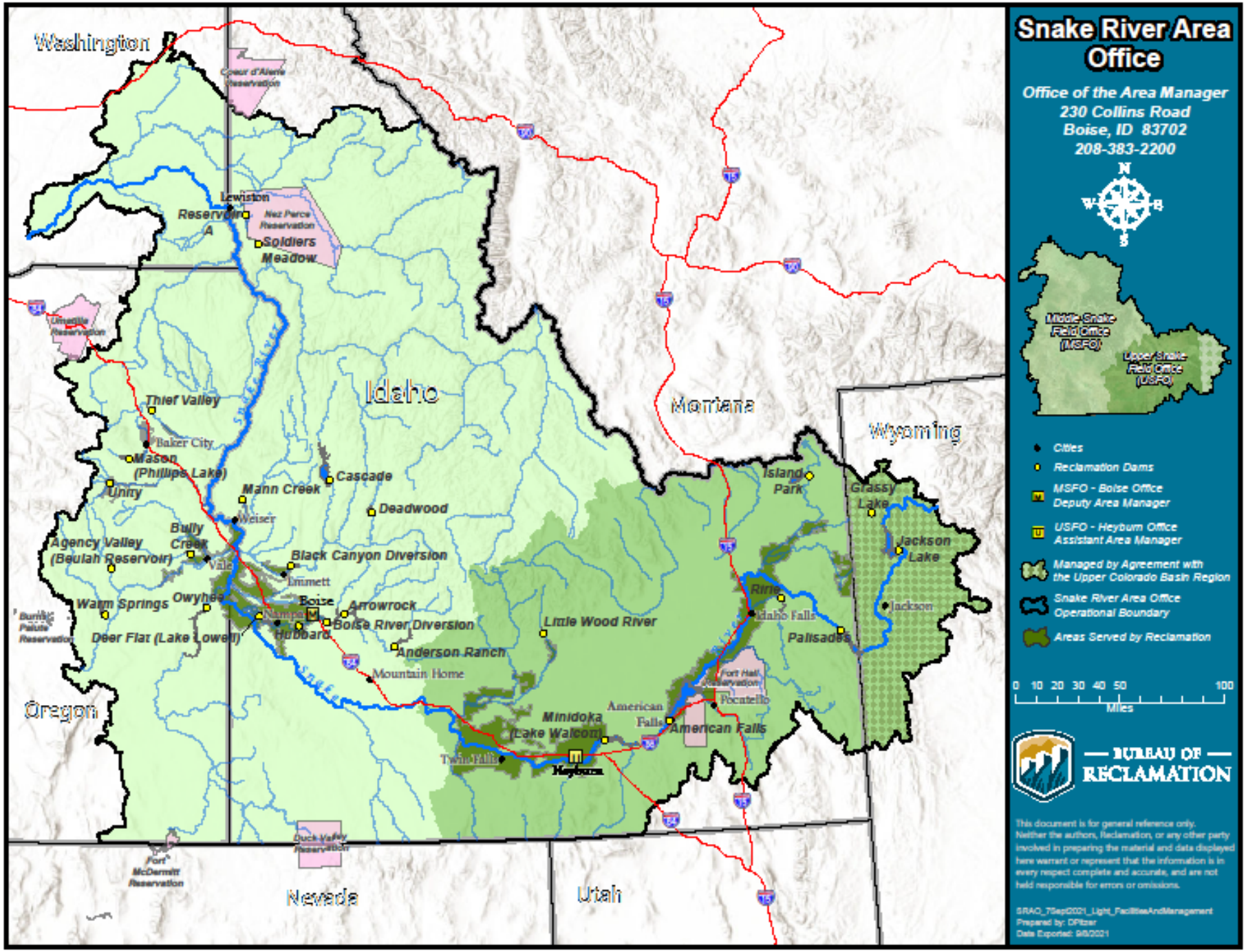
Upper Snake Operations and Maintenance Overview

Operations and Maintenance

Philosophy

- Maximize
  - Asset utilization & reliability
- Minimize
  - Equipment downtime

- Challenges
  - Aging Infrastructure (Ages range from 44 to 110 years old)
  - Funding
  - Work Windows (Time of the year & water elevation)


Snake River Area Office
Office of the Area Manager
230 Collins Road
Boise, ID 83702
208-383-2200
N
W
E
S
Middle Snake Field Office (MSFO)
Upper Snake Field Office (USFO)
Cities
Reclamation Dams
MSFO - Boise Office Deputy Area Manager
USFO - Heyburn Office Assistant Area Manager
Managed by Agreement with the Upper Colorado Basin Region
Snake River Area Office Operational Boundary
Areas Served by Reclamation
0 10 20 30 40 50 100
Miles
BUREAU OF RECLAMATION
This document is for general reference only. Neither the authors, Reclamation, or any other party involved in preparing the material and data displayed here warrant or represent that the information is in every respect complete and accurate, and are not held responsible for errors or omissions.
SRAO_7Sep2021_Light_FacilitiesAndManagement
Prepared by: DPitzer
Date Exported: 9/8/2021
Washington
Oregon
Nevada
Idaho
Montana
Wyoming
Utah
Lewiston
Reservoir A
Nez Perce Reservation
Soldiers Meadow
Umatilla Reservation
Coeur d'Alene Reservation
Thief Valley
Baker City
Mason (Phillips Lake)
Unity
Mann Creek
Cascade
Deadwood
Weiser
Bully Creek
Agency Valley (Beulah Reservoir)
Vale
Black Canyon Diversion
Emmett
Warm Springs
Owyhee
Boise
Arrowrock
Boise River Diversion
Hubbard
Deer Flat (Lake Lowell)
Burns Paiute Reservation
Anderson Ranch
Mountain Home
Little Wood River
Minidoka (Lake Walcott)
Twin Falls
Heyburn
American Falls
Fort Hall Reservation
Pocatello
Island Park
Grassy Lake
Jackson Lake
Jackson
Ririe
Idaho Falls
Palisades
Duck Valley Reservation
Fort McDermitt Reservation

American Falls Dam

American Falls Dam General Information

- Funding
  - Appropriations
    - 22.4% Flood Control
    - 2.7% Fish & Wildlife
    - 2.7% Recreation
  - Spaceholders (37)
    - 33.00 Idaho Power
    - 39.20% Water Users
- 1978 - Construction completed
- Key Projects ongoing & Upcoming

Spillway Concrete Issues

Trunnion Issues

Palisades Dam

Palisades Dam General Information

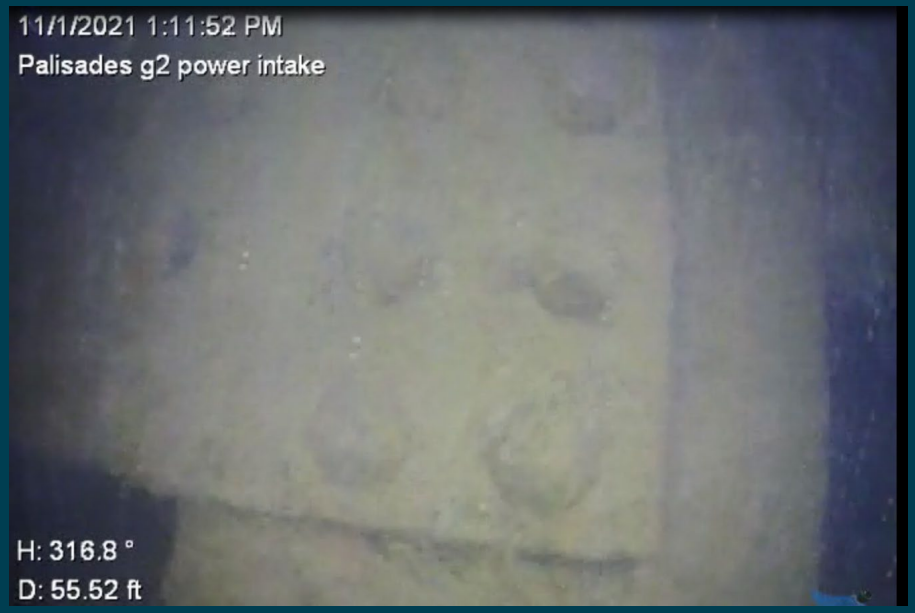
- Funding
  - Appropriations
    - 27.57% Flood Control
    - 4.0% Fish & Wildlife
    - 4.0% Recreation
  - Spaceholders (54)
    - 27.57% Water Users
  - Power
    - 36.86%
- 1957 - Construction completed
- Key Projects ongoing & Upcoming

Hollow Jet Issues

Note: these pictures were taken September 30, 2020

Gate Coating Repairs

Intake Gate Underwater Inspections



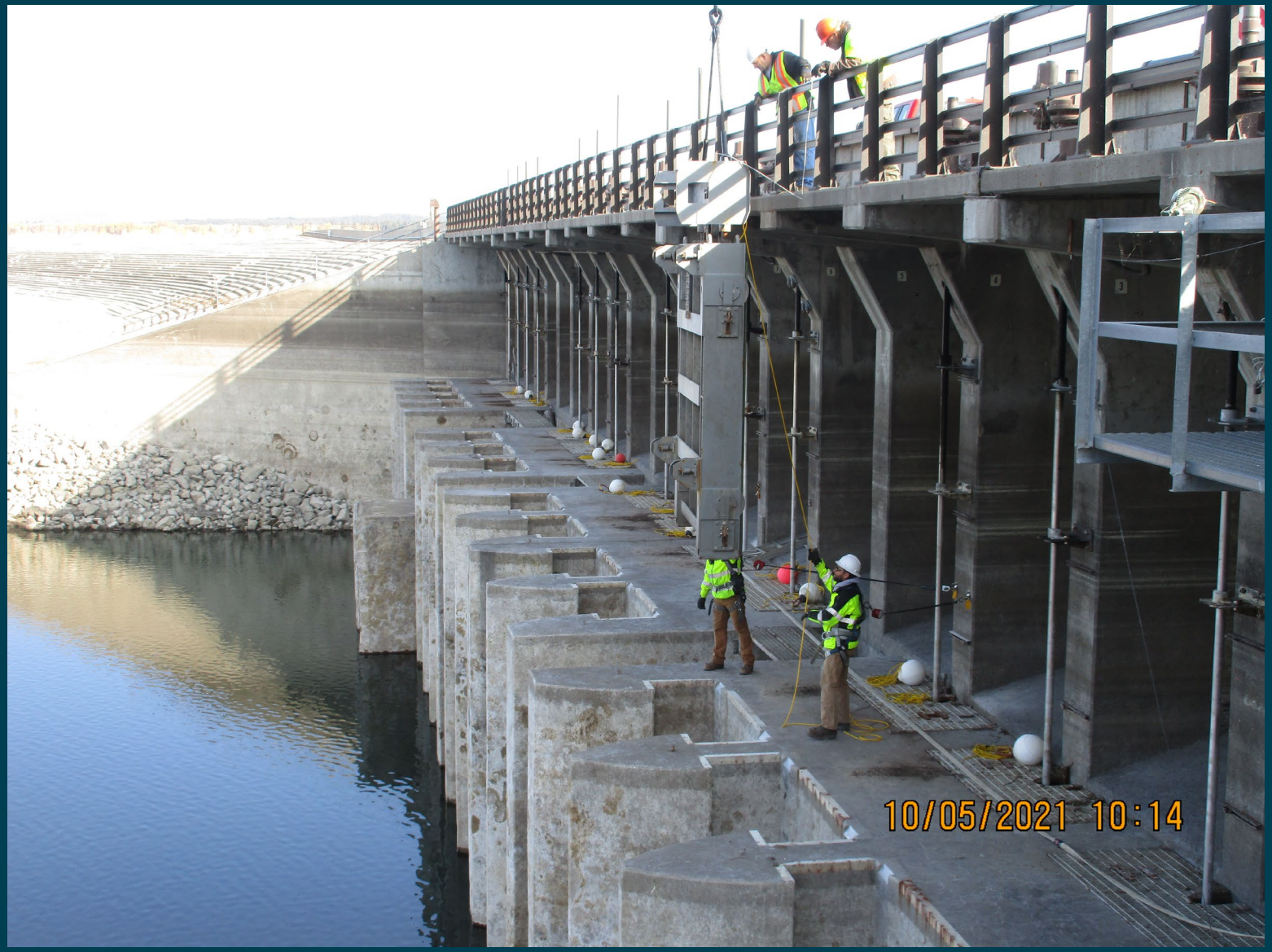
Jackson Lake Dam

Jackson Lake Dam General Information

- Funding
  - Appropriations
    - 29.5% Flood Control
    - 4.0% Fish & Wildlife
    - 4.0% Recreation
  - Spaceholders (32)
    - 62.5% Water Users
- 1912 – Original Construction completed
- Key Projects ongoing & Upcoming

Gate Frame Issues

Gate Frame Issues



Radial Gate Issues

Concrete Issues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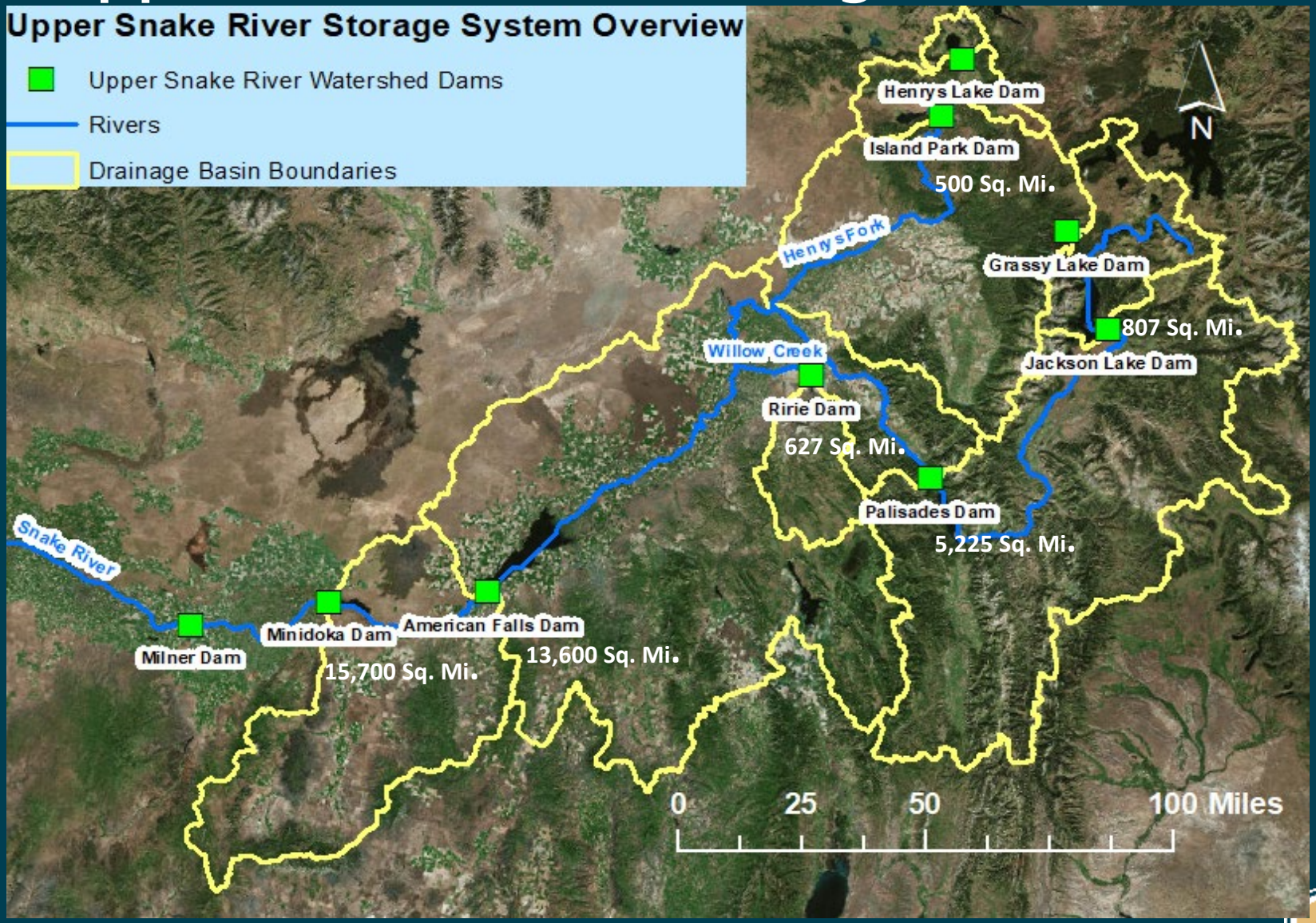
Upper Snake Water Operations Overview

