Shell Creek and Prairie Creek Watersheds Management Plan

Performance Monitoring Summary for time period October 2004 – July 2006

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

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Performance Monitoring Summary for time period October 2004 – July 2006

Prepared by:

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

Acknowledgements

The information contained in this 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 Conservation and Data 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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Performance Monitoring Summary

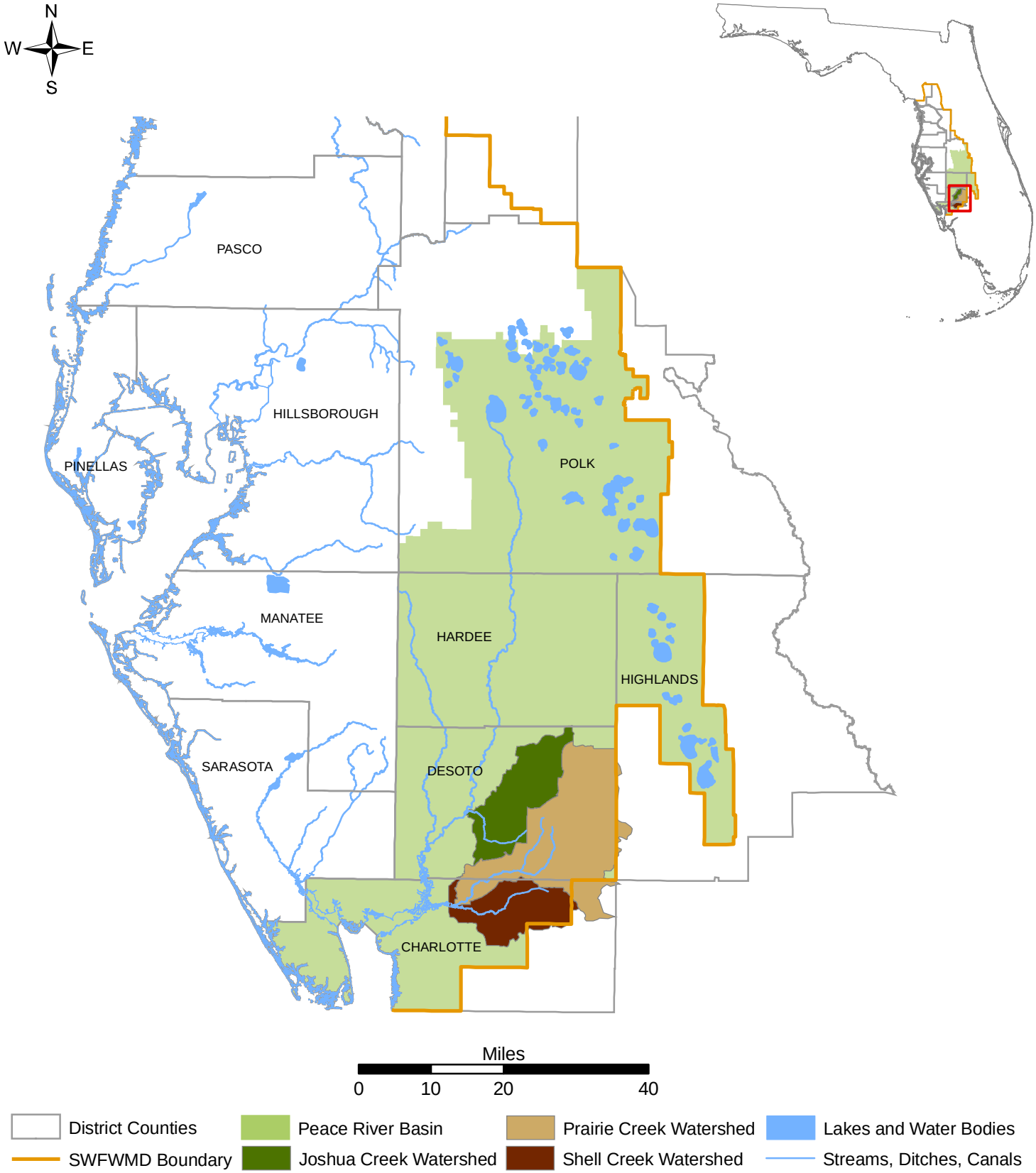
Purpose of Document
The purpose of this document is to provide a summary of performance monitoring results which are directly related to the management actions specified in the Shell Creek and Prairie Creek Watersheds Management Plan (SPCWMP) Reasonable Assurance document (SWFWMD, 2004). The SPCWMP Reasonable 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 in June 2005.

The reporting time period for this Performance Monitoring Summary document is October 2004 through July 2006. 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 of 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.

Figure1. Location of the Shell, Prairie, and Joshua Creek Watersheds



This Performance Monitoring Summary addresses the water segments listed 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

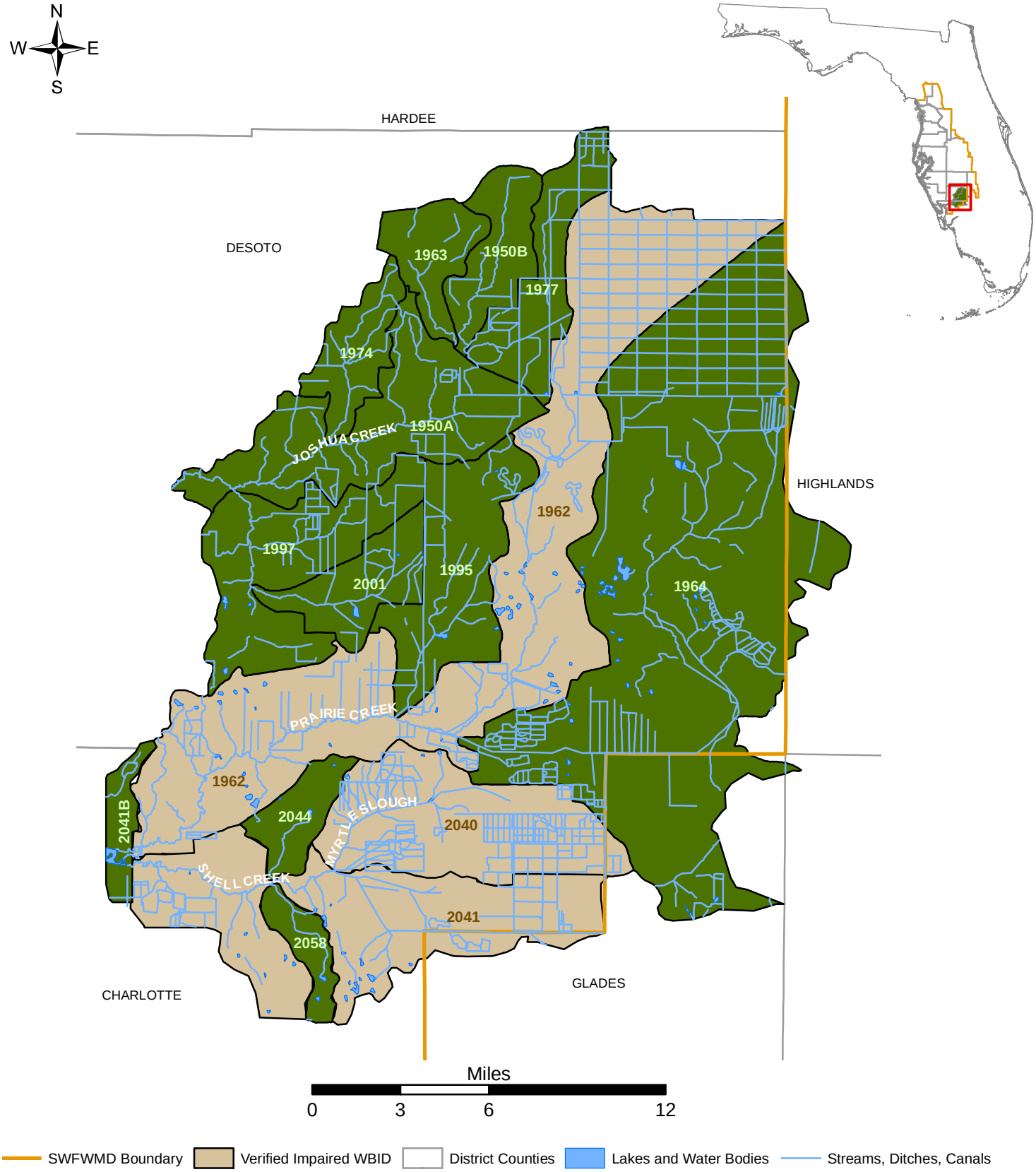
The performance monitoring results presented in this document will be prioritized by the verified impaired waterbody IDs (WBIDs) as listed above. However, the stakeholders group considers the entire area of the Shell, Prairie, and Joshua Creeks potentially impaired, therefore performance-monitoring results will also be presented for the 13 water bodies listed below. These 13 water bodies currently do not have a sufficient data record to allow for assessment of impairment for chloride, TDS, and specific conductance under the IWR. However, reasonable data exist, such as well water quality data, and short-term surface-water quality data that indicate these WBIDs need to be included within the SPCWMP Reasonable Assurance document. Therefore, the proposed management actions specified in the SPCWMP Reasonable Assurance document are 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

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



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 historical data sources through February 2004. The following table shows the median percent reduction goals established by FDEP in February 2004, as well as the median percent reductions observed since the FDEP assessment (March 2004 to July 2006). These figures are calculated by determining the percent reduction needed to meet the water quality goals of 250 mg/l chloride (at all times), 1000 mg/l TDS (at all times) and 500 mg/l TDS (as a monthly average) based upon 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 to determine exceedances above the 500 mg/L criteria.

Determining the current progress to date toward achieving the concentration reduction goals established by the FDEP is not possible at this time because the initial percent reduction calculations were based on over 20 years of historical data, while the current percent reduction calculations were determined using data from a recent 16-month time frame. As subsequent Performance Monitoring Summary documents are produced, a more reasonable assessment of progress can be accomplished as each two-year reporting period is compared to the FDEP percent reduction goals. The remainder of this document specifically addresses the 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 at all times[a]	TDS - 500 mg/L at all times[a,c]	TDS - 1000 mg/L at all times[b]	TDS - 1000 mg/L at all times[b]	Chloride - 250 mg/L at all times[b]	Chloride - 250 mg/L at all times[b]
	from RA Plan thru 2/2004	from 3/2004 to 7/2006 analysis	from RA Plan thru 2/2004	from 3/2004 to 7/2006 analysis	from RA Plan thru 2/2004	from 3/2004 to 7/2006 analysis
WBID 1962						
Prairie Creek at Washington Loop Rd.	25.6%	8.5%	10.2%	0.0%	Not Impaired	No values exceed criteria
Prairie Creek near Ft. Ogden (SR 31)	32.6%	7.9%	29.3%	0.0%	Not Impaired	No values exceed criteria
WBID 2041						
Shell Creek at Washington Loop Rd.	28.8%	15.9%	5.4%	11.6%	19.7%	12.0%
Shell Creek at SR 31	24.8%	12.4%	10.4%	29.8%	29.3%	26.4%
WBID 2040						
Myrtle Slough at SR 31	43.4%	33.1%	16.5%	1.5%	34.6%	16.1%

[a] Median of individual percent reductions needed to meet Class I criteria of 500 mg/L
[b] Median of individual percent reductions needed to meet Class I criteria of 250 mg/L
[c] Some values reported as field measured or field calculated

Resource Management Actions and Progress to Date

The following table shows the number and/or progress of Resource Management Actions that have been initiated in the SPJC Watersheds during the October 2004 to July 2006 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. The progress of Management Actions for each specific SPJC WBID is 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	Progress Oct. 2004 to July 2006		Result
Shell, Prairie, and Joshua Creek (SPJC) Well Back-Plugging Program	Number Wells Back-Plugged		Improves water quality at source of mineralized water. Highly effective with documented program success. Provides economic incentive to growers to improve crop production.
	Before Oct. 2004	After Oct. 2004	
	36	4	
SWFWMD Resource Regulation Well Construction and Water-Use Permitting (WUP)	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 applications.
	10		
Facilitating Agricultural Resource Management Systems (FARMS) Program	Number FARMS/EQUIP 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	
	20	19	
Environmental Quality Incentives Program (EQIP)	Number EQIP Projects		Focuses on key agricultural management activities to improve environmental conditions.
	See Above		
Peace River Valley/Manasota Citrus Best Management Practices	Not Quantitative See Regional Section		Highly effective as applied to nutrient management issues.
Regional Water Supply Plan and SWUCA Recovery Strategy	Not Quantitative See Regional Section		Significant over long-term (20 years) due to anticipated reduction in overall water use (with correspondent reduction in poor water quality use). Significant funding committed over long-term.
Quality of Water Improvement Program (QWIP)	Number Wells Plugged/Abandoned		Very effective as wells are available for complete abandonment.
	2		
Land Acquisition	Total Acres Acquired Historically through July 2006		Has the potential for a much greater percent effectiveness. Time frame for land acquisition is undetermined.
	39,000		
Mobile Irrigation Laboratory	Sites Visited	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).
	22	2468	
Education and Outreach	Media Coverage Items	No. Outreach Events Attended	Effective in promoting awareness of issue and advertising incentive programs available. Important element to maintain funding levels.
	17	47	
Research Efforts	Number Projects Funded		Effective in continual assessment of water quality problems to focus management actions for greatest effectiveness.
	6		

*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 reasonable progress toward water quality improvements within the SPJC watersheds. Data results from these monitoring networks have been used extensively in this Performance Monitoring Summary. A description for each of the water quality monitoring networks is given below:

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® 600XLM data sondes deployed in fifteen stream and canal systems throughout the SPJC watersheds. 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 will 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
Water quality data collected from agricultural Water-Use-Permit (WUP) wells allows project managers to determine which wells in the SPJC watersheds exhibit poor water quality (e.g. elevated levels of specific conductivity, 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 dependant on what areas have been selected for further investigation. Approximately 108 wells were sampled as part of the back-plug network during 2002-2003, and an additional 121 wells have been sampled for this effort in 2004-2006. 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, three of the wells in the original network are no longer sampled and not included in this report. One well has been added to the network bringing the current number of post back-plugged wells that are monitored on a quarterly frequency to thirteen. Additional wells may be added in the future.

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 5.38 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-Punta Gorda 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, but in the past have been monitored on a more frequent basis (bi-weekly) based on climatic conditions. 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 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 Nutrient Assessment 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 wells 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. Data from the City's monitoring networks are also to the Florida STORET database for use in TMDL/IWR water quality assessments.

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 at the FDEP-Punta Gorda office 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.

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 203 wells (District-wide) in the CGWQMN are sampled once each year during the months of December, January, February, and March. Of these 203 wells, 16 are located within the SPJC watersheds. A sub-network consisting of 71 wells (which were chosen from the original list of 203 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 the District monitoring networks listed in the previous section has a State-approved Quality Assurance Plan on file (#870100-G), 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 Resource Data Section is responsible for collecting all District ground and surface-water quality field parameters and samples. This section 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-Punta Gorda 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 will be addressed in a separate tabulated section.

The reporting time period for this Performance Monitoring Summary document is October 2004 through July 2006. 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 an 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.

Precipitation Totals in the SPJC Watersheds

During the reporting time period for this Performance Monitoring Summary (October 2004 through July 2006) rainfall deficits occurred throughout both wet and dry season time frames in central Florida, particularly during the spring and summer months of 2006.

The following graph represents rainfall total comparisons for 2004 through 2006. Since the reporting period for this document ended in July 2006, rainfall totals from only January through July of each year have been tabulated. Data for these gage sites were obtained from District Supervisory Control and Data Acquisition rain gage stations and were used to determine precipitation totals throughout the SPJC Watersheds. These rain gage sites were selected based on those with closest proximity to SPJC water quality monitoring locations (Figure 3).

Approximately 50 percent less rainfall was reported for January through July 2006 when compared to the same time period for 2005, and roughly 20 to 30 percent less precipitation fell when the majority of 2006 totals are compared to 2004 totals. Rainfall amounts have a direct influence on water quality in the receiving surface waters of agricultural run-off areas, especially

when mineralized ground water is the resource used for these irrigation practices. In addition, lower rainfall amounts not only cause increases in irrigation practices, but also reduce the dilution of run-off when mineralized Floridan aquifer ground water reaches urface water systems via direct run-off and/or leaching of soils. These rainfall deficits are apparent at some monitoring locations when reviewing the water quality data results contained in the following tabulated sections, specifically during the spring of 2006, and at key monitoring locations during the 2006 summer months.

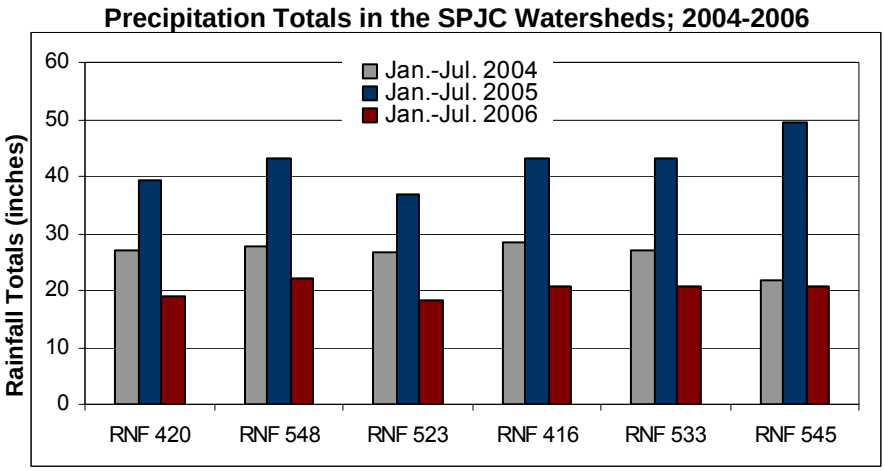
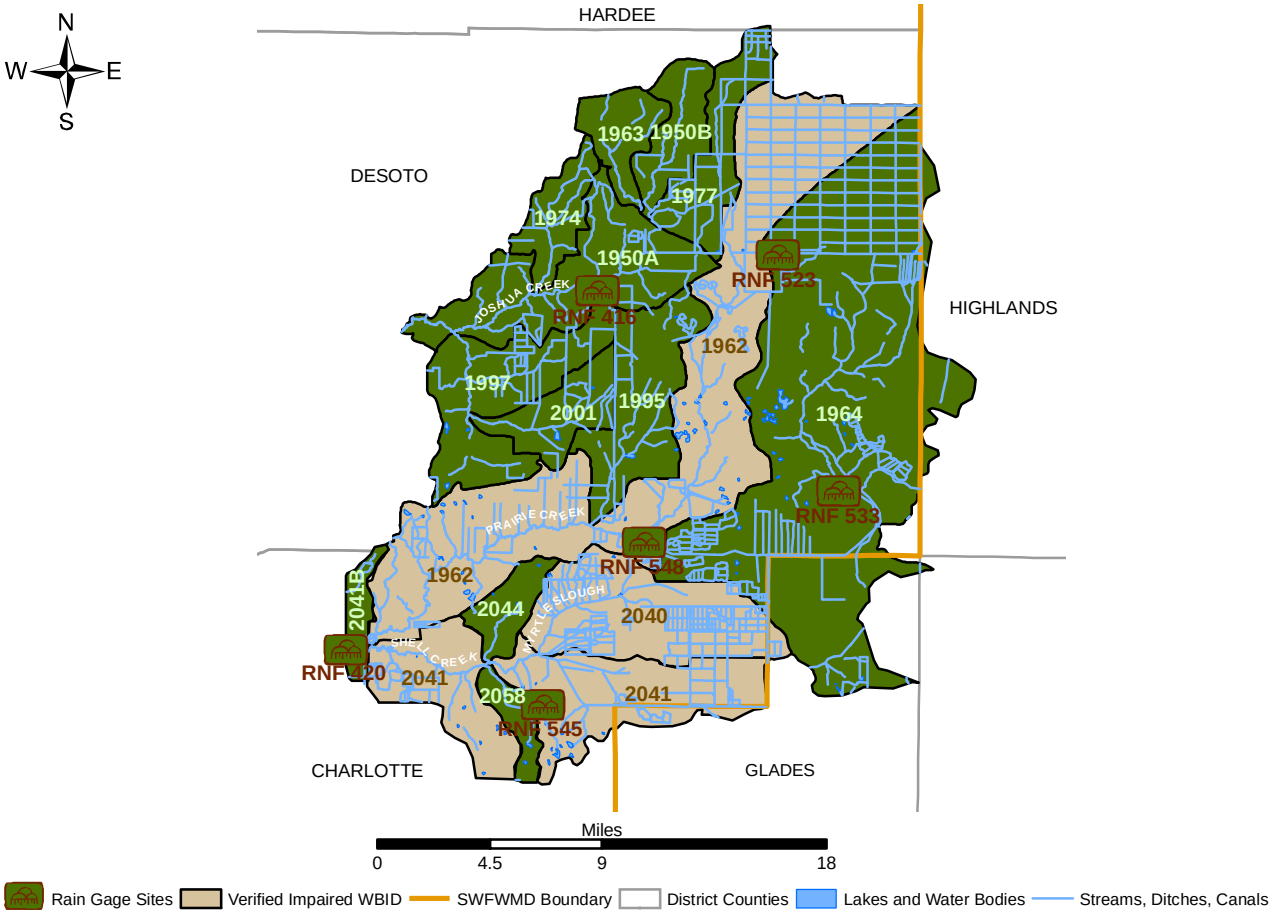


Figure 3. Select Rain Gage Sites within the Shell, Prairie, and Joshua Creek Watersheds



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 will be performed to establish monitoring sites in each of the water segments listed below. Site accessibility will determine the type, and frequency, of water quality data collection.

Water Segments in the SPJC Requiring Water Quality Data Collection Efforts

Water Segment	FDEP WBID	Water Body Type	Basin / Watershed
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

WBID 1962

Water Segment - Prairie Creek

Prairie Creek Watershed; Water Use - Class I

Verified Impaired Pollutants of Concern:

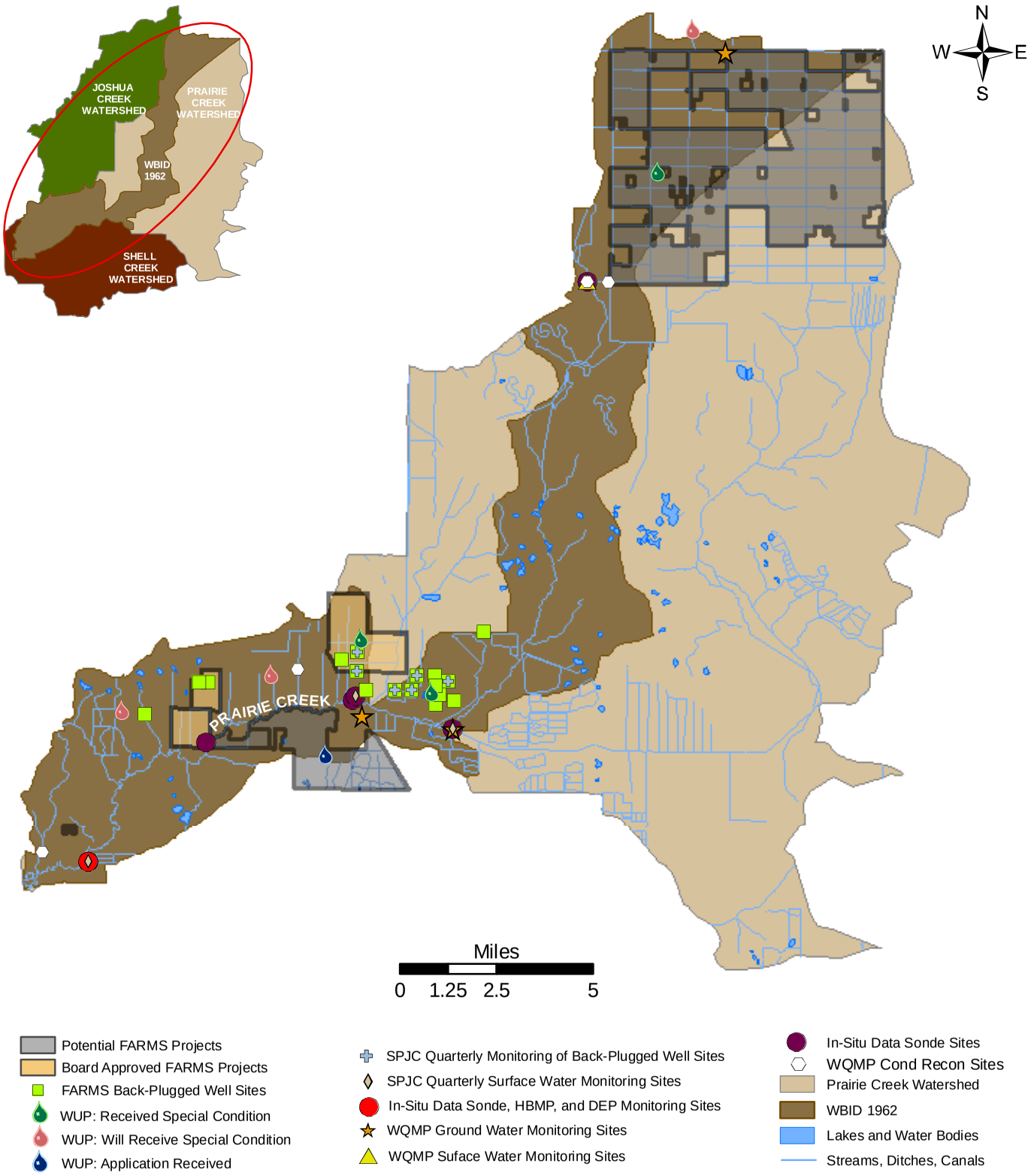
Sp. Conductance, TDS

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. The following table represents water quality improvements for chloride and TDS concentrations at each well directly following back-plugging activities. Four of the 17 wells were back-plugged after October 2004:

Pre- and Post Well Back-Plugging 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 repeated back-plug

District Resource Regulation – Water Use Permitting

In WBID 1962, seven Water Use Permit (WUP) applications were submitted to the District during the reporting time period for this Performance Monitoring Summary document (October 2004 through July 2006). Of the seven applications, four were renewals and three were letter modifications. Three of the six permits issued received additional special conditions to address water quality concerns in the SPJC watersheds. The remaining three 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 1962

New WUPs	0
WUP Renewals	4*
WUP Modifications	0
WUP Letter Modifications	3

* One application received but WUP not issued by 7/31/2006

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

There are currently three Board approved, operational FARMS/EQIP projects and four potential FARMS projects in WBID 1962:

WUP No. 20006765 (FARMS and EQIP funded; property also falls within WBIDs 1995 and 2001):
The primary goal of this project is to reduce groundwater withdrawals on a citrus grove 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, surface water collection pump station, two irrigation pump stations (including filtration), and piping necessary to connect the proposed tailwater interception and surface water reservoir system to the existing irrigation system. This project has been operational since July 2006 and has an estimated ground water offset of 222,500 gpd.

WUP No. 20008348 (FARMS funded):
The primary goal of this project is to reduce groundwater withdrawals on a citrus grove through the use of an existing shell pit as a tailwater recovery and surface water collection reservoir. The project components include: a surface water pump station, filtration, piping, and infrastructure necessary to operate and connect the existing reservoir into the irrigation system. This project has been operational since April 2006 and has offset an average of 182,500 gpd of groundwater. The current average exceeds the projected offset of 71,000 gpd.

WUP No. 20009127 (FARMS funded):
The primary goal of this project is to reduce groundwater withdrawals on a citrus grove through the installation and operation of three remote soil moisture-monitoring stations. The soil moisture data, collected in the three locations at three different vertical depths, will allow the grove manager 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 April 2006 and has offset an average of 101,400 gpd of groundwater. The current average exceeds the projected offset of 15,600 gpd.

The following four potential FARMS projects are currently under consideration and/or in the contract initiation phase:

WUP No. 20004905:
FARMS staff have discussed the potential to cost-share a project on a dairy which includes excavation of a surface water reservoir system designed for manure management, tailwater recovery, and reuse. Surface water withdrawals, instead of ground water, will be used for barn washing and pasture irrigation. Project components would include a surface water pump station and filtration.

WUP No. 20002386 (property also falls within WBID 1964):
FARMS staff have discussed the potential to cost-share water control structures. These structures would assist in on-site surface water management by keeping rainfall and irrigation tailwater onsite for longer periods of time, which could potentially reduce the frequency of irrigation events.

WUP No. 20003275 (property also falls within WBIDs 2040 and 2044):
FARMS staff are discussing the potential to reduce ground water withdrawals on a grove from an upper Floridan Aquifer well through the use of two existing shell pits as an irrigation source. Project components would include: a surface water pump station, piping, and infrastructure necessary to operate and connect the existing reservoir into the irrigation system. Other project components would include a pipe to connect the two reservoirs in order to maximize the availability of surface water. This project is proposed to be presented at the February 2006 Governing and Peace River Basin Boards for funding approval and is estimated to offset 148,000 gpd of ground water.

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.

The following table summarizes approved and potential FARMS projects in WBID 1962, as well as summarizing ground water offsets for each of these projects:

Approved and Potential FARMS/EQIP Projects in WBID 1962

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)	July 2006	222,500	N/D	N/D
WUP #20008348 (citrus)	April 2006	71,000	182,500	263,032
WUP #20009127 (citrus)	April 2006	15,600	101,400	238,367
*WUP #20004905 (dairy)	N/D	N/D	N/D	N/D
*WUP #20002386 (citrus, sod)	N/D	N/D	N/D	N/D
*WUP #20003275 (citrus)	February 2007	148,000	N/D	N/D
*WUP #20010065 (citrus)	N/D	N/D	N/D	N/D

*Potential project currently under consideration
N/D = Not determined
**The actual ground water offset fluctuates with weather conditions and seasons. The actual is calculated by dividing the number of days the project has been operational into the total gallons offset.

Quality of Water Improvement Program (QWIP)
No wells have been plugged/abandoned in WBID 1962 since October 2004.

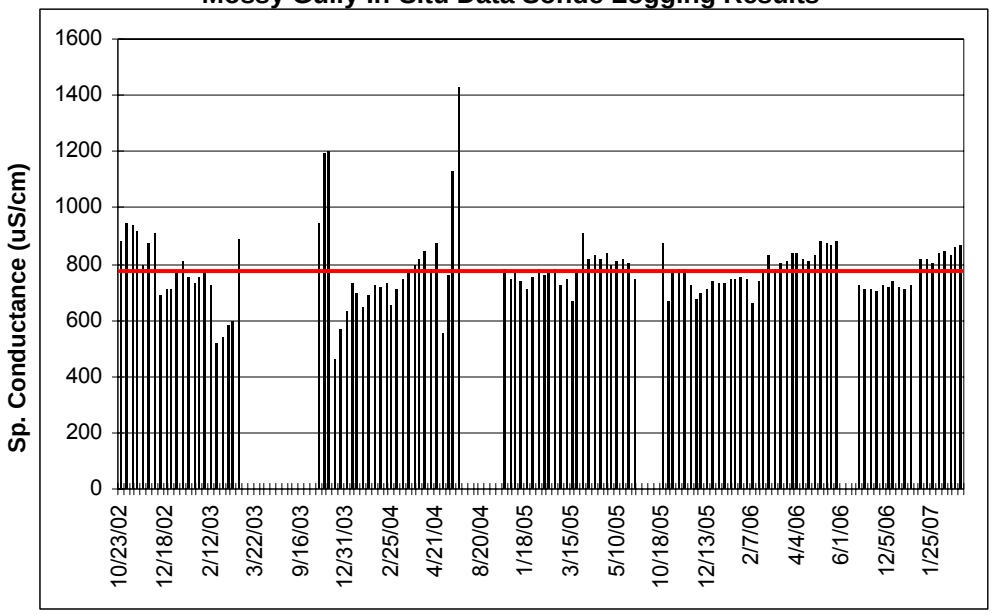
SPJC Water Quality Monitoring Results – Progress to Date

In-Stream Specific Conductance Logging Network (District and USGS)
There are currently six YSI® 600XLM data sondes deployed in creek and canal systems throughout WBID 1962.

The ***Mossy Gully*** data sonde is deployed in a canal that is located in the northern region of the Prairie Creek Watershed. This canal provides flows to Prairie Creek, and land use in the immediate surrounding area of this monitoring location is predominantly agriculture (citrus). The following data plot shows continuous/hourly logging of specific conductance values for dry season periods (November – May) for October 2002 through July 2006. 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 were removed from the data set.

The following graph shows no evidence of increasing or decreasing trends in specific conductance concentrations over the data period of record at this monitoring station. There is a potential FARMS project currently under consideration with property owners that would include an agricultural area located directly north of the data sonde site.

Mossy Gully In-Situ Data Sonde Logging Results

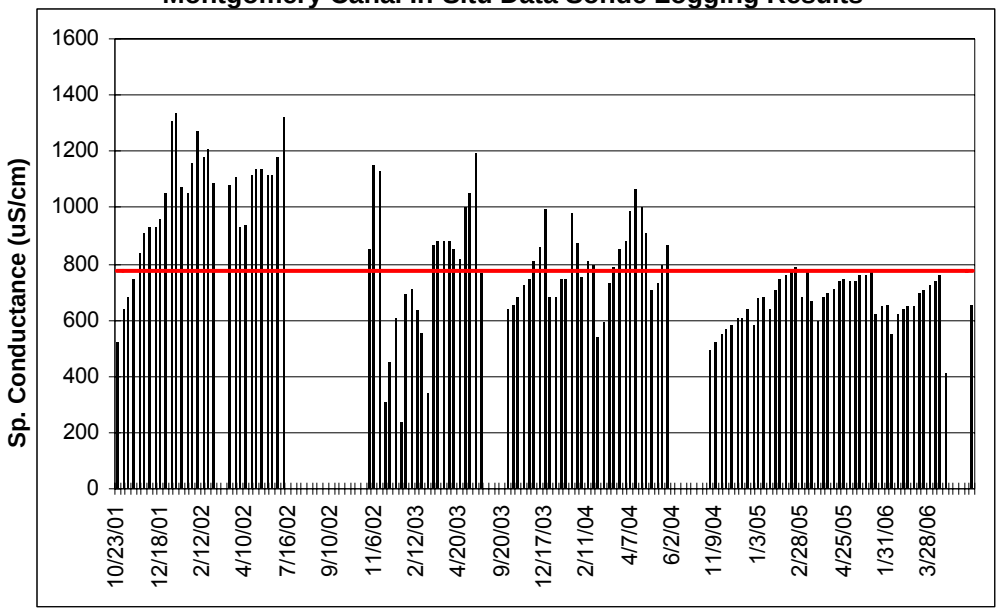


The ***Montgomery Canal*** data sonde is located in a canal in the central region of the Prairie Creek Watershed. This canal provides flows to Prairie Creek, and land use contributing to this canal has historically been agriculture (sod farming). The following data plot shows continuous/hourly logging of specific conductance values for dry season periods (November – May) for October 2001 through July 2006.

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 have occurred since this time period. In addition, 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.

