Southeast Boise Groundwater Management Area Water-Level Monitoring Update, 2025

IDAHO DEPARTMENT OF
WATER RESOURCES

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Open-File Report

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The Idaho Department of Water Resources designates Critical Groundwater Areas (CGWAs) and Groundwater Management Areas (GWMAs) under Idaho Code §42-233a and §42-233b, respectively. A CGWA is all or part of a groundwater basin that does not have sufficient groundwater to provide a reasonably safe supply for irrigation or other uses at the current or projected rates of withdrawal. A GWMA is all or part of a groundwater basin that may be approaching the conditions of a CGWA. The Southeast Boise GWMA was designated on October 14, 1994, based on decreasing water-table trends. This report describes the status and trends of aquifer levels in and around the Southeast Boise GWMA located in Ada County.

Introduction

The Southeast Boise Groundwater Management Area (SEB GWMA) is located in Boise, ID, and encompasses 17 square miles in Ada County (Figure 1). The Idaho Department of Water Resources (IDWR) manages a groundwater-level monitoring network in the vicinity of the SEB GWMA that consists of 33 active monitoring sites with 14 of the sites located within the GWMA.

This report provides an update to the status of the groundwater-level monitoring network in and around the SEB GWMA based on the 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., Veolia Water Idaho Inc., and 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 groundwater database and published on the public IDWR website. The J.R. Simplot Co., City of Boise, Idaho Transportation Department, Idaho Department of Lands, Boise Gun Club, and other landowners provide access to wells within the monitoring network.

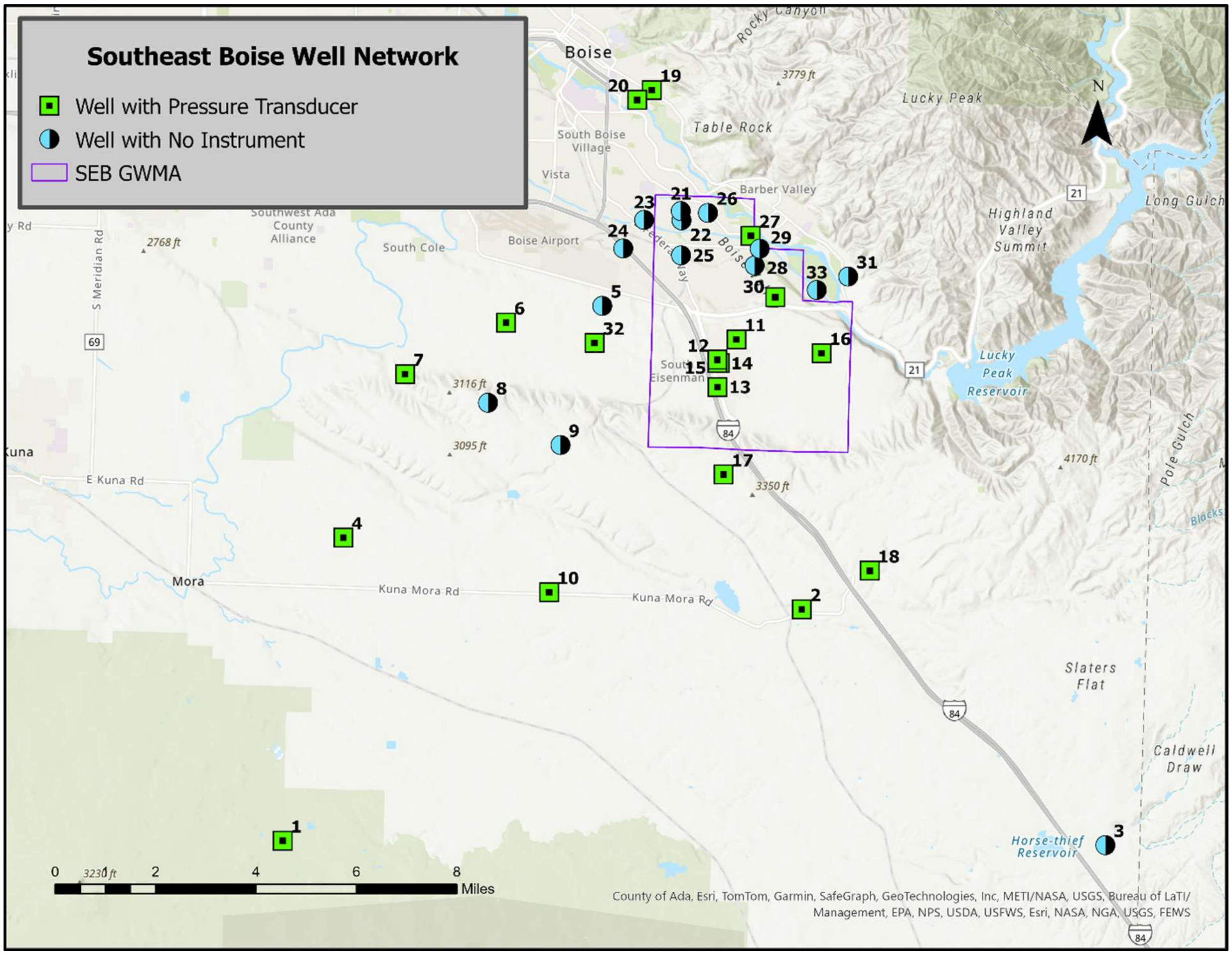

Figure 1. SEB GWMA Groundwater Monitoring Network. Numbered wells correspond to Map ID numbers listed in Table 1.

Status of the Monitoring Network

The network currently includes 33 active monitoring sites (Table 1), where one site (TVHP 4) contains a set of five nested wells, for a total of 37 active wells. Twenty-three (23) wells are 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 (Table 1). IDWR downloads the transducer data during seasonal manual measurement visits. All wells are measured manually at least twice per year during the spring and fall using an electric tape. Veolia Water Idaho Inc. measures seven wells bi-monthly.

Recent data collection was unsuccessful at two wells: Micron South (pending IDWR transducer work) and Boise Gun Club (pending landowner access issues). In 2023, the SunRoc well and the Blacks Creek Rest Area Westbound well were removed from the active network due to access issues. Inactive wells are summarized in Table 2.

Table 1. Active SEB GWMA monitoring network wells.

Map ID #[1]	Well Number	Well Name	Total Depth	Period of Record	Pressure Transducer	Model[2]
1	01N 01E 34AAA1	City of Boise Farm	Unknown	2018 - 2025	Yes	400
2	01N 03E 04BBD1	Prigge	735	1994 - 2025	Yes	500
3	01N 04E 28CAC1	Ken Agenbroad	763	1979 - 2025	No	-
4	02N 01E 36BBB1	Harris South Cole	305	1969 - 2025	Yes	400
5	02N 02E 02BBC2	JR Flat	567	1989 – 2025	No	-
6	02N 02E 04CBB1	IDL House	353	1973 - 2024	Yes	400
7	02N 02E 07CBC1	Hollilynn	460	1993 - 2025	Yes	400
8	02N 02E 17ABD1	Ten Mile	904	1996 – 2025	No	-
9	02N 02E 22BBB1	Pioneer	930	1998 - 2025	No	-
10	02N 02E 34CCD1[3]	Boise Gun Club	504	1976 - 2024	Yes	400
11	02N 03E 06DCA1	Micron Test #1	855	1986 - 2025	Yes	500
12	02N 03E 07BAC1	Micron Inner Compound	580	1983 - 2025	Yes	500
13	02N 03E 07CDA1	Micron Pettibone	478	1997 - 2025	Yes	500
14	02N 03E 07DBB1	Micron Shallow	561	1998 - 2025	Yes	500
15	02N 03E 07DBB2	Micron Deep	811	1998 - 2025	Yes	500
16	02N 03E 09BAA2	Micron Christensen	522	1993 - 2025	Yes	500
17	02N 03E 19DBB1[3]	Micron South	760	2017 - 2024	Yes	500
18	02N 03E 34ACC1	Blacks Creek Exit ITD	861	2012 - 2025	Yes	500
19	03N 02E 11DDD1	TV Lenzi	68	1977 - 2025	Yes	100
20	03N 02E 14ABC	TVHP 4-1 through 4-5	800	2002 - 2025	Yes	100 (3) / 400 (2)
21	03N 02E 25ACBC1	Helen Lowder Park	75	1992 - 2025	No	-
22	03N 02E 25CAA1	Centennial	416	1976 - 2025	No	-
23	03N 02E 26DBA1	Bergeson	663	1990 - 2025	No	-
24	03N 02E 35BAB1	Market	944	1991 - 2025	No	-
25	03N 02E 36ABC1	Terteling	642	1972 - 2025	No	-
26	03N 03E 30BCBD1	Hurok	48	1969 - 2025	No	-
27	03N 03E 30DDAA1	E Boise Ave	940	1987 - 2025	No	400
28	03N 03E 31ADD1	Simplot Golden Development	1180	1993 – 2025	No	-
29	03N 03E 32BBA1	Whitney Fire	280	1975 – 2025	No	-
30	03N 03E 32CDD1	Micron Columbia	802	1990 – 2025	Yes	500
31	03N 03E 33DAA1	Hammer Flats	127	1969 – 2025	No	-
32	02N 02E 03DDC1	Boise Airport	353	2019 – 2025	Yes	500
33	03N 03E 33CDB1	Surprise Valley	283	2021 - 2025	No	-

[1] Map ID # corresponds to labels on Figure 1.
[2] Indicates model of InSitu™ TROLL Pressure transducer.
[3] Wells are in the active network but are currently experiencing access or equipment issues.

Table 2. Inactive SEB GWMA monitoring network wells.

Well Number	Well Name	Period of Record	Comment
02N 02E 04CAA1	SEB IDL Field	2000 - 2009	Oil contamination
02N 02E 21CBB1	SunRoc	2018 - 2023	Access issues
02N 03E 09BCA2	Vern Guyer	1993 - 2007	
02N 03E 28CAA1	Blacks Creek Rest Area Westbound	2007 - 2023	Access issues
03N 02E 25CBCA1	Motive Power 41A	1997 - 2015	Access issues
03N 02E 36CDA1	Cromon	1991 - 2018	Access issues
03N 03E 31BDD1	Oregon Trail	1977 - 2012	Destroyed

Hydrogeology

The aquifer system beneath the Treasure Valley is part of the larger Western Snake River Plain aquifer (Bartolino, 2019). In southeast Boise, it includes a substantial buried alluvial fan and braided stream complex (Squires et al., 1992). These fluvial deposits also exhibit lacustrine characteristics due to past interactions with a lake system, where fluctuating lake levels, shoreline winds, and wave action contributed to the deposition of sand, gravel, and silt in complex layers (Squires & Wood, 2001). Beneath these deposits lies bedrock composed of Miocene rhyolites, Cretaceous granite from the Idaho Batholith, and other silicic volcanic rocks. Because hydrogeologic units are not well-defined or continuous across the aquifer, local variations in aquifer properties and water levels occur (Bartolino, 2019).

The aquifer system contains a relatively shallow local flow system and a relatively deeper regional flow system; both of which are underlain with a deeper low-temperature geothermal aquifer system. The relatively shallow system, generally composed of coarser-grained fluvial sediments, is known as the Snake River Group while the relatively deeper system, generally composed of finer-grained lacustrine sediments comprised of clay and silts, is known as the Idaho Group. Clay layers form non-continuous aquitards that separate the shallow aquifers from the deeper flow system. Groundwater can flow between systems depending on location and conditions. The shallow system has shorter groundwater residence times compared to the relatively deeper system (Petrich & Urban, 2004). Groundwater generally flows from east to west. However, the New York Canal, which runs through the SEB GWMA, creates a local groundwater divide. South of the canal, groundwater tends to flow west-southwest, while north of the canal, it flows west-northwest (Hundt & Bartolino, 2023). Readers interested in a deeper explanation of the complex geology and aquifer system are encouraged to review the listed references (Bartolino, 2019; Hundt & Bartolino, 2023; Petrich & Urban, 2004; Squires & Wood, 2001; Wood & Clemens, 1998).

The primary sources of recharge to the shallow flow system include canal seepage and infiltration from both precipitation and excess irrigation water; recharge also occurs to a lesser extent through seepage from the Boise River and creeks (Hundt & Bartolino, 2023). Recharge to the deep flow system occurs through downward percolation of groundwater within the Snake River Group sediments, as well as from mountain block recharge derived from snowmelt and precipitation (Petrich & Urban, 2004). Additionally, water from the Boise River is used for artificial recharge via injection wells at Micron (Micron, 2010).

The main sources of aquifer discharge include groundwater discharge to rivers, creeks, and agricultural drains, as well as groundwater pumping for irrigation, municipal water supplies, and private use (Hundt & Bartolino, 2023).

Water-Level Trend Analysis

Short-term (5-year), medium-term (10-year), and long-term (20-year) water levels have been analyzed using the Mann-Kendall (MK) statistical test to understand groundwater-level trends in the SEB GWMA. Appendix A presents individual groundwater-level hydrographs displaying the full recorded history for all wells in the monitoring network. Appendix B presents grouped hydrographs with uniform scales for select wells to improve the visualization of groundwater trends.

Statistical Analysis Overview

Calculating a linear trend for a set of water-level data is a simple way to describe long-term water-level changes. However, a calculated trend is not always representative of the behavior if there are frequent and/or large water-level fluctuations, and/or if the calculated trend is small. Therefore, a statistical assessment of the calculated trend is an important step in determining the general water-level behavior over time. A statistically significant trend indicates that there is a trend in the data (at the chosen confidence interval), and the calculated trend is the best linear representation of changes over time. Lack of statistical significance indicates that the trend cannot be considered different than zero, and the calculated trend does not adequately represent changes over time. The significance in water-level trends has been set to 95% probability; therefore, any trend with a p-value less than 0.05 is statistically significant.

A positive value for a trend indicates a rising water level. Conversely, a negative value for a trend represents a falling water level. This convention reflects the use of water elevation values to calculate trends; it was adopted for this year’s report to communicate results in a more straightforward way and to align across IDWR reports. Please note that previous reports for the SEB GWMA used the oppositive convention (e.g. negative trend values indicated rising water levels) and used depth-to-water values to calculate trends.

Limitations to Groundwater-Level Measurements

There are several factors that contribute to the difficulty of trend analysis for groundwater data. Several 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 manual data collection in wells without continuous pressure transducers make it difficult to conclude trends due to the uncertainty regarding the seasonal peaks and troughs of the hydrographs. All analyses should recognize the limitations of the data as well as the associated uncertainties.

Mann-Kendall Test Explanation and Results

Trends in water-level changes have been calculated using the Mann-Kendall (MK) test (Hirsch and Slack, 1984). The MK test was developed by the U.S. Geological Survey (USGS) and is the most frequently used test for detecting trends in environmental sciences (Helsel et al., 2006). Trends were calculated for 5-year, 10-year, and 20-year periods using a MK test adapted for the Python programming language (Hussein, et al. 2019). Analysis was performed on the annual mean water level for the spring months including March, April, and May. Wells were classified as having insufficient data if, during a given period, they contained less than 80% of the required data points or fewer than five total observations.

The trend test results summarized in Table 3 show that most wells in the SEB network show either rising water-level trends or statistically insignificant trends. Detailed results for each well are listed in Appendix C.

Table 3. Summary of Mann-Kendall test results for 37 active wells in the SEB GWMA network.

Period	# Wells With Rising Water-Level Trend	# Wells With Declining Water-Level Trend	# Wells with Insignificant Trend	# Wells with Insufficient Data	Trend Range
5 years	5 (13%)	1 (3%)	25 (68%)	6 (16%)	-0.7 to 1.6 ft
10 years	11 (30%)	5 (14%)	16 (42%)	5 (14%)	-1.4 to 2.3 ft
20 years	12 (32%)	2 (5%)	13 (35%)	10 (27%)	-0.5 to 4.9 ft

Wells that exhibited increasing water-level trends were typically located inside the GWMA and to the south of the GWMA (Figures 2, 3, and 4), while wells that exhibited decreasing water-level trends were typically located to the west and southwest of the GWMA (Figures 2 and 3). For the 5-year trend analyses the magnitude of water-level changes ranged from -0.7 to 1.6 feet per year (Figure 2). For the 10- year trend analyses the magnitude of water-level changes ranged from -1.4 to 2.3 feet per year (Figure 3). The magnitude of trends for the 20-year period skewed higher and ranged from -0.5 to 4.9 feet per year (Figure 4). The number of wells that showed a significant trend was less in the 5-year period (6 wells) compared to the 10- or 20-year periods (16 and 14 wells, respectively). This was likely due to the relatively small number of data points available for trend analysis; 5 points was the minimum for Mann-Kendall trend analysis (Meals, et. al., 2016).

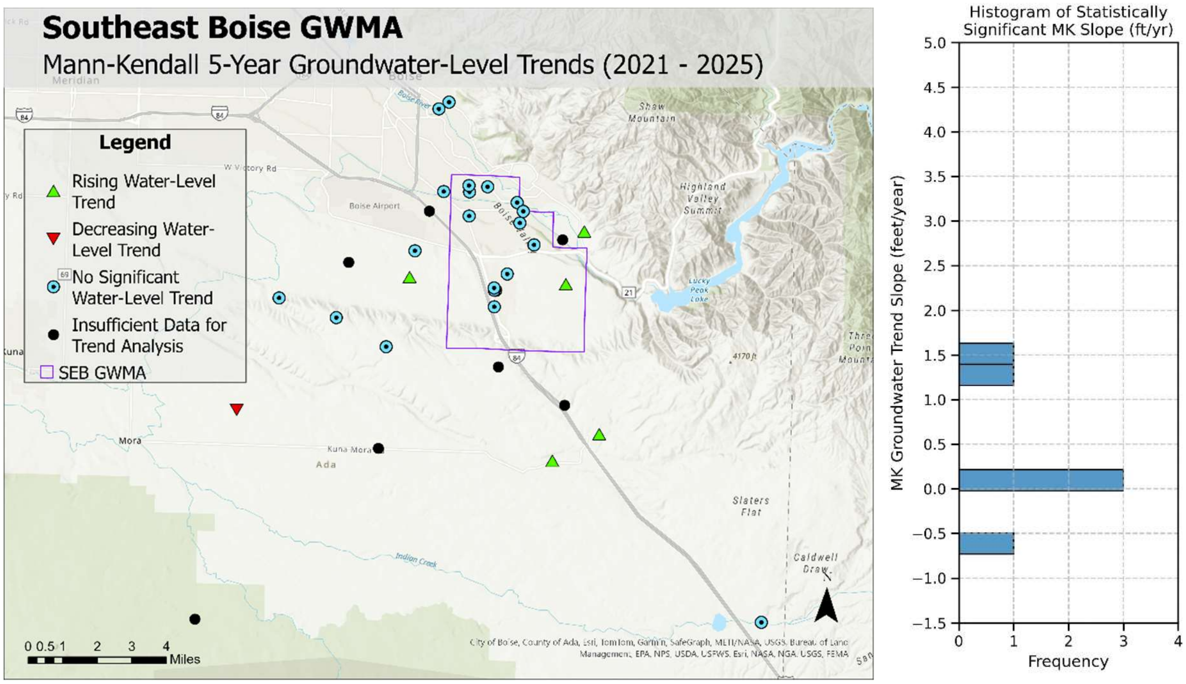

Figure 2. Mapped results of the Mann-Kendall 5-year statistical trend analysis. Rising and declining groundwater trends are shown for each well with a green up arrow and red down arrow, respectively. The frequency and magnitude of significant trends are illustrated in the histogram to the right where positive values indicate rising groundwater level.

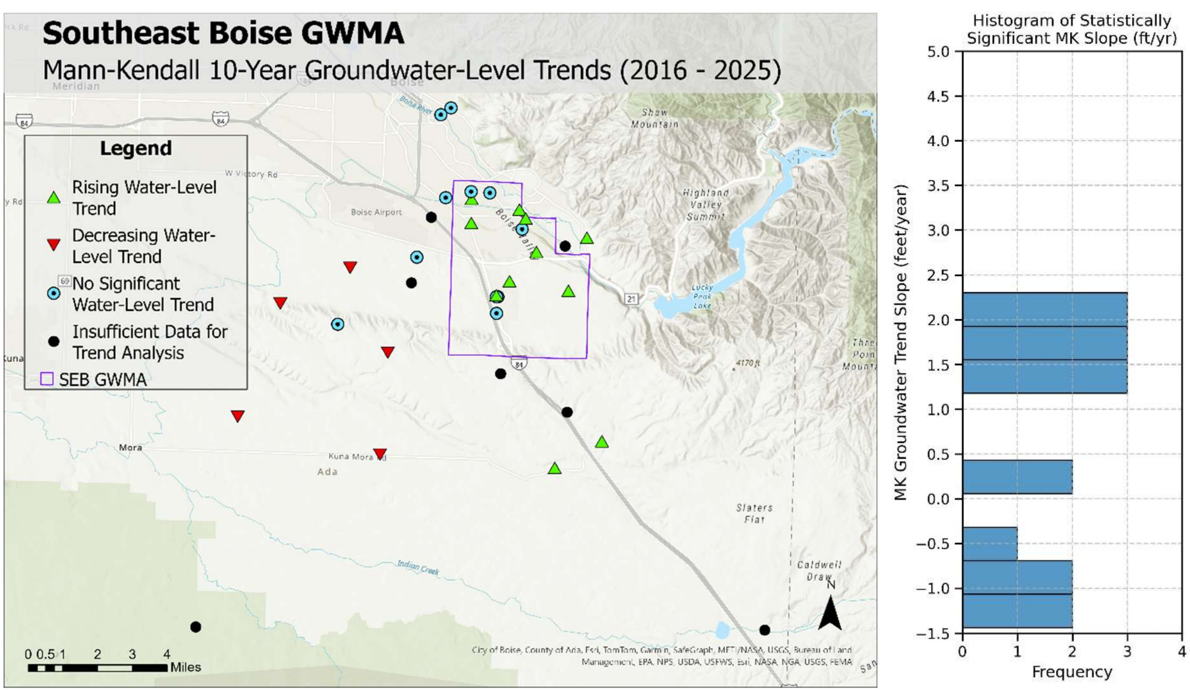

Figure 3. Mapped results of the Mann-Kendall 10-year statistical trend analysis.

