

ANNUAL SUMMARY OF GROUND WATER CONDITIONS IN THE SOUTHEAST BOISE GROUND WATER MANAGEMENT AREA CALENDAR YEAR 2019

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This report describes the ground water conditions in and around the Southeast Boise Ground Water Management Area (GWMA) based on the ground water level observation network established in the spring of 2000 under the guidance of the Southeast Boise Ground Water Advisory Committee (Advisory Committee). The network is a cooperative effort among Micron Technology, Inc., Suez Water Idaho Inc., and the Idaho Department of Water Resources (IDWR). The cooperators submit water level data to IDWR and/or provide support and access to wells for monitoring. The data is maintained in the IDWR ground water database. The J.R. Simplot Co., City of Boise, Sunroc Corp., Idaho Transportation Department, Idaho Department of Lands, Boise Gun Club, and other land owners provide access to wells within the monitoring network.

Status of Monitoring Network

The network currently consists of 35 active monitoring sites, with one site (03N 02E 14ABC) containing a set of five nested wells for a total of 39 active wells (**Figure B1**). The core monitoring network has remained relatively stable over time. During calendar year 2019, IDWR added one well to the monitoring network (02N 02E 03DDC1, Boise Airport Well) and deployed pressure transducers in nine wells (**Table A1**). Wells that have been designated as inactive monitoring sites are listed at the bottom of **Table A1**.

In September 2019, IDWR took over monitoring responsibilities for the eight monitoring wells previously monitored by Micron Technology Inc. In an effort to improve the monitoring data and prepare the wells for pressure transducer installations, Micron had the pump and pump column from the well 02N 03E 07BAC1 removed, and attempted to have the pump and pump column removed from 02N 03E 09BAA2 as well, but were unsuccessful due to unanticipated issues. Micron also ensured that IDWR staff and consultant staff were able to coordinate efforts to transition monitoring responsibilities and maintain consistent records and measurement points. Micron staff visited all of the wells with IDWR staff to ensure a smooth transition of responsibilities and to provide information to IDWR to pursue previous Advisory Committee recommendations. Micron purchased vented transducers and direct read cables for all eight wells, and IDWR installed the equipment and took over measurement responsibilities. One transducer malfunctioned shortly after installation, and will be replaced when the equipment is available to re-deploy.

IDWR contracted and provided oversight for the drilling of a new dedicated monitoring well at the Boise Airport that was completed in June 2019 (**Figure B2**). This new well provides a monitoring point just outside the west boundary of the GWMA in a data gap. The new well was completed to a depth of 353 feet below land surface in sands and gravels, with a depth to water of 279 feet below land surface. A vented transducer and direct read cable were installed in the well in July 2019 to record water levels twice daily.

At the recommendation of the committee, IDWR began refining elevations and geographic locations of wells, and will continue this process for all wells in the monitoring network that require updates. Updated locations and elevations were collected for all eight Micron monitoring wells, as well as the new Boise Airport well.

IDWR staff began applying measurement point adjustments to historic data and establishing consistent measurement points where necessary. This information will be used to improve the data quality and consistency, and prepare the data for statistical analysis.

One well (03N 03E 30DDAA1, E Boise Ave) had a fence built around the property in 2019, which prevents access by IDWR staff. IDWR staff have not yet been able to make contact with the owner to discuss access considerations.

IDWR's measurement and download schedules for the spring 2020 water level measurements were disrupted by the COVID-19 pandemic and the Statewide Stay-Home Order. These activities were not designated as Essential Government Functions as defined in Section 8.d of the March 25, 2020 Order to Self-Isolate, issued by Dave Jeppesen, Director of the Idaho Department of Health and Welfare, and thus were not undertaken at the anticipated times.

The current monitoring frequency for active wells in **Table A1** ranges from hourly to semi-annually. Twenty four wells monitored by IDWR are currently equipped with In-Situ™ pressure transducers, and are programmed to collect water level and water temperature observations at a minimum of two times per day (**Figure B1**), with most transducers now storing hourly readings. Wells measured by IDWR that do not contain pressure transducers are manually measured on a quarterly schedule. Suez Water Idaho Inc. provides approximately bi-monthly measurements.

Ground Water Level Trends

Ground water level hydrographs showing the complete period of record for active wells in the monitoring network are shown in **Appendix C**. Ground water level hydrographs displaying data only for the period from January 1, 1990 to December 31, 2019 for all active monitoring wells are shown in **Appendix D**. All available data has been included in this report. A number of wells are subject to significant seasonal trends and/or pumping effects, which can make it difficult to draw meaningful conclusions from the hydrographs. Similarly, nearby pumping and/or management changes may impact apparent water level trends. Periodic data collection in wells lacking continuous measurement devices can make it difficult to conclude trends due to the uncertainty regarding the seasonal peaks and troughs of the hydrographs relative to the instantaneous manual measurements. The magnitude of the observed water level changes can also be such that determining trends independent of factors such as systematic and random errors can be challenging. All qualitative and quantitative analyses should recognize the limitations of the data as well as the associated uncertainties. Statistical trend analysis has not been performed, however, qualitative trends have been summarized for the active wells.

Qualitative trends were determined by subtracting the minimum depth to water for a given calendar year from the minimum depth to water for calendar year 2019, and by subtracting the maximum depth to water for a given calendar year from the maximum depth to water for calendar year 2019 (**Table A2**). If the calculated difference for the minimum depth to water and the maximum depth to water values are both negative, the water level trend is said to be increasing (measured water levels are becoming

shallower). If the calculated difference for the minimum depth to water and the maximum depth to water values are both positive, the water level trend is said to be decreasing (measured water levels are becoming deeper). If the calculated difference for the minimum depth to water and the maximum depth to water values have different arithmetic signs, the water level trend is said to be undetermined.

Qualitative trends for 5, 10, and 15-year intervals were developed for the active monitoring network (**Table A2**). In the last five years (2014 to 2019), there have been apparent decreasing trends in the water levels in 10 of the 39 active wells. In that same time period, there have been apparent increasing trends in water levels in 14 of the 39 active wells. Water level trends for the remaining 15 wells were said to be undetermined due to water level ambiguity, and/or insufficient data.

Recommendations

In May 2019 the Advisory Committee requested that IDWR continue to pursue additional groundwater monitoring wells for the monitoring network, develop improved elevation data for the wells that currently utilize data based on topographic map data, utilize a statistical trend test methodology, produce hydrographs in the annual report using consistent scales whenever possible, and recommended that transducers be upgraded as appropriate and within a reasonable time frame to improve data collection. This annual report has detailed the progress made in the previous year towards furthering those Advisory Committee requests and recommendations. IDWR will continue to look for opportunities to pursue Advisory Committee requests and recommendations.

Appendix A

Tables

Table A1. Summary of the ground water monitoring network for the Southeast Boise GWMA.

Map ID	Well Number	Well Name	Period of Water Level Record	Status of Well	Comments
1	01N 01E 34AAA1	City of Boise Farm	2018 - 2020	Active	Transducer installed January 2018
2	01N 03E 04BBD1	Prigge	1994 - 2019	Active	Transducer installed October 2014, vented transducer installed April 2019
3	01N 04E 28CAC1	Ken Agenbroad	1979 - 2019	Active	
4	02N 01E 36BBB1	Harris South Cole	1969 - 2019	Active	Transducer installed May 2018
5	02N 02E 02BBC2	JR Flat	1989 - 2018	Active	
6	02N 02E 04CBB1	IDL House	1973 - 2019	Active	Transducer installed March 2017
7	02N 02E 07CBC1	Hollilynn	1993 - 2019	Active	Transducer installed May 2018
8	02N 02E 17ABD1	Ten Mile	1996 - 2018	Active	
9	02N 02E 21CBB1	SunRoc	2018 - 2019	Active	Transducer installed April 2018
10	02N 02E 22BBB1	Pioneer	1998 - 2018	Active	
11	02N 02E 34CCD1	Boise Gun Club	1976 - 2019	Active	Transducer installed November 2016
12	02N 03E 06DCA1	Micron Test #1	1986 - 2019	Active	Transducer installed October 2019
13	02N 03E 07BAC1	Micron Test #2	1983 - 2019	Active	Transducer installed October 2019
14	02N 03E 07CDA1	Pettibone	1997 - 2019	Active	Transducer installed October 2019
15	02N 03E 07DBB1	Micron Shallow Obs	1998 - 2019	Active	Transducer installed October 2019
16	02N 03E 07DBB2	Micron Deep Obs	1998 - 2019	Active	Transducer installed October 2019
17	02N 03E 09BAA2	Christensen	1993 - 2019	Active	Transducer installed October 2019
18	02N 03E 19DBB1	Micron South	2017 - 2019	Active	Vented transducer installed April 2019

Map ID	Well Number	Well Name	Period of Water Level Record	Status of Well	Comments
19	02N 03E 28CAA1	Blacks Creek Rest Area Westbound	2007 - 2019	Active	Transducer installed May 2018
20	02N 03E 34ACC1	Blacks Creek Exit ITD	2012 - 2019	Active	Transducer installed October 2014, vented transducer installed April 2019
21	03N 02E 11DDD1	TV Lenzi	1977 - 2019	Active	Transducer installed June 2016
22	03N 02E 14ABC	TVHP 4-1 through 4-5	2002 - 2019	Active	Transducers installed August 2016
23	03N 02E 25ACBC1	Helen Lowder Park	1992 - 2019	Active	
24	03N 02E 25CAA1	Centennial	1976 - 2018	Active	
25	03N 02E 26DBA1	Bergeson	1990 - 2018	Active	
26	03N 02E 35BAB1	Market	1991 - 2018	Active	
27	03N 02E 36ABC1	Terteling	1972 - 2018	Active	
28	03N 02E 36CDA1	Cromon	1991 - 2018	Active	
29	03N 03E 30BCBD1	Hurok	1969 - 2019	Active	
30	03N 03E 30DDAA1	E Boise Ave	1987 - 2019	Active	Transducer installed March 2017, Lost access to site in Summer of 2019
31	03N 03E 31ADD1	Simplot Golden Development	1993 - 2019	Active	
32	03N 03E 32BBA1	Whitney Fire	1975 - 2019	Active	
33	03N 03E 32CDD1	Micron Columbia	1990 - 2019	Active	Transducer installed October 2019, Removed January 2020 due malfunction
34	03N 03E 33DAA1	Hammer Flats	1969 - 2019	Active	
35	02N 02E 03DDC1	Boise Airport	2019-2020	Active	Drilled June 2019, Transducer installed July 2019
	02N 02E 04CAA1	SEB IDL Field	2000 - 2009	Inactive	Discontinued in 2010

Map ID	Well Number	Well Name	Period of Water Level Record	Status of Well	Comments
	02N 03E 09BCA2	Vern Guyer	1993 - 2007	Inactive	Discontinued in 2007
	03N 02E 25CBCA1	Motive Power 41A	1997 - 2015	Inactive	Discontinued in 2015
	03N 03E 31BDD1 - DESTROYED	Oregon Trail - Destroyed	1977 - 2012	Inactive	Discontinued in 2013

Table A2. Qualitative trend results for the 39 active monitoring wells.

Well Number	Well Name	5 Year Trend (2019-2014)	10 Year Trend (2019-2009)	15 Year Trend (2019-2004)
01N 01E 34AAA1	City of Boise Farm	N/A	N/A	N/A
01N 03E 04BBD1	Prigge	Increasing	Increasing	N/A
01N 04E 28CAC1	Ken Agenbroad	Increasing	Decreasing	N/A
02N 01E 36BBB1	Harris South Cole	Decreasing	Decreasing	Undetermined
02N 02E 02BBC2	JR Flat	Increasing	Increasing	Increasing
02N 02E 04CBB1	IDL House	Decreasing	Decreasing	N/A
02N 02E 07CBC1	Hollilynn	Increasing	Decreasing	Decreasing
02N 02E 21CBB1	SunRoc	N/A	N/A	N/A
02N 02E 22BBB1	Pioneer	Decreasing	Undetermined	Undetermined
02N 02E 34CCD1	Boise Gun Club	Decreasing	Decreasing	Decreasing
02N 03E 06DCA1	Micron Test #1	Decreasing	Decreasing	Undetermined
02N 03E 07CDA1	Pettibone	Decreasing	Increasing	Increasing
02N 03E 07DBB1	Micron Shallow Obs	Decreasing	Increasing	Increasing
02N 03E 07DBB2	Micron Deep Obs	Decreasing	Decreasing	Increasing
02N 03E 09BAA2	Christensen	Increasing	Increasing	Increasing
02N 03E 28CAA1	Blacks Creek Rest Area Westbound	Undetermined	Undetermined	N/A
02N 03E 34ACC1	Blacks Creek Exit ITD	Increasing	N/A	N/A
03N 02E 11DDD1	TV Lenzi	Increasing	Undetermined	Increasing
03N 02E 14ABC1	TVHP 4-1	Undetermined	Undetermined	N/A
03N 02E 14ABC2	TVHP 4-2	Undetermined	Increasing	N/A
03N 02E 14ABC3	TVHP 4-3	Increasing	Increasing	N/A
03N 02E 14ABC4	TVHP 4-4	Undetermined	Increasing	Increasing
03N 02E 14ABC5	TVHP 4-5	Increasing	Increasing	N/A
03N 02E 25CAA1	Centennial	Increasing	Increasing	Increasing
03N 02E 26DBA1	Bergeson	Increasing	Increasing	Increasing
03N 02E 35BAB1	Market	N/A	N/A	N/A
03N 02E 36ABC1	Terteling	Increasing	Increasing	Increasing
03N 03E 30BCBD1	Hurok	Undetermined	Undetermined	Undetermined
03N 03E 30DDAA1	E Boise Ave	Increasing	Increasing	Increasing
03N 03E 32BBA1	Whitney Fire	Increasing	Increasing	Increasing
03N 03E 31ADD1	Simplot Golden Development	Undetermined	Undetermined	Increasing
03N 03E 32CDD1	Micron Columbia	Decreasing	Decreasing	Increasing
03N 03E 33DAA1	Hammer Flats	Undetermined	Undetermined	Decreasing
02N 03E 07BAC1	Micron Test #2	Decreasing	Increasing	Increasing

Well Number	Well Name	5 Year Trend (2019-2014)	10 Year Trend (2019-2009)	15 Year Trend (2019-2004)
02N 02E 17ABD1	Ten Mile	N/A	N/A	N/A
02N 03E 19DBB1	Micron South	N/A	N/A	N/A
03N 02E 25ACBC1	Helen Lowder Park	Undetermined	Undetermined	Increasing
03N 02E 36CDA1	Cromon	N/A	N/A	N/A
02N 02E 03DDC1	Boise Airport Well	N/A	N/A	N/A

Appendix B

Figures

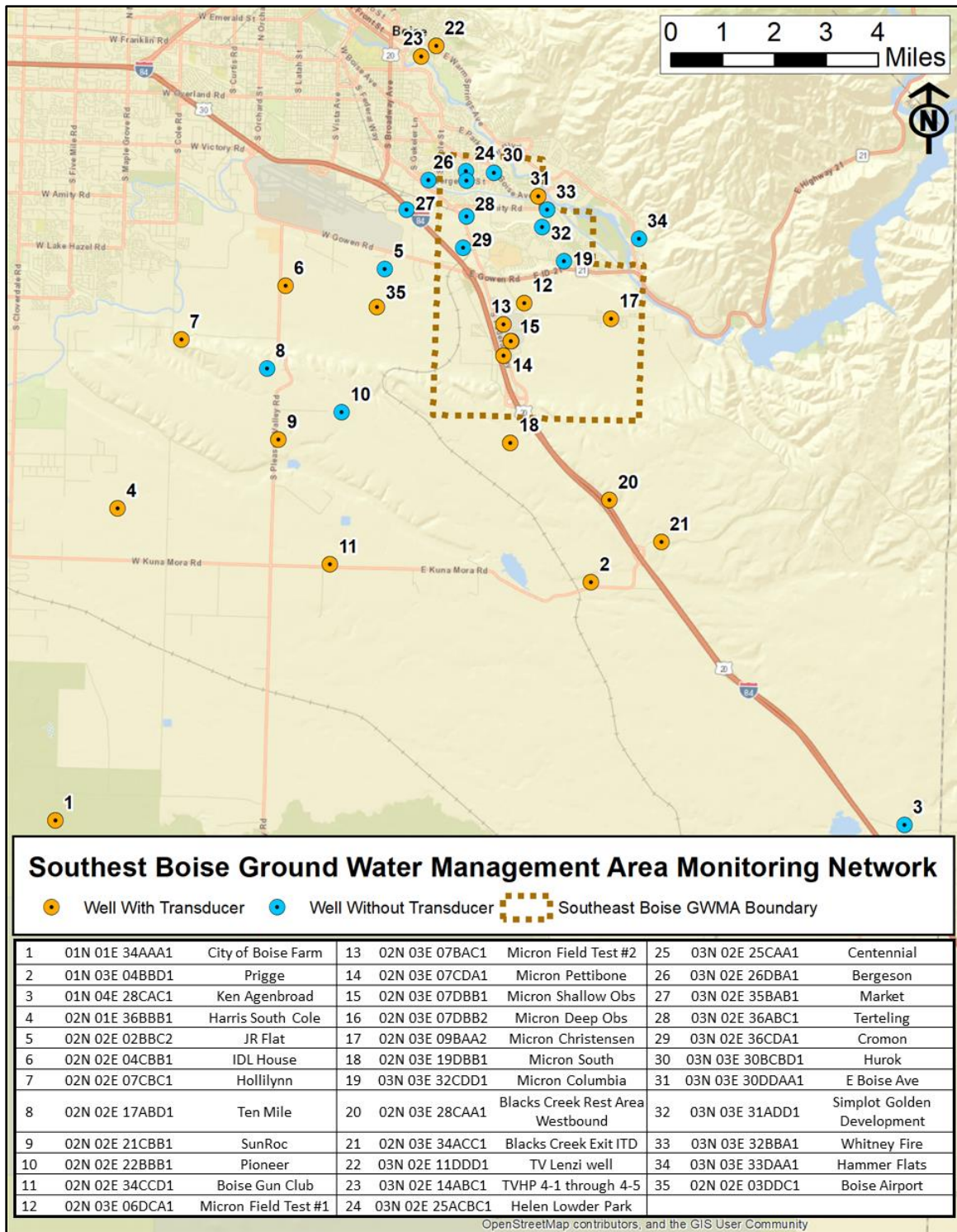


Figure B1. Current Southeast Boise GWMA monitoring network.

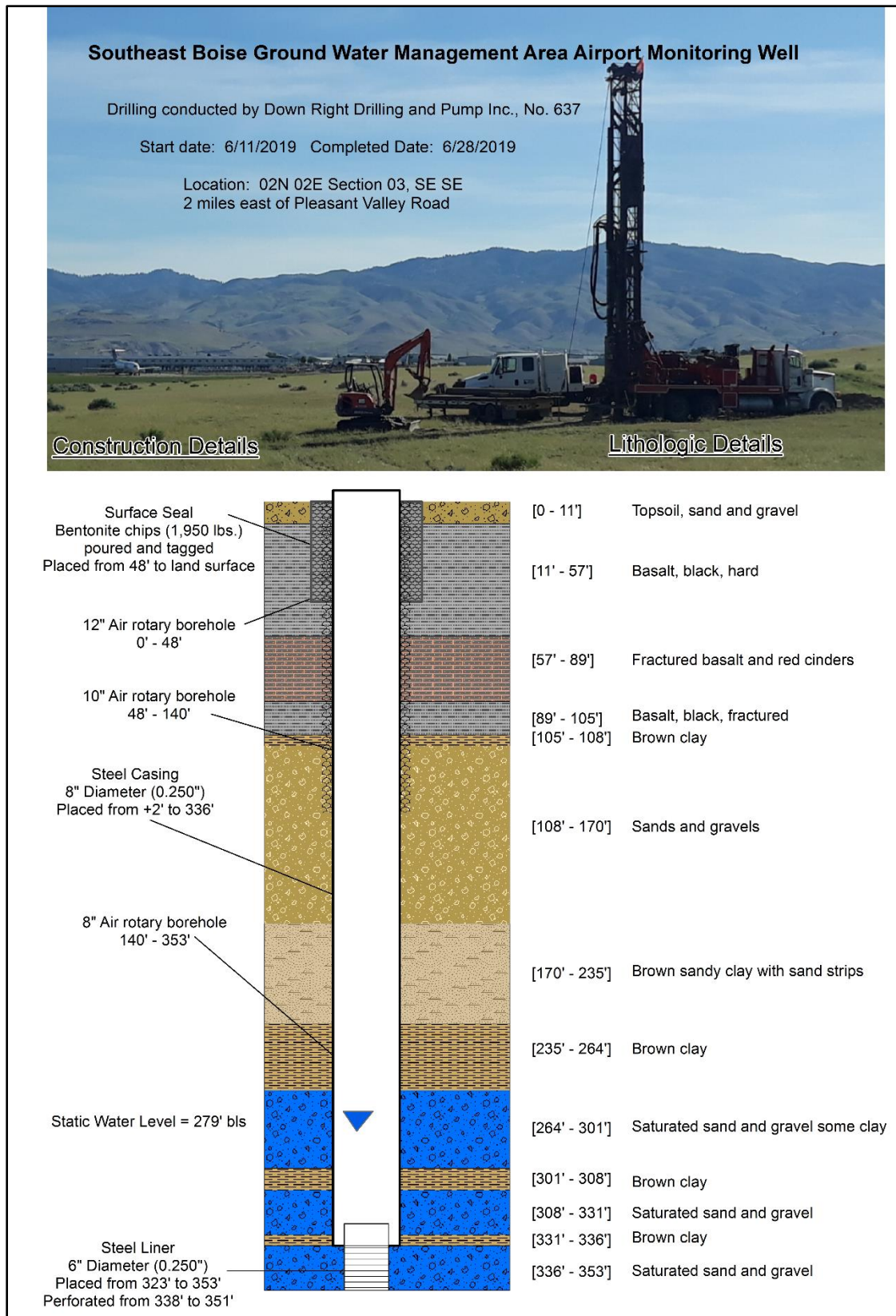
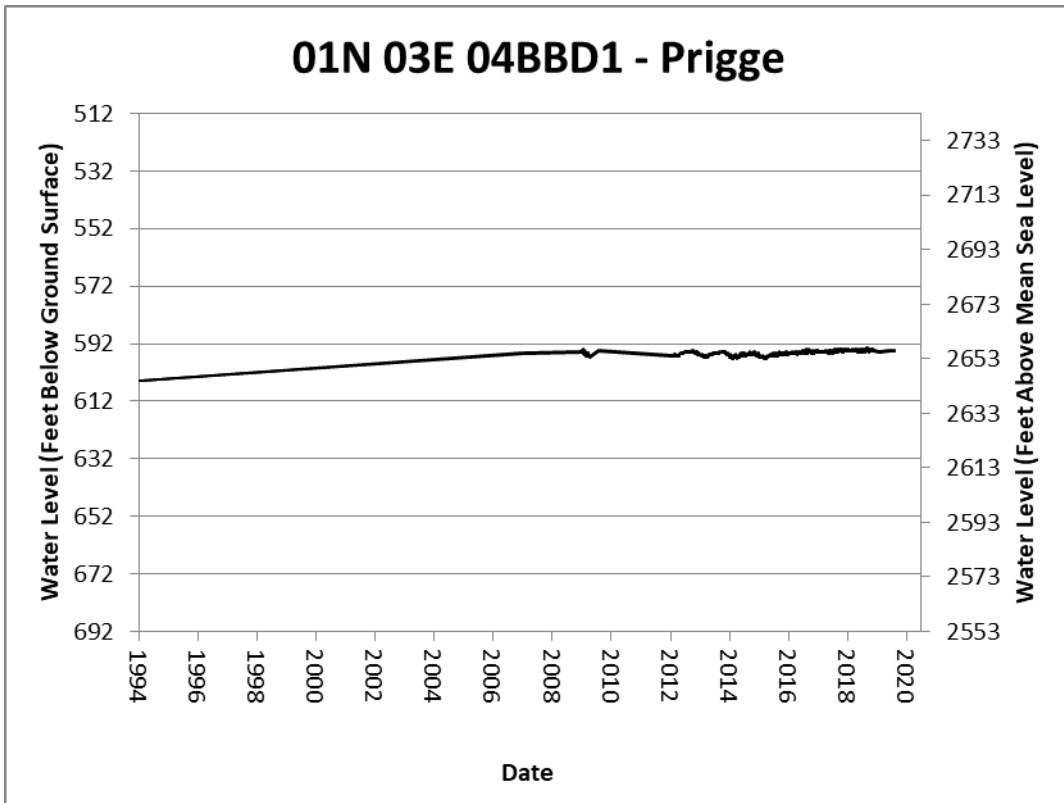
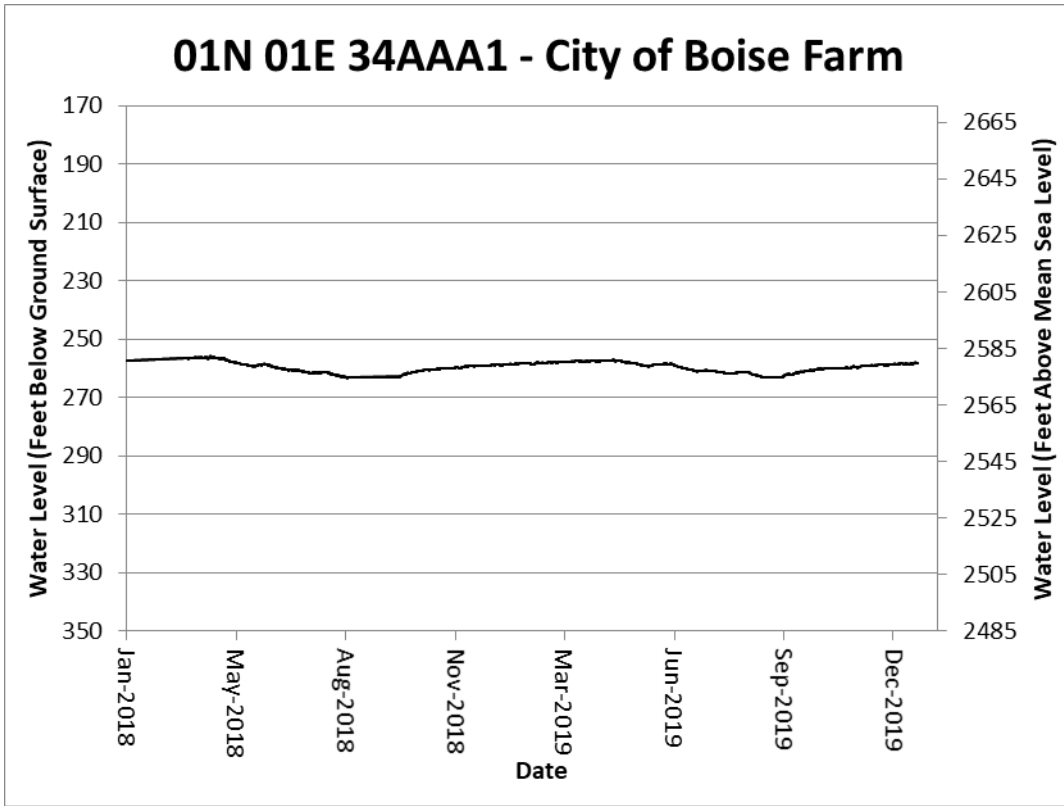
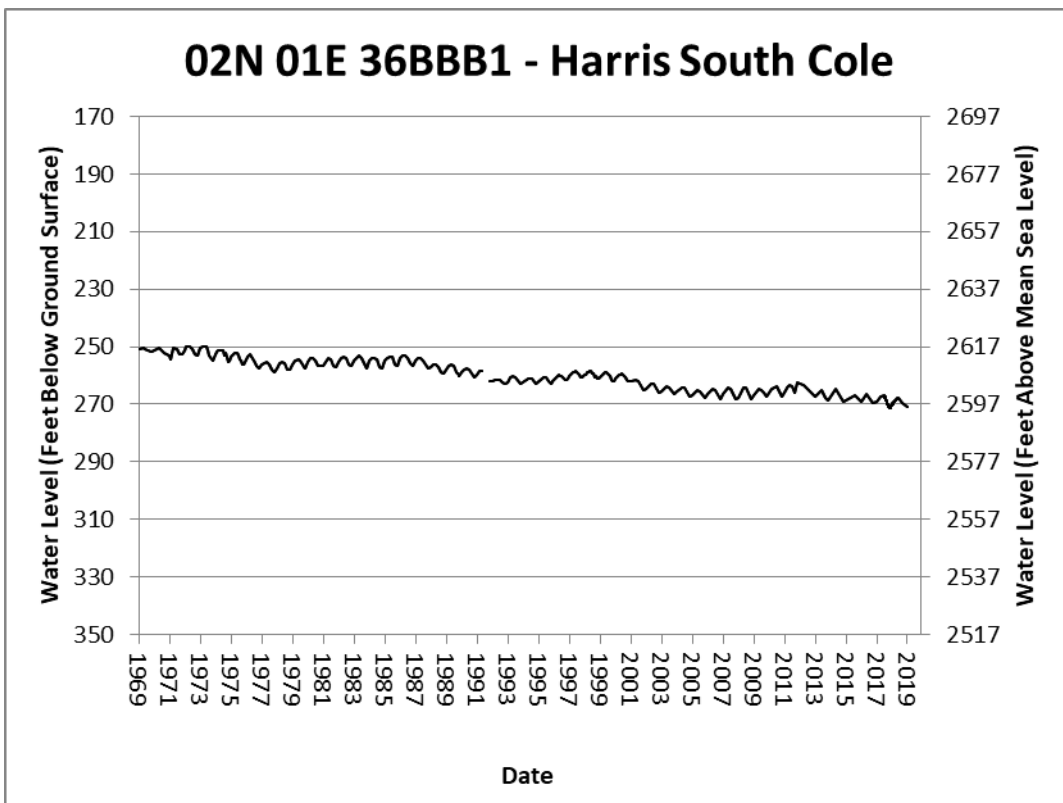
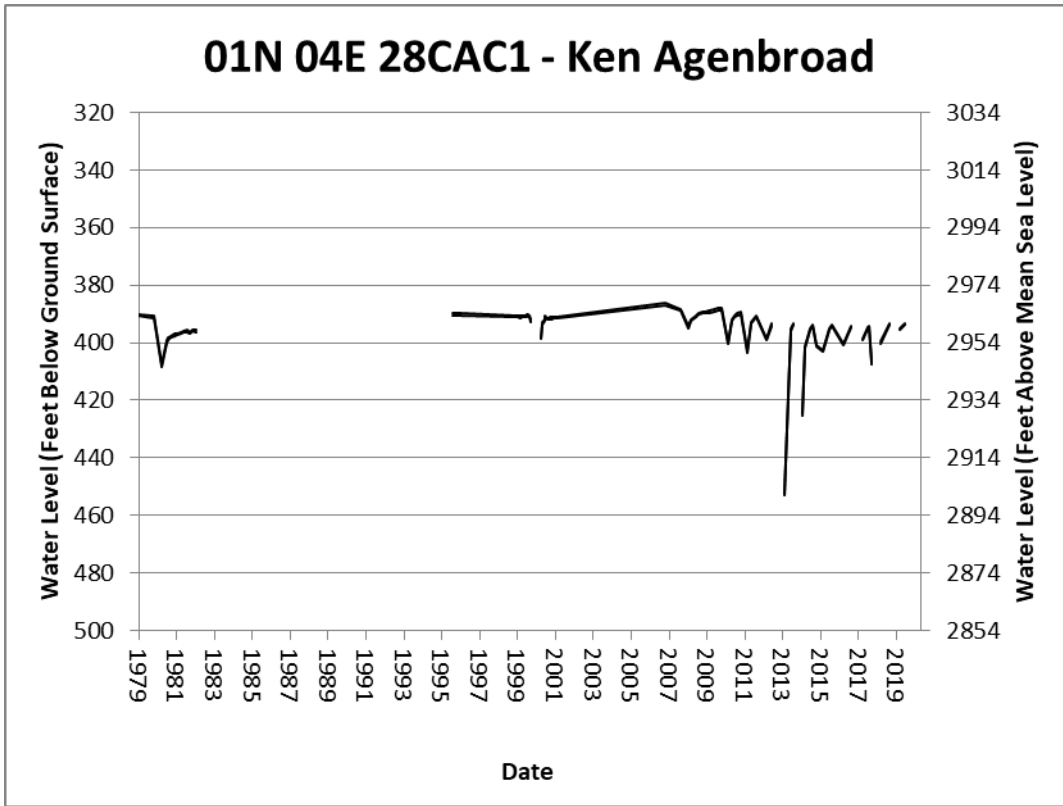


