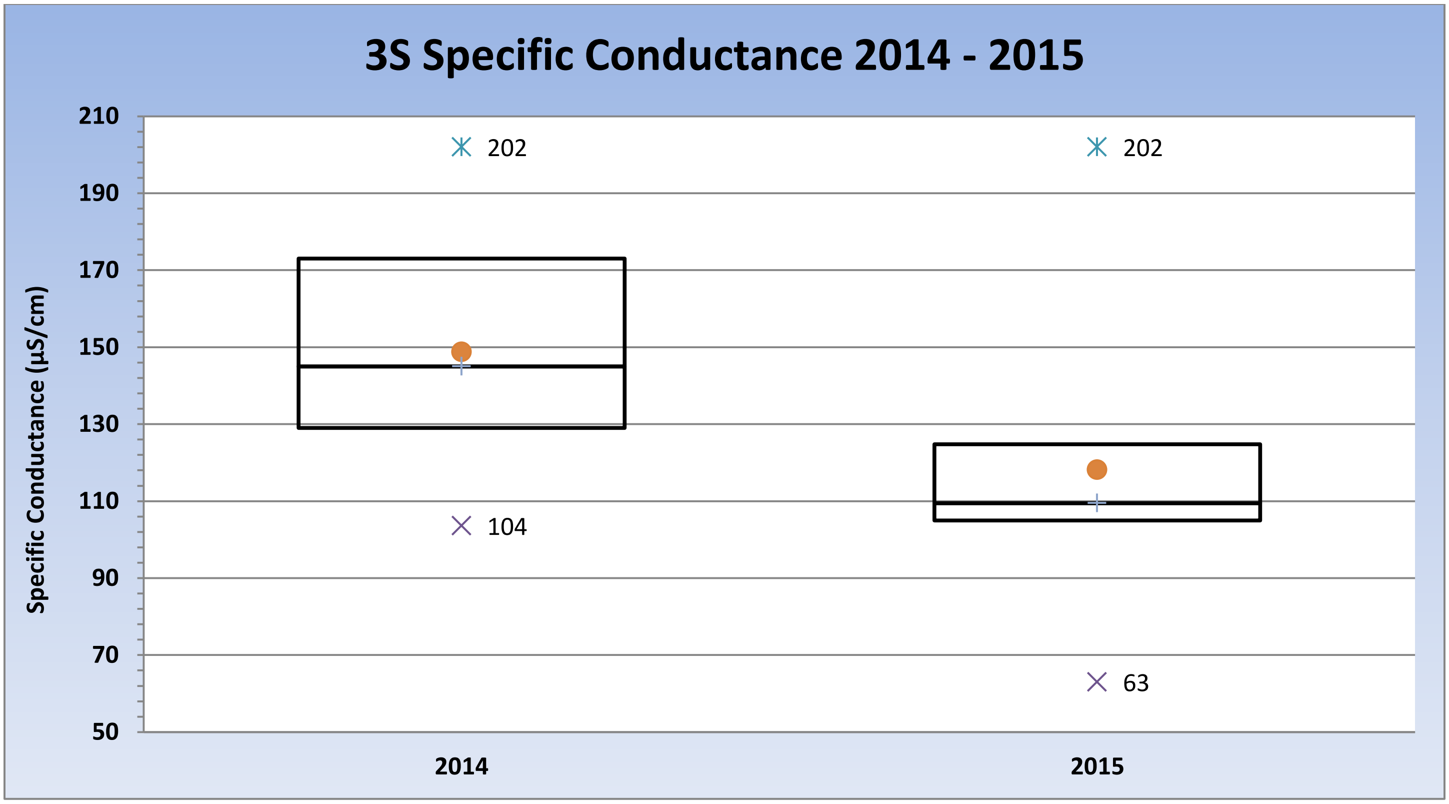

16S pH 2014 - 2015
pH (standard units)
8.50
8.00
7.50
7.00
6.50
6.00
7.40
7.10
7.5
7.1
2014
2015

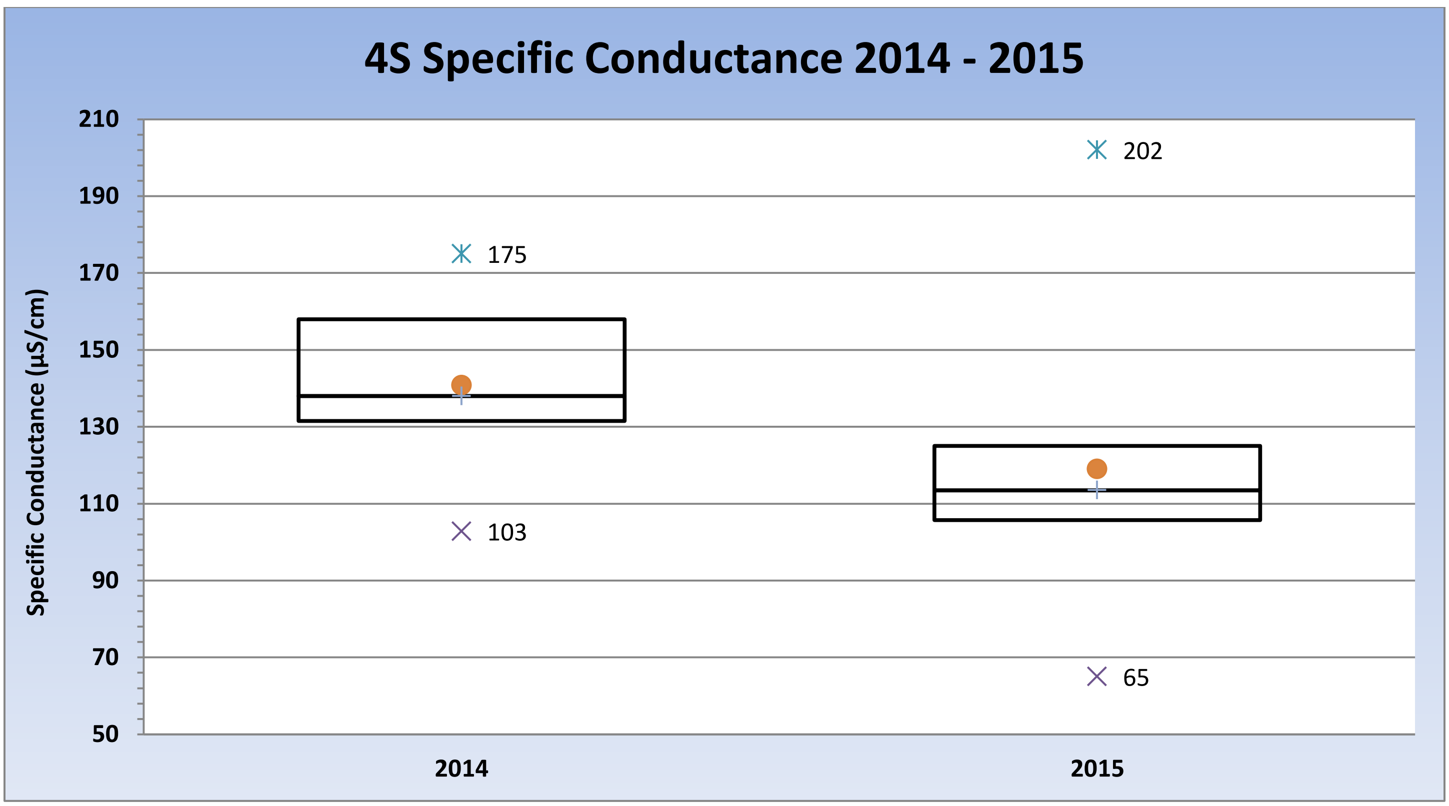

17S pH 2014 - 2015
pH (standard units)
8.50
8.00
7.50
7.00
6.50
6.00
7.20
6.34
7.32
6.24
2014
2015

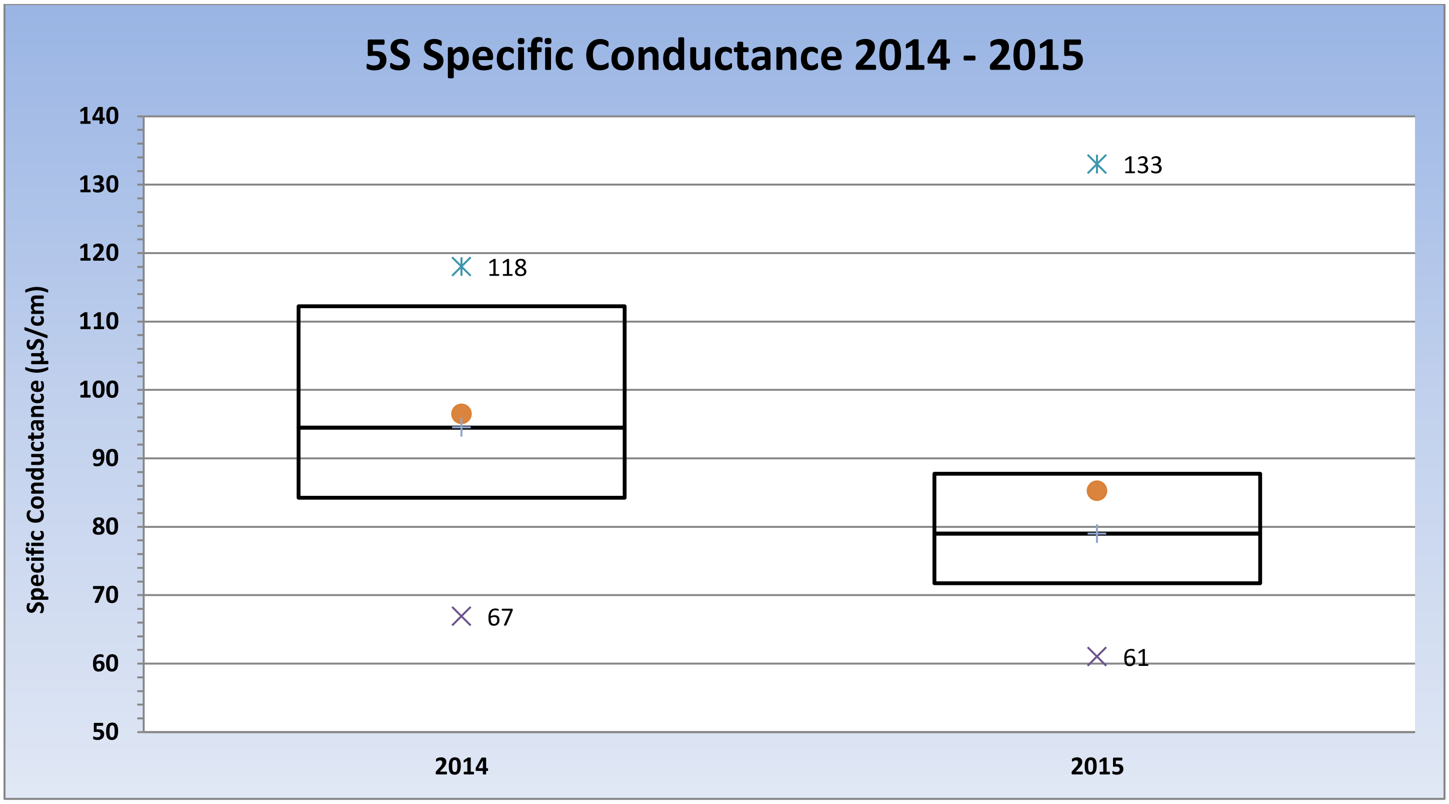

18S pH 2014 - 2015
pH (standard units)
8.50
8.00
7.50
7.00
6.50
6.00
7.40
6.71
7.44
6.83
2014
2015

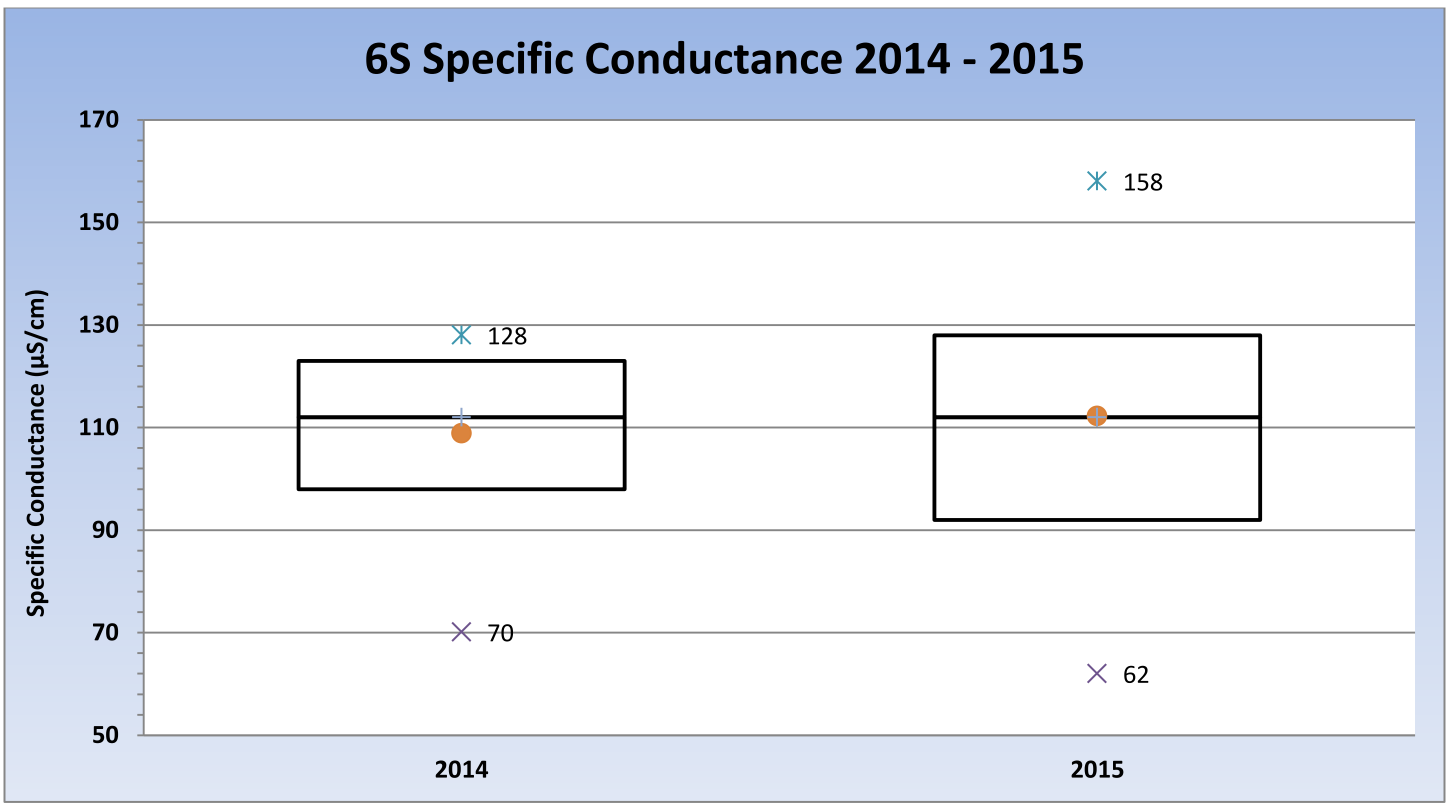

1S Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
250
230
210
190
170
150
130
110
90
70
50
221
118
235
63
2014
2015

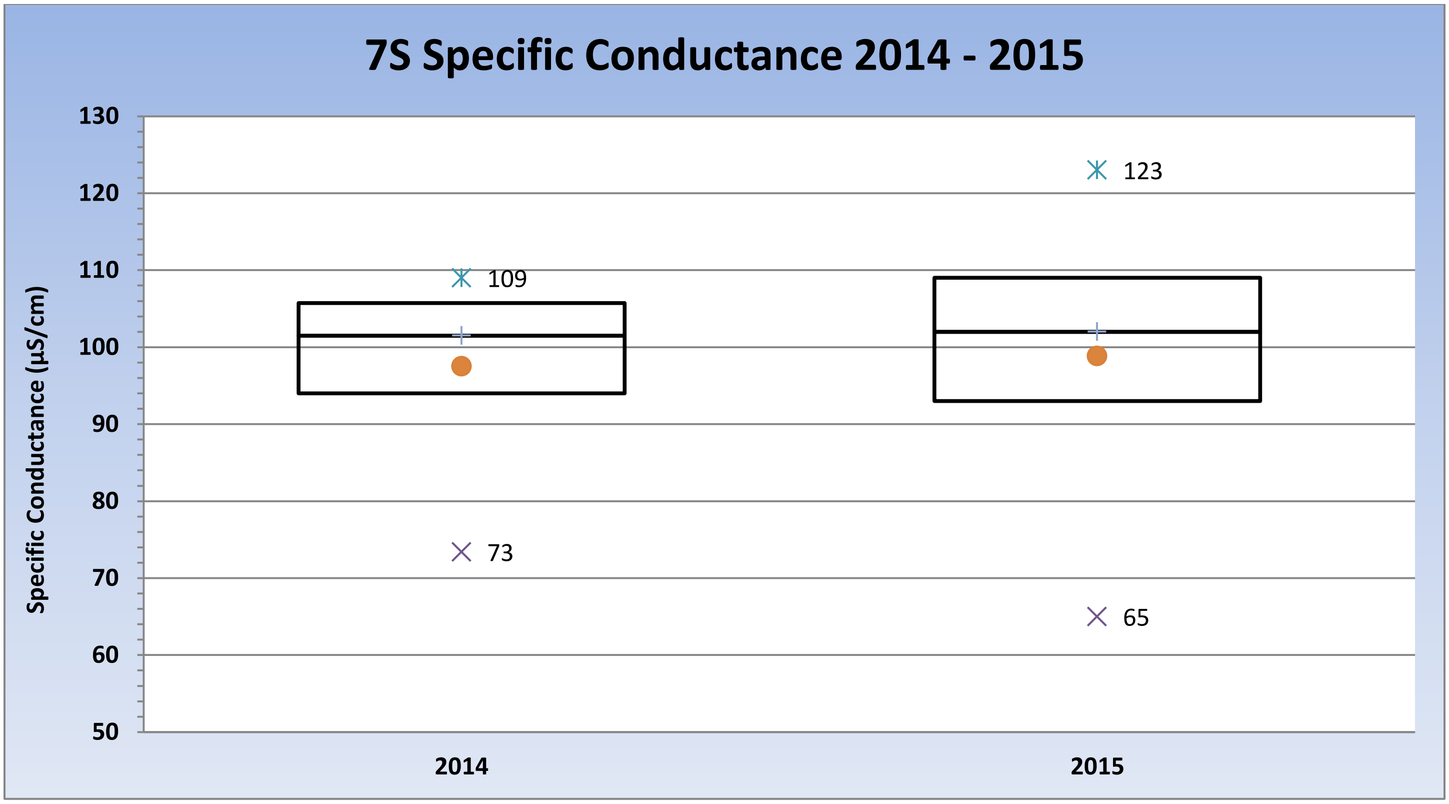

2S Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
300
250
200
150
100
50
236
115
246
63
2014
2015

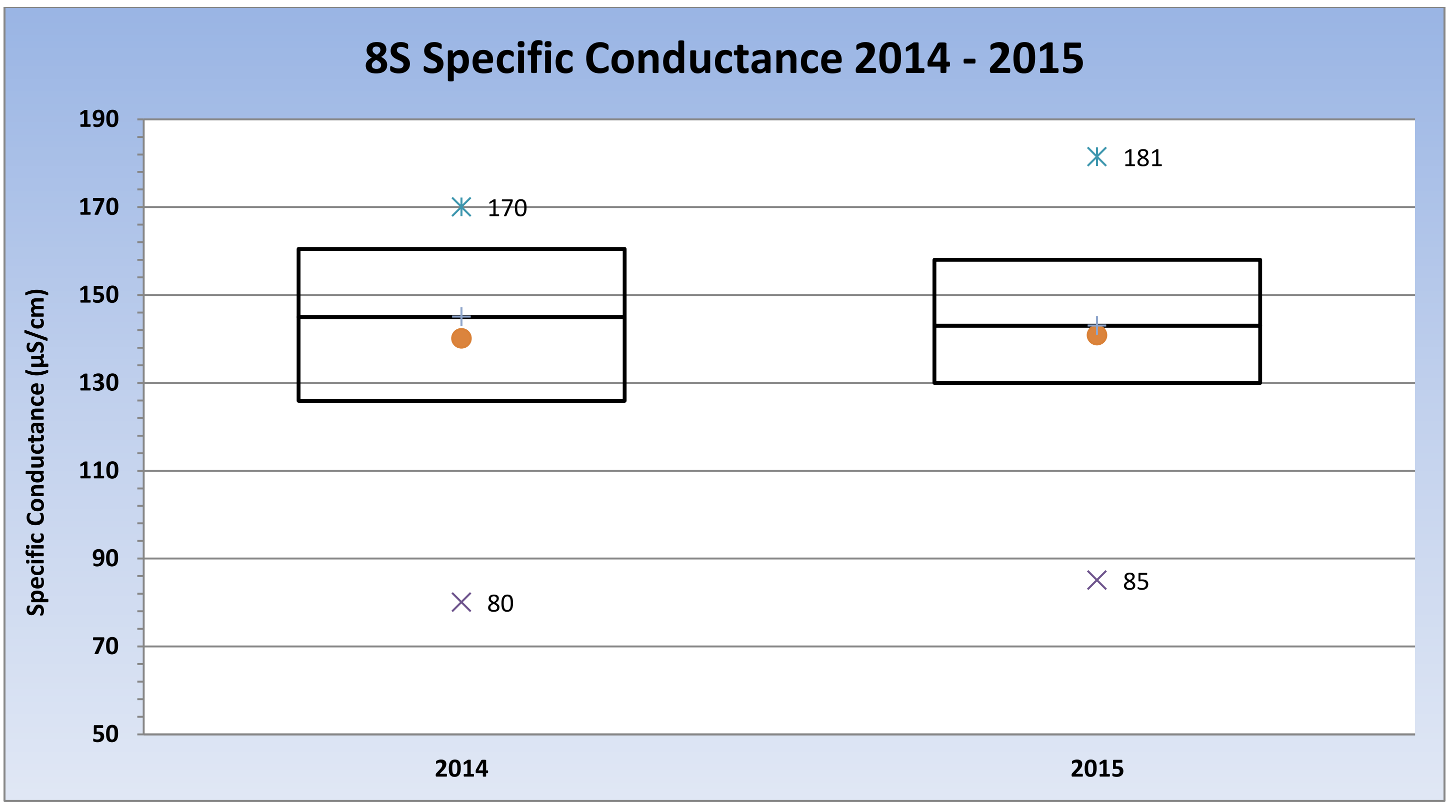

3S Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
210
190
170
150
130
110
90
70
50
202
104
202
63
2014
2015

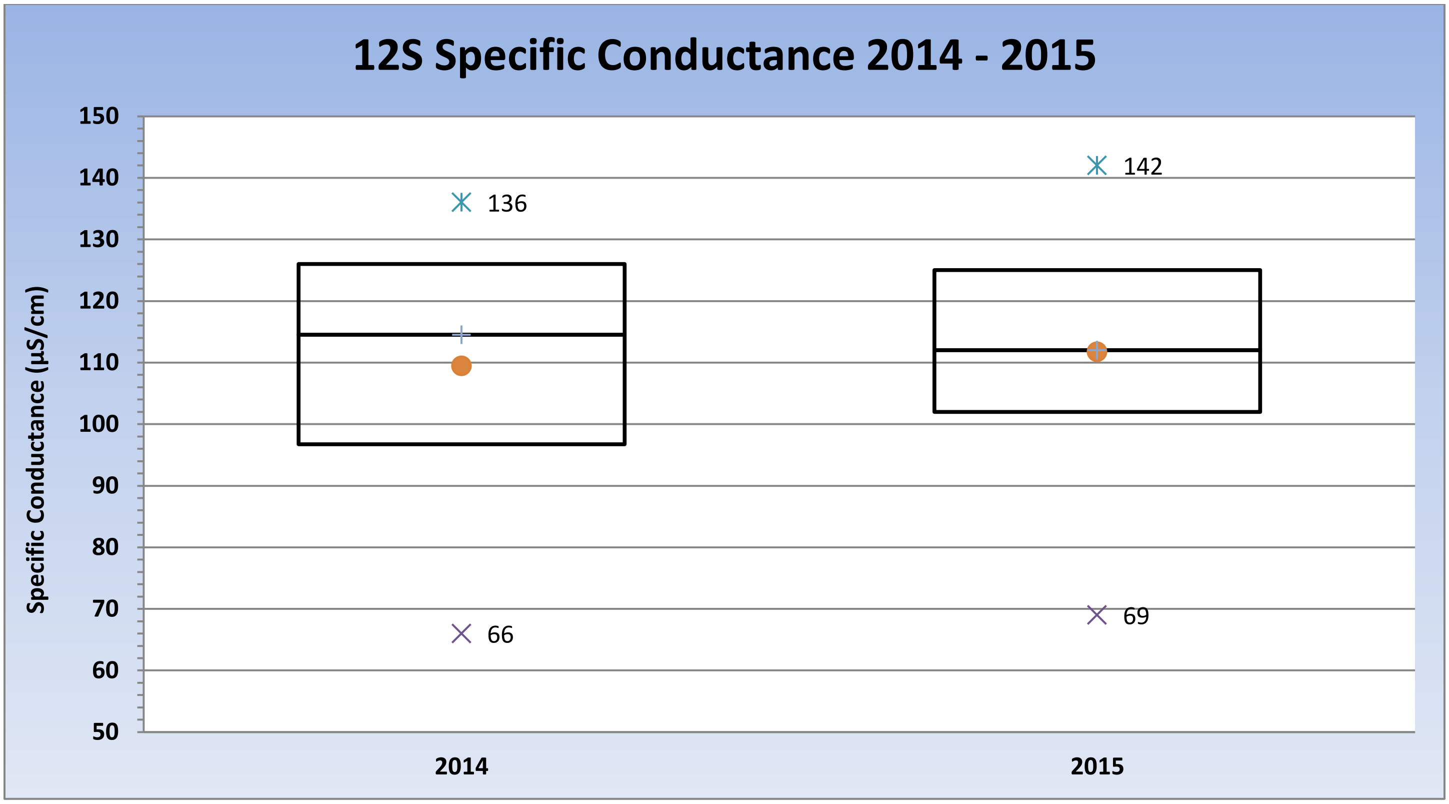

4S Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
210
190
170
150
130
110
90
70
50
175
103
202
65
2014
2015

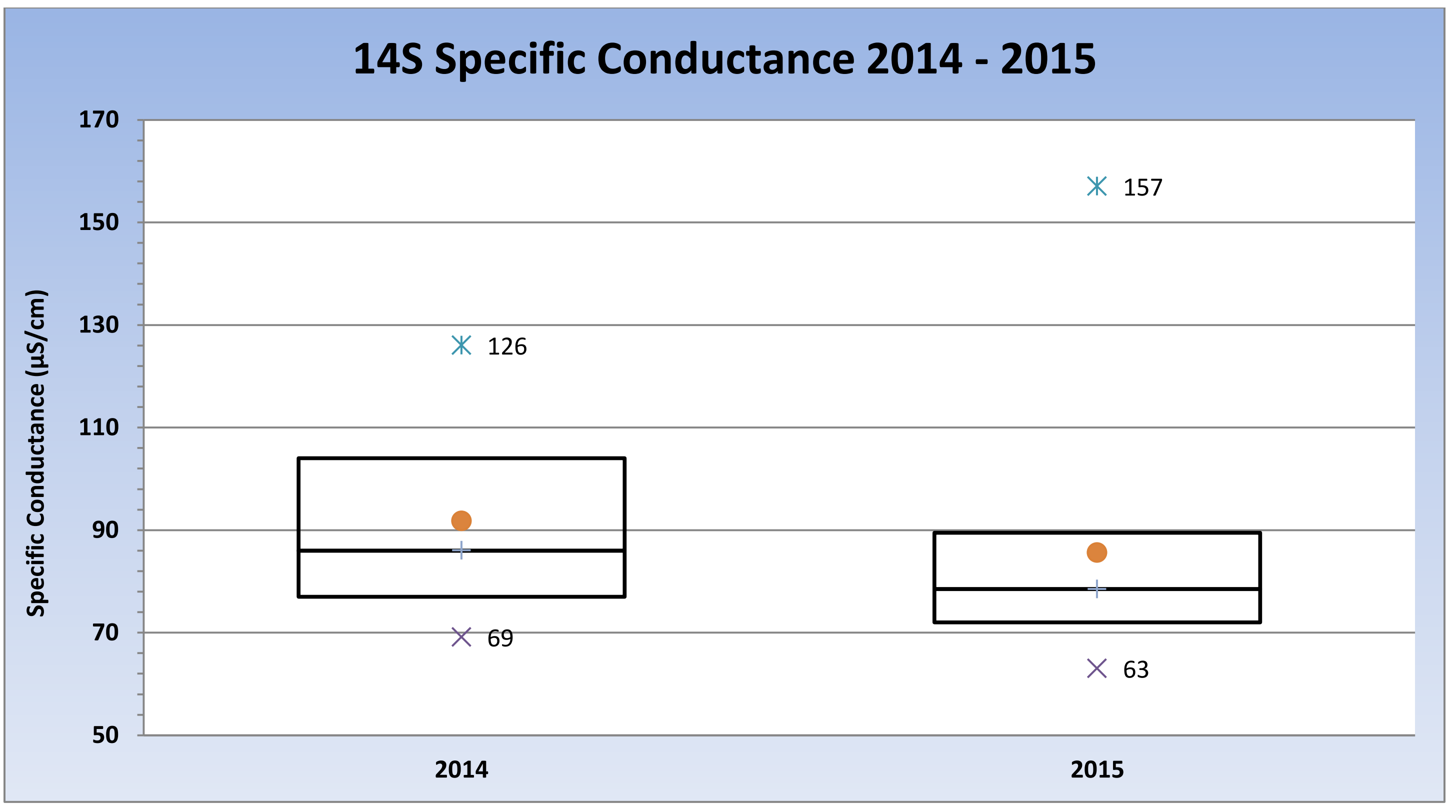

5S Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
140
130
120
110
100
90
80
70
60
50
118
67
133
61
2014
2015

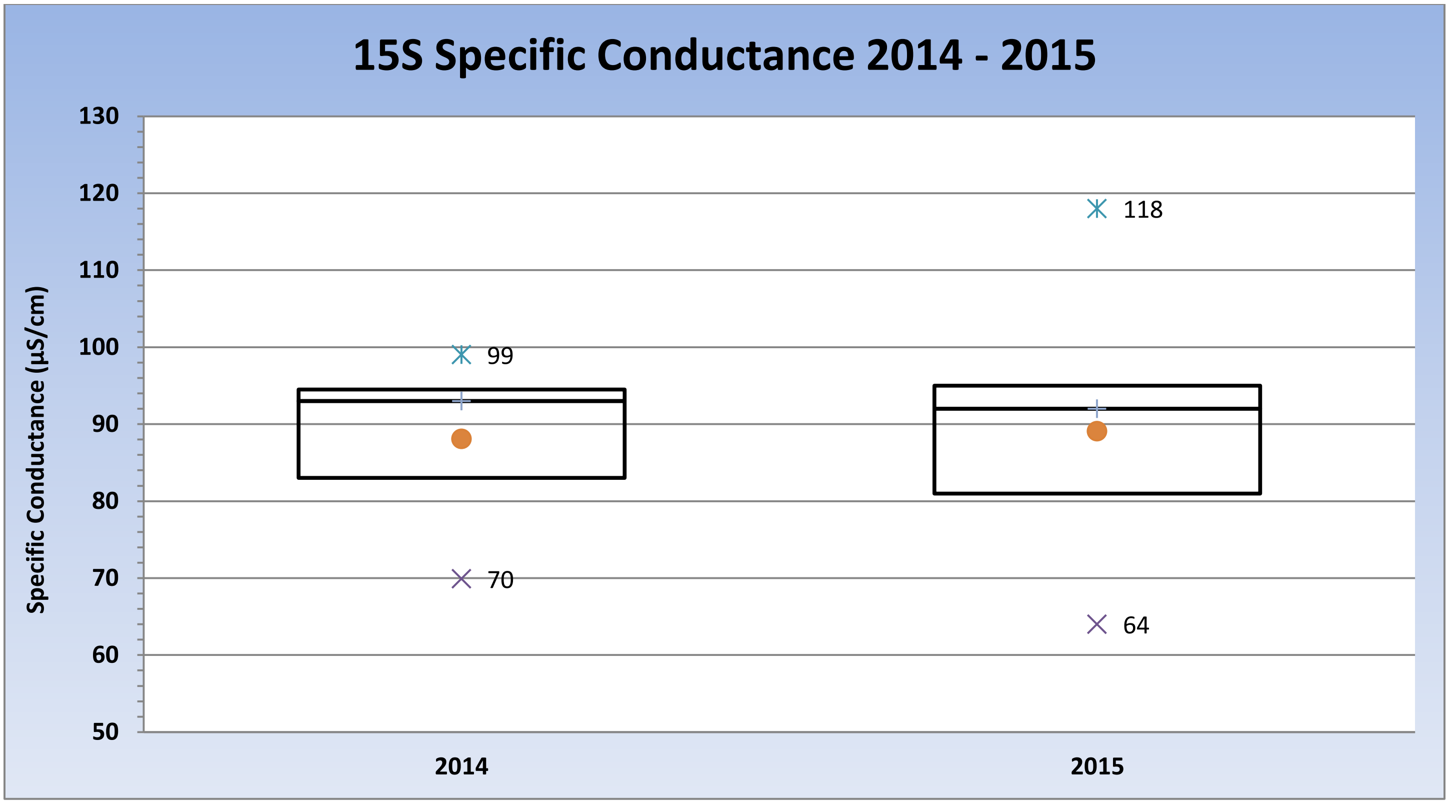

6S Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
170
150
130
110
90
70
50
128
70
158
62
2014
2015

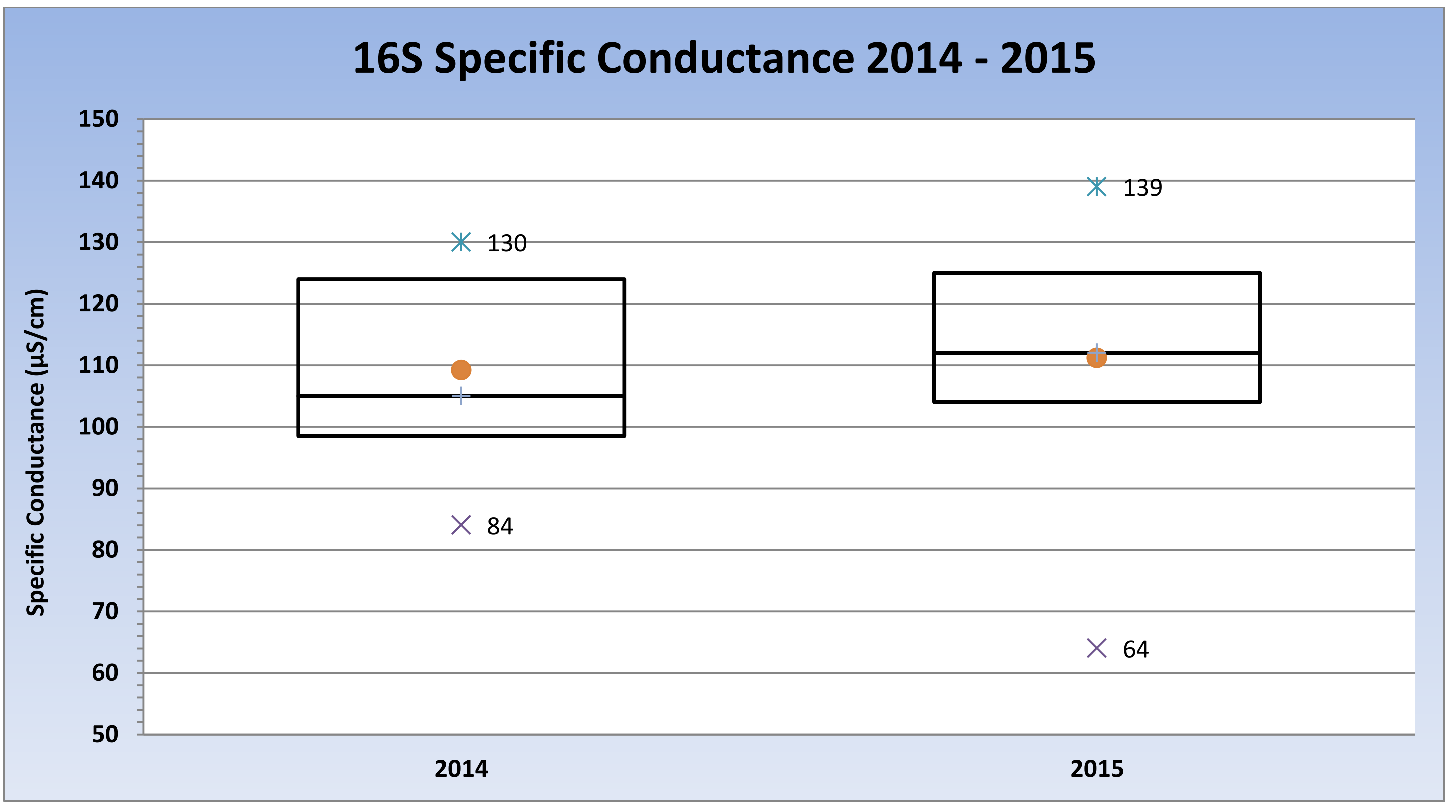

7S Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
130
120
110
100
90
80
70
60
50
109
73
123
65
2014
2015

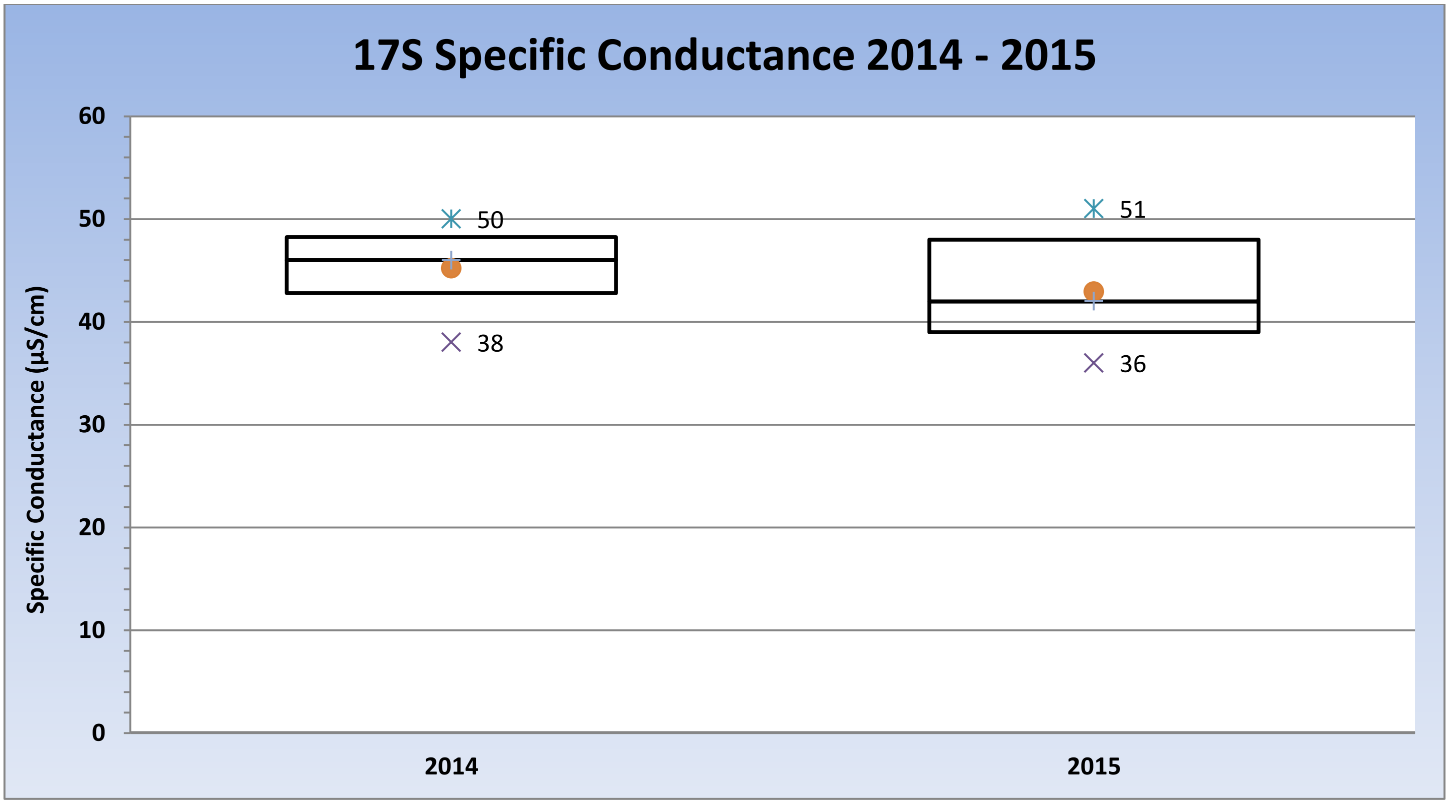

8S Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
190
170
150
130
110
90
70
50
170
80
181
85
2014
2015

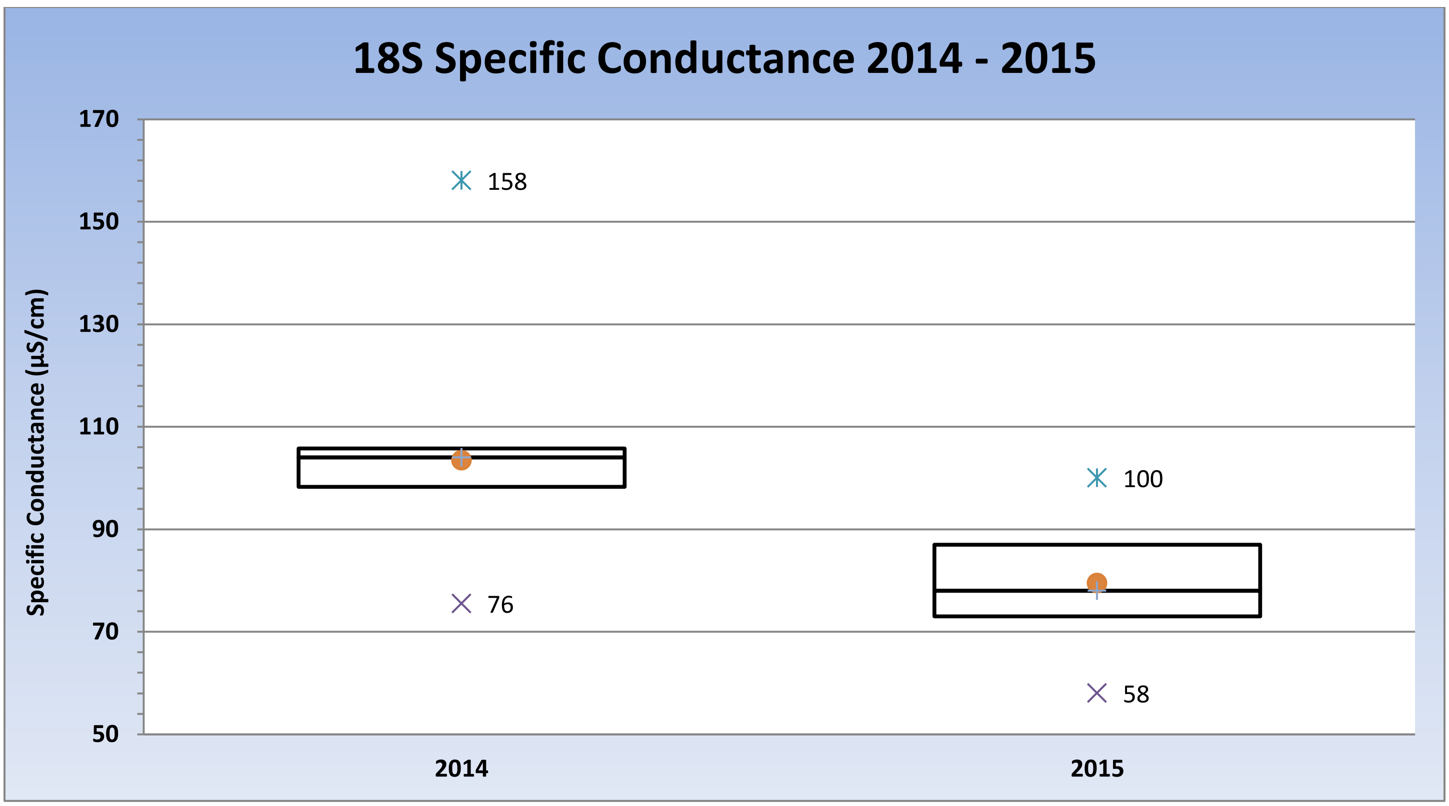

12S Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
150
140
130
120
110
100
90
80
70
60
50
136
66
142
69
2014
2015

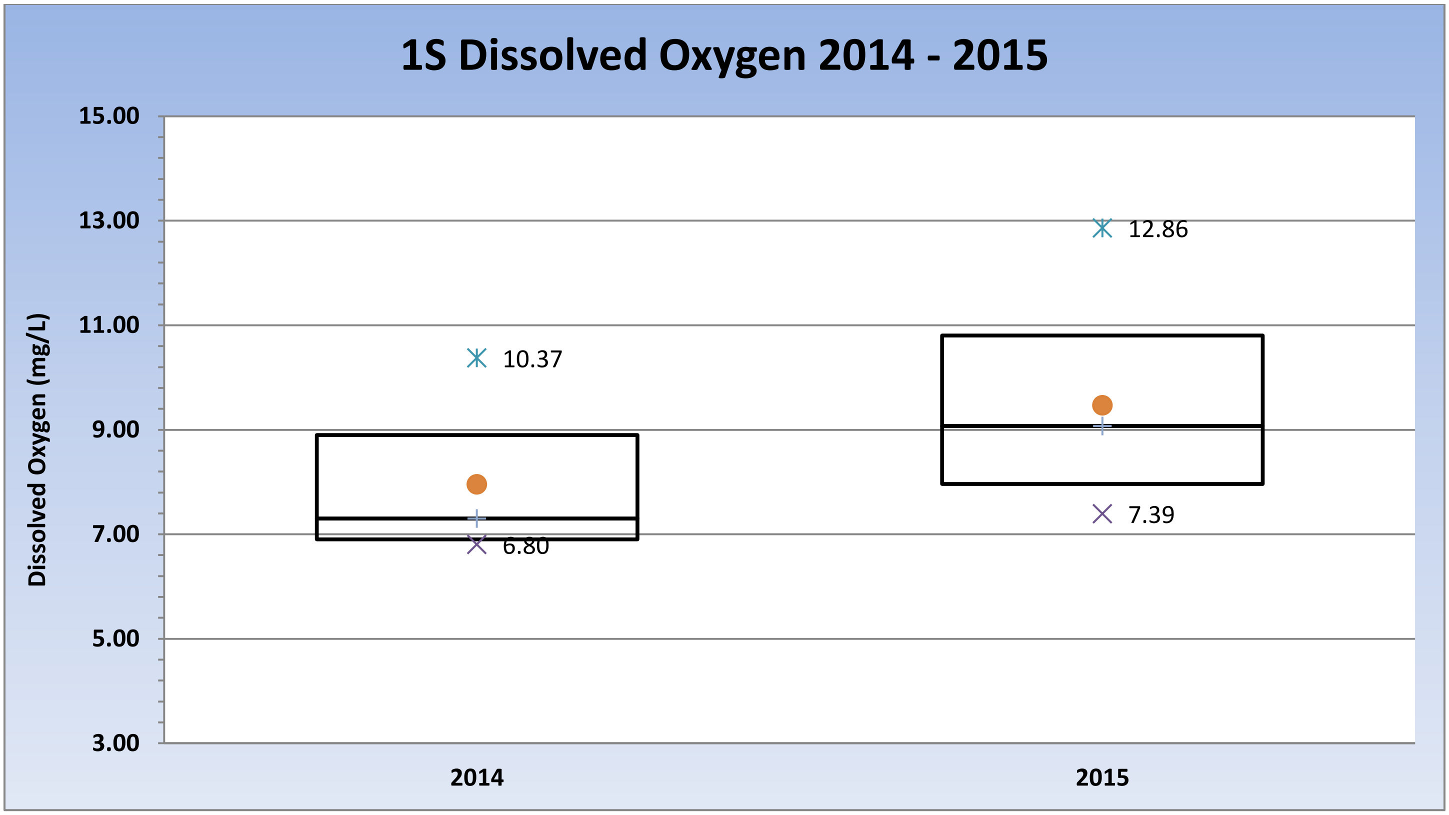

14S Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
170
150
130
110
90
70
50
126
69
157
63
2014
2015

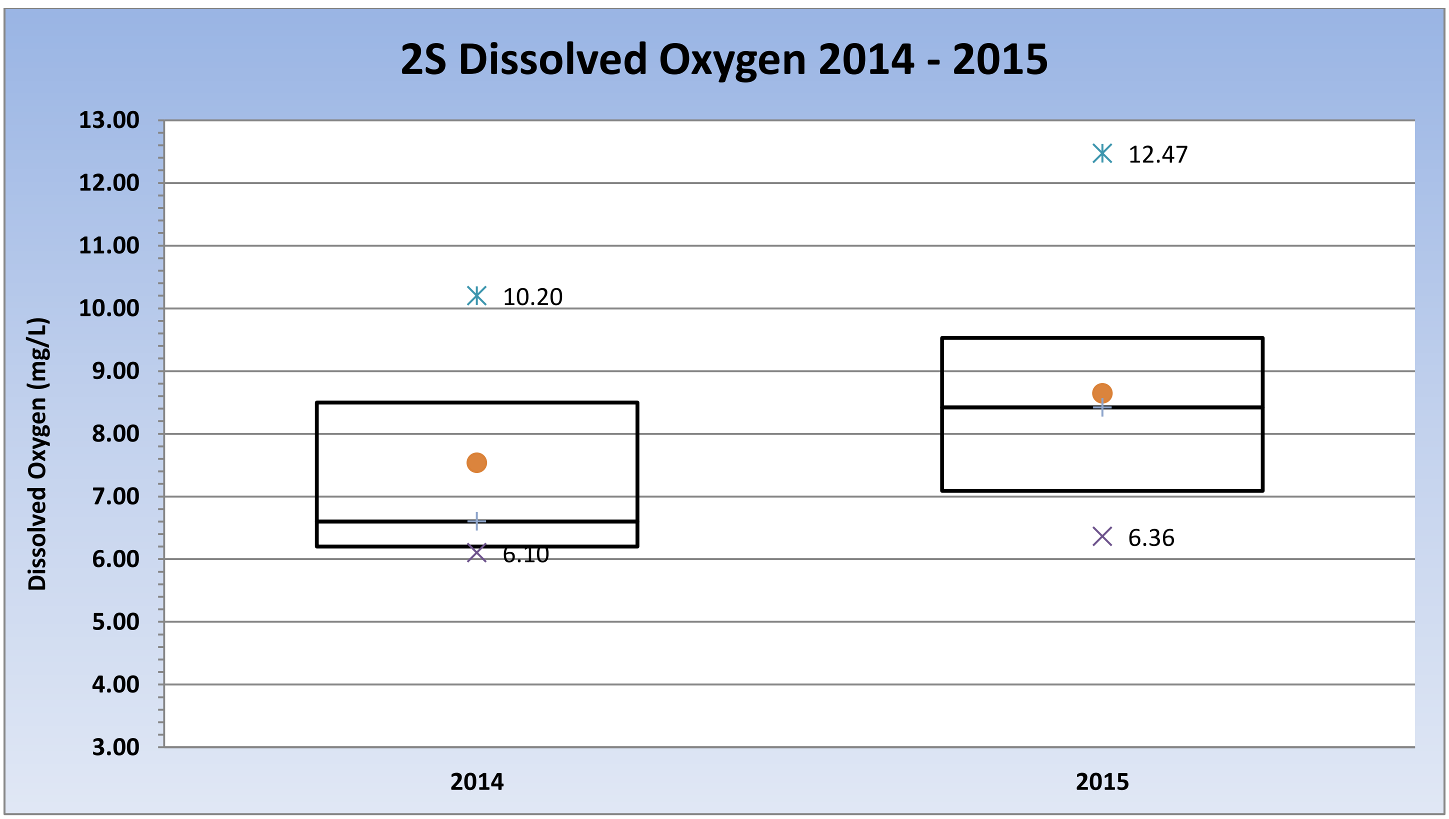

15S Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
130
120
110
100
90
80
70
60
50
99
70
118
64
2014
2015

