

# Presentation Outline

- Timeline and History of Hungry Horse Dam and SKQ Dam
- Hungry Horse and SKQ Dam and the Columbia River System, including Flood Risk Management (FRM)
- Review of weather and reservoir operations for water years 2022 and 2023
- Current conditions for water year 2024 and reservoir operations outlook





— BUREAU OF —  
RECLAMATION

# Overview of Hungry Horse Dam Operations

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# Background and History

How did Hungry Horse Dam get its name?

- Tex and Jerry the famous freight horses
- Wandered away during the severe winter of 1901
- When found, the stunned loggers nicknamed them the “Mighty Hungry Horses”



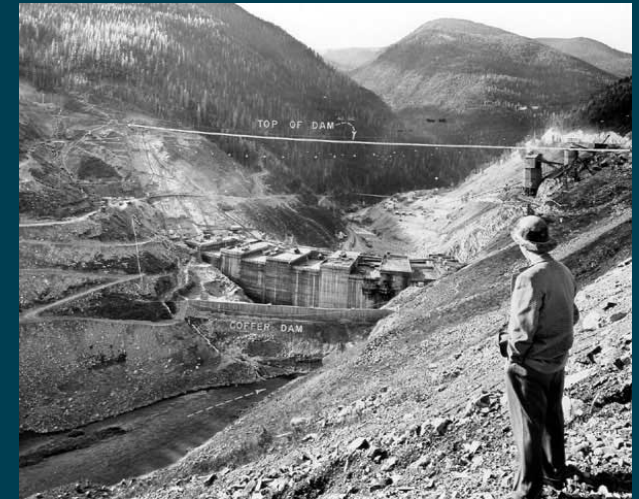
# Background and History

Why was Hungry Horse Dam built?

- World War II and energy needs
- Regulate water into Grand Coulee and Bonneville Dams for power production
- Provide local energy for the Flathead Valley
- Protect local agricultural lands from flooding

When did planning start and construction?

- Congress Authorized the project on June 5th, 1944
- Reclamation finished detailed design
- Construction lasted from 1948 to 1953





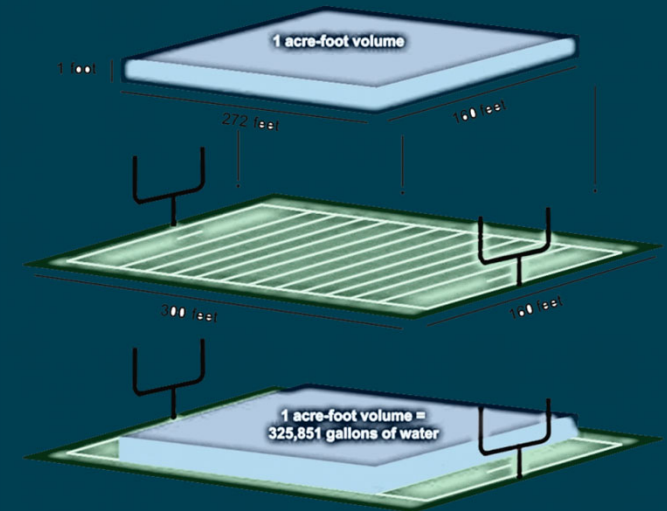
# Hungry Horse Dam Details

- 564-foot-high concrete arch dam
- Crest length of 2,115 ft (~0.4 mi.)
- Total project construction required 3.1 million cubic yards of concrete (~77,000 garbage trucks).
- The reservoir has a total capacity of 3,468,000 acre-feet.



