AGENDA

IDAHO WATER RESOURCE BOARD

Aquifer Stabilization Committee Meeting No. 1-24
Thursday, January 18, 2024
3:00 p.m. (MT) / 2:00 p.m. (PT)

Water Center
Conference Rooms 602 B, C, & D
322 E. Front St.
BOISE

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

1. Introductions and Attendance
2. South Fork Recharge Project*
3. Butte Market Lake Recharge Project*
4. Recharge Well Water Quality Test*
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.

Memorandum

To: IWRB Aquifer Stabilization Committee

From: Cooper Fritz

Date: January 18, 2023

Re: Progressive Irrigation Dist. – South Fork Recharge Basin Site Construction

REQUIRED ACTION: The Committee will consider a recommendation to the IWRB for the authorization of expenditure of funds from the ARPA State Fiscal Recovery Fund (ARPA Funds).

South Fork Recharge Basin Project Summary:

Recharge Project Cost: $5,868,000

Potential Recharge Capacity:	~90-120 cfs
Basin Size:	~30 acres
Basin Depth:	15’
Depth to Water:	~40-105’ bgs

Project:

- Purchase 73 acres upon which a recharge basin will be constructed.
- Summary of Proposed Work:
  - Excavation and construction of a new recharge basin.
  - Installation of headworks and delivery infrastructure into the basin from canal system.
  - Construction of two monitor wells and associated monitoring instrumentation.

Request of the IWRB:

Authorize the expenditure of $5,868,000 from ARPA funding to construct the South Fork Recharge Basin project to increase recharge capacity along the South Fork of the Snake River.

Background:

The overall goal of the ESPA Managed Recharge Program (Program) is to assist in stabilizing and potentially enhancing aquifer levels along with increasing spring flows and reach gains along the Snake River. To accomplish these goals the IWRB has been actively developing additional managed recharge capacity throughout the ESPA. Since 2014, the IWRB has added almost 2,300 cfs of recharge capacity throughout the ESPA, however, only 300 cfs of that capacity was in the Upper Valley (above American Falls Reservoir). Numerous factors played into this discrepancy favoring the Lower Valley (below American Falls Reservoir) such as water availability, large natural basins with proximity to high-capacity delivery systems (irrigation canals), and favorable hydrogeological conditions (infiltration rate, depth to water, subsurface geology). For the past few years, the IWRB has been focusing on developing more recharge capacity in the Upper Valley. The intent is to develop capacity in a range of areas which together can provide short and long term benefits to the aquifer and surface flows.

South Fork Recharge Basin Project:

This project is located approximately 12 miles northeast of Idaho Falls and three miles southwest of Ririe. Progressive Irrigation District’s (“PID”) proposal includes the purchase of approximately 73 acres currently on the market and adjacent to their Anderson Canal (“Anderson”) (Figure 1). A proposed Project Cost Breakdown,

which includes the asking price of the land, is provided in Table 1. PID then proposes to excavate the portion of the land south of the Anderson (30.1 acres), as shown in Figure 2, to 15 feet below the bottom of the canal. Without contingencies, the cost of excavation is just under two-thirds of the total cost of the project Total (Table 1). Willow Creek flows through the southern portion of the property and makes an "oxbow," as may be seen in Figure 2. If the oxbow can be removed, a 35.1-acre basin could be constructed. The cost to excavate the additional five acres is $432,911, which is included in the proposed Table 1 Excavation costs. The portion of the property north of the Anderson would be used to store fill from the excavated land and later could offer the opportunity for a Phase II of the project adding an additional 20 acres.

Table 1 -- A generalized Project Cost Breakdown for the proposed South Fork Recharge Basin. The Project Cost is the approximate summed Total and 10% contingency.

Item	Cost
73-acre parcel	$1,628,000
35.1 Acre Excavation	$3,408,220
Check/Headgate	$198,315
Power Connection	$20,000
Two Monitor Wells	$80,000
Total	$5,334,535
10% Contingency	$533,454
Project Cost	$5,868,000

The IWRB has invested in several small projects in the vicinity and the infiltration rates have been approximately 3.7 cfs per acre. It is estimated that the proposed site would have a recharge capacity of 110 cfs assuming a similar recharge rate per acre. However, if an unforeseen clay layer is encountered the infiltration rate could be somewhat lower (i.e., 90 cfs) or conversely, because of the large size of the potential basin, infiltration rates could be somewhat higher (e.g., 120 cfs). The Anderson can deliver approximately 350 cfs to the location when no irrigation is occurring (e.g., early April) and at least 100 cfs during peak irrigation (e.g., early July) without improvements. A check is proposed to be constructed in the channel of the Anderson with a diversion structure into the basin. The cost for the check structure proposed in Table 1 includes engineering consultancy, telemetry, a measuring device, and automated gate structures.

A domestic home is located approximately 475 feet southeast of the proposed basin as may be observed in Figure 2. In pursuit of ensuring that that dwelling is not impacted by the potential mound due to recharge activities, it is recommended that recharge operations in the potential basin be requested to cease if the mound reaches within 30 feet below ground surface ("bgs") in either of two proposed monitor wells. Given that groundwater levels in the spring are approximately 105 feet bgs, the mound is not anticipated to interfere with early season recharge operations. However, in the fall the groundwater level is approximately 40 feet bgs, a water level that leaves only 10 feet for a mound to form under the proposed basin. Therefore, fall recharge in the basin could be limited.

Conducting managed recharge in this area provides numerous benefits to the ESPA and the Snake River. The groundwater flow model developed for the ESPA (version 2.2) was utilized to determine the potential impact that conducting recharge in the vicinity of this site would have on surface water flows in various reaches of the Snake River. Utilizing the groundwater flow model (EPAM 2.2) predictions indicate that the site primarily provides short- and medium-term benefits to reaches of the river with 20% to 34% of recharged water

predicted to return to the surface in approximately eight months and 50% returning in about 1.3 to 2 years. Of that initial 50% returning, 52% to 85% is expected to return in the Heise to Near Shelley reach, 11% to 33% in the Shelley to Near Blackfoot reach, and 3% to 15% in the Near Blackfoot to Neeley reach. The variability in the modeling results is an indication the site is located in an area where most of the recharge water could flow more to the northwest (following the Snake River drainage) or the southwest (following the Willow Creek drainage).

ARPA Funding Expenditure Authorization:

The American Rescue Plan Act (ARPA), Pub. L. 117-2 subtitle M (2021), appropriated $219,800,000,000 to the Coronavirus State and Local Fiscal Recovery Fund (SLFRF) for making payments to the States to mitigate the fiscal effects stemming from the public health emergency with response to the Coronavirus disease. The SLFRF funds may be used include projects that would be eligible to receive financial assistance through the Clean Water State Revolving Fund (CWSRF), 40 CFR Part 35.3100—35.3170, and the Drinking Water State Revolving Fund (DWSRF), 40 CFR 35.3520. The CWSRF may be used for groundwater projects that protect and restore aquifers, including aquifer recharge projects. The DWSRF can fund aquifer recharge projects such as aquifer storage and recover wells and water reuse and recycling projects which can replace and offset potable water use and to develop new sources of water to increase drought resilience. This project falls into both categories. In 2022 the Idaho Legislature passed House Bill 769 in which it expressed its intent to set aside approximately $250,000,000 of ARPA funding to support projects managed by the IWRB, including for the continued identification, study, construction, or enlargement of managed aquifer recharge sites above Milner Dam. Out of the total amount of ARPA funds allocated to the IWRB it has set aside $14,000,000 dollars for ESPA Recharge projects (Resolution 30-2023). To-date, the IWRB has allocated $5,060,000 of that $14,000,000 to other recharge projects.

- A draft resolution to authorize expenditure of ARPA funding for the design and development of the South Fork Recharge Basin recharge site.

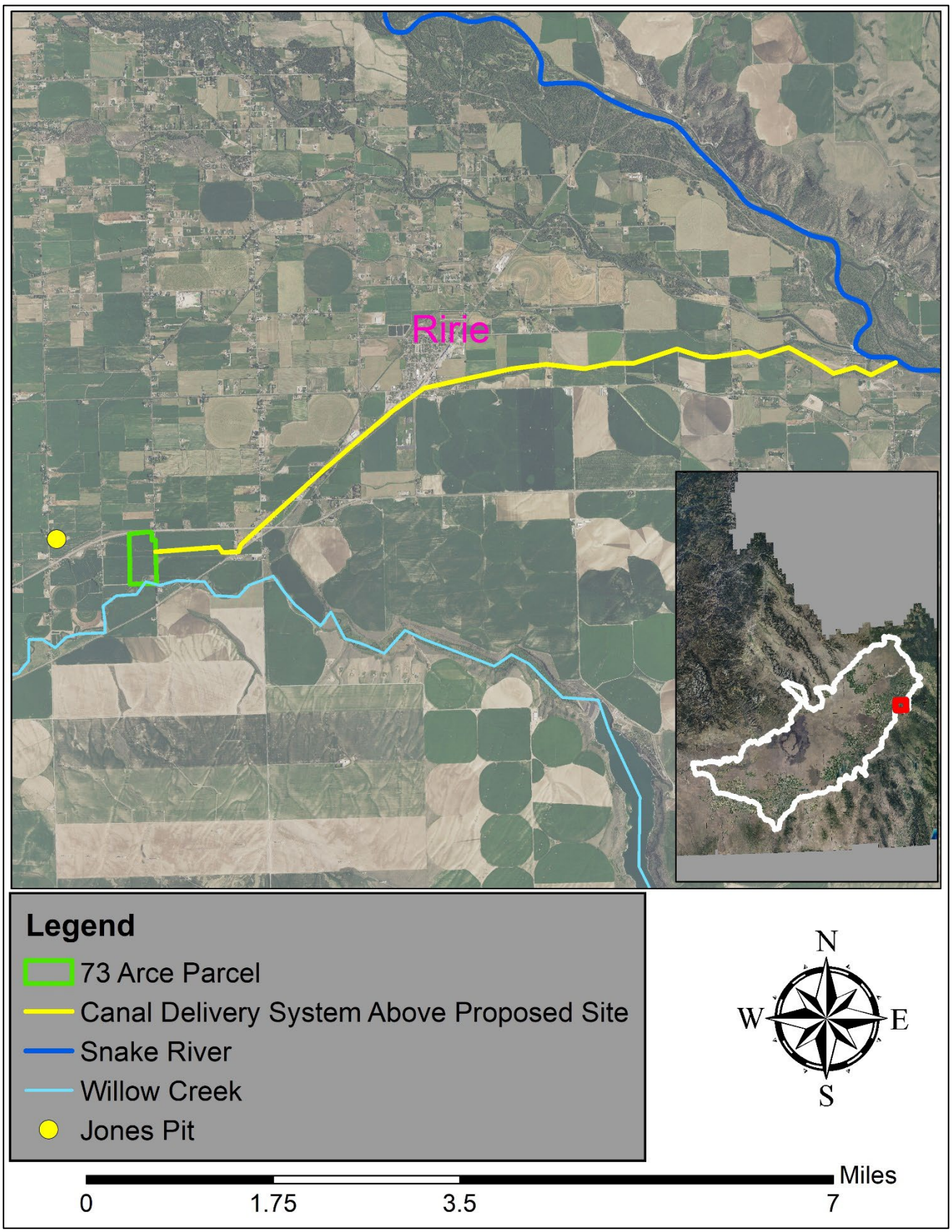


Figure 1 -- Proposed project location along with the approximate locations of the Main Stem of the Snake River, Willow Creek channel, and the Jones Pit.

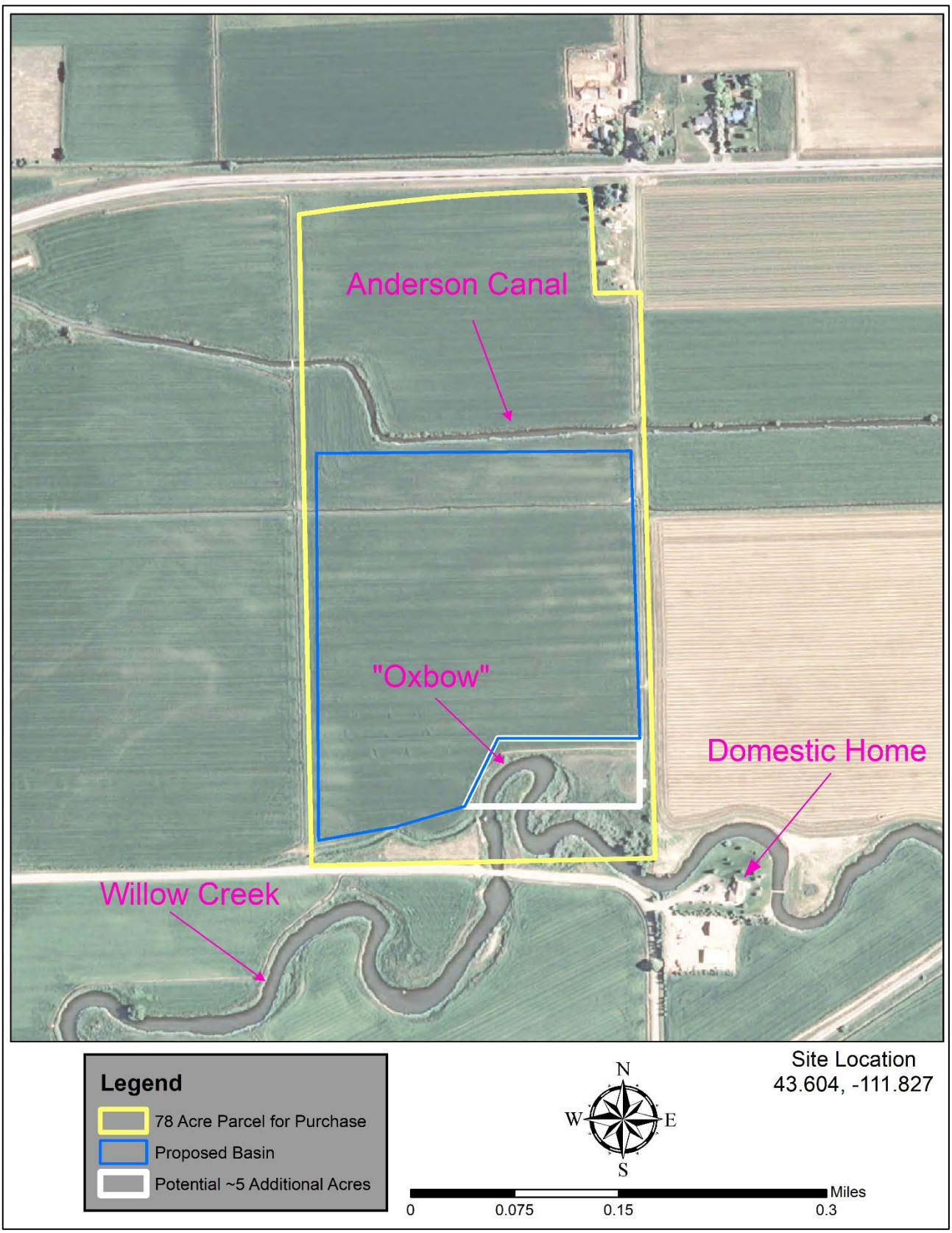


Figure 2 -- Local projection of the project showing the proposed property for purchase, the acres to-be excavated and five potential additional acres, as well as other notable features.