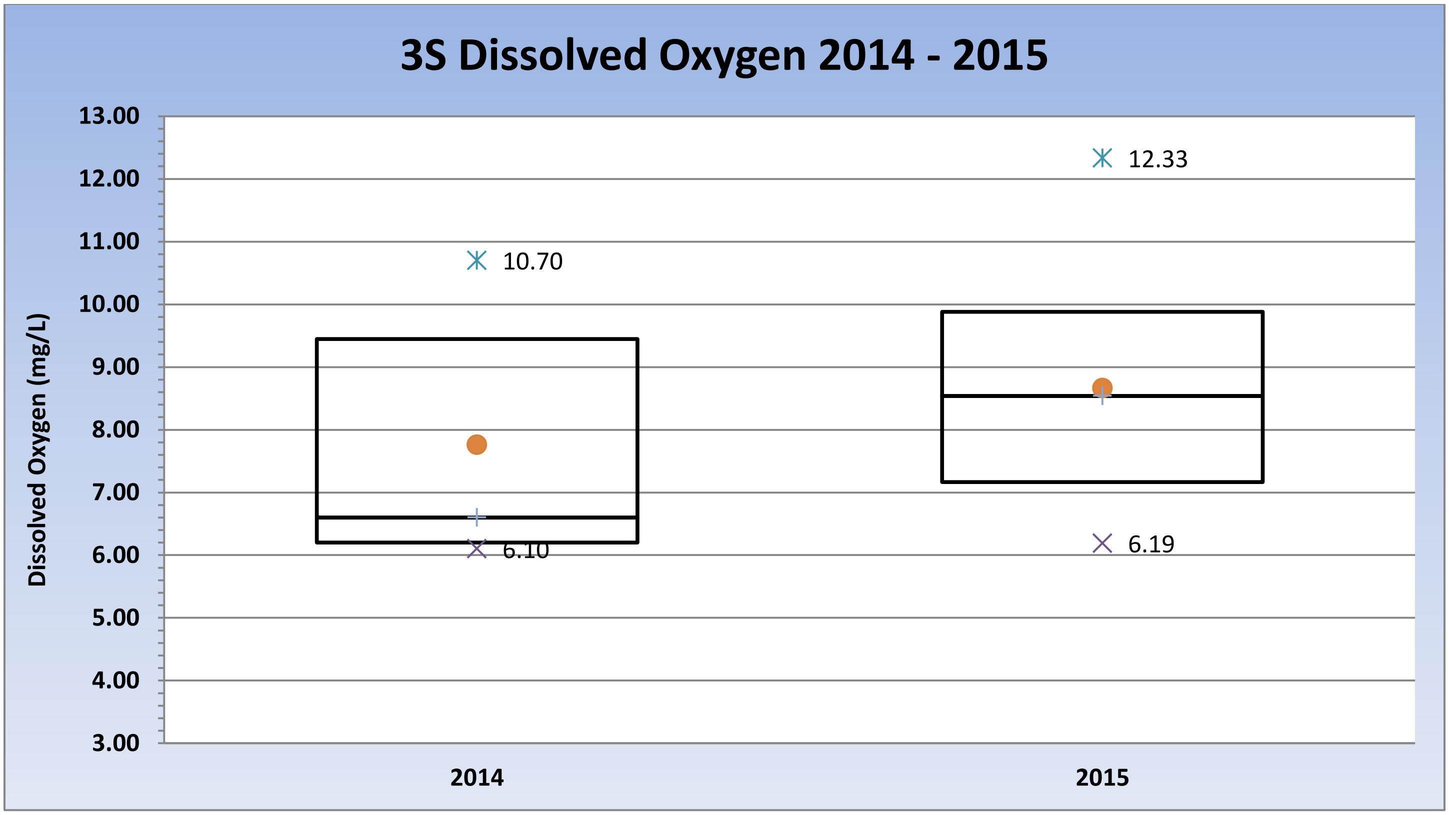

16S Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
150
140
130
120
110
100
90
80
70
60
50
130
84
139
64
2014
2015

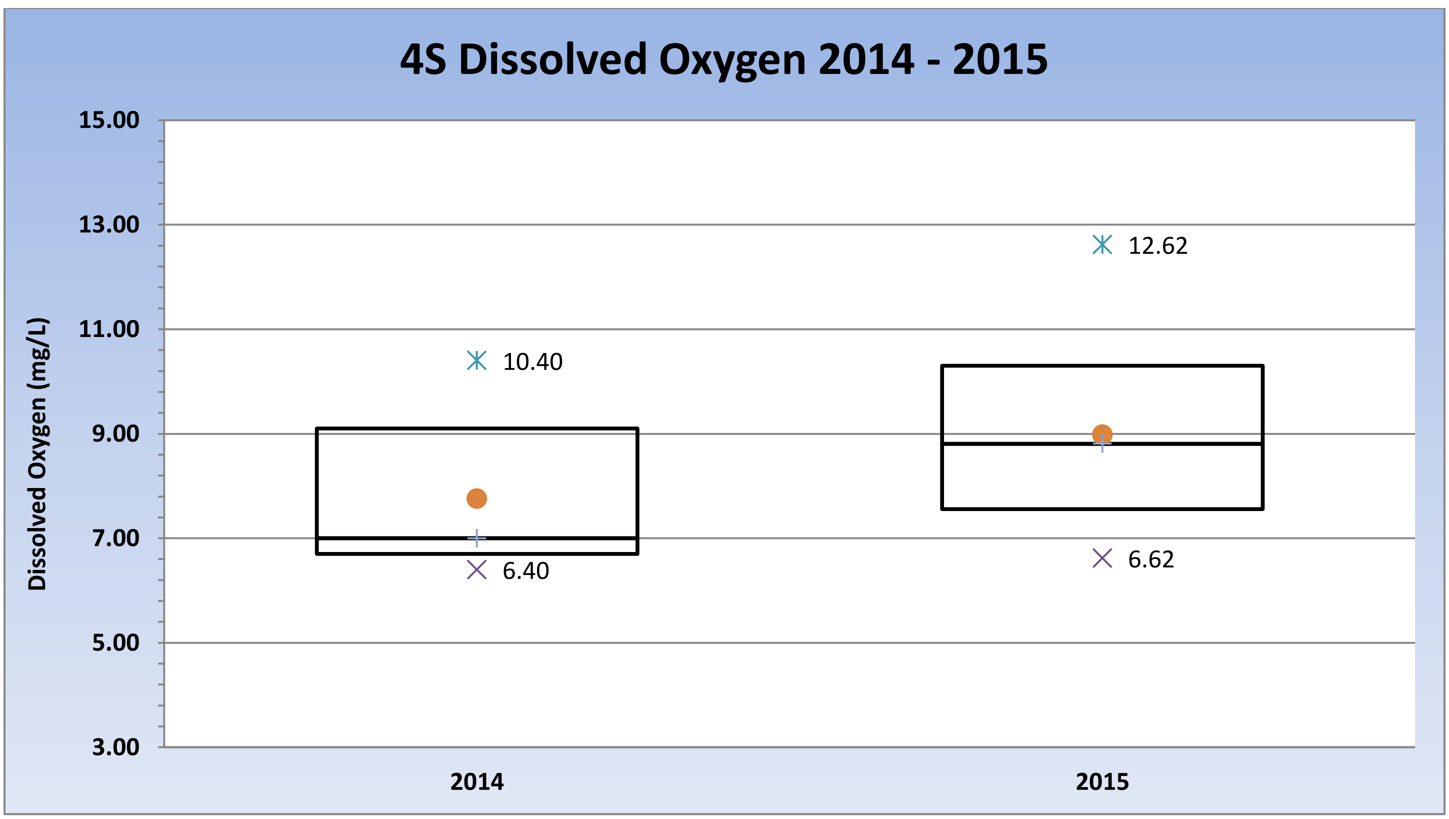

17S Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
60
50
40
30
20
10
0
50
38
51
36
2014
2015

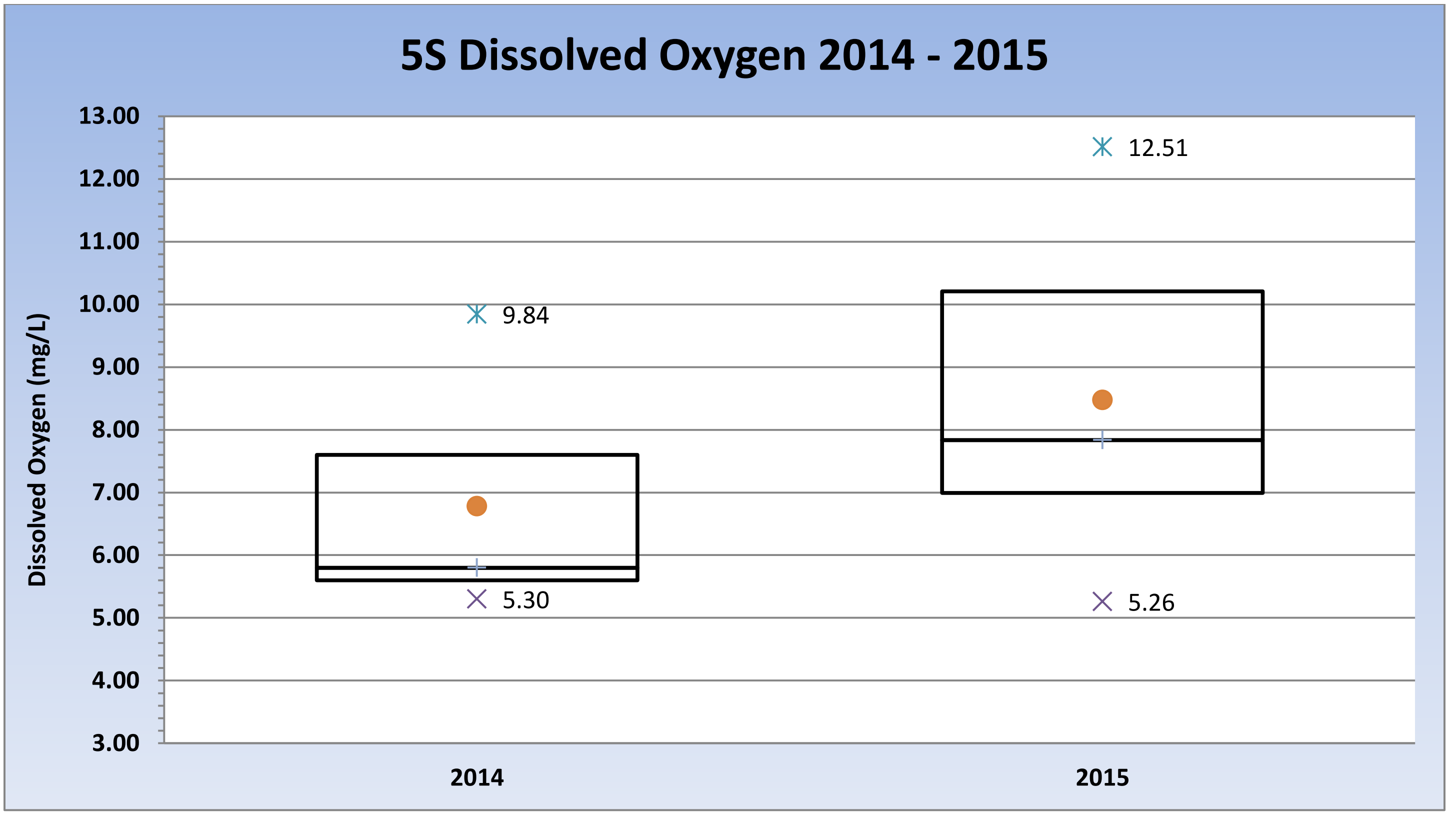

18S Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
170
150
130
110
90
70
50
158
76
100
58
2014
2015

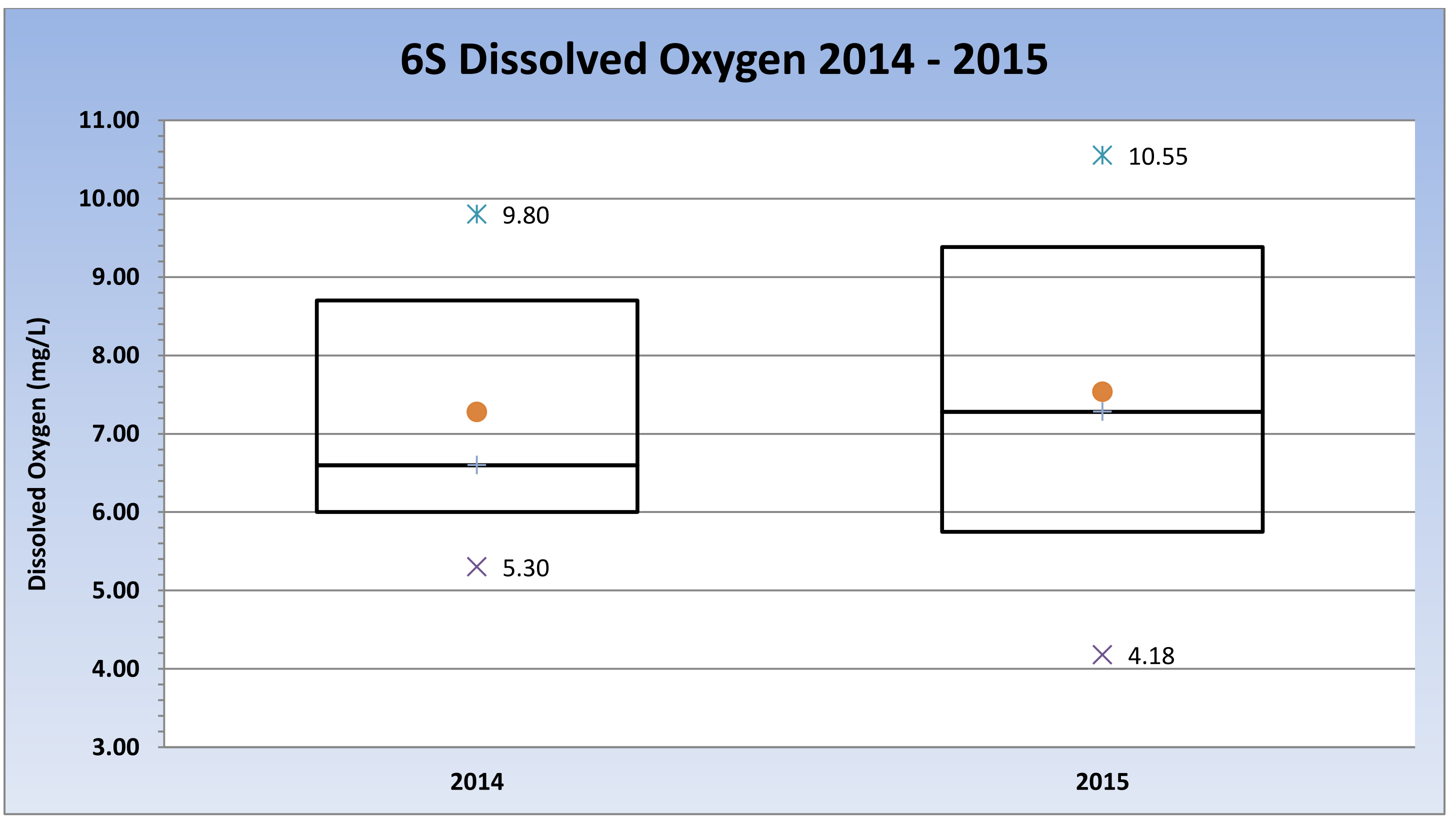

1S Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
15.00
13.00
11.00
9.00
7.00
5.00
3.00
10.37
6.80
12.86
7.39
2014
2015

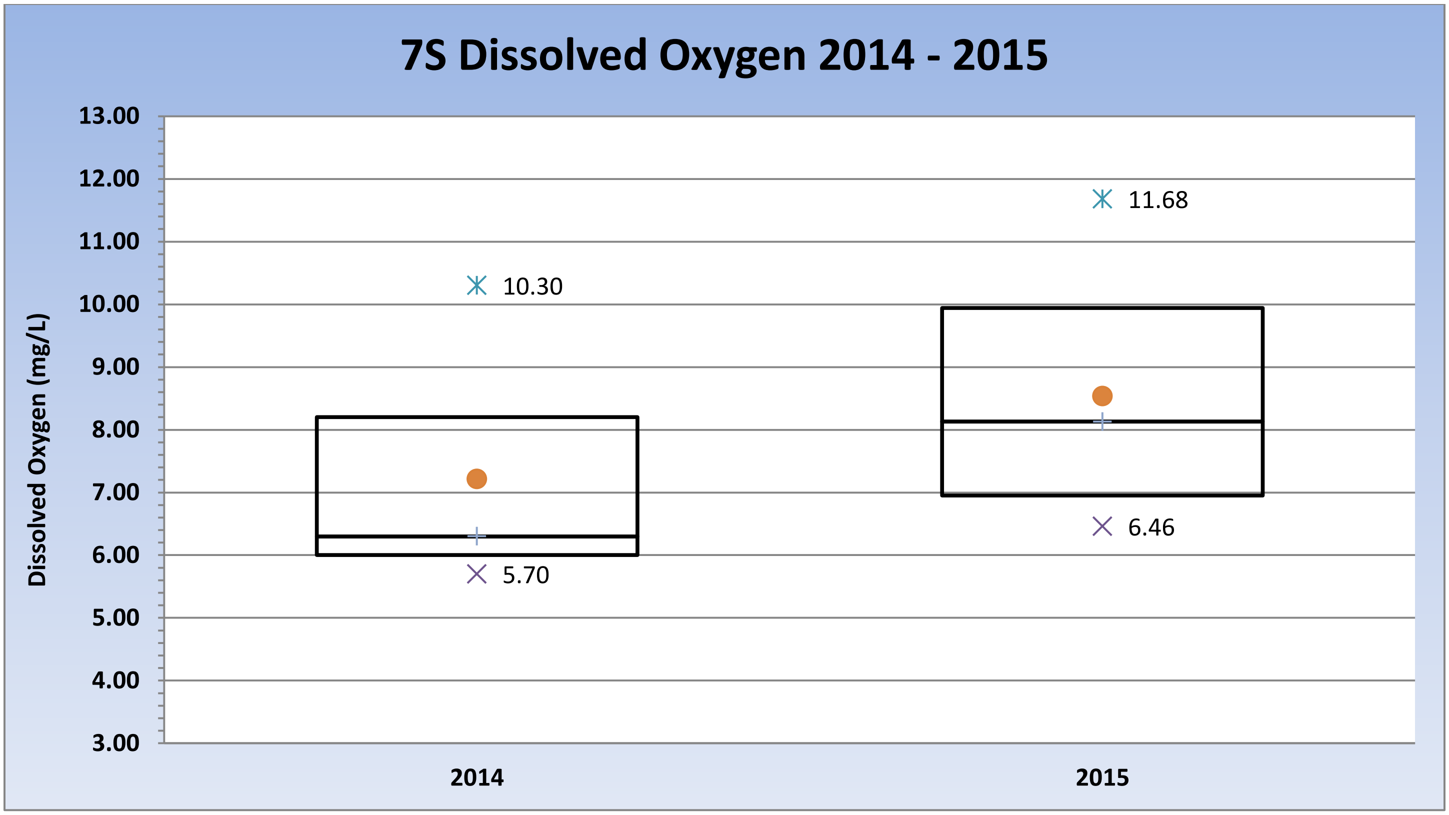

2S Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
10.20
6.10
12.47
6.36
2014
2015

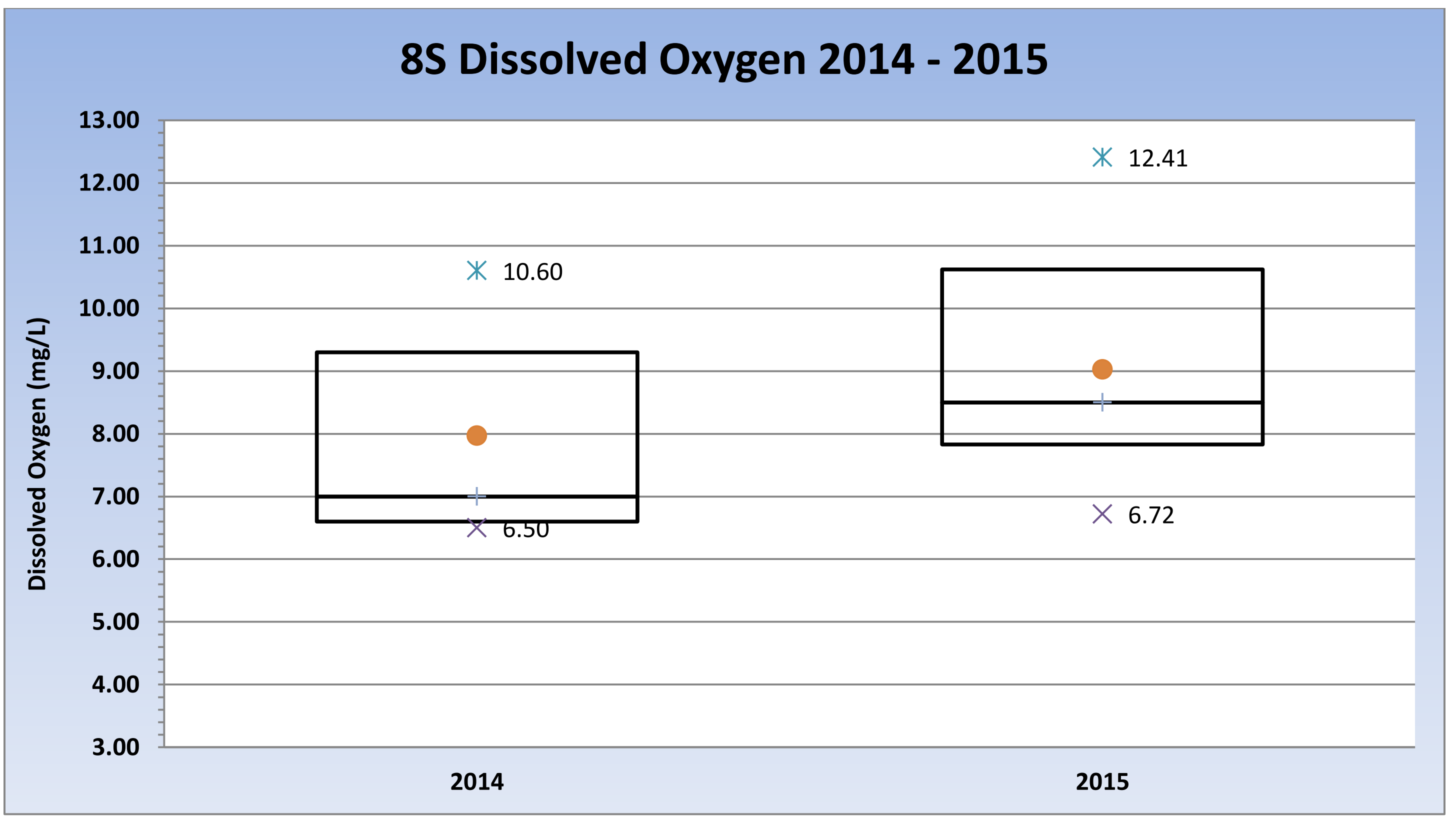

3S Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
10.70
6.10
12.33
6.19
2014
2015

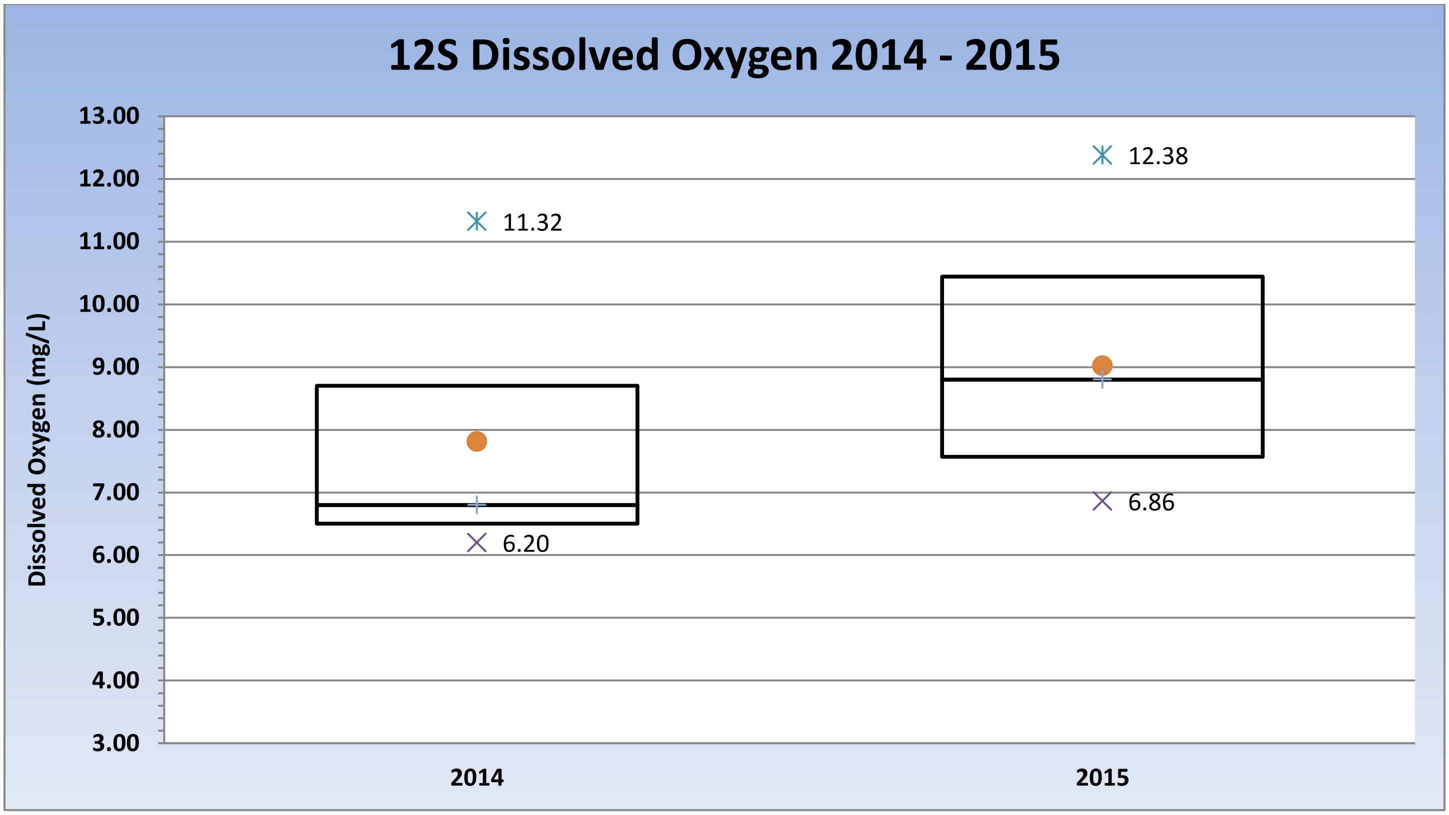

4S Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
15.00
13.00
11.00
9.00
7.00
5.00
3.00
10.40
6.40
12.62
6.62
2014
2015

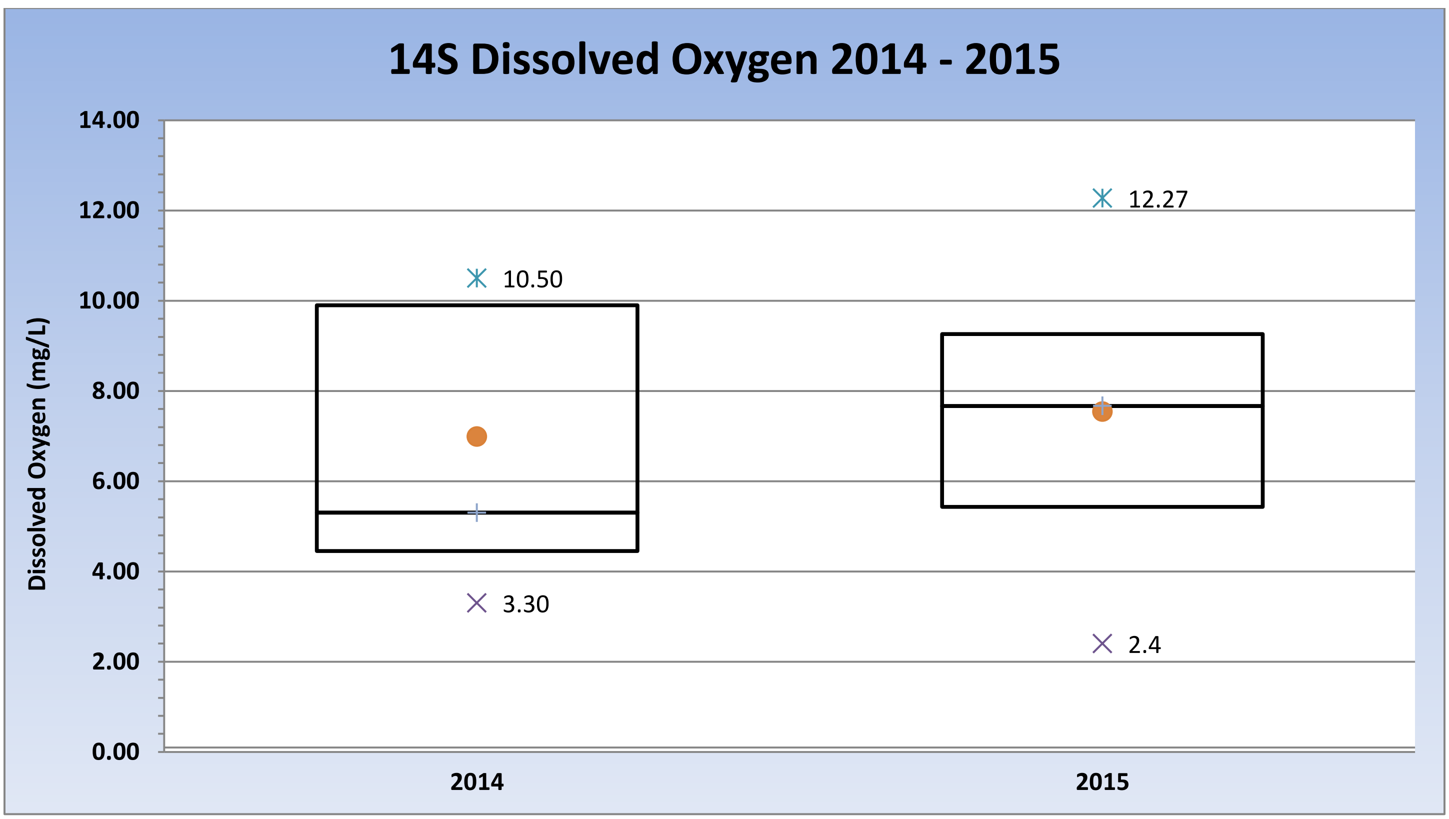

5S Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
9.84
5.30
12.51
5.26
2014
2015

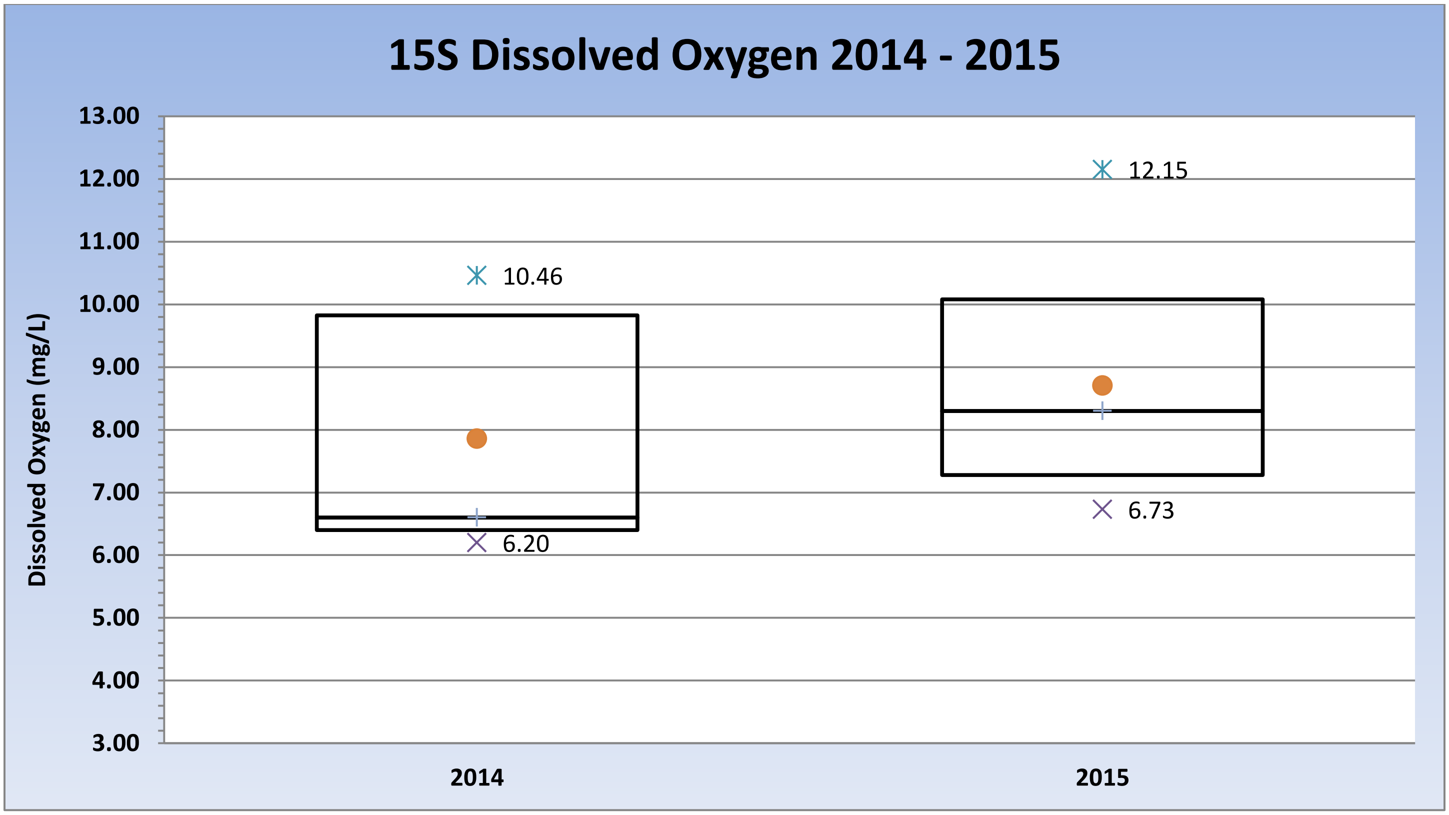

6S Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
9.80
5.30
10.55
4.18
2014
2015

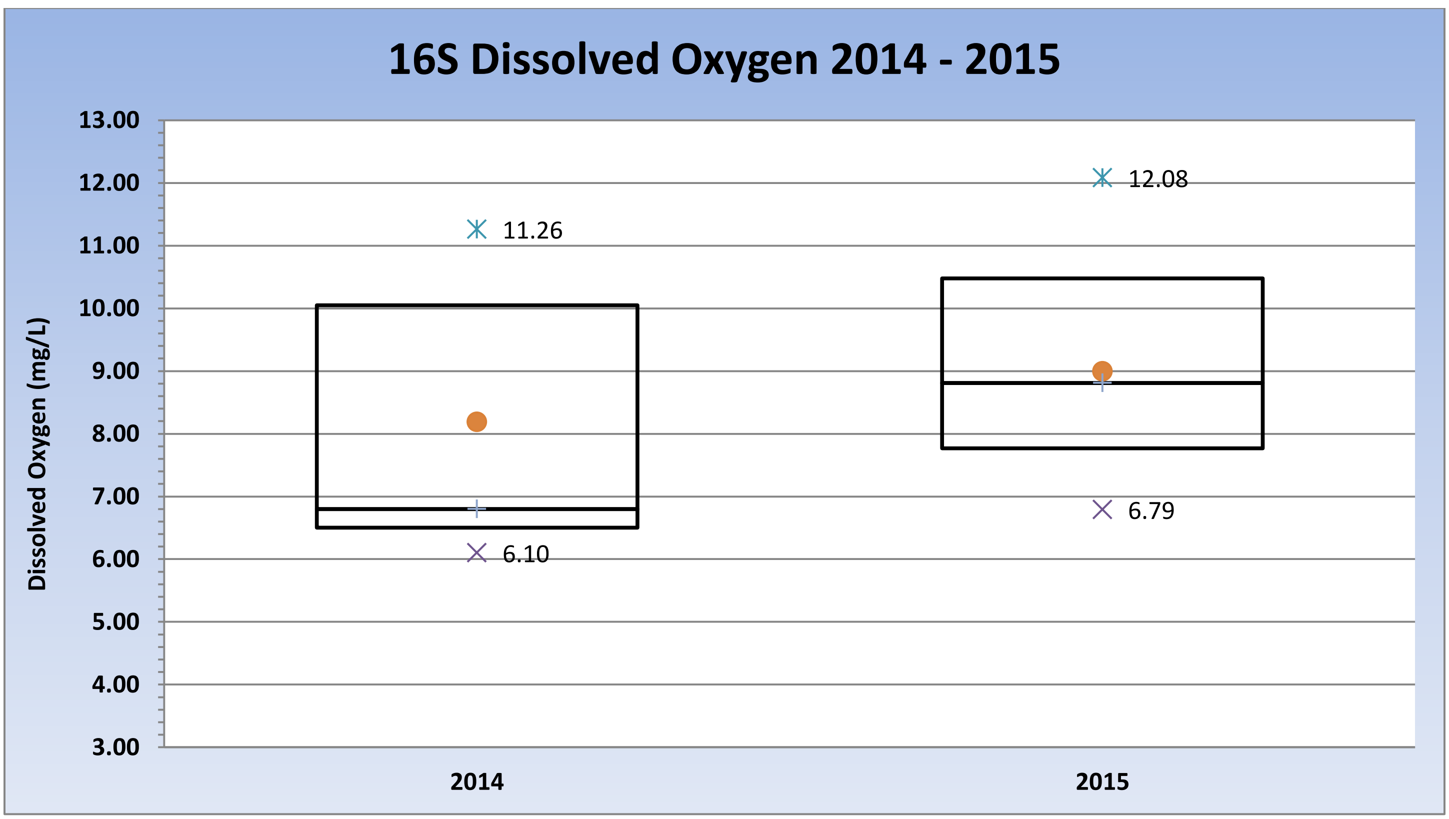

7S Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
10.30
5.70
11.68
6.46
2014
2015

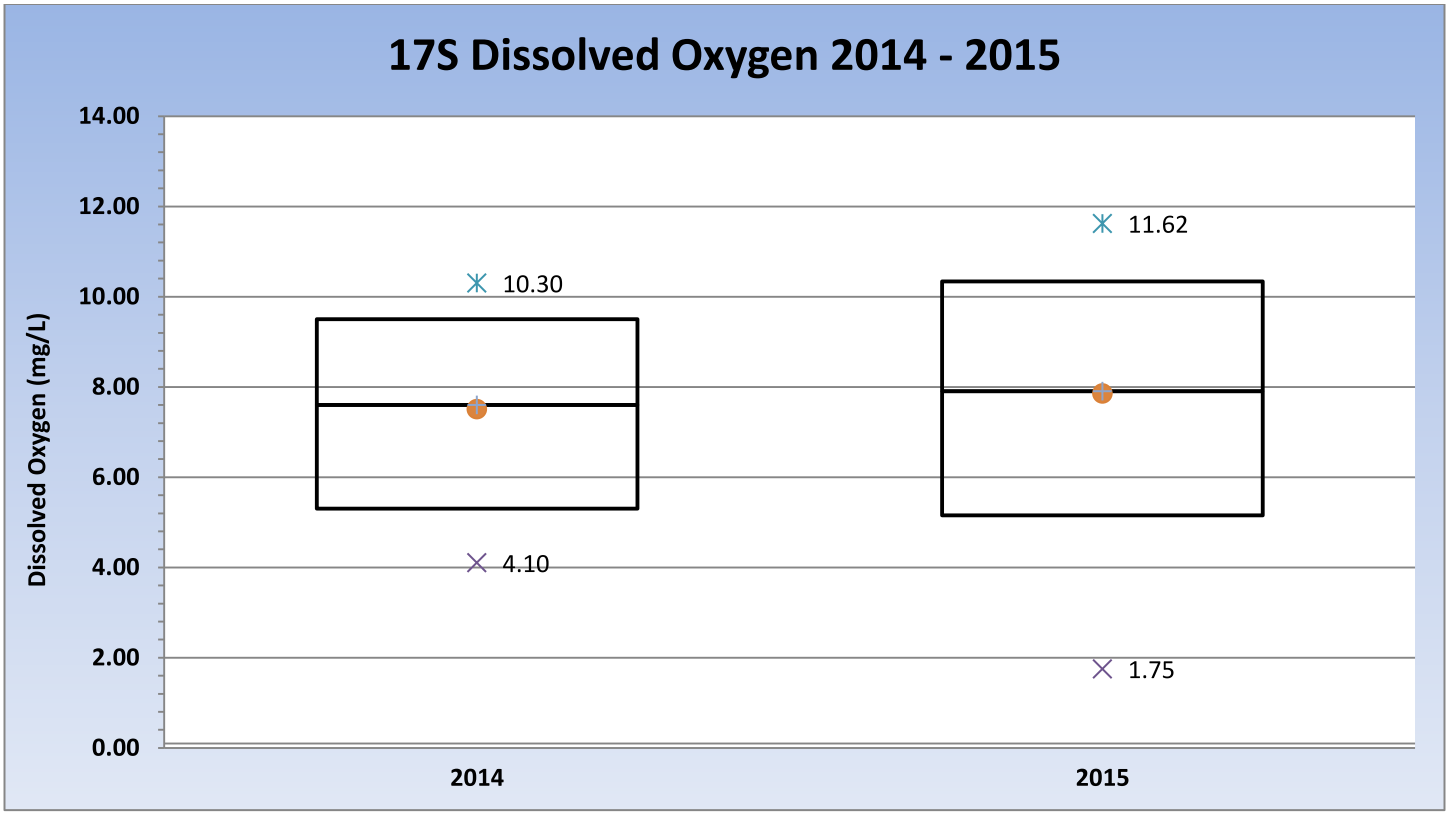

8S Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
10.60
6.50
12.41
6.72
2014
2015

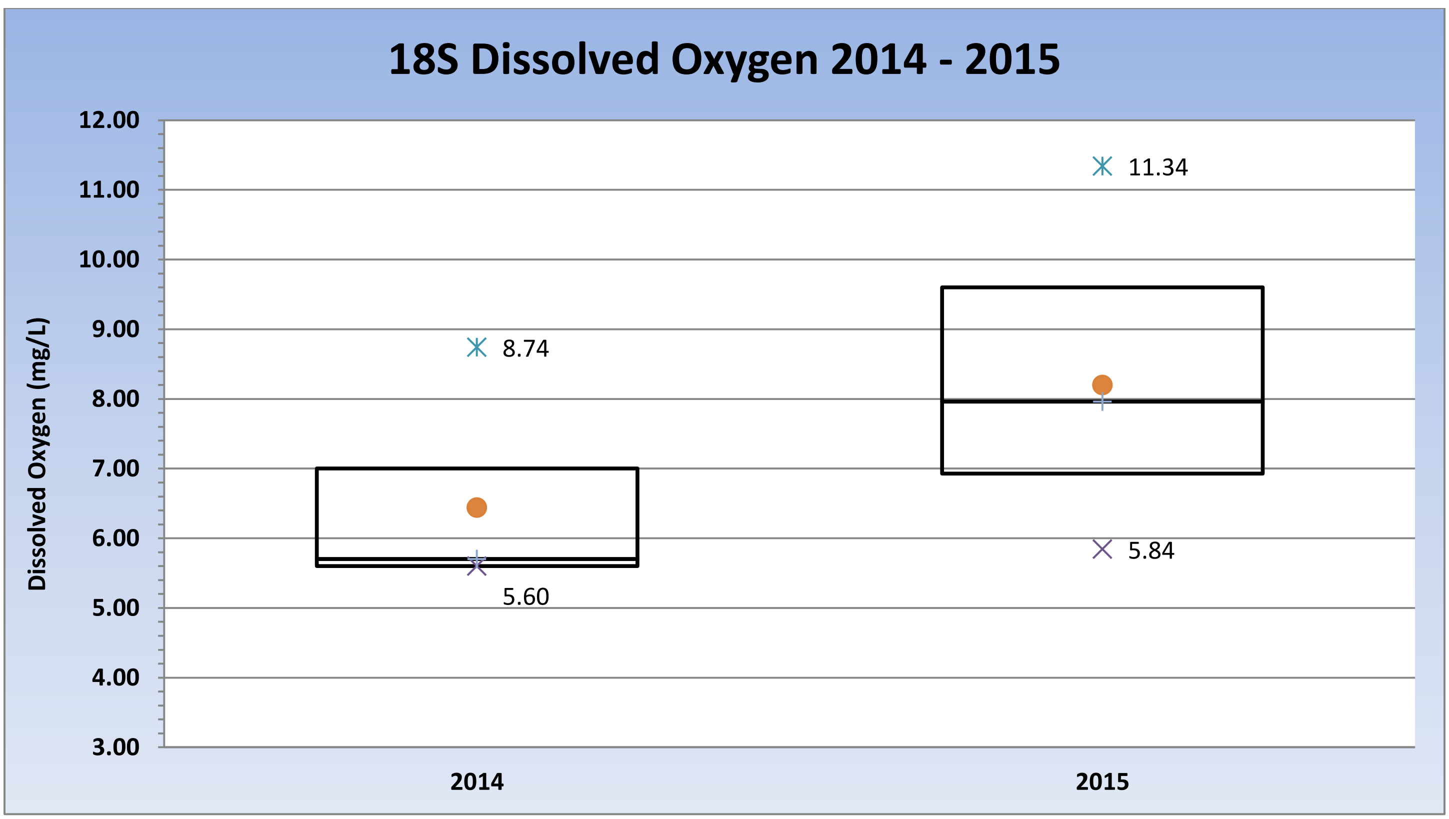

12S Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
11.32
6.20
12.38
6.86
2014
2015


14S Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
10.50
3.30
12.27
2.4
2014
2015


15S Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
10.46
6.20
12.15
6.73
2014
2015


16S Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
11.26
6.10
12.08
6.79
2014
2015


17S Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
10.30
4.10
11.62
1.75
2014
2015


18S Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
8.74
5.60
11.34
5.84
2014
2015

Town Creek Watershed

A total of 585 independent water quality measurements were collected in the Town Creek watershed in 2015.

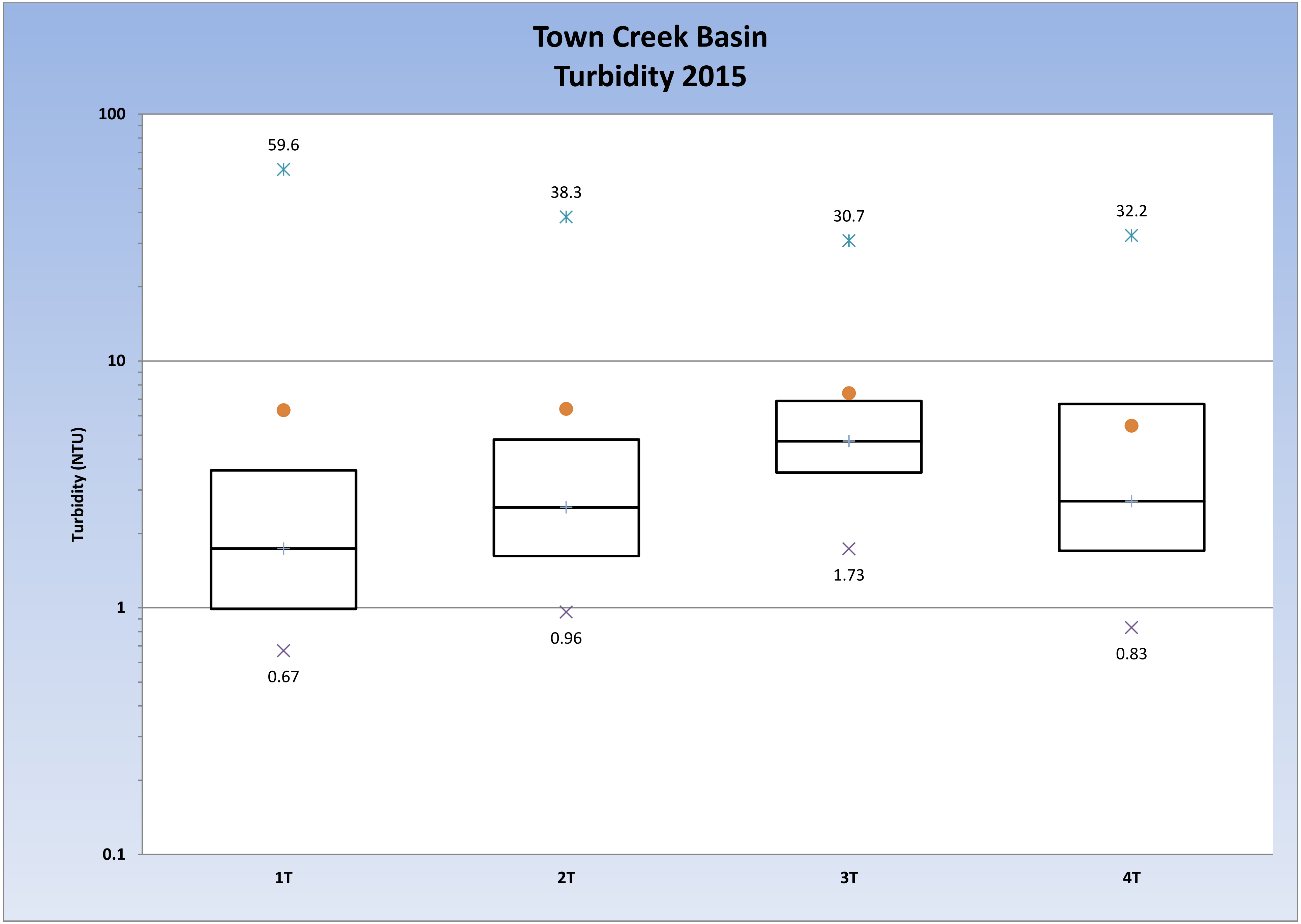
Monitoring Station Locations and Notes:

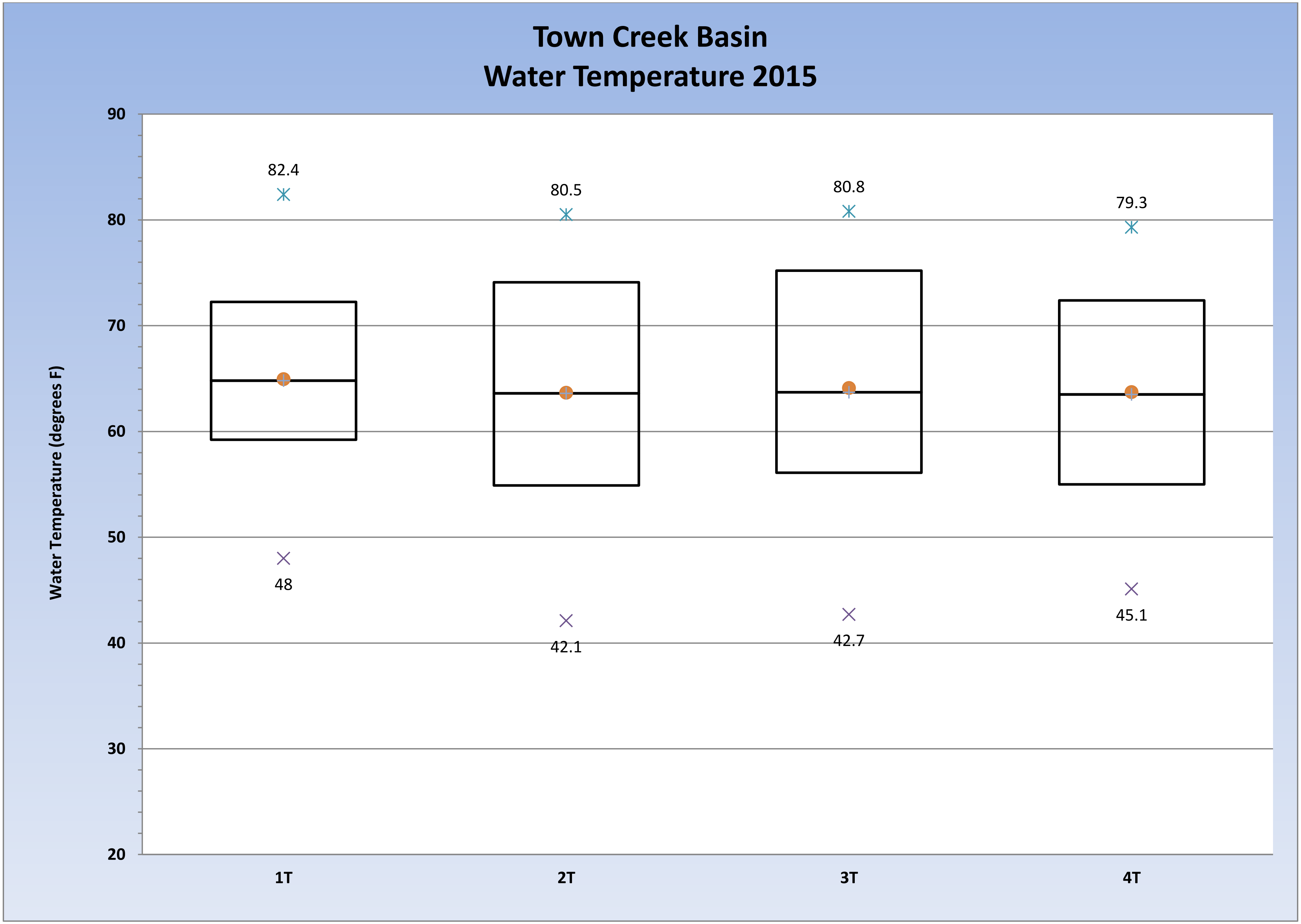
1T – Latitude *32, 35, 55.414 N*; Longitude *85, 28, 18.325 W*. Station 1T is located on Town Creek just upstream of the Samford Avenue crossing.
2T – Latitude *32, 35, 3.724 N*; Longitude *85, 28, 27.539 W*. Station 2T is located on Town Creek at the crossing of Gay Street.
3T – Latitude *32, 34, 46.858 N*; Longitude *85, 28, 42.094 W*. Station 3T is located on Town Creek at the crossing of East University Drive.
4T - Latitude *32, 39, 53.844 N*; Longitude *85, 28, 51.164 W*. Station 4T is located on Town Creek at the crossing of Shell-Toomer Parkway.

