AGENDA

IDAHO WATER RESOURCE BOARD

Aquifer Stabilization Committee Meeting No. 2-25
September 10, 2025
2:00 PM (MT) / 1:00 PM (PT)

Hilton Garden Inn
Snake River Room
1741 Harrison St. North
TWIN FALLS

Livestream available at https://www.youtube.com/@iwrb

1. Introductions and Attendance
2. Eastern Snake Plain Aquifer Storage Update
3. Eastern Snake Plain Aquifer Spring Discharge and Reach Gains
4. Eastern Snake Plain Aquifer Impacts
5. Other Items
6. Adjourn

Committee Members: Chair Dean Stevenson, Al Barker, Brian Olmstead, and Pat McMahon.

* Action Item: A vote regarding this item may be made at this meeting. Identifying an item as an action item on the agenda does not require a vote to be taken on the item.

Americans with Disabilities
The meeting will be held in person and online. If you require special accommodations to attend, participate in, or understand the meeting, please make advance arrangements by contacting Department staff by email jennifer.strange@idwr.idaho.gov or by phone at (208) 287-4800.

322 East Front Street • P.O. Box 83720 • Boise, Idaho 83720-0098
Phone: (208) 287-4800 Fax: (208) 287-6700 Website: idwr.idaho.gov/IWRB/

Memorandum

To: Idaho Water Resource Board (IWRB) Aquifer Stabilization Committee

From: Planning & Projects Bureau Staff

Date: September 5, 2025

Re: ESPA Storage Update

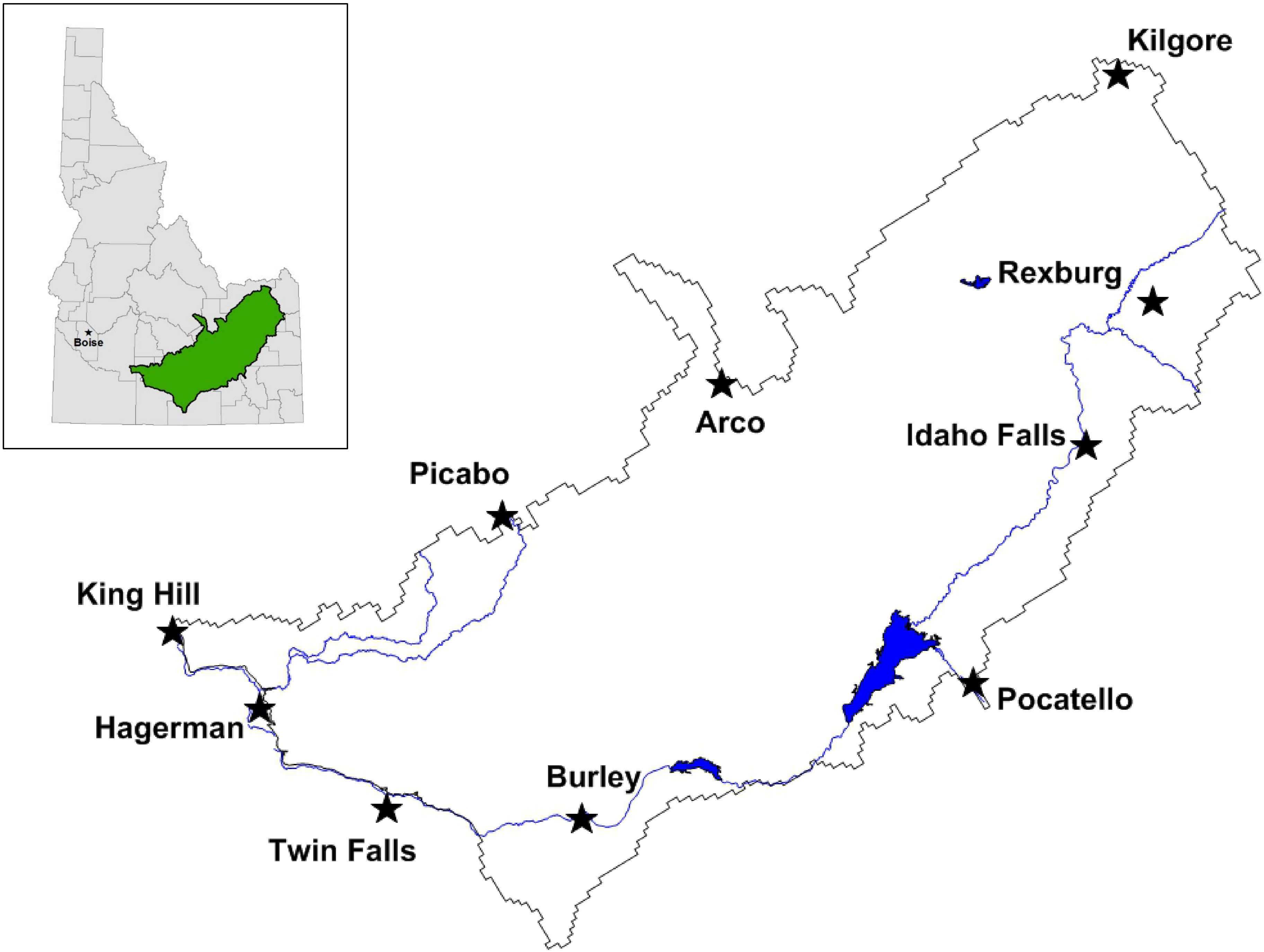
ACTION: Action may be requested

Hydrology staff will provide an update on ESPA storage data.

ESPA Storage Changes

Presented by Mike McVay, P.E., P.G.

September 10, 2025


Boise
Kilgore
Rexburg
Arco
Idaho Falls
Picabo
King Hill
Pocatello
Hagerman
Burley
Twin Falls

Aquifer Water Balance

Inflow – Outflow = ΔStorage

<u>ESPA Inflows</u> = Incidental recharge from SW irrigation, Canal Seepage, Perched River Seepage, Tributary Underflow, Precipitation.

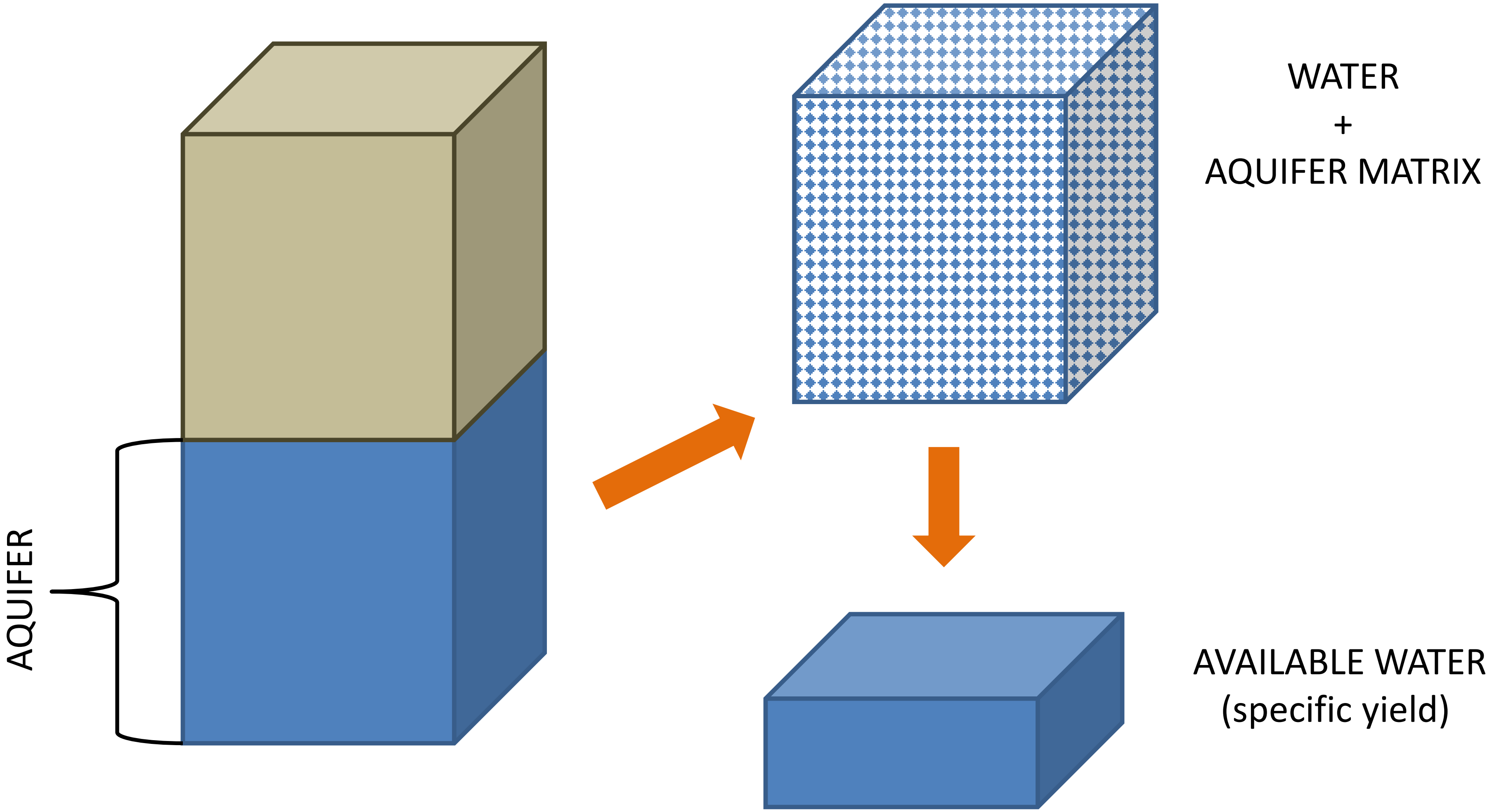
<u>ESPA Outflows</u> = Evapotranspiration, Spring Discharge, Well Pumping

- Requires large investment of time, money and effort.
- A more efficient method of calculating change-in-storage allows us to evaluate both aquifer conditions and aquifer management activities.
- Direct calculation of change-in-storage using water-level measurements.

Using Water-Level Data to Estimate Changes in Aquifer Storage

- Water-level changes are calculated for each of the wells.
- Changes at the wells are interpolated across the **ESPAM version 2.2** (ESPAM2.2) model area to create water-level change maps.
  - The resulting volume represents water and aquifer matrix.
- Specific Yield (Sy) is the ratio of the volume of water that drains from a saturated rock due to gravity to the total volume of the rock.

Specific Yield = Available Water



Using Water-Level Data to Estimate Changes in Aquifer Storage

- Water-level data are differenced to produce water-level changes at discrete points (at the wells).
- Changes at the wells are interpolated across the ESPAM2.2 model area to create water-level change maps.
  - The resulting volume represents water and aquifer matrix.

✓ The volumes calculated above are multiplied by the average, calibrated Sy from EPAM2.2 to calculate the change in volume of water.

IDAHO Water Resource Board

Mass Measurements and Aquifer Storage Changes

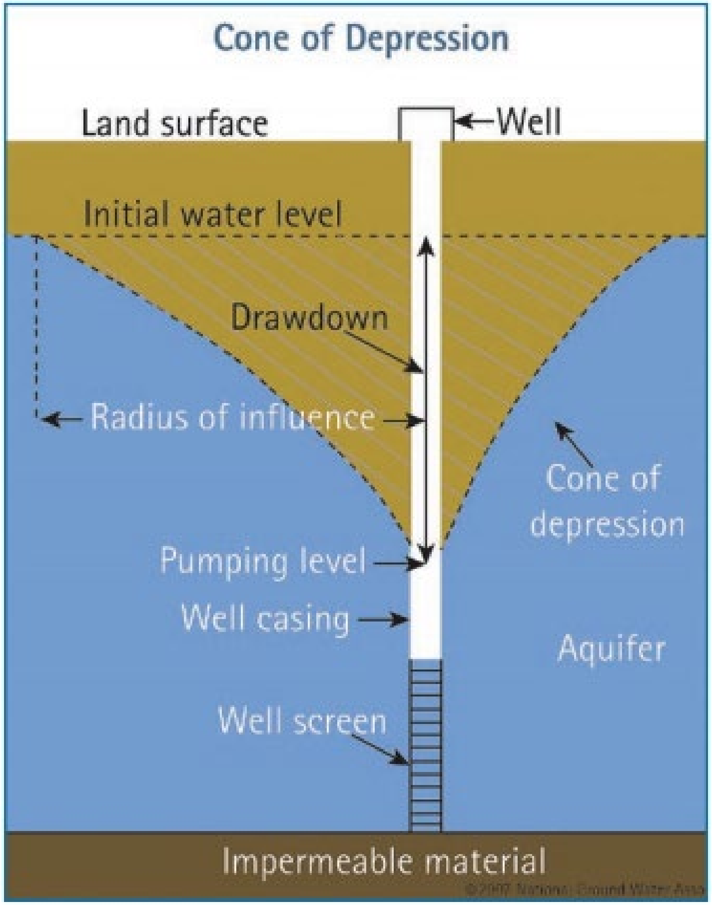
- Storage change calculations are based on data collected during mass measurement events.
- Mass measurement events are designed to collect as much data as possible during a brief window of time.
    - Provides a snapshot of the aquifer.
- Mass measurement events take place annually in the **spring**.
- Previous mass measurement events took place in the spring of 1980, 2001, 2002, 2008, 2013, 2018, 2023 and are now conducted every 5 years.

Rationale for using Spring-Season Water Levels

- Conducting measurement events in the spring:
  - Integrates the impacts due to irrigation-season activities into a resulting condition (annual aquifer storage change).
  - Maximizes the time between irrigation seasons.
  - Pre-irrigation measurements reduce the impact of local water use on water levels (unperturbed water table).

Water-Level Impacts due to Local Water Use

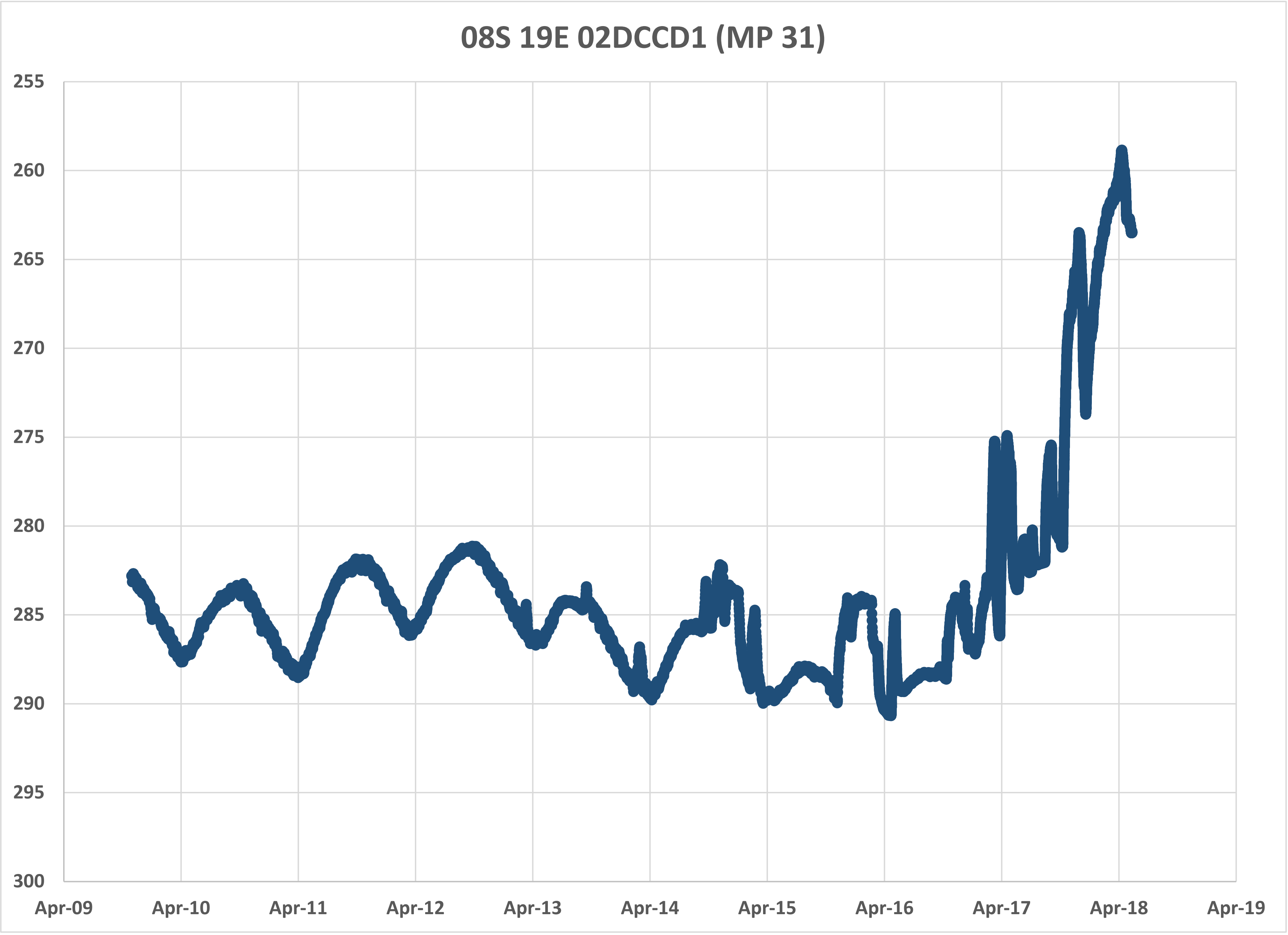
- Example: Short-term pumping in a well can produce water-level changes that do not represent the regional conditions. We don't want these water levels.
- What if a water level is impacted by increased areal recharge from a wet winter?
- Managed recharge also impacts water levels...



Source: National Groundwater Association,2007

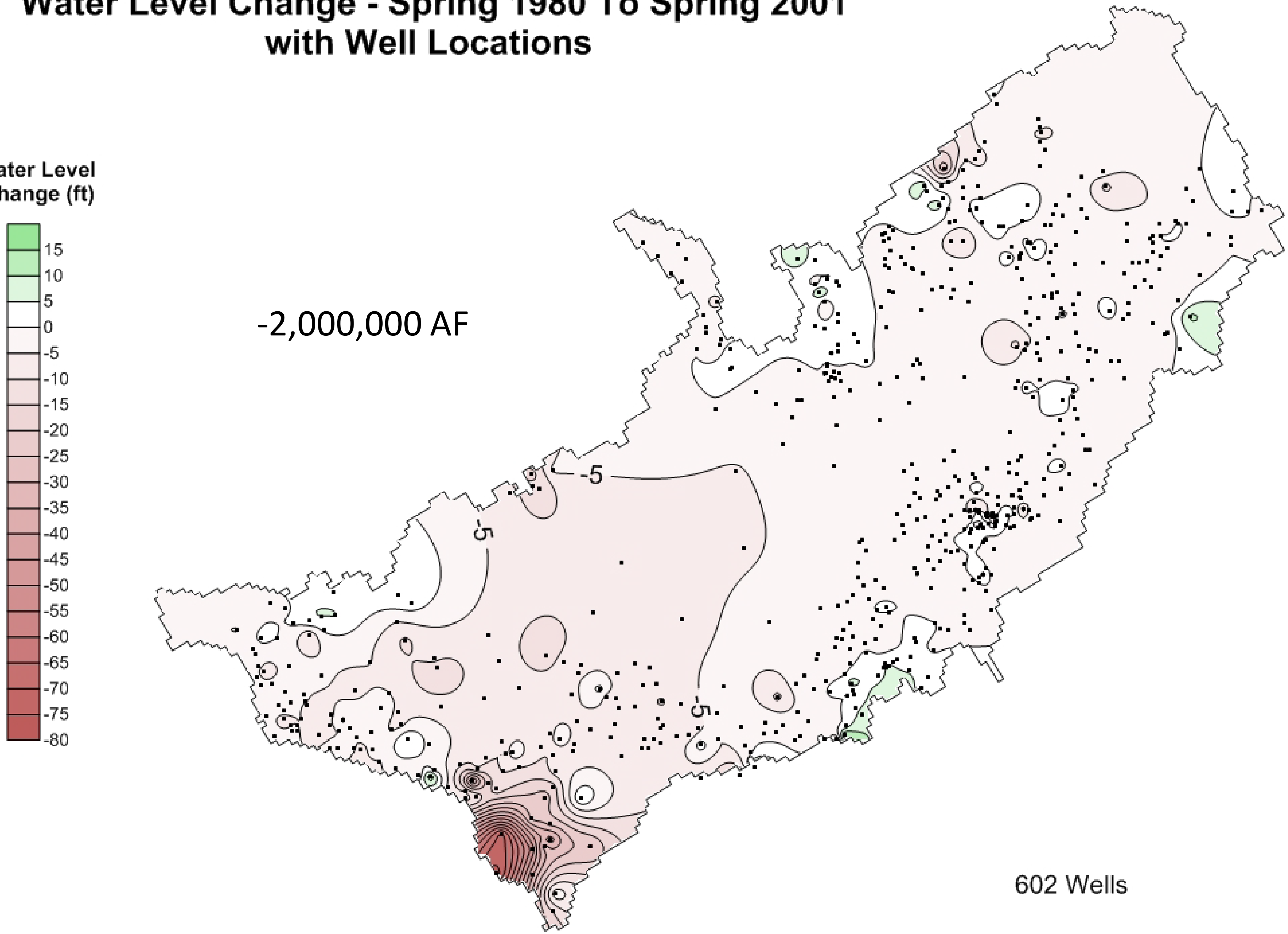
The Value of Transducer-Data Loggers

- Transducers measure the pressure of water above the probe.
  - Manual measurements are used to relate the pressure to depth-of-water.
- Data loggers record the pressure measurements.
- We collect much more data using transducers.
- Able to collect measurements even if the well is inaccessible during the synoptic measurement event.
- Allows for understanding of well behavior.
- Data collected via transducer allows for the selection of the most appropriate water level.

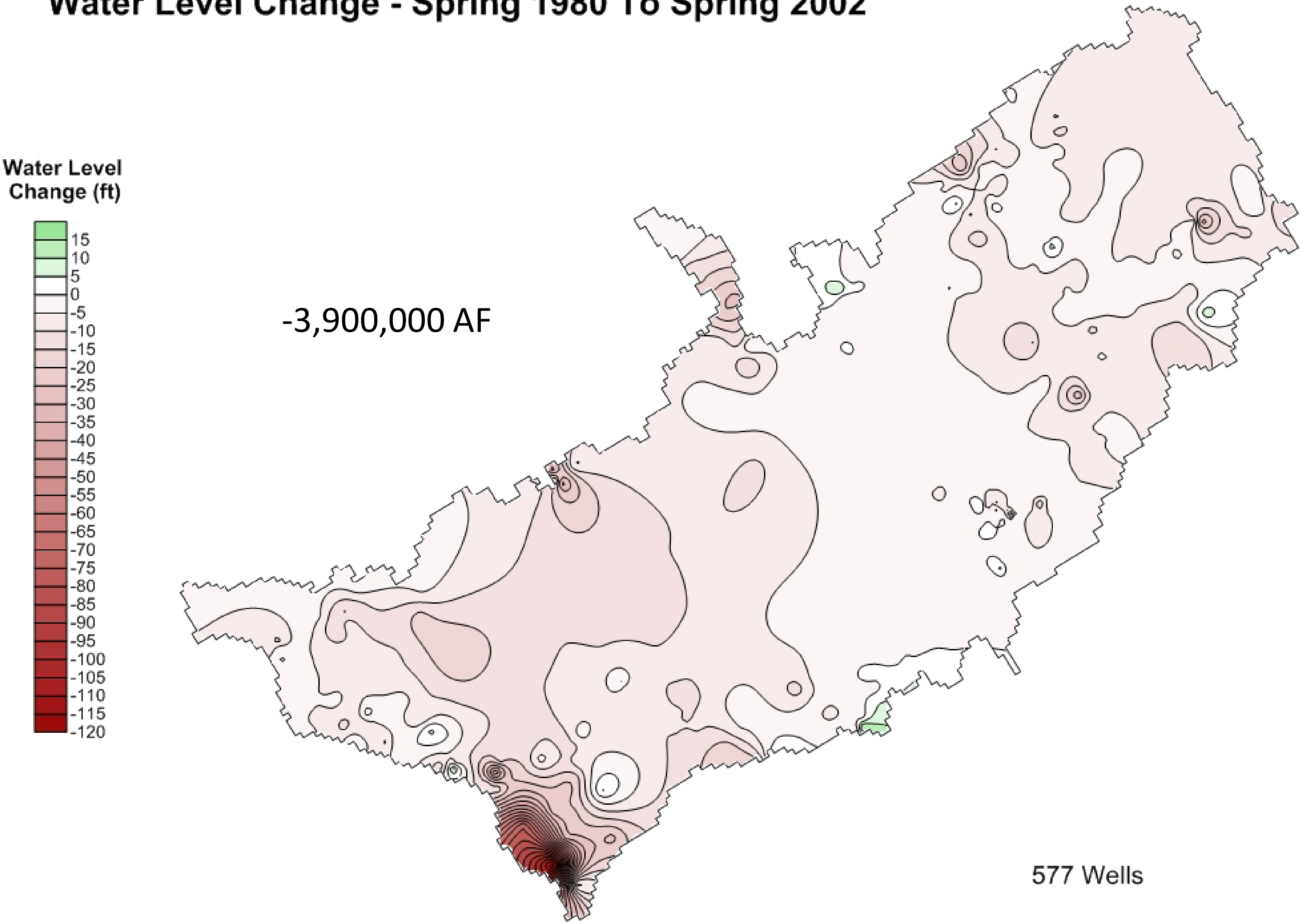

08S 19E 02DCCD1 (MP 31)
255
260
265
270
275
280
285
290
295
300
Apr-09
Apr-10
Apr-11
Apr-12
Apr-13
Apr-14
Apr-15
Apr-16
Apr-17
Apr-18
Apr-19

Mass Measurement Change Maps

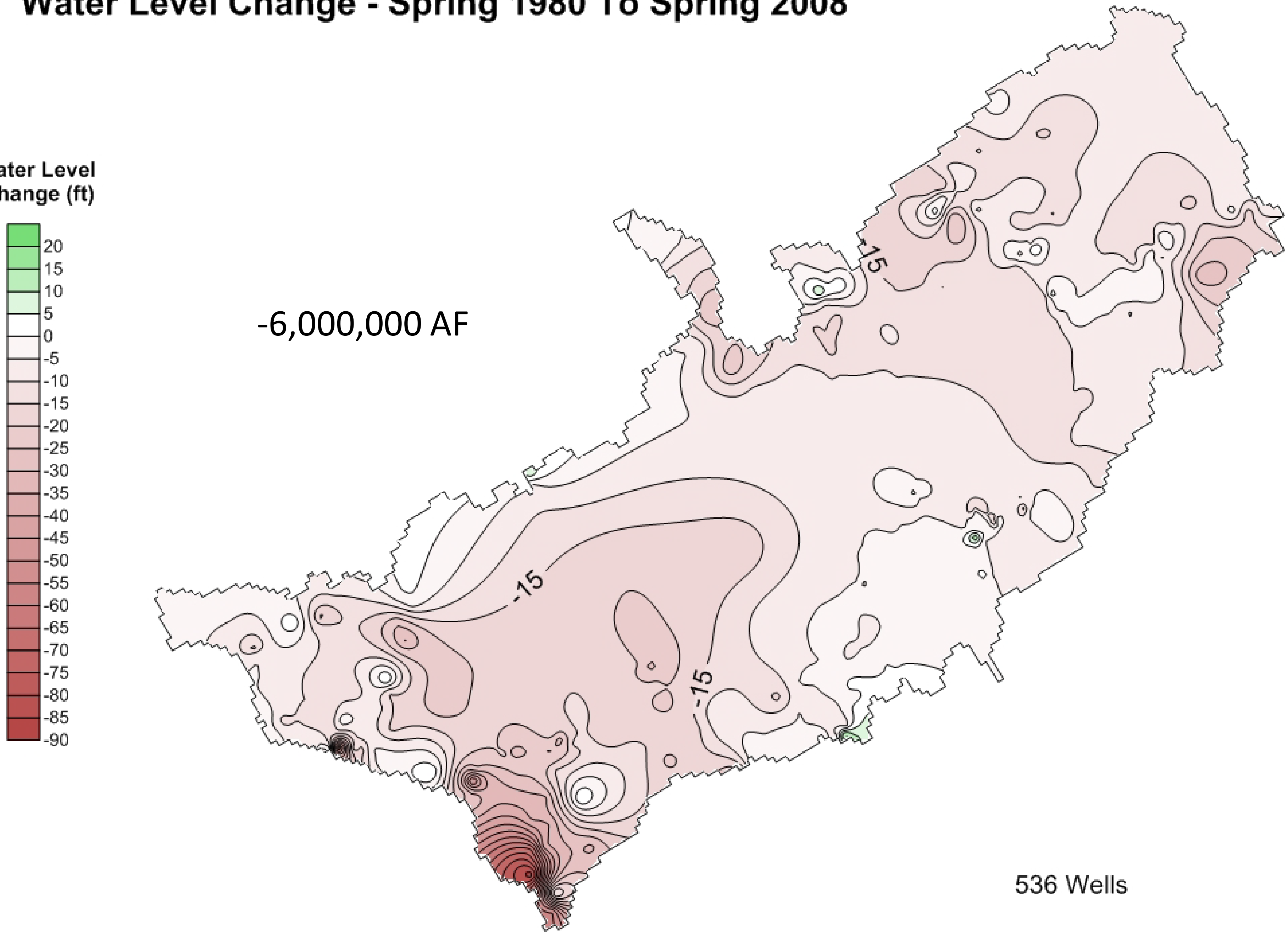
Water Level Change - Spring 1980 To Spring 2001 with Well Locations



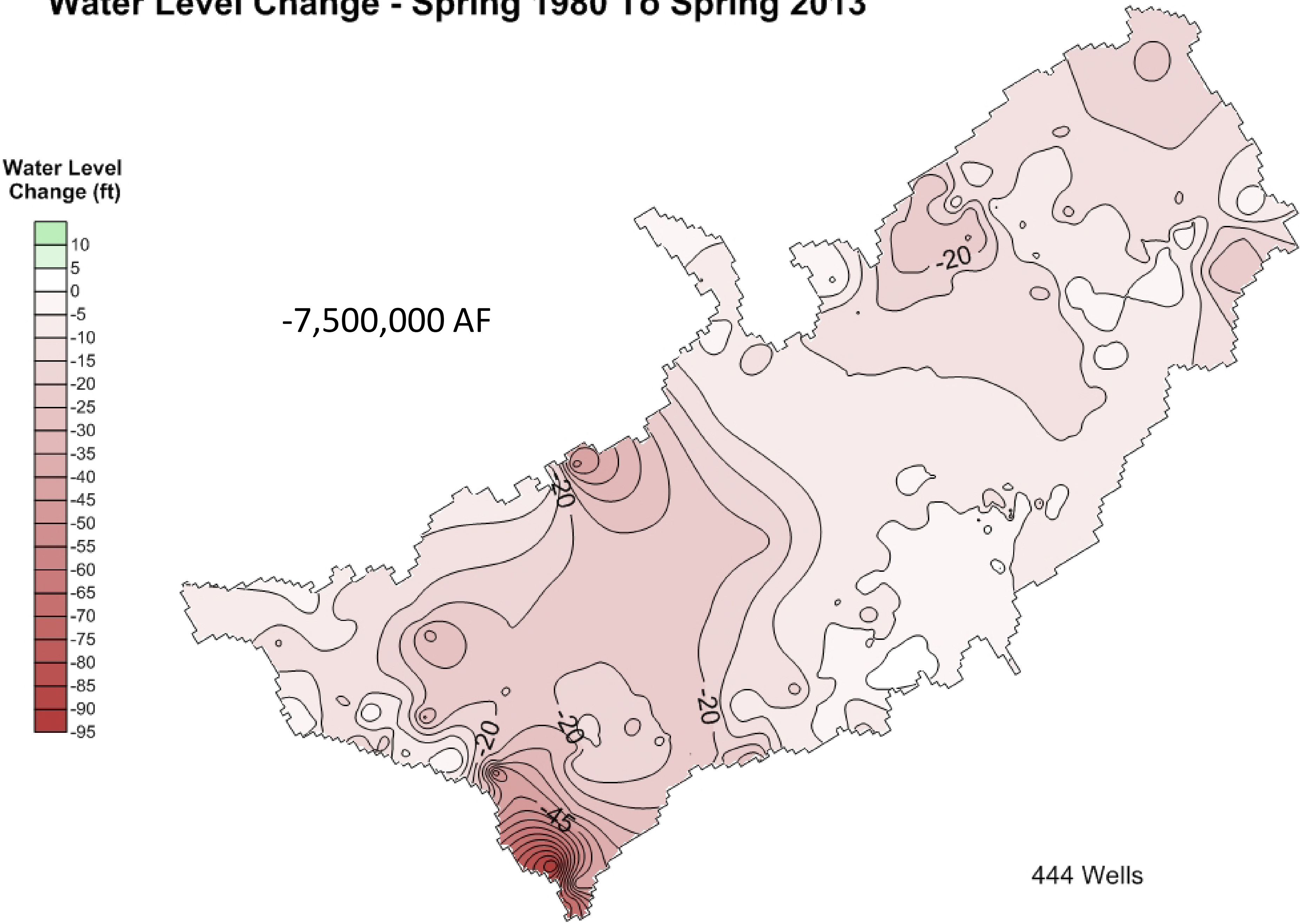
Water Level Change - Spring 1980 To Spring 2002



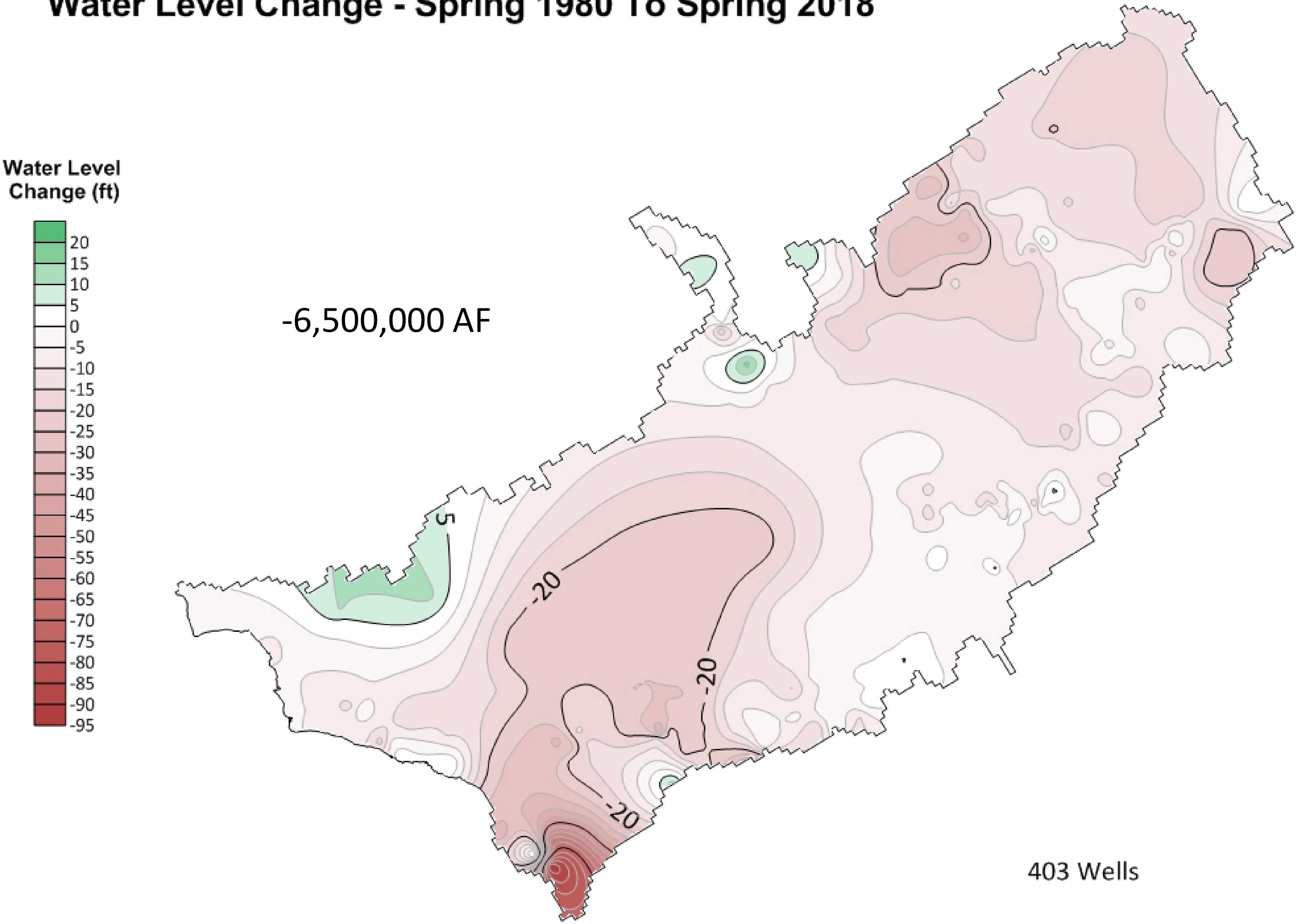
Water Level Change - Spring 1980 To Spring 2008