Upper Snake River Drainage Basin



Upper Snake System Overview

Upper Snake Field Office
Irrigation Organizations

- Maintain storage high in the watershed for optimized delivery to storage stakeholders.
- Within system management adjustments can be made to achieve power, water quality and ecological benefits
- 345 Points of Diversion/Water Rights
- 67 Diversions monitored in USBRs Hydromet
- 36 Storage Contract Holders
- Authorizations (Irrigation, flood control, power generation)

Island Park

Grassy Lake

Jackson Lake

Ririe

Palisades

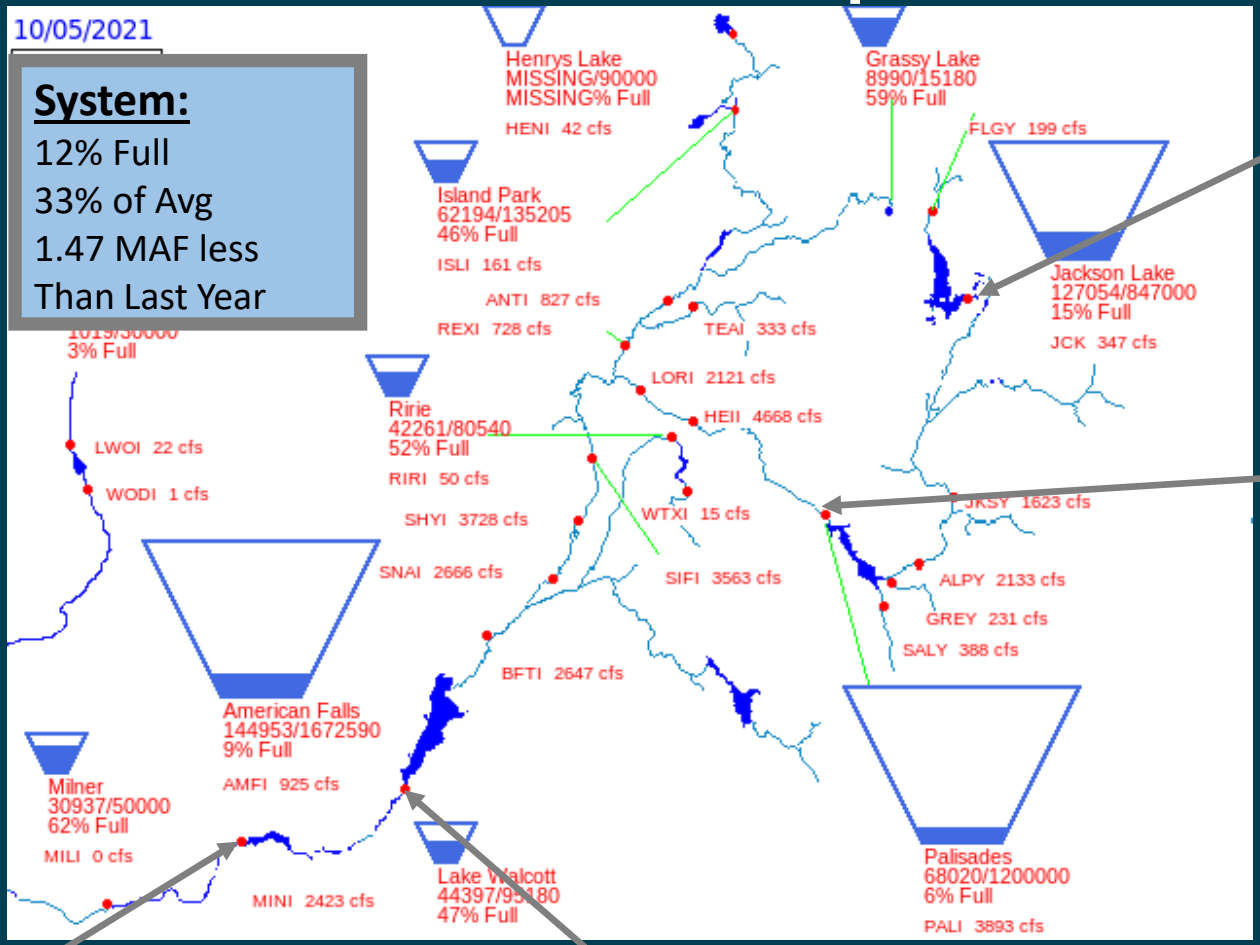
American Falls

Minidoka

Milner Dam
(Last Diversion Dam)

Stakeholder Coordination/Communication

2021 Water Operations Overview



Jackson Lake Dam

- Reclamation O&M Work
- Outflow River Level at winter flow by the morning of October 5th
- Recreation

Palisades Dam

- Irrigation deliveries until late October
- Forecasts of potentially getting below 0% full
  - First time since construction
  - Power generation concerns
- Water Quality (sediment)
  - Idaho Fish and Game concerns for fisheries
- Recreation/fishing

Minidoka Dam

- Water Quality (sediment)
  - Snake River Physa
    - Endangered species since 1992

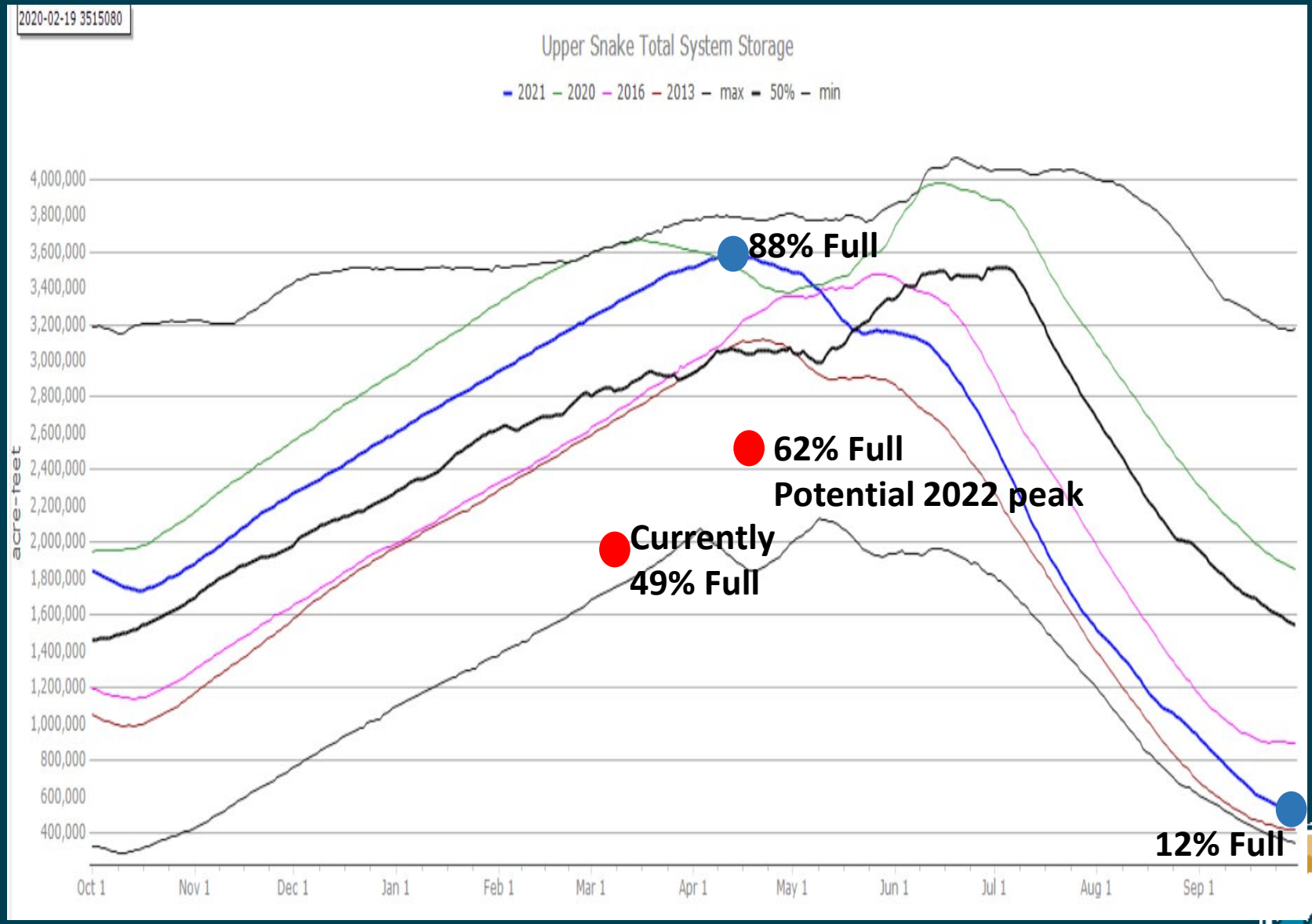
American Falls Dam

American Falls Spillway Project

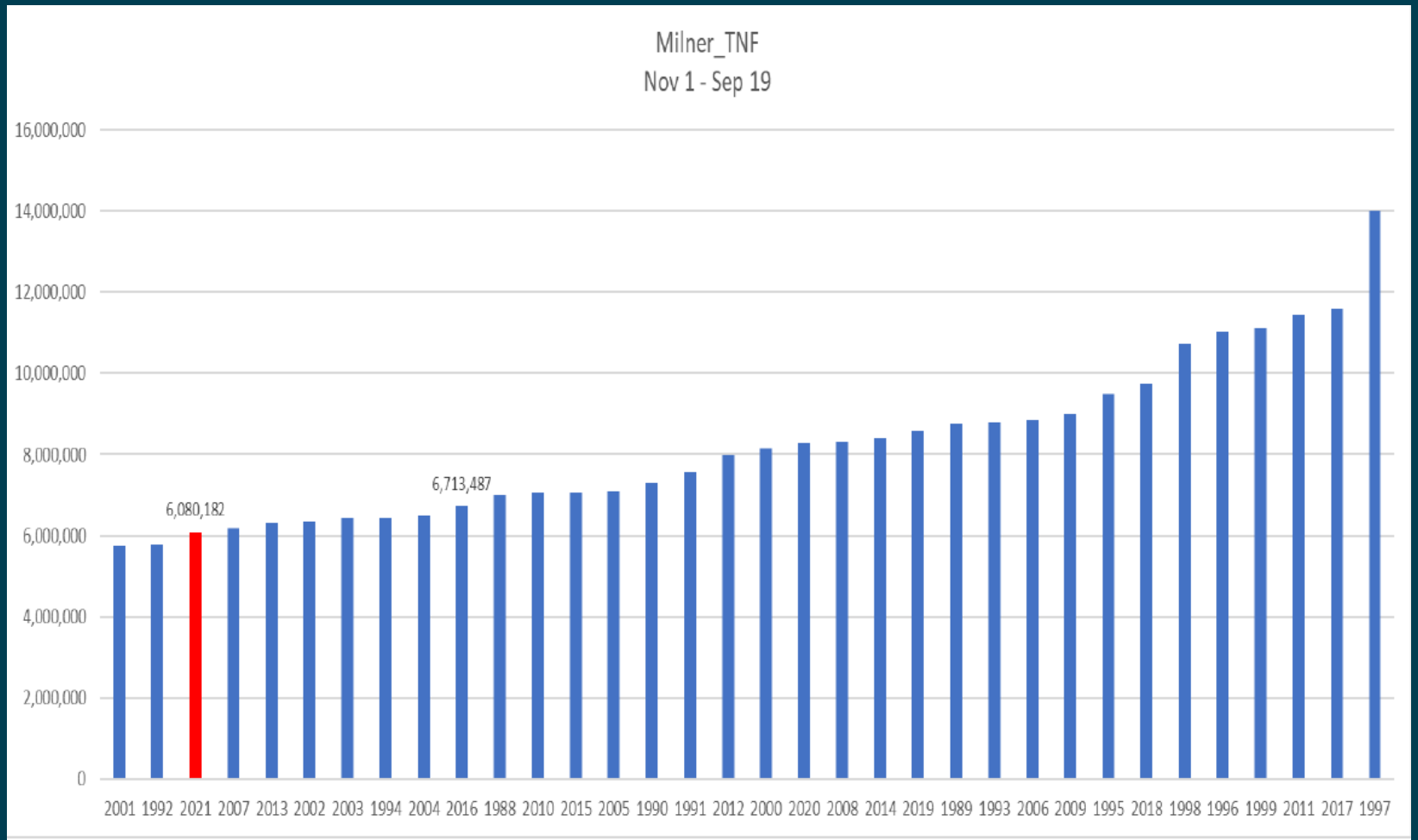
Managed risks (Districts, IPC, IDEQ, IDFG)

- Water Quality
  - Disolved oxygen/sediment
  - Large potential fisheries impacts
- Large risks to irrigation supply to Magic Valley ID

