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MEMORANDUM

TO: Michele DeHart

FROM: David Benner

DATE: February 26, 2002

RE: Status of Selected Columbia River Projects with Respect to Flood Control Targets and Upper Snake Project Refill Data

SUMMARY

- Dworshak, Hungry Horse, Grand Coulee, and Brownlee Reservoirs have each experienced decreasing flood control targets between January and February 2002, a likely result of increasing water supply forecasts.
- Current and recent-past reservoir elevations at Dworshak, Hungry Horse, Grand Coulee, and Brownlee have been either below or on target to be below flood control targets. For the most part, reservoir elevations have been well below (i.e., 18-32 feet) flood control targets.
- Libby Reservoir has experienced increasing flood control targets between January and February 2002, a likely result of decreasing water supply forecasts.
- Current reservoir elevations at Libby were slightly above flood control targets.
- Rates of reservoir refill were relatively consistent over the beginning of water year 2002 at the following Upper Snake River Reservoirs: Island Park, Ririe, Palisades, Grassy Lake, American Falls, and Jackson Lake. Rates of refill ranged from 40 to 7720 acre-feet per day.
- Reservoir content at the Minidoka project generally decreased over the beginning of water year 2002.

FLOOD CONTROL TARGETS

At your request, Flood Control Targets were determined and compared with current reservoir elevations for the following projects: Dworshak, Hungry Horse, Grand Coulee, Brownlee, and Libby. Flood Control Targets were based upon the 2002 January and February Water Supply Forecasts issued by the U.S. Army Corps of Engineers (USACE). USACE uses water supply forecasts estimated by various sources in calculating flood control targets (see note below Table 1).

Dworshak

USACE flood control elevations based upon the February 2002 water supply forecast were less than the flood control elevations calculated using the January 2002 water supply forecast (Figure 1). Over a common time period, flood control elevations calculated from the February water supply forecast were approximately 7 to 15 feet lower (with respect to Mean Sea Level) than those calculated using the January water supply forecast. The decrease between flood control elevations calculated using the January and February water supply forecasts can be primarily credited to a 142 Kaf (Apr-July) increase in water supply forecast between the mentioned months as estimated by USACE (Table 1). For the sake of comparison, it may be useful to compare the final water supply forecasts issued by the Northwest River Forecast Center (NWRFC) to that issued and used by USACE¹. The NWRFC estimated a 300 Kaf (Apr-July) increase in final water supply forecast between the months of January and February at Dworshak (Table 2). The actual reservoir elevations at Dworshak were approximately 2 to 6 feet below the flood control elevations calculated in January and appear on target to be at or below the flood control elevations calculated from the February water supply forecast.

Table 1. January and February 2002 water supply forecasts for selected projects within the Columbia Basin issued by the U.S. Army Corps of Engineers (USACE) in Portland, Oregon.

<u>Project</u>	<u>January Forecast</u>		<u>February Forecast</u>		<u>Forecast Change</u> <u>Jan to Feb</u>
	<u>Volume (Kaf)</u>	<u>Period</u>	<u>Volume (Kaf)</u>	<u>Period</u>	<u>Volume (Kaf)</u>
Dworshak	2766	Apr-July	2908	Apr-July	+ 142
Hungry Horse	1566	May-Sept	1859	May-Sept	+ 293
Grand Coulee	57100	Apr-Aug	58000	Apr-Aug	+ 900
Brownlee	4530	Apr-July	4570	Apr-July	+ 40
Libby	6063	Apr-Aug	6005	Apr-Aug	- 58

Note: Water supply forecasts issued by USACE originate from the following sources: Libby and Dworshak forecasts estimated by USACE, Hungry Horse forecasts estimated by the Bureau of Reclamation, Grand Coulee and Brownlee forecasts estimated by the Northwest River Forecast Center.

¹ It is important to note that USACE uses water supply forecasts provided by the NWRFC for the Grand Coulee and Brownlee projects.

Table 2. January and February 2002 final water supply forecasts for selected projects within the Columbia Basin estimated by the Northwest River Forecast Center (NWRFC) in Portland, Oregon.

Project	January Final Forecast		February Final Forecast		Forecast Change Jan to Feb
	Volume (Kaf)	Period	Volume (Kaf)	Period	Volume (Kaf)
Dworshak	2700	Apr-July	3000	Apr-July	+ 300
Hungry Horse	1790	Apr-Sept	1910	Apr-Sept	+ 120
Grand Coulee	59300	Jan-July	60800	Jan-July	+ 1500
Brownlee	4530	Apr-July	4570	Apr-July	+ 40
Libby	6440	Apr-Sept	6470	Apr-Sept	+ 30

