DEPARTMENT OF ENVIRONMENTAL QUALITY
ENVIRONMENTAL MANAGEMENT BUREAU
HARD ROCK PROGRAM
PO BOX 200901
HELENA MT 59620-0901
(406) 444-4953

Operating Permit Number: 00030
Project Name: Continental Mine
Report Due date: 6/13/22

(Enclose Required $100.00 Annual Fee)

ANNUAL PROGRESS REPORT FOR OPERATING PERMITS

Issued Pursuant to Title 82, Chapter 4, Part 3, MCA
And Administrative Rules Adopted Thereunder
(See 82-4-339, MCA and 17.24.118 for specific guidance.)

Name and Address of Permittee:	Location, and Legal Description of Permitted Area
Montana Resources, LLP 600 Shields Avenue Butte, Montana	Miles: 1-2 Direction From: East Nearest Town: Butte
	Section(s): T_____ N R_____ E County: _____
Contact Person(s): Mark Thompson Phone Number(s): (406) 496-3211 E-Mail Address: mthompson@montanaresources.com	See Attached Description in Section 1.0

Operation Status is currently: Active ☒ Inactive ☐ Abandoned ☐.
If the operation is currently inactive (operation is not extracting ore for future use or processing), indicate the provision of ARM 17.24.150(2) or (3) relied on to rebut the assumption that the operation has not been abandoned or completed. (Supporting documentation must be attached to this annual report.) N/A

Acreage & Bond
Acreage within permit area Acreage permitted for disturbance Acreage Currently Disturbed Acreage currently bonded Amount of bond Amount of Obligated Bond
See Attachments.

A. Annual report information required under Section 82-4-339, MCA

1. Pursuant to Section 82-4-339(1)(e), MCA, if the permittee is a corporation or other business entity, **ATTACH** a list of names and addresses of current officers, directors, owners of 10% or more of any class of voting stock, partners and the like and its resident agent for service of process. See Attached in Section 1.0.

2. Average number of payroll employees and on-site contracted employees who worked during the previous permit year: January to March 390; April to June 405; July to September 405; October to December 390

3. Average number of anticipated payroll employees and on-site contracted employees who ***will work*** during the next permit year: January to March 390; April to June 405; July to September 405; October to December 390

4. **ATTACH** two (2) copies of an updated map showing permit area, land disturbed during the last twelve (12) months, land to be disturbed in the next twelve (12) months. **See Appendix No. 1 and Section 6.0 Disturbance and Bonding.**

5. Estimate of acreage to be newly disturbed by the operation in the next 12-month period: **25**

6. The date of beginning, amount, and current status of reclamation performed during the previous twelve months. This information should be provided in the responses of **B**. 2, **B**. 3, and **B**. 4 below.
See Section 2.0 Reclamation Summary and Appendix 2.

7. If the operation is completed, indicate date of completion of operations: N/A

B. Annual report information required under 17.24.118, ARM 1. The number of acres of land affected by the operation during the preceding year and cumulatively: **See Attachments**
2. The extent of backfilling and grading performed during the preceding year and cumulatively: **See Attachments**
3. Two copies of maps showing the information required in **B**. 1 and **B**. 2 above. This information may be included on the maps submitted in response to **A**. 4. **Answered in A.4.**
4. Each annual report must include a status report on revegetation, pursuant to 82-4-339(1)(f)(iv) and (vi), MCA which includes the extent of reclamation (seeding or planting) performed during the preceding year (in narrative and map form), including: (a) the area of land planted; (b) the type of planting or seeding; (c) the mixtures and amounts seeded; (d) the species, location, and method of planting for site or species specific plantings; (e) the date of seeding or planting; (f) cumulative acres reseeded to date; and (g) cumulative acres of completed reclamation and the date each increment was completed. Please respond to (a) through (g) in the space provided below. **Attach** additional pages as necessary. **See Section 2.0 Reclamation Summary and Appendix 2.**
5. Each annual report must include an inventory of soils volumes which includes: (a) cubic yards salvaged in the preceding year and cumulatively; (b) cubic yards to be salvaged in the coming year; (c) cumulative volume of soils contained in stockpiles; and (d) replaced soil depths and volumes. Please respond to (a) through (d) in the space provided below. **Attach** additional pages as necessary. **See Section 5.0 Materials Inventory.**
6. Each annual report for those operations using cyanide or other metal leaching solvents or reagents or having the potential to generate acid must provide a narrative summary of water balance conditions during the preceding year and identify excess water holding capacity at the time of the annual report. **N/A**
7. When incremental bond has been approved, additional bond must be submitted, in the amount required, with the annual report and the status of incremental bonding must be described. **N/A**
8. If changes in facilities have occurred in the preceding year, the annual report must update the permit map required under Section 82-4-335(5)(e), MCA and ARM 17.24.115(k). The updated map must depict all approved surface features, as required by the department, in or associated with the permit area, reproduced at a scale applicable for field use. (This information can be included on the map required above under **A.**4.) **See Attachments.**
9. If cultural resource mitigations identified in the permit will be ongoing through the life of the operation, the annual report must include an updated cultural resource management table, including a list of sites mitigated and disturbed in the preceding year and sites to be mitigated and disturbed in the coming year. N/A
10. If comprehensive water monitoring is required by the permit, each annual report must include an evaluation of water monitoring reports submitted during the preceding year. The evaluation must include trend analyses for those key site-specific parameters required by the department in the permit. **See Section 4.0 Water Quality & Monitoring and Appendix 3.**
11. If site-specific geologic conditions identified in the permit indicate the need for geologic monitoring, each annual report must include monitoring results and must report materials balances as required in the permit. N/A
12. If site-specific closure requirements identified in the permit include monitoring for cyanide neutralization, acid rock drainage development, or similar occurrences, the annual report must include an evaluation of monitoring and testing data required in the permit for closure. N/A

13. Each annual report must include the names of key personnel for maintenance and monitoring, if the operation is shut down.
See Attached in Section 1.0.

14. Each annual report must include any other relevant information required by the permit or stipulations.
See Attached.

I CERTIFY THAT THE ABOVE STATEMENTS AND ATTACHED INFORMATION ARE TRUE TO THE BEST OF MY KNOWLEDGE.

Signature: ______________________, Date: June 13, 2022

Title: Vice President of Environmental Affairs

FOR DEPARTMENT OF ENVIRONMENTAL QUALITY USE ONLY

Date Received: ____________ Annual Fee Received: Yes ☐ No ☐ Map Updated? Yes ☐ No ☐

If applicable, information required by ARM 17.24.150(2) or (3) provided with the appropriate attachments? (OP Status) Yes ☐ No ☐

Information Required by 82-4-339(1)(e), MCA Attached? (**A** 1-3) Yes ☐ No ☐

Will Permittee Expand Scope of Operation During Next Permit Year? Yes ☐ No ☐

Montana Resources

Montana Resources, LLP
600 Shields Ave.
Butte, Montana
USA 59701

(406) 496-3200
(406) 723-9542 Fax
www.montanaresources.com

Continental Mine
Butte-Silver Bow County

Legal Description:

PERMIT # 00030; General Legal Description:

All or Portions of Sections 4, 5, 6, 7, 8, 9, 10, 15, 16, 17, 18, 20, 21, and 22 T3N, R7W

All or Portions of Sections 28, 29, 30, 31, 32, and 33, T4N, R7W

All or Portions of Section 13, T3N, R8W

All or Portions of Section 36, T4N, R8W

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600 Shields Ave.
Butte, Montana
USA 59701
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Montana Resources, LLP
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Travis Chiotti, Vice President, Operations
Robert Sanderson, Vice President, Maintenance
Mike McGivern, Vice President, Human Resources
Mark Thompson, Vice President, Environmental Affairs
Kyle Carter, Vice President, Finance

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Missoula, Montana 59808

&

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ANNUAL PROGRESS REPORT
MINE OPERATING PERMITS

Key Personnel for Maintenance and Monitoring in case of mine shutdown as required by 82-4-338 (5).

Mark Thompson, Vice President of Environmental Affairs

Jeremy Fleege, Environmental Engineer

Travis Chiotti, Vice President of Operations

Attachment to Annual Progress Report for Operating Permits.

“Acreage and Bond”

For Operating Permit Number 00030:

• Total Permit Area	6136 Acres
• Total Acreage Currently Disturbed	5533 Acres
• Amount of Bond	$116,477,500
• Amount of Obligated Bond	$116,477,500

Plate I reflects the permit areas as they existed at the beginning of 2021. During the course of 2021, the Permits were consolidated (MR 21-002) into Number 00030. In the future, all references to the former permit numbers will be removed.

Montana Resources

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600 Shields Ave.
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USA 59701

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Bond Status for Permit No. 00030

Total Bond as of December 31, 2020	**$114,602,575**
Total Bond as of December 31, 2021	**$116,477,500**

A 5-year bond review was completed in January 2021.

2.0 Reclamation Summary

2.1 Reclamation Activities

No reclamation activities were conducted in 2021.

Table 2.1 contains the cumulative acres reseeded and completed reclamation to date. Plate IV is an illustration of the cumulative completed reclamation.

2.2 Reclamation Maintenance

2.2.1 Weed Control

In June 2021, approximately 13.5 acres were treated with sterilant herbicide. These areas included electrical substations, railroad tracks, concentrator facilities, main office, explosive bunkers and around the Horseshoe Bend water treatment plant and reservoir. The locations covered are identified in this section.

In July and August 2021, noxious weeds were treated on approximately 52.4 acres. The areas treated, herbicides used, and application rates are identified in this section. The spraying targeted Spotted Knapweed, Dalmatian Toadflax, Hoary Alyssum, Canada Thistle, Musk Thistle, Baby's Breath, and Elk Thistle.

2.2.2 Vegetation Monitoring

Vegetation monitoring studies were conducted during 2021 and are attached in this section.

2.2.3 Seed Mix

No seed mix was used in 2021.

2.3 Soil Salvage

No soil was salvaged in 2021.

2.4 Recontouring Waste Dump Areas

No waste rock dump slopes were re-contoured in 2021.

2.5 Fencing

Fence maintenance was conducted in Woodville Canyon.

2.6 Planned Activities for 2022

Topsoil will be salvaged near the tailings pond waterline as needed.

During the 2022 season, reclamation maintenance will continue on previously reclaimed areas. Spot spraying is necessary in many areas because of the presence of broad leaf plant species such as clover and alfalfa in the reclamation seed mix. Maintenance items may include fertilizing, vegetation monitoring, and continued spraying to control noxious weeds.

Table 2.1 Completed Reclamation

Years	**Area (acres)**
1991, 1993	6.6
1992, 1996, 2005	11.2
1993, 2006, 2012	4.7
1996, 1996, 2012	47.8
1992	18.6
1995	1.3
2002	90.4
2004	3.1
2007	10.3
2011	7.3
2012	1.8
2014	6.3
2015	1.1
2017	-37.2
2018	37.4
2019	28.1
2020	25.7
Total:	**264.5**

Pioneer Weed Control, Inc. RR2 Box 220 Butte, MT 59701

Date: 6/8/2021 Applicator: Larry Burton License: 2-01-12772-12 Job #: 21836

County: Silver Bow Landowner: Montana Resources Reference:

Site: Industrial Start Time: 7:45 AM

Location (TRS): Finish Time: 10:30 AM

Travel Time:

Other Landmarks: Spray Rail Road bed from Montgomery Street to Hooligan Cans.

Area Treated: 3 Acres

Method: Blanket Spray

Weeds Treated

All Vegetation

Chemicals Applied

Trade Name	App. Rate	Total	EPA Reg. No.
Plainview SC	2 Qts/Acre	6 Quarts	432-1606

Weather Conditions

Time	Temp	Wind Dir	Speed
7:45 AM	51	South	0-1
10:30 AM	54	Calm	

Equipment/Labor

Resource	Qty
ATV #8	2.75 Hours

Comments:

ATV # 8 applied 300 gal. sterilant to 130,680 sq. ft. (3 acres).

Pioneer Weed Control, Inc. RR2 Box 220 Butte, MT 59701

Date: 6/8/2021 Applicator: Steve Bell License: 105137-12 Job #: 21836

County: Silver Bow Landowner: Montana Resources Reference:

Site: Industrial Start Time: 7:00 AM

Location (TRS): Finish Time: 11:30 AM

Travel Time:

Other Landmarks: Water Treatment Plant and Influent Pond

Area Treated: 3.35 Acres

Method: Blanket Spray

Weeds Treated

All Vegetation

Chemicals Applied

Trade Name	App. Rate	Total	EPA Reg. No.
Kleenup Pro	2 Qts./Ac	6.7 Quarts	34704-890
Marker Dye - Blue	Pkt/100 Gal	3.35 Pkts	N/A
Plainview SC	2 Qts/Acre	6.7 Quarts	432-1606

Weather Conditions

Time	Temp	Wind Dir	Speed
7:00 AM	52	Calm	
11:30 AM	60	West	1-2

Equipment/Labor

Resource	Qty
Truck #23	4.5 Hours

Comments:

Truck # 23 applied 335 gal. sterilant to 145,926 sq. ft. (3.35 acres).
GPS # 10 start at 001 end at 053

Pioneer Weed Control, Inc. RR2 Box 220 Butte, MT 59701

Date: 6/8/2021 Applicator: Nathan Taylor License: 105807-12 Job #: 21836

County: Silver Bow Landowner: Montana Resources Reference:

Site: Industrial Start Time: 7:00 AM

Location (TRS): Finish Time: 3:15 PM

Travel Time:

Other Landmarks: Sprayed sub stations and Garge Fuel Tank. Area Treated: 3.6 Acres

Method: Hand Spray

Weeds Treated

All Vegetation

Chemicals Applied

Trade Name	App. Rate	Total	EPA Reg. No.
Kleenup Pro	2 Qts./Ac	6.7 Quarts	34704-890
Marker Dye - Blue	Pkt/100 Gal	3.45 Pkts	N/A
Plainview SC	2 Qts/Acre	7.2 Quarts	432-1606

Weather Conditions

Time	Temp	Wind Dir	Speed
7:00 AM	53	Calm	
3:15 PM	72	Calm	

Equipment/Labor

Resource	Qty
Truck #21	8.25 Hours

Comments:

Truck # 21 applied 360 gal. sterilant to 156,816 sq. ft. (3.6 acres).
GPS # 5 start at 001 end at 042.

Pioneer Weed Control, Inc. RR2 Box 220 Butte, MT 59701

Date: 6/8/2021 Applicator: Steve Bell License: 105137-12 Job #: 21836

County: Silver Bow Landowner: Montana Resources Reference:

Site: Industrial Start Time: 11:30 AM

Location (TRS): Finish Time: 3:15 PM

Travel Time:

Other Landmarks: Bunkers, Fuel Bays and Concentrator Area Treated: 2.9 Acres

Method: Blanket Spray

Weeds Treated
All Vegetation

Chemicals Applied

Trade Name	App. Rate	Total	EPA Reg. No.
Kleenup Pro	2 Qts./Ac	5.8 Quarts	34704-890
Marker Dye - Blue	Pkt/100 Gal	2.9 Pkts	N/A
Plainview SC	2 Qts/Acre	5.8 Quarts	432-1606

Weather Conditions

Time	Temp	Wind Dir	Speed
11:30 AM	60	West	1-2
3:15 PM	72	West	0-1

Equipment/Labor

Resource	Qty
Truck #22	3.75 Hours
Truck #23	3.75 Hours

Comments:
Trucks # 22 & 23 applied 290 gal. sterilant to 126,324 sq. ft. (2.9 acres).
Additional applicator: Larry Burton

Pioneer Weed Control, Inc. RR2 Box 220 Butte, MT 59701

Date: 6/9/2021 Applicator: Steve Bell License: 105137-12 Job #: 21836

County: Silver Bow Landowner: Montana Resources

Reference:

Site: Industrial

Start Time: 7:00 AM

Finish Time: 8:00 AM

Location (TRS):

Travel Time:

Other Landmarks: Office area and storage sheds.

Area Treated: 0.6 Acres

Method: Blanket Spray

Weeds Treated

All Vegetation

Chemicals Applied

Trade Name	App. Rate	Total	EPA Reg. No.
Kleenup Pro	2 Qts./Ac	1.2 Quarts	34704-890
Marker Dye - Blue	Pkt/100 Gal	0.6 Pkts	N/A
Plainview SC	2 Qts/Acre	1.2 Quarts	432-1606

Weather Conditions

Time	Temp	Wind Dir	Speed
7:00 AM	41	Calm	
8:00 AM	46	Calm	

Equipment/Labor

Resource	Qty
Truck #21	1 Hours
Truck #23	1 Hours

Comments:

Trucks # 21 & 23 applied 60 gal. sterilant to 26,136 sq. ft. (.6 acre).
Additional applicator: Nathan Taylor
GPS # 10 054

PIONEER WEED CONTROL, INC.
104 VIENNA
BUTTE, MT 59701

MONTANA RESOURCES 2021 SUBSTATIONS/TRANSFORMER STERILANT LIST

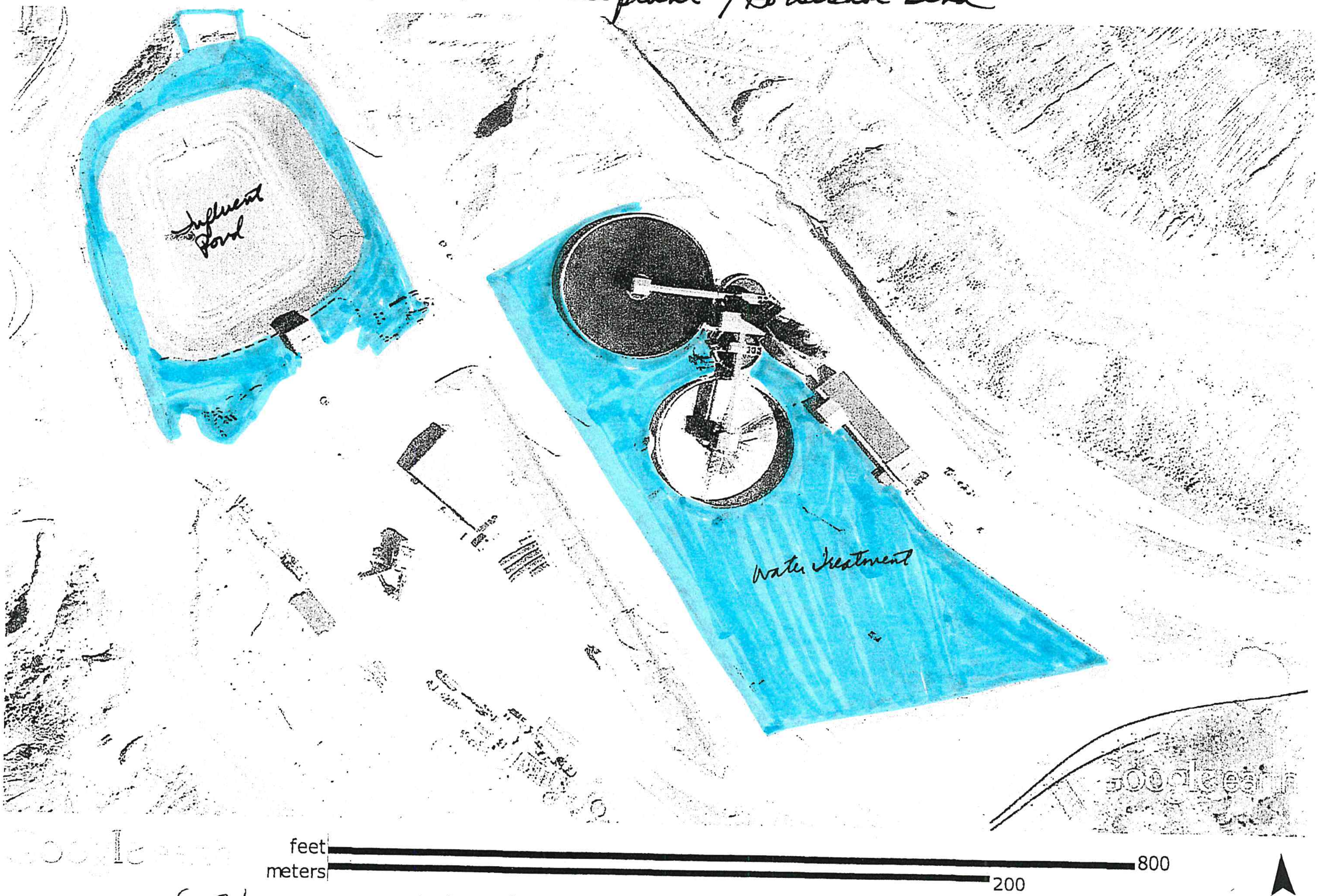
SITE	GALLONS	GPS.
Main Office	5	1
Primary Shop	5	2
1-A Drive House Propane Tank	10	3
Ecology Pond	5	4
Reservoir Tailings Pumphouse/Tailings Transformer	5	5
Parking Lot	5	6
Dewatering	10	7
Kiley Sub	5	8
Lower Fuel Bay Sub	10	9
North Feed	5	10
North Feed	5	11
810 Energize Pole/811 Energize Pole-by pink lunchroom	10	12
Transformer 810/Pink Lunch Room	10	13
South Feed Transformer	5	15
Big Bertha Water Tank Transformer	5	17
Power Pole NE of Water Tank Transformer # 1 & 2	10	14
Transformer 811/Pavilon	10	18
Transformer 812/Tropics	10	19
McQueen Grounding Transformer	5	20
Garage Sub	15	22
Repulp Building Transformer	5	24
Splice Shack Sub	5	25
Box Shop Sub	2	23
Transformer 813/Timber Butte Sub	5	38
Upper Fuel Bay Transformer	5	37
Rainbow Sub	5	35
Barge Sub/Barge Feeder	25	36
Water Treatment Dewatering Drives	5	21
Precip VFD Building	3	26
Precip Sub	85	27
Booster 3	25	28-31
Contractor Gate Power Pole	5	16

PIONEER WEED CONTROL, INC.
104 VIENNA
BUTTE, MT 59701

MONTANA RESOURCES 2021 FUEL BAYS/BUNKERS STERILANT LIST

SITE	GALLONS	GPS.
Lower Fuel Bay	10	30-33
Garage Gas Tanks	25	39-42
Upper Fuel Bay	20	34-41
Upper Bunker	30	42-50
Buckley Bunker	30	14-17
Buckley Fuel Bay	5	26-29
Buckley Yard	35	18-21
Secondary Crusher Fuel Tank	5	53
West Bunker	30	51-52
Buckley Shop	5	22-25

Water Treatment plant / Horseshoe Bend



6-8-21
Bell #23

335 gal.
3.35 ac.
145,926 sq ft.

2021 Montana Resources
sterilant

Pi... Weed Control

Pioneer Weed Control, Inc. RR2 Box 220 Butte, MT 59701

Date: 7/26/2021 Applicator: Nathan Taylor License: 105807-12 Job #: 2126

County: Silver Bow Landowner: Montana Resources Reference:

Site: Industrial Start Time: 5:45 AM

Location (TRS): Finish Time: 2:15 PM

Travel Time:

Other Landmarks: McQueen Area Treated: 4.2 Acres

Method: Spot Spray

Weeds Treated
Baby's Breath
Canada Thistle
Dalmation Toadflax
Elk Thistle
Spotted Knapweed

Chemicals Applied

Trade Name	App. Rate	Total	EPA Reg. No.
Escort	1 Ounces/Acre	4.2 Ounces	352-439
Marker Dye - Blue	Pkt/100 Gal	1.2 Pkts	N/A
Phase	1 Qt./100 Gal	2.1 Quarts	N/A
Platoon (2,4-D)	1 Quarts/Acre	4.2 Quarts	228-145
Tordon 22K*	2 Pints/Acre	8.4 Pints	62719-6

Weather Conditions

Time	Temp	Wind Dir	Speed
5:45 AM	52	Calm	
1:00 PM	89	East	2-3
2:15 PM	90	North	3-4

Equipment/Labor

Resource	Qty
Truck #21	8.5 Hours

Comments:
GPS # 5 start at 001 end at 030

Pioneer Weed Control, Inc. RR2 Box 220 Butte, MT 59701

Date: 7/26/2021 Applicator: Steve Bell License: 105137-12 Job #: 2126

County: Silver Bow Landowner: Montana Resources Reference:

Site: Industrial Start Time: 5:45 AM

Location (TRS): Finish Time: 2:15 PM

Travel Time:

Other Landmarks: Garage Area Area Treated: 10.5 Acres

Method: Spot Spray

Weeds Treated
Baby's Breath
Canada Thistle
Dalmation Toadflax
Elk Thistle
Spotted Knapweed

Chemicals Applied

Trade Name	App. Rate	Total	EPA Reg. No.
Escort	1 Ounces/Acre	10.5 Ounces	352-439
Foam Marker Soap	Pints/Acre	1 Pints	N/A
Phase	1 Qt./100 Gal	5.25 Quarts	N/A
Platoon (2,4-D)	1 Quarts/Acre	10.5 Quarts	228-145
Tordon 22K*	2 Pints/Acre	21 Pints	62719-6

Weather Conditions

Time	Temp	Wind Dir	Speed
5:45 AM	52	Calm	
9:30 AM	66	Calm	
12:45 PM	88	North	1-2
2:15 PM	90	North	3-4

Equipment/Labor

Resource	Qty
Truck #23	8.5 Hours

Comments:
GPS # 10 start at 056 end at 097

Pioneer Weed Control, Inc. RR2 Box 220 Butte, MT 59701

Date: 7/27/2021 Applicator: Nathan Taylor License: 105807-12 Job #: 2126

County: Silver Bow Landowner: Montana Resources

Site: Industrial

Location (TRS):

Other Landmarks: McQueen

Reference:
Start Time: 6:00 AM
Finish Time: 2:00 PM
Travel Time:
Area Treated: 4.4 Acres
Method: Spot Spray

Weeds Treated
Baby's Breath
Dalmation Toadflax
Elk Thistle
Spotted Knapweed

Chemicals Applied

Trade Name	App. Rate	Total	EPA Reg. No.
Escort	1 Ounces/Acre	4.4 Ounces	352-439
Marker Dye - Blue	Pkt/100 Gal	4.4 Pkts	N/A
Phase	1 Qt./100 Gal	2.2 Quarts	N/A
Platoon (2,4-D)	1 Quarts/Acre	4.4 Quarts	228-145
Tordon 22K*	2 Pints/Acre	8.8 Pints	62719-6

Weather Conditions

Time	Temp	Wind Dir	Speed
6:00 AM	61	Calm	
11:50 AM	83	Calm	
2:00 PM	88	Calm	

Equipment/Labor

Resource	Qty
Truck #21	8 Hours

Comments:
GPS # 5 start at 031 end at 060

Pioneer Weed Control, Inc. RR2 Box 220 Butte, MT 59701

Date: 7/27/2021 Applicator: Steve Bell License: 105137-12 Job #: 2126

County: Silver Bow Landowner: Montana Resources

Reference:

Site: Industrial

Start Time: 6:00 AM

Finish Time: 2:00 PM

Location (TRS):

Travel Time:

Other Landmarks: Area North of Fickler Oil

Area Treated: 11.5 Acres

Method: Spot Spray

Weeds Treated
Baby's Breath
Dalmation Toadflax
Spotted Knapweed

Chemicals Applied

Trade Name	App. Rate	Total	EPA Reg. No.
Escort	1 Ounces/Acre	11.5 Ounces	352-439
Foam Marker Soap	Pints/Acre	2 Pints	N/A
Phase	1 Qt./100 Gal	5.75 Quarts	N/A
Platoon (2,4-D)	1 Quarts/Acre	11.5 Quarts	228-145
Tordon 22K*	2 Pints/Acre	23 Pints	62719-6

Weather Conditions

Time	Temp	Wind Dir	Speed
6:00 AM	61	Calm	
7:05 AM	59	Calm	
9:05 AM	68	Calm	
11:50 AM	82	West	0-1
2:00 PM	88	Calm	

Equipment/Labor

Resource	Qty
Truck #23	8 Hours

Comments:
GPS # 10 start at 098 end at 124

Pioneer Weed Control, Inc. RR2 Box 220 Butte, MT 59701

Date: 7/28/2021 Applicator: Nathan Taylor License: 105807-12 Job #: 2126

County: Silver Bow Landowner: Montana Resources Reference:

Site: Industrial Start Time: 6:00 AM

Location (TRS): Finish Time: 2:00 PM

Travel Time:

Other Landmarks: Sprayed between crusher & Continental and parking area. Area Treated: 4.6 Acres

Method: Spot Spray

Weeds Treated
Dalmation Toadflax
Hoary Alyssum
Spotted Knapweed

Chemicals Applied

Trade Name	App. Rate	Total	EPA Reg. No.
Escort	1 Ounces/Acre	4.6 Ounces	352-439
Foam Marker Soap	Pints/Acre	0.5 Pints	N/A
Marker Dye - Blue	Pkt/100 Gal	3.2 Pkts	N/A
Phase	1 Qt./100 Gal	2.3 Quarts	N/A
Platoon (2,4-D)	1 Quarts/Acre	4.6 Quarts	228-145
Tordon 22K*	2 Pints/Acre	9.2 Pints	62719-6

Weather Conditions

Time	Temp	Wind Dir	Speed
6:00 AM	61	Calm	
9:15 AM	68	Calm	
11:45 AM	78	Northeast	1-2
2:00 PM	84	West	0-1

Equipment/Labor

Resource	Qty
Truck #21	8 Hours

Comments:
GPS # 5 start at 061 end at 133

Pioneer Weed Control, Inc. RR2 Box 220 Butte, MT 59701

Date: 7/28/2021 Applicator: Steve Bell License: 105137-12 Job #: 2126

County: Silver Bow Landowner: Montana Resources

Site: Industrial

Location (TRS):

Other Landmarks: Area North of Fickler Oil.

Reference:
Start Time: 6:00 AM
Finish Time: 2:00 PM
Travel Time:
Area Treated: 7 Acres
Method: Spot Spray

Weeds Treated
Baby's Breath
Dalmation Toadflax
Spotted Knapweed

Chemicals Applied

Trade Name	App. Rate	Total	EPA Reg. No.
Escort	1 Ounces/Acre	7 Ounces	352-439
Phase	1 Qt./100 Gal	3.5 Quarts	N/A
Platoon (2,4-D)	1 Quarts/Acre	7 Quarts	228-145
Tordon 22K*	2 Pints/Acre	14 Pints	62719-6

Weather Conditions

Time	Temp	Wind Dir	Speed
6:00 AM	61	Calm	
8:15 AM	63	Calm	
11:30 AM	75	North	0-1
2:00 PM	83	Northeast	0-1

Equipment/Labor

Resource	Qty
Truck #23	8 Hours

Comments:
GPS # 10 start at 125 end at 138

Pioneer Weed Control, Inc. RR2 Box 220 Butte, MT 59701

Date: 7/29/2021 Applicator: Nathan Taylor License: 105807-12 Job #: 2126

County: Silver Bow Landowner: Montana Resources Reference:

Site: Industrial Start Time: 6:00 AM

Location (TRS): Finish Time: 9:45 AM

Travel Time:

Other Landmarks: South of Crusher Area Treated: 1.3 Acres

Method: Spot Spray

Weeds Treated
Dalmation Toadflax
Spotted Knapweed

Chemicals Applied

Trade Name	App. Rate	Total	EPA Reg. No.
Escort	1 Ounces/Acre	1.3 Ounces	352-439
Marker Dye - Blue	Pkt/100 Gal	1.3 Pkts	N/A
Phase	1 Qt./100 Gal	0.65 Quarts	N/A
Platoon (2,4-D)	1 Quarts/Acre	1.3 Quarts	228-145
Tordon 22K*	2 Pints/Acre	2.6 Pints	62719-6

Weather Conditions

Time	Temp	Wind Dir	Speed
6:00 AM	59	Calm	
9:45 AM	69	Calm	

Equipment/Labor

Resource	Qty
Truck #21	3.75 Hours

Comments:
GPS # 5 start at 134 end at 156.

Pioneer Weed Control, Inc. RR2 Box 220 Butte, MT 59701

Date: 7/29/2021 Applicator: Steve Bell License: 105137-12 Job #: 2126

County: Silver Bow Landowner: Montana Resources Reference:

Site: Industrial Start Time: 6:00 AM

Location (TRS): Finish Time: 2:00 PM

Travel Time:

Other Landmarks: Moulton Reservoir Rd. Area Treated: 3.5 Acres

Method: Spot Spray

Weeds Treated
Baby's Breath
Canada Thistle
Dalmation Toadflax
Elk Thistle
Hoary Alyssum
Spotted Knapweed

Chemicals Applied

Trade Name	App. Rate	Total	EPA Reg. No.
Escort	1 Ounces/Acre	3.5 Ounces	352-439
Milestone	7 Ounces/Acre	3.5 Pints	62719-519
Phase	1 Qt./100 Gal	1.75 Quarts	N/A
Platoon (2,4-D)	1 Quarts/Acre	3 Quarts	228-145
Tordon 22K*	2 Pints/Acre	6 Pints	62719-6

Weather Conditions

Time	Temp	Wind Dir	Speed
6:00 AM	59	Calm	
11:10 AM	73	North	3-4
2:00 PM	80	North	1-2

Equipment/Labor

Resource	Qty
Truck #23	8 Hours

Comments:
GPS # 10 start at 139 end at 165

Pioneer Weed Control, Inc. RR2 Box 220 Butte, MT 59701

Date: 7/29/2021 Applicator: Nathan Taylor License: 105807-12 Job #: 2126

County: Silver Bow Landowner: Montana Resources

Reference:

Site: Industrial

Start Time: 10:00 AM

Finish Time: 2:00 PM

Location (TRS):

Travel Time:

Other Landmarks: Moulton Reservoir Rd.

Area Treated: 1 Acres

Method: Spot Spray

Weeds Treated
Canada Thistle
Hoary Alyssum
Musk Thistle
Spotted Knapweed

Chemicals Applied

Trade Name	App. Rate	Total	EPA Reg. No.
Escort	1 Ounces/Acre	1 Ounces	352-439
Marker Dye - Blue	Pkt/100 Gal	1 Pkts	N/A
Milestone	7 Ounces/Acre	0.438 Pints	62719-519
Phase	1 Qt./100 Gal	0.5 Quarts	N/A
Platoon (2,4-D)	1 Quarts/Acre	1 Quarts	228-145

Weather Conditions

Time	Temp	Wind Dir	Speed
10:00 AM	69	Calm	
2:00 PM	80	North	1-2

Equipment/Labor

Resource	Qty
Truck #12	4 Hours

Comments:
GPS # 5 start at 157 end at 181

Pioneer Weed Control, Inc. RR2 Box 220 Butte, MT 59701

Date: 7/30/2021 Applicator: Nathan Taylor License: 105807-12 Job #: 2126

County: Silver Bow Landowner: Montana Resources Reference:

Site: Industrial Start Time: 6:00 AM

Location (TRS): Finish Time: 1:30 PM

Travel Time:

Other Landmarks: Moulton Reservoir Rd. Area Treated: 2 Acres

Method: Spot Spray

Weeds Treated
Canada Thistle
Hoary Alyssum
Musk Thistle
Spotted Knapweed

Chemicals Applied

Trade Name	App. Rate	Total	EPA Reg. No.
Escort	1 Ounces/Acre	2 Ounces	352-439
Marker Dye - Blue	Pkt/100 Gal	2 Pkts	N/A
Milestone	7 Ounces/Acre	0.875 Pints	62719-519
Phase	1 Qt./100 Gal	1.4 Quarts	N/A
Platoon (2,4-D)	1 Quarts/Acre	2 Quarts	228-145

Weather Conditions

Time	Temp	Wind Dir	Speed
6:00 AM	52	Calm	
1:30 PM	85	West	2-3

Equipment/Labor

Resource	Qty
Truck #12	7.5 Hours

Comments:
GPS # 5 start at 182 end at 195

Pioneer Weed Control, Inc. RR2 Box 220 Butte, MT 59701

Date: 7/30/2021 Applicator: Steve Bell License: 105137-12 Job #: 2126

County: Silver Bow Landowner: Montana Resources Reference:

Site: Industrial Start Time: 6:00 AM

Location (TRS): Finish Time: 1:30 PM

Travel Time:

Other Landmarks: Moulton Reservoir Rd. Area Treated: 1.9 Acres

Method: Spot Spray

Weeds Treated
Canada Thistle
Hoary Alyssum
Spotted Knapweed

Chemicals Applied

Trade Name	App. Rate	Total	EPA Reg. No.
Escort	1 Ounces/Acre	1.9 Ounces	352-439
Milestone	7 Ounces/Acre	0.831 Pints	62719-519
Phase	1 Qt./100 Gal	1.65 Quarts	N/A
Platoon (2,4-D)	1 Quarts/Acre	1.9 Quarts	228-145

Weather Conditions

Time	Temp	Wind Dir	Speed
6:00 AM	52	Calm	
11:25 AM	77	Northeast	1-2
1:30 PM	85	West	2-3

Equipment/Labor

Resource	Qty
Truck #23	7.5 Hours

Comments:
GPS # 10 start at 166 end at 197

Pioneer Weed Control, Inc. RR2 Box 220 Butte, MT 59701

Date: 8/3/2021 Applicator: Nathan Taylor License: 105807-12 Job #: 2126

County: Silver Bow Landowner: Montana Resources Reference:

Site: Industrial Start Time: 7:15 AM

Location (TRS): Finish Time: 9:00 AM

Travel Time:

Other Landmarks: Moulton Reservoir Rd. Area Treated: 0.5 Acres

Method: Spot Spray

Weeds Treated
Hoary Alyssum
Spotted Knapweed

Chemicals Applied

Trade Name	App. Rate	Total	EPA Reg. No.
Escort	1 Ounces/Acre	0.5 Ounces	352-439
Marker Dye - Blue	Pkt/100 Gal	0.5 Pkts	N/A
Milestone	7 Ounces/Acre	0.219 Pints	62719-519
Phase	1 Qt./100 Gal	0.35 Quarts	N/A
Platoon (2,4-D)	1 Quarts/Acre	0.5 Quarts	228-145

Weather Conditions

Time	Temp	Wind Dir	Speed
7:15 AM	55	Calm	
9:00 AM	56	Calm	

Equipment/Labor

Resource	Qty
Truck #12	1.75 Hours

Comments:
GPS # 5 start at 001 end at 011


2021 Weed Spray
Pioneer Weed Control, Inc.


2021 Weed Spray ~ Pioneer Weed Control, Inc.

Montana Resources, LLP.
Continental Mine

2021 Reclamation Monitoring Report

Date:

May 25, 2022

Prepared For:
Montana Resources, LLP.

600 Shields Avenue
Butte, Montana 59701 USA

Prepared By:
WESTECH
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Helena, Montana 59604
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www.westech-env.com/

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Acronyms and Abbreviations

GPS	Global Positioning System
MR	Montana Resources
NRCS	Natural Resource Conservation Service
RDS	Rock Disposal Site
WESTECH	WESTECH Environmental Services, Inc.

EXECUTIVE SUMMARY

ES-1 Introduction

Reclamation monitoring was completed on the East Rock Disposal Site (RDS) Complex at Montana Resources' (MR) Continental Mine in 2021 to assess revegetation establishment. Monitoring was completed in 5 RDS sample units, including: Hillcrest, East, North East, North East – Tree, and Hot Spots. Monitoring was intended to evaluate three main parameters:

1. Is coversoil suitable for establishing stable and self-sustaining vegetation capable of supporting comparable utility of adjacent areas?
2. Do low pH, high metal concentrations, or other chemical parameters negatively affect revegetation relative to establishing stable and self-sustaining vegetation capable of supporting comparable utility of adjacent areas?
3. Is coversoil depth a limiting factor in establishing stable and self-sustaining vegetation capable of supporting comparable utility of adjacent areas?

To evaluate these parameters, revegetation data and soil samples were collected from within 0.01-acre plots randomly distributed within each of the main RDS. Samples were collected from within the much smaller, dispersed Hot Spots unit as those sites were encountered. In total, data were collected from the following number of plots by unit:

- Hillcrest RDS (29 vegetation sample plots; 15 soil samples);
- East RDS (30 vegetation sample plots; 15 soil samples);
- North East RDS (30 vegetation sample plots; 15 soil samples);
- "Hot Spots" within the Hillcrest RDS (6 vegetation sample plots; 6 soil samples); and
- Tree Planting within the North RDS (10 vegetation sample plots; 5 soil samples).

Sample locations are depicted in Appendix A.

ES-2 Vegetation Sampling Results

Seeded perennial grass species are well-established in the three main RDS: Hillcrest, East, and North East. Seeded perennial grass is present within the North East RDS – Tree unit but at lower levels; this site is dominated by planted trees. Very little vegetation of any type is present within the Hot Spots unit.

Total vegetation cover is the same in the older Hillcrest and North East RDS, but is higher in these two sites than the East RDS. Revegetation within the East RDS is between one and two years' old and will likely be similar to that in the older units within two to three more growing seasons.

Vegetation diversity is relatively low within all of the RDS. Not surprisingly, diversity is lowest in the Hot Spots unit with 13 species. Twenty-seven species were recorded in both the East RDS and the North

East RDS – Tree units. Twenty-nine species were recorded in the Hillcrest RDS, and 45 species were recorded in the North East RDS.

Noxious weeds are uncommon in any of the sample units. Spotted knapweed was very common before 2019; however, aggressive herbicide treatments have significantly reduced spotted knapweed and other noxious weeds within the sample units.

ES-3 Soil Sampling Results

Coversoil within all of the RDS except the Hot Spots unit is typically suitable for vegetation with regards to a variety of parameters, including: depth, coarse fragment material, percent organic matter, pH, and metal concentrations.

Mean coversoil depth is equal to the 20-inch coversoil recipe in all sample units except the Hillcrest RDS. Coversoil depth within the Hillcrest RDS averages approximately 13 inches, which is substantially less than the 20-inch prescription; however, coversoil was respread within the Hillcrest RDS prior to the development of the coversoil recipe.

Coarse fragments (i.e., particles > 2mm) vary among the different sample units but are less than the 40 percent cutoff criteria in all units. Coarse fragment material is greatest in the North East and North East – Tree RDS units.

Soil organic matter is greatest in the first horizon, or topsoil, within all sample units. Overall, the mean percent organic matter is greater in the Hillcrest RDS than the 1.5 percent criteria specified in the coversoil recipe, is less than that criteria in the East, North East, and North East - Tree RDS', but is the same as the 1.5 percent criteria in the Hot Spots unit. Considering that very little vegetation is present in the Hot Spots unit, the source of organic matter in this unit is puzzling.

Soil pH is similar among all the sample units except the Hot Spots unit. Soil pH within the Hot Spots is much lower than in the other units and averages pH 5.0, which is very strongly acid. Mean soil pH in the other units varies from 6.8 to 7.1, which is neutral.

Metals within the Hot Spots unit are high and exceed cutoff criteria for Cu, Zn, and TMI regardless of pH. In other units, Pb is above the cutoff criteria for samples with pH ≥ 6.5 only in the North East RDS – Tree unit; no other units have metals above the cutoff criteria at pH ≥ 6.5. At pH < 6.5, metal concentrations exceed the cutoff criteria in several units for Cu and TMI. Overall, 27 percent of soil samples, including the Hot Spots samples, have pH < 6.5 while 72 percent of soil samples have pH ≥ 6.5.

ES-4 Influence of Soils on Vegetation

The influence of soil parameters on revegetation was evaluated primarily through an assessment of changes in perennial grass canopy cover. Perennial grasses were used rather than total cover as they account for more than 92 percent of total cover and are, currently, the only seeded species in reclamation.

ES-4.1 Coversoil Depth and Vegetation

No clear relationship between coversoil depth and perennial grass cover is discernible. There is no difference in perennial grass cover between the North East RDS and the Hillcrest RDS, or between the North East RDS and the East RDS. Perennial grass cover is higher in the Hillcrest RDS than in the East RDS. However, the difference between Hillcrest RDS and East RDS cannot be attributed to deeper coversoil since the Hillcrest unit has shallower coversoil than either the North East or East RDS.

Coversoil depth ranges were examined at less than 20 inches to determine if perennial grass canopy cover was negatively affected. Those areas with <10 inches coversoil include 6 samples consisting of a single horizon, and 4 samples consisting of two horizons. The thinnest first horizon depth is 3 inches and the thickest is 7 inches. Six of these 10 sites with <10 inches coversoil were also analyzed for chemical constituents. Although these areas have thin coversoil relative to the coversoil recipe, they also have organic matter, pH, Cu, and TMI within the Montana Resources' Reclamation Plan parameters. This would indicate that if coversoil is otherwise suitable, depth may not be a limiting factor at least with first horizons between 3 and 7 inches thick.

ES-4.2 Coversoil Structure and Vegetation

The percent of sand, silt, and clay is similar among all sample units. Although the percent gravel, cobble, and stone vary among units, the total amount of material >2 mm is less than the 40 percent cutoff criteria. Not surprisingly therefore, the percent gravel and cobble combined (stones were omitted because they are rare in coversoil) does not have a discernible effect on perennial grass cover.

ES-4.3 Coversoil Organic Matter and Vegetation

Although percent organic matter is significantly greater in the Hillcrest RDS than in any other sample unit, the cover of perennial grass and total vegetation is not significantly different between the Hillcrest and North East RDS'. The difference in cover between the Hillcrest RDS and East RDS is likely a function of reclamation age, not percent organic matter. There is no general pattern in perennial grass cover and percent organic matter.

To further examine the relationship between percent organic matter and perennial grass cover, samples were placed into different categories of percent organic matter relative to the 1.5 percent parameter and the average cover of perennial grass calculated in each category. There is no significant difference in perennial grass canopy cover by percent organic matter category. However, sample size is low in the ≤ 0.5 % OM category and the conclusion that there is no difference in perennial grass cover between this category and other categories should be considered preliminary.

ES-4.4 Coversoil pH and Vegetation

Mean coversoil pH is ≥ 6.5 in all of the sample units except Hot Spots. Perennial grass cover is substantially less in areas with very strongly acidic soils (pH < 5.0); however, all but one of these samples is from a Hot Spot.

Perennial grass cover was further examined relative to pH by stratifying canopy cover by pH categories. Two categories were identified based on the coversoil formula: pH < 6.5, and pH ≥ 6.5. Mean perennial grass canopy cover is much lower in samples with pH < 6.5 than in samples with pH ≥ 6.5. Low pH can liberate metals at levels that are phytotoxic to plants.

However, that result is skewed by the inclusion of Hot Spots with very low pH. To further examine the effect of pH on perennial grass cover, the pH categories were further divided into the few sites with very low pH (3.2 to 4.9) relative to intermediate pH categories. Soils with pH < 5.0 are considered very strongly acid, soils between pH 5.0 - 5.5 are considered strongly acid, soils between pH 5.6 - 6.0 are considered moderately acid, soils between pH 6.1 – 6.5 are slightly acid, soils between pH 6.6 and 7.3 are neutral, and soils between pH 7.4 and 7.8 are slightly alkaline.

Typically, vegetation responds best at pH 6.6 to 7.0 although some tolerant plant species may do well in pH 5.6 – 6.0. There is no difference in perennial grass canopy cover among pH categories 5.4 to 7.3; this implies that grass species within reclamation at the RDS' are relatively tolerant of moderately acidic soils.

ES-4.5 Coversoil Metals and Vegetation

Overall, there is not a clear relationship between metal concentration, as measured by TMI, and perennial grass cover, with the exception that the Hot Spots samples have a high TMI and very low perennial grass cover. This finding is similar to the relationship between pH and perennial grass cover at Hot Spots sample sites and is anticipated since low pH can result in phytotoxic metal concentrations.

Stratifying the TMI by pH < 6.5 and ≥ 6.5 does show a clearer trend. The pH 6.5 boundary is the boundary at which phytotoxic levels are compared for various metals. Using pH 6.5 as a cutoff, there is a negative relationship between TMI and perennial grass cover. In contrast, when pH ≥ 6.5, there is a relatively neutral relationship between TMI and perennial grass cover.

Because low pH can affect meal availability, samples were further stratified by pH. Samples with pH ≤ 5.0 have higher TMI levels than samples with pH > 5 - < 6.5 or pH ≥ 6.5; there is no difference in TMI levels between samples with pH > 5 - < 6.5 and pH ≥ 6.5. The effect of this difference in TMI levels on perennial grass cover is the likely reason perennial grass cover is lower in areas with very low pH, although the high hydrogen ion concentration due to low pH could also be responsible.

However, since TMI levels are not different between the pH > 5.4 - < 6.5 and pH ≥ 6.5 categories, and perennial grass cover is not different in these categories either; pH as low as 5.4 apparently does not result in an appreciable reduction in perennial grass cover, at least for the species used in reclamation within the East, North East, and Hillcrest RDS'.

ES-4.6 Interaction of Coversoil Parameters and Vegetation

A multiple regression analysis was completed to evaluate parameters that could influence perennial grass canopy cover. A variety of models were evaluated to identify the most parsimonious model that also explained the most variance. Initial models included the following independent variables: 1) reclamation age; 2) total coversoil depth; 3) percent coarse fragment (> 2mm); 4) pH; 5) percent organic matter; and 6) TMI. The most explanatory model has an adjusted R^2 of 0.23 and identified only reclamation age and coversoil depth as significant parameters.

However, it is likely that the coversoil depth parameter is confounded by reclamation age since vegetation is still developing in the younger East RDS. When vegetation at this sample unit is more similar to that in the older North East and Hillcrest RDS', coversoil depth may no longer be a significant parameter. Further, even if coversoil depth is a significant parameter in the model, it is difficult to identify its practical effect on perennial grass cover. Mean perennial grass cover averages between 42 percent and 47 percent at coversoil depths of < 10 inches, ≥10 – 15 inches, and > 15 inches with no significant difference in perennial grass cover among these three coversoil depths. Splitting coversoil depth categories more finely on arbitrary five-inch increments reveals the same lack of effect on perennial grass cover.

ES-5 Conclusions

Three primary conclusions may be reached from the 2021 reclamation monitoring data:

1. Coversoil is suitable for establishing stable and self-sustaining vegetation capable of supporting comparable utility of adjacent areas in all sample units except the Hot Spots unit.
2. Low pH and high metal concentrations likely preclude development of vegetation within the Hot Spots sample sites.
3. Because coversoil is a suitable growth medium, coversoil depth does not limit perennial grass establishment and perpetuation.

ES-5.1 Stable and Self-Sustaining Vegetation

The stated goal of the Reclamation Plan is to "establish a self-sustaining vegetative cover capable of supporting post-closure land use objectives". This goal is consistent with MCA 82-4-336(9)(a) which states that, "the reclamation plan must provide for the reclamation of all disturbed land to comparable utility and stability as that of adjacent areas".

There are several types of land uses adjacent to the reclaimed areas, including: native aspen woodland, revegetated highway shoulders, residential areas, and active mining. Compared to these areas, perennial grass establishment within the RDS appears greater than the adjacent areas. Stability within the RDS is high as witnessed by the limited erosion that is present. Utility within the RDS is also high given use by wildlife.

Revegetation in the Hillcrest RDS, North East RDS, and North East RDS – Tree units clearly is self-sustaining and capable of supporting post-closure land use objectives. Revegetation in the East RDS is also capable of supporting the post-closure land use objective but is young; one or two more growing seasons are required to demonstrate that revegetation in this RDS is also self-sustaining. Revegetation in the small, isolated Hot Spots unit is not self-sustaining or capable of supporting post-closure land use objectives without remediation.

ES-5.2 Low pH and High Metal Concentrations in Hot Spots

All of the parameters that were evaluated for this monitoring report, with the exception of percent organic matter, indicate that coversoil in the Hot Spots sample unit is unsuitable for vegetation establishment consistent with the Reclamation Plan goal. Remedial action to cover these areas with suitable material is recommended to establish perennial grass, or other vegetation, on the Hot Spots sites.

ES-5.3 Coversoil Depth and Vegetation Establishment

The current coversoil recipe requires 20 inches of coversoil, of which approximately 6 inches are topsoil, on slopes between 5 percent and 37 percent. Vegetation establishment data indicate that 20 inches of coversoil is not necessary to establish self-sustaining vegetative cover capable of supporting post-closure land use objectives as long as other soil parameters are suitable.

ES-5.4 Future Monitoring

Revegetation monitoring in the future is recommended to evaluate the following topics.

1. Monitoring should be completed at small, isolated areas outside of the main RDS footprints to determine if self-sustaining vegetative cover capable of supporting post-closure land use objectives is present. In addition, soil samples should be collected at these sites consistent with the methods used in this report to determine if the results presented here are consistent with revegetation at these older, disparate sites.
2. Revegetation monitoring within the East RDS should be repeated at the sites that were sampled in 2021 to record vegetation development.

1.0 Introduction and Objectives

Reclamation has been completed on the East Rock Disposal Site (RDS) Complex at Montana Resources' (MR) Continental Mine since the 1970s; the majority of reclamation work has been completed since 2017 (see Figure 1). Since the 1970s, new reclamation techniques have been developed, seed sources have become more available and diverse, and operators and regulators have a greater understanding regarding the chemical and physical suitability of coversoils used for reclamation. However, since 1992, relatively little data have been collected on reclamation. WESTECH Environmental Services, Inc. (WESTECH) completed monitoring in 2021, at MR's direction, to assess reclamation on the East RDS Complex, which is comprised of the Hillcrest RDS, East RDS, and North East RDS. These three RDSs and their reclamation history are shown on Figure 1.

The objectives of monitoring the East RDS Complex in 2021 included:

- assessing desirable plant establishment, and reclamation utility and stability;
- identifying erosion, and prescribing remedies if necessary;
- identifying and describing noxious weed populations and prescribing management options if necessary; and
- evaluating the relationship between coversoil and/or topsoil characteristics and revegetation establishment.

Using data collected relative to these objectives, revegetation was assessed relative to three primary questions:

1. Is coversoil suitable for establishing stable and self-sustaining vegetation capable of supporting comparable utility of adjacent areas?
2. Do low pH, high metal concentrations, or other chemical parameters negatively affect revegetation relative to establishing stable and self-sustaining vegetation capable of supporting comparable utility of adjacent areas?
3. Is coversoil depth a limiting factor in establishing stable and self-sustaining vegetation capable of supporting comparable utility of adjacent areas?

2.0 Methods

Methods to evaluate revegetation establishment, coversoil and/or topsoil characteristics relative to revegetation establishment, erosion, and noxious weeds are described below.


CONTINENTAL PIT
North East RDS
2002, 2013, 2014
2019
2019, 2020
East RDS
2017, 2018
1995, 1996, 2002, 2012
Hillcrest RDS
CONTINENTAL DRIVE
I-15
Legend
Permit Boundary
Rock Diposal Site (RDS) Reclamation
Hillcrest - 48 Acres
East - 92 Acres
North East - 32 Acres
Reclamation History
Contour 25-foot
Aerial: 2020
0
900
1800 ft
Montana Resources
Continental Mine
Figure 1
Reclamation Sample Units
East Rock Disposal
Site Complex
WESTECH ENVIRONMENTAL
MR21_Rec_Mon_East_Dumps.dwg
1"=900'
05/26/21

2.1 Sample Units

Sample units shown in Appendix A were identified based on year of seeding, slope, and coversoil depth, and included the following:

- Hillcrest RDS (29 vegetation sample plots; 15 soil samples);
- East RDS (30 vegetation sample plots; 15 soil samples);
- North East RDS (30 vegetation sample plots; 15 soil samples);
- "Hot Spots" within the Hillcrest RDS (6 vegetation sample plots; 6 soil samples); and
- Tree Planting within the North RDS (10 vegetation sample plots; 5 soil samples).

Sample plots consisted of 0.01-acre (diameter = 11.7 feet) circular plots for recording vegetation cover and composition. In addition, soil pits were excavated and soil samples recorded within approximately half of all plots, with the exception of Hot Spots where soil samples were collected at each location. Note that 30 vegetation sample plots were anticipated for the Hillcrest unit; however, one of these plots occurred within a Hot Spot and was therefore included with that sampling unit. The center of each sample plot was recorded with a resource-grade Global Positioning System (GPS) unit and are shown in Appendix A.

Key variables evaluated at each plot included:

- canopy cover and composition;
- coversoil depth and composition;
- topsoil depth; and
- slope percent and aspect.

Specific parameters used to evaluate these variables are described in the following sections. In addition to allowing an assessment of the variables above, these parameters also provide the basis for a future assessment of metrics identified as important indicators of successful reclamation in the *Butte Reclamation Evaluation System* (Blicker et al. 2003) and *Land Reclamation Performance Evaluation Process and Standards Used at the Anaconda Smelter Site, Montana* (Rennick et al. 2009).

2.2 Canopy Cover and Composition

Total non-stratified (i.e., cannot exceed 100 percent) plant canopy cover was ocularly estimated within each sample plot. Canopy cover was recorded by species and summarized by morphological and origin classes according to the following categories:

- Native Perennial Grasses
- Introduced Perennial Grasses
- Native Annual Grasses
- Introduced Annual Grasses
- Native Perennial Forbs
- Introduced Perennial Forbs
- Native Annual/Biennial Forbs
- Introduced Annual/Biennial Forbs

- Subshrubs/Shrubs
- Trees

In addition to canopy cover, ground cover was also estimated to the nearest percent according to the following categories:

- Bare ground
- Rock
- Litter
- Lichen
- Moss
- Basal vegetation

2.3 Perennial Grass Density

Perennial grass establishment was evaluated by counting seedlings or mature grasses within three, representative one-square-foot areas at each sample plot. Only healthy plants with three or more green leaves were counted as these plants are most likely to survive winter conditions.

The Natural Resource Conservation Service (NRCS) has established guidelines for evaluating grass stand establishment in Montana based on seedling density (NRCS 2009). These guidelines are not strict, numerical standards but provide a basis for evaluating revegetation in the first growing season within a general area, as well as establishment over time. Guidelines are based on precipitation and ecological site. The average annual precipitation at the mine site is greater than 16 inches per year. Soils are primarily sandy, shallow and gravelly. Table 1 presents these NRCS guidelines.

Table 1. Grass Densities For Successful Seedings at the East RDS Complex

Precipitation (inches)	Ecological Site/Forage Suitability Group	Plants/Square Foot
16 - 22	Shallow, Gravelly, Eroded, etc.	1 -3

Source: NRCS 2009

Based on these expected densities, WESTECH utilized the following densities as guidelines for defining revegetation establishment at sample sites. Areas with less than one perennial grass per square foot may require remedial seeding or soil amendments.

Table 2. Mean Perennial Grass Density and Revegetation Establishment Rating

Mean Perennial Grasses/Sq. Ft.	Rating
>3	Excellent
1-3	Good
<1	Poor

2.4 Noxious Weeds

Noxious weeds were documented within sample plots. Surveyors recorded the percent cover by species within each plot.

2.5 Soil Characteristics

Soil samples were collected at approximately half of all plots with a shovel or soil auger. The topsoil (if present) and coversoil were identified and described relative to their physical characteristics, including:

- Boundary Distinction
- Color
- Texture
- Coarse fragment content
- Structure
- Roots Abundance and Size
- Effervescence

Coversoil depths, and different horizon depths, were evaluated within each sample unit and compared with coversoil balances identified in the preliminary 2021 MR Reclamation Plan.

In addition, samples were submitted for laboratory analysis to identify the variables listed in Table 3. These variables include constituents typically analyzed to determine soil productivity, but also include metals that could influence revegetation establishment depending on where in the soil profile they occur.

Table 3. Soil Variables for Laboratory Analysis

Soil pH	Arsenic	Lead
Soil Texture	Boron	Manganese
Electrical Conductivity	Cadmium	Molybdenum
Moisture Content	Calcium	Nickel
Bulk Density	Chloride	Nitrogen
Organic Matter	Copper	Potassium
Aluminum	Iron	Zinc

In particular, select metals were used to assess phytotoxicity in coversoil based on data collected by the Montana Department of Environmental Quality (MDEQ), U.S. Environmental Protection Agency (EPA), and Montana State University Reclamation Research Unit (MSU-RRU) as summarized and refined by Applied Geological Services (AGS 2022). These data were also compared to the 1998 Record of Decision (ROD) for the Anaconda Smelter Operable Unit in the same document. Table 4 presents phytotoxicity cutoffs for cover-soil suitability as a function of pH per Applied Geological Services (2022).