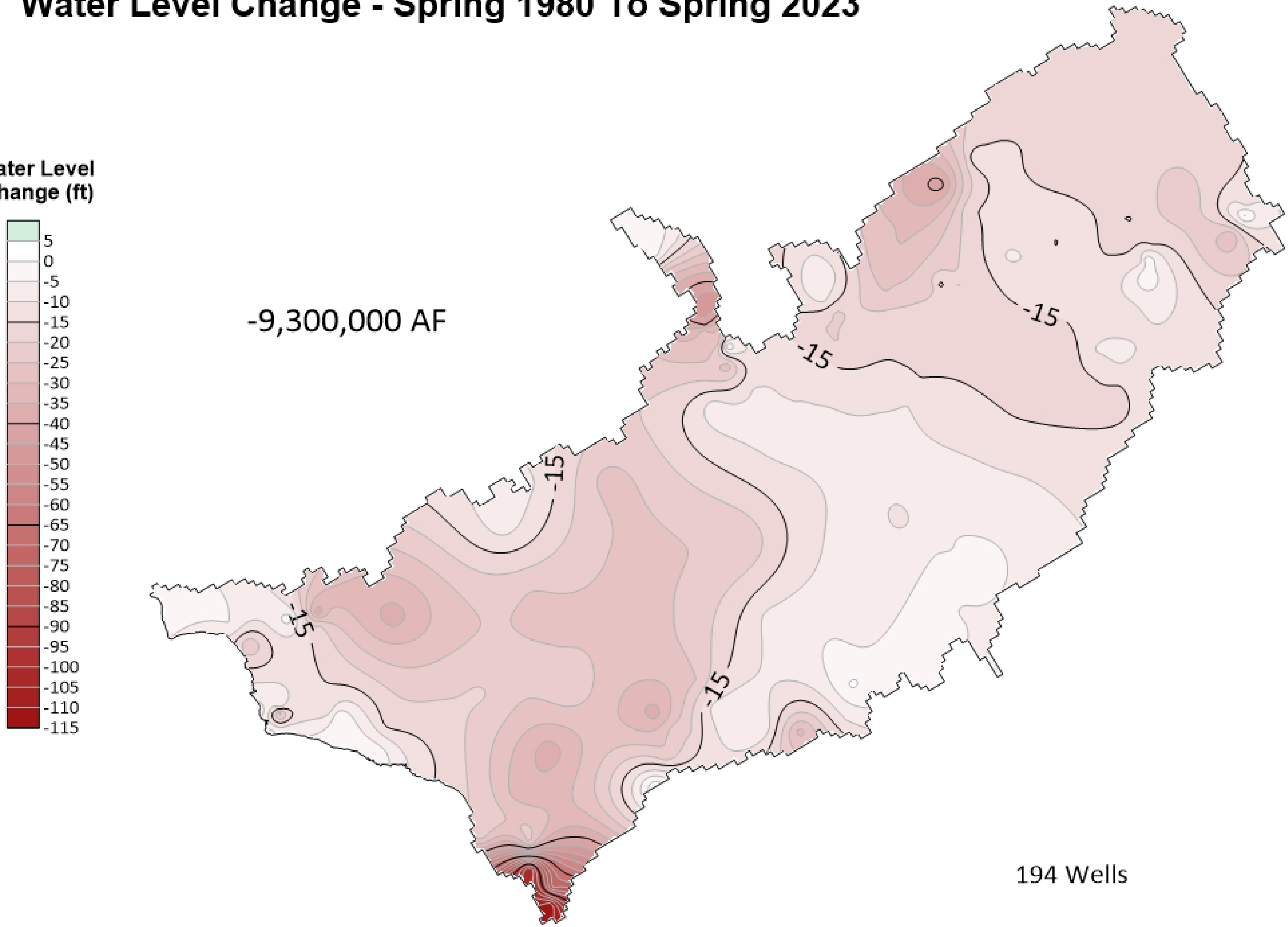
Water Level Change - Spring 1980 To Spring 2013



Water Level Change - Spring 1980 To Spring 2018



Water Level Change - Spring 1980 To Spring 2023

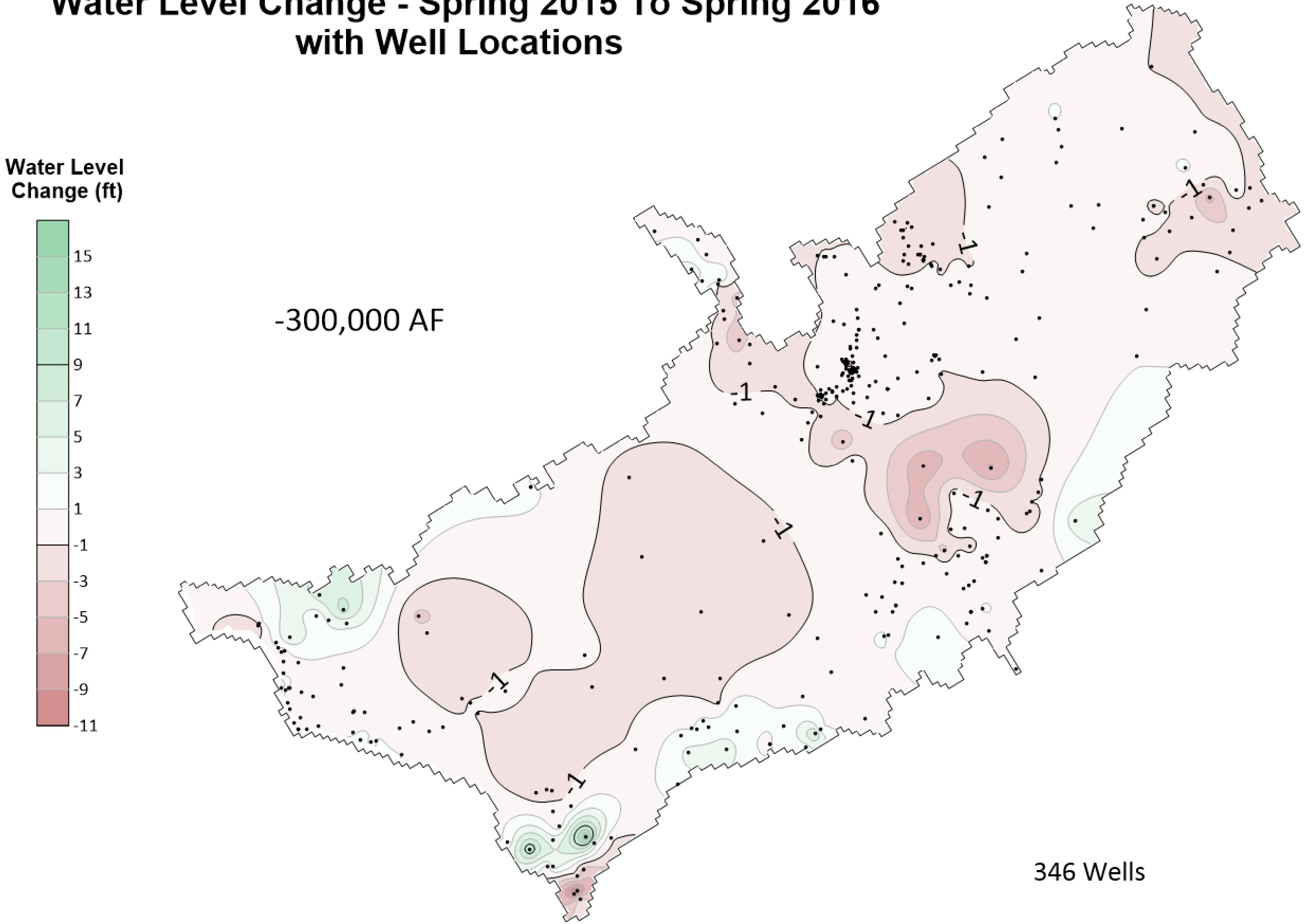


Storage Change between Mass Measurements

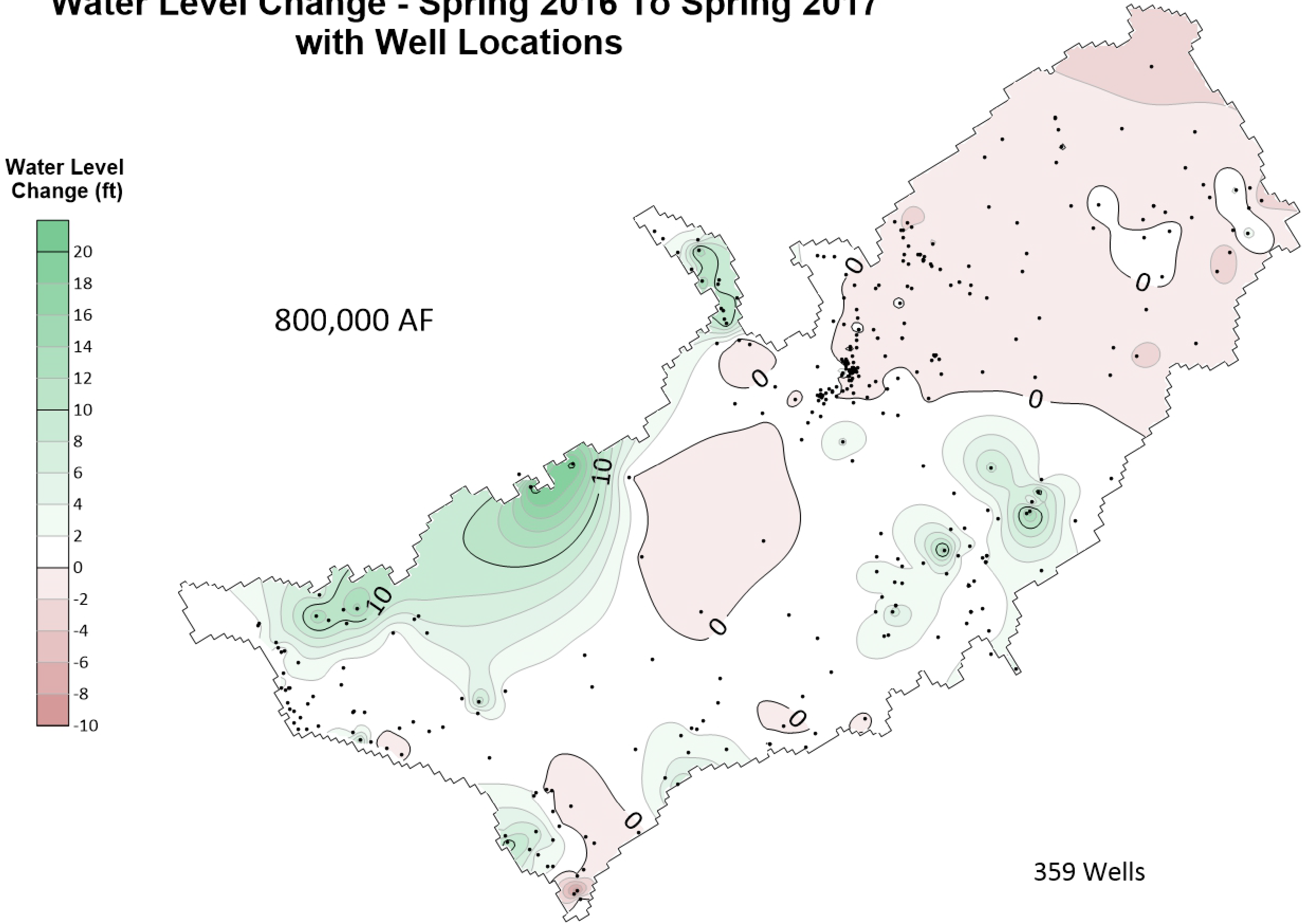
- Changes based on mass-measurement events give a general indication of the volume of water stored in the aquifer;
  - However, it is difficult to make management decisions with only this information.
- Hundreds of wells are measured in the spring each year.
  - Historically, these measurements were taken as time and conditions allowed.
- Since the spring of 2016, IDWR has been conducting coordinated measurement of the ESPA well network every spring to facilitate storage-change calculations.

Annual Measurement Change Maps: 2015 – 2025

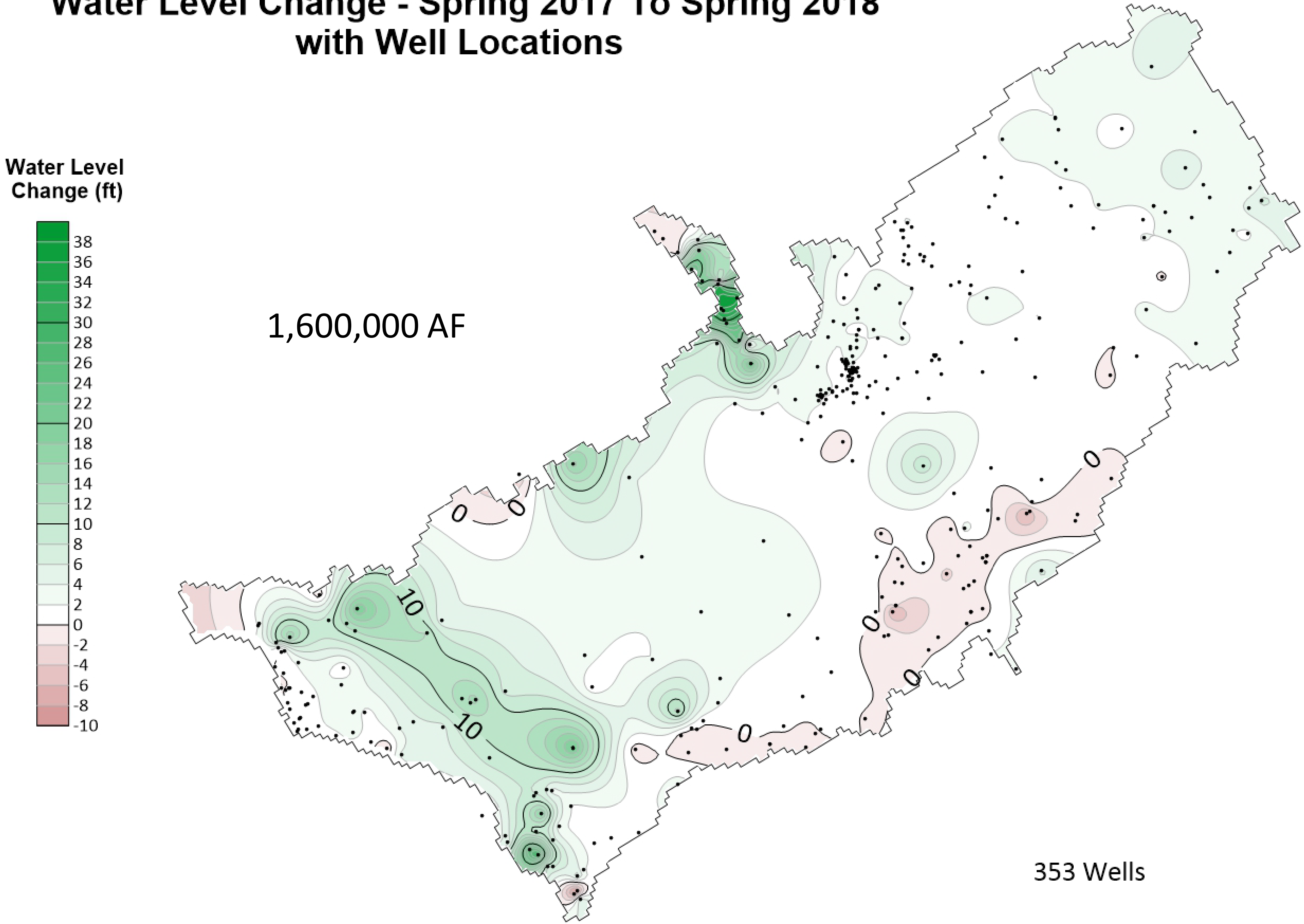
Water Level Change - Spring 2015 To Spring 2016 with Well Locations



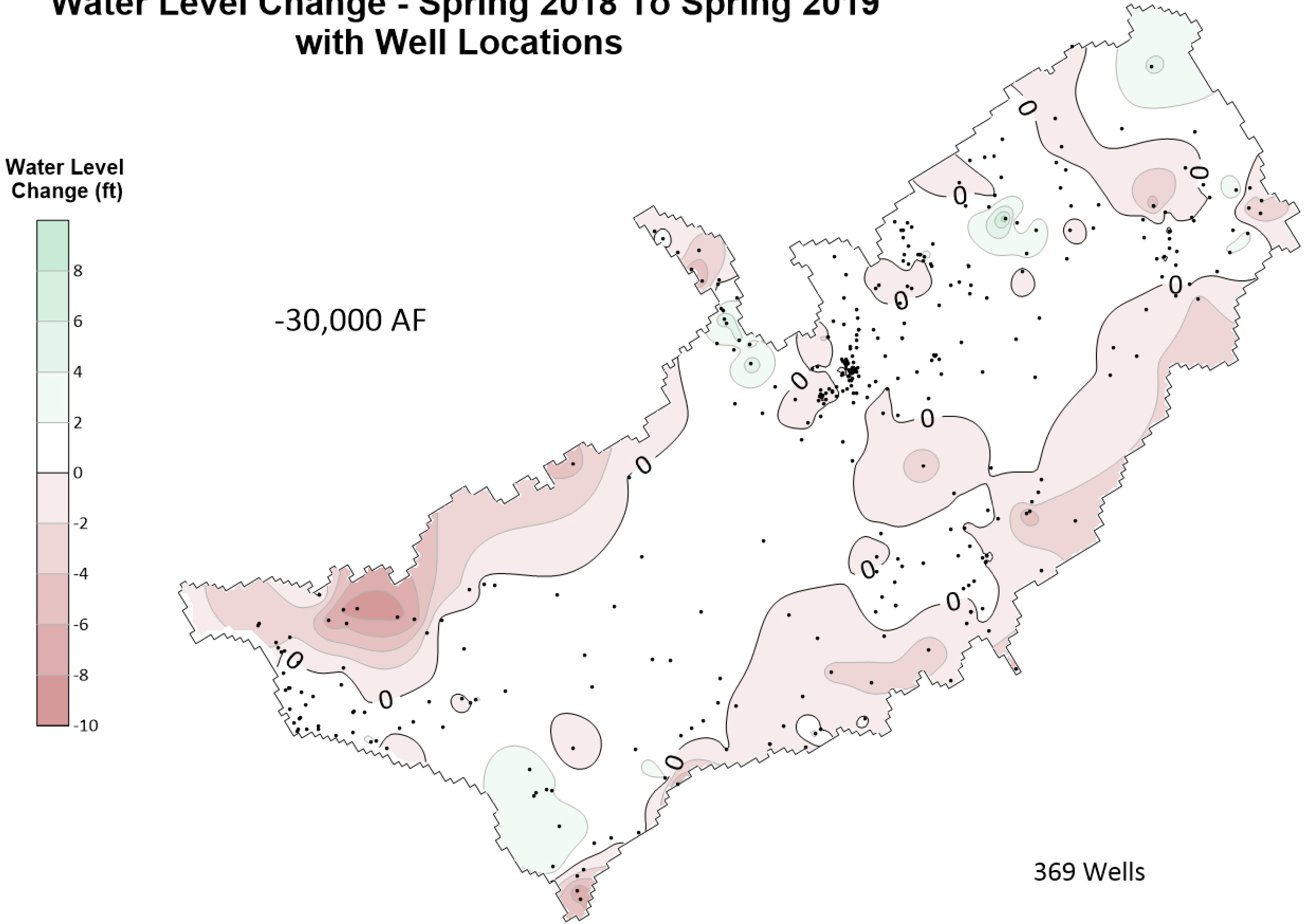
Water Level Change - Spring 2016 To Spring 2017 with Well Locations



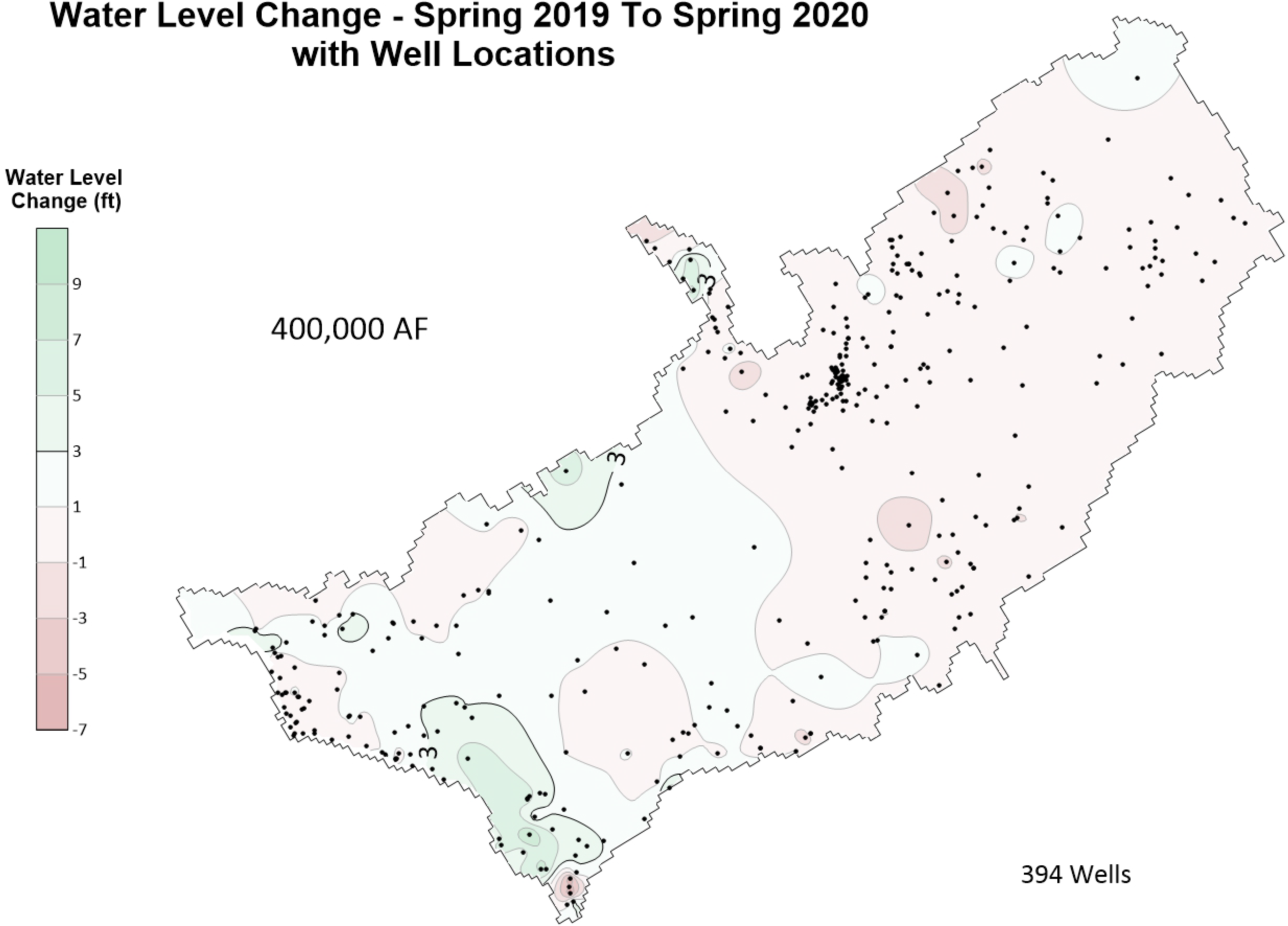
Water Level Change - Spring 2017 To Spring 2018 with Well Locations



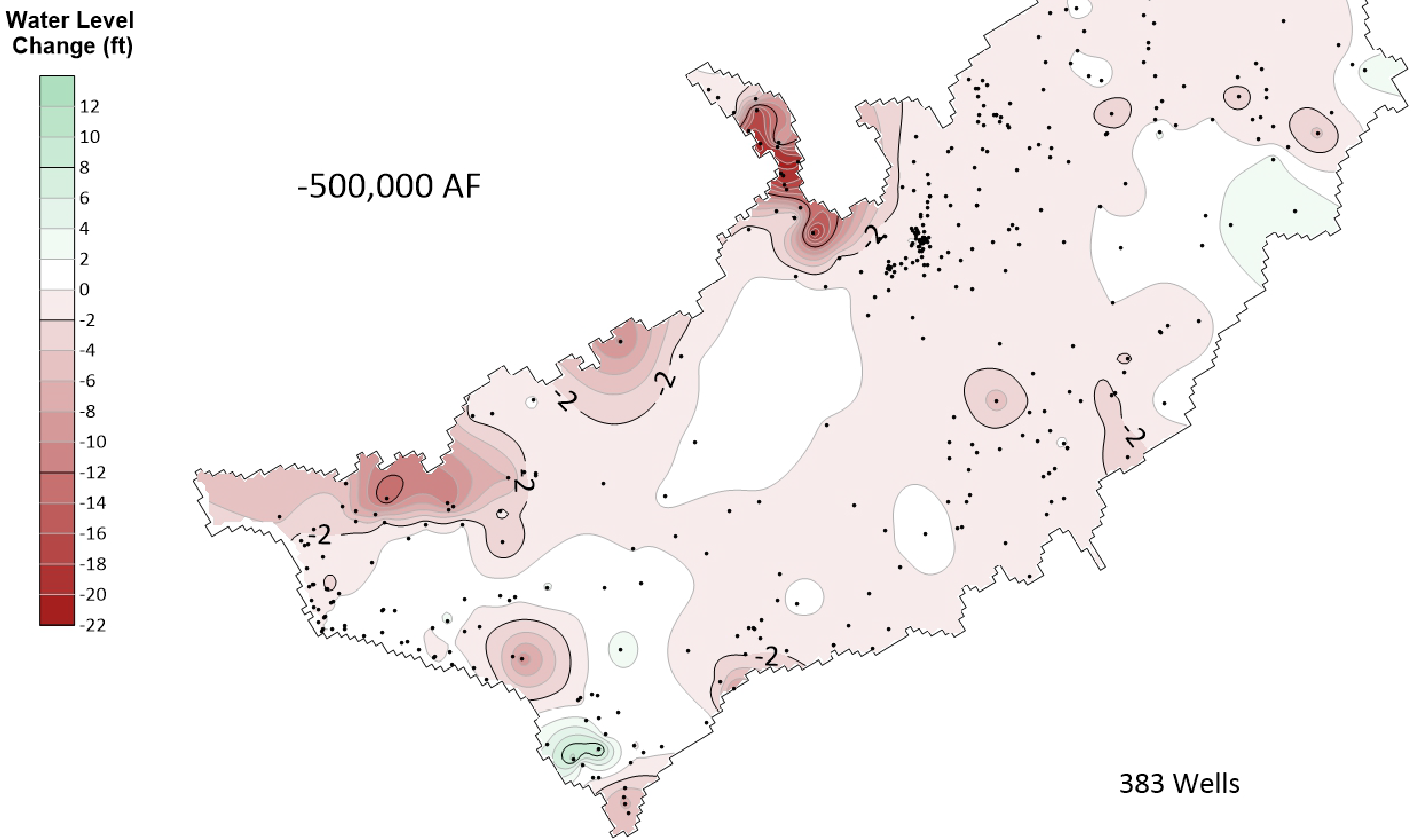
Water Level Change - Spring 2018 To Spring 2019 with Well Locations



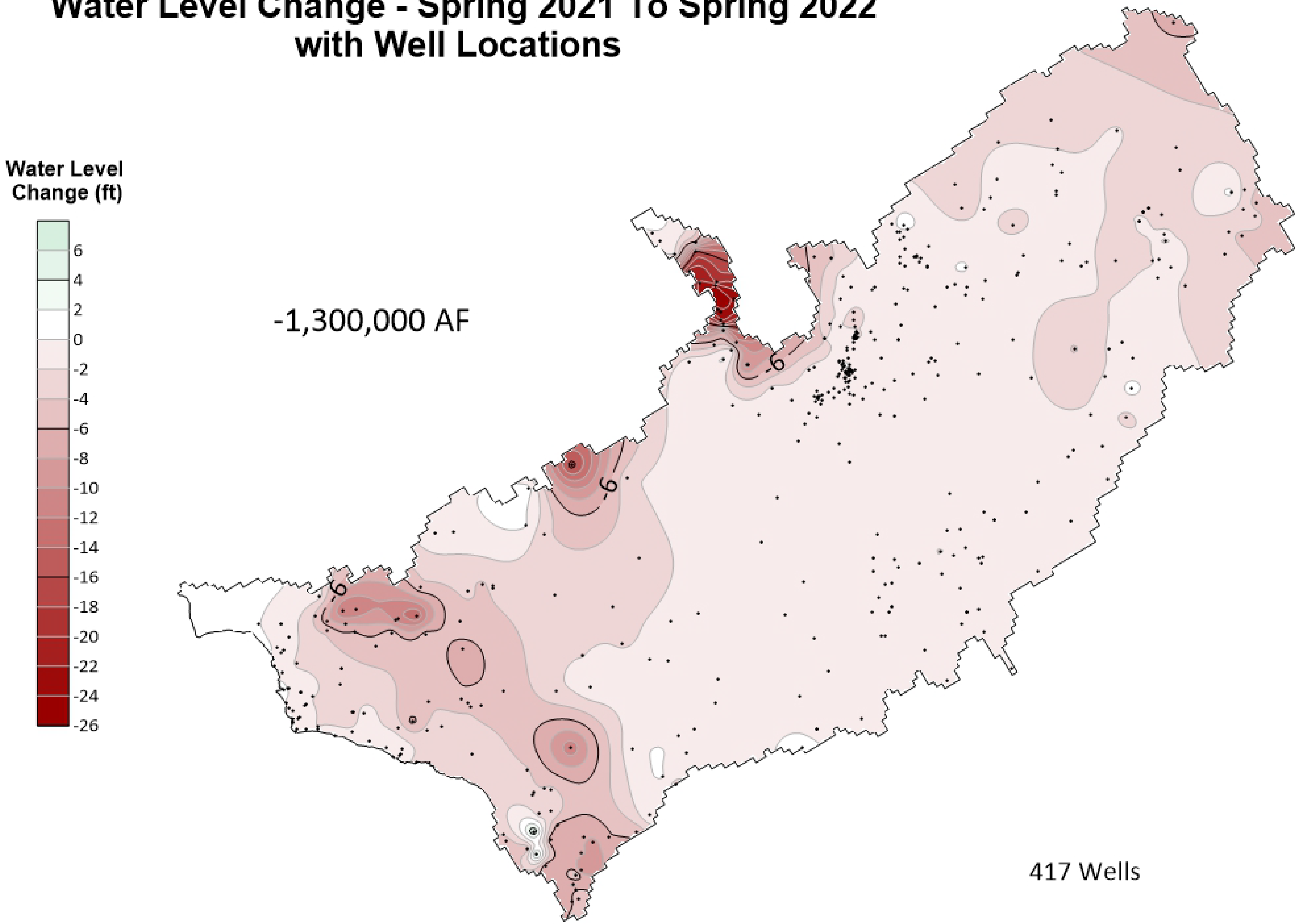
Water Level Change - Spring 2019 To Spring 2020
with Well Locations



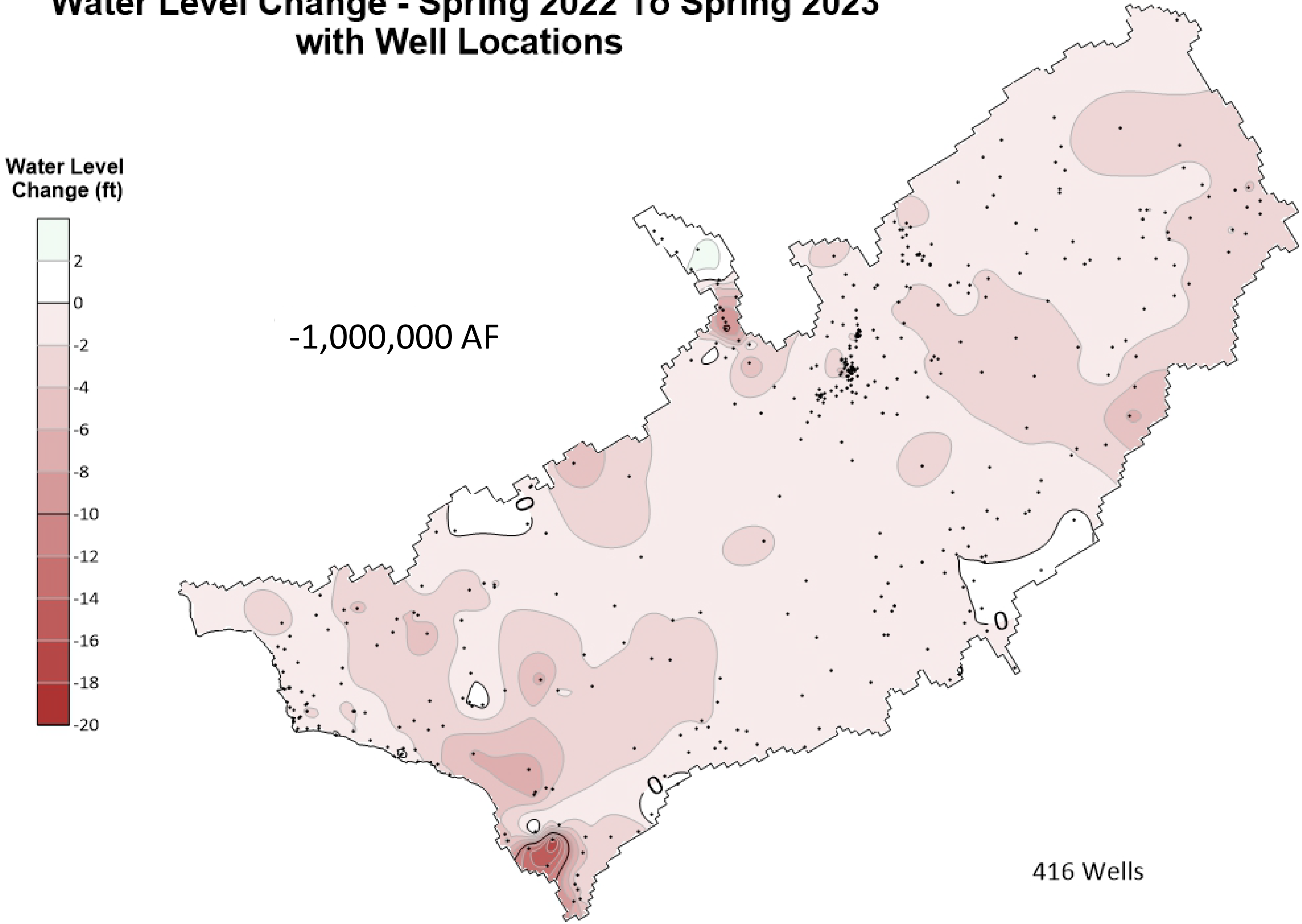
Water Level Change - Spring 2020 To Spring 2021 with Well Locations