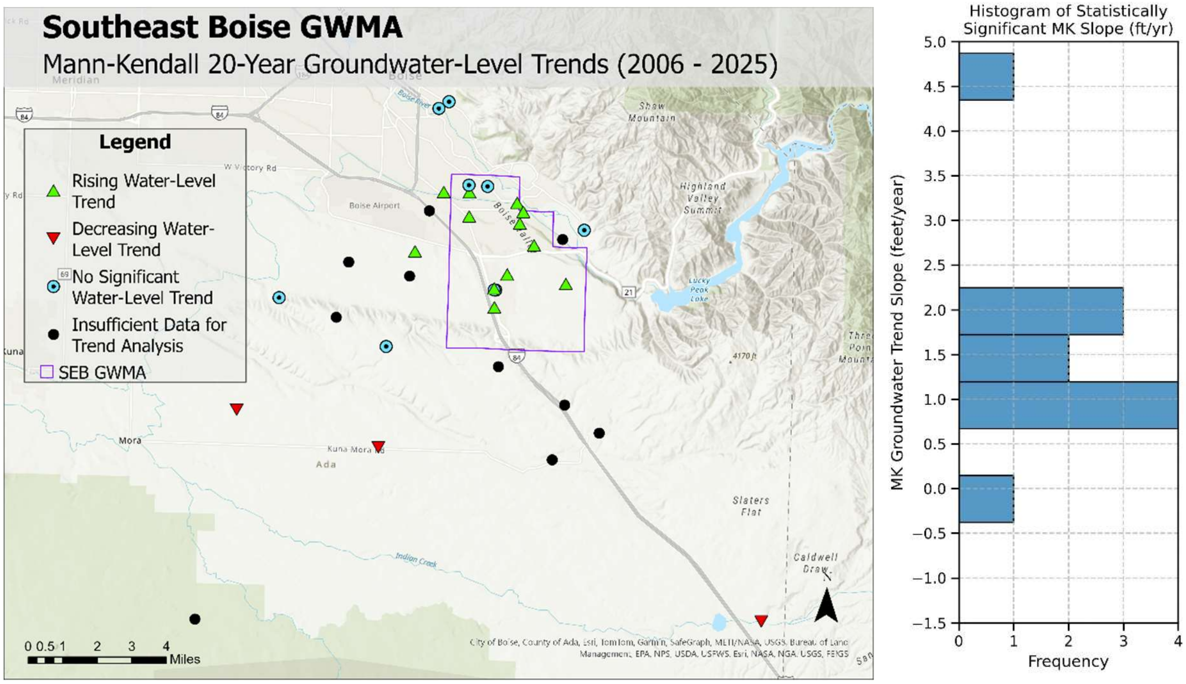

Figure 4. Mapped results of the Mann-Kendall 20-year statistical trend analysis.

It is important to evaluate regional aquifer conditions to determine if the trends found in individual wells are consistent across the area. The Regional Mann-Kendall (RMK) test calculates the regional water-level trend as the median trend for all wells. The RMK has been applied to the most recent 5-, 10-, and 20-year periods (Table 4).

Table 4. Regional Mann-Kendall water-level trends for 37 active wells in the SEB GWMA network.

Period	Trend (feet/year)	p-value
5 years	0.35	0.00
10 years	0.12	0.00
20 years	0.28	0.00

The RMK analyses indicate statistically significant regional rising water-level trends of 0.35 feet/year, 0.12 feet/year, and 0.28 feet/year for the most recent 5-, 10-, and 20-year periods, respectively.

Discussion

Summary

IDWR manages a groundwater-level monitoring network in and around the SEB GWMA. The network consists of 37 wells which were analyzed for water-level trends over the last 5-, 10-, and

20-year periods. Statistical Mann-Kendall analysis showed a mix of rising, declining, and insignificant groundwater-level trends. Wells located inside the GWMA tend to show rising or undetermined trends. Wells located to the west and southwest of the GWMA typically show decreasing or insignificant trends.

Recommendations

In May of 2023, the Advisory Committee made the following requests to IDWR:

1) Add new wells to the monitoring network, if possible (specifically near the Sunroc Well and the City of Boise injection/test wells).
2) Develop improved elevation data for the wells that currently utilize data based on topographic map data.
3) Analyze groundwater-level data utilizing a statistical trend-test methodology.
4) Produce hydrographs in the annual report using consistent scales whenever possible.
5) Upgrade transducer deployment to improve data collection.

IDWR has completed work on several of these recommendations with the following updates:

1) No new wells have been added to the monitoring network. IDWR will continue to work to identify new candidate wells and/or pursue drilling dedicated monitoring wells.
2) Improved ground surface elevation data was collected in October 2024 using high-precision GPS. IDWR's groundwater-level database was updated with high-precision GPS elevation values for 22 wells in May 2025. Updated elevation values are listed in Appendix D.
3) Mann-Kendall trend analysis was completed for 5-, 10-, and 20-year trends. In addition, Regional Mann-Kendall trend analysis was completed for 5-, 10-, and 20-year trends.
4) Hydrographs using a consistent scale were created for individual wells and mapped in Appendix B.
5) A transducer was rei-installed at IDL House in June 2025 to improve data collection in the region with declining water-level trends. IDWR will evaluate additional sites for transducer deployment. Four transducers in the network have been identified as candidates for upgrades when the current units reach end-of-life.

IDWR will continue to seek opportunities to enhance the SEB Monitoring Network and work to address Advisory Committee requests and feedback.

References

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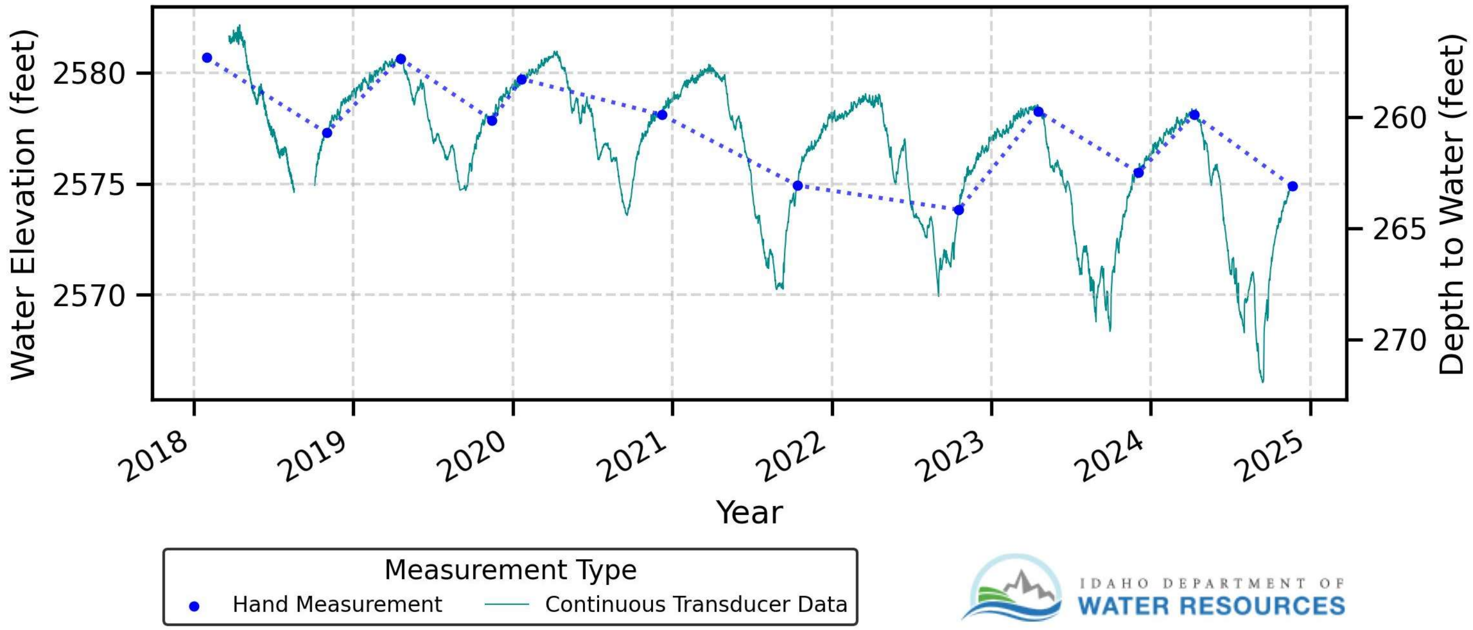
APPENDIX A