Table 4. Phytotoxicity Cutoffs for Cover-Soil Suitability (MDEQ et al. 1999) as a Function of pH Compared to TMI[1]

Low Phytotoxicity Levels (mg/kg)		
Analyte	**pH < 6.5**	**pH ≥ 6.5**
Arsenic (As)	136	224
Cadmium (Cd)	5.1	8.6
Copper (Cu)	236	1062
Lead (Pb)	94	179
Zinc (Zn)	196	379
Total Metal Index (TMI)	568	1665

[1] Per AGS (2022).

2.6 Erosion

In addition to collecting vegetation and soils data at specific sample points, indicators of erosion were recorded when encountered. The following indicators of accelerated erosion were evaluated:

- Flow pattern development resulting in larger (greater than 6 inches in depth) rills or gullies;
- Subsidence or slumping;
- Headcutting in drainages;
- Wind-scoured blowouts or depressions;
- Litter movement;
- Pedestals/terraces; and
- Percent bare ground.

Conditions were described and photographed at each site.

3.0 Results

Results are summarized in the following sections. Section 3.1 focuses on vegetation sampling results and Section 3.2 focuses on soil sampling results. Prior to sampling efforts, differences in vegetation growth between and among sample units were speculated to be a function of several potential parameters, including: cover soil depth, top soil depth, soil chemistry (e.g., pH, metal concentrations), or soil organic matter. These relationships are evaluated in Section 3.3 of this Report.

3.1 Vegetation

A list of all vascular plants recorded within sample plots is provided in Appendix A. Site data and canopy cover and perennial grass density from each plot are tabulated and presented in Appendix B.

Canopy Cover and Composition

Canopy cover and composition were assessed within and among sample units. Figure 2 presents the mean canopy cover ± standard error (SE) by morphological class within each sample unit. Mean canopy cover of annual grass, perennial forbs, annual forbs, and shrubs is low in all sample units. Mean canopy cover of trees is high only in the older tree stand within the North East RDS; only two other trees were observed in any of the other units.

Mean perennial grass cover is lowest within the Hot Spot where relatively little vegetation of any type was recorded; perennial grass cover is also relatively low within the tree stand.

Student's t-tests were used to evaluate differences in mean perennial grass cover and total vegetation among types. P-values less than 0.1000 are considered significant. Perennial grass is lower within Hot Spots than in any other unit except the North East RDS – Tree unit; perennial grass cover is the same between the Hot Spots unit and the North East RDS – Tree unit. Perennial grass cover is also lower in the younger East RDS than in the more established Hillcrest RDS, but the same as perennial grass cover in the established North East RDS. Table 4 presents *p*-values for t-tests between mean perennial grass cover in different units, cells in yellow indicate significant differences.

Table 4. T-Test P-Values: Mean Perennial Grass Cover and Sample Unit

Sample Unit	North East	Hillcrest	Hot Spots	Tree
	p-value	*p*-value	*p*-value	*p*-value
East	0.1112	0.0293	0.0016	0.0186
North East	--	0.5200	<0.0000	0.0002
Hillcrest	--	--	<0.0000	<0.0000
Hot Spots	--	--	--	0.1665

Total vegetation is lower within Hot Spots than any other unit, the same between the East RDS and the North East RDS – Tree units, and the same between the North East RDS and the Hillcrest RDS units, but higher within these two units than any other unit. Table 5 presents *p*-values for t-tests between total vegetation cover in different units; cells in yellow indicate significant differences.

Table 5. T-Test P-Values: Mean Total Vegetation Cover and Sample Unit

Sample Unit	North East	Hillcrest	Hot Spots	Tree
	p-value	*p*-value	*p*-value	*p*-value
East	0.0528	0.0137	0.0011	0.8168
North East	--	0.4340	<0.0000	0.0789
Hillcrest	--	--	<0.0000	0.0325
Hot Spots	--	--	--	0.0155

A parameter that could affect vegetation canopy cover is revegetation age. The East RDS was revegetated in 2019 and 2020; consequently, revegetation within this unit was one to two years old when sampled in 2021. In contrast, revegetation within the North East RDS averages 7 years old while revegetation within the Hillcrest RDS averages 9 years old. Revegetation age within the North East RDS – Tree unit is unknown but is at least 20 years old. Revegetation age within Hot Spots cannot be quantified since these sites are anomalies within the Hillcrest RDS, and soil replacement and revegetation may not have occurred at these sites similar to the surrounding area. The difference in canopy cover between the East RDS and the North East and Hillcrest RDS' may be a function of age and is examined in greater detail in Section 3.3.

Introduced perennial grasses dominate the perennial grass category in all sample units, although native perennial grasses represent approximately half of all perennial grass cover within the Hillcrest RDS unit. The most common introduced grasses within the entire area are intermediate wheatgrass and sheep fescue while the most common native grasses are basin wildrye and Idaho fescue. Mean canopy cover by origin and morphological class and sample unit are presented in Table 6.

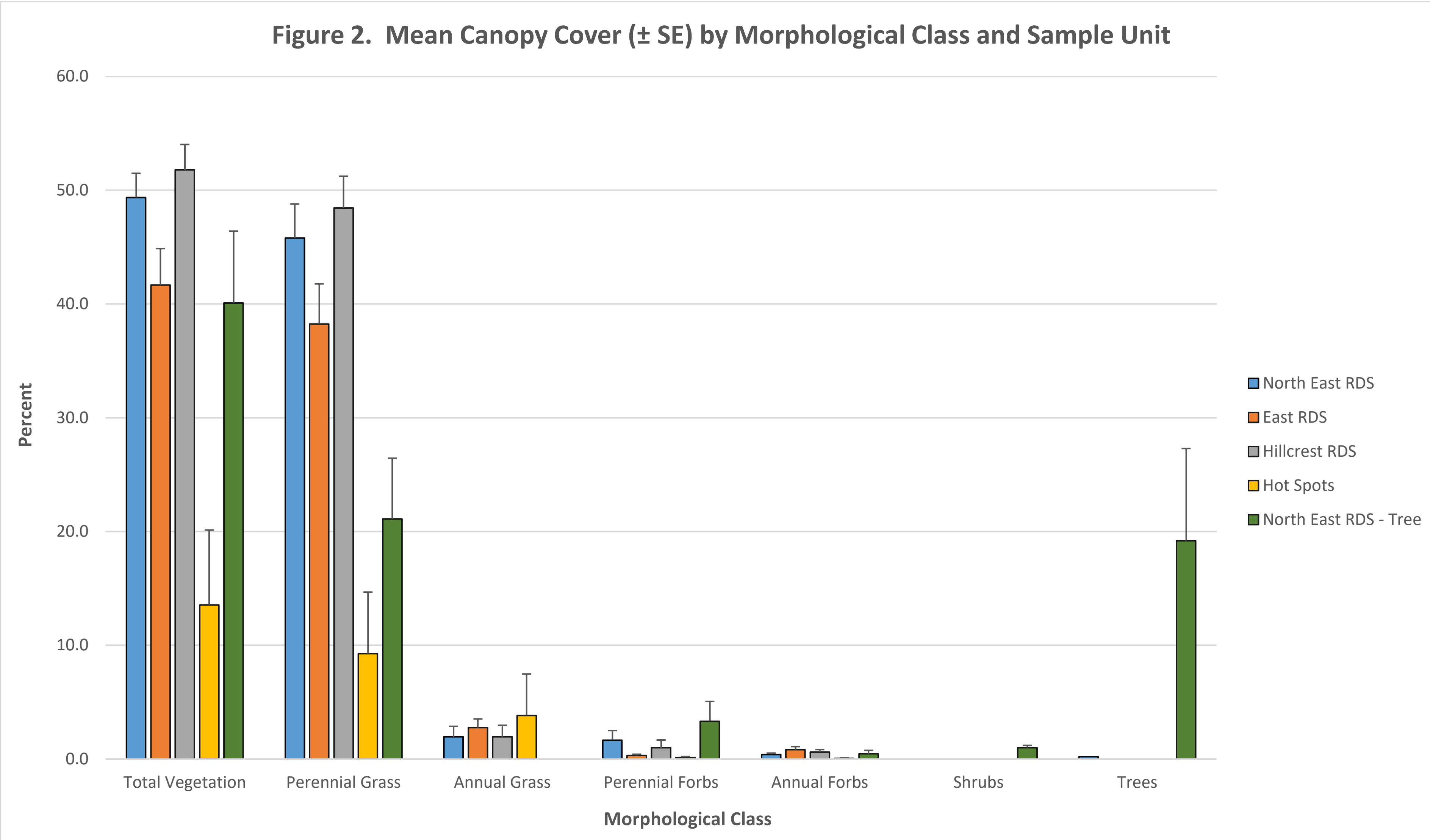


Figure 2. Mean Canopy Cover (± SE) by Morphological Class and Sample Unit
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Percent
Total Vegetation
Perennial Grass
Annual Grass
Perennial Forbs
Annual Forbs
Shrubs
Trees
Morphological Class
North East RDS
East RDS
Hillcrest RDS
Hot Spots
North East RDS - Tree

Table 6. Mean Canopy Cover (%) by Origin and Morphological Class and Sample Unit

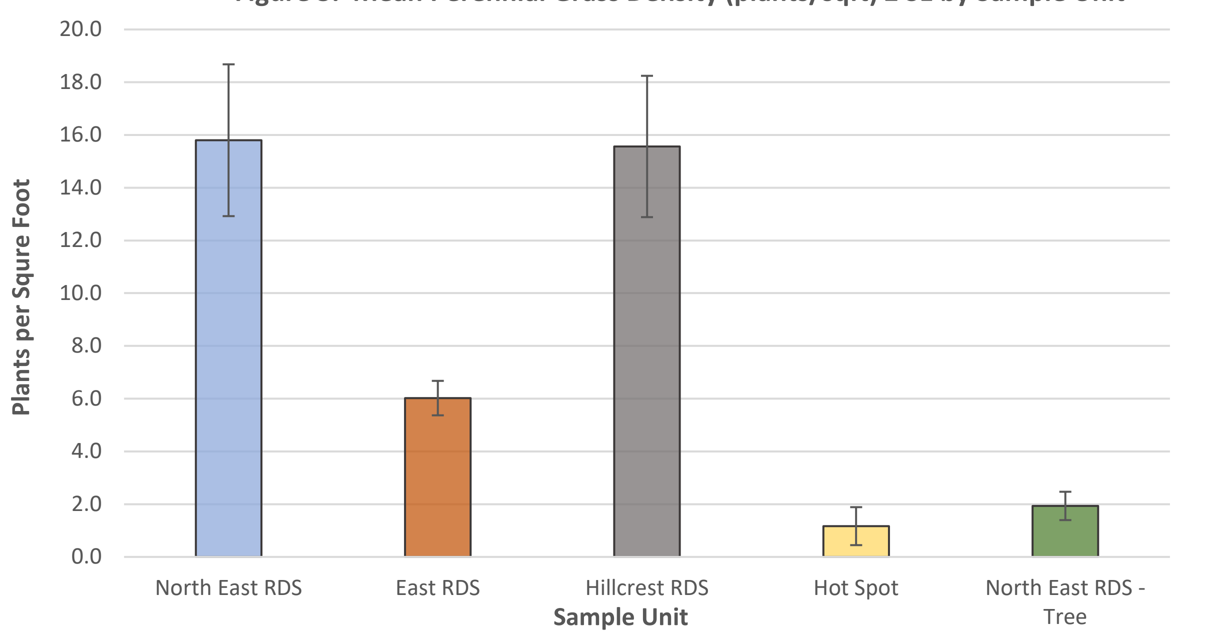
Sample Unit	Origin and Morphological Class								
	Native Perennial Grass	Introduced Perennial Grass	Introduced Annual Grass	Native Perennial Forb	Introduced Perennial Forb	Introduced Annual Forb	Native Annual Forb	Shrub	Tree
North East RDS	4.3	44.4	2.0	0.3	1.4	0.4	0.1	0.0	0.2
East RDS	7.0	33.0	2.8	0.1	0.1	0.9	0.0	0.0	0.7
Hillcrest RDS	24.7	27.2	3.0	0.2	0.8	0.7	0.0	0.0	0.0
North East RDS - Tree	0.2	21.5	0.0	0.4	3.1	0.5	0.0	0.6	19.2
Hot Spots	1.9	6.0	0.2	0.6	0.0	0.1	0.0	0.0	0.0

Diversity within each sample unit was also calculated based on the total number of species recorded within each unit. Not surprisingly, diversity is lowest in the Hot Spots unit with 13 species. Twenty-seven species were recorded in both the East RDS and the North East RDS – Tree units. Twenty-nine species were recorded in the Hillcrest RDS, and 45 species were recorded in the North East RDS.

Perennial Grass Density

Perennial grass density is used to evaluate vegetation establishment, primarily in younger stands or in stands with limited vegetation. Mean perennial grass density for each sample unit is shown in Figure 3. Perennial grass density is the same between the older North East RDS and Hillcrest RDS (p=0.9456) but is substantially lower (p<0.0000) in the East RDS than either of the two older sites. However, perennial grass

Figure 3. Mean Perennial Grass Density (plants/sqft) ± SE by Sample Unit



density is higher within the East RDS than in either the Hot Spots or the North East RDS – Tree units (p≤0.0070). Perennial grass density is the same between the Hot Spots and the North East RDS – Tree units (p=0.3608).

Compared to NRCS stand establishment guidelines (Table 2), perennial grass within all of the larger RDS sites including the East RDS rated Excellent; rated at the lower end of Good within the North East RDS – Tree unit; and rated Poor within the Hot Spots unit. Perennial grass density will likely increase within the East RDS similar to the North East and Hillcrest RDS' as the stand becomes more established; however, perennial grass density is unlikely to increase within either of the other two units without remedial action. Given that tree and perennial grass *cover* (although not perennial grass *density*) is relatively high within the North East RDS – Tree unit, and that it is a mature and stable stand, remedial action is not needed. Soil amendments and reseeding would be required within the Hot Spots to improve grass establishment (see Section 3.2).

Noxious Weeds

Noxious weeds were recorded within vegetation sampling plots as well as generally mapped in areas outside of sampling plots. Noxious weed cover is very low throughout the entire East RDS Complex. The most common noxious weed is spotted knapweed; however, canopy cover of spotted knapweed averages less than 1 percent over the entire site and is only common at one sample site in the North East RDS. Other noxious weeds that were recorded included: hoary alyssum, common mullein, dalmatian toadflax, yellow toadflax, and scotch thistle. None of these weeds' average cover is greater than 1 percent and only a few individual sites had cover of more than 1 percent.

Qualitative reclamation monitoring prior to 2021 documented extension spotted knapweed throughout the reclaimed areas. Consequently, MR implemented an aggressive noxious weed management program, primarily through herbicide treatment, with the result that noxious weeds are now uncommon within the reclaimed areas.

Erosion

Minor rilling was observed on the East RDS within areas that had been seeded in the last two years and where perennial vegetation is still establishing. None of these rills were contributing to off-site sedimentation; consequently, remedial action was not prescribed. Future monitoring will continue to assess these areas to determine if sediment control is needed. Montana Resources may also elect to inter-seed forbs and shrubs in these areas while bare ground is still present.

3.2 Soils

Several parameters were used to evaluate soils within the East RDS Complex as described in Section 2.5. These parameters are discussed in the following sections.

Soil Horizon and Coversoil Depth

Soil horizon depths, and overall coversoil depths, are presented by sample unit in Figure 4. Coversoil is defined as all soil horizons that could be extracted above the point of shovel refusal. Areas below coversoil are either coarse waste rock, indurate alluvium, or a mix of the two. Note that in the case of Hot Spots, there was no clear "coversoil", rather there is the material that was excavated to the point of refusal.

Coversoil depth is a key parameter in the Reclamation Plan's coversoil recipe. Three depths are specified:

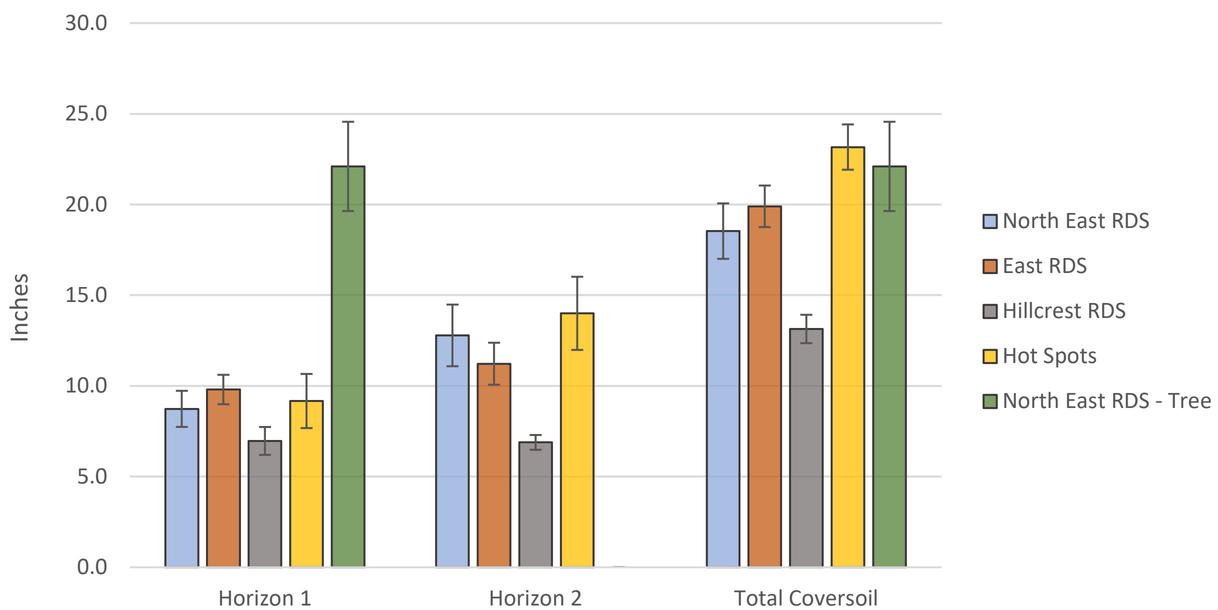
- 28 inches on slopes < 5%
- 20 inches on slopes ≥ 5% and ≤ 37%
- 36 inches on slopes > 37%

The mean slope at each sample plot within each RDS sample unit was calculated to determine which coversoil recipe category was most appropriate for analysis. Mean slope in all RDS was between ≥ 5% and ≤ 37%; mean percent slope for each RDS sample unit is:

- North East RDS – 16%
- Hillcrest RDS – 19%
- East RDS – 23%.

Based on this analysis, the 20-inch coversoil depth is most appropriate for comparison.

Figure 4. Mean Horizon and Total Depth (±SE) by Sample Unit



Horizons were distinguished in the field based on differences in soil texture and/or color. In general, where two horizons were present the first horizon is finer textured and darker colored with more roots than the lower horizon. Two horizons were present in most plots, although two plots contained three horizons, which were lumped for this analysis. Several plots contained only a single discernible horizon, including all plots within the North East RDS – Tree unit.

The Hillcrest RDS first and second horizons, and total coversoil depths, are less than those same parameter depths in any other sample unit ($p<0.0040$), including the Hot Spots which do have two discernible color horizons, both of which are deeper than those in the Hillcrest RDS.

With the exception of the North East RDS – Tree unit, the first and second horizon depths are not different among the North East RDS, East RDS, and Hot Spots (*p*>0.3235). However, mean total material depth is slightly higher in Hot Spots than in any of the other sample units besides the North East RDS – Tree unit.

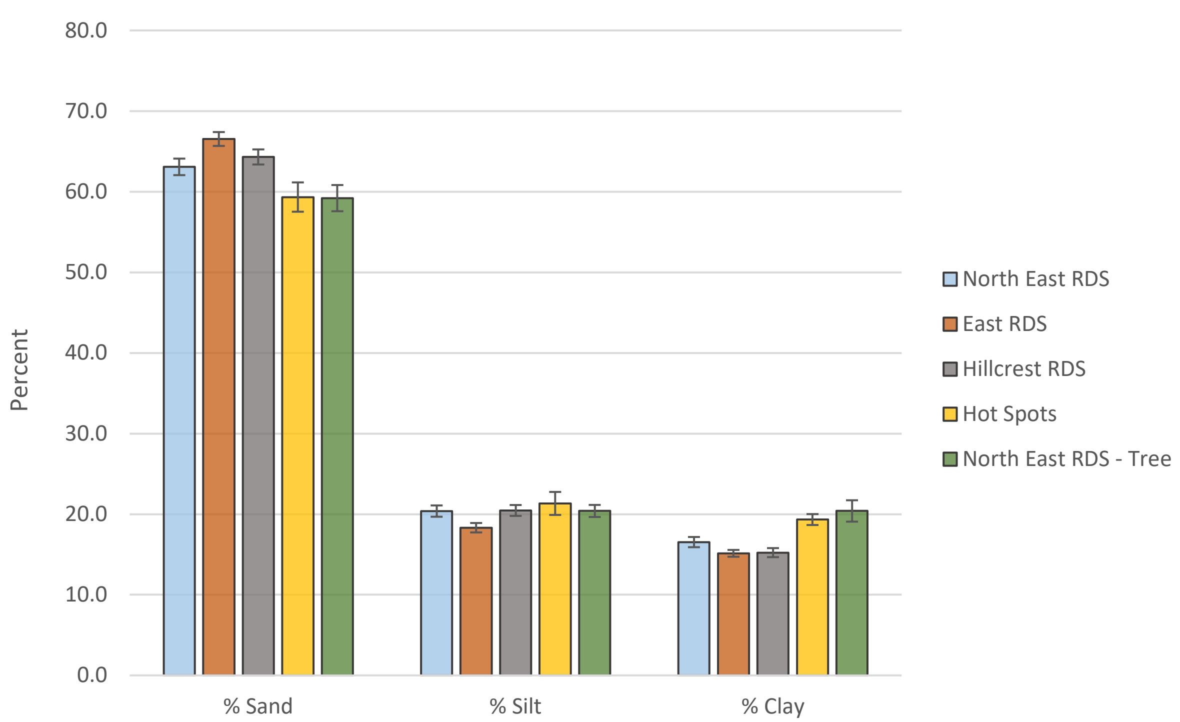
For the units where coversoil was applied (North East RDS, East RDS, and Hillcrest RDS), total depth is similar to the prescribed depth of 20 inches total alluvium and topsoil for slopes ≥ 5% and ≤ 37% at the North East and East RDS'. Total depth is substantially less within the Hillcrest RDS than the 20-inch prescribed depth (*p*<0.0000). However, the Hillcrest RDS was constructed prior to 2002 when recommended coversoil redistribution depths were first included in the Reclamation Plan.

The first horizon that was discernible in the field was assumed to consist primarily of topsoil; the percent organic matter in the first horizon compared to the second horizon supports this assumption (Figure 7). The existing Reclamation Plan "coversoil recipe" specifies that the top 6 inches of coversoil be comprised of topsoil or amended to an equivalent growth media. All of the first horizons within the sample units are greater than 6 inches (*p*>0.1097).

Soil Composition and Coarse Fragment in Coversoil

Most native soils at the MR Continental Mine contain a relatively high percentage of sand and alluvium, often comprised of decomposed granite. Not surprisingly given the coarse native material that constitutes redistributed coversoil, sand is the dominant particle within all sample units. Figure 5 summarizes the percent sand, silt, and clay by sample unit in the redistributed coversoil.

Figure 5. Mean Percent Sand, Silt, Clay (±SE) in Coversoil by Sample Unit



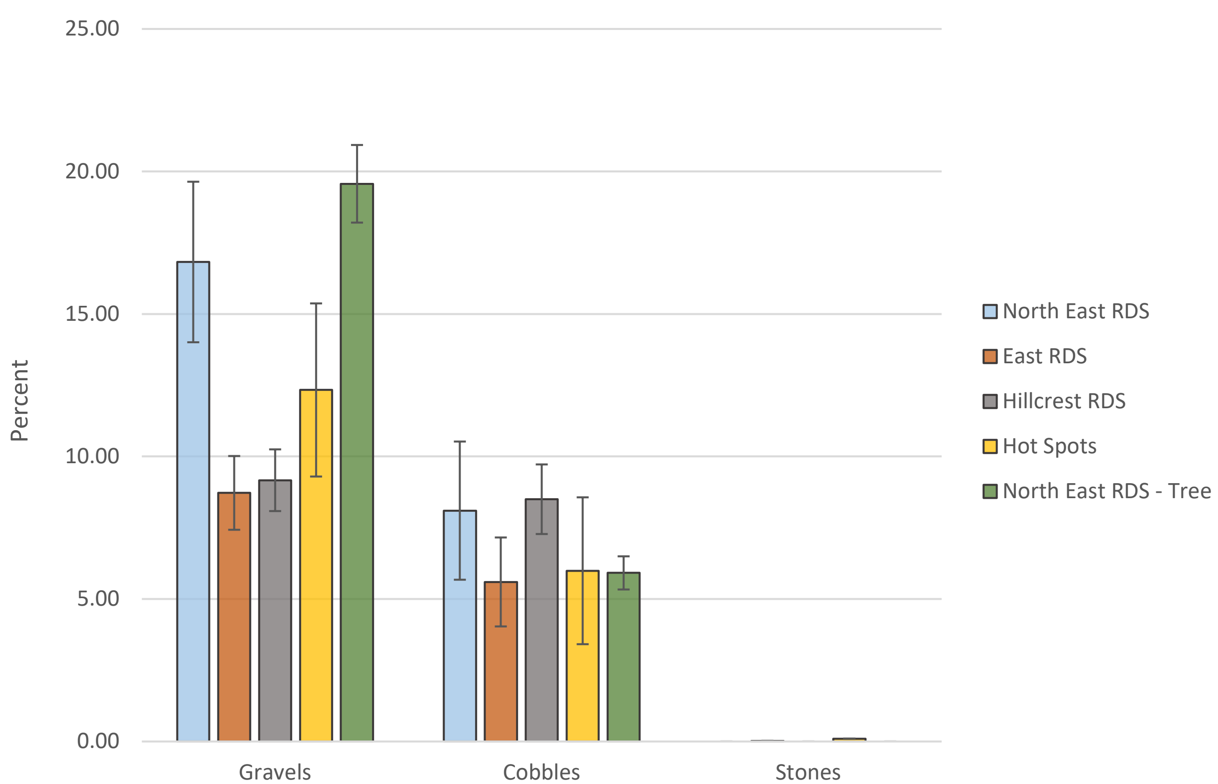
Hot Spots and the North East RDS – Tree have less sand than the other three RDS (*p*<0.0106). The percent sand is higher in the East RDS than the North East or Hillcrest RDS' (*p*<0.0121), and the same between the North East and Hillcrest RDS' (*p*=0.3440).

The East RDS has less silt than any other sample unit (*p*<0.0273), the percent silt is the same among the remaining sample units (*p*>0.5588).

The percent clay is the same between the East and Hillcrest RDS' (*p*=0.9000) and between the Hot Spots and North East RDS -Tree (*p*=0.4403). The percent clay in the North East RDS is greater than either the East or Hillcrest RDS' (*p*<0.0690) and less than either the Hot Spots or North East RDS units (*p*<0.0053).

The Montana Resources Quarternary Alluvium Study (AGS 2021) specifies a standard of no more than 40 percent coarse fragment (>2 mm) in coversoil. Gravels are defined as coarse fragment material between 2 mm and 7.6 cm, cobbles between approximately 7.6 cm and 25 cm, and stones greater than approximately 25 cm (USDA 2015). Figure 6 presents the mean percent coarse fragment by type and sample unit within coversoil.

Figure 6. Mean Percent Coarse Fragment (±SE) in Coversoil by Sample Unit



The percent gravel is highest in the Northeast and Tree sample units, with variable amounts recorded within Hot Spots. Overall, there is no difference in the percent gravel among the North East, Hot Spots, or North East RDS – Tree (*p*>0.1000) nor is there a difference in percent gravel between the East and

Hillcrest RDS’ (*p*>0.1000). Percent gravel is higher in the North East RDS than in either the East or Hillcrest RDS (*p*<0.0442).

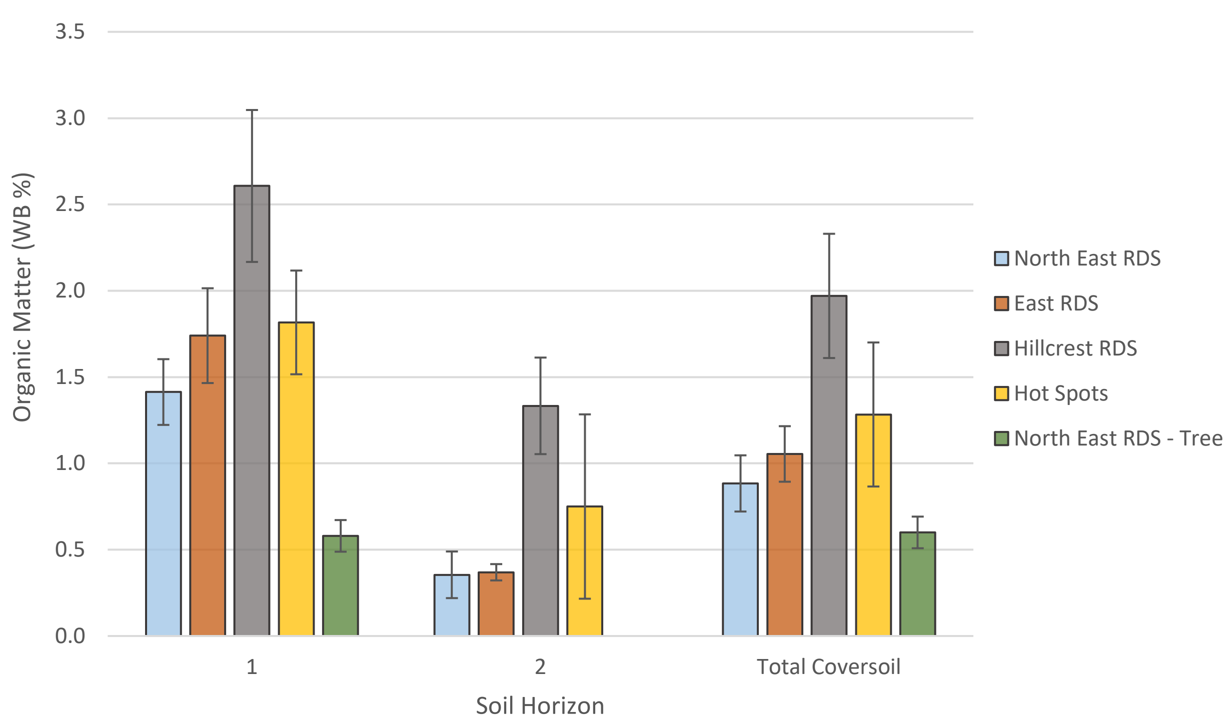
The percent cobble varies among sample units but is not significantly different (*p*>0.1000) except between the Hillcrest and North East - Tree RDS’ (*p*<0.0009). Very few stones were recorded and only within the Hillcrest and North East RDS sample units.

Relative to the 40 percent cutoff criteria for material > 2 mm (i.e., gravels or larger), none of the sample units have mean coarse fragment material greater than 40 percent. The North East RDS and the North East RDS – Tree units average the most total coarse fragment (gravels + cobbles + stones), both at 25 percent, which is well below the 40 percent cutoff criteria cited by AGS (2021).

Soil Organic Matter

Percent organic matter is a soil parameter specified in the Reclamation Plan coversoil recipe; coversoil must average 1.5 percent organic matter according to the Walkley-Black (WB) method to be considered suitable. Figure 7 depicts the mean percent organic matter by soil horizon and sample unit.

Figure 7. Mean Organic Matter - WB % (± SE) by Soil Horizon by Sample Unit



Percent organic matter is greater in the first horizon of the Hillcrest RDS than in the first horizon of the North East, East, or North East – Tree units (*p*<0.1000), but is the same as that in the Hot Spots unit in both horizons and the total coversoil (*p*>0.1412). The percent organic matter in the North East, East, and Hot Spots units is the same in both horizons and the total coversoil (*p*>0.2793). The percent organic matter in the North East – Tree unit is lower than in all the other units in the first horizon and total coversoil, but not significantly different except from the Hillcrest RDS (p=0.0430). These results may be questionable and a function of both the high variance in percent organic matter as well as the small sample size in the North East RDS – Tree and Hot Spots units.

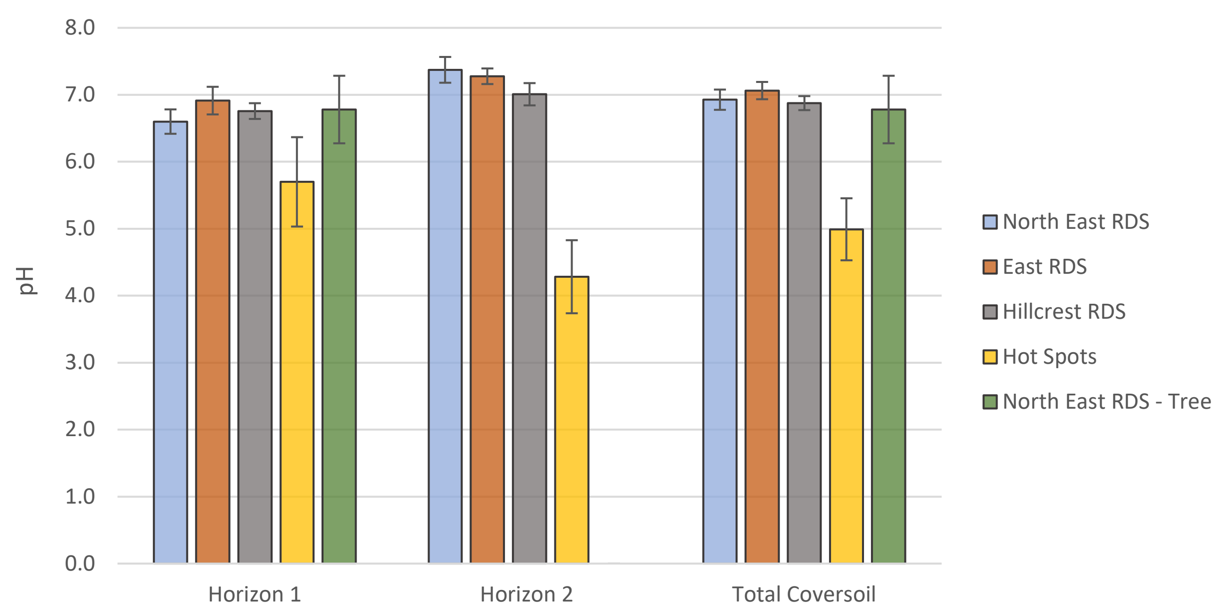
Overall, the percent organic matter within the total cover soil is equal to 1.5 percent as specified in the Reclamation Plan standard only in the Hot Spots sample unit (p=0.6257). Considering that there is very little vegetation within the Hot Spots, the source of organic matter in that sample unit is puzzling. The percent organic matter in total coversoil is less than 1.5 percent in all the other sample units (p<0.0151) except Hillcrest where percent organic matter is greater than 1.5 percent (p=0.0258). However, the percent organic matter is equal to 1.5 percent in the first horizon in the North East and East sample units (p>0.3969). The percent organic matter in the first horizon, which is assumed to primarily be topsoil, is likely the more important factor influencing vegetation than the percent organic matter in the deeper horizon where roots are less likely to be present.

Montana Resources annual reports indicate that average percent organic matter prior to redistributing as is highly variable in the topsoil. Between 2017 and 2020, the percent organic matter in topsoil material varied from a low of 0.8 percent to a high of 5.5 percent depending on the source; mean percent organic matter from these samples was 2.8 percent (Montana Resources 2017, 2018, 2019, 2020).

Soil pH

Soil pH can affect revegetation and metal availability. The Reclamation Plan specifies a pH cutoff of 6.5. Soils with pH equal or above 6.5 do not require a lime amendment while those below 6.5 do require a lime amendment. Figure 8 depicts mean pH by soil horizon and sample unit.

Figure 8. Mean pH (±SE) by Sample Unit



Soil pH is ≥ 6.5 in all of the sample units except Hot Spots, both in the first and second horizon and in the total coversoil (p>0.2843). Soil pH is ≥ 6.5 in the first horizon in the Hot Spots unit, but < 6.5 in the second horizon and in the total cover soil (p<0.0225). These data are consistent with soil sampling prior to redistribution. Montana Resources' recent annual reports indicate that average pH of alluvium prior to redistribution as coversoil is ≥ 6.5 (Montana Resources 2017, 2018, 2019, 2020). It is unlikely that coversoil was applied in the Hot Spots unit, or if it was, that the coversoil eroded out of these sites. This may explain why pH is significantly lower than 6.5 in the Hot Spots unit and lower than in any other sample unit.

Metals

A variety of heavy metals may cause phytotoxicity (Munshower 1994). Montana Resources, in conjunction with various agencies, has identified phytotoxicity cutoffs for several metals as a function of pH (AGC 2021). In particular, the following metal analytes are of interest: Arsenic (As), Cadmium (Cd), Copper (Cu), Lead (Pb), Zinc (Zn), and a Total Metal Index (TMI) in mg/kg calculated as the sum of As + Cu + Zn as stated in the Reclamation Plan. Table 7 summarizes metals of interest by soil sample horizon for each sample unit according to the pH cutoff of 6.5. Cells shaded in yellow indicate average concentrations greater than the phytotoxic level for a particular analyte.

Table 7. Mean Metal Concentrations Above and Below pH 6.5 by Unit

Samples with pH < 6.5 (n=27)							Samples with pH ≥ 6.5 (n=70)						
Analyte	Phytotoxic Cutoff	North East RDS	East RDS	Hillcrest RDS	Hot Spots	North East RDS - Tree	Analyte	Phytotoxic Cutoff	North East RDS	East RDS	Hillcrest RDS	Hot Spots	North East RDS - Tree
Mean Unit pH		6.0	5.9	5.8	4.3	4.9	Mean Unit pH		7.4	7.3	7.0	7.1	7.3
As	136	24	23	27	55	3	As	224	12	26	26	39	25
Cd	5.1	0.3	0.0	1.0	1.9	0.0	Cd	8.6	0.0	0.0	0.1	2.0	0.0
Cu	236	448	199	636	1322	827	Cu	1062	866	379	666	1920	742
Pb	94	77	68	109	148	10	Pb	179	78	88	117	106	209
Zn	196	140	101	367	595	33	Zn	379	128	146	161	494	73
TMI	568	612	323	1030	1971	863	TMI	1665	1005	551	852	2452	840

The mean concentration of several analytes is greater than the phytotoxic level at pH < 6.5; however, only the Hot Spots and North East RDS – Tree sample units have concentrations greater than the phytotoxic level at pH ≥ 6.5. Note that 27 samples (first or second horizon) were recorded with pH < 6.5 whereas 70 samples (first and second horizon) were recorded with pH ≥ 6.5. Interestingly, 3 of the 5 first horizons in Hot Spots had a pH ≥ 6.5 and all these horizons had Cu, Zn, and TMI greater than the phytotoxic level. All the samples with pH < 6.5 had Cu, Zn, and TMI greater than the phytotoxic level. Consequently, metal concentrations are high in the Hot Spots regardless of pH.

Eighty-nine percent of samples with pH < 6.5 had Cu greater than the phytotoxic level, including all of the Hot Spots samples. Fifty-nine percent of samples with pH < 6.5 had TMI greater than the phytotoxic level, including all of the Hot Spots samples.

In contrast, while all of the Hot Spots samples with pH ≥ 6.5 had Cu and TMI greater than the phytotoxic level, only 4 percent of samples within the other RDS units had Cu greater than phytotoxic levels and only 3 percent of samples had TMI greater than phytotoxic levels.

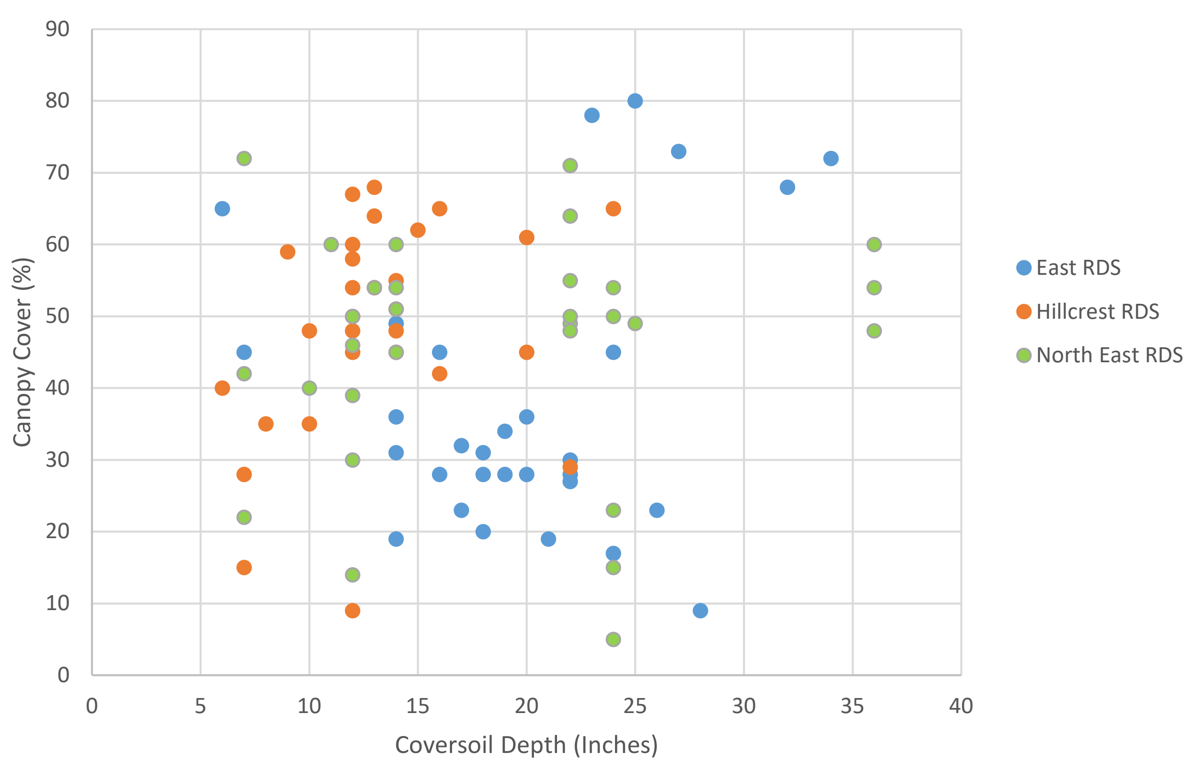
3.3 Influence of Soils on Vegetation

A variety of soil parameters are specified in the Reclamation Plan and other documents that are intended to insure adequate vegetation establishment and longevity. Parameters of particular interest include: coversoil depth, coversoil structure, coversoil percent organic matter, coversoil pH, and coversoil metal concentrations.

Coversoil Depth and Vegetation

Coversoil depth is a key parameter in the Reclamation Plan's coversoil recipe. Figure 9 presents the canopy cover of perennial grasses versus coversoil depth. Perennial grasses were used rather than total cover because they account for more than 92 percent of total cover and are, currently, the only seeded species in reclamation. Hot Spots and North East RDS – Tree sample units were omitted from this analysis since these areas are anomalies on the RDS reclamation and would skew data based on either very low cover (Hot Spots) or primarily tree cover (North East RDS – Tree).

Figure 9. Coversoil Depth vs Perennial Grass Cover

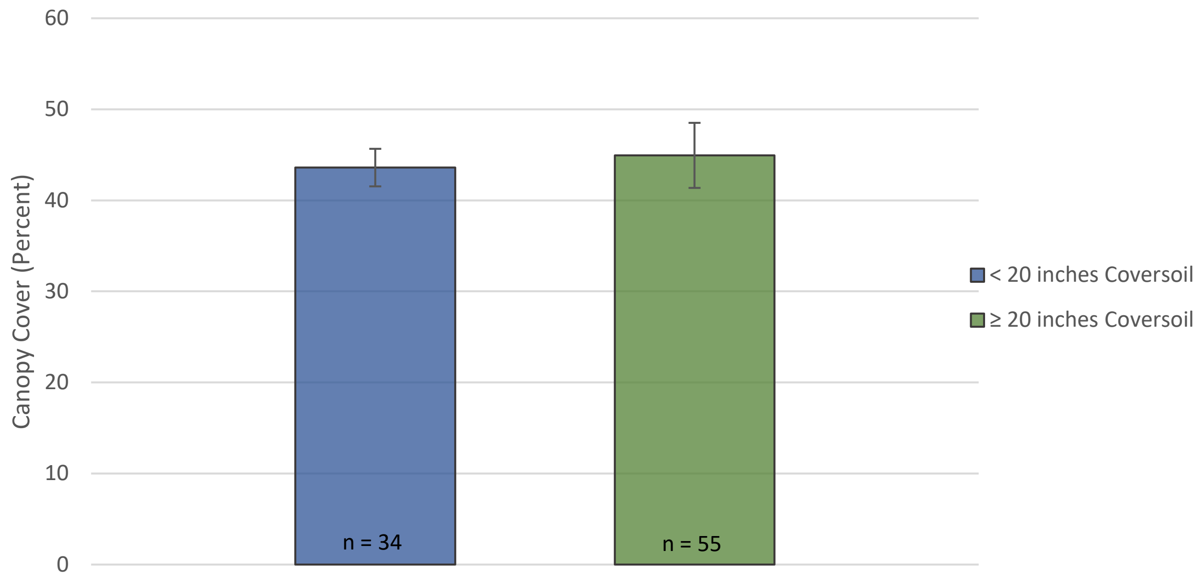


No clear relationship between coversoil depth and perennial grass cover is discernible in Figure 9. Table 4 and Figure 2 illustrate that there is no difference in perennial grass cover between the North East RDS and the Hillcrest RDS, or between the North East RDS and the East RDS. Perennial grass cover is higher in the Hillcrest RDS than in the East RDS. The difference between Hillcrest RDS and East RDS cannot be attributed to deeper coversoil since the Hillcrest unit has shallower coversoil than either the North East or East RDS (Figure 2).

In order to further evaluate coversoil depth on perennial grass cover, coversoil depth was compared to both the coversoil recipe as well as depth categories to determine if depths less than that prescribed resulted in less perennial grass, or if a minimum depth could be determined beyond which perennial grass cover was negatively affected.

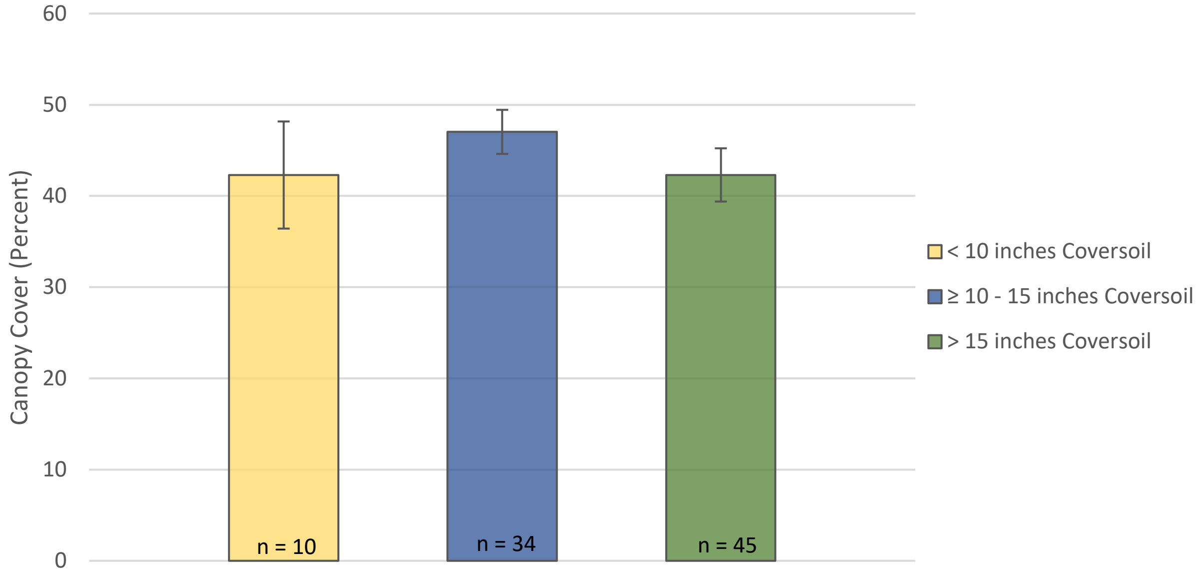
Mean slope of each RDS is between ≥ 5% and ≤ 37%. Consequently, the 20-inch coversoil depth was used as a break point for analysis. Mean perennial grass cover at sites with less than, and more than, 20-inch coversoil is shown in Figure 10. There is no difference (p=0.7277) in perennial grass canopy cover between areas with more than 20-inch coversoil and those with less than 20-inch coversoil.

Figure 10. Mean Perennial Grass Canopy Cover (±SE) at Sites with < 20 inches and ≥ 20 inches Coversoil



Coversoil depth ranges were examined at less than 20 inches to determine if perennial grass canopy cover was negatively affected. Figure 11 depicts mean canopy cover at sites with <10 inches coversoil, ≥10 – 15 inches coversoil, and > 15 inches coversoil. There is no difference (p>0.2375) in perennial grass cover between any of these coversoil breaks, although there are only 10 samples that have a coversoil <10 inches; consequently, concluding that 10 inches of coversoil produces the same perennial grass cover and deeper coversoil may be premature.

Figure 11. Mean Perennial Grass Canopy Cover (±SE)
at Sites with < 10 inches, ≥ 10-15 inches, and >15 inches Coversoil

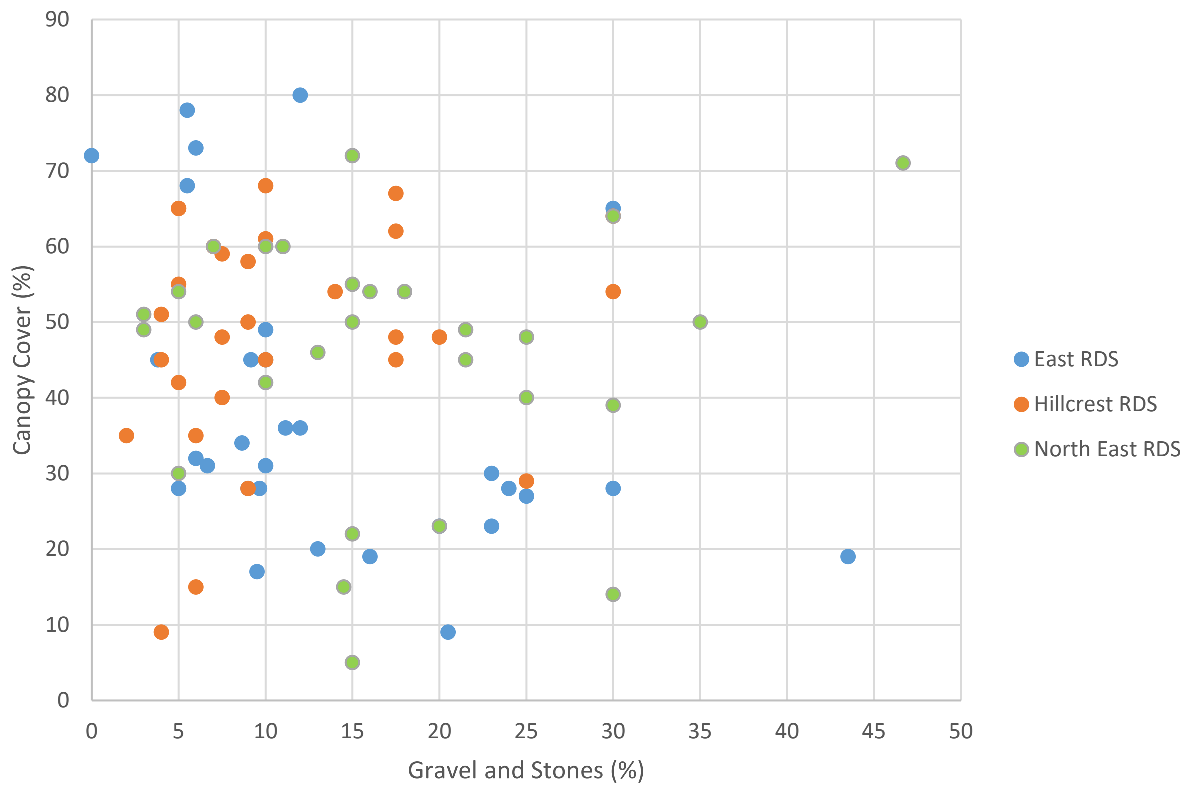


Those areas with <10 inches coversoil include 6 samples consisting of a single horizon, and 4 samples consisting of two horizons. The thinnest first horizon depth is 3 inches and the thickest is 7 inches. Six of these 10 sites with <10 inches coversoil were also analyzed for chemical constituents. In these samples, mean organic matter is 2.9 percent, mean pH is 6.6, mean Cu concentration is 548 mg/kg, and mean TMI is 768 mg/kg. Consequently, although these areas have thin coversoil relative to the coversoil recipe, they also have organic matter, pH, Cu, and TMI within the Reclamation Plan parameters. This would indicate that if coversoil is otherwise suitable, depth may not be a limiting factor at least with first horizons between 3 and 7 inches thick.

Coversoil Structure and Vegetation

The percent of sand, silt, and clay is similar among all sample units. Although the percent gravel, cobble, and stone vary among units, the total amount of material >2 mm is less than the 40 percent cutoff criteria. Not surprisingly, the percent gravel and cobble combined (stones were omitted because they are rare in coversoil) does not have a discernible effect on perennial grass cover (Figure 12).

Figure 12. Percent Gravel and Stones vs Perennial Grass Cover



Coversoil Organic Matter and Vegetation

Percent organic matter is a key parameter in the coversoil recipe which specifies that coversoil contain approximately 1.5 percent organic matter. Although percent organic matter is significantly greater in the Hillcrest RDS than in any other sample unit, both in the first horizon and in the coversoil overall, the cover of perennial grass and total vegetation is not significantly different between the Hillcrest and North East RDS'. The difference in cover between the Hillcrest RDS and East RDS is likely a function of reclamation age, not percent organic matter. Although the North East RDS – Tree sample unit contains primarily tree cover, perennial grass is present in some plots. Because the percent organic matter is low with the Tree sample units compared to the main RDS, data from the Tree unit are included to better evaluate the effect of low organic matter on perennial grass cover. Similar to other soil parameters, there is no general pattern in perennial grass cover and percent organic matter (Figure 13).

To further examine the relationship between percent organic matter and perennial grass cover, samples were placed into different categories of percent organic matter relative to the 1.5 percent parameter and the average cover of perennial grass calculated in each category. Figure 14 depicts mean perennial grass cover by four categories of percent organic matter.

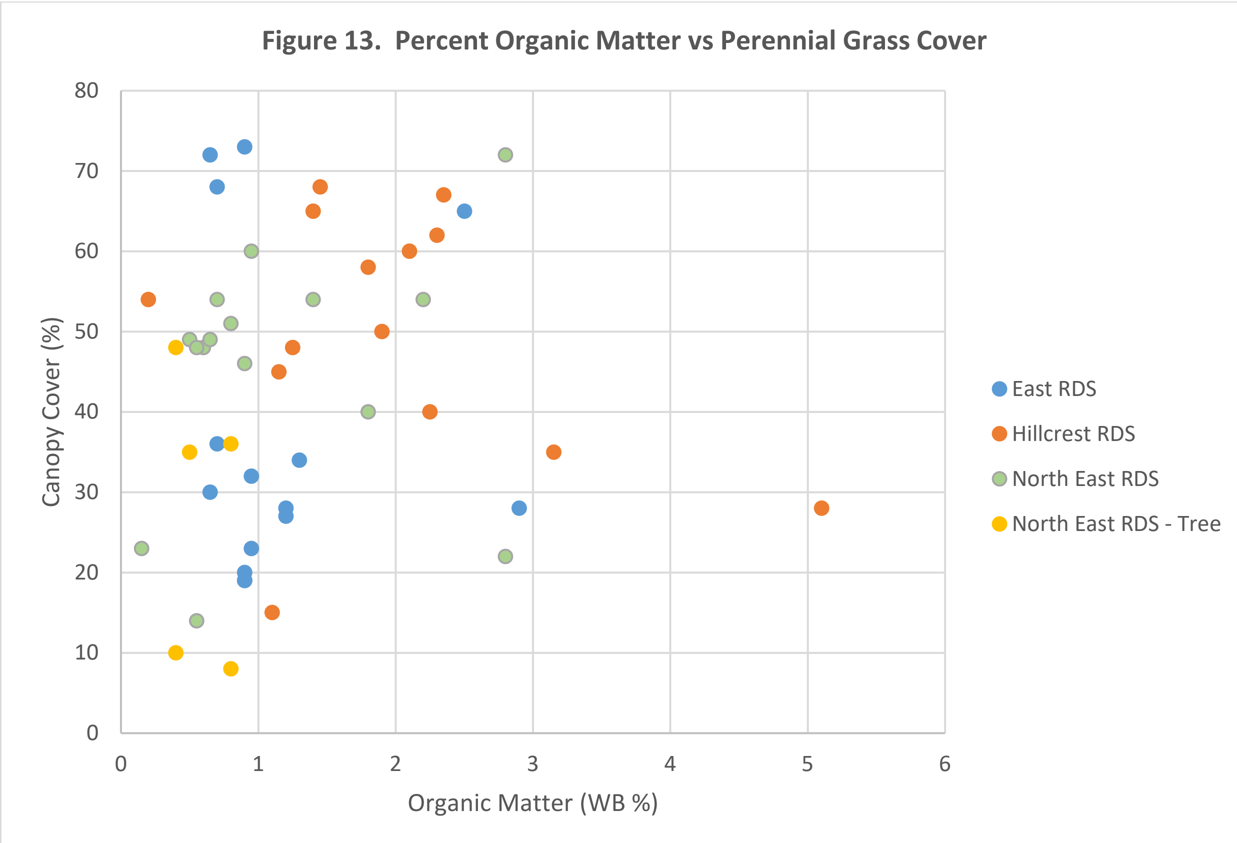


Figure 13. Percent Organic Matter vs Perennial Grass Cover
Canopy Cover (%)
80
70
60
50
40
30
20
10
0
0
1
2
3
4
5
6
Organic Matter (WB %)
East RDS
Hillcrest RDS
North East RDS
North East RDS - Tree

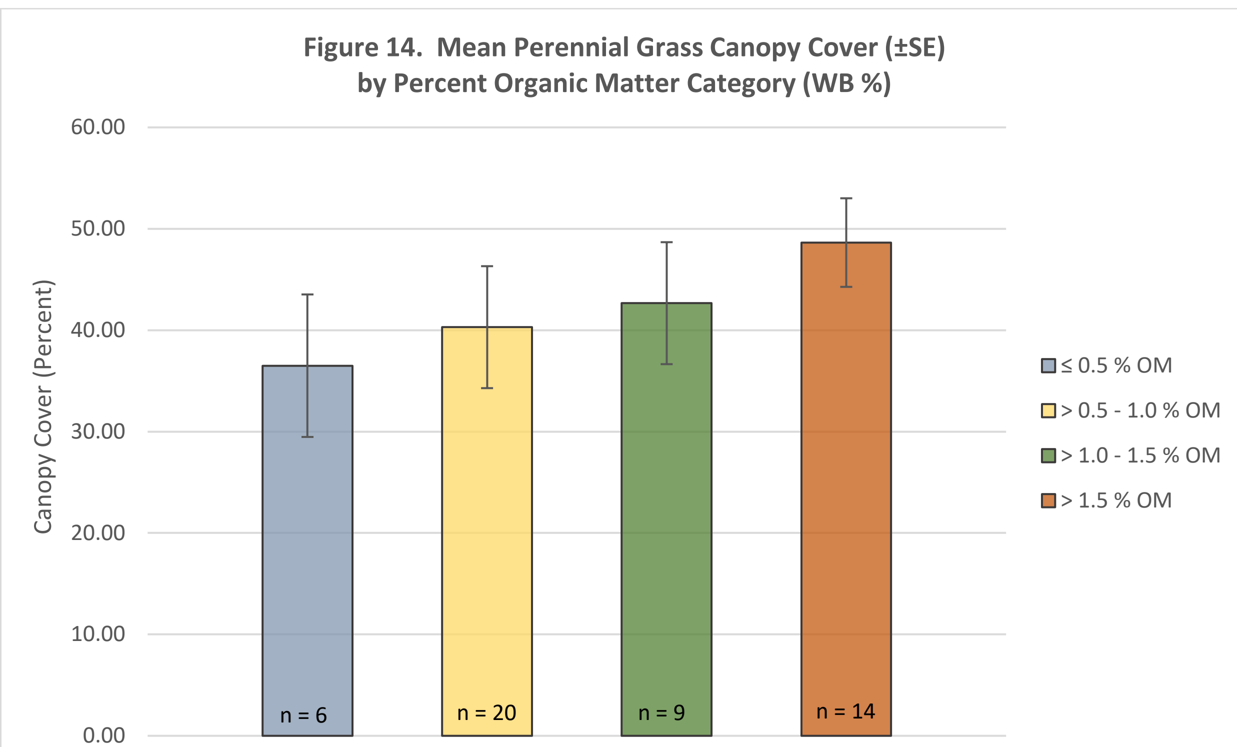


Figure 14. Mean Perennial Grass Canopy Cover (±SE)
by Percent Organic Matter Category (WB %)
Canopy Cover (Percent)
60.00
50.00
40.00
30.00
20.00
10.00
0.00
n = 6
n = 20
n = 9
n = 14
≤ 0.5 % OM
> 0.5 - 1.0 % OM
> 1.0 - 1.5 % OM
> 1.5 % OM

There is no significant difference in perennial grass canopy cover by percent organic matter category as shown in Table 8; however, sample size is low in the ≤ 0.5 % OM category and the conclusion that there is no difference in perennial grass cover between this category and other categories should be considered preliminary.