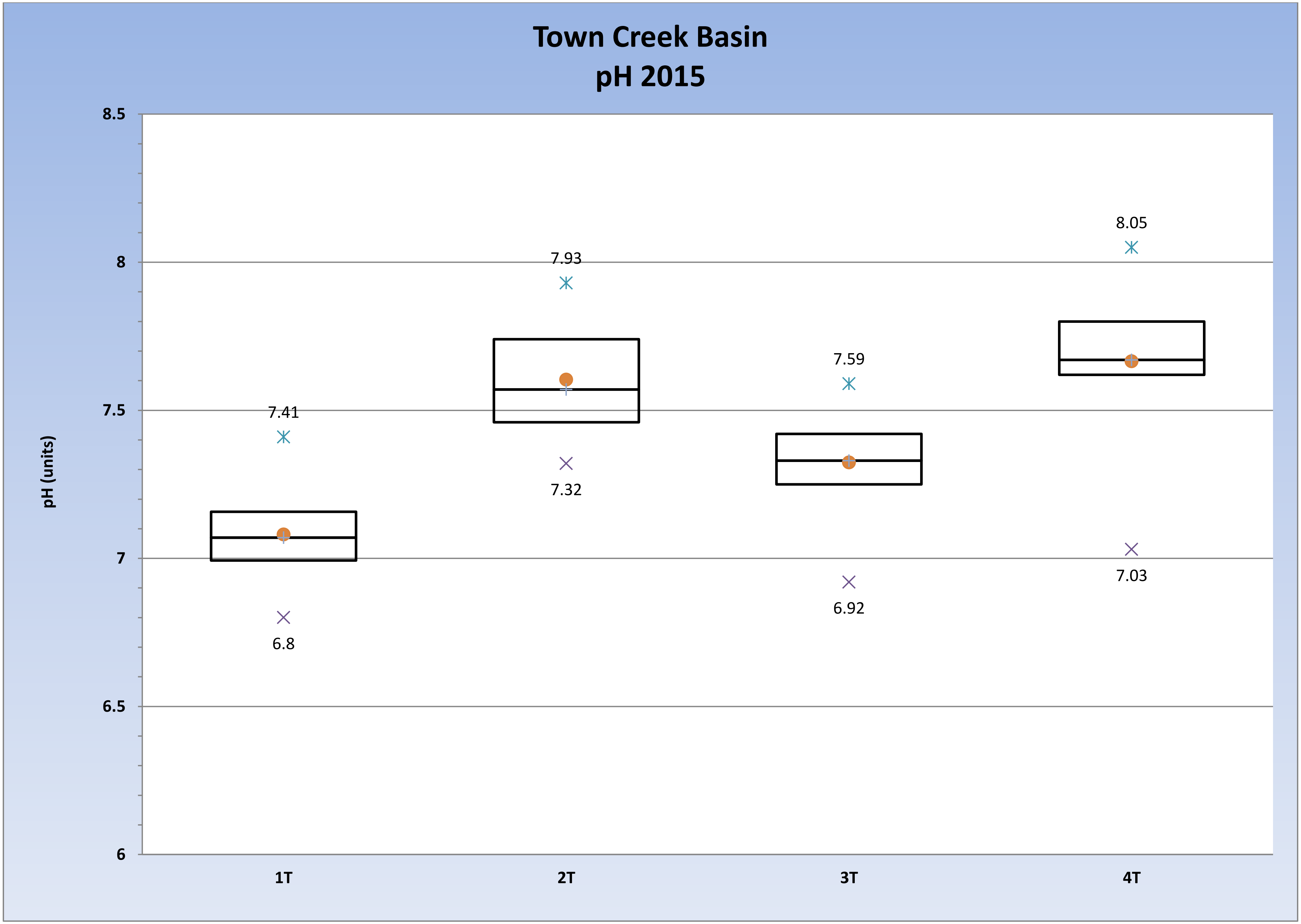
**See Insert for Maps of All Water Quality Monitoring Locations*

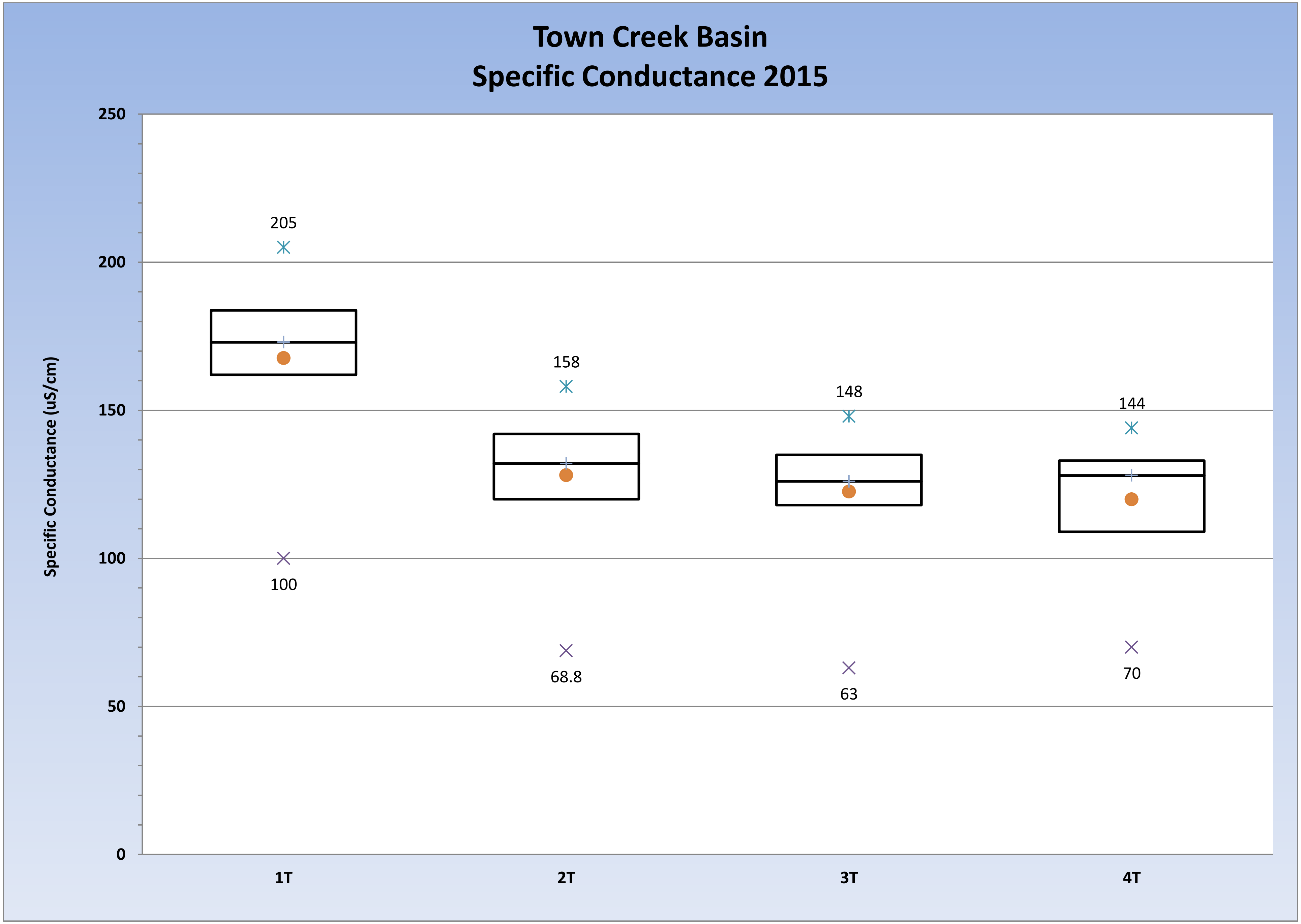
Nine Year Statistical Analysis of Turbidity Data for Town Creek Watershed

	1T								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	0.40	0.97	0.75	1.10	1.20	0.64	0.74	0.10	0.67
MAX	55.00	65.00	33.00	31.00	35.00	22.50	27.00	596.00	59.6
AVG	9.89	8.83	7.04	4.10	5.66	4.94	3.66	23.94	6.31
MEDIAN	5.87	2.80	4.25	2.50	3.10	3.21	2.09	3.25	1.74
	2T								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	0.52	0.95	0.65	0.82	1.30	0.73	0.25	0.10	0.96
MAX	73.33	70.00	35.00	33.00	32.00	23.30	144.00	193.00	38.3
AVG	11.27	10.00	8.13	4.52	6.30	5.41	10.68	13.05	6.39
MEDIAN	6.57	3.42	4.60	2.80	3.80	3.50	2.98	3.92	2.55
	3T								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	0.48	0.88	1.00	0.93	1.30	1.21	0.75	1.65	1.73
MAX	66.67	65.00	58.00	48.00	41.00	21.90	18.60	153.00	30.7
AVG	11.70	10.48	10.38	5.51	8.36	5.29	5.59	10.41	7.39
MEDIAN	7.15	4.02	5.80	3.00	5.10	3.95	4.02	4.65	4.73
	4T								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
MIN	0.15	0.72	2.00	0.75	1.30	0.57	0.92	0.10	0.83
MAX	70.00	80.00	55.00	45.00	39.00	32.30	27.20	77.30	32.2
AVG	11.91	11.72	10.46	5.10	7.92	6.21	5.38	7.56	5.46
MEDIAN	6.69	4.27	6.05	2.60	4.80	4.45	3.25	2.68	2.7

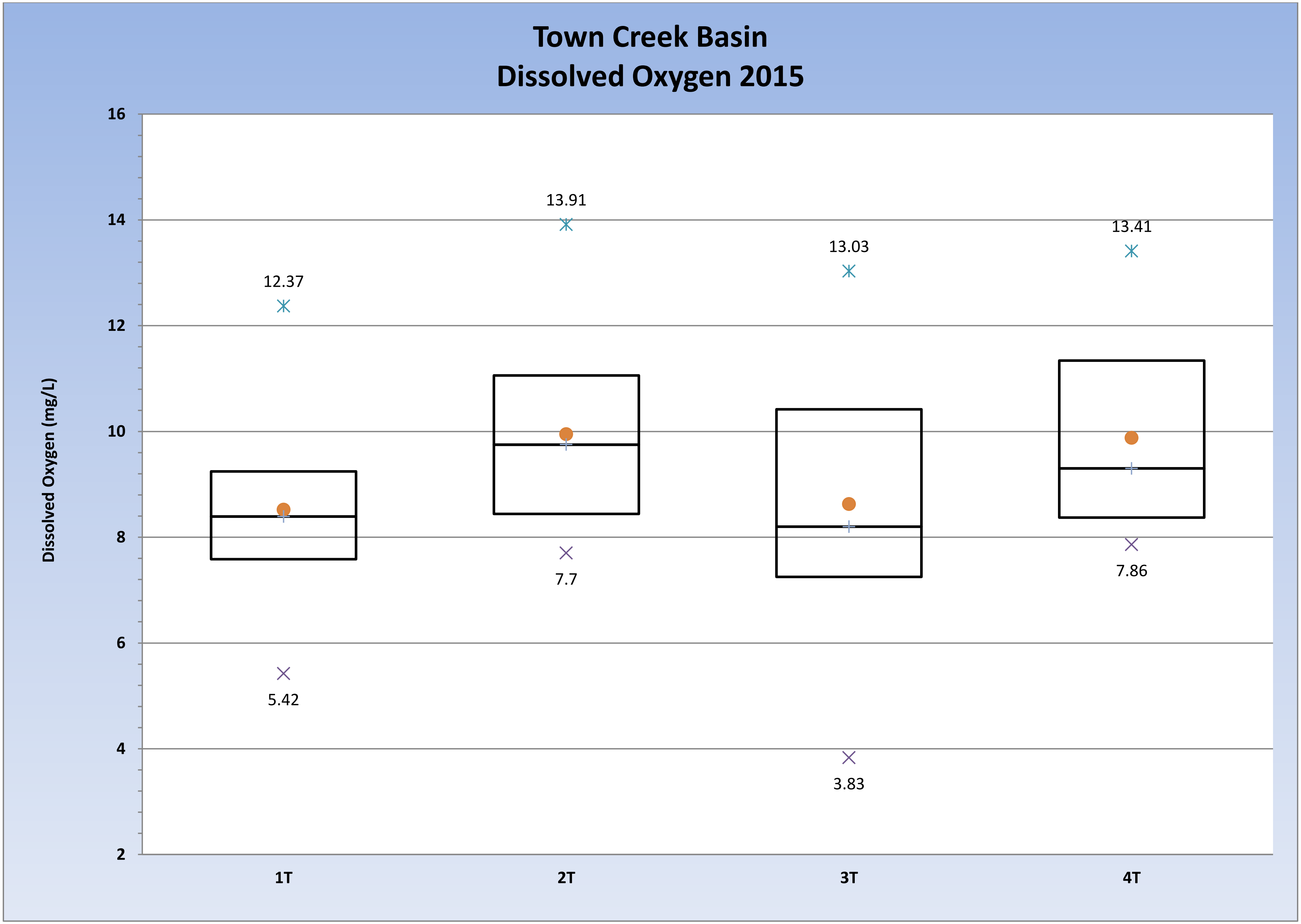

Town Creek Basin
Turbidity 2015
Turbidity (NTU)
100
10
1
0.1
59.6
38.3
30.7
32.2
1.73
0.67
0.96
0.83
1T
2T
3T
4T

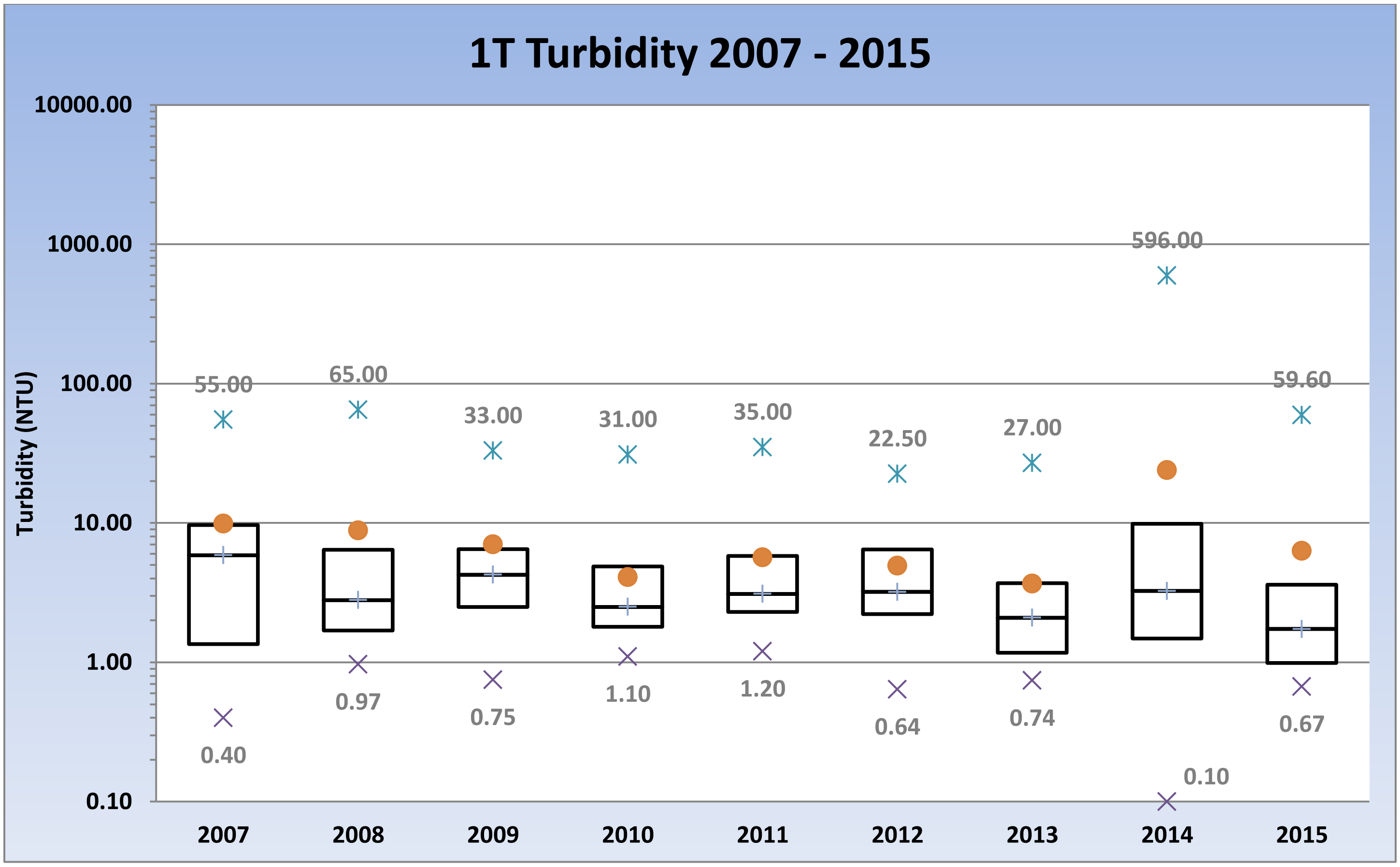

Town Creek Basin
Water Temperature 2015
Water Temperature (degrees F)
90
80
70
60
50
40
30
20
82.4
80.5
80.8
79.3
48
42.1
42.7
45.1
1T
2T
3T
4T

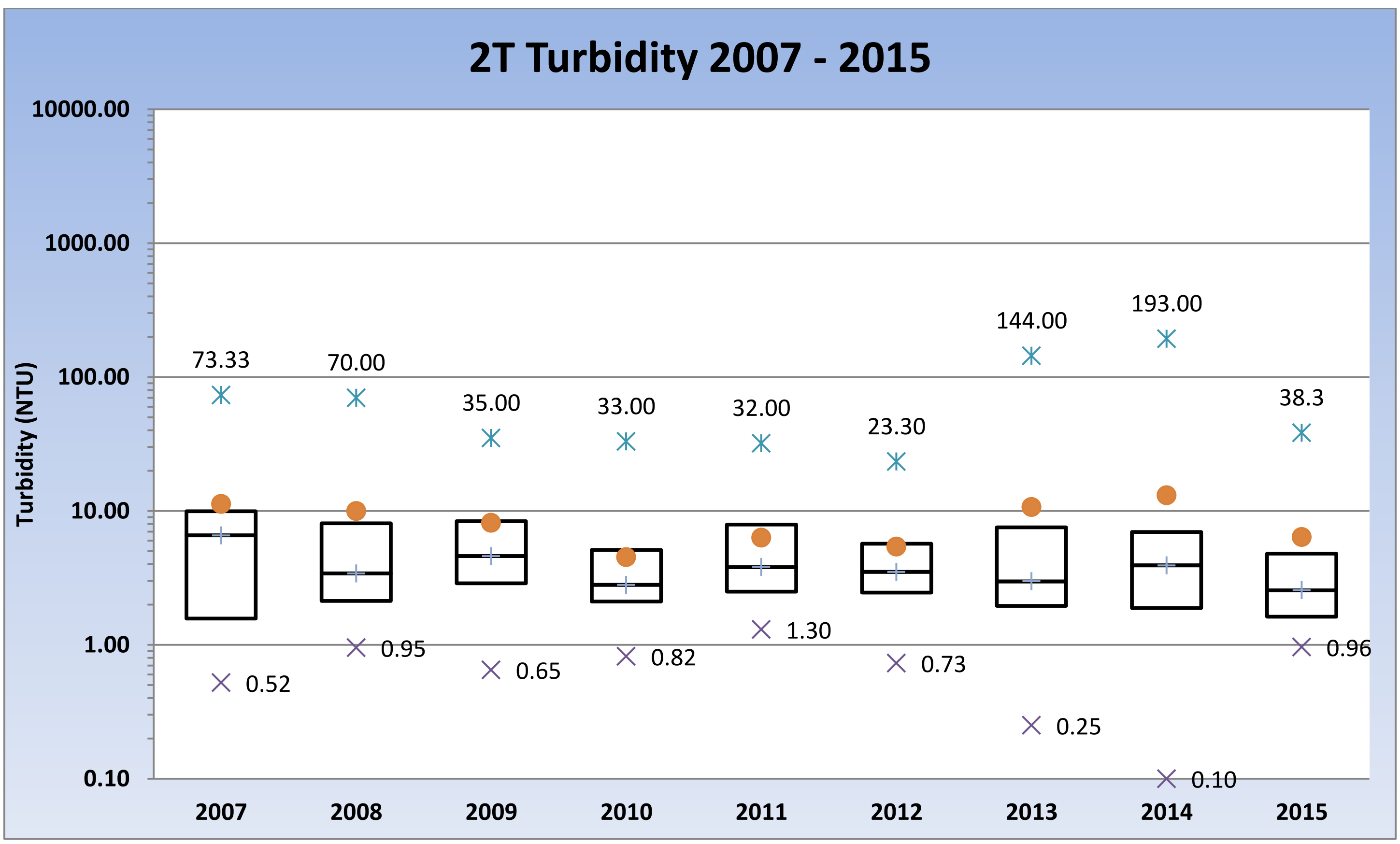

Town Creek Basin
pH 2015
pH (units)
8.5
8
7.5
7
6.5
6
7.41
6.8
7.93
7.32
7.59
6.92
8.05
7.03
1T
2T
3T
4T

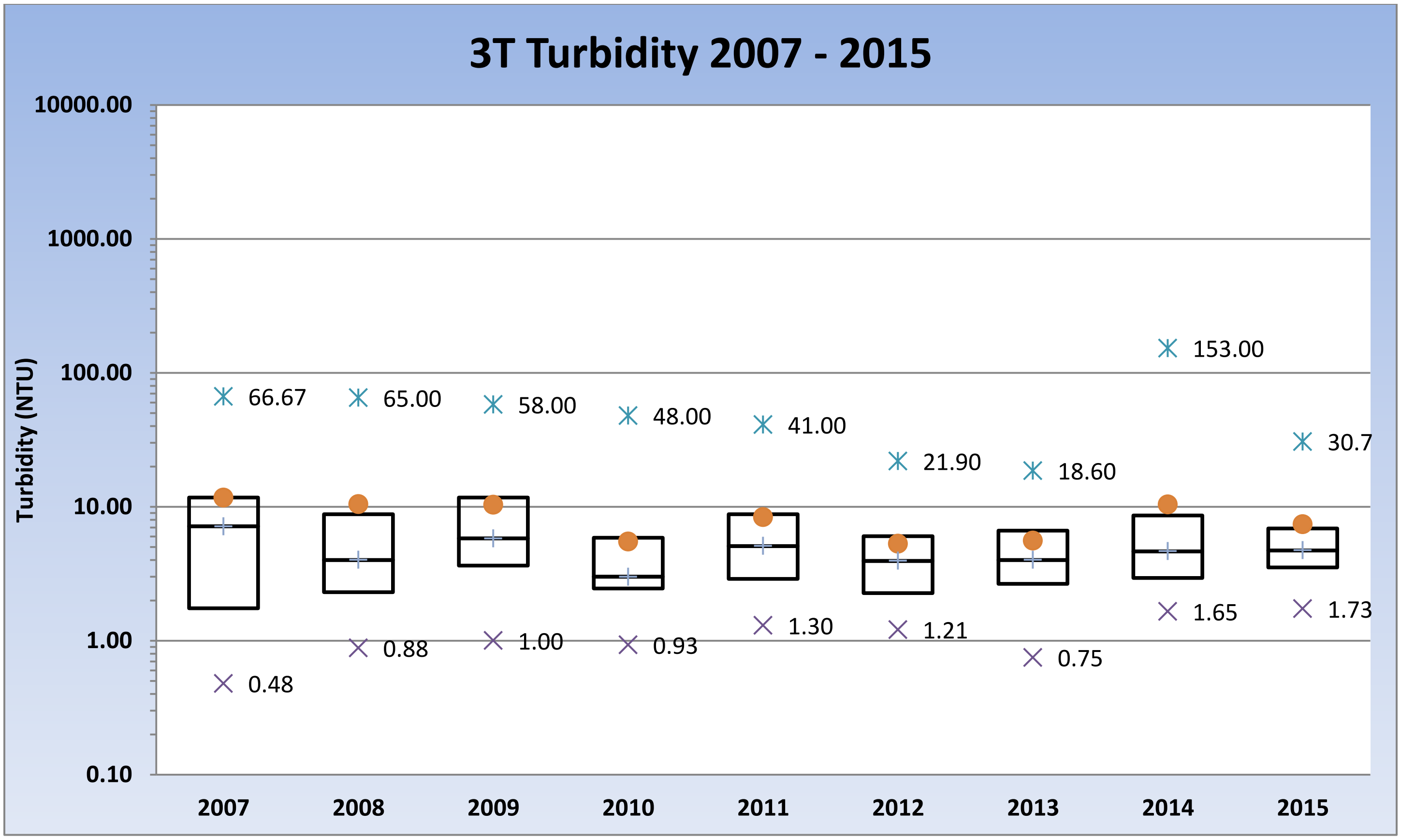


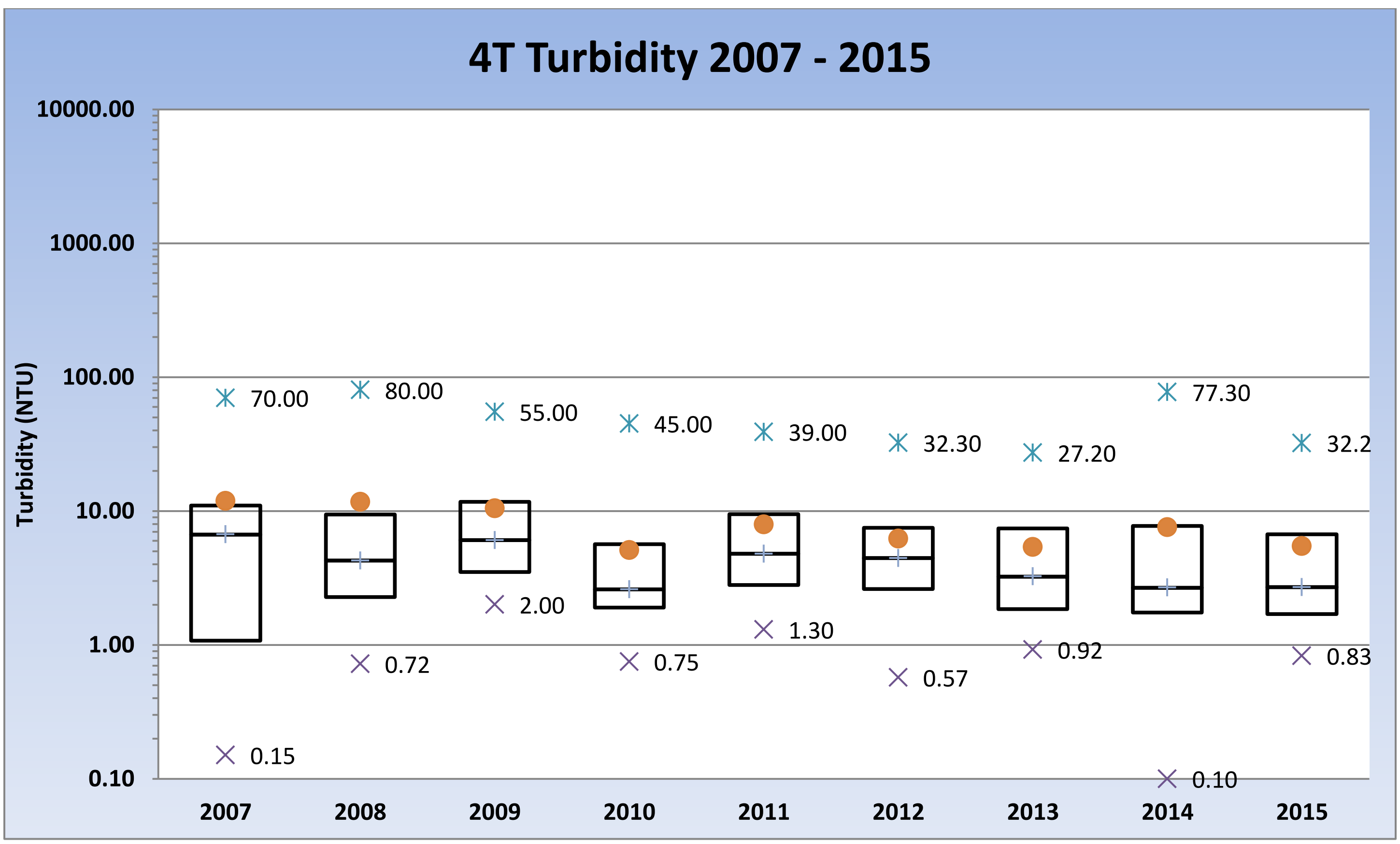
Town Creek Basin
Specific Conductance 2015
Specific Conductance (uS/cm)
250
200
150
100
50
0
205
158
148
144
100
68.8
63
70
1T
2T
3T
4T

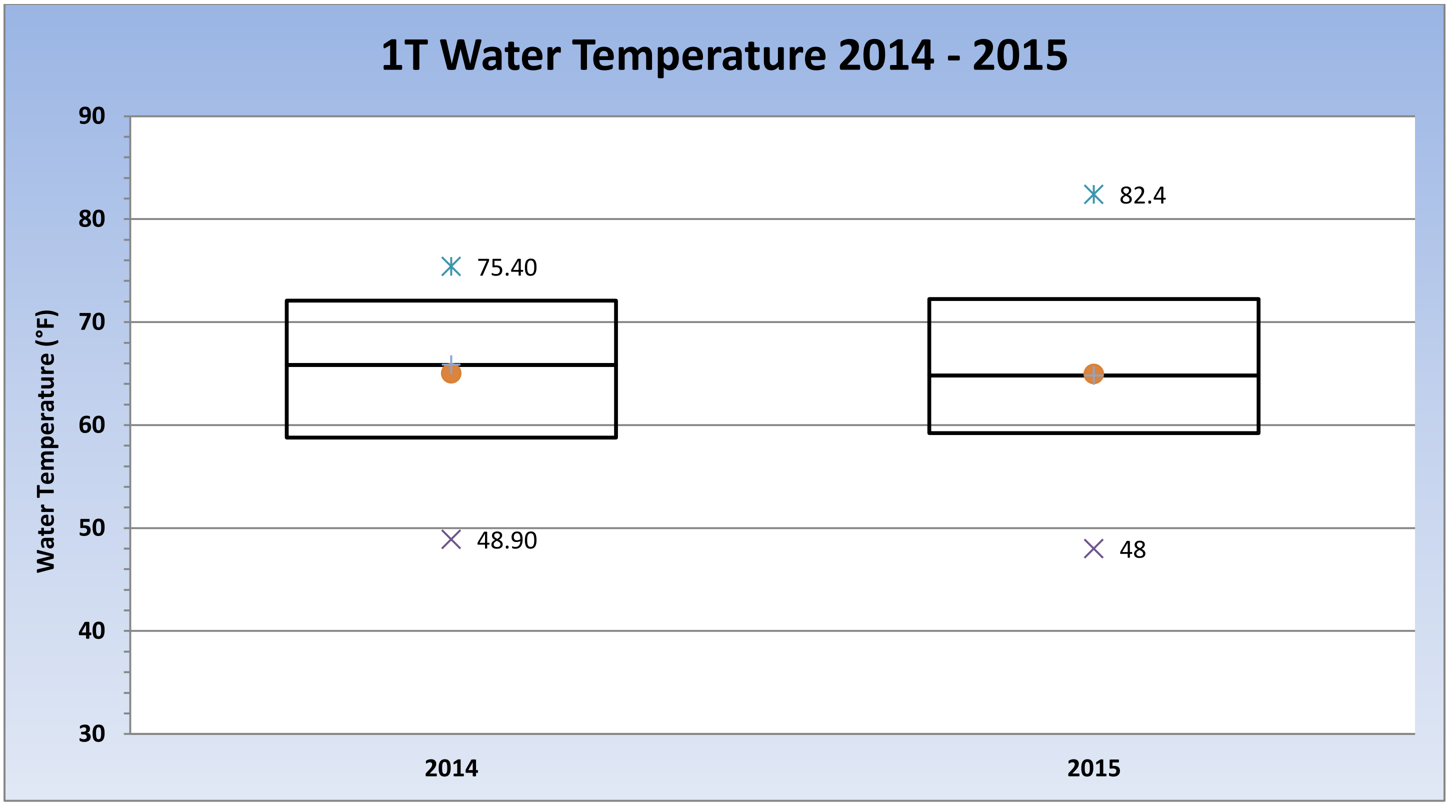

Town Creek Basin
Dissolved Oxygen 2015
Dissolved Oxygen (mg/L)
16
14
12
10
8
6
4
2
12.37
13.91
13.03
13.41
5.42
7.7
3.83
7.86
1T
2T
3T
4T

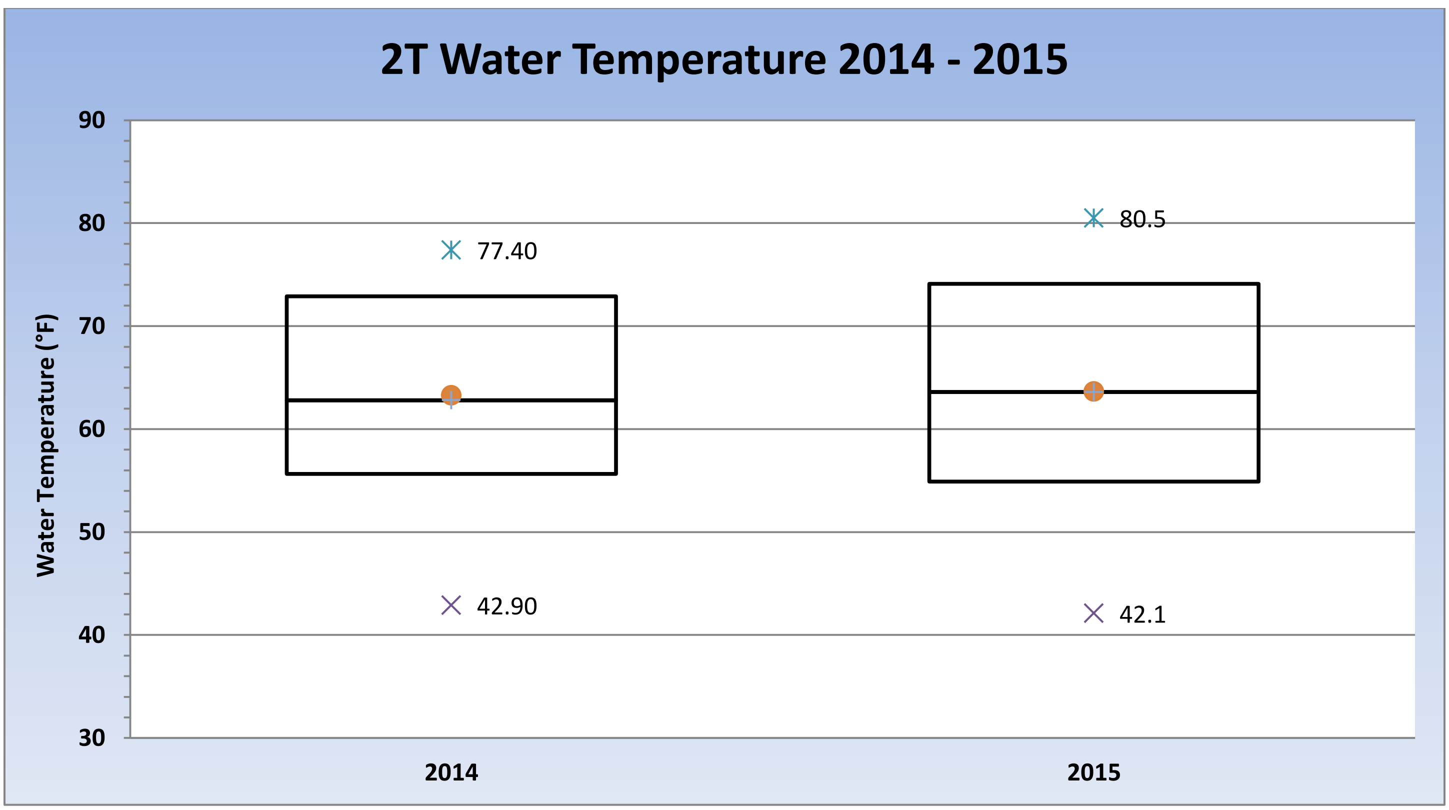

1T Turbidity 2007 - 2015
Turbidity (NTU)
10000.00
1000.00
100.00
10.00
1.00
0.10
55.00
65.00
33.00
31.00
35.00
22.50
27.00
596.00
59.60
0.40
0.97
0.75
1.10
1.20
0.64
0.74
0.10
0.67
2007
2008
2009
2010
2011
2012
2013
2014
2015

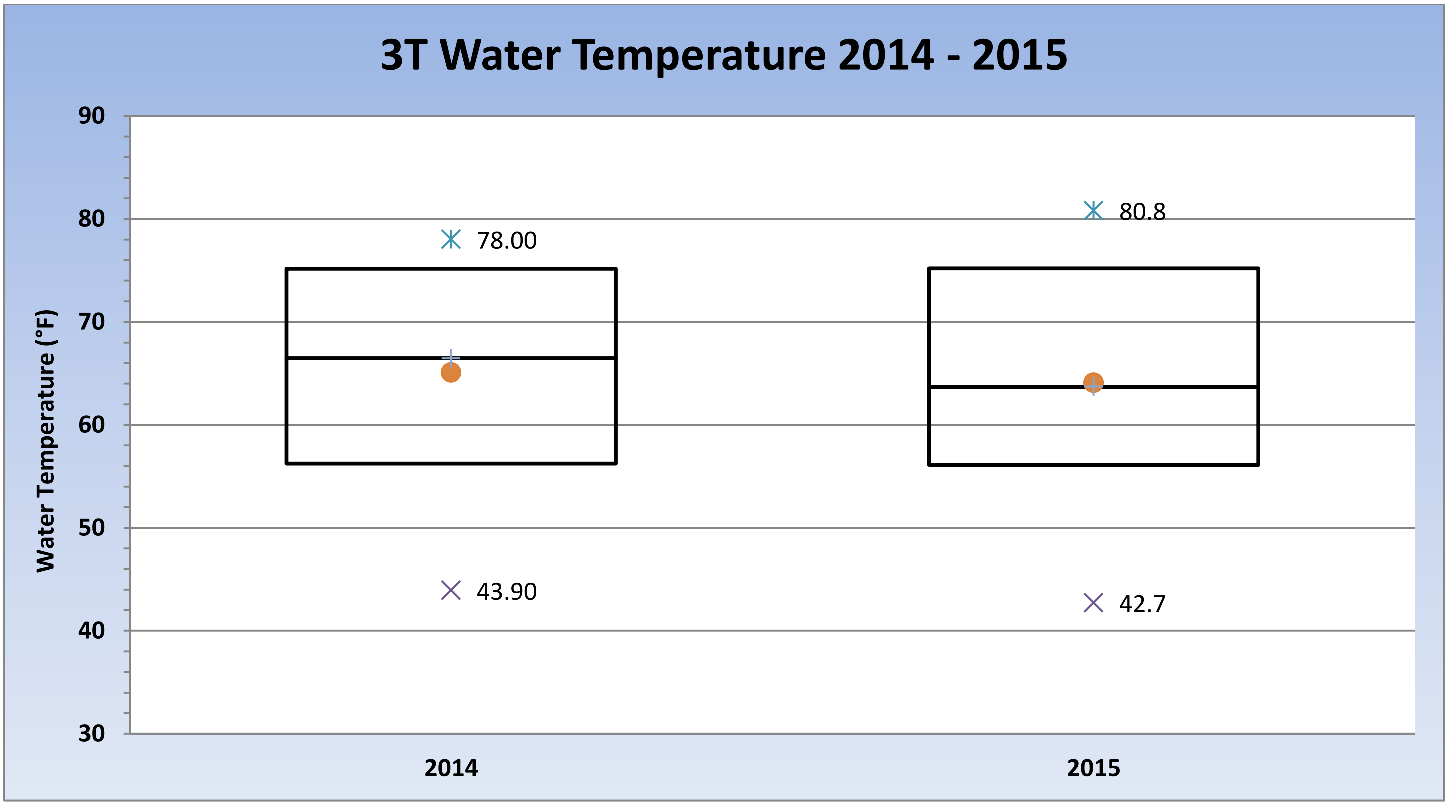

2T Turbidity 2007 - 2015
Turbidity (NTU)
10000.00
1000.00
100.00
10.00
1.00
0.10
73.33
70.00
35.00
33.00
32.00
23.30
144.00
193.00
38.3
0.52
0.95
0.65
0.82
1.30
0.73
0.25
0.10
0.96
2007
2008
2009
2010
2011
2012
2013
2014
2015

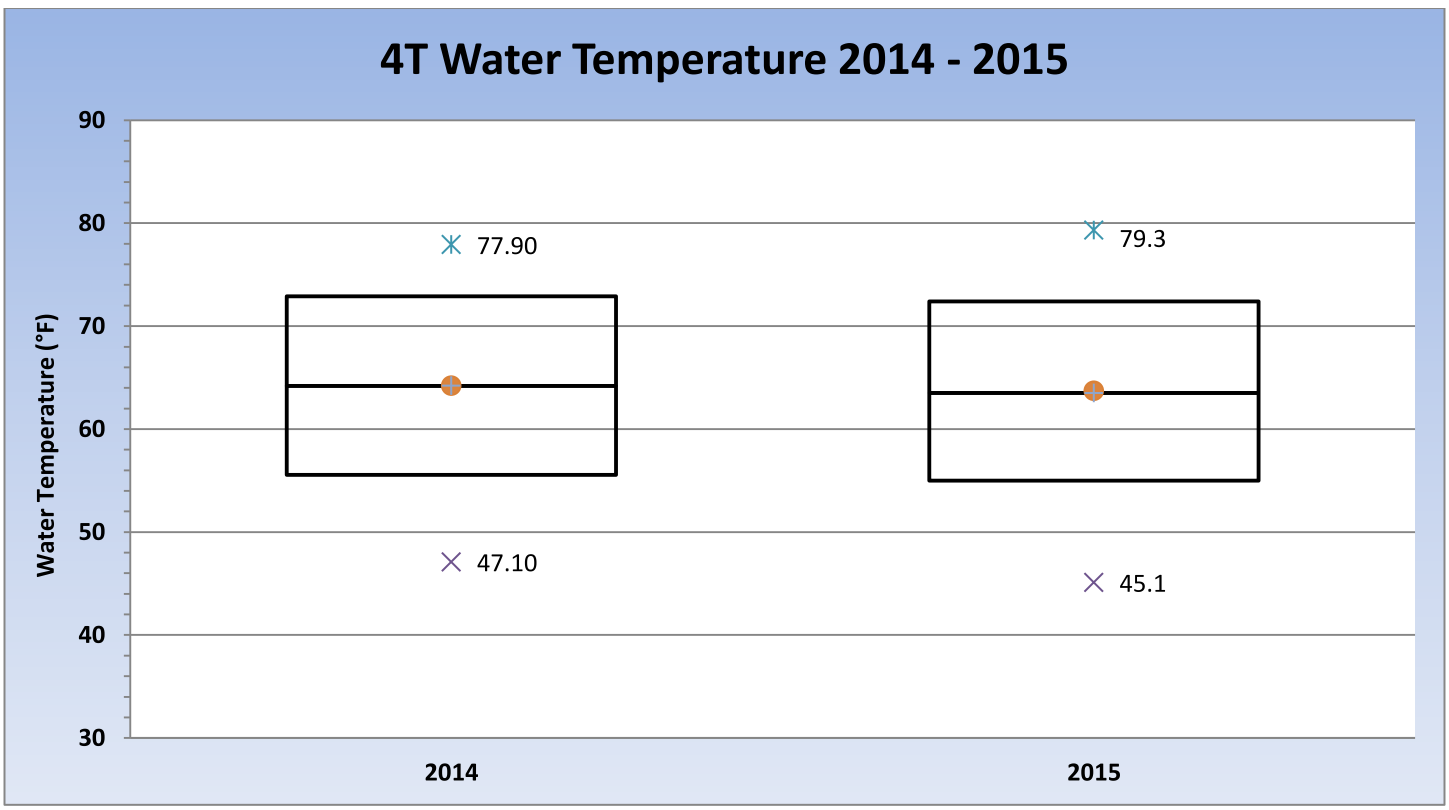

3T Turbidity 2007 - 2015
Turbidity (NTU)
10000.00
1000.00
100.00
10.00
1.00
0.10
66.67
65.00
58.00
48.00
41.00
21.90
18.60
153.00
30.7
0.48
0.88
1.00
0.93
1.30
1.21
0.75
1.65
1.73
2007
2008
2009
2010
2011
2012
2013
2014
2015

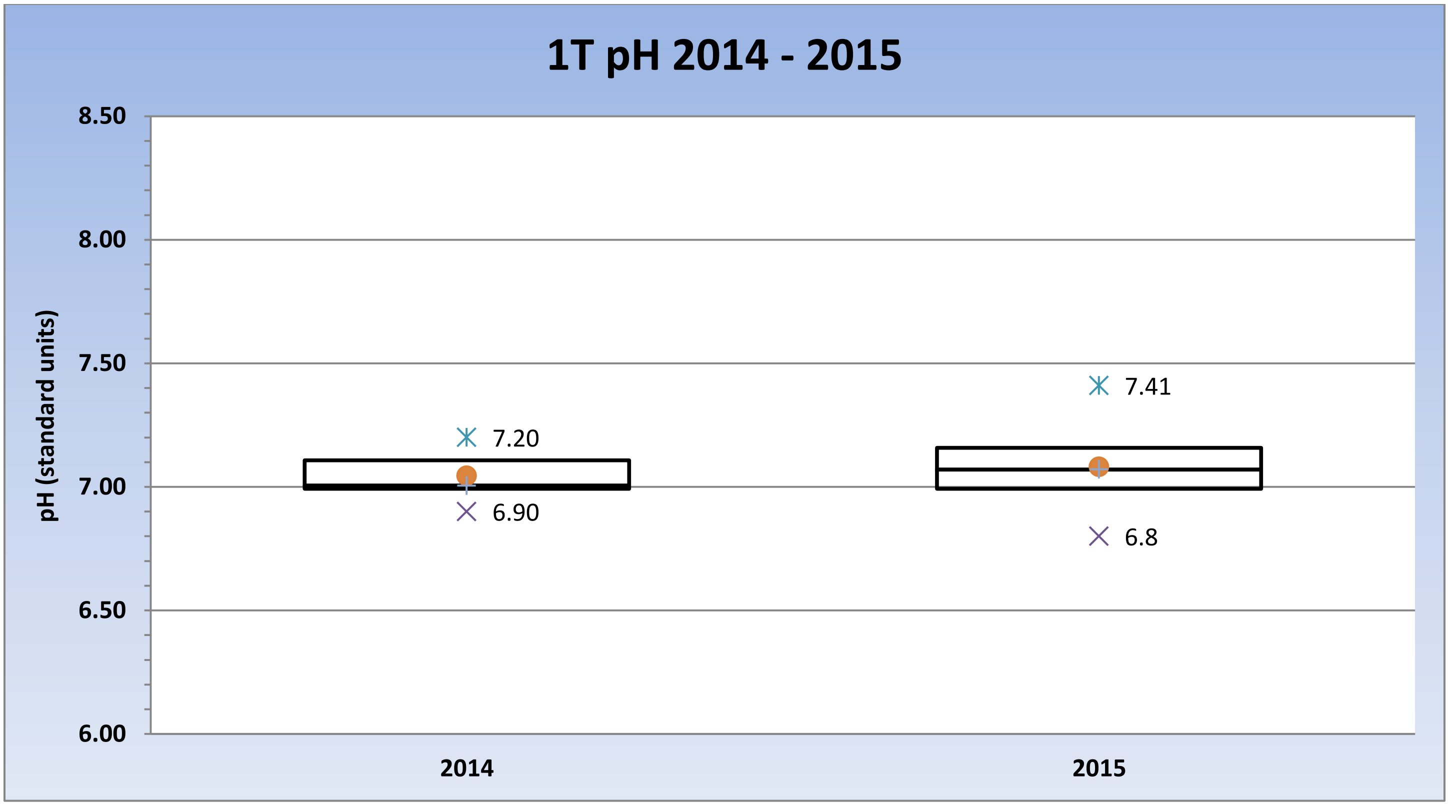

4T Turbidity 2007 - 2015
Turbidity (NTU)
10000.00
1000.00
100.00
10.00
1.00
0.10
70.00
80.00
55.00
45.00
39.00
32.30
27.20
77.30
32.2
0.15
0.72
2.00
0.75
1.30
0.57
0.92
0.10
0.83
2007
2008
2009
2010
2011
2012
2013
2014
2015

