

COLUMBIA RIVER WATER MANAGEMENT GROUP

MEETING NO. 490

1. ATTENDANCE

The following met at 9:30 a.m., on Thursday, March 12, 1998, in the Custom House, Portland, OR.

Members or Alternates Present

Ted Day, US Bureau of Reclamation, Chair
 Nancy Stephan, Bonneville Power Admin
 Joe Intermill, National Weather Service-RFC
 Dan Moore, Natural Resources Conservation Svc
 Doug McChesney, Washington Dept of Ecology
 Roger Ross, Corps of Engineers

Others Present

Nengjin Liu, Idaho Power Co
 Tim Heizenrader, PacifiCorp
 Tom Fero, National Weather Service-RFC
 Judy Garbutt, National Weather Service-RFC
 Dušica Jevremović, Fish Passage Center
 Jon Lea, Natural Resources Conservation Svc
 Cathy Hlebechuk, Corps of Engineers (NWD-NP)

Members Not Present or Represented

Ed Hubbard, U.S. Geological Survey
 Walter Boyle, Federal Energy Regulatory Comm
 Jack Gakstatter, U.S. Environ'l Protection Agy
 Bruce McCammon, U.S. Forest Service
 Marvin Yoshinaka, U.S. Fish and Wildlife Service
 Bill Brooks, Bureau of Land Management
 _____, National Marine Fisheries Svc
 B Ondrechen, Idaho Dpt Water Resources & Cons
 Barry Norris, Oregon Water Resources Dept
 Mike Turnipseed, Nevada State Engineer
 Gordon Fassett, Wyoming State Engineer
 Jack Stults, Montana Dept of Natural Res & Cons

2. MINUTES OF LAST MEETING

The minutes of the last meeting were issued on the Internet, for the first time. Future issues will be released on the Internet, in lieu of mailed hard copy, about mid-month at <http://www.nwd-wc.usace.army.mil/crwmg.htm>.

3. WEATHER SUMMARY

A warm and dry February dominated the Pacific Northwest, with the exception of above normal precipitation across southern Oregon and southwestern Idaho, as reported by Joe Intermill (Enc 1). Mean basin temperatures for 30 stations departed 3.3°F above normal with individual stations ranging from +6.7°F to -1.7°F from normal.

As during January, several weather systems and extended deep Aleutian troughs moved across the basin with southwesterly flow. The bulk of the system energy moved into California. Precipitation was fairly spotty.

Monthly and **seasonal** precipitation, in percent of normal, are given below.

<u>Basin</u>	<u>Feb</u>	<u>Oct-Feb</u>	<u>Basin</u>	<u>Feb</u>	<u>Oct-Feb</u>
Above Grand Coulee	43%	79%	Kootenai	48%	74%
Above Ice Harbor	92%	92%	Clearwater	53%	84%
Above The Dalles	69%	88%	Pend Oreille/Spokane	56%	86%
Willamette	105%	97%	Rogue	166%	111%

4. SNOWPACK

With the drier than normal weather during February most sub-basin snowpack's water content either remained constant or decreased according to Dan Moore (Enc 2 and p 12 of Enc 1). The February 1 average Columbia Basin snowpack was 84% of its normal value, down 6 percentage points from last month; in terms of the April 1 peak snowpack the March 1 snowpack was 71%, up 10 points from last month but still 11 points below normal. Sub-basin snowpack increases were limited to parts of eastern Oregon and southwestern Idaho with

increases of 3-10 points. British Columbia and its Kootenay Basin had the largest declines, with 8 and 9 points. In Idaho the Clearwater dropped 7 points and the Salmon dropped 4 points. The Washington Cascade snowpacks increased at a normal rate leaving the Yakima with the heaviest snowpack at 116% of normal.

NRCS's website contains monthly summaries of precipitation, streamflow, snow pack, and other data can be found at: ftp://ftp.wcc.nrcs.usda.gov/data/climate/basin_reports/westwide.htm.

5. SURFACE WATER SUPPLY INDEX (SWSI)

This month the Oregon SWSI was generally unchanged during February, according to Jon Lea (Enc 3) with the exceptions of the southern basins that were on the edge of the California storms. The Idaho SWSI values indicate an increase in their water supply also from the California storms.

6. STREAMFLOW

Average monthly streamflows throughout the Northwest were generally below normal during February, according to a report submitted by Ed Hubbard (Enc 4); exceptions were in the upper Snake Basin. Streamflows west of the Cascades were generally lower than those of January while those rivers in eastern basins generally had higher flows.

7. RUNOFF VOLUME FORECASTS

Joe Intermill reported that the forecasts decreased this month, reflecting the below normal precipitation and snowpacks. The most probable forecasts (Enc 1) varied from highs of 105% to 110% in northeastern Washington to lows of 69% in parts of the Snake River Plain. Selected forecasts for key basins in maf, are:

	<u>January-July</u>	<u>April-July</u>	<u>April-Sept</u>
Columbia at Grand Coulee	54.8 (87%)		55.7 (86%)
Snake at Lower Granite	26.4 (89%)	19.1 (88%)	
Columbia at The Dalles	91.7 (87%)		84.4 (85%)
Libby	5.15 (81%)		5.37 (79%)
Hungry Horse	1.69 (74%)		1.62 (74%)
Dworshak (NWS)	2.68 (76%)	2.00 (74%)	2.13 (74%)
Dworshak - Official (Enc 5)		1.805 (67%)	

The official Dworshak forecast procedure was developed by the NRCS and includes an El Niño effect. This has been reviewed and accepted by the Corps for official use for forecasting Dworshak runoff and can be found on the Corps' NWD-WC web site at: <http://www.nwd-wc.usace.army.mil/cgi-bin/report.pl?dwrf.txt>.

8. RESERVOIR OPERATION

Irrigation supply is above normal for the upcoming irrigation season according to Ted Day (Enc 6). Grand Coulee is holding its pool down for spillway drum gate work, Hungry Horse is below its flood control draft point and is operating near minimum outflow to maintain fish flows on the Flathead River at Columbia Falls, and the Boise system is already below its flood control target elevation and is passing inflow.

Active content available at the end of February at 52 irrigation reservoirs (excluding Grand Coulee and Hungry Horse) was 8,505,800 af--78% of capacity, 985,300 af more than last year, and 1,068,500 af more than normal, at **Franklin D Roosevelt Lake (Grand Coulee Dam)** the active contents was approximately 2,561,600 af--49% of capacity, 1,867,200 af more than last year, and 276,300 af less than normal, and at **Hungry Horse** the active content was 1,911,700 af--64% of capacity, 1,234,600 af more than last year, and 153,300 af more than normal.