Storage Use

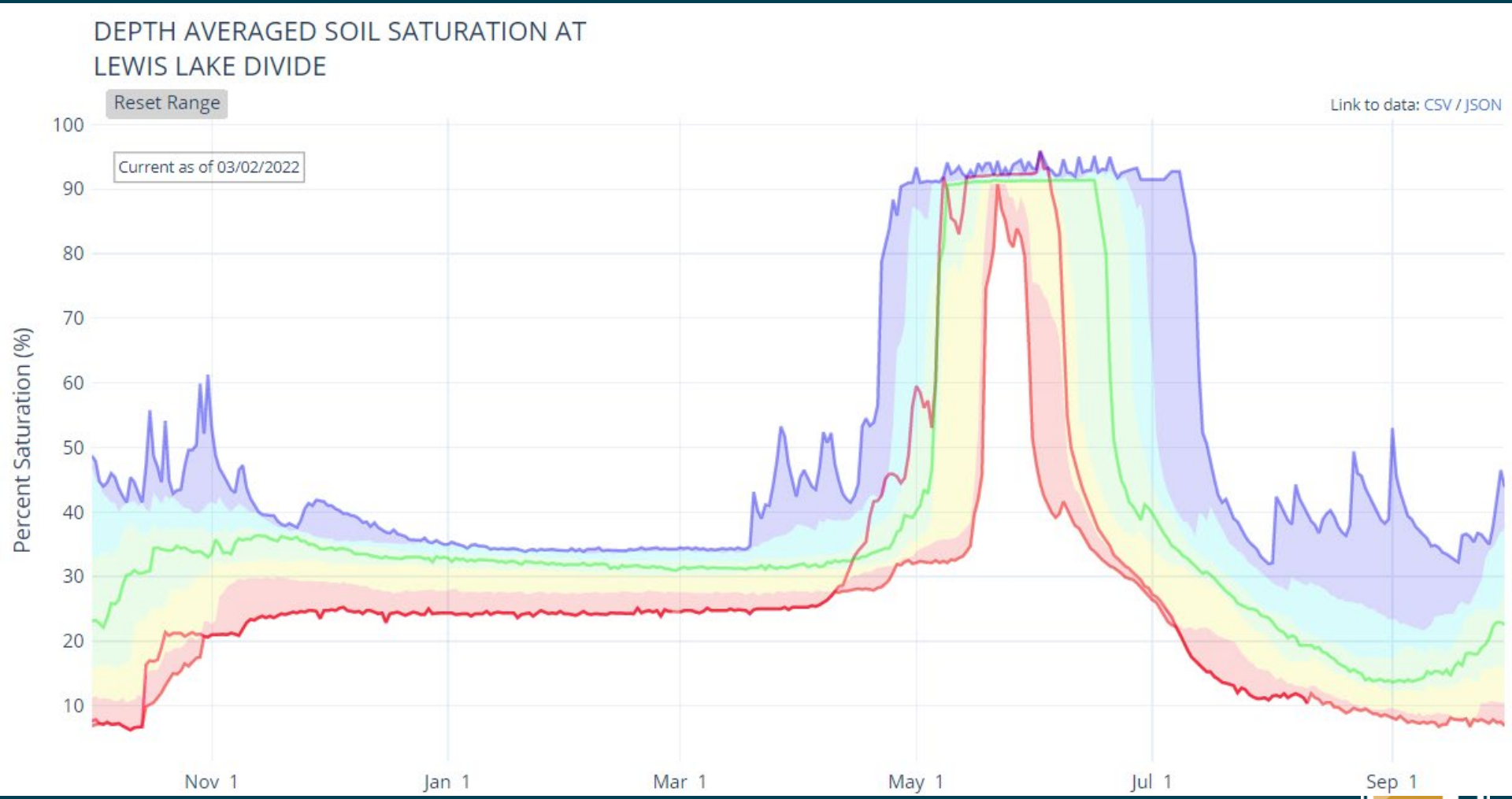

2020-02-19 3515080
Upper Snake Total System Storage
2021 2020 2016 2013 max 50% min
acre-feet
4,000,000
3,800,000
3,600,000
3,400,000
3,200,000
3,000,000
2,800,000
2,600,000
2,400,000
2,200,000
2,000,000
1,800,000
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
Oct 1
Nov 1
Dec 1
Jan 1
Feb 1
Mar 1
Apr 1
May 1
Jun 1
Jul 1
Aug 1
Sep 1
88% Full
62% Full
Potential 2022 peak
Currently
49% Full
12% Full

Low Natural Flow

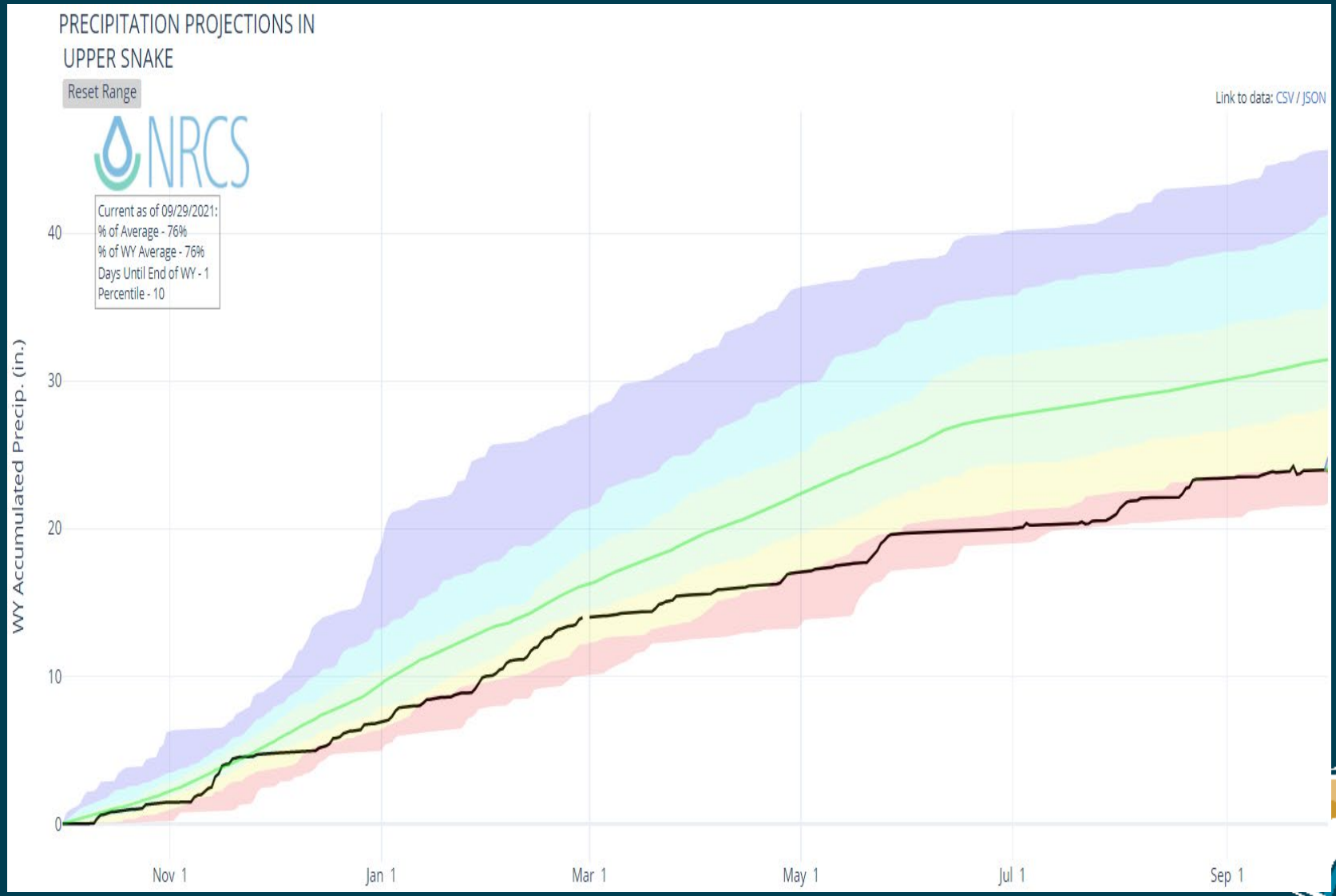


2021: 6.080 MAF, 73% of average
Ranks 31/34 since 1988 (1992,2001)

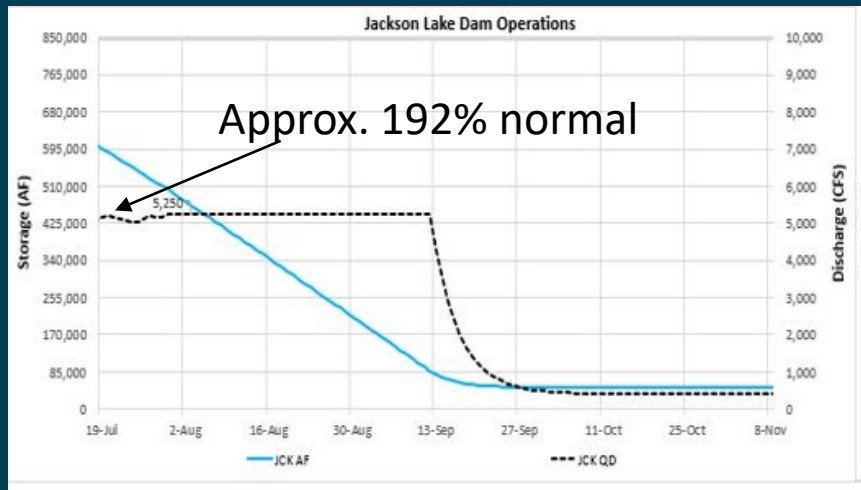
Low Soil Moisture

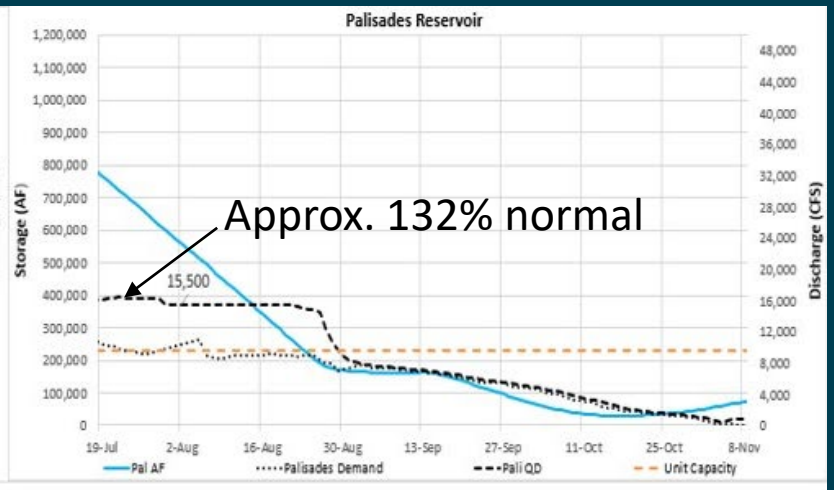


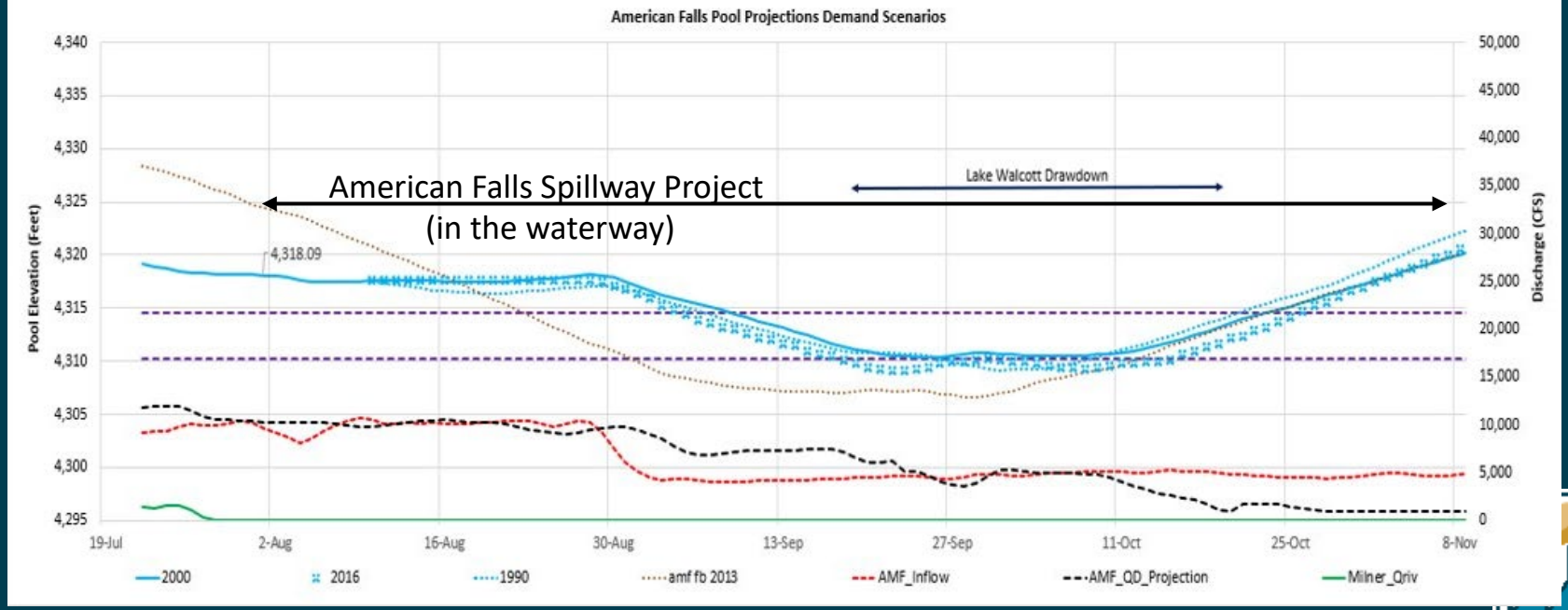
Low Precipitation Totals



July 2021 Projections







Formal Annual Coordination

- Monthly/Weekly – US Army Corps of Engineers
- May – Teton Flood Stakeholder meeting
- May – spring Snake River agency meeting
  - BOR, GTNP, WGFD, BTNF, TCD, TU, WY SEO, Idaho Power, others
- May – spring Jackson public information meeting
  - Runoff forecasts, river flow management, snowpack conditions
- September – Snake River agency meeting
  - BOR, GTNP, WGFD, BTNF, TCD, TU, WY SEO, Idaho Power, others
- Fall Timeframe – Annual meeting with the NPS

2022 Snake River Agency Groups Added Coordination

- July – kickoff of early fall season planning
- July to September – interactive planning
- September – Snake River agency meeting
- Approximately early October – reach winter flows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Jackson Lake Operations Overview