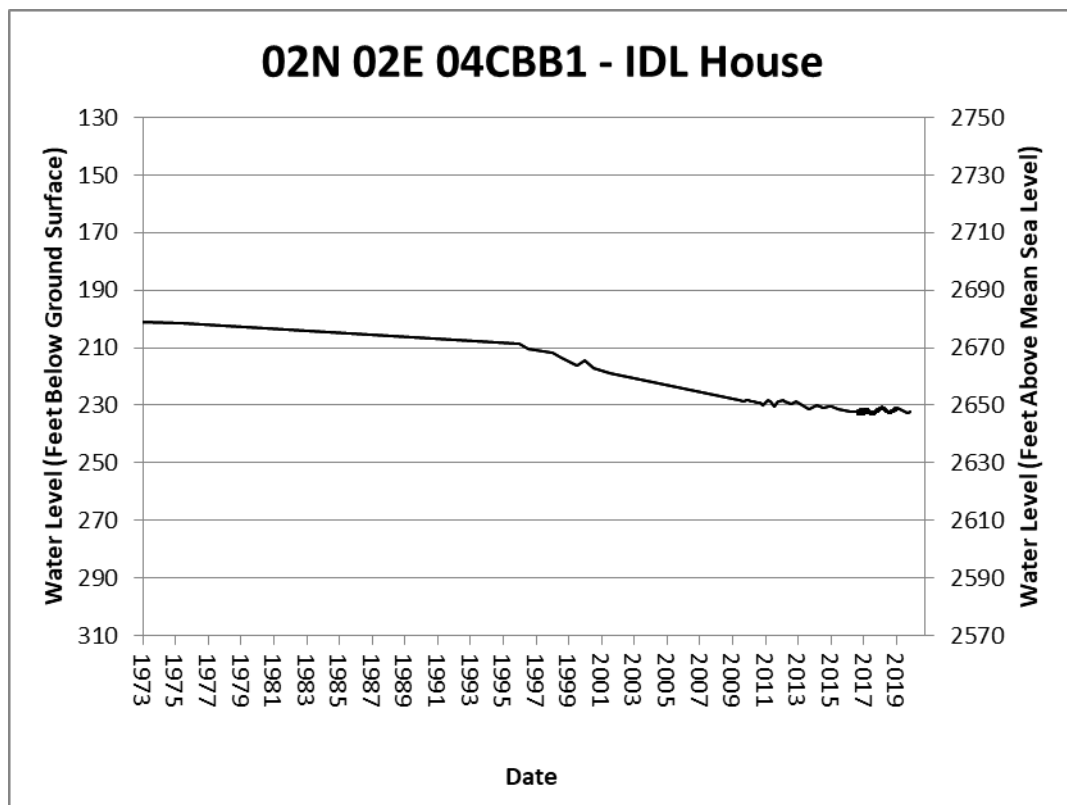
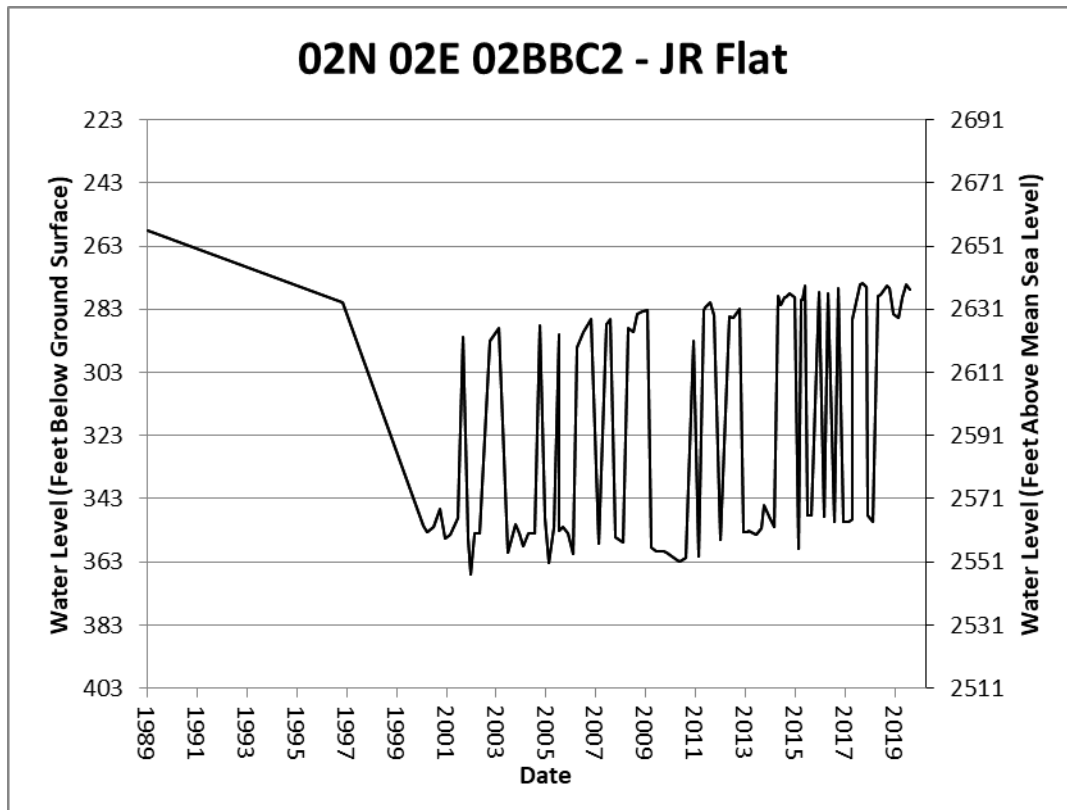
Figure B2. Construction and lithology information for the Boise Airport Well.

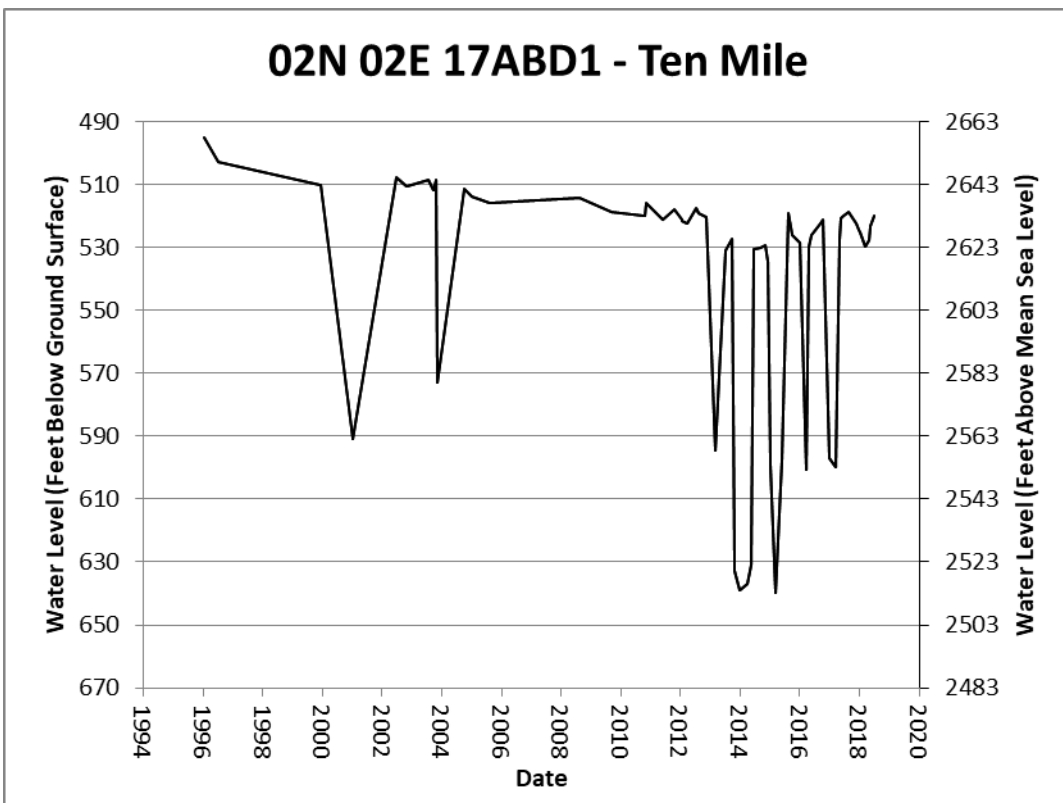
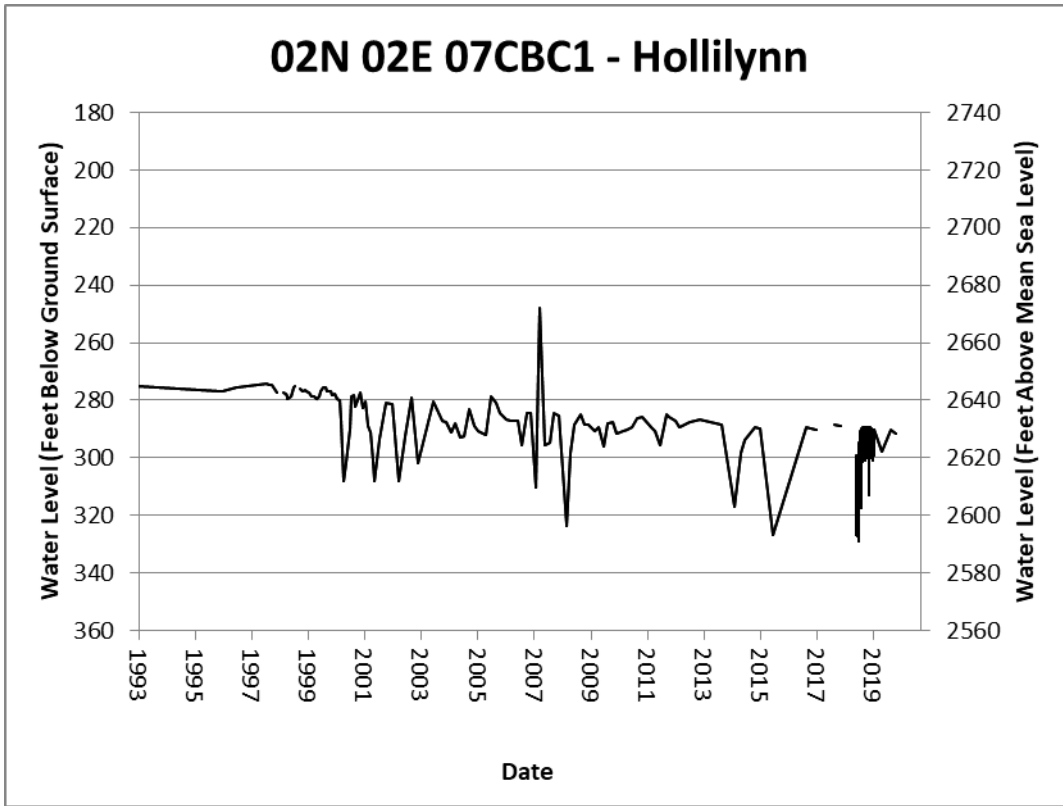
Appendix C

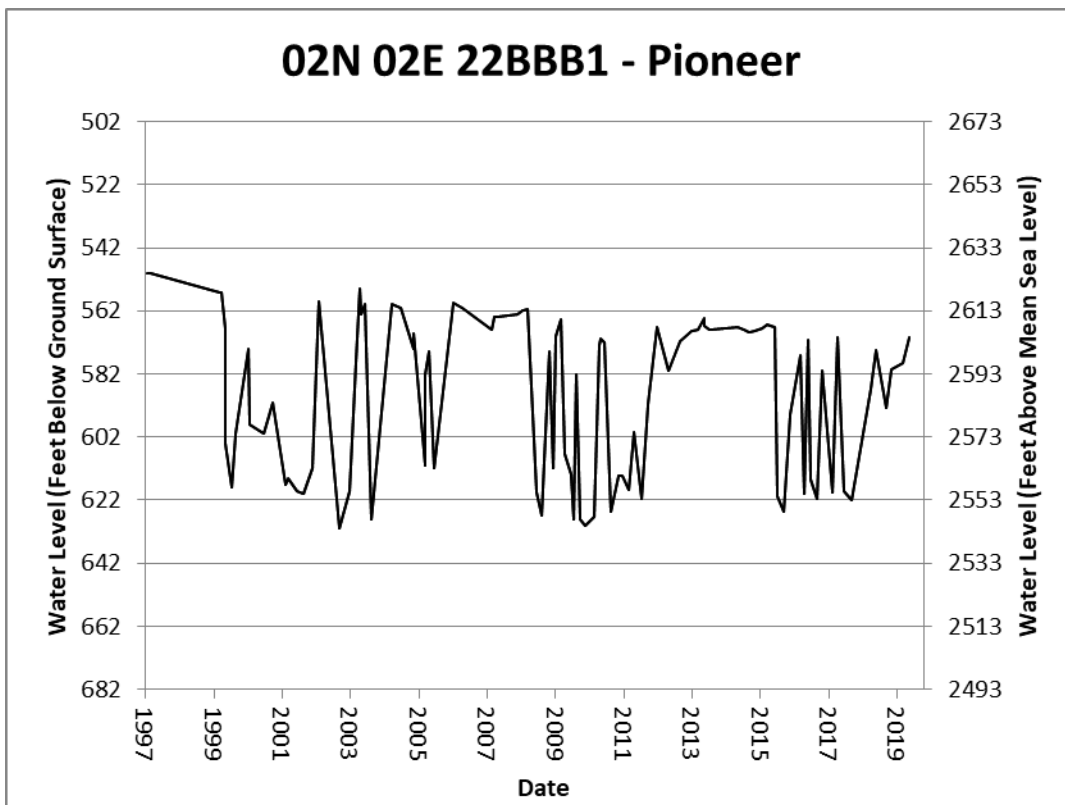
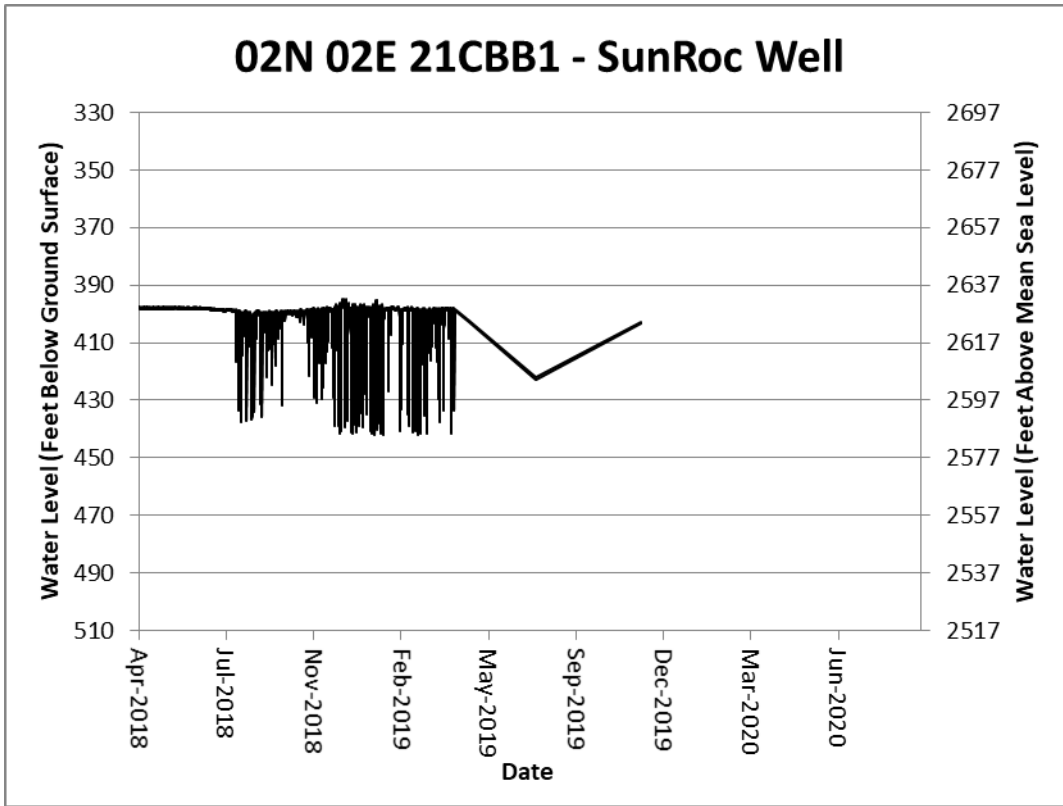
Hydrographs for Active Monitoring Wells

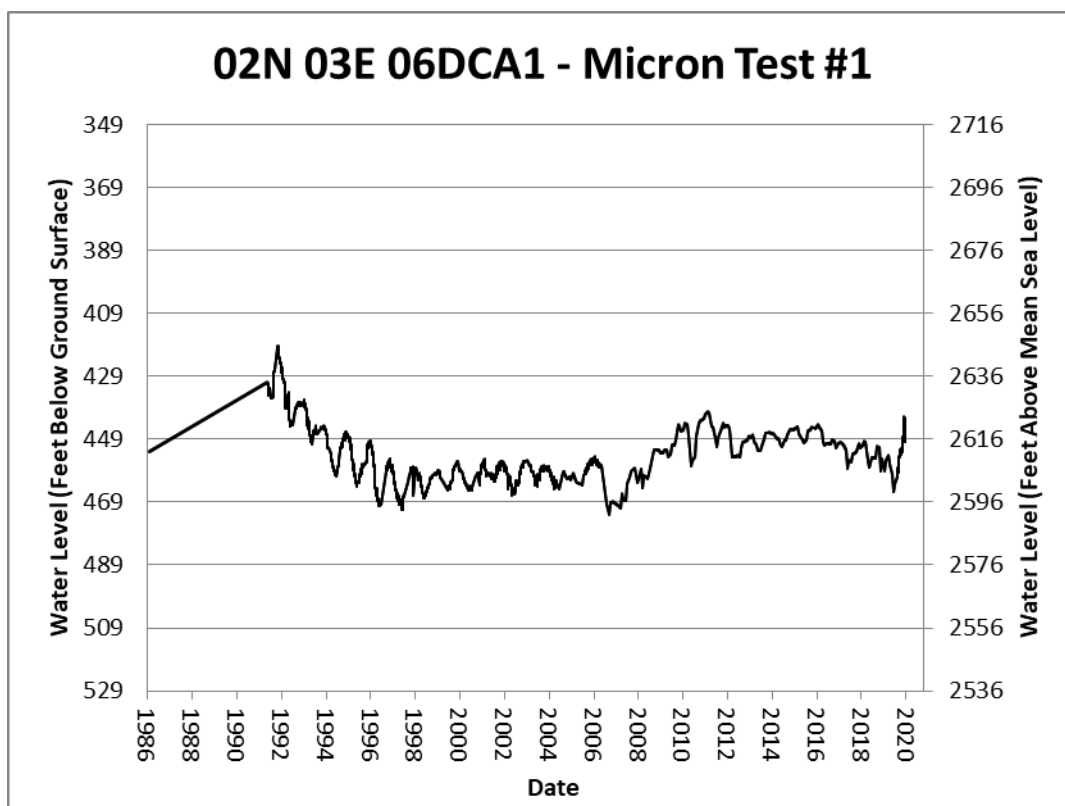
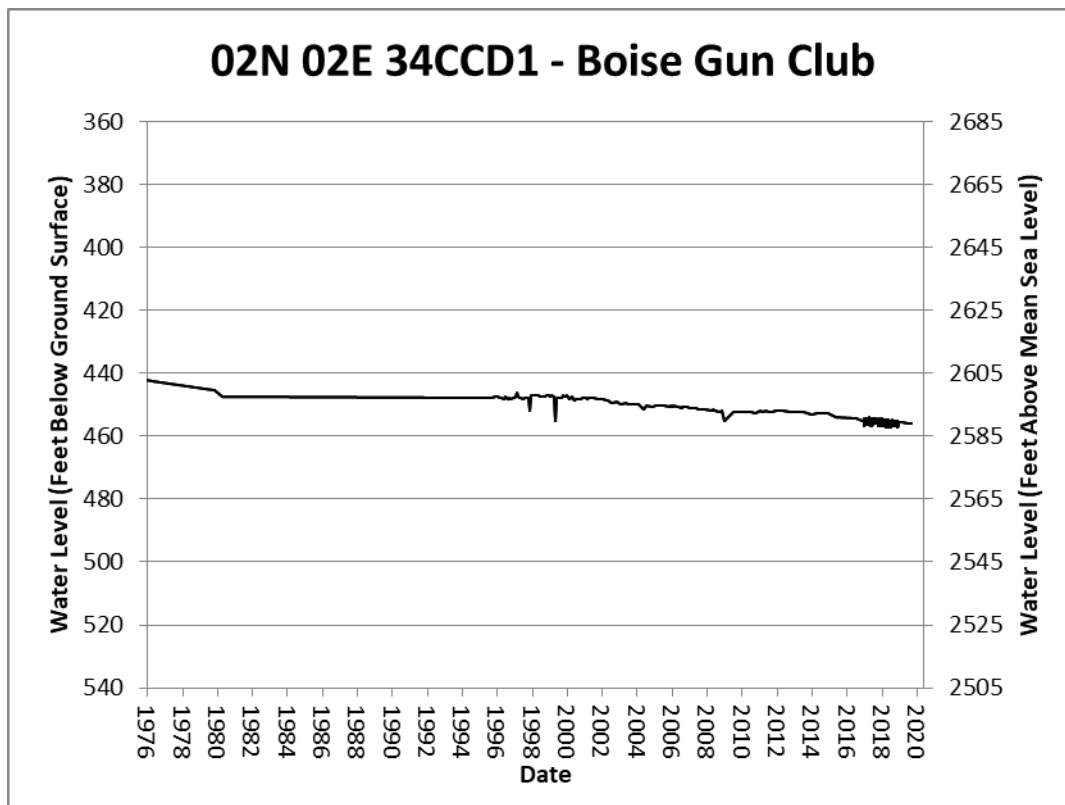