Cathy Hlebechuk reported on the operation of the Corps' projects (Enc 7). **Libby** drafted to its March 1 flood control level; now, with the reduced forecast, the flood control requirement has raised so the project is now storing. Lake Pend Oreille (**Albeni Falls**) is maintaining Pend Oreille Lake within the 2055.0-2056.0 ft range. **Dworshak** is discharging minimum outflow and the pool is slowly beginning to refill following the completion of the grouting work at the dam. The pool is currently 35.7 ft below the flood control curve. At the **Lower Snake Projects, Ice Harbor, Lower Monumental, and Little Goose** were operating at their normal operating pool levels and **Lower Granite** was operating in the top foot of its operating range due to the construction of the surface fish bypass collector.

The **Willamette basin projects** started their refill process on February 1 and are releasing minimum flow. Fill rates are low, however, due to low inflows.

Brownlee pool is at 2043.7 ft and operating towards its new April 30 target flood control elevation of 2066.0 ft, according to Nengjin Liu.

9. POWER OPERATIONS

On February 28 the Federal System of reservoirs was at 42.8% of full storage capacity and the Coordinated System was 43.9% of full, according to Nancy Stephan. The net monthly energy delivery over the Pacific North-west/Southwest intertie was from the north to south with a net delivery of 2,086,714 MWh. System firm loads ran near the estimate at 92.5% (after correction for temperature deviation from normal).

10. HYDROMET

Jon Lea reported that the NRCS will be installing another new SNOTEL site in the Carbon River drainage on Mt Rainier for the City of Puyallup. They are also looking to install two sites in the Dungeness and Elwha basins near Port Angeles.

The seasonal installation of water quality sensors at Hungry Horse will begin soon.

One suggestion for the June travel meeting was to visit the lower Snake projects to observe some of the technical difficulties involved in a possible drawdown or breaching of the projects for fish passage.

11. NEXT MEETINGS

The next meetings are tentatively scheduled for 9:30 am, in the Custom House, Room 118, on April 14, May 12, and the travel meeting on June 11.

Roger L. Ross
Secretary

Enclosures

1. Weather Summary

- a. Monthly Precipitation Map
- b. Monthly Temperature Map
- c. Seasonal Precipitation Map
- d. Columbia Basin Monthly Precipitation Summary
- e. Seasonal Water Supply Forecast
- f. Columbia Basin Peak Forecast
- g. Streamflow Forecasts Map

2. Snowpack Summary
 - a. Columbia Basin Snowpack Summary
 - b. Mountain Snow Water Equivalent Map
 - c. Sub-Basin Snowpack Graphs
3. SWSI Oregon & Idaho
4. Streamflow Summary
5. Dworshak Forecast
6. USBR Project Summary
 - a. Upper Snake Teacup
 - b. Boise Teacup
 - c. Project Summary
 - d. Yakima Summary
7. Corps Project Summary

ABRIDGED

WATER SUPPLY OUTLOOK

COLUMBIA RIVER AND PACIFIC COAST BASINS

March 1, 1998

COLLABORATIVE AND SUPPORTIVE AGENCIES:

Northwest River Forecast Center, NWS
USDA/National Resource Conservation Service
US Army Corps of Engineers, North Pacific Division
US Bureau of Reclamation
British Columbia Hydro and Power Authority
Weather Services Directorate/Environment Canada
Local water district managers and utility companies

For more information, or to be included on the mailing list, please contact:

Northwest River Forecast Center
NOAA/National Weather Service
Attn: Tom Fero, Water Supply Coordinator or
Kyle Martin, *Water Supply Outlook* Technical Editor
Judith L. Garbutt, *Water Supply Outlook* Production Editor
5241 NE 122nd Avenue
Portland, Oregon 97230-1089

Internet Homepage: <http://www.nwrfc.noaa.gov>

(503) 326-7291
(503) 326-2598 (FAX)

tfero@nwrfc.noaa.gov
kmartin@nwrfc.noaa.gov

Enc 1

ZCZC PDXRRMPD2 WES
TTAA00 KPDR DDHMM

NORTHWEST RIVER FORECAST CENTER - PORTLAND, OREGON

COLUMBIA BASIN PRECIPITATION (MONTHLY SUMMARY)

NWS PORTLAND RIVER FORECAST CENTER
COLUMBIA BASIN DIVISION AVERAGES OF SEASONAL PRECIPITATION

DIVISION	..FEB TO DAY 28..		OCT - FEB....		
	OBSD	DEP	PCT AV	OBSD	DEP	PCT AV
COLUMBIA ABOVE COULEE	.91	-1.18	44.	10.01	-2.72	79.
SNAKE RV AB ICE HARBOR	1.47	-.08	95.	8.10	-.70	92.
COLUMBIA AB THE DALLES	1.45	-.65	69.	10.92	-1.52	88.
COLUMBIA AB CASTLEGAR	1.52	-1.41	52.	16.18	-1.66	91.
KOOTENAI	.99	-1.02	49.	9.57	-3.36	74.
CLARK FORK	.40	-.93	30.	5.84	-2.08	74.
FLATHEAD	.48	-1.35	26.	6.85	-3.91	64.
PEND OREILLE/ SPOKANE	1.65	-1.31	56.	14.54	-2.45	86.
NORTHEAST WASHINGTON	1.58	.07	104.	9.06	-.22	98.
OKANOGAN	1.70	.45	136.	8.32	.76	110.
EAST SLOPES WASH CASC.	4.14	-.50	89.	28.23	.84	103.
CENTRAL WASHINGTON	1.29	.49	161.	5.44	.45	109.
UPPER SNAKE	1.25	-.50	71.	8.90	-.74	92.
SNAKE RIVER PLAIN	.90	.04	105.	4.45	-.57	89.
OWYHEE/ MALHEUR	1.48	.55	159.	5.35	-.26	95.
SALMON/ BOISE/ PAYETTE	1.74	-.21	89.	10.11	-1.06	91.
BURNT/ GRANDE RONDE	.88	-.48	65.	7.36	-.99	88.
CLEARWATER	1.58	-1.29	55.	13.33	-2.52	84.
SOUTHEAST WASHINGTON	1.24	-.57	69.	9.27	-.90	91.
UPPER JOHN DAY	1.10	-.12	90.	6.74	-.98	87.
UMATILLA/ LWR JOHN DAY	1.13	-.34	77.	9.31	.49	106.
UPR DESCHUTES/ CROOKED	1.84	.40	128.	8.72	-.28	97.
HOOD/ LOWER DESCHUTES	2.95	-.29	91.	17.57	-1.45	92.
NW SLOPE WASH CASCADES	6.25	-3.51	64.	54.88	-1.03	98.
SW WA CASCADES/COWLITZ	6.71	-1.45	82.	46.02	.10	100.
WILLAMETTE VALLEY	7.14	.33	105.	37.47	-1.33	97.
ROGUE/ UMPQUA	6.84	2.72	166.	27.10	2.75	111.
KLAMATH BASIN	2.80	.92	149.	13.46	1.81	116.
LAKE COUNTY-GOOSE LAKE	1.49	.45	143.	6.41	-.26	96.
HARNEY/ MALHEUR BASIN	2.11	1.14	218.	7.59	1.40	123.

