South Miami-Dade Seasonal Operations Supplemental Groundwater Level Data Collection and Evaluation from October 2009 to February 2010

Prepared for:

South Florida Water Management District

November 2010

Prepared by:

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Background

During the winter growing season, the normal practice is to lower canal levels about 0.5 to 0.8 feet below normal high range in the coastal agricultural areas of south Miami-Dade County. This practice is done in an effort to lower ground water levels within the C-102 and C-103 basins to optimize farming conditions. Farmers began drawing down canals in this area seasonally in the 1930's with their own pumps; but when the Central and Southern Florida Project (C&SF Project) was built, the U.S. Army Corp of Engineer's and then the South Florida Water Management District (SFWMD) continued to draw down canal levels via their constructed and operated water control structures. After completion of the C&SF project, operations during the growing season were designed to mimic the previous conditions created by the farming interests and in 1981 the process of lowering canal levels was formally adopted by the SFWMD to prevent flooding of the agricultural fields. This practice continues today and provides optimal growing conditions that are vital for planting seasonal row crops and having them available for the winter market.

During the winter growing season in the coastal agricultural areas of south Miami-Dade County, surface water levels in the canals are lowered to about 1.4 to 2.0 feet above sea level from October to December (approximately 45 days). Generally, on October 15th within the C-102 and C-103 basins, the SFWMD begins to operate S20F, S-179 and S-21A water control structures in their low ranges, but may be operated at a higher level depending on actual field conditions. The low ranges for these three structures are as follows: The S-20F water control structure operating in low range is opened at 1.4 feet and closed at 1.0 feet relative to the National Geodetic Datum of 1929 (NGVD, 29). The S-179 control structure operating in low range is opened at 3.1 feet and closed at 2.7 feet NGVD, 29. The S-21A control structure operating in low range is opened at 1.4 feet and closed at 1.0 feet NGVD, 29. However, during the 2009 growing season, the SFWMD operated the S-21A water control structure in an interim range where it opened at 2.0 feet and closed at 1.6 feet NGVD, 29.

Objective

In an effort to better determine the net effect on ground water levels in response to lowering SFWMD operated canals within the agricultural area of south Miami-Dade County during the winter growing season, the SFWMD contracted AECOM Technical Services to install automated water level devices to record ground water levels in several Surficial aquifer monitor wells in this area and to conduct a statistical analysis on ground water levels and surface water (canal) stages.

Scope

AECOM furnished and installed automated water level recorders (absolute pressure transducers) that were used to monitor ground water levels on an hourly basis within four (4) Surficial aquifer monitor wells selected by the SFWMD for a period of four months. The monitor wells used in this study are maintained by the U.S. Geological Survey and identified as G-3698, G-3699, G-3700 and G3701. The locations of these wells and other monitor stations used in this study are shown in **Figure 1**. A fifth absolute pressure transducer was placed at the G-3698 site to record

hourly barometric pressure and temperature readings to correct the submerged absolute pressure transducers readings from the four monitor wells to atmospheric conditions. In addition, groundwater levels in monitor wells G-1183, G3356, G1486, BBCW-2, BBCW-4 and BBCW-5 were also analyzed as part of the statistical analysis. Finally, surface water stages were statistically analyzed at S21A_H, S195_T, S179_T, S20F_H, S20G_H, S196_H, S21_H, S-165_T and S166_T, where H is the headwater and T is the tailwater.

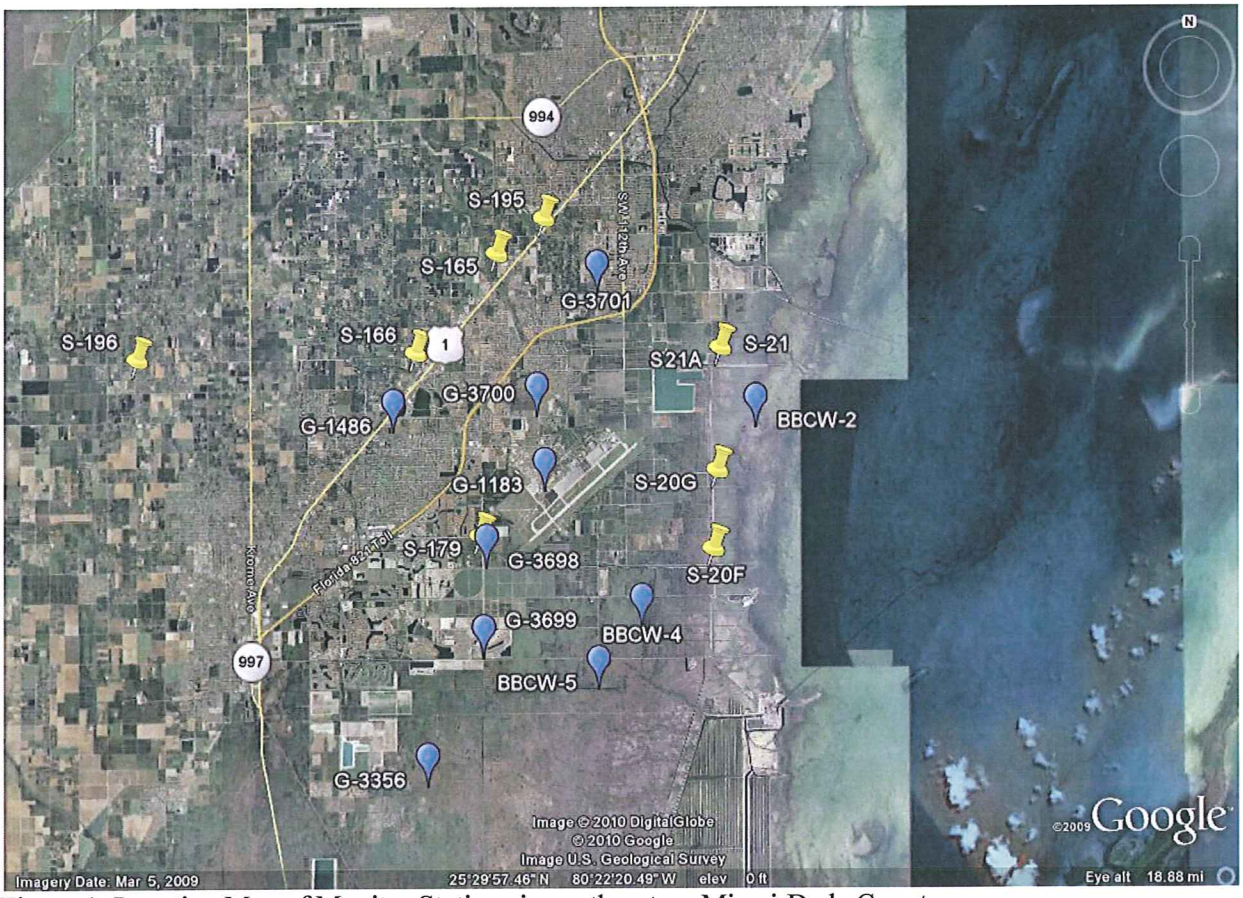


Figure 1: Location Map of Monitor Stations in southeastern Miami-Dade County

Note: Blue symbol identifies ground water monitor wells
Yellow symbol identifies surface water stations

Water Level Data Collection

Methodology

The continuous water level recorders consisted of 15 pounds per square inch (psi), self-recording, pressure transducers manufactured by Onset Computer Inc. The technical specifications and calibration sheets for the individual Hobo water level pressure transducers are provided in ***Appendix A.*** The Hobo sensors were suspended by monofilament line rated to 25 pounds from the well caps and lowered inside the monitor well. The sensors were set to a sufficient depth below previously recorded minimum water levels based on historical ground

water level records from the U.S Geological Survey for each monitor well. Water levels (pressure) were recorded on an hourly basis and stored in the individual data logger's internal memory.

On a monthly basis, each of the four pressure sensors were retrieved to surface and inspected. The pressure readings were then retrieved from the data loggers using an USB-based optical interface. During the data download, internal parameters of the data loggers that include its programming status, available free memory and power level were checked to ensure they were within operational limits to continue recording water levels. Once the internal parameters were verified, the data were retrieved from the sensor's internal memory. The data were viewed and graphed using HoboWare Pro software to verify that the correct number-of-pressure readings were obtained and that the ground water level data trends were consistent. In addition, depth-to-water readings were taken using an electronic water level indicator to verify the automated pressure transducer readings. Field reports documenting the monthly site visits are provided in ***Appendix B.***

Data Compilation

The pressure reading is the pressure exerted by the water column that resides above the installed pressure transducer plus atmospheric pressure measured in pounds per square inch (psi) recorded at each hour of the day using a military time format (e.g., 1000 hr). The recorded pressure readings are corrected for atmospheric pressure via the HoboWare Pro software. This is done by subtracting the atmospheric pressure (approximately 14.7 psi) from the measured pressure to determine only the pressure exerted by the overlying water column in the monitor well. Once the pressure readings are corrected for atmospheric pressure effects; they are converted to feet of equivalent freshwater head. This is done by multiplying the corrected transducer pressure reading by a conversion factor of 2.31 (assuming the total dissolve solids concentration of the ground water does not exceed 1,000 milligram per liter (mg/L) using equation no 1:

$$FWH = CP * 2.31 \quad (1)$$

where:
FWH = Freshwater Head in feet
CP = Corrected Pressure in pounds per square inch
2.31 = Conversion Factor (dimensionless)

Second, the Hobo sensor setting depth elevations were determined. The setting depth elevation referenced to National Geodetic Vertical Datum of 1929 (NGVD, 29) was determined using the surveyed top of casing elevation provided by the USGS and the measured length of monofilament nylon cable attached to the Hobo pressure sensor from the monitor well cap using equation no. 2:

$$TSD = STCE - CL \quad (2)$$

where:
TSD = Transducer Setting Depth (feet – NGVD, 29)
STCE = Surveyed Top of Casing Elevation (feet – NGVD, 29)
CL = Cable Length (feet)

Once these two parameters are determined, the freshwater head (FWH) is added to the transducer setting depth (TSD) to yield ground water levels corrected to NGVD, 1929 (mean sea level). The surveyed elevation data and various measured physical attributes (i.e., cable length) are provided in ***Appendix C.***

After the four month monitoring period was completed; the ground water data was compiled and presented as hydrographs with the ground water levels referenced to the National Geodetic Vertical Datum of 1929 for direct comparison. The hydrographs were used to show changes in ground water levels within the Surficial aquifer in response to lowering surface water levels in the canals via the SFWMD-operated water control structures, irrigation well withdrawals and rainfall events.

Summary statistics, trend analysis (hydrographs), and correlation analysis of the collected ground water level data from the four USGS monitor wells and other ground water and surface water monitor stations in the agricultural area of south Miami-Dade County are provided in the following sections.

Statistical Analysis

Summary Statistics

Basic summary statistics were computed using daily mean water level readings for each of the ground water monitor wells and surface water stations within the agricultural area of south Miami-Dade County that were collected over the four (4) month monitoring period. The parameters determined include:

- Minimum recorded value – lowest recorded water level for the monitoring period (MP)
- Maximum recorded value – highest recorded water level for the MP
- Range – the absolute value between the minimum and maximum recorded values measured during the MP – this value is useful to determine magnitude of water level change over the MP
- Mean – average value – all hourly values were summed and divided by the total number of calculated mean water level values over the MP.
- Median – The median or 50 percentile is the middle of a distribution where half the values are above the median and half are below. The median value is less sensitive to extreme value than is the arithmetic mean.
- Standard Deviation - tells how widely the values in a data set are spread apart. A large standard deviation tells you that the data are fairly diverse, while a small standard deviation tells you the data are pretty tightly bunched together.

A statistical summary of ground water levels of the Surficial aquifer within the agricultural area of south Miami-Dade County is provided in **Table 1.**

Table 1: Summary Statistics for Surficial Aquifer Ground Water Monitor Stations

Station	G- 3698 (feet)	G- 3699 (feet)	G-3700 (feet)	G-3701 (feet)	G-1183 (feet)	G-3356_G (feet)	G-1486_G (feet)	BBCW2 (feet)	BBCW4 (feet)	BBCW5 (feet)
Minimum	1.48	1.25	1.51	1.52	1.56	1.96	2.45	1.44	1.42	1.51
Maximum	2.65	2.46	3.34	2.54	3.00	3.14	3.77	2.14	2.13	2.32
Range	1.18	1.22	1.83	1.02	1.44	1.18	1.32	0.70	0.71	0.81
Mean	1.94	1.64	2.24	1.95	1.91	2.38	2.79	1.75	1.70	1.81
Median	1.90	1.57	2.19	1.97	1.87	2.30	2.78	1.74	1.68	1.74
St. Deviation	0.18	0.22	0.23	0.21	0.23	0.29	0.24	0.19	0.16	0.19
Monitor Depth	80-85	83-88	78-83	78-83	47	13	32	42-44	35-37	43-45

Period of Record 10-14-09 to 2-15-10; Monitor depth is feet below land surface

A statistical summary of surface water canal levels within the agricultural area of south Miami-Dade County is provided in **Table 2.**

Table 2: Summary Statistics for Surface Water Canal Monitor Stations

Station	S21A_H (feet)	S195_T (feet)	S179_T (feet)	S20F_H (feet)	S20G_H (feet)	S196_H (feet)	S196_T (feet)	S-21_H (feet)	S-165_T (feet)	S-166_T (feet)
Minimum	1.23	1.32	1.08	1.04	1.46	4.61	3.12	1.23	3.47	2.35
Maximum	2.08	2.94	2.11	2.07	2.10	4.95	4.18	2.08	4.57	2.95
Range	0.85	1.62	1.03	1.03	0.64	0.34	1.06	0.85	1.10	0.60
Mean	1.60	1.83	1.53	1.49	1.73	4.75	3.50	1.60	3.87	2.64
Median	1.63	1.85	1.53	1.50	1.72	4.76	3.43	1.63	3.88	2.65
St. Deviation	0.24	0.34	0.18	0.17	0.15	0.08	0.23	0.24	0.25	0.14

Period Record 10-14-09 to 2-15-10
H = Headwater
T = Tailwater

Trend Analysis

Hydrographs show changes in ground and surface water levels over time and are often the most important source of information about the hydrological conditions within an area. The pattern of ground water level change in a hydrograph can provide information on the physical characteristics of the ground water flow system, the rainfall patterns and the interrelation between recharge to and discharge from an aquifer. Water level changes shown in a hydrograph can also be caused by other management options such as irrigation and surface water management practices. The canals and water control structures for the C-102 and C-103 basins are shown on **Figure 2.**

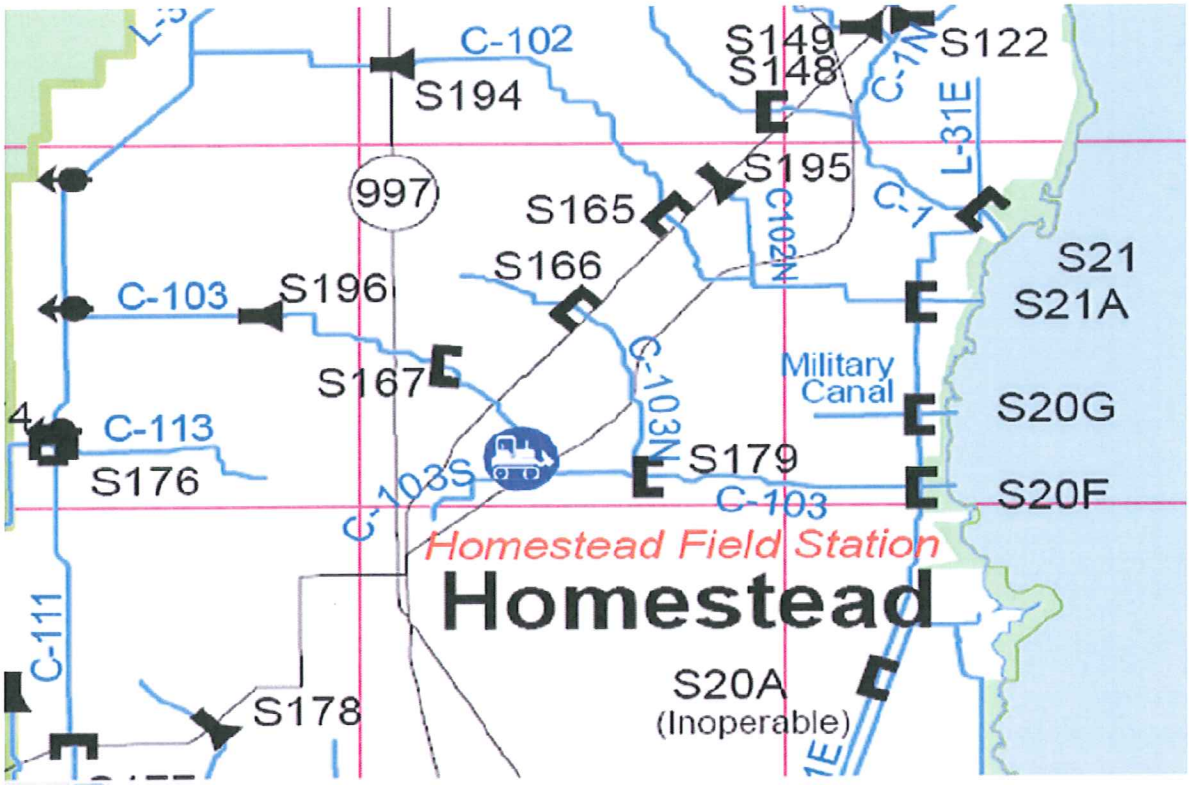


Figure 2: SFWMD operated Canals and Water Control Structures in the C-102 and C-103 Basins. (Source; SFWMD)

The hydrographs generated using daily mean ground and surface water levels for the individual monitor stations within the agricultural area of south Miami-Dade County are provided in ***Appendix D.*** The daily mean surface water level data were only available from DBHydro for each surface water station, so the hourly groundwater data were converted to daily mean values for direct comparison purposes. The hydrographs of the mean water levels for the various surface monitoring stations within the C-102 and C-103 basins are summarized in **Figure 3.**

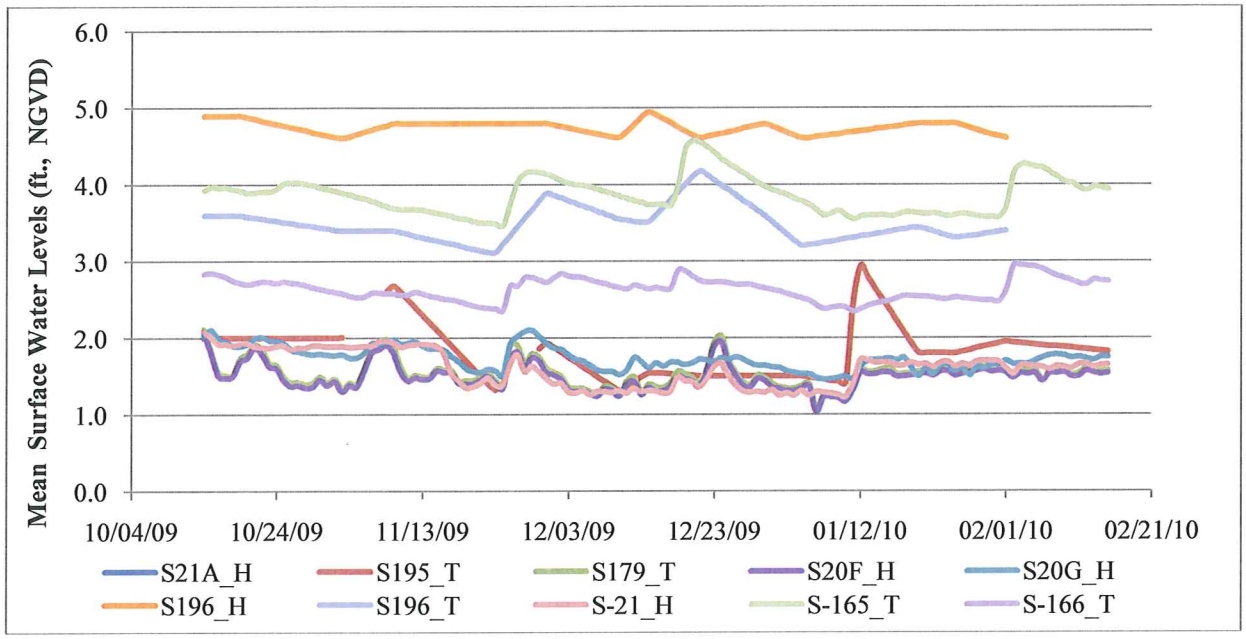


Figure 3: Hydrographs of Mean Surface Water Levels in the C-102 and C-103 Basins

The hydrographs of the mean water levels for the various ground water monitoring stations within the C-102 and C-103 basins are summarized in **Figure 4.** The trends of all ground water stations shown in **Figure 4** appear to be similar in nature and indicate, in general, declining water levels over the monitoring period of October 14, 2009 to January 1, 2010 similar to surface water levels shown in **Figure 3**. The occurrence and magnitude of change in ground water levels differ based on the depth of the monitor wells, vertical permeability of the overlying sediment and proximity of the monitor wells to large surface water canals and or irrigation wells and the magnitude of localized rainfall events.

