

Facilitating Agricultural Resource Management Systems (FARMS)



Well Back-Plugging Initiative

Biennial Status Report

October 2015 – September 2017



FARMS Program
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October 2015 – September 2017

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Southwest Florida Water Management District



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FARMS Well Back-Plugging Initiative Biennial Status Report

October 2015 – September 2017

Introduction

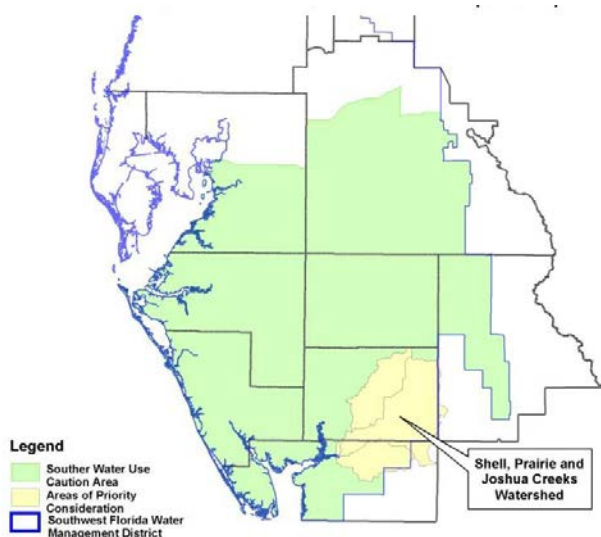
Regional watersheds, public water supply and cropland productivity can be seriously affected by long-term use of highly mineralized groundwater for irrigation. Deeper groundwater in the Southwest Florida Water Management District's southern and coastal aquifer systems can be more concentrated in chloride, sulfate and other minerals dissolved from the aquifer and from mineralized groundwater interaction. Each year, a single high capacity irrigation well can translocate a dry-mass equivalent of several tons of these minerals from below ground into a watershed. With 83 wells back-plugged to date, improving water quality for public supply, farms and the environment is an ongoing, regular achievement of the FARMS Well Back-Plugging Initiative.

In response to elevated levels of specific conductance, chloride and total dissolved solids in water quality monitored for Punta Gorda's public drinking water reservoir, the District implemented the Back-Plugging Funding Assistance Initiative in July 2002. The purpose of the initiative is to identify and modify wells in areas of the District often producing highly mineralized groundwater. Section 373.206 of the Florida Statutes (F.S.) authorizes the Florida Department of Environmental Protection (FDEP) and/or the Water Management District to plug a well if it is determined to be of such poor water quality as to have adverse impacts upon an aquifer or other water bodies meant to serve as public drinking water sources, or that could become public water sources. Section 373.203(3), F.S. defines "well plugging" to include plugging, capping or controlling a well, as deemed appropriate by FDEP or the Water Management District.

In 2004, the Back-Plugging Initiative became an integral part of the District's FARMS Program, which funds cost-share projects meant to implement and establish enhanced water quality and water quantity Best Management Practices for the agricultural sector. While the Back-Plugging Initiative has been focused mainly on agricultural wells in the Southern Water Use Caution Area (SWUCA), other user groups may qualify to participate.

The SWUCA, which is denoted by depressed aquifer levels and saltwater intrusion along the coast, encompasses approximately 5,100 square miles and extends through eight counties comprising the southern half of the Southwest Florida Water Management District (Figure 1.)

Figure 1. Southern Water Use Caution Area (SWUCA)



The SWUCA Extends into Eight Counties:

Charlotte
DeSoto
Hardee
Highlands
Sarasota
Manatee
Hillsborough
Polk

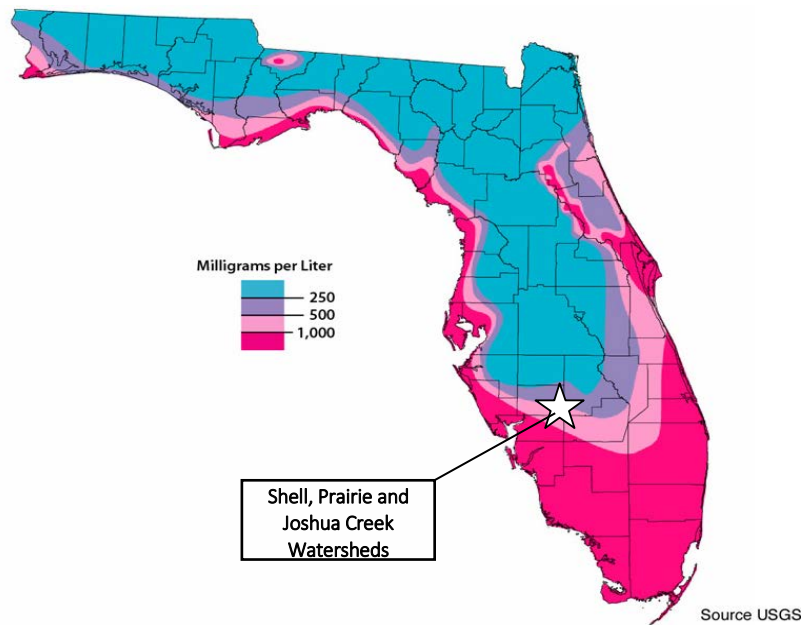
Groundwater mineralization can be easily field-checked with a conductivity or total dissolved solids (TDS) meter. Wells in the Shell, Prairie and Joshua Creek watersheds (SPJC), upstream of the Punta Gorda and Peace River public supply reservoirs, have been found with conductivity ranging up to 17,000 micro Siemens per centimeter ($\mu\text{S}/\text{cm}$), which is far greater than the surface water Class I criterion of 1,275 $\mu\text{S}/\text{cm}$. The relative incidence of chloride concentration in groundwater found to range in the Upper Floridan aquifer is shown by Figure 2.

Prolonged well pumping, particularly during periods of drought, can induce "up-coning" and blend better groundwater with the deeper mineralized sources of the aquifer complex. Wells that originally produced acceptable quality water may become degraded with time from continuous pumping.

Back-plugging is an effort to block off the deeper, often more mineralized groundwater. However, completion of a back-plug operation could potentially result in some loss of well capacity. Experience and careful investigations leading to many successful back-plug completions over the years has demonstrated that any loss of well capacity is often negligible or on average less than 25 percent.

Growers may have other options to resolve water quality and supply problems by reconfiguring irrigation zones or developing an alternative irrigation source such as a surface water reservoir through funding opportunities offered through the District’s FARMS Program. This has proven popular with growers willing to update, automate or reconfigure their irrigation systems to improve water quality, reduce reliance on groundwater and facilitate water conservation in their daily operations.

Figure 2. Chloride Concentration in the Upper Floridan Aquifer



Back-Plugging Procedure

To qualify for the District’s assistance with the Back-Plugging Initiative, the measured conductivity of groundwater in the well should be at least 1,000 $\mu\text{S}/\text{cm}$. FARMS program staff can be called upon to screen the well for qualification to participate. Following qualification, the well owner will be notified to have the pump removed to allow access for a down-hole geophysical survey scheduled and conducted by District staff. Staff will examine the geophysical data recorded to determine if the well is a good back-plug candidate and will make a recommendation for completing the operation, which typically involves back-filling a selected bottom interval with coarse gravel and sealing off the top of it with an interval of cement. The well owner is responsible for selecting and scheduling the contractor(s) involved to remove/replace the well pump and complete the back-plug. Ideally, irrigation wells are back-plugged in the summer wet season, as it often takes three or more weeks to coordinate and complete the back-plug while the well is out of service.

After the well is back-plugged the pump is replaced and the discharge checked for water quality. Well owners may be reimbursed up to \$1,500 per back-plug event to remove and replace the pump, and up to \$5,000 per event for an actual back-plug operation conducted by a State licensed driller. The final reimbursement amount is determined by average bore-hole volume plugged. Back-plug activities are permitted under Chapter 40D-3, Florida Administrative Code (F.A.C.) and monitored by District staff.