INDIVIDUAL HYDROGRAPHS
DISPLAYING FULL RECORDED HISTORY

City of Boise Farm -- Unused Domestic

01N 01E 34AAA1

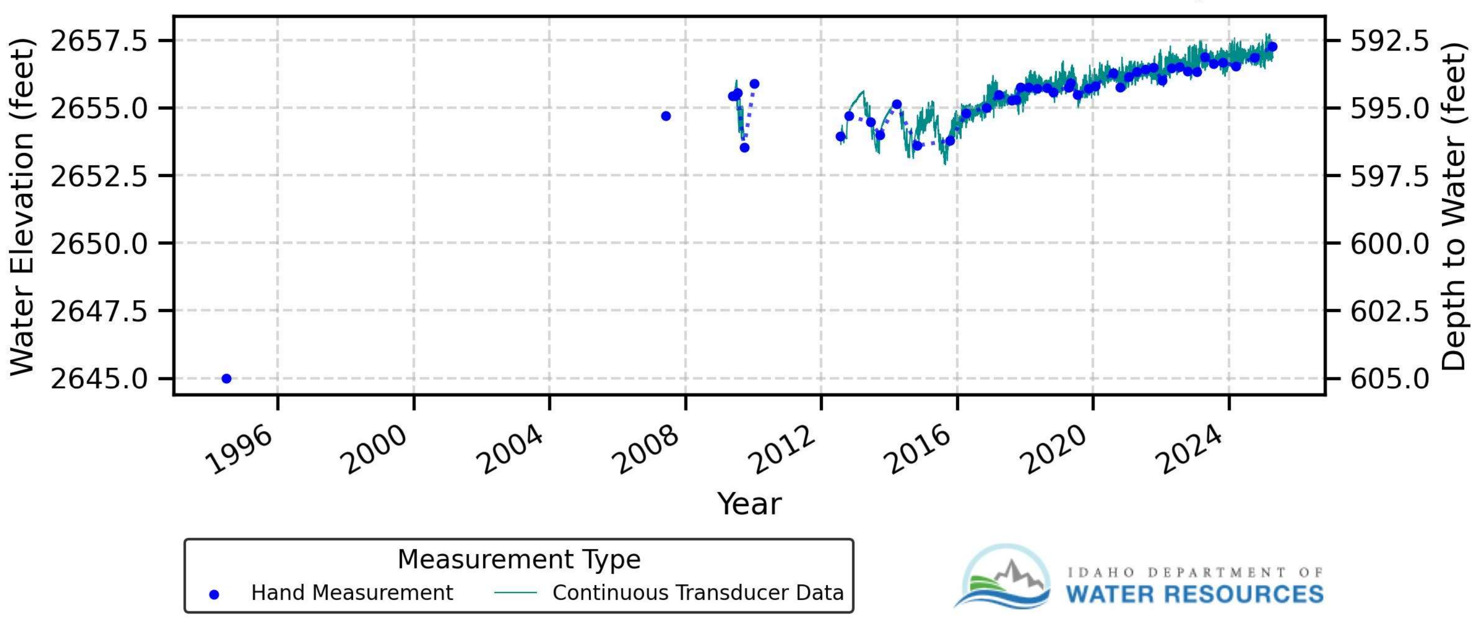
Well Depth = Unknown



Prigge

01N 03E 04BBD1

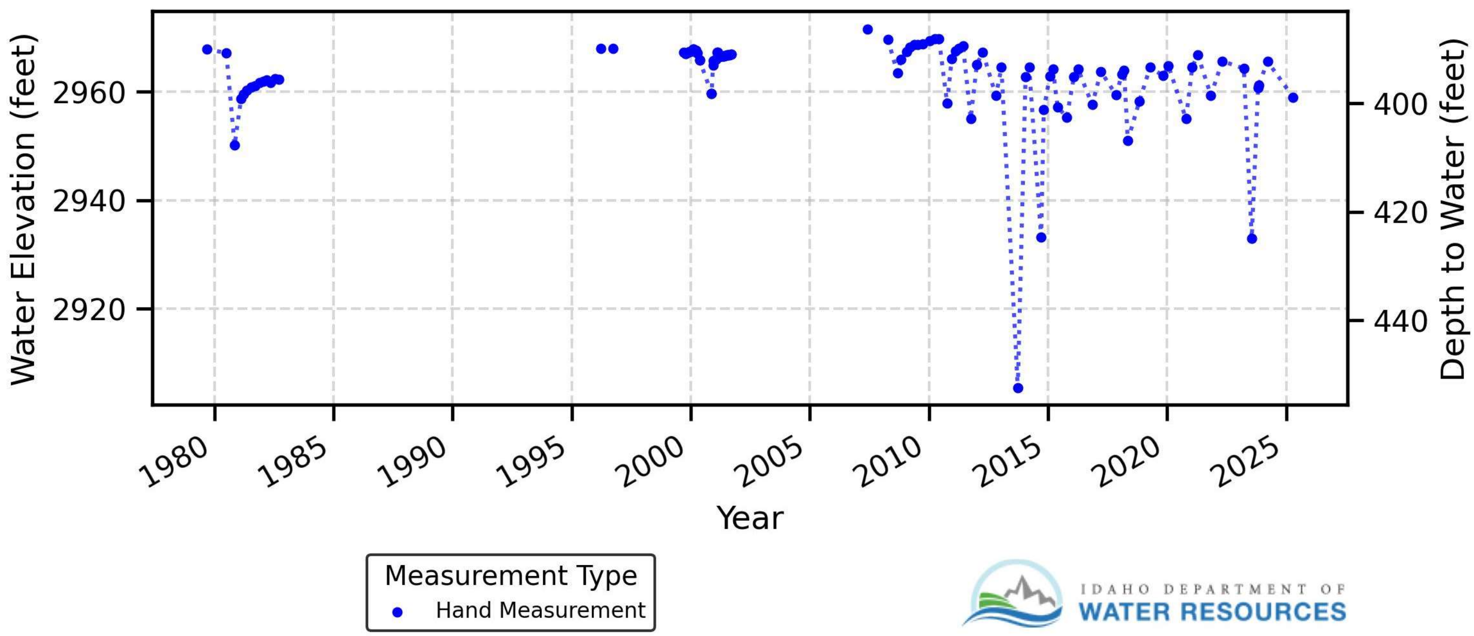
Well Depth = 735



Ken Agenbroad

01N 04E 28CAC1

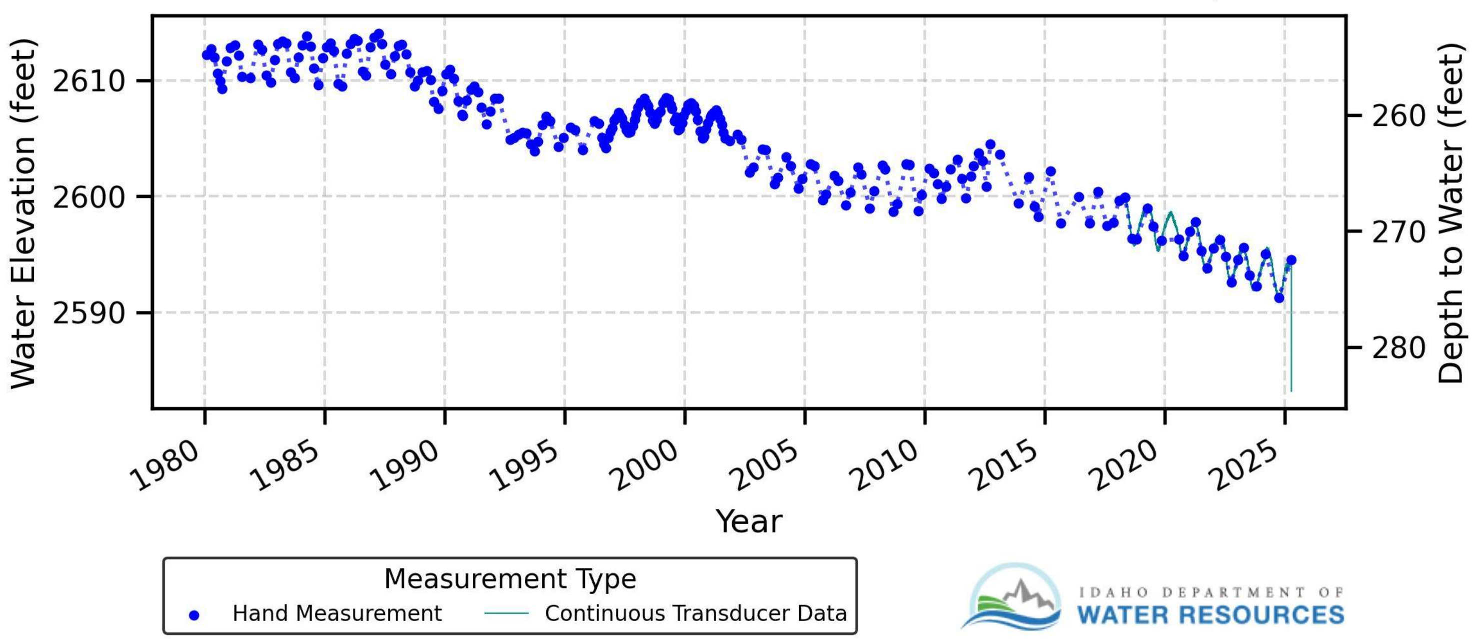
Well Depth = 763

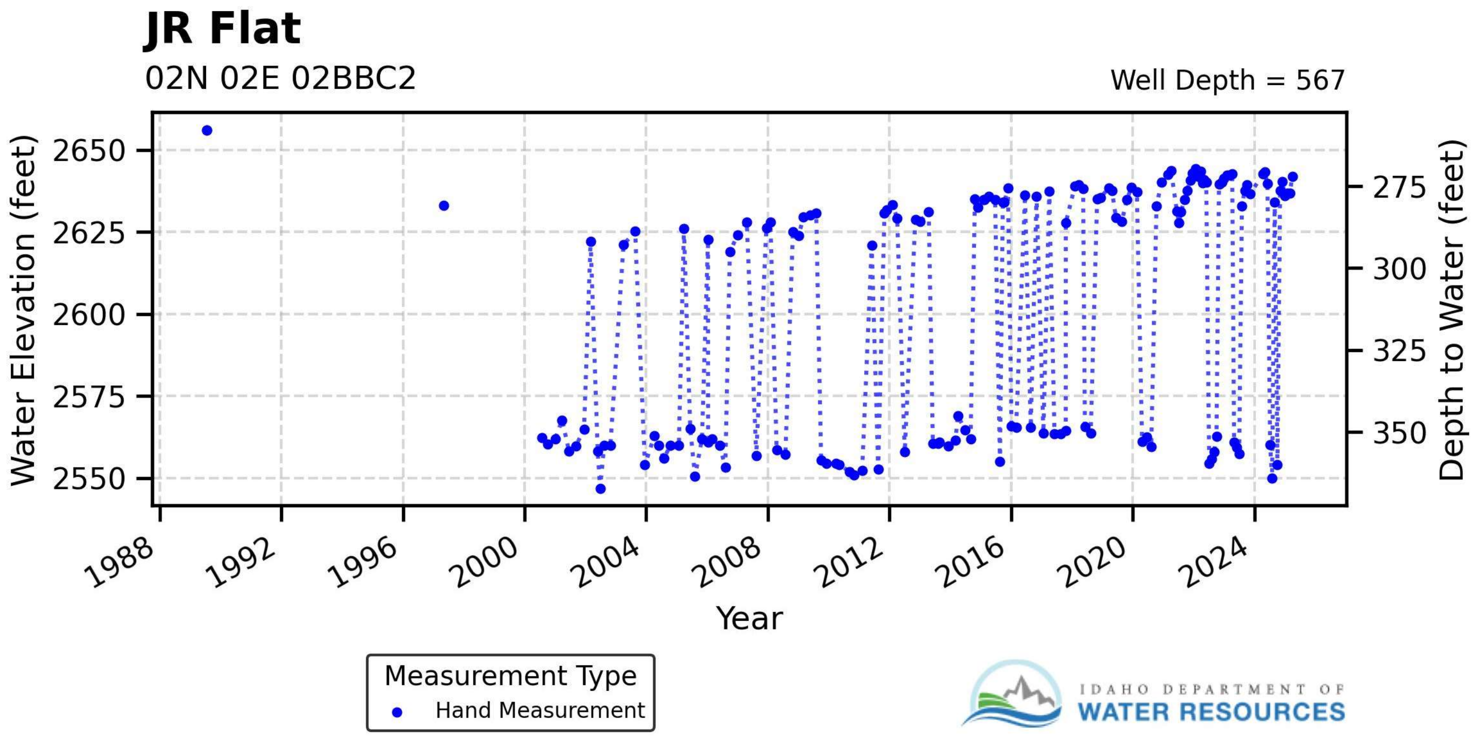


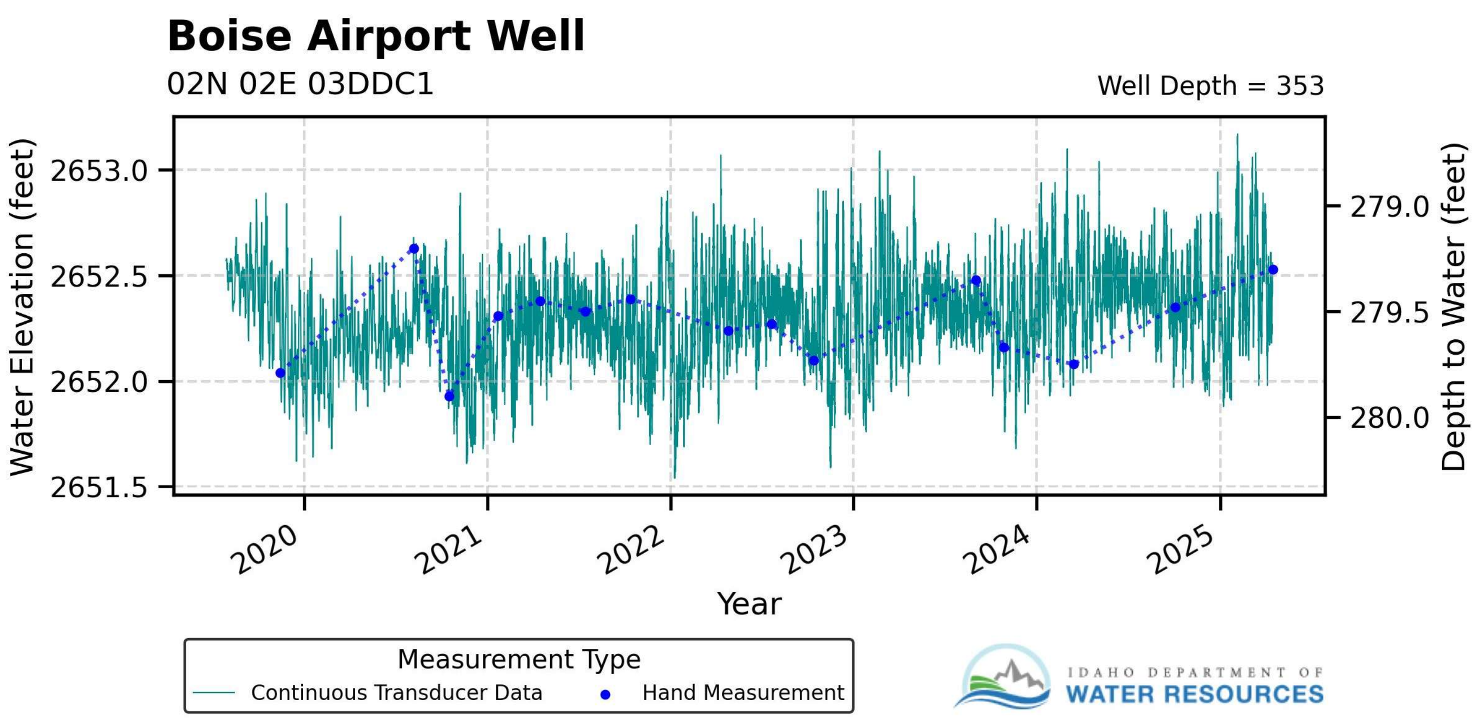
Harris South Cole

02N 01E 36BBB1

Well Depth = 305



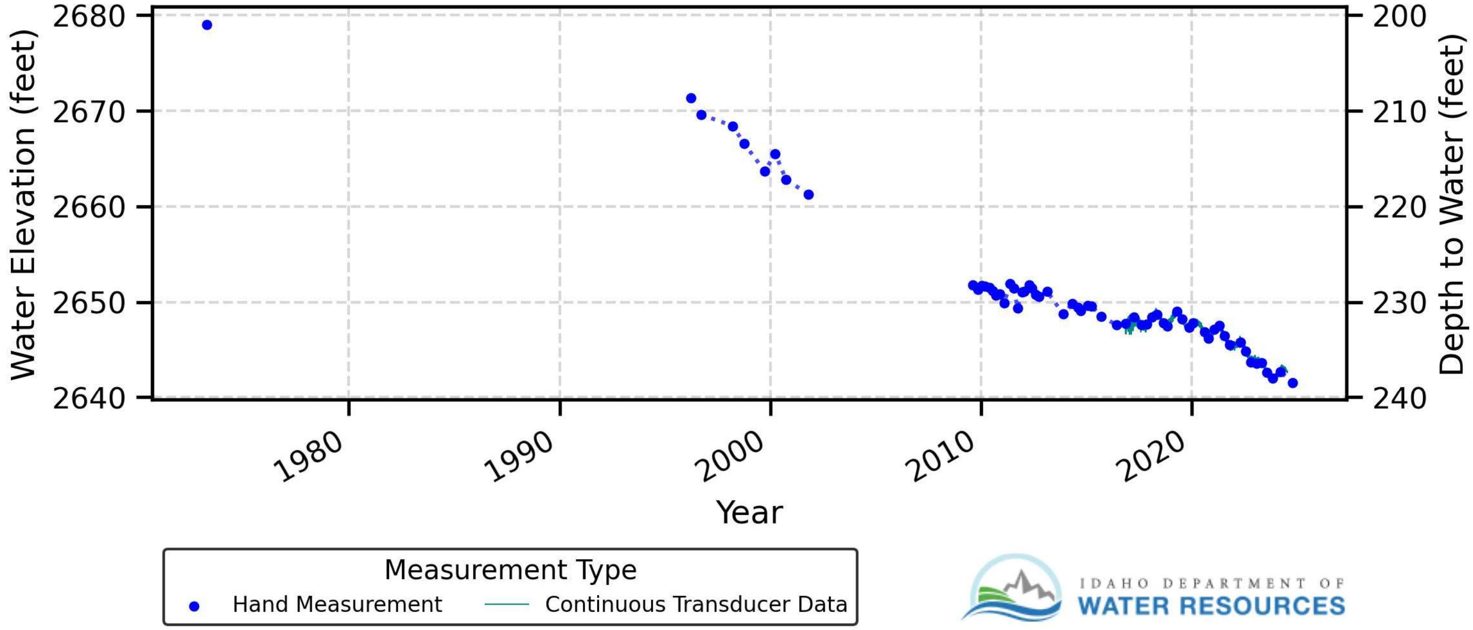

JR Flat
02N 02E 02BBC2
Well Depth = 567
Water Elevation (feet)
Depth to Water (feet)
2650
2625
2600
2575
2550
275
300
325
350
1988
1992
1996
2000
2004
2008
2012
2016
2020
2024
Year
Measurement Type
Hand Measurement


Boise Airport Well
02N 02E 03DDC1
Well Depth = 353
Water Elevation (feet)
Depth to Water (feet)
2653.0
2652.5
2652.0
2651.5
279.0
279.5
280.0
2020
2021
2022
2023
2024
2025
Year
Measurement Type
Continuous Transducer Data
Hand Measurement

IDL House

02N 02E 04CBB1

Well Depth = 353



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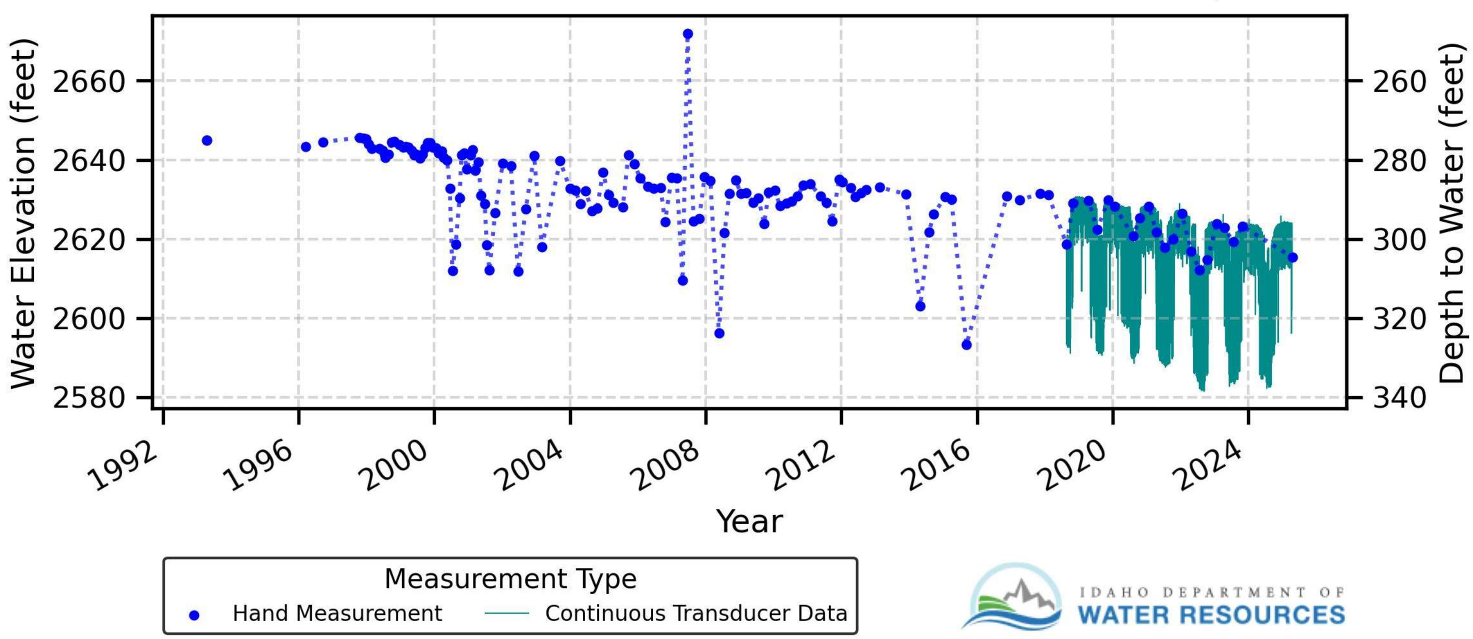
Hollilynn

02N 02E 07CBC1

Well Depth = 460



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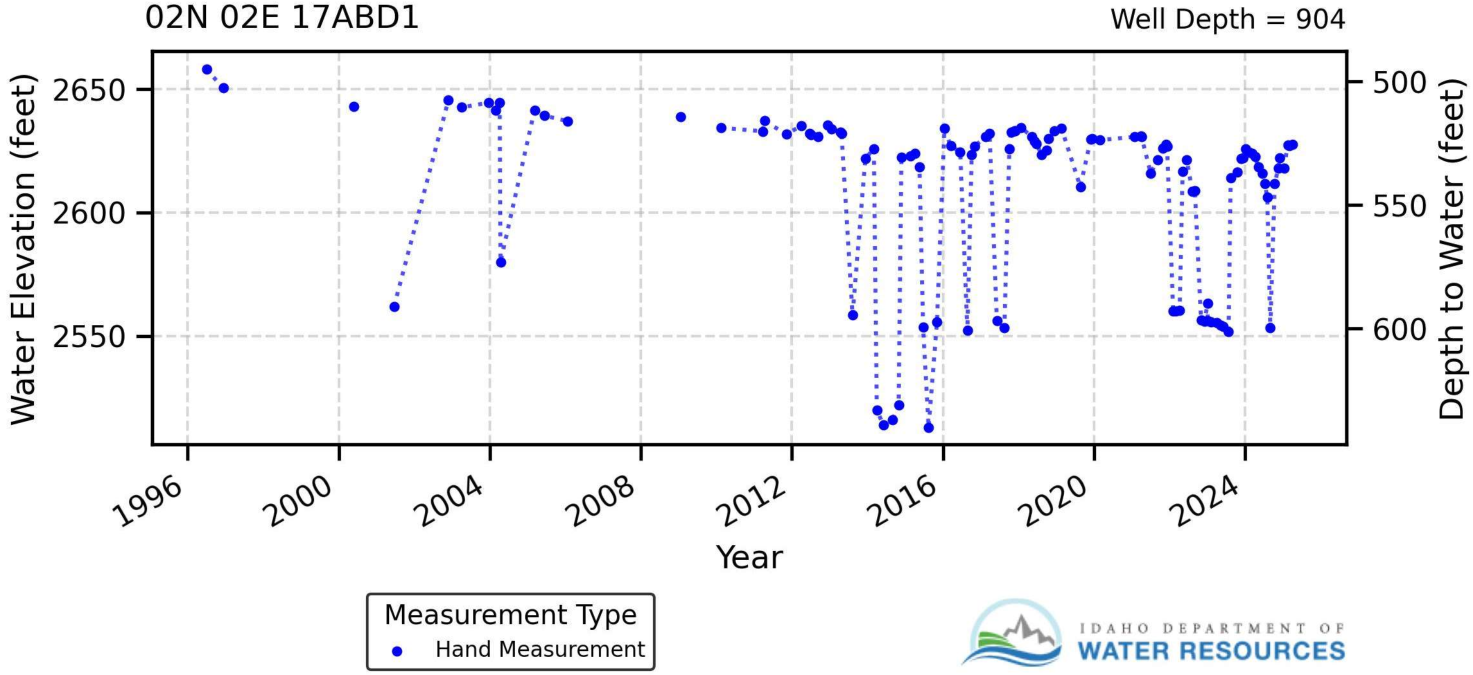
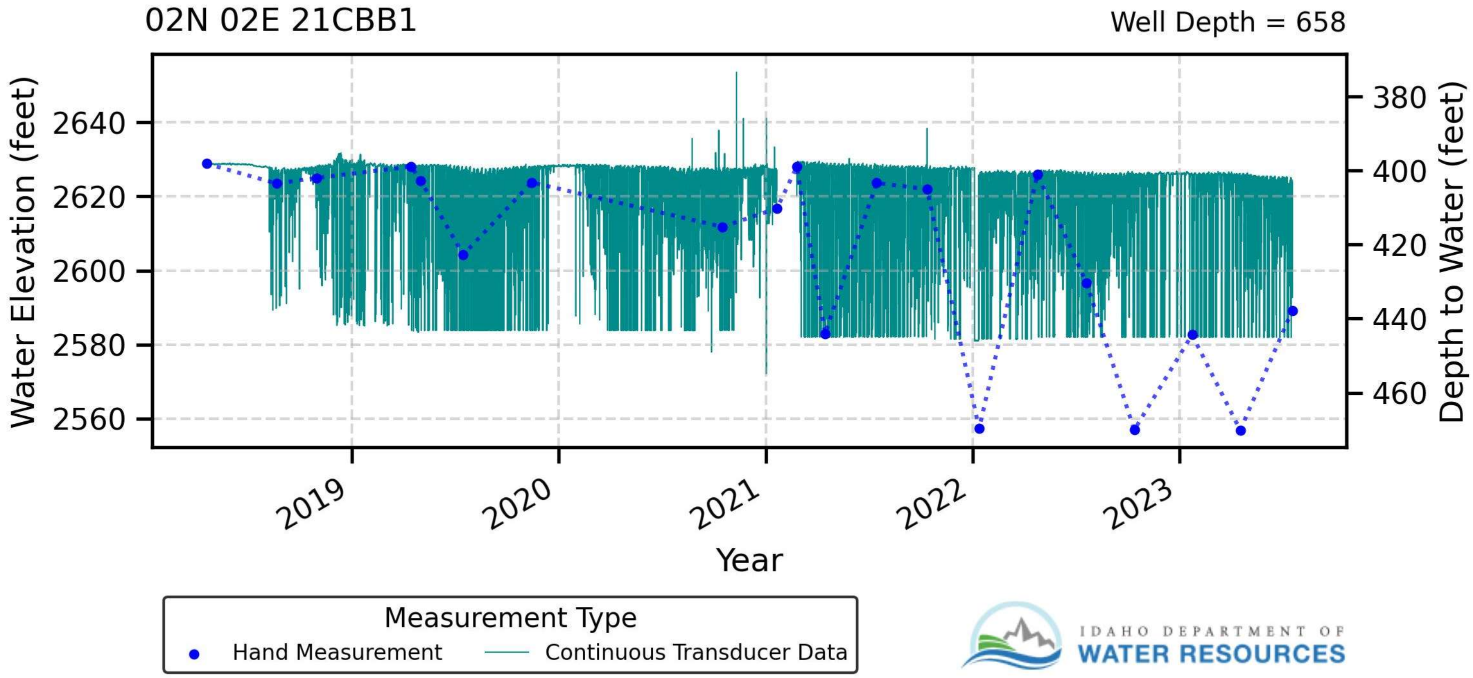
Ten Mile

