

# **Shell Creek and Prairie Creek Watersheds Management Plan**

**Second Bi-Annual  
Performance Monitoring Summary  
for time period August 2006 – August 2008**



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

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## **Second Bi-Annual Performance Monitoring Summary for time period August 2006 – August 2008**

**Prepared by:**

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

### **Acknowledgements**

The information contained in the second bi-annual 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 Resource Data and Restoration Department at the Southwest Florida Water Management District. For information or additional copies of this document, please contact (813) 985-7481, extension 2102.



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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 second bi-annual 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 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 and received approval from the FDEP Secretary in June 2005.

The reporting time period for this second bi-annual Performance Monitoring Summary document is August 2006 through August 2008. 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 will be generated on a bi-annual 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. Currently, water quality is impaired 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 second bi-annual 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 based on FDEP's evaluations using methodologies from the Impaired Surface Waters Rule (IWR) (Chapter 62-303, F.A.C.) (Figure 2):



**Water Segments in the SPJC Listed as TMDL 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

The performance monitoring results presented in this document will be prioritized by the verified impaired waterbody IDs (WBIDs) as listed above. However, the stakeholders group considers 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 Run	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 not contained within District boundaries

**Water Quality; Progress to Date**

Considerable progress has been achieved for reducing TDS concentrations below the Class I criteria of 500 mg/L within the Prairie Creek sub-basin during the August 2006 to August 2008 reporting period, with no values exceeding the 1000 mg/L criteria in the Prairie Creek (WBID 1962), Shell Creek @ Washington Loop Road (WBID 2041), and Myrtle Slough @ SR 31 (WBID 2040) water segments. Notable improvements in TDS concentrations above the 1000 mg/L criteria have also occurred in Shell Creek @ SR 31 (WBID 2041) over the past two reporting periods, however both water segments in Shell Creek (WBID 2041) and Myrtle Slough (WBID 2040) have not shown improvements with regard to the 500 mg/L TDS standard. Percentages of chloride concentration exceedances within the Shell Creek (WBID 2041) and Myrtle Slough (WBID 2040) water bodies continue to show improvements.



The following table provides cost expenditures that have supported top priority Resource Management Actions within the SPJC Watersheds during the October 2004 to August 2008 time frame. Water quality monitoring and laboratory expenditures are also included. The \$13,168,700 expended for Resource Management Actions listed below are those that have been defined as having the highest effectiveness to address water quality impairment within the SPJC watersheds and are supported by District, State, Federal, and Facilitating Agricultural Resource Management Systems (FARMS) participant cost-share funding. Funding that has supported Regional Resource Management Actions (SWUCA Recovery, Land Acquisition, 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; 2004 - 2008**

Resource Management Action	Total Expenditure
Facilitating Agricultural Resource Management Systems (FARMS) Program	\$6,300,000
Environmental Quality Incentives Program (EQIP)	\$6,300,000
Shell, Prairie, and Joshua Creek (SPJC) Well Back-Plugging Program	\$45,000
Quality of Water Improvement Program (QWIP)	\$12,700
Water Quality Monitoring & Laboratory Analysis	\$511,000

The improvements in mineralized constituents seen throughout the August 2006 to August 2008 time period within 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. These improvements are of particular significance since the SPJC region was impacted during this performance monitoring period by severe drought conditions. The following section details these climactic impacts.

**Precipitation and Stream Discharge within the SPJC Watersheds**

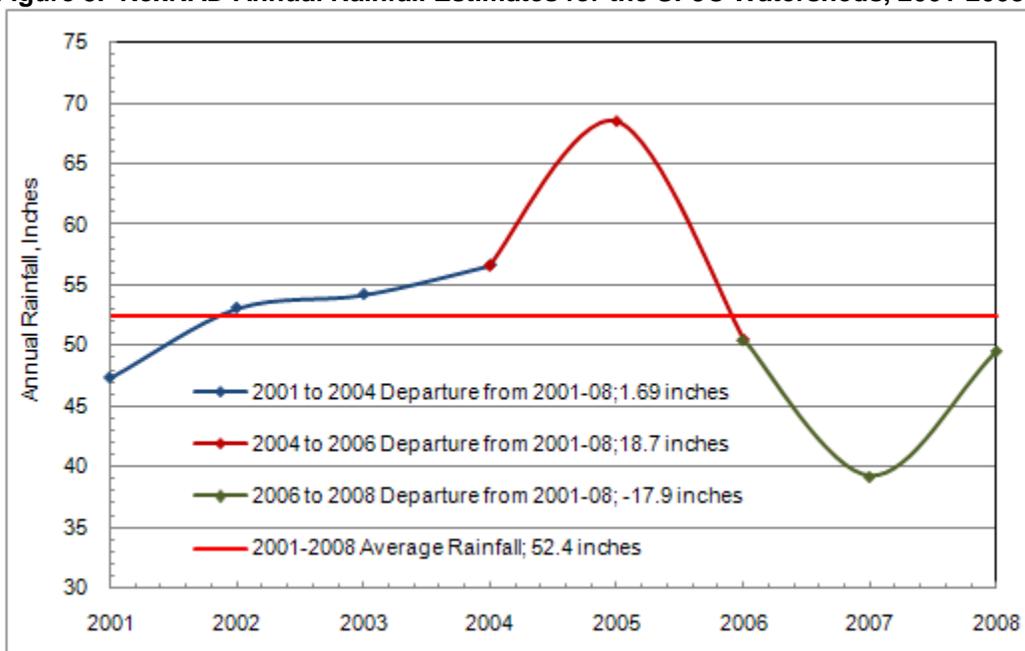
Prevailing climatic conditions have a direct influence on water quality in receiving surface waters within agricultural areas of the SPJC watersheds. Mineralized groundwater, which commonly occurs throughout the SPJC, can affect both shallow groundwater (water table) and direct runoff, especially when 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 water 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 performance monitoring eight-year period (2001 to 2008) was 52.4 inches, which

correlates well with the 93-year period (1915 to 2008) average of 51.91 inches for DeSoto County. The average annual total for the three monitoring periods represents a range of prevailing climatic conditions: normal, wet, and dry.

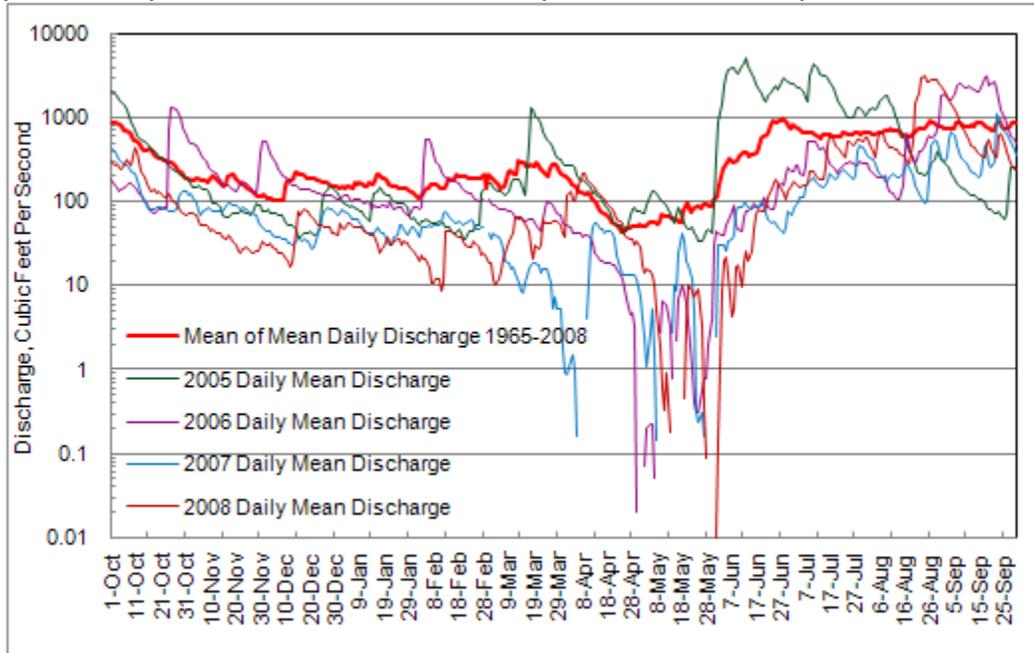
Figure 3 compares total annual rainfall throughout the SPJC performance monitoring period (2001 to 2008), and can be used to evaluate how climatic conditions may have affected resource management actions and subsequent water-quality data results during these time periods. The initial baseline performance 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 and final 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 prompted an increase in irrigation usage of ambient mineralized groundwater and subsequent runoff of groundwater to surface water systems within the SPJC watersheds.

**Figure 3. NexRAD Annual Rainfall Estimates for the SPJC Watersheds, 2001-2008**



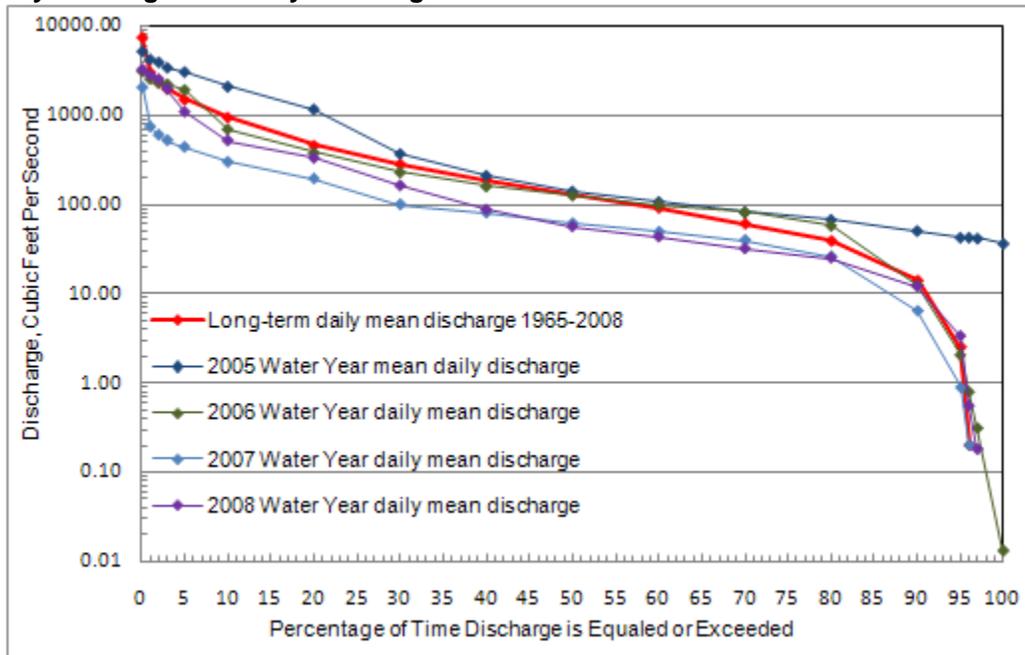
Hydrograph comparisons of long-term (1965-2008) mean of daily mean discharge (heavy red line) for the Shell Creek Reservoir are shown in Figure 4. The Shell Creek Reservoir station monitors combined drainage from both the Prairie and Shell Creek watersheds. The increased discharge for the 2005 water year correlates with above average annual rainfall. The 2005 discharges during the normally dry spring and the wet summer months noticeably exceeded both the long-term means and the discharge for each of the subsequent years, 2006 to 2008. Almost all discharge that occurred during the 2006 to 2008 water years (October 1 through September 30) was generally well below the long-term mean, and extended periods of low to no flow conditions were also experienced.

**Figure 4. Long-term (1965-2008) mean of daily mean discharge, and daily mean discharge (2005 - 2008) for the Shell Creek Reservoir (USGS site 02298202).**



Discharge-duration curves are cumulative frequency curves that graphically characterize streamflow conditions. The flat shape of the curves indicate stable conditions, whereas, areas of marked decreasing slope for the lower discharges can indicate the percentage of time that no flow or limited groundwater (base flow) contribution occurred. The annual (2005-2008) daily discharge-duration curves developed for the Shell Creek Reservoir and their relation to the long-term 43-year discharge duration curve indicate that the 2005 water year had discharges well above average, with record high flows and elevated low flows, and no periods of no flows (Figure 5). Discharges for the subsequent years, 2006-2008, that correspond to the current performance monitoring period, were generally well below the long-term discharge for the complete range of flows that included periods of higher flows, and especially for the periods of low and no flows.

**Figure 5. Discharge Duration Curves of 2005 - 2008 Annual Daily Discharge Compared to 43-year Long-Term Daily Discharge**



## 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 established by FDEP, progress achieved during the first bi-annual reporting period (March 2004 to July 2006), and progress achieved for the current reporting period of August 2006 through August 2008. 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 a median of all individual values that exceed these levels at long-term data collection stations. Since multiple values for TDS during a one-month time period are not consistently available to calculate monthly averages, individual values have been used in some instances to determine exceedances above the 500 mg/L criteria.

Considerable progress has been achieved for reducing TDS concentrations below the Class I criteria of 500 mg/L within the Prairie Creek sub-basin during the August 2006 to August 2008 reporting period, with no values exceeding the 1000 mg/L criteria in the Prairie Creek (WBID 1962), Shell Creek @ Washington Loop Road (WBID 2041), and Myrtle Slough (WBID 2040) water segments when compared to the initial FDEP 2001 to 2004 reporting period. Notable improvements in TDS concentrations above the 1000 mg/L criteria have also occurred in Shell Creek at SR 31 (WBID 2041) over the past two reporting periods, however water segments in Shell Creek (WBID 2041) and Myrtle Slough (WBID 2040) have not shown improvements with regard to the 500 mg/L TDS standard. Percentages of chloride concentration exceedances within the Shell Creek (WBID 2041) and Myrtle Slough (WBID 2040) water bodies continue to show improvements. The remainder of this document specifically describes management actions and monitoring efforts that have been accomplished thus far toward addressing water quality impairment in the SPJC watershed and providing reasonable assurance toward achieving these goals.

TMDL Verified Impaired Water Segments	TDS; 500 mg/L as monthly avg. <sup>a,c</sup>	TDS; 500 mg/L as monthly avg. <sup>a,c</sup>	TDS; 500 mg/L as monthly avg. <sup>a,c</sup>	TDS; 1000 mg/L at all times <sup>c</sup>	TDS; 1000 mg/L at all times <sup>c</sup>	TDS; 1000 mg/L at all times <sup>c</sup>	Chloride; 250 mg/L at all times <sup>b</sup>	Chloride; 250 mg/L at all times <sup>b</sup>	Chloride; 250 mg/L at all times <sup>b</sup>
	RA Plan/FDEP % Reduction Goal	Progress 3/2004 to 7/2006	Progress 8/2006 to 8/2008	RA Plan/FDEP % Reduction Goal	Progress 3/2004 to 7/2006	Progress 8/2006 to 8/2008	RA Plan/FDEP % Reduction Goal	Progress 3/2004 to 7/2006	Progress 8/2006 to 8/2008
<b>WBID 1962</b>									
Prairie Creek at Washington Loop Rd.	25.6%	8.5%	11.7%	10.2%	No values exceed criteria	No values exceed criteria	Not Impaired	Not Impaired	Not Impaired
Prairie Creek near Ft. Ogden (SR 31)	32.6%	7.9%	16.7%	29.3%	No values exceed criteria	No values exceed criteria	Not Impaired	Not Impaired	Not Impaired
<b>WBID 2041</b>									
Shell Creek at Washington Loop Rd.	28.8%	15.9%	25.9%	5.4%	11.6%	No values exceed criteria	19.7%	12.0%	11.6%
Shell Creek at SR 31	24.8%	12.4%	25.6%	10.4%	29.8%	0.8%	29.3%	26.4%	13.8%
<b>WBID 2040</b>									
Myrtle Slough at SR 31	43.4%	33.1%	36.7%	16.5%	1.5%	No values exceed criteria	34.6%	16.1%	10.7%

<sup>a</sup> Median of individual percent reductions needed to meet Class I criteria of 500 mg/L

<sup>b</sup> Median of individual percent reductions needed to meet Class I criteria of 250 mg/L

<sup>c</sup> Some values reported as field measured or field calculated

Data sources include; FDEP data base; IWR2009\_run37, City of Punta Gorda, FDEP Ft. Myers, and SWFWMD

### Resource Management Actions and Progress to Date

The following table provides the number and/or progress of Resource Management Actions that have been initiated in the SPJC Watersheds during the October 2004 to August 2008 time frame. These Management Actions have been defined in the SPJCWMP 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. The progress for particular Management Actions which are considered regional rather than specifically related to a boundary-defined WBID area can be found in a separate tabulated section.

Resource Management Action	Current and Prior Progress		Result
<b>Shell, Prairie, and Joshua Creek (SPJC) Well Back-Plugging Program</b>	Number Wells Back-Plugged		Improves water quality at source of mineralized water. Highly effective with documented program success. Provides economic incentive to growers to improve crop production.
	Prior to Aug. 2006	Aug. 2006 - 2008	
	40	4	
<b>SWFWMD Resource Regulation Well Construction and Water-Use Permitting (WUP)</b>	Overall Number Permits Receiving SPJC WUP Stipulations		Highly effective compliment to incentive programs such as FARMS and Well Back-Plugging. Regulates compliance on permit renewals and new WUP applications.
	29		
<b>Facilitating Agricultural Resource Management Systems (FARMS) Program</b>	Overall Number FARMS/EQIP Projects		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.
	Approved	Potential	
	44	28	
<b>Environmental Quality Incentives Program (EQIP)</b>	Overall Number EQIP Projects		Focuses on key agricultural management activities to improve environmental conditions.
	See Above		
<b>*Peace River Valley/Manasota Citrus Best Management Practices</b>	Not Quantitative See Regional Section		Highly effective as applied to nutrient management issues.
<b>*Regional Water Supply Plan and SWUCA Recovery Strategy</b>	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.
<b>Quality of Water Improvement Program (QWIP)</b>	Overall Number Wells Plugged/Abandoned		Very effective as wells are available for complete abandonment.
	3		
<b>*Land Acquisition</b>	Total Acres Acquired Historically through Aug. 2008		Has the potential for a much greater percent effectiveness. Time frame for land acquisition is undetermined.
	41,000		
<b>*Mobile Irrigation Laboratory</b>	Overall Sites Visited	Overall Acres Served	Effective due to its ability to improve water management. Can result in decreased water use (with correspondent reduction in poor water quality use).
	84	6000	
<b>*Education and Outreach</b>	Overall Media Coverage Items	Overall Outreach Events Attended	Effective in promoting awareness of issue and advertising incentive programs available. Important element to maintain funding levels.
	37	89	
<b>*Research Efforts</b>	Overall Number Projects Funded		Effective in continual assessment of water quality problems to focus management actions for greatest effectiveness.
	10		

\*Regional Resource Management Action Items

## **Water Quality Monitoring Networks and Data Sources**

The Southwest Florida Water Management District (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 SPJCWMP 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 re-use projects and other management actions at site-specific locations to meet performance-monitoring objectives.

#### Network Description

During dry season events (November through May) the District currently has YSI<sup>®</sup> 600XLM data sondes deployed in fifteen stream and canal systems throughout the SPJC watersheds. Eight of these locations have been recently equipped with telemetry equipment so data are transferred instantaneously via satellite to a web site interface for viewing and retrieval. An additional three 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 150 surface water stations District-wide. Thirty-one of these stations are located throughout the SPJC watersheds. Additional stations may be added to this network as more sites are identified. 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

A table comparing specific conductance concentrations 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

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 may 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. Following back-plugging activities water quality data are collected to determine if the well back-plugs have resulted in an improvement in water quality. A sub-set of back-plugged wells is currently monitored on an ongoing, quarterly basis to ensure the back-plugs have remained functional and no measurable differences in water quality are observed.

#### Network Descriptions

Wells in the SPJC watersheds that are potential candidates for back-plugging are scheduled for sampling on an "as needed" basis which is dependent on what areas have been selected for further investigation. Approximately 108 wells were sampled as part of the back-plug network during 2002-2003 to characterize water quality and assess potential back-plug candidates, with an additional 121 wells sampled as part of this effort in 2004-2006. To date, 44 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. Due to land sales and resultant land use changes, five of the wells in the original network are no longer sampled bringing the current number of post back-plugged wells that are monitored on a quarterly frequency to nine.

### Reporting of Results

Results from each quarterly event for wells in the Post Back-Plug Network will be displayed as graphical plots. These data results assist with determining if the well back-plugs have remained functional and no measurable differences in water quality are observed.

### ***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 also identify surface waters that show poor water quality characteristics.

The City of Punta Gorda is currently permitted to withdraw 8.1 million gallons per day (mgd) (annual average) for public supply from the Shell Creek Reservoir. 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 reporting results to the District on an annual basis since 1991.

#### Network Descriptions

The District collects samples from five surface water stations on a quarterly frequency and the FDEP-Fort Myers office currently collects samples at six surface water sites (rivers and streams) throughout the SPJC watersheds. The FDEP sites are currently sampled on a monthly basis. 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 1999-2001 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, 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. There is not a defined network at this time for biological monitoring although staff with the District and FDEP-Punta Gorda have performed SCI monitoring over the past few years 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. Habitat assessment 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 ground water 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 ground water 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 71 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 149 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 (2005) conclusions on the status of salt water intrusion in Charlotte, DeSoto, and Highlands counties will be presented in the Regional Water Quality Monitoring 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 contained 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 August 2006 through August 2008. Performance monitoring results contained in the October 2004 to July 2006 summary report 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 2014. Performance Monitoring Summaries will be generated on a bi-annual 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.

### **Water Segments in the SPJC Watersheds Recognized as Requiring Water Quality Monitoring Efforts**

The following table represents waterbodies in the SJPC watersheds that are currently lacking water quality monitoring data collection efforts. Although Resource Management Actions are occurring in these WBIDs, the SPJC Stakeholders Group realizes the importance of collecting water quality data throughout all of the SPJC WBIDs not only to track the success of Resource Management Actions, but also to determine areas that require additional focus. None of the waterbodies shown below are currently listed by FDEP as verified impaired under TMDL Rule.

Field reconnaissance was conducted in May 2008 to determine monitoring accessibility within the following WBIDs. At this time all potential monitoring locations were on private property, and access permission has not been secured at this time.

**Water Segments in the SPJC Requiring Water Quality Data Collection Efforts**

<b>Water Segment</b>	<b>FDEP WBID</b>	<b>Water Body Type</b>	<b>Basin / Watershed</b>
Joshua Cr. ab Honey Run	1950B	Stream	Peace River / Joshua Creek
Lake Slough	1963	Stream	Peace River / Joshua Creek
Honey Run	1977	Stream	Peace River / Joshua Creek

**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*

**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 17 irrigation wells have been back-plugged in WBID 1962. No wells were back-plugged in WBID 1962 during the current reporting period of August 2006 to August 2008. 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.	DID 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, 26 Water Use Permit (WUP) applications were submitted to the District over the entire reporting period of performance monitoring (October 2004 to August 2008). Of the twenty six applications, one was a new permit, sixteen were renewals, and nine were modifications or letter modifications. Eleven of the twenty-four permits issued received additional special conditions to address water quality concerns in the SPJC watersheds. The remaining permits will receive the special conditions through a corrective process. Detailed explanations for these special conditions can be found in Appendix II.

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

**WUP Renewals and Modifications in WBID 1962**

	<b>Oct. 2004 – July 2006</b>	<b>Aug. 2006 – Aug. 2008</b>
New WUPs	0	1
WUP Renewals	4	12
WUP Modifications	0	2
WUP Letter Modifications	3	4
WUPs Conditioned	3	8

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

During the October 2004 to August 2008 time period there have been seven Board approved, operational FARMS/EQIP projects established in WBID 1962. An additional five FARMS projects are being discussed or are in the contract initiation phase. 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/EQIP Projects in WBID 1962; October 2004 to August 2008**

<b>Project Number / Type</b>	<b>Project Start/Expected Date</b>	<b>Projected Ground Water Offset (gpd)</b>	<b>**Actual Ground Water Offset (gpd)</b>	<b>Max. Ground Water Offset Achieved in One Month (gpd)</b>
WUP #20006765 (citrus) Phase I	August 2006	222,500	352,087	989,129
WUP #20006765 (citrus) Phase 2	N/D	76,980	N/D	N/D
WUP #20008348 (citrus)	April 2006	71,000	109,505	403,600
WUP #20009127 (citrus)	May 2006	15,600	24,592	287,179
WUP #20002386 (citrus, sod)	N/D	225,100	N/D	N/D
WUP #20003275 (citrus)	N/D	148,000	N/D	N/D
WUP # 20000153 (citrus)	N/D	835	N/D	N/D
*WUP #20006765 (citrus) Phase 3	N/D	348,400	N/D	N/D
*WUP #20010065 (citrus)	N/D	N/D	N/D	N/D
*WUP # 20003069 (citrus)	N/D	N/D	N/D	N/D
*WUP 20009782 (citrus)	N/D	N/D	N/D	N/D
*WUP # 200004641 (citrus)	N/D	32,000	N/D	N/D

\*Potential project currently under consideration

N/D = Not determined; project under construction, in contract phase, or 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.

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

**Quality of Water Improvement Program (QWIP)**

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

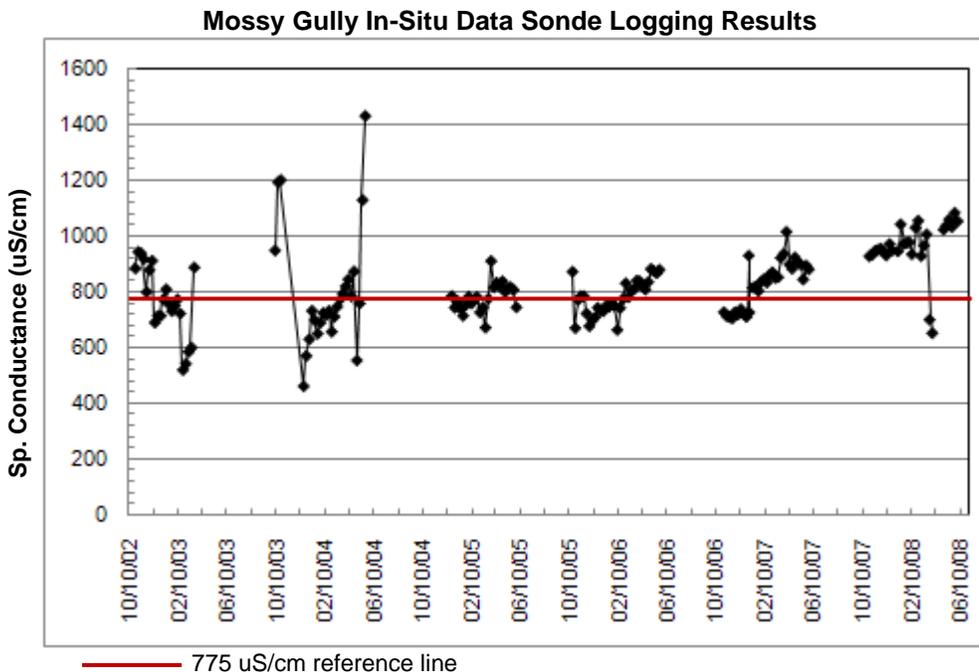
**SPJC Water Quality Monitoring Results – Progress to Date**

**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. The site was upgraded to include data collection via satellite telemetry in October 2009. 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 May 2008. 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 concentrations over the data period of record at this monitoring station, particularly during the last dry season event (2007-2008). A FARMS project is currently in operation that is located directly north of the data sonde site.

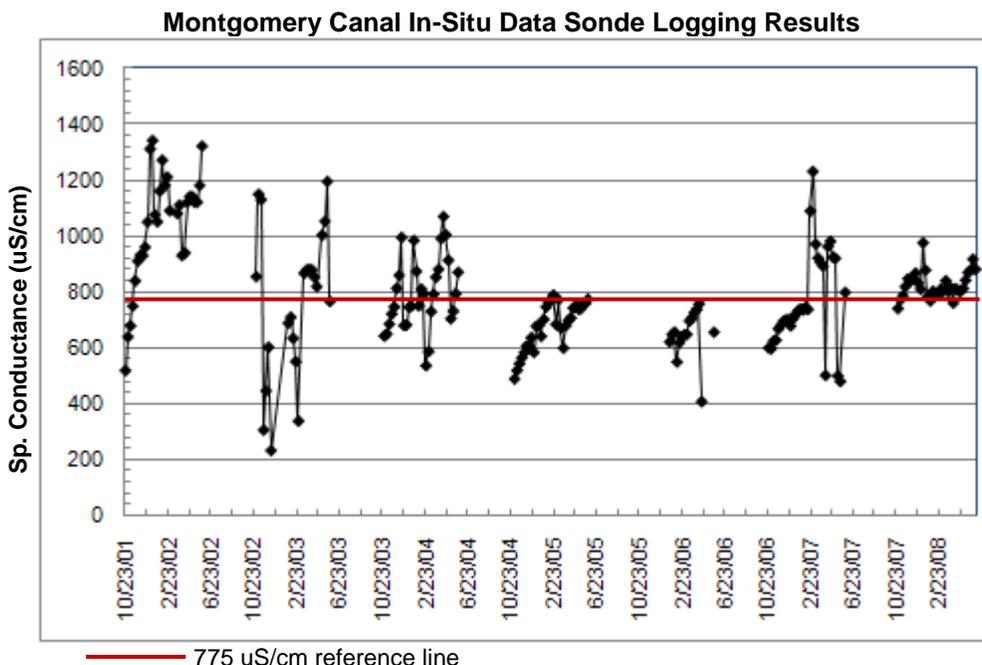


## WBID 1962

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

The **Montgomery Canal** data sonde is located in a canal in the central region of the Prairie Creek Watershed, and the site was upgraded to include data collection via satellite telemetry in October 2008. 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 2001 through May 2008.

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 2005-2006 time period. Well back-plugging activities have occurred in the immediate surrounding area of this data sonde location which has also contributed to water quality improvements in this portion of the Prairie Creek Watershed. Slight increases in specific conductance occurred during the 2007-2008 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.

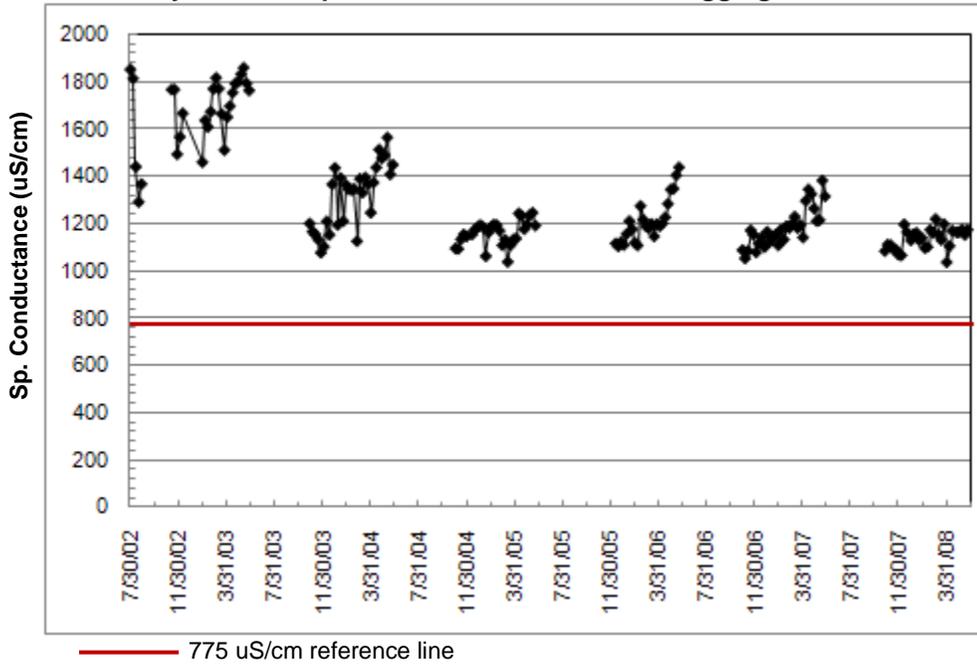


The **Symons Pump Canal** data sonde is deployed in an irrigation canal located in the central region of the Prairie Creek Watershed. The canal provides flows to Prairie Creek, and the monitoring location is directly adjacent to citrus farming activities. The immediate surrounding area also includes 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 2008.