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

Montgomery Canal In-Situ Data Sonde Logging Results

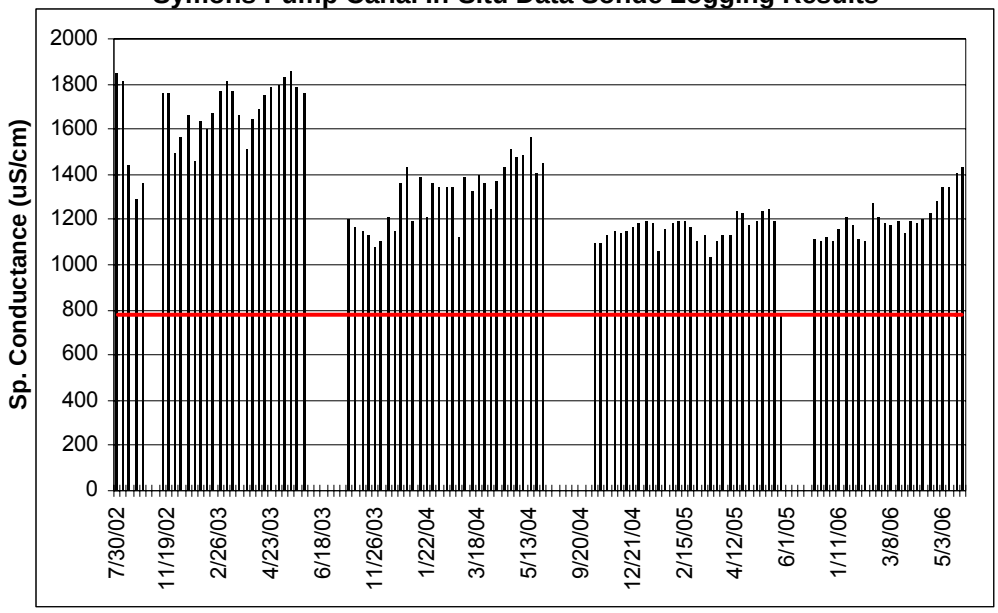


The ***Symons Pump Canal*** data sonde is deployed in an irrigation canal located in the central region of the Prairie Creek Watershed. The canal provides flows to Prairie Creek, and the monitoring location is directly adjacent to citrus farming activities. The immediate surrounding area also includes rangeland. The following data plot shows continuous/hourly logging of specific conductance values for dry season periods (November–May) for November 2002 through May 2006.

Four wells were back-plugged on this property in November and December 2001 therefore, decreases in specific conductance have occurred 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

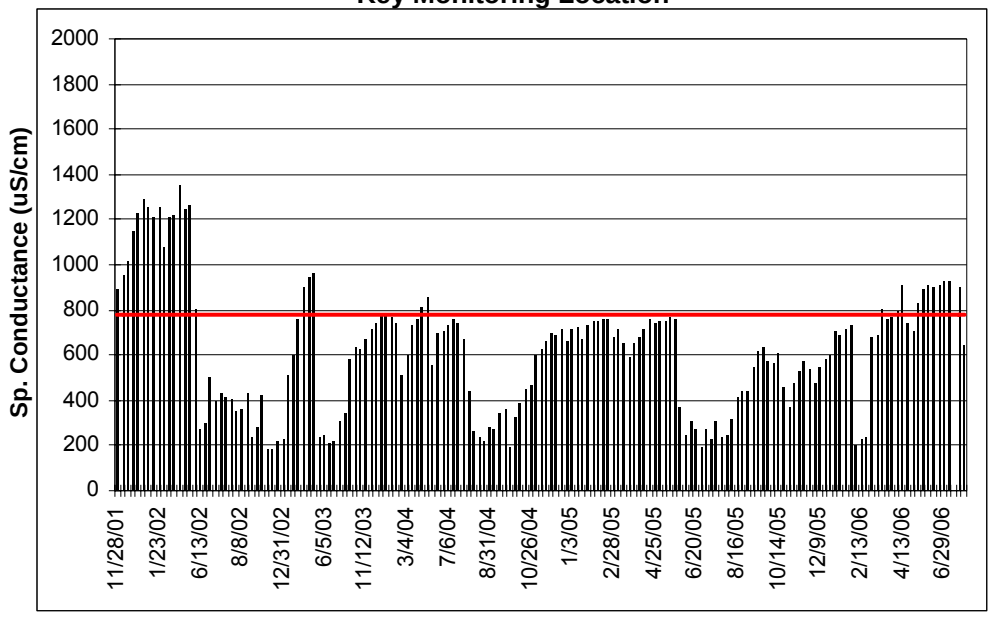


The ***Prairie Creek near Fort Ogden*** data sonde is deployed in the main channel of Prairie Creek in the central region of the Prairie Creek Watershed, and is located approximately 100 yards downstream of Symons Pump Canal's confluence with Prairie Creek. The immediate surrounding land use includes agriculture (citrus) and rangeland. This location is one of the key index 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. The following data plot shows weekly median results for continuous/hourly logging of specific conductance values throughout each year for November 2001 through July 2006.

Decreases in specific conductance have occurred at this monitoring location during dry season events since the November 2001 time period. Increasing values for the months of April through July 2006 are most likely due to below average rainfall amounts in the spring and summer months.

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

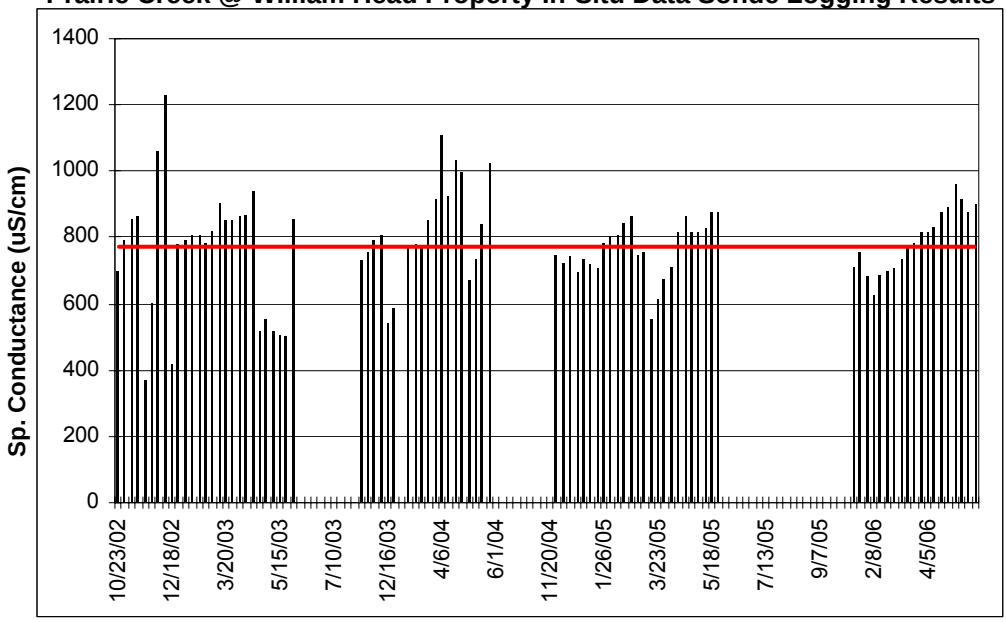
Prairie Creek near Ft. Ogden In-Situ Data Sonde Logging Results
Key Monitoring Location



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. Land use in the immediate surrounding area is rangeland and agriculture. The following data plot shows continuous/hourly logging of specific conductance values for dry season periods (November – May) for October 2002 through July 2006. Sediment smothering of the data sonde probe site during periods of high flow conditions has occurred at this location therefore, these erroneous values were removed from the data set.

There appears to be no increasing or decreasing trends in specific conductance over the data period of record. Two 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.

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

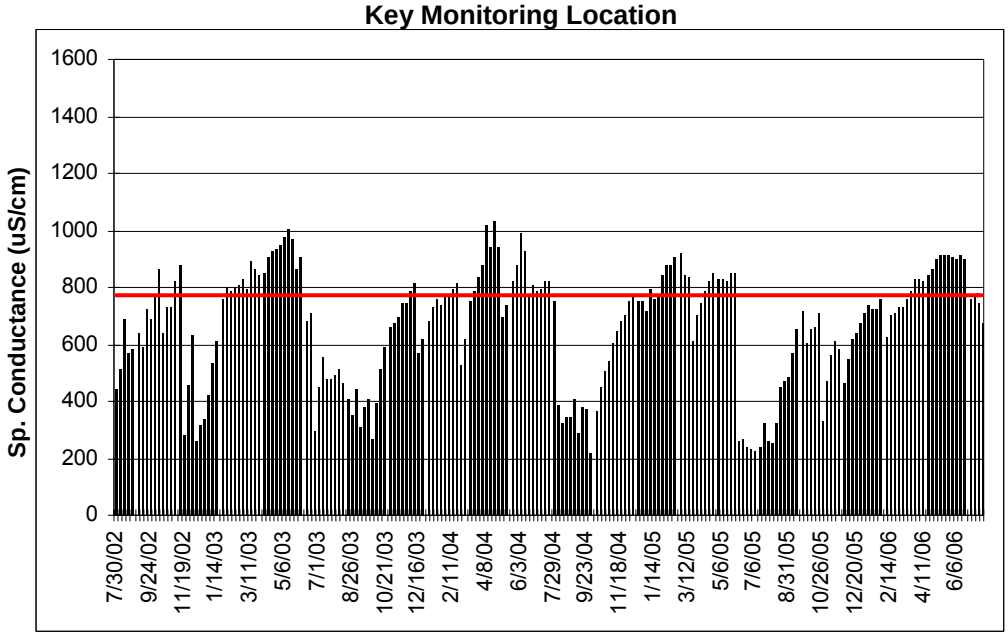


The ***Prairie Creek @ Washington Loop Road*** data sonde is located on the main stem of Prairie Creek in the southern region of the Prairie Creek watershed, just upstream of the Shell Creek Reservoir. Land use in the immediate surrounding area is predominantly agriculture, with some rangeland and urban/built-up. This location is one of the key index 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. The following data plot shows continuous/hourly logging of specific conductance values throughout each year for July 2002 through July 2006.

Slight decreases in weekly median specific conductance values have occurred during the dry season periods of 2003 through 2005. Below average rainfall amounts during the 2006 dry and wet season months are reflected by slight increases in specific conductance concentrations.

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 logging results 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 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	18,291	71	0.4%	104	48	46.2%
*Montgomery Canal	23,358	839	3.6%	129	56	43.4%
*Symons Pump Canal	19,417	9,158	47%	113	113	100%
**Prairie Cr. nr Ft. Ogden	28,335	583	2%	165	35	21.2%
Prairie Cr. @ William Head	16,024	51	0.3%	90	51	56.7%
**Prairie Cr. @ Washington Loop	34,008	3	.009%	207	34.8	34.8%

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

Specific Conductance Reconnaissance Network (District)

Within WBID 1962 there are currently four stations monitored for the Specific Conductance Reconnaissance Network. Individual values for the Mossy Gully @ SR 70 station have been excluded from this section since they were discussed earlier in the In-Stream Specific Conductance Logging Network section. Of the 12 individual specific conductance values collected within WBID 1962 during the period of record, two values exceeded the 775 uS/cm goal criteria and no values exceeded the FDEP surface-water quality Class I criterion of 1275 uS/cm. The following table summarizes the percent change increases and/or decreases between dry season events for each monitoring station within WBID 1962. 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.

Specific Conductance Reconnaissance Results in WBID 1962 over Entire Period of Data Record

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	↓3.55%	↑1.17%
Unnamed Cr. @ Washington Loop Rd. - #29	414	270	1009	738	873	↑58.97%	↓15.58%
Unnamed Ditch @	Dry	454	521	331	Dry	*	*

* 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.

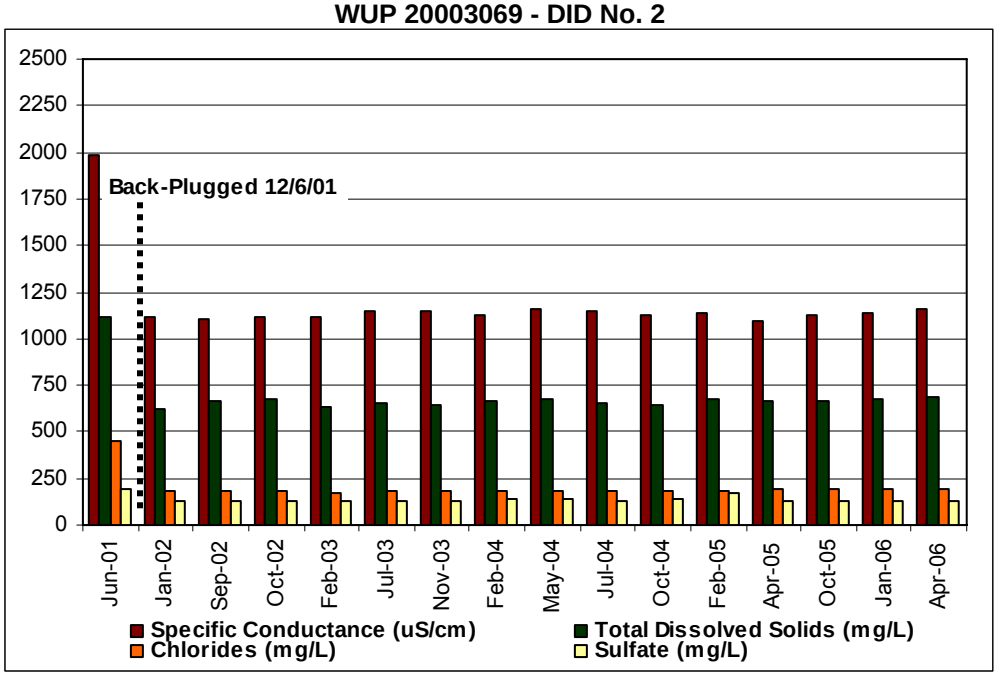
WBID 1962

Water Segment - Prairie Creek

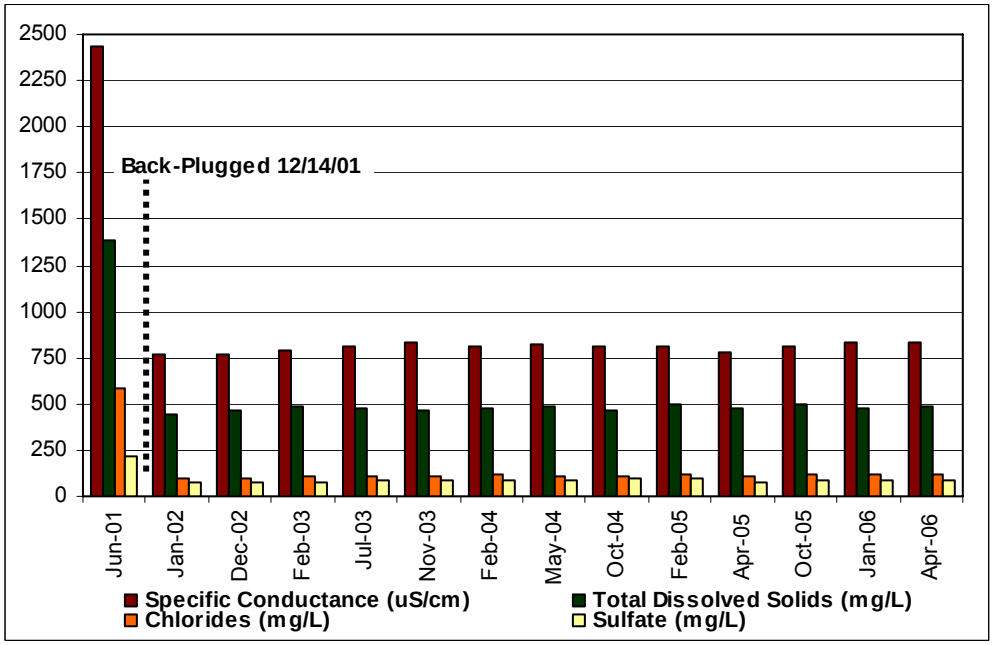
Prairie Creek Watershed; Water Use - Class I

Verified Impaired Pollutants of Concern – sp. conductance, TDS

WUP 20003069 - DID No. 2

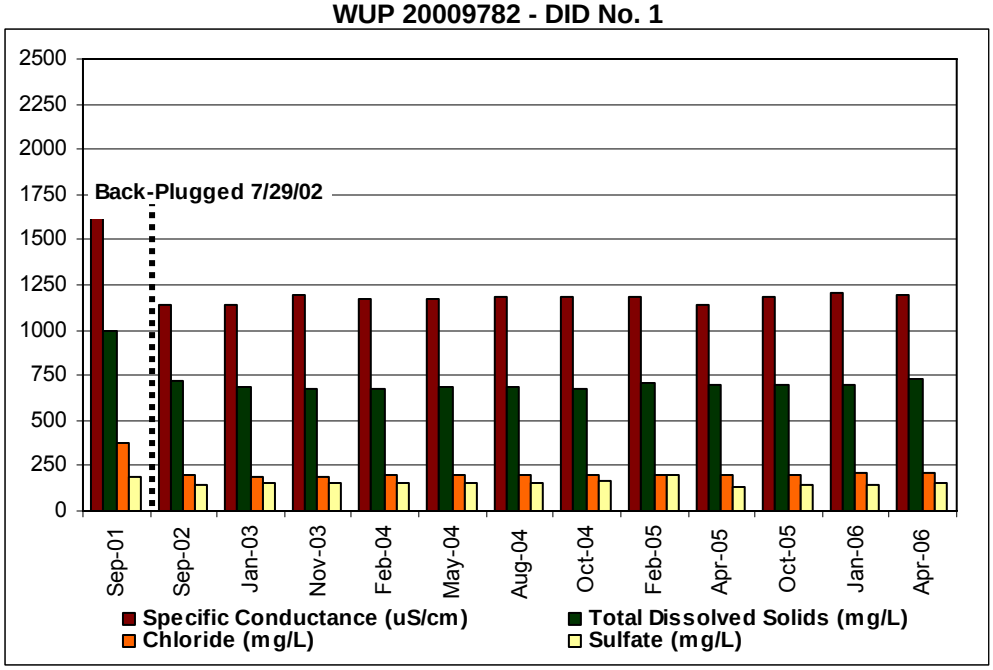


WUP 20003069 - DID No. 6

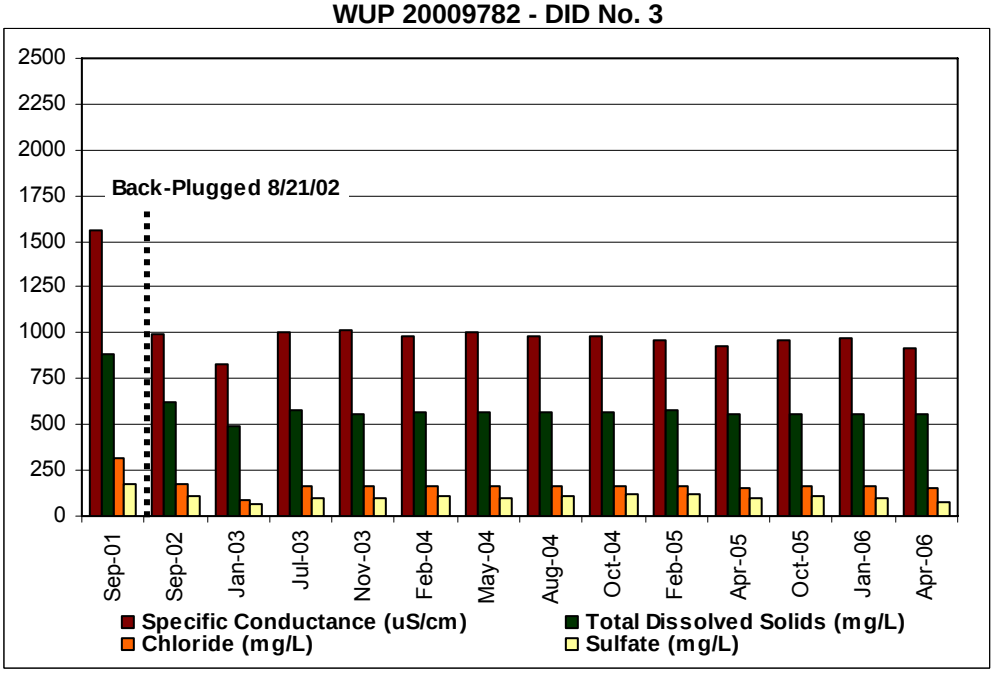


WBID 1962
Water Segment - Prairie Creek
Prairie Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern – sp. conductance, TDS

WUP 20009782 - DID No. 1



WUP 20009782 - DID No. 3



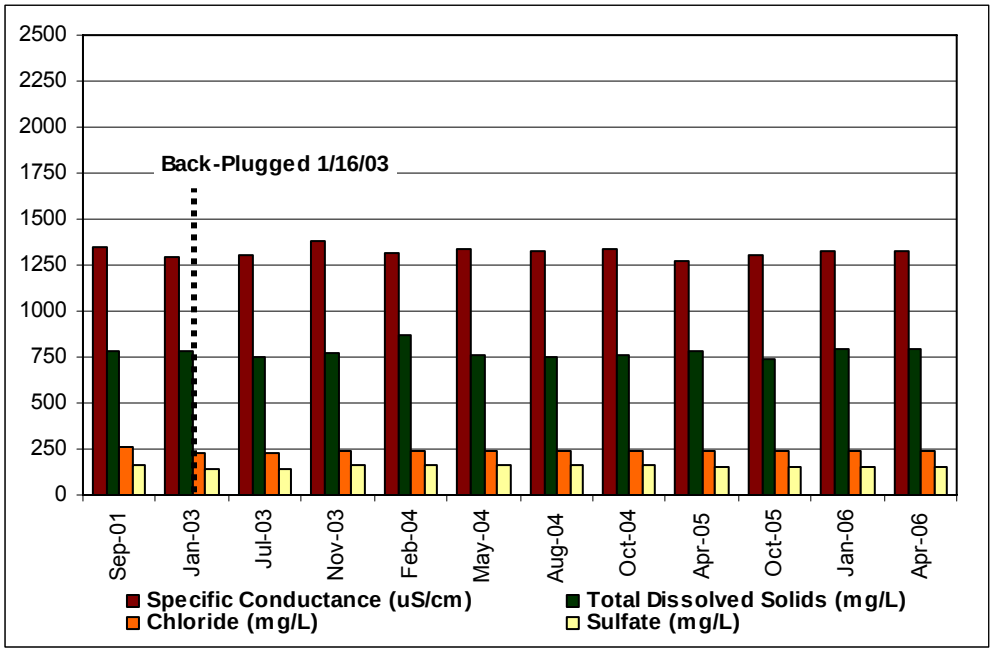
WBID 1962

Water Segment - Prairie Creek

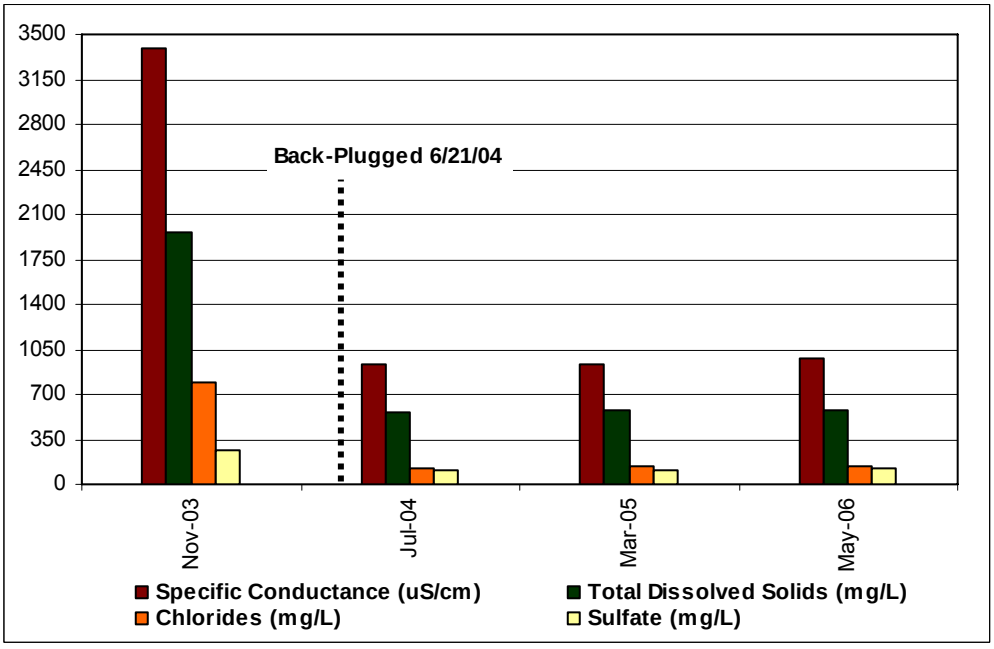
Prairie Creek Watershed; Water Use - Class I

Verified Impaired Pollutants of Concern – sp. conductance, TDS

WUP 20009782 - DID No. 4



WUP 20006765 - DID No. 18



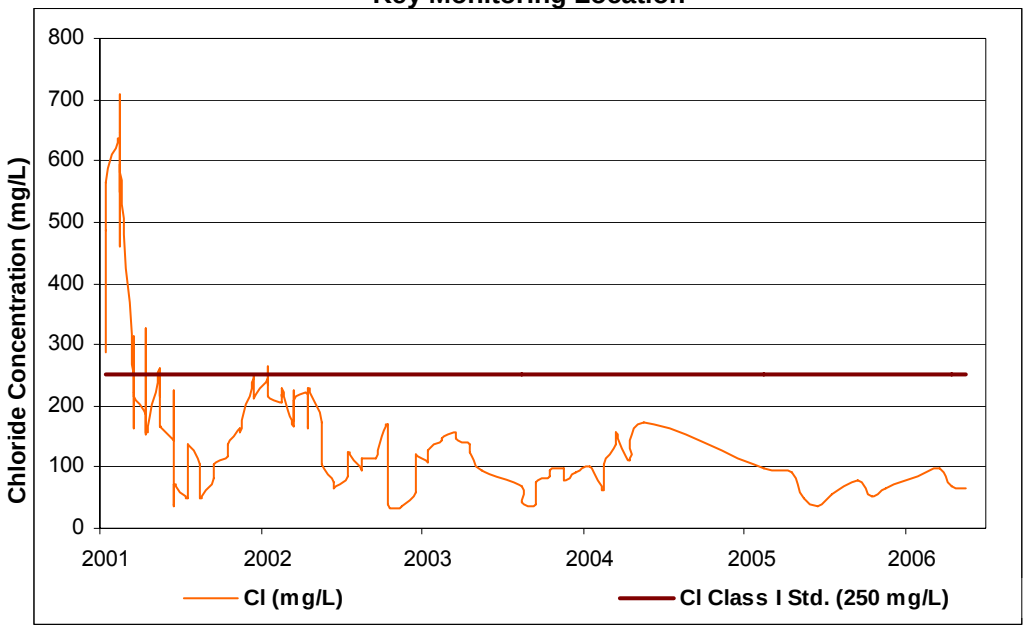
Surface-Water Quality Monitoring Networks (District, FDEP, and City of Punta Gorda)

The following graphs represent water quality results through July 2006 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 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 for the 2002 through 2006 time frame from monitoring efforts conducted by the FDEP-Fort Myers office. 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. In addition, the District began quarterly sample collection at select stations in the SPJC in 2002 and 2005. The results from these monitoring efforts are also included in the following data plots.

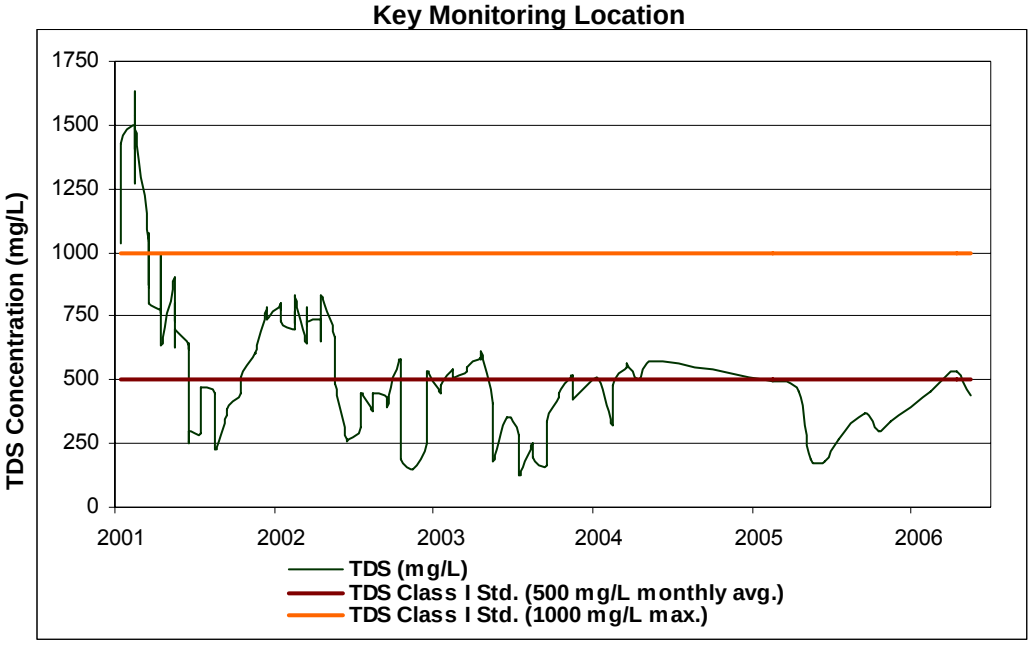
For comparative purposes, these data plots also contain reference lines depicting FDEP Class I criteria for chloride (250 mg/L) and TDS (500 mg/L as a monthly average, 1000 mg/L as maximum).

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

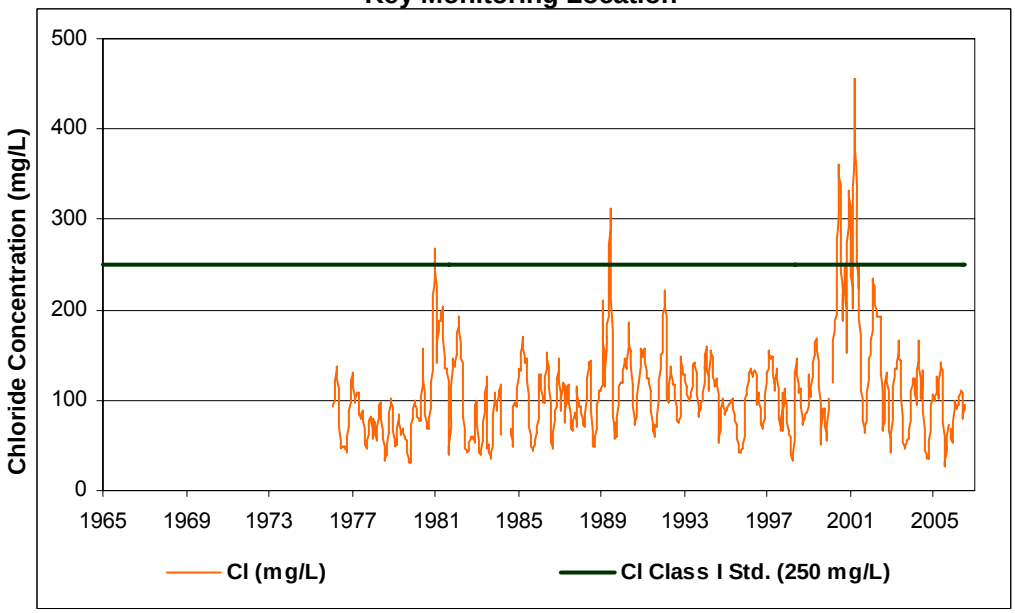


WBID 1962
Water Segment - Prairie Creek
Prairie Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern – sp. conductance, TDS

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

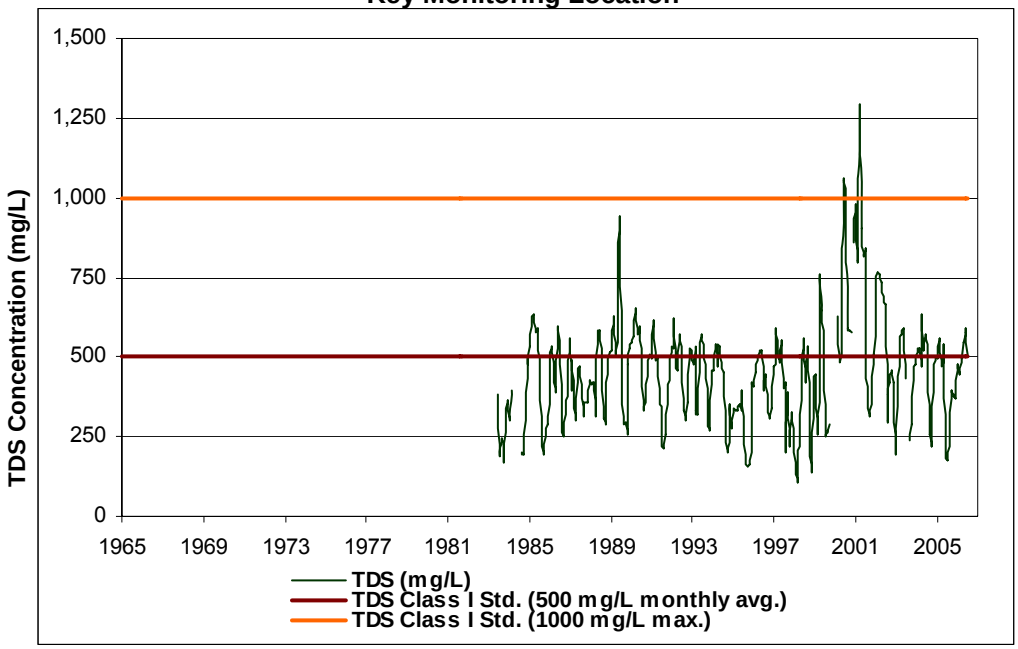


Prairie Creek @ Washington Loop Rd. Water Quality Results for Chloride
Key Monitoring Location



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

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



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

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 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
*Mossy Gulley	9	0	N/A	9	4	44.4%	0	N/A
*Montgomery Canal	16	0	N/A	16	1	6.3%	0	N/A
*Symons Pump Canal	15	3	20%	15	15	100%	2	13.3%
**Prairie Cr. nr Ft. Ogden	122	16	13.1%	124	72	58%	13	1.4%
**Prairie Cr. @ Washington Loop Rd.	360	9	2.5%	238	81	34%	3	1.3%

*Monitoring site located in agricultural canal – not on main channel of Prairie Creek.
**Key monitoring location
***This parameter not listed by FDEP as TMDL verified impaired in WBID 1962

Habitat Assessment and Stream Condition Index Monitoring (FDEP)

During the reporting time period for this Performance Monitoring document, no sites in WBID 1962 were evaluated for the Habitat or Stream Condition Index Assessments.