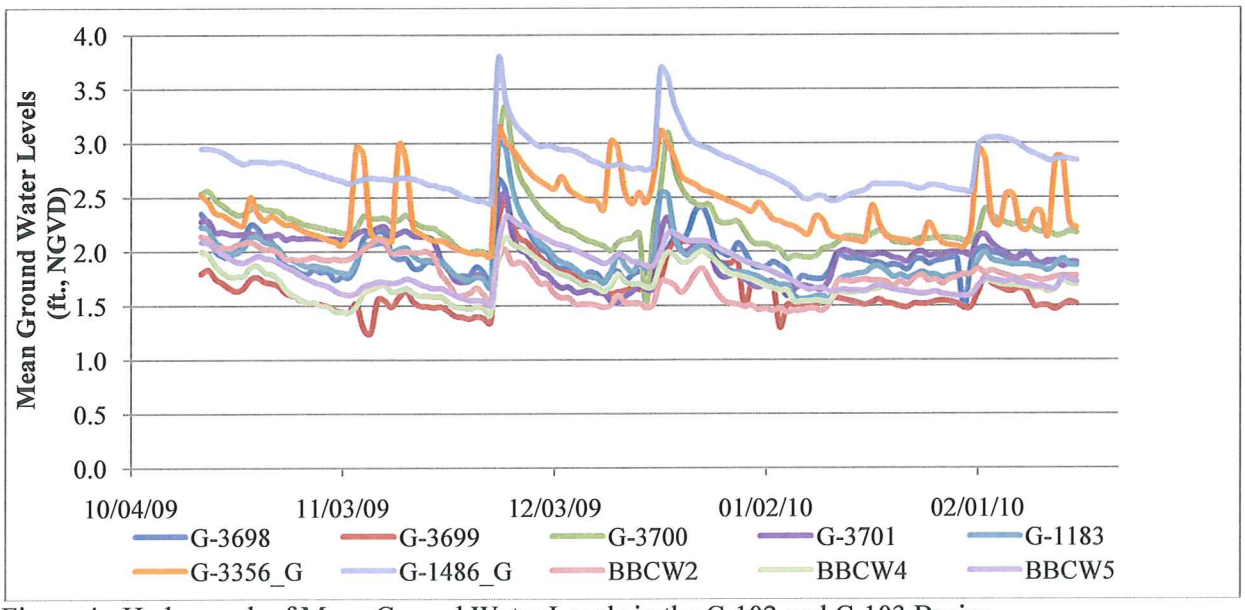


Figure 4: Hydrograph of Mean Ground Water Levels in the C-102 and C-103 Basins

The changes in ground water levels during the four-month monitoring period in which the canal levels are lowered are shown in **Figure 5**. The water level recorded on October 14, 2009 at 1200 hours was used to represent ground water levels prior to the start of the drawdown in canal levels. Successive ground water readings were compared to the initial reading and the difference in ground water levels calculated for the 4-month monitoring period. The difference in ground water levels shown in **Figure 5** indicates that ground water levels are generally below those prior to the start of the prescribed drawdown of canal levels. The positive responses in water levels are associated with rainfall events, after which they slowly decline in response to maintained surface water levels.

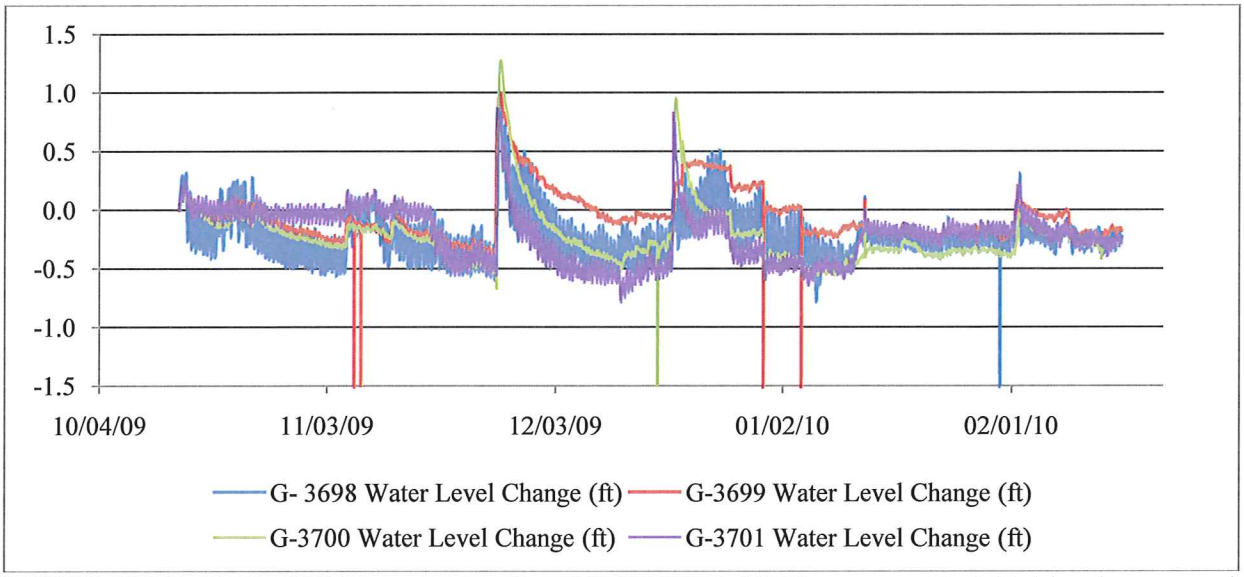


Figure 5: Change in Ground Water Levels from 10-15-09 to 2-15-10 compared to initial levels measured on 10-14-09

Note: The downward spikes shown above are caused when the pressure transducers were removed from the well for sampling or the download of data

Correlation Coefficients

The first step to determine the relationship between variables is to construct X-Y scatter plots to visually inspect the data for outliers and to see if the relationship between the two measured variables is linear. The scatter plots with the best-fit line and liner regression between the various surface and ground water monitor stations are provided in ***Appendix D***. In addition, this type of plot helps to determine visually whether there is a strong or weak correlation between two variables, and whether the correlation is positive or negative (based on the direction of the best fit line). However, there is a mathematical way of quantifying the linear relationship between variables by calculating the correlation coefficient. This is also known as Pearson's Correlation Coefficient, represented by the letter ***r***. It is a single number, which ranges from -1 (strong negative correlation) to +1 (strong positive correlation). The correlation coefficient indicates whether there is a relationship between the two variables, and whether the relationship

is a positive or a negative number. Correlation coefficients that are close to -1 or +1 indicate a strong correlation. Values near +1 indicate as the independent variable rises there will be an associated increase in the dependent variable. Values close to 0 to +/-0.4 indicate a weak correlation. A value of zero indicates no correlation at all.

Initially, hourly data were used to determine the degree of linear relationship between the various water level data sets but a large degree of scatter ("statistical noise") was noted. In an effort to reduce the "noise", various time averaging filters were applied. This included calculating the mean values for 4, 12 and 24 hour time steps. X-Y scatter plots were constructed using the three time average water level data from the four USGS monitor wells and the coefficient of determination (r^2 see below explanation) determined. The daily mean (24-hour time average) produced the highest coefficients of determination. Therefore, the daily mean water levels were computed for each of the four hourly ground water level data sets over the period of record and used to calculated the correlation coefficients used in this analysis.

Occasionally, the coefficient of determination is used synonymously with the correlation coefficient. However, the coefficient of determination written as r^2 indicates the proportion of the variation between the data points as accounted for by the best fit line through the points of a scatter plot. It indicates how close the points are to the best fit line and is found by squaring the correlation coefficient. Although a correlation between two variables doesn't mean that one causes the other, it can suggest a way of finding out what the true cause might be. There may be some underlying variable(s) that cause variations in either or both parameters but not identified during the development of the monitoring program.

A summary of the coefficient of determination (r^2) and correlation coefficients (r) between the various ground and surface water stations within the agricultural area of south Miami-Dade County are provided in **Table 3.**

Table 3: Summary of Correlation Coefficients between Various Monitor Stations

Independent Variable	Dependent Variable	Type of Comparison Pairs	Coefficient of determination r^2	Correlation Coefficient r	Distance between Independent and Dependent Variables (miles)
S21A_H	G-3701	SW to GW	0.7420	0.8614	2.44
S195_T	G-3701	SW to GW	0.3890	0.6237	1.42
S21A_H	G-3700	SW to GW	0.1094	0.3308	3.18
G-3700	G-1486	GW to GW	0.6262	0.7913	2.57
G-3700	G-1183	GW to GW	0.8228	0.9071	1.3
S196_H	G-3700	SW to GW	0.0322	0.1794	7.17
S196_T	G-3700	SW to GW	0.2570	0.5070	7.17
G-3700	BBCW-2	GW to GW	0.2687	0.5184	3.86
S20F_H	G-3698	SW to GW	0.6114	0.7819	3.95
S196_H	G-3698	SW to GW	0.0600	0.2449	7.03
S196_T	G-3698	SW to GW	0.1834	0.4283	7.03
S179_T	G-3698	SW to GW	0.6502	0.8063	0.3

G-3698	G-1183	GW to GW	0.6099	0.7810	1.61
G-3698	BBCW-4	GW to GW	0.6154	0.7845	2.88
S20F_H	G-3699	SW to GW	0.0668	0.2585	4.25
S179_T	G-3699	SW to GW	0.0823	0.2869	1.78
G-3699	G-3356	GW to GW	0.4089	0.6395	2.32
G-3699	BBCW-5	GW to GW	0.7907	0.8892	2.11

H = Headwater T = Tailwater
SW = Surface Water Monitor Station
GW = Ground Water Monitor Well Station

Summary

Based on the water levels measured in the four-month monitoring period of this study and calculated correlation coefficients were highest between the following surface water control structure and ground water monitor well stations: S21A_H and G-3701; S20F_H and G-3698; S179_T and G-3698. A high correlation coefficient between a surface water control structure and a ground water monitor well was not necessarily controlled by the distance between them but the distance from the segment of the canal controlled by a particular water control structure and the monitor well.

The higher positive correlation coefficients between these monitor station pairs indicate that as surface water levels rise and fall there is a similar response in ground water levels. The response time (generally referred to as lag time) between when a change occurred in the surface water system and corresponding change in the ground water system could not be determined because only daily mean water levels were available from DBHydro for the surface water stations and several of the ground water monitor wells used in this analysis. For those surface and ground water monitor station pairs where a moderate to high correlation coefficient was determined; it is assumed that the changes in ground and surface water levels are in general agreement within a 24-hour period.

There is good agreement with ground water levels from several of the ground water monitor wells based on the high correlation coefficients shown in **Table 3.** However, there is not a one to one relationship (a correlation coefficient of +1) between the various ground water monitor well pairs; this may be due to the monitor wells being completed at various depths as shown in **Table 1** within the Surficial aquifer, localized differences in ground water levels due to the operation scheme of local and regional canals, localized irrigation withdrawals practices and isolated rainfall events.

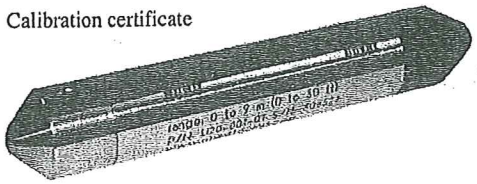
Appendix A

Pressure Transducer Specifications and Calibration Sheets

HOBO® U20 Water Level Logger (Part # U20-001-01)

Inside this package:

- HOBO U20 Water Level Logger
- Calibration certificate



Doc #8976-F, MAN-U20-001-01
Onset Computer Corporation

Thank you for purchasing a HOBO data logger. With proper care, it will give you years of accurate and reliable measurements.

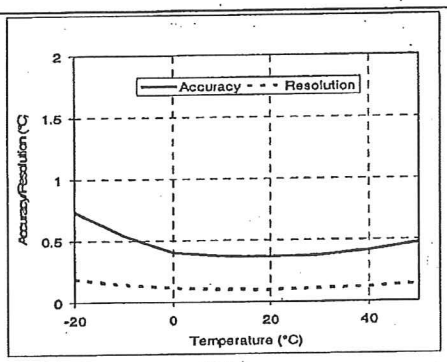
The HOBO Water Level Logger is designed to measure water level in wells, rivers, streams, and lakes. The logger uses a maintenance-free absolute pressure sensor and features a durable stainless steel housing and ceramic pressure sensor. The logger uses precision electronics to measure pressure and temperature. Using a reference water level, the HOBOware® software automatically converts the pressure readings into water level readings. Furthermore, the software supports compensation for temperature, fluid density, and barometric pressure. The logger has enough memory to record over 21,700 combined pressure and temperature measurements.

The logger uses an optical USB communications interface (USB-Optic Base Station, Part # BASE-U-4, with COUPLER2-B) for launching and reading out the logger. The optical interface allows the logger to be offloaded without breaking the integrity of the seals. The USB compatibility allows for easy setup and fast downloads.

HOBOware software is also required for logger operation. Visit www.onsetcomp.com for compatible software.

Specifications

Pressure Sensor	
Operation range	0 to 207 kPa (0 to 30 psia); approximately 0 to 9 m (0 to 30 ft) of water depth at sea level, or 0 to 12 m (0 to 40 ft) of water at 3,000 m (10,000 ft) of altitude
Factory calibrated range	69 to 207 kPa (10 to 30 psia), 0° to 40°C (32° to 104°F)
Burst pressure	310 kPa (45 psia) or 18 m (60 ft) depth
Accuracy (typical error)*	0.05% FS 0.5 cm (0.015 ft) water
Accuracy (maximum error)*	0.1% FS 1.0 cm (0.03 ft) water
Resolution	< 0.02 kPa (0.003 psi), 0.21 cm (0.007 ft) water
Pressure response time 90%	< 1 second
Thermal response time (90%)†	Approximately 10 minutes in water to achieve full temperature compensation of the pressure sensor
* Absolute pressure sensor accuracy includes all temperature and hysteresis-induced errors. † Maximum error due to rapid thermal changes is approximately 0.5%.	
Temperature Sensor	
Operation range	-20° to 50°C (-4° to 122°F)
Accuracy	0.37°C at 20°C (0.67°F at 68°F), see Plot A
Resolution	0.1°C at 20°C (0.18°F at 68°F) (10-bit), see Plot A
Response time (90%)	3.5 minutes in water (typical)
Stability (drift)	0.1°C (0.18°F) per year
Logger	
Real-time clock	± 1 minute per month 0° to 50°C (32° to 122°F)
Battery	2/3 AA, 3.6 Volt Lithium, factory-replaceable
Battery life (typical use)	5 years with 1 minute or greater logging interval
Memory (non-volatile)	64K bytes memory (approx. 21,700 pressure and temperature samples)
Dimensions	2.46 cm (0.97 inches) diameter, 15 cm (5.9 inches) length; mounting hole 6.3 mm (0.25 inches) diameter
Weight	Approximately 210 g (7.4 oz)
Wetted materials	316 stainless steel, Viton® o-rings, acetyl cap, ceramic sensor
Shock/drop	Logger is sensitive to shocks. Handle with care and avoid any impact. Always use proper packaging when shipping the logger.
Logging interval	Fixed-rate or multiple logging intervals, with up to 8 user-defined logging intervals and durations; logging intervals from 1 second to 18 hours. Refer to HOBOware software manual.
Launch modes	Immediate start and delayed start
Offload modes	Offload while logging; stop and offload
Battery indication	Battery voltage can be viewed in status screen and optionally logged in datafile. Low battery indication in datafile.
CE	The CE Marking identifies this product as complying with the relevant directives in the European Union (EU).



Plot A

Accessories available

- 50-ft 1/16" Teflon®-Coated Stainless Steel Cable (Part # CABLE-1-50)
- 300-ft 1/16" Teflon-Coated Stainless Steel Cable (Part # CABLE-1-300)
- Crimp sleeve for Teflon-Coated Stainless Steel Cable (Part # CABLE-1-CRIMP)

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Part #: MAN-U20-001-01, Doc #: 8976-F

Calibration Sheet for Transducer

Monitor Well G-3698

C-3498

onset

CALIBRATION CERTIFICATE

LOGGER SERIAL NUMBER: 1023951
CALIBRATION RESULT: PASSED

Report Number	1023951_07_17_06_49
Certification Date	7/17/2006
Logger Type	HOBO Water Level Logger
Water Level Range	0 to 9 m (0 to 30 ft)
Logger Part Number	U20-001-01
Logger Status	New
Full Scale Pressure Range	0 to 207 kPa (0 to 30 psi)
Calibrated Range	69 to 207 kPa (10 to 30 psi), 0 to 40° C

Onset Computer Corporation certifies that the pressure accuracy of the data logger listed above has been observed to be within its published pressure specifications. Onset Computer's calibrated reference instruments are traceable to NIST, and certification files are maintained at Onset Computer's corporate headquarters in Bourne, MA.

