

Shell Creek and Prairie Creek Watersheds Management Plan

Fifth Performance Monitoring Summary September 2012– September 2014



Shell, Prairie, and Joshua Creeks Watershed Management Plan Stakeholders Group

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**Shell Creek and Prairie Creek
Watersheds Management Plan**
Fifth Performance Monitoring Summary
September 2012 – September 2014

Prepared by:

**Shell, Prairie, and Joshua Creeks
Watershed Management Plan Stakeholders Group**

Acknowledgements

The information contained in the fifth Performance Monitoring Summary is a result of the dedication of the Shell, Prairie, and Joshua Creeks Watershed Management Plan Stakeholders Group and the many agricultural entities that allow continuous access to their private properties, and who have volunteered their time to participate in the partnership process in order to collaboratively address and monitor the water quality issues in the Shell, Prairie, and Joshua Creek watersheds.

This document was compiled by the Data Collection and Natural Systems Restoration Bureaus at the Southwest Florida Water Management District. For information or additional copies of this document, please contact (352) 796-7211, extension 2201.

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Shell Creek and Prairie Creek Watersheds Management Plan Performance Monitoring Summary

Purpose of Document

The purpose of this document is to provide the fifth biennial summary of performance monitoring results which are directly related to management actions specified in the Shell Creek and Prairie Creek Watersheds Management Plan (SPCWMP) Reasonable Assurance document (SWFWMD, 2004). The SPCWMP Reasonable Assurance document was developed by the Shell, Prairie, and Joshua Creeks (SPJC) Watershed Stakeholders Group in 2004 to address verified Total Maximum Daily Load (TMDL) impairment in surface waters due to elevated concentrations of chloride, total dissolved solids (TDS), and specific conductance.

The SPCWMP Reasonable Assurance document is comprehensive in scope and not only provides reasonable assurance that management actions will address water quality conditions due to elevated chloride, TDS, and specific conductance in the TMDL impaired Shell and Prairie Creek watersheds, but in the adjacent Joshua Creek watershed as well (Figure 1). The SPCWMP Reasonable Assurance document was submitted to the Florida Department of Environmental Protection (FDEP) in December 2004, received approval from the FDEP Secretary in June 2005, and was adopted by an order signed by the FDEP Secretary in February 2012.

The reporting time period for this fifth Performance Monitoring Summary document is September 2012 through September 2014. The goal of the SPJC Stakeholders Group is to achieve the water quality goals set forth in the SPCWMP Reasonable Assurance document by 2014. Performance Monitoring Summaries have been generated on a biennial basis over the duration of this time period to show reasonable assurance toward improving water quality and consistently meeting Class I surface-water quality criteria under Florida Administrative Code (F.A.C.) 62-302.530 in the SPJC TMDL impaired sub-basins.

Description of Water Quality Goals

The specific goal of the Stakeholders Group is to improve surface-water quality within the Shell and Prairie Creek watersheds, with specific emphasis placed on identified TMDL impaired sub-basins, to consistently meet Class I surface-water quality criteria. Water quality has been historically impacted in some areas of the SPJC watersheds due to elevated levels of chloride, TDS, and specific conductance derived from the use of mineralized groundwater to irrigate agricultural lands for crop production. The goal of the SPCWMP Reasonable Assurance document (and the specific management actions outlined within the document) is to reduce levels of specific conductance, chloride, and TDS below the maximum Class I criterion of 1275 uS/cm, 250 mg/L, and 1000 mg/L, respectively, at all times throughout the SPJC watersheds. In addition, the goal of the plan is to reduce TDS below the Class I standard of 500 mg/L as a monthly average. Specific conductance must be below 775 uS/cm, based upon historical data analysis in the SPJC watersheds, to ensure compliance with Class I standards for chloride and TDS. A specific conductance value of 775 uS/cm equates to a chloride concentration of approximately 150 mg/L and a TDS concentration of 500 mg/L. The time frame to achieve these water quality goals is ten years, or by 2014.

This fifth Performance Monitoring Summary addresses the water segments found in the following table, each of which are Class I water bodies that have been listed as verified impaired in 2004 based on FDEP's evaluations using methodologies from the Impaired Surface Waters Rule (IWR) (Chapter 62-303, F.A.C.) (Figure 2)). Upon approval of the SPCWMP, these water segments were designated as Category 4b (a TMDL will not be established because a Reasonable Assurance Plan has been approved which documents management actions to address the identified impaired parameters).

Water Segments in the SPJC Listed as Verified Impaired

Water Segment	FDEP WBID	Water Body Type	Basin/Watershed	Impaired Area	Parameters of Concern
*Prairie Creek	1962	Stream	Peace River/ Prairie Creek	29 mi.	Sp. Conductance, TDS
Shell Creek	2041	Stream	Peace River/ Shell Creek	10.5 mi.	Sp. Conductance, Chloride, TDS
Myrtle Slough	2040	Stream	Peace River/ Shell Creek	6 mi.	Sp. Conductance, Chloride, TDS

*Of notable mention, and documented recently in the FDEP's Verified Assessment Period Report Card (Cycle 3 / Group 3 – June, 2015), no water segments in the Prairie Creek watershed (WBID 1962) are listed as impaired for TDS or specific conductance.

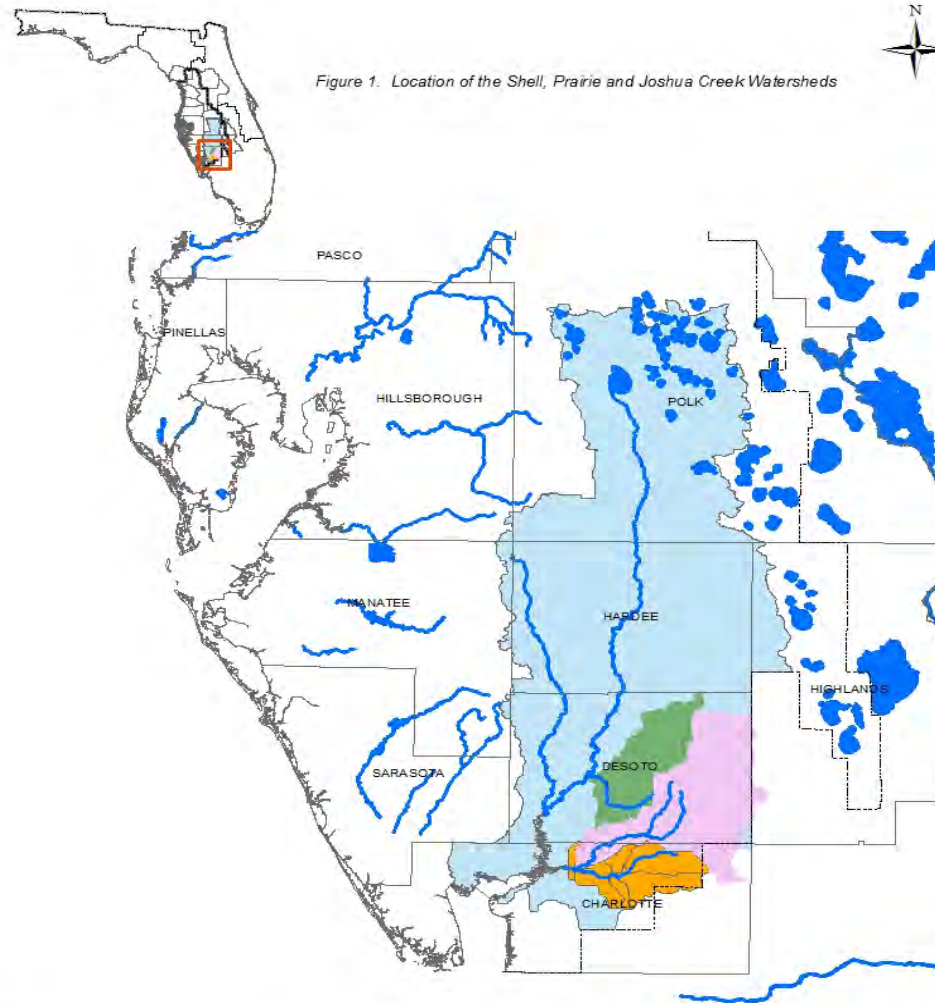


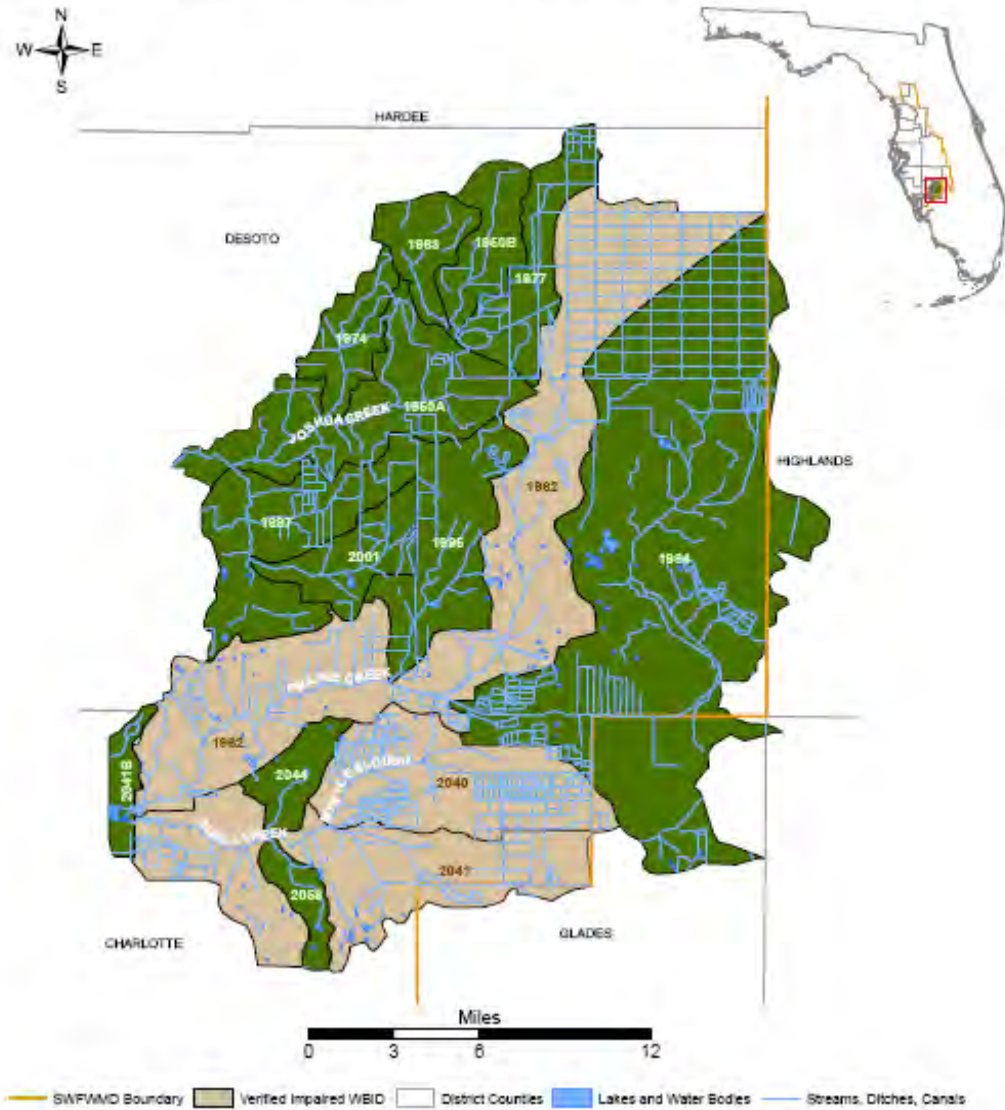
Figure 1. Location of the Shell, Prairie and Joshua Creek Watersheds

Legend

- District Counties
- 1:250,000 Streams
- WATER
- Joshua Creek Watershed
- Prairie Creek Watershed
- Shell Watershed
- Peace River Basin

0 5 10 20 30 40 Miles

Figure 2. Location of WBIDs within the Shell, Prairie, and Joshua Creek Watersheds



The performance monitoring results presented in this document will be prioritized by the 2004 verified impaired water body IDs (WBIDs) as listed above. However, the stakeholders group considered the entire area of the Shell, Prairie, and Joshua Creeks potentially impaired, therefore performance monitoring results will also be presented for the 13 water bodies listed below with proposed management actions specified in the SPCWMP Reasonable Assurance document also being applied within the following WBIDs:

Water Segments in the SPJC not Listed as TMDL Verified Impaired

Water Segment	FDEP WBID	Water Body Type	Basin / Watershed
Shell Creek Reservoir	2041B	Reservoir / Lake	Peace River / Shell Creek
Cypress Slough	2044	Stream	Peace River / Shell Creek
Unnamed Ditch	2058	Stream	Peace River / Shell Creek
Cow Slough	1964	Stream	Peace River / Prairie Creek
Myrtle Slough	1995	Stream	Peace River / Prairie Creek
Joshua Cr. ab Peace Rv.	1950A	Stream	Peace River / Joshua Creek
Joshua Cr. ab Honey Creek	1950B	Stream	Peace River / Joshua Creek
Lake Slough	1963	Stream	Peace River / Joshua Creek
Unnamed Branch	1974	Stream	Peace River / Joshua Creek
Honey Run	1977	Stream	Peace River / Joshua Creek
Hawthorne Creek	1997	Stream	Peace River / Joshua Creek
Hog Bay Slough	2001	Stream	Peace River / Joshua Creek
*Gannet Slough	2020	Stream	Peace River

*Addressed in this report but only partially contained within District boundaries

Expenditures in the SPJC Watersheds for Top Priority Resource Management Actions

The following table provides cost expenditures that have supported top priority resource management actions within the SPJC Watersheds during the October 2012 to September 2014 time frame, and also includes combined funding for these efforts since inception of the SPCWMP Reasonable Assurance document. Water quality monitoring and associated laboratory expenditures for performance monitoring activities are also included. The \$47,221,455 expended to date for resource management actions have been supported by District, State, and Federal cost-share funding. Listed below are actions that have been defined as having the highest effectiveness to address water quality impairment within the SPJC watersheds. Funding that has supported regional resource management actions (SWUCA Recovery, etc.) are difficult to determine and are not provided at this time. A table providing progress-to-date for each of the 11 Resource Management Actions can be found in the following “Resource Management Actions and Progress to Date” section.

Cost Expenditures in the SPJC Watersheds for Top Priority Resource Management Actions; October 2012 to September 2014 (FY2013 and FY2014) (prior funding also provided)

Resource Management Action	Total Expenditure
Shell, Prairie, and Joshua Creek (SPJC) Well Back-Plugging Program	\$20,050*
Facilitating Agricultural Resource Management Systems (FARMS) Program FY2013-FY2014	\$2,423,715*
Environmental Quality Incentives Program (EQIP)	\$840,212**
Quality of Water Improvement Program (QWIP)	\$24,000
Water Quality Monitoring & Laboratory Analysis	\$62,093
Total Expenditures FY2012 - FY2014	\$3,370,070
Top Priority Resource Management Action Expenditures 2004 – 2012	\$43,441,225
USGS Water Quality and Discharge Measurements at Key (3) Locations 2004 - 2014	\$410,160
Total Expenditures 2004 – 2014	\$47,221,455

*These are District expenditures and do not include cooperator costs.

**These represent expenditures of federal dollars by the USDA

The improvements in mineralized constituents seen throughout the SPJC surface waters can be directly related to resource management actions that have been initiated within the SPJC watershed since inception of the SPCWMP Reasonable Assurance Plan.

Precipitation within the SPJC Watersheds

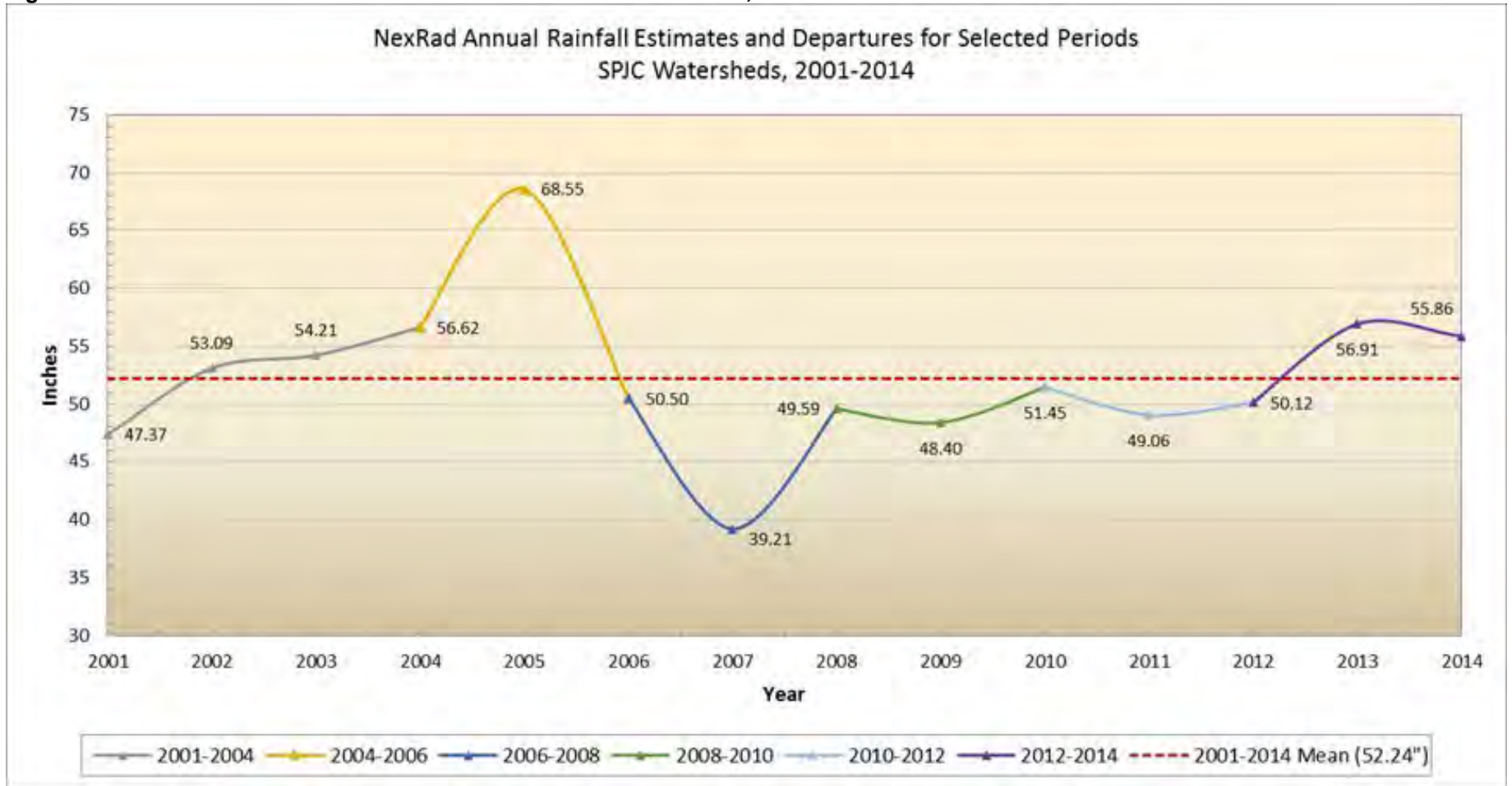
Prevailing climatic conditions have a direct influence on water quality in receiving surface waters within agricultural areas of the SPJC watersheds. Mineralized groundwater, which commonly occurs throughout the SPJC, can affect both shallow groundwater (water table) and direct runoff, especially when used to irrigate during dry conditions. The intensity of dry conditions can increase mineralized concentrations due to two principal factors; 1) additional mineralized irrigation water is applied to crops to compensate for rainfall shortages, and 2) reduced rainfall limits the natural dilution and flushing effects on direct runoff to the underlying shallow groundwater aquifer, which ultimately then drains

to surface-water systems. During dry or drought periods, the source of most, if not all, streamflow is derived from shallow groundwater aquifer discharge. This effect on surface waters can be further compounded by a corresponding decrease in stream discharge associated with lower rainfall. Conversely, during wet conditions, the increase in rainfall can dilute and decrease the concentration of mineralized groundwater runoff that ultimately drains to surface-water bodies.

Rainfall calculations for the SPJC watersheds were determined using National Weather Service NexRAD RADAR imagery. Daily totals were estimated based on cumulative rainfall amounts measured within a cell of an overlying network grid. NexRAD rainfall estimates, based on the SPJC network grid, are considered highly accurate when compared to individual point rainfall gages located strategically within a watershed. The NexRAD average annual rainfall for the SPJC watersheds (2001 to 2014) was 52.24 inches, representing a range of normal, wet, and dry climatic conditions.

Figure 3 compares total annual rainfall throughout the SPJC performance monitoring period (2001 to 2014), and can be used to evaluate how climatic conditions may have affected resource management actions and subsequent water-quality data results during these time periods. The initial baseline performance monitoring results were based on data collected during a 'flat' climatic period from 2001 to 2004, with an average of 52.8 inches of rainfall. This period started with a regional drought in 2001 that ended the following year. The 2004 to 2006 monitoring period was heavily influenced by both the effects of three back-to-back hurricanes that occurred in the latter part of 2004 and a very wet year in 2005 where above average rainfall amounts of 58.6 inches were experienced. The third time period, 2006 to 2008, has been classified as a period of persistent drought with an annual average rainfall of 46.4 inches. The year 2007 was particularly dry with only 39.2 inches of measured precipitation. This deficit of approximately 13 inches from the fourteen-year average (2001 to 2014) prompted an increase in irrigation usage of ambient mineralized groundwater and subsequent runoff of groundwater to surface water systems within the SPJC watersheds. The 2008 to 2010 study period had an average annual rainfall of 49.81 inches, and a cumulative rainfall deficit for the consecutive three-year period of 7.28 inches below the fourteen-year average (2001 to 2014) of 52.24 inches. During the 2010 to 2012 study period, average annual rainfall was 50.21 inches which reflected continued drought conditions with a cumulative rainfall deficit of 6.09 inches compared to the 2001 to 2014 annual average of 52.54. The period between 2012 and 2014 started off with a rainfall deficit of 2.12 inches in 2012 and rebounded in 2013 and 2014 with annual average rainfall exceeding the 2001 to 2014 period by 4.67 and 3.62 inches respectively. In summary, below average rainfall and/or drought conditions occurred over fifty percent of the time during the 2004 to 2014 performance monitoring period.

Figure 3. NexRAD Annual Rainfall Estimates for the SPJC Watersheds, 2001-2014



Median Percent Reduction Goals and Progress to Date

Concentration based load reductions that need to occur in the SPJC impaired water segments by year 2014 have been identified by the FDEP using IWR data sources from January 2001 through February 2004. The following table includes the reduction goals initially established by FDEP, progress achieved during the first biennial reporting period (March 2004 to July 2006), and progress achieved for subsequent and current (2012 to 2014) reporting periods. These percentages are calculated by determining the reductions required to meet water quality goals of 250 mg/L for chloride, 1000 mg/L for TDS (at all times) and 500 mg/L for TDS (as a monthly average) based upon data collected at long-term data collection stations and calculated as; 1) percent each discrete value is above the established water quality criteria for each parameter, and 2) percentage shown is the median of all individual percent values that exceed criteria levels. Also provided on this table is the number of values (for each site and parameter) that exceeded water quality criteria, since in some instances what appears to be a high percentage is due to only one value exceeding the water quality criteria. In addition, multiple values for TDS during a one-month time period are not consistently available to calculate monthly averages, therefore individual values have been used in some instances to determine exceedances above the 500 mg/L criteria.

Considerable progress has been made, since the inception of this Reasonable Assurance Plan (2004) toward achieving the water quality goals of 1) 250 mg/L for chloride (at all times); 2) 1000 mg/L for TDS (at all times) and; 3) 500 mg/L for TDS (as a monthly average) in Prairie Creek (WBID 1962), Shell Creek (WBID 2041) and Myrtle Slough (WBID2040). Discussion of the progress toward attainment of these goals is discussed below by WBID.

The most notable progress toward meeting these goals has been in the Prairie Creek watershed (WBID 1962). Since 2004, TDS exceedances of the 500 mg/L monthly average criterion decreased at both monitoring locations for every reporting period, with the exception of 2010 to 2012. The TDS exceedances that occurred during the 2010 to 2012 reporting period occurred toward the end of a six year drought period. There have been no exceedances of the 1000 mg/L criterion for TDS (at all times) since monitoring began in 2004, and this WBID was not identified by the FDEP as impaired for chloride. Success in achieving the TDS criterion of 1000 mg/L (at all times) may be due in large part to the number of FARMS projects that have been implemented , including well back-plugging that has occurred in the Prairie Creek watershed. Over the time period of implementing resource management actions within WBID 1962, 17 operational FARMS projects have been executed resulting in over 2.8 million gallons per day of groundwater offset.

Shell Creek (WBID 2041), has shown some improvements with TDS concentrations exceeding the 500 mg/L monthly average criterion, although not as pronounced, or in some cases, as consistent, as Prairie Creek. The target median percent reductions required by FDEP was 28.8 percent, with 25 individual values exceeding the 500 mg/L criteria for the Shell Creek at the Washington Loop site, and 24.8 percent with 25 individual values exceeding the TDS criteria for the Shell Creek at SR 31 site. During the 2004 to 2006 reporting period, these values decreased to 15.9 percent with 15 values exceeding criteria, and 12.4 percent and 10 values, respectively. In addition, during this reporting period, higher than average annual rainfall events occurred due to three hurricanes that impacted this area in 2004. Every reporting period since 2004 to 2006 has shown decreases in individual values that exceed the 500 mg/L criterion for TDS. The percent of values have shown increases and decreases throughout the remainder of the study period. For the current reporting period of 2012 to 2014, the percent and number of individual values exceeding the 500 mg/L criterion for TDS both decreased when compared to the needed median percent reductions established by the FDEP. With respect to the criterion of 1000 mg/L TDS (at all times), the Shell Creek at Washington Loop Site (WBID 2041), has shown improvements throughout the study period. The percent exceedances of this criterion in the 2004 to 2006 reporting period at this site were 11.6 percent, but only one individual value exceeded the criterion compared to the median percent reductions needed (10.4 percent and 8 values exceeding criteria). For the 2006 to 2008, 2008 to 2010 and 2012 to 2014 reporting periods, no values exceeded

the criterion for TDS of 1000 mg/L. For 2010 to 2012, 4.1 percent of the values exceeded the criterion which is less than the median percent reductions needed. Given that 2006 to 2012 had below average rainfall, it can be recognized that management actions implemented in the Shell Creek Watershed have reduced the concentration and quantity of mineralized groundwater entering the surface waters of this area. As of 2014, there are 11 operational FARMS projects that have resulted in approximately 2.0 million gallons per day of groundwater offset. Three of these projects became operational during this reporting period. Water quality improvements in the Shell Creek Watershed are further evidenced by the decreases seen in the percentages of values exceeding the chloride criterion of 250 mg/L (at all times) at both sites in this WBID.

Water quality representing WBID 2040 is collected at Myrtle Slough at SR 31 in the Shell Creek Watershed. Results show more consistent decreases in the percentage of values and individual values exceeding the TDS criteria. The reporting period 2010 to 2012 was the only reporting period that showed a decrease in the percentage of values exceeding the 500 mg/L TDS criterion. As mentioned previously, the reporting timeframe came at the end of an extended drought period that began in 2006. Results compared to the criterion for TDS of 1000 mg/L (at all times) improved and none of the reporting periods showed an increase in the number of individual values or percentage of values compared to the FDEP established median percent reductions needed; 2006 to 2008 and 2012 to 2014 reporting periods had no values exceeding the TDS 1000 mg/L criterion. With respect to the chloride criterion of 250 mg/L (at all times), values in every reporting period were less than the identified median percent reductions needed. This was the case for average and below average rainfall years, which supports the successes of FARMS projects and other management actions in reducing the impacts of quality and concentration of mineralized groundwater entering the surface waters of this WBID. There have been 11 FARMS projects implemented in this WBID which have resulted in approximately 3.1 million gallons per day of groundwater offset.

Management actions and efforts undertaken by the SPJC Stakeholders Group to address persistent mineralized water quality impacts in the Shell Creek WBIDs are explained in the following section.

Shell Creek and Prairie Creek Watersheds - Percent Reduction Calculations to Meet Criteria

TMDL Verified Impaired Water Segments by WBID	TDS; 500 mg/L as monthly avg. ^{a,c}							TDS; 1000 mg/L at all times ^b					Chloride; 250 mg/L at all times					
	Initial RA Plan Percent & No. Values Exceeding Criteria	3/2004 to 7/2006 Percent & No. Values Exceeding Criteria	8/2006 to 8/2008 Percent & No. Values Exceeding Criteria	9/2008 to 9/2010 Percent & No. Values Exceeding Criteria	9/2010 to 9/2012 Percent & No. Values Exceeding Criteria	10/2012 to 10/2014 Percent & No. Values Exceeding Criteria	Initial RA Plan Percent & No. Values Exceeding Criteria	3/2004 to 7/2006 Percent & No. Values Exceeding Criteria	8/2006 to 8/2008 Percent & No. Values Exceeding Criteria	9/2008 to 9/2010 Percent & No. Values Exceeding Criteria	9/2010 to 9/2012 Percent & No. Values Exceeding Criteria	10/2012 to 10/2014 Percent & No. Values Exceeding Criteria	Initial RA Plan Percent & No. Values Exceeding Criteria	3/2004 to 7/2006 Percent & No. Values Exceeding Criteria	8/2006 to 8/2008 Percent & No. Values Exceeding Criteria	9/2008 to 9/2010 Percent & No. Values Exceeding Criteria	9/2010 to 9/2012 Percent & No. Values Exceeding Criteria	10/2012 to 10/2014 Percent & No. Values Exceeding Criteria
WBID 1962																		
Prairie Creek at Washington Loop Rd.	25.6% 20 Values	8.5% 7 Values	11.7% 11 Values	9.8% 10 Values	50% 12 Values	5.1% 3 Values	10.2% 7 Values	No values exceed criteria	No values exceed criteria	No values exceed criteria	No values exceed criteria	No values exceed criteria	Not Impaired	Not Impaired	Not Impaired	Not Impaired	Not Impaired	Not Impaired
Prairie Creek near Ft. Ogden (SR 31)	32.6% 16 Values	7.9% 5 Values	16.7% 8 Values	2.4% 5 Values	42% 10 Values	4% 1 Values	29.3% 13 Values	No values exceed criteria	No values exceed criteria	No values exceed criteria	No values exceed criteria	No values exceed criteria	Not Impaired	Not Impaired	Not Impaired	Not Impaired	Not Impaired	Not Impaired
WBID 2041																		
Shell Creek at Washington Loop Rd.	28.8% 25 Values	15.9% 15 Values	25.9% 17 Values	23.9% 13 Values	87% 21 Values	23.8% 11 Values	5.4% 8 Values	11.6% 1 Value	No values exceed criteria	No values exceed criteria	4.1% 14 Values	No values exceed criteria	19.7% 52 Values	12% 2 Values	11.6% 2 Values	6.93% 4 Values	6.1% 13 Values	15.6% 12 Values
Shell Creek at SR 31	24.8% 25 Values	12.4% 10 Values	25.6% 15 Values	38.4% 21 Values	75% 12 Values	36.7% 17 Values	10.4% 19 Values	29.8% 2 Values	*24.2% 2 Values	8.7% 2 Values	No values exceed criteria	4% 3 Values	29.3% 39 Values	26.4% 2 Values	13.8% 9 Values	14.5% 9 Values	50% 8 Values	16.6% 17 Values
WBID 2040																		
Myrtle Slough at SR 31	43.4% 33 Values	33.1% 13 Values	36.7% 20 Values	37.1% 23 Values	95% 17 Values	24.2% 17 Values	16.5% 48 Values	1.5% 1 Value	No values exceed criteria	14.6% 1 Value	1.7% 1 Value	No values exceed criteria	34.6% 63 Values	16.1% 4 Values	10.71% 7 Values	10.69% 6 Values	27.1% 19 Values	7.4% 5 Values

^a Median of individual percent exceedances above the Class I criteria of 500 mg/L

^b Median of individual percent exceedances above the Class I criteria of 250 mg/L

^c Some earlier FDEP and City of Punta Gorda TDS data not lab analyzed; values calculated from field measured specific conductance readings

Data sources include: FDEP STORET; IWR2011_run43, City of Punta Gorda, FDEP Ft. Myers, and SWFWMD

*Value reported in prior reports (0.8%) was incorrect - appropriate value shown

Management Actions Implemented to Target Poor Water Quality in the Shell Creek and Myrtle Slough Watersheds

Elevated TDS and chloride concentrations in both Shell Creek and Myrtle Slough (WBIDs 2041 and 2040, respectively) have been correlated to agricultural activities in the headwaters of these creek systems, along with six years of persistent drought conditions. Surface and ground water quality monitoring efforts were implemented to locate irrigation wells that were contributing elevated mineralization to these surface water systems via seepage and direct runoff. Outreach to the agricultural community in these watersheds occurred using the FARMS Program as an incentive to improve irrigation practices, raise awareness through monitoring of irrigation water, implementing precision irrigation projects, assisting with the back-plugging of highly mineralized groundwater wells, and increasing the use of alternative water supply sources such as tailwater recovery ponds. These incentives have been very effective in the SPJC watersheds at reducing mineralized groundwater inputs to receiving surface waters.

The District's Specific Conductance Reconnaissance Network revealed elevated specific conductivity levels in the headwaters of Shell Creek at S.R. 31. A reconnaissance sampling program was initiated in June 2010 in an effort to identify sources of poor water quality potentially contributing to the elevated mineralization in this area, using specific conductance as the surrogate. Agricultural sites were accessed and approximately 50 spot checks were performed in irrigation ditches to locate elevated conductance levels. In addition to surface water conductance levels, approximately 40 groundwater wells were sampled to locate elevated mineralized sources, and potential well back-plugging and FARMS projects were discussed with several permittees. Ultimately, six locations were selected for sampling from August 2010 through January 2014. Subsequently, five FARMS projects have been implemented in the area in recent years to address potential poor water quality sources. Combined, these projects will result in over 563,000 gallons per day of groundwater offset and should have a measurable impact on the elevated specific conductance in the Shell Creek headwaters as the properties will be offsetting groundwater sources that were impacted by upwelling of poor water quality within large diameter irrigation wells. Further expansion of tailwater recovery projects in this area could also occur as the water quality of groundwater irrigation wells in this area continue to impact crop production.

The remainder of this document details water resource management actions and monitoring efforts that have been accomplished over the 2004 to 2014 time period toward addressing water quality impairment in the SPJC watersheds, and providing reasonable assurance toward achieving the FDEP established median percent reduction goals.

Resource Management Actions and Progress to Date

The following table provides the number and/or progress of Resource Management Actions that have been initiated and/or completed in the SPJC Watersheds during the October 2004 to September 2014 time frame. These Management Actions have been defined in the SPCWMP Reasonable Assurance document, and are expected to measurably improve chloride, specific conductance, and TDS concentrations within each of the SPJC Watersheds. The Resource Management Actions are listed in order of their effectiveness to address water quality impairment, with detailed progress of Management Actions for each specific SPJC WBID summarized in the following tabulated sections of this document.

Resource Management Action	Current and Prior Progress		Result
Shell, Prairie, and Joshua Creek (SPJC) Well Back-Plugging Program	Number Wells Back-Plugged		Improves water quality at source of mineralized water. Highly effective with documented program success. Provides economic incentive to growers as it improves crop production.
	Prior to October 2012	October 2012- September 2014	
	52	3	
SWFWMD Resource Regulation Well Construction and Water-Use Permitting (WUP)	Permitted and Constructed Irrigation Wells (2006-2012)	Water-Use Permits (2006-2014)	Highly effective complement to incentive programs such as FARMS and Well Back-Plugging. Regulates compliance on permit renewals and new WUP applications.
	693	251	
	Overall Number FARMS/EQIP Projects		
Facilitating Agricultural Resource Management Systems (FARMS) Program	Overall Number FARMS Projects prior to October 2012	Overall Number FARMS Projects 2012-2014	Very effective dual role of improving water quality and reducing water use. High grower participation due to improved water supply for crops and economic incentive.
	43	6	
	Overall Number EQIP Projects**		
Environmental Quality Incentives Program (EQIP)	74		Focuses on key agricultural management activities to improve environmental conditions.
Water Quality/Quantity Best Management Practices for Citrus	Not Quantitative See Regional Section		Highly effective as applied to nutrient management issues.
*Regional Water Supply Plan and SWUCA Recovery Strategy	Not Quantitative See Regional Section		Significant over long-term (20 years) due to anticipated reduction in overall water use (with correspondent reduction in poor water quality use). Significant funding committed over long-term.
Quality of Water Improvement Program (QWIP)	Overall Number Wells Plugged/Abandoned 2004-2014		Very effective as wells are available for complete abandonment.
	7		
*Land Acquisition	Total Acres Acquired Historically through Sept. 2014		Has the potential for a much greater percent effectiveness. Time frame for land acquisition is undetermined.
	47,834		
*Mobile Irrigation Laboratory	Overall Sites Visited 2004-2014	Overall Acres Served 2004-2014	Effective due to its ability to improve water management. Can result in decreased water use (with correspondent reduction in poor water quality use).
	112	12,703	
*Education and Outreach	Overall Media Coverage Items 2004-2014	Overall Outreach Events Attended 2004-2014	Effective in promoting awareness of issue and advertising incentive programs available. Important element to maintain funding levels.
	70	183	
*IFAS Research Efforts	Overall Number Projects Funded 2004-2014		Effective in continual assessment of water quality problems to focus management actions for greatest effectiveness.
	44		

*Regional Resource Management Action Items **DeSoto and Charlotte Counties

Water Quality Monitoring Networks and Data Sources

The District, FDEP, United States Geological Survey (USGS), and City of Punta Gorda currently have surface and/or ground-water quality monitoring networks in place from which data results are being used to demonstrate progress toward water quality improvements within the SPJC watersheds. Results from these monitoring networks are used extensively in this Performance Monitoring Summary. The following information describes the purpose for initiating these networks and also explains how data from these networks are utilized for SPCWMP Reasonable Assurance performance monitoring.

In-Stream Specific Conductance Logging Network (District and USGS)

Purpose

The purpose of the Specific Conductance Logging Network is: 1) to determine surface water systems (streams, canals) that may be showing ground water signature characteristics so that management actions can be developed, and 2) to track the success of tailwater recovery projects and other management actions at site-specific locations to meet performance-monitoring objectives.

Network Description

Up through September 2014, during dry season events (November through May), the District had YSI® 600XLM data sondes deployed in fourteen stream and canal systems throughout the SPJC watersheds. An additional five stations have data sondes deployed year-round which are maintained by the USGS under contract with the District. All data sondes are programmed to record temperature and specific conductance measurements on either hourly or 15-minute intervals.

Reporting of Results

The Specific Conductance Logging Network results will be displayed as graphical plots and are presented in the following tabulated sections. These data plots reflect weekly median values for specific conductance, which have been calculated from independent values collected on 15 minute or hourly intervals. These data plots also show weekly median specific conductance values in relation to the 775 uS/cm reference line goal. A table located at the end of each tabulated section provides the overall specific conductance monitoring logging results for each respective WBID/water segment.

Specific Conductance Reconnaissance Network (District)

Purpose

The purpose of the Specific Conductance Reconnaissance Network is to track changes or declines in water quality of stream and canal systems throughout the SPJC watersheds and in other areas adjacent to these watersheds. This network assists with identifying surface waters that are showing ground water signature characteristics and also provide information on surface waters that are entering the SPJC watersheds from outside study area boundaries.

Network Description

Field parameters (temperature, specific conductance, pH, total station depth, and salinity) are currently collected at approximately 150 surface water stations District-wide. Thirty-five of these stations are located throughout the SPJC watersheds. Each station is visited twice per year, during dry and rainy season periods. Station locations have been selected based on ease of accessibility (bridge/culvert crossings, etc.) for efficiency purposes.

Reporting of Results

Table comparing specific conductance for dry season events, along with percent change increases and/or decreases for each monitoring location, will be shown for each respective WBID.

Pre- and Post Back-Plugging Well Monitoring Network (District)

Purpose

A total of 55 wells were back-plugged in the SPJC watersheds by the end of the current reporting period (October 2010 to September 2014). Generally, agricultural Water Use Permit (WUP) wells that exceed 600 feet or more in depth and produce highly mineralized groundwater with a specific conductance measuring greater than 1000 uS/cm may be candidates for the Well Back-Plug Program. Typically, these wells have a source of high ion concentration groundwater coming from the bottom well interval that can degrade better quality groundwater produced from upper well intervals. Locating and plugging off a poor quality groundwater source in the well without a severe reduction in pumping capacity is the goal of every successful back-plug operation (SWFWMD, 2007).

Water quality data collected from agricultural (WUP) wells allows project managers to determine which wells in the SPJC watersheds exhibit poor water quality (e.g. elevated levels of specific conductivity (>1000 uS/cm), chloride, and TDS). These wells, if proven to have poor water quality, are then scheduled for back-plugging based on owner consent if reviews of other well characteristics indicate that an improvement might be achieved. Water quality data and well productivity data are collected following back-plug activities to determine if the well back-plugs have resulted in an improvement in water quality and/or a change in well yield. A sub-set of back-plugged wells have been periodically monitored on an ongoing, quarterly basis to assure the back-plug remains functional with no measurable differences in water quality.

Network Descriptions

Wells in the SPJC watersheds that are potential candidates for back-plugging may be sampled on an "as needed" basis depending on the areas targeted for further investigation. Between 2002 and 2014, 519 candidate wells have been sampled in an effort to identify viable wells for back plugging. Approximately 108 wells were sampled as part of the back-plug investigation network during 2002 to 2003 to characterize water quality and assess potential back-plug candidates, with an additional 121 wells sampled as part of this effort in 2004 to 2006; then approximately 180 wells were sampled during the 2006 to 2008 period, 110 wells were sampled during the 2008 to 2010 period and 110 wells were sampled in the 2010 to 2012 reporting period. To date, 52 wells have been back-plugged in the SPJC watersheds. The original Post Back-Plug Monitoring Network consisted of 16 wells sampled on a quarterly frequency to ensure that the well back-plugs remain functional with no changes in water quality. Routine monitoring of select back-plug sites was discontinued in November 2013 for a variety of reasons including land sales and resultant land use changes, and budget decreases. However, all monitoring results over the time period that these wells were sampled show each well retained back-plug integrity and associated improved water quality supporting the decision to discontinue monitoring.

Reporting of Results

Results from each quarterly event for wells in the Post Back-Plug Network are displayed as graphical plots. These results assure that the well back-plugs remain functional with no measurable difference in water quality.

Surface-Water Quality and Biological Monitoring Networks (District, FDEP, and City of Punta Gorda)

Purpose

Surface-water quality samples are collected by the District, FDEP, and City of Punta Gorda to track concentration levels of impaired parameters within identified TMDL impaired waters throughout the SPJC watersheds. Results from these monitoring efforts also assist project managers in determining the success of management actions and identify surface waters that show poor water quality characteristics.

The City of Punta Gorda has a water use permit allowing them to withdraw 8.1 million gallons per day (mgd) (annual average) for public supply from the Shell Creek Reservoir. Additionally, the City is authorized under a separate water use permit held by the Peace River Manasota Regional Water Supply Authority (PRWRWSA) to withdraw an additional 2.2 mgd, on a temporary basis only, to assist the PRMRWSA in meeting regional demand. In 1991, under conditions of the original Water Use Permit, the District required the City to implement a Hydrobiological Monitoring Program (HBMP) to ensure the long-term protection of Shell Creek and lower Peace River estuarine systems. The overall objectives of this monitoring program are to determine whether biological communities are adversely impacted by either existing or projected permitted freshwater withdrawals from the reservoir. The City has performed these monitoring efforts and has reported results to the District on an annual basis since 1991.

Network Descriptions

The FDEP-Fort Myers office currently collects samples at five surface water sites (rivers and streams) throughout the SPJC watersheds. The FDEP sites are currently sampled on a monthly basis. Through February 2014, the District collected samples from seven surface water stations on a quarterly frequency. As of March 2014 the District quarterly data collection effort was discontinued due to overlap with the FDEP-Fort Myers office monthly monitoring as well as the data no longer being incorporated into performance monitoring reporting after the 2010 to 2012 reporting period. All data collected for the District and FDEP surface water projects are uploaded to the Florida STORET database for use in TMDL/IWR water quality assessments. All data collected by FDEP and District staff for Habitat Assessment (HA) and Stream Condition Index (SCI) monitoring efforts (DEP-SOP-001/01 FS 7000) are uploaded to the FDEP SBIO database for use in TMDL assessments.

Field parameters collected for the above District water quality networks include temperature, specific conductance, pH, dissolved oxygen, salinity, and total station depth. Chemical parameters include chloride, sulfate, TDS, silica, iron, strontium, sodium, magnesium, calcium, potassium, and alkalinity. The field and chemical parameter list for the FDEP sites is similar to the District's list with the exception of nutrients and bacteria data that are collected at select sites.

The District also performs sample collection for other long-term surface-water quality monitoring networks. Two of these networks: Peace River and Comprehensive Watershed Management, have stations located District-wide. Four sites in these networks are located within the SPJC watersheds and samples are collected on a monthly frequency. Parameters include temperature, specific conductance, pH, dissolved oxygen, total station depth, nutrients, major ions, and chlorophyll. Data from these networks will also be utilized for SPJC performance monitoring reviews and reporting, and are also uploaded to the Florida STORET database for use in TMDL/IWR water quality assessments.

The City of Punta Gorda performs water quality monitoring at 19 surface water stations located throughout the Shell and Prairie Creek systems, as well as the reservoir. Three of these stations (freshwater-upstream of Hendrickson Dam) are located within the SPJC study area boundaries. Prior to 2005, data collection and laboratory analysis was performed by Earth Balance, North Port, Florida under contract with the City. Since 2005, Test America; Analytical Testing

Corporation, Orlando, Florida has performed monitoring and laboratory analysis for this effort. During the 1999 to 2001 drought period the City also monitored surface-water quality at additional sites throughout the Shell and Prairie Creek Watersheds.

Field parameters collected at the three freshwater HBMP monitoring sites include temperature, specific conductance, pH, dissolved oxygen, salinity, Secchi depth, total station depth, and sample collection depth. Chemical parameters include color, turbidity, total suspended solids, nitrate+nitrite, ammonia, Total Kjeldahl Nitrogen, orthophosphate, total phosphate, chlorophyll a, silica, alkalinity, chloride, and total organic carbon.

Results from monitoring the biology of rivers and streams provide a comprehensive depiction of the overall health of a flowing surface-water system. HA and SCI monitoring can assist in determining if anthropogenic factors, such as run-off from surrounding land-use practices and/or disruption of riparian zone buffer areas, are impairing macroinvertebrate habitat and populations. Although there is not a defined network at this time for biological monitoring, District and FDEP staff have performed SCI monitoring in the Joshua, Shell, and Prairie Creek watersheds.

Reporting of Results

Data from the District, FDEP, and City of Punta Gorda's monitoring networks have been used collectively to produce graphical plots depicting water quality trends in TMDL impaired waters throughout the SPJC. Data collected by the City for their HBMP have been essential in providing water quality information for historical review and trend analysis, as well as data collected by the City since 1975 which was initiated to monitor potential degradation of Shell and Prairie Creeks. The entire period of record for both of these data sets has been utilized for SPJC performance monitoring reviews and reporting.

Habitat Assessment and Stream Condition Index (FDEP and District)

Purpose

Habitat Assessment (HA) and Stream Condition Index monitoring (SCI) provide a comprehensive depiction of the overall health of a flowing surface-water system. HAs provide a measure of anthropogenic disturbances to biological communities by scoring stations according to their habitat/in-stream characteristics and morphological and riparian features; habitat availability, habitat diversity, water velocity, habitat smothering, artificial channelization, bank stability, and riparian zone vegetation width and quality. The SCI adds a biometric component to the HA score to further assess the biological community response to potential disturbances using such matrices as total number of taxa present in a sample, total number of sensitive taxa present in a sample, etc.

Network Description

All HAs and SCIs performed by the District are completed in accordance with FDEP SOPs FT 3100 and FS 7420, respectively. HAs and SCIs are performed on qualified sites, selected from the WQMP surface water networks, with an emphasis on waterbodies or reaches of waterbodies not actively monitored by other agencies, in an effort to increase the coverage of sites monitored within a watershed. HA and SCI data are stored by FDEP in their Statewide Biological Database (SBIO) and are utilized along with water chemistry results in support of TMDL assignment. FDEP also conducts HA and SCI assessments within the SPJC watersheds.

Reporting of Results

The results of HAs and SCIs performed by FDEP or the District will be provided for each respective WBID.

Coastal Ground-Water Quality Monitoring Network (District)

Water-Use Permitting Ground-Water Quality Monitoring Network (District)

Purpose

The Coastal Ground-Water Quality Monitoring Network (CGWQMN) was developed to determine the quality of groundwater in coastal regions of the District. Primary use of the data is to track any apparent landward movement of salt-water intrusion resulting from major agricultural, industrial, and municipal groundwater withdrawals. The network is also designed to monitor up-coning of sulfate rich waters in coastal areas and limited inland areas.

The Water Use Permitting Ground-Water Quality Monitoring Network (WUPNET), located in the Southern Water Use Caution Area (SWUCA), was developed to upgrade the quality of data obtained from permitted irrigation and public supply wells. Well permit conditions require that permit holders provide water quality information about their wells to the District. Historically, data received for some of the permitted wells were not reliable. This network provides a continuous, reliable data collection effort to assist with water resource management decisions. Data from these two networks can also be utilized for SPJC performance monitoring reviews and reporting.

Network Descriptions

Approximately 360 wells (District-wide) in the CGWQMN are sampled once each year during the months of December, January, February, and March. Of these 360 wells, 16 are located within the SPJC watersheds. A sub-network consisting of approximately 70 wells (which were chosen from the original list of 360 wells) is sampled additionally in May and September. Fourteen of these sub-network wells are located within the SPJC watersheds.

Wells sampled for the WUPNET were chosen using statistical techniques to determine well density and sampling frequency. From these statistical results a sentinel or “fixed” well network has been established for water quality monitoring of the WUPNET. Monitoring of the sentinel portion of the WUPNET is done concurrently with the CGWQMN. Approximately 150 wells (District-wide) in the sentinel WUPNET are sampled three times each year during the months of January, May, and September. Of these 149 wells, 17 lie within SPJC watershed boundaries.

Field parameters collected for the above District well networks include temperature, specific conductance, pH, depth-to-water, and purge volume. Chemical parameters for the CGWQMN include chloride, sulfate, TDS, silica, iron, strontium, sodium, magnesium, calcium, potassium, and alkalinity. Parameters collected for the WUPNET are the same as the CGWQMN with the exception of TDS. Fluoride is also on the parameter list for the WUPNET project.

Reporting of Results

A narrative summarizing the District's most recent (2011) conclusions on the status of salt water intrusion in Charlotte, DeSoto, and Highlands counties will be presented in the Regional Water Quality Monitoring Networks section of this report.

Quality Assurance/Quality Control Elements that Demonstrate Monitoring will Comply with Chapter 62-160, F.A.C.

The analyzing laboratory (District Laboratory, Brooksville, Florida) for District monitoring networks listed in the previous section has a State-approved Quality Assurance Plan on file (#870100-G; Rev. 15; 12/05/08), which complies with FDEP's Quality Assurance (QA) rule, Chapter 62-160 F.A.C., including FDEP approved Standard Operating Procedures (SOPs). The District laboratory

is NELAC certified (Lab ID #E44149). The District's Water Quality Monitoring Program (WQMP) is responsible for collecting the ground and surface-water quality field parameters and samples for the various networks described in the previous section. The WQMP also has an internal SOP manual that is updated on an annual basis.

Water quality monitoring and laboratory analysis that is performed by the FDEP Ft. Myers office falls under FDEP's Quality Assurance Plan and SOP guidelines. Water quality monitoring and laboratory analysis performed for the City of Punta Gorda's HBMP is conducted by Test America; Analytical Testing Corporation, Orlando, Florida. This laboratory is NELAC certified (Lab ID #E87839).

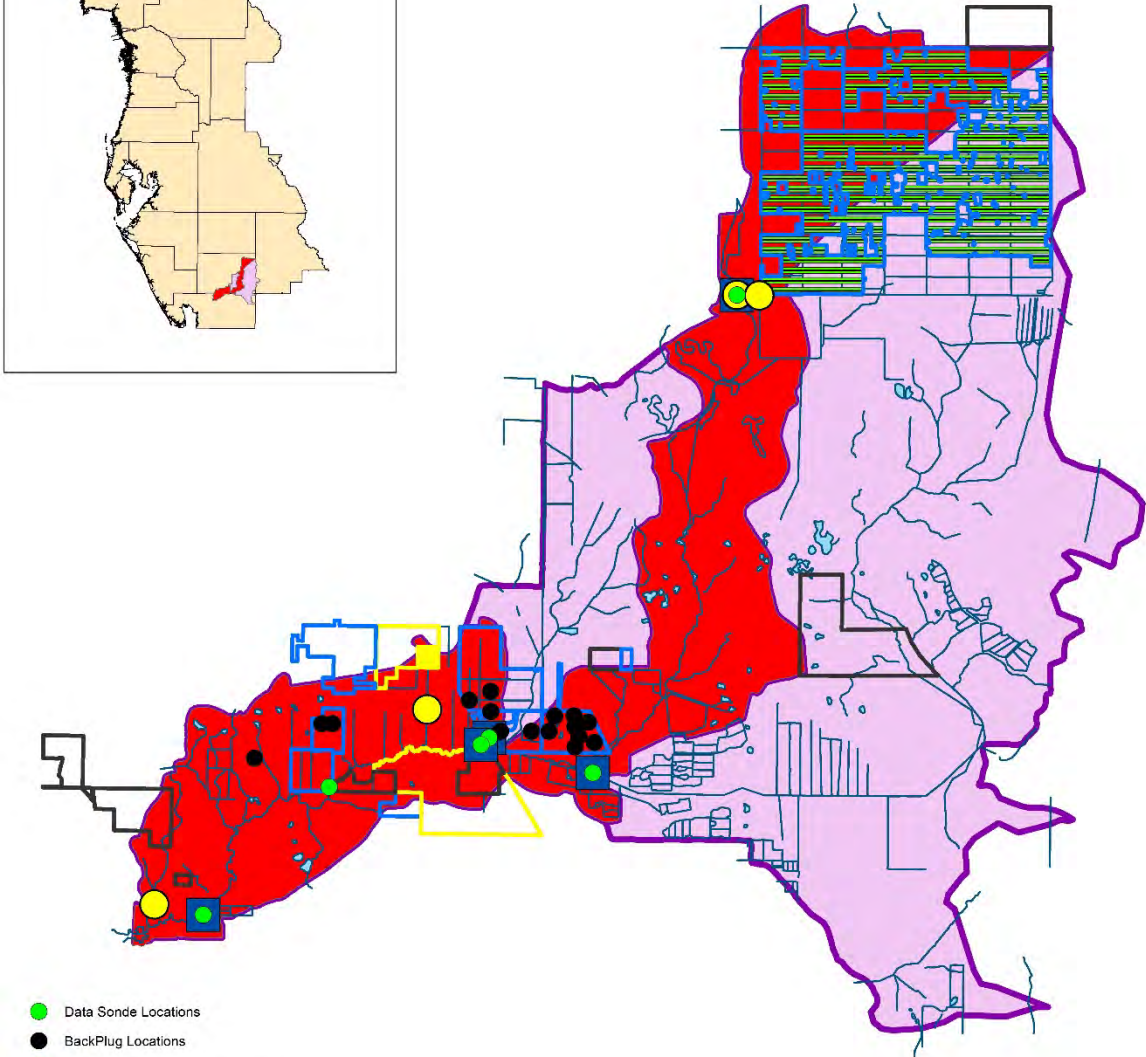
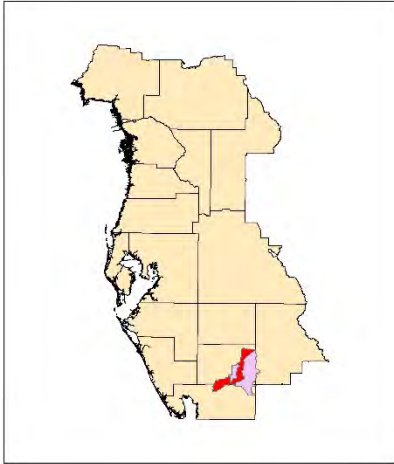
Procedures for Reporting Results

Performance monitoring results for water bodies in each of the SPJC WBIDs is contained in the following tabulated sections of this Performance Monitoring Summary. Particular management actions which are considered regional rather than specifically related to a boundary-defined WBID area are addressed in a separate tabulated section.

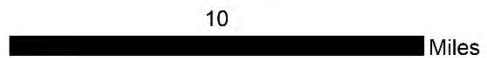
The reporting time period for this Performance Monitoring Summary document is September 2012 through September 2014. Performance monitoring results contained in the previous summary reports are also included. The goal of the SPJC Stakeholders Group is to achieve the water quality goals set forth in the SPCWMP Reasonable Assurance document by the end of 2014. Performance Monitoring Summaries have been generated on a biennial basis over the duration of this time period to show reasonable assurance toward improving water quality and consistently meeting Class I surface-water quality standards in the SPJC TMDL impaired sub-basins.

WBID 1962
Water Segment - Prairie Creek
Prairie Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern:
Sp. Conductance, TDS

WBID 1962
 Water Segment - Prairie Creek
 Prairie Creek Watershed; Water Use - Class I
 Verified Impaired Pollutants of Concern - sp. conductance, TDS



- Data Sonde Locations
- BackPlug Locations
- Reconnaissance Network Locations
- Surface Water Sample Locations
- WBID 1962
- FARMs - Dormant Contacts
- FARMs Projects - Operational
- FARMs Projects - Approval Pending
- FARMs Projects - Under Construction
- Lakes
- Streams and Canals
- Prairie Creek Watershed



WBID 1962
Water Segment - Prairie Creek
Prairie Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern – sp. conductance, TDS

Proposed Management Actions – Progress to Date

Shell, Prairie, and Joshua Creek Well Back-Plugging Program

Since the inception of this program, a total of 19 irrigation wells have been back-plugged in WBID 1962. No additional wells were back-plugged in WBID 1962 during the current reporting period. The following table represents water quality improvements for chloride and TDS concentrations at each well directly following back-plugging activities:

Post Well Back-Plugging Water Quality Results in WBID 1962

Permit Information		Percent Improvement	
WUP No.	District ID No.	TDS (mg/L)	Chloride (mg/L)
20009732	2	27%	37%
20009127	6	N/A	N/A
20009127	7	N/A	N/A
20009129 (20012818)	1	76%	91%
20009782	1	31%	49%
20009782	2	-1%	-4%
20009782	3	45%	73%
20009782	4	N/A	N/A
20009782	4	1%	13%
20009782	5	-1%	1%
20009782	6	11%	21%
20009782	7	-5%	2%
20009782	9	N/A	N/A
20009782	9	N/A	N/A
20003069	2	44%	59%
20003069	6	68%	83%
20003069	7	64%	80%
20006765	18	71%	84%
20006765	19	55%	70%

Denotes repeat back-plug

District Resource Regulation – Water Use Permitting

In WBID 1962, eighty-six Water Use Permit (WUP) applications were submitted to the District over the entire reporting period of performance monitoring (October 2004 to September 2014). Of the eighty-six applications, two were new permits, fifty-four were renewals, five were modifications, twenty were letter modifications, and five were owner transfers.

WUP Renewals and Modifications in WBID 1962

	Oct. 2004 – July 2006	Oct. 2006 – Aug. 2008	Sept. 2008 – Sept. 2010	Oct. 2010 – Sept. 2012	Oct. 2012 – Sept. 2014	Totals
New WUPs	0	1	1	0	0	2
WUP Renewals	4	12	12	18	8	54
WUP Modifications	0	2	2	0	1	5
WUP Letter Modifications	3	4	0	8	5	20
WUP Owner Transfer	0	0	0	5	0	5
Totals	7	19	15	31	14	86

WBID 1962
Water Segment - Prairie Creek
Prairie Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern – sp. conductance, TDS

Facilitating Agricultural Resource Management Systems (FARMS) and/or Environmental Quality Incentives (EQIP) Projects

Twenty-three FARMS projects were Board approved between October 2004 and September 2014 in WBID 1962, four of which have since been cancelled. An additional five FARMS projects were discussed or were in the contract initiation phase during this time. The following table summarizes the Board approved projects, as well as ground water offsets that have occurred over the performance monitoring period. Details for each of the projects listed below can be found in Appendix IV.

FARMS Projects in WBID 1962; October 2004 to September 2014

WUP Number	Project Number	Crop Type	Project Status	Operational Date	Projected Ground Water Offset (gpd)	**Actual Ground Water Offset as of September 2014 (gpd)	Max. Groundwater Offset Achieved in One Month through September 2014 (gpd)
008348	H514	Citrus	Operational	4/20/2006	71,000	83,200	403,600
ª006765	H516	Citrus	Operational	8/2/2006	222,500	236,600	1,175,689
ª006765	H516	Citrus	Operational	3/5/2009	76,980	202,000	711,581
009127	H526	Citrus	Operational	4/26/2006	15,600	38,900	494,565
002386	H555	Citrus	Operational	4/23/2009	225,100	80,800	171,710
012818	H556	Blueberry	Operational	1/1/2010	98,820	172,049	708,968
ª006765	H584	Citrus	Operational	6/7/2010	348,400	301,100	877,065
004641	H594	Citrus	Operational	9/7/2012	32,000	175,725	465,693
002386	H606	Citrus	Operational	3/14/2011	818,450	811,900	1,781,800
002386	H606	Citrus	Operational	9/24/2013	628,988	T H606	T H606
002386	H606	Citrus	Operational	5/31/2011	M H606	M H606	M H606
002386	H606	Citrus	Operational	9/24/2013	M H606	M H606	M H606
002386	H608	Citrus	Operational	10/18/2011	81,840	54,000	124,600
011982	H610	Sod	Operational	3/2/2012	107,280	192,400	563,063
009782	H648	Citrus	Operational	8/30/2013	71,300	57,600	124,600
003069	H657	Citrus	Operational	7/30/2012	185,000	392,500	422,400
006765	H693	Citrus	Operational	10/11/2013	87,100	83,600	161,800
002665	H682	Citrus	Under Construction	N/D	65,000	N/D	N/D
003275	H708	Citrus	Under Construction	N/D	379,400	N/D	N/D
008287	H546	Citrus	Cancelled	Cancelled	14,400	Cancelled	Cancelled
003275	H507	Citrus	Cancelled	Cancelled	148,000	Cancelled	Cancelled
000153	H547	Citrus	Cancelled	Cancelled	16,700	Cancelled	Cancelled
004589	H617	Hay	Cancelled	Cancelled	Cancelled	Cancelled	Cancelled
004905*		Dairy	Dormant	N/D	N/D	N/D	N/D

WBID 1962
Water Segment - Prairie Creek
Prairie Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern – sp. conductance, TDS

007783*		Citrus	Dormant	N/D	N/D	N/D	N/D
009226*		Strawberry	Dormant	N/D	N/D	N/D	N/D
010065*		Citrus	Dormant	N/D	N/D	N/D	N/D
013370*		Biofuels	Dormant	N/D	N/D	N/D	N/D

*Potential project or project under consideration between October 2004 and September 2014

N/D = Not determined/project under consideration

a Also received EQIP funding

M = Project merged with other H606 projects to facilitate tracking

T = Project offset tracked with other H606 projects

**The actual ground water offset fluctuates with weather conditions and seasons. The actual is calculated by dividing the number of days the project has been operational into the total gallons offset.

Quality of Water Improvement Program (QWIP)

No wells have been plugged/abandoned in WBID 1962 since October 2004.

SPJC Water Quality Monitoring Results – Progress to Date

In-Stream Specific Conductance Logging Network (District and USGS)

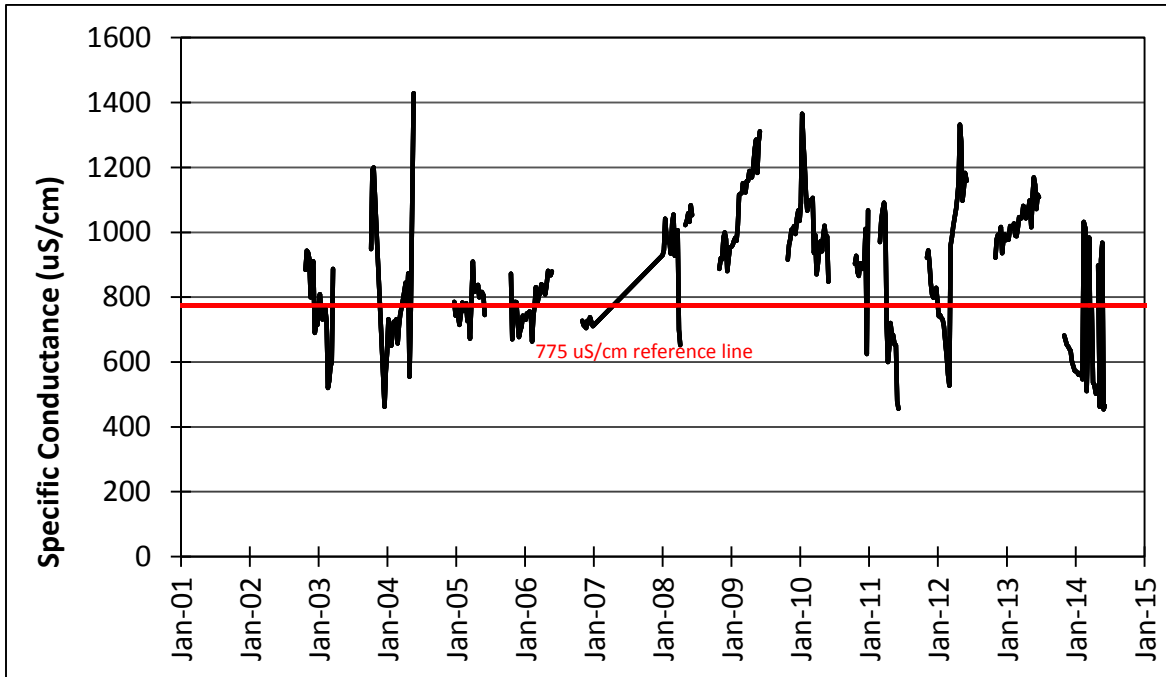
There are currently six YSI® 600XLM data sondes deployed in creek and canal systems throughout WBID 1962.

The **Mossy Gully** data sonde is deployed in an agricultural canal that is located in the northern region of the Prairie Creek Watershed. This canal provides flows to Prairie Creek, and land use in the immediate surrounding area of this monitoring location is predominantly agriculture (citrus). The following data plot shows median weekly values of continuous/hourly logging for specific conductance during dry season periods (November – May) for October 2002 through June 2014. Low water level conditions and smothering of the data probe by sediment and vegetation has resulted in some missing values for this monitoring location. These erroneous values have been removed from the data set.

The following graph shows evidence of increasing trends in specific conductance over the data period of record at this monitoring station, particularly during the 2007 to 2009 dry seasons.

WBID 1962
Water Segment - Prairie Creek
Prairie Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern – sp. conductance, TDS

Mossy Gully In-Situ Data Sonde Logging Results

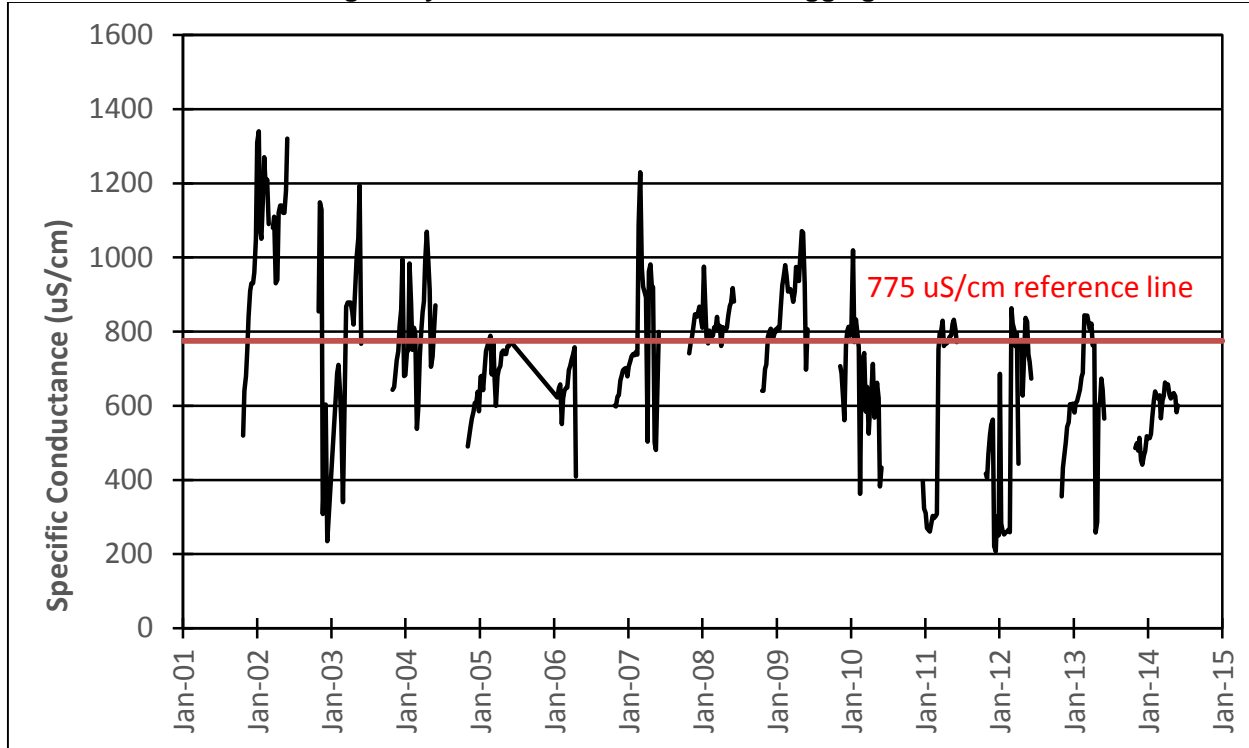


The **Montgomery Canal** data sonde is located in a canal in the central region of the Prairie Creek Watershed. This canal provides flows to Prairie Creek, and land use contributing to this canal has historically been agriculture (sod farming). The following data plot shows median weekly values of continuous/hourly logging for specific conductance during dry season periods (November – May) for October 2002 through May 2014.