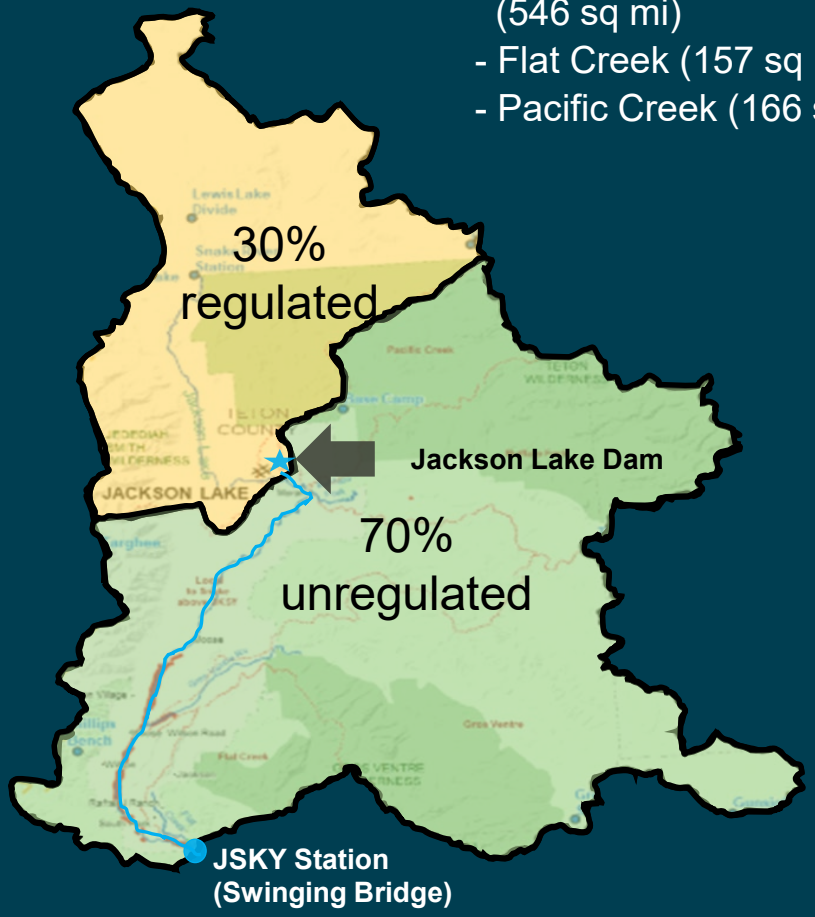
Jackson Lake Annual Operations

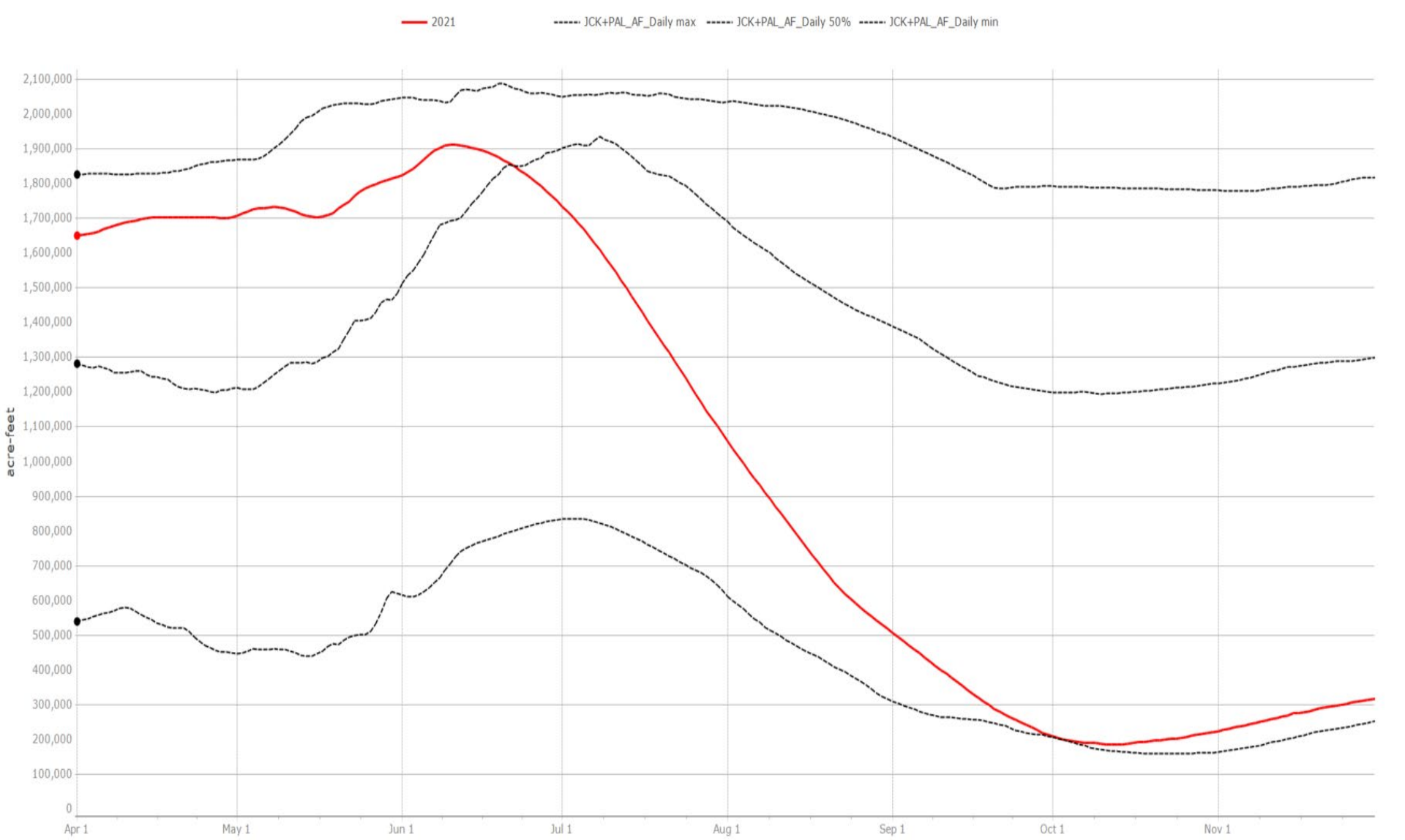
- High/Normal Operations
  - Preferred location for water storage, due to its location high in the watershed.
  - Lake users generally prefer it to be maintained as full as possible for as long as possible.
  - Date of refill is generally mid-May to July 1.
  - 200,000 acre-feet of space provided during the winter to provide FRM during ice jams (releases reduced to zero)
- Drought Operations
  - If American Falls Reservoir and Palisades Reservoir are projected to empty, more water is moved downstream from Jackson Lake to meet irrigation demand.
  - Winter flow can be set to a minimum of inflow or 280 cfs whichever is less. WSEO storage use
  - 430 avg. winter release (66’-21’)

- Winter flood risk requirement 200 KAF at Jackson
  - Winter FRM Continues through May 1st
- Forecasting begins January 1st
  - Forecast for system at Heise
- FRM for system begins March 1st
  - Palisades and Jackson Joint Operation
  - Target 75/25 FRM space split
- Refill begins based on basin conditions and Forecast of remaining runoff

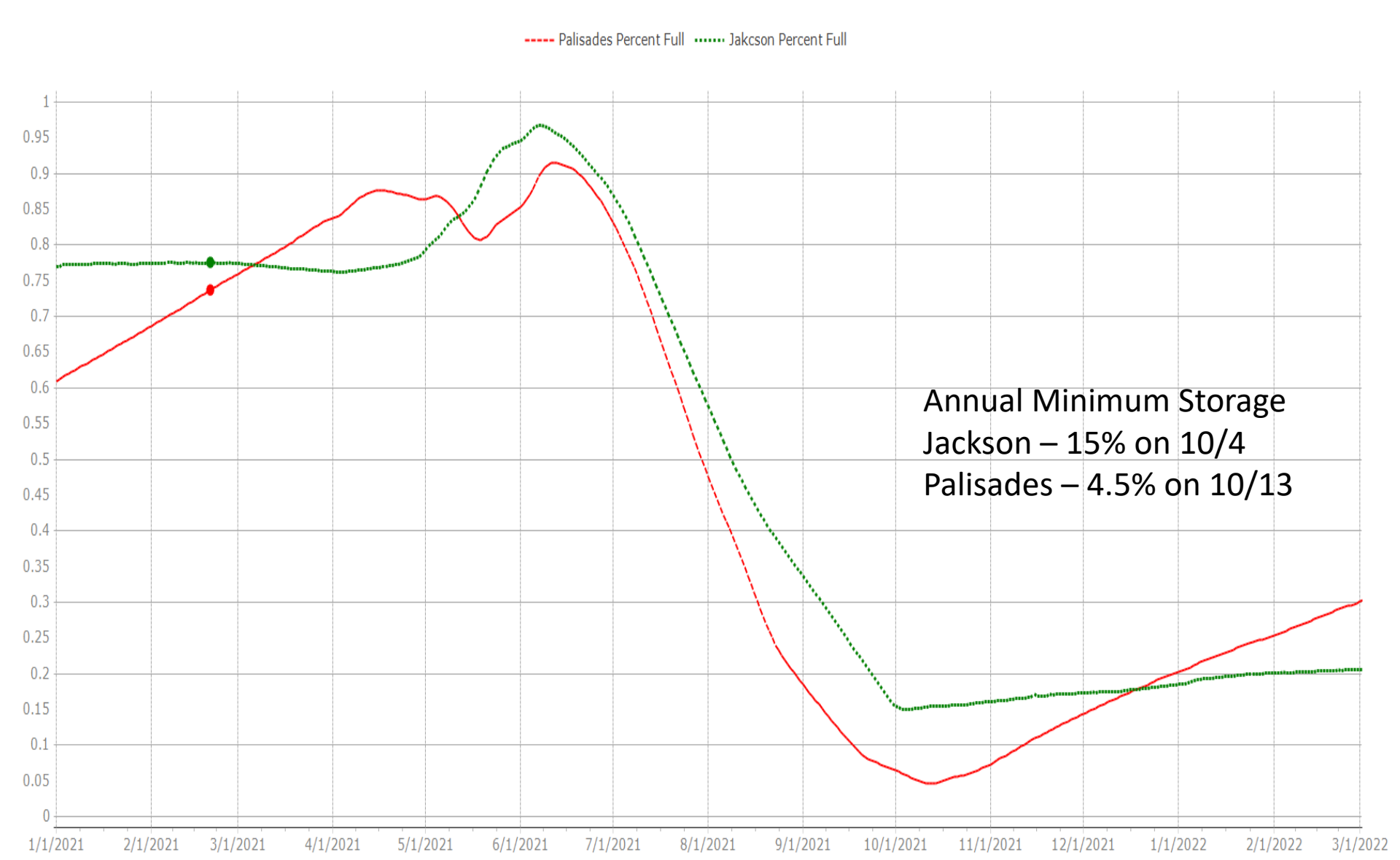
Above Jackson Dam – 807 sq mi
Above Moose Gauge – 1,677 sq mi
JSKY Gauge - 2,627 sq mi
Above Alpine Gauge – 3,465 sq mi
Above Palisades – 5,225 sq mi

- Jackson Lake regulates approximately 30% of the basin area above Jackson
- The other 70% of the basin area is unregulated and flows into Palisades Reservoir
  - Gros Ventre (624 sq mi)
  - Buffalo Fork (370 sq mi)
  - Local area to the Snake (546 sq mi)
  - Flat Creek (157 sq mi)
  - Pacific Creek (166 sq mi)