02N 02E 17ABD1



SunRoc Well

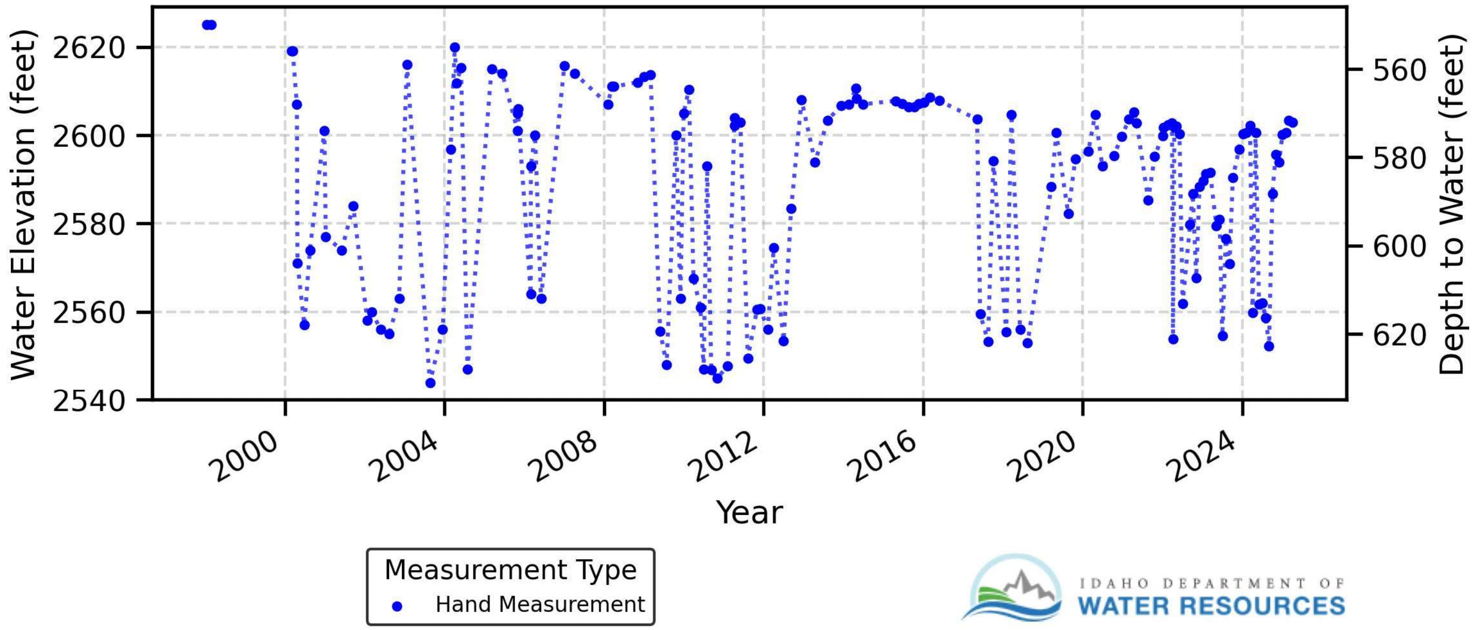
02N 02E 21CBB1



Pioneer

02N 02E 22BBB1

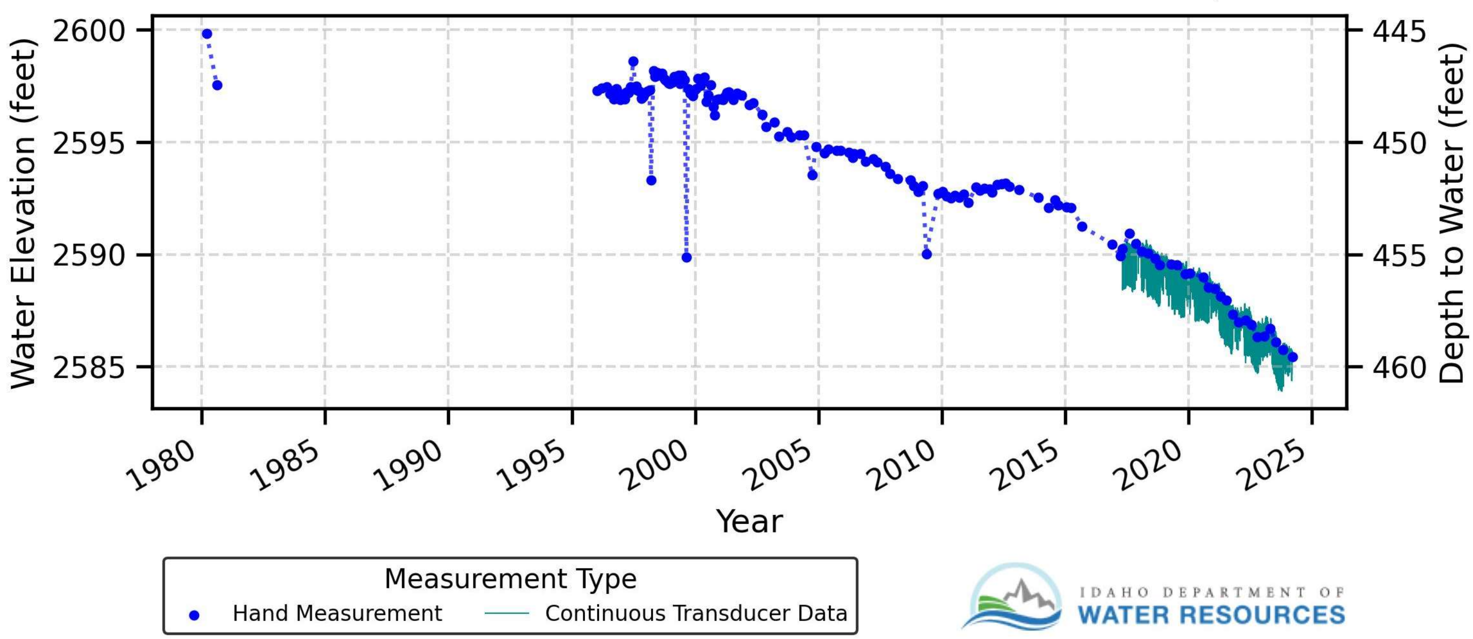
Well Depth = 930



Boise Gun Club

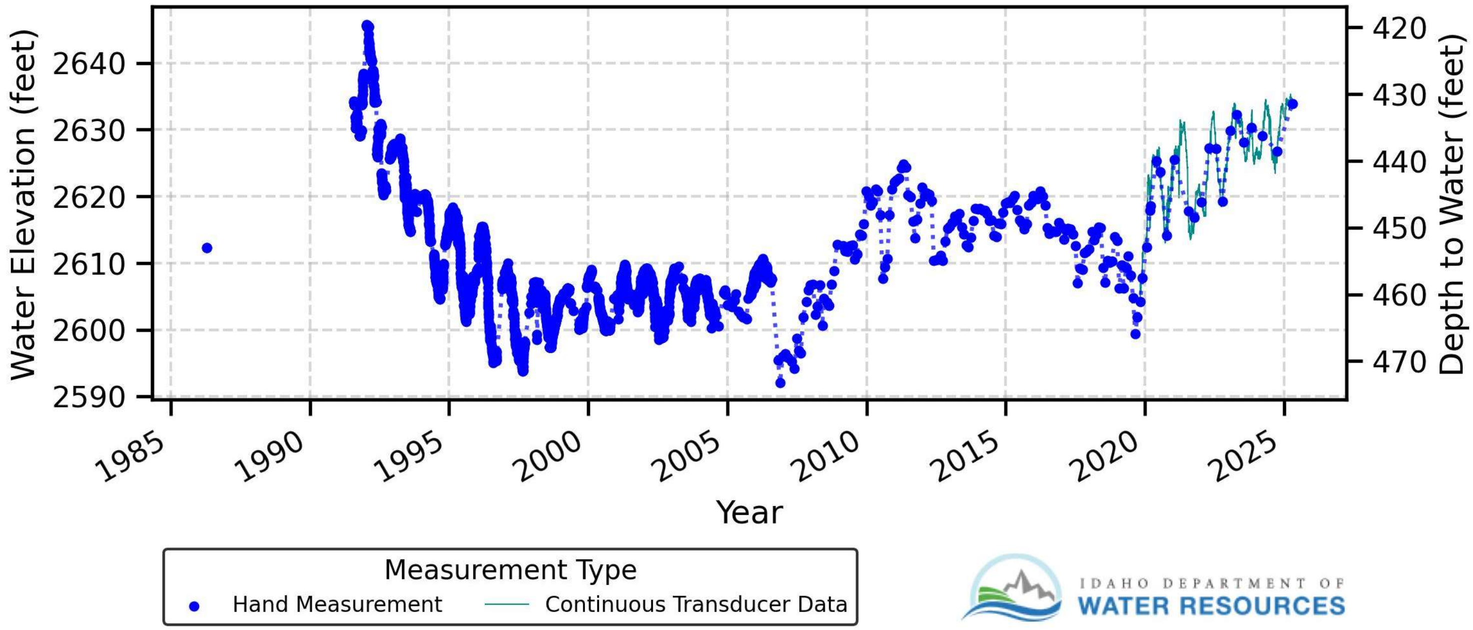
02N 02E 34CCD1

Well Depth = 504



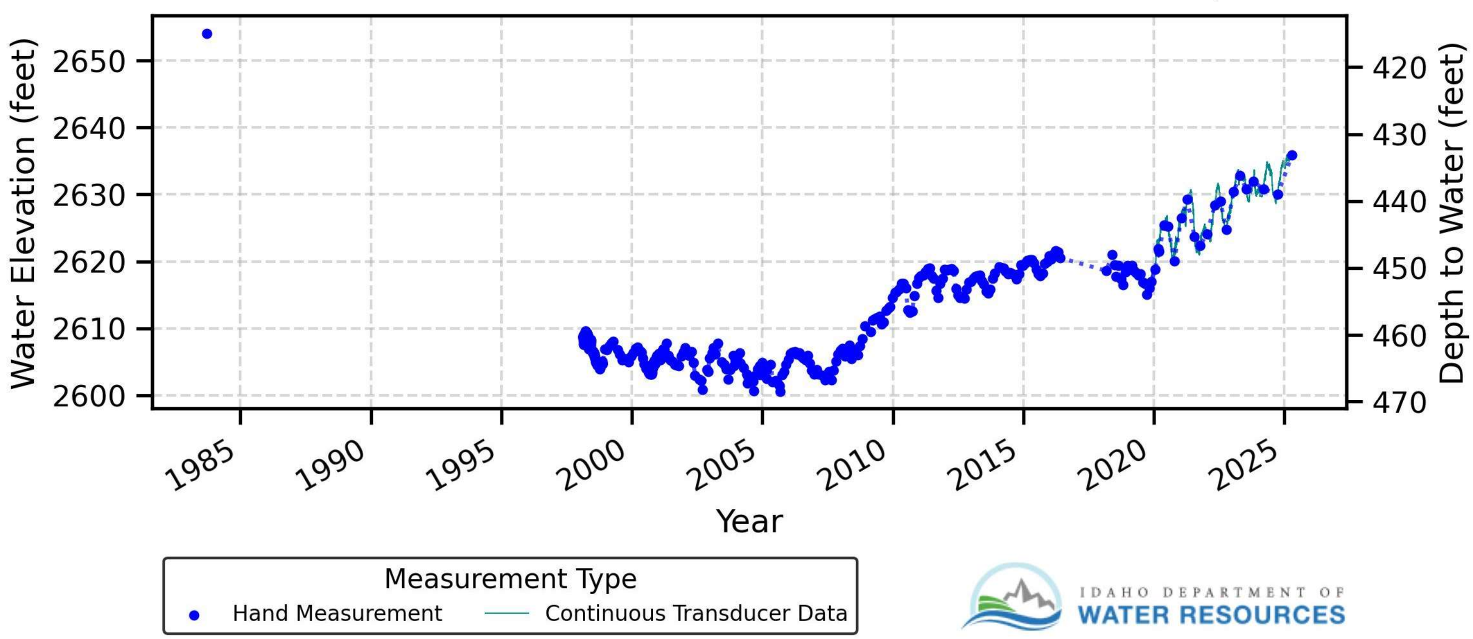
Micron Field Test #1

02N 03E 06DCA1 Well Depth = 855



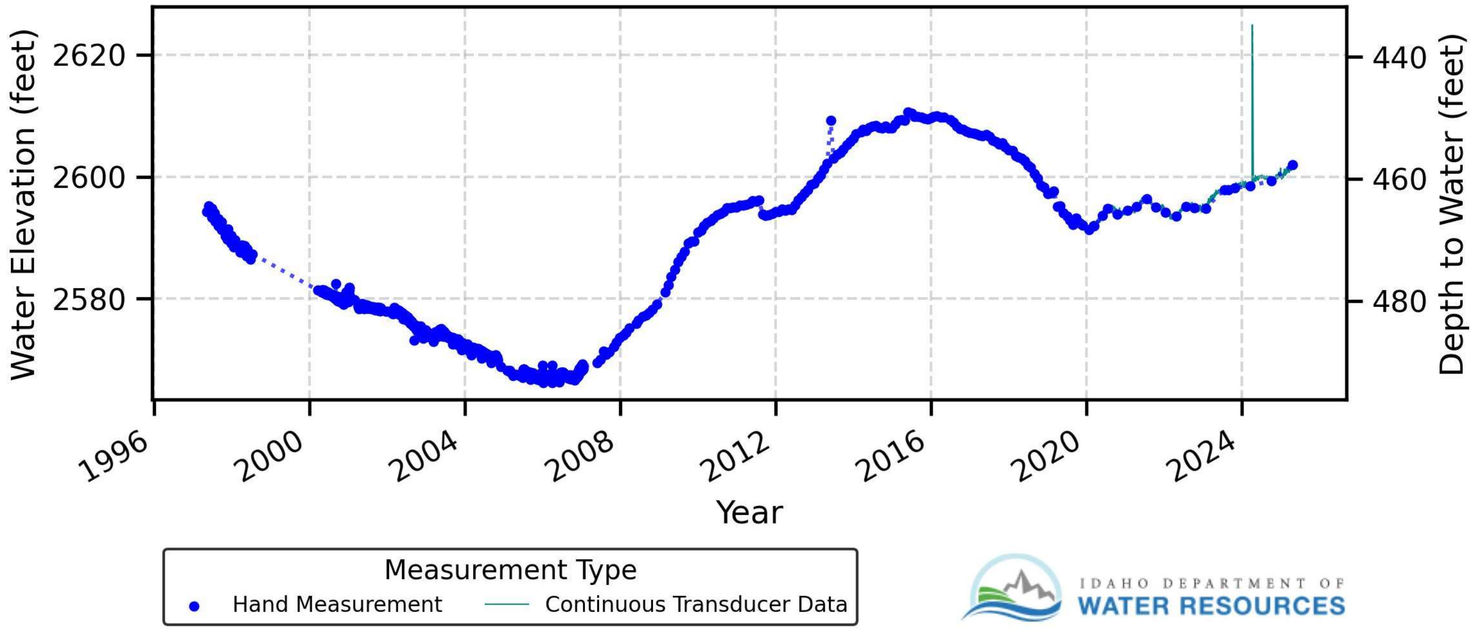
Micron Inner Compound Well

02N 03E 07BAC1 Well Depth = 580



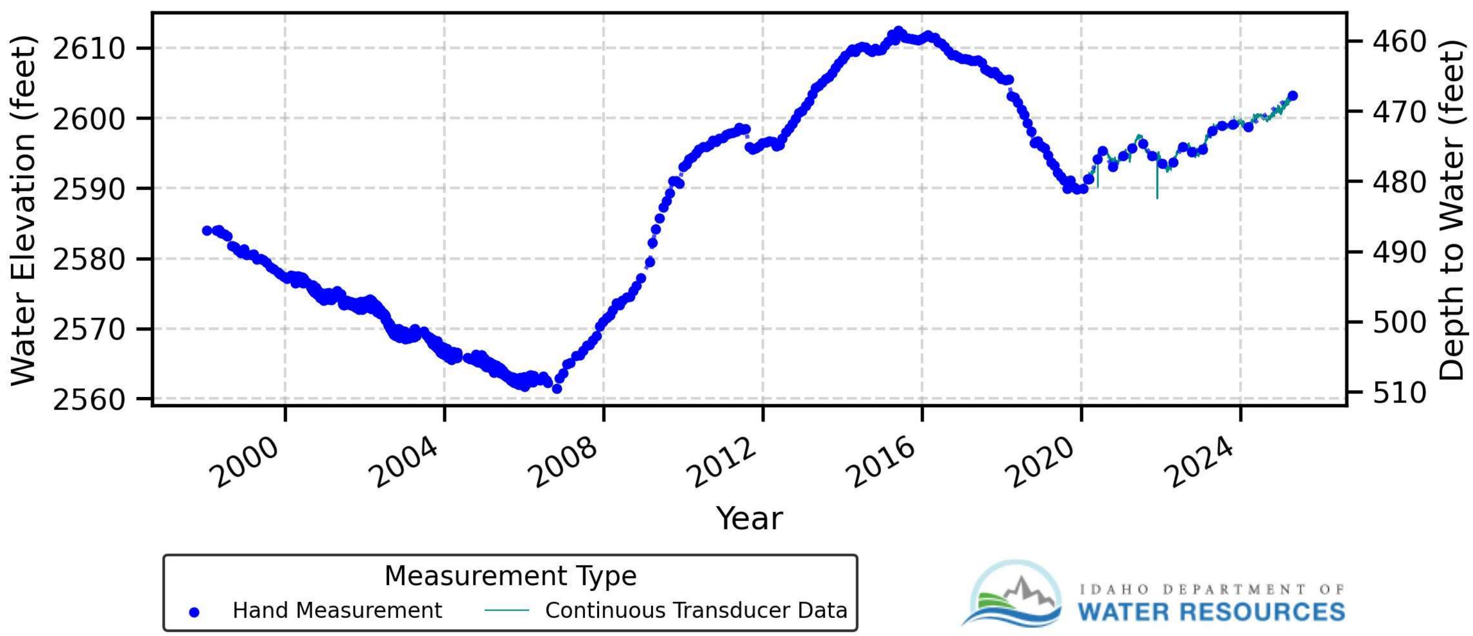
Micron Pettibone

02N 03E 07CDA1 — Well Depth = 478



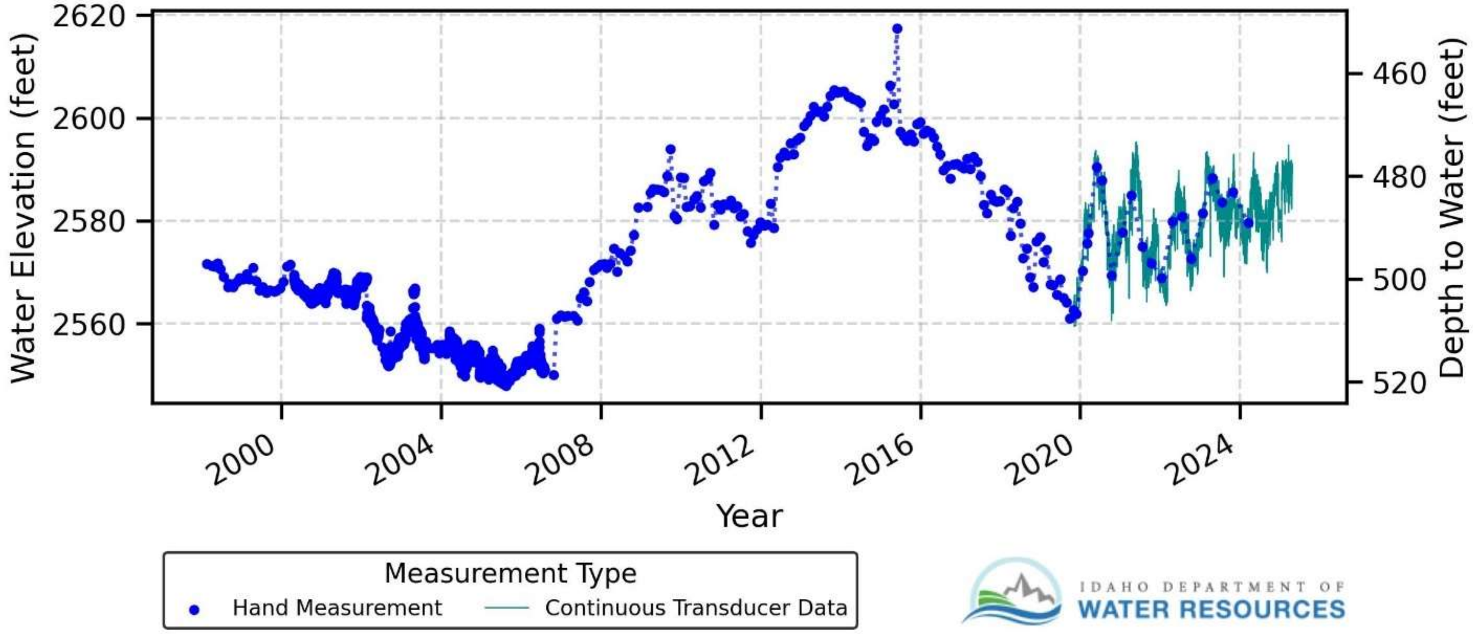
Micron Shallow Obs East Well

02N 03E 07DBB1 — Well Depth = 561