Test Equipment and Procedures

Pressure Regulator and Calibrator: TE1-9947 (Calibrated on 5/12/2006)
Environmental Chamber: TE1-10026
Onset Calibration Software: D-9420
Onset Calibration Procedure: D-9124
Range of Applied Pressures: 69 to 207 kPa (10 to 30 psi)
Range of Applied Temperature: 0-40 °C (Nominal)

Test Data

Pressure (psia)	
Applied	Observed
15.000	14.986
21.000	20.997
29.000	28.999

Results

Specified Pressure Accuracy: PASSED

Typical: ± 0.1 %FS, ± 0.21 kPa (± 0.03 psi)

Maximum: ± 0.3 %FS, ± 0.62 kPa (± 0.09 psi)

Test Performed By: DMH

This calibration report may not be reproduced, except in full, without the written approval of Onset Computer Corporation.

D-9568-D

Onset Computer Corporation

Tel: 508-759-9500

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Bourne, Massachusetts
02532 USA

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02559-3450 USA

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Calibration Sheet for Pressure Transducer

Monitor Well G-3699

6 3699

onset

CALIBRATION CERTIFICATE

LOGGER SERIAL NUMBER: 1023950
CALIBRATION RESULT: PASSED

Report Number	1023950_07_17_06_49
Certification Date	7/17/2006
Logger Type	HOBO Water Level Logger
Water Level Range	0 to 9 m (0 to 30 ft)
Logger Part Number	U20-001-01
Logger Status	New
Full Scale Pressure Range	0 to 207 kPa (0 to 30 psi)
Calibrated Range	69 to 207 kPa (10 to 30 psi), 0 to 40° C

Onset Computer Corporation certifies that the pressure accuracy of the data logger listed above has been observed to be within its published pressure specifications. Onset Computer's calibrated reference instruments are traceable to NIST, and certification files are maintained at Onset Computer's corporate headquarters in Bourne, MA.

Test Equipment and Procedures

Pressure Regulator and Calibrator: TE1-9947 (Calibrated on 5/12/2006)
Environmental Chamber: TE1-10026
Onset Calibration Software: D-9420
Onset Calibration Procedure: D-9124
Range of Applied Pressures: 69 to 207 kPa (10 to 30 psi)
Range of Applied Temperature: 0-40 °C (Nominal)

Test Data

Pressure (psia)	
Applied	Observed
15.000	14.994
21.000	21.002
29.000	29.007

Results

Specified Pressure Accuracy: PASSED

Typical: ± 0.1 %FS, ± 0.21 kPa (± 0.03 psi)

Maximum: ± 0.3 %FS, ± 0.62 kPa (± 0.09 psi)

Test Performed By: DMH

This calibration report may not be reproduced, except in full, without the written approval of Onset Computer Corporation.

D-9568-D

Onset Computer Corporation

Tel: 508-759-9500

Sales: 1-800-LOGGERS

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470 MacArthur Blvd.
Bourne, Massachusetts
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Mailing: PO Box 3450
Pocasset, Massachusetts
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www.onsetcomp.com

Calibration Sheet for Pressure Transducer

Monitor Well G-3700

C-5700

onset

CALIBRATION CERTIFICATE

LOGGER SERIAL NUMBER: 1023949
CALIBRATION RESULT: PASSED

Report Number	1023949_07_17_06_49
Certification Date	7/17/2006
Logger Type	HOBO Water Level Logger
Water Level Range	0 to 9 m (0 to 30 ft)
Logger Part Number	U20-001-01
Logger Status	New
Full Scale Pressure Range	0 to 207 kPa (0 to 30 psi)
Calibrated Range	69 to 207 kPa (10 to 30 psi), 0 to 40° C

Onset Computer Corporation certifies that the pressure accuracy of the data logger listed above has been observed to be within its published pressure specifications. Onset Computer's calibrated reference instruments are traceable to NIST, and certification files are maintained at Onset Computer's corporate headquarters in Bourne, MA.

Test Equipment and Procedures

Pressure Regulator and Calibrator: TE1-9947 (Calibrated on 5/12/2006)
Environmental Chamber: TE1-10026
Onset Calibration Software: D-9420
Onset Calibration Procedure: D-9124
Range of Applied Pressures: 69 to 207 kPa (10 to 30 psi)
Range of Applied Temperature: 0-40 °C (Nominal)

Test Data

Pressure (psia)	
Applied	Observed
15.000	14.994
21.000	21.003
29.000	29.001

Results

Specified Pressure Accuracy: PASSED

Typical: ± 0.1 %FS, ± 0.21 kPa (± 0.03 psi)

Maximum: ± 0.3 %FS, ± 0.62 kPa (± 0.09 psi)

Test Performed By: DMH

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Onset Computer Corporation

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470 MacArthur Blvd.
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Pocasset, Massachusetts
02559-3450 USA

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Calibration Sheet for Pressure Transducer

Monitor Well G-3701

C-3791

onset

CALIBRATION CERTIFICATE

LOGGER SERIAL NUMBER: 1023946
CALIBRATION RESULT: PASSED

Report Number	1023946_07_17_06_41
Certification Date	7/17/2006
Logger Type	HOBO Water Level Logger
Water Level Range	0 to 9 m (0 to 30 ft)
Logger Part Number	U20-001-01
Logger Status	New
Full Scale Pressure Range	0 to 207 kPa (0 to 30 psi)
Calibrated Range	69 to 207 kPa (10 to 30 psi), 0 to 40° C

Onset Computer Corporation certifies that the pressure accuracy of the data logger listed above has been observed to be within its published pressure specifications. Onset Computer's calibrated reference instruments are traceable to NIST, and certification files are maintained at Onset Computer's corporate headquarters in Bourne, MA.

Test Equipment and Procedures

Pressure Regulator and Calibrator: TE1-9947 (Calibrated on 5/12/2006)
Environmental Chamber: TE1-10026
Onset Calibration Software: D-9420
Onset Calibration Procedure: D-9124
Range of Applied Pressures: 69 to 207 kPa (10 to 30 psi)
Range of Applied Temperature: 0-40 °C (Nominal)

Test Data

Pressure (psia)	
Applied	Observed
15.000	14.992
21.000	20.999
29.000	29.001

Results

Specified Pressure Accuracy: PASSED

Typical: ± 0.1 %FS, ± 0.21 kPa (± 0.03 psi)

Maximum: ± 0.3 %FS, ± 0.62 kPa (± 0.09 psi)

Test Performed By: DMH

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Onset Computer Corporation

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Calibration Sheet for

Barometer/Temperature Sensor

Barometer

onset®

HOBO® Data Loggers

CALIBRATION CERTIFICATE

LOGGER SERIAL NUMBER: 1126789
CALIBRATION RESULT: PASSED

Report Number	1126789_03_19_07_40
Certification Date	3/19/2007
Logger Type	HOBO Water Level Logger
Water Level Range	0 to 9 m (0 to 30 ft)
Logger Part Number	U20-001-01
Logger Status	New
Full Scale Pressure Range	0 to 207 kPa (0 to 30 psi)
Calibrated Range	69 to 207 kPa (10 to 30 psi), 0 to 40° C

Onset Computer Corporation certifies that the pressure accuracy of the data logger listed above has been observed to be within its published pressure specifications. Onset Computer's calibrated reference instruments are traceable to NIST, and certification files are maintained at Onset Computer's corporate headquarters in Bourne, MA.

Test Equipment and Procedures

Pressure Regulator and Calibrator: TE1-9947 (Calibrated on 5/12/2006)
Environmental Chamber: TE1-10026
Onset Calibration Software: D-9420
Onset Calibration Procedure: D-9124
Range of Applied Pressures: 69 to 207 kPa (10 to 30 psi)
Range of Applied Temperature: 0-40 °C (Nominal)

Test Data

Pressure (psia)	
Applied	Observed
15.000	14.986
21.001	20.996
28.998	28.994

Results

Specified Absolute Pressure Accuracy: PASSED

Typical: ± 0.1 %FS, ± 0.21 kPa (± 0.03 psi)

Maximum: ± 0.3 %FS, ± 0.62 kPa (± 0.09 psi)

Test Performed By: GJF

This calibration report may not be reproduced, except in full, without the written approval of Onset Computer Corporation.

D-9568-F

Onset Computer Corporation 470 MacArthur Blvd. Bourne, MA 02532 USA
Tel: 508-759-9500 Fax: 508-759-9100 Web: www.onsetcomp.com Email: sales@onsetcomp.com

Appendix B

Monthly Field Reports

AECOM

DAILY REPORT OF ACTIVITY

Project Number: 60147362	Project Name: Miami Dade Drawdown Study	Client: SFWMD	Date: 11/07/2009	Day of Week Saturday	Contractor:
Well Name: N/A	FDEP Permit #:	Starting Depth:	Ending Depth:	Bit Size:	Driller:

Primary Activity: Initial Download of Pressure Transducers in USGS GW Monitor Wells
Resident Geologist: Michael Bennett

Time	Activity
0815 hr	Left Wellington and proceeded to drive to Homestead area to check and download the pressure transducers installed in multiple ground water monitoring wells
1000 hr	Arrived at **G-3701** monitor well site. Remove well cap and pressure transducer from well. Battery and memory (at 3%) checks were good. Proceeded to download data from Hobo pressure transducer – it successfully downloaded all measured hourly readings. The various measured parameters were then graphed as part of the QA/QC procedures. Reinstalled transducer into G-3701 and secured PVC well cap and manhole cover.
1027 hr	Arrived at **G-3700** monitor well site located next to Airport Plaza. Bailed standing water from well enclosure and removed well cap and pressure transducer. Battery and memory (at 3%) checks were good. Proceeded to download data from Hobo pressure transducer – it successfully downloaded all measured hourly readings. The various measured parameters were then graphed as part of the QA/QC procedures. Reinstalled transducer into G-3700 and secured PVC well cap and manhole cover.
1055 hr	Arrived at **G-3698** monitor well site located next to Bay Side Tree Farm. Bailed standing water from well enclosure and removed well cap and pressure transducer. Battery and memory (at 3%) checks were good. Proceeded to download data from Hobo pressure transducer – it successfully downloaded all measured hourly readings. The various measured parameters were then graphed as part of the QA/QC procedures. Reinstalled transducer into G-3698 and secured PVC well cap and manhole cover.
1122 hr	Arrived at **G-3699** monitor well site located next to Homestead Raceway. Battery and memory (at 3%) checks were good. Proceeded to download data from Hobo pressure transducer from G-3699, it successfully downloaded all measured hourly readings. The various measured parameters were then graphed as part of the QA/QC procedures. Battery and memory (at 3%) checks were good for barometer. Proceeded to download data from Hobo pressure transducer (used for barometric readings) – it successfully downloaded all measured hourly readings. The various measured parameters were then graphed as part of the QA/QC procedures. Reinstalled transducer into G-3699 and barometer and secured PVC well cap and manhole cover.
1130 hr	Off Site proceed to Polo Tropical for Lunch
1345 hr	Arrived back in West Palm Beach

AECOM

DAILY REPORT OF ACTIVITY

Project Number: 60147362	Project Name: Miami Dade Drawdown Study	Client: SFWMD	Date: 11/28/2009	Day of Week Saturday	Contractor:
Well Name: N/A	FDEP Permit #:	Starting Depth:	Ending Depth:	Bit Size:	Driller:

Primary Activity: November 2009 Download of Pressure Transducers in USGS GW Monitor Wells
Resident Geologist: Michael Bennett

Time	Activity
0800 hr	Left Wellington and proceeded to drive to Homestead area to check and download the pressure transducers installed in multiple ground water monitoring wells.
0947 hr	Arrived at **G-3701** monitor well site. Remove well cap and pressure transducer from well. Battery and memory (at 7%) checks were good. Proceeded to download data from Hobo pressure transducer – it successfully downloaded all measured hourly readings. The various measured parameters were then graphed as part of the QA/QC procedures. Reinstalled transducer into G-3701 and secured PVC well cap and manhole cover.
1020 hr	Arrived at **G-3700** monitor well site located next to Airport Plaza. Homestead AFB Air Show today so access to site was difficult due to traffic and parking. Bailed standing water from well enclosure and removed well cap and pressure transducer. Battery and memory (at 7%) checks were good. Proceeded to download data from Hobo pressure transducer – it successfully downloaded all measured hourly readings. The various measured parameters were then graphed as part of the QA/QC procedures. Reinstalled transducer into G-3700 and secured PVC well cap and manhole cover.
1059 hr	Arrived at **G-3698** monitor well site located next to Bay Side Tree Farm. Homestead AFB Air Show today so access to site was difficult due to traffic and securing – redirected around AFB and follow security detours. Bailed standing water from well enclosure and removed well cap and pressure transducer. Battery and memory (at 7%) checks were good. Proceeded to download data from Hobo pressure transducer – it successfully downloaded all measured hourly readings. The various measured parameters were then graphed as part of the QA/QC procedures. Reinstalled transducer into G-3698 and secured PVC well cap and manhole cover.
1127 hr	Arrived at **G-3699** monitor well site located next to Homestead Raceway. Battery and memory (at 7%) checks were good. Proceeded to download data from Hobo pressure transducer from G-3699, it successfully downloaded all measured hourly readings. The various measured parameters were then graphed as part of the QA/QC procedures. Battery and memory (at 7%) checks were good for barometer. Proceeded to download data from Hobo pressure transducer (used for barometric readings) – it successfully downloaded all measured hourly readings. The various measured parameters were then graphed as part of the QA/QC procedures. Reinstalled transducer into G-3699 and barometer and secured PVC well cap and manhole cover.
1149 hr	Off Site proceed to Polo Tropical for Lunch
1345 hr	Arrived back in West Palm Beach

AECOM

DAILY REPORT OF ACTIVITY

Project Number: 60147362	Project Name: Miami Dade Drawdown Study	Client: SFWMD	Date: 12/30/2009	Day of Week Saturday	Contractor:
Well Name: N/A	FDEP Permit #:	Starting Depth:	Ending Depth:	Bit Size:	Driller:

Primary Activity: December 2009 Download of Pressure Transducers in USGS GW Monitor Wells
Resident Geologist: Michael Bennett

Time	Activity
0755 hr	Left Wellington and proceeded to drive to Homestead area to check and download the pressure transducers installed in multiple ground water monitoring wells.
0940 hr	Arrived at **G-3701** monitor well site. Remove well cap and pressure transducer from well. Battery and memory (at 12%) checks were good. Proceeded to download data from Hobo pressure transducer – it successfully downloaded all measured hourly readings. The various measured parameters were then graphed as part of the QA/QC procedures. Reinstalled transducer into G-3701 and secured PVC well cap and manhole cover.
1002 hr	Arrived at **G-3700** monitor well site located next to Airport Plaza. Bailed standing water from well enclosure and removed well cap and pressure transducer. Battery and memory (at 12%) checks were good. Proceeded to download data from Hobo pressure transducer – it successfully downloaded all measured hourly readings. The various measured parameters were then graphed as part of the QA/QC procedures. Reinstalled transducer into G-3700 and secured PVC well cap and manhole cover.
1025 hr	Arrived at **G-3698** monitor well site located next to Bay Side Tree Farm. Bailed standing water from well enclosure and removed well cap and pressure transducer. Battery and memory (at 12%) checks were good. Proceeded to download data from Hobo pressure transducer – it successfully downloaded all measured hourly readings. The various measured parameters were then graphed as part of the QA/QC procedures. Reinstalled transducer into G-3698 and secured PVC well cap and manhole cover.
1048 hr	Arrived at **G-3699** monitor well site located next to Homestead Raceway. Battery and memory (at12%) checks were good. Proceeded to download data from Hobo pressure transducer from G-3699, it successfully downloaded all measured hourly readings. The various measured parameters were then graphed as part of the QA/QC procedures. Battery and memory (at12%) checks were good for barometer. Proceeded to download data from Hobo pressure transducer (used for barometric readings) – it successfully downloaded all measured hourly readings. The various measured parameters were then graphed as part of the QA/QC procedures. Reinstalled transducer into G-3699 and barometer and secured PVC well cap and manhole cover.
1115 hr	Off Site proceed to Polo Tropical for Lunch
1320 hr	Arrived back in West Palm Beach

AECOM

DAILY REPORT OF ACTIVITY

Project Number: 60147362	Project Name: Miami Dade Drawdown Study	Client: SFWMD	Date: 01/30/2010	Day of Week Saturday	Contractor:
Well Name: N/A	FDEP Permit #:	Starting Depth:	Ending Depth:	Bit Size:	Driller:

Primary Activity: January 2010 Downloads of Pressure Transducers in USGS GW Monitor Wells
Resident Geologist: Michael Bennett

Time	Activity
0840 hr	Left Wellington and proceeded to drive to Homestead area to install pressure transducers in multiple ground water monitoring wells
1015 hr	Arrived at **G-3701** monitor well site. Numerous large red ants around well pad and well casing, sprayed Cutter Repellent around wellhead to gain access to remove well cap and pressure transducer – removed pressure transducer from well. Measured depth to water from top of well casing – measured depth was 4.61 feet – from black mark on east side of casing. Battery and memory (at16%) checks were good. Proceeded to download data from Hobo pressure transducer – it successfully downloaded all measured hourly readings. The various measured parameters were then graphed as part of the QA/QC procedures. Reinstalled transducer into G-3701 and secured PVC well cap and manhole cover.
1035 hr	Arrived at **G-3700** monitor well site located next to Airport Plaza. Bailed standing water from well enclosure and removed well cap and pressure transducer. Measured depth to water from top of well casing – measured depth was 7.43 feet – from black mark on casing. Battery and memory (at16%) checks were good. Proceeded to download data from Hobo pressure transducer – it successfully downloaded all measured hourly readings. The various measured parameters were then graphed as part of the QA/QC procedures. Reinstalled transducer into G-3700 and secured PVC well cap and manhole cover.
1055 hr	Arrived at **G-3698** monitor well site located next to Bay Side Tree Farm. Bailed standing water from well enclosure and removed well cap and pressure transducer. Measured depth to water from top of well casing – measured depth was 2.20 feet – from black mark on casing. Battery and memory (at16%) checks were good. Proceeded to download data from Hobo pressure transducer – it successfully downloaded all measured hourly readings. The various measured parameters were then graphed as part of the QA/QC procedures. Reinstalled transducer into G-3698 and secured PVC well cap and manhole cover. Conducted survey of water levels in the small irrigation canal located north of G-3698 using a level transit. The readings from the well pad of G-3698 were 5.34 feet; 7.71 feet at the top of rock of the canal bank and 7.725 feet to top of water surface in canal. Depth to water from the top of rock on the canal back to surface water was 0.6 feet.
1142 hr	Arrived at **G-3699** monitor well site located next to Homestead Raceway. Measured depth to water from top of well casing – measured depth was 4.55 feet – from black mark on casing. Battery and memory (at16%) checks were good. Proceeded to download data from Hobo pressure transducer from G-3699 was successfully downloaded all measured hourly readings. The various measured parameters were then graphed as part of the QA/QC procedures. Battery and memory (at16%) checks were good. Proceeded to download data from Hobo pressure transducer (used for barometric readings) – it was successfully downloaded all measured hourly readings. The various measured parameters were then graphed as part of the QA/QC procedures.