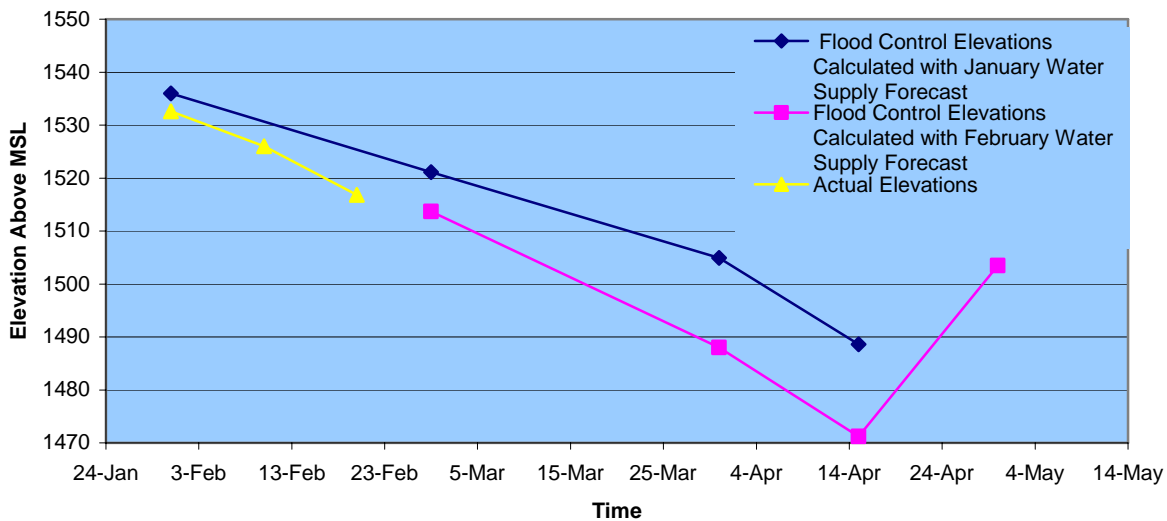


Figure 1. Dworshak flood control elevations based upon January and February 2002 water supply forecasts and actual reservoir elevations.

Hungry Horse

At the Hungry Horse Reservoir, flood control elevations calculated from the February 2002 water supply forecast were approximately 10 to 20 feet lower (with respect to Mean Sea Level) than those calculated using the January 2002 water supply forecast (Figure 2). The decrease between flood control elevations calculated using the January and February water supply forecasts is likely due to a 293 Kaf (May-Sept) increase in USACE water supply forecast between the mentioned months (Table 1). For comparison, the NWRFC estimated a 120 Kaf (Apr-Sept) increase in final water supply forecast between the months of January and February at Hungry Horse (Table 2). The actual reservoir elevations at Hungry Horse were approximately 20 to 30 feet below the flood control elevations calculated from either the January or February water supply forecasts.

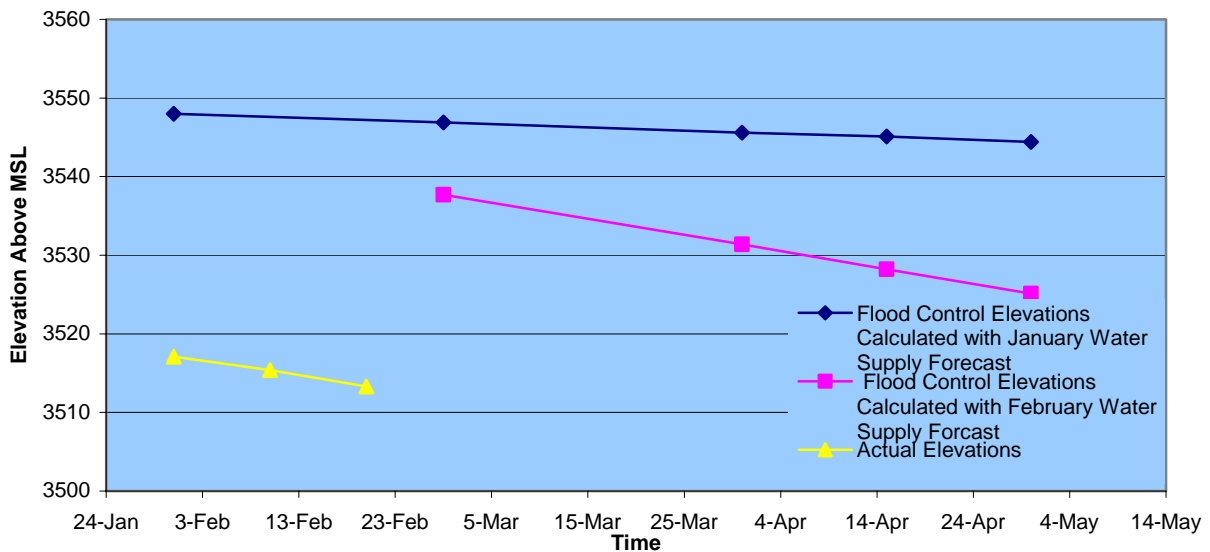


Figure 2. Hungry Horse flood control elevations based upon January and February 2002 water supply forecasts and actual reservoir elevations.

Grand Coulee

At Grand Coulee, the flood control elevations calculated from the February 2002 water supply forecast were approximately 1 to 2 feet lower (with respect to Mean Sea Level) than those calculated using the January 2002 water supply forecast (Figure 3). The decrease between flood control elevations calculated using the January and February water supply forecasts may be credited to a 900 Kaf (Apr-Aug) increase in USACE issued water supply forecast between the mentioned months (Table 1). For comparison, the NWRFC estimated a 1500 Kaf (Jan-July) increase in final water supply forecast between the months of January and February at Grand Coulee (Table 2)². The actual reservoir elevations at Grand Coulee were approximately 18 to 32 feet below the flood control elevations calculated from either the January or February water supply forecasts. It should be pointed out that a flood control shift is being conducted between Grand Coulee and the Snake River Projects, helping to explain the low elevations with respect to flood control targets.