BEFORE THE IDAHO WATER RESOURCE BOARD

IN THE MATTER OF THE SOUTH FORK RECHARGE BASIN SITE DEVELOPMENT	RESOLUTION TO APPROVE FUNDS FROM THE ARPA STATE FISCAL RECOVERY FUND AND PROVIDE SIGNATORY AUTHORITY

WHEREAS, about one-third of Idaho's population resides on the Eastern Snake Plain and the Eastern Snake Plain Aquifer (ESPA) is the sole source of drinking water for both cities and most rural residents of the Eastern Snake Plain; and

WHEREAS, due to numerous factors, including drought, the ESPA has been losing approximately 216,000 acre-feet annually from aquifer storage since the 1950's resulting in declining ground water levels in the aquifer and reduced spring flows to the Snake River; and

WHEREAS, the State Water Plan includes a goal to accomplish managed recharge in the ESPA averaging 250,000 acre-feet annually; and

WHEREAS, the 2016 Idaho Legislature passed and approved Senate Concurrent Resolution 136 directing the IWRB to develop the capacity to achieve 250,000 acre-feet of annual average managed recharge to the ESPA by December 31, 2024; and

WHEREAS, implementation of managed recharge on the ESPA will meet the goals and objectives of stabilizing and improving aquifer levels for, among other things, protecting municipal and domestic drinking water supplies and addressing variability in climatic conditions, including drought; and

WHEREAS, the American Rescue Plan Act (ARPA), Pub. L. 117-2 subtitle M (2021), appropriated $219,800,000,000 to the Coronavirus State and Local Fiscal Recovery Fund (SLFRF) for making payments to the States to mitigate the fiscal effects stemming from the public health emergency with response to the Coronavirus disease; and

WHEREAS, the SLFRF funds may be used to, among other things, make necessary investments in water, sewer, or broadband infrastructure. Pub L. 117-2 sec. 602(c)(1)(D), 42 U.S.C. § 802(c)(D); and

WHEREAS, eligible uses of the SLFRF include projects that would be eligible to receive financial assistance through the Clean Water State Revolving Fund (CWSRF), 40 CFR Part 35.3100—35.3170, and the Drinking Water State Revolving Fund (DWSRF), 40 CFR 35.3520; and

WHEREAS, the CWSRF may be used for groundwater projects that protect and restore aquifers, including aquifer recharge projects; and

WHEREAS, the DWSRF can fund aquifer recharge projects such as aquifer storage and recover wells and water reuse and recycling projects which can replace and offset potable water use and to develop new sources of water to increase drought resilience; and

WHEREAS, in 2022 the Idaho Legislature passed House Bill 769 in which it expressed its intent to set aside approximately $250,000,000 of ARPA funding to support projects managed by the IWRB, including for the continued identification, study, construction, or enlargement of managed aquifer recharge sites above Milner Dam; and

WHEREAS, Senate Bill 1181 appropriated $50,000,000 for Fiscal Year 2024 to support projects managed by the IWRB, including for the continued identification, study, construction, or enlargement of managed aquifer recharge sites above Milner Dam; and

WHEREAS, Idaho Code § 42-1760 authorizes the IWRB to expend, loan, or grant moneys from the water management account for water projects that conserve or increase water supply, improve drought resiliency, address water sustainability, or support flood management, including the identification, study, and construction of managed aquifer recharge sites above Milner dam; and

WHEREAS, Progressive Irrigation District ("PID") presented a proposal to IWRB on January 18, 2024, for the South Fork Recharge Basin and associated infrastructure for a proposed cost of $5,868,000; and

WHEREAS, the South Fork Recharge Basin Project will contribute to the IWRB goal of achieving 250,000 acre-feet of annual average managed recharge to the ESPA by December 31, 2024 and will meet the goals and objectives of stabilizing and improving aquifer levels for, among other things, protecting municipal and domestic drinking water supplies and addressing variability in climatic conditions, including drought; and

NOW THEREFORE BE IT RESOLVED that the IWRB authorizes expenditures up to $5,868,000 from the ARPA State Fiscal Recovery Fund for the development of the South Fork Recharge Basin Project. Further authorizations may be required upon determination of total development and construction costs; and

NOW THEREFORE BE IT FURTHER RESOLVED that the IWRB authorizes its chairman or designee, to execute the necessary agreements or contracts for the purpose of this resolution.

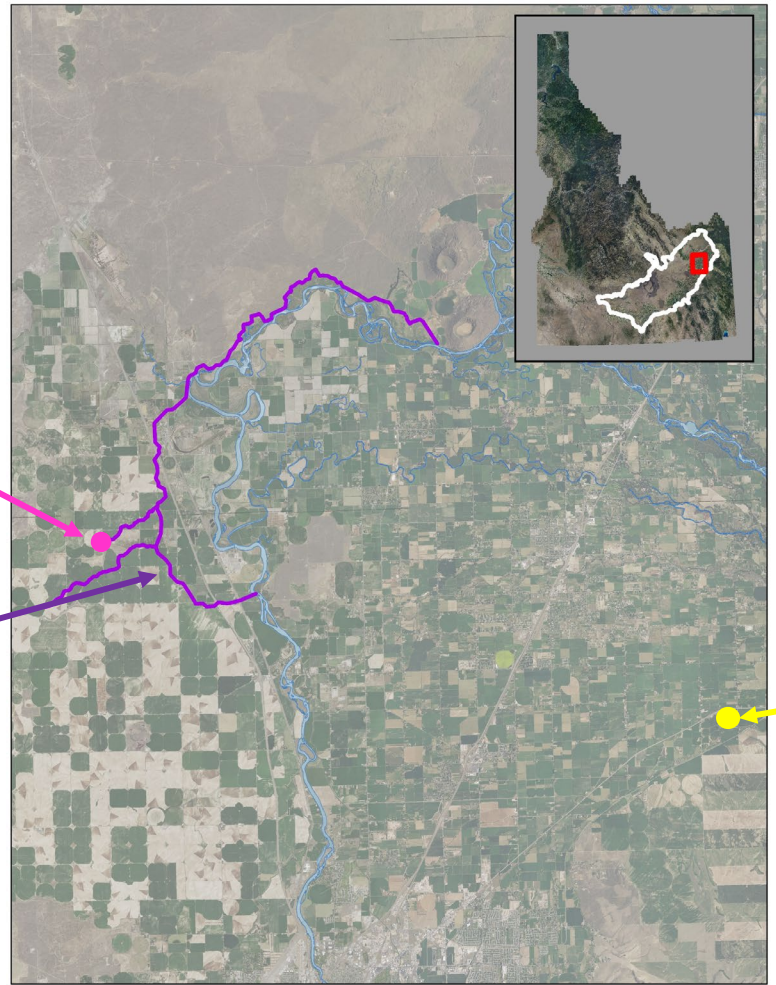
DATED this 19th day of January 2024.

_____
JEFF RAYBOULD, Chairman
Idaho Water Resource Board

ATTEST _____
DEAN STEVENSON, Secretary

Opportunities to Increase Off-Canal Aquifer Recharge Capacity in the Upper Valley

Additional Injection Wells



Canal Capacity Increase Study

South Fork Recharge Basin

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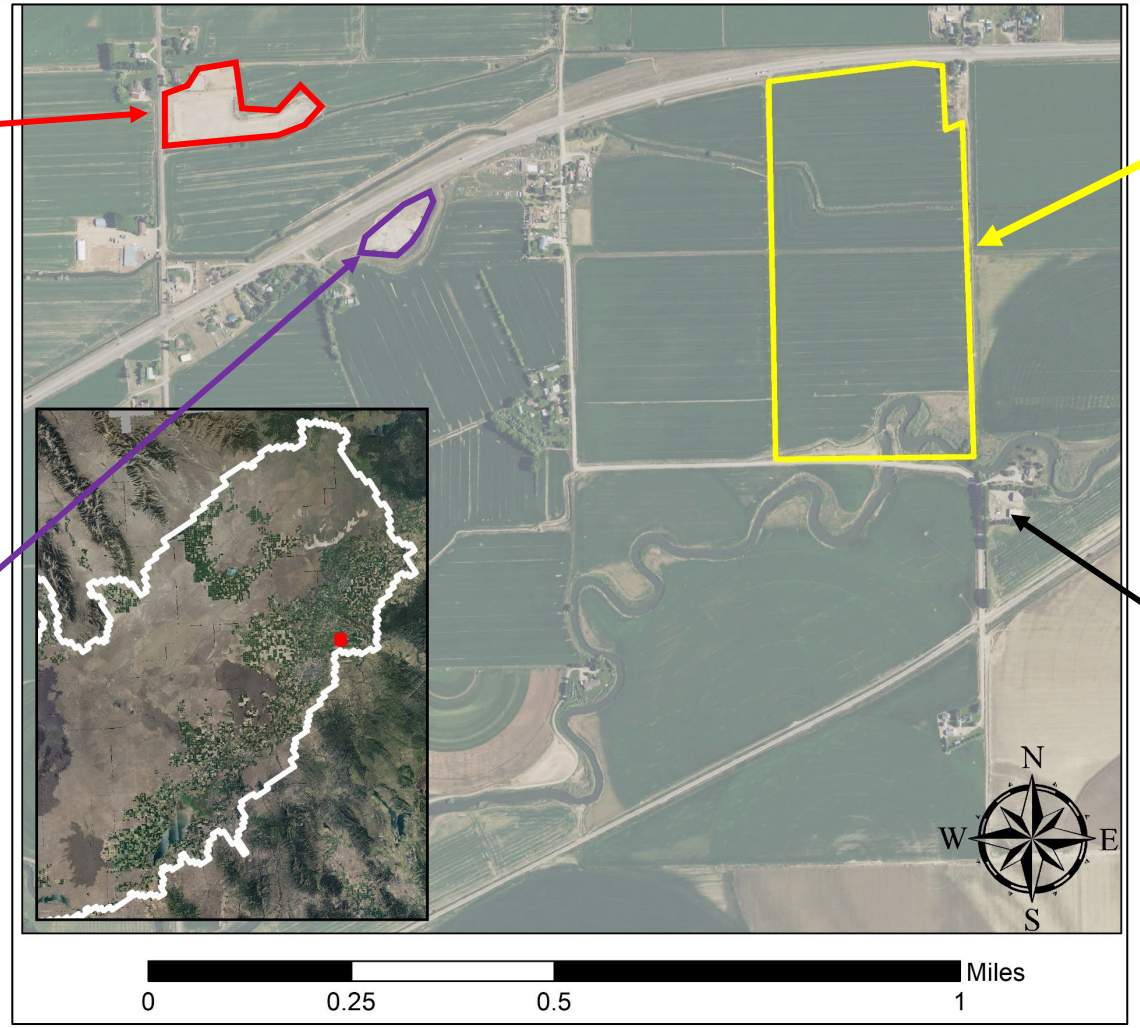
Jones Pit
4 acres /
14.5 cfs
= ~3.7 cfs/acre

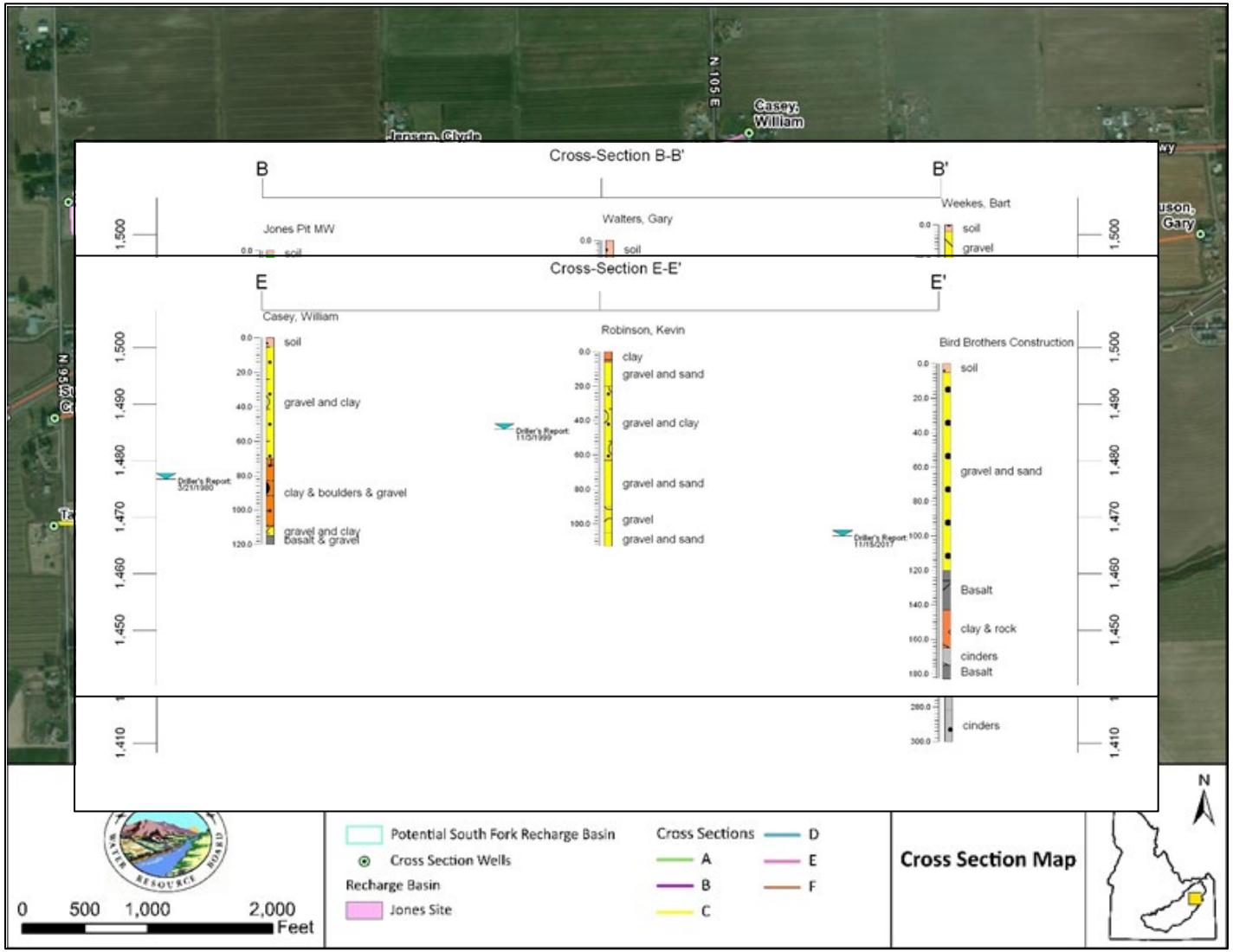
Ryker Pit
Fall 2022 Test
3 acres /
15 cfs
= ~5 cfs/acre