	Reinstalled transducer into G-3698 and the barometer and secured PVC well cap and manhole cover.
1200 hr	Off Site proceed to Polo Tropical for Lunch
1430 hr	Arrived back in West Palm Beach

AECOM

DAILY REPORT OF ACTIVITY

Project Number: 60147362	Project Name: Miami Dade Drawdown Study	Client: SFWMD	Date: 02/27/2010	Day of Week Saturday	Contractor:
Well Name: N/A	FDEP Permit #:	Starting Depth:	Ending Depth:	Bit Size:	Driller:

Primary Activity: February 2010 Downloads of Pressure Transducers in USGS GW Monitor Wells
Resident Geologist: Michael Bennett

Time	Activity
0815 hr	Left Wellington stopped at Costco to refuel then proceeded to drive to Homestead area to check and download the pressure transducers install in multiple ground water monitoring wells
0952 hr	Arrived at **G-3701** monitor well site. Remove well cap and pressure transducer from well. Measured depth to water from top of well casing – measured depth was 4.83 feet – from black mark on east side of casing. Battery and memory (at 20%) checks were good. Proceeded to download data from Hobo pressure transducer – it successfully downloaded all measured hourly readings. The various measured parameters were then graphed as part of the QA/QC procedures. Reinstalled transducer into G-3701 and secured PVC well cap and manhole cover.
1015 hr	Arrived at **G-3700** monitor well site located next to Airport Plaza. Bailed standing water from well enclosure and removed well cap and pressure transducer. Measured depth to water from top of well casing – measured depth was 7.32 feet – from black mark on casing. Battery and memory (at 20%) checks were good. Proceeded to download data from Hobo pressure transducer – it successfully downloaded all measured hourly readings. The various measured parameters were then graphed as part of the QA/QC procedures. Reinstalled transducer into G-3700 and secured PVC well cap and manhole cover.
1031 hr	Arrived at **G-3698** monitor well site located next to Bay Side Tree Farm. Bailed standing water from well enclosure and removed well cap and pressure transducer. Measured depth to water from top of well casing – measured depth was 2.20 feet – from black mark on casing. Battery and memory (at 20%) checks were good. Proceeded to download data from Hobo pressure transducer – it successfully downloaded all measured hourly readings. The various measured parameters were then graphed as part of the QA/QC procedures. Reinstalled transducer into G-3698 and secured PVC well cap and manhole cover.
1046 hr	Arrived at **G-3699** monitor well site located next to Homestead Raceway. Measured depth to water from top of well casing – measured depth was 4.37 feet – from black mark on casing. Battery and memory (at 20%) checks were good. Proceeded to download data from Hobo pressure transducer from G-3699, it successfully downloaded all measured hourly readings. The various measured parameters were then graphed as part of the QA/QC procedures. Battery and memory (at 20%) checks were good for barometer. Proceeded to download data from Hobo pressure transducer (used for barometric readings) – it successfully downloaded all measured hourly readings. The various measured parameters were then graphed as part of the QA/QC procedures. Reinstalled transducer into G-3698 and barometer and secured PVC well cap and manhole cover.
1100 hr	Off Site proceed to Polo Tropical for Lunch
1310 hr	Arrived back in West Palm Beach

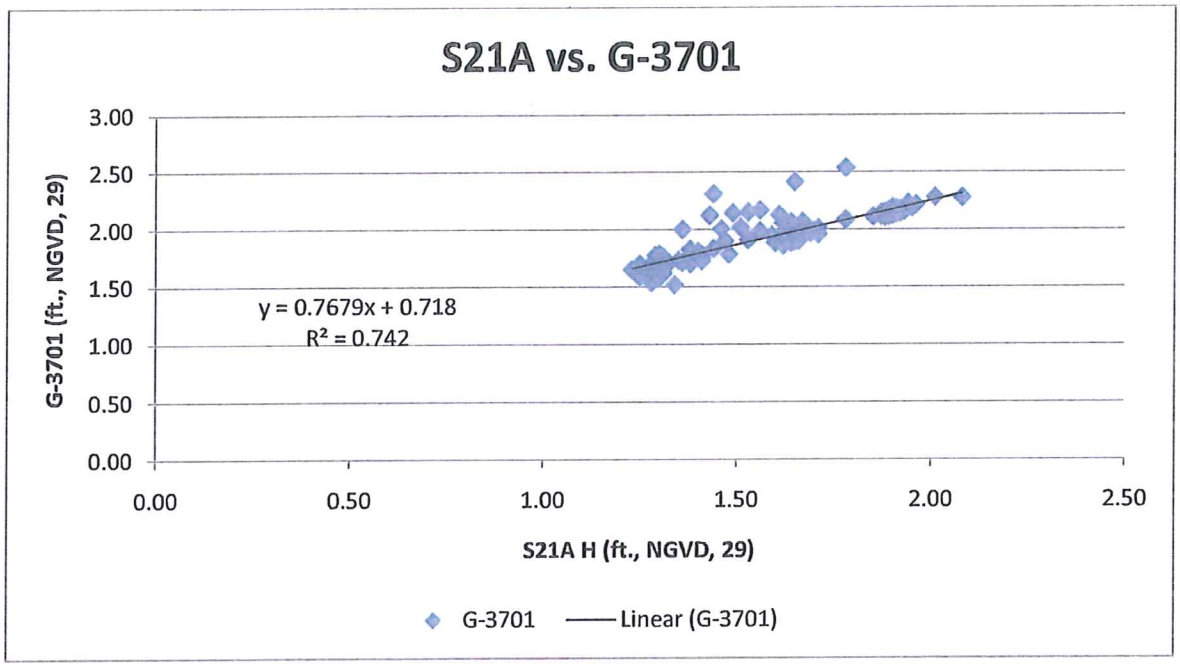
Appendix C

Monitor Wells – Measured Parameters

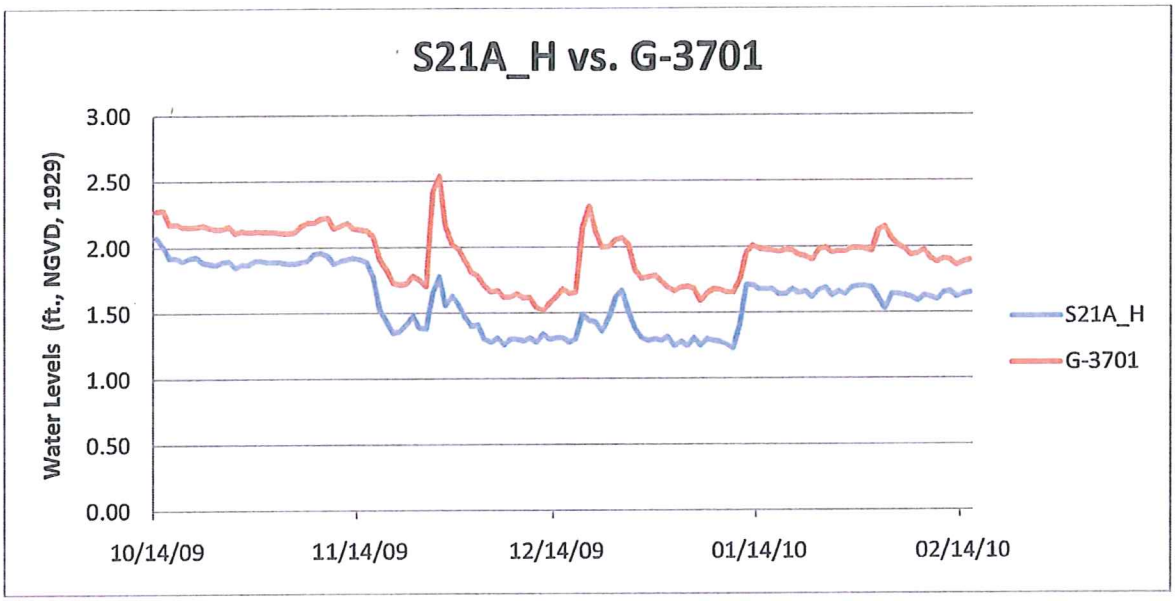
SFWMD Miami-Dade Drawdown Study Equipment Deployed				Top of Casing Elevation (ft) NGVD 29	Top of Casing to Transducer Distance (inches)	Top of Casing to Transducer Distance (feet)	Transducer Elevation (ft) NGVD 29	Depth to Water (feet)	Calculated Water Level (ft. NGVD)
Site No.	Well Identifier	Monitor Interval feet bls	Transducer Serial No.					10/14/2009	10/14/2009
G-3698	Tree Farm	80 to 85	1023951	3.99	146.38	12.20	-8.21	1.85	2.14
G-3699	Raceway	83 to 88	1023950	5.80	142.50	11.88	-6.08	4.20	1.60
G-3700	Airport Plaza	77.5 to 82.5	1023949	9.35	147.25	12.27	-2.92	6.90	2.45
G-3701	SW 248th St.	78 to 83	1023946	6.64	146.88	12.24	-5.60	4.50	2.14
Barometer			1023945						

Appendix D

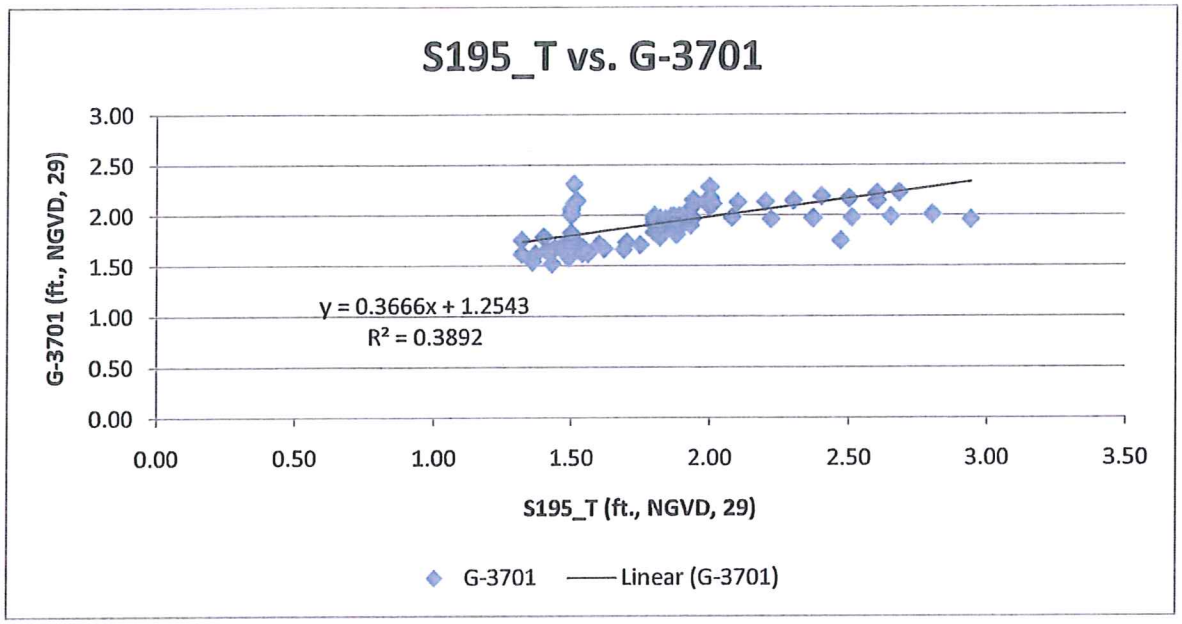
Hydrographs and Scatter Plots of Surface and Ground Water Stations



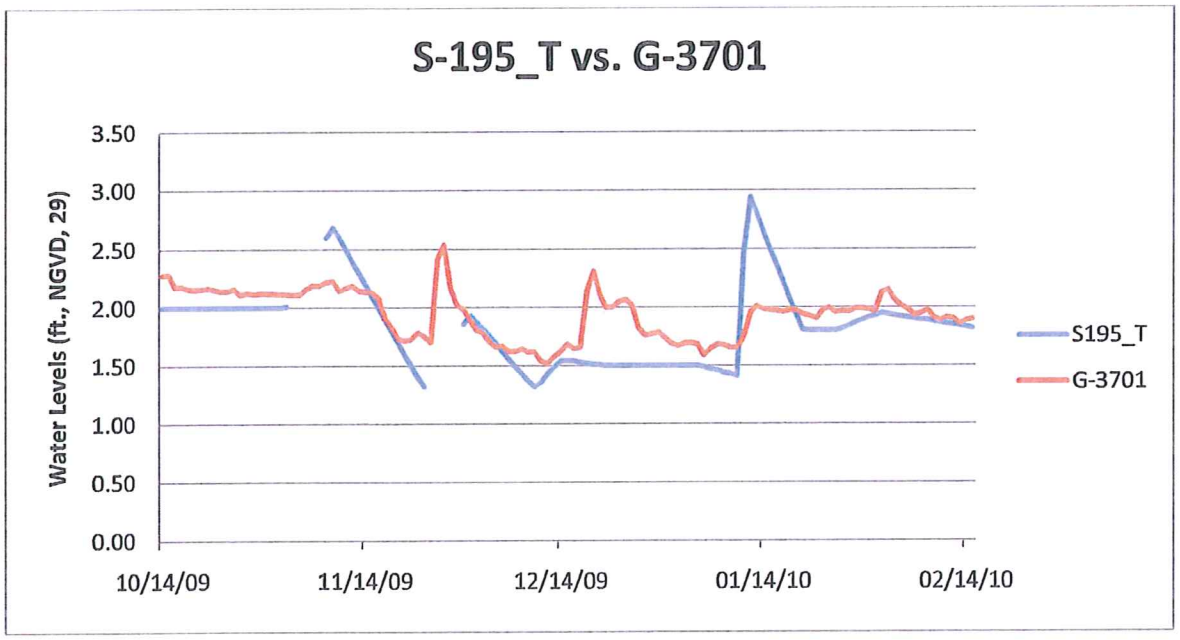
Scatter Plot of Water Levels from Water Control Structure S21A_H and Monitor Well G-3701 with Best Fit Line



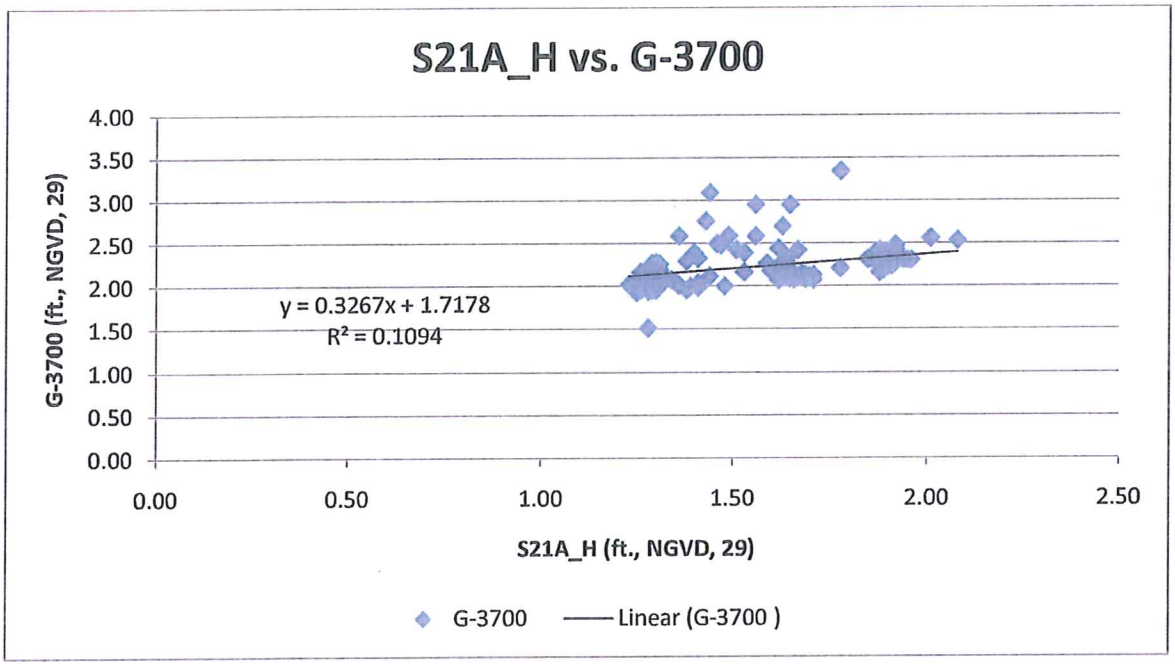
Hydrographs for Water Control Structure S21A_H and Monitor Well G-3701



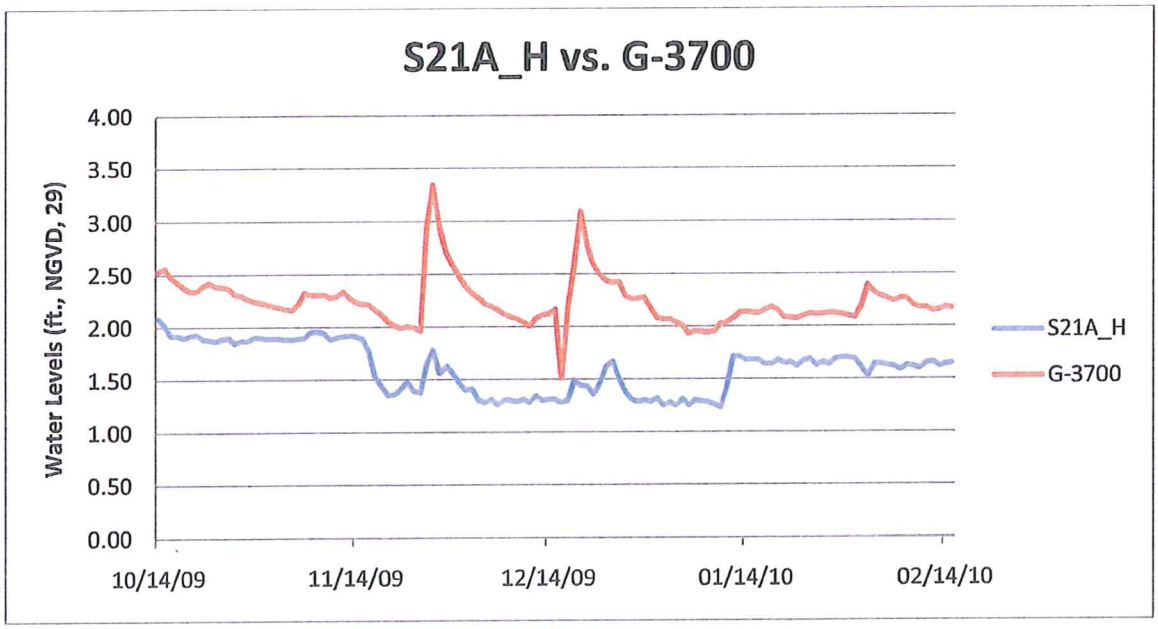
Scatter Plot of Water Levels from Water Control Structure S195_T and Monitor Well G-3701 with Best Fit Line