² USACE uses water supply forecasts for Grand Coulee that are estimated by the NWRFC. The difference between the forecasted water supply values issued for Grand Coulee by USACE and those issued on the NWRFC website are a result of the forecast period.

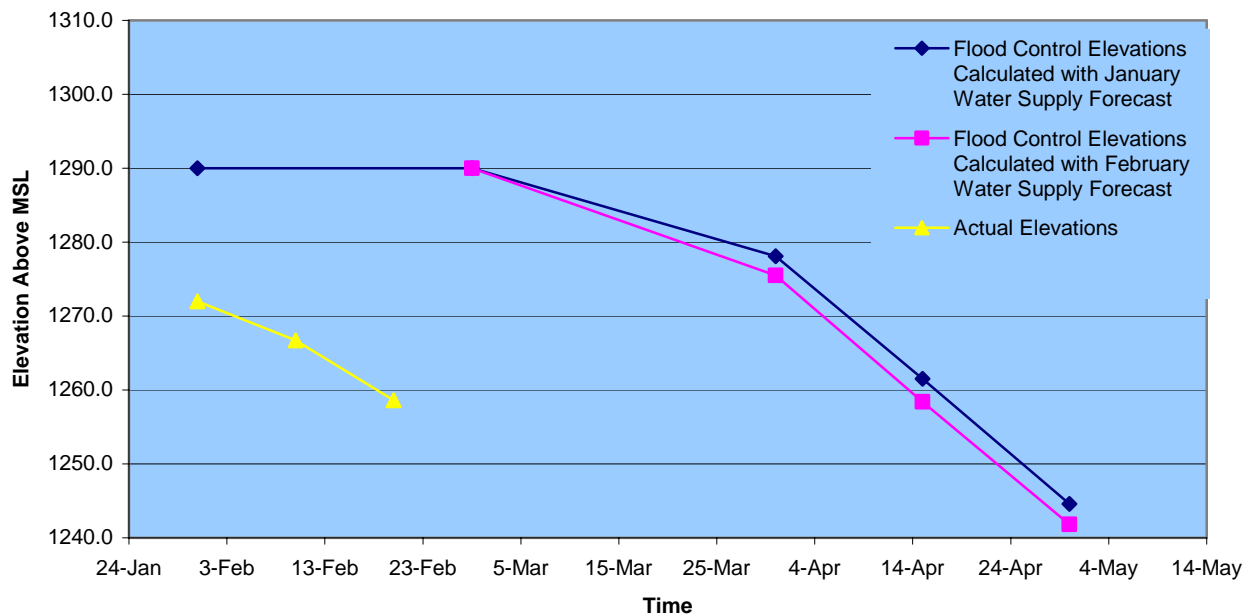


Figure 3. Grand Coulee flood control elevations based upon January and February 2002 water supply forecasts and actual reservoir elevations.

Brownlee

At the Brownlee Reservoir, the flood control elevations calculated from the February 2002 water supply forecast were only slightly lower (with respect to Mean Sea Level) than those calculated using the 2002 January water supply forecast (Figure 4). The minimal decrease between flood control elevations calculated using the January and February water supply forecasts may be credited to a slight, 40 Kaf (Apr-July), increase in USACE water supply forecast between the mentioned months (Table 1). Similarly, the NWRFC estimated a 40 Kaf (Apr-July) increase in final water supply forecast between the months of January and February (Table 2)³. Actual reservoir elevations at Brownlee were approximately 25 feet below the flood control elevations calculated in early February and 20 feet lower than elevations calculated in mid February.

³ USACE uses water supply forecasts for Brownlee that are estimated by the NWRFC. Because the forecast periods for the water supply values issued for Grand Coulee by USACE and the NWRFC are exactly the same, the values should also be the same.

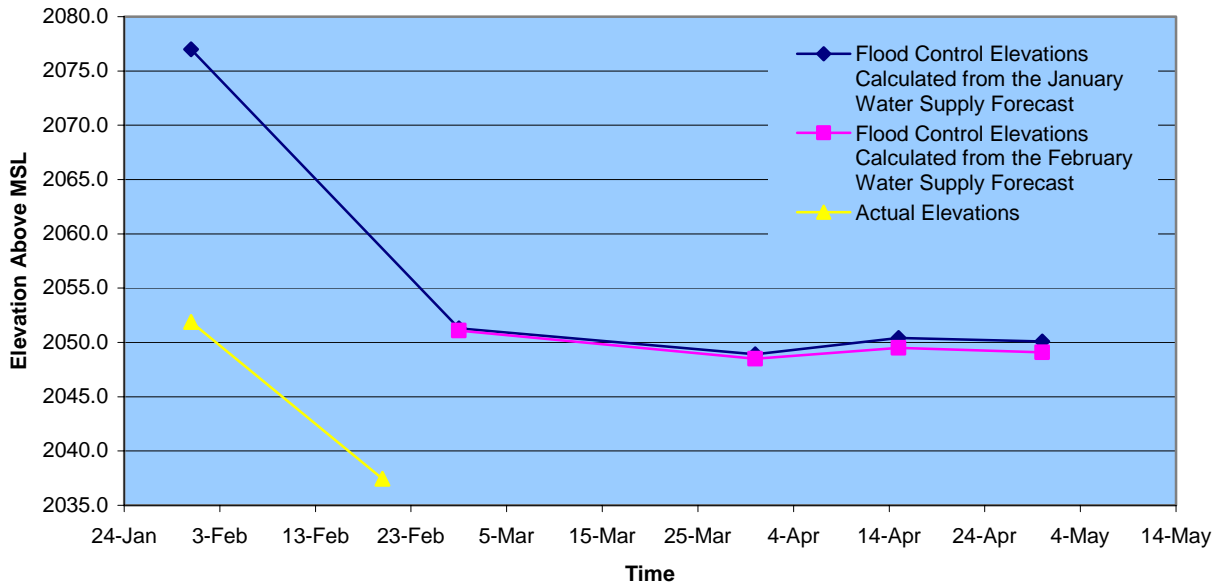


Figure 4. Brownlee flood control elevations based upon January and February 2002 water supply forecasts and actual reservoir elevations.