Table 7. T-Test P-Values: Mean Perennial Grass Cover by Percent Organic Matter Category

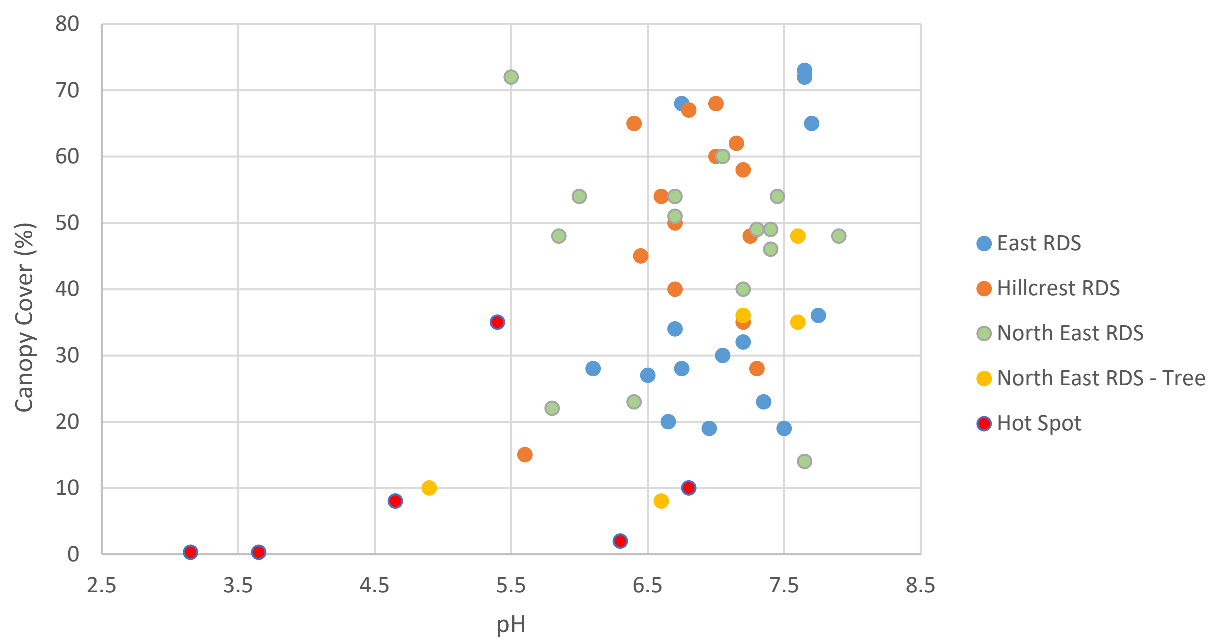
% Organic Matter Category	> 0.5 - 1.0 %	> 1.0 - 1.5 %	> 1.5 %
	p-value	*p*-value	*p*-value
≤ 0.5 %	0.6738	0.5208	0.1510
> 0.5 - 1.0 %	--	0.7608	0.2017
> 1.0 - 1.5 %	--	--	0.4202

Although these data do not prove that organic matter < 0.5 percent will result in adequate perennial grass establishment, they do indicate that there is necessarily a clear benefit of increasing organic matter beyond even 0.5 percent.

Coversoil pH and Vegetation

Mean coversoil pH is ≥ 6.5 in all of the sample units except Hot Spots, both in the first and second horizon and in the total coversoil. Figure 15 shows perennial grass cover by pH. All sample units are included since pH may be a limiting parameter to perennial grass cover within the Hot Spots unit. Because pH is similar between the first horizons and the total coversoil within sample unit, further analysis by horizon was not completed.

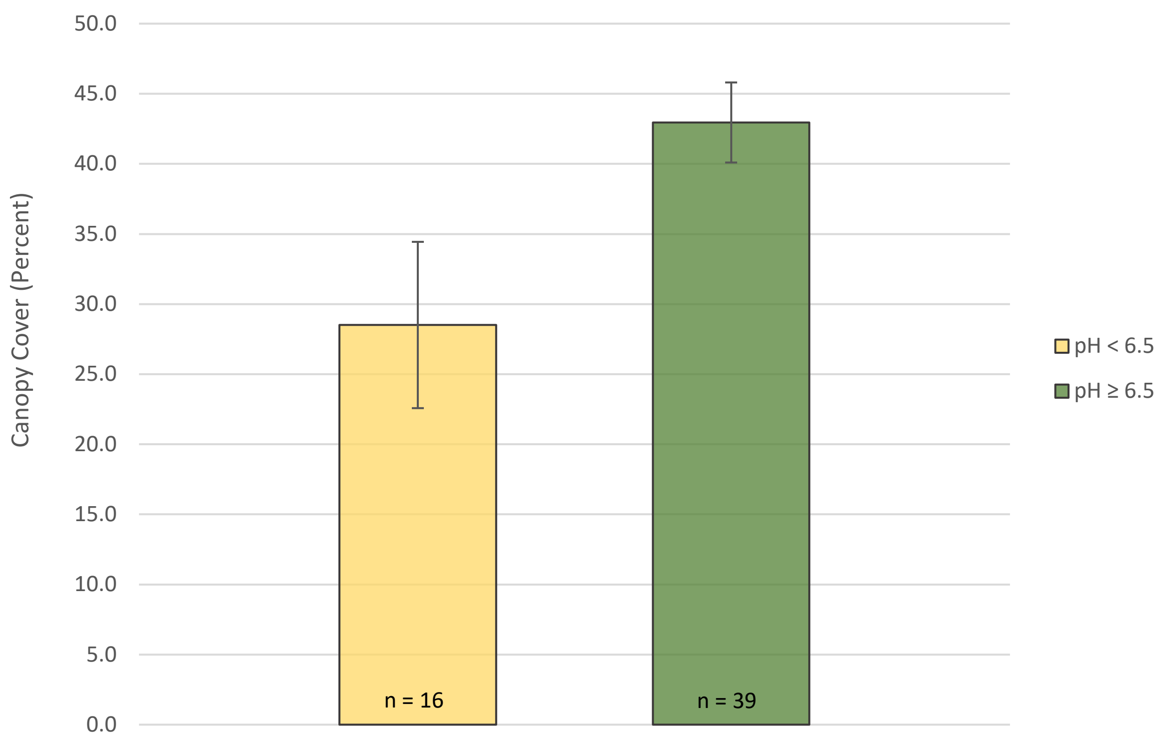
Figure 15. pH vs Perennial Grass Cover



Perennial grass cover was further examined relative to pH by stratifying canopy cover by pH categories. Two categories were identified based on the coversoil formula: pH < 6.5, and pH ≥ 6.5.

Mean perennial grass canopy cover is much lower in samples with pH < 6.5 than in samples with pH ≥ 6.5 (p=0.0124). Low pH can liberate metals at levels that are phytotoxic to plants.

Figure 16. Mean Perennial Grass Canopy Cover (±SE) by pH Category

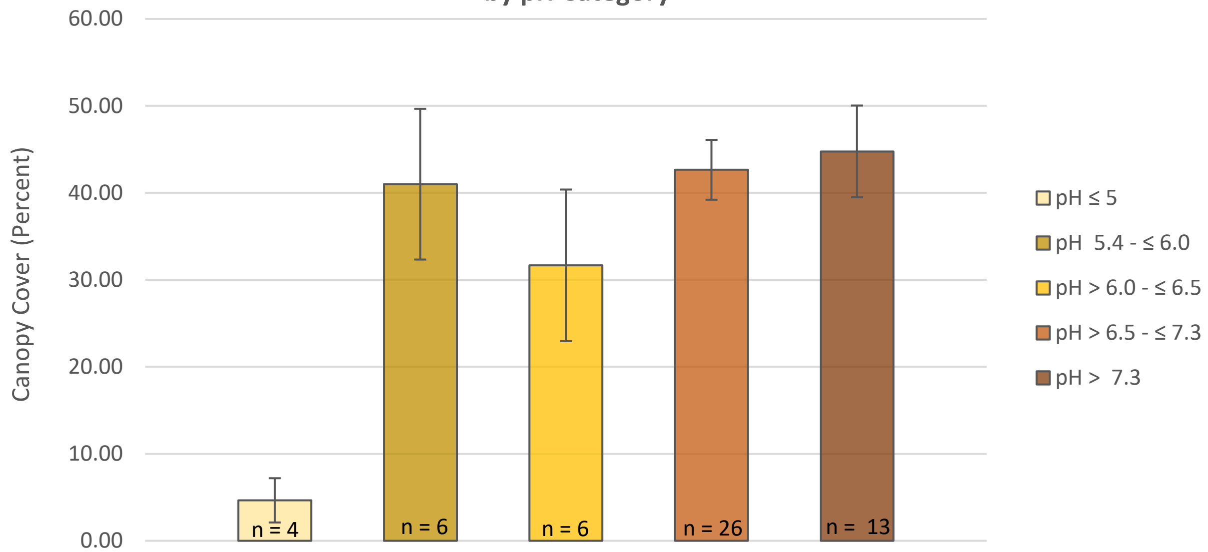


To further examine the effect of pH on perennial grass cover, the pH categories were further divided into the few sites with very low pH (3.2 to 4.9) relative to intermediate pH categories. Soils with pH < 5.0 are considered very strongly acid, soils between pH 5.0 - 5.5 are considered strongly acid, soils between pH 5.6 - 6.0 are considered moderately acid, soils between pH 6.1 – 6.5 are slightly acid, soils between pH 6.6 and 7.3 are neutral, and soils between pH 7.4 and 7.8 are slightly alkaline (Munshower 1994).

Based on these definitions, coversoils were categorized to further examine the relationship between pH and perennial grass cover. Note that there were no samples between pH 5.0 and 5.4; consequently, there is no category of pH 5.0 – 5.4 in this analysis.

Figure 17 depicts mean perennial grass canopy cover in these 5 pH categories. Data in Figure 17 illustrate the effect of the 4 samples with pH ≤ 5.0 on the analysis shown in Figure 16. In those few samples, all but one of which are Hot Spots, perennial grass cover is less than 10 percent. Perennial grass cover in the pH ≤ 5.0 is less than in the other categories ($p<0.0107$) but is the same between the remaining categories ($p=0.1951$), although sample size is limited in the pH > 5.4 - ≤ 6.0 and pH > 6.0 - ≤ 6.5 categories. Typically, vegetation responds best at pH 6.6 to 7.0 although some tolerant plant species may do well in pH 5.6 – 6.0 (Munshower 1994). Based on those criteria, it is interesting that perennial grass canopy cover is not different among pH categories 5.4 to 7.3; this implies that grass species within reclamation at the RDS' are relatively tolerant of moderately acidic soils.

Figure 17. Mean Perennial Grass Canopy Cover (±SE) by pH Category



Coversoil Metals and Vegetation

Overall, there is not a clear relationship between metal concentration, as measured by TMI, and perennial grass cover (Figure 18), with the exception that the Hot Spots samples have a high TMI and very low perennial grass cover. This finding is similar to the relationship between pH and perennial grass cover at Hot Spots sample sites (Figure 15) and is anticipated since low pH can result in phytotoxic metal concentrations.

Stratifying the TMI by pH < 6.5 and ≥ 6.5 does show a clearer trend. The pH 6.5 boundary is the boundary at which phytotoxic levels are compared for various metals. Using pH 6.5 as a cutoff, Figure 19 shows a negative relationship between TMI and perennial grass cover. In contrast, when pH ≥ 6.5, there is a relatively neutral relationship between TMI and perennial grass cover (Figure 20).

Figure 18. Total Metal Index (TMI) in Coversoil vs Perennial Grass Cover

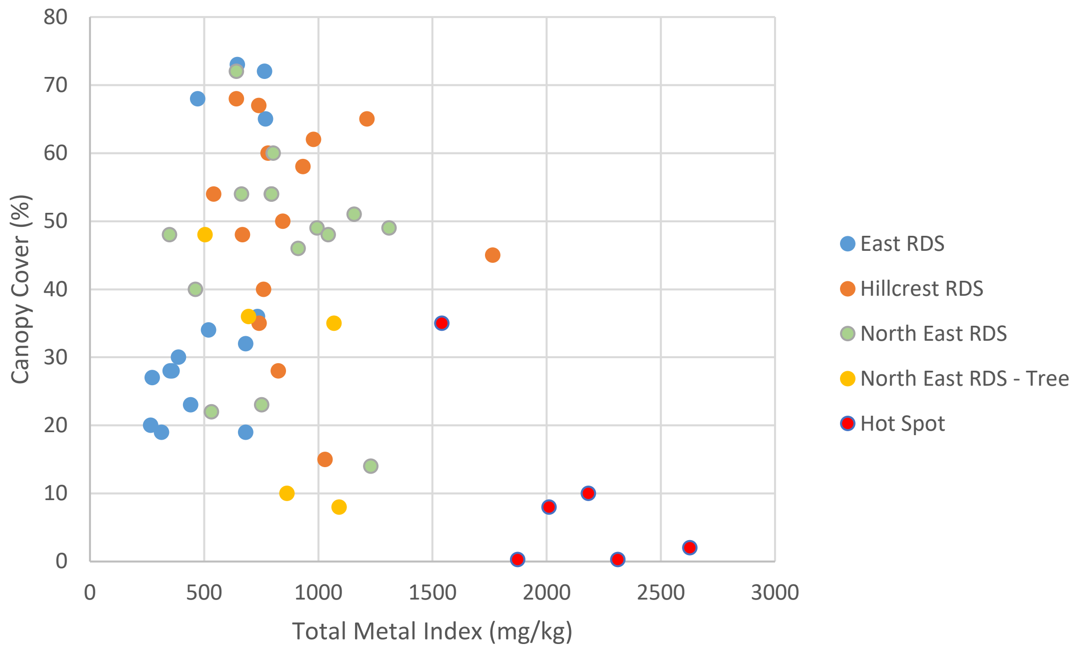
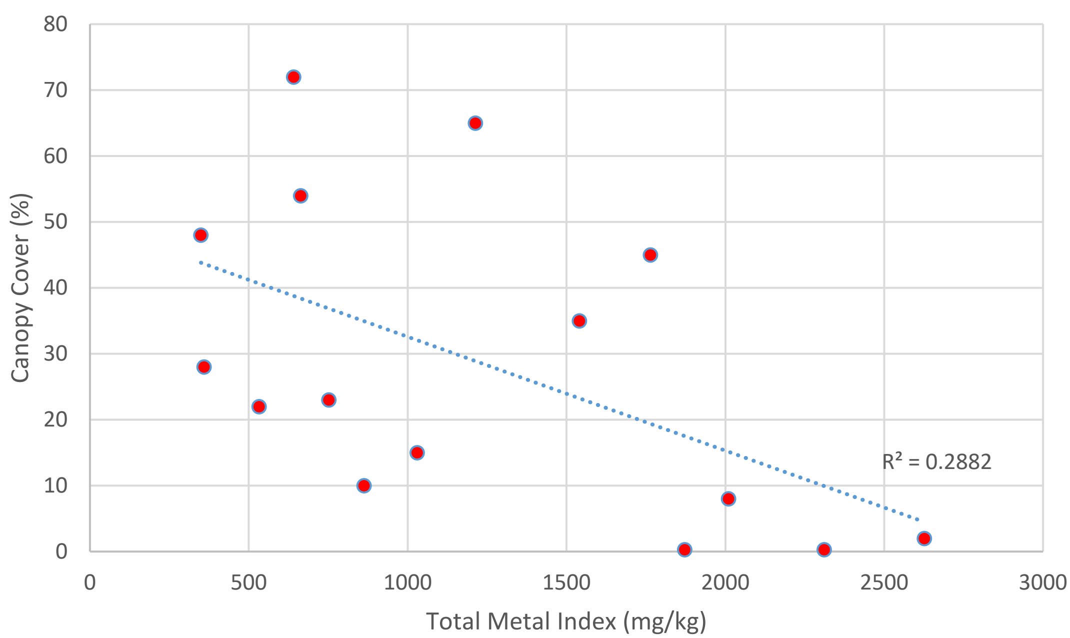
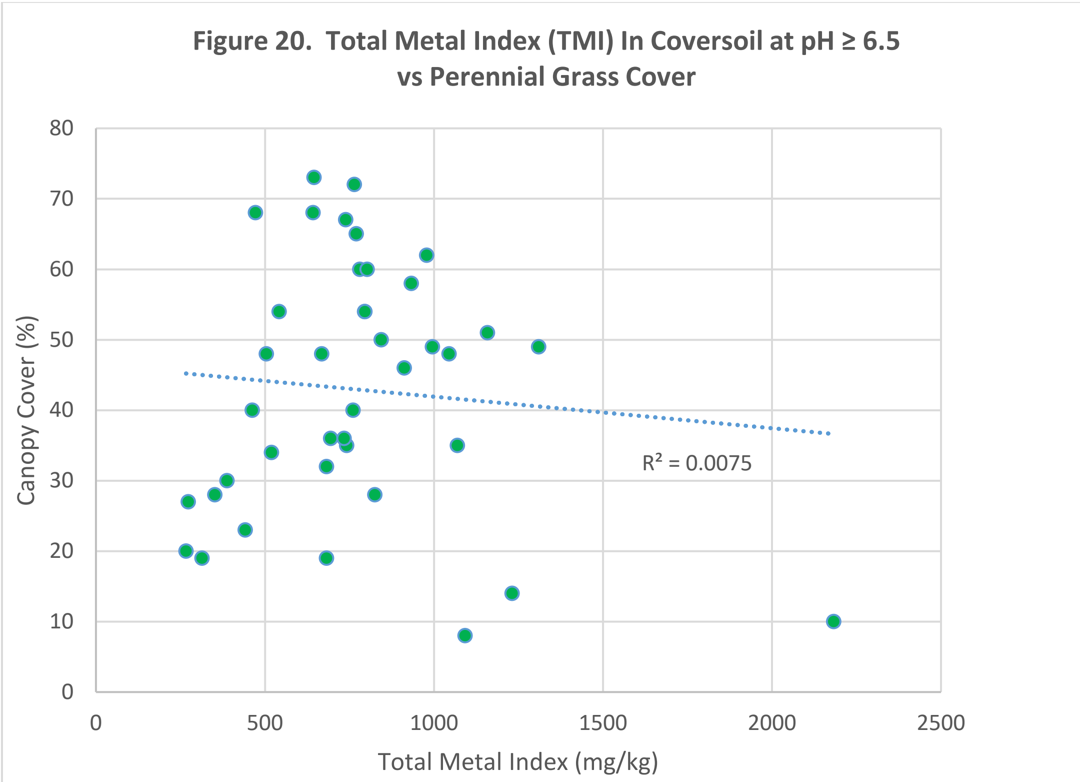


Figure 19. Total Metal Index (TMI) in Coversoil at pH < 6.5 vs Perennial Grass Cover

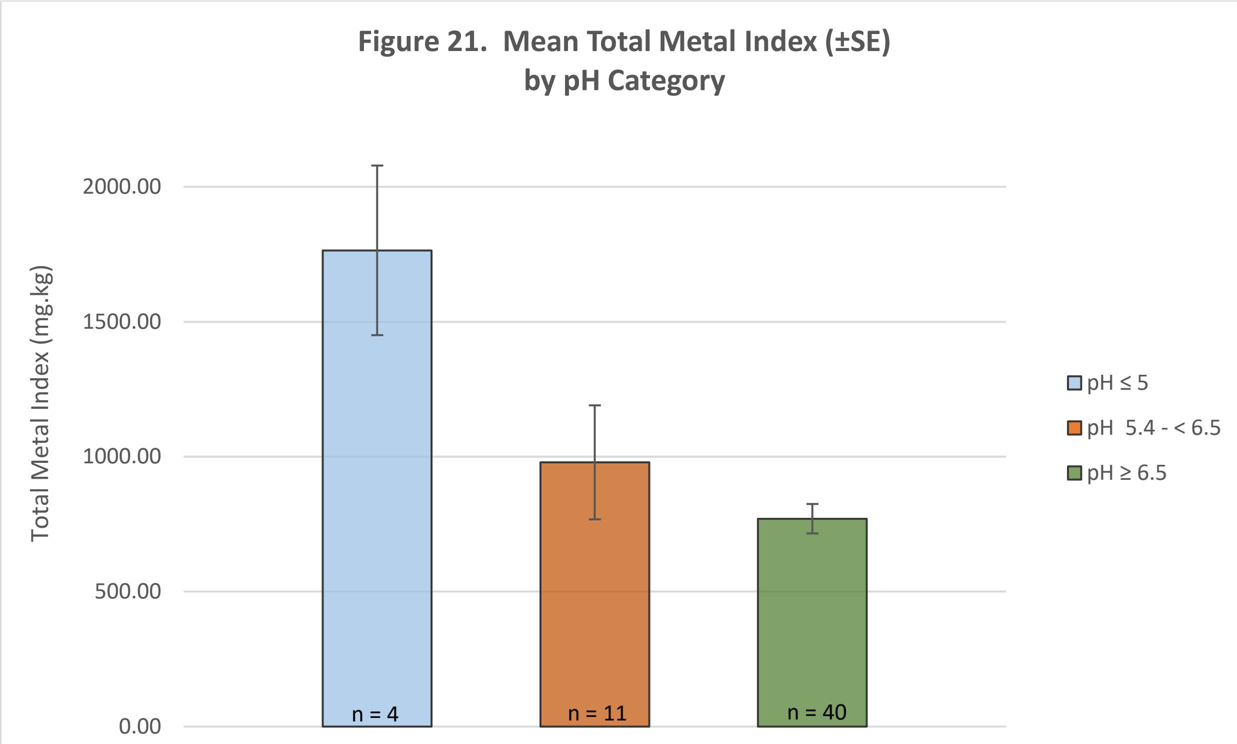




As indicated in the figures above, perennial grass cover is negatively affected by high TMI levels. The TMI cutoff for pH < 6.5 is 568 mg/kg; 80 percent of samples in Figure 19 exceed that threshold. In contrast, the TMI cutoff for pH ≥ 6.5 is 1665 mg/kg; 2 percent of samples in Figure 20 exceed that threshold.

Figure 21 depicts mean TMI for three pH categories, those that are very strongly acid, those that are strongly to slightly acid, and those above the TMI cutoff pH ≥ 6.5. Samples with pH ≤ 5.0 have higher TMI levels than samples with pH > 5 - < 6.5 or pH ≥ 6.5 (p<0.0681); there is no difference in TMI levels between samples with pH > 5 - < 6.5 and pH ≥ 6.5 (p=0.1911). The effect of this difference in TMI levels on perennial grass cover is the likely reason perennial grass cover is lower in areas with very low pH, as shown in Figure 17, although the high hydrogen ion concentration due to low pH could also be responsible (Munshower 1994).

However, since TMI levels are not different between the pH > 5.4 - < 6.5 and pH ≥ 6.5 categories, and perennial grass cover is not different in these categories either; pH as low as 5.4 apparently does not result in an appreciable reduction in perennial grass cover, at least for the species used in reclamation within the East, North East, and Hillcrest RDS'.



Interaction of Coversoil Parameters and Vegetation

Data in the previous sections indicate that of the numerous coversoil parameters that could affect vegetation establishment, the only parameters with a clear measurable influence are low pH and a resulting high TMI. When the Hot Spots samples are removed from the dataset due to very low pH and very high TMI, the effect of relatively low pH and relatively high TMI on perennial grass cover is reduced. Because the intent of reclamation is not to reclaim areas consistent with Hot Spots, data from those samples are excluded from the analysis in this section. Similarly, data from the North East RDS – Tree samples are excluded from analysis in this section. Montana Resources may elect to reclaim additional tree stands in the future, but because this sample unit does not represent standard reclamation procedures at the mine, and because seeded species are relatively sparse within the tree stand, the lack of seeded species within the unit would skew an analysis of the most important contributing factors to establishing the majority of revegetation at the site.

A multiple regression analysis was completed to evaluate parameters that could influence perennial grass canopy cover. A variety of models were evaluated to identify the most parsimonious model that also explained the most variance. Initial models included the following independent variables based on analysis in previous sections and coversoil parameters of interest: 1) reclamation age; 2) total coversoil depth; 3) percent coarse fragment (> 2mm); 4) pH; 5) percent organic matter; and 6) TMI. The most explanatory model has an adjusted R^2 of 0.23 and identified the following significant variables as shown in Table 8.

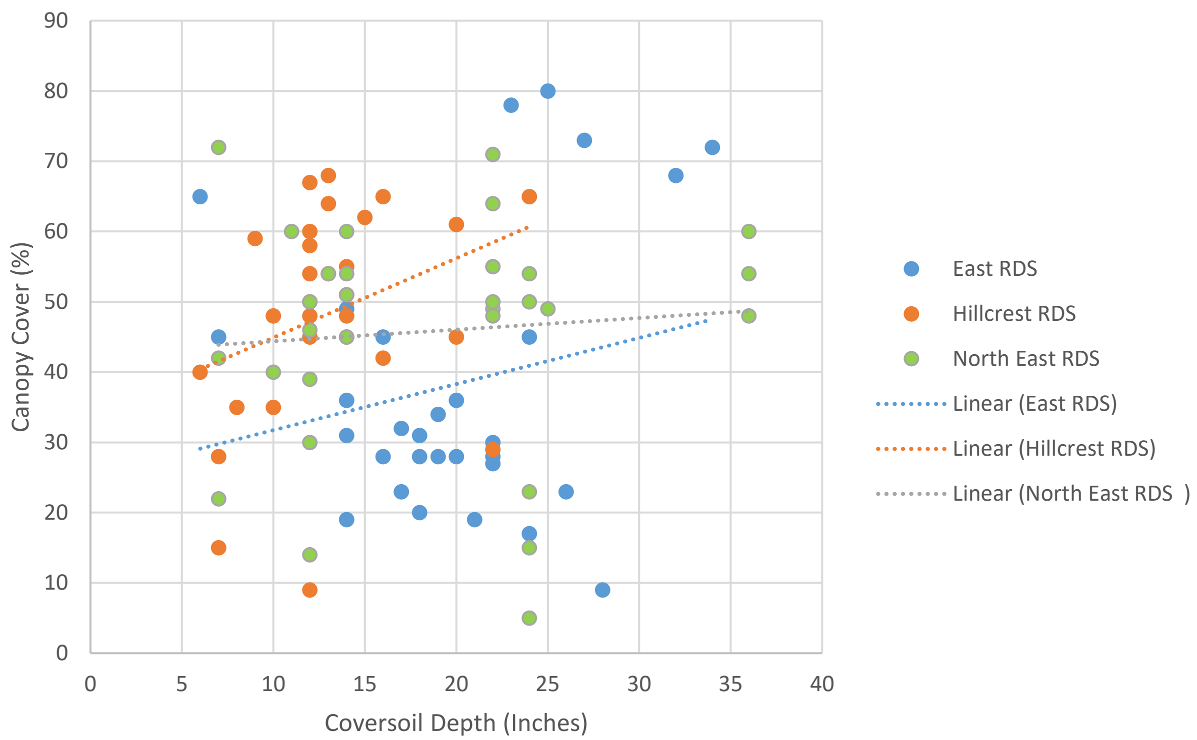
Table 8. Multiple Regression Model Results

Independent Variable	*p*-value	*Model Significance (F)*
Reclamation Age (years)	0.0007	0.0021
Coversoil Depth (inches)	0.0248	

Reclamation age is a key driver of perennial grass canopy cover, the older North East RDS and Hillcrest RDS have more total vegetation, and the Hillcrest RDS has more perennial grass, than does the younger East RDS.

Given that perennial grass cover is not significantly different among various coversoil depths and that there is no clear pattern in coversoil depth and perennial grass cover, it is surprising that coversoil depth is a significant parameter in the model. However, further examination of the relationship between coversoil depth and perennial grass cover reveals a positive relationship between coversoil depth and perennial grass cover within each RDS sample unit. Trendlines in Figure 22 illustrate this positive relationship.

Figure 22. Coversoil Depth (inches) vs Perennial Grass Cover with Linear Trendlines

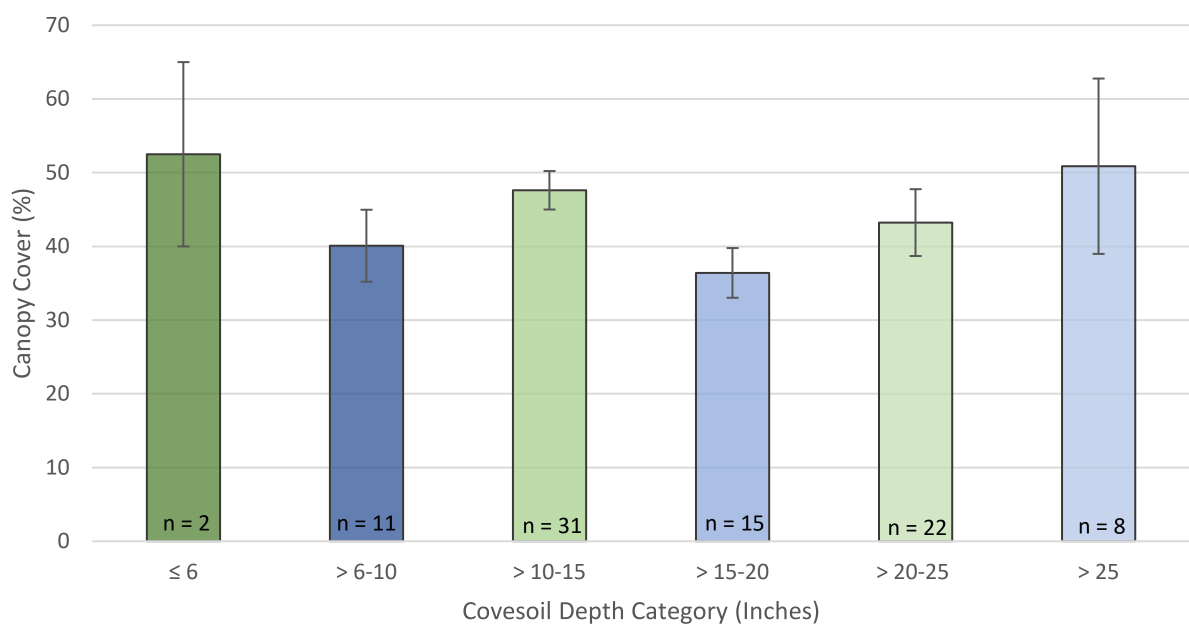


Because the relationship between coversoil depth and perennial grass cover is positive within each sample unit, coversoil depth as an overall parameter has a significant influence on the model. In contrast, other soil parameters, such as percent organic matter, show positive, negative, and neutral relationships with perennial grass cover; consequently, these relationships cancel each other out when combined. Similarly, when the Hot Spot and North East RDS – Tree sample units are removed from analysis, the relationships between pH or TMI and perennial grass cover are either highly positive, or slightly negative, within the East, Hillcrest, and North East RDS', with the result that these relationships cancel one another out when modeled as a whole.

Although coversoil depth is a significant parameter in this model, its significance may decline with time, not because coversoil depth will change but because perennial grass cover will likely increase within the younger East RDS sample unit. As this happens, the relationship between coversoil depth and perennial grass cover will become more neutral with the result that coversoil depth may no longer be a significant parameter.

Further, even if coversoil depth is a significant parameter in the model, it is difficult to identify its practical effect on perennial grass cover. Mean perennial grass cover averages between 42 percent and 47 percent at coversoil depths of < 10 inches, ≥10 – 15 inches, and > 15 inches with no significant difference in perennial grass cover among these three coversoil depths. Splitting coversoil depth categories more finely on arbitrary five-inch increments reveals the same lack of effect on perennial grass cover (Figure 23), although sample size in the < 6 inch and > 25-inch categories is limited and may not be representative. The only significant difference (p=0.0151) among these categories is between the 10 – 15 inch and 15 – 20-inch categories, which is likely not an ecologically meaningful distinction.

Figure 23. Mean Perennial Grass Canopy Cover (±SE) at Sites with ≤ 6 inches, > 6 - 10 inches, > 10 - 15 inches, > 15 - 20 inches, > 20 - 25 inches, and > 25 inches Coversoil



4.0 Conclusions

Three primary conclusions may be reached from the 2021 reclamation monitoring data:

1. Coversoil is suitable for establishing stable and self-sustaining vegetation capable of supporting comparable utility of adjacent areas in all sample units except the Hot Spots unit.
2. Low pH and high metal concentrations likely preclude development of vegetation within the Hot Spots sample sites.
3. Because coversoil is a suitable growth medium, coversoil depth does not limit perennial grass establishment and perpetuation.

Stable and Self-Sustaining Vegetation

The stated goal of the Reclamation Plan is to "establish a self-sustaining vegetative cover capable of supporting post-closure land use objectives". This goal is consistent with MCA 82-4-336(9)(a) which states that, "the reclamation plan must provide for the reclamation of all disturbed land to comparable utility and stability as that of adjacent areas".

Vegetation on reclaimed areas has been established since 1995 on portions of the Hillcrest RDS and since 2002 on portions of the North East RDS (see Appendix A). Although some portions of these RDS' have been revegetated in later years, the last year revegetation was completed on the Hillcrest RDS was 2012 and the last year revegetation was completed on the North East RDS was 2014. Compared to the younger East RDS where revegetation is between one and two years old, revegetation in these older RDS' has clearly developed greater canopy cover, perennial grass density, and diversity. Further, seed heads were observed on most perennial grasses within all of the RDS units. Consequently, revegetation development indicates a self-sustaining vegetative cover in these units.

The post-closure land use objective is to maintain stable soils and provide vegetation that may be used by wildlife. No erosion was observed in any RDS other than the recently seeded East RDS where vegetation is establishing. Erosion that is present within the East RDS is minor and is anticipated to resolve as canopy cover increases. Soils are stable in the other RDS', although they are exposed in the Hot Spots sites. However, the Hot Spots are not an intended post-closure land use.

A variety of songbirds were observed within reclaimed areas during reclamation monitoring. Similarly, numerous mule deer were observed feeding in the reclaimed areas. Consequently, wildlife currently use reclaimed areas.

The MCA states that reclaimed lands must provide for "comparable utility and stability as that of adjacent areas". There are several types of land uses adjacent to the reclaimed areas, including: native aspen woodland, revegetated highway shoulders, residential areas, and active mining. Compared to all of these areas, perennial grass establishment within the RDS appears greater than the adjacent areas. Stability within the RDS is also high as witnessed by the limited erosion that is present. Utility within the RDS is also high given use by wildlife.

Revegetation in the Hillcrest RDS, North East RDS, and North East RDS – Tree units clearly is self-sustaining and capable of supporting post-closure land use objectives. Revegetation in the East RDS is also capable of supporting the post-closure land use objective but is young; one or two more growing seasons are required to demonstrate that revegetation in this RDS is also self-sustaining. Revegetation in the small, isolated Hot Spots unit is not self-sustaining or capable of supporting post-closure land use objectives without remediation.

Low pH and High Metal Concentrations in Hot Spots

All of the parameters that were evaluated for this monitoring report, with the exception of percent organic matter, indicate that coversoil in the Hot Spots sample unit is unsuitable for vegetation establishment consistent with the Reclamation Plan goal. Remedial action to cover these areas with suitable material is recommended to establish perennial grass, or other vegetation, on the Hot Spots sites.

Coversoil Depth and Vegetation Establishment

The current coversoil recipe requires 20 inches of coversoil, of which approximately 6 inches are topsoil, on slopes between 5 percent and 37 percent. Vegetation establishment data indicate that 20 inches of coversoil is not necessary to establish self-sustaining vegetative cover capable of supporting post-closure land use objectives as long as other soil parameters are suitable.

Future Monitoring

Revegetation monitoring in the future is recommended to evaluate the following topics.

1. Monitoring should be completed at small, isolated areas outside of the main RDS footprints to determine if self-sustaining vegetative cover capable of supporting post-closure land use objectives is present. In addition, soil samples should be collected at these sites consistent with the methods used in this report to determine if the results presented here are consistent with revegetation at these older, disparate sites.
2. Revegetation monitoring within the East RDS should be repeated at the sites that were sampled in 2021 to record vegetation development. These data would assist with answering the following three questions:
    a. How many growing seasons are required for vegetation to establish to levels similar to that in the older RDS? Revegetation in the North East RDS and Hillcrest RDS are 7 years old at a minimum. Based on revegetation on other mines and disturbances in Montana, it likely will require a total of 3 to 5 years for revegetation within the East RDS to be similar to that in these older RDS.
    b. As perennial grass cover increases in the East RDS, will the relationship between coversoil depth and perennial grass cover become more neutral with the result that coversoil depth may no longer be a significant parameter?
    c. Does the minor rilling within the East RDS resolve or is remedial action necessary?

5.0 References

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Appendix A –
Reclamation Sample Units

LEGEND

- Permit Boundary
- Rock Diposal Site (RDS) Reclamation Hillcrest - 48 Acres
- 2021 Vegetation Sample Site
- 2021 Vegetation / Soils Sample Site
- Reclamation History
- Contour 25-foot
- Contour 5-foot

Aerial: 2021

0 300 600 ft

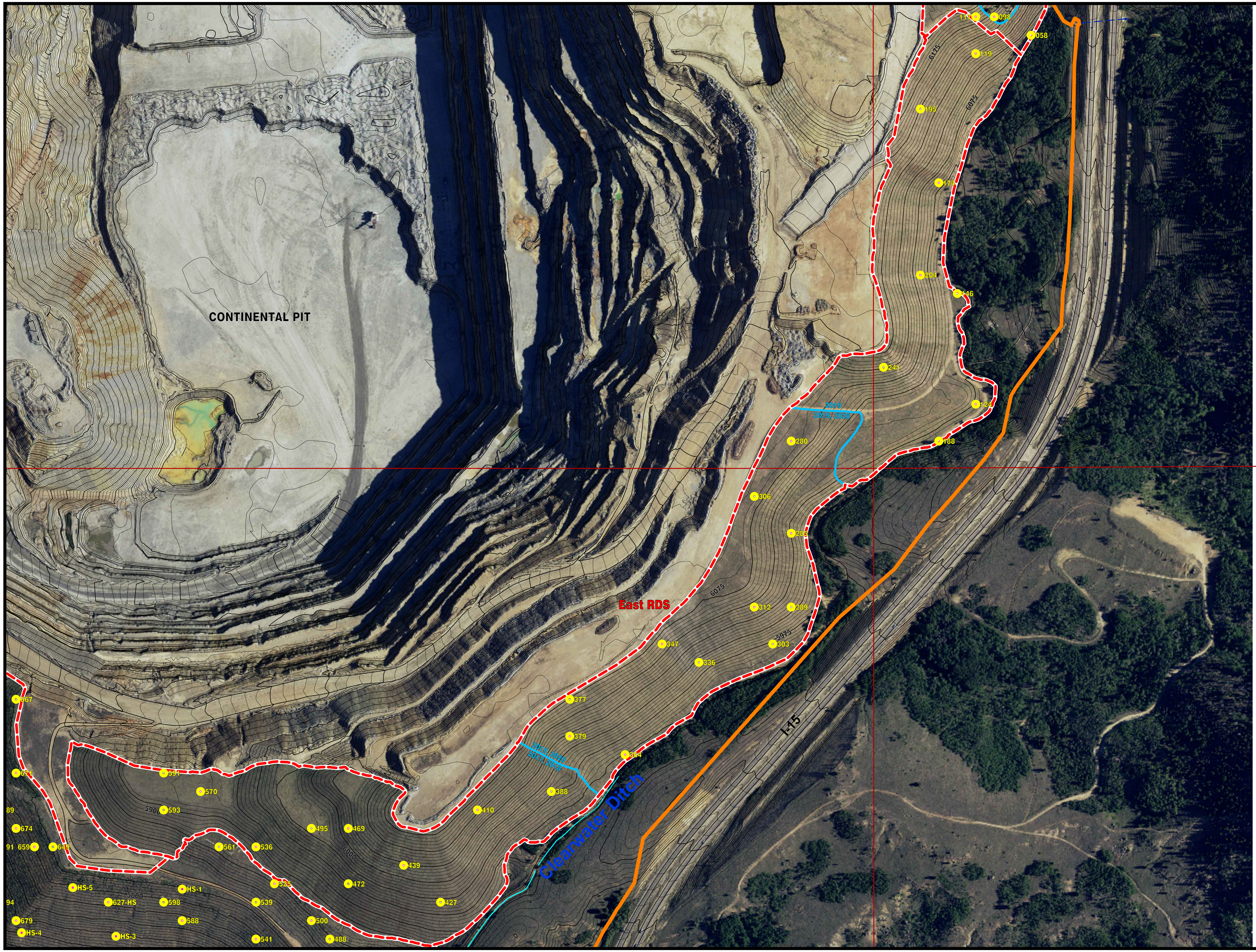
Montana Resources
Continental Mine

Appendix A

Reclamation Sample Units Hillcrest Rock Disposal Site

WESTECH ENVIRONMENTAL

MR22_Rec_Mon_East_Dump_Plots.dwg | 1"=300' | 06/02/22



LEGEND

Permit Boundary

Rock Diposal Site (RDS) Reclamation East - 92 Acres

2021 Vegetation Sample Site

2021 Vegetation / Soils Sample Site

Reclamation History

Contour 25-foot

Contour 5-foot

Aerial: 2021

0 500 1000 ft

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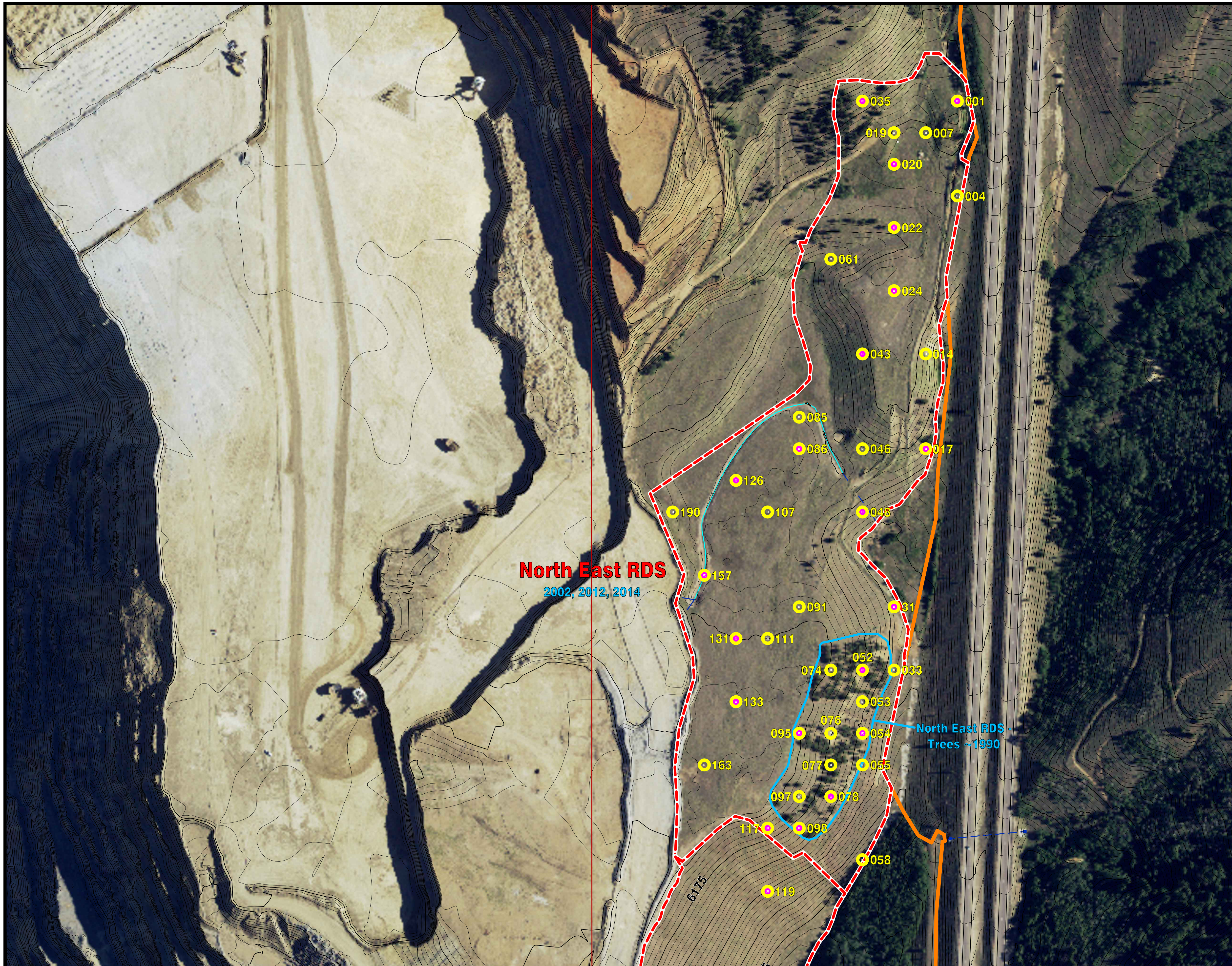
Appendix A

Reclamation Sample Units East Rock Disposal Site

WESTECH ENVIRONMENTAL

MR22_Rec_Mon_East_Dump_Plots.dwg | 1"=500' | 06/02/22



LEGEND

- Permit Boundary
- Rock Diposal Site (RDS) Reclamation North East - 32 Acres
- 2021 Vegetation Sample Site
- 2021 Vegetation / Soils Sample Site
- Reclamation History
- Contour 25-foot
- Contour 5-foot

Aerial: 2021

N

0 300 600 ft

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Appendix A

Reclamation Sample Units North East Rock Disposal Site

WESTECH ENVIRONMENTAL

MR22_Rec_Mon_East_Dump_Plots.dwg | 1"=300' | 06/02/22

3.0 Material Characterization

3.1 Alluvium

No alluvium was stockpiled in 2021.

3.2 Leached Capping

No leached capping material was stockpiled in 2021.

3.3 Material Characterization Program

During construction of the 6450-lift to the YDTI, an ABA sample is collected every 40,000 cubic yards of zone D1 material, every 400,000 cubic yards of zone U material and every 10,000 cubic yards of zone UA material. Results from these samples analyzed in 2021 are contained in the construction reports prepared per the Construction Management Plan.

None of the leached capping from the D East pushback will be used as reclamation material. All leached capping material was used for tailings embankment construction. The purpose of sampling this material used for construction is to segregate the material relatively so that when the material balance allows, the higher quality leached capping can be placed in the downstream side of the embankment and the material of lesser quality can be placed to the center or to the upstream side of the embankment.

Quarterly tailing composite samples were collected in 2020 but results from ABA and whole rock analysis were not available for the 2020 Annual Report. In addition, quarterly tailings samples were collected in 2021. The results from the 2020 and 2021 quarterly tailings samples are included in Table 3.1.

Table 3.1 Tailings Geochemistry

	2020				2021			
Sample Site/No. →	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
	M.T.P.H.	M.T.P.H.	M.T.P.H.	M.T.P.H.	M.T.P.H.	M.T.P.H.	M.T.P.H.	M.T.P.H.
Constituent ↓	20Q1	20Q2	20Q3	20Q4	21Q1	21Q2	21Q3	21Q4
ppm Cu	458	402	312	365	358	429	454	478
ppm Mo	71	77	82	82	72	91	67	82
% Fe	2.39	2.01	1.86	1.99	1.85	1.98	1.89	1.69
% Al	1.29	1.19	1.16	1.03	1.19	1.33	1.36	1.24
ppm Sb	<1	<2	<2	<2	<20	<20	24	25
ppm As	5	5	6	5	4	6	6	3
ppm Ba	77	69	73	68	82	77	82	76
ppm Bi	1	1	1	1	<1	2	2	2
ppm Cd	<1	<1	<1	<1	<1	<1	<1	<1
% Ca	0.840	0.810	0.857	0.777	0.810	0.910	0.867	0.739
ppm Cr	10	12	12	11	12	12	13	12
ppm Co	11	10	10	9	10	10	10	10
ppm Pb	16	28	18	26	23	33	27	39
% Mg	0.706	0.712	0.734	0.646	0.740	0.786	0.749	0.624
ppm Mn	446	321	350	404	417	477	365	295
ppm Ni	7	9	8	7	8	8	8	7
ppm P	497	482	475	443	458	463	424	427
% K	0.677	0.760	0.771	0.643	0.856	0.898	0.857	0.685
% Si	0.0352	0.0280	0.0254	0.0261	0.0428	0.0363	0.0353	0.0355
% Na	<0.0200	0.0178	0.0192	0.0165	0.0220	0.0214	0.0226	0.0172
ppm Sr	21	35	38	24	23	34	41	37
ppm Sn	<7	3	3	2	<20	<20	26	27
ppm Ti	845	802	792	684	1000	953	912	797
ppm V	49	58	55	47	58	56	55	48
ppm Zn	188	139	156	162	143	229	198	103
ppm Se	<1	<1	<1	<1	<1	<1	<1	<1
pH	8.8	8.8	8.9	9.1	8.9	9.0	9.1	9.9
ABP T/THO	-39	-32	-16	-37	-37	-52	-51	-58
% S-N-EX	0.14	0.12	0.10	0.23	0.17	0.20	0.12	0.12
% S-PYR	1.5	1.7	1.1	1.5	1.7	2.2	1.8	2.2
% S-SO_4	0.06	0.06	0.11	0.18	0.02	0.01	0.30	0.06
% S-Tot.	1.9	1.9	1.3	1.9	1.9	2.5	2.4	2.5
AGP T/THO	60	60	42	60	60	77	74	79
ANP T/THO	20	27	25	23	23	25	23	20

4.0 Water Quality

During 2021, MR continued the water quality sampling program. Attached is a report which includes a summary and trend analysis of the water monitoring conducted in 2021.

Water Quantity:

The average freshwater make-up flow from the Silver Lake Water System (SLWS) in 2020 was 1.20 million gallons per day (MGD). Tailings are pumped as a slurry to the YDTI at an average rate of approximately 18,000 gpm. The tailings slurry is approximately 35% solids by mass. Water returned from the YDTI to the mill was not measured in 2021 but is estimated to be an average rate of approximately 21 MGD[1]. The average flow in the Clear Water Ditch as measured by MBMG at a flume near the guard shack was 958 gpm in 2021; reflecting campaign pumping of the Continental Pit. Flow from the Continental Pit is not monitored but is estimated to average approximately 0.5 MGD. Approximately 1.5 billion gallons were treated at the Horseshoe Bend Water Treatment Plant; 1.2 billion gallons of Berkeley Pit water was extracted and treated; and 2.6 billion gallons were discharged to Silver Bow Creek by the BMFOU Pilot Project in 2021. Also, approximately 11.8 million gallons of water were pumped to the MR Dredge Pond from the Parrot Tailings Removal Project in 2021.

[1] This includes water delivered to the Polishing Plant for discharge to Silver Bow Creek.

MONTANA RESOURCES
2021 BASELINE AND OPERATIONAL
WATER RESOURCES MONITORING REPORT

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April 2022

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LIST OF ACRONYMS

bgs	Below Ground Surface
DI	Deionized water
DO	Dissolved Oxygen
FSAP	Field Sampling and Analysis Plan
GWE	Groundwater Elevation
MR	Montana Resources, LLP
PRDL	Project Required Detection Limit
QC	Quality Control
RPD	Relative Percent Difference
SC	Specific Conductance
SOP	Standard Operating Procedure
SWL	Static Water Level
VWP	Vibrating Wire Piezometer
WED	West Embankment Drain
YDTI	Yankee Doodle Tailings Impoundment

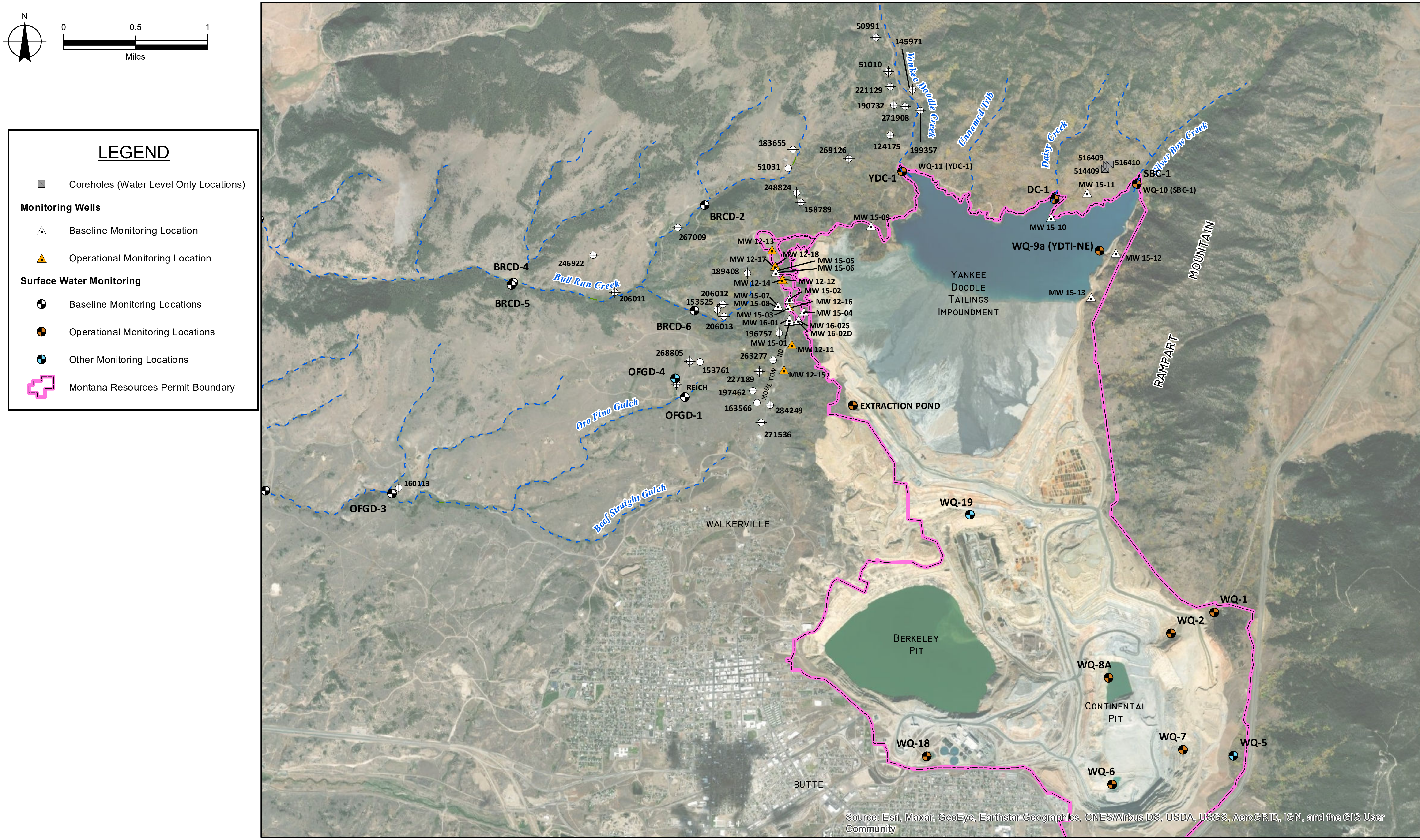
MONTANA RESOURCES
2021 BASELINE AND OPERATIONAL
WATER RESOURCES MONITORING REPORT

1.0 INTRODUCTION

At the request of Montana Resources, LLP (MR), Hydrometrics conducted hydrologic monitoring in the vicinity of the Continental Mine in 2021. The 2021 monitoring program included semi-annual (spring and fall) groundwater and surface water sampling. Monitoring activities were focused on the Yankee Doodle Tailings Impoundment (YDTI) and Moulton Reservoir Road area, with additional monitoring sites located throughout the active mine site (Figure 1-1). The 2021 monitoring program is a continuation of the water resources monitoring implemented the past several years and contributes to establishment of an extensive water quality database for the YDTI and Continental Mine area and satisfies certain Continental Mine operating permit requirements. Objectives of the monitoring program include:

1. Continue baseline surface water and groundwater quality monitoring as initiated under MR's Amendment 10 mine permitting program; and
2. Provide operational water quality data as required by the Continental Mine operating permit(s).

This report documents the scope and results of 2021 water resources monitoring activities conducted by Hydrometrics at the Continental Mine. Also included is an analysis of water quality trends for the monitoring period of record. Besides documenting current water quality conditions and trends, information provided in this report will be used in design and planning of future water resources monitoring programs.



MONTANA RESOURCES
YANKEE DOODLE TAILINGS IMPOUNDMENT

MONTANA RESOURCES PROJECT AREA AND 2021 SURFACE WATER AND GROUNDWATER MONITORING LOCATIONS

FIGURE 1-1

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2.0 MONITORING PROGRAM SCOPE

This section describes the scope and details of the 2021 water resources monitoring program including monitoring locations, schedules, and analytical parameters. The sampling methodology is also summarized below with additional detail provided in the 2021 Field Sampling and Analysis Plan (FSAP; Hydrometrics, 2021).

2.1 SURFACE WATER MONITORING

The 2021 surface water monitoring program included a total of 20 sites (Table 2-1). Eleven of these sites are included in MR's operational monitoring program designated for seasonal sampling in the current mine operating permit (MR, 2019). Six sites are considered baseline monitoring sites established during 2012 to 2016 to document surface water quality west of the YDTI as part of the YDTI Amendment 10 permitting activities. Water quality data from these sites documents current hydrologic conditions around the YDTI for comparison to future water quality data. Three sites are neither operational nor baseline and were sampled at MR's request for general information. Table 2-1 provides a description of each site by program with site locations shown in Figure 2-1.