# Units of Measure - What's an acre-foot of water?

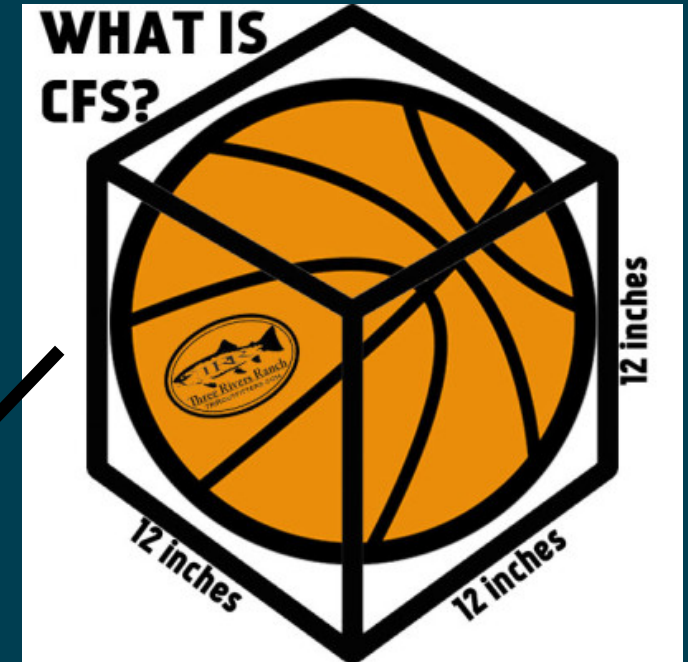
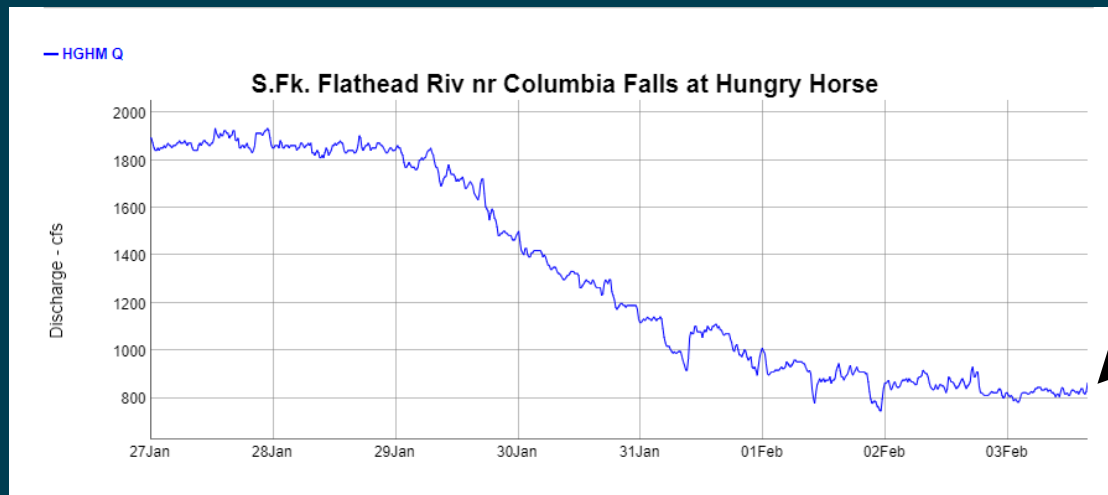
Volume in a reservoir is measured in acre-ft



Hungry Horse Reservoir has a total capacity of 3,468,000 acre-feet.