Four wells were back-plugged on this property in November and December 2001 therefore, specific conductance values have continued to decrease since this time period as soil flushing occurs (see Case Study No. 1 in the SPCWMP Reasonable Assurance document). A FARMS project has been implemented on agricultural property located directly north of this monitoring location.

**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**

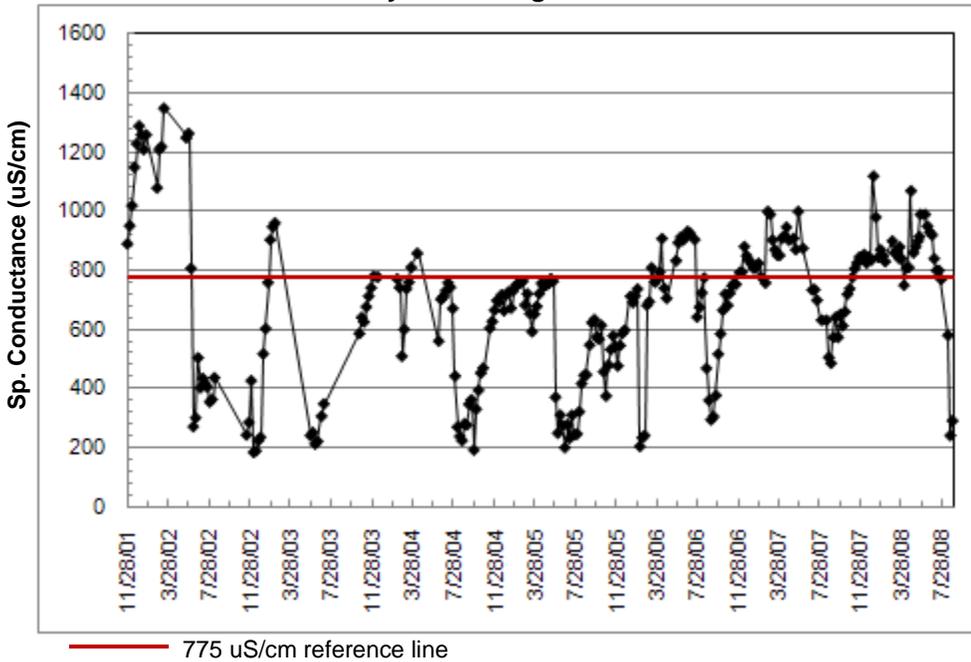


The ***Prairie Creek near Fort Ogden*** data sonde is deployed in the main channel of Prairie Creek in the central region of the Prairie Creek Watershed, and is located approximately 100 yards downstream of the Symon Pump Canal's confluence with Prairie Creek. The immediate surrounding land use includes 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 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/hourly logging of specific conductance values throughout each year for November 2001 through August 2008.

Decreases in specific conductance have occurred at this monitoring location during dry season events since the November 2001 time period. Four wells were back-plugged on a property located just upstream of this monitoring location in November and December 2001 which has resulted in water quality improvements. In addition, a FARMS project has been implemented on agricultural property located directly north of this monitoring location. Increasing specific conductance values for the 2006-2008 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 late 2001.

**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 In-Situ Data Sonde Logging Results**  
**Key Monitoring Location**

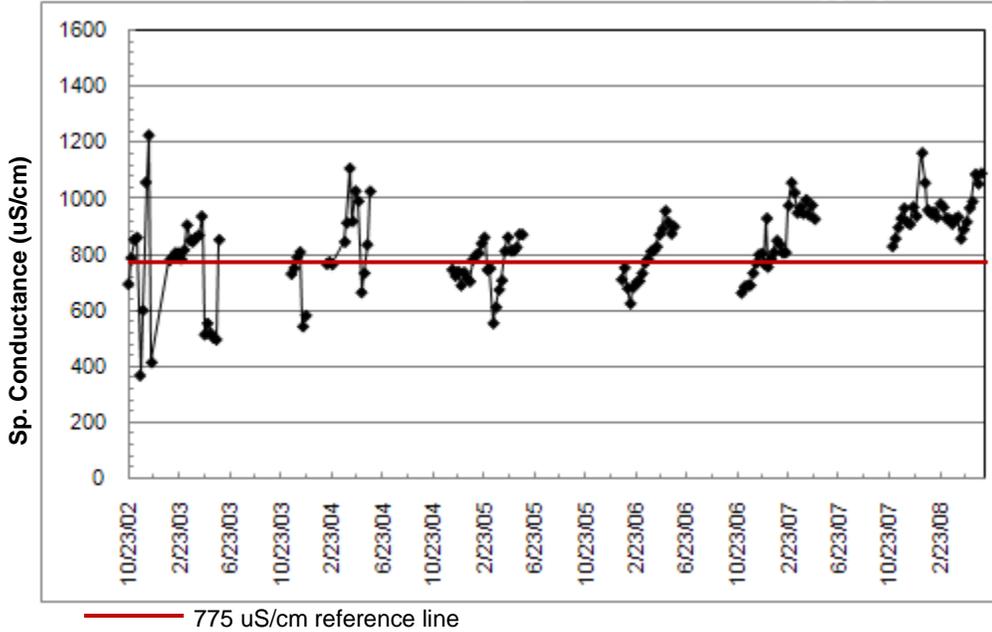


The ***Prairie Creek @ William Head*** property data sonde is located in the main channel of Prairie Creek in the south/central region of the Prairie Creek watershed, and the site was upgraded to include data collection via satellite telemetry in October 2009. Land use in the immediate surrounding area 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 May 2008. Sediment smothering of 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 2006-2008 time periods are a result of below average rainfall amounts during dry season months however, no weekly median values have exceeded the 1,275 uS/cm Class III criteria for specific conductance since 2002. Three FARMS projects have been implemented on properties located north of this monitoring location. In addition, two wells were back-plugged on one of these FARMS project properties.

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

**Prairie Creek @ William Head Property In-Situ Data Sonde Logging Results**

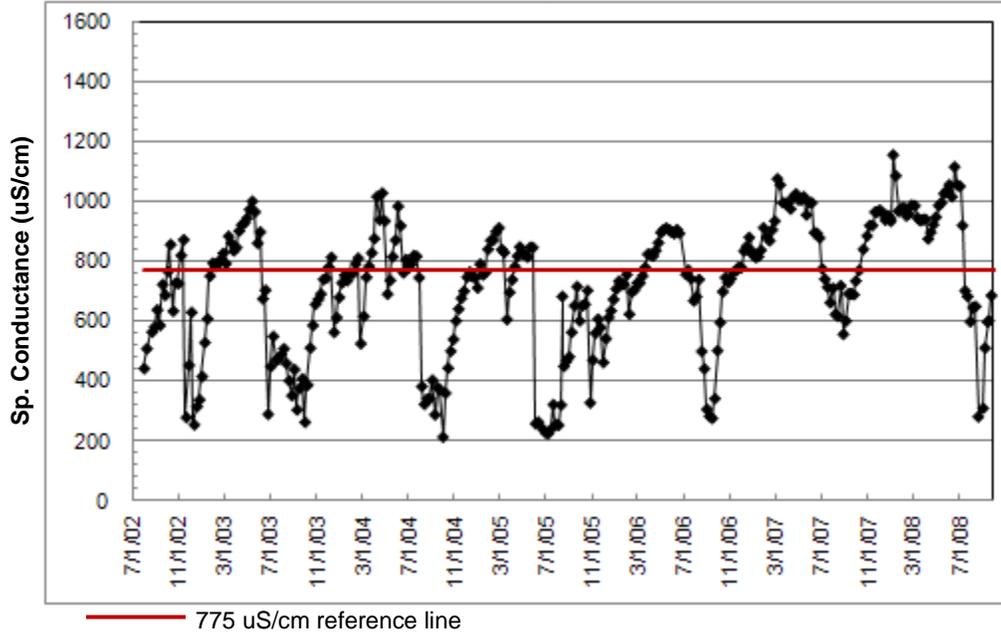


The **Prairie Creek @ Washington Loop Road** data sonde is located on the main stem of Prairie Creek in the southern region of the Prairie Creek watershed, just upstream of the Shell Creek Reservoir. Land use in the immediate surrounding area is predominantly agriculture, with some rangeland and urban/built-up. 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/hourly logging of specific conductance values throughout each year for July 2002 through August 2008.

Decreases in weekly median specific conductance values occurred during the dry season periods of 2003 through 2005. Below average rainfall amounts during the 2006-2008 dry and wet season months are reflected by increasing trends in specific conductance concentrations during this time period. Two FARMS projects located just upstream of this monitoring location are currently in operation, and two wells have been back-plugged on one of the FARMS project properties. There have been no weekly median exceedances of the 1,275 uS/cm Class I criteria for specific conductance since monitoring began at this location in 2002.

**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. In-Situ Data Sonde Logging Results**  
**Key Monitoring Location**



The following table summarizes period of data record 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 criteria.

**Specific Conductance Logging Results in WBID 1962 over Entire Period of Data Record**  
**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	33,709	1,475	0.44%	163	95	58.3%
*Montgomery Canal	34,332	927	2.7%	191	94	49.2%
*Symons Pump Canal	29,773	9,938	33.4%	174	173	99.4%
**Prairie Cr. nr Ft. Ogden	88,825	854	0.96%	263	96	36.5%
Prairie Cr. @ William Head	27,807	77	0.28%	147	100	68%
**Prairie Cr. @ Washington Loop	104,776	4	0.004%	314	143	45.5%

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

\*\* Key monitoring location

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

**Specific Conductance Reconnaissance Network (District)**

Within WBID 1962 there are currently three 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 twenty three individual specific conductance values collected within WBID 1962 during the period of record, four values exceeded the 775 uS/cm goal criteria and one value 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 2004-2006 and 2006-2008 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.

Dry season specific conductance values increased overall between the two reporting periods at one monitoring station in WBID 1962. The remaining two monitoring stations in WBID 1962 were dry during the 2007 and 2008 dry season events. Discontinuation of flow during the dry season is expected for small stream and canal systems and generally indicates that the system is not being impacted by groundwater runoff.

**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. - #3A	701	Dry	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	Dry	454	521	331	Dry	*	*

\* Station dry

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

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

**Specific Conductance Reconnaissance Results in WBID 1962; 2006 - 2008**

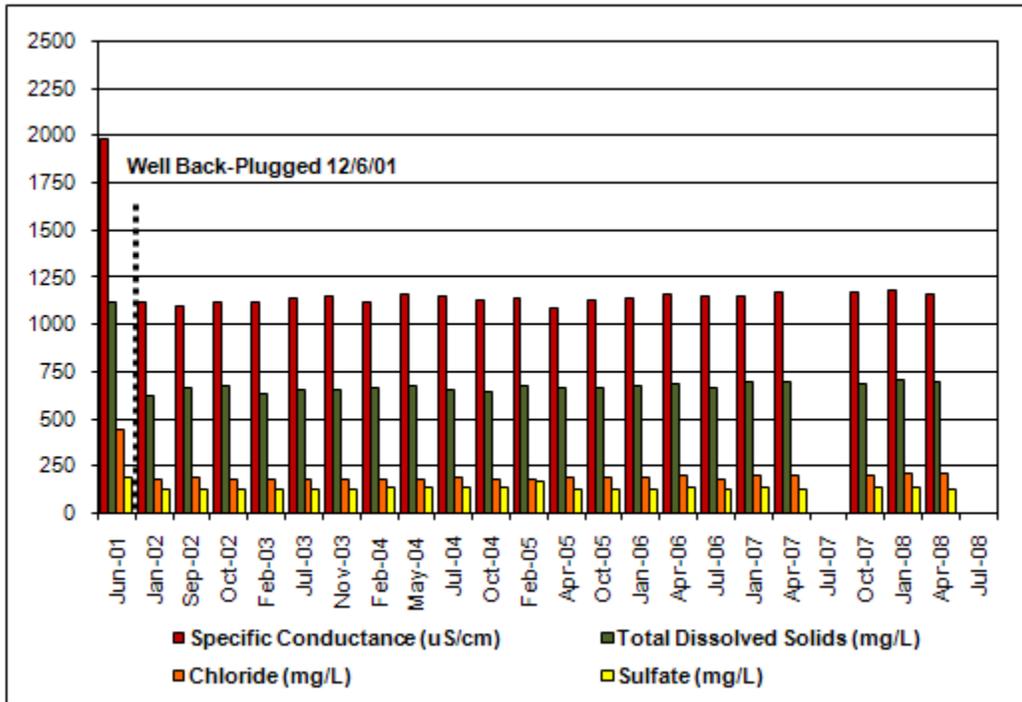
Station	Wet Season 2006 Value uS/cm	Dry Season 2007 Value uS/cm	Wet Season 2007 Value uS/cm	Dry Season 2008 Value uS/cm	Wet Season 2008 Value uS/cm	Percent change Dry Season 2006 vs. Dry Season 2007	Percent change Dry Season 2007 vs. Dry Season 2008
Unnamed Cr. - #3A	572	766	599	885	651	↑11.82%	↑15.54%
Unnamed Cr. @ Washington Loop Rd. - #29	151	Dry	1401	Dry	636	*	*
Unnamed Ditch @ Farms Rd. - #12	700	Dry	435	Dry	423	*	*

\* Station dry

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

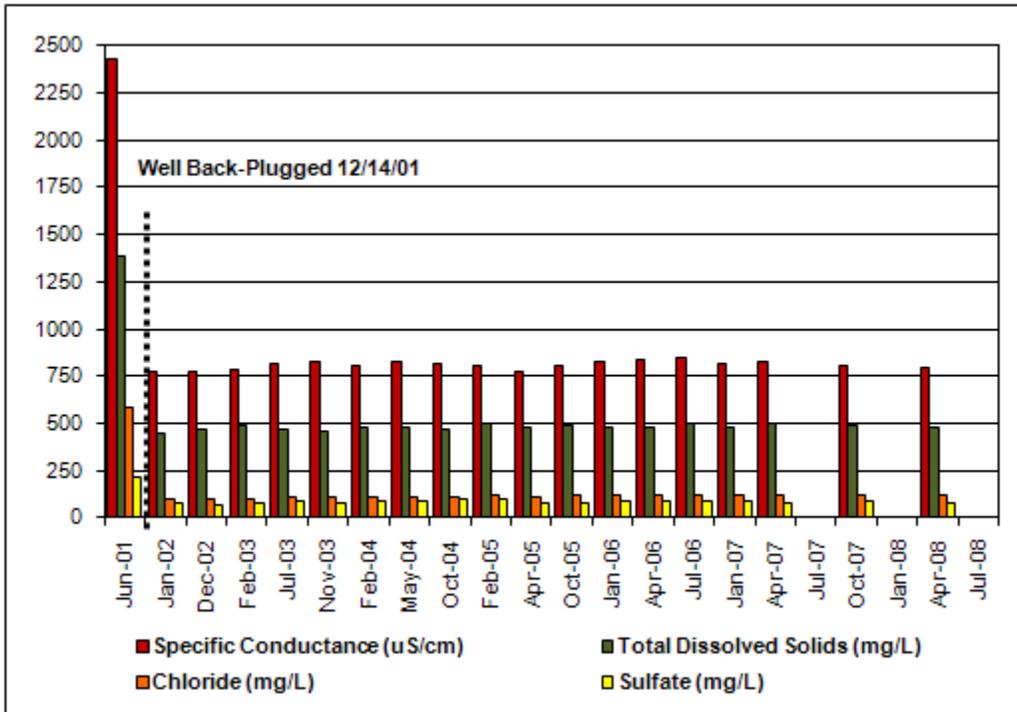
There are six back-plugged wells in WBID 1962 that are sampled on a quarterly frequency to monitor long-term improvements of water quality and to also ensure that the back-plugs have remained functional. The following graphs represent water quality results throughout the period of data record for each quarterly monitored well showing both pre- and post back-plug values for specific conductance, sulfate, chloride, and TDS. To date, all of the wells have retained the integrity of the post back-plug concentrations for these parameters.

**WUP 20003069 - DID No. 2**

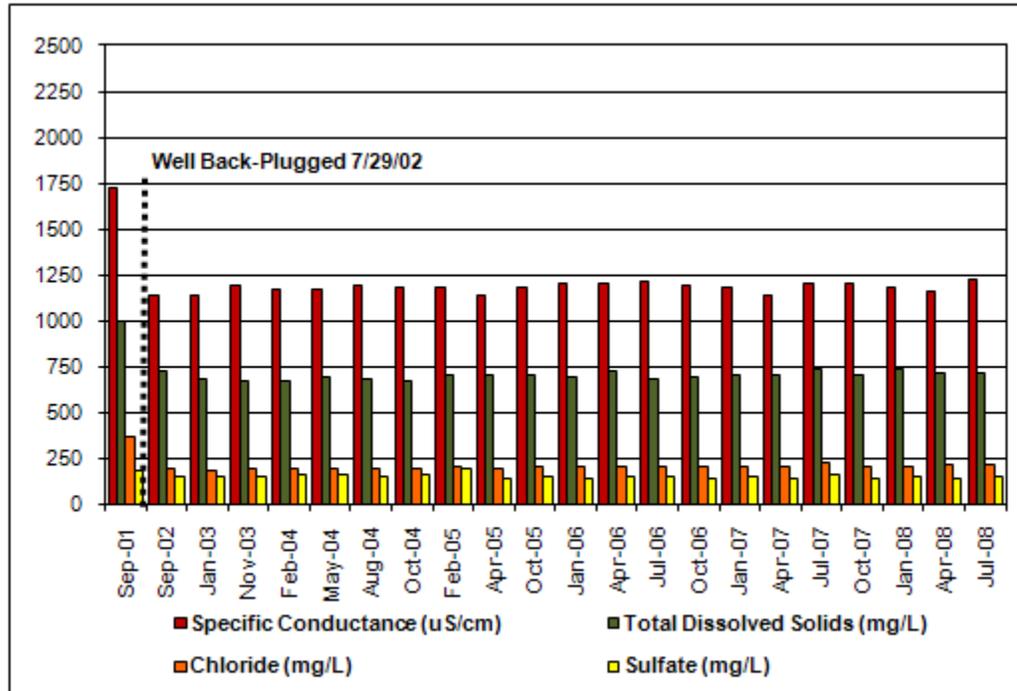


**WBID 1962**  
*Water Segment - Prairie Creek*  
*Prairie Creek Watershed; Water Use - Class I*  
*Verified Impaired Pollutants of Concern – sp. conductance, TDS*

**WUP 20003069 - DID No. 6**

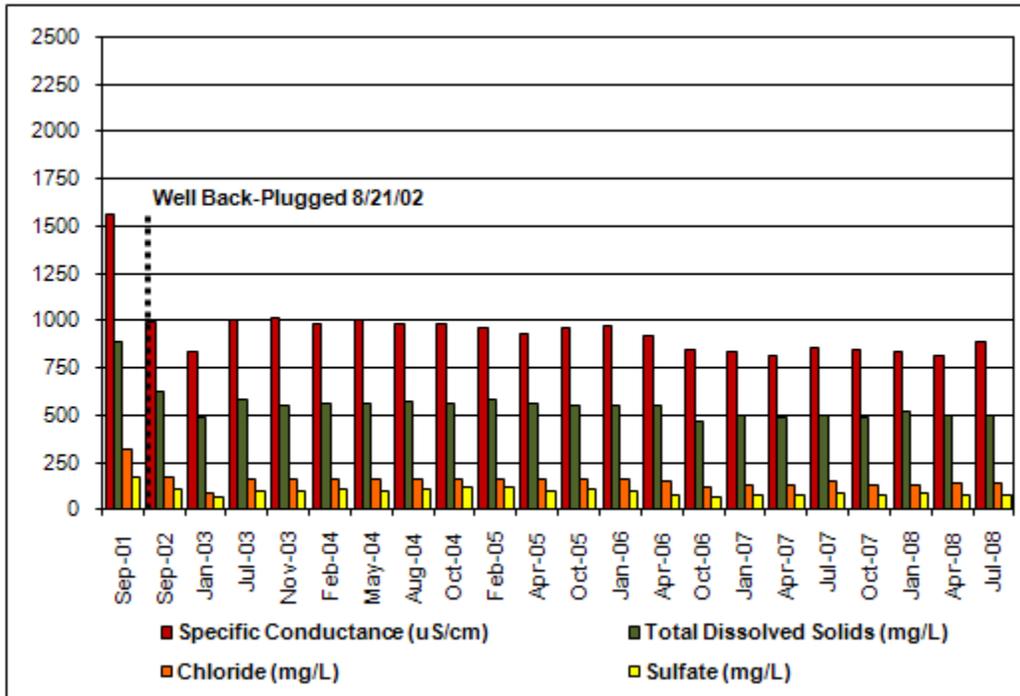


**WUP 20009782 - DID No. 1**

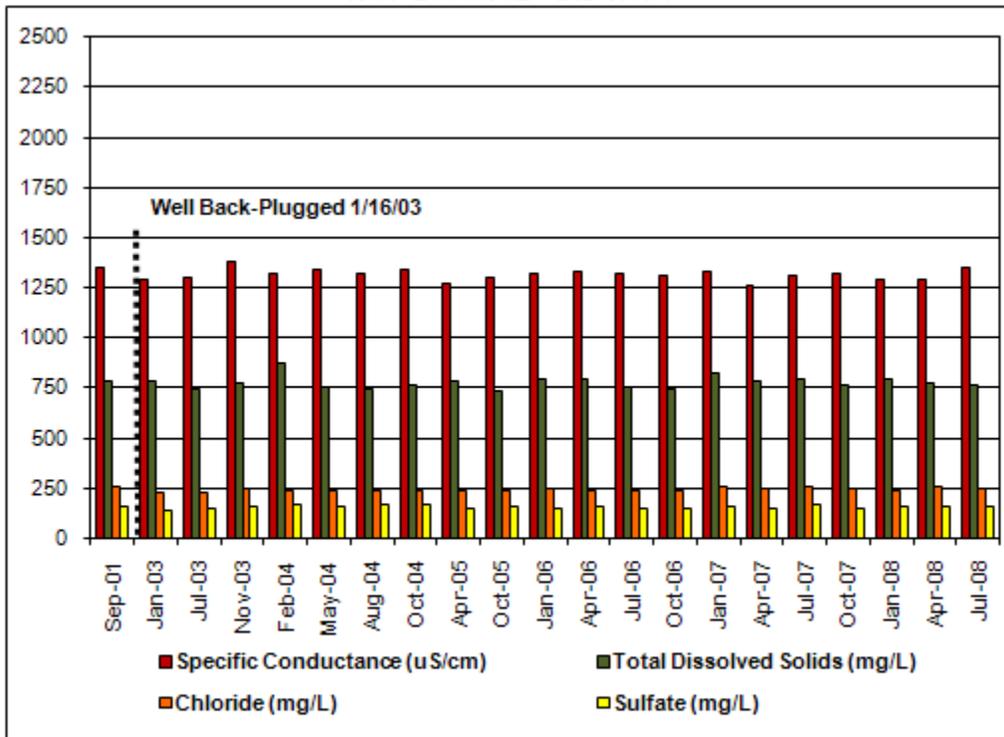


**WBID 1962**  
*Water Segment - Prairie Creek*  
*Prairie Creek Watershed; Water Use - Class I*  
*Verified Impaired Pollutants of Concern – sp. conductance, TDS*

**WUP 20009782 - DID No. 3**

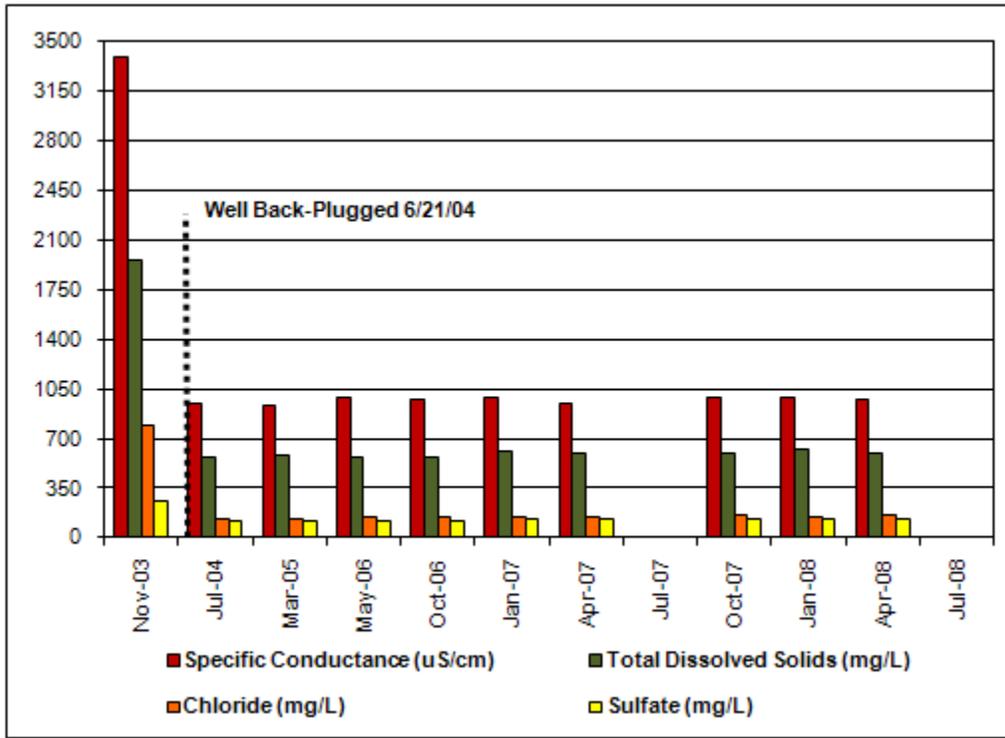


**WUP 20009782 - DID No. 4**



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

**WUP 20006765 - DID No. 18**



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

The following graphs represent period of record water quality results through August 2008 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, as well as any data collected by the City since 1991 under the City's WUP requirements. Data were also used from FDEP's IWR database. Averaged monthly values for TDS are not consistently available from the above data sources (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). Notable improvements in both chloride and TDS concentrations have occurred at these monitoring locations since 2001.

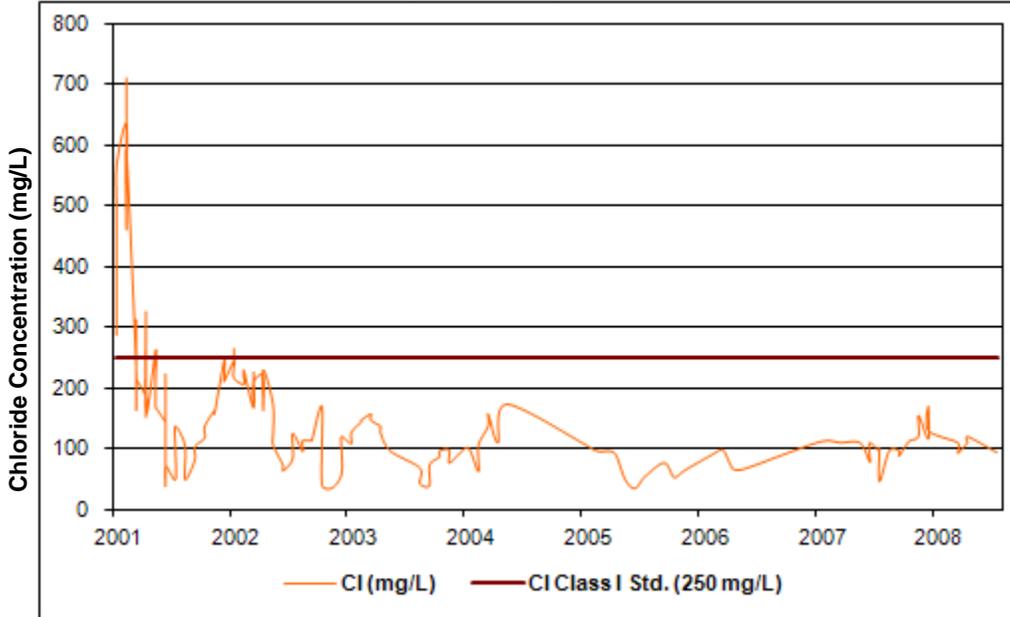
**WBID 1962**

*Water Segment - Prairie Creek*

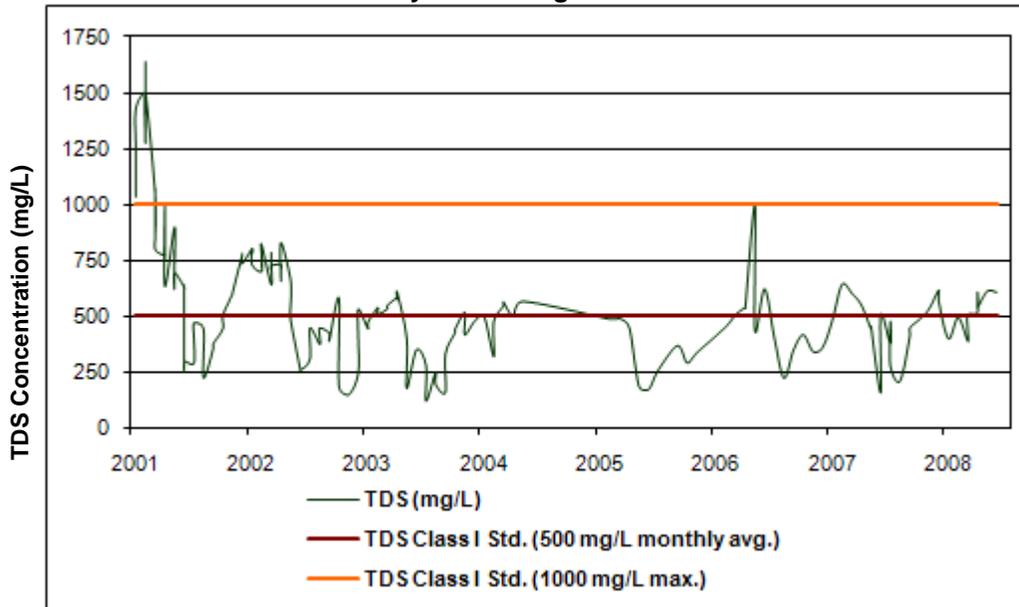
*Prairie Creek Watershed; Water Use - Class I*

*Verified Impaired Pollutants of Concern – sp. conductance, TDS*

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

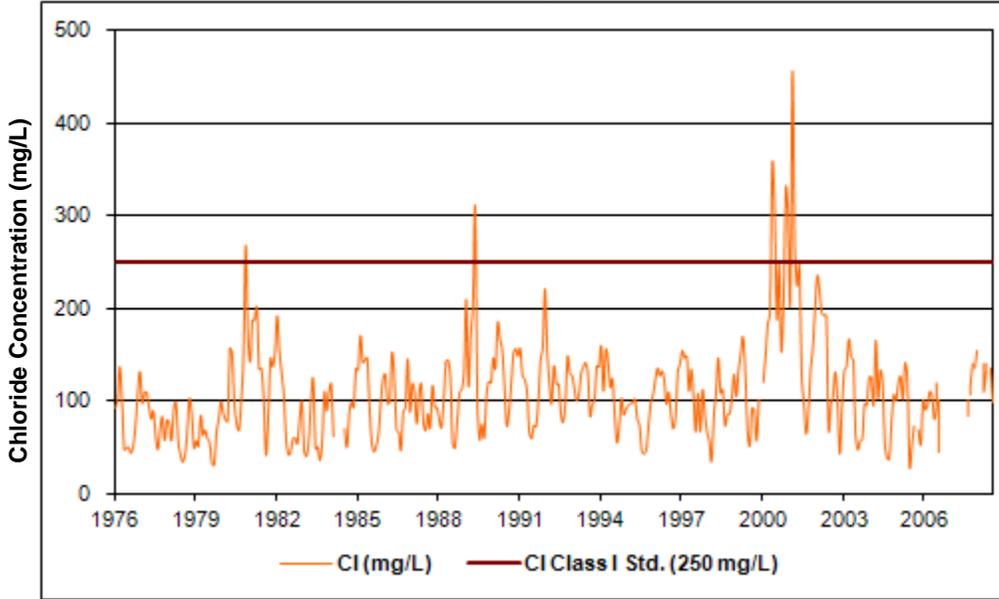


**Prairie Creek near Ft. Ogden Water Quality Results for TDS  
Key Monitoring Location**

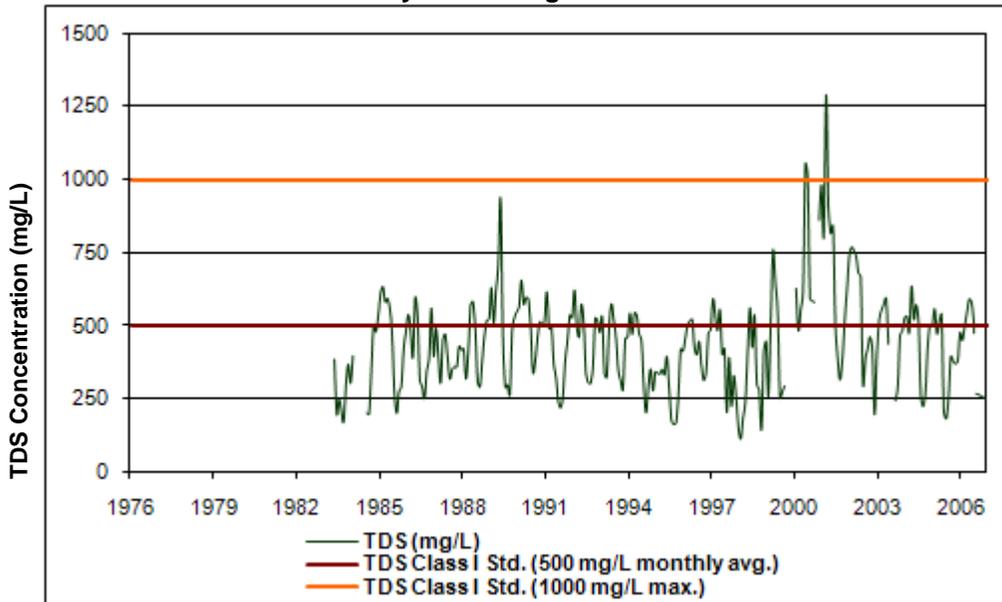


**WBID 1962**  
*Water Segment - Prairie Creek*  
*Prairie Creek Watershed; Water Use - Class I*  
*Verified Impaired Pollutants of Concern – sp. conductance, TDS*

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



**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.

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

**Chloride and TDS Water Quality Results in WBID 1962 over Entire Period of Data Record**  
**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	30	0	N/A	35	32	91.4%	0	N/A
*Montgomery Canal	24	0	N/A	24	4	16.7%	0	N/A
*Symons Pump Canal	22	3	13.6%	21	21	100%	2	9.5%
**Prairie Cr. nr Ft. Ogden	146	15	10.2%	162	88	54.3%	13	8.0%
**Prairie Cr. @ Washington Loop Rd.	383	9	2.3%	287	96	33.4%	3	1.0%

\*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 TMDL verified impaired in WBID 1962

**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, two sites in WBID 1962 were evaluated for these biological health indicators. The results of these 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
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")

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, it is likely that the impairment of this system for the SCI can be directly

**WBID 1962**

*Water Segment - Prairie Creek*

*Prairie Creek Watershed; Water Use - Class I*

*Verified Impaired Pollutants of Concern – sp. conductance, TDS*

linked 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*

**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, nine Water Use Permit (WUP) applications were submitted to the District over the entire reporting period of performance monitoring (October 2004 to August 2008). Of the nine applications four were new permits, three were renewals, and two were letter modifications. Two of the ten permits issued received additional special conditions to address water quality concerns in the SPJC watersheds. The remaining permits will receive the special conditions through a corrected permit process. Detailed explanations for these special conditions can be found in Appendix II.