During the fall of 2004 a large portion of the sod farming operation upstream of this monitoring site was discontinued therefore, noticeable decreases in specific conductance occurred during the 2005 to 2006 time period. Well back-plugging activities have occurred in the immediate surrounding area of this data sonde location which have also contributed to water quality improvements in this portion of the Prairie Creek Watershed. Slight increases in specific conductance occurred during the 2007 to 2008 dry season months as agricultural operations became more active in the area during this time period, and drought conditions resulted in increased irrigation with groundwater. Significant decreases in specific conductivity were recorded during the 2009 to 2010 dry season. During a majority of the 2010 to 2012 and 2012 to 2014 reporting periods decreases in specific conductance were observed. Although the specific conductance values during the dry season of the current reporting period saw increasing values, the maximum values were still below the historic maximum values, indicating overall progress in this area of Prairie Creek Watershed.

WBID 1962
Water Segment - Prairie Creek
Prairie Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern – sp. conductance, TDS

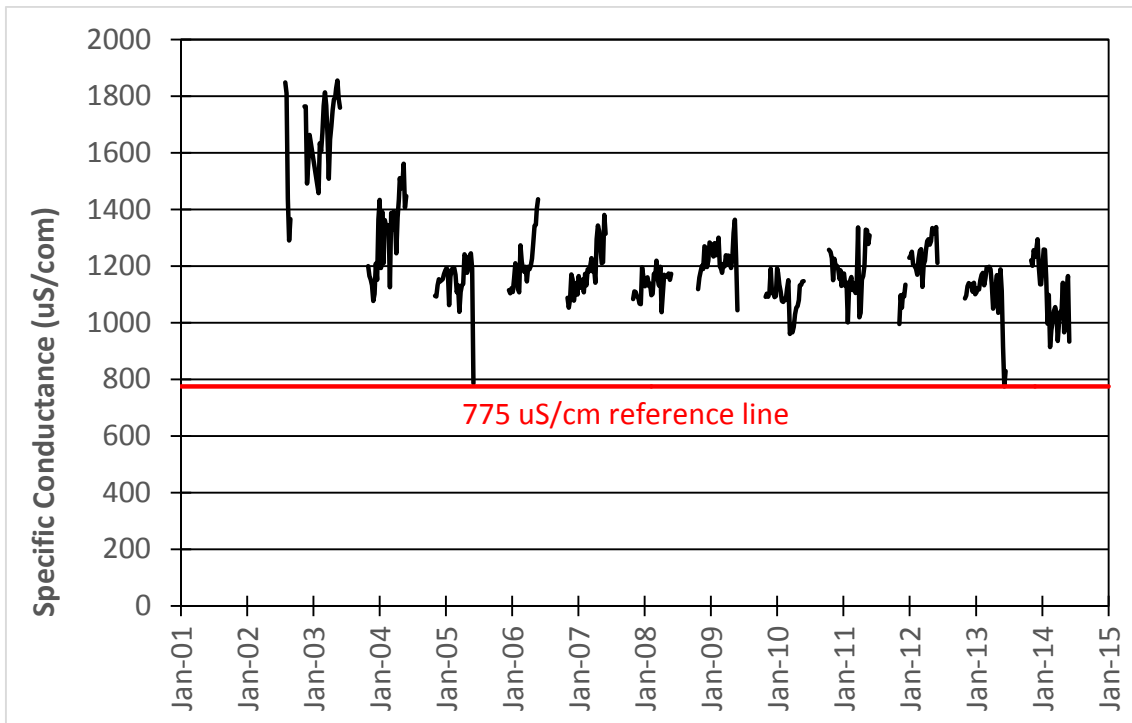
Montgomery Canal In-Situ Data Sonde Logging Results



The ***Symons Pump Canal*** data sonde is deployed in an irrigation canal located in the central region of the Prairie Creek Watershed. The canal provides flows to Prairie Creek, and the monitoring location is directly adjacent to citrus farming activities. The immediate surrounding area also includes rangeland. The following data plot shows median weekly values of continuous/hourly logging for specific conductance during dry season periods (November–May) for November 2002 through May 2014. The following graph shows evidence of decreasing trends in specific conductance over the data period of record at this monitoring station, although the values still exceed the 775 uS/cm reference.

WBID 1962
Water Segment - Prairie Creek
Prairie Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern – sp. conductance, TDS

Symons Pump Canal In-Situ Data Sonde Logging Results



WBID 1962

Water Segment - Prairie Creek

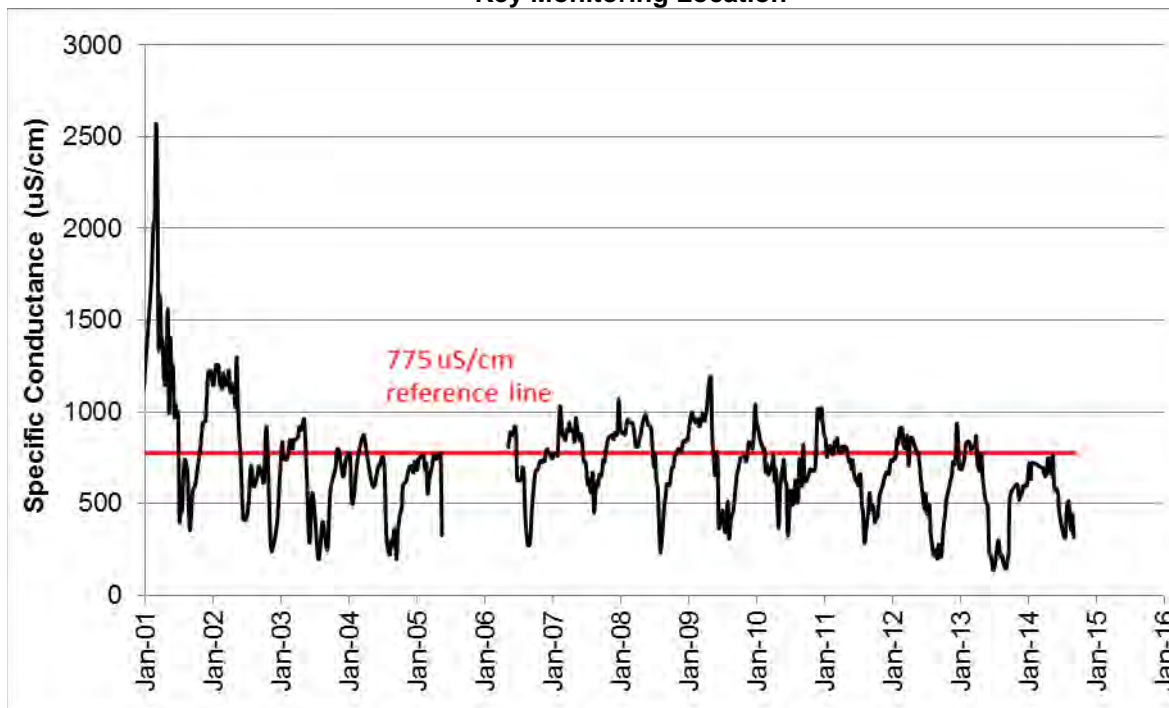
Prairie Creek Watershed; Water Use - Class I

Verified Impaired Pollutants of Concern – sp. conductance, TDS

The **Prairie Creek near Fort Ogden** data sonde is deployed in the main channel of Prairie Creek in the central region of the Prairie Creek Watershed, and is located approximately 100 yards downstream of the Symon Pump Canal's confluence with Prairie Creek. The immediate surrounding land use includes agriculture (citrus) and rangeland. This location is one of the key surface water monitoring stations in WBID 1962, with data results used by FDEP for IWR assessments. For this reason data sonde deployment occurs year-round at this site under contract with the USGS. The following data plot shows weekly median results for continuous/15 minute logging of specific conductance values throughout each year for February 2001 through September 2014.

Decreases in specific conductance have occurred at this monitoring location during dry season time periods since February 2001. Increasing specific conductance values for the 2006 to 2008 time periods are a result of severe drought conditions, particularly during dry season months however, no weekly median values have exceeded the 1,275 uS/cm Class III criteria for specific conductance since mid-2002. Specific conductance values for the 2010 to 2012 reporting period showed some improvement although exceedances continue to persist during the dry season time frames. Specific conductance values in late 2012 and early 2013 showed exceedances however specific conductance values for the remainder of this reporting period were less than 775 uS/cm.

**Prairie Creek near Ft. Ogden In-Situ Data Sonde Logging Results
Key Monitoring Location**

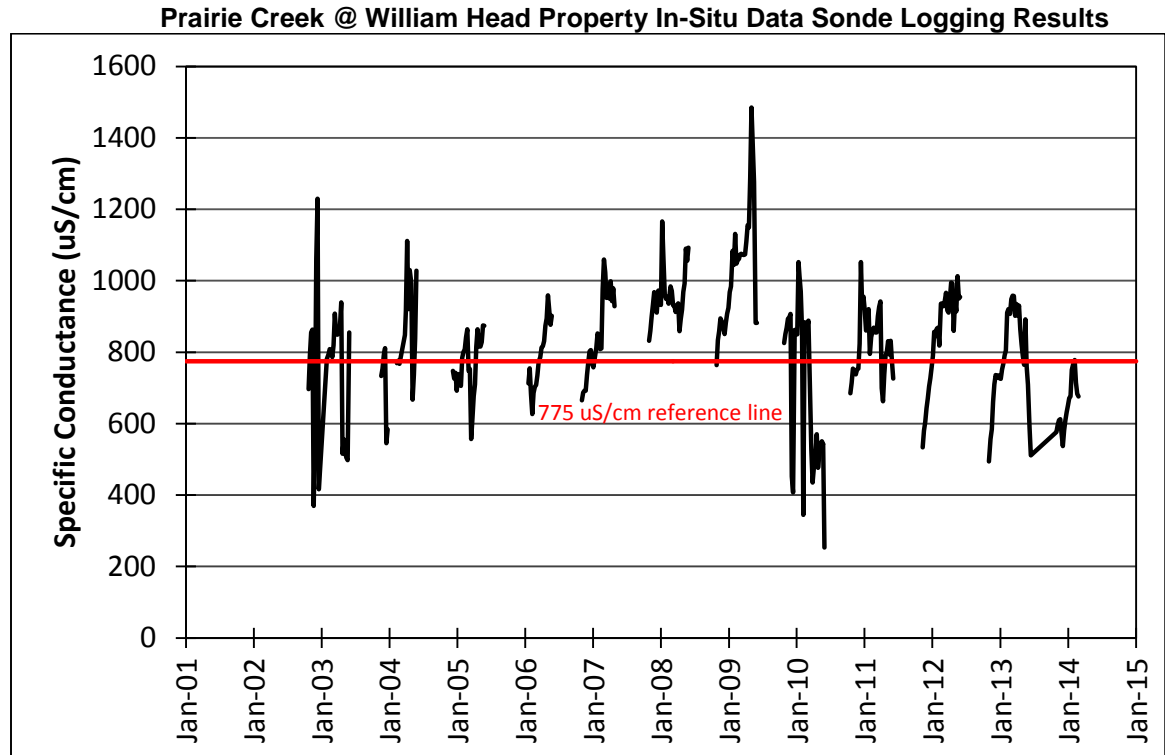


The **Prairie Creek @ William Head** property data sonde is located in the main channel of Prairie Creek in the south/central region of the Prairie Creek watershed. Land use in the immediate surrounding area is rangeland and agriculture (citrus). The following data plot shows weekly median results for continuous/hourly logging of specific conductance values for dry season periods (November – May) for October 2002 through February 2012. Sediment smothering of

WBID 1962
Water Segment - Prairie Creek
Prairie Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern – sp. conductance, TDS

the data sonde during periods of high flow conditions has occurred at this location therefore, these erroneous values have been removed from the data set.

Increasing trends in specific conductance values for the 2006 to 2008 and the beginning of 2008 to 2010 time periods are a result of below average rainfall amounts during dry season months. Trends for the current reporting period reflect previous seasonal variability with overall declines since 2009 and values remaining below the 775 uS/cm reference line in 2013 and 2014.



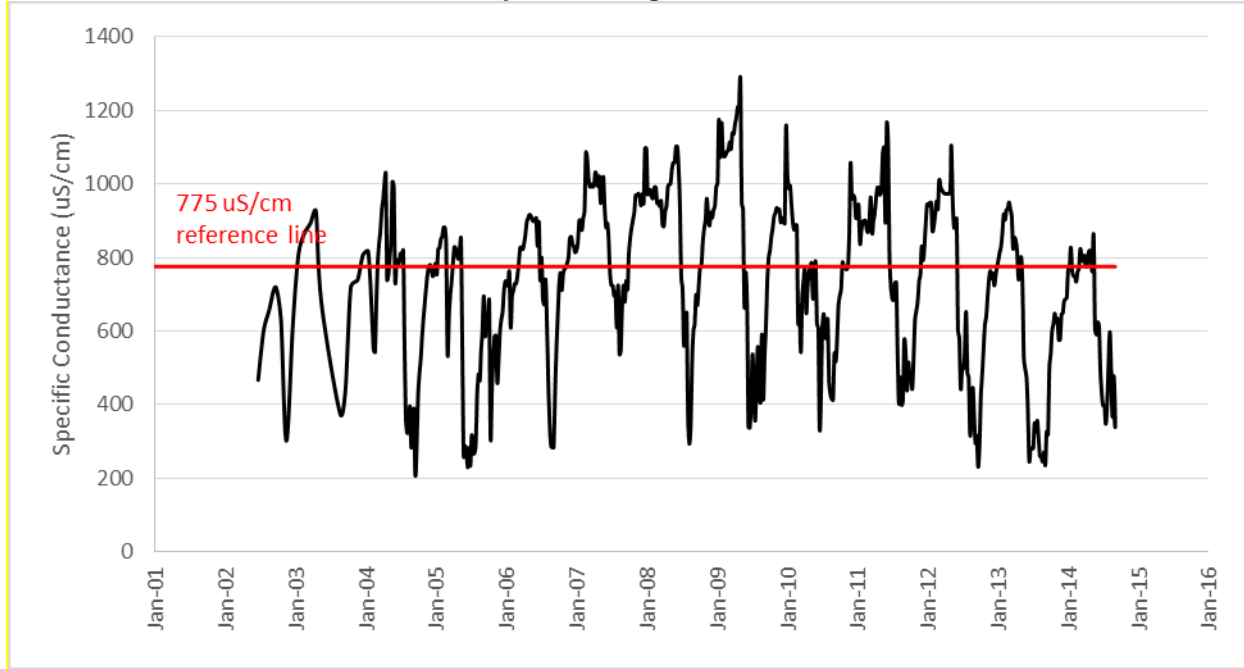
The **Prairie Creek @ Washington Loop Road** data sonde is located on the main stem of Prairie Creek in the southern region of the Prairie Creek watershed, just upstream of the Shell Creek Reservoir. Land use in the immediate surrounding area is predominantly agriculture, with some rangeland and urban/built-up. This location is one of the key surface water monitoring stations in WBID 1962, with data results used by FDEP for TMDL assessments. For this reason, data sonde deployment occurs year-round at this site under contract with the USGS. The following data plot shows weekly median results for continuous/15 minute logging of specific conductance values throughout each year for July 2002 through September 2014.

Decreases in weekly median specific conductance values occurred during the dry season periods of 2003 through 2005. Below average rainfall amounts during the 2006 to 2008 dry and wet season months are reflected by increasing trends in specific conductance values during this time period. Specific conductance values during the 2010 to 2014 time period are showing a declining trend, as depicted in the percentage of values below the 775 uS/cm reference line, compared to previous reporting periods. The percentage of weekly median values greater than 775 uS/cm has also decreased since the previous 2012 to 2012 reporting period. The improvements in specific

WBID 1962
Water Segment - Prairie Creek
Prairie Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern – sp. conductance, TDS

conductance can be attributed to resource management activities, as well as an increase in average annual rainfall (as presented in Figure 3), which subsequently reduces the need for irrigation practices for agricultural purposes.

Prairie Creek @ Washington Loop Rd. In-Situ Data Sonde Logging Results
Key Monitoring Location



The following table summarizes period of record data logging results for specific conductance at the six established data sonde monitoring locations in WBID 1962. Individual values, and the percentage of these values exceeding the FDEP surface-water quality Class I and Class III criterion of 1275 uS/cm are provided. This table also includes the number of weekly median values and percentages of these weekly values above the 775 uS/cm goal.. The value of 775 uS/cm was chosen as a surrogate value for chloride and is equivalent to a chloride value of 150 mg/L and a TDS concentration of 500 mg/L (SWFWMD, 2004). Although the 775 uS/cm was not met, the waterbody is not impaired for TDS, chloride or specific conductance.

Specific Conductance Logging Results in WBID 1962 from 2002 to 2014
Sites are listed as they are located from north to south throughout WBID 1962

Water Segment	Number Individual Logged Values	Number Individual Values >1275 uS/cm	Percentage of Individual Values >1275 uS/cm	Number Weekly Median Values	Number Weekly Median Values >775 uS/cm	Percentage Weekly Median Values >775 uS/cm
*Mossy Gully	61,623	2046	3.3%	351	238	67.8%
*Montgomery Canal	62,681	943	1.5%	374	156	41%
*Symons Pump Canal	61,881	13,741	22.2%	363	363	100%

WBID 1962
Water Segment - Prairie Creek
Prairie Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern – sp. conductance, TDS

**Prairie Cr. nr Ft. Ogden	292,703	212	0.07%	564	218	38.7%
Prairie Cr. @ William Head	55,478	153	0.3%	325	209	64.3%
**Prairie Cr. @ Washington Loop	362,647	801	0.2%	568	268	47.2 %

*Monitoring site located in agricultural canal – not on main channel of Prairie Creek.

** Key monitoring location

Specific Conductance Reconnaissance Network (District)

Within WBID 1962 there are currently four stations monitored for the Specific Conductance Reconnaissance Network. Individual values for the Mossy Gully @ SR 70 station have been excluded from this section since they were discussed earlier in the In-Stream Specific Conductance Logging Network section. Of the 54 individual specific conductance values collected within WBID 1962 during the period of record, 12 values exceeded the 775 uS/cm goal criteria and three values exceeded the FDEP surface-water quality Class III criterion of 1275 uS/cm.

The following tables summarize the percent change increases and/or decreases between dry season events for each monitoring station within WBID 1962 during the 2004 to 2006, 2006 to 2008, 2008 to 2010, 2010 to 2012 and 2012 to 2014 reporting periods. Individual values for each dry season event are also provided. Stations that were not flowing during a sample event are denoted in the following table as dry.

Overall, dry season percent changes for the 2012 to 2014 reporting period were either increasing, decreasing or not calculated due to dry stations.

Specific Conductance Reconnaissance Results in WBID 1962; 2004 - 2006

Station	Dry Season 2004 Value uS/cm	Wet Season 2004 Value uS/cm	Dry Season 2005 Value uS/cm	Wet Season 2005 Value uS/cm	Dry Season 2006 Value uS/cm	Percent change Dry Season 2004 vs. Dry Season 2005	Percent change Dry Season 2005 vs. Dry Season 2006
Unnamed Cr. SR 70- #3A	701	*	677	537	685	↓3.42%**	↑1.18%**
Unnamed Cr. @ Washington Loop Rd. - #29	414	270	1009	738	873	↑143.72%**	↓13.48%**
Unnamed Ditch @ Farms Rd. - #12	*	454	521	331	*	*	*

* Station dry

**Values modified since 2004 – 2006 Performance Monitoring Report due to calculation error.

Specific Conductance Reconnaissance Results in WBID 1962; 2006 - 2008

Station	Wet Season 2006 Value uS/cm	Dry Season 2007 Value uS/cm	Wet Season 2007 Value uS/cm	Dry Season 2008 Value uS/cm	Wet Season 2008 Value uS/cm	Percent change Dry Season 2006 vs. Dry Season 2007	Percent change Dry Season 2007 vs. Dry Season 2008
Unnamed Cr. SR 70- #3A	572	766	599	885	651	↑11.82%	↑15.54%

WBID 1962
Water Segment - Prairie Creek
Prairie Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern – sp. conductance, TDS

Unnamed Cr. @ Washington Loop Rd. - #29	151	*	1401	*	636	*	*
Unnamed Ditch @ Farms Rd. - #12	700	*	435	*	423	*	*

* Station dry

Specific Conductance Reconnaissance Results in WBID 1962; 2008 - 2010

Station	Dry Season 2009 Value uS/cm	Wet Season 2009 Value uS/cm	Dry Season 2010 Value uS/cm	Wet Season 2010 Value uS/cm	Percent change Dry Season 2008 vs. Dry Season 2009	Percent change Dry Season 2009 vs. Dry Season 2010
Unnamed Cr. SR 70- #3A	904	690	675	573	↑2.1%	↓25.3%
Unnamed Cr. @ Washington Loop Rd. - #29	1798	210	827	405	*	↓54.0%
Unnamed Ditch @ Farms Rd. - #12	551	334	544	634	*	↓1.3%

* Station dry

Specific Conductance Reconnaissance Results in WBID 1962; 2010 - 2012

Station	Dry Season 2011 Value uS/cm	Wet Season 2011 Value uS/cm	Dry Season 2012 Value uS/cm	Wet Season 2012 Value uS/cm	Percent change Dry Season 2010 vs. Dry Season 2011	Percent change Dry Season 2011 vs. Dry Season 2012
Unnamed Cr. SR 70- #3A	808	576	847	565	↑19.70%**	↑4.83%**
Unnamed Cr. @ Washington Loop Rd. - #29	1037	703	*	404	↑25.39%**	*
Unnamed Ditch @ Farms Rd. - #12	*	588	*	443	*	*

* Station dry

**Values modified since 2010 – 2012 Performance Monitoring Report due to calculation error

Specific Conductance Reconnaissance Results in WBID 1962; 2012 - 2014

Station	Dry Season 2013 Value uS/cm	Wet Season 2013 Value uS/cm	Dry Season 2014 Value uS/cm	Wet Season 2014 Value uS/cm	Percent change Dry Season 2012 vs. Dry Season 2013	Percent change Dry Season 2013 vs. Dry Season 2014
Unnamed Cr. SR 70- #3A	722	374	792	402	↓14.76%	↑9.70%

WBID 1962

Water Segment - Prairie Creek

Prairie Creek Watershed; Water Use - Class I

Verified Impaired Pollutants of Concern – sp. conductance, TDS

Unnamed Cr. @ Washington Loop Rd. - #29	1323	70	433	137	*	↓67.27%
Unnamed Ditch @ Farms Rd. - #12	*	132	*	364	*	*

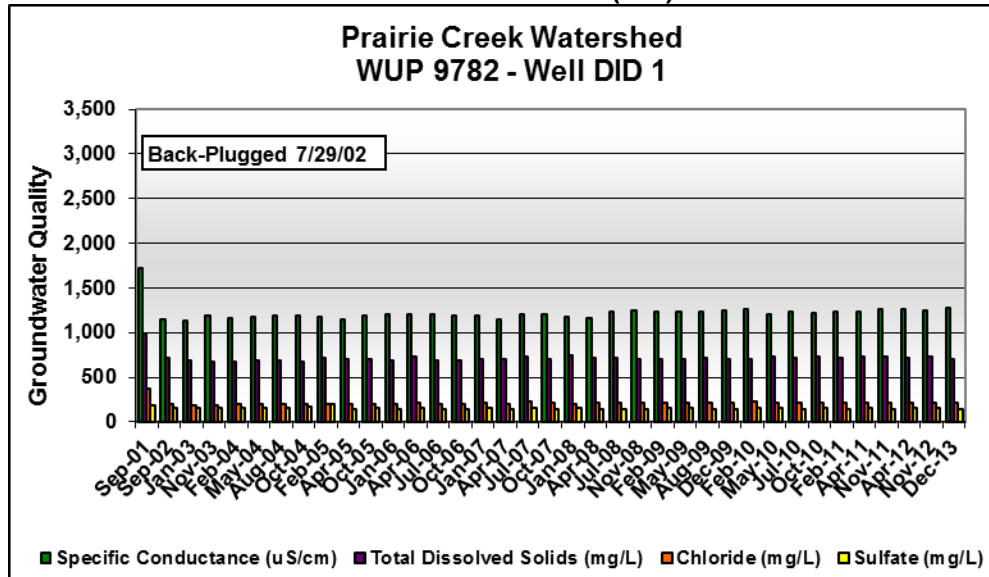
* Station dry

Pre- and Post Back-Plug Well Monitoring Network (District)

WBID 1962 has six back-plugged wells, which have been sampled quarterly to monitor long-term groundwater quality parameters and assure that the back-plugs remained intact. Routine monitoring of these wells was suspended in November 2013.

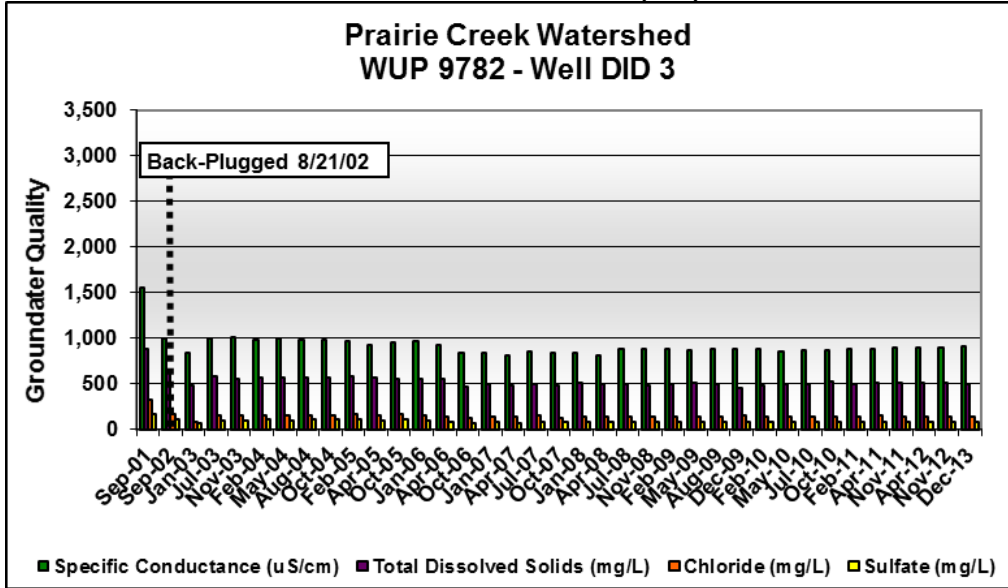
The following graphs represent mineralized constituent values pre- and post well back-plugging activities.

WUP 20003069 – District ID (DID) No. 1

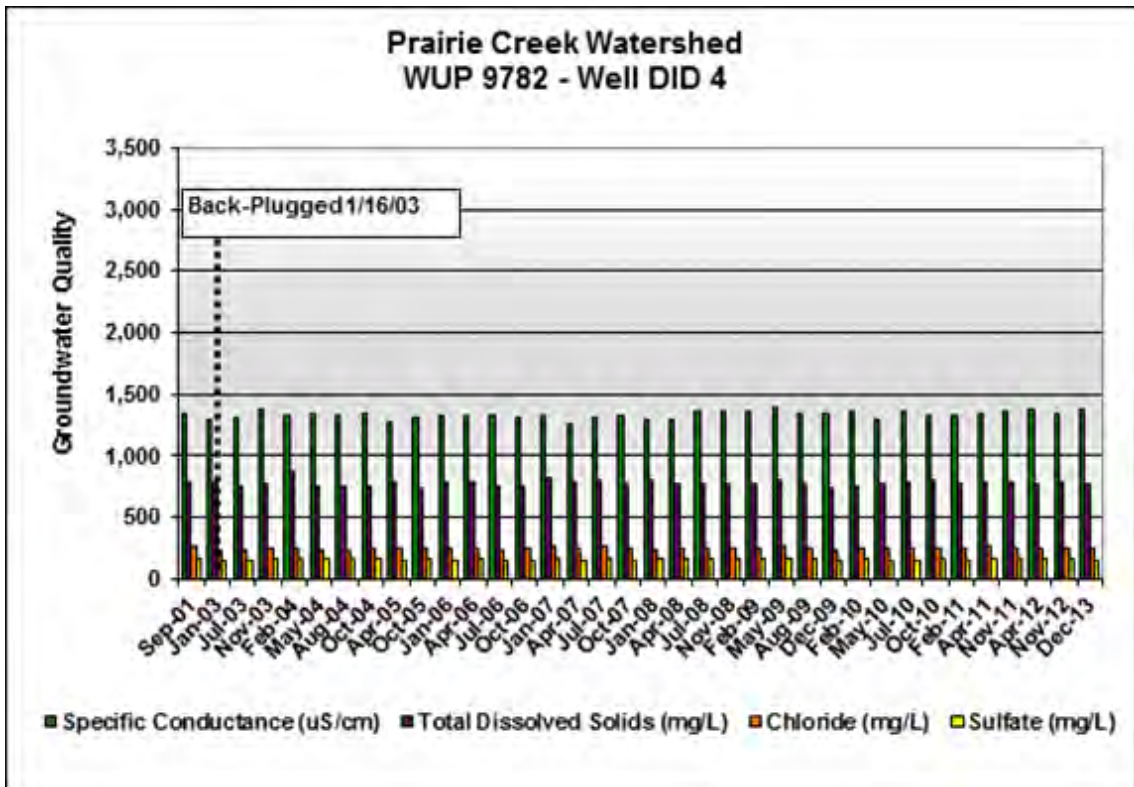


WBID 1962
Water Segment - Prairie Creek
Prairie Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern – sp. conductance, TDS

WUP 20009782 - DISTRICT ID (DID) No. 3

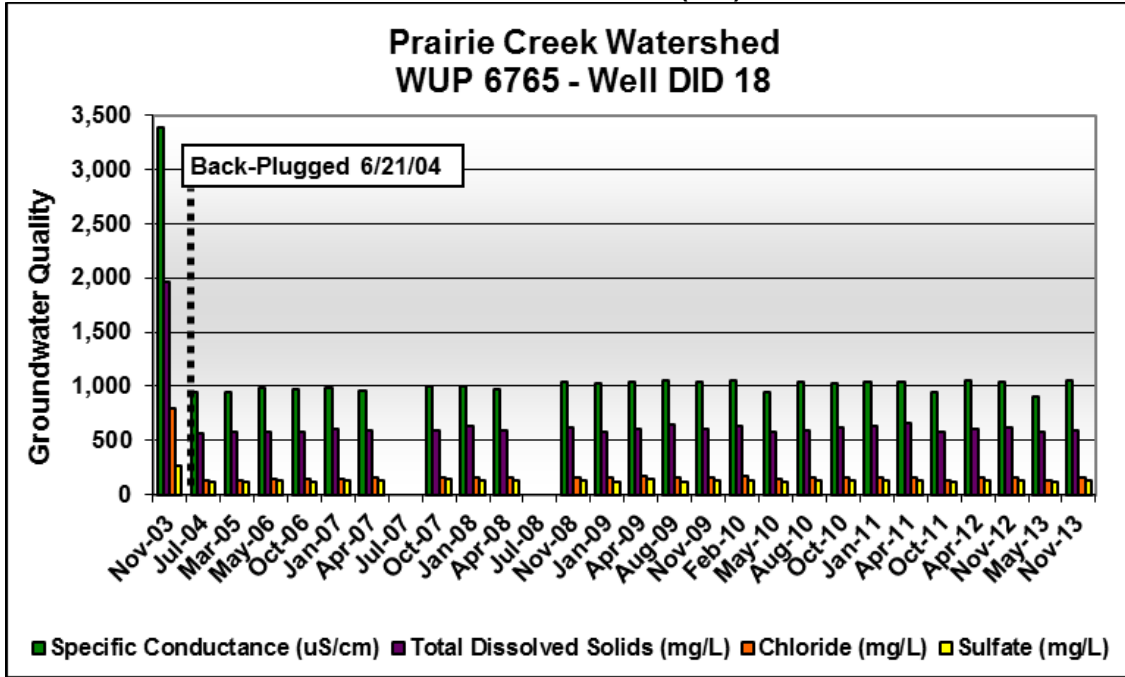


WUP 20009782 - DISTRICT ID (DID) No. 4

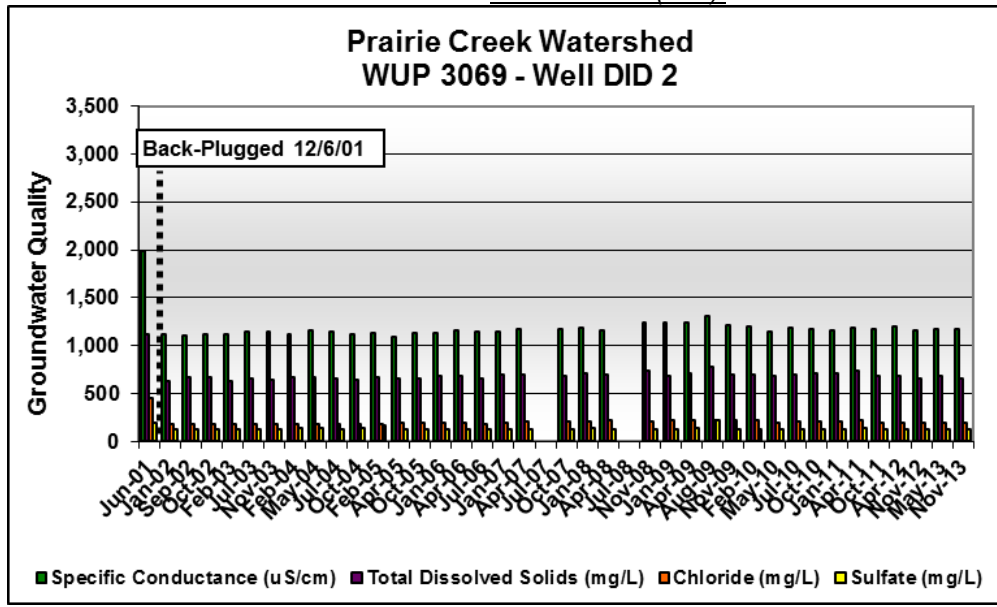


WBID 1962
 Water Segment - Prairie Creek
 Prairie Creek Watershed; Water Use - Class I
 Verified Impaired Pollutants of Concern – sp. conductance, TDS

WUP 20006765 - DISTRICT ID (DID) No. 18

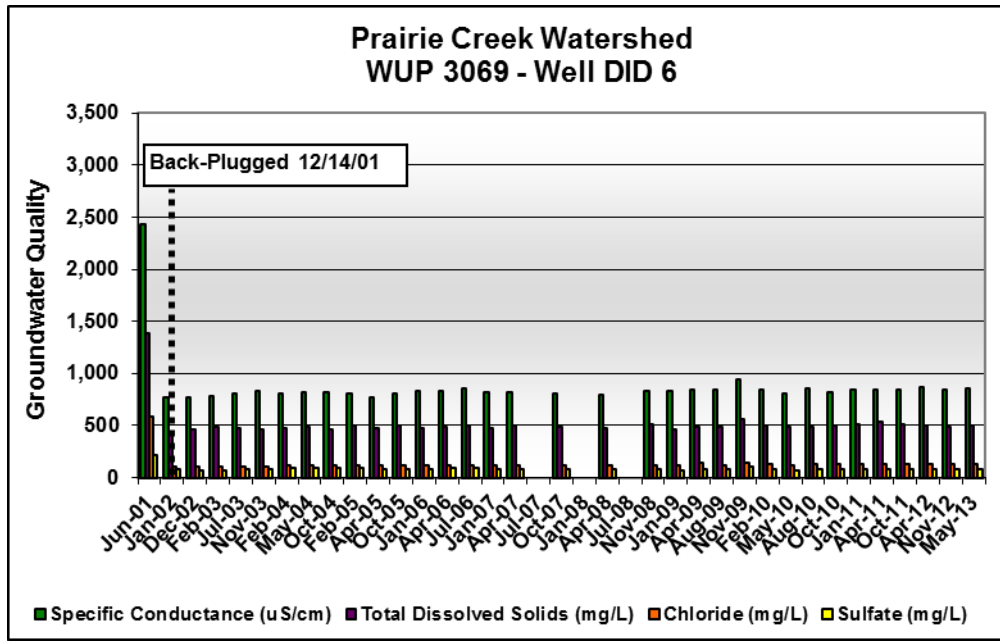


WUP 20003069 – DISTRICT ID (DID) 2



WUP 20003069 – DISTRICT ID (DID) 6

WBID 1962
Water Segment - Prairie Creek
Prairie Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern – sp. conductance, TDS



Surface-Water Quality Monitoring Networks (District, FDEP, and City of Punta Gorda)

The following graphs represent period of record water quality results through September 2014 for chloride and TDS concentrations at two key water quality monitoring stations in WBID 1962. Graphical representations for three additional surface water stations monitored in this WBID can be found in Appendix I. A table summarizing individual values above the Class I surface-water quality criteria for each of these five monitoring stations can be found at the end of this section.

These data plots were generated using historical and recently collected data from the City of Punta Gorda and FDEP, as well as any data collected by the City since 1991 under the City's WUP requirements. Averaged monthly values for TDS are not consistently available (e.g. only one value available per month), therefore individual values were used to determine the number and percentage of TDS values over the 500 mg/L monthly average criterion. Numerous values for TDS in the above data sets were reported as calculated rather than derived from laboratory analyses.

For comparative purposes, these data plots also contain reference lines depicting FDEP Class I criteria for chloride (250 mg/L) and TDS (500 mg/L as a monthly average, 1000 mg/L as maximum).

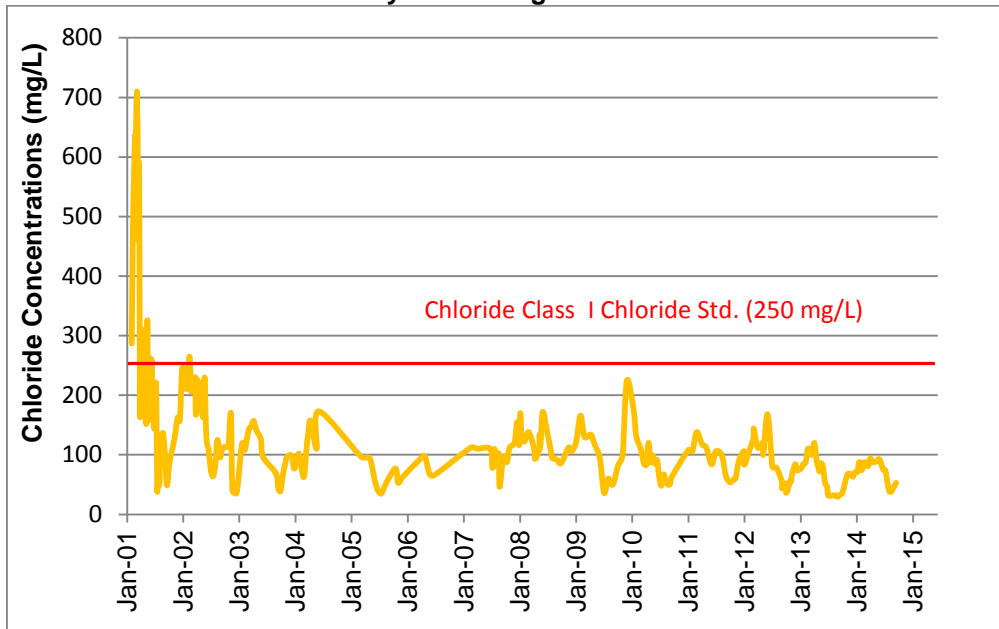
WBID 1962

Water Segment - Prairie Creek

Prairie Creek Watershed; Water Use - Class I

Verified Impaired Pollutants of Concern – sp. conductance, TDS

**Prairie Creek near Ft. Ogden Water Quality Results for Chloride
Key Monitoring Location**



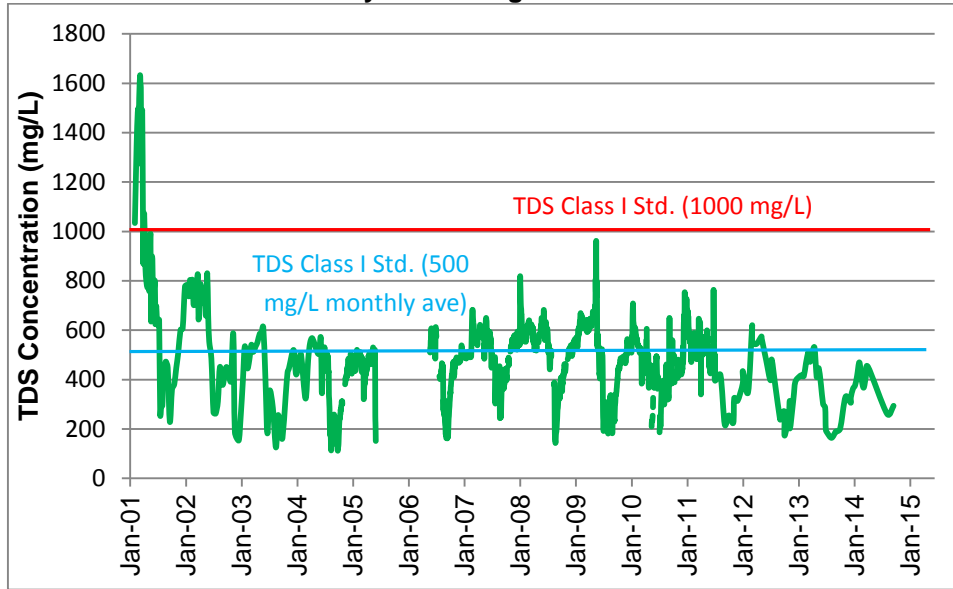
WBID 1962

Water Segment - Prairie Creek

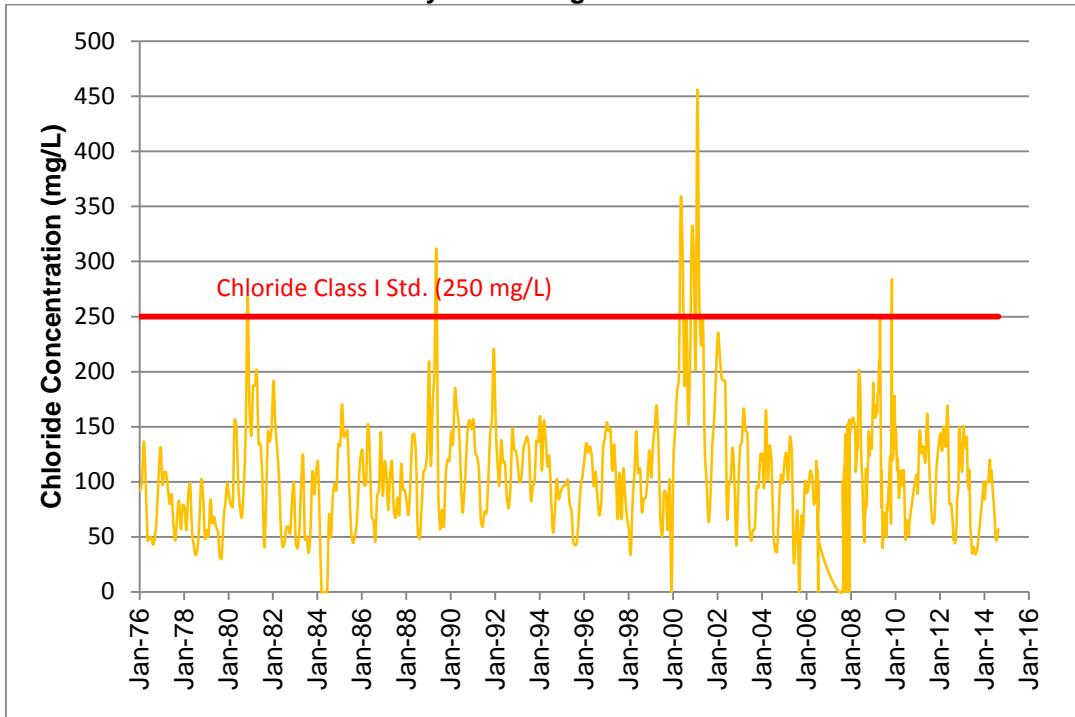
Prairie Creek Watershed; Water Use - Class I

Verified Impaired Pollutants of Concern – sp. conductance, TDS

**Prairie Creek near Ft. Ogden Water Quality Results for TDS
Key Monitoring Location**

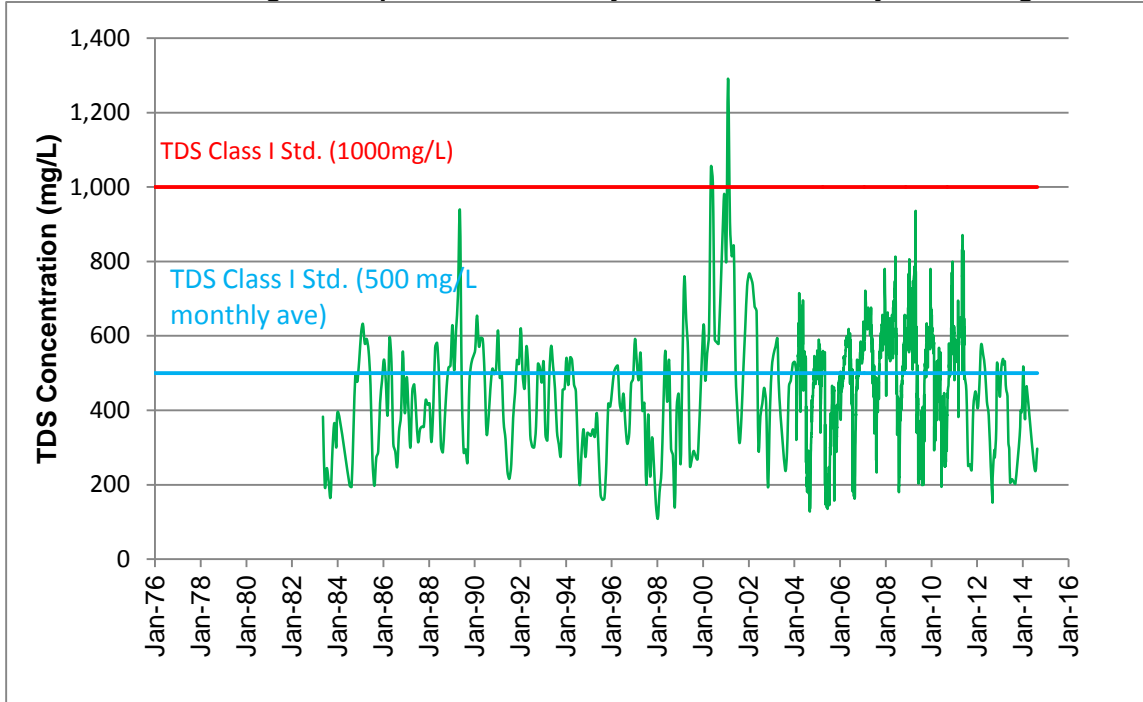


**Prairie Creek @ Washington Loop Rd. Water Quality Results for Chloride
Key Monitoring Location**



WBID 1962
Water Segment - Prairie Creek
Prairie Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern – sp. conductance, TDS

Prairie Creek @ Washington Loop Rd. Water Quality Results for TDS Key Monitoring Location



The following table summarizes water quality results for chloride and TDS at the five established monitoring locations in WBID 1962. Individual values, and the percentage of these values exceeding the FDEP surface-water quality Class I criterion of 250 mg/L for chloride, 500 mg/L (as monthly average), and 1000 mg/L (as maximum) for TDS are provided.

Chloride and TDS Water Quality Results in WBID 1962 from 2004 to 2014
Sites are listed as they are located from north to south throughout WBID 1962

Water Segment	***Number Individual Reported CI Values	***Number Individual CI Values >250 mg/L	***Percentage Individual CI Values >250 mg/L	Number Individual Reported TDS Values	Number Individual TDS Values >500 mg/L	Percentage Individual TDS Values >500 mg/L	Number Individual TDS Values >1000 mg/L	Percentage Individual TDS Values >1000 mg/L
*Mossy Gulley	85	0	0%	86	75	87.2%	0	0%
*Montgomery Canal	60	0	0%	59	10	17%	0	0%
*Symons Pump Canal	57	6	10.5%	55	53	96.4%	4	7.3%
**Prairie Cr. nr Ft. Ogden	265	16	6%	2208	997	45.2%	13	0.6%
**Prairie Cr. @ Washington Loop Rd.	542	11	2%	2930	1580	54%	3	0.1%

*Monitoring site located in agricultural canal – not on main channel of Prairie Creek (Class III).

**Key monitoring location (Class I)

***This parameter not listed by FDEP as verified impaired in WBID 1962

WBID 1962
Water Segment - Prairie Creek
Prairie Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern – sp. conductance, TDS

Habitat Assessment and Stream Condition Index Monitoring (District)

No sites were evaluated for HAs and SCIs during the October 2004 to July 2006 time period. During the August 2006 to August 2008 reporting period, three sites in WBID 1962 were evaluated for biological health indicators. No sites were evaluated for HAs and SCIs during the 2008 to 2010 or 2010 to 2012 reporting periods. Three sites in WBID 1962 were evaluated for biological health indicators in the 2012 to 2014 reporting period. The results of the 2006 to 2008 and 2012 to 2014 assessments are presented below. During the period between October 2004 and September 2014 the FDEP has updated its methodology for calculating the SCI score. For the sites sampled by FDEP, the FDEP retroactively recalculated the Overall SCI Score using the SCI_2012 method. Sites with SCI values calculated using the SCI 2012 method are noted with an asterisk. The remaining sites were evaluated using the SCI_2007 method.

Habitat Assessment and Stream Condition Index Results

Station	Assessment Date	In-Stream Characteristics Score	Morphological and Riparian Features Score	Overall Habitat Assessment Score	Overall SCI Score
Prairie Creek at Herbert Road	01/30/2008	51	69	120 Optimal	19 Category 3 ("impaired")
Prairie Creek near Ft. Ogden	05/28/2008	45	54	99 Suboptimal	39 Category 2 ("healthy")
Prairie Creek @ William Head Property	06/16/2008	38	57	95 Suboptimal	23 Category 3 ("impaired")
*Prairie Creek near Ft. Ogden	12/19/2012	54	74	128 Optimal	53
Prairie Creek @ William Head Property	02/21/2013	52	67	119 Suboptimal	21 Category 3 ("impaired")
*Prairie Creek @ SR 31	12/12/2013	*	*	*	50 Category 2 ("healthy")
*Prairie Creek @ SR 31	4/16/2014	*	*	*	58 Category 2 ("healthy")

*Overall SCI Score recalculated retroactively by FDEP using SCI_2012 methods.

According to FDEP SOP 002/01 LT 7000, stations scored as Category 2 ("healthy") are characterized as having a diverse assemblage of species, with a small increase in dominance by a single taxon; very tolerant taxa represent a small percentage of individuals. Stations scored as Category 3 ("impaired") are characterized as having a notable loss of diversity with very tolerant taxa representing a large proportion of the individuals collected.

A definitive link between declines in the number and quality of macroinvertebrates and surface waters with elevated specific conductance values from anthropogenic activities has not been determined. However, the FDEP has extensively analyzed the effect of elevated specific conductance on the macroinvertebrate community.

http://publicfiles.dep.state.fl.us/dear/labs/biology/miscpubs/cond_criteria.pdf

WBID 1962

Water Segment - Prairie Creek

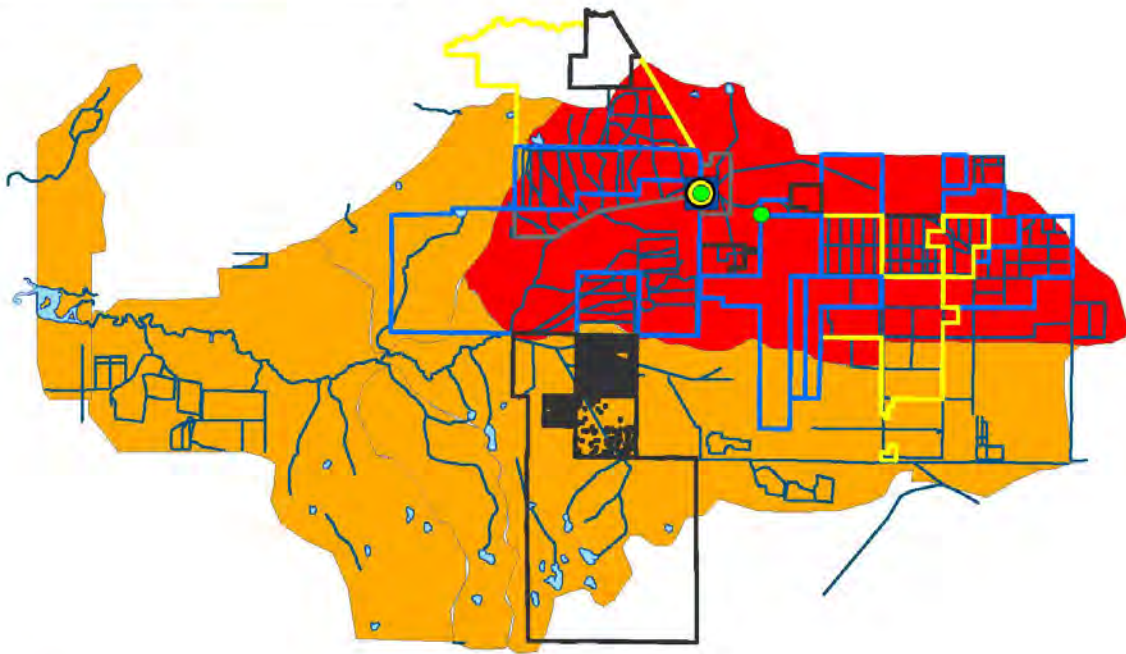
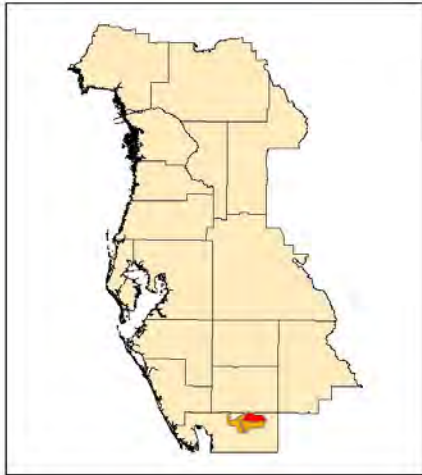
Prairie Creek Watershed; Water Use - Class I

Verified Impaired Pollutants of Concern – sp. conductance, TDS

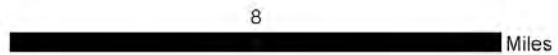
The impairment of the Prairie Creek at Herbert Road and Prairie Creek at William Head Property sites for the SCI can be attributed to secondary factors of anthropogenic activities such as runoff which can lead to sedimentation and turbidity. Sedimentation and the resulting high turbidity of surface waters occurs as runoff flows over disturbed agricultural soils, picking up sediments and other small debris which can physically scour the bodies of the macroinvertebrates and smother available habitat and food sources.

WBID 2040
Water Segment – Myrtle Slough
Shell Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern:
Sp. Conductance, TDS, Chloride

WBID 2040
 Water Segment - Myrtle Slough
 Shell Creek Watershed: Water Use - Class I
 Verified Impaired Pollutants of Concern - sp. conductance, TDS, chloride



- Data Sonde Locations
- Reconnaissance Network Locations
- Surface Water Sample Locations selection
- FARMS Projects - Dormant
- FARMS Projects - Operational
- FARMS Projects - Retired
- FARMS Projects - Under Construction
- Lakes
- Streams and Canals
- WBID 2040
- Shell Creek Watershed



WBID 2040

*Water Segment – Myrtle Slough
Shell Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern:
Sp. Conductance, TDS, Chloride*

Proposed Management Actions – Progress to Date

Shell, Prairie, and Joshua Creek Well Back-Plugging Program

To date no irrigation wells have been back-plugged in WBID 2040.

District Resource Regulation – Water Use Permitting

In WBID 2040, twenty eight Water Use Permit (WUP) applications were submitted to the District over the entire reporting period of performance monitoring (October 2004 to September 2014). Of the twenty eight applications, four were new permits, twelve were renewals, eight were modifications or letter modifications, and four were owner transfers.

WUP Renewals and Modifications in WBID 2040

	Oct. 2004 – July 2006	Aug. 2006 – Aug. 2008	Sept. 2008 – Sept. 2010	Oct. 2010 – Sept. 2012	Oct. 2012 – Sept. 2014	Totals
New WUPs	0	4	0	0	0	4
WUP Renewal	1	2	2	7	0	12
WUP Modifications	1	1	1	1	0	4
WUP Letter Modifications	0	0	1	3	0	4
WUP Owner Transfer	0	0	0	2	2	4
Totals	2	7	4	13	2	28

Facilitating Agricultural Resource Management Systems (FARMS) and/or Environmental Quality Incentives (EQIP) Projects

Twenty FARMS projects were Board approved in WBID 2040 between October 2004 and September 2014, three of which have since been cancelled. An additional four potential FARMS projects were under consideration during this time period. The following table summarizes the projects, as well as actual and projected ground water offsets that have occurred over the performance monitoring period. Details for each of the below listed projects can be found in Appendix IV.

Approved and Potential FARMS Projects in WBID 2040; October 2004-September 2014

WUP Number	Project Number	Ag Type	Project Status	Operational Date	Projected Groundwater Offset (gpd)	Actual Groundwater Offset as of September 2014 (gpd)	Max. Groundwater Offset Achieved in One Month through September 2014 (gpd)
009398	H501	CITRUS	Operational	10/1/2003	120,700	T - H501	T - H501
003530	H504	CITRUS	Operational	1/31/2004	142,600	161,453	1,548,667
009398	H501	CITRUS	Operational	8/9/2005	60,300	T - H501	T - H501
009687	H512	ROW	Operational	12/31/2005	245,700	570,670	3,658,739
001759	H534	SOD	Operational	9/12/2008	197,000	228,300	721,508

WBID 2040
Water Segment – Myrtle Slough
Shell Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern:
Sp. Conductance, TDS, Chloride

009052	H539	CITRUS	Operational	3/19/2009	1,358,400	779,901	3,387,194
009687	H512	ROW	Operational	8/31/2009	662,700	305,619	1,130,045
013096	H573	CITRUS	Operational	3/16/2010	23,790	190,400	624,097
009398	H501	CITRUS	Operational	10/4/2011	826,000	673,300	1,592,719
009417	H585	CITRUS	Operational	11/30/2012	80,000	79,900	317,903
002593	H704	CITRUS	Operational	3/11/2013	130,000	105,700	205,300
010726	H513	ROW	Retired	1/1/2006	106,260	106,250	256,243
002689	H588	CITRUS	Under Construct	N/D	175,190	N/D	N/D
002689	H593	CITRUS	Under Construct	N/D	173,685	N/D	N/D
002593	H649	CITRUS	Under Construct	N/D	130,000	N/D	N/D
002689	H593	CITRUS	Under Construct	N/D	M	M	M
003275	H708	CITRUS	Under Construct	N/D	379,400	N/D	N/D
003070	H639	CITRUS	Cancelled	N/D	150,000	N/D	N/D
012541	H550	SOD	Cancelled	N/D	0	N/D	N/D
003275	H507	CITRUS	Cancelled	N/D	148,000	N/D	N/D
003070		CITRUS	Dormant	N/D	N/D	N/D	N/D
006569		SOD	Dormant	N/D	N/D	N/D	N/D
007783		CITRUS	Dormant	N/D	N/D	N/D	N/D
010959		ROW	Dormant	N/D	N/D	N/D	N/D

Potential project or project under consideration between October 2004 and September 2014

N/D = Not determined/project under consideration

^aAlso received EQIP funding

M = Project merged with other projects to facilitate tracking

T = Project offset tracked with other H501 projects

**The actual ground water offset fluctuates with weather conditions and seasons. The actual is calculated by dividing the number of days the project has been operational into the total gallons offset.

Quality of Water Improvement Program (QWIP)

From October 2003 to September 2010, one well has been plugged/abandoned through the QWIP Program in WBID 2040. The well was associated with WUP No. 20009687.05, District Identification number (DID) 3, and had a casing diameter of six inches, a casing depth of 318 feet, and a total depth of 468 feet below land surface. The specific conductance at the time the well had geophysical logging performed on January 11, 2005 was 670 uS/cm. The well was plugged on April 14, 2005.

Pre- and Post Back-Plug Well Monitoring Network (District)

To date no wells in WBID 2040 are monitored as part of the Back-Plug Well Monitoring Network.

SPJC Water Quality Monitoring Results – Progress to Date

In-Stream Data Sonde - Conductance Logging Network (District and USGS)

There is currently one YSI® 600XLM data sonde deployed in WBID 2040 at station *Myrtle Slough @ SR 31* which is located in the northeastern region of the Shell Creek Watershed and provides

WBID 2040

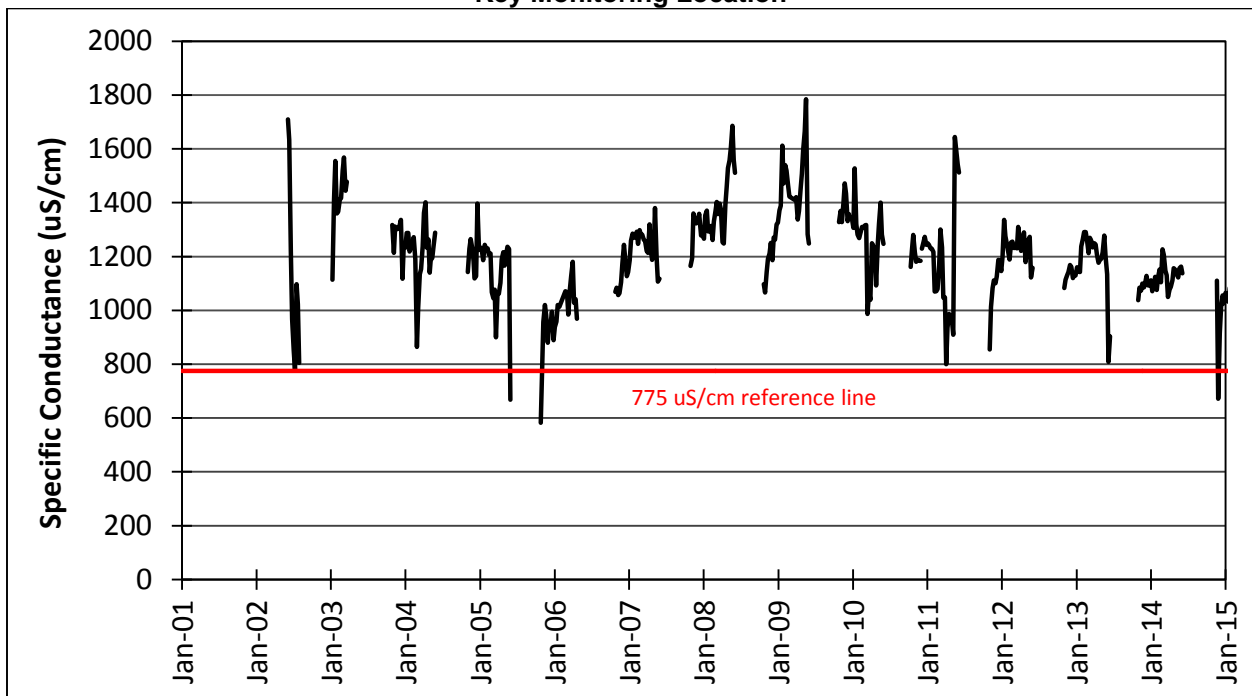
Water Segment – Myrtle Slough
Shell Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern:
Sp. Conductance, TDS, Chloride

flows to Shell Creek. The majority of land use surrounding this monitoring location is agriculture. This location is one of the key surface water monitoring stations in WBID 2040, with data results used by FDEP for TMDL assessments. In contrast to other key monitoring locations in the SPJC, data sonde deployment does not occur year-round at this site due to the potential for flooding and access issues during the wet season.

The following data plot shows weekly median values for specific conductance, which have been calculated from independent values collected on an hourly frequency during dry season periods (November – May) from January 2003 through January 2015. Smothering of the data probe by decaying vegetation caused periodic losses of data at this site during periods of low flow conditions. These erroneous values have been removed from the data set.

Specific conductance at this monitoring location decreased from 2002 to early 2005 time period, trends increased through the 2006 to 2008 period and show an overall decrease since 2008.

**Myrtle Slough @ SR 31 In-Situ Data Sonde Logging Results
Key Monitoring Location**



The following table summarizes logging results at the established data sonde monitoring location in WBID 2040. Individual values, and the percentage of values, exceeding the FDEP surface-water quality Class I criterion of 1275 uS/cm are provided. This table also includes the number of weekly median values above the 775 uS/cm goal criteria.

WBID 2040

Water Segment – Myrtle Slough
Shell Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern:
Sp. Conductance, TDS, Chloride

Specific Conductance Logging Results in WBID 2040 for the period from 2002 to 2014

Water Segment	Number Individual Logged Values	Number Individual Values >1275 uS/cm	Percentage of Individual Values >1275 uS/cm	Number Weekly Median Values	Number Weekly Median Values >775 uS/cm	Percentage Weekly Median Values >775 uS/cm
**Myrtle Slough @ SR 31	67,586	20,666	30.6%	382	378	99%

** Key Monitoring Location (Class I)

Specific Conductance Reconnaissance Network (District)

Within WBID 2040 there is one station currently being monitored for the Specific Conductance Reconnaissance Network. Individual values for **Myrtle Slough @ SR 31** will not be explained here since the specific conductance results were discussed earlier in the In-Stream Specific Conductance Logging Network section.

Pre- and Post Back-Plug Well Monitoring Network (District)

To date no wells in WBID 2040 are monitored as part of the Back-Plug Well Monitoring Network.

Surface-Water Quality Monitoring Networks (District, FDEP, and City of Punta Gorda)

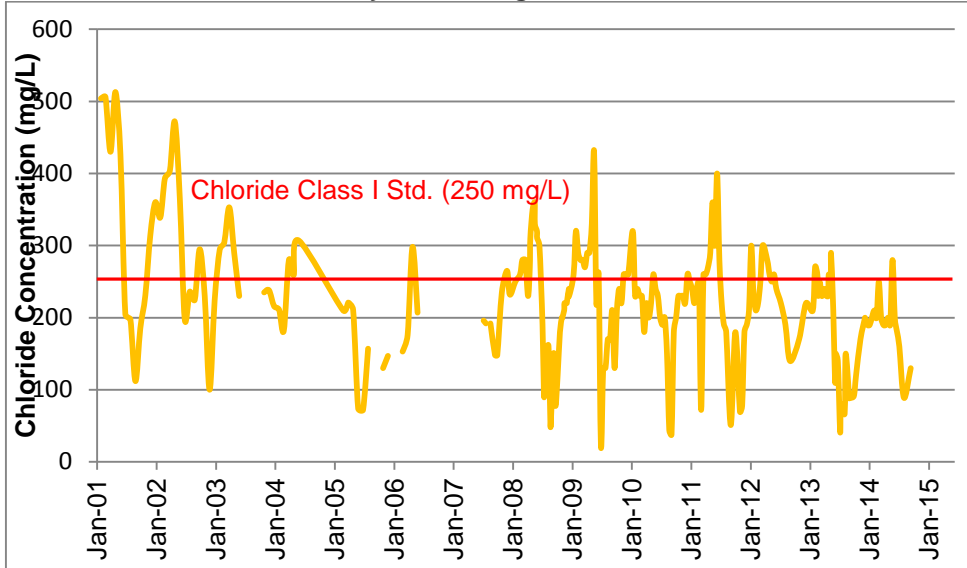
One water quality sample collection site has been established in WBID 2040 at Myrtle Slough @ SR 31, which is a key monitoring location. The following graphs represent available water quality results through September 2014 for chloride and TDS concentrations. These data plots were generated using data that were collected by the FDEP-Fort Myers office. The City began collecting water quality samples at this location as a result of deteriorating water quality in the Shell Creek Reservoir during the 2001 drought. This site is not included under the City's WUP monitoring requirements; therefore the period of data record is shorter than some of the monitoring locations in the SPJC. Numerous values for TDS in both of these data sets were reported as calculated rather than derived from laboratory analyses. For comparative purposes, these data plots also contain reference lines depicting FDEP Class I criteria for chloride (250 mg/L) and TDS (500 mg/L as a monthly average, 1000 mg/L as maximum).

Decreasing trends in both chloride and TDS have occurred during the period of data record at the Myrtle Slough monitoring location. Drought impacts are evident by slight increases in both constituents during dry season months, with wet season rainfall events reducing both TDS and chloride concentrations.