# Units of Measure – What's a cfs?

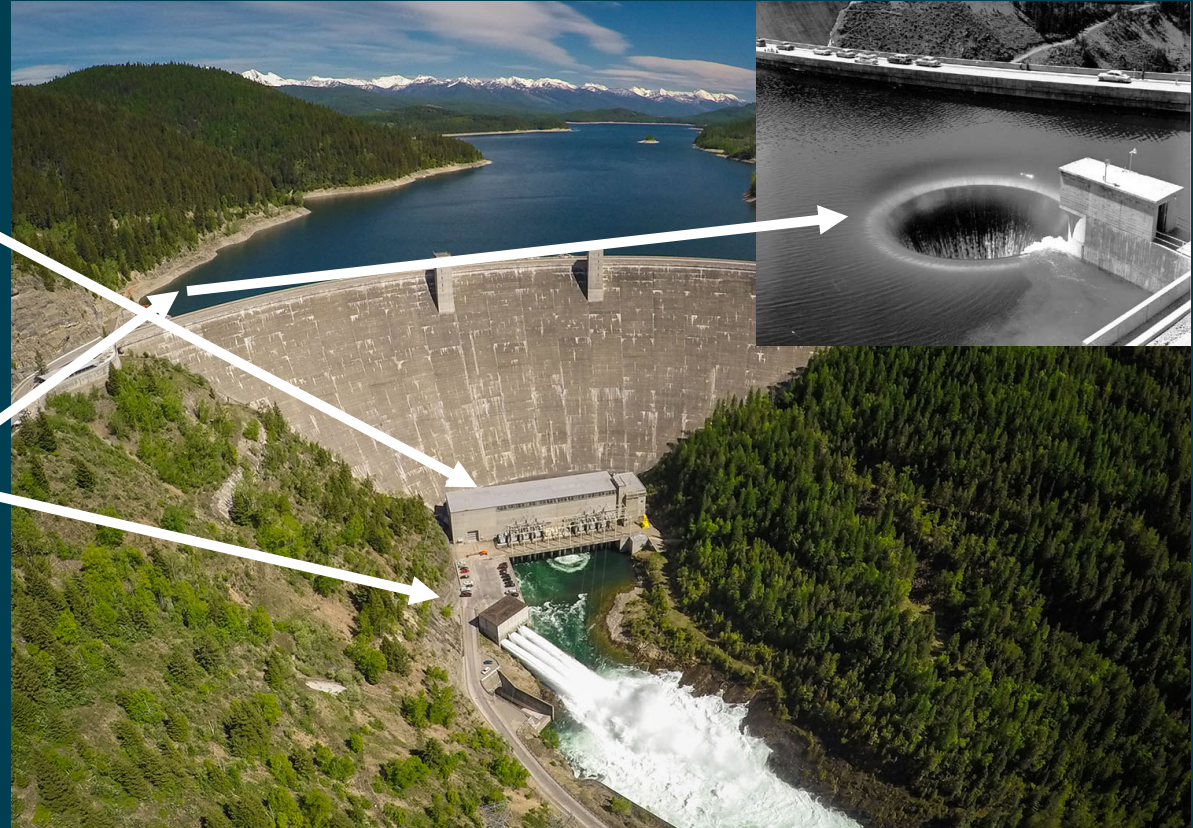
- Discharge in river is in cubic feet per second (cfs)





# Hungry Horse Dam – Hydraulic Capacity

- Four Unit Power plant
  - 3,000 cfs each at 107 MW
- Three hollow-jet valves
  - 14,000 cfs combined
- Ring Gate Spillway
  - 50,000 cfs at 3565.0 ft