WBID 2040

WBID 2040

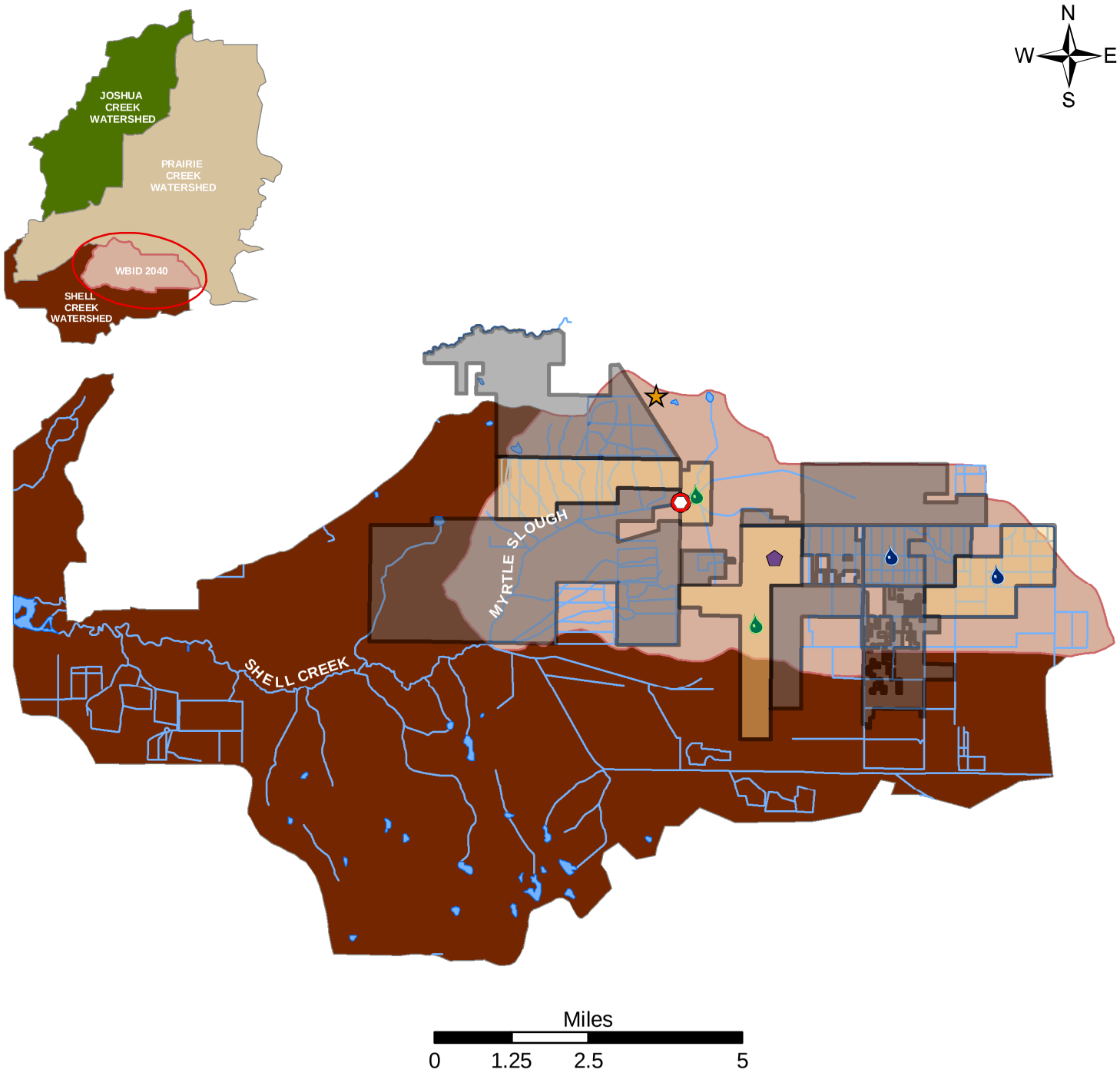
Water Segment – Myrtle Slough
Shell Creek Watershed; Water Use - Class I
Verified Impaired Pollutants of Concern:
Sp. Conductance, TDS, Chloride

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, four WUP applications were received during the reporting time period of this document. Of the four applications, one was a renewal and three were modifications. Two permits were not issued within the timeframe of this document. Both permits issued received additional special conditions to address water quality concerns in the SPJC watersheds. 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 2040

New WUPs	0
WUP Renewal	1
WUP Modifications	3*
WUP Letter Modifications	0

* Two applications received but not issued by 7/31/2006

Facilitating Agricultural Resource Management Systems (FARMS) and/or Environmental Quality Incentives (EQIP) Projects
There are currently six Board approved, operational, or complete FARMS/EQIP projects and seven potential FARMS projects in WBID 2040**:**

WUP No. 20009687 – Phase I (FARMS and EQIP funded; property also falls within WBID 2041):
The primary goal of this project is to reduce upper Floridan aquifer ground water quantities on a row crop farm on the north side of the property through the use of a newly excavated shell pit onsite. Project components include two surface water pump stations, filtration, pipeline to connect the surface water into the existing irrigation system, soil moisture sensors and automated pump controls. This project has been operational since April 2006 and has offset an average of 231,217 gpd of ground water. The projected average is 662,700 gpd.

WUP No. 20009687 – Phase II (FARMS funded; property also falls within WBID 2041):
The primary goal of Phase II is to interconnect surface water resources on both the north and south sides of the row crop farm. The project includes two surface water pumping stations, and filtration and pipelines to fully supply and interconnect the entire irrigation system. In addition, Phase II will incorporate a central computer irrigation efficiency control system which allows for remote irrigation management. Once complete, the project is estimated to offset an additional 245,700 gpd of ground water.

WUP No. 20009398 – Phase I (FARMS funded; property also falls within WBID 2044):
The primary goal of this project is to reduce ground water 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 (see Case Study No. 5 in the SPCWMP Reasonable Assurance document). The Phase I project is complete and operational since October 2003 with an offset of 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 2044):
The primary goal of Phase II is to further increase ground water 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 operational since August 2005, and the actual combined offset is averaging 502,188 gallons per day (gpd). The combined projected offset is 181,000 gpd.

WUP No. 20010726 (FARMS and EQIP funded):
The primary goal of this project is to reduce groundwater withdrawals through the use of tailwater recovery, and surface water collection. Project components include the infrastructure necessary to operate and connect two reservoirs to a new, more efficient drip irrigation system. Part of the project has been operational since January 2006 and has an average offset of 137,889 gpd. The projected offset was 352,000 gpd.

WUP No. 20003530 (FARMS funded):
The primary goal of this project is to reduce upper Floridan groundwater withdrawals through the use of two existing surface water reservoirs for irrigation and frost/freeze protection. Project components include two surface water pump stations, and filtration and pipeline to connect the surface water into the existing irrigation system (see Case Study No. 6 in the SPCWMP Reasonable Assurance document). This project has been complete since December 2003 and has offset an average of 205,974 gpd of ground water. The projected offset was 142,600 gpd.

The following seven potential FARMS projects are currently under consideration and/or in the contract initiation phase:

WUP No. 20001759 (property also falls within WBID 2044):
The primary goal of this project is to reduce upper Floridan groundwater withdrawals through the use of an existing surface water reservoir to irrigate sod. Project components include one pump station, filtration, piping, and the infrastructure necessary to connect the reservoir to the sod production area. The grower is furthering water conservation by installing a center pivot system with hanging, low-flow micro jets. This project has an estimated offset of 197,000 gpd of ground water.

WUP No. 20003070:
FARMS staff have discussed the potential to cost-share a project involving the excavation of a shell pit, surface water pump station, filtration, and pipeline to connect surface water into existing irrigation system.

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. 20009052:
FARMS staff have discussed the potential to cost-share a project to reduce intermediate and upper Floridan Aquifer groundwater withdrawals through the use of an existing surface water reservoir and existing ditches to irrigate a citrus grove. Project components would include two surface water pump stations, filtration, piping, a weather station, culverted risers, and the infrastructure necessary to connect the surface water reservoirs into the existing irrigation system.

WUP No. 20003275 (property also falls within WBIDs 1962 and 2044):
FARMS staff are discussing the potential to reduce Floridan aquifer ground water withdrawals on a citrus grove through the use of two existing shell pits as an irrigation source. Project components would include; a surface water pump station, piping, and infrastructure necessary to operate and connect the existing reservoir into the irrigation system. Other project components would include a pipe to connect the two reservoirs in order to maximize the availability of surface water. This project is to be presented to the February 2007 Governing and Peace River Basin Boards for funding approval and is estimated to offset over 148,000 gpd of ground water.

WUP No. 20009417 (also in WBID 2041):
FARMS staff have discussed the potential to cost-share a project to reduce groundwater withdrawals through the use of an existing storm water retention area. Project components would include excavation to deepen the existing pond for additional storage, a surface water pump station, filtration, and pipeline to connect the surface water into the existing irrigation system.

WUP No. 20012541:
FARMS staff have discussed the potential to cost-share a project to reduce groundwater withdrawals through the use of an existing storm water retention area. Project components would include excavation to deepen the existing pond for additional storage, a surface water pump station, and pipeline to connect the surface water into the existing irrigation system.

The following table summarizes approved and potential FARMS projects in WBID 2040, as well as summarizing ground water offsets for each of these projects:

Approved and Potential FARMS/EQIP Projects in WBID 2040

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 #20009687 (row crop – Phase I)	April 2006	662,700	231,217	545,735
WUP #20009687 (row crop – Phase II)	Under Construction	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	502,188	2,256,226
WUP #20010726 (row crop)	January 2006	352,000	137,889	256,243
WUP #20003530 (citrus)	December 2003	142,600	205,974	1,548,667
*WUP #20001759 (sod)	N/D	197,000	N/D	N/D
*WUP #20003070 (citrus)	N/D	N/D	N/D	N/D
*WUP #20002689 (citrus)	N/D	N/D	N/D	N/D
*WUP #20009052 (citrus)	N/D	N/D	N/D	N/D
*WUP #20003275 (citrus)	N/D	148,000	N/D	N/D
*WUP #20009417 (citrus)	N/D	N/D	N/D	N/D
*WUP #200012541 (sod)	N/D	N/D	N/D	N/D

*Potential project currently under consideration
N/D = Not determined
**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 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)

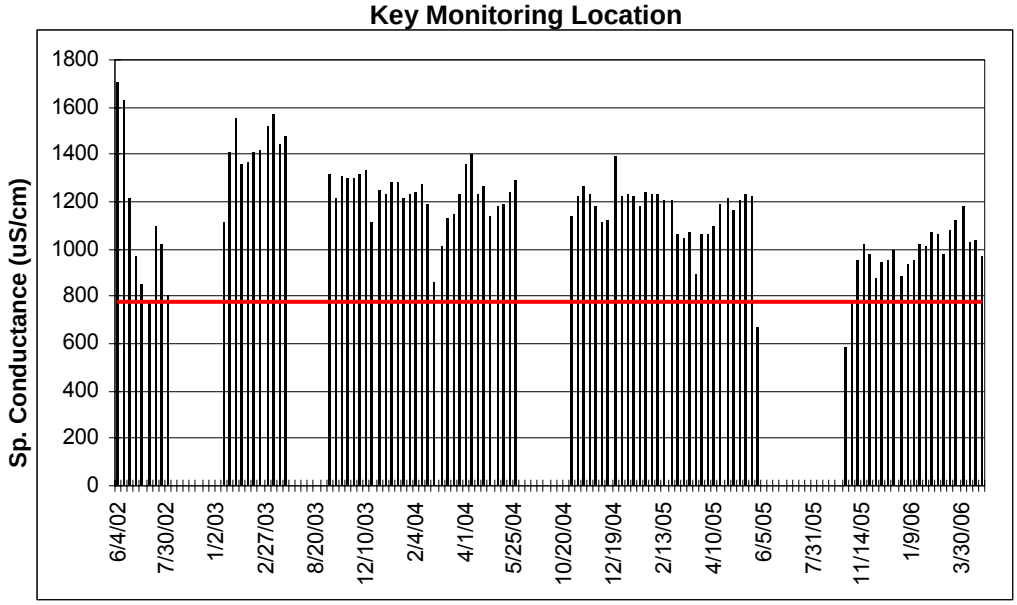
There is currently one YSI® 600XLM data sonde deployed in WBID 2040 at station ***Myrtle Slough @ SR 31,*** located in the northeastern region of the Shell Creek Watershed. This surface water feature provides flows to Shell Creek. The majority of land use surrounding this monitoring location is agriculture. This location is one of the key index surface water monitoring stations in WBID 2040, with data results used by FDEP for TMDL assessments. In contrast to

other key monitoring locations in the SPJC, data sonde deployment does not occur year-round at this site due to the potential for flooding and access issues during the wet season.

The following data plot shows weekly median values for specific conductance, which have been calculated from independent values collected on an hourly frequency during dry season periods (November – May) from January 2003 through July 2006. 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 have decreased over the period of data record. Within WBID 2040, six FARMS projects are currently in operation or under construction, and discussions are underway for seven additional projects. These projects have contributed to the improvement in water quality conditions at this site.

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



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

Specific Conductance Logging Results in WBID 2040 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 @ SR 31	18,196	4,373	24%	105	102	97.1%

** Key Monitoring Location

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.

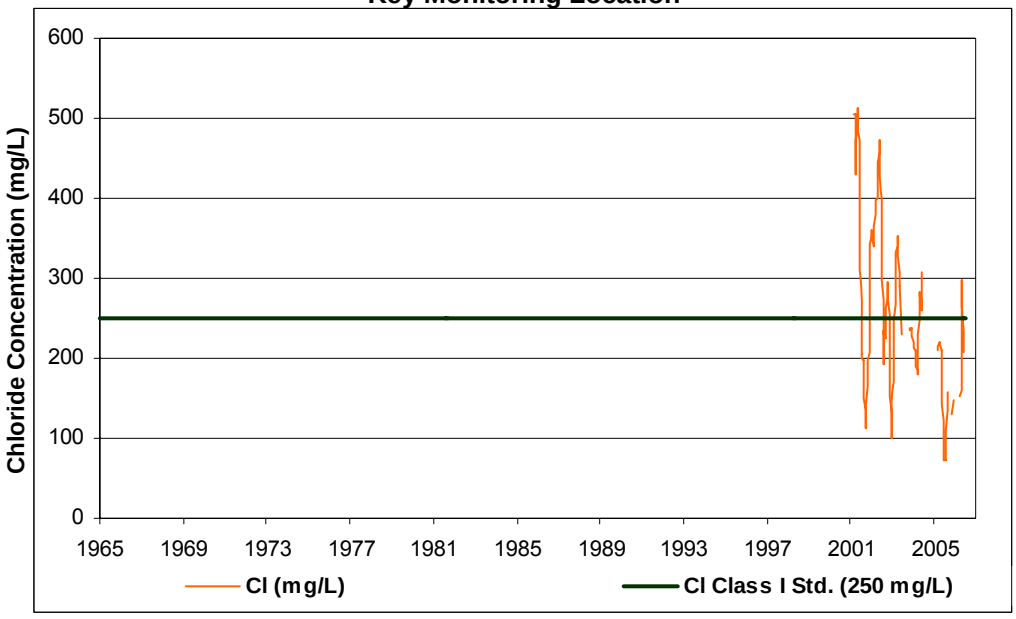
Pre- and Post Back-Plug Well Monitoring Network (District)

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)

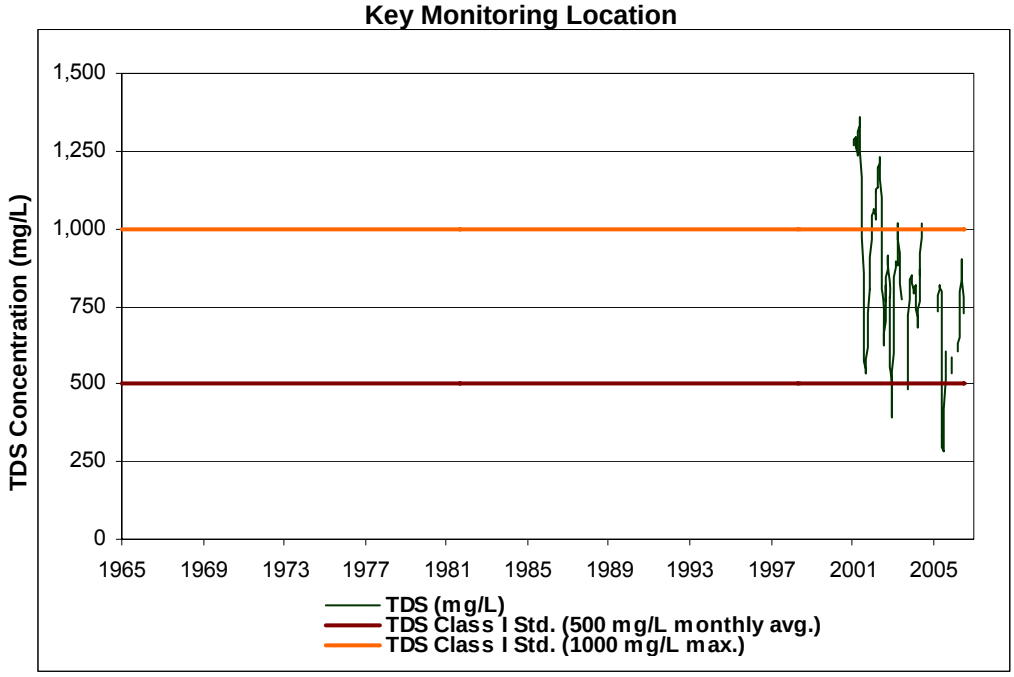
One water quality sample collection site has been established in WBID 2040 at ***Myrtle Slough @ SR 31,*** which is a key monitoring location. The following graphs represent available water quality results through July 2006 for chloride and TDS concentrations. These data plots were generated using data 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. Data were also used for the 2002 through 2006 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).

Myrtle Slough @ SR 31 Water Quality Results for Chloride
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

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



Chloride and TDS Water Quality Results in WBID 2040 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
**Myrtle Slough @ SR 31	50	21	42%	51	47	92.2%	14	29.8%

**Key Monitoring Location

Habitat Assessment and Stream Condition Index Monitoring (FDEP)

In the summer of 2003 and winter of 2004, biological (macroinvertebrate) samples for Stream Condition Index (SCI) analysis were collected at Myrtle Slough @ SR 31. The SCI compares the biological community found in 20 dipnet sweeps of the best available habitat in a stream, with the community that would be expected in an undisturbed stream in the same part of the state. 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.

WBID 2041

WBID 2041

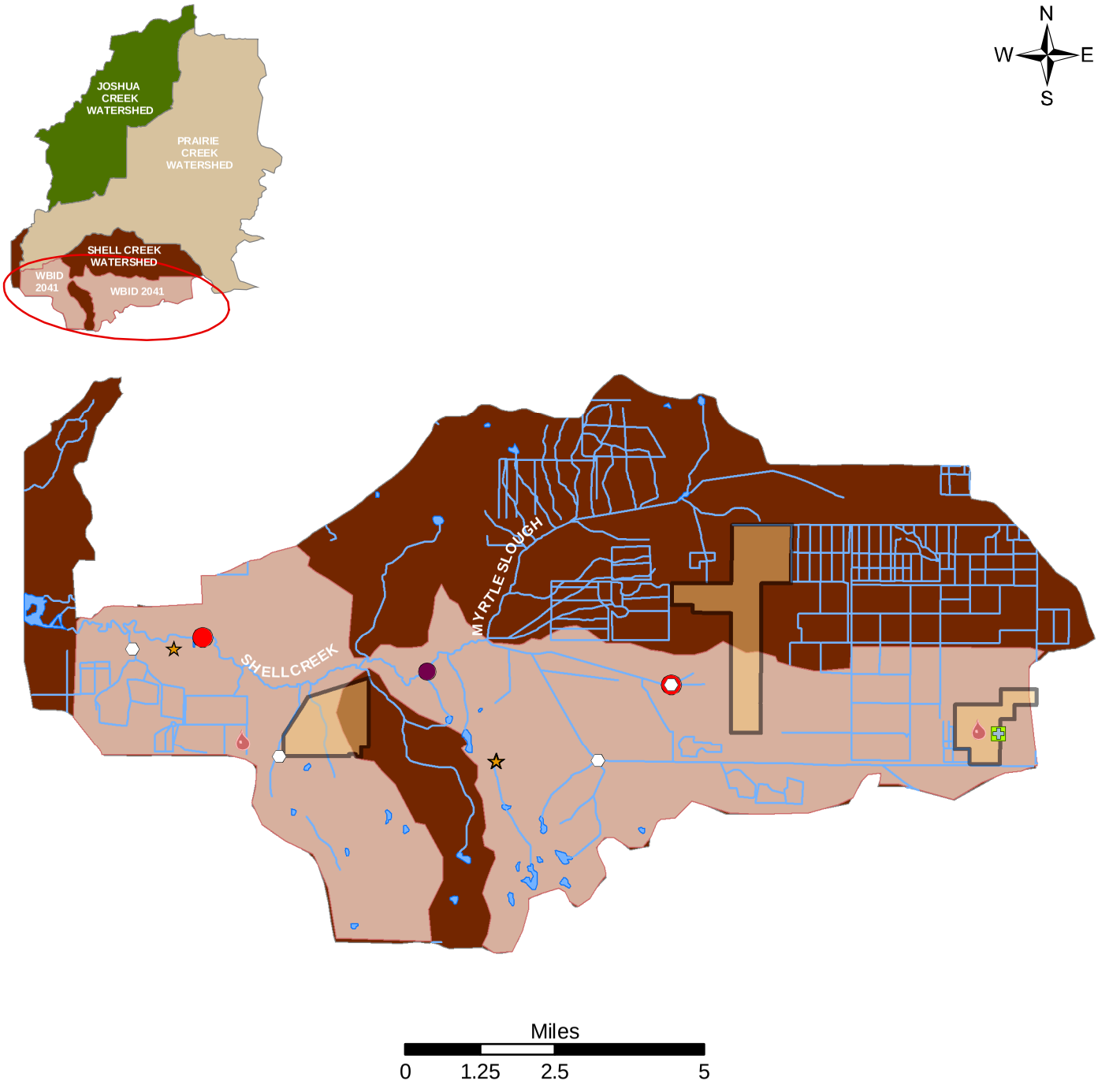
Water Segment – Shell Creek
Shell Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern:
Sp. Conductance, TDS, Chloride

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.

Pre- and Post Well Back-Plugging Results in WBID 2041

Permit Information		Percent Improvement	
WUP No.	DID No.	TDS (mg/L)	Chloride (mg/L)
20009648	1	47%	67%
20009648	2	N/A	N/A

District Resource Regulation – Water Use Permitting

In WBID 2041, two WUP applications were received during the October 2004 through July 2006 time period. Of the two applications, one was a new permit and one was a letter modification (see table below). Neither permit issued received additional special conditions to address water quality concerns in the SPJC watersheds. These permits will receive the special conditions through a corrected permit process.

WUP Renewals and Modifications in WBID 2041

New WUPs	1
WUP Renewals	0
WUP Modifications	0
WUP Letter Modifications	1

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

There are currently four Board approved, operational, or under construction FARMS/EQIP projects, and two potential FARMS projects in WBID 2041:

WUP No. 20009687– Phase I (FARMS and EQIP funded; property also falls within WBID 2040): The primary goal of this project is to reduce upper Floridan aquifer groundwater quantities on a row crop farm on the north side of the property through the use of a newly excavated shell pit onsite. Project components include two surface water pump stations, filtration, pipeline to connect the surface water into the existing irrigation system, soil moisture sensors and automated pump controls. This project has been operational since April 2006 and has offset an average of 231,217 gpd of ground water. The projected average is 662,700 gpd.

WUP No. 20009687 – Phase II (FARMS funded; property also falls within WBID 2040):
The primary goal of Phase II is to interconnect surface water resources on both the north and south sides of the row crop farm. Phase II project components include two surface water pump stations, filtration, and pipelines to fully supply and interconnect the entire irrigation system on the north and south side of the farm. In addition, Phase II will incorporate a central computer irrigation efficiency control system that allows for remove irrigation management. Once complete, the project is estimated to offset an additional 245,700 gpd of ground water

WUP No. 20009476 (FARMS funded; property also falls within WBID 2058):
The primary goal of this project is to capture and reuse surface water and irrigation tailwater for citrus irrigation. Project components include a surface water pump station, components to make an additional surface water pump station usable, additional water control structures to assist in tailwater recovery and float wells to assist in reducing the frequency of irrigation events (see Case Study No. 4 in the SPCWMP Reasonable Assurance document). This project has been operational since August 2003 and has offset an average of 143,078 gpd of groundwater. The project offset was 136,000 gpd.

WUP No. 20009648 (FARMS and EQIP funded):
The primary goal of this project is to reduce groundwater withdrawals through the use of a tailwater recovery and surface water collection reservoir. FARMS project components include excavation of a tailwater recovery reservoir, infrastructure necessary to operate and connect the reservoir into the existing irrigation system, and 12 additional water control structures to improve internal surface water management. This project was completed on March 2006 and has offset an average of 192,361 gpd of ground water. The projected offset was 132,500 gpd.

The following two potential FARMS projects are currently under consideration and/or in the contract initiation phase:

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, surface water pump station, filtration, and pipeline to connect into existing irrigation system.

WUP No. 20009417 (property also falls within WBID 2040):
FARMS staff have discussed the potential to cost-share a project to reduce groundwater withdrawals through the use of an existing storm water retention area. Project components would include excavation to deepen the existing pond for additional storage, a surface water pump station, filtration, and pipeline to connect the surface water into the existing irrigation system.

The following table summarizes approved and potential FARMS projects in WBID 2041, as well as summarizing ground water offsets for each of these projects:

Approved and Potential FARMS/EQIP Projects in WBID 2041

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 #20009687 (row crop – Phase I)	April 2006	662,700	231,217	545,735
WUP #20009687 (row crop – Phase II)	Under construction	245,700	N/D	N/D
WUP #20009476 (citrus)	August 2003	136,000	143,078	386,400
WUP #20009648 (row crop)	March 2006	132,500	192,361	266,267
*WUP #20002689 (citrus)	N/D	N/D	N/D	N/D
*WUP #20009417 (citrus)	N/D	N/D	N/D	N/D

*Potential project currently under consideration
N/D = Not determined
**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.

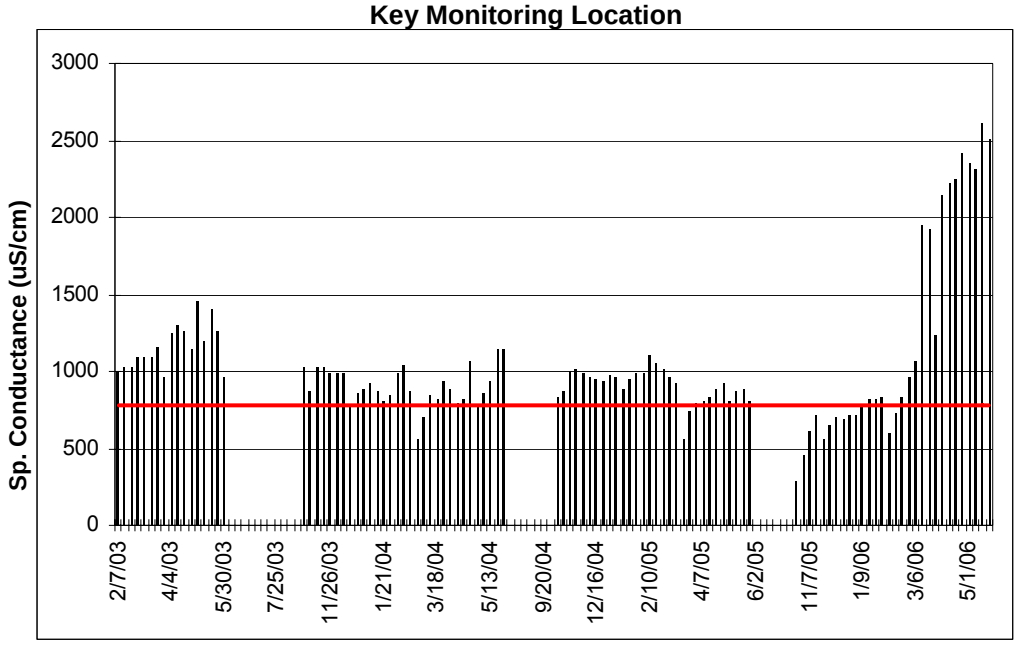
SPJC Water Quality Monitoring Results – Progress to Date

In-Stream Data Sonde - Conductance Logging Network (District and USGS)
There are currently three YSI® 600XLM data sondes deployed in WBID 2041, which is located in the southern region of the Shell 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 ***Shell Creek @ SR 31*** data sonde is located in the main channel of Shell Creek in the eastern region of WBID 2041. This monitoring location is near the headwaters of Shell Creek, and is a key index surface water monitoring station with data results used by FDEP for TMDL assessments. In contrast to other key monitoring locations in the SPJC, data sonde deployment does not occur year-round at this site due to flooding issues during the wet season. Land uses contributing to this canal include agriculture (citrus), rangeland, wetlands, and upland forested areas. The following data plot shows continuous/hourly logging of specific conductance values for dry season periods (November – May) for February 2003 through May 2006. 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 have significantly increased during the dry season months of 2005-2006 which in part can be attributed to below average rainfall during this time period. There are two FARMS Projects currently operating to the east, and upstream, of this monitoring location. This portion of the Shell Creek watershed is designated as a priority area for management actions.

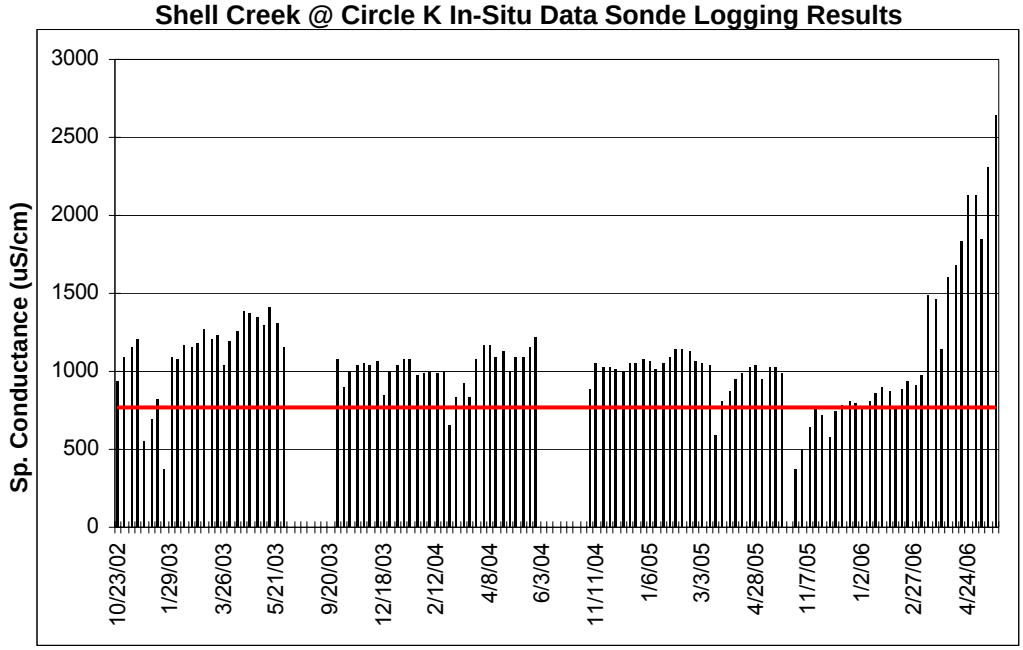
Shell Creek @ SR 31 In-Situ Data Sonde Logging Results
Key Monitoring Location



The ***Shell Creek @ Circle K*** data sonde is located in the main channel of Shell Creek in the central region of WBID 2041. Land use contributing to this canal is predominantly agriculture (citrus). The following data plot shows continuous/hourly logging of specific conductance values for dry season periods (November – May) for October 2002 through May 2006.

Specific conductance values have increased during the dry season months of 2006, due to below average rainfall during this time period, and water quality impacts from upstream areas in the watershed. There are currently no FARMS or back-plugging activities that have occurred in the immediate area surrounding this data sonde location, although one project has been implemented upstream of this location.

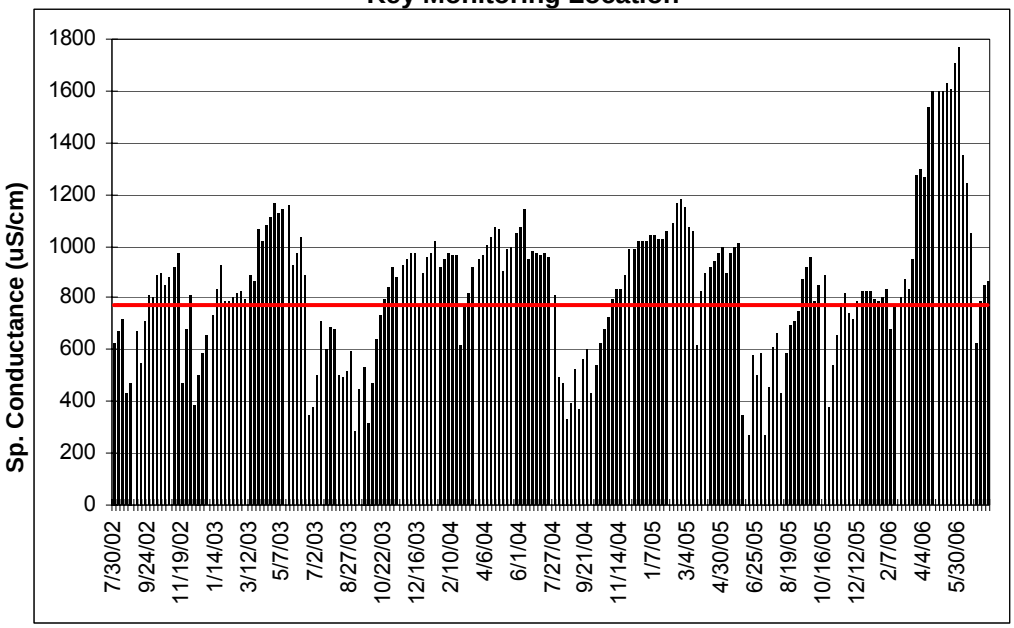
Shell Creek @ Circle K In-Situ Data Sonde Logging Results



The ***Shell Creek @ Washington Loop Road*** data sonde is located on the main channel of Shell Creek in the southern region of the Shell Creek watershed, just upstream of the Shell Creek Reservoir. Land use in the immediate surrounding area is urban/built up and agriculture. This location is one of the key index 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. The following data plot shows continuous/hourly logging of specific conductance for weekly median values throughout each year for July 2002 through July 2006.

Below average rainfall amounts during the spring and summer months of 2006, and impacts from upstream land uses in the Shell Creek watershed, have resulted in increased weekly median specific conductance values at this monitoring location for this time period. One FARMS project is located on a property upstream of this monitoring location which has tributaries directly contributing flow to Shell Creek.

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	21,857	2,772	12.7%	108	91	84.3%
Shell Creek @ Circle K	20,684	3,090	15%	118	104	88.1%
**Shell Creek @ Washington Loop	34,504	1,764	5.1%	208	135	0.39%

**Key Monitoring Location

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 eleven individual specific conductance values collected within WBID 2041 during the period of record, four 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. 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.

Specific Conductance Reconnaissance Results in WBID 2041 over Entire Period of Data Record

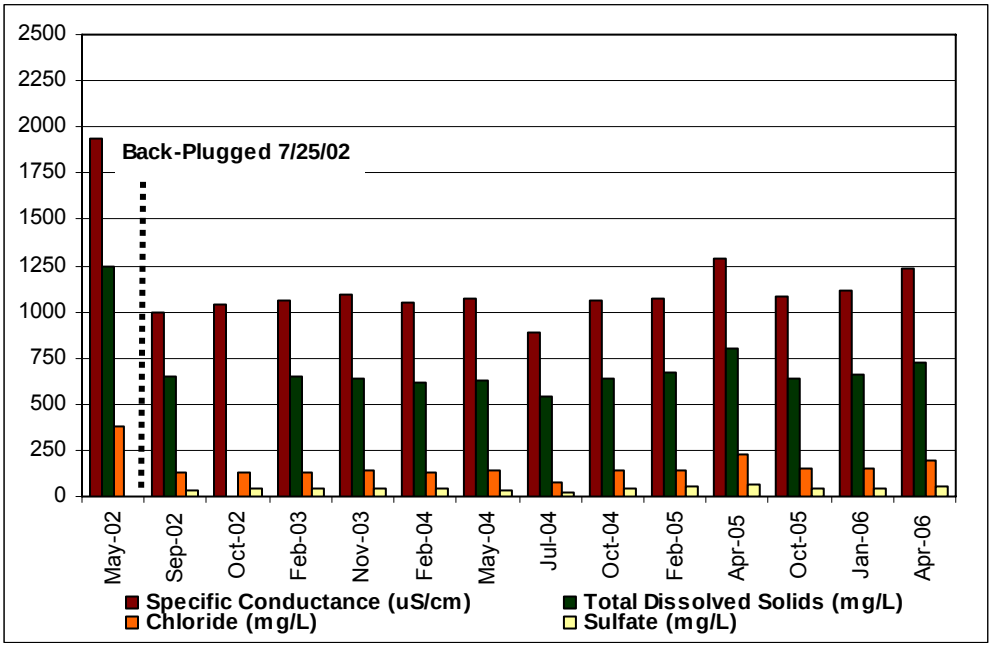
Station	Dry Season 2004 Value uS/cm	Wet Season 2004 Value uS/cm	Dry Season 2005 Value uS/cm	Wet Season 2005 Value uS/cm	Dry Season 2006 Value uS/cm	Percent change Dry Season 2004 versus Dry Season 2005	Percent change Dry Season 2005 versus Dry Season 2006
Unnamed Cr. @ Washington Lp Rd – #28	1708	467	1559	959	1415	↓9.56%	↓10.18%
Unnamed Cr. @ CR 74 - #26	392	63	299	Dry	Dry	↓31.10%	*
Unnamed Cr. @ CR 74 - #25	Dry	164	331	84	Dry	*	*

* 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 on 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 this well showing both pre- and post back-plug values for specific conductance, sulfate, chloride, and TDS. To date, this well has retained the integrity of the post back-plug concentrations for these parameters.