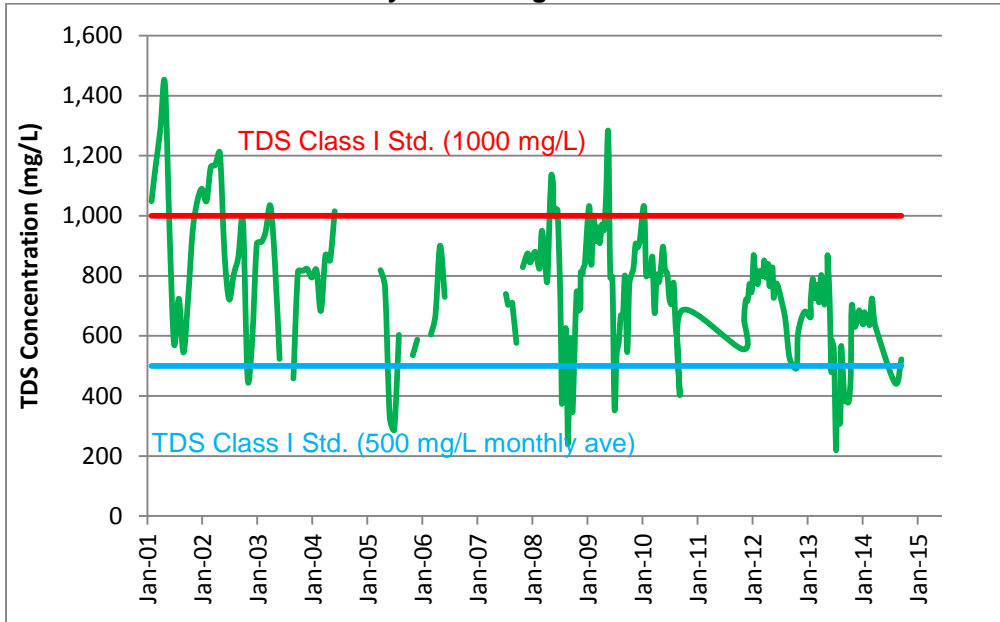
WBID 2040

Water Segment – Myrtle Slough
Shell Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern:
Sp. Conductance, TDS, Chloride

**Myrtle Slough @ SR 31 Water Quality Results for Chloride
Key Monitoring Location**



**Myrtle Slough @ SR 31 Water Quality Results for TDS
Key Monitoring Location**



WBID 2040

*Water Segment – Myrtle Slough
Shell Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern:
Sp. Conductance, TDS, Chloride*

Chloride and TDS Water Quality Results in WBID 2040 from 2002 to 2014

Water Segment	Number Individual Reported CI Values	Number Individual CI Values >250 mg/L	Percentage Individual CI Values >250 mg/L	Number Individual Reported TDS Values	Number Individual TDS Values >500 mg/L	Percentage Individual TDS Values >500 mg/L	Number Individual TDS Values >1000 mg/L	Percentage Individual TDS Values >1000 mg/L
**Myrtle Slough @ SR 31	227	76	34%	216	195	90.2%	21	9.7%

**Key Monitoring Location (Class I)

Habitat Assessment and Stream Condition Index Monitoring (FDEP)

In the summer of 2003 and winter of 2004, biological (macroinvertebrate) samples for SCI analysis were collected at Myrtle Slough @ SR 31. The initial 2004 SCI evaluation of this site on March 1, 2004 was "Excellent." This evaluation was performed using SCI_1992 methodology.

After the 2004 samples were collected and evaluated, a new method of calculating the SCI was developed by FDEP to more accurately reflect the biological condition of streams and effects of development around them. The SCI 2004 methodology ranks streams as Good, Fair, Poor, or Very Poor. The sample from March 1, 2004 for Myrtle Slough @ SR 31 was categorized under this new method as "Fair", which indicates a significant change from completely natural conditions, but not a serious degradation of the biological community. Because the SCI_2004 method had not been adopted at the time the samples were collected, the SCI_2004 evaluation was not official, but did provide an additional analysis of the biological condition of the stream system.

Since the above sample was collected FDEP SCI methodology has undergone two additional method changes, SCI_2007 and SCI_2012. For the sites sampled by FDEP, the FDEP retroactively recalculated the Overall SCI Score using the SCI_2012 method. Sites with SCI values calculated using the SCI 2012 method are noted with an asterisk. The remaining sites were evaluated using the SCI_2007 method.

During the August 2006 to August 2008 reporting period, no sites in WBID 2040 were evaluated for HAs or SCIs. During the September 2008-September 2010 reporting period, one site in WBID 2040 was evaluated for biological health indicators. No sites were evaluated during the 2010 to 2012 reporting period for HAs or SCIs. During the September 2012 to September 2014 reporting period, two samples in WBID 2040 were evaluated for biological health indicators. Both of these samples indicated that biological health was impaired.

Habitat Assessment and Stream Condition Index Results

Station	Assessment Date	In-Stream Characteristics Score	Morphological and Riparian Features Score	Overall Habitat Assessment Score	Overall SCI Score
Myrtle Slough @ SR 31	08/11/2009	40	28	68 Marginal	18 Category 3 ("impaired")
*Myrtle Slough West of SR 31	12/10/2013	42	48	90 Suboptimal	23 Category 3 ("impaired")

WBID 2040

*Water Segment – Myrtle Slough
Shell Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern:
Sp. Conductance, TDS, Chloride*

*Myrtle Slough West of SR 31	04/09/2014	40	52	92 Suboptimal	25 Category 3 ("impaired")
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* Overall SCI Score recalculated retroactively by FDEP using SCI_2012 methods.

According to FDEP SOP 002/01 LT 7000, stations scored as Category 3 ("impaired") are characterized as having a notable loss of diversity with very tolerant taxa representing a large proportion of the individuals collected.

A definitive link between declines in the number and quality of macroinvertebrates and surface waters with elevated specific conductance values from anthropogenic activities has not been determined. However, the FDEP has extensively analyzed the effect of elevated specific conductance on the on the macroinvertebrate community.

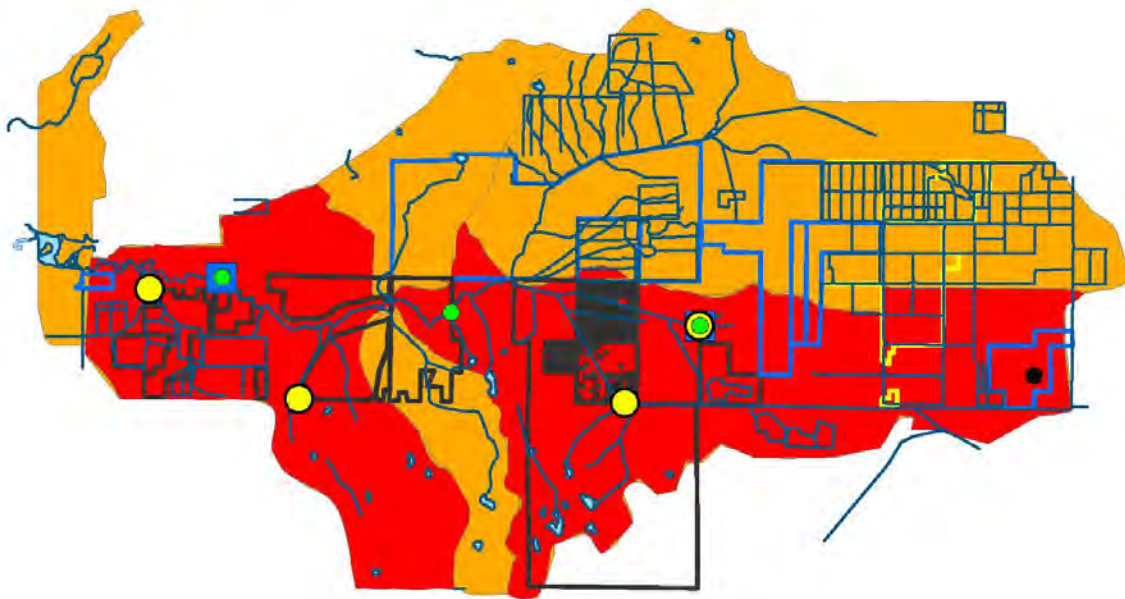
http://publicfiles.dep.state.fl.us/dear/labs/biology/miscpubs/cond_criteria.pdf

The impairment of the Myrtle Slough @ SR 31 site for the SCI can be attributed to secondary factors of anthropogenic activities such as runoff which can lead to sedimentation and turbidity. Sedimentation and the resulting high turbidity of surface waters occurs as runoff flows over disturbed agricultural soils, picking up sediments and other small debris which can physically scour the bodies of the macroinvertebrates and smother available habitat and food sources.

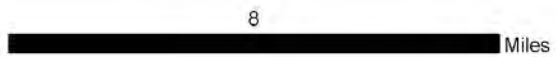
WBID 2041
Water Segment – Shell Creek
Shell Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern:
Sp. Conductance, TDS, Chloride



WBID 2041
 Water Segment - Shell Creek
 Shell Creek Watershed; Water Use - Class I
 Verified Impaired Pollutants of Concern - sp. conductance, TDS, chloride



- Data Sonde Locations
- Reconnaissance Network Locations
- Surface Water Sample Locations
- Backplug Locations
- FARMS Projects - Dormant Contracts
- FARMS Projects - Operational
- FARMS Projects - Under Construct
- Lakes
- Streams and Canals
- WBID 2041
- Shell Creek Watershed



WBID 2041

*Water Segment – Shell Creek Reservoir
Shell Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern:
Sp. Conductance, Chloride*


Proposed Management Actions – Progress to Date

Shell, Prairie, and Joshua Creek Well Back-Plugging Program

Four irrigation wells have been back-plugged in WBID 2041 since Program inception. The following table represents water quality improvements for TDS and chloride concentrations for each well directly following back-plug activities. Two irrigation wells were back-plugged in WBID 2041 for the current report period.

Post Well Back-Plugging Water Quality Results in WBID 2041

Permit Information		Percent Improvement	
WUP No.	DISTRICT ID No.	TDS (mg/L)	Chloride (mg/L)
20009648	1	51%	76%
20009648	2	N/A	N/A
20009926	10	NA	NA
20009926	11	19%	62%

 Denotes repeated back-plug
*Only this DID continues to be monitored.

District Resource Regulation – Water Use Permitting

In WBID 2041, twenty-eight Water Use Permit (WUP) applications were submitted to the District over the entire reporting period of performance monitoring (October 2004 to September 2014). Of the twenty-eight applications six were new permits, fifteen were renewals, and six received letter modifications, and one was an owner transfer (see table below).

WUP Renewals and Modifications in WBID 2041

	Oct. 2004 – July 2006	Aug. 2006 – Aug. 2008	Sept. 2008 – Sept. 2010	Oct. 2010 – Sept. 2012	Oct. 2012 – Sept. 2014	Totals
New WUPs	1	4	0	1	0	6
WUP Renewals	0	1	5	9	0	15
WUP Modifications	0	0	0	0	0	0
WUP Letter Modifications	1	1	1	1	2	6
WUP Owner Transfer	0	0	0	1	0	1
Totals	2	6	6	12	2	28

Facilitating Agricultural Resource Management Systems (FARMS) and/or Environmental Quality Incentives (EQIP) Projects

Seventeen FARMS projects were Board approved between October 2004 and September 2014 in WBID 2041, two of which have since been cancelled. An additional seven FARMS projects were under consideration during this time period. The following table summarizes the projects, as well as actual and projected ground water offsets that have occurred over the performance monitoring period. Details for each of the below listed projects can be found in Appendix IV.

WBID 2041

*Water Segment – Shell Creek Reservoir
Shell Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern:
Sp. Conductance, Chloride*

Approved and Potential FARMS Projects in WBID 2041; October 2004 through September 2014

WUP Number	Project Number	Ag Type	Project Status	Operational Date	Projected Groundwater Offset (gpd)	Actual Groundwater Offset as of September 2014 (gpd)	Max. Groundwater Offset Achieved in One Month through September 2014 (gpd)
009476	H500	CITRUS	Operational	8/28/2003	136,000	154,900	706,259
009648	H508	ROW	Operational	5/2/2006	132,500	222,799	1,310,000
009687	H512	ROW	Operational	12/31/2005	245,700	305,619	1,130,045
009687	H512	ROW	Operational	8/31/2009	662,700	570,670	3,658,739
001759	H534	CITRUS	Operational	9/12/2008	197,000	228,300	721,508
009476	H548	CITRUS	Operational	6/19/2008	27,170	134,700	1,176,019
None	H563	CITRUS	Operational	9/1/2009	55,200	31,300	63,206
013096	H573	CITRUS	Operational	3/16/2010	23,790	190,400	624,097
009417	H585	CITRUS	Operational	11/30/2012	80,000	79,900	317,903
None	H629	CITRUS	Operational	5/1/2011	22,500	11,200	22,000
002593	H649	CITRUS	Operational	3/11/2013	130,000	105,700	205,300
002689	H588	CITRUS	Under Construct	N/D	175,190	N/D	N/D
002689	H593	CITRUS	Under Construct	N/D	173,685	N/D	N/D
002689	H593	CITRUS	Under Construct	N/D	M H593	M H593	M H593
002593	H704	CITRUS	Under Construct	N/D	130,000	N/D	N/D
009476	H575	CITRUS	Cancelled	N/D	181,208	N/D	N/D
009727	H581	CITRUS	Cancelled	N/D	26,700	N/D	N/D
002588	N/D	ROW	Potential	N/D	N/D	N/D	N/D
002589	N/D	ROW	Dormant	N/D	N/D	N/D	N/D
009926	N/D	CITRUS	Dormant	N/D	N/D	N/D	N/D
010874	N/D	CITRUS	Dormant	N/D	N/D	N/D	N/D
010959	N/D	ROW	Dormant	N/D	N/D	N/D	N/D
012872	N/D	ROW	Dormant	N/D	N/D	N/D	N/D
020204	N/D	ROW	Dormant	N/D	N/D	N/D	N/D

*Potential project under consideration between October 2004 and September 2014

N/D = Not determined/project under consideration

M = Project merged with H593

*Funding also provided by EQIP

**The actual ground water offset fluctuates with weather conditions and seasons. The actual is calculated by dividing the number of days the project has been operational into the total gallons offset

WBID 2041

*Water Segment – Shell Creek Reservoir
Shell Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern:
Sp. Conductance, Chloride*

Quality of Water Improvement Program (QWIP)

From 2012 to September 2014, three wells were plugged/abandoned through the QWIP Program in WBID 2041. The wells were associated with WUP No. 20009926, District Identification numbers (DID) 6,7,8.

DID 6 had a casing diameter of ten inches, a casing depth of 296 feet, and a total depth of 550 feet below land surface. The specific conductance at the time the well had geophysical logging performed on April 26, 2008 was 2,860 uS/cm. The well was plugged on July 29, 2013.

DID 7 had a casing diameter of ten inches, a casing depth of 300 feet, and a total depth of 550 feet below land surface. The specific conductance at the time of sampling on September 8, 2005 was 3,137 uS/cm. This well was not geophysically logged due to access issues. The well was plugged on April 3, 2013.

DID 8 had a casing diameter of ten inches, a casing depth of 309 feet, and a total depth of 550 feet below land surface. The specific conductance at the time of testing on September 8, 2005 was 2,816 uS/cm. This well was not geophysically logged due to access issues. The well was plugged on April 3, 2013.

SPJC Water Quality Monitoring Results – Progress to Date

In-Stream Data Sonde - Conductance Logging Network (District and USGS)

There are currently three YSI® 600XLM data sondes deployed in WBID 2041. The following data plots reflect weekly median values for specific conductance, which have been calculated from independent values collected on an hourly frequency.

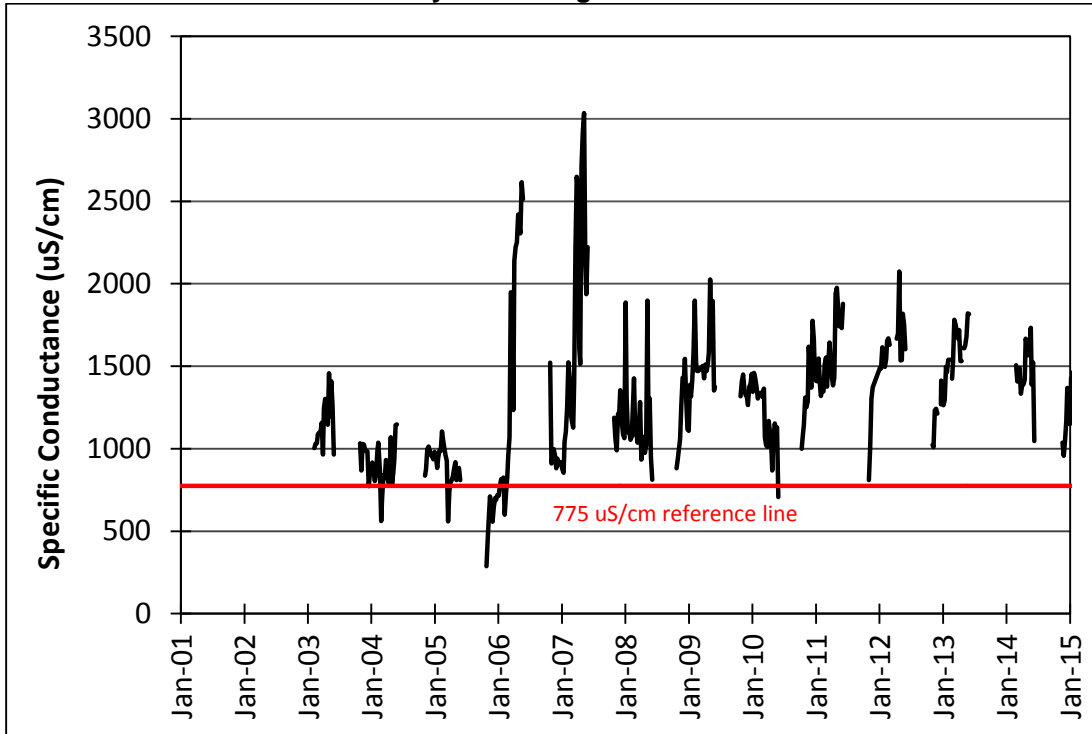
The **Shell Creek @ SR 31** data sonde is located in the main channel of Shell Creek in the eastern region of WBID 2041. This monitoring location is near the headwaters of Shell Creek, and is a key surface water monitoring station with data results used by FDEP for TMDL assessments. In contrast to other key monitoring locations in the SPJC, data sonde deployment does not occur year-round at this site due to flooding issues during the wet season. Land uses contributing to this canal include agriculture (citrus), rangeland, wetlands, and upland forested areas. The following data plot shows continuous/hourly logging of specific conductance values for dry season periods (November – May) for February 2003 through January 2015. Low water level conditions and smothering of the data probe by sediment and vegetation have resulted in some missing values for this monitoring location. These erroneous values have been removed from the data set.

Specific conductance values increased during the dry season months of 2005 to 2007 which in part can be attributed to below average rainfall during this time period. Dry season values decreased significantly in late 2007 to early 2008 and remained in the 1,000 to 1,500 uS/cm range. Values during the last two reporting periods have increased slightly and generally remain in the 1,000 uS/cm to 2,000 uS/cm range.

WBID 2041

Water Segment – Shell Creek Reservoir
Shell Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern:
Sp. Conductance, Chloride

**Shell Creek @ SR 31 In-Situ Data Sonde Logging Results
Key Monitoring Location**



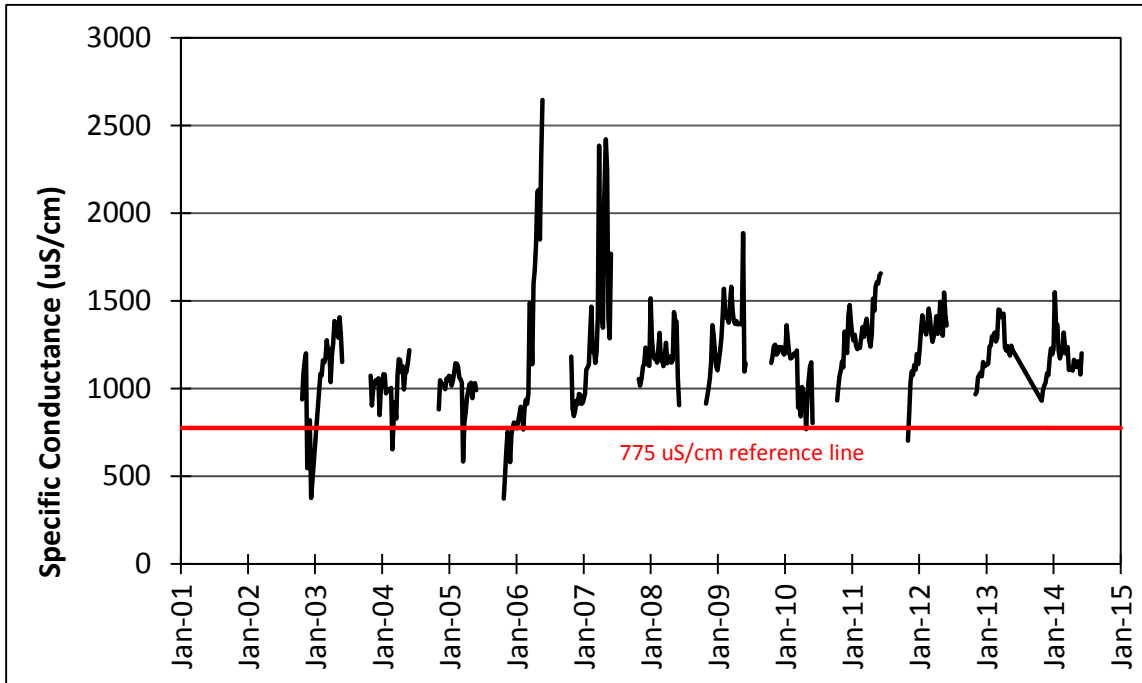
The **Shell Creek @ Circle K** data sonde is located in the main channel of Shell Creek in the central region of WBID 2041. Land use contributing to this canal is predominantly agriculture (citrus). The following data plot shows continuous/hourly logging of specific conductance values for dry season periods (November – May) for October 2002 through June 2014.

Specific conductance values increased during the dry season months of 2005 to 2009 due to below average rainfall during this time period but show improvement during the 2010 dry period. The last two reporting periods are similar to the 2008 to 2009 time period with seasonal fluctuations related to rainfall.

WBID 2041

Water Segment – Shell Creek Reservoir
Shell Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern:
Sp. Conductance, Chloride

Shell Creek @ Circle K In-Situ Data Sonde Logging Results



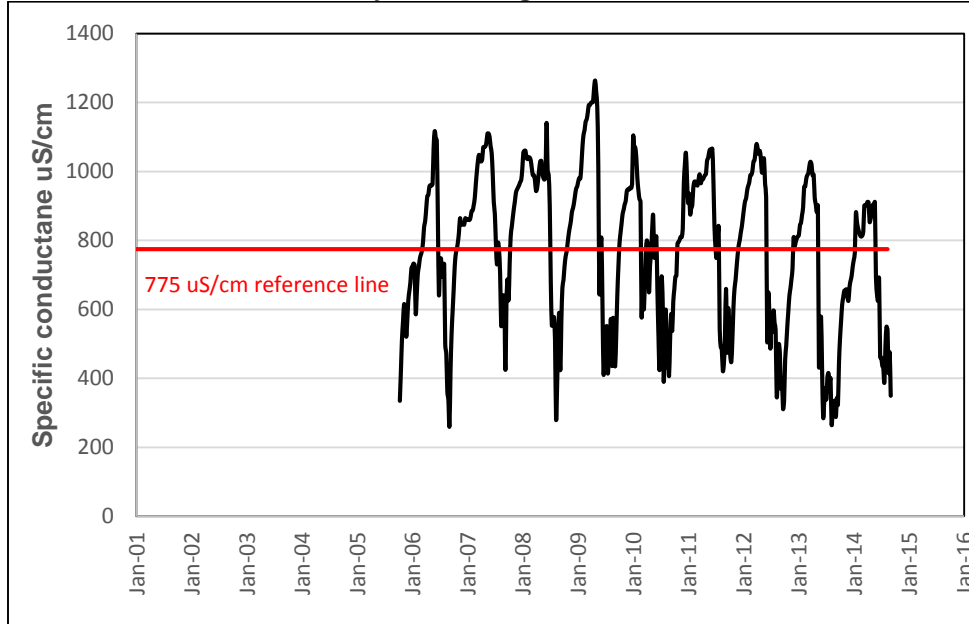
The **Shell Creek @ Washington Loop Road** data sonde is located on the main channel of Shell Creek in the southern region of the Shell Creek watershed, just upstream of the Shell Creek Reservoir. Land use in the immediate surrounding area is urban/built up and agriculture. This location is one of the key surface water monitoring stations in WBID 2041, with data results used by FDEP for TMDL assessments. For this reason, data sonde deployment occurs year-round at this site under contract with the USGS. The following data plot shows continuous/15 minute logging of specific conductance for weekly median values throughout each year for February 2004 through September 2014.

Impacts to smaller tributaries and canals that provide flow to this location have resulted in increased trends in weekly median specific conductance at this site. This coupled with below average rainfall conditions beginning in 2006, intensified the impacts due to the potential need for more irrigation with groundwater and less dilution from surface water runoff.

WBID 2041

*Water Segment – Shell Creek Reservoir
 Shell Creek Watershed: Water Use - Class I
 Verified Impaired Pollutants of Concern:
 Sp. Conductance, Chloride*

**Shell Creek @ Washington Loop Rd. In-Situ Data Sonde Logging Results
 Key Monitoring Location**



Specific Conductance Logging Results in WBID 2041 for the period from 2002 to 2014
 Sites are listed as they are located from east to west throughout WBID 2041

Water Segment	Number Individual Logged Values	Number Individual Values >1275 uS/cm	Percentage of Individual Values >1275 uS/cm	Number Weekly Median Values	Number Weekly Median Values >775 uS/cm	Percentage Weekly Median Values >775 uS/cm
**Shell Creek @ SR 31	63,386	27,208	43%	357	339	95%
Shell Creek @ Circle K	60,991	16,871	27.7%	375	359	95.7%
**Shell Creek @ Washington Loop	370,025	51,519	13.9%	554	395	71%

**Key Monitoring Location (Class I)

WBID 2041

*Water Segment – Shell Creek Reservoir
Shell Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern:
Sp. Conductance, Chloride*

Specific Conductance Reconnaissance Network (District)

Within WBID 2041 there are currently four stations monitored for the Specific Conductance Reconnaissance Network. Individual values for the Shell Creek @ SR 31 station are not presented here since they were discussed previously in the In-Stream Specific Conductance Logging Network section. Of the 47 individual specific conductance values collected within WBID 2041 during the period of record, 13 values exceeded the 775 uS/cm goal criteria and ten values exceeded the FDEP surface-water quality Class I criterion of 1275 uS/cm.

The following table summarizes the percent change increases and/or decreases between dry season events for each monitoring station within WBID 2041 during the 2004 to 2006, 2006 to 2008, 2008 to 2010, 2010 to 2012, and 2012 to 2014 reporting periods. Individual values for each dry season event are also provided. Stations that were not flowing during a sample event are denoted as dry in the table. Dry season percent changes for the 2012 to 2014 reporting period show one site increasing, one site decreasing, and one site or not calculated due to dry conditions.

Specific Conductance Reconnaissance Results in WBID 2041; 2004 - 2006

Station	Dry Season 2004 Value uS/cm	Wet Season 2004 Value uS/cm	Dry Season 2005 Value uS/cm	Wet Season 2005 Value uS/cm	Dry Season 2006 Value uS/cm	Percent change Dry Season 2004 versus Dry Season 2005	Percent change Dry Season 2005 versus Dry Season 2006
Unnamed Cr. @ Washington Lp Rd – #28	1708	467	1559	959	1415	↓8.72%**	↓9.24%**
Unnamed Cr. @ CR 74 - #26	392	63	299	*	*	↓23.72%**	*
Unnamed Cr. @ CR 74 - #25	*	164	331	84	*	*	*

* Station dry

**Values modified since 2004 – 2006 Performance Monitoring Report due to calculation error.

Specific Conductance Reconnaissance Results in WBID 2041; 2006 - 2008

Station	Wet Season 2006 Value uS/cm	Dry Season 2007 Value uS/cm	Wet Season 2007 Value uS/cm	Dry Season 2008 Value uS/cm	Wet Season 2008 Value uS/cm	Percent change Dry Season 2006 versus Dry Season 2007	Percent change Dry Season 2007 versus Dry Season 2008
Unnamed Cr. @ Washington Lp Rd – #28	500	1252	673	*	155	↓11.52%	*
Unnamed Cr. @ CR 74 - #26	38	*	33	*	33	*	*
Unnamed Cr. @ CR 74 - #25	130	*	166	*	163	*	*

* Station dry

WBID 2041

*Water Segment – Shell Creek Reservoir
Shell Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern:
Sp. Conductance, Chloride*

Specific Conductance Reconnaissance Results in WBID 2041; 2008 - 2010

Station	Dry Season 2009 Value uS/cm	Wet Season 2009 Value uS/cm	Dry Season 2010 Value uS/cm	Wet Season 2010 Value uS/cm	Percent change Dry Season 2008 vs. Dry Season 2009	Percent change Dry Season 2009 vs. Dry Season 2010
Unnamed Cr. @ Washington Lp Rd – #28	1637	586	1269	1337	*	↓22.5%
Unnamed Cr. @ CR 74 - #26	216	39	175	*	*	↓19.0%
Unnamed Cr. @ CR 74 - #25	*	77	153	403	*	*

* Station dry

Specific Conductance Reconnaissance Results in WBID 2041; 2010 - 2012

Station	Dry Season 2011 Value uS/cm	Wet Season 2011 Value uS/cm	Dry Season 2012 Value uS/cm	Wet Season 2012 Value uS/cm	Percent change Dry Season 2010 vs. Dry Season 2011	Percent change Dry Season 2011 vs. Dry Season 2012
Unnamed Cr. @ Washington Lp Rd – #28	*	1610	1681	1358	*	*
Unnamed Cr. @ CR 74 - #26	*	73	*	72	*	*
Unnamed Cr. @ CR 74 - #25	*	96	*	128	*	*

* Station dry

Specific Conductance Reconnaissance Results in WBID 2041; 2012 - 2014

Station	Dry Season 2013 Value uS/cm	Wet Season 2013 Value uS/cm	Dry Season 2014 Value uS/cm	Wet Season 2014 Value uS/cm	Percent change Dry Season 2012 vs. Dry Season 2013	Percent change Dry Season 2013 vs. Dry Season 2014
Unnamed Cr. @ Washington Lp Rd – #28	1435	267	1504	658	↓14.63%	↑4.81%
Unnamed Cr. @ CR 74 - #26	*	30	*	35	*	*
Unnamed Cr. @ CR 74 - #25	566	141	*	156	*	*

* Station dry

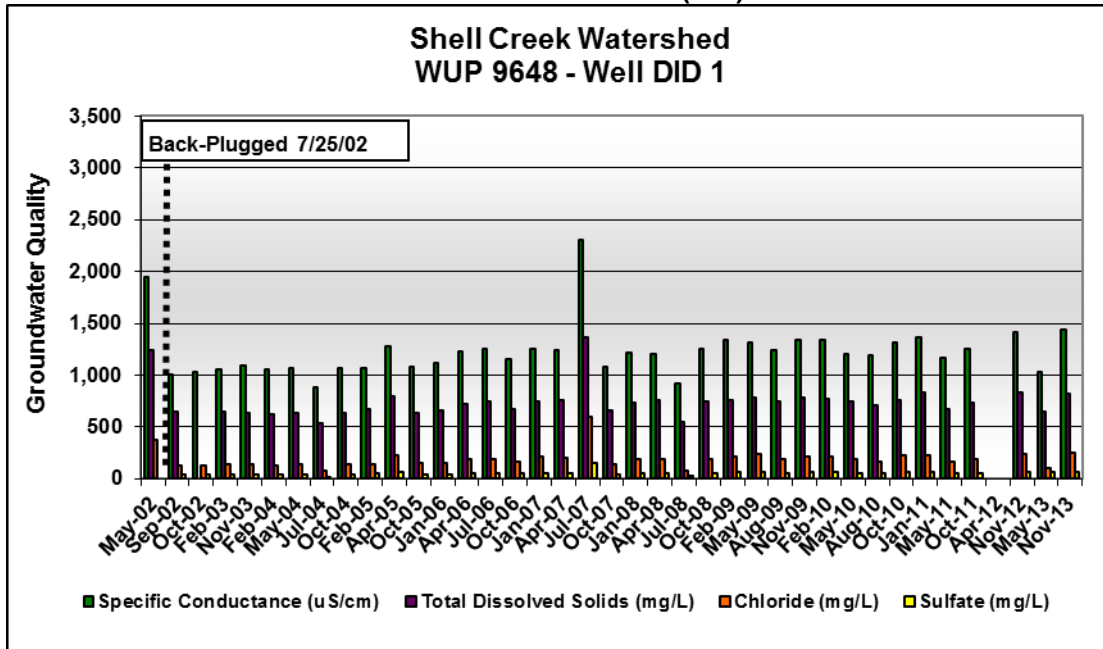
WBID 2041

Water Segment – Shell Creek Reservoir
Shell Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern:
Sp. Conductance, Chloride

Pre- and Post Back-Plug Well Monitoring Network (District)

WBID 2041 has one back-plugged well that has been sampled quarterly to monitor long-term groundwater quality parameters and assure that the back-plug remained intact. Routine monitoring of the well was suspended in November 2013. Monitoring results for July 2007 indicated increased mineral concentrations, which triggered a repeat back-plug in August 2007 and successful recovery to the previous back-plug mineralized concentrations. The following graph represents mineralized constituent values pre- and post-well back-plugging activities.

WUP 20009648 - DISTRICT ID (DID) No. 1



*2012 sampling was not completed during this reporting period due to access issues

Surface-Water Quality Monitoring Networks (District, FDEP, and City of Punta Gorda)

The following graphs represent available water quality results through September 2014 for chloride and TDS concentrations at key Class I monitoring stations; Shell Creek @ Washington Loop Rd. and Shell Creek @ SR 31 in WBID 2041. The data plots for station Shell Creek @ Washington Loop Rd. were generated using historical data from the City of Punta Gorda, as well as data collected by the City since 1991 under the City's WUP requirements. Data were also used for the 2002 through 2010 time frame from monitoring efforts conducted by the FDEP-Fort Myers office.

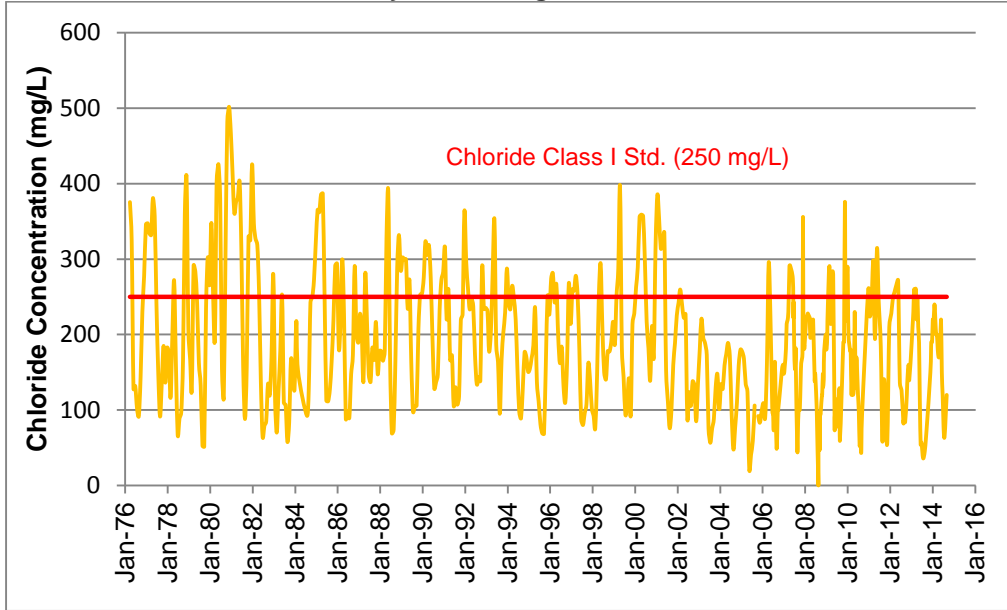
Numerous values for TDS in both of these data sets were reported as calculated rather than derived from laboratory analyses. For comparative purposes these data plots also contain reference lines depicting FDEP Class I criteria for chloride (250 mg/L) and TDS (500 mg/L as a monthly average, 1000 mg/L as maximum).

The City also began collecting water quality samples at the Shell Creek @ SR 31 location as a result of deteriorating water quality in the Shell Creek Reservoir during the 2001 drought. This site is not included under the City's WUP monitoring requirements; therefore the period of data record is shorter than some of the monitoring locations in the SPJC.

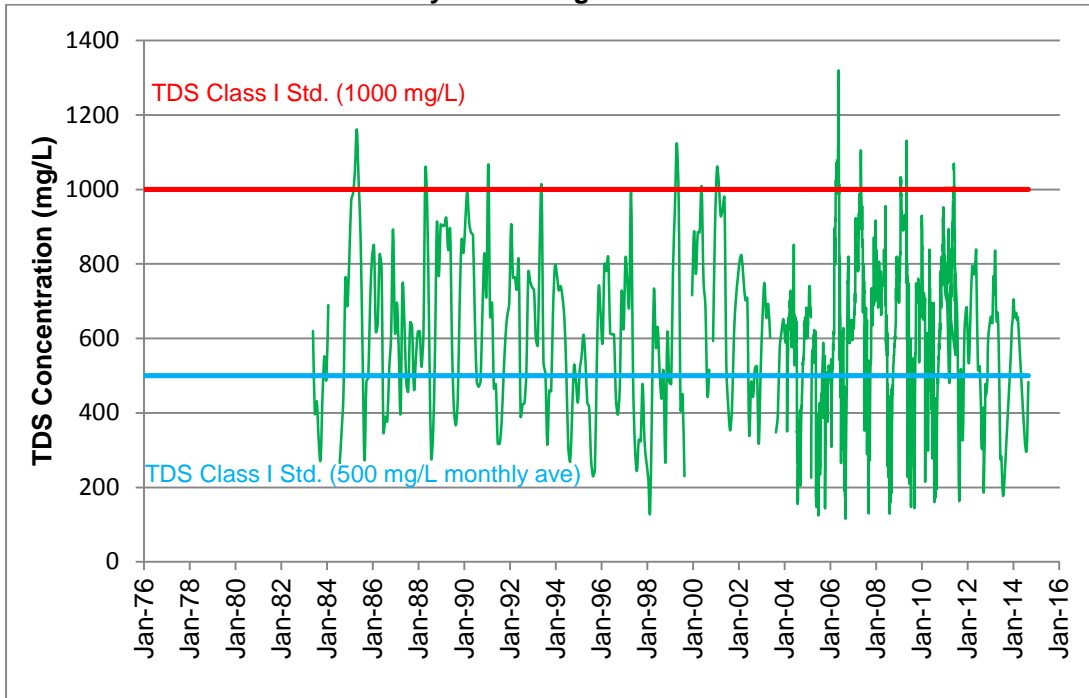
WBID 2041

Water Segment – Shell Creek Reservoir
Shell Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern:
Sp. Conductance, Chloride

**Shell Cr. @ Washington Loop Rd. Water Quality Results for Chloride
Key Monitoring Location**



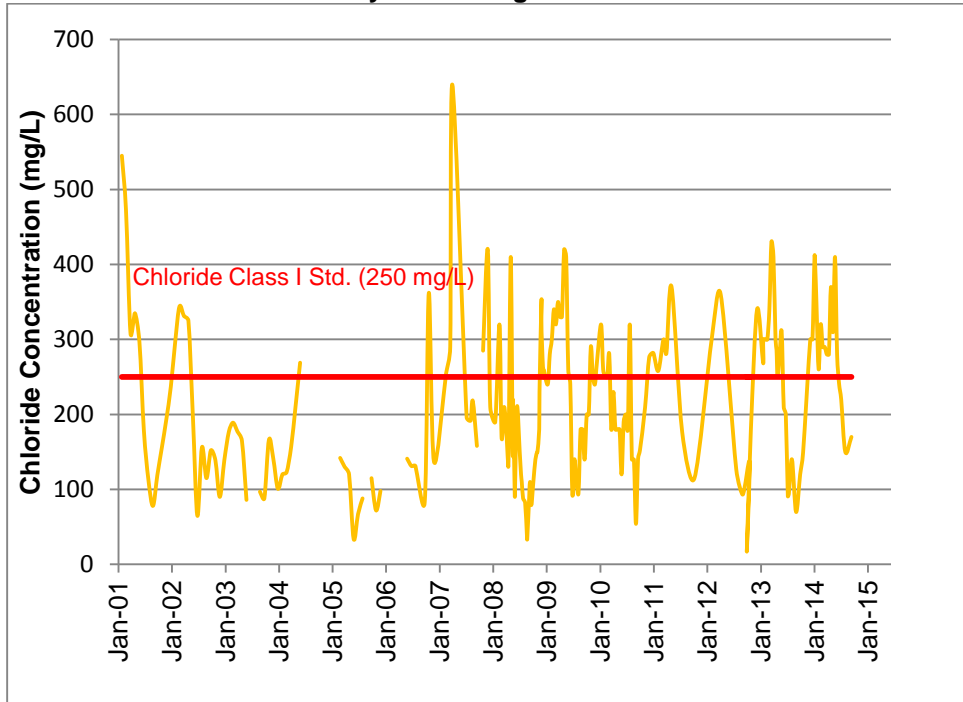
**Shell Cr. @ Washington Loop Rd. Water Quality Results for TDS
Key Monitoring Location**



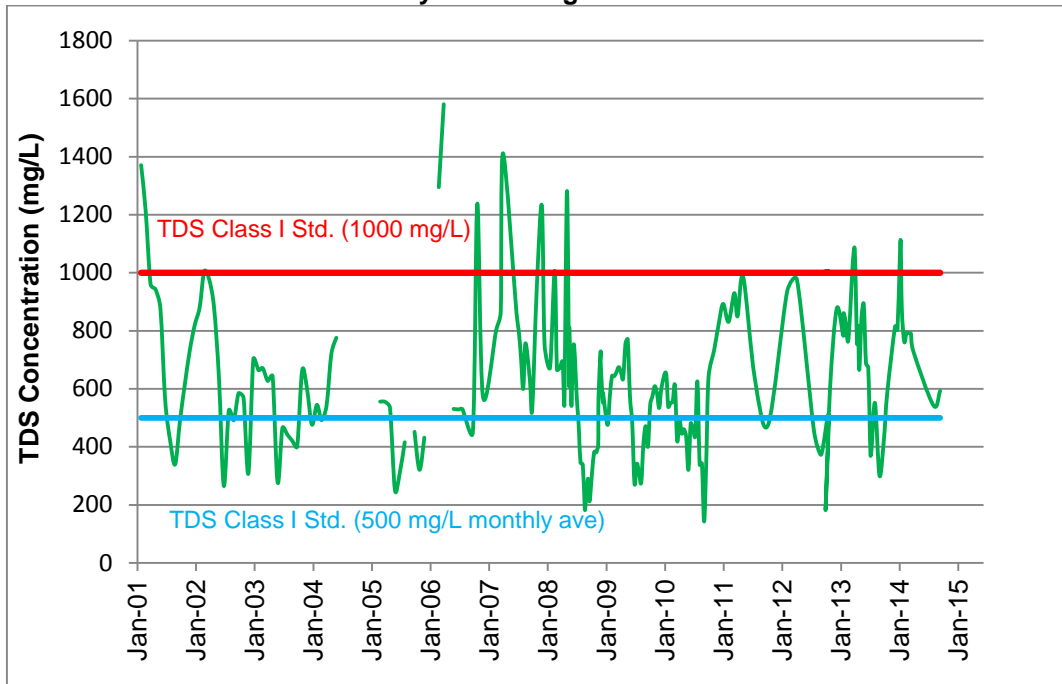
WBID 2041

Water Segment – Shell Creek Reservoir
Shell Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern:
Sp. Conductance, Chloride

**Shell Cr. @ SR 31 Water Quality Results for Chloride
Key Monitoring Location**



**Shell Cr. @ SR 31 Water Quality Results for TDS
Key Monitoring Location**



WBID 2041

*Water Segment – Shell Creek Reservoir
Shell Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern:
Sp. Conductance, Chloride*

Chloride and TDS Water Quality Results in WBID 2041 for the period from 2004 to 2014

Water Segment	Number Individual Reported CI Values	Number Individual CI Values >250 mg/L	Percentage Individual CI Values >250 mg/L	Number Individual Reported TDS Values	Number Individual TDS Values >500 mg/L	Percentage Individual TDS Values >500 mg/L	Number Individual TDS Values >1000 mg/L	Percentage Individual TDS Values >1000 mg/L
**Shell Cr. @ Washington Loop Rd.	534	129	24.2%	2984	2204	74%	90	3%
**Shell Cr. @ SR 31	201	79	39.3%	198	134	68%	14	7.1%

**Key Monitoring Location (Class I)

Habitat Assessment and Stream Condition Index Monitoring (FDEP)

In the summer of 2003 and winter of 2004, biological (macroinvertebrate) samples for SCI analysis were collected at Shell Creek @ Circle K. The initial 2004 SCI evaluation of this site was "Excellent" for the sample collected on February 24, 2004 and analyzed using the SCI_1992 methodology.

After the samples were collected and evaluated, a new method of calculating the SCI was developed by FDEP to more accurately reflect the biological condition of streams and effects of development around them. The SCI 2004 methodology ranks streams as Good, Fair, Poor, or Very Poor. The Shell Creek @ Circle K site was categorized under this new method as "Fair", which indicates a significant change from completely natural conditions, but not a serious degradation of the biological community. Because the SCI_2004 method had not been adopted at the time the samples were collected, the SCI_2004 evaluation was not official, but did provide an additional analysis of the biological condition of the stream system. Both the old and new SCI evaluations do not indicate that water quality is having a detrimental effect on the biological communities at the Shell Creek @ Circle K site.

Since the above sample was collected FDEP SCI methodology has undergone additional method changes. For the sites below, the SCI_2007 method was used to report the Overall SCI Score.

During the August 2006 to August 2008 reporting period, no sites in WBID 2041 were evaluated for biological health indicators. Two sites were evaluated for HAs and SCIs during the September 2008 to September 2010 time period. No sites were evaluated for HAs or SCIs during the 2010 to 2012 reporting period and the 2012 to 2014 reporting period. The results of the assessments are presented below.

Habitat Assessment and Stream Condition Index Results

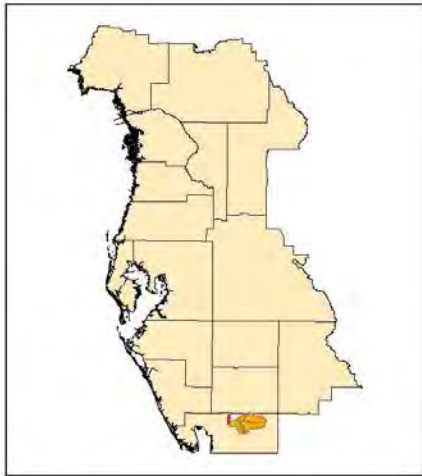
Station	Assessment Date	In-Stream Characteristics Score	Morphological and Riparian Features Score	Overall Habitat Assessment Score	Overall SCI Score
Shell Cr. @ SR 31	06/15/2010	51	63	114 Suboptimal	36 Category 2 ("healthy")
Shell Creek @ Circle K	06/16/2010	55	68	123 Optimal	49 Category 2 ("healthy")

WBID 2041

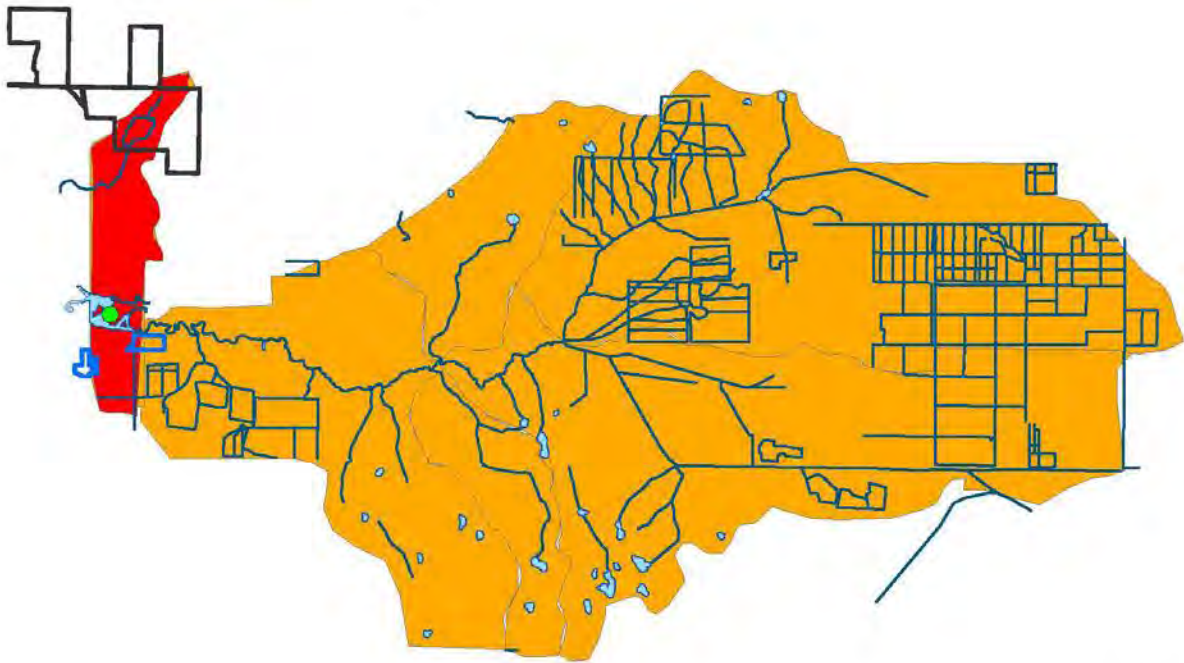
*Water Segment – Shell Creek Reservoir
Shell Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern:
Sp. Conductance, Chloride*








According to FDEP SOP 002/01 LT 7000, stations scored as Category 2 (“healthy”) are characterized as having a diverse assemblage of species, with a small increase in dominance by a single taxon; very tolerant taxa represent a small percentage of individuals. The 2010 biological health assessments indicate that water quality is not having a detrimental effect on the biological communities of the Shell Creek @ SR 31 and Shell Creek @ Circle K sites.

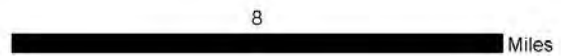
WBID 2041B
Water Segment – Shell Creek Reservoir
Shell Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern: None



WBID 2041B
Water Segment - Shell Creek Reservoir
Shell Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern - None



-  Data Sonde Locations
-  WBID 2041B
-  FARMs Projects - Dormant
-  FARMs Projects - Operational
-  Streams and Canals
-  Lakes
-  Shell Creek Watershed



WBID 2041B

*Water Segment – Shell Creek Reservoir
Shell Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern – none*

Proposed Management Actions- Progress to Date

Shell, Prairie, and Joshua Creek Well Back-Plugging Program

To date, no irrigation wells have been back-plugged in WBID 2041B.

District Resource Regulation – Water Use Permitting

In WBID 2041B, four Water Use Permit (WUP) applications were submitted to the District over the entire reporting period of performance monitoring (October 2004 to September 2014). Two applications were renewals, one was a new WUP's and one was a letter modification.

WUP Renewals and Modifications in WBID 2041B

	Oct. 2004 – July 2006	Aug. 2006 – Aug. 2008	Sept. 2008 – Sept. 2010	Oct. 2010 – Sept. 2012	Oct. 2012– Sept. 2014	Totals
New WUPs	0	0	0	1	0	1
WUP Renewals	0	1	1	0	0	2
WUP Modifications	0	0	0	0	0	0
WUP Letter Modifications	0	0	0	1	0	1
WUP Owner Transfer	0	0	0	0	0	0
Totals	0	1	1	2	0	4

Facilitating Agricultural Resource Management Systems (FARMS) and/or Environmental Quality Incentives (EQIP) Projects

Three FARMS projects have been Board approved in WBID 2041B between October 2004 and September 2014, one of which has since been cancelled. One additional property was considered for potential projects during this time period. The following table summarizes this project. Details for this project can be found in Appendix IV.

Approved and Potential FARMS Projects in WBID 2041B; October 2004 through September 2014

WUP Number	Project Number	Ag Type	Project Status	Operational Date	Projected Groundwater Offset (gpd)	Actual Groundwater Offset as of September 2014 (gpd)	Max. Groundwater Offset Achieved in One Month through September 2014 (gpd)
None	H563	CITRUS	Operational	9/1/2009	55,200	31,300	63,206
None	H629	CITRUS	Operational	5/1/2011	22,500	11,200	22,000
004589	H617	HAY	Cancelled	N/D	N/D	N/D	N/D
020285		CITRUS	Dormant	N/D	N/D	N/D	N/D

*Potential project under consideration between October 2004 and September 2014

N/D = Not determined/project under consideration

a Funding also provided by EQIP

**The actual ground water offset fluctuates with weather conditions and seasons. The actual is calculated by dividing the number of days the project has been operational into the total gallons offset.

Quality of Water Improvement Program (QWIP)

No wells have been plugged/abandoned in WBID 2041B since October 2004.

WBID 2041B

*Water Segment – Shell Creek Reservoir
Shell Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern – none*

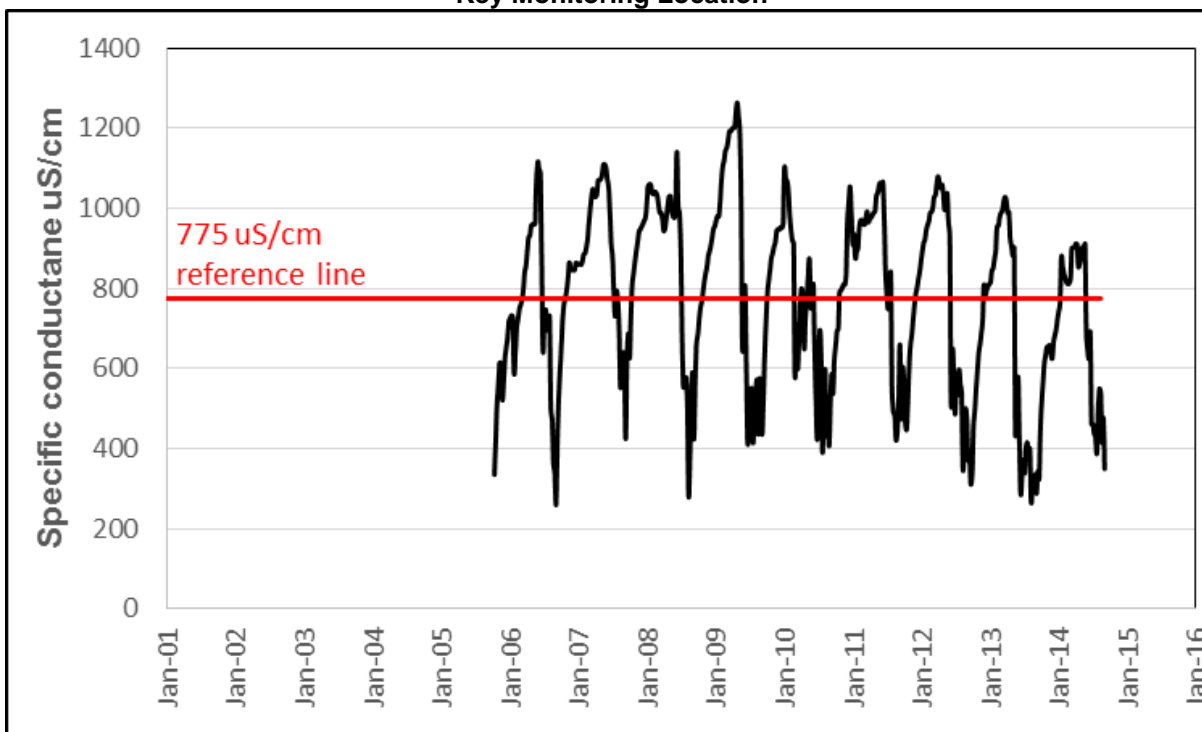
SPJC Water Quality Monitoring Results – Progress to Date

In-Stream Data Sonde - Conductance Logging Network (District and USGS)

There is currently one YSI® 600XLM data sonde deployed in WBID 2041B at the **Shell Creek Reservoir**. This Reservoir is the City of Punta Gorda's in-stream, potable water supply source and is located in the southwestern region of the Shell Creek Watershed. This location is also one of the key surface water monitoring stations with data sonde deployment occurring year-round under contract with the USGS. This WBID is not listed as having verified water quality impairments for TDS, chloride, or specific conductance. Land uses immediately surrounding the Reservoir include agriculture, urban/built-up, and upland forests.

The following data plots reflect weekly median values for specific conductance, which have been calculated from independent values collected on a 15 minute frequency from October 2005 through September 2014. Specific conductance values increased during the dry season months of 2005 to 2009 due to below average rainfall during these time periods. The period 2012 to 2014 shows a decreasing trend, which reflects higher average annual rainfall reported during 2013 and 2014.

**Shell Creek Reservoir In-Situ Data Sonde Logging Results
Key Monitoring Location**



Specific Conductance Logging Results in WBID 2041B for the period from 2005 to 2014

Water Segment	Number Individual Logged Values	Number Individual Values >1275 uS/cm	Percentage of Individual Values >1275 uS/cm	Number Weekly Median Values	Number Weekly Median Values >775 uS/cm	Percentage Weekly Median Values >775 uS/cm
**Shell Cr. Reservoir	310,749	552	0.2%	466	259	55.6%

**Key Monitoring Location

WBID 2041B

Water Segment – Shell Creek Reservoir
Shell Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern – none

Specific Conductance Reconnaissance Network (District)

Within WBID 2041B there are no stations currently being monitored for the Specific Conductance Reconnaissance Network.

Pre- and Post Back-Plug Well Monitoring Network (District)

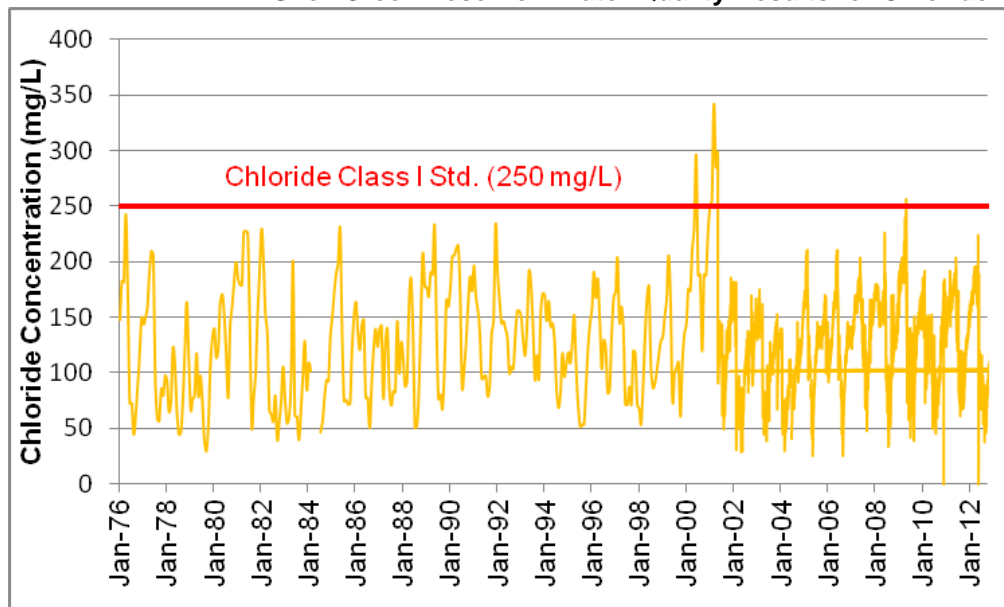
To date no wells in WBID 2041B are monitored as part of the Back-Plug Well Monitoring Network.

Surface-Water Quality Monitoring Networks (District, FDEP, and City of Punta Gorda)

The following graphs represent water quality results through February 2012 for chloride and TDS concentrations at the Shell Creek Reservoir (WBID 2041B). These data plots were generated using historical data from the City of Punta Gorda, as well as data collected by the City since 1991 under the City's WUP requirements. Numerous values for TDS in the comprehensive data set were reported as calculated rather than derived from laboratory analyses. Data were also used for the 2002 through 2006 time frame from monitoring efforts conducted by the FDEP-Fort Myers office. For comparative purpose, these data plots also contain reference lines depicting FDEP Class I criteria for chloride (250 mg/L) and TDS (500 mg/L as a monthly average, 1000 mg/L as maximum).

Chloride and TDS concentrations remain relatively consistent throughout the period of data record at the Shell Creek Reservoir, with drought impacts evident during 2000 to 2001 when chloride and TDS were at their highest levels. Even though rainfall totals during 2006 to 2012 were less than 2000 to 2001 totals, management actions within the Shell Creek watershed have assisted with keeping values below the drinking water standard for chloride (with the exception of one value), and below the TDS drinking water standard of 1000 mg/L.

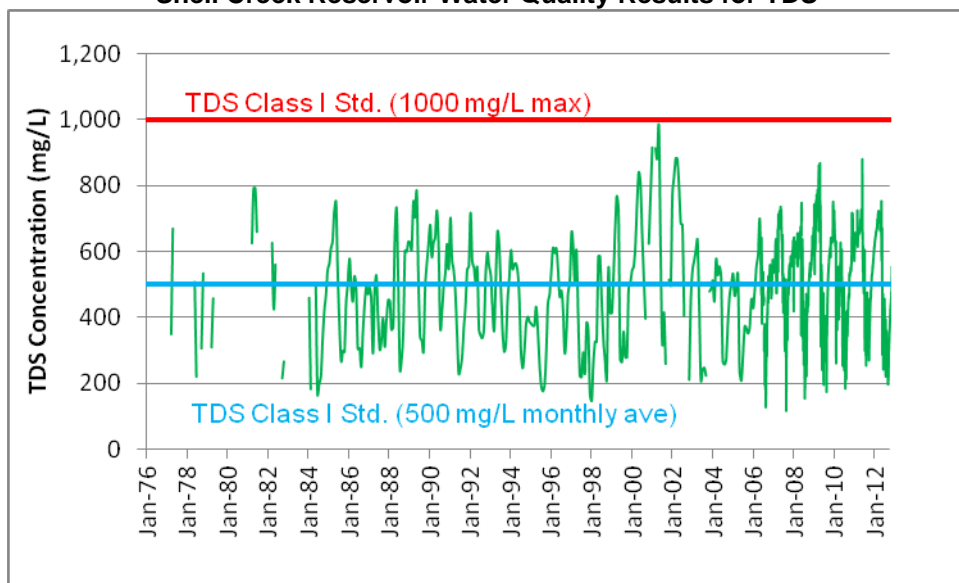
Shell Creek Reservoir Water Quality Results for Chloride



WBID 2041B

*Water Segment – Shell Creek Reservoir
Shell Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern – none*

Shell Creek Reservoir Water Quality Results for TDS



Chloride and TDS Water Quality Results in WBID 2041 over Entire Period of Data Record

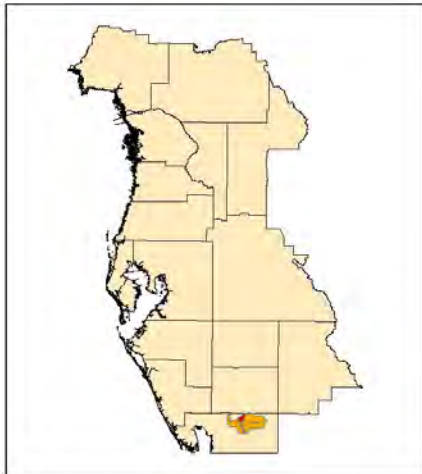
Water Segment	Number Individual Reported CI Values	Number Individual CI Values >250 mg/L	Percentage Individual CI Values >250 mg/L	Number Individual Reported TDS Values	Number Individual TDS Values >500 mg/L	Percentage Individual TDS Values >500 mg/L	Number Individual TDS Values >1000 mg/L	Percentage Individual TDS Values >1000 mg/L
**Shell Cr. @ Washington Loop Rd.	534	129	24.2%	2984	2204	74%	90	3%
**Shell Cr. @ SR 31	201	79	39.3%	198	134	68%	14	7.1%

**Key Monitoring Location (Class I)

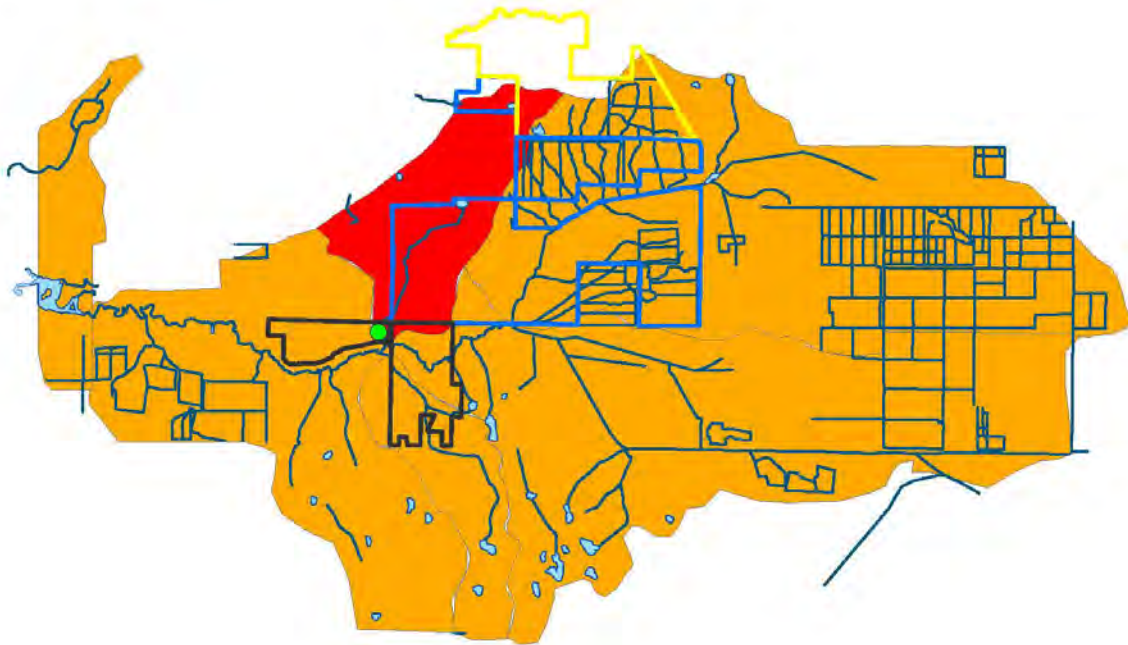
Habitat Assessment and Stream Condition Index Monitoring (FDEP)

There have been no sites in WBID 2041B evaluated for HAs or SCIs during the October 2004 to September 2014 time period.

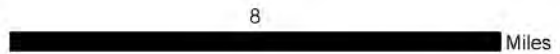
WBID 2044
Water Segment – Cypress Slough
Shell Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern: None



WBID 2044
Water Segment - Cypress Slough
Shell Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern - None



-  Data Sonde Locations
-  WBID 2044
-  FARMs Projects - Dormant Contacts
-  FARMs Projects - Operational
-  FARMs Projects - Under Construction
-  Lakes
-  Streams and Canals
-  Shell Creek Watershed



WBID 2044

*Water Segment – Cypress Slough
Shell Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern: None*

Proposed Management Actions – Progress to Date

Shell, Prairie, and Joshua Creek Well Back-Plugging Program

To date, no irrigation wells have been back-plugged in WBID 2044.

District Resource Regulation – Water Use Permitting

Four WUP applications were submitted to the District in WBID 2044 during the reporting period of October 2004 to September 2014. Two of these applications were renewals, one was a letter modification and one was an ownership transfer.

WUP Renewals and Modifications in WBID 2044

	Oct. 2004 – July 2006	Aug. 2006 – Aug. 2008	Sept. 2008 – Sept. 2010	Oct. 2010 – Sept. 2012	Oct. 2012 – Sept. 2014	Totals
New WUPs	0	0	0	0	0	0
WUP Renewals	0	0	2	0	0	2
WUP Modifications	0	0	0	0	0	0
WUP Letter Modifications	0	0	0	1	0	1
WUP Owner Transfer	0	0	0	1	0	1
Totals	0	0	2	2	0	4

Facilitating Agricultural Resource Management Systems (FARMS) and/or Environmental Quality Incentives (EQIP) Projects

Eight FARMS projects were Board approved in WBID 2044 between October 2004 and September 2014 two of which have since been cancelled. One additional project was under consideration during this time period. The following table summarizes the projects, including actual and projected ground water offsets that have occurred during the monitoring period. Details for each of the below listed projects can be found in Appendix IV.

Approved and Potential FARMS Projects in WBID 2044; October 2004 through September 2014

WUP Number	Project Number	Ag Type	Project Status	Operational Date	Projected Groundwater Offset (gpd)	Actual Groundwater Offset as of September 2014 (gpd)	Max. Groundwater Offset Achieved in One Month through September 2014 (gpd)
009398	H501	CITRUS	Operational	10/1/2003	120,700	T H501	T H501
009398	H501	CITRUS	Operational	8/9/2005	60,300	T H501	TH501
009398	H501	CITRUS	Operational	10/4/2011	826,000	673,300	1,592,719
001759	H534	SOD	Operational	9/12/2008	197,000	228,300	721,508
011982	H610	SOD	Operational	3/2/2012	107,280	192,400	563,063
003275	H708	CITRUS	Under Construct	N/D	379,400	N/D	N/D
003275	H507	CITRUS	Cancelled	Cancelled	148,000	Cancelled	Cancelled
009727	H581	CITRUS	Cancelled	Cancelled	26,700	Cancelled	Cancelled
09926		CITRUS	Dormant	N/D	N/D	N/D	

WBID 2044
Water Segment – Cypress Slough
Shell Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern: None

*Potential project under consideration between October 2004 and September 2012

N/D = Not determined/project under consideration

T H501 = Project performance tracked under H501 Phase 3.