Property for
Proposed Basin

Depth to Water:
~105’ bgs in Spring
~40’ bgs in Fall

Recommend
Recharge Cease
when Water Table
30’ bgs


N 105 E
Casey, William
N 95 E
Cross-Section B-B'
B
B'
Jones Pit MW
soil
Walters, Gary
soil
Weekes, Bart
soil
gravel
Cross-Section E-E'
E
E'
Casey, William
soil
gravel and clay
clay & boulders & gravel
gravel and clay
Basalt & gravel
Robinson, Kevin
clay
gravel and sand
gravel and clay
gravel and sand
gravel
gravel and sand
Bird Brothers Construction
soil
gravel and sand
Basalt
clay & rock
cinders
Basalt
cinders
1,500
1,490
1,480
1,470
1,460
1,450
1,410
0
500
1,000
2,000
Feet
Potential South Fork Recharge Basin
Cross Section Wells
Recharge Basin
Jones Site
Cross Sections
A
B
C
D
E
F
Cross Section Map
N

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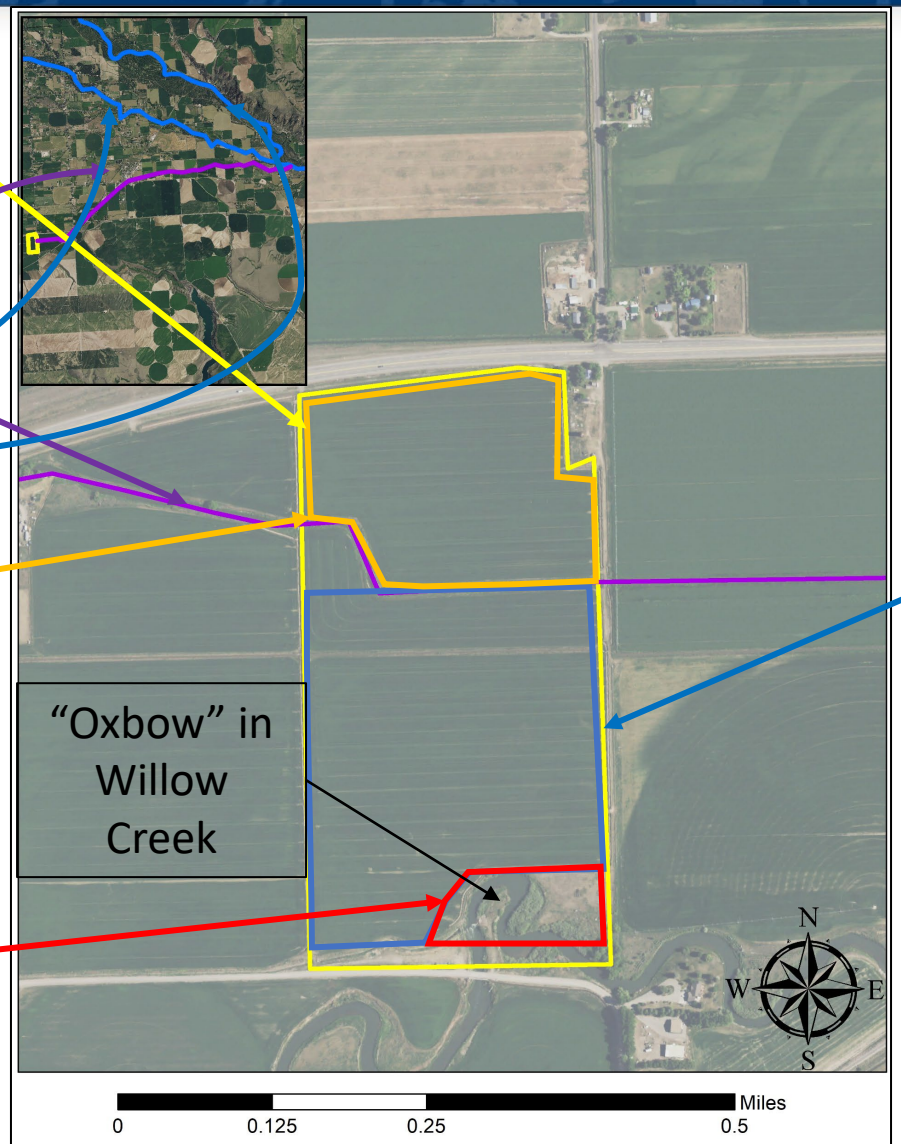
73 Acre Parcel
Anderson Canal Bisects
- 350 cfs non-irrigation season
- 100 cfs during irrigation season

Anderson Canal

Dry Bed of Snake River

South Fork of Snake River

20 acres north of Anderson used to store excavated fill
- Potential Phase II location



5 potential additional acres

South Fork Recharge Basin
30 acres * 3.7 cfs/acre =
~110 cfs

Budget Proposal Overview

Item		Cost
• Property	--	$1,628,000
• Excavation	--	$3,408,220
• Includes the potential five additional acres.		
• Check and Headgate	--	$198,315
• Power Connection	--	$20,000
• Monitor Wells (2)	--	$80,000
• Total	--	**$5,334,525**
• Contingency (10%)	--	$533,453
• **Proposal**	--	**$5,868,000**

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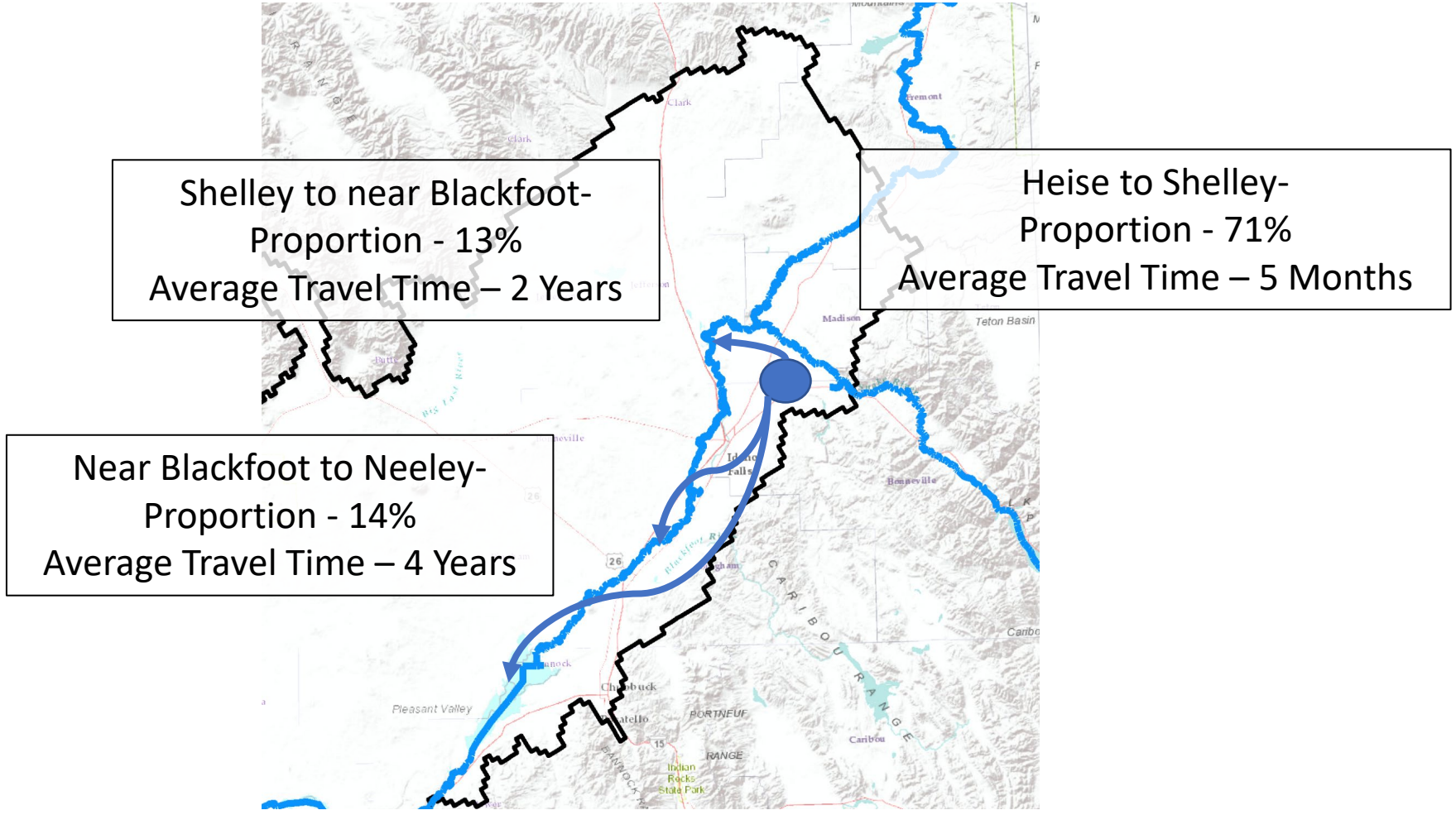
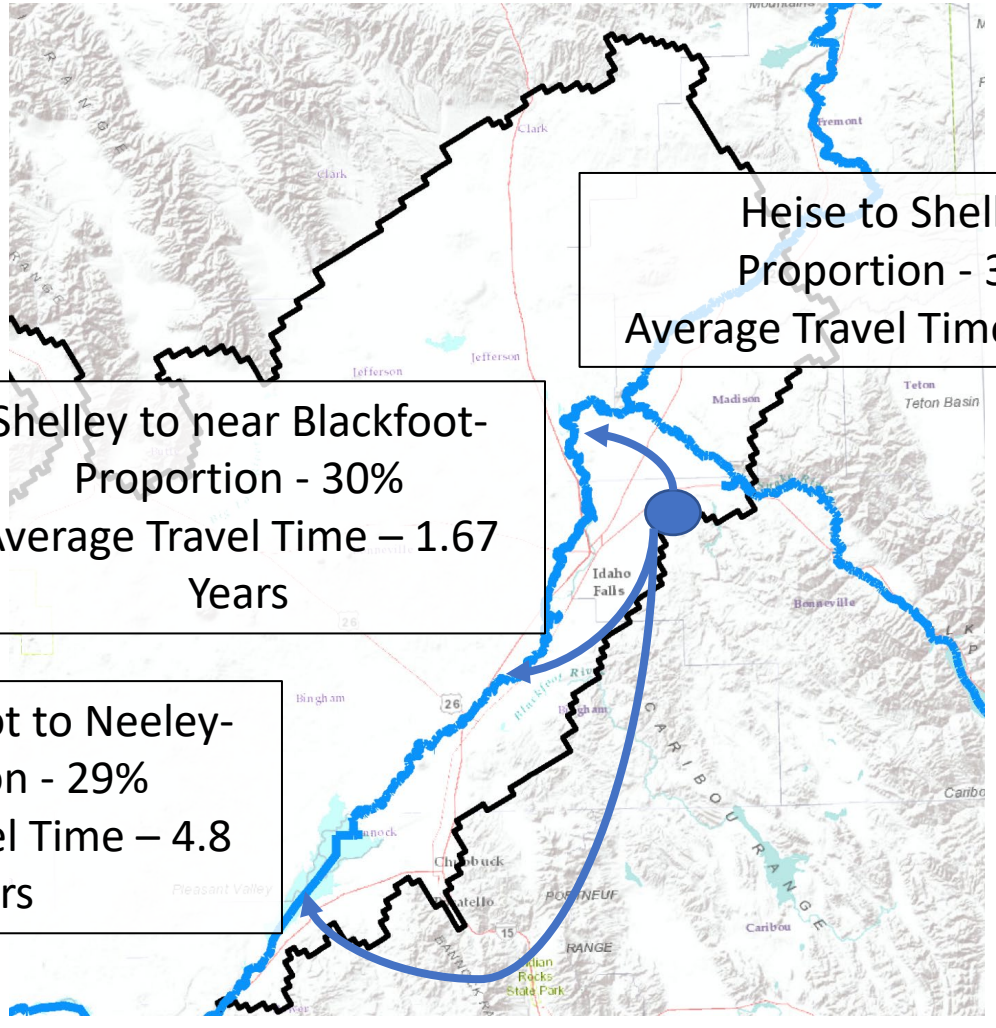
Where does Dry Bed recharge end up?



Where does Willow Creek recharge end up?