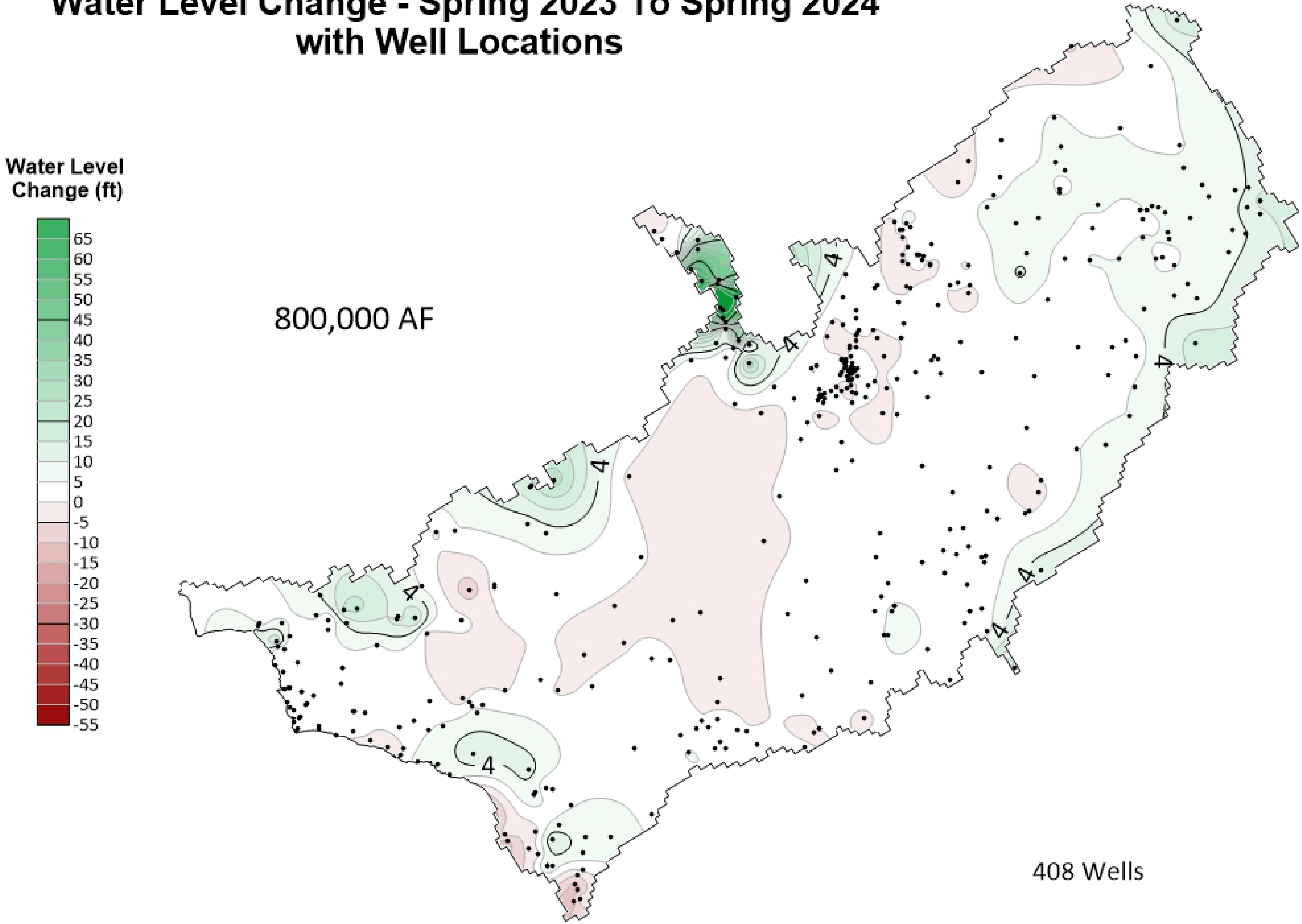
Water Level Change - Spring 2021 To Spring 2022 with Well Locations



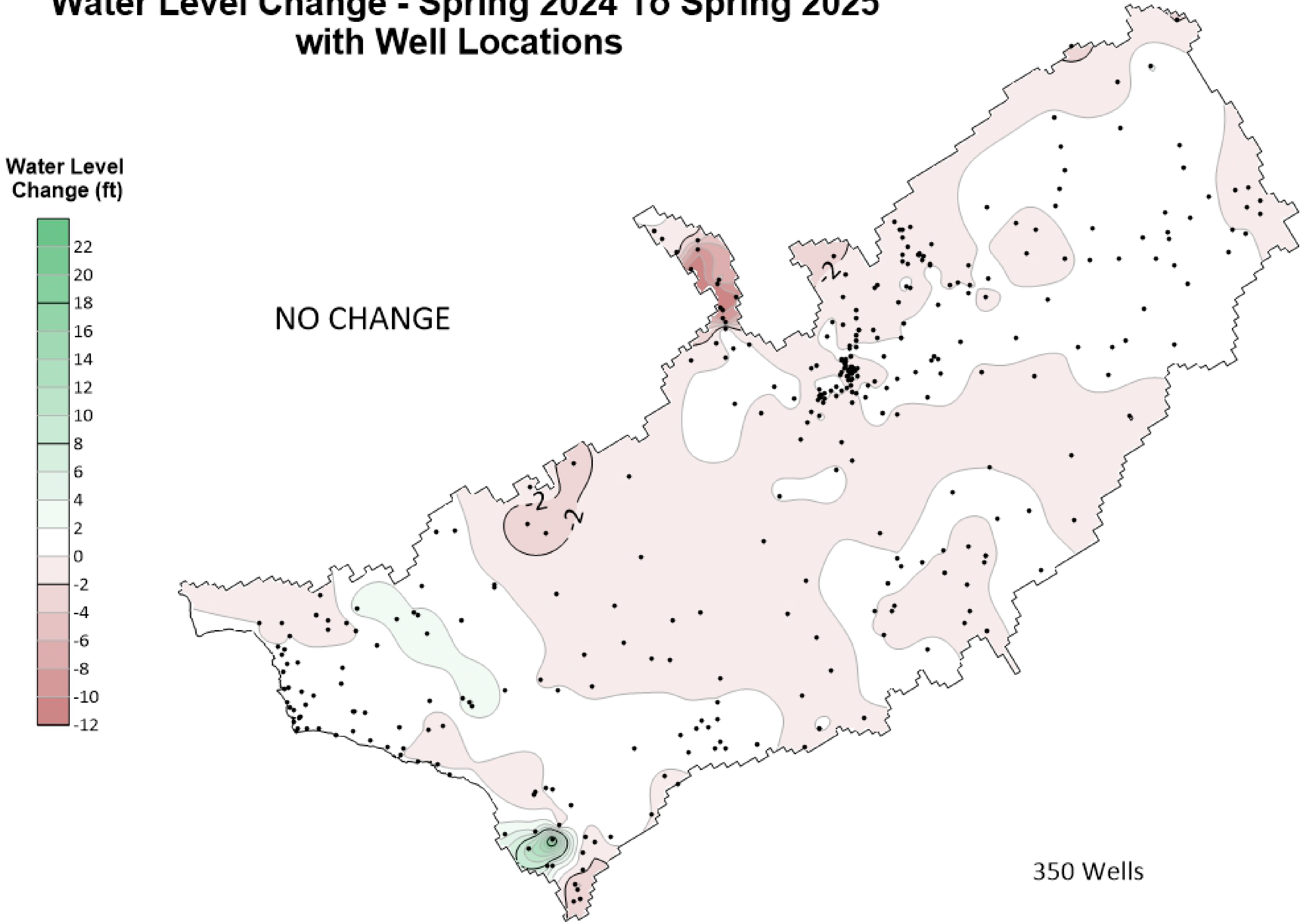
Water Level Change - Spring 2022 To Spring 2023 with Well Locations



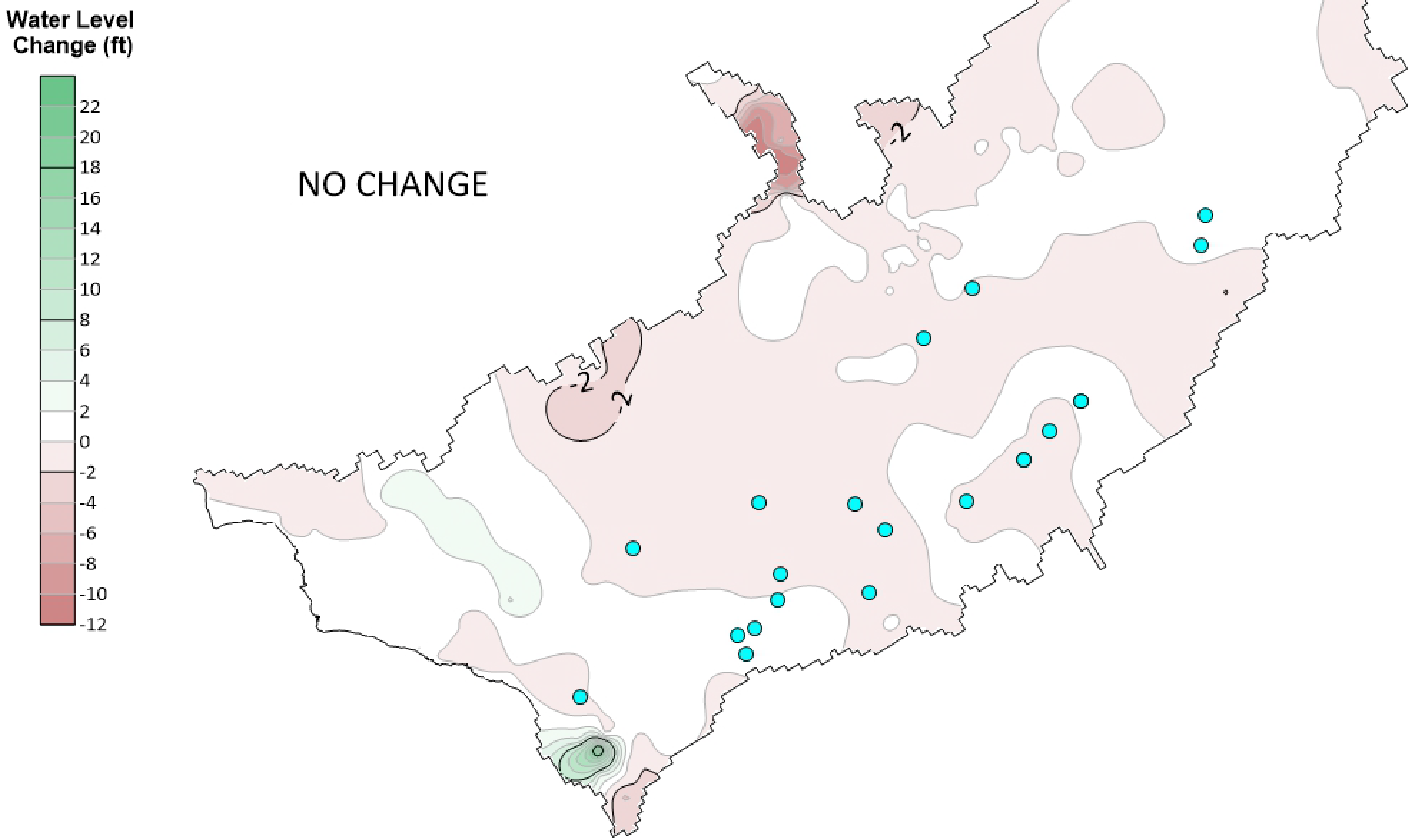
Water Level Change - Spring 2023 To Spring 2024 with Well Locations

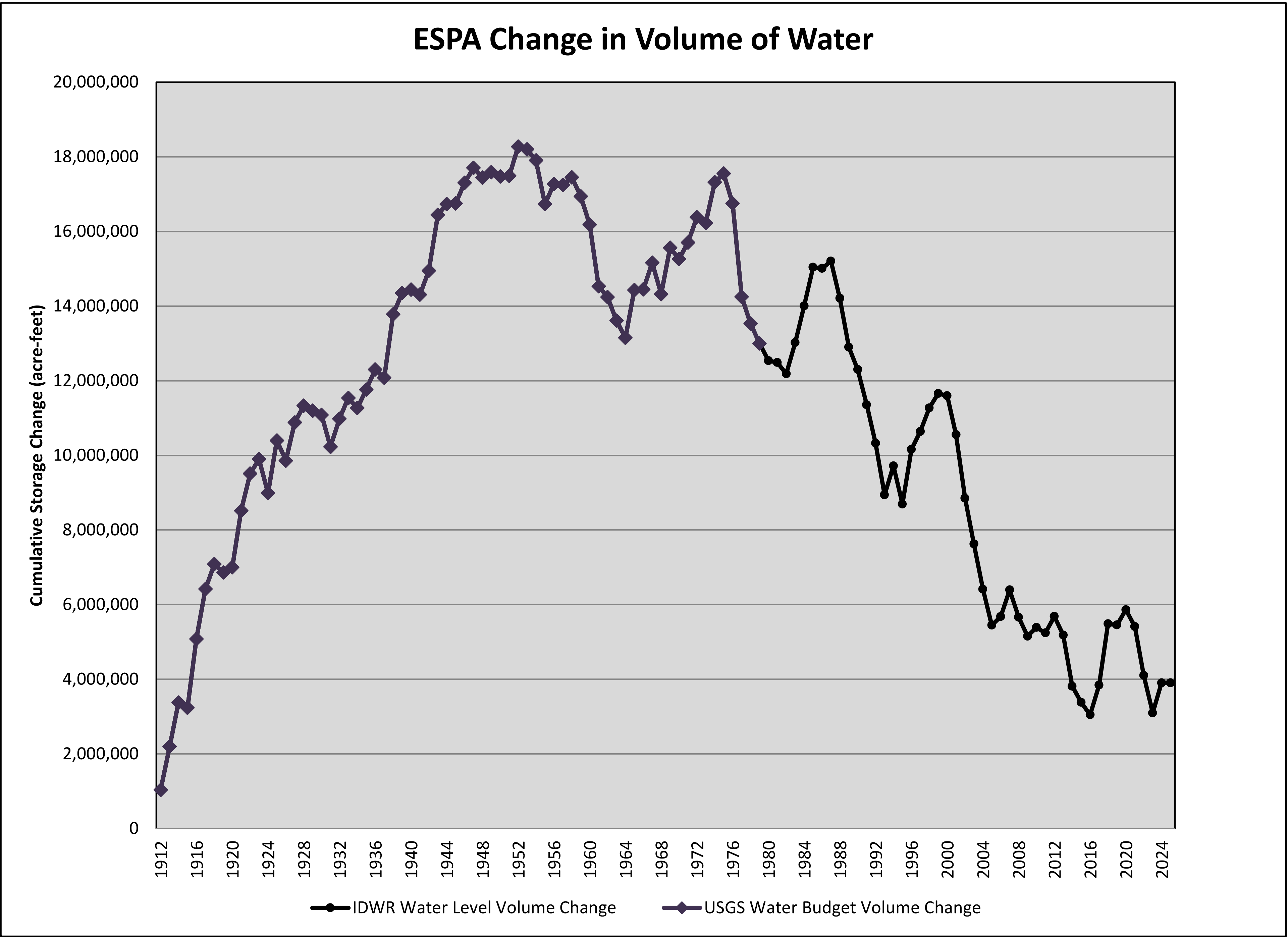


Water Level Change - Spring 2024 To Spring 2025 with Well Locations

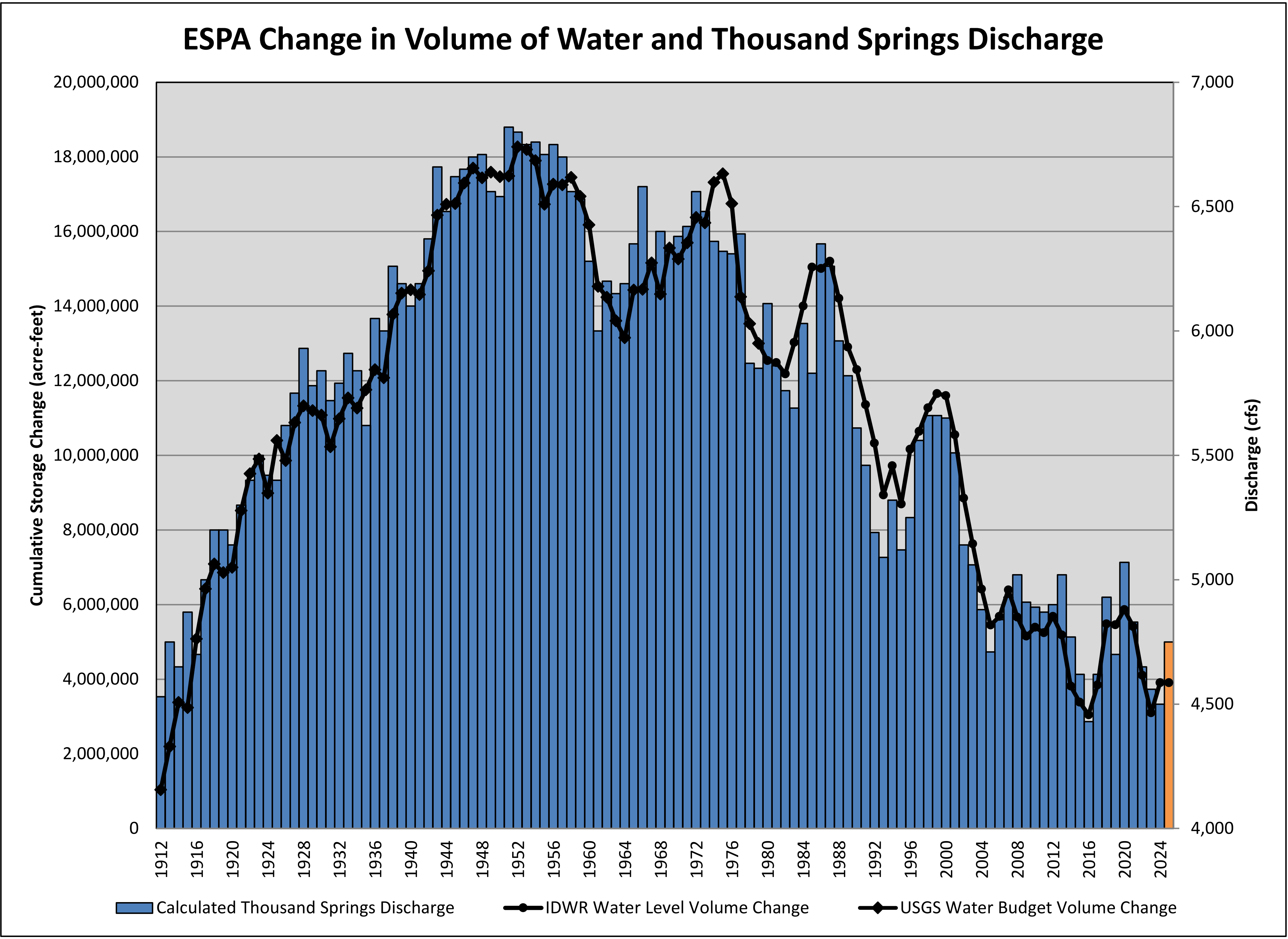


Water Level Change - Spring 2024 To Spring 2025 with Sentinel Well Locations





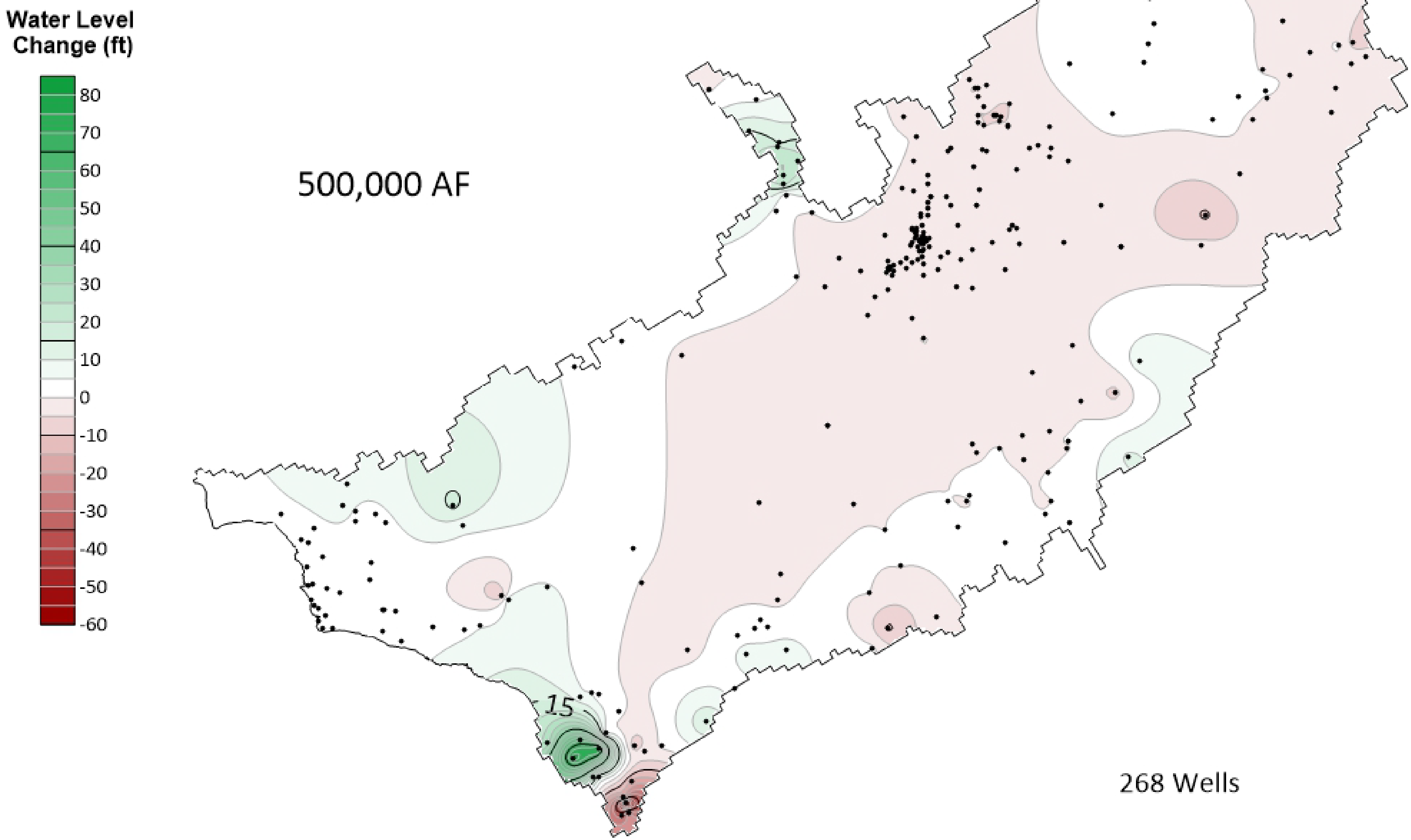
ESPA Change in Volume of Water
Cumulative Storage Change (acre-feet)
20,000,000
18,000,000
16,000,000
14,000,000
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0
1912
1916
1920
1924
1928
1932
1936
1940
1944
1948
1952
1956
1960
1964
1968
1972
1976
1980
1984
1988
1992
1996
2000
2004
2008
2012
2016
2020
2024
IDWR Water Level Volume Change
USGS Water Budget Volume Change



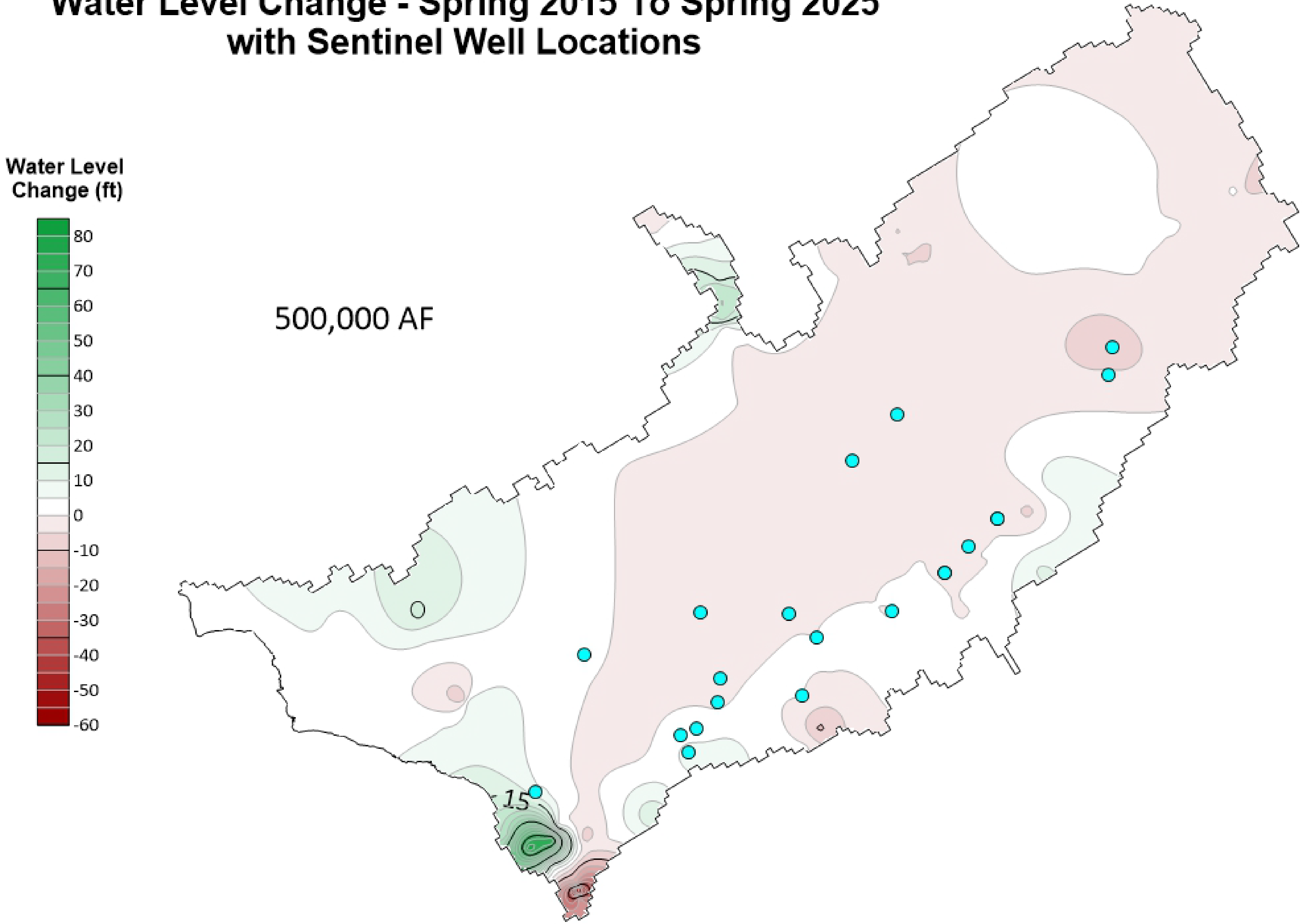
ESPA Change in Volume of Water and Thousand Springs Discharge
Cumulative Storage Change (acre-feet)
Discharge (cfs)
20,000,000
18,000,000
16,000,000
14,000,000
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0
7,000
6,500
6,000
5,500
5,000
4,500
4,000
1912
1916
1920
1924
1928
1932
1936
1940
1944
1948
1952
1956
1960
1964
1968
1972
1976
1980
1984
1988
1992
1996
2000
2004
2008
2012
2016
2020
2024
Calculated Thousand Springs Discharge
IDWR Water Level Volume Change
USGS Water Budget Volume Change

Intermediate Change Map:
2015 – 2025

Water Level Change - Spring 2015 To Spring 2025 with Well Locations



Water Level Change - Spring 2015 To Spring 2025 with Sentinel Well Locations



Storage Change Summary

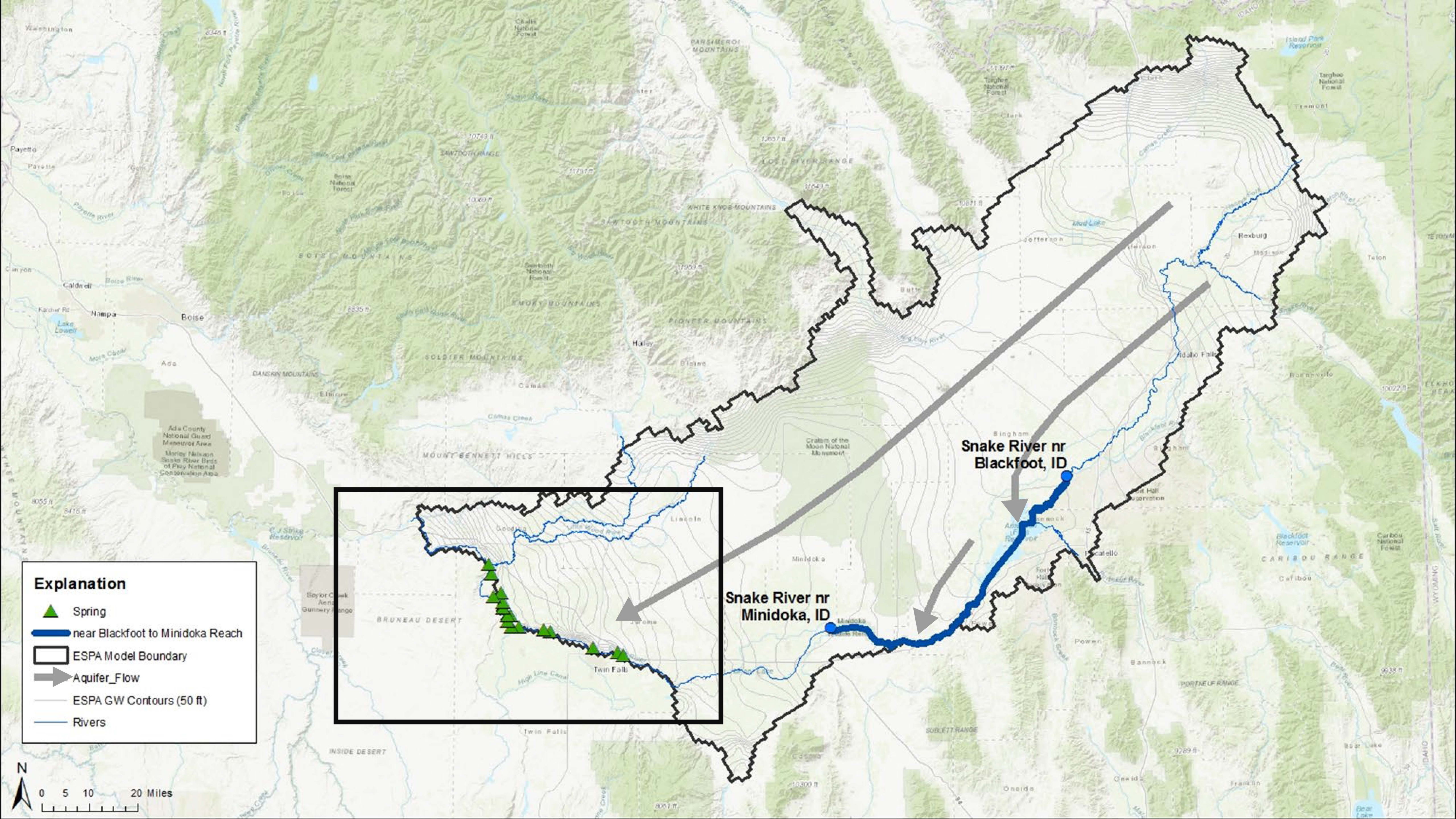
- The aquifer storage remained stable (no change) from 2024 to 2025.
- The aquifer has gained approximately 500,000 acre-feet of storage since 2015.
- Undulations due to weather are to be expected.
- The ESPA leaks, and aquifer-storage gains are fleeting.
- Perseverance through the dry times is vital to success.

Discussion

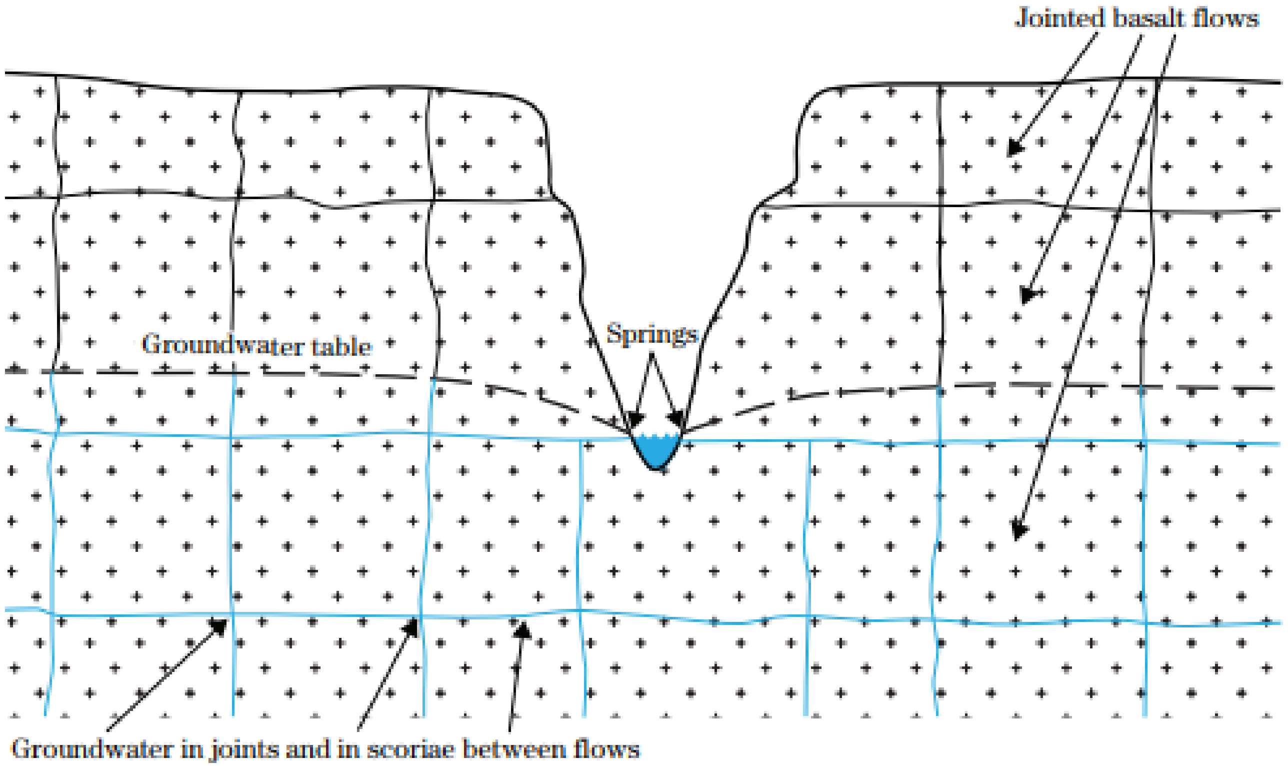
Eastern Snake Plain Aquifer Discharge

Presented by: Ethan Geisler

September 10, 2025


Snake River nr
Blackfoot, ID
Snake River nr
Minidoka, ID
Explanation
Spring
near Blackfoot to Minidoka Reach
ESPA Model Boundary
Aquifer_Flow
ESPA GW Contours (50 ft)
Rivers
N
0 5 10 20 Miles

Spring Discharge on ESPA



- Springs occur when the groundwater table intersects the land surface or canyon wall.