**The actual ground water offset fluctuates with weather conditions and seasons. The actual is calculated by dividing the number of days the project has been operational into the total gallons offset.

Quality of Water Improvement Program (QWIP)

There have been no wells plugged/abandoned in WBID 2044 since October 2004.

SPJC Water Quality Monitoring Results – Progress to Date

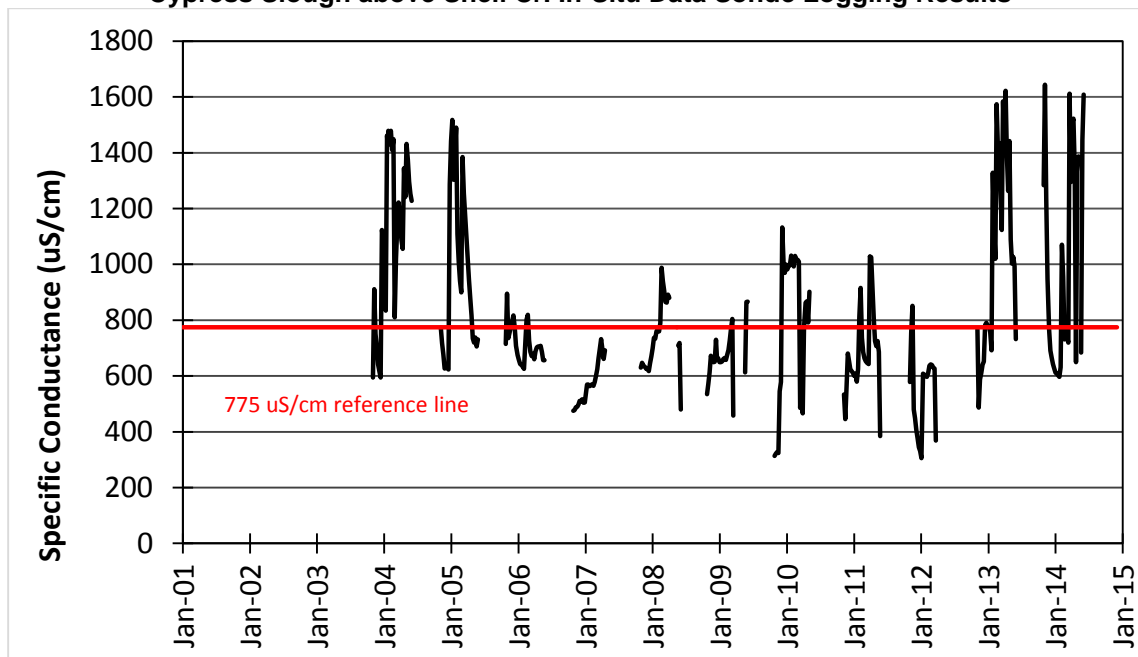
In-Stream Data Sonde - Conductance Logging Network (District and USGS)

There is currently one YSI® 600XLM data sonde in WBID 2044 deployed at station **Cypress Slough above Shell Creek**. This slough is located in the central region of the Shell Creek Watershed and provides flows to Shell Creek. The majority of land use surrounding this monitoring location is agriculture.

The following data plot shows weekly median values for specific conductance, which have been calculated from independent values collected on an hourly frequency during dry season periods (November – May) from November 2003 through June 2014. Infrequent smothering of the data probe by sediment has caused some loss of data at this site during periods of low flow conditions. These erroneous values have been removed from the data set.

Notable decreases in weekly median specific conductance values occurred during the dry season months of 2005 to 2012 when compared to the 2003 to 2005 time period. During the current reporting period, the dry season specific conductance values appear to be similar to those seen in the 2003 to 2005 time period. FARMS staff are researching recent land use and/or permittee changes that have occurred in this WBID.

Cypress Slough above Shell Cr. In-Situ Data Sonde Logging Results



WBID 2044

*Water Segment – Cypress Slough
Shell Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern: None*

Specific Conductance Logging Results in WBID 2044 for the period from 2003 to 2014

Water Segment	Number Individual Logged Values	Number Individual Values >1275 uS/cm	Percentage of Individual Values >1275 uS/cm	Number Weekly Median Values	Number Weekly Median Values >775 uS/cm	Percentage Weekly Median Values >775 uS/cm
Cypress Slough above Shell Cr.	51,100	6,923	13.5%	302	119	39.4%

Specific Conductance Reconnaissance Network (District)

Within WBID 2044 there are no stations currently being monitored for the Specific Conductance Reconnaissance Network.

Pre- and Post Back-Plug Well Monitoring Network (District)

To date, no wells in WBID 2044 are monitored as part of the Back-Plug Well Monitoring Network.

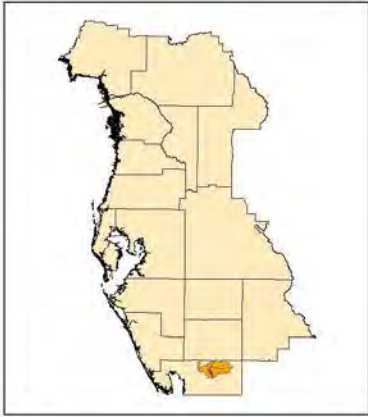
Surface-Water Quality Monitoring Networks (District, FDEP, and City of Punta Gorda)

There are no water quality sample collection activities occurring in WBID 2044 at this time.

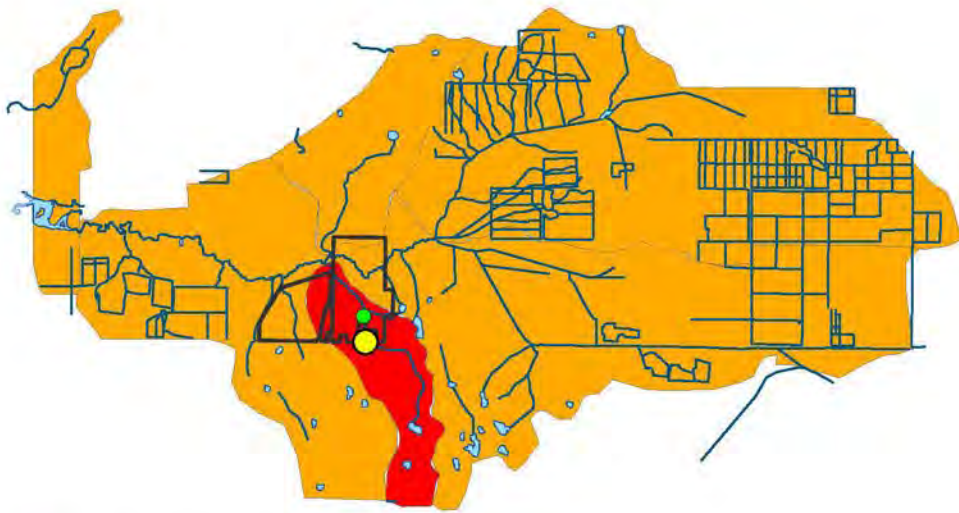
Habitat Assessment and Stream Condition Index Monitoring

There have been no sites assessed for HAs or SCIs in WBID 2044 throughout the October 2004 to September 2014 reporting periods.

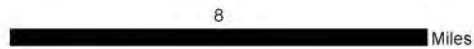
WBID 2058
Water Segment – Unnamed Ditch
Shell Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern: None



WBID 2058
 Water Segment - Unnamed Ditch
 Shell Creek Watershed; Water Use - Class 3F
 Verified Impaired Pollutants of Concern - None



- Data Sonde Locations
- Reconnaissance Network Locations
- FARMS - Dormant Contacts
- FARMS - Operational
- Lakes
- Streams and Canals
- WBID 2058
- Shell Creek Watershed



WBID 2058
Water Segment – Unnamed Ditch
Shell Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

Proposed Management Actions – Progress to Date

Shell, Prairie, and Joshua Creek Well Back-Plugging Program

Two irrigation wells have been back-plugged in WBID 2058 since Program inception. The following table represents water quality improvements for TDS and chloride concentrations at the well directly following back-plug activities.

Pre- and Post-Well Back-Plugging Results in WBID 2058

Permit Information		Percent Improvement	
WUP No.	DISTRICT ID (DID) No.	TDS (mg/L)	Chloride (mg/L)
20009926	1	1%	-1%
20009926	5	40%	38%

District Resource Regulation – Water Use Permitting

Four Water Use Permit (WUP) applications were submitted to the District for this WBID over the entire reporting period of performance monitoring (October 2004 to September 2014). All four applications were for WUP renewals.

WUP Renewals and Modifications in WBID 2058

	Oct. 2004 – July 2006	Aug. 2006 – Aug. 2008	Sept. 2008 – Sept. 2010	Oct. 2010 – Sept. 2012	Oct. 2012 – Sept. 2014	Totals
New WUPs	0	0	0	0	0	0
WUP Renewals	0	1	1	2	0	4
WUP Modifications	0	0	0	0	0	0
WUP Letter Modifications	0	0	0	0	0	0
WUP Owner Transfer	0	0	0	0	0	0
Totals	0	1	1	2	0	0

Facilitating Agricultural Resource Management Systems (FARMS) and/or Environmental Quality Incentives (EQIP) Projects

Three FARMS projects were Board approved in WBID 2058 between October 2004 and September 2014, one of which has since been cancelled. An additional potential project was also considered during this time period. The following table summarizes the projects, as well as actual and projected ground water offsets that have occurred over the performance monitoring period. Details for each of the below listed projects can be found in Appendix IV.

WBID 2058
Water Segment – Unnamed Ditch
Shell Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

Approved and Potential FARMS Projects in WBID 2058; October 2004 through September 2014

WUP Number	Project Number	Ag Type	Project Status	Operational Date	Projected Groundwater Offset (gpd)	Actual Groundwater Offset as of September 2014 (gpd)	Max. Groundwater Offset Achieved in One Month through September 2014 (gpd)
009476	H500	CITRUS	Operational	8/28/2003	136,000	154,900	706,259
009476	H548	CITRUS	Operational	6/19/2008	27,170	134,700	1,176,019
009476	H575	CITRUS	Cancelled	Cancelled	Cancelled	Cancelled	Cancelled
009926		CITRUS	Dormant	N/D	N/D	N/D	N/D

*Potential project under consideration between October 2004 and September 2014

N/D = Not determined/project under consideration

a Funding also provided by EQIP

**The actual ground water offset fluctuates with weather conditions and seasons. The actual is calculated by dividing the number of days the project has been operational into the total gallons offset.

Quality of Water Improvement Program (QWIP)

From 2012 to September 2014, one well was plugged/abandoned through the QWIP Program in WBID 2058. The well was associated with WUP No. 20009926, District Identification number (DID) 3.

DID 3 had a casing diameter of ten inches, a casing depth of 300 feet, and a total depth of 580 feet below land surface. The specific conductance at the time the well had geophysical logging performed on September 8, 2005 was 3,163 uS/cm. The well was plugged on July 29, 2013.

SPJC Water Quality Monitoring Results – Progress to Date

In-Stream Data Sonde - Conductance Logging Network (District and USGS)

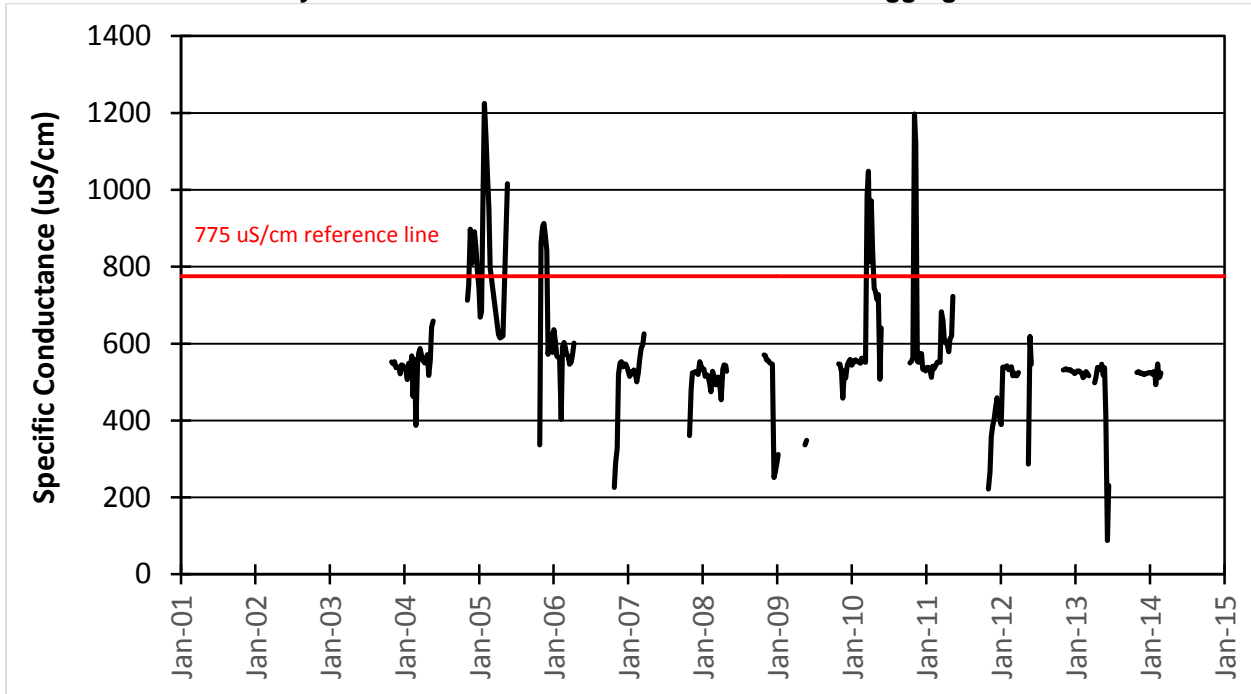
There is currently one YSI® 600XLM data sonde deployed in WBID 2058 at station ***Tributary from Cecil Webb Lake***. This site is located in the central region of the Shell Creek Watershed, and flows from this small tributary enter Shell Creek. The major contributing land uses surrounding this water body are rangelands and upland forests, and the majority of flow contributing to this tributary originates from a small lake.

The following data plot shows weekly median values for specific conductance, which have been calculated from independent values collected on an hourly frequency during dry season periods (November – May) from November 2003 through February 2014. The tributary went dry at the beginning of April 2006; therefore, no data are available for the months of April and May 2006.

Increases in weekly median values for specific conductance during the November 2004 through May 2005 time frame occurred because the lake that is the headwaters of this tributary was being augmented by a Floridan aquifer well with elevated concentrations of mineralized ground water. Regulatory actions undertaken in the summer of 2005 have resulted in decreasing conductance concentration values through February 2014. Dry season values in 2010 and 2011 exceeded the 775mg/L threshold for the first time in four years, but decreased during 2012.

WBID 2058
Water Segment – Unnamed Ditch
Shell Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

Tributary from Cecil Webb Lake In-Situ Data Sonde Logging Results



Specific Conductance Logging Results in WBID 2058 for the period from 2003 to 2014

Water Segment	Number Individual Logged Values	Number Individual Values >1275 uS/cm	Percentage of Individual Values >1275 uS/cm	Number Weekly Median Values	Number Weekly Median Values >775 uS/cm	Percentage Weekly Median Values >775 uS/cm
Tributary from Cecil Webb Lake	47,276	119	0.25%	279	25	9%

Specific Conductance Reconnaissance Network (District)

Within WBID 2058 there is one station currently being monitored for the Specific Conductance Reconnaissance Network. Of the 16 individual specific conductance values collected within WBID 2058 during the period of record, no values exceeded either the 775 uS/cm goal criteria or the FDEP surface-water quality Class I criterion of 1275 uS/cm. The following tables summarize the percent change increases and/or decreases between dry season events for this monitoring station within WBID 2058 during the 2004 to 2006, 2006 to 2008, 2008 to 2010, 2010 to 2012, and 2012 to 2014 reporting periods. Individual values for each dry season event are also provided. Stations that were not flowing during a sample event are denoted in the following table as dry.

Overall, dry season percent changes for the 2012 to 2014 reporting period were either increasing or not calculated due to dry conditions stations.

WBID 2058
Water Segment – Unnamed Ditch
Shell Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

Specific Conductance Reconnaissance Results in WBID 2058; 2004 - 2006

Station	Dry Season 2004 Value uS/cm	Wet Season 2004 Value uS/cm	Dry Season 2005 Value uS/cm	Wet Season 2005 Value uS/cm	Dry Season 2006 Value uS/cm	Percent change Dry Season 2004 versus Dry Season 2005	Percent change Dry Season 2005 versus Dry Season 2006
Trib. From Cecil Webb Lake on SR 74	*	420	691	568	*	*	*

* Station dry

Specific Conductance Reconnaissance Results in WBID 2058; 2006 - 2008

Station	Wet Season 2006 Value uS/cm	Dry Season 2007 Value uS/cm	Wet Season 2007 Value uS/cm	Dry Season 2008 Value uS/cm	Wet Season 2008 Value uS/cm	Percent change Dry Season 2006 versus Dry Season 2007	Percent change Dry Season 2007 versus Dry Season 2008
Trib. From Cecil Webb Lake on SR 74	213	*	171	*	233	*	*

* Station dry

Specific Conductance Reconnaissance Results in WBID 2058; 2008 - 2010

Station	Dry Season 2009 Value uS/cm	Wet Season 2009 Value uS/cm	Dry Season 2010 Value uS/cm	Wet Season 2010 Value uS/cm	Percent change Dry Season 2008 vs. Dry Season 2009	Percent change Dry Season 2009 vs. Dry Season 2010
Trib. From Cecil Webb	563	233	507	264	*	↓9.9%

* Station dry

Specific Conductance Reconnaissance Results in WBID 2058; 2010 - 2012

Station	Dry Season 2011 Value uS/cm	Wet Season 2011 Value uS/cm	Dry Season 2012 Value uS/cm	Wet Season 2012 Value uS/cm	Percent change Dry Season 2010 vs. Dry Season 2011	Percent change Dry Season 2011 vs. Dry Season 2012
Trib. From Cecil Webb	*	315	393	237	*	*

* Station dry

Specific Conductance Reconnaissance Results in WBID 2058; 2012 - 2014

Station	Dry Season 2013 Value uS/cm	Wet Season 2013 Value uS/cm	Dry Season 2014 Value uS/cm	Wet Season 2014 Value uS/cm	Percent change Dry Season 2012 vs. Dry Season 2013	Percent change Dry Season 2013 vs. Dry Season 2014
Trib. From Cecil Webb	479	45	*	209	↑21.88%	*

* Station dry

WBID 2058
Water Segment – Unnamed Ditch
Shell Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

Pre- and Post Back-Plug Well Monitoring Network (District)

To date, no wells in WBID 2058 are monitored as part of the Back-Plug Well Monitoring Network.

Surface-Water Quality Monitoring Networks (District, FDEP, and City of Punta Gorda)

There are no water quality sample collection activities occurring in WBID 2058 at this time.

Habitat Assessment and Stream Condition Index Monitoring

During the October 2004 to August 2008 reporting periods, no sites in WBID 2058 were evaluated for biological health indicators. One site was evaluated for HAs and SCIs during the September 2008 to September 2010 time period. No sites were evaluated for HAs or SCIs during the 2010 to 2012 reporting period or the 2012 to 2014 reporting period. The results of the 2010 assessment are presented below.

During the period between October 2004 and September 2014 the FDEP has updated its methodology for calculating the SCI score. The Overall SCI Score reported below was calculated using the SCI_20007 methodology.

Habitat Assessment and Stream Condition Index Results

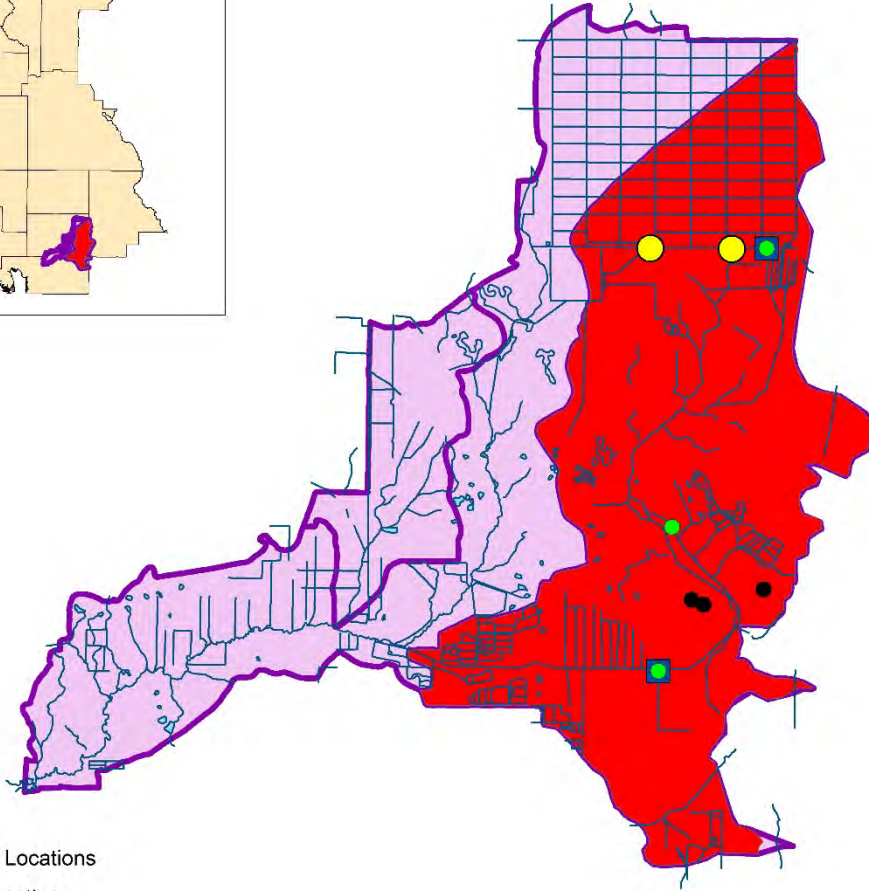
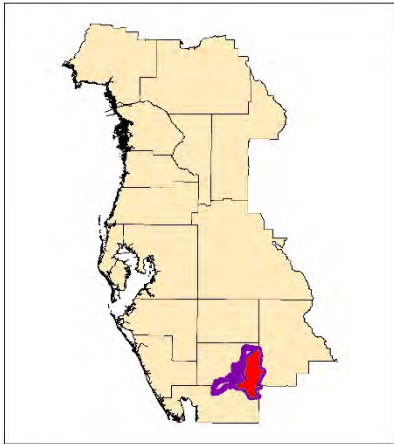
Station	Assessment Date	In-Stream Characteristics Score	Morphological and Riparian Features Score	Overall Habitat Assessment Score	Overall SCI Score
Trib. From Cecil Webb	06/16/2010	46	64	110 Suboptimal	62 Category 2 ("healthy")

According to FDEP SOP 002/01 LT 7000, stations scored as Category 2 ("healthy") are characterized as having a diverse assemblage of species, with a small increase in dominance by a single taxon; very tolerant taxa represent a small percentage of individuals. This assessment indicates that water quality is not having a detrimental effect on biological communities at the Tributary from Cecil Webb station.

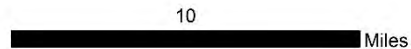
WBID 1964
Water Segment – Cow Slough
Prairie Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

WBID 1964

*Water Segment - Cow Slough
Prairie Creek Watershed; Water Use - Class 3F
Verified Impaired Pollutants of Concern - None*



- Data Sonde Locations
- Backplug Locations
- Reconnaissance Network Locations
- Surface Water Sampling Sites
- FARMs Projects - Dormant Contacts
- FARMs Projects - Operational
- ▨ FARMs Projects - Approval Pending
- FARMs - Potential Projects
- FARMs Projects - Under Construction
- WBID 1964
- Lakes
- Streams and Canals
- Prairie Creek Watershed



WBID 1964
Water Segment – Cow Slough
Prairie Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

Proposed Management Actions – Progress to Date

Shell, Prairie, and Joshua Creek Well Back-Plugging Program

Since the inception of this Program, a total of three irrigation wells have been back-plugged in WBID 1964. The following table represents water quality improvements for chloride and TDS concentrations at each well directly following back-plugging activities. No additional wells have been back-plugged since October 2004.

Pre- and Post Well Back-Plugging Results in WBID 1964

Permit Information		Percent Improvement	
WUP No.	DISTRICT ID (DID) No.	TDS (mg/L)	Chloride (mg/L)
20006275	5	N/A	N/A
20006872	66	67%	76%
20006872	76	85%	89%

District Resource Regulation – Water Use Permitting

In WBID 1964, thirty-six Water Use Permit (WUP) applications were submitted to the District over the entire reporting period of performance monitoring (October 2004 to September 2014). Of the thirty-six applications, one was a new permit, twenty-five were renewals, six were letter modifications, and four were owner transfers.

WUP Renewals and Modifications in WBID 1964

	Oct. 2004 – July 2006	Aug. 2006 – Aug. 2008	Sept. 2008 – Sept. 2010	Oct. 2010 – Sept. 2012	Oct. 2012 – Sept. 2014	Totals
New WUPs	0	1	0	0	0	1
WUP Renewals	1	7	8	8	1	25
WUP Modifications	0	0	0	0	0	0
WUP Letter Modifications	1	1	0	2	2	6
WUP Owner Transfer	0	0	0	2	2	4
Totals	2	9	8	12	5	36

Facilitating Agricultural Resource Management Systems (FARMS) and/or Environmental Quality Incentives (EQIP) Projects

Ten FARMS projects were Board approved in WBID 1964 and five projects were under consideration between October 2004 and September 2014. The following table summarizes the projects, as well as actual and projected ground water offsets. Details for each of the below listed projects can be found in Appendix IV.

WBID 1964
Water Segment – Cow Slough
Prairie Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

Potential FARMS Projects in WBID 1964; October 2004 through September 2014

WUP Number	Project Number	Ag Type	Project Status	Operational Date	Projected Groundwater Offset (gpd)	Actual Groundwater Offset as of September 2014 (gpd)	Max. Groundwater Offset Achieved in One Month through September 2014 (gpd)
003530	H504	CITRUS	Operational	1/31/2004	142,600	161,453	1,548,667
009052	H539	CITRUS	Operational	3/19/2009	1,358,400	779,901	3,387,194
002386	H555	CITRUS	Operational	4/23/2009	225,100	80,800	564,241
002386	H606	CITRUS	Operational	3/14/2011	432,000	811,900	2,664,591
002386	H606	CITRUS	Operational	5/31/2011	386,450	T H606	T H606
002386	H606	CITRUS	Operational	9/24/2013	628,988	T H606	T H606
002386	H606	CITRUS	Operational	12/30/2013	18,980	M H606	M H606
002386	H608	CITRUS	Operational	10/18/2011	81,840	54,000	143,045
006872	H656	CITRUS	Operational	8/31/2012	160,000	48,469	86,100
006275	H703	CITRUS	Under Construct	N/D	260,000	N/D	N/D
006274		CITRUS	Potential	N/D	N/D	N/D	N/D
013370		Biofuels	Dormant	N/D	N/D	N/D	N/D
010791		CITRUS	Dormant	N/D	N/D	N/D	N/D
004606		SOD	Dormant	N/D	N/D	N/D	N/D
011549		CITRUS	Dormant	N/D	N/D	N/D	N/D

*Potential project or project under consideration between October 2004 and September 2014

N/D = Not determined/project under consideration

M = Project merged with other H606 to facilitate tracking

T = Project offset tracked with other H606 projects

**The actual ground water offset fluctuates with weather conditions and seasons. The actual is calculated by dividing the number of days the project has been operational into the total gallons offset.

Quality of Water Improvement Program (QWIP)

There have been no wells plugged/abandoned in WBID 1964 since October 2004.

SPJC Water Quality Monitoring Results – Progress to Date

In-Stream Data Sonde - Conductance Logging Network (District and USGS)

There are currently three YSI® 600XLM data sondes deployed in WBID 1964, which is located in the eastern region of the Prairie Creek Watershed. The following data plots reflect weekly median values for specific conductance, which have been calculated from independent values collected on an hourly frequency.

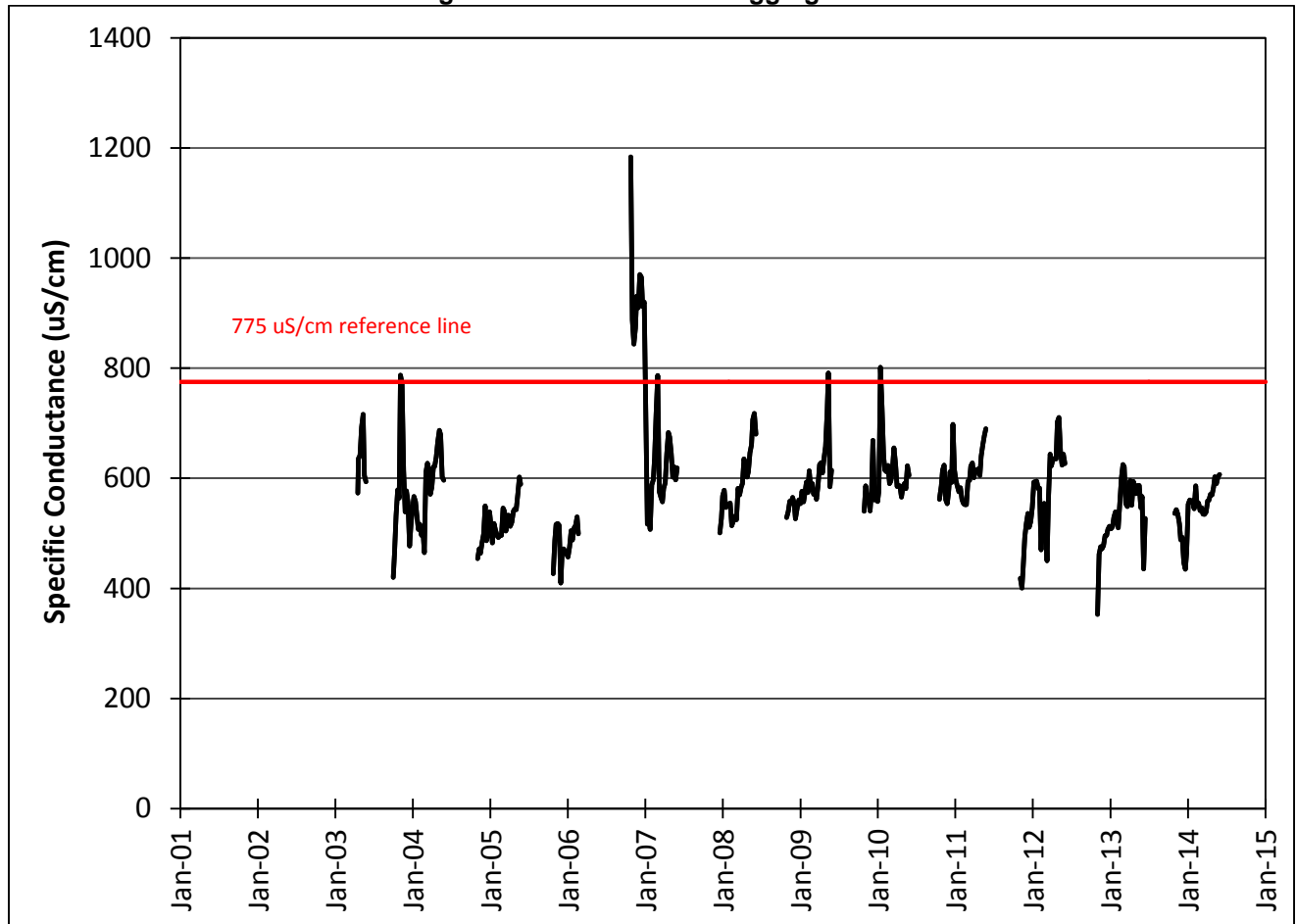
The **Cow Slough** data sonde is located in an agricultural canal in the northern area of WBID 1964 on SR 70. Flows from this canal do not contribute directly to Prairie Creek, but travel south through a large wetland area before entering Montgomery Canal (which then becomes Prairie Creek). Land use in the immediate surrounding areas of this canal is predominantly agriculture (citrus). The following data plot shows weekly median values from continuous/hourly logging of

WBID 1964
Water Segment – Cow Slough
Prairie Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

specific conductance values for dry season periods (November – May) for April 2003 through June 2014 .

The majority of specific conductance values over the period of data record, have been below the 775 uS/cm goal. Values above the 775 uS/cm goal occurred during the October 2006 to December 2008 and the October 2008 to December 2010 time periods., The last two reporting periods had no values above the 775 uS/cm target. Additionally, no values have exceeded the 1275 uS/cm Class III surface water criteria for specific conductance at this monitoring location.

Cow Slough In-Situ Data Sonde Logging Results

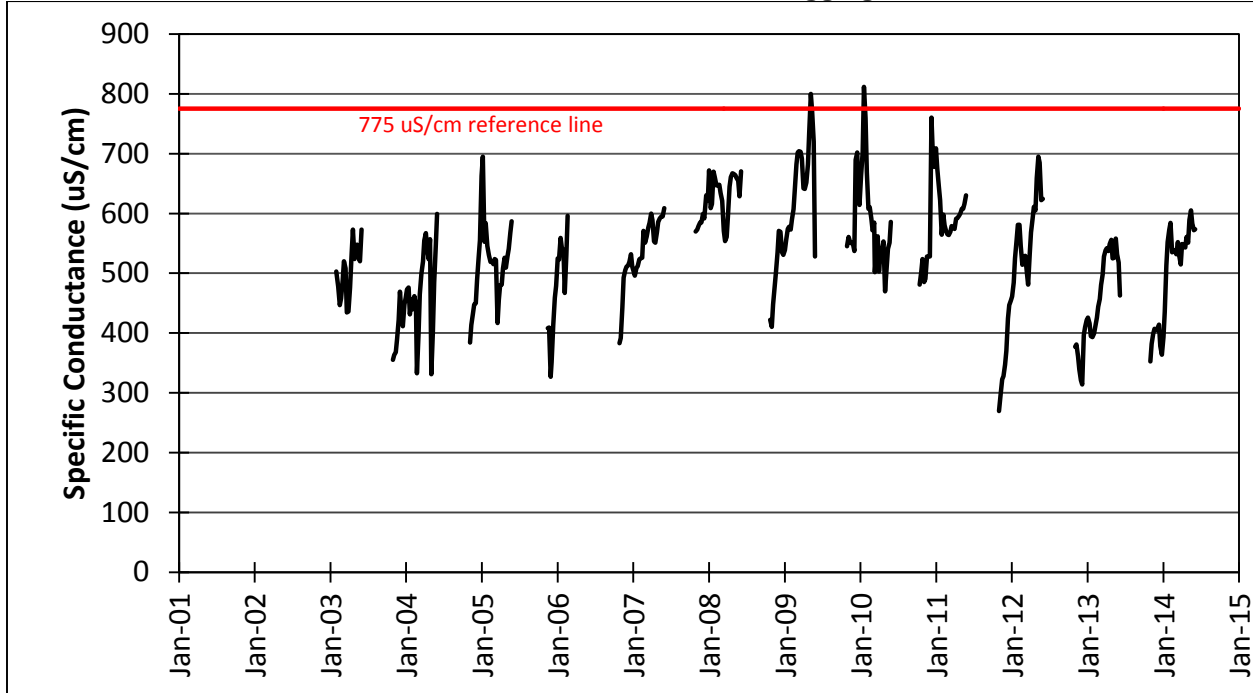


The **Doehill Main Canal** data sonde is located in an agricultural canal in the central region of WBID 1964. Flows from this canal contribute directly to Prairie Creek via Montgomery Canal. Land uses in the immediate surrounding region of this canal include wetlands, rangelands, and small areas of agriculture.

The following data plot shows median weekly values derived from continuous/hourly logging of specific conductance for dry season periods (November – May) for January 2003 through June 2014. The data sonde malfunctioned during March – May 2006 therefore, no data exist for these months. The majority of the weekly median specific conductance values have been below the 775 uS/cm reference goal over the data period of record.

WBID 1964
Water Segment – Cow Slough
Prairie Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

Doehill Main Canal In-Situ Data Sonde Logging Results

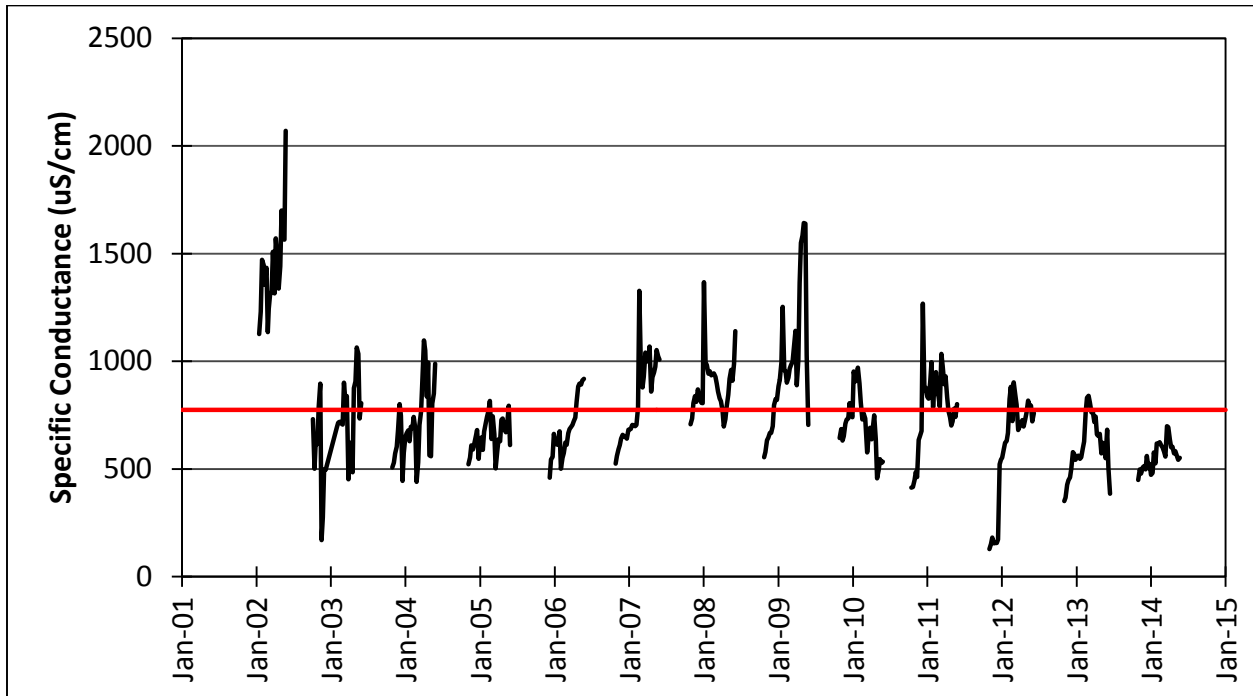


The ***Emerald Isle East Canal*** data sonde is located in an agricultural canal in the south-central region of WBID 1964, and flows from this canal contribute directly to Prairie Creek. Land use in the immediate area of this canal is predominantly agriculture (sod farming) with some wetlands and rangelands. The following data plot shows weekly median values for continuous/hourly logging of specific conductance values for dry season periods (November – May) for January 2002 through May 2014.

In the fall of 2004 a large portion of the sod farming operation located upstream of this monitoring site was discontinued. Therefore, noticeable decreases in specific conductance occurred since this time period. Drought impacts are evident by increases in values over the 2007 to 2011 dry season months. During the current reporting period, specific conductance values have shown a significant decreasing trend.

WBID 1964
Water Segment – Cow Slough
Prairie Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

Emerald Isle East Canal In-Situ Data Sonde Logging Results



Specific Conductance Logging Results in WBID 1964 for the period from 2004 to 2014

Water Segment	Number Individual Logged Values	Number Individual Values >1275 uS/cm	Percentage of Individual Values >1275 uS/cm	Number Weekly Median Values	Number Weekly Median Values >775 uS/cm	Percentage Weekly Median Values >775 uS/cm
Cow Slough	59,662	0	0%	335	14	4.2%
*Doehill Main Canal	59,489	96	0.2%	349	2	0.6%
*Emerald Isle East Canal	67,531	4,074	6%	388	152	39.2%

*Monitoring site located in agricultural canal – not on main channel of Prairie Creek.

Specific Conductance Reconnaissance Network (District)

Within WBID 1964 there are currently two stations monitored for the Specific Conductance Reconnaissance Network. Of the 31 individual specific conductance values collected within WBID 1964 during the period of record, one value exceeded the 775 uS/cm goal criteria and no values exceeded the FDEP surface-water quality Class I criterion of 1275 uS/cm.

The following tables summarize the percent change increases and/or decreases between dry season events for each monitoring station within WBID 1964 during the 2004 to 2006, 2006- 2008, 2008, 2008 to 2010, 2010 to 2012, and 2012 to 2014 reporting periods. Individual values for each dry season event are also provided. Stations that were not flowing during a sample event have been recorded as dry.

Dry season percent changes for the 2012 to 2014 reporting period showed a decreasing trend or were not reported due to dry conditions.

WBID 1964
Water Segment – Cow Slough
Prairie Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

Specific Conductance Reconnaissance Results in WBID 1964; 2004 - 2006

Station	Dry Season 2004 Value uS/cm	Wet Season 2004 Value uS/cm	Dry Season 2005 Value uS/cm	Wet Season 2005 Value uS/cm	Dry Season 2006 Value uS/cm	Percent change Dry Season 2004 versus Dry Season 2005	Percent change Dry Season 2005 versus Dry Season 2006
Unnamed Cr. @ SR 70 - #2	479	290	641	367	707	↑33.82%**	↑10.30%**
Unnamed Cr. @ SR 70 - #33	*	114	*	*	*	*	*

* Station dry

**Values modified since 2004 – 2006 Performance Monitoring Report due to calculation error.

Specific Conductance Reconnaissance Results in WBID 1964; 2006 - 2008

Station	Wet Season 2006 Value uS/cm	Dry Season 2007 Value uS/cm	Wet Season 2007 Value uS/cm	Dry Season 2008 Value uS/cm	Wet Season 2008 Value uS/cm	Percent change Dry Season 2006 versus Dry Season 2007	Percent change Dry Season 2007 versus Dry Season 2008
Unnamed Cr. @ SR 70 - #2	540	586	662	653	600	↓17.11%	↑11.43%
Unnamed Cr. @ SR 70 - #33	*	*	*	*	126	*	*

* Station dry

Specific Conductance Reconnaissance Results in WBID 1964; 2008 - 2010

Station	Dry Season 2009 Value uS/cm	Wet Season 2009 Value uS/cm	Dry Season 2010 Value uS/cm	Wet Season 2010 Value uS/cm	Percent change Dry Season 2008 vs. Dry Season 2009	Percent change Dry Season 2009 vs. Dry Season 2010
Unnamed Cr. @ SR 70 - #2	780	549	619	*	↑19.4%	↓20.6%
Unnamed Cr. @ SR 70 - #33	368	575	140	389	*	↓62.0%

* Station dry

WBID 1964
Water Segment – Cow Slough
Prairie Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

Specific Conductance Reconnaissance Results in WBID 1964; 2010 - 2012

Station	Dry Season 2011 Value uS/cm	Wet Season 2011 Value uS/cm	Dry Season 2012 Value uS/cm	Wet Season 2012 Value uS/cm	Percent change Dry Season 2010 vs. Dry Season 2011	Percent change Dry Season 2011 vs. Dry Season 2012
Unnamed Cr. @ SR 70 - #2	*	531	664	530	*	↑1.9%
Unnamed Cr. @ SR 70 - #33	**	47**	**	405**	**	**

* Station dry

**Values modified since 2010 – 2012 Performance Monitoring Report due to reporting incorrect site.

Specific Conductance Reconnaissance Results in WBID 1964; 2012 - 2014

Station	Dry Season 2013 Value uS/cm	Wet Season 2013 Value uS/cm	Dry Season 2014 Value uS/cm	Wet Season 2014 Value uS/cm	Percent change Dry Season 2012 vs. Dry Season 2013	Percent change Dry Season 2013 vs. Dry Season 2014
Unnamed Cr. @ SR 70 - #2	626	360	600	368	↓5.72%	↓4.15%
Unnamed Cr. @ SR 70 - #33	*	308	567	286	*	*

* Station dry

Pre- and Post Back-Plug Well Monitoring Network (District)

To date, no wells in WBID 1964 are monitored as part of the Back-Plug Well Monitoring Network.

Surface-Water Quality Monitoring Networks (District, FDEP, and City of Punta Gorda)

The following table represents water quality results through July 2006 for chloride and TDS concentrations at two monitoring stations in WBID 1964. Since these monitoring sites are not considered key index stations, graphical results are not presented in the main body of the report but can be found in Appendix I. The following information was generated using data from the District's SPJC quarterly monitoring network.

Chloride and TDS Water Quality Results in WBID 1964 from 2002 to 2014
Sites are listed as they are located from north to south throughout WBID 1964

Water Segment	Number Individual Reported Cl Values	Number Individual Cl Values >250 mg/L	Percentage Individual Cl Values >250 mg/L	Number Individual Reported TDS Values	Number Individual TDS Values >500 mg/L	Percentage Individual TDS Values >500 mg/L	Number Individual TDS Values >1000 mg/L	Percentage Individual TDS Values >1000 mg/L
*Cow Slough	90	0	0%	91	1	1.1%	0	0%
*Emerald Isle East Canal	49	2	4.1%	49	11	22.4%	0	0%

*Monitoring site located in agricultural canal – not on main channel of Prairie Creek

WBID 1964
Water Segment – Cow Slough
Prairie Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

Habitat Assessment and Stream Condition Index Monitoring

During the October 2004 to August 2008 reporting periods, no sites in WBID 1964 were evaluated for biological health indicators. Two sites were evaluated for HAs and SCIs during the September 2008 to September 2012 time period. No sites were evaluated for HAs and SCIs during the 2010 to 2012 or the 2012 to 2014 reporting periods. The results of the 2010 assessments are presented below.

During the period between October 2004 and September 2014 the FDEP has updated its methodology for calculating the SCI score. For the sites sampled by FDEP, the FDEP retroactively recalculated the Overall SCI Score using the SCI_2012 method. Sites with SCI values calculated using the SCI 2012 method are noted with an asterisk.

Habitat Assessment and Stream Condition Index Results

Station	Assessment Date	In-Stream Characteristics Score	Morphological and Riparian Features Score	Overall Habitat Assessment Score	Overall SCI Score
Emerald Isle East Canal	06/17/2010	26	22	48 Marginal	27 Category 3 ("impaired")
*Doehill Main Canal	06/17/2010	15	50	65 Marginal	37 Category 2 Healthy

*Overall SCI Score recalculated retroactively by FDEP using SCI_2012 methods.

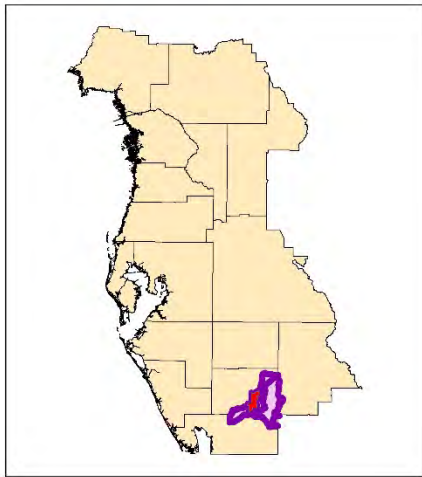
According to FDEP SOP 002/01 LT 7000, stations scored as Category 3 ("impaired") are characterized as having a notable loss of diversity with very tolerant taxa representing a large proportion of the individuals collected.

A definitive link between declines in the number and quality of macroinvertebrates and surface waters with elevated specific conductance values from anthropogenic activities has not been determined. However, the FDEP has extensively analyzed the effect of elevated specific conductance on the on the macroinvertebrate community.

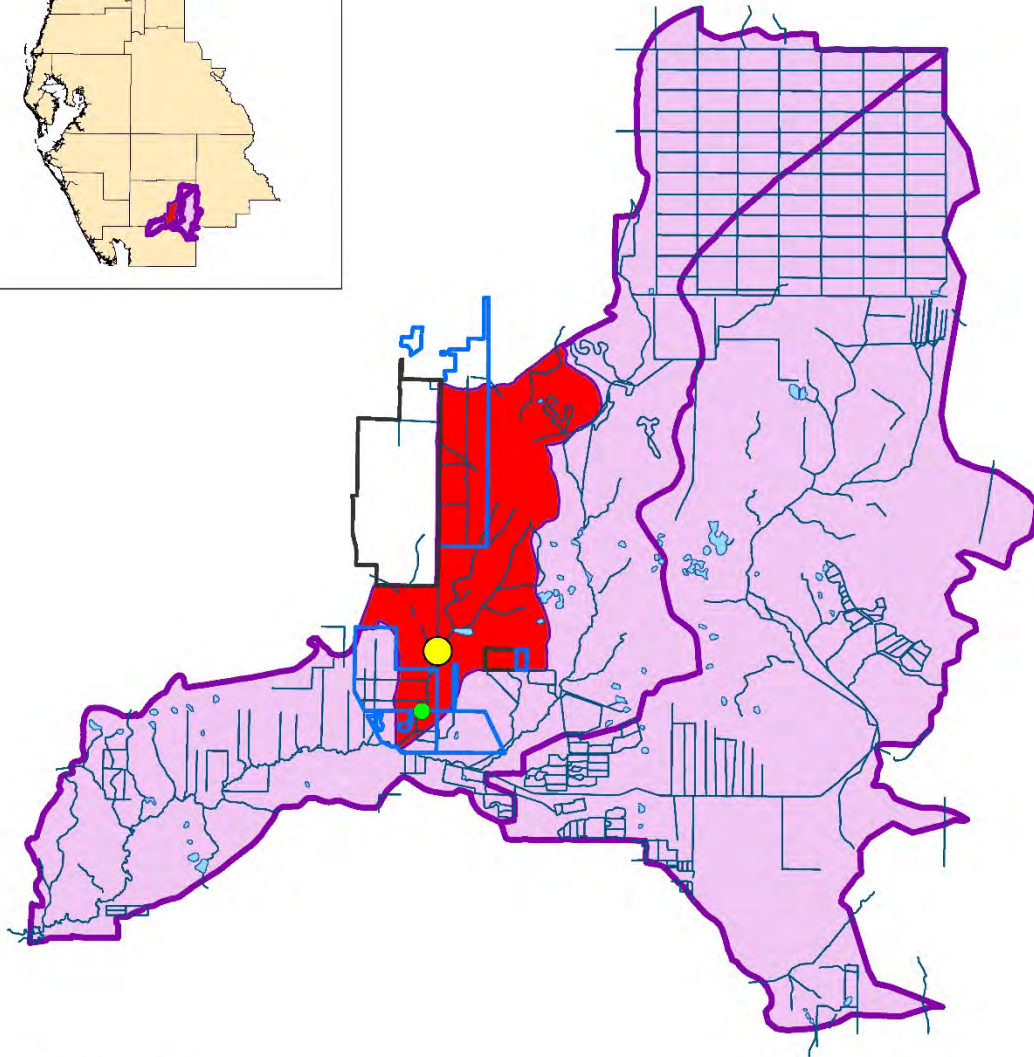
http://publicfiles.dep.state.fl.us/dear/labs/biology/miscpubs/cond_criteria.pdf

The impairment of the Emerald Isle East Canal and Doehill Main Canal sites for the SCI can be attributed to secondary factors of anthropogenic activities such as runoff which can lead to sedimentation and turbidity. Sedimentation and the resulting high turbidity of surface waters occurs as runoff flows over disturbed agricultural soils, picking up sediments and other small debris which can physically scour the bodies of the macroinvertebrates and smother available habitat and food sources.

WBID 1995
Water Segment – Myrtle Slough
Prairie Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern: None



WBID 1995
Water Segment - Myrtle Slough
Prairie Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern - None



- Data Sonde Locations
- Reconnaissance Network Locations
- WBID 1995
- FARMs - Dormant Contacts
- FARMs Projects - Operational
- Lakes
- Streams and Canals
- Prairie Creek Watershed



8
 Miles

WBID 1995
Water Segment – Myrtle Slough
Prairie Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern – None

Proposed Management Actions – Progress to Date

Shell, Prairie, and Joshua Creek Well Back-Plugging Program

Since the inception of the Well Back-Plugging Program, one irrigation well has been back-plugged in WBID 1995. The following table represents water quality improvements for chloride and TDS concentrations at this well directly following back-plugging activities. No additional wells have been back-plugged since October 2004.

Pre- and Post Well Back-Plugging Results in WBID 1995

Permit Information		Percent Improvement	
WUP No.	DISTRICT ID (DID) No.	TDS (mg/L)	Chloride (mg/L)
20010971	1	57%	86%

District Resource Regulation – Water Use Permitting

In WBID 1995, twenty-three Water Use Permit (WUP) applications were submitted to the District over the entire reporting period of performance monitoring (October 2004 to September 2014). Of the twenty-three applications, five were new permits, eleven were renewals, six were letter modifications and one was an ownership transfer.

WUP Renewals and Modifications in WBID 1995

	Oct. 2004 – July 2006	Aug. 2006 – Aug. 2008	Sept. 2008 – Sept. 2010	Oct. 2010 – Sept. 2012	Oct. 2012 – Sept. 2014	Totals
New WUPs	2	2	0	0	1	5
WUP Renewals	2	3	3	2	1	11
WUP Modifications	0	0	0	0	0	0
WUP Letter Modifications	1	1	0	4	0	6
WUP Owner Transfer	0	0	0	1	0	1
Totals	5	6	3	7	2	23

Facilitating Agricultural Resource Management Systems (FARMS) and/or Environmental Quality Incentives (EQIP) Projects

Eleven FARMS projects were Board approved in WBID 1995 between October 2004 and September 2014, two of which have since been cancelled. The following table summarizes the projects, as well as projected and actual ground water offsets that have occurred over the performance monitoring period. Details for each of the below listed projects can be found in Appendix IV.

WBID 1995
Water Segment – Myrtle Slough
Prairie Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern – None

FARMS Projects in WBID 1995; October 2004 – September 2014

WUP Number	Project Number	Ag Type	Project Status	Operational Date	Projected Groundwater Offset (gpd)	Actual Groundwater Offset as of September 2014 (gpd)	Max. Groundwater Offset Achieved in One Month through September 2014 (gpd)
006765	H516	CITRUS	Operational	8/2/2006	222,500	235,600	1,175,689
006765	H516	CITRUS	Operational	3/5/2009	76,980	202,000	711,581
006765	H584	CITRUS	Operational	6/7/2010	348,400	301,100	877,065
006765	H693	CITRUS	Operational	10/11/2013	87,100	83,600	161,800
012818	H556	BLUEBERRY	Operational	1/1/2010	98,820	172,049	708,968
012818	H560	BLUEBERRY	Operational	12/31/2009	25,000	91,420	1,191,221
007462	H567	CITRUS	Operational	7/18/2012	186,900	191,300	612,500
009782	H648	CITRUS	Operational	8/30/2013	71,300	57,600	124,600
003069	H657	CITRUS	Operational	7/30/2012	185,000	392,500	422,400
005060	H502	CITRUS	Cancelled	N/A	66,000	N/D	N/D
008287	H546	CITRUS	Cancelled	N/A	14,400	N/D	N/D

N/D = Not determined/project under consideration
 a Funding also provided by EQIP

**The actual ground water offset fluctuates with weather conditions and seasons. The actual is calculated by dividing the number of days the project has been operational into the total gallons offset.

Quality of Water Improvement Program (QWIP)

From October 1, 2003 to date, one well has been plugged/abandoned through the QWIP Program in WBID 1995. The well was associated with WUP No. 20003069, DID number 4. It had a casing diameter of 12 inches, a casing depth of approximately 80 feet, and a total depth of 606 feet below land surface. The specific conductance at the time the well had geophysical logging performed on February 24, 2003 was 863 uS/cm. The well was plugged on January 29, 2004.

SPJC Water Quality Monitoring Results – Progress to Date

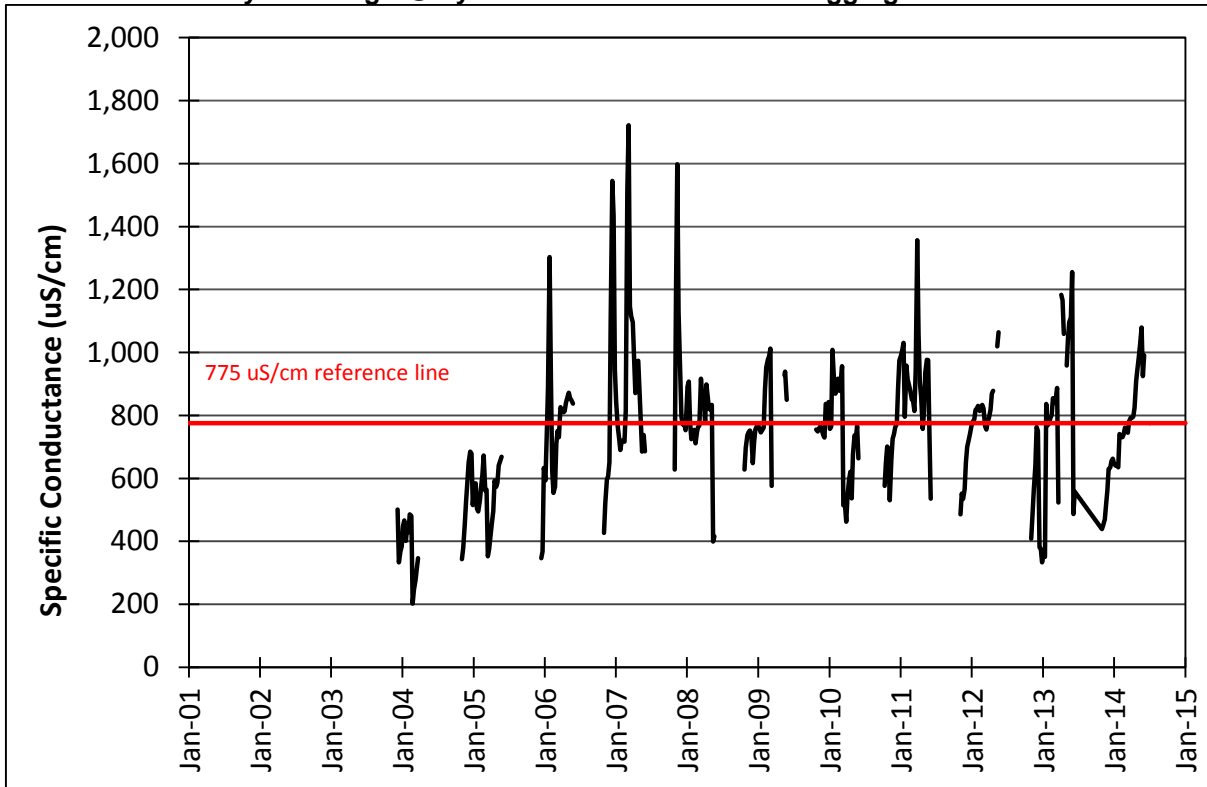
In-Stream Data Sonde - Conductance Logging Network (District and USGS)

There is currently one YSI® 600XLM data sonde deployed in WBID 1995 in **Myrtle Slough**. This data sonde site is located in the southern region of WBID 1995 in the Prairie Creek watershed. Land uses immediately surrounding this monitoring location are predominantly agriculture (citrus). The following data plot shows continuous/hourly logging of specific conductance values for dry season periods (November – May) for December 2003 through May 2014. The data sonde was smothered by sediment during March – May 2004 therefore, no data exist for this time period.

The following data plot reflects weekly median values for specific conductance, which have been calculated from independent values collected on an hourly frequency. Specific conductance values show an increasing trend throughout the first half of the period of data record. Values in the last two reporting periods indicate a reoccurrence of values above the 775 µS/cm reference line during 2011 through 2014.

WBID 1995
Water Segment – Myrtle Slough
Prairie Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern – None

Myrtle Slough @ Symons In-Situ Data Sonde Logging Results



Specific Conductance Logging Results in WBID 1995 for the period from 2003 to 2014

Water Segment	Number Individual Logged Values	Number Individual Values >1275 uS/cm	Percentage of Individual Values >1275 uS/cm	Number Weekly Median Values	Number Weekly Median Values >775 uS/cm	Percentage Weekly Median Values >775 uS/cm
Myrtle Slough @ Symons	51,650	1,188	2.3%	310	129	41.6%

Specific Conductance Reconnaissance Network (District)

Within WBID 1995 there is currently one station monitored for the Specific Conductance Reconnaissance Network. Of the fifteen individual specific conductance values collected within WBID 1995 during the period of record, one value exceeded the 775 uS/cm goal criteria and no values exceeded the FDEP surface-water quality Class I criterion of 1275 uS/cm. The following tables summarize the percent change increases and/or decreases between dry season events for each monitoring station within WBID 1995 during the 2004 to 2006, 2006 to 2008, 2008 to 2010, 2010 to 2012, and 2012 to 2014 reporting periods. Individual values for each dry season event are also provided. Stations that were not flowing during a sample event are denoted below as dry.

Overall, dry season percent changes for the 2012 to 2014 reporting period were not calculated due to dry conditions in both 2013 and 2014.

WBID 1995

*Water Segment – Myrtle Slough
Prairie Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern – None*

Specific Conductance Reconnaissance Results in WBID 1995; 2004 - 2006

Station	Dry Season 2004 Value uS/cm	Wet Season 2004 Value uS/cm	Dry Season 2005 Value uS/cm	Wet Season 2005 Value uS/cm	Dry Season 2006 Value uS/cm	Percent change Dry Season 2004 versus Dry Season 2005	Percent change Dry Season 2005 versus Dry Season 2006
Myrtle Slough @ Pine Island Rd. - #30	652	208	572	312	*	↓12.27%**	*

* Station dry.

**Values modified since 2004 – 2006 Performance Monitoring Report due to calculation error.

Specific Conductance Reconnaissance Results in WBID 1995; 2006 - 2008

Station	Wet Season 2006 Value uS/cm	Dry Season 2007 Value uS/cm	Wet Season 2007 Value uS/cm	Dry Season 2008 Value uS/cm	Wet Season 2008 Value uS/cm	Percent change Dry Season 2006 versus Dry Season 2007	Percent change Dry Season 2007 versus Dry Season 2008
Myrtle Slough @ Pine Island Rd. - #30	280	*	256	*	466	*	*

* Station dry.

Specific Conductance Reconnaissance Results in WBID 1995; 2008 - 2010

Station	Dry Season 2009 Value uS/cm	Wet Season 2009 Value uS/cm	Dry Season 2010 Value uS/cm	Wet Season 2010 Value uS/cm	Percent change Dry Season 2008 vs. Dry Season 2009	Percent change Dry Season 2009 vs. Dry Season 2010
Myrtle Slough @ Pine Island Rd. - #30	979	462	646	338	*	↓34.0%

*Station dry.

WBID 1995

*Water Segment – Myrtle Slough
Prairie Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern – None*

Specific Conductance Reconnaissance Results in WBID 1995; 2010 - 2012

Station	Dry Season 2011 Value uS/cm	Wet Season 2011 Value uS/cm	Dry Season 2012 Value uS/cm	Wet Season 2012 Value uS/cm	Percent change Dry Season 2010 vs. Dry Season 2011	Percent change Dry Season 2011 vs. Dry Season 2012
Myrtle Slough @ Pine Island Rd. - #30	*	328	*	263	*	*

*Station dry.

Specific Conductance Reconnaissance Results in WBID 1995; 2012 - 2014

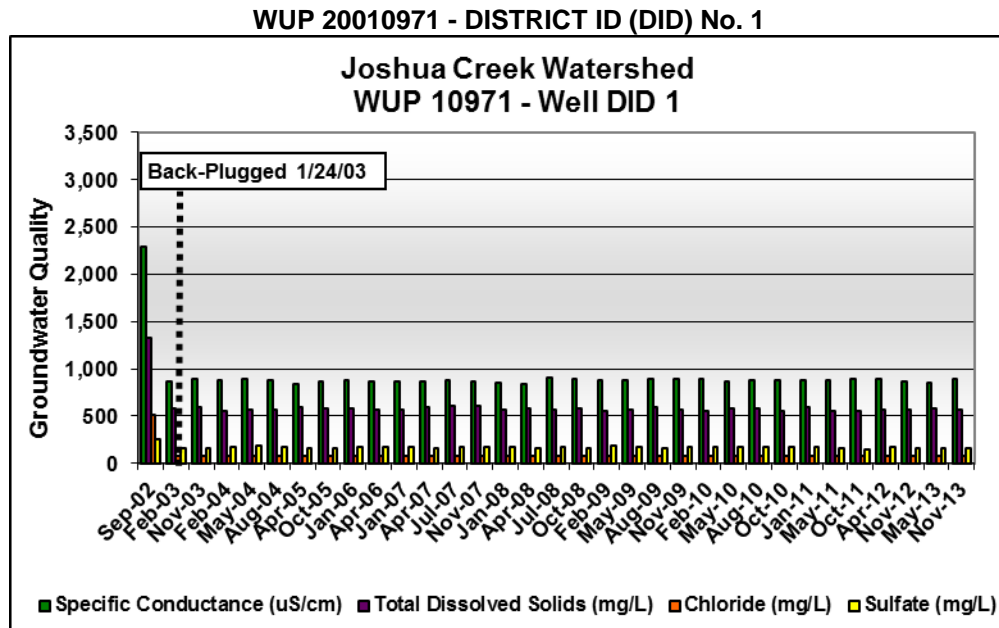
Station	Dry Season 2013 Value uS/cm	Wet Season 2013 Value uS/cm	Dry Season 2014 Value uS/cm	Wet Season 2014 Value uS/cm	Percent change Dry Season 2012 vs. Dry Season 2013	Percent change Dry Season 2013 vs. Dry Season 2014
Myrtle Slough @ Pine Island Rd. - #30	*	151	*	204	*	*

*Station dry.

Pre- and Post Back-Plug Well Monitoring Network (District)

WBID 1995 has one back-plugged well that has been sampled quarterly to monitor long-term groundwater quality parameters and assure that the back-plug remained intact. Routine monitoring of the well was suspended in November 2013.

The following graph represents water quality results throughout the period of data record for this quarterly monitored well showing both pre- and post-back-plug values for specific conductance, sulfate, chloride, and TDS. To date, this well has retained the integrity of the post back-plug concentrations for these parameters.



WBID 1995

*Water Segment – Myrtle Slough
Prairie Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern – None*

Surface-Water Quality Monitoring Networks (District, FDEP, and City of Punta Gorda)

There are no water quality sample collection activities occurring in WBID 1995 at this time.

Habitat Assessment and Stream Condition Index Monitoring (FDEP)

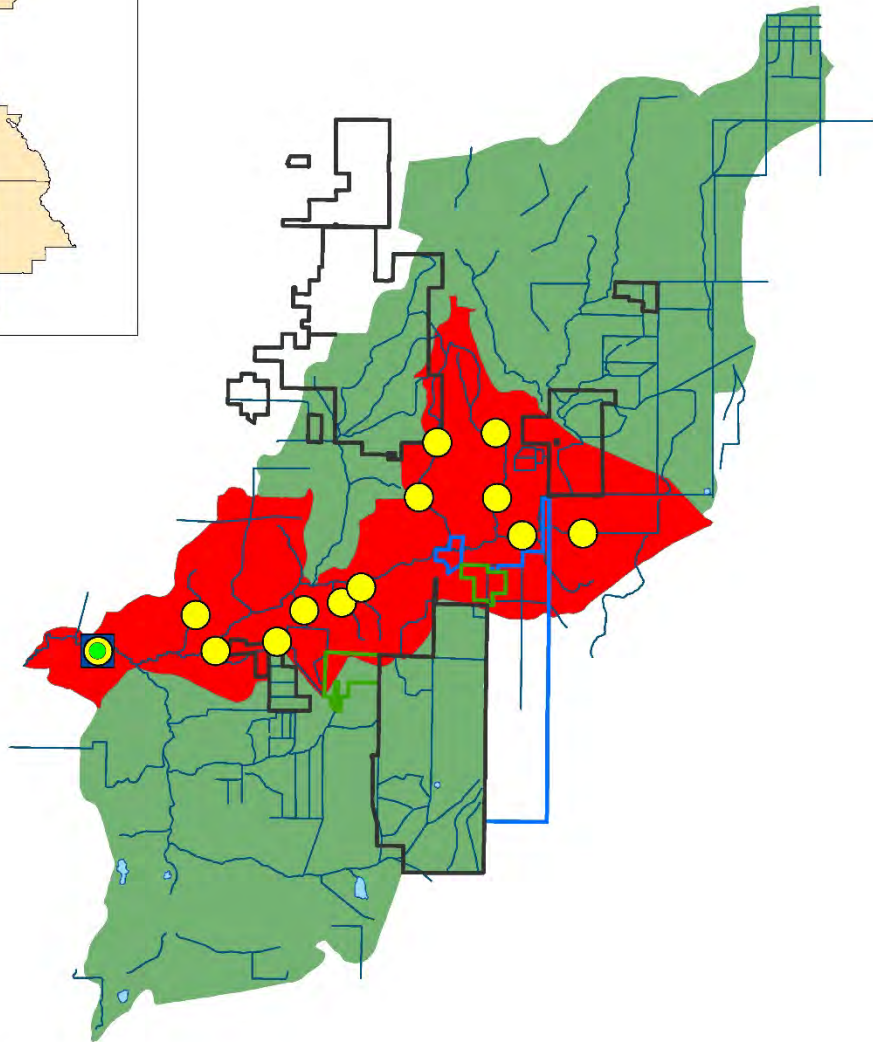
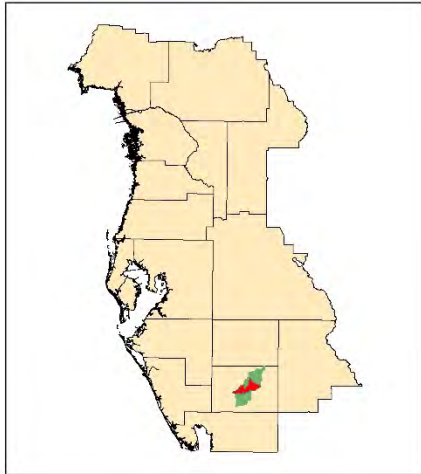
In the summer of 2003 and winter of 2004, biological (macroinvertebrate) samples for SCI analysis were collected at Myrtle Slough above Nichols Road. The initial 2004 SCI evaluation of this site was "Excellent" using SCI_1992 methodology

After the samples were collected and evaluated, a new method of calculating the SCI was developed by FDEP to more accurately reflect the biological condition of streams and effects of development around them. The SCI 2004 methodology ranks streams as Good, Fair, Poor, or Very Poor. The Myrtle Slough @ Nichols Road site was categorized under this new method as "Fair", which indicates a significant change from completely natural conditions, but not a serious degradation of the biological community. Because the SCI_2004 method had not been adopted at the time the samples were collected, the SCI_2004 evaluation was not official, but did provide an additional analysis of the biological condition of the stream system. Both the old and new SCI evaluations do not indicate that water quality is having a detrimental effect on the biological communities at the Myrtle Slough @ Nichols Road site.