DIVISION VALUES ARE COMPUTED BY UTILIZING UN-WEIGHTED PRECIPITATION AMOUNTS FROM KEY STATIONS IN EACH AREA. NORMALS BASED ON 1961-1990. FOR FURTHER INFORMATION CONTACT: NWRFC (503) 326-7291.

CONTINUED "EL NINO" WARMTH AND DRIER CONDITIONS MARKED FEBRUARY. MONTANA WAS PARTICULARLY DRY. IN FACT, KALISPELL REPORTED THE FIFTH DRIEST FEBRUARY ON RECORD. HIGH ELEVATION SNOW PACKS INCREASED WHILE LOWER ELEVATION AND UPPER COLUMBIA SNOW PACKS MELTED.

MEAN TEMPERATURES DEPARTED +3.1 DEGREES (31 STATIONS) FROM NORMAL FOR THE PACIFIC NORTHWEST RELATIVE TO 1961-1990 NORMALS. MEAN TEMPERATURE DEPARTURES RANGED BETWEEN 6.7 AND -7.3 DEGREES. RECORD HIGHS NOTED ON THE 6TH FOR PORTLAND (59, TIE) AND SALEM (67 DEGREES). RECORD PRECIPITATION NOTED AT ASTORIA ON THE 28TH (1.25 INCH) AND SALEM ON THE 21ST (1.21 INCH). BY THE 28TH, THE REGIONAL SNOW DEPTHS (IN INCHES) WERE: TETE JAUNE, B.C., 39; BLUE RIVER, B.C., 20; KALISPELL, MT, 3; BUTTE, MT, 3; DIXIE, ID, 40; ELK CITY, ID, 20; POWELL, ID, 30; MIDDLE FORK RANCH, ID, 10; YELLOWPINE BAR, ID, 5; WEST YELLOWSTONE, MT, 32; WILD HORSE RESERVOIR, NV, 21; CRATER LAKE NP, OR, 141; MT. HOOD-TIMBERLINE LODGE, OR, 171; MT. RAINIER-PARADISE RS, WA, 170; STAMPEDE PASS, WA, 95; SNOQUALMIE PASS, WA, 99; STEVENS PASS, WA, 100; MT. BAKER LODGE, WA, 168.

LIKE JANUARY'S PATTERN, SEVERAL FRONTS AND EXTENDED DEEP ALEUTIAN TROUGHS MOVED ACROSS THE BASIN WITH SOUTHWESTERLY FLOW. THE BULK OF THE SYSTEM ENERGY MOVED INTO CALIFORNIA. PRECIPITATION WAS FAIRLY CONSTANT. MINOR FLOODING OCCURRED WEST OF THE CASCADES.

FOR FEBRUARY...PRECIPITATION WAS 44 PERCENT OF NORMAL (1961-1990) AT COLUMBIA ABOVE COULEE; 95 PERCENT OF NORMAL AT THE SNAKE RIVER ABOVE ICE HARBOR; AND 69 PERCENT AT COLUMBIA ABOVE THE DALLES.

end/nwrfc/kmartin
NNNN

ZCZC PDXESPPDR
TTAA00 KPDR 062111

SEASONAL
WATER SUPPLY FORECASTS
ISSUED BY
NATIONAL WEATHER SERVICE
NORTHWEST RIVER FORECAST CENTER
PORTLAND OREGON

MAR-98FINAL	1	W A T E R S U P P L Y F O R E C A S T S	PERIOD	FORECAST	%	AVERAGE
STREAM AND STATION						
COLUMBIA RIVER						
		MICA RESERVOIR INFLOW, BC	FEB-SEP	11600.0	88	13170.
			APR-SEP	11200.0	88	12730.
		ARROW LAKES INFLOW	FEB-SEP	24800.0	93	26800.
			APR-SEP	23500.0	92	25540.
		BIRCHBANK, BC (1)	APR-SEP	39300.0	90	43800.
		GRAND COULEE, WA (1)	JAN-JUL	54800.0	87	63280.
			APR-SEP	55700.0	86	64850.
		ROCK ISLAND DAM BLO, WA (1)	APR-SEP	61600.0	87	70480.
		THE DALLES NR, OR (1)	APR-SEP	84400.0	85	98980.
			JAN-JUL	91700.0	87	105900.
KOOTENAI RIVER						
		LIBBY RES INFLOW, MT (1)	APR-SEP	5370.0	79	6772.
KOOTENAY RIVER						
		KOOTENAY LAKE INFLOW, BC	APR-SEP	13800.0	83	16650.
DUNCAN RIVER						
		DUNCAN RESERVOIR INFLOW, BC	FEB-SEP	2190.0	94	2319.
			APR-SEP	2110.0	94	2238.
CLARK FORK						
		ST. REGIS, MT (1)	APR-SEP	3060.0	75	4095.
PEND OREILLE RIVER						
		PEND OREILLE LAKE IN, ID (1)	APR-SEP	10200.0	71	14370.
S.F. FLATHEAD RIVER						
		HUNGRY HORSE RES IN, MT (1)	APR-SEP	1620.0	74	2184.
FLATHEAD RIVER						
		FLATHEAD LAKE INFLOW, MT (1)	APR-SEP	5070.0	73	6926.
COEUR D'ALENE RIVER						
		COEUR D'ALENE LAKE IN, ID	APR-SEP	1910.0	70	2720.
SIMILKAMEEN RIVER						
		NIGHTHAWK NR, WA (1)	APR-JUL	1080.0	83	1304.
OKANAGAN RIVER						
		TONASKET NR, WA (1)	APR-SEP	1350.0	83	1623.
CHELAN RIVER						
		LAKE CHELAN INFLOW, WA (1)	APR-SEP	1140.0	98	1160.
YAKIMA RIVER						
		PARKER NR, WA	APR-SEP	1900.0	95	1994.
SKAGIT RIVER						
		CONCRETE NR, WA	APR-SEP	6250.0	96	6525.
COWLITZ RIVER						
		MAYFIELD RES INFLOW, WA	APR-SEP	1940.0	98	1971.
			APR-JUL	1700.0	98	1731.
		CASTLE ROCK, WA	APR-SEP	2570.0	96	2668.
SNAKE RIVER						
		JACKSON LAKE INFLOW, WY (1)	APR-JUL	705.0	90	781.
		PALISADES RES INFLOW, ID (1)	APR-JUL	2960.0	92	3226.
		HEISE NR, ID	APR-JUL	3140.0	91	3451.
		WEISER, ID (1)	APR-JUL	4970.0	91	5465.
		BROWNLEE RES INFLOW	APR-JUL	5250.0	91	5794.
		LOWER GRANITE RES IN, WA (1)	JAN-JUL	26400.0	89	29740.
			APR-JUL	19100.0	88	21650.
TETON RIVER						
		ST. ANTHONY NR, ID	APR-JUL	380.0	100	380.
HENRYS FORK						
		REXBURG NR, ID	APR-JUL	1180.0	97	1219.
PORTNEUF RIVER						
		TOPAZ, ID	APR-SEP	98.0	105	93.
BIG LOST RIVER						
		MACKAY RESERVOIR INFLOW, ID	APR-JUL	130.0	87	150.
BIG WOOD RIVER						
		HAILEY, ID (1)	APR-JUL	198.0	78	254.
		MAGIC RESERVOIR INFLOW, ID	APR-JUL	205.0	69	295.
LITTLE WOOD RIVER						
		CAREY NR, ID	APR-JUL	79.0	86	92.
DESCHUTES RIVER						
		BENHAM FALLS, OR	APR-SEP	785.0	112	702.
OWYHEE RIVER						
		OWYHEE RES INFLOW, OR	MAR-JUL	535.0	94	567.
BOISE RIVER						
		BOISE NR, ID (1)	APR-JUL	1270.0	89	1421.
MALHEUR RIVER						