Heise to Shelley-
Proportion - 36%
Average Travel Time – 1 Year

Shelley to near Blackfoot-
Proportion - 30%
Average Travel Time – 1.67 Years

Near Blackfoot to Neeley-
Proportion - 29%
Average Travel Time – 4.8 Years

50% return = 2 Years

4 m return = 9%

Butte & Market Lake Recharge Wells

Poitevin Injection Well Expansion

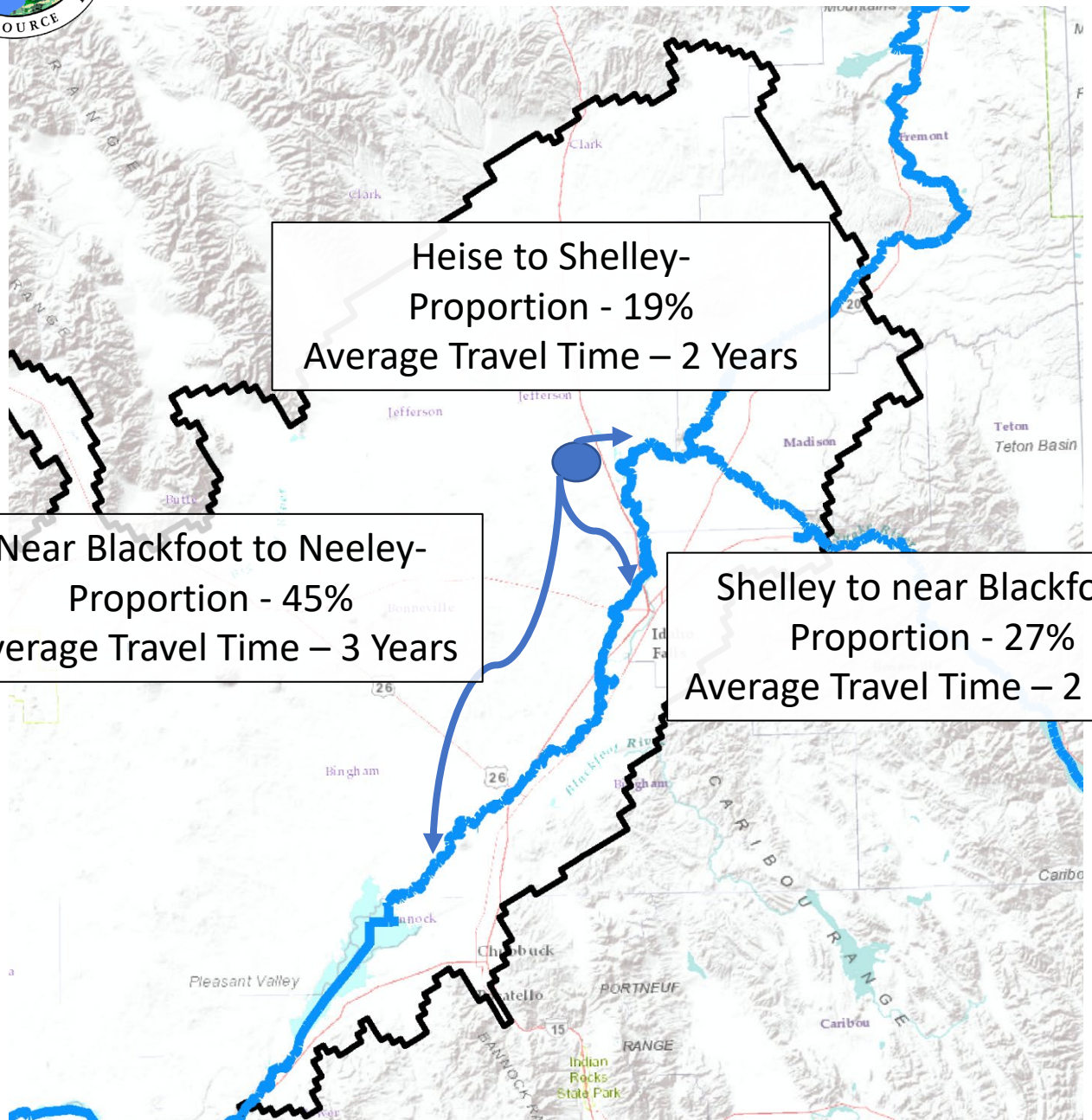
Pot. Capacity	24-30 cfs
Number of Wells	2
DTW	~245 ft bgs
5 yr - Retention	30%

Project:

- Installation of 2 new wells
- Improve access road
- Canal infrastructure for water delivery

Cost **$571,000**

Butte & Market Lake

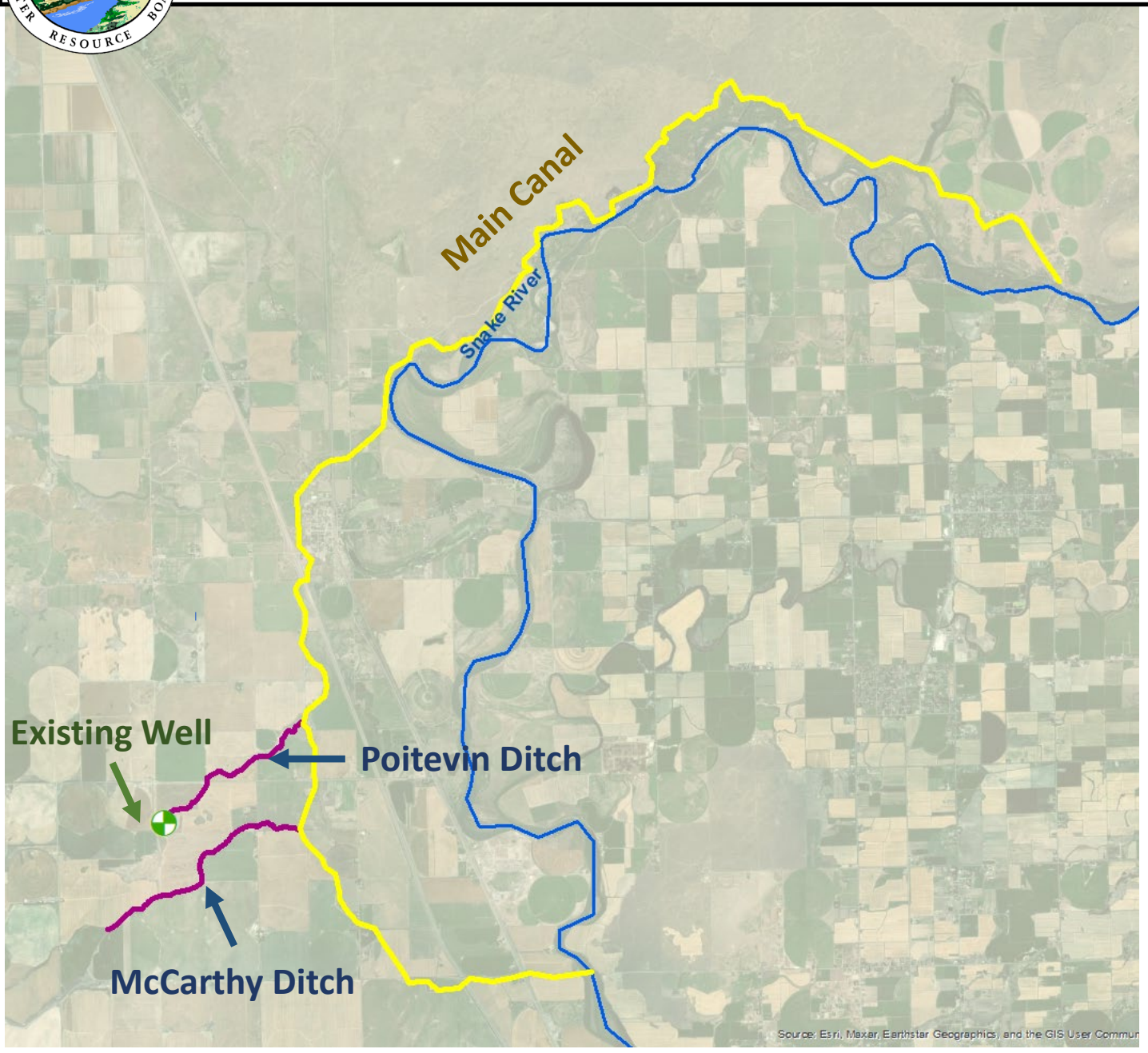


Poitevin Injection Well Expansion

Recharge Impact to Surface Water:

- 7% return = 8 m
- 50% return = 3+ years

Butte & Market Lake Canal Improvement



System Capacity Study

Increase Pot. Capacity 200 cfs

- Poitevin 100 cfs
- McCarthy 100 cfs

Study:

- Increase Canal Capacity
  - Improvements to Poitevin
  - Improvements to McCarthy
- Model of Main Canal
- Options & Cost Estimate for Improvements

Cost $94,000


Questions?

Memorandum

To: Idaho Water Resource Board

From: Cooper Fritz

Date: January 18, 2023

Re: Butte Market Lake Canal Company – Poitevin Injection Well Site Expansion

REQUIRED ACTION: The Board will consider approval of a resolution to authorize expenditure of funds from the ARPA State Fiscal Recovery Fund (ARPA Funds).

Poitevin Injection Well Site Expansion Project Summary:

Recharge Project Cost: $571,000

Potential Recharge Capacity: ~24-30 cfs
Number of Wells: 2
Depth to Water: ~245' bgs

Project:

- Installation of two new injection wells.
- Improvement of access road to the injection wells.
- Canal infrastructure improvements for delivery to the wells.

Request of the IWRB:

Authorize the expenditure of $571,000 from ARPA funding to construct the Poitevin Injection Well Site Expansion project to increase recharge capacity along the Main Stem of the Snake River.

Background:

The overall goal of the ESPA Managed Recharge Program (Program) is to assist in stabilizing and potentially enhancing aquifer levels along with increasing spring flows and reach gains along the Snake River. To accomplish these goals the IWRB has been actively developing additional managed recharge capacity throughout the ESPA. Since 2014, the IWRB has added almost 2,300 cfs of recharge capacity throughout the ESPA, however, only 300 cfs of that capacity was in the Upper Valley (above American Falls Reservoir). Numerous factors played into this discrepancy favoring the Lower Valley (below American Falls Reservoir) such as water availability, large natural basins with proximity to high-capacity delivery systems (irrigation canals), and favorable hydrogeological conditions (infiltration rate, depth to water, subsurface geology). For the past few years, the IWRB has been focusing on developing more recharge capacity in the Upper Valley. The intent is to develop capacity in a range of areas which together can provide short and long term benefits to the aquifer and surface flows.

Members of the IWRB visited the nascent Poitevin Injection Well Site ("Site") during a field trip of potential Upper Valley sites in the autumn of 2022. It consisted of one injection well and a dedicated monitor well, located at the end of a lateral ditch known as the Poitevin (Figure 1). A water quality test performed in the spring of 2023 observed and inferred no negative groundwater quality implications arising from injecting canal water from the Butte Market Lake Canal Company ("BMLCC") system into the aquifer. As a result, BMLCC is interested in expanding the Site.

Poitevin Injection Well Site Expansion Project:

This project is located approximately three miles southwest of Roberts and 12.5 north northwest of the Idaho Falls Regional Airport at the end of the Poitevin lateral ditch ("Poitevin," shown in Figure 1) which diverts off of the BMLCC main canal. BMLCC's proposal includes the drilling of two 20-inch diameter recharge injection wells, approximately 320 feet deep. A proposed Project Cost Breakdown, which includes the bids to drill the two wells as well as infrastructure to deliver water into them from the canal, is provided in Table 1.

Table 1 -- A generalized Project Cost Breakdown for the proposed Poitevin Injection Well Sie Expansion. The Project Cost is the approximate summed Total and 15% contingency.

Item	Cost
Two Injection Wells	$338,400
Delivery Infrastructure from Canal to Wells	$53,280
Flow Meters	$20,000
Access Road Improvements	$60,000
Canal Check Rehab	$10,000
Consultant	$15,000
Total	$496,680
15% Contingency	$74,502
Project Cost	$571,000

The existing 16-inch injection well at the Site can recharge a consistent 10.5 cfs. It is therefore estimated that the proposed 20-inch wells will inject 12 – 15 cfs each. The Poitevin can deliver up to about 40 cfs to the Site, but that rate is strongly dependent on the elevation of the Poitevin water level because the lateral is topographically flat. To increase the water level elevation at the entrance to the Poitevin, the rehabilitation of a check in the main BMLCC canal below the lateral is also proposed (Figure 1) and the cost is shown in Table 1. Peak irrigation demand is equal to the BMLCC system delivery capacity from around mid-June until mid-August, so 40 cfs cannot be guaranteed for recharge delivery during that period.

During a spring of 2023 water quality experiment and a fall of 2023 recharge event, a "mound" of approximately 100 feet or more was observed in the injection well (likely in the casing). However, no hydrologic response was observed in the dedicated monitor well located less than 0.1 miles (Figure 1) from the injection well. Therefore, hydrologic mounding from the two additional wells is not expected to reduce the rate of water delivered by the existing and/or additional wells. Currently the Site is sometime inaccessible in the early spring (i.e., when some recharge operations occur) because the access road is too muddy. Therefore, improvements to the access road (which runs along the Poitevin from the county road) are also proposed here.

Conducting managed recharge in this area provides numerous benefits to the ESPA and the Snake River. The groundwater flow model developed for the ESPA (version 2.2) was utilized to determine the potential impact that conducting recharge in the vicinity of this site would have on surface water flows in various reaches of the Snake River. Predictions indicate that the site primarily provides medium- and long-term benefits to reaches of

the river with 7% of recharged water predicted to return to the surface in approximately eight months and 50% returning in about 3.33 years. Of that initial 50% returning, approximately 56% is expected to return in the Heise to Near Shelley reach and 44% in the Shelley to Near Blackfoot reach.

ARPA Funding Expenditure Authorization:

The American Rescue Plan Act (ARPA), Pub. L. 117-2 subtitle M (2021), appropriated $219,800,000,000 to the Coronavirus State and Local Fiscal Recovery Fund (SLFRF) for making payments to the States to mitigate the fiscal effects stemming from the public health emergency with response to the Coronavirus disease. The SLFRF funds may be used include projects that would be eligible to receive financial assistance through the Clean Water State Revolving Fund (CWSRF), 40 CFR Part 35.3100—35.3170, and the Drinking Water State Revolving Fund (DWSRF), 40 CFR 35.3520. The CWSRF may be used for groundwater projects that protect and restore aquifers, including aquifer recharge projects. The DWSRF can fund aquifer recharge projects such as aquifer storage and recover wells and water reuse and recycling projects which can replace and offset potable water use and to develop new sources of water to increase drought resilience. This project falls into both categories. In 2022 the Idaho Legislature passed House Bill 769 in which it expressed its intent to set aside approximately $250,000,000 of ARPA funding to support projects managed by the IWRB, including for the continued identification, study, construction, or enlargement of managed aquifer recharge sites above Milner Dam. Out of the total amount of ARPA funds allocated to the IWRB has set aside $14,000,000 dollars for ESPA Recharge projects (Resolution 30-2023). To-date, the IWRB has allocated $5,060,000 of that $14,000,000 to other recharge projects.

- A draft resolution to authorize expenditure of ARPA funding for the design and development of the Poitevin Injection Well Site Expansion.