No HA or SCI evaluations were conducted in WBID 1995 during the August 2006 to September 2014 time period.

WBID 1950A
Water Segment – Joshua Creek ab. Peace River
Joshua Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

WBID 1950A
Water Segment - Joshua Creek above Peace River
Joshua Creek Watershed; Water Use - Class 3F
Verified Impaired Pollutants of Concern - None



- Data Sonde Locations
- Reconnaissance Network Locations
- Surface Water Sample Locations
- FARMS - Dormant Contacts
- FARMS - Operational
- FARMS - Potential
- Lakes
- Streams and Canals
- WBID 1950A
- Joshua Watershed



WBID 1950A

Water Segment – Joshua Creek ab. Peace River
Joshua Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern – None

Proposed Management Actions – Progress to Date

Shell, Prairie, and Joshua Creek Well Back-Plugging Program

Since the inception of the Well Back-Plugging Program, two irrigation wells have been back-plugged in WBID 1950A. The following table represents water quality improvements for chloride and TDS concentrations at these wells directly following back-plug activities. No additional wells were back-plugged in the current report period.

Pre- and Post Well Back-Plugging Results in WBID 1950A

Permit Information		Percent Improvement	
WUP No.	DISTRICT ID (DID) No.	TDS (mg/L)	Chloride (mg/L)
20002240	3	71%	83%
20002240	4	70%	94%

District Resource Regulation – Water Use Permitting

Forty-eight Water Use Permit (WUP) applications were submitted for WBID 1950A to the District over the entire reporting period of performance monitoring (October 2004 to September 2014). Of the forty-eight applications thirty-four were renewals, two were new permits, three were modifications, two were an owner transfer, and seven were letter modifications.

WUP Renewals and Modifications in WBID 1950A

	Oct. 2004 – Jul. 2006	Aug. 2006 – Aug. 2008	Sept. 2008 – Sept. 2010	Oct. 2010 – Sept. 2012	Oct. 2012 – Sept. 2014	Totals
New WUPs	0	1	1	0	0	2
WUP Renewals	0	4	11	9	10	34
WUP Modifications	1	1	1	0	0	3
WUP Letter Modifications	1	1	1	3	1	7
WUP Owner Transfer	0	0	1	1	0	2
Totals	2	7	15	13	11	48

Facilitating Agricultural Resource Management Systems (FARMS) and/or Environmental Quality Incentives (EQIP) Projects

Three FARMS projects have been Board approved to date within this WBID, two of which have been subsequently cancelled. Four additional projects were under consideration between October 2004 and September 2014. The following table summarizes the projects, as well as ground water offsets that have occurred over the performance monitoring period. Details for each of the below listed projects can be found in Appendix IV.

WBID 1950A

Water Segment – Joshua Creek ab. Peace River
Joshua Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern – None

FARMS Projects in WBID 1950A; October 2004 – September 2014

WUP Number	Project Number	Ag Type	Project Status	Operational Date	Projected Groundwater Offset (gpd)	Actual Groundwater Offset as of September 2014 (gpd)	Max. Groundwater Offset Achieved in One Month through September 2014 (gpd)
007462	H567	CITRUS	Operational	7/18/2012	186,900	191,300	612,500
005060	H502	CITRUS	Cancelled	N/D	66,000	N/D	N/D
007331	H660	Citrus	Cancelled	N/D	106,680	N/D	N/D
009567		CITRUS	Potential	N/D	0	N/D	N/D
007870		Blueberry	Potential	N/D	0	N/D	N/D
007854		CITRUS	Dormant	N/D	0	N/D	N/D
008566		STRAWBERRY	Dormant	N/D	0	N/D	N/D

*Potential project under consideration between October 2004 and September 2014

N/D = Not determined/project under consideration

**The actual ground water offset fluctuates with weather conditions and seasons. The actual is calculated by dividing the number of days the project has been operational into the total gallons offset.

Quality of Water Improvement Program (QWIP)

There have been no wells plugged/abandoned in WBID 1950A since October 2004.

SPJC Water Quality Monitoring Results – Progress to Date

In-Stream Data Sonde - Conductance Logging Network (District and USGS)

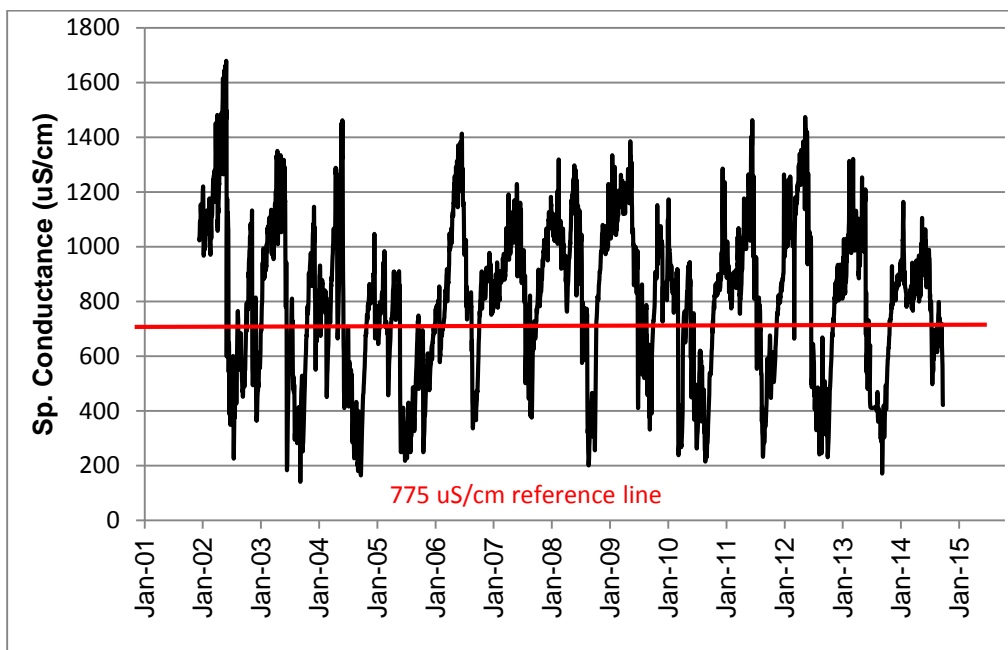
There is currently one YSI® 600XLM data sonde deployed in WBID 1950A at Joshua Creek @ Nocatee, with maintenance and operation performed by the USGS. This monitoring location is in the western region of WBID 1950A in the Joshua Creek Watershed. Land use immediately surrounding this site includes agriculture, wetlands, and some urban/built-up. Although the Joshua Creek Watershed does not currently have any waterbodies listed as TMDL impaired, monitoring is occurring because evidence of impairment has been observed. Due to the potential for future TMDL impairment, this monitoring location is being regarded as a key station, with data sonde deployment occurring year-round.

The following data plot reflects weekly median values for specific conductance, which were calculated from independent values collected on an hourly frequency from January 2002 through September 2014. Specific conductance values remain consistent with previous periods. A table located at the end of this section provides the overall data sonde specific conductance monitoring results for WBID 1950A.

WBID 1950A

*Water Segment – Joshua Creek ab. Peace River
Joshua Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern – None*

Joshua Creek @ Nocatee In-Situ Data Sonde Logging Results



Specific Conductance Logging Results in WBID 1950A for the period from 2002 to 2014

Water Segment	Number Individual Logged Values	Number Individual Values >1275 uS/cm	Percentage of Individual Values >1275 uS/cm	Number Weekly Median Values	Number Weekly Median Values >775 uS/cm	Percentage Weekly Median Values >775 uS/cm
Joshua Creek @ Nocatee	438,773	19,457	4.4%	661	390	59%

Specific Conductance Reconnaissance Network (District)

Within WBID 1950A there are currently 13 stations monitored for the Specific Conductance Reconnaissance Network. Individual values for the Joshua Creek @ Nocatee station have been excluded from this section since they were discussed earlier in this plan in the In-Stream Specific Conductance Logging Network section. Of the 191 individual specific conductance values collected within WBID 1950A during the period of record, 48 values exceeded the 775 uS/cm goal criteria and 10 values exceeded the FDEP surface-water quality Class I criterion of 1275 uS/cm. The following tables summarize the percent change increases and/or decreases between dry season events for each monitoring station within WBID 1950A during the 2004 to 2006, 2006 to 2008, 2008 to 2010, 2010 to 2012, and 2012 to 2014 reporting periods. Individual values for each dry season event are also provided. Stations that were not flowing during a sample event are denoted as dry.

Dry season percent changes for the 2012 to 2014 reporting period show mixed results overall or were not calculated due to dry conditions at six stations during the reporting period.

WBID 1950A

*Water Segment – Joshua Creek ab. Peace River
 Joshua Creek Watershed: Water Use – Class 3F
 Verified Impaired Pollutants of Concern – None*

Specific Conductance Reconnaissance Results in WBID 1950A; 2004 - 2006

Station	Dry Season 2004 Value uS/cm	Wet Season 2004 Value uS/cm	Dry Season 2005 Value uS/cm	Wet Season 2005 Value uS/cm	Dry Season 2006 Value uS/cm	Percent change Dry Season 2004 versus Dry Season 2005	Percent change Dry Season 2005 versus Dry Season 2006
Unnamed Ditch @ CR 760 - #5	551	64	506	517	424	↓8.17%**	↓16.21%**
Joshua Cr. @ SR 70 – #6	516	116	511	339	572	↓0.97%**	↑11.94%**
Unnamed Cr. @ CR 760 - #6	1093	330	974	619	1430	↓10.89%**	↑46.82%**
Unnamed Cr. @ Airport Ave. - #34	590	638	631	553	*	↑6.95%**	*
Unnamed Cr. @ SR 31 - #7.	*	314	*	*	*	*	*
Unnamed Cr. @ SE Kings St. -	442	229	468	183	*	↑5.88%**	*
Unnamed Cr. @ CR 760 - #5	1183	180	618	620	*	↓47.76%**	*
Upper Joshua Cr. - # 32	52	44	162	70	*	↑211.54%**	*
Unnamed Cr. @ CR 760 - #4	*	63	294	197	*	*	*
Unnamed Cr. @ Roan St. - #2	564	124	626	*	*	↑10.99%**	*
Unnamed Cr. @ Roan St. - #3	721	78	441	309	*	↓38.83%**	*
Tributary to Joshua Cr. @ SR 70	*	104	333	218	*	*	*

* Station dry.

**Values modified since 2004 – 2006 Performance Monitoring Report due to calculation error.

WBID 1950A

Water Segment – Joshua Creek ab. Peace River

Joshua Creek Watershed: Water Use – Class 3F

Verified Impaired Pollutants of Concern – None

Specific Conductance Reconnaissance Results in WBID 1950A; 2006 - 2008

Station	Wet Season 2006 Value uS/cm	Dry Season 2007 Value uS/cm	Wet Season 2007 Value uS/cm	Dry Season 2008 Value uS/cm	Wet Season 2008 Value uS/cm	Percent change Dry Season 2006 versus Dry Season 2007	Percent change Dry Season 2007 versus Dry Season 2008
Unnamed Ditch @ CR 760 - #5	301	675	401	708	671	↑59.20%	↑4.89%
Joshua Cr. @ SR 70 – #6	198	656	447	791	398	↑14.69%	↑20.58%
Unnamed Cr. @ CR 760 - #6	722	1662	972	2019	991	↑16.22%	↑21.48%
Unnamed Cr. @ Airport Ave. - #34	*	*	*	840	914	*	*
Unnamed Cr. @ SR 31 - #7.	*	*	*	*	*	*	*
Unnamed Cr. @ SE Kings St. -	260	*	*	*	*	*	*
Unnamed Cr. @ CR 760 - #5	507	*	682	*	715	*	*
Upper Joshua Cr. - # 32	*	*	*	*	*	*	*
Unnamed Cr. @ CR 760 - #4	262	*	*	*	326	*	*
Unnamed Cr. @ Roan St. - #2	322	*	419	*	431	*	*
Unnamed Cr. @ Roan St. - #3	114	*	*	942	306	*	*
Tributary to Joshua Cr. @ SR 70	210	*	274	*	337	*	*

* Station dry.

WBID 1950A

Water Segment – Joshua Creek ab. Peace River

Joshua Creek Watershed: Water Use – Class 3F

Verified Impaired Pollutants of Concern – None

Specific Conductance Reconnaissance Results in WBID 1950A; 2008 - 2010

Station	Dry Season 2009 Value uS/cm	Wet Season 2009 Value uS/cm	Dry Season 2010 Value uS/cm	Wet Season 2010 Value uS/cm	Percent change Dry Season 2008 vs. Dry Season 2009	Percent change Dry Season 2009 vs. Dry Season 2010
Unnamed Ditch @ CR 760 - #5	792	240	612	105	↑11.9	↓22.7%
Joshua Cr. @ SR 70 – #6	766	389	565	254	↓3.2%	↓26.2%
Unnamed Cr. @ CR 760 - #6	1594	971	1051	1095	↓21.1%	↓34.1%
Unnamed Cr. @ Airport Ave. - #34	1009	1069	1044	628	↑20.1%	↑3.5%
Unnamed Cr. @ SR 31 - #7.	*	*	*	*	*	*
Unnamed Cr. @ SE Kings St. -	1234	373	726	464	*	↓41.2%
Unnamed Cr. @ CR 760 - #5	955	604	768	639	*	↓19.6%
Upper Joshua Cr. - # 32	161	91	148	*	*	↓8.1%
Unnamed Cr. @ CR 760 - #4	470	287	*	403	*	*
Unnamed Cr. @ Roan St. - #2	994	518	*	505	*	*
Unnamed Cr. @ Roan St. - #3	879	416	822	462	↓6.7%	↓6.5%
Tributary to Joshua Cr. @ SR 70	880	429	830	427	*	↓5.7%

* Station dry.

WBID 1950A

*Water Segment – Joshua Creek ab. Peace River
 Joshua Creek Watershed: Water Use – Class 3F
 Verified Impaired Pollutants of Concern – None*

Specific Conductance Reconnaissance Results in WBID 1950A; 2010 - 2012

Station	Dry Season 2011 Value uS/cm	Wet Season 2011 Value uS/cm	Dry Season 2012 Value uS/cm	Wet Season 2012 Value uS/cm	Percent change Dry Season 2010 vs. Dry Season 2011	Percent change Dry Season 2011 vs. Dry Season 2012
Unnamed Ditch @ CR 760 - #5	944	176	1468	147	↑19.2%	↑55.5%
Joshua Cr. @ SR 70 – #6	670	292	768	271	↓12.5%	↑14.6%
Unnamed Cr. @ CR 760 - #6	1647	1264	1753	1129	↑3.3%	↑6.4%
Unnamed Cr. @ Airport Ave. - #34	1021	1033	1135	1154	↑1.2%	↑11.2%
Unnamed Cr. @ SR 31 - #7.	*	1126	2863	685	*	*
Unnamed Cr. @ SE Kings St. -	*	476	753	338	*	*
Unnamed Cr. @ CR 760 - #5	603	631	591	484	↓21.5%	↓2%
Upper Joshua Cr. - # 32	938	201	*	91	↑534%	*
Unnamed Cr. @ CR 760 - #4	*	480	*	178	*	*
Unnamed Cr. @ Roan St. - #2	*	581	*	483	*	*
Unnamed Cr. @ Roan St. - #3	423	605	*	402	*	*
Tributary to Joshua Cr. @ SR 70	322	526	547	441	↓61.8%	↑37%

* Station dry.

WBID 1950A

*Water Segment – Joshua Creek ab. Peace River
Joshua Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern – None*

Specific Conductance Reconnaissance Results in WBID 1950A; 2012 - 2014

Station	Dry Season 2013 Value uS/cm	Wet Season 2013 Value uS/cm	Dry Season 2014 Value uS/cm	Wet Season 2014 Value uS/cm	Percent change Dry Season 2012 vs. Dry Season 2013	Percent change Dry Season 2013 vs. Dry Season 2014
Unnamed Ditch @ CR 760 - #5	*	116	*	143	*	*
Joshua Cr. @ SR 70 – #6	784	247	646	244	↑2.08%	↓17.60%
Unnamed Cr. @ CR 760 - #6	1769	719	1399	1139	↑0.91%	↓20.92%
Unnamed Cr. @ Airport Ave. - #34	1282	794	1088	870	↑12.95%	↓15.13%
Unnamed Cr. @ SR 31 - #7.	*	358	*	722	*	*
Unnamed Cr. @ SE Kings St. -	*	205	702	164	*	*
Unnamed Cr. @ CR 760 - #5	*	330	482	720	*	*
Upper Joshua Cr. - # 32	*	41	*	117	*	*
Unnamed Cr. @ CR 760 - #4	*	114	410	188	*	*
Unnamed Cr. @ Roan St. - #2	*	212	*	506	*	*
Unnamed Cr. @ Roan St. - #3	*	147	*	271	*	*
Tributary to Joshua Cr. @ SR 70	*	201	*	224	*	*

* Station dry

Pre- and Post Back-Plug Well Monitoring Network (District)

To date, no wells in WBID 1950A are monitored as part of the Back-Plug Well Monitoring Network.

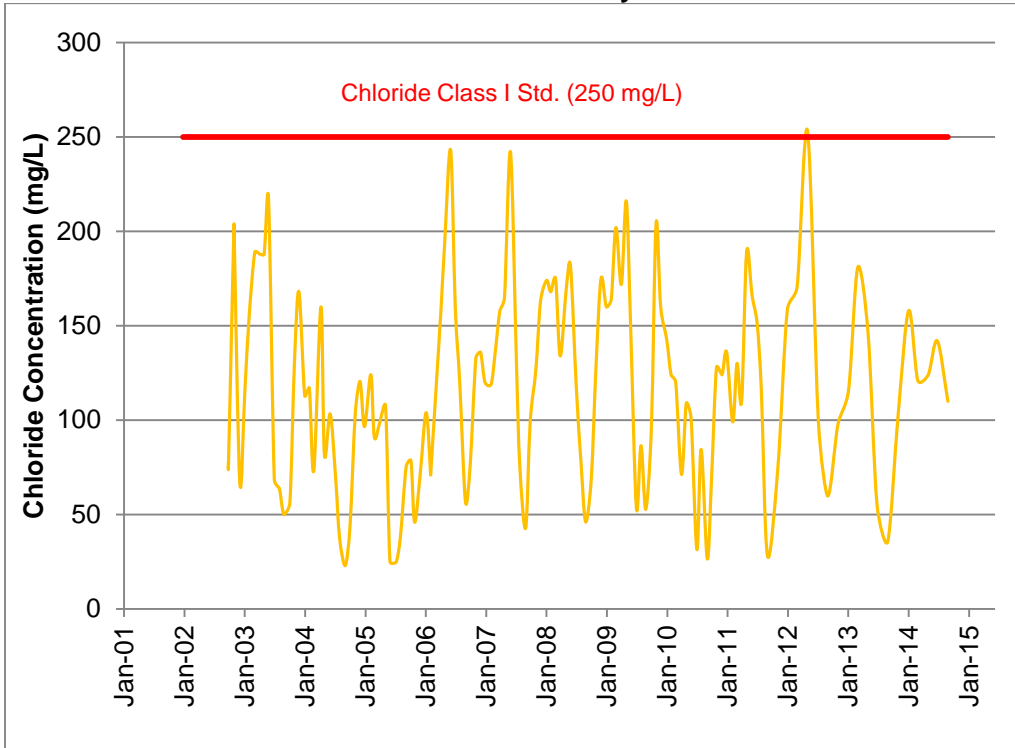
Surface-Water Quality Monitoring Networks (District, FDEP, and City of Punta Gorda)

The following graphs represents water quality results through September 2014 for chloride and TDS concentrations at station Joshua Creek @ Nocatee (WBID 1950A). Although this creek is a Class III system, for comparative purposes, these data plots also contain reference lines depicting FDEP Class I criteria for chloride (250 mg/L) and TDS (500 mg/L as a monthly average, 1000 mg/L as maximum). Overall, chloride values have been below the Class I criteria for chloride since 2003, with only one value exceeding the criteria in 2012. Values continue to remain below the TDS (1000 mg/L) criteria for the current reporting period.

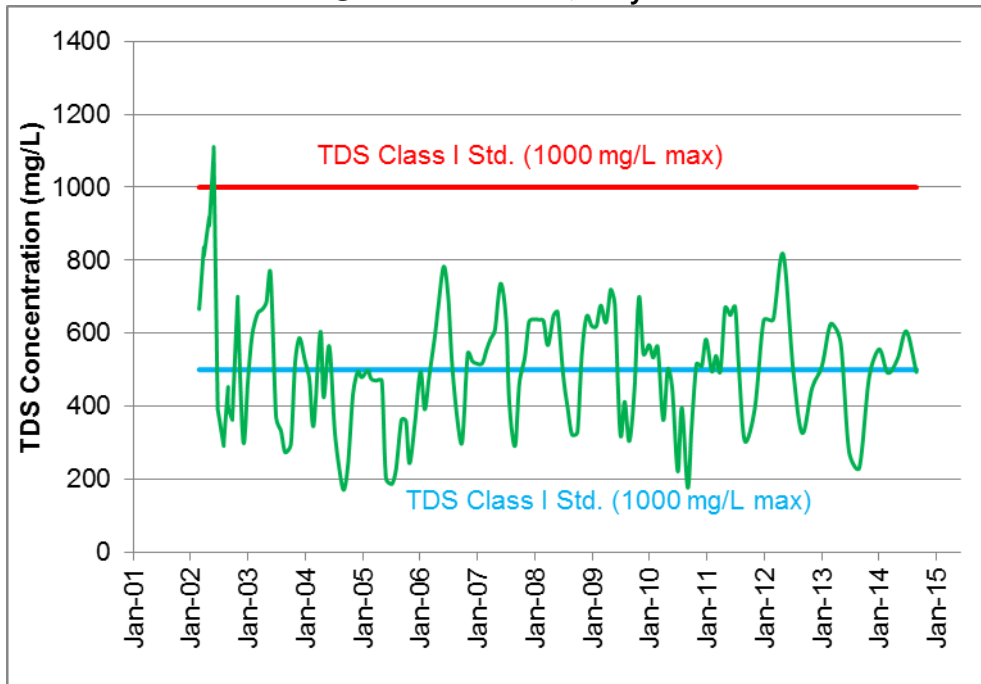
WBID 1950A

Water Segment – Joshua Creek ab. Peace River
Joshua Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern – None

Joshua Creek @ Nocatee Water Quality Results for Chloride



Joshua Creek @ Nocatee Water Quality Results for TDS



*Graph was updated from previous report versions to include missing TDS data for 2006, 2007 and 2008

WBID 1950A

*Water Segment – Joshua Creek ab. Peace River
Joshua Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern – None*

Chloride and TDS Water Quality Results in WBID 1950A for the period from 2002 to 2014

Water Segment	Number Individual Reported CI Values	Number Individual CI Values >250 mg/L	Percentage Individual CI Values >250 mg/L	Number Individual Reported TDS Values	Number Individual TDS Values >500 mg/L	Percentage Individual TDS Values >500 mg/L	Number Individual TDS Values >1000 mg/L	Percentage Individual TDS Values >1000 mg/L
Joshua Cr. @ Nocatee	131	1	0.8%	142	72	51%	2	1%

Habitat Assessment and Stream Condition Index Monitoring (FDEP)

No sites in WBID 1950A were evaluated for biological health indicators during the October 2004 to July 2006 reporting period. During the August 2006 to August 2008 reporting period, two sites in WBID 1950A were evaluated for HAs and SCIs. During the September 2008 to September 2010 reporting period, one site was evaluated for HAs and SCIs. During the 2010 to 2012 reporting period, one site was evaluated for HAs and SCIs. During the 2012 to 2014 reporting period, one site was evaluated for HAs and SCIs. The results of the assessments are presented below.

During the period between October 2004 and September 2014 the FDEP has updated its methodology for calculating the SCI score. For the sites sampled by FDEP, the FDEP retroactively recalculated the Overall SCI Score using the SCI_2012 method. Sites with SCI values calculated using the SCI_2012 method are noted with an asterisk. The remaining sites were evaluated using the SCI_2007 method.

Habitat Assessment and Stream Condition Index Results

Station	Assessment Date	In-stream Characteristics Score	Morphological and Riparian Features Score	Overall Habitat Assessment Score	Overall SCI Score
Joshua Creek @ Nocatee	05/21/2007	38	42	80 Suboptimal	30 Category 3 ("impaired")
Joshua Creek at Airport Road	01/30/2008	67	70	137 Optimal	47 Category 2 ("healthy")
Unnamed Cr. @ CR 760 - #6	08/12/2009	60	70	130 Optimal	12 Category 3 ("impaired")
Unnamed Cr. @ Airport Ave. - #34	06/06/2011	52	50	102 Suboptimal	73 Category 1 ("exceptional")
*Joshua Creek @ Nocatee	02/21/2013	55	55	110 Suboptimal	75 Category 3 ("impaired")

* Overall SCI Score recalculated retroactively by FDEP using SCI_2012 methods.

WBID 1950A

*Water Segment – Joshua Creek ab. Peace River
Joshua Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern – None*

According to FDEP SOP 002/01 LT 7000, stations scored as Category 1 (“exceptional”) are characterized as having a diverse assemblage of species, with no observable dominance by a single taxa and a low occurrence of tolerant taxa. Stations scored as Category 2 (“healthy”) are characterized as having a diverse assemblage of species, with a small increase in dominance by a single taxon; very tolerant taxa represent a small percentage of individuals. Stations scored as Category 3 (“impaired”) are characterized as having a notable loss of diversity with very tolerant taxa representing a large proportion of the individuals collected.

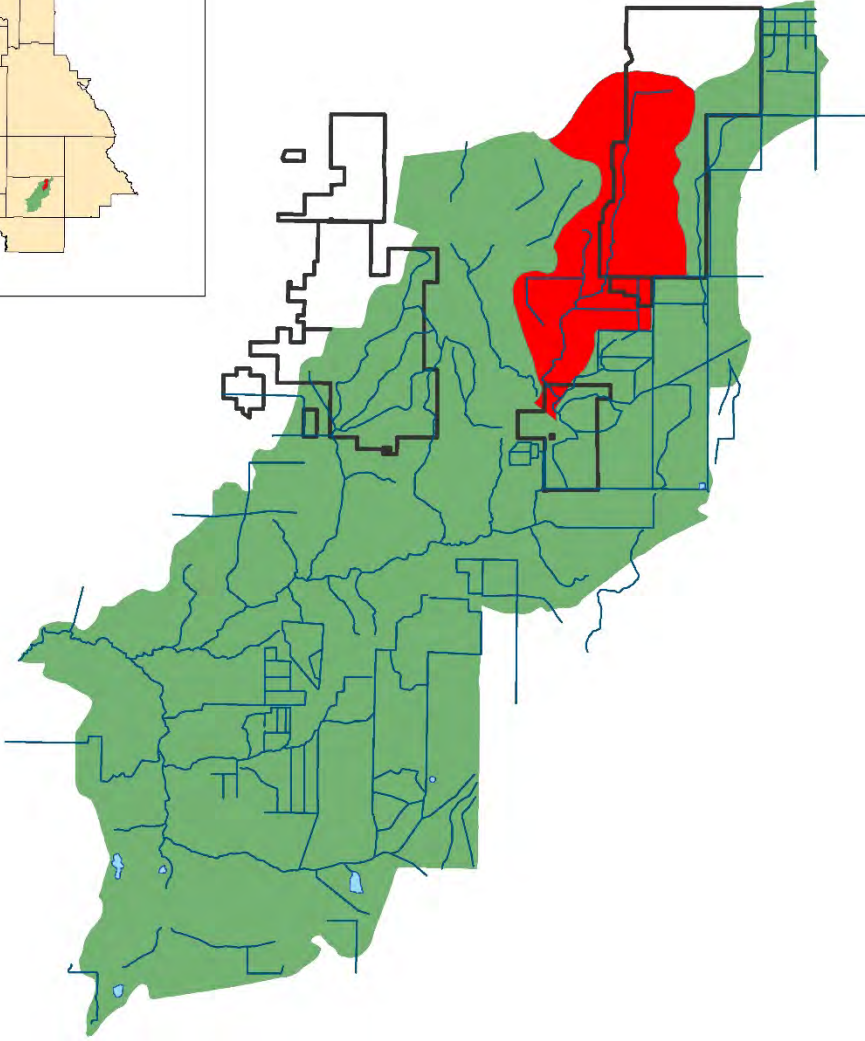
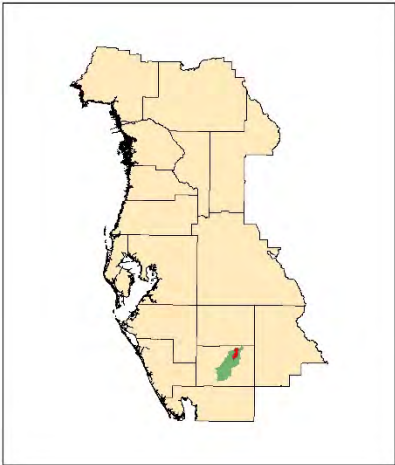
A definitive link between declines in the number and quality of macroinvertebrates and surface waters with elevated specific conductance values from anthropogenic activities has not been determined. However, the FDEP has extensively analyzed the effect of elevated specific conductance on the on the macroinvertebrate community.

http://publicfiles.dep.state.fl.us/dear/labs/biology/miscpubs/cond_criteria.pdf

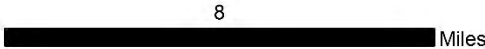
The impairment of the Joshua Creek at Nocatee and Unnamed Creek @ CR 760 sites for the SCI can be attributed to secondary factors of anthropogenic activities such as runoff which can lead to sedimentation and turbidity. Sedimentation and the resulting high turbidity of surface waters occurs as runoff flows over disturbed agricultural soils, picking up sediments and other small debris which can physically scour the bodies of the macroinvertebrates and smother available habitat and food sources.

WBID 1950B
Water Segment – Joshua Creek ab. Honey Creek
Joshua Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

WBID 1950B
Water Segment - Joshua Creek above Honey Creek
Joshua Creek Watershed; Water Use - Class 3F
Verified Impaired Pollutants of Concern - None



- WBID 1950B
- FARMS - Dormant Contacts
- Lakes
- Streams and Canals
- Joshua Creek Watershed



WBID 1950B

Water Segment – Joshua Creek ab. Honey Creek
Joshua Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern – None

Proposed Management Actions – Progress to Date

Shell, Prairie, and Joshua Creek Well Back-Plugging Program

To date no irrigation wells have been back-plugged in WBID 1950B.

District Resource Regulation – Water Use Permitting

Ten Water Use Permit (WUP) applications were submitted to the District for WBID 1950B over the entire reporting period of performance monitoring (October 2004 to September 2014). One of the applications was for a new WUP, four were renewals, one was a modification, and four were letter modifications.

WUP Renewals and Modifications in WBID 1950B

	Oct. 2004 – Jul. 2006	Aug. 2006 – Aug. 2008	Sept. 2008 – Sept. 2010	Oct. 2010 – Sept. 2012	Oct. 2012 – Sept. 2014	Totals
New WUPs	0	0	1	0	0	1
WUP Renewals	0	0	2	1	1	4
WUP Modifications	1	0	0	0	0	1
WUP Letter Modifications	0	0	1	1	2	4
WUP Owner Transfer	0	0	0	0	0	0
Totals	1	0	4	2	3	10

Facilitating Agricultural Resource Management Systems (FARMS) and/or Environmental Quality Incentives (EQIP) Projects

To date, there are no Board approved FARMS/EQIP projects in WBID 1950B. Two projects were under consideration between October 2004 and September 2014.

Quality of Water Improvement Program (QWIP)

There have been no wells plugged/abandoned in WBID 1950B since October 2004.

SPJC Water Quality Monitoring Results – Progress to Date

In-Stream Data Sonde - Conductance Logging Network (District and USGS)

There are no instantaneous data collection activities occurring in WBID 1950B at this time.

Specific Conductance Reconnaissance Network (District)

Within WBID 1950B there are no stations currently being monitored for the Specific Conductance Reconnaissance Network.

Pre- and Post Back-Plug Well Monitoring Network (District)

To date no wells in WBID 1950B are monitored as part of the Back-Plug Well Monitoring Network.

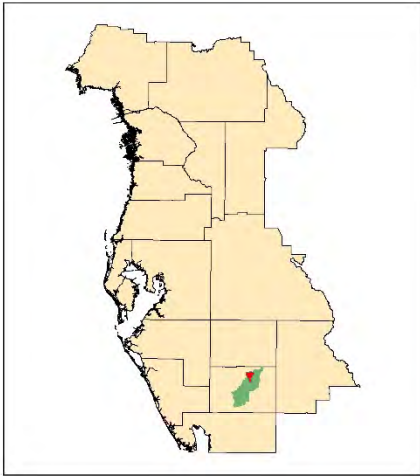
Surface-Water Quality Monitoring Networks (District, FDEP, and City of Punta Gorda)

There are no water quality sample collection activities occurring in WBID 1950B at this time.

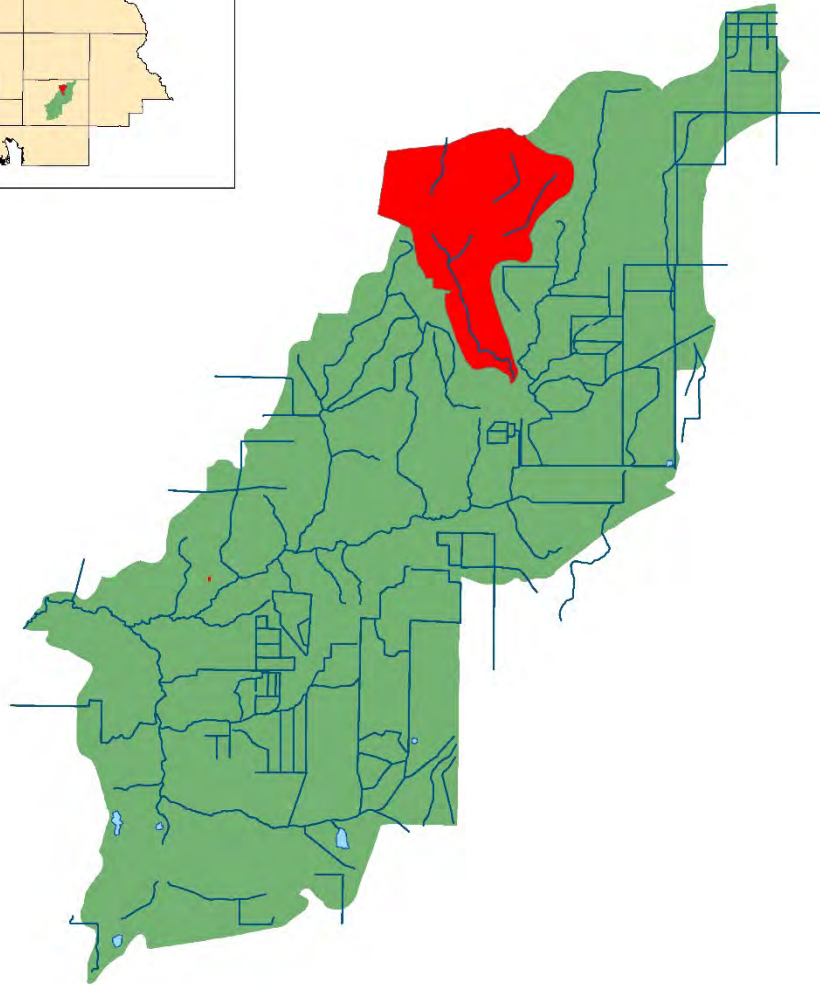
Habitat Assessment and Stream Condition Index Monitoring





No sites in WBID 1950B have been evaluated for HA or SCIs during the October 2004 to September 2014 time period.

WBID 1963
Water Segment – Lake Slough
Joshua Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern: None



WBID 1963
Water Segment - Lake Slough
Joshua Creek Watershed; Water Use - Class 3F
Verified Impaired Pollutants of Concern - None



-  Lakes
-  Streams and Canals
-  WBID 1963
-  Joshua Creek Watershed



WBID 1963
Water Segment – Lake Slough
Joshua Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern – None

Proposed Management Actions – Progress to Date

Shell, Prairie, and Joshua Creek Well Back-Plugging Program

To date no irrigation wells have been back-plugged in WBID 1950B.

District Resource Regulation – Water Use Permitting

Eight Water Use Permit (WUP) applications were submitted to the District for WBID 1963 over the entire reporting period of performance monitoring (October 2004 to September 2014). One of the applications was for a new WUP, three were renewals, one was a modification, and three were letter modifications.

WUP Renewals and Modifications in WBID 1963

	Oct. 2004 – Jul. 2006	Aug. 2006 – Aug. 2008	Sept. 2008 – Sept. 2010	Oct. 2010 – Sept. 2012	Oct. 2012 – Sept. 2014	Totals
New WUPs	0	0	1	0	0	1
WUP Renewals	0	0	2	1	0	3
WUP Modifications	1	0	0	0	0	1
WUP Letter Modifications	0	0	1	1	1	3
WUP Owner Transfer	0	0	0	0	0	0
Totals	1	0	4	2	1	8

Facilitating Agricultural Resource Management Systems (FARMS) and/or Environmental Quality Incentives (EQIP) Projects

To date, there are no Board approved FARMS/EQIP projects in WBID 1963.

Shell, Prairie, and Joshua Creek Well Back-Plugging Program

To date no irrigation wells have been back-plugged in WBID 1963.

Quality of Water Improvement Program (QWIP)

There have been no wells plugged/abandoned in WBID 1963 since October 2004.

SPJC Water Quality Monitoring Results – Progress to Date

In-Stream Data Sonde - Conductance Logging Network (District and USGS)

There are no instantaneous data collection activities occurring in WBID 1963 at this time.

Specific Conductance Reconnaissance Network (District)

There are currently no water quality sites being monitored for the Specific Conductance Reconnaissance Network in WBID 1963.

Pre- and Post Back-Plug Well Monitoring Network (District)

To date, no wells in WBID 1963 are monitored as part of the Back-Plug Well Monitoring Network.

Surface-Water Quality Monitoring Networks (District, FDEP, and City of Punta Gorda)

There are no water quality sample collection activities occurring in WBID 1963 at this time.

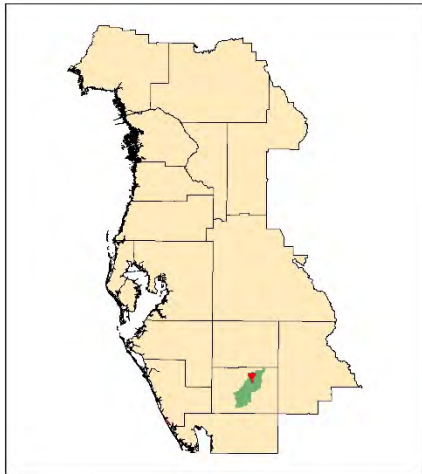
WBID 1963

*Water Segment – Lake Slough
Joshua Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern – None*

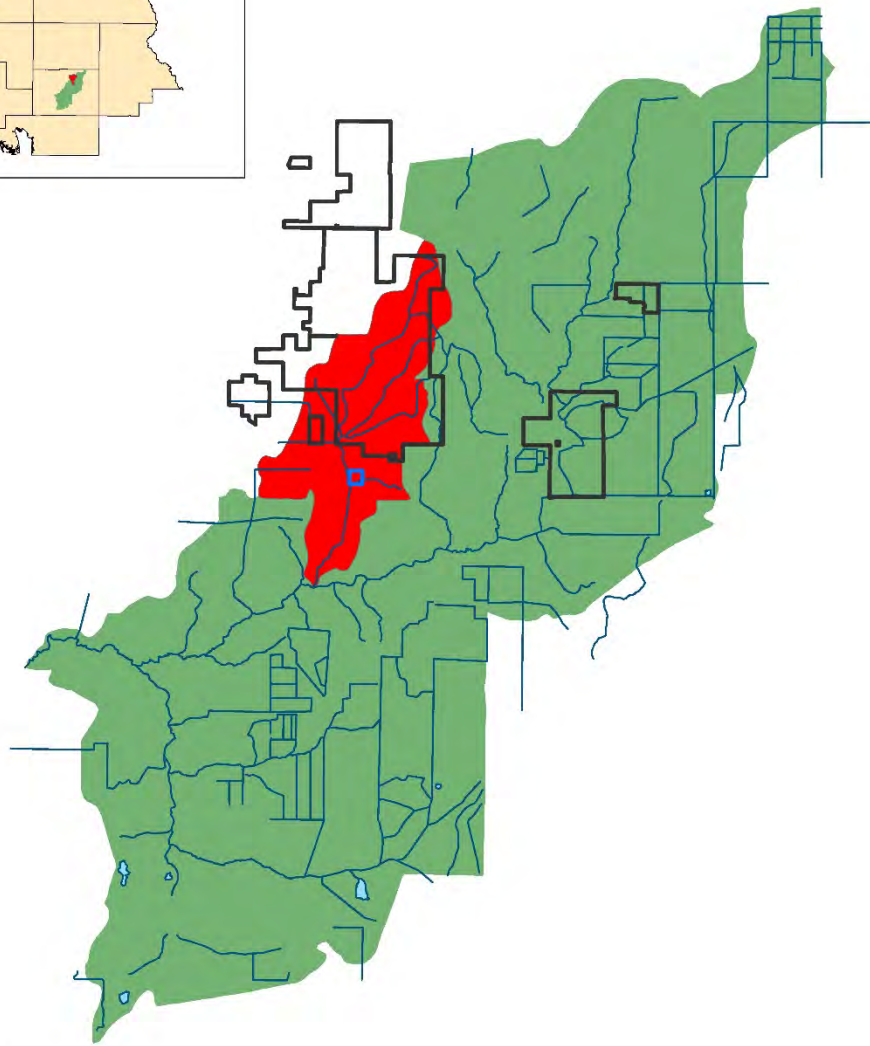
Habitat Assessment and Stream Condition Index Monitoring


No sites in WBID 1963 have been evaluated for HAs or SCIs during the October 2004 to September 2014 time period.

WBID 1974
Water Segment – Unnamed Branch
Joshua Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern: None



WBID 1974
Water Segment - Unnamed Branch
Joshua Creek Watershed; Water Use - Class 3F
Verified Impaired Pollutants of Concern - None



-  WBID 1974
-  FARMs - Dormant Contacts
-  FARMs - Operational
-  Lakes
-  Streams and Canals
-  Joshua Watershed



WBID 1974

*Water Segment – Unnamed Branch
Joshua Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern – None*

Proposed Management Actions – Progress to Date

Shell, Prairie, and Joshua Creek Well Back-Plugging Program

No wells were back plugged during this reporting period.

District Resource Regulation – Water Use Permitting

Twelve Water Use Permit (WUP) applications were submitted to the District for WBID 1974 over the entire reporting period of performance monitoring (October 2004 to September 2014). Six were for renewals, one was for a modification, four were letter modifications, and one was for an owner transfer.

WUP Renewals and Modifications in WBID 1974

	Oct. 2004 – Jul. 2006	Aug. 2006 – Aug. 2008	Sept. 2008 – Sept. 2010	Oct. 2010 – Sept. 2012	Oct. 2012 – Sept. 2014	Totals
New WUPs	0	0	0	0	0	0
WUP Renewals	0	1	2	3	0	6
WUP Modifications	0	0	1	0	0	1
WUP Letter Modifications	0	0	1	1	2	4
WUP Owner Transfer	0	0	0	0	1	1
Totals	0	1	4	4	3	12

Facilitating Agricultural Resource Management Systems (FARMS) and/or Environmental Quality Incentives (EQIP) Projects

One FARMS/EQIP project was Board approved in WBID 1974. One additional project was under consideration between October 2004 and September 2014. The following table summarizes this project, as well as ground water offsets that have occurred over the performance monitoring period. Details for the project listed below can be found in Appendix IV.

FARMS Projects in WBID 1974; October 2004 September 2014

WUP Number	Project Number	Ag Type	Project Status	Operational Date	Projected Groundwater Offset (gpd)	Actual Groundwater Offset as of September 2014 (gpd)	Max. Groundwater Offset Achieved in One Month through September 2014 (gpd)
001391	H570	Blueberry	Operational	12/1/09	48,600	30,756	95,881
008566		Strawberry	Dormant	N/D	N/D	N/D	N/D

*Potential project under consideration between October 2004 and September 2014.

**The actual ground water offset fluctuates with weather conditions and seasons. The actual is calculated by dividing the number of days the project has been operational into the total gallons offset.

a Funding also provided by EQIP

Shell, Prairie, and Joshua Creek Well Back-Plugging Program

To date no irrigation wells have been back-plugged in WBID 1974.

Quality of Water Improvement Program (QWIP)

There have been no wells plugged/abandoned in WBID 1974 since October 2004.

WBID 1974

*Water Segment – Unnamed Branch
 Joshua Creek Watershed: Water Use – Class 3F
 Verified Impaired Pollutants of Concern – None*

SPJC Water Quality Monitoring Results – Progress to Date

In-Stream Data Sonde - Conductance Logging Network (District and USGS)

There are no instantaneous data collection activities occurring in WBID 1974 at this time.

Specific Conductance Reconnaissance Network (District)

Within WBID 1974 there are currently two stations monitored for the Specific Conductance Reconnaissance Network. Of the 44 individual specific conductance values collected within WBID 1974 during the period of record, four values exceeded the 775 uS/cm goal criteria and no values exceeded the FDEP surface-water quality Class I criterion of 1275 uS/cm. The following table summarizes the percent change increases and/or decreases between dry season events for each monitoring station within WBID 1974. Individual values for each dry season event are also provided.

Dry season percent changes for the 2012 to 2014 reporting period were decreasing for WBID 1974.

Specific Conductance Reconnaissance Results in WBID 1974; 2004 - 2006

Station	Dry Season 2004 Value uS/cm	Wet Season 2004 Value uS/cm	Dry Season 2005 Value uS/cm	Wet Season 2005 Value uS/cm	Dry Season 2006 Value uS/cm	Percent Change Dry Season 2004 vs. Dry Season 2005	Percent Change Dry Season 2005 vs. Dry Season 2006
Maple Branch @ Roan St. - #	673	129	720	641	634	↑6.98%**	↓11.94%**
Maple Branch @ SR 70 - # 7	492	121	518	350	500	↑5.28%**	↓3.47%**

**Values modified since 2004 – 2006 Performance Monitoring Report due to calculation error.

Specific Conductance Reconnaissance Results in WBID 1974; 2006 - 2008

Station	Wet Season 2006 Value uS/cm	Dry Season 2007 Value uS/cm	Wet Season 2007 Value uS/cm	Dry Season 2008 Value uS/cm	Wet Season 2008 Value uS/cm	Percent Change Dry Season 2006 vs. Dry Season 2007	Percent Change Dry Season 2007 vs. Dry Season 2008
Maple Branch @ Roan St. - # 8	349	704	507	868	456	↑11.04%	↑23.30%
Maple Branch @ SR 70 - # 7	384	662	455	610	419	↑32.40%	↓7.85%

WBID 1974

*Water Segment – Unnamed Branch
Joshua Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern – None*

Specific Conductance Reconnaissance Results in WBID 1974; 2008 - 2010

Station	Dry Season 2009 Value uS/cm	Wet Season 2009 Value uS/cm	Dry Season 2010 Value uS/cm	Wet Season 2010 Value uS/cm	Percent Change Dry Season 2008 vs. Dry Season 2009	Percent Change Dry Season 2009 vs. Dry Season 2010
Maple Branch @ Roan St. - # 8	661	395	647	427	↓23.8%	↓2.1%
Maple Branch @ SR 70 - # 7	696	389	526	438	↑14.1%	↓24.4%

Specific Conductance Reconnaissance Results in WBID 1974; 2010 - 2012

Station	Dry Season 2011 Value uS/cm	Wet Season 2011 Value uS/cm	Dry Season 2012 Value uS/cm	Wet Season 2012 Value uS/cm	Percent Change Dry Season 2010 vs. Dry Season 2011	Percent Change Dry Season 2011 vs. Dry Season 2012
Maple Branch @ Roan St. - # 8	572	431	1235	434	↓11.59%	↑115.91%
Maple Branch @ SR 70 - # 7	595	455	864	416	↑13.12%	↑45.21%

*This table was omitted from the 2010 – 2012 Performance Monitoring Report.

Specific Conductance Reconnaissance Results in WBID 1974; 2012 - 2014

Station	Dry Season 2013 Value uS/cm	Wet Season 2013 Value uS/cm	Dry Season 2014 Value uS/cm	Wet Season 2014 Value uS/cm	Percent Change Dry Season 2012 vs. Dry Season 2013	Percent Change Dry Season 2013 vs. Dry Season 2014
Maple Branch @ Roan St. - # 8	838	231	662	574	↓32.15%	↓21.00%
Maple Branch @ SR 70 - # 7	747	221	589	578	↓13.54%	↓21.15%

Pre- and Post Back-Plug Well Monitoring Network (District)

To date, no wells in WBID 1974 are monitored as part of the Back-Plug Well Monitoring Network.

Surface-Water Quality Monitoring Networks (District, FDEP, and City of Punta Gorda)

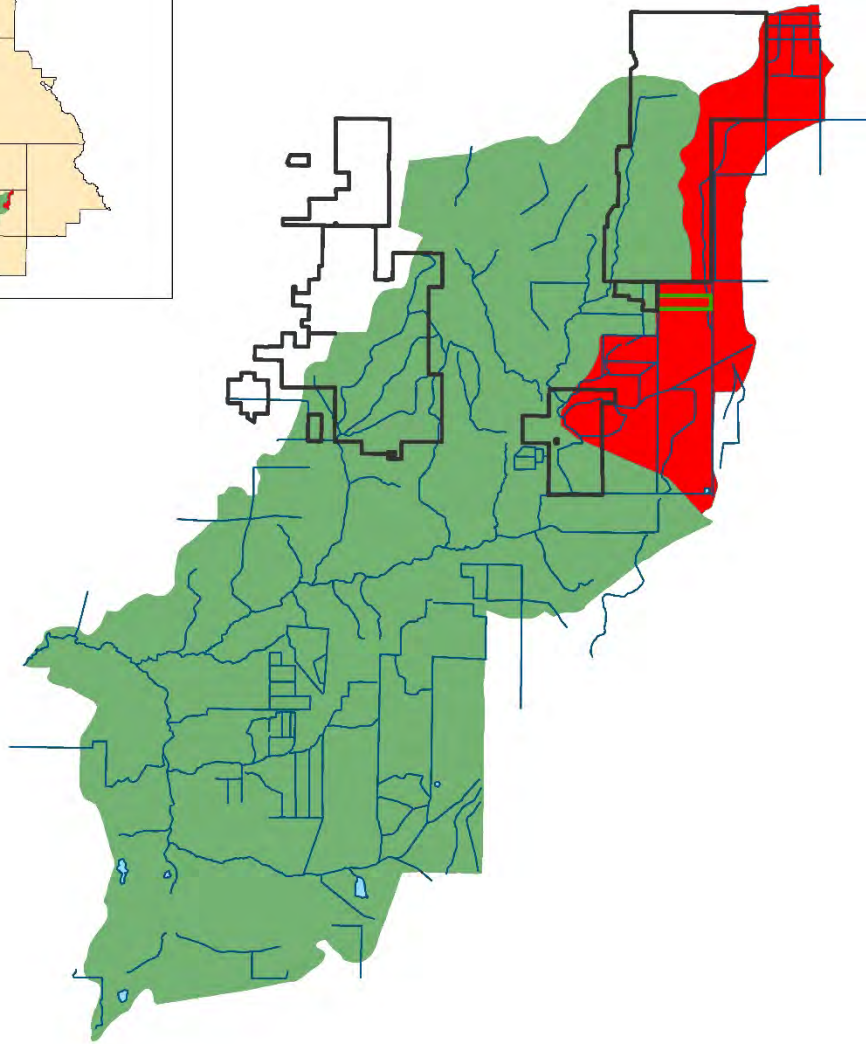
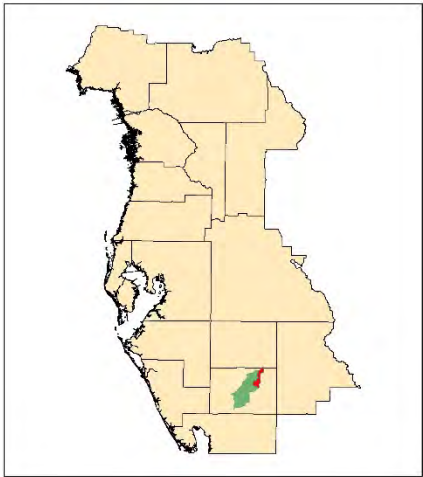
There are no water quality sample collection activities occurring in WBID 1974 at this time.







Habitat Assessment and Stream Condition Index Monitoring

No sites in WBID 1974 were evaluated for HAs or SCIs during the October 2004 to September 2014 reporting period.

WBID 1977
Water Segment – Honey Run
Joshua Creek Watershed
Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

WBID 1977
Water Segment - Honey Run
Joshua Creek Watershed; Water Use - Class 3F
Verified Impaired Pollutants of Concern - None



-  WBID 1977
-  FARMS - Dormant Contacts
-  FARMS - Potential Projects
-  Lakes
-  Streams and Canals selection
-  Joshua Creek Watershed



8

 Miles

WBID 1977
Water Segment – Honey Run
Joshua Creek Watershed
Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

Proposed Management Actions – Progress to Date

Shell, Prairie, and Joshua Creek Well Back-Plugging Program

To date, no irrigation wells have been back-plugged in WBID 1977.

District Resource Regulation – Water Use Permitting

Eleven Water Use Permit (WUP) applications were submitted for WBID 1977 to the District over the entire reporting period of performance monitoring (October 2004 to September 2014), one was for a new permit, three were for a renewal, five were for letter modifications, one was for a modification, and one was for an ownership transfer.

WUP Renewals and Modifications in WBID 1977

	Oct. 2004 – Jul. 2006	Aug. 2006 – Aug. 2008	Sept. 2008 – Sept. 2010	Oct. 2010 – Sept. 2012	Oct. 2012 – Sept. 2014	Totals
New WUPs	0	0	1	0	0	1
WUP Renewals	0	1	0	1	1	3
WUP Modifications	0	1	0	0	0	1
WUP Letter Modifications	0	0	2	1	2	5
WUP Owner Transfer	0	0	0	1	0	1
Totals	0	2	3	3	3	11

Facilitating Agricultural Resource Management Systems (FARMS) Projects

To date, there are no Board approved FARMS projects in WBID 1977; however, three projects were under consideration between October 2004 and September 2014.

FARMS Projects in WBID 1977; October 2004 – September 2014

WUP Number	Project Number	Ag Type	Project Status	Operational Date	Projected Groundwater Offset (gpd)	Actual Groundwater Offset as of September 2014 (gpd)	Max. Groundwater Offset Achieved in One Month through September 2014 (gpd)
007957		Citrus	Dormant	N/D	N/D	N/D	N/D
012562		Citrus	Potential	N/D	N/D	N/D	N/D
008566		Strawberry	Dormant	N/D	N/D	N/D	N/D

*Potential project under consideration between October 2004 and September 2014,

**The actual ground water offset fluctuates with weather conditions and seasons. The actual is calculated by dividing the number of days the project has been operational into the total gallons offset.

N/D = Not determined/project under consideration

Shell, Prairie, and Joshua Creek Well Back-Plugging Program

To date no irrigation wells have been back-plugged in WBID 1977.

Quality of Water Improvement Program (QWIP)

There have been no wells plugged/abandoned in WBID 1977 since October 2004.

WBID 1977
Water Segment – Honey Run
Joshua Creek Watershed
Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

SPJC Water Quality Monitoring Results – Progress to Date

In-Stream Data Sonde - Conductance Logging Network (District and USGS)

There are no instantaneous data collection activities occurring in WBID 1977 at this time.

Specific Conductance Reconnaissance Network (District)

There are currently no water quality sites being monitored for the Specific Conductance Reconnaissance Network in WBID 1977.

Pre- and Post Back-Plug Well Monitoring Network (District)

To date, no wells in WBID 1977 are monitored as part of the Back-Plug Well Monitoring Network.

Surface-Water Quality Monitoring Networks (District, FDEP, and City of Punta Gorda)

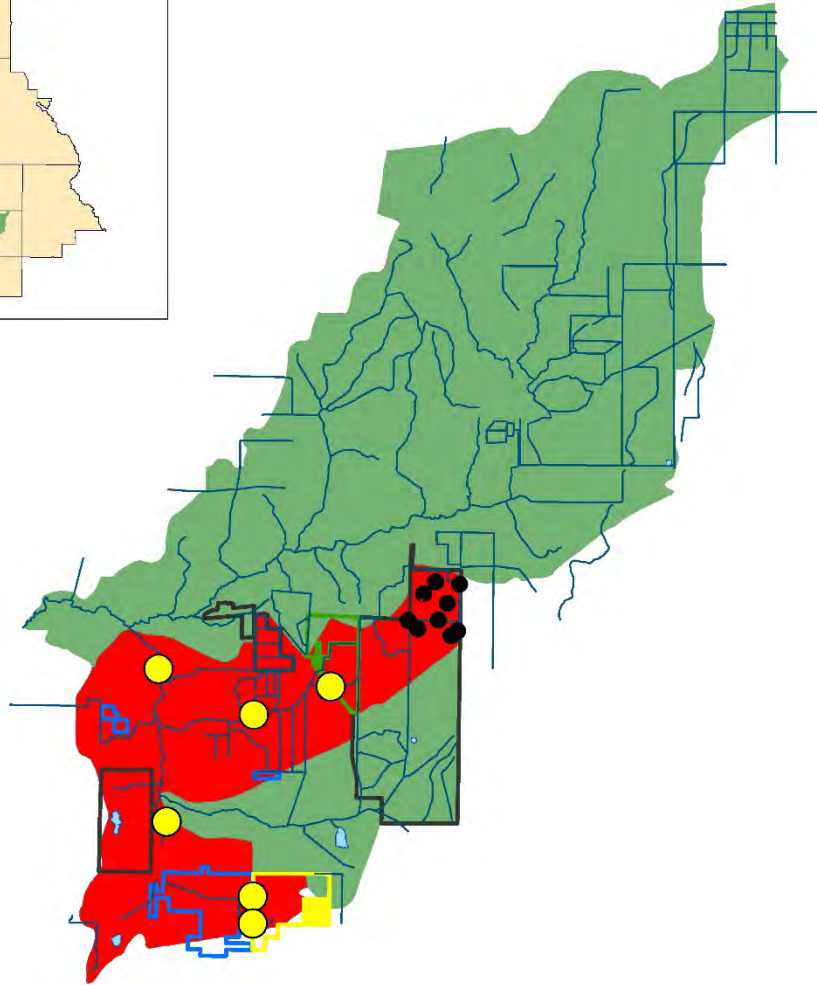
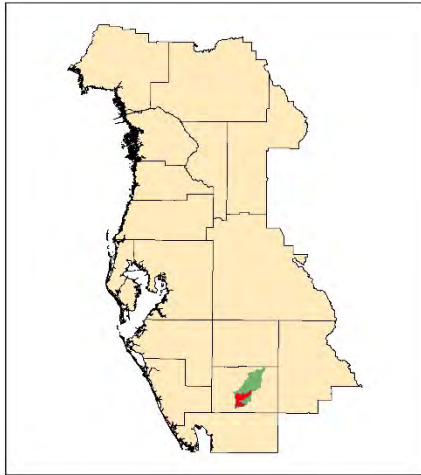
There are no water quality sample collection activities occurring in WBID 1977 at this time.

Habitat Assessment and Stream Condition Index Monitoring

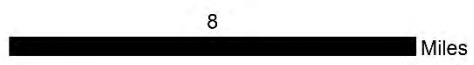
During all five reporting periods for this Performance Monitoring document, no sites in WBID 1977 have been evaluated for the HAs or SCIs.

WBID 1997
Water Segment – Hawthorne Creek
Joshua Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

WBID 1997
 Water Segment - Hawthorne Creek
 Joshua Creek Watershed; Water Use - Class 3F
 Verified Impaired Pollutants of Concern - None



- Backplug Locations
- Reconnaissance Network Locations
- Lakes
- Streams and Canals
- WBID 1997
- FARMs Projects - Under Construction
- FARMs - Potential Projects
- FARMs Projects - Operational
- FARMs - Dormant Contacts
- Joshua Creek Watershed



WBID 1997
Water Segment – Hawthorne Creek
Joshua Creek Watershed
Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

Proposed Management Actions – Progress to Date

Shell, Prairie, and Joshua Creek Well Back-Plugging Program

Ten irrigation wells have been back-plugged in WBID 1997 since Program inception. The following table represents groundwater quality improvements for chloride and TDS concentrations at these wells directly following back-plugging activities. There was one irrigation well back-plugged in WBID 1997 for the current report period.

Pre- and Post-Well Back-Plugging Results in WBID 1997

Permit Information		Percent Improvement	
WUP No.	DISTRICT ID (DID) No.	TDS (mg/L)	Chloride (mg/L)
20005060	2	33%	65%
20005060	3	N/A	N/A
20005060	4	11%	28%
20005060	5	37%	87%
20005060	7	49%	88%
20005060	9	58%	93%
20005060	10	64%	94%
20005060	12	47%	90%
20005060	13	68%	95%
20008660	2	68%	86%

District Resource Regulation – Water Use Permitting

Sixty-nine Water Use Permit (WUP) applications were submitted for WBID 1997 to the District over the entire reporting period of performance monitoring (October 2004 to September 2014). Of the sixty-nine applications, fifty-two were renewals, seven were owner transfers, eight were letter modifications and two were a modification.

WUP Renewals and Modifications in WBID 1997

	Oct. 2004 – Jul. 2006	Aug. 2006 – Aug. 2008	Sept. 2008 – Sept. 2010	Oct. 2010 – Sept. 2012	Oct. 2012 – Sept. 2014	Totals
New WUPs	0	0	0	0	0	0
WUP Renewals	2	9	10	17	14	52
WUP Modifications	0	1	0	0	1	2
WUP Letter Modifications	1	1	0	5	1	8
WUP Owner Transfer	0	0	2	5	0	7
Totals	3	11	12	27	16	69

WBID 1997
Water Segment – Hawthorne Creek
Joshua Creek Watershed
Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

Facilitating Agricultural Resource Management Systems (FARMS) Projects

Eight FARMS projects were Board approved in WBID 1997 between October 2004 and September 2014, three of which were subsequently cancelled. Four additional projects were under consideration during this time period. The following table summarizes the projects, as well as projected and actual ground water offsets that have occurred over the performance monitoring period. Details for each of the below listed projects can be found in Appendix IV.

FARMS Projects in WBID 1997; October 2004 through September 2014

WUP Number	Project Number	Ag Type	Project Status	Operational Date	Projected Groundwater Offset (gpd)	Actual Groundwater Offset as of September 2014 (gpd)	Max. Groundwater Offset Achieved in One Month through September 2014 (gpd)
002418	H522	BLUEBERRY	Operational	11/20/2008	50,130	54,756	309,871
013225	H557	SOD	Operational	4/12/2013	128,320	28,000	163,258
009716	H560	BLUEBERRY	Operational	12/31/2009	25,000	91,420	1,191,221
004641	H594	CITRUS	Operational	9/7/2012	32,000	175,725	465,693
002665	H682	CITRUS	Under Construct	N/D	65,000	N/D	N/D
005060	H502	CITRUS	Cancelled	12/20/2005	66,000	N/D	N/D
008660	H545	CITRUS	Cancelled	N/D	0	N/D	N/D
007331	H660	CITRUS	Cancelled	N/D	106,680	N/D	N/D
008660	N/D	CITRUS	Potential	N/D	0	N/D	N/D
009567	N/D	CITRUS	Potential	N/D	0	N/D	N/D
007854	N/D	CITRUS	Dormant	N/D	0	N/D	N/D
008480	N/D	CITRUS	Dormant	N/D	0	N/D	N/D

*Potential project under consideration between October 2004 and September 2014

N/D = Not determined/project under consideration

a Funding also provided by EQIP

**The actual ground water offset fluctuates with weather conditions and seasons. The actual is calculated by dividing the number of days the project has been operational into the total gallons offset.

Quality of Water Improvement Program (QWIP)

There have been no wells plugged/abandoned in WBID 1997 since October 2004.

SPJC Water Quality Monitoring Results – Progress to Date

In-Stream Data Sonde - Conductance Logging Network (District and USGS)

There are no instantaneous data collection activities occurring in WBID 1997 at this time.

Specific Conductance Reconnaissance Network (District)

Within WBID 1997 there are currently six stations monitored for the Specific Conductance Reconnaissance Network. Of the 113 individual specific conductance values collected within WBID 1997 during the period of record, 79 values exceeded the 775 uS/cm goal criteria and 33 values exceeded the FDEP surface-water quality Class I criterion of 1275 uS/cm. The following

WBID 1997
Water Segment – Hawthorne Creek
Joshua Creek Watershed
Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

tables summarize the percent change increases and/or decreases between dry season events for each monitoring station within WBID 1997 during the 2004 to 2006, 2006 to 2008, 2008 to 2010, 2010 to 2012, and 2012 to 2014 reporting periods. Individual values for each dry season event are also provided. Stations that were not flowing during a sample event are denoted as dry in the following table.

Dry season percent changes for the 2012 to 2014 reporting period had percent changes that were either increasing, decreasing or not calculated for the reporting period due to dry conditions.

Specific Conductance Reconnaissance Results in WBID 1997; 2004 - 2006

Station	Dry Season 2004 Value uS/cm	Wet Season 2004 Value uS/cm	Dry Season 2005 Value uS/cm	Wet Season 2005 Value uS/cm	Dry Season 2006 Value uS/cm	Percent change Dry Season 2004 vs. Dry Season 2005	Percent Change Dry Season 2005 vs. Dry Season 2006
Upper Hawthorne Cr. @ Piggyback Rd. - #14	1457	423	943	748	1422	↓35.28%**	↑50.80%**
Unnamed Cr. @ SR 31 Near 760A - #31	1347	512	1226	690	1461	↓8.89%**	↑19.17%**
Unnamed Cr. @ CR 763 - #8	1303	630	1165	869	1447	↓10.59%**	↑24.21%**
Unnamed Cr. @ CR 763 - #10	*	*	809	*	*	*	*
Unnamed Ditch @ CR 763 - #11	833	*	713	494	*	↓14.41%**	*
Hawthorne Cr. @ 760A	1108	315	1009	855	1435	↓8.94%**	↑42.22%**

* Station dry

**Values modified since 2004 – 2006 Performance Monitoring Report due to calculation error.

WBID 1997
Water Segment – Hawthorne Creek
Joshua Creek Watershed
Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

Specific Conductance Reconnaissance Results in WBID 1997; 2006 - 2008

Station	Wet Season 2006 Value uS/cm	Dry Season 2007 Value uS/cm	Wet Season 2007 Value uS/cm	Dry Season 2008 Value uS/cm	Wet Season 2008 Value uS/cm	Percent change Dry Season 2006 vs. Dry Season 2007	Percent Change Dry Season 2007 vs. Dry Season 2008
Upper Hawthorne Cr. @ Piggyback	673	1345	1020	1614	710	↓5.41%	↑20.00%
Unnamed Cr. @ SR 31 Near 760A - #31	468	*	908	2420	1517	*	*
Unnamed Cr. @ CR 763 - #8	573	1544	926	2401	960	↑6.70%	↑55.51%
Unnamed Cr. @ CR 763 - #10	*	*	*	*	789	*	*
Unnamed Ditch @ CR 763 - #11	669	*	*	*	*	*	*
Hawthorne Cr. @ 760A	595	1227	999	1511	981	↓14.49%	↑23.15%

* Station dry.

Specific Conductance Reconnaissance Results in WBID 1997; 2008 - 2010

Station	Dry Season 2009 Value uS/cm	Wet Season 2009 Value uS/cm	Dry Season 2010 Value uS/cm	Wet Season 2010 Value uS/cm	Percent change Dry Season 2008 vs. Dry Season 2009	Percent Change Dry Season 2009 vs. Dry Season 2010
Upper Hawthorne Cr. @ Piggyback Rd - #14	1001	574	838	891	↓38.0%	↓16.3%
Unnamed Cr. @ SR 31 Near 760A - #31	1545	737	1780	795	↓36.2%	↑15.2%
Unnamed Cr. @ CR 763 - #8	1506	844	1241	831	↓37.3%	↓17.6%
Unnamed Cr. @ CR 763 - #10	1004	733	828	*	*	↓17.5%
Unnamed Ditch @ CR 763 - #11	1101	710	858	*	*	↓22.1%
Hawthorne Cr. @ 760A	1347	752	876	754	↓10.9%	↓35.0%

* Station dry.