Libby

At the Libby Reservoir, the flood control elevations calculated from the February 2002 water supply forecast were slightly higher (with respect to Mean Sea Level) than those calculated using the January 2002 water supply forecast (Figure 5). The increase between flood control elevations calculated using the January and February water supply forecasts may be credited to a 58 Kaf (Apr-Aug) decrease in USACE estimated water supply forecast between the mentioned months (Table 1). Conversely, the NWRFC estimated a 30 Kaf (Apr-Sept) increase in final water supply forecast between the months of January and February at Libby (Table 2). It is probable that the periods of forecast, April to August (USACE) and April to September (NWRFC), are accountable for the differing water supply forecasts issued by the USACE and NWRFC. Actual reservoir elevations at Libby were approximately 2 feet above the flood control elevations calculated in early February and slightly (approximately 0.5 feet) higher than elevations calculated in mid February.

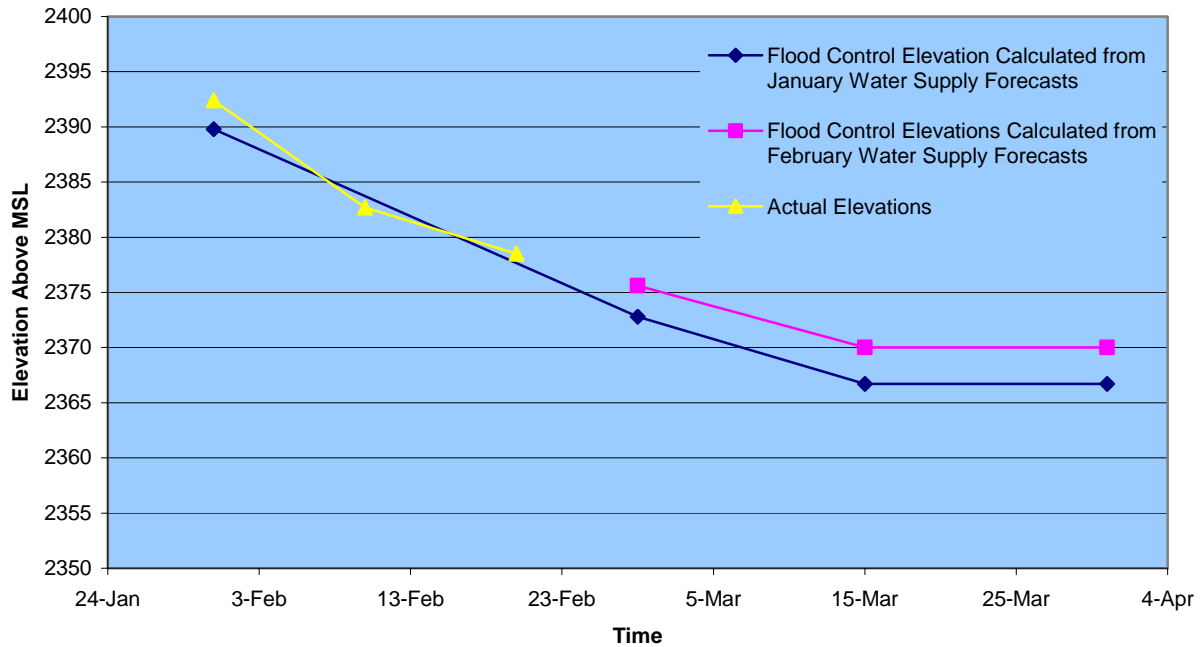


Figure 5. Libby flood control elevations based upon January and February 2002 water supply forecasts and actual reservoir elevations.

Dworshak, Hungry Horse, Grand Coulee, and Brownlee reservoirs all exhibited similar trends with respect to flood control targets and current elevations. Each reservoir reported decreasing flood control targets between the months of January and February 2002, a likely result of increasing water supply forecasts between the same months. Also, each current reservoir elevation was below the most recent flood control target.

The Libby Project displayed a different trend than observed at the other reservoirs. At Libby, flood control elevations calculated from the February 2002 water supply forecast were slightly higher than those calculated using the January 2002 water supply forecast. The increase between flood control elevations calculated using the January and February water supply forecasts may be credited to a 58 Kaf (Apr-Aug) decrease in USACE water supply forecast between the two months. Actual reservoir elevations at Libby were slightly above the current flood control targets.

UPPER SNAKE RESERVOIR CONTENT: WATER YEAR 2002

Upper Snake River project water content data was located and plotted for water year 2002. Reservoir water content at the following projects were evaluated over the 2002 water year: Island Park, Ririe, Palisades, Grassy Lake, American Falls, Jackson Lake, and Minidoka.