**WUP Renewals and Modifications in WBID 2040**

	<b>Oct. 2004 – July 2006</b>	<b>Aug. 2006 – Aug. 2008</b>
New WUPs	0	4
WUP Renewal	1	2
WUP Modifications	1	1
WUP Letter Modifications	0	0
WUPs Conditioned	2	0

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

During the October 2004 – August 2008 time period there have been ten Board approved, operational FARMS/EQIP projects established in WBID 2040. An additional four FARMS projects are being discussed or are in the contract initiation phase. 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 2040**  
*Water Segment – Myrtle Slough*  
*Shell Creek Watershed; Water Use - Class I*  
*Verified Impaired Pollutants of Concern – sp. conductance, TDS, chloride*

**Approved and Potential FARMS/EQIP Projects in WBID 2040**

<b>Project Number / Type</b>	<b>Project Start Date</b>	<b>Projected Ground Water Offset (gpd)</b>	<b>**Actual Ground Water Offset (gpd)</b>	<b>Max. Ground Water Offset Achieved in One Month (gpd)</b>
WUP #20009687 (row crop) Phase I	April 2006	662,700	455,907	1,919,548
WUP #20009687 (row crop) Phase II	August 2009	245,700	N/D	N/D
WUP #20009398 (citrus) Phase I	October 2003	120,700	See phase II, offsets combined	See phase II, offsets combined
WUP #20009398 (citrus) Phase II	August 2005	60,300	451,912	2,256,226
WUP #20009398 (citrus) Phase III	N/D	N/D	N/D	N/D
WUP #20010726 (row crop)	January 2006	106,260	45,746	256,243
WUP #20003530 (citrus)	December 2003	142,600	190,110	1,548,667
WUP #20001759 (sod)	August 2008	197,000	85,623	603,667
WUP #20009052 (citrus)	March 2009	1,457,400	N/D	N/D
WUP #20003275 (citrus)	N/D	148,000	N/D	N/D
*WUP #20002689 (citrus)	N/D	145,900	N/D	N/D
*WUP #20009417 (citrus)	N/D	80,000	N/D	N/D
*WUP #200013096 (citrus)	N/D	23,790	N/D	N/D
*WUP #20002588 (sod & row crop)	N/D	N/D	N/D	N/D

\*Potential project currently under consideration

N/D = Not determined; project under construction, in contract phase, or 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)**

From October 2003 to August 2008, 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.

**SPJC Water Quality Monitoring Results – Progress to Date**

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

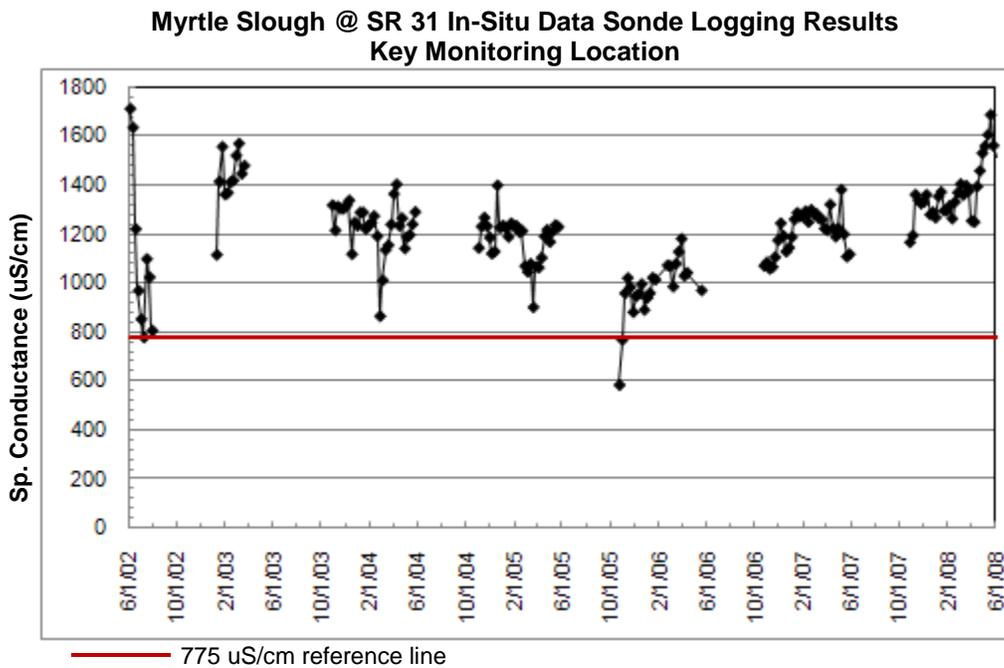
There is currently one YSI® 600XLM data sonde deployed in WBID 2040 at station **Myrtle Slough @ SR 31** which is located in the northeastern region of the Shell Creek Watershed and provides flows to Shell Creek. This monitoring station was outfitted with satellite telemetry in October 2008. The majority 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

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

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 May 2008. 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 concentrations at this monitoring location decreased over the 2002 to early 2005 time period, and trends have increased throughout 2006-2008. Five properties currently have FARMS projects in operation or under construction upstream of this 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 over Entire Period of Data Record**

<b>Water Segment</b>	<b>Number Individual Logged Values</b>	<b>Number Individual Values &gt;1275 uS/cm</b>	<b>Percentage of Individual Values &gt;1275 uS/cm</b>	<b>Number Weekly Median Values</b>	<b>Number Weekly Median Values &gt;775 uS/cm</b>	<b>Percentage Weekly Median Values &gt;775 uS/cm</b>
**Myrtle Slough @ SR 31	33,847	12,111	35.7%	168	166	98.8%

\*\* 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.

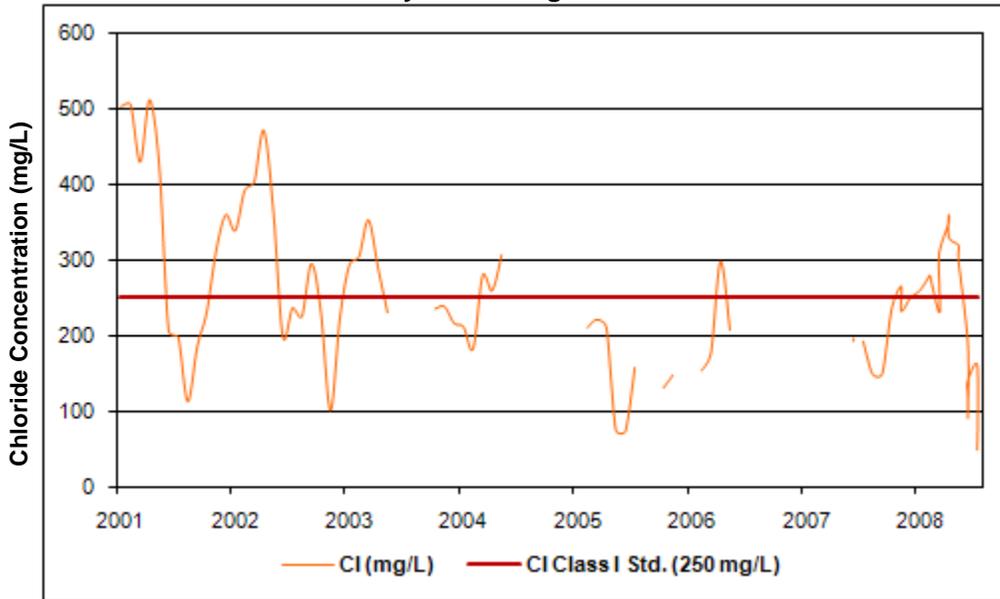
**Surface-Water Quality Monitoring Networks (District, FDEP, and City of Punta Gorda)**

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 August 2008 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).

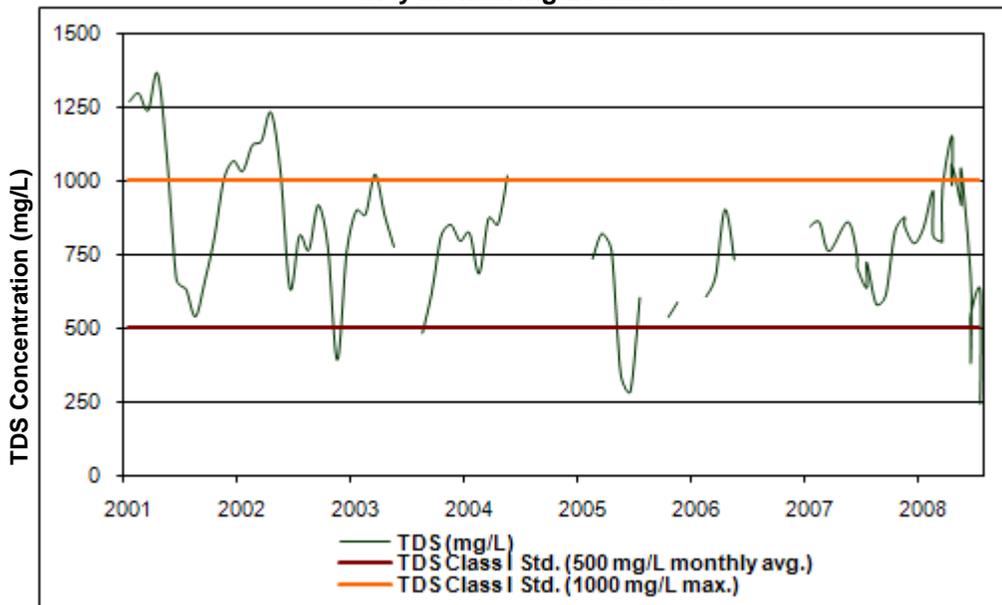
Decreasing trends in both chloride and TDS have occurred during the period of data record at the Myrtle Slough monitoring location. Drought impacts during 2007-2008 are evident by slight increases in both constituents during dry season months, with wet season rainfall events reducing both TDS and chloride concentrations during July and August 2008.

**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 over Entire Period of Data Record**

<b>Water Segment</b>	<b>Number Individual Reported CI Values</b>	<b>Number Individual CI Values &gt;250 mg/L</b>	<b>Percentage Individual CI Values &gt;250 mg/L</b>	<b>Number Individual Reported TDS Values</b>	<b>Number Individual TDS Values &gt;500 mg/L</b>	<b>Percentage Individual TDS Values &gt;500 mg/L</b>	<b>Number Individual TDS Values &gt;1000 mg/L</b>	<b>Percentage Individual TDS Values &gt;1000 mg/L</b>
**Myrtle Slough @ SR 31	80	36	45%	84	76	90.5%	17	20.2%

\*\*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 was "Excellent."

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 2004\_ SCI methodology ranks streams as Good, Fair, Poor, or Very Poor. 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 is not official, but does 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 @ SR 31 site.

During the August 2006 to August 2008 reporting period, no sites in WBID 2040 were evaluated for HAs or SCIs.

**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*

WBID 2041  
 Water Segment – Shell Creek  
 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**

Since the inception of this Program two irrigation wells have been back-plugged in WBID 2041. 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 in WBID 2041 since October 2004.

**Post Well Back-Plugging Water Quality Results in WBID 2041**

Permit Information		Percent Improvement	
WUP No.	DID No.	TDS (mg/L)	Chloride (mg/L)
20009648	1	51%	76%
20009648	2	N/A	N/A

Denotes repeated back-plug

**District Resource Regulation – Water Use Permitting**

In WBID 2041, eight Water Use Permit (WUP) applications were submitted to the District over the entire reporting period of performance monitoring (October 2004 to August 2008). Of the eight applications five were new permits, one was a renewal, and two received letter modifications (see table below). None of the eight permits issued received additional special conditions to address water quality concerns in the SPJC watersheds, but will receive the special conditions through a corrected permit process. Detailed explanations for these special conditions can be found in Appendix II.

**WUP Renewals and Modifications in WBID 2041**

	Oct. 2004 – July 2006	Aug. 2006 – Aug. 2008
New WUPs	1	4
WUP Renewals	0	1
WUP Modifications	0	0
WUP Letter Modifications	1	1
WUPs Conditioned	0	0

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

During the October 2004 – August 2008 time period there have been six Board approved, operational FARMS/EQIP projects established in WBID 2041. An additional nine FARMS projects are being discussed or are in the contract initiation phase. 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 2041**  
*Water Segment – Shell Creek*  
*Shell Creek Watershed: Water Use - Class I*  
*Verified Impaired Pollutants of Concern – sp. conductance, TDS, chloride*

**Approved and Potential FARMS/EQIP Projects in WBID 2041**

<b>Project Number / Type</b>	<b>Project Start/Expected Date</b>	<b>Projected Ground Water Offset (gpd)</b>	<b>**Actual Ground Water Offset (gpd)</b>	<b>Max. Ground Water Offset Achieved in One Month (gpd)</b>
WUP #20009687 (row crop) Phase I	April 2006	662,700	455,907	1,919,548
WUP #20009687 (row crop) Phase II	August 2009	245,700	N/D	N/D
WUP #20009476 (citrus)	August 2003	136,000	190,509	706,259
WUP #20009476 (citrus) Phase I (electronics)	August 2003	27,170	-198,756	545,322
WUP #20001759 (sod)	August 2008	N/D	228,352	N/D
WUP #20009648 (row crop)	May 2006	132,500	280,668	809,862
*WUP #20002589	N/D	N/D	N/D	N/D
*WUP #20009476 (citrus) Phase II	December 2008	181,208	N/D	N/D
*WUP #20002689 (citrus)	N/D	145,990	N/D	N/D
*WUP #20009417 (citrus)	N/D	80,000	N/D	N/D
*WUP #20002588 (row crop)	N/D	N/D	N/D	N/D
*WUP #200010959 (citrus)	N/D	N/D	N/D	N/D
*No WUP (citrus)	N/D	55,200	N/D	N/D
*WUP #20009727 (citrus)	N/D	26,700	N/D	N/D
*WUP #200013096 (citrus)	N/D	23,790	N/D	N/D

\*Potential project currently under consideration

N/D = Not determined; project under construction, in contract phase, or 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)**

No wells have been plugged/abandoned in WBID 2041 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 2041. The following data plots reflect weekly median values for specific conductance, which have been calculated from independent values collected on an hourly frequency.

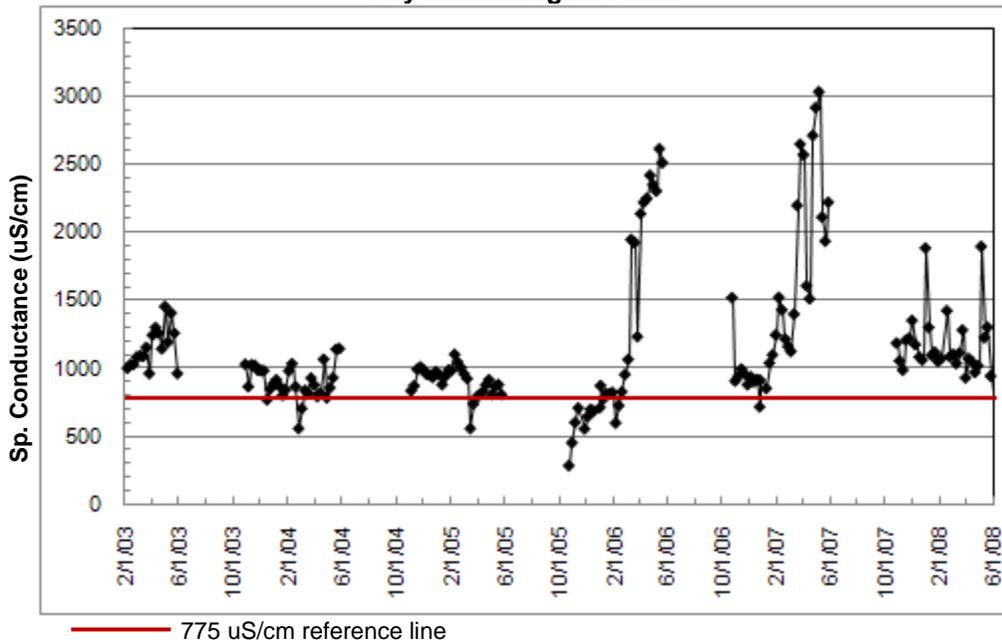
The **Shell Creek @ SR 31** data sonde is located in the main channel of Shell Creek in the eastern region of WBID 2041, and was upgraded to include satellite telemetry in October 2008. This monitoring location is near the headwaters of Shell Creek, and is a key surface water monitoring station with 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

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

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 May 2008. 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 2005-2007 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. Two FARMS projects which became operational in 2006 upstream of this monitoring location have made notable improvements in mineralized constituents at this monitoring location.

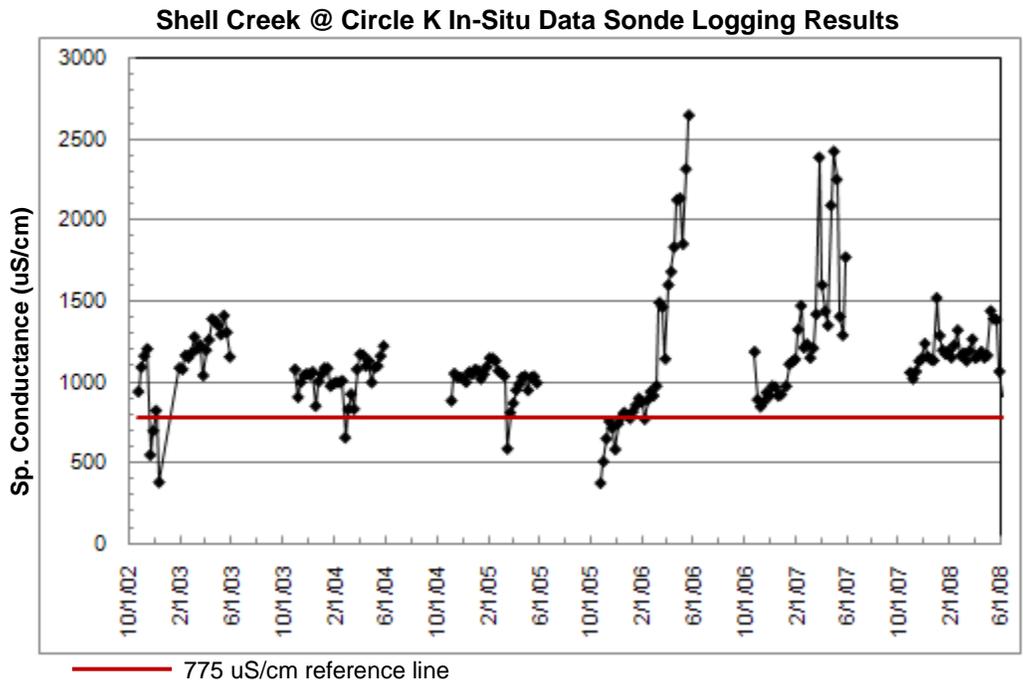
**Shell Creek @ SR 31 In-Situ Data Sonde Logging Results**  
**Key Monitoring Location**



The **Shell Creek @ Circle K** data sonde is located in the main channel of Shell Creek in the central region of WBID 2041. Satellite telemetry was added to this monitoring location in October 2009. 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 May 2008.

Specific conductance values increased during the dry season months of 2005-2007 due to below average rainfall during this time period, while late 2007 to early 2008 dry season concentrations have been considerably lower. Two FARMS projects which became operational in 2006 upstream of this monitoring location have made notable improvements in mineralized constituents at this monitoring location.

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

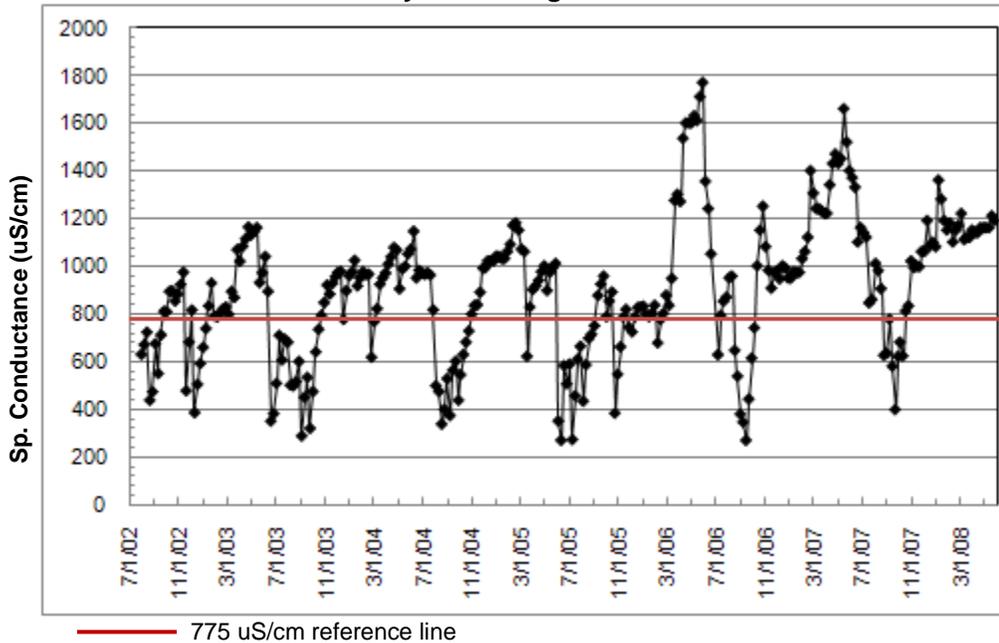


The **Shell Creek @ Washington Loop Road** data sonde is located on the main channel of Shell Creek in the southern region of the Shell Creek watershed, just upstream of the Shell Creek Reservoir. Land use in the immediate surrounding area is urban/built up and agriculture. This location is one of the 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/hourly logging of specific conductance for weekly median values throughout each year for July 2002 through August 2008.

Below average rainfall amounts during the spring and summer months of 2006, and these impacts on smaller tributaries and canals that provide flow to this location, have resulted in increased trends in weekly median specific conductance values for the 2002-2007 time period. Even though drought conditions persisted throughout 2007 and 2008, decreasing specific conductance values measured during this time period can directly be attributed to FARMS projects that became operational within this WBID in 2006.

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

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



**Specific Conductance Logging Results in WBID 2041 over Entire Period of Data Record**  
**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	35,429	7,039	19.9%	170	153	90.0%
Shell Creek @ Circle K	31,189	6,245	20.0%	180	166	92.2%
**Shell Creek @ Washington Loop	106,774	10,874	10.2%	317	223	70.3%

\*\*Key Monitoring Location (Class I)

**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 21 individual specific conductance values collected within WBID 2041 during the period of record, five values exceeded the 775 uS/cm goal criteria and three 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 2004-2006 and 2006-2008 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. All monitoring stations in WBID 2041 were dry or had reduced specific conductance values during the 2007 and 2008 dry season events (as compared to preceding dry season events), indicating a decrease in mineralized groundwater runoff at these locations over the entire period of record.

**WBID 2041**

*Water Segment – Shell Creek*

*Shell Creek Watershed: Water Use - Class I*

*Verified Impaired Pollutants of Concern – sp. conductance, TDS, chloride*

**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	Dry	Dry	↓23.72%**	*
Unnamed Cr. @ CR 74 - #25	Dry	164	331	84	Dry	*	*

\* 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	Dry	155	↓11.52%	*
Unnamed Cr. @ CR 74 - #26	38	Dry	33	Dry	33	*	*
Unnamed Cr. @ CR 74 - #25	130	Dry	166	Dry	163	*	*

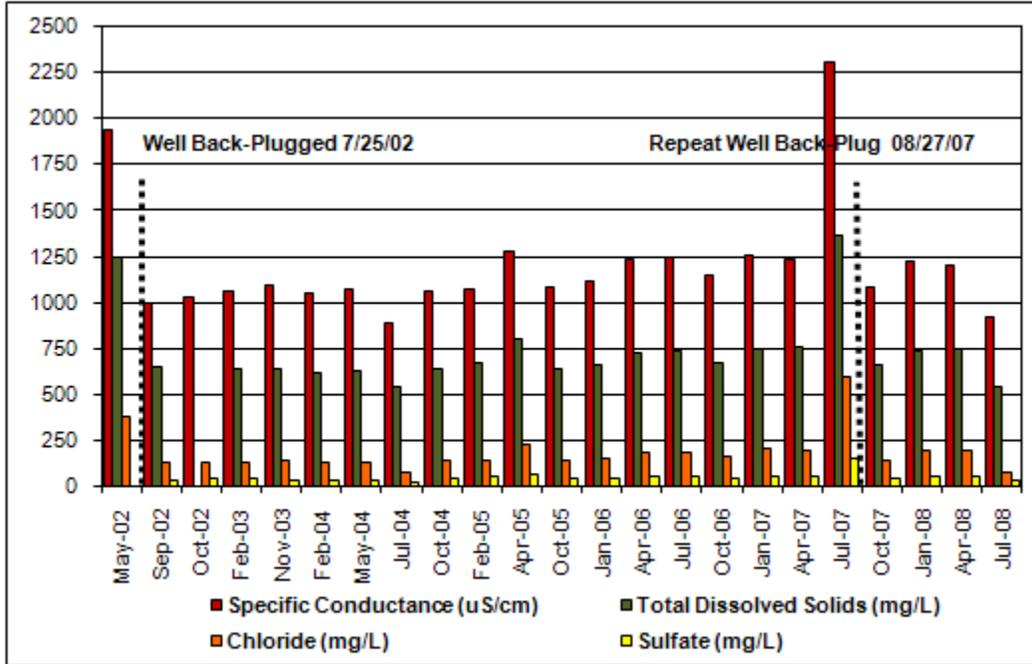
\* Station dry

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

There is one back-plugged well in WBID 2041 that is sampled on a quarterly frequency to monitor long-term improvements in water quality, and to also ensure that the back-plugs have remained functional. Monitoring results in July 2007 indicated an increase in mineralized parameters, therefore a repeat back-plug of this well was performed on August 27, 2007. The following graph represents water quality results throughout the period of data record for this well showing both pre- and post back-plug values for specific conductance, sulfate, chloride, and TDS. Following the second back-plug, this well has retained the integrity of the post back-plug concentrations.

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

**WUP 20009648 - DID No. 1**



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

The following graphs represent available water quality results through August 2008 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 2008 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 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).

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.

Overall decreasing trends for both chloride and TDS have occurred at both monitoring stations in WBID 2041, with increasing trends evident during 2006-2008 as a result of drought impacts. Values fall below water quality criteria thresholds during wet season rainfall months at the end of the data record (summer 2008).