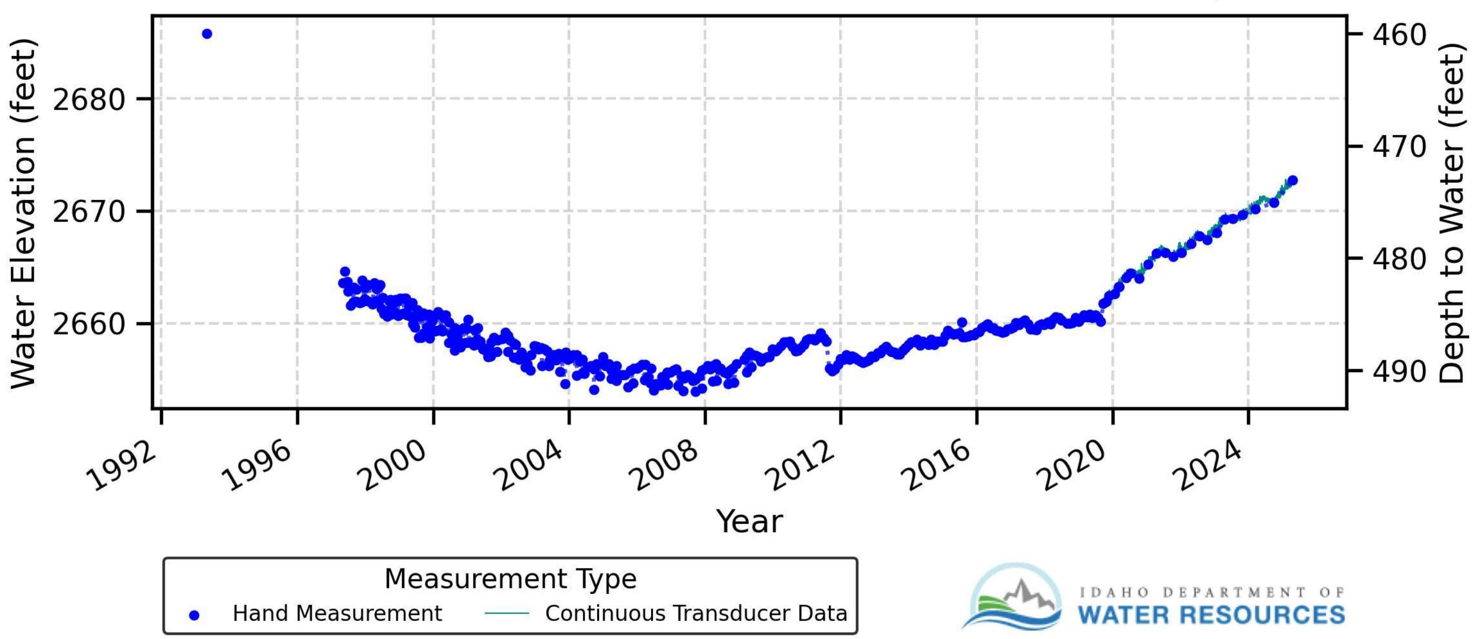
Micron Deep Obs West Well

02N 03E 07DBB2 Well Depth = 811

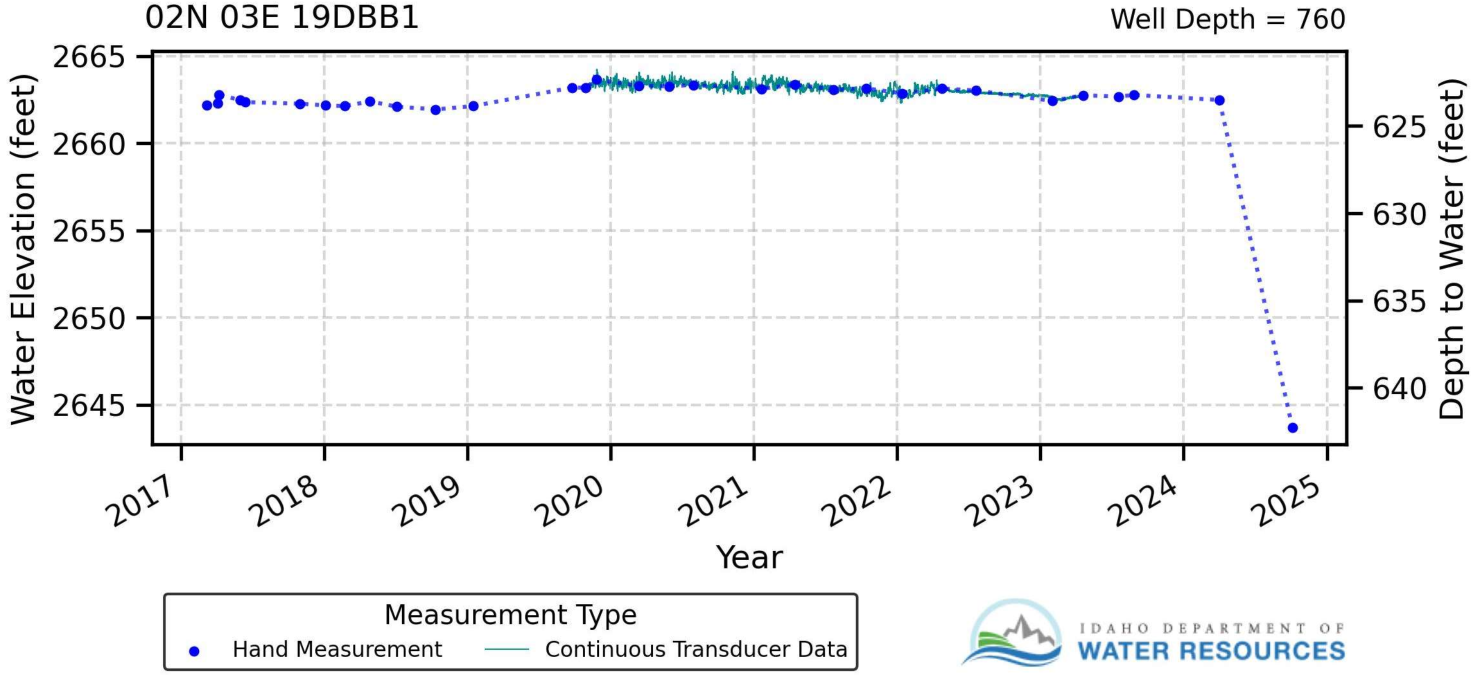


Micron Christensen

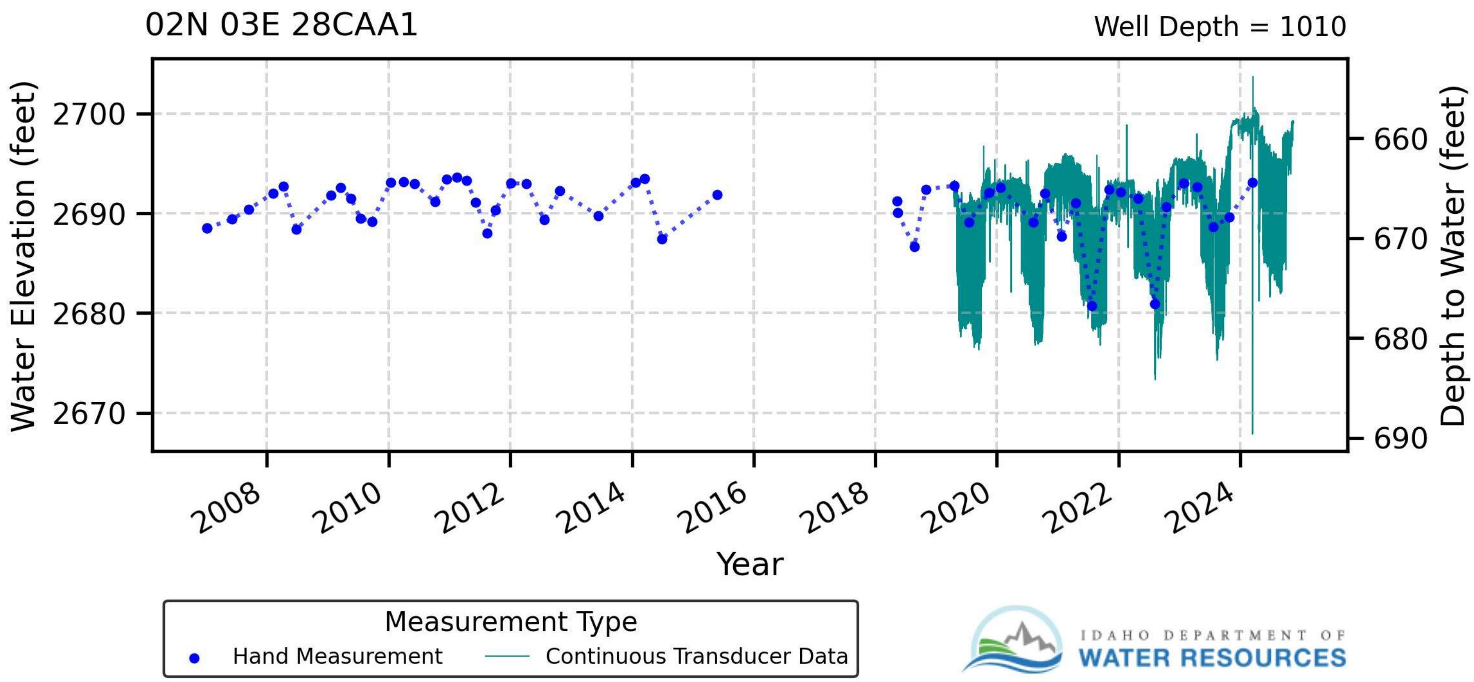
02N 03E 09BAA2 Well Depth = 522



Micron South



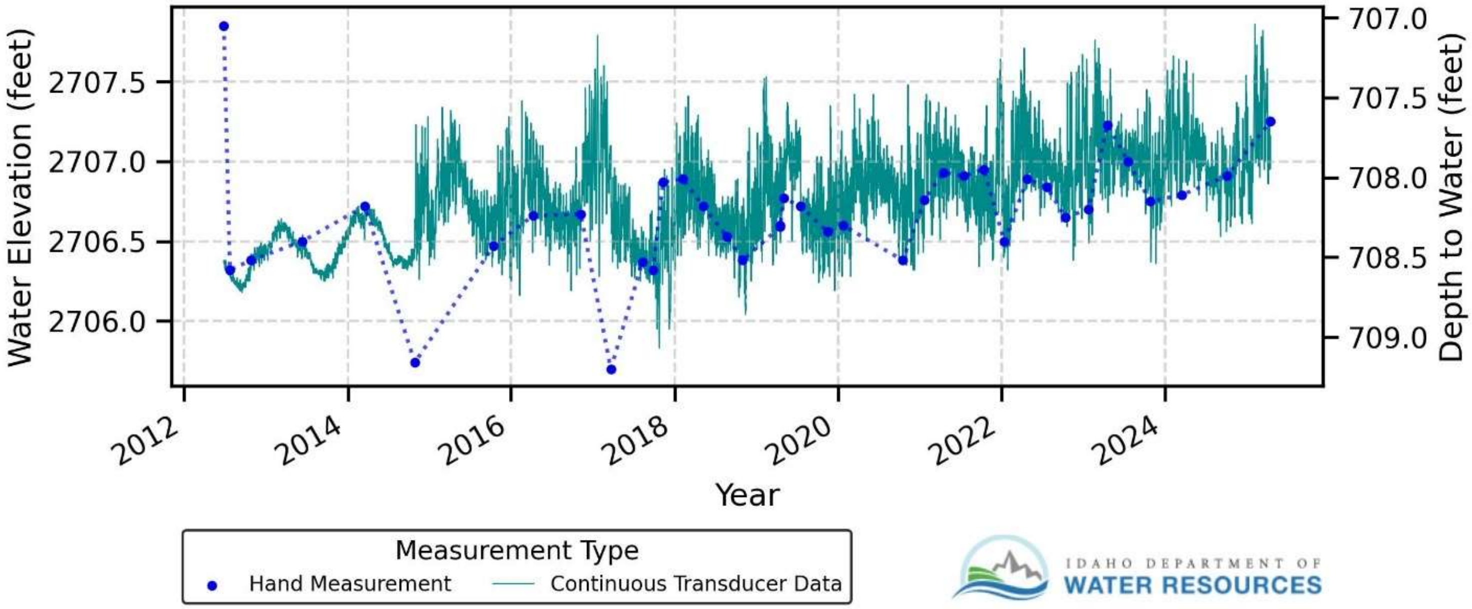
Blacks Creek Rest Area Westbound Well



Blacks Creek Exit ITD Well

02N 03E 34ACC1

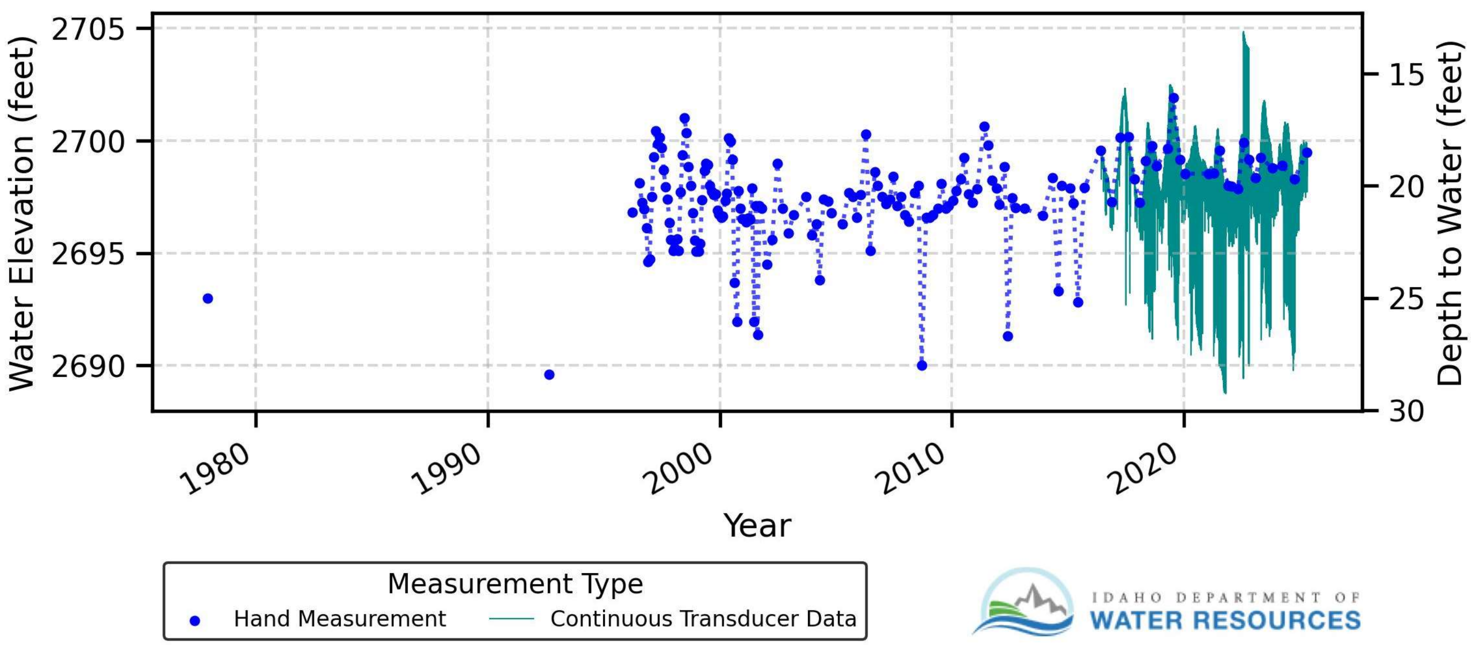
Well Depth = 861



TV Lenzi well

03N 02E 11DDD1

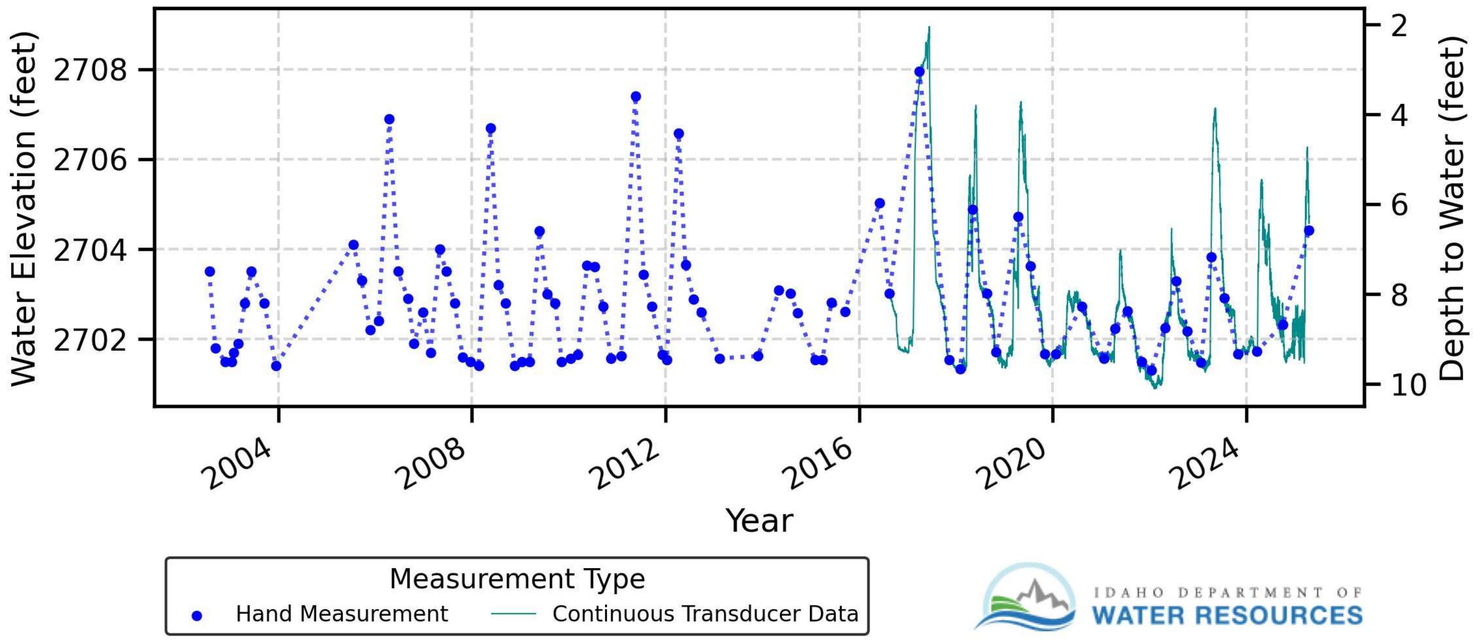
Well Depth = 68



TVHP 4-1

03N 02E 14ABC1

Well Depth = 800

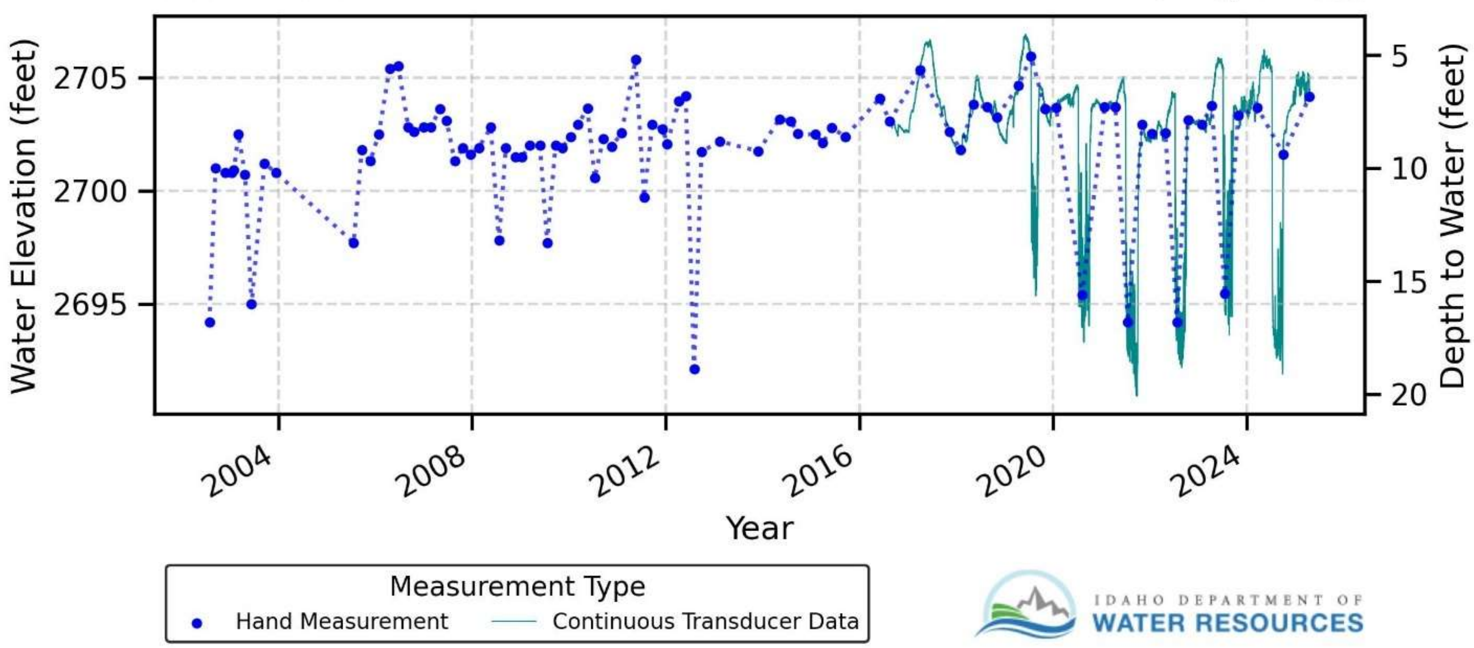


IDAHO DEPARTMENT OF WATER RESOURCES

TVHP 4-2

03N 02E 14ABC2