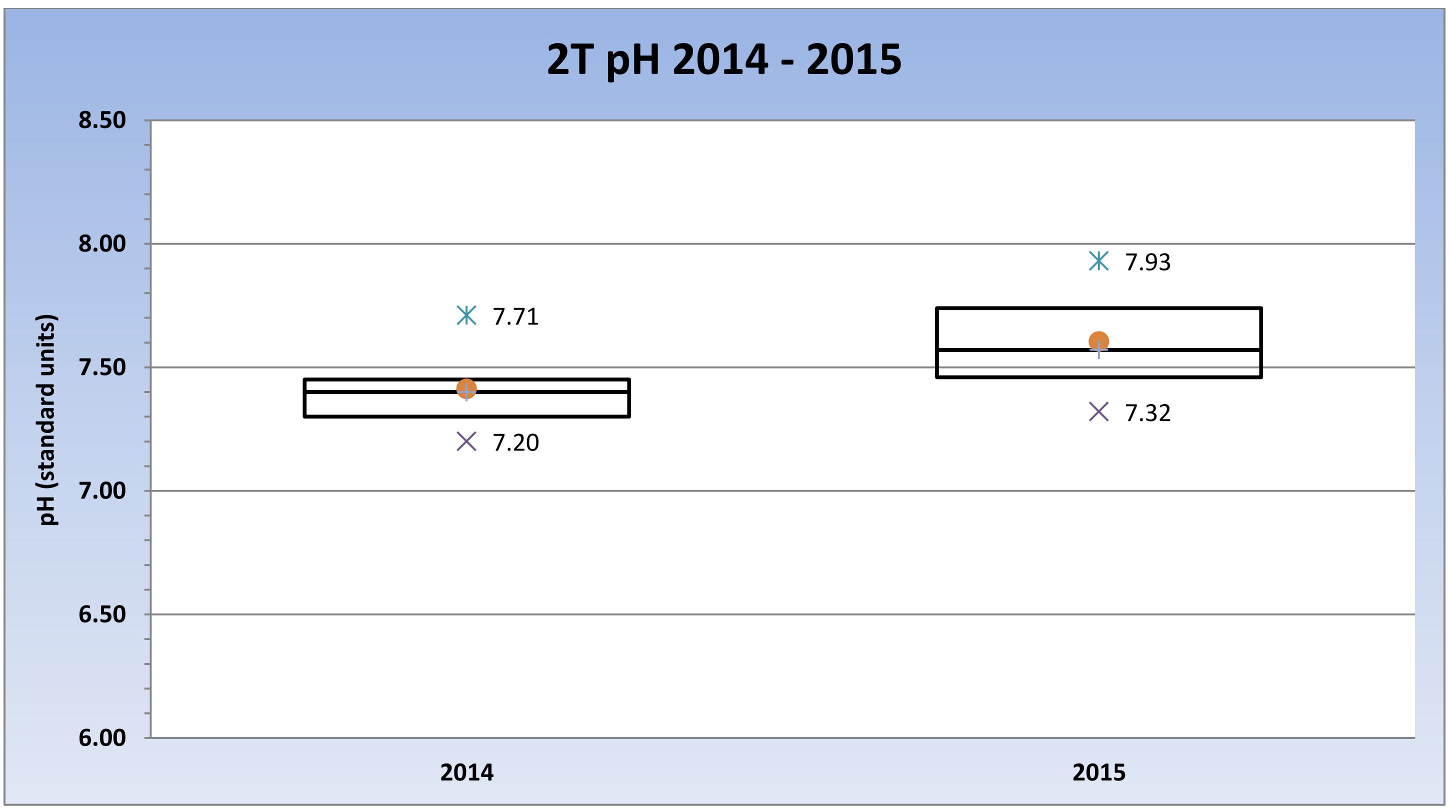

1T Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
75.40
48.90
82.4
48
2014
2015

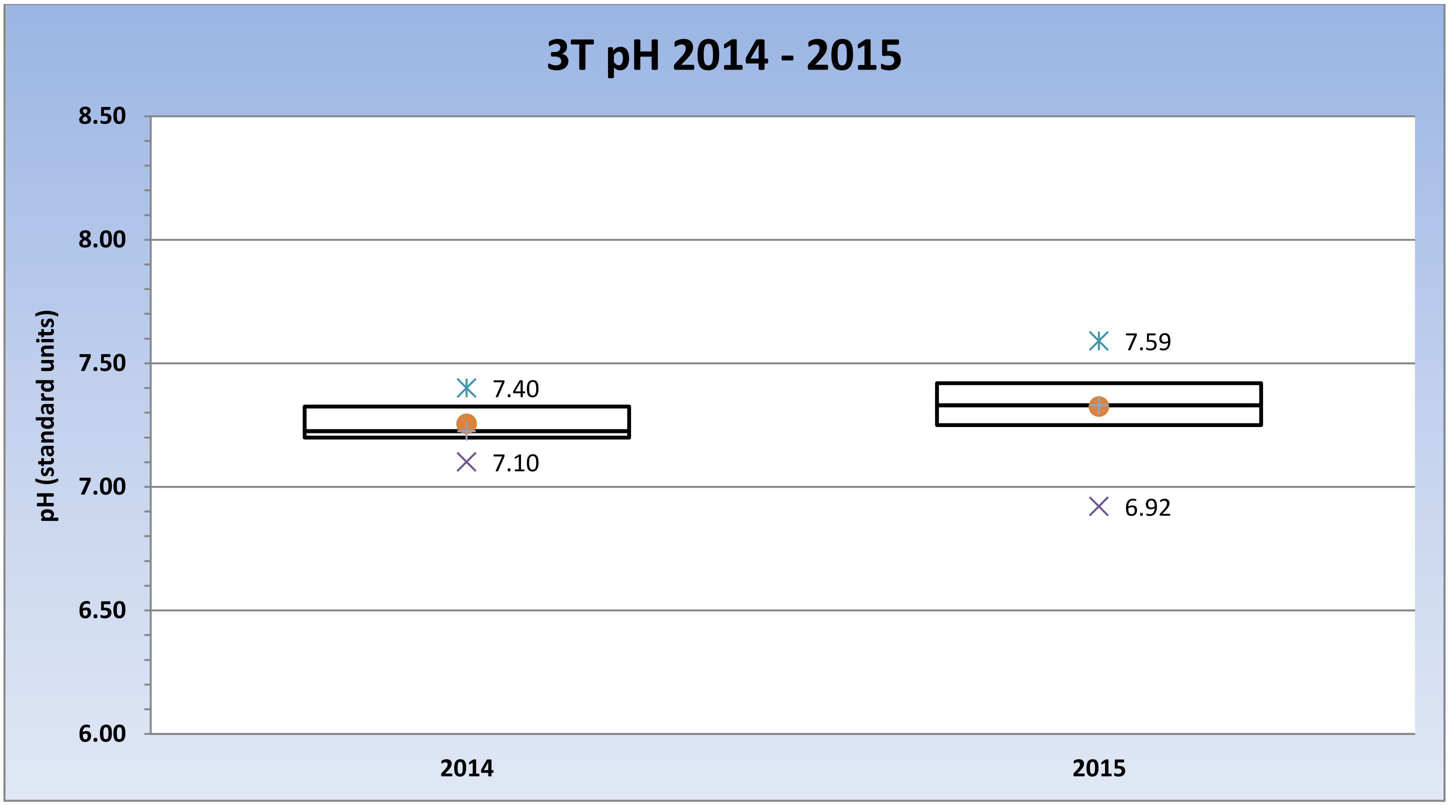

2T Water Temperature 2014 - 2015
Water Temperature (°F)
90
80
70
60
50
40
30
77.40
42.90
80.5
42.1
2014
2015

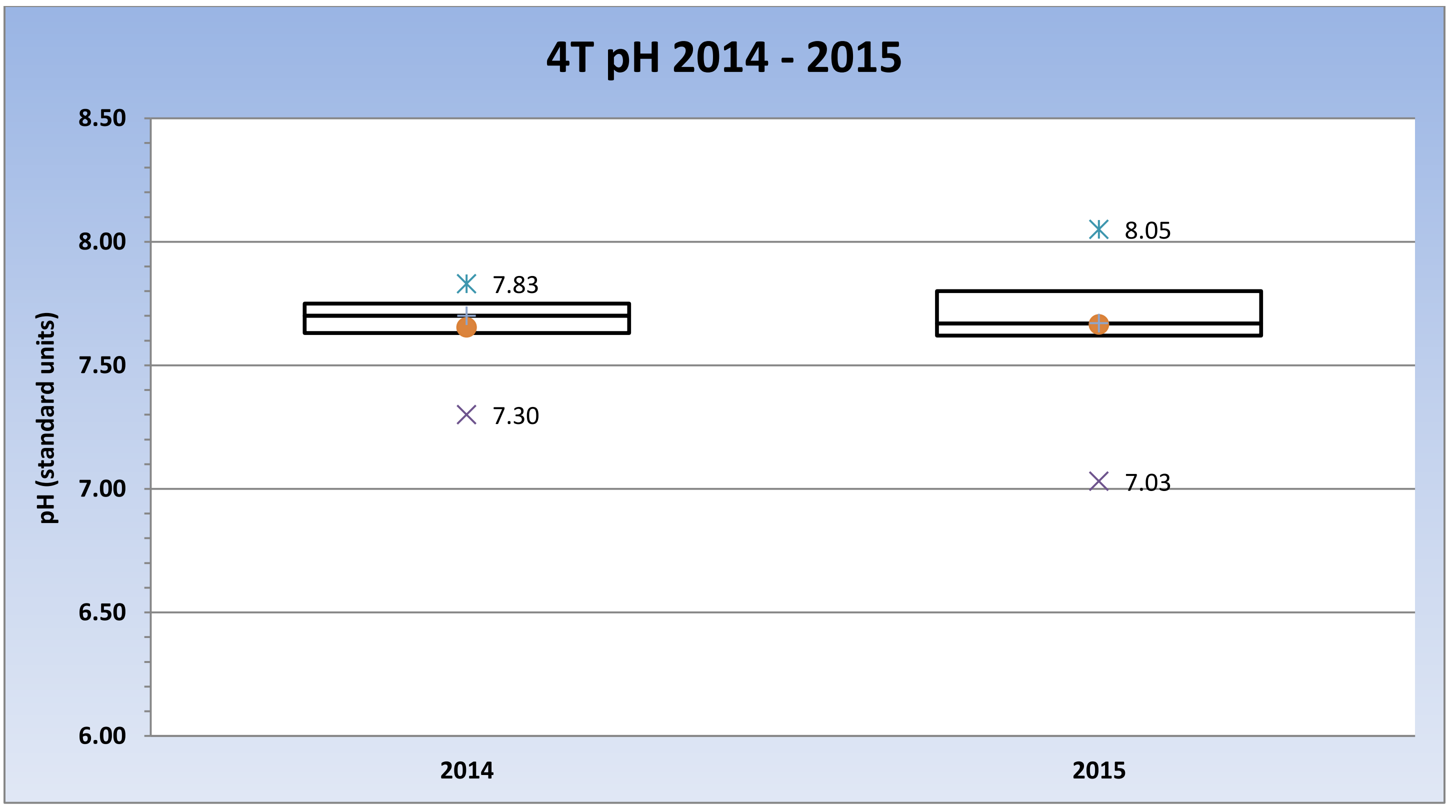

3T Water Temperature 2014 - 2015
90
80
70
60
50
40
30
Water Temperature (°F)
78.00
43.90
80.8
42.7
2014
2015

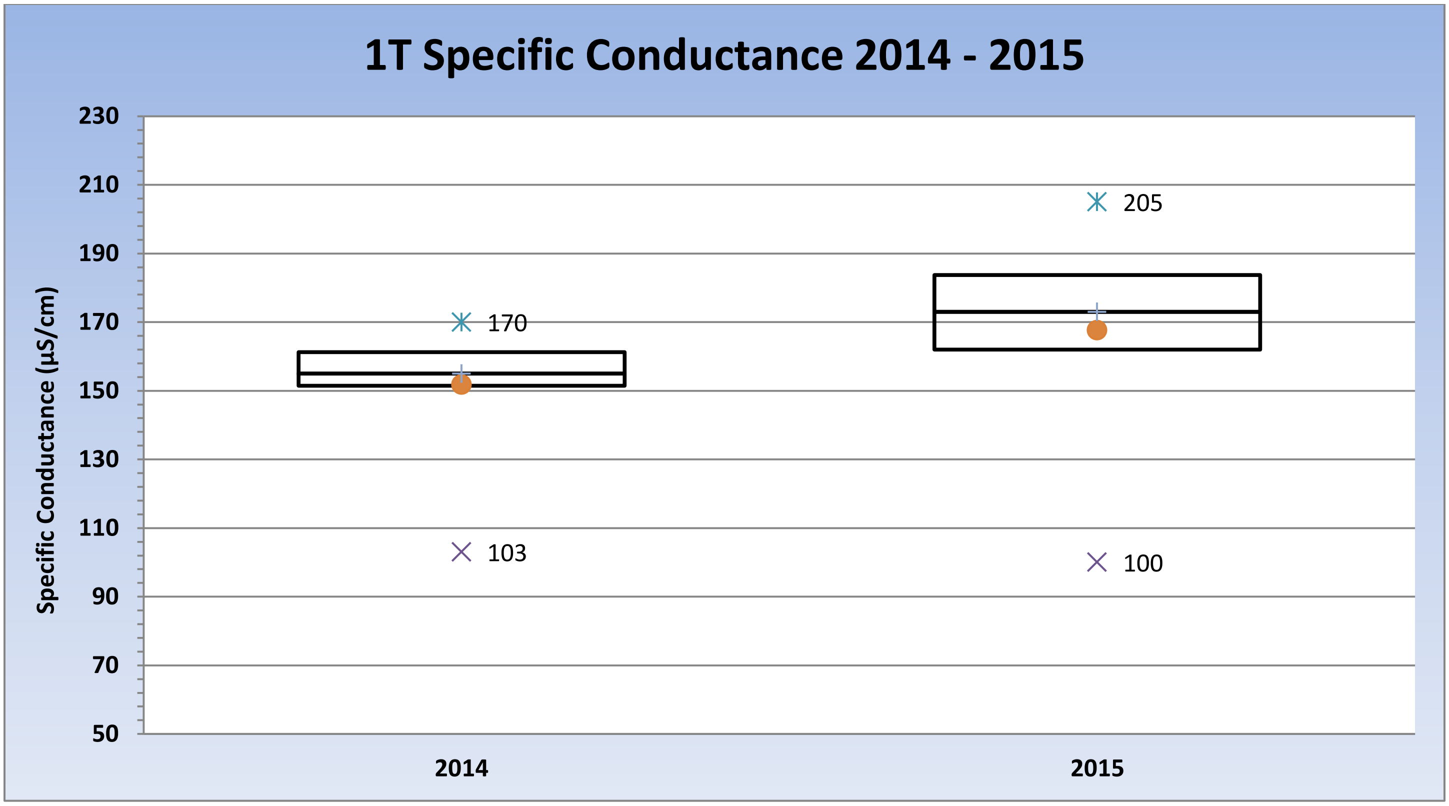

4T Water Temperature 2014 - 2015
90
80
70
60
50
40
30
Water Temperature (°F)
77.90
47.10
79.3
45.1
2014
2015

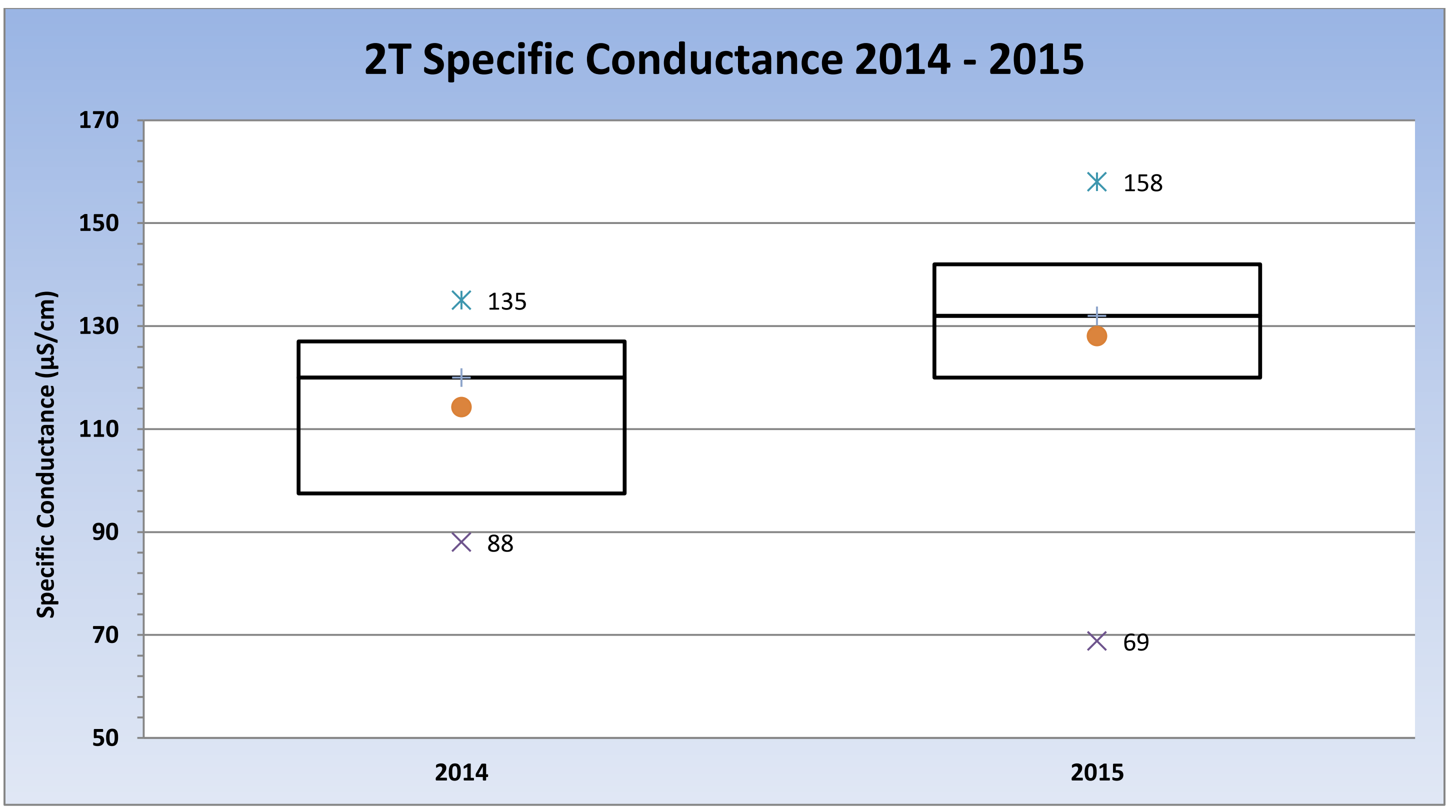

1T pH 2014 - 2015
pH (standard units)
8.50
8.00
7.50
7.00
6.50
6.00
7.20
6.90
7.41
6.8
2014
2015

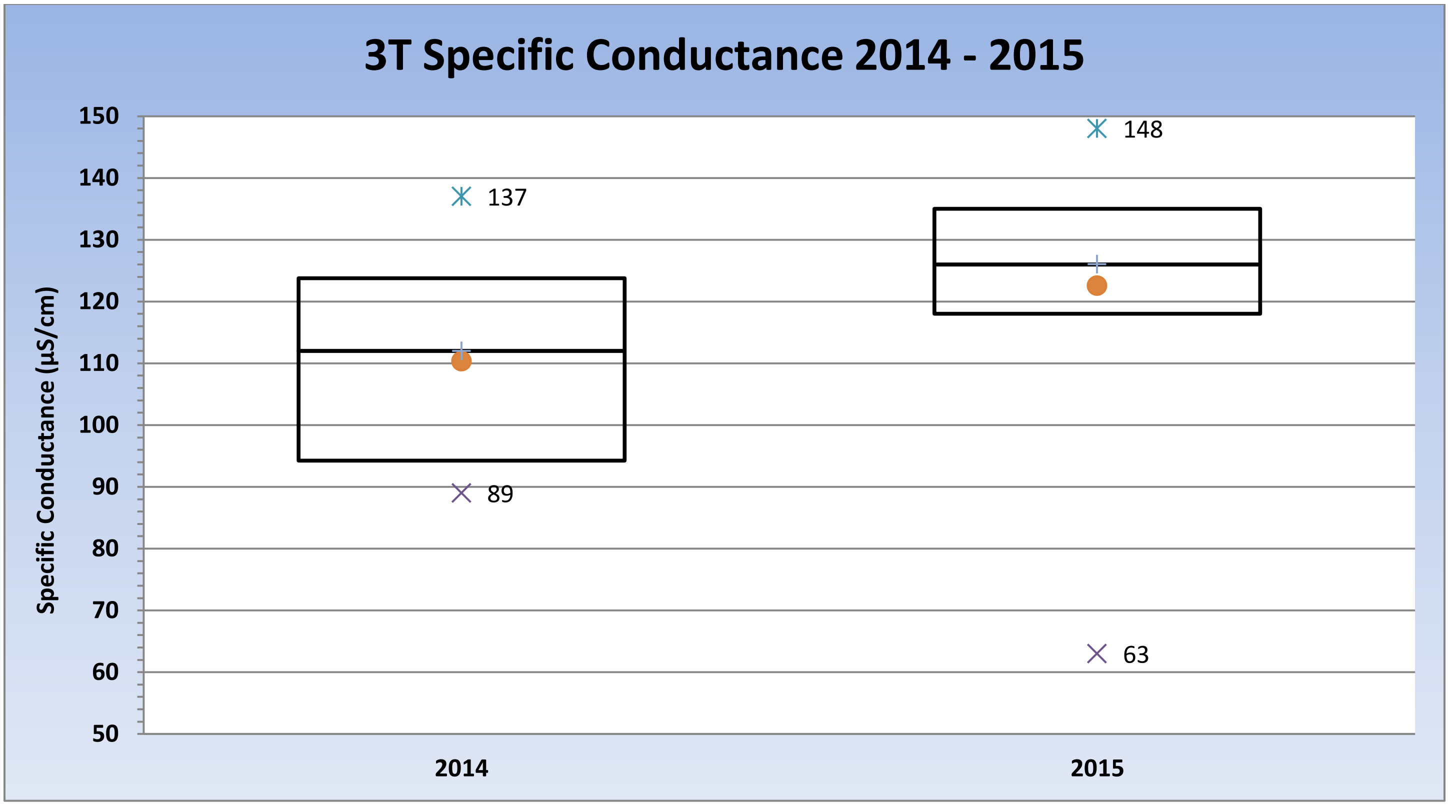

2T pH 2014 - 2015
pH (standard units)
8.50
8.00
7.50
7.00
6.50
6.00
7.71
7.20
7.93
7.32
2014
2015


3T pH 2014 - 2015
pH (standard units)
8.50
8.00
7.50
7.00
6.50
6.00
7.40
7.10
7.59
6.92
2014
2015

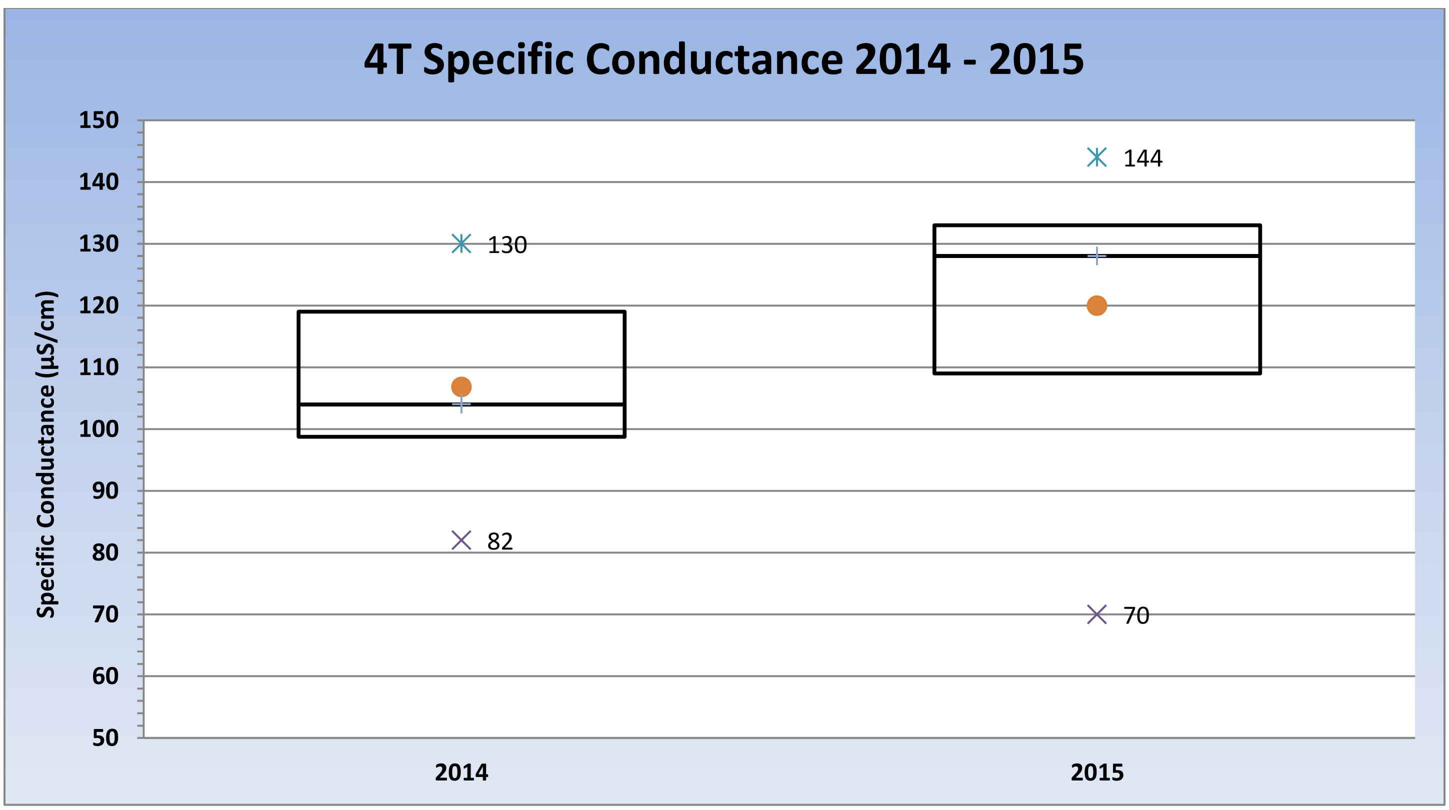

4T pH 2014 - 2015
pH (standard units)
8.50
8.00
7.50
7.00
6.50
6.00
7.83
7.30
8.05
7.03
2014
2015


1T Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
230
210
190
170
150
130
110
90
70
50
2014
2015
205
170
103
100

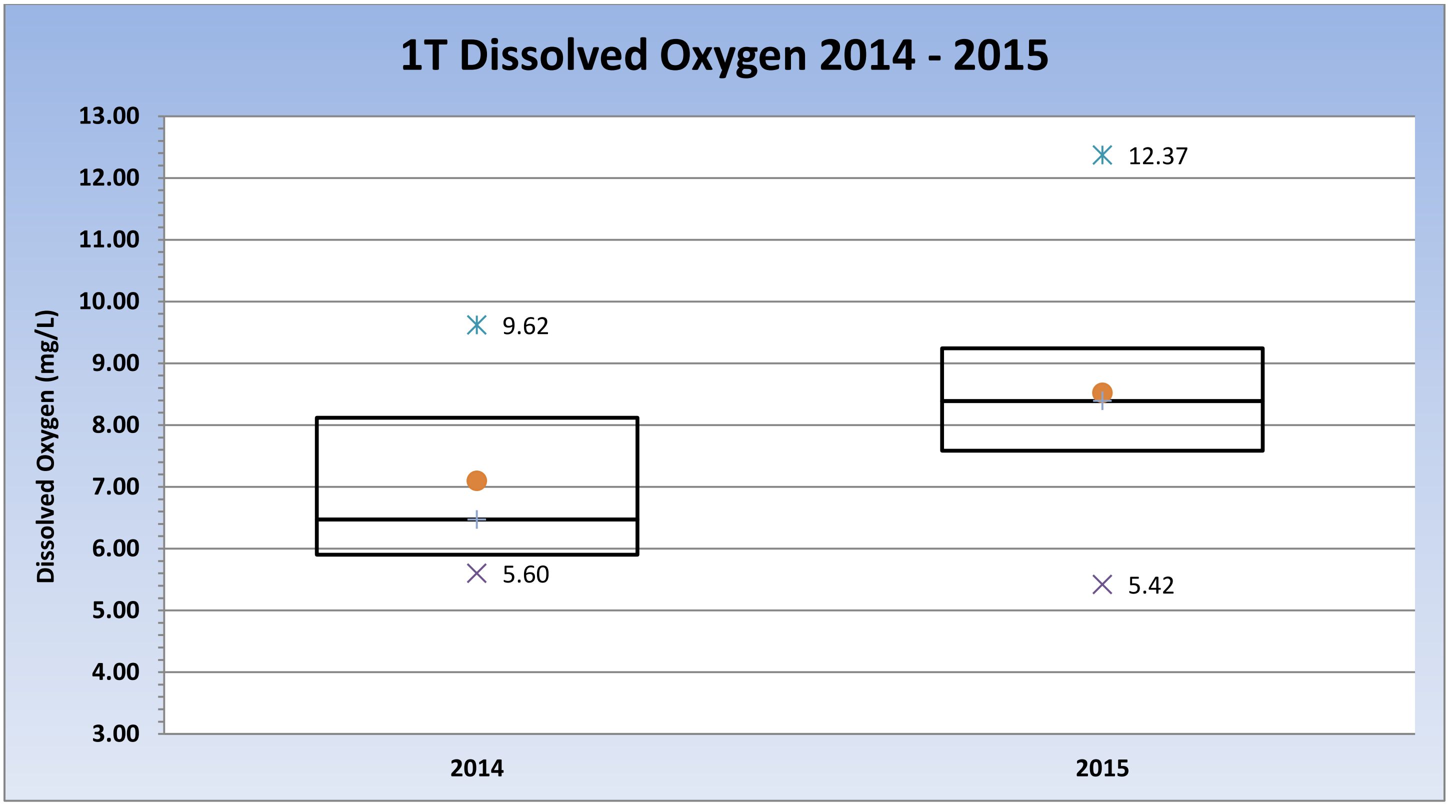

2T Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
170
150
130
110
90
70
50
2014
2015
158
135
88
69

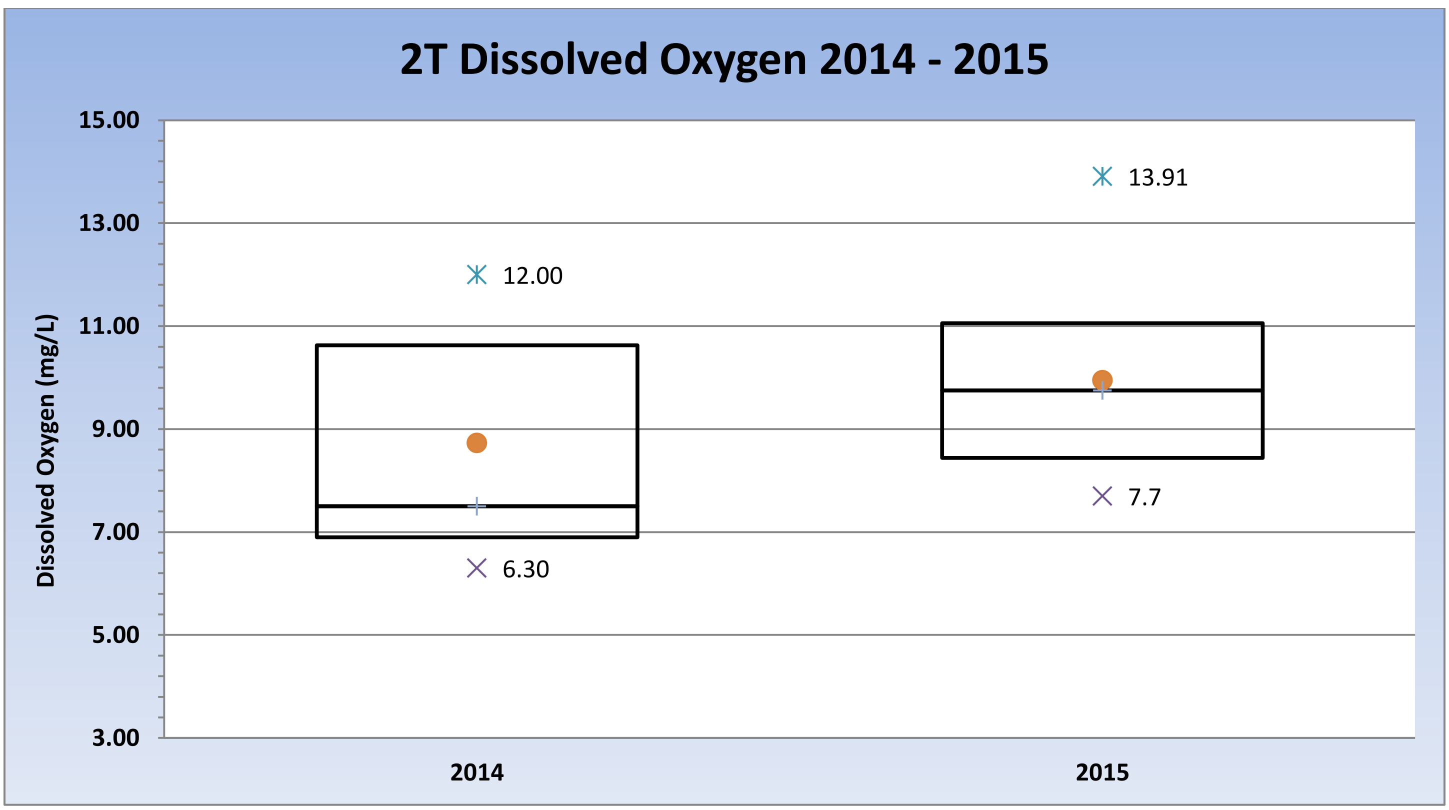


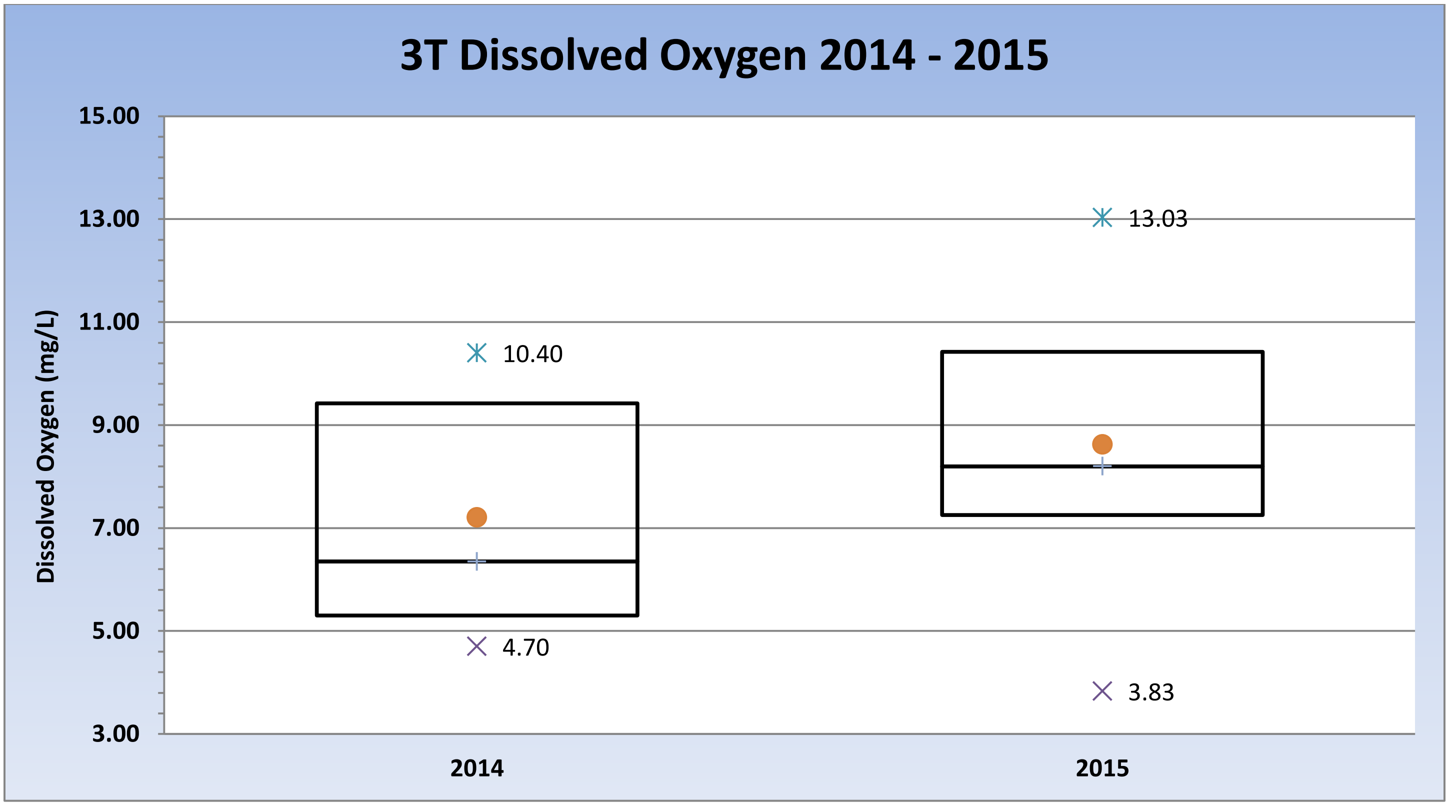
3T Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
150
140
130
120
110
100
90
80
70
60
50
137
89
148
63
2014
2015

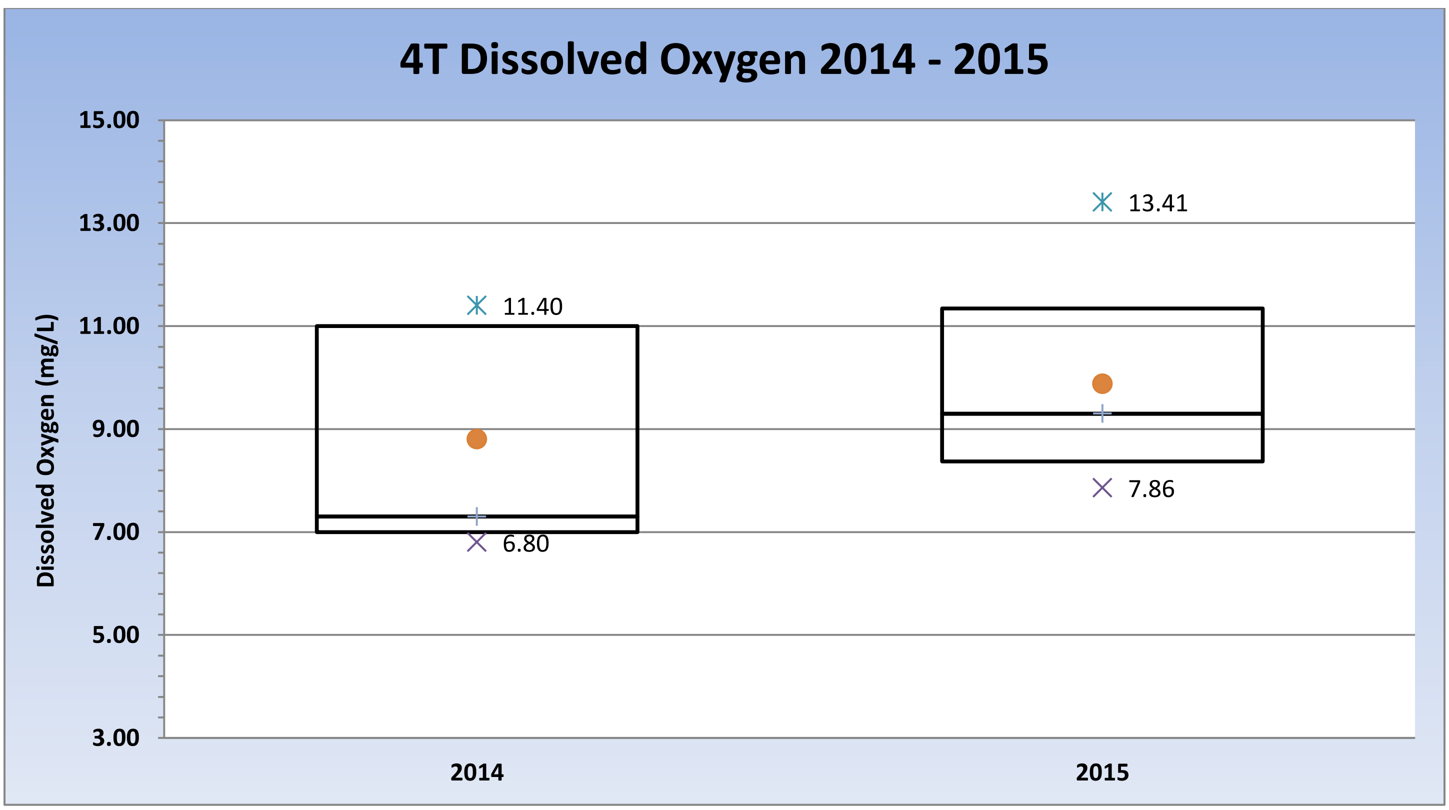


4T Specific Conductance 2014 - 2015
Specific Conductance (µS/cm)
150
140
130
120
110
100
90
80
70
60
50
130
82
144
70
2014
2015


1T Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
9.62
5.60
12.37
5.42
2014
2015


2T Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
15.00
13.00
11.00
9.00
7.00
5.00
3.00
12.00
6.30
13.91
7.7
2014
2015


3T Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
15.00
13.00
11.00
9.00
7.00
5.00
3.00
10.40
4.70
13.03
3.83
2014
2015


4T Dissolved Oxygen 2014 - 2015
Dissolved Oxygen (mg/L)
15.00
13.00
11.00
9.00
7.00
5.00
3.00
11.40
6.80
13.41
7.86
2014
2015

3.0 Multi-parameter Monitoring

3.1 Purpose

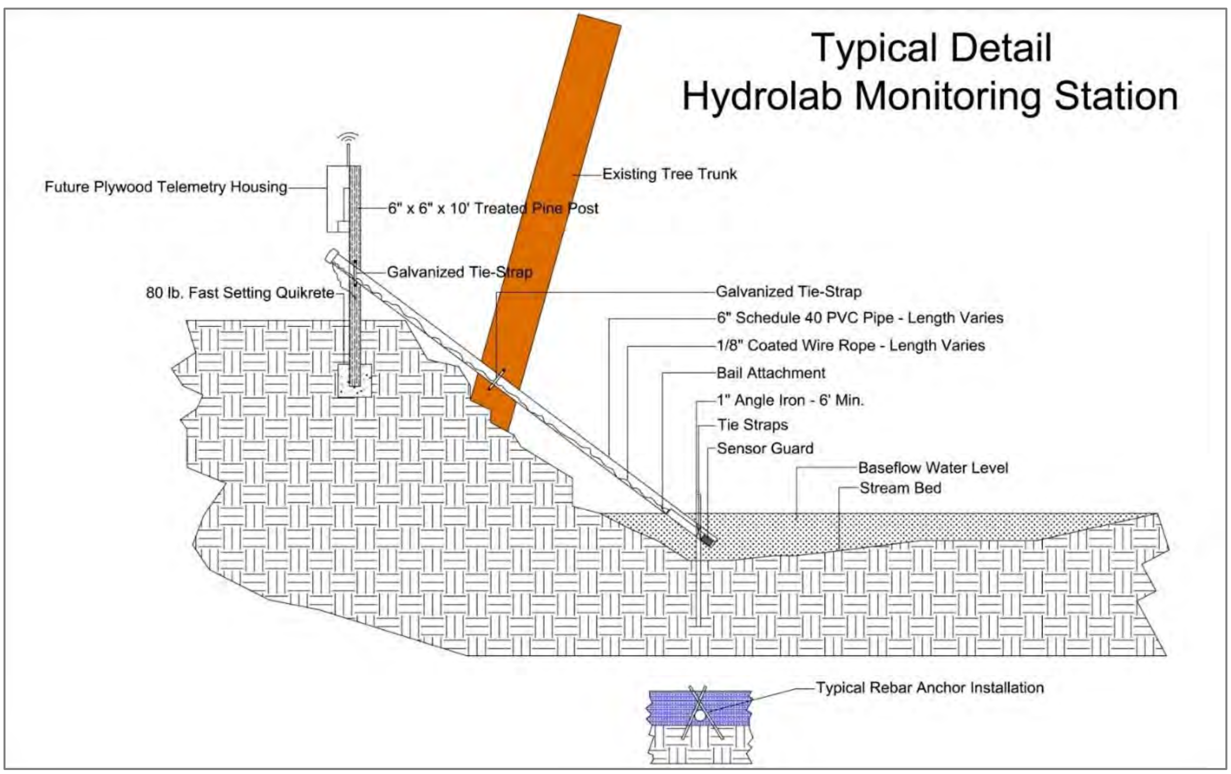
There is no single water quality parameter available to determine the health of a waterbody. Rather, the overall health of aquatic ecosystems is determined by a wide range of biological, chemical, physiochemical, and physical characteristics. Furthermore, these characteristics often vary from region-to-region, 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 multi-parameter monitoring may also be operated as secondary devices for detection and tracing of illicit discharges.

3.2 Definition and Methods

The Water Resource Management Department is equipped with two Hach Hydrolab DS5 Multi-parameter 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's Mill Creek. Each deployment will last one calendar year, for which the monitoring of Parkerson's Mill was performed between July 27, 2012 and July 18, 2012 and the monitoring of Saugahatchee Creek began on August 1, 2013. The Hydrolabs were moved to Moore's Mill Creek beginning August 13, 2014. Each sonde is cleaned and data downloaded once per week and is shipped to the manufacturer once per quarter for performance testing, evaluation, and calibration. 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 15 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.

*Information regarding individual sensor range, accuracy, and resolution and analytical method can be found at http://www.ott.com/en-uk/products/water-quality/hydrolab-ds5-multiparameter-data-sonde/.