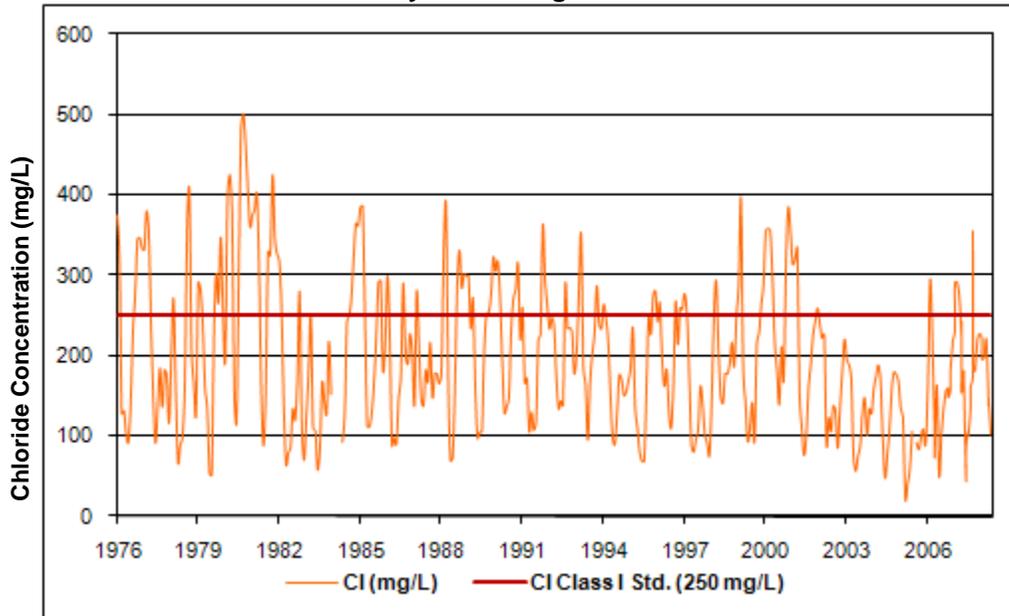
**WBID 2041**

*Water Segment – Shell Creek*

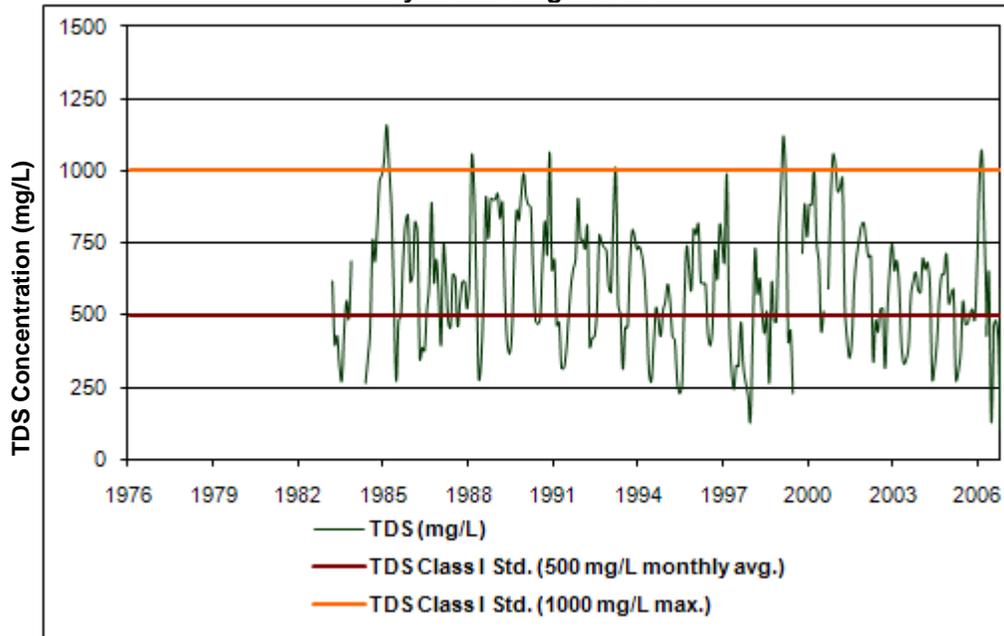
*Shell Creek Watershed: Water Use - Class I*

*Verified Impaired Pollutants of Concern – sp. conductance, TDS, chloride*

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

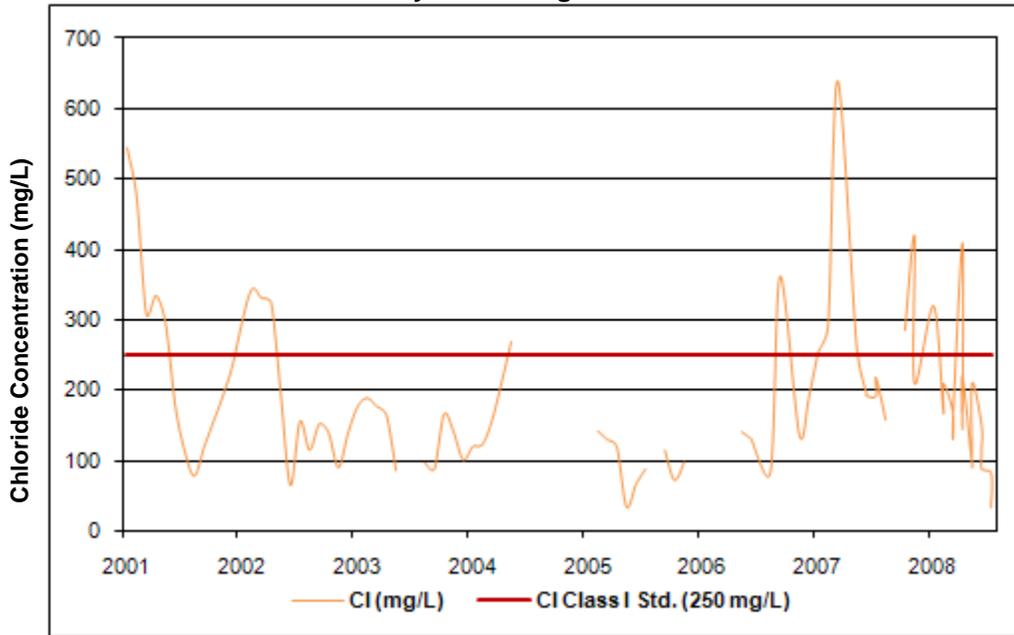


**Shell Cr. @ Washington Loop Rd. Water Quality Results for TDS  
Key Monitoring Location**

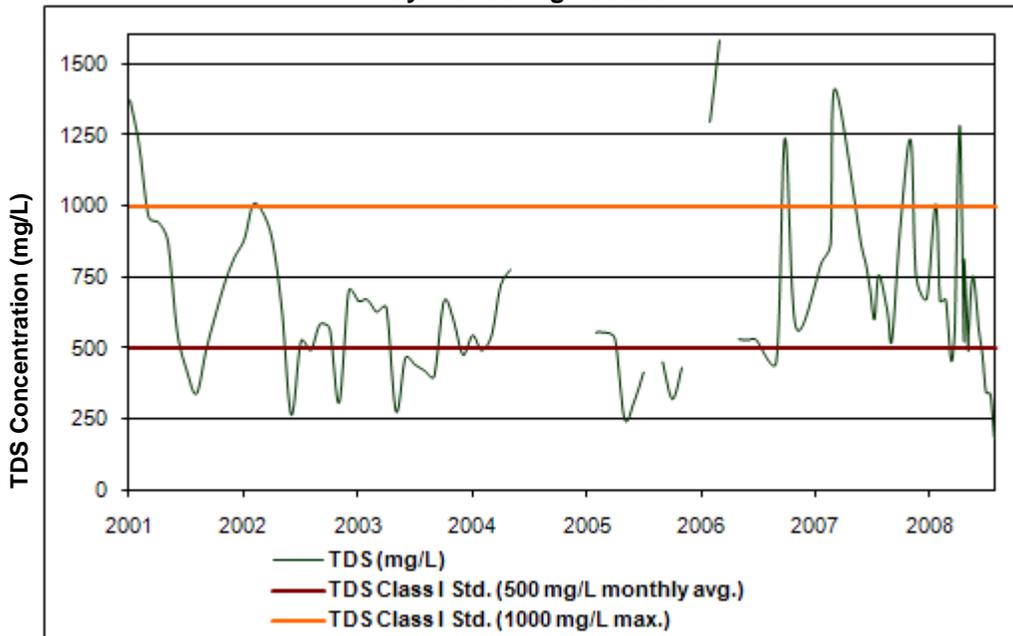


**WBID 2041**  
Water Segment – Shell Creek  
Shell Creek Watershed: Water Use - Class I  
Verified Impaired Pollutants of Concern – sp. conductance, TDS, chloride

**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*

*Shell Creek Watershed: Water Use - Class I*

*Verified Impaired Pollutants of Concern – sp. conductance, TDS, chloride*

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

<b>Water Segment</b>	<b>Number Individual Reported CI Values</b>	<b>Number Individual CI Values &gt;250 mg/L</b>	<b>Percentage Individual CI Values &gt;250 mg/L</b>	<b>Number Individual Reported TDS Values</b>	<b>Number Individual TDS Values &gt;500 mg/L</b>	<b>Percentage Individual TDS Values &gt;500 mg/L</b>	<b>Number Individual TDS Values &gt;1000 mg/L</b>	<b>Percentage Individual TDS Values &gt;1000 mg/L</b>
**Shell Cr. @ Washington Loop Rd.	405	113	27.9%	303	190	62.7%	10	3.3%
**Shell Cr. @ SR 31	87	20	22.9%	91	63	69.2%	10	11.0%

\*\*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."

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 2004\_ SCI 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 is not official, but does 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.

During the August 2006 to August 2008 reporting period, no sites in WBID 2041 were evaluated for the HAs or SCIs.

**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*

**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, one Water Use Permit (WUP) application was submitted to the District over the entire reporting period of performance monitoring (October 2004 to August 2008). This one application was a renewal, and did not receive additional special conditions to address water quality concerns in the SPJC watersheds. This permit will receive the special conditions through a corrected permit process. Detailed explanations for special conditions can be found in Appendix II.

**WUP Renewals and Modifications in WBID 2041B**

	<b>Oct. 2004 – July 2006</b>	<b>Aug. 2006 – Aug. 2008</b>
New WUPs	0	0
WUP Renewals	0	1
WUP Modifications	0	0
WUP Letter Modifications	0	0
WUPs Conditioned	0	0

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

During the October 2004 – August 2008 time period there are no Board approved, operational FARMS/EQIP projects established in WBID 2041. One FARMS project is being discussed. The following table summarizes this project. Details for this project can be found in Appendix IV:

**Approved and Potential FARMS/EQIP Projects in WBID 2041B**

<b>Project Number / Type</b>	<b>Project Start/Expected Date</b>	<b>Projected Ground Water Offset (gpd)</b>	<b>**Actual Ground Water Offset (gpd)</b>	<b>Max. Ground Water Offset Achieved in One Month (gpd)</b>
*No WUP (citrus)	N/D	55,200	N/D	N/D

\*Potential project currently under consideration

N/D = Not determined; project under construction, in contract phase, or under consideration

**Quality of Water Improvement Program (QWIP)**

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

**SPJC Water Quality Monitoring Results – Progress to Date**

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

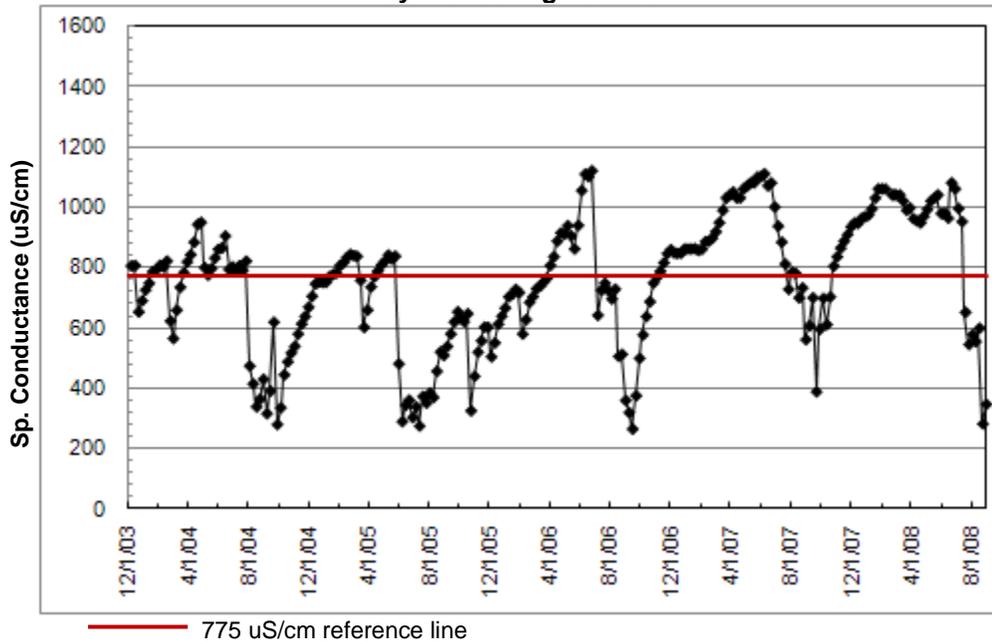
There is currently one YSI® 600XLM data sonde deployed in WBID 2041B at the **Shell Creek Reservoir**. This Reservoir is the City of Punta Gorda's in-stream, potable water supply source and is located in the southwestern region of the Shell Creek Watershed. This location is also one of the key surface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

**WBID 2041B**

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

The following data plots reflect weekly median values for specific conductance, which have been calculated from independent values collected on an hourly frequency from December 2003 through August 2008. Specific conductance values have increased during the dry season months of 2005-2008 due to below average rainfall during these time periods, but have not exceeded the 1275 uS/cm Class I criteria throughout the period of data record. There is currently one FARMS project under discussion that is located just upstream of the reservoir.

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



**Specific Conductance Logging Results in WBID 2041B over Entire Period of Data Record**

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	80,356	0	0%	247	129	52.2%

\*\*Key Monitoring Location

**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 August 2008 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

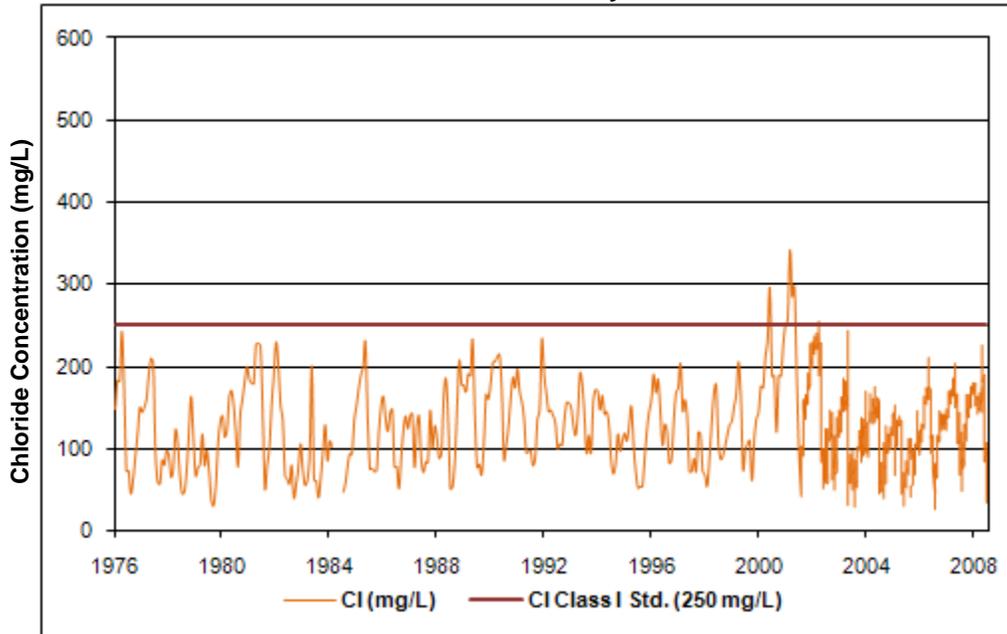
**WBID 2041B**

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

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).

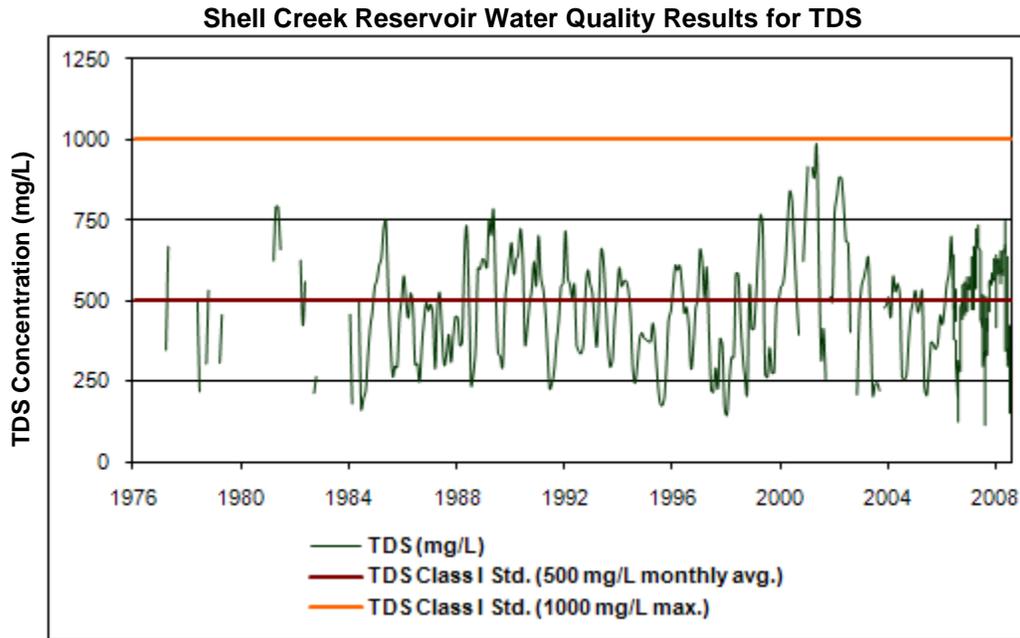
Chloride and TDS concentrations remain relatively consistent throughout the period of data record at the Shell Creek Reservoir, with drought impacts evident during 2000-2001 when chloride and TDS were at their highest levels. Even though rainfall totals during 2006-2008 were less than 2000-2001 totals, management actions within the Shell Creek watershed have assisted with keeping values below the drinking water standard for chloride, 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



**Chloride and TDS Water Quality Results in WBID 2041B 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. Reservoir	2850	7	0.25%	1095	853	77.9%	0	0.0

\*\*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 August 2008 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*

**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**

No WUP applications were submitted to the District during the reporting period of October 2004 to August 2008.

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

During the October 2004 – August 2008 time period there have been five Board approved, operational FARMS/EQIP projects established in WBID 2041. An additional FARMS project is being discussed. 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:

**Approved and Potential FARMS/EQIP Projects in WBID 2044**

<b>Project Number / Type</b>	<b>Project Start Date</b>	<b>Projected Ground Water Offset (gpd)</b>	<b>**Actual Ground Water Offset (gpd)</b>	<b>Max. Ground Water Offset Achieved in One Month (gpd)</b>
WUP #20009398 (citrus) Phase I	October 2003	120,700	See phase II, offsets combined	See phase II, offsets combined
WUP #20009398 (citrus) Phase II	August 2005	60,300	451,912	2,256,226
WUP #20009398 (citrus) Phase III	N/D	1,000,000	N/D	N/D
WUP #20001759 (sod)	N/D	197,000	N/D	N/D
WUP #20003275 (citrus)	N/D	148,000	N/D	N/D
*WUP #20009727 (citrus)	N/D	26,700	N/D	N/D

\*Potential project currently under consideration

N/D = Not determined; project under construction, in contract phase, or 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 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 deployed at station **Cypress Slough above Shell Creek**, and this monitoring station was upgraded with satellite telemetry in October 2009. 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.

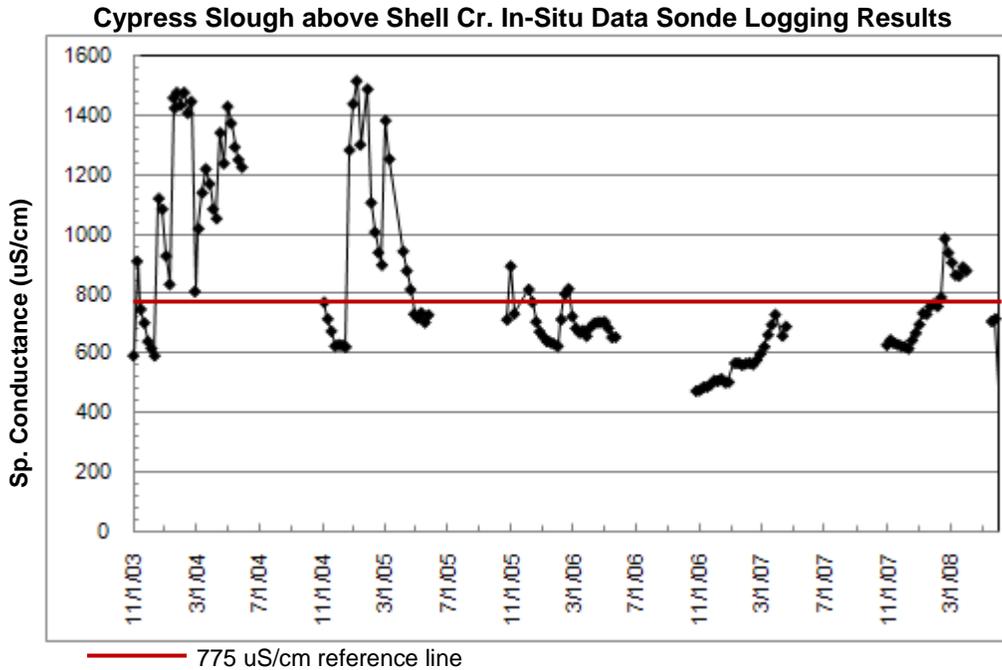
The following data plot shows weekly median values for specific conductance, which have been calculated from independent values collected on an hourly frequency during dry season periods (November – May) from November 2003 through May 2008. Infrequent smothering of the data

**WBID 2044**

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

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 have occurred during the dry season months of 2005-2008 when compared to the 2003-2005 time period, with no values exceeding the Class III criteria for specific conductance (1275 uS/cm) since 2004-2005. Five FARMS projects have been initiated in the upstream regions of this monitoring location, and one additional project is currently under review.



**Specific Conductance Logging Results in WBID 2044 over Entire Period of Data Record**

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.	14,460	2,890	20%	86	44	51.2%

**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.

**WBID 2044**

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

**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 August 2008 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*

**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**

To date, no irrigation wells have been back-plugged in WBID 2058.

**District Resource Regulation – Water Use Permitting**

In WBID 2058, one Water Use Permit (WUP) application was submitted to the District over the entire reporting period of performance monitoring (October 2004 to August 2008). This application was for a WUP renewal, and did not receive additional special conditions to address water quality concerns in the SPJC watersheds. This permit will receive the special conditions through a corrected permit process. Detailed explanations for special conditions applied to all WUPs in the SPJC Watersheds can be found in Appendix II.

**WUP Renewals and Modifications in WBID 2058**

	<b>Oct. 2004 – July 2006</b>	<b>Aug. 2006 – Aug. 2008</b>
New WUPs	0	0
WUP Renewals	0	1
WUP Modifications	0	0
WUP Letter Modifications	0	0
WUPs Conditioned	0	0

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

During the October 2004 – August 2008 time period there have been two Board approved, operational FARMS/EQIP projects established in WBID 2058. An additional FARMS project is being discussed. 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:

**Approved and Potential FARMS/EQIP Projects in WBID 2058**

<b>Project Number / Type</b>	<b>Project Start/Expected Date</b>	<b>Projected Ground Water Offset (gpd)</b>	<b>**Actual Ground Water Offset (gpd)</b>	<b>Max. Ground Water Offset Achieved in One Month (gpd)</b>
WUP #20009476 (citrus) (electronics)	August 2003	136,000	190,509	203,000
WUP #20009476 (citrus) Phase I (electronics)	September 2008	27,170	N/D	N/D
*WUP #20009476 (citrus) Phase II	October 2008	181,208	N/D	N/D

\*Potential project currently under consideration

N/D = Not determined; project under construction, in contract phase, or 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.

## WBID 2058

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

### Quality of Water Improvement Program (QWIP)

There have been no wells plugged/abandoned in WBID 2058 since October 2004.

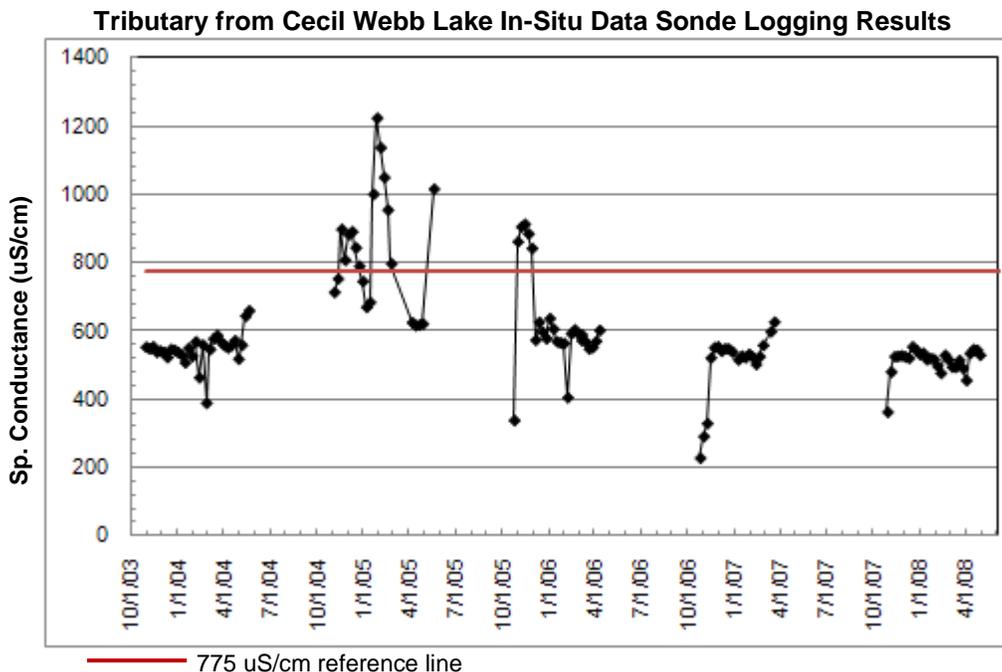
### SPJC Water Quality Monitoring Results – Progress to Date

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

There is currently one YSI® 600XLM data sonde deployed in WBID 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 May 2008. 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 throughout the remaining period of record, and permanent reductions of this poor water quality entering Shell Creek (refer to Case Study No. 3 in the SPCWMP Reasonable Assurance document). A FARMS project is currently operating downstream, and to the west, of this data collection site and an additional project is under discussion.



## WBID 2058

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

### Specific Conductance Logging Results in WBID 2058 over Entire Period of Data Record

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	14,322	0	0%	76	18	23.7%

### **Specific Conductance Reconnaissance Network (District)**

Within WBID 2058 there is one station currently being monitored for the Specific Conductance Reconnaissance Network. Of the six 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 and 2006 to 2008 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.

The one monitoring station in WBID 2058 was dry during the 2007 and 2008 dry season events, and wet season specific conductance values were low. Discontinuation of flow during the dry season is expected for small stream and canal systems and generally indicates that the system is not being impacted by groundwater runoff.

### 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	Dry	420	691	568	Dry	*	*

\* 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	213	Dry	171	Dry	233	*	*

\* Station dry

### **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.

**WBID 2058**

*Water Segment – Unnamed Ditch  
Shell 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 2058 were evaluated for the HA or SCI assessments.

**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*

**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.

Permit Information		Percent Improvement	
WUP No.	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, 11 Water Use Permit (WUP) applications were submitted to the District over the entire reporting period of performance monitoring (October 2004 to August 2008). Of the eleven applications one was a new permit, eight were renewals, and two were letter modifications. Two of the applications received special conditions to address water quality concerns in the SPJC watersheds. The remaining permits will receive the special conditions through a corrected permit process. Detailed explanations for special conditions applied to all WUPs in the SPJC Watersheds can be found in Appendix II.

	Oct. 2004 – July 2006	Aug. 2006 – Aug. 2008
New WUPs	0	1
WUP Renewals	1	7
WUP Modifications	0	0
WUP Letter Modifications	1	1
WUPs Conditioned	1	1

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

During the October 2004 – August 2008 time period two Board approved FARMS/EQIP projects have been established in WBID 1964 and one project is being considered. The following table summarizes this project, as well as 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/EQIP Projects in WBID 1964

Project Number / Type	Project Start Date	Projected Ground Water Offset (gpd)	Actual Ground Water Offset (gpd)	Max. Ground Water Offset Achieved in One Month (gpd)
WUP #20002386 (citrus, sod)	April 2009	225,100	N/D	N/D
WUP #20003530 (citrus)	June 2004	142,600	190,333	N/D
*WUP #20006872 (citrus)	N/D	N/D	N/D	N/D

\*Potential project currently under consideration

N/D = Not determined; project under construction, in contract phase, or 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 1964 since October 2004.

### SPJC Water Quality Monitoring Results – Progress to Date

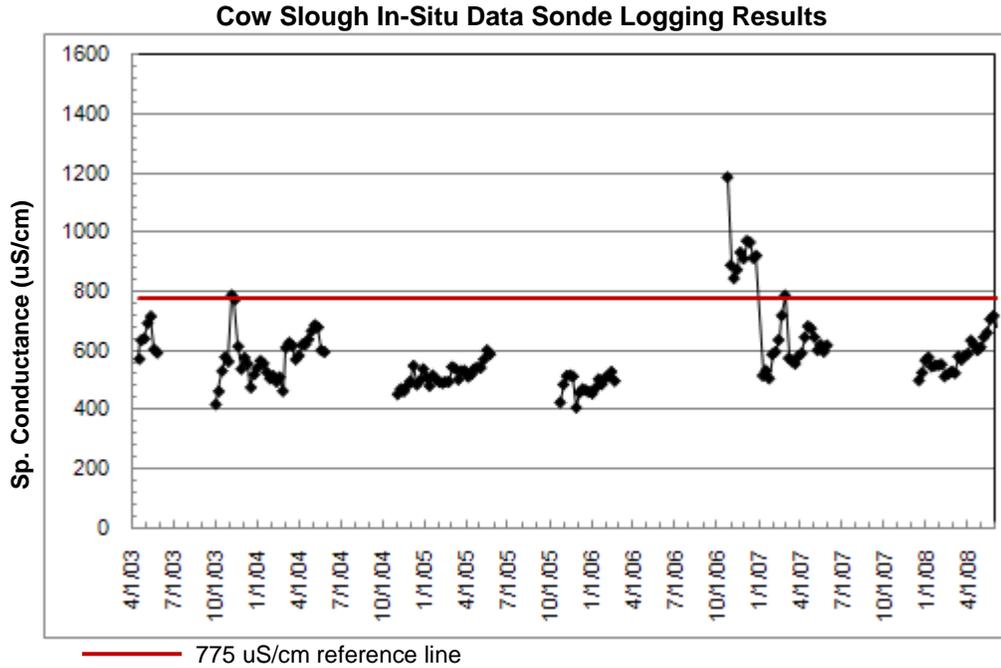
#### In-Stream Data Sonde - Conductance Logging Network (District and USGS)

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 specific conductance values for dry season periods (November – May) for April 2003 through May 2008.

The majority of specific conductance values over the period of data record, have been below the 775 uS/cm goal, with values above the goal during the October to December 2006 time period. No values have exceeded the 1275 uS/cm Class III surface water criteria for specific conductance at this monitoring location. A FARMS project is operational upstream of this monitoring location.

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

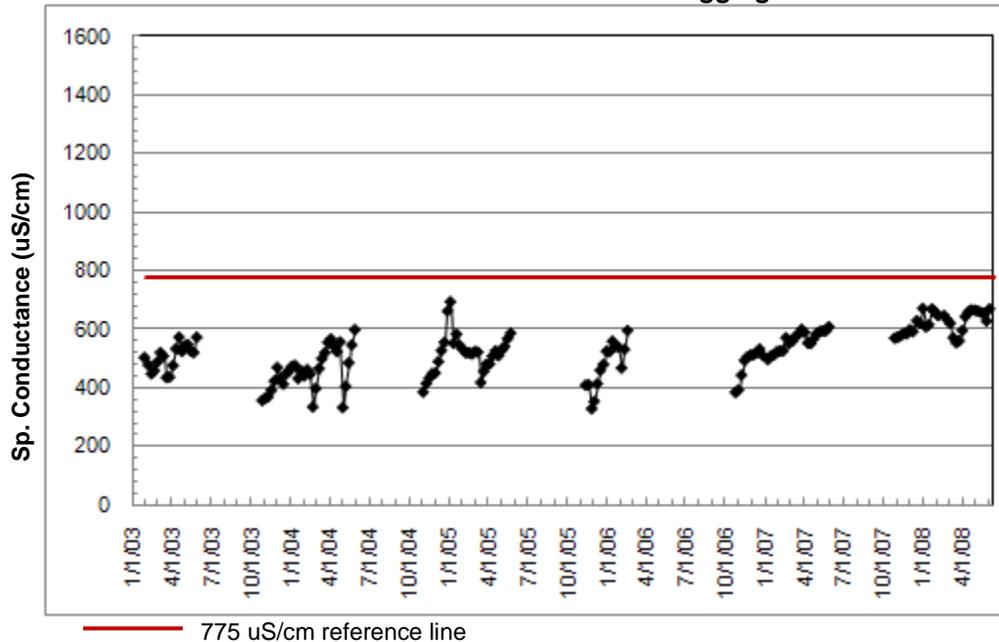


The **Doehill Main Canal** data sonde is located in an agricultural canal in the central region of WBID 1964. Flows from this canal contribute directly to Prairie Creek via Montgomery Canal. Land uses in the immediate surrounding region of this canal include wetlands, rangelands, and small areas of agriculture.