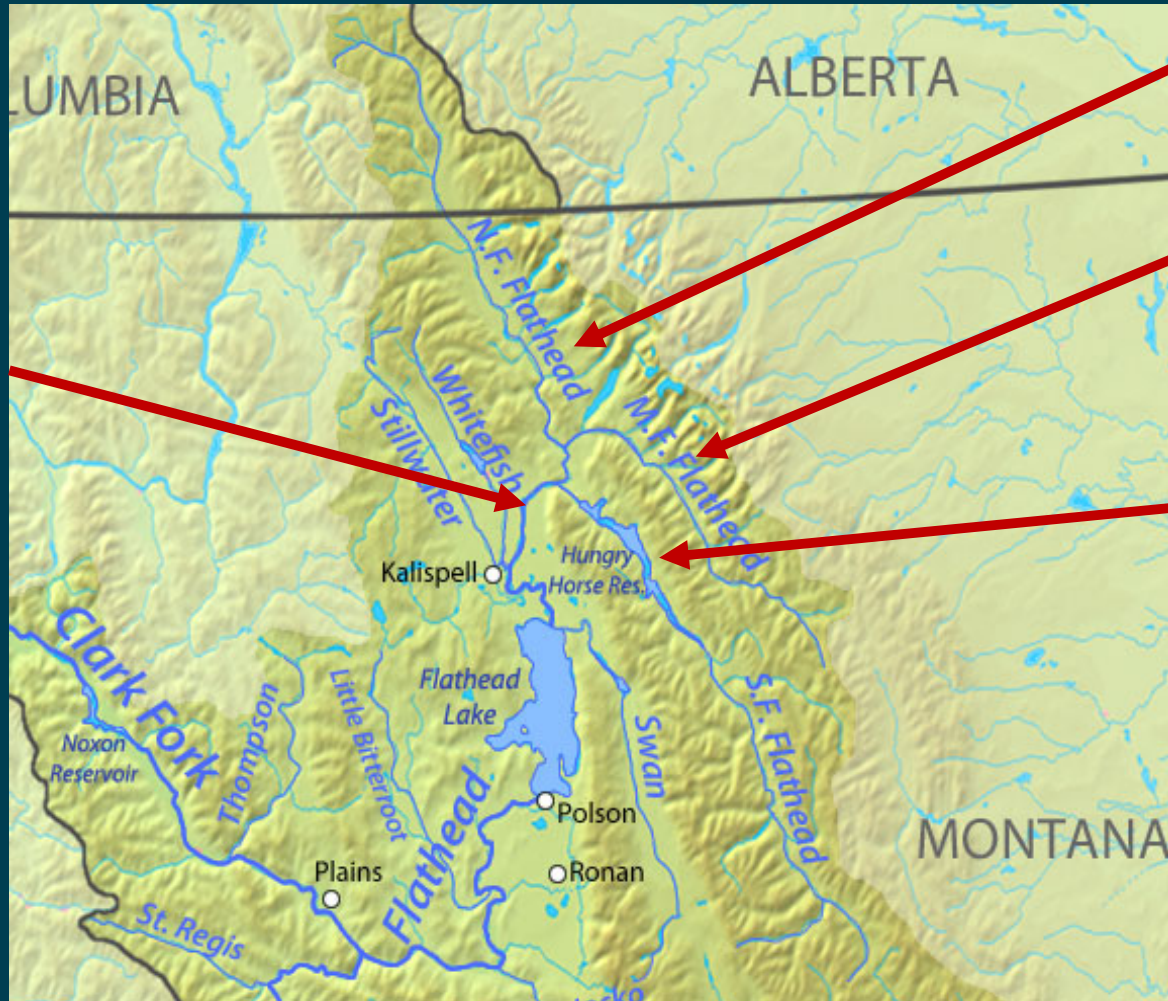
# Hungry Horse Dam Primary Uses

- Flood Risk Management (both system and local)
- Hydropower generation
- Recreation
- Fish and Wildlife Conservation – provided under the Endangered Species Act (ESA)
- In-stream flow regulation

# Regional Map



# Flathead River Drainage



N.F. Flathead  
• 1,556 square miles

M.F. Flathead  
• 1,125 square miles

S.F. Flathead (Hungry Horse Dam)  
• 1,668 square miles  
• Only 37% of basin above Columbia Falls



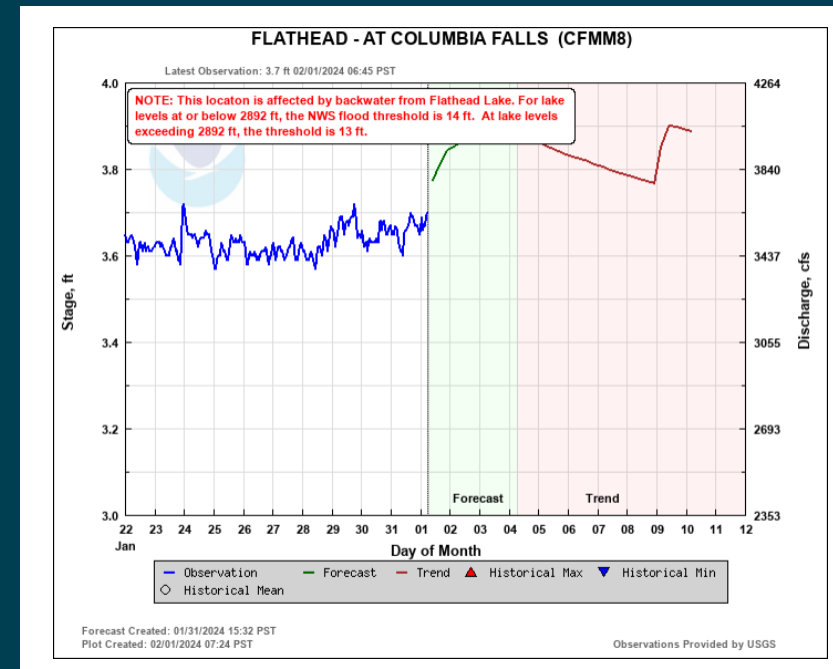
Flathead River Above Columbia Falls

• 4,473 square miles



# Hungry Horse Dam – Flood Risk Management (FRM)

- Provides system flood risk management for Columbia River System (CRS)
- Provides local flood risk management protection for the Flathead River at Columbia Falls
- Controls only 37% of flow at Columbia Falls, the north and middle forks have natural flow