DREWSEY NR, OR	MAR-JUL	109.0	106	103.
N.F. MALHEUR RIVER				
BEULAH RES INFLOW, OR (1)	MAR-JUL	80.0	105	76.
PAYETTE RIVER				
HORSESHOE BEND NR, ID (1)	APR-JUL	1580.0	98	1618.
WEISER RIVER				
WEISER NR, ID (1)	APR-JUL	385.0	100	386.
POWDER RIVER				
SUMPTER NR, OR	MAR-JUL	54.0	81	67.
SALMON RIVER				
WHITEBIRD, ID (1)	APR-JUL	5560.0	93	5956.
GRANDE RONDE RIVER				
LA GRANDE, OR	MAR-JUL	172.0	79	218.
TROY, OR (1)	MAR-JUL	1340.0	91	1471.
CLEARWATER RIVER				
OROFINO, ID (1)	APR-JUL	3900.0	83	4718.
N.F. CLEARWATER RIVER				
DWORSHAK RES INFLOW, ID (1)	APR-JUL	2000.0	74	2700.
	APR-SEP	2130.0	74	2874.
CLEARWATER RIVER				
SPALDING, ID (1)	APR-JUL	6120.0	80	7618.
	APR-SEP	6470.0	80	8052.
UMATILLA RIVER				
GIBBON NR, OR	APR-JUL	59.0	84	70.
PENDLETON, OR	APR-JUL	118.0	84	141.
S.F. WALLA WALLA RIVER				
MILTON NR, OR	APR-JUL	48.0	91	53.
M.F. JOHN DAY RIVER				
RITTER, OR (1)	APR-JUL	104.0	90	116.
N.F. JOHN DAY RIVER				
MONUMENT NR, OR	APR-JUL	510.0	90	567.
JOHN DAY RIVER				
SERVICE CREEK, OR (1)	APR-SEP	780.0	95	821.
CROOKED RIVER				
PRINEVILLE RES INFLOW, OR	MAR-JUL	171.0	100	171.
OCHOCO CREEK				
OCHOCO RES INFLOW, OR	MAR-JUL	34.0	103	33.
S. SANTIAM RIVER				
WATERLOO, OR	APR-SEP	515.0	89	576.
N. SANTIAM RIVER				
MEHAMA, OR	APR-SEP	780.0	94	832.
WILLAMETTE RIVER				
SALEM, OR	APR-SEP	4110.0	88	4670.
CLACKAMAS RIVER				
ESTACADA, OR	APR-SEP	700.0	94	742.
MCKENZIE RIVER				
VIDA NR, OR	APR-SEP	1050.0	89	1184.
ROGUE RIVER				
RAYGOLD, OR	APR-SEP	850.0	98	868.
SILVIES RIVER				
BURNS NR, OR	APR-SEP	109.0	121	90.

THESE FORECASTS ARE SELECTED FROM THOSE PREPARED BY: NATIONAL WEATHER SERVICE, NATURAL RESOURCE CONSERVATION SERVICE, AND B.C. HYDRO AND POWER AUTHORITY. FOR VARIOUS PROJECT INFLOWS, THE FORECASTS HAVE BEEN COORDINATED WITH THE COLUMBIA RIVER FORECAST SERVICE AND THE U.S. BUREAU OF RECLAMATION.

ALL FORECASTS ARE IN THOUSANDS OF ACRE-FEET
 ALL AVERAGES ARE FOR THE PERIOD 1961 THROUGH 1990
 END.....NOAA/NWS/NORTHWEST RFC.....