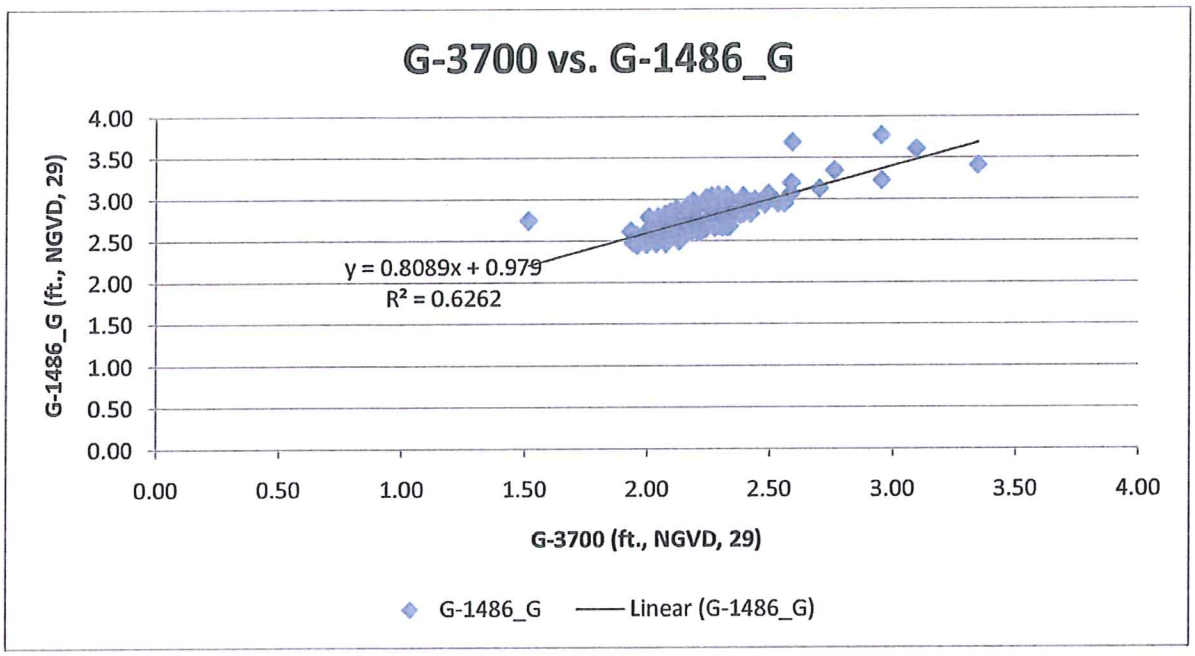
Hydrographs for Water Control Structure S-195_T and Monitor Well G-3701



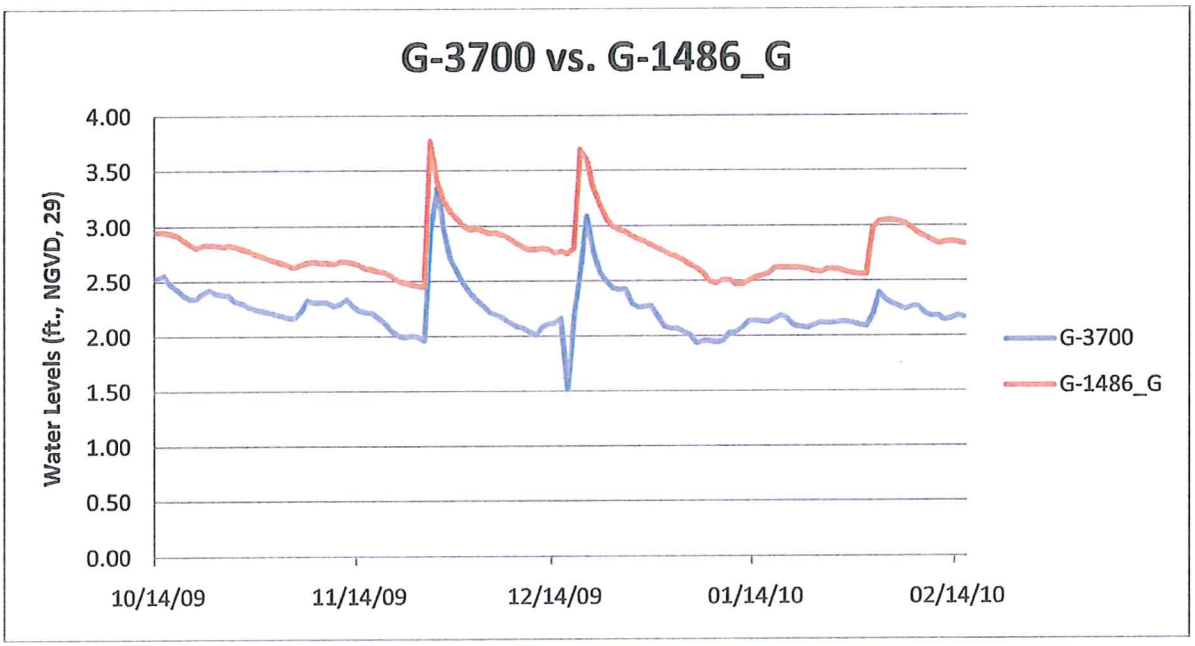
Scatter Plot of Water Levels from Water Control Structure S21A_H and Monitor Well G-3700 with Best Fit Line



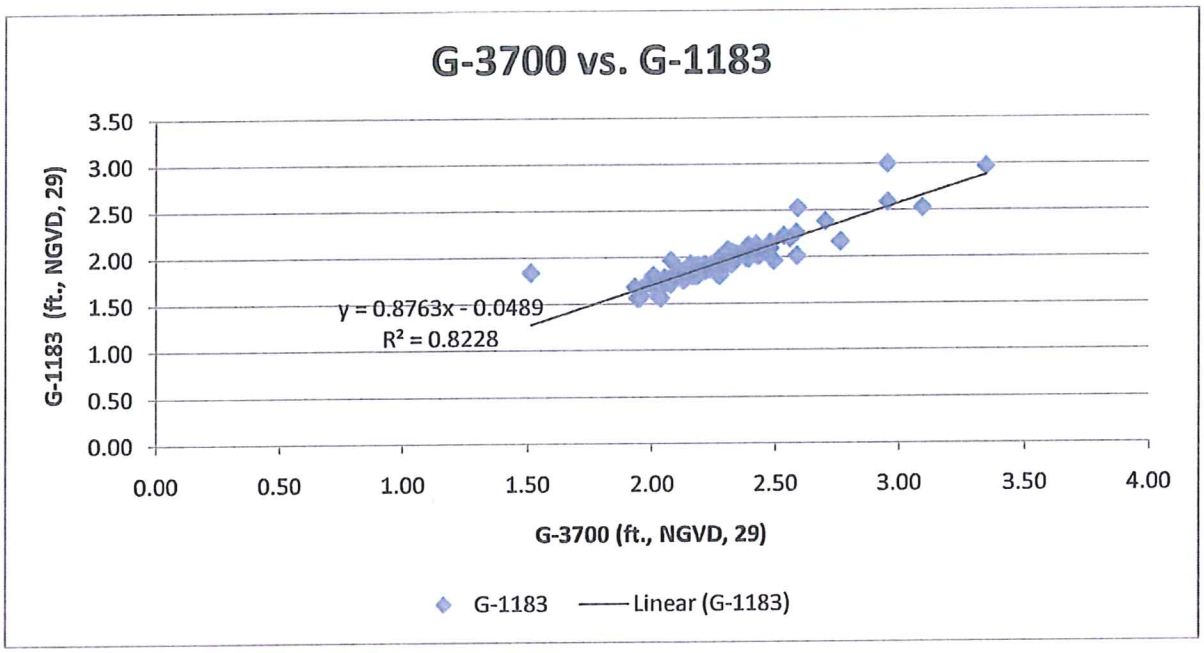
Hydrographs for Water Control Structure S21A_H and Monitor Well G-3700



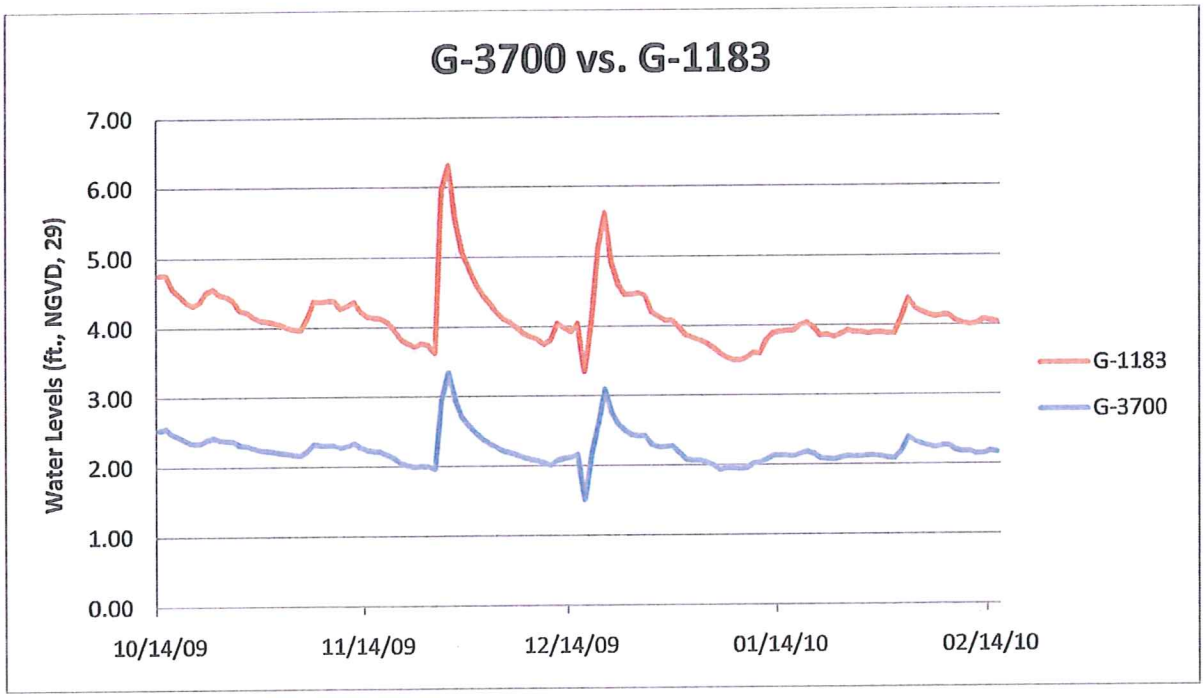
Scatter Plot of Water Levels from Monitor Wells G-3700 and G-1486_G with Best Fit Line



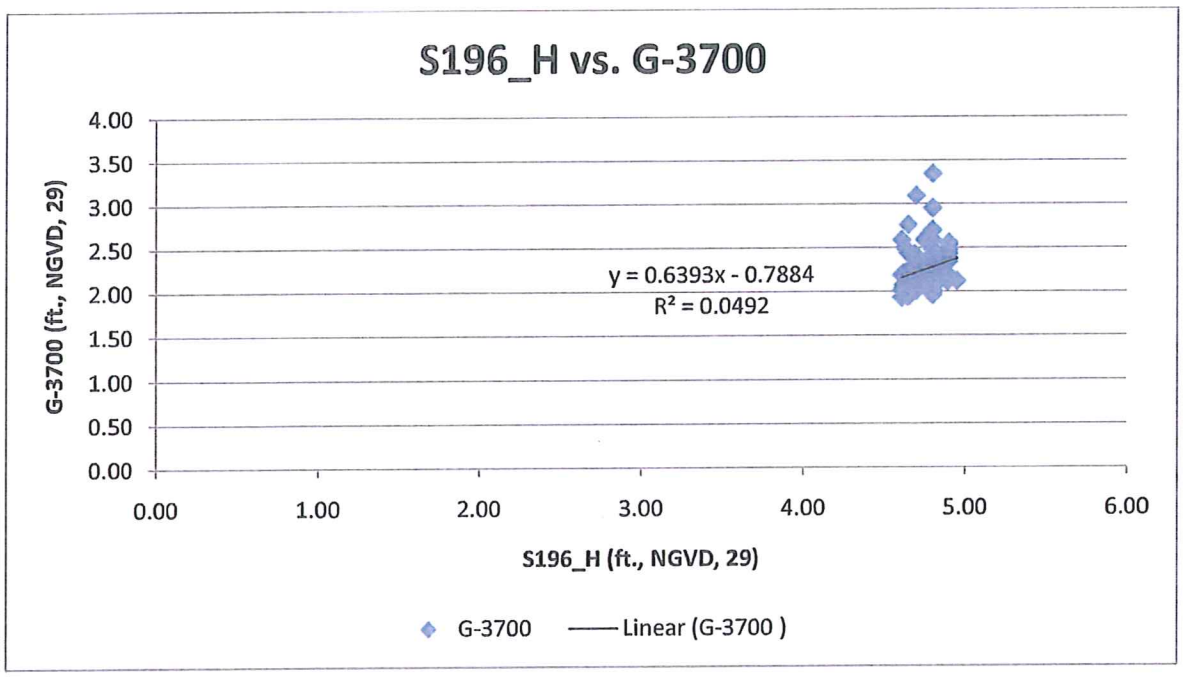
Hydrographs for Monitor Wells G-3700 and G-1486_G



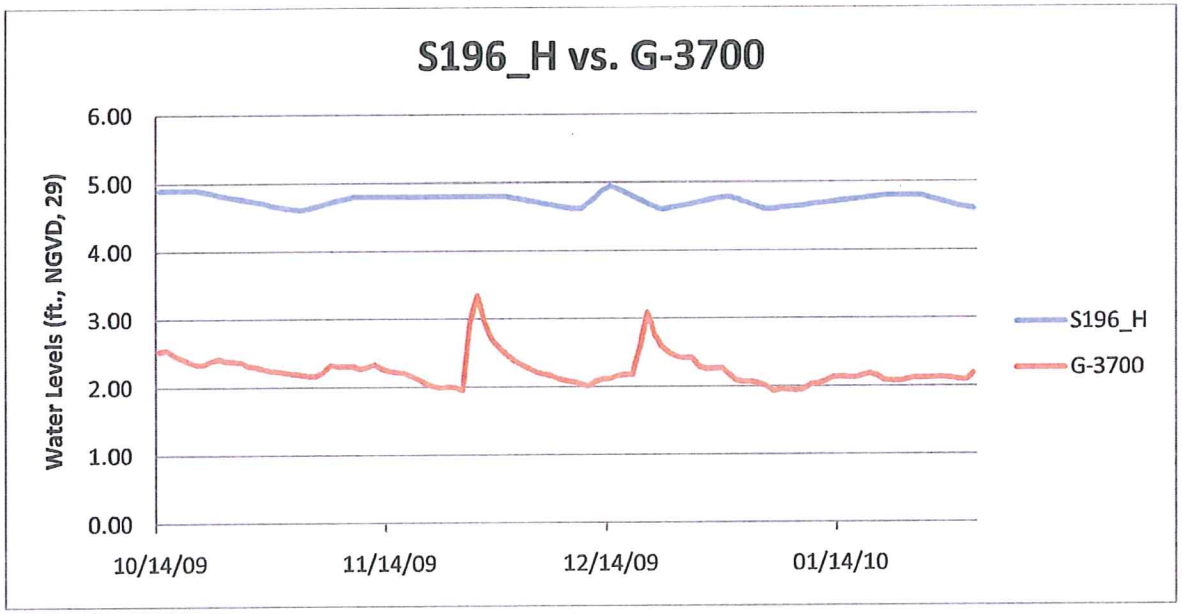
Scatter Plot of Water Levels from Monitor Wells G-3700 and G-1183 with Best Fit Line



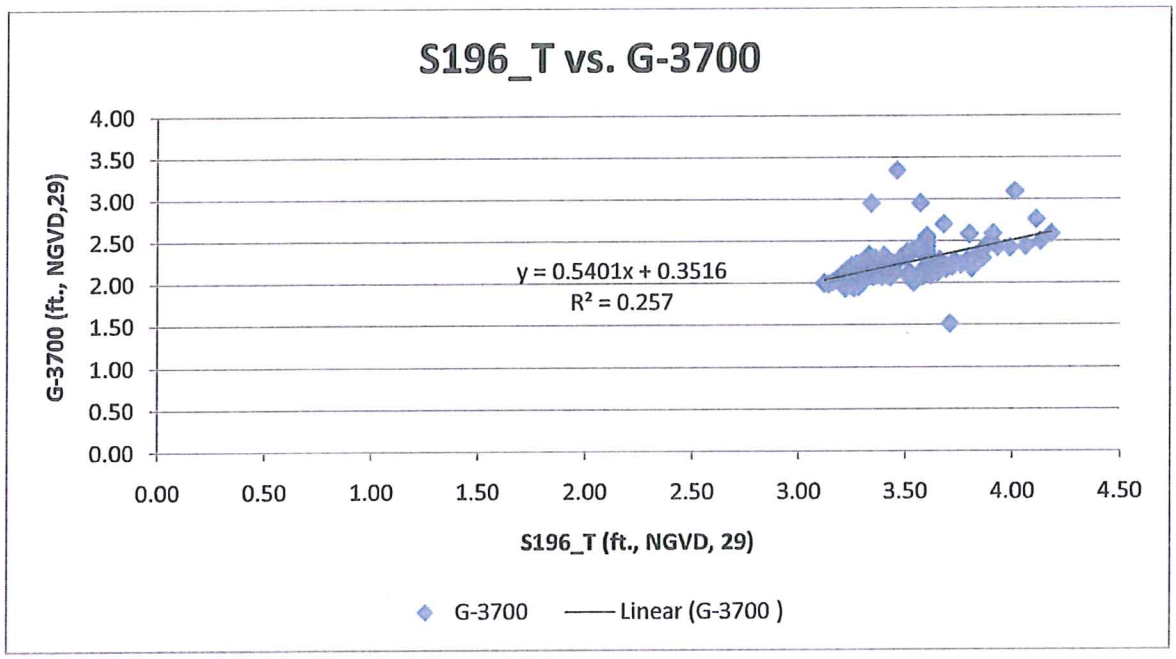
Hydrographs for Monitor Wells G-3700 and G-1183



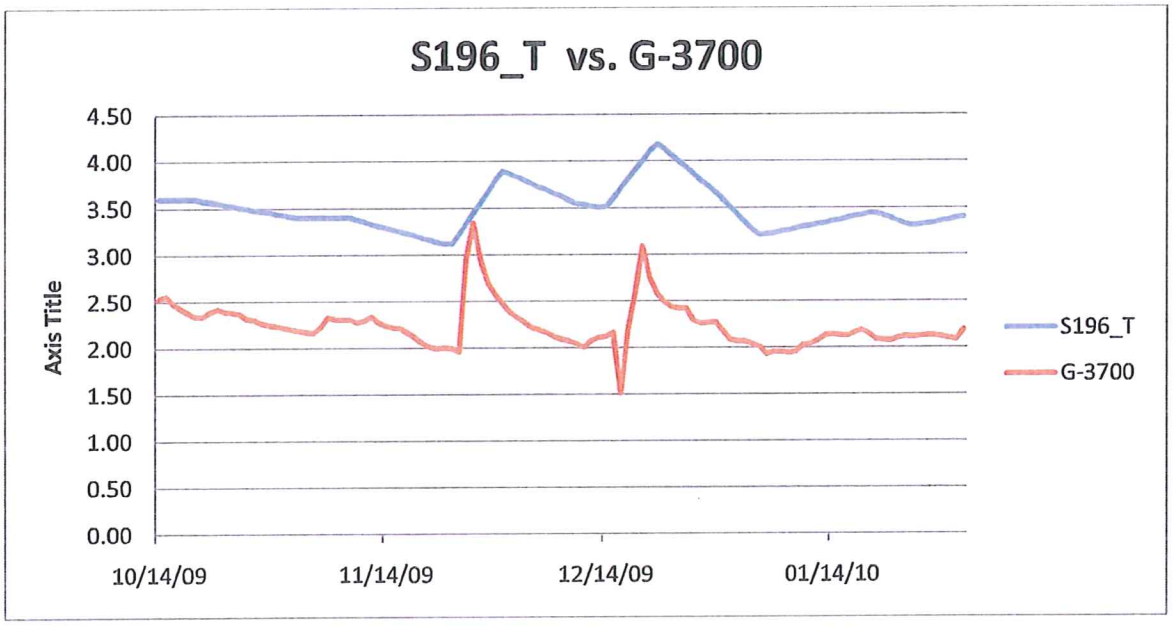
Scatter Plot of Water Levels from Water Control Structure S196_H and Monitor Well G-3700 with Best Fit Line