Storage Conditions above Heise

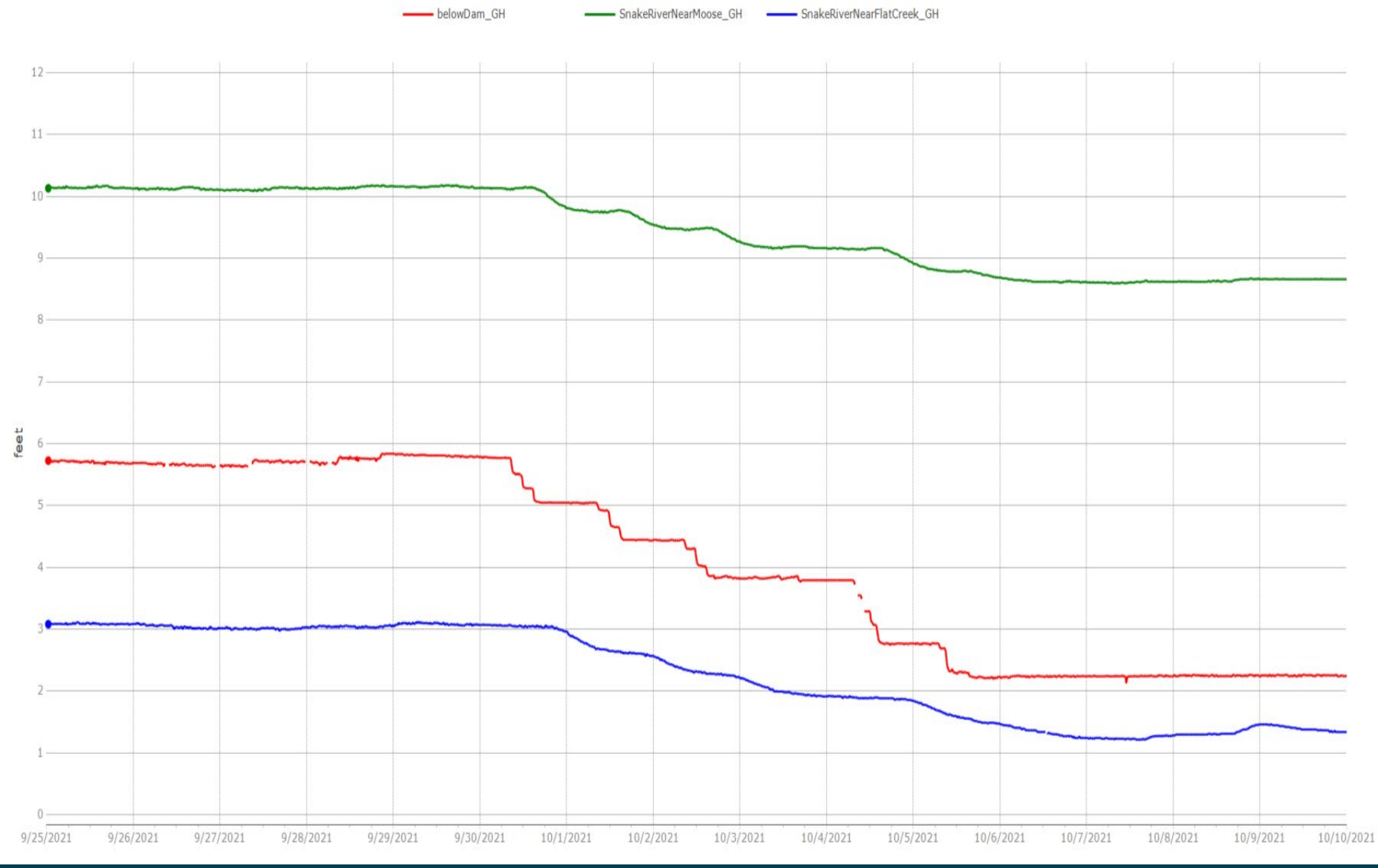


Storage Conditions above Heise

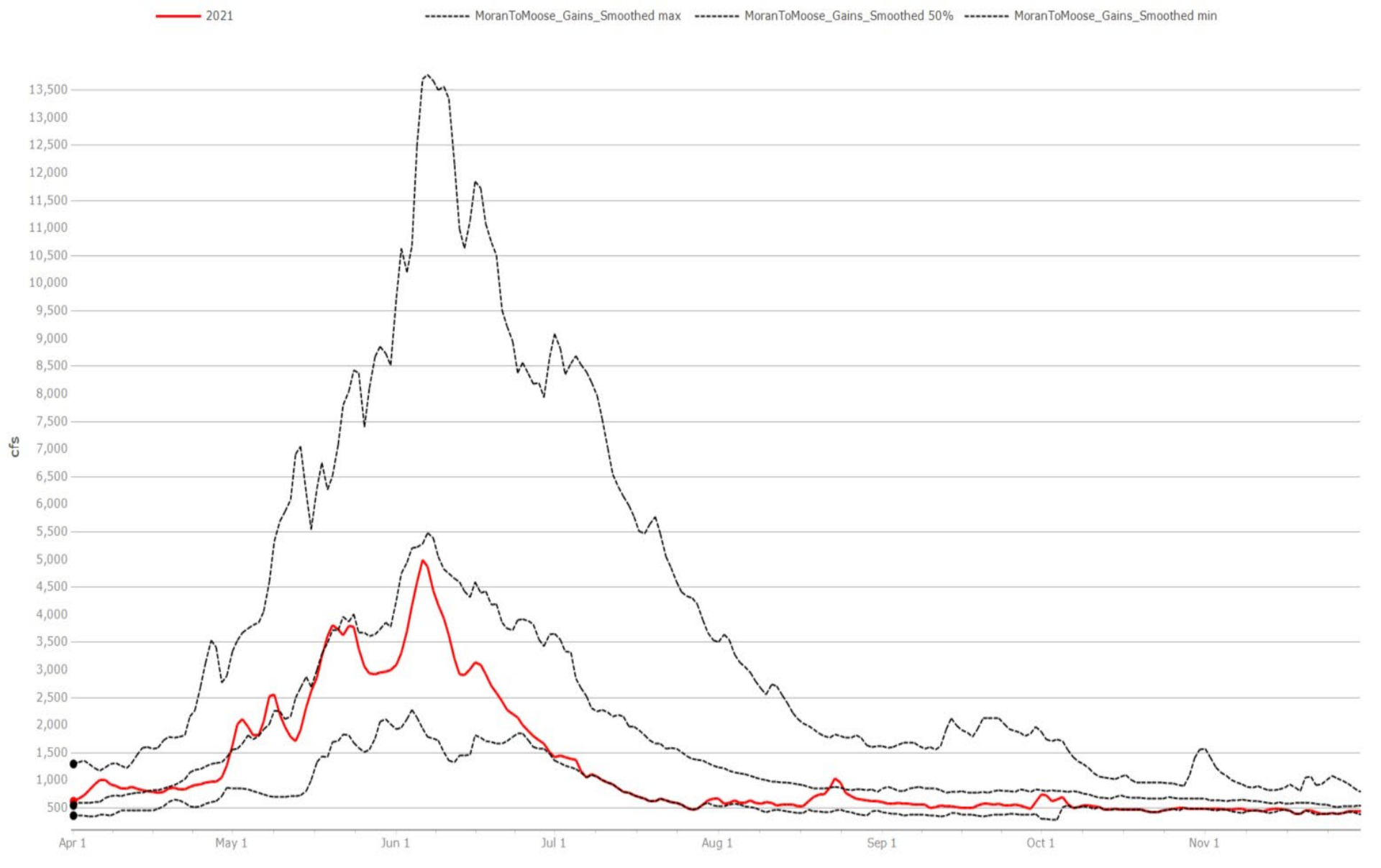
Draft-Provisional Ramp Down of Jackson Releases

Thursday, September 30, 2021	GH Target (Feet)	Discharge (CFS)	Stage Change (Inches)	Discharge Change (Inches)	Interval (Hours)
9:00	5.51	2,618	-	minus 250-400	-
12:00	5.28	2,373	-2.69	-245.01	3.00
15:00	5.06	2,131	-2.69	-242.42	3.00
Friday, October 1, 2021	GH Target	Discharge			
9:00	4.83	1,913	-2.69	-218.23	18.00
12:00	4.61	1,697	-2.69	-215.53	3.00
15:00	4.39	1,503	-2.69	-194.62	3.00
Saturday, October 2, 2021	GH Target	Discharge			
9:00	4.16	1,322	-2.69	-180.56	18.00
12:00	3.94	1,146	-2.69	-176.37	3.00
15:00	3.71	989	-2.69	-156.77	3.00
Monday, October 4, 2021	GH Target	Discharge			
8:00	3.49	839	-2.69	-150.27	41.00
10:00	3.27	706	-2.69	-132.54	2.00
12:00	3.04	586	-2.69	-119.94	2.00
14:00	2.82	472	-2.69	-114.70	2.00
Tuesday, October 5, 2021	GH Target	Discharge			
8:00	2.59	372	-2.69	-99.24	18.00
10:00	2.37	277	-2.69	-95.25	2.00

Ramp-Down Schedule for 2021



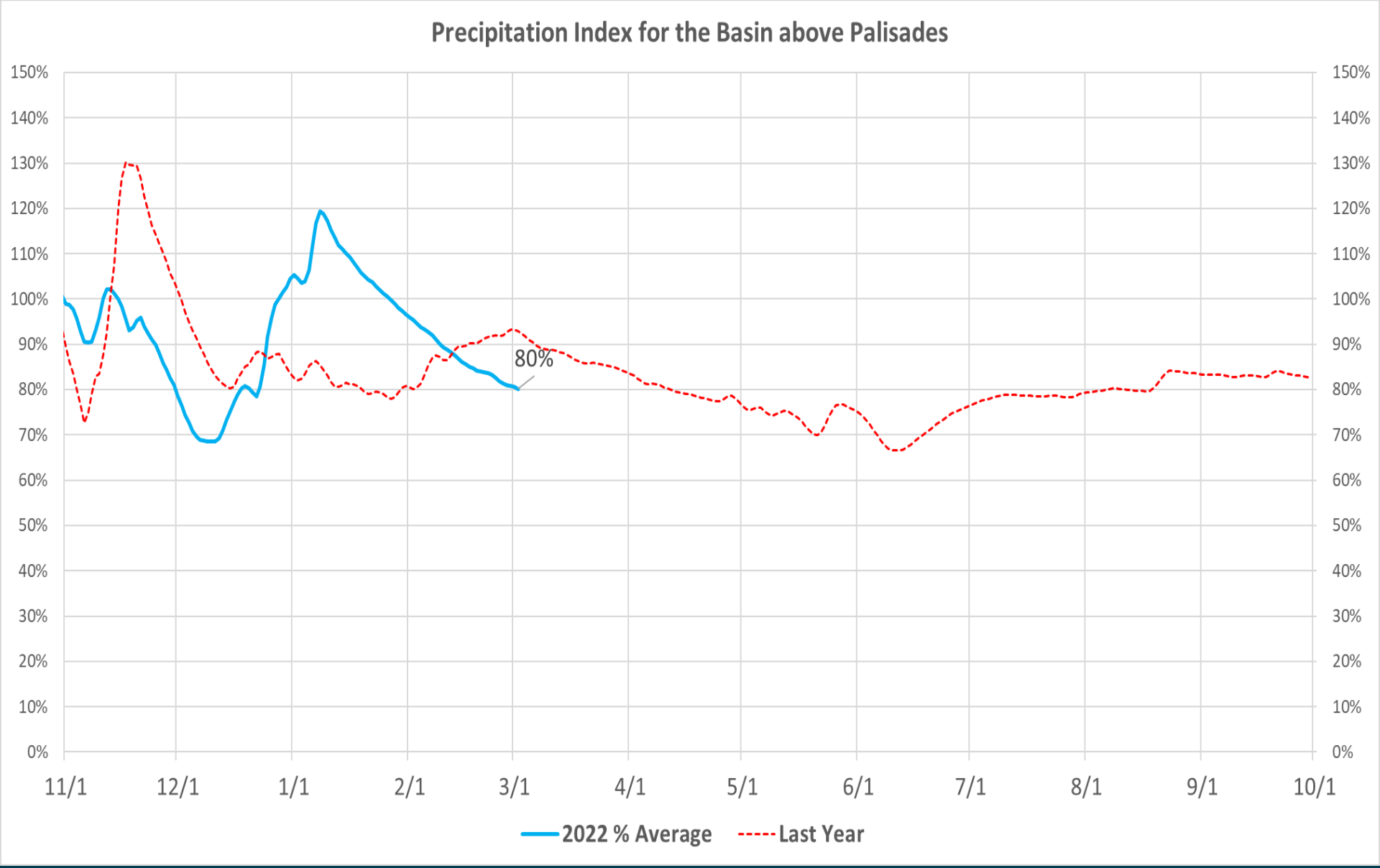
Observed Gauge Heights During Ramp-Down



Moran to Moose Streamflow Gains

Jackson Storage

2022 Outlook

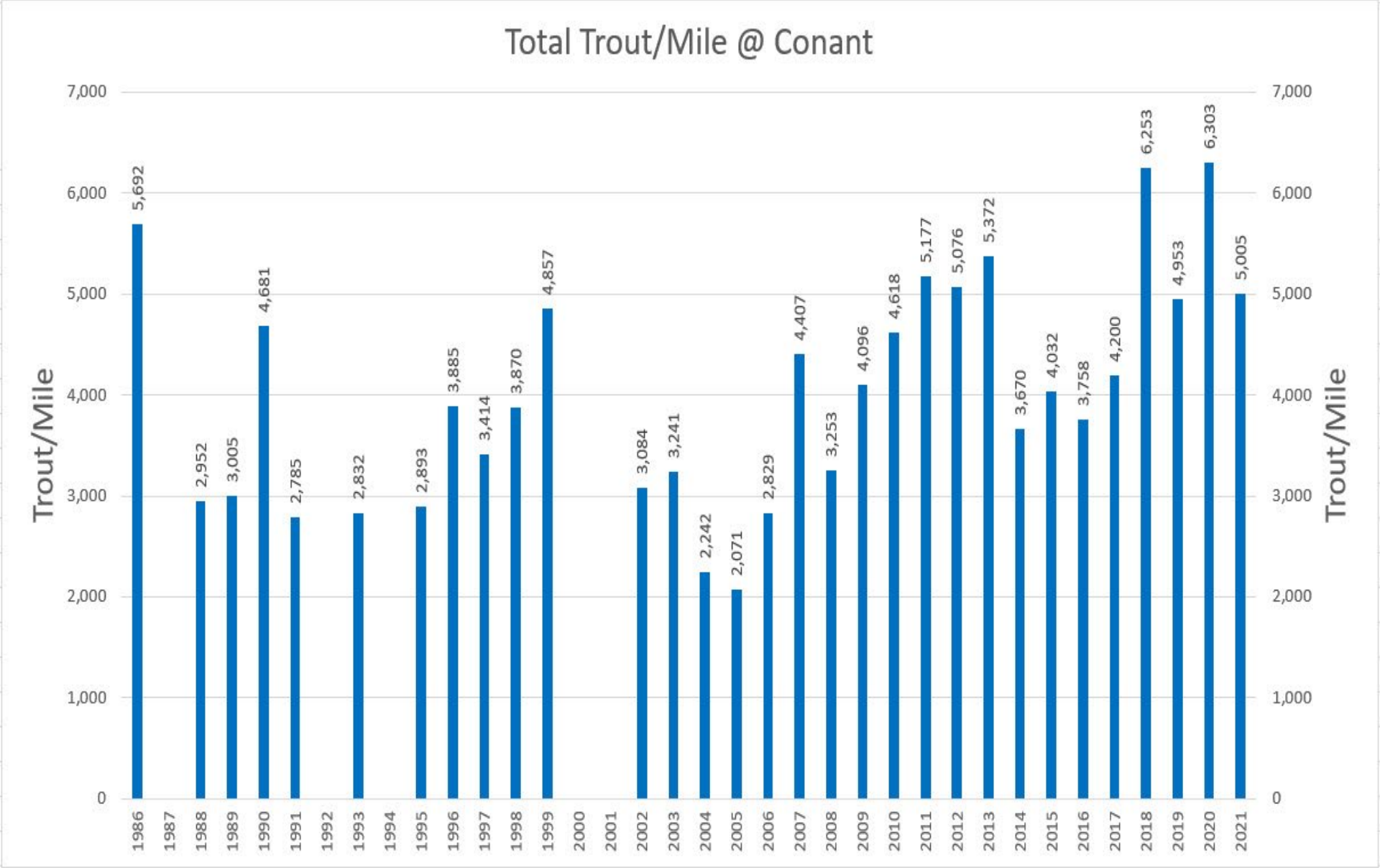


Precipitation Trends

Rank	Year	Total System Storage (Acre-Feet)
1	2004	1,693,215
2	1993	1,762,779
3	2002	1,797,903
4	1989	1,864,813
5	2005	1,914,319
6	2003	1,930,232
7	2022	1,951,384
8	2014	1,952,911
9	1978	1,997,510
10	2008	2,017,325
11	1995	2,194,998
12	1991	2,283,400
13	1988	2,355,358
14	2006	2,581,659
15	2013	2,604,660
16	1986	2,615,136
17	1982	2,643,216
18	2016	2,645,730
19	1985	2,663,438
20	2011	2,737,392
21	2001	2,742,394
22	1997	2,769,918
23	1987	2,822,565
24	2017	2,838,112
25	1992	2,894,456
26	1984	2,934,556
27	1999	2,935,341
28	1990	2,983,281
29	1977	2,998,532
30	1980	3,082,775
31	2009	3,088,047
32	1983	3,116,395
33	2007	3,132,822
34	1979	3,157,500
35	2015	3,164,001
36	2012	3,197,914
37	2021	3,252,453
38	1998	3,259,321
39	2010	3,337,405
40	2000	3,344,274
41	1981	3,448,024
42	1996	3,449,911
43	2018	3,512,743
44	2019	3,520,421
45	1994	3,577,000
46	2020	3,601,263