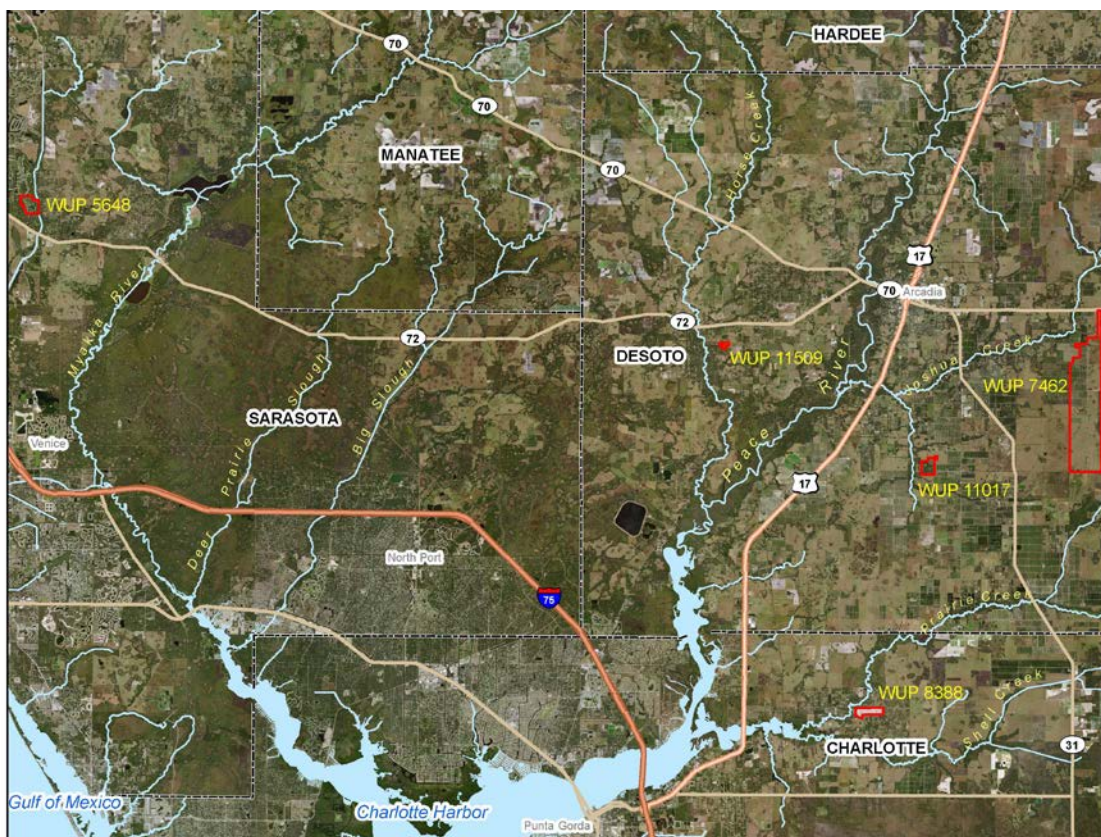
Wells Back-Plugged for the Current Report Period

Water quality results for seven (7) wells back-plugged within the current report period from October 2015 to September 2017 are summarized below in Table 1. Location of wells back-plugged within the current report period are mapped corresponding to water use permit number in Figure 3. The results for all wells back-plugged including the current report period have been summarized in Appendix B.

Table 1. Summary of Water Quality Results for Wells Back-Plugged 2015-2017

Watershed	Water Use Permit No.	District Well ID	Back-Plug Completion Date	Water Quality Before Back Plug			Percent Lowered After Back Plug		
				Conductivity ($\mu\text{S}/\text{cm}$)	TDS (mg/L)	Chloride (mg/L)	Conductivity	TDS	Chloride
Shell	8388	2	12/29/16	3,182	1,820	783	12%	32%	35%
Prairie	7462	50	1/28/16	1,208	1,150	1,326	34%	56%	97%
Prairie	7462	51	5/17/16	3,630	2,323	1,386	74%	74%	97%
Prairie	7462	52	8/25/17	2,200	1,240	448	60%	52%	83%
Joshua	11017	1	5/16/16	2,670	1,330	470	29%	8%	28%
Horse	11509	1	9/19/17	3,070	1,965	624	37%	37%	61%
Myakka	5648	1	1/6/17	4,400	2,820	580	21%	20%	21%

Figure 3. Location of Wells Back-Plugged 2015-2017




Conclusions

Water quality analytical results for all 83 wells back-plugged in the SWUCA since inception of the District Initiative are summarized in Appendix B. Conductivity and TDS were lowered an average of 41 percent, and chloride lowered by 58 percent. Lost well capacity averaged 20 percent overall. Of the 83 wells back-plugged in the SWUCA, 61 were completed in the SPJC watersheds with conductivity, TDS and chloride lowered an average of 41, 42 and 60 percent, respectively (Appendix B).

Appendix A

Board Procedure for Back-Plugging Funding Assistance Initiative

BOARD PROCEDURE			
SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT			
TITLE: Procedure for Back-Plugging Funding Assistance Initiative			
DEPARTMENT: Resource Conservation and Development	NUMBER: 61-7A	PAGE: 1 OF 4	
APPROVED BY:  E. B. VERGARA, EXECUTIVE DIRECTOR	EFFECTIVE DATE: July 10, 2002	SUPERSEDES: N/A	