ZCZC PDXESGPDR
 TTAA00 KPDR 062158
 PEAK FLOW/STAGE FORECAST
 NATIONAL WEATHER SERVICE
 NW RIVER FORECAST CENTER
 3/6/98

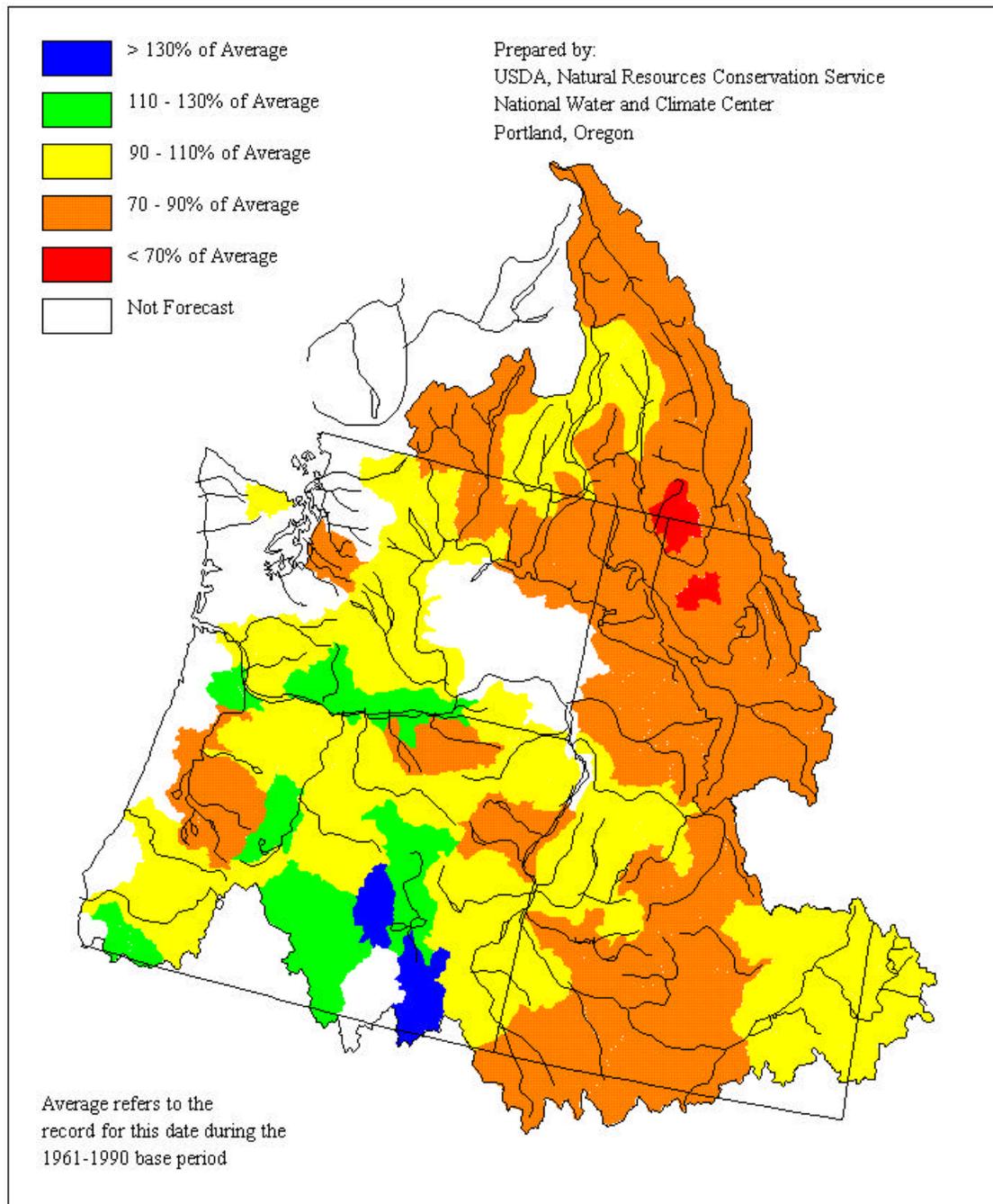
MARCH FINAL FORECAST

STATION	**** PROBABLE RANGE ****		****	
	FLOOD STAGE (FEET)	LOW STAGE (FEET)	HIGH STAGE (FEET)	LOW FLOW (KCFS)
COLUMBIA BASIN				
COLUMBIA RIVER				
PRIEST RAPIDS - WASH	32.0	16.8	23.6	133.3
THE DALLES				229.3
VANCOUVER	16.0	8.4	13.2	
WILLAMETTE RIVER				
PORTLAND - OREG.	18.0	7.9	12.7	
CLARK FORK				
MISSOULA (ABV) - MT.	11.0	6.6	10.2	8.5
ST. REGIS - MT.	19.0	11.8	14.4	20.2
FLATHEAD RIVER				
COLUMBIA FALLS - MT.	14.0	9.4	12.8	24.3
PEND OREILLE RIVER				
NEWPORT - WASH.	100KCFS			35.5
SPOKANE RIVER				
SPOKANE - WA.	27.0	23.4	25.0	15.4
OKANOGAN RIVER				
TONASKET - WA.	15.0	11.8	14.4	11.5
WENATCHEE RIVER				
PESHASTIN - WA.	13.0	9.2	11.4	12.9
YAKIMA RIVER				
PARKER (NR) - WA.	10.0	6.0	8.2	7.0
SNAKE RIVER				
LOWER GRANITE - WA.				119.7
203.7				
HENRYS FORK				
REXBURG - ID.	9.5	8.8	9.8	6.4
PAYETTE RIVER				
EMMETT - ID.	16KCFS	7.2	10.6	8.6
SALMON RIVER				
WHITEBIRD - ID.	32.0	25.4	28.6	52.6
CLEARWATER RIVER				
SPALDING - ID.	18.0	10.0	14.0	36.2
70.0				

PEAK FORECASTS PREDICT THE RANGE OF THE 67% CHANCE (1-SIGMA ABOUT THE MEDIAN) OF OCCURRENCE. ABNORMAL WEATHER DURING THE CRITICAL MELT PERIOD MAY CAUSE THE PEAK TO BE OUTSIDE THE INDICATED RANGE.

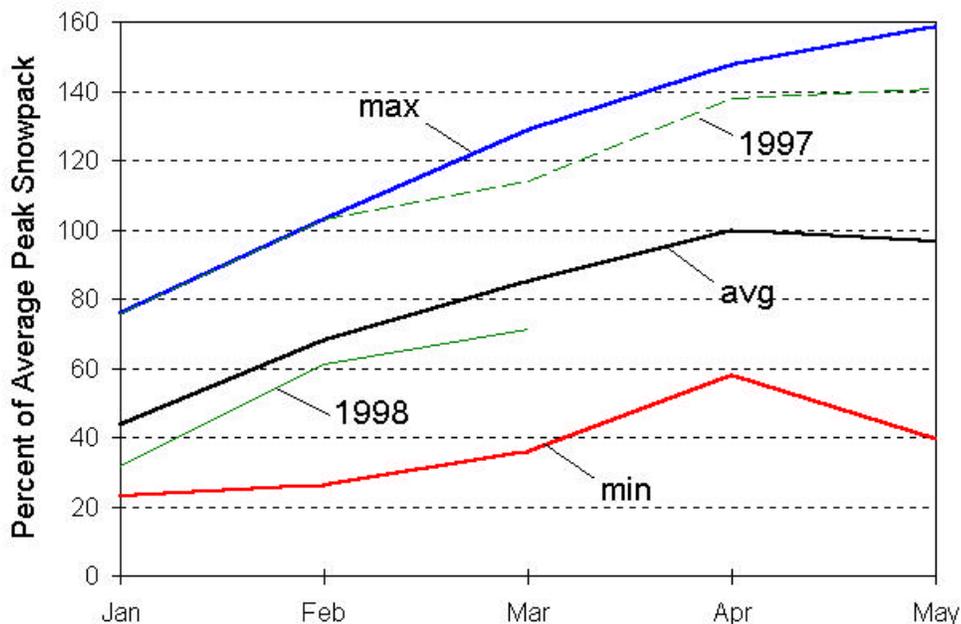
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Spring and Summer Streamflow Forecasts as of March 1, 1998 (in relation to the average for this date)



United States Department of Agriculture -- Natural Resources Conservation Service
in cooperation with
United States Department of Commerce, NOAA -- National Weather Service

Columbia Basin Snowpack Summary



March 1, 1998

1998 has been an up and down year so far. While January provided snowpack increases throughout the Columbia Basin, February left things hanging or let it drop slightly. British Columbia and the Kootenay had the largest declines, down 8 and 9 percent, respectively. That leaves Canada at 86% for March 1, while in the US, the Kootenai, Pend Oreille, and Spokane dropped to the mid 70's percent. The Clearwater dropped 7% to 73%, and the Salmon dropped 4% to 84%.

Washington held steady, with snowpack accumulations during the month rising in step with the average. North Cascades holds 106% and the Yakima, at 116%, has the best snowpack in the Columbia this month. The upper Snake in Wyoming dropped 5% to 92. The only increases in Idaho were small-- the Boise and Payette basins up 3% to 91.

The Snake sub-basins of Eastern Oregon also increased 3% to 108, while the John Day held steady at 88%. The Deschutes had the largest increase in the Columbia this month, up 10% to 94.