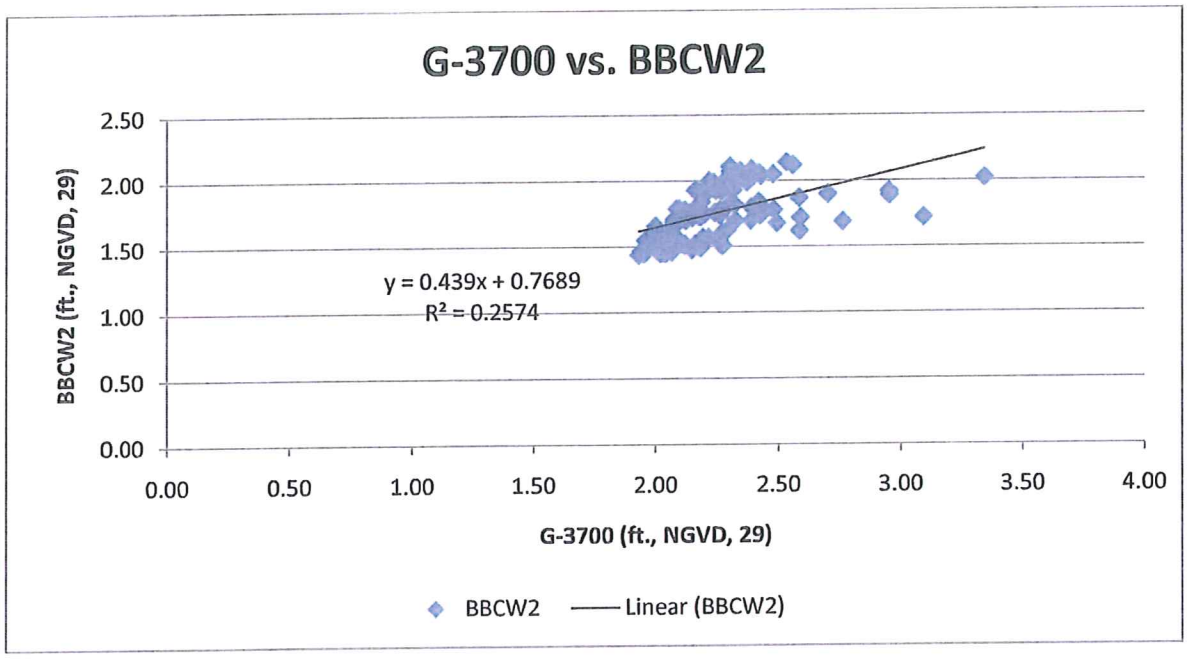
Hydrographs for Water Control Structure S196_H and Monitor Well G-3700



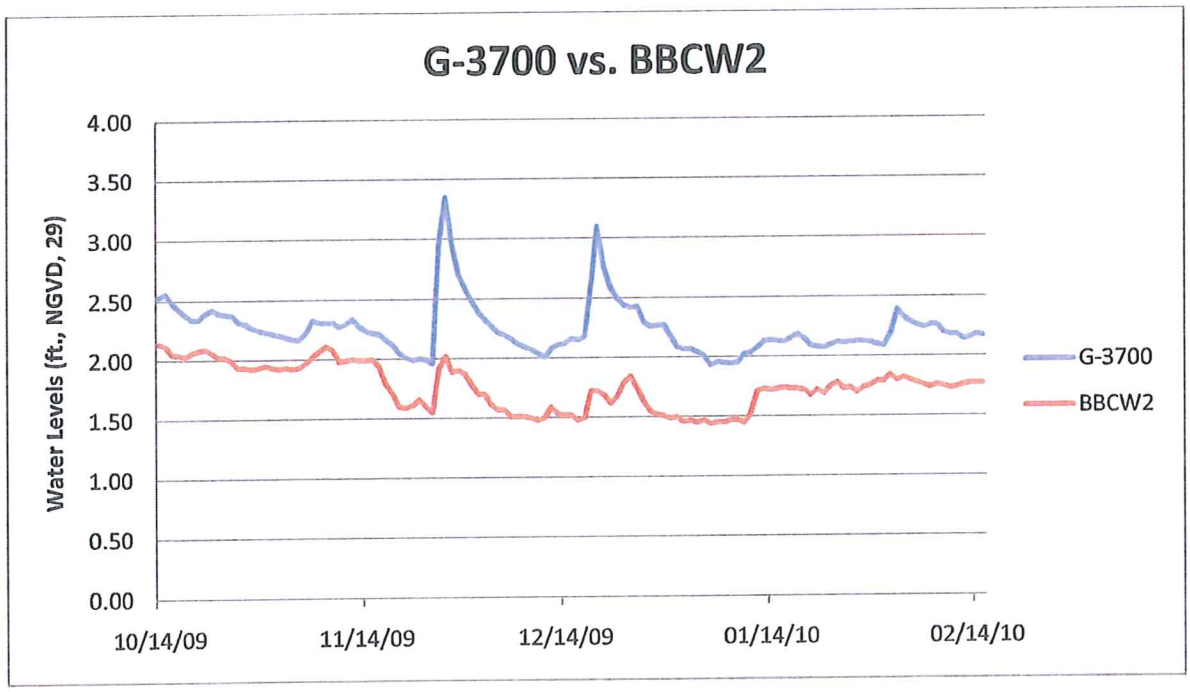
Scatter Plot of Water Levels from Water Control Structure S196_T and Monitor Well G-3700 with Best Fit Line



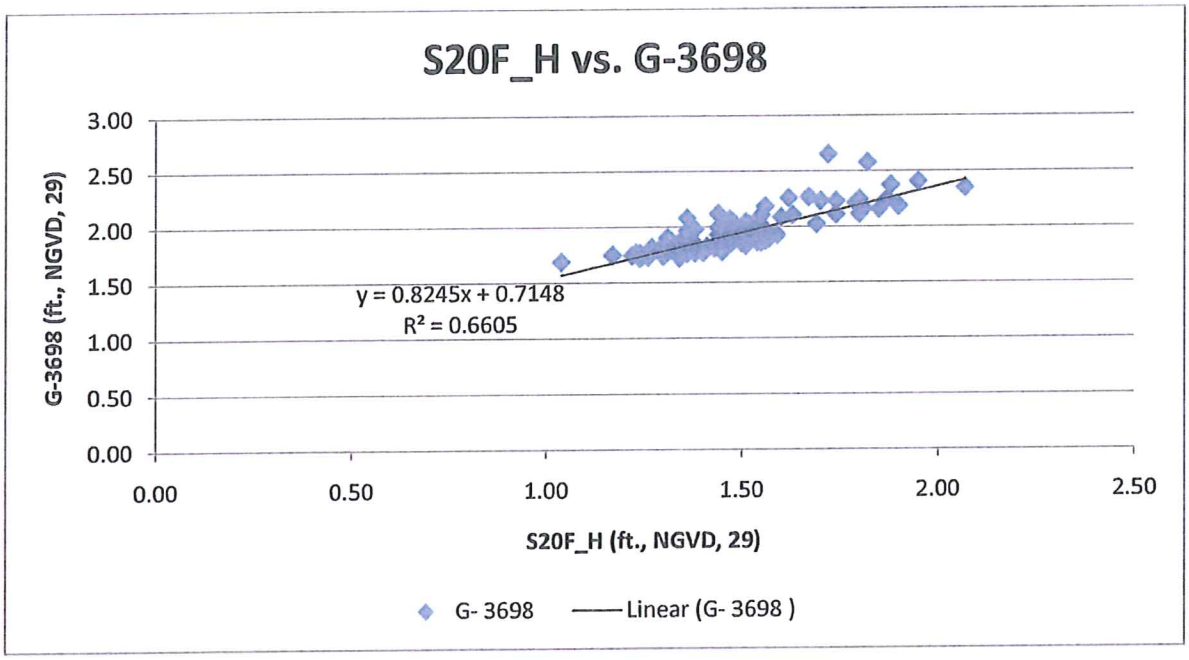
Hydrographs for Water Control Structure S196_T and Monitor Well G-3700



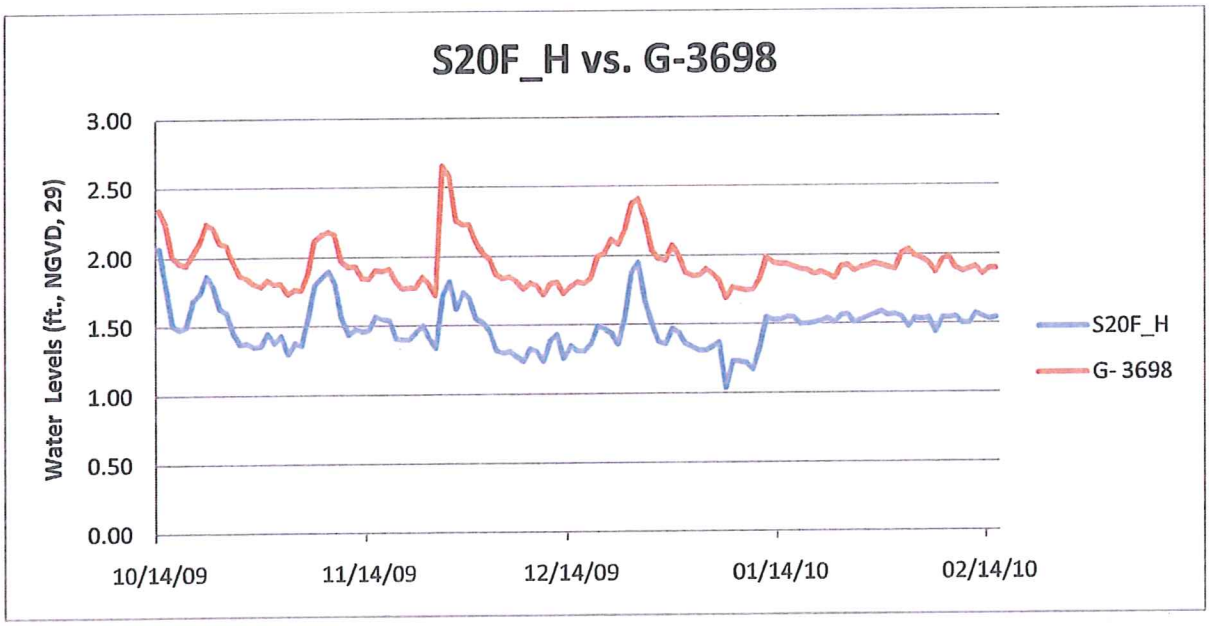
Scatter Plot of Water Levels from Monitor Wells G-3701 and BBCW2 with Best Fit Line



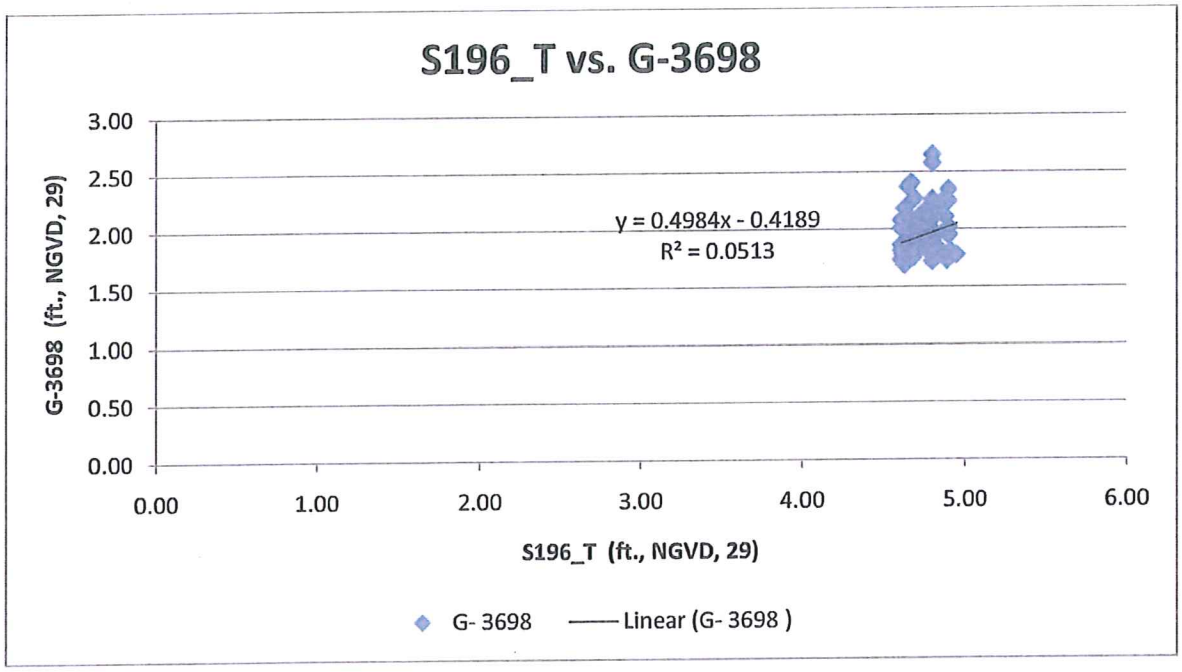
Hydrographs for Monitor Wells G-3700 and BBCW2



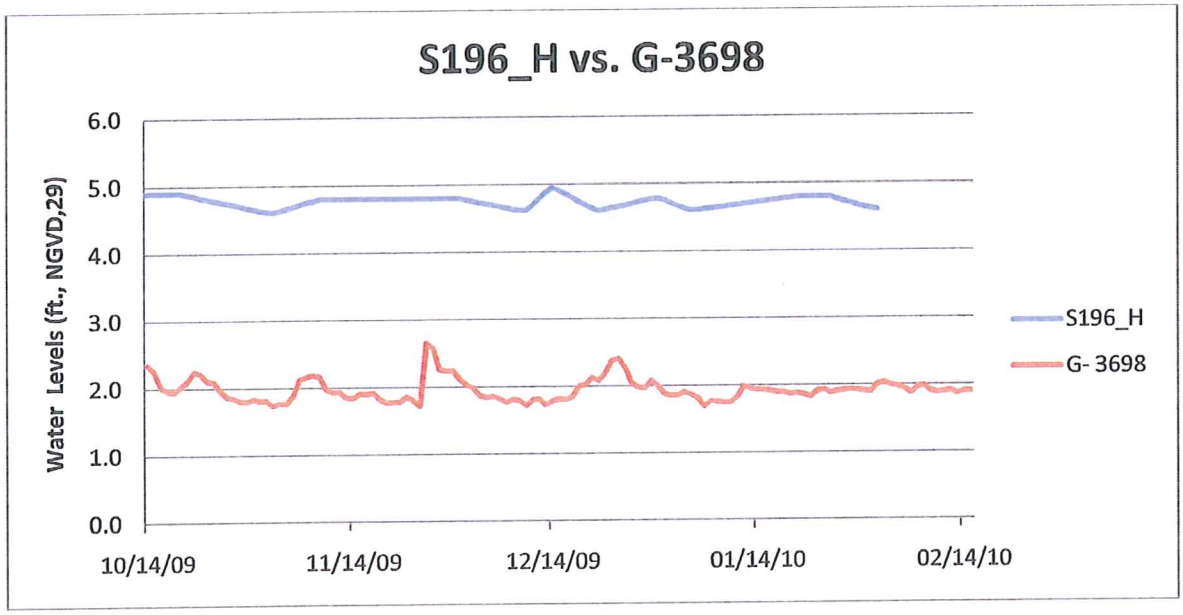
Scatter Plot of Water Levels from Water Control Structure S20F_H and Monitor Well G-3698 with Best Fit Line



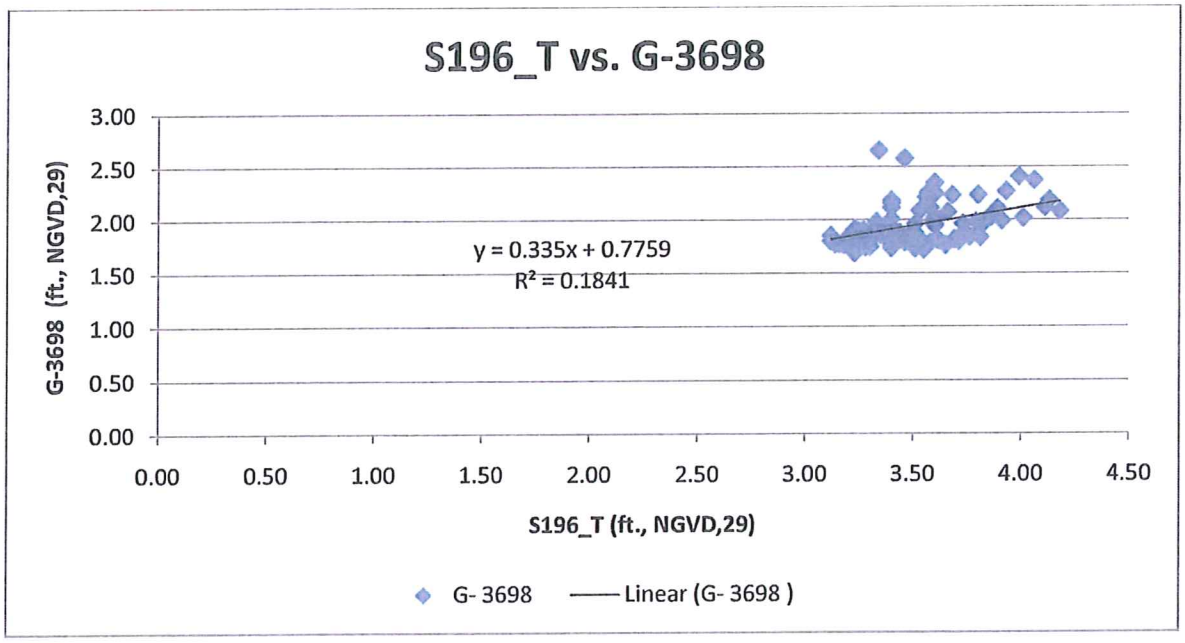
Hydrographs for Water Control Structure S20F_H and Monitor Well G-3698