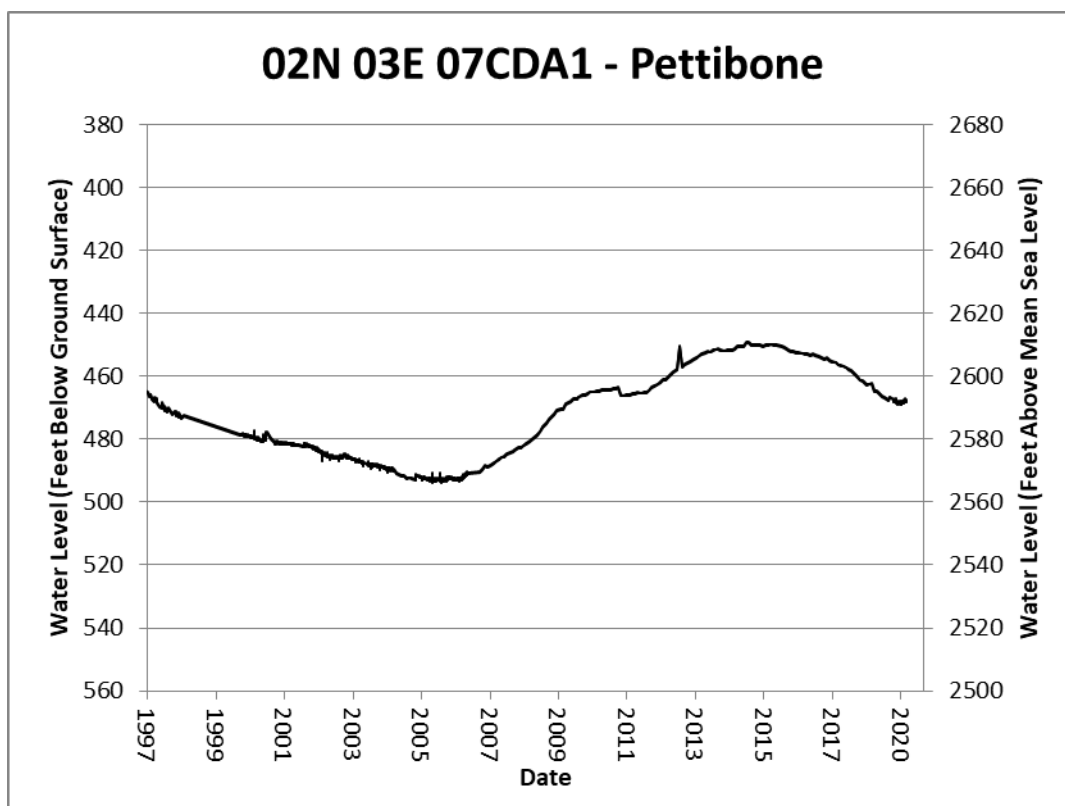
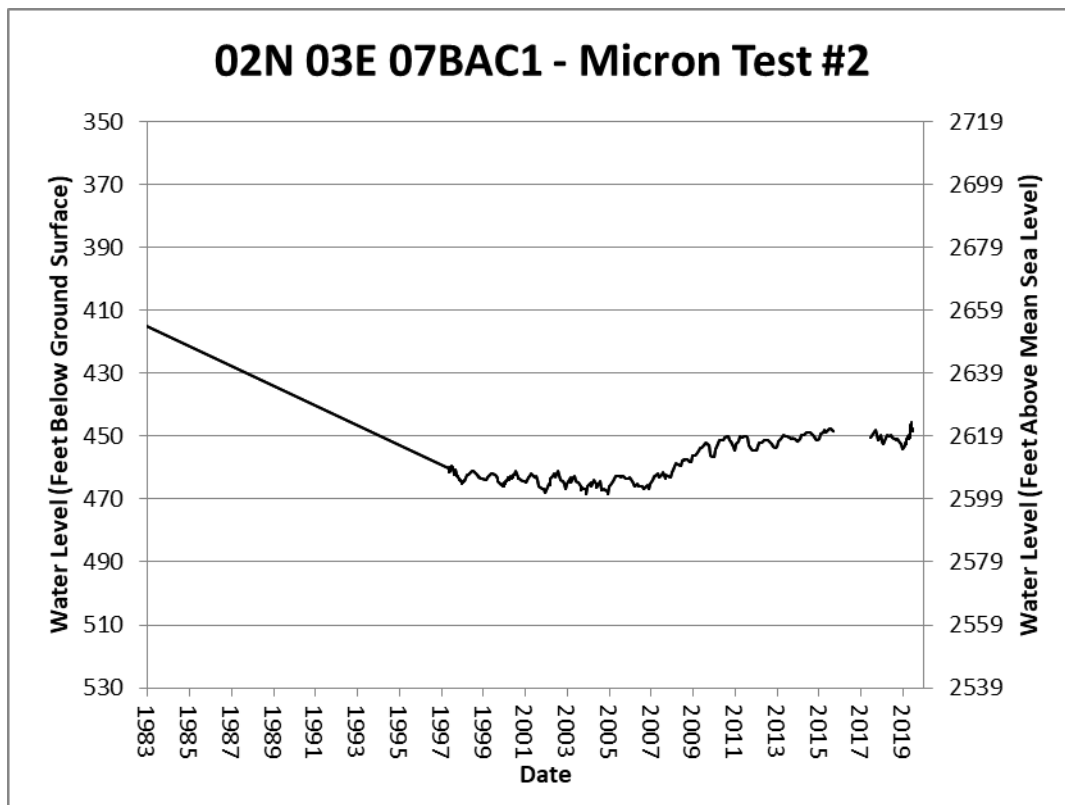


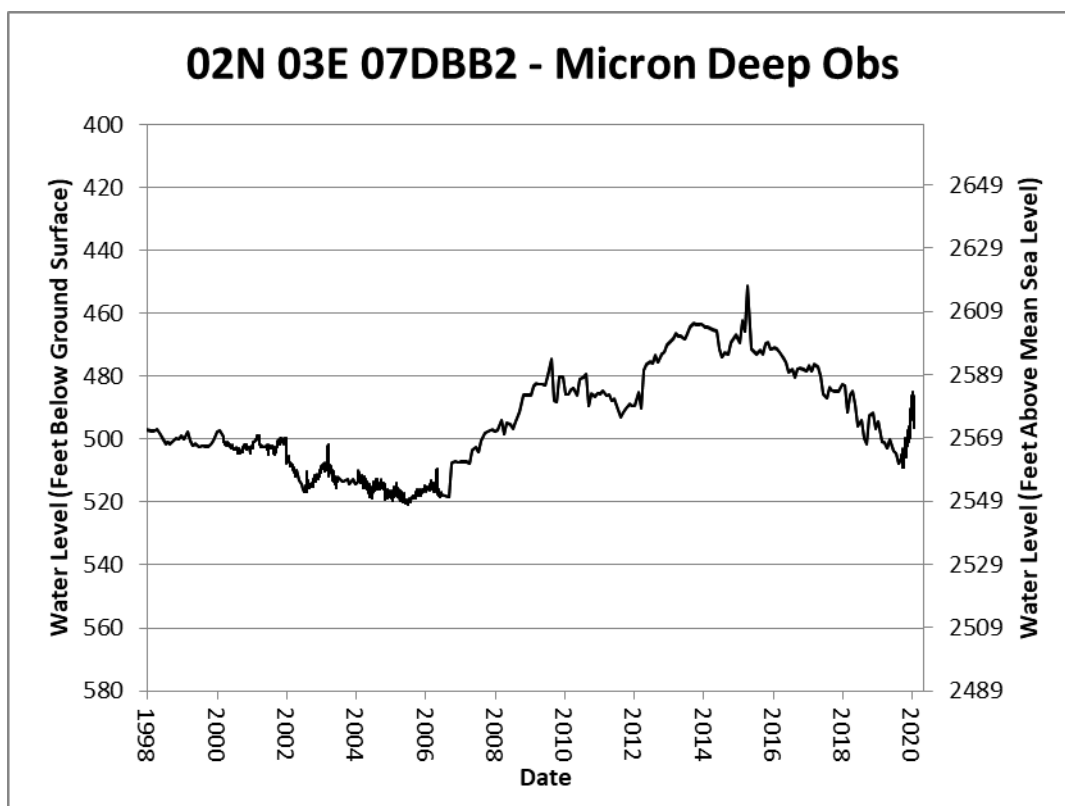
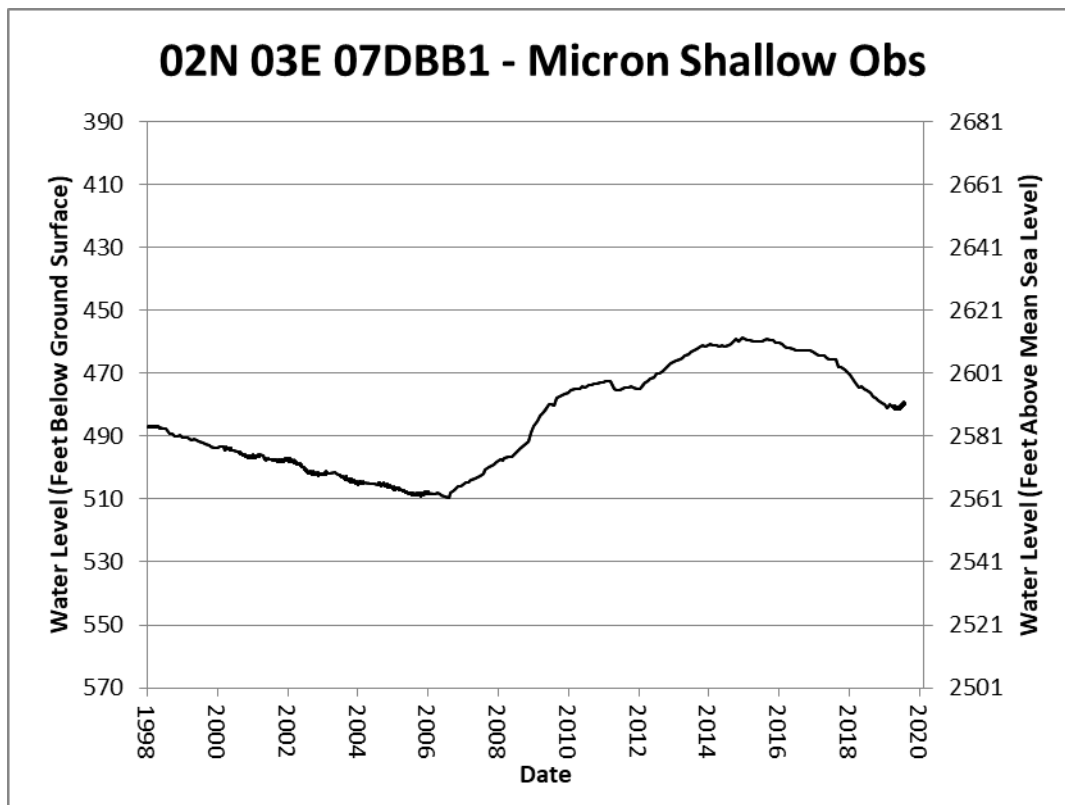


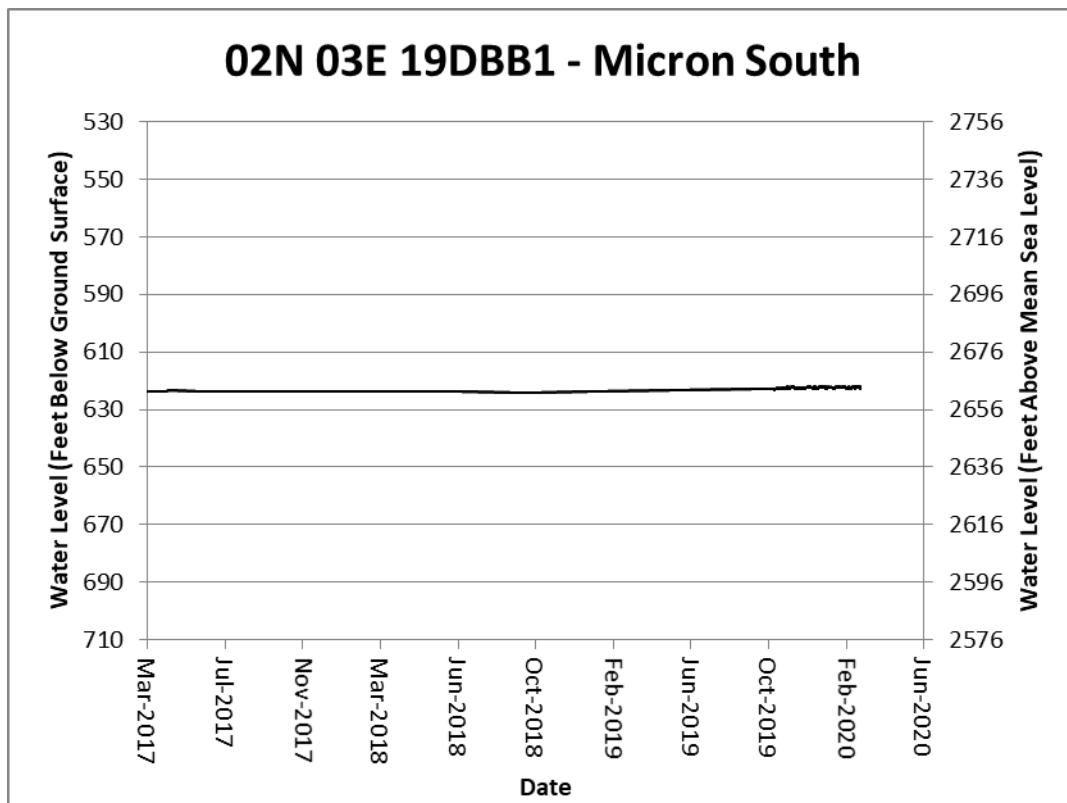
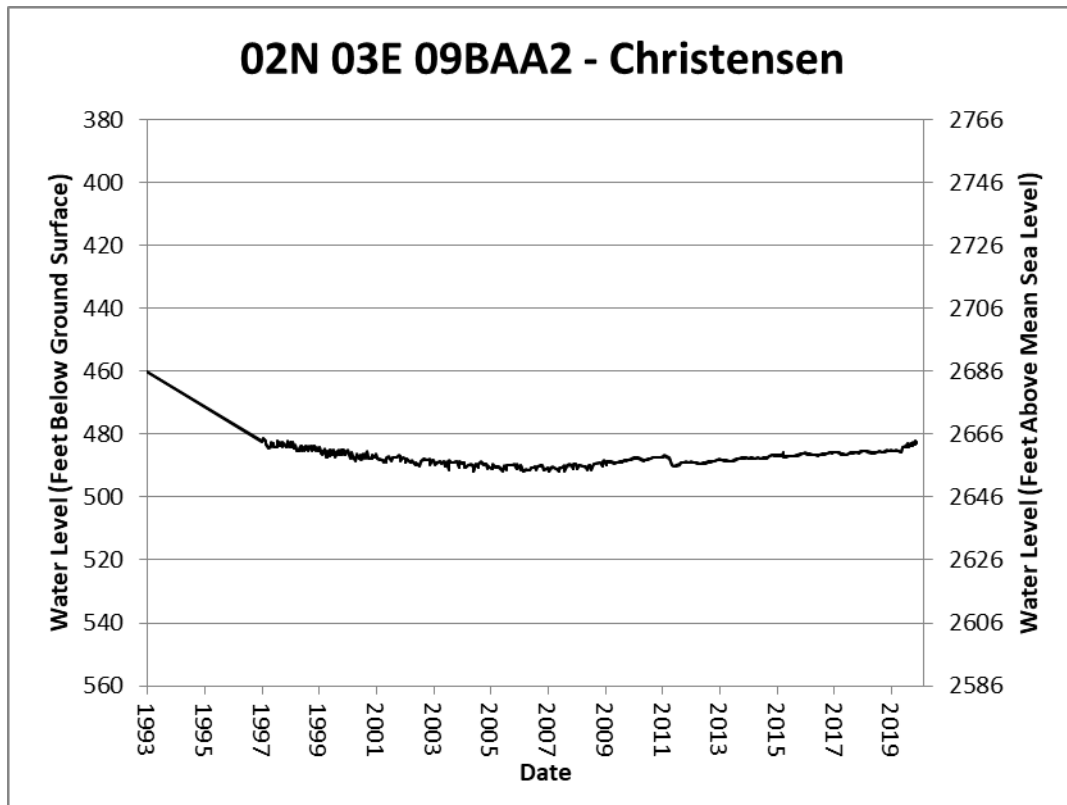




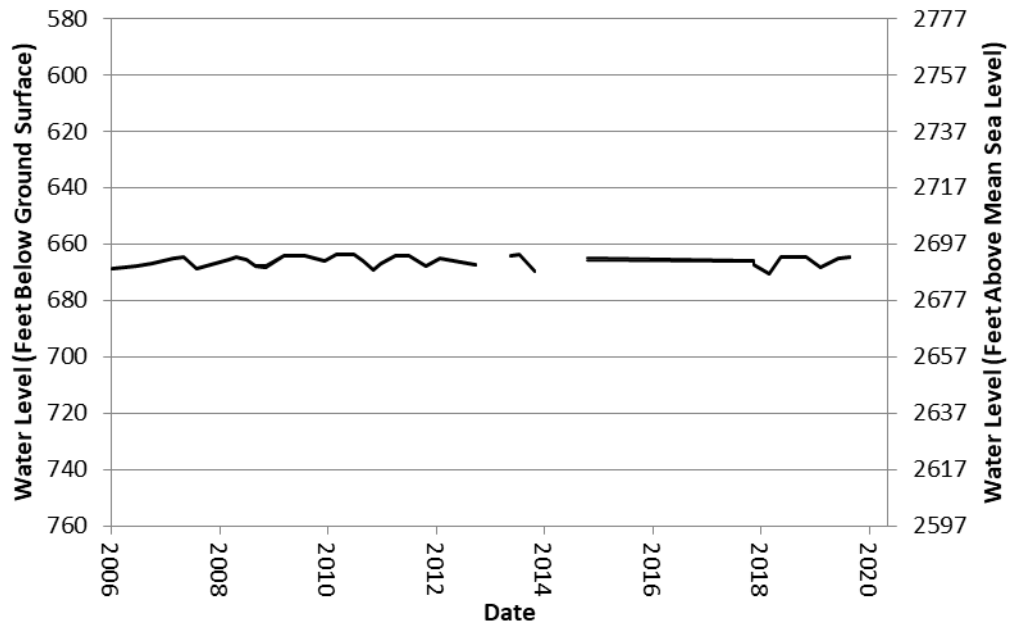




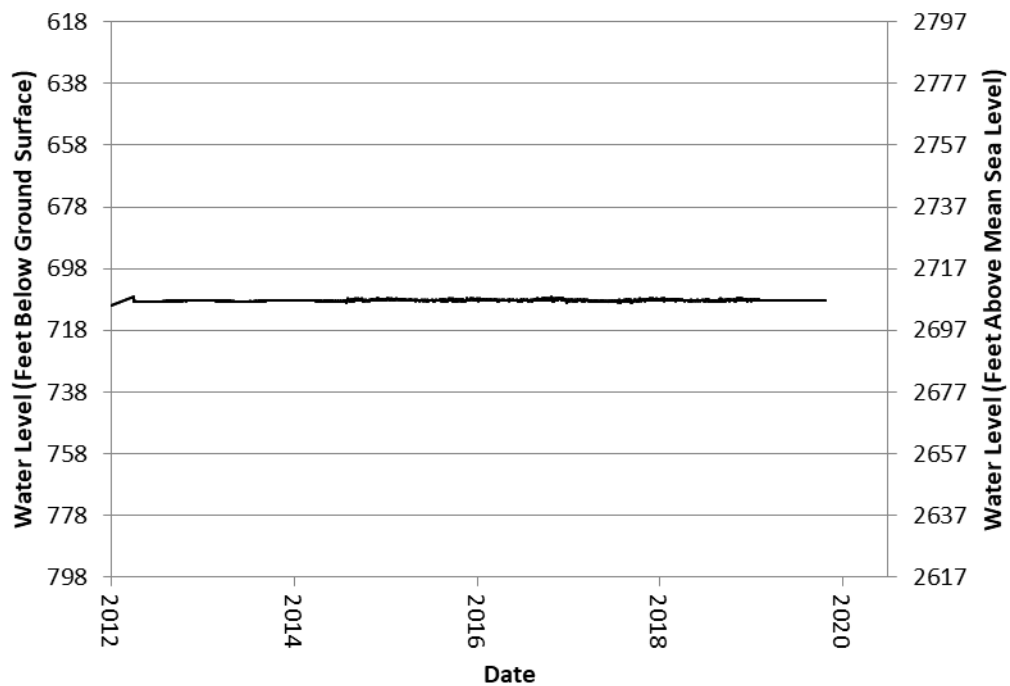


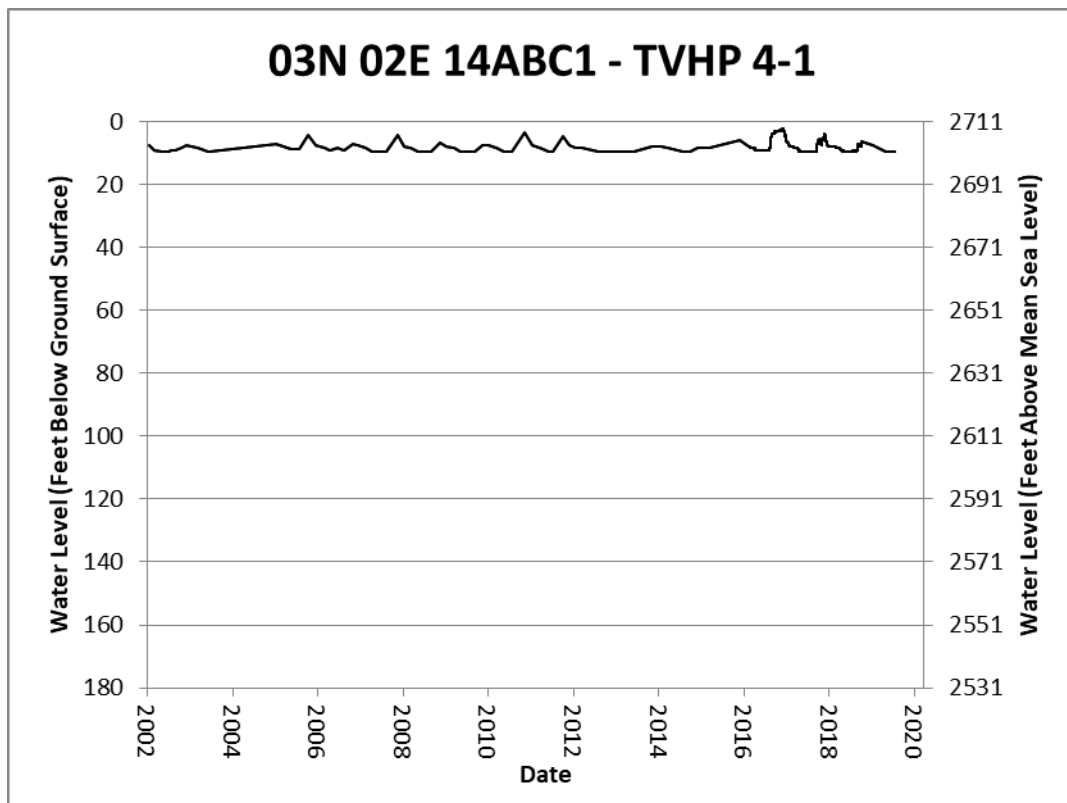
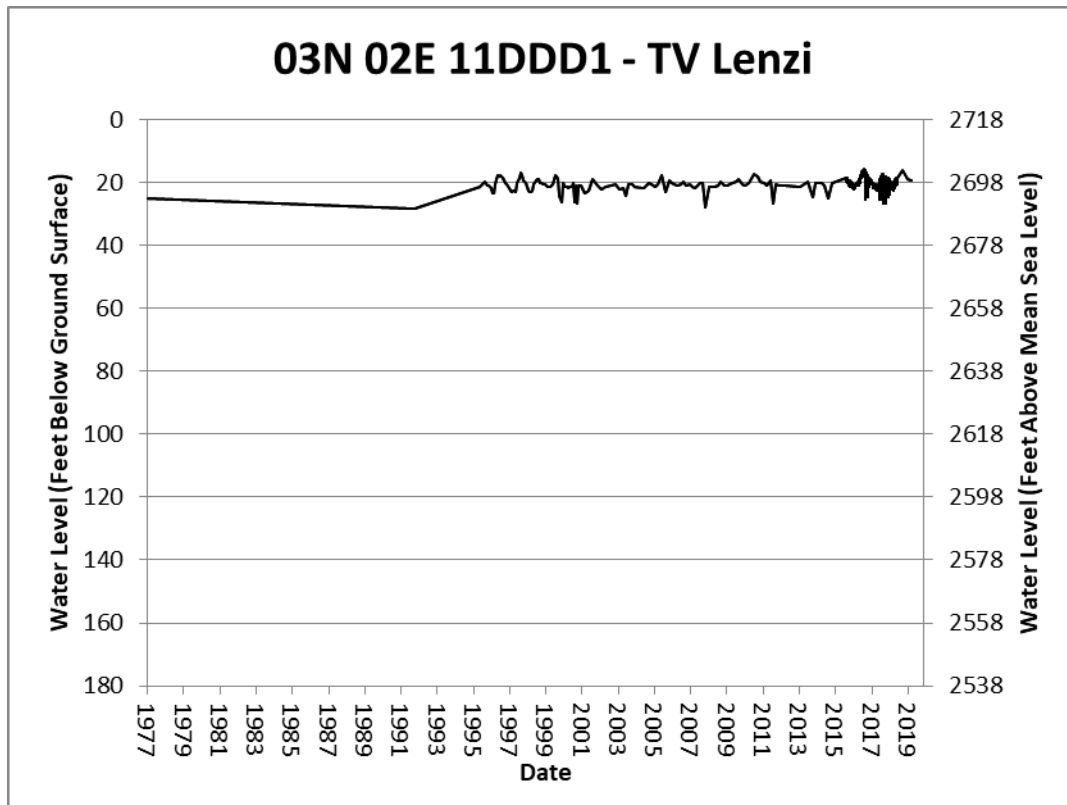