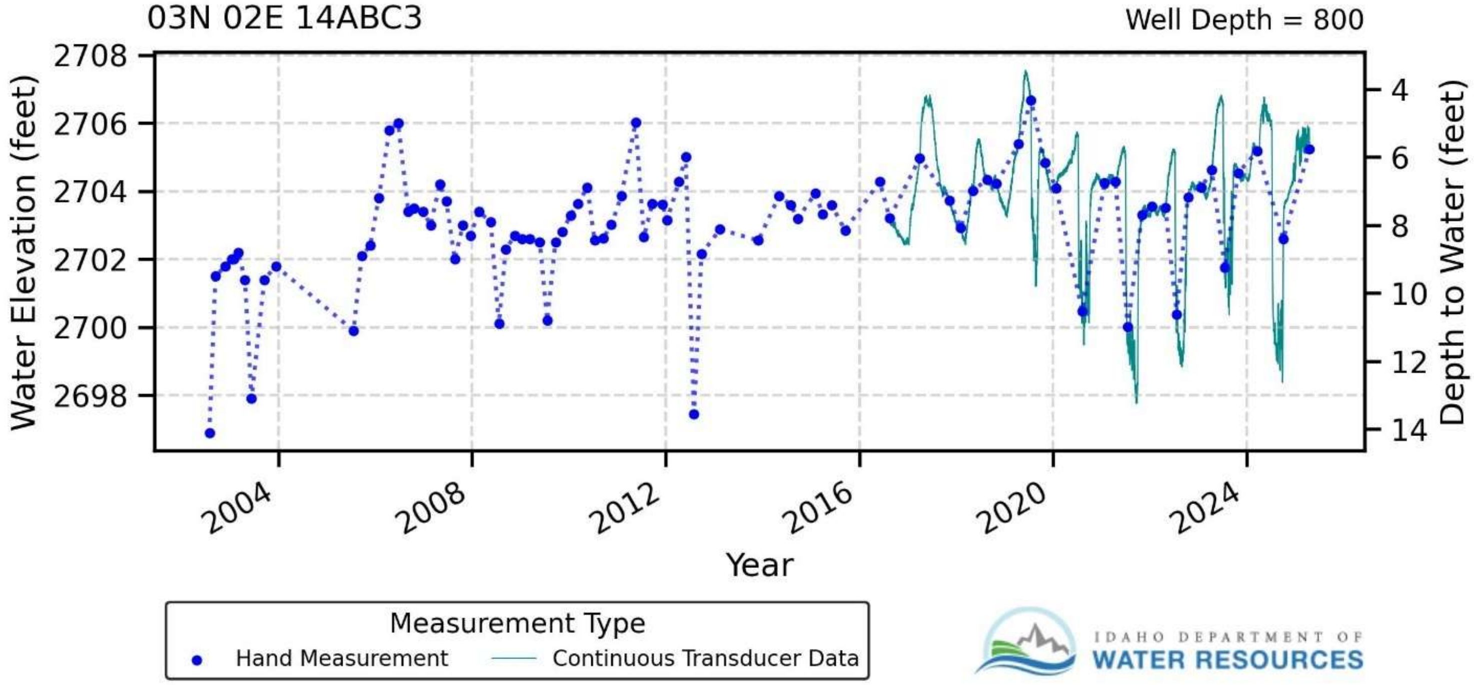
Well Depth = 800



IDAHO DEPARTMENT OF WATER RESOURCES

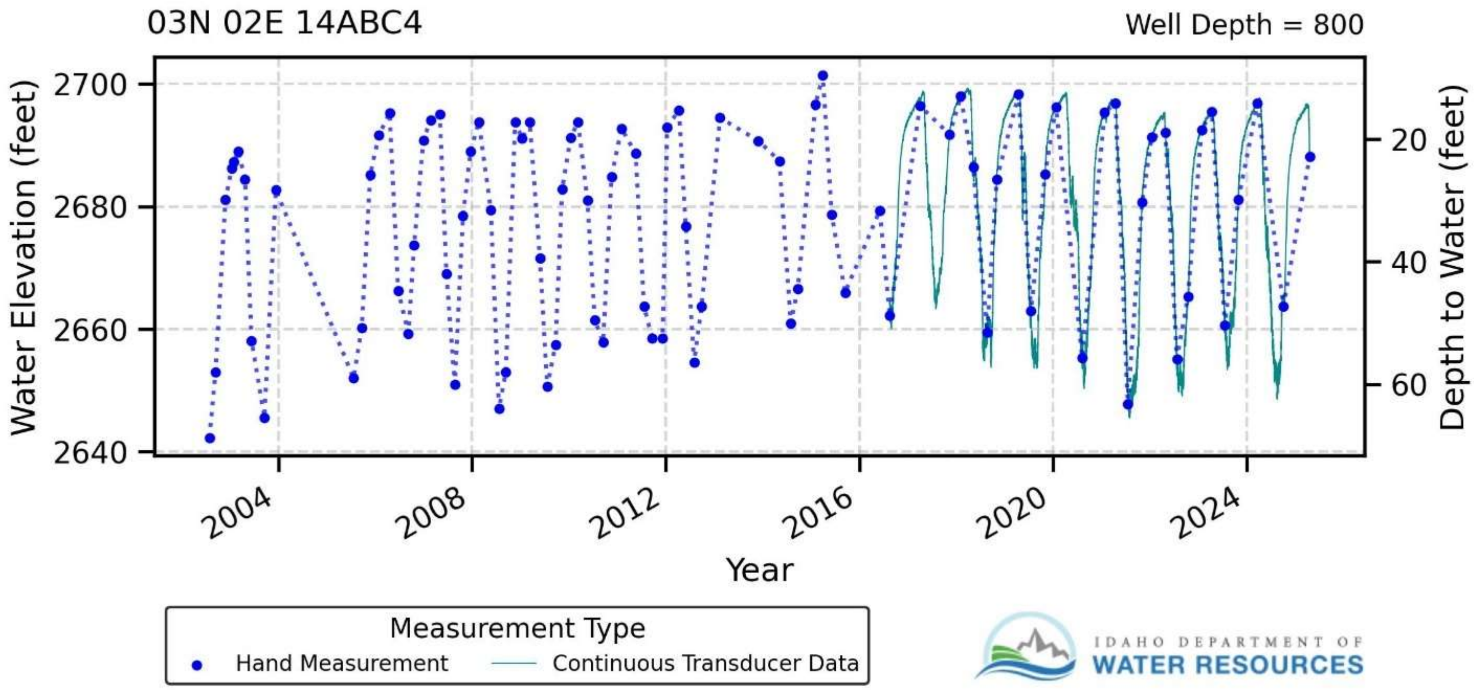
TVHP 4-3

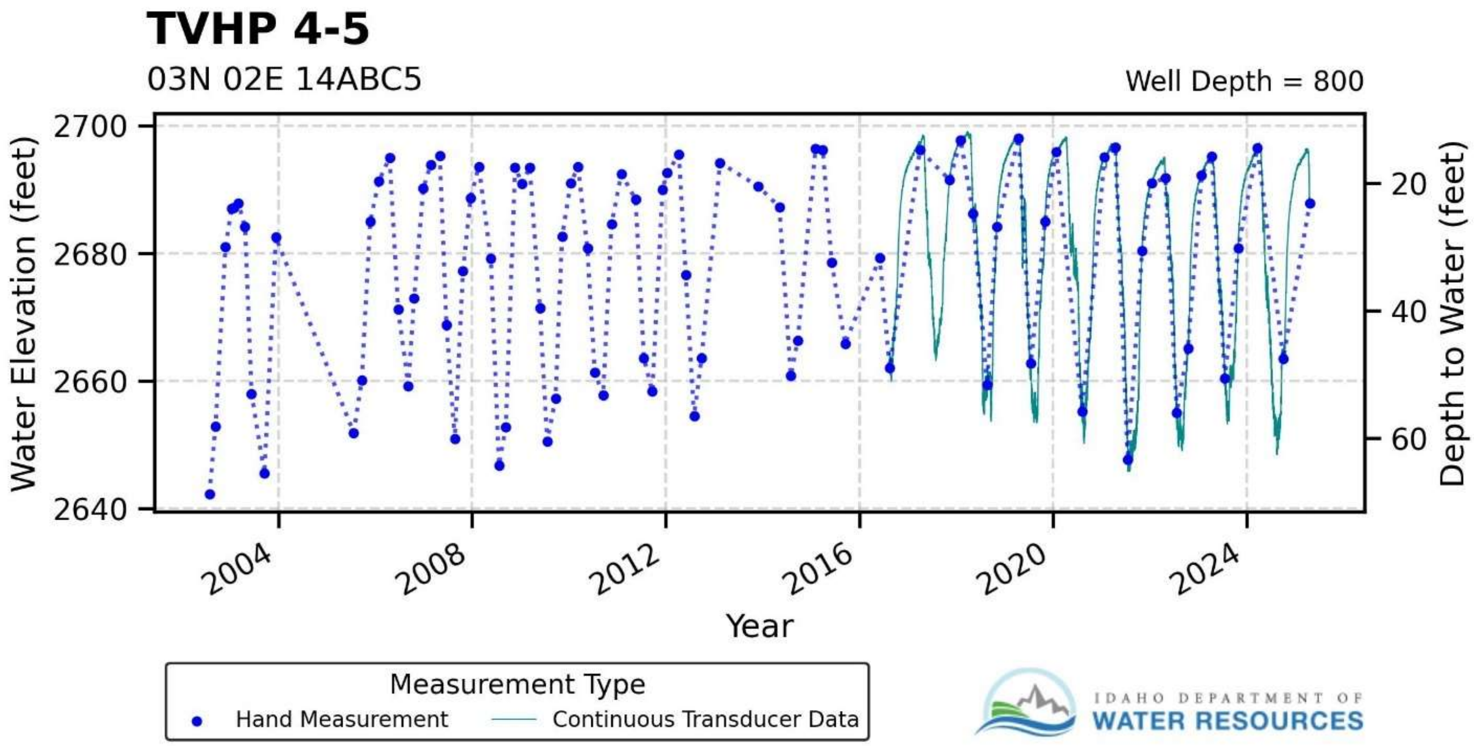
03N 02E 14ABC3

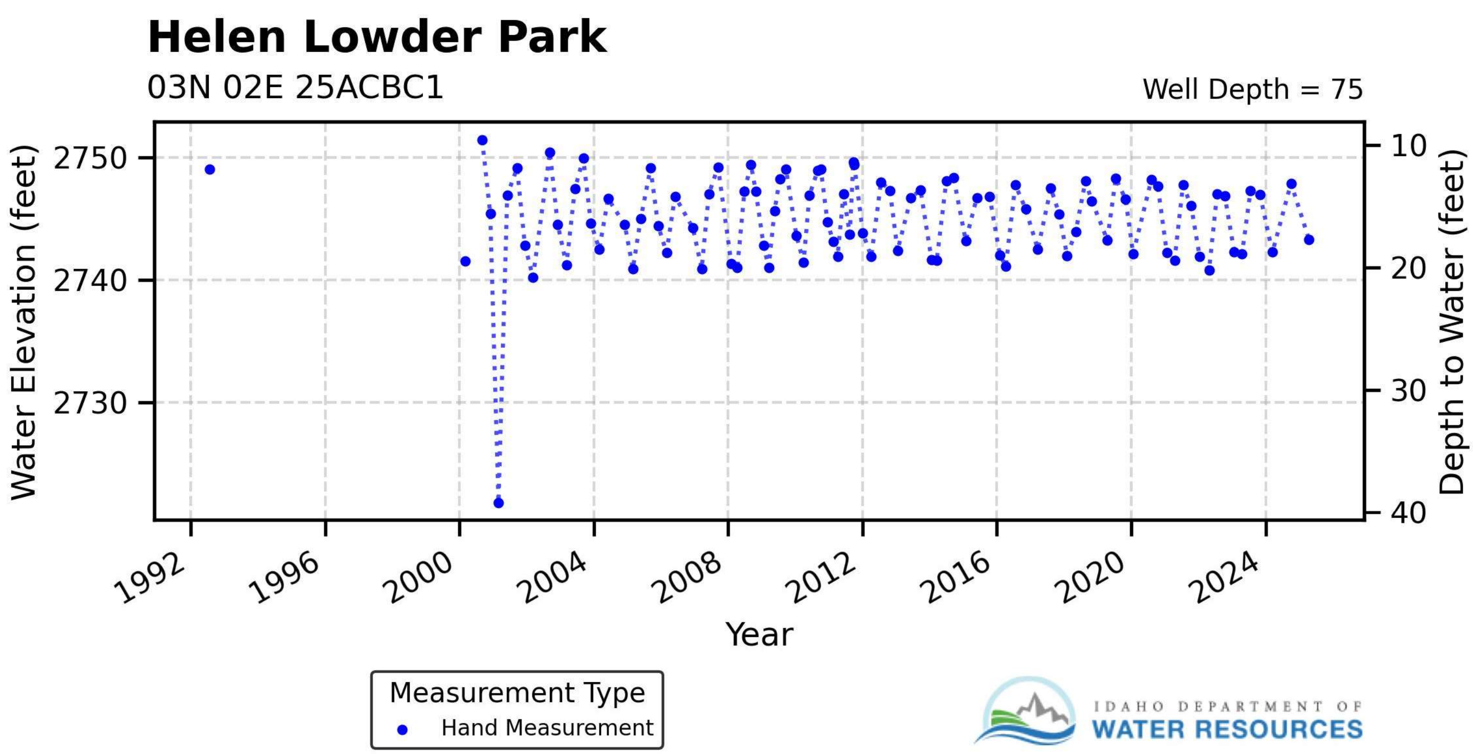


TVHP 4-4

03N 02E 14ABC4



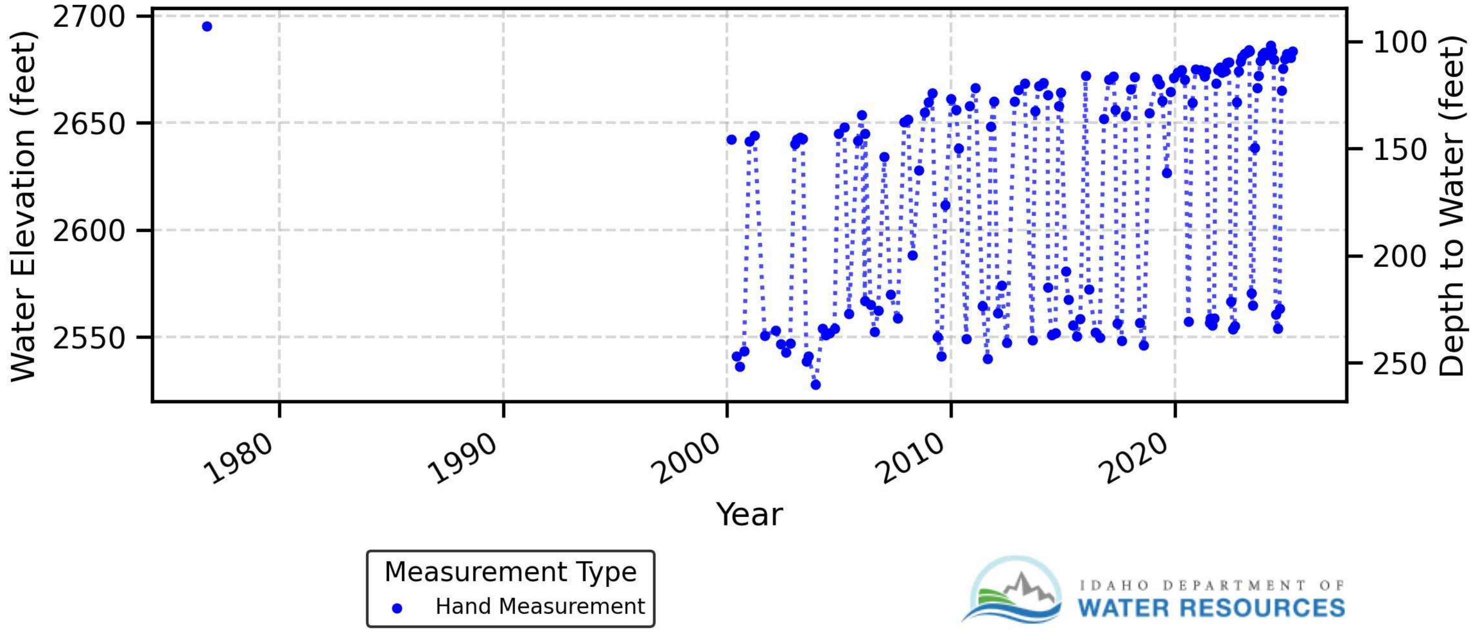

TVHP 4-5
03N 02E 14ABC5
Well Depth = 800
Water Elevation (feet)
Depth to Water (feet)
Year
Measurement Type
Hand Measurement
Continuous Transducer Data
IDAHO DEPARTMENT OF WATER RESOURCES


Helen Lowder Park
03N 02E 25ACBC1
Well Depth = 75
Water Elevation (feet)
Depth to Water (feet)
Year
Measurement Type
Hand Measurement
IDAHO DEPARTMENT OF WATER RESOURCES