WBID 1997
Water Segment – Hawthorne Creek
Joshua Creek Watershed
Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

Specific Conductance Reconnaissance Results in WBID 1997; 2010 - 2012

Station	Dry Season 2011 Value uS/cm	Wet Season 2011 Value uS/cm	Dry Season 2012 Value uS/cm	Wet Season 2012 Value uS/cm	Percent change Dry Season 2010 vs. Dry Season 2011	Percent Change Dry Season 2011 vs. Dry Season 2012
Upper Hawthorne Cr. @ Piggyback	1567 **	1067 **	2078 **	591 **	↑87.0% **	↑34.6% **
Unnamed Cr. @ SR 31 Near 760A - #31	1949 **	1126 **	2863 **	685 **	↑9.5% **	↑46.9% **
Unnamed Cr. @ CR 763 - #8	1614 **	892 **	1971 **	800 **	↑30.1% **	↑22.1% **
Unnamed Cr. @ CR 763 - #10	1050 **	911 **	1294 **	722 **	↑26.8% **	↑23.2% **
Unnamed Ditch @ CR 763 - #11	1006 **	865 **	***	902 **	↑17.2% **	***
Hawthorne Cr. @ 760A	1384 **	810	1678 **	612 **	↑58.0% **	↑21.2% **

* Station dry.

**Values modified since 2010 – 2012 Performance Monitoring Report due to the data from the 2008 – 2010 Performance Monitoring Report table being reported for this table.

Specific Conductance Reconnaissance Results in WBID 1997; 2012 - 2014

Station	Dry Season 2013 Value uS/cm	Wet Season 2013 Value uS/cm	Dry Season 2014 Value uS/cm	Wet Season 2014 Value uS/cm	Percent change Dry Season 2012 vs. Dry Season 2013	Percent Change Dry Season 2013 vs. Dry Season 2014
Upper Hawthorne Cr. @ Piggyback	1633	366	1861	432	↓21.4%	↑14.0%
Unnamed Cr. @ SR 31 Near 760A - #31	2233	419	2116	938	↓22.0%	↓5.2%
Unnamed Cr. @ CR 763 - #8	1245	351	1642	809	↓36.8%	↑31.9%
Unnamed Cr. @ CR 763 - #10	839	387	835	709	↓35.2%	↓0.5%
Unnamed Ditch @ CR 763 - #11	1675	459	*	693	*	*
Hawthorne Cr. @ 760A	1140	337	1236	552	↓32.1%	↑8.4%

* Station dry.

Pre- and Post Back-Plug Well Monitoring Network (District)

To date, no wells in WBID 1997 are monitored as part of the Back-Plug Well Monitoring Network.

Surface-Water Quality Monitoring Networks (District, FDEP, and City of Punta Gorda)

There are no water quality sample collection activities occurring in WBID 1997 at this time.

WBID 1997
Water Segment – Hawthorne Creek
Joshua Creek Watershed
Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

Habitat Assessment and Stream Condition Index Monitoring

No sites in WBID 1997 were evaluated for HAs or SCIs during the October 2004 to July 2006 time period. During the August 2006 to August 2008 reporting period, one site in WBID 1997 was evaluated for biological health indicators. No sites were evaluated for HAs and SCIs during the September 2008 to September 2012 time period. One site was evaluated for HAs and SCIs in the September 2012 to September 2014 reporting period. The results of the assessments are presented below.

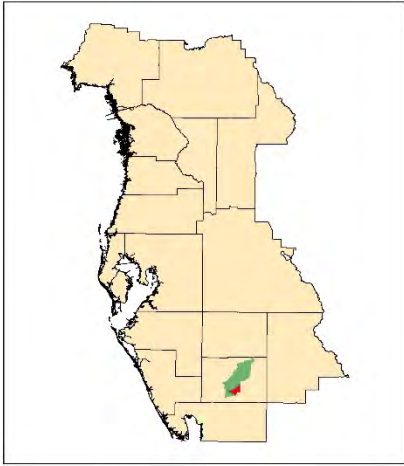
During the period between October 2004 and September 2014 the FDEP has updated its methodology for calculating the SCI score. For the sites sampled by FDEP, the FDEP retroactively recalculated the Overall SCI Score using the SCI_2012 method. The Overall SCI Scores below were reported using the SCI_2012 methodology.

Habitat Assessment and Stream Condition Index Results

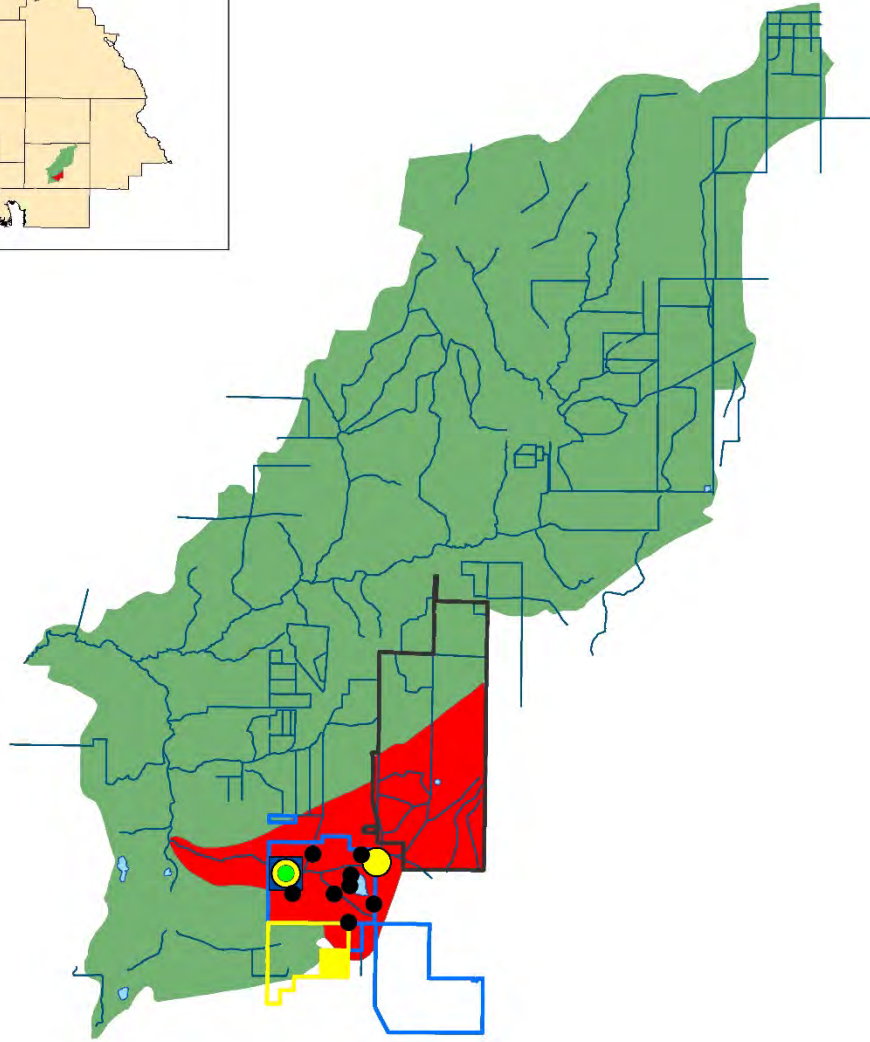
Station	Assessment Date	In-stream Characteristics Score	Morphological and Riparian Features Score	Overall Habitat Assessment Score	Overall SCI Score
Hawthorne Creek at Reynolds	01/30/2008	41	51	92 Suboptimal	65 Category 2 ("healthy")
Hawthorne Creek at Reynolds	11/16/2011	57	66	123	55 Category 2 (healthy)
Hawthorne Creek at Reynolds	07/22/2014	59	51	110	Not Collected

According to FDEP SOP 002/01 LT 7000, stations scored as Category 2 ("healthy") are characterized as having a diverse assemblage of species, with a small increase in dominance by a single taxon; very tolerant taxa represent a small percentage of individuals. This biological health assessment indicates that water quality is not having a detrimental effect on the biological communities or the Hawthorne Creek @ Reynolds site.

WBID 2001
Water Segment – Hog Bay
Joshua Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern: None



WBID 2001
 Water Segment - Hog Bay
 Joshua Creek Watershed; Water Use - Class 3F
 Verified Impaired Pollutants of Concern - None



- Data Sonde Locations
- Backplug Locations
- Reconnaissance Network Locations
- Surface Water Sample Locations
- FARMS - Dormant
- FARMS - Operational
- FARMS - Under Construct
- Lakes
- Streams and Canals
- WBID 2001
- Joshua Watershed



WBID 2001
Water Segment – Hog Bay
Joshua Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern – None


Proposed Management Actions – Progress to Date

Shell, Prairie, and Joshua Creek Well Back-Plugging Program

Since the inception of the Program, a total of 12 irrigation wells have been back-plugged in WBID 2001. The following table represents water quality improvements for TDS and chloride concentrations at these wells directly following back-plug activities. No wells were back-plugged in the current report period.

Pre- and Post Well Back-Plugging Results in WBID 2001

Permit Information		Percent Improvement	
WUP No.	DISTRICT ID (DID) No.	TDS (mg/L)	Chloride (mg/L)
20009716*	2	22%	54%
20006669	2	33%	45%
20006669	4	-18%	-46%
20006669	5	34%	62%
20006669	8	94%	99%
20006669	9	N/A	0%
20006669	10	77%	90%
20006669	11	94%	99%
20006669	12	N/A	N/A
20006669	12	95%	99%
20006669	13	83%	91%
20006669	15	48%	84%

 Denotes repeated back-plug
 *Only this DID continues to be monitored.

District Resource Regulation – Water Use Permitting

Twenty-one Water Use Permit (WUP) applications were submitted to the District in WBID 2001 over the entire reporting period of performance monitoring (October 2004 to September 2014). Of the twenty-one applications, one was for a new permit, nine were renewals, three were owner transfers, and eight were letter modifications.

WUP Renewals and Modifications in WBID 2001

	Oct. 2004 – Jul. 2006	Aug. 2006 – Aug. 2008	Sept. 2008 – Sept. 2010	Oct. 2010 – Sept. 2012	Oct. 2012 – Sept. 2014	Totals
New WUPs	0	0	0	0	1	1
WUP Renewals	2	0	3	2	2	9
WUP Modifications	0	0	0	0	0	0
WUP Letter Modifications	1	0	0	5	2	8
WUP Owner Transfer	0	0	2	1	0	3
Totals	3	0	5	8	5	21

WBID 2001
Water Segment – Hog Bay
Joshua Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern – None

Facilitating Agricultural Resource Management Systems (FARMS) Projects

Fourteen FARMS projects were Board approved in WBID 2001 between October 2004 and September 2014, one of which has subsequently been cancelled. One additional project was under consideration during this time period. The following table summarizes the projects, as well as projected and actual groundwater offsets that have occurred over the performance monitoring period. Details for each of the below listed projects can be found in Appendix IV.

FARMS Projects in WBID 2001; October 2004 through September 2014

WUP Number	Project Number	Ag Type	Project Status	Operational Date	Projected Groundwater Offset (gpd)	Actual Groundwater Offset as of September 2014 (gpd)	Max. Groundwater Offset Achieved in One Month through September 2014 (gpd)
006669	H505	CITRUS	Operational	4/21/2006	170,900	39,081	413,300
006669	H569	CITRUS	Operational	3/15/2010	127,300	146,183	795,469
006669	H604	CITRUS	Operational	11/30/2010	70,000	207,705	1,950,710
006669	H673	CITRUS	Operational	1/15/2013	173,000	206,208	768,750
006765	H516	CITRUS	Operational	8/2/2006	222,500	235,600	1,175,689
006765	H516	CITRUS	Operational	3/5/2009	76,980	202,000	711,581
006765	H584	CITRUS	Operational	6/7/2010	348,400	301,100	877,065
006765	H693	CITRUS	Operational	10/11/2013	87,100	83,600	161,800
009716	H530	BLUEBERRY	Operational	5/15/2007	71,200	115,799	402,433
002418	H522	BLUEBERRY	Operational	11/20/2008	50,130	54,756	309,871
009716	H560	BLUEBERRY	Operational	12/31/2009	25,000	91,420	1,191,221
002665	H682	CITRUS	Under Construct	N/D	65,000	N/D	N/D
006669	H695	CITRUS	Under Construct	N/D	86,600	N/D	N/D
005060	H502	CITRUS	Cancelled	12/20/2005	66,000	N/D	N/D
020103		Strawberry	Dormant	N/D	0	N/D	N/D

*Potential project under consideration between October 2004 and September 2014

N/D = Not determined/project under consideration

^a Funding also provided by EQIP

**The actual ground water offset fluctuates with weather conditions and seasons. The actual is calculated by dividing the number of days the project has been operational into the total gallons offset.

Quality of Water Improvement Program (QWIP)

From October 1, 2003 to date, one well has been plugged/abandoned through the QWIP Program in WBID 2001. The well was associated with WUP No. 20011200.03, DID number 2. It had a casing diameter of ten inches, a casing depth of 96 feet, and a total depth of 929 feet below land surface. The specific conductance at the time the well had geophysical logging performed on February 10, 2005 was 1,089 uS/cm. The well was plugged on January 20, 2006.

WBID 2001
Water Segment – Hog Bay
Joshua Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern – None

SPJC Water Quality Monitoring Results – Progress to Date

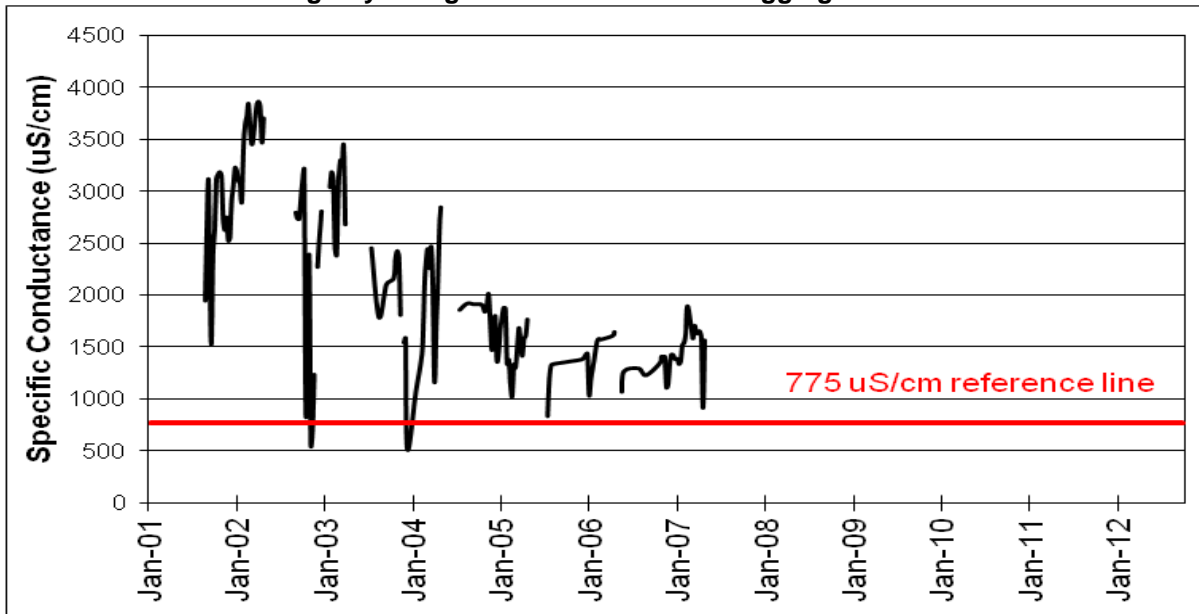
In-Stream Data Sonde - Conductance Logging Network (District and USGS)

From May 2001 to May 2007, there was one YSI® 600XLM data sonde deployed in WBID 2001 at station Hog Bay Slough in the Joshua Creek watershed. This monitoring location is no longer active because the property owner has denied access. This site is located in the western portion of WBID 2001, and flows from this canal enter Joshua Creek. The major contributing land use to this canal is agriculture (citrus), and this monitoring station is located directly within a citrus grove. Battery malfunctions occurred during May 2003, December – February 2003, and October – November 2005; therefore, no data exists for these time periods.

The following data plot shows weekly median values for specific conductance, which have been calculated from independent values collected on an hourly frequency during dry season periods (November – May) from October 2001 through May 2007. A table located at the end of this section provides the overall data sonde specific conductance monitoring results for WBID 2001.

Back-plugging activities that occurred on this property in 2001 at eight well site locations have resulted in noticeable decreases in specific conductance in this canal system throughout the period of data record (see Case Study No. 2 in the SPCWMP Reasonable Assurance document).

Hog Bay Slough In-Situ Data Sonde Logging Results



Specific Conductance Logging Results in WBID 2001 for the period from 2001 to 20007

Water Segment	Number Individual Logged Values	Number Individual Values >1275 uS/cm	Percentage of Individual Values >1275 uS/cm	Number Weekly Median Values	Number Weekly Median Values >775 uS/cm	Percentage Weekly Median Values >775 uS/cm
Hog Bay Slough	29,868	24,302	81.4%	163	160	98.2%

WBID 2001
Water Segment – Hog Bay
Joshua Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern – None

Specific Conductance Reconnaissance Network (District)

Within WBID 2001 there is currently one station monitored for the Specific Conductance Reconnaissance Network. Of the 22 individual specific conductance values collected within WBID 2001 during the period of record, no values exceeded either the 775 uS/cm goal criteria or the FDEP surface-water quality Class I criterion of 1275 uS/cm. The following tables summarize the percent change increases and/or decreases between dry season events for each monitoring station within WBID 2001 during the 2004 to 2006, 2006 to 2008, 2008 to 2010, 2010 to 2012, and 2012 to 2014 reporting periods. Individual values for each dry season event are also provided. Stations that were not flowing during a sample event have been recorded as dry in the following table.

Overall, dry season percent changes for the 2012 to 2014 reporting period had either increased or decreased.

Specific Conductance Reconnaissance Results in WBID 2001; 2004 - 2006

Station	Dry Season 2004 Value uS/cm	Wet Season 2004 Value uS/cm	Dry Season 2005 Value uS/cm	Wet Season 2005 Value uS/cm	Dry Season 2006 Value uS/cm	Percent change Dry Season 2004 versus Dry Season 2005	Percent change Dry Season 2005 versus Dry Season 2006
Hog Bay @ SR 31 - #9	605	205	403	318	622	↓33.39%**	↑54.34%**

**Values modified since 2004 – 2006 Performance Monitoring Report due to calculation error.

Specific Conductance Reconnaissance Results in WBID 2001; 2006 - 2008

Station	Wet Season 2006 Value uS/cm	Dry Season 2007 Value uS/cm	Wet Season 2007 Value uS/cm	Dry Season 2008 Value uS/cm	Wet Season 2008 Value uS/cm	Percent change Dry Season 2006 versus Dry Season 2007	Percent change Dry Season 2007 versus Dry Season 2008
Hog Bay @ SR 31 - #9	197	284	348	464	611	↓54.34%	↑63.38%

Specific Conductance Reconnaissance Results in WBID 2001; 2008 - 2010

Station	Dry Season 2009 Value uS/cm	Wet Season 2009 Value uS/cm	Dry Season 2010 Value uS/cm	Wet Season 2010 Value uS/cm	Percent change Dry Season 2008 versus Dry Season 2009	Percent change Dry Season 2009 versus Dry Season 2010
Hog Bay @ SR 31 - #9	772	565	612	431	↑66.4%	↓20.7%

WBID 2001
Water Segment – Hog Bay
Joshua Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern – None

Specific Conductance Reconnaissance Results in WBID 2001; 2010-2012

Station	Dry Season 2011 Value uS/cm	Wet Season 2011 Value uS/cm	Dry Season 2012 Value uS/cm	Wet Season 2012 Value uS/cm	Percent change Dry Season 2010 versus Dry Season 2011	Percent change Dry Season 2011 versus Dry Season 2012
Hog Bay @ SR 31 - #9	486	577	314	246	↓20.6%	↓35.4%

Specific Conductance Reconnaissance Results in WBID 2001; 2012-2014

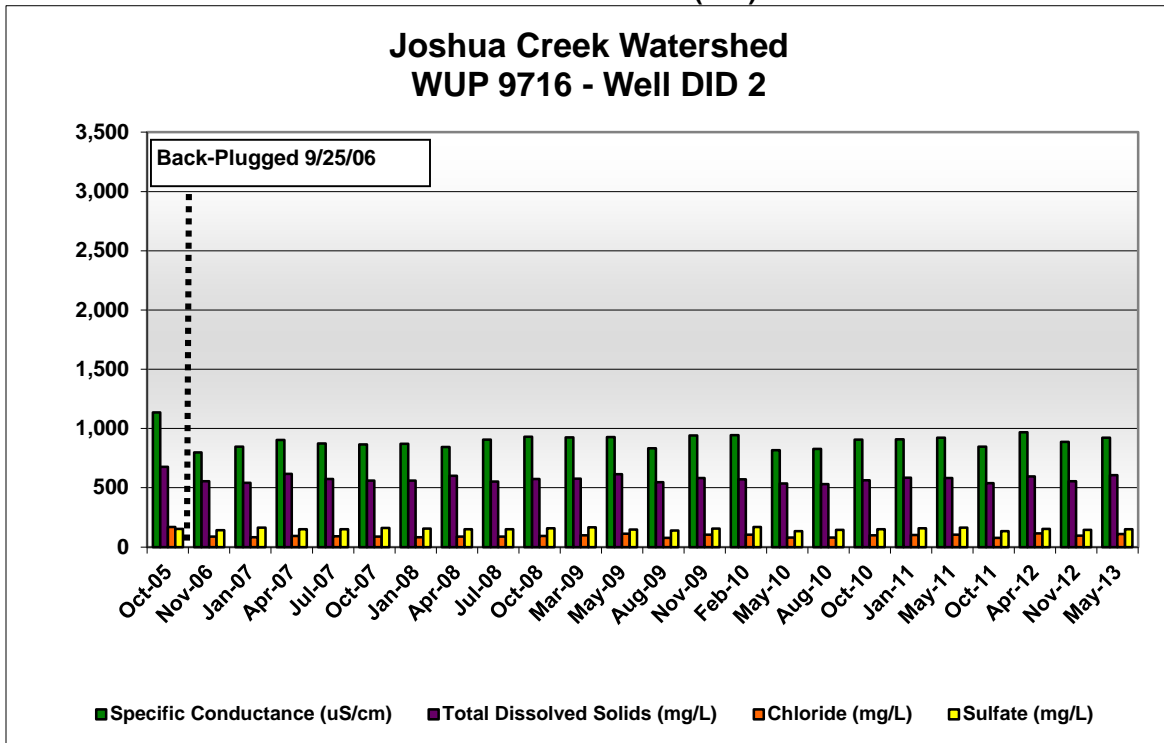
Station	Dry Season 2013 Value uS/cm	Wet Season 2013 Value uS/cm	Dry Season 2014 Value uS/cm	Wet Season 2014 Value uS/cm	Percent change Dry Season 2012 versus Dry Season 2013	Percent change Dry Season 2013 versus Dry Season 2014
Hog Bay @ SR 31 - #9	460	203	272	380	↑46.5%	↓40.9%

Pre- and Post Back-Plug Well Monitoring Network (District)

There is one back-plugged well in WBID 2001 that was sampled on a quarterly frequency to monitor long-term groundwater quality parameters and assure that the back-plug remained intact. Routine monitoring of the well was suspended in May 2013.

The following graph represents water quality results throughout the period of data record for this quarterly monitored well showing both pre- and post-back-plug values for specific conductance, sulfate, chloride, and TDS. To date, this well has retained the integrity of the post back-plug concentrations for these parameters.

WUP 20009716 – District ID(DID) No. 2



Surface-Water Quality Monitoring Networks (District, FDEP, and City of Punta Gorda)

WBID 2001
Water Segment – Hog Bay
Joshua Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern – None

The following table represents water quality results through July 2006 for chloride and TDS concentrations at one monitoring station (Hog Bay Slough) in WBID 2001. Since this monitoring site is not considered a key index station, graphical results are not presented here but can be found in Appendix I. The following information was generated using data from the District's SPJC quarterly monitoring network. Monitoring began at this location in June 2003 and ended in September 2007 due to access denial by the property owner.

Chloride and TDS Water Quality Results in WBID 2001 for the period from 2004 to 2014

Water Segment	Number Individual Reported CI Values	Number Individual CI Values >250 mg/L	Percentage Individual CI Values >250 mg/L	Number Individual Reported TDS Values	Number Individual TDS Values >500 mg/L	Percentage Individual TDS Values >500 mg/L	Number Individual TDS Values >1000 mg/L	Percentage Individual TDS Values >1000 mg/L
Hog Bay Slough	58	35	60.3%	59	59	100%	56	95%

*Monitoring site located in agricultural canal – not on main channel of Joshua Creek.

Habitat Assessment and Stream Condition Index Monitoring (District)

No sites in WBID 2001 were evaluated for HAs or SCIs during the October 2004 to July 2006, September 2008 to September 2010, and 2010 to 2012 reporting periods. During the August 2006 to August 2008 reporting period, two sites in WBID 2001 were evaluated for HAs and SCIs. One site in WBID 2001 was evaluated for HAs and SCIs in the September 2012 to September 2014 reporting period. The results of the assessments are presented below.

During the period between October 2004 and September 2014 the FDEP has updated its methodology for calculating the SCI score. For the sites sampled by FDEP, the FDEP retroactively recalculated the Overall SCI Score using the SCI_2012 method. Sites with SCI values calculated using the SCI_2012 method are noted with an asterisk. The remaining sites were evaluated using the SCI_2007 method.

Habitat Assessment and Stream Condition Index Results

Station	Assessment Date	In-stream Characteristics Score	Morphological and Riparian Features Score	Overall Habitat Assessment Score	Overall SCI Score
Hog Bay Slough	05/23/2007	40	67	107 Suboptimal	46 Category 2 ("healthy")
Hog Bay at CR 763	01/30/2008	42	36	78 Marginal	53 Category 2 ("healthy")
*Hog Bay at CR 763	11/16/2011	43	55	98 Suboptimal	38 Category 2 (healthy)
*Hog Bay on Taylor Property	04/25/2013	54	68	122 Optimal	39 Category 2 ("healthy")
*Hog Bay on Taylor Property	12/18/2013	53	58	111 Suboptimal	48 Category 2 ("healthy")

* Overall SCI Score recalculated retroactively by FDEP using SCI_2012 methods.

WBID 2001

Water Segment – Hog Bay

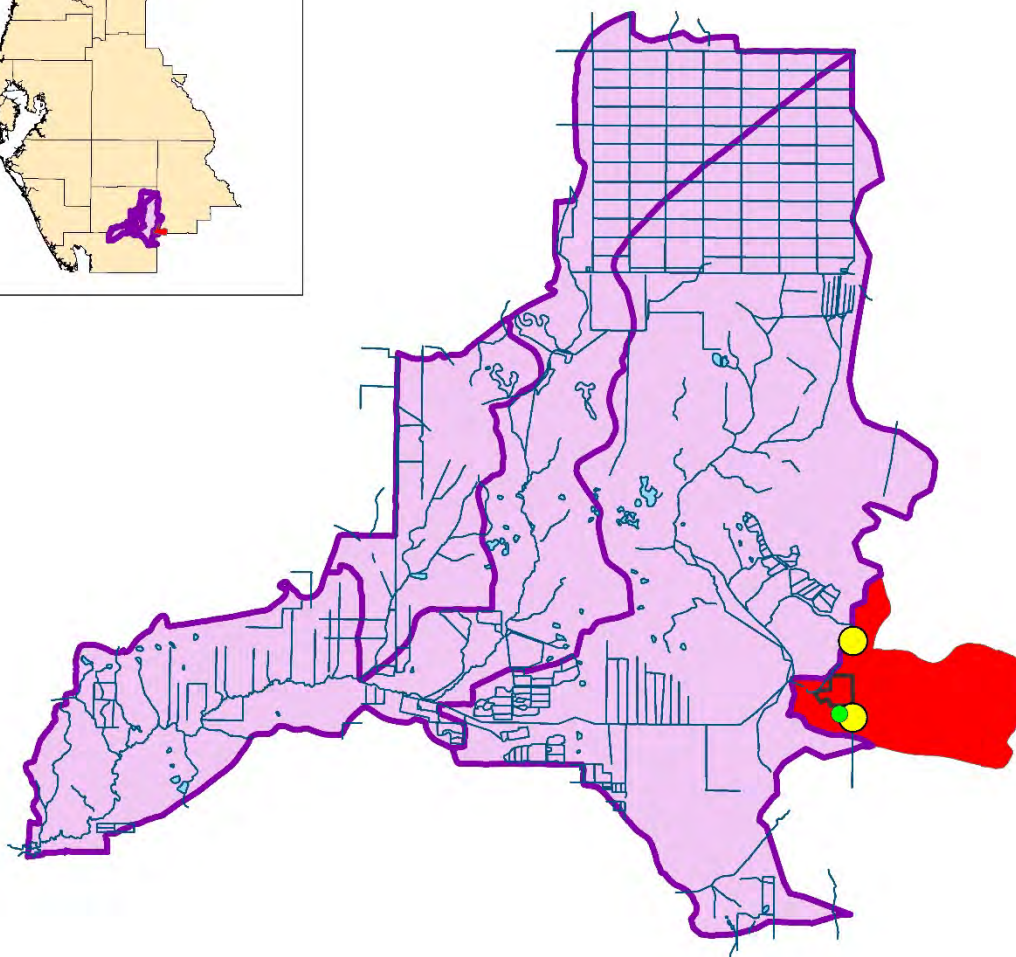
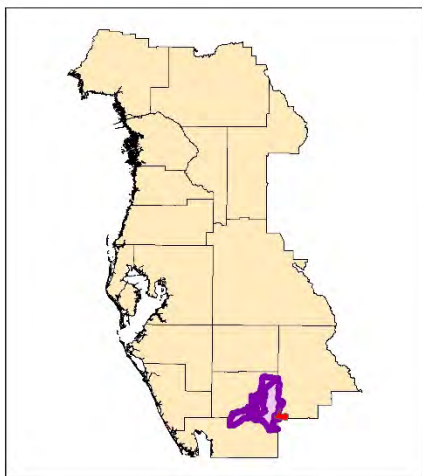
Joshua Creek Watershed: Water Use – Class 3F

Verified Impaired Pollutants of Concern – None

According to FDEP SOP 002/01 LT 7000, stations scored as Category 2 (“healthy”) are characterized as having a diverse assemblage of species, with a small increase in dominance by a single taxon; very tolerant taxa represent a small percentage of individuals. These assessments indicate that water quality is not having a detrimental effect on the biological communities at the Hog Bay Slough, Hog Bay at CR 763 sites and Hog Bay on Taylor Property.

WBID 2020
Water Segment – Gannet Slough
Prairie Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

WBID 2020
Water Segment - Gannett Slough
Prairie Creek Watershed; Water Use - Class 3F
Verified Impaired Pollutants of Concern - None



-  Data Sonde Locations
-  Reconnaissance Network Locations
-  FARMS - Dormant Contacts
-  Lakes
-  Streams and Canals
-  WBID 2020
-  Prairie Creek Watershed



10
Miles

WBID 2020
Water Segment – Gannett Slough
Prairie Creek Watershed; Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

Proposed Management Actions – Progress to Date

Shell, Prairie, and Joshua Creek Well Back-Plugging Program

To date, no irrigation wells have been back-plugged in WBID 2020.

District Resource Regulation – Water Use Permitting

One Water Use Permit (WUP) applications were submitted for WBID 2020 to the District over the entire reporting period of performance monitoring (October 2004 to September 2014). The application was for a renewal.

WUP Renewals and Modifications in WBID 2020

	Oct. 2004 – Jul. 2006	Aug. 2006 – Aug. 2008	Sept. 2008 – Sept. 2010	Oct. 2010 – Sept. 2012	Oct. 2012 – Sept. 2014	Totals
New WUPs	0	0	0	0	0	0
WUP Renewals	0	1	0	0	0	1
WUP Modifications	0	0	0	0	0	0
WUP Letter Modifications	0	0	0	0	0	0
WUP Owner Transfer	0	0	0	0	0	0
Totals	0	1	0	0	0	1

Facilitating Agricultural Resource Management Systems (FARMS) Projects

One potential FARMS project was under consideration within this WBID between October 2004 and September 2014.

Potential FARMS/EQIP Projects in WBID 2020; October 2004 through September 2014

WUP Number	Project Number	Ag Type	Project Status	Operational Date	Projected Groundwater Offset (gpd)	Actual Groundwater Offset as of September 2014 (gpd)	Max. Groundwater Offset Achieved in One Month through September 2014 (gpd)
011665		Citrus	Dormant	N/D	N/D	N/D	N/D

N/D = Not determined/project under consideration

SPJC Water Quality Monitoring Results – Progress to Date

In-Stream Data Sonde - Conductance Logging Network (District and USGS)

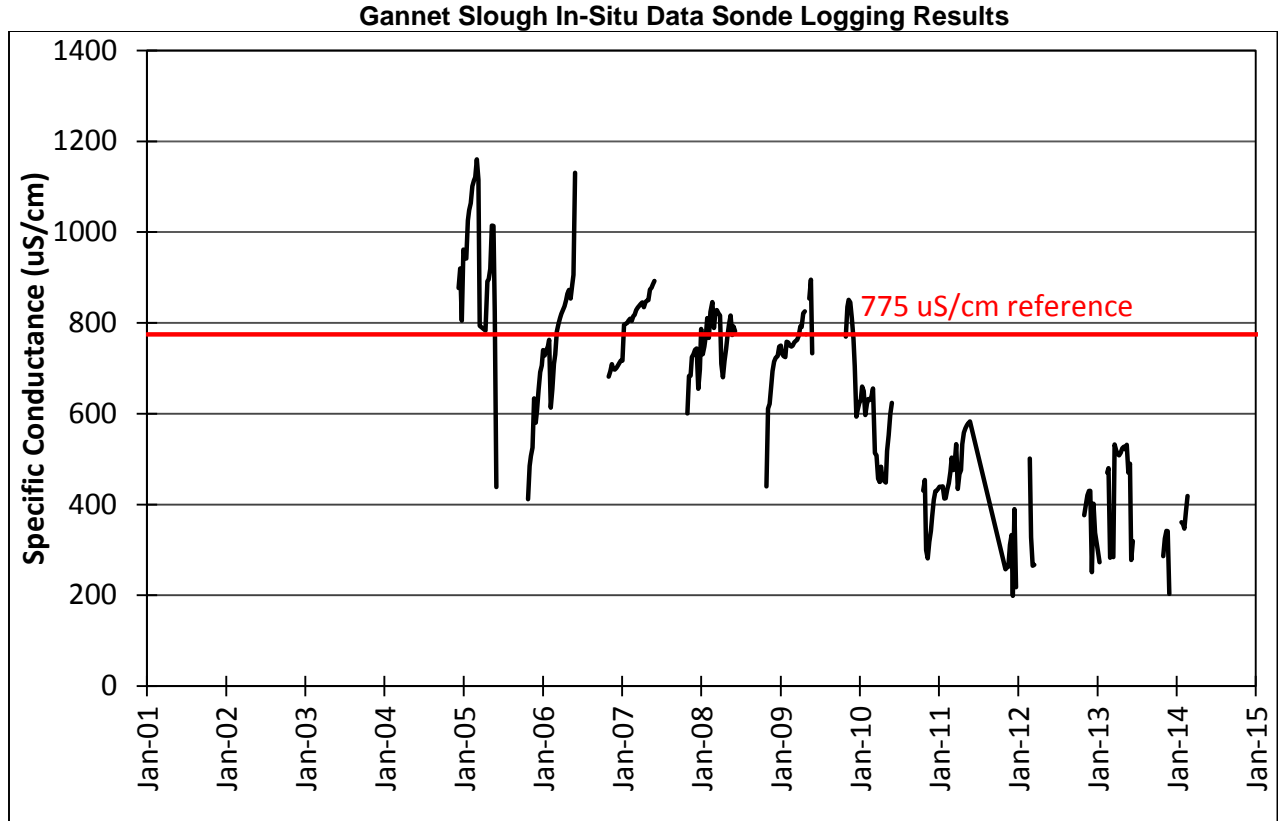
The **Gannet Slough** data sonde is deployed in a small tributary/slough in the southeastern region of the Prairie Creek watershed. This monitoring site is located in the South Florida Water Management District and surrounding land uses include agriculture (citrus) and rangeland. Gannet Slough flows to the west, with flows eventually entering Montgomery Canal/Prairie Creek. Although WBID 2020 is not contained within the study/monitoring area boundary for SPJC management actions and monitoring initiatives, the District established this data collection site to

WBID 2020

*Water Segment – Gannett Slough
 Prairie Creek Watershed; Water Use – Class 3F
 Verified Impaired Pollutants of Concern: None*

determine the water quality of this tributary/slough and its potential impacts to the receiving surface waters in the Prairie Creek Watershed.

The following data plot shows weekly median values for specific conductance, which have been calculated from independent values collected on an hourly frequency during dry season periods (November – May) from December 2004 through February 2014. Dry season specific conductance values have decreased over the period of record.



Specific Conductance Logging Results in WBID 2020 for the period from 2004 to 2014

Water Segment	Number Individual Logged Values	Number Individual Values >1275 uS/cm	Percentage of Individual Values >1275 uS/cm	Number Weekly Median Values	Number Weekly Median Values >775 uS/cm	Percentage Weekly Median Values >775 uS/cm
Gannett Slough	46,103	4	0%	263	79	30%

Regional Management Actions in the SPJC Watersheds

District Resource Regulation

The legislative basis for Water Use Permitting and Well Construction are codified in Chapter 373, Parts II and III, F.S. District rules Chapter 40D-2 (Consumptive Use of Water), and Chapter 40D-3 (Well Construction), were adopted by the District to implement these two Regulatory Programs. Under these programs an applicant must meet the three-prong test of Chapter 373 and the Conditions for Issuance in order for a permit to be issued for well construction or water use. If the application meets the Conditions for Issuance and the permit is issued with the appropriate standard and special conditions, the District is provided with the reasonable assurance that the well construction and water use will meet the District's regulatory program responsibilities and the Class I water quality standards.

Well Construction Permitting

Since implementation of the SPCWMP Reasonable Assurance document, staff has re-evaluated the number of irrigation wells related to WUPs that are proposed to be constructed in the three watersheds. Through current reporting period, approximately 156 wells were proposed to be constructed through approved WUPs within the SPJC watersheds. Of this total, 46 wells have proposed total depths that exceed the depth criteria*. These wells could potentially intersect highly mineralized zones within the Upper Floridan aquifer system and exceed water quality limits, therefore a maximum total depth will be imposed for these proposed WUP-related wells through well construction stipulations. Below is a breakdown of the proposed wells in all three watersheds.

**Approximate Number of Proposed Irrigation Wells - Potential Contributions to Impairment
(August 2006 – September 2012)**

Watershed	No. of Proposed WUP-Related Irrigation Wells (Aug. 2006 – Aug. 2008)	No. of Proposed WUP-Related Irrigation Wells (Aug. 2006 – Sept. 2010)	No. of Proposed WUP-Related Irrigation Wells (through 2012)**	Depth Criteria*	Total No. Proposed WUP-Related Wells Exceeding Criteria through 2012**
Joshua	36	37	35	1400	12
Prairie	74	65	75	1200	28
Shell	12	40	46	450	6
TOTALS	122	142	156	N/A	46

*Total depth criteria used in the well construction queries were taken from average depths of post back-plugged irrigation wells per watershed and ROMP well site vertical water quality profile data.

**Wells listed as proposed by watershed as of February 2013.

Well construction permits (WCP) associated with WUPs issued by the District will contain the following limitations and requirements for wells constructed in the Shell, Prairie, and Joshua Creek watersheds: 1) maximum total depth limits, 2) required water quality sampling with depth, and 3) a maximum specific conductance limit of 1000 uS/cm. Historically, two WCP Stipulations have been used to ensure that these criteria were followed: 1) Stipulation No. 31 – Special Well Construction and 2) Stipulation No. 41 – Special Well Construction – Water Quality Sampling. In 2007, these WCP Stipulations were combined into Stipulation No. 56 - Special Well Construction and water quality sampling for the Shell, Prairie, and Joshua Creek Watersheds. Copies of these three stipulations are attached in Appendix II.

The aquifer information generated from the well back-plugging program is available to regulatory staff. Staff will utilize the information when making decisions regarding well construction in order to avoid continued use of highly mineralized water as a permanent irrigation source.

Nearly 700 groundwater wells have been permitted and constructed in the SPJC since August, 2006. Staff is working on continued coordination to ensure all permits in these watersheds receive both stipulations.

**Approximate Number of Permitted and Constructed Wells in the
SPJC Watersheds (August 1, 2006 through September 30, 2012)**

Watershed	No. of Permitted and Constructed Wells	Depth Criteria*	Wells Exceeding Criteria
Joshua	405	1400	5 – 1 new, 3 repairs, 1 plugging
Prairie	166	1200	5 – 2 new and 3 repairs
Shell	122	450	8– 2 new, 2 repairs, and 4 pluggings
TOTALS	693	N/A	18 – 5 new, 8 repairs, and 5 pluggings

Well Construction

Geographic Information Systems (GIS) analyses of the District's well construction database indicate that there are approximately 1121 existing permitted and constructed groundwater irrigation wells within the SPJC watersheds. Of these existing wells, approximately 386 exceed the depth criteria.

**Approximate Number of Existing Permitted and Constructed Irrigation Wells Potentially
Contributing to Impairment in the
SPJC Watersheds (through 2012)**

Watershed	No. of Existing Permitted and Constructed Irrigation Wells	Depth Criteria*	Wells Exceeding Criteria
Joshua	386	1400	89
Prairie	428	1200	154
Shell	307	450	143
TOTALS	1121	N/A	386

*Total depth criteria used in the well construction queries were taken from average depths of post back-plugged irrigation wells per watershed and Regional Observation Monitor Well Program (ROMP) well site vertical water quality profile data.

Additional GIS well construction depth analyses indicate that there are 528 permitted and constructed irrigation wells located in the three impaired WBIDs of Shell Creek and Prairie Creek. Of these wells, approximately 218 exceed depth criteria in verified impaired WBIDs 1962, 2040 and 2041. Due to their location, these wells may directly contribute to impacts in area surface waters due to runoff from mineralized ground water. Testing of these irrigation wells is considered a priority in support of the FARMS Program and property owners will be given all possible assistance to expedite this task. A summary of existing irrigation well queries within the impaired WBIDs is given below.

Potential Number of Permitted and Constructed Irrigation Wells Directly Contributing to Impairment in the SPJC Watersheds

Watershed	WBID No.	No. of Permitted and Constructed Irrigation Wells	Depth Criteria*	Wells Exceeding Criteria
Shell	2040	144	450 ft.	92 (17 WUPs)
Shell	2041	117	450 ft.	38 (10 WUPs)
Prairie	1962	267	1200 ft.	88 (27 WUPs)
TOTALS	N/A	528	N/A	218 (53 WUPs – one WUP is in more than one WBID)

*Total depth criteria used in the well construction queries were taken from average depths of post back-plugged irrigation wells per watershed and ROMP well site vertical water quality profile data.

Within the impaired WBIDs, these "deeper" wells are associated with 27 WUPs in the Prairie Creek watershed and 27 WUPs in the Shell Creek watershed and may be directly contributing to mineralized concentrations within these three impaired surface water WBIDs. These properties are considered a priority within the SPCWMP Reasonable Assurance document and will be given all possible assistance under the FARMS Program. Twenty-two of these priority permits located in the three Shell and Prairie Creek priority watersheds have Board approved FARMS projects.

Water Use Permitting

The District regulates the use of groundwater and surface water for irrigation, as well as other uses through Chapter 40D-2, Consumptive Use of Water. As part of the evaluation process, the District requires all Water Use Permit (WUP) applicants to evaluate the economic, technical, and environmental feasibility of developing an alternative supply, such as surface water. Funding for development of these alternative supplies can be provided through the FARMS program. Farm operators have an additional incentive to participate in the FARMS Program to address water quality issues in the SPJC watersheds. A June 30, 2010 amendment to the District’s water use permitting rules in Chapter 40D-2, F.A.C. address permits with a 20 year duration. The amendment language allows for 20 year permits to be issued in accordance with the following criteria outlined in 40D-2.321, “Duration of Permits.” This Rule was amended again, with Rule development beginning in July, 2012 and the Rule became effective on January 1, 2013. The most recent Rule amendment allows more permits to be eligible for the 20 year duration and the language for each amendment is presented below.

June 2010:

- (1) When requested by an applicant, a water use permit shall have a duration of 20 years if:*
 - (a) The applicant provides reasonable assurance that the proposed withdrawals and use meets the conditions for issuance in Rule 40D-2.301, F.A.C., and the criteria in Part B, Basis of Review, of the Water Use Permit Information Manual, incorporated by reference in Rule 40D-2.091, F.A.C., and*
 - (b) There is a demonstrated demand of at least 20 years, and*
 - (c) One or more of the conditions in paragraph (2) (a)-(f) will be met, and*
 - (d) Where mitigation measures are proposed by the applicant, paragraph (2) (g) is met.*
- (2) Conditions for a water use permit with a duration of 20 years:*
 - (a) The permit is for the development of an Alternative Water Supply. A longer duration shall be granted where the permittee demonstrates a longer duration is required by the bonding authority for the retirement of bonds issued for the construction of the project and the applicant*

provides reasonable assurance that the proposed use meets the conditions for issuance in Rule 40D-2.301, F.A.C., and the criteria in Part B, Basis of Review, of the Water Use Permit Information Manual, and that there is a demonstrated demand for the requested duration.

(b) The applicant demonstrates that at least 75 percent of their total annual average water needs will be met using an Alternative Water Supply or Supplies by the tenth year of the permit.

(c) The applicant demonstrates that it has achieved and will maintain a compliance per capita rate of less than 110 gallons per day per person, or will achieve such per capita by the tenth year of the permit. For regional water supply authorities, the per capita rate requirements shall refer to the weighted average compliance per capita rate of the member governments.

(d) The applicant demonstrates for its system-wide use of reclaimed water including imports and exports that it will beneficially reuse at least 75 percent of its treated domestic waste water, and at least 75 percent of that quantity will offset existing and planned water supplies by the tenth year of the permit. The term offset means the amount of traditional, potable quality water supplies that will be replaced by reclaimed water, expressed as an annual average in MGD.

(e) The applicant demonstrates that the project meets the Conditions of Eligibility of the Facilitating Agricultural Resource Management System (FARMS) program as specified in Rule 40D-26.101, F.A.C. and has an approved Facilitating Agricultural Resource Management System (FARMS) application and, by the tenth year of the permit, demonstrates that it will develop an Alternative Water Supply or Supplies that offset a minimum of 50 percent of the applicant's current fresh or brackish water supply.

(f) The permit to be issued is a Small General.

(g) Any pre-existing adverse impacts resulting from the permittee's existing permit that are being addressed through a mitigation plan that includes a minimum flow and level recovery strategy must be eliminated by the tenth year of the permit.

January 2013:

(1) When requested by an applicant, a water use permit shall have a duration of 20 years provided the applicant provides sufficient data to demonstrate reasonable assurance that the proposed use meets the conditions for issuance in Rule 40D-2.301, F.A.C., and the criteria in Part B, Basis of Review, of the Water Use Permit Information Manual, incorporated by reference in Rule 40D-2.091, F.A.C. for the requested duration.

(2) If there are pre-existing adverse impacts resulting from the permittee's existing permit that are being addressed through a mitigation plan that includes a minimum flow and recovery strategy that must be eliminated by the tenth year of the permit, the water use permit shall have a duration of 10 years provided that the applicant provides sufficient data to demonstrate reasonable assurance that the proposed use meets the conditions for issuance in Rule 40D-2.301, F.A.C., and the criteria in Part B, Basis of Review, of the Water Use Permit Information Manual, incorporated by reference in Rule 40D-2.091, F.A.C. for the permit's duration. Subsection (3) shall not apply to a permit required to have a 10 year duration pursuant to subsection 40D-2.321(2), F.A.C.

(3) Permits that do not qualify for a 20 year permit duration pursuant to subsection 40D-2.321(1), F.A.C., shall be issued for a shorter duration that reflects the period for which the applicant has provided sufficient data to demonstrate such reasonable assurances that the proposed use meets the conditions for issuance in Rule 40D-2.301, F.A.C., and the criteria in Part B, Basis of Review, of the Water Use Permit Information Manual, incorporated by reference in Rule 40D-2.091, F.A.C.

(4) The District is authorized to issue permits for a period up to 50 years in accordance with Section 373.236(3), F.S.

(5) If the permitted water use activity ceases for more than 2 years the permit shall be subject to revocation unless documentation is provided indicating that use will recommence within the next year.

(6) Permits that are modified prior to renewal will maintain the original expiration date unless the applicant requests the modification be deemed by the District to be substantial as described in the Basis of Review Section 1.12, and treated as a renewal with modification. If the District determines that the criteria of Basis of Review Section 1.12 are met, the application shall be processed as a renewal application with modification. Notwithstanding Basis of Review Section 1.12(2)a.(5), a request for modification solely of the permit expiration date of a water use permit issued from January 1, 2003 to December 31, 2012, shall be approved by letter, provided the permit is in compliance with the criteria in Rule 40D-2.301, F.A.C. and all conditions of the permit, and the permit does not exceed the applicable permit duration provided in subsection 40D-2.321(1), F.A.C. or is a permit required to have a ten year duration pursuant to subsection 40D-2.321(2), F.A.C.

(7) Wholesale Public Supply Permits shall be issued with an expiration date that coincides with the expiration date of the supplier's permit that provides the majority of the supply to the Wholesale Public Supply Permittee.

(8) Subject to the limitations on groundwater allocations explained in the provisions under the heading "REQUIREMENTS FOR APPLICANTS FOR GROUNDWATER WITHDRAWALS WITHIN THE CENTRAL FLORIDA COORDINATION AREA" set forth in Section 3.6 of the Basis of Review ("the Provisions"), within the CFCA, the maximum permit duration for a Public Supply Utility or Similar Applicant proposing to withdraw groundwater shall be limited to December 31, 2013, unless the applicant will satisfy the requirements of B.2.a. or b., of the Provisions. If the applicant satisfies the requirements of B.2.a., or b., the permit duration shall be up to 20 years.

Since the implementation of the SPCWMP Reasonable Assurance document, staff have refined the boundaries of the watersheds and corrected the number of water use permits located in or bordering the watersheds. Based on that evaluation, there are currently 297 WUPs issued by the District in the Shell, Prairie and Joshua Creek watersheds for agriculture, mining/dewatering, public supply and industrial/commercial uses. During the October 2004 – July 2006 reporting period approximately 106.4 million gallons per day (mgd) was permitted for these four use types, approximately 117.6 mgd was permitted over the August 2006 – August 2008 reporting period, approximately 143 mgd was permitted for the September 2008 – September 2010 reporting period, and approximately 142 mgd for the September 2010- September 2012 period. During the current reporting period, approximately 87 percent of the total water use permits was issued for agricultural use with less than one percent for industrial/commercial, 1.5 percent issued for mining/dewatering, and 11 percent for public supply. The table below provides a complete breakdown of the WUPs in the Shell, Prairie and Joshua Creek watersheds over all four reporting time periods.

Water Use Permit Summary in the SPJC Watersheds (October 2004 – July 2006)

Predominant Use	Shell Creek (avg. gpd)	Prairie Creek (avg. gpd)	Joshua Creek (avg. gpd)	Total (avg. gpd)	Percent Use in Watershed
Agriculture	19,422,400	47,254,560	33,576,000	100,252,960	94.2%
Public Supply	5,370,100	347,600	155,000	5,872,700	5.5%
Mining/ Dewatering	95,000	121,000	0	216,000	0.2%
Industrial/ Commercial	0	0	76,100	76,100	0.1%
Total Permitted Quantities (gpd)	24,887,500	47,723,160	33,807,100	106,417,760	100.0%

Water Use Permit Summary in the SPJC Watersheds (August 2006 – August 2008)

Predominant Use	Shell Creek (avg. gpd)	Prairie Creek (avg. gpd)	Joshua Creek (avg. gpd)	Total (avg. gpd)	Percent Use in Watershed
Agriculture	17,631,300	47,624,600	33,870,700	99,126,600	84.4%
Public Supply	15,300,100	821,600	155,000	16,276,700	13.9%
Mining/ Dewatering	1,806,500	211,500	0	2,018,000	1.7%
Industrial/ Commercial	0	0	0	0	0%
Total Permitted Quantities (gpd)	34,737,900	48,657,700	34,025,800	117,421,300	100.0%

Water Use Permit Summary in the SPJC Watersheds (Sept 2008 – Sept 2010)

Predominant Use	Shell Creek (avg. gpd)	Prairie Creek (avg. gpd)	Joshua Creek (avg. gpd)	Total (avg. gpd)	Percent Use in Watershed
Agriculture	27,797,500	56,937,600	41,406,800	126,141,900	88.2%
Public Supply	15,300,100	821,600	155,000	16,276,700	11.4%
Mining/ Dewatering	319,700	204,300	0	524,000	0.4%
Industrial/ Commercial	0	0	76,100	76,100	<0.1%
Total Permitted Quantities (gpd)	43,417,300	57,963,500	41,637,900	143,018,700	100.0%

Water Use Permit Summary in the SPJC Watersheds (Sept 2010- Sept 2012)

Predominant Use	Shell Creek (avg. gpd)	Prairie Creek (avg. gpd)	Joshua Creek (avg. gpd)	Total (avg. gpd)	Percent Use in Watershed
Agriculture	25,716,200	57,213,300	41,391,780	124,321,280	87.1%
Public Supply	15,300,100	821,600	0	16,121,700	11.3%
Mining/ Dewatering	2,048,000	147,100	0	2,195,100	1.5%
Industrial/ Commercial	0	0	76,100	76,100	<0.1%
Total Permitted Quantities (gpd)	43,064,300	58,182,000	41,474,580	142,788,880	100.00%

Of the 11.3 percent for public supply, 99 percent is surface water from the Shell Creek Reservoir for the City of Punta Gorda. The remaining percentage is groundwater that is treated through a lime softening process or other similar process to meet drinking water standards prior to consumption.

The quantities of water for mining/dewatering are based upon that volume of water that is transported off-site as moisture contained within the product mined, generally sand or shell. The shallow water table aquifer water contained within the sand or shell does not contribute to the declining water quality in these two basins and is not considered an integral contributor to the water quality issues in these basins.

The permits that have been renewed in the past several years will contain all of the necessary special conditions designed to meet the water quality issues associated with this management plan. Appendix II provides an example of the special conditions attached to WUPs to address water quality impairment in the SPJC watersheds prior to 2007 and the revised/simplified special conditions in use after 2007.

Within the WUP renewal process, each applicant must address the issue of groundwater quality, the potential effects on the surface water bodies within each WBID in which it is located and address the composite water quality potentially leaving each site. An integral part of that analysis includes water quality sampling of ground water from existing wells and potentially modifying the construction of the existing well if the water quality does not meet the standard of 1000 uS/cm. In addition, if a new well is proposed under the water use permit the District will stipulate the construction standard in order to meet all of the requirements of the SPCWMP Reasonable Assurance document (see Appendix III).

Resource Regulation activities have already shown the ability to account for a significant improvement in surface water quality. As District staff performs water quality monitoring in tributaries that flow into Shell, Prairie and Joshua Creeks, they are able to identify potential water quality "hot spots". The location of these "hot spots" provides Regulation staff with additional information that can be taken into account during the WUP evaluation process. Regulation staff then urges permittees toward the FARMS and Back-Plugging Programs for cost-share assistance to address and remediate water quality issues at those sites. This staff coordination within the District will allow for continued water quality improvements within these watersheds.

Mini-FARMS Program

In 2005, the District and FDACS agreed to co-fund the Mini-FARMS Program, which assists smaller growers (generally defined as having irrigated acreage of less than 100 acres) in establishing Best Management Practices (BMPs) for water resource improvements within the District. The cost-share reimbursement rate was capped at 85 percent of verified costs for eligible items, up to a maximum amount of \$8,000 per project. Program cooperators sign a "Notice of Intent" (NOI) form that is submitted to FDACS staff to provide documentation that serves as proof of the applicant's intent to implement BMPs in accordance with F.S. 403.067(7) (c) 2.

Beginning in 2010 the Mini-FARMS cost-share rate was changed to 75 percent of verified costs for eligible items, up to \$5,000 per project with eligibility and reimbursements administered jointly by FDACS and the District.

To qualify for Mini-FARMS BMP cost-share the following criteria must be met:

- Agricultural properties under consideration for cost share are limited to 100 irrigated acres or less per parcel. All pressurized irrigation systems are encouraged to receive an expedited Mobile Irrigation Lab evaluation if water conservation BMPs are contemplated.
- Actively engaged in agriculture the past two years.
- All sites considered for possible cost share assistance must be free of active regulatory enforcement action that may influence the scope of the project.
- A grower must be enrolled to implement BMPs. Qualifying BMPs must be first time, new installations; the Mini-FARMS Program will not reimburse for like-kind replacements. Replacement of existing items may be eligible if improvements to the system can be demonstrated to have environmental benefits.

The total mini-FARMS projects implemented and reimbursed by the District are listed in the following table:

Mini- FARMS projects in SPJC during October 2012 to October 2014				
Fiscal year	BMP Practice	Crop type	Grower Cost	District Cost
2012	Weather Station	Vegetables	\$6,998.87	\$5,000.00
2012	Crop cloth	Vegetables	\$4,881.00	\$3,660.75
2014	Permanent Fertigation Facility	Citrus	\$5,485.68	\$3,226.88
2014	Permanent Fertigation Facility	Citrus	\$1,883.46	\$1,412.60
2014	Permanent Fertigation Facility	Citrus	\$4,047.81	\$3,035.86
		Total	\$23,296.82	\$16,336.09

Best Management Practices

Agricultural BMP Implementation through the Notice of Intent (NOI) Process and Florida Watershed Restoration Act

The FDACS coordinates with the FDEP and other stakeholders to identify and adopt science-based BMPs to minimize water quality and quantity impacts from agricultural operations. FDACS Office of Agricultural Water Policy also has a Cost Share Program to assist in implementation of BMPs in the manuals for water quality improvements as well as water conservation. BMPs must be economically viable and focus on real problems using workable solutions. As a part of BMP implementation, growers participate in an environmental assessment of their farming operations. This process helps to identify the applicable BMPs to address water quality and quantity concerns. Farmers and ranchers submit the identified

BMPs, those in place and planned, to FDACS along with an NOI to implement the BMPs. The District's Governing Board approved funding for the IFAS BMP Implementation Team at a level of \$50,000 for Fiscal Years FY2010 through FY2012 and \$50,760 in FY2014 for a combined total of \$250,760. Additional funding support from the District is anticipated in future years.

Section 403.067(7) (c)(3), Florida Statutes, provides a *Presumption of Compliance* with water quality standards to growers who enroll in and implement/maintain FDACS BMPs that FDEP has verified as effective in addressing pollutant loads addressed by the practices. Participation in BMPs also precludes FDEP from recovering costs or damages associated with contamination of surface or ground waters from the targeted pollutants. Additionally, growers enrolled in the BMP Program can become eligible for cost-share funding to implement specific practices. FDACS has the lead role in coordinating the development and implementation of BMPs. The adopted manuals, rules, and other documents can be found at:

<http://www.floridaagwaterpolicy.com/BestManagementPractices.html>

Water Quality BMPs for Citrus Groves

In February 2005, the FDACS adopted a manual detailing BMPs for Citrus Groves in the Peace River and Manasota Basins. The complete historic manual can be found at:

http://www.floridaagwaterpolicy.com/PDF/Bmps/Bmp_PeaceRiverCitrus2004.pdf

The FDACS adopted a consolidated, statewide citrus manual in 2012, which integrates flatwoods and ridge citrus BMPs into a single document:

http://www.floridaagwaterpolicy.com/PDF/Bmps/Bmp_FloridaCitrus2012.pdf

The major categories of BMPs include:

- Grove Development and Renovation
- Nutrient Management
- Irrigation Management
- Drainage Management
- Sediment and Erosion Control Measures
- Water Resources Protection
- Integrated Pest Management

Ridge Citrus operations will be required to re-enroll under the manual within a specified time period. While already-enrolled active flatwoods operations will be “grandfathered” under the new manual, grove owners who are re-establishing fallow groves will be encouraged and expected to re-enroll under the new manual. BMPs in the Citrus BMP Program involve water management systems, including tailwater recovery, surface water use, and soil moisture monitoring. These are activities the FARMS Program typically funds.

Overall, 55,032 citrus acres in the SPJC have been enrolled in the BMP program as of September, 2014.

Best Management Practices for Vegetable and Agronomic Crops

In 2006, FDACS adopted a manual detailing the water quality/quantity BMPs for Florida Vegetable and Agronomic Crops. This manual was revised and updated in October 2015 and includes BMPs for vegetables, field crops, sugarcane, forage grasses grown for hay or silage production, or caladiums and applies to farmers statewide.

The BMPs contained in the existing manual should decrease leaching of nutrients and agricultural chemicals into groundwater and reduce the off-site movement of pesticides, nutrients, sediments, and overall water volume to surface water sources. The major categories of BMPs are listed below. The manual can be found at: http://www.freshfromflorida.com/content/download/63017/1444054/VACBMP_FINAL_2015.pdf

- Pesticide Management
- Conservation Practices And Buffers
- Erosion Control And Sediment Management
- Nutrient And Irrigation Management
- Water Resources Management
- Seasonal Or Temporary Farming

The BMPs assist in the implementation of the vegetable and agronomic BMP Program involve water management systems, including tailwater recovery systems, surface water use, and soil moisture monitoring. These are activities that FARMS typically funds.

Overall, 4,148 vegetable acres in the SPJC have been enrolled in the BMP program as of September, 2014.

Best Management Practices for Cow/Calf Operations

In 2009, the FDACS adopted a statewide BMP manual for beef cow/calf operations in Florida. These practices are designed to protect water resources and help maintain compliance with state water quality standards. The manual discusses Total Maximum Daily Loads (TMDLs) and why it is important to the rancher to implement BMPs. Assistance in conducting a site assessment and enrolling in BMPs can be obtained from FDACS and its contractors. Agricultural Extension agents may be able to provide technical assistance with BMP implementation. This manual can be found at:

<http://www.freshfromflorida.com/Divisions-Offices/Agricultural-Water-Policy/Enroll-in-BMPs/BMP-Rules-Manuals-and-Other-Documents>

The major categories of BMPs are listed below:

- Nutrient Management
- Alternative Cattle Water Sources
- Prescribed Grazing
- Sediment and Erosion Control Measures
- Water Resources Management
- Conservation Buffers
- Fence Installation
- High-Intensity Areas
- Animal Mortality
- Wellhead Protection
- Wetlands and Springs Protection
- Prescribed Burning
- Integrated Pest Management and Pharmaceuticals

Overall, 53,289 cow/calf operation acres in the SPJC have been enrolled in the BMP program as of September, 2014.

Best Management Practices for Florida Container Nursery

In 2007, FDACS adopted a statewide manual detailing the water quality/quantity BMPs for Florida Container Nurseries. The complete container nursery manual can be found by accessing the following link:

http://www.floridaagwaterpolicy.com/PDF/Bmps/Bmp_FloridaContainerNurseries2007.pdf

The major categories of BMPs are listed below:

- Nursery layout
- Container substrate and planting practices
- Fertilization management
- Container substrate nutrient monitoring
- Irrigation water quality
- Irrigation application
- Irrigation uniformity
- Erosion control and runoff water management
- Pesticide management
- Waste management

Overall, 9 nursery acres in the SPJC have been enrolled in the BMP program as of September, 2014.

The complete container nursery manual can be found by accessing the following link:

http://www.floridaagwaterpolicy.com/PDF/Bmps/Bmp_FloridaContainerNurseries2007.pdf

Water Quality/Quantity BMPs for Florida Dairy Operations

In 2015, FDACS adopted a statewide BMP manual for Florida Dairy Operations. The practices in this manual address water quality and quantity impacts from dairy production activities and help maintain compliance with water quality standards and address water quantity reductions. The complete manual can be found by accessing the following link:

<http://freshfromflorida.s3.amazonaws.com/Media%2FFiles%2FAgricultural-Water-Policy-Files%2FBest-Management-Practices%2FdairyBMPFinal.pdf>

The major categories of BMPS are listed below:

- Nutrient Management
- Irrigation Management
- Dairy Watering Requirements and Sources
- Pasture and Grazing Management
- Sediment and Erosion Control Measures
- Water Resources Protection
- Integrated Pest Management and Pharmaceuticals
- Odor Prevention and Management
- Animal Mortality Management
- Recycling and Waste Management
- Dairy Closure

FDACS staff is currently encouraging dairy operations to enroll in this recently developed BMP Program.

Water Quality BMPs for Sod Production

In 2008, FDACS adopted a statewide BMP manual for Florida Sod. The complete manual can be found by accessing the following link:

http://www.floridaagwaterpolicy.com/PDF/Bmps/Bmp_FloridaSod2008.pdf

The major categories of BMPs are listed below:

- Nutrient management
- Irrigation scheduling
- Irrigation system maintenance and evaluation
- Sediment and erosion control measures
- Integrated pest management
- Wellhead protection
- Wetlands and springs protection
- Ditch construction and maintenance
- Conservation buffers
- Stormwater management
- Access roads
- Mowing management
- Seasonal farming operations

Overall, 582 sod acres in the SPJC have been enrolled in the BMP program as of September, 2014.

Water Quality BMPs for Specialty Fruit and Nut Crops

In 2012, FDACS adopted a statewide BMP manual for Specialty Fruit and Nut Crops, most significantly for the SPJC including blueberry production. The complete manual can be found by accessing the following link:

http://www.floridaagwaterpolicy.com/PDF/Bmps/Bmp_FloridaSpecialtyFruitNut2011.pdf

The major categories of BMPs are listed below:

- Nutrient management
- Irrigation management
- Sediment and erosion control
- Stormwater management
- Water resources protection
- Integrated pest management

Overall, 188 specialty fruit and nut acres in the SPJC have been enrolled in the BMP program as of September, 2014.

Water Quality BMPs for Florida Equine Operations

In 2012, FDACS adopted a statewide BMP manual for Florida Equine Operations. The complete manual can be found by accessing the following link:

<http://www.flrules.org/Gateway/reference.asp?No=Ref-00772>

The major categories of BMPs are listed below:

- Nutrient management
- Manure Management
- Sediment and Erosion Control
- Pasture Management

- Stormwater Management
- Water Resources Protection
- Equine Watering Requirements and Sources
- Pesticide/Pharmaceutical Use
- Animal Mortality Management

FDACS staff is currently encouraging equine operations to enroll in this recently developed BMP Program.

Federal Environmental Quality Incentives Program (EQIP)

The Environmental Quality Incentives Program (EQIP) is a voluntary program that provides financial assistance to farmers and ranchers who face threats to soil, water, air, plant and related natural resources on their land. Through EQIP, the NRCS provides assistance to agricultural producers in a manner that will promote agricultural production and environmental quality as compatible goals, optimize environmental benefits, and help farmers and ranchers meet federal, state, tribal, and local environmental requirements.

National priorities will be used to guide which producers will be selected to receive EQIP funding. The national priorities are:

- Reductions of nonpoint source pollution, such as nutrients, sediment, pesticides, or excess salinity in impaired watersheds consistent with total maximum daily loads (TMDLs) where available; the reduction of surface and groundwater contamination; and the reduction of contamination from agricultural point sources, such as concentrated animal feeding operations;
- Conservation of ground and surface water resources;
- Reduction of emissions, such as particulate matter, nitrogen oxides, volatile organic compounds, and ozone precursors and depleters that contribute to air quality impairment violations of National Ambient Air Quality Standards;
- Reduction in soil erosion and sedimentation from unacceptable levels on agricultural land; and,
- Promotion of at-risk species habitation conservation.

The NRCS State Conservationist, with advice from the State Technical Committee, decides how funds will be apportioned into various resource concerns, what practices will be offered, what cost-share rates will be, and the ranking process used to prioritize contracts.

EQIP Eligibility

Persons engaged in livestock or agricultural productions are eligible for the program. Eligible land includes cropland, rangeland, pasture, private non-industrial forestland, and other farm or ranch land. Land that has been irrigated two of the last five years is eligible for EQIP assistance to improve irrigation efficiency. NRCS works with the participant to develop the Resource Management System (RMS) Plan of Operations. This RMS Plan becomes the basis for which practices are eligible for cost-share assistance and become part of the cost-share agreement between NRCS and the participant. NRCS provides cost-share payments to landowners under these agreements that can be up to ten years in duration.

The total amount of cost-share and incentive payments paid to an individual or entity is limited to an aggregate of \$300,000, directly or indirectly, for all contracts entered into during fiscal years 2009 through 2014.

EQIP Action Item Timeline

- EQIP has a continuous signup period.
- Annually, NRCS establishes a cutoff date for applications to be evaluated and ranked for current year funding.
- All applications received after the cutoff date will be held for evaluation for funding the following fiscal year.
- Stakeholder and local working group meetings are conducted to develop local resource concerns.

History of Funding in Charlotte County

Since 2004, there have been 37 farms funded under EQIP totaling 40,967 acres. The total cost-share funding obligated for the 37 farms was \$5,099,707.

History of EQIP Funding in Charlotte County; 2004 - 2014

Year	Acres	Cost-Share Funding Obligated
2004	831	\$345,100
2005	7,184	\$226,228
2006	2,355	\$791,885
2007	1,323	\$677,498
2008	12,238	\$559,425
2009	6,058	\$148,034
2010	1,640	\$845,331
2011	7,207	\$1,083,885
2012	2,131	\$422,321
2013	780	\$97,177
2014	2,368	\$294,757
Total	44,115	\$ 5,491,641

History of Funding in DeSoto County

Since 2004, there have been 37 farms funded under EQIP totaling 32,899 acres. The total cost-share funding obligated for the 37 farms was \$5,213,671.