- Difficult Road Access or boat access
- Seepage, underflow, no channelized flow

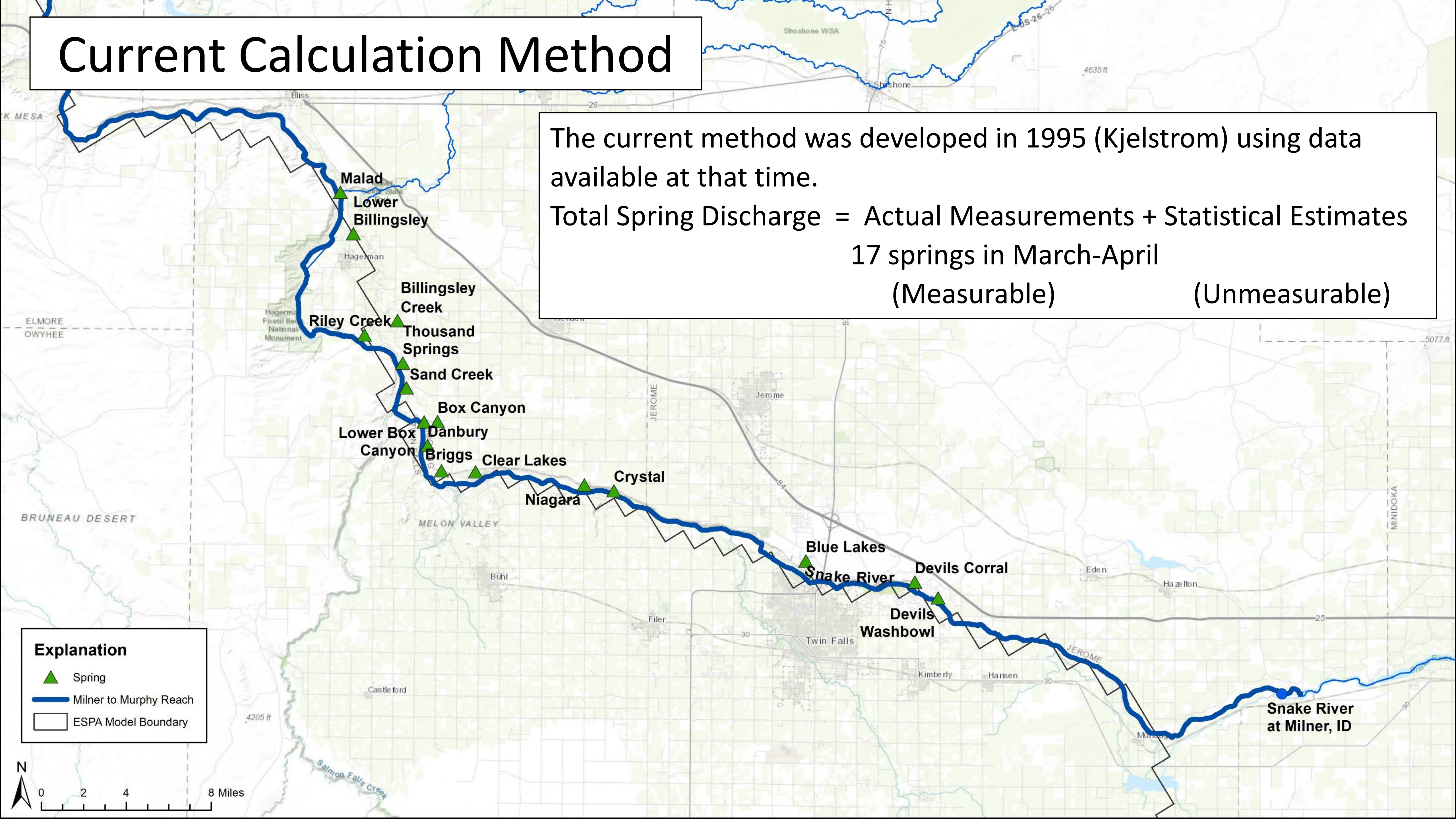
Current Calculation Method

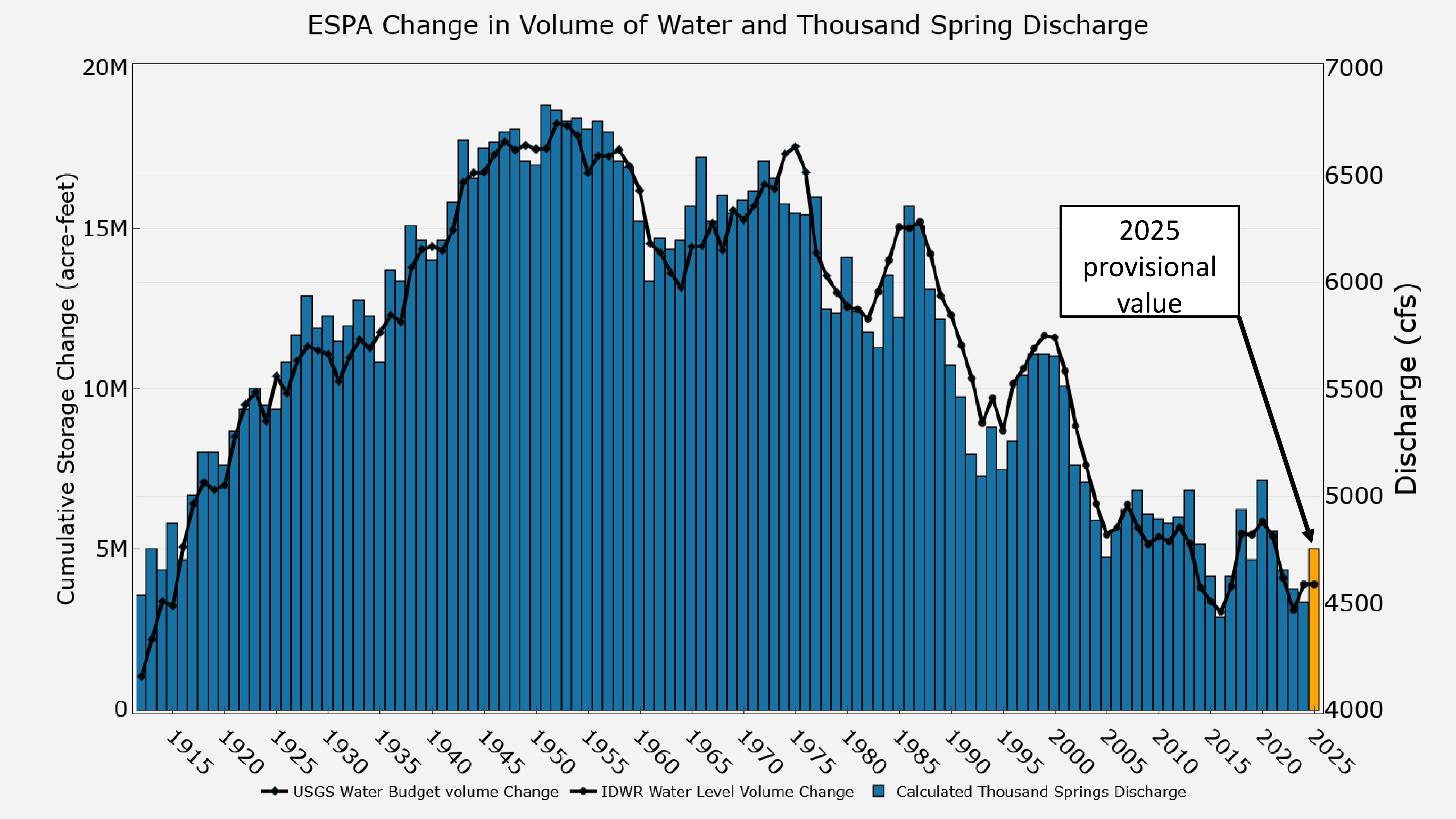
The current method was developed in 1995 (Kjelstrom) using data available at that time.

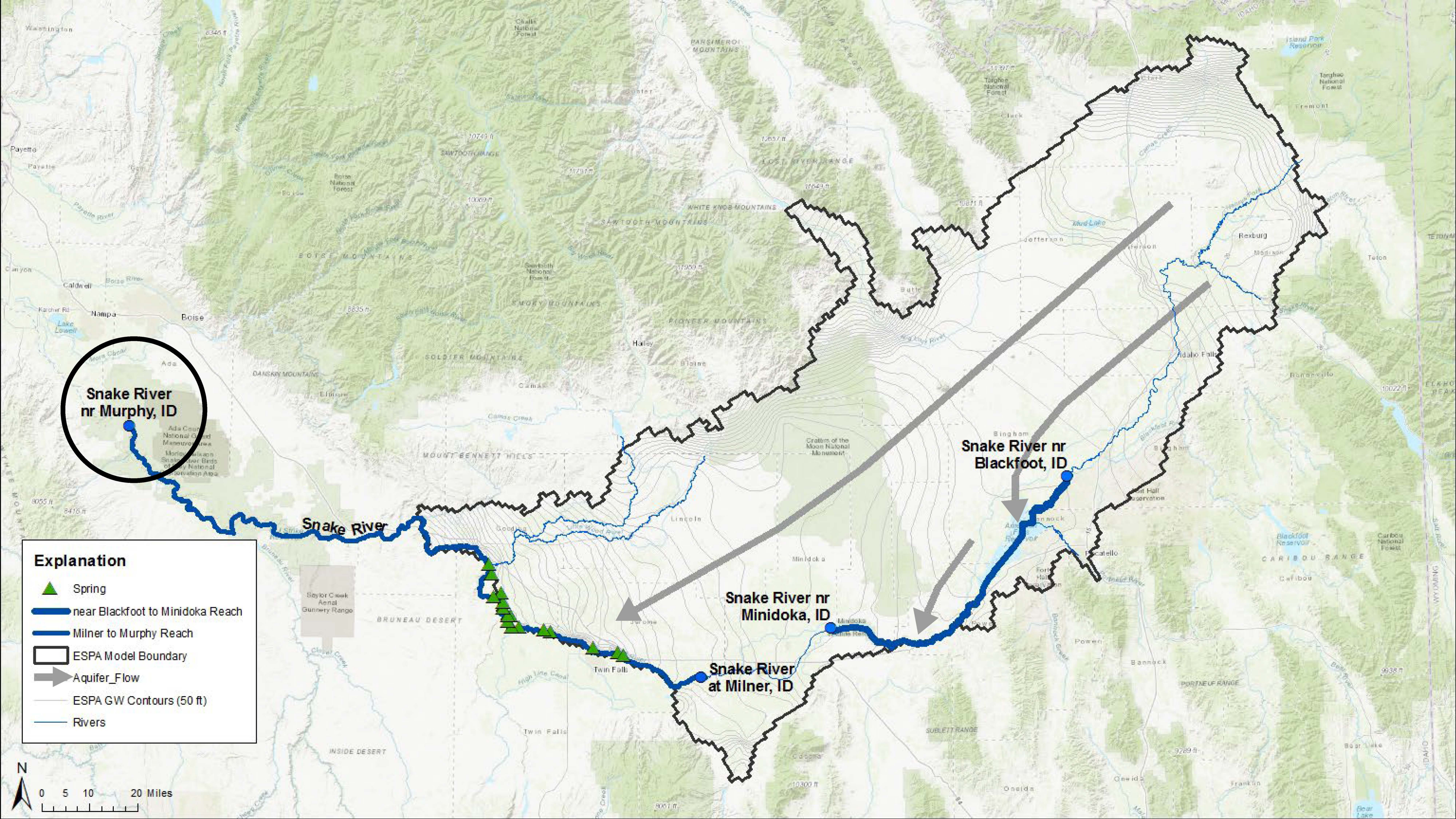
Total Spring Discharge = Actual Measurements + Statistical Estimates

17 springs in March-April

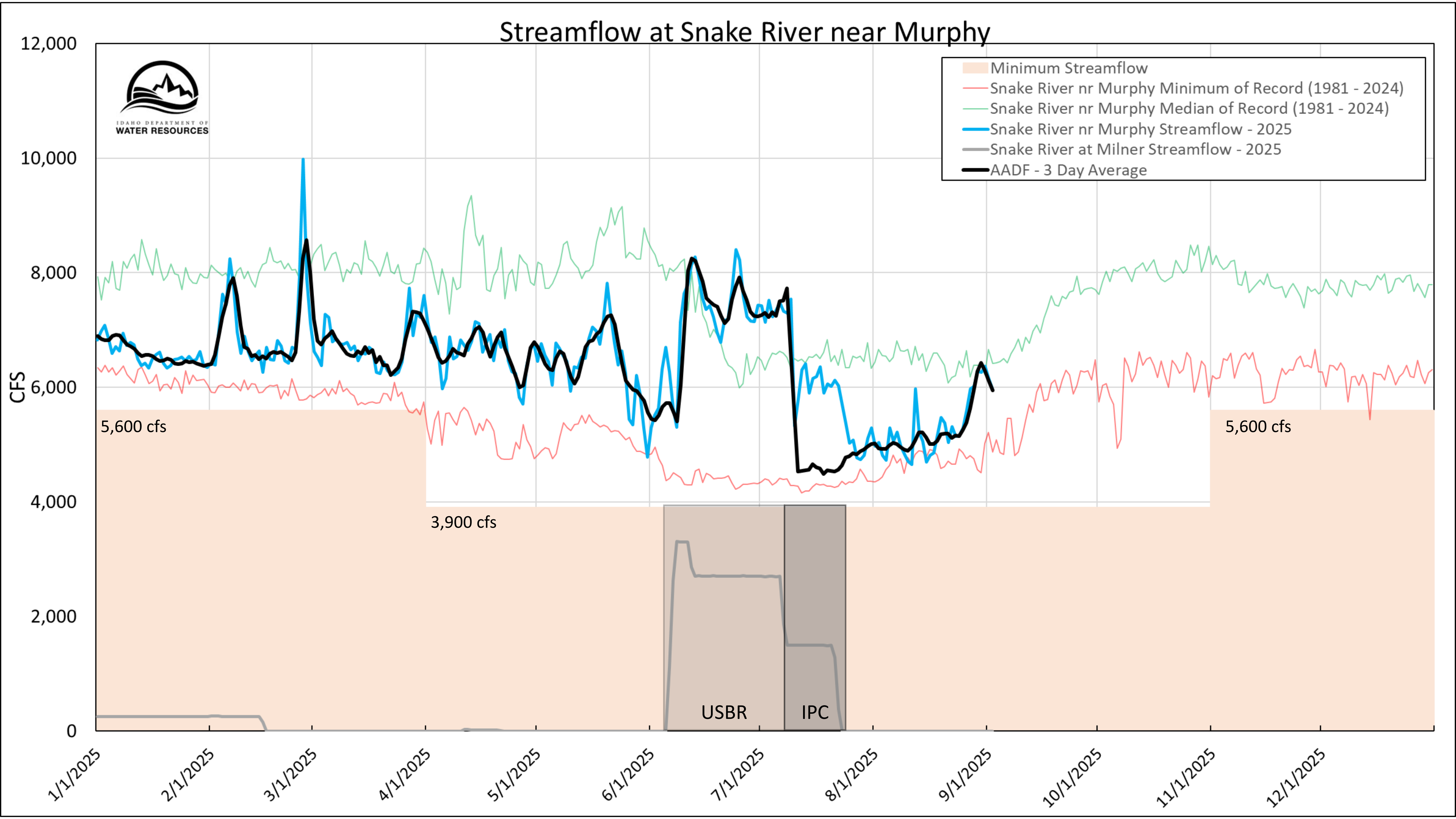
(Measurable) (Unmeasurable)



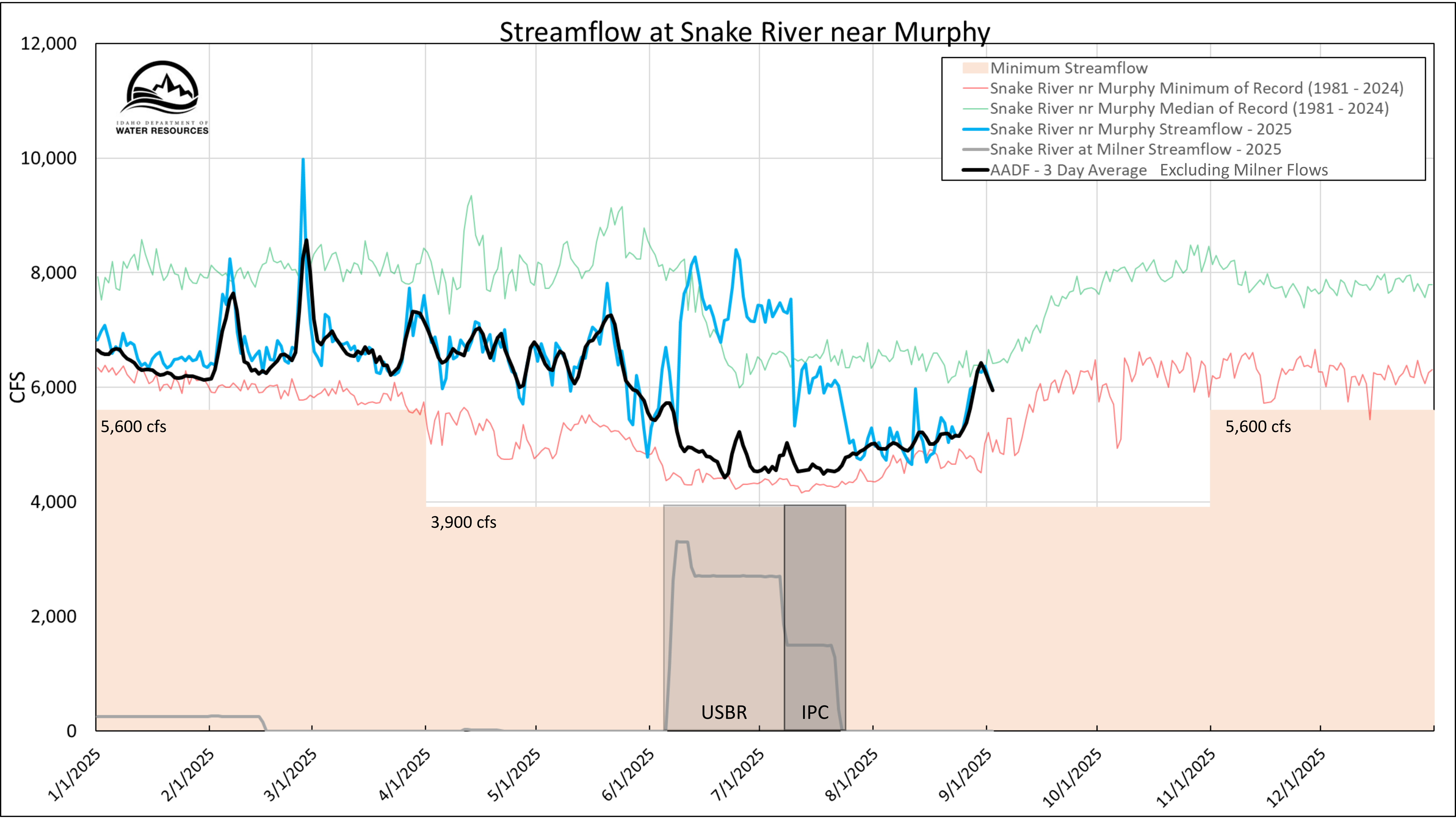

ESPA Change in Volume of Water and Thousand Spring Discharge
Cumulative Storage Change (acre-feet)
0
5M
10M
15M
20M
Discharge (cfs)
4000
4500
5000
5500
6000
6500
7000
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
2025 provisional value
USGS Water Budget volume Change
IDWR Water Level Volume Change
Calculated Thousand Springs Discharge



Snake River nr Murphy, ID
Snake River
Snake River nr Blackfoot, ID
Snake River nr Minidoka, ID
Snake River at Milner, ID
Explanation
Spring
near Blackfoot to Minidoka Reach
Milner to Murphy Reach
ESPA Model Boundary
Aquifer_Flow
ESPA GW Contours (50 ft)
Rivers
N
0 5 10 20 Miles



Streamflow at Snake River near Murphy
IDAHO DEPARTMENT OF WATER RESOURCES
Minimum Streamflow
Snake River nr Murphy Minimum of Record (1981 - 2024)
Snake River nr Murphy Median of Record (1981 - 2024)
Snake River nr Murphy Streamflow - 2025
Snake River at Milner Streamflow - 2025
AADF - 3 Day Average
CFS
12,000
10,000
8,000
6,000
4,000
2,000
0
5,600 cfs
3,900 cfs
5,600 cfs
USBR
IPC
1/1/2025
2/1/2025
3/1/2025
4/1/2025
5/1/2025
6/1/2025
7/1/2025
8/1/2025
9/1/2025
10/1/2025
11/1/2025
12/1/2025



Streamflow at Snake River near Murphy
IDAHO DEPARTMENT OF
WATER RESOURCES
Minimum Streamflow
Snake River nr Murphy Minimum of Record (1981 - 2024)
Snake River nr Murphy Median of Record (1981 - 2024)
Snake River nr Murphy Streamflow - 2025
Snake River at Milner Streamflow - 2025
AADF - 3 Day Average Excluding Milner Flows
CFS
12,000
10,000
8,000
6,000
4,000
2,000
0
5,600 cfs
3,900 cfs
5,600 cfs
USBR
IPC
1/1/2025
2/1/2025
3/1/2025
4/1/2025
5/1/2025
6/1/2025
7/1/2025
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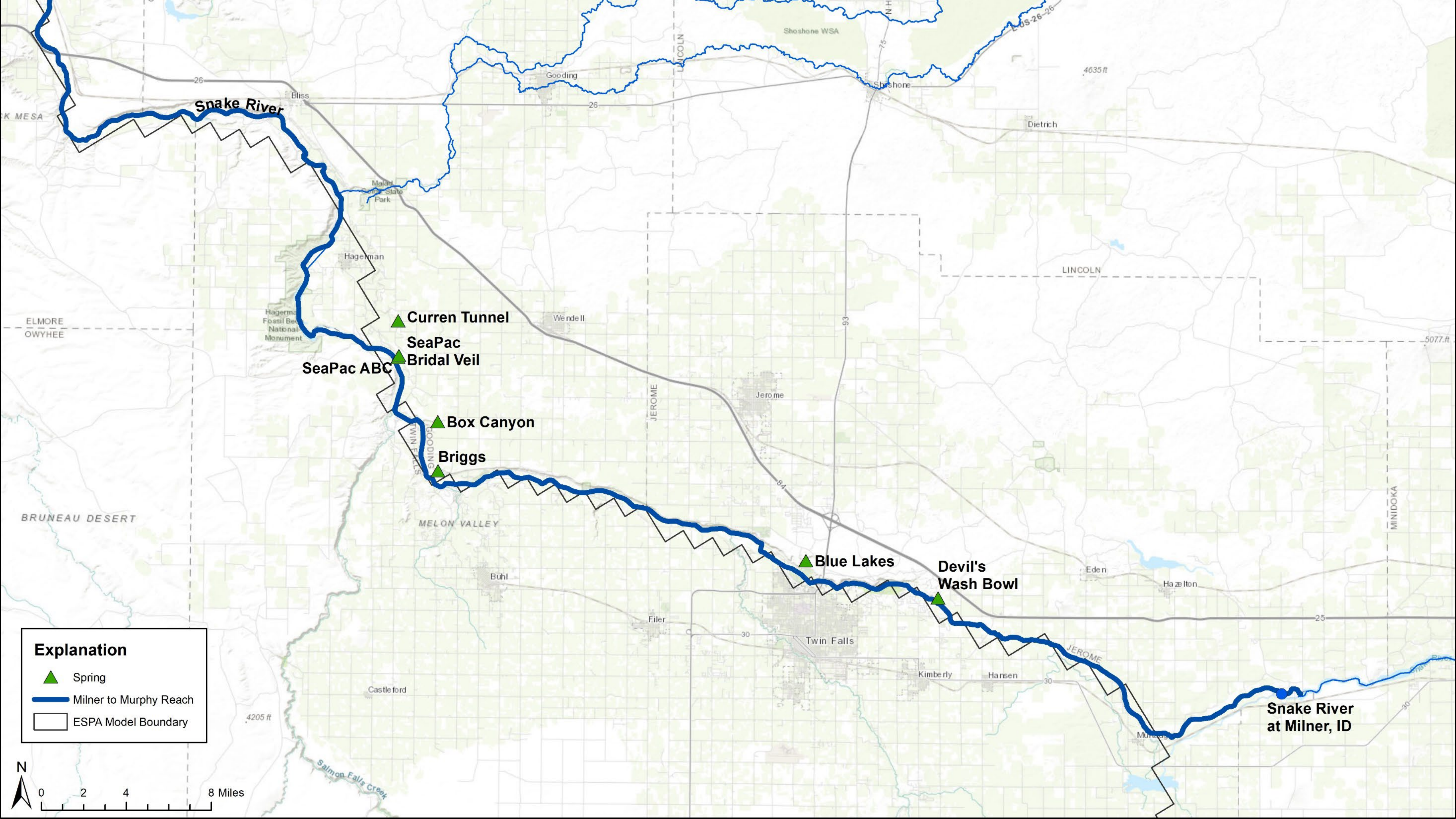
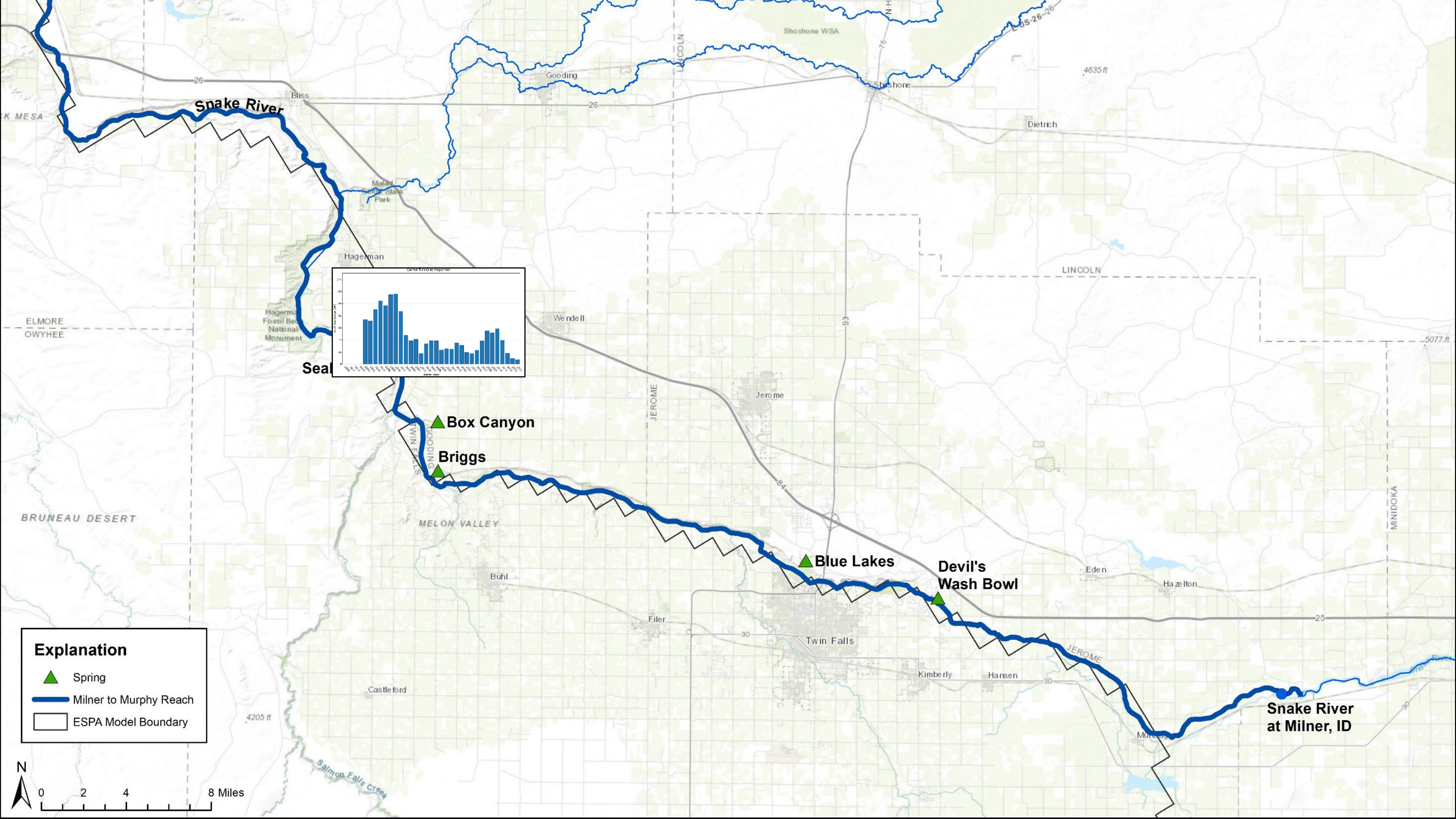
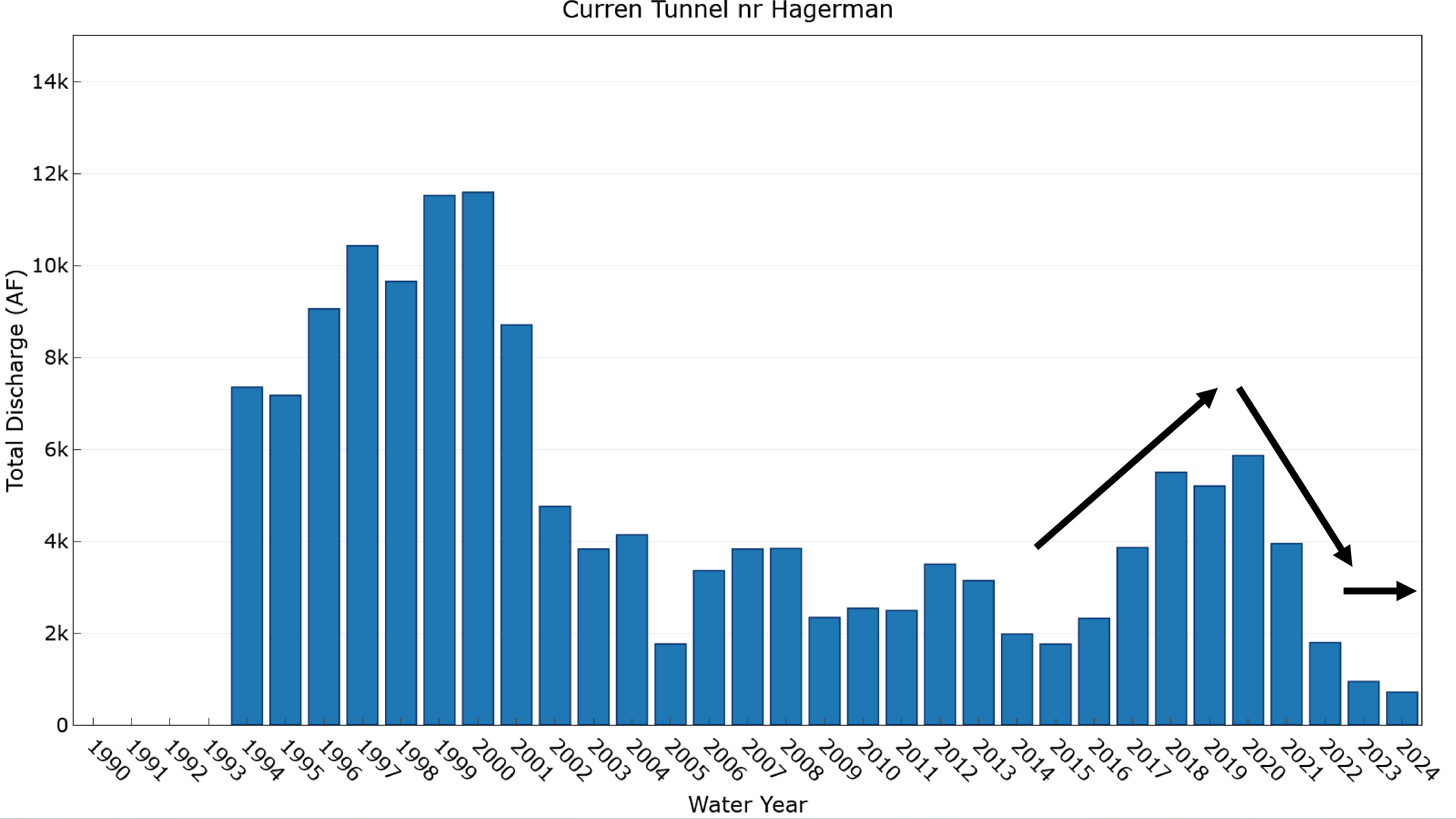
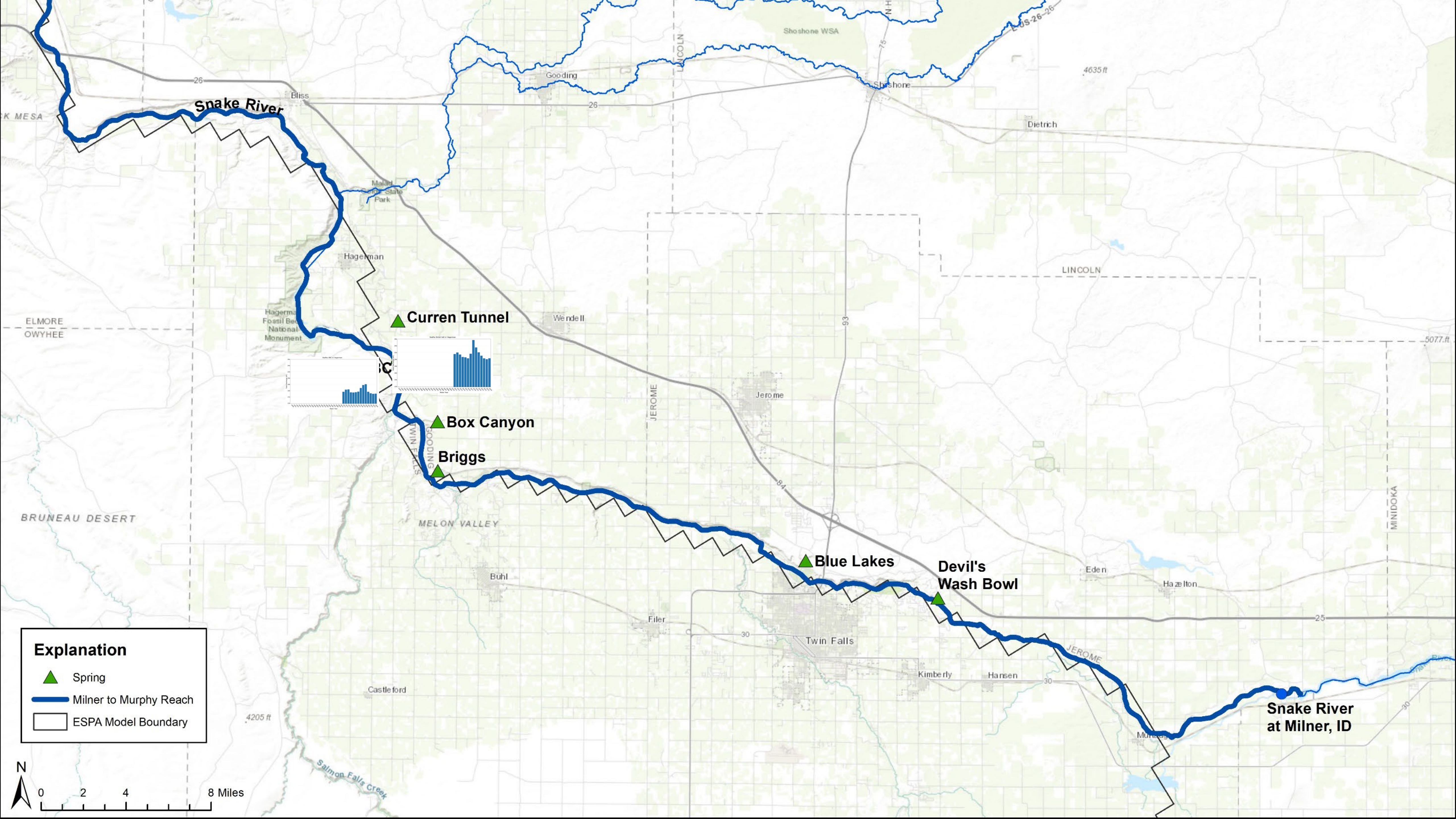
9/1/2025
10/1/2025
11/1/2025
12/1/2025