Centennial

03N 02E 25CAA1

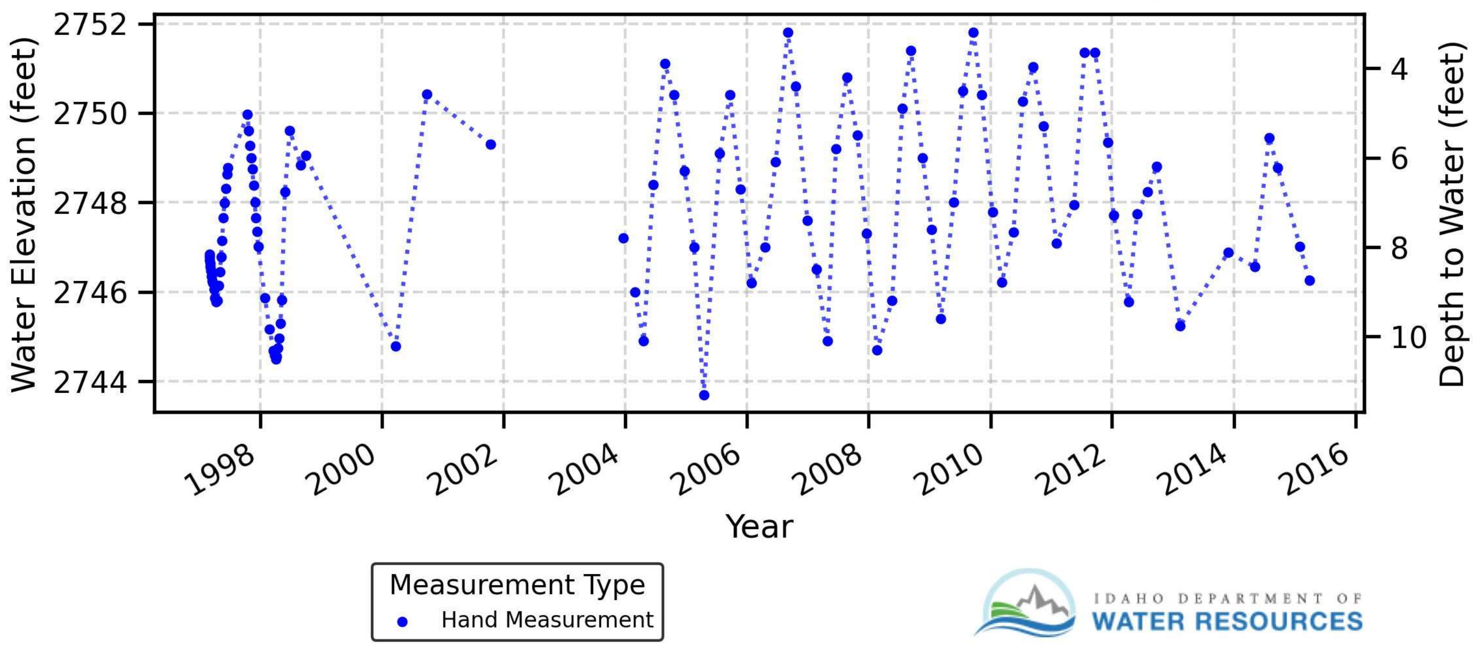
Well Depth = 416

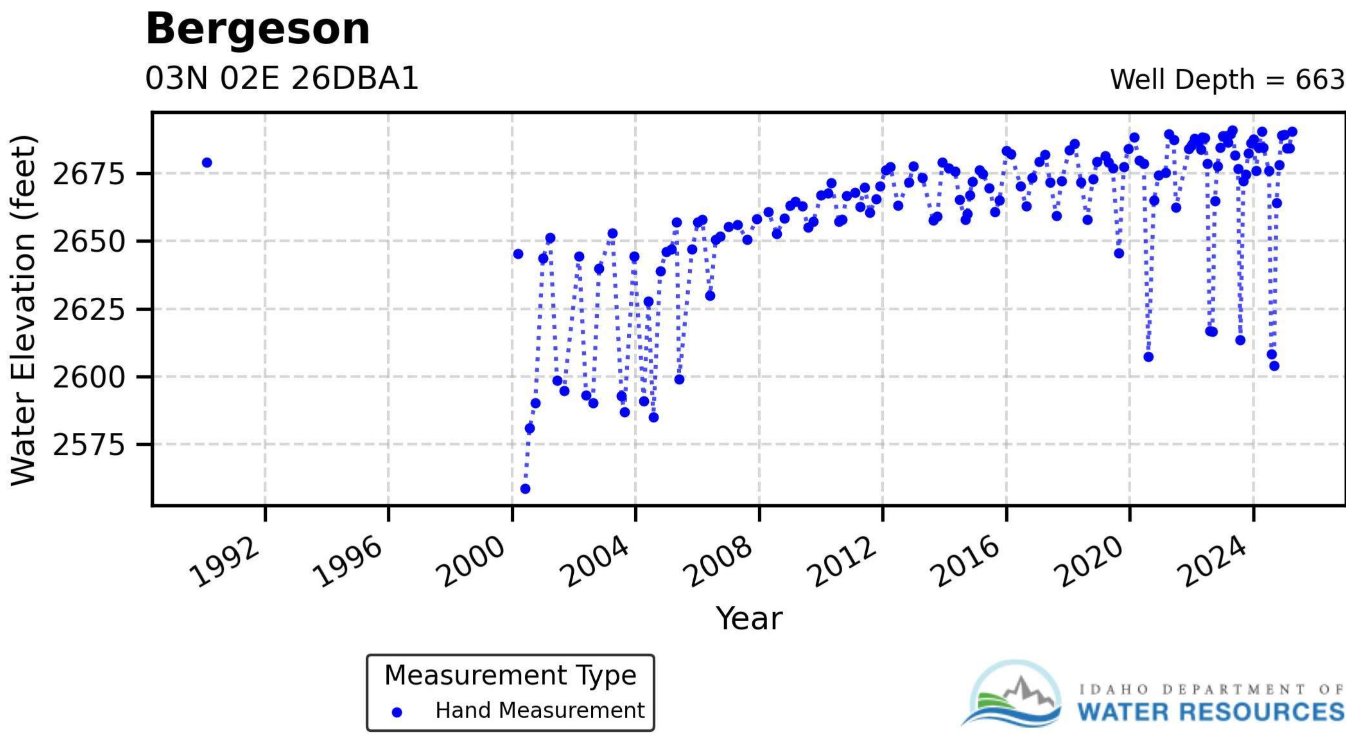


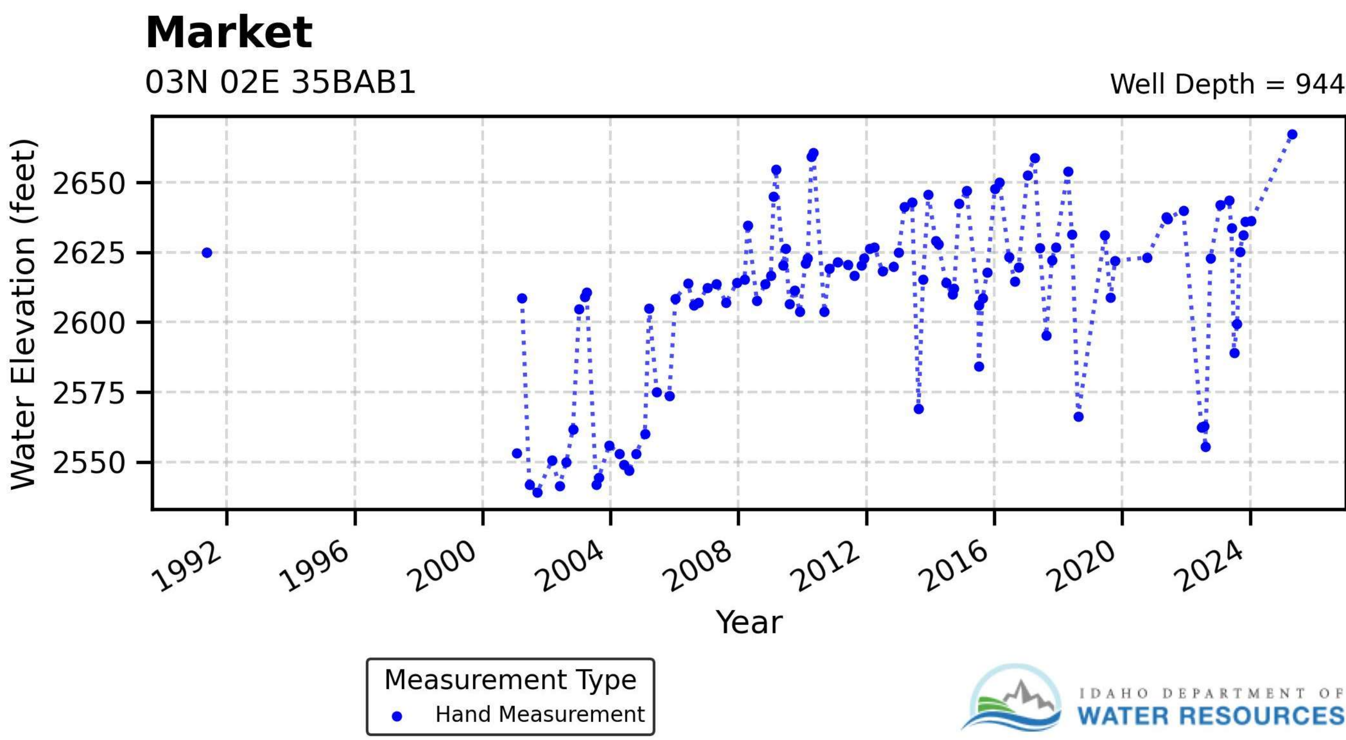
Motive Power 41A

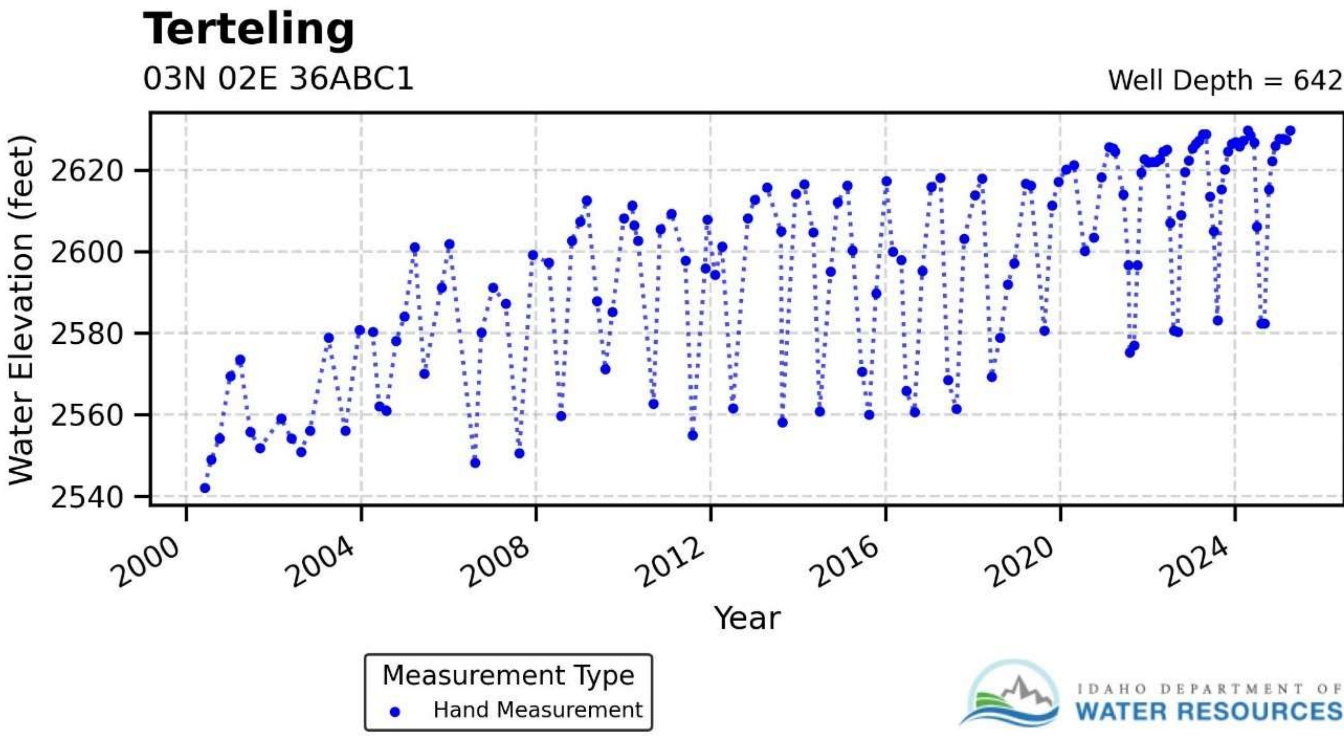
03N 02E 25CBCA1

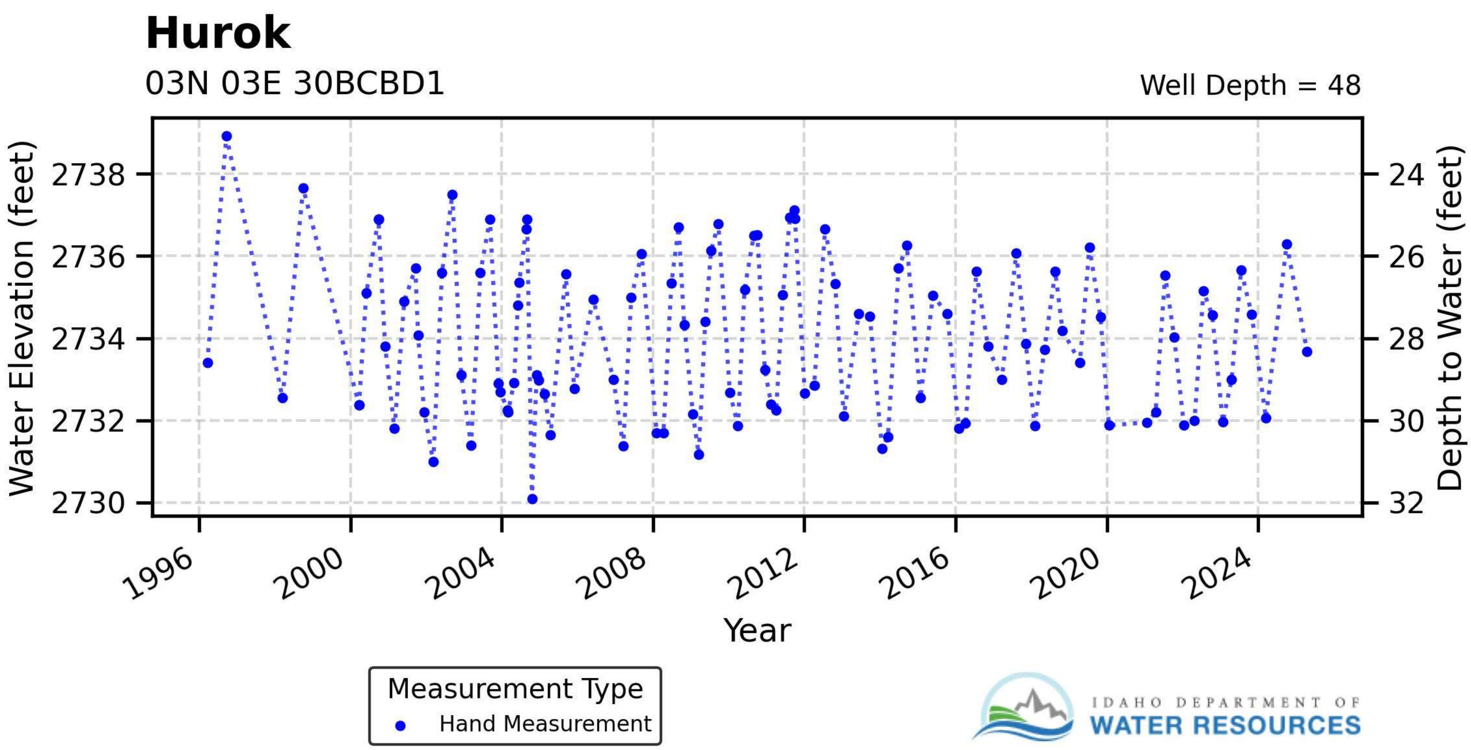
Well Depth = Unknown

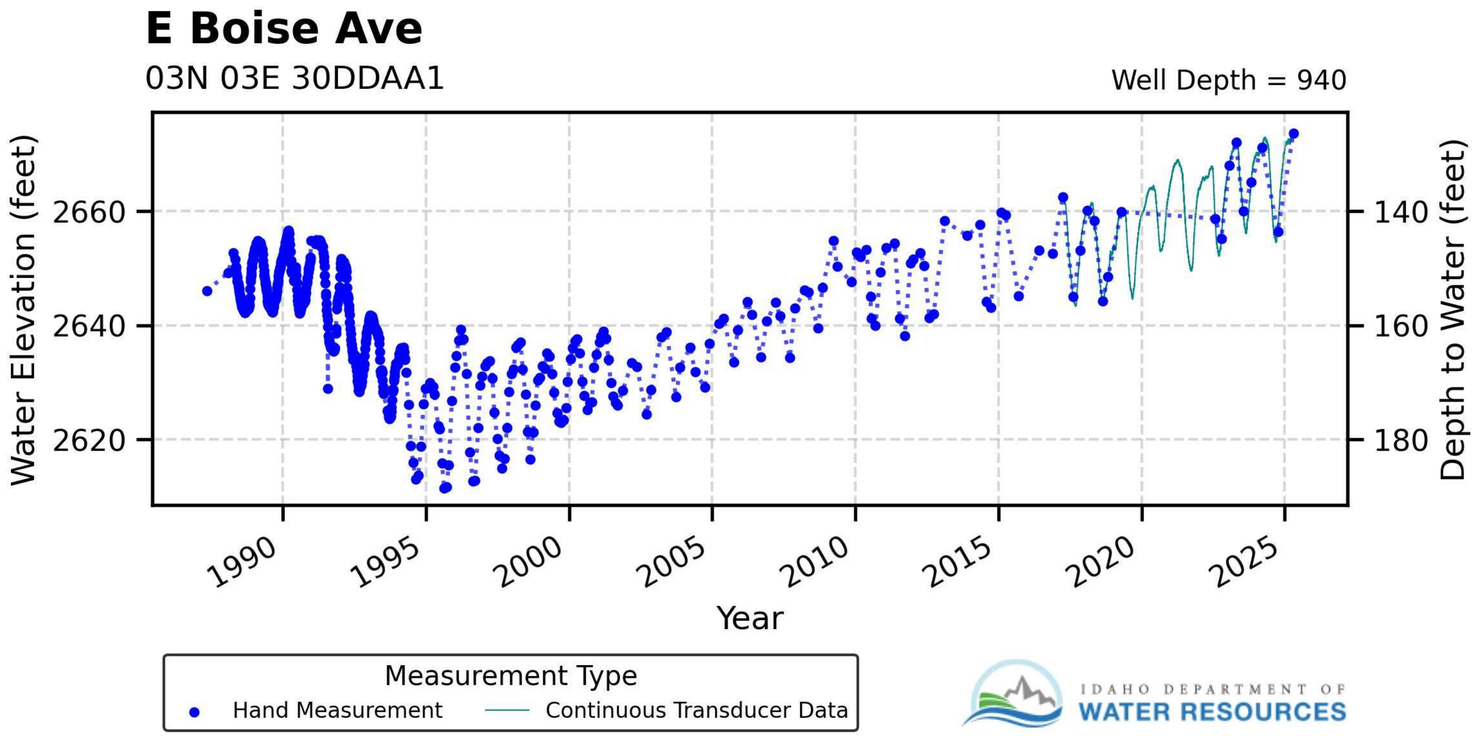


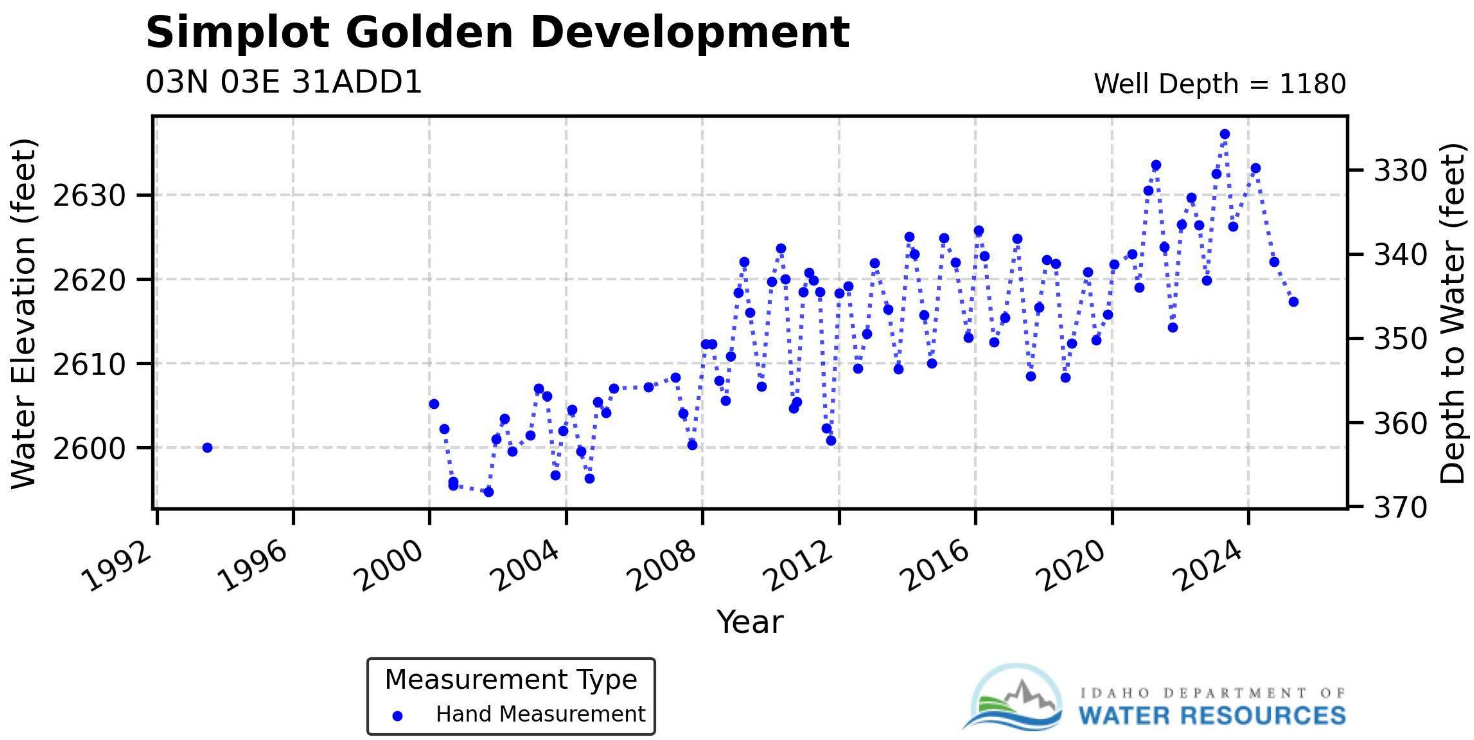

Bergeson
03N 02E 26DBA1
Well Depth = 663
Water Elevation (feet)
Depth to Water (feet)
Year
Measurement Type
Hand Measurement
IDAHO DEPARTMENT OF
WATER RESOURCES


Market
03N 02E 35BAB1
Well Depth = 944
Water Elevation (feet)
Depth to Water (feet)
Year
Measurement Type
Hand Measurement
IDAHO DEPARTMENT OF
WATER RESOURCES


Terteling
03N 02E 36ABC1
Well Depth = 642
Water Elevation (feet)
Depth to Water (feet)
Year
2540
2560
2580
2600
2620
260
280
300
320
340
2000
2004
2008
2012
2016
2020
2024
Measurement Type
Hand Measurement
IDAHO DEPARTMENT OF
WATER RESOURCES


Hurok
03N 03E 30BCBD1
Well Depth = 48
Water Elevation (feet)
Depth to Water (feet)
Year
2730
2732
2734
2736
2738
24
26
28
30
32
1996
2000
2004
2008
2012
2016
2020
2024
Measurement Type
Hand Measurement
IDAHO DEPARTMENT OF
WATER RESOURCES

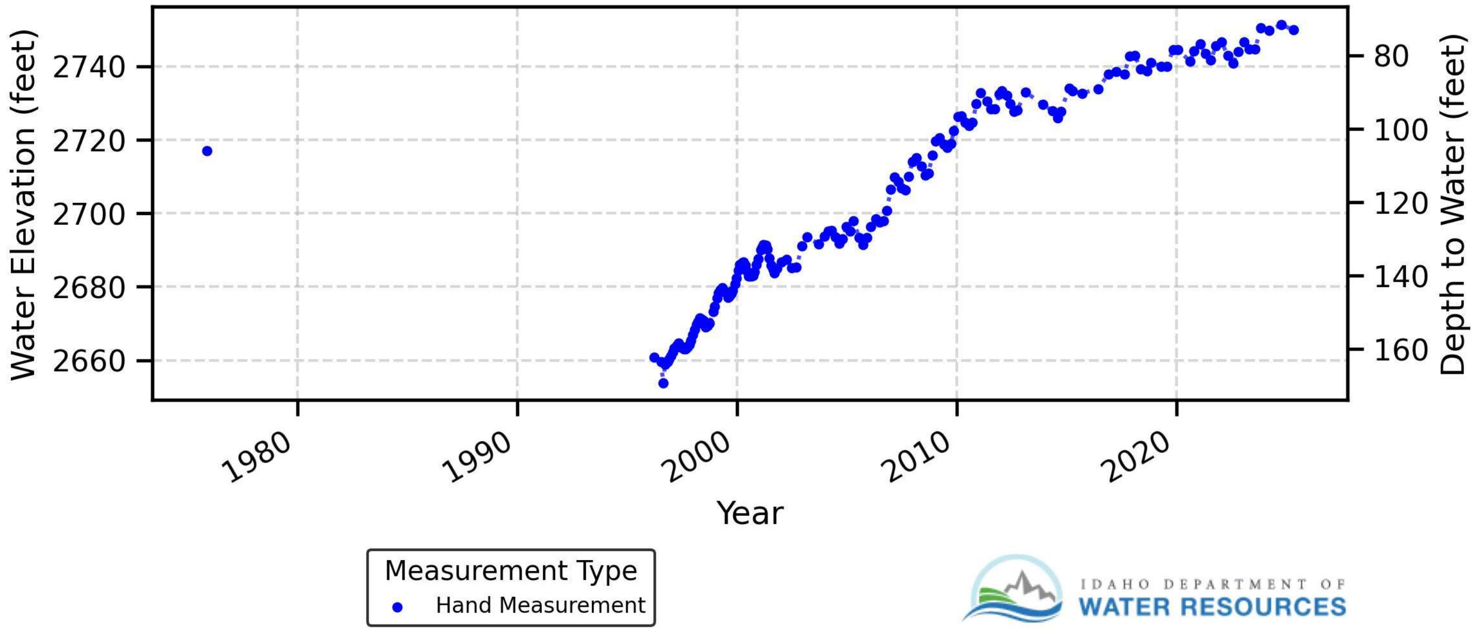

E Boise Ave
03N 03E 30DDAA1
Well Depth = 940
Water Elevation (feet)
Depth to Water (feet)
Year
Measurement Type
Hand Measurement
Continuous Transducer Data


Simplot Golden Development
03N 03E 31ADD1
Well Depth = 1180
Water Elevation (feet)
Depth to Water (feet)
Year
Measurement Type
Hand Measurement