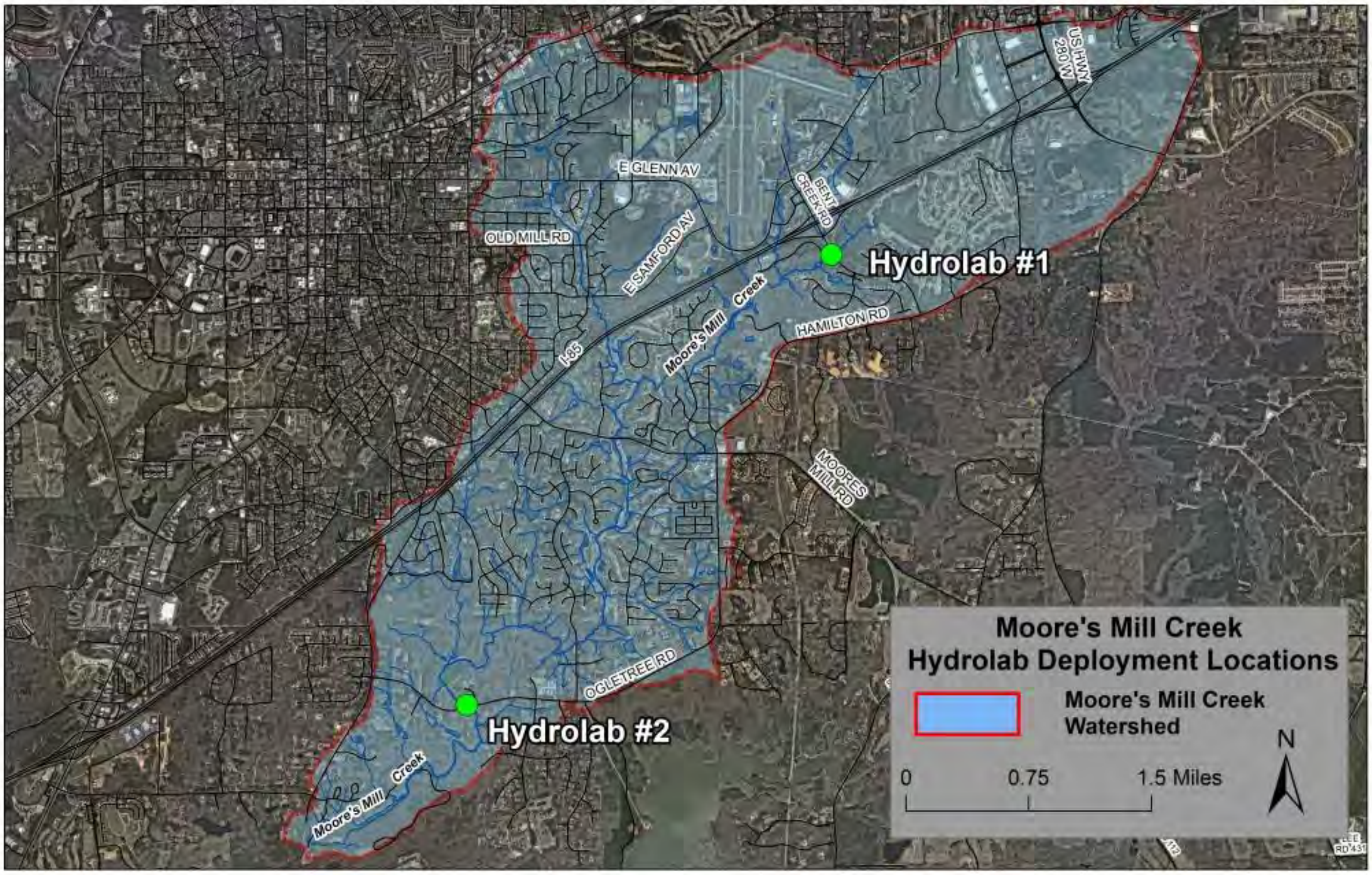


Typical Detail
Hydrolab Monitoring Station
Future Plywood Telemetry Housing
6" x 6" x 10' Treated Pine Post
Existing Tree Trunk
Galvanized Tie-Strap
80 lb. Fast Setting Quikrete
Galvanized Tie-Strap
6" Schedule 40 PVC Pipe - Length Varies
1/8" Coated Wire Rope - Length Varies
Bail Attachment
1" Angle Iron - 6' Min.
Tie Straps
Sensor Guard
Baseflow Water Level
Stream Bed
Typical Rebar Anchor Installation

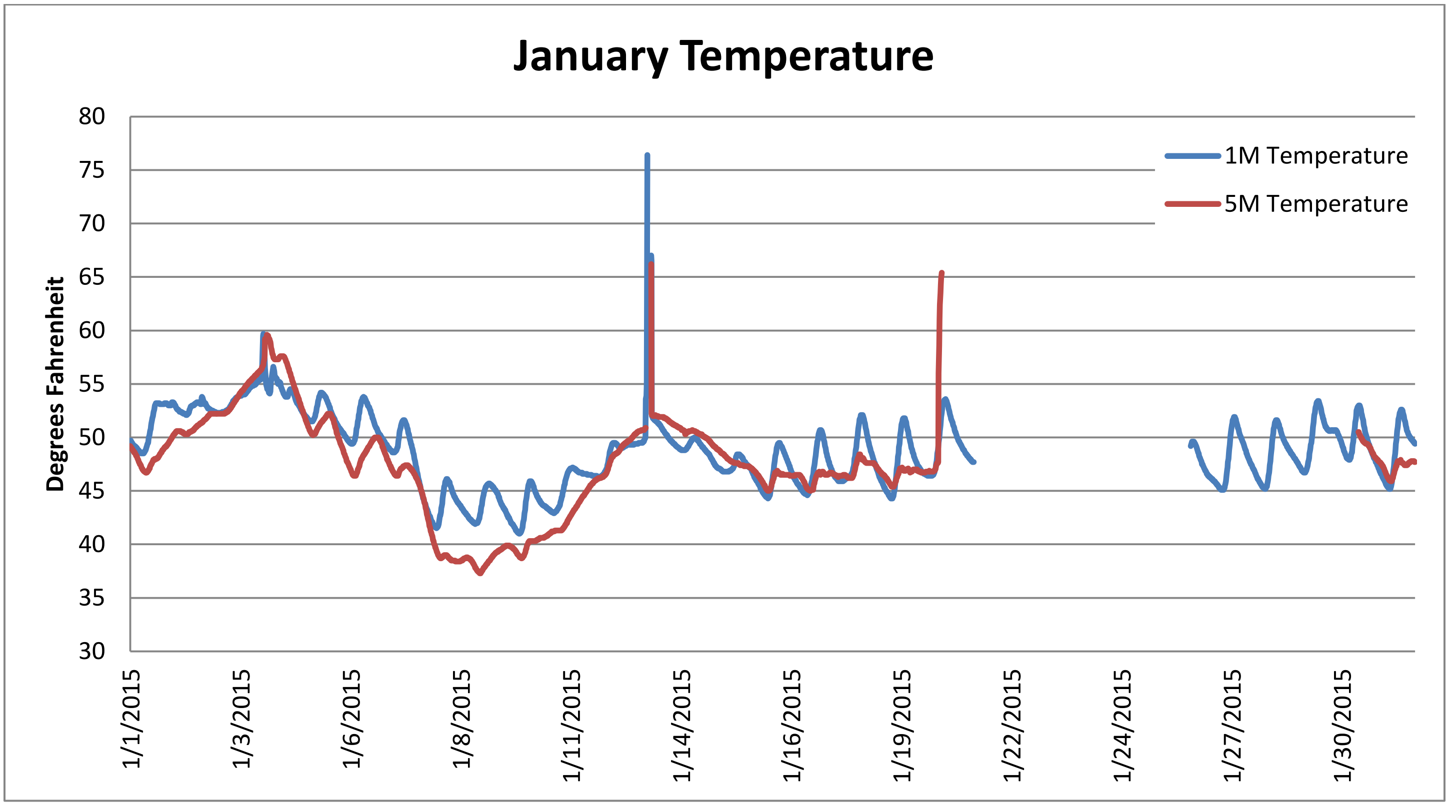
3.3 Multi-parameter Monitoring Data

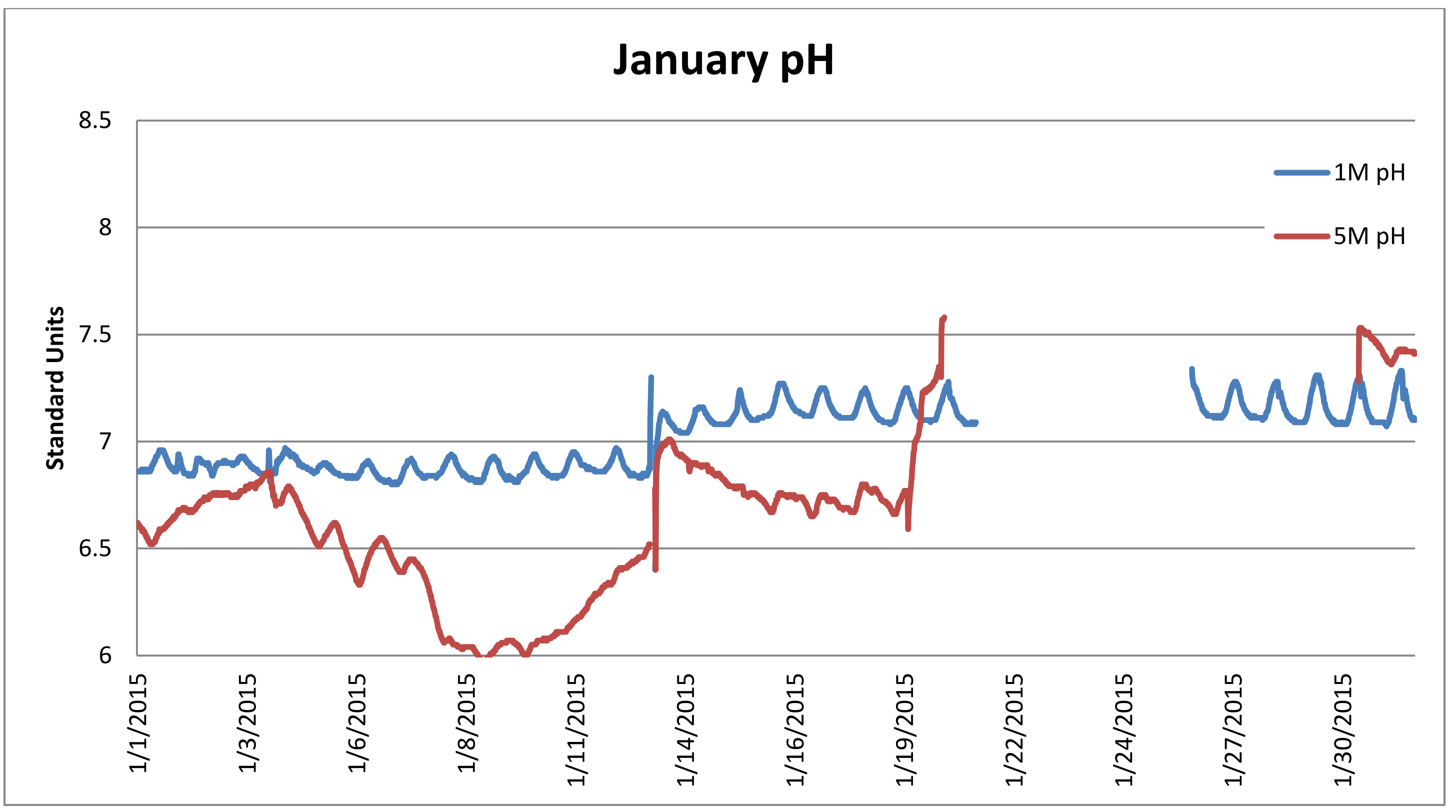
Moore's Mill Creek

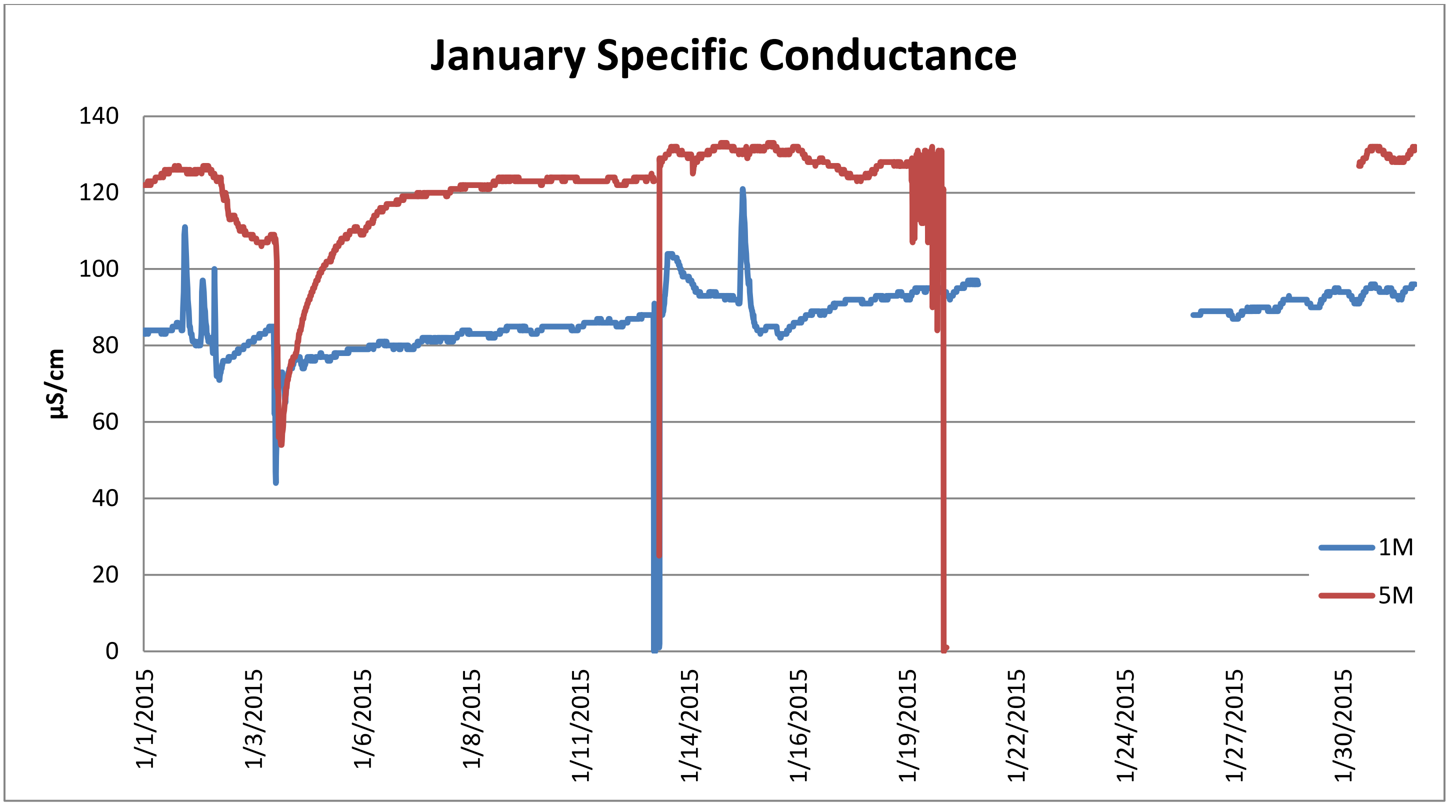
Multi-parameter monitoring began on Moore's Mill Creek on August 13, 2014, and continued through May 2015. Below is a map of the Hydrolab locations on Moore's Mill Creek. Monthly data collected during this extended deployment are graphed below. Site number 1M refers to Hydrolab #1, and site number 5M refers to Hydrolab #2.

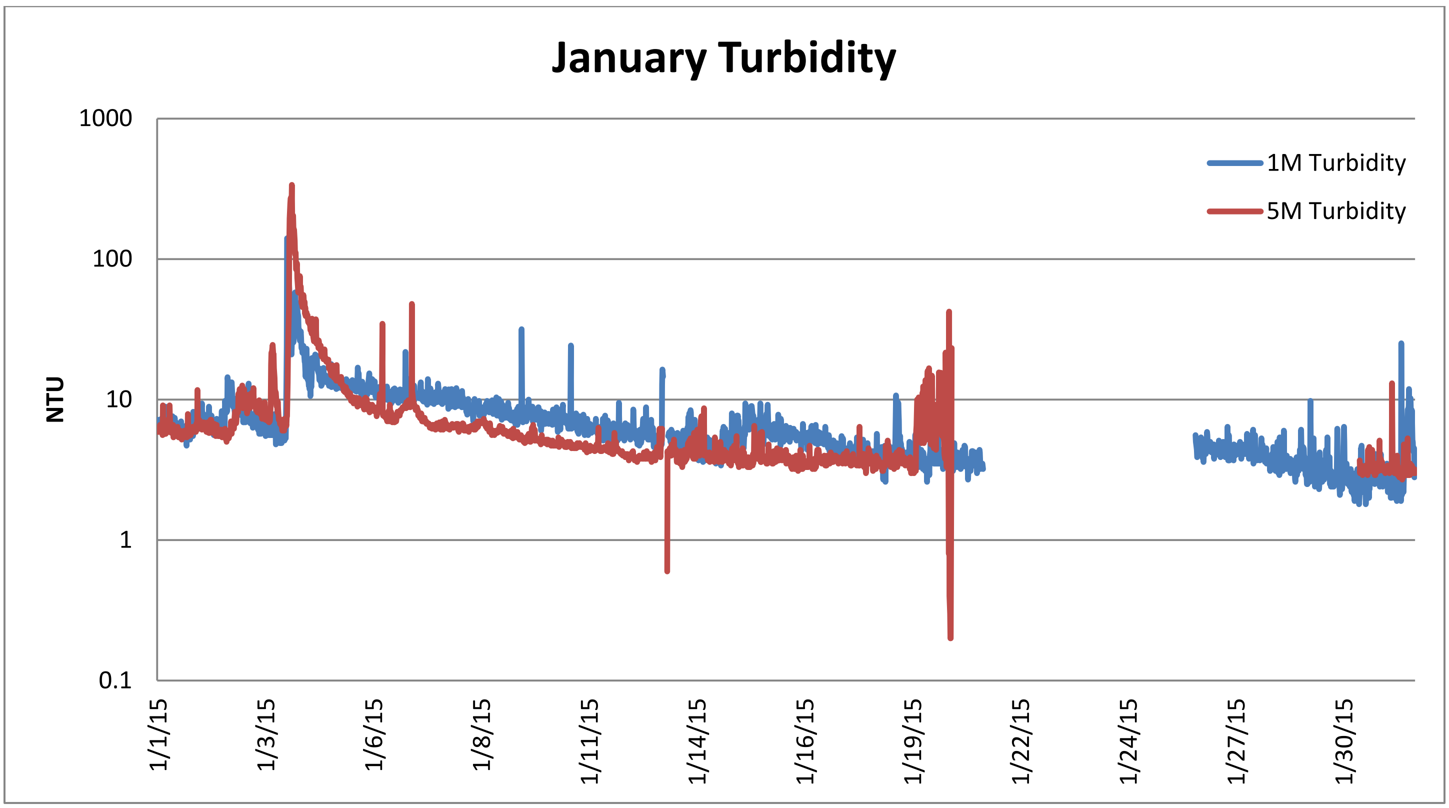


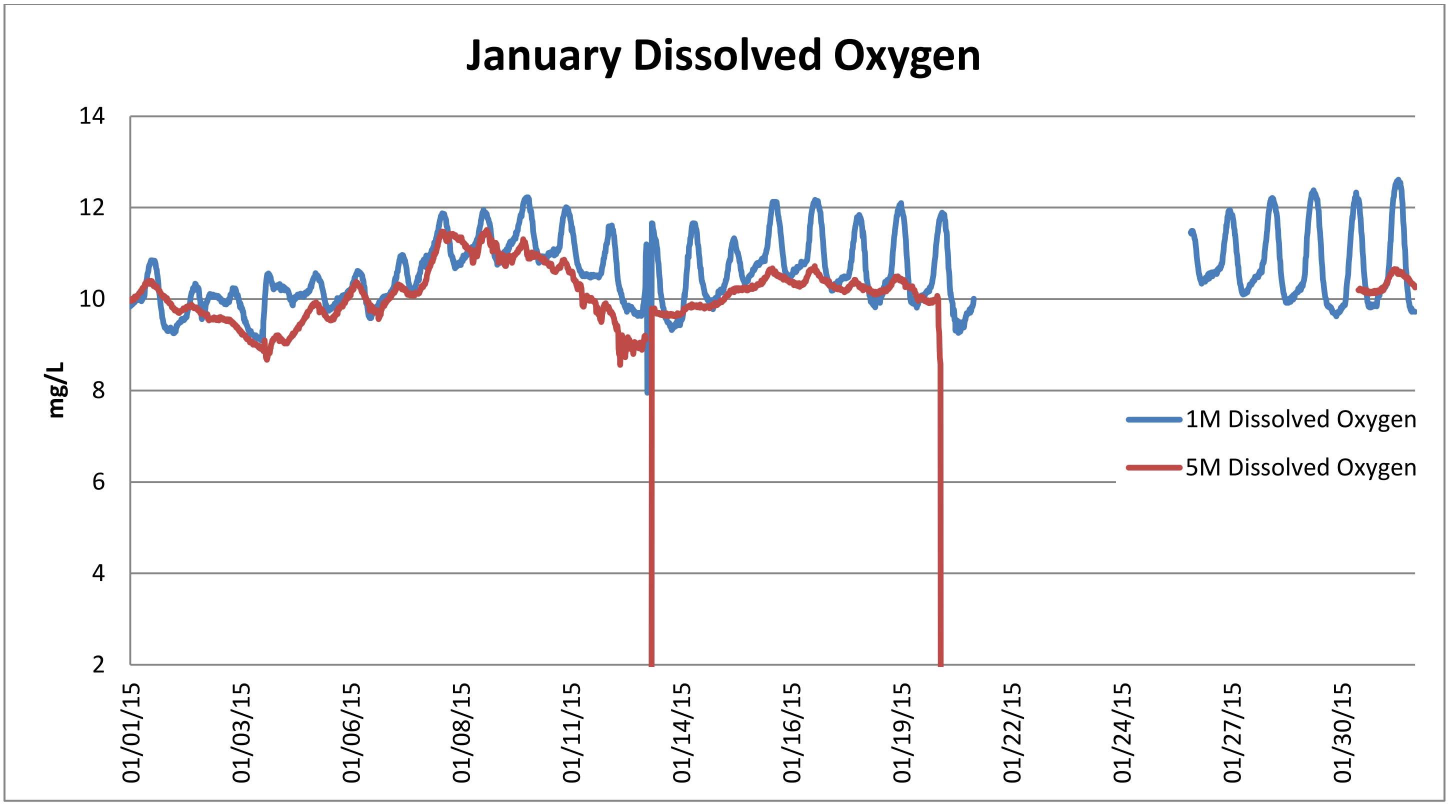
January 2015



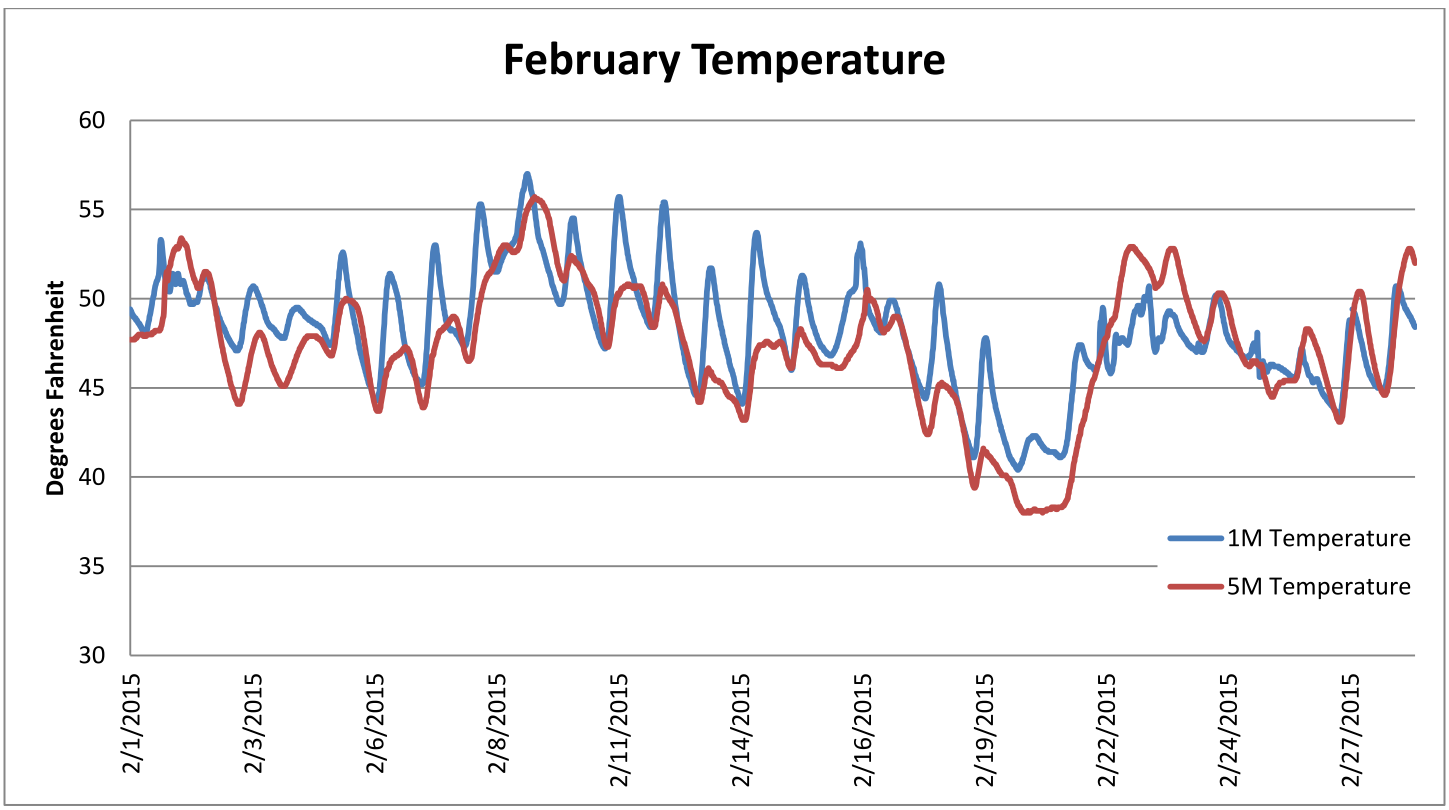


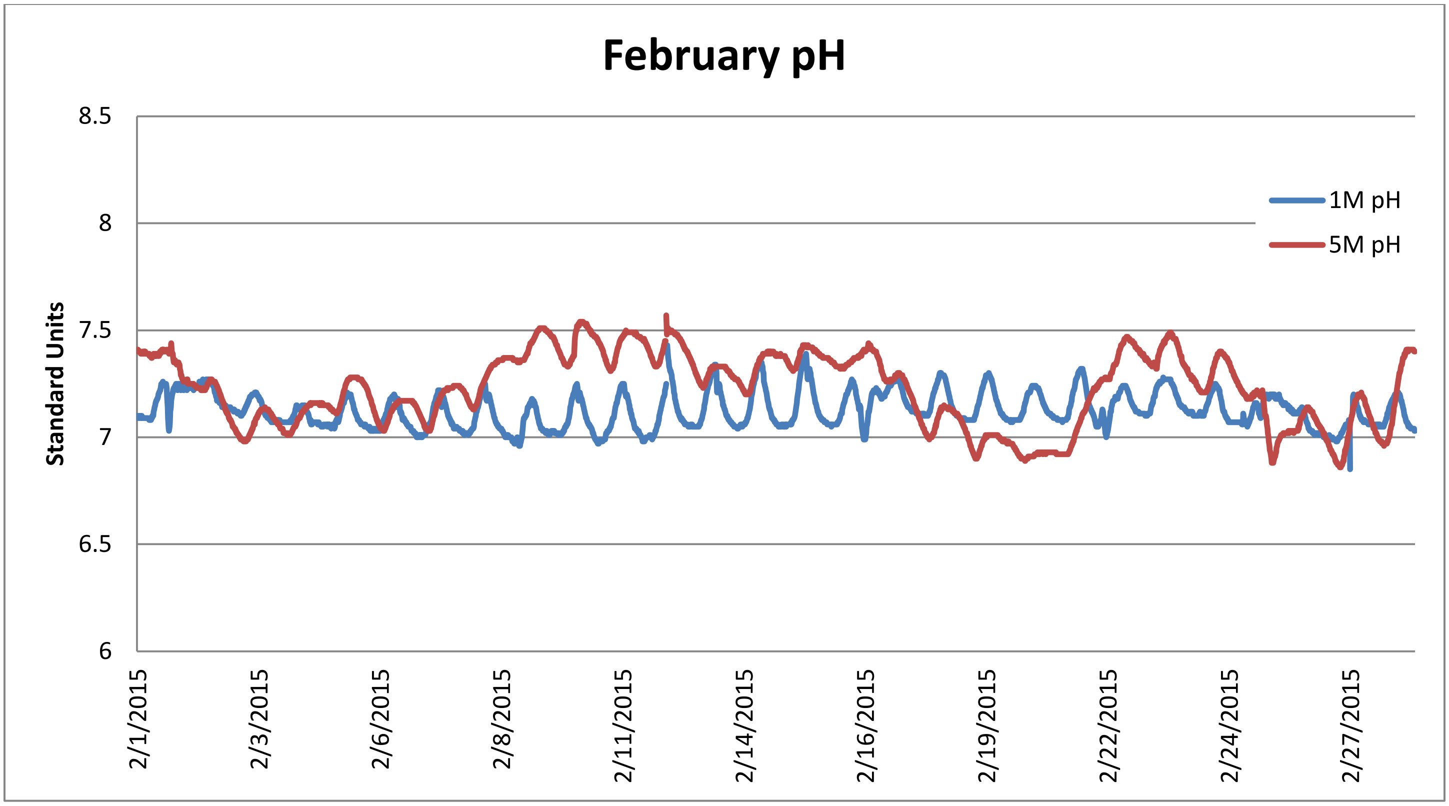

January Specific Conductance
μS/cm
140
120
100
80
60
40
20
0
1M
5M
1/1/2015
1/3/2015
1/6/2015
1/8/2015
1/11/2015
1/14/2015
1/16/2015
1/19/2015
1/22/2015
1/24/2015
1/27/2015
1/30/2015

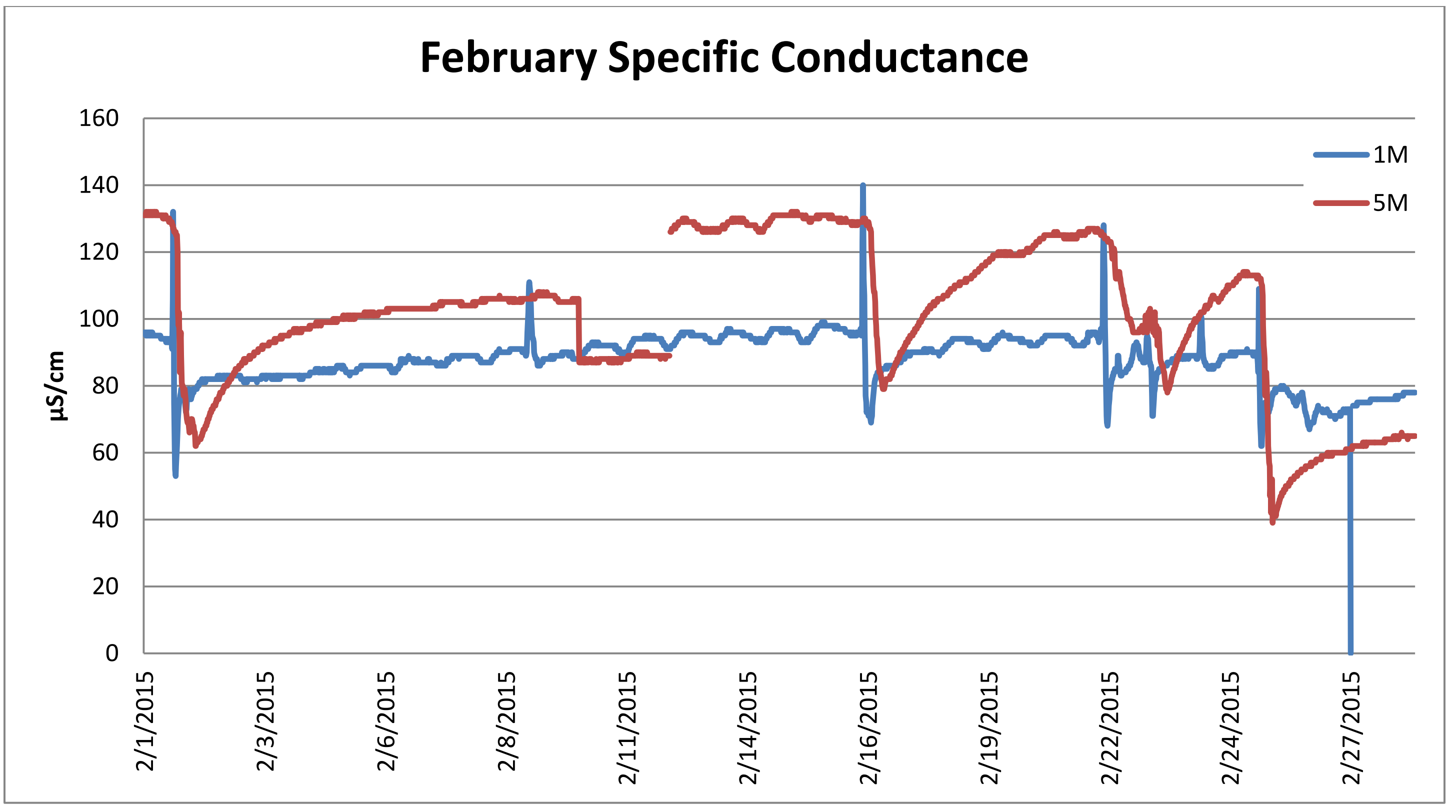

January Turbidity
NTU
1000
100
10
1
0.1
1M Turbidity
5M Turbidity
1/1/15
1/3/15
1/6/15
1/8/15
1/11/15
1/14/15
1/16/15
1/19/15
1/22/15
1/24/15
1/27/15
1/30/15

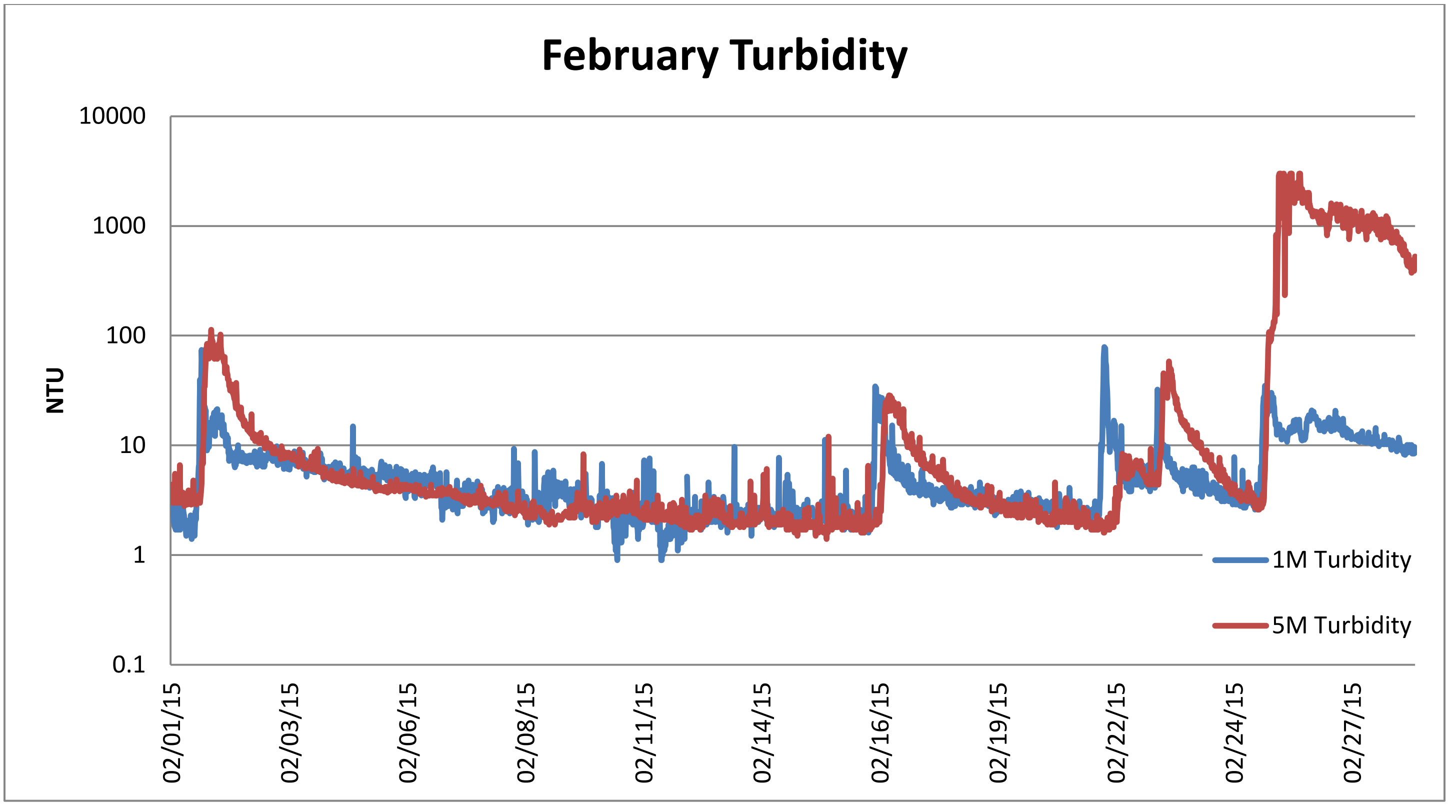


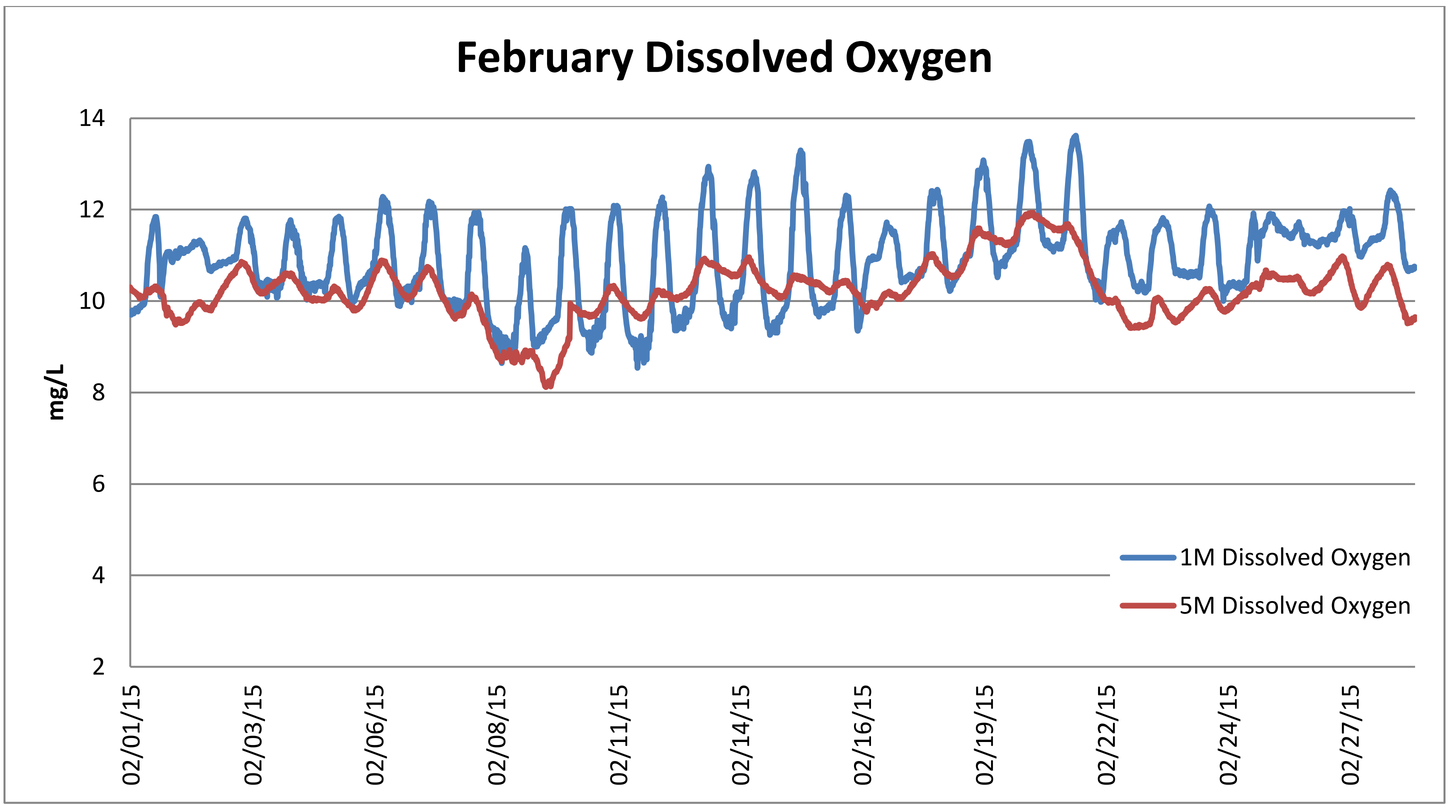
February 2015



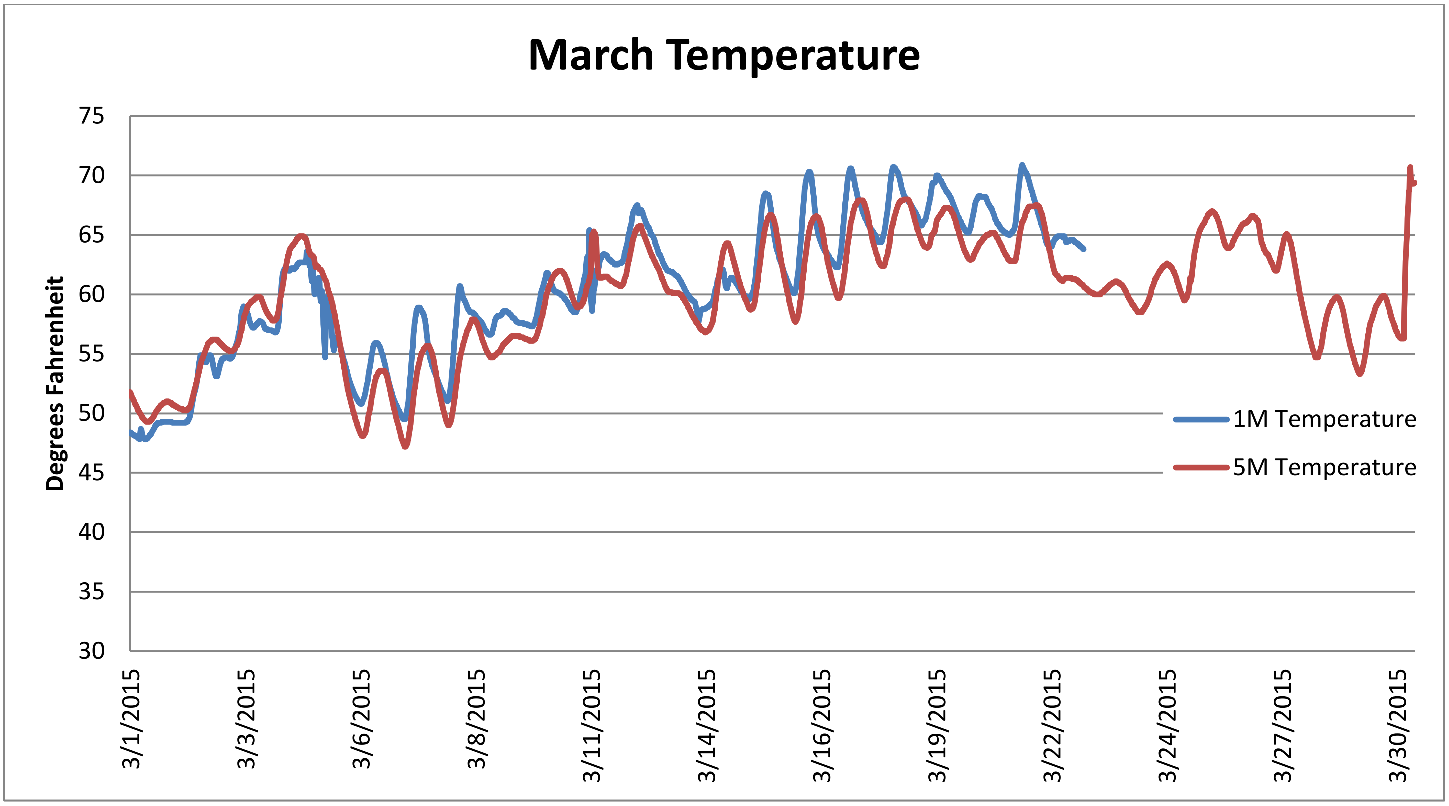

February pH
Standard Units
8.5
8
7.5
7
6.5
6
1M pH
5M pH
2/1/2015
2/3/2015
2/6/2015
2/8/2015
2/11/2015
2/14/2015
2/16/2015
2/19/2015
2/22/2015
2/24/2015
2/27/2015


February Specific Conductance
µS/cm
160
140
120
100
80
60
40
20
0
1M
5M
2/1/2015
2/3/2015
2/6/2015
2/8/2015
2/11/2015
2/14/2015
2/16/2015
2/19/2015
2/22/2015
2/24/2015
2/27/2015

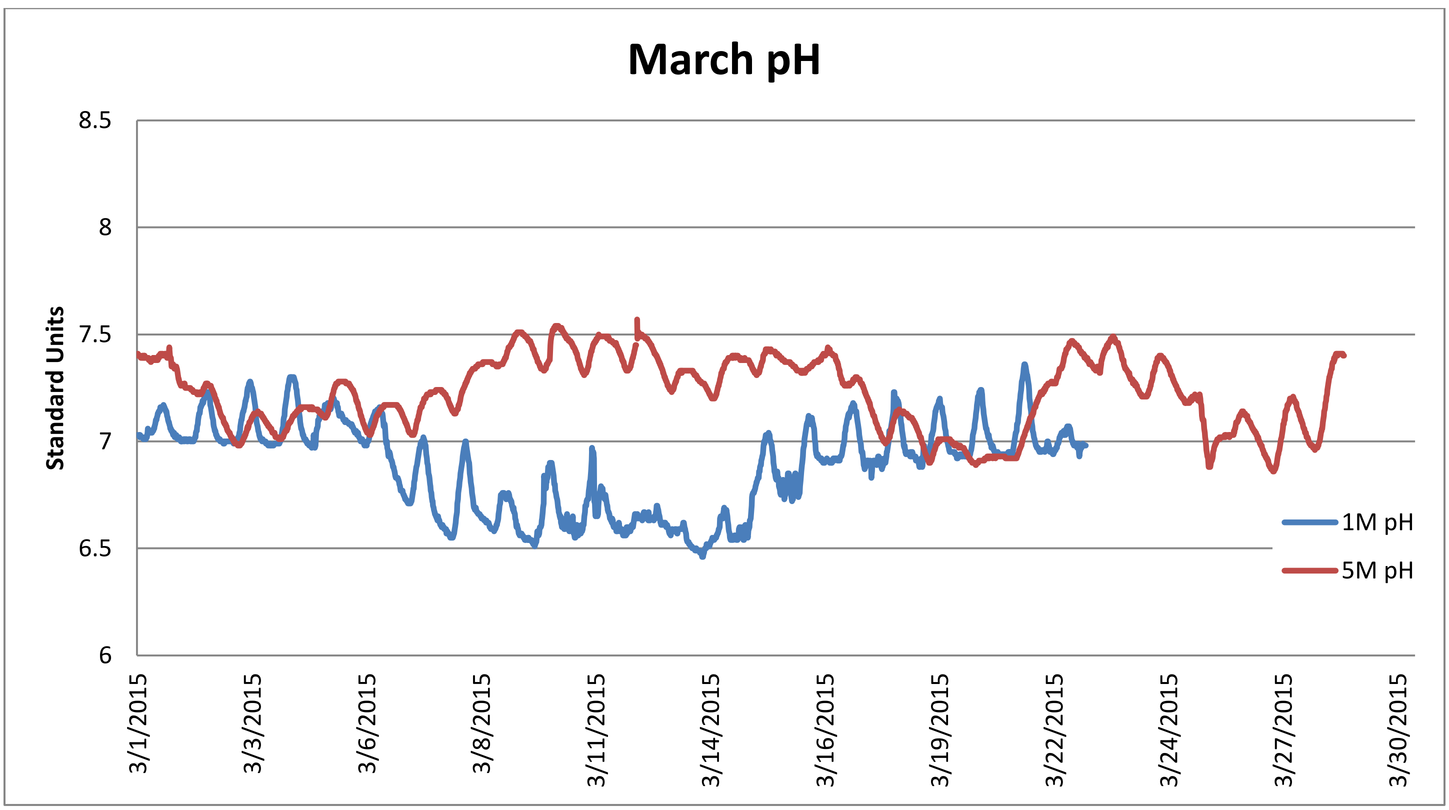

February Turbidity
10000
1000
100
10
1
0.1
NTU
1M Turbidity
5M Turbidity
02/01/15
02/03/15
02/06/15
02/08/15
02/11/15
02/14/15
02/16/15
02/19/15
02/22/15
02/24/15
02/27/15


February Dissolved Oxygen
14
12
10
8
6
4
2
mg/L
1M Dissolved Oxygen
5M Dissolved Oxygen
02/01/15
02/03/15
02/06/15
02/08/15
02/11/15
02/14/15
02/16/15
02/19/15
02/22/15
02/24/15
02/27/15

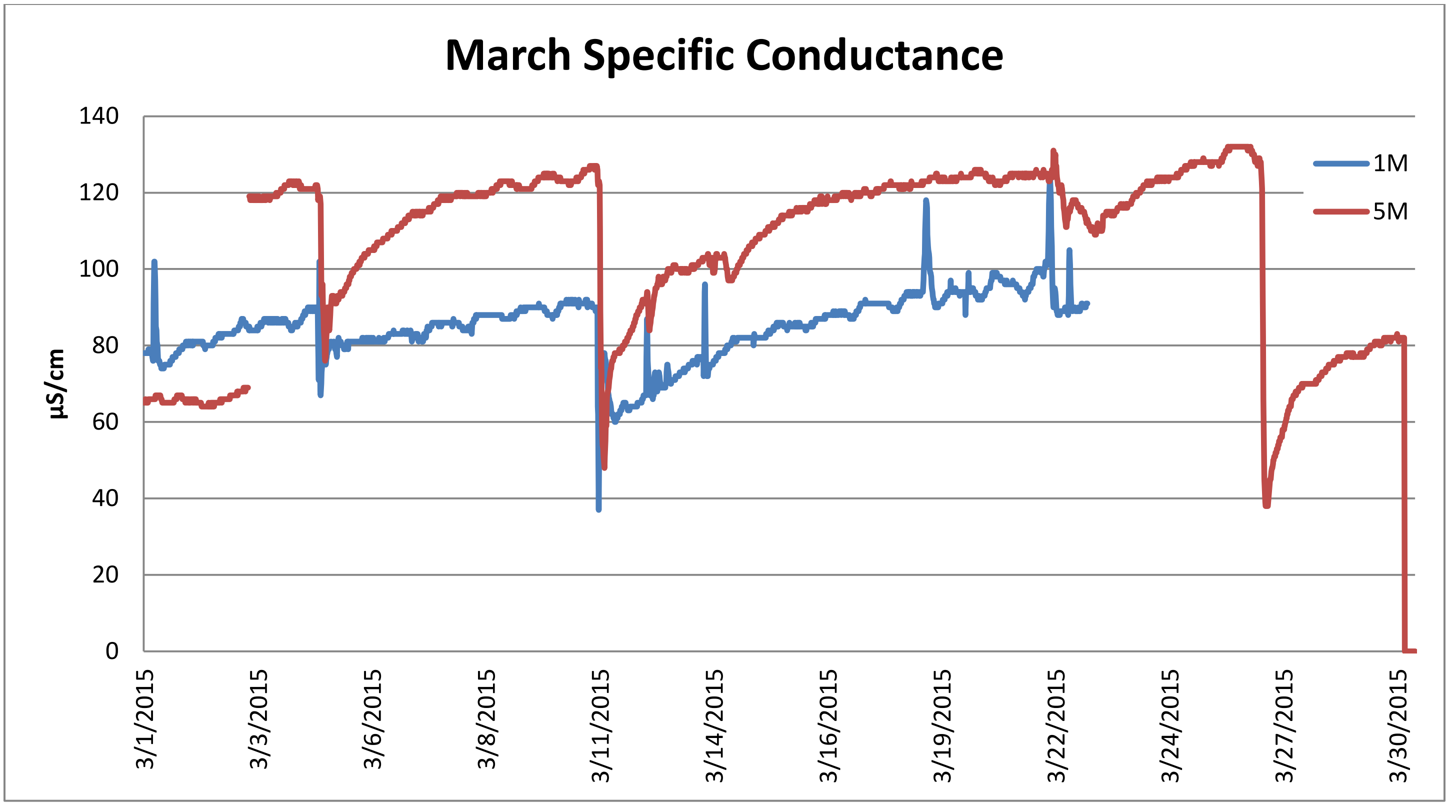
March 2015

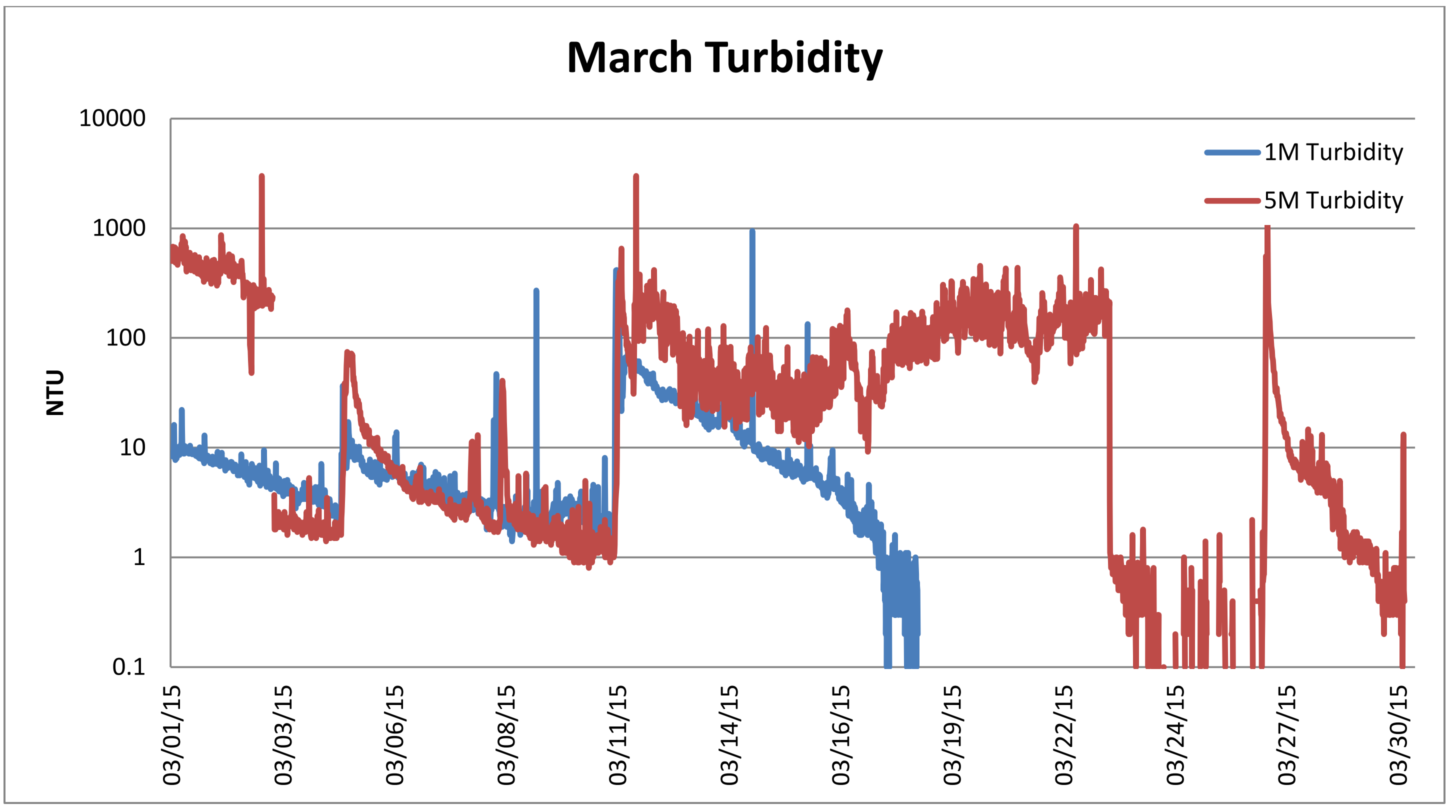


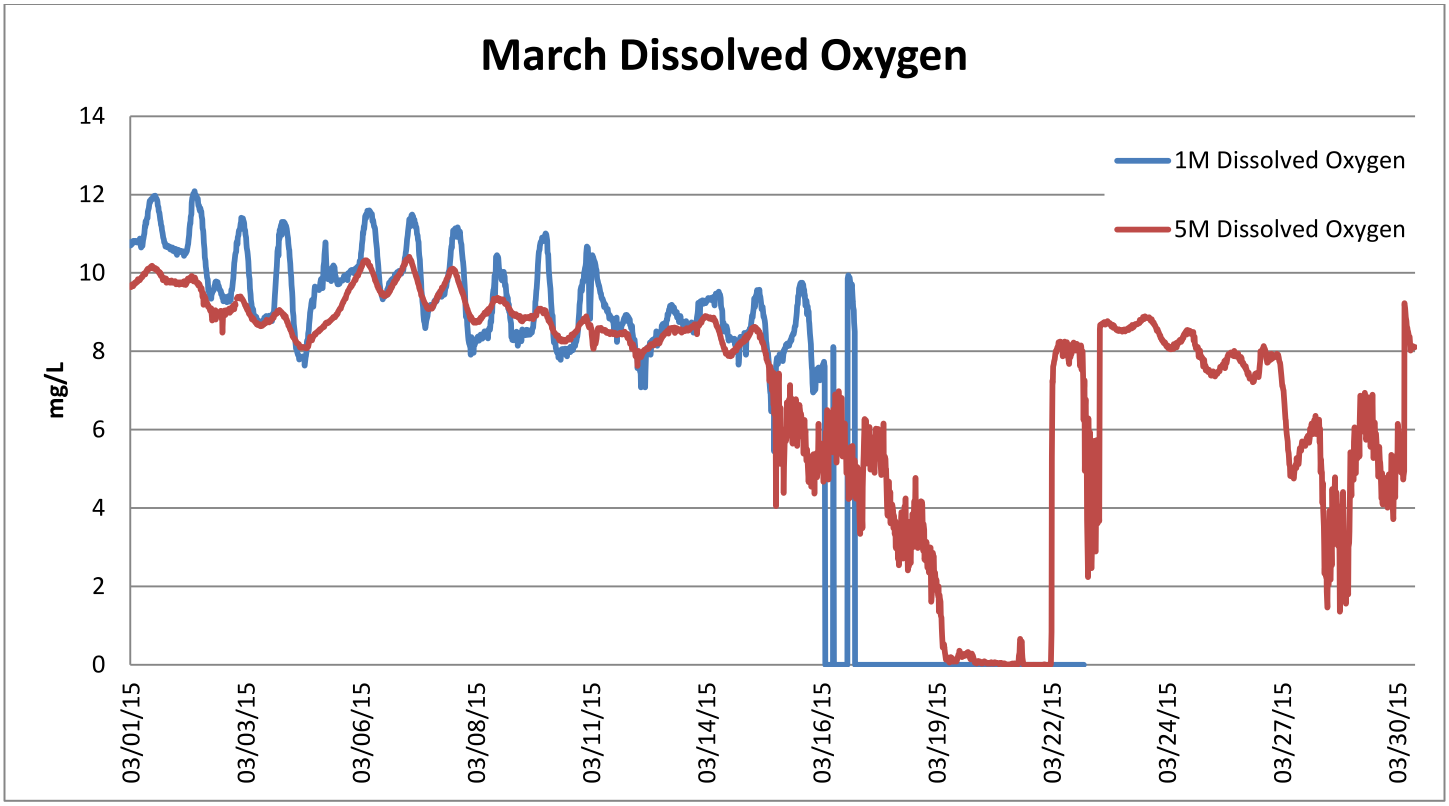
March Temperature
Degrees Fahrenheit
75
70
65
60
55
50
45
40
35
30
3/1/2015
3/3/2015
3/6/2015
3/8/2015
3/11/2015
3/14/2015
3/16/2015
3/19/2015
3/22/2015
3/24/2015
3/27/2015
3/30/2015
1M Temperature
5M Temperature