Two sampling events were conducted in 2021, one in June during high flow conditions, and the second in October during the low flow season. The two sampling events are meant to document surface water quality conditions under the varying flow regimes.

Monitoring at each surface water site included field measurements of streamflow (where conditions allowed), pH, specific conductance (SC), dissolved oxygen (DO), and water temperature. Water samples were also collected at each site for laboratory analyses of a suite of major constituent, nutrient, and trace metal concentrations at Energy Laboratories in Helena (Table 2-2). With the exception of aluminum, all metals were analyzed for the total recoverable fraction. Aluminum samples were filtered through a 0.45 µm disposable filter in the field prior to preservation for dissolved fraction analysis. Details of surface water sampling procedures, sample handling and preservation, and analytical methods are included in the 2021 FSAP (Hydrometrics, 2021).

2.2 GROUNDWATER MONITORING

The 2021 groundwater monitoring program included water quality sampling at 24 monitoring wells according to the monitoring schedule in Table 2-3. The majority of sites (22) are part of the operational monitoring program (MR, 2018) with the remaining two sites monitored to further document baseline water quality conditions. All wells were monitored during spring (June) and fall (October) to document groundwater characteristics under variable hydrologic conditions. Monitoring well locations are shown on Figure 2-2.

Groundwater monitoring included field measurements of static water level (SWL), pH, SC, DO, and water temperature. Groundwater samples were collected at each well for laboratory analyses of major constituent, nutrient, and trace metal concentrations at Energy Laboratories in Helena (Table 2-2). Samples for metals analyses were filtered through a disposable 0.45 µm filter prior to preservation for

TABLE 2-1. 2021 MONTANA RESOURCES SURFACE WATER MONITORING SITES

Site ID	Latitude (°N)	Longitude (°W)	Description
BRCD-2(1)	46.0608	-112.5433	Upper Bull Run Creek drainage downstream of BRCD-1 at Poorman Rd crossing.
BRCD-4(1)	46.0523	-112.5705	Bull Run Creek at end of Frog Pond Rd, downstream of BRCD-3.
BRCD-5(1)	46.0520	-112.5707	Tributary to Bull Run Creek entering from the south immediately downstream of BRCD-4.
BRCD-6(1)	46.0501	-112.5442	South Fork of BRC upstream of Bull Run Road crossing. Very little flow.
OFGD-1(1)	46.0414	-112.5451	Head of Frog Pond at junction of Bull Run Creek Rd and Frog Pond Rd (east of Bull Run Creek road).
OFGD-3(1)	46.0306	-112.5869	Downstream Oro Fino Gulch in Section 10.
OFGD-4(3)	46.0433	-112.5467	Spring/seep in Oro Fino Gulch drainage downstream of OFGD-1. Sampled upgradient of house.
DC-1 (WQ-15)(2)	46.0627	-112.4929	Lower Dixie Creek at impoundment immediately upstream of metal culvert.
SBC-1 (WQ-10)(2)	46.0645	-112.4811	Silver Bow Creek immediately upstream of tailings pond.
YDC-1 (WQ-11)(2)	46.0650	-112.5150	Yankee Doodle Creek immediately upstream of tailings pond.
YDTI-NE (WQ-9a)(2)	46.0617	-112.4869	Tailings pond near decant barge.
Extraction Pond(2)	46.0414	-112.5207	West Embankment Drain extraction pond.
WQ-1(2)	Woodville East: upstream of the previously reclaimed Woodville waste rock dump.		
WQ-2(2)	Woodville West: southwest side of the Woodville waste rock dump.		
WQ-6(2)	Continental Pit South: southern end of the active Continental Pit.		
WQ-7(2)	Pavilion Seep: on the 5840 bench of the Continental Pit below the old Columbia Gardens		
WQ-8A(2)	Continental Pit North: northern end of the Continental Pit.		
WQ-18(2)	Emergency/Ecology Pond: Southwest corner of the property north of Texas Avenue.		
WQ-5(3)	Clear Water Ditch near southeastern property boundary, upstream of waste rock facilities.		
WQ-19(3)	No. 10 Seep on East-West Embankment at weir.		

(1) Baseline Monitoring Sites
(2) Operational Monitoring Site
(3) Other monitoring site.

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LEGEND

- Baseline Monitoring Locations
- Operational Monitoring Locations
- Other Monitoring Locations

MONTANA RESOURCES
YANKEE DOODLE TAILINGS IMPOUNDMENT

2021 SURFACE WATER MONITORING LOCATIONS

FIGURE
2-1

TABLE 2-2. 2021 SURFACE WATER AND GROUNDWATER ANALYTICAL PARAMETER LIST

Parameter	Analytical Method [1]	Project Required Detection Limit (mg/L)
Physical Parameters		
pH	150.2/SM 4500H-B	0.1 s.u.
Specific Conductance	120.1/SM 2510B	1 µmhos/cm
TDS	SM 2540C	10
TSS	SM 2540D	10
Common Ions		
Alkalinity	SM 2320B	1
Acidity as CaCO3 (if pH<5)	A2310B	1
Bicarbonate	SM 2320B	1
Carbonate	SM 2320B	1
Sulfate	300	1
Chloride	300.0/SM 4500CL-B	1
Fluoride	A 4500 F-C	0.1
Nutrients - Operational Surface Water Samples Only		
Nitrate + Nitrite as N	E353.2	0.03
Total Phosphorous as P	E365.1	0.05
Metals: Surface Water-Total Recoverable (except dissolved for aluminum); Groundwater - Dissolved		
Aluminum (Al) (dissolved)	200.7/200.8	0.005
Antimony	200.8/200.9	0.0005
Arsenic (As)	200.8/SM 3114B	0.001
Boron (B)	200.7/200.8	0.1
Cadmium (Cd)	200.7/200.8	0.00003
Calcium	215.1/200.7	5
Chromium (Cr)	200.7/200.8	0.001
Copper (Cu)	200.7/200.8	0.001
Iron (Fe)	200.7/200.8	0.02
Lead (Pb)	200.7/200.8	0.0003
Lithium (Li)	200.8/200.9	0.1
Magnesium	242.1/200.7	5
Manganese (Mn)	200.7/200.8	0.01
Mercury (Hg)	245.2/245.1/200.8/SM 3112B	0.000005
Molybdenum (Mo)	E246.2/200.7/200.8	0.0001
Nickel (Ni)	200.7/200.8/200.9	0.002
Potassium	258.1/200.7	5
Rubidium (Rb)	200.8/200.9	0.0001
Selenium (Se)	200.7/200.8/SM 3114B	0.001
Silicon (Si)	200.7/200.8	0.1
Silver (Ag)	200.7/200.8	0.0002
Sodium	273.1/200.7	5
Strontium (Sr)	200.7/200.8	0.02
Tungsten (W)	200.7/200.8	0.0001
Thallium (Tl)	200.8/200.9	0.0002
Uranium	200.8	0.0002
Vanadium (V)	E286.2200.7/200.8	0.1
Zinc (Zn)	200.7/200.8	0.008
Field Parameters		
Water Temperature	HF-SOP-20	0.1 °C
Dissolved Oxygen (DO)	HF-SOP-22	0.01 mg/L
pH	HF-SOP-20	0.01 pH standard unit
Specific Conductance (SC)	HF-SOP-79	1 µmhos/cm

(1) Analytical methods are from *Standard Methods for the Examination of Water and Wastewater* (SM) or EPA's *Methods for Chemical Analysis of Water and Waste* (1983). Equivalent methods may be substituted.

TABLE 2-3. 2021 GROUNDWATER MONITORING SITES
MONTANA RESOURCES YANKEE DOODLE TAILINGS IMPOUNDMENT

Monitor Well	Location	Top of Casing Elevation	Screen Interval feet bgs
MW 12-11	South ridge near ridge crest	6521.41	145-195
MW 12-12	North ridge near ridge crest	6475.87	165-200
MW 12-13	North ridge near ridge crest	6490.28	150-200
MW 12-14	North ridge near ridge crest	6476.47	100-150
MW 12-15	South ridge near ridge crest	6518.90	150-200
MW 12-16	Central ridge, groundwater potentiometric low	6487.58	141-191
MW 12-17	North ridge near ridge crest	6472.97	155-195
MW 12-18	North ridge near ridge crest	6472.65	80-115
MW 15-01	Central ridge near ridge crest	6504.13	182-222
MW 15-02	Central ridge near ridge crest	6483.34	147-197
MW 15-03	Central ridge, groundwater potentiometric low	6487.41	345-385
MW 15-04	Central ridge on east ridge flank	6435.98	170-220
MW 15-05	North ridge near ridge crest	6468.72	240-290
MW 15-06	North ridge near ridge crest	6468.97	350-400
MW 15-07	Central ridge near ridge crest	6464.65	162.5-202.5
MW 15-08	Central ridge near ridge crest	6464.57	81.5-101.5
MW 15-09	North of tailings impoundment	6455.25	92-142
MW 15-10*	North of tailings impoundment	6369.00	84-99
MW 15-11*	North of tailings impoundment	6536.30	161-201
MW 15-12	East of tailings impoundment	6436.18	68.5-98.5
MW 15-13	East of tailings impoundment	6420.83	81-101
MW 16-01	Central ridge, deep fracture system	6502.09	485-517
MW 16-02D	Central ridge, deep fracture system	6499.41	489-549
MW 16-02S	Central ridge near ridge crest	6499.33	244-264

* Denotes baseline monitoring sites; all other sites are operational monitoring sites.
bgs - below ground surface
Elevations relative to Anaconda mine grid datum.

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MONTANA RESOURCES
YANKEE DOODLE TAILINGS IMPOUNDMENT

2021 GROUNDWATER SAMPLING LOCATIONS

FIGURE
2-2

analysis of the dissolved fraction. Details on groundwater sampling procedures, sample handling and preservation, and analytical methods are included in the 2021 FSAP (Hydrometrics, 2021).

In addition to seasonal water quality monitoring, SWLs were recorded monthly at most YDTI wells throughout 2021. Groundwater level monitoring, particularly along the ridge west of the impoundment (the West Ridge) is an important component of the YDTI monitoring program since the groundwater levels along the ridge are of interest in maintaining hydraulic containment along the west side of the YDTI (MR, 2018). The monitoring wells are also instrumented with vibrating wire piezometers (VWPs) for continuous water level monitoring. All manual water level data is maintained in a spreadsheet database by Hydrometrics with the VWP data maintained by MR.

2.3 FIELD QUALITY CONTROL SAMPLES

In accordance with the 2021 FSAP, field quality control (QC) samples were collected during all sampling events to assess data quality and representativeness. QC samples were collected at a frequency of one set (one duplicate, one deionized water (DI) blank, one equipment rinsate blank for groundwater; one duplicate, one DI blank for surface water) per 20 field samples during each monitoring event. A total of 18 QC samples were collected in 2021 with the QC sample results utilized for data validation as described in Section 4.0.

3.0 MONITORING RESULTS

Results of the 2021 surface water and groundwater monitoring programs are discussed below. Water quality results from each program are evaluated with a focus on key parameters of interest based on their frequency of occurrence (arsenic, uranium), their relevance to the Continental Mine orebody or metal mines in general (i.e., copper, iron, manganese), and for their potential to serve as indicators of YDTI process water (molybdenum, tungsten, rubidium, fluoride, sulfate). Although concentrations of these five "indicator parameters" are not exceptionally high in the tailings pond (with the possible exception of molybdenum and sulfate), they are an order of magnitude or more greater than in the surrounding surface water and groundwater, leading to their use as indicators of potential mixing of surrounding groundwater and surface water with tailings impoundment water. It should be noted that the presence of these indicator parameters in surface water and groundwater is not in itself an indication of mixing with tailings water. These parameters are elevated in the tailings pond due to their enrichment in the local bedrock, and therefore are expected to occur naturally in local surface water and groundwater as well. However, abnormally high concentrations or consistent trends of increasing concentrations can be used to identify areas that may warrant further evaluation.

3.1 SURFACE WATER MONITORING RESULTS

The 2021 surface water monitoring database is included in Appendix A with select 2021 results summarized in Table 3-1. Concentration trend plots for the five indicator parameters molybdenum, tungsten, rubidium, fluoride, and sulfate for Bull Run Creek, Oro Fino Gulch, and the Yankee Doodle Tailings Pond monitoring sites are included in Appendix B[1]. The Table 3-1 summary includes average 2021 concentrations (average of the June and October results) for the select parameters noted above. Key points of interest in the 2021 surface water dataset are outlined below.

Upgradient Drainages

As described in previous reports (MR, 2018), surface water in upstream drainages Silver Bow, Dixie and Yankee Doodle Creeks is a calcium-bicarbonate type water with 2021 field-measured pH values ranging from 7.91 to 8.98 and averaging 7.98 (Table 3-1, Appendix A). Trace metal concentrations are generally low with antimony, boron, cadmium, chromium, lithium, mercury, nickel, selenium, silver, thallium, tungsten, vanadium and zinc at or less than the project required detection limits (PRDLs) in all 2021 samples. Concentrations of the YDTI indicator parameters fluoride, sulfate, molybdenum, rubidium, and tungsten are all one to three orders of magnitude lower than the tailings pond concentrations (Table 3-1). The 2021 sample results for the upstream drainages are consistent with past sampling results dating back several years.

[1] When viewing the trend plots, note that a number of anomalous analytical results recorded in 2019 are believed to be due to the use of a different analytical laboratory; all other analyses were performed by Energy Laboratories.

TABLE 3-1. 2021 SURFACE WATER AVERAGE PARAMETER CONCENTRATIONS

Drainage/Area	Flow	pH	Sulfate	Fluoride	Molybdenum	Tungsten	Rubidium	Arsenic	Uranium	Copper	Iron	Manganese
	gpm	*S.U.*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*
West Ridge and Upstream Drainages												
Bull Run Ck	11	7.86	37	0.16	0.0024	0.00006	0.0033	0.0237	0.0020	0.004	0.35	0.073
Oro Fino Gulch	10	7.40	123	0.32	0.0038	0.00012	0.0027	0.0164	0.0029	0.005	2.61	1.690
Upstream Drainages	109	7.98	16	0.08	0.0017	0.00008	0.0012	0.0048	0.0057	0.003	0.22	0.024
Active Mine Site and Tailings Impoundment												
WQ-1-Woodville East	35	7.60	189	0.20	0.0008	0.00005	0.0023	0.0008	0.0021	0.085	0.225	0.109
WQ-2-Woodville West	42	7.15	205	0.45	0.2085	0.00005	0.0043	0.0005	0.0004	0.080	0.010	0.011
WQ-5-Clearwater Ditch[1]	7	7.00	97	0.20	0.0045	0.00005	0.0022	0.0005	0.0001	0.003	0.330	0.146
WQ-6-Cont Pit South	Ponded	5.45	1205	1.80	0.4865	0.00005	0.0328	0.0005	0.0354	8.77	2.80	8.47
WQ-7-Pavillion Seep	78	3.10	1265	0.60	0.0042	0.00005	0.0383	0.0010	0.0670	54.9	26.0	18.7
WQ-8A-Cont Pit North	Ponded	4.20	1800	2.35	0.0316	0.00005	0.0336	0.0015	0.1865	41.2	3.75	16.8
WQ-18-Ecology Pond	Ponded	11.20	1510	3.05	0.7760	0.01040	0.0104	0.0008	0.0020	0.494	0.265	0.44
WQ-19-No. 10 Seep	98	3.14	2110	0.33	0.0109	0.00005	0.0200	0.0073	0.0899	17.1	21.0	27.5
WQ-9A Tailings Pond	Ponded	10.3	1810	3.10	1.175	0.01870	0.0486	0.0030	0.0010	0.004	0.010	0.004
Extraction Pond 2021	Ponded	3.31	1900	0.23	0.0004	0.00005	0.0416	0.0010	0.0526	30.1	18.0	19.6

Upstream Drainages include Silver Bow, Dixie, and Yankee Doodle Creeks; Individual sites described in Table 2-1 and shown on Figure 2-1.

Concentrations are average of June and October results; Below detect values replaced with 1/2 DL.

1 - Site dry in October 2021, sampled in June only.

All metals concentrations are total recoverable fraction.

West Ridge Drainages

The 2021 monitoring program included two mainstem sites (BRCD-2 and BRCD-4) and two spring sites (BRCD-5 and BRCD-6) in Bull Run Creek drainage, and two mainstem sites (OFGD-1 and OFGD-3) and one spring site (OFGD-4) in Oro Fino Gulch along the west flank of West Ridge (Figure 2-1). Similar to the upstream sites, surface water in these drainages is a calcium-bicarbonate type water with alkaline pH. Trace metal concentrations are generally low at these sites although some concentrations are higher than in the upstream drainages due to increased bedrock mineralization, and possibly historic mining disturbances, southward along the West Ridge. Boron, lithium, selenium, thallium and vanadium concentrations were equal to or less than the PRDL in all samples from these drainages in 2021. Similar to the upgradient drainages, concentrations of YDTI indicator parameters fluoride, sulfate, molybdenum, rubidium and tungsten in the West Ridge drainage samples are all one to three orders of magnitude lower than the tailings pond concentrations (Table 3-1). As shown in Appendix B, concentrations of the YDTI indicator parameters show no consistent increasing trends for the period of record at all West Ridge surface water sites.

Yankee Doodle Tailings Pond

The tailings pond water (site WQ-9A) is a calcium-sulfate type water with a 2021 average lab-measured pH of 10.3 as measured from the decant barge. Compared to the upgradient and West Ridge drainages, the tailings pond water is enriched in sulfate, fluoride, molybdenum, tungsten, and rubidium (Table 3-1), making these potential indicators of tailings pond-influenced waters. The 2021 tailings pond concentrations are similar to past sampling results for the indicator and other parameters with fluoride and sulfate concentrations stabilizing after exhibiting moderate increases over the past few years (Appendix A and Appendix B).

Extraction Pond

The Extraction Pond receives drainage from the west embankment drain (WED) and was added to the operational monitoring program in 2020. Field-measured pH of the Extraction Pond water ranged from 3.23 to 3.38 and averaged 3.31 in 2021. Concentrations of some metals, including aluminum, cadmium, copper, iron, lead, manganese, uranium, and zinc, are enriched in the Extraction Pond as compared to the tailings pond. The Extraction Pond water also differs significantly from the tailings pond in general chemistry, with average 2021 magnesium concentrations in the extraction and tailings ponds 82 and 5.5 mg/L, respectively. The Extraction Pond is a lined facility with the captured water contained and pumped to the YDTI.

Active Mine Site

Water quality at the active mine site monitoring locations is variable with some sites exhibiting highly elevated metals concentrations, consistent with past sampling results from these sites. The affected waters at the mine site monitoring locations are all treated and/or contained within the Continental Mine process circuit.

3.2 GROUNDWATER MONITORING RESULTS

The 2021 groundwater monitoring results are summarized in Table 3-2 with the complete 2021 water quality database included in Appendix A. Concentration trend plots for the indicator parameters molybdenum, tungsten, rubidium, fluoride, and sulfate are included in Appendix B.

Table 3-2 includes average concentrations of select parameters from the June and October 2021 groundwater sampling events. Parameters presented in Table 3-2 are the same indicator and general interest parameters as presented in Section 3.1 for surface water, plus groundwater elevations and nitrate plus nitrite as nitrogen concentrations. Also shown are the average 2021 concentrations for the tailings pond (site WQ-9A) for comparison to the groundwater concentrations. Key points of interest in the 2021 dataset include:

- As described in previous reports (MR, 2018), groundwater in most of the West Ridge area is a calcium-bicarbonate type water with some calcium-sulfate type waters in the south portion of the ridge, corresponding to an increase in bedrock mineralization.
- Concentrations of several trace metals were near or less than the analytical detection limits in most 2021 samples. Parameters with concentrations less than the laboratory reporting limits in all 2021 groundwater samples include boron, chromium, lead, lithium, mercury, nickel, silver, thallium, and vanadium (Appendix A). Trace metals detected on the most frequent basis (>90% of samples) include molybdenum, rubidium, strontium, and uranium.
- Concentrations of potential indicator parameters fluoride, sulfate, tungsten, rubidium, and molybdenum are all one to three orders of magnitude lower in the groundwater samples than in the tailings pond water (Table 3-2). As shown in the Appendix B trend graphs, none of the monitoring wells exhibit overall consistent increasing concentration trends for these parameters. A number of wells show an increase in molybdenum concentrations in October 2021, but these values are within the range of prior concentrations, and increases were also noted at upgradient well MW15-11 indicating these concentrations are not related to the tailings impoundment. The lack of consistent indicator parameter concentration trends in the YDTI-area groundwater is consistent with the West Ridge groundwater levels being 40 feet or more higher than the tailings pond level.

With few exceptions, the 2021 groundwater samples represent high quality groundwater with low to non-detect concentrations of most trace metals and potential indicator parameters. The 2021 groundwater monitoring results are consistent with previous groundwater monitoring results dating back as far as 2012 for some of the West Ridge monitoring wells.

3.3 GROUNDWATER ELEVATION DATA

Groundwater elevation monitoring is an important component of the tailings impoundment monitoring program since long-term hydrodynamic containment, particularly along the West Ridge, is dependent, in part, on the existing hydrologic divide beneath the ridge crest, as well as engineered controls and

TABLE 3-2. 2021 MONITORING WELL AVERAGE PARAMETER CONCENTRATIONS

Monitoring Well	GWE	Field pH	N+N	Sulfate	Fluoride	Molybdenum	Tungsten	Rubidium	Arsenic	Uranium	Copper	Iron	Manganese
	feet	*S.U.*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*
MW12-11	6467.89	7.20	0.485	29	0.05	0.0020	0.00005	0.00135	0.007	0.0167	0.0008	0.010	0.0008
MW12-12	6431.06	8.51	0.020	41	0.20	0.0073	0.00010	0.00035	0.009	0.0844	0.0005	0.010	0.0140
MW12-13	6467.25	8.51	0.020	41	0.20	0.0073	0.00010	0.00035	0.009	0.0844	0.0005	0.010	0.0140
MW12-14	6438.56	7.70	0.765	4.0	0.05	0.0002	0.00008	0.00065	0.002	0.0012	0.0005	0.010	0.0005
MW12-15	6492.41	7.56	3.27	152	0.05	0.0032	0.00005	0.00180	0.005	0.0208	0.0015	0.075	0.0055
MW12-16	6398.88	7.45	1.56	67	0.05	0.0022	0.00008	0.00090	0.003	0.0066	0.0005	0.010	0.0005
MW12-17	6437.98	7.98	0.245	53	0.10	0.0056	0.00010	0.00105	0.009	0.0229	0.0005	0.010	0.005
MW12-18	6436.30	6.82	1.350	18	0.05	0.0004	0.00005	0.00055	0.002	0.0022	0.0005	0.030	0.0005
MW15-01	6449.43	7.78	1.065	29	0.05	0.0005	0.00005	0.00055	0.005	0.0014	0.0005	0.010	0.0005
MW15-02	6422.33	7.34	0.550	9	0.05	0.0006	0.00005	0.00050	0.004	0.0040	0.0005	0.010	0.0005
MW15-03	6392.41	7.77	1.31	63	0.07	0.0060	0.00005	0.00063	0.006	0.0159	0.0005	0.020	0.0017
MW-15-04	6390.69	7.25	0.470	40	0.05	0.0008	0.00005	0.00100	0.0005	0.0021	0.0005	0.045	0.0030
MW-15-05	6436.77	8.07	0.495	53	0.15	0.0115	0.00008	0.00080	0.005	0.0367	0.0005	0.010	0.0150
MW-15-06	6431.14	8.34	0.005	8.0	0.20	0.0094	0.00013	0.00095	0.013	0.0242	0.0005	0.040	0.0360
MW-15-07	6405.20	7.14	0.330	9.5	0.05	0.0003	0.00005	0.00035	0.0005	0.0010	0.0005	0.010	0.0005
MW-15-08	6409.66	7.17	0.290	8.5	0.05	0.0005	0.00008	0.00130	0.001	0.0001	0.0010	0.075	0.0075
MW-15-09	6422.86	6.96	0.255	35	0.10	0.0015	0.00005	0.00090	0.003	0.0010	0.0005	0.010	0.0115
MW-15-10	6359.77	6.61	0.353	19	0.05	0.0002	0.00007	0.00053	0.0005	0.0010	0.0005	0.010	0.0113
MW-15-11	6381.15	7.43	0.167	46	0.05	0.0021	0.00015	0.00097	0.0005	0.0180	0.0005	0.010	0.0005
MW-15-12	6379.42	6.95	0.070	14	0.10	0.0032	0.00005	0.00070	0.001	0.0033	0.0005	0.010	0.0005
MW-15-13	No Access												
MW-16-01	6403.41	8.12	0.005	61	0.50	0.0150	0.00605	0.00160	0.075	0.0108	0.0005	0.010	0.0260
MW-16-02D	6405.48	7.67	0.005	64	0.20	0.0068	0.00135	0.00215	0.010	0.0030	0.0008	0.010	0.1160
MW-16-02S	6448.76	7.95	5.28	117	0.08	0.0048	0.00105	0.00105	0.085	0.0129	0.0020	0.010	0.0005
WQ-9A-Tailings Pond		10.30	0.650	1810	3.10	1.17	0.01870	0.04860	0.003	0.0010	0.0035	0.010	0.0040

Concentrations shown are average of June and October 2021 sample results.

N+N - Nitrate plus Nitrite as N

Individual sites described in Table 2-3 and shown on Figure 2-2.

All metals concentrations are dissolved fraction.

GWE - Groundwater Elevation

0.005	Indicates all 2021 results less than detection limit; values replaced with 1/2 detection limit.

components of the YDTI operations and management program (MR, 2018). The 2021 monitoring program included periodic manual water level measurements and continuous monitoring with VWPs in the 24 monitoring wells shown in Figure 2-2. Table 3-3 includes the monthly manual data for each well and the corresponding tailings pond (site WQ-9A) elevations for comparison. Appendix C includes period-of-record hydrographs for each well based on the continuous water level data. Note that all elevations presented below are relative to the local Anaconda Mine Grid datum.

Water levels at all West Ridge monitoring wells decreased from January to December 2021 (Table 3-4). Water level declines were greatest in the central and south ridge area where groundwater recharge is most reliant on incident precipitation as opposed to groundwater inflow from the north. Well MW15-01 shows the largest decline at 5.7 feet. With wells MW16-02S, MW12-15, and MW15-02 all declining more than five feet. All other wells declined between 1.5 and 4.9 feet. Monitoring well MW12-16, located in an area referred to as the groundwater potentiometric low where West Ridge groundwater elevations are the lowest, showed the smallest decline at 1.5 feet. Groundwater levels at monitoring wells MW16-01 and MW16-02D, both completed in an area of depressed groundwater levels referred to as the deep fracture system, showed modest declines of about three feet in 2021.

The 2021 groundwater level declines follow steady increases experienced over the past few years at most wells (see continuous water level hydrographs in Appendix C). For example, water levels at the groundwater potentiometric low (MW12-16 and MW15-03) and the deep fracture system (MW16-01 and MW16-02D) increased between 8.5 and 18.4 feet from 2017 to the end of 2020. The 2021 declines are likely due to the dry conditions experienced in 2021, reflecting the importance of incident precipitation recharge on the West Ridge groundwater levels. Annual precipitation for the last four water years as measured at the Burt Mooney Airport in Butte, include 13.63 inches for 2018, 13.64 inches for 2019, and 9.45 inches and 6.69 inches for 2020 and 2021, respectively. As of the end of 2021, groundwater elevations along the crest of West Ridge, as measured in the West Ridge monitoring wells, ranged from 33 feet (at the groundwater potentiometric low) to 132 feet (in the south ridge area) higher than the tailings pond water level.

3.4 DEVIATIONS FROM SAMPLING PLAN

The 2021 water resources monitoring was conducted in accordance with the 2021 MR sampling and analysis plan (Hydrometrics, 2021) with the following exceptions:

- Surface water monitoring sites OFGD-4 (Oro Fino Gulch) and WQ-5 (Clearwater Ditch) were dry in the fall and could not be sampled during the October sampling event.
- Surface water site BRCD-6 (Bull Run drainage) was dry during both the spring and fall sampling events.
- Monitoring well MW15-12 could not be sampled in the fall and MW15-13 (both located along the east side of the tailings pond) could not be sampled in the spring or fall due to road construction blocking vehicle access.

All other sampling protocol was consistent with the 2021 FSAP.

TABLE 3-3. 2021 MONITORING WELL MANUAL WATER LEVEL DATA

Well	Measuring Point Elev.	Depth to Water									
		1/29/21	4/27/21	5/19/21	6/21/21	7/20/21	8/24/21	9/24/21	10/12/21	11/9/21	12/17/21
MW 12-11	6521.41	50.48	52.07	52.2	52.64	53.04	53.65	54.08	54.35	54.7	55.42
MW 12-12	6475.87	43.03	43.47	43.39	43.69	44.22	44.95	45.61	46.05	46.43	47.09
MW 12-13	6490.28	23.77	21.13	21	20.92	21.94	23.37	24.56	25.15	26	27.09
MW 12-14	6476.47	37.05	35.53	35.7	36.35	37.19	38.28	39.06	39.53	40.19	41.13
MW 12-15	6518.91	23.82	24.7	25	25.3	25.9	26.7	27.45	27.83	28.22	29
MW 12-16	6487.58	-	88.66	88.35	88.33	88.48	88.73	88.86	89.02	89.29	90.21
MW 12-17	6472.97	33.24	34.03	33.96	34.05	34.4	34.97	35.59	35.98	36.5	37.22
MW 12-18	6472.65	33.73	32.63	32.88	33.18	33.85	35.02	35.95	36.4	37.01	37.74
MW 15-01	6504.13	51.23	53.1	53.27	53.77	54.22	54.89	55.47	55.8	56.15	56.95
MW 15-02	6483.34	59.25	59	59.16	59.6	60.32	61.28	62.18	62.66	63.44	64.4
MW 15-03	6487.41	92.85	94.25	94.3	94.45	94.6	94.74	95.1	95.3	95.4	95.88
MW 15-05	6468.72	30.24	31.03	31	31.11	31.5	32.1	32.59	32.9	33.2	33.78
MW 15-06	6468.97	35.35	36.22	36.2	36.4	36.71	37.39	38.05	38.45	38.65	39.28
MW 15-07	6464.65	57.53	58.27	58.38	58.58	58.94	59.47	60.05	60.4	60.73	61.27
MW 15-08	6464.57	52.82	53.32	53.52	53.74	54.35	54.98	55.73	56.18	56.64	57.2
MW 16-01	6501.53	96.63	96.98	96.9	97.43	97.69	98.38	98.95	99.15	99.16	99.65
MW 16-02S	6499.33	47.18	49	49.14	49.64	50.13	50.8	51.34	51.62	52	52.79
MW 16-02D	6499.41	92.36	92.65	92.63	93.25	93.55	94.1	94.61	94.85	94.88	95.3
MW 15-04	6435.98	45.9	44.36	43.73	44.6	45.42	45.7	45.83	46.22	46.83	47.65
MW 15-09	6455.25	29.41	-	30.8	31.16	31.8	32.55	33.33	33.75	-	-

Well	Screened Interval feet	Groundwater Elevation									
		1/29/21	4/27/21	5/19/21	6/21/21	7/20/21	8/24/21	9/24/21	10/12/21	11/9/21	12/17/21
MW 12-11	145-195	6470.93	6469.34	6469.21	6468.77	6468.37	6467.76	6467.33	6467.06	6466.71	6465.99
MW 12-12	160-195	6432.84	6432.40	6432.48	6432.18	6431.65	6430.92	6430.26	6429.82	6429.44	6428.78
MW 12-13	145-195	6466.51	6469.15	6469.28	6469.36	6468.34	6466.91	6465.72	6465.13	6464.28	6463.19
MW 12-14	100-150	6439.42	6440.94	6440.77	6440.12	6439.28	6438.19	6437.41	6436.94	6436.28	6435.34
MW 12-15	150-200	6495.52	6494.64	6494.34	6494.04	6493.44	6492.64	6491.89	6491.51	6491.12	6490.34
MW 12-16	140-190		6398.92	6399.23	6399.25	6399.10	6398.85	6398.72	6398.56	6398.29	6397.37
MW 12-17	155-195	6439.73	6438.94	6439.01	6438.92	6438.57	6438.00	6437.38	6436.99	6436.47	6435.75
MW 12-18	80-115	6438.92	6440.02	6439.77	6439.47	6438.80	6437.63	6436.70	6436.25	6435.64	6434.91
MW 15-01	182-222	6452.90	6451.03	6450.86	6450.36	6449.91	6449.24	6448.66	6448.33	6447.98	6447.18
MW 15-02	147-197	6424.09	6424.34	6424.18	6423.74	6423.02	6422.06	6421.16	6420.68	6419.90	6418.94
MW 15-03	345-385	6394.56	6393.16	6393.11	6392.96	6392.81	6392.67	6392.31	6392.11	6392.01	6391.53
MW 15-05	240-290	6438.48	6437.69	6437.72	6437.61	6437.22	6436.62	6436.13	6435.82	6435.52	6434.94
MW 15-06	350-400	6433.62	6432.75	6432.77	6432.57	6432.26	6431.58	6430.92	6430.52	6430.32	6429.69
MW 15-07	162.5-202.5	6407.12	6406.38	6406.27	6406.07	6405.71	6405.18	6404.60	6404.25	6403.92	6403.38
MW 15-08	81.5-101.5	6411.75	6411.25	6411.05	6410.83	6410.22	6409.59	6408.84	6408.39	6407.93	6407.37
MW 16-01	485-517	6404.90	6404.55	6404.63	6404.10	6403.84	6403.15	6402.58	6402.38	6402.37	6401.88
MW 16-02S	489-549	6452.15	6450.33	6450.19	6449.69	6449.20	6448.53	6447.99	6447.71	6447.33	6446.54
MW 16-02D	244-264	6407.05	6406.76	6406.78	6406.16	6405.86	6405.31	6404.80	6404.56	6404.53	6404.11
MW 15-04	170-220	6390.08	6391.62	6392.25	6391.38	6390.56	6390.28	6390.15	6389.76	6389.15	6388.33
MW 15-09	92-142	6425.84		6424.45	6424.09	6423.45	6422.70	6421.92	6421.50		
WQ-9A	Tailings Pond	6359	6361	6361	6361	6360	6360	6359	6359	6359	6358

NM - Not Measured
All measurements in feet
All elevations ACM Datum (USGS=ACM-58.00 ft)

TABLE 3-4. 2021 GROUNDWATER LEVEL DECLINES

Monitoring Well	Well Location	Total Well Depth feet	Water Level Decline - feet
MW 15-01	Central West Ridge near ridge crest	230	-5.72
MW 16-02S	Central West Ridge near ridge crest	264	-5.61
MW 12-15	Southern West Ridge near ridge crest	200	-5.18
MW 15-02	Central West Ridge near ridge crest	197	-5.15
MW 12-11	Southern West Ridge near ridge crest	200	-4.94
MW 15-08	Central West Ridge near ridge crest	102	-4.38
MW 12-14	Northern West Ridge near ridge crest	150	-4.08
MW 12-12	Northern West Ridge near ridge crest	200	-4.06
MW 12-18	Northern West Ridge near ridge crest	115	-4.01
MW 12-17	Northern West Ridge near ridge crest	195	-3.98
MW 15-06	Northern West Ridge near ridge crest	400	-3.93
MW 15-07	Central West Ridge near ridge crest	203	-3.74
MW 15-05	Northern West Ridge near ridge crest	240	-3.54
MW 12-13	Northern West Ridge near ridge crest	200	-3.32
MW 15-03	Central ridge, groundwater potentiometric low	386	-3.03
MW 16-01	Central ridge, deep fracture system	517	-3.02
MW 16-02D	Central ridge, deep fracture system	552	-2.94
MW 15-04	Central ridge on east ridge flank	220	-1.75
MW 12-16	Central ridge, groundwater potentiometric low	191	-1.55

4.0 DATA VALIDATION RESULTS

All 2021 groundwater and surface water samples have been validated in accordance with the EPA's data validation guidelines (EPA, 2017) and the 2021 project FSAP (Hydrometrics, 2021). The data validation process includes a review of sampling procedures to ensure consistency with the project FSAP and Standard Operating Procedures (SOPs), and detailed review of all field measurement and laboratory analytical results. All field QC sample analytical results were reviewed for compliance with appropriate criteria (DI and rinsate blank results less than PRDLs; field duplicate results within +/-20% relative percent difference or RPD) and qualified with appropriate flagging if noncompliant. Laboratory QC samples (laboratory blanks, duplicates, spikes) were also reviewed with exceedances noted in the validation reports although no data flagging occurs for laboratory QC exceedances at the "Standard" level of validation. Following validation and flagging, the data were uploaded to the Montana Resources Project EnviroData database.

The number of field samples, QC samples, and validation results are summarized in Table 4-1. As shown, molybdenum exceeded the 20% RPD QC criteria in the June surface water event duplicate sample. As a result, seven of the molybdenum results associated with the duplicate sample were flagged with a "J". Nitrate plus nitrite as nitrogen was detected at the reporting limit of 0.01 mg/L in one of the June surface water DI blanks resulting in five associated field samples being flagged "B". One DI blank from the October groundwater event showed an exceedance of the PRDL for nitrate plus nitrite as nitrogen, which resulted in three associated field samples being flagged "B". All other 2021 QC sample results were within the associated QC criteria. These few QC exceedances are all minor in magnitude and do not adversely affect the usability of the data for its intended purposes, which is to further document current water quality conditions and concentration trends in the YDTI West Ridge area groundwater and surface water.

TABLE 4-1. 2021 QC SAMPLE COLLECTION AND DATA VALIDATION SUMMARY

Monitoring Event	No. Field Samples	Field QC Samples			QC Exceedances
		DI Blanks	*Rinsate Blanks*	*Dupli-cates*	
June Surface Water	19	2	0	2	DI Blank: N+N as N detected at RL (0.01 mg/L); 5 samples flagged "B". Duplicate: Mo exceeded 20% RPD, 7 results flagged "J"
October Surface Water	17	1	0	1	DI Blanks: None Duplicates: None
June Groundwater	23	2	2	2	DI/Rinsate Blanks: None Duplicates: None
October Groundwater	22	2	2	2	DI Blanks: N+N as N exceedance, 3 associated field samples flagged "B" Rinsate Blanks: None Duplicates: None

5.0 2021 MONITORING SUMMARY

The 2021 MR groundwater and surface water monitoring results are consistent with the 2020 and prior years monitoring results. Groundwater chemistry in the West Ridge and upgradient groundwater and surface water is primarily a calcium-bicarbonate type water of good quality with very low or nondetectable trace metal concentrations. Groundwater and surface water in the southern portion of the ridge transitions to a calcium-sulfate type water due to the increased bedrock mineralization in that area. Concentrations of potential tailings pond water indicator parameters, including fluoride, sulfate, molybdenum, rubidium, and tungsten, show no increasing trends in area groundwater or surface water, indicating a lack of mixing with tailings pond water as expected. Groundwater elevations along the West Ridge declined one to five feet during 2021, likely in response to the dry conditions, but remain 30 to 130 feet higher than the tailings pond water level, thus maintaining hydrodynamic containment along the West Ridge. Groundwater level and water quality monitoring will continue in 2022 in accordance with the MR operating permit.

6.0 REFERENCES

EPA, 2017. National Functional Guidelines for Inorganic Superfund Methods Data Review. EPA-540-R-2017-001. Office of Superfund Remediation and Technology Innovation. January 2017.

Hydrometrics, Inc., 2021. Montana Resources 2021 Field Sampling and Analysis Plan. Prepared for Montana Resources, LLP. June 2021.

Montana Resources, LLP (MR), 2018. Amendment to Operating Permits 00030 and 00030A to Continue Operations at the Continental Mine. May 2018.

Montana Resources, LLP (MR), 2019. Montana Resources Continental Mine Operations Plan. January 2019.

APPENDIX A

2021 BASELINE AND OPERATIONAL
WATER RESOURCES MONITORING DATABASE

Station Name		MW-16-02D	MW-16-01	MW-15-06	MW-15-05	MW-15-09	MW-12-18	MW-12-18	MW-16-02S	MW-12-13	MW-12-17	RINSATE BLANK	MW-15-02	MW-12-14
Sample Date		2021/06/21 11:35	2021/06/21 12:50	2021/06/21 13:45	2021/06/21 16:30	2021/06/21 17:25	2021/06/22 08:35	2021/06/22 08:50	2021/06/22 08:35	2021/06/22 09:40	2021/06/22 10:40	2021/06/22 18:15	2021/06/22 10:50	2021/06/22 11:40
FieldSampleId		MR-2106-200	MR-2106-201	MR-2106-202	MR-2106-203	MR-2106-204	MR-2106-205	MR-2106-206	MR-2106-207	MR-2106-208	MR-2106-209	MR-2106-210	MR-2106-211	MR-2106-212
Lab		Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs
	Units							Duplicate				Blank		
Field Parameters														
Depth to Water	Feet	93.18	97.24	37.36	31	31.05	31.35		49.56	20.94	34.03		59.42	36.29
Dissolved Oxygen	mg/L	0.92	0.54	0.26	0.29	0.88	6.55		0.95	0.71	1.58		6.91	8.44
Field pH	s.u.	7.75	8.06	8.31	8.09	7.03	6.79		7.92	7.3	8		7.34	7.68
Field Specific Conductivity	umhos/cm	271	259	314	469	191	473		528	380	335		543	204
Oxidation Reduction Pot	Millivolts	216.5	-15.5	-198.3	-160.5	58.4	7.8		74.3	510.6	100.4		-3.7	131.5
Water Temperature	Deg C	9.5	12	8.2	8.5	8.1	7.8		8.2	8.6	9		8.4	8.4
Physical Parameters														
pH	s.u.	7.6 H	7.9 H	8.2 H	8.0 H	7.0 H	6.9 H	6.8 H	8.0 H	7.2 H	8.1 H	7.1 H	7.4 H	7.3 H
Specific Conductivity	umhos/cm	277	262	317	474	201	472	472	550	400	353	<5	546	217
Total Dissolved Solids	mg/L	171	166	190	299	135	337	342	392	255	222	<10	352	150
Total Suspended Solids	mg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	15	<10	<10	<10
Major Constituents														
Alkalinity as CaCO3	mg/L	55 D	46 D	150 D	190 D	55 D	97 D	97 D	120 D	120 D	110 D	<2	150 D	88 D
Bicarbonate as HCO3	mg/L	67 D	55 D	180 D	230 D	67 D	120 D	120 D	150 D	150 D	140 D	<2	190 D	110 D
Carbonate as CO3	mg/L	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Chloride	mg/L	5	6	4	5	1	64	64	5	16	5	<1	64	8
Fluoride	mg/L	0.2	0.5	0.2	0.2	0.1	<0.1	<0.1	0.1	<0.1	0.1	<0.1	<0.1	<0.1
Sulfate	mg/L	61	59	8	51	34	18	18	113	45	53	<1	9	4
Nutrients														
Nitrate + Nitrite as N	mg/L	<0.01	<0.01	<0.01	0.48	0.25	1.39	1.35	5.26 D	0.35	0.23	<0.01	0.54	0.75
Phosphorus (TOT)	mg/L	0.01	0.07	0.03	0.05	0.03	0.07	0.08	0.82	0.03	0.08	<0.01	0.04	0.05
Metals/Metaloids														
Aluminum (DIS)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.011	<0.005	<0.005	<0.005	<0.005	<0.005
Antimony (DIS)	mg/L	0.0007	0.0014	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	0.0013	0.0006	<0.0005	<0.0005	<0.0005
Arsenic (DIS)	mg/L	0.01	0.078	0.013	0.005	0.003	0.002	0.002	0.088	0.004	0.009	<0.001	0.004	0.002
Boron (DIS)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium (DIS)	mg/L	<0.00003	<0.00003	<0.00003	<0.00003	0.00012	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003
Calcium (DIS)	mg/L	32	29	44	60	17	50	51	50	48	41	<1	67	24
Chromium (DIS)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (DIS)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Iron (DIS)	mg/L	<0.02	<0.02	0.04	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Iron, Ferrous (DIS)	mg/L	<0.02	<0.02	0.04	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Lead (DIS)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Lithium (DIS)	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium (DIS)	mg/L	4	3	4	13	8	14	14	14	10	11	<1	14	6
Manganese (DIS)	mg/L	0.115	0.025	0.037	0.015	0.013	<0.001	<0.001	<0.001	0.003	0.005	<0.001	<0.001	<0.001
Mercury (DIS)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum (DIS)	mg/L	0.0062 D	0.0137 D	0.0088 D	0.0105 D	0.0014 D	0.0004 D	0.0004 D	0.0045 D	0.002 D	0.005 D	<0.0001	0.0006 D	0.0001 D
Nickel (DIS)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Potassium (DIS)	mg/L	3	4	4	5	3	5	5	6	4	5	<1	5	3
Rubidium (DIS)	mg/L	0.0022	0.0016	0.001	0.0008	0.0009	0.0005	0.0006	0.0011	0.0012	0.0011	<0.0001	0.0005	0.0007
Selenium (DIS)	mg/L	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silicon (DIS)	mg/L	6	3.4	5.4	5.9	10.9	13.4	13.5	11.8	11.5	6.1	<0.1	10.8	11.7
Silver (DIS)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sodium (DIS)	mg/L	11	13	12	14	8	10	10	38	12	8	<1	9	6
Strontium (DIS)	mg/L	0.49	0.53	0.48	0.57	0.09	0.21	0.21	0.3	0.29	0.21	<0.01	0.25	0.13
Thallium (DIS)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Tungsten (DIS)	mg/L	0.0013	0.0058	0.0002	0.0001	<0.0001	<0.0001	<0.0001	0.001	<0.0001	0.0001	<0.0001	<0.0001	0.0001
Uranium (DIS)	mg/L	0.0032	0.0113	0.0252	0.0409	0.001	0.0023	0.0022	0.0134	0.0074	0.0237	<0.0002	0.004	0.0012
Vanadium (DIS)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc (DIS)	mg/L	0.723	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008

D- Laboratory reporting limit increased due to sample matrix interference H-Analysis performed past method holding time

Station Name		MW-15-08	MW-15-07	MW-12-15	MW-12-11	MW-12-12	DI BLANK	MW-15-04	MW-15-01	MW-15-03	MW-15-10	MW-15-11	MW-15-11	MW-15-12
Sample Date		2021/06/22 12:25	2021/06/22 13:20	2021/06/22 14:10	2021/06/22 14:20	2021/06/22 17:25	2021/06/22 14:50	2021/06/22 16:25	2021/06/23 10:20	2021/06/23 14:05	2021/06/23 09:30	2021/06/23 11:00	2021/06/23 11:30	2021/06/23 12:30
FieldSampleId		MR-2106-213	MR-2106-214	MR-2106-215	MR-2106-216	MR-2106-217	MR-2106-218	MR-2106-219	MR-2106-220	MR-2106-221	MR-2106-222	MR-2106-223	MR-2106-224	MR-2106-225
Lab		Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs
	Units						Blank						Duplicate	
Field Parameters														
Depth to Water	Feet	53.65	58.55	25.2	52.56	43.69		44.48	53.7	94.75	8.18	154.81		56.76
Dissolved Oxygen	mg/L	6.83	10.22	3.96	4.52	0.08		4.26	5.98	0.83	10.54	3.48		4.37
Field pH	s.u.	7.16	7.14	7.58	7.17	8.38		7.27	7.8	7.78	6.27	7.29		6.95
Field Specific Conductivity	umhos/cm	186	221	601	331	277		238	208	369	127	303		156
Oxidation Reduction Pot	Millivolts	152.5	127.5	-59.5	110.5	60.7		60.3	2.6	-144.1	131.5	81.6		84.1
Water Temperature	Deg C	8.7	9.5	8.2	9.1	9		9.2	9	10.5	8.9	9.6		8.1
Physical Parameters														
pH	s.u.	6.5 H	7.2 H	7.5 H	7.2 H	8.2 H	6.2 H	7.1 H	7.6 H	7.6 H	6.5 H	7.7 H	7.7 H	6.9 H
Specific Conductivity	umhos/cm	198	235	702	349	291	<5	242	213	374	136	320	319	165
Total Dissolved Solids	mg/L	154	153	484	226	178	<10	176	144	245	121	200	194	112
Total Suspended Solids	mg/L	40	38	39	<10	<10	<10	<10	<10	23	<10	<10	<10	<10
Major Constituents														
Alkalinity as CaCO3	mg/L	59 D	79 D	170 D	87 D	96 D	<2	72 D	66 D	110 D	41 D	110 D	110 D	67 D
Bicarbonate as HCO3	mg/L	72 D	96 D	210 D	110 D	120 D	<2	87 D	80 D	140 D	50 D	140 D	140 D	82 D
Carbonate as CO3	mg/L	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Chloride	mg/L	16	16	18	32	5	<1	2	3	4	<1	1	1	<1
Fluoride	mg/L	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	0.1
Sulfate	mg/L	9	10	153	29	41	<1	41	29	64	20	46	47	14
Nutrients														
Nitrate + Nitrite as N	mg/L	0.27	0.32	3.14 D	0.48	0.02	<0.01	0.48	1.05	1.31	0.32	0.16	0.16	0.07
Phosphorus (TOT)	mg/L	0.41	0.11	0.1	0.16	<0.01	<0.01	0.03	0.11	0.07	<0.01	<0.01	<0.01	0.01
Metals/Metaloids														
Aluminum (DIS)	mg/L	<0.005	0.012	<0.005	<0.005	<0.005	<0.005	0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Antimony (DIS)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Arsenic (DIS)	mg/L	0.001	<0.001	0.005	0.007	0.009	<0.001	<0.001	0.005	0.006	<0.001	<0.001	<0.001	0.001
Boron (DIS)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium (DIS)	mg/L	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003
Calcium (DIS)	mg/L	19	24	99	39	37	<1	23	22	43	11	41	41	19
Chromium (DIS)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (DIS)	mg/L	0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron (DIS)	mg/L	<0.02	<0.02	0.12	<0.02	<0.02	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Iron, Ferrous (DIS)	mg/L	<0.02	<0.02	0.12	<0.02	<0.02	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Lead (DIS)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Lithium (DIS)	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium (DIS)	mg/L	6	7	20	10	4	<1	8	7	13	3	8	8	5
Manganese (DIS)	mg/L	0.008	<0.001	0.005	0.001	0.015	<0.001	0.003	<0.001	0.002	0.012	<0.001	<0.001	<0.001
Mercury (DIS)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum (DIS)	mg/L	0.0005 D	0.0003 D	0.0027 D	0.0017 D	0.0066 D	<0.0001	0.0008 D	0.0005 D	0.0052 D	0.0002 D	0.002 D	0.002 D	0.0032 D
Nickel (DIS)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Potassium (DIS)	mg/L	4	3	6	3	4	<1	4	3	4	2	2	2	3
Rubidium (DIS)	mg/L	0.0011	0.0004	0.0019	0.0014	0.0003	<0.0001	0.001	0.0006	0.0007	0.0006	0.001	0.001	0.0007
Selenium (DIS)	mg/L	<0.001	<0.001	<0.001	<0.001	0.007	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silicon (DIS)	mg/L	17.9	13.3	7.7	11.1	4.9	<0.1	15.9	13.1	10.3	20.4	8.8	8.7	10.6
Silver (DIS)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sodium (DIS)	mg/L	7	7	12	9	12	<1	10	6	8	10	9	9	6
Strontium (DIS)	mg/L	0.14	0.17	0.45	0.15	0.35	<0.01	0.15	0.12	0.32	0.08	0.15	0.16	0.13
Thallium (DIS)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Tungsten (DIS)	mg/L	0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.0002	0.0002	<0.0001
Uranium (DIS)	mg/L	<0.0002	0.001	0.0212	0.0163	0.0843	<0.0002	0.0023	0.0014	0.0166	0.0013	0.0183	0.0185	0.0033
Vanadium (DIS)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc (DIS)	mg/L	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008

Station Name		MW-15-13	RINSATE BLANK	MW-12-16	DI BLANK
Sample Date		2021/06/23 11:35	2021/06/23 14:00	2021/06/23 15:35	2021/06/23 14:55
FieldSampleId		MR-2106-226	MR-2106-227	MR-2106-228	MR-2106-229
Lab		Hydro	Energy Labs	Energy Labs	Energy Labs
	Units	No Sample	Blank		Blank
Field Parameters					
Depth to Water	Feet	101.5		88.23	
Dissolved Oxygen	mg/L			6.68	
Field pH	s.u.			7.36	
Field Specific Conductivity	umhos/cm			344	
Oxidation Reduction Pot	Millivolts			99.6	
Water Temperature	Deg C			9.3	
Physical Parameters					
pH	s.u.		6.5 H	7.4 H	6.2 H
Specific Conductivity	umhos/cm		<5	360	<5
Total Dissolved Solids	mg/L		<10	232	<10
Total Suspended Solids	mg/L		<10	<10	<10
Major Constituents					
Alkalinity as CaCO3	mg/L		<2	83 D	<2
Bicarbonate as HCO3	mg/L		<2	100 D	<2
Carbonate as CO3	mg/L		<4	<4	<4
Chloride	mg/L		<1	12	<1
Fluoride	mg/L		<0.1	<0.1	<0.1
Sulfate	mg/L		<1	68	<1
Nutrients					
Nitrate + Nitrite as N	mg/L		<0.01	1.56	<0.01
Phosphorus (TOT)	mg/L		<0.01	0.05	<0.01
Metals/Metaloids					
Aluminum (DIS)	mg/L		<0.005	<0.005	<0.005
Antimony (DIS)	mg/L		<0.0005	<0.0005	<0.0005
Arsenic (DIS)	mg/L		<0.001	0.003	<0.001
Boron (DIS)	mg/L		<0.05	<0.05	<0.05
Cadmium (DIS)	mg/L		<0.00003	<0.00003	<0.00003
Calcium (DIS)	mg/L		<1	37	<1
Chromium (DIS)	mg/L		<0.001	<0.001	<0.001
Copper (DIS)	mg/L		<0.001	<0.001	<0.001
Iron (DIS)	mg/L		<0.02	<0.02	<0.02
Iron, Ferrous (DIS)	mg/L		<0.02	<0.02	<0.02
Lead (DIS)	mg/L		<0.0003	<0.0003	<0.0003
Lithium (DIS)	mg/L		<0.1	<0.1	<0.1
Magnesium (DIS)	mg/L		<1	14	<1
Manganese (DIS)	mg/L		<0.001	<0.001	<0.001
Mercury (DIS)	mg/L		<0.0001	<0.0001	<0.0001
Molybdenum (DIS)	mg/L		<0.0001	0.0019 D	<0.0001
Nickel (DIS)	mg/L		<0.002	<0.002	<0.002
Potassium (DIS)	mg/L		<1	5	<1
Rubidium (DIS)	mg/L		<0.0001	0.001	<0.0001
Selenium (DIS)	mg/L		<0.001	<0.001	<0.001
Silicon (DIS)	mg/L		<0.1	12.3	<0.1
Silver (DIS)	mg/L		<0.0002	<0.0002	<0.0002
Sodium (DIS)	mg/L		<1	9	<1
Strontium (DIS)	mg/L		<0.01	0.23	<0.01
Thallium (DIS)	mg/L		<0.0002	<0.0002	<0.0002
Tungsten (DIS)	mg/L		<0.0001	0.0001	<0.0001
Uranium (DIS)	mg/L		<0.0002	0.0065	<0.0002
Vanadium (DIS)	mg/L		<0.01	<0.01	<0.01
Zinc (DIS)	mg/L		<0.008	<0.008	<0.008

Station Name		MW-16-02D	MW-15-06	MW-16-01	MW-12-12	MW-15-05	MW-15-09	RINSATE BLANK	MW-12-13	MW-12-18	MW-15-02	MW-12-17	MW-12-14	MW-15-08
Sample Date		2021/10/12 13:45	2021/10/12 14:35	2021/10/12 15:20	2021/10/12 18:05	2021/10/13 09:10	2021/10/13 09:20	2021/10/13 09:45	2021/10/13 10:30	2021/10/13 10:15	2021/10/13 11:30	2021/10/13 11:35	2021/10/13 12:25	2021/10/13 13:05
FieldSampleId		MR-2110-200	MR-2110-201	MR-2110-202	MR-2110-203	MR-2110-204	MR-2110-205	MR-2110-206	MR-2110-207	MR-2110-208	MR-2110-209	MR-2110-210	MR-2110-211	MR-2110-212
Lab		Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs
	Units							Blank						
Field Parameters														
Depth to Water	Feet	94.68	38.3	99	45.93	32.9	33.73		25.12	36.35	62.6	35.96	39.53	56.17
Dissolved Oxygen	mg/L	1.17	0.23	0.62	0.1	0.23	0.94		0.9	5.95	6.65	1.81	7.5	8.42
Field pH	s.u.	7.6	8.37	8.18	8.64	8.05	6.88		6.88	6.82	7.33	7.95	7.71	7.17
Field Specific Conductivity	umhos/cm	279	310	259	276	473	181		364	463	554	322	199	186
Oxidation Reduction Potential	Millivolts	202.6	-130.9	26.7	26.1	-115.7	52.8		47.5	44.6	-4.3	35.1	68.2	95.6
Water Temperature	Deg C	5.8	6.6	6.3	7.7	8.2	7.3		8	7.6	8.2	7.8	7.5	7.3
Physical Parameters														
pH	s.u.	7.6 H	8.2 H	7.9 H	8.3 H	8.0 H	7.0 H	6.1 H	7.1 H	6.8 H	7.4 H	8.1 H	7.5 H	6.5 H
Specific Conductivity	umhos/cm	290	322	268	296	479	203	<5	402	465	559	357	222	207
Total Dissolved Solids	mg/L	179	181	153	173	291	131	<10	245	302	343	214	140	148
Total Suspended Solids	mg/L	<10	241	<10	<10	<10	<10	<10	11	<10	<10	<10	<10	40
Major Constituents														
Alkalinity as CaCO3	mg/L	56 D	150 D	47 D	97 D	180 D	58 D	<3	120 D	98 D	160 D	120 D	88 D	57 D
Bicarbonate as HCO3	mg/L	68 D	180 D	56 D	120 D	220 D	70 D	<3	150 D	120 D	190 D	140 D	110 D	69 D
Carbonate as CO3	mg/L	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Chloride	mg/L	5	4	6	5	5	1	<1	17	63	67	5	9	19
Fluoride	mg/L	0.2	0.2	0.5	0.2	0.1	0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1
Sulfate	mg/L	67	8	63	40	55	35	<1	46	18	9	52	4	8
Nutrients														
Nitrate + Nitrite as N	mg/L	<0.01	<0.01	<0.01	0.02	0.51	0.26	<0.01	0.43	1.28 D	0.56	0.26	0.78	0.31
Phosphorus (TOT)	mg/L	0.01	0.16	0.07	<0.01	0.05	0.03	<0.01	0.03	0.07	0.04	0.05	0.05	0.38
Metals/Metaloids														
Aluminum (DIS)	mg/L	<0.005	0.009	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	0.096
Antimony (DIS)	mg/L	0.0007	<0.0005	0.0012	<0.0005	<0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.0005	0.0007	<0.0005	<0.0005
Arsenic (DIS)	mg/L	0.009	0.013	0.072	0.008	0.005	0.003	<0.001	0.004	0.002	0.004	0.009	0.002	0.001
Boron (DIS)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium (DIS)	mg/L	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	0.00013	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003
Calcium (DIS)	mg/L	34	45	29	37	63	17	<1	51	52	71	43	26	19
Chromium (DIS)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
Copper (DIS)	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
Iron (DIS)	mg/L	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	<0.02	<0.02	0.14
Lead (DIS)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Lithium (DIS)	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium (DIS)	mg/L	4	4	3	4	13	8	<1	10	14	15	12	6	6
Manganese (DIS)	mg/L	0.117	0.035	0.027	0.013	0.015	0.01	<0.001	0.003	<0.001	<0.001	0.005	<0.001	0.007
Mercury (DIS)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum (DIS)	mg/L	0.0073 D	0.01 D	0.0162 D	0.008 D	0.0125 D	0.0016 D	<0.0001	0.0022 D	0.0004 D	0.0006 D	0.0061 D	0.0003 D	0.0004 D
Nickel (DIS)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Potassium (DIS)	mg/L	3	4	4	4	5	3	<1	5	5	4	5	3	4
Rubidium (DIS)	mg/L	0.0021	0.0009	0.0016	0.0004	0.0008	0.0009	<0.0001	0.0011	0.0005	0.0005	0.001	0.0006	0.0015
Selenium (DIS)	mg/L	<0.001	<0.001	<0.001	0.006	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silicon (DIS)	mg/L	6	5.4	3.4	4.7	5.9	10.9	<0.1	11.5	13.6	11	6.1	11.7	17.1
Silver (DIS)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sodium (DIS)	mg/L	11	12	12	12	14	7	<1	11	9	9	8	6	7
Strontium (DIS)	mg/L	0.49	0.46	0.51	0.33	0.55	0.09	<0.01	0.27	0.2	0.24	0.2	0.12	0.13
Thallium (DIS)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Tungsten (DIS)	mg/L	0.0014	<0.0001	0.0063	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001
Uranium (DIS)	mg/L	0.0028	0.0232	0.0103	0.0844	0.0325	0.0009	<0.0002	0.0062	0.0021	0.004	0.0221	0.0011	<0.0002
Vanadium (DIS)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc (DIS)	mg/L	0.681	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008