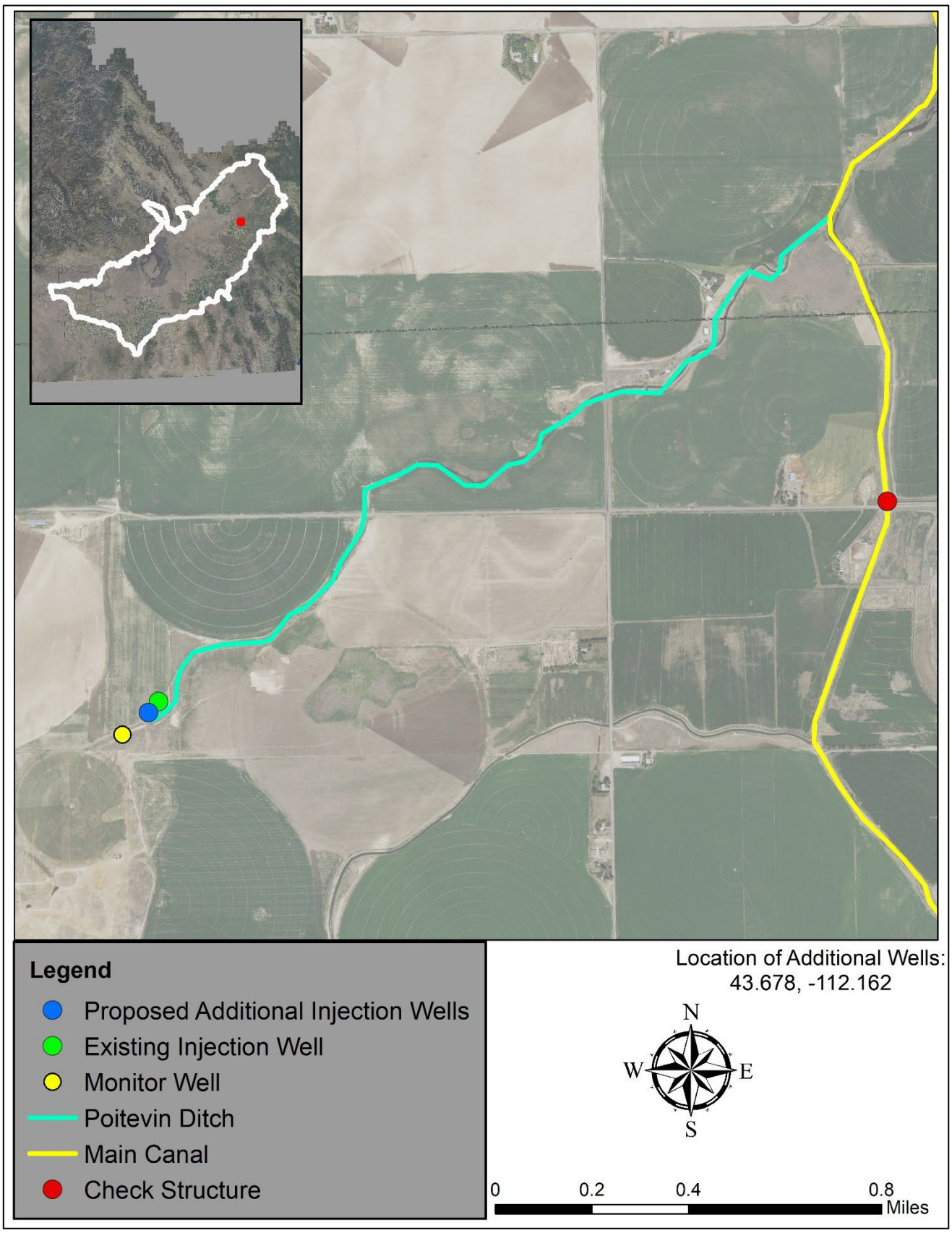


Figure 1. Butte Market Lake Canal Company proposed Poitevin Injection Well Site Expansion project.

BEFORE THE IDAHO WATER RESOURCE BOARD

IN THE MATTER OF THE EXPANSION OF THE POITEVIN INJECTION WELL SITE	RESOLUTION TO APPROVE FUNDS FROM THE ARPA STATE FISCAL RECOVERY FUND AND PROVIDE SIGNATORY AUTHORITY

WHEREAS, about one-third of Idaho's population resides on the Eastern Snake Plain and the Eastern Snake Plain Aquifer (ESPA) is the sole source of drinking water for both cities and most rural residents of the Eastern Snake Plain; and

WHEREAS, due to numerous factors, including drought, the ESPA has been losing approximately 216,000 acre-feet annually from aquifer storage since the 1950's resulting in declining ground water levels in the aquifer and reduced spring flows to the Snake River; and

WHEREAS, the State Water Plan includes a goal to accomplish managed recharge in the ESPA averaging 250,000 acre-feet annually; and

WHEREAS, the 2016 Idaho Legislature passed and approved Senate Concurrent Resolution 136 directing the IWRB to develop the capacity to achieve 250,000 acre-feet of annual average managed recharge to the ESPA by December 31, 2024; and

WHEREAS, implementation of managed recharge on the ESPA will meet the goals and objectives of stabilizing and improving aquifer levels for, among other things, protecting municipal and domestic drinking water supplies and addressing variability in climatic conditions, including drought; and

WHEREAS, the American Rescue Plan Act (ARPA), Pub. L. 117-2 subtitle M (2021), appropriated $219,800,000,000 to the Coronavirus State and Local Fiscal Recovery Fund (SLFRF) for making payments to the States to mitigate the fiscal effects stemming from the public health emergency with response to the Coronavirus disease; and

WHEREAS, the SLFRF funds may be used to, among other things, make necessary investments in water, sewer, or broadband infrastructure. Pub L. 117-2 sec. 602(c)(1)(D), 42 U.S.C. § 802(c)(D); and

WHEREAS, eligible uses of the SLFRF include projects that would be eligible to receive financial assistance through the Clean Water State Revolving Fund (CWSRF), 40 CFR Part 35.3100—35.3170, and the Drinking Water State Revolving Fund (DWSRF), 40 CFR 35.3520; and

WHEREAS, the CWSRF may be used for groundwater projects that protect and restore aquifers, including aquifer recharge projects; and

WHEREAS, the DWSRF can fund aquifer recharge projects such as aquifer storage and recover wells and water reuse and recycling projects which can replace and offset potable water use and to develop new sources of water to increase drought resilience; and

WHEREAS, in 2022 the Idaho Legislature passed House Bill 769 in which it expressed its intent to set aside approximately $250,000,000 of ARPA funding to support projects managed by the IWRB, including for the continued identification, study, construction, or enlargement of managed aquifer recharge sites above Milner Dam; and

WHEREAS, Senate Bill 1181 appropriated $50,000,000 for Fiscal Year 2024 to support projects managed by the IWRB, including for the continued identification, study, construction, or enlargement of managed aquifer recharge sites above Milner Dam; and

WHEREAS, Idaho Code § 42-1760 authorizes the IWRB to expend, loan, or grant moneys from the water management account for water projects that conserve or increase water supply, improve drought resiliency, address water sustainability, or support flood management, including the identification, study, and construction of managed aquifer recharge sites above Milner dam; and

WHEREAS, Butte-Market Lake Canal Company ("BMLCC") presented a proposal to IWRB on January 18, 2024, for the Expansion of the Poitevin Injection Well Site recharge sites and infrastructure to improve recharge capacity for a proposed cost of $571,000; and

WHEREAS, the Expansion of the Poitevin Injection Well Site will contribute to the IWRB goal of achieving 250,000 acre-feet of annual average managed recharge to the ESPA by December 31, 2024 and will meet the goals and objectives of stabilizing and improving aquifer levels for, among other things, protecting municipal and domestic drinking water supplies and addressing variability in climatic conditions, including drought; and

NOW THEREFORE BE IT RESOLVED that the IWRB authorizes expenditures up to $571,000 from the ARPA State Fiscal Recovery Fund for the development of the Expansion of the Poitevin Injection Well Site; and

NOW THEREFORE BE IT FURTHER RESOLVED that the IWRB authorizes its chairman or designee, to execute the necessary agreements or contracts for the purpose of this resolution.

DATED this 19th day of January, 2024.

_____

JEFF RAYBOULD, Chairman
Idaho Water Resource Board

ATTEST _____
DEAN STEVENSON, Secretary

Memorandum

To: Idaho Water Resource Board

From: Cooper Fritz

Date: January 18, 2023

Re: Butte Market Lake Canal Company – System Capacity Improvement Study

REQUIRED ACTION: The Board will consider approval of a resolution to authorize expenditure of funds from the Secondary Aquifer Stabilization Fund.

System Capacity Improvement Study Project Summary:

Study Cost: $94,000

Goal of Study: Identify improvements necessary to increase system capacity by 200 cfs, on top of existing peak irrigation flows, dedicated for delivery to a to-be proposed largescale recharge injection well complex.

Request of the IWRB:

Authorize the expenditure of $94,000 from the Secondary Aquifer Planning, Management, and Implementation Fund to carry out an engineering study ("study") as part of an effort to increase capacity along the Main Stem of the Snake River.

Background:

The Butte Market Lake Canal Company ("BMLCC") system currently offers a delivery capacity of 40 cfs to an off-canal recharge site ("Site," shown in Figure 1) located at the end of a lateral ditch where it has one injection well capable of injecting 10.5 cfs. A separate and concurrently submitted proposal contemplates drilling two additional recharge injection wells at the Site, which will together be able to recharge the entirety of available off canal capacity. However, 40 cfs is not always guaranteed for delivery when recharge water is available because BMLCC irrigation demand equals supply from mid-June until mid-August. To increase its recharge opportunities BMLCC seeks to identify the system improvements necessary to deliver an additional 200 cfs, which would be dedicated to recharge, including during the time between mid-June and mid-August.

System Capacity Improvement Study Proposal:

The BMLCC system is in the vicinity of Roberts (Figure 1). BMLCC desires to construct two recharge injection well complexes, the first near an existing injection well site along the Poitevin lateral ditch and the second is a to-be proposed site along the McCarty lateral ditch, both shown in Figure 1. The goal for each complex is to recharge approximately 100 cfs, for a total of 200 cfs recharge capacity.

The proposed study would determine what canal channel improvements (i.e., lining, enlarging, clearing, etc.) are necessary to get 100 cfs to the end of each the Poitevin and McCarty lateral ditches ("laterals") from the diversion into the BMLCC system off the Snake River. The 200 cfs contemplated in the study will be in addition to peak irrigation flows and dedicated to recharge deliveries. Because 200 cfs is a system capacity increase of approximately 51%, the study will also by necessity make suggestions for improving the system from below the laterals to its terminus. Work involved in the study includes surveying the system via drone and developing a computer model of its current condition. Computer models and photographs will then be

used to contemplate the necessary improvements. The study will also provide a cost estimate for all the recommended improvements, as well as reasonable alternatives if necessary.

The study is proposed to start prior to the 2024 irrigation season, required among other reasons because data from dry canal beds is necessary to ascertain precise elevation and channel roughness data. The intent is to have the results of the study available by early September 2024 with improvements to be presented to the IWRB for funding in November 2024. Also anticipated for concurrent consideration in November 2024 will be a proposal for the additional injection wells necessary to deliver a total of 200 cfs.

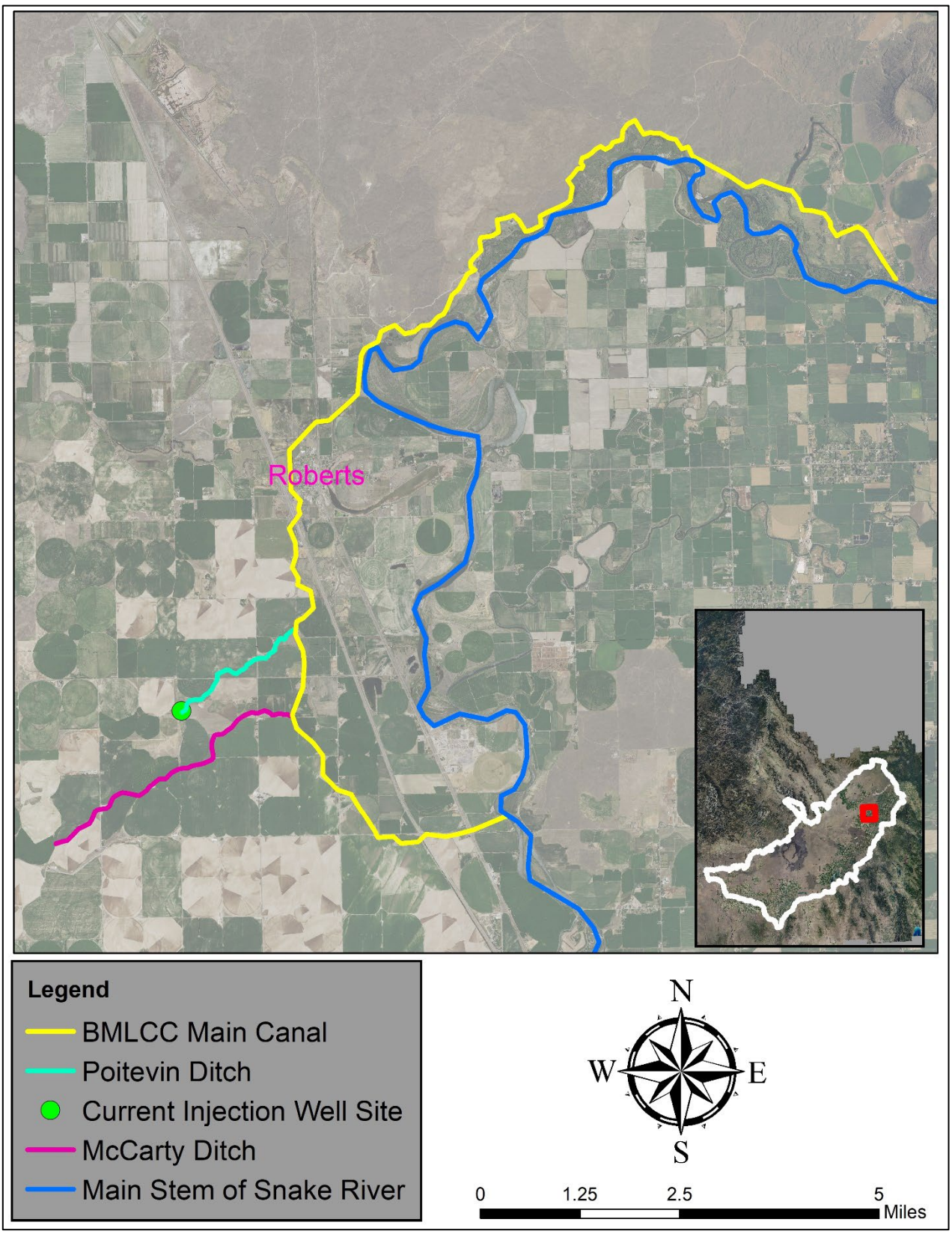


Figure 1. Location of the Butte Market Lake Canal Company (BMLCC) Main Canal, two lateral ditches which will be proposed to host recharge sites, a current recharge injection well site, and local geographic features.