Island Park Dam and Reservoir

The Island Park Dam and Reservoir began the 2002 water year (October 1, 2001) at approximately 24,000 acre-feet (Figure 6). Between October 1, 2001 and February 14, 2002 the reservoir filled at an average rate of 480 acre-feet per day. On February 14, 2002 the Island Park Dam and Reservoir contained approximately 89,000 acre-feet of water.

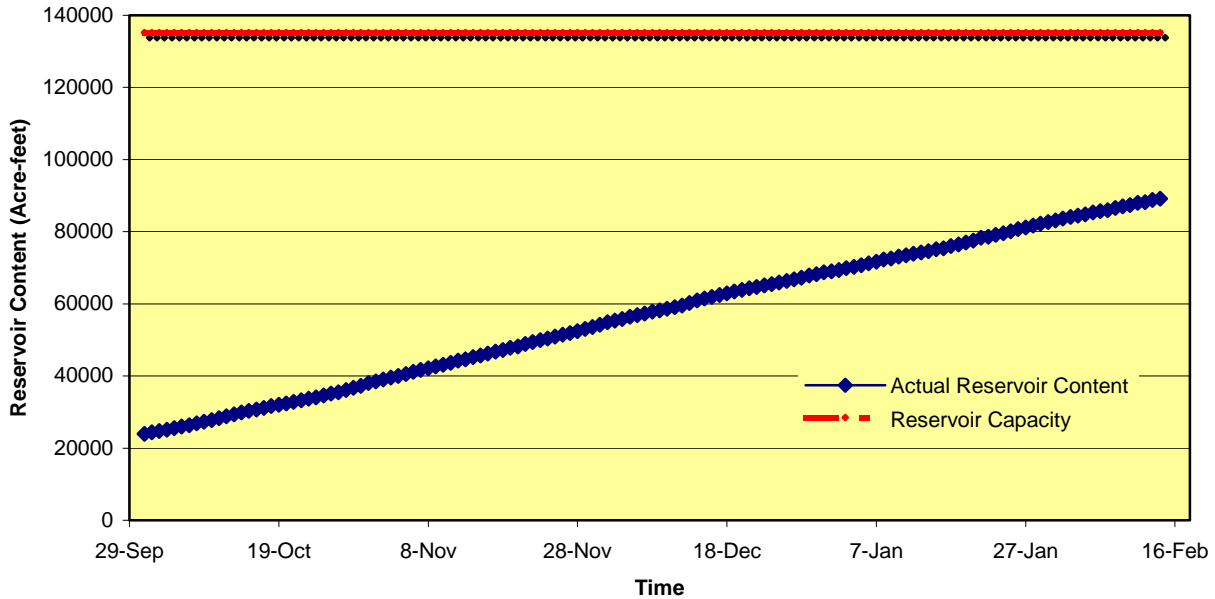


Figure 6. Water year 2002 reservoir content at the Island Park Dam and Reservoir on the Henry’s Fork River.

Ririe Dam and Reservoir on Willow Creek

The Ririe Dam and Reservoir began the 2002 water year (October 1, 2001) at approximately 24,300 acre-feet (Figure 7). Between October 1, 2001 and February 20, 2002 the reservoir filled at an average rate of 40 acre-feet per day. On February 20, 2002 the Ririe Dam and Reservoir contained approximately 30,000 acre-feet of water.

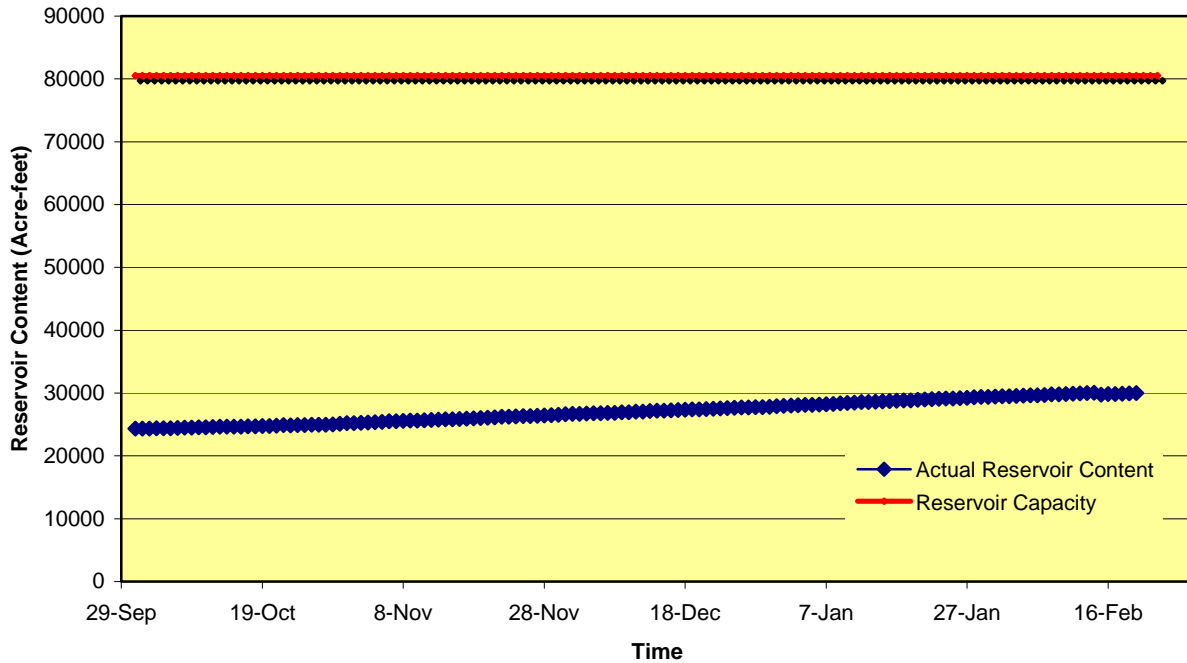


Figure 7. Water year 2002 reservoir content at the Ririe Dam and Reservoir on Willow Creek.