History of EQIP Funding in DeSoto County; 2004 - 2014

Year	Acres	Cost-Share Funding Obligated
2004-2005	5,880	\$1,394,649
2006	0	\$0
2007	2,674	\$932,463
2008	4,326	\$1,377,116
2009	1,944	\$426,541
2010	4,631	\$107,591
2011	541	\$188,935
2012	12,903	\$786,376
2013	2,014	\$319,155
2014	814	\$129,122
Total	35,727	\$ 5,661,948

The following link provides additional information and a list of conservation practices:

<http://www.nrcs.usda.gov/PROGRAMS/EQIP/>

Regional Water Supply Plan and Southern Water Use Caution Area Recovery Strategy

In April 2015, the District Governing Board approved the “Draft 2015 Regional Water Supply Plan” (RWSP) for public review and comment. The final approved 2015 RWSP was adopted by the Governing Board in November 2015. The RWSP is an updated assessment of projected water demands and potential sources of water to meet these demands in the Planning Region (which includes the SPJC watersheds) of the District for the period 2015 to 2035. The purpose of the plan, as an update to the 2010 RWSP, is to provide the framework for future water management decision in areas of the District where the hydrologic system is stressed due to ground-water withdrawals. The RWSP identifies potential options and associated costs for developing alternative sources. The RWSP is a critical component in the SPCWMP Reasonable Assurance document because it identifies and promotes the use of alternative sources, including surface water or improved irrigation management systems to provide conservation. The increased use of these alternative sources will decrease the reliance of the agricultural community on poor ground-water quality wells within the area covered under the SPCWMP Reasonable Assurance document.

The 2015 version of the RWSP specifically includes some of the key management actions that are also a part of the SPCWMP Reasonable Assurance document. The RWSP Executive Summary Volume indicates that one of the guiding principles includes expanding agricultural conservation programs such as FARMS. The Southern Region Volume of the RWSP highlights the accomplishments and need for the use of the FARMS Program, the Irrigation Well Back-Plugging Program, and the QWIP for water conservation. The emphasis these key SPCWMP Reasonable Assurance document management actions have within the context of the RWSP indicates the strong commitment to these efforts by the District and its cooperators in the Shell and Prairie Creek areas. Water resource planning in the RWSP is expected to continue to support efforts to reduce ground water use within the SPJC area, which will improve water quality in surface waters impacted by mineralized ground water withdrawals.

The Southern Water Use Caution Area (SWUCA) Recovery Strategy (SWFWMD, 2006) was completed in March 2006. The critical goal of this strategy is to reduce ground water withdrawals within the SWUCA (including the area of the SPCWMP Reasonable Assurance document) to improve lake levels in the Lake Wales Ridge area, increase river flows in the Upper Peace River, slow salt water intrusion in the Upper Floridan aquifer along coastal regions, and ensure there are sufficient water supplies for all existing and projected reasonable-beneficial users. As with the RWSP, the SWUCA Recovery Strategy specifically references agricultural conservation efforts and alternative supplies to accomplish these goals.

In July 2015 the District completed a five year assessment of the SWUCA Recovery Strategy (2007 to 2011). The assessment indicates that significant progress has been made with respect to the Upper Peace River and water supply goals (including the SPCWMP area) but additional work needs to be done to ensure recovery can be achieved within the Most Impacted Area of the SWUCA (southwestern Hillsborough, western Manatee and northwestern Sarasota County's) and the Ridge Lakes areas.

A specific example of these goals includes the SWUCA resource regulation rules. These rules can require increased agricultural efficiencies as well as conditions on Water Use Permits that directly address the installation of alternative supply irrigation sources. These efforts reduce the reliance on ground water by the agricultural community which also limits the use of mineralized water that can potentially impact surface water.

Both the RWSP and the SWUCA Recovery Strategy focus extensively on reducing Upper Floridan aquifer ground water withdrawals. The focus on reducing Upper Floridan water use, as applied within the area of the SPCWMP Reasonable Assurance document, results in a reduction in the use of Upper Floridan aquifer zones that are potentially mineralized due to elevated concentrations of chloride, TDS, and specific conductance. A reduction in ground water use lowers the potential for poor water quality to enter area surface water bodies. This strongly links the RWSP and SWUCA Recovery Strategy with the Class I water quality impairment issues described within this plan. As the recommendations and strategies in these documents continue to be implemented, including such efforts as FARMS projects, land acquisition activities, well plugging and back-plugging, and new water use rules, continued progress in improving water quality conditions is expected. The natural alignment on water resource issues that these two critical guidance documents provide to the relatively localized issue of the SPCWMP Reasonable Assurance document ensure considerable progress will be achieved.

Land Acquisition Programs

The Florida Forever Trust Fund was established by the Florida Legislature in 1999 and provides funding to several state agencies and the five Water Management Districts for land acquisition and acquiring less-than-fee (LTF) interests in land. To date, approximately 47,834 acres have been protected in the Prairie, Joshua and Shell Creek Watersheds through either fee acquisition or acquisition of LTF interests. Proposed land acquisition projects by the District in these watersheds total approximately 47,600 acres through fee acquisition or acquisition of LTF interests. The following table summarizes the acreage totals associated with these land acquisition projects.

Summary of Acreage Totals Associated with District Land Acquisition Projects in the SPJC Watersheds*

Project	Watershed/County	Acquired		Proposed		Total
		Fee	Less-than Fee	Fee	Less-than Fee	
Bright Hour Watershed	Prairie and Joshua/DeSoto		33,161		18,027	51,188
Prairie Creek Preserve	Prairie/Charlotte	1,644				1,644
Hathaway Park	Shell/Charlotte	14				14
Shell Creek Preserve	Shell/Charlotte	367				367
Biscayne Trust Conservation Easement	Shell/Charlotte		177			177
Babcock Ranch Preserve	Shell/Charlotte	2,126				2,126
Fred C. Babcock-Cecil M. Webb WMA	Shell/Charlotte	6,885				6,885
Wetlands Reserve Program Easements	Prairie/Charlotte, DeSoto, Highlands		3,074			3,074
Grassland Reserve Program Easement	Shell/Charlotte		386			386
Hall Ranch	Shell/Charlotte			5,866		5,866
Prairie/Shell Creek	Prairie and Shell/DeSoto and Charlotte			4,070	12,636	16,706
Long Island Marsh	Prairie/Charlotte, Desoto			7,016		7,016
Total		11,036	36,798	16,952	30,663	95,449

*Note: Acquired acres include District, Charlotte County, Lee County and United States Department of Agriculture. Proposed includes only those acres identified by the District.

The Peace River/Manasota Regional Water Supply Authority recently completed the Peace River Manasota Regional Water Supply Authority Integrated Water Supply Master Plan Update (April 2015). Within the document, the Shell Creek System, located in north and east Charlotte County and southeast DeSoto County, is identified as a potential future water supply source though not favored for implementation until 2035. The feasibility study investigated creating new storage and enhancing the available yield of Shell Creek. The District could acquire lands in these regions of the Shell and Prairie Creek Watersheds if this portion of the study moves forward.

On November 7, 2006, Charlotte County citizens approved a referendum authorizing the county to issue up to \$77 million in bonds to purchase environmentally sensitive lands under the Conservation Charlotte initiative. These lands are to be held in preservation for public use. The bonds are paid for by a .20 mil ad valorem tax and will be levied annually until 2027. The Charlotte County Natural Resources Division is responsible for the management of these lands, and under this program anyone can nominate land for acquisition. Sites are reviewed using science-based criteria by biologists from the Natural Resources Division, with final purchases approved by the Board of Charlotte County Commissioners. Since the inception of this program 1,970 acres that fall within the impaired SPJC watersheds were acquired by Charlotte County. As of this report, no further land acquisition has occurred in these watersheds through the Conservation Charlotte Program. The following table summarizes these purchased lands.

Summary of Acreage Totals Associated with Charlotte County’s “Conservation Charlotte” Land Acquisition Projects in the SPJC Watersheds

Project	Watershed/County	Acres Acquired
Shell Creek Preserve	Shell Cr. / Charlotte	370
Prairie Creek Preserve	Prairie Cr. / DeSoto	1,600

Education and Outreach Activities

Education and outreach activities are an integrated collaborative approach at state, regional, and local levels. These cooperative efforts in the SPJC have involved the FDEP, FDACS, District, City of Punta Gorda, Charlotte Harbor National Estuary Program, Peace River Valley Citrus Growers Association, University of Florida/Institute of Food and Agricultural Science, USDA–NRCS, and Florida Farm Bureau. Activities have and continue to focus on State Legislative Delegations, Regional Policy Boards, and grower associations. Also, articles and press releases concerning this issue and associated recovery strategies are an on-going activity. Additionally, display booths and presentations are provided at relevant conferences and commodity trade organizations.

A considerable education and outreach effort is tied to the FARMS and Well Back-Plugging Programs. Each of these programs entails numerous site visits with potential program applicants which allows for an opportunity to educate individual growers on the water quality issues within the SPJC watersheds. Growers who have participated in these cost-share programs have realized significantly improved quality of water available for irrigation use. This, in turn, has resulted in improved tree quality and fruit yield. This education and outreach effort, coupled with the ability to demonstrate both environmental and economic impact improvements, provides the greatest opportunity to involve additional growers within the region in management actions.

See Appendix V for a partial list of media coverage, and outreach and education activities that have occurred throughout the timeline of this document.

Regional Water Quality Monitoring Networks

Coastal Ground-Water Quality Monitoring Network (District) and Water-Use Permitting Ground-Water Quality Monitoring Network (District)

Water quality data collected by the District's Water Quality Monitoring Program were used in Volume VI of the Coastal Ground-Water Quality Monitoring Network / Water-Use Permit Network Report (SWFWMD, 2011) in order to assess changes in the water quality of wells in the Coastal Ground-Water Quality Monitoring Network (CGWQMN) and the Water-Use Permit Ground-Water Quality Monitoring Network (WUPNET) over a period of fourteen years from 1993 to 2007. Monitor wells throughout the District were included in the analysis for this report. In order to assess the increases and decreases in chloride concentrations for the SPJC area, only information for Charlotte, Desoto, and Highlands counties from this report will be discussed.

According to the Coastal Ground-Water Quality Monitoring Network / Water-Use Permit Network Report, wells located in the Southern Water Use Caution Area (SWUCA), which incorporates the SPJC area, are particularly at risk of contamination by salt-water intrusion and sulfate enriched mineralized waters. This is most likely due to ground water withdrawals that reduce coastal discharge. The trending of both chloride and sulfate, along with chloride/sulfate ratios, were examined within the report. The Wilcoxon Rank-Sum test, a statistical trend analysis method, was used to evaluate the data. The data were separated into six different temporal groups and compared according to the bounds of the test. For the SPJC area, the percentage of wells with significant increases and decreases in chloride for Charlotte, Desoto, and Highlands counties is presented below.

From the seven-year temporal group chloride trend analysis comparisons performed, Charlotte and Desoto were two of the counties established to have monitor well(s) in the intermediate aquifer with significantly increasing chloride trends. It is important to note that other intermediate aquifer and Tampa/Suwannee monitor wells in these two counties also showed a significant decrease in chloride concentrations. A significant increase in chloride concentrations was reported for six wells (approximately 33 percent) in Charlotte County and one well (approximately 17 percent) in Desoto County. A significant decrease in chlorides was reported for three wells (approximately 17 percent) in Charlotte County and one well (approximately 17 percent) in Desoto County. This can possibly be explained by localized land uses, which may be contributing to the upwelling of transition zone waters. In Desoto County, the Tampa/ Suwannee monitor well(s) were found not to have a significant increase in chloride concentrations, while five Ocala/ Avon Park monitor wells (approximately 83 percent) were found to have a significant increase in chloride concentrations. Conversely, in Charlotte County the Ocala/Avon Park monitor well(s) did not display any significant increases in chlorides, but one Tampa/Suwannee monitor well (25 percent) was reported to have a significant increase in chloride concentrations. Highlands County was only represented in the Ocala/Avon Park monitor well analysis and determined to have one well (50 percent) with a significant increase in chloride concentration. The following tables summarize the fourteen-year chloride trend results for Charlotte, DeSoto, and Highlands counties:

Fourteen Year Chloride Trend Analysis Results for Monitor Wells in Charlotte County

Well / Aquifer Type	No. Wells Analyzed	No. Wells w/Significant Trend	Percentage Wells w/Significant Trend
Intermediate	18	6↑, 3↓	33%↑, 17%↓
Tampa/Suwannee	4	1↑, 1↓	25%↑, 25%↓
Ocala/Avon Park	1	0↑, 0↓	0%↑, 0%↓

Fourteen Year Chloride Trend Analysis Results for Monitor Wells in DeSoto County

Well / Aquifer Type	No. Wells Analyzed	No. Wells w/Significant Trend	Percentage Wells w/Significant Trend
Intermediate	6	1↑, 1↓	17%↑, 17%↓
Tampa/Suwannee	4	0↑, 1↓	0%↑, 25%↓
Ocala/Avon Park	6	5↑, 0↓	83%↑, 0%↓

Fourteen Year Chloride Trend Analysis Results for Monitor Wells in Highlands County

Well / Aquifer Type	No. Wells Analyzed	No. Wells w/Significant Trend	Percentage Wells w/Significant Trend
Intermediate	0	0↑, 0↓	0%↑, 0%↓
Tampa/Suwannee	0	0↑, 0↓	0%↑, 0%↓
Ocala/Avon Park	2	1↑, 0↓	50%↑, 0%↓

Efforts to continue ground-water quality monitoring for salt water intrusion and/or up-welling of mineralized water through the CGWQMN and WUPNET are scheduled to be a continuous long term data collection effort. Automation of these trend data is currently scheduled to be released by the end of 2013.

Mobile Irrigation Laboratory

The following information was taken from the Fiscal Year Activity Reports, which are submitted to the District by the USDA, Natural Resources Conservation Service, Wauchula, Florida. Acreage evaluations for irrigation management and crop types are not broken down by geographical region because this information remains confidential to encourage greater participation by agriculture entities. Therefore, information specific to the SPJC Watersheds is not available.

Project Description

The Mobile Irrigation Laboratory (MIL) is a joint project of the District and the United States Department of Agriculture Natural Resources Conservation Service (NRCS). The purpose of the MIL project is to help farmers and growers in Southwest Florida conserve water through efficient irrigation. The Lab operator helps irrigators test the performance of irrigation systems, plan system improvements and establish irrigation schedules. In addition, the lab operator helps growers install tensiometers, water table observation wells and other water saving devices.

Accomplishments in 2012 - 2014

In Fiscal Year 2012 through 2014 (October 1, 2012 to September 30, 2014), the MIL assisted nine growers or irrigation system operators. Two irrigation systems were tested serving a total of about 164 acres. Two new micro-irrigation systems were installed covering 102 acres. Follow up services were provided for four sites to review water management plans, plan system improvements, and install or service water management equipment. From FY 2012 to FY 2014 MIL services (i.e. evaluations and irrigation management) were provided for irrigation systems serving over 4,400 acres. If recommended improvements are made, the Potential Water Saving will be over 68 million gallons per year (based on Farm Irrigation Rating Method estimates).

Accomplishments in 2010 - 2012

In Fiscal Year 2010 through 2012 (October 1, 2010 to September 30, 2012), the MIL assisted 12 growers or irrigation system operators. Twelve irrigation systems were tested serving a total of about 1,948 acres. If recommended improvements are made, the Potential Water Saving will be 557 million gallons per year (based on Farms Irrigation Rating Method estimates). One new micro-irrigation system was installed covering 31 acres. Follow up services were provided for eleven sites to review water management plans, plan system improvements, and install or service water management equipment. From FY 2010 to FY 2012 MIL services (i.e. evaluations and irrigation management) were provided for irrigation systems serving over 2465 acres.

Accomplishments in 2008 - 2010

In Fiscal Year 2008 through 2010 (October 1, 2008 to September 30, 2010), the MIL assisted 10 growers or irrigation system operators. Eight irrigation systems were tested serving a total of about 355 acres. If recommended improvements are made, the Potential Water Saving will be 90 million gallons per year (based on Farms Irrigation Rating Method estimates). Five new micro-irrigation systems were installed covering 155 acres. Follow up services were provided for six sites to review water management plans, plan system improvements, and install or service water management equipment. From FY 2008 to FY 2010 MIL services (i.e. evaluations and irrigation management) were provided for irrigation systems serving over 3000 acres.

Accomplishments in 2007 - 2008

In Fiscal Year 2007 (October 1, 2006 to September 30, 2007), the MIL assisted 52 growers or irrigation system operators. Seven irrigation systems were tested serving a total of about 620 acres. If recommended improvements are made, an estimated 13 percent average increase in efficiency will result in these systems. Follow up services were provided for 45 sites to review water management plans, plan system improvements, and install or service water management equipment. In 2007 MIL services (i.e. evaluations and irrigation management) were provided for irrigation systems serving over 3000 acres. Since the beginning of the project in 1986, assistance has been provided for 1040 irrigation systems serving approximately 46,000 acres.

Much of the water management assistance in 2007 involved helping NRCS field offices with EQIP practices. The Wauchula field office and other field offices were assisted with checking needs, planning, designing or checking 30 irrigation systems for EQIP. An additional 15 cooperators throughout the area were assisted with irrigation system designs, evaluations or water management.

During Fiscal Year 2008 the MIL was without a designated operator due to a vacated position while the staff position was advertised and filled. A new operator was brought on board in late 2008 therefore only one project was conducted. This project was a single site irrigation efficiency evaluation.

Accomplishments in 2005 - 2006

In Fiscal Year 2006 (October 1, 2005 to September 30, 2006), the MIL assisted 31 growers or irrigation system operators. Thirteen irrigation systems were tested, serving a total of about 630 acres. If recommended improvements are made, an estimated 9 percent average increase in efficiency will result in these systems. Follow-up services were provided for 22 sites to review water management plans, plan system improvements, and install or service water management equipment. In 2005 to 2006, MIL services (i.e., evaluations and irrigation management) were provided for irrigation systems serving over 3000 acres.

IFAS Research Completed Prior to October 2012

Sod Irrigation on Farm Demonstration Project

Cooperator: University of Florida

Status: Completed

With the increase of urban growth the demand for sod production will also increase. Irrigation system choice and management of these systems for sod production includes seepage irrigation by ditch conveyance; the use of subsurface tile; fully enclosed subirrigation and overhead irrigation through fixed systems; and center pivot and moveable big guns. No one system seems to be the system of choice or the system that provides for efficient water use and optimum sod production. This demonstration project monitored several typical sod irrigation systems in an established commercial setting to determine the effectiveness and efficiency of water use. A network of data collection sites for water table levels; weather data; pumping records; and production data were used to determine the effectiveness of different irrigation systems and their management. The use of GIS mapping allowed cross-site evaluation for such measurements as soil moisture, water table levels, and production quality. Data from the project was used to make recommendations for system and irrigation management improvements that aid in water conservation.

SWUCA Soil Water Balance and Citrus Evapotranspiration

Cooperator: University of Florida

Status: Completed

Research has shown that citrus trees have different water requirements through the growing season. The frequency of irrigation and the amount of water applied with each irrigation are dependent on local climatic conditions, soil water holding capacity, plant size and density. By knowing when and how much water to apply a grower will get optimum utilization of the water resource and conserve water. Most of the citrus water use research is based on overhead irrigation. Since the current standard is micro-irrigation, which applies water to a limited wetted area, the industry needs updated information to improve their irrigation efficiency.

Crops Coefficients & Water Use for Watermelons

Cooperator: University of Florida

Status: Completed

To improve the crops' water use efficiency and to help conserve water, it's important for the grower and the District to know exactly how much water the crops require. Currently, the District and the growers use water use values developed outside of Florida. Although these values seem to be reasonable, local information could help to reduce water use. The intent of this project was to develop crop coefficients to determine how much water is needed for watermelon production and to improve irrigation management. These values helped reduce water use, and were used to update the District's AGMOD program and for other conservation efforts.

Water Requirements for Transplant Establishment of Plastic Mulched Vegetable Crops Grown on Flatwoods

Cooperator: University of Florida

Status: Completed

Much variation occurs for the use of water for field preparation and crop establishment of transplanted vegetables grown on flatwoods soils. Whether or not a grower uses microirrigation, some form of subirrigation (i.e., seepage) is required to get the field into condition to form beds and establish new transplants. This study helped determine the amount of time and hence, the amount of water needed to ensure both survivability and water conservation. The results from this project helped producers make decisions as to the minimum period of time needed to establish a

crop with respect to the irrigation systems used and local conditions. This resulted in providing growers with a water management tool to further conserve water resources. In addition the District used this information in AGMOD, its irrigation water use projection tool.

Reducing Winter and Fall Citrus Irrigation

Cooperator: University of Florida

Status: Completed

Recent one-year studies in Japan and Israel have indicated that water restriction to trees results in substantial water savings and, at the same time, benefits fruit quality. The intent of this project was to study when and how much water can be withheld from a mature citrus tree during the fall and winter months without impacting the fruit. After this objective is obtained, information from the project was distributed to the growers to help them reduce water use in an area of water use concerns.

Impact of Organic Amendments on Soil Water Retention and Water Conservation

Cooperator: University of Florida

Status: Completed

While the yield and biological effects of organic amendments have been investigated, the water conservation benefits of organic amendments have not been quantified for Florida. Research done in other parts of the U.S. has indicated that while the organic amendments can increase the field capacity of soil with higher than 15 percent clay, the net increase in the plant available water was not substantial. However, for sandy soils the preliminary research done elsewhere (Minnesota) indicates that there was a net increase in the water holding capacity. In light of the potential for amendments to increase the water holding capacity of soils and grower (citrus and vegetable) interest in using the amendments, efforts were needed to quantify the water conservation benefits of organic amendments in Southwest Florida. Preliminary research done by the PI at a vegetable grower site in Southwest Florida indicated that the fields treated with compost (yard waste) resulted in three percent increase in soil moisture compared to the no-compost site. There are other similar organic amendments available which may offer similar benefits. The objectives of this study were to quantify the effects of two organic amendments (yard waste + bio-solids and another commercially available product) on the water holding capacity and total water use in Southwest Florida. The organic amendments were implemented on a vegetable or citrus farm in Southwest Florida. Soil moisture monitoring instruments and flow measurement devices were installed to monitor continuous flow and soil moisture data for three years. Effect of organic amendments in increasing the wetted volume (drip/micro sprinkler) was also quantified.

Tailwater Recovery

Cooperator: University of Florida

Status: Completed

This project will built on previous research to examine best management practices for commercial vegetable farms in south Florida to reduce the potential re-introduction of pathogens via tailwater. The project's objective was to examine management practices and to formulate recommendations to reduce the potential impact of reintroducing economically important pathogens to the field. Management practices to reduce the likelihood of reintroducing pathogens were tested for commercial nurseries in Oklahoma and other sites. The project was intended to determine if it was possible that some of these strategies were applicable to vegetable crops including dilution of irrigation water with unused water to lower pathogen populations; sand filtration, UV light, chlorination, or ozonation. Also investigated were water sources managed by taking water for irrigation from deeper parts of the pond to promote the dilution, settling and die-off of the pathogen or pumping from the middle depth to avoid pathogens that settle on the bottom of the pond or motile spores, which aggregate on the surface of the water.

Evaluation and Demonstration of Soil Moisture Based on Demand Irrigation Controllers for Vegetable Production

Cooperator: University of Florida

Status: Completed

Water use information from this project will be used by growers to save water and reduce pollutant loading. Although soil moisture based control has been investigated in the past, the systems tested required either too much maintenance (e.g. tensiometers) or were too expensive to be practical for farmers. The technology being tested in this project consisted of commercially available controllers that have been marketed for irrigation control but have not been tested under Florida conditions for vegetable crops. Results from this project will help expedite the grower's acceptance of this water conserving technology. The project's statistical design will be a randomized complete block design with four replicates. Based on field trial results, a demonstration trial was conducted in a vegetable field within the District

Effects of Micro-Sprinkler Irrigation Coverage on Citrus Irrigation Management and Water Use

Cooperator: University of Florida

Status: Completed

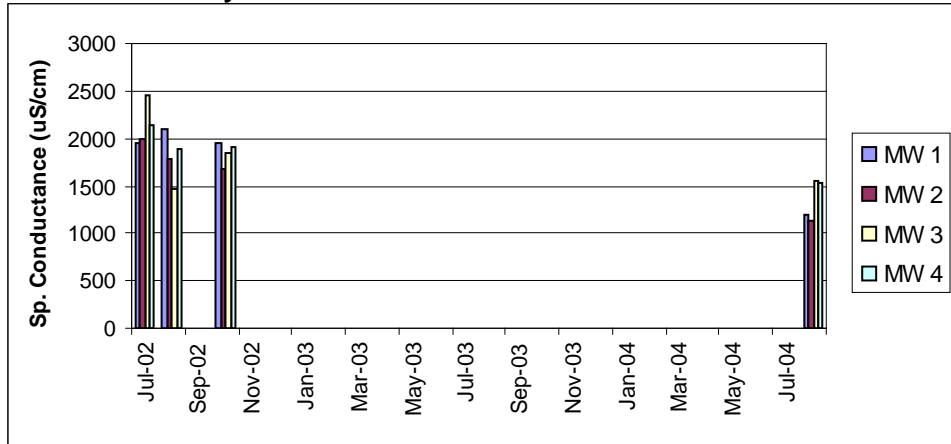
More than 300,000 acres of citrus are permitted within the Peace River Basin with most under micro-irrigation. Micro-irrigation efficiently supplies water to a tree's primary root mass and can significantly decrease water use. The project will assist improvements to irrigation system design and management that will help growers conserve water. The amount of water saved will depend on the implementation of management practices and area of crop production, which may periodically change with conditions of market and weather.

Back-Plugging of Deep Irrigation Wells and the Effects on Salinity in Surficial Aquifer Wells; Symons Grove, DeSoto County, Florida

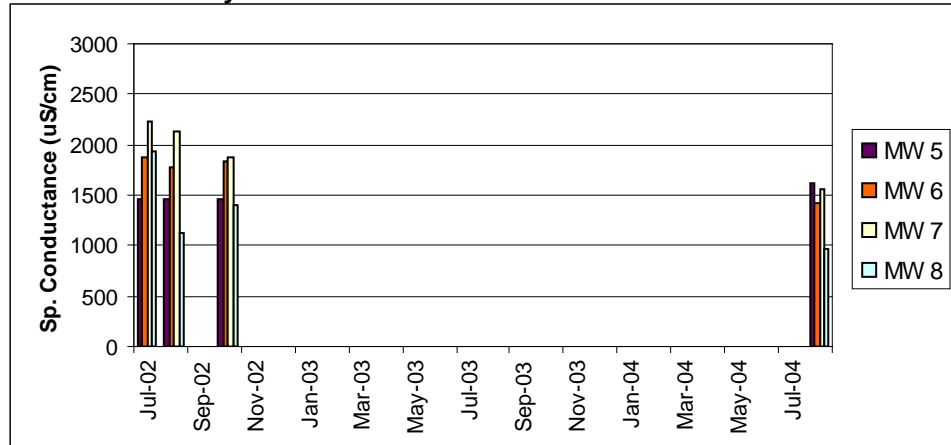
A District project study was initiated to determine whether successful back-plugging of deep irrigation wells would induce a subsequent decrease of salinity in shallow groundwater beneath a large, irrigated citrus grove in the Prairie Creek watershed (WBID 1962). In 2001, District staff back-plugged borehole intervals for three deep irrigation wells penetrating the Upper Floridan aquifer. Following these procedures, results of test pumping for these wells indicated a combined average of nearly 60 percent reduction in specific conductance from pre-existing conditions.

In 2002, 14 shallow monitor wells ranging in depth from about 12 to 20 feet were installed across the 450-acre property and configured for sampling at the water table. Two years later, 2004 monitoring results indicated shallow groundwater specific conductance had decreased overall on average nearly 25 percent from initial conditions. The following graphs show lower specific conductance values observed in the surficial aquifer wells in 2004 when compared to the 2002 time period. These lower values are believed to be the direct result of significantly improved quality in irrigation waters presently used at the grove.

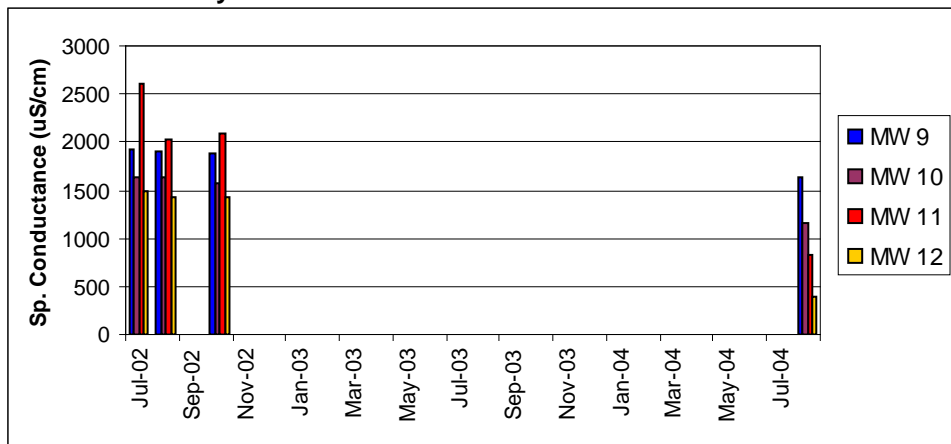
Symons Surficial Monitor Wells MW1 – MW4



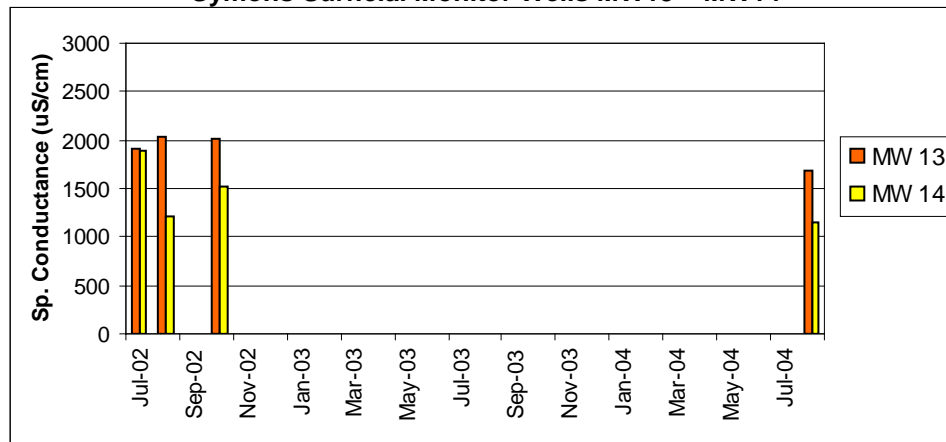
Symons Surficial Monitor Wells MW5 – MW8



Symons Surficial Monitor Wells MW9 – MW12



Symons Surficial Monitor Wells MW13 – MW14



Evaluation and Development of an Evapotranspiration Reference Model for Irrigation of Wood Ornamentals

Cooperator: University of Florida

Status: Completed

The key to irrigation conservation is knowing when and how much to irrigate. To improve nursery growers' irrigation water use, they must be more precise in the amount and frequency of irrigation they apply. Growers need to irrigate based on plant requirements and maximizing the use of rain events. This project will develop a mathematic nursery irrigation model based on reference evapotranspiration (ETref) to help them conserve water. The model will improve irrigation management by helping to determine the amount and frequency of irrigation, thus, helping to reduce ground water use in an area of water use concern.

Crop Coefficients and Water Use for Peppers in Southwest Florida

Cooperator: University of Florida

Status: Completed

Peppers are one of the major row crops grown in the District and in some regions, second only to tomatoes. The actual amount of water these crops use is based on soils, growing season and climatic conditions. To improve the crops' water use efficiency and to help conserve water, it is important for the grower and the District to know exactly how much water the crops require. This lysimeter study will determine how much water pepper plants in Southwest Florida need, determine crop coefficients, and an irrigation schedule to help growers.

Reducing Water Consumption in Polyethylene-Mulched Tomato and Pepper Fields After Methyl Bromide Phase-Out

Cooperator: University of Florida

Status: Completed

Tomato and pepper producers use methyl bromide (MBr) to fumigate their beds before production. About 50 to 95 percent of the MBr that is injected in to the soil can eventually enter the atmosphere and damage the earth's ozone layer. EPA's Clean Air Act (Amendments of 1990) requires that MBr and other similar chemicals be phased out. The loss of MBr has a major impact on the production practices of tomato and pepper producers in our District and can cause an increase their water use. This project will provide the water use information needed to address this change in technology.

Accounting for Interception of Sprinkler Irrigation Water by Container Grown Plants

Cooperator: University of Florida

Status: Completed

The plant canopy plays a critical role in the interception of sprinkler irrigation water. Depending on the size and architecture of the canopy, as well as the container spacing, interception of irrigation water can be greater than or less than the amount of irrigation water that would fall into the container. Typically, interception is considered a water loss and not accounted for when supplying irrigation water. This project will quantify the amount of water that is intercepted by the plant and funneled to the plant's container. By accounting for this intercepted water, the overall amount for irrigation management can be reduced. The industry is supportive of this project and will provide funds to reduce the overall project results.

Update of Net Irrigation Requirements for Turfgrass

Cooperator: University of Florida

Status: Completed

This project will accurately determine the net irrigation requirements for turfgrass, using defensible methodologies that render the information useful for broad planning and information purposes, as well as site-specific water use permitting. The previous net turfgrass irrigation requirements, published in IFAS's Bulletin 200 "Water Requirements of Florida Turfgrasses" in 1984 has been determined to no longer be valid due to the outdated methodology. This project will update the information using the more current and widely accepted methods to determine plant water requirements and measure evapotranspiration (ET) of turfgrasses.

Evaluation of Minimal Required Number of Soil Moisture Sensors

Cooperator: University of Florida

Status: Completed

Recently, the District and FDACS have funded multi-year projects to investigate the potential use of soil moisture based irrigation. The use of soil moisture sensors has shown strong potential for saving irrigation water. This project will determine how many sensors are needed for each location. The information from the project will be used by the District's FARMS program and many also be used for permitting water use.

Determine Specific Irrigation Volumes, Frequency, and Fertilization Rates for Strawberries

Cooperator: University of Florida

Status: Completed

This study developed specific water use and nutrient recommendations for the most predominant (Strawberry Festival, Winter Dawn and Ventana) varieties of strawberries grown in the District. Historically these growers have been following one set of irrigation and fertilizer recommendations. Recent research supported by the District indicates that strawberry varieties responded differently to varying irrigation and nitrogen (N) fertilization programs. In those studies, irrigation volumes between 4.6 and 9.1 acre-inch/season (25-50 percent of typical permitted amounts) were tested in conjunction with drip-applied N rates ranging between 0.4 and 0.8 lb/acre/day. The planted cultivars, which have different growth habits and production patterns reacted differently to these rates. These reactions strongly suggested that the current one-size-fits-all recommendations for irrigation and N management in strawberry should be reevaluated and considered depending on the planted variety. This project developed irrigation information to reduce agricultural water use and fertilizer loading from strawberry production.

Water Use During Production of Select Tropical Foliage

Cooperator: University of Florida

Status: Completed

Greenhouse production of foliage crops is very intensive. Often plants will be grown on raised benches with additional plants grown above, suspended from the greenhouse superstructure. Because plants are grown in much smaller containers than woody landscape plants, there are more plants per unit area. Foliage crops also are more intensively irrigated, fertilized and managed than nursery crops. Because of their high density and extensive use of liquid fertilization, ground water contamination is more likely under greenhouse operations than outdoor nursery production. This project helped determine daily evapotranspiration of several commonly grown foliage plants under commercial greenhouse conditions. It also measured inside micro-environment conditions using conventional weather sensors and calculated reference evapotranspiration (ET_{ref}) using a "big leaf" model.

Evaluation of Bahia Dwarf Turf Grass for Water Use Efficiency

Cooperator: University of Florida

Status: Completed

This multi-agency, multi-year research project investigated a potentially viable drought tolerant alternative to current popular grass varieties, called "Bahia dwarf." The research helped determine how the variety should be cultivated such that it will be marketable within the turfgrass industry. This project, investigated and documented the drought tolerance of Bahia dwarf under field conditions. IFAS compared Bahia dwarf to the industry standard St. Augustine grass, and wild type Bahia grass. To further enhance Bahia dwarf, additional transgenic Bahia grass lines with an improved drought stress response was generated and compared to St. Augustine grass and wild type Bahia grass. In the second and third year of the project, IFAS evaluated water use efficiency, turf quality, mowing requirement and persistence under different irrigation regimes.

Water Needs for Genetically Altered Lantana Camera

Cooperator: University of Florida

Status: Completed

A large amount of water is permitted for nursery and landscape irrigation. With the increase of urban development it is anticipated that the overall permitted amount for these uses will also increase. To reduce water use for landscape irrigation and to conserve water, the District has been promoting Florida Friendly principles. One of the first and most important principles of this practice is the selection and use of drought-tolerant plants (Koske and Owings). The intent of this project was to develop a drought tolerant variety of Lantana camara; and determine its water needs for nursery production and urban landscapes.

Research Activities Completed between October 2012 and September 2014

Evaluation of Different On-Farm Blueberry Systems to Improve Irrigation Efficiency

Cooperator: University of Florida

Status: Completed

This project compared different irrigation management techniques under real production conditions to determine the most efficient way to irrigate blueberry plants. Due to current market conditions and plant diseases, many Central Florida agricultural producers have converted their production acres to blueberries, which is a high valued cash crop. Some of the newer blueberry growers have relatively little experience with blueberry irrigation and some of the existing producers might not be familiar with better ways to manage different irrigation systems. Researchers created a demonstration plot in a grower's field. This plot consisted of different soils and irrigation methods to determine which is best for specific growing conditions. The projects results were presented to the growers during a field day for them to learn and visualize the project's results.

Efficient Irrigation Practices for Florida Blueberries.

Cooperator: University of Florida

Status: Completed

Blueberry production is a high valued cash crop. The estimated 2003 value of blueberry production in Florida was about \$18.6 million dollars. As the value of other crops decrease, more growers have been converting their fields to blueberries. A 1998 report estimated a 400 percent increase in blueberry acres by the year 2008. This four-budget year research project has quantified how much water a typical blueberry plant needs and will develop irrigation guidelines to help conserve water, reduce potential runoff and water quality impacts.

Automated Citrus Irrigation Management to Reduce Water Consumption

Cooperator: University of Florida

Status: Completed

Agriculture is the largest permitted water use in the District and citrus production is the largest of those permitted uses. Over 366 MGD are permitted for citrus irrigation and most of that water use is in the SWUCA. This project will help citrus growers reduce their water use by developing tools to automate and improve irrigation scheduling. These tools can be used by the District's FARMS program to further expand their conservation efforts. Where applicable, this project will build on past projects and use new technology to help reduce water and fertilizer use.

Determination of Maximum Acceptable Irrigation Deficit in Turf Grasses

Cooperator: University of Florida

Status: Completed

The project determined the level of deficit irrigation of three common turfgrasses (St. Augustine, Bahia and Zoysia) that will result in adequate turfgrass quality. Turfgrass response to varying levels and duration of soil water deficit were studied. Deeper root development is associated with improved drought response. Therefore, fertility, mowing and irrigation management practices were also studied to determine the effect on turfgrass root development. The first phase of the project included performing container studies of the three types of turfgrass to determine the evapotranspiration (ET) rates and response of turfgrass quality and root characteristics to soil water deficit. Also during the first phase, field plots were constructed at the UF/IFAS Turfgrass Research Unit in Citra. The second phase of the project included monitoring of the field plots. Irrigation of the field plots were controlled by soil moisture sensors and based on observations from the container studies. The effect of mowing height and frequency on root growth was also studied in containers during the second phase, as well additional irrigation management practices and deficit nitrogen fertilization. The field project continued into the third phase in order to assess repeatability of trends observed. Also in the third phase, new field plots were established to test turfgrass response to mowing management practices that were observed during the second phase container study. The root depth, shoot growth, visual appearance and water use were monitored during and after turfgrass establishment. The project concluded after the third phase, and a final report integrated all aspects of the project. Recommendations for deficit irrigation of the three turfgrasses were presented.

Water Use of Two Bio Fuel Crops

Cooperator: University of Florida

Status: Completed

High fuel prices and a strong national interest in greater energy independence and conservation made biofuels important at the time this research was originated. In addition, the state of Florida was promoting biofuel production to assist the state's agricultural community. The southern half of Florida, with a subtropical climate, had good potential for biofuel crop production. Large-scale production of biofuel crops will affect the water and related land resources in the nation, including Florida. The effects on water supply and water quality are especially important for southwest

Florida due to already stressed surface and ground water resources. The water use of two potential energy crops, switchgrass, *Panicum virgatum*, and sweet sorghum, *Sorghum bicolor*, was quantified. The results of this research was necessary in evaluating the water supply needs of the biofuel crops and in developing improved strategies for sustainable agricultural production.

IFAS BMP Implementation

Cooperator: University of Florida

Status: Completed

The primary goal of this project is to assist IFAS in promoting BMPs, which include typical FARMS Program projects. District participation in this project will promote the establishment of additional FARMS Projects, which will provide water resource benefits. The Scope of Work for the BMP Agreement includes: Assisting growers with conducting site assessments, selecting applicable BMPs, and filing Notices of Intent to Implement (NOIs); Following up with growers to determine whether they need help understanding or implementing BMPs, and providing technical assistance directly or by coordinating with the appropriate OAWP staff or IFAS Extension agents; Informing growers of available BMP-related programs offered by FDACS, the water management districts, and other entities; Providing field demonstrations, workshops, and other educational opportunities for growers and their employees concerning FDACS-adopted BMPs; Identifying areas of further educational needs.

Evaluation of Nutrient Leaching From Mixed Landscapes

Cooperator: University of Florida

Status: Completed

This project partnered with the District's existing project, Investigation and Development of Methods to Determine Urban Landscape Irrigation for Planning and Permitting in Central Florida, to determine the impacts of irrigation scheduling on nutrient leaching. Information from this project helped to develop models based on irrigation, rainfall input, ET and plant size to determine nitrogen and phosphorus leaching.

Turfgrass Establishment

Cooperator: University of Florida

Status: Completed

The project helped determine the total water needs and watering interval for establishment of four common residential turfgrasses (Floritam St. Augustine, Captiva St. Augustine, Argentine Bahia, and Empire Zoysia). New turfgrass plots were established at the Gulf Coast Research and Education Center in Balm (Hillsborough County) at least three times throughout the year for each of two years to represent a range of seasons and varying weather conditions.

Feasibility of Genetically Altered Nandina in Central Florida

Cooperator: University of Florida

Status: Completed

There are over 5,000 acres of nursery production in the central part of our District and typically they are permitted for about 1.7 million gallons of water per acre. With the increase of urban development it is anticipated that the number of nursery acres will increase and landscape water use will increase. To reduce landscape irrigation and to conserve water, the District has been promoting Florida Friendly principles. One of the first and most important principles of this practice is the selection and use of drought-tolerant plants (Koske and Owings). Nandina is a very popular drought tolerant plant and recently its use has been declining because it was listed as an invasive species. This project developed and determined nursery production and urban landscapes water requirements for a drought tolerant variety of Nandina.

Development of Irrigation Schedule & Crop Coefficients for Trees II

Cooperator: University of Florida

Status: Completed

This project is an expansion and enhancement of previous research and investigated additional tree species to help reduce nursery and landscape water use. Information from this project helped nursery producers; commercial landscapers and homeowners reduce water use. The amount of water saved will be a function of the number of acres planted and their water use, which will change annually based on market and climatic conditions.

Developing Methods to Determine Urban Landscape Water Needs for Planning and Permitting in Central Florida

Cooperator: University of Florida

Status: Completed

This project developed a method and approach to determining urban landscape irrigation water use for planning and permitting in the District. Currently, the District calculates urban landscape irrigation use for permitting and planning purposes by using a turfgrass evapotranspiration rate (ET) that was determined by a lysimeter study based in Ft. Lauderdale, with a root zone deeper than turf. These conditions are not consistent with those in central Florida, and a new and more accurate method was required. Given the amount of fresh water used for urban landscape irrigation within the District (roughly 282 mgd in 2008) it is important that these calculations be accurate and defensible. Turfgrasses that were used in the project include Bahia, Zoysia and St. Augustine, while plant materials include viburnum and magnolia varieties. Objectives included determining: (1) the crop coefficient for turfgrass species common in Florida landscapes; (2) turfgrass rooting characteristics, to enable accurate determination of irrigation allocation; (3) the crop coefficient for several ornamental species common in Florida landscapes; (4) landscape coefficient of mixed-species landscapes using various percentages of planted areas under well-watered conditions; and (5) landscape coefficient of mixed-species landscapes using a fixed ratio of turf to ornamental landscape and predetermined irrigation levels.

Reduction of Irrigation Applications for Strawberry Transplant Establishment & Cold Protection

Cooperator: University of Florida

Status: Completed

This project demonstrated the use of alternative irrigation methods and an anti-transpirant spray to reduce water use for establishing bare-rooted strawberries and for cold protection. A by-product of this project was to determine the amount of water used by these irrigation practices. This information was used by the District's Regulation Department, FARMS Program, and by the growers for water conservation. Traditionally, establishment of bare-rooted strawberry transplants is accomplished through continuously applying overhead irrigation water during daylight hours (8-10 hours/day) for up to two weeks. The goal of this practice is to prevent transplant mortality by limiting foliage desiccation while the transplants are establishing a root system. It has been shown that intermittent overhead irrigation is effective even when application times are reduced to 25 percent of continuous irrigation (5 minutes-on, 15 minutes-off) where no detrimental effect on plant survival and eventual fruit yield was detected. The primary reason that this practice has not been adopted by growers is that the overhead irrigation systems have been designed and engineered to provide irrigation to the total area in the event that frost or freeze protection is needed. Because of this need, present irrigation systems for most commercial strawberry producers would have to be modified in order to accomplish intermittent overhead irrigation for transplant establishment. During the 2008, growing season IFAS research tried using an anti-transpirant on a small area to reduce water used for crop establishment and were very successful. Some individual growers tried similar products for cold protection and they too were successful. This project utilized the anti-transpirant under research conditions to help

reduce water use for crop establishment and cold protection. This in combination with intermediate irrigation will help save water. Project costs and water use information will be collected and presented to the growers.

Optimizing Irrigation to Conserve Water for Shade Tree Production

Cooperator: University of Florida

Status: Completed

The goal of the project was to develop irrigation management strategies that take advantage of plant gas exchange properties occurring at moderate water stress. These strategies would be linked to the ongoing projects modeling tree water use based on ETo, further increasing the level of irrigation precision of non-production situations beyond that which will come from the ETo projects. There are over 5,000 acres of nursery production in the central part of the District and typically they are permitted for about 1.7 million gallons of water per acre. With the increase of urban development, it is anticipated that the number of nursery acres will increase and landscape water use will too. This project will investigate ways to reduce nursery and landscape irrigation by studying the relationships between moderate water stress, photosynthesis and shoot growth of trees. Plant growth is a two stage process. First, new cells are produced by meristematic tissues. Second, these cells enlarge. The first phase mainly requires new cellular components which are derived from photosynthesis and absorbed minerals. The principal requirement for the second phase of growth, cell enlargement, is hydrostatic (turgor) pressure. Plant water status, mainly as it affects cell turgor pressure, is the primary driving force in this second phase. In pecans, nearly all leaf expansion occurred at night (Anderson, 1989). This is the time when water stress in plants is the lowest, and water status and turgor pressure are the highest. This is hypothesized as the primary reason cyclic irrigation of containerized plants accelerates growth, in that it results in higher turgor pressures during the night by making more water available in the root ball late in the day. While this information on leaf expansion was reported in the scientific literature over 10 years ago, it was never pursued much further and was investigated in this project.

Comparison of Eddy Correlation and Lysimeter Techniques for Quantifying Evapotranspiration

Cooperator: University of Florida

Status: Completed

The eddy correlation technique is a key atmospheric measurement technique to measure and calculate vertical turbulent fluxes within atmospheric boundary layers. The method analyzes high-frequency wind and scalar atmospheric data series, and yields values of fluxes of these properties. It is a statistical method used in meteorology and other applications to determine exchange rates of trace gases over natural ecosystems and agricultural fields. The project was to determine if the eddy correlation technique could estimate evapotranspiration for any particular plant more accurately or more easily than using lysimeters for determining plant evapotranspiration values.

Ongoing Research Activities October 2012 through September 2014

Florida Automated Weather Network Data Dissemination and Education

Cooperator: University of Florida

Status: Project in Progress

The Florida Automated Weather Network (FAWN) project started in 1997 and the District's involvement with the project started in 2003. This project collects and distributes real-time weather and climatic data, specifically geared to agricultural users, to increase irrigation efficiencies and reduce water use. Funding for the project is provided annually and primarily supports network maintenance and enhancements. In FY2010 and FY2011 FAWN introduced a cold weather tool kit, designed to assist agricultural users in reducing their frost/freeze water use. FAWN also

conducts educational workshops and commodity based weather schools to promote the proper use of the information available on the FAWN website. <http://fawn.ifas.ufl.edu/>

Reduction of Water Use for Citrus Cold Protection

Cooperator: University of Florida

Status: Project in Progress

This is an ongoing agricultural water conservation project to assist citrus producers in reducing the amount of water used for cold protection. Citrus growers use their low volume sprinkler systems to conserve water during regular irrigation and also for cold protection under certain night-time freezing conditions. One characteristic of low volume sprinkler irrigation used for citrus cold protection is that the decision to use the irrigation system in this manner must be made prior temperatures dropping to the plant's critical freezing temperature and for citrus trees this temperature will change as winter progresses and the groves become more or less cold hardy. This project provides growers with an indication of their grove's potential cold hardiness-critical temperature range over the winter as reported to the FAWN weather system website, so growers can optimize their cold protection irrigation requirements.

Irrigation Requirements for Diverse Soilless and Open Field Production

Cooperator: University of Florida

Status: Project in Progress

Most of Florida's strawberry production occurs under the annual hill system, in which raised planting beds are fumigated for soil borne pest control, irrigated with drip lines, and covered with polyethylene mulch. Open-field production of strawberries uses elevated water volumes for plant establishment, crop maintenance and freeze protection. Currently, alternative production systems are being tested and implemented by growers and rural home owners to produce strawberry and vegetable crops. One of these systems consists of soilless medium with vertical or horizontal containers. This project will quantify the benefits of this type of production and provide information to the growers to help reduce their water use.

Automatic Sprinkler Irrigation in Container Nurseries Using a Web-Based Program

Cooperator: University of Florida

Status: Project in Progress

Irrigation scheduling based upon objective information has the potential to improve plant water use efficiency in the container nursery. A preliminary trial at the University of Florida resulted in a 30 percent reduction in container nursery water use when using the web-based Container Crop Resource Optimization Program (CCROP) to manage irrigation versus a constant irrigation rate. CCROP utilizes a combination of cultural practices and daily weather information at the container nursery. The funding for the second year of this project will continue to develop a software-hardware interface to automatically operate irrigation control valves (as opposed to relying on the grower to manually operate valves) using the CCROP for producing ornamental crops in a commercial nursery. The addition to the Scope of Work beginning in the third year of the study will improve the ability of the grower to use the automated system, and therefore further increase efficiency and decrease water use, by integrating the CCROP irrigation scheduling program with a web based tool linked to FAWN weather data. The spreadsheet version of the irrigation scheduling system used in the initial Scope of Work will be translated into an interactive web version and testing of the web based system will be conducted in a commercial nursery.

Citrus Irrigation Soil Moisture Sensors

Cooperator: University of Florida

Status: Project in Progress

This water conservation project will evaluate the use of soil moisture sensors and a soil water balance model to more effectively irrigate a large citrus grove using automated irrigation equipment. The soil moisture and irrigation control systems will be provided by the co-operator and will be partially funded by the FARMS program. The Orange-Co, Inc. Joshua Grove will be the demonstration site for irrigation scheduling with both soil moisture sensors and the Citrus Water Management System (CWMS). The grove is currently equipped with six soil moisture sensor arrays that are recorded on a daily basis. Irrigation is being scheduled for approximately 17,000 acres of grove using these few sensors. Grove management is not satisfied with these few sensor sites and will expand the number of soil moisture sensors to 36 AquaSpy sensor arrays over the next 3 years. Irrigation schedules will be automated using Motorola radio linked control equipment including diesel engine starts. Irrigation in selected grove blocks will be scheduled using the soil moisture sensors or the CWMS for a three-year period. The project will demonstrate the use of soil moisture models, soil moisture sensors, and automated irrigation systems with engine starts, demonstrate the Citrus Water Management System on a large citrus operation, expedite the acceptance of the CWMS soil water balance model, compare soil water estimates at several depths by CWMS to soil moisture sensor data, compare water use with intensively managed systems with irrigation water use of surrounding groves, and provide educational programs to cooperators, citrus growers, SWFWMD personnel, and mobile irrigation lab field agents.

Evaluation of Bed Geometry for Water Conservation on Drip Irrigated Tomatoes in Southwest Florida

Cooperator: University of Florida

Status: Project in Progress

This is a three (3) year research project to evaluate the most effective and efficient bed geometry for drip irrigated tomatoes. The goal of the research is to determine the bed configuration for a drip irrigated tomato crop's root zone that results in greatest water conservation while having the added benefit of reducing both fertilizer leaching and storm generated runoff. Winter vegetable production is one of the largest water use groups in Florida and should be one of the target areas for water conservation. Historically, tomatoes in southwest Florida are produced with raised crop beds covered with plastic mulch. These beds typically measure three feet wide at the top with a height of eight inches. The geometry of these beds was designed more for purposes other than for water use efficiency. Bed geometry should be evaluated in order to develop dimensions that increase both irrigation efficiency and nutrient uptake, while maintaining or increasing crop yields. Additionally, a narrower bed might allow producers to use one drip tape instead of two to maintain optimum soil moisture within the bed. Differently configured beds may also help growers increase their yield (more plants per acre) and water and nutrient use efficiency while reducing the nutrient transport to groundwater and surface water. The goal of the proposed project is to evaluate different mulched, raised-bed geometries for water use and crop yield.

Differences in Water Requirements for Greening-Infected Citrus Trees versus Non-Infected Trees

Cooperator: University of Florida

Status: Project in Progress

In October 2008, the District approved funding for a citrus irrigation study to determine if an alternative method of citrus production, with a higher tree density, would yield a productive crop from younger trees, while reducing water use. By 2012, it was discovered that all the trees in the research study had contracted Huanglongbing bacterial disease (citrus greening). One of the main results of citrus greening is fruit drop and decreased yield. Because the research was started on healthy trees and was aimed at determining if innovative irrigation techniques could increase yield, the discovery of citrus greening in the research trees effectively rendered a portion of the results unusable for the current project scope-of-work, as it could not be determined if the crop

yield was primarily affected by the innovative irrigation techniques or the influence of citrus greening. Since the original study commenced, the District has seen an increase in the number of growers citing citrus greening as the cause for using more supplemental irrigation water than permitted. One of the management techniques for greening infected groves is based upon greater nutrient and water applications. Because of this the District is in need of research to determine if additional water is required by trees infected with citrus greening, and if so, how much more water is necessary to maintain a productive tree. Following discussions with District staff, Dr. Morgan proposed a modification to the previous study's scope of work to incorporate the District needs to better understand how water use is impacted by citrus greening. This modified investigation will use a portion of the results obtained from the former study as a basis to understand how citrus greening has impacted water use, and will quantify the difference in water use between infected and healthy trees.

Development of Landscape Fertilizer BMPs

Cooperator: University of Florida

Status: Project in Progress

The objective of this project is to verify the accuracy of the Florida Yards and Neighborhoods (FYN) and Florida Green Industries best management practices (BMPs) fertilizer recommendations across a wide range of common landscape plants. Plant growth, biomass allocation, shoot nutrient status, foliar characteristics and aesthetic quality will be evaluated. Plants will be irrigated uniformly as needed according to IFAS recommendations. The funding request for FY 14 is \$81,772. This project is composed of two phases. Phase 1 will determine nitrogen fertilizer recommendations for annuals, perennials, groundcovers, vines and shrubs commonly grown in landscapes within the District. These recommendations will be developed solely on plant response to determine the minimum nitrogen fertilizer rates needed to achieve acceptable growth and quality. Phase 2 will determine the effect of fertilizer rate and application method on the potential for nitrogen leaching from woody ornamental plant beds and the nutrient use efficiency of woody ornamentals.

Non-Irrigation Alternatives for Strawberry Cold Protection

Cooperator: University of Florida

Status: Project in Progress

This project will develop a scientific based "Tool Box," of non-irrigation alternatives for strawberry cold protection. The project will determine the appropriate use of these cold protection methods, identify limitations and economic feasibility. This information will expedite the implementation of these non-irrigation cold protection alternatives in an area of resource concerns.

Cold Protection Optimization

Cooperator: University of Florida

Status: Project in Progress

Irrigation is the primary method used for fruit, vegetable and nursery cold protection. During recent cold events the Dover/Plant City region experienced several resource problems believed to be caused by irrigation used for crop protection. Although, most agricultural producers follow best management practices for cold protection irrigation there are opportunities to optimize this water use. This project will investigate current irrigation cold protection practices with the intent to identify ways to enhance and optimize irrigation for crop cold protection.

Development of Irrigation Schedule and Crop Coefficients for Trees III

Cooperator: University of Florida

Status: Project in Progress

This project is an expansion and enhancement of previous research and investigated additional tree species to help reduce nursery and landscape water use. Information from this project helped

nursery producers; commercial landscapers and homeowners reduce water use. The amount of water saved will be a function of the number of acres planted and their water use, which will change annually based on market and climatic conditions

New Research Activities: October 2012 – September 2014

Exploring the Feasibility of Converting Seepage to Center Pivot Irrigation

Cooperator: University of Florida

Status: Project in Progress

This is a three-year project to quantify the savings of irrigation water used to grow potatoes and beans by converting from seepage to center pivot irrigation. Quantifying the water that could be saved by converting from seepage to center pivot irrigation methods will help the FARMS Program determine funding options for potential future projects and can help with recovery efforts toward natural systems.

Determination of Irrigation Requirements for Peaches

Cooperator: University of Florida

Status: Project in Progress

This project will determine the irrigation requirements for peaches in west-central and southwest Florida in grower fields. The specific objectives are: a) Assess the appropriate frequency and volume of irrigation needed for optimum peach growth and yields; b) Determine the water replenishing schedule for peaches growing in deep sandy soils; and c) Prepare research and educational materials, seminar, and media for current and potential peach growers.

Irrigation Scheduling to Address Water Demand of Greening-Infected Citrus Trees

Cooperator: University of Florida

Status: Project in Progress

Recently, the Southwest Florida Water Management District has reported that more citrus growers are exceeding their monthly and yearly permitted water allocations. Citrus grower organizations (e.g. Florida Citrus Mutual) have conducted meetings to investigate the need for research work on improved irrigation practices for greening-infected trees. Estimation of soil water uptake and resulting soil water depletion under greening-infected trees have not been conducted in Florida or other areas where greening occurs. Thus, field scale experimentation is needed to determine if current citrus irrigation practices need to be changed during this interim period. The combination of experiments and demonstrations in a wide range of soils and areas of the state will improve the applicability and adoption of improved irrigation management recommendations.

Appendices and References

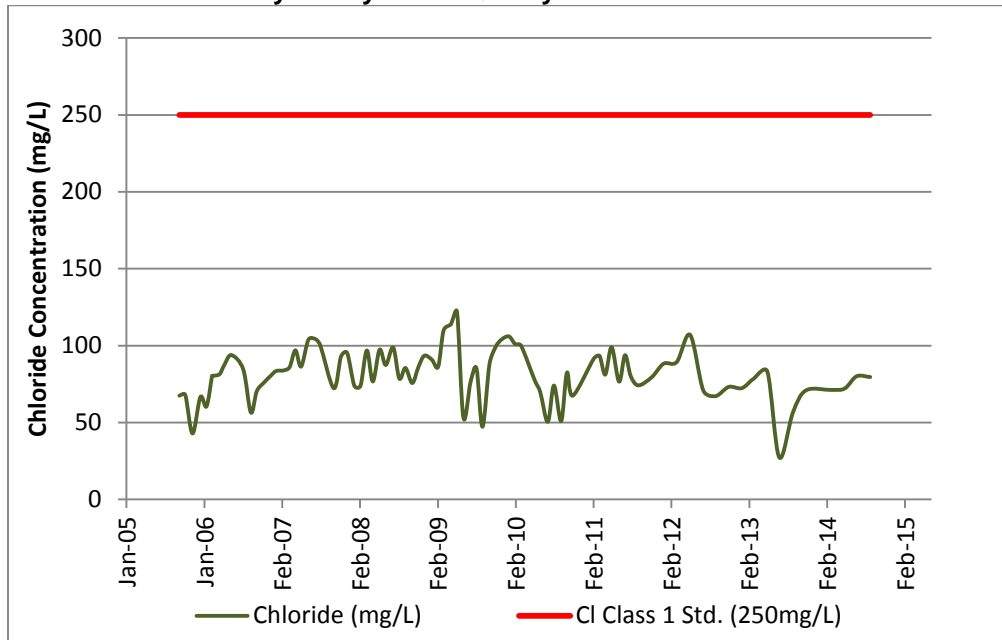
Appendix I

Water Quality Results from In-Stream Data Collection for Specific Conductance at "Non-Key" Monitoring Locations

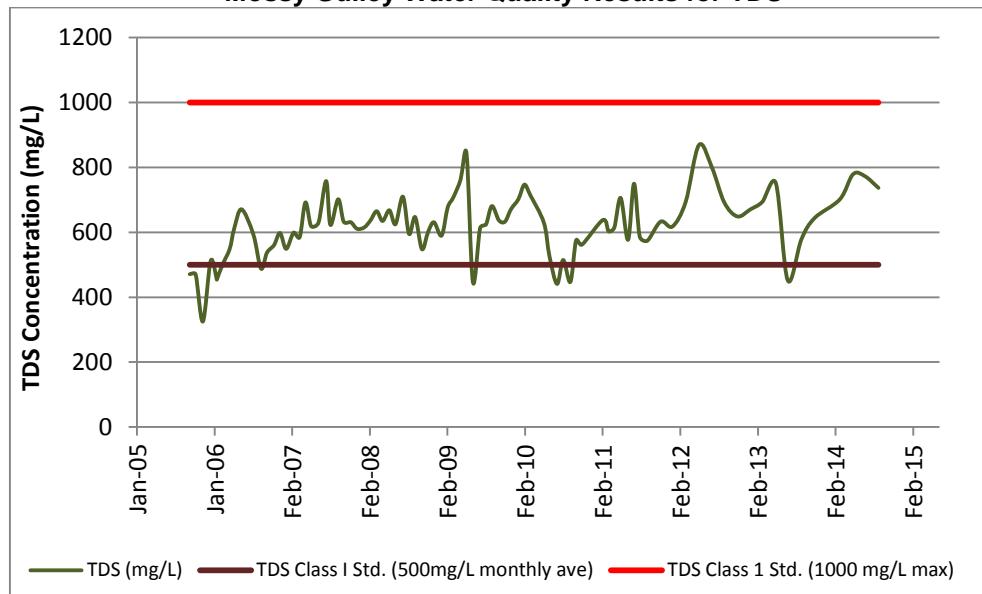
WBID 1962

Water Segment - Prairie Creek
Prairie Creek Watershed

Mossy Gulley Water Quality Results for Chloride



Mossy Gulley Water Quality Results for TDS

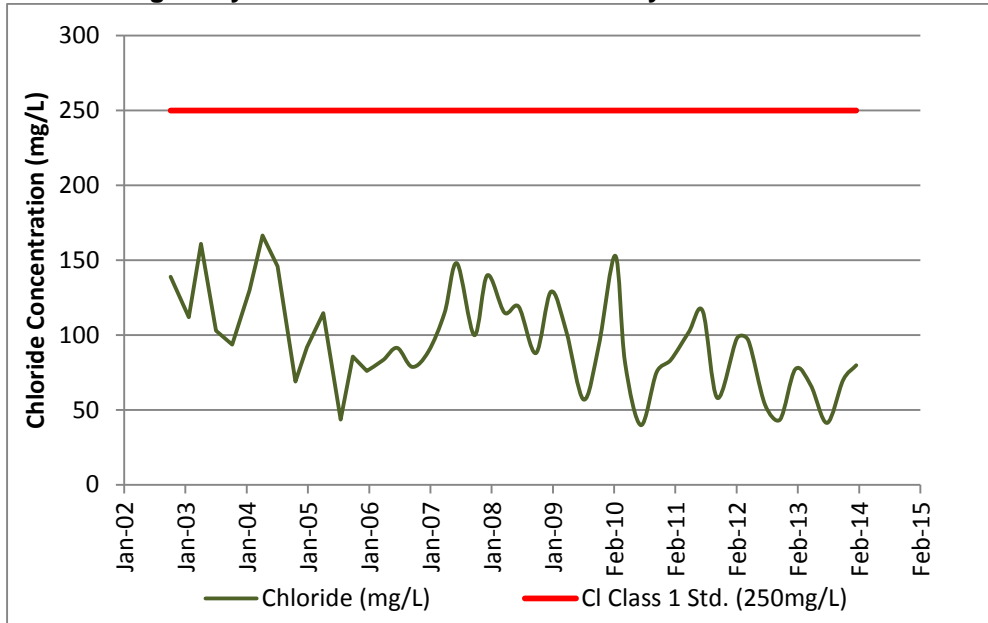


Appendix I

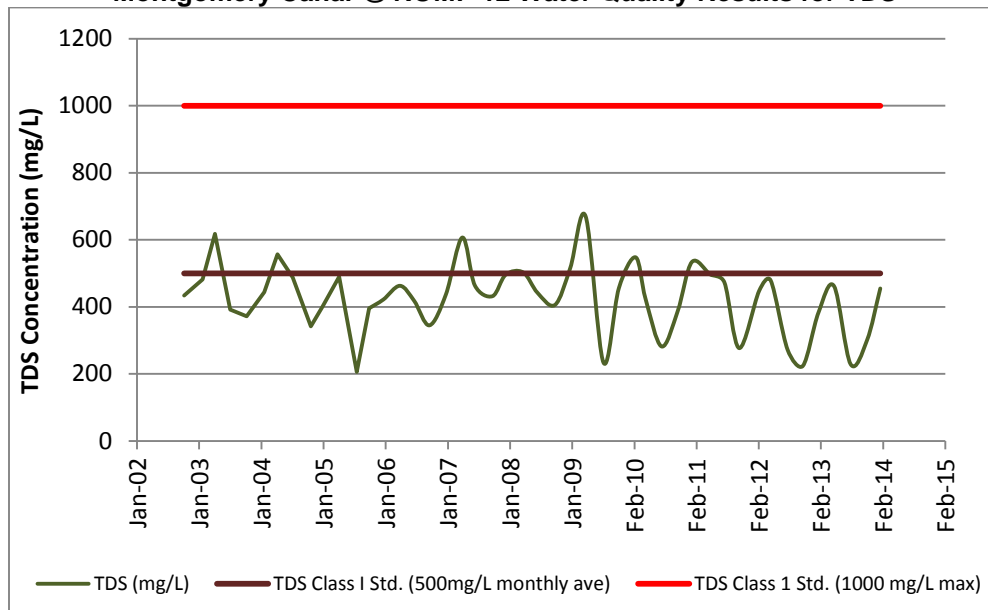
WBID 1962

Water Segment - Prairie Creek
Prairie Creek Watershed

Montgomery Canal @ ROMP 12 Water Quality Results for Chloride



Montgomery Canal @ ROMP 12 Water Quality Results for TDS

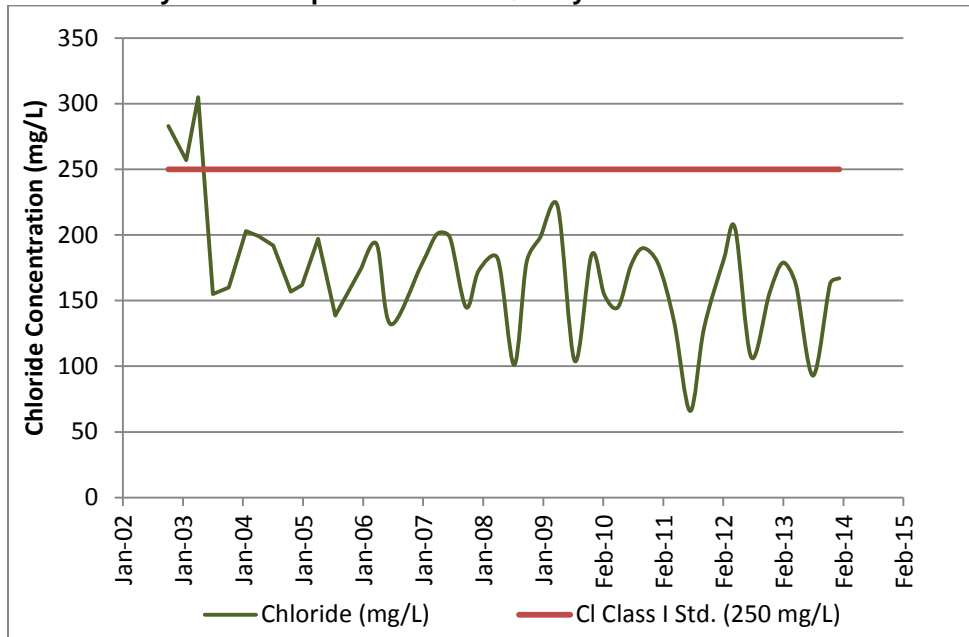


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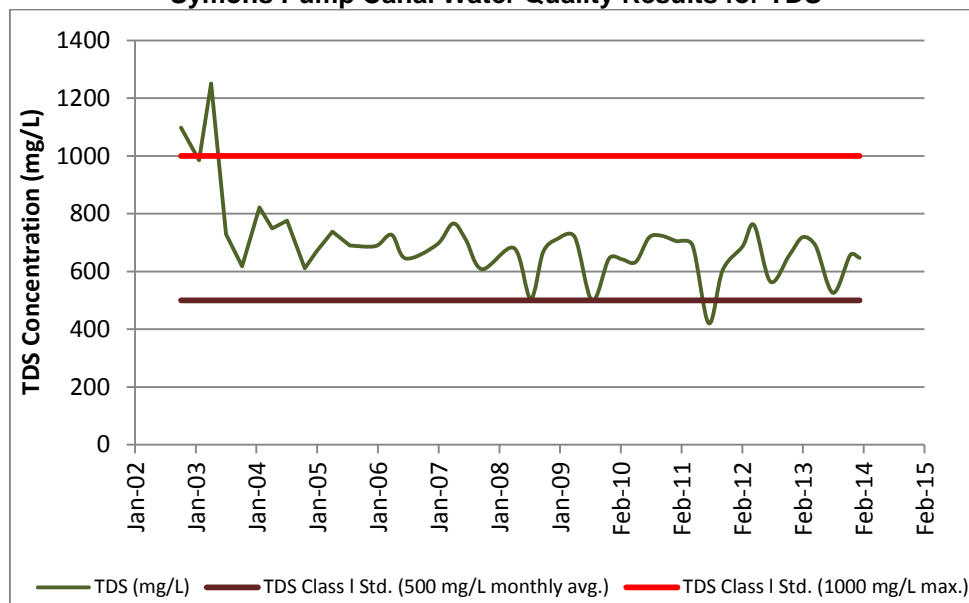
WBID 1962