BEFORE THE IDAHO WATER RESOURCE BOARD

IN THE MATTER OF THE BUTTE MARKET LAKE CANAL COMPANY SYSTEM CAPACITY IMPROVEMENT STUDY	RESOLUTION TO APPROVE FUNDS FROM THE SECONDARY AQUIFER PLANNING, MANAGEMENT, AND IMPLEMENTATION FUND AND PROVIDE SIGNATORY AUTHORITY

WHEREAS, about one-third of Idaho's population resides on the Eastern Snake Plain and the Eastern Snake Plain Aquifer (ESPA) is the sole source of drinking water for both cities and most rural residents of the Eastern Snake Plain; and

WHEREAS, due to numerous factors, including drought, the ESPA has been losing approximately 216,000 acre-feet annually from aquifer storage since the 1950's resulting in declining ground water levels in the aquifer and reduced spring flows to the Snake River; and

WHEREAS, the State Water Plan includes a goal to accomplish managed recharge in the ESPA averaging 250,000 acre-feet annually; and

WHEREAS, the 2016 Idaho Legislature passed and approved Senate Concurrent Resolution 136 directing the IWRB to develop the capacity to achieve 250,000 acre-feet of annual average managed recharge to the ESPA by December 31, 2024; and

WHEREAS, implementation of managed recharge on the ESPA will meet the goals and objectives of stabilizing and improving aquifer levels for, among other things, protecting municipal and domestic drinking water supplies and addressing variability in climatic conditions, including drought; and

WHEREAS, Senate Bill 1181 appropriated $50,000,000 for Fiscal Year 2024 to support projects managed by the IWRB, including for the continued identification, study, construction, or enlargement of managed aquifer recharge sites above Milner Dam; and

WHEREAS, Idaho Code § 42-1760 authorizes the IWRB to expend, loan, or grant moneys from the water management account for water projects that conserve or increase water supply, improve drought resiliency, address water sustainability, or support flood management, including the identification, study, and construction of managed aquifer recharge sites above Milner dam; and

WHEREAS, Butte Market Lake Canal Company ("BMLCC") presented a proposal to IWRB on January 18, 2024, detailing a System Capacity Improvement Study; and

WHEREAS, the System Capacity Improvement Study will contribute the identification, study, construction, or enlargement of managed aquifer recharge sites above Milner Dam; and

WHEREAS, the proposed total cost of BMLCC's System Capacity Improvement Study is $94,000.

NOW THEREFORE BE IT RESOLVED that the IWRB authorizes expenditures up to $94,000 from the

Secondary Aquifer Planning, Management, and Implementation Fund the implementation of the System Capacity Improvement Study. Further authorizations may be required upon determination of total development and construction costs; and

NOW THEREFORE BE IT FURTHER RESOLVED that the IWRB authorizes its chairman or designee, to execute the necessary agreements or contracts for the purpose of this resolution.

DATED this 19th day of January 2024.

_____
JEFF RAYBOULD, Chairman
Idaho Water Resource Board

ATTEST _____
DEAN STEVENSON, Secretary

IDAHO
Water Resource Board

Canal Water: A Survey of its Potential Contaminants and the Results of its Injection into a Fractured Basalt Aquifer

Created and Presented by

Cooper Fritz, IWRB Recharge Program Coordinator

January 2024

Managed Aquifer Recharge Injection Wells

- **Efficient way to get new water into the ground:**
  - **Efficient use of land.**
  - **Hydrologically efficient.**
  - **Economically efficient to develop.**
- **Concerns have arisen about impacts to aquifer water quality.**
- **Two results regarding canal surface water quality:**
  - **Bacteria transport survey.**
  - **Contaminant survey*.**

*Preliminary

Contaminant Survey

- **Canal surface water is sampled ~monthly.**
  - **170 total samples from 9 canal systems.**
  - **October 2014 start date.**
- **Tested variously for:**
  - **30 industrial byproducts, 48 pesticides, and 54 herbicides (“organic compounds”).**
  - **14 metals.**
  - **Nitrogen.**
  - ***E.* coli and Total Coliform (“bacteria”).**

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Water Resource Board

0 10 20 40 Miles

Legend

Canals

Surface Water Sampling Locations

Surface Water Sample Locations

Contaminant Survey -- Continued

- Vast majority of organic compounds – non-detect.
- Exceptions:
  - Bis(2-ethylhexyl)phthalate.
    - Known laboratory contaminant.
    - 16 out 139 samples.
      - Average concentration of 1.44 ug/L and maximum of 4 ug/L.
        - Maximum Contaminant Level ("MCL"): 6 ug/L.
  - Chlorpropham (aka CIPI).
    - Sprout inhibitor – stored commercial potatoes.
    - 8 out of 138 samples.
    - Observed only in January and February (30 samples).
      - Average: 0.38 ug/L, Maximum: 0.52 ug/L.
        - MCL: not established; Class E carcinogen (evidence of non-carcinogen in humans).

Contaminant Survey

- **Metals – Non-Detect.**
  - **Exception – Uranium.**
    - **5 out of 6 samples.**
    - **Average: 1.45 ug/L, maximum: 2.10 ug/L.**
      - **MCL: 30 ug/L.**
- **Nitrogen.**
  - **152 samples analyzed for Nitrates as N or Nitrate-Nitrite.**
  - **Average: 0.84 mg/L, maximum: 5.18 mg/L.**
    - **MCL: 10 mg/L.**

Contaminant Survey

- **Bacteria:**
  - **Total Coliform ("TC"):**
    - **All 170 samples contained TC.**
      - **16 contained more TC than could be measured (2,420 MPN/100 mL)**
  - **E. Coli:**
    - **117 out of 169 contained at least 1 MPN/100 mL**

Bacteria is a contaminant of concern.

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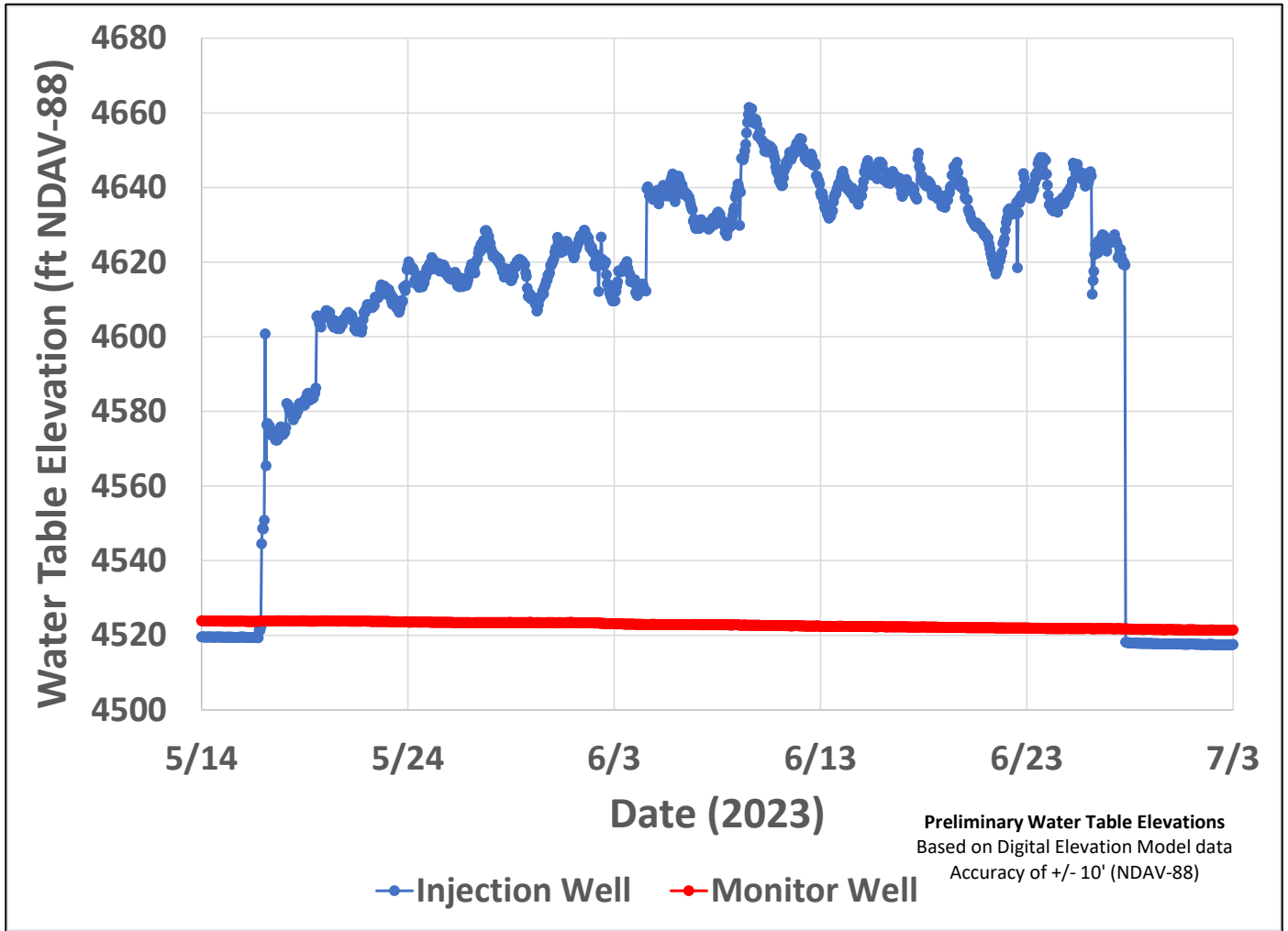
Results of an Injection Well Water Quality Test with a Focus on Bacteria Transport

Background -- Preliminary Hydrologic Data



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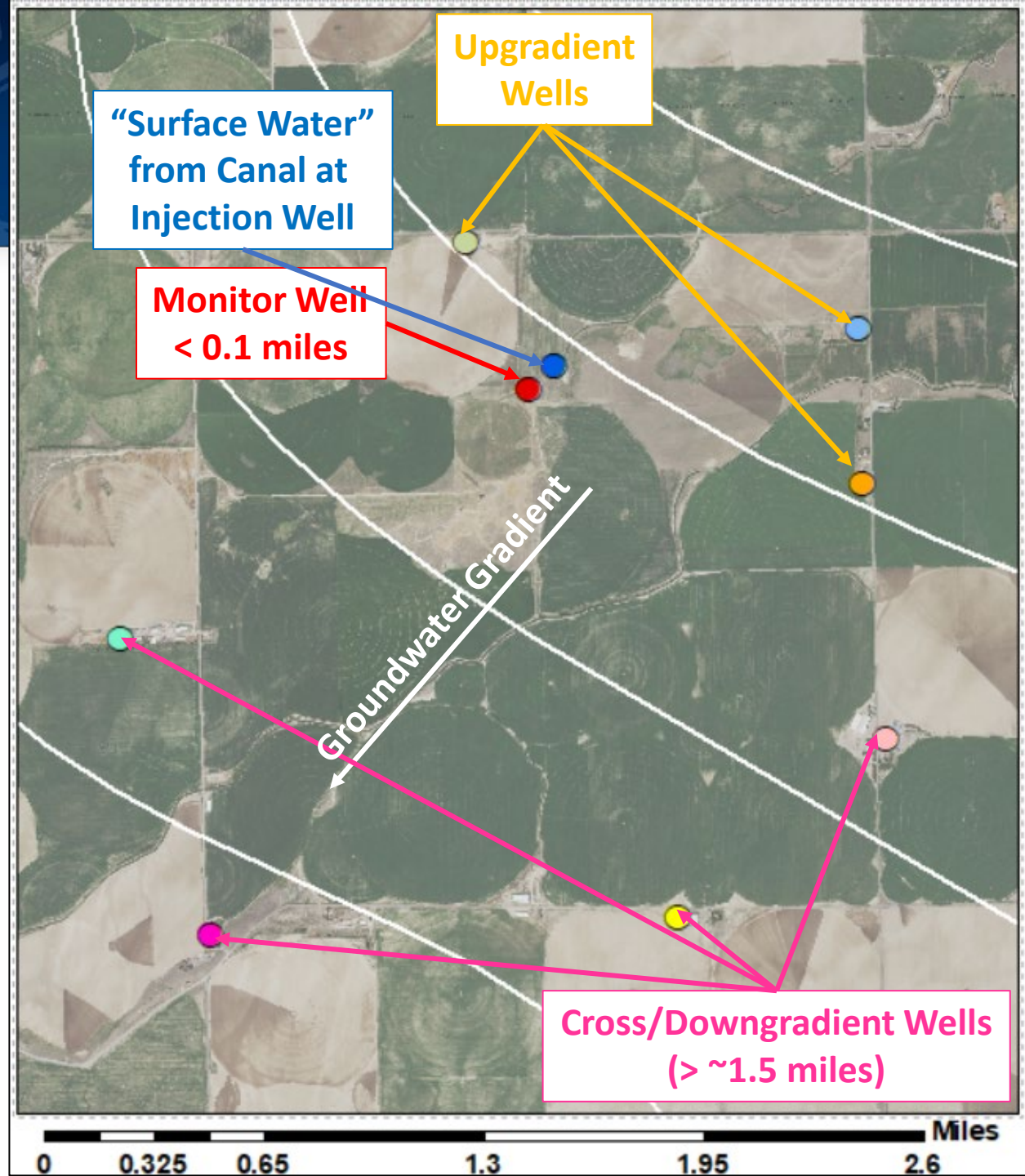
Sampling Network Overview

Legend

- Injection Well/Canal
- Monitor Well
- Winder Well
- Snarr NE Well
- Mickelsen Well
- Messenger Well
- J Evans Well
- Snarr Well
- B Evans Well
- 50 ft Groundwater Contours



Experiment Overview

- **Probably about 900 AF of operational spill injected from May 16 – June 27, 2023.**
  - **Started fast, slowed down over time.**
- **86 total samples analyzed,**
  - **Seven surface water samples,**
  - **Eight wells sampled 9+ times.**
- **All samples analyzed for major ions, bacteria, and nitrate.**
  - **Chloride is the ion of focus here.**
  - **Bacteria is the contaminant of focus.**