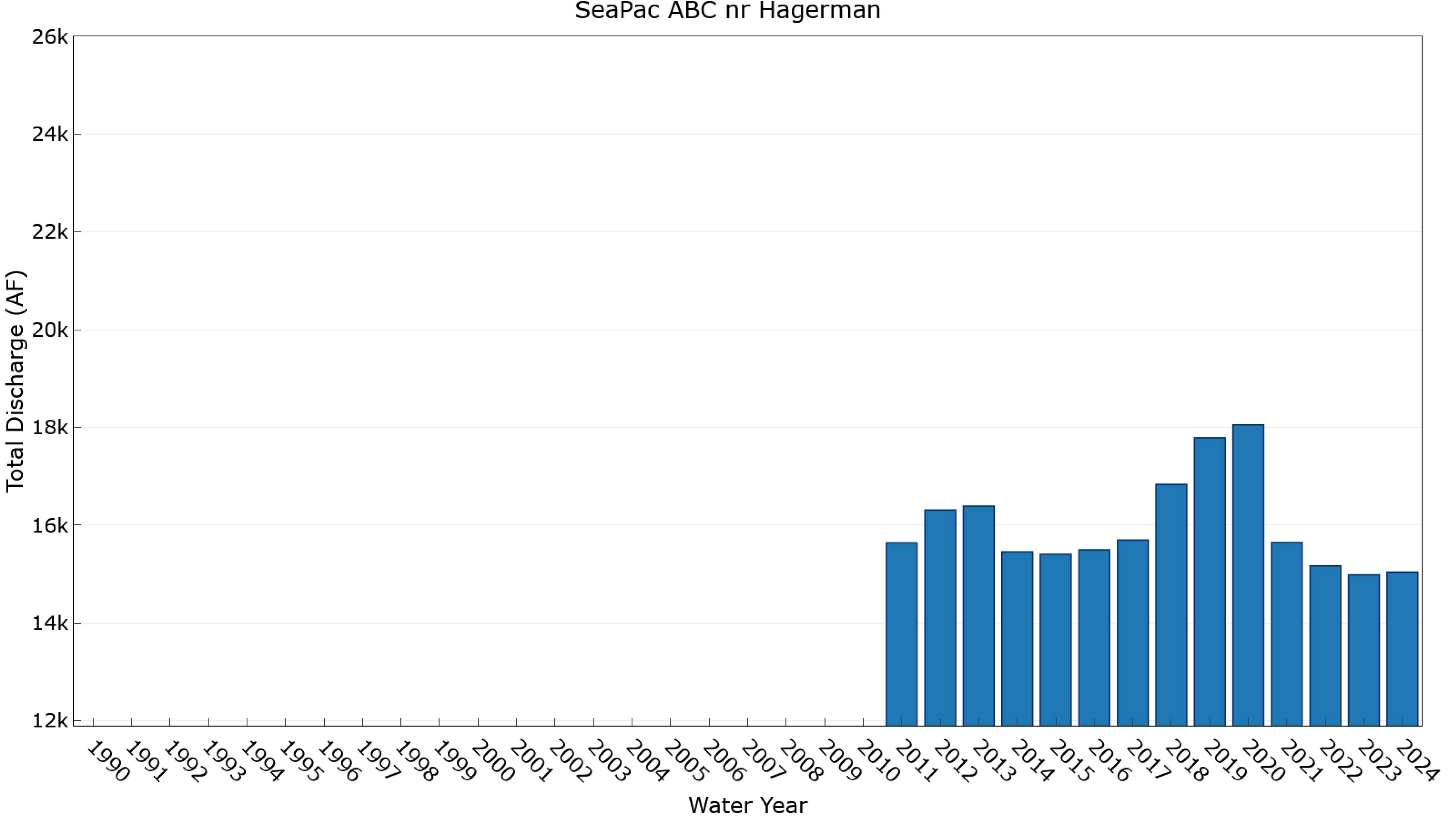
Snake River
Curren Tunnel
SeaPac
Bridal Veil
SeaPac ABC
Box Canyon
Briggs
Blue Lakes
Devil's
Wash Bowl
Snake River
at Milner, ID
Explanation
Spring
Milner to Murphy Reach
ESPA Model Boundary
N
0
2
4
8 Miles
Bliss
Gooding
Shoshone
Dietrich
Hagerman
Wendell
Jerome
Twin Falls
Kimberly
Hansen
Eden
Hazelton
Buhl
Filer
Castleford
ELMORE
OWYHEE
LINCOLN
JEROME
MINIDOKA
BRUNEAU DESERT
MELON VALLEY
Shoshone WSA
Salmon Falls Creek
4635 ft
5077 ft
4205 ft

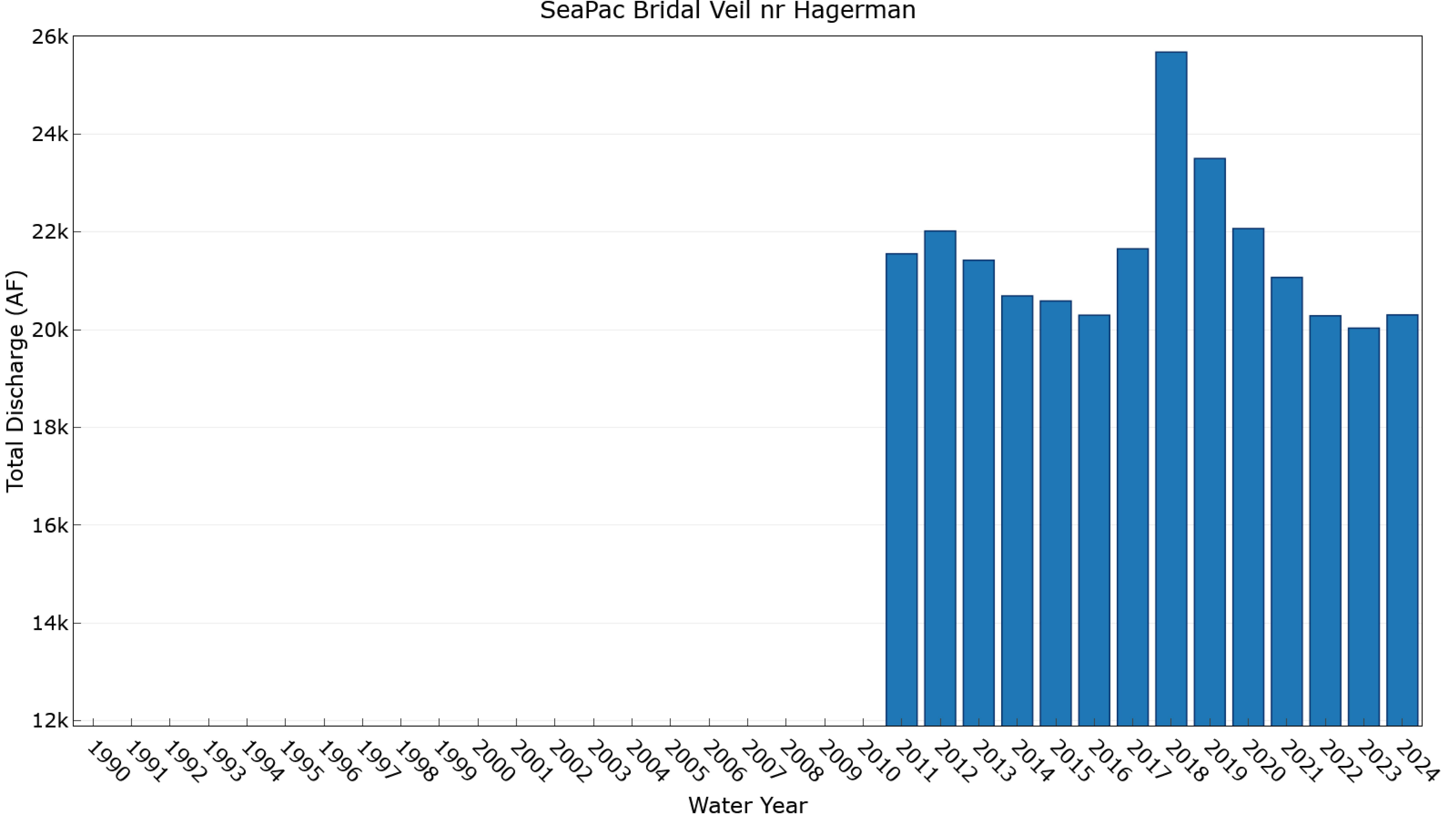

Snake River
Bliss
Gooding
Shoshone WSA
Shoshone
Dietrich
LINCOLN
4635 ft
5077 ft
Malad Gorge State Park
Hagerman
Hagerman Fossil Beds National Monument
ELMORE
OWYHEE
Wendell
Jerome
JEROME
Box Canyon
Briggs
GOODING
TWIN FALLS
BRUNEAU DESERT
MELON VALLEY
Blue Lakes
Devil's Wash Bowl
Eden
Hazelton
MINIDOKA
Buhl
Filer
Twin Falls
Kimberly
Hansen
Castleford
4205 ft
Salmon Falls Creek
Snake River at Milner, ID
Explanation
Spring
Milner to Murphy Reach
ESPA Model Boundary
N
0 2 4 8 Miles


Curren Tunnel nr Hagerman
Total Discharge (AF)
0
2k
4k
6k
8k
10k
12k
14k
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Water Year

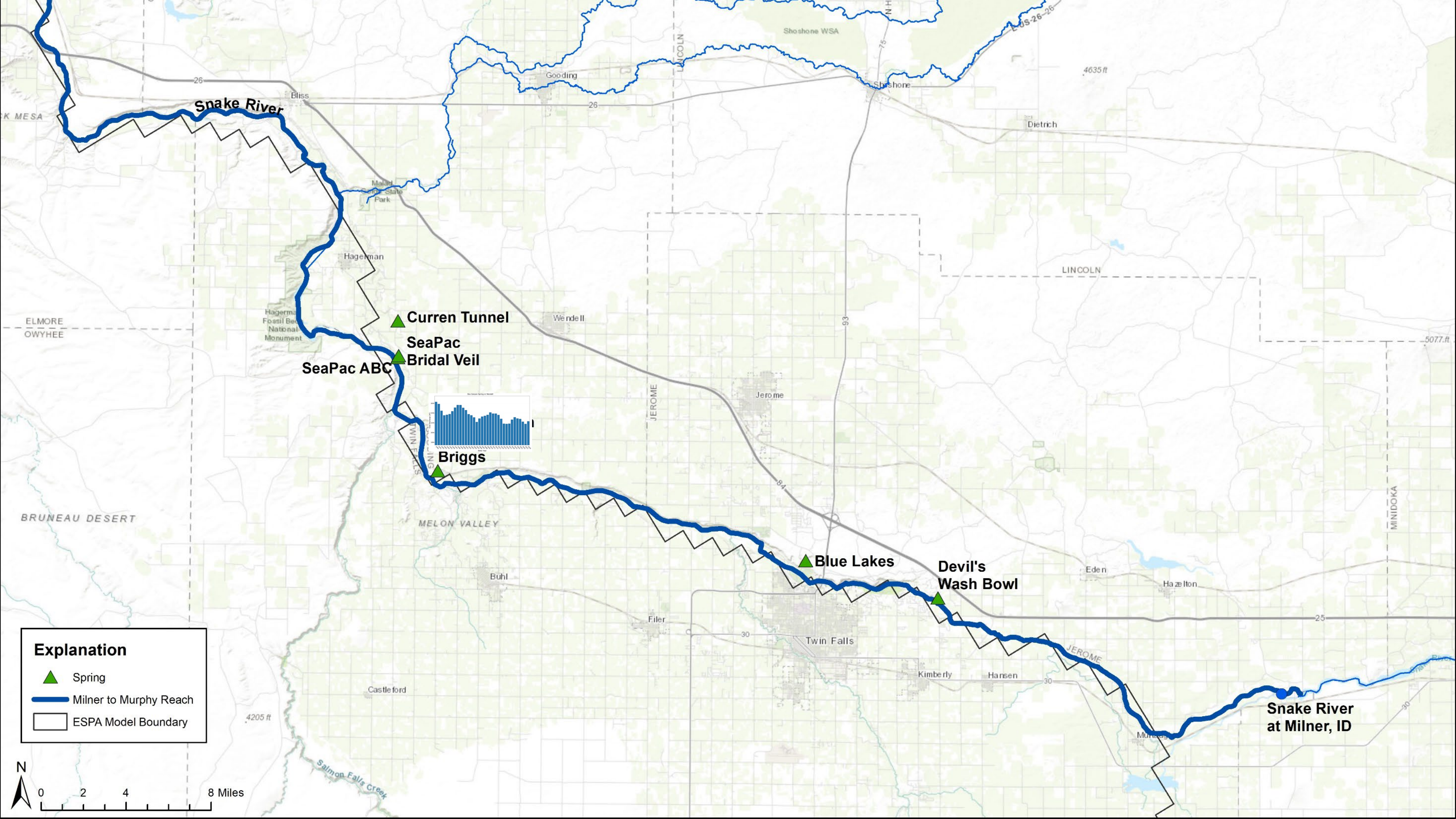


Snake River
Curren Tunnel
Box Canyon
Briggs
Blue Lakes
Devil's
Wash Bowl
Snake River
at Milner, ID
Explanation
Spring
Milner to Murphy Reach
ESPA Model Boundary
N
0
2
4
8 Miles
Bliss
Gooding
Shoshone
Shoshone WSA
Dietrich
Hagerman
Wendell
Jerome
Twin Falls
Kimberly
Hansen
Filer
Buhl
Castleford
Eden
Hazelton
LINCOLN
JEROME
GOODING
TWIN FALLS
MINIDOKA
ELMORE
OWYHEE
BRUNEAU DESERT
MELON VALLEY
Salmon Falls Creek
4635 ft
5077 ft
4205 ft

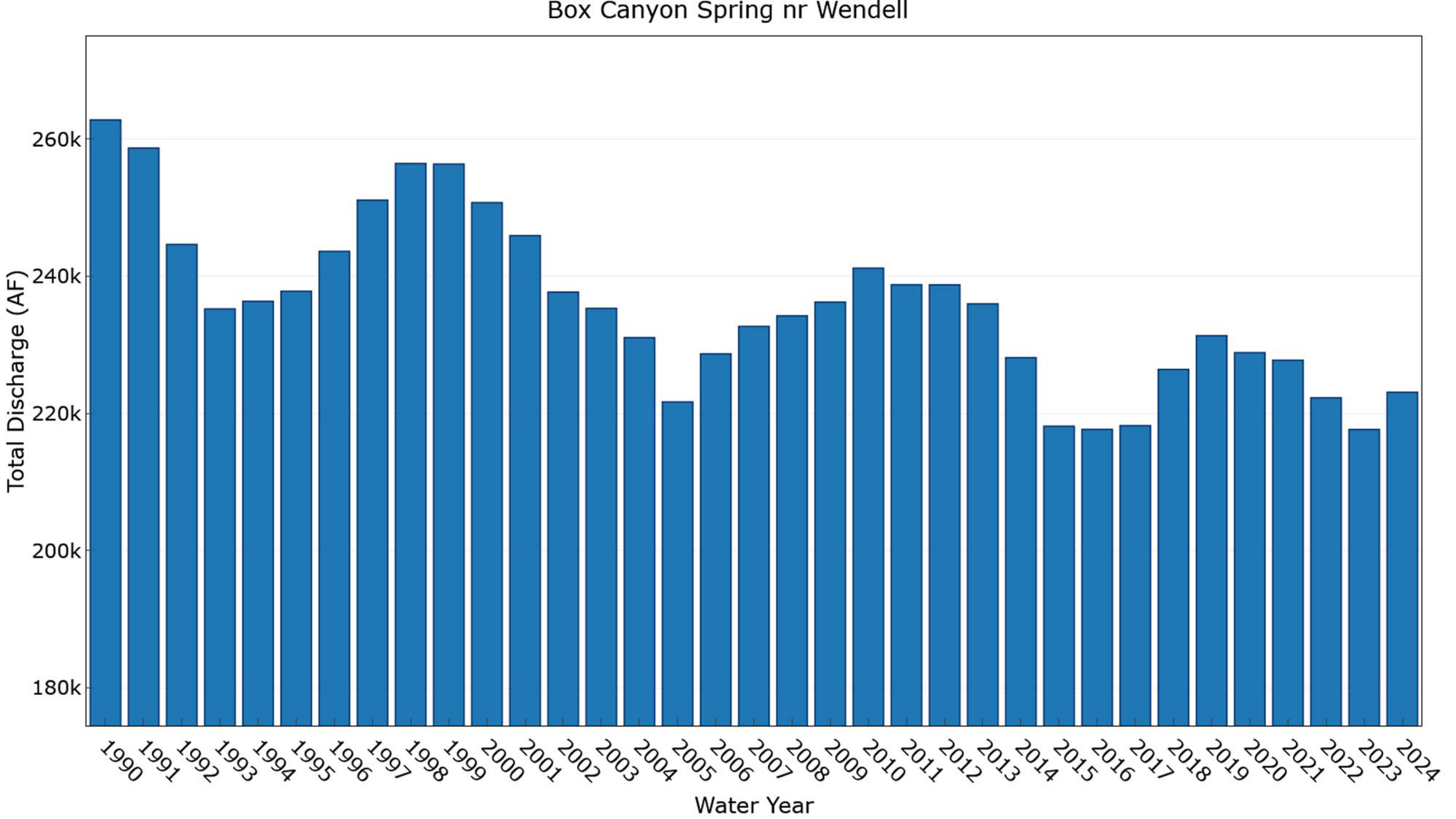

SeaPac ABC nr Hagerman
Total Discharge (AF)
26k
24k
22k
20k
18k
16k
14k
12k
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Water Year



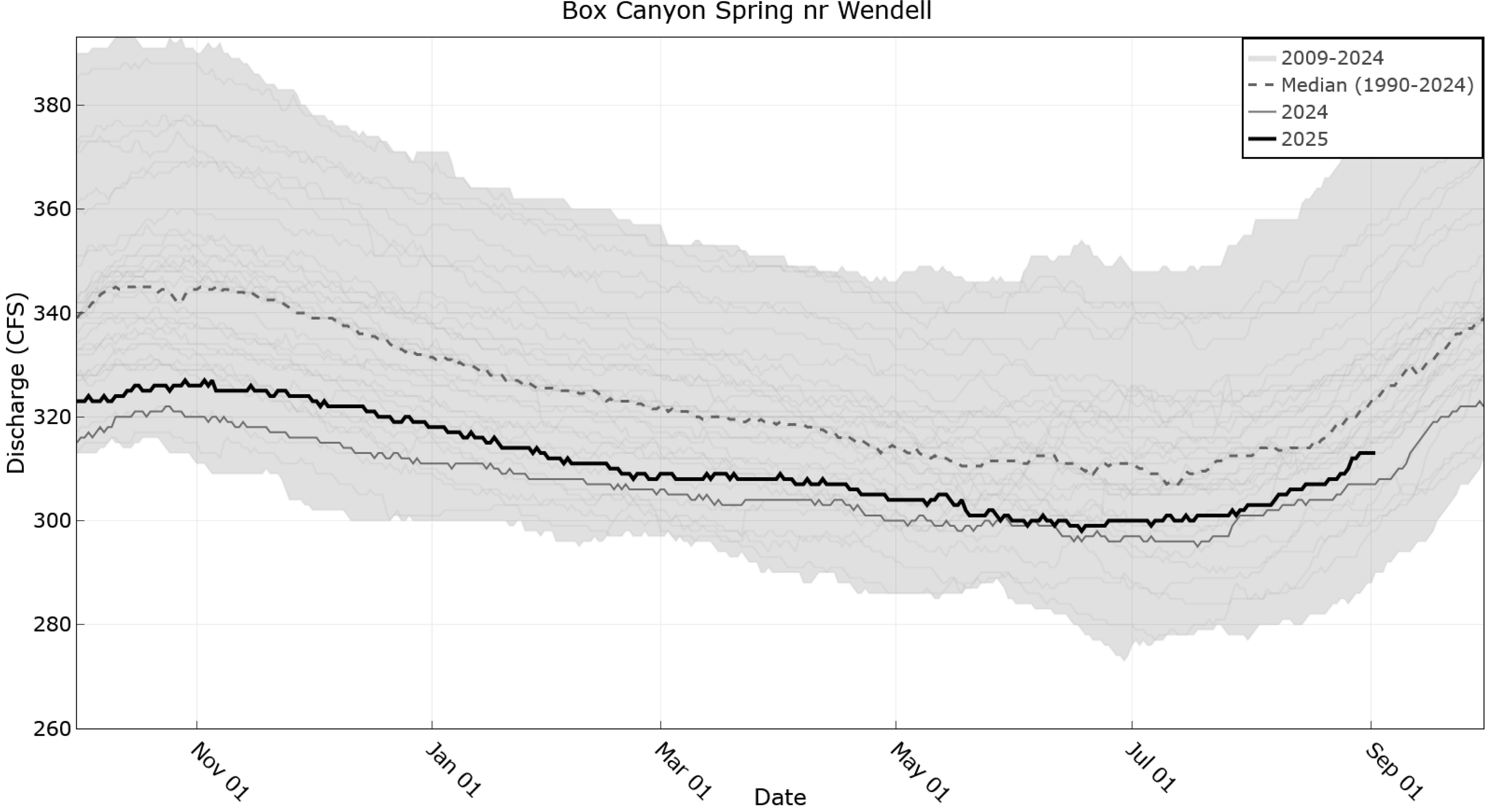
SeaPac Bridal Veil nr Hagerman
Total Discharge (AF)
26k
24k
22k
20k
18k
16k
14k
12k
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Water Year

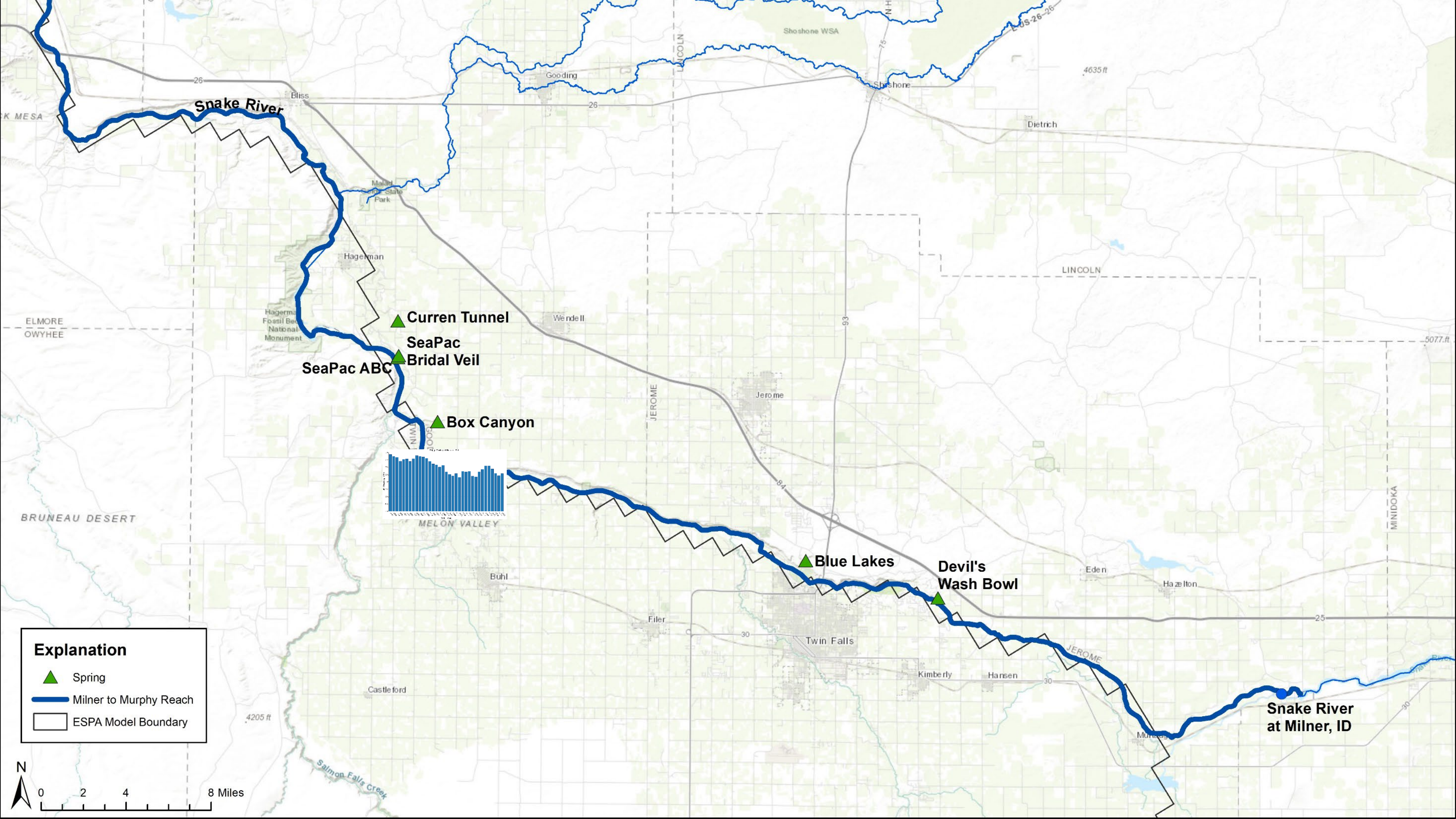


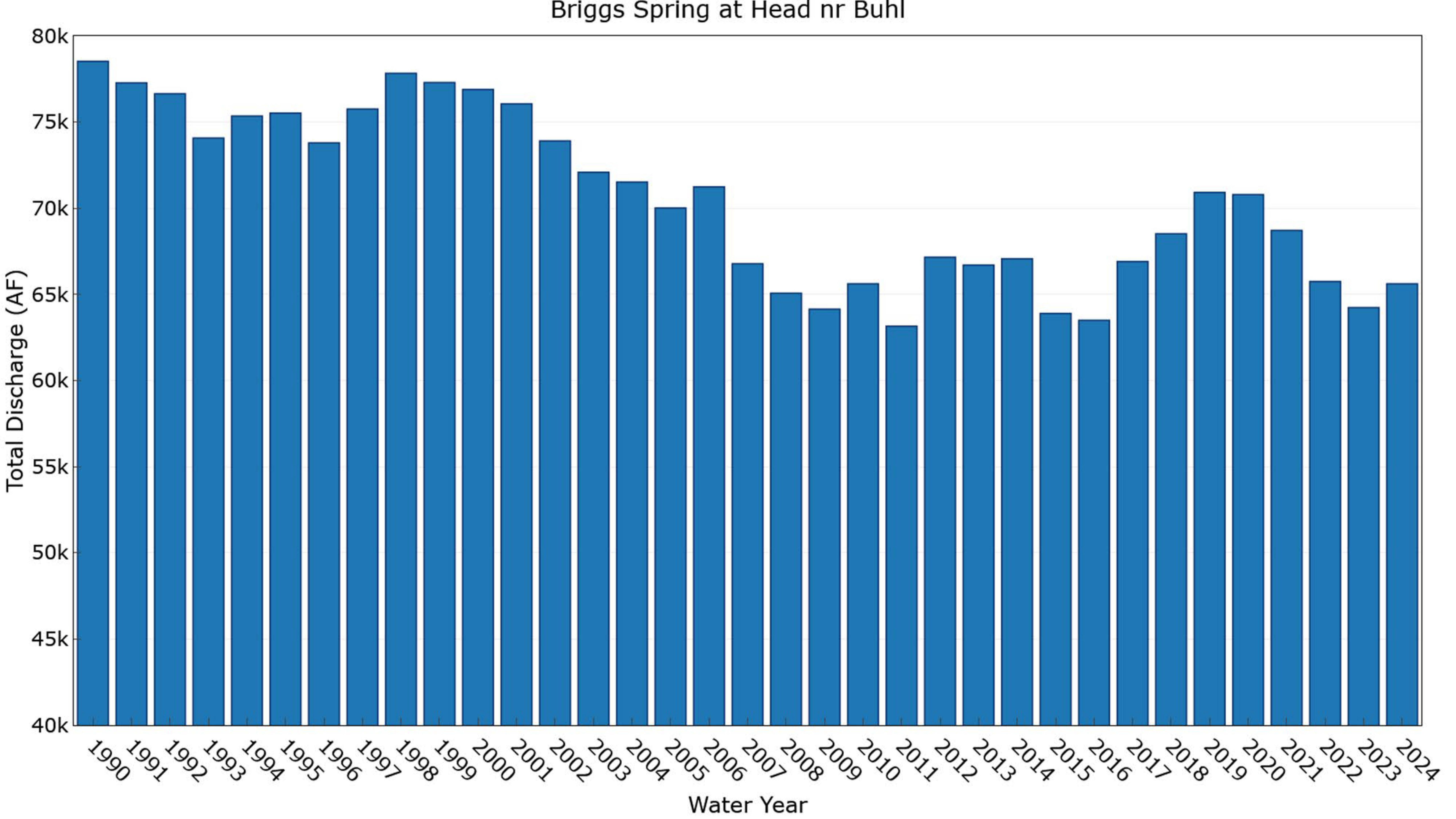
Snake River
Curren Tunnel
SeaPac
Bridal Veil
SeaPac ABC
Briggs
Blue Lakes
Devil's
Wash Bowl
Snake River
at Milner, ID
Explanation
Spring
Milner to Murphy Reach
ESPA Model Boundary
N
0
2
4
8 Miles
Bliss
Gooding
Shoshone
Shoshone WSA
Dietrich
LINCOLN
Hagerman
Wendell
Jerome
JEROME
Twin Falls
Buhl
Filer
Kimberly
Hansen
Castleford
Eden
Hazelton
MINIDOKA
ELMORE
OWYHEE
BRUNEAU DESERT
MELON VALLEY
Salmon Falls Creek
4635 ft
5077 ft
4205 ft

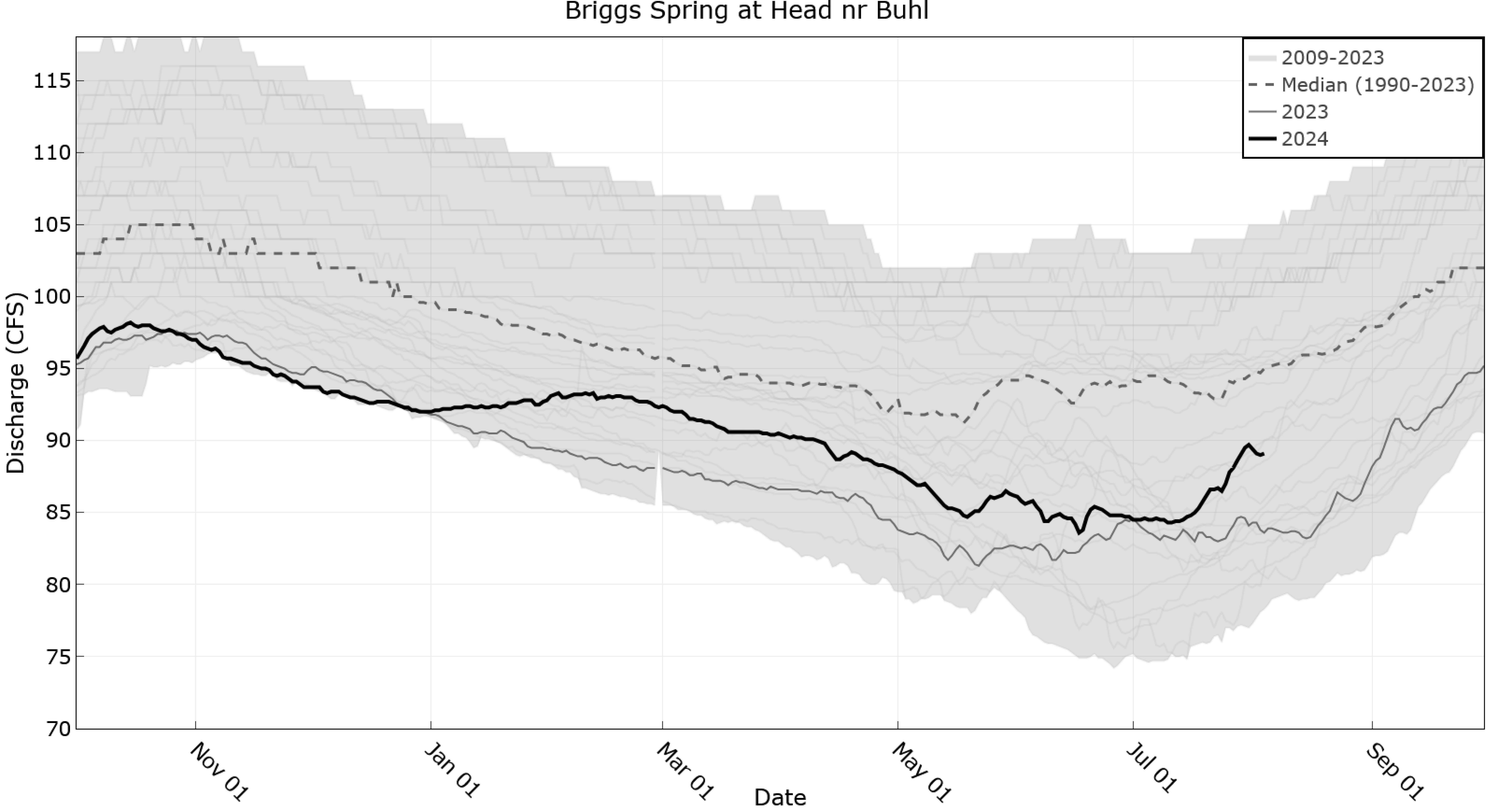


Box Canyon Spring nr Wendell
Total Discharge (AF)
260k
240k
220k
200k
180k
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Water Year