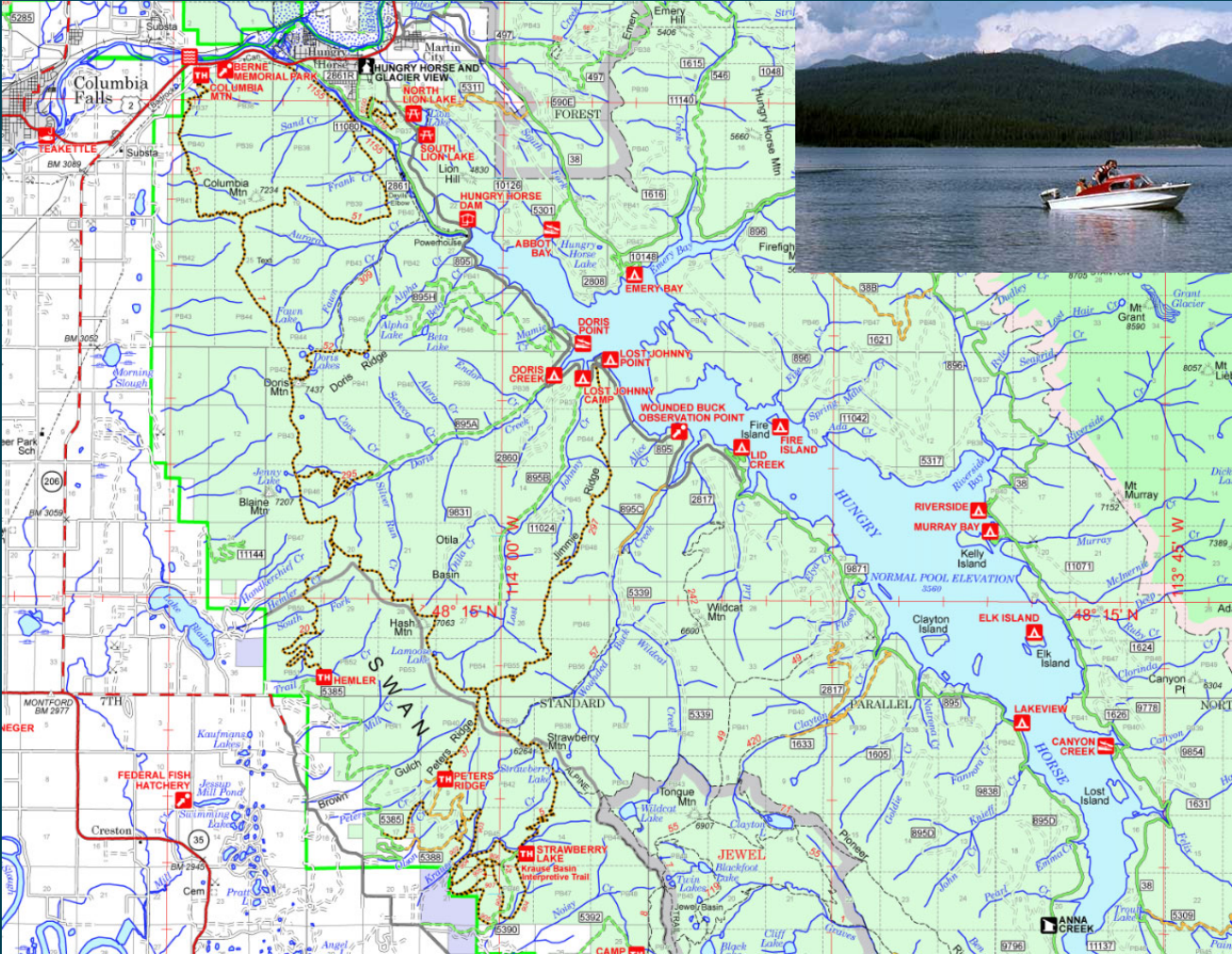
# Hungry Horse Dam – Hydropower

- Powerhouse has 4 units – maximum generating capacity of 408 MW.
- Net Generation of 1.4 million MWh (enough for ~140,000 homes)
- Transmission restrictions in the Flathead Valley limit the amount of power produced at Hungry Horse Dam to 310 MW.