WUP 20009648 - DID No. 1



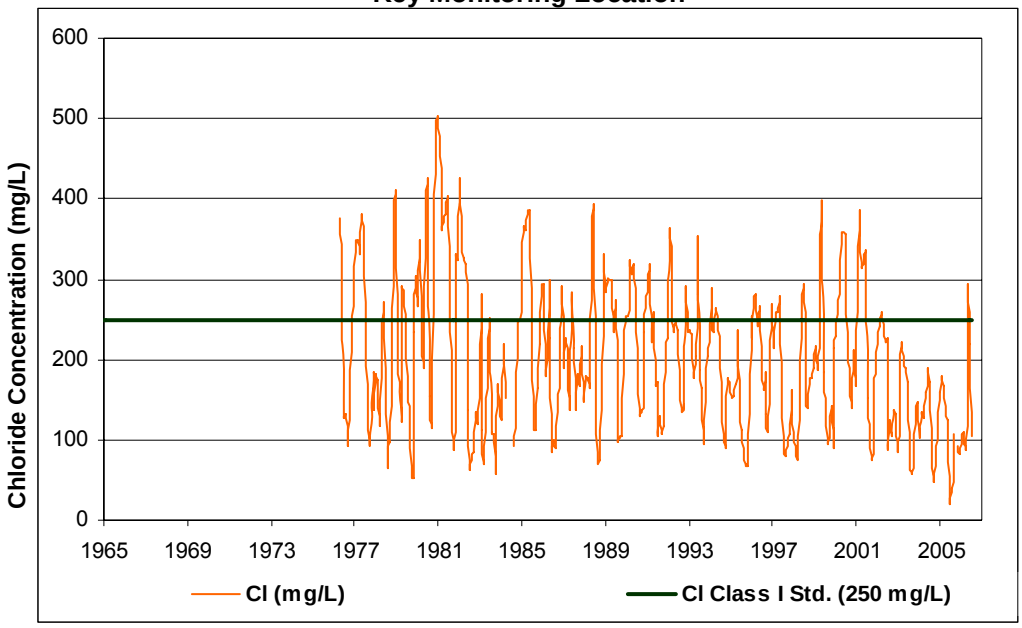
Surface-Water Quality Monitoring Networks (District, FDEP, and City of Punta Gorda)

The following graphs represent available water quality results through July 2006 for chloride and TDS concentrations at key 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 2006 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).

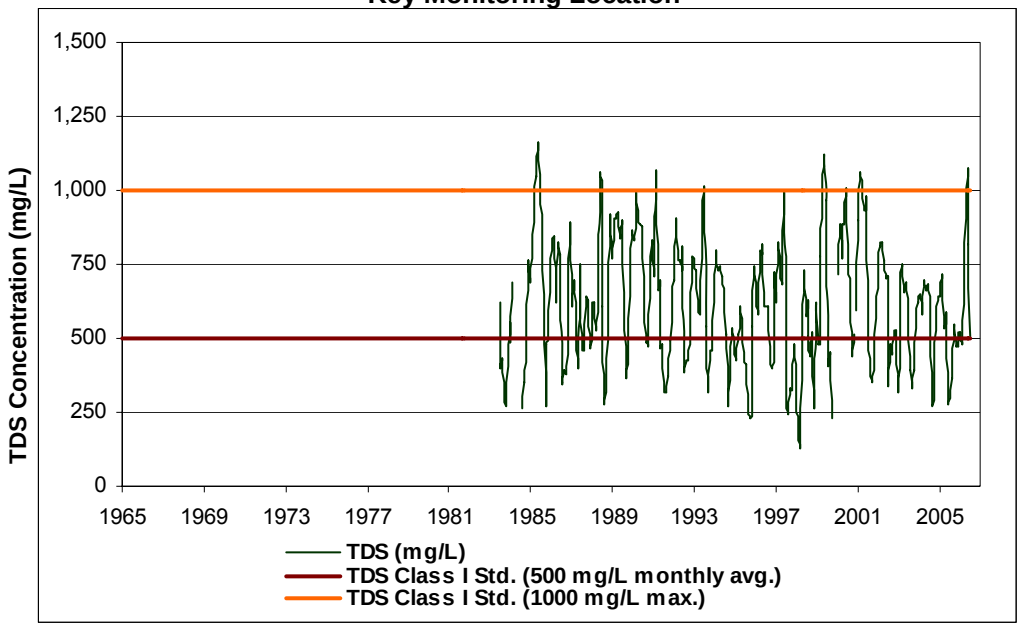
The City also began collecting water quality samples at the Shell Creek @ SR 31 location as a result of deteriorating water quality in the Shell Creek Reservoir during the 2001 drought. This site is not included under the City's WUP monitoring requirements; therefore the period of data record is shorter than some of the monitoring locations in the SPJC. Data collected by FDEP were also utilized for this location for 2002 through 2006.

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

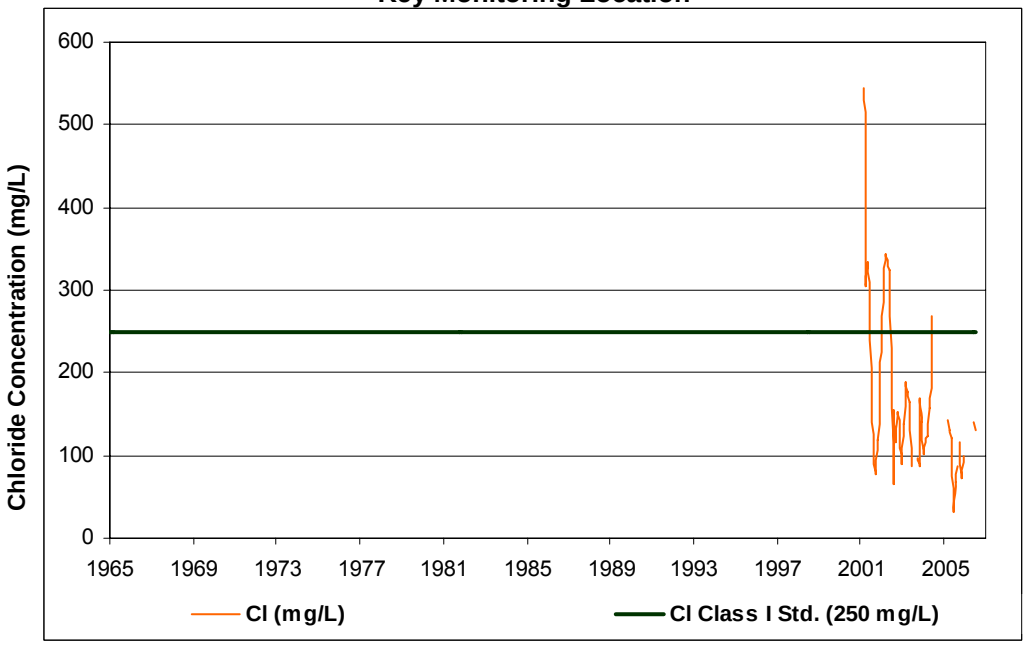


WBID 2041
Water Segment – Shell Creek
Shell Creek Watershed: Water Use - Class I
Verified Impaired Pollutants of Concern – sp. conductance, TDS, chloride

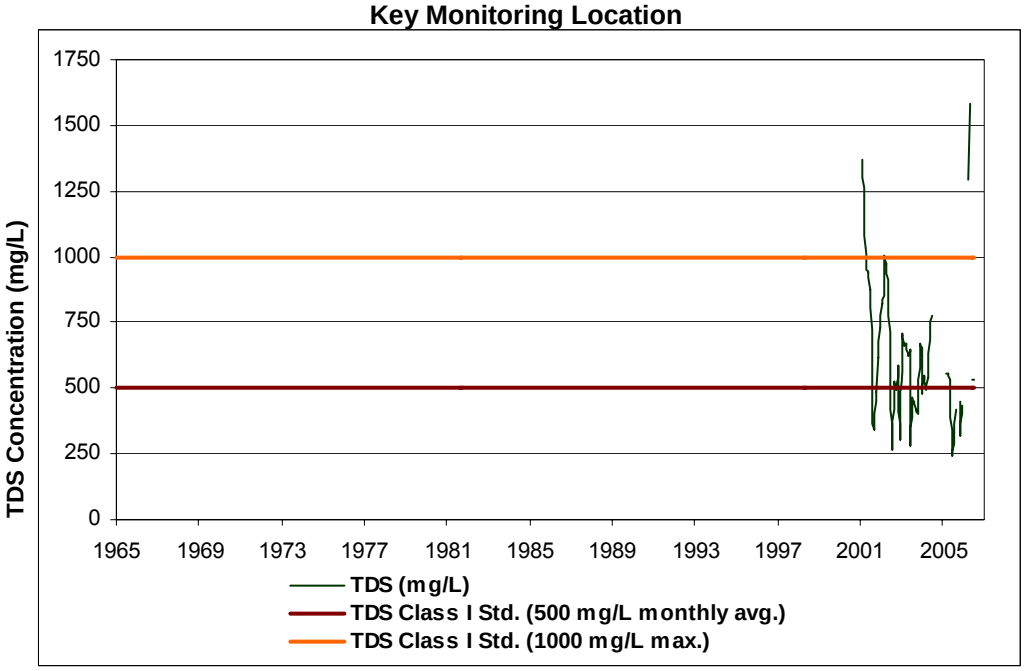
Shell Cr. @ Washington Loop Rd. Water Quality Results for TDS
Key Monitoring Location



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



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



Chloride and TDS Water Quality Results in WBID 2041 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
**Shell Cr. @ Washington Loop Rd.	359	105	29.2%	239	156	65.3%	10	4.2%
**Shell Cr. @ SR 31	51	11	21.6%	54	32	59.3%	5	9.3%

**Key Monitoring Location

Habitat Assessment and Stream Condition Index Monitoring (FDEP)

In the summer of 2003 and winter of 2004, biological (macroinvertebrate) samples for Stream Condition Index (SCI) analysis were collected at Shell Creek @ Cirlcle K. The SCI compares the biological community found in 20 dipnet sweeps of the best available habitat in a stream, with the community that would be expected in an undisturbed stream in the same part of the state. 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.

WBID 2041B

WBID 2041B

Water Segment – Shell Creek Reservoir

Shell Creek Watershed: Water Use - Class I

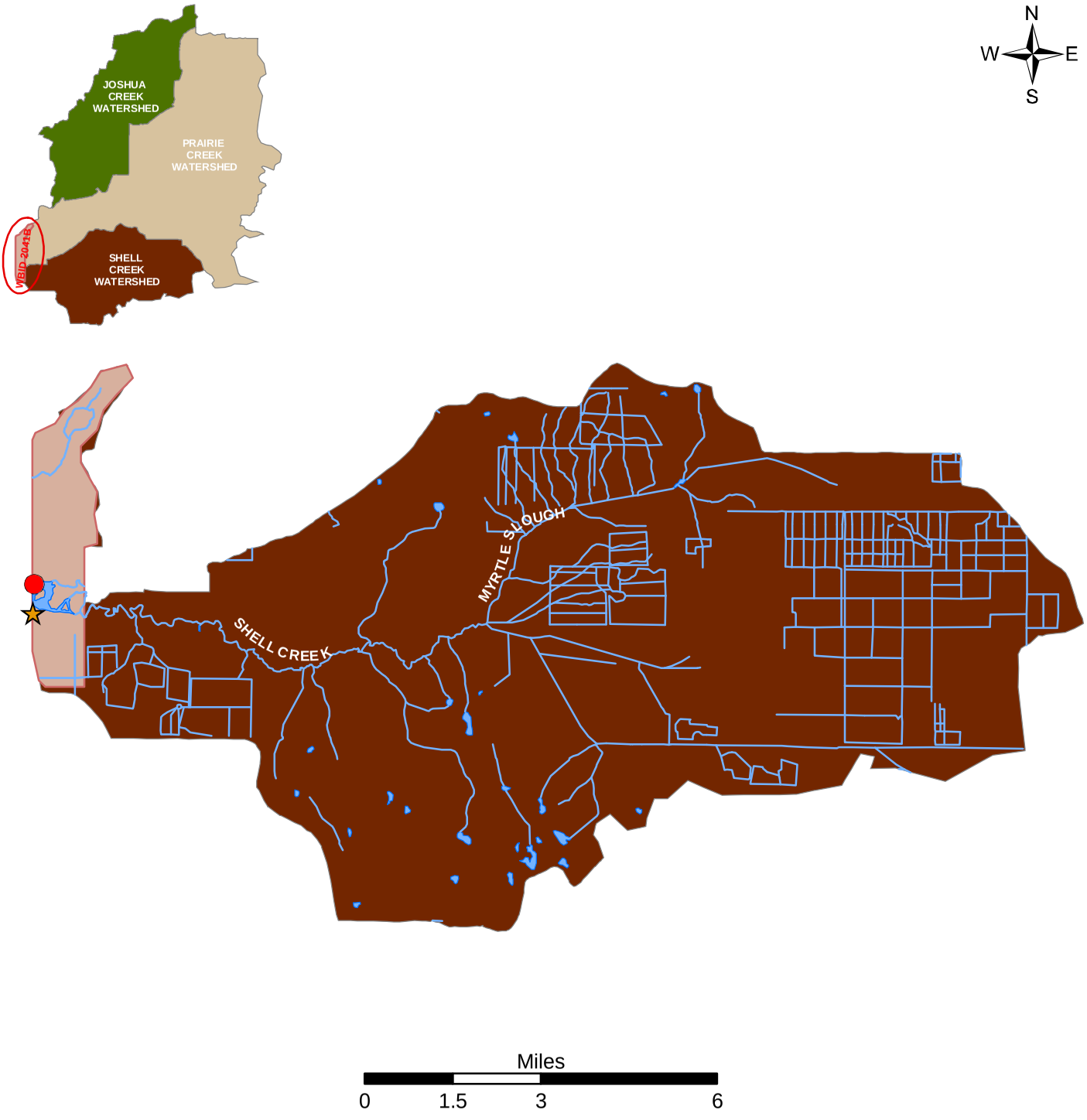
Verified Impaired Pollutants of Concern: None

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
No WUP applications were received by the District in WBID 2041B during the October 2004 through July 2006 time period.

Facilitating Agricultural Resource Management Systems (FARMS) and/or Environmental Quality Incentives (EQIP) Projects
To date, there are no Board approved or potential FARMS/EQIP projects in this WBID.

Quality of Water Improvement Program (QWIP)
No wells have been plugged/abandoned in WBID 2041B since October 2004.

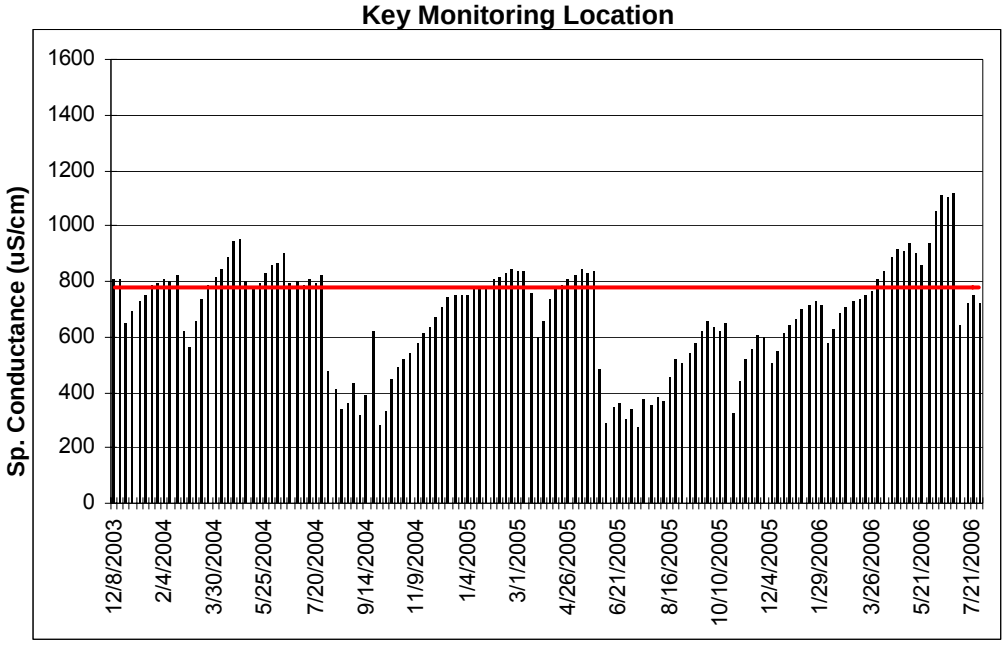
SPJC Water Quality Monitoring Results – Progress to Date

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 index surface water monitoring stations with data sonde deployment occurring year-round, although at this time this WBID is not listed as having any TMDL verified water quality impairments. Land uses immediately surrounding the Reservoir include agriculture, urban/built-up, and upland forests.

The following data plots reflect weekly median values for specific conductance, which have been calculated from independent values collected on an hourly frequency from December 2003 through July 2006. Specific conductance values have most likely increased during the dry season months of 2005-2006 due to below average rainfall during this time period.

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

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	22,879	0	0%	138	52	37.7%

**Key Monitoring Location

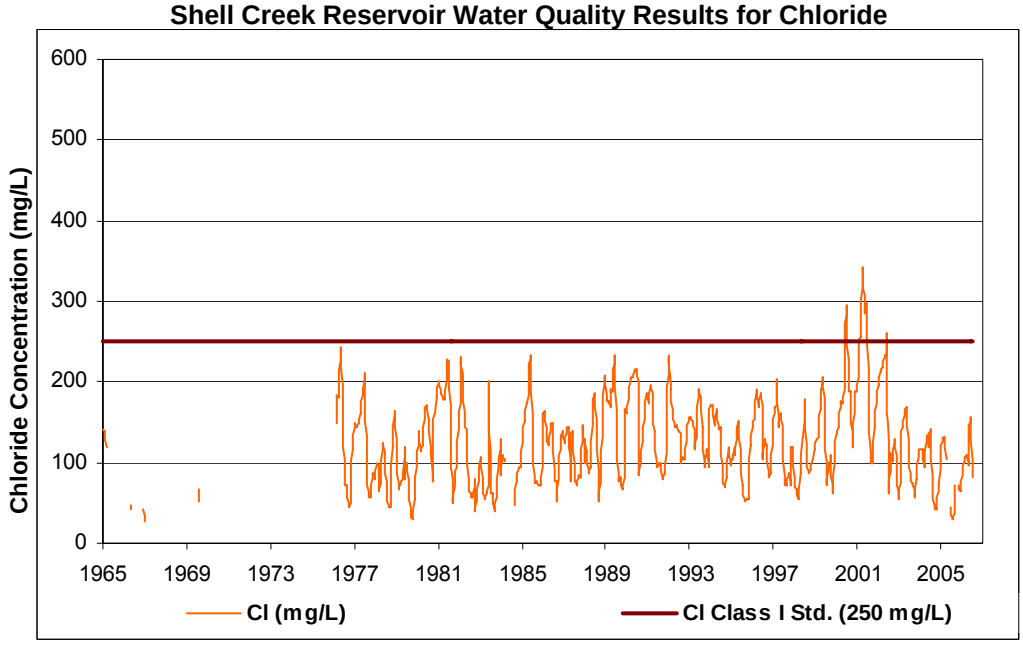
Specific Conductance Reconnaissance Network (District)
Within WBID 2041B there are no stations currently being monitored for the Specific Conductance Reconnaissance Network.

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.

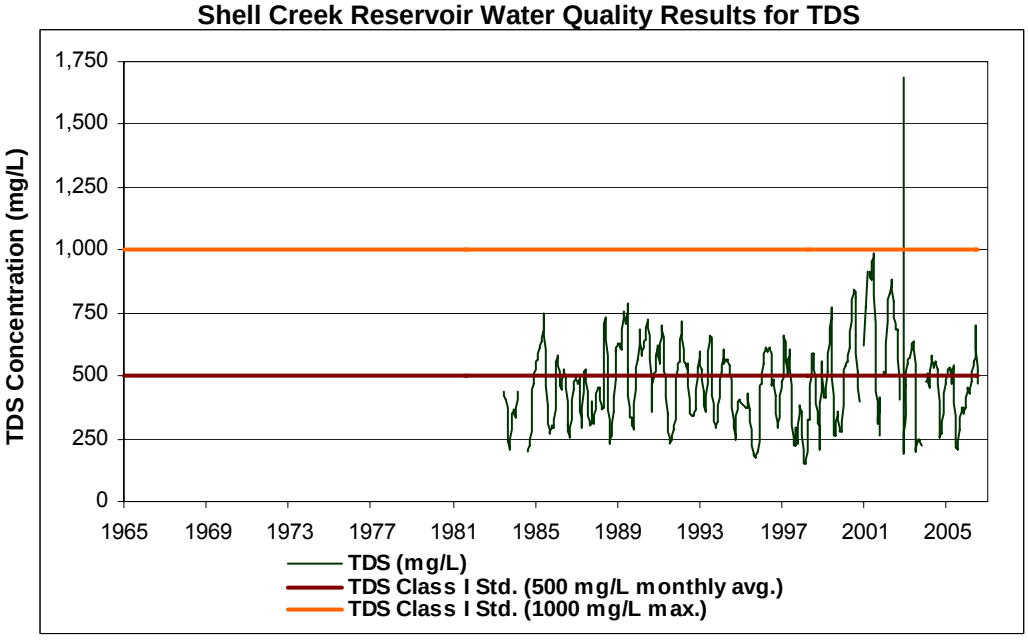
Surface-Water Quality Monitoring Networks (District, FDEP, and City of Punta Gorda)
The following graph represents water quality results through July 2006 for chloride and TDS concentrations at the Shell Creek Reservoir (WBID 2041B). This data plot was generated using historical data from the City of 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 2006 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).

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

Shell Creek Reservoir Water Quality Results for Chloride



Shell Creek Reservoir Water Quality Results for TDS



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 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
**Shell Cr. Reservoir	379	7	1.8%	226	96	42.5%	1	0.44%

**Key Monitoring Location

Habitat Assessment and Stream Condition Index Monitoring (FDEP)

During the reporting time period for this Performance Monitoring document, no sites in WBID 2041B were evaluated for the Habitat or Stream Condition Index Assessments.

WBID 2044

Water Segment – Cypress Slough

Shell Creek Watershed: Water Use - Class I

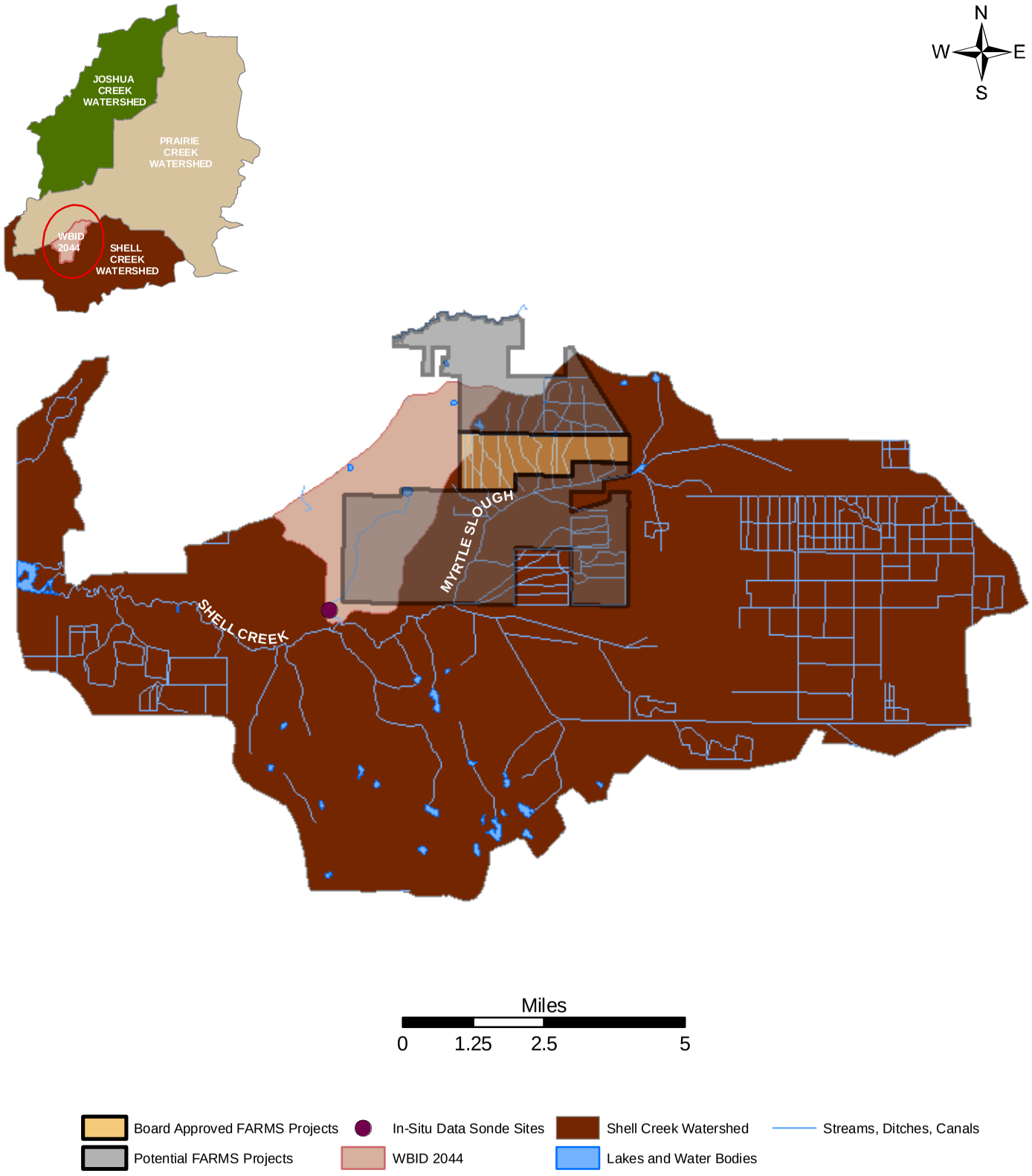
Verified Impaired Pollutants of Concern: None

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 received by the District in WBID 2044 during the October 2004 through July 2006 time period.

Facilitating Agricultural Resource Management Systems (FARMS) and/or Environmental Quality Incentives (EQIP) Projects
There are currently two Board approved, operational FARMS/EQIP projects and two potential FARMS projects in WBID 2044:

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.

The following two potential FARMS projects are currently under consideration and/or in the contract initiation phase:

WUP No. 20001759 (property also falls within WBID 2040):
The primary goal of this project is to reduce upper Floridan groundwater withdrawals through the use of an existing surface water reservoir to irrigate sod. Project components include one pump station, filtration, piping, and infrastructure necessary to connect the reservoir to the sod production area. The grower is furthering water conservation by installing a center pivot system with hanging, low-flow micro jets. This project has an estimated offset of 197,000 gpd of ground water.

WUP No. 20003275 (property also falls within WBIDs 1962 and 2040):
FARMS staff are discussing the potential to reduce groundwater withdrawals on a grove from an upper Floridan Aquifer well through the use of two existing shell pits as an irrigation source. Project components would include; a surface water pump station, piping, and infrastructure necessary to operate and connect the existing reservoir into the irrigation system. Other project components would include a pipe to connect the two reservoirs in order to maximize the availability of surface water. This project is to be presented to the February 2007 Governing and Peace River Basin Boards for funding approval and is estimated to offset over 148,000 gpd of ground water.

The following table summarizes approved and potential FARMS projects in WBID 2044, as well as summarizing ground water offsets for each of these projects:

Approved and Potential FARMS/EQIP Projects in WBID 2044

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 #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	502,188	2,256,226
*WUP #20001759 (sod)	N/D	197,000	N/D	N/D
*WUP #20003275 (citrus)	N/D	148,000	N/D	N/D

*Potential project currently under consideration
N/D = Not determined
**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

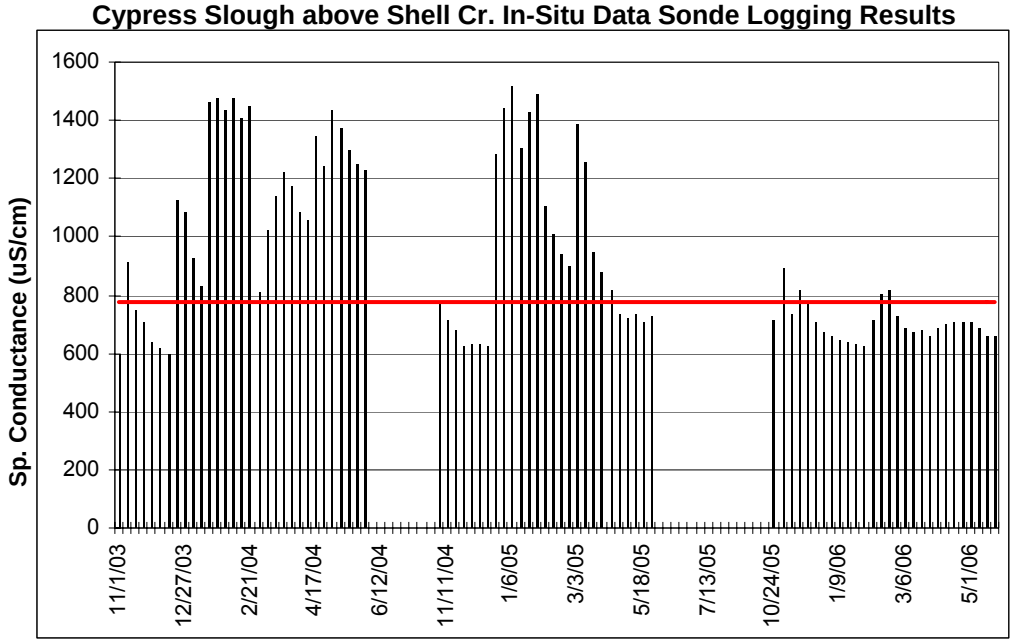
In-Stream Data Sonde - Conductance Logging Network (District and USGS)
There is currently one YSI® 600XLM data sonde deployed at station ***Cypress Slough above Shell Creek,*** which is located in the central region of the Shell Creek Watershed. This water body provides flows to Shell Creek. The majority 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 2006. Infrequent smothering of the data probe by sediment has caused some loss of data at this site during periods of low flow conditions. These erroneous values have been removed from the data set.

A notable decrease in weekly median specific conductance values has occurred during November through May of 2005-2006 when compared to the dry season months of 2003-2005. Two FARMS projects have been initiated in the upstream regions of this monitoring location, and one additional project is currently under review.

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

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



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.

Habitat Assessment and Stream Condition Index Monitoring (FDEP)
During the reporting time period for this Performance Monitoring document, no sites in WBID 2044 were evaluated for the Habitat or Stream Condition Index Assessments.

WBID 2058

WBID 2058

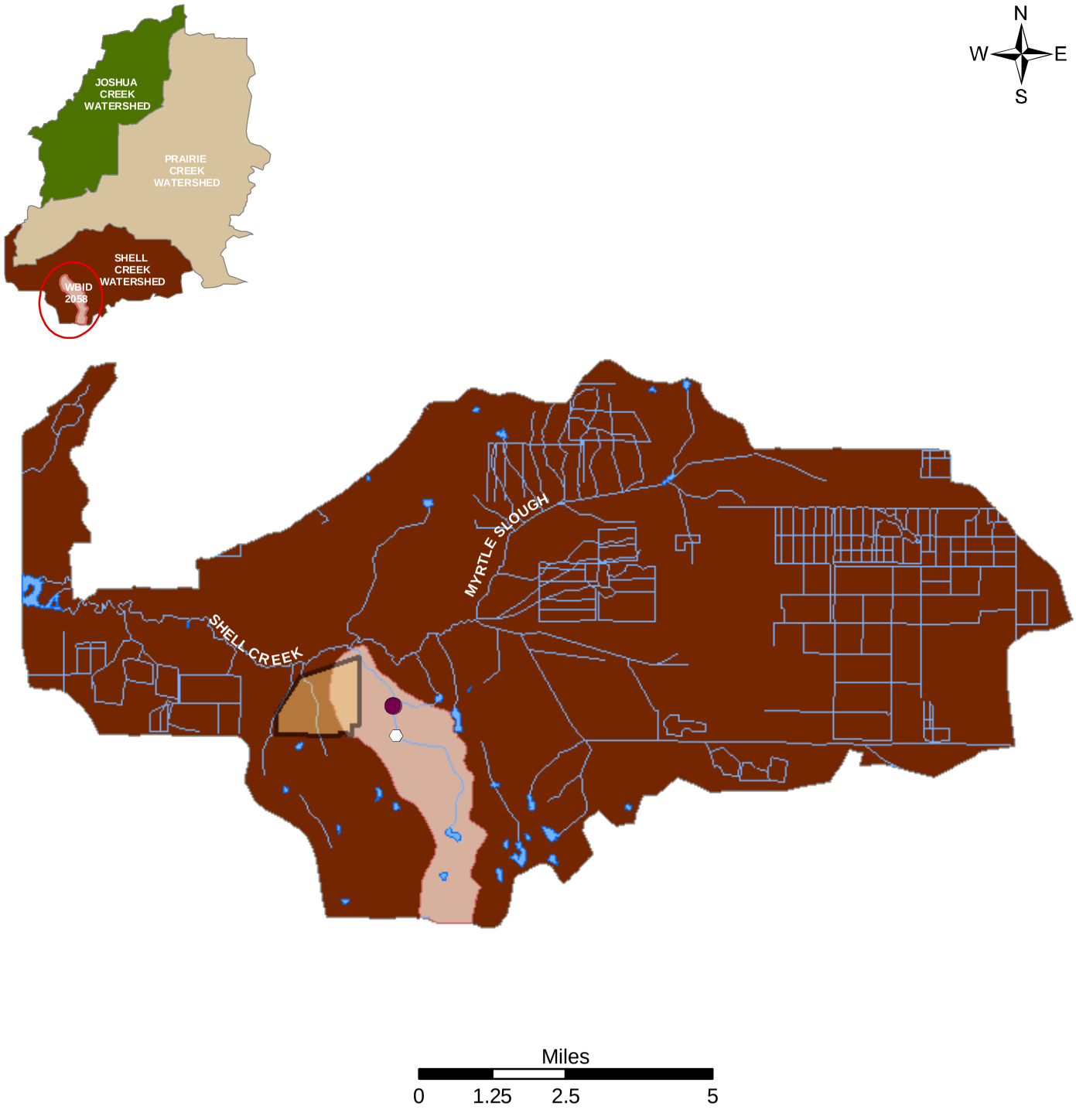
Water Segment – Unnamed Ditch

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
No WUP applications were received by the District in WBID 2058 during the October 2004 through July 2006 time period.

Facilitating Agricultural Resource Management Systems (FARMS) and/or Environmental Quality Incentives (EQIP) Projects
There is currently one Board approved, operational FARMS project in WBID 2058.

WUP No. 20009476 (FARMS funded; property also falls within WBID 2041):
The primary goal of this project is to capture and reuse surface water and irrigation tailwater for citrus irrigation. Project components include a surface water pump station, components to make an additional surface water pump station usable, additional water control structures to assist in tailwater recovery and float wells to assist in reducing the frequency of irrigation events. This project has been operational since August 2003 and has offset an average of 143,078 gpd of groundwater. The project offset was 136,000 gpd.