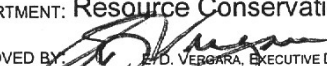
Purpose

The Southwest Florida Water Management District has established the Back-Plugging Funding Assistance Initiative (the Initiative) in order to locate and back-plug poor water quality wells which adversely impact the Floridan and/or Intermediate aquifer systems in the District. This Initiative is statutorily authorized through Section 373.206, Florida Statutes (F.S.), which provides in part, "Upon the determination by the Department of Environmental Protection or the appropriate water management district that the water in an artesian well is of such poor quality as to have an adverse impact upon an aquifer or other water body which serves as a source of public drinking water or which is likely to be such a source in the future, such well shall be plugged in accordance with department or appropriate water management district specifications for well plugging." "Well plugging" is defined at Section 373.203(3), F.S. to include "plugging, capping, or otherwise controlling a well as deemed appropriate by the department or by the appropriate water management district."

The purpose of the Initiative is to improve ground water quality in existing wells that exhibit poor water quality. The Initiative facilitates the District's Regional Water Supply Plan and is designed to serve as an incentive to landowners to back-plug poor water quality wells. The back-plugging of wells will assist in sustaining surface water and ground water resources. In addition, the protection of ground water and surface water quality will reduce the need for developing alternative sources.

Procedure

1. District staff will identify potential sites and communicate with landowners, take water quality samples from each existing well on-site, inspect each well using geophysical logs and video logs to evaluate borehole characteristics to define zones of poor water quality, develop back-plugging permit stipulations, analyze water quality sampling prior to and following back-plugging to determine improvement in water quality, and monitor flow before and after back-plugging to determine the effect of back-plugging on well production.
2. A landowner shall qualify for the Initiative if the tested well demonstrates a zone of water quality which exceeds specific conductivity levels of 1,000 *us/cm* as verified by District staff, the landowner executes and submits the required documents as described herein to the District, and the landowner otherwise complies with the requirements of the Initiative.
3. The landowner shall provide documentation showing that he or she is the owner of the subject real property and shall sign an acknowledgment that he or she has read the *Procedure for Back-Plugging Funding Assistance Initiative* (the Acknowledgment).

BOARD PROCEDURE		
SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT		
TITLE: Procedure for Back-Plugging Funding Assistance Initiative		
DEPARTMENT: Resource Conservation and Development	NUMBER: 61-7A	PAGE: 2 OF 4
APPROVED BY:  J.D. VERGARA, EXECUTIVE DIRECTOR	EFFECTIVE DATE: July 10, 2002	SUPERSEDES: N/A

4. By signing the Acknowledgment, the landowner agrees to allow District staff to enter upon his or her real property for the public purpose of operating equipment and vehicles in order to geophysically log and obtain water-quality samples from the qualified well(s); introduce geophysical logging equipment, video inspection camera, and thief's sampler into the qualified well(s) and borehole(s) as is reasonably necessary to geophysically log and obtain water quality samples; and, observe back-plugging activity performed by a well contractor employed by the landowner. The landowner agrees to allow the District such access to the real property beginning from the time the landowner signs the Acknowledgment and ending upon completion of all procedures required by the Initiative.


5. Funding for this Initiative is limited. Qualified wells will be considered for reimbursement in the order in which the Back-Plugging Reimbursement Claim Forms (Claim Forms) are received by the District. If the landowner complies with all requirements of the Initiative, the District will provide the landowner the lesser of the Maximum Eligible Reimbursement Amount as indicated on the Claim Form or the amount invoiced by the licensed well contractor. However, under no circumstances will the District reimburse the landowner in excess of \$5,000 per well for back-plugging and \$1,500 per well for pulling and resetting of pump.

6. Maximum Eligible Reimbursement Amount is determined by District staff's evaluation of borehole diameter, length of the back-plugged interval, equipment used, and reasonable labor costs, as specified on the Claim Form. District staff will review the geophysical logs and video logs to obtain data necessary to determine the Maximum Eligible Reimbursement Amount. Allowable costs may be updated periodically to reflect current market conditions.

7. The District will provide a copy of the geophysical logs and water quality analysis to the landowner. The landowner is responsible for retaining and negotiating a contract with a water well contractor who is licensed in the State of Florida, to back-plug the qualifying well(s). The landowner is required to file a permit application for the back-plugging activity in a timely manner. If the landowner does not sign the permit application personally, the application must contain a letter of authorization signed by the landowner designating an agent.

8. The qualifying well(s) must be back-plugged within 30 days of the Claim Form issuance date. If the permitted back-plugging is not complete within this time frame, the landowner will not be eligible for reimbursement. If denied funding, the landowner may re-apply for assistance through the Initiative, if funds are available.