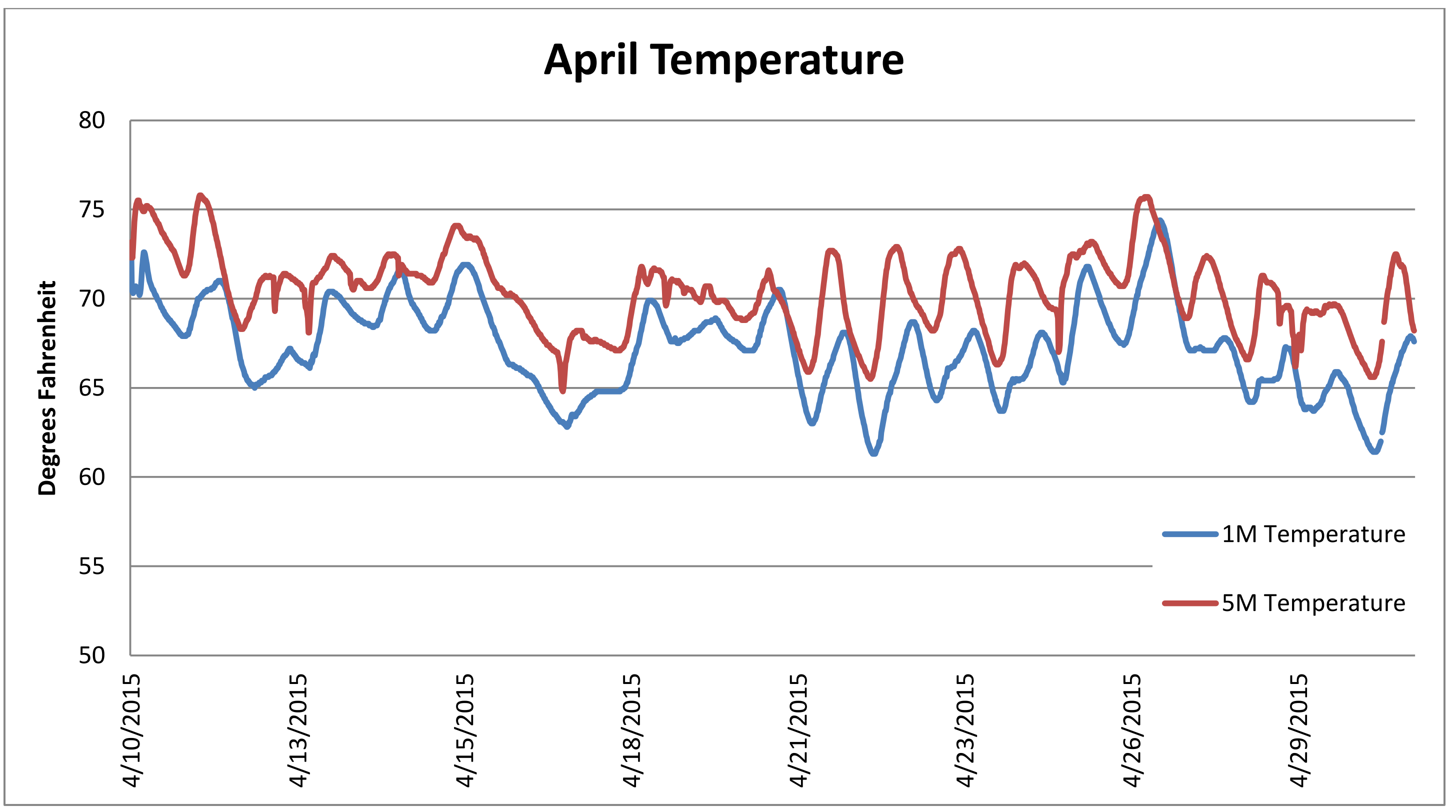
March pH
Standard Units
8.5
8
7.5
7
6.5
6
3/1/2015
3/3/2015
3/6/2015
3/8/2015
3/11/2015
3/14/2015
3/16/2015
3/19/2015
3/22/2015
3/24/2015
3/27/2015
3/30/2015
1M pH
5M pH

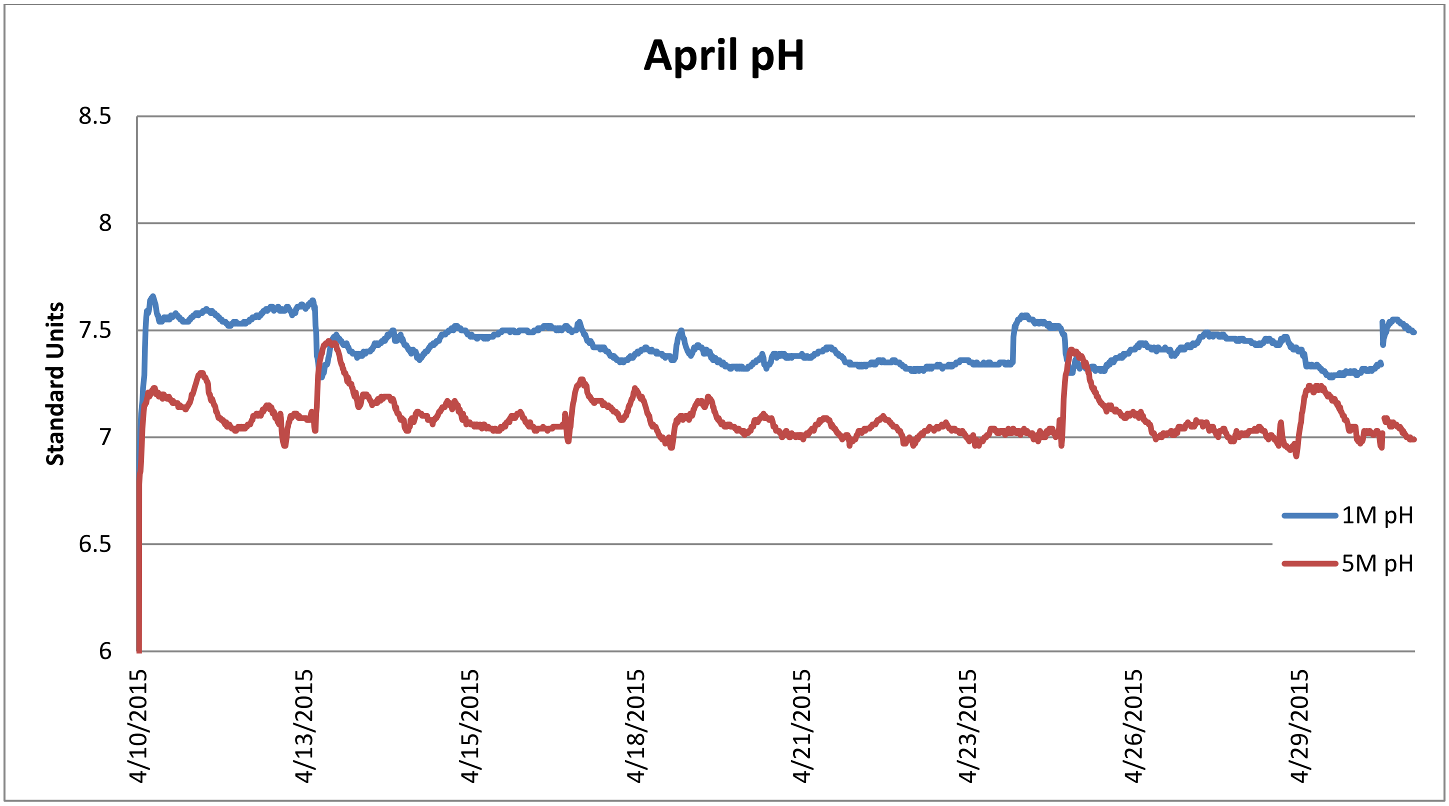

March Specific Conductance
140
120
100
80
60
40
20
0
µS/cm
3/1/2015
3/3/2015
3/6/2015
3/8/2015
3/11/2015
3/14/2015
3/16/2015
3/19/2015
3/22/2015
3/24/2015
3/27/2015
3/30/2015
1M
5M

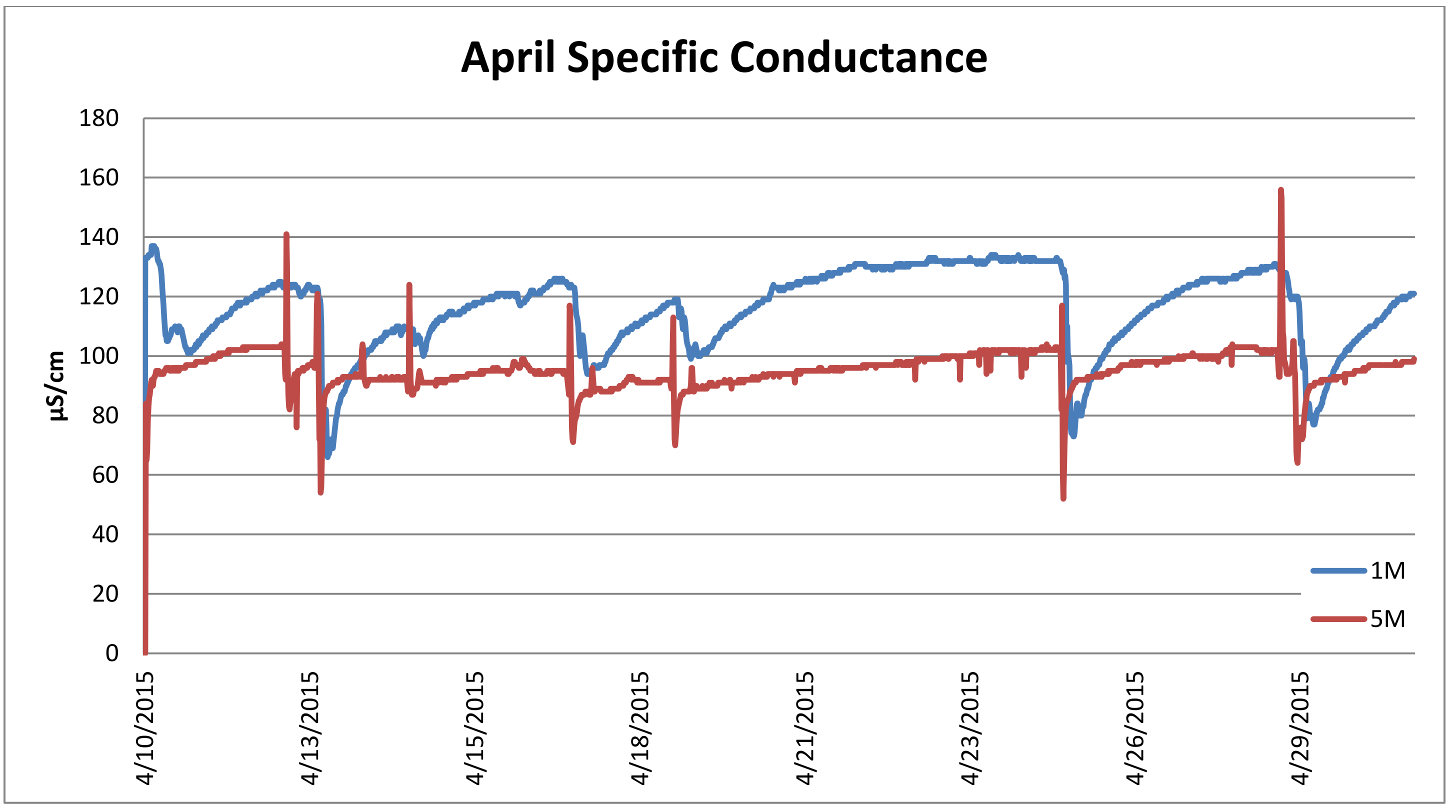

March Turbidity
10000
1000
100
10
1
0.1
NTU
03/01/15
03/03/15
03/06/15
03/08/15
03/11/15
03/14/15
03/16/15
03/19/15
03/22/15
03/24/15
03/27/15
03/30/15
1M Turbidity
5M Turbidity

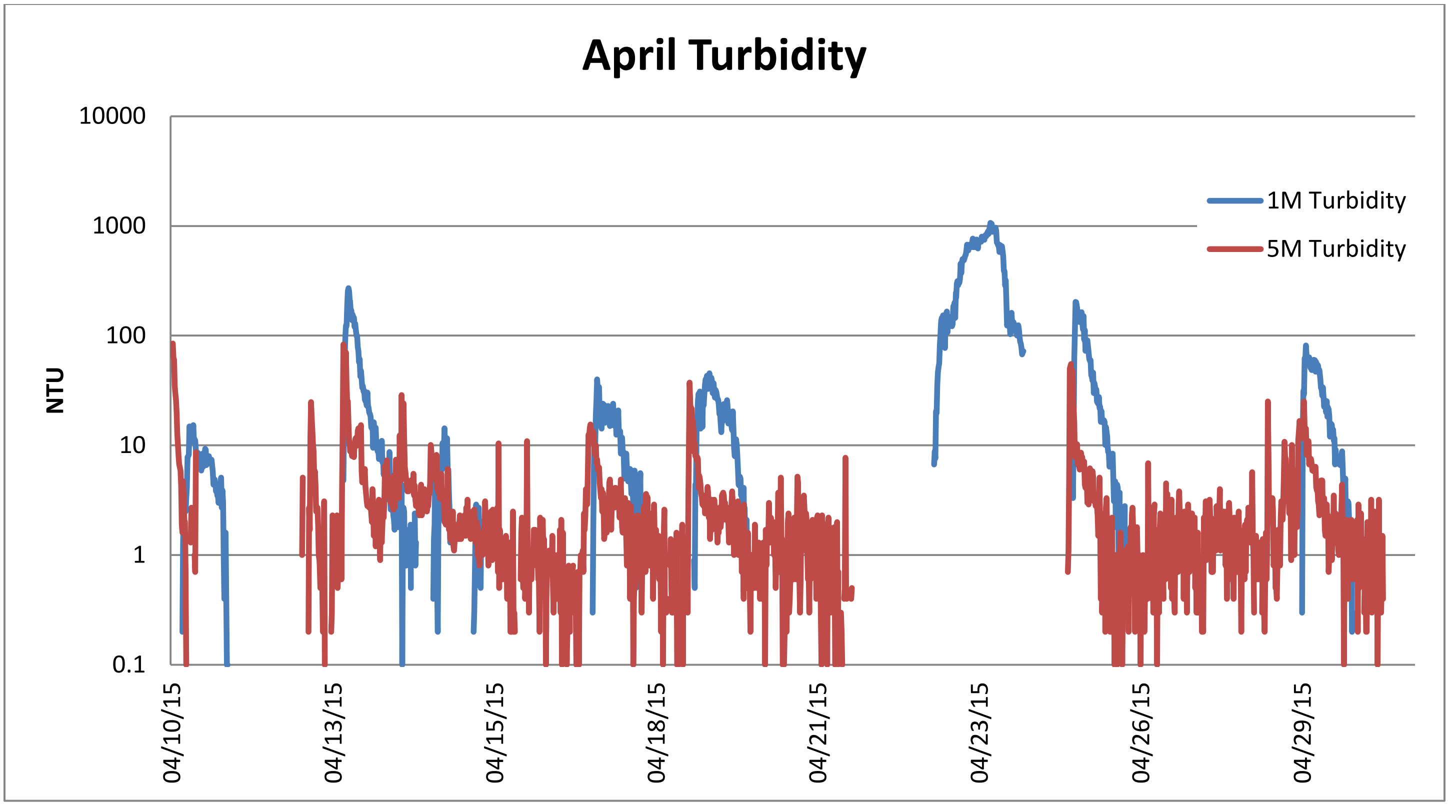

March Dissolved Oxygen
mg/L
14
12
10
8
6
4
2
0
1M Dissolved Oxygen
5M Dissolved Oxygen
03/01/15
03/03/15
03/06/15
03/08/15
03/11/15
03/14/15
03/16/15
03/19/15
03/22/15
03/24/15
03/27/15
03/30/15

April 2015

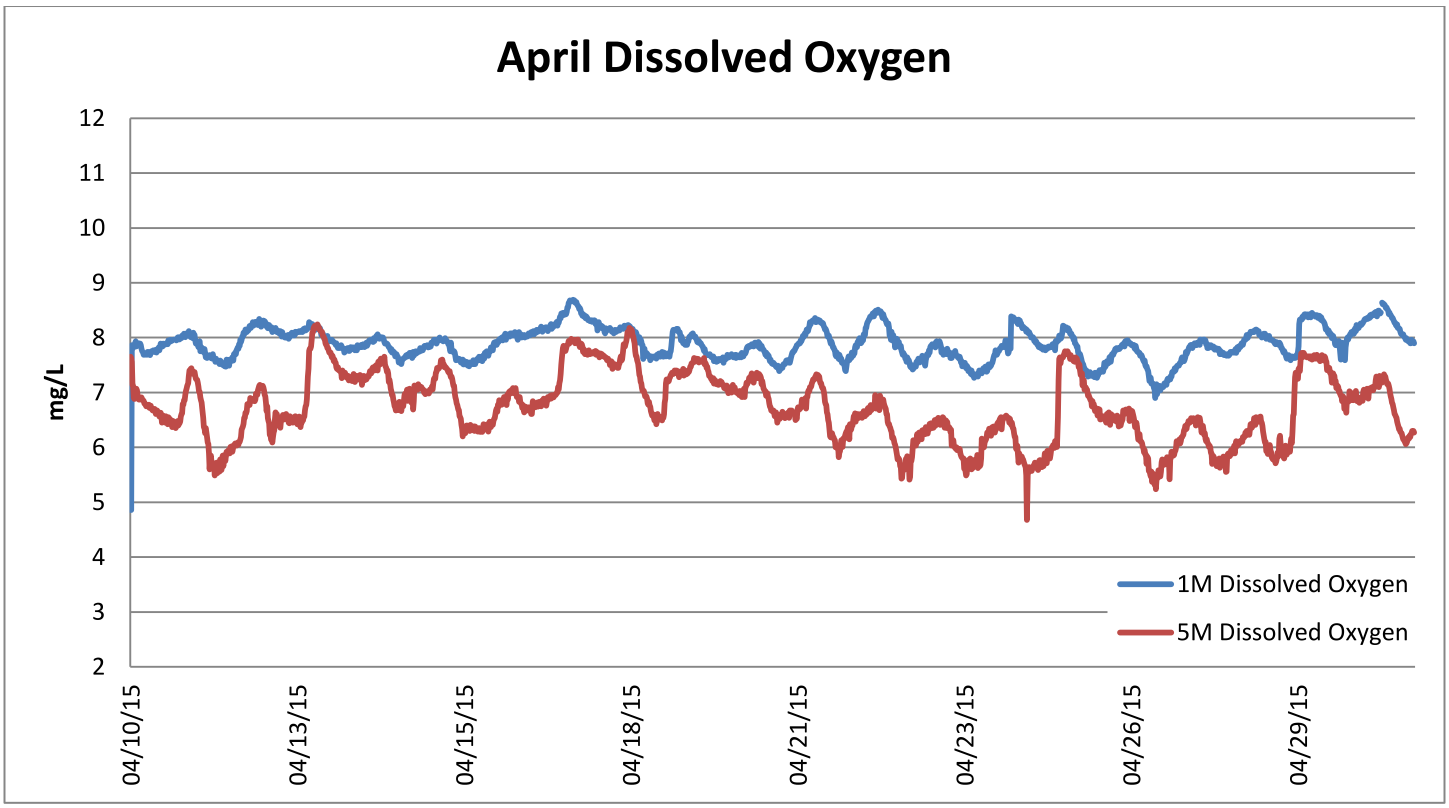

April Temperature
Degrees Fahrenheit
80
75
70
65
60
55
50
1M Temperature
5M Temperature
4/10/2015
4/13/2015
4/15/2015
4/18/2015
4/21/2015
4/23/2015
4/26/2015
4/29/2015


April pH
Standard Units
8.5
8
7.5
7
6.5
6
1M pH
5M pH
4/10/2015
4/13/2015
4/15/2015
4/18/2015
4/21/2015
4/23/2015
4/26/2015
4/29/2015


April Specific Conductance
µS/cm
180
160
140
120
100
80
60
40
20
0
1M
5M
4/10/2015
4/13/2015
4/15/2015
4/18/2015
4/21/2015
4/23/2015
4/26/2015
4/29/2015

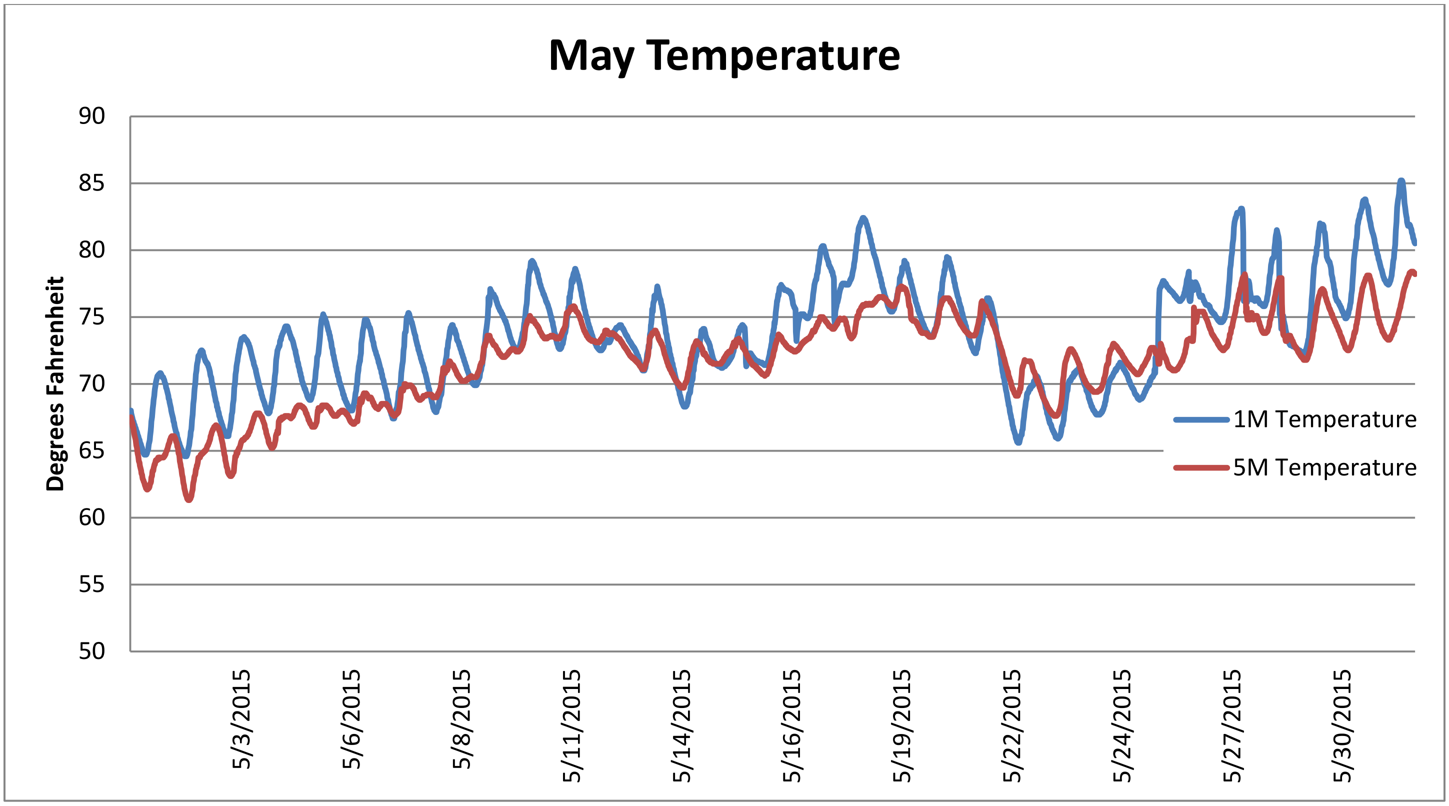


April Turbidity
10000
1000
100
10
1
0.1
NTU
1M Turbidity
5M Turbidity
04/10/15
04/13/15
04/15/15
04/18/15
04/21/15
04/23/15
04/26/15
04/29/15

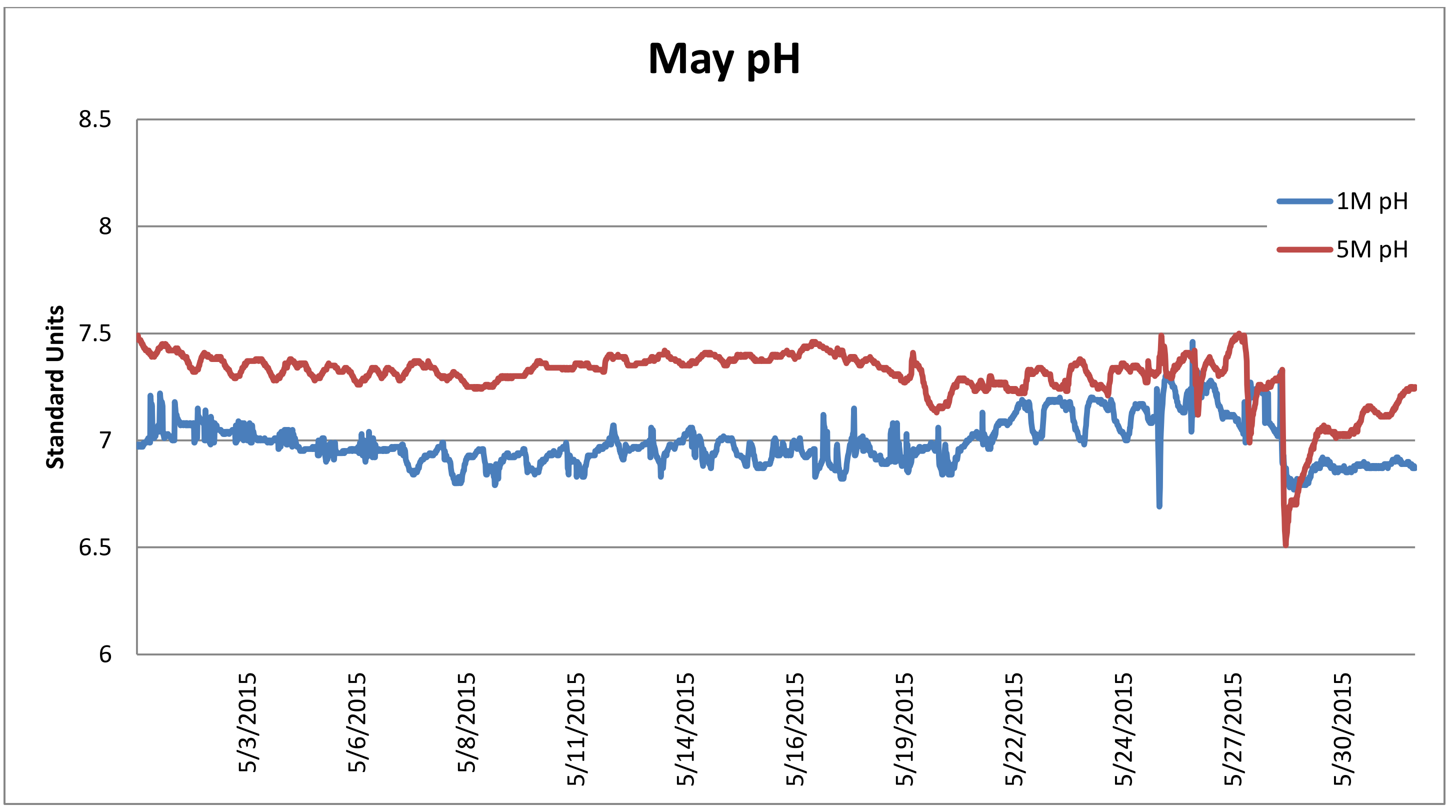


April Dissolved Oxygen
12
11
10
9
8
7
6
5
4
3
2
mg/L
1M Dissolved Oxygen
5M Dissolved Oxygen
04/10/15
04/13/15
04/15/15
04/18/15
04/21/15
04/23/15
04/26/15
04/29/15

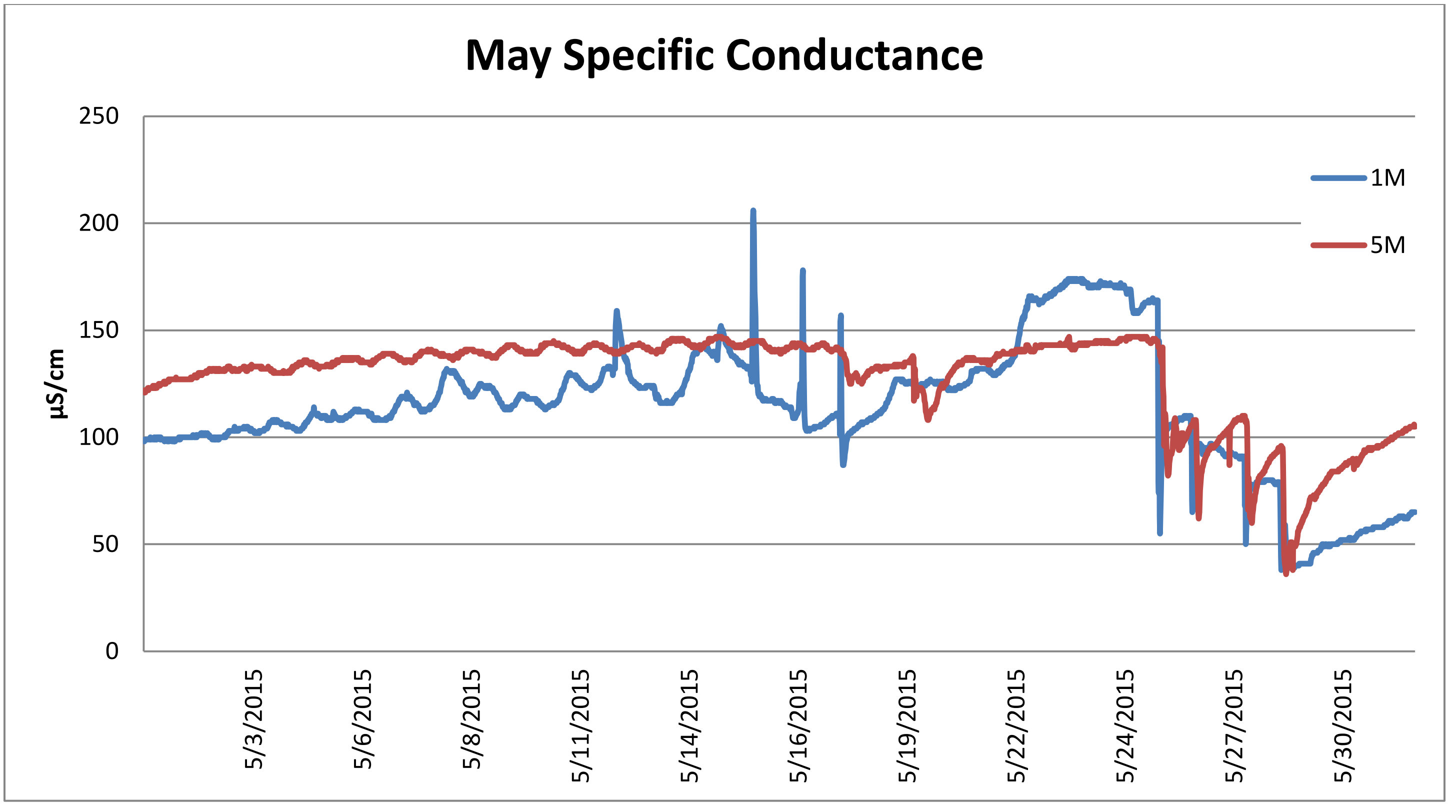
May 2015

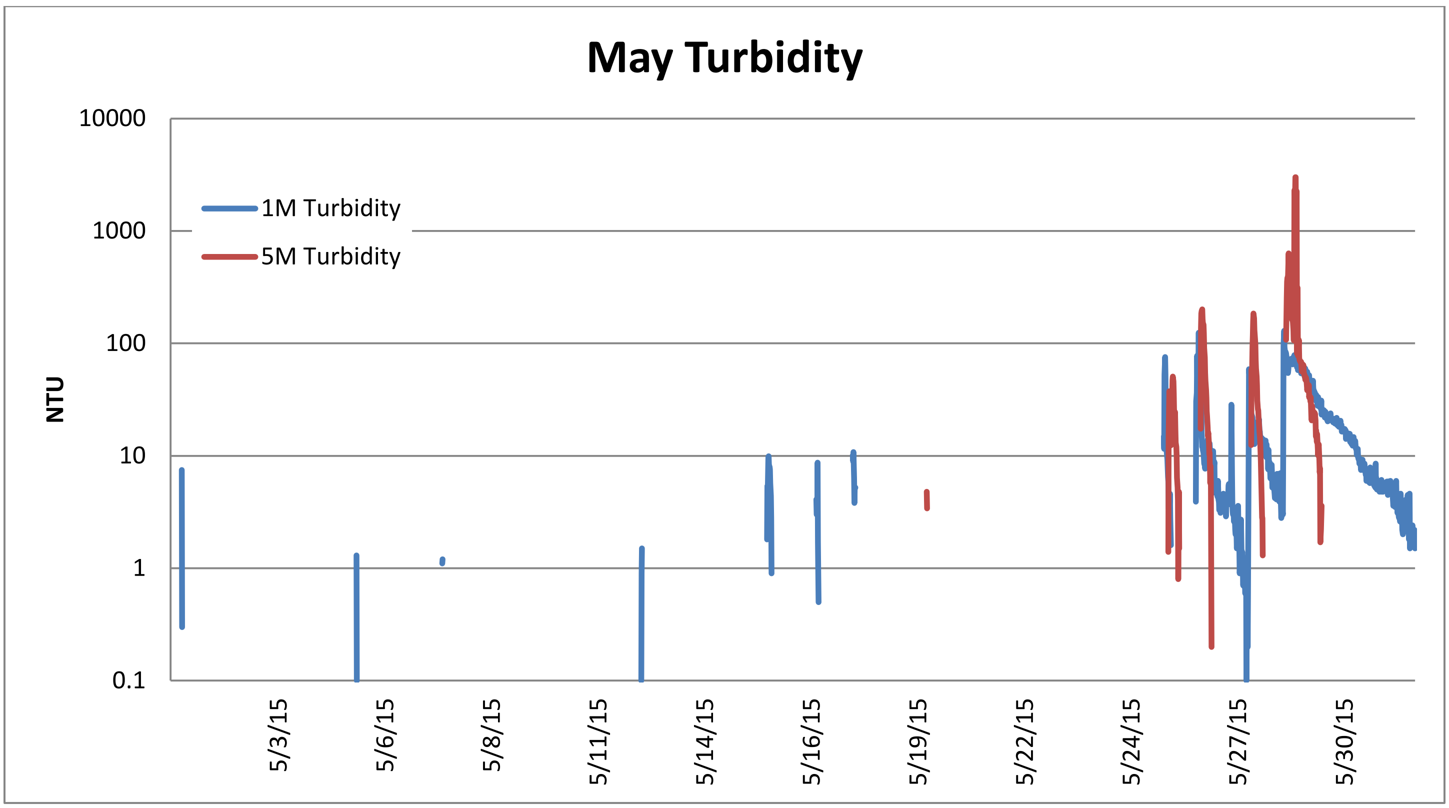


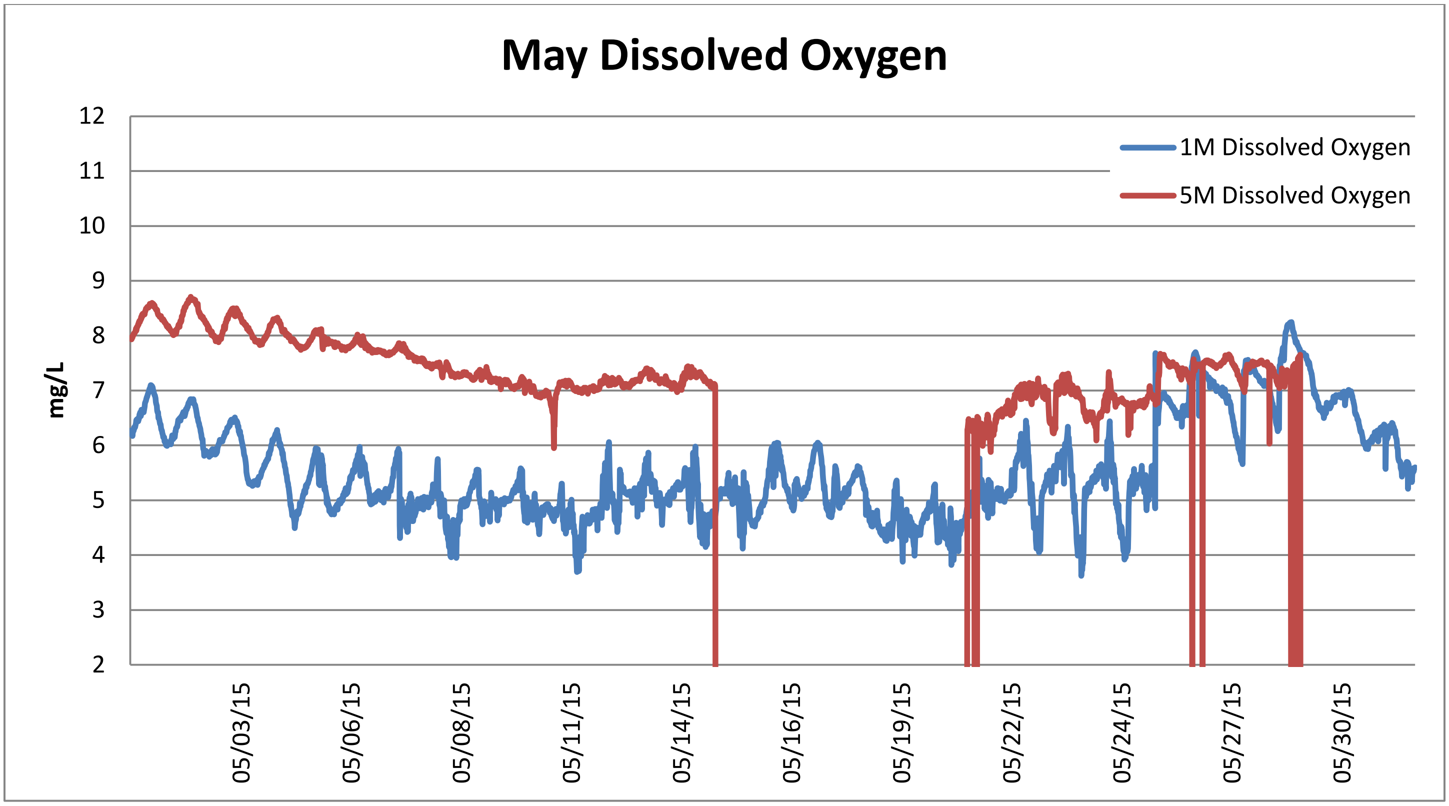
May Temperature
Degrees Fahrenheit
90
85
80
75
70
65
60
55
50
5/3/2015
5/6/2015
5/8/2015
5/11/2015
5/14/2015
5/16/2015
5/19/2015
5/22/2015
5/24/2015
5/27/2015
5/30/2015
1M Temperature
5M Temperature



May pH
Standard Units
8.5
8
7.5
7
6.5
6
5/3/2015
5/6/2015
5/8/2015
5/11/2015
5/14/2015
5/16/2015
5/19/2015
5/22/2015
5/24/2015
5/27/2015
5/30/2015
1M pH
5M pH


May Specific Conductance
250
200
150
100
50
0
µS/cm
1M
5M
5/3/2015
5/6/2015
5/8/2015
5/11/2015
5/14/2015
5/16/2015
5/19/2015
5/22/2015
5/24/2015
5/27/2015
5/30/2015


May Turbidity
10000
1000
100
10
1
0.1
NTU
1M Turbidity
5M Turbidity
5/3/15
5/6/15
5/8/15
5/11/15
5/14/15
5/16/15
5/19/15
5/22/15
5/24/15
5/27/15
5/30/15


May Dissolved Oxygen
12
11
10
9
8
7
6
5
4
3
2
mg/L
1M Dissolved Oxygen
5M Dissolved Oxygen
05/03/15
05/06/15
05/08/15
05/11/15
05/14/15
05/16/15
05/19/15
05/22/15
05/24/15
05/27/15
05/30/15

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's Mill or Saugahatchee Creek during the critical summer months. Monitoring at the Northside WPCF was discontinued in 2013 due to closure of the plant. 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 with 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

H.C. Morgan WPCF Upstream Latitude *32, 32, 9.89 N;* Longitude *85, 30, 20.443 W*

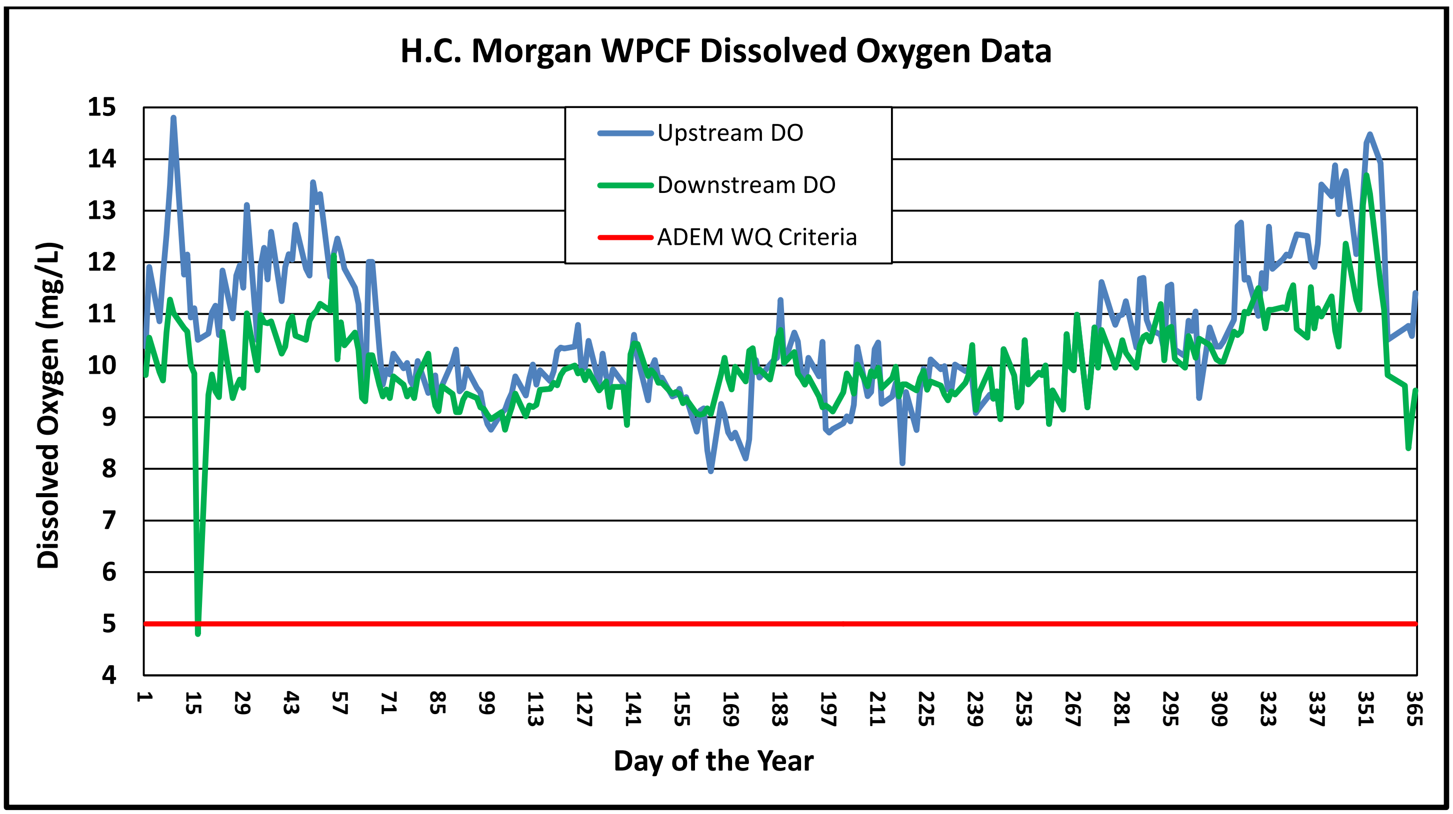
H.C. Morgan WPCF Downstream Latitude *32, 33, 9.077 N;* Longitude *85, 30, 19.699 W*

Northside WPCF Latitude *32, 37, 41.32 N;* Longitude *85, 32, 44.75 W*

4.4 Data

As with previous years, monitoring of dissolved oxygen at the H.C. Morgan WPCF during the 2015 calendar year indicated a positive influence on in-stream dissolved oxygen levels during the critical summer months. The data continue to support a trend of increasing average dissolved oxygen in both Parkerson's Mill Creek and Saugahatchee Creek for the last nine years.