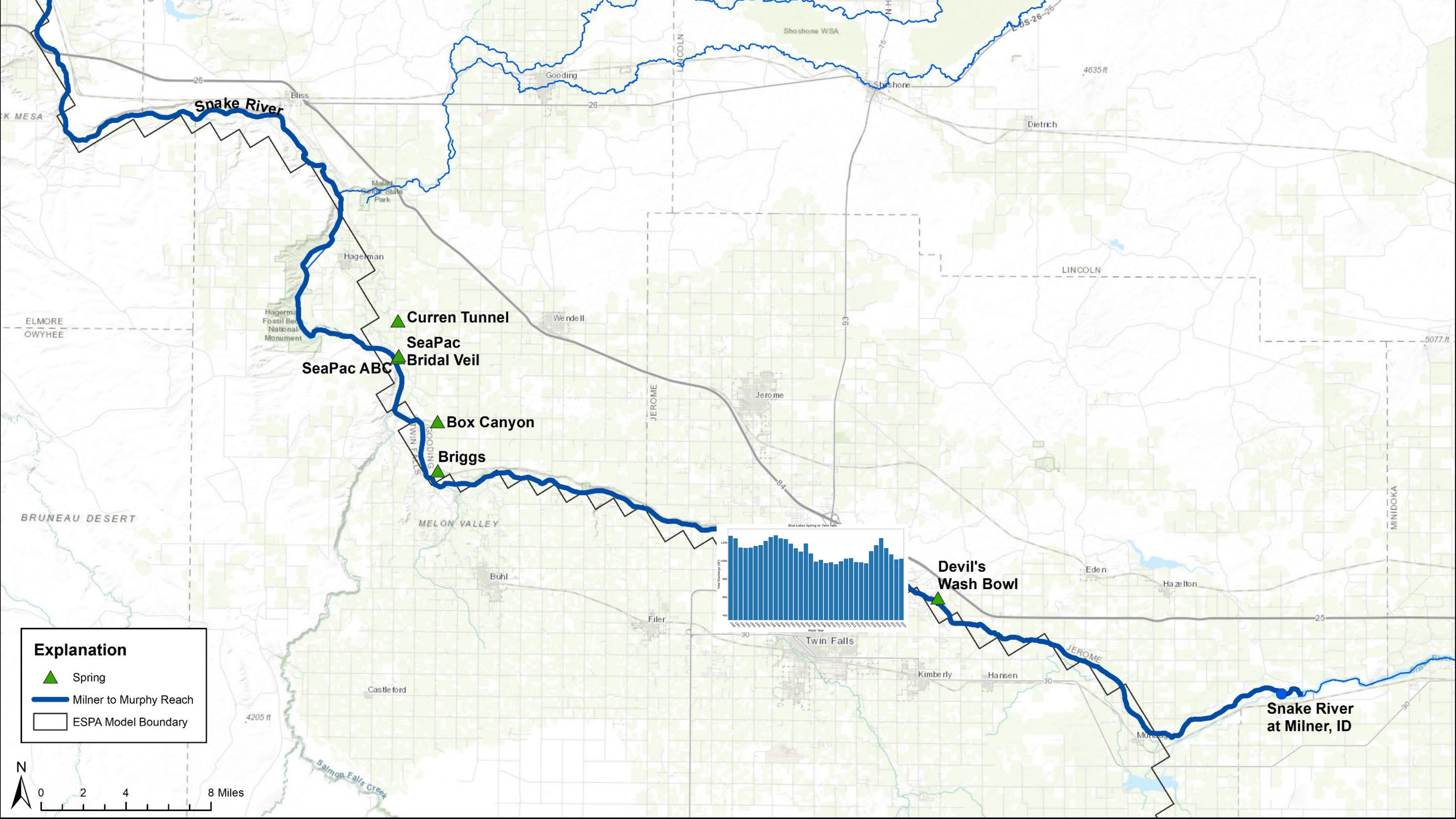

Box Canyon Spring nr Wendell
2009-2024
Median (1990-2024)
2024
2025
Discharge (CFS)
380
360
340
320
300
280
260
Nov 01
Jan 01
Mar 01
May 01
Jul 01
Sep 01
Date

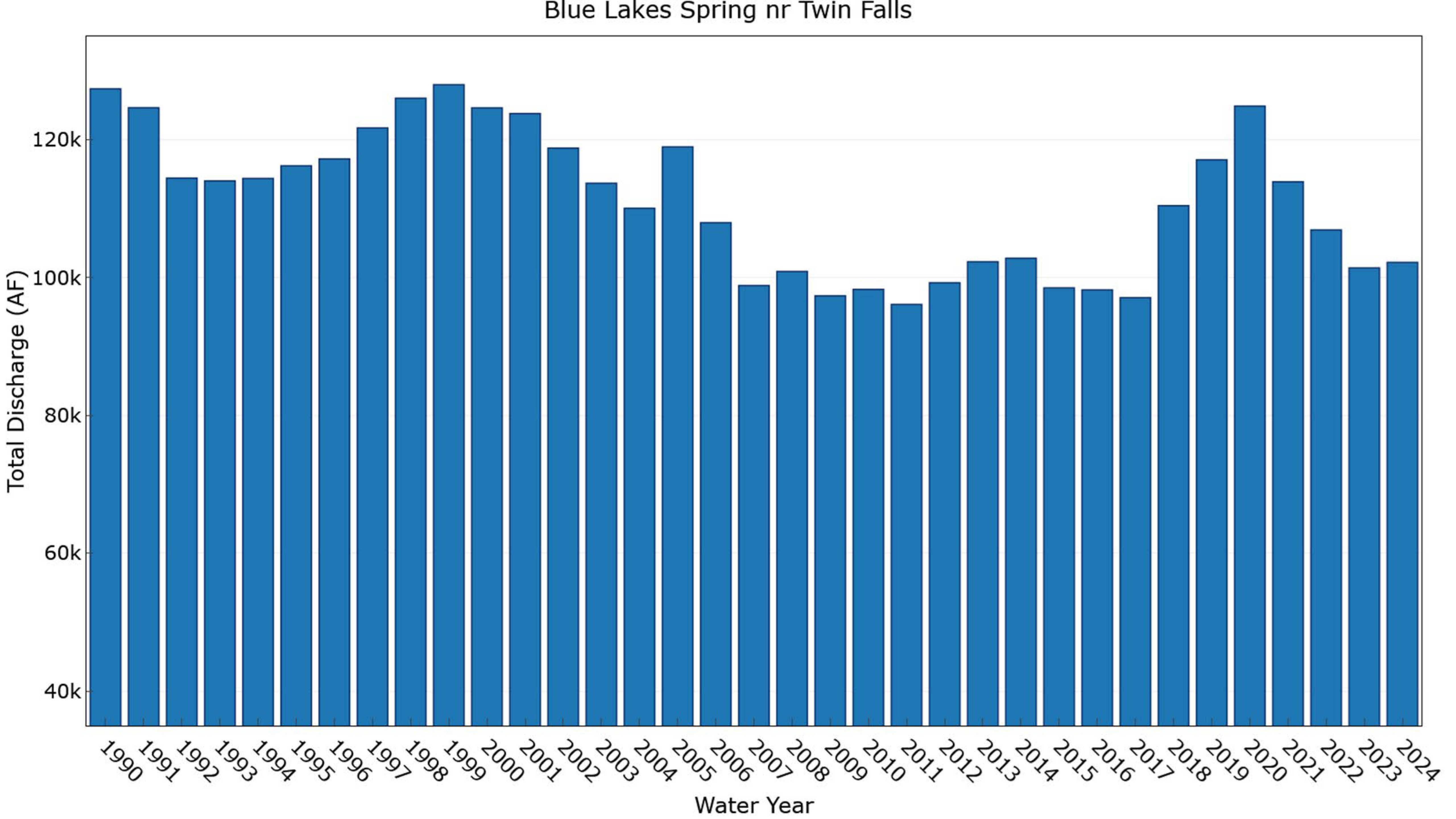

Snake River
Curren Tunnel
SeaPac
Bridal Veil
SeaPac ABC
Box Canyon
Blue Lakes
Devil's
Wash Bowl
Snake River
at Milner, ID
Explanation
Spring
Milner to Murphy Reach
ESPA Model Boundary
N
0
2
4
8 Miles
Shoshone WSA
Gooding
Bliss
Shoshone
Dietrich
4635 ft
Malad Gorge State Park
Hagerman
Hagerman Fossil Beds National Monument
Wendell
LINCOLN
ELMORE
OWYHEE
JEROME
Jerome
5077 ft
MELON VALLEY
BRUNEAU DESERT
Buhl
Filer
Twin Falls
Kimberly
Hansen
Eden
Hazelton
MINIDOKA
Castleford
4205 ft
Salmon Falls Creek
26
93
84
30
25
75

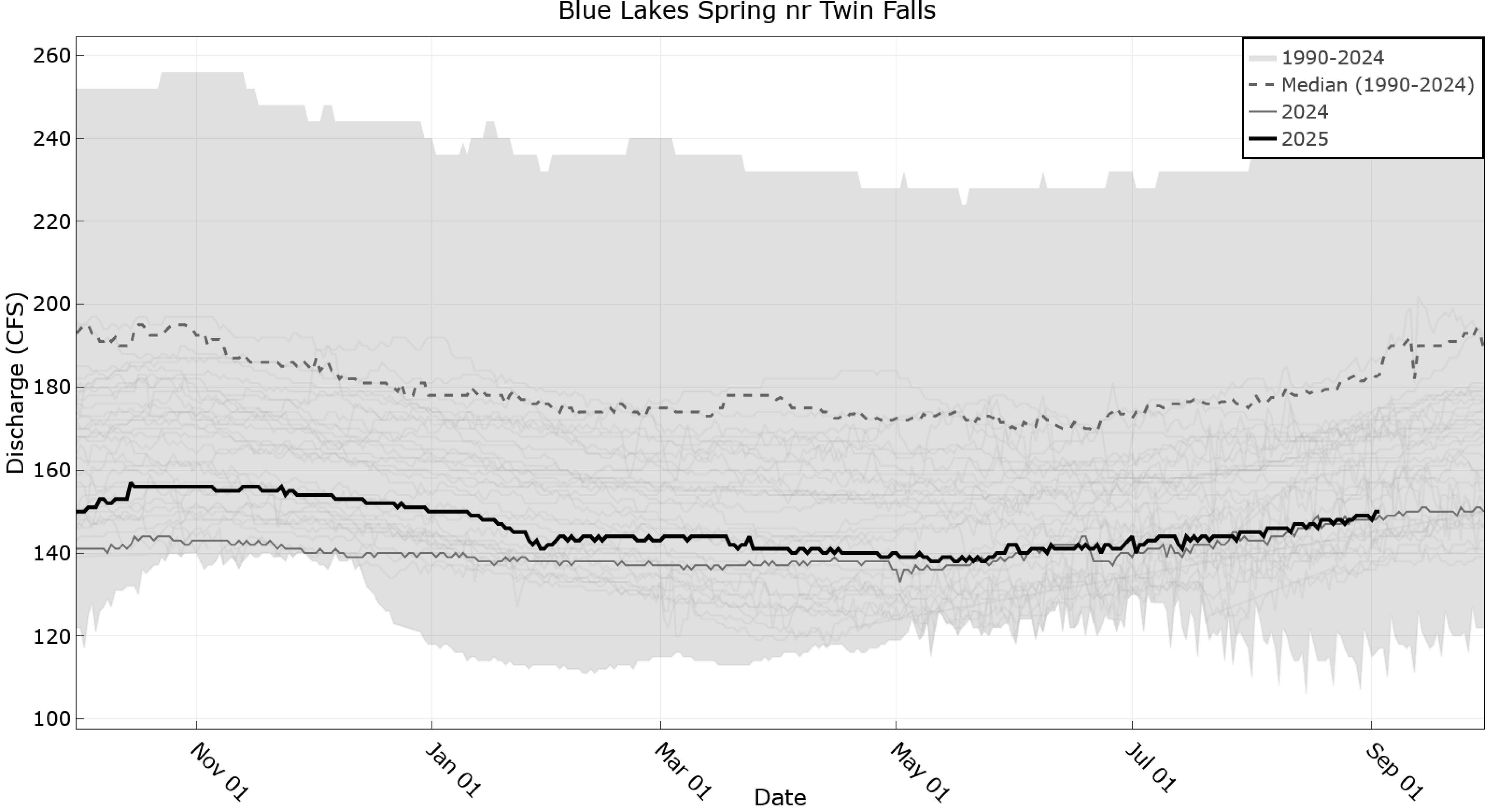

Briggs Spring at Head nr Buhl
Total Discharge (AF)
80k
75k
70k
65k
60k
55k
50k
45k
40k
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Water Year

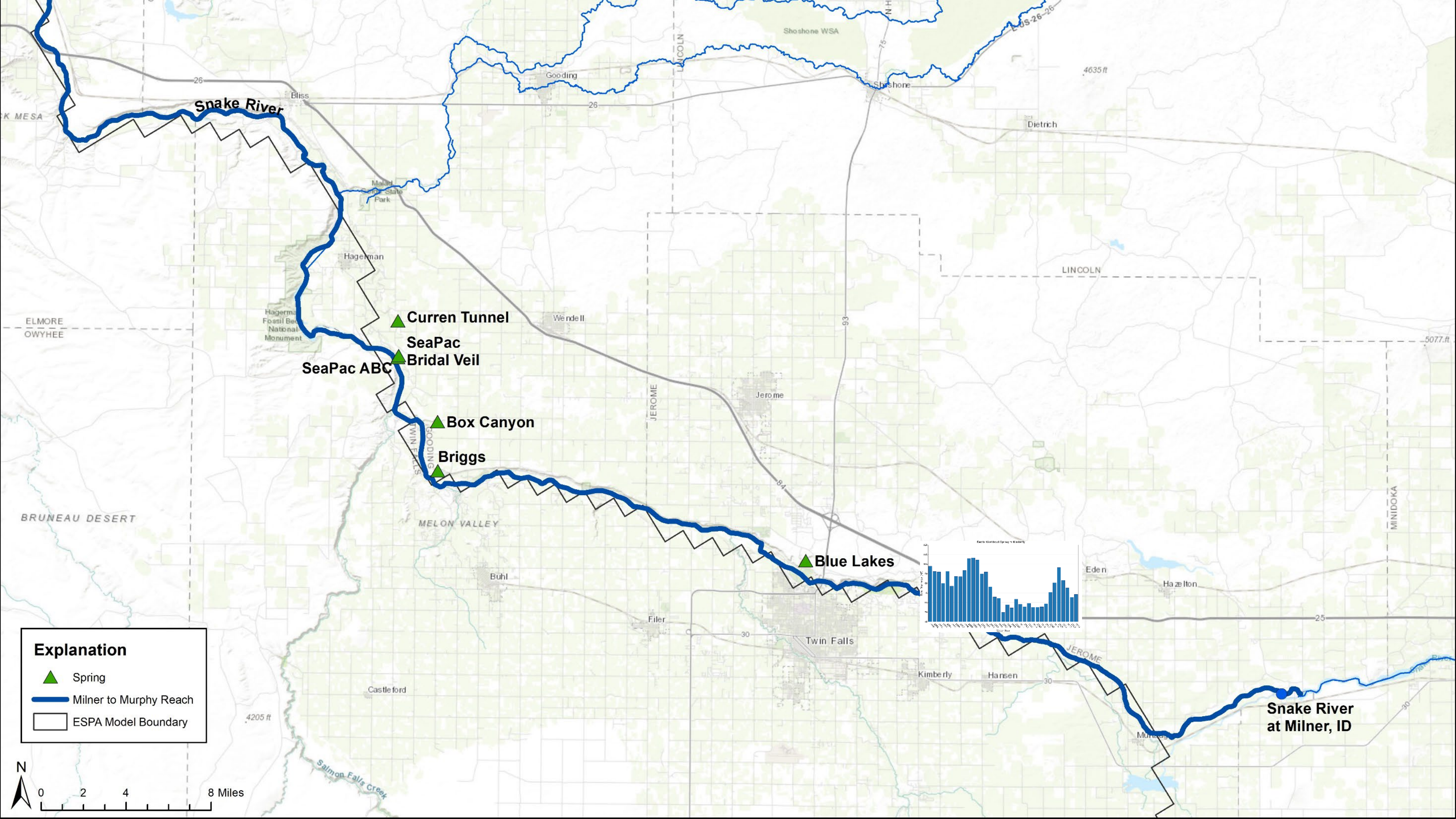


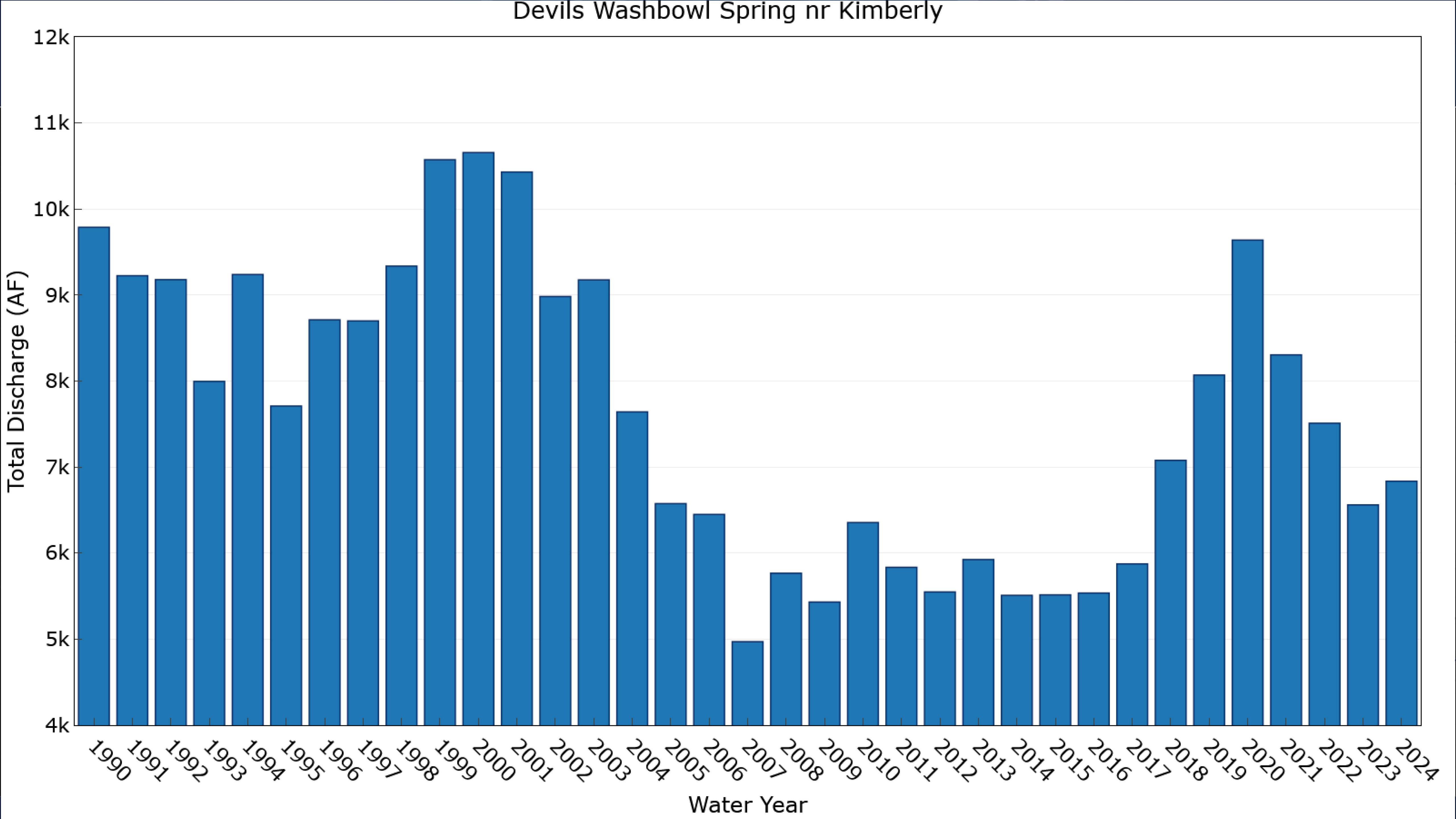
Briggs Spring at Head nr Buhl
2009-2023
Median (1990-2023)
2023
2024
Discharge (CFS)
115
110
105
100
95
90
85
80
75
70
Nov 01
Jan 01
Mar 01
May 01
Jul 01
Sep 01
Date

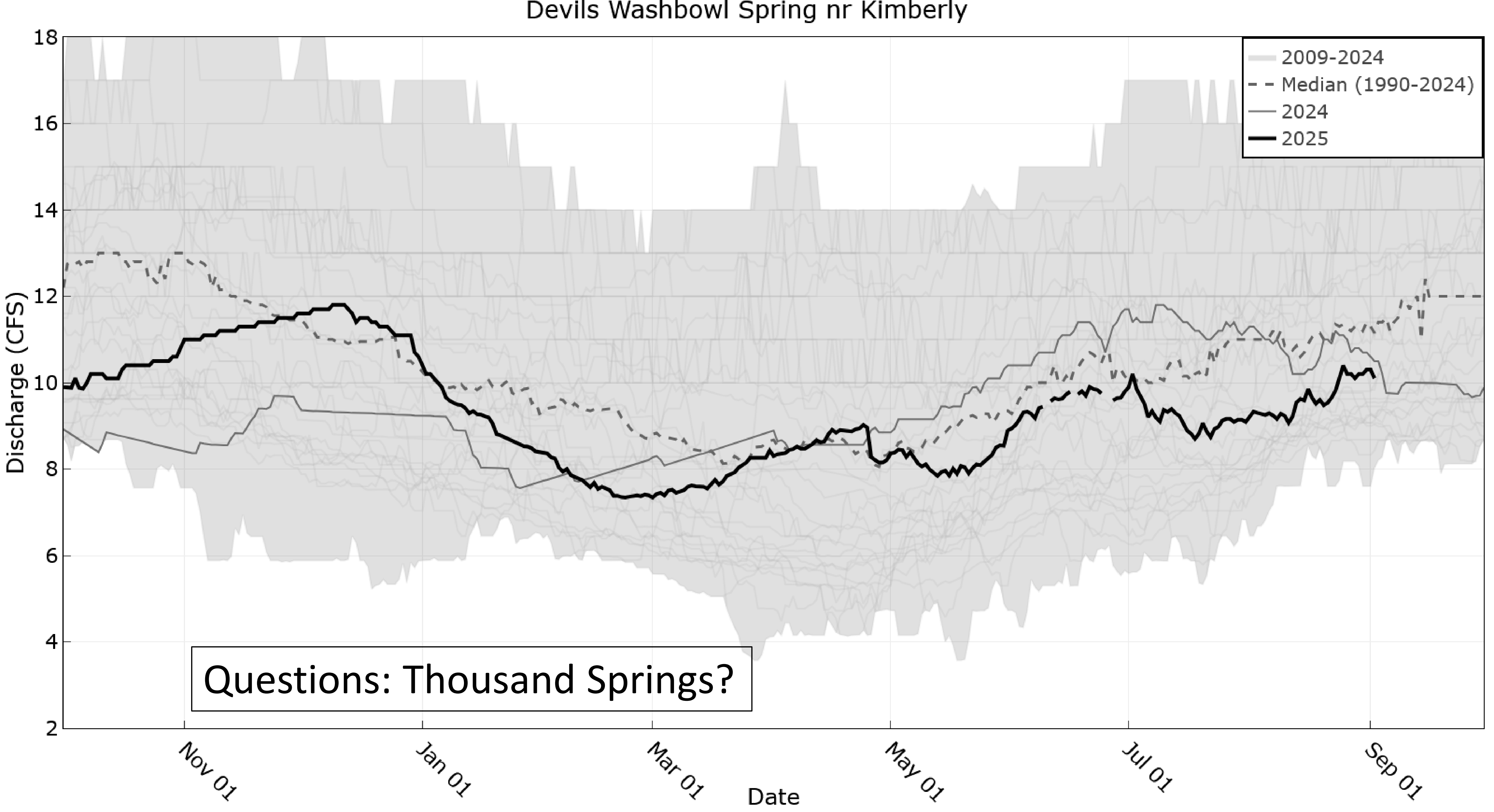

Snake River
Curren Tunnel
SeaPac
Bridal Veil
SeaPac ABC
Box Canyon
Briggs
Devil's
Wash Bowl
Snake River
at Milner, ID
Blue Lakes Spring nr Twin Falls
Explanation
Spring
Milner to Murphy Reach
ESPA Model Boundary
N
0
2
4
8 Miles
Shoshone WSA
Gooding
Shoshone
Bliss
Dietrich
Malad Gorge State Park
Hagerman
Hagerman Fossil Beds National Monument
Wendell
Jerome
LINCOLN
ELMORE
OWYHEE
JEROME
GOODING
TWIN FALLS
MINIDOKA
BRUNEAU DESERT
MELON VALLEY
Buhl
Filer
Twin Falls
Kimberly
Hansen
Eden
Hazelton
Castleford
Salmon Falls Creek
4635 ft
5077 ft
4205 ft

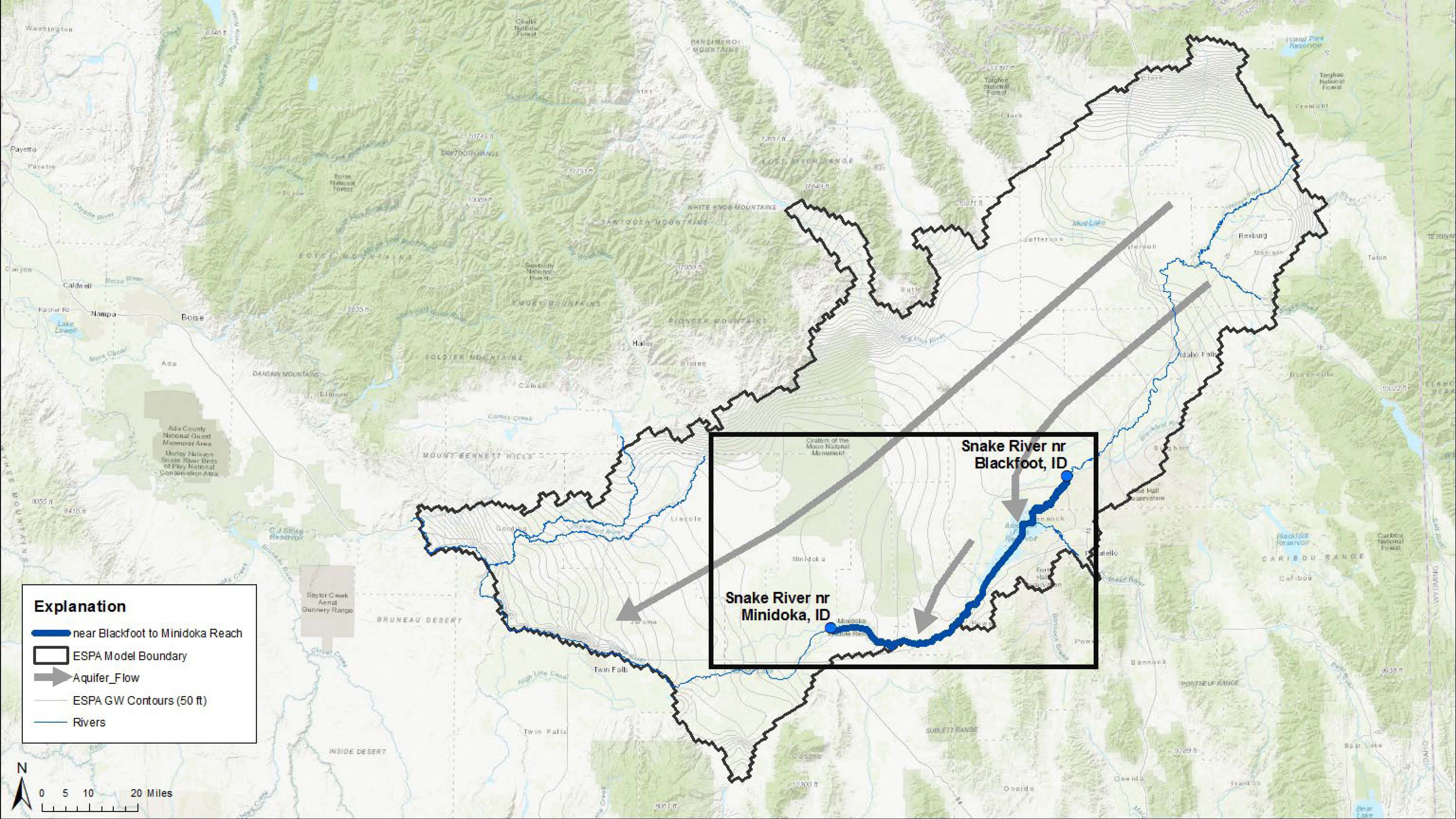

Blue Lakes Spring nr Twin Falls
Total Discharge (AF)
120k
100k
80k
60k
40k
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Water Year


Blue Lakes Spring nr Twin Falls
1990-2024
Median (1990-2024)
2024
2025
Discharge (CFS)
260
240
220
200
180
160
140
120
100
Nov 01
Jan 01
Mar 01
May 01
Jul 01
Sep 01
Date


Explanation
Spring
Milner to Murphy Reach
ESPA Model Boundary
N
0
2
4
8 Miles
Snake River
Curren Tunnel
SeaPac
Bridal Veil
SeaPac ABC
Box Canyon
Briggs
Blue Lakes
Snake River
at Milner, ID
Bliss
Gooding
Shoshone
Shoshone WSA
Dietrich
LINCOLN
Hagerman
Hagerman Fossil Beds National Monument
Malad Gorge State Park
Wendell
Jerome
JEROME
GOODING
TWIN FALLS
ELMORE
OWYHEE
BRUNEAU DESERT
MELON VALLEY
Buhl
Filer
Twin Falls
Kimberly
Hansen
Eden
Hazelton
Castleford
MINIDOKA
Salmon Falls Creek
4635 ft
5077 ft
4205 ft
26
30
25
84
93
75


Devils Washbowl Spring nr Kimberly
Total Discharge (AF)
12k
11k
10k
9k
8k
7k
6k
5k
4k
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Water Year

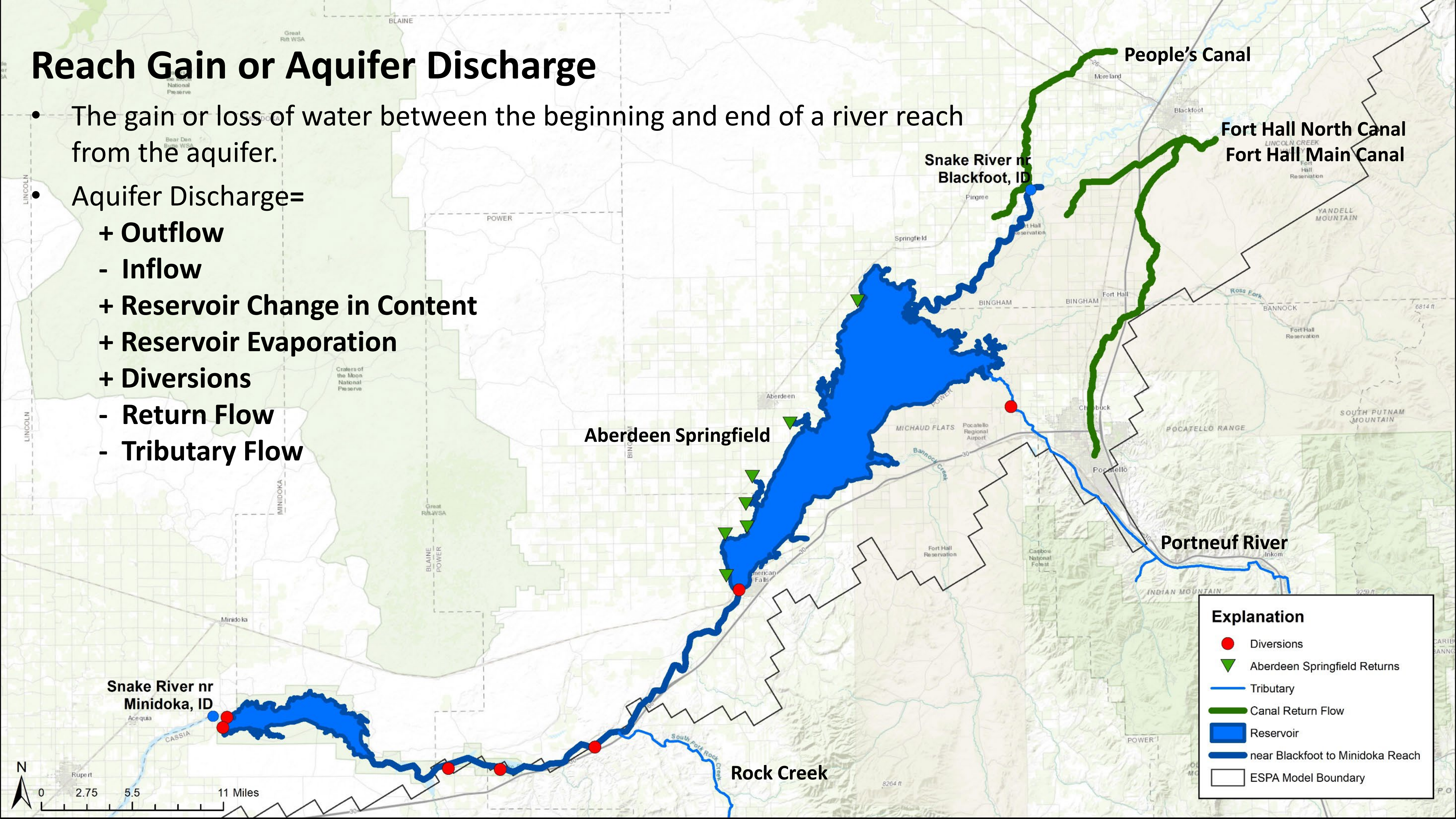

Devils Washbowl Spring nr Kimberly
2009-2024
Median (1990-2024)
2024
2025
Discharge (CFS)
18
16
14
12
10
8
6
4
2
Nov 01
Jan 01
Mar 01
May 01
Jul 01
Sep 01
Date
Questions: Thousand Springs?