D- Laboratory reporting limit increased due to sample matrix interference

H-Analysis performed past method holding time

Station Name		MW-15-07	MW-15-03	MW-15-03	DI BLANK	MW-12-11	MW-15-04	MW-16-02S	MW-12-16	MW-12-15	MW-15-01	RINSATE BLANK	MW-15-10	MW-15-10
Sample Date		2021/10/13 14:10	2021/10/13 15:30	2021/10/13 15:50	2021/10/13 16:10	2021/10/13 15:05	2021/10/13 16:15	2021/10/13 16:30	2021/10/14 09:40	2021/10/14 10:30	2021/10/14 12:15	2021/10/14 11:00	2021/10/14 11:55	2021/10/14 12:30
FieldSampleId		MR-2110-213	MR-2110-214	MR-2110-215	MR-2110-216	MR-2110-217	MR-2110-218	MR-2110-219	MR-2110-220	MR-2110-221	MR-2110-222	MR-2110-223	MR-2110-224	MR-2110-225
Lab		Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs
	Units			Duplicate	Blank							Blank		Duplicate
Field Parameters														
Depth to Water	Feet	60.35	95.25			54.48	46.1	51.58	89.18	27.8	55.7		10.29	
Dissolved Oxygen	mg/L	8.78	1.11			5.13	4.47	1.08	7.38	3.24	10.28		8	
Field pH	s.u.	7.13	7.75			7.23	7.22	7.98	7.54	7.54	7.75		6.94	
Field Specific Conductivity	umhos/cm	215	371			316	238	510	341	695	210		126	
Oxidation Reduction Potential	Millivolts	82.8	-76.9			67.4	44.9	37	78.9	-55.6	52		100.5	
Water Temperature	Deg C	8	9.6			7.9	8.6	7.7	8.1	7.8	8.4		8.1	
Physical Parameters														
pH	s.u.	7.2 H	7.7 H	7.7 H	5.8 H	7.3 H	7.2 H	8.0 H	7.5 H	7.6 H	7.7 H	5.9 H	6.4 H	6.4 H
Specific Conductivity	umhos/cm	240	378	378	<5	349	242	557	366	705	216	<5	136	137
Total Dissolved Solids	mg/L	156	241	238	<10	215	168	366	236	471	148	<10	111	111
Total Suspended Solids	mg/L	53	24	22	<10	<10	<10	<10	<10	12	<10	<10	<10	<10
Major Constituents														
Alkalinity as CaCO3	mg/L	78 D	110 D	110 D	<3	89 D	72 D	120 D	86 D	170 D	66 D	<3	41 D	42 D
Bicarbonate as HCO3	mg/L	95 D	140 D	140 D	<3	110 D	87 D	150 D	100 D	200 D	79 D	<3	50 D	50 D
Carbonate as CO3	mg/L	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Chloride	mg/L	17	4	4	<1	29	2	5	10	18	3	<1	<1	<1
Fluoride	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Sulfate	mg/L	9	62	62	<1	29	39	120	65	150	28	<1	19	19
Nutrients														
Nitrate + Nitrite as N	mg/L	0.34	1.31 D	1.3	<0.01	0.49	0.46	5.3 D	1.56 D	3.4 D	1.08 D	<0.01	0.37	0.37
Phosphorus (TOT)	mg/L	0.11	0.07	0.06	<0.01	0.14	0.04	0.8	0.05	0.05	0.11	<0.01	<0.01	<0.01
Metals/Metaloids														
Aluminum (DIS)	mg/L	0.03	0.007	<0.005	<0.005	0.018	0.01	0.018	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Antimony (DIS)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Arsenic (DIS)	mg/L	<0.001	0.006	0.006	<0.001	0.007	<0.001	0.081	0.003	0.004	0.004	<0.001	<0.001	<0.001
Boron (DIS)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium (DIS)	mg/L	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003
Calcium (DIS)	mg/L	24	43	43	<1	38	23	51	36	95	22	<1	11	11
Chromium (DIS)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (DIS)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	0.002	<0.001	<0.001	<0.001	<0.001
Iron (DIS)	mg/L	<0.02	0.03	0.02	<0.02	<0.02	0.05	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02
Lead (DIS)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Lithium (DIS)	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium (DIS)	mg/L	8	14	13	<1	10	8	15	14	21	7	<1	3	3
Manganese (DIS)	mg/L	<0.001	0.002	0.001	<0.001	<0.001	0.003	<0.001	<0.001	0.006	<0.001	<0.001	0.011	0.011
Mercury (DIS)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum (DIS)	mg/L	0.0002 D	0.0065 D	0.0064 D	<0.0001	0.0022 D	0.0008 D	0.005 D	0.0024 D	0.0036 D	0.0005 D	<0.0001	0.0002 D	<0.0001
Nickel (DIS)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Potassium (DIS)	mg/L	3	4	4	<1	3	4	6	5	6	3	<1	2	2
Rubidium (DIS)	mg/L	0.0003	0.0006	0.0006	<0.0001	0.0013	0.001	0.001	0.0008	0.0017	0.0005	<0.0001	0.0005	0.0005
Selenium (DIS)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silicon (DIS)	mg/L	12.9	9.9	9.9	<0.1	10.2	15.1	11.6	11.5	7.3	12.6	<0.1	19.2	19.2
Silver (DIS)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sodium (DIS)	mg/L	8	8	8	<1	9	10	38	9	12	6	<1	10	10
Strontium (DIS)	mg/L	0.16	0.3	0.3	<0.01	0.14	0.14	0.28	0.22	0.42	0.11	<0.01	0.08	0.08
Thallium (DIS)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Tungsten (DIS)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0011	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Uranium (DIS)	mg/L	0.0009	0.0156	0.0155	<0.0002	0.017	0.0019	0.0123	0.0067	0.0204	0.0013	<0.0002	0.0008	0.0008
Vanadium (DIS)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc (DIS)	mg/L	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008

Station Name		DI BLANK	MW-15-11	MW-15-12	MW-15-13
Sample Date		2021/10/14 13:00	2021/10/14 13:30	2021/10/14 13:35	2021/10/14 13:40
FieldSampleId		MR-2110-226	MR-2110-230	MR-2110-231	MR-2110-232
Lab		Energy Labs	Energy Labs	Hydro	Hydro
	Units	Blank		No Sample	No Sample
Field Parameters					
Depth to Water	Feet		155.5	No Access	No Access
Dissolved Oxygen	mg/L		3.64		
Field pH	s.u.		7.57		
Field Specific Conductivity	umhos/cm		301		
Oxidation Reduction Potential	Millivolts		56.7		
Water Temperature	Deg C		8.6		
Physical Parameters					
pH	s.u.	5.6 H	7.7 H		
Specific Conductivity	umhos/cm	<5	323		
Total Dissolved Solids	mg/L	<10	196		
Total Suspended Solids	mg/L	<10	<10		
Major Constituents					
Alkalinity as CaCO3	mg/L	<3	110 D		
Bicarbonate as HCO3	mg/L	<3	140 D		
Carbonate as CO3	mg/L	<4	<4		
Chloride	mg/L	<1	1		
Fluoride	mg/L	<0.1	<0.1		
Sulfate	mg/L	<1	44		
Nutrients					
Nitrate + Nitrite as N	mg/L	<0.01	0.18		
Phosphorus (TOT)	mg/L	<0.01	<0.01		
Metals/Metaloids					
Aluminum (DIS)	mg/L	<0.005	<0.005		
Antimony (DIS)	mg/L	<0.0005	<0.0005		
Arsenic (DIS)	mg/L	<0.001	<0.001		
Boron (DIS)	mg/L	<0.05	<0.05		
Cadmium (DIS)	mg/L	<0.00003	<0.00003		
Calcium (DIS)	mg/L	<1	41		
Chromium (DIS)	mg/L	<0.001	<0.001		
Copper (DIS)	mg/L	<0.001	<0.001		
Iron (DIS)	mg/L	<0.02	<0.02		
Lead (DIS)	mg/L	<0.0003	<0.0003		
Lithium (DIS)	mg/L	<0.1	<0.1		
Magnesium (DIS)	mg/L	<1	8		
Manganese (DIS)	mg/L	<0.001	<0.001		
Mercury (DIS)	mg/L	<0.0001	<0.0001		
Molybdenum (DIS)	mg/L	<0.0001	0.0023 D		
Nickel (DIS)	mg/L	<0.002	<0.002		
Potassium (DIS)	mg/L	<1	2		
Rubidium (DIS)	mg/L	<0.0001	0.0009		
Selenium (DIS)	mg/L	<0.001	<0.001		
Silicon (DIS)	mg/L	<0.1	8.4		
Silver (DIS)	mg/L	<0.0002	<0.0002		
Sodium (DIS)	mg/L	<1	10		
Strontium (DIS)	mg/L	<0.01	0.15		
Thallium (DIS)	mg/L	<0.0002	<0.0002		
Tungsten (DIS)	mg/L	<0.0001	<0.0001		
Uranium (DIS)	mg/L	<0.0002	0.0171		
Vanadium (DIS)	mg/L	<0.01	<0.01		
Zinc (DIS)	mg/L	<0.008	<0.008		

Station Name		WQ-15 (DC-1)	WQ-10 (SBC-1)	WQ-9A (YDTI-NE)	WQ-2	WQ-5	WQ-7	WQ-6	WQ-8A	WQ-18	WQ-19 (SEEP-10)	EXTRACTION POND	EXTRACTION POND	DI BLANK
Sample Date		2021/06/24 10:00	2021/06/24 10:40	2021/06/24 11:00	2021/06/24 11:40	2021/06/24 12:40	2021/06/24 13:05	2021/06/24 13:20	2021/06/24 13:30	2021/06/24 14:30	2021/06/24 15:10	2021/06/24 15:40	2021/06/24 15:50	2021/06/24 16:30
FieldSampleId		MR-2106-100	MR-2106-101	MR-2106-102	MR-2106-103	MR-2106-104	MR-2106-105	MR-2106-106	MR-2106-107	MR-2106-108	MR-2106-109	MR-2106-110	MR-2106-111	MR-2106-112
Lab		Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs
	Units				Woodville West	Clearwater Ditch	Pavillion Seep	C. Pit South	C. Pit North	Dredge Pond			Duplicate	Blank
Field Parameters														
Dissolved Oxygen	mg/L	9.5	9.45	6.66	10.5	8.34	8.15	6.56	7.66	6.62	7.31	0.51	0.4	
Field pH	s.u.	7.96	7.91	10.31	8.7	8.19	3.17	4.59	4.38	11.04	2.96	3.24	3.23	
Field Specific Conductivity	umhos/cm	229	231	2,842	454	353	1,675	1,828	2,544	2,501	3,384	2,842	2,860	
Flow	gpm	31	58	Ponded	58	13.4	91	Ponded	Ponded	Ponded	94	Ponded	Ponded	
Oxidation Reduction Pot	Millivolts	88	65.6	37.8	170	68.4	552	240	374	29.1	514.8	437.6	438.5	
Water Temperature	Deg C	8.8	8.9	16.1	7.3	12.5	16.4	21	21.7	22.1	20.2	7.9	7.6	
Physical Parameters														
pH	s.u.	8.1	8	10.4	7.2	7	3.1	5.2	4.5	10.8	3	3.4	3.4	5.5
Specific Conductivity	umhos/cm	254	260	3,040	516	386	2,130	2,110	2,790	2,530	3,650	3,010	3,000	7
Total Dissolved Solids	mg/L	164	161	2,930	353	253	1,880	1,950	2,860	2,330	4,240	2,940	2,960	<10
Total Suspended Solids	mg/L	<10	<10	<10	<10	<10	<10	<10	10	27	<10	<10	<10	<10
Major Constituents														
Alkalinity as CaCO3	mg/L	110	120	27	30	39	<2	3	<2	47	<2	<2	<2	<2
Bicarbonate as HCO3	mg/L	130	140	13	35	47	<2	3	<2	15	<2	<2	<2	<2
Carbonate as CO3	mg/L	<2	<2	10	<2	<2	<2	<2	<2	21	<2	<2	<2	<2
Chloride	mg/L	<1	<1	13	11	24	9	9	9	12	11	12	12	<1
Fluoride	mg/L	0.1	0.1	3.2	0.4	0.2	0.7	1.9	2.7	3.3	0.2	0.2	0.2	<0.1
Sulfate	mg/L	16	14	1,820	186	97	1,170	1,260	1,820	1,440	2,350	1,930	1,950	<1
Total Acidity as CaCO3	mg/L						330		210		570	370	370	
Nutrients														
Nitrate + Nitrite as N	mg/L	0.01 B	<0.01 B	0.69	0.16	<0.01B	0.02 B	0.05	0.08	0.62	0.04 B	0.05	0.05	0.01
Phosphorus (TOT)	mg/L	0.02	0.02	<0.01	0.01	0.03	0.02	<0.01	0.02	0.01	0.04	0.01	0.01	<0.01
Metals/Metaloids														
Aluminum (DIS)	mg/L	<0.005	<0.005	0.023	0.018	<0.005	22.3	3.64	18.6	0.137	10.3	35.6	36	<0.005
Antimony (TRC)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Arsenic (TRC)	mg/L	0.007	0.002	0.002	<0.001	<0.001	0.001	<0.001	0.001	<0.001	0.007	0.001	0.001	<0.001
Boron (TRC)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium (TRC)	mg/L	<0.00003	<0.00003	0.00024	0.00147	0.00012	0.191	0.0299	0.169	0.00512	0.239	0.262	0.258	<0.00003
Calcium (TRC)	mg/L	33	33	661	56	42	207	409	529	559	485	413	421	<1
Chromium (TRC)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.007	0.003	0.003	<0.001
Copper (TRC)	mg/L	0.003	0.001	0.002	0.071	0.003	51.9	10.9	39.9	0.815	22.7	31	30.8	<0.001
Iron (DIS)	mg/L			<0.02								19.2	19.6	<0.02
Iron (TRC)	mg/L	0.17	0.06	<0.02	<0.02	0.33	17.8	3.76	0.91	0.3	22.7	19.8	20.1	<0.02
Iron, Ferrous (DIS)	mg/L			<0.02								19.2	19.6	<0.02
Lead (TRC)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.0249	0.0029	0.0017	0.0005	<0.0003	0.0072	0.007	<0.0003
Lithium (TRC)	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium (TRC)	mg/L	7	7	6	15	10	72	44	79	8	84	83	84	<1
Manganese (TRC)	mg/L	0.048	0.012	0.003	0.009	0.146	15.8	9.24	15.8	0.698	31.6	19.6	19.9	<0.001
Mercury (TRC)	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Molybdenum (TRC)	mg/L	0.0019 J	0.0018 J	1.16 J	0.236 J	0.0045 J	0.0046 J	0.408 J	0.0398 J	0.73 J	0.0129 J	<0.0002 J	0.0009 J	<0.0002
Nickel (TRC)	mg/L	<0.002	<0.002	<0.002	0.002	<0.002	0.101	0.048	0.117	0.004	0.13	0.112	0.11	<0.002
Potassium (TRC)	mg/L	2	3	40	3	3	6	6	7	29	18	19	19	<1
Rubidium (TRC)	mg/L	0.0009	0.0014	0.0411	0.0036	0.0022	0.0327	0.0338	0.0311	0.0419	0.018	0.0397	0.0408	<0.0001
Selenium (TRC)	mg/L	<0.001	<0.001	0.004	<0.001	<0.001	0.002	<0.001	<0.001	0.003	0.001	<0.001	0.001	<0.001
Silicon (TRC)	mg/L	10.5	9.4	4.2	14.2	13.6	26.1	9.3	13	4.3	16.3	18.2	18.4	<0.1
Silver (TRC)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sodium (TRC)	mg/L	8	6	103	13	11	24	34	38	64	92	79	78	<1
Strontium (TRC)	mg/L	0.21	0.23	3.4	0.33	0.25	0.75	2	3.25	3.29	1.43	1.58	1.58	<0.01
Thallium (TRC)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0003	0.0005	<0.0002	<0.0002	<0.0002	0.0005	0.0005	<0.0002
Tungsten (TRC)	mg/L	<0.0001	<0.0001	0.0185	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0119	<0.0001	<0.0001	<0.0001	<0.0001
Uranium (TRC)	mg/L	0.0097	0.0041	0.0003	0.0004	<0.0002	0.057	0.0444	0.172	0.0034	0.133	0.0527	0.0514	<0.0002
Vanadium (TRC)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc (TRC)	mg/L	<0.008	<0.008	<0.008	0.359	0.039	23.3	4.4	21.3	0.598	80.7	36.3	37.3	<0.008

J-Duplicate sample RPD exceedence B-Blank sample exceedence H-Analysis performed past method holding time

Station Name		WQ-11 (YDC-1)	BRCD-2	BRCD-6	OFGD-1	OFGD-4	BRCD-4	BRCD-4	BRCD-5	OFGD-3	DI BLANK	WQ-1
Sample Date		2021/06/23 16:45	2021/06/24 09:15	2021/06/24 09:30	2021/06/24 09:45	2021/06/24 10:05	2021/06/24 10:30	2021/06/24 10:45	2021/06/24 11:00	2021/06/24 11:45	2021/06/24 12:15	2021/06/24 13:30
FieldSampleId		MR-2106-120	MR-2106-121	MR-2106-122	MR-2106-123	MR-2106-124	MR-2106-125	MR-2106-126	MR-2106-127	MR-2106-128	MR-2106-129	MR-2106-130
Lab		Energy Labs	Energy Labs	Hydro	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs
	Units			No Sample				Duplicate			Blank	
Field Parameters												
Dissolved Oxygen	mg/L	7.44	7.6		4.53	3.5	6.24		6.96	7.83		7.74
Field pH	s.u.	8.18	7.93		7.22	7.16	8.08		8.1	8.06		7.67
Field Specific Conductivity	umhos/cm	120	217		535	621	312		164	620		545
Flow	gpm	507	12.3	Dry	0.31	0.3	31		2.4	36		34.6
Oxidation Reduction Pot	Millivolts	32.3	77.2		52.1	54.1	74.7		80.9	26.1		75.2
Water Temperature	Deg C	13.5	9.4		11	12.2	15.3		16.3	10.8		11.5
Physical Parameters												
pH	s.u.	8	7.8		7.1	7	7.9	8	7.9	8	6	7.6
Specific Conductivity	umhos/cm	126	224		548	651	320	320	176	631	<5	557
Total Dissolved Solids	mg/L	104	163		355	421	217	219	144	418	<10	389
Total Suspended Solids	mg/L	<10	11		58	70	18	14	<10	<10	<10	<10
Major Constituents												
Alkalinity as CaCO3	mg/L	49	61		120	170	91	92	50	170	<2	65
Bicarbonate as HCO3	mg/L	59	74		140	200	110	110	61	200	<2	79
Carbonate as CO3	mg/L	<2	<2		<2	<2	<2	<2	<2	<2	<2	<2
Chloride	mg/L	1	7		6	37	7	7	5	20	<1	12
Fluoride	mg/L	<0.1	<0.1		0.2	0.3	0.2	0.2	0.2	0.5	<0.1	0.2
Sulfate	mg/L	9	28		138	93	49	49	18	116	<1	179
Total Acidity as CaCO3	mg/L											
Nutrients												
Nitrate + Nitrite as N	mg/L	<0.01	0.52		<0.01	0.23	0.07	0.07	0.92	<0.01	<0.01	0.08
Phosphorus (TOT)	mg/L	0.07	0.36		0.28	0.35	0.19	0.21	0.13	0.12	<0.01	0.03
Metals/Metaloids												
Aluminum (DIS)	mg/L	0.04	0.029		<0.005	<0.005	<0.005	<0.005	0.011	<0.005	<0.005	0.058
Antimony (TRC)	mg/L	<0.0005	<0.0005		<0.0005	0.0011	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Arsenic (TRC)	mg/L	0.007	0.023		0.019	0.031	0.039	0.04	0.006	0.013	<0.001	0.001
Boron (TRC)	mg/L	<0.05	<0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium (TRC)	mg/L	<0.00003	<0.00003		0.00005	0.00025	0.00005	0.00004	0.00005	<0.00003	<0.00003	0.0016
Calcium (TRC)	mg/L	14	22		70	83	36	37	15	77	<1	69
Chromium (TRC)	mg/L	<0.001	<0.001		<0.001	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (TRC)	mg/L	0.01	0.004		0.002	0.019	0.005	0.005	0.002	<0.001	<0.001	0.094
Iron (DIS)	mg/L											
Iron (TRC)	mg/L	0.67	0.23		4.27	6.49	0.6	0.65	0.21	0.06	<0.02	0.34
Iron, Ferrous (DIS)	mg/L											
Lead (TRC)	mg/L	0.0011	0.0006		0.0008	0.0137	0.0014	0.0014	0.0008	<0.0003	<0.0003	0.001
Lithium (TRC)	mg/L	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium (TRC)	mg/L	3	7		15	16	8	8	4	16	<1	17
Manganese (TRC)	mg/L	0.034	0.036		4.74	2.12	0.101	0.104	0.011	0.12	<0.001	0.14
Mercury (TRC)	ug/L	<0.01	<0.01		<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Molybdenum (TRC)	mg/L	0.001	0.0008		0.0013	0.0076	0.0046	0.0047	0.0012	0.0046	<0.0002	0.0008
Nickel (TRC)	mg/L	<0.002	<0.002		<0.002	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Potassium (TRC)	mg/L	2	4		4	6	5	5	4	5	<1	3
Rubidium (TRC)	mg/L	0.0014	0.0018		0.001	0.0101	0.0028	0.003	0.0031	0.001	<0.0001	0.0023
Selenium (TRC)	mg/L	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silicon (TRC)	mg/L	10.5	17.9		11.4	17.5	15.3	14.6	24.8	13.9	<0.1	13.1
Silver (TRC)	mg/L	<0.0002	<0.0002		<0.0002	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sodium (TRC)	mg/L	5	7		12	19	10	10	8	20	<1	13
Strontium (TRC)	mg/L	0.07	0.15		0.42	0.88	0.21	0.22	0.14	0.68	<0.01	0.47
Thallium (TRC)	mg/L	<0.0002	<0.0002		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Tungsten (TRC)	mg/L	0.0002	<0.0001		0.0002	0.0002	0.0001	<0.0001	0.0001	0.0001	<0.0001	<0.0001
Uranium (TRC)	mg/L	0.0008	0.0015		0.0012	0.0052	0.0029	0.0029	0.0004	0.0028	<0.0002	0.0022
Vanadium (TRC)	mg/L	<0.01	<0.01		<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc (TRC)	mg/L	<0.008	<0.008		0.011	0.044	<0.008	<0.008	<0.008	<0.008	<0.008	0.326

Station Name		OFGD-3	WQ-11 (YDC-1)	BRCD-2	BRCD-6	OFGD-1	OFGD-4	BRCD-4	BRCD-5	WQ-15 (DC-1)	WQ-10 (SBC-1)	WQ-9A (YDTI-NE)	WQ-2
Sample Date		2021/10/18 08:45	2021/10/18 10:00	2021/10/18 10:40	2021/10/18 11:20	2021/10/18 11:30	2021/10/18 12:00	2021/10/18 12:20	2021/10/18 12:40	2021/10/19 09:15	2021/10/19 10:00	2021/10/19 10:20	2021/10/19 11:00
FieldSampleId		MR-2110-100	MR-2110-101	MR-2110-102	MR-2110-103	MR-2110-104	MR-2110-105	MR-2110-106	MR-2110-107	MR-2110-150	MR-2110-151	MR-2110-152	MR-2110-153
Lab		Energy Labs	Energy Labs	Energy Labs	Hydro	Energy Labs	Hydro	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs
	Units				No Sample		No Sample						
Field Parameters													
Dissolved Oxygen	mg/L	10	10.9	10.65		2.95		10.67	9.31	10.58	10.82	7.1	9.71
Field pH	s.u.	8.3	8.98	8.63		7.74		7.86	8.09	8.73	8.7	9.23	7.8
Field Specific Conductivity	umhos/cm	624	186	238		595		310	167	244	261	3,023	556
Flow	Gallons Per Min	13.0	31.7	4.3	Dry	<1.0	Dry	15.0	2.6	8.0	19.6	Ponded	25.0
Oxidation Reduction Potential	Millivolts	47.2	42.3	42.2		-141		9.7	18.3	88.9	74.6	70.1	192.4
Water Temperature	Deg C	2	1.8	1.5		5.2		4.1	8.4	2.9	1.8	10	7.2
Physical Parameters													
pH	s.u.	7.9 H	7.9 H	7.6 H		7.0 H		7.9 H	7.9 H	7.9 H	8.0 H	10.2 H	7.1 H
Specific Conductivity	umhos/cm	662	199	249		603		333	181	264	280	3,190	598
Total Dissolved Solids	mg/L	429	130	168		387		226	149	160	167	3,010 D	433
Total Suspended Solids	mg/L	<10	<10	110		<10		<10	87	<10	17	<10	<10
Major Constituents													
Alkalinity as CaCO3	mg/L	180 D	77 D	65 D		130 D		88 D	51 D	100 D	120 D	41 D	23 D
Bicarbonate as HCO3	mg/L	220 D	94 D	78 D		160 D		110 D	62 D	130 D	140 D	46 D	28 D
Carbonate as CO3	mg/L	<3	<3	<3		<3		<3	<3	<3	<3	<3	<3
Chloride	mg/L	21	3	8		5		6	5	<1	<1	13	7
Fluoride	mg/L	0.4	0.1	<0.1		0.2		0.2	0.2	<0.1	0.1	3	0.5
Sulfate	mg/L	116	13	37		152		62	18	24	17	1,800	224
Total Acidity as CaCO3	mg/L												
Nutrients													
Nitrate + Nitrite as N	mg/L	<0.01	<0.01	0.35		<0.01		<0.01	1.27	<0.01	<0.01	0.6	0.18
Phosphorus (TOT)	mg/L	0.1	0.07	0.36		0.06		0.11	0.21	<0.01	0.01	0.02	0.03
Metals/Metaloids													
Aluminum (DIS)	mg/L	<0.005	0.014	0.015		<0.005		0.006	0.023	<0.005	<0.005	0.092	0.034
Antimony (TRC)	mg/L	<0.0005	<0.0005	<0.0005		<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	0.0006	<0.0005
Arsenic (TRC)	mg/L	0.01	0.006	0.025		0.009		0.027	0.006	0.005	0.002	0.004	<0.001
Boron (TRC)	mg/L	<0.05	<0.05	<0.05		<0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium (TRC)	mg/L	<0.00003	<0.00003	0.00012		<0.00003		<0.00003	0.0001	<0.00003	<0.00003	0.00029	0.00217
Calcium (TRC)	mg/L	85	24	26		77		38	17	31	33	665	65
Chromium (TRC)	mg/L	<0.001	<0.001	<0.001		<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (TRC)	mg/L	<0.001	0.002	0.007		<0.001		0.002	0.004	0.001	0.001	0.005	0.088
Iron (TRC)	mg/L	0.03	0.3	0.51		2.2		0.14	0.08	0.04	0.07	<0.02	<0.02
Lead (TRC)	mg/L	<0.0003	<0.0003	0.003		<0.0003		<0.0003	0.0032	<0.0003	<0.0003	<0.0003	<0.0003
Lithium (TRC)	mg/L	<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium (TRC)	mg/L	18	5	8		17		9	5	7	8	5	19
Manganese (TRC)	mg/L	0.071	0.016	0.136		1.4 D		0.092	0.032	0.014	0.017	0.005	0.012
Mercury (TRC)	ug/L	<0.01	<0.01	0.02		<0.01		<0.01	0.01	<0.01	<0.01	<0.01	<0.01
Molybdenum (TRC)	mg/L	0.0044 D	0.0012 D	0.0006 D		0.0013 D		0.0035 D	0.0012 D	0.0025 D	0.0018 D	1.19 D	0.181 D
Nickel (TRC)	mg/L	<0.002	<0.002	<0.002		<0.002		<0.002	<0.002	<0.002	<0.002	<0.002	0.003
Potassium (TRC)	mg/L	5	2	5		5		4	4	2	3	43	4
Rubidium (TRC)	mg/L	0.0011	0.0005	0.0052		0.0004		0.0017	0.0054	0.0007	0.002	0.0561	0.0049
Selenium (TRC)	mg/L	<0.001	<0.001	<0.001		<0.001		<0.001	<0.001	<0.001	<0.001	0.004	<0.001
Silicon (TRC)	mg/L	15.1	12.8	16.3		11.5		14.3	26	10.3	9.2	5.3 D	15.3
Silver (TRC)	mg/L	<0.0002	<0.0002	<0.0002		<0.0002		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sodium (TRC)	mg/L	21	7	8		15		10	9	8	7	108	14
Strontium (TRC)	mg/L	0.78	0.13	0.17		0.45		0.23	0.15	0.23	0.25	3.79	0.41
Thallium (TRC)	mg/L	<0.0002	<0.0002	<0.0002		<0.0002		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Tungsten (TRC)	mg/L	<0.0001	<0.0001	<0.0001		<0.0001		<0.0001	<0.0001	<0.0001	<0.0001	0.0189	<0.0001
Uranium (TRC)	mg/L	0.003	0.0025	0.0023		0.0025		0.0028	0.0009	0.0114	0.0056	0.0017	0.0003
Vanadium (TRC)	mg/L	<0.01	<0.01	<0.01		<0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc (TRC)	mg/L	<0.008	<0.008	0.009		<0.008		<0.008	<0.008	<0.008	<0.008	<0.008	0.521

D- Laboratory reporting limit increased due to sample matrix interference

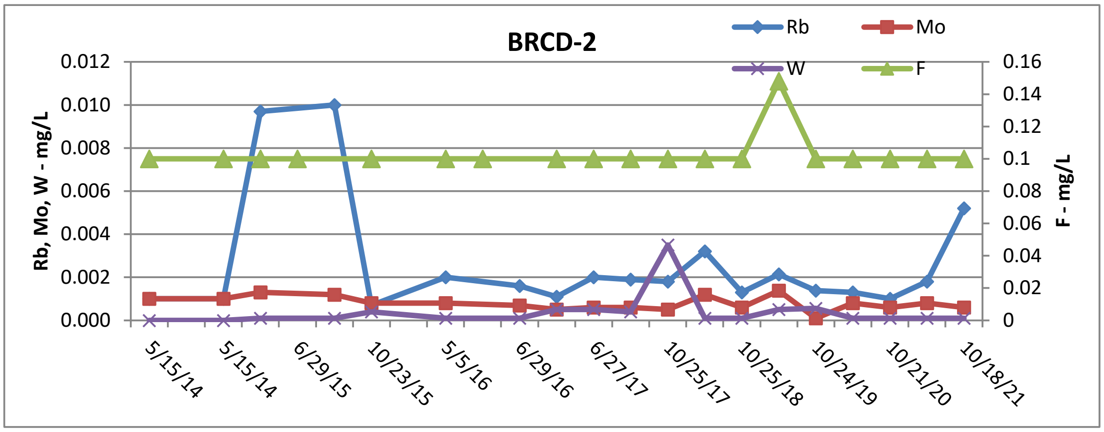
H-Analysis performed past method holding time

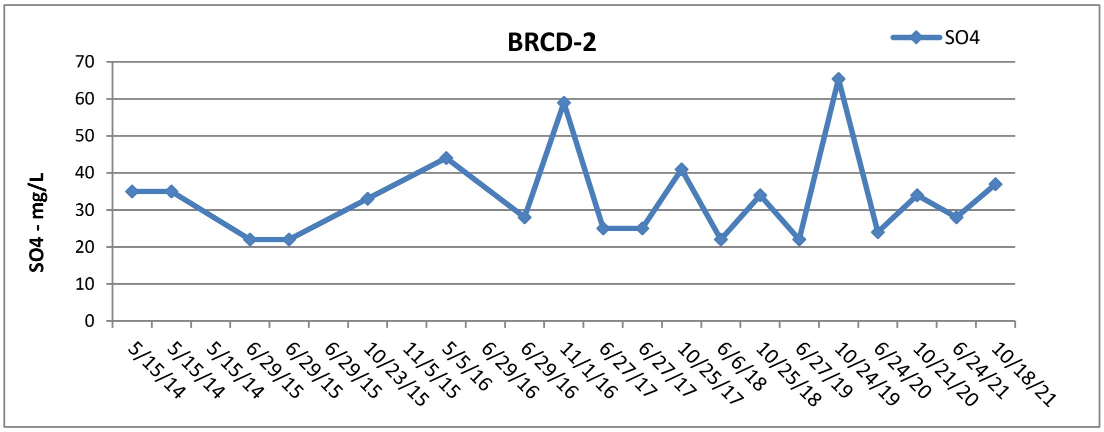
Station Name		WQ-5	WQ-7	WQ-6	DI BLANK	WQ-8A	WQ-19 (SEEP-10)	WQ-19 (SEEP-10)	EXTRACTION POND	WQ-18	WQ-1
Sample Date		2021/10/19 12:00	2021/10/19 12:30	2021/10/19 12:40	2021/10/19 13:00	2021/10/19 13:35	2021/10/19 14:15	2021/10/19 14:30	2021/10/19 14:45	2021/10/19 15:15	2021/10/19 16:40
FieldSampleId		MR-2110-154	MR-2110-155	MR-2110-156	MR-2110-157	MR-2110-158	MR-2110-159	MR-2110-160	MR-2110-161	MR-2110-162	MR-2110-163
Lab		Hydro	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs
	Units	No Sample			Blank			Duplicate			
Field Parameters											
Dissolved Oxygen	mg/L		9.67	9.98		8.5	8.39	8.38	0.51	8.12	9.41
Field pH	s.u.		3.46	5.21		4.18	3.23	3.23	3.38	9.35	
Field Specific Conductivity	umhos/cm		2,356	1,995		2,764	3,178	3,177	2,888	3,628	565
Flow	Gallons Per Min	No Flow	64	Ponded		Ponded	100	100	Ponded	Ponded	34.5
Oxidation Reduction Potential	Millivolts		540.6	186.7		438	499.6	499.4	447.3	63	70.9
Water Temperature	Deg C		6.7	7.6		8.2	13	13	8.5	12.9	6.1
Physical Parameters											
pH	s.u.		3.1 H	5.7 H	5.6 H	3.9 H	3.1 H	3.1 H	3.3 H	11.6 H	7.6 H
Specific Conductivity	umhos/cm		2,480	2,120	5	2,990	3,340	3,350	3,080	3,530	609
Total Dissolved Solids	mg/L		2,260 D	1,860 D	<10	2,970 D	3,150 D	3,070 D	2,910 D	2,750 D	424
Total Suspended Solids	mg/L		<10	<10	<10	17	<10	<10	<10	30	<10
Major Constituents											
Alkalinity as CaCO3	mg/L		<3	4 D	<3	<3	<3	<3	<3	260 D	60 D
Bicarbonate as HCO3	mg/L		<3	5 D	<3	<3	<3	<3	<3	<3	73 D
Carbonate as CO3	mg/L		<3	<3	<3	<3	<3	<3	<3	66 D	<3
Chloride	mg/L		7	8	<1	8	12	13	14	12	8
Fluoride	mg/L		0.5	1.7	<0.1	2	0.4	0.4	0.3	2.8	0.2
Sulfate	mg/L		1,360	1,150	<1	1,780	1,990	1,990	1,820	1,580	198
Total Acidity as CaCO3	mg/L		440			290	400	410	370		
Nutrients											
Nitrate + Nitrite as N	mg/L		<0.01	0.01	<0.01	0.02	0.01	0.01	0.01	0.56	<0.01
Phosphorus (TOT)	mg/L		0.02	<0.01	<0.01	0.02	0.03	0.03	0.01	<0.01	<0.01
Metals/Metaloids											
Aluminum (DIS)	mg/L		27.1 D	1.43 D	<0.005	23.6 D	29.6 D	29.8 D	31 D	<0.005	0.044
Antimony (TRC)	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Arsenic (TRC)	mg/L		0.001	<0.001	<0.001	0.002	0.007	0.008	0.001	0.001	<0.001
Boron (TRC)	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium (TRC)	mg/L		0.281	0.0241	<0.00003	0.328	0.2	0.199	0.264	0.00144	0.00222
Calcium (TRC)	mg/L		254	410	<1	502	475	486	415	698	73
Chromium (TRC)	mg/L		0.003	<0.001	<0.001	<0.001	0.004	0.004	0.003	<0.001	<0.001
Copper (TRC)	mg/L		58 D	6.63 D	<0.001	42.5 D	14.5 D	14.2 D	28.5 D	0.172	0.076
Iron (TRC)	mg/L		34.2 D	1.84 D	<0.02	6.59 D	20.1 D	20.3 D	14.1 D	0.23	0.11
Lead (TRC)	mg/L		0.0301	0.0012	<0.0003	0.0033	0.0005	0.0006	0.0078	0.0011	<0.0003
Lithium (TRC)	mg/L		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium (TRC)	mg/L		96	39	<1	85	61	63	80	3	18
Manganese (TRC)	mg/L		21.6 D	7.7 D	<0.001	17.7 D	25.3 D	25.5 D	19.4 D	0.181	0.077
Mercury (TRC)	ug/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Molybdenum (TRC)	mg/L		0.0038 D	0.565 D	<0.0002	0.0234 D	0.0098 D	0.0101 D	<0.0004	0.822 D	0.0008 D
Nickel (TRC)	mg/L		0.138	0.039	<0.002	0.152	0.098	0.1	0.111	<0.002	<0.002
Potassium (TRC)	mg/L		7	6	<1	8	20	20	20	35	3
Rubidium (TRC)	mg/L		0.0438	0.0318	<0.0001	0.036	0.0209	0.0211	0.0442	0.0532	0.0022
Selenium (TRC)	mg/L		0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	<0.001
Silicon (TRC)	mg/L		29.2 D	8.8 D	<0.1	14.3 D	17 D	17 D	20.7 D	4 D	15.6
Silver (TRC)	mg/L		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sodium (TRC)	mg/L		28	38	<1	38	94	93	80	80	13
Strontium (TRC)	mg/L		0.93	2	<0.01	3.27	1.45	1.43	1.63	3.22	0.54
Thallium (TRC)	mg/L		0.0004	0.0003	<0.0002	0.0003	0.0002	0.0002	0.0006	<0.0002	<0.0002
Tungsten (TRC)	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0089	<0.0001
Uranium (TRC)	mg/L		0.077	0.0263	<0.0002	0.201	0.0677	0.0689	0.0536	0.0005	0.0019
Vanadium (TRC)	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc (TRC)	mg/L		30.6 D	3.56 D	<0.008	26.5 D	59.6 D	59.9 D	35.9 D	0.169	0.512

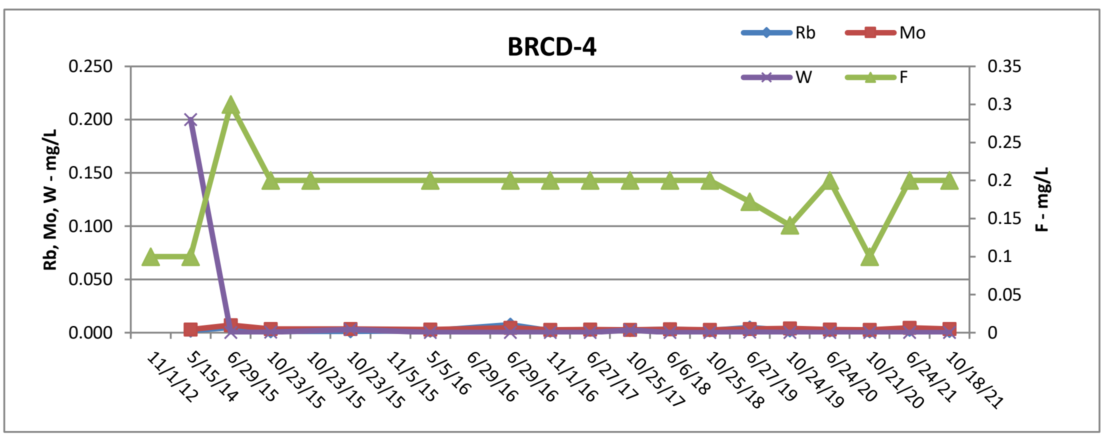
APPENDIX B

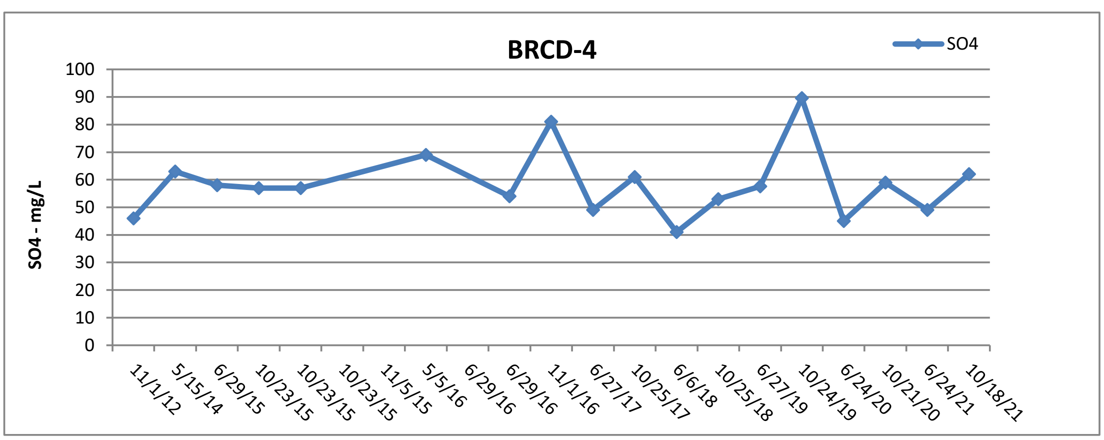
GROUNDWATER AND SURFACE WATER CONCENTRATION TREND PLOTS FOR SELECT PARAMETERS

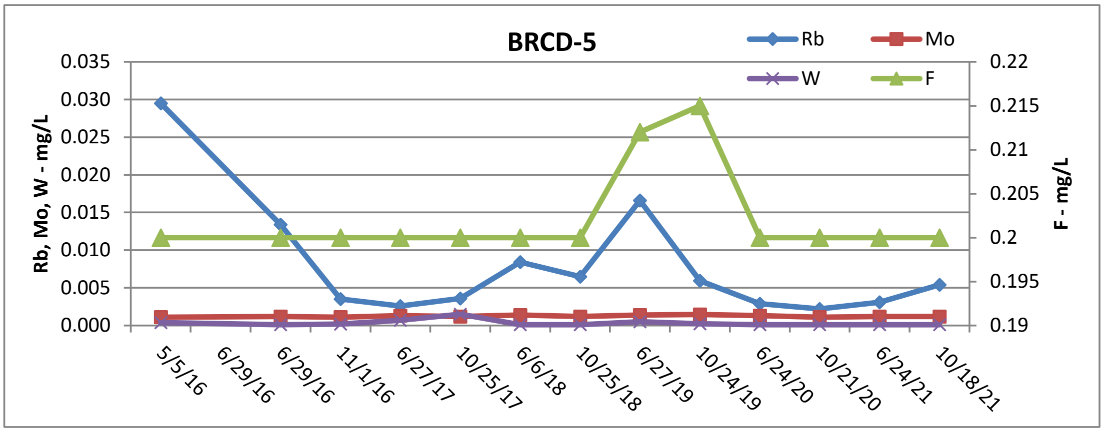
B-1 SURFACE WATER TREND PLOTS

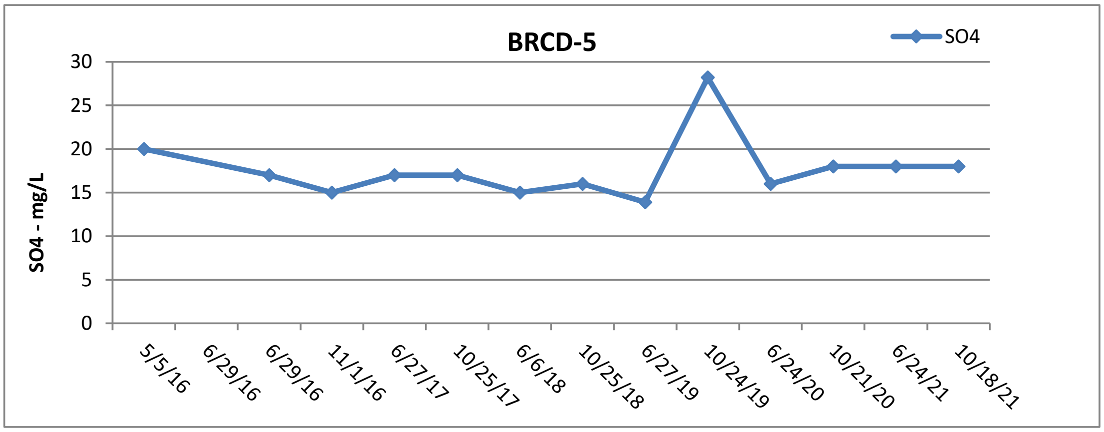

BRCD-2
Rb
Mo
W
F
Rb, Mo, W - mg/L
F - mg/L
0.012
0.010
0.008
0.006
0.004
0.002
0.000
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
5/15/14
5/15/14
6/29/15
10/23/15
5/5/16
6/29/16
6/27/17
10/25/17
10/25/18
10/24/19
10/21/20
10/18/21

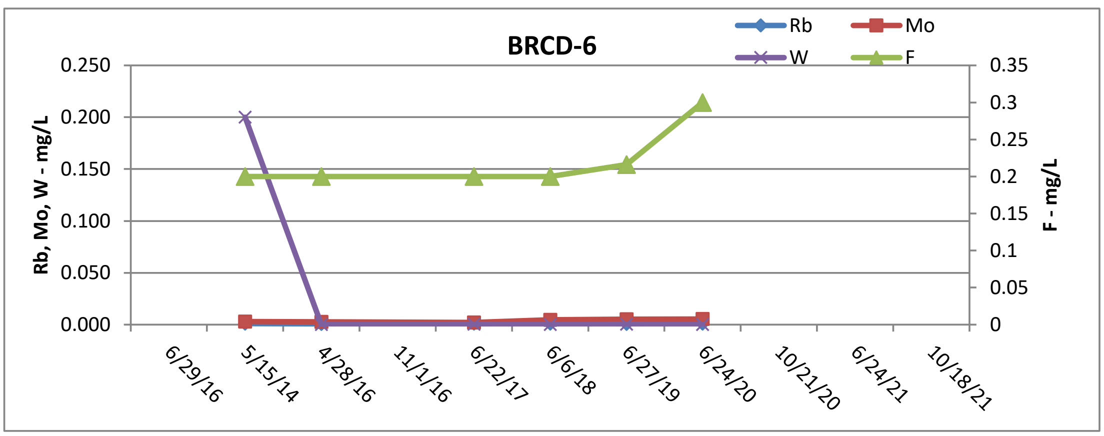

BRCD-2
SO4
SO4 - mg/L
70
60
50
40
30
20
10
0
5/15/14
5/15/14
5/15/14
6/29/15
6/29/15
6/29/15
10/23/15
11/5/15
5/5/16
6/29/16
6/29/16
11/1/16
6/27/17
6/27/17
10/25/17
6/6/18
10/25/18
6/27/19
10/24/19
6/24/20
10/21/20
6/24/21
10/18/21

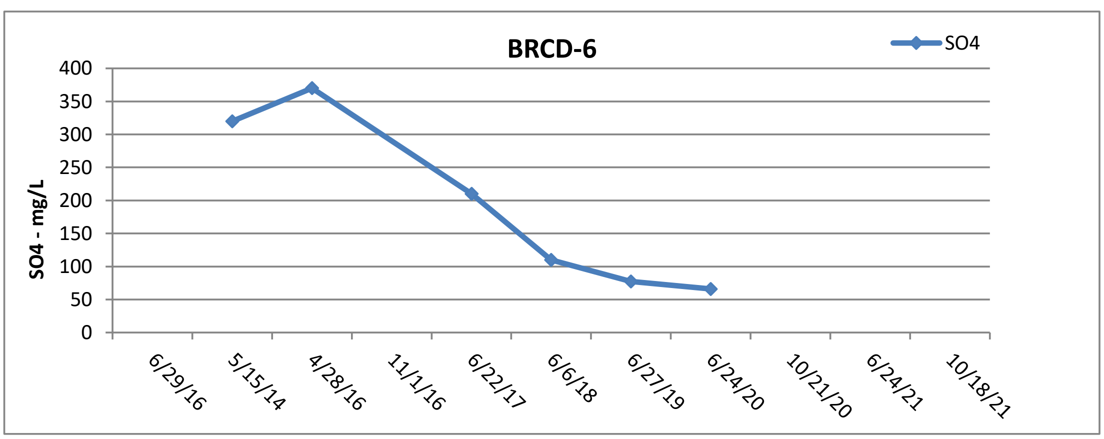

BRCD-4
Rb
Mo
W
F
Rb, Mo, W - mg/L
F - mg/L
0.250
0.200
0.150
0.100
0.050
0.000
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
11/1/12
5/15/14
6/29/15
10/23/15
10/23/15
10/23/15
11/5/15
5/5/16
6/29/16
6/29/16
11/1/16
6/27/17
10/25/17
6/6/18
10/25/18
6/27/19
10/24/19
6/24/20
10/21/20
6/24/21
10/18/21

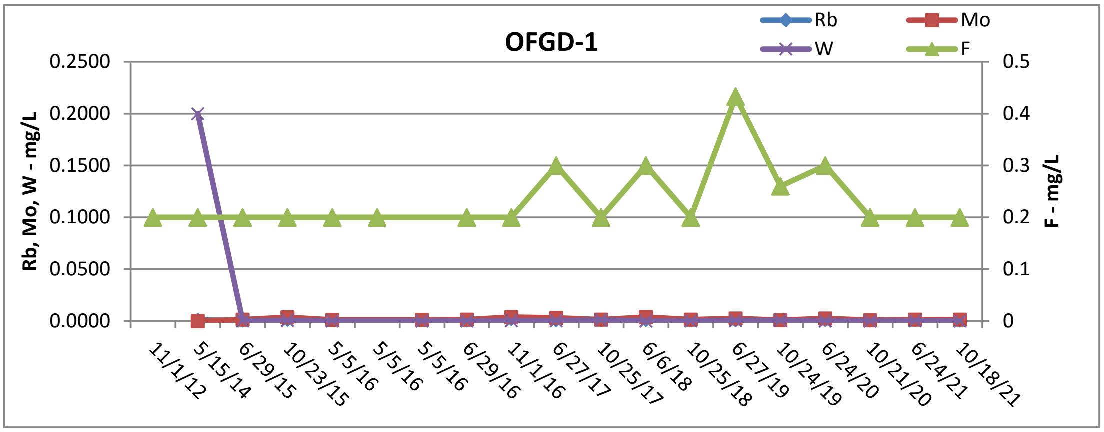

BRCD-4
SO4
SO4 - mg/L
100
90
80
70
60
50
40
30
20
10
0
11/1/12
5/15/14
6/29/15
10/23/15
10/23/15
10/23/15
11/5/15
5/5/16
6/29/16
6/29/16
11/1/16
6/27/17
10/25/17
6/6/18
10/25/18
6/27/19
10/24/19
6/24/20
10/21/20
6/24/21
10/18/21

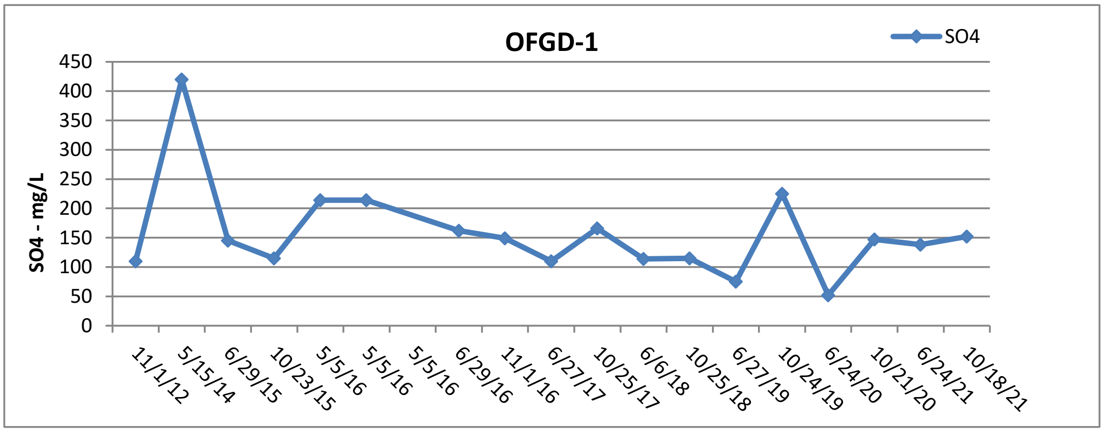

BRCD-5
Rb
Mo
W
F
Rb, Mo, W - mg/L
F - mg/L
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
0.22
0.215
0.21
0.205
0.2
0.195
0.19
5/5/16
6/29/16
6/29/16
11/1/16
6/27/17
10/25/17
6/6/18
10/25/18
6/27/19
10/24/19
6/24/20
10/21/20
6/24/21
10/18/21

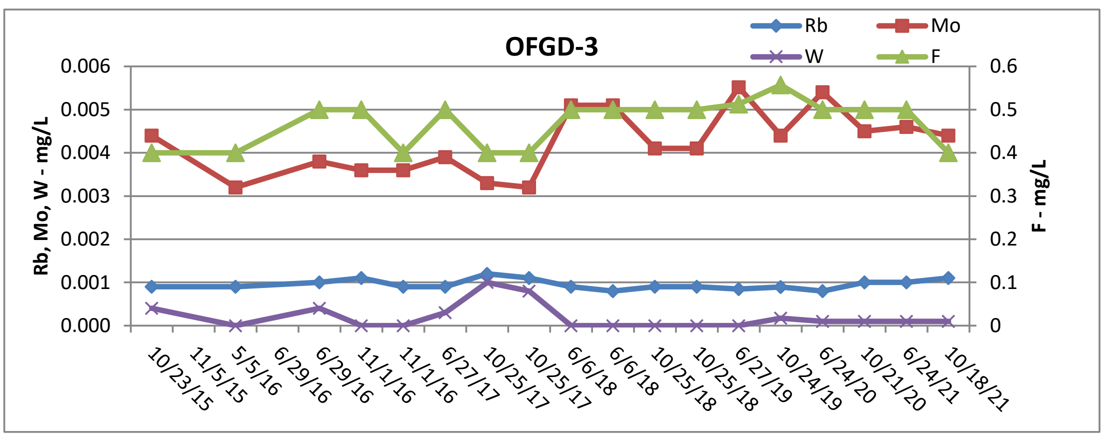

BRCD-5
SO4
SO4 - mg/L
30
25
20
15
10
5
0
5/5/16
6/29/16
6/29/16
11/1/16
6/27/17
10/25/17
6/6/18
10/25/18
6/27/19
10/24/19
6/24/20
10/21/20
6/24/21
10/18/21

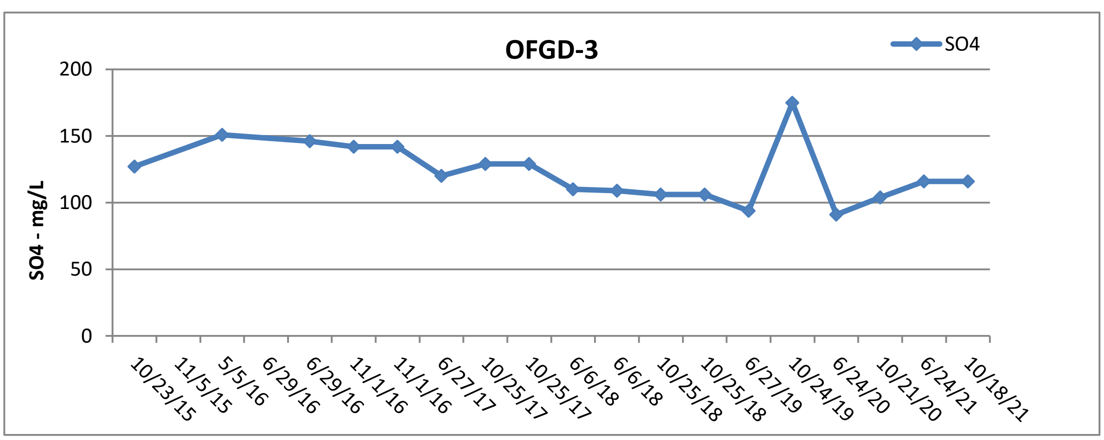

BRCD-6
Rb
Mo
W
F
Rb, Mo, W - mg/L
F - mg/L
0.250
0.200
0.150
0.100
0.050
0.000
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
6/29/16
5/15/14
4/28/16
11/1/16
6/22/17
6/6/18
6/27/19
6/24/20
10/21/20
6/24/21
10/18/21


BRCD-6
SO4
SO4 - mg/L
400
350
300
250
200
150
100
50
0
6/29/16
5/15/14
4/28/16
11/1/16
6/22/17
6/6/18
6/27/19
6/24/20
10/21/20
6/24/21
10/18/21

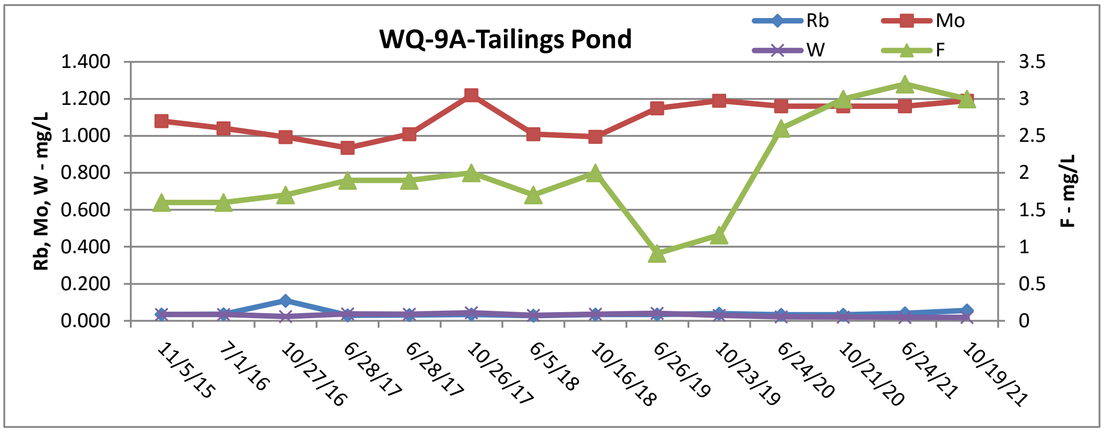

OFGD-1
Rb
Mo
W
F
Rb, Mo, W - mg/L
F - mg/L
0.2500
0.2000
0.1500
0.1000
0.0500
0.0000
0.5
0.4
0.3
0.2
0.1
0
11/1/12
5/15/14
6/29/15
10/23/15
5/5/16
5/5/16
5/5/16
6/29/16
11/1/16
6/27/17
10/25/17
6/6/18
10/25/18
6/27/19
10/24/19
6/24/20
10/21/20
6/24/21
10/18/21