Water Segment - Prairie Creek
Prairie Creek Watershed

Symons Pump Canal Water Quality Results for Chloride



Symons Pump Canal Water Quality Results for TDS

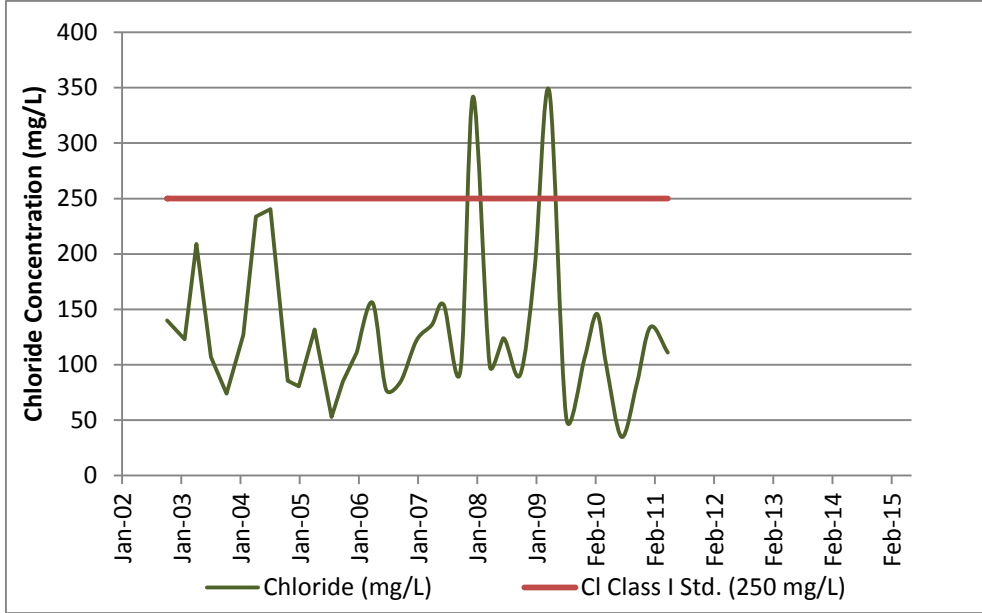


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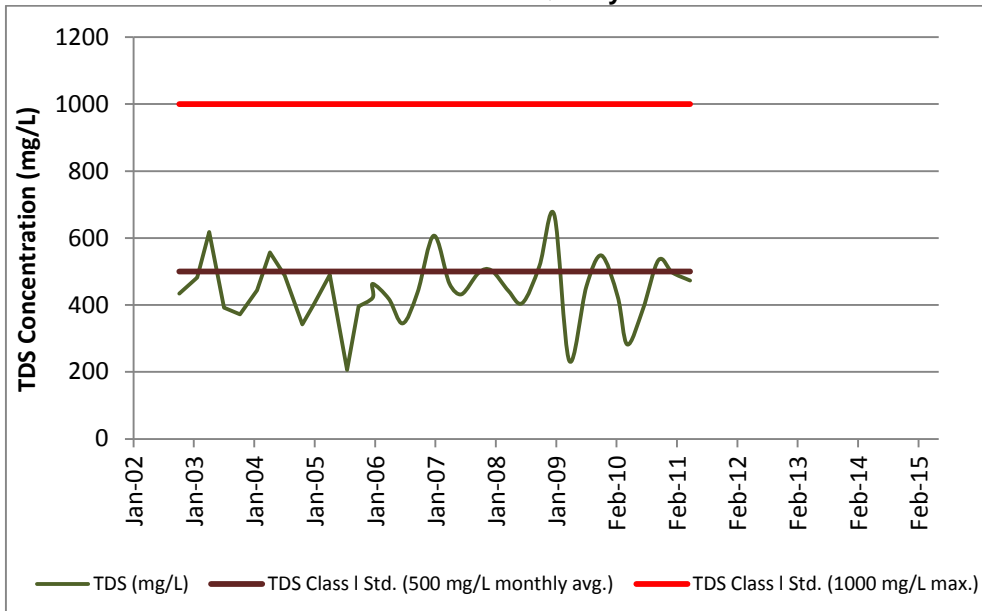
WBID 1964

Water Segment – Cow Slough
Prairie Creek Watershed

Emerald Isle Canal #5 Water Quality Results for Chloride



Emerald Isle Canal #5 Water Quality Results for TDS

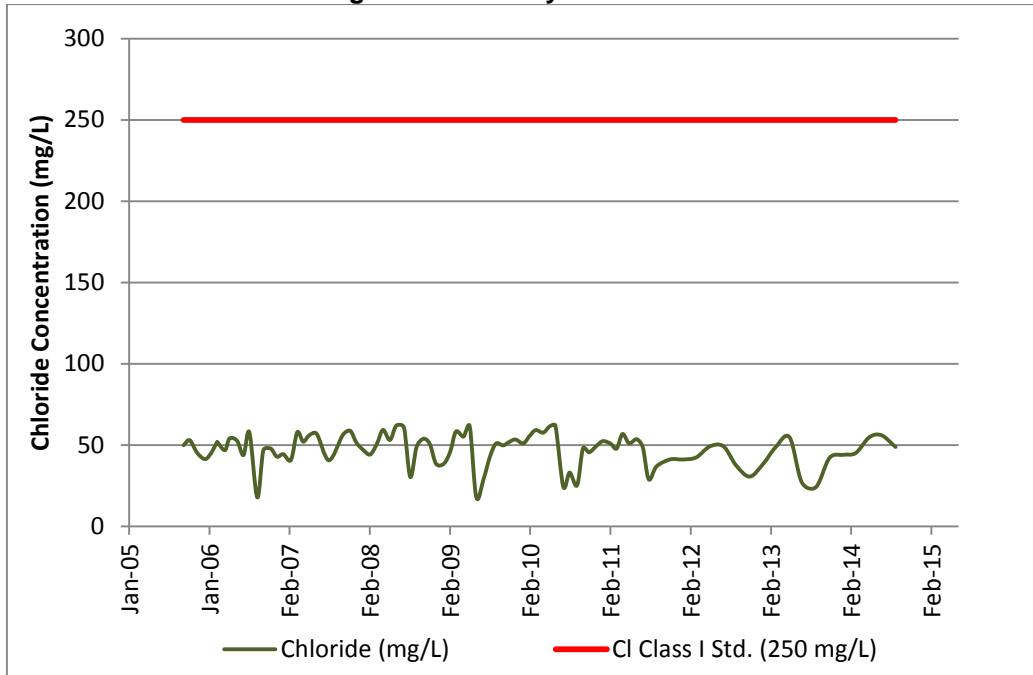


Appendix I

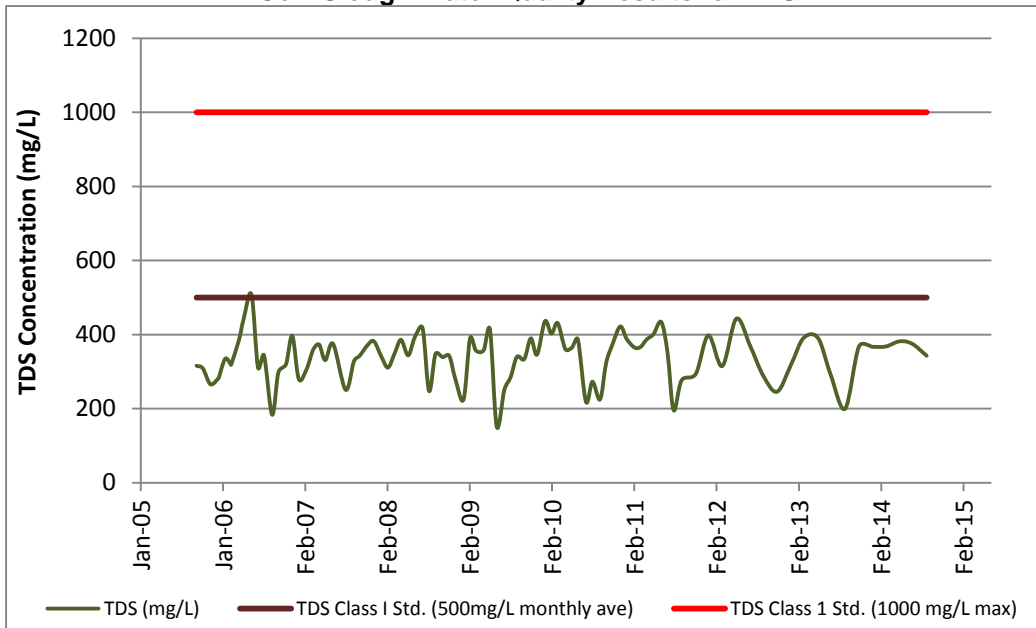
WBID 1964

Water Segment – Cow Slough
Prairie Creek Watershed

Cow Slough Water Quality Results for Chloride



Cow Slough Water Quality Results for TDS

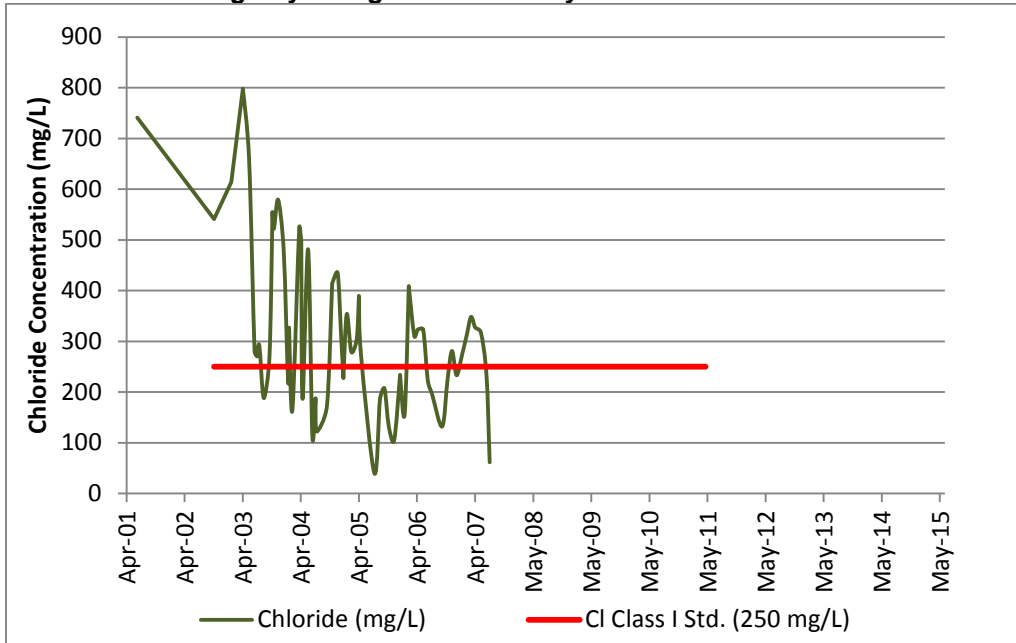


Appendix I

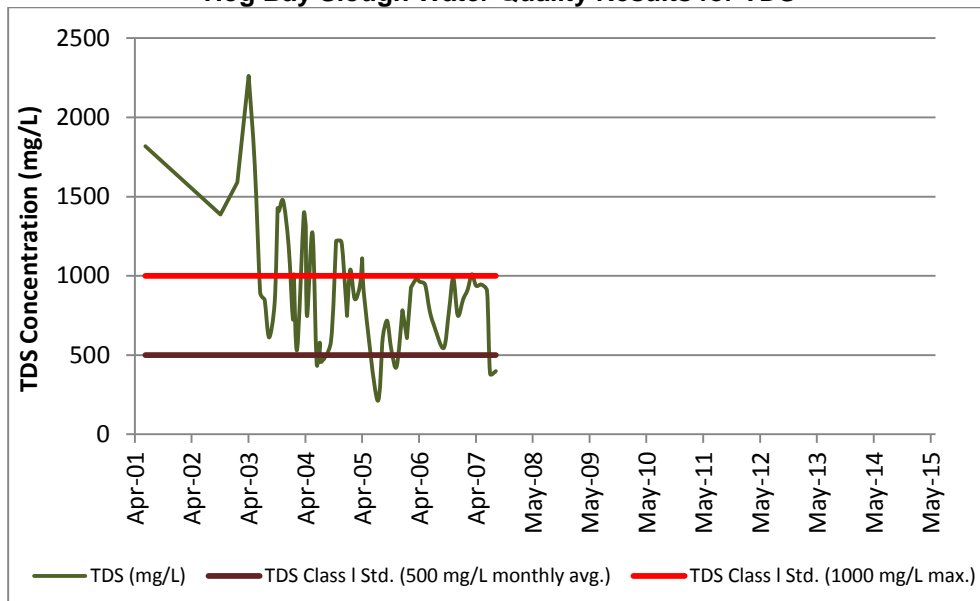
WBID 2001

Water Segment – Hog Bay
Joshua Creek Watershed

Hog Bay Slough Water Quality Results for Chloride



Hog Bay Slough Water Quality Results for TDS



Appendix II

Special Conditions Applied to Water Use Permits Located in the SPJC Watersheds

In use prior to 2007:

Shell and Prairie Creek Watershed - Special Condition

The District has determined that direct and indirect run-off of irrigation water into Shell Creek and Prairie Creek have contributed to water quality degradation in a Class I waterway that serves as a public supply source for an existing legal water user, the City of Punta Gorda. Degradation of the City's reservoir has occurred to such an extent that the concentration of several constituents has exceeded secondary drinking water standards in the past. To avoid further degradation of the reservoir and to improve water quality, such that it is consistent with Class I water quality standards, the Permittee shall continue to improve the management of irrigation water by reducing or eliminating off-site discharge of lower quality irrigation water. At the time of issuance of this permit the District is addressing off-site discharge and attempting to resolve the aforementioned adverse impacts through cooperative and collaborative measures with Permittees, changes in irrigation management practices, and other methods. If the effectiveness of these measures is determined to be insufficient to resolve these adverse impacts and irrigation management practices on this site appear to contribute to these continued impacts, the District may seek to modify this permit in accordance with applicable law.

Joshua Creek Watershed - Special Condition

This specific permit is issued with the understanding that the Permittee shall implement Best Management Practices (BMPs), which will result in elimination of off-site discharge of lower quality irrigation water to the greatest extent practicable. This is required to avoid contribution by this permitted site to the water quality degradation and potential impairment of surface waters within the Joshua Creek watershed.

In use starting in 2007:

Specific Well Construction – Water Quality Problem Area

The Permittee shall construct the proposed wells according to the surface diameter and casing depth specifications below. The casing shall be continuous from land surface to the minimum depth stated and is specified to prevent the unauthorized interchange of water between different water bearing zones. The total depth listed below is an estimate, based on best available information, of the depth at which high producing zones are encountered and which poor water quality should not be encountered. However, since this well is located in an area where water quality can be poor, it is the Permittee's responsibility to have the water in the well sampled during well construction before reaching the maximum total depth stated below. Such sampling is necessary to ensure that the well does not encounter water of a quality that cannot be utilized by the Permittee, and to ensure that withdrawals from the well will not cause salt-water intrusion. All depths given are in feet below land surface. For Well Construction requirements see Exhibit B, Well Construction Instructions, attached to and made part to this permit.

District ID No. (Specify DID No.), Permittee ID No. (specify PID No.) having a surface diameter of (insert outer diameter) inches, with a minimum casing depth of (Insert min. casing depth) feet, drilled to a maximum total depth of (insert max. total depth) feet.

Appendix II

Best Management Practices (SPJC)

This specific permit is issued with the understanding that the Permittee shall implement Best Management Practices (BMPs), which will result in elimination of off-site discharge of lower quality irrigation water to the greatest extent practicable. This is required to avoid contribution by this permitted site to the water quality degradation within the Shell Creek and Prairie Creek watersheds, and to assist in improvement in water quality of the City of Punta Gorda's Shell Creek Reservoir.

Joshua Creek Best Management Practices

This specific permit is issued with the understanding that the Permittee shall implement Best Management Practices (BMPs), which will result in elimination of off-site discharge of lower quality irrigation water to the greatest extent practicable. This is required to avoid contribution by this permitted site to the water quality degradation and potential impairment of surface waters within the Joshua Creek watershed.

Water Quality Sampling at Total Depth in SPJC

Upon initiation of the construction of the well(s) listed below, the Permittee shall notify the Data Collection Bureau (813) 985-7481 or 800-836-0797, extension 4258. Upon reaching the estimated total depth(s) listed below for the wells listed below, a water-quality sample shall be collected by District Staff for laboratory analysis. The sample shall be collected during reverse air drilling, or other appropriate method with prior approval by the Water Use Permit Bureau Chief, which will allow representative samples to be collected. The sample shall be analyzed by the District's certified laboratory for specific conductivity, chloride, sulfate and total dissolved solids. Reports of the analyses will be submitted to the Permittee upon completion.

District ID No. xxx / Permittee ID No. XXX, at estimated total depth of [x.xxx] feet

Appendix III

Special Well Construction Stipulations - For Wells Located in the Shell, Prairie and Joshua Creek Watersheds

In use previously:

Stipulation No. 31 – Special Well Construction

The Permittee shall construct the proposed well according to the surface diameter and casing depth specifications below. The casing depth specified is to prevent the unauthorized interchange of water between different water bearing zones. The total depth listed below is an estimate, based on best available information, and of the depth at which high producing zones are encountered and which poor water quality should not be encountered. However, since this well is located in an area where water quality can be poor, it is the Permittee's responsibility to have the water in the well sampled during well construction, before reaching the estimated maximum total depth. Such sampling is necessary to ensure that the well does not encounter water of a quality that cannot be utilized by the Permittee, and to ensure that withdrawals from the well will not cause salt-water intrusion.

District ID No.	Permittee ID No.	Permittee Diameter	Surface Diameter	Minimum Casing Depth	Maximum Total Depth
	XX	XX	X inches	XX feet	XX feet

- a. Regardless of the maximum depth specified above, drilling shall cease when the specific conductance of the ground water reaches 1,000 uS/cm.
- b. The casing shall be continuous from land surface to the minimum depth stated above.
- c. All well casing (including liners and/or pipe) must be sealed to the depth specified above.
- d. The proposed well(s) shall be constructed of materials that are resistant to degradation of the casing/grout due to interaction with the water of lesser quality. A minimum grout thickness of two (2) inches is required on wells four (4) inches or more in diameter.
- e. A minimum of twenty (20) feet overlap and two (2) centralizers is required for Public Supply wells, and all wells six (6) inches or more in diameter.
- f. The finished well casing depth shall not vary from these specifications by greater than ten percent unless advance approval is granted by the Regulation Department Director, Resource Regulation, or the Supervisor of the Well Construction Permitting Section in Brooksville.
- g. The finished well total depth shall not exceed the suggested maximum total depth by greater than ten percent unless advance approval is granted by the Regulation Department Director, Resource Regulation, or the Supervisor of the Well Construction Permitting Section in Brooksville.
- h. Advance approval from the Regulation Department Director, Resource Regulation, is necessary should the Permittee propose to change the well location or casing diameter.

The Permittee shall submit a copy of the well completion report to the District Permit Data Section, Records and Data Department within 30 days of well completion.

In use previously:

Stipulation No. 41 – Special Well Construction – Water Quality Sampling

- a. During drilling of District ID No(s). ___, Permittee ID No(s). ___ water-quality samples shall be collected at intervals of 50 feet or less, from XX feet to a maximum depth of five feet above the bottom of the well. Regardless of the specified sample collection interval, a sample shall be collected from the depth, which corresponds, to five feet above the bottom of the well. Samples shall be collected during reverse air drilling, or other appropriate method with prior approval by the Regulation Department Director, Resource Regulation, which will allow representative samples for each depth to be collected.

Samples shall be analyzed in the field for specific conductance. Reports of the analyses shall be submitted to the District's Permit Data Section, Records and Data Department.

- b. Following completion of District ID No(s). ___, Permittee ID No(s). ___, a water-quality sample shall be collected for laboratory analysis. The sample shall be collected during reverse air drilling, or other appropriate method with prior approval by the Regulation Department Director, Resource Regulation, which will allow representative samples to be collected. The sample shall be analyzed by a certified laboratory for chloride, sulfate, and total dissolved solids. The Permittee's sampling procedure shall follow the handling and chain of custody procedures designated by the certified laboratory that will undertake the analysis. Reports of the analyses shall be submitted to the Permit Data Section, Records and Data Department (using District forms) within thirty days of sampling, and shall include the signature of an authorized representative and the certification number of the Department of Health and Rehabilitative Services (DHRS) certified laboratory under Environmental Laboratory Certification General Category "1" which undertook the analysis.

Analyses shall be performed according to procedures outlined in the current edition of Standard Methods for the Examination of Water and Wastewater (American Public Health Association, 1995), or by Methods for Chemical Analyses of Water and Wastes (EPA, 1983).

In use currently:

STIPULATION #56: Special Well Construction and Water Quality Sampling For The Shell, Prairie and Joshua Creek Watersheds

The Permittee shall construct the proposed well(s) according to the surface diameter and casing depth specifications below. The casing depth specified is to prevent the unauthorized interchange of water between different water bearing zones. The total depth listed below is an estimate, based on best available information. However, since this well is located in an area where water quality can be poor, it is the well driller's responsibility to measure specific conductivity of the well water during construction, in ?? foot intervals once casing is set. The open hole interval of the well can only be advanced if the specific conductivity does not exceed 1000 microSiemens/centimeter and sampling of specific conductivity occurs in ?? foot intervals. Such sampling is necessary to ensure that the well does not encounter water of a quality that cannot be utilized by the Permittee, and to ensure that withdrawals from the well will not cause impacts to area surface waters or induce salt water intrusion. Specific conductivity readings must be recorded and submitted to the District. District staff are available to assist and verify readings during well construction and to receive water quality results. Please contact the Data Collection Bureau at (813) 985-7481 ext. 2102, 48 hours prior to initiation of well construction

and specify at that time if assistance is needed in collecting specific conductivity measurements.

District ID No. **XX having** surface diameter of **XX inches**, with minimum casing depth of **XX feet**, drilled to estimated total depth of **XX feet**.

1. Regardless of the maximum depth specified above, it is the well driller's responsibility to cease drilling when the specific conductivity of the ground water reaches 1,000 microSiemens/centimeter.
2. The casing shall be continuous from land surface to the minimum depth stated above.
3. All well casing (including liners and/or pipe) must be sealed to the depth specified above.
4. The proposed well(s) shall be constructed of materials that are resistant to degradation of the casing/grout due to interaction with the water of lesser quality. A minimum grout thickness of two (2) inches is required on wells four (4) inches or more in diameter.
5. A minimum of twenty (20) feet overlap and two (2) centralizers is required for Public Supply wells, and all wells six (6) inches or more in diameter.
6. The finished well casing depth shall not vary from these specifications by greater than ten (10) percent unless advance approval is granted by the Water Use Permit Bureau Chief, or the Well Construction Section Manager.
7. The finished well total depth shall not exceed the maximum total depth unless advance approval is granted by either the Water Use Permit Bureau Chief, or the Well Construction Section Manager, and the specific conductivity is less than 1,000 microSiemens/centimeter.
8. Advance approval from the Water Use Permit Bureau Chief is necessary should the Permittee propose to change the well location or casing diameter.

The Permittee shall submit a copy of the well completion reports to the District's Water Use Permit.

Appendix IV

Detailed Descriptions of FARMS Board Approved Projects List by FARMS Project Number (Does not include cancelled or potential projects) October 2004 – September 2014

WUP No. 20009476 - Surface Water – H500 (FARMS and EQIP funded; WBIDs 2041 and 2058):
The purpose of the project is to capture and reuse surface water and irrigation tailwater for citrus irrigation. The project facilitates the withdrawal and use of surface water and irrigation tailwater from drainage areas within the property boundaries. This project has been operational since August 2003. Over the life of the project surface water use has averaged more than 154,900 gpd, which is 114 percent of the projected offset.

WUP No. 20009398 – Phase I – H501 (FARMS funded; WBIDs 2040 and 2044):
The purpose of the project is to increase the use of surface water and irrigation tailwater through the construction of a surface water pump station, filtration, and piping for citrus irrigation. The project also consists of the installation and use of radio controlled pump station controllers to allow for the precise startup and shutdown of all irrigation sources based on data remotely collected by the project's soil moisture probes and weather station. This project has been operational since October 2003. Surface water use as a result of Phases 1, 2 and 3 of this project has averaged 673,300 gpd. This is 81 percent of projected total offsets.

WUP No. 20009398 – Phase II – H501 (FARMS funded; WBIDs 2040 and 2044):
The purpose of Phase 2 of this FARMS project is to further increase groundwater savings and irrigation conservation by adding components that complement the Phase I project infrastructure. The additions include filter element replacement for the six surface water pump stations; pump station auto starts and solenoids to improve the remote start-up and shut-down of all pump stations; five additional soil moisture stations to increase precise irrigation management on additional farm acreage; an interconnecting sub-main pipeline to accommodate increased distribution of irrigation resources, an upgrade to the existing computer system to operate the software necessary to micromanage all irrigation resources, new rain bucket switches to shut off irrigation pumps during rain events, riser boards for existing surface water control structures, and a conductance meter to accurately monitor onsite water quality. This project has been operational since August 2005. Surface water use as a result of Phases 1, 2 and 3 of this project has averaged 673,300 gpd. This is 81 percent of projected total offsets.

WUP No. 20009398 – Phase III – H501 (FARMS funded; WBIDs 2040 and 2044):
The purpose of the project is to reduce Upper Floridan aquifer withdrawals through the construction and operation of a 68-acre surface water irrigation reservoir, the retrofitting of two surface water irrigation pump stations, and efficiently controlling the irrigation events through the operation of automated pumps controlled by soil moisture probes and rain monitoring devices. This project has been operational since October 2011. Surface water use as a result of Phases 1, 2 and 3 of this project has averaged 673,300 gpd. This is 81 percent of projected total offsets.

WUP No. 20003530 – H504 (FARMS funded; WBIDs 1964 and 2040):

The purpose of the project is to reduce Upper Floridan aquifer withdrawals through the construction and operation of a 40-acre surface water irrigation reservoir. FARMS components include a surface water irrigation pump station, filtration, and the piping necessary to connect the proposed surface water reservoir system to the existing irrigation system. In addition, the project expands the use of surface water resources through the installation of a second surface water pump station on an existing shell pit, approximately four-acres in size. This second pump station also involved the installation of a pipeline to connect to the irrigation system and is anticipated to reduce groundwater irrigation for approximately 195 acres. Surface water supplies for the shell pit are additionally increased through manual manipulation of existing onsite water control structures. This project is operational and the actual offset is averaging 161,453 gpd, which is 113 percent of the projected offset.

WUP No. 20006669 Phase I – H505 (FARMS funded; WBID 2001):

The primary goal of this project is to reduce groundwater withdrawals on a citrus grove through the use of surface water from an existing storm water collection reservoir. Project components include a surface water pump station, filtration, piping and the infrastructure necessary to operate and connect the existing reservoir into the irrigation system. This project has been operational since April 2006 and has an average ground water offset of 39,081 gpd, which is 23 percent of the projected offset.

WUP No. 20009648 – H508 (FARMS and EQIP funded; WBID 2041):

The purpose of the project is to reduce Upper Floridan groundwater withdrawals through the use of a 15-acre tailwater recovery and surface water collection reservoir to irrigate a large variety of organically grown vegetables on a 585-acre farm. FARMS project components include surface water pump stations, filtration, piping for irrigation and water control structures to assist in on-site surface water management. This project has been operational since May 2006. Actual ground water offset has averaged 222,800 gpd, which is 168 percent of the projected offset.

WUP No. 20009687 – Phase I – H512 (FARMS and EQIP funded; WBIDs 2040 and 2041):

The purpose of the first phase of the project was to reduce groundwater withdrawals through the use of surface water from a shell pit on the northern portion of the property. Phase I of the FARMS project funded two surface water withdrawal pump stations, filtration, and mainline pipe to connect the northern surface water reservoir to the existing drip irrigation system, and central irrigation control system with soil moisture sensors. Phase I of this project has been operational since April, 2006. Average surface water use is 570,670 gpd, which is about 86 percent of the projected offset; however, it is 100 percent of the irrigation applied to the site.

WUP No. 20009687 – Phase II – H512 (FARMS funded; WBIDs 2040 and 2041):

The purpose of the second phase of the project is to reduce groundwater withdrawals through the use of surface water from an additional shell pit on the southern portion of the property. The second phase of the FARMS project includes additional surface water pumps, filtration and piping to connect the southern reservoir to the existing irrigation system and also to connect the southern irrigation system to the northern irrigation system. Phase II became operational in August 2009. Surface water use has averaged 305,619 gpd, which is 124 percent of the projected offset; however, it is 100 percent of the irrigation applied to the site.

WUP No. 20010726 – H513 (FARMS and EQIP funded; WBID 2040):

The purpose of the project is to reduce groundwater withdrawals through the use of two tailwater recovery and surface water collection reservoirs. FARMS project components include two surface water pump stations, filtration and the infrastructure necessary to operate and connect the reservoirs to a new, more efficient drip irrigation system. This project has been operational since January, 2006 however, the project's contract term has been completed and the property is not being used to grow an irrigated crop. Because no crop is being grown and the contract obligation is complete, it is now considered a retired project. Despite the retired status, no groundwater has been used on the site since the system became operational.

WUP No. 20008348 – H514 (FARMS funded; WBID 1962):

The purpose of the project is to reduce groundwater withdrawals through the use of an existing shell pit as a tailwater recovery and surface water collection reservoir. FARMS project components include a surface water pump station, filtration, piping and infrastructure necessary to operate and connect the existing reservoir into the irrigation system. Other project components include the construction of a swale to provide additional tailwater recovery on the farm. This project has been operational since April, 2006. Surface water use has averaged 83,200 gpd since that time, which is 117 percent of the projected groundwater offset.

WUP No. 20006765 – Phase I – H516 (FARMS and EQIP funded; WBIDs 1962, 1995 and 2001):

The purpose of the project is to reduce groundwater withdrawals through the construction and operation of a tailwater interception and surface water reservoir system. The project included the excavation of a linear interception trench and feeder ditches, a 20,000 gallon per minute (gpm) surface water collection pump station, two 2,500 gpm irrigation pump stations, including filtration, and piping necessary to connect the tailwater interception and surface water reservoir system to the existing irrigation system. Project has been operational since August, 2006 and has offset an average of 235,600 gpd, or 106 percent of projected offset.

WUP No. 20006765 – Phase II – H516 (FARMS and EQIP funded; WBIDs 1962, 1995 and 2001):

The purpose of the project is to reduce Upper Floridan aquifer withdrawals through the use of an existing 25-acre pond as an irrigation source. FARMS project components consist of two surface water irrigation pump stations, filtration, and the piping necessary to connect the surface water reservoir system to the existing irrigation system. This project has been operational since March, 2009 and has offset an average of 202,000 gpd, or 262 percent of the projected offset.

WUP No. 20002418 – H522 (FARMS funded; WBIDs 1997 and 2001):

The purpose of the project is to reduce Upper Floridan aquifer withdrawals through the construction and operation of a surface water irrigation reservoir. FARMS components include a surface water irrigation pump station, filtration, and the piping necessary to connect the surface water reservoir system to the existing irrigation system. The project also addresses water quality concerns by reducing the amount of mineralized ground water entering Joshua Creek. This project has been operational since May, 2008. Surface water use averaged 54,756 gpd since that time, which is 109 percent of the projected offset.

WUP No. 20009127 – H526 (FARMS funded; WBID 1962):

The purpose of the project is to reduce groundwater withdrawals through the installation and operation of three remote soil moisture-monitoring stations. Soil moisture data, collected in the three locations, at three different vertical depths, allows the grower to shorten irrigation events by applying irrigation to the root zone only. Once the necessary moisture content is reached, the onsite manager can determine when to stop irrigating. This type of precision irrigation management allows for reduced water use, reduced fertilizer leaching, and reduced fuel

consumption. This project has been operational since May 2006. The actual offset is averaging 38,900 gpd, which is 249 percent of the projected offset.

WUP No. 20009716 – H530 (FARMS and EQIP funded; WBID 2001):

The purpose of the project is to reduce mineralized groundwater withdrawals through the use of surface water from an existing storm water collection reservoir. FARMS project components include two surface water irrigation pumps, filtration, piping and infrastructure necessary to operate and connect the existing reservoir into the irrigation system. The project also increases irrigation efficiency through the use of an innovative, real-time irrigation control system. The system employs automated pump controls, soil moisture and weather monitoring devices to reduce overall irrigation and extend surface water resources. This project has been operational since September 2006. Surface water use has averaged 115,800 gpd since that time, which is 163 percent of the projected offset.

WUP No. 20001759 – H534 (FARMS funded; WBIDs 2040, 2041 and 2044):

The purpose of the project is to reduce Upper Floridan aquifer withdrawals through the use of an existing 12-acre surface water reservoir to irrigate 140 acres of sod. FARMS project components include one pump station, filtration, piping, and infrastructure necessary to connect the reservoir to the sod production area. Construction was complete on this project in August 2008. Surface water use has averaged 228,300 gpd since that time which is 116 percent of the projected offset; however, it should be noted that sod production has been reduced during this time period due to economic conditions.

WUP No. 20009052 - H539 (FARMS funded; WBIDs 1964 and 2040):

The purpose of the project is to reduce Upper Floridan groundwater withdrawals through the use of an existing surface water reservoir and existing grove ditches to irrigate 1,335 acres of a 1,665-acre citrus grove. FARMS project components include two surface water pump stations, filtration, piping, a weather station, culverts with risers, and infrastructure necessary to connect the surface water reservoirs into the existing irrigation system. This project has been operational since January, 2008. Surface water use has averaged 779,900 gpd, which is approximately 57 percent of the projected offset; however, it should be noted that irrigated acreage has been reduced due to citrus canker and 100 percent of water use is from surface water.

WUP No. 20009476 - Electronics – H548 (FARMS funded; WBIDs 2041 and 2058):

The purpose of this project is to reduce groundwater pumping using a system of solar powered environmental sensors and radio telemetry uplinked to the Internet to optimize irrigation scheduling and prevent over-watering. This project became operational in June, 2008. Water use reduction as a result of the project is estimated at 134,700 gpd, which is 496 percent of the projected offset.

WUP No. 20002386 – H555 (FARMS funded; WBIDs 1962 and 1964):

The purpose of the project is to reduce ground-water withdrawals from the Upper Floridan aquifer. The reduction in ground-water usage is achieved through the construction and operation of a linear surface-water irrigation reservoir, one surface-water irrigation pump station, filtration, and the mainline piping necessary to connect the reservoir to a more efficient microjet irrigation system. This project became operational in April 2009 and has averaged a groundwater offset of 80,800 gpd, which is 108 percent of the projected offset.

WUP No. 20012818 – H556 (FARMS and EQIP funded; WBIDs 1962 and 1995):

The purpose of the project is to reduce Upper Floridan aquifer withdrawals through the creation of a two-acre reservoir within an existing storm water and tailwater retention area. The project also includes the construction of a surface water irrigation pump station, filtration, and the piping necessary to connect the proposed surface water reservoir system to the existing irrigation system. This project began operation in December, 2008. Surface water use has averaged 172,049 gpd since operation began, which is 174 percent of the projected offset.

WUP No. 200013225 – H557 (FARMS and EQIP funded; WBID 1997):

The primary goal of this project is to replace the permitted Upper Floridan aquifer withdrawal through the use of two surface water reservoirs and the construction of two surface water irrigation pump stations, filtration, and the piping necessary to connect the proposed surface water reservoirs to the existing irrigation system. This project became partially operational in January 2010. Surface water use has averaged 28,000 gpd since that time, which is 22 percent of the projected offset; however, it should be noted that the sod production on this farm has been less than expected due to economic conditions and changes in lessee and 100 percent of water use is from surface water.

WUP 20002418, 20012818, 20009716 – H560 (FARMS funded; WBIDs 1995, 1997 and 2001):

The purpose of the project is to further reduce Upper Floridan aquifer withdrawals and overall water use on three existing blueberry farms through an integrated irrigation system that includes two weather stations, soil moisture sensors, and automated pump controls for the three Upper Floridan wells to reduce the number and duration of irrigation events. The project involves Farm 4 in the Hog Bay Slough watershed of Joshua Creek, Farm 5 in the Hawthorne Creek watershed of Joshua Creek, and Farm 6 in the Myrtle Slough Watershed of Prairie Creek. All three farms are within five miles of one another. This project became operational in February 2010. Actual offset has averaged 91,420 gpd, which is 366 percent of the projected offset.

No WUP Associated with this Project – H563 (FARMS funded; WBIDs 2041 and 2041B):

The purpose of the project is to improve the quality of water that leaves the 40-acre citrus grove and flows into the Shell Creek reservoir by constructing a surface water pump station, with associated filters and mainline piping, to withdraw water directly from Shell Creek. This project became operational in September 2009. Actual offset has averaged 31,300 gpd, which is 57 percent of the projected offset.

WUP No. 20007462 – H567 (FARMS funded; WBIDs 1995 and 1995a):

The purpose of this project is to convert an existing five-acre storm water management pond to collect tailwater and surface water from the property and surrounding watershed to offset mineralized Upper Floridan aquifer groundwater used for irrigation over approximately 692 acres of citrus. This project became operational in July, 2012. Actual offset has averaged 191,300 gpd, which is 102 percent of the projected offset.

WUP No. 20006669 – Phase II + Culverts – H569 (FARMS and EQIP funded; WBID 2001):

The purpose of the project is to reduce the withdrawal of mineralized groundwater through the construction and operation of a five-acre surface water irrigation reservoir. The reduction in groundwater use will benefit the Joshua Creek Watershed by reducing the quantity of marginal quality groundwater entering the creek. FARMS project components consist of one surface water irrigation pump station, filtration, and the piping necessary to connect the proposed surface water reservoir system to the existing irrigation system. This project has been operational since March, 2010 and has an average groundwater offset of 146,183 gpd, which is 115 percent of the projected offset.

WUP No. 20001391 – H570 (FARMS and EQIP funding; WBID 1974):

The purpose of the project is to reduce Upper Floridan aquifer withdrawals through the creation of a one-acre reservoir. The project includes the construction of a surface water irrigation pump station, filtration, and the piping necessary to connect the proposed surface water reservoir system to the existing irrigation system. This project became operational in December 2009 and surface water use has averaged 30,756 gpd, which is 63 percent of the projected offset.

WUP No. 200013096 – H573 (FARMS funded; WBIDs 2040 and 2041):

The primary goal of the project is to increase the efficiency of irrigation events by installing hydraulic valves that will be controlled by a timer at each irrigation zone, a cut-off switch for the single power unit, and a rain sensor to shut down the system during rainfall events. The project became operational in March 2010. Actual offset has averaged 190,400 gpd, which is 800 percent of the projected offset.

WUP No. 20006765 – Phase III – H584 (FARMS and EQIP funded; WBIDs 1962, 1995 and 2001):

The purpose of the project is to reduce Upper Floridan aquifer withdrawals through the use of an existing 36-acre reservoir as an irrigation source. FARMS project components consist of a surface water irrigation pump station, filtration, pump controls and the piping necessary to connect the surface water reservoir system to the existing irrigation system. This project has been operational since June, 2010 and has offset an average of 301,100 gpd, or 86 percent of the projected offset.

WUP No. 20009417 – H585 (FARMS and EQIP funded; WBIDs 2040 and 2041):

The purpose of the project is to reduce Upper Floridan aquifer groundwater withdrawals through the use of surface water supplies. An existing farm reservoir will be used to accumulate storm runoff and tailwater, which will augment grove irrigation. The proposed project components are a surface water pump station and mainline pipe to the existing grove irrigation system. The project became operational in November 2012. Actual offset has averaged 79,900 gpd, which is 100 percent of the projected offset.

WUP No. 20002689 – H588 (FARMS funded; WBIDs 2040 and 2041):

The primary goal of this project is to increase the efficiency of irrigation events to the groves owned and maintained by Bermont Properties by installing hydraulic valves that will be controlled by a timer at each irrigation zone and rain sensors to shut down each zone during rainfall events. FARMS project components will consist of several dozen hydraulically controlled irrigation valves, five irrigation control stations with rain sensors, and the piping necessary to connect the new valves to the existing irrigation system. This project is expected to become operational in December 2015.

WUP No. 20002689 – H593 and H593 Amendment (FARMS funded; WBIDs 2040 and 2041):

FARMS staff have discussed the potential to cost-share a project to reduce Upper Floridan aquifer withdrawals with surface water. Project components would include the excavation of a reservoir, a surface water pump station, filtration, and pipeline to connect to the existing irrigation system. The contract amendment was to increase the pump capacity and power unit size of the originally intended pump station at the 5.0-acre reservoir, add pipeline to connect the 5.0-acre surface water reservoir to an existing 3.6-acre grove ditch made a part of this project through the contract amendment, and to add a pump station at the 3.6-acre grove ditch that will irrigate an additional 190 acres of citrus grove. The project is expected to become operational in 2015.

WUP No. 20004641 – H594 (FARMS funded; WBIDs 1962 and 1997):

This project will integrate soil moisture sensors, hydraulic valve controls, and automated pump controls to conserve groundwater. The project area consists of approximately 312 acres of citrus. The primary goal of the project is to reduce Upper Floridan and Intermediate aquifer withdrawals by efficiently controlling irrigation events through the automated operation of pumps and hydraulic valves controlled by soil moisture sensors. The project became operational in September 2012. Actual offset is 175,725 gpd, which is 549 percent of the projected offset.

WUP No. 20006669 Phase 2, Pump 2 – H604 (FARMS funded; WBID 2001):

The primary goal of the project is to reduce the withdrawal of groundwater through the addition of a second pump to the existing southern tailwater reservoir. The reduction in groundwater use will benefit the Joshua Creek Watershed by reducing the quantity of marginal quality groundwater entering the creek. FARMS project components consist of one surface water irrigation pump station, filtration, and the piping necessary to connect the additional pump system to the existing irrigation system. This project became operational in November 2010. Actual offset is 207,705 gpd, which is 296 percent of the projected offset.

WUP No. 20002386 – H606 – Section 10 SW, Phase 1a, Phases 2 and 3 and Phase 2 and 3 Amendment (FARMS funded; WBIDs 1962 and 1964):

The primary goal of the multiple phase of this project is to reduce groundwater withdrawals from the Upper Floridan aquifer through the construction and operation of multiple linear surface water irrigation reservoirs, each with a surface water irrigation pump station and the filtration and the piping necessary to connect the pump stations to the respective existing irrigation systems. The linear reservoirs will be formed by placing adjustable risers within existing drainage culverts and withdrawing water that will be stored within linear, large grove ditches behind the risers. This first portion of this project became operational in June, 2011 and additional phases are under construction. Actual groundwater offset through September 2012 was 811,900 gpd, which is 108 percent of the projected offset for the initial two phases.

WUP No. 20002386 – H608 (FARMS funded; WBIDs 1962 and 1964):

The primary goal of this project is to reduce groundwater withdrawals from the Upper Floridan aquifer by utilizing an existing grove ditch as a linear surface water irrigation reservoir. Surface water from the ditch reservoir will be withdrawn and used to irrigate 110 acres of citrus. The project became operational in October, 2011. Actual groundwater offset is 54,000, which is 66 percent of the projected offset.

WUP No. 20011982 – H610 (FARMS funded; WBIDs 1962 and 2044):

The primary goal of this project is to collect and reuse irrigation water from 2.6 miles of surface ditches on the property and surrounding watershed. The surface water will be used to irrigate 307 acres of sod with seepage irrigation. The project became operational in March 2012. Actual groundwater offset is 192,400 gpd, which is 179 percent of the projected offset.

No Assigned WUP – H629 (FARMS funded; WBIDs 2041 and 2041b):

The primary goal of this project is to reduce mineralized groundwater withdrawals from the Upper Floridan aquifer by utilizing an existing surface water reservoir recently modified for use in irrigating the grove. FARMS project components consist of an electrically operated surface water irrigation pump station, water filtration equipment, controls and mainline pipe necessary to connect the surface water pump to the existing irrigation system. The project became operational in May 2011. The actual groundwater offset has averaged 11,200 gpd, which is 50 percent of the projected offset and 100 percent of the water use in the grove is from surface water.

WUP No. 20009782 – H648 (FARMS funded; WBIDs 1962 and 1995):

The primary goal of the project is to reduce the use of groundwater for irrigation and cold protection by construction of a five-acre reservoir and operation of surface water control structures and a pump station to be connected to the existing grove irrigation system. Surface water will be used for irrigation and cold protection to the greatest extent practicable for approximately 500 acres of grove area surrounding the reservoir site. FARMS project components consist of reservoir control structures, a stationary surface water pump station with filtration, and mainline pipe to connect the surface water pump station to the existing irrigation system. Actual groundwater offset is 57,600 gpd, which is 81 percent of the projected offset.

WUP No. 20002593 – H649 (FARMS funded; WBID 2040):

The primary goal of this project is to reduce mineralized groundwater withdrawals from the Upper Floridan aquifer by utilizing an existing surface water reservoir recently modified for use in irrigating a citrus grove. The project became operational in May, 2011. Actual groundwater offset is 105,700 gpd, which is 81 percent of the projected offset. It should be noted that 100 percent of the water used to irrigate the grove is now from surface water.

WUP No. 20006872 – H656 (FARMS and EQIP funded; WBID 1964):

This primary goal of this project is to construct and operate a 5.15-acre reservoir to collect tailwater and surface water from the property and surrounding watershed to offset mineralized Upper Floridan aquifer groundwater quantities used for irrigation over approximately 500 citrus acres. FARMS project components consist of a stationary surface water pump station, filtration system, and mainline pipe to connect the surface water pump station to the existing irrigation system. This project became operational in August 2012. Actual groundwater offset is 48,469 gpd, which is 30 percent of the projected offset.

WUP No. 20003069 – H657 (FARMS funded; WBIDs 1962 and 1995):

This project will involve construction and operation of a five-acre reservoir to collect tailwater and surface water from the property and surrounding watershed to offset Upper Floridan aquifer groundwater quantities for irrigation and cold protection. FARMS project components consist of two surface water pump stations, filtration systems, and mainline pipe to connect the surface water pump stations to the existing irrigation system. Actual groundwater offset is 392,500 gpd, which is 212 percent of the projected offset.

WUP No. 20006669 – H673 (FARMS funded; WBID 2001):

The primary goal of this project is the construction and operation of a five-acre reservoir to collect tailwater and surface water from the property and surrounding watershed to offset Upper Floridan aquifer groundwater used for supplemental irrigation of citrus. Actual groundwater offset is 206,208 gpd, which is 119 percent of the projected offset.

WUP No. 20006765 – H693 (FARMS funded; WBIDs 1962, 1995 and 2001):

This grove previously completed three FARMS projects that each facilitated an existing tailwater reservoir to offset the use of Upper Floridan aquifer groundwater with surface water to irrigate the grove. The Phase 4 project will facilitate the remaining fourth tailwater reservoir to supply surface water for supplemental irrigation of a 333-acre portion of the citrus grove and further reduce use of groundwater. Actual groundwater offset is 83,600 gpd, which is 96 percent of the projected offset.

WUP No. 20006669 Phase 4 – H695 (FARMS funded; WBID 2001):

The Phase 4 project will supply surface water for supplemental irrigation and will be integrated into the overall irrigation system capable of serving the entire grove and further reduce use of groundwater. FARMS project components for Phase 4 will consist of a surface water irrigation pump station, located on the reservoir used in the Phase 3 FARMS project, and includes a filtration system, and the mainline pipe necessary to connect the surface water reservoir pump station to the existing irrigation system, and six culverts to direct water to the reservoir. The project is expected to be operational in 2015.

WUP No. 20006265 – H703 (FARMS funded; WBID 1964):

This project will involve the construction and operation of two, four-acre reservoirs to collect tailwater and surface water from the property and surrounding watershed to offset Upper Floridan aquifer groundwater used for supplemental irrigation. FARMS project components consist of two duplex surface water pump stations, filtration systems, control culverts, and mainline pipe necessary to connect the surface water reservoirs to the existing irrigation system. The project is expected to be operational in 2015.

WUP No. 20002593 Phase 2 – H704 (FARMS funded; WBIDs 2040, 2041):

Phase 2 will involve enlargement of the existing Phase 1 tailwater reservoir to five acres and includes installation of an additional surface water pump station to offset Upper Floridan aquifer groundwater used for supplemental irrigation. FARMS project components consist of a tailwater recovery pump, a surface water irrigation pump station, filtration system, control culverts, and mainline pipe necessary to connect the additional pump station to the existing irrigation system. The project is expected to be operational in 2015.

WUP No. 20003275 – H708 (FARMS funded; WBIDs 1962, 2040, and 2044):

This project will involve the installation and operation of two surface water pumping stations at an existing 33-acre reservoir system, to collect tailwater and surface water from the property and surrounding watershed to offset Upper Floridan aquifer groundwater used for supplemental irrigation on 408 acres of the citrus grove. FARMS project components consist of two surface water pump stations, filtration systems, a 200-acre conversion of the citrus grove irrigation from seep to microspray, and mainline pipe necessary to connect the surface water reservoir to the irrigation system. The project is expected to be operational in 2015.

Appendix V
Media Coverage (October 2004 – September 2014)

Title	Outlet	Date
<i>Southwest Florida WMD Report</i>	Florida Agriculture	07/2006
<i>District approves project that could reduce groundwater pumping up to 197,000 gallons per day</i>	SWFWMD Press Release	09/2006
<i>Mini-FARMS Cost Share Funding</i>	PRVCGA Citrus Grower Vol 13, No. 10	10/2006
<i>SWFWMD Well Back-Plugging Program</i>	PRVCGA Citrus Grower Vol 13, No. 12	12/2006
<i>FARMS Program</i>	InTheField Magazine	12/2006
<i>FARMS Program Expanding</i>	PRVCGA Citrus Grower Vol 14, No. 2	12/2007
<i>Ag Reservoirs Confused With Dirt Mining</i>	PRVCGA Citrus Grower Vol 14, No. 3	03/2007
<i>Disturbing the Peace</i>	Charlotte Sun, Supplement	04/2007
<i>Changing to Surface Irrigation?</i>	PRVCGA Citrus Grower Vol 14, No. 7	07/2007
<i>SWFWMD Well Back-Plugging Program</i>	PRVCGA Citrus Grower Vol 14, No. 7	07/2007
<i>Fertilizer laws needed to limit runoff into water</i>	Charlotte Sun	11/2007
<i>Growers Worry About Water Supplies</i>	Charlotte Sun	11/2007
<i>Project's final phase will continue to reduce groundwater pumping in Charlotte County</i>	Charlotte Sun	02/2008
<i>Irrigation program will benefit from county cooperation</i>	Charlotte Sun, editorial	03/2008
<i>To Restore Peace, Water Is Needed</i>	Tampa Tribune	05/2008
<i>FARMS Program: A Progressive Approach to Water Management</i>	Florida Citrus Mutual, Triangle	08/2008
<i>"State Eyeing Charlotte's Water Quality"</i>	Sun-Herald.com	03/2005
<i>"BMP Kick-Off"</i>	Peace Rv. Valley Citrus Growers Assoc. Newsletter	06/2005
<i>"Peace Rv. Basin Board Sets Proposed Millage Rate"</i>	Sun-Herald.com	06/2005
<i>"Tree Health and Salinity"</i>	Triangle (Florida Citrus Manual)	06/2005
<i>"FARMS Cost-Share Program"</i>	Peace Rv. Valley Citrus Growers Assoc. Newsletter	07/2005
<i>"SWFWMD's Activities Increase Production"</i>	Peace Rv. Valley Citrus Growers Assoc. Newsletter	08/2005
<i>"Citrus Best Management Practices"</i>	Peace Rv. Valley Citrus Growers Assoc. Newsletter	09/2005
<i>"Acronyms you Should get to Know"</i>	Florida Agriculture	10/2005
<i>"Shell Creek & Prairie Creek Watersheds Management Plan Stakeholders Signing Ceremony"</i>	Harbor Happenings (Charlotte Harbor NEP)	Issue 2; 2005
<i>"International Interest in FARMS Program"</i>	Water Matters; District Newsletter	09/2005
<i>"BMPs – Easy as 1,2,3"</i>	Peace Rv. Valley Citrus Growers Assoc. Newsletter	10/2005
<i>"District Releases \$1 million for FARMS Program"</i>	e-Resource	01/2006
<i>"\$1 Million in Grants to Help Farmers, Environment"</i>	Sun-Herald	02/2006
<i>"FARMS"</i>	(WWSB) ABC - Sarasota	02/2006
<i>"SWFWMD Programs Available to Assist Producers"</i>	Florida Lawn Newsletter	05/2006
<i>"SWUCA Plan will Restore Water Resources, Meet Water Needs"</i>	Water Matters; District Newsletter	05/2006
<i>"Cost-share Funding for BMP Participants"</i>	Peace Rv. Valley Citrus Growers Assoc. Newsletter	07/2006
<i>"Mini-Farms"</i>	e-Resource	05/2006

<i>"FARMS Activity Summary"</i>	Peace Rv. Valley Citrus Growers Assoc. Newsletter	01/2009
<i>"BMP Tour Teaches Others About Ag Conservation"</i>	Peace Rv. Valley Citrus Growers Assoc. Newsletter	12/2009
<i>"Backplugging Helps Local Growers"</i>	Peace Rv. Valley Citrus Growers Assoc. Newsletter	04/2010
<i>"West Central Florida Water Restoration Action Plan – Report to the Legislature"</i>	Southwest Florida Water Management District	03/2010
<i>"FARMS Project Boosts Economy, Improves Water Quality and Reduces Water Use"</i>	Watermatters	08/2009
<i>"Cost-sharing funding through the FARMS Program helps growers in southwest Florida improve water quality and reduce water use"</i>	Florida Grower	09/2009
<i>"Water Need to Knows"</i>	Peace Rv. Valley Citrus Growers Assoc. Newsletter	12/2010
<i>"Water District Offers Farmers a Carrot"</i>	Citrus County Chronicle	2/2011
<i>"Water Management District Undergoes Changes"</i>	Peace Rv. Valley Citrus Growers Assoc. Newsletter	6/2011
<i>"Water Quality Issues Monitored"</i>	Peace Rv. Valley Citrus Growers Assoc. Newsletter	10/2011
<i>"United Front on Water Quality Regulation"</i>	Peace Rv. Valley Citrus Growers Assoc. Newsletter	3/2012
<i>"Southern Water Soil Experts"</i>	In the Field Magazine	4/2012
<i>"Reasonable Assurance Plan Adopted"</i>	Peace Rv. Valley Citrus Growers Assoc. Newsletter	4/2012
<i>"Agencies Update Agricultural Interests on Water Issues at Regional Meeting"</i>	In the Field Magazine	6/2012
<i>"District Remains Committed to Agricultural Programs"</i>	Water World	6/2012
<i>"Public-Private Partnerships in Water Resource Management – Case Studies at the Southwest Florida Water Management District"</i>	The Florida Watershed Journal	9/2012
<i>"SWFWMD Remains Committed to Agricultural Programs"</i>	The Triangle	12/2014
<i>"Water quality a woe for Charlotte Harbor"</i>	The Ledger	12/2012
<i>"Landfill Battle Doesn't Bode Well for decision Making"</i>	Charlotte Sun	1/2013
<i>"Ranchers using best practices"</i>	Charlotte Sun	1/2013
<i>"Florida Offers Funding for weather stations, water improvements"</i>	The Grower	1/2013
<i>"SWFWMD offers mini-farms cost share program"</i>	The Triangle	2/2013
<i>"FARMS Contract Reviewed"</i>	PRVCGA newsletter	2/2013
<i>"Strawberry signs of the times"</i>	Florida Grower	3/2013
<i>"State will help pay for citrus growers' weather stations"</i>	Southeast Agnet	4/2013
<i>"Sewer foes distort data to sway board"</i>	Charlotte Sun	6/2013
<i>"Barbara Carlton: respected and resourceful"</i>	Citrus Industry Magazine	9/2013
<i>"Water Conservation Remains Critical Ag Goal"</i>	Highlands Today	9/2013
<i>"Science that's propelling ag into the future"</i>	Central Florida Ag News	10/2013
<i>"Florida Goes Back to the Well to Protect Water"</i>	Growing Produce	2/2014

<i>"Protecting a Precious Resource"</i>	Florida Grower	2/2014
<i>"Enough Time. Let's solve issue of Myakka flooding"</i>	Venice Gondolier	4/2014
<i>"SWUCA Recovery a Top Priority"</i>	PRVCGA newsletter	3/2014
<i>"CHNEP Tour Time Well Spent"</i>	PRCVGA newsletter	4/2014
<i>"SWFWMD Ag Advisory Visits FARMS Project"</i>	PRVCGA newsletter	4/2014
<i>"District Taking Suggestions"</i>	PRVCGA newsletter	7/2014
<i>"Water issues tap agricultural alliance test"</i>	Citrus County Chronicles	7/2014

Outreach and Education (October 2004 – September 2014)

Event	Date
2006 Citrus Expo	August, 2006
SWFWMD Ag Advisory Committee	August, 2006
DeSoto Co. Planning Commission – Ag reservoirs	October, 2006
Florida Blueberry Growers Fall Short Course	October, 2006
2006 Ag Expo	November, 2006
Legislators FARMS Tour	November, 2006
SPJC Stakeholders Meeting	November, 2006
Legislators FARMS Tour	December, 2006
Charlotte Co. ANRAC Meeting	December, 2006
USDA-CREES National Water Conference	January, 2007
PRVCGA Annual Meeting	February, 2007
SWFWMD Ag Advisory Committee	February, 2007
Florida Blueberry Growers Spring Meeting	March, 2007
DeSoto Co. Planning Commission – Ag reservoirs	March, 2007
SPJC Stakeholders Meeting	April, 2007
Florida Chapter, ASABE Annual Conference	May, 2007
Legislators FARMS Tour	May, 2007
SWFWMD Ag Advisory Committee	May, 2007
Charlotte Co. ANRAC Meeting	May, 2007
2007 Florida Industry Annual Conference	June, 2007
2007 Soil & Water Conservation Society Conference	July, 2007
SWFWMD Well Drillers Advisory Committee	July, 2007
2007 Florida Local Environmental Resource Agencies Conference	August, 2007
SWFWMD Ag Advisory Committee	August, 2007
2007 Citrus Expo	August, 2007
Florida Blueberry Growers Fall Short Course	October, 2007
SWFWMD Governing Board Meeting - FARMS Status Report	October, 2007
2007 Ag Expo	November, 2007
SPJC Stakeholders Meeting	November, 2007
FARMS Interagency Meeting	December, 2007
PRVCGA Annual Meeting	January, 2008
SPJC Stakeholders Meeting	March, 2008
FARMS Interagency Meeting	March, 2008
IFAS Workshop – Water & Nutrients in the Root Zone	May, 2008
Florida Chapter, ASABE Annual Conference	June, 2008
2008 Florida Industry Annual Conference	June, 2007
FARMS Interagency Meeting	July, 2008
FARMS Interagency Meeting	October, 2008
FDACS Fall Interagency Meeting	November, 2008
2008 Ag Expo	November, 2008
2008 Florida Blueberry Growers Fall Meeting	November, 2008
SPJC Stakeholders Meeting	December, 2008

Legislative Delegation Meeting (Manatee)	Dec. 2004
Legislative Delegation Meeting (Sarasota)	Dec. 2004
Peace River/Manasota Water Supply Authority Meeting	Dec. 2004
Shell and Prairie Creek RA Plan Signing Ceremony	Dec. 3, 2004
Legislative Delegation Meeting (Charlotte)	Jan. 2005
American Clean Water Foundation	Jan. 2005
EPA SPJC RA Plan Briefing – Atlanta, Ga.	Jan. 31, 2005
CHEC Field Trip to FARMS Projects	Feb. 2005

Manatee Chamber of Commerce Environmental and Legislative Committee	Feb. 2005
Manasota League of Cities	Feb. 2005
FARMS Interagency Team Meeting	Feb. 18, 2005
SPJC Stakeholder Meeting	Mar. 3, 2005
Florida Farm Bureau Legislative Reception	Mar. 29, 2005
District Governing Board	Mar. 29, 2005
IFAS – Balm Research Center Opening	April 1, 2005
CHEC Meeting	April 27, 2005
SWF RPC	May 1, 2005
Agricultural Advisory Committee Meeting	May 3, 2005
IFAS Peace River Citrus BMP Kickoff	May 18, 2005
Vegetable BMP Meeting	June 6, 2005
SPJC RA Plan Presented at Fl. Lake Management Society Conference	June 7, 2005
Peace River Basin Board - DEP/EPA Approval Status of SPJC RA Plan	June 10, 2005
Sarasota County Agriculture Council meeting	June 14, 2005
Florida Representatives Field Visit – TRB Groves	June 30, 2005
Flatford Agriculture Meeting – FDACS	July 7, 2005
Australians Visit FARM Project Properties	Jul. 25, 2005
Agricultural Advisory Committee Meeting	Aug. 9, 2005
FARMS Interagency Meeting	Aug. 29, 2005
Citrus Expo	Aug. 24, 2005
Peace River/Manasota Regional Water Supply Authority Meeting	Oct. 27, 2005
Agricultural Advisory Committee Meeting	Nov. 9, 2005
SPJC Stakeholder Meeting	Nov. 10, 2005
FARMS Interagency Meeting	Nov. 28, 2005
SPJC RA Plan Presented at Fl. Stormwater Association Conference	Dec. 7, 2005
IFAS Citrus BMP Workshop, Arcadia	Jan. 18, 2005
FDACS Annual Meeting, Tallahassee	Feb 7, 2006
Agricultural Advisory Committee Meeting	Feb. 12, 2006
Tampa Bay Wholesale Growers Spring Conference	Feb. 25, 2006
FARMS Interagency Meeting	Feb. 27, 2006
Spring Blueberry Tour	Mar. 7, 2006
Senate Agriculture Meeting	Mar. 8, 2006
FDACS Luncheon – Upper Myakka	Apr. 1, 2006
SPJC Stakeholder Meeting	May 4, 2006
Agricultural Advisory Committee Meeting	May 17, 2006
WMDs Coordination Meeting	May 18, 2006
Vegetable and Agronomic Crop BMP Manual Regional Sign-up	Jun. 14, 2006
Cattleman's Annual Conference	Jun. 20, 2006
FARMS Interagency Meeting	October 14, 2008
SWFWMD Food Safety Public Meeting	October 8, 2008
Ag Expo – GCREC Balm	October 2009
SWFWMD Agricultural Advisory Committee	February 2009
Charlotte Harbor National Estuary Program Reservoirs Seminar	April 2009

IFAS GCREC – Balm Precision Agriculture Seminar	July 2009
Florida Citrus Expo	August 2009
Florida Tomato Institute	September 2009
SWFWMD Agricultural Advisory Committee	November 2009
FAWN Weather School	January 2010
Florida State Fair Breakfast	February 2010
SWFWMD Agricultural Advisory Committee	February 2010
SWFWMD Agricultural Advisory Committee	May 2010
Peace River Valley Citrus Growers Association Annual Meeting	February 2009
PRVCGA and Charlotte Harbor Environmental Center BMP Tour	November 2009
Peace River Valley Citrus Growers Association Annual Meeting	February 2010
Florida Citrus Expo	August 2010
Agritunity Conference	January 2010
Agritunity Conference	January 2009
FSGA Agritech	August 2009
Florida Blueberry Growers Association Meeting	October 2009
FARMS Interagency Meeting	October 2009
Spring Expo	February 2010
FSGA Agritech	August 2010
Good Agricultural Practices Workshop	February 2010
Hardee County Economic Development Council meeting	June 2010
DeSoto County Planning Commission meeting	February 2008
SPJC Stakeholders meeting	February 2010
SPJC Stakeholders meeting	March 2008
SPJC Stakeholders meeting	June 2009
SPJC Stakeholders meeting	December 2008
Association of Florida Conservation Districts Annual Meeting	July 2010
State of Our Water Conference	November 2008
American Association of Agricultural and Biological Engineers – Florida Section Annual Meeting	June 2009
American Association of Agricultural and Biological Engineers – Florida Section Annual Meeting	June 2010
DeSoto County Farm Bureau	August 2009
Florida Blueberry Growers Association meeting	November 2008
Peace River Basin Board Tour	November 2008
SWFWMD Agricultural Advisory Committee meeting	November 2008
FARMS Interagency Meeting	January 2009
Spring Expo	February 2009
Florida Blueberry Growers Association meeting	March 2009
IFAS Nursery Growers Workshop	April 2009
Prairie River Ranch FARMS Project Tour	May 2009
Farming into the Future Seminar	July 2009
FLM Prairie River Ranch Peace Basin Board Tour	October 2009
Florida Blueberry Growers Association meeting	October 2009
University of Florida Water Institute Symposium	February 2010
Agritech Outreach	August 2010
Florida Citrus Expo	August 2010
FARMS Program Update – SWFWMD Governing Board	October 2010
SWFWMD Agricultural Advisory Committee	November 2010
Florida Ag Expo	November 2010
SPJC Stakeholders Meeting	December 2010
Spring Expo	February 2011
PRVCGA Annual Meeting	March 2011
Florida Blueberry Growers Association Annual Meeting	March 2011

UF-IFAS Vegetable Field Day	May 2011
Charlotte County Soil and Water Conservation District meeting	May 2011
SWFWMD Agricultural Advisory Committee	May 2011
Charlotte County ANRAC	July 2011
Charlotte County ANRAC	August 2011
Specialty Fruit and Nut BMP Manual Kick-Off	October 2011
Florida Blueberry Growers Association	November 2011
Florida Ag Expo	November 2011
Spring Expo	February 2012
Wedgeworth Leadership Class VIII	February 2012
Florida Berry Expo	February 2012
PRVCGA Annual Meeting	February 2012
Florida Blueberry Growers Association	March 2012
All Florida Ag Expo	April 2012
Charlotte Harbor Estuary Program FARMS Tour	April 2012
Southwest Florida Agricultural water Update	May 2012
FAWN Advisory Committee meeting	June 2012
SWFWMD Agricultural Advisory Committee	June 2012
Peace Creek BMAP meeting	June 2012
Florida Citrus Expo	August 2012
SWFWMD Agricultural Advisory Committee	September 2012
Florida Blueberry Growers Association	October 2012
Florida Ag Expo	November 2012
PRVCGA Annual Meeting	February 2013
FARMS Tour Hancock Groves	February 2013
Second Vegetable and Small Fruit Protected Ag. Field Day	March 2013
Florida Citrus Growers Institute	April 2013
All Florida Ag. Show	April 2013
Vegetable Crop Health Management Workshop	May 2013
Citrus Expo at Lee County Civic Center	August 2013
PRVCGA Bus Tour	November 2013
Citrus Greening Research Meeting	November 2013
Florida Ag Expo	November 2013
Florida Blueberry Growers Association Annual Meeting	February 2014
CHNEP Ag Tour Lady Moon Farms, TRB Groves and Chapman Groves with PRVCGA	March 2014
Citrus Irrigation Workshop with IFAS	April 2014
Citrus Expo at Lee County Civic Center	August 2014

References

- Southwest Florida Water Management District; Dec. 2004; Shell Creek and Prairie Creek Watersheds Management Plan; Reasonable Assurance Document; Tampa, Florida.
- Southwest Florida Water Management District; Apr. 2015; Water Quality Monitoring Program Standard Operating Procedures; Tampa, Florida.
- Southwest Florida Water Management District; Apr. 2015; Draft 2015 Regional Water Supply Plan; Brooksville, Florida.
- Southwest Florida Water Management District; Dec. 2010; Regional Water Supply Plan; Brooksville, Florida.
- Southwest Florida Water Management District; Mar. 2006; Southern Water Use Caution Area; Recovery Strategy; Brooksville, Florida.
- Southwest Florida Water Management District; Mar. 2011; Coastal Ground-Water Quality Monitoring Network / Water-Use Permit Network Report; Volume VI; Tampa, Florida.
- Southwest Florida Water Management District; April 2014; FARMS Well Back-Plugging Program Bi-Annual Status Report; Oct. 2011 – Sept. 2013; Sarasota, Florida.
- American Public Health Association; 1995; Standard Methods for the Examination of Water and Wastewater; 19th Edition.
- U.S. Environmental Protection Agency; 1983; Methods for Chemical Analyses of Water and Wastes.