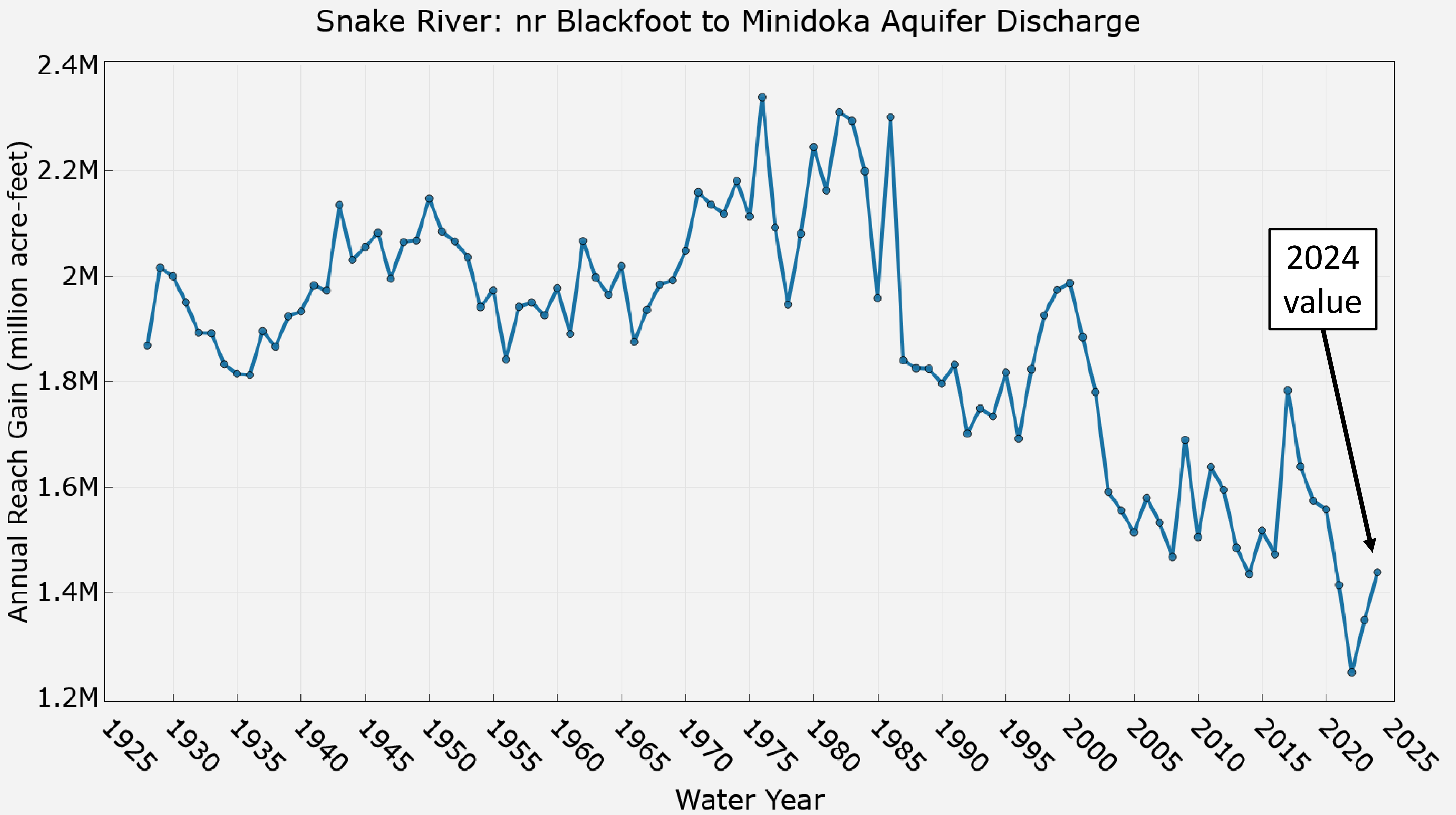


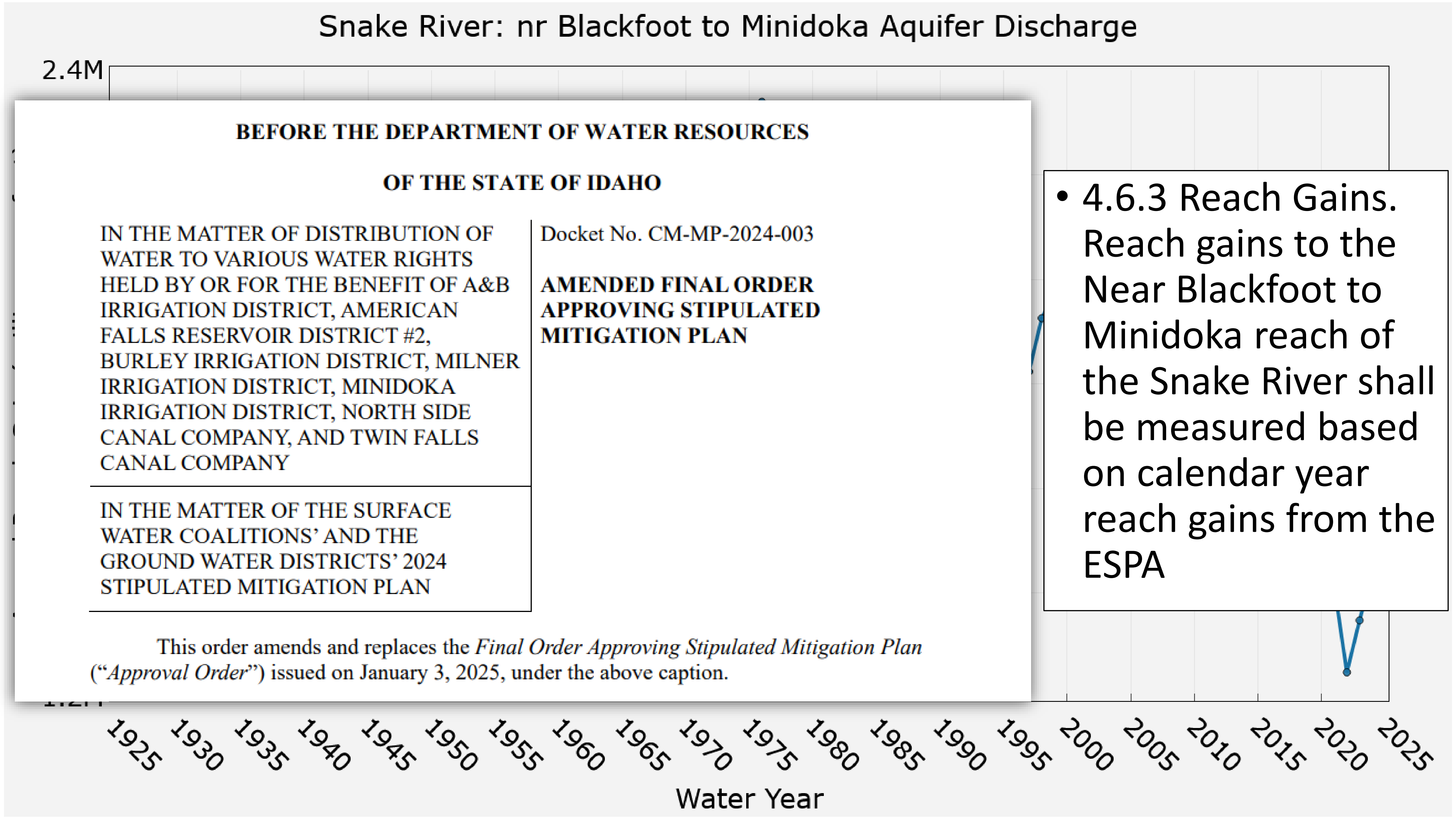
Snake River nr Blackfoot, ID
Snake River nr Minidoka, ID
Explanation
near Blackfoot to Minidoka Reach
ESPA Model Boundary
Aquifer_Flow
ESPA GW Contours (50 ft)
Rivers
N
0 5 10 20 Miles

Reach Gain or Aquifer Discharge

- The gain or loss of water between the beginning and end of a river reach from the aquifer.
- Aquifer Discharge=
  - **+ Outflow**
  - **- Inflow**
  - **+ Reservoir Change in Content**
  - **+ Reservoir Evaporation**
  - **+ Diversions**
  - **- Return Flow**
  - **- Tributary Flow**




Snake River: nr Blackfoot to Minidoka Aquifer Discharge
Annual Reach Gain (million acre-feet)
2.4M
2.2M
2M
1.8M
1.6M
1.4M
1.2M
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
Water Year
2024 value



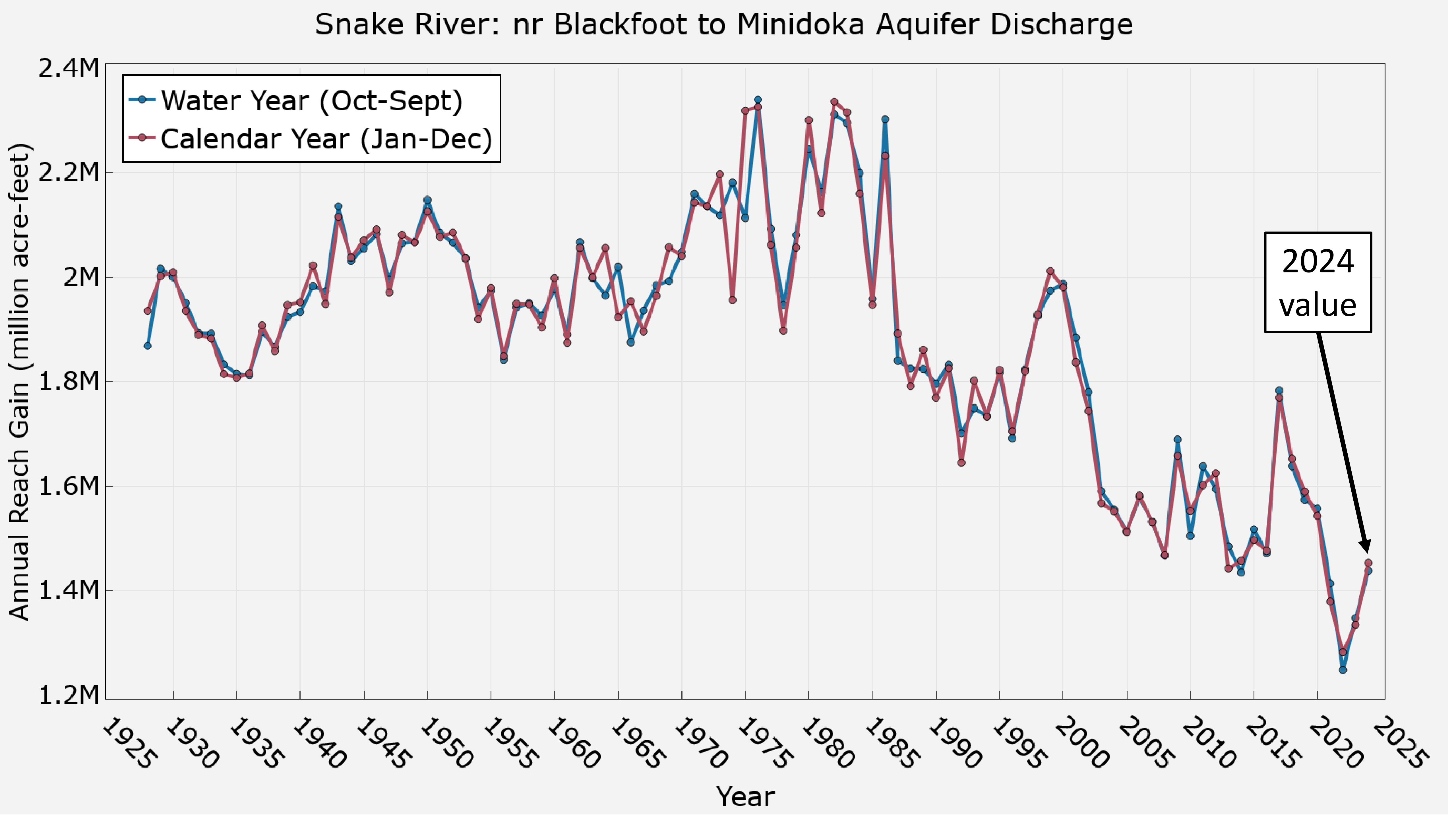
BEFORE THE DEPARTMENT OF WATER RESOURCES

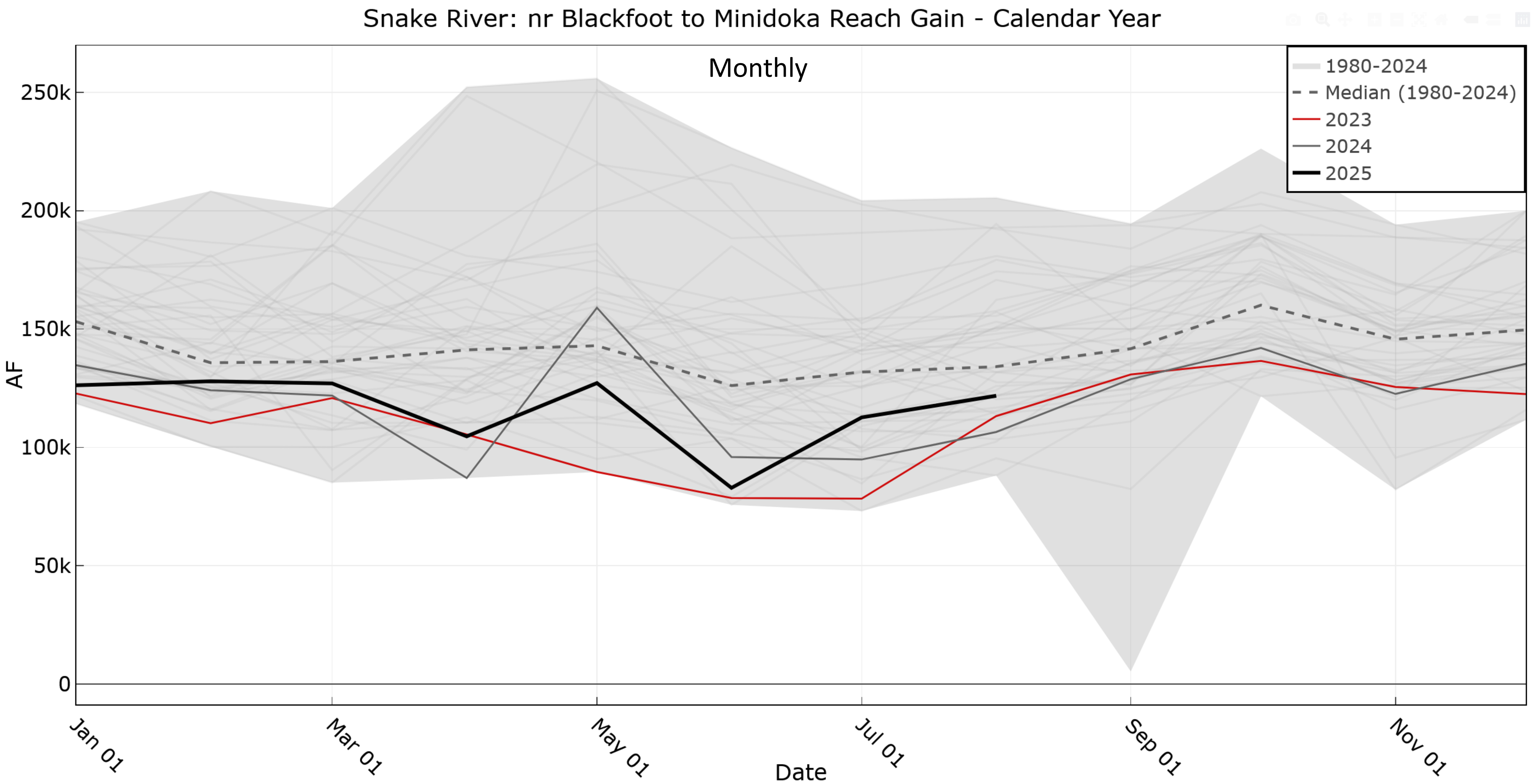
OF THE STATE OF IDAHO

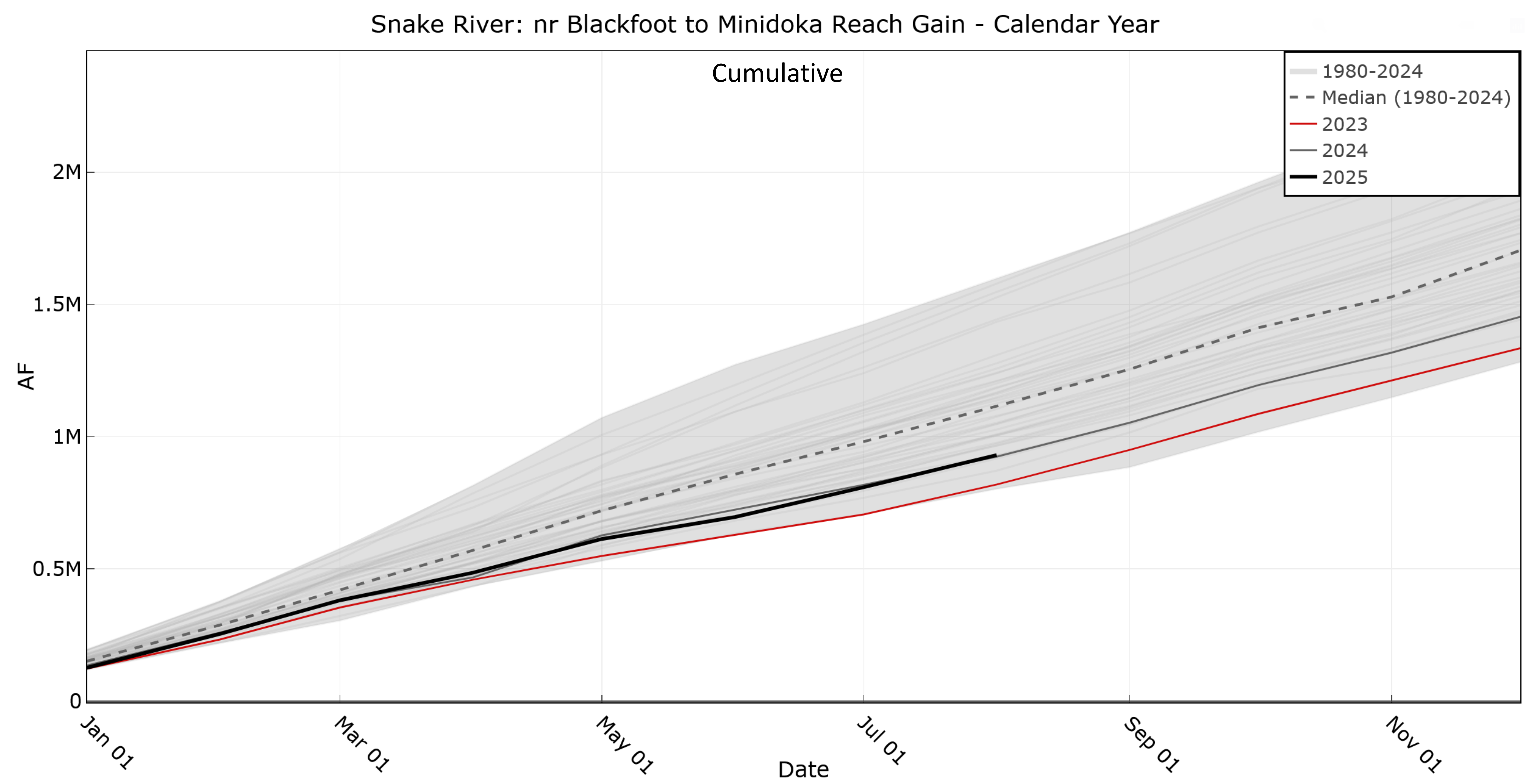
IN THE MATTER OF DISTRIBUTION OF WATER TO VARIOUS WATER RIGHTS HELD BY OR FOR THE BENEFIT OF A&B IRRIGATION DISTRICT, AMERICAN FALLS RESERVOIR DISTRICT #2, BURLEY IRRIGATION DISTRICT, MILNER IRRIGATION DISTRICT, MINIDOKA IRRIGATION DISTRICT, NORTH SIDE CANAL COMPANY, AND TWIN FALLS CANAL COMPANY	Docket No. CM-MP-2024-003 **AMENDED FINAL ORDER APPROVING STIPULATED MITIGATION PLAN**
IN THE MATTER OF THE SURFACE WATER COALITIONS' AND THE GROUND WATER DISTRICTS' 2024 STIPULATED MITIGATION PLAN	

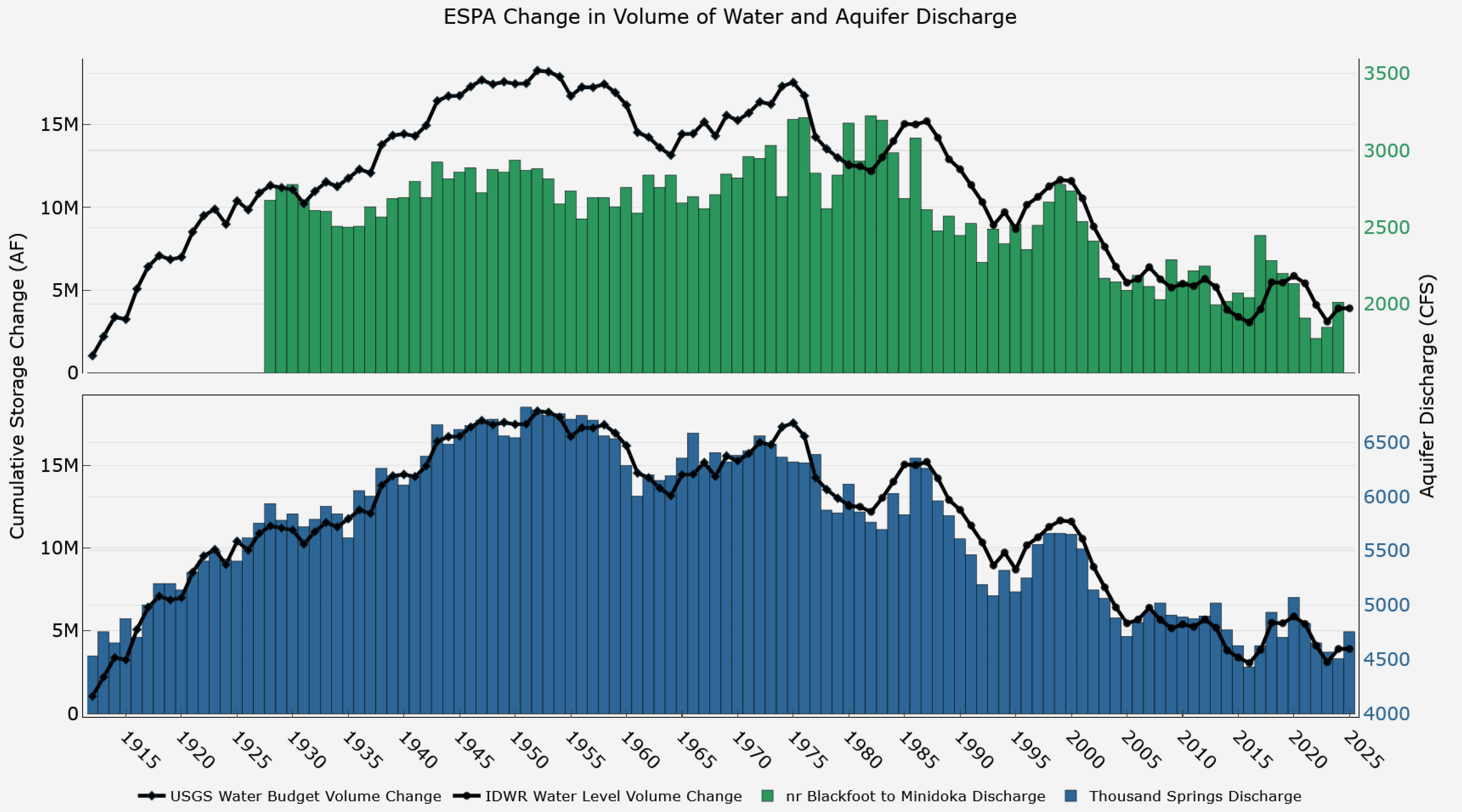
This order amends and replaces the *Final Order Approving Stipulated Mitigation Plan* ("*Approval Order*") issued on January 3, 2025, under the above caption.

- 4.6.3 Reach Gains. Reach gains to the Near Blackfoot to Minidoka reach of the Snake River shall be measured based on calendar year reach gains from the ESPA


Snake River: nr Blackfoot to Minidoka Aquifer Discharge
Water Year (Oct-Sept)
Calendar Year (Jan-Dec)
2024
value
Annual Reach Gain (million acre-feet)
2.4M
2.2M
2M
1.8M
1.6M
1.4M
1.2M
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
Year


Snake River: nr Blackfoot to Minidoka Reach Gain - Calendar Year
Monthly
1980-2024
Median (1980-2024)
2023
2024
2025
250k
200k
150k
100k
50k
0
AF
Jan 01
Mar 01
May 01
Jul 01
Sep 01
Nov 01
Date


Snake River: nr Blackfoot to Minidoka Reach Gain - Calendar Year
Cumulative
1980-2024
Median (1980-2024)
2023
2024
2025
AF
2M
1.5M
1M
0.5M
0
Jan 01
Mar 01
May 01
Jul 01
Sep 01
Nov 01
Date


ESPA Change in Volume of Water and Aquifer Discharge
Cumulative Storage Change (AF)
Aquifer Discharge (CFS)
0
5M
10M
15M
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
USGS Water Budget Volume Change
IDWR Water Level Volume Change
nr Blackfoot to Minidoka Discharge
Thousand Springs Discharge

Modeled Aquifer Management Impacts

ALEX MOODY, IDWR

SEPTEMBER 10, 2025

IDAHO DEPARTMENT OF WATER RESOURCES

Modeled recharge and pumping reduction volumes

IGWA Recharge

- Includes donated SWC storage, city mitigation, and conversion canal losses
- Knowledge of timing and location varies in detail
- 2024 includes ~3,000 AF of North Snake conversions

Pumping reductions

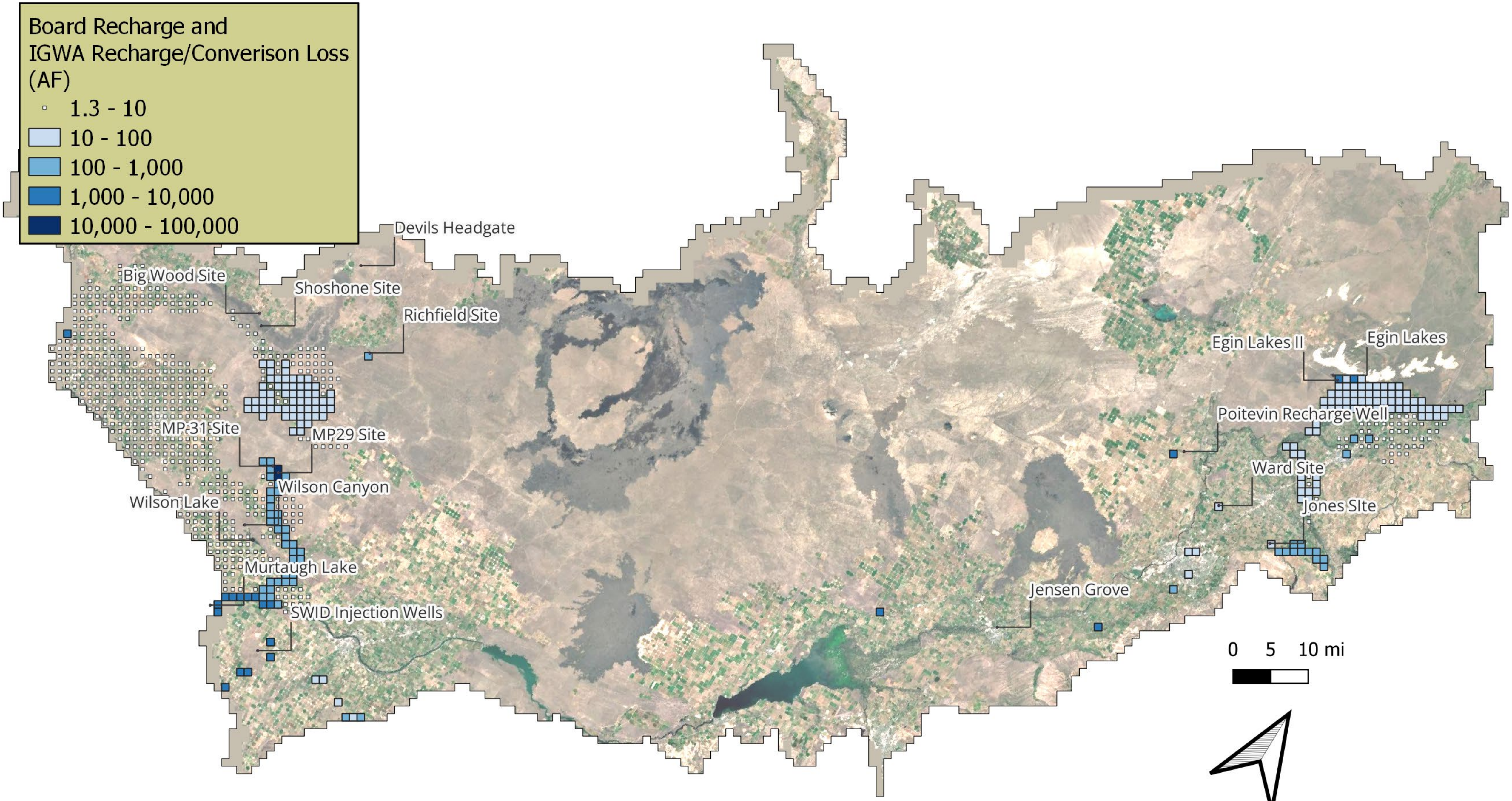
- Distributed evenly through the irrigation season
- Some reported WMIS are outside model boundary (<0.5%)

IWRB recharge

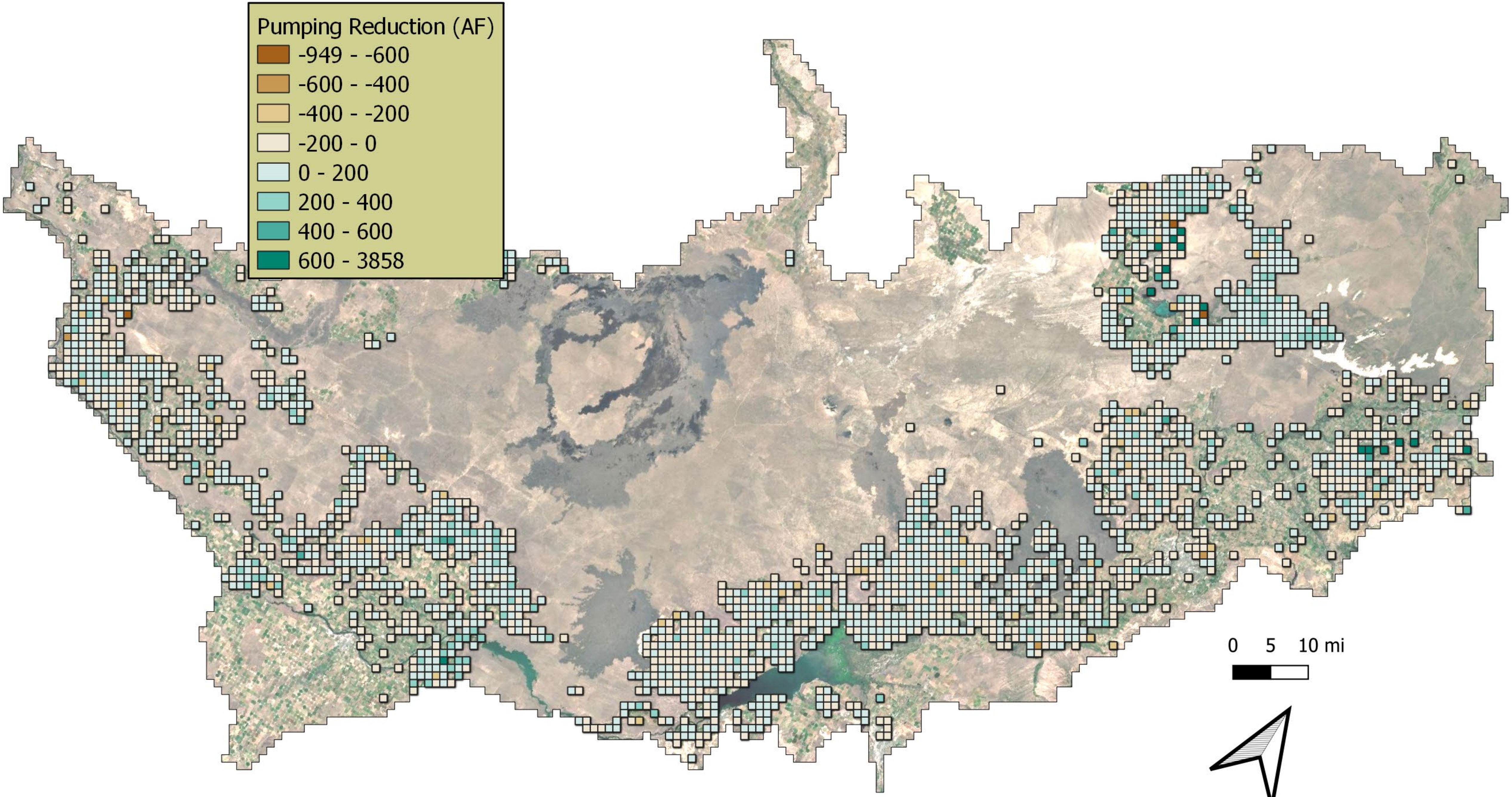
- Timing and location well known

Calendar Year	Board Recharge (KAF)*	IGWA Recharge (KAF)*	Pumping Reduction (KAF)*	All Mitigation 5-year Average (KAF)
2014	41.5	-	-	
2015	102.3	16.8	-	
2016	174.1	101.8	121.8	
2017	355.7	243.3	225.6	
2018	316.2	178.2	172.3	410.0
2019	336.3	168.2	272.9	557.1
2020	440.1	169.4	193	693.8
2021	134.5	67.6	61.4	667.0
2022	181.5	20.5	123.8	567.2
2023	181.8	110.3	326.4	557.5
2024	403.1	138.6	196.7	549.7
2025	71	-	-	-

** These volumes are model and inputs and may differ slightly from reported Department or IGWA numbers due to aggregation period, wells outside of the model, and omission of most surface water conversions.*



Modeled Recharge Volumes August 2024 – July 2025



Modeled Pumping Volumes August 2024 – July 2025

Aquifer Recharge, Discharge, and Storage

Impacts at end of model run (July 2025)

Above Milner

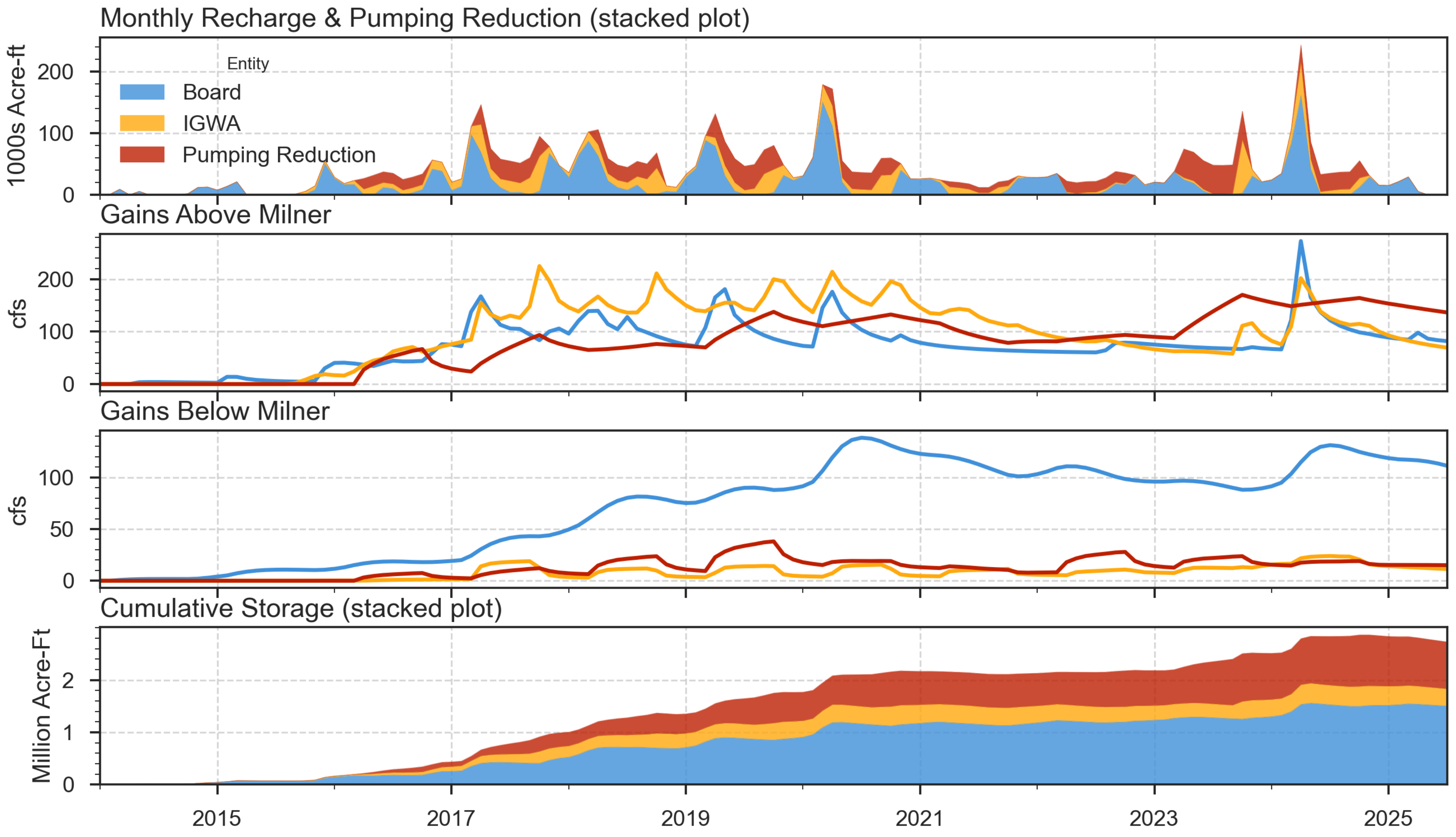
- 287 cfs

Below Milner

- 138 cfs

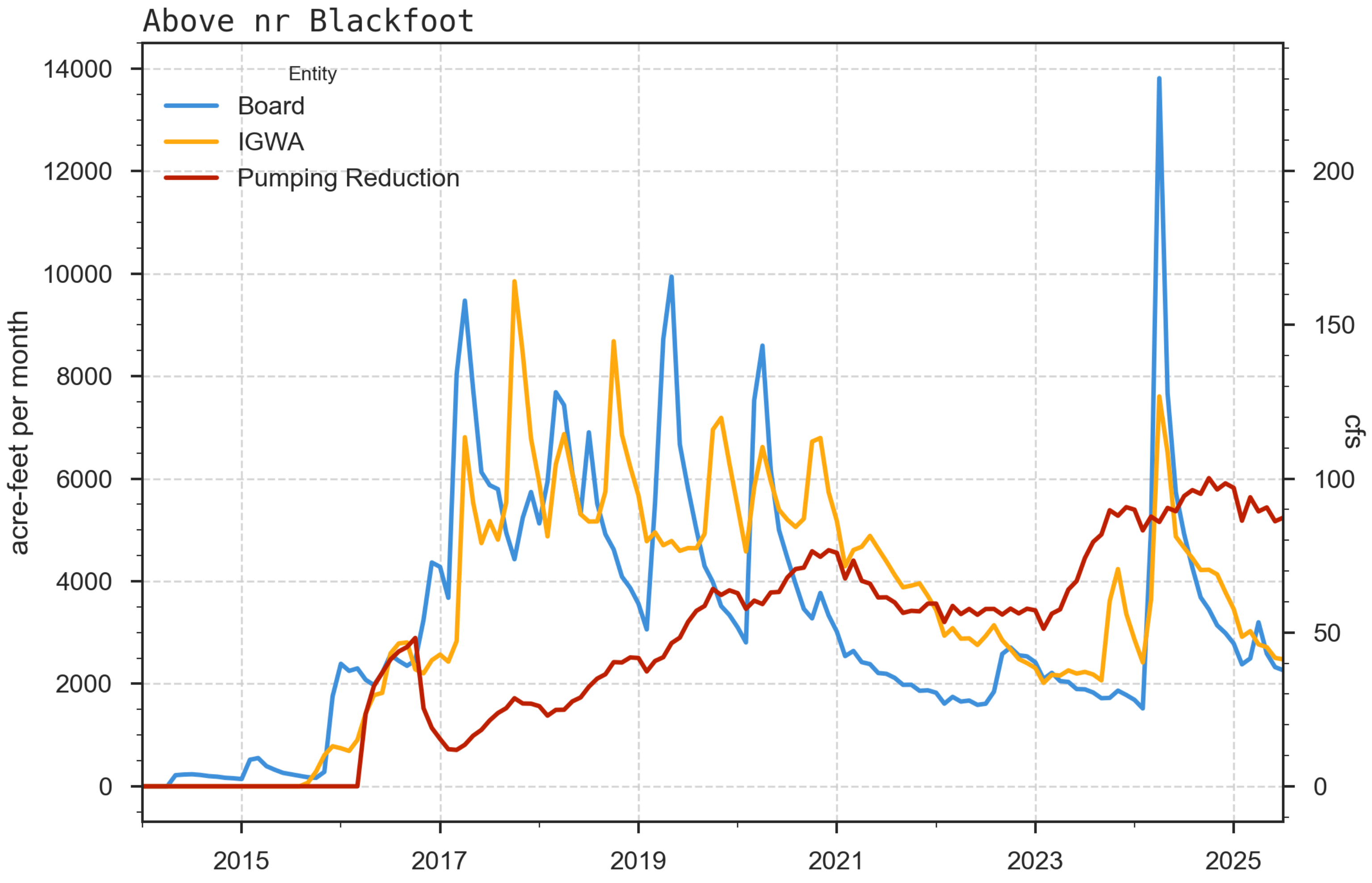
Storage

- IWRB: 1.50 MAF
- IGWA Recharge: 0.33 MAF
- Reductions: 0.90 MAF
- Total: 2.73 MAF
- July 2024: 2.83 MAF (3.7% higher)