The following table summarizes the approved FARMS project in WBID 2058, as well as summarizing ground water offsets for this project:

Approved FARMS/EQIP Projects in WBID 2058

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 #20009476 (citrus)	August 2003	136,000	143,078	386,400

****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)
The have been no wells plugged/abandoned in WBID 2058 since October 2004.

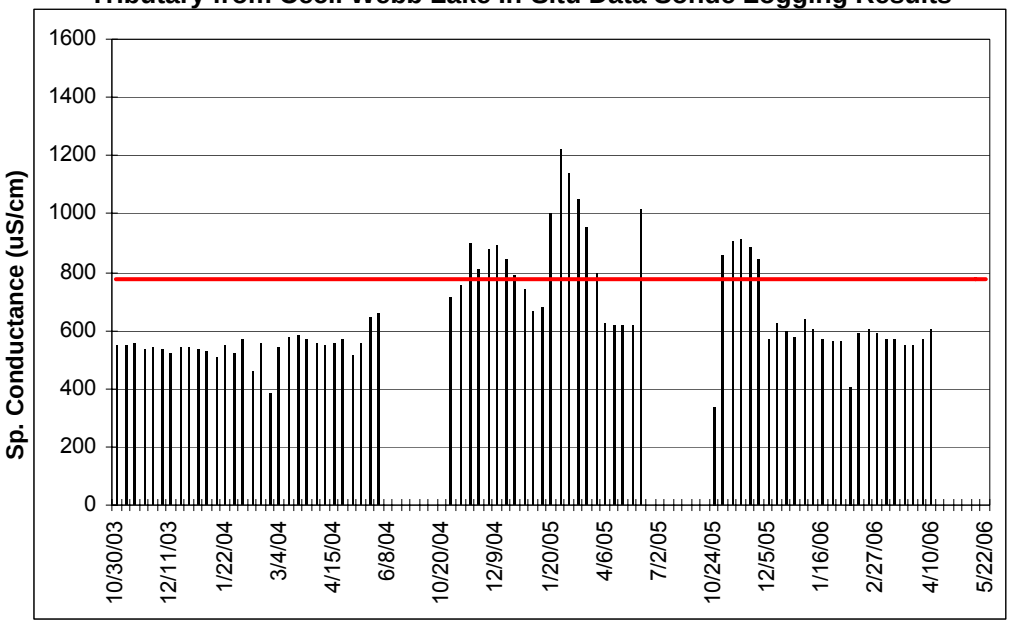
SPJC Water Quality Monitoring Results – Progress to Date

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 April 2006. 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. District Regulatory actions undertaken in the summer of 2005 have resulted in a decrease in these specific conductance concentration values 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.

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



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 three 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 table summarizes the percent change increases and/or decreases between dry season events for each monitoring station within WBID 2058. 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.

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

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

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

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

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

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

Habitat Assessment and Stream Condition Index Monitoring (FDEP)

During the reporting time period for this Performance Monitoring document, no sites in WBID 2058 were evaluated for the Habitat or Stream Condition Index Assessments.

WBID 1964

WBID 1964

Water Segment – Cow Slough

Prairie Creek Watershed: Water Use – Class 3F

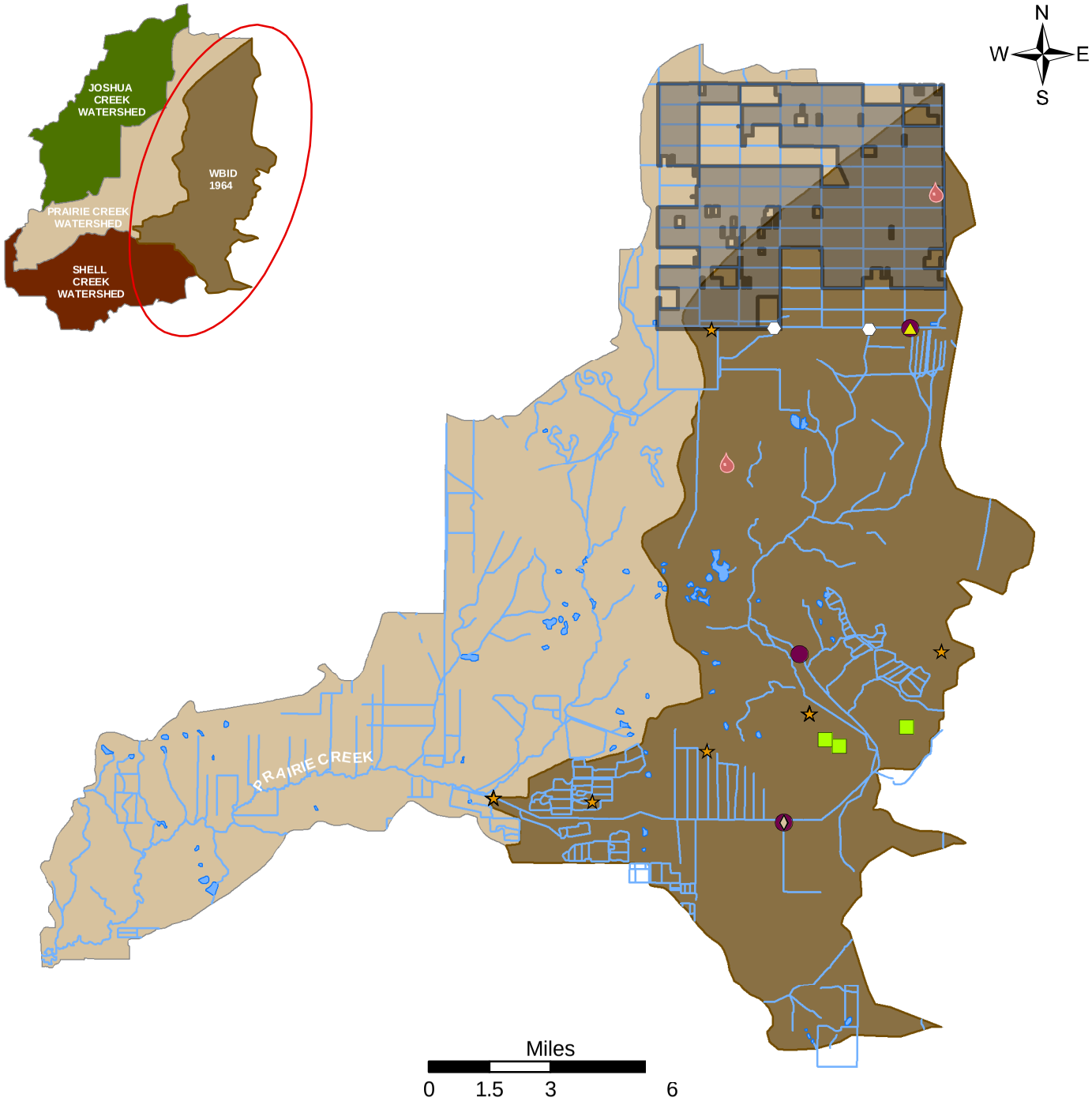
Verified Impaired Pollutants of Concern: None

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.

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

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, two WUP applications were received during the reporting time period for this document. Of the two applications, one was a renewal and one was a letter modification. Neither permit issued received additional special conditions to address water quality concerns in the SPJC watersheds. These 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 1964

New WUPs	0
WUP Renewals	1
WUP Modifications	0
WUP Letter Modifications	1

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 1964. The following potential FARMS project is currently under consideration:

WUP No. 20002386 (FARMS funded; property also falls within WBID 1962):
FARMS staff have discussed the potential to cost-share water control structures on a citrus grove. These structures would assist in on-site surface water management by keeping rainfall and irrigation tailwater onsite for longer periods of time, which could potentially reduce the frequency of irrigation events.

The following table summarizes the potential FARMS project in WBID 1964, as well as summarizing ground water offsets for this project:

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)	N/D	N/D	N/D	N/D

*Potential project currently under consideration
N/D = Not determined

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

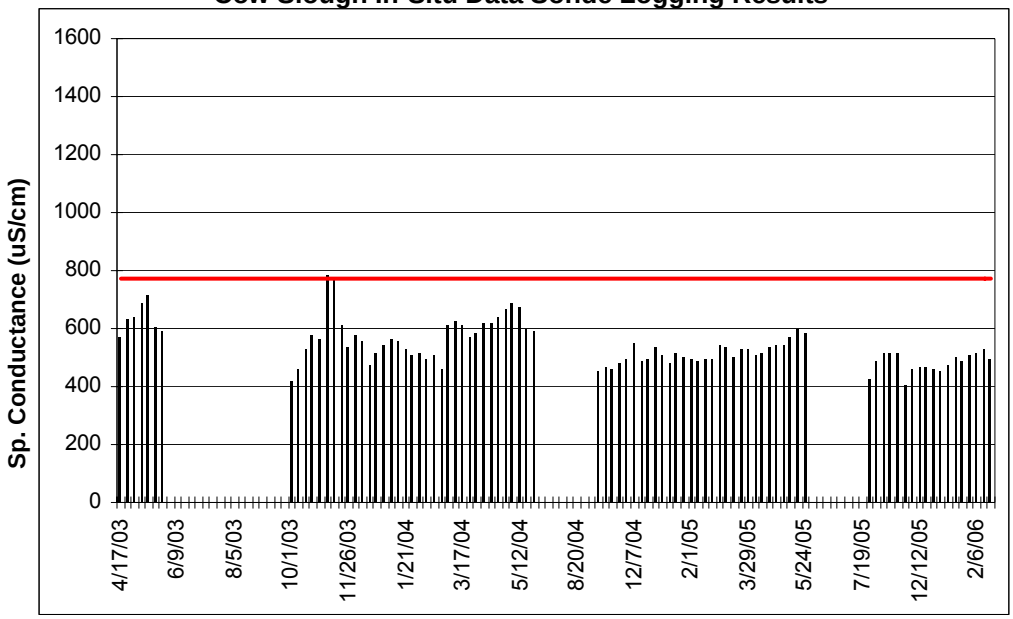
In-Stream Data Sonde - Conductance Logging Network (District and USGS)
There are currently three YSI® 600XLM data sondes deployed in WBID 1964, which is located in the eastern region of the Prairie Creek Watershed. The following data plots reflect weekly median values for specific conductance, which 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 continuous/hourly logging of specific conductance values for dry season periods (November – May) for April 2003 through February 2006. The data sonde malfunctioned during March – May 2006 therefore, no data exist for these months.

The majority of specific conductance values over the period of data record, have been below the 775 uS/cm goal. A potential FARMS project in an agricultural area upstream of this monitoring location is currently under consideration.

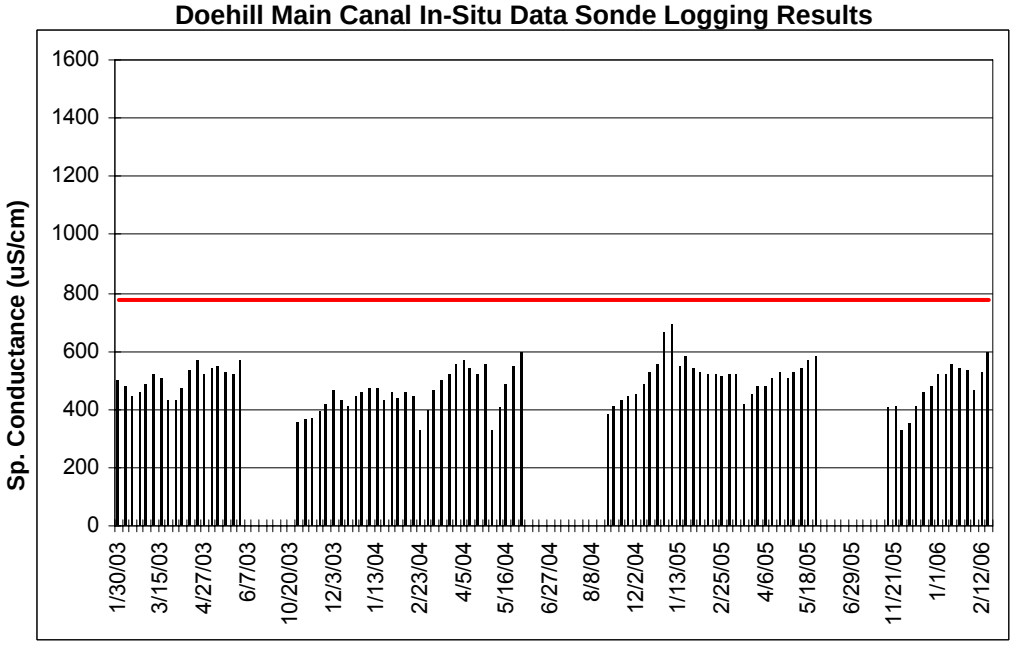
WBID 1964
Water Segment – Cow Slough
Prairie Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern – None

Cow Slough In-Situ Data Sonde Logging Results



The ***Doehill Main Canal*** data sonde is located in an agricultural canal in the central region of WBID 1964. Flows from this canal contribute directly to Prairie Creek via Montgomery Canal. Land uses in the immediate surrounding region of this canal include wetlands, rangelands, and small areas of agriculture. The following data plot shows continuous/hourly logging of specific conductance values for dry season periods (November – May) for January 2003 through February 2006. The data sonde malfunctioned during March – May 2006 therefore, no data exist for these months. This monitoring location has had weekly median specific conductance values below the 775 uS/cm threshold over the data period of record. No back-plugging or FARMS activities have occurred in the immediate area of this monitoring location.

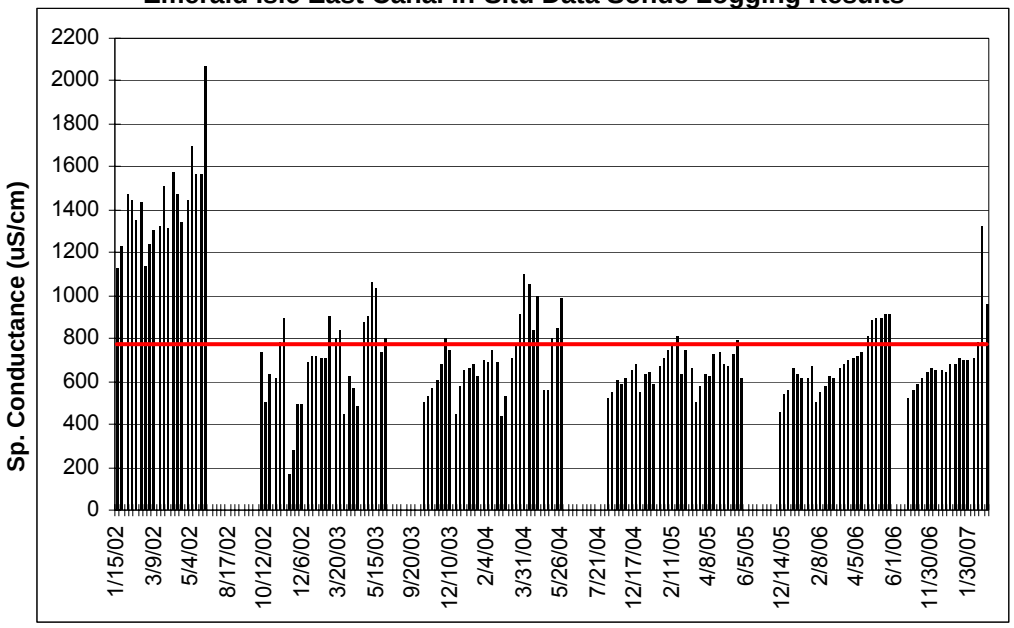
Doehill Main Canal In-Situ Data Sonde Logging Results



The ***Emerald Isle East Canal*** data sonde is located in an agricultural canal in the south-central region of WBID 1964. 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 continuous/hourly logging of specific conductance values for dry season periods (November – May) for January 2002 through May 2006.

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 have occurred since this time period. Additionally, three wells have been back-plugged in the upstream region of this location.

Emerald Isle East Canal In-Situ Data Sonde Logging Results



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 six 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 table

summarizes the percent change increases and/or decreases between dry season events for each monitoring station within WBID 1964. Individual values for each dry season event are also provided. Stations that were not flowing during a sample event have been recorded as dry.

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

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	↑25.27%	↑9.34%
Unnamed Cr. @ SR 70 - #33	Dry	114	Dry	Dry	Dry	*	*

* 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.

Habitat Assessment and Stream Condition Index Monitoring (FDEP)

During the reporting time period for this Performance Monitoring document, no sites in WBID 1964 were evaluated for the Habitat or Stream Condition Index Assessments.

WBID 1995

WBID 1995

Water Segment – Myrtle Slough

Prairie Creek Watershed: Water Use - Class I

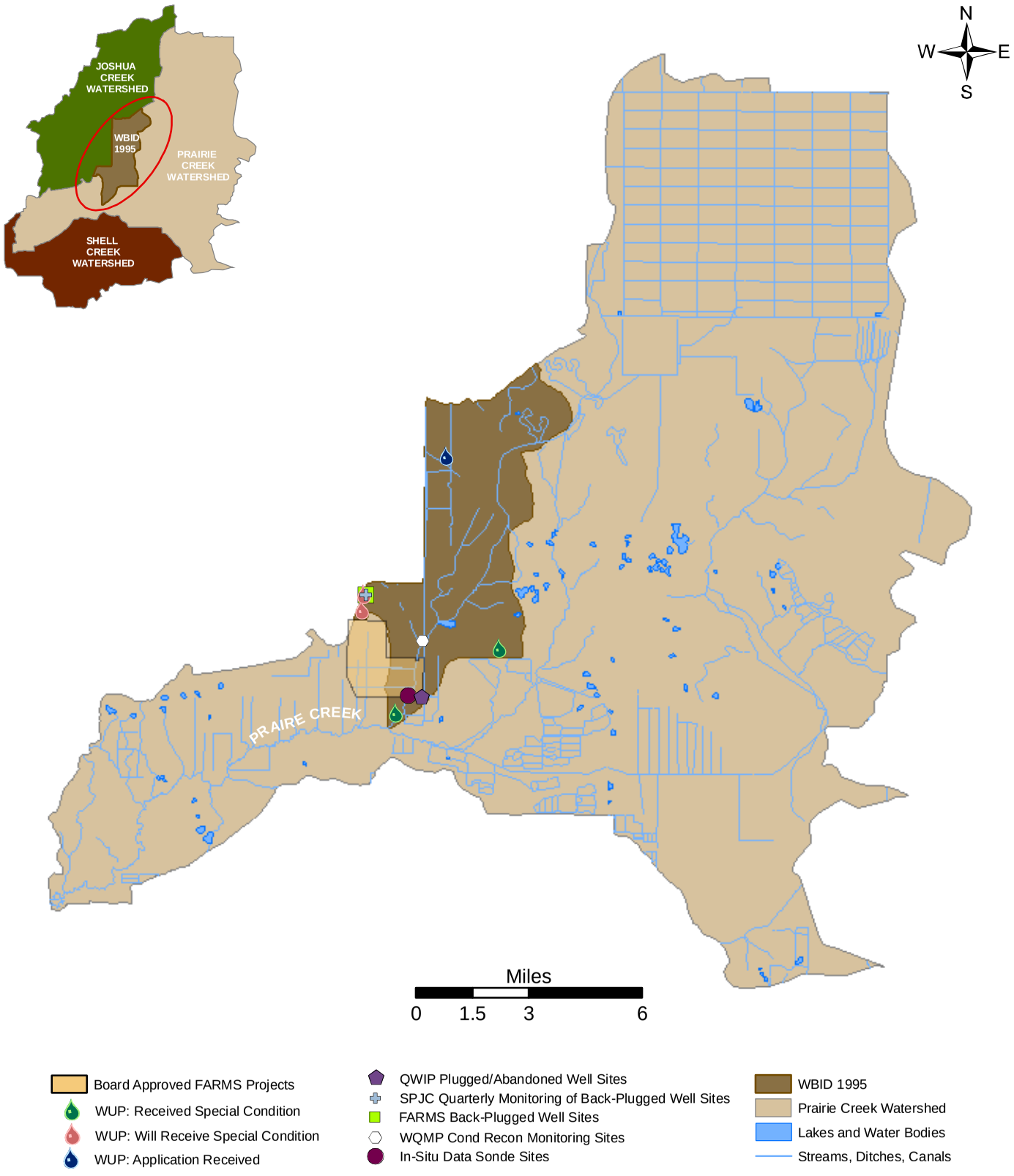
Verified Impaired Pollutants of Concern: None

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, five WUP applications were received. Of the five applications, two were new permits, two were renewals, and one was a letter modification. One permit was not issued within the timeframe of this document (see table below). Two of the four permits issued received additional special conditions to address water quality concerns in the SPJC watersheds. The other two 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

New WUPs	2
WUP Renewals	2*
WUP Modifications	0
WUP Letter Modifications	1

* One application received but WUP not issued by 7/31/2006

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

There is currently one Board approved, operational FARMS/EQIP project in WBID 1995:

WUP No. 20006765 (FARMS and EQIP funded; property also falls within WBID 1962, 2001):
The primary goal of this project is to reduce groundwater withdrawals on a citrus grove 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, surface water collection pump station, two irrigation pump stations (including filtration), and piping necessary to connect the proposed tailwater interception and surface water reservoir system to the existing irrigation system. This project has been operational since July 2006 and has an estimated ground water offset of 222,500 gpd.

The following table summarizes the approved FARMS project in WBID 1995, as well as summarizing ground water offsets for this project:

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

Approved FARMS/EQIP Projects in WBID 1995

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)	July 2006	222,500	N/D	N/D

N/D = Not determined

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

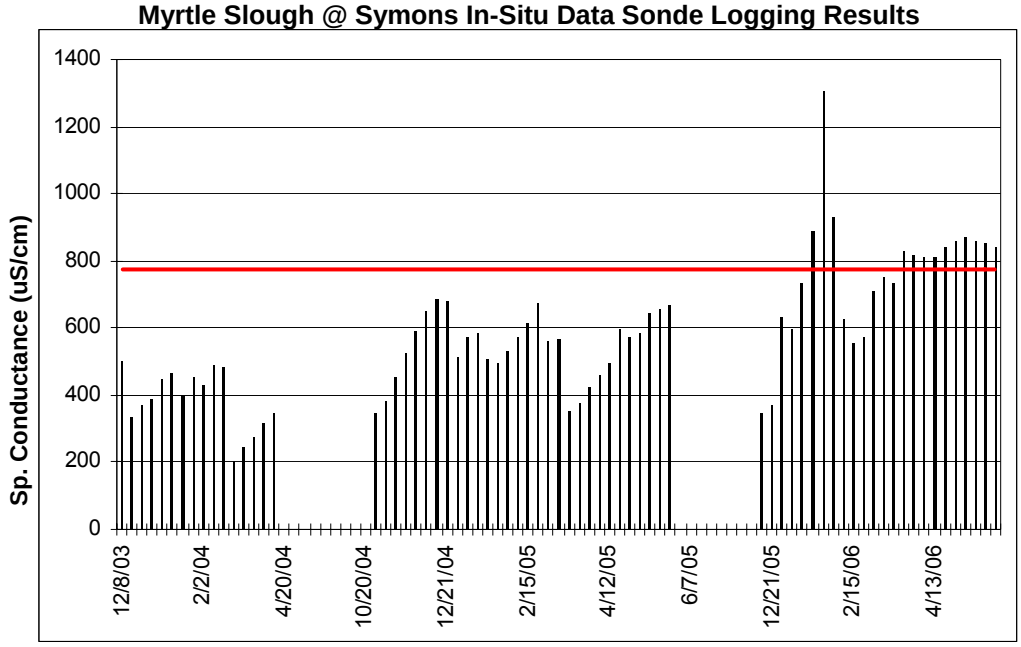
In-Stream Data Sonde - Conductance Logging Network (District and USGS)

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. 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 February 2006. 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 increased during the January 2005 through May 2006 time period. A portion of one operational FARMS project falls within the upstream region of this data sonde location. 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	11,525	183	1.6%	70	13	18.6%

Specific Conductance Reconnaissance Network (District)

Within WBID 1995 there is currently one station monitored for the Specific Conductance Reconnaissance Network. Of the four 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 table summarizes the percent change increases and/or decreases between dry season events for each monitoring station within WBID 1995. Individual values for each dry season event are also provided. Stations that were not flowing during a sample event are denoted below as dry.

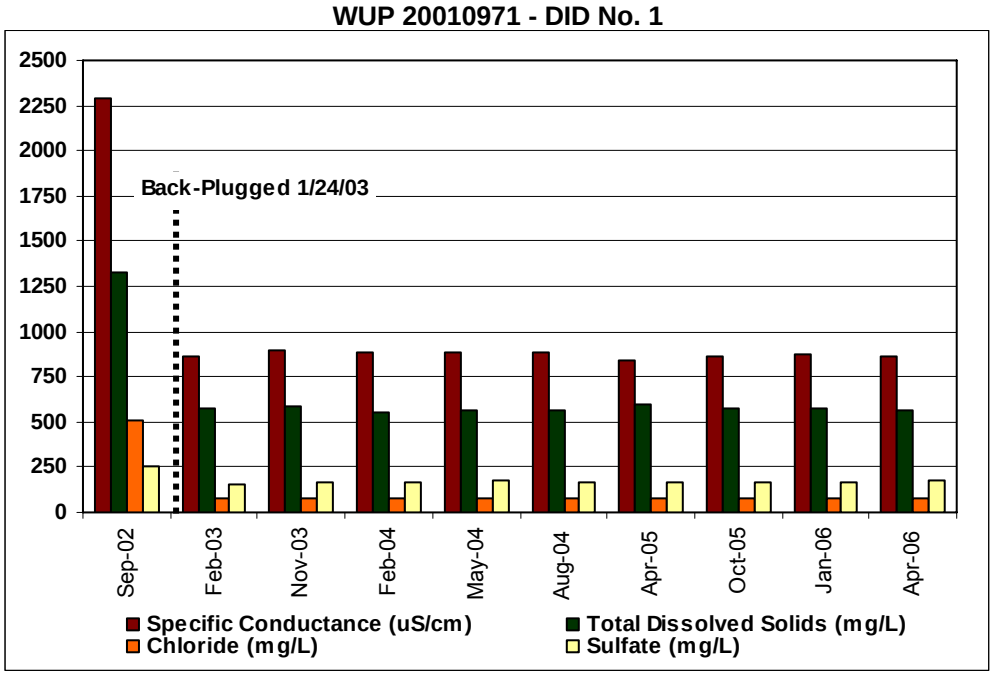
Specific Conductance Reconnaissance Results in WBID 1995 over Entire Period of Data Record

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	↓13.99%	*

* 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.



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 Stream Condition Index (SCI) analysis were collected at Myrtle Slough above Nichols Road. The SCI compares the biological community found in 20 dipnet sweeps of the best available habitat in a stream, with the community that would be expected in an undisturbed stream in the same part of the state. 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.

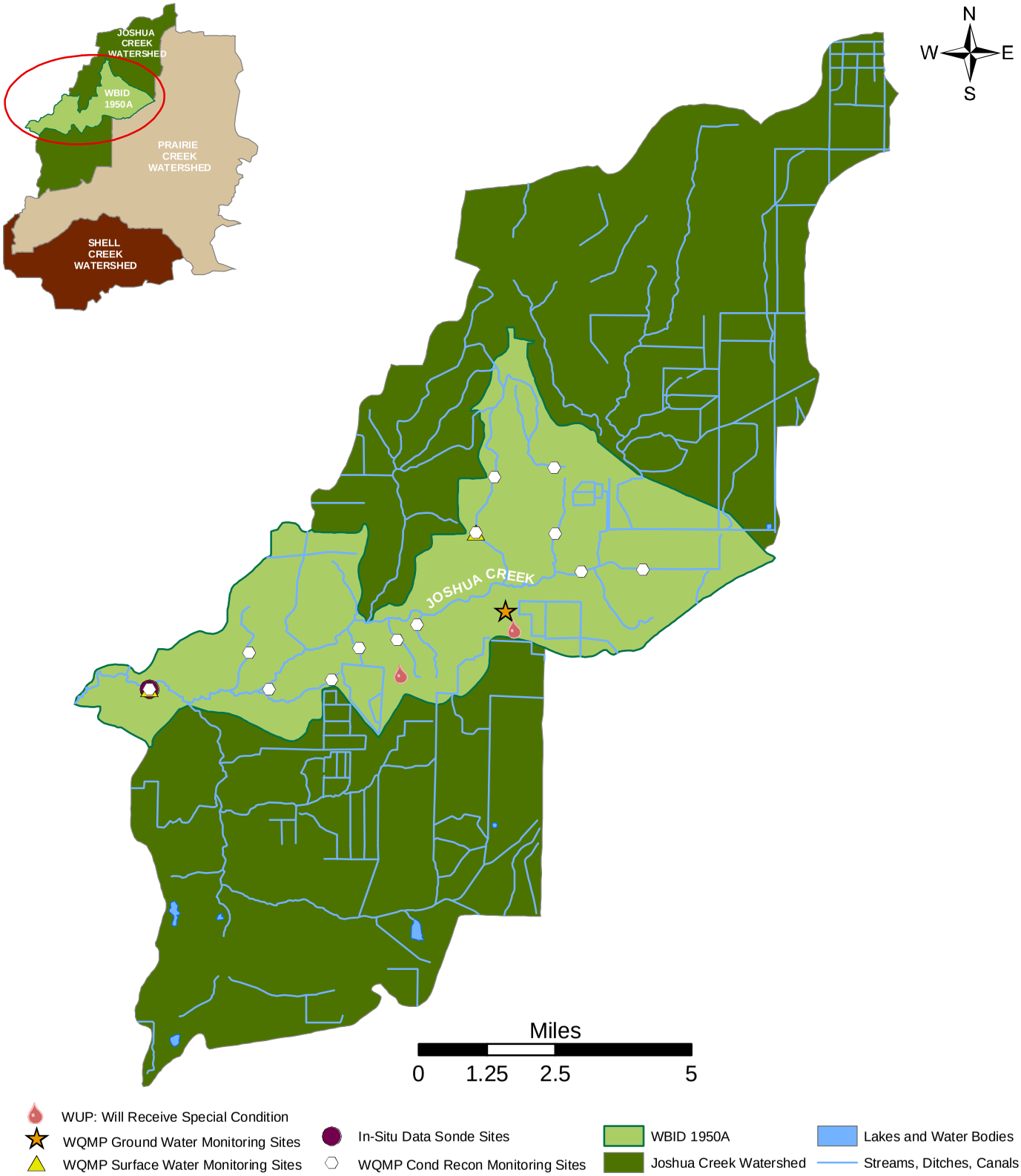
WBID 1950A

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

District Resource Regulation – Water Use Permitting
In WBID 1950A, two WUP applications were received during the October 2004 through July 2006 timeframe. Of the two applications, one was a modification and one was a letter modification (see table below). Neither permit issued received additional special conditions to address water quality concerns in the SPJC watersheds. These 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

New WUPs	0
WUP Renewals	0
WUP Modifications	1
WUP Letter Modifications	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 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

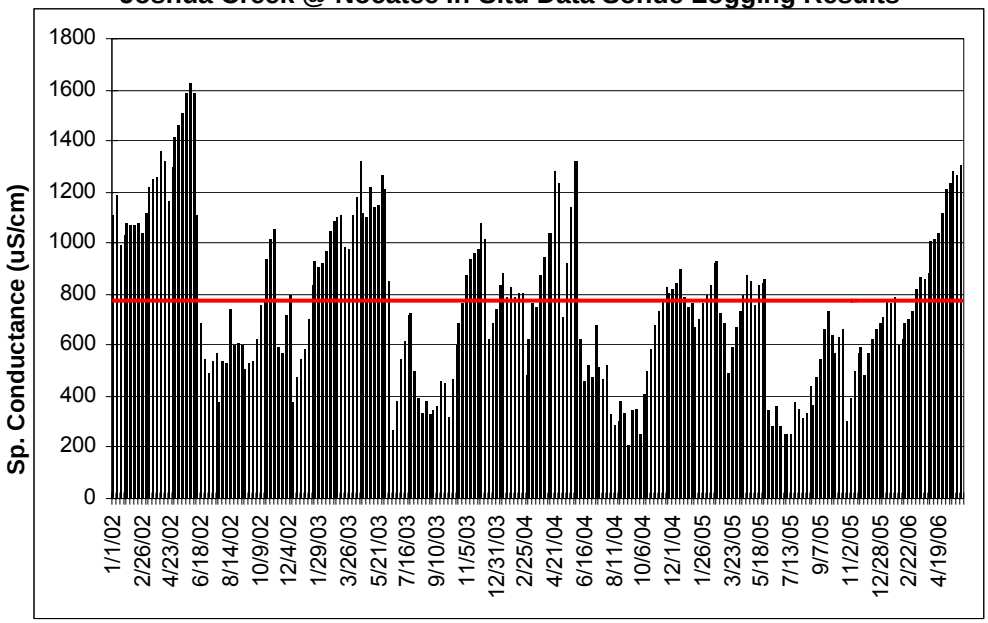
In-Stream Data Sonde - Conductance Logging Network (District and USGS)
There is currently one YSI® 600XLM data sonde deployed in WBID 1950A at Joshua Creek @ Nocatee, with maintenance and operation performed by the USGS. This monitoring location is in the western region of WBID 1950A in the Joshua Creek 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 index station, with data sonde deployment occurring year-round.

The following data plot reflects weekly median values for specific conductance, which were calculated from independent values collected on an hourly frequency from January 2002 through July 2006. Specific conductance concentrations show a slight decreasing trend during dry season periods. There have been no back-plugging or FARMS project activities in WBID 1950A. A table located at the end of this section provides the overall data sonde specific conductance monitoring results for WBID 1950A.

WBID 1950A

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

Joshua Creek @ Nocatee In-Situ Data Sonde Logging Results



Specific Conductance Logging Results in WBID 1950A 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	47,641	3,240	6.8%	239	112	46.9%

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 45 individual specific conductance values collected within WBID 1950A during the period of record, four values exceeded the 775 uS/cm goal criteria and one value 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 1950A. Individual values for each dry season event are also provided. Stations that were not flowing during a sample event are denoted as dry.

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

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	↓8.89%	↓19.34%
Joshua Cr. @ SR 70 – #6	516	116	511	339	572	↓0.98%	↑10.66%
Unnamed Cr. @ CR 760 - #6	1093	330	974	619	1430	↓12.22%	↑31.89%
Unnamed Cr. @ Airport Ave. - #34	590	638	631	553	Dry	↑6.50%	*
Unnamed Cr. @ SR 31 - #7.	Dry	314	Dry	Dry	Dry	*	*
Unnamed Cr. @ SE Kings St. -	442	229	468	183	Dry	↑5.56%	*
Unnamed Cr. @ CR 760 - #5	1183	180	618	620	Dry	↓91.42%	*
Upper Joshua Cr. - # 32	52	44	162	70	Dry	↑67.90%	*
Unnamed Cr. @ CR 760 - #4	Dry	63	294	197	Dry	*	*
Unnamed Cr. @ Roan St. - #2	564	124	626	Dry	Dry	↑9.90%	*
Unnamed Cr. @ Roan St. - #3	721	78	441	309	Dry	↑63.49%	*
Tributary to Joshua Cr. @ SR	Dry	104	333	218	Dry	*	*

* Station dry.