Palisades Dam

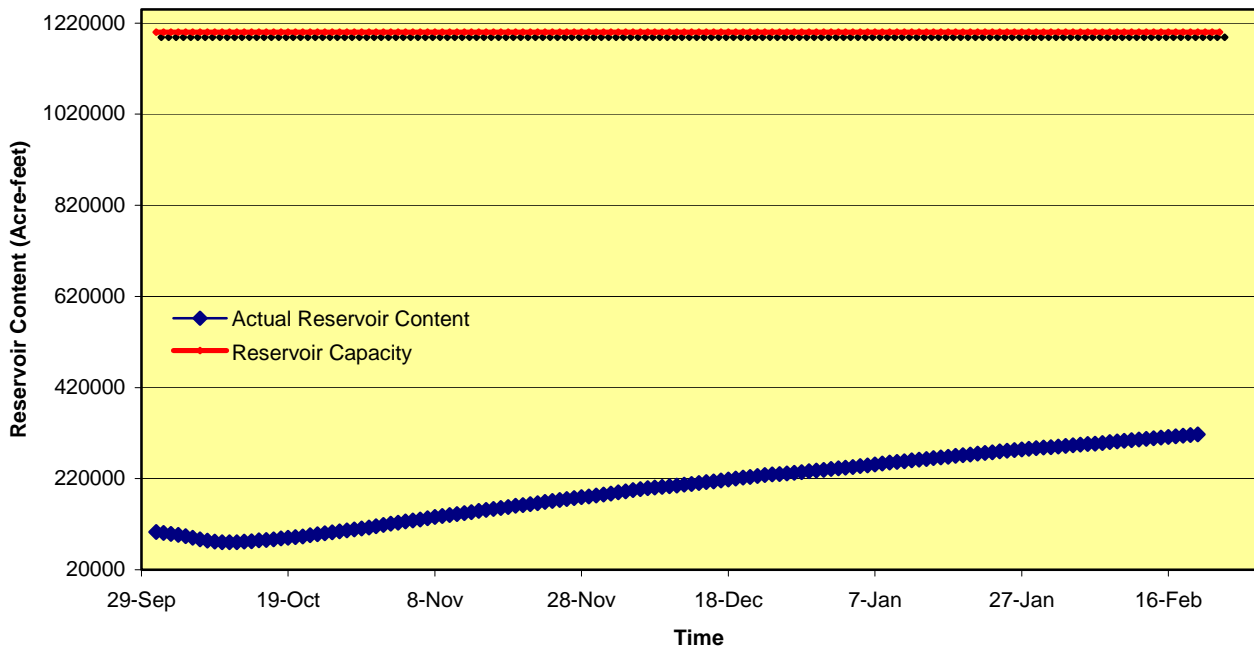


Figure 8. Water year 2002 reservoir content at the Palisades Dam.

The Palisades Dam began the 2002 water year (October 1, 2001) at approximately 103,000 acre-feet (Figure 8). Reservoir content dropped steadily from October 1, 2001 to October 10, 2001 at an average rate of 2300 acre-feet per day, reaching a low of approximately 80,000 acre-feet on October 10, 2001. Between October 11, 2001 and February 20, 2002 the reservoir filled at an average rate of 1800 acre-feet per day. On February 20, 2002 the Palisades Dam contained approximately 317,000 acre-feet of water.

Grassy Lake near Moran, Wyoming

Grassy Lake began the 2002 water year (October 1, 2001) at approximately 8,700 acre-feet (Figure 9). Between October 1, 2001 and February 14, 2002 the reservoir filled at an average rate of 6 acre-feet per day. On February 14, 2002 Grassy Lake contained approximately 9,500 acre-feet of water.