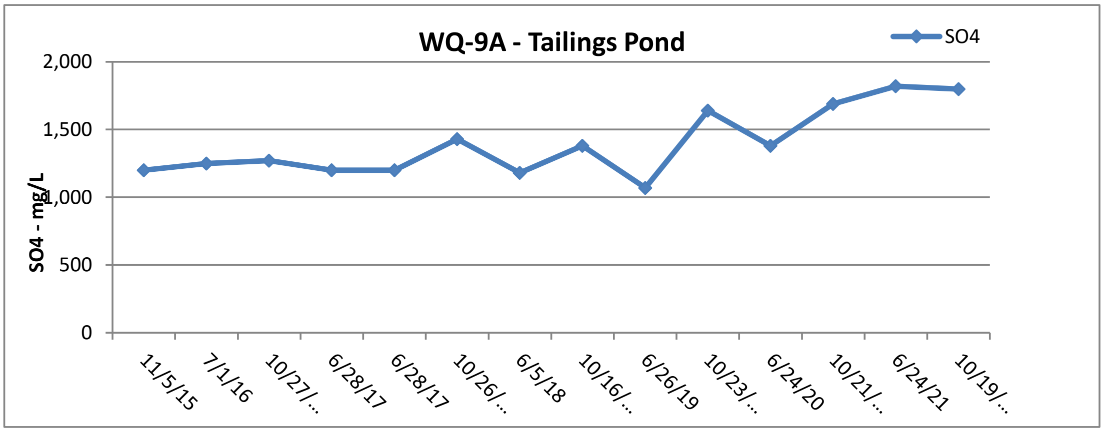

OFGD-1
SO4
SO4 - mg/L
450
400
350
300
250
200
150
100
50
0
11/1/12
5/15/14
6/29/15
10/23/15
5/5/16
5/5/16
5/5/16
6/29/16
11/1/16
6/27/17
10/25/17
6/6/18
10/25/18
6/27/19
10/24/19
6/24/20
10/21/20
6/24/21
10/18/21


OFGD-3
Rb
Mo
W
F
Rb, Mo, W - mg/L
F - mg/L
0.006
0.005
0.004
0.003
0.002
0.001
0.000
0.6
0.5
0.4
0.3
0.2
0.1
0
10/23/15
11/5/15
5/5/16
6/29/16
6/29/16
11/1/16
11/1/16
6/27/17
10/25/17
10/25/17
6/6/18
6/6/18
10/25/18
10/25/18
6/27/19
10/24/19
6/24/20
10/21/20
6/24/21
10/18/21

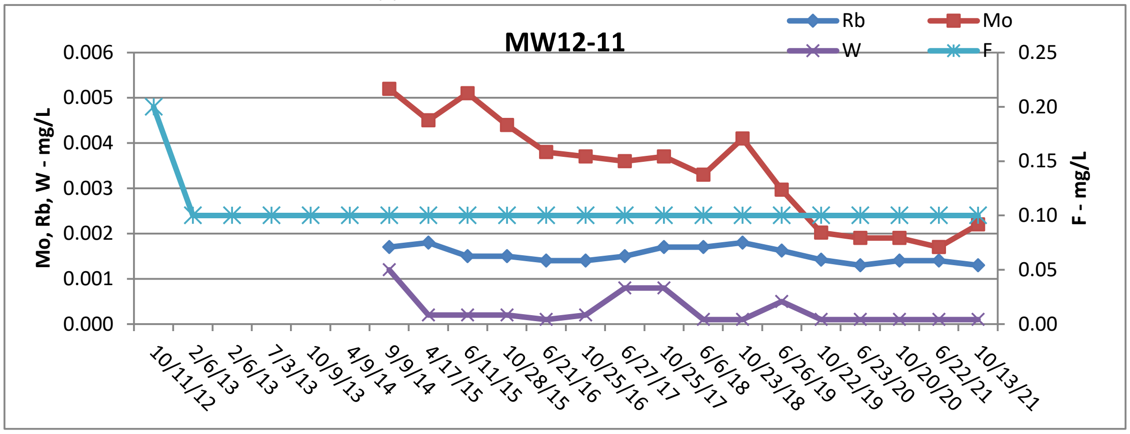

OFGD-3
SO4
SO4 - mg/L
200
150
100
50
0
10/23/15
11/5/15
5/5/16
6/29/16
6/29/16
11/1/16
11/1/16
6/27/17
10/25/17
10/25/17
6/6/18
6/6/18
10/25/18
10/25/18
6/27/19
10/24/19
6/24/20
10/21/20
6/24/21
10/18/21

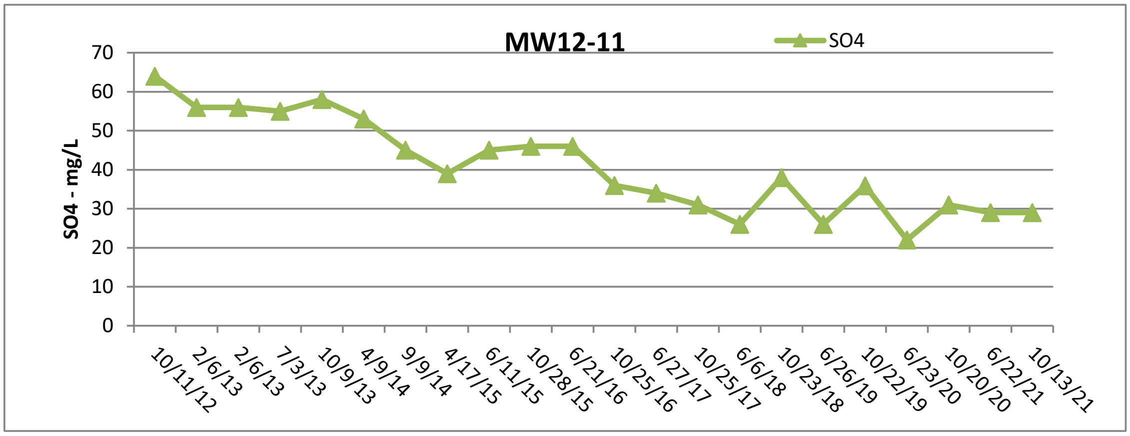
Appendix B. Surface Water Trend Plots

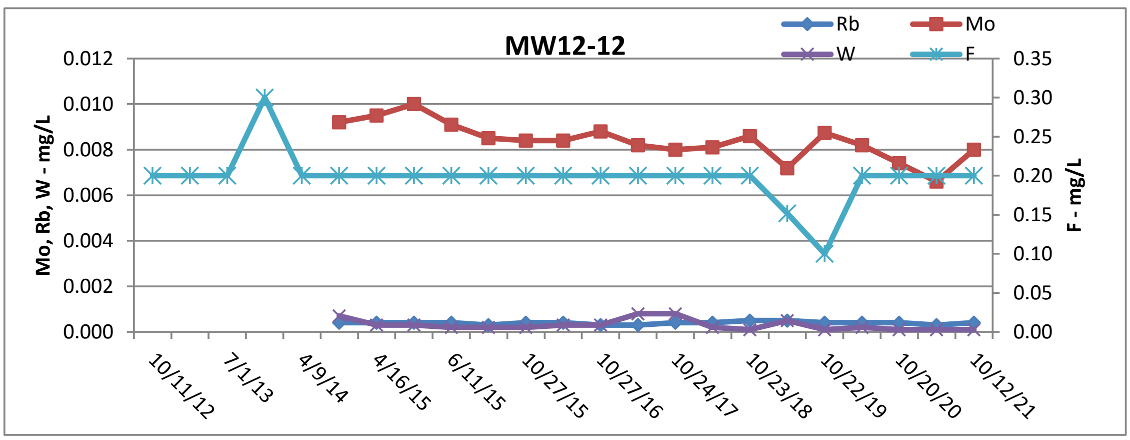


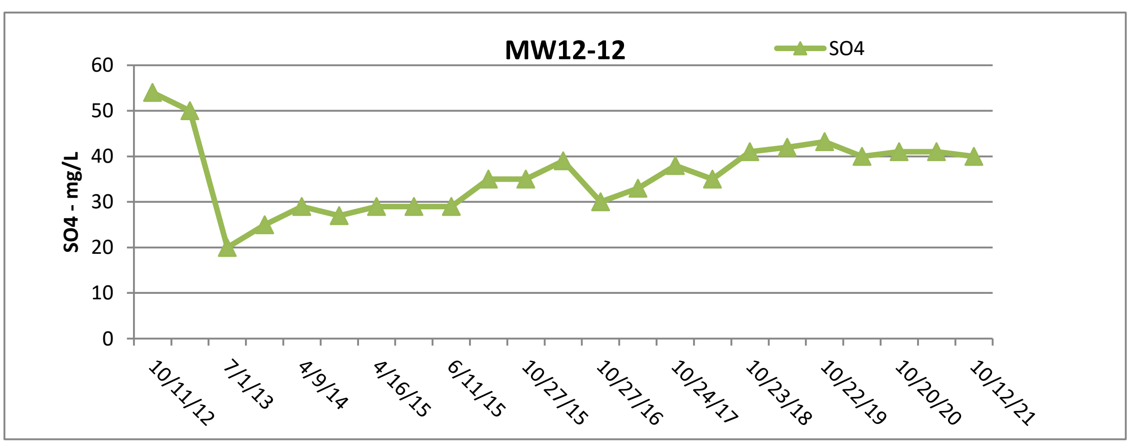


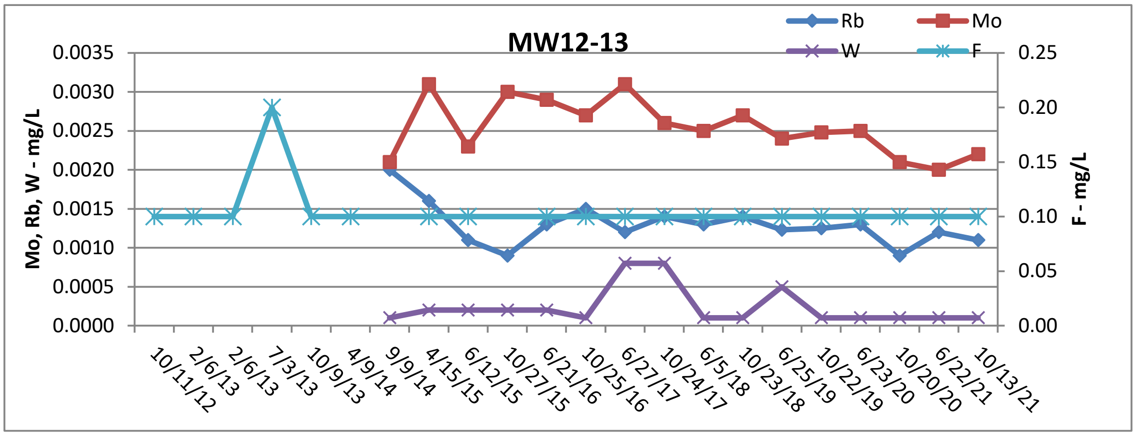
B-2 GROUNDWATER TREND PLOTS

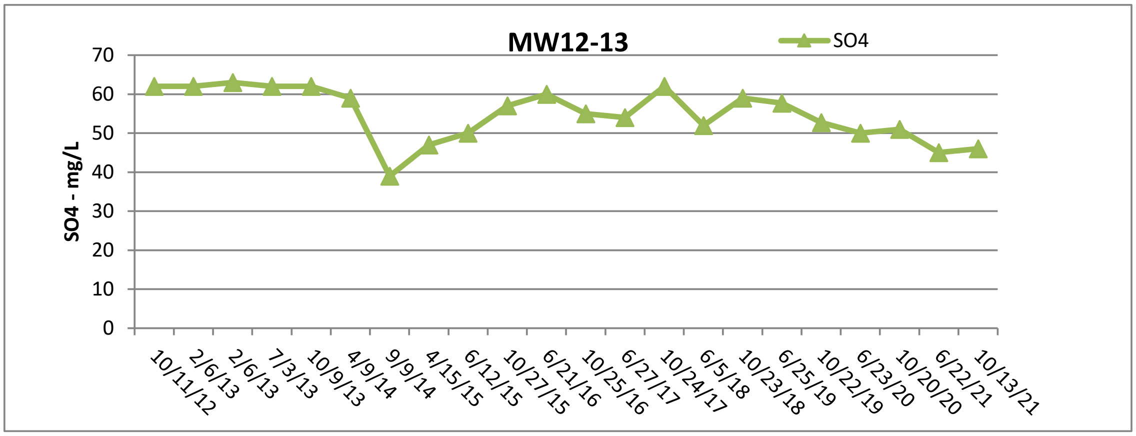

MW12-11
Rb
Mo
W
F
Mo, Rb, W - mg/L
F - mg/L
0.006
0.005
0.004
0.003
0.002
0.001
0.000
0.25
0.20
0.15
0.10
0.05
0.00
10/11/12
2/6/13
2/6/13
7/3/13
10/9/13
4/9/14
9/9/14
4/17/15
6/11/15
10/28/15
6/21/16
10/25/16
6/27/17
10/25/17
6/6/18
10/23/18
6/26/19
10/22/19
6/23/20
10/20/20
6/22/21
10/13/21

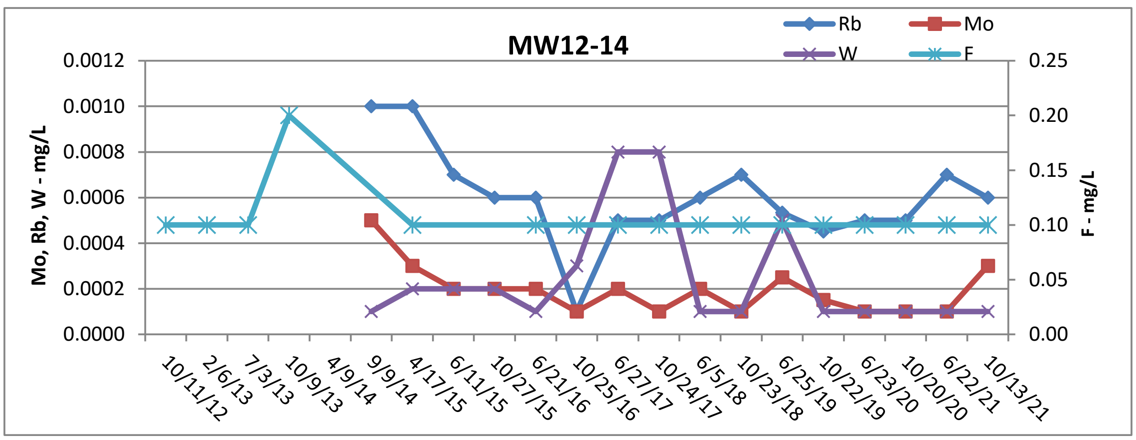

MW12-11
SO4
SO4 - mg/L
70
60
50
40
30
20
10
0
10/11/12
2/6/13
2/6/13
7/3/13
10/9/13
4/9/14
9/9/14
4/17/15
6/11/15
10/28/15
6/21/16
10/25/16
6/27/17
10/25/17
6/6/18
10/23/18
6/26/19
10/22/19
6/23/20
10/20/20
6/22/21
10/13/21

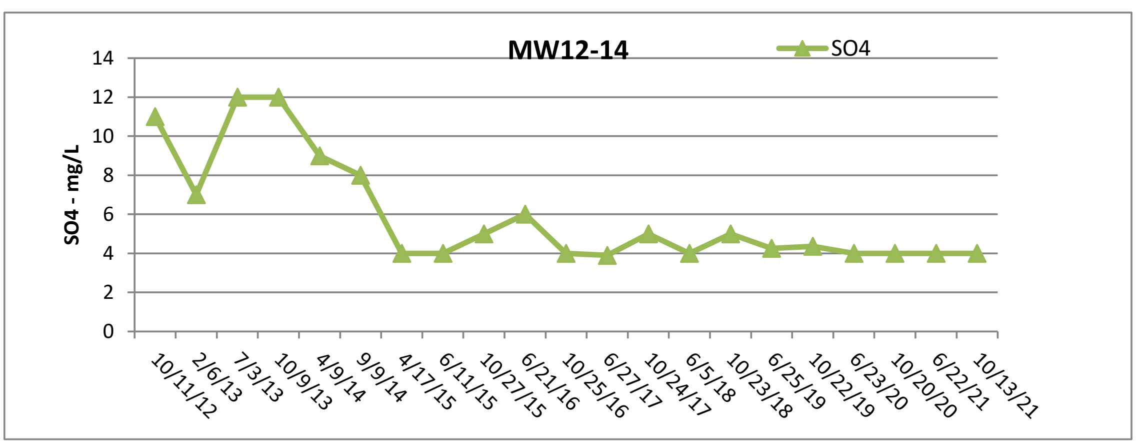

MW12-12
Rb
Mo
W
F
Mo, Rb, W - mg/L
F - mg/L
0.012
0.010
0.008
0.006
0.004
0.002
0.000
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
10/11/12
7/1/13
4/9/14
4/16/15
6/11/15
10/27/15
10/27/16
10/24/17
10/23/18
10/22/19
10/20/20
10/12/21

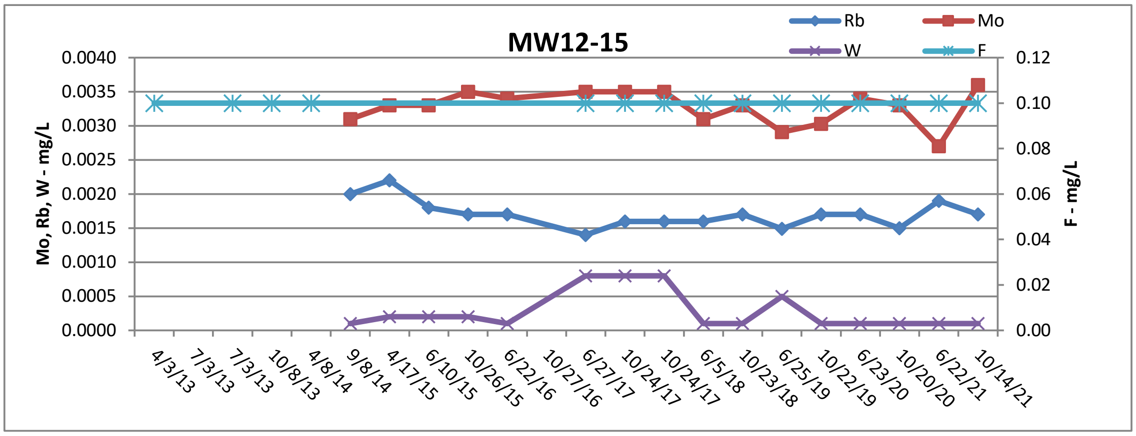

MW12-12
SO4
SO4 - mg/L
60
50
40
30
20
10
0
10/11/12
7/1/13
4/9/14
4/16/15
6/11/15
10/27/15
10/27/16
10/24/17
10/23/18
10/22/19
10/20/20
10/12/21

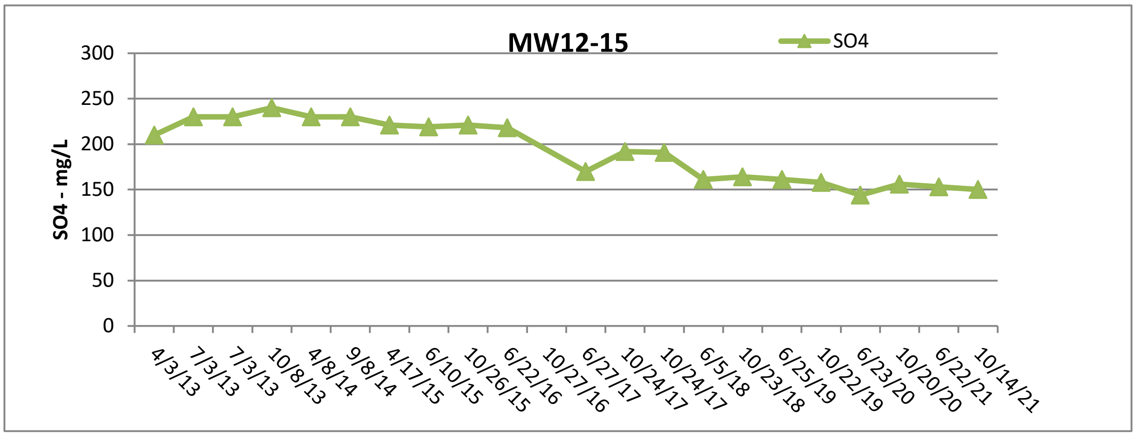

MW12-13
Rb
Mo
W
F
Mo, Rb, W - mg/L
F - mg/L
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0.25
0.20
0.15
0.10
0.05
0.00
10/11/12
2/6/13
2/6/13
7/3/13
10/9/13
4/9/14
9/9/14
4/15/15
6/12/15
10/27/15
6/21/16
10/25/16
6/27/17
10/24/17
6/5/18
10/23/18
6/25/19
10/22/19
6/23/20
10/20/20
6/22/21
10/13/21

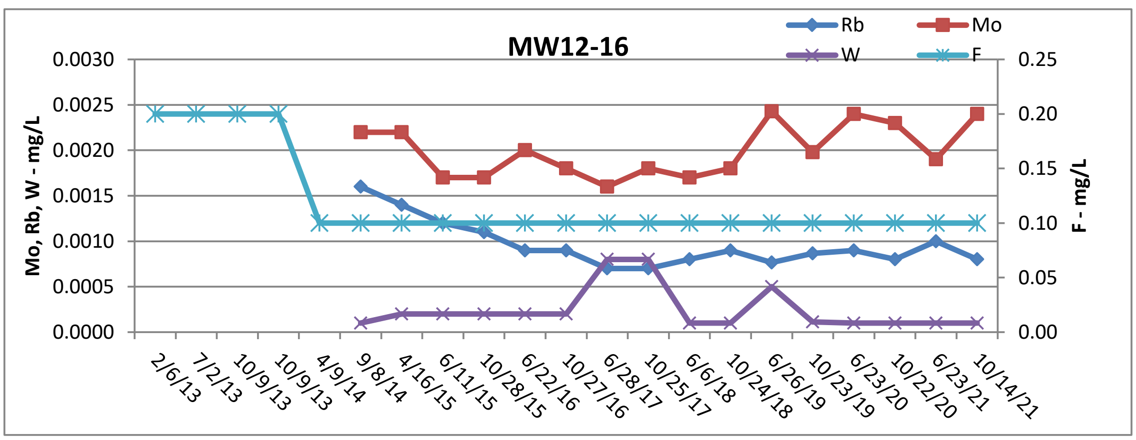

MW12-13
SO4
SO4 - mg/L
70
60
50
40
30
20
10
0
10/11/12
2/6/13
2/6/13
7/3/13
10/9/13
4/9/14
9/9/14
4/15/15
6/12/15
10/27/15
6/21/16
10/25/16
6/27/17
10/24/17
6/5/18
10/23/18
6/25/19
10/22/19
6/23/20
10/20/20
6/22/21
10/13/21

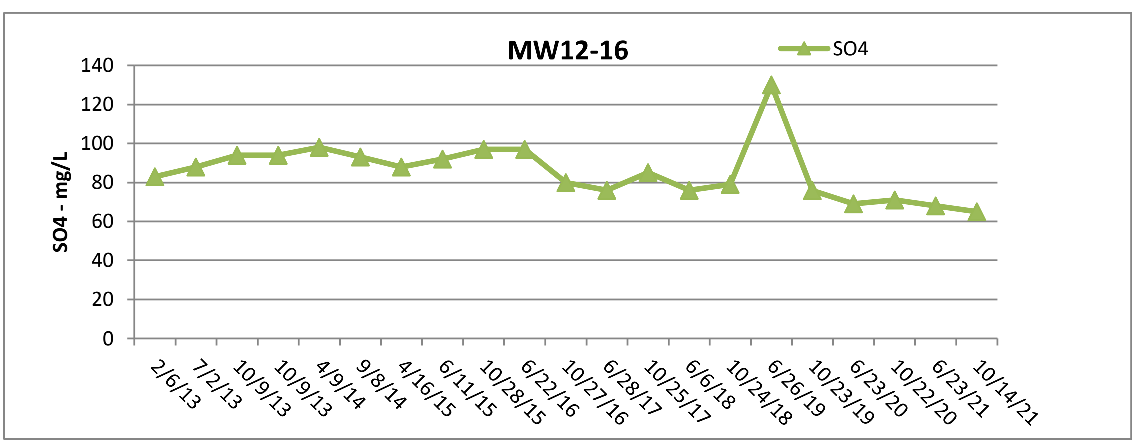

MW12-14
Rb
Mo
W
F
Mo, Rb, W - mg/L
F - mg/L
0.0012
0.0010
0.0008
0.0006
0.0004
0.0002
0.0000
0.25
0.20
0.15
0.10
0.05
0.00
10/11/12
2/6/13
7/3/13
10/9/13
4/9/14
9/9/14
4/17/15
6/11/15
10/27/15
6/21/16
10/25/16
6/27/17
10/24/17
6/5/18
10/23/18
6/25/19
10/22/19
6/23/20
10/20/20
6/22/21
10/13/21

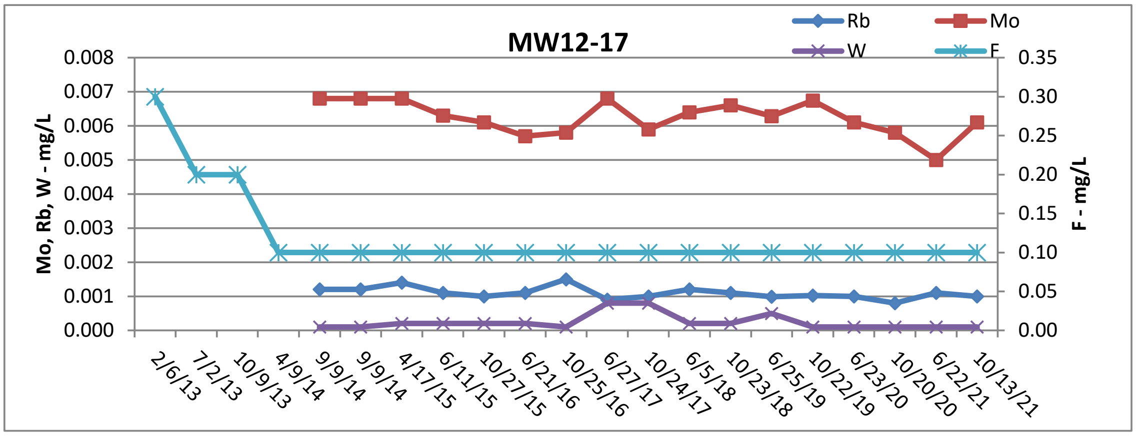

MW12-14
SO4
SO4 - mg/L
14
12
10
8
6
4
2
0
10/11/12
2/6/13
7/3/13
10/9/13
4/9/14
9/9/14
4/17/15
6/11/15
10/27/15
6/21/16
10/25/16
6/27/17
10/24/17
6/5/18
10/23/18
6/25/19
10/22/19
6/23/20
10/20/20
6/22/21
10/13/21

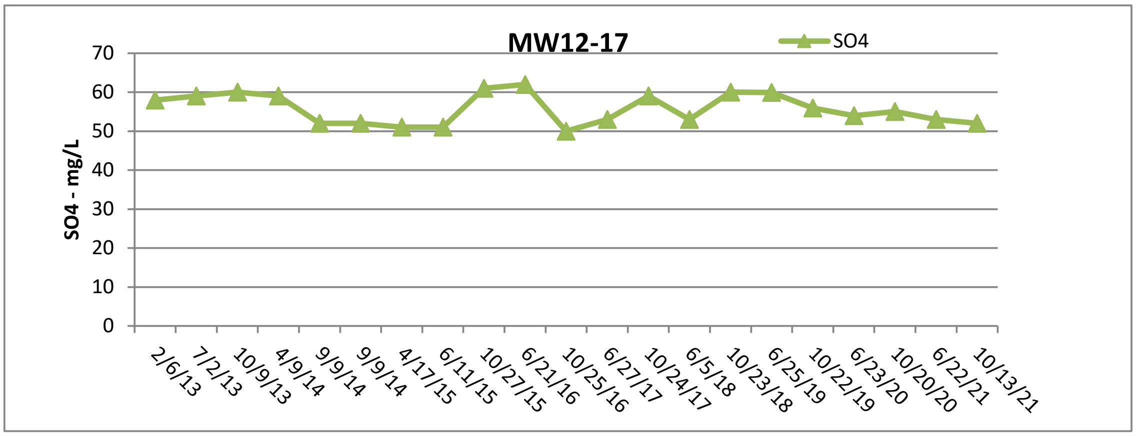

MW12-15
Rb
Mo
W
F
Mo, Rb, W - mg/L
F - mg/L
0.0040
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0.12
0.10
0.08
0.06
0.04
0.02
0.00
4/3/13
7/3/13
7/3/13
10/8/13
4/8/14
9/8/14
4/17/15
6/10/15
10/26/15
6/22/16
10/27/16
6/27/17
10/24/17
10/24/17
6/5/18
10/23/18
6/25/19
10/22/19
6/23/20
10/20/20
6/22/21
10/14/21

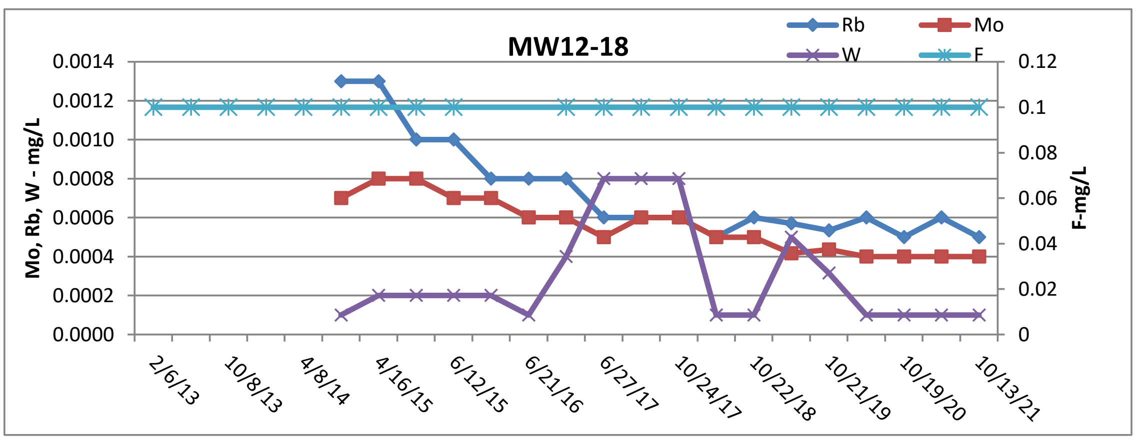

MW12-15
SO4
SO4 - mg/L
300
250
200
150
100
50
0
4/3/13
7/3/13
7/3/13
10/8/13
4/8/14
9/8/14
4/17/15
6/10/15
10/26/15
6/22/16
10/27/16
6/27/17
10/24/17
10/24/17
6/5/18
10/23/18
6/25/19
10/22/19
6/23/20
10/20/20
6/22/21
10/14/21

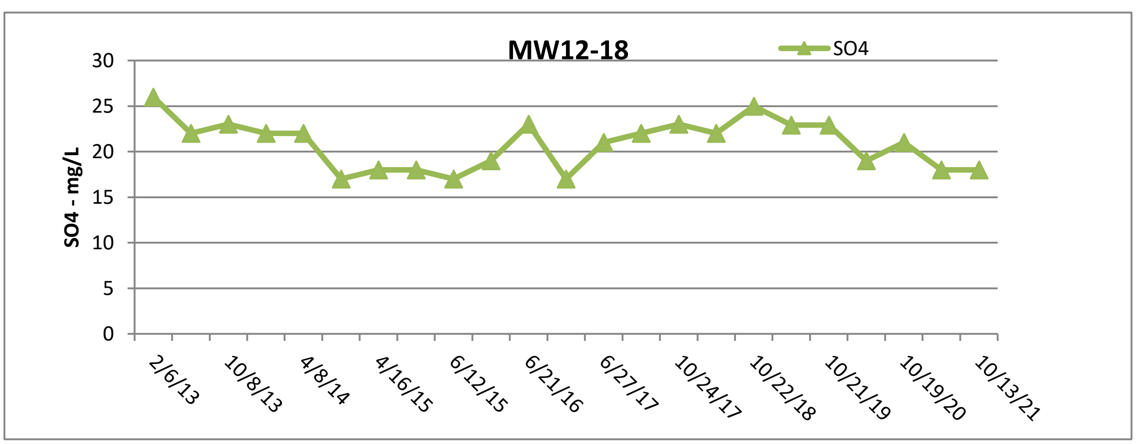

MW12-16
Rb
Mo
W
F
Mo, Rb, W - mg/L
F - mg/L
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0.25
0.20
0.15
0.10
0.05
0.00
2/6/13
7/2/13
10/9/13
10/9/13
4/9/14
9/8/14
4/16/15
6/11/15
10/28/15
6/22/16
10/27/16
6/28/17
10/25/17
6/6/18
10/24/18
6/26/19
10/23/19
6/23/20
10/22/20
6/23/21
10/14/21

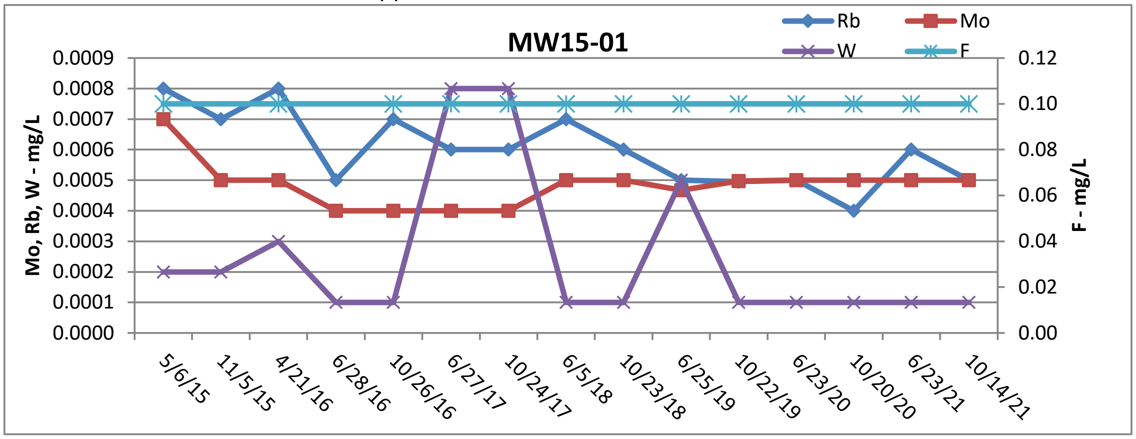

MW12-16
SO4
SO4 - mg/L
140
120
100
80
60
40
20
0
2/6/13
7/2/13
10/9/13
10/9/13
4/9/14
9/8/14
4/16/15
6/11/15
10/28/15
6/22/16
10/27/16
6/28/17
10/25/17
6/6/18
10/24/18
6/26/19
10/23/19
6/23/20
10/22/20
6/23/21
10/14/21

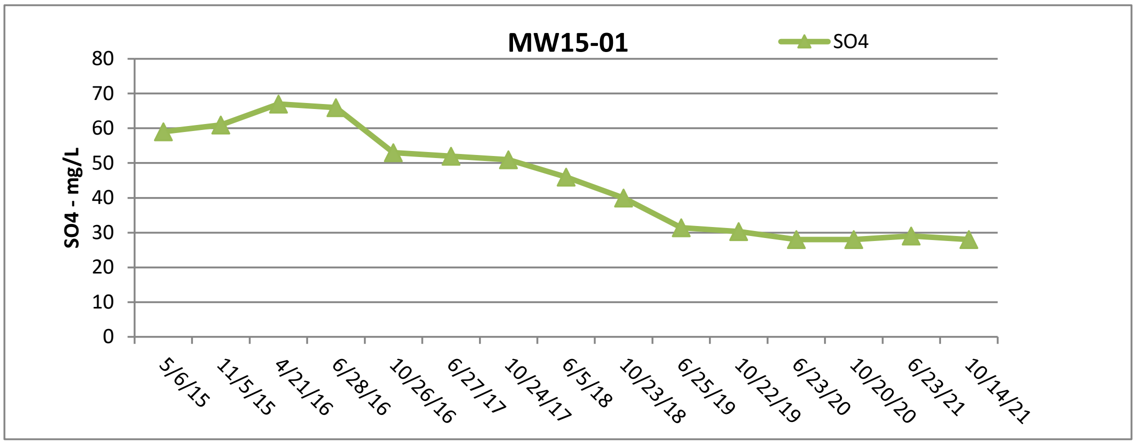

MW12-17
Rb
Mo
W
F
Mo, Rb, W - mg/L
F - mg/L
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0.000
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
2/6/13
7/2/13
10/9/13
4/9/14
9/9/14
9/9/14
4/17/15
6/11/15
10/27/15
6/21/16
10/25/16
6/27/17
10/24/17
6/5/18
10/23/18
6/25/19
10/22/19
6/23/20
10/20/20
6/22/21
10/13/21

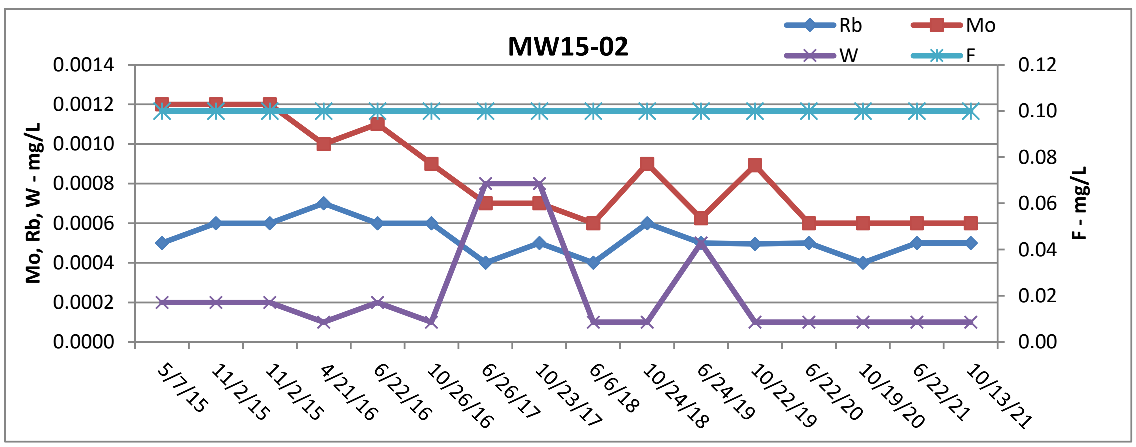

MW12-17
SO4
SO4 - mg/L
70
60
50
40
30
20
10
0
2/6/13
7/2/13
10/9/13
4/9/14
9/9/14
9/9/14
4/17/15
6/11/15
10/27/15
6/21/16
10/25/16
6/27/17
10/24/17
6/5/18
10/23/18
6/25/19
10/22/19
6/23/20
10/20/20
6/22/21
10/13/21

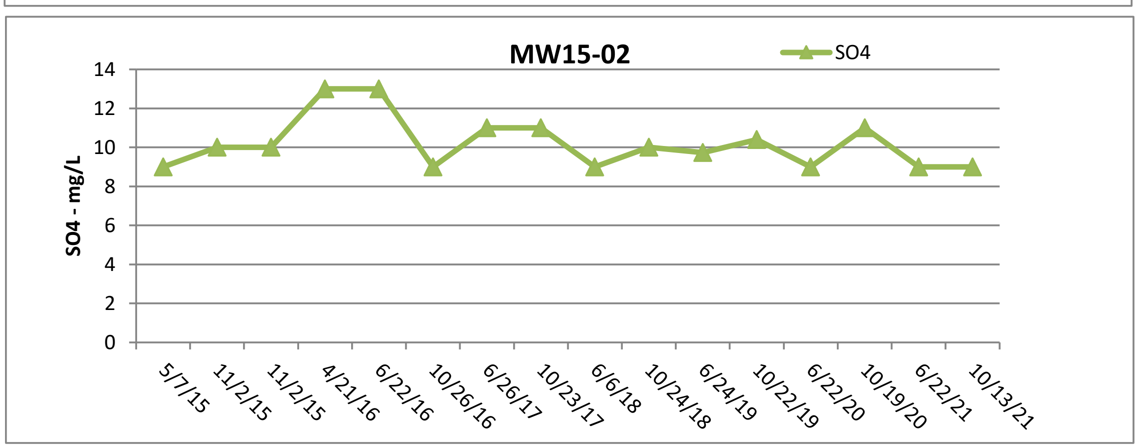

MW12-18
Rb
Mo
W
F
Mo, Rb, W - mg/L
F-mg/L
0.0014
0.0012
0.0010
0.0008
0.0006
0.0004
0.0002
0.0000
0.12
0.1
0.08
0.06
0.04
0.02
0
2/6/13
10/8/13
4/8/14
4/16/15
6/12/15
6/21/16
6/27/17
10/24/17
10/22/18
10/21/19
10/19/20
10/13/21

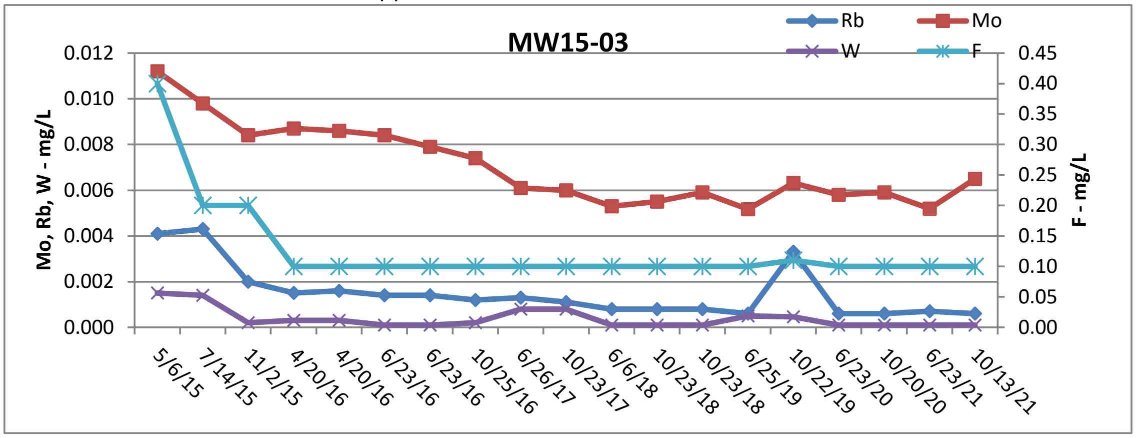

MW12-18
SO4
SO4 - mg/L
30
25
20
15
10
5
0
2/6/13
10/8/13
4/8/14
4/16/15
6/12/15
6/21/16
6/27/17
10/24/17
10/22/18
10/21/19
10/19/20
10/13/21

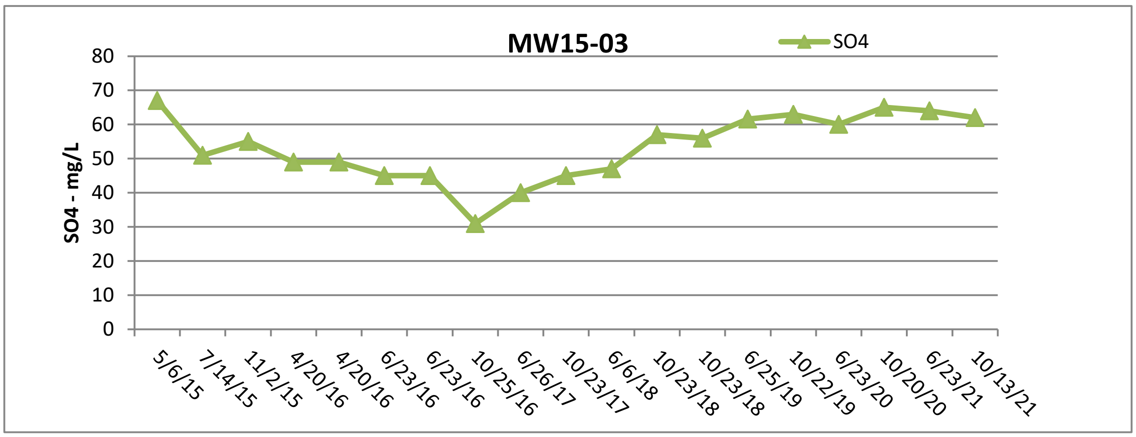

MW15-01
Rb
Mo
W
F
Mo, Rb, W - mg/L
F - mg/L
0.0009
0.0008
0.0007
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
0.0000
0.12
0.10
0.08
0.06
0.04
0.02
0.00
5/6/15
11/5/15
4/21/16
6/28/16
10/26/16
6/27/17
10/24/17
6/5/18
10/23/18
6/25/19
10/22/19
6/23/20
10/20/20
6/23/21
10/14/21

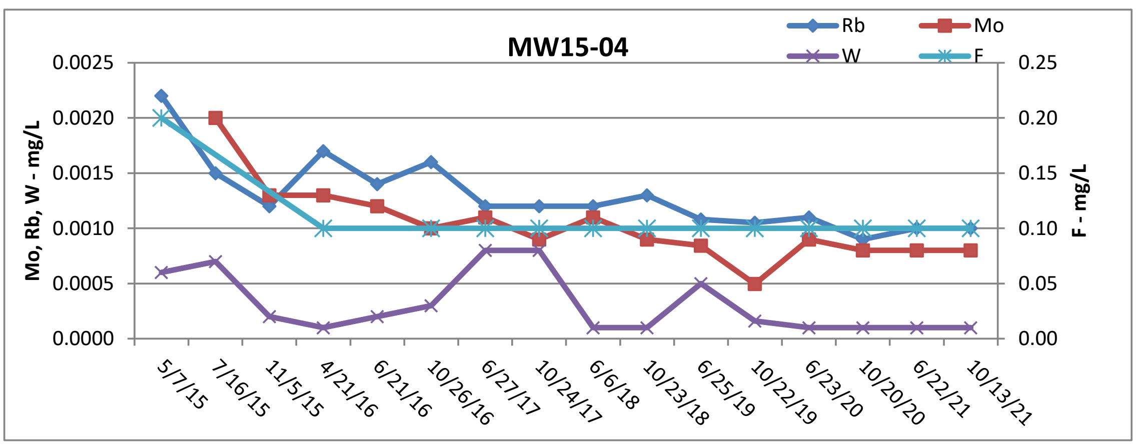

MW15-01
SO4
SO4 - mg/L
80
70
60
50
40
30
20
10
0
5/6/15
11/5/15
4/21/16
6/28/16
10/26/16
6/27/17
10/24/17
6/5/18
10/23/18
6/25/19
10/22/19
6/23/20
10/20/20
6/23/21
10/14/21

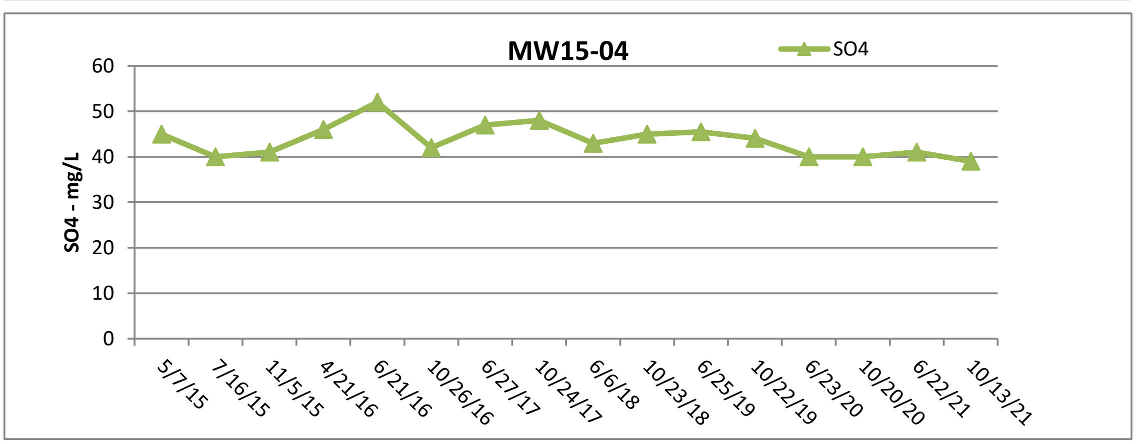

MW15-02
Rb
Mo
W
F
Mo, Rb, W - mg/L
F - mg/L
0.0014
0.0012
0.0010
0.0008
0.0006
0.0004
0.0002
0.0000
0.12
0.10
0.08
0.06
0.04
0.02
0.00
5/7/15
11/2/15
11/2/15
4/21/16
6/22/16
10/26/16
6/26/17
10/23/17
6/6/18
10/24/18
6/24/19
10/22/19
6/22/20
10/19/20
6/22/21
10/13/21

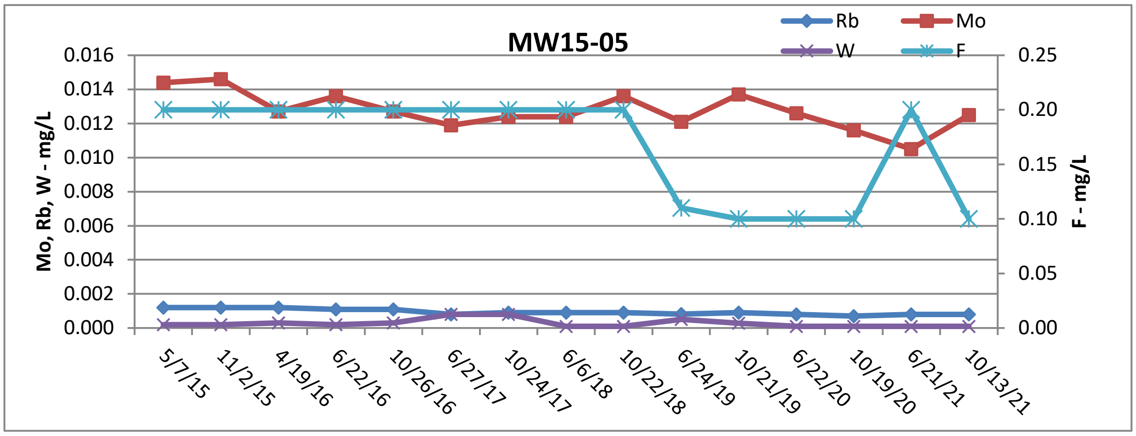

MW15-02
SO4
SO4 - mg/L
14
12
10
8
6
4
2
0
5/7/15
11/2/15
11/2/15
4/21/16
6/22/16
10/26/16
6/26/17
10/23/17
6/6/18
10/24/18
6/24/19
10/22/19
6/22/20
10/19/20
6/22/21
10/13/21

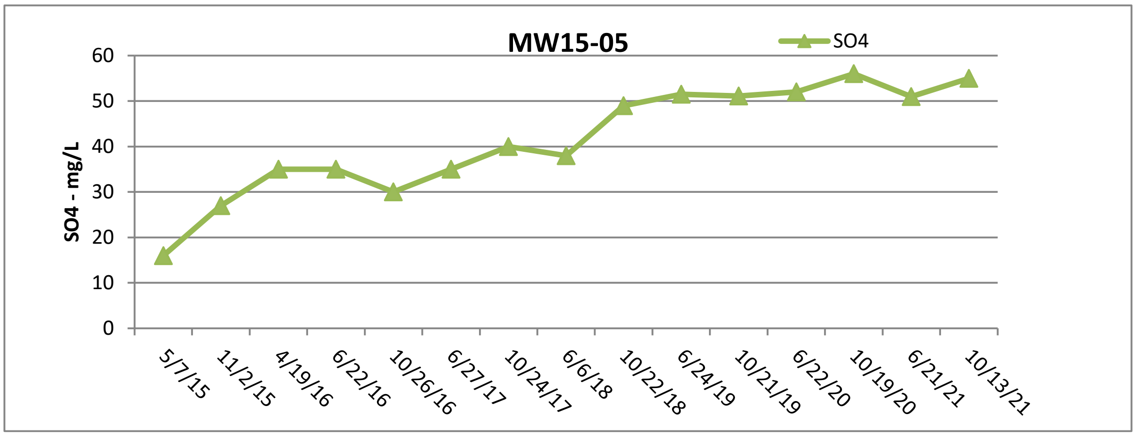

MW15-03
Rb
Mo
W
F
Mo, Rb, W - mg/L
F - mg/L
0.012
0.010
0.008
0.006
0.004
0.002
0.000
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
5/6/15
7/14/15
11/2/15
4/20/16
4/20/16
6/23/16
6/23/16
10/25/16
6/26/17
10/23/17
6/6/18
10/23/18
10/23/18
6/25/19
10/22/19
6/23/20
10/20/20
6/23/21
10/13/21

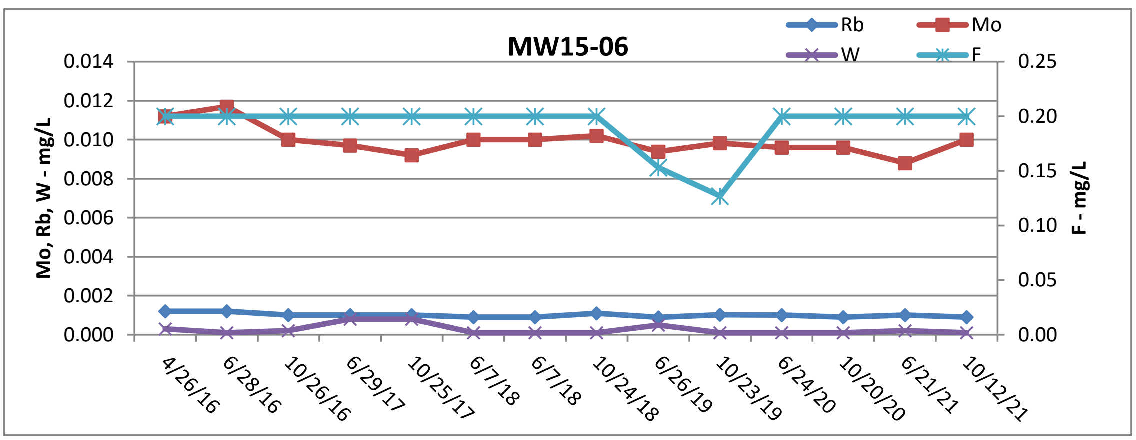

MW15-03
SO4
SO4 - mg/L
80
70
60
50
40
30
20
10
0
5/6/15
7/14/15
11/2/15
4/20/16
4/20/16
6/23/16
6/23/16
10/25/16
6/26/17
10/23/17
6/6/18
10/23/18
10/23/18
6/25/19
10/22/19
6/23/20
10/20/20
6/23/21
10/13/21

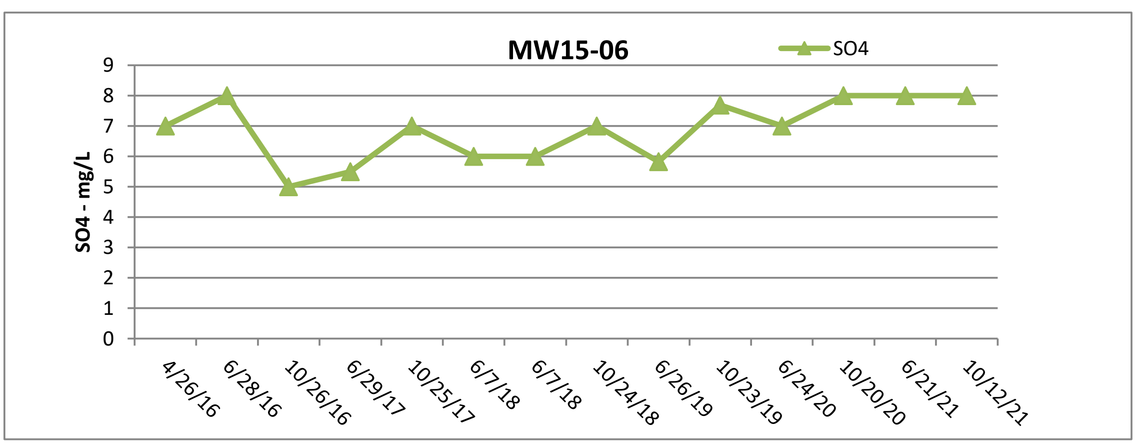

MW15-04
Rb
Mo
W
F
Mo, Rb, W - mg/L
F - mg/L
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0.25
0.20
0.15
0.10
0.05
0.00
5/7/15
7/16/15
11/5/15
4/21/16
6/21/16
10/26/16
6/27/17
10/24/17
6/6/18
10/23/18
6/25/19
10/22/19
6/23/20
10/20/20
6/22/21
10/13/21

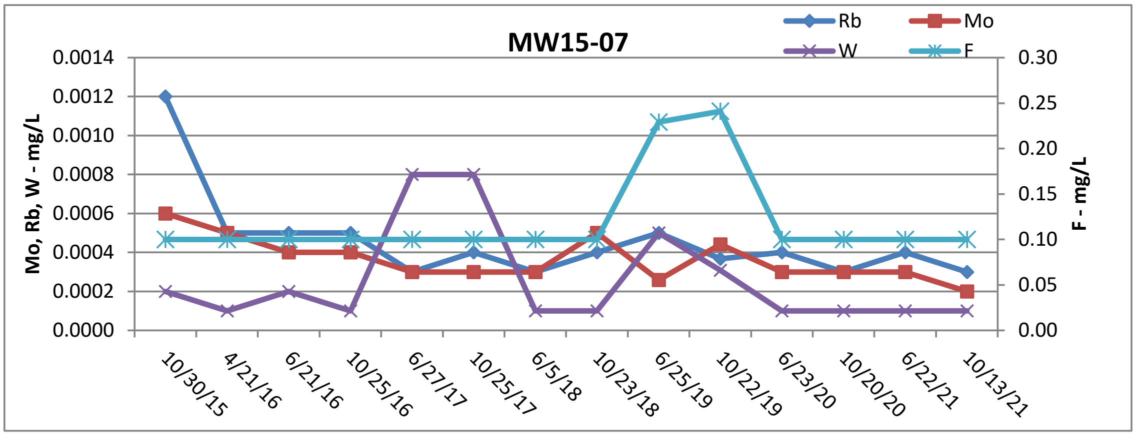

MW15-04
SO4
SO4 - mg/L
60
50
40
30
20
10
0
5/7/15
7/16/15
11/5/15
4/21/16
6/21/16
10/26/16
6/27/17
10/24/17
6/6/18
10/23/18
6/25/19
10/22/19
6/23/20
10/20/20
6/22/21
10/13/21