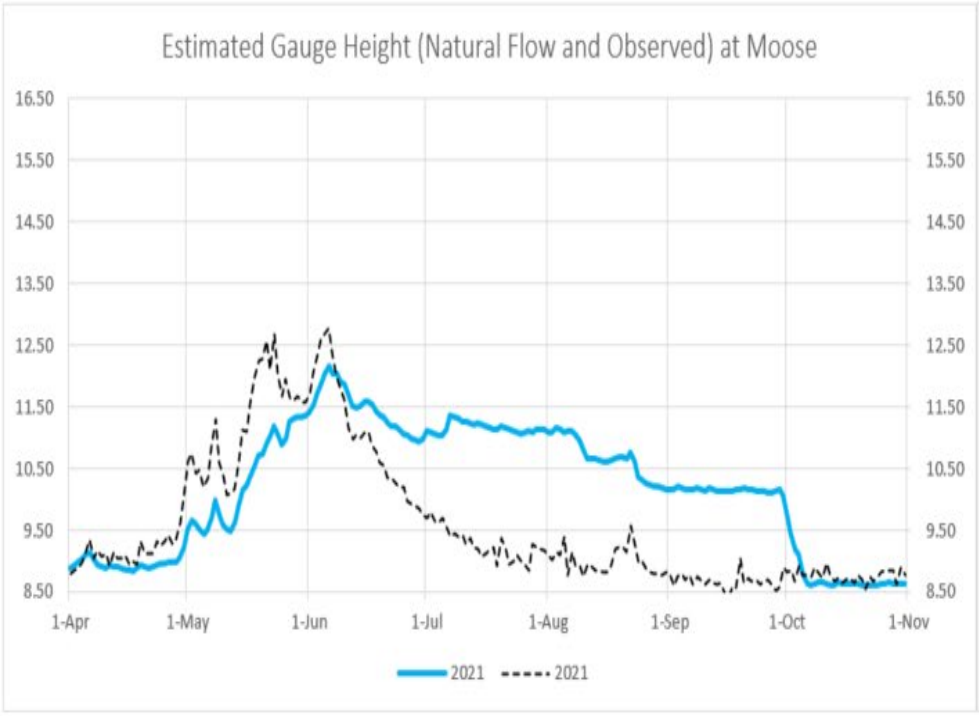
Rank	Year	Jackson and Palisades Storage (Acre-Feet)	JCK QD
1	1993	466,262	254
2	2002	484,377	284
3	2004	489,763	254
4	2022	537,498	275
5	1989	566,588	214
6	2014	570,107	289
7	2005	578,613	274
8	1978	627,400	237
9	2003	633,126	274
10	2008	708,925	312
11	1995	721,972	295
12	1988	779,848	283
13	1991	859,239	351
14	2013	1,045,891	340
15	2006	1,067,029	324
16	2017	1,097,443	299
17	1986	1,112,200	1510
18	2001	1,137,266	397
19	1985	1,164,642	502
20	1987	1,197,600	125
21	1982	1,202,605	712
22	2016	1,244,768	383
23	1997	1,270,242	1520
24	2011	1,333,031	478
25	1992	1,392,244	425
26	1999	1,451,751	536
27	2009	1,454,036	479
28	1980	1,461,640	267
29	1990	1,483,326	403
30	1984	1,491,129	510
31	2007	1,493,911	501
32	1979	1,544,300	845
33	2021	1,569,876	496
34	1983	1,573,560	486
35	2010	1,606,024	409
36	2015	1,629,857	504
37	1996	1,635,405	703
38	1998	1,643,287	657
39	2012	1,664,007	508
40	1981	1,686,232	667
41	1977	1,687,410	90
42	2019	1,688,699	482
43	2000	1,701,826	438
44	2020	1,765,740	335
45	1994	1,768,139	377
46	2018	1,789,240	617

Historical Rank of Current Storage (as of Mar 4)



South Fork Fishery

Additional Information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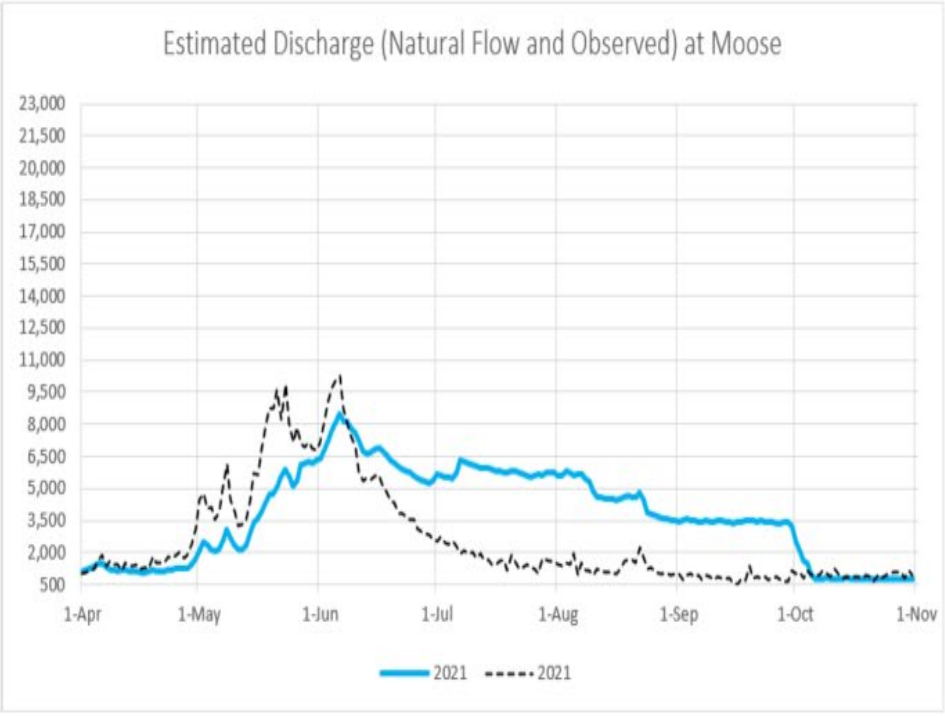
16.50
15.50
14.50
13.50
12.50
11.50
10.50
9.50
8.50
1-Apr
1-May
1-Jun
1-Jul
1-Aug
1-Sep
1-Oct
1-Nov
2021
2021


Estimated Discharge (Natural Flow and Observed) at Moose
23,000
21,500
20,000
18,500
17,000
15,500
14,000
12,500
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9,500
8,000
6,500
5,000
3,500
2,000
500
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1-May
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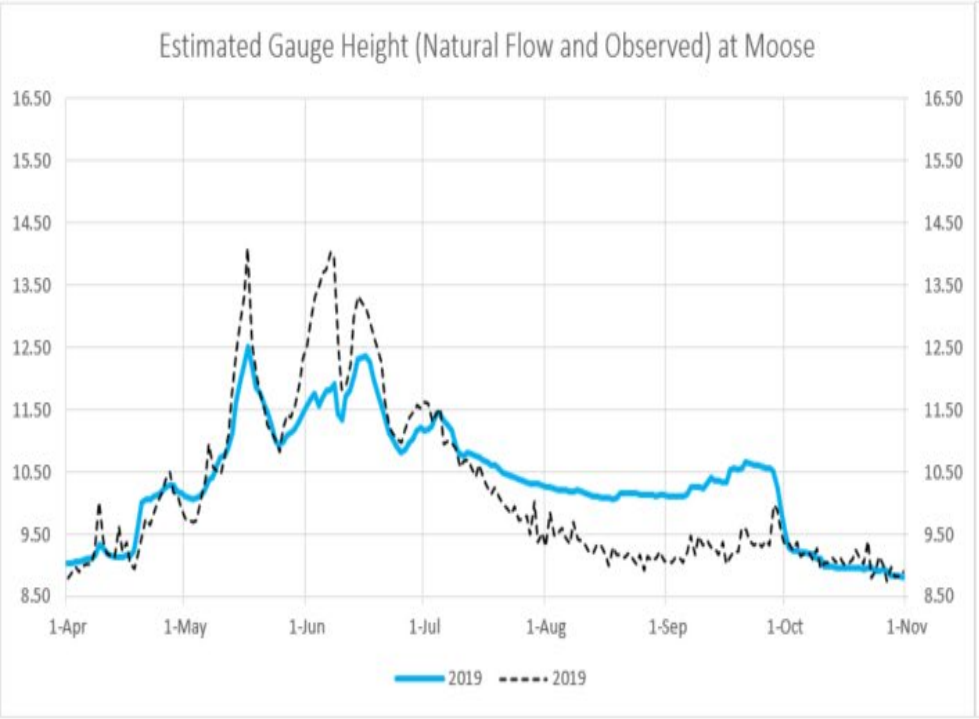
1-Jul
1-Aug
1-Sep
1-Oct
1-Nov
2021
2021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15.50
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13.50
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11.50
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1-Jun
1-Jul
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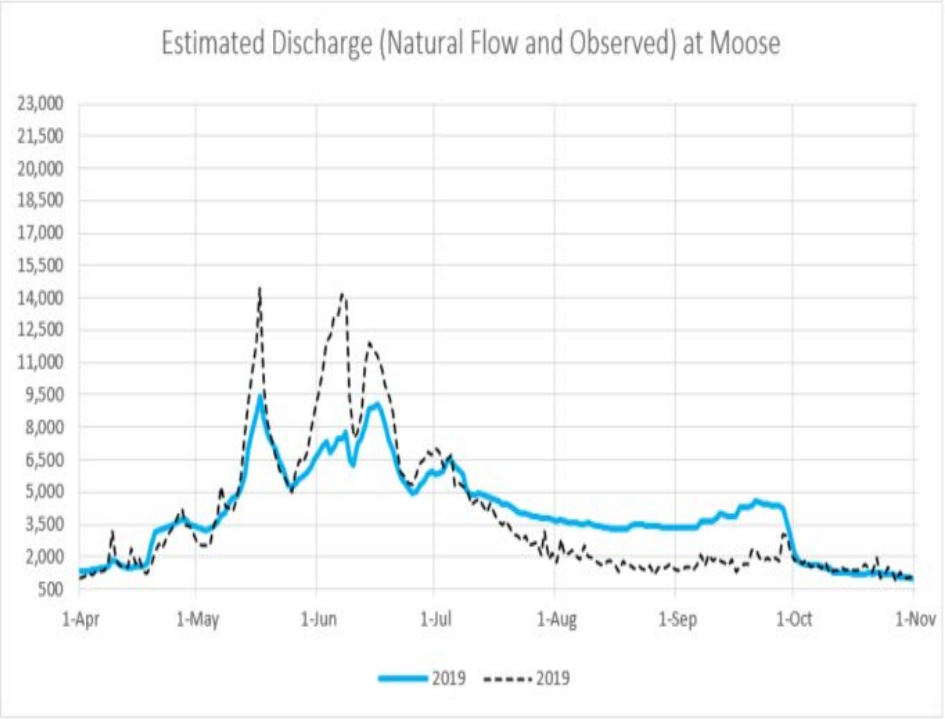
1-Sep
1-Oct
1-Nov
2019
2019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8,000
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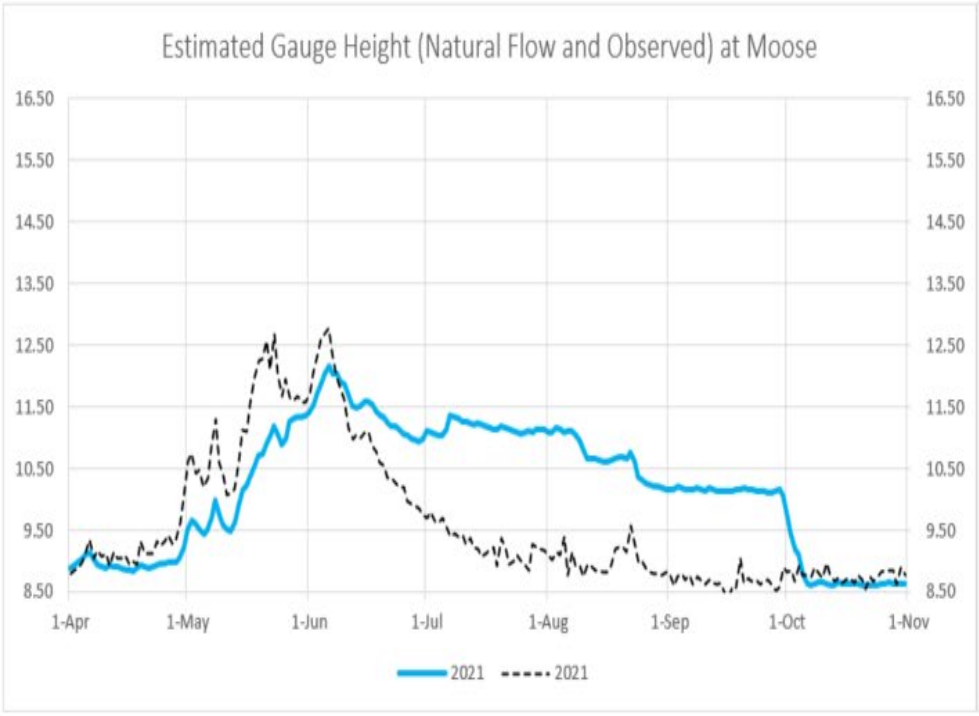
1-Nov
2019
2019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14.50
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12.50
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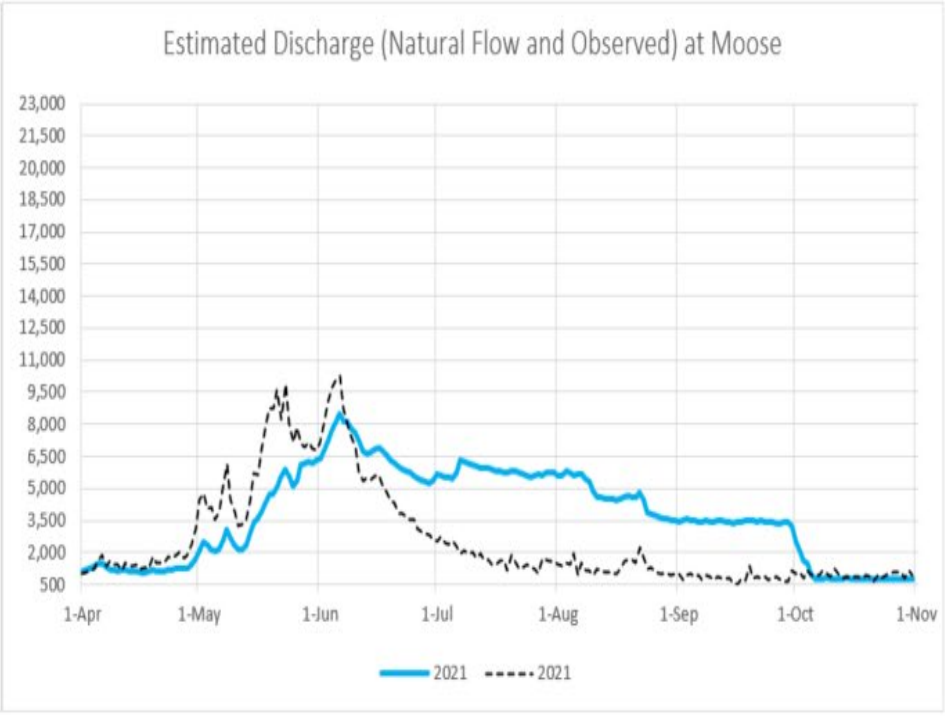
2021
2021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21,500
20,000
18,500
17,000
15,500
14,000
12,500
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9,500
8,000
6,500
5,000
3,500
2,000
500
1-Apr
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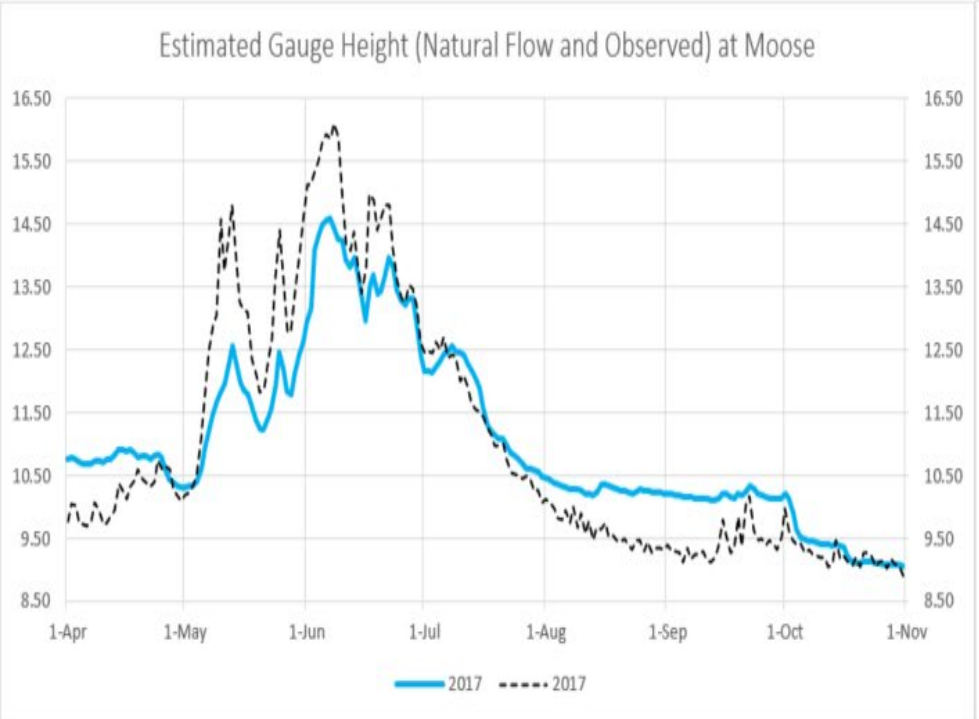
1-Aug
1-Sep
1-Oct
1-Nov
2021
2021