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 May 2008. The data sonde malfunctioned during March – May 2006 therefore, no data exist for these months. This monitoring location continues to have weekly median specific conductance values below the 775 uS/cm goal over the data period of record. No FARMS projects have been established in the immediate area of this monitoring location.

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

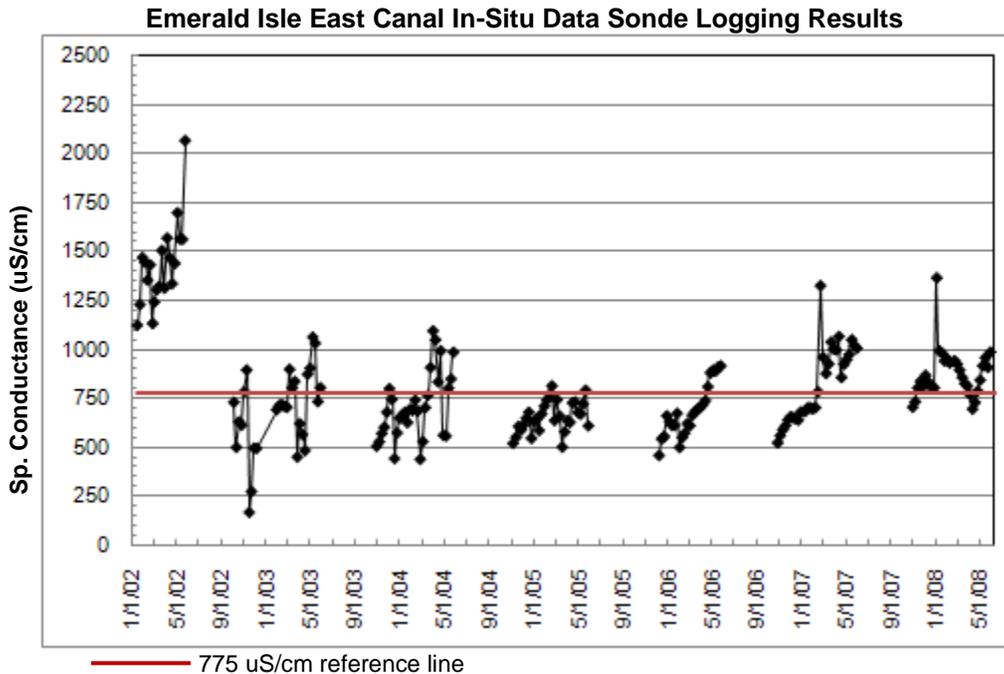
**Doehill Main Canal In-Situ Data Sonde Logging Results**



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 2008.

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 2007-2008 dry season months. One potential FARMS project is under discussion that is located on a property just north of this monitoring location. Additionally, three wells have been back-plugged in the upstream region of this location.

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



**Specific Conductance Logging Results in WBID 1964 over Entire Period of Data Record**

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	15,065	0	0%	90	1	1.1%
*Doehill Main Canal	15,878	0	0%	0	0	0%
*Emerald Isle East Canal	22,280	2,394	10.7%	134	47	35%

\*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 12 individual specific conductance values collected within WBID 1964 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 1964 during the 2004- 2006 and 2006 - 2008 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. All monitoring stations in WBID 1964 were dry or had reduced specific conductance values during the 2007 and 2008 dry season events (as compared to preceding dry season events), indicating a decrease in mineralized groundwater runoff at these locations over the entire period of record.

**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	Dry	114	Dry	Dry	Dry	*	*

\* 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	Dry	Dry	Dry	Dry	126	*	*

\* 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 over Entire Period of Data Record  
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	10	0	N/A	10	1	10%	0	N/A
*Emerald Isle East Canal	16	0	N/A	16	3	18.8%	0	N/A

\*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 period, no sites in WBID 1964 were evaluated for the HA or SCI Assessments.



**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*

**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.	DID No.	TDS (mg/L)	Chloride (mg/L)
20010971	1	57%	86%

**District Resource Regulation – Water Use Permitting**

In WBID 1995, 11 Water Use Permit (WUP) applications were submitted to the District over the entire reporting period of performance monitoring (October 2004 to August 2008). Of the eleven applications four were new permits, five were renewals, and two were letter modifications. Three of the applications received additional special conditions to address water quality concerns in the SPJC watersheds. The remaining permits will receive the special conditions through a corrected permit process. Detailed explanations for special conditions applied to all WUPs in the SPJC Watersheds can be found in Appendix II.

**WUP Renewals and Modifications in WBID 1995**

	Oct. 2004 – July 2006	Aug. 2006 – Aug. 2008
New WUPs	2	2
WUP Renewals	2	3
WUP Modifications	0	0
WUP Letter Modifications	1	1
WUPs Conditioned	1	2

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

During the October 2004 – August 2008 time period there have been four Board approved, operational FARMS/EQIP projects established in WBID 1995. An additional four FARMS projects are being discussed or are in the contract initiation phase. 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 1995**  
*Water Segment – Myrtle Slough*  
*Prairie Creek Watershed: Water Use - Class I*  
*Verified Impaired Pollutants of Concern – None*

**FARMS/EQIP Projects in WBID 1995; October 2004 – August 2008**

Project Number / Type	Project Start Date	Projected Ground Water Offset (gpd)	**Actual Ground Water Offset (gpd)	Max. Ground Water Offset Achieved in One Month (gpd)
WUP #20006765 (citrus) Phase I	August 2006	222,500	352,087	989,129
WUP #20006765 (citrus) Phase II	N/D	76,980	N/D	N/D
WUP #200012818 (citrus)	N/D	98,820	297,939	1,134,065
WUP #20002418, 20012818, 20009716 (citrus)	N/D	50,130	58,022	309,871
*WUP #20006765 (citrus) Phase III	N/D	348,400	N/D	N/D
*WUP #20008287 (citrus)	N/D	14,400	N/D	N/D
*WUP # 20003069 (citrus)	N/D	N/D	N/D	N/D
*WUP 200009782 (Citrus)	N/D	N/D	N/D	N/D

\*Potential project currently under consideration

N/D = Not determined; project under construction, in contract phase, or 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)**

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. 20003069.08, 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**

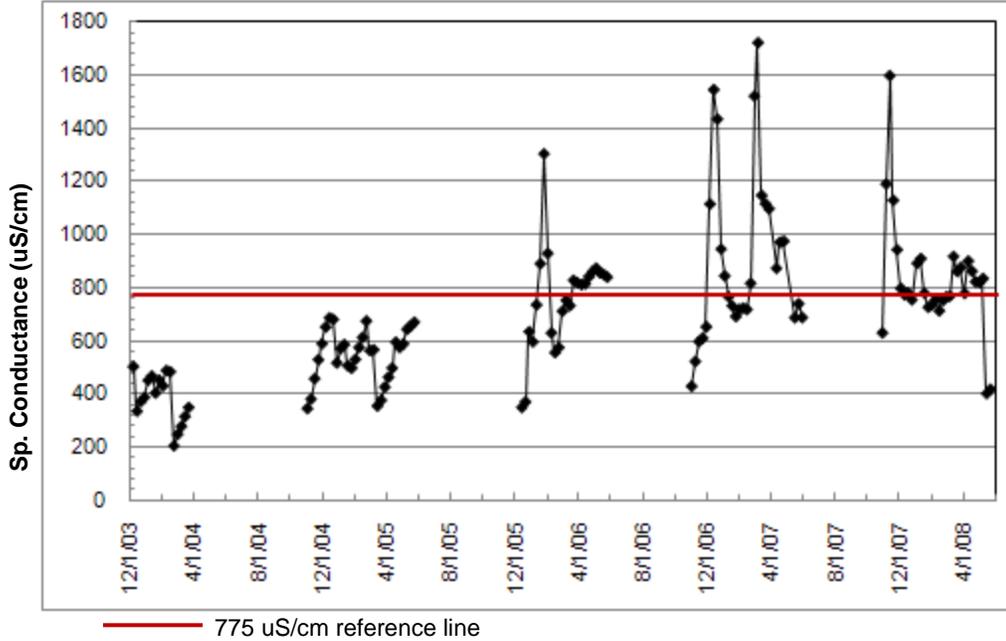
**In-Stream Data Sonde - Conductance Logging Network (District and USGS)**

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 and was upgraded with satellite telemetry in October 2009. 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 2008. 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 concentrations show an increasing trend throughout the period of data record, with values dropping significantly during the 2007-2008 dry seasons. Two FARMS projects are now operational in the upstream region of this data sonde location, and three additional projects are under discussion. A table located at the end of this section provides the overall data sonde specific conductance monitoring results for WBID 1995.

**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 over Entire Period of Data Record**

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	22,644	1,020	4.5%	147	49	33.3%

**Specific Conductance Reconnaissance Network (District)**

Within WBID 1995 there is currently one station monitored for the Specific Conductance Reconnaissance Network. Of the seven individual specific conductance values collected within WBID 1995 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 1995 during the 2004-2006 and 2006-2008 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.

The one monitoring station in WBID 1995 was dry during the 2007 and 2008 dry season events. Discontinuation of flow during the dry season is expected for small stream and canal systems and generally indicates that the system is not being impacted by groundwater runoff.

**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	Dry	↓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	Dry	256	Dry	466	*	*

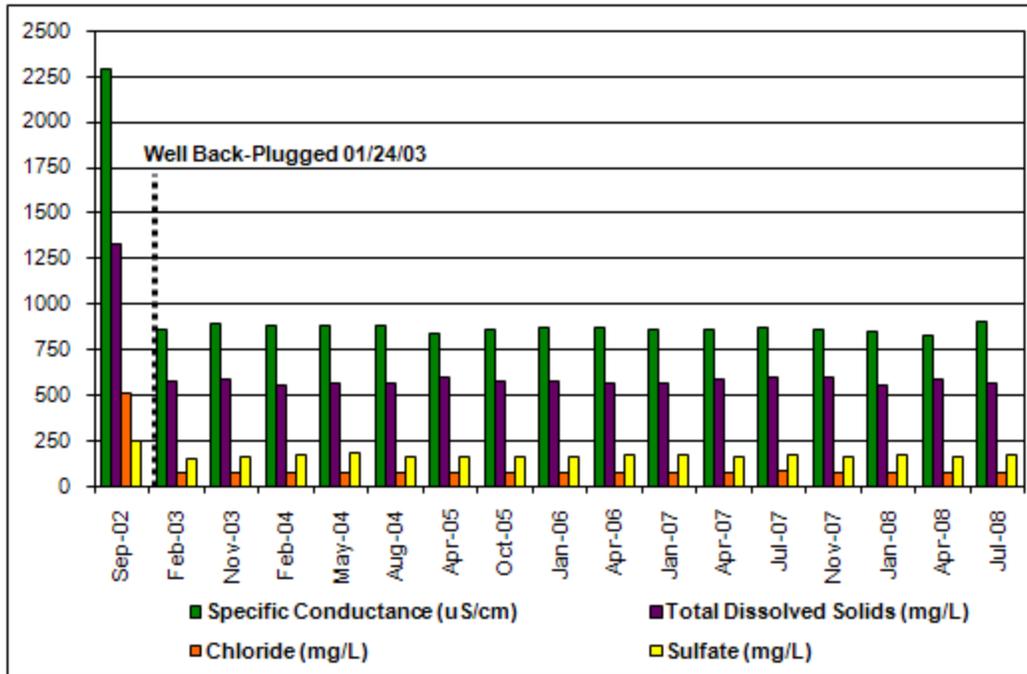
\* Station dry.

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

There is one back-plugged well in WBID 1995 that is sampled on a quarterly frequency to monitor long-term improvements on water quality and to also ensure that the back-plug has remained functional. 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*

**WUP 20010971 - DID No. 1**



**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."

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 2004\_ SCI 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 is not official, but does 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 evaluations were conducted in WBID 1995 during the August 2006 to August 2008 time period for SCIs or HAs.



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

## 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 1995. The following table represents water quality improvements for chloride and TDS concentrations at this well directly following back-plugging activities. These wells were back-plugged in January and February 2008, during the current reporting period

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

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

#### **District Resource Regulation – Water Use Permitting**

In WBID 1950A, ten Water Use Permit (WUP) applications were submitted to the District over the entire reporting period of performance monitoring (October 2004 to August 2008). Of the ten applications four were renewals, one was a new permit, two were modifications, and two were letter modifications. Two of the applications received additional special conditions to address water quality concerns in the SPJC watersheds. The remaining permits will receive the special conditions through a corrected permit process. Detailed explanations for special conditions applied to all WUPs in the SPJC Watersheds can be found in Appendix II.

**WUP Renewals and Modifications in WBID 1950A**

	Oct. 2004 – Jul. 2006	Aug. 2006 – Aug. 2008
New WUPs	0	1
WUP Renewals	0	4
WUP Modifications	1	1
WUP Letter Modifications	1	1
WUPs Conditioned	0	2

#### **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 1950A.

#### **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

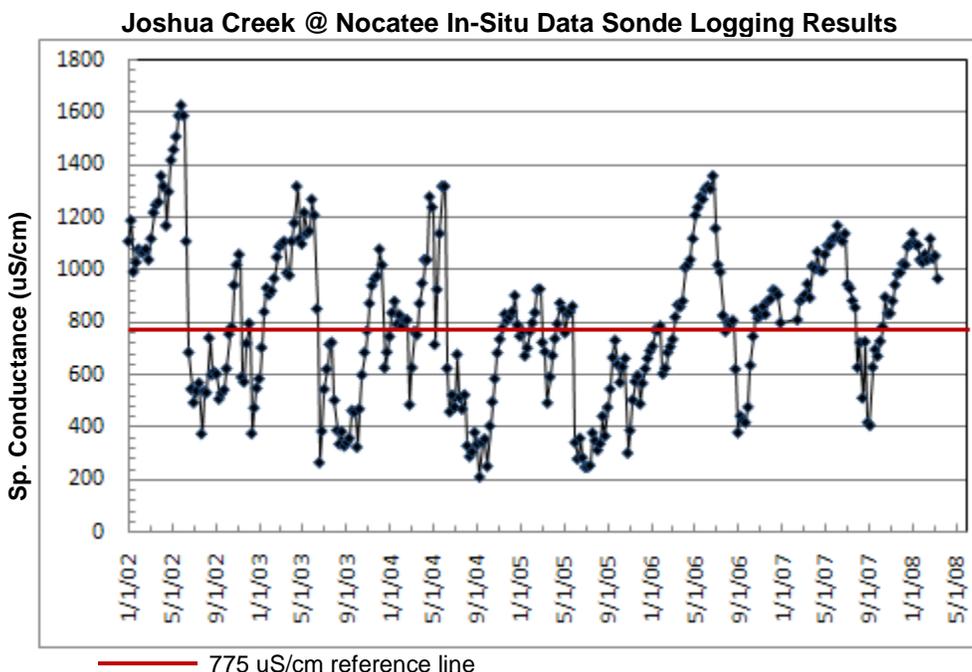
#### **In-Stream Data Sonde - Conductance Logging Network (District and USGS)**

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.

## WBID 1950A

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

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 May 2008. Specific conductance concentrations show a slight decreasing trend during dry season periods. There have been no back-plugging or FARMS project activities to date in WBID 1950A. A table located at the end of this section provides the overall data sonde specific conductance monitoring results for WBID 1950A.



**Specific Conductance Logging Results in WBID 1950A over Entire Period of Data Record**

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	57,888	3,240	5.6%	344	112	32.63%

### **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 77 individual specific conductance values collected within WBID 1950A during the period of record, 12 values exceeded the 775 uS/cm goal criteria and three 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 2004-2006 and 2006-2008 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.

## WBID 1950A

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

Dry season specific conductance values increased overall between the two reporting periods for five monitoring stations in WBID 1950A. The remaining seven monitoring stations in WBID 1950A were dry during the 2007 and 2008 dry season events. Discontinuation of flow during the dry season is expected for small stream and canal systems and generally indicates that the system is not being impacted by groundwater runoff.

### 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	Dry	↑6.95%**	*
Unnamed Cr. @ SR 31 - #7.	Dry	314	Dry	Dry	Dry	*	*
Unnamed Cr. @ SE Kings St. -	442	229	468	183	Dry	↑5.88%**	*
Unnamed Cr. @ CR 760 - #5	1183	180	618	620	Dry	↓47.76%**	*
Upper Joshua Cr. - # 32	52	44	162	70	Dry	↑211.54%**	*
Unnamed Cr. @ CR 760 - #4	Dry	63	294	197	Dry	*	*
Unnamed Cr. @ Roan St. - #2	564	124	626	Dry	Dry	↑10.99%**	*
Unnamed Cr. @ Roan St. - #3	721	78	441	309	Dry	↓38.83%**	*
Tributary to Joshua Cr. @ SR	Dry	104	333	218	Dry	*	*

\* 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	Dry	Dry	Dry	840	914	*	*
Unnamed Cr. @ SR 31 - #7.	Dry	Dry	Dry	Dry	Dry	*	*
Unnamed Cr. @ SE Kings St. -	260	Dry	Dry	Dry	Dry	*	*
Unnamed Cr. @ CR 760 - #5	507	Dry	682	Dry	715	*	*
Upper Joshua Cr. - # 32	Dry	Dry	Dry	Dry	Dry	*	*
Unnamed Cr. @ CR 760 - #4	262	Dry	Dry	Dry	326	*	*
Unnamed Cr. @ Roan St. - #2	322	Dry	419	Dry	431	*	*
Unnamed Cr. @ Roan St. - #3	114	Dry	Dry	942	306	*	*
Tributary to Joshua Cr. @ SR	210	Dry	274	Dry	337	*	*

\* 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)**

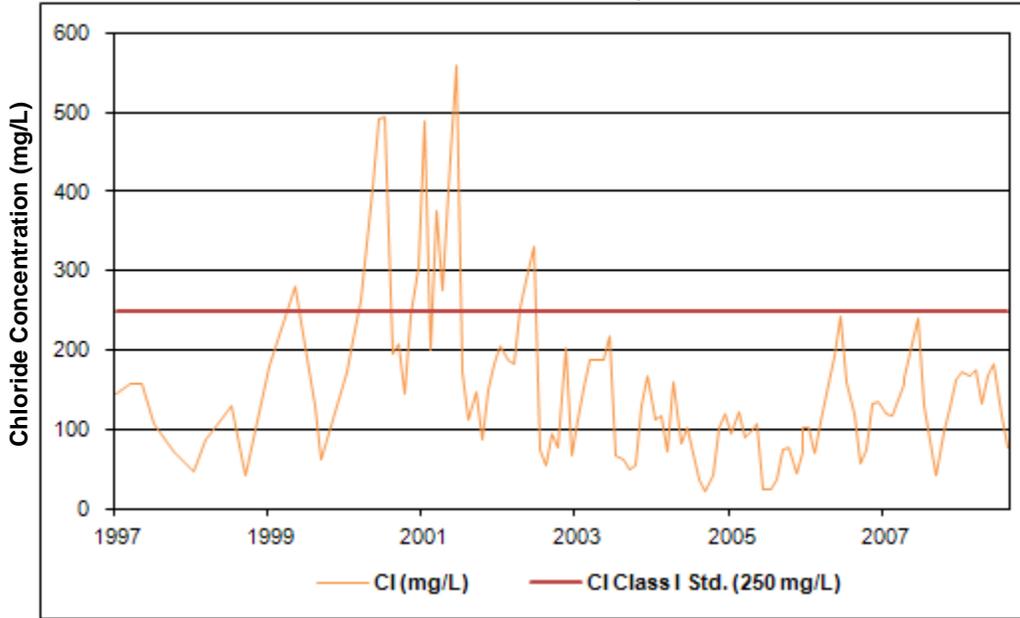
The following graphs represents water quality results through July 2006 for chloride and TDS concentrations at station Joshua Creek @ Nocatee (WBID 1950A). These data plots were generated using data from the District's monthly CWM Network. Although this creek is a Class III system, for comparative purposes, 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).

Significant decreasing trends in both chloride and TDS concentrations have occurred since the drought impacts of 2000-2001. All chloride values have been below the Class I criteria for chloride and TDS (1000 mg/L) since 2002-2003.

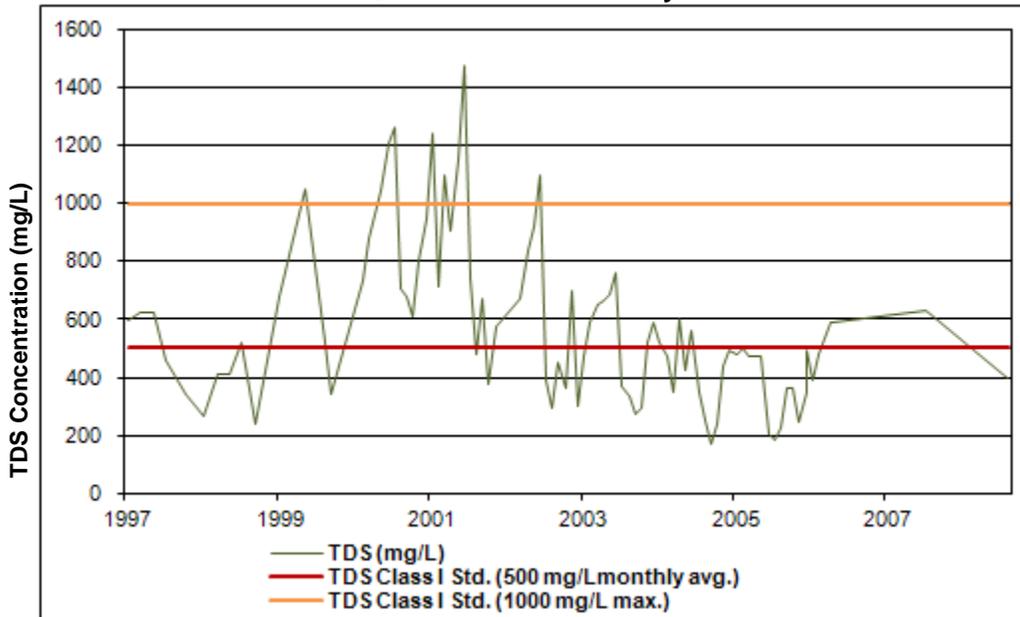
**WBID 1950A**

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**



## 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 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
Joshua Cr. @ Nocatee	119	14	11.8%	87	43	49.4%	9	10.3%

### Habitat Assessment and Stream Condition Index Monitoring (FDEP)

During the August 2006 to August 2008 reporting period, one site in WBID 1950A was evaluated for HAs and SCIs. The results of these 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
Joshua Creek @ Nocatee	05/21/2007	38	42	80 Suboptimal	30 Category 3 ("impaired")

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, it is likely that the impairment of this system for the SCI can be directly linked 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.

No sites in WBID 1950A were evaluated for HAs or SCIs during the October 2004 to July 2006 reporting period.

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

**WBID 1950B**

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

**WBID 1950B**

*Water Segment – Joshua Creek ab. 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 1950B.

**District Resource Regulation – Water Use Permitting**

In WBID 1950B, two Water Use Permit (WUP) applications were submitted to the District over the entire reporting period of performance monitoring (October 2004 to August 2008). Both applications were renewals, of which one received a special condition to address water quality concerns in the SPJC watersheds. The remaining permit will receive the special conditions through a corrected permit process. Detailed explanations for special conditions applied to all WUPs in the SPJC Watersheds can be found in Appendix II.

**WUP Renewals and Modifications in WBID 1950B**

	<b>Oct. 2004 – Jul. 2006</b>	<b>Aug. 2006 – Aug. 2008</b>
New WUPs	0	0
WUP Renewals	2	0
WUP Modifications	0	0
WUP Letter Modifications	0	0
WUPs Conditioned	1	0

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

To date, there are no Board approved FARMS/EQIP projects, and one potential project in WBID 1950B.

**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 August 2008 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*

**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 1963.

**District Resource Regulation – Water Use Permitting**

In WBID 1963, one Water Use Permit (WUP) application was submitted to the District over the entire reporting period of performance monitoring (October 2004 to August 2008) which was a letter modification. This permit did not receive additional special conditions to address water quality concerns in the SPJC watersheds, but will receive the special condition through a corrected permit process. Detailed explanations for special conditions applied to all WUPs in the SPJC Watersheds can be found in Appendix II.

**WUP Renewals and Modifications in WBID 1963**

	<b>Oct. 2004 – Jul. 2006</b>	<b>Aug. 2006 – Aug. 2008</b>
New WUPs	0	0
WUP Renewals	0	0
WUP Modifications	1	0
WUP Letter Modifications	0	0
WUPs Conditioned	0	0

**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 August 2008 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**

*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**

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

**District Resource Regulation – Water Use Permitting**

In WBID 1974, one Water Use Permit (WUP) application was submitted to the District over the entire reporting period of performance monitoring (October 2004 to August 2008) for a renewal. This permit did not receive special conditions to address water quality concerns in the SPJC watersheds, but will receive the special conditions through a corrected permit process. Detailed explanations for special conditions applied to all WUPs in the SPJC Watersheds can be found in Appendix II.

**WUP Renewals and Modifications in WBID 1974**

	<b>Oct. 2004 – Jul. 2006</b>	<b>Aug. 2006 – Aug. 2008</b>
New WUPs	0	0
WUP Renewals	0	1
WUP Modifications	0	0
WUP Letter Modifications	0	0
WUPs Conditioned	0	0

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

During the October 2004 – August 2008 time period there have been no Board approved, operational FARMS/EQIP projects established in WBID 1974 and one project is currently under discussion. 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/EQIP Projects in WBID 1974; October 2004 – August 2008**

<b>Project Number / Type</b>	<b>Project Start Date</b>	<b>Projected Ground Water Offset (gpd)</b>	<b>**Actual Ground Water Offset (gpd)</b>	<b>Max. Ground Water Offset Achieved in One Month (gpd)</b>
*WUP #20001391 (citrus)	February 2009	48,600	N/D	N/D

**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.

**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.

**WBID 1974**

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

**Specific Conductance Reconnaissance Network (District)**

Within WBID 1974 there are currently two stations monitored for the Specific Conductance Reconnaissance Network. Of the 20 individual specific conductance values collected within WBID 1974 during the period of record, one value exceeded either 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 specific conductance values increased overall between the two reporting periods for both monitoring stations in 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. - #	349	704	507	868	456	↑11.04%	↑23.30%
Maple Branch @ SR 70 - # 7	384	662	455	610	419	↑32.40%	↓7.85%

**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 August 2008 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**  
*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**

In WBID 1977, two Water Use Permit (WUP) applications were submitted to the District over the entire reporting period of performance monitoring (October 2004 to August 2008), one for a renewal, and one for a modification. One of these permits received a special condition to address water quality concerns in the SPJC watersheds, but will receive the special conditions through a corrected permit process. Detailed explanations for special conditions applied to all WUPs in the SPJC Watersheds can be found in Appendix II.

**WUP Renewals and Modifications in WBID 1977**

	<b>Oct. 2004 – Jul. 2006</b>	<b>Aug. 2006 – Aug. 2008</b>
New WUPs	0	0
WUP Renewals	0	1
WUP Modifications	0	1
WUP Letter Modifications	0	0
WUPs Conditioned	0	1

**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 1977.

**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.

**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.

**WBID 1977**

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

**Habitat Assessment and Stream Condition Index Monitoring**

During both 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

**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**

Since the inception of this Program, a total of nine irrigation wells have been back-plugged in WBID 1997. The following table represents water quality improvements for chloride and TDS concentrations at these wells directly following back-plugging activities. No additional wells have been back-plugged since October 2004.

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

Permit Information		Percent Improvement	
WUP No.	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%

**District Resource Regulation – Water Use Permitting**

In WBID 1997, 14 Water Use Permit (WUP) applications were submitted to the District over the entire reporting period of performance monitoring (October 2004 to August 2008). Of the fourteen applications eleven were renewals, two were letter modifications, and one was a modification. Six of the fourteen permits received special conditions to address water quality concerns in the SPJC watersheds. The remaining will receive the special conditions through a corrected permit process. Detailed explanations for special conditions applied to all WUPs in the SPJC Watersheds can be found in Appendix II.

**WUP Renewals and Modifications in WBID 1997**

	Oct. 2004 – Jul. 2006	Aug. 2006 – Aug. 2008
New WUPs	0	0
WUP Renewals	2	9
WUP Modifications	0	1
WUP Letter Modifications	1	1
WUPs Conditioned	1	5

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

During the October 2004 – August 2008 time period there has been two Board approved, operational FARMS/EQIP projects established in WBID 1997. An additional project is being discussed. 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 1997**

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

**Potential FARMS Projects in WBID 1997**

<b>Project Number / Type</b>	<b>Project Start Date</b>	<b>Projected Ground Water Offset (gpd)</b>	<b>Actual Ground Water Offset (gpd)</b>	<b>Max. Ground Water Offset Achieved in One Month (gpd)</b>
WUP #20002418, 200012818, 20009716 (blueberries)	2009	25,000	N/D	N/D
WUP #20002418 (blueberries)	N/D	50,130	58,022	309,871
WUP 200013225 (sod)	N/D	128,320	N/D	N/D
*WUP #20004641 (citrus)	N/D	32,000	N/D	N/D

\*Potential project currently under consideration

N/D = Not determined; project under construction, in contract phase, or 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 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 45 individual specific conductance values collected within WBID 1997 during the period of record, 31 values exceeded the 775 uS/cm goal criteria and 14 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 1997 during the 2004-2006 and 2006-2008 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 specific conductance values increased overall between the two reporting periods for four monitoring stations in WBID 1997. The remaining two monitoring stations in WBID 1997 were dry during the 2007 and 2008 dry season events. Discontinuation of flow during the dry season is expected for small stream and canal systems and generally indicates that the system is not being impacted by groundwater runoff.

**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; 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	Dry	Dry	809	Dry	Dry	*	*
Unnamed Ditch @ CR 763 - #11	833	Dry	713	494	Dry	↓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 Rd. - #14	673	1345	1020	1614	710	↓5.41%	↑20.00%
Unnamed Cr. @ SR 31 Near 760A - #31	468	Dry	908	2420	1517	*	*
Unnamed Cr. @ CR 763 - #8	573	1544	926	2401	960	↑6.70%	↑55.51%
Unnamed Cr. @ CR 763 - #10	Dry	Dry	Dry	Dry	789	*	*
Unnamed Ditch @ CR 763 - #11	669	Dry	Dry	Dry	Dry	*	*
Hawthorne Cr. @ 760A	595	1227	999	1511	981	↓14.49%	↑23.15%

\* 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.

**Habitat Assessment and Stream Condition Index Monitoring**

No sites in WBID 1997 have been evaluated for HAs or SCIs during the October 2004 to August 2008 time periods.

**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*

**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 this Program, a total of ten irrigation wells have been back-plugged in WBID 2001. The following table represents water quality improvements for chloride and TDS concentrations at these wells directly following back-plugging activities. Two of these wells were back-plugged during the current reporting period of August 2006-2008.

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

Permit Information		Percent Improvement	
WUP No.	DID No.	TDS (mg/L)	Chloride (mg/L)
20009716	2	22%	54%
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

**District Resource Regulation – Water Use Permitting**

In WBID 2001, three Water Use Permit (WUP) applications were submitted to the District over the entire reporting period of performance monitoring (October 2004 to August 2008). Of the three applications two were renewals and one was a letter modifications. One of the three permits received special conditions to address water quality concerns in the SPJC watersheds. The remaining permits will receive the special conditions through a corrected process. Detailed explanations for special conditions applied to all WUPs in the SPJC Watersheds can be found in Appendix II.

**WUP Renewals and Modifications in WBID 2001**

	Oct. 2004 – Jul. 2006	Aug. 2006 – Aug. 2008
New WUPs	0	0
WUP Renewals	2	0
WUP Modifications	0	0
WUP Letter Modifications	1	0
WUPs Conditioned	1	0

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

During the October 2004 – August 2008 time period there have been four Board approved, operational FARMS/EQIP projects established in WBID 2001. An additional project is being discussed. The following table summarizes the projects, as well as ground water offsets that

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

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/EQIP Projects in WBID 2001**

Project Number / Type	Project Start Date/Expected Date	Projected Ground Water Offset (gpd)	**Actual Ground Water Offset (gpd)	Max Ground Water Offset Achieved in One Month (gpd)
WUP #20006669 (citrus) Phase I	April 2006	170,900	103,452	413,300
WUP #20009716 (blueberries)	September 2006	71,200	120,922	374,548
WUP #20002418 (blueberries)	May 2008	50,130	58,022	309,871
WUP #20012818, 20009716, 20002418 (blueberries)	2009	98,820	297,939	1,134,065
*WUP #20006669 (citrus) Phase II	December 2008	107,700	N/D	N/D

\*Potential project currently under consideration

N/D = Not determined; project under construction, in contract phase, or 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)**

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.