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

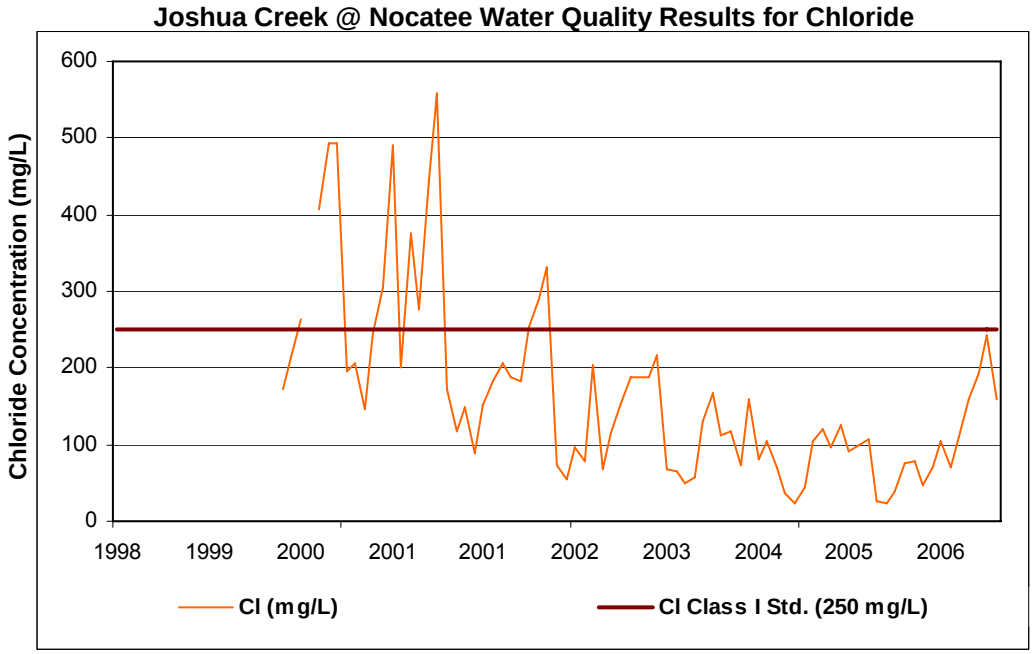
To date, no wells in WBID 1950A are monitored as part of the Back-Plug Well Monitoring Network.

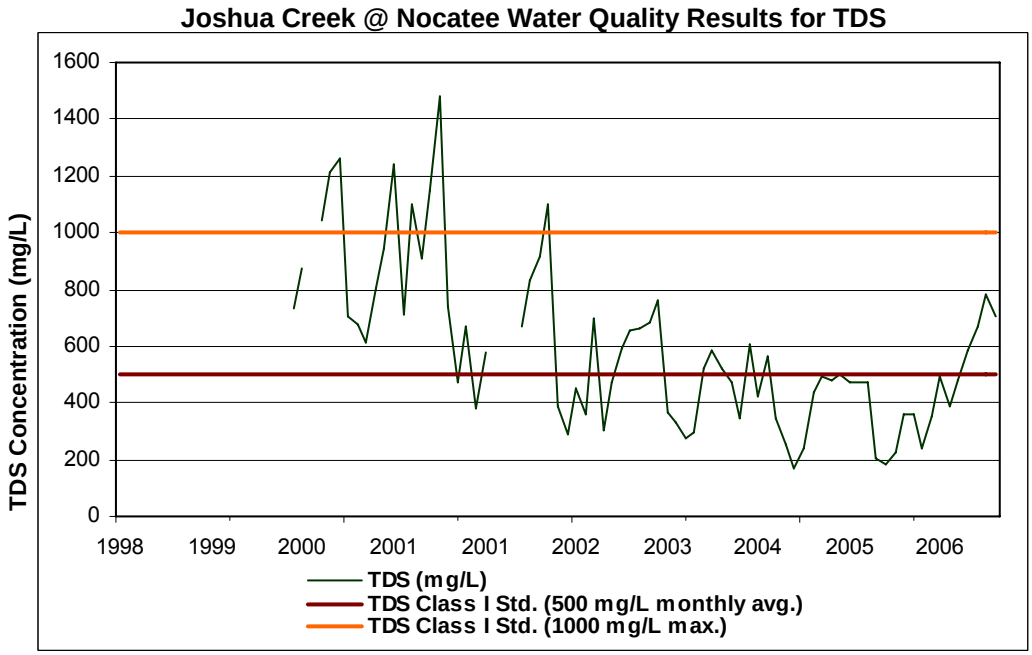
Surface-Water Quality Monitoring Networks (District, FDEP, and City of Punta Gorda)

The following graphs represents water quality results through July 2006 for chloride and TDS concentrations at station Joshua Creek @ Nocatee (WBID 1950A). These data plot were generated using data from the District's monthly CWM Network. 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).

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

Chloride and TDS Water Quality Results in WBID 1950A 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
Joshua Cr. @ Nocatee	78	13	16.7%	72	36	50%	8	11.1%

Habitat Assessment and Stream Condition Index Monitoring (FDEP)

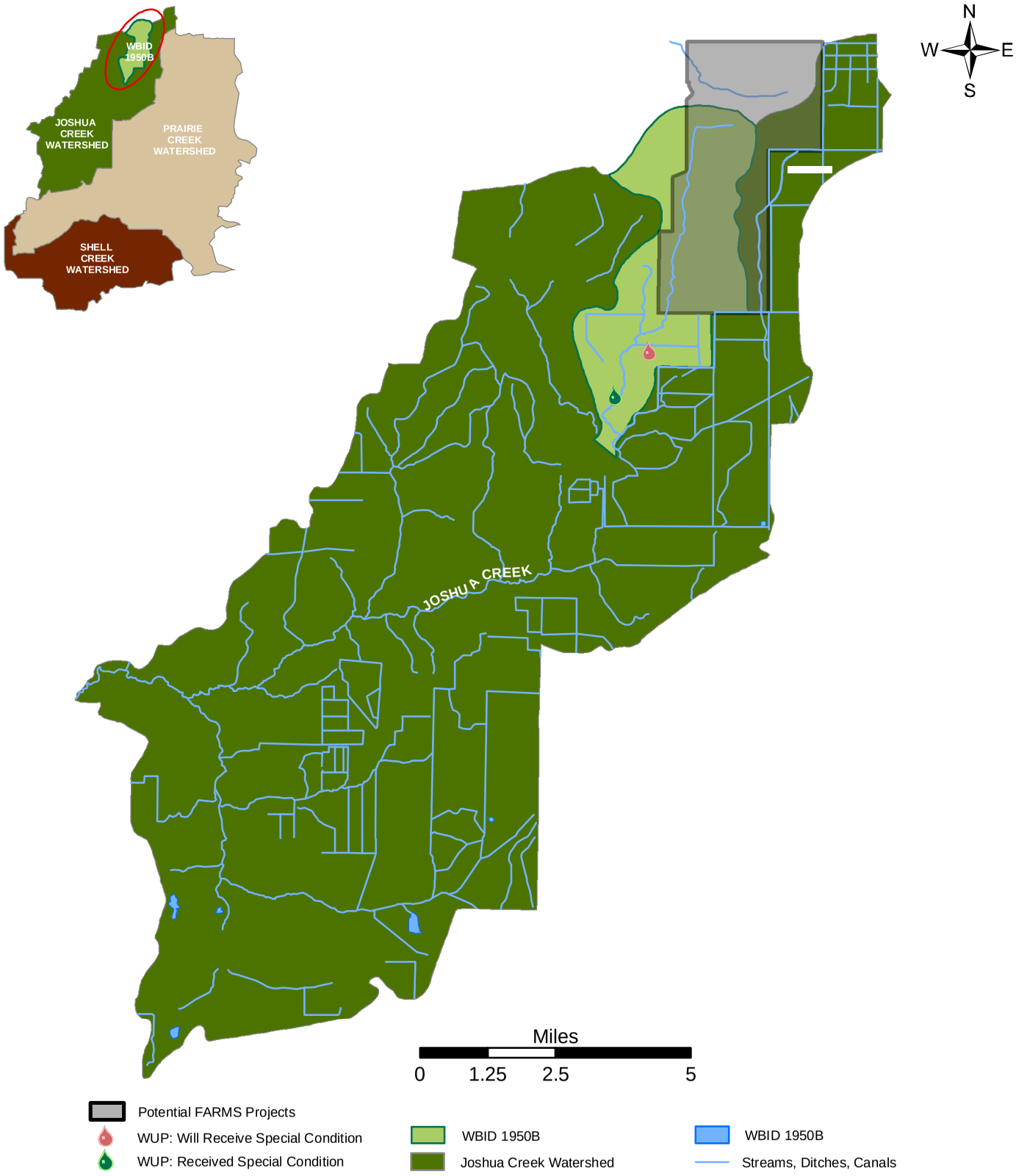
During the reporting time period for this Performance Monitoring document, no sites in WBID 1950A were evaluated for the Habitat or Stream Condition Index Assessments.

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 WUP applications were received. Of the two applications, both were renewals (see table below). One permit issued received an additional special condition to address water quality concerns in the SPJC watersheds. The other permit will receive the special conditions through a corrected permit process. Detailed explanations for special conditions that apply to all WUPs in the SPJC Watersheds can be found in Appendix II.

WUP Renewals and Modifications in WBID 1950B

New WUPs	0
WUP Renewals	2
WUP Modifications	0
WUP Letter Modifications	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. The following potential FARMS project is currently under consideration:

WUP No. 20007957 (FARMS funded; property also falls within WBID 1977):
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.

Potential FARMS Projects in WBID 1950B

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 #20007957 (citrus)	N/D	N/D	N/D	N/D

*Potential project currently under consideration
N/D = Not determined

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 (FDEP)
During the reporting time period for this Performance Monitoring document, no sites in WBID 1950B were evaluated for the Habitat or Stream Condition Index Assessments.

WBID 1963

WBID 1963

Water Segment – Lake Slough

Joshua Creek Watershed: Water Use – Class 3F

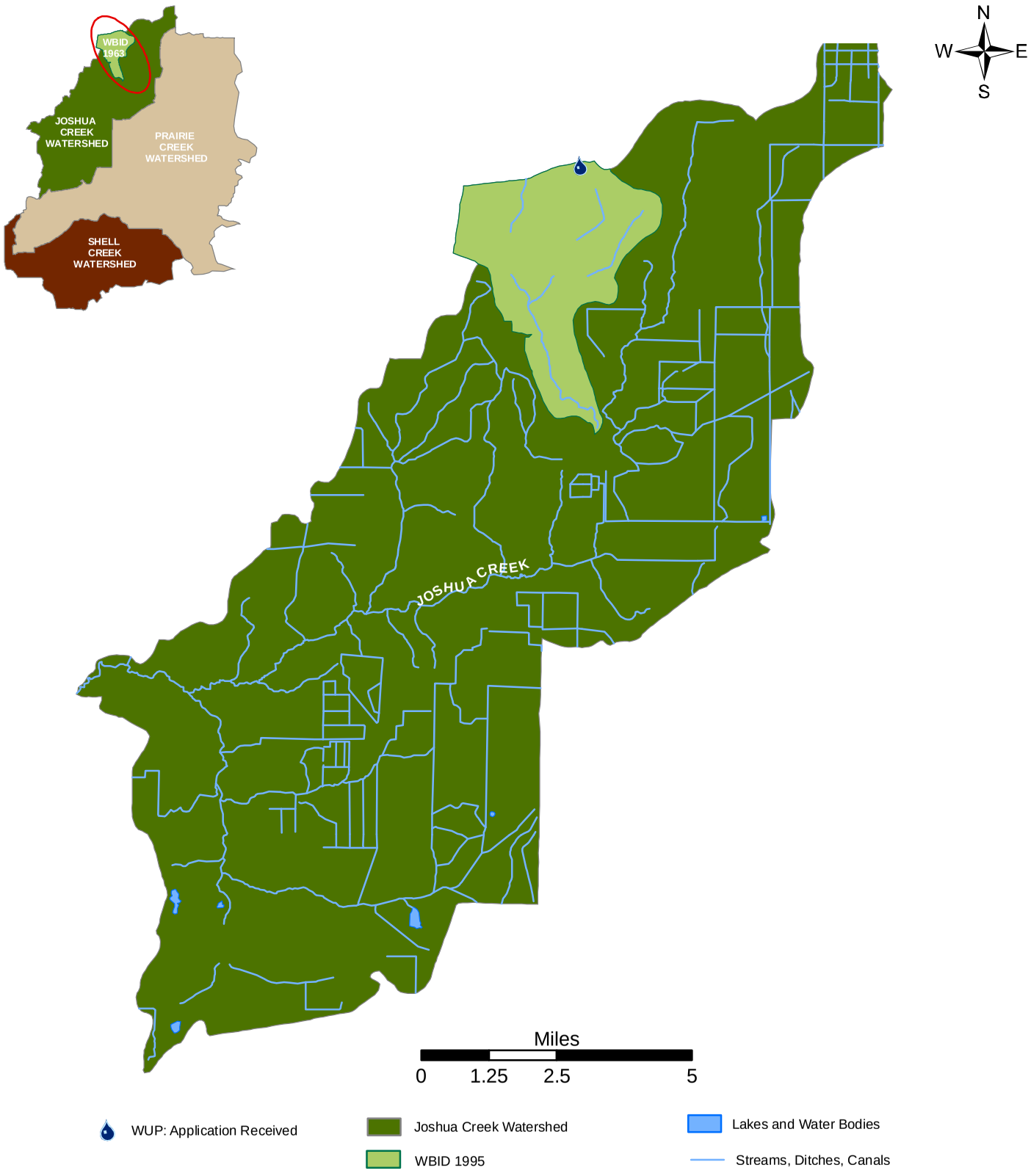
Verified Impaired Pollutants of Concern: None

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 WUP application was received, but was not issued within the timeframe of this document (see table below). 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

New	0
Renewal	0
Modification	1*
Letter Modification	0

* 1 Application Received but WUP not issued by 7/31/2006

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.

Habitat Assessment and Stream Condition Index Monitoring (FDEP)
During the reporting time period for this Performance Monitoring document, no sites in WBID 1963 were evaluated for the Habitat or Stream Condition Index Assessments.

WBID 1974

WBID 1974

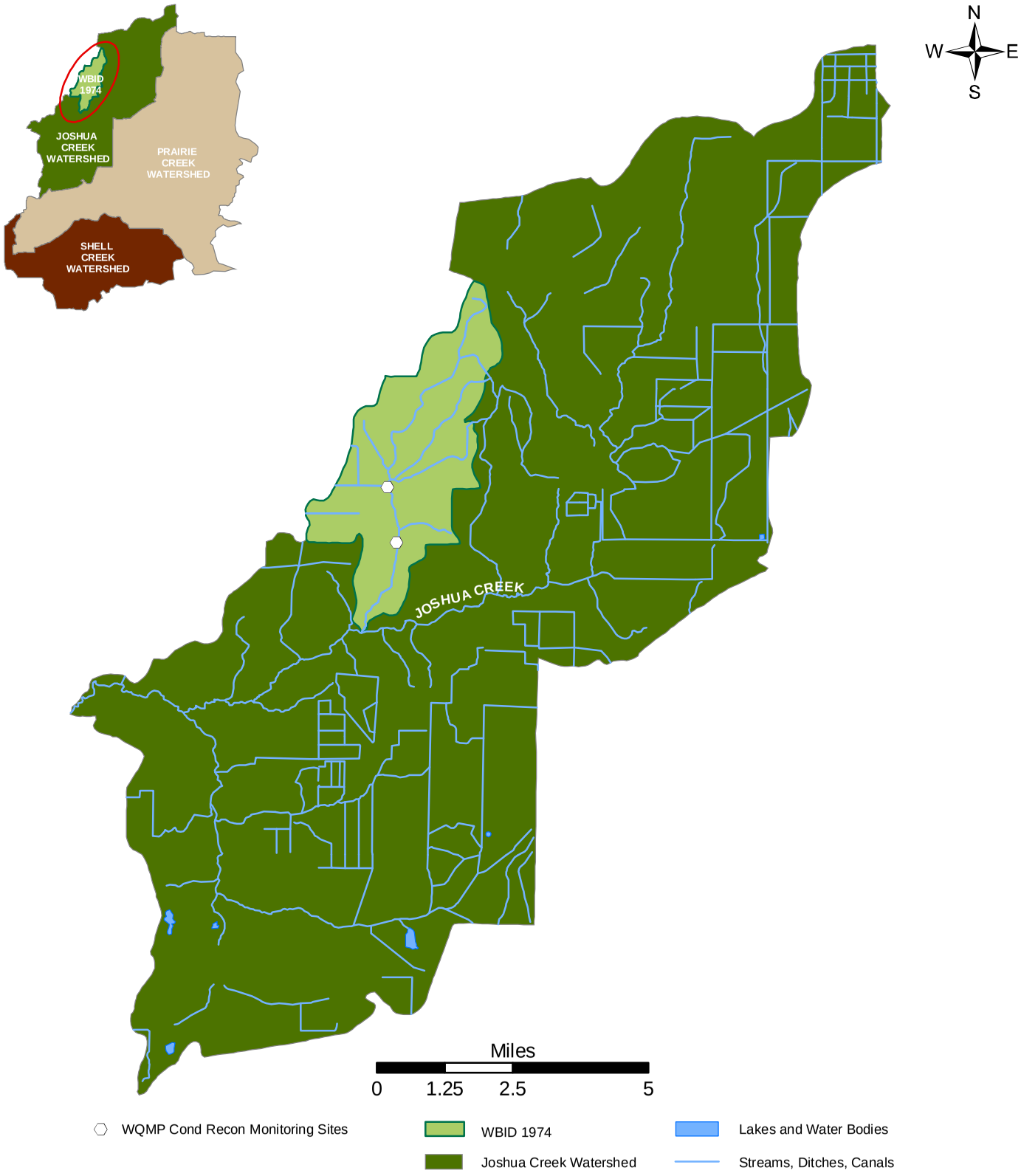
Water Segment – Unnamed Branch

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
There have been no WUP applications received by the District in WBID 1974 during the October 2004 through July 2006 time period.

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 1974.

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.

Specific Conductance Reconnaissance Network (District)
Within WBID 1974 there are currently two stations monitored for the Specific Conductance Reconnaissance Network. Of the ten individual specific conductance values collected within WBID 1974 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 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.

Specific Conductance Reconnaissance Results in WBID 1974 over Entire Period of Data Record

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	↑6.53%	↓13.56%
Maple Branch @ SR 70 - # 7	492	121	518	350	500	↑5.02%	↓3.60%

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 (FDEP)
During the reporting time period for this Performance Monitoring document, no sites in WBID 1974 were evaluated for the Habitat or Stream Condition Index Assessments.

WBID 1977

WBID 1977

Water Segment – Honey Run

Joshua Creek Watershed

Water Use – Class 3F

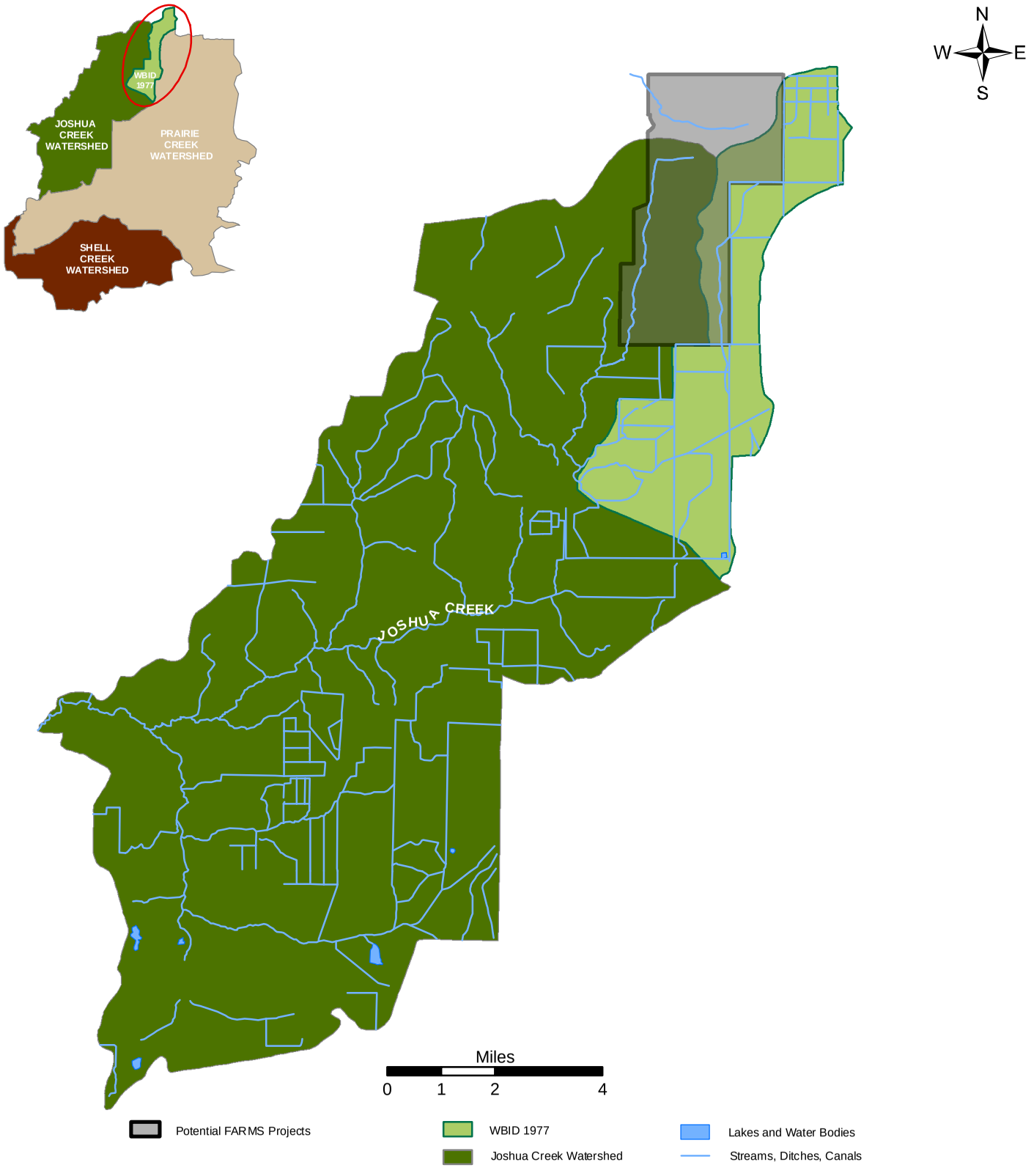
Verified Impaired Pollutants of Concern: None

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
There have been no WUP applications received by the District in WBID 1977during the October 2004 through July 2006 time period.

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 1977. The following potential FARMS project is currently under consideration:

WUP No. 20007957 (FARMS funded; property also falls within WBID 1950B):
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.

Potential FARMS Projects in WBID 1977

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 #20007957 (citrus)	N/D	N/D	N/D	N/D

*Potential project currently under consideration
N/D = Not determined

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.

Habitat Assessment and Stream Condition Index Monitoring (FDEP)
During the reporting time period for this Performance Monitoring document, no sites in WBID 1977 were evaluated for the Habitat or Stream Condition Index Assessments.

WBID 1997

WBID 1997

Water Segment – Hawthorne Creek

Joshua Creek Watershed: Water Use – Class 3F

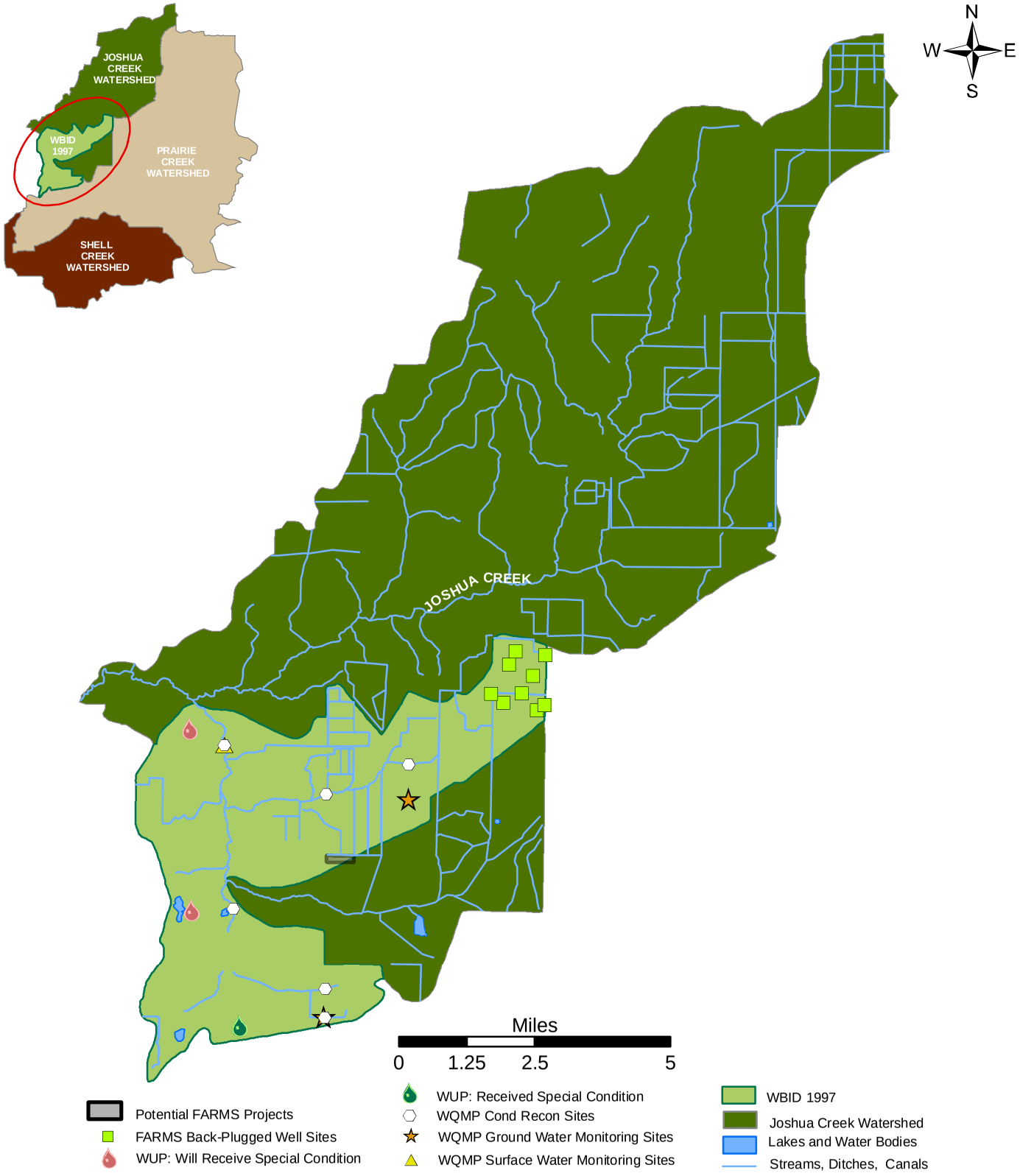
Verified Impaired Pollutants of Concern: None

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, three WUP applications were received. Of the three applications, two were renewals and one was a letter modification (see table below). One permit received an additional special condition to address water quality concerns in the SPJC watersheds. The other 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 1997

New WUPs	0
WUP Renewals	2
WUP Modifications	0
WUP Letter Modifications	1

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 1997. The following potential FARMS project is currently under consideration:

WUP No. 20002418 (FARMS funded; property also falls within WBID 2001):
FARMS staff have discussed the potential to cost-share a project on a blueberry farm that includes the excavation of a tailwater recovery reservoir and the use of surface water to offset groundwater. Project components would include a surface water pump station, filtration, and a pipeline to connect the surface water into the existing irrigation system.

The following table summarizes the potential FARMS project in WBID 1997 as well as summarizing ground water offsets for this project:

Potential FARMS Projects in WBID 1997

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 #20002418 (blueberries)	N/D	N/D	N/D	N/D

*Potential project currently under consideration
N/D = Not determined

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 24 individual specific conductance values collected within WBID 1997 during the period of record, 16 values exceeded the 775 uS/cm goal criteria and 7 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 1997. 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.

Specific Conductance Reconnaissance Results in WBID 1997 over Entire Period of Data Record

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	↓54.51%	↑33.68%
Unnamed Cr. @ SR 31 Near 760A - #31	1347	512	1226	690	1461	↓9.87%	↑16.08%
Unnamed Cr. @ CR 763 - #8	1303	630	1165	869	1447	↓11.85%	↑19.49%
Unnamed Cr. @ CR 763 - #10	Dry	Dry	809	Dry	Dry	*	*
Unnamed Ditch @ CR 763 - #11	833	Dry	713	494	Dry	↓16.83%	*
Hawthorne Cr. @ 760A	1108	315	1009	855	1435	↓9.81%	↑26.69%

* 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 (FDEP)

During the reporting time period for this Performance Monitoring document, no sites in WBID 1997 were evaluated for the Habitat or Stream Condition Index Assessments.

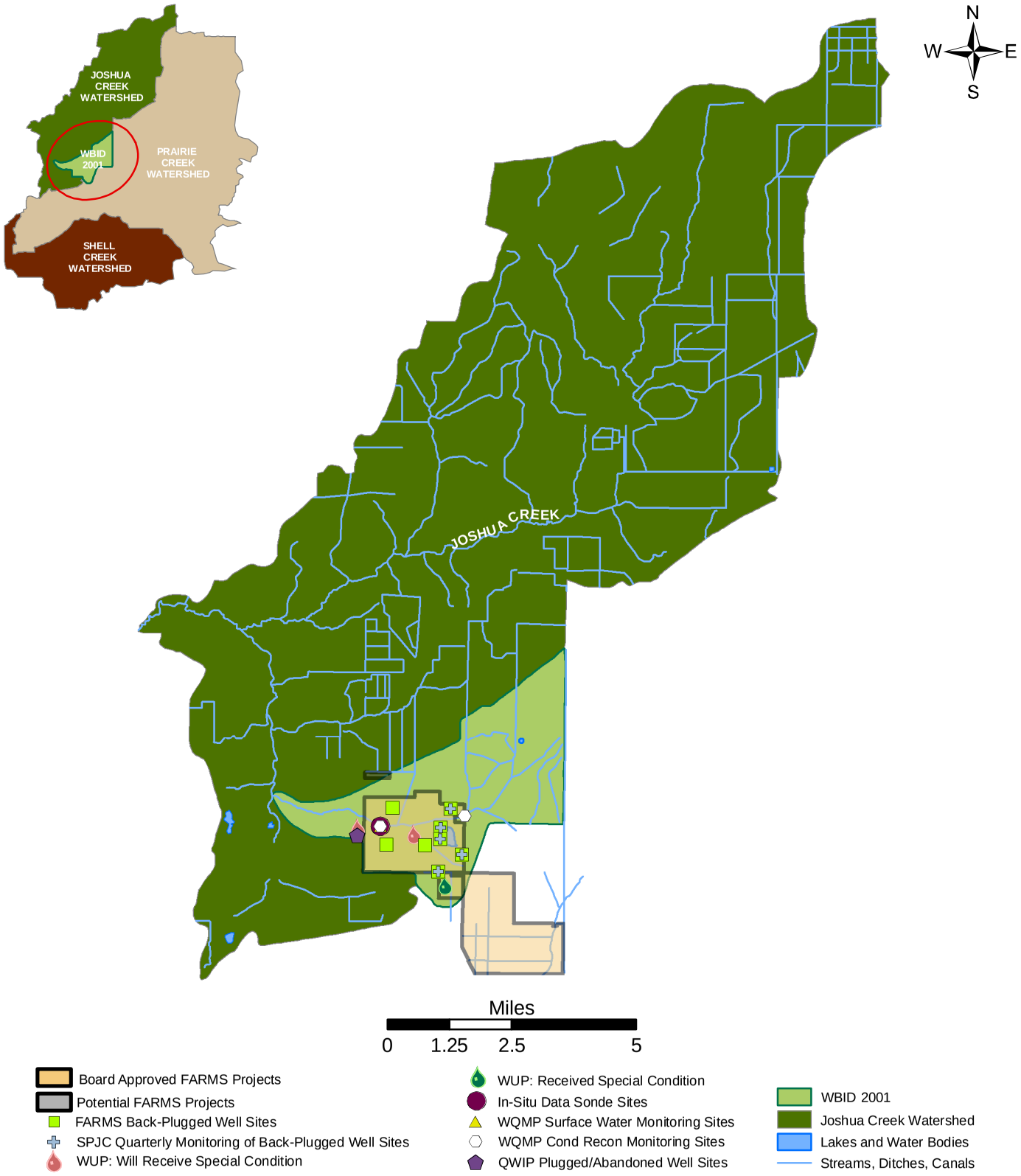
WBID 2001
Water Segment – Hog Bay
Joshua Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern: None

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 eight 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. No additional wells have been back-plugged since October 2004.

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

Permit Information		Percent Improvement	
WUP No.	**DID No.**	**TDS (mg/L)**	**Chloride (mg/L)**
20006669	4	-18%	-46%
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 WUP applications were received during the October 2004 through July 2006 time period. Of the three applications, one was a renewal, one was a modification, and one was a letter modification (see table below). One permit issued received an additional special condition to address water quality concerns in the SPJC watersheds. The other 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 2001

New WUPs	0
WUP Renewals	1
WUP Modifications	1
WUP Letter Modifications	1

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

There are currently three Board approved, operational FARMS/EQIP projects and one potential FARMS project in WBID 2001:

WUP No. 20006669 (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. 20006765 (FARMS and EQIP funded; property also falls within WBIDs 1962 and 1995):
The primary goal of this project is to reduce groundwater withdrawals on a citrus grove 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, surface water collection pump station, two irrigation pump stations (including filtration), and piping necessary to connect the proposed tailwater interception and surface water reservoir system to the existing irrigation system. This project has been operational since July 2006 and has an estimated ground water offset of 222,500 gpd.

WUP No. 20009716 (FARMS and EQIP funded):
The primary goal of this project is to reduce mineralized groundwater withdrawals on a blueberry farm through the use of surface water from an existing storm water collection reservoir. Project components include two surface water irrigation pumps, filtration, piping, and the infrastructure necessary to operate and connect the existing reservoir into the irrigation system. The project will also increase irrigation efficiency through the use of an innovative, real-time irrigation control system. The proposed system will employ automated pump controls, and soil moisture and weather monitoring devices to reduce overall irrigation and extend surface water resources. Once complete, the project is estimated to offset 71,200 gpd of ground water.

The following potential FARMS project is currently under consideration:

WUP No. 20002418 (property also falls within WBID 1997):
FARMS staff have discussed the potential to cost-share a project on a blueberry farm that includes the excavation of a tailwater recovery reservoir. To offset groundwater usage, the surface water captured in this reservoir will be utilized for irrigation purposes. Project components would include a surface water pump station, filtration, and pipeline to connect the surface water into the existing irrigation system.

The following table summarizes the potential FARMS project in WBID 2001, as well as summarizing ground water offsets for this project:

Approved and Potential FARMS/EQIP Projects in WBID 2001

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 #20006669 (citrus)	April 2006	170,900	111,295	164,067
WUP #20006765 (citrus)	July 2006	222,500	N/D	N/D
WUP #20009716 (blueberries)	Under construction	71,200	N/D	N/D
*WUP #20002418 (blueberries)	N/D	N/D	N/D	N/D

*Potential project currently under consideration
N/D = Not determined
**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 10 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)

There is currently one YSI® 600XLM data sonde deployed in WBID 2001 at station Hog Bay Slough in the Joshua Creek watershed. 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 April 2006. 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 (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 in WBID 2001.