9. The pump must be reset within 20 days of the completion of the back-plugging. If the pump is not reset within this time frame, the landowner will not be eligible for reimbursement. If denied funding, the landowner may re-apply for assistance through the Initiative, if funds are available.

BOARD PROCEDURE			
SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT			
TITLE: Procedure for Back-Plugging Funding Assistance Initiative			
DEPARTMENT: Resource Conservation and Development	NUMBER: 61-7A	PAGE: 3 OF 4	
APPROVED BY: 	E.D. VERGARA, EXECUTIVE DIRECTOR	EFFECTIVE DATE: July 10, 2002	SUPERS EDES: N/A

10. All well back-plugging activity must be observed by District staff, a consultant of the District, or other District designee. The landowner must provide a copy of a detailed invoice prepared by the well contractor and completion report to the District within 14 days of completion of the back-plugging activity. District staff will review these documents within 14 days of receipt thereof. If District staff determines that the back-plugging activity was performed in compliance with the Initiative, the District shall reimburse the landowner the Maximum Eligible Reimbursement Amount, or the contractor's invoice amount, whichever is less. Any amount invoiced by the contractor in excess of the Maximum Eligible Reimbursement Amount identified on the Claim Form is the sole responsibility of the landowner.

11. QWIP staff will maintain a well back-plugging data base to contain water quality, well construction details, water use permitting information, and reimbursement amounts.

12. QWIP staff will include the back-plugging data base and back-plugging effectiveness measures in the annual update of the Artesian Well Plugging Program Work Plan submitted to the Secretary, Florida Department of Environmental Protection.

13. Any cost associated with well construction problems encountered after the back-plugging due to change of borehole dynamics is the sole responsibility of the landowner and is not an eligible reimbursement cost under the Initiative.


14. Any cost associated with the loss of production or the quality of water produced from the qualifying well(s) after back-plugging is the sole responsibility of the landowner and is not an eligible reimbursement cost under the Initiative.

15. Any cost associated with the installation, rehabilitation, or maintenance of new well casing is the sole responsibility of the landowner and is not an eligible reimbursement cost under the Initiative.

16. Any cost associated with pump and/or well maintenance prior to or after back-plugging is the sole responsibility of the landowner and is not an eligible reimbursement cost under the Initiative.

17. Any back-plugged well that exhibits only nominal improvement in water quality is eligible for additional back-plugging through the Initiative, provided District staff determines that additional back-plugging is likely to result in significant water quality improvement, and the poor results of the prior back-plugging effort were not caused by contractor negligence or error.

18. Procedures 1 through 17 apply to all wells that qualify for additional back-plugging.

BOARD PROCEDURE			
SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT			
TITLE: Procedure for Back-Plugging Funding Assistance Initiative			
DEPARTMENT: Resource Conservation and Development	NUMBER: 61-7A	PAGE: 4 OF 4	
APPROVED BY:  E. D. VERGARA, EXECUTIVE DIRECTOR	EFFECTIVE DATE: July 10, 2002	SUPERSEDES: N/A	

19. Exceptions to this Procedure as described herein must be approved in writing by the Executive Director or his/her designee.

**ACKNOWLEDGMENT OF PROCEDURE FOR
BACK-PLUGGING FUNDING ASSISTANCE INITIATIVE**

I/We hereby acknowledge that I/we have read and understand the Southwest Florida Water Management District's *Procedure for Back-Plugging Funding Assistance Initiative*.

Date

Owner's Signature

Printed Name / Title of Authorized Representative

Date

Co-Owner's Signature
(Required if property has co-owners)

Printed Name

Property Address

Appendix B

Summary of Well Back-Plugging Results

Peace River Watershed

WELL			BEFORE BACK-PLUGGING				AFTER BACK-PLUGGING				PERCENT DECREASE			
Water Use Permit	District ID	Back-Plug Date	Conductivity (uS/cm)	TDS (mg/L)	Chloride (mg/L)	Pumping Rate (gpm)	Conductivity (uS/cm)	TDS (mg/L)	Chloride (mg/L)	Pumping Rate (gpm)	Conductivity (uS/cm)	TDS (mg/L)	Chloride (mg/L)	Pumping Rate (gpm)
9565	4	09/03/02	3,010	1,700	777	2,610	1,312	804	177	1,700	56%	53%	77%	35%
9565	1	09/06/02	6,570	3,970	1,800	2,050	1,491	649	83	1,700	77%	84%	95%	17%
7434	5	03/18/03	3,010	1,830	732	3,000	1,277	837	161	1,100	58%	54%	78%	63%
12453	4	06/30/03	3,600	2,068	857	2,200	1,488	931	245	NA	59%	55%	71%	NA
6197	8	12/10/06	1,180	NA	NA	NA	252	NA	NA	NA	79%	NA	NA	NA
10420	30	11/16/07	1,428	792	239	NA	1,405	888	235	410	2%	-12%	2%	NA
10420	38	11/06/07	1,442	836	250	NA	1,445	916	250	680	0%	-10%	0%	NA