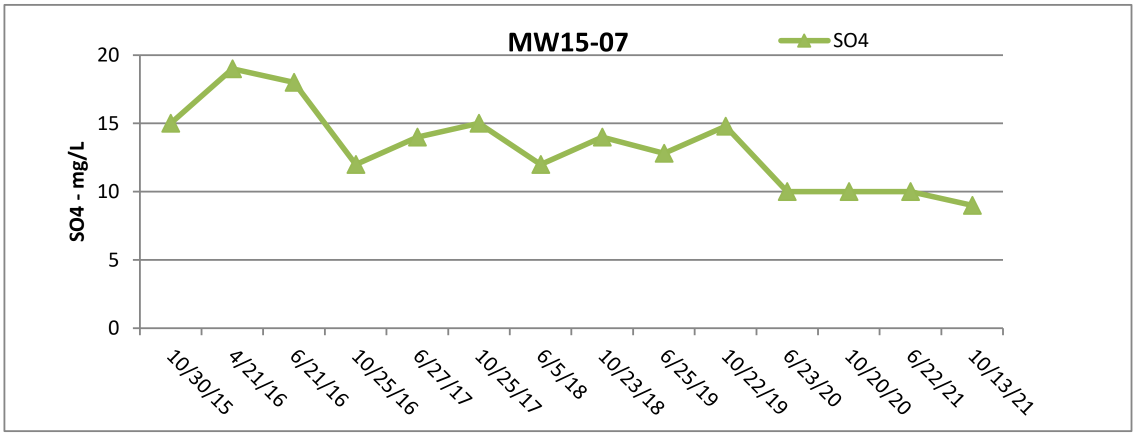

MW15-05
Rb
Mo
W
F
Mo, Rb, W - mg/L
F - mg/L
0.016
0.014
0.012
0.010
0.008
0.006
0.004
0.002
0.000
0.25
0.20
0.15
0.10
0.05
0.00
5/7/15
11/2/15
4/19/16
6/22/16
10/26/16
6/27/17
10/24/17
6/6/18
10/22/18
6/24/19
10/21/19
6/22/20
10/19/20
6/21/21
10/13/21

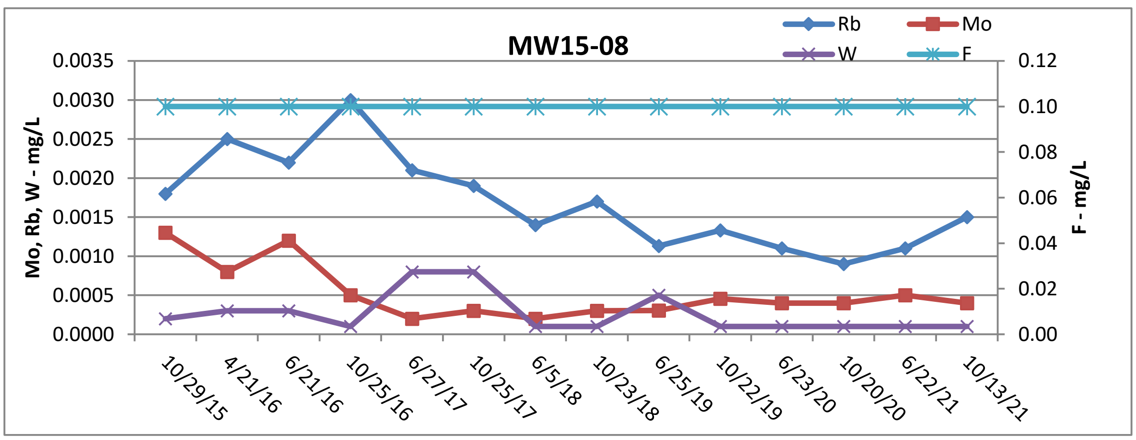

MW15-05
SO4
SO4 - mg/L
60
50
40
30
20
10
0
5/7/15
11/2/15
4/19/16
6/22/16
10/26/16
6/27/17
10/24/17
6/6/18
10/22/18
6/24/19
10/21/19
6/22/20
10/19/20
6/21/21
10/13/21

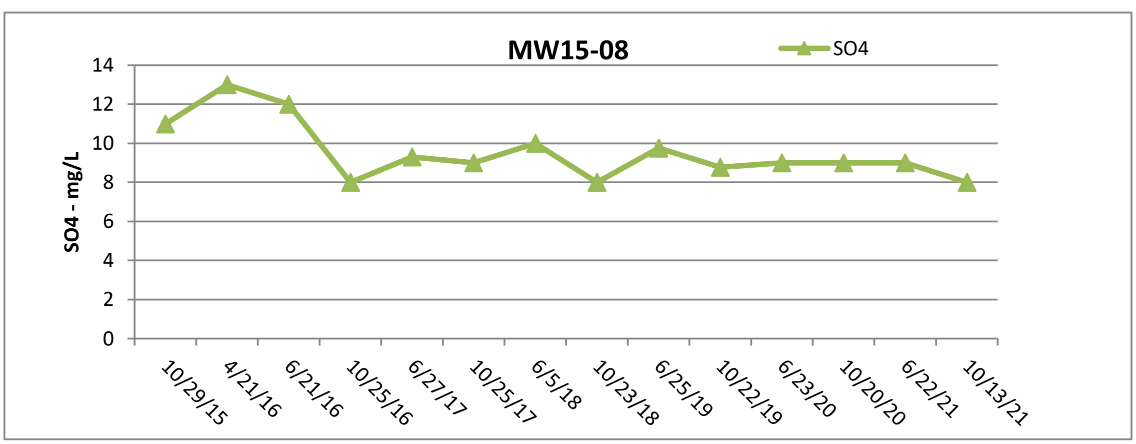

MW15-06
Rb
Mo
W
F
Mo, Rb, W - mg/L
F - mg/L
0.014
0.012
0.010
0.008
0.006
0.004
0.002
0.000
0.25
0.20
0.15
0.10
0.05
0.00
4/26/16
6/28/16
10/26/16
6/29/17
10/25/17
6/7/18
6/7/18
10/24/18
6/26/19
10/23/19
6/24/20
10/20/20
6/21/21
10/12/21

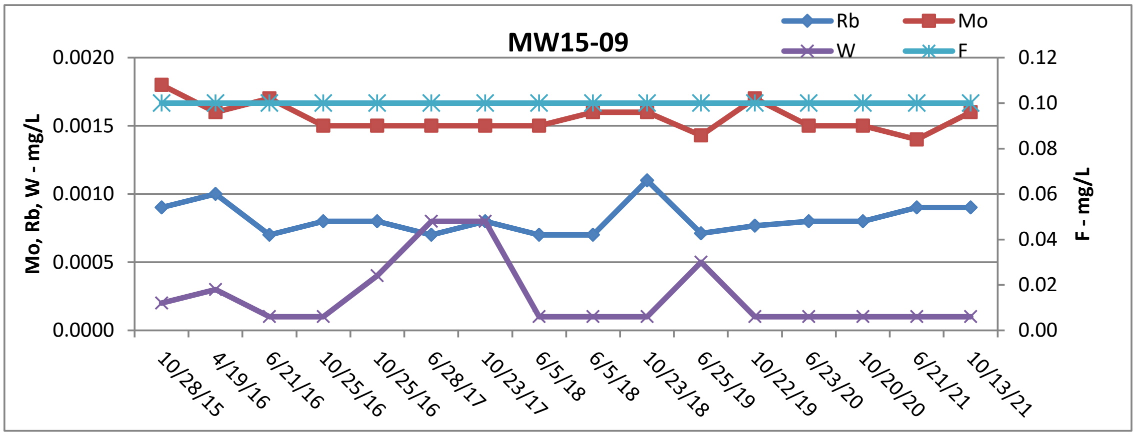

MW15-06
SO4
SO4 - mg/L
9
8
7
6
5
4
3
2
1
0
4/26/16
6/28/16
10/26/16
6/29/17
10/25/17
6/7/18
6/7/18
10/24/18
6/26/19
10/23/19
6/24/20
10/20/20
6/21/21
10/12/21

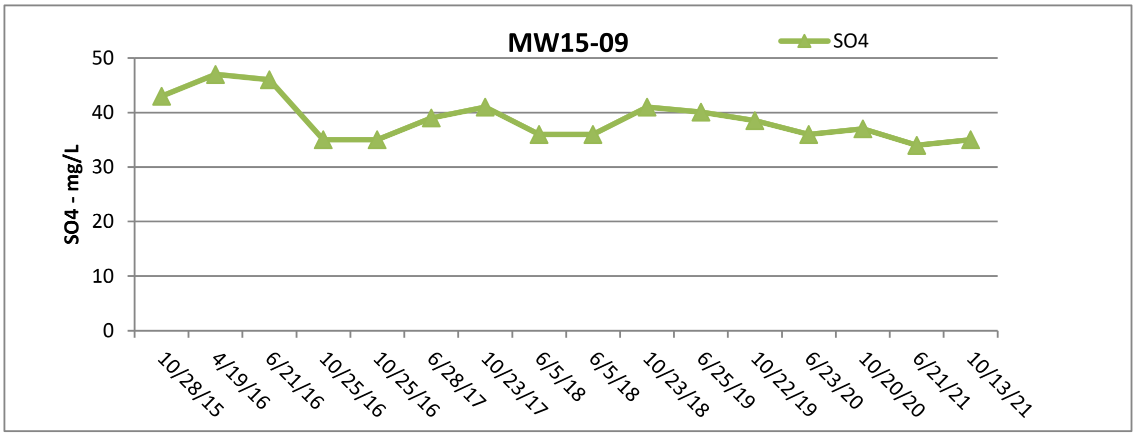

MW15-07
Rb
Mo
W
F
Mo, Rb, W - mg/L
F - mg/L
0.0014
0.0012
0.0010
0.0008
0.0006
0.0004
0.0002
0.0000
0.30
0.25
0.20
0.15
0.10
0.05
0.00
10/30/15
4/21/16
6/21/16
10/25/16
6/27/17
10/25/17
6/5/18
10/23/18
6/25/19
10/22/19
6/23/20
10/20/20
6/22/21
10/13/21

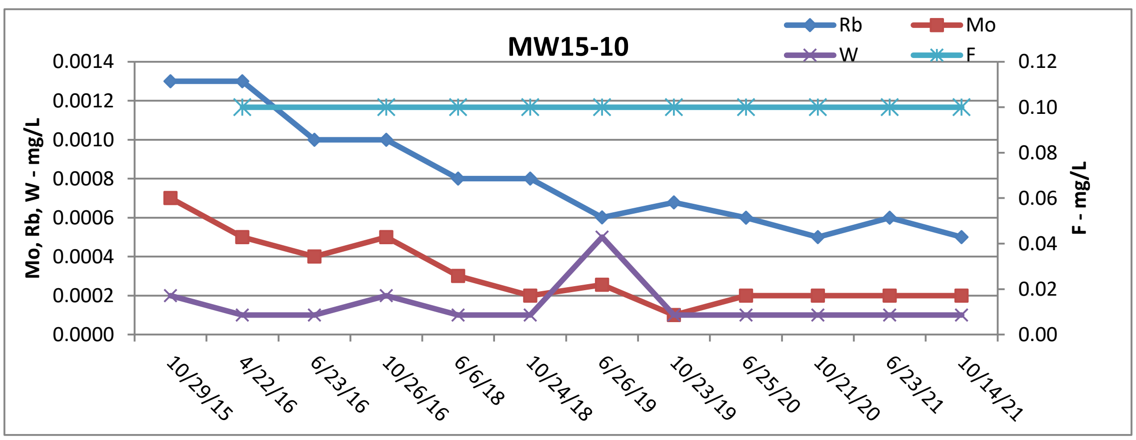

MW15-07
SO4
SO4 - mg/L
20
15
10
5
0
10/30/15
4/21/16
6/21/16
10/25/16
6/27/17
10/25/17
6/5/18
10/23/18
6/25/19
10/22/19
6/23/20
10/20/20
6/22/21
10/13/21

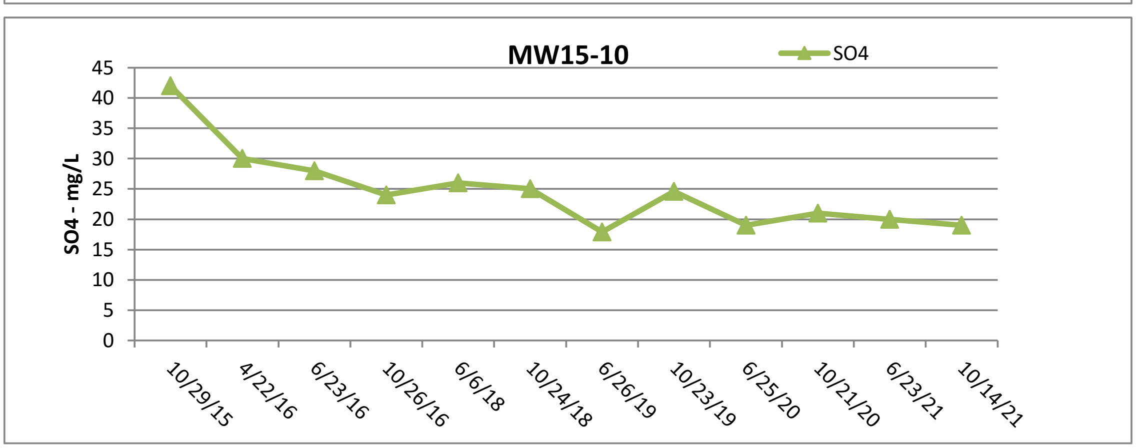

MW15-08
Rb
Mo
W
F
Mo, Rb, W - mg/L
F - mg/L
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0.12
0.10
0.08
0.06
0.04
0.02
0.00
10/29/15
4/21/16
6/21/16
10/25/16
6/27/17
10/25/17
6/5/18
10/23/18
6/25/19
10/22/19
6/23/20
10/20/20
6/22/21
10/13/21

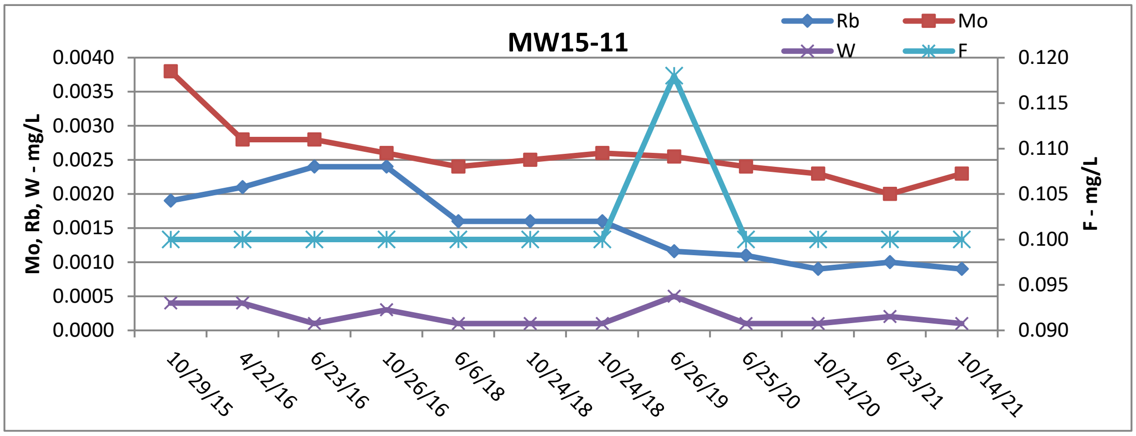

MW15-08
SO4
SO4 - mg/L
14
12
10
8
6
4
2
0
10/29/15
4/21/16
6/21/16
10/25/16
6/27/17
10/25/17
6/5/18
10/23/18
6/25/19
10/22/19
6/23/20
10/20/20
6/22/21
10/13/21

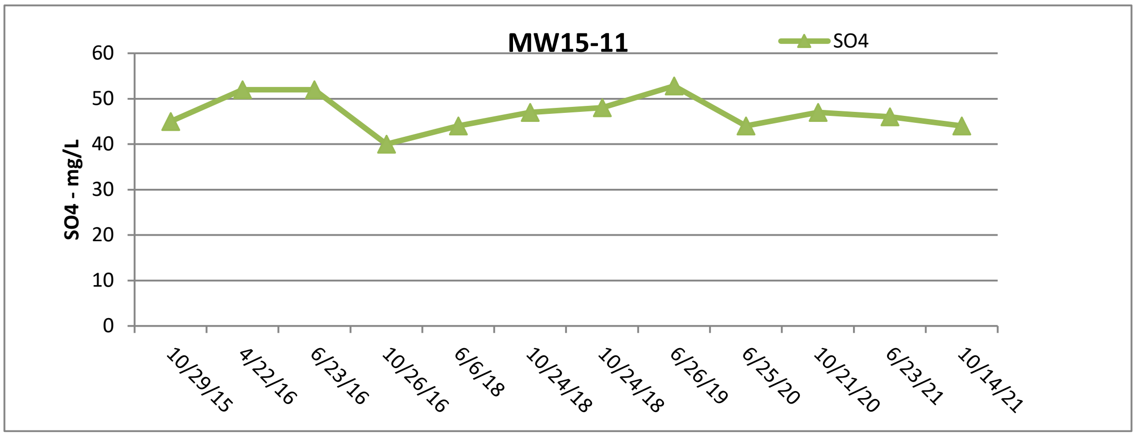

MW15-09
Rb
Mo
W
F
Mo, Rb, W - mg/L
F - mg/L
0.0020
0.0015
0.0010
0.0005
0.0000
0.12
0.10
0.08
0.06
0.04
0.02
0.00
10/28/15
4/19/16
6/21/16
10/25/16
10/25/16
6/28/17
10/23/17
6/5/18
6/5/18
10/23/18
6/25/19
10/22/19
6/23/20
10/20/20
6/21/21
10/13/21

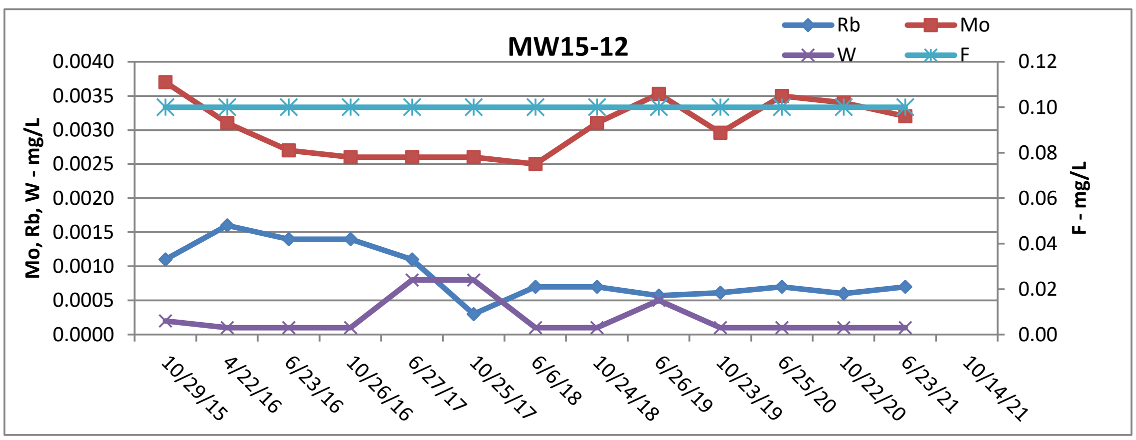

MW15-09
SO4
SO4 - mg/L
50
40
30
20
10
0
10/28/15
4/19/16
6/21/16
10/25/16
10/25/16
6/28/17
10/23/17
6/5/18
6/5/18
10/23/18
6/25/19
10/22/19
6/23/20
10/20/20
6/21/21
10/13/21

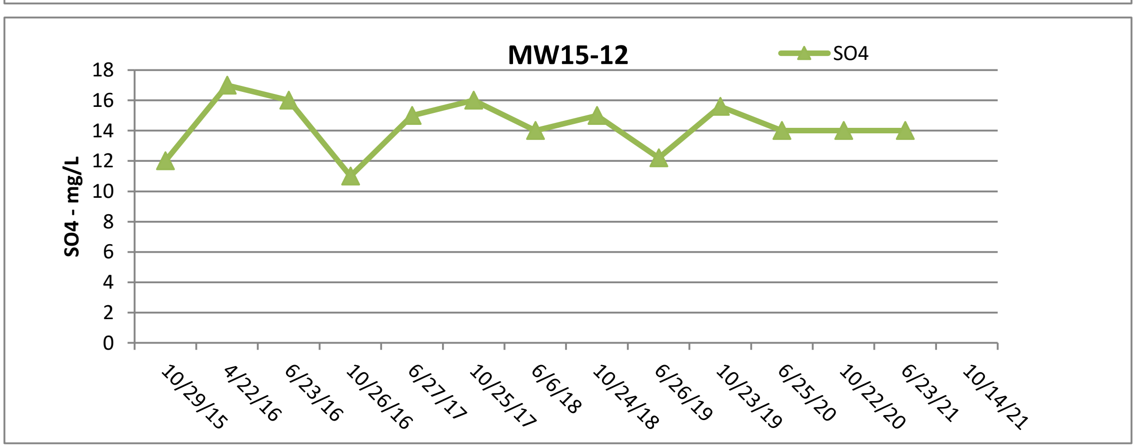

MW15-10
Rb
Mo
W
F
Mo, Rb, W - mg/L
F - mg/L
0.0014
0.0012
0.0010
0.0008
0.0006
0.0004
0.0002
0.0000
0.12
0.10
0.08
0.06
0.04
0.02
0.00
10/29/15
4/22/16
6/23/16
10/26/16
6/6/18
10/24/18
6/26/19
10/23/19
6/25/20
10/21/20
6/23/21
10/14/21

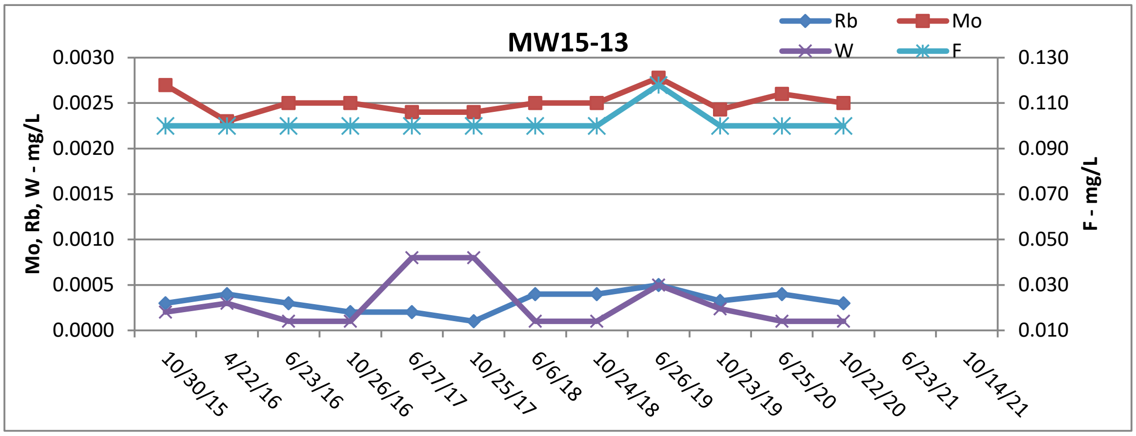

MW15-10
SO4
SO4 - mg/L
45
40
35
30
25
20
15
10
5
0
10/29/15
4/22/16
6/23/16
10/26/16
6/6/18
10/24/18
6/26/19
10/23/19
6/25/20
10/21/20
6/23/21
10/14/21

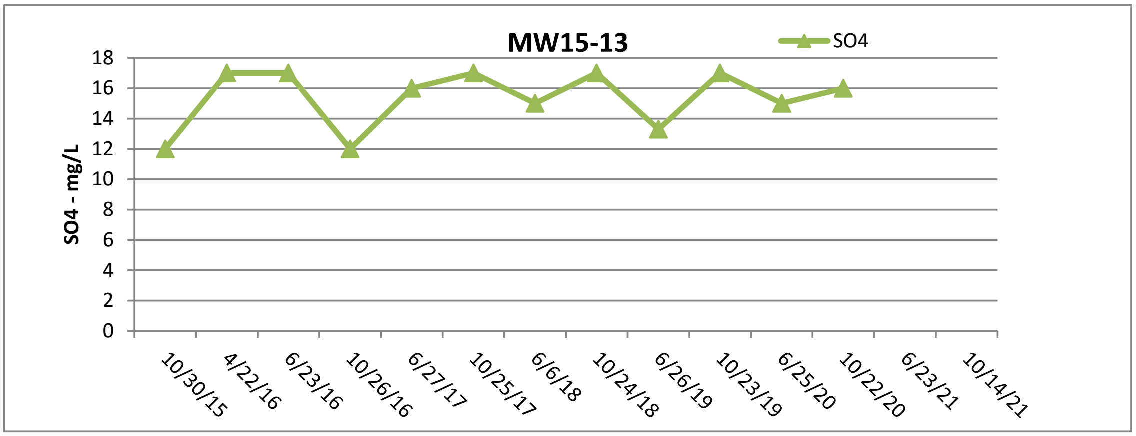

MW15-11
Rb
Mo
W
F
Mo, Rb, W - mg/L
F - mg/L
0.0040
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0.120
0.115
0.110
0.105
0.100
0.095
0.090
10/29/15
4/22/16
6/23/16
10/26/16
6/6/18
10/24/18
10/24/18
6/26/19
6/25/20
10/21/20
6/23/21
10/14/21

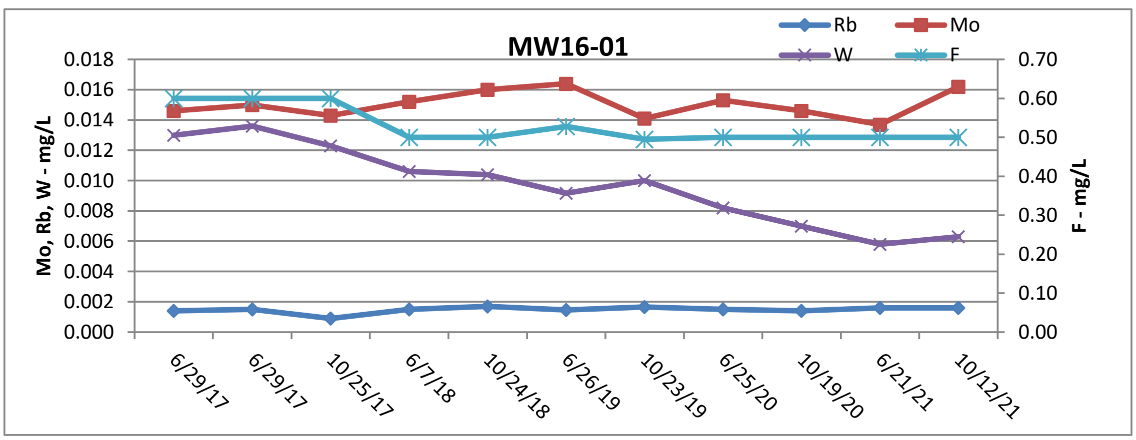

MW15-11
SO4
SO4 - mg/L
60
50
40
30
20
10
0
10/29/15
4/22/16
6/23/16
10/26/16
6/6/18
10/24/18
10/24/18
6/26/19
6/25/20
10/21/20
6/23/21
10/14/21

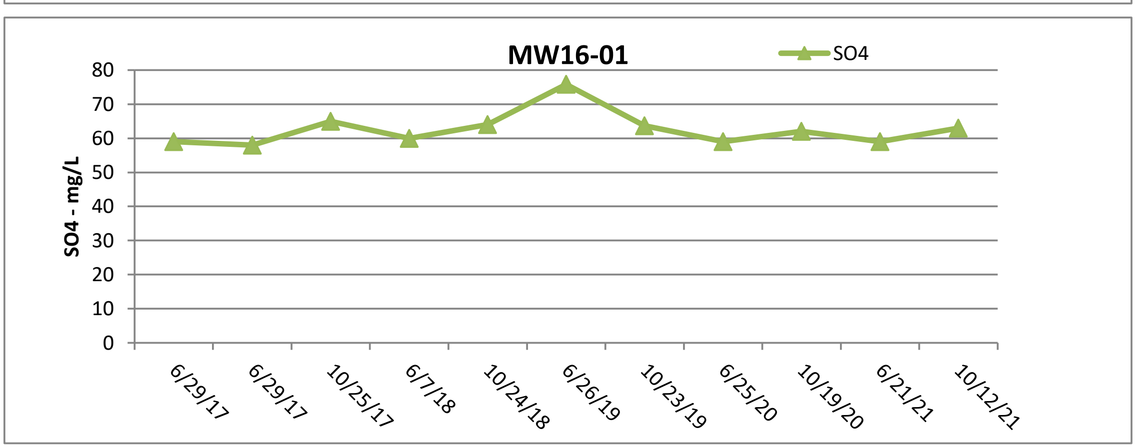

MW15-12
Rb
Mo
W
F
Mo, Rb, W - mg/L
F - mg/L
0.0040
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0.12
0.10
0.08
0.06
0.04
0.02
0.00
10/29/15
4/22/16
6/23/16
10/26/16
6/27/17
10/25/17
6/6/18
10/24/18
6/26/19
10/23/19
6/25/20
10/22/20
6/23/21
10/14/21

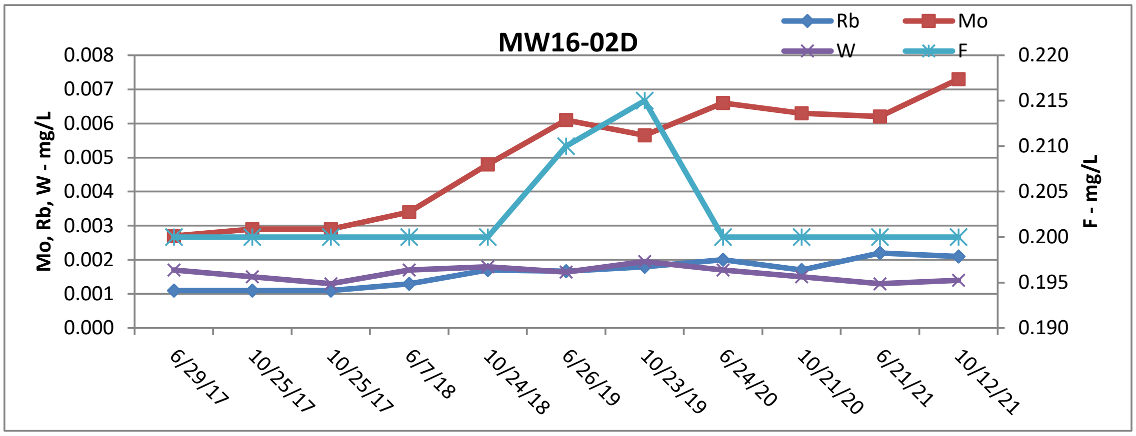

MW15-12
SO4
SO4 - mg/L
18
16
14
12
10
8
6
4
2
0
10/29/15
4/22/16
6/23/16
10/26/16
6/27/17
10/25/17
6/6/18
10/24/18
6/26/19
10/23/19
6/25/20
10/22/20
6/23/21
10/14/21

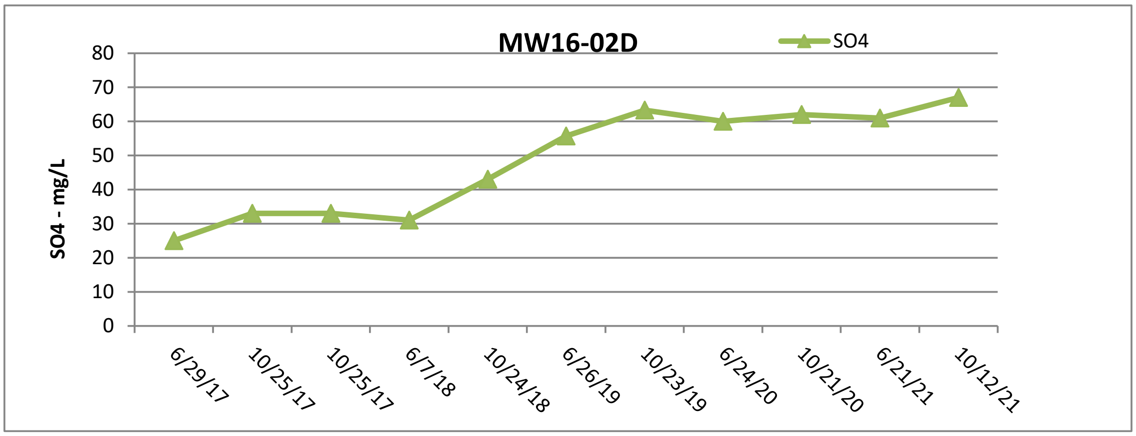

MW15-13
Rb
Mo
W
F
Mo, Rb, W - mg/L
F - mg/L
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0.130
0.110
0.090
0.070
0.050
0.030
0.010
10/30/15
4/22/16
6/23/16
10/26/16
6/27/17
10/25/17
6/6/18
10/24/18
6/26/19
10/23/19
6/25/20
10/22/20
6/23/21
10/14/21

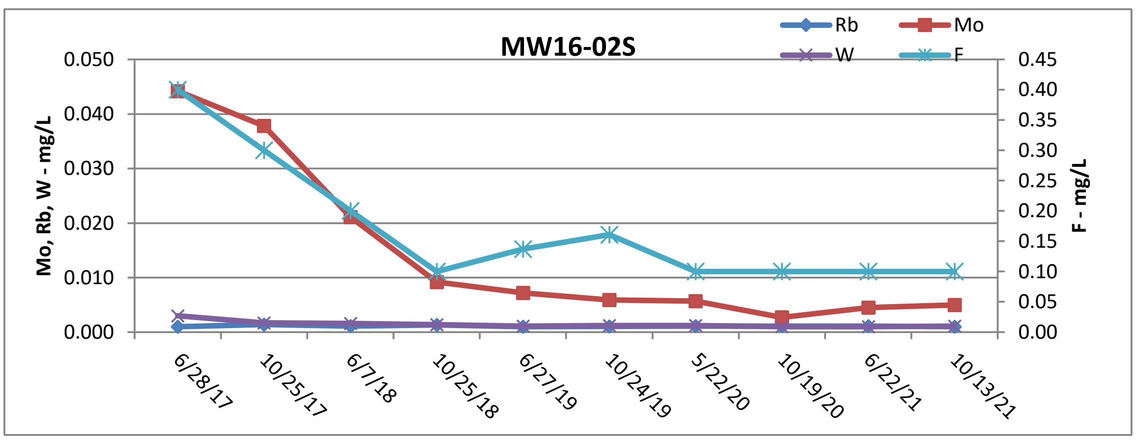

MW15-13
SO4
SO4 - mg/L
18
16
14
12
10
8
6
4
2
0
10/30/15
4/22/16
6/23/16
10/26/16
6/27/17
10/25/17
6/6/18
10/24/18
6/26/19
10/23/19
6/25/20
10/22/20
6/23/21
10/14/21

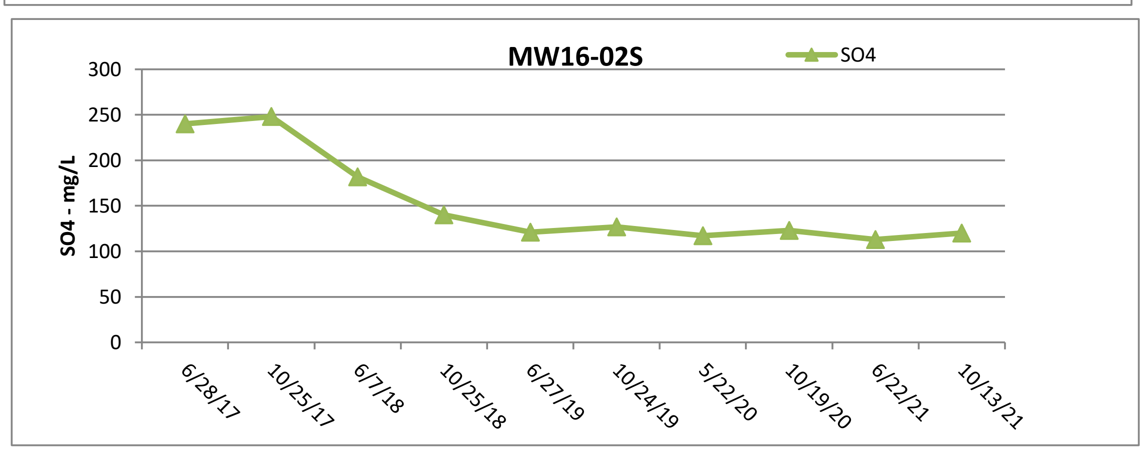

MW16-01
Rb
Mo
W
F
Mo, Rb, W - mg/L
F - mg/L
0.018
0.016
0.014
0.012
0.010
0.008
0.006
0.004
0.002
0.000
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
6/29/17
6/29/17
10/25/17
6/7/18
10/24/18
6/26/19
10/23/19
6/25/20
10/19/20
6/21/21
10/12/21


MW16-01
SO4
SO4 - mg/L
80
70
60
50
40
30
20
10
0
6/29/17
6/29/17
10/25/17
6/7/18
10/24/18
6/26/19
10/23/19
6/25/20
10/19/20
6/21/21
10/12/21


MW16-02D
Rb
Mo
W
F
Mo, Rb, W - mg/L
F - mg/L
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0.000
0.220
0.215
0.210
0.205
0.200
0.195
0.190
6/29/17
10/25/17
10/25/17
6/7/18
10/24/18
6/26/19
10/23/19
6/24/20
10/21/20
6/21/21
10/12/21

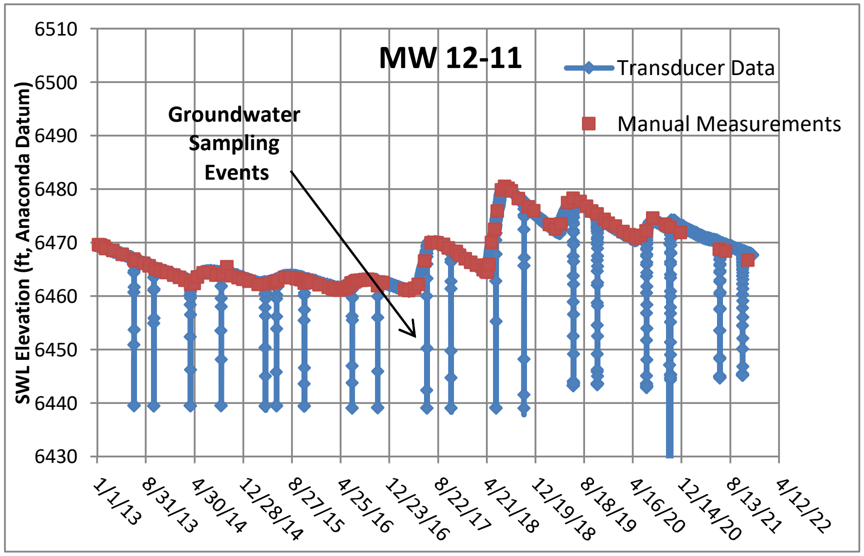

MW16-02D
SO4
SO4 - mg/L
80
70
60
50
40
30
20
10
0
6/29/17
10/25/17
10/25/17
6/7/18
10/24/18
6/26/19
10/23/19
6/24/20
10/21/20
6/21/21
10/12/21

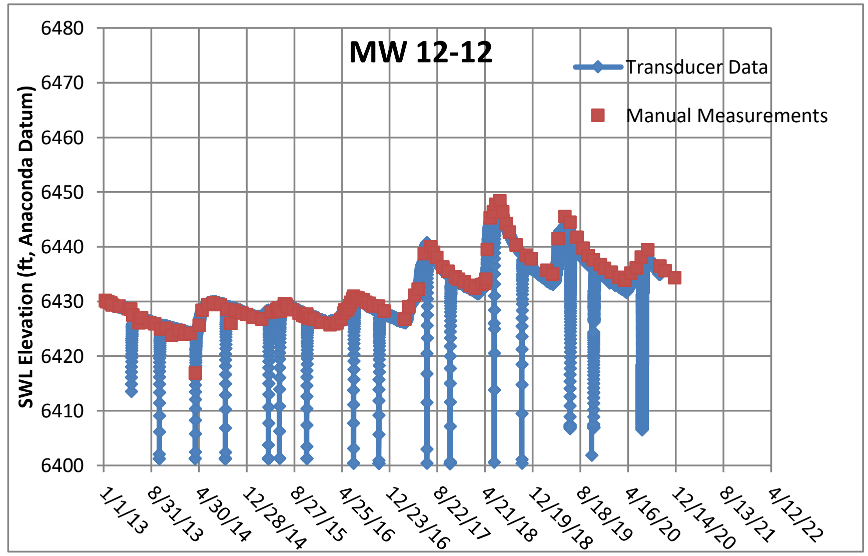

MW16-02S
Rb
Mo
W
F
Mo, Rb, W - mg/L
F - mg/L
0.050
0.040
0.030
0.020
0.010
0.000
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
6/28/17
10/25/17
6/7/18
10/25/18
6/27/19
10/24/19
5/22/20
10/19/20
6/22/21
10/13/21

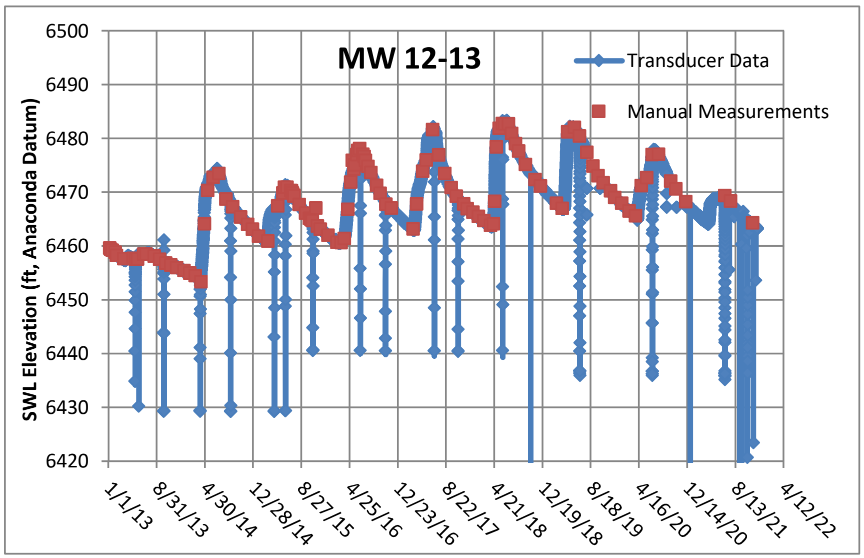

MW16-02S
SO4
SO4 - mg/L
300
250
200
150
100
50
0
6/28/17
10/25/17
6/7/18
10/25/18
6/27/19
10/24/19
5/22/20
10/19/20
6/22/21
10/13/21

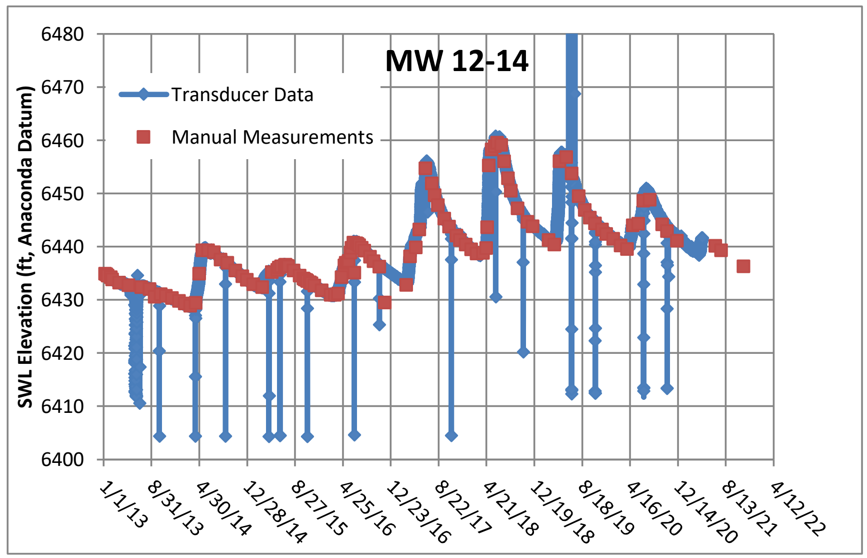
APPENDIX C

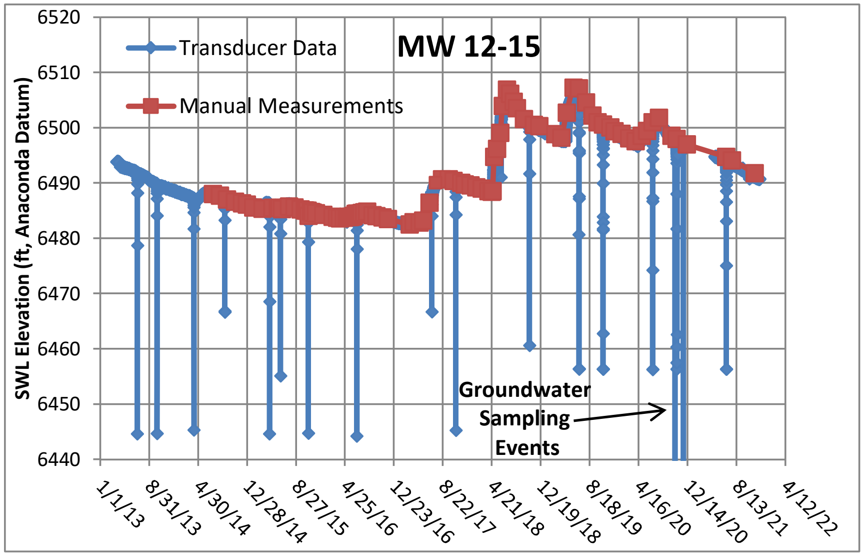
WATER LEVEL HYDROGRAPHS FOR IMPOUNDMENT AREA MONITORING WELLS

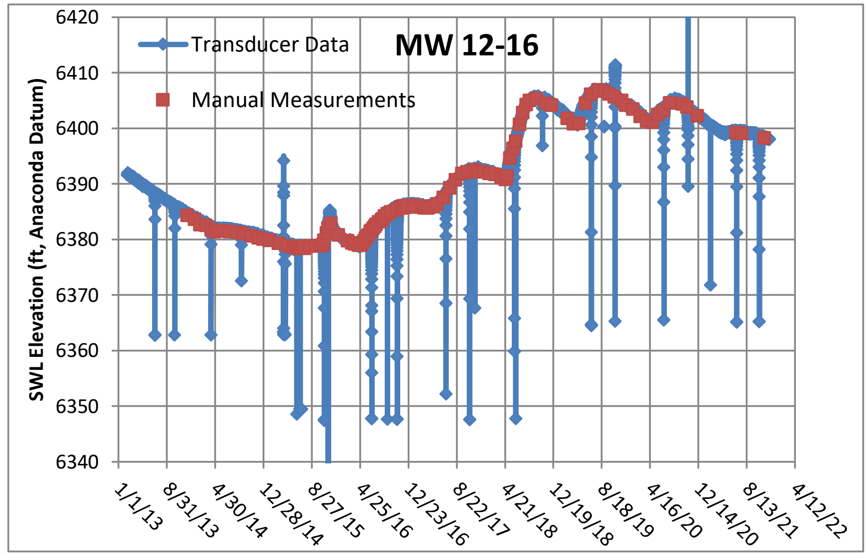

MW 12-11
Transducer Data
Manual Measurements
Groundwater Sampling Events
SWL Elevation (ft, Anaconda Datum)
6510
6500
6490
6480
6470
6460
6450
6440
6430
1/1/13
8/31/13
4/30/14
12/28/14
8/27/15
4/25/16
12/23/16
8/22/17
4/21/18
12/19/18
8/18/19
4/16/20
12/14/20
8/13/21
4/12/22

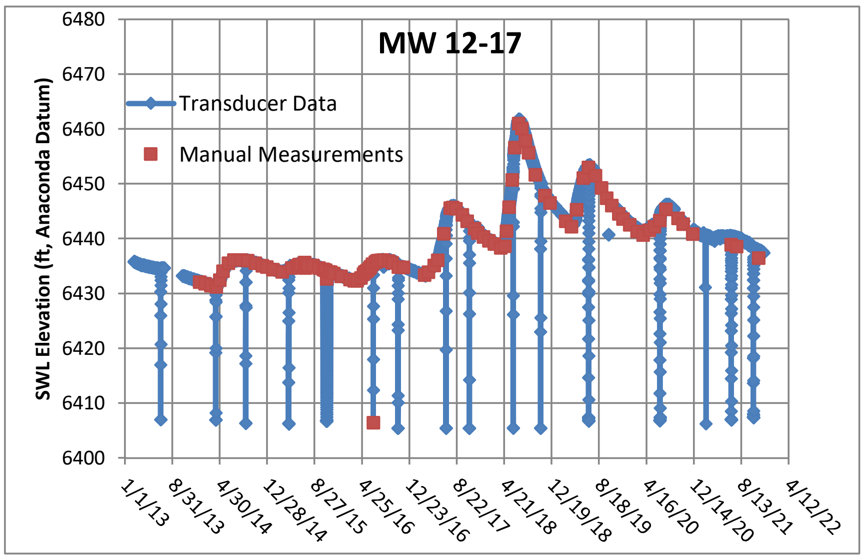

MW 12-12
Transducer Data
Manual Measurements
SWL Elevation (ft, Anaconda Datum)
6480
6470
6460
6450
6440
6430
6420
6410
6400
1/1/13
8/31/13
4/30/14
12/28/14
8/27/15
4/25/16
12/23/16
8/22/17
4/21/18
12/19/18
8/18/19
4/16/20
12/14/20
8/13/21
4/12/22

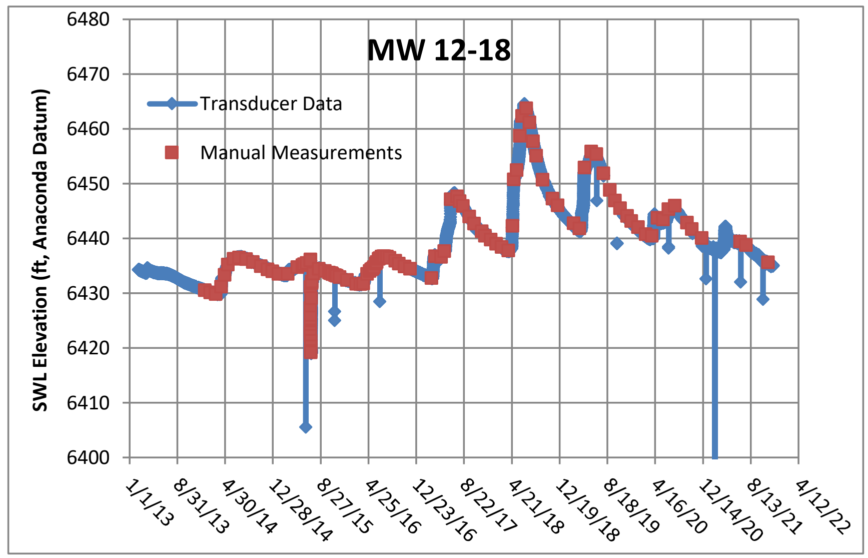

MW 12-13
Transducer Data
Manual Measurements
SWL Elevation (ft, Anaconda Datum)
6500
6490
6480
6470
6460
6450
6440
6430
6420
1/1/13
8/31/13
4/30/14
12/28/14
8/27/15
4/25/16
12/23/16
8/22/17
4/21/18
12/19/18
8/18/19
4/16/20
12/14/20
8/13/21
4/12/22

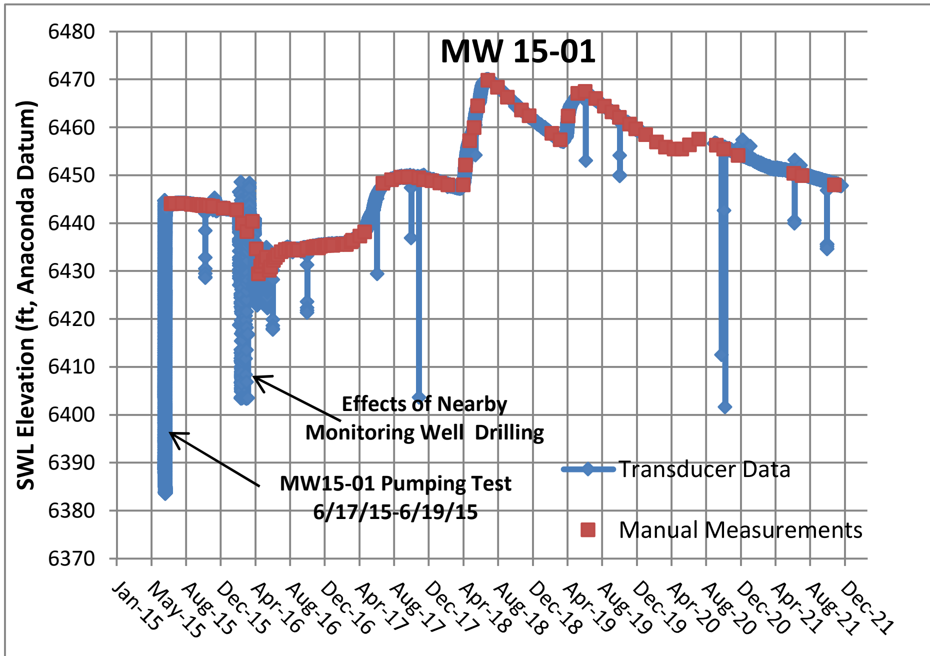

MW 12-14
Transducer Data
Manual Measurements
SWL Elevation (ft, Anaconda Datum)
6480
6470
6460
6450
6440
6430
6420
6410
6400
1/1/13
8/31/13
4/30/14
12/28/14
8/27/15
4/25/16
12/23/16
8/22/17
4/21/18
12/19/18
8/18/19
4/16/20
12/14/20
8/13/21
4/12/22

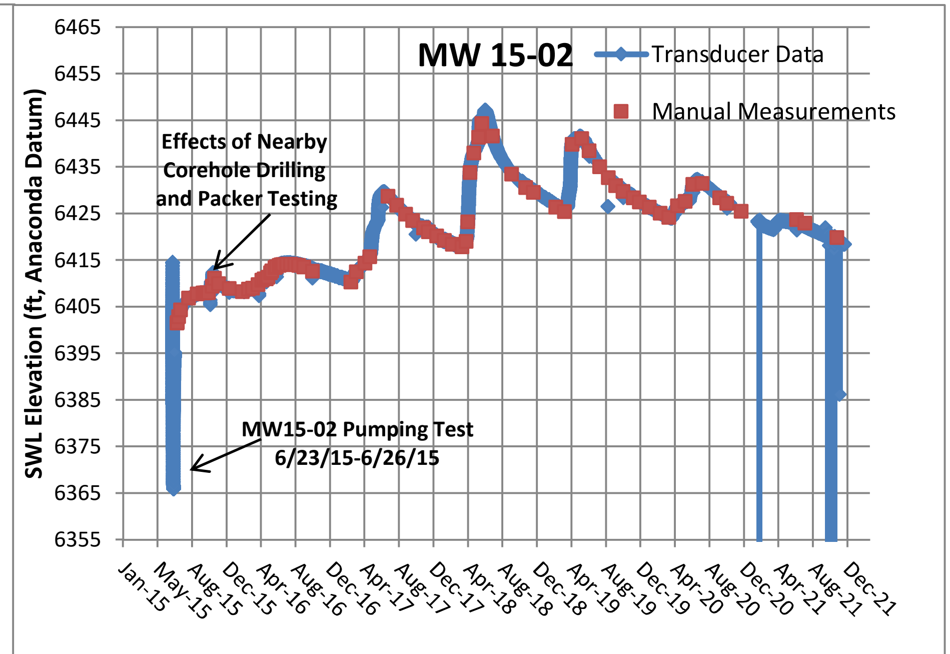

MW 12-15
Transducer Data
Manual Measurements
Groundwater Sampling Events
SWL Elevation (ft, Anaconda Datum)
6520
6510
6500
6490
6480
6470
6460
6450
6440
1/1/13
8/31/13
4/30/14
12/28/14
8/27/15
4/25/16
12/23/16
8/22/17
4/21/18
12/19/18
8/18/19
4/16/20
12/14/20
8/13/21
4/12/22

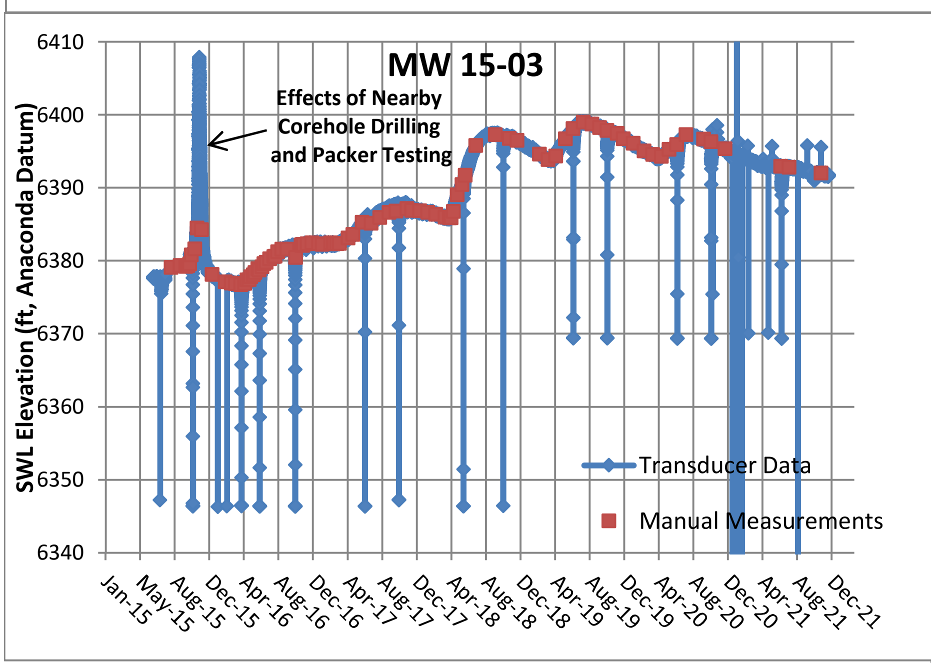

MW 12-16
Transducer Data
Manual Measurements
SWL Elevation (ft, Anaconda Datum)
6420
6410
6400
6390
6380
6370
6360
6350
6340
1/1/13
8/31/13
4/30/14
12/28/14
8/27/15
4/25/16
12/23/16
8/22/17
4/21/18
12/19/18
8/18/19
4/16/20
12/14/20
8/13/21
4/12/22