**SPJC Water Quality Monitoring Results – Progress to Date**

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

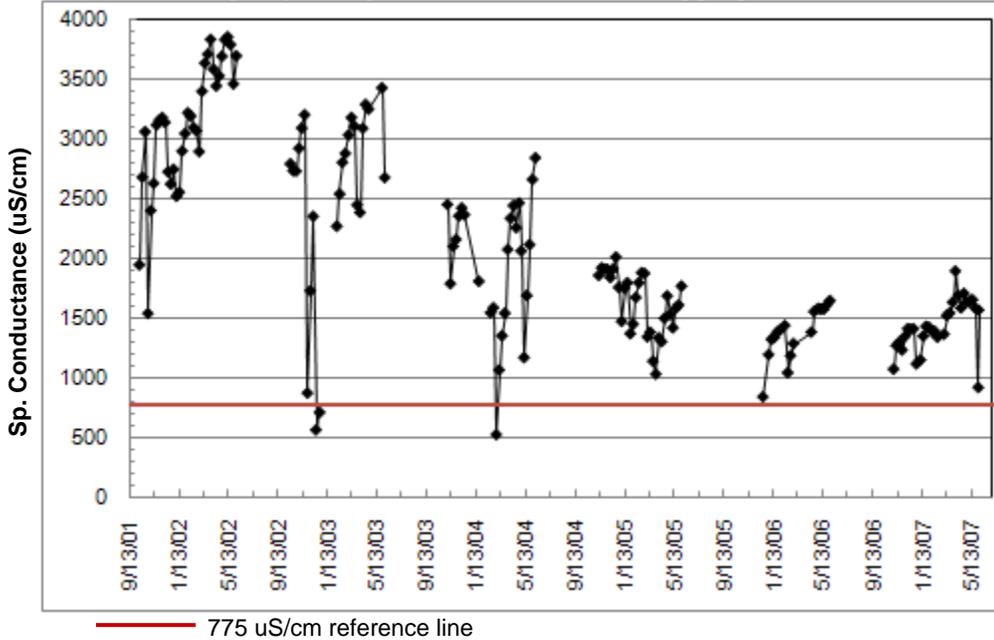
From May 2001 to May 2007, there was one YSI® 600XLM data sonde deployed in WBID 2001 at station Hog Bay Slough in the Joshua Creek watershed. This monitoring location is no longer active because the property owner has denied access. This site is located in the western portion of WBID 2001, and flows 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 concentrations in this canal system throughout the period of data record (see Case Study No. 2 in the SPCWMP Reasonable Assurance document). In addition, three FARMS projects are currently in process and one project is under consideration. These projects are located on properties upstream of this monitoring location.

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

**Hog Bay Slough In-Situ Data Sonde Logging Results**



**Specific Conductance Logging Results in WBID 2001 over Entire Period of Data Record**

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%

**Specific Conductance Reconnaissance Network (District)**

Within WBID 2001 there are currently two stations monitored for the Specific Conductance Reconnaissance Network. Individual values for the Hog Bay Slough – Prairie River Grove 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 ten 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 2004-2006 and 2006-2008 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 table.

The WBID 2001 monitoring station had reduced specific conductance values during the 2007 and 2008 dry season events (as compared to preceding dry season events), indicating a decrease in mineralized groundwater runoff at this location over the entire period of record.

**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; 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**

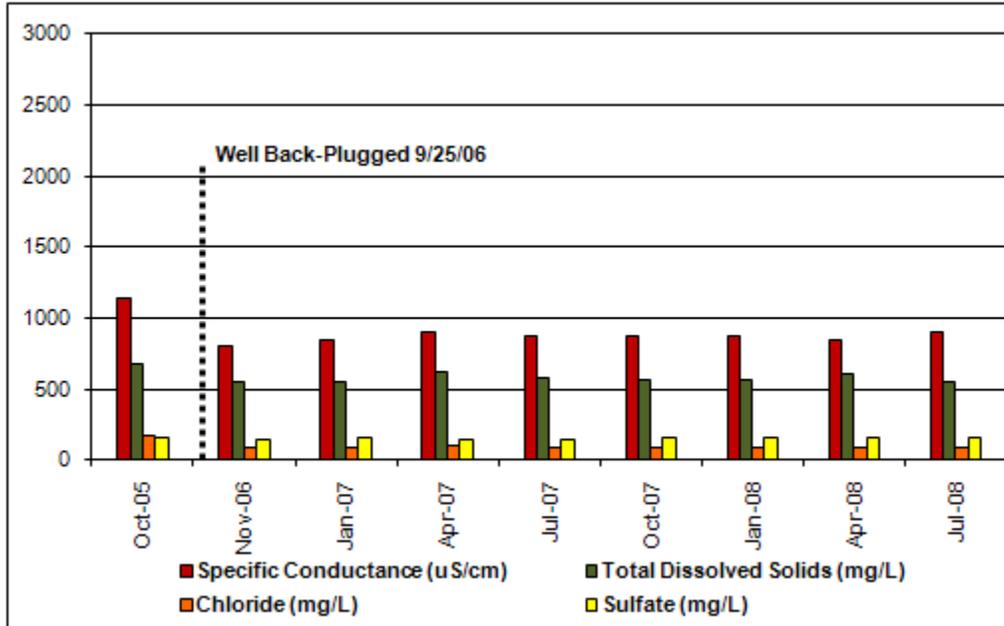
Station	Wet Season 2006 Value uS/cm	Dry Season 2007 Value uS/cm	Wet Season 2007 Value uS/cm	Dry Season 2008 Value uS/cm	Wet Season 2008 Value uS/cm	Percent change Dry Season 2006 versus Dry Season 2007	Percent change Dry Season 2007 versus Dry Season 2008
Hog Bay @ SR 31 - #9	197	284	348	464	611	↓54.34%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

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

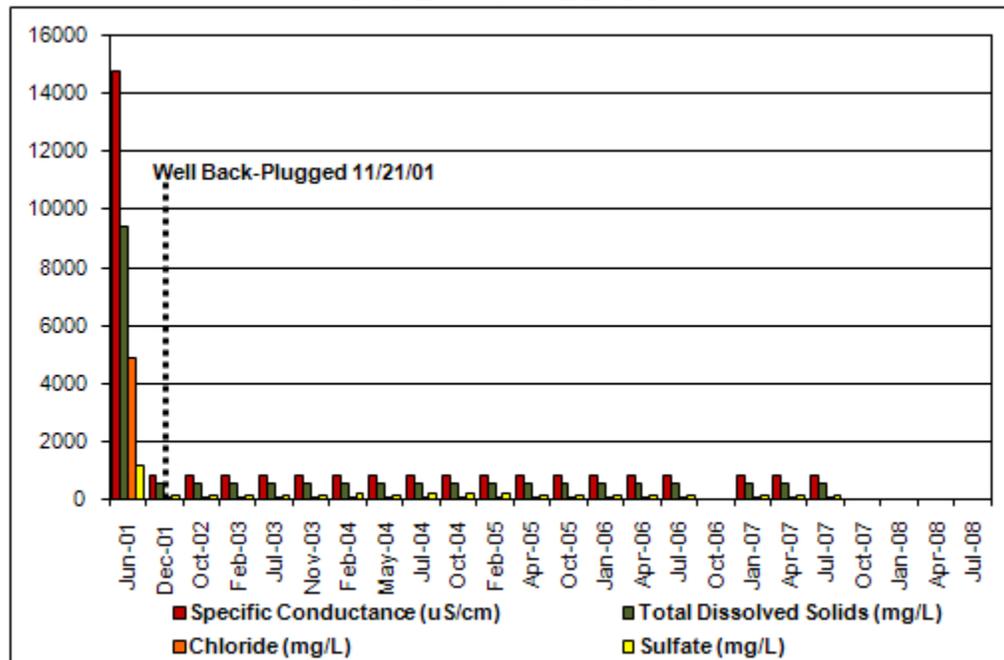
There are six back-plugged wells in WBID 2001 that are sampled on a quarterly frequency to monitor long-term improvements on water quality and to also ensure that the back-plugs have remained functional. Since July 2007, wells denoted (\*) have been denied sampling access by the property owner. The following graphs represent water quality results throughout the period of data record for these quarterly monitored wells showing both pre- and post back-plug values for specific conductance, sulfate, chloride, and TDS. To date, all wells have retained the integrity of the post back-plug concentrations for these parameters.

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

**WUP 20009716 - DID No. 2**

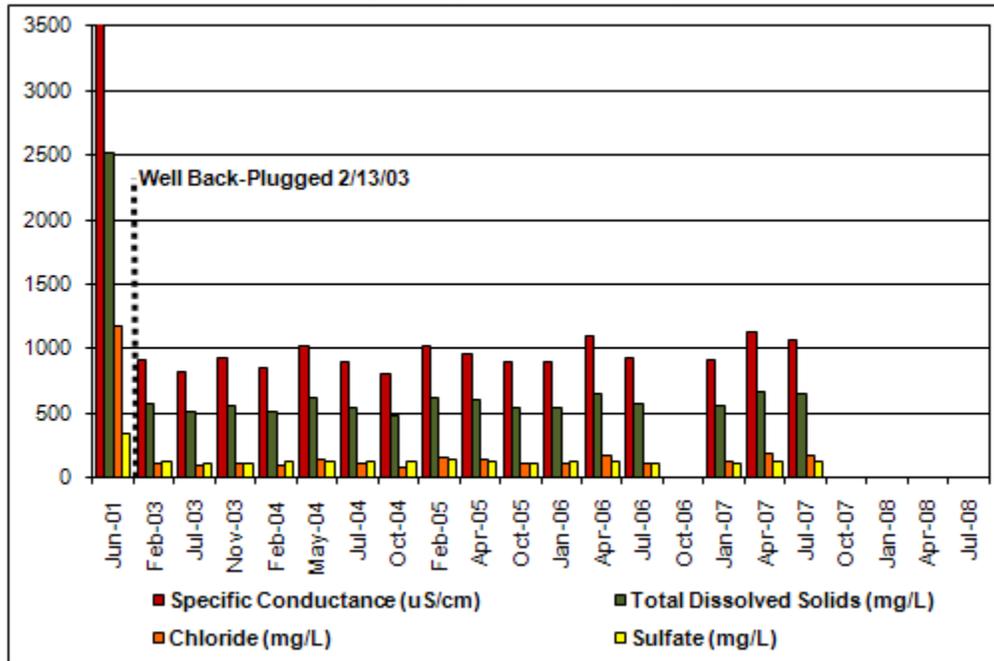


**\*WUP 20006669 - DID No. 8**

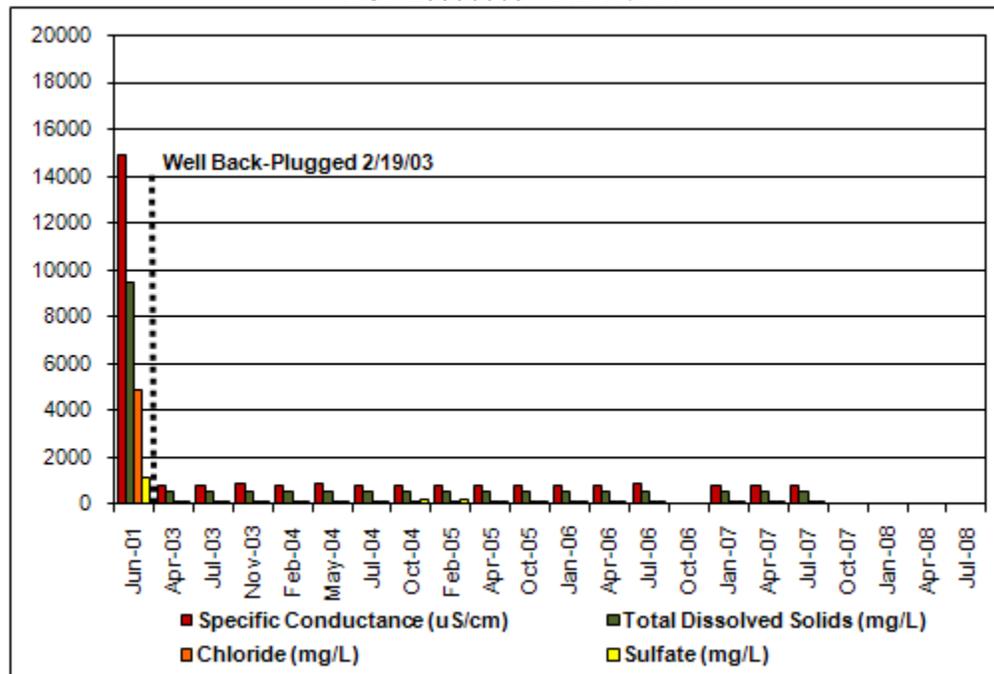


**WBID 2001**  
 Water Segment – Hog Bay  
 Joshua Creek Watershed: Water Use – Class 3F  
 Verified Impaired Pollutants of Concern – None

**\*WUP 20006669 - DID No. 10**

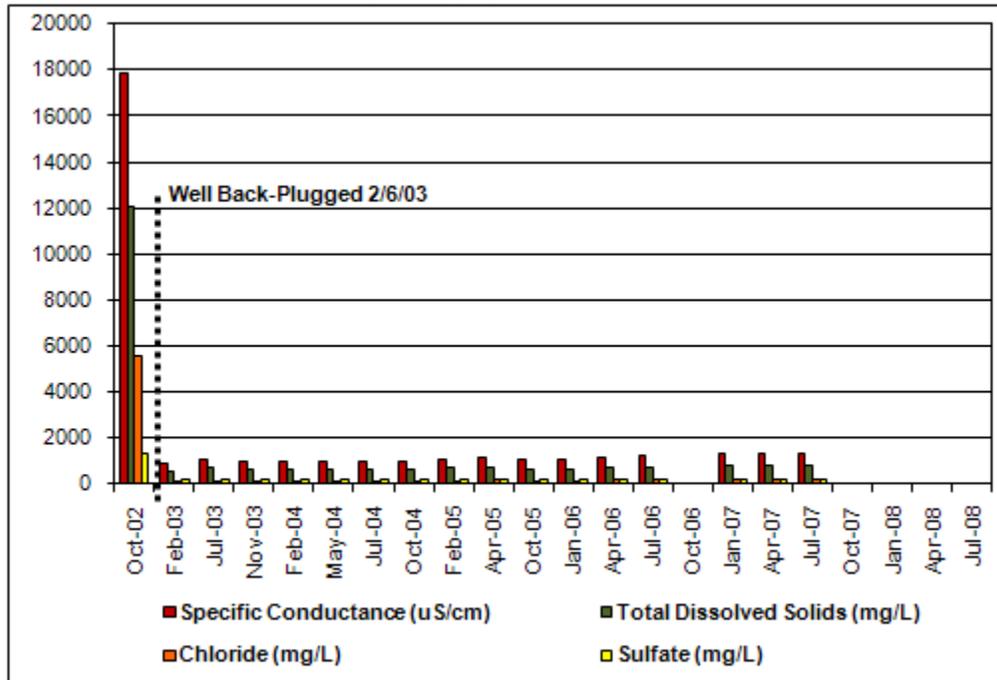


**\*WUP 20006669 - DID No. 11**

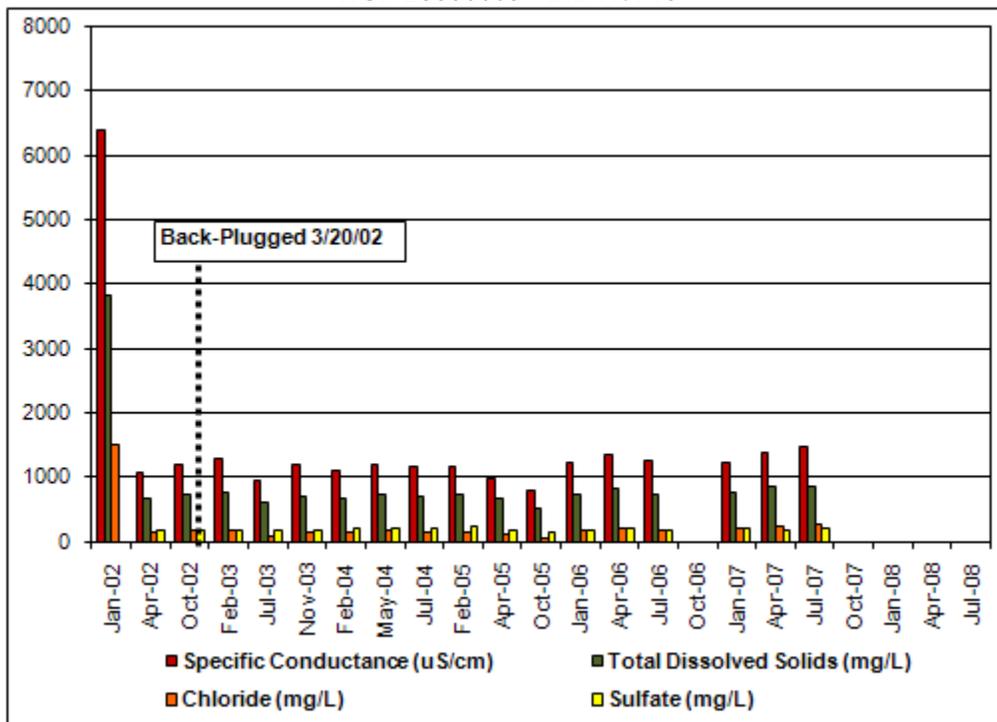


**WBID 2001**  
 Water Segment – Hog Bay  
 Joshua Creek Watershed: Water Use – Class 3F  
 Verified Impaired Pollutants of Concern – None

**\*WUP 20006669 - DID No. 12**



**WUP 20006669 - DID No. 13**



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

**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 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 over Entire Period of Data Record**

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
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)**

During the August 2006 to August 2008 reporting period, one site in WBID 2001 was evaluated for the HAs and SCIs. The results of these 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
Hog Bay Slough	05/23/2007	40	67	107 Suboptimal	46 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.

No sites in WBID 2001 were evaluated for the HAs or SCIs during the October 2004 to July 2006 reporting period.

**WBID 2020**  
**Water Segment – Gannett Slough**  
**Prairie Creek Watershed**  
**Borders DeSoto/Highlands Counties/SFWMD**  
**Water Use - Class 3F**  
**TMDL verified impaired pollutants of concern: None**

**WBID 2020**  
*Water Segment – Gannett Slough*  
*Prairie Creek Watershed*  
*Borders DeSoto/Highlands Counties/SFWMD*  
*Water Use - Class 3F*  
*TMDL verified impaired pollutants of concern – None*

**Proposed Management Actions – Progress to Date**

This WBID is located outside of District boundaries in the South Florida Water Management District, therefore, no current or proposed management actions, well back-plugging, FARMS projects, or water quality / biological sample collection activities are occurring in WBID 2020, with the exception of instantaneous monitoring of specific conductance which is explained below.

**SPJC Water Quality Monitoring Results – Progress to Date**

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

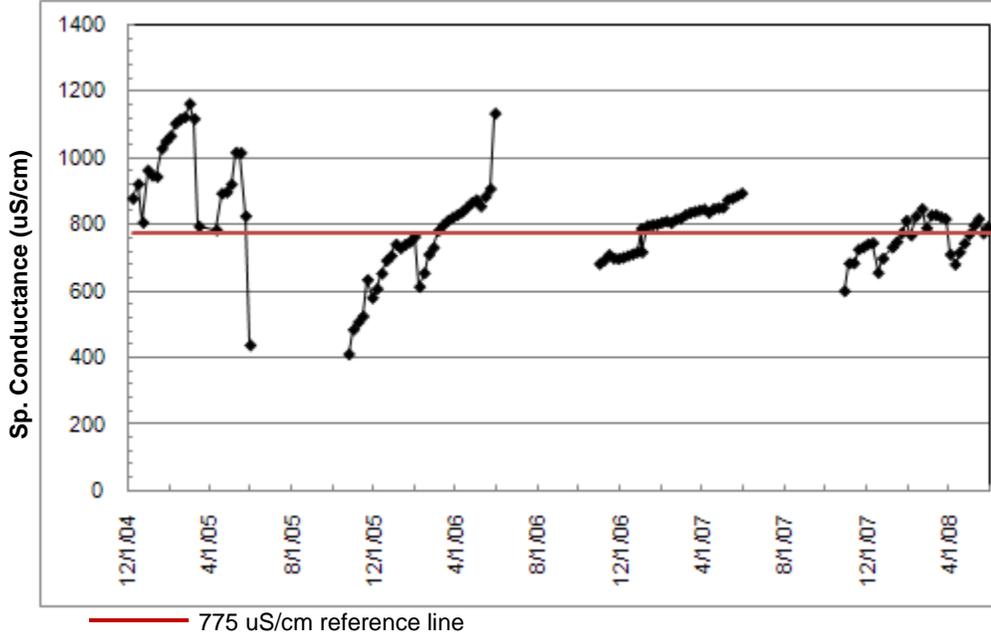
The *Gannet Slough* data sonde is deployed in a small tributary/slough in the southeastern region of the Prairie Creek watershed. This monitoring site is located in the South Florida Water Management District and surrounding land uses include agriculture (citrus) and rangeland. Gannet Slough flows to 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 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 May 2008.

Dry season specific conductance concentrations have decreased when comparing 2004-2005 to 2006-2008 values. There is an increasing trend during the March through May 2006 dry season period. FARMS and well back-plugging activities have not occurred in the upstream areas of this location because these properties are not contained within District boundaries.

**WBID 2020**  
*Water Segment – Gannett Slough*  
*Prairie Creek Watershed*  
*Borders DeSoto/Highlands Counties/SFWMD*  
*Water Use - Class 3F*  
*TMDL verified impaired pollutants of concern – None*

**Gannett Slough In-Situ Data Sonde Logging Results**



**Specific Conductance Logging Results in WBID 2020 over Entire Period of Data Record**

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	19,311	0	0%	136	68	50.0%



## 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 have re-evaluated the number of irrigation wells that are proposed to be constructed in the three watersheds. During the entire current reporting (October 2004 – August 2008), approximately 322 wells were proposed to be constructed through approved Water Use Permits within the SPJC watersheds. Of this total, 179 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 all proposed 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  
(October 2004 – August 2008)**

Watershed	No. of Proposed Irrigation Wells (Oct. 2004 – Jul. 2006)	No. of Proposed Irrigation Wells (Aug. 2006 – Aug. 2008)	Depth Criteria*	Total No. Wells Exceeding Criteria
Joshua	58	36	1400	11
Prairie	128	74	1200	153
Shell	14	12	450	15
TOTALS	200	122	N/A	179

\*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.

Well construction permits (WCP) 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 water quality limit of 1000 uS/cm. Two WCP Stipulations are used to ensure these criteria are followed: 1) Stipulation No. 31 – Special Well Construction and 2) Stipulation No. 41 – Special Well Construction – Water Quality Sampling. Copies of these two 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.

Since implementation of the SPCWMP Reasonable Assurance Document, five deep wells were permitted. Of the five wells, two received Stipulation No. 31 and three received Stipulations No.

31 and 41. Staff are working on continued coordination to ensure all permits in these watersheds received both stipulations.

### Well Construction

Geographic Information Systems (GIS) analyses of the District's well construction database indicate that there are approximately 755 existing groundwater irrigation wells within the SPJC watersheds. Of these wells, approximately 379 exceed the depth criteria.

**Approximate Number of Existing Irrigation Wells Potentially Contributing to Impairment in the SPJC Watersheds (Oct. 2004 – August 2008)**

Watershed	No. of Existing Irrigation Wells	Depth Criteria*	Wells Exceeding Criteria
Joshua	306	1400	103
Prairie	294	1200	155
Shell	155	450	121
TOTALS	755	N/A	379

\*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 413 wells located in the impaired WBIDs of Shell Creek and Prairie Creek. Of these wells approximately 244 exceed depth criteria chosen for 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 effort in support of the FARMS Program and property owners will be given all possible assistance to expedite this task. A summary of well construction queries within the impaired WBIDs is given below.

**Potential Number of Irrigation Wells Directly Contributing to Impairment in the SPJC Watersheds (Oct. 2004 – August 2008)**

Watershed	WBID No.	No. of Irrigation Wells	Depth Criteria*	Wells Exceeding Criteria
Shell	2040	156	450 ft.	98
Shell	2041	57	450 ft.	37
Prairie	1962	200	1200 ft.	109
TOTALS	N/A	413	N/A	244

\*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 34 Water Use Permits (WUPs) in the Prairie Creek watershed and 25 WUPs in the Shell Creek watershed and may be directly contributing to mineralized concentrations within the 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. Twelve of these priority permits located in the Shell and Prairie Creek 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. Proposed amendments 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 would allow a 20 year permit for an applicant with an approved FARMS application for an eligible project which would offset a minimum of 50 percent of the applicant's current groundwater supply.

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 294 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, and approximately 117.6 mgd was permitted over the August 2006 – August 2008 reporting period. During the current reporting period, approximately 84.3 percent water use permits were for agriculture (a reduction of 1.8 mgd, or nine percent, compared to the October 2004 – July 2006 time period), 1.7 percent were for mining/dewatering, less than one percent for industrial/commercial, and 13.8 percent for public supply. The table below provides a complete breakdown of the WUPs in the Shell, Prairie and Joshua Creek watersheds over both reporting time periods.

**Water Use Permit Summary in the SPJC Watersheds (October 2004 – July 2006)**

<b>Predominant Use</b>	<b>Shell Creek (avg. gpd)</b>	<b>Prairie Creek (avg. gpd)</b>	<b>Joshua Creek (avg. gpd)</b>	<b>Total (avg. gpd)</b>	<b>Percent Use in Watershed</b>
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)**

<b>Predominant Use</b>	<b>Shell Creek (avg. gpd)</b>	<b>Prairie Creek (avg. gpd)</b>	<b>Joshua Creek (avg. gpd)</b>	<b>Total (avg. gpd)</b>	<b>Percent Use in Watershed</b>
Agriculture	17,631,300	47,624,600	33,870,700	99,126,600	84.3%
Public Supply	15,300,100	821,600	155,000	16,276,700	13.8%
Mining/ Dewatering	1,806,500	211,500	0	2,018,000	1.7%
Industrial/ Commercial	0	0	0	0	0.2%
Total Permitted Quantities (gpd)	34,805,900	48,657,700	34,175,800	117,639,400	100.0%

Of the 8.2 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 majority of groundwater use in this geographic area continues to be agriculture (89.9 percent). Within the Shell Creek watershed, there was a decrease of 1.8 MGD for quantities allocated to agriculture, believed to be attributed to citrus groves and farm fields removed from production due to vigorous development and associated mining/borrow pit activities. As part of the Water Use Permit renewal, the City of Punta Gorda was granted an increase of 2.7 MGD, which accounts for a 2.7 percent increase in the public supply category.

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.

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 perform 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 Mini-Farms Program is administered by FDACS through contractual agreements with the local Soil and Water Conservation District (SWCD). The cost-share reimbursement rate is 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.

To qualify for Mini-FARMS the following criteria must be met:

- Production units 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.

Mini-FARMS is a recently initiated program, therefore it was not included in the SPJCWMP Reasonable Assurance document (December 2004) as part of the Management Action items. During the October 2004 – July 2006 reporting period the Mini-Farms Program had initiated two projects. Throughout August 2006 – August 2008 sixteen more projects were added. These projects were administered by Highlands, Hillsborough, Manatee, and Peace River Soil and Water Conservation Districts. Of the eighteen total projects only one is located within the SPJC watersheds (Charlotte County). Funding of \$75,000 was provided to FDACS by the District during FY2007, but due to severe budget constraints experienced by FDACS, no program funding was provided after December 2007.

### **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. 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.

An innovative element of the BMP Program is the *Presumption of Compliance* with water quality standards (F.S. 403.067 (7)(c)3), which applies 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. A list with all the adopted manuals, rules and other documents can be found by accessing the following web link:

<http://www.floridaagwaterpolicy.com/BestManagementPractices.html>

### **Water Quality BMPs for Peace River Valley / Manasota Basin Citrus Groves**

In February 2005, the FDACS adopted a manual detailing BMPs for Citrus Groves in the Peace River and Manasota Basins. The complete manual can be found by accessing the following web link:

[http://www.floridaagwaterpolicy.com/PDF/Bmps/Bmp\\_PeaceRiverCitrus2004.pdf](http://www.floridaagwaterpolicy.com/PDF/Bmps/Bmp_PeaceRiverCitrus2004.pdf)

In January 2006, IFAS requested funding from the District to assist with the implementation of the Peace River/Manasota Basins Citrus BMP Program. The BMPs involve water management systems, including tailwater recovery, surface water use, and soil moisture monitoring. These are activities the FARMS Program typically funds. Furthermore, the Flatwoods Citrus area includes the Peace River and Manasota watersheds, which are priority areas for the FARMS Program. The District's Governing Board approved funding for this program at a level of \$150,000 (\$50,000 for each of a three year period). The EPA, Florida Department of Agriculture and Consumer Services (FDACS), South Florida Water Management District, and St. Johns Water Management District are also providing funds for this project. The District will continue to provide funding for these efforts through 2008.

The BMP Implementation Teams have currently been operating in the Peace River/Manasota Basins (PRMB) since 2005. The following table documents the extent of grove evaluations in the Peace River Basin through August 2008. Overall, approximately 42 percent of the estimated current acreage in the Peace River Basin has been evaluated.

**Summary of PRMB Grove Evaluations by County as of August 30, 2008**

<b>County</b>	<b>Acres<sup>1</sup></b>	<b>2008 FASS Census Acres<sup>2</sup></b>	<b>Percent of FASS Acres Evaluated</b>
Charlotte	3,216	5,995 <sup>3</sup>	53.6
DeSoto	40,879	61,426	66.5
Hardee	7,450	45,109	16.5
Manatee	3,824	18,389	20.8
Sarasota	38	1,502	2.5
Total	55,407	132,421	41.8

<sup>1</sup>Acres enrolled under the PRMB BMP Program.

<sup>2</sup>County citrus acreage obtained from Commercial Citrus Inventory 2008 (April 2009), Florida Agricultural Statistics Service (FASS), Maitland, Florida.

[http://www.nass.usda.gov/Statistics\\_by\\_State/Florida/Publications/Citrus/cci/2008/cci08.pdf](http://www.nass.usda.gov/Statistics_by_State/Florida/Publications/Citrus/cci/2008/cci08.pdf)

<sup>3</sup>According to the Citrus Inventory (2008), Charlotte Co. has 11,991 acres in citrus. However, only half of this acreage resides within SWFWMD.

### **Best Management Practices for Vegetable and Agronomic Crops**

In 2006, the FDACS adopted a manual detailing the water quality/quantity BMPs for Florida Vegetable and Agronomic Crops. The manual is applicable to vegetable and agronomic crop farmers statewide. The focal crops the manual addresses are vegetables, potatoes, corn, soybeans, peanuts, peppers, sugarcane, and cotton. For the purposes of this manual, vegetables also include tomatoes, cucumbers, strawberries, melons, and various types of squashes. Other row crops outside the purview of this manual (for example, hay and other forage grasses) may be covered under other state rules or BMP Programs.

The BMPs that have been identified 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:

- Pesticide Management
- Conservation Practices And Buffers
- Erosion Control And Sediment Management
- Nutrient And Irrigation Management
- Water Resources Management
- Seasonal Or Temporary Farming

In January 2007, IFAS requested funding from the District to assist in the implementation of the vegetable and agronomic BMP Program. The BMPs involve water management systems including tailwater recovery systems, surface water use, and soil moisture monitoring. These are activities that FARMS typically funds. The District's Governing Board approved funding for this program at a level of \$50,000 for two years, and \$55,000 for the final third year, for a total of \$155,000. The EPA, FDACS, and the District are also funding this project. The manual can be found by accessing:

[http://www.floridaagwaterpolicy.com/PDF/Bmps/Bmp\\_VeggieAgroCrops2005.pdf](http://www.floridaagwaterpolicy.com/PDF/Bmps/Bmp_VeggieAgroCrops2005.pdf)

The BMP Implementation Team has been operational since February 2006 in the PRMB area. The following table documents the extent of vegetable and agronomic crops farm evaluations as of August 2008.