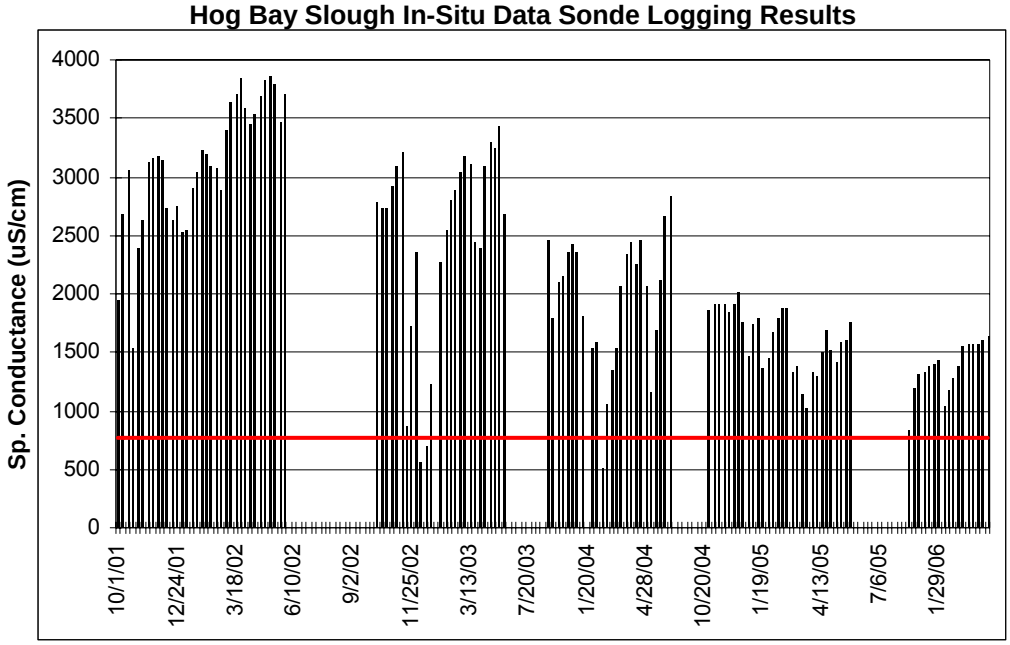
WBID 2001

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	21,222	18,906	89%	133	130	97.7%

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 five 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 table summarizes the percent change increases and/or decreases between dry season events for each monitoring station within WBID 2001. 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.

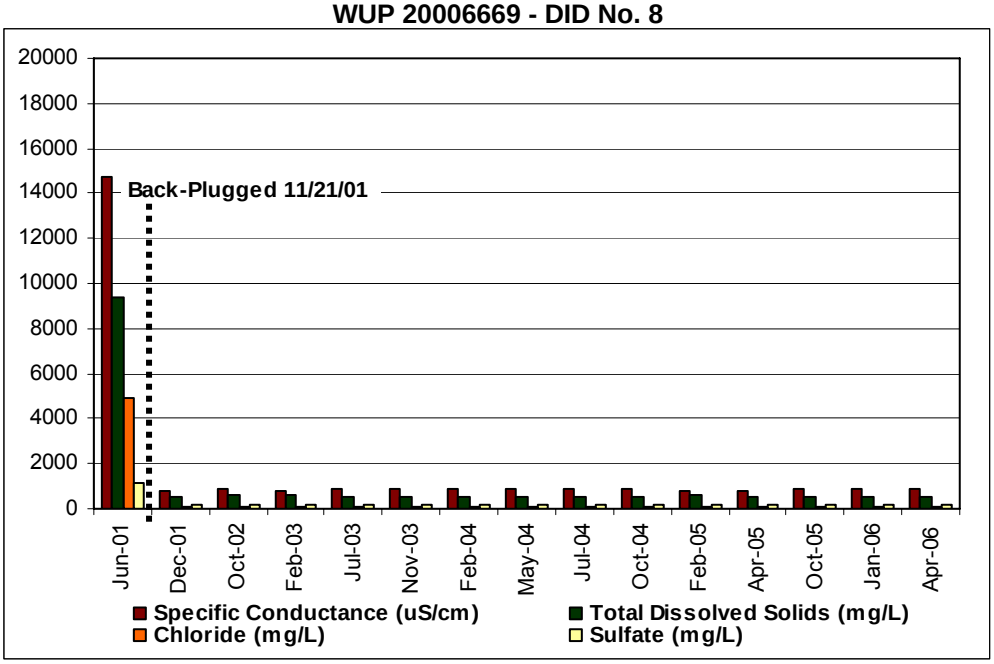
Specific Conductance Reconnaissance Results in WBID 2001 over Entire Period of Data Record

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	↓50.12%	↑35.21%

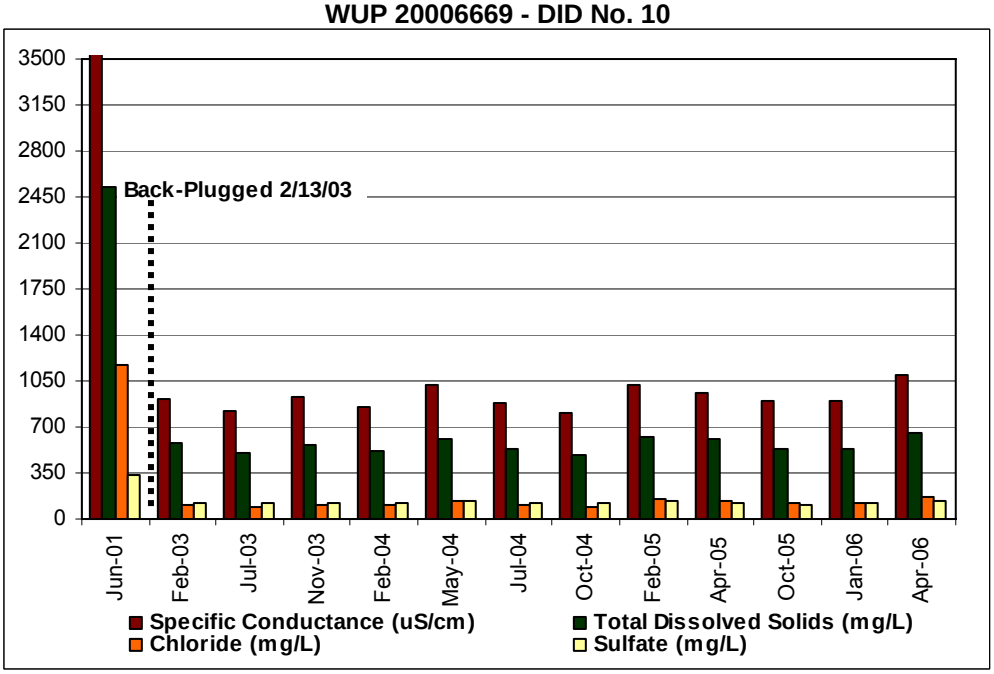
Pre- and Post Back-Plug Well Monitoring Network (District)

There are five 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. 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.

WUP 20006669 - DID No. 8

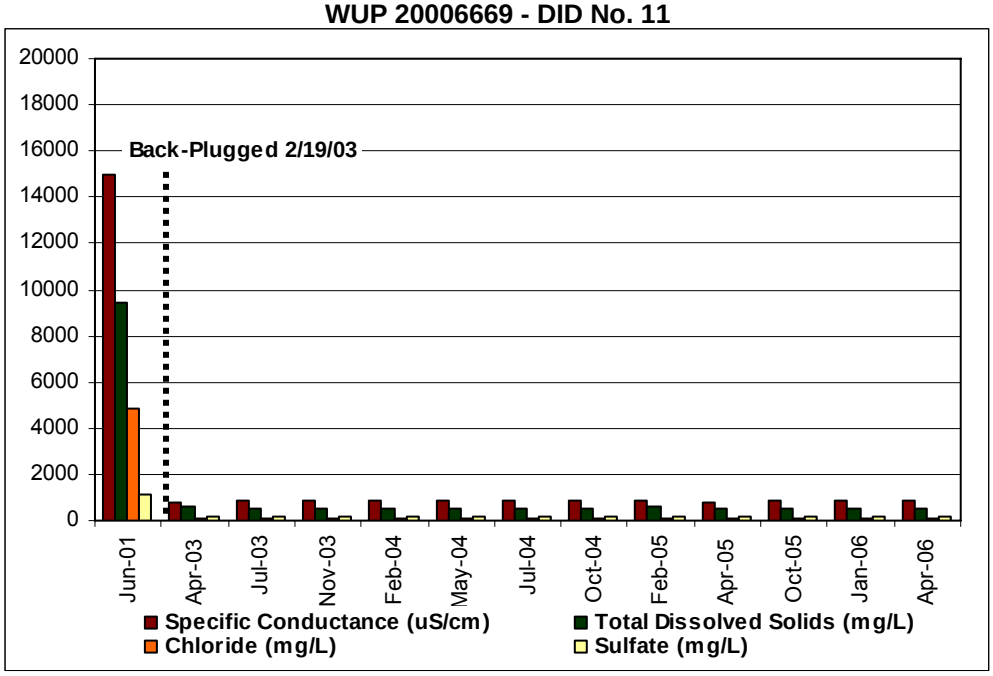


WUP 20006669 - DID No. 10

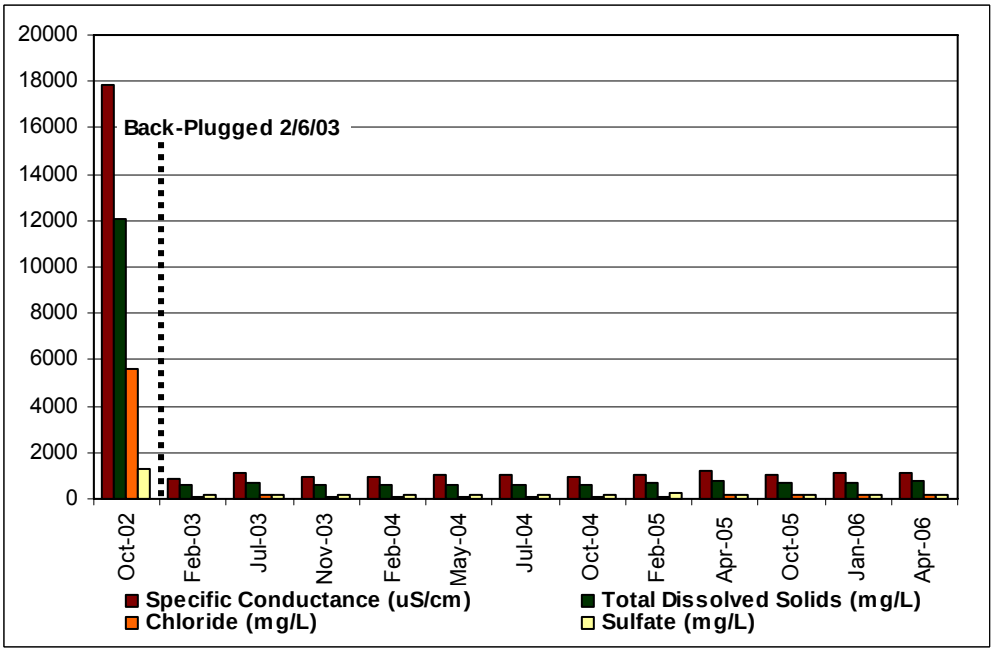


WBID 2001
Water Segment – Hog Bay
Joshua Creek Watershed: Water Use – Class 3F
Verified Impaired Pollutants of Concern – None

WUP 20006669 - DID No. 11

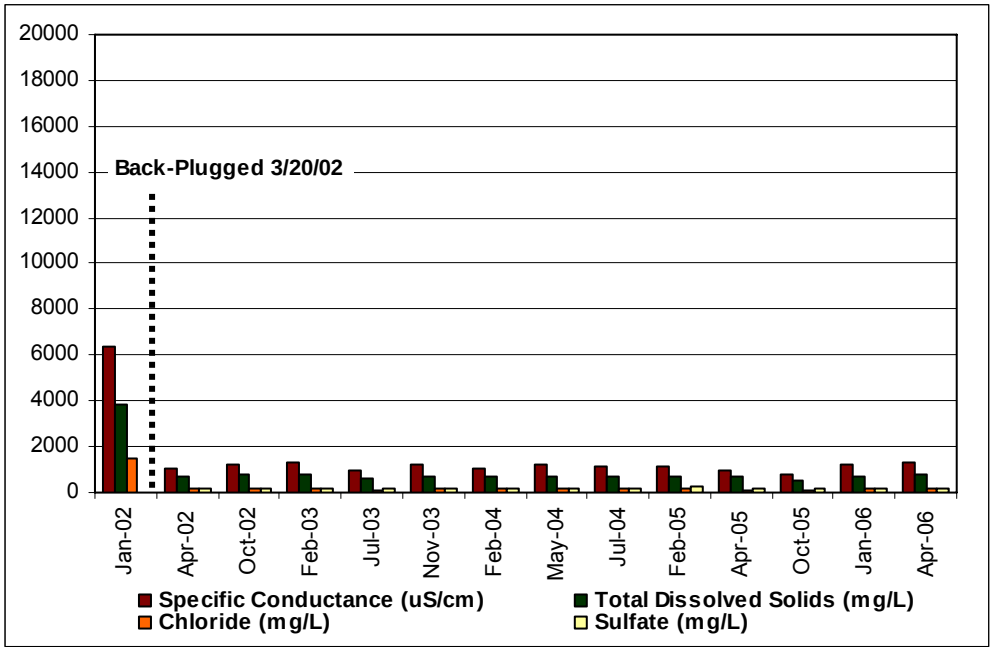


WUP 20006669 - DID No. 12



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

WUP 20006669 - DID No. 13



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.

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	35	20	57.1%	35	31	88.6%	9	25.7%

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

Habitat Assessment and Stream Condition Index Monitoring (FDEP)

During the reporting time period for this Performance Monitoring document, no sites in WBID 2001 were evaluated for the Habitat or Stream Condition Index Assessments.

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

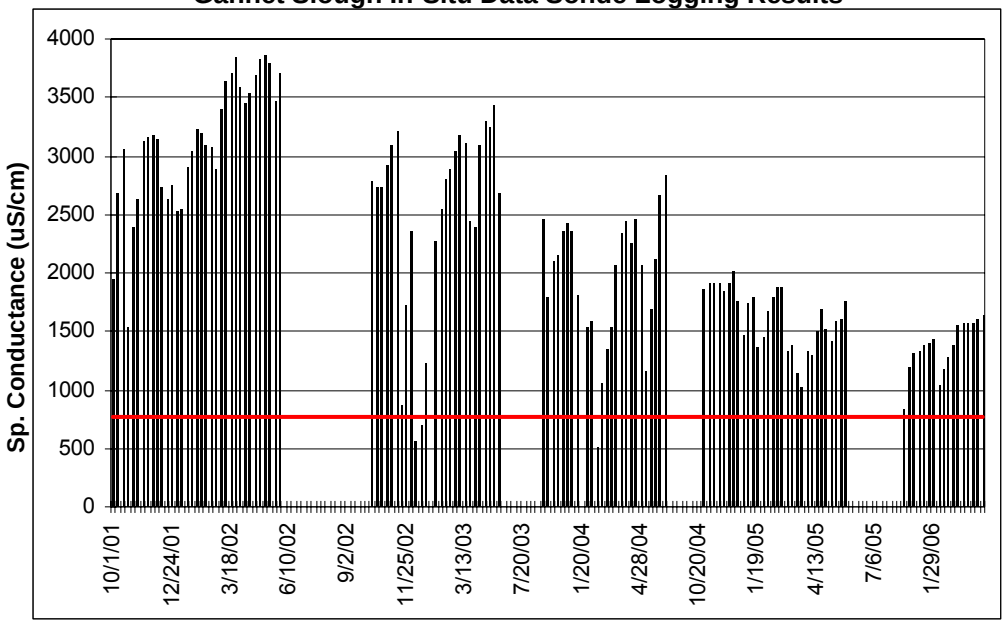
In-Stream Data Sonde - Conductance Logging Network (District and USGS)
The ***Gannet Slough*** data sonde is deployed in a small tributary/slough in the southeastern region of the Prairie Creek watershed. This monitoring site is located in the South Florida Water Management District and surrounding land 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 April 2006.

Dry season specific conductance concentrations have decreased when comparing 2004-2005 to 2005-2006 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

Gannet 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
Gannet Slough	8,926	0	0%	55	35	63.6%

Regional Management Actions

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 wells that are proposed to be constructed in the three watersheds. Currently, approximately 200 wells are proposed to be constructed through approved Water Use Permits within the SPJC watersheds. Of this total, 125 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

Watershed	No. of Proposed Irrigation Wells	Depth Criteria*	Wells Exceeding Criteria
Joshua	58	1,400	8
Prairie	128	1,200	109
Shell	14	450	8
TOTALS	200	N/A	125

*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 1,000 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 914 existing groundwater irrigation wells within the SPJC watersheds. Of these wells, approximately 436 exceed the depth criteria.

Approximate Number of Existing Irrigation Wells Potentially Contributing to Impairment in the SPJC Watersheds

Watershed	No. of Existing Irrigation Wells	Depth Criteria*	Wells Exceeding Criteria
Joshua	324	1,400	102
Prairie	406	1,200	200
Shell	184	450	134
TOTALS	914	N/A	436

*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 363 wells located in the impaired WBIDs of Shell Creek and Prairie Creek. Of these wells approximately 219 exceed depth criteria chosen for verified impaired WBIDs #1962, #2040 and #2041. Due to their location, these wells may directly contribute to pollutant loading in area surface waters due to 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 SPJCWatersheds

Watershed	WBID No.	No. of Irrigation Wells	Depth Criteria*	Wells Exceeding Criteria
Shell	2040	106	450 ft.	82
Shell	2041	55	450 ft.	32
Prairie	1962	202	1,200 ft.	105
TOTALS	N/A	363	N/A	219

*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 in the Prairie Creek watershed and 25 Water Use Permits in the Shell Creek watershed and may be directly contributing to pollutant loading within the impaired 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.

Since 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 Water Management District in the Shell, Prairie and Joshua Creek watersheds for agriculture, mining/dewatering, public supply and industrial/commercial uses. Approximately 106.4 million gallons per day (mgd) is currently permitted for these four use types. Of that total, approximately 94.2 percent is permitted for agriculture, less than one percent for mining/dewatering and industrial/commercial, and 5.5 percent for public supply. The table below provides a complete breakdown of the WUPs in the Shell, Prairie and Joshua Creek watersheds.

Water Use Permit Summary in the SPJC Watersheds

Predominant Use	Shell Creek (gpd)	Prairie Creek (gpd)	Joshua Creek (gpd)	Total (gpd) Per Use	Percent Use in Watershed
Agriculture	19,422,400	47,254,560	33,576,000	100,252,960	94.2%
Public Supply	5,370,100	347,600	155,000	5,872,700	5.5%
Mining/ Dewatering	95,000	121,000	0	216,000	0.2%
Industrial/ Commercial	0	0	76,100	76,100	0.1%
Total Permitted Quantities (gpd)	24,887,500	47,723,160	33,807,100	106,417,760	100.0%

Of the 5.5 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 issue in these basins.

The majority of groundwater use in this geographic area continues to be agriculture (94.2 percent). The District has issued 281 water use permits with an annual average daily quantity of 100.2 mgd of groundwater for irrigation of citrus, pasture, blueberries and row crops, which typically includes melons or other small vegetables. The wells associated with these agricultural permits have been the target of the back-plugging program to date. As each WUP is renewed the District will re-evaluate 89 percent of the water use permits in Shell, Prairie, and Joshua Creeks during the next 10 years (2014). This equates to approximately 98 percent of the permitted quantities in these basins.

The permits that have been renewed in the past several years will contain all of the necessary special conditions designed to meet the water quality issues associated with this management plan. Appendix II provides an example of the special conditions attached to WUPs to address water quality impairment in the SPJC watersheds.

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 1,000 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 October 2005, the District, and the FDACS agreed to design and implement a reimbursement program, following the general FARMS Program procedures, to directly assist smaller growers (generally defined as having irrigated acreage of less than 100 acres) on water resource projects that reduce water use. This new program, called the Mini-FARMS Program, is in the final stages of development and will be administered by FDACS through contractual agreements with the local Soil and Water Conservation District. The District has proposed to provide funding assistance to FDACS in the amount of $75,000 per year in support of the Mini-FARMS Program, beginning in October 2007. The cost share reimbursement rate will be capped at 85 percent of verified costs for eligible items, up to a maximum amount of $8,000 per project. The Mini-FARMS Program will require an application process that District staff will review along with FDACS, and a contract with the applicable Soil and Water Conservation District. Potential Mini-FARMS Program cooperators will sign a "Notice of Intent" (NOI) form that will be 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. Since any current or completed Mini-FARMS projects have occurred past the reporting time period for this document, a complete overview of Mini-FARMS projects and progresses occurring in the SPJC region will be presented in the second Performance Monitoring document. There have been sixteen projects initiated since the program's inception throughout the SWUCA. One of these projects is located within the SPJC (Charlotte County).

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 Best Management Practices (BMPs) for agricultural land and water uses. BMPs must also be economically viable and focus on real problems with workable solutions. BMP priorities are to correct existing water quality and quantity concerns and ultimately are meant to substantially minimize potential problems arising from ongoing agricultural operations.

Enrollment in the BMP program is strictly voluntary. As a part of BMP implementation, growers participate in an environmental assessment of their farming operations. This process helps to identify BMPs that potentially achieve the optimum economic and environmental benefits. BMPs are identified for each parcel of land along with a tax ID that is specified on a NOI to implement BMPs, and then cataloged with FDACS. If a critical management practice has yet to be established in the farm operation, the anticipated time that it will be implemented is resolved on the NOI. Program enrollment then becomes an agreement for growers to better maintain records and provide documentation of all BMPs (i.e. fertilizer application dates and amounts, or design and construction details of a water control structure).

An innovative element of the BMP program is the *Presumption of Compliance* with water quality standards (F.S. 403.067 (7)(c)3), which provides a powerful incentive for growers to enroll in the BMP program since they may have immunity from cost recovery by the State in elevating watershed impairment concerns. Additionally, growers enrolled in the BMP program can become eligible for cost-share funding to implement specific BMP practices that are determined beneficial to operations and environmental resources alike. FDACS has the lead role in coordinating Florida agriculture's non-point source challenges with FDEP and regional stakeholders in the identification and adoption of science-based BMPs. Formally adopted BMPs become the environmental standards of agricultural operations and are formulated to enhance and protect the water resources of Florida watersheds while providing significant farming benefits to BMP participants.

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

In May 2003, a steering committee was established to guide the development of BMPs for the Peace River / Manasota Basins and the Charlotte Harbor National Estuary Program (PRMB/CHNEP) citrus growing area. The steering committee established immediate and long-term goals directed at improving water quality and reducing water quantity impacts for the PRMB/CHNEP area, which includes the SPJC watersheds.

In 2005, the University of Florida, Institute of Food and Agricultural Sciences (IFAS), and the Indian River Research and Education Center, were tasked with the implementation of the Peace River / Manasota Basins Citrus BMP Implementation. The following tasks were defined:

a. Field a three-person team focused on providing guidance to growers/managers for BMP implementation in commercial citrus groves. This team will conduct evaluations of grove physical features and production practices and then provide recommendations for changes and improved operation and management.
b. Establish demonstrations of unfamiliar BMPs on commercial sites and conduct evaluations of their effectiveness to reduce off-site impacts of grove operations.
c. Provide educational opportunities (workshops, demonstrations, field days, etc.) to demonstrate and discuss BMPs for all levels within the citrus production system, from upper management to grove laborers. Training materials and programs will be developed and presented in both English and Spanish for laborers.
d. Work with the steering and implementation committees to identify new BMPs or improvements to existing BMPs which can result in practical solutions for improving water quality and the sustainability of citrus production. In addition, the implementation team will provide information on the status of BMP implementation to interested agencies and the general public.

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 for more than a year. The following table documents the extent of grove evaluations in the Peace River Basin through September 2006. Overall, approximately 23 percent of the estimated current acreage in the Peace River Basin has been evaluated.

Summary of PRMB Grove Evaluations by County as of September 30, 2006.

County	Acres*	Number Groves	2006 FASS Census Acres	Percent of FASS Acres Evaluated	Number Cost-Share Projects Funded
Charlotte	2,849	6	3,921	72.7	3
DeSoto	19,596	31	61,083	32.1	15
Hardee	6,087	13	45,084	13.5	5
Manatee	465	4	20,316	2.3	3
Sarasota	650	1	1,652	39.3	0
Total	29,647	55	130,288	22.8	26

*County citrus acreage obtained from Citrus Summary (September 2006 update), Florida Agricultural Statistics Service (FASS), Orlando, Florida.

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/PDFs/BMPs/PeaceRiverBMPManual.pdf

Best Management Practices for Vegetable and Agronomic Crops

In 2006, the Florida Department of Agriculture and Consumer Services (FDACS) adopted a manual detailing the water quality/quantity Best Management Practices (BMPs) for Florida Vegetable and Agronomic Crops. The practices outlined in this manual are intended to be applied statewide by both vegetable and agronomic crop farmers. Along these lines, the focal crops for which the manual was written to address 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

The University of Florida, IFAS, Indian River Research and Education Center was tasked with the implementation of the BMPs for Vegetables and Agronomic Crops. The project is in the process of securing funding for the Implementation Teams at this time. Specific objectives of the implementation project are to:

a. Field three BMP Implementation Teams focused on providing guidance to growers/managers for BMP implementation on commercial farms. These teams will conduct evaluations of physical features and production practices and then provide recommendations for changes and improved operation and management.
b. Provide BMP training (workshops, field days, etc.) to demonstrate and discuss BMPs for all levels within the production system, from upper management to laborers. Training materials and programs will be brought up to date and presented in both English and Spanish.
c. Work with the steering and implementation committees to identify new BMPs, or improvements to existing BMPs, that can result in practical solutions for improving water quality and the sustainability of vegetable production. In addition, the Implementation Teams will provide information on the status of BMP implementations to interested agencies and the general public.
d. Review pertinent research relating to BMPs and develop summaries in formats suitable for dissemination to growers.

In January 2007, IFAS requested funding from SWFWMD 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 South Florida Water Management District (SFWMD) are also funding this project. The complete manual can be found by accessing the following link: http://www.floridaagwaterpolicy.com/PDFs/BMPs/vegetable&agronomicCrops.pdf. A listing of

IFAS BMP Implementation Team "success stories" as of February 13, 2007 can be viewed in Appendix IV.

Water Quality BMPs for Cow/Calf Operations
In 1999, FDACS, in conjunction with the Florida Cattleman's Association and other state and federal organizations, developed a manual of water quality BMPs for beef cow/calf operations in Florida. These practices were designed to protect state water bodies and maintain compliance with state water quality standards. The manual defines TMDLs, and why it is important to the rancher to develop a conservation plan. While a BMP Implementation Team has not been funded for this commodity, the manual states that assistance in developing a conservation plan to implement BMPs can be obtained through the local Soil and Water Conservation District (SWCD), the USDA – Natural Resources Conservation Service (NRCS), and through private consultants.

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. The FDACS and District FARMS Program work very closely with EQIP to provide cost-share funding to agriculture operations to improve water quality conditions in the SPJC watersheds.

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 2007.

2007- EQIP Action Item Timeline

- EQIP has a continuous signup period.
- Stakeholder and local working group meetings are conducted to develop local resource concerns.
- Ranking criteria reviewed by area resource conservationist and material is posted on the internet website by October 23, 2006.
- The 2007 batching period will end December 15, 2006.
- All EQIP applications will be evaluated on a statewide basis using the criteria on the Internet.
- Contracts developed and entered into computer system by May 4, 2007.

History of Funding in Charlotte County
Since 2004, there have been 14 farms funded under EQIP totaling 10,270 acres. The total cost-share funding obligated for the 14 farms was $1,363,213.00.

Year	Acres	Cost-Share Funding Obligated
2004	831	$345,100.00
2005	7,184	$226,228.00
2006	2,255	$791,885.00

History of Funding in DeSoto County
Since 2004, there have been eight farms funded under EQIP totaling 5,880 acres. The total cost-share funding obligated for the eight farms was $1,394,649.34.

For more information on how to sign up, and review forms and a list of conservation practices, go to: 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 Quality of Water Improvement Program (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. Future updates to the RWSP are 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 ArcGIS mapping tools were utilized to portray more accurate estimates.

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

Project	Watershed/County	Acres Acquired		Acres Proposed	
		Fee	Less-than-fee	Fee	Less-than-fee
Prairie / Shell Creek	Prairie and Shell Cr. / Charlotte	609		13,604	10,624
Bright Hour Watershed	Prairie Cr. / DeSoto		32,227		19,287
Long Island Marsh	Prairie Cr. / DeSoto			7,023	
Cecil Webb Wildlife Management Area	Shell Cr. / Charlotte	6,320			

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.

The Peace River/Manasota Regional Water Supply Authority recently completed a draft of the Integrated Regional Water Supply Master Plan. Within the draft, the Shell Creek System, located in north and east Charlotte County and southeast DeSoto County, is identified as a potential future water supply source. A feasibility study will be conducted to investigate creating new storage and enhancing the available yield of Shell Creek. Part of this project may 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 Water Supply Master Plan moves forward.

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, CHNEP, Peace River Valley Citrus Growers Association (PRVCGA), UF/IFAS, USDA–NRCS, and FFB. 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 by 2008.

Mobile Irrigation Laboratory

The following information was taken from the fiscal year 2006 Activities Report, which was 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 Southwest Florida Water Management District (SWFWMD) 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 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. This year, 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 1034 irrigation systems serving about 45,000 acres.

Information, Education, and Other Activities

Information, education and other mobile irrigation lab activities included the following:

- Demonstrated electronic soil moisture measurement equipment to growers
- Helped develop Conservation System Guides for evaluating impacts of irrigation practices

- Provided training to Field Offices in use of pipeline design and irrigation water management computer workbooks
- Revised computer workbooks for reporting and compiling Field Office outreach and civil rights activities
- Assisted NRCS employees with Excel
- Developed materials and instructed at Irrigation Water Management Course
- Made presentation to Highlands Soil and Water Conservation District
- Made presentation to Peace River Valley Citrus Growers Association

The following table lists the services that were provided by the MIL from October 1, 2005 through September 30, 2006 for irrigation water management practices.

Mobile Irrigation Laboratory Services; October 2005 through September 2006

Service Provided	No. Sites	Acres
Check design and/or installation of micro-irrigation system	14	1048
Cleaned, prepared, and reinstalled tensiometers at new location, reviewed irrigation water management results	3	330
Planned improvements of irrigation system	5	1090
Totals	22	2468

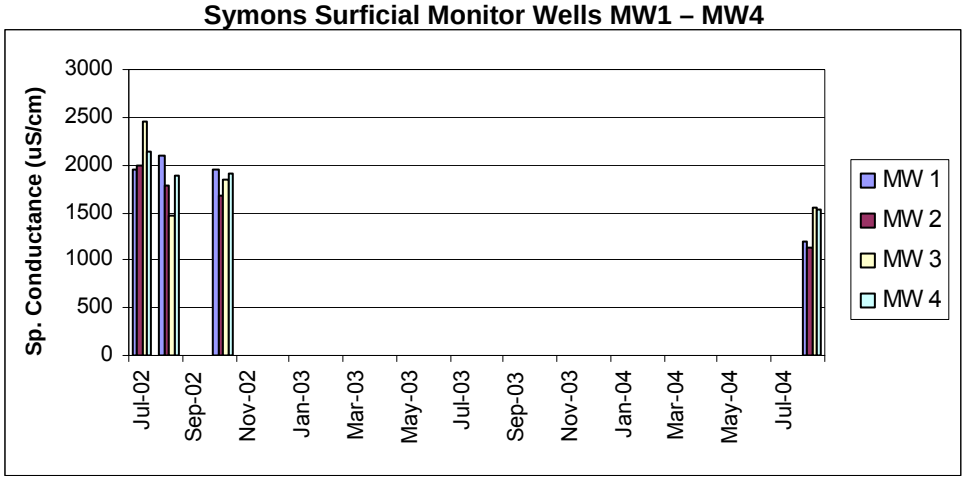
Research Activities

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

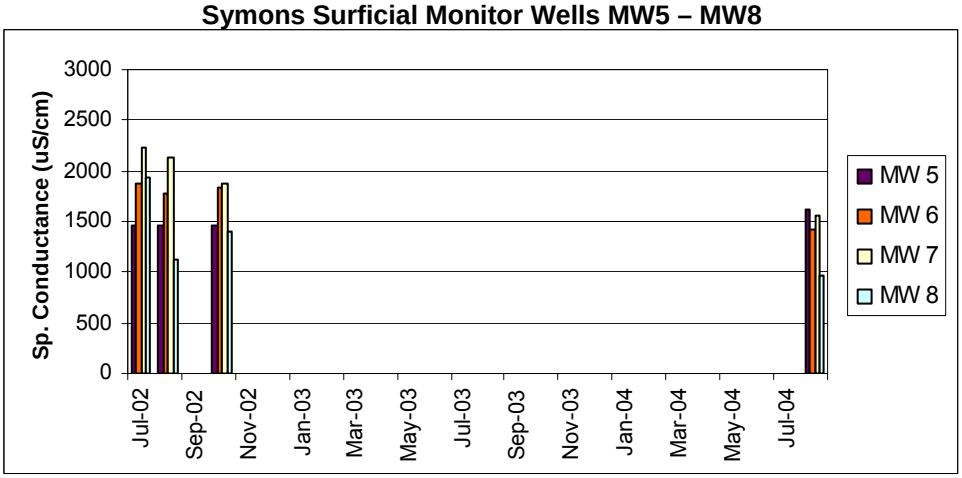
A project study was initiated to determine whether successful back-plugging of deep irrigation wells would induce a subsequent decrease of salinity in shallow groundwater beneath a large, irrigated citrus grove in the Prairie Creek watershed (WBID 1962). In 2001, District staff back-plugged borehole 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, fourteen 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.