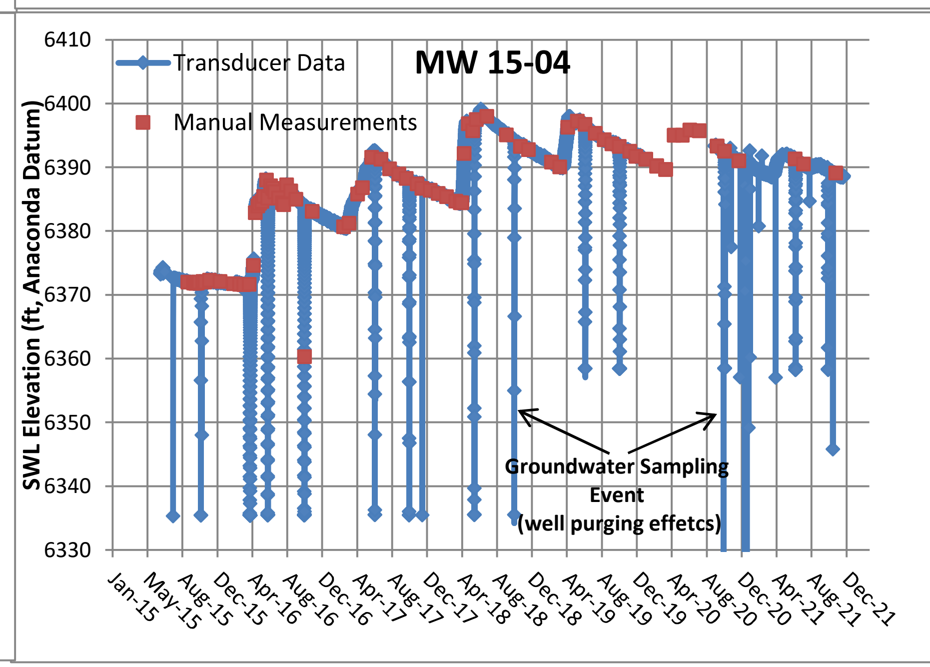

MW 12-17
Transducer Data
Manual Measurements
SWL Elevation (ft, Anaconda Datum)
6480
6470
6460
6450
6440
6430
6420
6410
6400
1/1/13
8/31/13
4/30/14
12/28/14
8/27/15
4/25/16
12/23/16
8/22/17
4/21/18
12/19/18
8/18/19
4/16/20
12/14/20
8/13/21
4/12/22

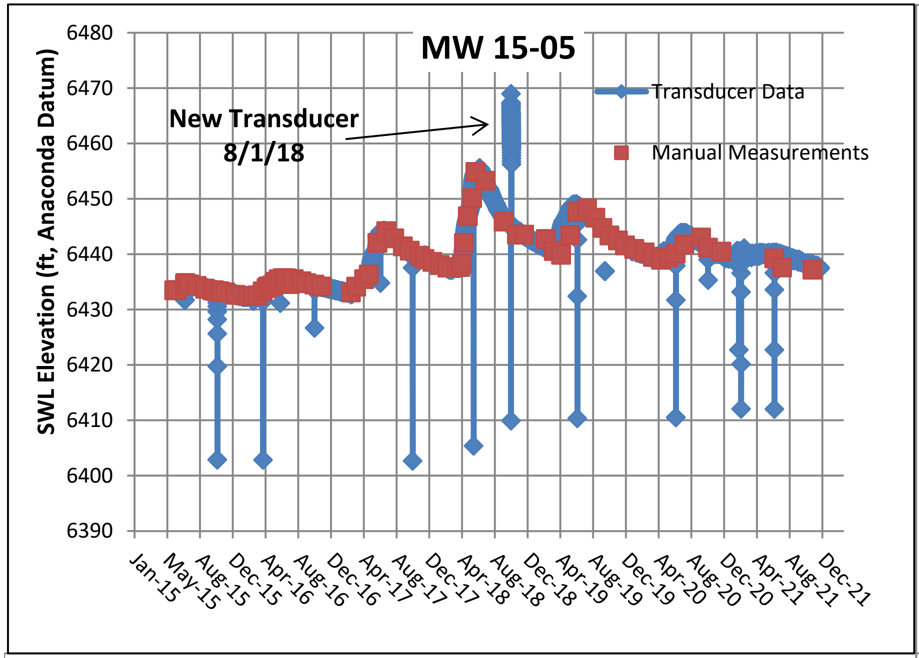

MW 12-18
Transducer Data
Manual Measurements
SWL Elevation (ft, Anaconda Datum)
6480
6470
6460
6450
6440
6430
6420
6410
6400
1/1/13
8/31/13
4/30/14
12/28/14
8/27/15
4/25/16
12/23/16
8/22/17
4/21/18
12/19/18
8/18/19
4/16/20
12/14/20
8/13/21
4/12/22

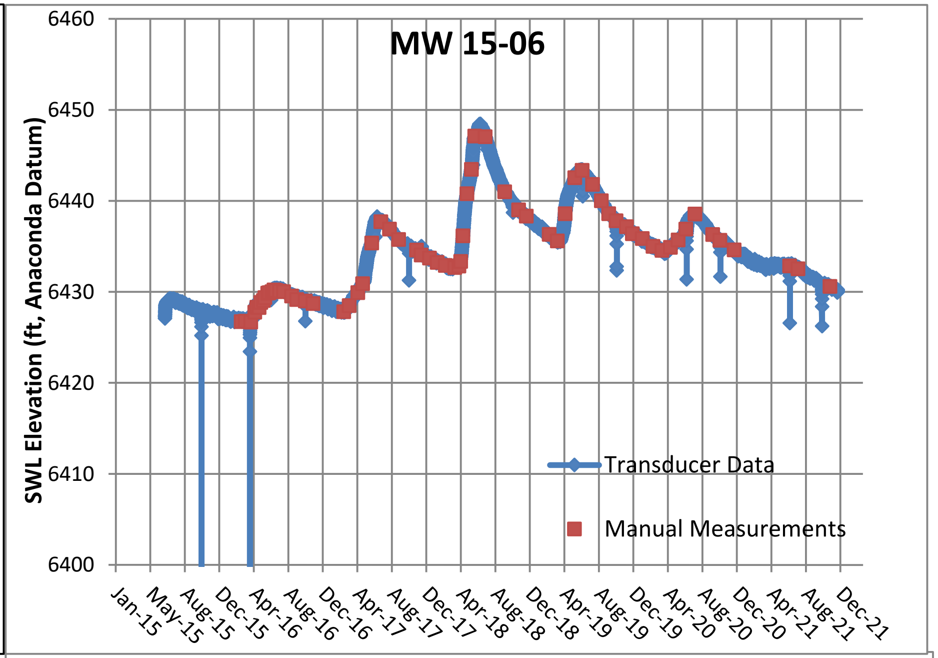

MW 15-01
SWL Elevation (ft, Anaconda Datum)
Effects of Nearby Monitoring Well Drilling
MW15-01 Pumping Test 6/17/15-6/19/15
Transducer Data
Manual Measurements

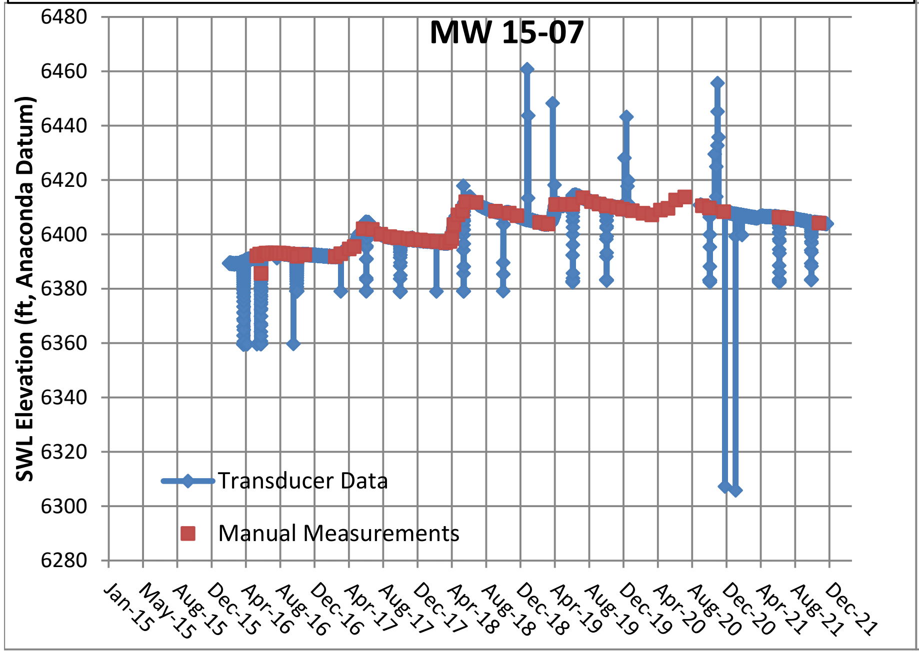

MW 15-02
SWL Elevation (ft, Anaconda Datum)
Effects of Nearby Corehole Drilling and Packer Testing
MW15-02 Pumping Test 6/23/15-6/26/15
Transducer Data
Manual Measurements

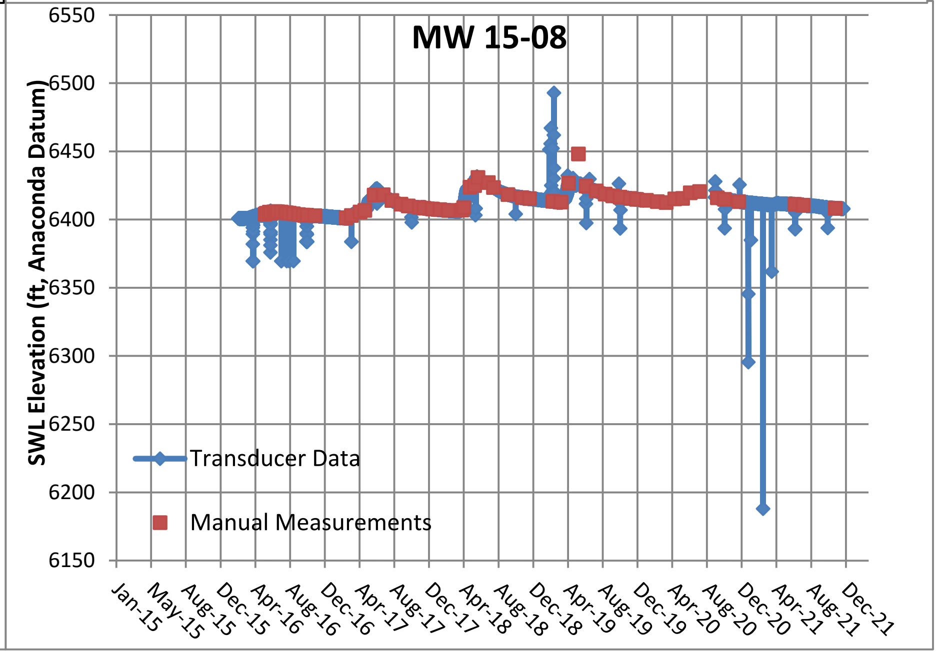

MW 15-03
SWL Elevation (ft, Anaconda Datum)
Effects of Nearby Corehole Drilling and Packer Testing
Transducer Data
Manual Measurements

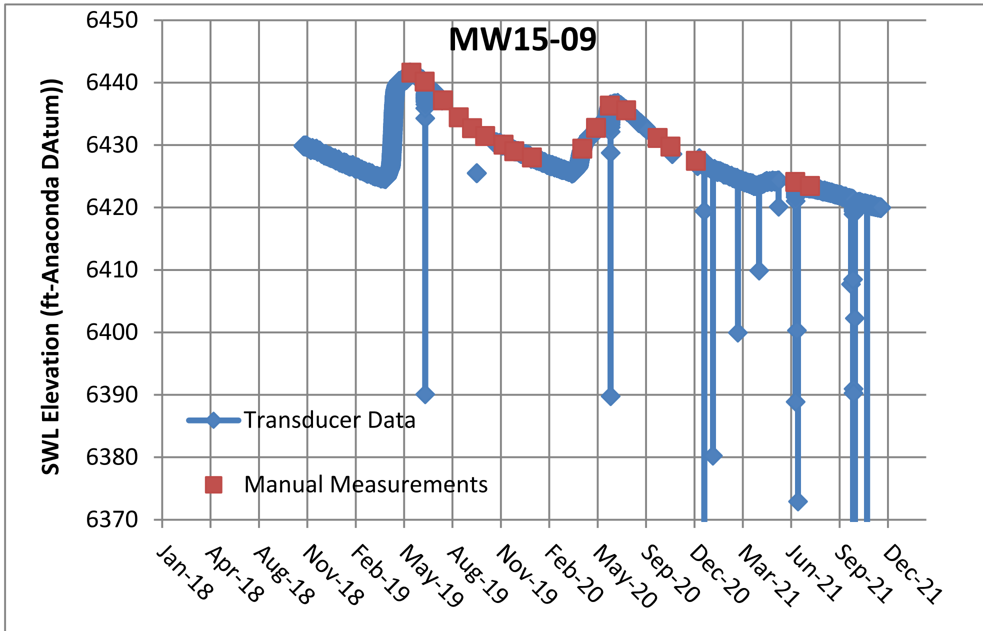

MW 15-04
SWL Elevation (ft, Anaconda Datum)
Groundwater Sampling Event (well purging effetcs)
Transducer Data
Manual Measurements

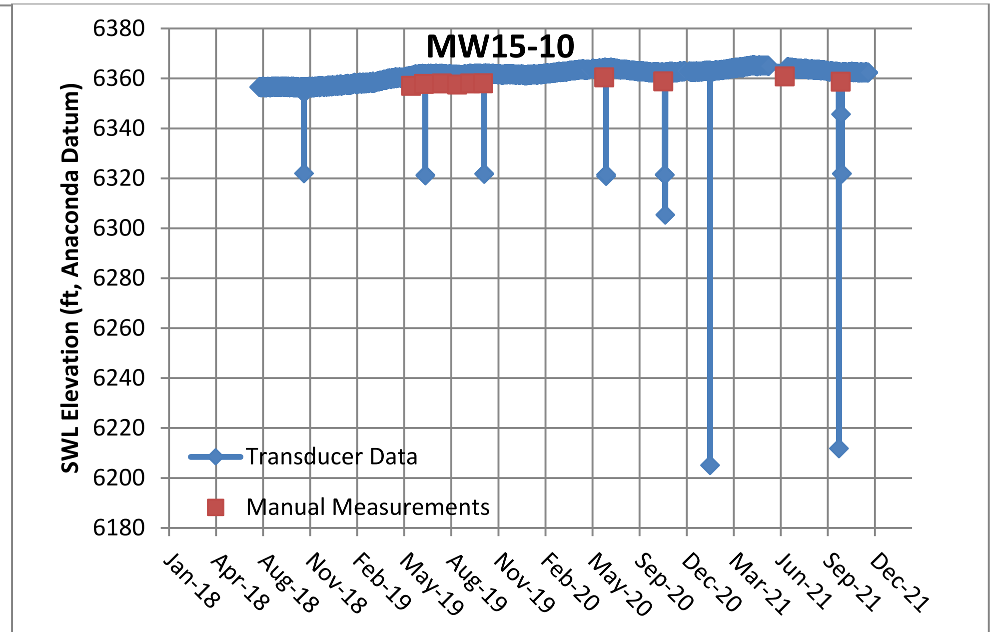

MW 15-05
New Transducer 8/1/18
Transducer Data
Manual Measurements
SWL Elevation (ft, Anaconda Datum)

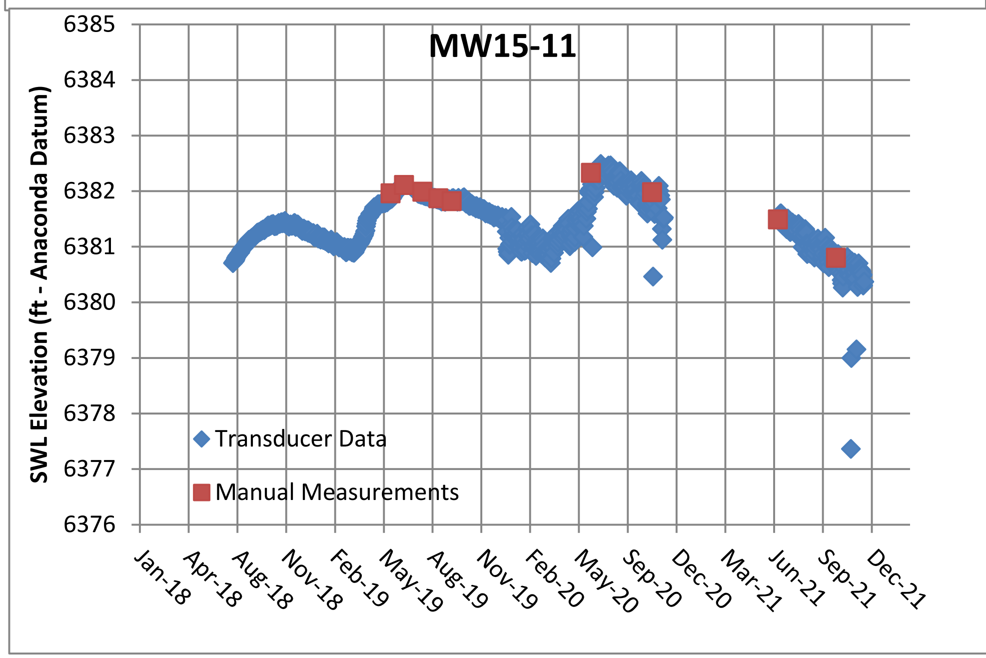

MW 15-06
Transducer Data
Manual Measurements
SWL Elevation (ft, Anaconda Datum)

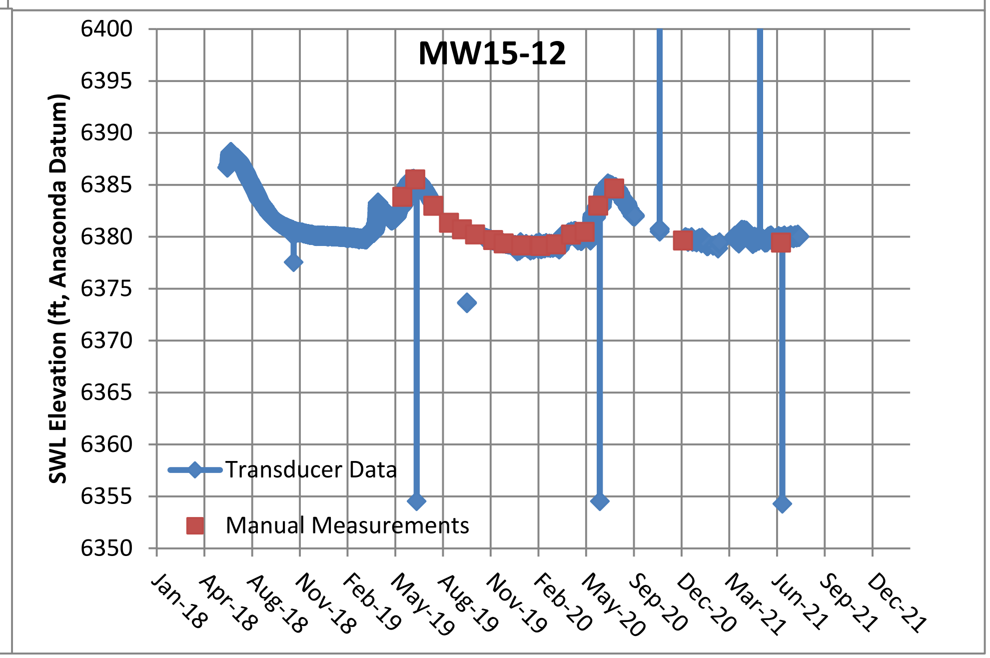

MW 15-07
Transducer Data
Manual Measurements
SWL Elevation (ft, Anaconda Datum)

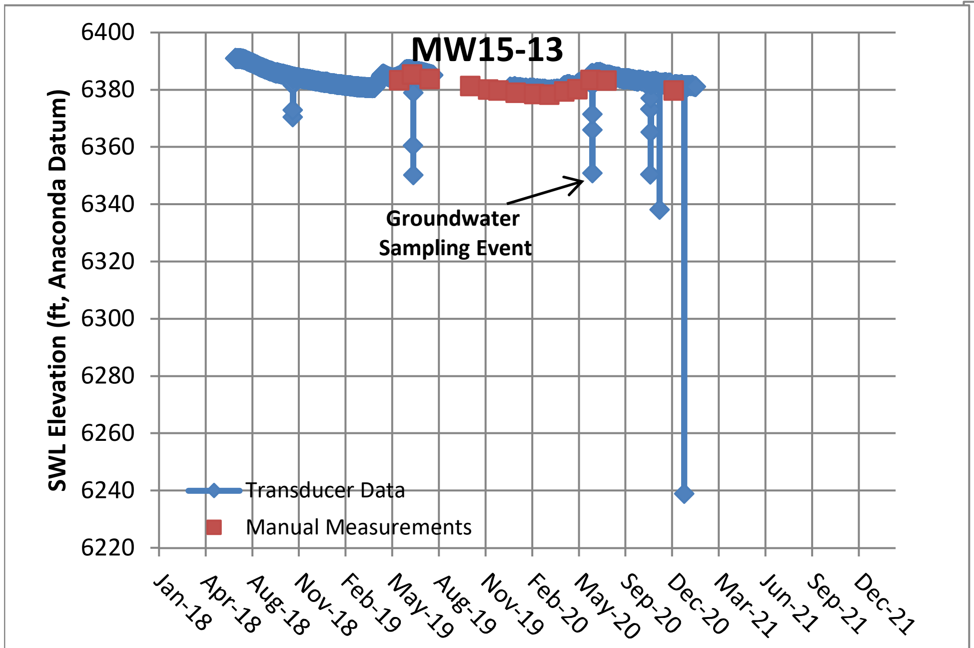

MW 15-08
Transducer Data
Manual Measurements
SWL Elevation (ft, Anaconda Datum)

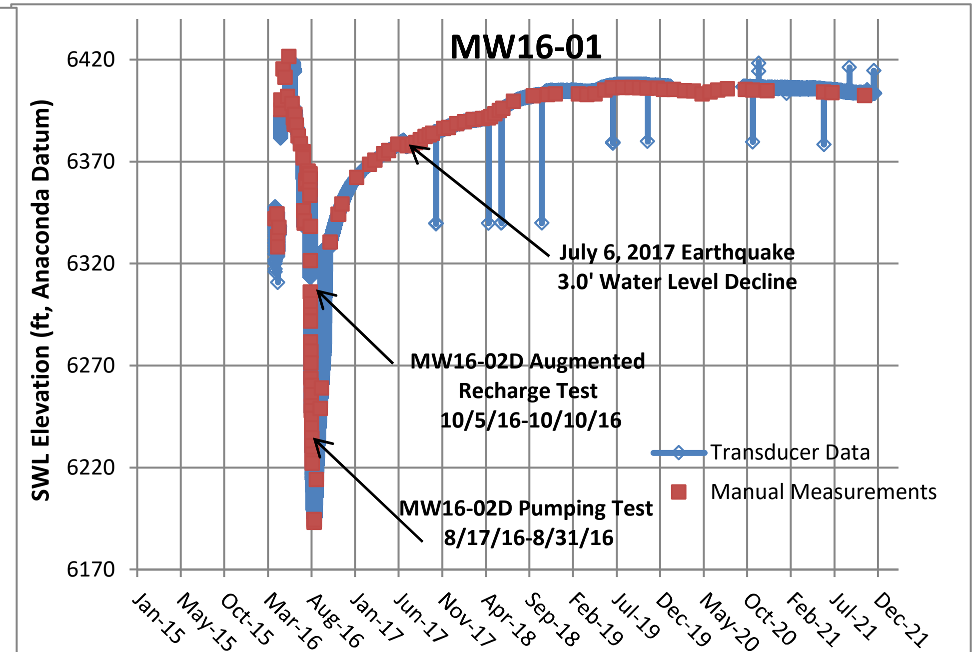

MW15-09
SWL Elevation (ft-Anaconda DAtum))
6450
6440
6430
6420
6410
6400
6390
6380
6370
Transducer Data
Manual Measurements
Jan-18
Apr-18
Aug-18
Nov-18
Feb-19
May-19
Aug-19
Nov-19
Feb-20
May-20
Sep-20
Dec-20
Mar-21
Jun-21
Sep-21
Dec-21

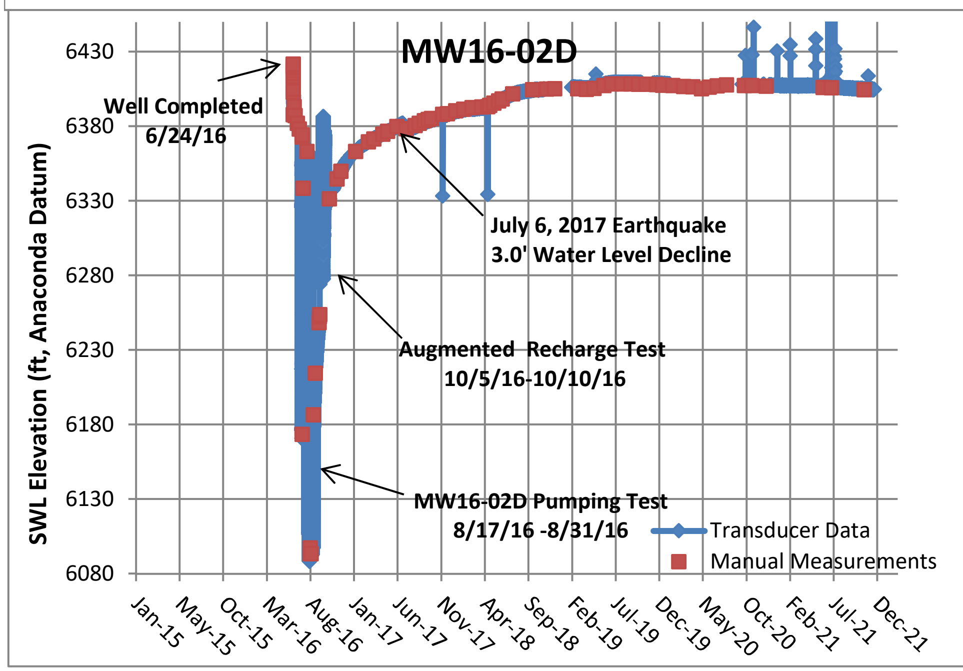

MW15-10
SWL Elevation (ft, Anaconda Datum)
6380
6360
6340
6320
6300
6280
6260
6240
6220
6200
6180
Transducer Data
Manual Measurements
Jan-18
Apr-18
Aug-18
Nov-18
Feb-19
May-19
Aug-19
Nov-19
Feb-20
May-20
Sep-20
Dec-20
Mar-21
Jun-21
Sep-21
Dec-21

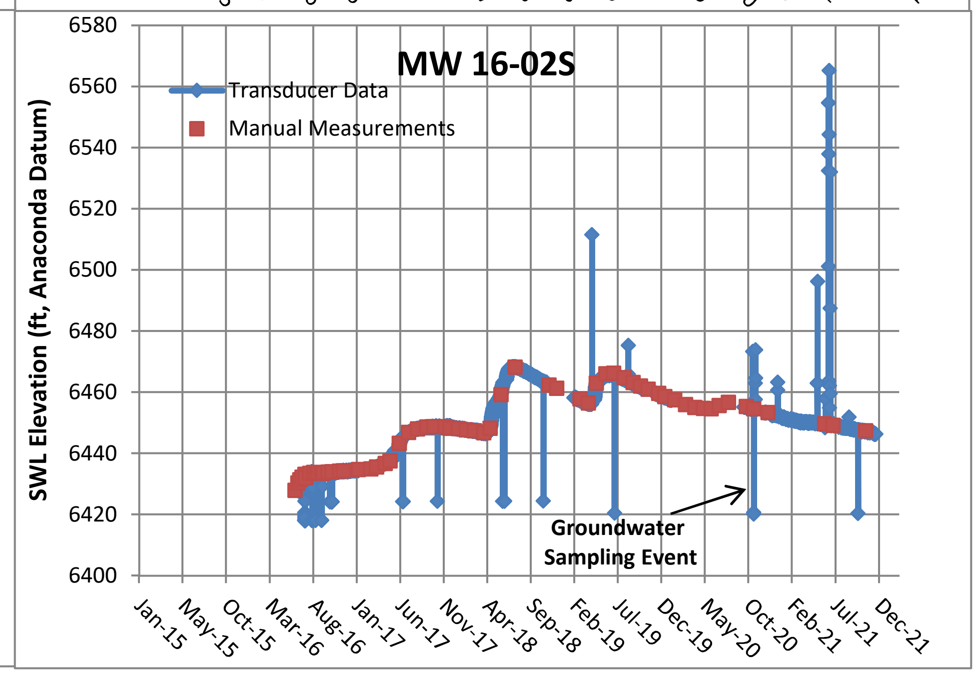

MW15-11
SWL Elevation (ft - Anaconda Datum)
6385
6384
6383
6382
6381
6380
6379
6378
6377
6376
Transducer Data
Manual Measurements
Jan-18
Apr-18
Aug-18
Nov-18
Feb-19
May-19
Aug-19
Nov-19
Feb-20
May-20
Sep-20
Dec-20
Mar-21
Jun-21
Sep-21
Dec-21


MW15-12
SWL Elevation (ft, Anaconda Datum)
6400
6395
6390
6385
6380
6375
6370
6365
6360
6355
6350
Transducer Data
Manual Measurements
Jan-18
Apr-18
Aug-18
Nov-18
Feb-19
May-19
Aug-19
Nov-19
Feb-20
May-20
Sep-20
Dec-20
Mar-21
Jun-21
Sep-21
Dec-21


MW15-13
SWL Elevation (ft, Anaconda Datum)
6400
6380
6360
6340
6320
6300
6280
6260
6240
6220
Jan-18
Apr-18
Aug-18
Nov-18
Feb-19
May-19
Aug-19
Nov-19
Feb-20
May-20
Sep-20
Dec-20
Mar-21
Jun-21
Sep-21
Dec-21
Groundwater
Sampling Event
Transducer Data
Manual Measurements


MW16-01
SWL Elevation (ft, Anaconda Datum)
6420
6370
6320
6270
6220
6170
Jan-15
May-15
Oct-15
Mar-16
Aug-16
Jan-17
Jun-17
Nov-17
Apr-18
Sep-18
Feb-19
Jul-19
Dec-19
May-20
Oct-20
Feb-21
Jul-21
Dec-21
July 6, 2017 Earthquake
3.0' Water Level Decline
MW16-02D Augmented
Recharge Test
10/5/16-10/10/16
MW16-02D Pumping Test
8/17/16-8/31/16
Transducer Data
Manual Measurements


MW16-02D
SWL Elevation (ft, Anaconda Datum)
6430
6380
6330
6280
6230
6180
6130
6080
Jan-15
May-15
Oct-15
Mar-16
Aug-16
Jan-17
Jun-17
Nov-17
Apr-18
Sep-18
Feb-19
Jul-19
Dec-19
May-20
Oct-20
Feb-21
Jul-21
Dec-21
Well Completed
6/24/16
July 6, 2017 Earthquake
3.0' Water Level Decline
Augmented Recharge Test
10/5/16-10/10/16
MW16-02D Pumping Test
8/17/16 -8/31/16
Transducer Data
Manual Measurements


MW 16-02S
SWL Elevation (ft, Anaconda Datum)
6580
6560
6540
6520
6500
6480
6460
6440
6420
6400
Jan-15
May-15
Oct-15
Mar-16
Aug-16
Jan-17
Jun-17
Nov-17
Apr-18
Sep-18
Feb-19
Jul-19
Dec-19
May-20
Oct-20
Feb-21
Jul-21
Dec-21
Transducer Data
Manual Measurements
Groundwater
Sampling Event

5.0 Materials Inventory

5.1 Topsoil

No soil salvage occurred in 2021.

Table 5.1 contains the current topsoil inventory by stockpile. A history of topsoil stockpile activity can be found in the 2014 Annual Report and subsequent annual reports.

Topsoil will continue to be salvaged concurrent with the rising water levels in the YDTI.

Table 5.1. Soil Stockpile Inventory through 2020

Stockpile	Cubic Yards - 2020	Cubic Yards – 2021
Bunker[1]	95,900	95,900
Mouton Road	474,700	474,700
Bumtown II	37,420	37,420
Total	**608,020**	**608,020**

5.2 Alluvium

Approximately 20 million cubic yards of suitable reclamation material has been identified in the Central Zone/McQueen area.

Approximately 1,545,000 cubic yards of alluvium are currently contained in the Lunchroom Stockpile.

Approximately 1,067,000 cubic yards of alluvium are currently contained in a temporary stockpile near four-corners. This material will be used for Zone F for the 6450-lift of the YDTI.

No new stockpiling of alluvium is anticipated in 2022.

5.3 Leached Capping

All leached capping mined in 2021 was used for tailing embankment construction.

All leached capping mined in 2022 will be used for tailings embankment construction. No stockpiling of leach capping is anticipated in 2022.

[1] Sometimes referred to as the Four Corners Stockpile.

5.4 Parrot Tailings

Approximately 300,300 cubic yards of mine wastes from the historic Parrot Smelter area were brought to MR by Montana Natural Resource Damage Program (NRDP) in 2021. It is anticipated that material haulage will continue from the Parrot Smelter area to MR in 2022.

Water from the Parrot Smelter project area was pumped to MR in 2021 (see Section 4).

5.5 Compost

MR stockpiled approximately 6,300 cubic yards of compost on the Lunchroom Stockpile in 2021.

6.0 Disturbance and Bonding Status

6.1 2020 Disturbance Summary

There was little to no new disturbance during 2021 primarily due to the absence of rise in the tailings pond resulting from the BMFOU Pilot Project.

Montana Resources mined 20,600,000 tons of non-ore rock in 2021. This rock was predominately used for constructing the Yankee Doodle Tailings Impoundment (YDTI).

The bottom of the Continental Pit is at the 5160' elevation in the North Pit and at the 5280' elevation in the South Pit.

A total of 16,400,000 tons of ore were mined in 2021.

It is anticipated that approximately 50 acres of new disturbance will occur in 2022, mostly associated with topsoil salvage and stockpiling, and YDTI construction.

6.2 Bond and Permit Status

Present Bond Review

In 2021, a 5-year bond review was Completed. The bond was increased from $114,602,575 to $116,477,500.

Operating Permit Amendments and Revisions

The mine operating permit (00030) is active.

Four minor Revisions to the Operating permit were approved during 2021:

- MR 21-001 – Boundary adjustment to exclude Berkeley Pit Viewing Stand;
- MR 21-002 – Consolidation of Operating Permits;
- MR 21-003 – Parrot Tailings Project Phase IIC;
- MR 21-004 – Resolution of stipulation for erosion control.

For Operating Permit Number: 00030:

• Total Permit Area	6136 Acres
• Total Acreage Currently Disturbed	5533 Acres
• Amount of Bond	$116,477,500
• Amount of Obligated Bond	$116,477,500

Table 6.1 is a more detailed table of facility acreages. Within the permit boundary there are areas subject to differing bonding requirements. Table 6.2 identifies these areas by designation. Plate II illustrates their locations.

MR, DEQ and others have collaboratively developed mapping and planimetry to define the various areas and acreages and developed a methodology for annually updating these areas. Areas identified in this annual report generally agree with the areas utilized in the current 5-year bond review.

Table 6.1. Acreage Covered by Operating Permit

	Area (Acres)
Continental Pit	1000
Berkeley Pit	684
Primary Crusher	44
Concentrator Area	95
Precipitation Plant Area	73
YDTI Embankments	689
YDTI Beach	900
YDTI Pond	602
Leach Pads	201
Mining Related Facilities	1035
Undisturbed	603
Reclaimed	210
Total	**6136**

Table 6.2. Areas Subject to Various Bonding Requirements

Bond Status	**Area (Acres)**
Exempt from Bonding	
BMFOU	997
GMMIA	17
Pre-1971 Process Facilities	212
Pre-1974	1687
Bond by Calculation	3223
Total	**6136**

7.0 Yankee Doodle Tailings Impoundment

The Yankee Doodle Tailings Impoundment (YDTI) is located entirely within Montana Resources' property. The embankment is currently being constructed to a permitted elevation of 6450 feet, ACM datum. The tailings pond had a 2021 year-end elevation of 6358 feet. This is a decrease in the tailings pond elevation of 1foot for 2021.

7.1 *Inspection*

The YDTI was visually inspected monthly, throughout 2021 in conjunction with routine monitoring of instrumentation.

The Engineer of Record (EOR) annual inspection of the YDTI was conducted on September 10, 2021. The Annual Inspection Report (AIR) was submitted to DEQ on January 11, 2022. The AIR provides detailed information regarding the operation, maintenance, monitoring and construction of the YDTI.

Also submitted with the AIR were the Corrective Action Plans associated with the EOR recommendations. Those plans are attached.

7.2 *Ongoing Disturbance*

The YDTI Pond typically increases its area of inundation by 18-25 acres annually with normal milling operations. As the elevation of the pond rises, undisturbed ground at the north end of the pond is inundated by the pond. However, in 2021, the pond decreased in elevation as a result of the BMFOU Pilot Project.

7.3 *Site Investigation*

In 2021, a multi-year site investigation of the YDTI continued with additional borings in the embankments. The reports and data will be made available to DEQ and the IRP.

Montana Resources

600 Shields Ave.
Butte, Montana 59701

January 11, 2022

Montana Department of Environmental Quality
Hard Rock Mining Bureau
Attn: Garrett Smith
P.O. Box 200901
Helena, MT 59620

Re: 2021 Annual Inspection Report for Yankee Doodle Tailings Impoundment and Corrective Action Plan for Recommendations

Dear Mr. Smith:

The Engineer of Record (EOR) annual inspection of the Montana Resources, LLP (MR) Yankee Doodle Tailings Impoundment (YDTI) was conducted on September 13, 2021, by Mr. Daniel Fontaine, P.E., the Engineer of Record (EOR). Mr. Fontaine was accompanied during the site inspection by Mr. Mike Harvie (Manager of Engineering and Geology) of MR.

The EOR annual inspection is required under Section 82-4-381 of the Montana Code Annotated (MCA), which also requires the mine operator to prepare a Corrective Action Plan (CAP) summarizing the recommendations of the EOR and an implementation schedule for the corrective actions. KP prepared the 'Yankee Doodle Tailings Impoundment – 2021 Annual Inspection Report' (AIR), following the inspection.

This letter documents MR's CAP in response to the eight recommendations presented by the EOR:

1. Maintain reductions in freshwater use from the Silver Lake Water System to the extent reasonably practicable and continue the Pilot Project to incrementally reduce the water inventory in the YDTI supernatant pond towards the target of approximately 15,000 acre-ft (continuation of 2020 recommendation).

2. Modify the tailings distribution system by extending Line 2 to allow discharge at location NS-1 and NS-2 when the EL. 6,450 ft raise of the embankment is completed adjacent to these discharge locations (deferral from 2020 recommendations).

3. Modify the tailings distribution system to include two additional discharge locations as follows:
    - one located between the current locations of EW-1 and NS-1, and
    - one located between the current locations of NS-1 and NS-2.

4. Implement alluvium facing at the interface between the rockfill surcharge and tailings beach between discharge between Section 23+00 NW and Section 13+00 N along the upstream face of the EL. 6,400 ft surcharge lift.

5. Infill low areas along the downstream side of the North-South Embankment and regrade the embankment crest from approximately Section 43+00 N towards the north.

6. Complete maintenance work in the upper Horseshoe Bend (HsB) area to improve drainage and limit ponding in this area.

7. Develop and implement a new system to collect flows along the Seep 10 bench and convey these flows to the HsB Pond. Re-grade the Seep 10 bench surface to enhance drainage collection and limit ponding of water to the extent practicable.

8. Investigate options for automating collection of the HsB Weir flow monitoring data using the Sensemetrics remote monitoring system platform.

MR has developed the following CAP that is expected to effectively address the recommendations contained in the AIR.

1. **Maintain reductions in freshwater use from the Silver Lake Water System to the extent reasonably practicable and continue the Pilot Project to incrementally reduce the water inventory in the YDTI supernatant pond towards the target of approximately 15,000 acre-ft (continuation of 2020 recommendation).**

MR continued to operate with reduced freshwater use in 2021 (in comparison to pre-2017 years), with an average SLWS flowrate of approximately 1.2 MGPD (January through December inclusive). This is comparable with the average flowrate since mid-2017. MR anticipates comparable average use of freshwater in 2022.

Since commissioning the Pilot Project in September 2019, the net YDTI water deficit is approximately 2,190 M gallons (6,720 ac-ft), through 2021. MR is optimistic that the YDTI supernatant pond target inventory of approximately 15,000 acre-ft can be achieved over the next 2 to 4 years through a combination of the discharging water from the YDTI using the pilot project and continuing to operate the concentrator with reduced SLWS freshwater use. The Pilot Project is not entirely within MR's control however due to a variety of factors and Polishing Plant interruptions are possible that could impact the timeline.

2. **Modify the tailings distribution system by extending Line 2 to allow discharge at location NS-1 and NS-2 when the EL. 6,450 ft raise of the embankment is completed adjacent to these discharge locations (deferral from 2020 recommendations).**

As noted in the 2019 and 2020 CAP, MR recognizes the ability to discharge from either of two lines or at two locations concurrently along the North-South Embankment would improve flexibility for operations and enhance beach development adjacent to the embankment. MR committed in the 2019 CAP to making adjustments to the system in 2020 provided it was reasonably practicable within the mine schedule. MR issued a Deferral Notification in December 2020 (MR, 2020), identifying that realignment would not be practicable due to construction occurring in this area through to mid-2022. MR now anticipates the construction of the EL. 6,450 ft embankment will be complete in this area in Q3 of 2022, and Line 2 can then be realigned in Q4 of 2022.

3. **Modify the tailings distribution system to include two additional discharge locations as follows:**
    - **one located between the current locations of EW-1 and NS-1, and**
    - **one located between the current locations of NS-1 and NS-2.**

MR agrees the addition of two new discharge locations, for a total of 12 locations, will continue to improve operational flexibility and beach development within the tailings facility. As detailed in the Recommendation 2 Corrective Action, MR are currently constructing the EL. 6,450 ft raise of the YDTI embankments and will relocate the tailings delivery pipelines following completion of this raise.

MR propose to install the two new recommended tailings discharge points (one point between the existing EW-1 and NS-1, and one point between NS-1 and NS-2) when relocating the tailings pipelines. MR also intend to review the spacing of the spigots along Line 2 and Line 3 to have the discharges more equally spaced. The current schedule for relocation of the tailings delivery pipeline to EL.6,450 ft is Q3 and Q4 of 2022.

4. **Implement alluvium facing at the interface between the rockfill surcharge and tailings beach between Section 23+00 NW and Section 13+00 N along the upstream face of the EL. 6,400 ft surcharge lift.**

MR has placed additional alluvium (Zone F) on the upstream face of the rockfill surcharge between Section 23+00 NW and Section 13+00 N since the EOR inspection in September 2021. MR will place additional alluvium in this area adjacent to the tailings discharge corridor after relocation of the Tailings Delivery Line 2. This recommendation will be completed in Q3 of 2022. MR will continue to monitor for tailings water ponding adjacent to the embankment upstream slope as per the TOMS Manual (MR/KP. 2020) and take additional operational and/or maintenance measures as appropriate to limit water ingress into the embankment.

Note, MR placed alluvium on the upstream slope face of the embankment when initially constructing the EL. 6,400 ft raise of the rockfill surcharge; however, alluvium was not placed on the upstream slope face of the tailings discharge corridor at the time of construction. MR will place alluvium as required to maintain a separation zone between the tailings and the Zone U during construction of the EL. 6,450 ft embankment and associated tailings discharge corridor.

5. **Infill low areas along the downstream side of the North-South Embankment and regrade the embankment crest from approximately Section 43+00 N towards the north.**

MR agrees that promoting drainage from the embankment crest surface and eliminating areas of ponded water is important. MR will regrade and place additional of U material along the EL. 6,400 ft crest of the North-South Embankment as required to promote drainage and runoff of surface water from the embankment crest and slopes. Construction activities are currently ongoing in the Central Pedestal Area and MR utilizes portions of the North-South Embankment as haul road access to this area. MR will address this embankment surface grading recommendation in Q1 of 2022.

6. **Complete maintenance work in the upper HsB area to improve drainage and limit ponding in this area.**

MR agrees that improving drainage and limiting ponding in the HsB area adjacent to the toe of the YDTI embankments is beneficial. MR completed a variety of maintenance activities in the HsB area during Q4 of 2021 to improve drainage and reduce ponding as recommended by the EOR during the annual inspection site visit. The works completed to date include breaching the upper HsB area berm to limit ponding in the upper HsB Area. MR have also breached the berm of the Holding Pond to discharge into Surge Pond. MR will continue to monitor ponding and flow rates in the HsB area and complete drainage maintenance as required.

7. **Develop and implement a new system to collect flows along the Seep 10 bench and convey these flows to the HsB Pond. Re-grade the Seep 10 bench surface to enhance drainage collection and limit ponding of water to the extent practicable.**

MR will regrade the existing surface drainage ditches located on the Seep 10 (EL. 5,900 ft) bench to reduce ponding of water on the bench surface. Minor works to lower culvert elevations to promote drainage to the existing Seep 10 pond and weir will be conducted if required. The Seep 10 flows will continue to be gravity conveyed to the HsB area via the existing weir and pipeline system. MR propose to conduct this work in Q2 of 2022. MR considers these works an interim stage prior to construction of a new Seep 10 surface drainage system in 2023.

The preliminary design of a new Seep 10 bench drainage system was presented in the HsB Rock Disposal Site Stage 1 Drainage System Report prepared by KP in December 2021 (KP, 2021). The design concept included the relocation of the Seep 10 pond and weir to the west, and a drainage pipeline to HsB Pond along the 7 percent Ramp. The Issued for Construction designs will be prepared during 2022, and construction of the new system will commence once the design process is complete.

8. **Investigate options for automating collection of the HsB Weir flow monitoring data using the Sensemetrics remote monitoring system platform.**

The HsB Weir was established by the Montana Bureau of Mines and Geology (MBMG) to monitor the flows through the HsB pond in 1996. MR will review options for automating collection and distribution of the weir flow monitoring data using the existing remote monitoring system operating on-site. MR will coordinate with MBMG to obtain their approval for automation of the weir data collection. Provided MBMG are in agreement with the proposed upgrade connection, MR intend to commission automation of HsB weir data collection by Q3 of 2022.

If there are any questions or concerns regarding the CAP and schedule please contact me at (406) 496-3211.

Sincerely,

Mark Thompson

Vice President of Environmental Affairs
Montana Resources, LLP

600 Shields Ave.
Butte, Montana 59701

Attachments:

A. Engineer of Record – Verification

References:

Knight Piésold Ltd. (KP) 2021, Horseshoe Bend Rock Disposal Site – Stage 1 Drainage System Report, KP Ref . No. VA101-126/25-3 Rev. 0, December 6, 2021.

Montana Resources and Knight Piésold Ltd. (MR/KP, 2020). Yankee Doodle Tailings Impoundment – Tailings Operations, Maintenance and Surveillance (TOMS) Manual, Rev 4, May 13, 2020.

Montana Resources, LLP. (MR) 2020, 2019 Yankee Doodle tailings Impoundment Corrective Action Pan – Corrective Action 2 Deferral Notification Letter, December 18, 2020

600 Shields Ave.
Butte, Montana 59701

ATTACHMENT A:

Engineer of Record (EOR) Verification

I have reviewed and verify that the corrective actions proposed by MR should reasonably be expected to effectively address the recommendations contained in the 2021 Annual Inspection Report.

MONTANA
2022-01-11
DANIEL DYLAN
FONTAINE
No. 59785 PE
LICENSED
PROFESSIONAL ENGINEER

Reviewed: ______________________________
Daniel Fontaine, P.E.
Engineer of Record,
Knight Piésold Ltd.

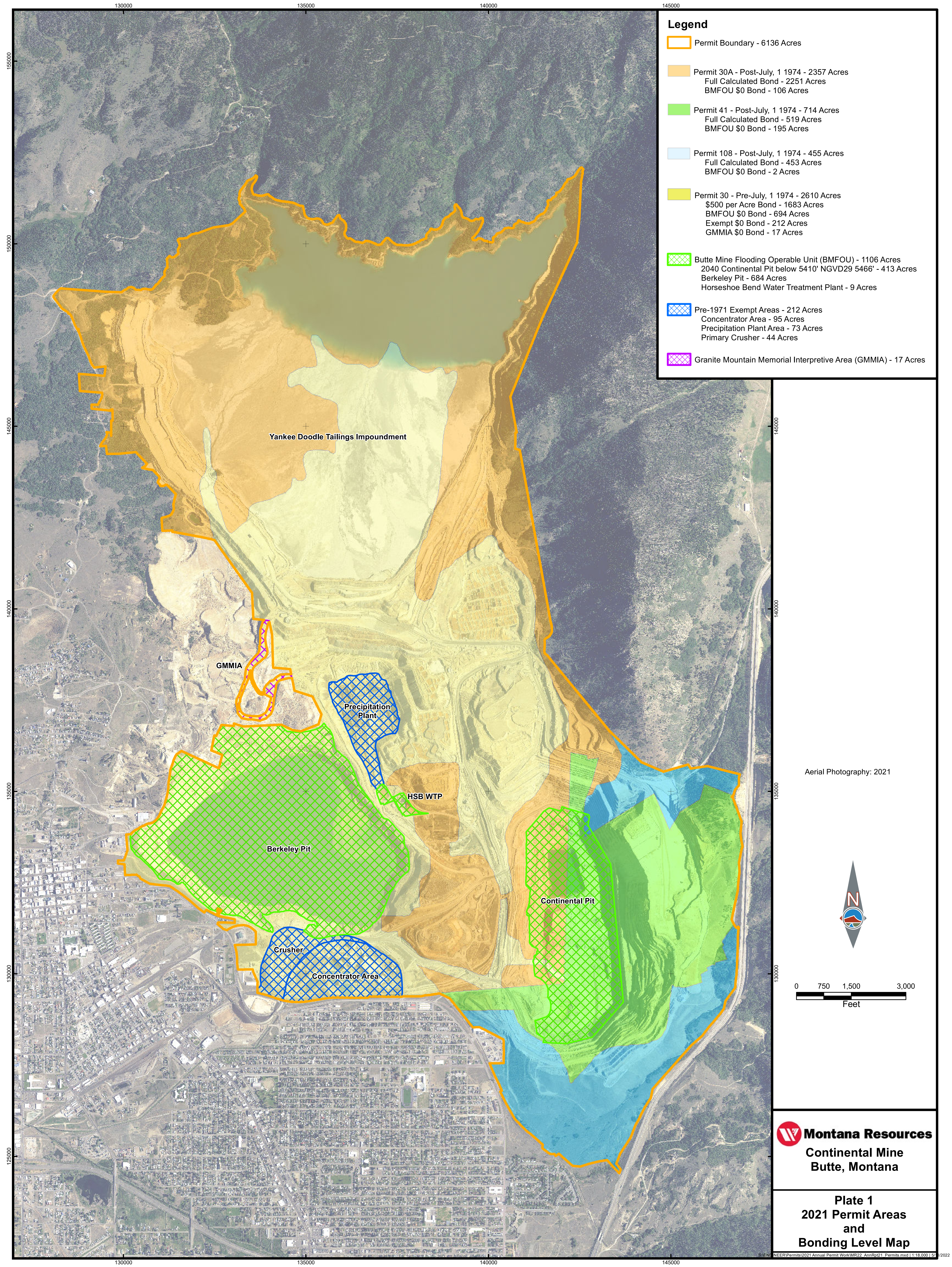
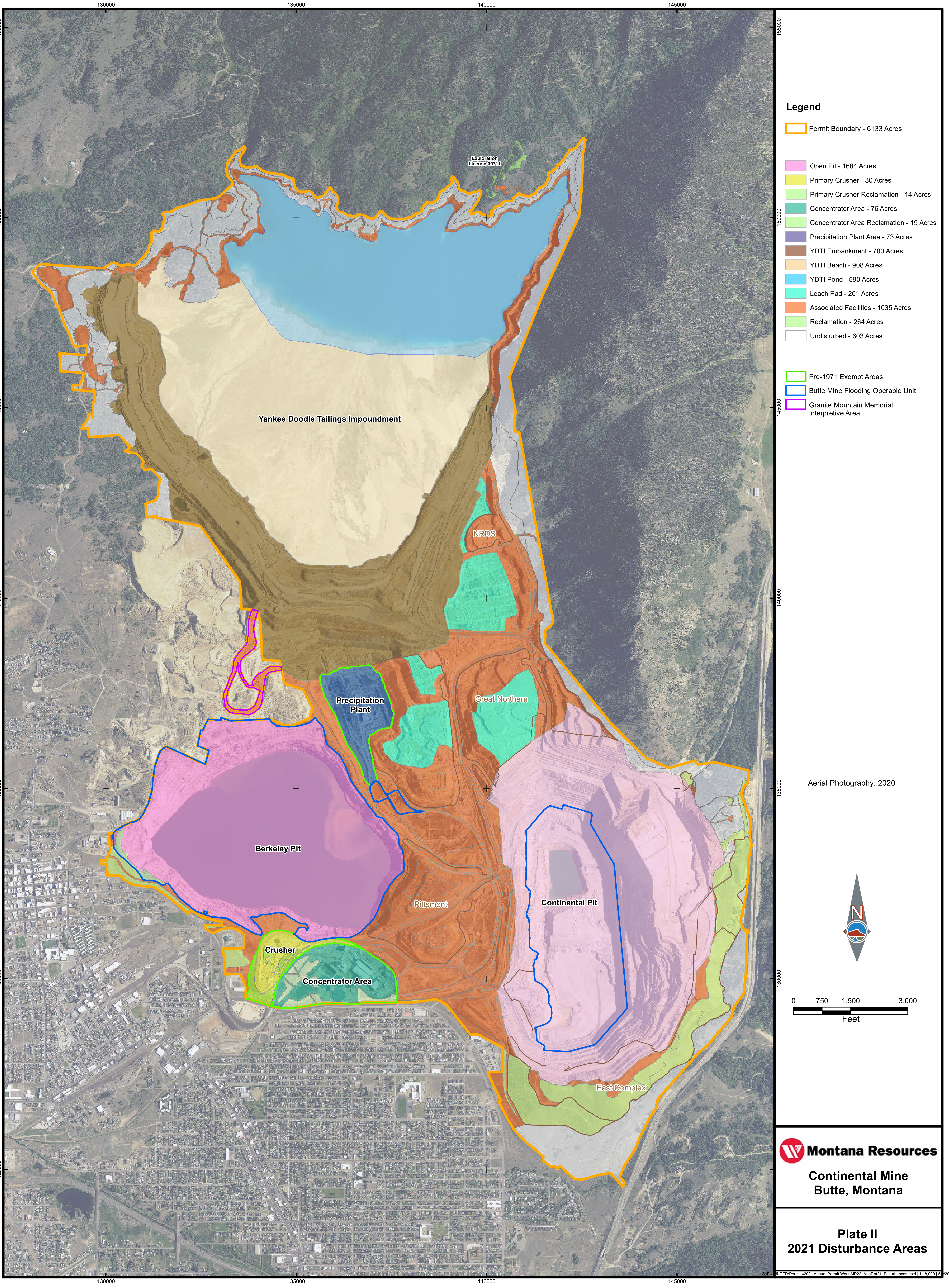
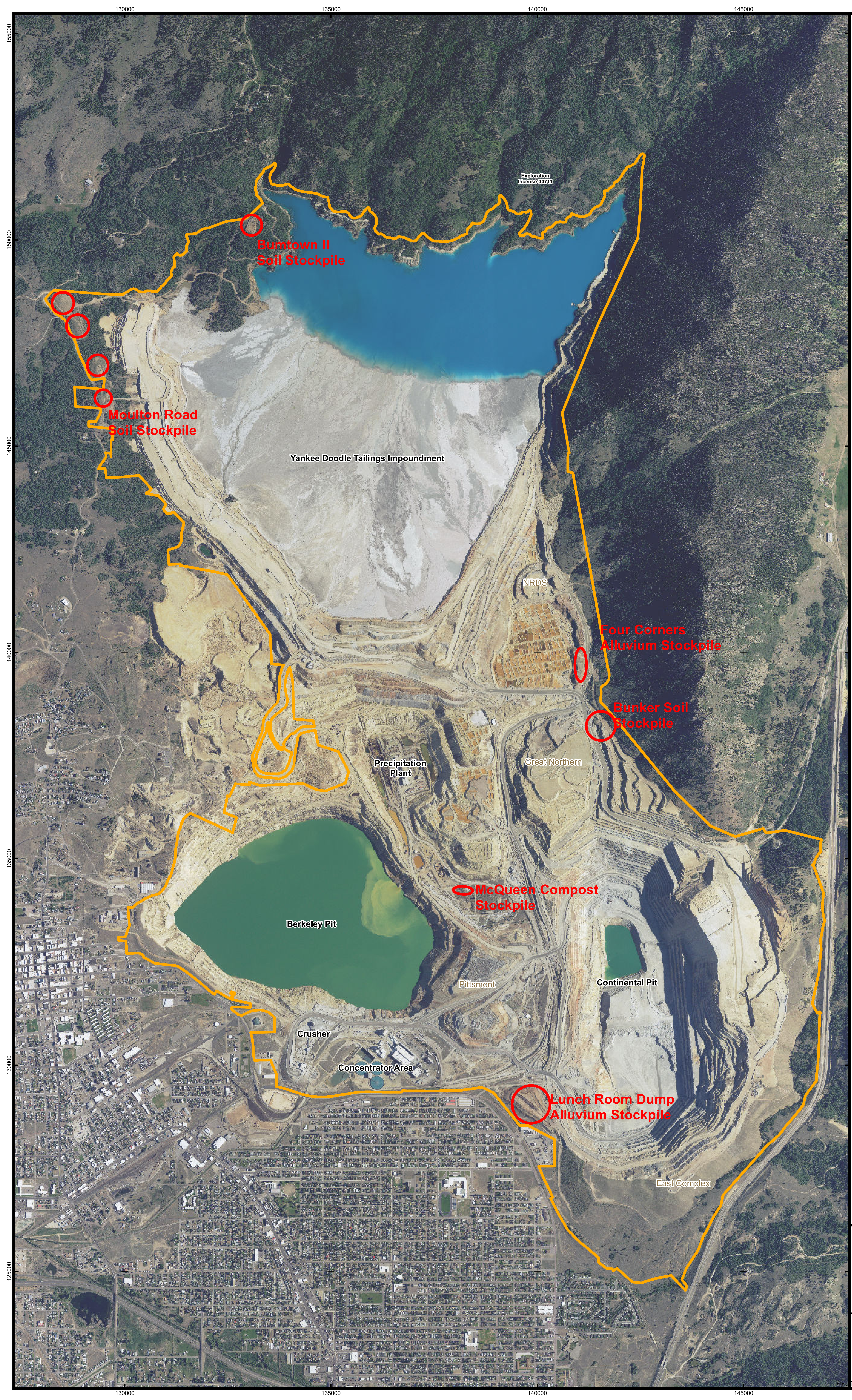


Plate 1
2021 Permit Areas and Bonding Level Map



Yankee Doodle Tailings Impoundment
Exploration License 00711
NRDS
Great Northern
Precipitation Plant
Berkeley Pit
Pittsmont
Continental Pit
Crusher
Concentrator Area
East Complex
Legend
Permit Boundary - 6133 Acres
Open Pit - 1684 Acres
Primary Crusher - 30 Acres
Primary Crusher Reclamation - 14 Acres
Concentrator Area - 76 Acres
Concentrator Area Reclamation - 19 Acres
Precipitation Plant Area - 73 Acres
YDTI Embankment - 700 Acres
YDTI Beach - 908 Acres
YDTI Pond - 590 Acres
Leach Pad - 201 Acres
Associated Facilities - 1035 Acres
Reclamation - 264 Acres
Undisturbed - 603 Acres
Pre-1971 Exempt Areas
Butte Mine Flooding Operable Unit
Granite Mountain Memorial Interpretive Area
Aerial Photography: 2020
N
0 750 1,500 3,000
Feet
Montana Resources
Continental Mine
Butte, Montana
Plate II
2021 Disturbance Areas
130000
135000
140000
145000
150000
155000
125000



Legend

- 2020_Permit
- Soil Stockpiles

Aerial Photography: 2020

N

0 750 1,500 3,000
Feet

Montana Resources

Continental Mine
Butte, Montana

Plate III
2021 Stockpile Areas

Legend

Permit Boundary - 6133 Acres

Reclamation - 264 Acres

Aerial Photography: 2021

N

0 500 1,000 2,000
Feet

Montana Resources

Continental Mine
Butte, Montana

Plate IV
2021 Disturbance Areas