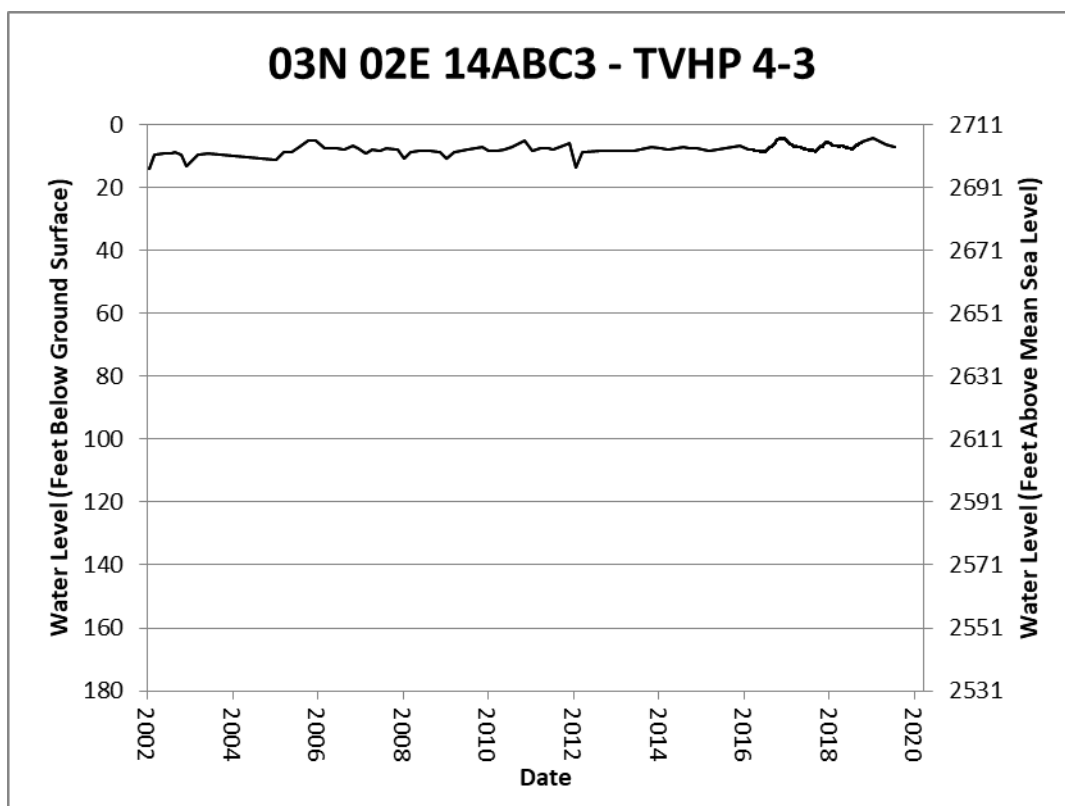
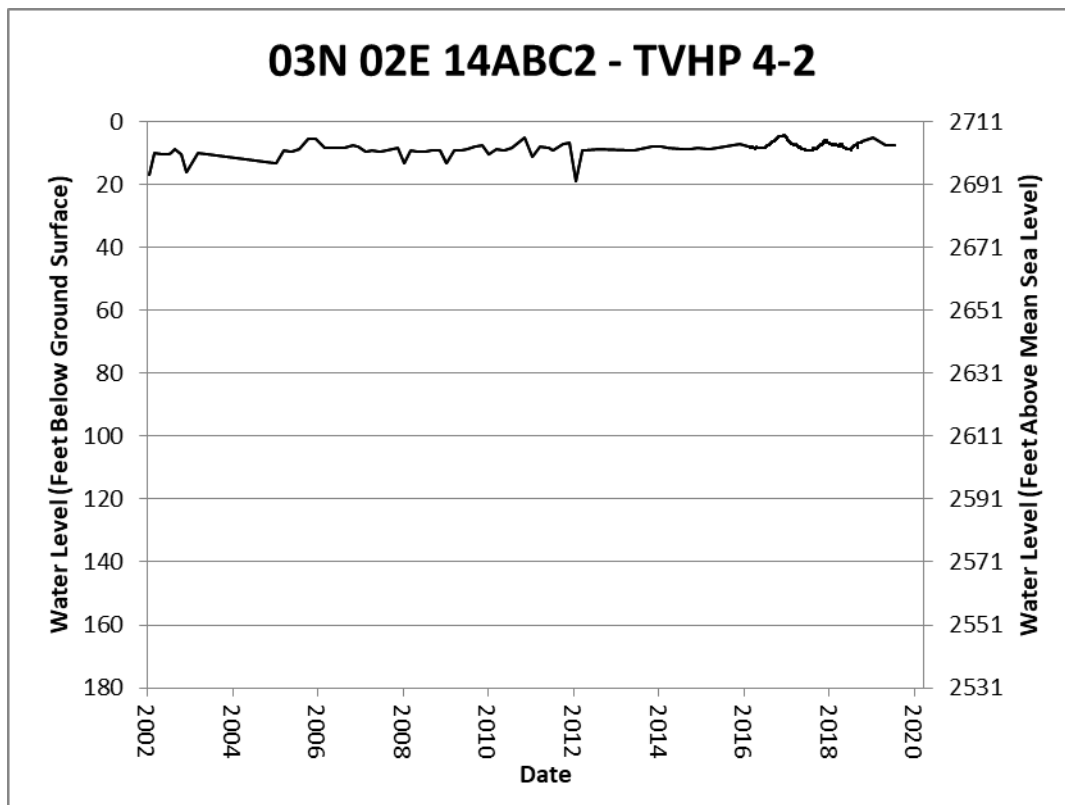
02N 03E 28CAA1 - Blacks Creek Rest Area Westbound

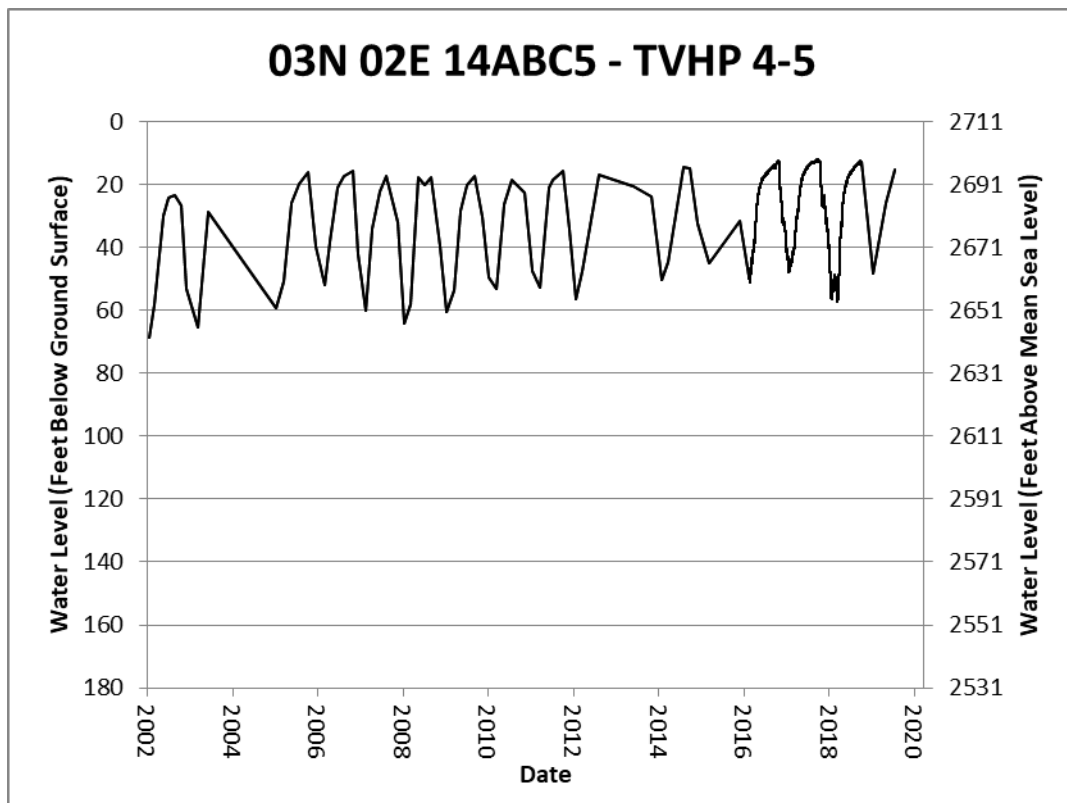
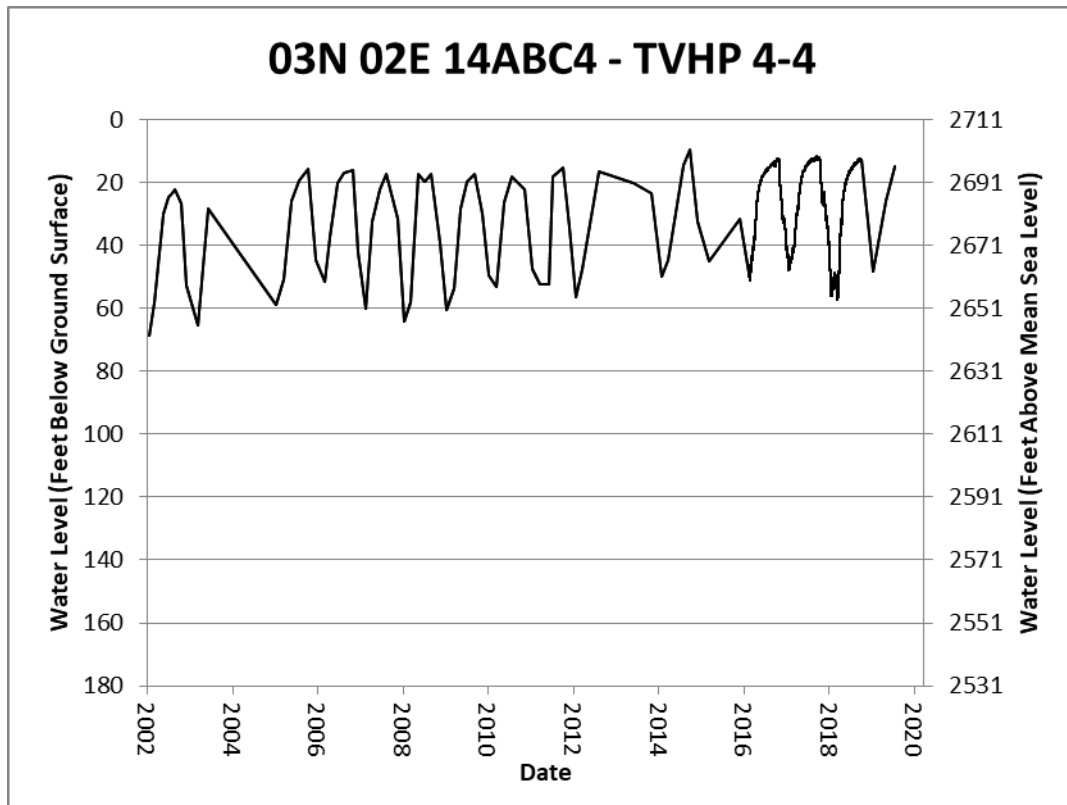


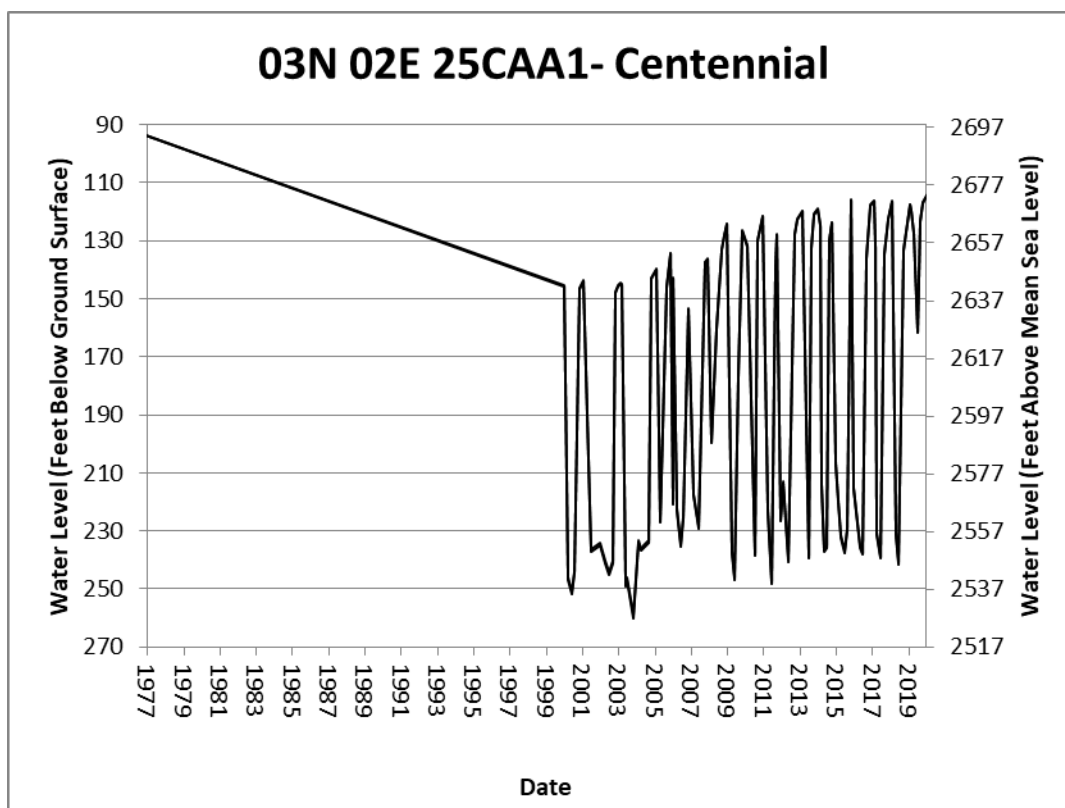
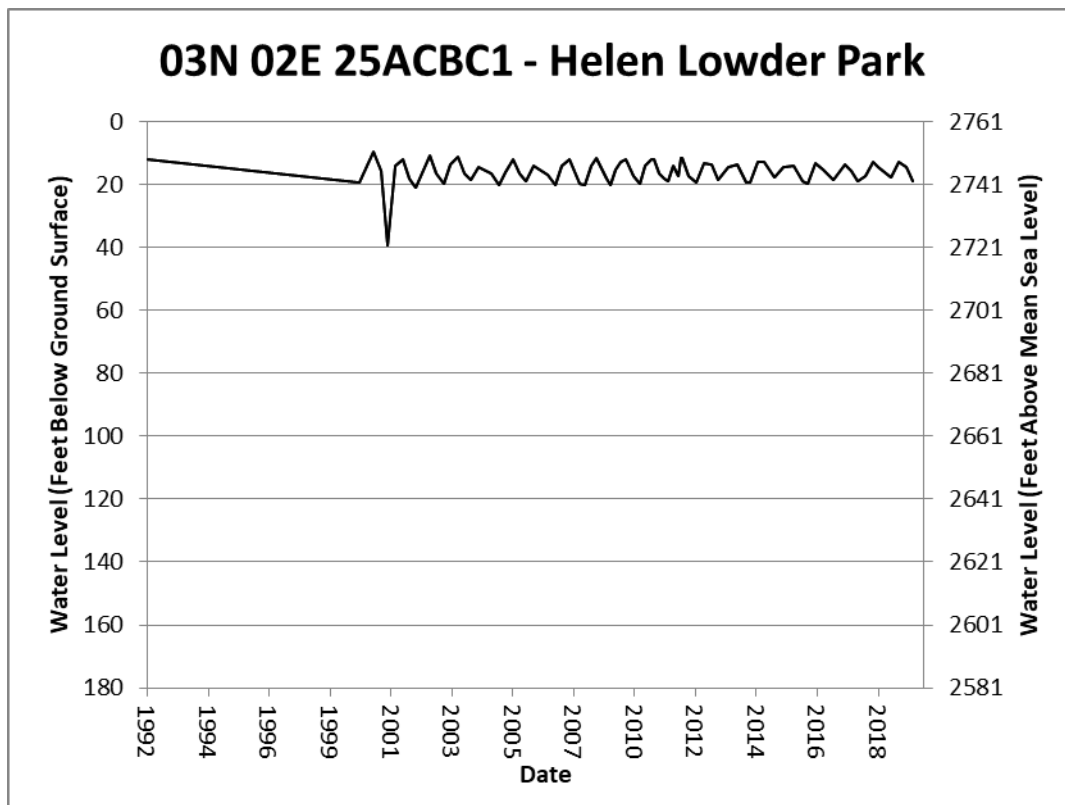
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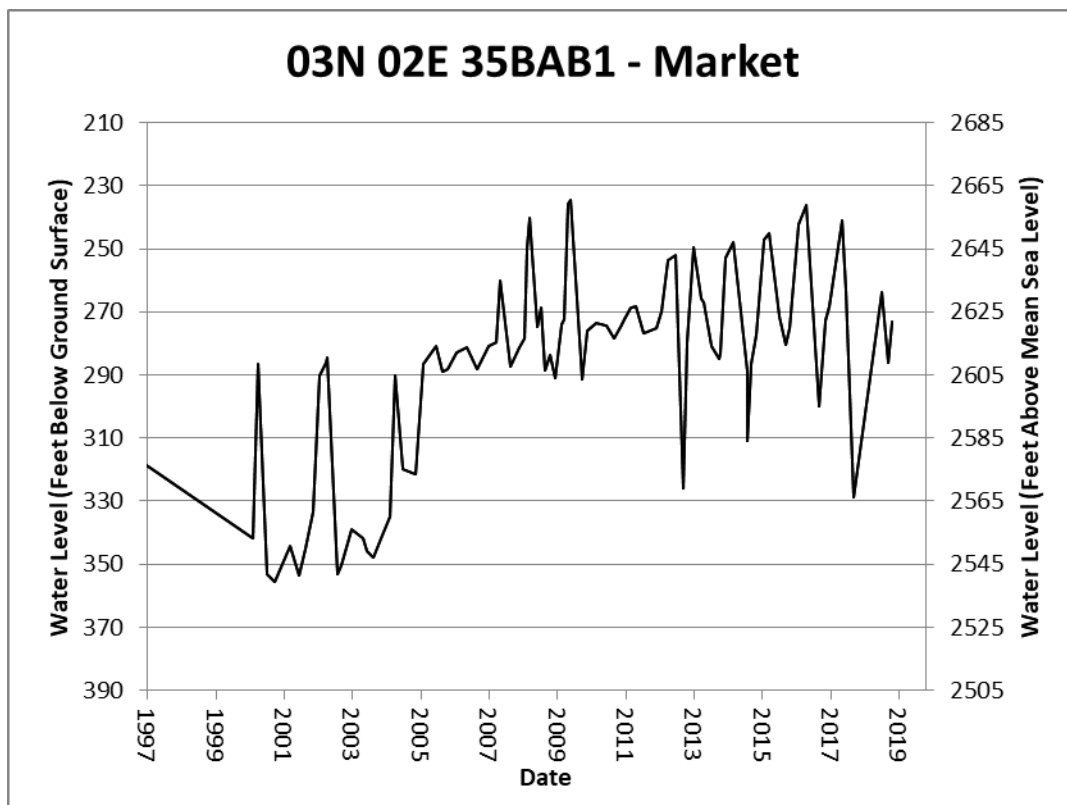
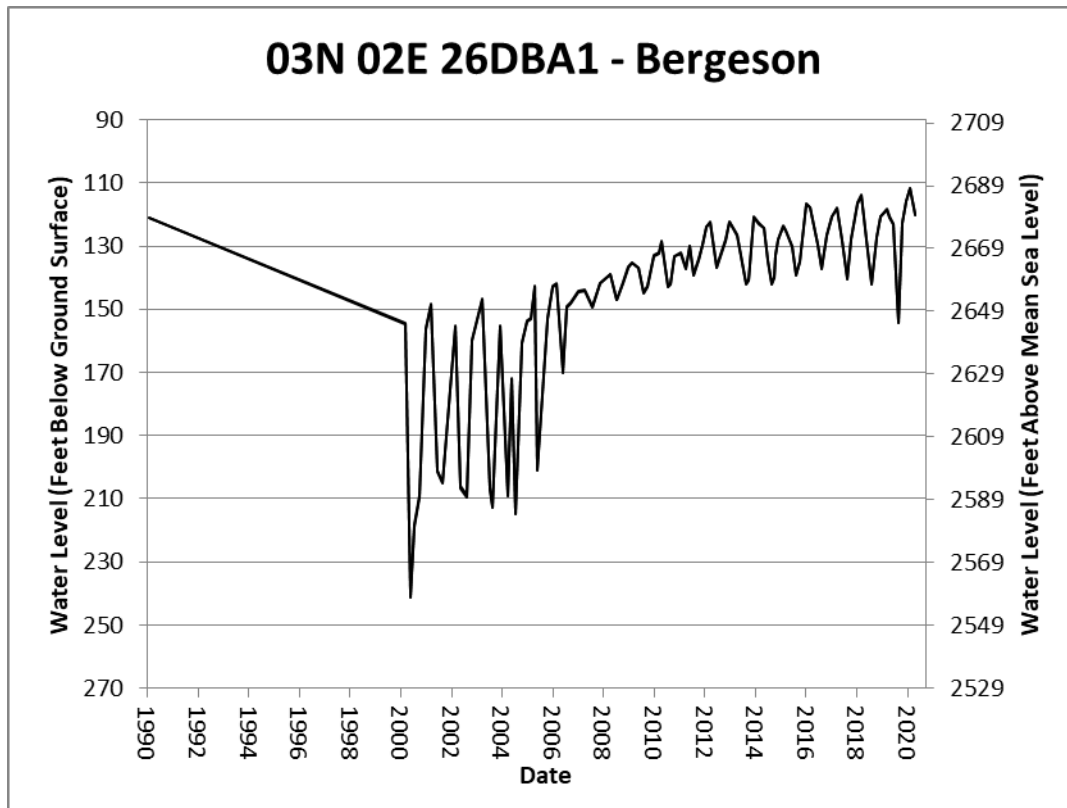


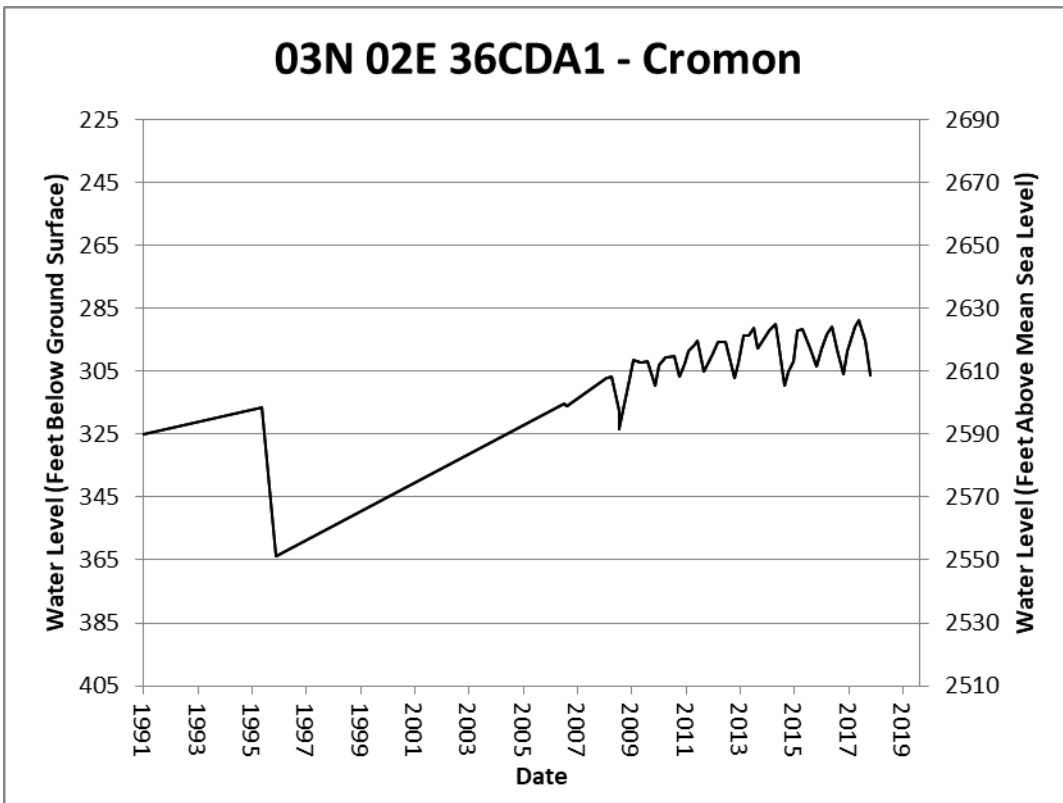
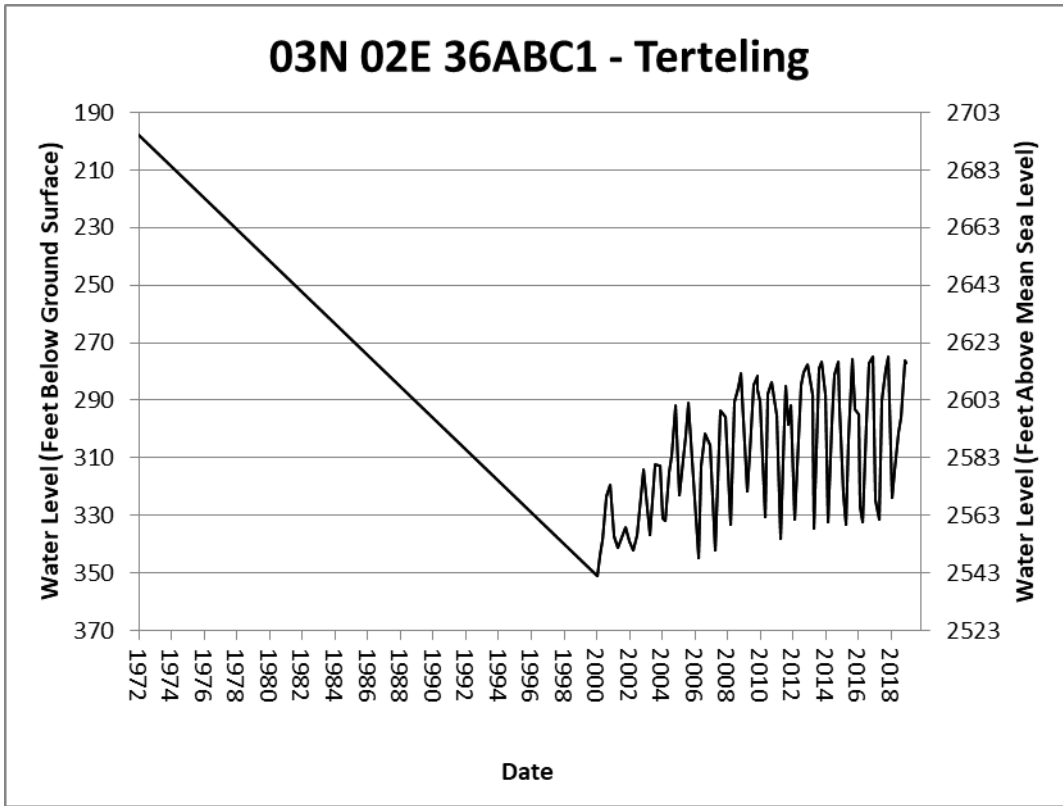