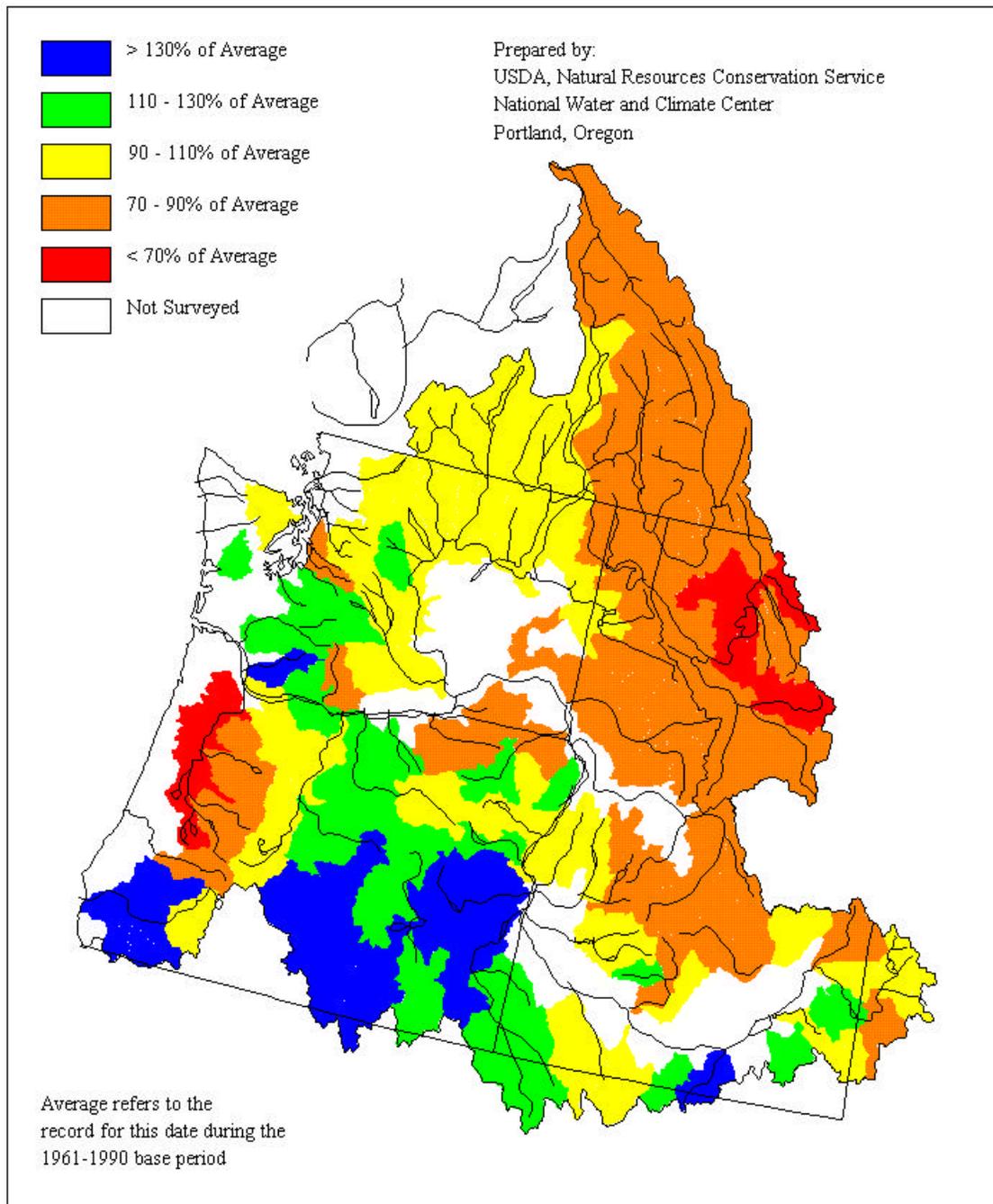
Overall, the Basin holds 84 percent of normal for March 1, which is 71 percent of the normal peak in early April. It's looking like an El Niño year again, similar to 1966, except in that year February provided a better increase up to 80% instead of this year's 71%. The most recent similar March 1 snowpack would be 1994's at 69%.

Dan Moore
 Columbia River Basin Hydrologist
 Natural Resources Conservation Service
 National Water and Climate Center
 101 SW Main Street, Suite 1600
 Portland, OR 97204-3224
 (503) 414-3054

dmoore@wcc.nrcs.usda.gov

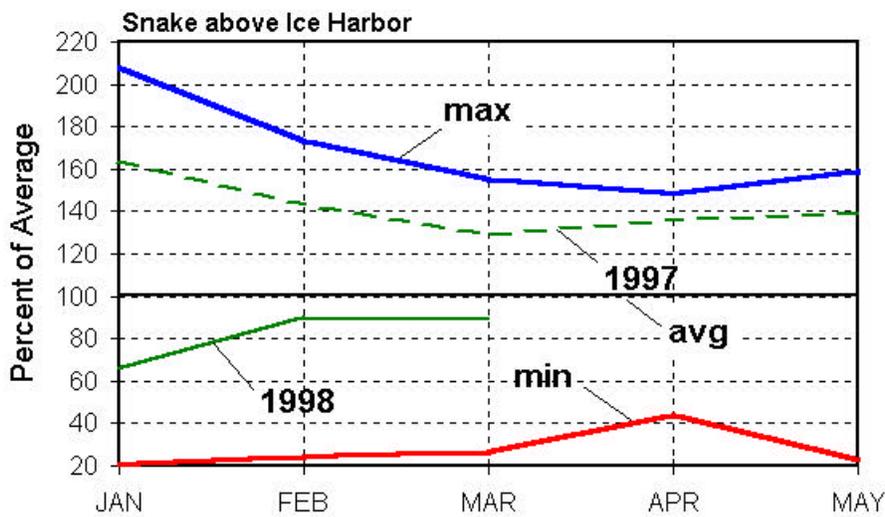
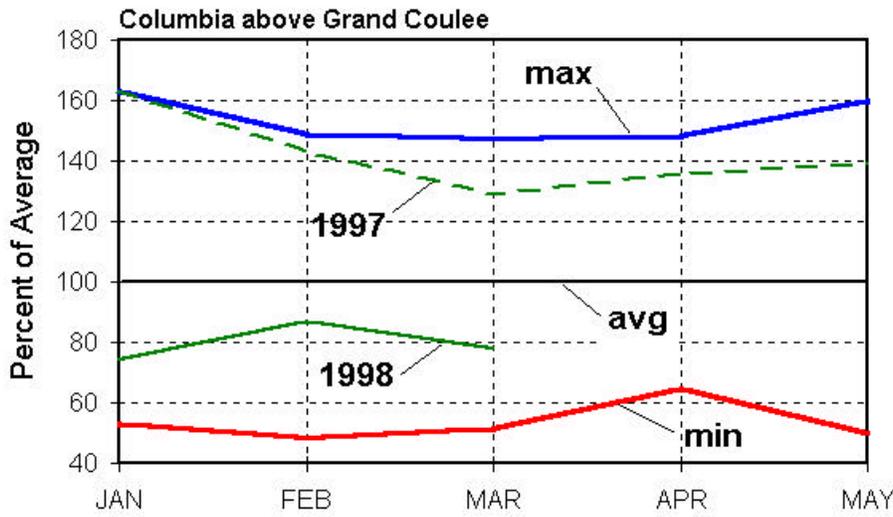
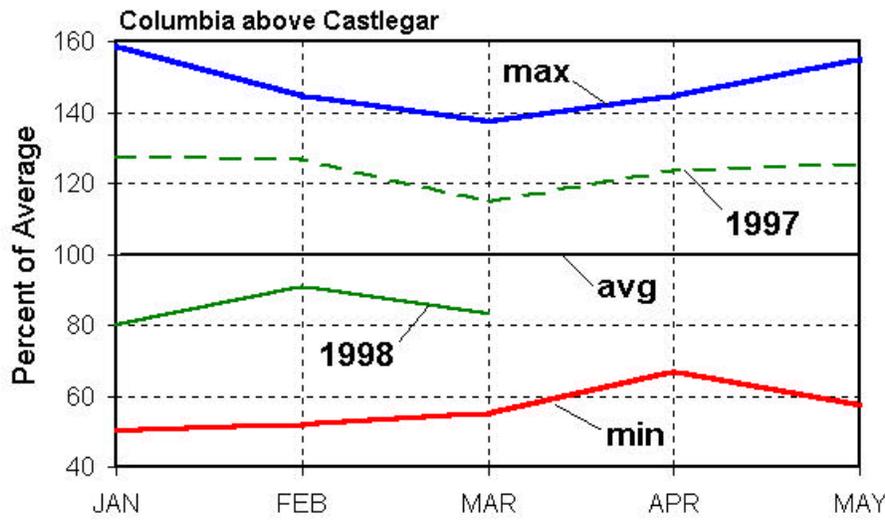
Mountain Snow Water Equivalent