Estimated Gauge Height (Natural Flow and Observed) at Moose
16.50
15.50
14.50
13.50
12.50
11.50
10.50
9.50
8.50
1-Apr
1-May
1-Jun
1-Jul
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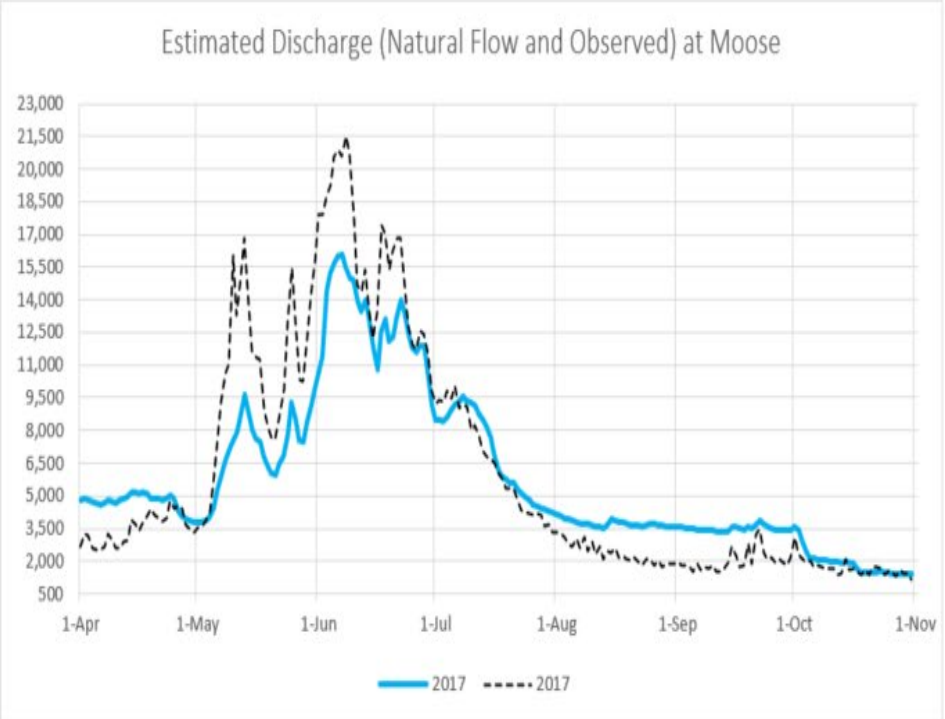
2017


Estimated Discharge (Natural Flow and Observed) at Moose
23,000
21,500
20,000
18,500
17,000
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9,500
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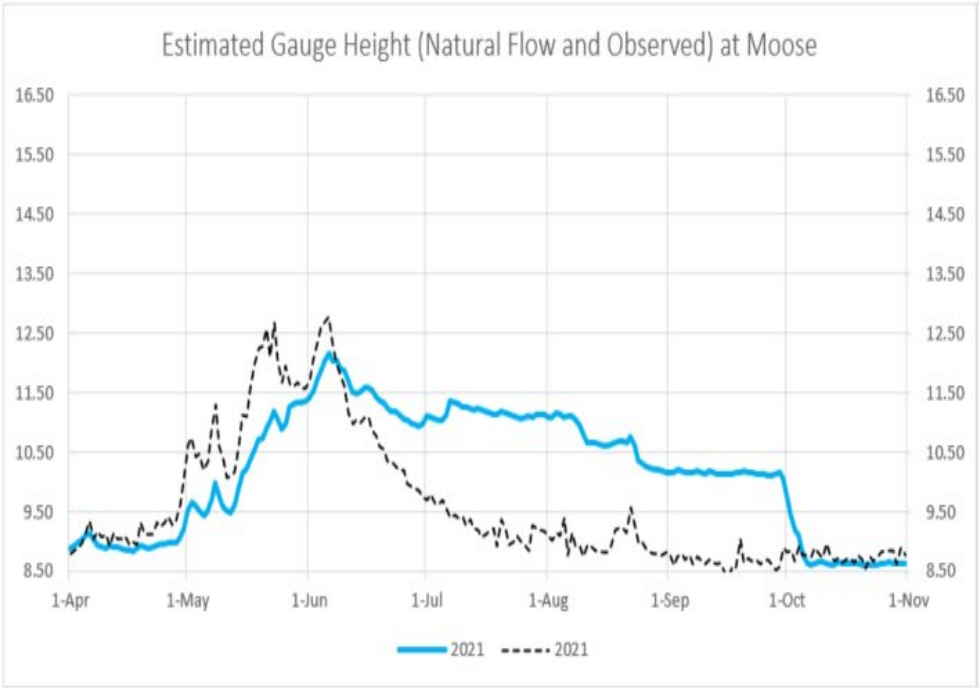
2017
2017