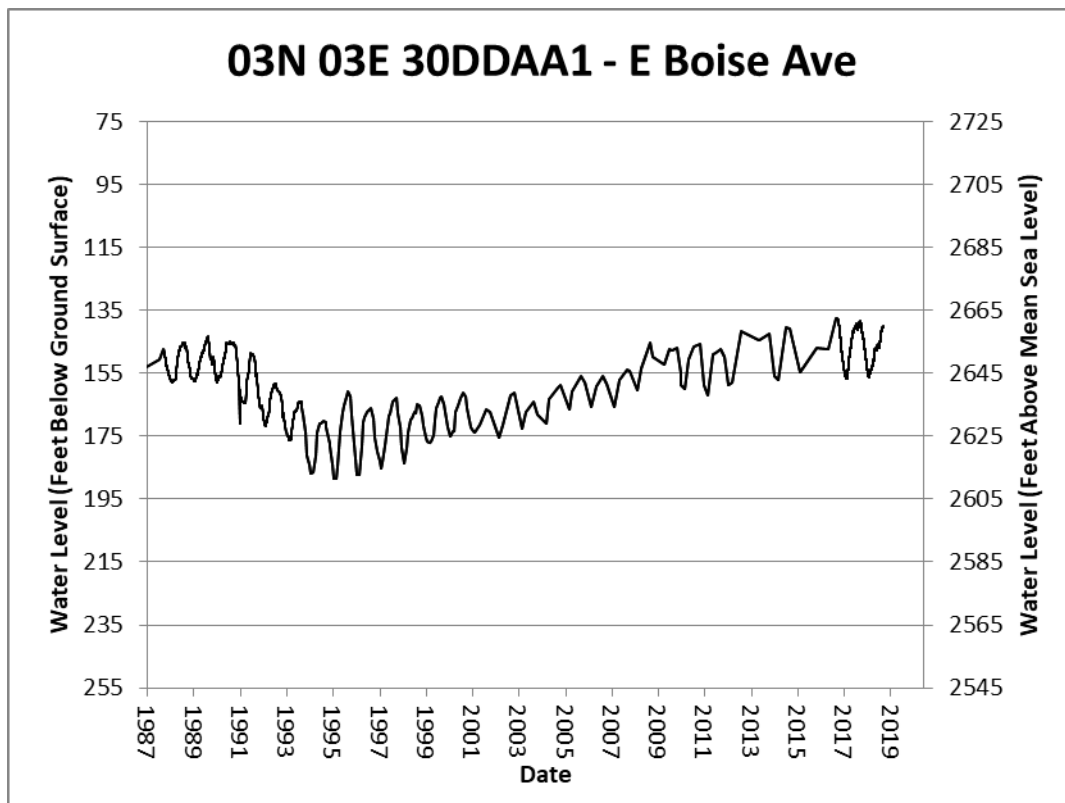
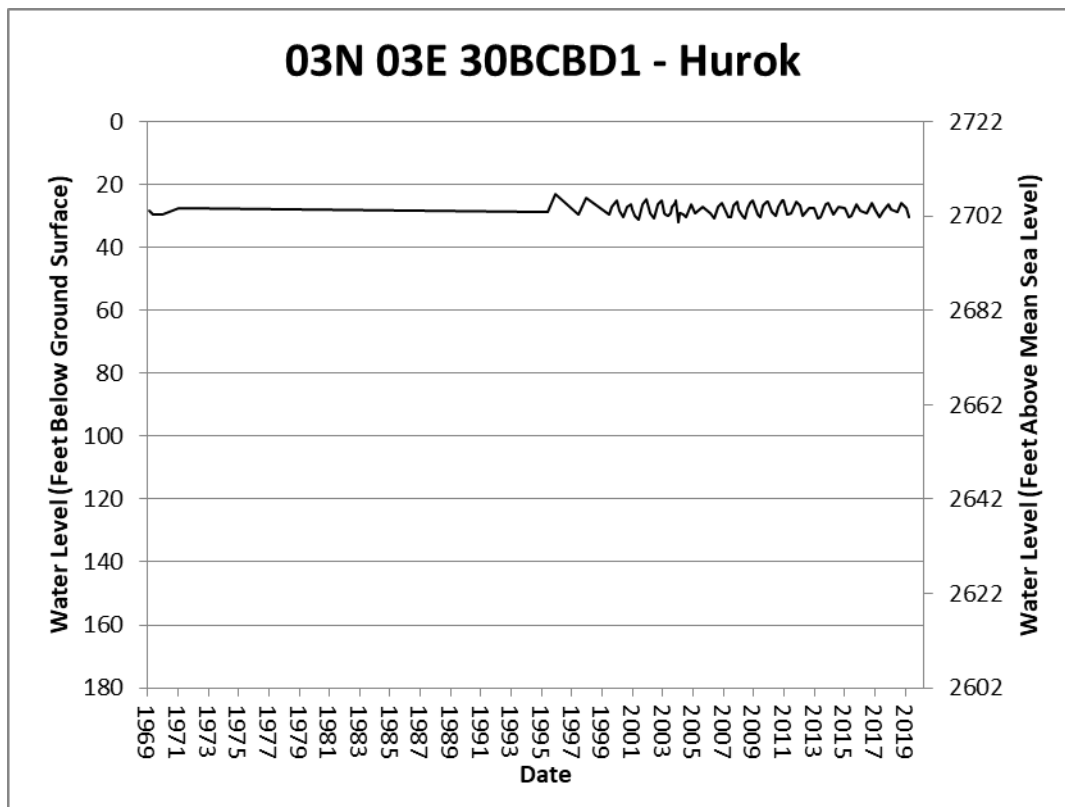


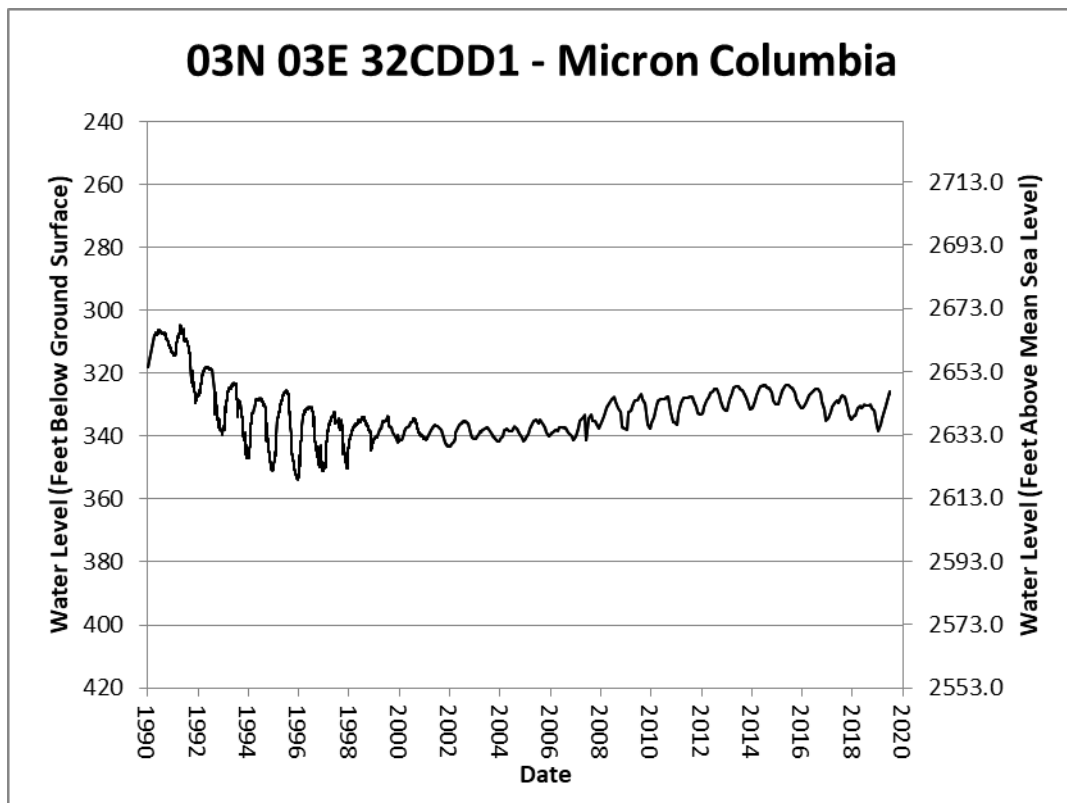
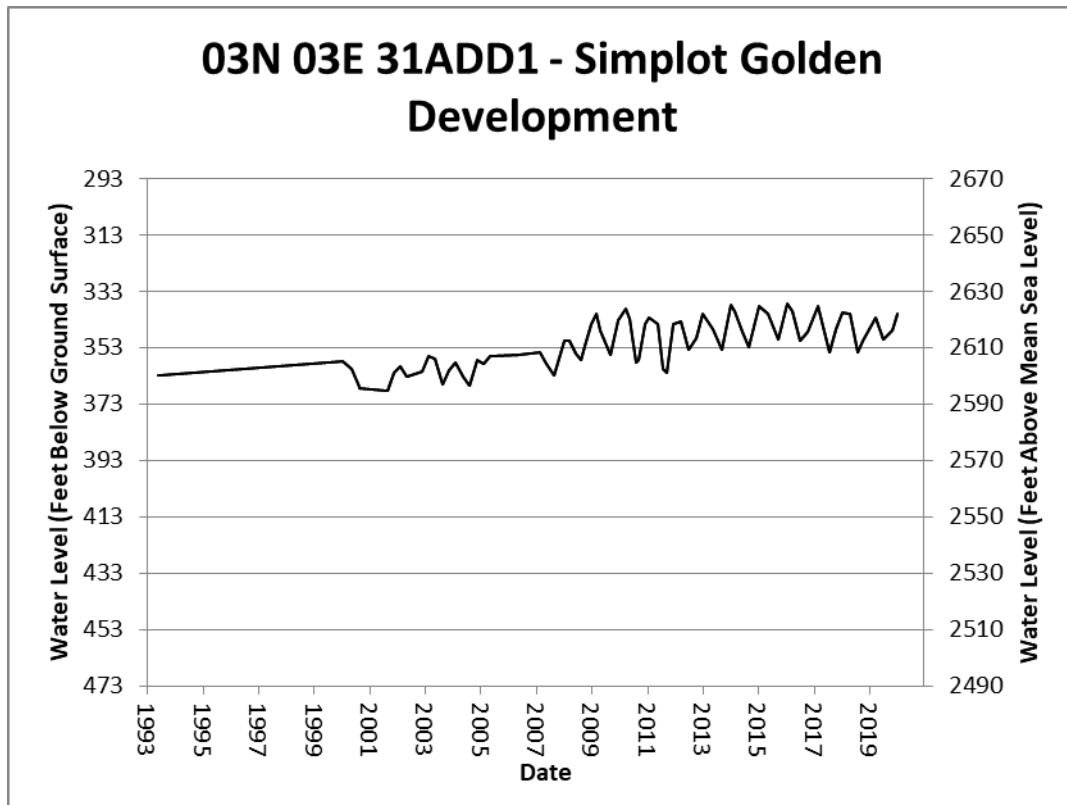


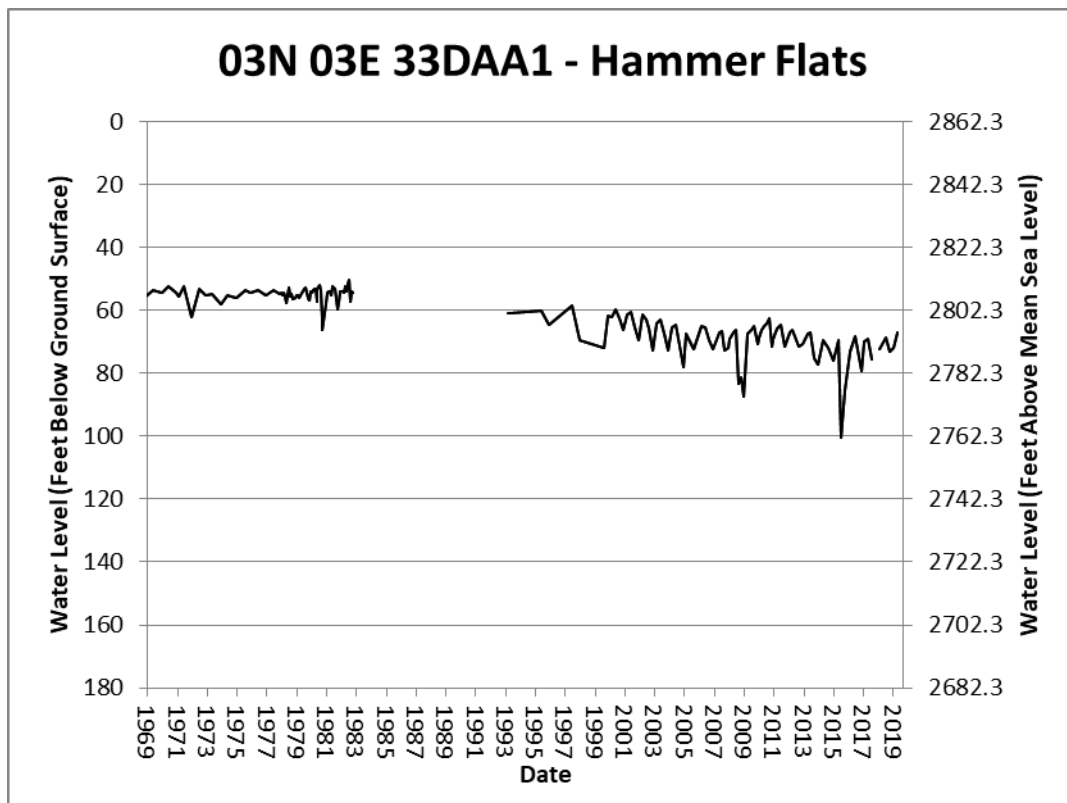
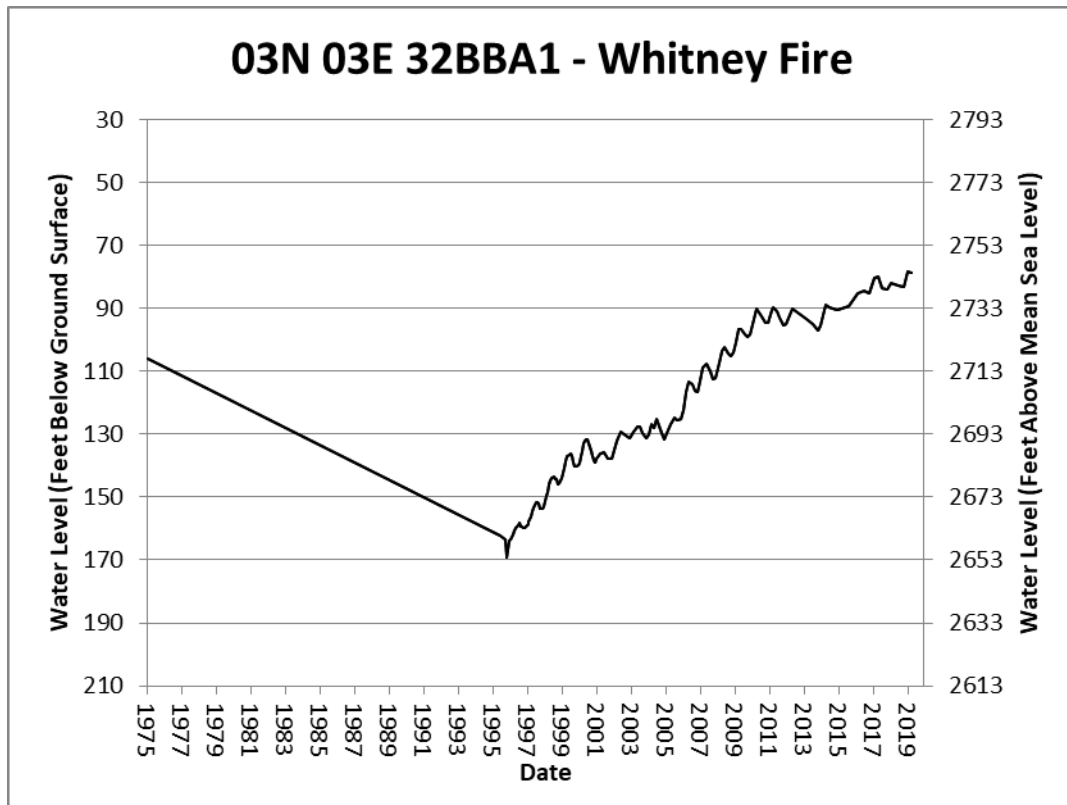






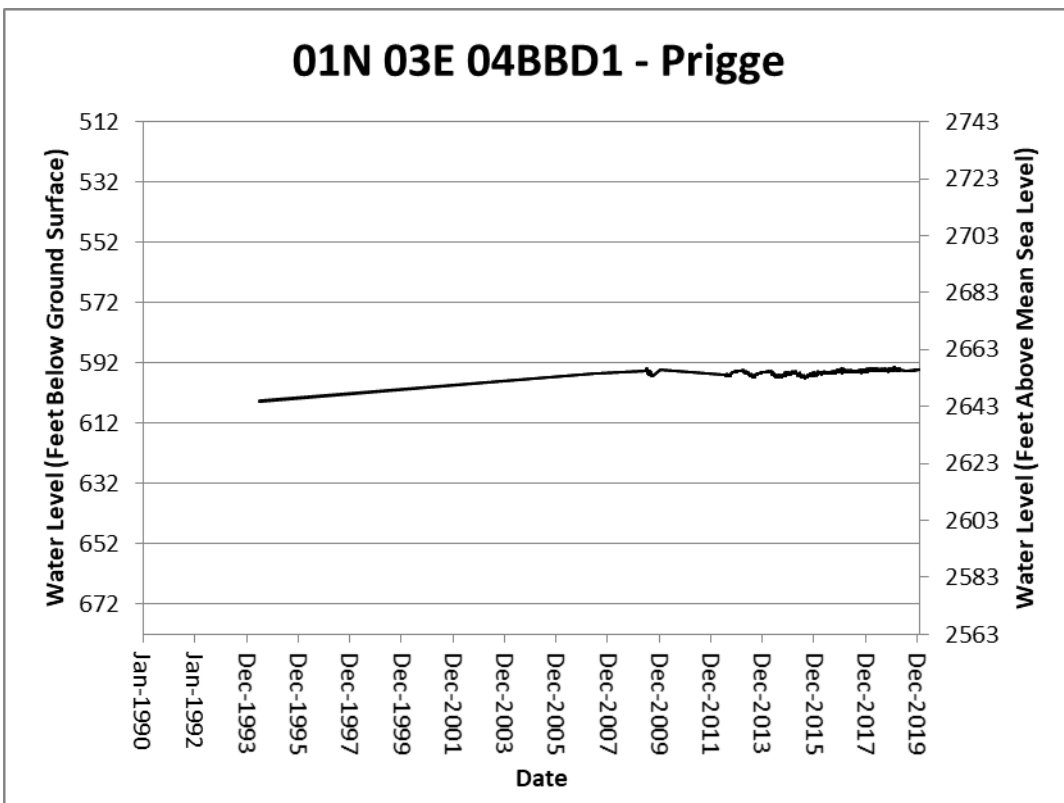
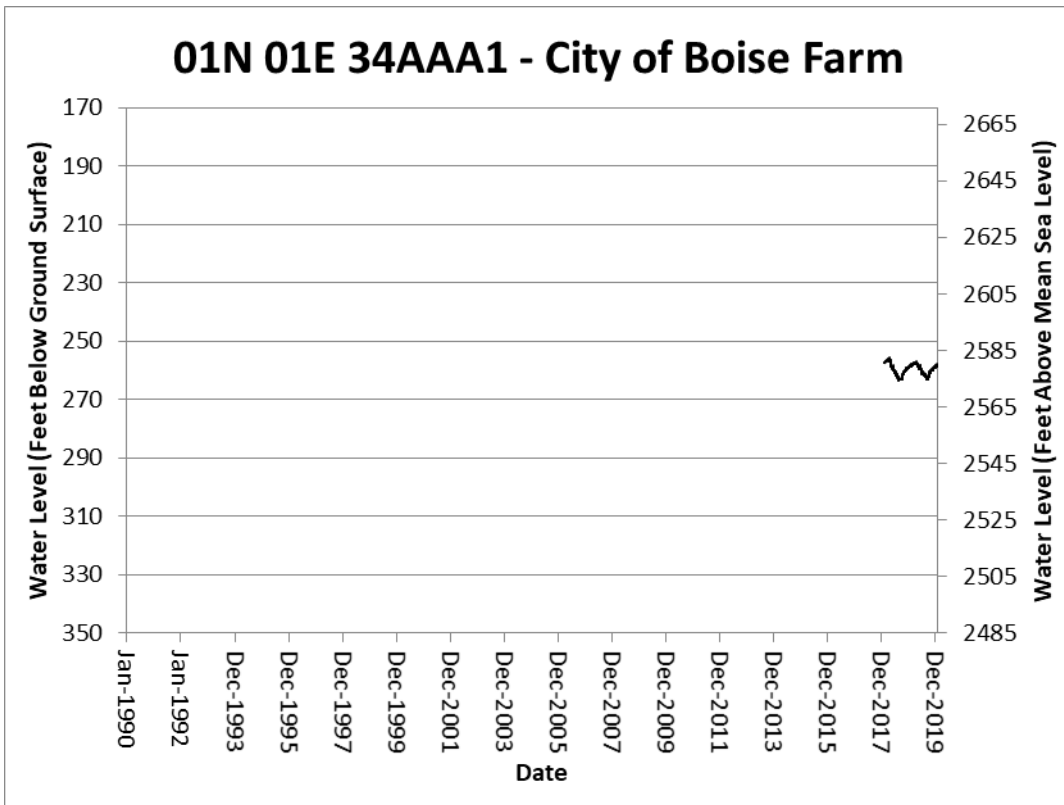


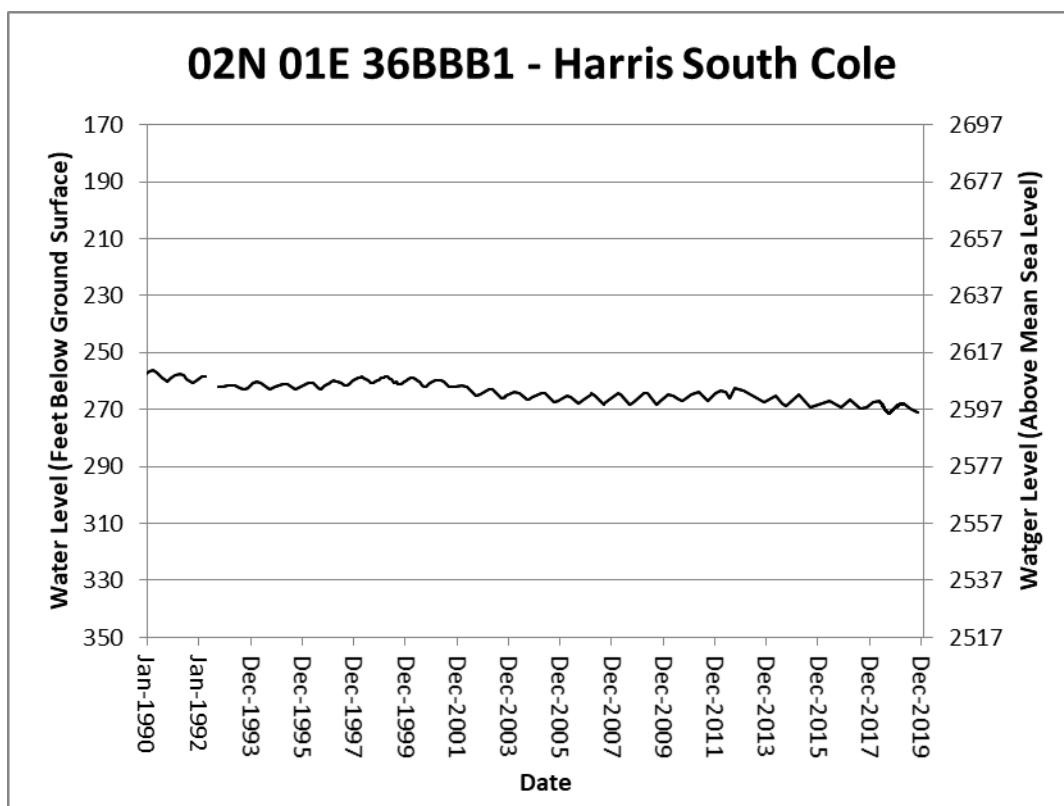
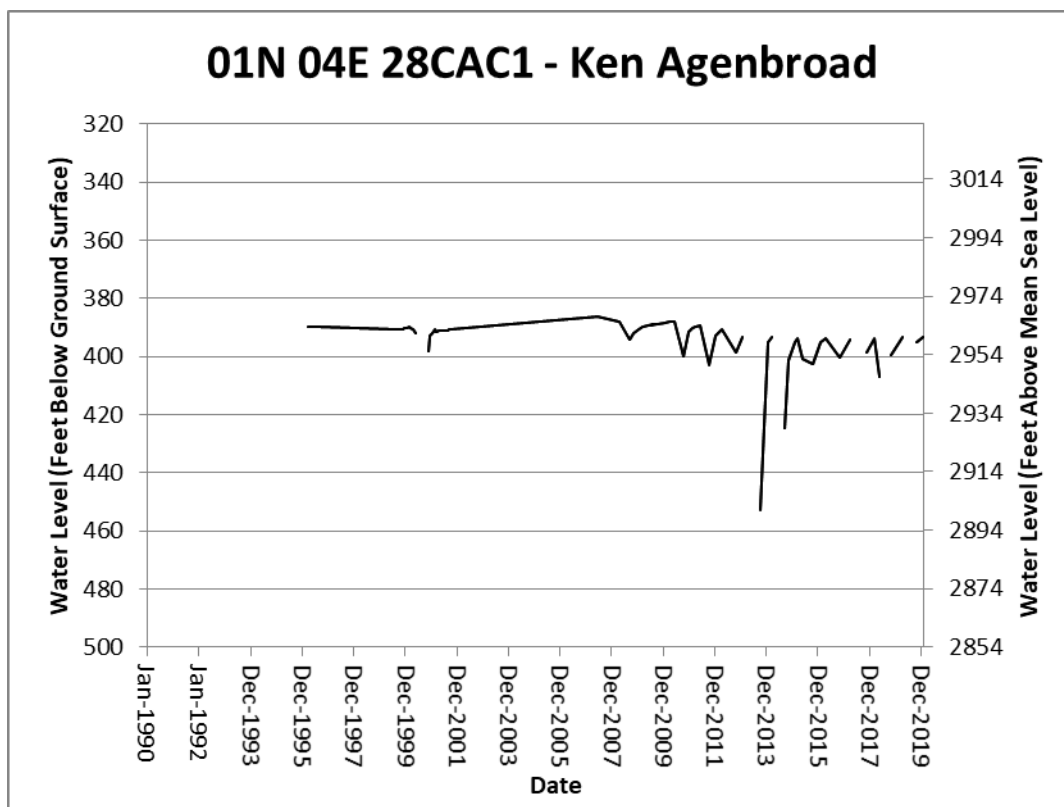