Alafia River Watershed

WELL			BEFORE BACK-PLUGGING				AFTER BACK-PLUGGING				PERCENT DECREASE			
Water Use Permit	District ID	Back-Plug Date	Conductivity (uS/cm)	TDS (mg/L)	Chloride (mg/L)	Pumping Rate (gpm)	Conductivity (uS/cm)	TDS (mg/L)	Chloride (mg/L)	Pumping Rate (gpm)	Conductivity (uS/cm)	TDS (mg/L)	Chloride (mg/L)	Pumping Rate (gpm)
656	2	10/01/04	2,662	1,549	528	810	1,669	1,039	260	780	37%	33%	51%	4%
1124	13	12/06/04	3,188	NA	NA	NA	1,655	NA	NA	NA	48%	NA	NA	NA
656	3	09/29/04	2,890	1,684	597	1,100	1,153	699	139	730	60%	58%	77%	34%
656	5	09/01/04	3,020	1,770	618	850	1,389	922	178	NA	54%	48%	71%	NA
3055	6	11/08/05	1,630	NA	190	NA	1,323	872	108	NA	19%	NA	43%	NA
3055	7	04/09/08	1,930	1,290	255	NA	1,325	898	132	NA	31%	30%	48%	NA

Horse Creek (Peace River Watershed)

WELL			BEFORE BACK-PLUGGING				AFTER BACK-PLUGGING				PERCENT DECREASE			
Water Use Permit	District ID	Back-Plug Date	Conductivity (uS/cm)	TDS (mg/L)	Chloride (mg/L)	Pumping Rate (gpm)	Conductivity (uS/cm)	TDS (mg/L)	Chloride (mg/L)	Pumping Rate (gpm)	Conductivity (uS/cm)	TDS (mg/L)	Chloride (mg/L)	Pumping Rate (gpm)
2703	4	11/26/03	2,233	2,070	20	3,750	2,176	1,943	19.70	2,600	3%	6%	2%	31%
11509	1	09/19/17	3,070	1,965	624	2,800	1,930	1,237	244.00	2,800	37%	37%	61%	0%

Manatee River Watershed

WELL			BEFORE BACK-PLUGGING				AFTER BACK-PLUGGING				PERCENT DECREASE			
Water Use Permit	District ID	Back-Plug Date	Conductivity (uS/cm)	TDS (mg/L)	Chloride (mg/L)	Pumping Rate (gpm)	Conductivity (uS/cm)	TDS (mg/L)	Chloride (mg/L)	Pumping Rate (gpm)	Conductivity (uS/cm)	TDS (mg/L)	Chloride (mg/L)	Pumping Rate (gpm)
7846	54	04/17/02	NA	2,250	346	NA	NA	NA	NA	NA	NA	NA	NA	NA
7846	65	02/15/11	NA	1,708	NA	NA	NA	1,310	NA	NA	NA	23%	NA	NA
7846	67	03/09/11	NA	1,368	NA	NA	NA	1,050	NA	NA	NA	23%	NA	NA
9808	1	05/29/07	3,270	2,460	575	750	1,717	1,370	144	725	47%	44%	75%	3%
11922	3	06/25/15	1,860	1,440	125	2,300	790	394	NA	2,300	58%	73%	NA	0%

Myakka River Watershed

WELL			BEFORE BACK-PLUGGING				AFTER BACK-PLUGGING				PERCENT DECREASE			
Water Use Permit	District ID	Back-Plug Date	Conductivity (uS/cm)	TDS (mg/L)	Chloride (mg/L)	Pumping Rate (gpm)	Conductivity (uS/cm)	TDS (mg/L)	Chloride (mg/L)	Pumping Rate (gpm)	Conductivity (uS/cm)	TDS (mg/L)	Chloride (mg/L)	Pumping Rate (gpm)
5648	1	1/6/2017	4,400	2,820	580	1,000	3,470	2,260	460	1,000	21%	20%	21%	0%
12516	1	11/13/07	2,690	1,770	470	850	1,180	874	63	600	56%	51%	87%	29%