**Summary of Farm Evaluations within the PRMB by County as of August 30, 2008**

<b>County</b>	<b>Acres</b>
Charlotte	55
DeSoto	2,250
Hardee	-
Manatee	29,301
Sarasota	-
Total	31,606

### **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 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. While a BMP Implementation Team has not been funded for this commodity, the manual states that assistance in conducting a site assessment and enrolling in BMPs can be obtained from FDACS and its contractors and

agricultural extension agents.

### **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 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

The BMP Implementation Team has covered the PRMB area since 2007. The following table shows the extent of container nurseries evaluations.

**Summary of Nursery Evaluations within the PRMB by County as of August 30, 2008**

<b>County</b>	<b>Acres</b>
Charlotte	27
DeSoto	-
Hardee	-
Manatee	18
Sarasota	-
Total	45

The complete manual can be found by accessing the following link:

[http://www.floridaagwaterpolicy.com/PDF/Bmps/Bmp\\_FloridaContainerNurseries2007.pdf](http://www.floridaagwaterpolicy.com/PDF/Bmps/Bmp_FloridaContainerNurseries2007.pdf)

### **Water Quality BMPs for Sod Production**

In 2008, FDACS adopted a statewide BMP manual for Florida Sod. 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

As of August 2008, there have been no sod farm evaluations within PRMB.

The complete manual can be found by accessing the following link:

[http://www.floridaagwaterpolicy.com/PDF/Bmps/Bmp\\_FloridaSod2008.pdf](http://www.floridaagwaterpolicy.com/PDF/Bmps/Bmp_FloridaSod2008.pdf)

### **Implementation Assurance**

Since 2005, the Office of Agriculture Water Policy (OAWP) has been establishing a BMP implementation assurance program. In July 2008, the 1<sup>st</sup> annual report on the implementation of Agricultural Best Management Practices was published. This report details the activities and results obtained for the Suwannee River Basin, Lake Okeechobee Watershed, Ridge Citrus and Indian River Citrus. An implementation assurance evaluation for the PRMB was conducted in 2009.

The complete Implementation Assurance Report can be found by accessing the following link:

<http://www.floridaagwaterpolicy.com/ImplementationAssurance.html>

### **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.

EQIP was reauthorized in the Farm Security and Rural Investment Act of 2002 (Farm Bill). The 2002 Farm Bill provides the funds, facilities, and authorities of the Commodity Credit Corporation (CCC) to NRCS for carrying out EQIP and working with landowners to implement conservation practices on their property.

National priorities will be used to guide which producers will be selected to receive EQIP funding. The national priorities are:

- Reduction of non-point source pollution such as nutrients, sediment, pesticides, or excess salinity in impaired watersheds, consistent with TDMLs where available; as well as reduction of groundwater contamination and 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 portioned 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 Farm Security and Rural Investment Act of 2002 (Farm Bill) limits the total amount of cost-share and incentive payments paid to an individual or entity to an aggregate of \$450,000, directly or indirectly, for all contracts entered into during fiscal years 2002 through 2008. The Food, Conservation, and Energy Act of 2008 (Farm Bill) states that beginning in the 2009 fiscal year, and continuing through the six-year period until 2014, this amount will be reduced to \$300,000.

### **2008- 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. The evaluation cutoff date for fiscal year 2009 is March 13, 2009.
- 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 19 farms funded under EQIP totaling 23,931 acres. The total cost-share funding obligated for the 19 farms was \$2,640,136.

**History of EQIP Funding in Charlotte County; 2004 - 2008**

<b>Year</b>	<b>Acres</b>	<b>Cost-Share Funding Obligated</b>
2004	831	\$345,100
2005	7,184	\$226,228
2006	2,355	\$791,885
2007	1,323	\$677,498
2008	12,238	\$559,425
Total	23,931	\$2,640,136

### History of Funding in DeSoto County

Since 2004, there have been 25 farms funded under EQIP totaling 12,880 acres. The total cost-share funding obligated for the 25 farms was \$3,704,228.

**History of EQIP Funding in DeSoto County; 2004 - 2008**

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
Total	12,880	\$3,704,228

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 December 2006, the District Governing Board approved the “Regional Water Supply Plan” (RWSP) (SWFWMD, 2006). 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 2000 to 2025. The purpose of the plan, as an update to the 2001 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 2006 version of the RWSP specifically includes some of the key management actions that are also a part of the SPCWMP Reasonable Assurance document. Page five of the RWSP indicates that one of the guiding principles developed since the 2001 RWSP includes expanding agricultural conservation programs such as FARMS. Pages 17, 18, 199, and 200 of the RWSP highlight the accomplishments of the FARMS Program, the Irrigation Well Back-Plugging Program, and the QWIP. 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. Updates to the RWSP are currently in progress and will be completed in 2011. 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. As in the draft version of this report, 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.

A specific example of these goals includes the new 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**

Funding for land acquisitions in the state of Florida is possible through the Florida Forever Program. This Program was established by the Florida Legislature in 1999 and provides funding to several state agencies and the five Water Management Districts for land acquisition (including less-than-fee (LTF) interests). The District is projected to receive approximately 25 percent of the state's funding distribution to be allocated for project funding (\$26 million per year) over a ten-year period.

To date, the District has acquired approximately 39,000 acres in the Prairie and Shell Creek Watersheds through either fee or LTF interests. Proposed land acquisition projects in these watersheds total approximately 50,000 acres through fee or LTF interests. The acquired land totals have not changed significantly since publication of the SPJCWMP Reasonable Assurance document in December 2004, although the following table which summarizes the acreage totals associated with these land acquisition projects is slightly different than the information presented in the SPJCWMP. The slight differences in these figures are attributed to changes in the District's methodologies for determining acreage totals. In 2004, acres reported on legal deed descriptions were used, and in 2005 and 2008 ArcGIS mapping tools were utilized to portray more accurate estimates.

Acquisition of the Long Island Marsh property is currently under additional review and may also be eligible for federal funding through the USDA Wetlands Reserve Program. It has been proposed that a portion of the 7,023-acre (fee) parcel be acquired through LTF interests. Terms under this agreement would potentially allow for the construction of surface water retention and storage areas. These projects would provide supplies of good water quality for augmentation of

the Montgomery Canal/Prairie Creek system during dry season periods. As of March 1, 2004, there are sixteen water-use permits that have been issued in the Long Island Marsh and Prairie/Shell Creek proposed project areas. Daily water use averages for all 16 permits totals approximately 2,168,880 gallons per day. Considerable ground-water use savings and surface-water quality improvement will be realized if these proposed property acquisitions are made through fee interests.

**Summary of Acreage Totals Associated with District Land Acquisition  
Projects in the SPJC Watersheds**

Project	Watershed/County	Acres Acquired		Acres Proposed		Totals
		Fee	Less-than-fee	Fee	Less-than-fee	
Prairie / Shell Creek	Prairie and Shell Cr. / Charlotte	609		13,604	10,624	24,837
Bright Hour Watershed	Prairie Cr. / DeSoto		32,227		19,311	51,538
Long Island Marsh	Prairie Cr. / DeSoto			3,686		3,686
Cecil Webb Wildlife Management Area	Shell Cr. / Charlotte	6,320				6,320

The Peace River/Manasota Regional Water Supply Authority recently completed the Regional Source Feasibility Study. 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 out past 2020. The feasibility study investigated creating new storage and enhancing the available yield of Shell Creek. Part of this project could be done in conjunction with the City of Punta Gorda, who utilizes Shell Creek as their raw water source. 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. Approximately 2,000 acres have been acquired since the inception of this program that fall within the impaired SPJC watersheds. 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 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 5 of the Coastal Ground-Water Quality Monitoring Network / Water-Use Permit Network Report (SWFWMD, 2005) 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 ten years from 1993 to 2003. 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 five 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 ten year chloride and sulfate trend analysis that were performed, Charlotte and Desoto were two of the counties established to have monitor well(s) in the intermediate aquifer with

significantly increasing chloride trends. A significant increase in chlorides was reported for three wells (approximately 16 percent) in Charlotte County and one well (approximately 20 percent) in Desoto County. However, it is also important to note that other intermediate aquifer wells in these two counties showed a significant decrease in chlorides. A significant decrease in chlorides was reported for four wells (approximately 21 percent) in Charlotte County and one well (approximately 20 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 or decrease in chlorides, while three Ocala/ Avon Park monitor wells (approximately 60 percent) were found to have a significant increase in chlorides. Conversely, in Charlotte County the Tampa/Suwannee and Ocala/Avon Park monitor well(s) included in the ten year trend analysis did not display any significant increases in chlorides. However, two Charlotte County, Tampa/Suwannee monitor wells were reported to have a significant decrease in chlorides. Highlands County was only represented in the Ocala/Avon Park monitor well analysis and determined to have no significant change in chlorides for those wells. The following tables summarize the ten-year chloride trend results for Charlotte, DeSoto, and Highlands Counties:

**Ten 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	19	3↑, 4↓	16%↑, 21%↓
Tampa/Suwannee	4	0↑, 2↓	0%↑, 50%↓
Ocala/Avon Park	1	0↑, 0↓	0%↑, 0%↓

**Ten 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	5	1↑, 1↓	20%↑, 20%↓
Tampa/Suwannee	4	0↑, 0↓	0%↑, 0%↓
Ocala/Avon Park	5	3↑, 0↓	60%↑, 0%↓

**Ten 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	0↑, 0↓	0%↑, 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. A sixth volume of the CGWQMN and WUPNET report is currently scheduled to be produced in 2010.

**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 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 2005-2006, MIL services (i.e., evaluations and irrigation management) were provided for irrigation systems serving over 3000 acres.

### **Research Activities; August 2006 – August 2008:**

The following are project summaries of District cooperatively funded agricultural research initiatives to develop and implement BMPs in the SPJC watersheds:

#### **Reduction of Water Use for Citrus Cold Protection**

Peace River Basin, Water Supply (90 percent), Water Quality (10 percent)

Cooperator: University of Florida; Completion report in progress.

Low volume irrigation is used by Florida citrus growers to conserve water and provide a more effective method of freeze protection. However, using irrigation for freeze protection requires timely decision making to avoid water reaching freezing temperature in the irrigation system piping. The purpose of this project is to develop site-specific methodology to accurately determine next-day minimum temperatures based on sunset temperatures the previous

evening. 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.

#### **Automated Citrus Irrigation Management to Reduce Water Consumption**

Peace River Basin, Water Supply (80 percent), Flood Protection (10 percent), Water Quality (10 percent)

Cooperator: University of Florida; Project in progress.

Agriculture is the largest permitted water use in the District, with citrus production accounting for over 336 mgd, located mostly in the SWUCA. The purpose of this project is to help citrus growers reduce their water use by developing and comparing improved irrigation scheduling tools for citrus production, particularly for automated systems. Where applicable, this project will build on past projects and use new technology to help reduce water and fertilizer use. The actual amount of water saved will depend on acres planted, climatic and growing conditions.

#### **Evaluation of Different On-Farm Blueberry Systems to Improve Irrigation Efficiency**

Peace River Basin, Water Supply (85 percent), Water Quality (15 percent)

Cooperator: University of Florida; Project in progress.

Due to market conditions and plant diseases, many central Florida producers have converted production acres to blueberries, a high value cash crop. However, the newer growers have little experience with blueberry irrigation and management options. This project will compare different irrigation management techniques under real production conditions to determine the most efficient method of blueberry irrigation. The project's results will be presented to growers during a field day.

#### **Citrus Irrigation Management to Increase Young Tree Growth & Productivity on Flatwoods Ridge Soils**

Peace River Basin partner funding, Water Supply (85 percent), Water Quality (15 percent)

Cooperator: University of Florida; Project in progress.

Due to citrus greening, canker, and labor issues, the industry is looking to the University to develop different techniques for economical production of citrus in Florida, including high density planting of smaller trees. This project will develop irrigation and nutrient management recommendations for this new method of production to help conserve water and reduce nutrient loading. The University will investigate and develop new cultural technology, including changes to plant density, nutrient, and irrigation management. 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.

#### **Research Activities; October 2004 – July 2006:**

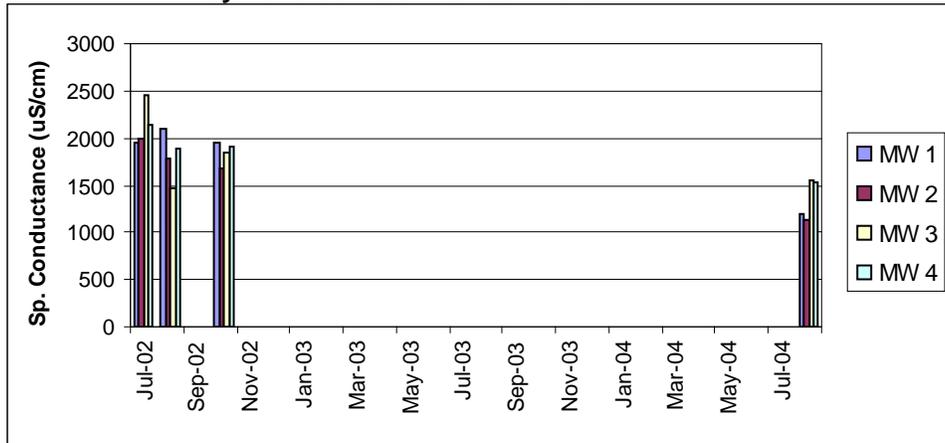
##### **Back-Plugging of Deep Irrigation Wells and the Effects on Salinity in Surficial Aquifer Wells; Symons Grove, DeSoto County, Florida**

A 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.

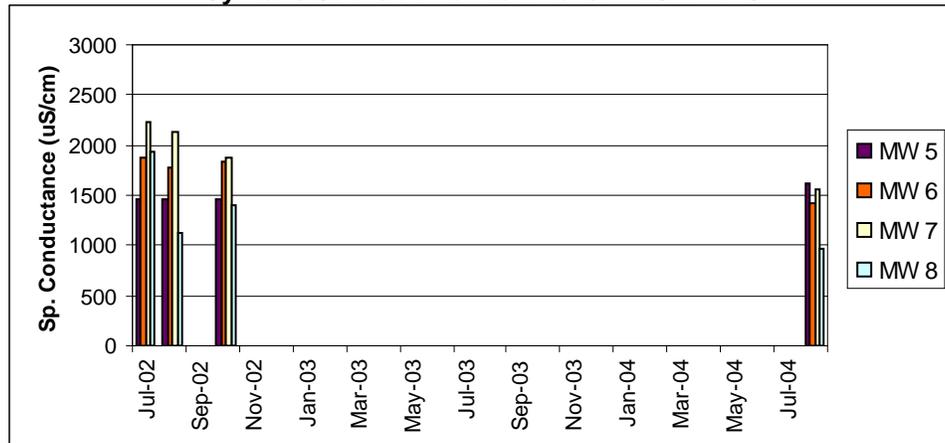
In 2002, 14 shallow monitor wells ranging in depth from about 12 to 20 feet were installed across the 450 acre property and configured for sampling at the water table. Two years later,

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. The study is ongoing, and beginning in 2007 the wells will be sampled on a quarterly frequency.

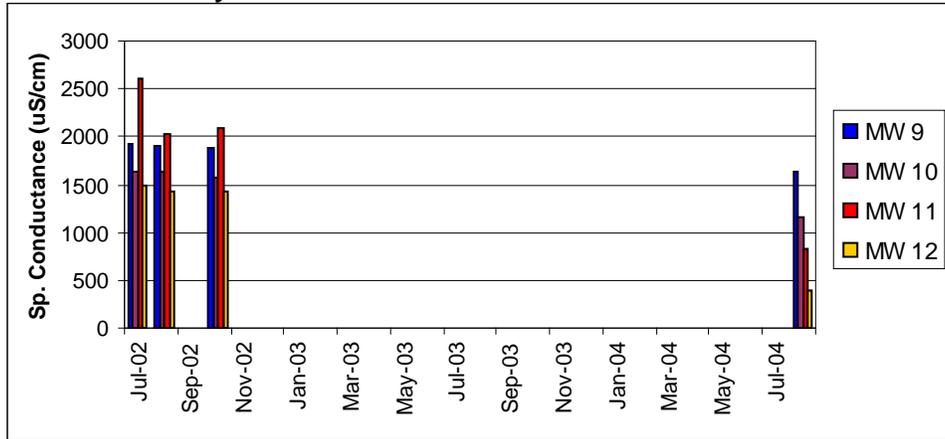
**Symons Surficial Monitor Wells MW1 – MW4**



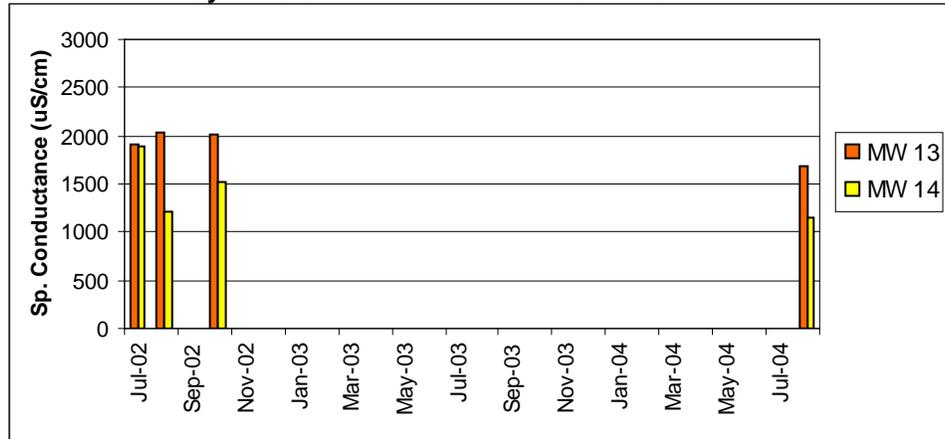
**Symons Surficial Monitor Wells MW5 – MW8**



**Symons Surficial Monitor Wells MW9 – MW12**



**Symons Surficial Monitor Wells MW13 – MW14**



The following are project summaries of completed District cooperatively funded agricultural research initiatives to develop and implement BMPs in the SPJC watersheds:

**Effects of Micro-Sprinkler Irrigation Coverage on Citrus Irrigation Management and Water Use**

Peace River Basin, Water Supply (90 percent), Water Quality (10 percent)

Cooperator: University of Florida; Completion report in progress.

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 systems design and management that will help growers conserve water in an area of water resource concerns. 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.

**Reduce Winter/Fall Citrus Irrigation**

Peace River Basin, Water Supply (80 percent), Water Quality (20 percent)

Cooperator: University of Florida; Project in progress.

Studies in Japan and Israel have indicated that timely water restriction to citrus trees will optimize fruit quality and result in water savings. The intent of this project is to study effects of limited water use by mature citrus during the fall and winter months for this region. The project will assist growers to conserve water in an area of water resource concerns. 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.

#### **Determining Water Use during Production of Select Tropical Foliage Plants**

Peace River Basin, Water Supply (85 percent), Water Quality (15 percent)

Cooperator: University of Florida; Project in progress.

Commercial greenhouse foliage crop production often involves high plant densities coupled with increased irrigation and fertilizer rates. Because of this, groundwater and stormwater runoff contamination from greenhouse production operations often occur. The project should be useful to more accurately determine evapotranspiration rates of several commonly grown foliage plants under commercial greenhouse conditions. Information will be used to assist growers in reducing water use and fertilizer losses.

#### **Blueberry Grower Irrigation Best Management Practices Demonstration**

Peace River Basin partner funding, Water Supply (100 percent)

Cooperator: University of Florida; Project in progress.

Blueberry production is trending upwards of approximate 400 percent by year 2008 due to conversion from citrus or other crops. Field conditions require pH amended (acidic) soils that are comprised mainly of tree bark mixed into the upper soil layer of a raised or mounded planting bed. Relatively little is known of water holding capacity, bulk density, and other characteristics of bark amended soils commonly in use. The demonstration project will function under actual field growing conditions and explore variations in management approaches to improve irrigation practices and update grower information.

#### **Water Budget & Irrigation for Mature Southern Highbush Blueberries**

Peace River Basin equal partner funding, Water Supply (90 percent), Water Quality (10 percent)

Cooperator: University of Florida; Project in progress.

Florida blueberry growers generally irrigate every two to three days during the growing season. Frequent irrigation is thought to be needed because the raised, bark-amended soil beds typically used for planting dry out rapidly due to exposure and limited water holding capacity in the effective root zone. The amount of water applied for each irrigation event may well be in excess of what is needed to adequately saturate the effective root zone. Comparisons will be made of plant growth and yield under "standard" and "reduced" irrigation rates to determine total water budget and crop coefficient.

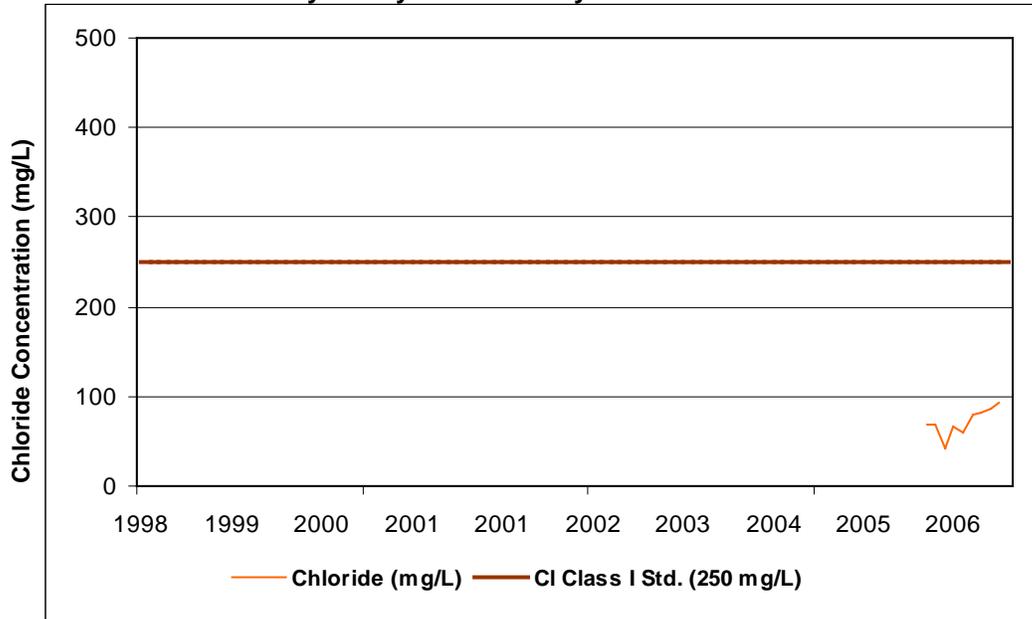
**Appendices  
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References**

## Appendix I

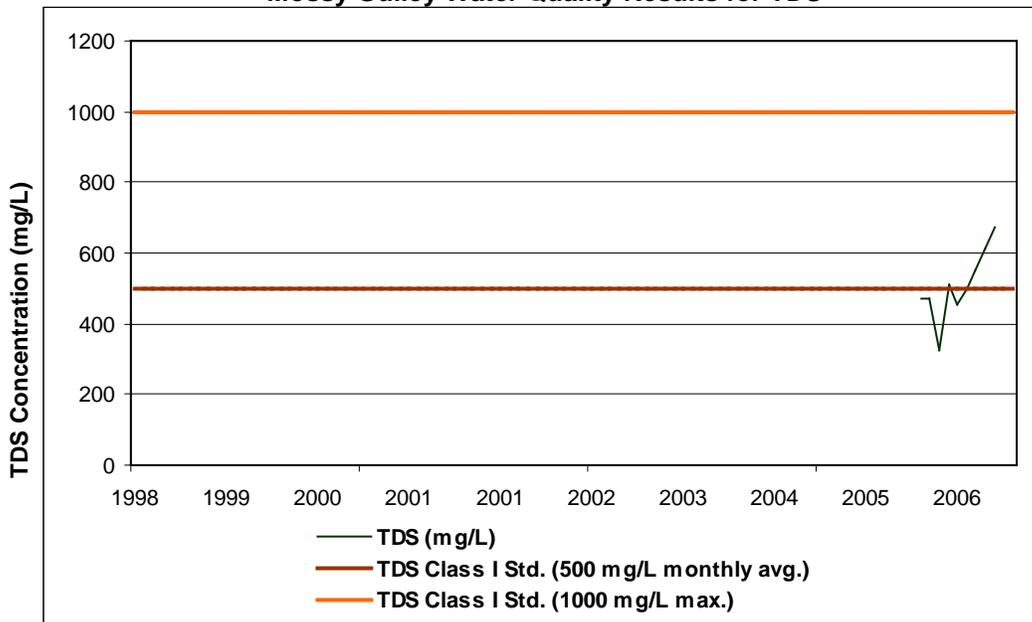
### Water Quality Results from In-Stream Data Collection for Specific Conductance at "Non-Key" Monitoring Locations

**WBID 1962**  
*Water Segment - Prairie Creek*  
*Prairie Creek Watershed*

#### Mossy Gulley Water Quality Results for Chloride



#### Mossy Gulley Water Quality Results for TDS

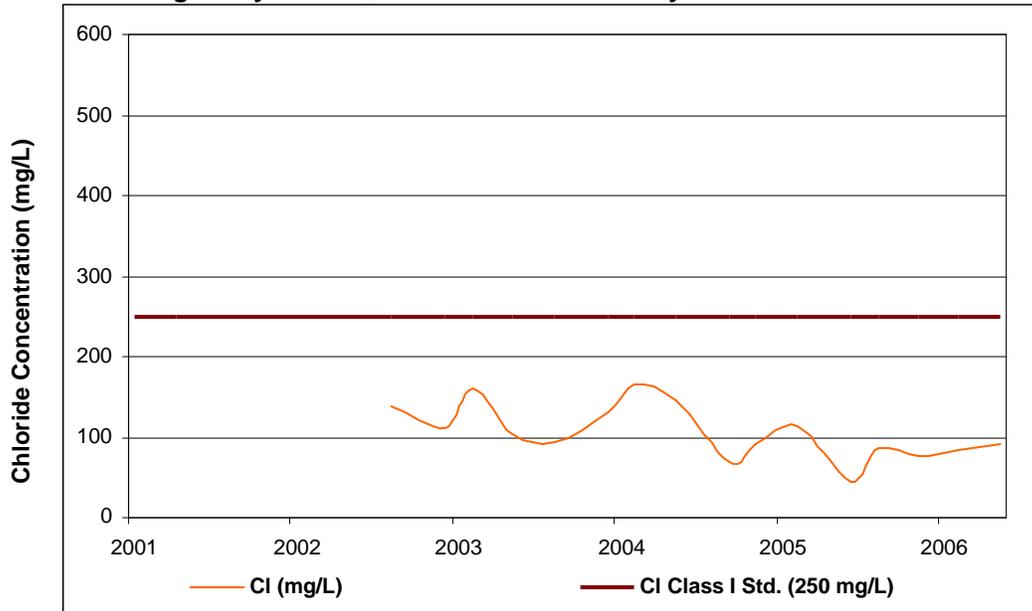


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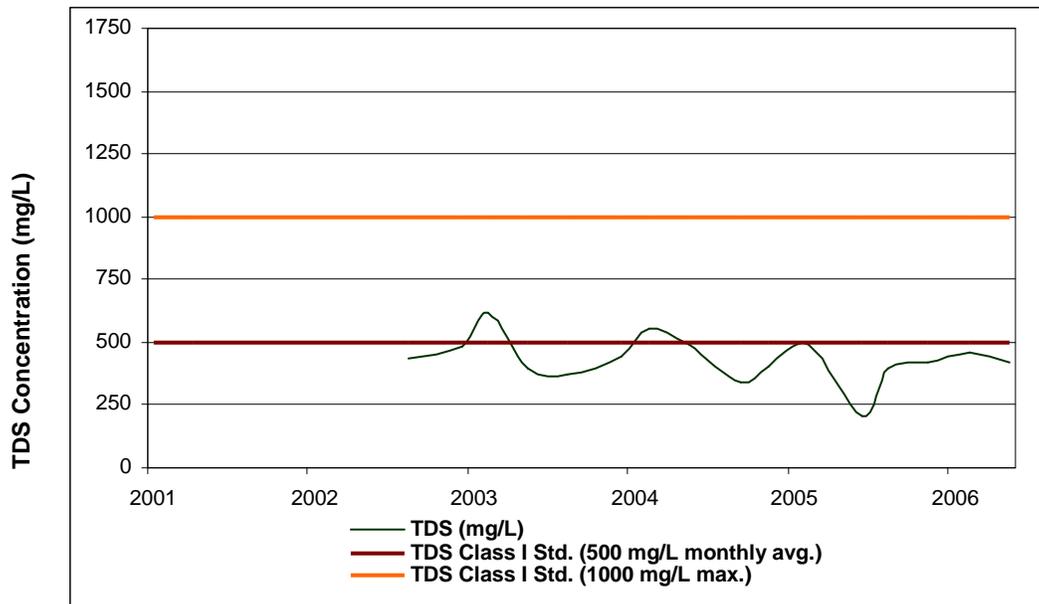
## WBID 1962

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

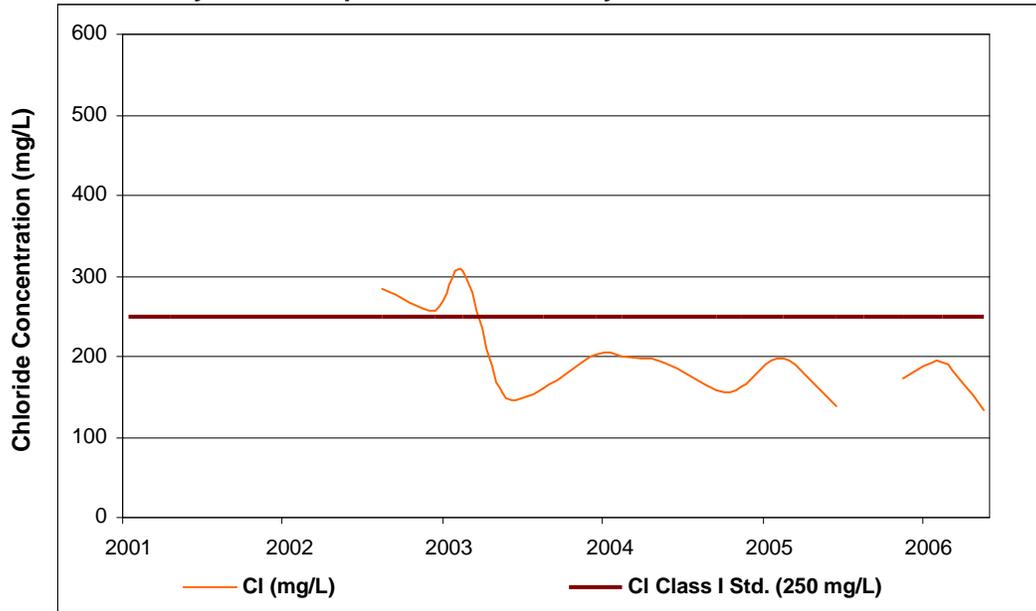


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**WBID 1962**

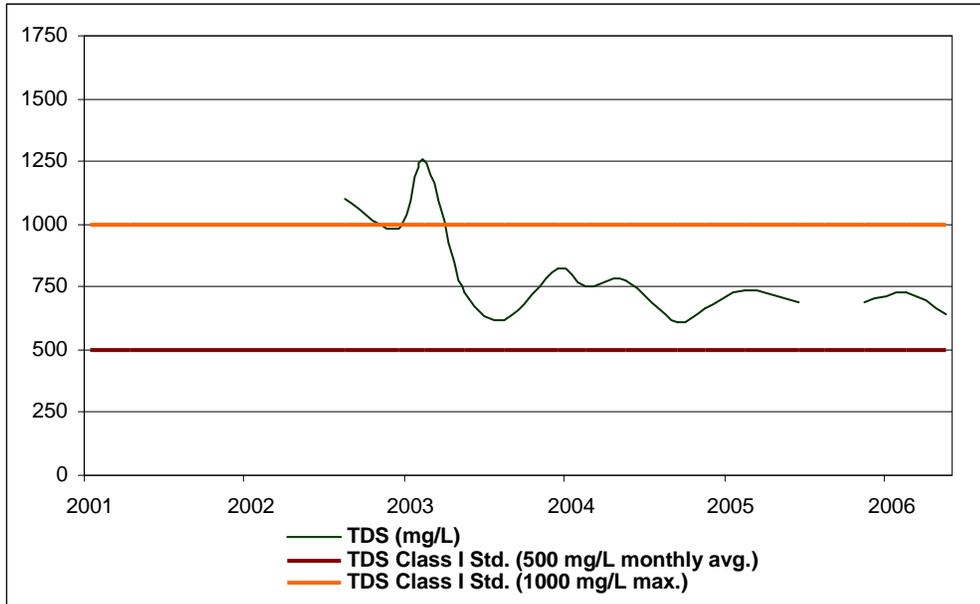
*Water Segment - Prairie Creek  
Prairie Creek Watershed*