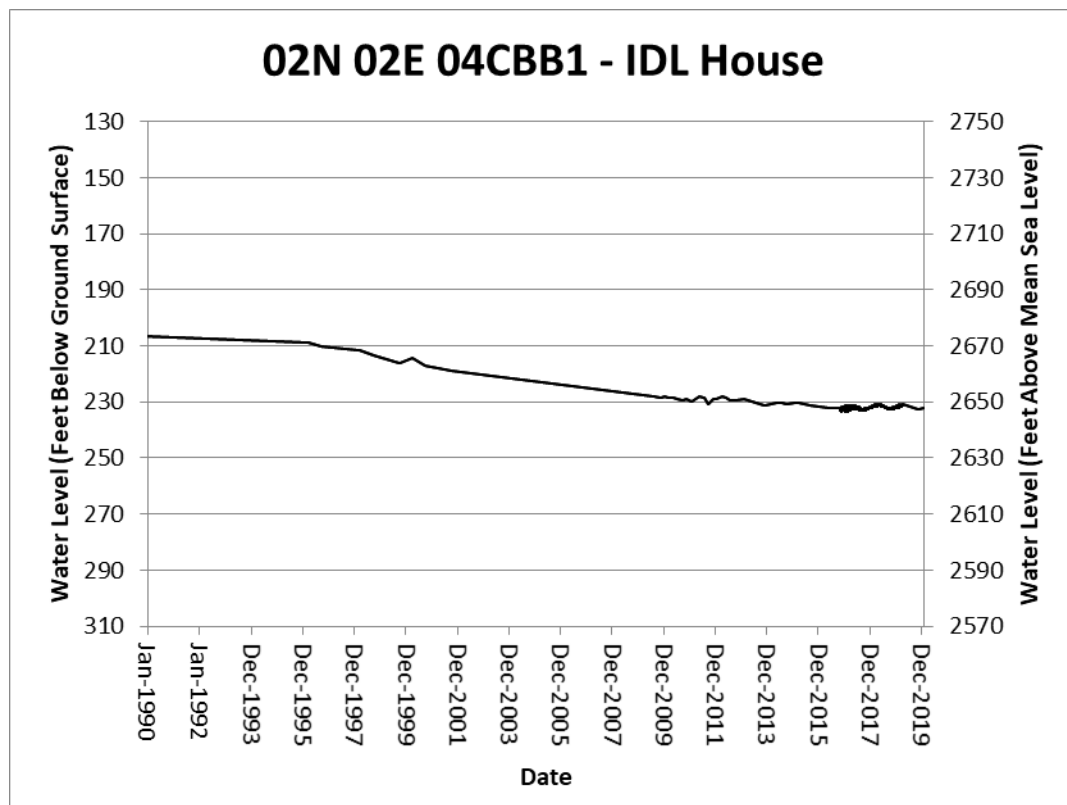
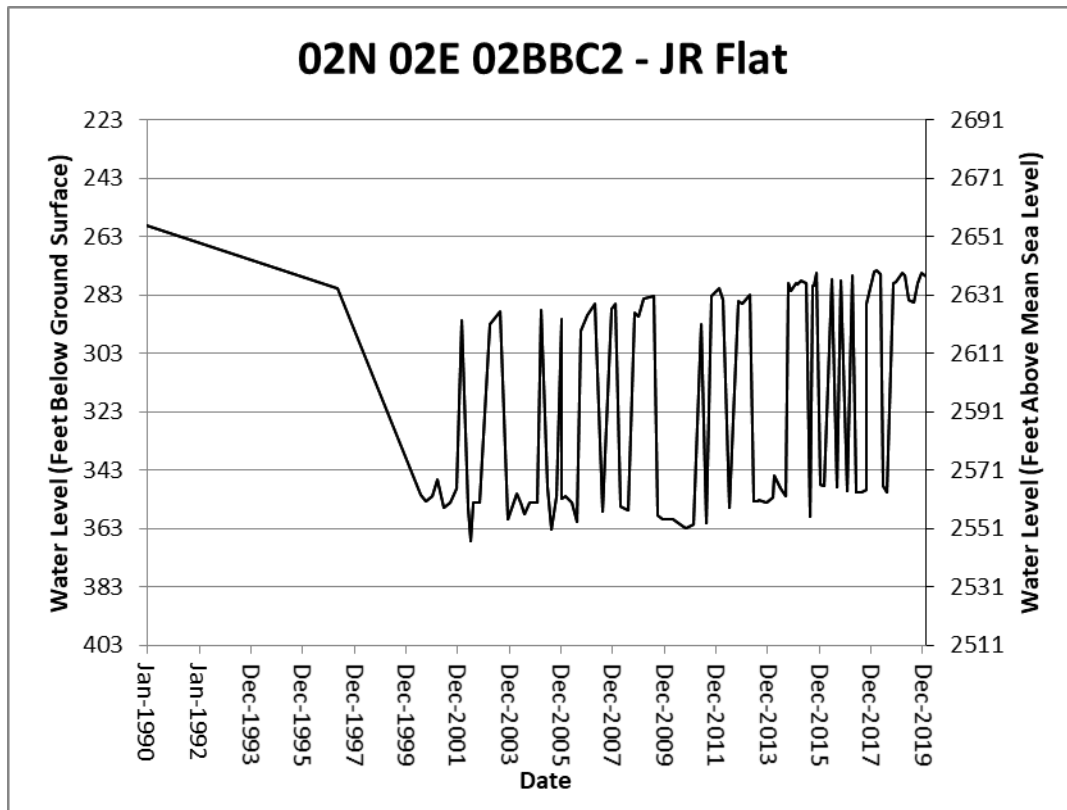


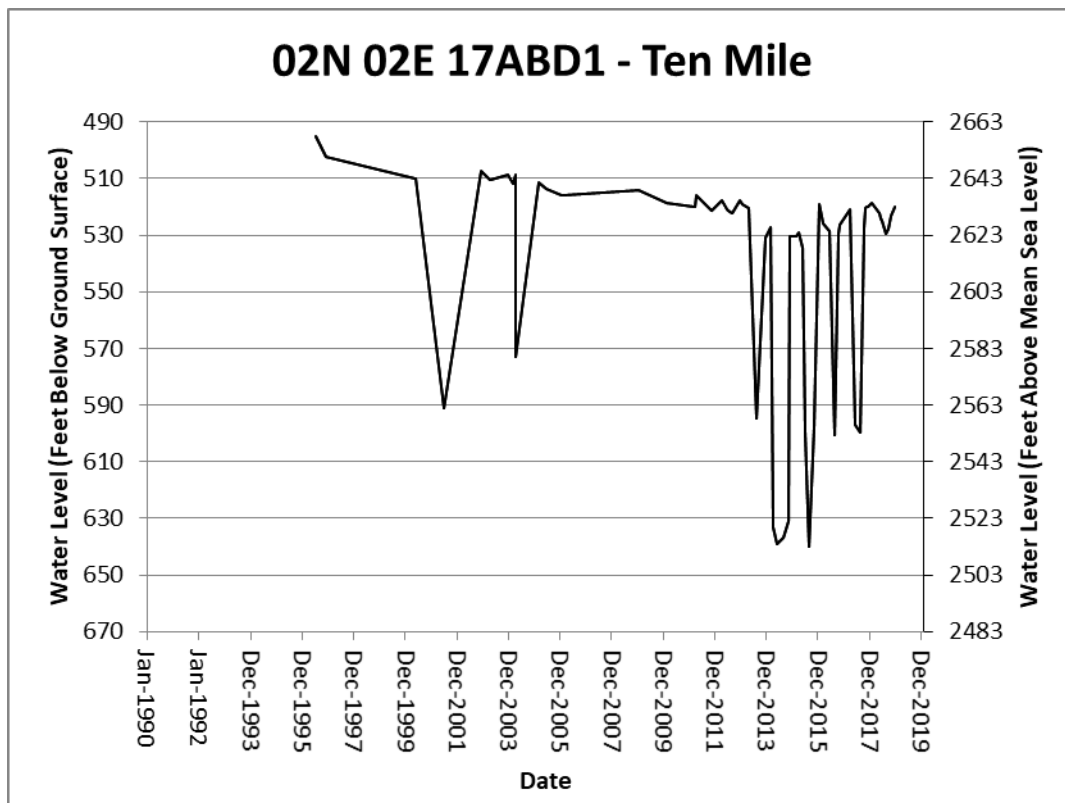
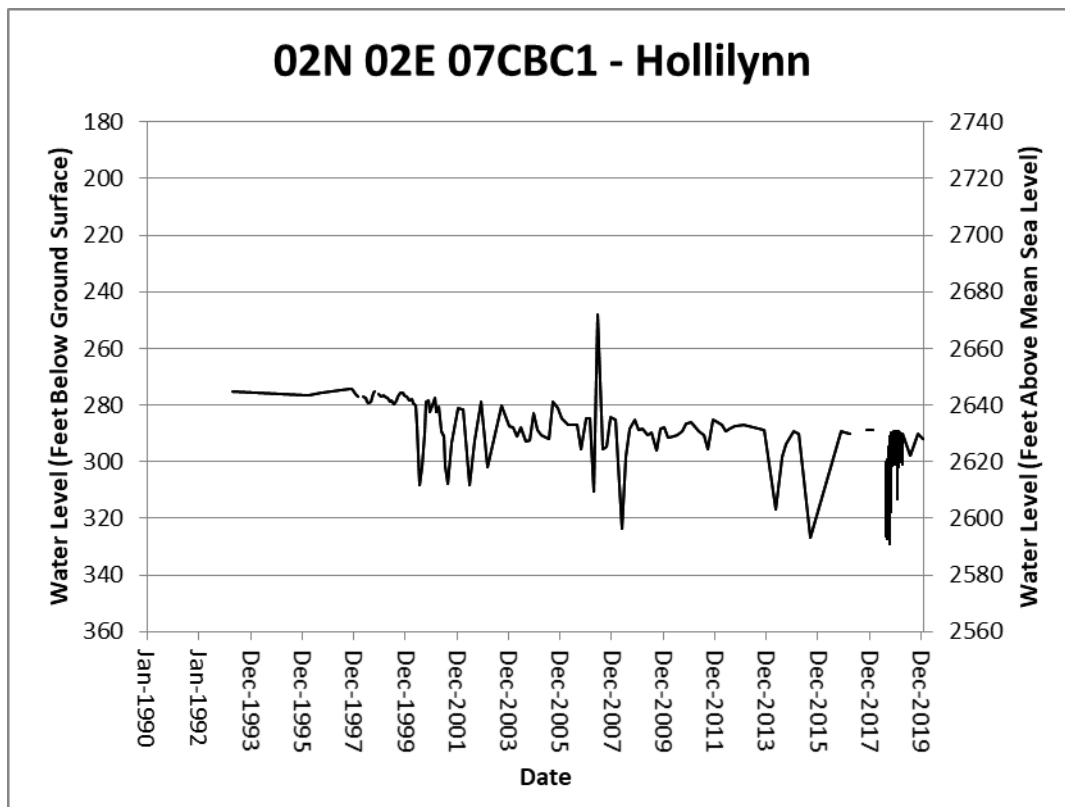
Appendix D

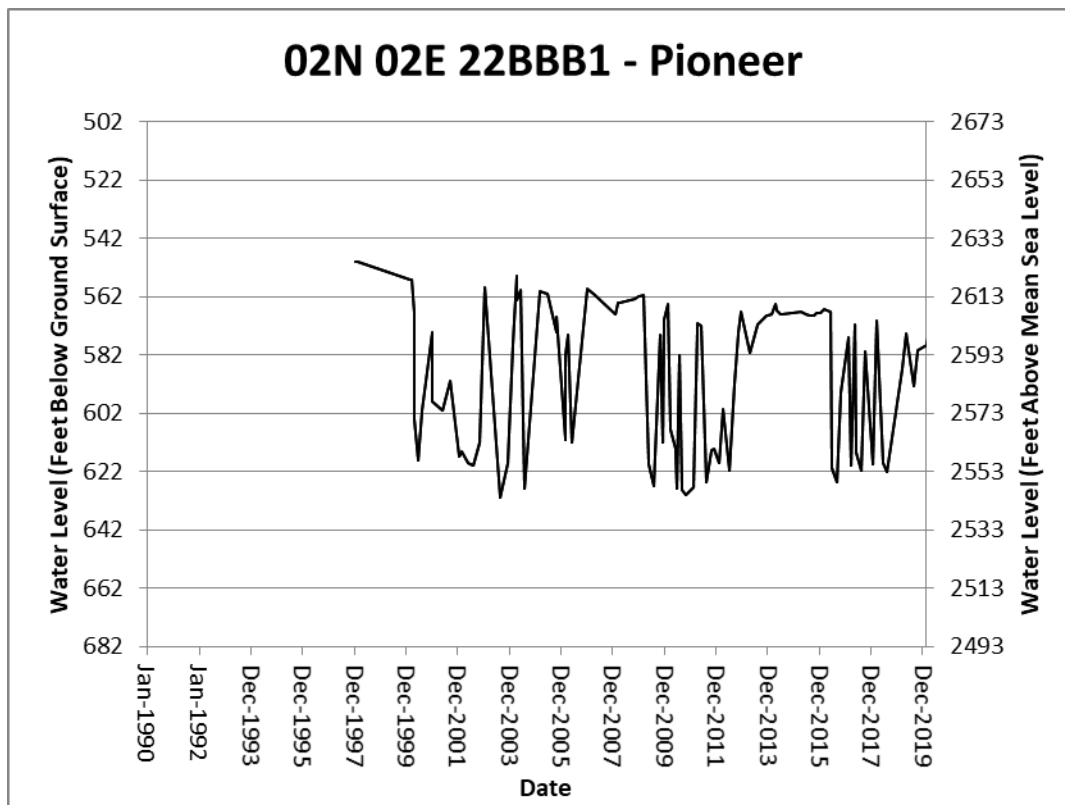
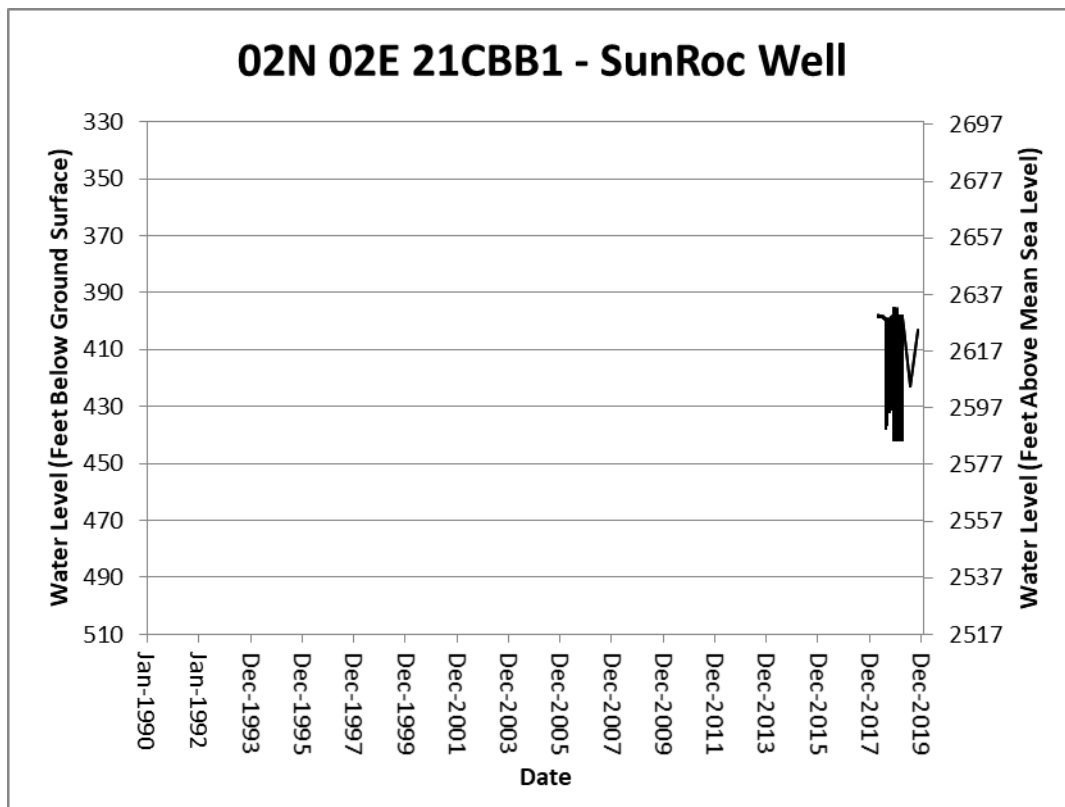
Hydrographs for Active Monitoring Wells from 1990 through 2019

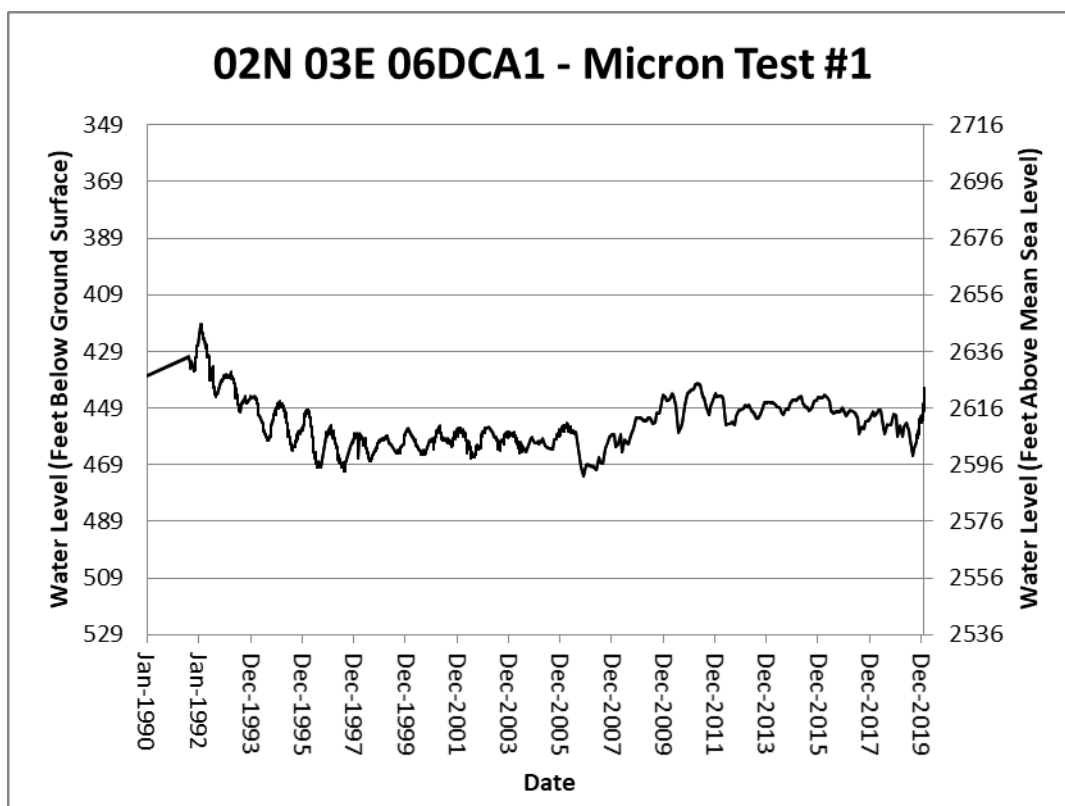
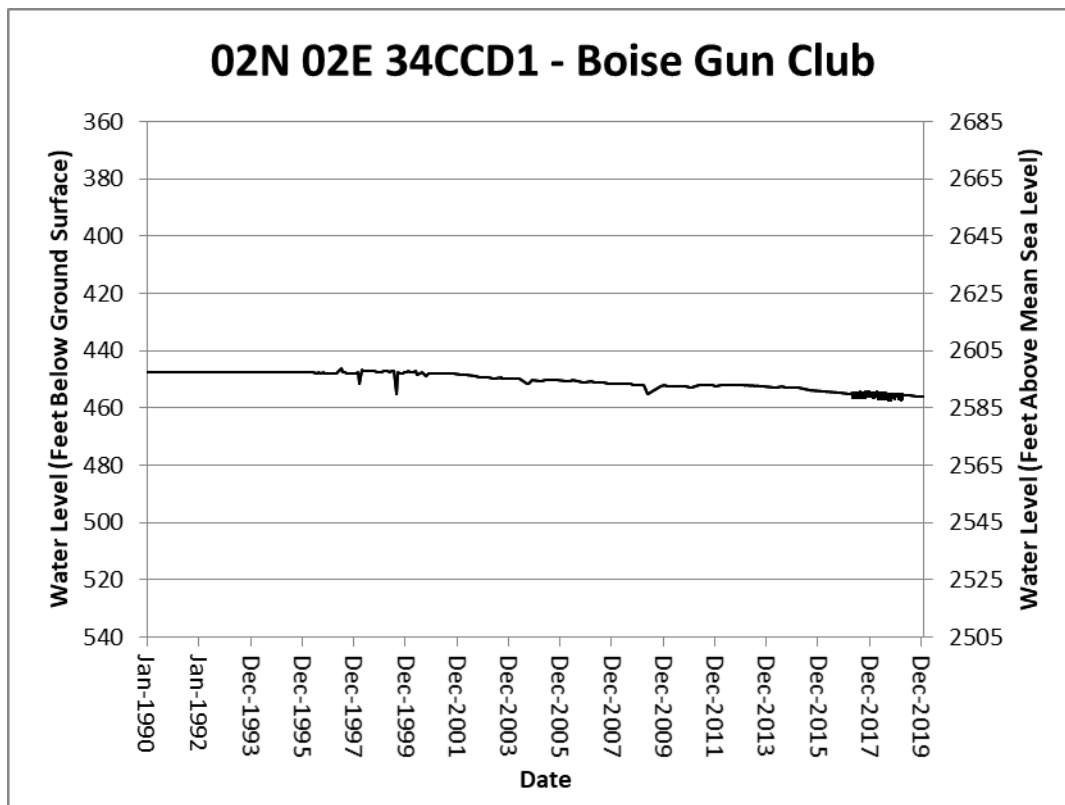


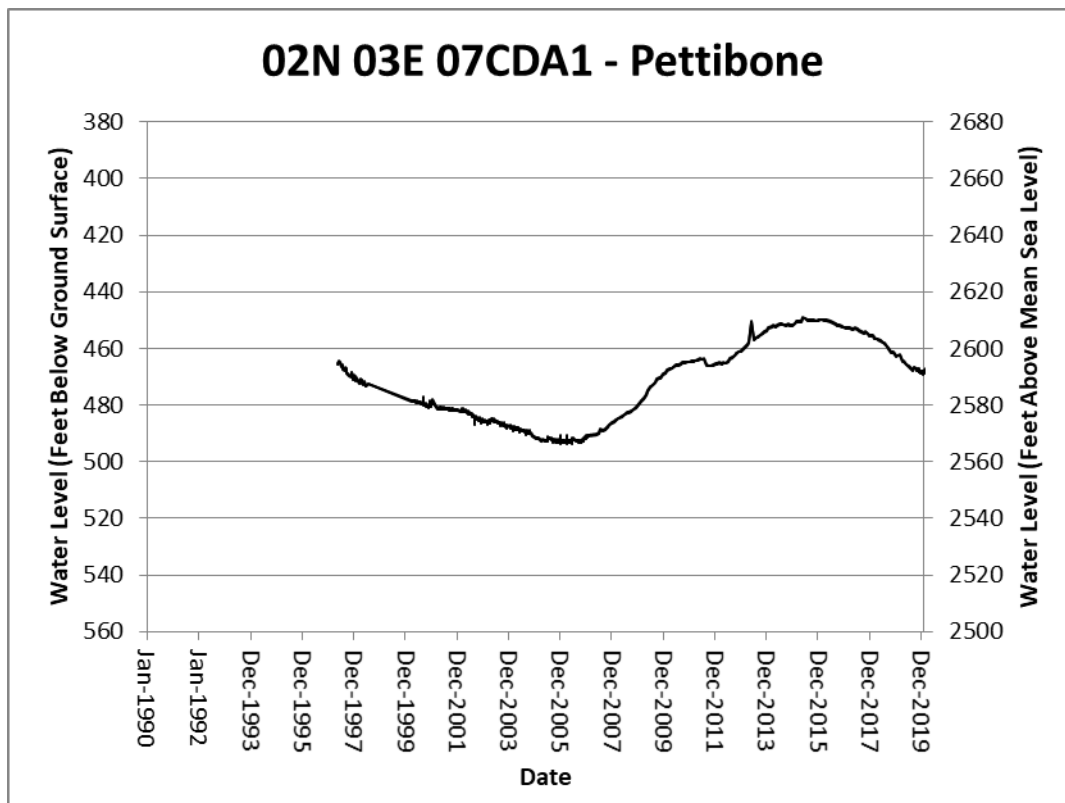
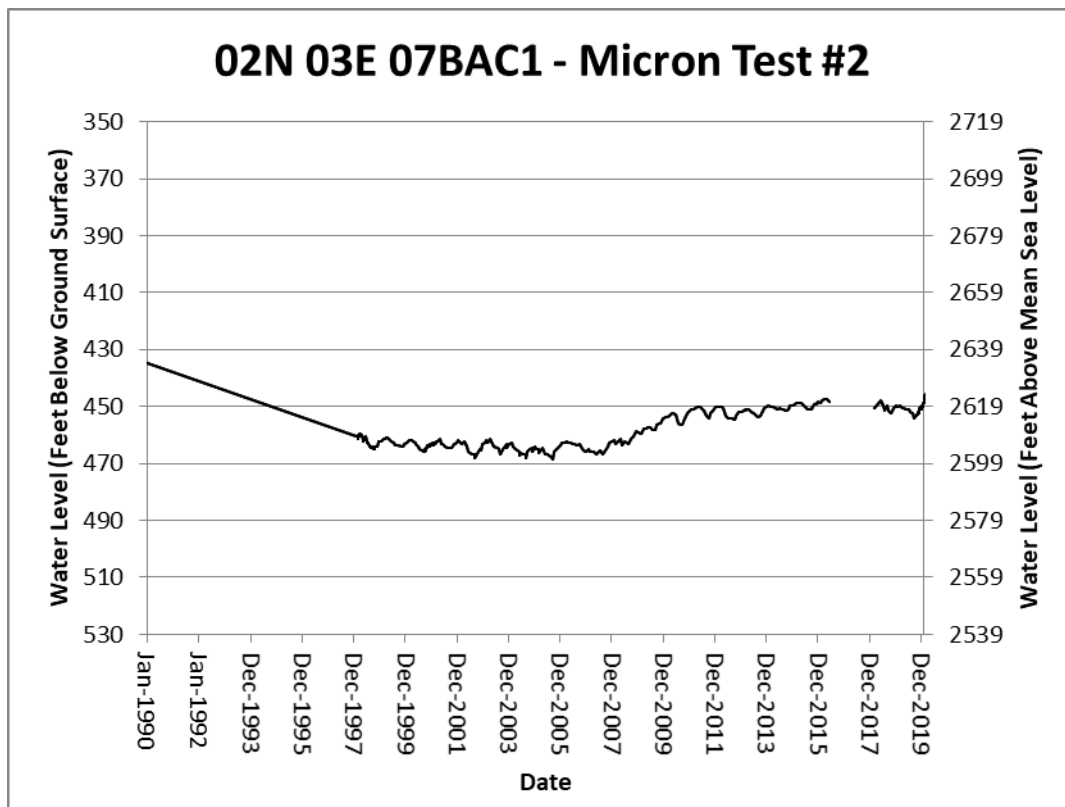