as of March 1, 1998 (in relation to the average for this date)



United States Department of Agriculture -- Natural Resources Conservation Service
in cooperation with
The Province of British Columbia -- Ministry of the Environment

Columbia Sub-Basin Snowpack Graphs - March 1, 1998

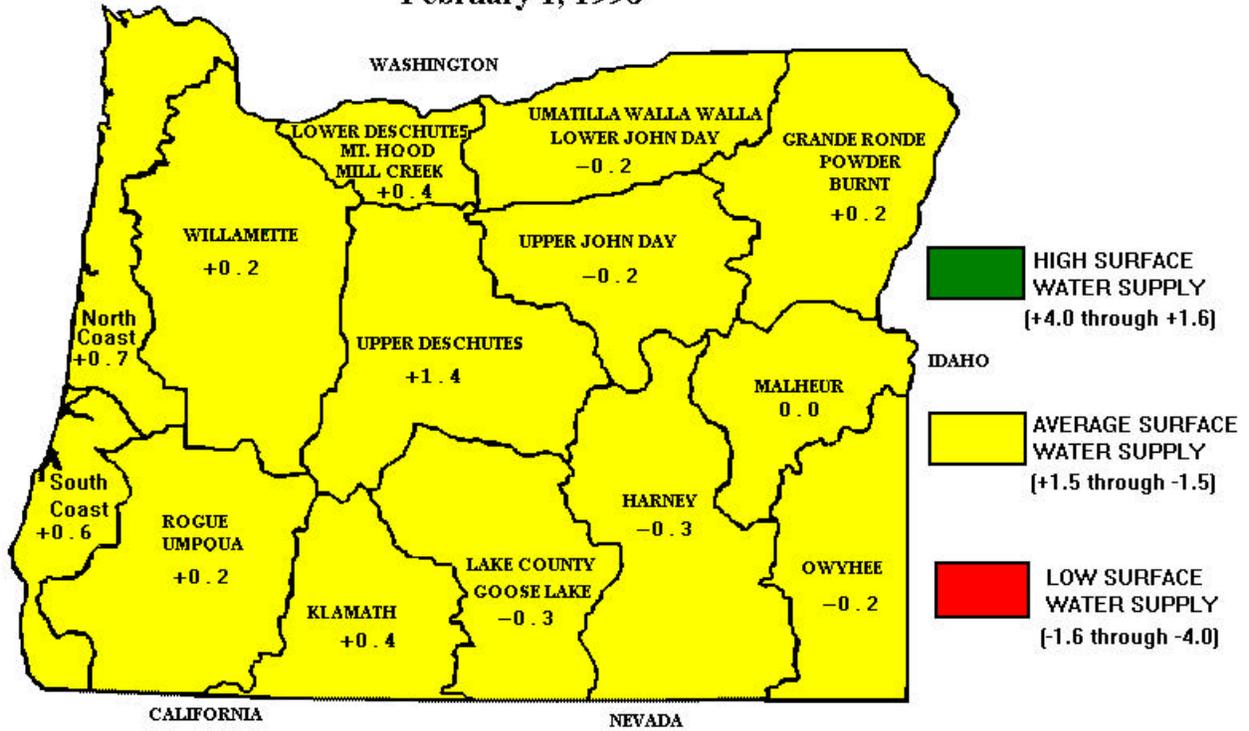


Dan Moore

SURFACE WATER SUPPLY INDEX

(SWSI)

February 1, 1998



US GEOLOGICAL SURVEY, WATER RESOURCES DIVISION
Oregon District

COMPARATIVE FLOW TABLE FOR FEBRUARY, 1998

Station	----- Monthly mean discharge -----		Change in dis- charge from	----- Discharge near end of month -----		----- Accumulated Runoff -----
	Cubic feet per second	Percent of Normal	previous month (percent)	Cubic feet per second	Date	Oct-Feb Percent of Normal
John Day River at Service Creek, OR	2,236	84	+70	1,290	28	72
Wilson River nr Tillamook, OR	1,991	94	-44	1,620	28	125
Umpqua River nr Elkton, OR	12,628	91	-37	8,292	28	83
Columbia River at The Dalles, OR	102,200(a)	90	+1	197,000	28	116
Willamette River at Salem, OR	38,965(a)	90	-33	26,530	28	91
Chehalis River nr Grand Mound, WA	4,786	85	-51	3,510	28	123
Skykomish River nr Gold Bar, WA	2,740	71	-35	1,810	28	111
Spokane River at Spokane, WA	6,665(a)	87	+38	6,600	28	102
Snake River at Heise, ID	3,500(a)	110	-14	3,130	28	120
Snake River at Weiser, ID	21,262	100	+10	22,100	28	109
Salmon River at White Bird, ID	4,571	92	-2	4,310	28	104
Clearwater River at Spalding, ID	9,386	83	+32	7,090	28	98
Clark Fork at St. Regis, MT	2,880	77	+26	2,790	28	89
MF Flathead River nr West Glacier, MT	459	62	-21	430	28	89