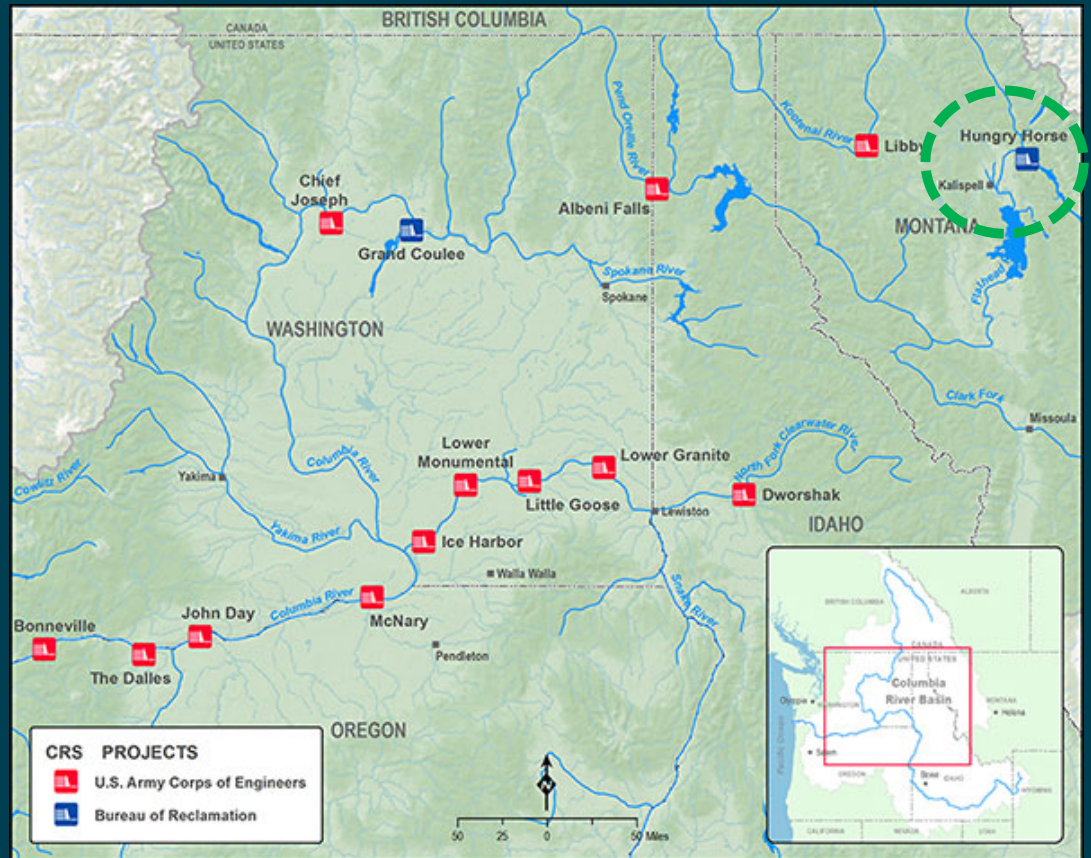
# Recreation





# Regional Map and the Columbia River System (CRS)

- 14 federal multiple purpose dams and related facilities
- Operated as a coordinated system
- Operated to meet multiple congressionally authorized public purposes
- Dams located in Idaho, Montana, Oregon, and Washington



# Fish and Wildlife – Technical Management Team (TMT)

Federal, Tribal, and state governments hold jurisdictions over ESA-listed salmon, steelhead, bull trout and Kootenai River white sturgeon, other aquatic species, and related water management issues across the Columbia River Basin.

Current Columbia River System (CRS) operations are described in the following documents:

1. AA's 2020 CRS Proposed Action as described in the Record of Decision and associated biological assessments;
2. National Marine Fisheries Service's and U.S. Fish and Wildlife Service's 2020 CRS and 2008 Upper Snake River biological opinions (BiOps);
3. AA's Annual Fish Operations Plan; and
4. AA's Annual Water Management Plans and Seasonal Updates.