Whitney Fire

03N 03E 32BBA1

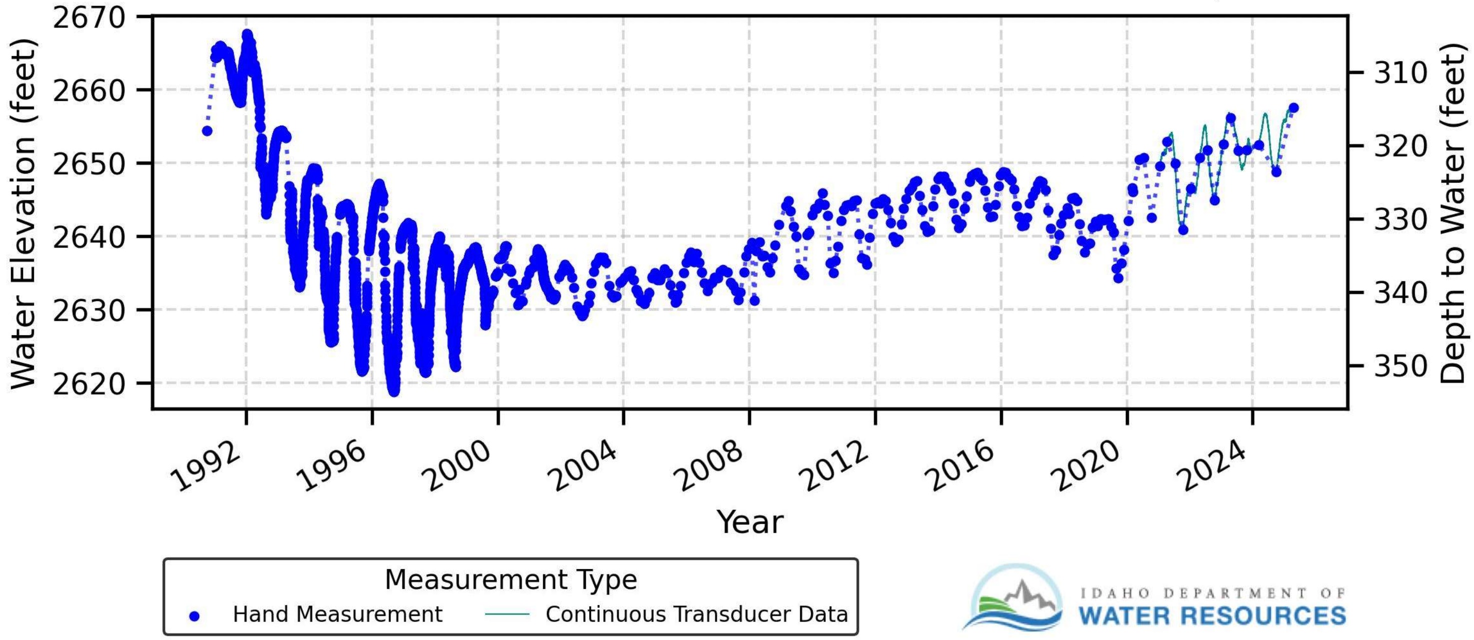
Well Depth = 280

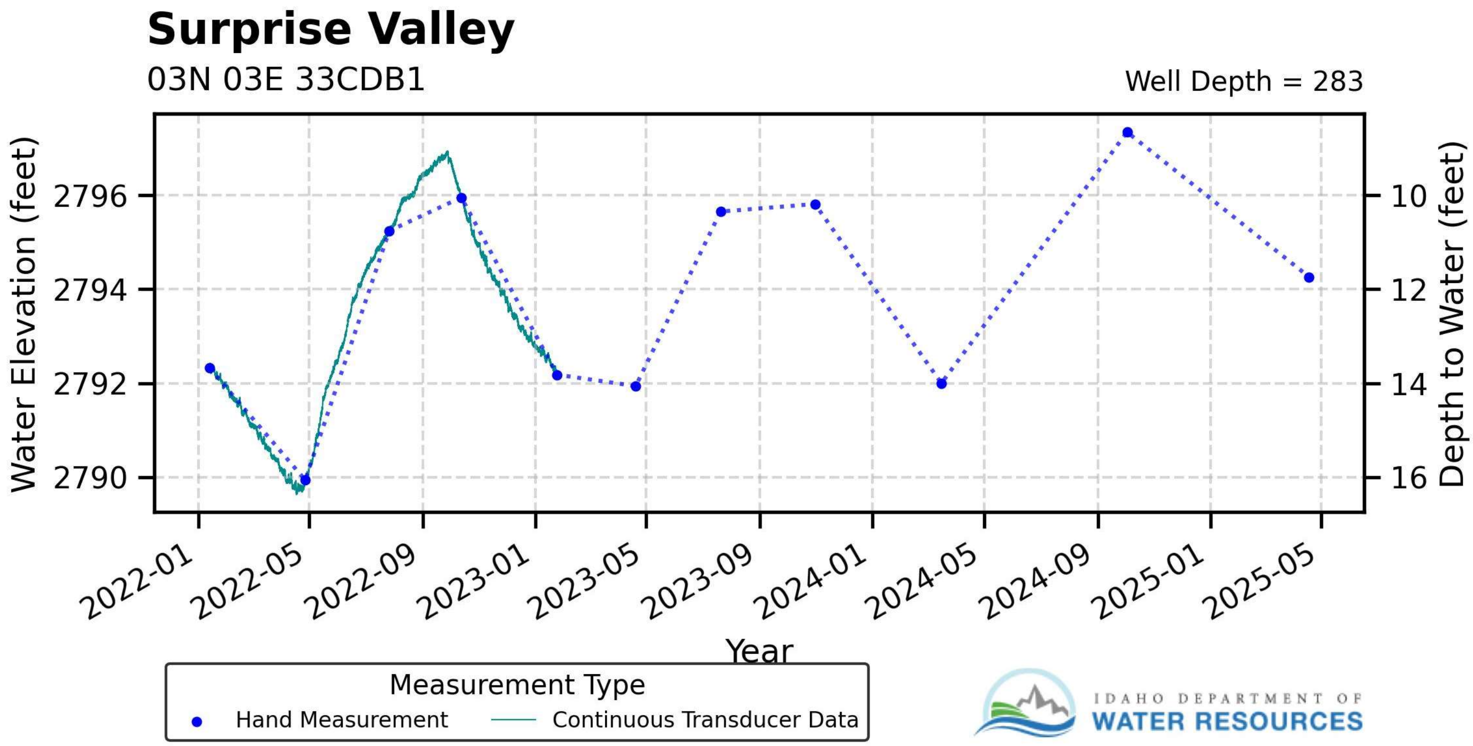


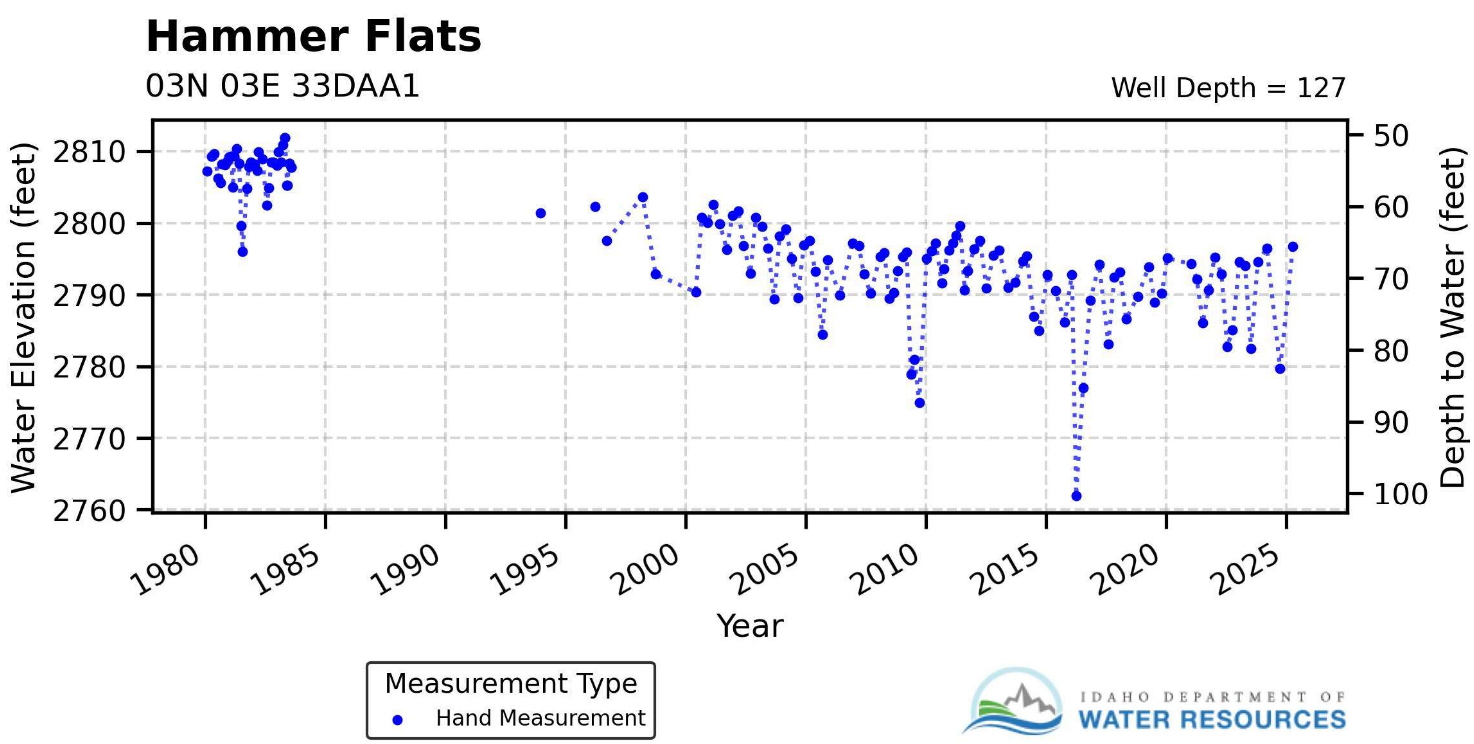
Micron Columbia

03N 03E 32CDD1

Well Depth = 802

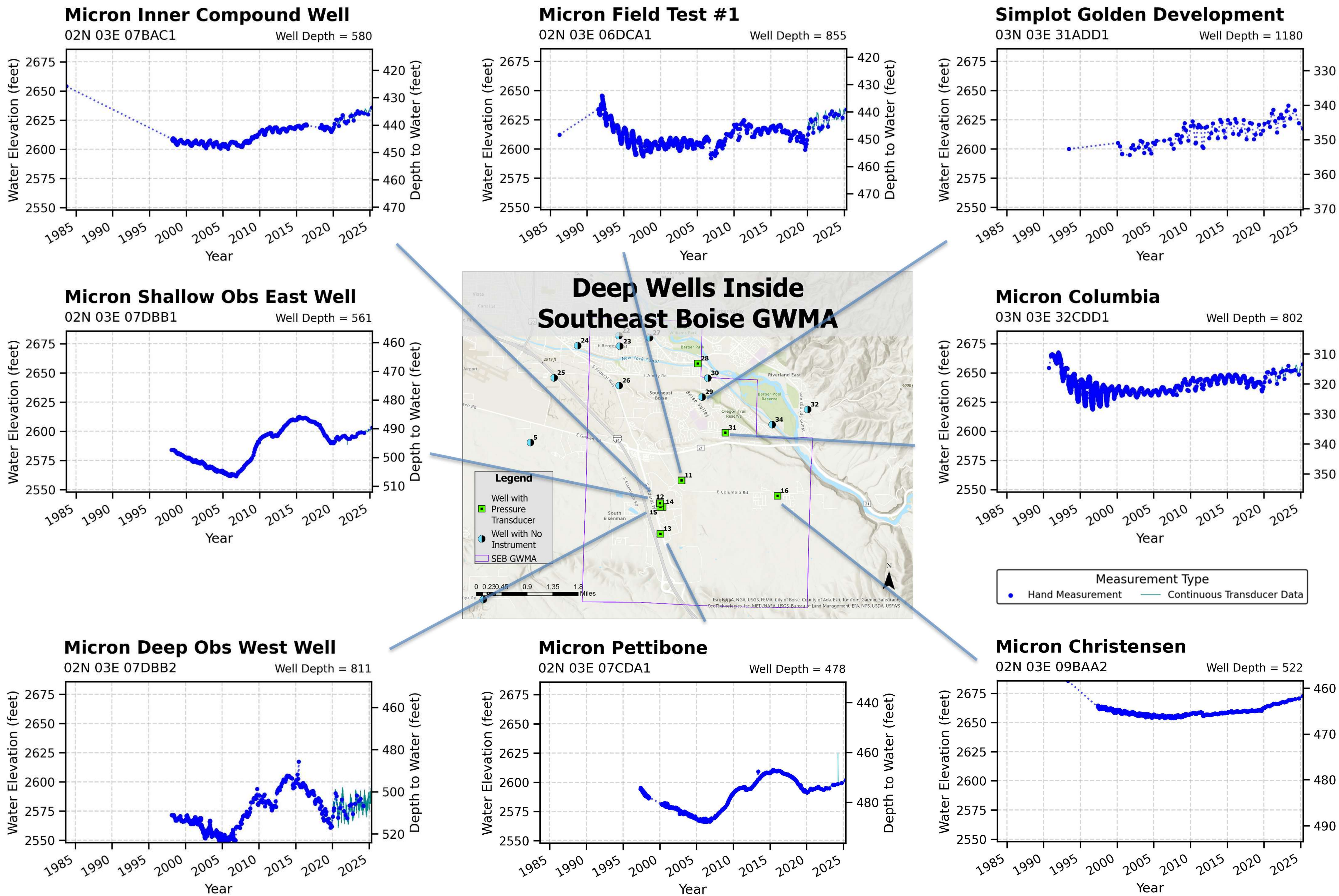


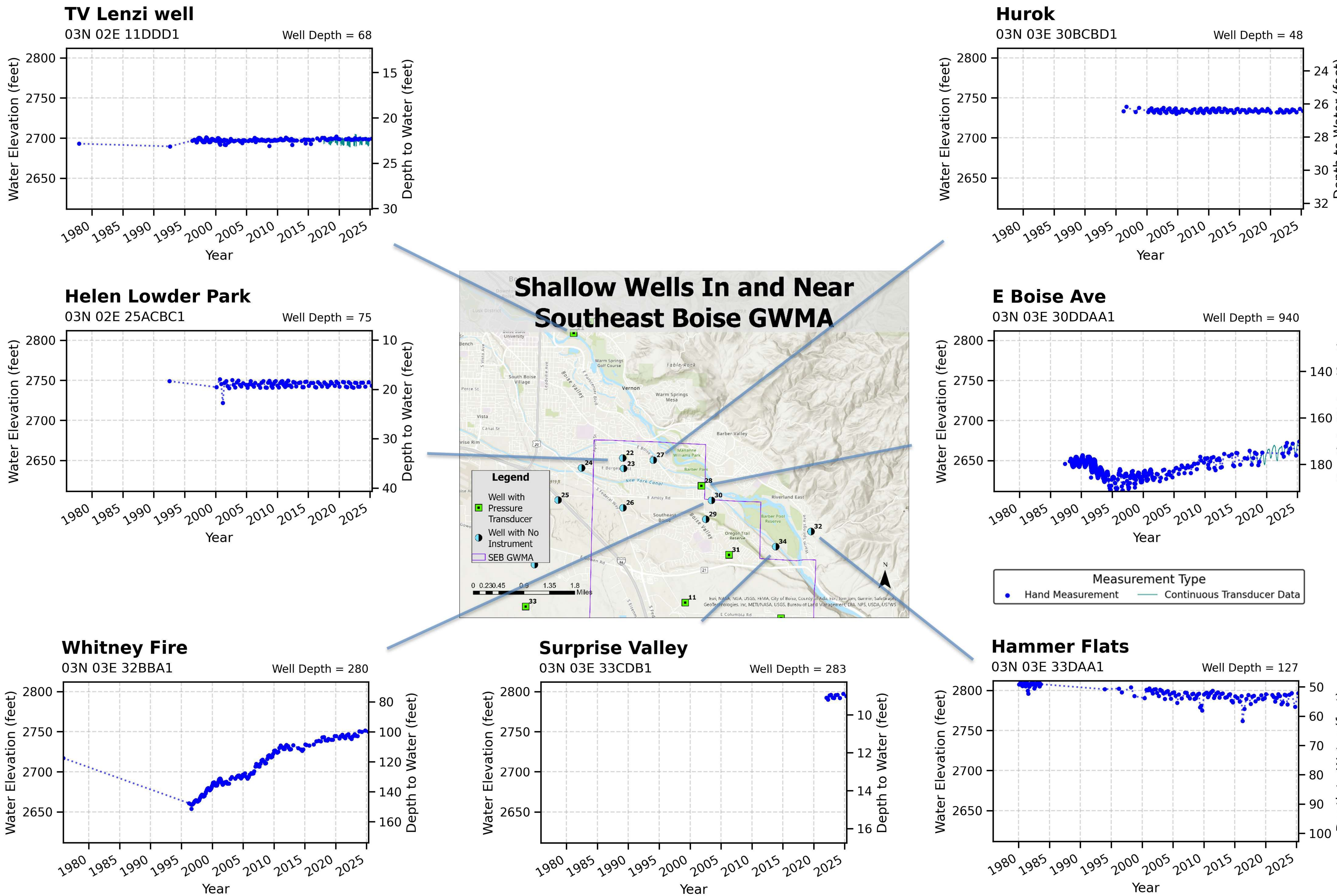

Surprise Valley
03N 03E 33CDB1
Well Depth = 283
Water Elevation (feet)
Depth to Water (feet)
Year
Measurement Type
Hand Measurement
Continuous Transducer Data
IDAHO DEPARTMENT OF WATER RESOURCES

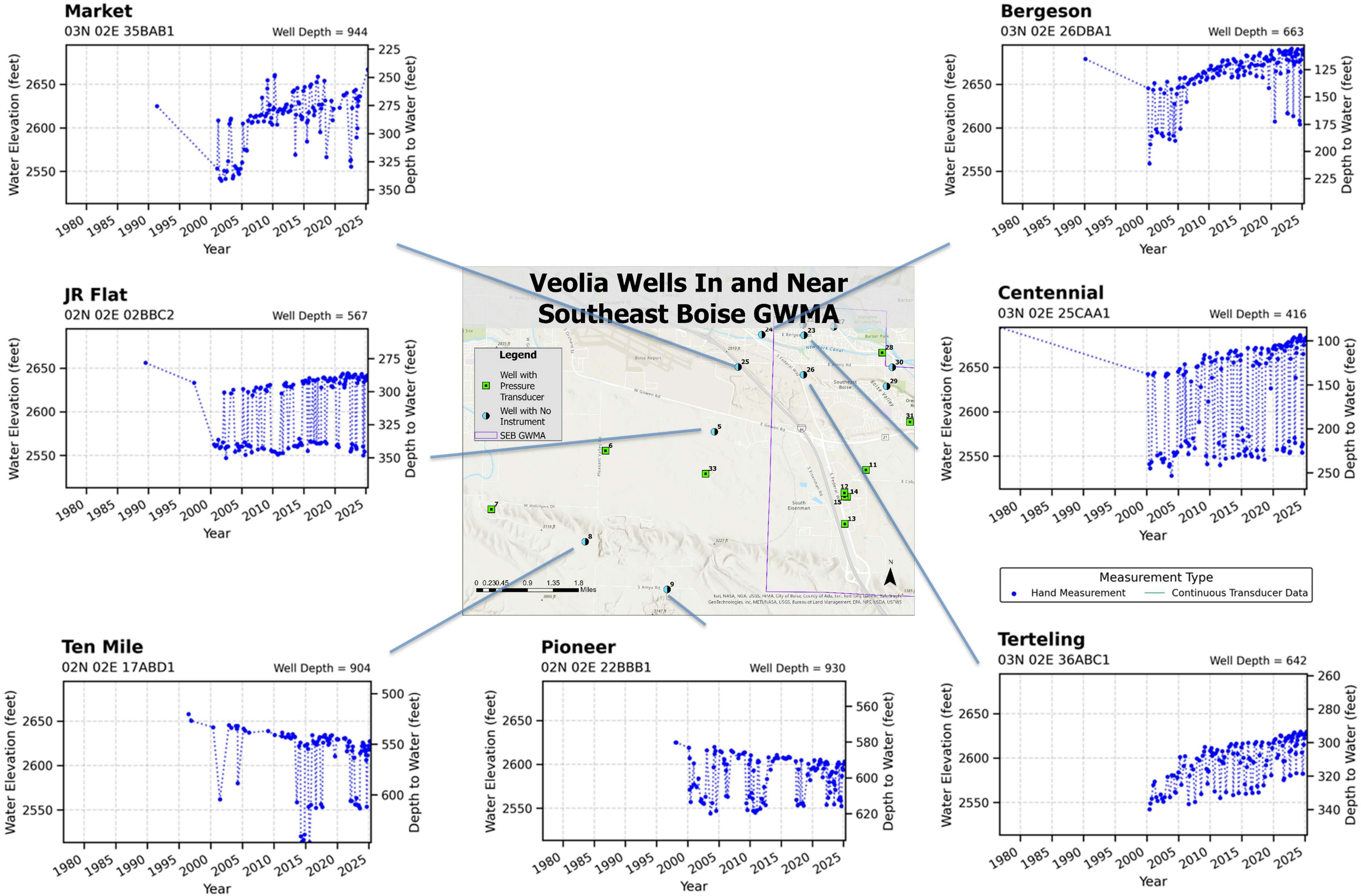

Hammer Flats
03N 03E 33DAA1
Well Depth = 127
Water Elevation (feet)
Depth to Water (feet)
Year
Measurement Type
Hand Measurement
IDAHO DEPARTMENT OF WATER RESOURCES

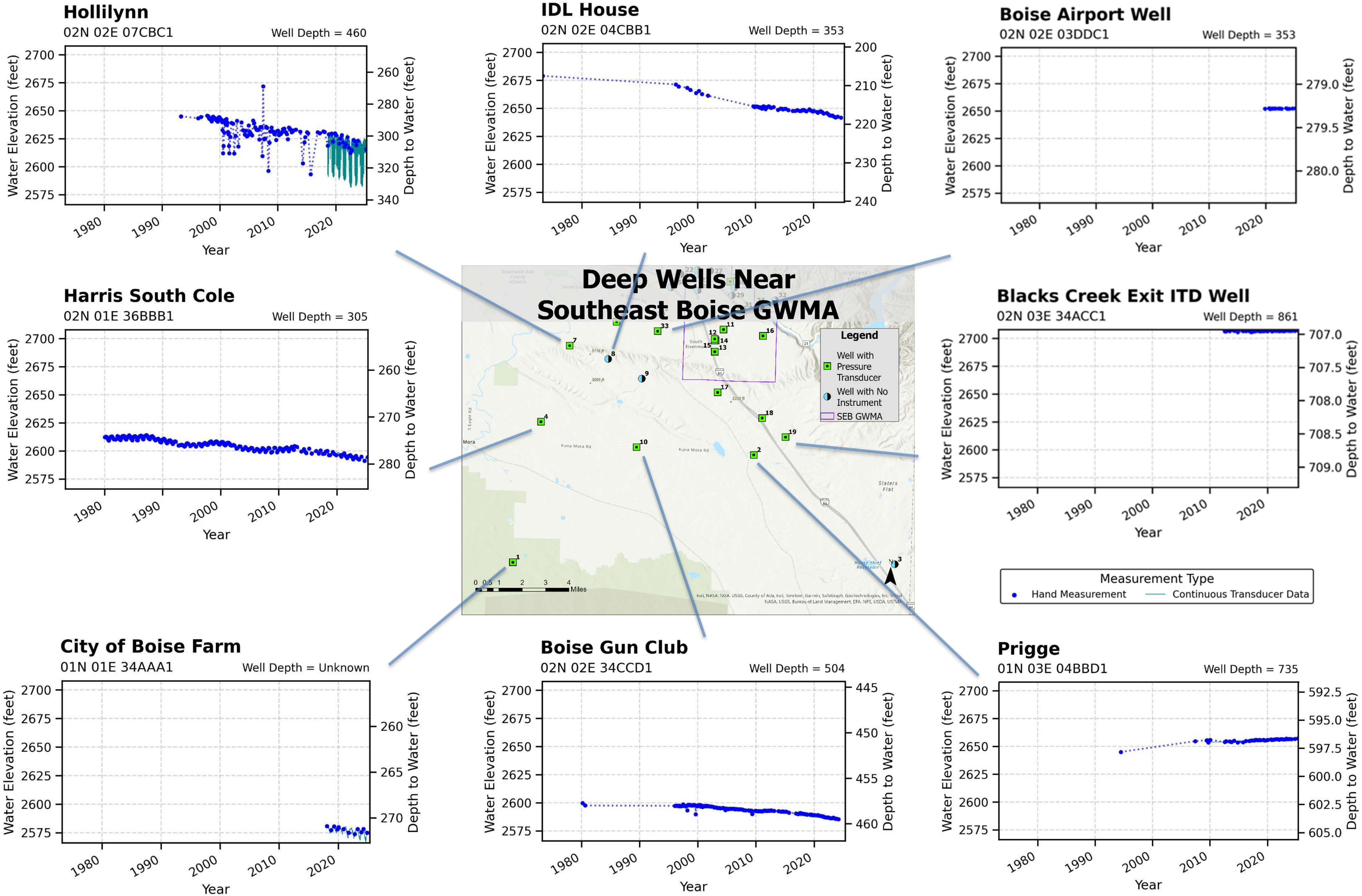
APPENDIX B

GROUPED HYDROGRAPHS OF THE SOUTHEAST BOISE NETWORK


Micron Inner Compound Well
02N 03E 07BAC1
Well Depth = 580
Micron Field Test #1
02N 03E 06DCA1
Well Depth = 855
Simplot Golden Development
03N 03E 31ADD1
Well Depth = 1180
Micron Shallow Obs East Well
02N 03E 07DBB1
Well Depth = 561
Deep Wells Inside Southeast Boise GWMA
Legend
Well with Pressure Transducer
Well with No Instrument
SEB GWMA
Miles
Micron Columbia
03N 03E 32CDD1
Well Depth = 802
Measurement Type
Hand Measurement
Continuous Transducer Data
Micron Deep Obs West Well
02N 03E 07DBB2
Well Depth = 811
Micron Pettibone
02N 03E 07CDA1
Well Depth = 478
Micron Christensen
02N 03E 09BAA2
Well Depth = 522
Water Elevation (feet)
Depth to Water (feet)
Year


Shallow Wells In and Near Southeast Boise GWMA
Legend
Well with Pressure Transducer
Well with No Instrument
SEB GWMA
0 0.23 0.45 0.9 1.35 1.8 Miles
TV Lenzi well
03N 02E 11DDD1
Well Depth = 68
Hurok
03N 03E 30BCBD1
Well Depth = 48
Helen Lowder Park
03N 02E 25ACBC1
Well Depth = 75
E Boise Ave
03N 03E 30DDAA1
Well Depth = 940
Measurement Type
Hand Measurement
Continuous Transducer Data
Whitney Fire
03N 03E 32BBA1
Well Depth = 280
Surprise Valley
03N 03E 33CDB1
Well Depth = 283
Hammer Flats
03N 03E 33DAA1
Well Depth = 127
Water Elevation (feet)
Depth to Water (feet)
Year
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025


Market
03N 02E 35BAB1
Well Depth = 944
Bergeson
03N 02E 26DBA1
Well Depth = 663
JR Flat
02N 02E 02BBC2
Well Depth = 567
Centennial
03N 02E 25CAA1
Well Depth = 416
Ten Mile
02N 02E 17ABD1
Well Depth = 904
Pioneer
02N 02E 22BBB1
Well Depth = 930
Terteling
03N 02E 36ABC1
Well Depth = 642
Water Elevation (feet)
Depth to Water (feet)
Year
Veolia Wells In and Near Southeast Boise GWMA
Legend
Well with Pressure Transducer
Well with No Instrument
SEB GWMA
0 0.23 0.45 0.9 1.35 1.8 Miles
Measurement Type
Hand Measurement
Continuous Transducer Data


Hollilynn
02N 02E 07CBC1
Well Depth = 460
IDL House
02N 02E 04CBB1
Well Depth = 353
Boise Airport Well
02N 02E 03DDC1
Well Depth = 353
Harris South Cole
02N 01E 36BBB1
Well Depth = 305
Blacks Creek Exit ITD Well
02N 03E 34ACC1
Well Depth = 861
City of Boise Farm
01N 01E 34AAA1
Well Depth = Unknown
Boise Gun Club
02N 02E 34CCD1
Well Depth = 504
Prigge
01N 03E 04BBD1
Well Depth = 735
Water Elevation (feet)
Depth to Water (feet)
Year
Deep Wells Near Southeast Boise GWMA
Legend
Well with Pressure Transducer
Well with No Instrument
SEB GWMA
Kuna Mora Rd
Slaters Flat
Miles
Measurement Type
Hand Measurement
Continuous Transducer Data

APPENDIX C

DETAILED MANN-KENDALL TEST RESULTS

Table A. Detailed results of the Mann-Kendall trend analysis test. Positive slopes indicate rising water-level trends. Bolded values indicate the trend is statistically significant (p-value < 0.05) and NA indicates the calculation is not applicable due to insufficient data.

Station Name	Station Long Name	5-yr Trend (feet/year)	5-yr Trend p-value	10-yr Trend (feet/year)	10-yr Trend p-value	20-yr Trend (feet/year)	20-yr Trend p-value
01N 01E 34AAA1	City of Boise Farm	NA	NA	NA	NA	NA	NA
01N 03E 04BBD1	Prigge	**0.21**	0.03	**0.22**	0.00	NA	NA
01N 04E 28CAC1	Ken Agenbroad	-1.31	0.09	0.10	0.75	**-0.38**	0.01
02N 01E 36BBB1	Harris South Cole	**-0.73**	0.03	**-0.77**	0.00	**-0.51**	0.00
02N 02E 02BBC2	JR Flat	-0.86	0.46	0.79	0.21	**1.07**	0.00
02N 02E 03DDC1	Boise Airport	**0.05**	0.03	NA	NA	NA	NA
02N 02E 04CBB1	IDL House	NA	NA	**-0.88**	0.01	NA	NA
02N 02E 07CBC1	Hollilynn	-0.13	1.00	**-1.41**	0.04	-0.49	0.11
02N 02E 17ABD1	Ten Mile	2.42	1.00	-0.76	0.39	NA	NA
02N 02E 21CBB1	SunRoc	NA	NA	NA	NA	NA	NA
02N 02E 22BBB1	Pioneer	-0.74	0.81	**-1.44**	0.03	-0.39	0.52
02N 02E 34CCD1	Boise Gun Club	NA	NA	**-0.69**	0.00	-0.47	0.00
02N 03E 06DCA1	Micron Field Test #1	1.59	0.22	**2.30**	0.01	**1.18**	0.00
02N 03E 07BAC1	Micron Inner Compound	1.82	0.22	**2.14**	0.01	**1.41**	0.00
02N 03E 07CDA1	Micron Pettibone	2.15	0.09	-0.78	0.37	**1.30**	0.04
02N 03E 07DBB1	Micron Shallow Obs East	2.02	0.09	-0.94	0.59	1.28	0.06
02N 03E 07DBB2	Micron Deep Obs West	1.51	0.46	-0.32	0.86	0.56	0.32
02N 03E 09BAA2	Micron Christensen	**1.63**	0.03	**1.59**	0.00	**0.80**	0.00
02N 03E 19DBB1	Micron South	NA	NA	NA	NA	NA	NA
02N 03E 28CAA1	Blacks Creek Rest Area Westbound	NA	NA	NA	NA	NA	NA
02N 03E 34ACC1	Blacks Creek Exit ITD	**0.06**	0.03	**0.06**	0.00	NA	NA
03N 02E 11DDD1	TV Lenzi	0.25	0.22	-0.08	0.92	0.10	0.15
03N 02E 14ABC1	TVHP 4-1	0.45	0.46	-0.18	0.35	-0.12	0.23
03N 02E 14ABC2	TVHP 4-2	0.27	0.22	-0.01	0.92	0.05	0.45
03N 02E 14ABC3	TVHP 4-3	0.36	0.22	0.03	0.75	0.06	0.33
03N 02E 14ABC4	TVHP 4-4	0.06	1.00	-0.50	0.08	0.24	0.54
03N 02E 14ABC5	TVHP 4-5	0.97	0.22	-0.07	0.60	0.31	0.29
03N 02E 25ACBC1	Helen Lowder Park	0.50	0.09	0.10	0.75	0.06	0.31

Station Name	Station Long Name	5-yr Trend (feet/year)	5-yr Trend p-value	10-yr Trend (feet/year)	10-yr Trend p-value	20-yr Trend (feet/year)	20-yr Trend p-value
03N 02E 25CAA1	Centennial	2.49	0.22	**2.28**	0.01	**4.87**	0.00
03N 02E 25CBCA1	Motive Power	NA	NA	NA	NA	NA	NA
03N 02E 26DBA1	Bergeson	-0.42	0.81	0.66	0.18	**1.73**	0.00
03N 02E 35BAB1	Market	NA	NA	NA	NA	NA	NA
03N 02E 36ABC1	Terteling	1.05	0.09	**1.80**	0.00	**2.00**	0.00
03N 03E 30BCBD1	Hurok	0.36	0.46	0.01	0.83	0.05	0.06
03N 03E 30DDAA1	E Boise Ave	1.23	0.09	**1.87**	0.00	**1.45**	0.00
03N 03E 31ADD1	Simplot Golden Development	-3.97	0.46	1.17	0.75	**0.99**	0.01
03N 03E 32BBA1	Whitney Fire	2.01	0.09	**1.41**	0.00	**2.01**	0.00
03N 03E 32CDD1	Micron Columbia	1.45	0.22	**1.25**	0.01	**0.86**	0.00
03N 03E 33CDB1	Surprise Valley	NA	NA	NA	NA	NA	NA
03N 03E 33DAA1	Hammer Flats	**1.21**	0.03	**1.30**	0.03	-0.10	0.59

APPENDIX D

GROUND SURFACE ELEVATION VALUES OBTAINED USING HIGH-PRECISION GPS

Table D. Updated ground surface elevations determined using high-precision GPS in October 2024.

Station Long Name	Previous Elevation (feet)	Previous Positioning Method	Updated Elevation (feet)[1]	Elevation Change (feet)
Prigge	3250	Topo	3263.69 +/- 0.38	13.7
Harris South Cole	2867	Topo	2872.69 +/- 0.04	5.7
IDL House	2880	Topo	2884.38 +/- 0.03	4.4
Hollilynn	2920	Topo	2946.96 +/- 0.03	27.0
Boise Gun Club	3045	Topo	3051.98 +/- 0.05	7.0
Blacks Creek Rest Area Westbound	3357.5	Professional Survey	3364.25 +/- 0.44	6.8
Blacks Creek Exit ITD	3414.9	Professional Survey	3408.07 +/- 0.05	-6.8
TV Lenzi	2718	Topo	2723.58 +/- 0.17	5.6
TVHP	2711	Topo	2709.80 +/- 1.07	-1.2
Helen Lowder Park	2761	Topo	2759.28 +/- 0.03	-1.7
Hurok	2762	Topo	2770.99 +/- 0.03	9.0
Simplot Golden Development	2963	Topo	2974.91 +/- 0.05	11.9
Whitney Fire	2823	Topo	2829.96 +/- 0.03	7.0
Surprise Valley	2806	Digitized	2820.00 +/- 0.03	14.0
Hammer Flats	2862.3	Professional Survey	2865.72 +/- 0.20	3.4

[1] Error indicates 1 standard deviation or 66.67% confidence.