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Shell Creek Watershed

WELL			BEFORE BACK-PLUGGING				AFTER BACK-PLUGGING				PERCENT DECREASE			
Water Use Permit	District ID	Back-Plug Date	Conductivity (uS/cm)	TDS (mg/L)	Chloride (mg/L)	Pumping Rate (gpm)	Conductivity (uS/cm)	TDS (mg/L)	Chloride (mg/L)	Pumping Rate (gpm)	Conductivity (uS/cm)	TDS (mg/L)	Chloride (mg/L)	Pumping Rate (gpm)
9648	1	8/27/2007	2,310	1,360	599	1,500	1,080	663	144	1,000	53%	51%	76%	33%
9648	2	07/22/02	2,540	1,625	606	1,500	3,040	NA	NA	1,500	-20%	NA	NA	0%
9926	1	10/06/09	3,160	1,880	829	NA	3,290	1,870	841	NA	-4%	1%	-1%	NA
9926	5	08/24/10	3,179	1,883	829	NA	2,110	1,130	511	NA	34%	40%	38%	NA
9926	10	07/30/13	3,570	2,030	951	NA	3,557	1,990	873	NA	0%	2%	8%	NA
9926	11	07/30/13	1,904	1,068	460	NA	1,634	870	177	NA	14%	19%	62%	NA
8388	2	12/29/16	3,182	1,820	783	NA	2,800	1,240	510	NA	12%	32%	35%	NA

Prairie Creek Watershed

WELL			BEFORE BACK-PLUGGING				AFTER BACK-PLUGGING				PERCENT DECREASE			
Water Use Permit	District ID	Back-Plug Date	Conductivity (uS/cm)	TDS (mg/L)	Chloride (mg/L)	Pumping Rate (gpm)	Conductivity (uS/cm)	TDS (mg/L)	Chloride (mg/L)	Pumping Rate (gpm)	Conductivity (uS/cm)	TDS (mg/L)	Chloride (mg/L)	Pumping Rate (gpm)
3069	7	11/27/01	2,710	1,565	691	3,150	942	569	138	2,100	65%	64%	80%	33%
3069	2	12/06/01	1,965	1,120	448	1,150	1,126	627	184	1,050	43%	44%	59%	9%
3069	6	12/14/01	2,410	1,387	584	1,700	795	443	101	1,500	67%	68%	83%	12%
3069	5	04/19/11	1,330	741	242	1,800	1,163	696	198	1,800	13%	6%	18%	0%
9782	9	09/13/02	2,140	1,234	511	2,050	2,080	NA	NA	2,000	3%	NA	NA	2%
6872	76	08/01/02	8,560	5,200	2,490	1,770	1,359	793	267	1,000	84%	85%	89%	44%
9782	3	08/21/02	1,543	887	321	1,200	1,016	490	86	1,025	34%	45%	73%	15%
6872	66	11/12/02	3,310	1,940	836	2,720	1,126	643	198	650	66%	67%	76%	76%
9782	4	01/16/03	1,358	788	261	2,500	1,362	780	226	1,750	0%	1%	13%	30%
9782	2	01/10/03	903	536	131	700	946	543	136	700	-5%	-1%	-4%	0%
9782	5	09/12/03	950	545	155	1,100	992	548	153	1,100	-4%	-1%	1%	0%
9782	7	09/23/03	1,212	676	236	1,325	1,275	707	231	1,000	-5%	-5%	2%	25%
9782	6	10/01/03	1,460	839	304	1,650	1,347	750	241	1,500	8%	11%	21%	9%
6275	5	02/19/04	4,559	2,544	1,150	1,000	861	NA	NA	500	81%	NA	NA	50%
6765	18	06/21/04	3,240	1,955	789	1,895	936	561	126	1,800	71%	71%	84%	5%
6765	19	09/21/04	2,300	1,430	497	1,900	1,037	643	148	NA	55%	55%	70%	NA
9732	2	10/11/04	2,178	1,226	463	NA	1,544	889	294	NA	29%	27%	37%	NA
12818	1	04/28/05	3,325	1,900	857	NA	740	463	78	NA	78%	76%	91%	NA
9127	7	03/22/06	1,970	NA	NA	NA	1,462	NA	NA	NA	26%	NA	NA	NA
9127	6	03/24/06	1,500	NA	NA	NA	1,153	NA	NA	NA	23%	NA	NA	NA
9782	1	07/29/02	1,713	993	372	1,825	1,182	684	189	1,250	31%	31%	49%	32%
7783	1	05/05/09	4,000	2,560	NA	1,600	3,270	1,880	871	1,550	18%	27%	NA	3%
13349	3	10/15/10	1,705	942	432	NA	1,530	824	376	NA	10%	13%	13%	NA
13349	8	10/15/10	2,050	1,185	499	NA	1,980	1,102	473	NA	3%	7%	5%	NA
8985	24	09/03/15	1,830	920	NA	1,000	1,590	795	NA	1,000	13%	14%	NA	0%
7462	50	01/28/16	1,208	1,150	1,326	1,200	799	511	41	1,200	34%	56%	97%	0%
7462	51	05/17/16	3,630	2,323	1,386	1,200	951	608	39	1,200	74%	74%	97%	0%
7462	52	08/25/17	2,200	1,240	448	1,200	880	590	76	1,200	60%	52%	83%	0%