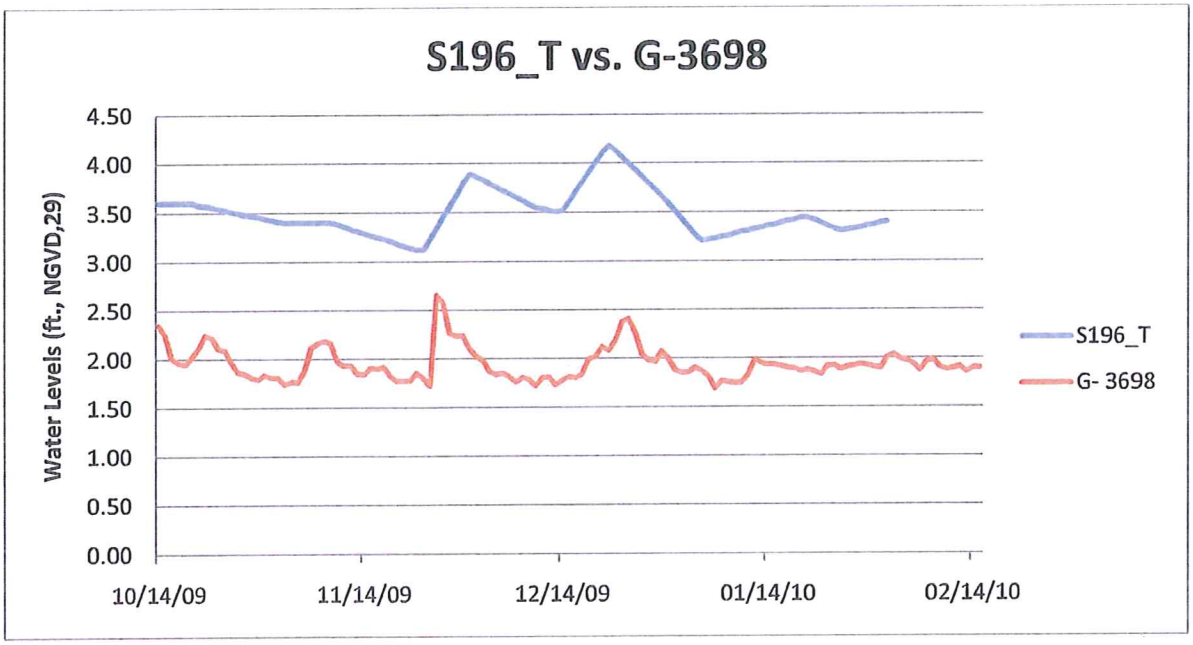
Scatter Plot of Water Levels from Water Control Structure S196_T and Monitor Well G-3698 with Best Fit Line



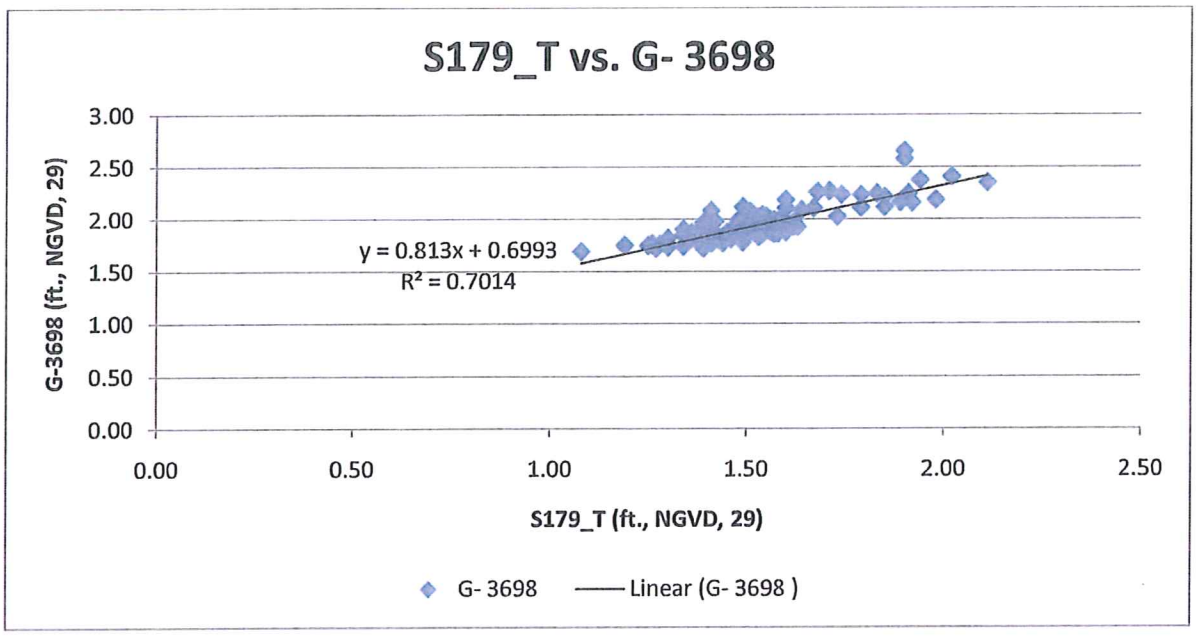
Hydrographs for Water Control Structure S196_H and Monitor Well G-3698



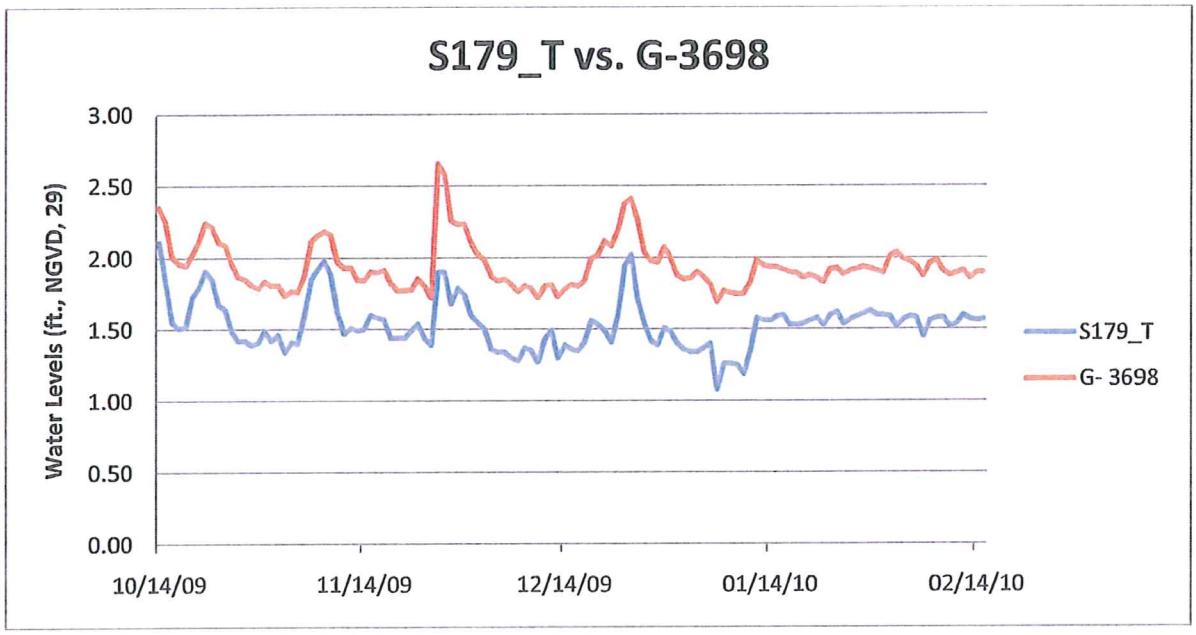
Scatter Plot of Water Levels from Water Control Structure S196_T and Monitor Well G-3698 with Best Fit Line



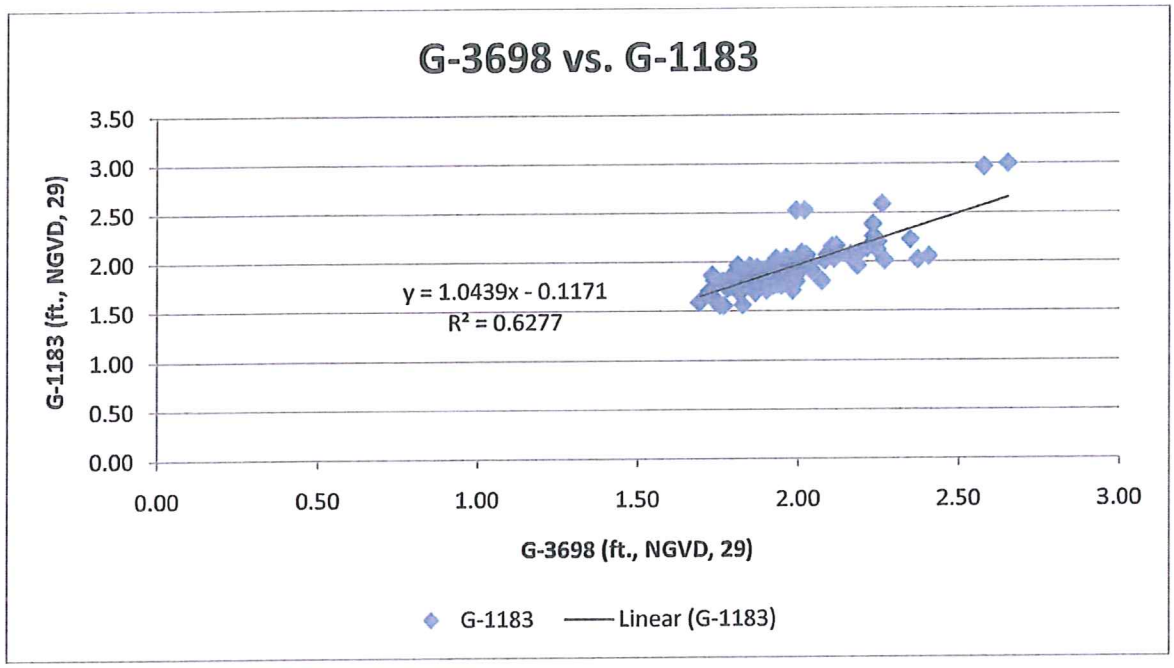
Hydrographs for Water Control Structure S196_T and Monitor Well G-3698



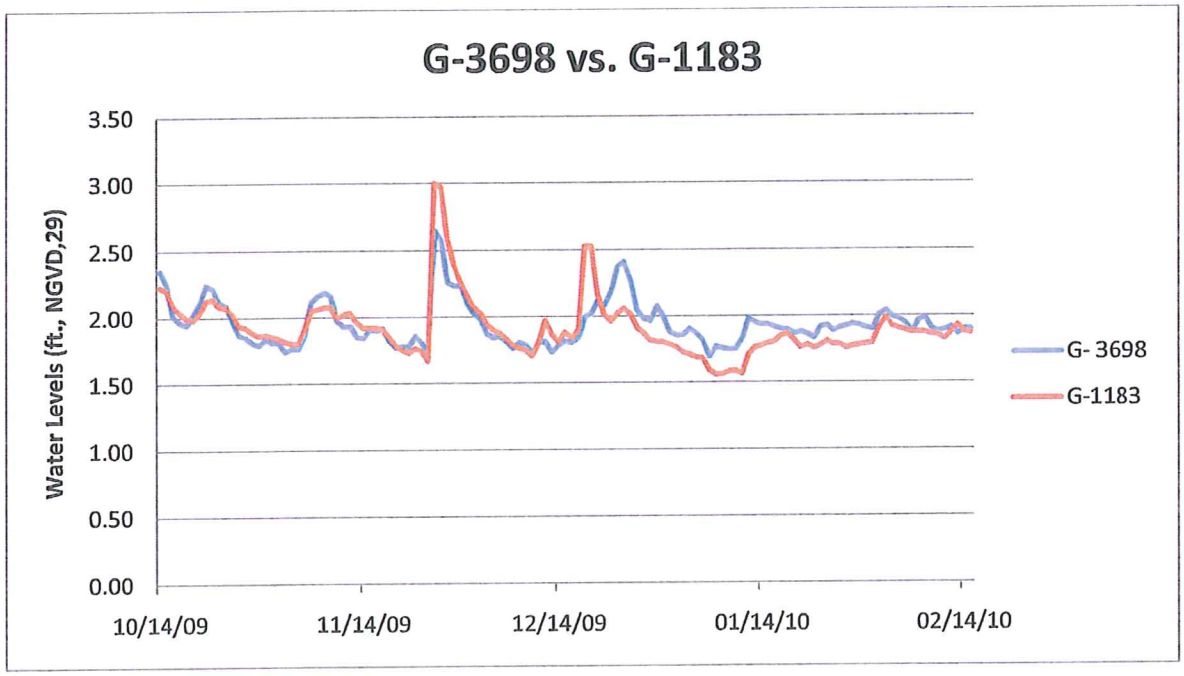
Scatter Plot of Water Levels from Water Control Structure S179_T and Monitor Well G-3698 with Best Fit Line



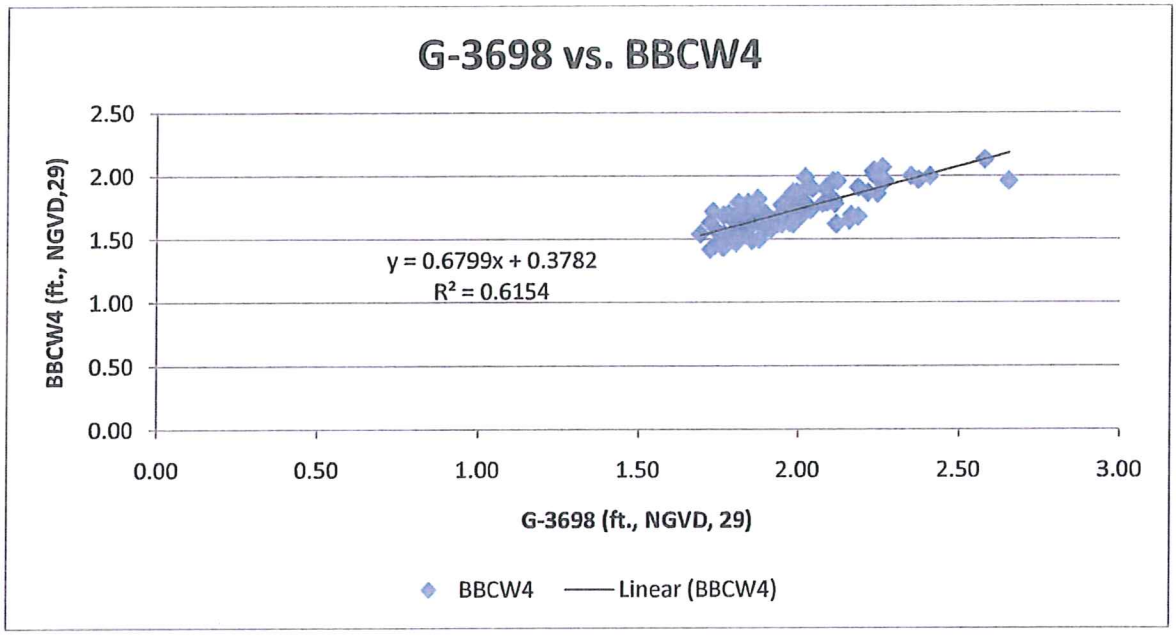
Hydrographs for Water Control Structure S179_T and Monitor Well G-3698



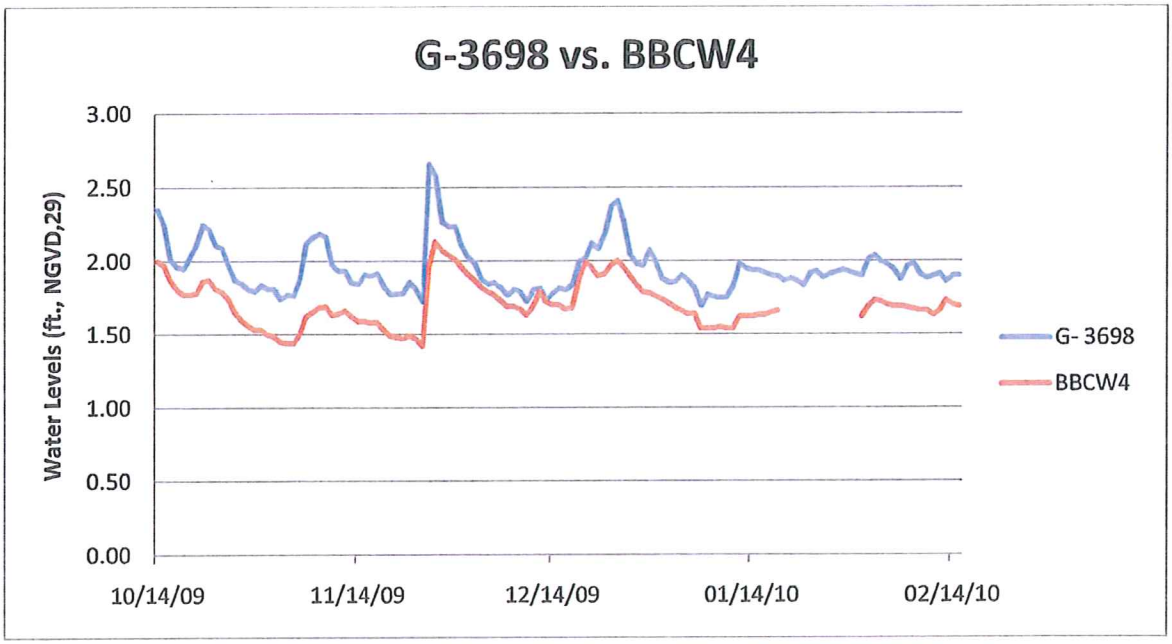
Scatter Plot of Water Levels from Monitor Wells G-3698 and G-1183 with Best Fit Line



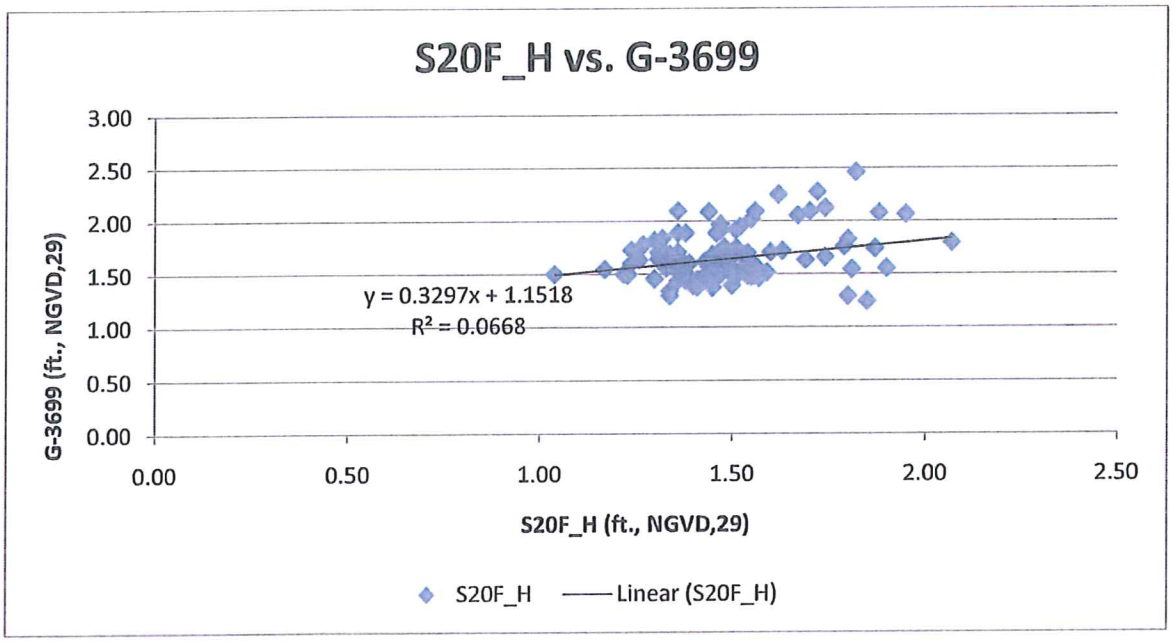
Hydrographs for Monitor Wells G-3698 and G-1183