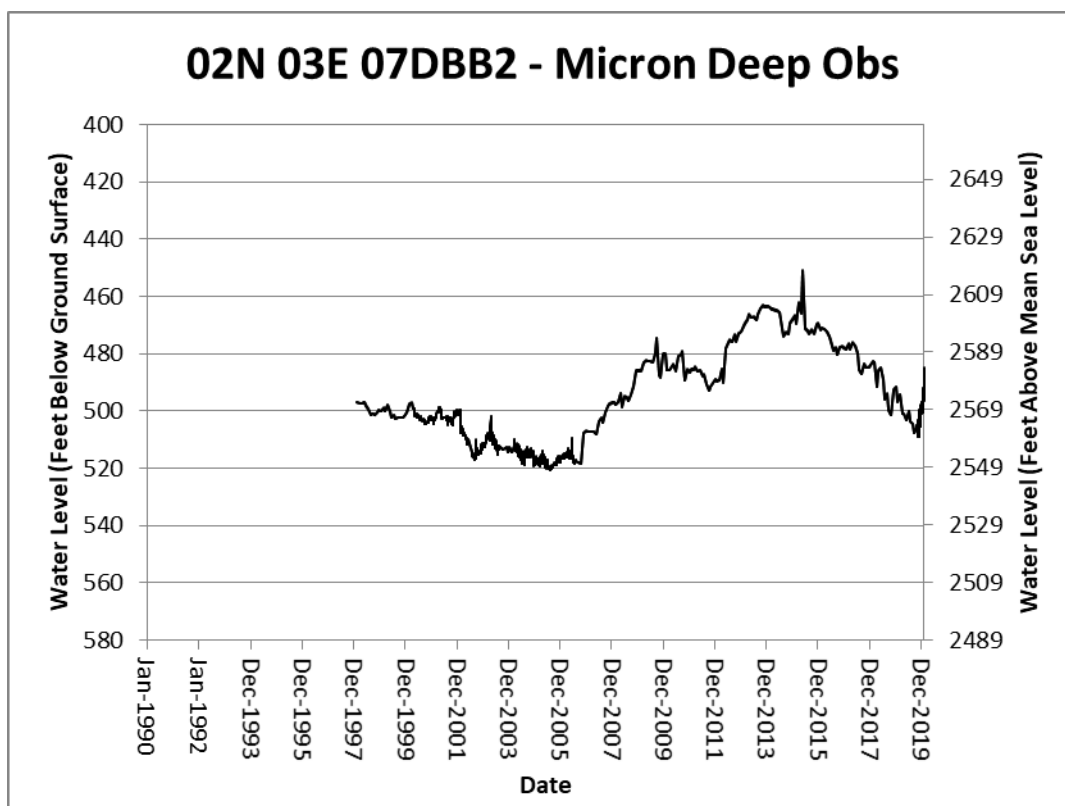
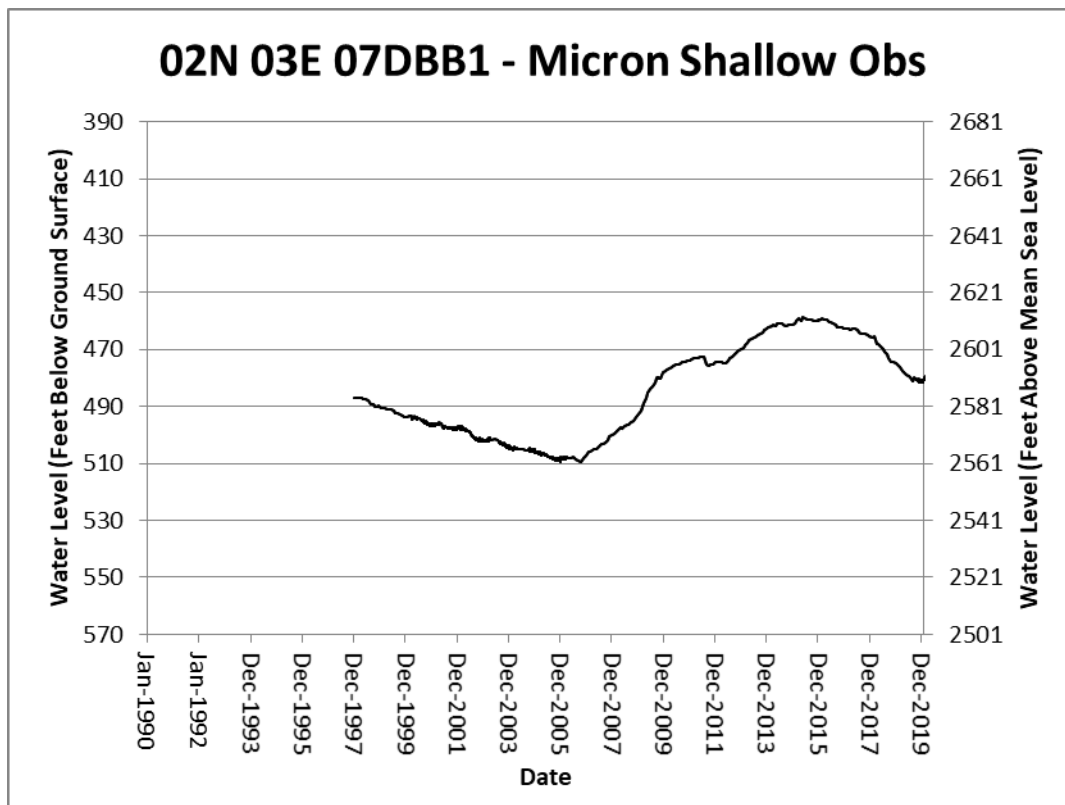


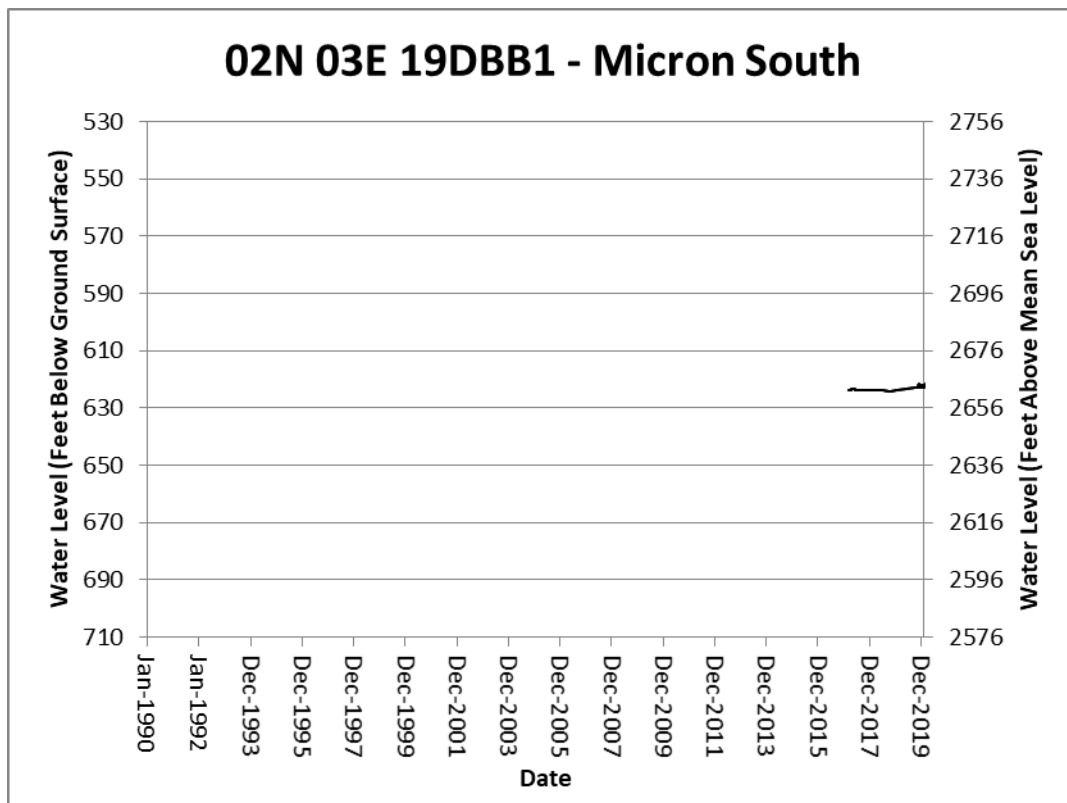
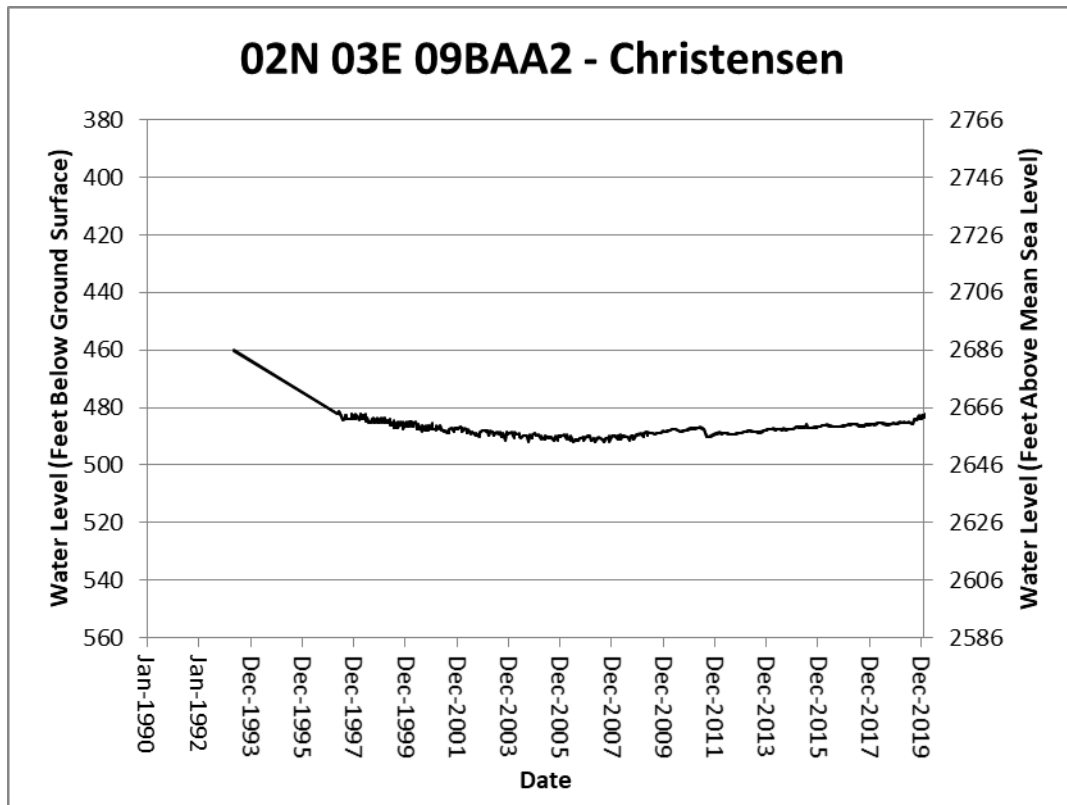




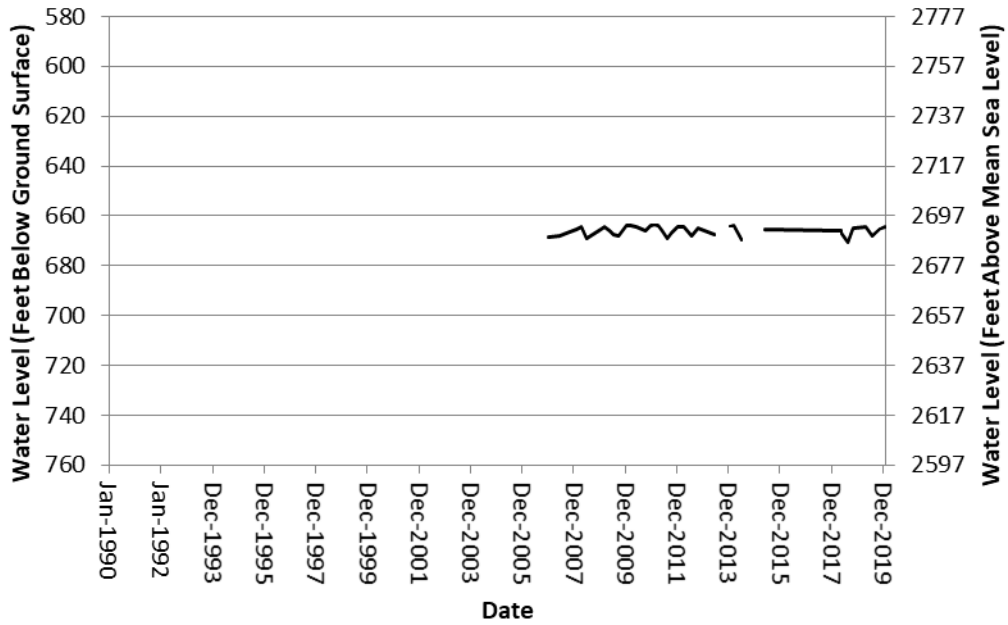




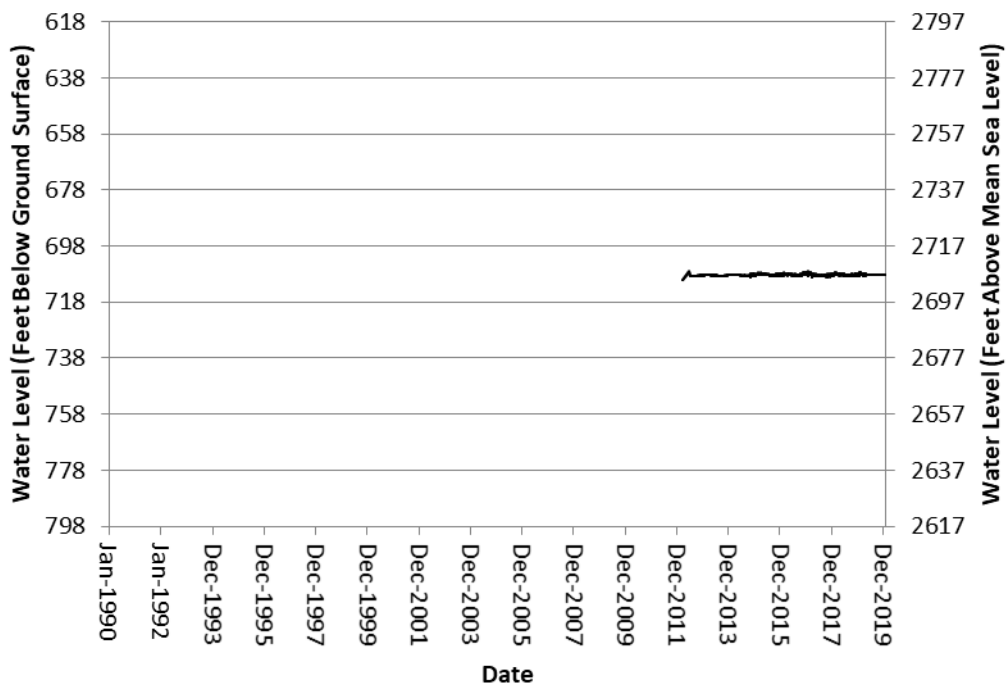


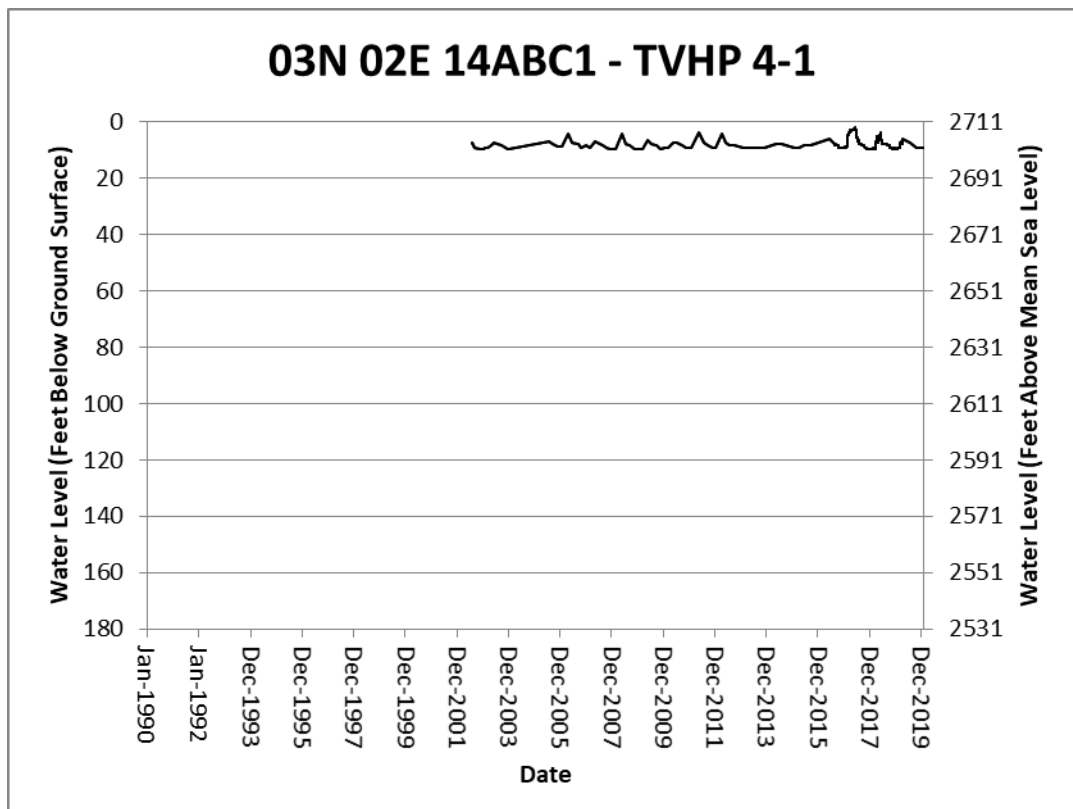
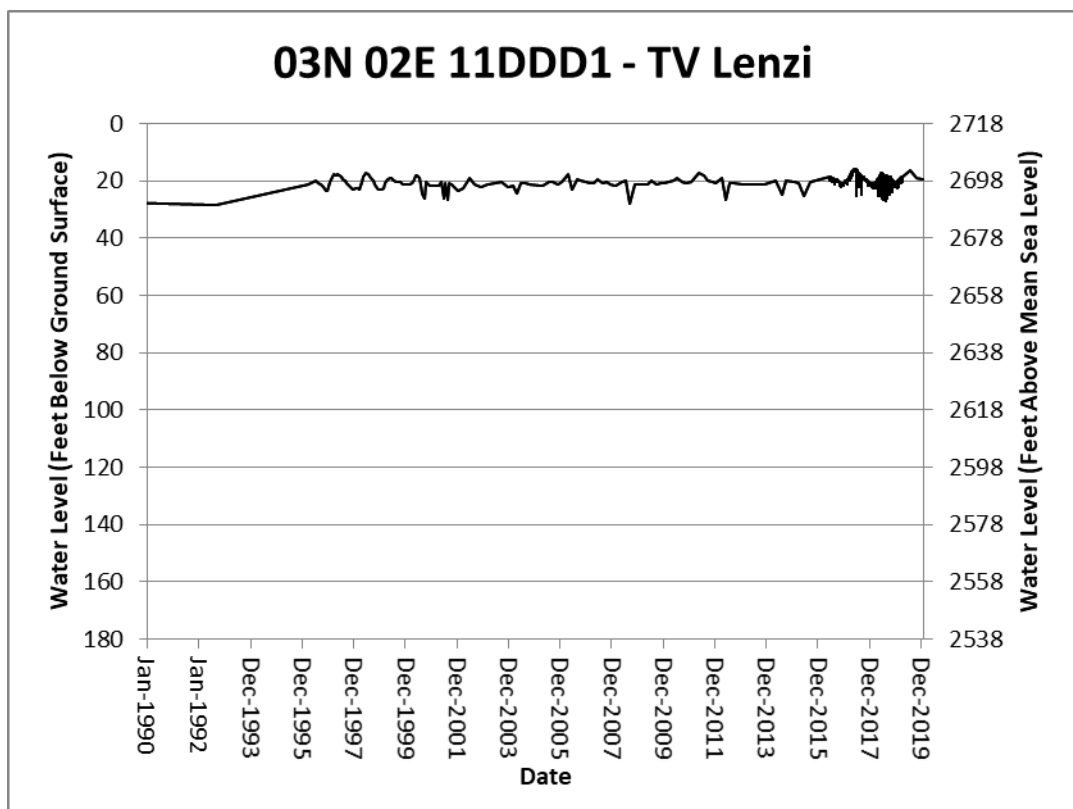


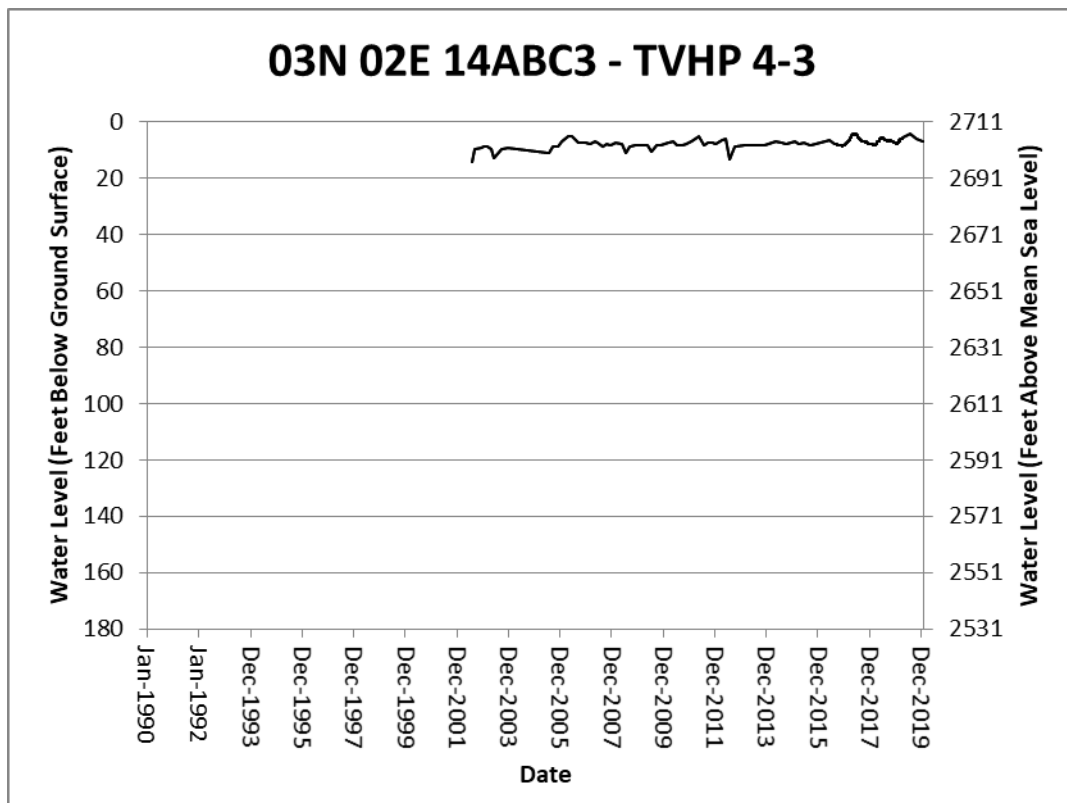
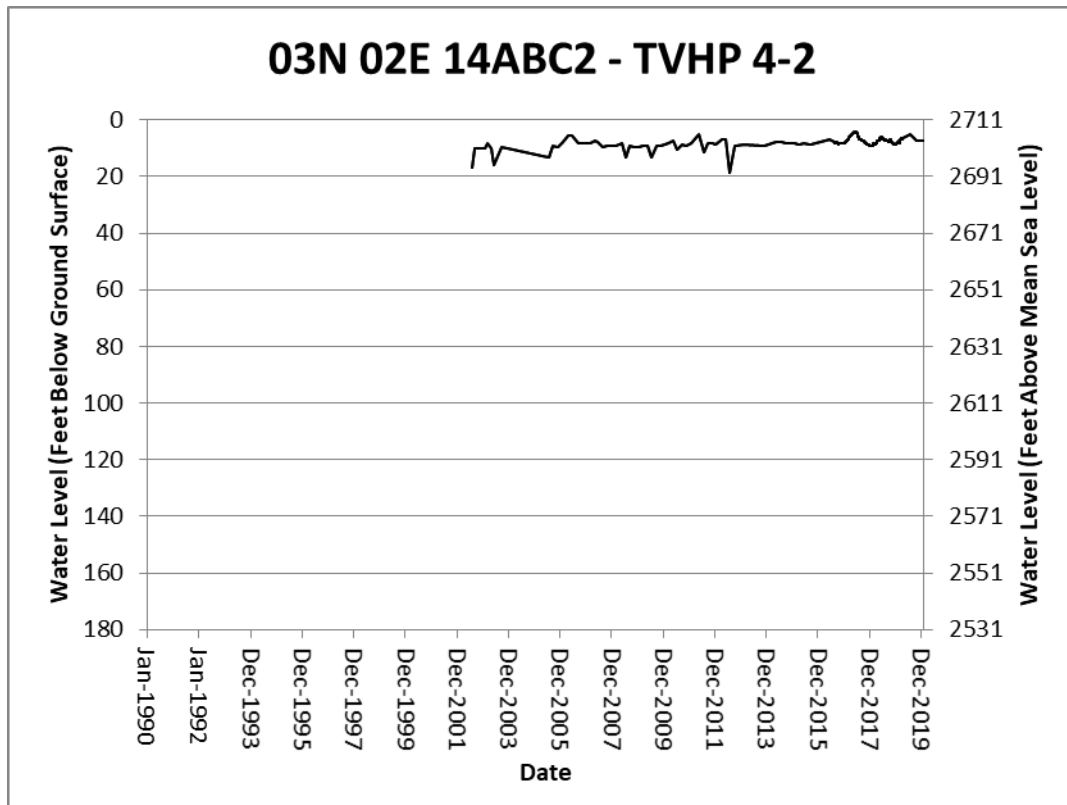
02N 03E 28CAA1 - Blacks Creek Rest Area Westbound