FARMS Well Back-Plugging Initiative Biennial Status Report 2015-2017

Joshua Creek Watershed

WELL			BEFORE BACK-PLUGGING				AFTER BACK-PLUGGING				PERCENT DECREASE			
Water Use Permit	District ID	Back-Plug Date	Conductivity (uS/cm)	TDS (mg/L)	Chloride (mg/L)	Pumping Rate (gpm)	Conductivity (uS/cm)	TDS (mg/L)	Chloride (mg/L)	Pumping Rate (gpm)	Conductivity (uS/cm)	TDS (mg/L)	Chloride (mg/L)	Pumping Rate (gpm)
6669	8	11/21/01	14,820	9,384	4,880	3,000	853	541	64	2,000	94%	94%	99%	33%
6669	12	02/28/03	17,240	12,060	5,600	3,000	935	583	83	2,500	95%	95%	99%	17%
6669	10	02/13/03	4,259	2,524	1,170	2,500	940	575	112	2,000	78%	77%	90%	20%
6669	11	02/19/03	15,020	9,450	4,850	2,500	854	584	64	1,500	94%	94%	99%	40%
5060	13	03/17/03	3,450	2,080	846	2,266	931	662	40	1,320	73%	68%	95%	42%
6669	13	03/20/03	6,400	3,826	1,505	3,000	1,064	667	133	2,000	83%	83%	91%	33%
5060	9	03/24/03	3,123	1,806	720	1,892	1,035	760	51	1,477	67%	58%	93%	22%
5060	10	03/28/03	3,427	2,029	818	1,583	975	735	48	970	72%	64%	94%	39%
6669	4	04/03/03	1,046	657	127	1,285	1,244	772	185	1,100	-19%	-18%	-46%	14%
5060	7	04/10/03	2,728	1,528	576	2,507	1,067	772	71	1,720	61%	49%	88%	31%
5060	12	04/18/03	2,505	1,423	520	1,734	998	751	55	1,490	60%	47%	90%	14%
5060	5	04/24/03	2,071	1,190	380	3,259	1,050	749	48	2,700	49%	37%	87%	17%
5060	4	05/09/03	2,096	1,188	383	1,285	1,820	1,062	275	1,100	13%	11%	28%	14%
5060	2	05/16/03	2,216	1,256	429	1,500	1,345	836	151	1,400	39%	33%	65%	7%
5060	3	05/19/03	NA	NA	NA	NA	948	663	42	NA	NA	NA	NA	NA
6669	9	06/06/03	2,019	1,122	395	2,500	786	526	77	1,700	61%	53%	81%	32%
6669	15	09/19/03	1,793	1,040	508	NA	862	538	80	650	52%	48%	84%	NA
9716	2	10/01/06	1,226	729	192	800	866	566	88	750	29%	22%	54%	6%
10971	1	01/24/03	2,427	1,330	507	3,000	869	577	73	2,000	64%	57%	86%	33%
2240	4	01/31/08	4,450	2,540	1,060	1,800	1,100	757	65	1,300	75%	70%	94%	28%
2240	3	02/27/08	3,960	2,270	973	1,800	1,030	658	162	1,300	74%	71%	83%	28%
6669	5	07/17/08	1,512	910	282	NA	987	598	106	NA	35%	34%	62%	NA
6669	2	04/20/09	2,160	1,300	508	NA	1,530	871	280	NA	29%	33%	45%	NA
4611	3	07/06/12	2,070	1,240	375	2,000	1,740	1,040	291	2,000	16%	16%	22%	0%
8660	2	10/22/13	4,310	2,350	1,010	2,000	1,260	754	145	2,000	71%	68%	86%	0%
11017	1	05/16/16	2,670	1,330	470	2,000	1,900	1,224	109	2,000	29%	8%	77%	0%

NA	No data by time of report, or not sampled	Total Percent Decrease All Wells	41%	41%	58%	20%
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