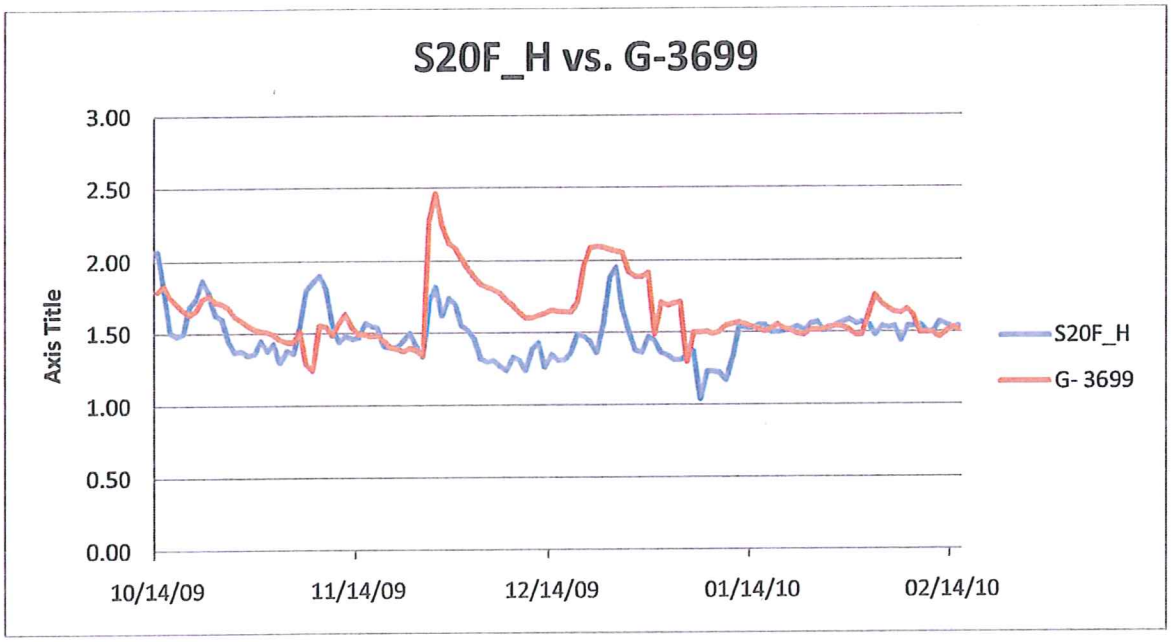
Scatter Plot of Water Levels from Monitor Wells G-3698 and BBCW4 with Best Fit Line



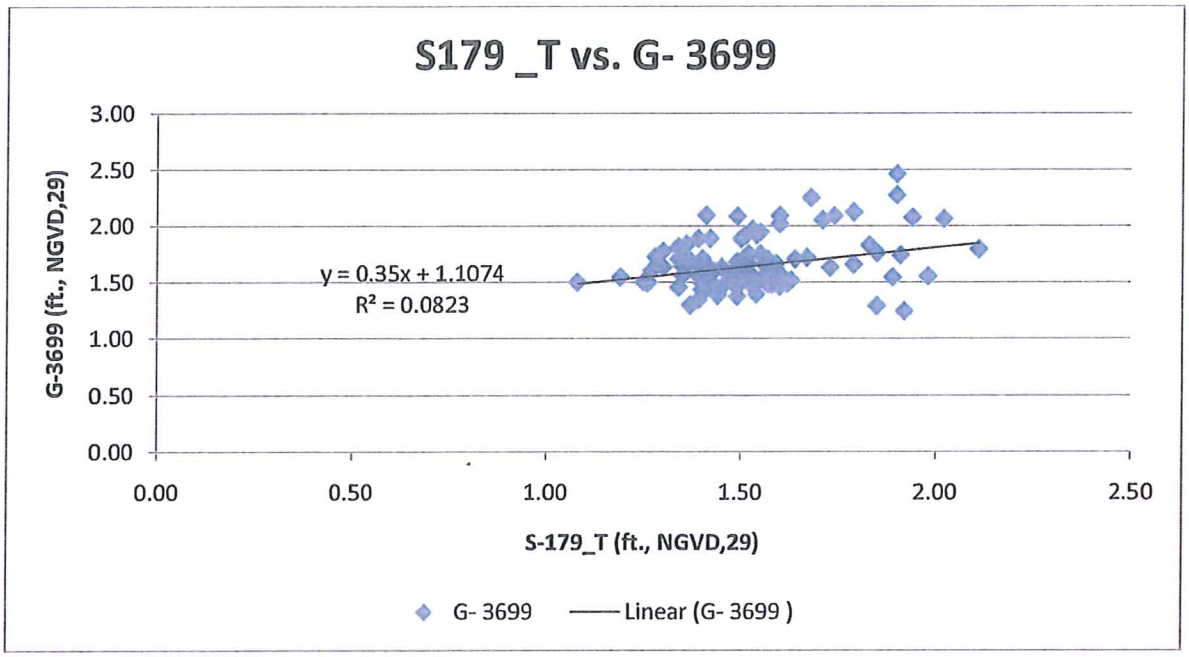
Hydrographs for Monitor Wells G-3698 and BBCW4



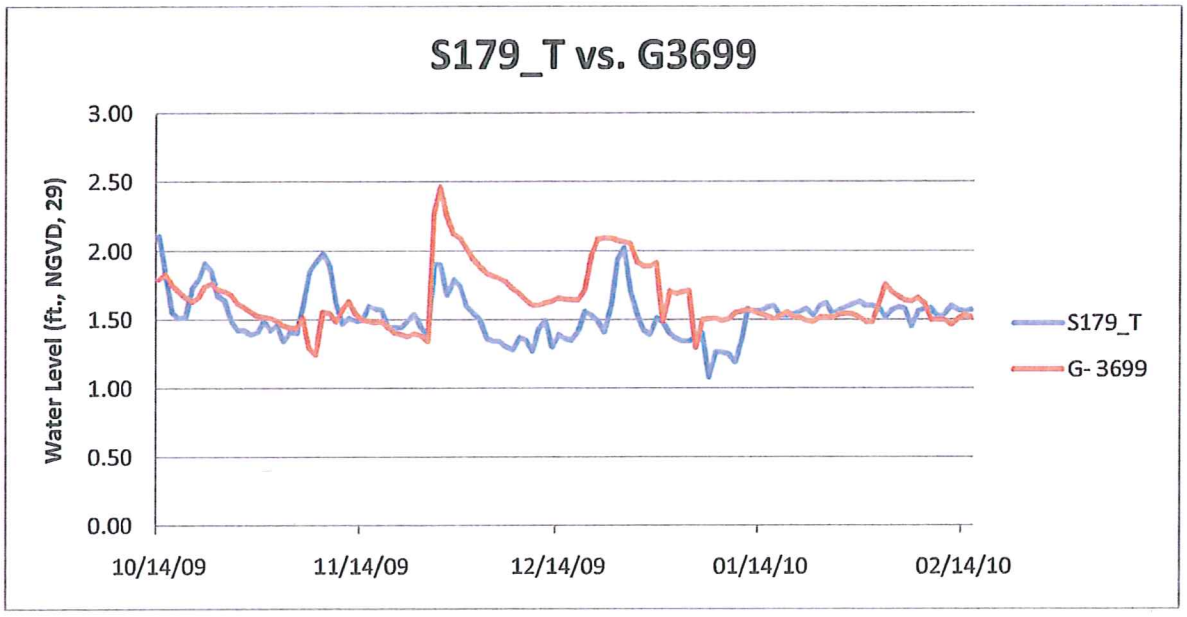
Scatter Plot of Water Levels from Water Control Structure S20F_H and Monitor Well G-3699 with Best Fit Line



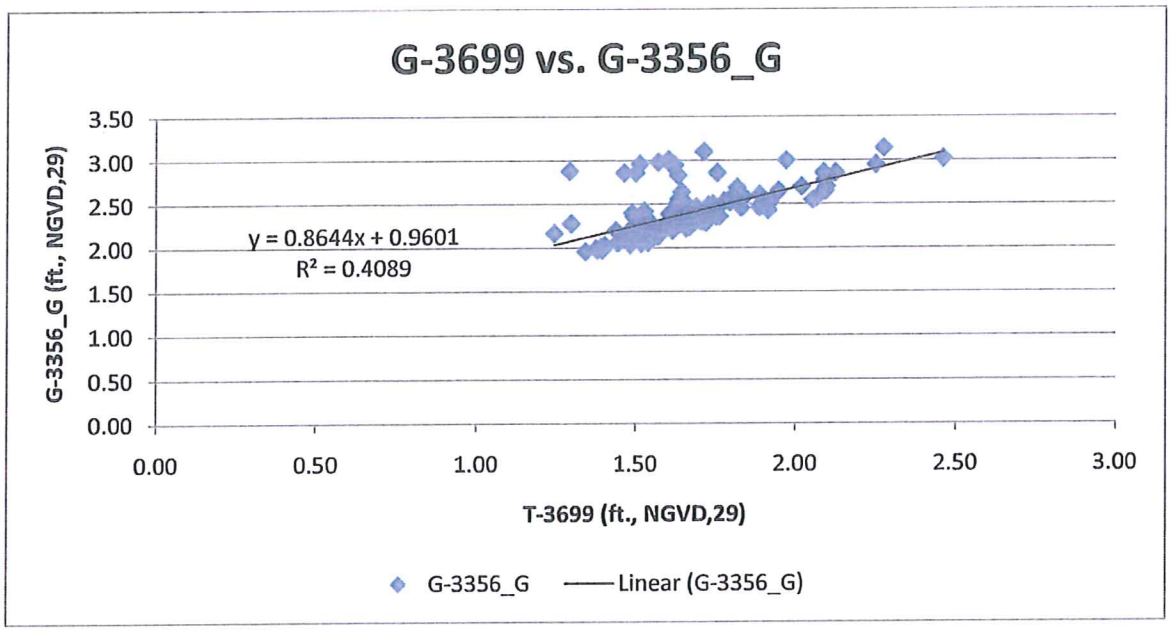
Hydrographs for Water Control Structure S20F_H and Monitor Well G-3699



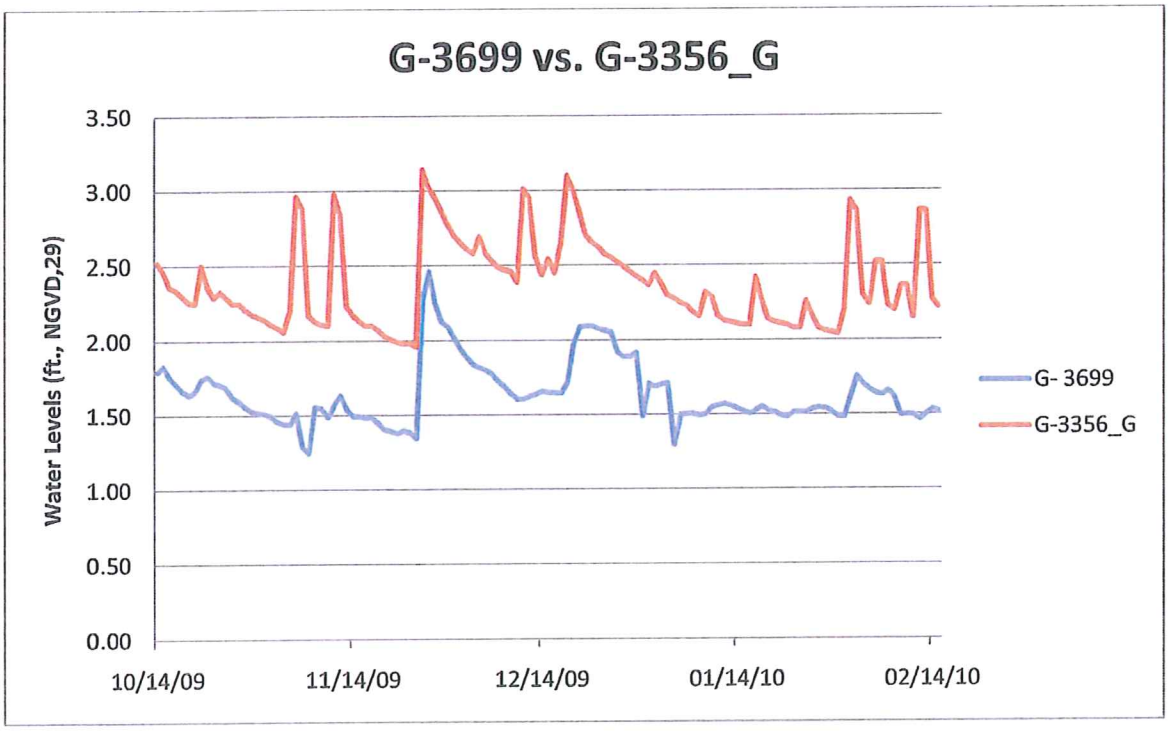
Scatter Plot of Water Levels from Water Control Structure S179_T and Monitor Well G-3699 with Best Fit Line



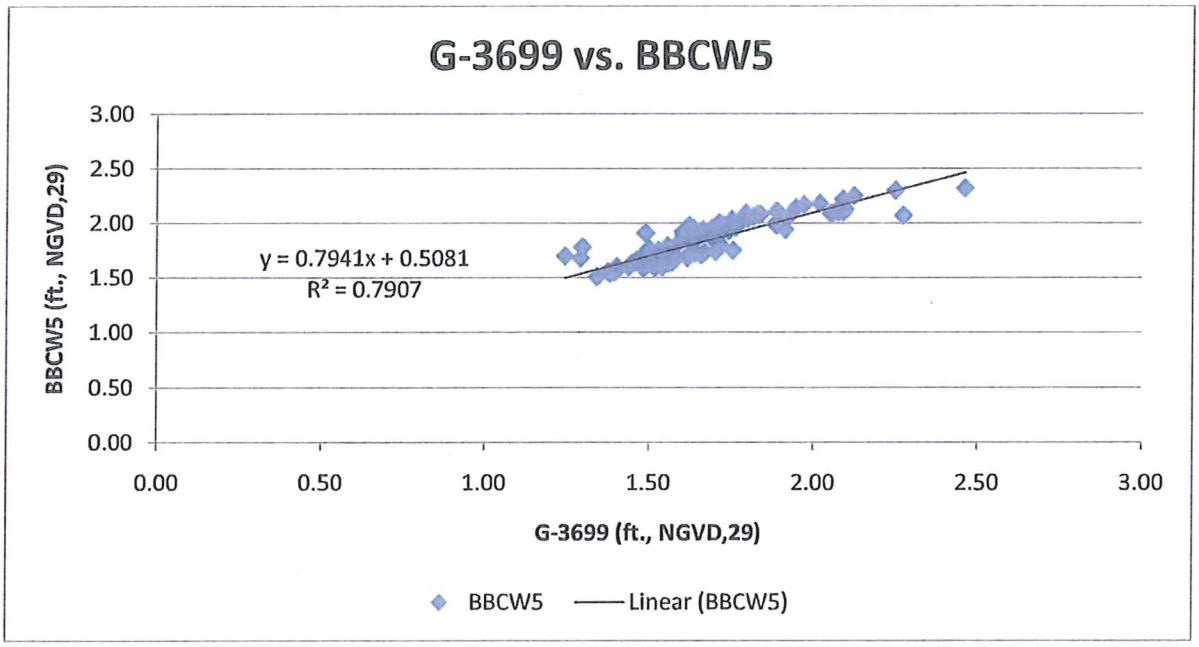
Hydrographs for Water Control Structure S-179_T and Monitor Well G-3699



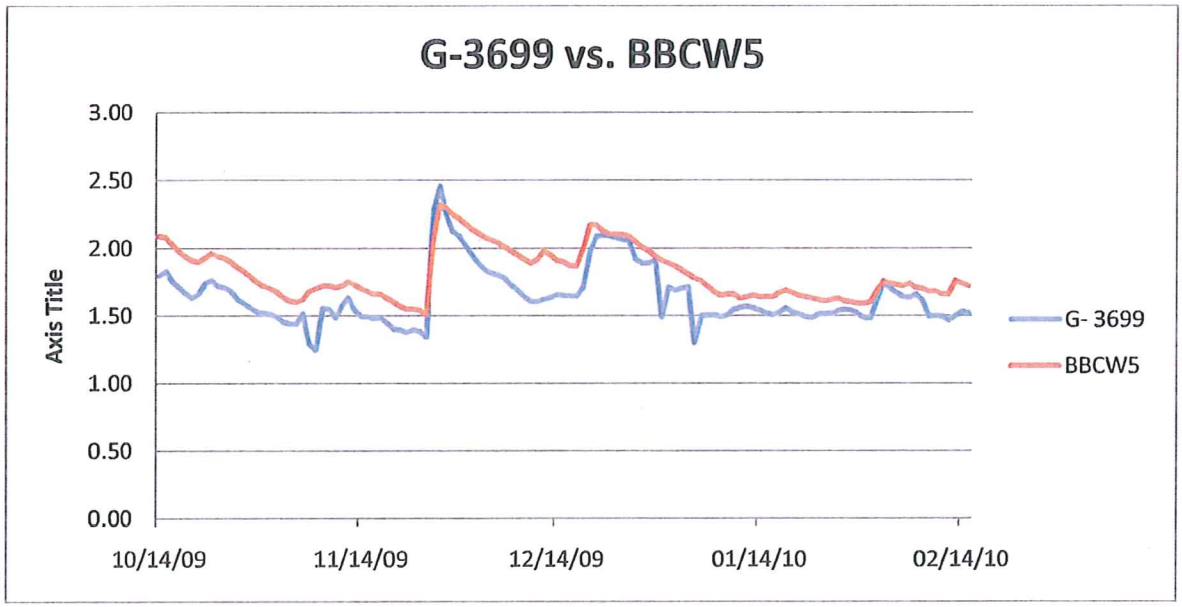
Scatter Plot of Water Levels from Monitor Wells G-3699 and G-3356_G with Best Fit Line



Hydrographs for Monitor Wells G-3699 and G-3356_G



Scatter Plot of Water Levels from Monitor Wells G-3699 and BBCW5 with Best Fit Line



Hydrographs for Monitor Wells G-3699 and BBCW5