H.C. Morgan WPCF Dissolved Oxygen Monitoring Stations



H.C. Morgan WPCF Dissolved Oxygen Monitoring Data

H.C. Morgan WPCF Dissolved Oxygen Data January – March 2015

January 2015					February 2015					March 2015				
Date	Upstream		Downstream		Date	Upstream		Downstream		Date	Upstream		Downstream	
	DO	Temp	DO	Temp		DO	Temp	DO	Temp		DO	Temp	DO	Temp
1	10.37	10.2	9.82	16.9	1					1				
2	11.91	10.7	10.54	17.1	2	10.49	12.3	9.91	15.3	2	11.51	11.2	10.6	15.8
3					3	11.92	7.1	10.98	11.5	3	11.19	13.8	10.3	16.3
4					4	12.28	8.5	10.84	15.5	4	10.01	15.3	9.38	17.2
5	10.86	11.1	9.88	15.6	5	11.67	9.5	10.82	15.6	5	9.45	17.6	9.31	17.6
6	11.75	8.6	9.71	16.1	6	12.59	7.5	10.86	15.5	6	12.01	10.6	10.2	15.5
7	12.53	9.1	10.64	16.5	7					7				
8	13.49	6.8	11.28	15	8					8				
9	14.8	16.8	11.02	15	9	11.25	12.3	10.23	16.7	9	10.35	12.8	9.63	16.5
10					10	11.91	10.4	10.37	15.7	10	9.63	14.4	9.4	16.3
11					11	12.16	8.7	10.82	15.9	11	9.92	15	9.54	17.2
12	11.76	9.7	10.73	16.1	12	12.05	9	10.95	15.7	12	9.83	16.5	9.37	17.2
13	12.15	11.6	10.66	16.8	13	12.73	5.8	10.58	15.2	13	10.23	15.6	9.79	16.7
14	10.93		10.01		14					14				
15	11.11	9.4	9.85	14.7	15					15				
16	10.5	9.2	4.8	14.7	16	11.88	8.4	10.5	15.1	16	9.95	14.5	9.63	16.2
17					17	11.74	10.5	10.87	15.4	17	10.05	14.9	9.4	16.6
18					18	13.55	4.9	10.99	14.7	18	9.69	17.3	9.54	18
19	10.62	9.8	9.43	14.2	19	13.16	5.4	11.06	14.5	19	9.58	17.4	9.37	18.2
20	11.03	6.5	9.83	14.9	20	13.32	4.6	11.2	14.6	20	10.09	17.7	9.79	18.3
21	11.16	6.8	9.5	16.4	21					21				
22	10.59	8	9.39	16.9	22					22				
23	11.84	10.4	10.65	15.6	23	11.72	11.4	11.06	14	23	9.47	16.3	10.2	16.7
24					24	12.17	9.3	12.13	9.3	24	9.66	14.4	9.58	17.5
25					25	12.46	8.3	10.12	15.8	25	9.81	15	9.22	17.4
26	10.91	9.4	9.37	16.2	26	12.21	8.2	10.84	13.1	26	9.17	17.5	9.12	18
27	11.74	6.5	9.58	15.9	27	11.88	10.8	10.39	14.9	27	9.61	16.6	9.6	17.4
28	11.94	6.8	9.73	15.3	28					28				
29	11.51	8	9.57	16.3	29					29				
30	13.11	10.4	11.01	16.1	30					30	10.08	14.4	9.45	17.5
31					31					31	10.31	15.3	9.1	18.6
Avg.	11.66	9.68	9.86	15.82	Avg.	12.16	8.65	10.78	14.7	Avg.	10.07	15.19	9.57	17.12
Min	10.37	6.5	4.8	14.2	Min	10.49	4.6	9.91	9.3	Min	9.17	10.6	9.1	15.5
Max	14.8	16.8	11.28	17.1	Max	13.55	12.3	12.13	16.7	Max	12.01	17.7	10.6	18.6

H.C. Morgan WPCF Dissolved Oxygen Data April – June 2015

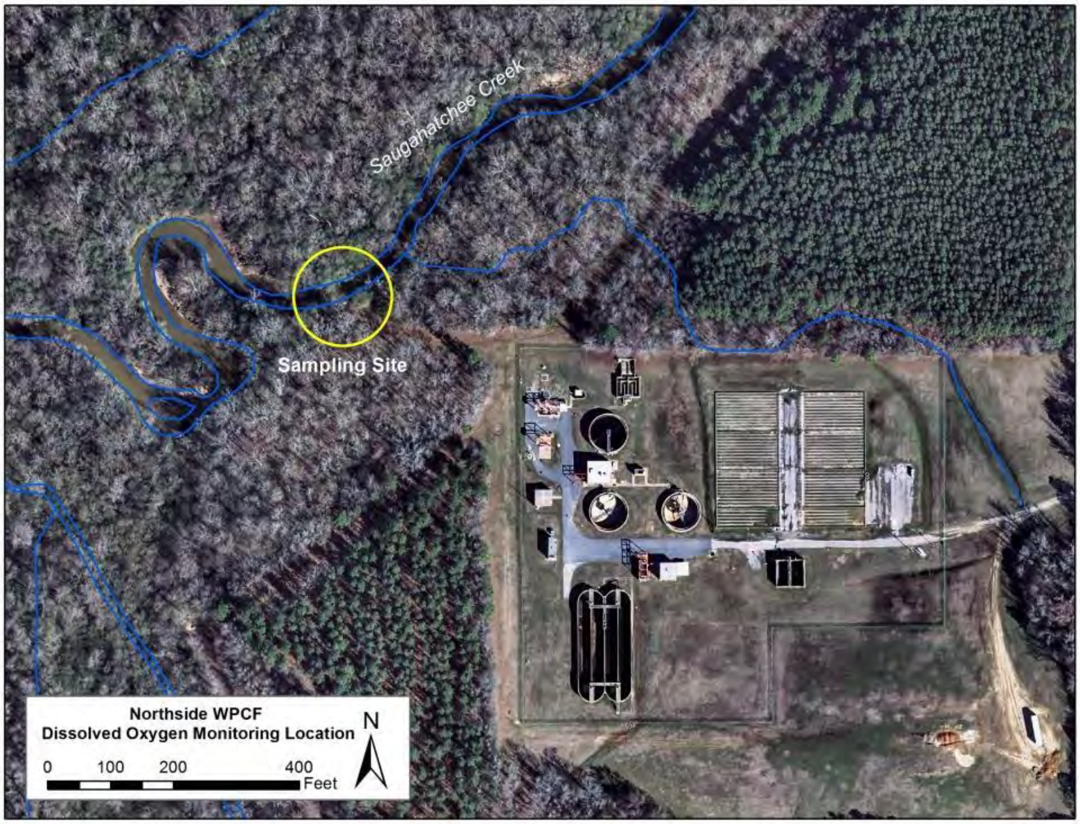
April 2015					May 2015					June 2015				
Date	**Upstream**		**Downstream**		**Date**	**Upstream**		**Downstream**		**Date**	**Upstream**		**Downstream**	
	DO	**Temp**	**DO**	**Temp**		**DO**	**Temp**	**DO**	**Temp**		**DO**	**Temp**	**DO**	**Temp**
1	9.5	17.4	9.1	18.5	**1**	10.33	17.1	9.92	20.2	**1**	9.4	22.7	9.45	23.1
2	9.57	17.5	9.34	18.8	**2**					**2**	9.43	22.9	9.49	23
3	9.94	17.3	9.46	18.9	**3**					**3**	9.55	22.3	9.45	23.6
4					**4**	10.37	17.7	10	20.5	**4**	9.29	22.6	9.27	23.3
5					**5**	10.79	18.9	9.85	21.5	**5**	9.39	22.9	9.35	23.8
6	9.57	16.7	9.37	18.9	**6**	9.92	18.6	9.9	20.7	**6**				
7	9.48	18.5	9.19	19.5	**7**	9.97	19	9.72	20.9	**7**				
8	9.11	19.1	9.16	19.6	**8**	10.48	20	9.89	21.9	**8**	8.72	24.3	9.07	24.2
9	8.87	19.9	9.05	20	**9**					**9**	9.13	24.2	9.05	24.2
10	8.76	19.8	8.96	20.6	**10**					**10**	9.17	23.2	9.07	24
11					**11**	9.65	22.1	9.52	22.3	**11**	8.36	23.8	9.17	24.2
12					**12**	10.23	22.9	9.6	22.8	**12**	7.95	24.1	9.06	24
13	9.08	19.3	9.1	20.1	**13**	9.79	21.7	9.69	22.4	**13**				
14	9.15	19.9	8.76	20.4	**14**	9.64	20.4	9.2	21.9	**14**				
15	9.32	20.1	8.99	20.5	**15**	9.93	21.7	9.59	22.2	**15**	9.26	24.9	9.83	25.2
16	9.47	19	9.19	20.3	**16**					**16**	9.04	25.4	10.15	25
17	9.79	17.2	9.46	18.9	**17**					**17**	8.71	25.7	9.75	24.6
18					**18**	9.65	22.4	9.59	22.7	**18**	8.59	25.5	9.54	25.6
19					**19**	8.98	22.2	8.85	23.3	**19**	8.7	25.7	9.98	25.5
20	9.42	19.8	9.02	20.6	**20**	10.06	23.1	10.22	23.1	**20**				
21	9.76	16.9	9.23	19.9	**21**	10.6	23.4	10.43	23.1	**21**				
22	10.02	16.2	9.2	20	**22**	10.15	19.4	10.42	23.8	**22**	8.2	26	9.69	25.6
23	9.63	17.4	9.24	20	**23**				21.7	**23**	8.57	26.2	10.29	25.5
24	9.91	17	9.53	19.6	**24**					**24**	10.11	25.6	10.34	25.5
25					**25**	9.33	21.9	9.8	22.9	**25**	10.107	24.9	9.87	25.3
26					**26**	9.94	22.3	9.91	22.9	**26**	9.77	26.4	9.93	26.4
27	9.7	18.3	9.55	20	**27**	10.11	22	9.83	22.7	**27**				
28	9.89	18.1	9.67	20.2	**28**	9.77	22.5	9.67	23	**28**				
29	10.28	17.7	9.62	20.1	**29**	9.77	22.9	9.67	22.9	**29**	10.02	23.7	9.73	24.7
30	10.35	16.8	9.82	20	**30**					**30**	10.1	23.8	10.04	24.9
					31					**31**				
Avg.	9.57	18.2	9.27	19.8	**Avg.**	9.97	21.1	9.77	22.2	**Avg.**	9.17	24.4	9.62	24.6
Min	8.76	16.2	8.76	18.5	**Min**	8.98	17.1	8.85	20.2	**Min**	7.95	22.3	9.05	23
Max	10.35	20.1	9.82	20.6	**Max**	10.79	23.4	10.43	23.8	**Max**	10.17	26.4	10.34	26.4

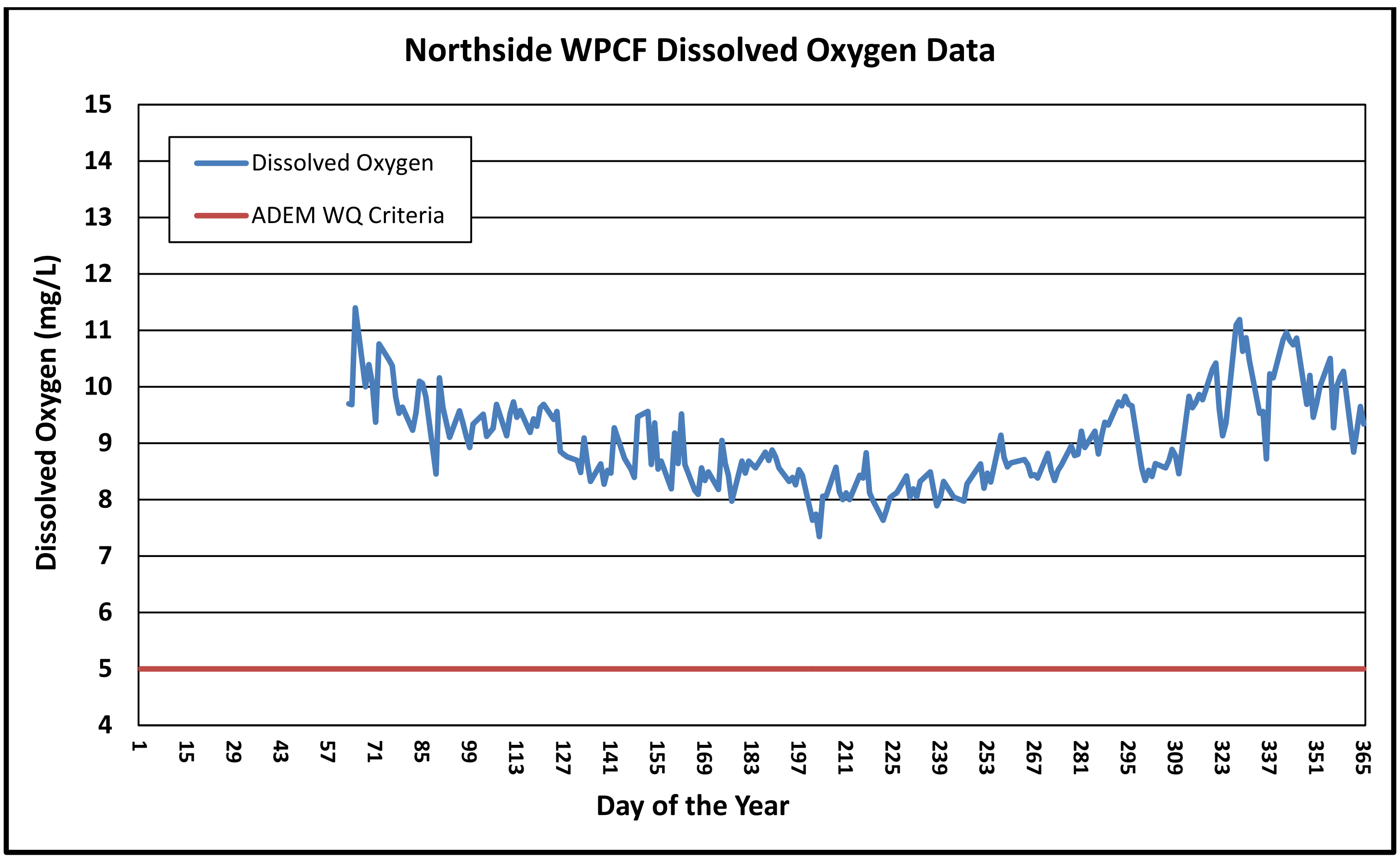
H.C. Morgan WPCF Dissolved Oxygen Data July – September 2015

July 2015					August 2015					September 2015				
Date	**Upstream**		**Downstream**		**Date**	**Upstream**		**Downstream**		**Date**	**Upstream**		**Downstream**	
	DO	**Temp**	**DO**	**Temp**		**DO**	**Temp**	**DO**	**Temp**		**DO**	**Temp**	**DO**	**Temp**
1	10.15	23.7	10.52	25.1	**1**					**1**	9.36	26	9.88	26.8
2	11.27	23.1	10.69	25.2	**2**					**2**	9.5	25.9	9.73	27
3	10.04	25.6	10.05	25.8	**3**	9.4	26.4	9.76	26.6	**3**	8.96	25.8	9.44	26.7
4					**4**	9.66	26.9	9.98	27	**4**	10.32	24.6	10.23	26.5
5					**5**	9.32	26.8	9.4	27.1	**5**				
6	10.64	23.2	10.26	24.5	**6**	8.11	26.3	9.64	27.1	**6**				
7	10.47	23.5	9.84	24.5	**7**	9.49	26.4	9.64	26.7	**7**	9.81	26.1	9.77	26.7
8	9.86	24.9	9.75	25.2	**8**					**8**	9.19	26.2	9.3	26.8
9	9.66	24.8	9.63	25.4	**9**					**9**	9.29	25.9	9.76	26.9
10	10.15	25.9	9.78	26.3	**10**	8.75	26.2	9.52	26.8	**10**	10.49	24.7	9.74	26.2
11					**11**	9.55	27.1	9.76	26.9	**11**	9.64	24.5	9.62	26.9
12					**12**	9.94	26.8	9.9	27.3	**12**				
13	9.79	26.2	9.4	27	**13**	9.56	24.1	9.53	26.4	**13**				
14	10.46	27.8	9.19	26.9	**14**	10.12	25.3	9.69	25.5	**14**	9.86	18.8	10.14	25.4
15	8.77	25.7	9.23	26.1	**15**					**15**	9.82	18.9	10.59	26.3
16	8.7	25.8	9.18	26.6	**16**					**16**	10	20.8	9.85	24.8
17	8.77	26	9.11	26.4	**17**	9.93	25.1	9.61	26.9	**17**	8.87	21.5	9.74	25.7
18					**18**	9.99	25.2	9.44	27.3	**18**	9.52	21.3	9.91	25
19					**19**	9.54	25.1	9.33	26	**19**				
20	8.88	26.2	9.48	26.6	**20**	9.53	24.9	9.5	25.8	**20**				
21	9.02	26.3	9.85	27.1	**21**	10.02	26.1	9.44	27.3	**21**	9.15	23	9.51	25.9
22	8.92	25.5	9.73	26.2	**22**					**22**	10.61	20.5	9.92	25.8
23	9.24	25.4	9.46	26.2	**23**					**23**	9.98	20.9	9.79	25.6
24	10.36	26	10.02	26.9	**24**	9.89	26	9.67	27.5	**24**	9.91	20.8	9.85	26
25					**25**	9.95	25.5	9.83	27.2	**25**	10.99	19.5	9.82	25.8
26					**26**	9.71	25.9	10.4	27.1	**26**				
27	9.41	26.2	9.6	27.1	**27**	9.08	25.8	9.14	26.8	**27**				
28	9.49	26.5	9.89	27.2	**28**	9.18	26.2	9.48	26.9	**28**	9.19	21.6	9.5	25.5
29	10.32	26.6	9.79	26.8	**29**					**29**	9.87	22.2	9.96	26.1
30	10.45	25.9	9.96	27.1	**30**						10.74	23	10.09	26.1
31	9.26	26.8	9.56	27.3	**31**	9.44	25.9	9.94	26.6	**31**				
Avg.	9.74	25.5	9.74	26.2	**Avg.**	9.53	25.9	9.63	26.8	**Avg.**	9.78	22.8	9.82	26.1
Min	8.7	23.1	9.11	24.5	**Min**	8.11	24.1	9.14	25.5	**Min**	8.87	18.8	9.3	24.8
Max	11.27	27.8	10.69	27.3	**Max**	10.12	27.1	10.04	27.5	**Max**	10.99	26.2	10.59	27

H.C. Morgan WPCF Dissolved Oxygen Data October – December 2015

October 2015					November 2015					December 2015				
Date	Upstream		Downstream		Date	Upstream		Downstream		Date	Upstream		Downstream	
	DO	Temp	DO	Temp		DO	Temp	DO	Temp		DO	Temp	DO	Temp
1	10.6	22.3	9.96	25.8	1					1	12.04	16.6	11.52	22.0
2	11.62	21.1	10.69	25.4	2	10.74	22.3	10.4	23.2	2	11.91	17.0	10.72	20.8
3					3					3	12.36	12.4	11.11	19.7
4					4	10.37	22.1	10.123	23.8	4	13.51	12.0	10.95	20.8
5	10.98	21.5	10.17	24.9	5	10.37	22.4	10.08	23.6	5				
6	10.79	19.7	9.96	24.7	6	10.47	22.2	10.08	23.1	6				
7	10.96	19.5	10.18	24.4	7					7	13.28	11.7	11.34	20.0
8	10.99	18.7	10.49	25.2	8					8	13.88	10.7	10.68	20.1
9	11.25	20.3	10.25	24.9	9	10.89	22.2	10.66	19.5	9	12.93	10.3	10.37	19.9
10					10	12.7	15.6	10.59	20.3	10	13.58	11.8	11.34	19.7
11					11	12.77	15.9	10.66	20.9	11	13.77	12.3	12.36	19.6
12	10.35	18.3	9.96	24.7	12	11.66	17	11.04	22.5	12				
13	11.68	19.1	10.39	24.8	13	11.7	17.3	11.01	22.6	13				
14	11.7	18.2	10.56	23.2	14					14	12.16	20.6	11.27	
15	10.89	16.3	10.6	23.4	15					15	12.30	16.6	11.08	19.8
16	10.7	17.2	10.47	23.5	16	10.96	18.2	11.5	22.8	16	13.27	11.9	13.11	20.2
17					17	11.79	15.1	11.14	21.7	17	14.31	15.4	13.69	19.8
18					18	11.49	16.6	10.72	22	18	14.48	11.8	13.33	18.8
19	10.6	14.1	11.19	21.9	19	12.69	17.5	11.08	21.6	19				
20	10.28	15.8	10.1	22.6	20	11.87	18.4	11.08	21.5	20				
21	11.53	15	10.71	23.5	21					21	13.92	10.4	11.57	18.7
22	11.57	16.3	10.75	22.9	22					22	12.50	16.4	11.08	18.7
23	10.31	17.9	10.13	22.8	23	12.06	9.4	11.13	19.9	23	10.50	15.5	9.82	17.6
24					24	12.15	8.4	11.09	18.8	24				
25					25	12.12	9.7	11.39	18.4	25				
26	10.18	18	9.96	22.6	26	12.34	9.7	11.56	17.8	26				
27	10.87	17.2	10.57	22.7	27	12.54	9.6	10.71	12.5	27				
28	10.67	18.4	10.38	23.3	28					28	10.72	16.4	9.61	19.6
29	11.05	17.5	10.15	25.6	29					29	10.77	17.8	8.40	18.9
30	9.37	17.5	10.52	23.2	30	12.51	15.4	10.54	19.8	30	10.57	17.6	9.02	19.4
31										31	11.41	18.1	9.52	18.9
Avg.	10.86	18.2	10.37	23.9	Avg.	11.71	16.3	10.83	20.8	Avg.	12.58	14.4	8.40	19.7
Min	9.37	14.1	9.96	21.9	Min	10.37	8.4	10.08	12.5	Min	10.50	10.3	13.69	17.6
Max	11.7	22.3	11.19	25.8	Max	12.77	22.4	11.56	23.8	Max	14.48	20.6	231.89	22.0





Northside WPCF Dissolved Oxygen Monitoring Data

Northside WPCF Dissolved Oxygen Data January – March 2015

January 2015			February 2015			March 2015		
Date	DO	Temp	Date	DO	Temp	Date	DO	Temp
1			1			1		
2			2			2		
3			3			3		
4			4			4	9.7	15
5			5			5	9.68	14.2
6			6			6	11.4	8
7			7			7		
8			8			8		
9			9			9	10	12.7
10			10			10	10.3	13.1
11			11			11	10.0	15.5
12			12			12	9.37	17.6
13			13			13	10.7	17
14			14			14		
15			15			15		
16			16			16	10.4	16.8
17			17			17	10.3	17.5
18			18			18	9.82	15.6
19			19			19	9.53	15.4
20			20			20	9.64	16.7
21			21			21		
22			22			22		
23			23			23	9.23	18.4
24			24			24	9.54	16.4
25			25			25	10.1	15.4
26			26			26	10.0	18.5
27			27			27	9.82	15.2
28			28			28		
29			29			29		
30			30			30	8.45	15.2
31			31			31	10.1	14.2
Avg.			Avg.			Avg.	9.93	15.4
Min			Min			Min	8.45	8
Max			Max			Max	11.4	18.5

Northside WPCF Dissolved Oxygen Data April – June 2015

April 2015			May 2015			June 2015		
Date	**DO**	**Temp**	**Date**	**DO**	**Temp**	**Date**	**DO**	**Temp**
1	9.64	17.8	**1**	9.69	16.6	**1**	9.56	18.1
2	9.37	17.2	**2**			**2**	8.62	21.4
3	9.1	17.4	**3**			**3**	9.36	18.4
4			**4**	9.42	17.4	**4**	8.54	21.6
5			**5**	9.56	18.6	**5**	8.68	22.4
6	9.57	16.9	**6**	8.85	17.6	**6**		
7	9.36	18.2	**7**	8.80	18.2	**7**		
8	9.12	18.6	**8**	8.76	18.0	**8**	8.19	23.1
9	8.92	21.3	**9**			**9**	9.18	25.9
10	9.34	18.7	**10**			**10**	8.64	21.6
11			**11**	8.69	23.5	**11**	9.52	22.1
12			**12**	8.48	21.6	**12**	8.62	24.4
13	9.51	18.4	**13**	9.09	20.6	**13**		
14	9.12	20.5	**14**	8.64	20.3	**14**		
15	9.19	19.7	**15**	8.32	21.7	**15**	8.16	26.3
16	9.26	19.3	**16**			**16**	8.09	26.4
17	9.69	19.6	**17**			**17**	8.56	26.8
18			**18**	8.63	25.9	**18**	8.34	26.2
19			**19**	8.27	22.5	**19**	8.49	26.6
20	9.13	19.8	**20**	8.52	23.1	**20**		
21	9.52	18.6	**21**	8.47	21.3	**21**		
22	9.73	17.2	**22**	9.27	18.7	**22**	8.18	25.2
23	9.46	19.3	**23**			**23**	9.05	26.9
24	9.58	18.4	**24**			**24**	8.64	25.4
25			**25**	8.73	22.1	**25**	8.43	26.2
26			**26**	8.64	21.6	**26**	7.97	26.1
27	9.19	19.3	**27**	8.54	21.7	**27**		
28	9.43	18.7	**28**	8.39	22.4	**28**		
29	9.3	17.8	**29**	9.47	22.5	**29**	8.68	25
30	9.63	17.3	**30**			**30**	8.47	23.7
31			**31**			**31**		
Avg.	9.37	18.64	**Avg.**	8.82	20.8	**Avg.**	8.64	24.08
Min	8.92	16.9	**Min**	8.27	16.6	**Min**	7.97	18.1
Max	9.73	21.3	**Max**	9.69	25.9	**Max**	9.56	26.9

Northside WPCF Dissolved Oxygen Data July – September 2015

July 2015			August 2015			September 2015		
Date	DO	Temp	Date	DO	Temp	Date	DO	Temp
1	8.68	23.4	1			1		
2	8.62	21.4	2			2		
3	8.56	25.2	3	8.43	26.8	3	7.97	24.7
4			4	8.38	26.4	4	8.28	24.2
5			5	8.83	23.4	5		
6	8.84	23.5	6	8.12	25.2	6		
7	8.69	23.5	7	7.98	27.0	7		
8	8.88	23.4	8			8	8.63	25.1
9	8.76	23.9	9			9	8.2	24.6
10	8.56	24	10	7.63	26.4	10	8.47	24.8
11			11	7.82	25.7	11	8.31	24.4
12			12	8.03	26.3	12		
13	8.32	26.1	13	8.08	26.6	13		
14	8.39	25.9	14	8.12	25.3	14	9.14	18.5
15	8.26	26	15			15	8.75	19
16	8.53	25.4	16			16	8.58	21
17	8.43	26.1	17	8.42	24.7	17	8.65	21
18			18	8.04	25.6	18		
19			19	8.19	26.3	19		
20	7.63	26.4	20	8.05	25.2	20		
21	7.74	27.2	21	8.32	25.8	21	8.71	22.7
22	7.34	26.5	22			22	8.62	22.3
23	8.06	25.2	23			23	8.42	21.6
24	8.06	24.8	24	8.49	25.8	24	8.44	21.4
25			25	8.19	24.0	25	8.38	22.6
26			26	7.89	26.7	26		
27	8.57	28	27	8.02	26.0	27		
28	8.14	25.3	28	8.32	23.5	28	8.82	21.6
29	8	25.8	29			29	8.52	22.2
30	8.12	25.2	30			30	8.34	23.1
31	8	27.7	31	8.04	24.1	31		
Avg.	8.31	25.21	Avg.	8.16	25.6	Avg.	8.51	22.49
Min	7.34	21.4	Min	7.63	23.4	Min	7.97	18.5
Max	8.88	28	Max	8.83	27.0	Max	9.14	25.1

Northside WPCF Dissolved Oxygen Data October – December 2015

October 2015			November 2015			December 2015		
Date	**DO**	**Temp**	**Date**	**DO**	**Temp**	**Date**	**DO**	**Temp**
1	8.52	21.2	**1**			**1**	9.56	17.2
2	8.61	20.9	**2**	8.56	19.6	**2**	8.72	17.7
3			**3**	8.69	20	**3**	10.2	13.6
4			**4**	8.89	20.6	**4**	10.1	13
5	8.95	18.9	**5**	8.78	20.8	**5**		
6	8.78	18.6	**6**	8.46	19.4	**6**		
7	8.80	19.1	**7**			**7**	10.8	12.2
8	9.21	18.4	**8**			**8**	10.9	10.1
9	8.92	18.7	**9**	9.83	16	**9**	10.8	12
10			**10**	9.63	16.4	**10**	10.7	13.1
11			**11**	9.72	16.1	**11**	10.8	13.4
12	9.21	17.4	**12**	9.86	16.4	**12**		
13	8.81	18.5	**13**	9.77	15.9	**13**		
14	9.14	17.8	**14**			**14**	9.69	16.5
15	9.37	15.6	**15**			**15**	10.2	13.1
16	9.32	15.8	**16**	10.31	13.2	**16**	9.46	15.6
17			**17**	10.42	13.6	**17**	9.71	15.2
18			**18**	9.61	18.2	**18**	10.0	13.8
19	9.73	14.7	**19**	9.13	17.8	**19**		
20	9.66	14.2	**20**	9.36	17.4	**20**		
21	9.83	13.8	**21**			**21**	10.5	12.2
22	9.69	15.3	**22**			**22**	9.27	15.5
23	9.66	15.5	**23**	11.1	10.8	**23**	10.0	15.1
24			**24**	11.19	12.2	**24**	10.1	15.6
25			**25**	10.63	12.1	**25**	10.2	16
26	8.55	19.5	**26**	10.87	12.8	**26**		
27	8.34	18.6	**27**	10.46	12.3	**27**		
28	8.52	19.2	**28**			**28**	8.84	19
29	8.41	18.3	**29**			**29**		
30	8.64	19.6	**30**	9.53	17	**30**	9.65	18.2
31			**31**			**31**	9.34	15.7
Avg.	9.03	17.7	**Avg.**	9.75	16.12	**Avg.**	10	14.72
Min	8.34	13.8	**Min**	8.46	10.8	**Min**	8.72	10.1
Max	9.83	21.2	**Max**	11.19	20.8	**Max**	10.9	19

5.0 Ammonia (Nitrogen) Monitoring Program

5.1 Purpose

Parkerson's 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's 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's 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's 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's 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 2015 are shown below.

5.2 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 Strips (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 finding of sanitary sewer discharge to the City's MS4 is immediately addressed using the most appropriate corrective action.

5.3 Monitoring Sites

Monitoring site locations depend on access to storm sewer infrastructure or receiving streams. See map below for 2015 sampling locations.

5.4 Data

Three samples collected during 2015 indicated an ammonia (nitrogen) concentration above 0.5 mg/L. Follow-up monitoring and field investigation of these sites helped to identify two (2) public sanitary sewer concerns. Appropriate corrective action was taken immediately in each of these circumstances.

Ammonia Monitoring Sites and Measured Concentrations

Date	Site	Basin	Coordinates	Ammonia (mg/L)
3/20/2015	SC2	Saugahatchee Creek	32.625 N 85.474 W	6.0
6/17/2015	TC19	Town Creek	32.589 N 85.479 W	3.0
7/29/2015	TC18	Town Creek	32.587 N 85.475 W	6.0

6.0 Source Water Monitoring Program (Lake Ogletree)

6.1 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 land-uses, 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.

6.2 Methods

The Water Works Board of the City of Auburn (AWWB) conducts water quality sampling and analysis at 14 locations throughout the Lake Ogletree Watershed. Water quality assessment includes sampling at locations along the main stem of Chewacla Creek ("C-Sites"), its smaller tributaries ("T-Sites"), and Lake Ogletree ("L-Sites"). Parameters monitored once every two months at these locations include fecal coliforms, E. coli, chlorophyll-a, ammonia, orthophosphate, total phosphorus, nitrate-nitrite, kjeldahl-N, pH, temperature, turbidity, specific conductance, dissolved oxygen and an array of minerals. A QA/QC field blank for ammonia, orthophosphate, total phosphorus, nitrate-nitrite, and kjeldahl-N is collected at a single randomly selected site during each sampling round. Bi-weekly monitoring is also conducted at these sites for temperature, pH, specific conductance, dissolved oxygen, and turbidity. Off-flavor compounds (2-methylisoborneol and geosmin are sampled for at the drinking water intake (site L2) on a biweekly to weekly basis, depending on the time of year. The following are the parameters which are included in this program and the method of analysis.

- Temperature – YSI ProPlus Quatro
- Specific Conductance – YSI ProPlus Quatro
- Dissolved Oxygen – YSI 2003 polarographic sensor
- pH – YSI 1001
- Chlorophyll a - SM 10200H-2-1994
- Turbidity – LaMotte 2020WE turbidimeter
- Ammonia (as N) – EPA 350.1
- Nitrate+Nitrite – EPA 353.2
- Total Kjeldahl Nitrogen – EPA 351.2
- Orthophosphate – SM 4500 PE-1999
- Total Phosphorus – EPA 365.4
- ICP Metals – SM 3120 B
- Fecal Coliforms – SM 9222 D
- E. coli - SM 9223B-2004
- 2-Methylisoborneol – SM 6040 D
- Geosmin – SM 6040 D

6.3 Monitoring Stations and Data

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*

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*

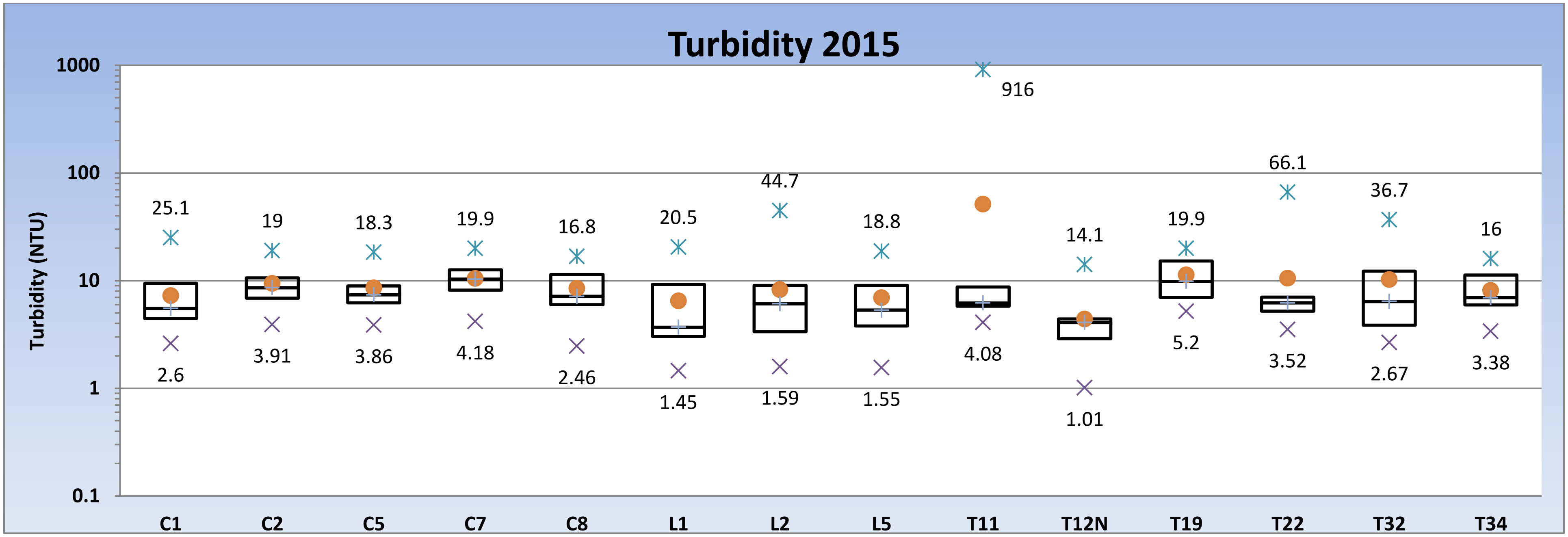
C8 – Station C8 is located upstream of the bridge crossing of CR 146 (Moores Mill Road) with Chewacla Creek. Latitude *32, 34, 5.715 N*; Longitude *85, 21, 42.033 W*

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*

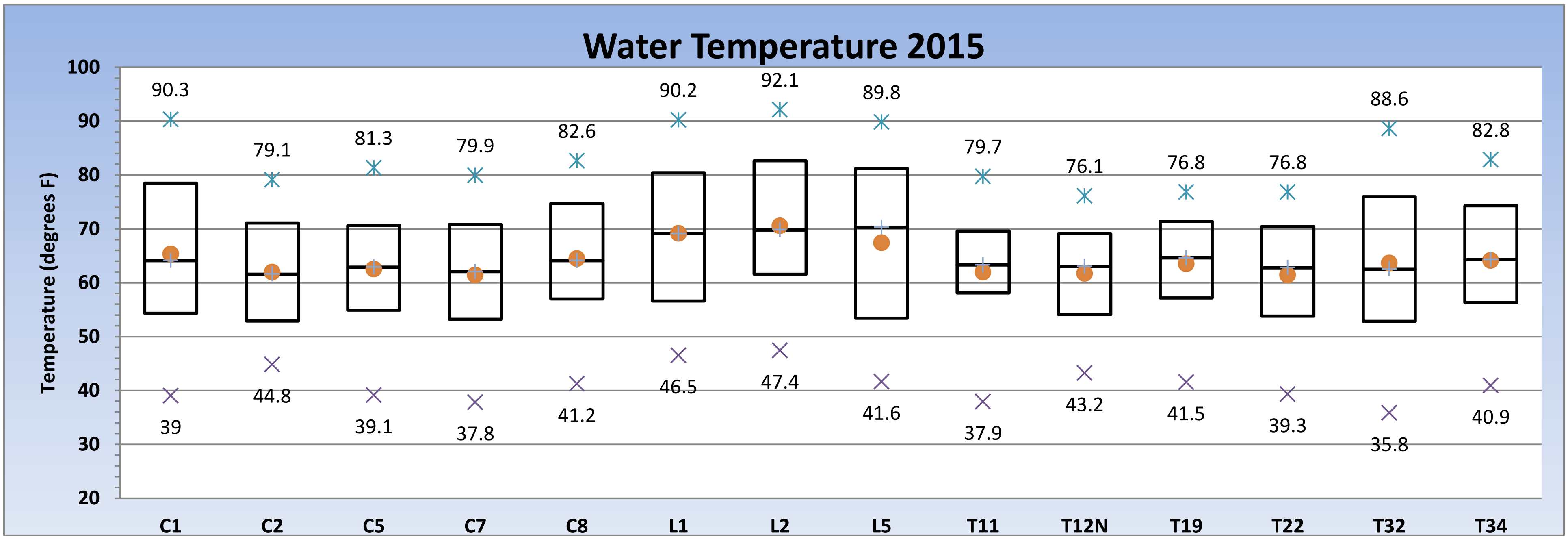
L2 – Station L2 is located in Lake Ogletree near the water intake pump house. Latitude *32, 33, 5.626 N*; Longitude *85, 26, 45.038 W*

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*

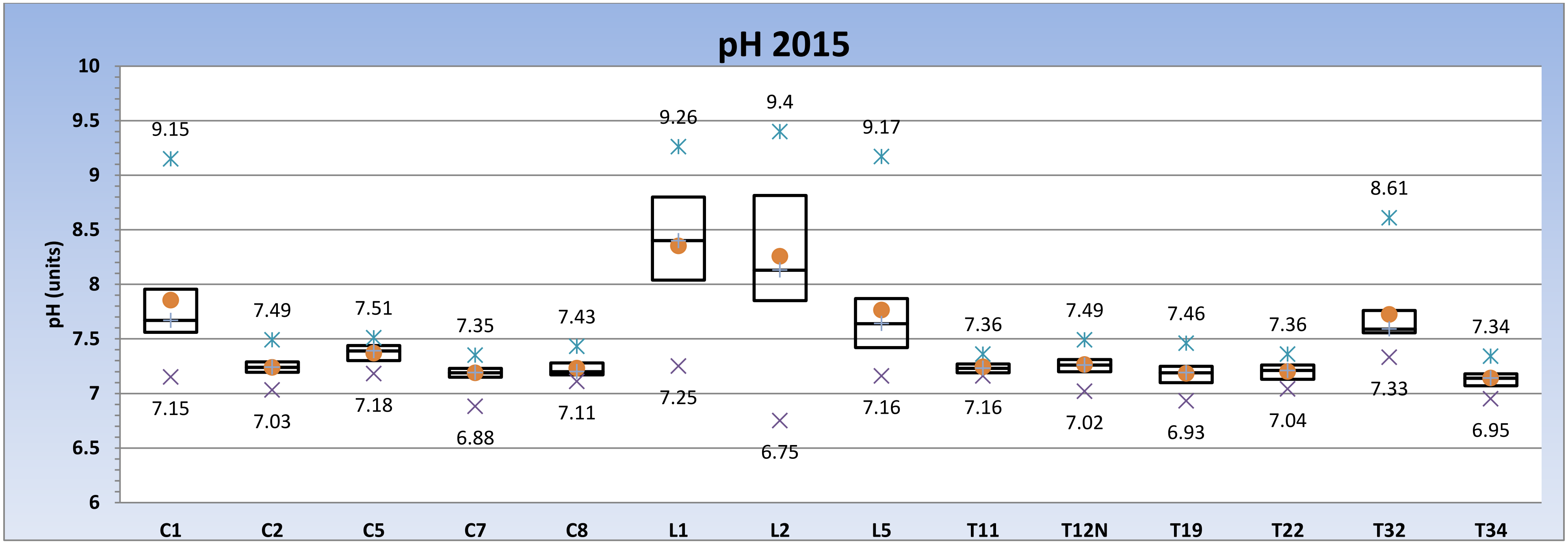
**See Insert for Maps of All Water Quality Monitoring Locations*

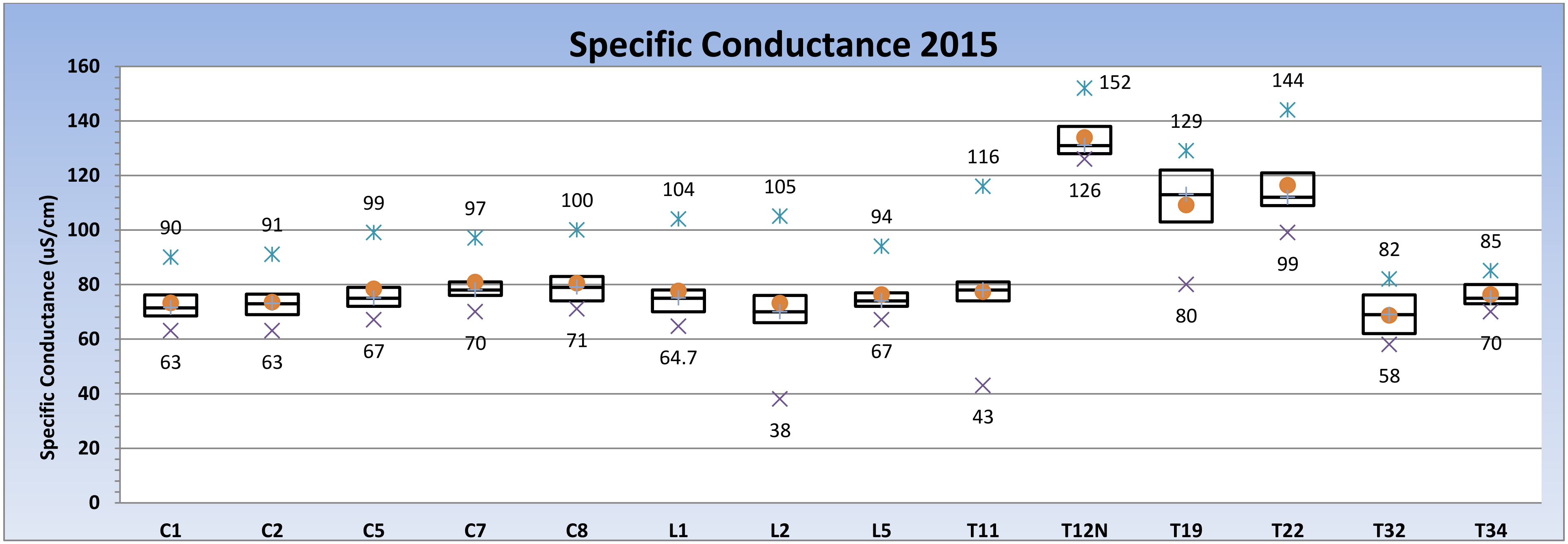


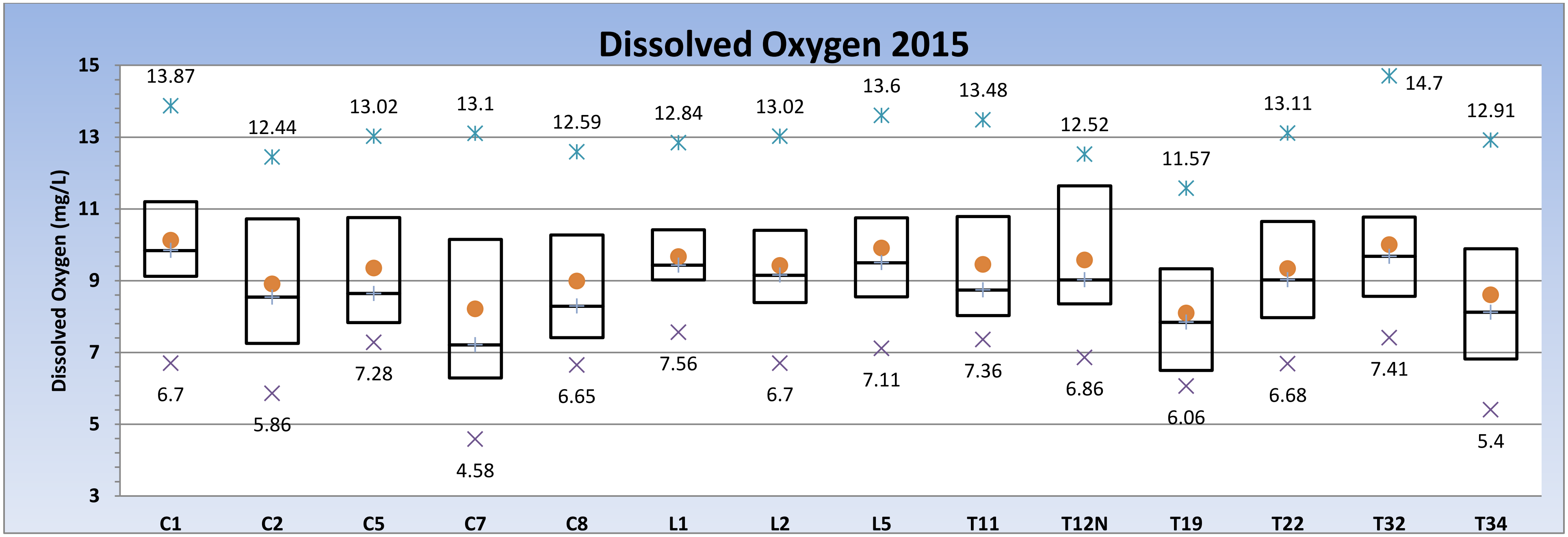
Turbidity 2015
Turbidity (NTU)
1000
100
10
1
0.1
25.1
19
18.3
19.9
16.8
20.5
44.7
18.8
916
14.1
19.9
66.1
36.7
16
2.6
3.91
3.86
4.18
2.46
1.45
1.59
1.55
4.08
1.01
5.2
3.52
2.67
3.38
C1
C2
C5
C7
C8
L1
L2
L5
T11
T12N
T19
T22
T32
T34

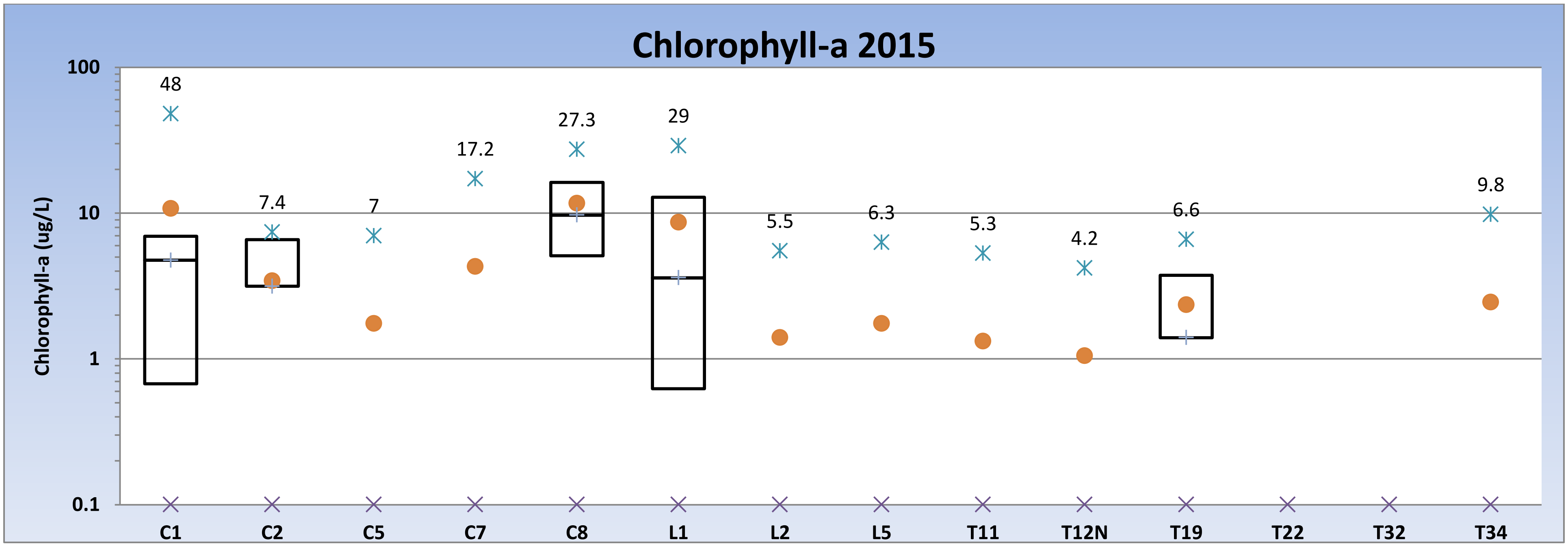


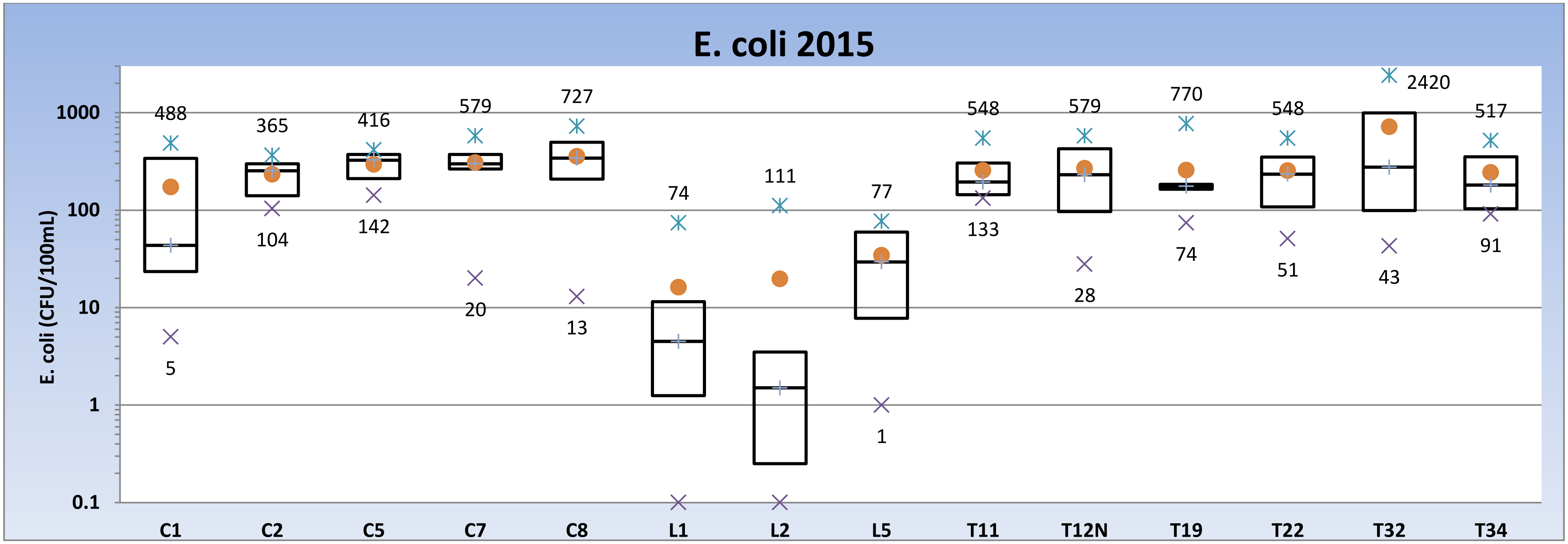
Water Temperature 2015
Temperature (degrees F)
100
90
80
70
60
50
40
30
20
90.3
79.1
81.3
79.9
82.6
90.2
92.1
89.8
79.7
76.1
76.8
76.8
88.6
82.8
39
44.8
39.1
37.8
41.2
46.5
47.4
41.6
37.9
43.2
41.5
39.3
35.8
40.9
C1
C2
C5
C7
C8
L1
L2
L5
T11
T12N
T19
T22
T32
T34

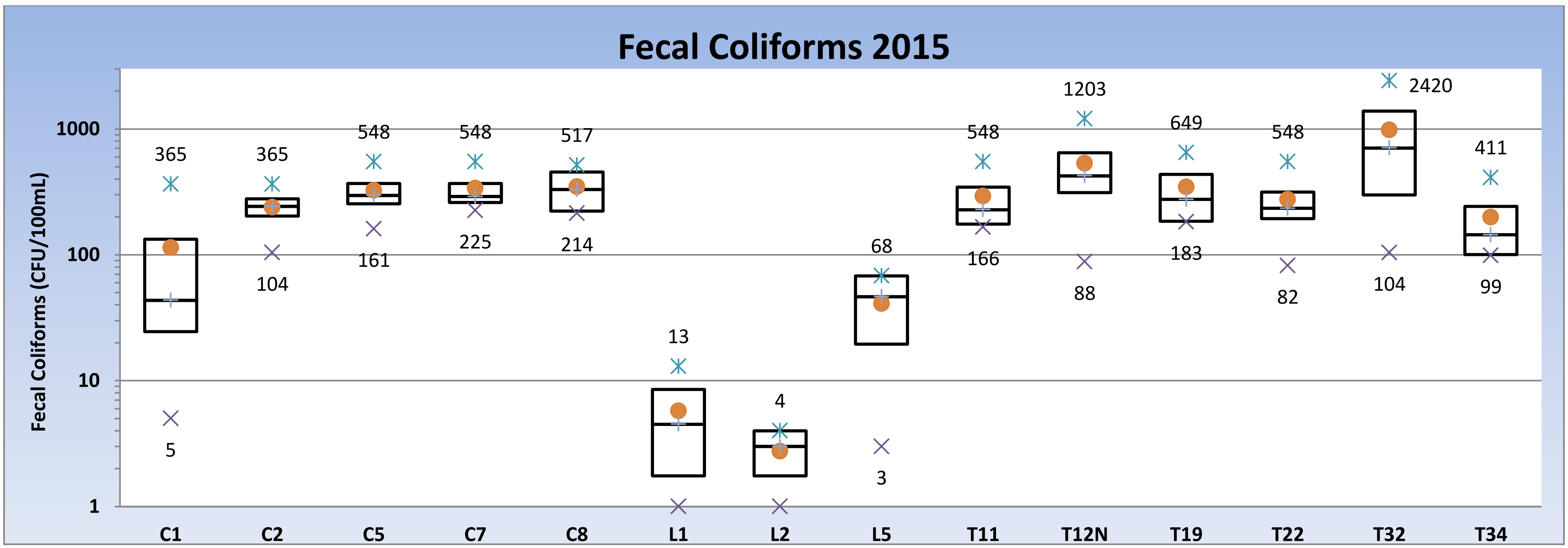

pH 2015
pH (units)
10
9.5
9
8.5
8
7.5
7
6.5
6
9.15
7.15
7.49
7.03
7.51
7.18
7.35
6.88
7.43
7.11
9.26
7.25
9.4
6.75
9.17
7.16
7.36
7.16
7.49
7.02
7.46
6.93
7.36
7.04
8.61
7.33
7.34
6.95
C1
C2
C5
C7
C8
L1
L2
L5
T11
T12N
T19
T22
T32
T34