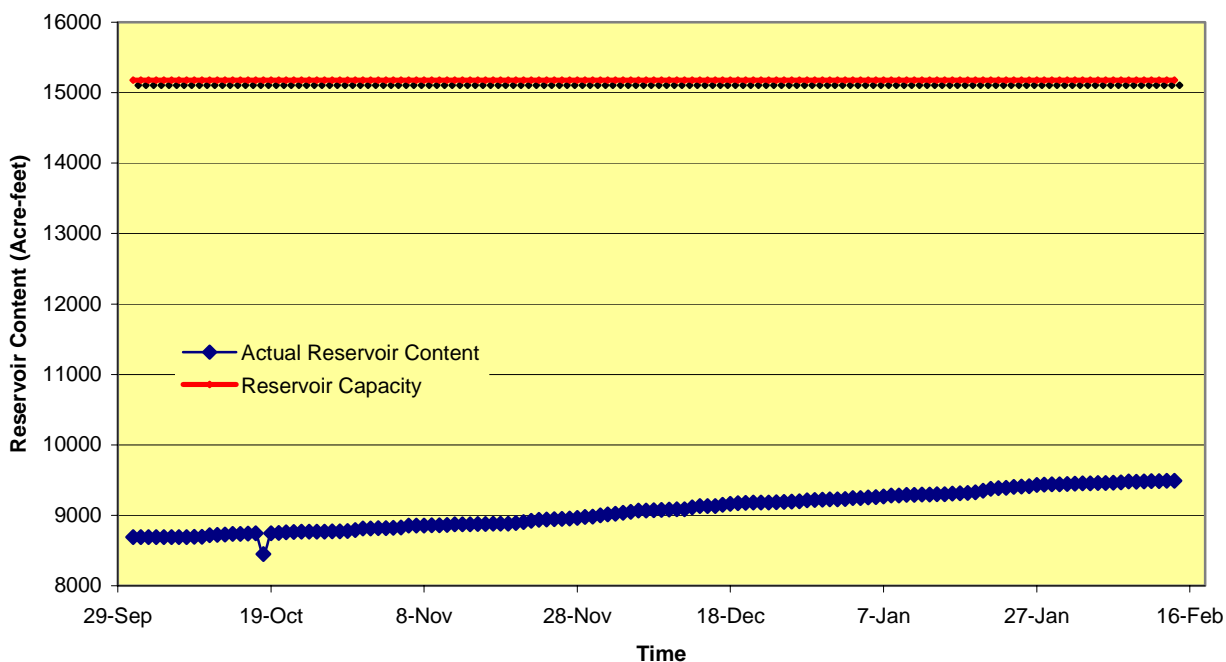


Figure 9. Water year 2002 reservoir content at Grassy Lake near Moran, Wyoming.

American Falls Dam and Reservoir, Idaho

The American Falls Dam and Reservoir began the 2002 water year (October 1, 2001) at approximately 42,400 acre-feet (Figure 10). Reservoir content increased at a relatively low rate of 1360 acre-feet per day from October 1, 2001 to October 11, 2001. Between October 11, 2001

and February 20, 2002 the reservoir filled at a higher average rate of 7720 acre-feet per day. On February 20, 2002 the American Falls Dam and Reservoir contained approximately 1,069,000 acre-feet of water.

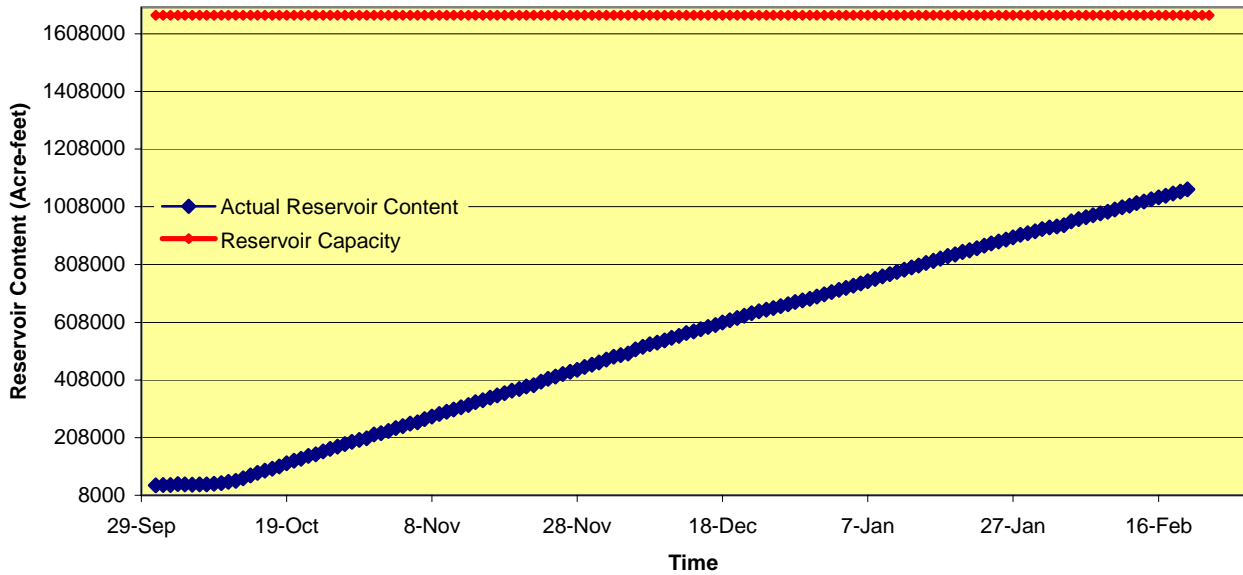


Figure 10. Water year 2002 reservoir content at American Falls Dam and Reservoir, Idaho.