Estimated Gauge Height (Natural Flow and Observed) at Moose
16.50
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1-Apr
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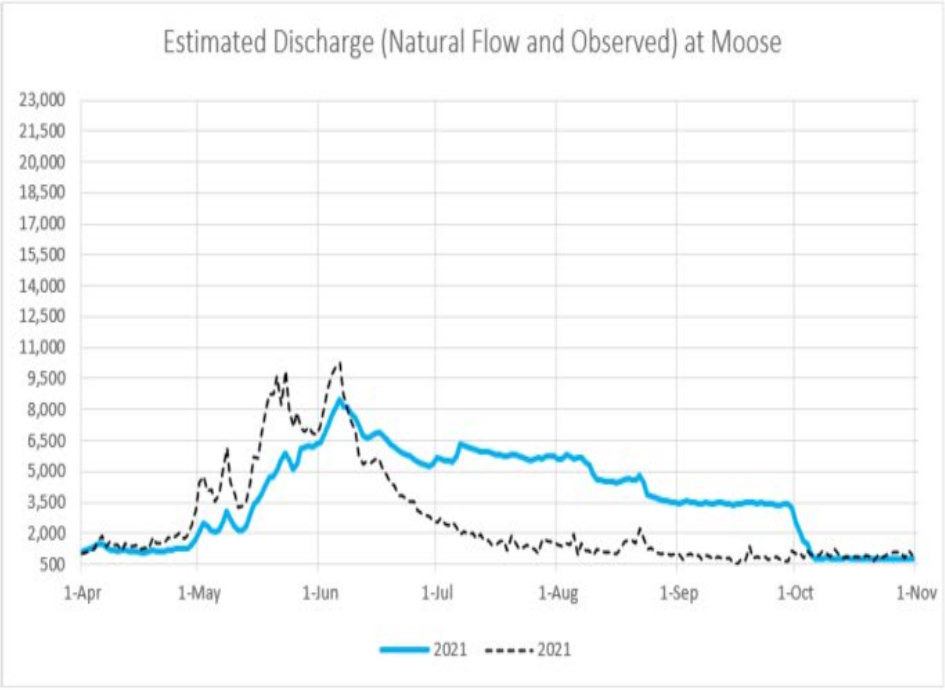
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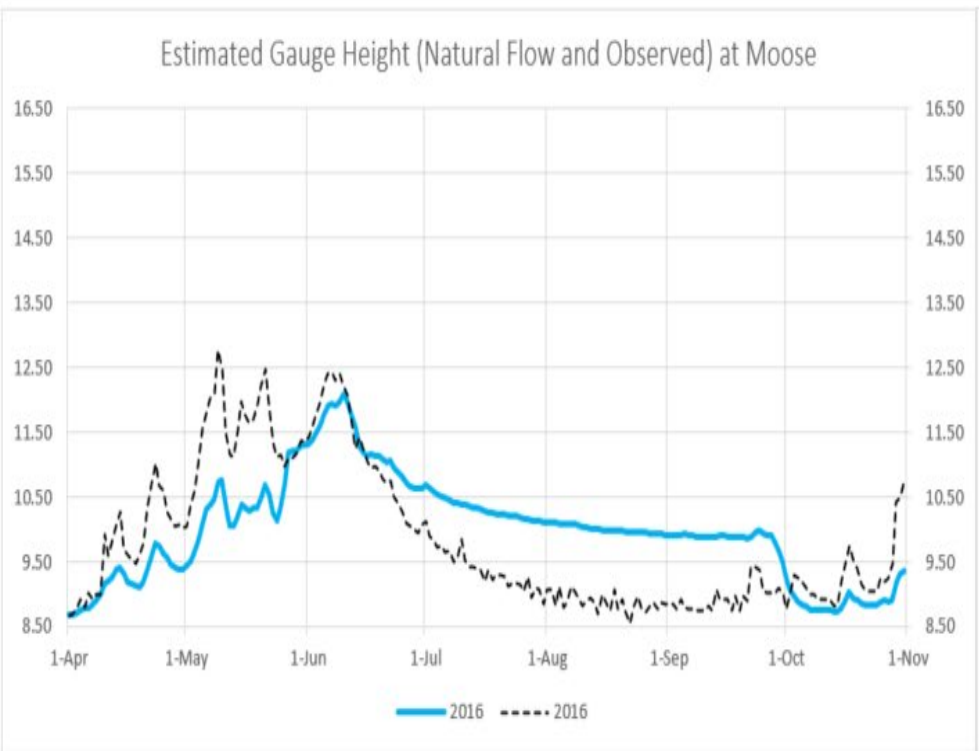
Estimated Gauge Height (Natural Flow and Observed) at Moose
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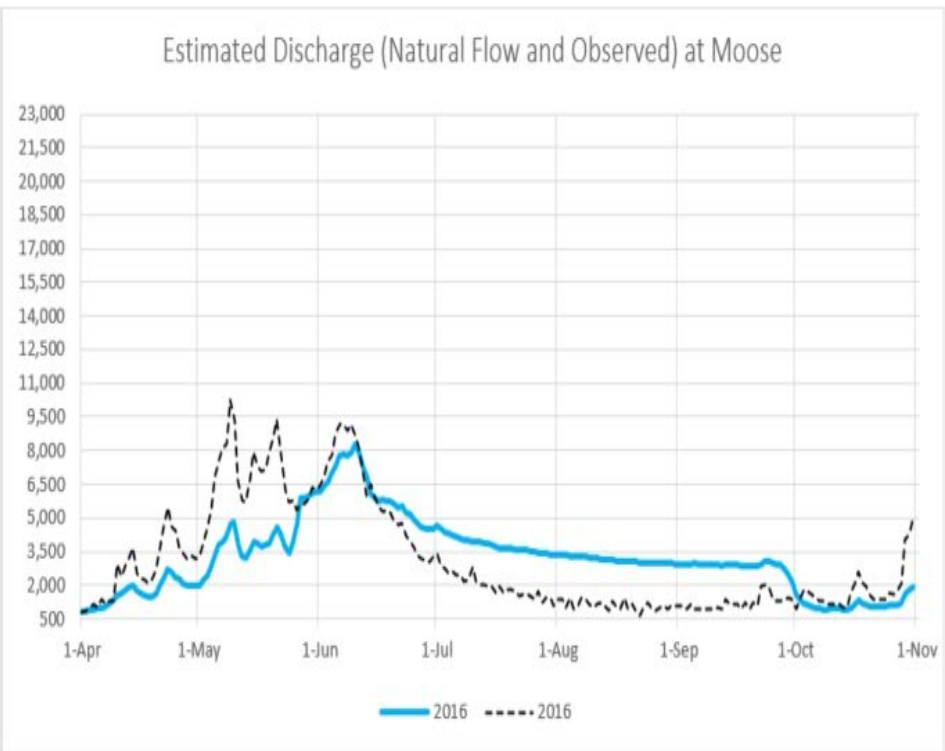
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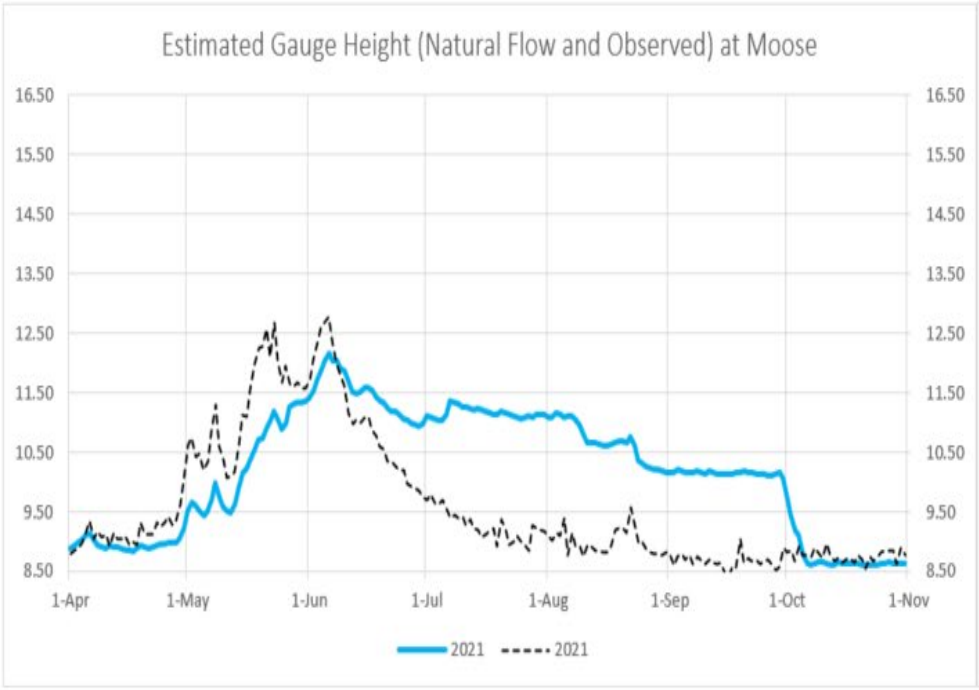
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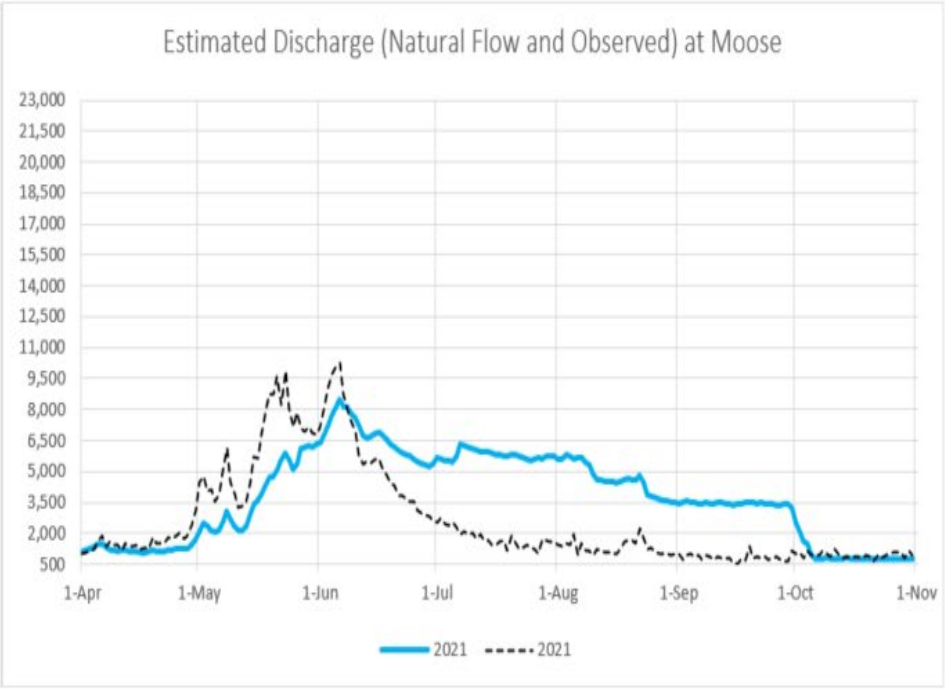
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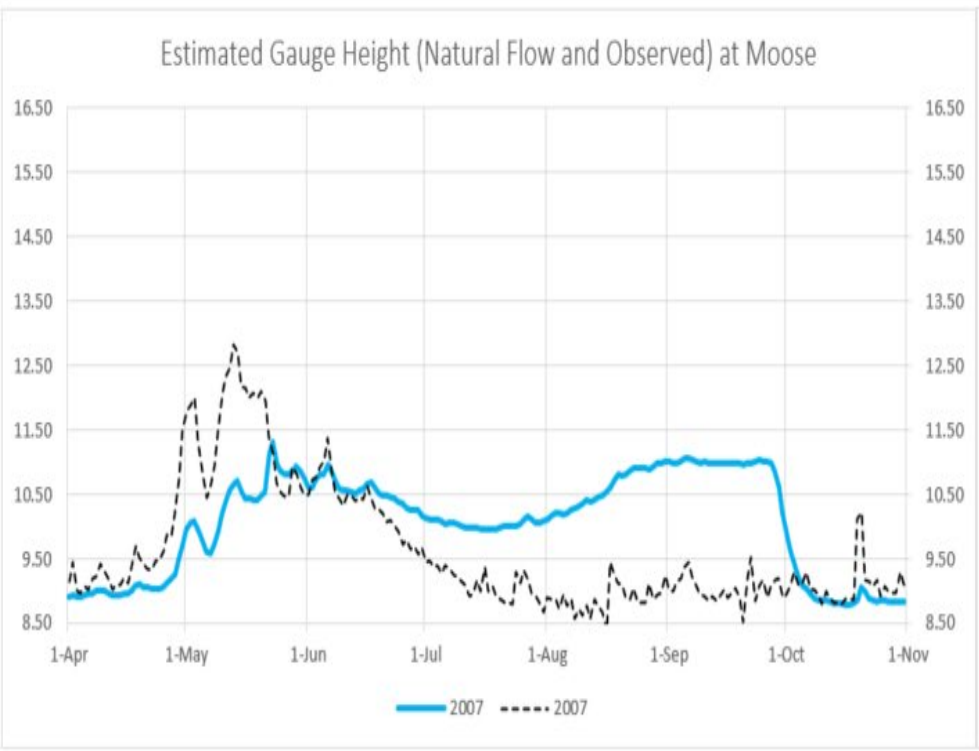
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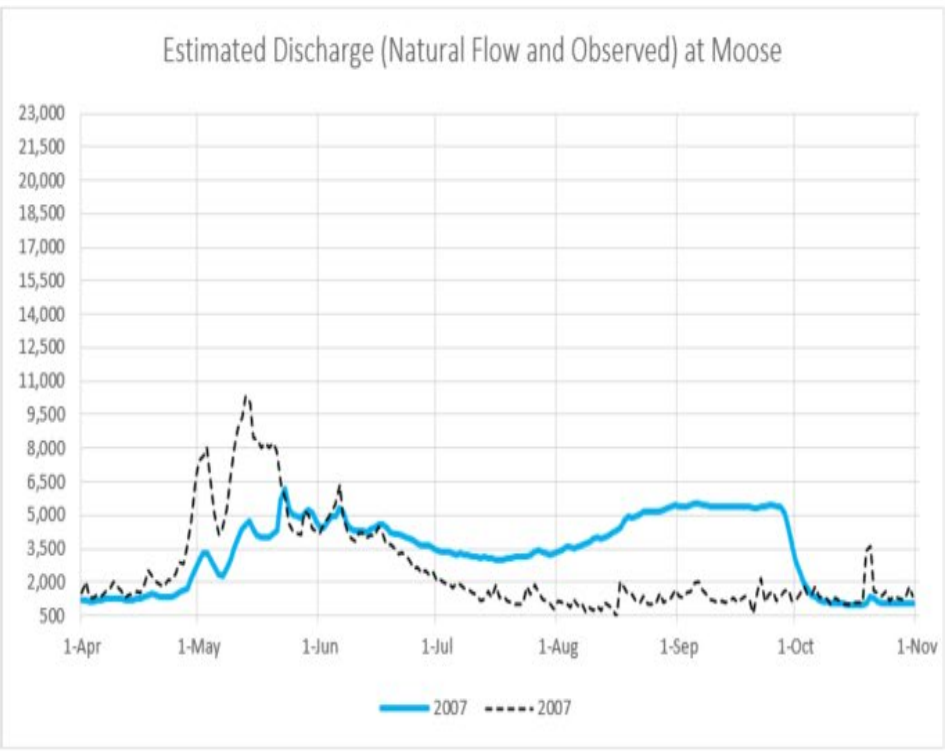
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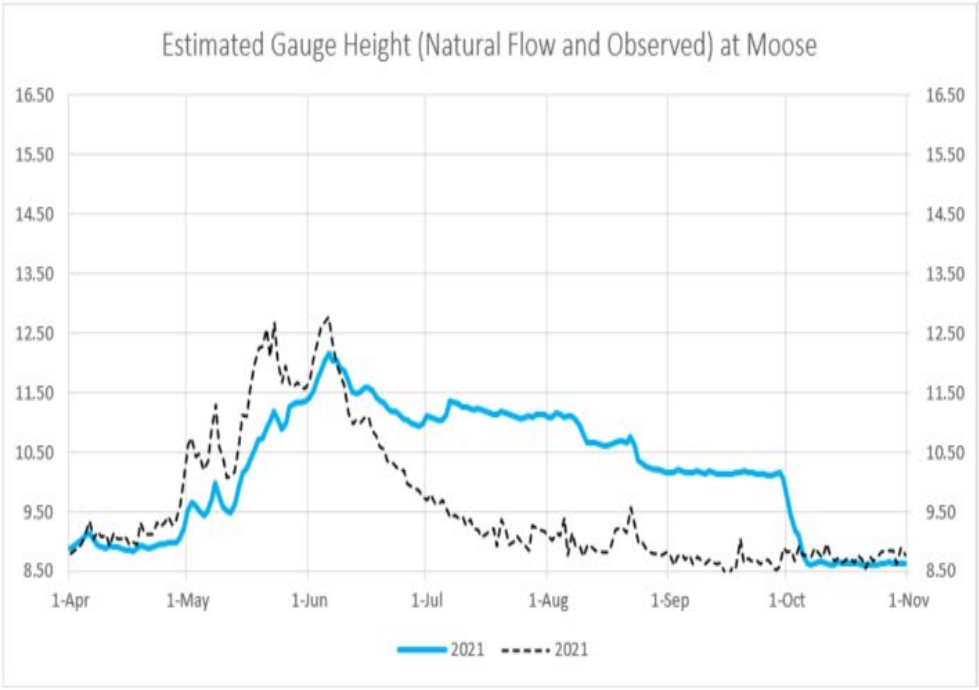
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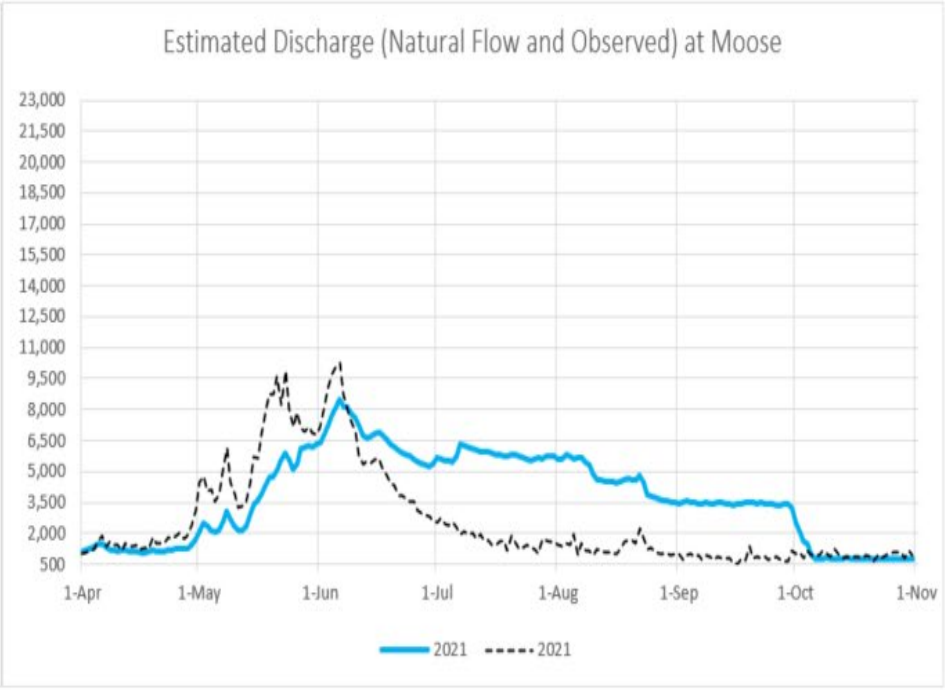
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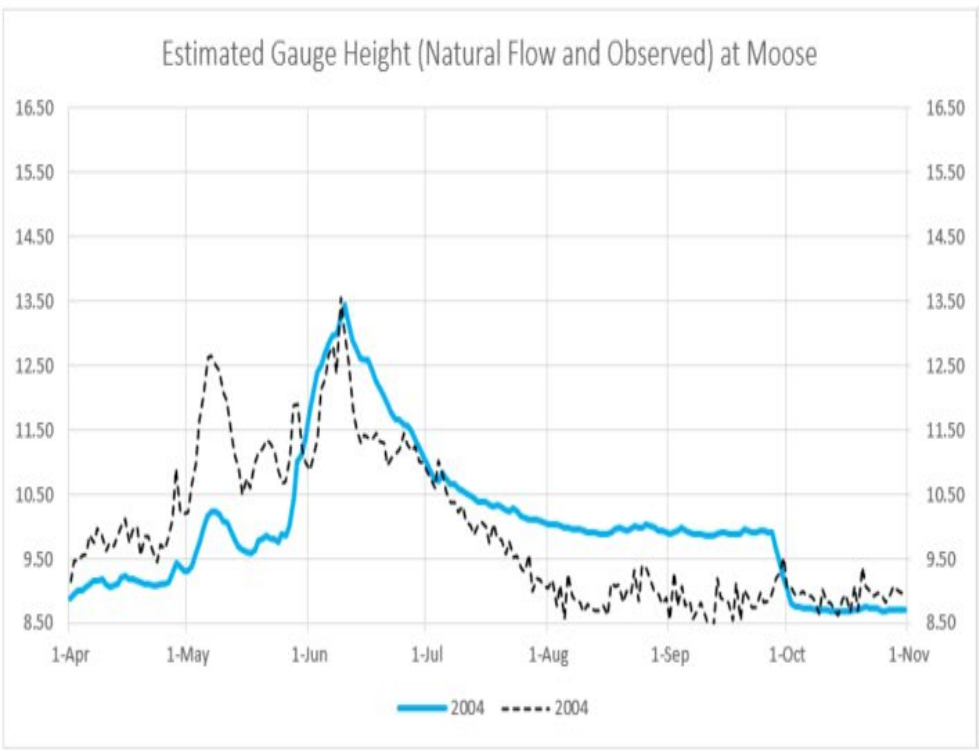
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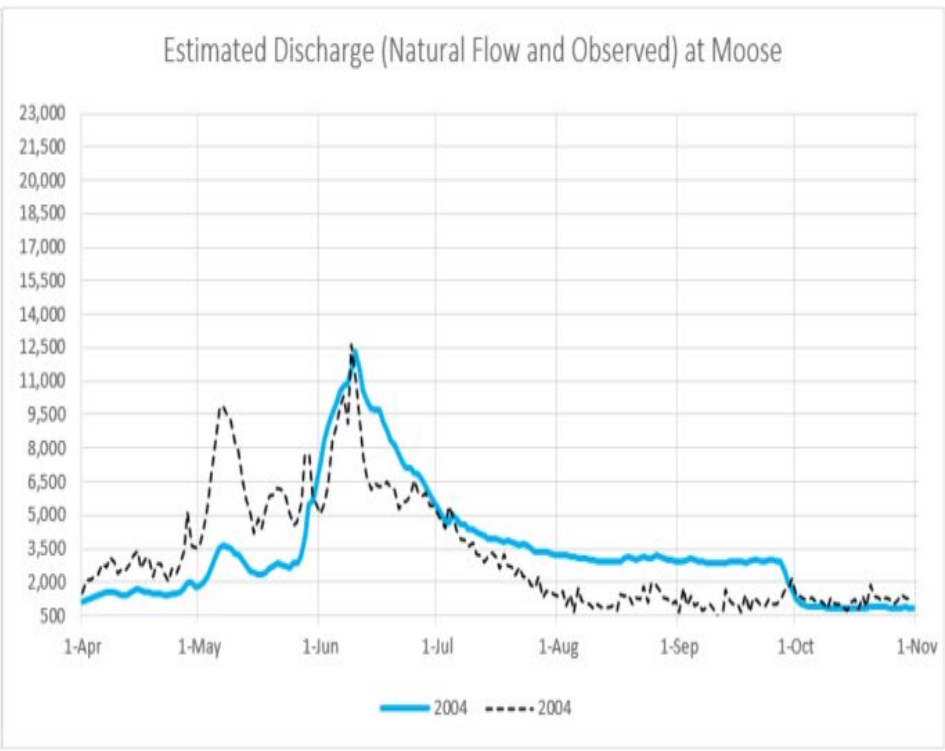
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