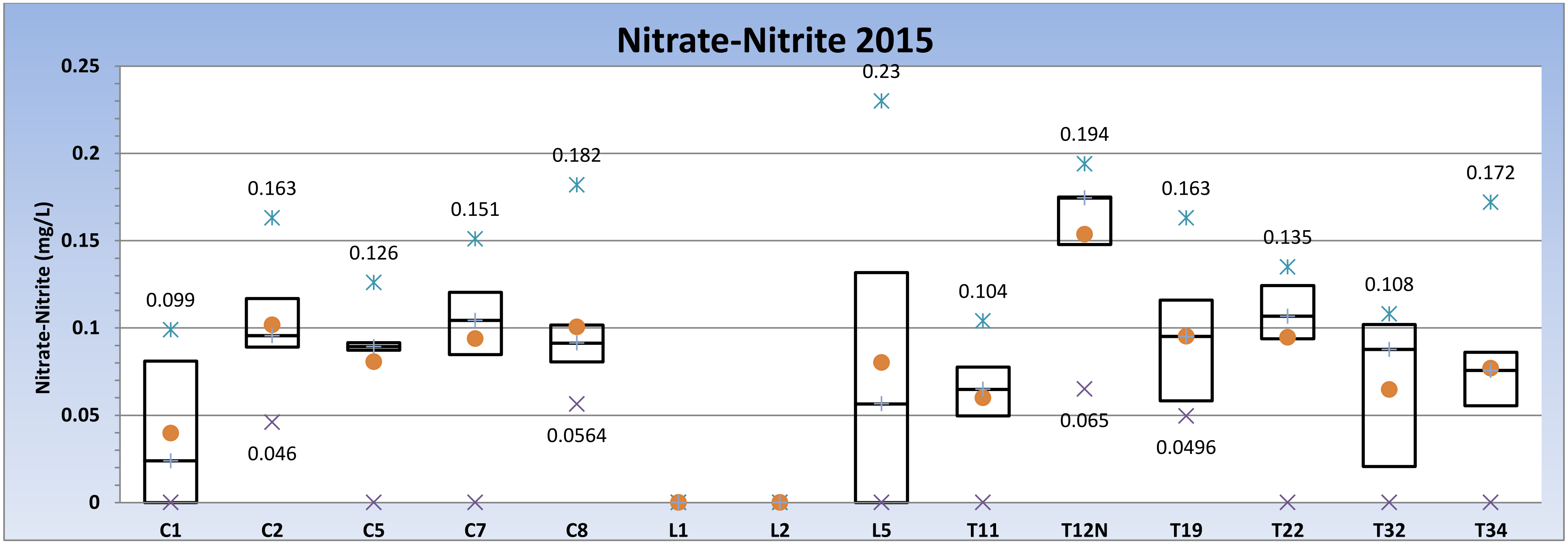

Specific Conductance 2015
Specific Conductance (uS/cm)
160
140
120
100
80
60
40
20
0
90
63
91
63
99
67
97
70
100
71
104
64.7
105
38
94
67
116
43
152
126
129
80
144
99
82
58
85
70
C1
C2
C5
C7
C8
L1
L2
L5
T11
T12N
T19
T22
T32
T34


Dissolved Oxygen 2015
Dissolved Oxygen (mg/L)
15
13
11
9
7
5
3
13.87
12.44
13.02
13.1
12.59
12.84
13.02
13.6
13.48
12.52
11.57
13.11
14.7
12.91
6.7
5.86
7.28
4.58
6.65
7.56
6.7
7.11
7.36
6.86
6.06
6.68
7.41
5.4
C1
C2
C5
C7
C8
L1
L2
L5
T11
T12N
T19
T22
T32
T34

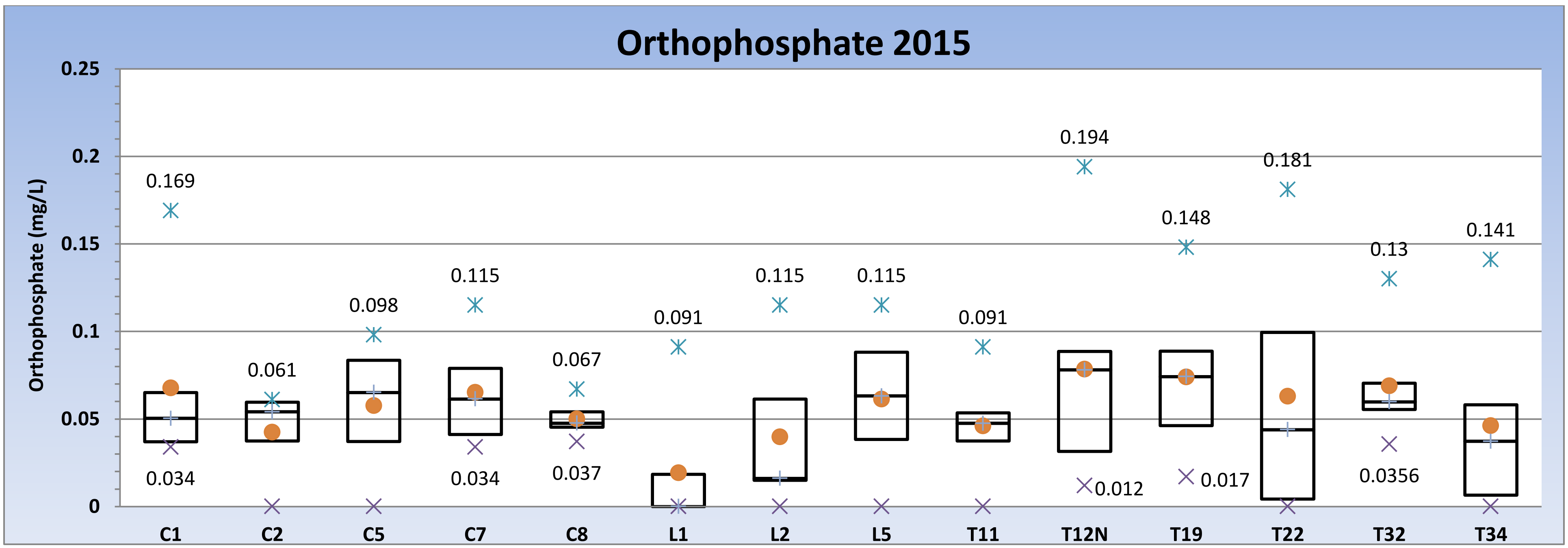

Chlorophyll-a 2015
Chlorophyll-a (ug/L)
100
10
1
0.1
48
7.4
7
17.2
27.3
29
5.5
6.3
5.3
4.2
6.6
9.8
C1
C2
C5
C7
C8
L1
L2
L5
T11
T12N
T19
T22
T32
T34


E. coli 2015
E. coli (CFU/100mL)
1000
100
10
1
0.1
488
5
365
104
416
142
579
20
727
13
74
111
77
1
548
133
579
28
770
74
548
51
2420
43
517
91
C1
C2
C5
C7
C8
L1
L2
L5
T11
T12N
T19
T22
T32
T34


Fecal Coliforms 2015
Fecal Coliforms (CFU/100mL)
1000
100
10
1
365
5
365
104
548
161
548
225
517
214
13
4
68
3
548
166
1203
88
649
183
548
82
2420
104
411
99
C1
C2
C5
C7
C8
L1
L2
L5
T11
T12N
T19
T22
T32
T34



Nitrate-Nitrite 2015
Nitrate-Nitrite (mg/L)
0.25
0.2
0.15
0.1
0.05
0
0.099
0.163
0.046
0.126
0.151
0.182
0.0564
0.23
0.104
0.194
0.065
0.163
0.0496
0.135
0.108
0.172
C1
C2
C5
C7
C8
L1
L2
L5
T11
T12N
T19
T22
T32
T34



Orthophosphate 2015
Orthophosphate (mg/L)
0.25
0.2
0.15
0.1
0.05
0
0.169
0.034
0.061
0.098
0.115
0.034
0.067
0.037
0.091
0.115
0.115
0.091
0.194
0.012
0.148
0.017
0.181
0.13
0.0356
0.141
C1
C2
C5
C7
C8
L1
L2
L5
T11
T12N
T19
T22
T32
T34

7.0 Parkerson Mill Creek Intensive Bacteriological Study - 2015

7.1 Purpose

Parkerson's 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's 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. 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's 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's 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. During the summer of 2015, the City collected E. coli samples, physical and chemical parameters, and measured streamflow at the same sites along Parkerson's Mill Creek as the 2010 study. Data collected in 2015 continue to support the impairment status of Parkerson's Mill Creek.

7.2 Methods

The City conducted water quality sampling at seven (7) locations along Parkerson's Mill Creek that were sampled during the 2010 study, along with one (1) reference site on a tributary to Hodnett Creek in a primarily forested watershed in rural western Lee County. Data were collected once per month during April and May, then weekly during June, and then once during July. Water quality sampling included E. coli, pH, temperature, turbidity, specific conductance, dissolved oxygen. Streamflow measurements were also conducted at five (5) sites after samples were collected.

- Temperature – YSI ProPlus Quatro
- Specific Conductance – YSI ProPlus Quatro
- Dissolved Oxygen – YSI 2003 polarographic sensor
- pH – YSI 1001
- Turbidity – LaMotte 2020WE turbidimeter
- E. coli - SM 9223B-2004

7.3 Monitoring Sites and Data

PKML-W – Station PKML-W is located 400 ft. south of Biggio Dr. on the west branch of Parkerson's Mill Creek. Latitude *32, 35, 45.55 N*; Longitude *85, 29, 45.22 W*

PKML-E – Station PKML-E is located 500 ft. south of Samford Ave. on the east branch of Parkerson's Mill Creek. Latitude *32, 35, 46.50 N*; Longitude *85, 29, 43.46 W*

PKML-2 – Station PKML-2 is located on Parkerson's Mill Creek 150 ft. upstream of Shug Jordan Parkway. Latitude *32, 35, 09.78 N*; Longitude *85, 30, 07.40 W*

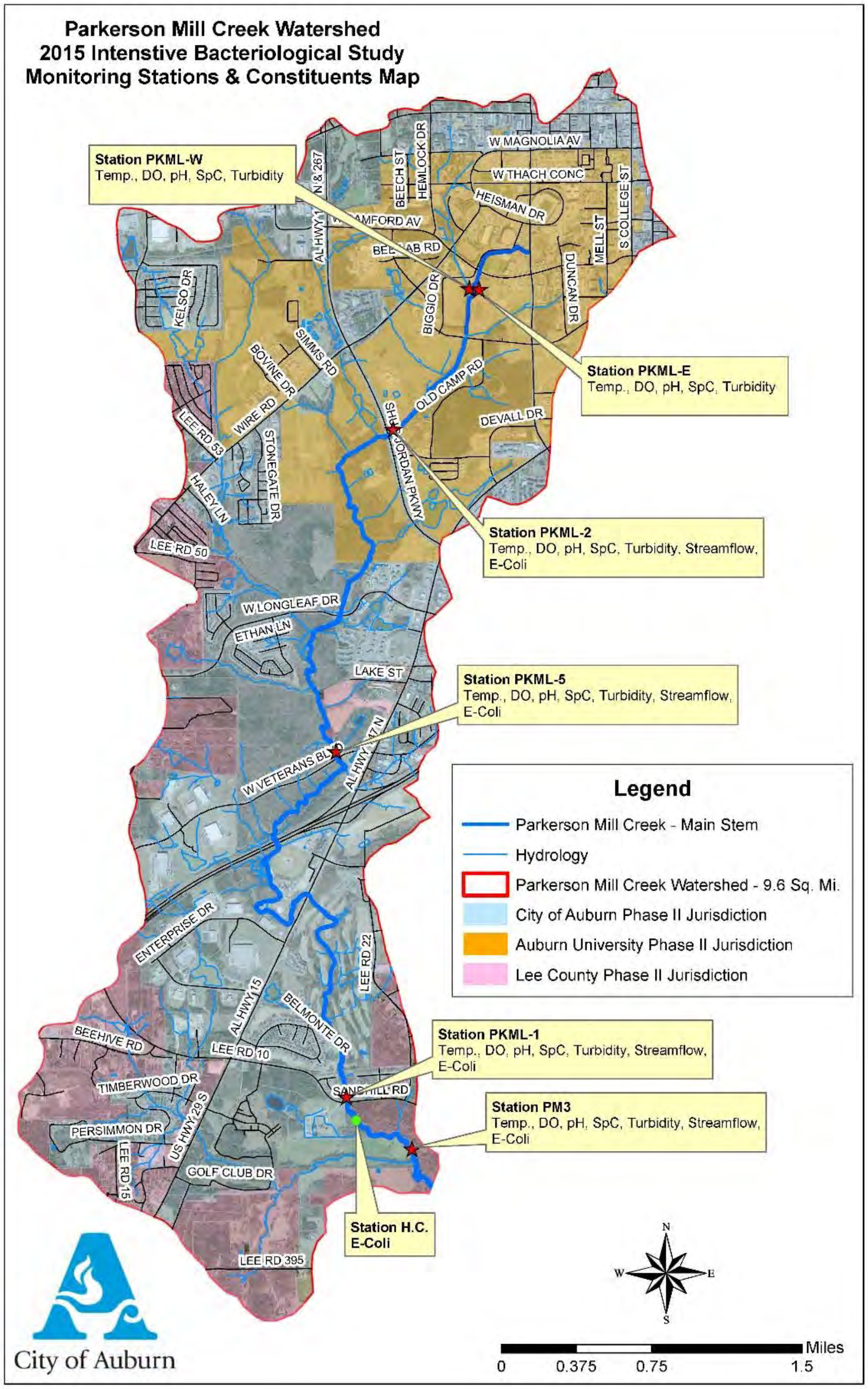
PKML-5 – Station PKML-5 is located on Parkerson's Mill Creek 200 ft. upstream of W. Veterans Blvd. Latitude *32, 33, 46.79 N*; Longitude *85, 30, 26.82 W*

PKML-1 – Station PKML-1 is located on Parkerson's Mill Creek 100 ft. upstream of Sandhill Rd. Latitude *32, 32, 16.23 N*; Longitude *85, 30, 22.62 W*

PM-3 – Station PM3 is located on Parkerson's Mill Creek 0.3 mi. downstream of H.C. Morgan WPCF outfall. Latitude *32, 32, 03.08 N*; Longitude *85, 30, 04.06 W*

H.C. – Station H.C is the H.C. Morgan WPCF outfall. Latitude *32, 32, 09.46 N*; Longitude *85, 30, 20.01 W*

REF-1 – Station REF-1 is located on a tributary to Hodnett Creek 50 ft. upstream of Wire Rd. Latitude *32, 32, 34.32 N*; Longitude *85, 35, 18.15 W*

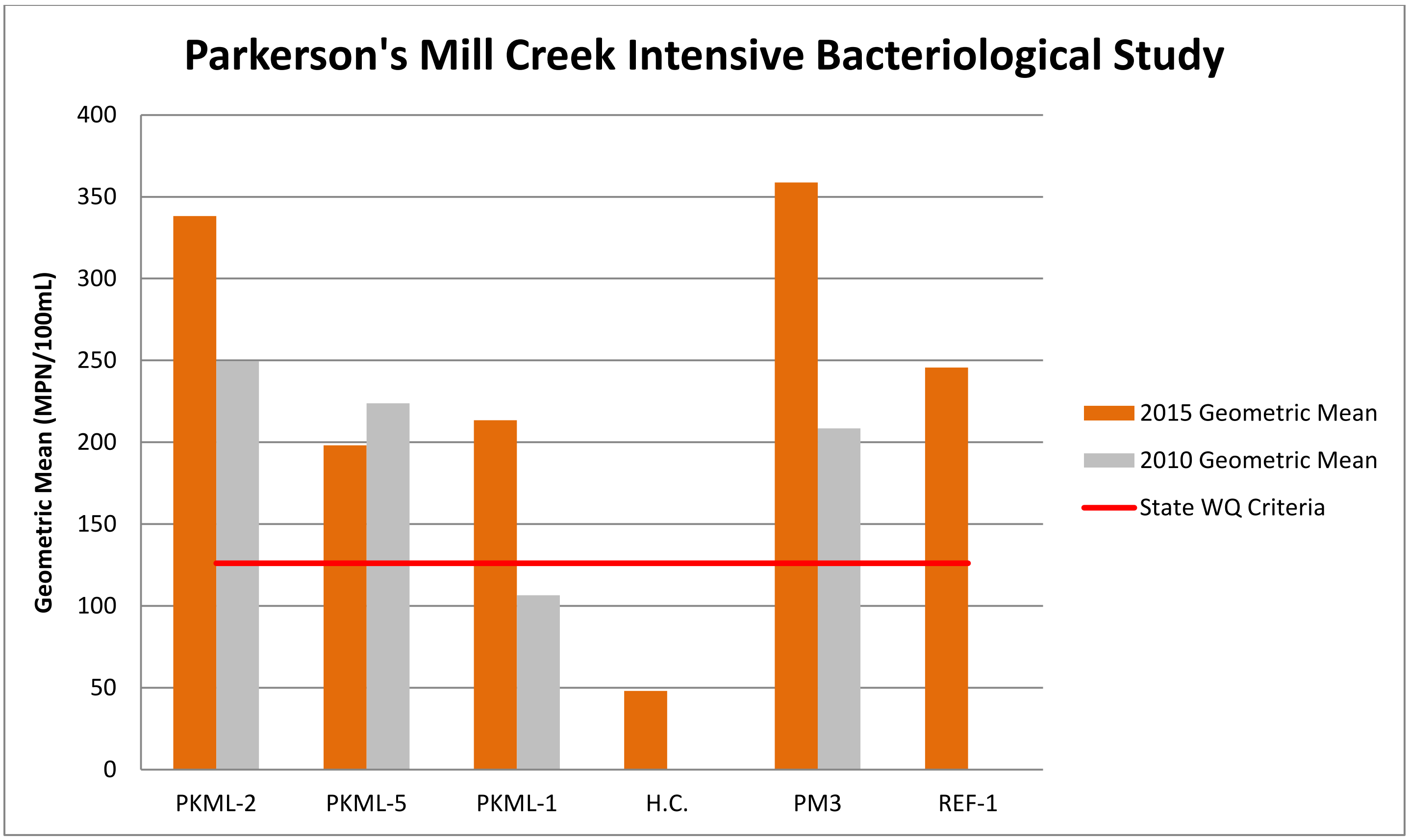


2015 Parkerson Mill Creek Bacteriological Study Sampling Locations

2015 Parkerson Mill Creek Bacteriological Study Sampling Data

	4/7/2015							
	PKML-E	**PKML-W**	**PKML-2**	**PKML-5**	**PKML-1**	**H.C.**	**PM3**	**REF-1**
Temp. (F)	71.9	71	67.4	66.9	66.2	N/A	65.7	67.8
pH	7.61	7.78	7.42	7.58	8.08	N/A	7.55	7.08
SpC (uS/cm)	180.1	327.9	158.3	125.5	203.3	N/A	258.3	58.3
DO (mg/L)	9.01	9.11	8.23	9.25	9.33	N/A	8.84	9.16
Turbidity (NTU)	4.83	1.31	5.06	6.47	5.58	N/A	3.59	5.42
E-Coli (MPN)	N/A	N/A	579	649	365	10	387	326
	5/4/2015							
	PKML-E	**PKML-W**	**PKML-2**	**PKML-5**	**PKML-1**	**H.C.**	**PM3**	**REF-1**
Temp. (F)	67.4	70.3	63.8	62.8	63	N/A	66.7	63.6
pH	7.82	8.01	7.68	7.51	7.88	N/A	7.45	6.81
SpC (uS/cm)	383.1	314.1	295.8	180	174.8	N/A	283.3	62.1
DO (mg/L)	9.08	11.06	8.7	9.18	9.35	N/A	8.48	9.23
Turbidity (NTU)	1.547	2.54	1.68	3.14	3.71	N/A	2.54	4.6
E-Coli (MPN)	N/A	N/A	365	145	166	26	248	613
	6/8/2015							
	PKML-E	**PKML-W**	**PKML-2**	**PKML-5**	**PKML-1**	**H.C.**	**PM3**	**REF-1**
Temp. (F)	74.6	79.7	75.1	74.6	76.2	N/A	75.3	73.5
pH	8.06	8.13	7.88	7.59	7.88	N/A	7.28	6.94
SpC (uS/cm)	413	356	356	219	197.7	N/A	349.5	73
DO (mg/L)	8.92	9.75	8.24	8.13	8.13	N/A	7.07	8.12
Turbidity (NTU)	0.49	1.46	6.74	2.4	2.22	N/A	4.74	6.7
E-Coli (MPN)	N/A	N/A	276	108	62	40	488	155
	6/15/2015							
	PKML-E	**PKML-W**	**PKML-2**	**PKML-5**	**PKML-1**	**H.C.**	**PM3**	**REF-1**
Temp. (F)	77.1	84.6	77.5	75.9	77.2	N/A	76	73.8
pH	7.97	8.11	7.69	7.39	7.76	N/A	7.34	7.01
SpC (uS/cm)	405	247	301.5	122.5	127.5	N/A	281.1	72.9
DO (mg/L)	8.35	9.89	7.75	7.55	7.93	N/A	7.24	8.37
Turbidity (NTU)	0.68	2.85	1.48	3.75	6.05	N/A	4.4	6.91
E-Coli (MPN)	N/A	N/A	112	126	111	63	249	326
	6/22/2015							
	PKML-E	**PKML-W**	**PKML-2**	**PKML-5**	**PKML-1**	**H.C.**	**PM3**	**REF-1**
Temp. (F)	75.2	76.9	76.2	80.9	82.1	78.7	79.3	77.8
pH	7.74	7.72	7.76	7.69	8.05	7.26	7.37	7.3
SpC (uS/cm)	502	362	441	223	197.5	390	373.4	85
DO (mg/L)	6.71	6.06	6.85	8.08	8.01	8.6	7.05	8.17
Turbidity (NTU)	0.66	1.29	0.603	1.44	1.97	N/A	2.9	3.53
E-Coli (MPN)	N/A	N/A	248	105	435	70	291	435

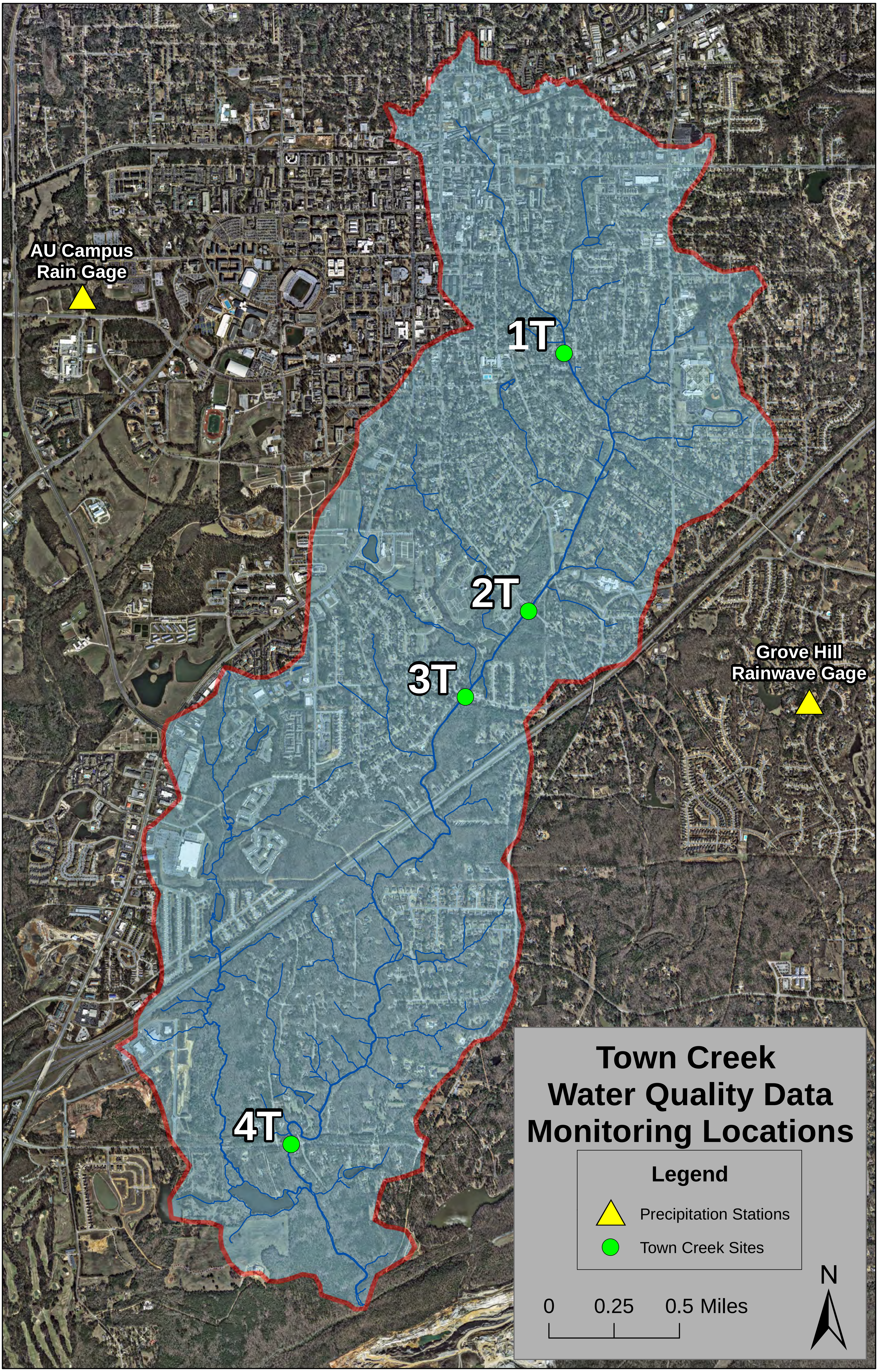
	6/29/2015							
	PKML-E	PKML-W	PKML-2	PKML-5	PKML-1	H.C.	PM3	REF-1
Temp. (F)	77.2	80.1	74.2	75.7	75.1	76.8	75	73.1
pH	8	7.9	7.63	7.32	7.78	7.32	7.47	6.8
SpC (uS/cm)	382	259	253	110	108	333	179	62
DO (mg/L)	8.32	8.28	7.73	7.52	8.2	7.9	7.94	8.22
Turbidity (NTU)	1.02	5.12	6.76	13.5	19.7	N/A	14.8	10.8
E-Coli (MPN)	N/A	N/A	1986	770	770	29	866	326
	7/6/2015							
	PKML-E	PKML-W	PKML-2	PKML-5	PKML-1	H.C.	PM3	REF-1
Temp. (F)	73.90	74.90	73.10	74.10	74.40	76.30	75.20	73.80
pH	7.85	7.81	7.63	7.43	7.80	7.29	7.97	7.00
SpC (uS/cm)	441	256	248	139	131	323	230	61
DO (mg/L)	8.27	8.40	7.90	7.81	8.20	8.01	7.95	8.10
Turbidity (NTU)	1.23	6.35	7.51	8.00	9.63	N/A	6.20	7.01
E-Coli (MPN)	N/A	N/A	291	278	192	50	194	125

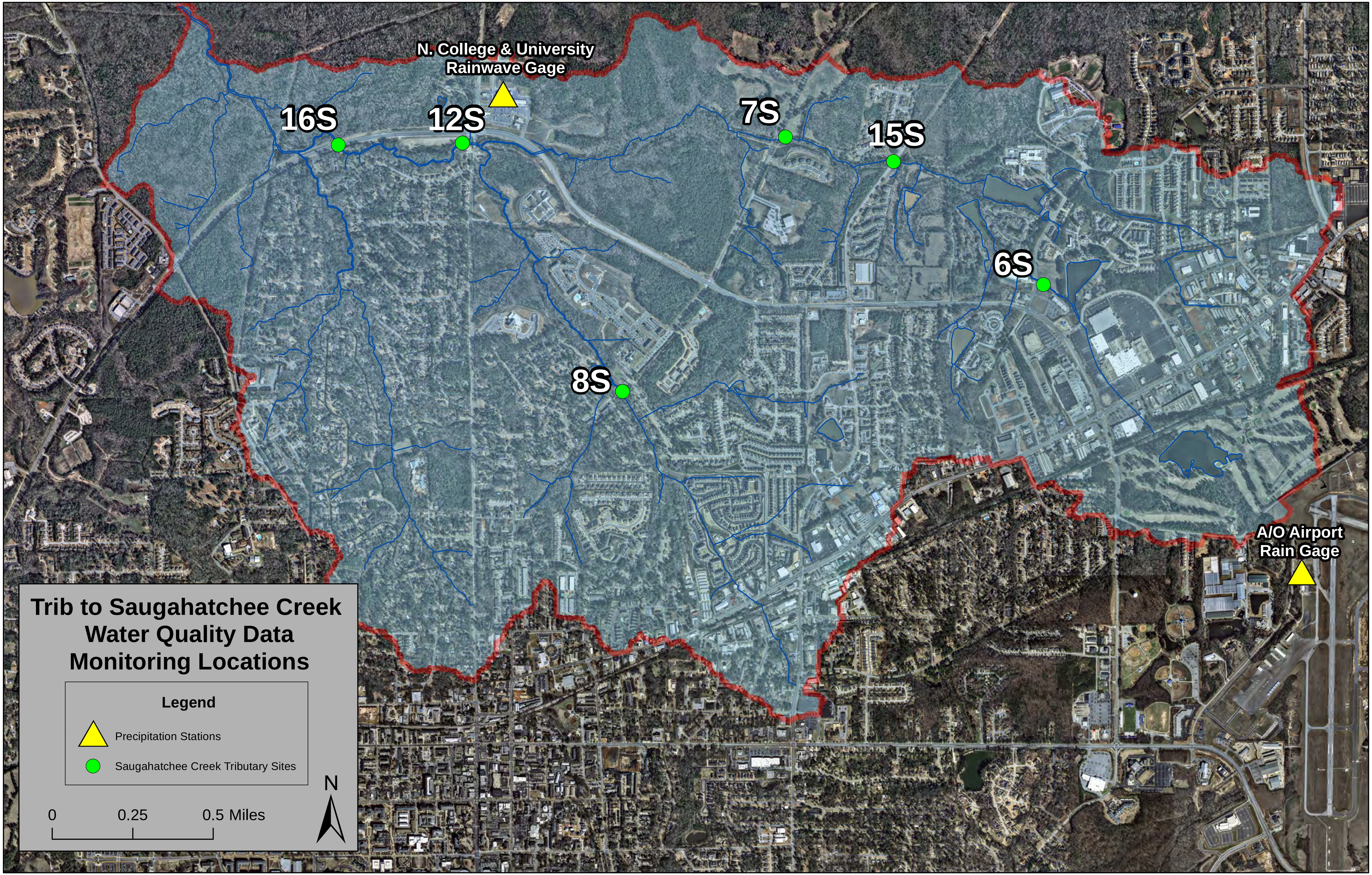


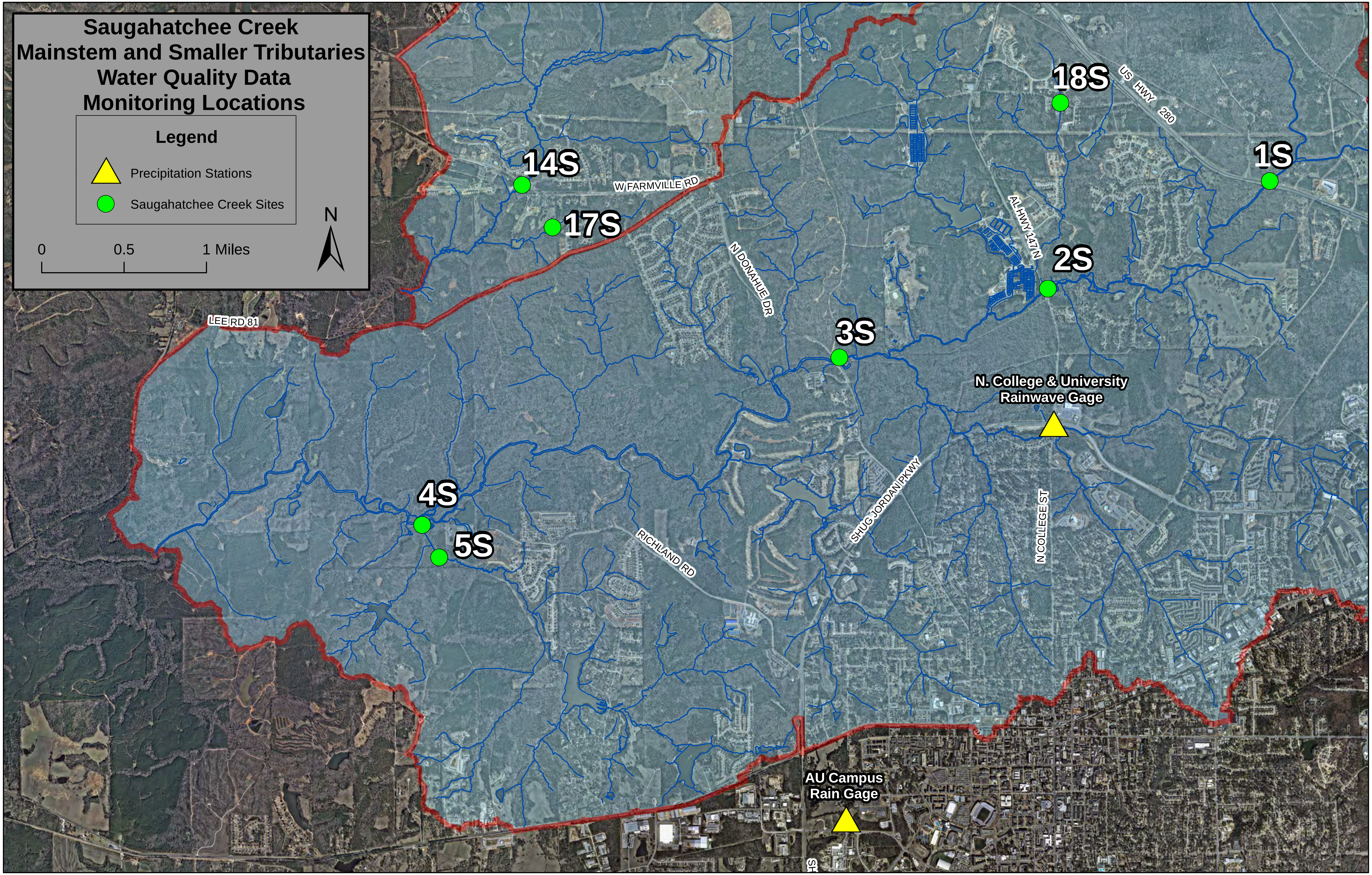
2010 and 2015 E. coli Data Comparison

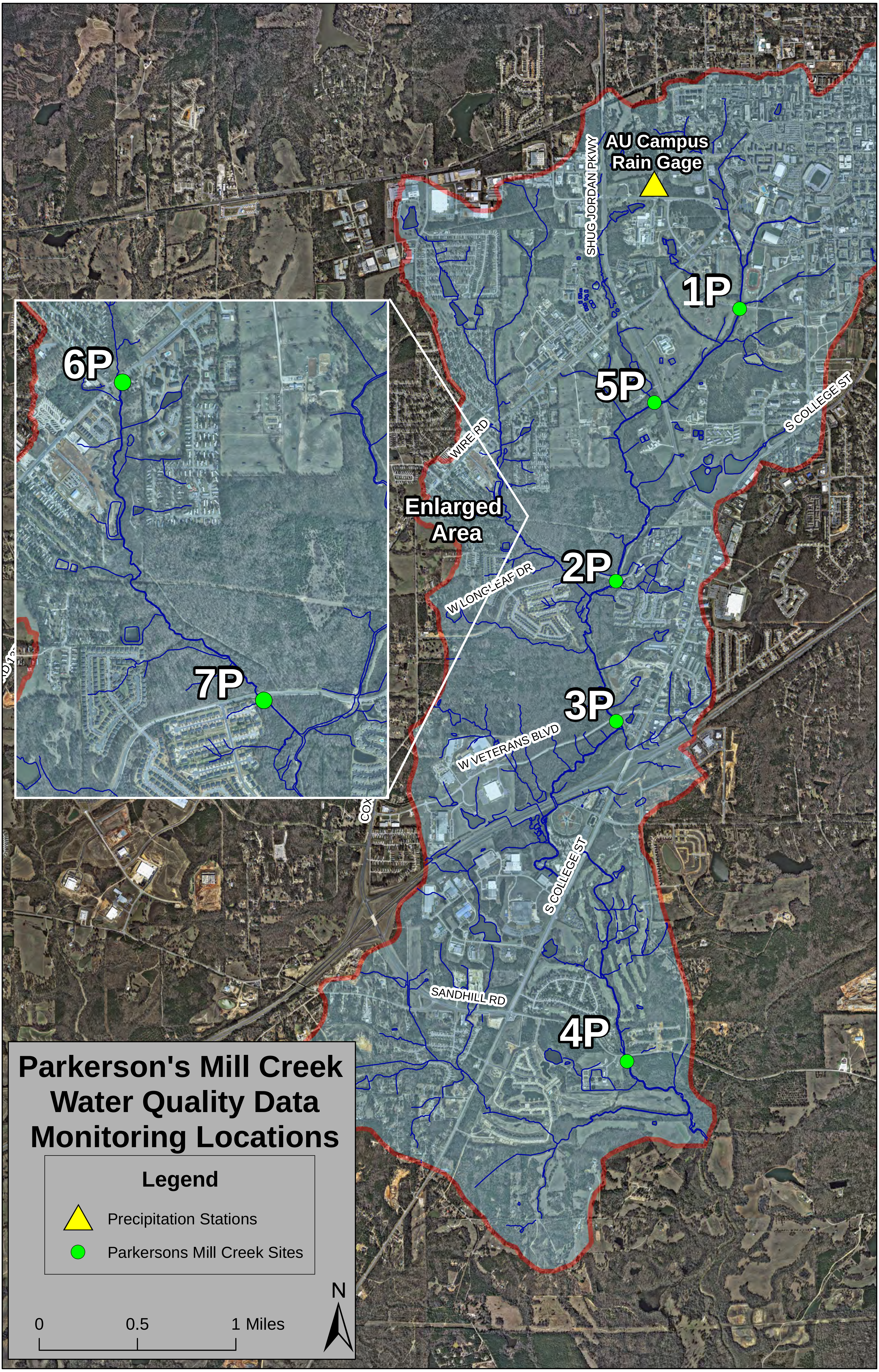
APPENDIX F

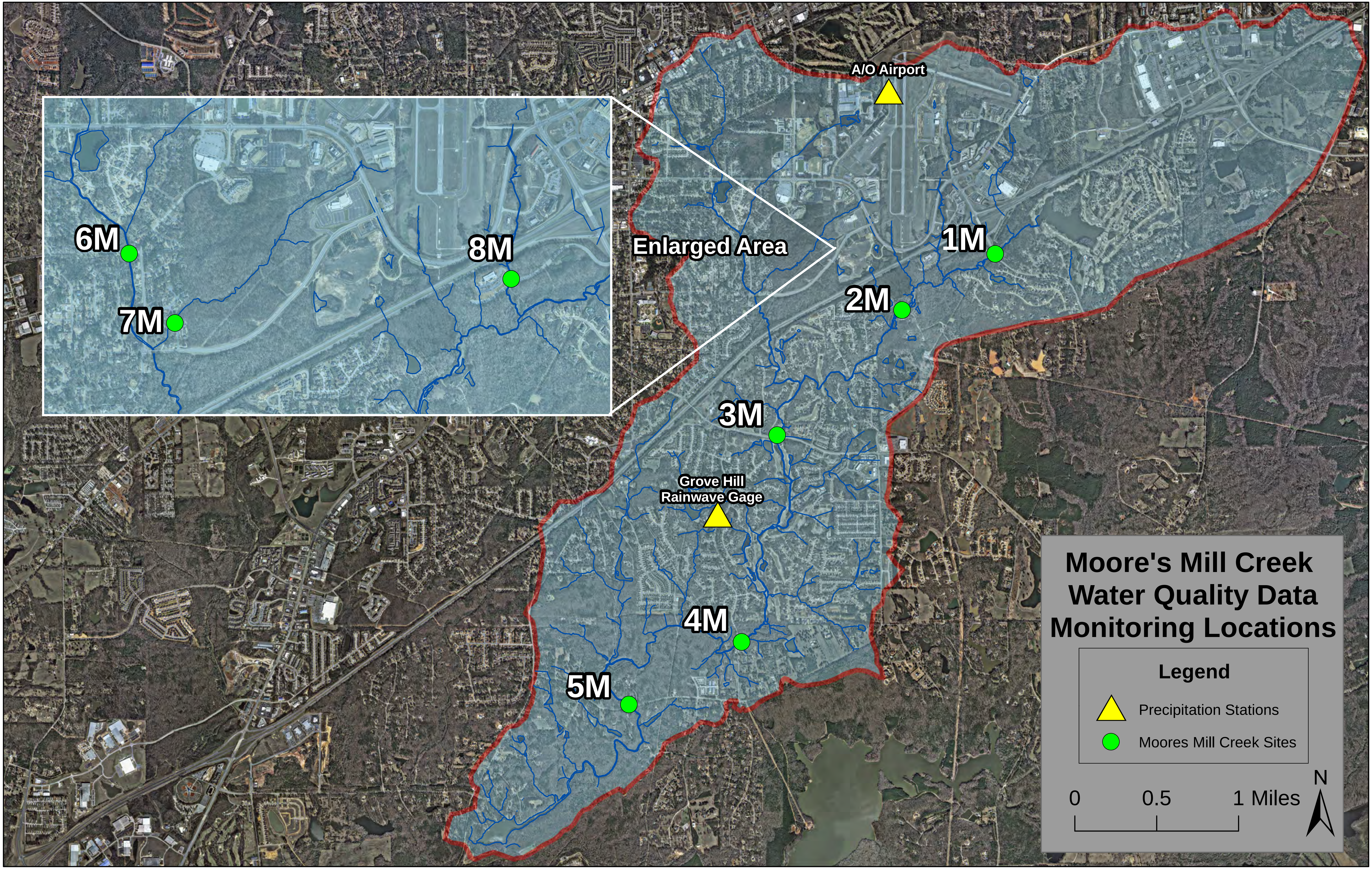
WATER QUALITY MONITORING LOCATION MAPS


AU Campus
Rain Gage
1T
2T
3T
4T
Grove Hill
Rainwave Gage
Town Creek
Water Quality Data
Monitoring Locations
Legend
Precipitation Stations
Town Creek Sites
N
0
0.25
0.5 Miles

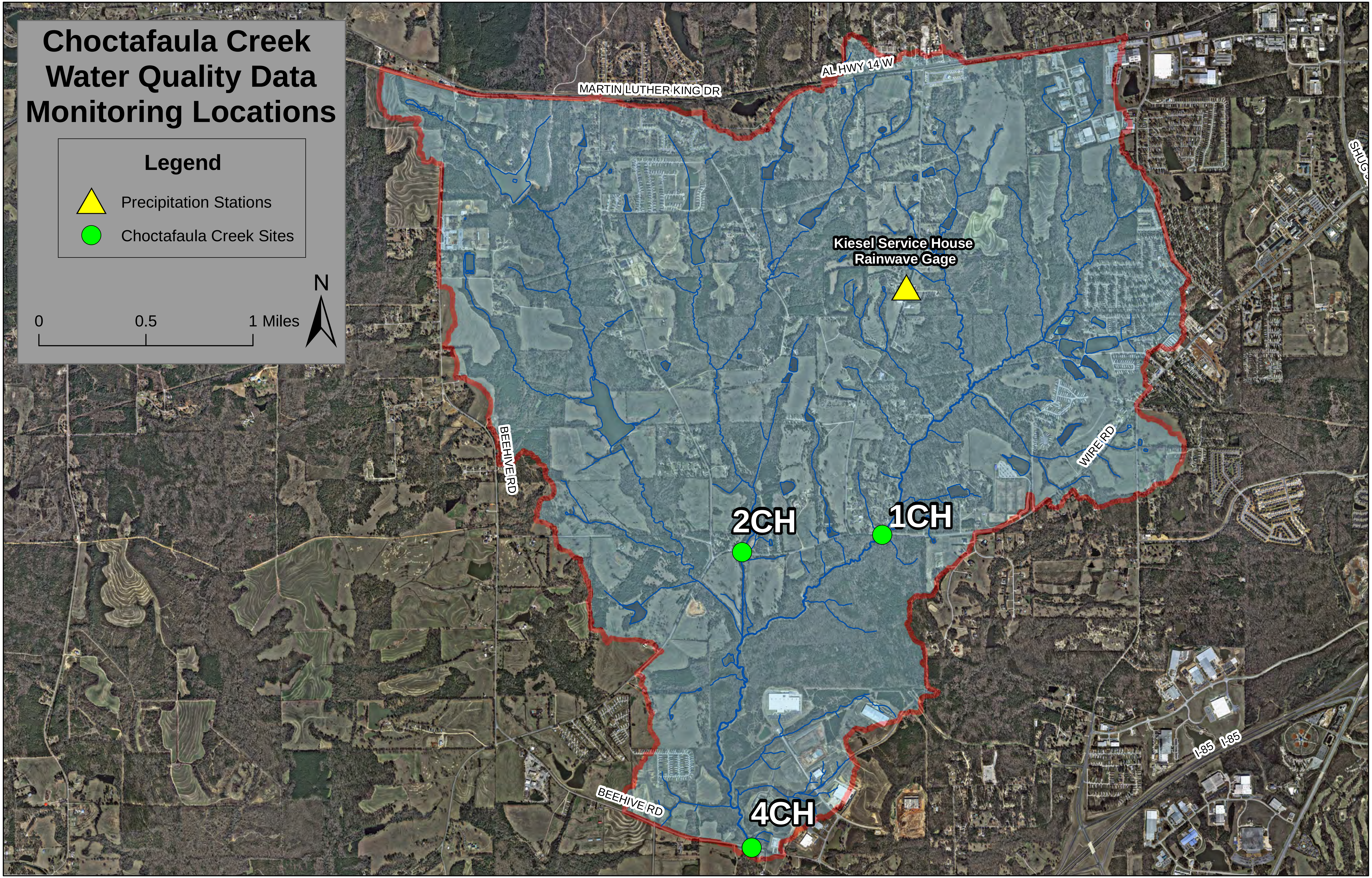

N. College & University
Rainwave Gage
16S
12S
7S
15S
6S
8S
A/O Airport
Rain Gage
Trib to Saugahatchee Creek
Water Quality Data
Monitoring Locations
Legend
Precipitation Stations
Saugahatchee Creek Tributary Sites
0
0.25
0.5 Miles
N

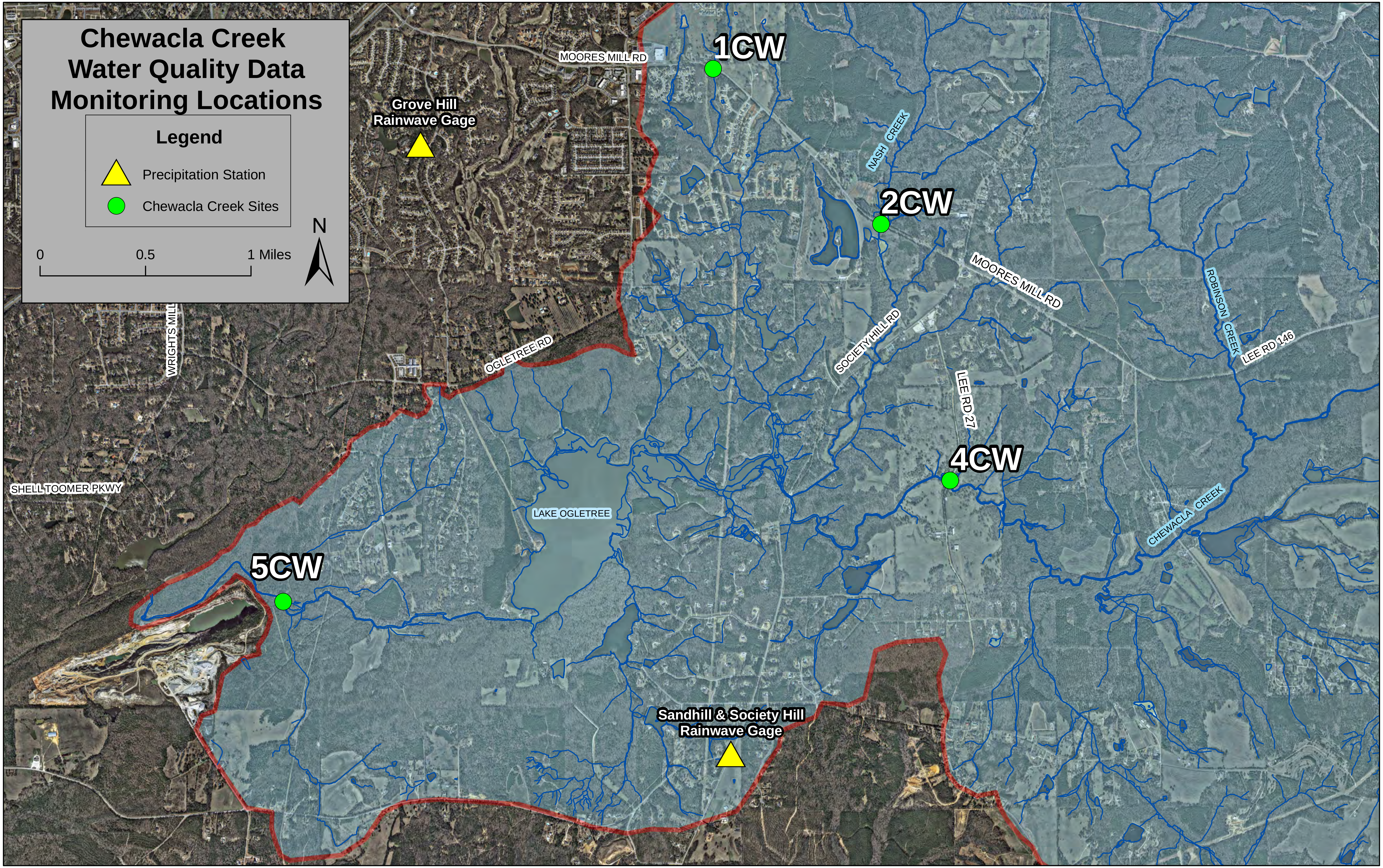

Saugahatchee Creek
Mainstem and Smaller Tributaries
Water Quality Data
Monitoring Locations
Legend
Precipitation Stations
Saugahatchee Creek Sites
0
0.5
1 Miles
N
18S
1S
14S
17S
2S
3S
4S
5S
W FARMVILLE RD
US HWY 280
AL HWY 147 N
N DONAHUE DR
LEE RD 81
N. College & University
Rainwave Gage
SHUG JORDAN PKWY
N COLLEGE ST
RICHLAND RD
AU Campus
Rain Gage


AU Campus Rain Gage
SHUG JORDAN PKWY
1P
5P
6P
7P
2P
3P
4P
S COLLEGE ST
WIRE RD
Enlarged Area
W LONGLEAF DR
W VETERANS BLVD
SANDHILL RD
Parkerson's Mill Creek Water Quality Data Monitoring Locations
Legend
Precipitation Stations
Parkersons Mill Creek Sites
0
0.5
1 Miles
N



Moore's Mill Creek
Water Quality Data
Monitoring Locations
Legend
Precipitation Stations
Moores Mill Creek Sites
0
0.5
1 Miles
N
A/O Airport
Grove Hill
Rainwave Gage
Enlarged Area
1M
2M
3M
4M
5M
6M
7M
8M


Choctafaula Creek
Water Quality Data
Monitoring Locations
Legend
Precipitation Stations
Choctafaula Creek Sites
0
0.5
1 Miles
N
MARTIN LUTHER KING DR
AL HWY 14 W
Kiesel Service House
Rainwave Gage
BEEHIVE RD
WIRE RD
2CH
1CH
4CH
BEEHIVE RD
I-85
I-85



Chewacla Creek
Water Quality Data
Monitoring Locations
Legend
Precipitation Station
Chewacla Creek Sites
0
0.5
1 Miles
N
Grove Hill
Rainwave Gage
1CW
2CW
4CW
5CW
Sandhill & Society Hill
Rainwave Gage
MOORES MILL RD
NASH CREEK
MOORES MILL RD
SOCIETY HILL RD
ROBINSON CREEK
LEE RD 146
LEE RD 27
OGLETREE RD
WRIGHTS MILL
SHELL TOOMER PKWY
LAKE OGLETREE
CHEWACLA CREEK