Injection Well

~0.09 Miles

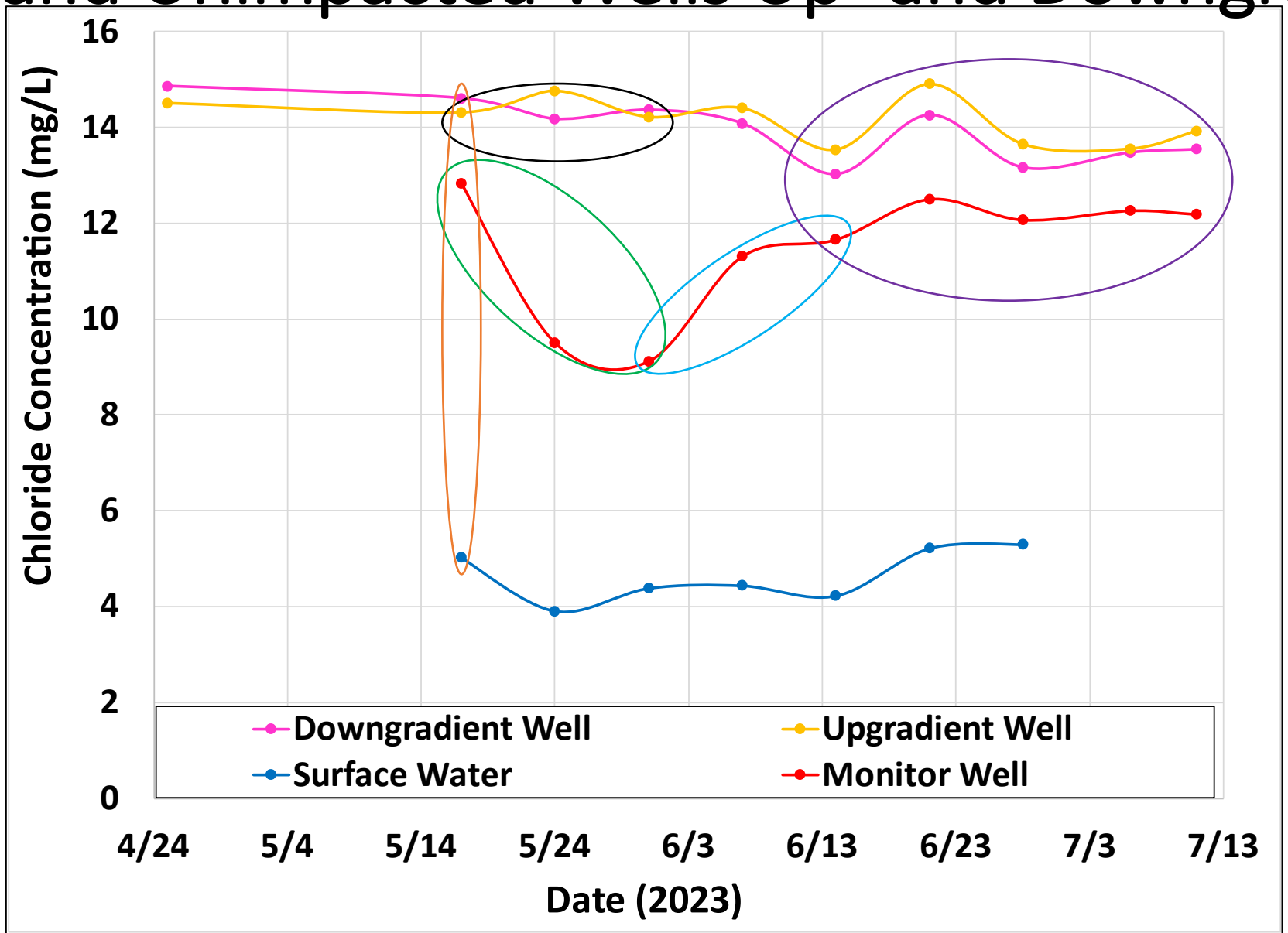
Monitor Well

Both wells completed in fractured basalt aquifer, ~255’ below ground surface into the deeper of two water tables.

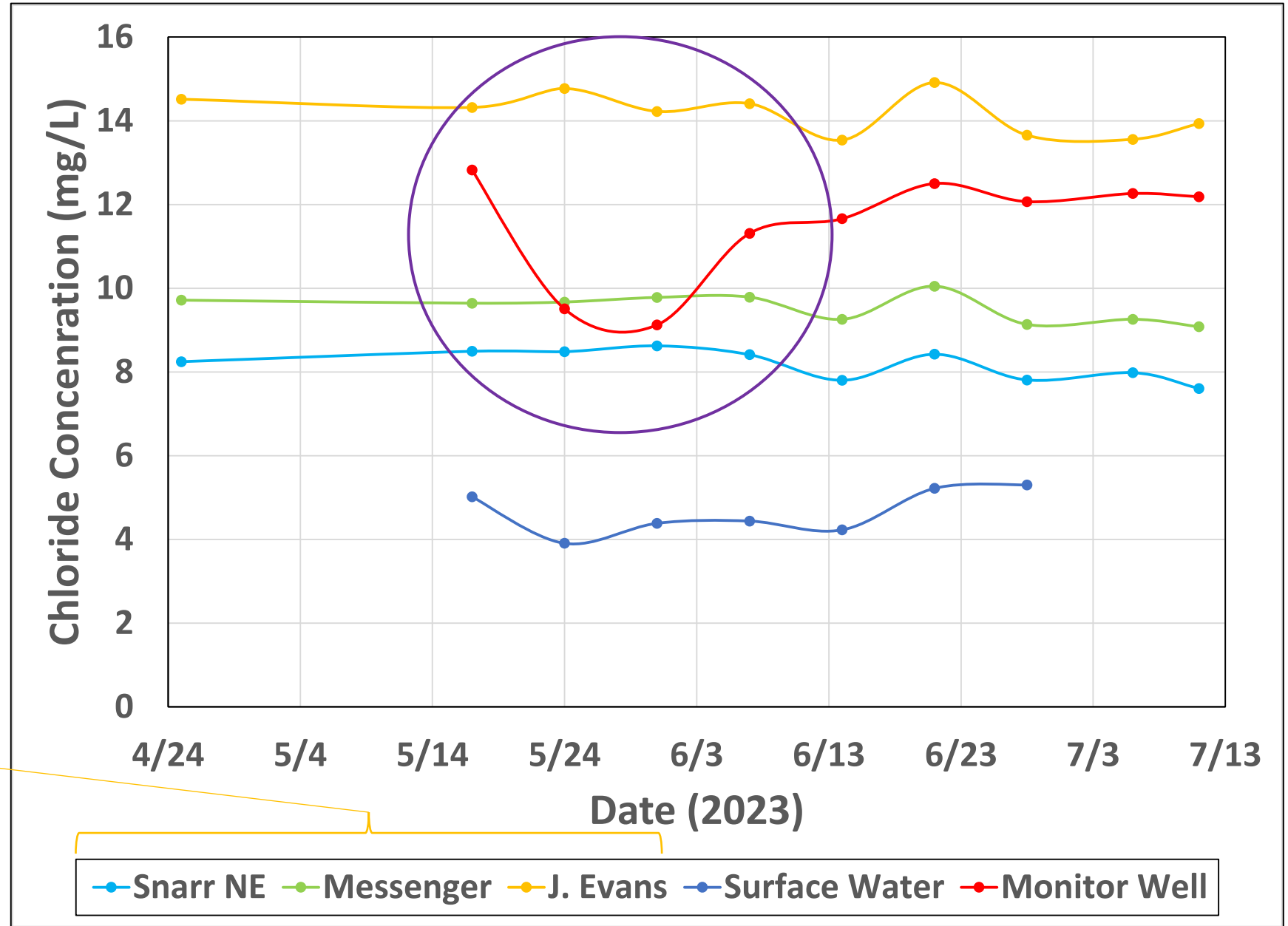
Travel time from Injection Well to Monitor Well is approximately 3.5 days*.

* Appendix A

Chloride Concentrations in Monitor Well, Surface Water, and Unimpacted Wells Up- and Downgradient

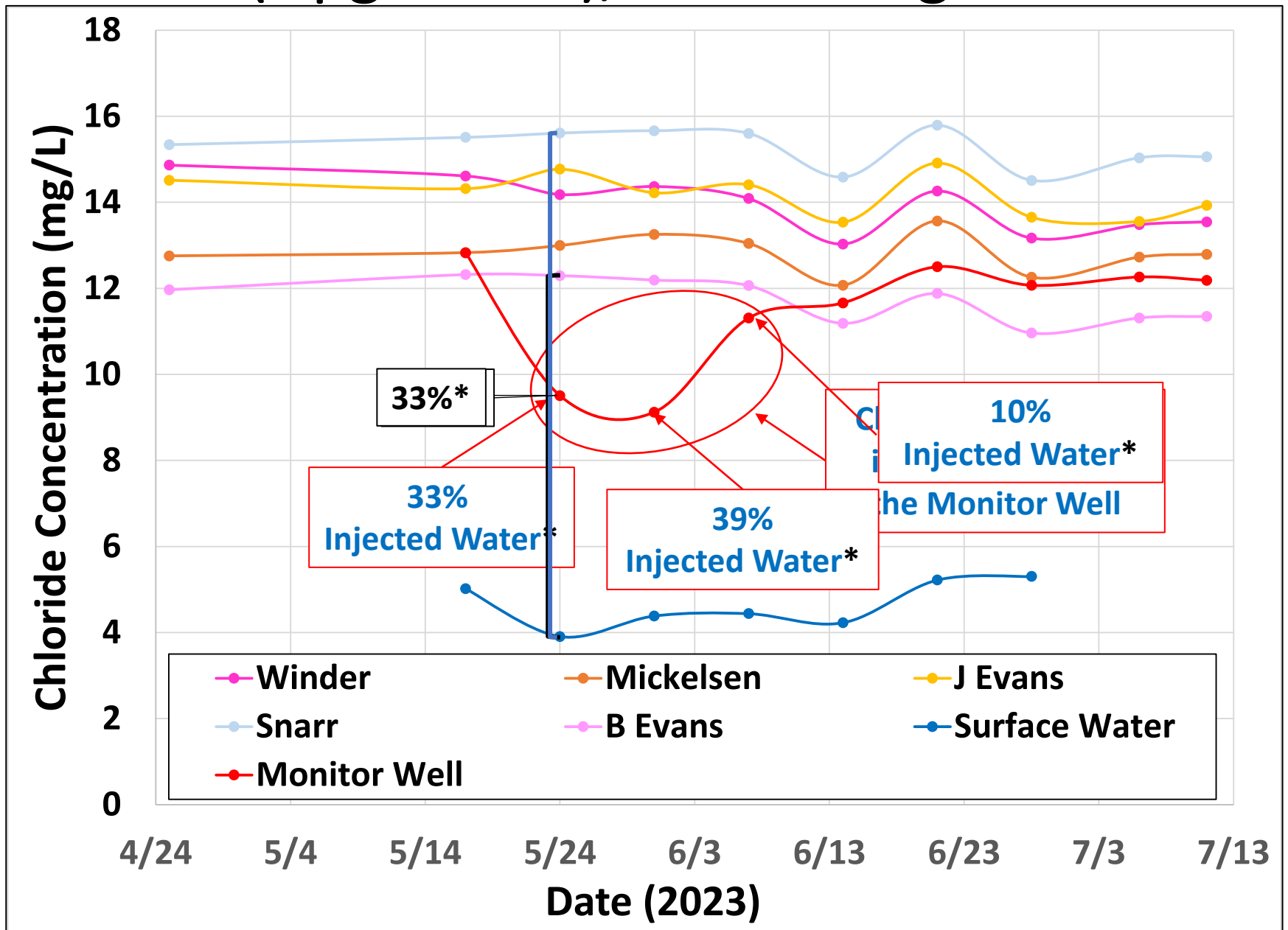


Chloride Concentrations in Surface Water, Monitor Well, and Upgradient Wells

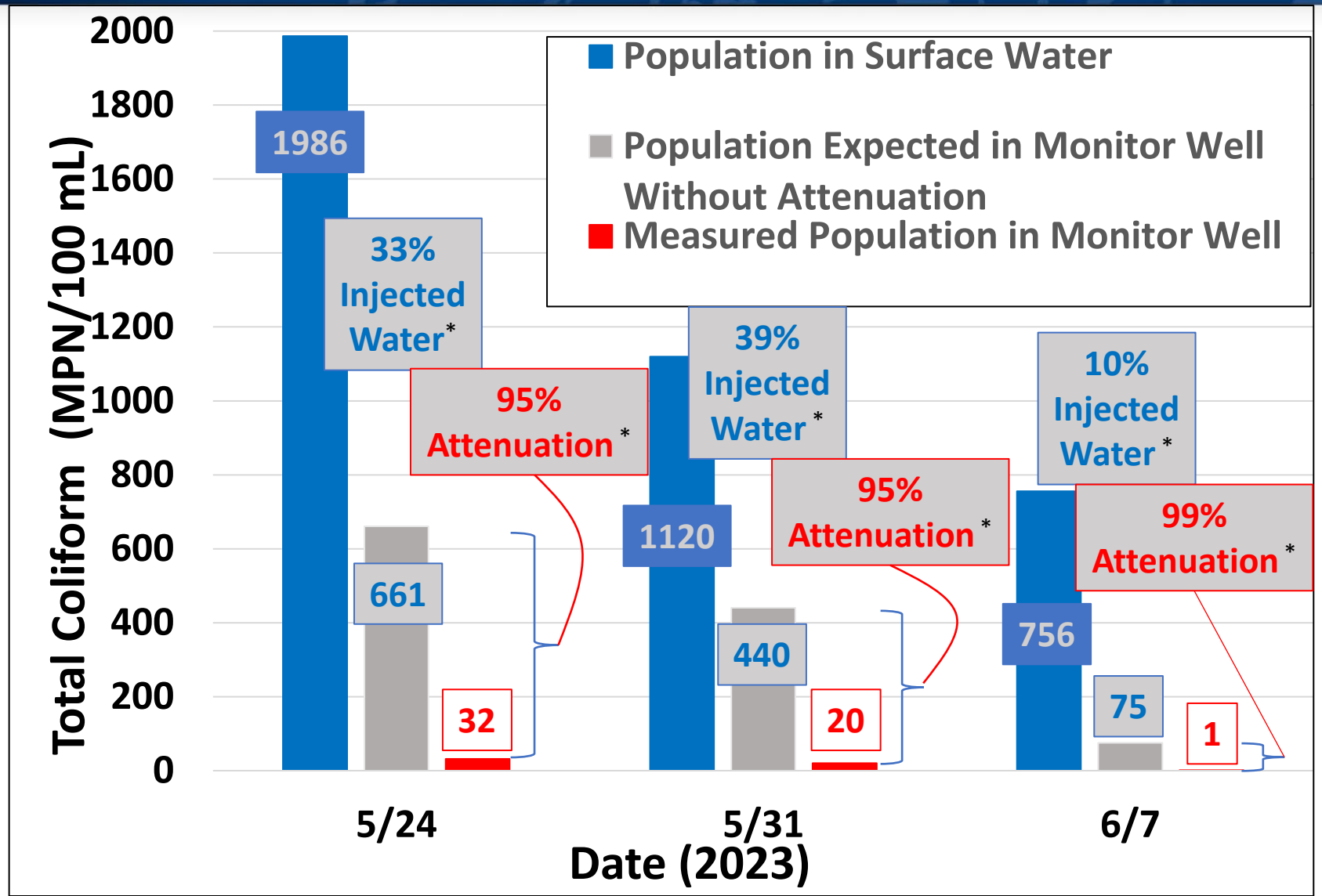


Upgradient Wells

Chloride Concentrations in Surface Water, Monitor Well, J Evans (Upgradient), and Downgradient Wells