**Symons Pump Canal Water Quality Results for Chloride**



**Symons Pump Canal Water Quality Results for TDS**

TDS Concentration (mg/L)

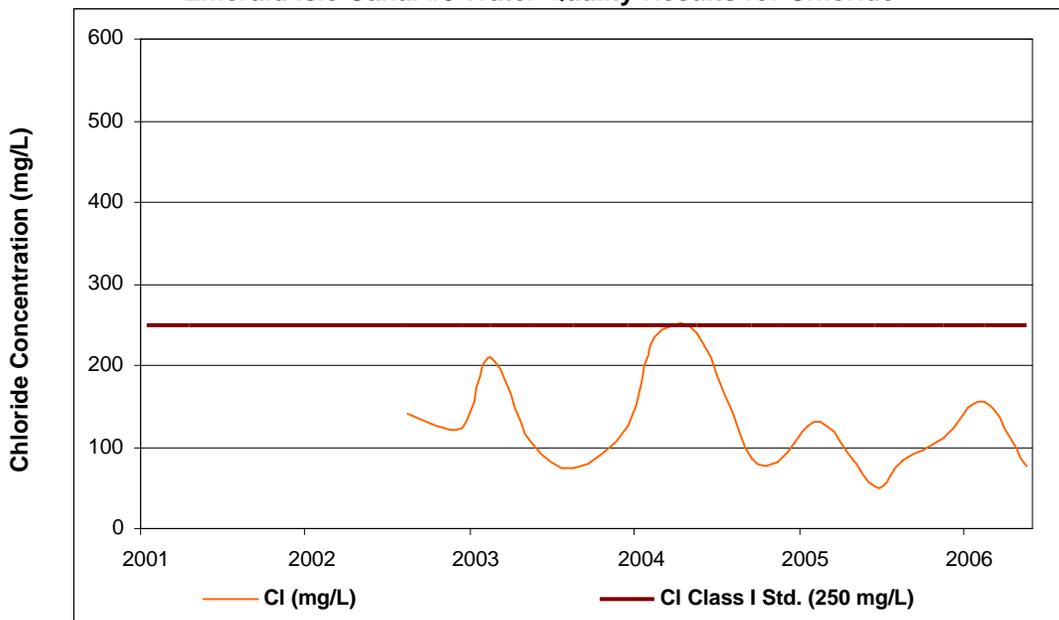


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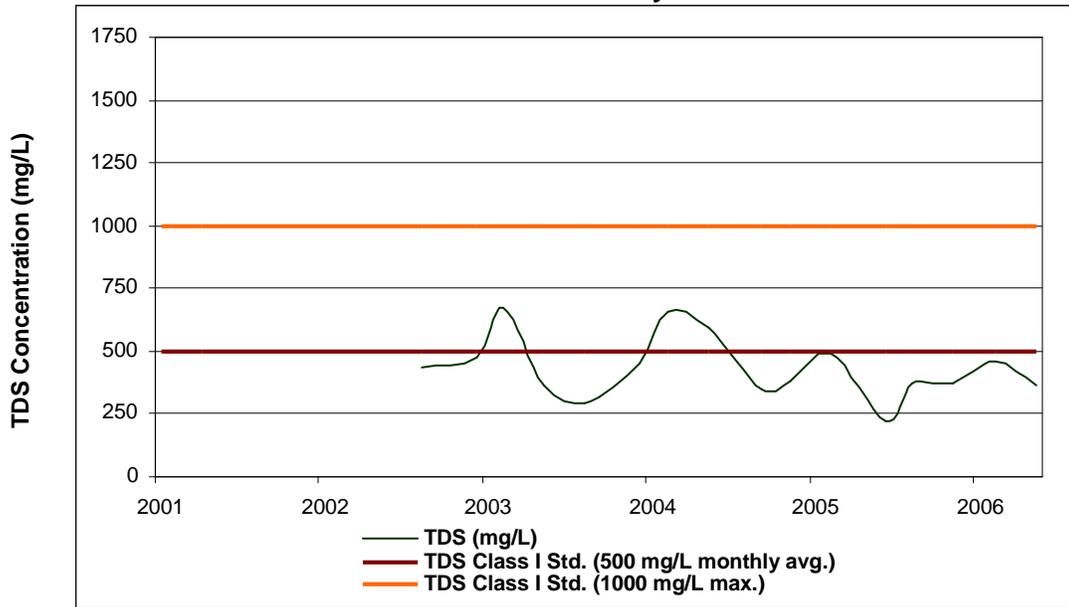
**WBID 1964**

*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

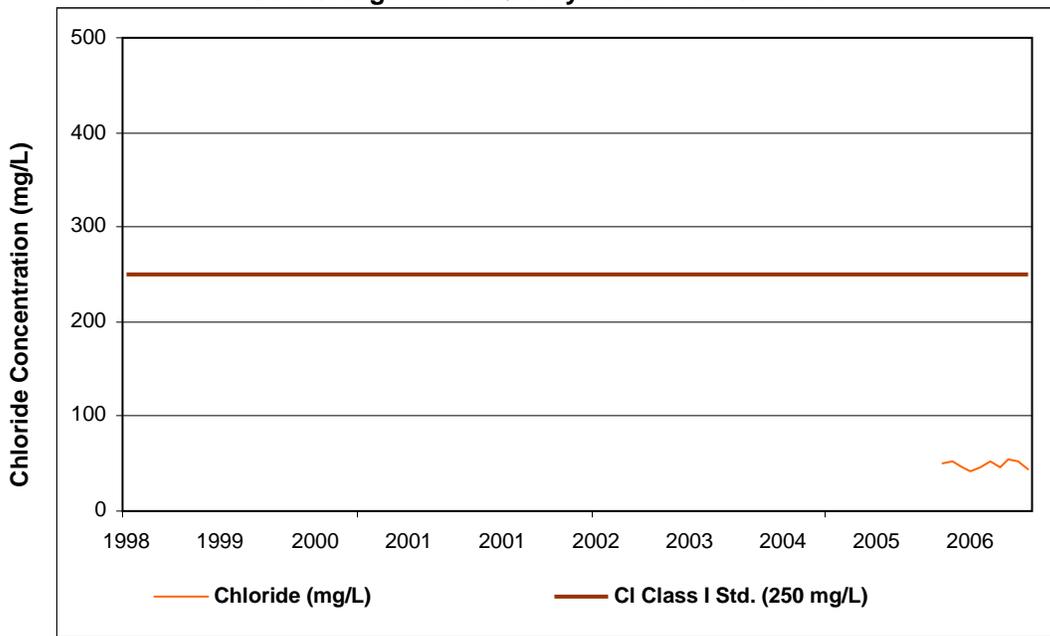


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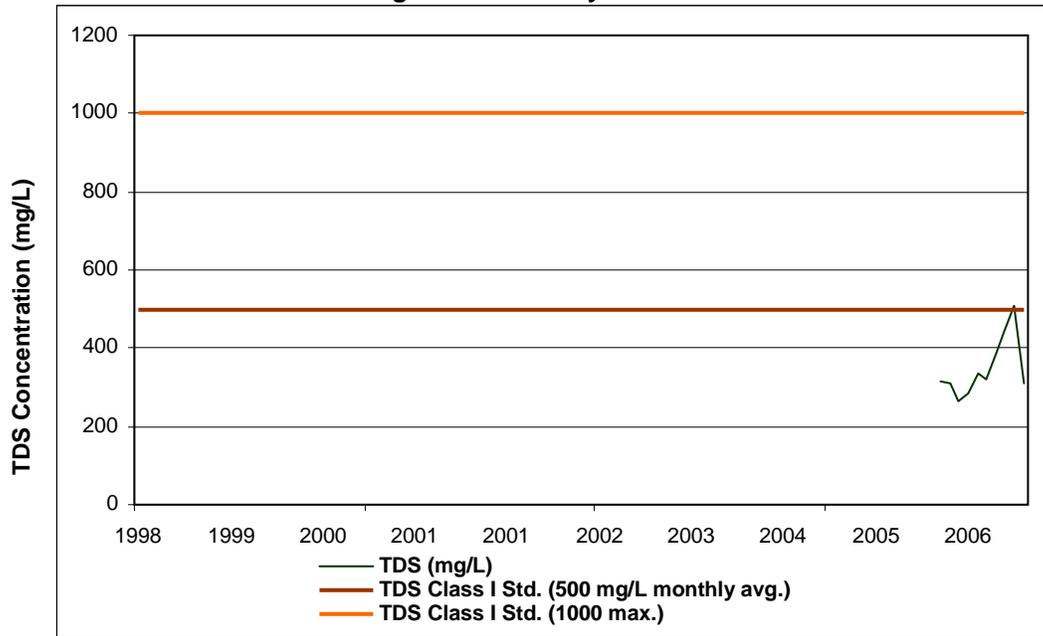
#### WBID 1964

*Water Segment – Cow Slough  
Prairie Creek Watershed*

### Cow Slough Water Quality Results for Chloride



### Cow Slough Water Quality Results for TDS

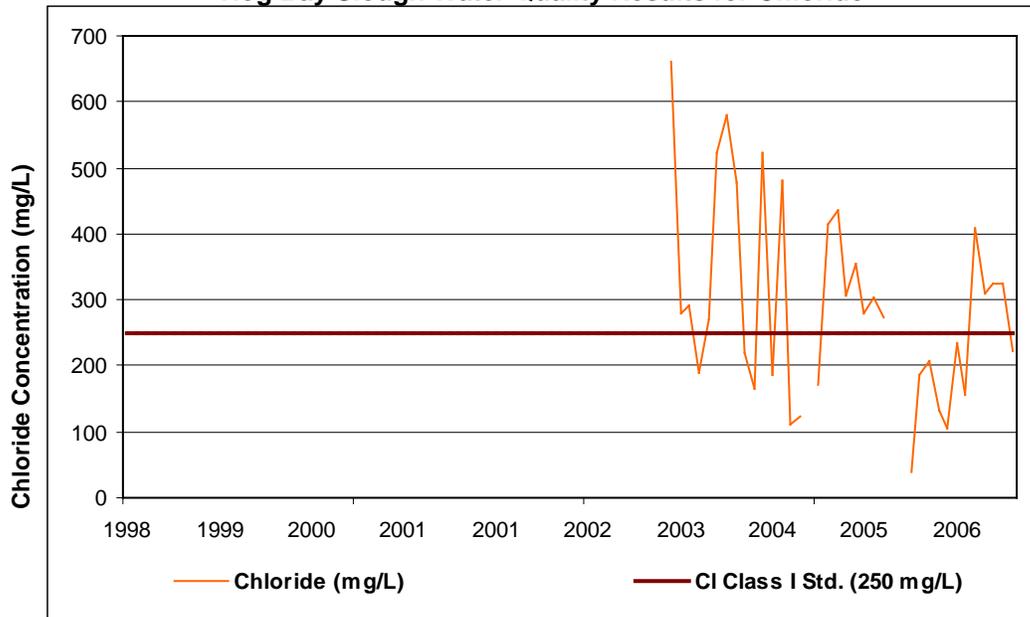


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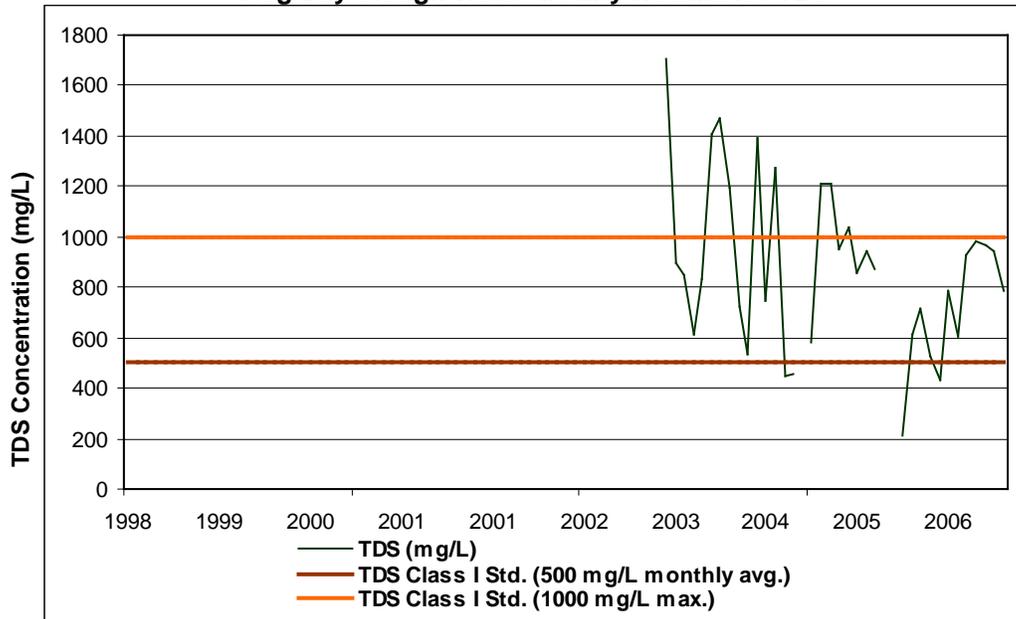
#### WBID 2001

*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**

#### **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.

### Appendix III

## Special Well Construction Stipulations - For Wells Located in the Shell, Prairie and Joshua Creek Watersheds

### 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, 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.	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.

### Appendix III

#### 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).

## Appendix IV

### Detailed Descriptions of FARMS Projects October 2004 – August 2008

#### WBID 1962

##### **Board Approved FARMS and/or EQIP Projects:**

WUP No. 20006765 – Phase I (FARMS and EQIP funded; property also falls within WBID 1995):

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 gallons per minute (gpm) surface water collection pump station, two 2,500 gpm irrigation pump stations, including filtration, and piping necessary to connect the proposed 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 358,009 gpd, or 160 percent of projected offset.

WUP No. 20006765 – Phase II (FARMS and EQIP funded; property also falls within WBID 1995):

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 proposed surface water reservoir system to the existing irrigation system. This project is expected to be operational in 2009.

WUP No. 20008348 (FARMS funded):

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 more than 123,000 gpd since that time, which is more than 170 percent of the projected groundwater offset.

WUP No. 20009127 (FARMS funded):

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 32,577 gpd, which is 208 percent of the projected offset.

WUP No. 20000153 (FARMS funded):

The purpose of the project is to reduce groundwater withdrawals using a system of solar powered field sensors and radio telemetry to monitor soil moisture and climate conditions at a 15-acre citrus grove within the Prairie Creek watershed (SPJC) in Charlotte County. Field environmental conditions can be monitored and recorded in real-time to enable the grower to

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optimize irrigation scheduling, improve crop yields and prevent over-watering. This project is under construction and is expected to be operational in 2010.

WUP No. 20002386 (property also falls within WBID 1964):

The purpose of the project is to reduce ground-water withdrawals from the heavily impacted 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 is expected to be operational in April 2009.

WUP No. 20003275 (property also falls within WBIDs 2040 and 2044):

The purpose of the project is to reduce groundwater withdrawals from one Upper Floridan aquifer well through the use of two existing in ground reservoirs as an irrigation source. The project also addresses water quality concerns by reducing the amount of mineralized ground water entering Prairie Creek. FARMS project components include a surface water pump station, the piping and infrastructure necessary to operate and connect the existing reservoirs into the irrigation system, and a pipe to interconnect the two reservoirs in order to maximize the availability of surface water for irrigation. The contract for this project is being developed at this time, and is expected to be operational in late 2010.

### **WBID 1962**

#### **FARMS Projects Currently Under Discussion:**

WUP No. 20010065:

FARMS staff have discussed the potential to cost-share soil moisture probes and automated pump controls on a citrus grove to reduce ground water withdrawals.

WUP No. 20006765 – Phase III (property also falls within WBIDs 1995);

The purpose of the project is to reduce groundwater withdrawals through development of an existing surface water supply to irrigate 470-acres of citrus in grove block 4, and cross-connect this to grove block 1, which is irrigated with surface water from the Phase 1 FARMS project. The project components are a surface water pump station, and mainline pipe and control accessories. The project is expected to be approved in August, 2009.

WUP No. 20003069 (property also falls within WBID 1995):

FARMS staff have discussed the excavation of a reservoir and use of surface water for citrus grove irrigation.

WUP No. 20009782 (this property also falls within WBID 1995):

FARMS staff have discussed the excavation of a reservoir and use of surface water for citrus grove irrigation.

WUP No. 200004641 (property also falls within WBID 1997):

FARMS staff have discussed potential projects with this property owner that could potentially offset 32,000 gpd of groundwater currently used for citrus irrigation.

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### **WBID 2040**

#### **Board Approved FARMS and/or EQIP Projects:**

WUP No. 20003530 (FARMS funded; property also falls within WBID 1964):

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 190,333 gpd, which is 133 percent of the projected offset.

WUP No. 20001759 (property also falls within WBID 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 228,352 gpd since that time.

WUP No. 20010726 (FARMS and EQIP funded):

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. Surface water use has averaged 45,746 gpd, however no groundwater has been used on the site since the system became operational. The low water use is due to averaging the water use over long periods of time that the fields lie fallow in order to avoid common diseases associated with melon production.

WUP No. 20009398 – Phase I (FARMS funded; property also falls within WBID 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 Phase 1 and 2 of this project has averaged 473,382 gpd. This is more than 250 percent above projected offsets.

WUP No. 20009398 – Phase II (FARMS funded; property also falls within WBID 2044):

The purpose of Phase 2 of this FARMS project is to further increase groundwater savings and irrigation conservation by adding components that compliment 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

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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 October 2003. Surface water use as a result of Phase 1 and 2 of this project has averaged 473,382 gpd. This is more than 250 percent above projected offsets.

WUP No. 20009398 – Phase III (FARMS funded; property also falls within WBID 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. A contract is under development for Phase III of this project, and is expected to be operational in 2010.

WUP No. 20009687 – Phase I (FARMS and EQIP funded; property also falls within WBID 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, 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 600,910 gpd, which is about 90 percent of the projected offset. However it is 100 percent of the irrigation applied to the site.

WUP No. 20009687 – Phase II (FARMS funded; property also falls within WBID 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 is under construction, and should be completed by August 2009.

WUP No. 20009052: (FARMS funded):

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 an 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 802,793 gpd, which is approximately 55 percent of the projected offset.

WUP No. 20003275 (FARMS funded; property also falls within WBIDs 1962 and 2044):

The purpose of the project is to reduce groundwater withdrawals from one Upper Floridan aquifer well through the use of two existing in ground reservoirs as an irrigation source. The project also addresses water quality concerns by reducing the amount of mineralized ground water entering Prairie Creek. FARMS project components include a surface water pump station, the piping and infrastructure necessary to operate and connect the existing reservoirs into the irrigation system, and a pipe to interconnect the two reservoirs in order to maximize the

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availability of surface water for irrigation. The contract for this project is being developed at this time, and is expected to be operational in late 2010.

### **WBID 2040**

#### **FARMS Projects Currently Under Discussion:**

WUP No. 20002689 (property also falls within WBID 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.

WUP No. 20009417 (property also falls within WBID 2041):

The purpose 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 is expected to be approved in 2009.

WUP No. 200013096 (property also falls within WBID 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 is expected to be approved in 2009.

WUP No. 20002588 (property also falls within WBID 2041):

FARMS staff discussed the excavation of a reservoir and use of surface water for sod and row crop irrigation.

### **WBID 2041**

#### **Board Approved FARMS and/or EQIP Projects:**

WUP No. 20009687 – Phase I (FARMS and EQIP funded; property also falls within WBID 2040):

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, 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 600,910 gpd, which is about 90 percent of the projected offset. However it is 100 percent of the irrigation applied to the site.

WUP No. 20009687 – Phase II (FARMS funded; property also falls within WBID 2040):

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 is under construction, and should be completed by August 2009.

WUP No. 20009476 – Original Project (FARMS funded; property also falls within WBID 2058):

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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 203,000 gpd or more than 149 percent of projected offset.

WUP No. 20009476 – Phase I of Second Project (FARMS funded; property also falls within WBID 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 should be operational in September 2008.

WUP No. 20009648 (FARMS and EQIP funded):

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 271,600 gpd or about 178 percent of expected offset.

WUP No. 20001759 (property also falls within WBID 2040 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 228,352 gpd since that time.

### **WBID 2041**

#### **FARMS Projects Currently Under Discussion:**

No WUP Associated with this Project (property also falls within WBID 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 withdrawal water directly from Shell Creek. This project is under construction, and should be operational in August 2009.

WUP No. 20010959:

FARMS Staff discussed the excavation of two to three, five acre reservoirs that might replace the groundwater on site.

WUP No. 20002588: (property also falls within WBID 2040):

FARMS staff discussed the excavation of a reservoir and use of surface water for sod and row crop irrigation.

WUP No. 20009476 – Phase II of Second Project (FARMS funded; property also falls within WBID 2058):

The purpose of the project is to reduce Intermediate aquifer withdrawals of highly mineralized groundwater by the alternative use of a large surface water reservoir proposed to irrigate a 668-acre citrus grove, Project components consist of three separate pumping stations, controls,

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filtration, and mainline pipe necessary to connect to the existing grove irrigation system. This project is expected to be approved in October, 2008.

WUP No. 20002689 (property also falls within WBID 2040):

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.

WUP No. 200013096 (property also falls within WBID 2040):

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 is expected to be approved in 2009.

WUP No. 20009417 (property also falls within WBID 2040):

The purpose 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. It is expected that this project will be approved in 2009.

WUP No. 20009727 (property also falls within WBID 2044):

The purpose of the project is twofold: to reduce surface water withdrawals from the Prairie Creek property; and to reduce Upper Floridan aquifer withdrawals at the Shell Creek property. Both goals are to be accomplished through the installation of solar-powered field sensors and radio telemetry systems that are uplinked to the Internet to monitor citrus grove water requirements and optimize irrigation scheduling. The project is comprised of a weather station at each grove site, with one soil moisture sensor for the Prairie Creek grove, and three sensors at the Shell Creek grove. This project is expected to be approved in 2009.

WUP 20002589;

FARMS Staff have been discussing an irrigation system conversion with this grower to improve irrigation efficiency and reduce groundwater use.

### **WBID 2041B**

#### **Board Approved FARMS and/or EQIP Projects:**

There are currently no Board Approved FARMS/EQIP projects in WBID 2041B.

### **WBID 2041B**

#### **FARMS Project Currently Under Discussion:**

No WUP Associated with this Project (property also falls within WBID 2041):

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 withdrawal water directly from Shell Creek. This project is under construction

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### **WBID 2044**

#### **Board Approved FARMS and/or EQIP Projects:**

##### WUP No. 20009398 – Phase I (FARMS funded; property also falls within WBID 2040):

The primary goal of this project is to reduce groundwater withdrawals on a citrus grove through precision irrigation controls and surface water. Project components include six pressure-sustaining valves for each of the existing surface water pumps, an upgrade to the irrigation pump control system, a weather station, and ten soil moisture sensor stations. The Phase I project is complete and has been operational since October 2003 and had offset approximately 570,191 gpd of groundwater with surface water for irrigation. The projected offset for Phase I was 120,700 gpd.

##### WUP No. 20009398 – Phase II (FARMS funded; property also falls within WBID 2040):

The primary goal of Phase II of this FARMS project is to further increase groundwater savings and irrigation conservation on the citrus grove by adding components that compliment 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 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 water control structures to enhance irrigation water management, and a conductance meter to accurately monitor onsite water quality. Phase II has been operation since August 2005 and the combined offset is averaging 502,188 gpd. The combined projected offset is 181,000 gpd.

##### WUP No. 20009398 – Phase III (FARMS funded; property also falls within WBID 2040):

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. A contract is under development for Phase III of this project, and is expected to be operational in 2010.

##### WUP No. 20003275 (property also falls within WBIDs 1962 and 2040):

The purpose of the project is to reduce groundwater withdrawals from one Upper Floridan aquifer well through the use of two existing in ground reservoirs as an irrigation source. The project also addresses water quality concerns by reducing the amount of mineralized ground water entering Prairie Creek. FARMS project components include a surface water pump station, the piping and infrastructure necessary to operate and connect the existing reservoirs into the irrigation system, and a pipe to interconnect the two reservoirs in order to maximize the availability of surface water for irrigation. The contract for this project is being developed at this time, and is expected to be operational in late 2010.

##### WUP No. 20001759 (property also falls within WBID 2040 and 2041):

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 228,352 gpd since that time.

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### **WBID 2044**

#### **FARMS Projects Currently Under Discussion:**

WUP No. 20009727 (property also falls within WBID 2041):

The purpose of the project is twofold: to reduce surface water withdrawals from the Prairie Creek property; and to reduce Upper Floridan aquifer withdrawals at the Shell Creek property. Both goals are to be accomplished through the installation of solar-powered field sensors and radio telemetry systems that are uplinked to the Internet to monitor citrus grove water requirements and optimize irrigation scheduling. The project is comprised of a weather station at each grove site, with one soil moisture sensor for the Prairie Creek grove, and three sensors at the Shell Creek grove. This project is expected to be approved in 2009.

### **WBID 2058**

#### **Board Approved FARMS and/or EQIP Projects:**

WUP No. 20009476 – Original Project (FARMS funded; property also falls within WBID 2041):

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 203,000 gpd or more than 149 percent of projected offset.

WUP No. 20009476 – Phase I of Second Project (FARMS funded; property also falls within WBID 2041):

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 should be operational in September 2008.

### **WBID 2058**

#### **FARMS Projects Currently Under Discussion:**

WUP No. 20009476 – Phase II of Second Project (FARMS funded; property also falls within WBID 2041):

The purpose of the project is to reduce Intermediate aquifer withdrawals of highly mineralized groundwater by the alternative use of a large surface water reservoir proposed to irrigate a 668-acre citrus grove. Project components consist of three separate pumping stations, controls, filtration, and mainline pipe necessary to connect to the existing grove irrigation system. This project is expected to be approved in October, 2008.

### **WBID 1964**

#### **Board Approved FARMS and/or EQIP Projects:**

WUP No. 20002386 (FARMS funded; property also falls within WBID 1962):

The purpose of the project is to reduce ground-water withdrawals from the heavily impacted 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 is expected to become operational in April, 2009.

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WUP No. 20003530 (FARMS funded; property also falls within WBID 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 190,333 gpd, which is 133 percent of the projected offset.

### **WBID 1964**

#### **FARMS Projects Currently Under Discussion:**

WUP No. 20006872:

FARMS staff are discussing groundwater offset projects for a citrus grove.

### **WBID 1995**

#### **Board Approved FARMS and/or EQIP Projects:**

WUP No. 20012818 (FARMS funded):

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 189,959 gpd since operation began.

WUP 20002418, 20012818, 20009716 (FARMS funded; property also falls within WBIDs 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 is under construction, and is expected to be operational in 2009.

WUP No. 20006765 – Phase I (FARMS and EQIP funded; property also falls within WBID 1962):

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 gallons per minute (gpm) surface water collection pump station, two 2,500 gpm irrigation pump stations, including filtration, and piping necessary to connect the proposed tailwater interception and surface water

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reservoir system to the existing irrigation system. Project has been operational since August, 2006 and has offset an average of 358,009 gpd, or 160 percent of projected offset.

WUP No. 20006765 – Phase II (FARMS and EQIP funded; property also falls within WBID 1962):

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 proposed surface water reservoir system to the existing irrigation system. This project is expected to be operational in 2009.

### **WBID 1995**

#### **FARMS Projects Currently Under Discussion:**

WUP No. 20008287:

The purpose of the project is to reduce Upper Floridan aquifer withdrawals through the installation of a solar-powered field sensor and radio telemetry system uplinked to the Internet to monitor irrigation requirements for two citrus groves and optimize irrigation scheduling. The project is comprised of a weather station at both grove sites, with three soil moisture sensors for the Desoto County grove, and one soil moisture sensor for the Hardee County grove. The contract for this project is being developed at this time.

WUP No. 20006765 – Phase III (property also falls within WBID 1962):

The purpose of the project is to reduce groundwater withdrawals through development of an existing surface water supply to irrigate 470 acres of citrus in grove block 4, and cross-connect this to grove block 1, which is irrigated with surface water from the Phase 1 FARMS project. The project components are a surface water pump station, and mainline pipe and control accessories. The project is expected to be approved in August, 2009.

WUP No. 20003069 (property also falls within WBID 1962):

FARMS staff have discussed the excavation of a reservoir and use of surface water for citrus grove irrigation.

WUP No. 20009782 (this property also falls within WBID 1962):

FARMS staff have discussed the excavation of a reservoir and use of surface water for citrus grove irrigation.

### **WBID 1974**

#### **Board Approved FARMS and/or EQIP Projects:**

WUP No. 20001391:

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 is expected to be approved in February 2009.

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### **WBID 1997**

#### **Board Approved FARMS and/or EQIP Projects:**

WUP 20002418, 20012818, 20009716 (this property also falls within WBIDs 1995 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 is under construction, and is expected to be operational in 2009.

WUP No. 20002418 (FARMS funded; property also falls within WBIDs 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 77,007 gpd since that time.

WUP No. 200013225 (FARMS and EQIP funded):

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 should be operational in 2009.

### **WBID 1997**

#### **FARMS Projects Currently Under Discussion:**

WUP No. 200004641 (property also falls within WBID 1962):

FARMS staff have discussed potential projects with this property owner that could potentially offset 32,000 gpd of groundwater currently used for citrus irrigation.

### **WBID 2001**

#### **Board Approved FARMS and/or EQIP Projects:**

WUP No. 20006669 Phase I (FARMS funded):

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 111,295 gpd. This average is below the projected offset of 170,900 gpd.

WUP No. 20009716 (FARMS and EQIP funded):

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

## Appendix IV

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 met or exceeded projected offset since that time.

WUP No. 20002418 (FARMS and EQIP funded, property also falls within WBIDs 1997):

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 77,007 gpd since that time.

WUP 20002418, 20012818, 20009716 (property also falls within WBIDs 1995 and 1997):

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 is under construction, and is expected to be operational in 2009.

### **WBID 2001**

#### **FARMS Projects Currently Under Discussion:**

WUP No. 20006669 – Phase II:

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 should be approved in December 2008.

## Appendix V

### Media Coverage and Education and Outreach Activities in the SPJC Watersheds

#### Media Coverage (October 2004 – August 2008)

Title	Outlet	Date
<i>Southwest Florida WMD Report</i>	FloridAgriculture	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 &amp; 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

## Appendix V

### Outreach and Education (October 2004 – August 2008)

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

*(Table continued  
on next page)*

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Event	Date
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

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- Southwest Florida Water Management District; Aug. 2009; Water Quality Monitoring Program Standard Operating Procedures; Tampa, Florida.
- Southwest Florida Water Management District; Dec. 2006; Regional Water Supply Plan; Brooksville, Florida.
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- American Public Health Association; 1995; Standard Methods for the Examination of Water and Wastewater; 19<sup>th</sup> Edition.
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