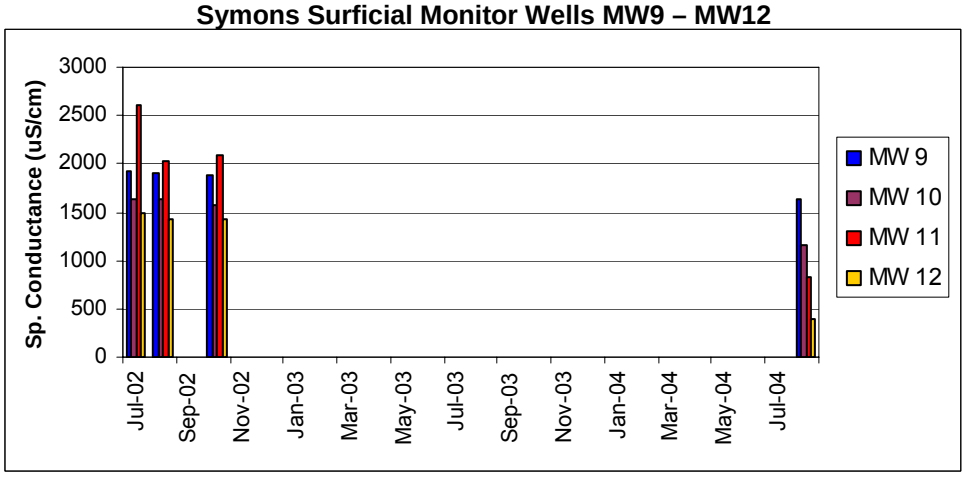
Symons Surficial Monitor Wells MW1 – MW4

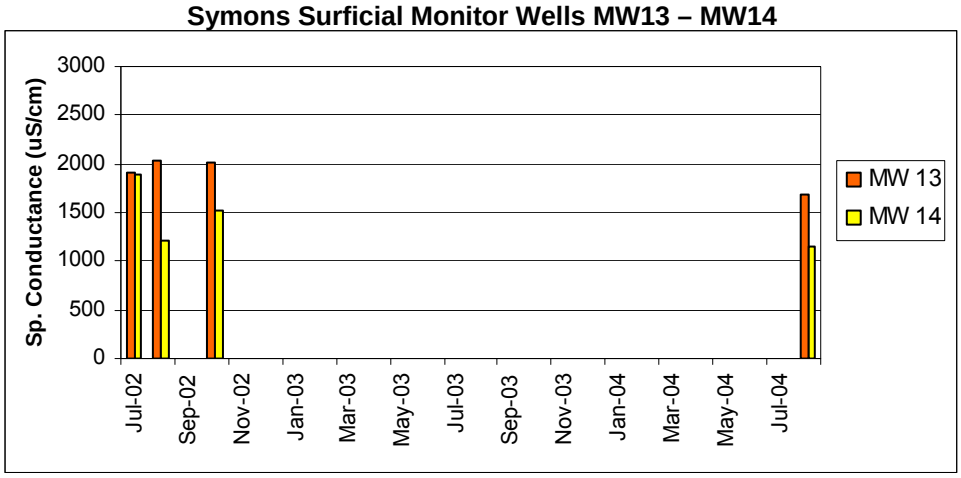


Symons Surficial Monitor Wells MW5 – MW8



Symons Surficial Monitor Wells MW9 – MW12





The following are project summaries of current 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 & References

Appendices
and
References

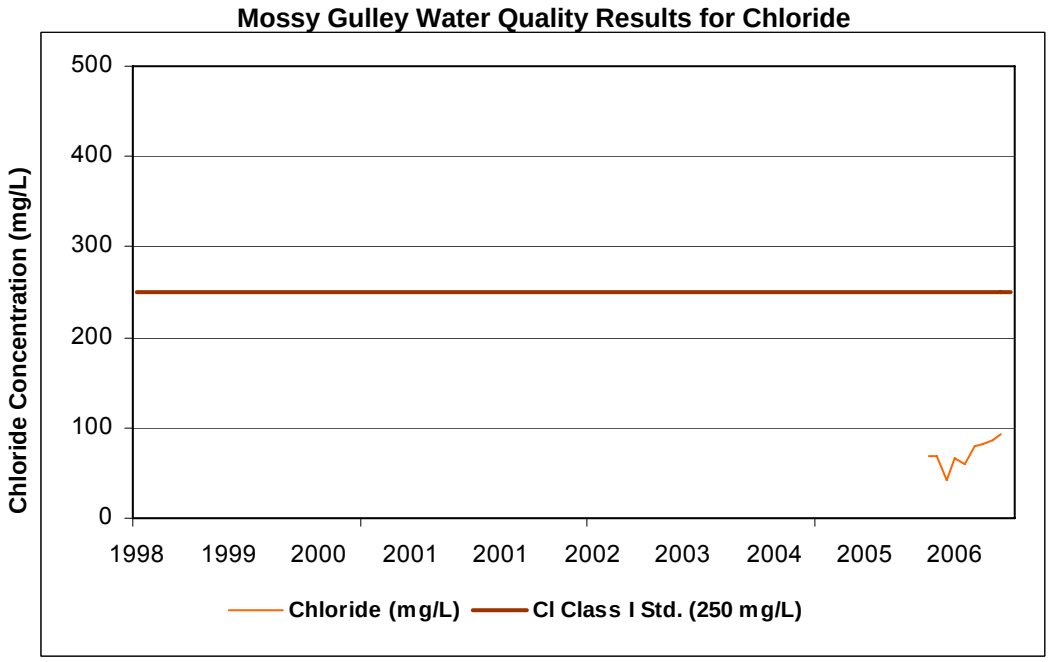
Appendix I

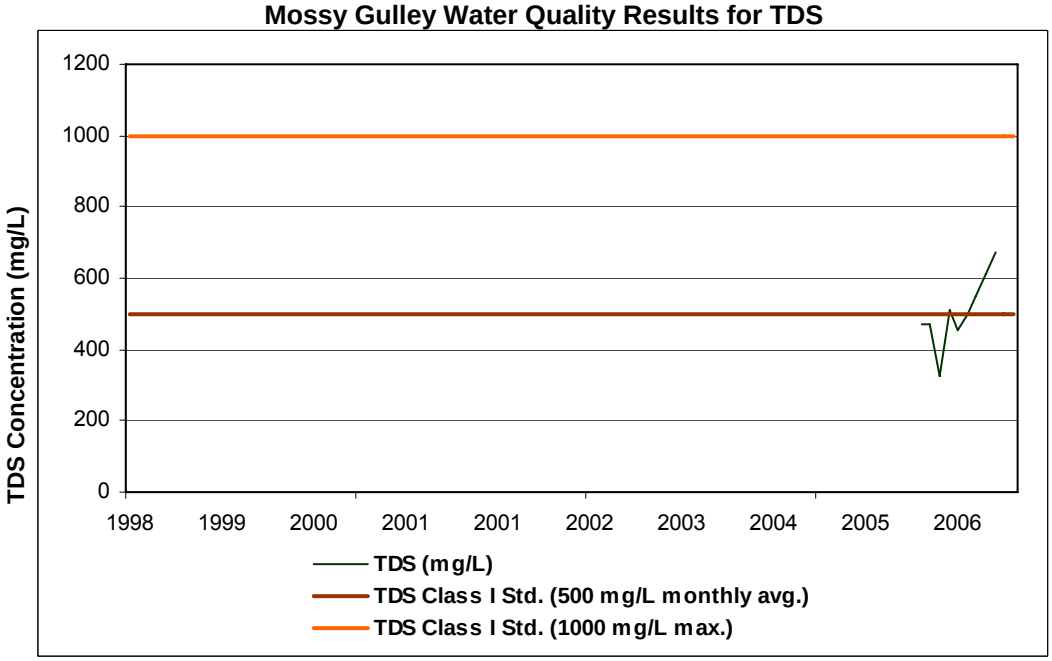
Water Quality Results from In-Stream Data Collection for Specific Conductance at "Non-Key" Monitoring Locations

WBID 1962

Water Segment - Prairie Creek

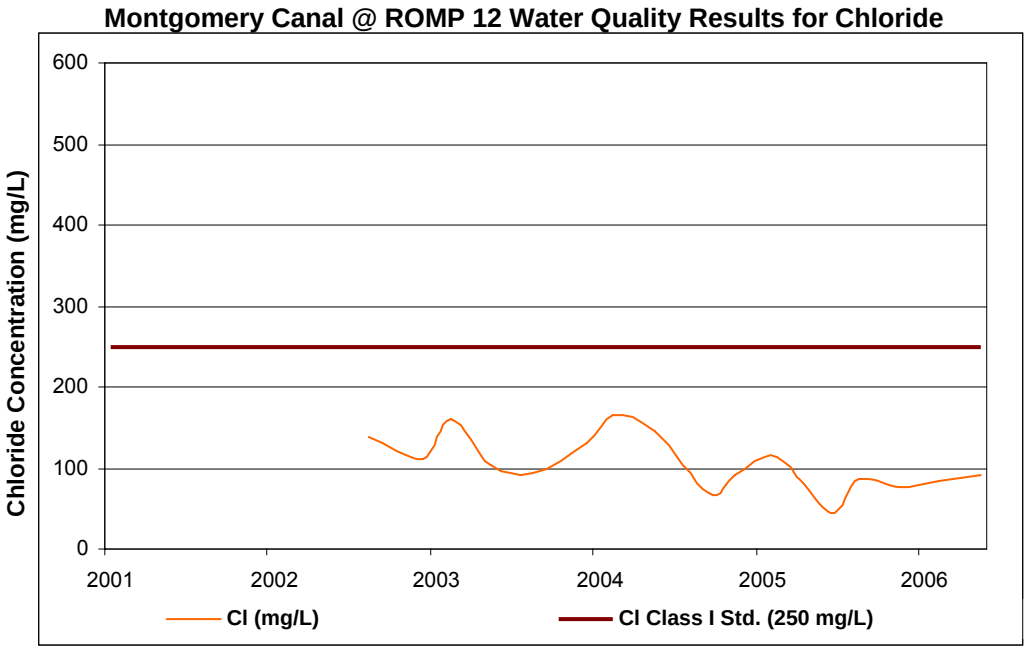
Prairie Creek Watershed

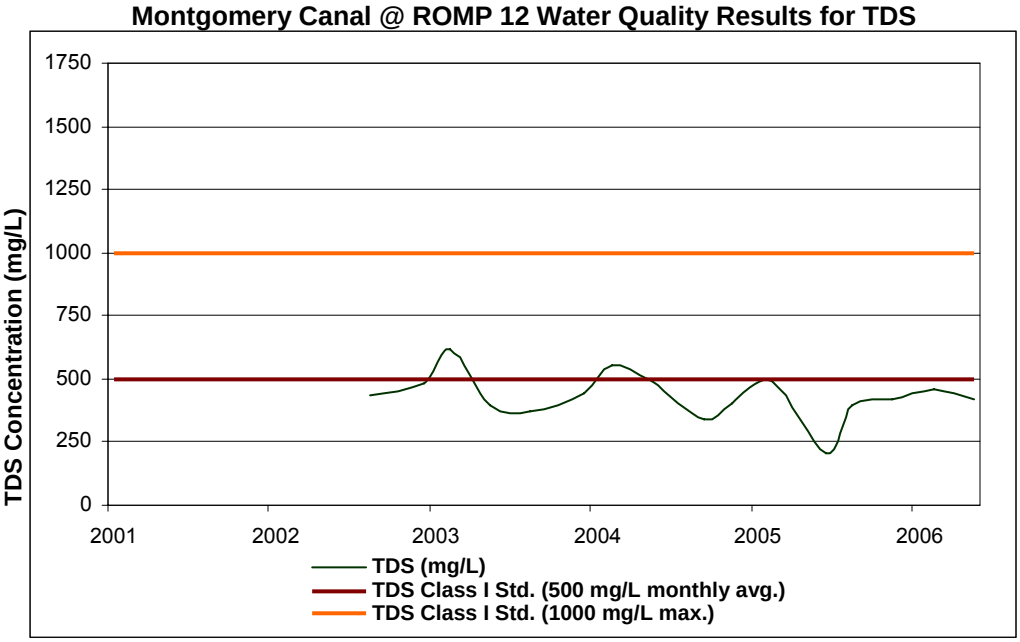




Appendix I

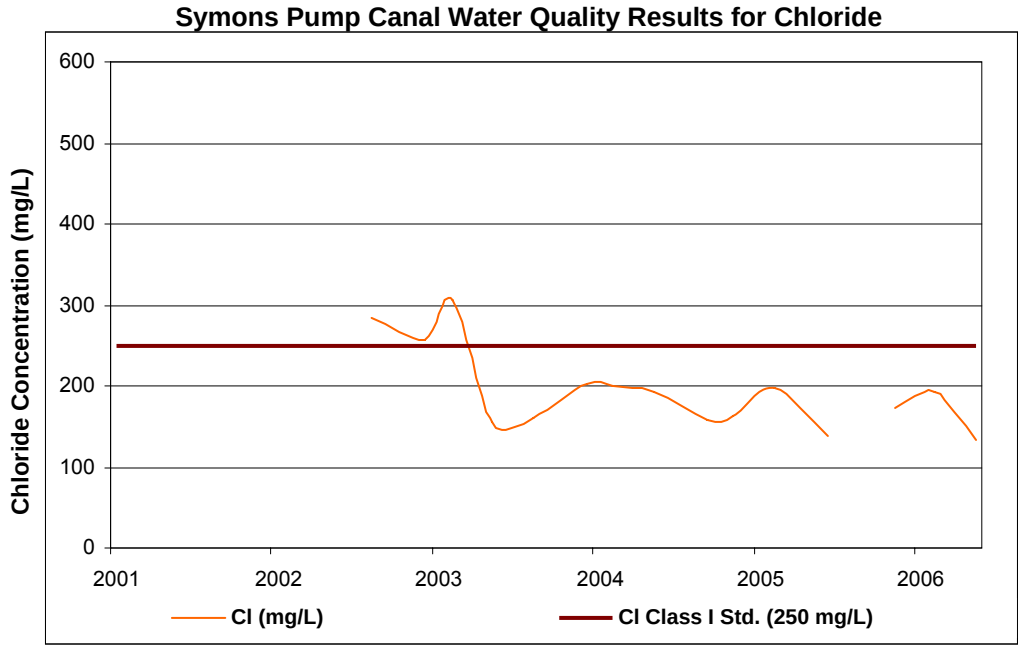
WBID 1962
Water Segment - Prairie Creek
Prairie Creek Watershed

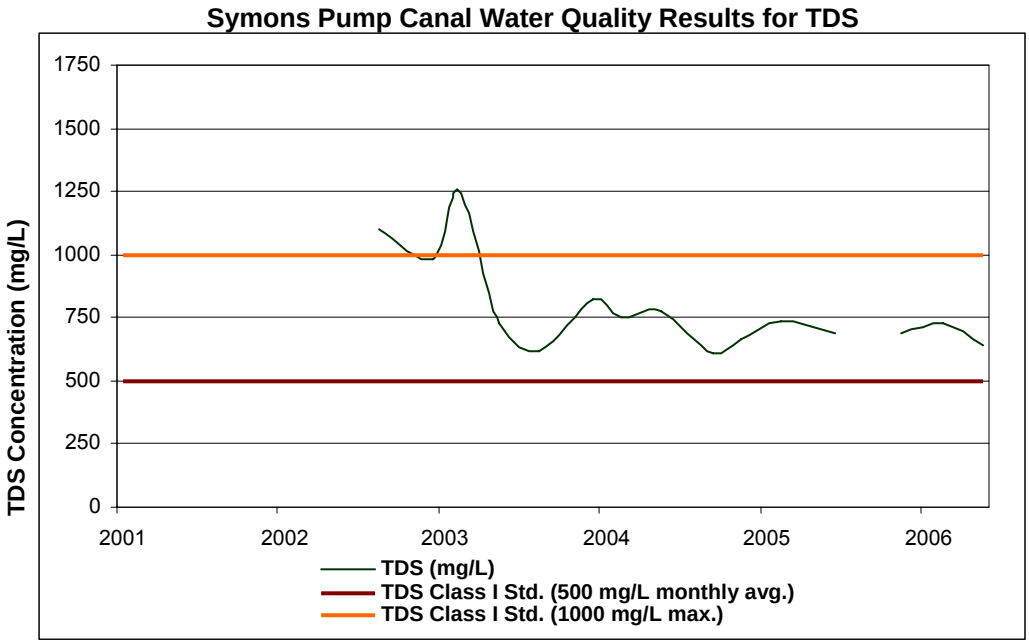




Appendix I

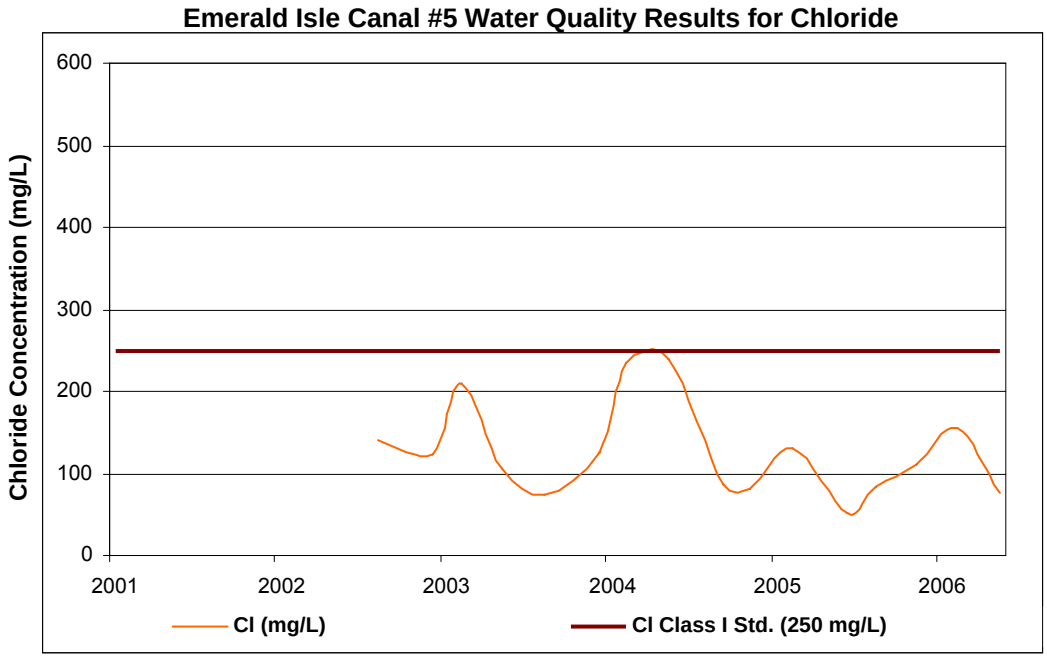
WBID 1962
Water Segment - Prairie Creek
Prairie Creek Watershed

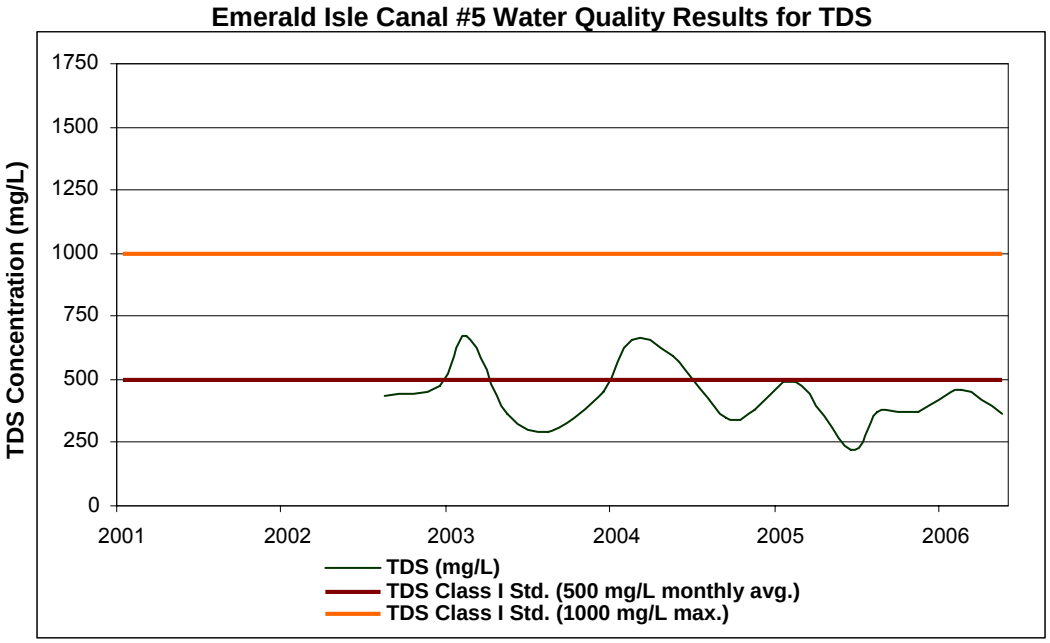




Appendix I

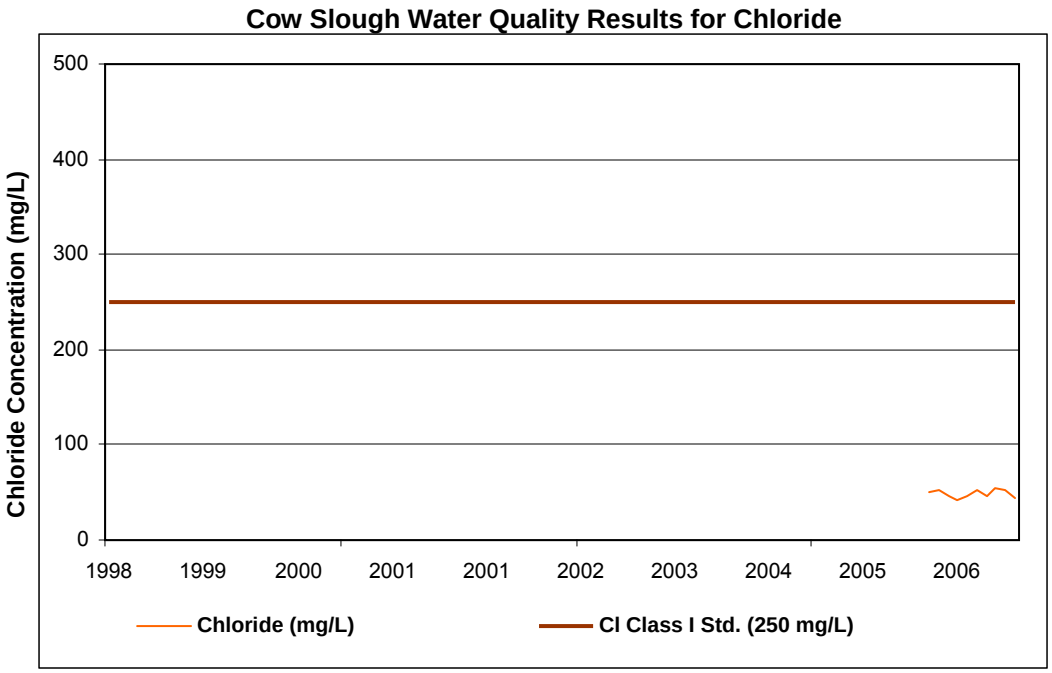
WBID 1964
Water Segment – Cow Slough
Prairie Creek Watershed

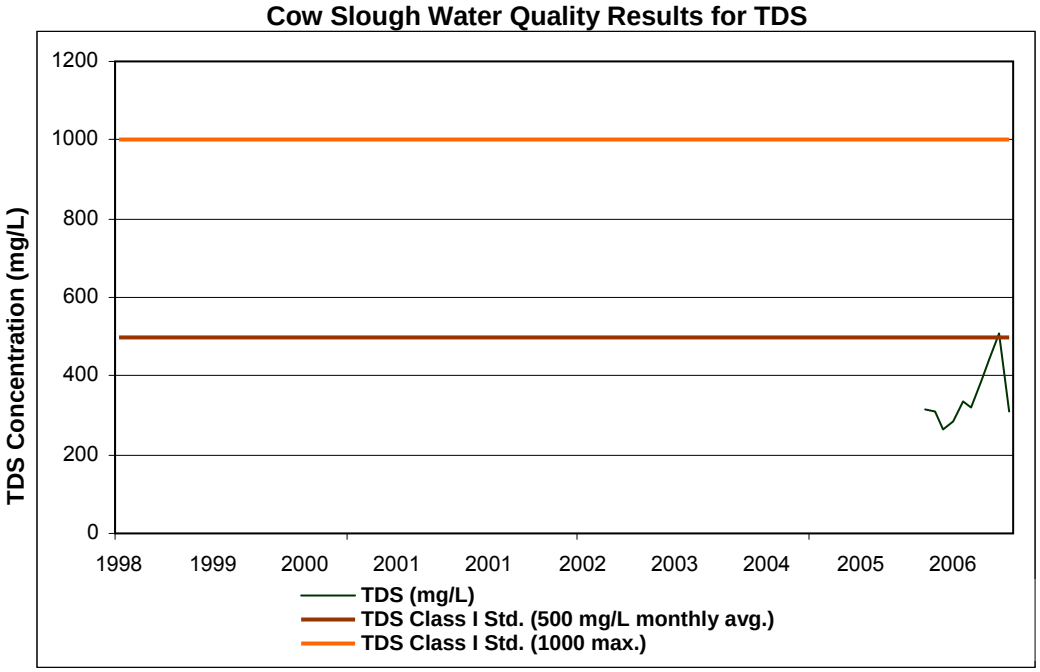




Appendix I

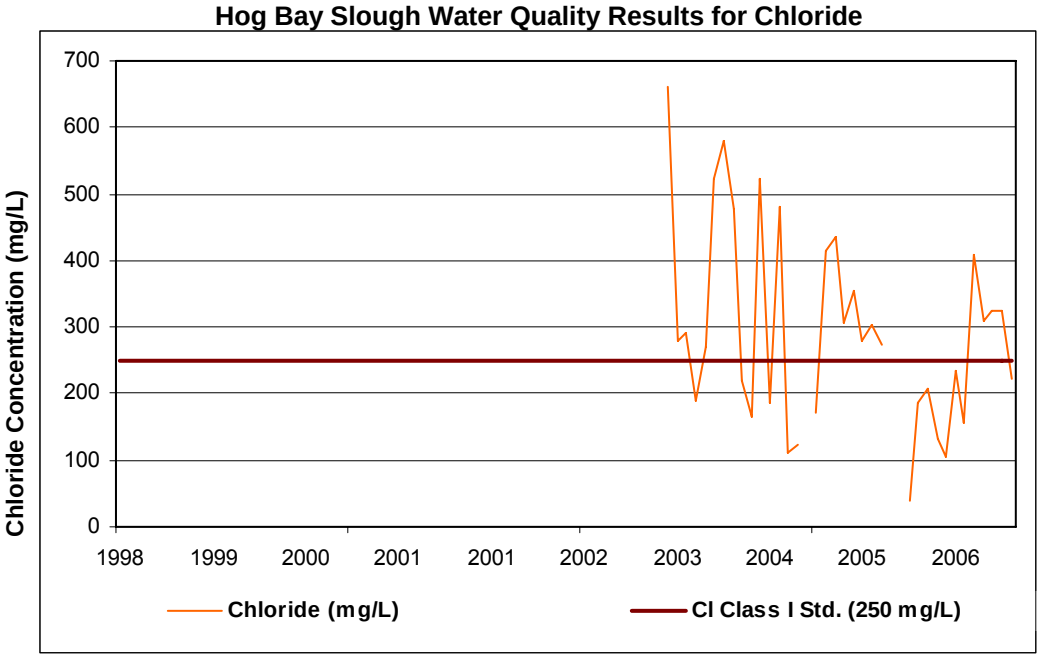
WBID 1964
Water Segment – Cow Slough
Prairie Creek Watershed

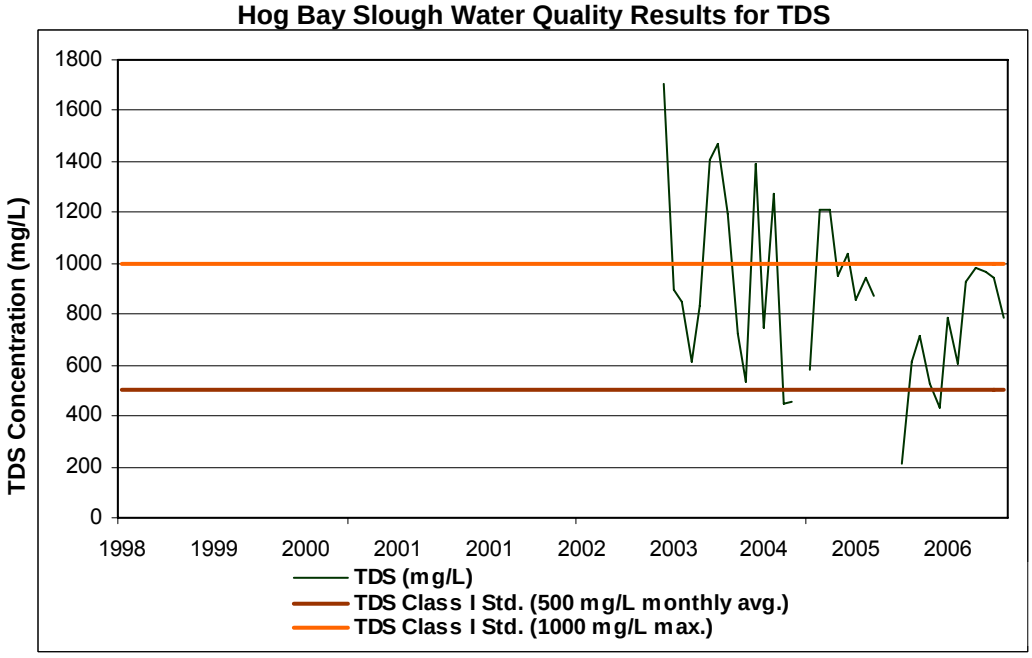




Appendix I

WBID 2001
Water Segment – Hog Bay
Joshua Creek Watershed





Appendix II

Special Conditions Applied to All 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

IFAS BMP Implementation Team "Success Stories" (state-wide) (email correspondence from Brian Bowman, Indian River Research and Education Center, Fort Pierce, Florida)

The following are short descriptions of some of the results that IFAS has documented as part of their on-going BMP Implementation education programs coupled with FDACS cost-share programs:

- A corn grower reduced nitrogen inputs by 30 lbs/acre on 70 acres using BMP tools. This was a reduction of 2100 lbs of nitrogen with no yield loss. More importantly, he plans to apply this experience to reduce rates on all his fields next season.
- Peanut growers are adopting more sophisticated soil moisture equipment to guide their irrigation scheduling. Eliminating one unnecessary irrigation event per crop will conserve about 1.5 million gallons of water (assuming irrigation of 0.4" on a 140-acre field).
- A BMP Demonstration watermelon farm marketed a farm-record yield using BMP irrigation and nutrient management tools.
- A BMP Demonstration strawberry farm was using three times the IFAS recommended fertilizer rates (approx. 1.5 lbs/acre/day) in order to fertilize plants because his irrigation practices were leaching much of the applied nutrients. The methods he used were similar to those of his peers. After implementing an ET-based irrigation schedule and using BMP irrigation tools, fertilizer use is below that recommended by IFAS rates (less than 0.5 lbs/acre/day).
- Most farms in the Suwannee Valley region are now using GPS equipment for spreading fertilizers. This equipment eliminates overlapping when spreading, resulting in less fertilizer used to cover fields.
- The following table documents the fertilizer reductions for a Peace River grower who received $10,200 in cost-share funds for a variable rate fertilizer spreader. The results are only for the first of three applications that will be made this year. Therefore, the 66 tons of fertilizer saved in this one application would result in a reduction of nearly 200 tons applied over the course of a year (approx. 0.42 tons/acre).

			Fertilizer Applied			
Grower Name	**Approx. Resets (%)**	**Grove Size (acres)**	**Traditional Spreader (w/out eyes) (lbs)**	**VRT Spreader (with eyes) (lbs)**	**Savings (lbs)**	**Savings (%)**
1	70	188	112,800	57,482	55,318	51
2	85	129	77,400	35,634	41,766	46
3	25	160	96,000	60,760	35,240	63
Avg./Total	60	477	286,200	153,876	132,324	54

Appendix V

Media Coverage and Education and Outreach Activities in the SPJC Watersheds

Media Coverage

Title	Outlet	Date
"State Eyeing Charlotte's Water Quality"	Sun-Herald.com	Mar. 23 2005
"BMP Kick-Off"	Peace Rv. Valley Citrus Growers Assoc. Newsletter	Jun. 1 2005
"Peace Rv. Basin Board Sets Proposed Millage Rate"	Sun-Herald.com	Jun. 15 2005
"Tree Health and Salinity"	Triangle (Florida Citrus Manual)	Jun. 24 2005
"FARMS Cost-Share Program"	Peace Rv. Valley Citrus Growers Assoc. Newsletter	Jul. 1 2005
"SWFWMD's Activities Increase Production"	Peace Rv. Valley Citrus Growers Assoc. Newsletter	Aug. 1 2005
"Citrus Best Management Practices"	Peace Rv. Valley Citrus Growers Assoc. Newsletter	Sep. 1 2005
"Acronyms you Should get to Know"	Florida Agriculture	Oct. 1 2005
"Shell Creek & Prairie Creek Watersheds Management Plan Stakeholders Signing Ceremony"	Harbor Happenings (Charlotte Harbor NEP)	Issue 2; 2005
"International Interest in FARMS Program"	Water Matters; District Newsletter	Sep. 2005
"BMPs – Easy as 1,2,3"	Peace Rv. Valley Citrus Growers Assoc. Newsletter	Oct. 1 2005
"District Releases $1 million for FARMS Program"	e-Resource	Jan. 1 2006
"$1 Million in Grants to Help Farmers, Environment"	Sun-Herald	Feb. 2 2006
"FARMS"	(WWSB) ABC - Sarasota	Feb. 2 2006
"SWFWMD Programs Available to Assist Producers"	Florida Lawn Newsletter	May 1 2006
"SWUCA Plan will Restore Water Resources, Meet Water Needs"	Water Matters; District Newsletter	May 2006
"Cost-share Funding for BMP Participants"	Peace Rv. Valley Citrus Growers Assoc. Newsletter	Jul. 1 2006
"Mini-Farms"	e-Resource	May 2006

Appendix V

Outreach and Education

Event	Date
Legislative Delegation Meeting (Manatee)	Dec. 2004
Legislative Delegation Meeting (Saratsota)	Dec. 2004
Peace River/Manasota Water Supply Authority Meeting	Dec. 2004
Shell and Prairie Creek RA Plan Signing Ceremony	Dec. 3, 2004
Legislative Delegation Meeting (Charlotte)	Jan. 2005
American Clean Water Foundation	Jan. 2005
EPA SPJC RA Plan Briefing – Atlanta, Ga.	Jan. 31, 2005
CHEC Field Trip to FARMS Projects	Feb. 2005
Manatee Chamber of Commerce Environmental and Legislative Committee	Feb. 2005
Manasota League of Cities	Feb. 2005
FARMS Interagency Team Meeting	Feb. 18, 2005
SPJC Stakeholder Meeting	Mar. 3, 2005
Florida Farm Bureau Legislative Reception	Mar. 29, 2005
District Governing Board	Mar. 29, 2005
IFAS – Balm Research Center Opening	April 1, 2005
CHEC Meeting	April 27, 2005
SWF RPC	May 1, 2005
Agricultural Advisory Committee Meeting	May 3, 2005
IFAS Peace River Citrus BMP Kickoff	May 18, 2005
Vegetable BMP Meeting	June 6, 2005
SPJC RA Plan Presented at Fl. Lake Management Society Conference	June 7, 2005
Peace River Basin Board - DEP/EPA Approval Status of SPJC RA Plan	June 10, 2005
Sarasota County Agriculture Council meeting	June 14, 2005
Florida Representatives Field Visit – TRB Groves	June 30, 2005
Flatford Agriculture Meeting - FDACS	July 7, 2005
Australians Visit FARM Project Properties	Jul. 25, 2005
Agricultural Advisory Committee Meeting	Aug. 9, 2005
FARMS Interagency Meeting	Aug. 29, 2005
Citrus Expo	Aug. 24, 2005
Peace River/Manasota Regional Water Supply Authority Meeting	Oct. 27, 2005
Agricultural Advisory Committee Meeting	Nov. 9, 2005
SPJC Stakeholder Meeting	Nov. 10, 2005
FARMS Interagency Meeting	Nov. 28, 2005
SPJC RA Plan Presented at Fl. Stormwater Association Conference	Dec. 7, 2005
IFAS Citrus BMP Workshop, Arcadia	Jan. 18, 2005
FDACS Annual Meeting, Tallahassee	Feb 7, 2006
Agricultural Advisory Committee Meeting	Feb. 12, 2006
Tampa Bay Wholesale Growers Spring Conference	Feb. 25, 2006
FARMS Interagency Meeting	Feb. 27, 2006
Spring Blueberry Tour	Mar. 7, 2006
Senate Agriculture Meeting	Mar. 8, 2006
FDACS Luncheon – Upper Myakka	Apr. 1, 2006
SPJC Stakeholder Meeting	May 4, 2006
Agricultural Advisory Committee Meeting	May 17, 2006
WMDs Coordination Meeting	May 18, 2006
Vegetable and Agronomic Crop BMP Manual Regional Sign-up	Jun. 14, 2006
Cattleman's Annual Conference	Jun. 20, 2006

References

Southwest Florida Water Management District; Dec. 2004; Shell Creek and Prairie Creek Watersheds Management Plan; Reasonable Assurance Document; Tampa, Florida.

Southwest Florida Water Management District; Aug. 2006; Water Quality Monitoring Program Standard Operating Procedures; Tampa, Florida.

Southwest Florida Water Management District; Dec. 2006; Regional Water Supply Plan; Brooksville, Florida.

Southwest Florida Water Management District; Mar. 2006; Southern Water Use Caution Area; Recovery Strategy; Brooksville, Florida.

Southwest Florida Water Management District; Mar. 2005; Coastal Ground-Water Quality Monitoring Network / Water-Use Permit Network Report; Volume V; Tampa, Florida.

American Public Health Association; 1995; Standard Methods for the Examination of Water and Wastewater; 19th Edition.

U.S. Environmental Protection Agency; 1983; Methods for Chemical Analyses of Water and Wastes.