*Appendix B


Total Coliform (MPN/100 mL)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Population in Surface Water
Population Expected in Monitor Well Without Attenuation
Measured Population in Monitor Well
1986
33% Injected Water*
661
95% Attenuation *
32
1120
39% Injected Water *
440
95% Attenuation *
20
756
10% Injected Water *
75
99% Attenuation *
1
5/24
5/31
6/7
Date (2023)

*Appendix B

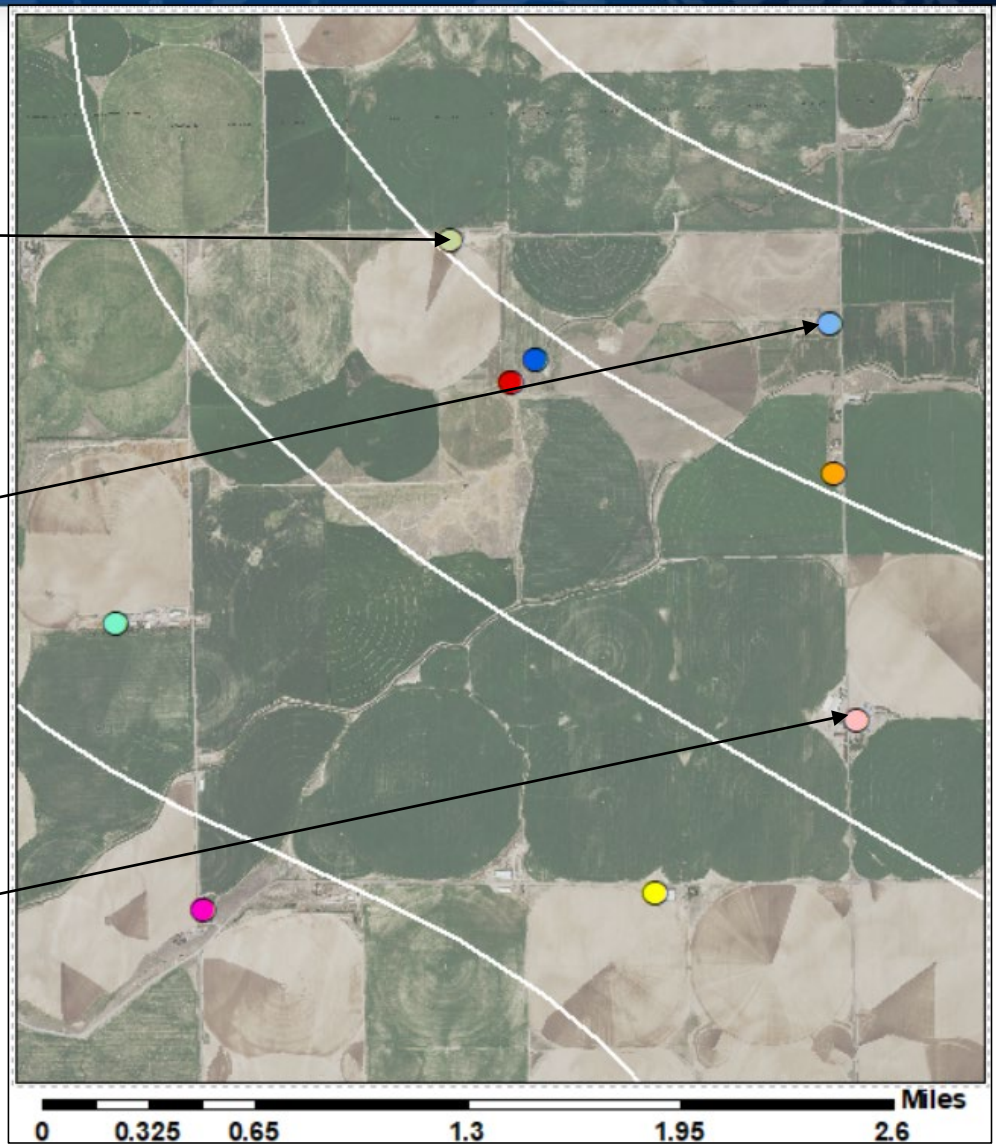
Bacteria (Total Coliform)

Unlikely Sourced from Injectate

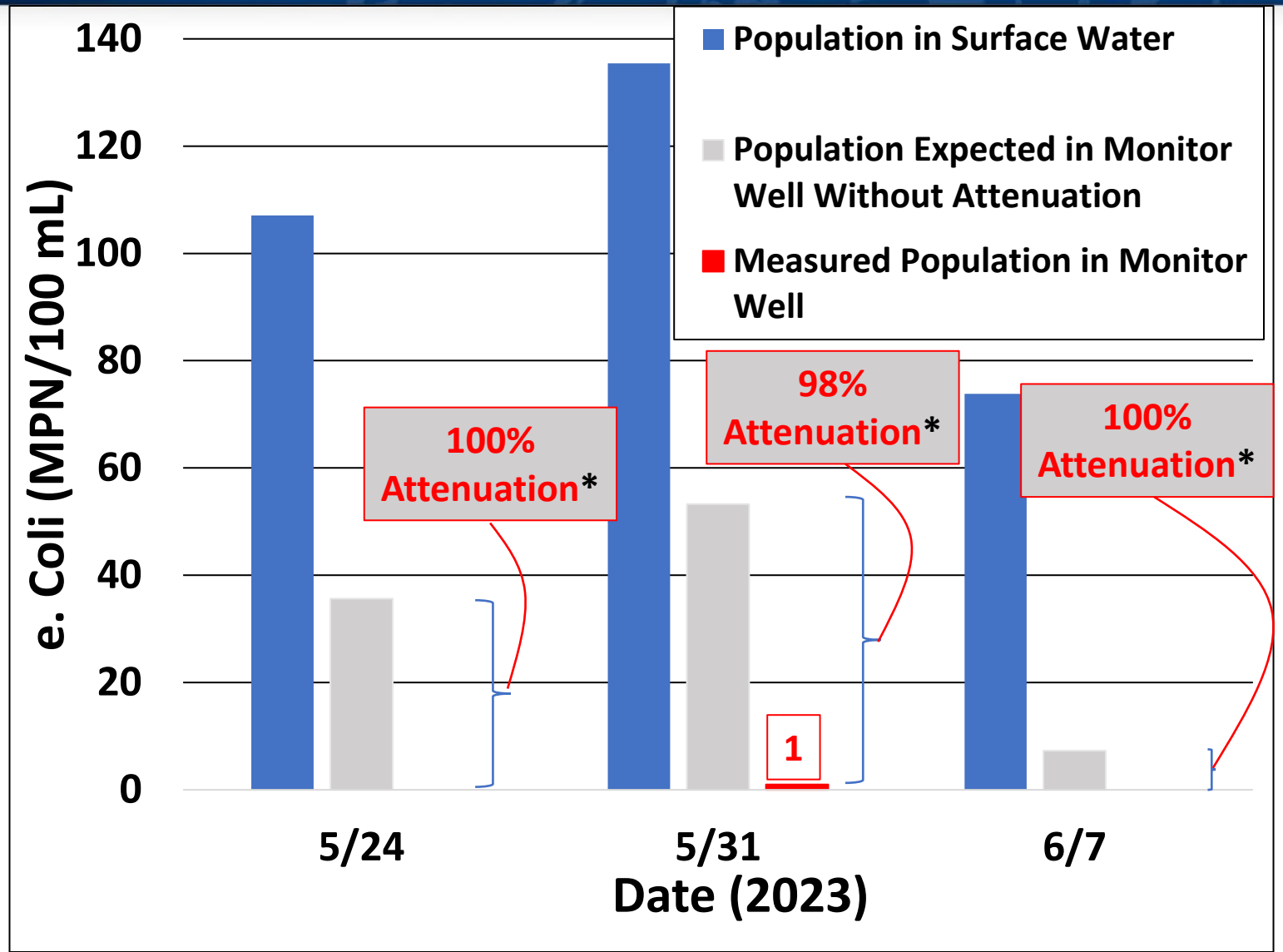
Messenger Well
5/17 – 11 MPN/100 mL

Snarr NE Well
6/28 – 1 MPN/100 mL
7/6 – 2 MPN/100 mL

B Evans Well
6/14 – 1 MPN/100 mL



e. Coli
Human Health
Standard is
< 1 MPN/100 ml
(IDAPA 58.01.11)



*Appendix B

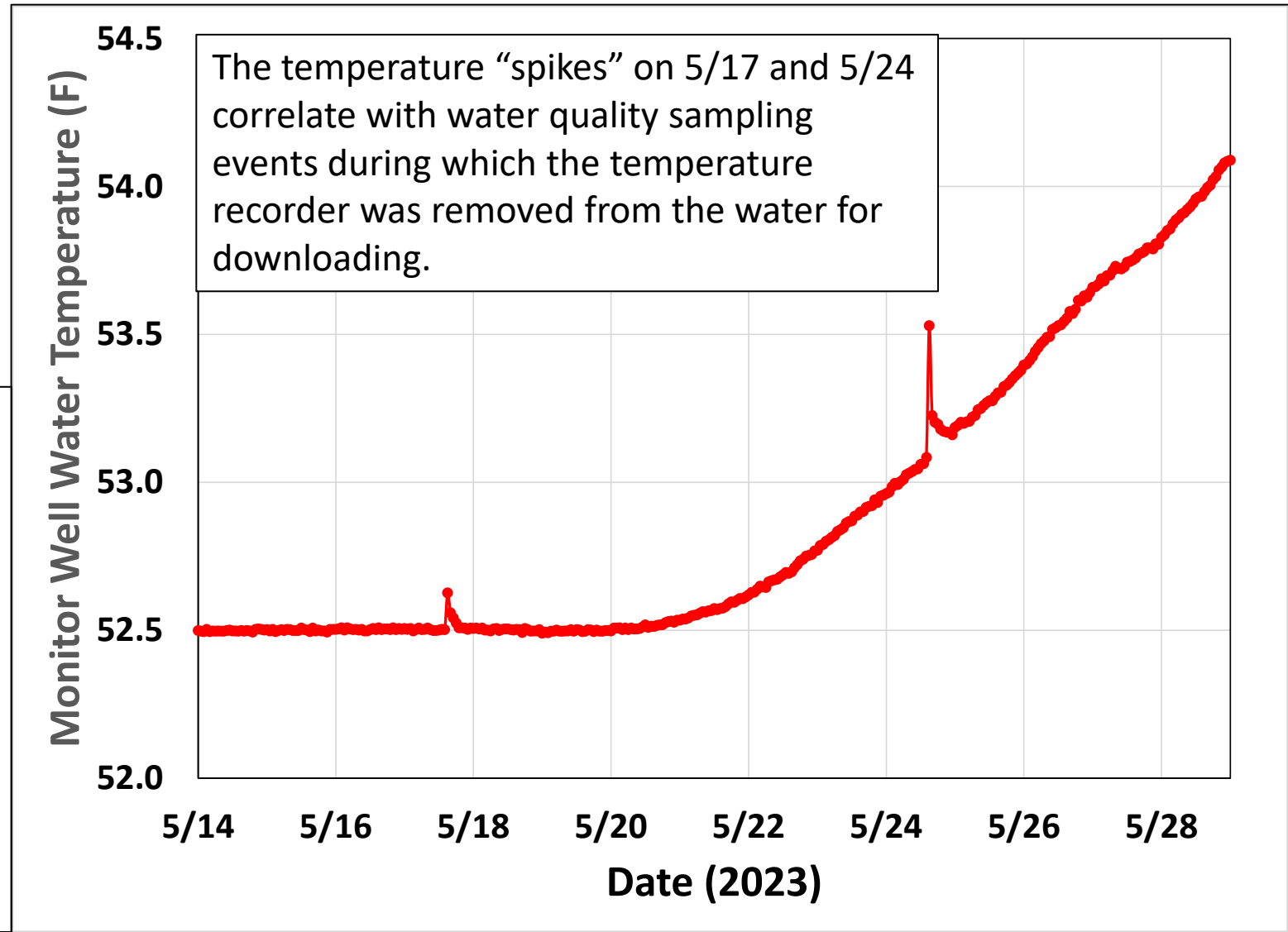
Conclusions

- **Bacteria is the contaminant of concern in canal water.**
- **Bacteria populations rapidly attenuate below ground.**
  - **Greater than 95 % over 0.1 miles traveled in 3.5 days.**

Appendix A – Monitor Well Temperature Data

Water temperature in the Monitor Well was stable over the course of the 263 days of available data (not shown) prior to the increase in temperature which correlated with the arrival of infiltrated water around Midnight on May 20, 2023, approximately 3.5 days after the injection test began.

Increases in temperature were observed in all wells in the network over the 10 sampling events (not shown), yet hydrologic and chemical evidence do not support this rise in Temperature, correlated with the injection Event, with the arrival of injected water. Instead, the thermal shock to the closed system of introducing fluid with a different temperature perhaps diffused at least through the extent of the sampling network. This is an observation worthy of further study.



Appendix B – Mixing Excess Bacteria Concentrations

Equation 1: $Y = ([Cl^-]_{mw} - [Cl^-]_{bew}) / ([Cl^-]_{i/sw} - [Cl^-]_{bew})$

Where $Cl^-_{\text{mw, ww, and i/sw}}$ are the chloride concentration in the Monitor Well, B Evans Well, and Injected/Surface Water and
Y = Mixing Fraction, or % of Injected/Surface Water in the Monitor Well sample.

Equation 2: $\text{Bacteria}_{\text{Expected}} = Y * \text{Bacteria}_{/sw}$

Where Bacteria_{mw} = the expected population of bacteria in sample were no attenuation to occur, assuming all bacteria in the Monitor Well was due to mixing with ambient groundwater. The B Evans well was used as ambient groundwater because it had the lowest chloride concentration in the chemically unimpacted well, which in turn predicted the lowest percentage of injected water in the Monitor Well sample, and subsequently the lowest bacteria expected.

Equation 3: Bacteria Attenuation Percentage $= 1 - (\text{Bacteria}_{\text{Expected}} / \text{Bacteria}_{i/sw}) * 100$

Because the result is hypothetical, travel time to the injection well was 3.5 days, and samples were taken weekly, the concentration of bacteria in the injection/surface water sample and monitor well sample collected on the same day were used.