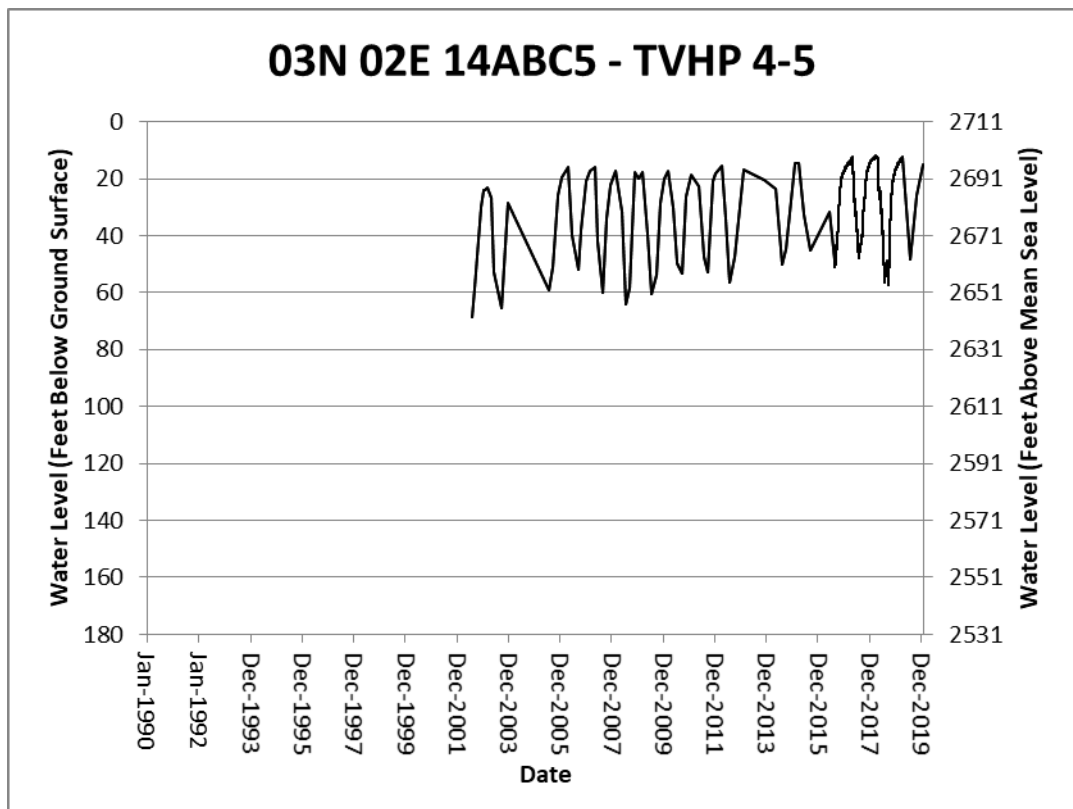
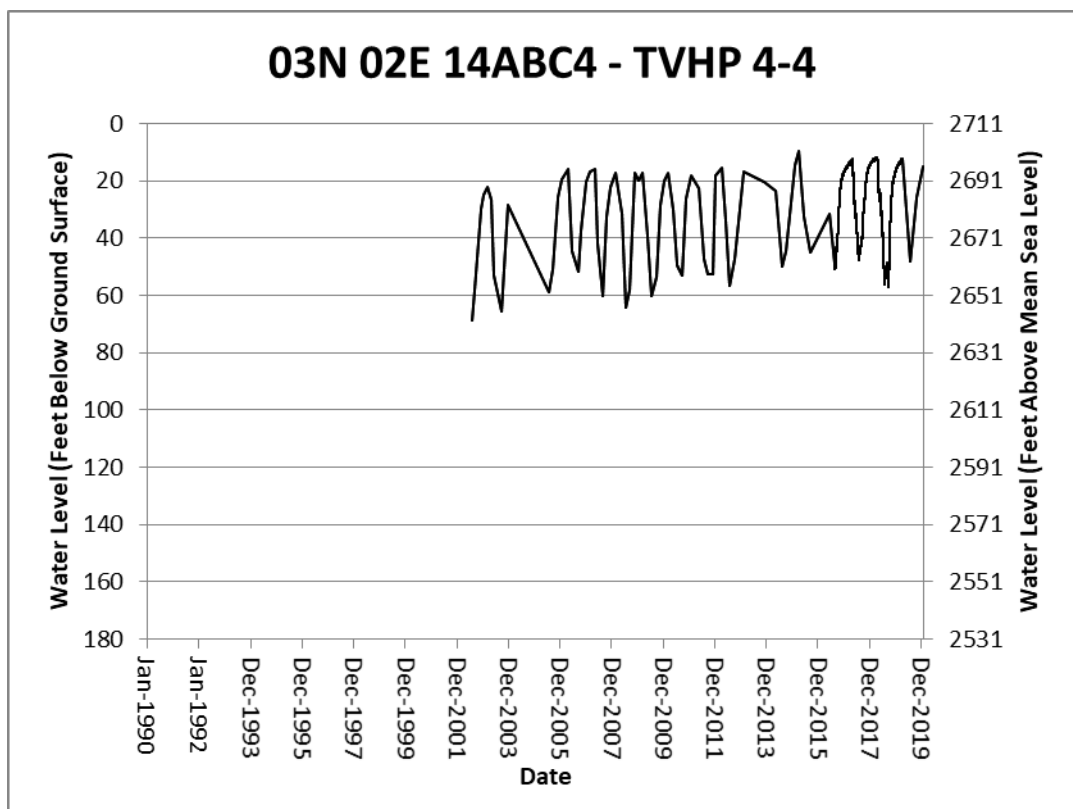


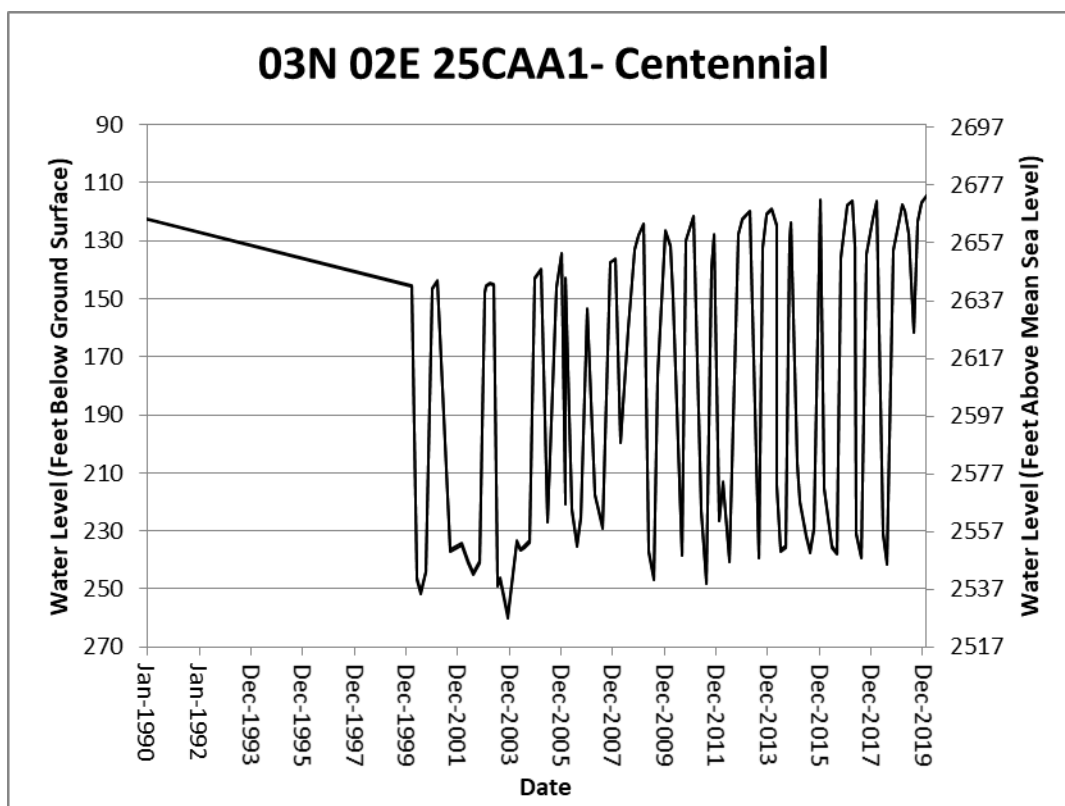
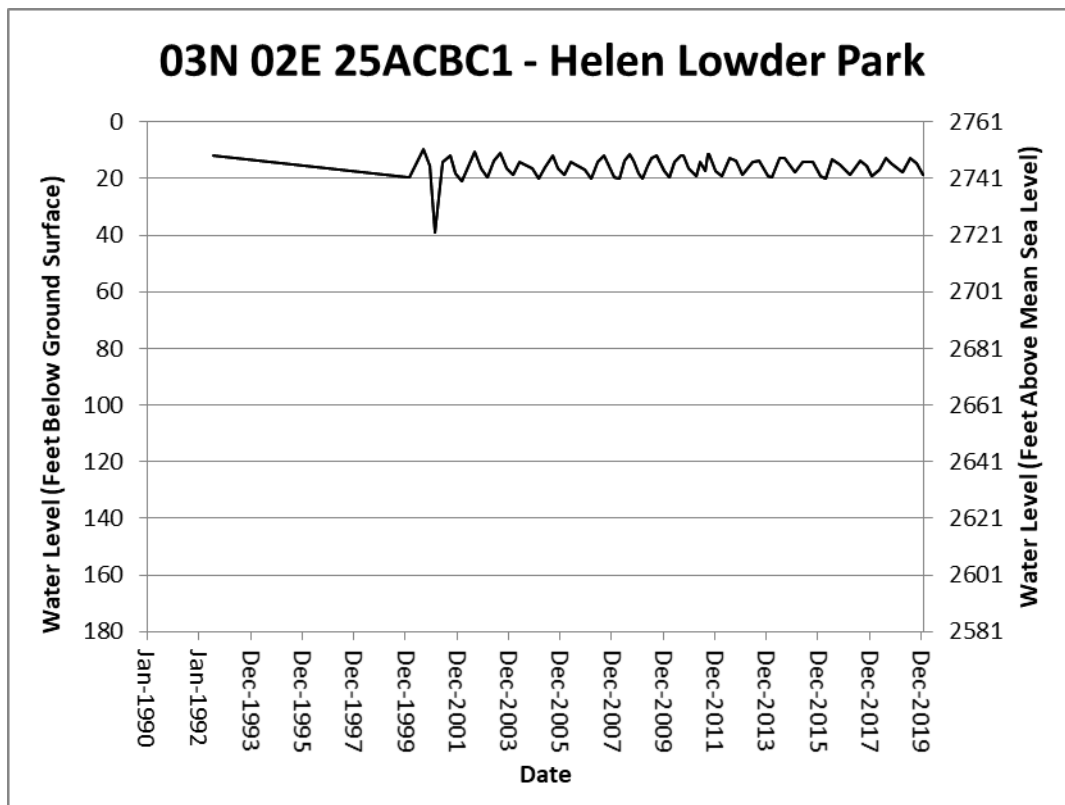
02N 03E 34ACC1 - Blacks Creek Exit ITD

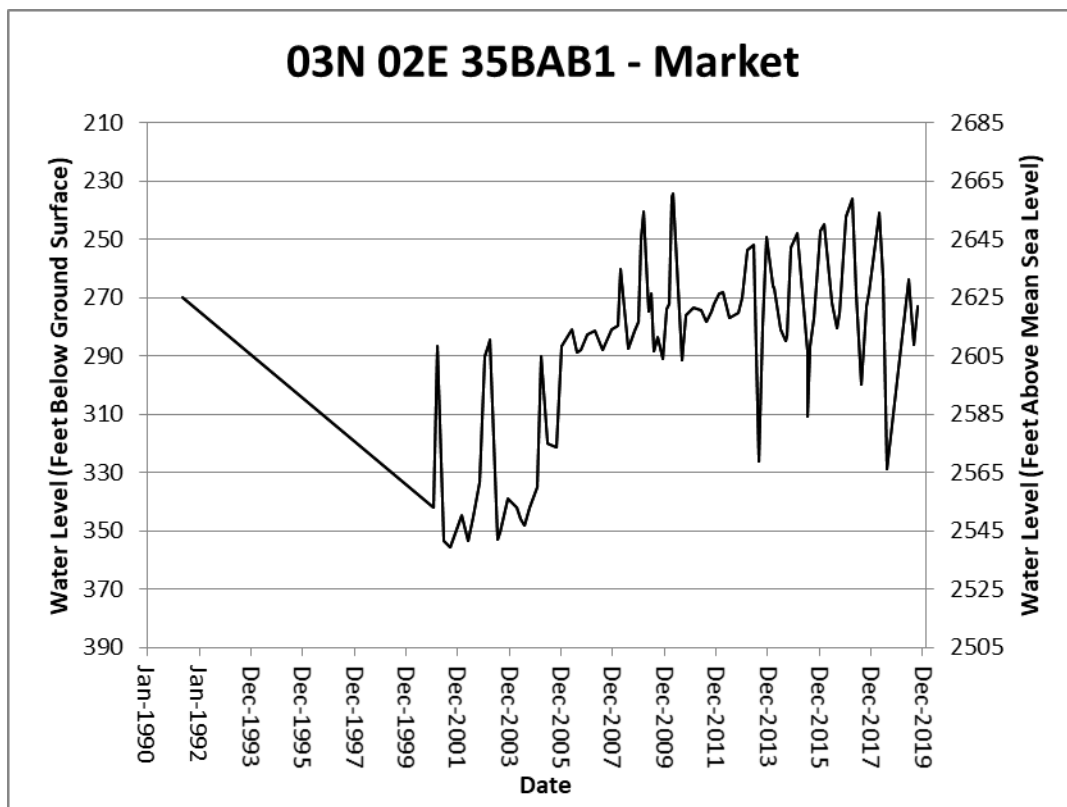
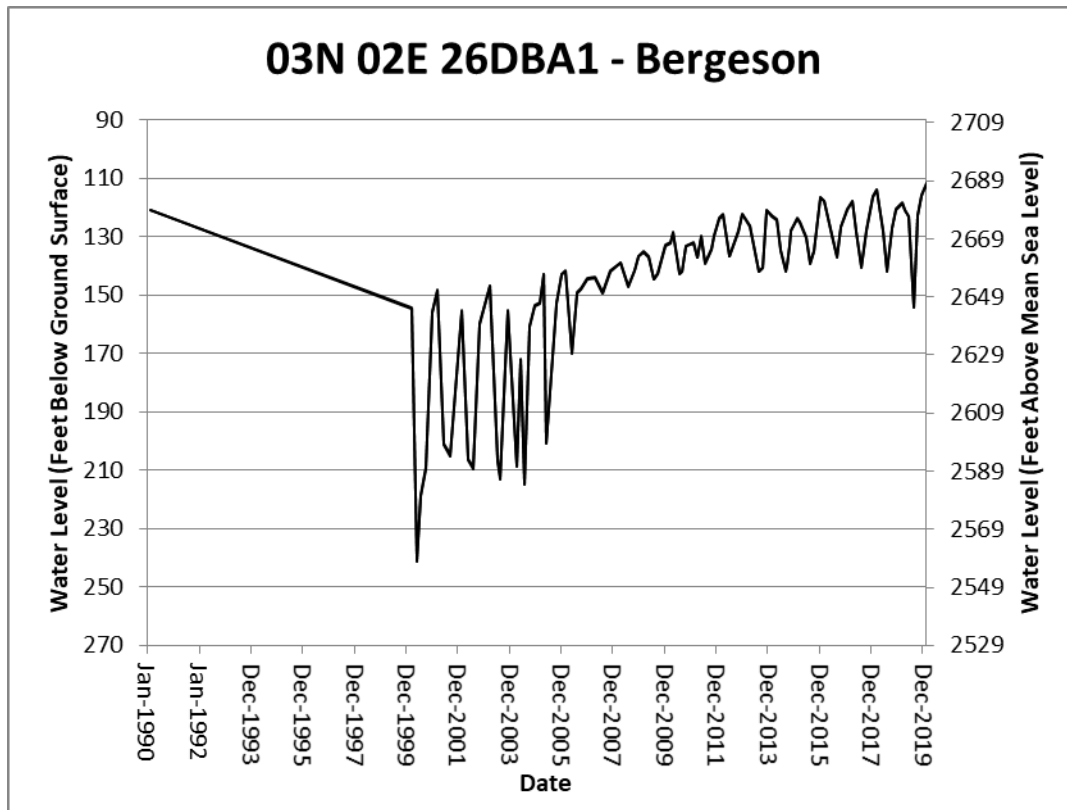


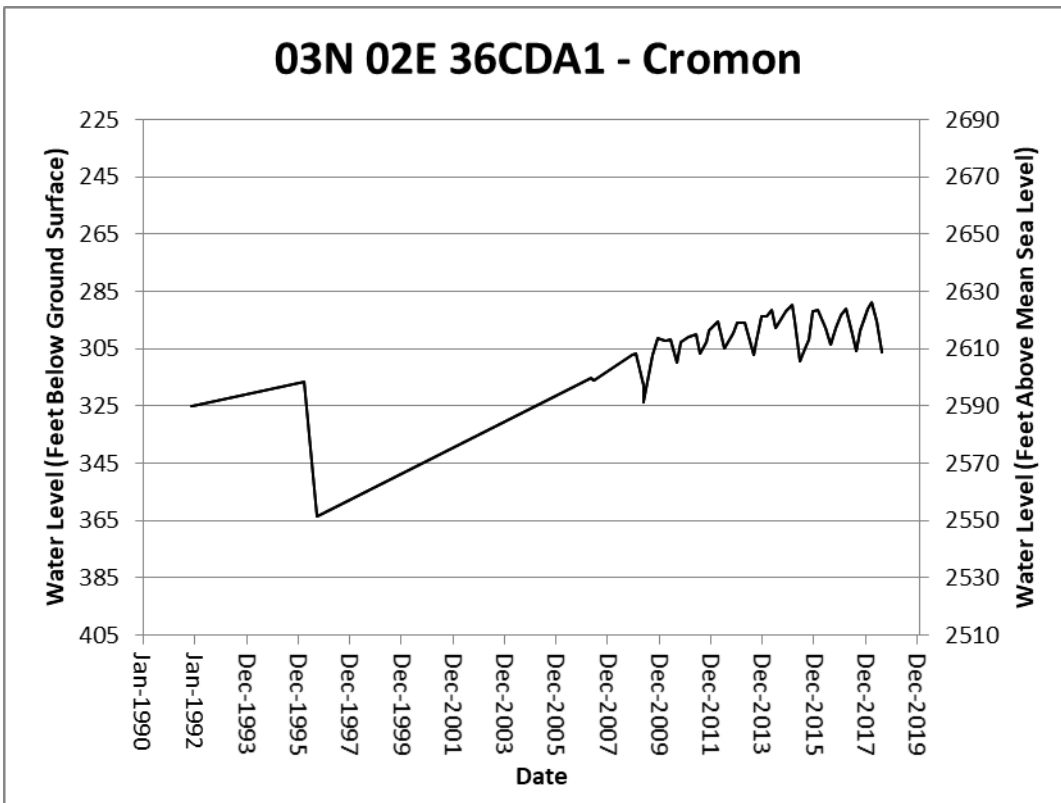
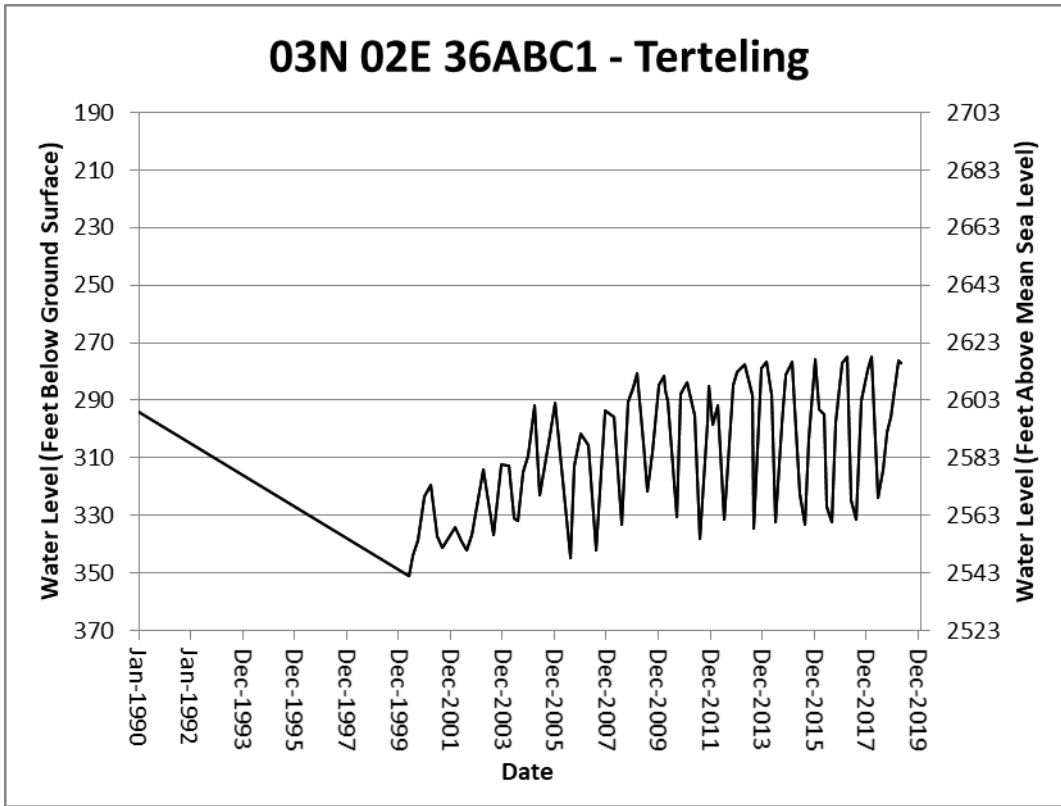


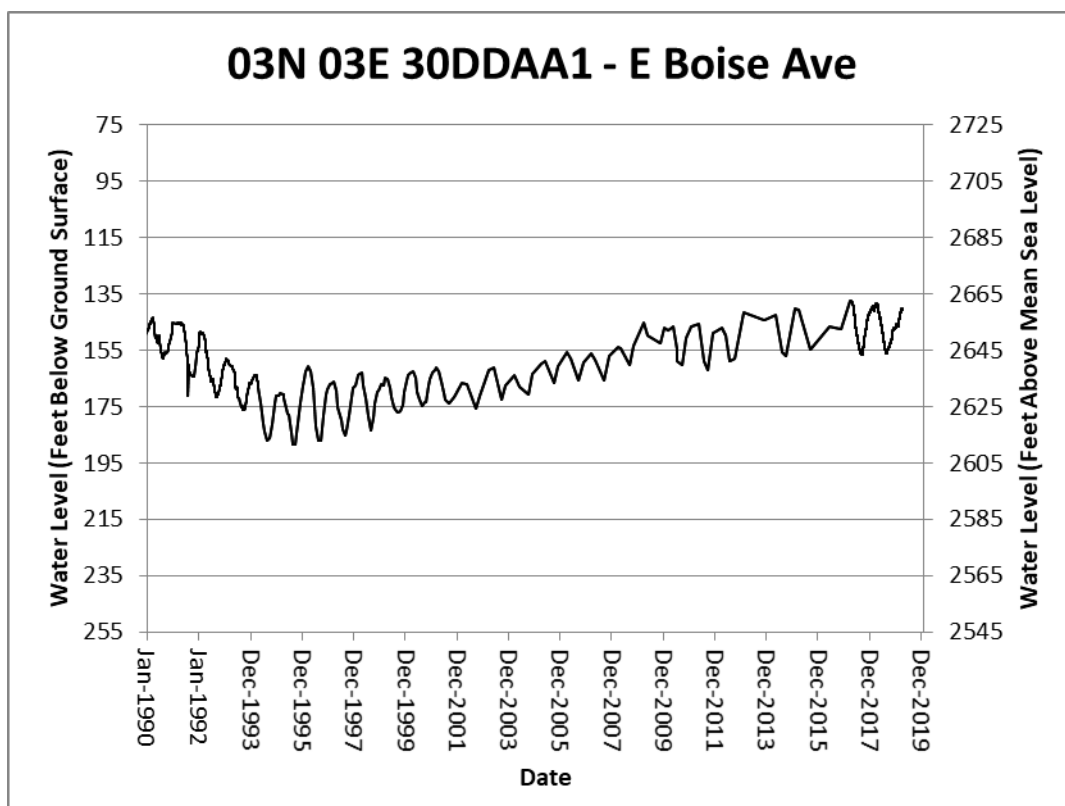
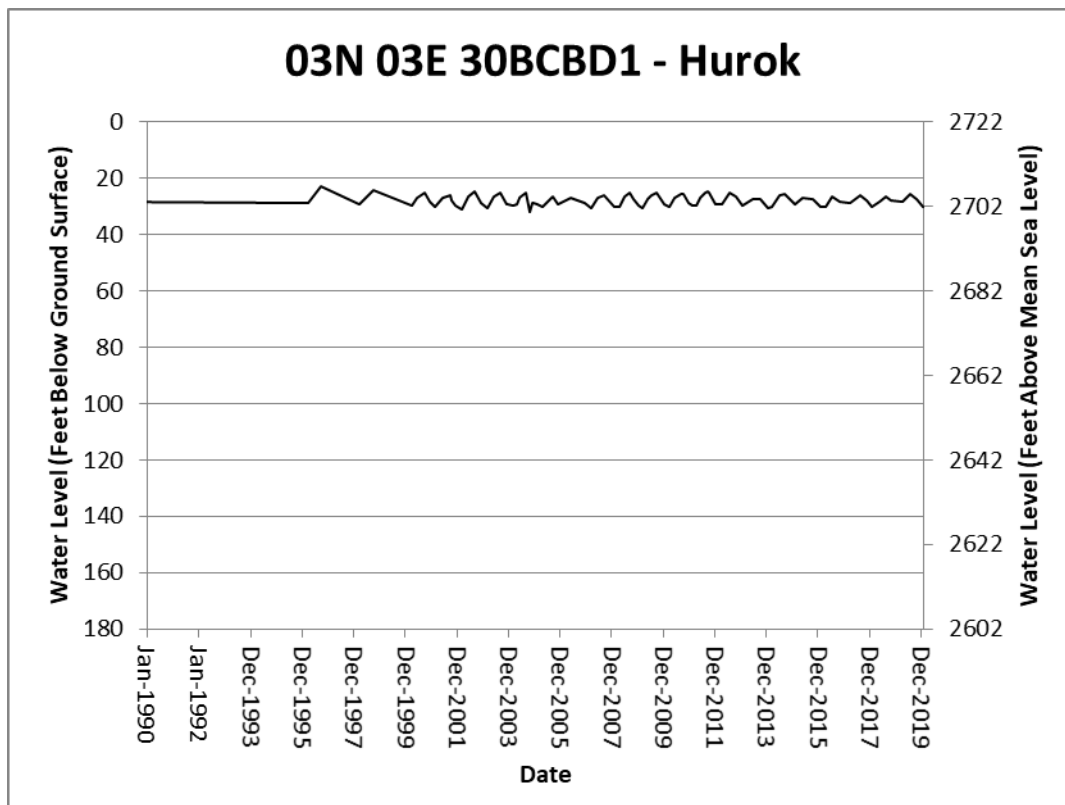




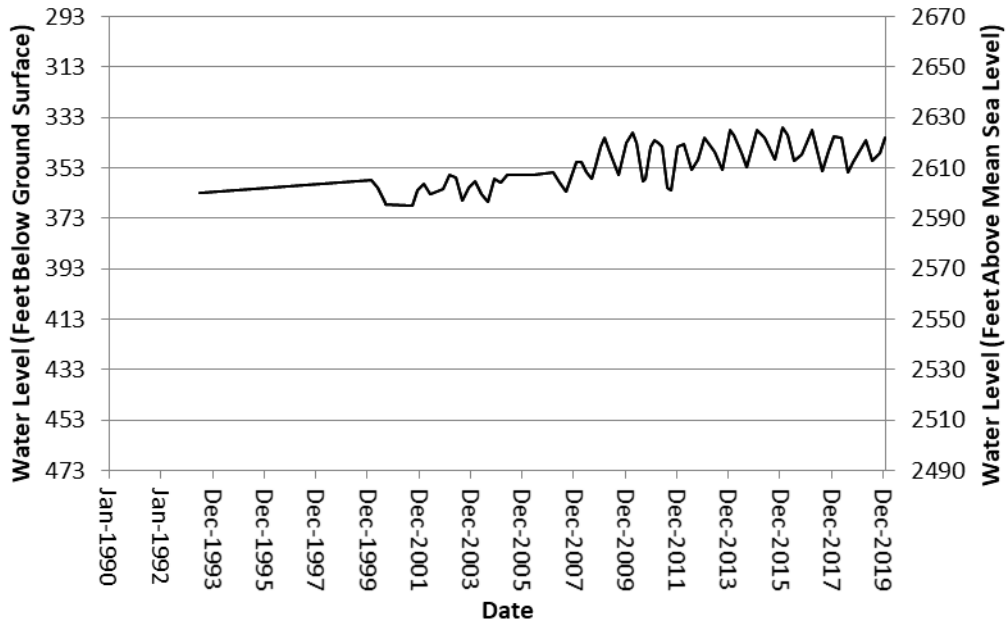








03N 03E 31ADD1 - Simplot Golden Development



03N 03E 32CDD1 - Micron Columbia