# Montana Fish Accords

- Signed on May 2<sup>nd</sup>, 2008, between state of Montana and the Action Agencies (BPA, USACE, and Reclamation).
- Provided funding for the permanent protection of resident fish habitat through land purchases and conservation easements in northwest Montana.
- Implemented Montana's operations at Hungry Horse Dam.
- Operations would stabilize flows and keep more water in the reservoirs behind the facilities during the months of July, August, and September, providing significant benefits to resident fish above and below the dams.





# Fish and Wildlife – South Fork and Columbia Falls Minimum Flows

- Set by the March Water Supply Forecast
  - Then is set for March through December
  - January and February are set by their respective forecasts

**Table 7. Minimum Flows at Hungry Horse and Columbia Falls.**

Hungry Horse Apr–Aug inflow forecast (KAF)	Hungry Horse min flow <sup>a</sup> (CFS)	Columbia Falls min flow (CFS)
< 1190	400	3200
1190 - 1790	Interpolate between 400-900	Interpolate between 3200-3500
> 1790	900	3500

a. To prevent or minimize flooding on the Flathead River above Flathead Lake, Hungry Horse discharges can be reduced to a minimum flow of 300 cfs when the stage at Columbia Falls exceeds 13 feet.



# Fish and Wildlife - September Draft Targets

- Set by the May Water Supply Forecast

**Table 6. Hungry Horse End of September Elevation Targets**

Hungry Horse May-September inflow forecast (KAF)	Hungry Horse forebay target on Sept 30 (ft)
< 1410	3540
1410 – 1580	Interpolate between 3540-3550
> 1580	3550

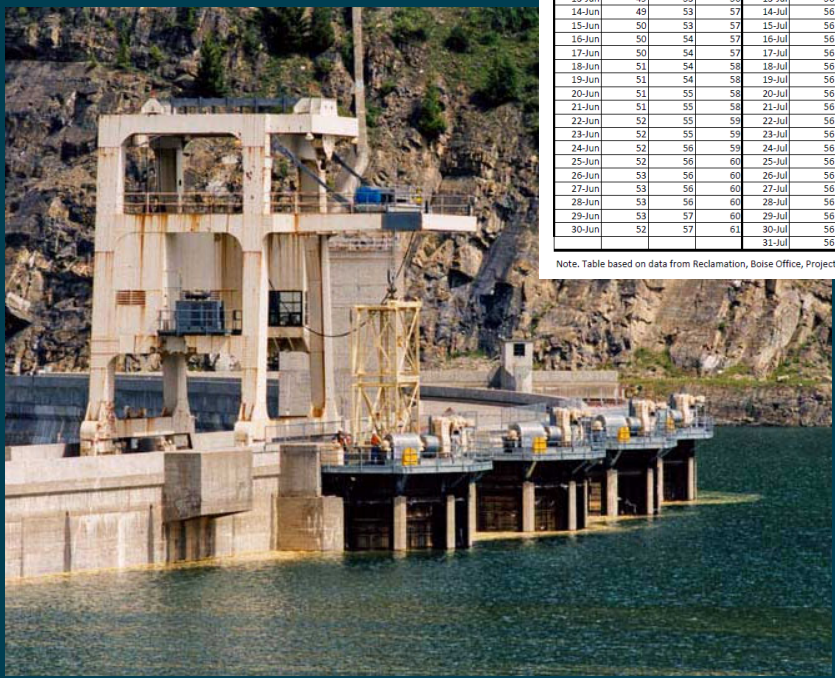
Operations in September are primarily focused on benefiting ESA-listed bull trout and other resident fish species downstream of the dam. The intent is to maintain steady or gradually declining flows in the Flathead River. Hungry Horse may draft slightly above or below the end of September draft target depending on inflows and minimum flow requirements. Hungry Horse may end the month at an elevation above the end of September draft limit if inflows are higher than were forecasted in the planned operation. Hungry Horse may end the month at an elevation below the end of September draft limit due to minimum flow requirements and if inflows are lower than were forecasted in the planned operation.