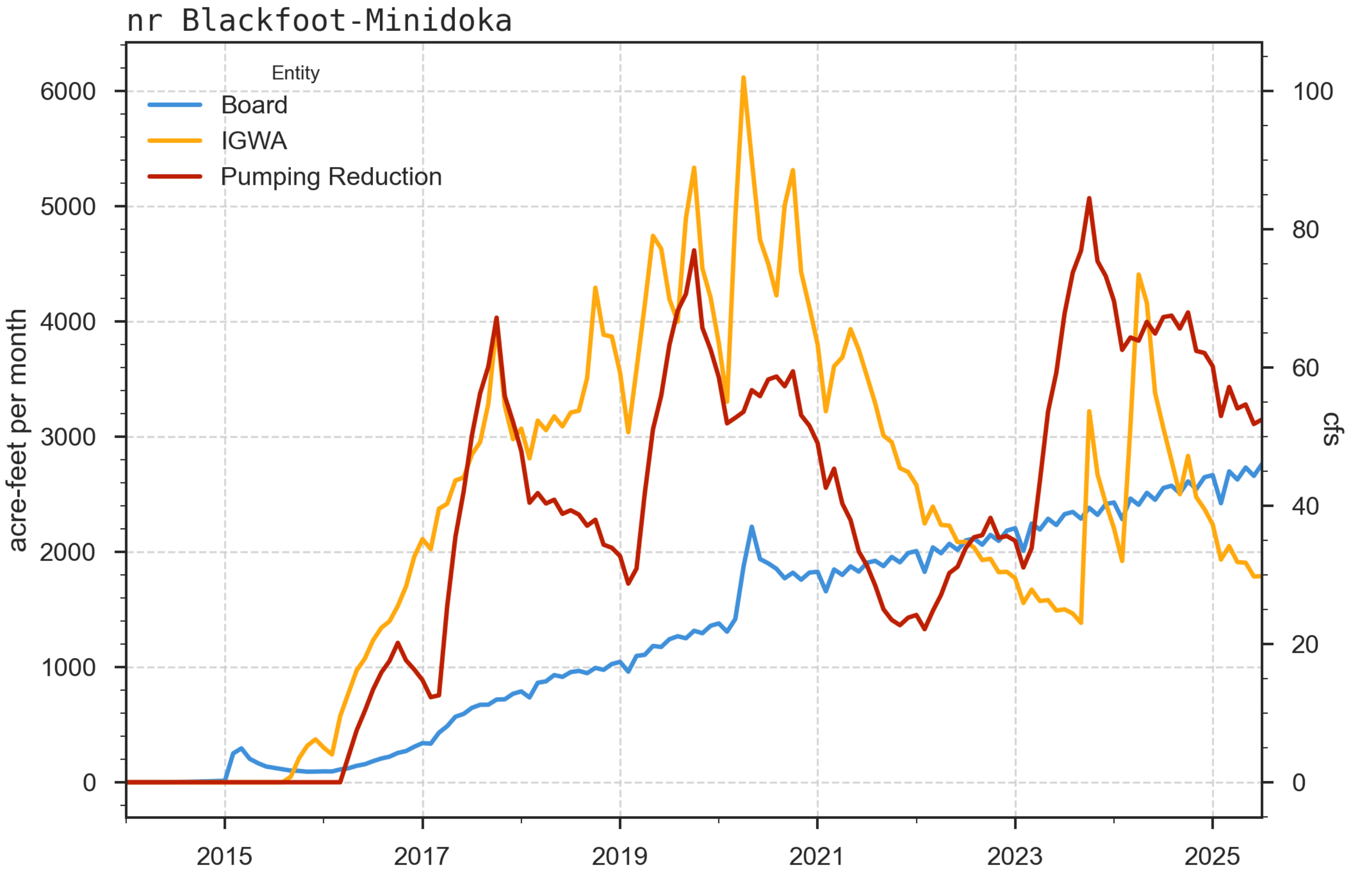
Impacts above near Blackfoot

Average volume (KAF) accruing to reach since 2018		
	Apr-Oct	Nov-Mar
Board	20	12
IGWA	24	18
Pumping Reduction	29	22
Total	73	52



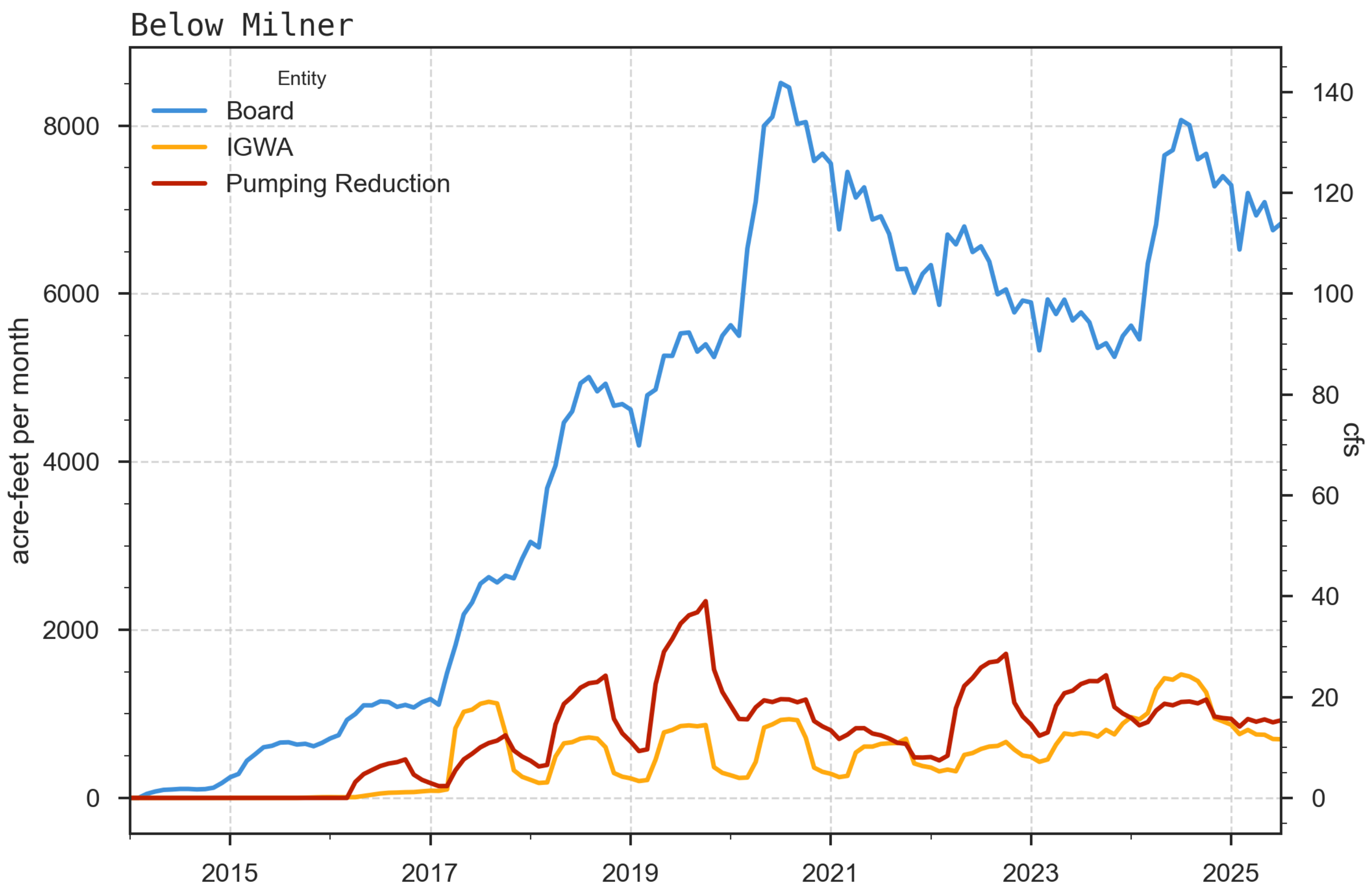
Impacts from near Blackfoot to Minidoka

Average volume (KAF) accruing to reach since 2018		
	Apr-Oct	Nov-Mar
Board	15	11
IGWA	17	13
Pumping Reduction	20	14
Total	52	38



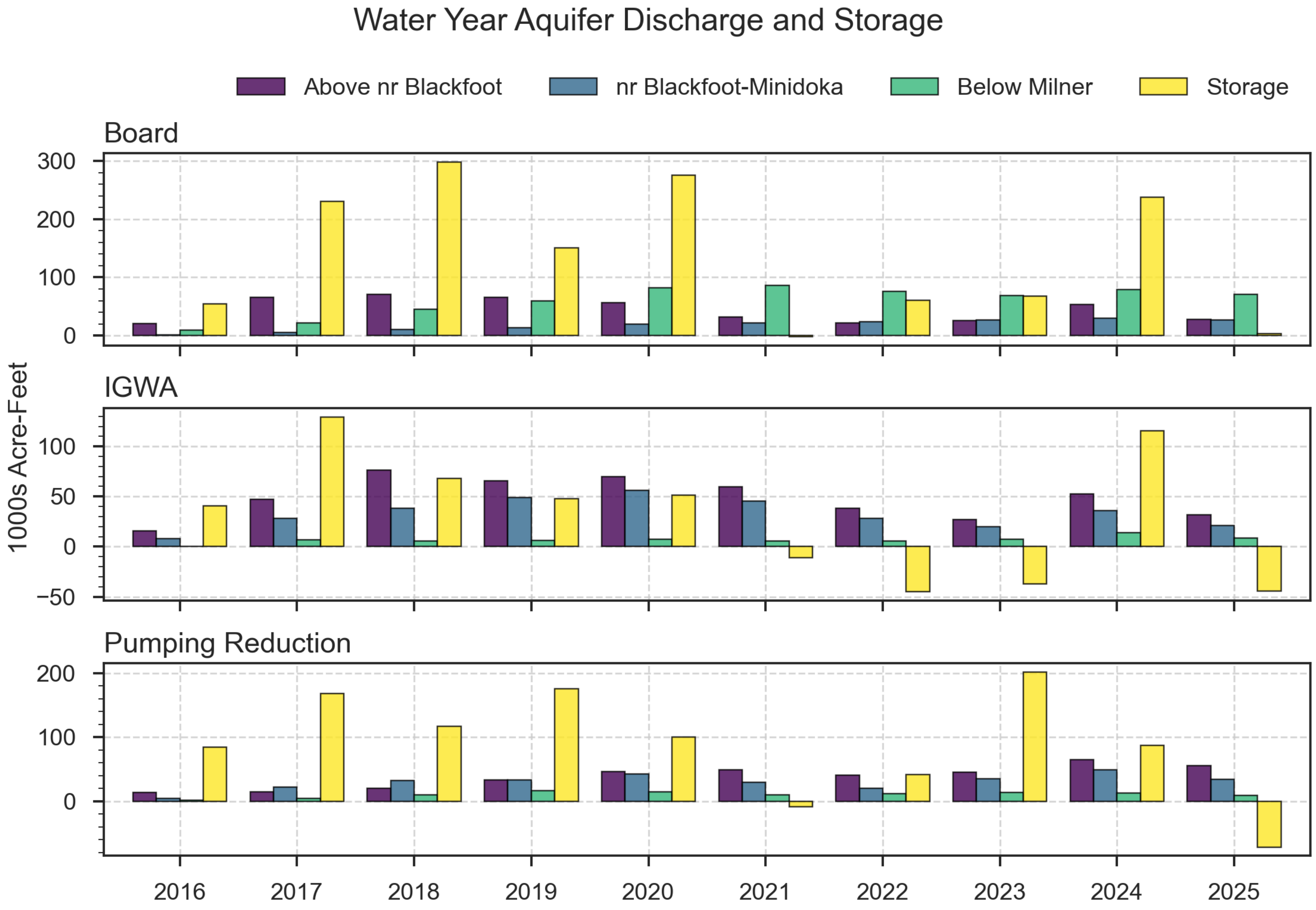
Impacts below Milner

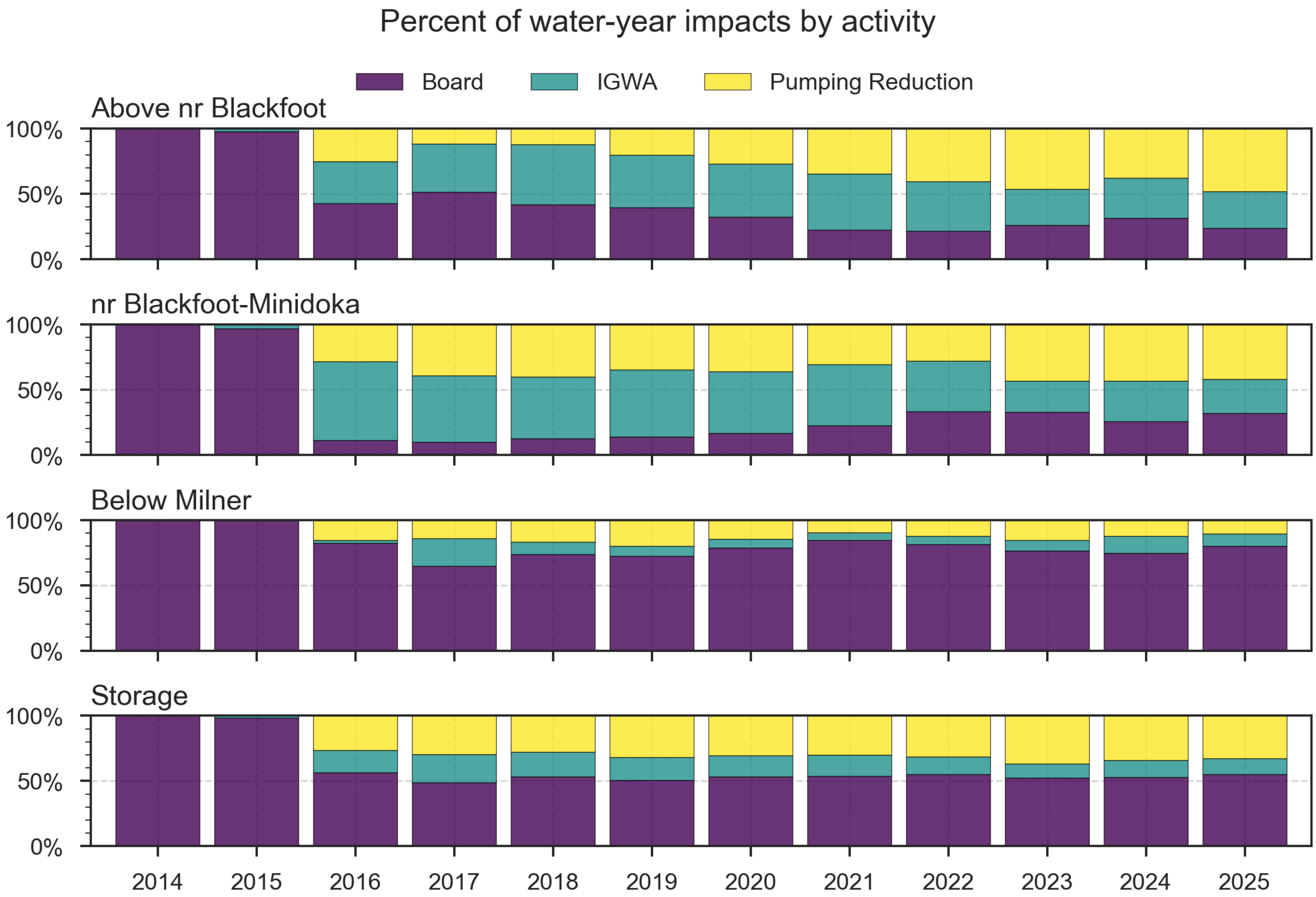
Average volume (KAF) accruing to reach since 2018	Apr-Oct	Nov-Mar
Board	44	32
IGWA	5	3
Pumping Reduction	8	4
Total	57	39



Annual impacts

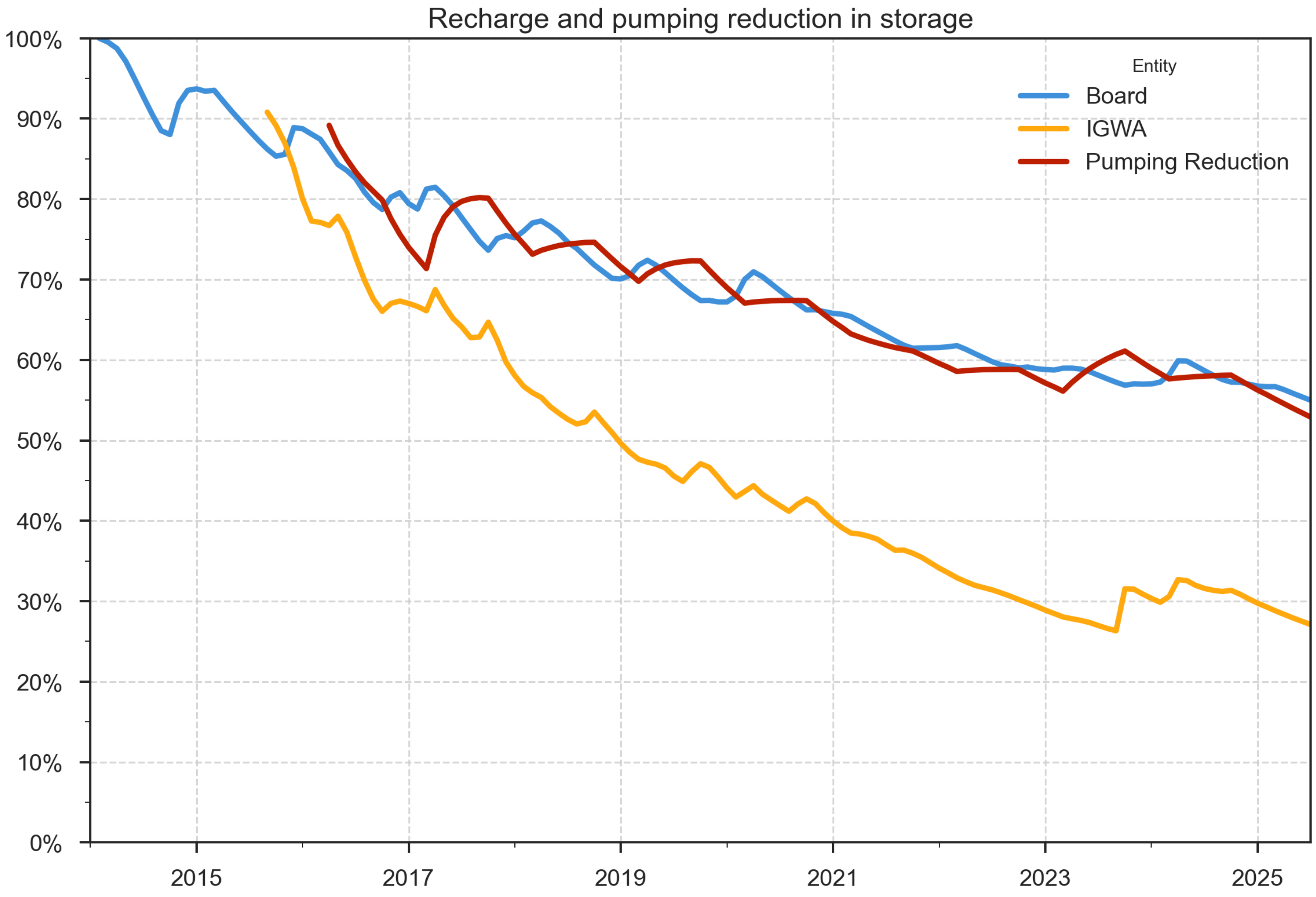
- Where are reach gains occurring for each management activity?
- Board recharge mainly impacts below Milner.
- Above Milner Board impacts spike in years with more upper valley recharge.
- Relative location of impacts for IGWA recharge and pumping reduction are consistent.




Percent of water-year impacts by activity
Board
IGWA
Pumping Reduction
Above nr Blackfoot
nr Blackfoot-Minidoka
Below Milner
Storage
100%
50%
0%
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025

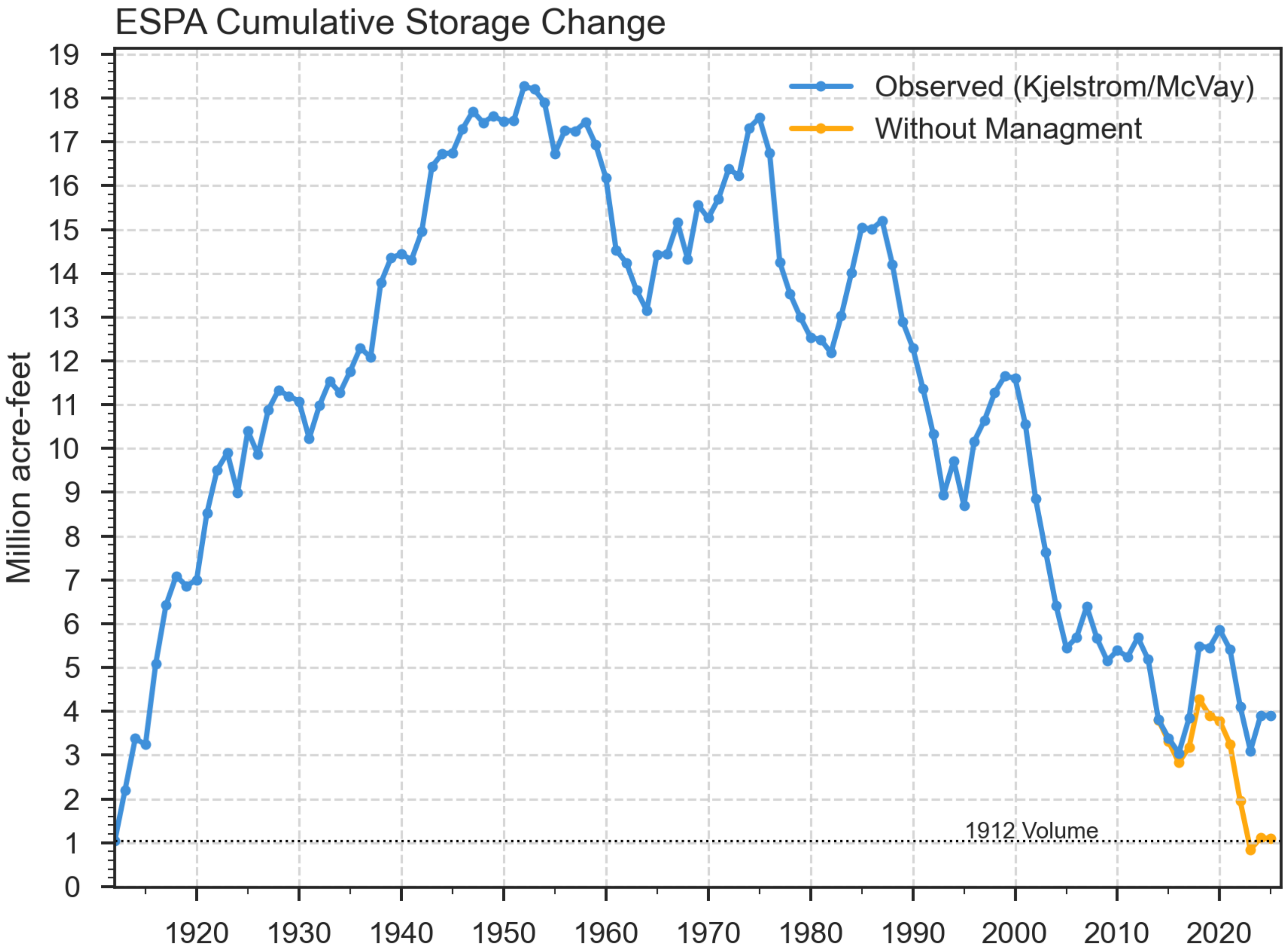
Storage Retention

- IWRB: 56%
- IGWA, City, and SWC Storage recharge: 29%
- IGWA pumping reductions: 53%



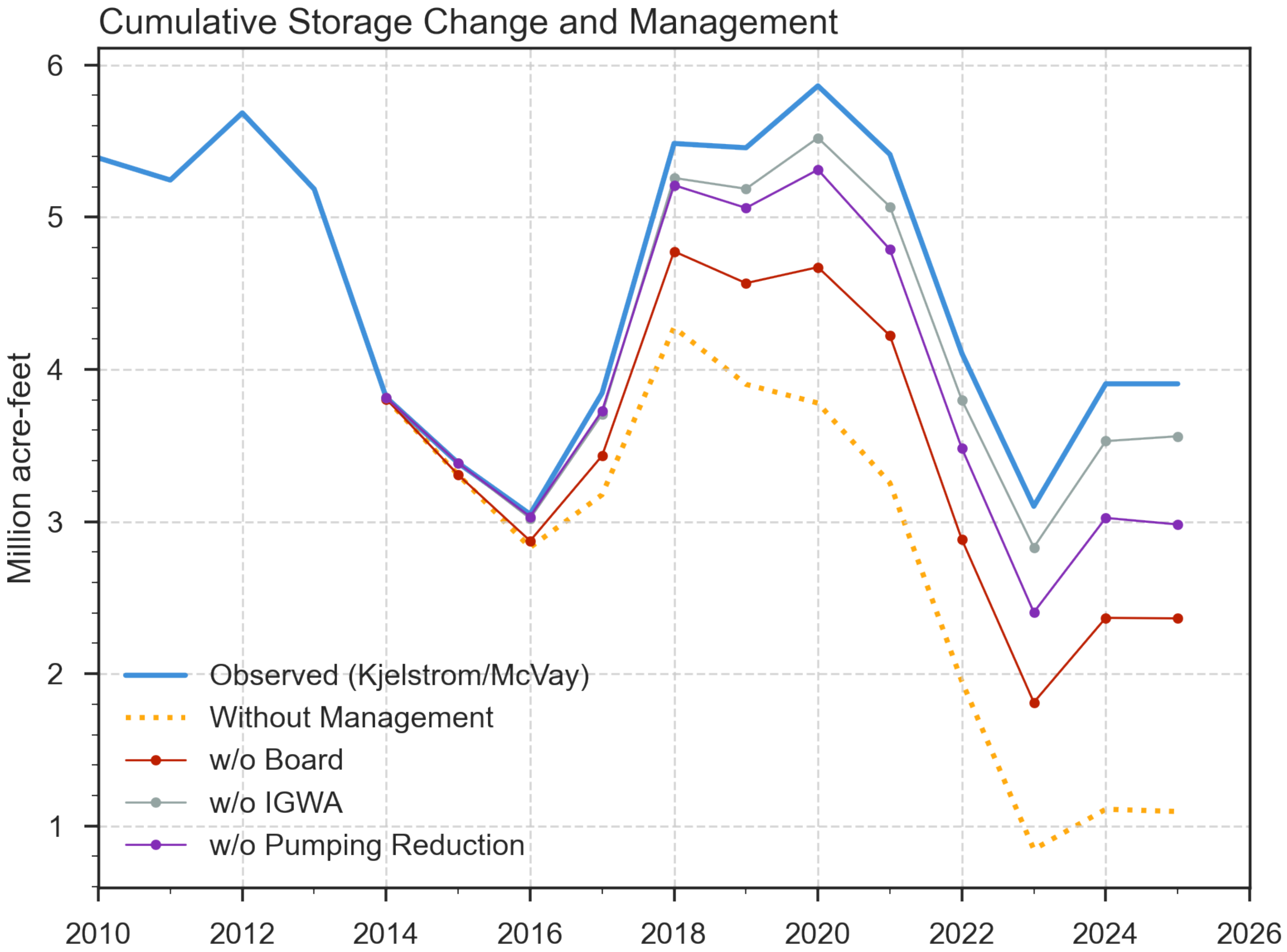
Comparison to ESPA aquifer storage change

Aquifer storage shows declining trend without management (yellow line).



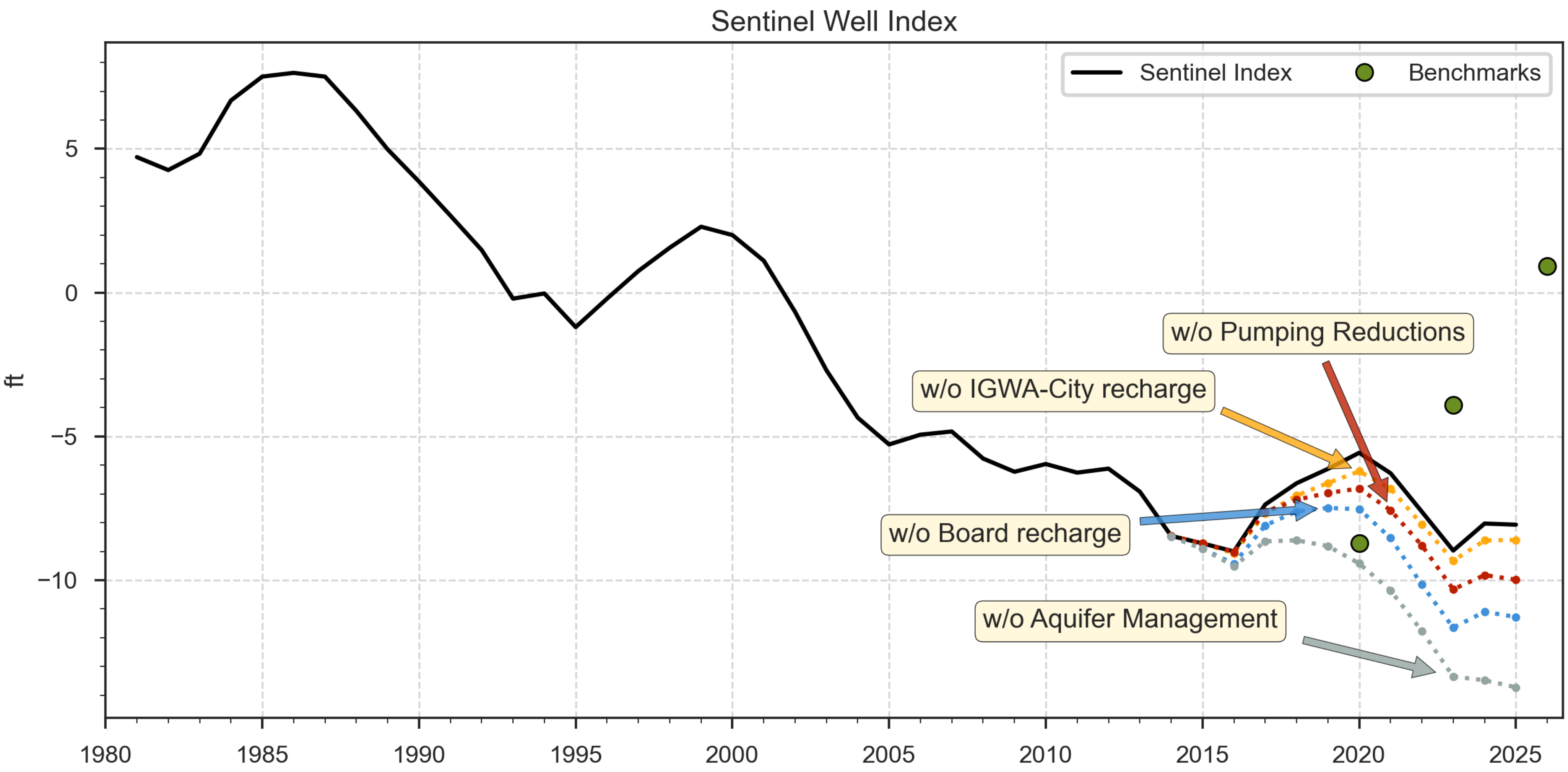
Managed aquifer storage change since 2010

- Varying levels of impact by management activity.
- Management activities moderate the decline in aquifer storage.



Sentinel well impacts

Sentinel Index 5.6 feet higher with aquifer management



Visualizing impacts to the aquifer

Animations of modeled and observed water level changes

Water Level Animation Link

Aquifer water level response from IWRB recharge

* Water level change between -0.5 ft and 0.5 ft are not displayed

Aquifer water level response from IGWA, city, and donated storage recharge

* Water level change between -0.5 ft and 0.5 ft are not displayed

Aquifer water level response from pumping reductions below baseline

* Water level change between -0.5 ft and 0.5 ft are not displayed

- Water level change
  - 5 foot contours with blues showing increase and reds showing decrease
  - Interpolated from 505 wells with at least 4 measurements per year
- Heatmap represents modeled proportion of observed change.
  - If opposite sign of change, modeled impact is set to zero
  - End-of-month model results interpolated to weekly
- **FOR ILLUSTRATIVE PURPOSE ONLY**

Takeaways

Management has increased aquifer Storage by 2.73 million acre-feet and moderated storage decline.

Board recharge adds 79,000 AF to reach gains during irrigation season, 55,000 during winter.

5-year average of all mitigation activities is 550,000 acre-feet .