Jackson Lake on the Snake River near Moran

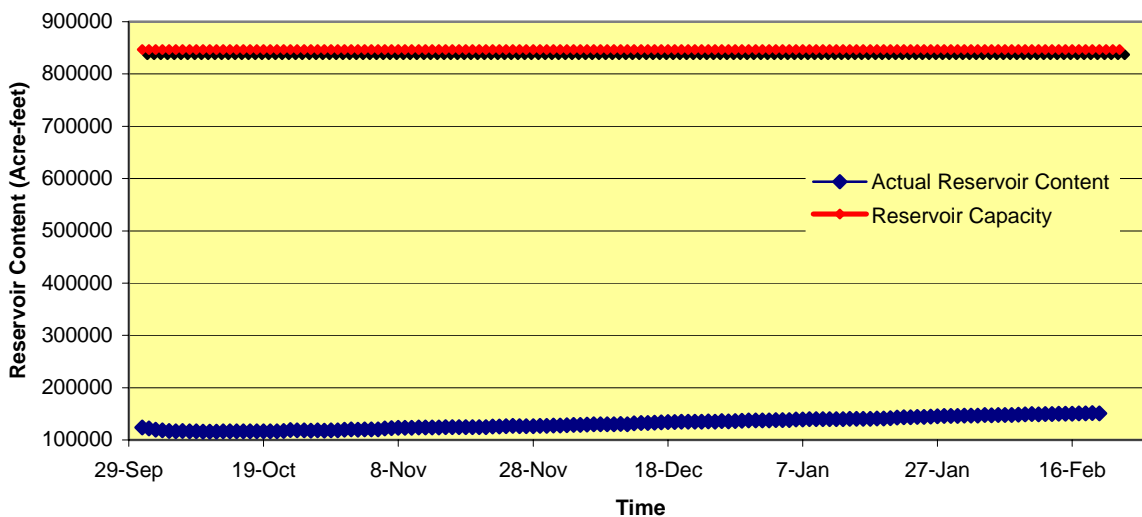


Figure 11. Water year 2002 reservoir content at Jackson Lake on the Snake River near Moran.

Jackson Lake began the 2002 water year (October 1, 2001) at approximately 124,000 acre-feet (Figure 11). Reservoir content dropped steadily from October 1, 2001 to October 10, 2001 at an average rate of 800 acre-feet per day, reaching a low of approximately 116,000 acre-feet on October 10, 2001. Between October 11, 2001 and February 20, 2002 the reservoir filled at an average rate of 260 acre-feet per day. On February 20, 2002 Jackson Lake contained approximately 151,000 acre-feet of water.

Minidoka Dam and Lake Walcott on the Snake River, Idaho

Minidoka Dam began the 2002 water year (October 1, 2001) at approximately 44,700 acre-feet (Figure 12). Reservoir content dropped steadily from October 1, 2001 to October 7, 2001 at an average rate of 990 acre-feet per day, reaching 38,700 acre-feet on October 7, 2001. Between October 8, 2001 and February 14, 2002 the reservoir content decreased at an average rate of 19 acre-feet per day. On February 14, 2002 Minidoka Dam contained approximately 35,300 acre-feet of water.

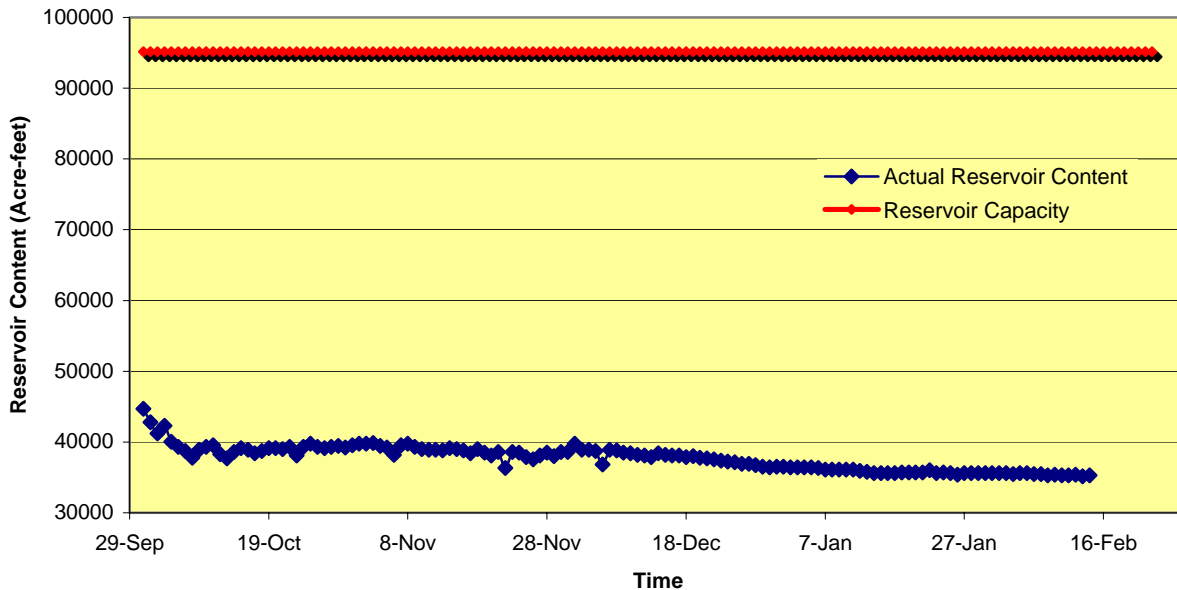


Figure 12. Water year 2002 reservoir content at Minidoka Dam and Lake Walcott on the Snake River, Idaho.

Generally, the Upper Snake River projects of Island Park, Ririe, Palisades, Grassy Lake, American Falls, and Jackson Lake exhibited similar trends over the beginning of the 2002 water year. At these projects, reservoir content increased at a relatively constant rate between October 1, 2001 and mid-February 2002. Reservoir content at the Minidoka project generally decreased over the same period.