# Fish and Wildlife – Downstream Water Temperature

Seasonal installation of  
Selective Withdrawal gates

Designed to draw warmer  
water at shallow levels in the  
reservoir to help native bull  
trout fisheries downstream



**TABLE 2-2 HUNGRY HORSE DAM & RESERVOIR SELECTIVE WITHDRAWAL SYSTEM--OUTLET TEMPERATURE (° F)**

DATE	TEMPERATURE			DATE	TEMPERATURE			DATE	TEMPERATURE			DATE	TEMPERATURE		
	MIN	OPT	MAX		MIN	OPT	MAX		MIN	OPT	MAX		MIN	OPT	MAX
1-Jun	46	49	53	1-Jul	54	57	61	1-Aug	56	60	64	1-Sep	53	57	60
2-Jun	46	50	53	2-Jul	54	57	61	2-Aug	56	60	64	2-Sep	53	57	60
3-Jun	46	50	53	3-Jul	54	58	61	3-Aug	56	60	64	3-Sep	53	56	60
4-Jun	47	50	54	4-Jul	54	58	61	4-Aug	56	60	64	4-Sep	53	56	60
5-Jun	47	51	54	5-Jul	54	58	62	5-Aug	56	60	64	5-Sep	53	56	60
6-Jun	47	51	54	6-Jul	55	58	62	6-Aug	56	60	64	6-Sep	53	56	60
7-Jun	47	51	55	7-Jul	55	58	62	7-Aug	56	60	64	7-Sep	52	56	60
8-Jun	48	51	55	8-Jul	55	58	62	8-Aug	56	60	63	8-Sep	52	56	59
9-Jun	48	52	55	9-Jul	55	59	62	9-Aug	56	60	63	9-Sep	52	56	59
10-Jun	48	52	55	10-Jul	55	59	62	10-Aug	56	60	63	10-Sep	52	55	59
11-Jun	49	52	56	11-Jul	55	59	62	11-Aug	56	60	63	11-Sep	52	55	59
12-Jun	49	53	56	12-Jul	55	59	63	12-Aug	56	60	63	12-Sep	51	55	59
13-Jun	49	53	56	13-Jul	56	59	63	13-Aug	56	59	63	13-Sep	51	55	58
14-Jun	49	53	57	14-Jul	56	59	63	14-Aug	56	59	63	14-Sep	51	55	58
15-Jun	50	53	57	15-Jul	56	59	63	15-Aug	56	59	63	15-Sep	51	55	58
16-Jun	50	54	57	16-Jul	56	60	63	16-Aug	55	59	63	16-Sep	51	55	58
17-Jun	50	54	57	17-Jul	56	60	63	17-Aug	55	59	63	17-Sep	51	54	58
18-Jun	51	54	58	18-Jul	56	60	63	18-Aug	55	59	62	18-Sep	51	54	58
19-Jun	51	54	58	19-Jul	56	60	63	19-Aug	55	59	62	19-Sep	50	54	58
20-Jun	51	55	58	20-Jul	56	60	64	20-Aug	55	59	62	20-Sep	50	54	57
21-Jun	51	55	58	21-Jul	56	60	64	21-Aug	55	58	62	21-Sep	50	54	57
22-Jun	52	55	59	22-Jul	56	60	64	22-Aug	55	58	62	22-Sep	50	54	57
23-Jun	52	55	59	23-Jul	56	60	64	23-Aug	55	58	62	23-Sep	50	53	57
24-Jun	52	56	59	24-Jul	56	60	64	24-Aug	55	58	62	24-Sep	50	53	57
25-Jun	52	56	60	25-Jul	56	60	64	25-Aug	54	58	62	25-Sep	50	53	57
26-Jun	53	56	60	26-Jul	56	60	64	26-Aug	54	58	61	26-Sep	49	53	57
27-Jun	53	56	60	27-Jul	56	60	64	27-Aug	54	58	61	27-Sep	49	53	56
28-Jun	53	56	60	28-Jul	56	60	64	28-Aug	54	58	61	28-Sep	49	53	56
29-Jun	53	57	60	29-Jul	56	60	64	29-Aug	54	57	61	29-Sep	49	53	56
30-Jun	52	57	61	30-Jul	56	60	64	30-Aug	54	57	61	30-Sep	49	53	56
				31-Jul	56	60	64	31-Aug	53	57	61				

Note. Table based on data from Reclamation, Boise Office, Project Operations (HGH WCM - 2005)