Percent of Normal computed using 30-year base period, Wtr Yrs 1961-90

(a) adjusted for upstream storage

03/11/98

DWORSHAK APRIL-JULY INFLOW FORECAST

Run Date is 5 MAR 1998
 1NOV 1DEC 1JAN 1FEB 1MAR 1APR 1MAY 1JUN

ELBI ELK BUTTE	.2	5.2	9.8	20.5	25.3			
HEMI HEMLOCK	.3	6.8	13.0	23.9	28.5			
HOOM HOODOO BASIN	.3	7.8	12.3	23.6	27.3			
PIRI PIERCE RG S			3.2	6.0	7.1			
SHAI SHANGHI SUM	.2	4.9	9.4	18.1	22.8			
LSLI LOST LAKE	4.3	10.3	15.5	29.0	33.9			
EKRI ELK RIVER 1S			3.4					
DWR AVERAGE KAF	137	193	132	166	221			
ASOI July-Aug SOI	-3	-3	-3	-3	-3			
SSOI July-Sep SOI	-5	-5	-5	-5	-5			
OSOI July-Oct SOI	-6	-6	-6	-6	-6			
NSOI July-Nov SOI		-8	-8	-8	-8			
DSOI July-Dec SOI			-9	-9	-9			
DWORSHAK FC SPACE			700	730	600			
DWORSHAK FC ELEV			1558	1556	1565			
DWORSHAK FOM ELEV	1500	1500	1505	1513	1524			

ELBI = ELK BUTTE ACCUMULATED SWE IN INCHES (snotel) elev 5550
 HEMI = HEMLOCK ACCUMULATED SWE IN INCHES (snotel) elev 5810
 HOOM = HOODOO BASIN ACCUMULATED SWE IN INCHES (snotel) elev 6050
 PIRI = PIERCE RANGER STATION ACCUMULATED SWE IN INCHES (snow course)
 LSLI = LOST LAKE ACCUMULATED SWE IN INCHES (snotel) elev 6110
 EKRI = ELK RIVER 1S ACCUMULATED MONTHLY PRECIP IN INCHES elev 2910
 DWRI = MONTHLY DWORSHAK INFLOW (KAF)
 JD = JANUARY DWORSHAK INFLOW (KAF)
 FD = FEBRUARY DWORSHAK INFLOW (KAF)
 MD = MARCH DWORSHAK INFLOW (KAF)
 AD = APRIL DWORSHAK INFLOW (KAF)

FORECAST EQUATIONS:

01OCT=276.4*ASOI+2690
 01NOV=191.5*SSOI+2667
 01DEC=144.2*OSOI+2687
 01JAN=12.7*ELBI+15.3*HEMI+13.3*HOOM+63.3*PIRI+89.7*NSOI+17.1*EKRI+1539
 01FEB=18.6*ELBI+15.6*HEMI+18.5*HOOM+44.1*PIRI+20.3*DSOI+.8*JD+540
 01MAR=14.2*ELBI+14.7*HEMI+15.5*HOOM+33.4*PIRI+21.8*DSOI+.9*JD+.2*FD+369
 01APR=15.1*ELBI+15.4*HEMI+14.6*HOOM+15.9*SHAI+22.6*DSOI+.8*JD+.3*FD+.3*MD-168
 01MAY=14.1*ELBI+12.3*HEMI+12.6*HOOM+13.9*SHAI+.3*AD-201
 01JUN=8.2*ELBI+7.3*HEMI+8.4*HOOM+5.7*LSLI+183

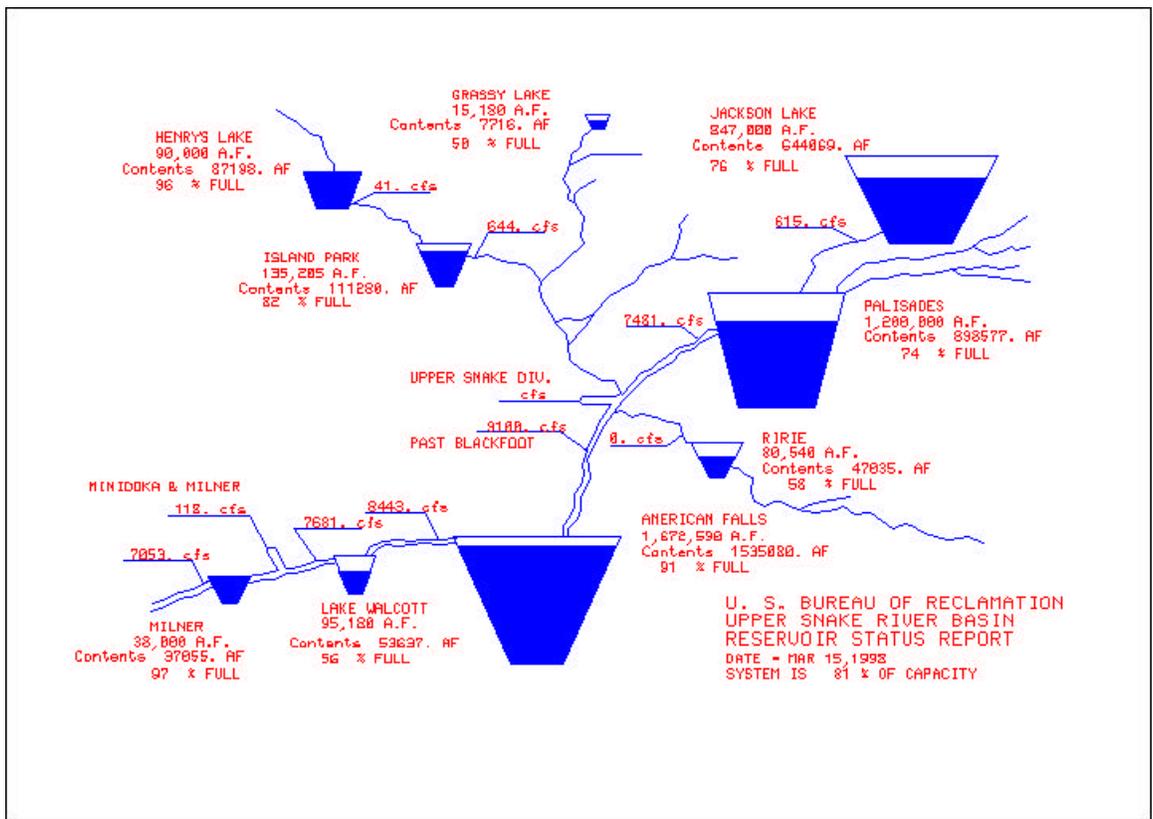
April-July Average inflow 2700 KAF

% Chance that OBSERVED will be > than given value

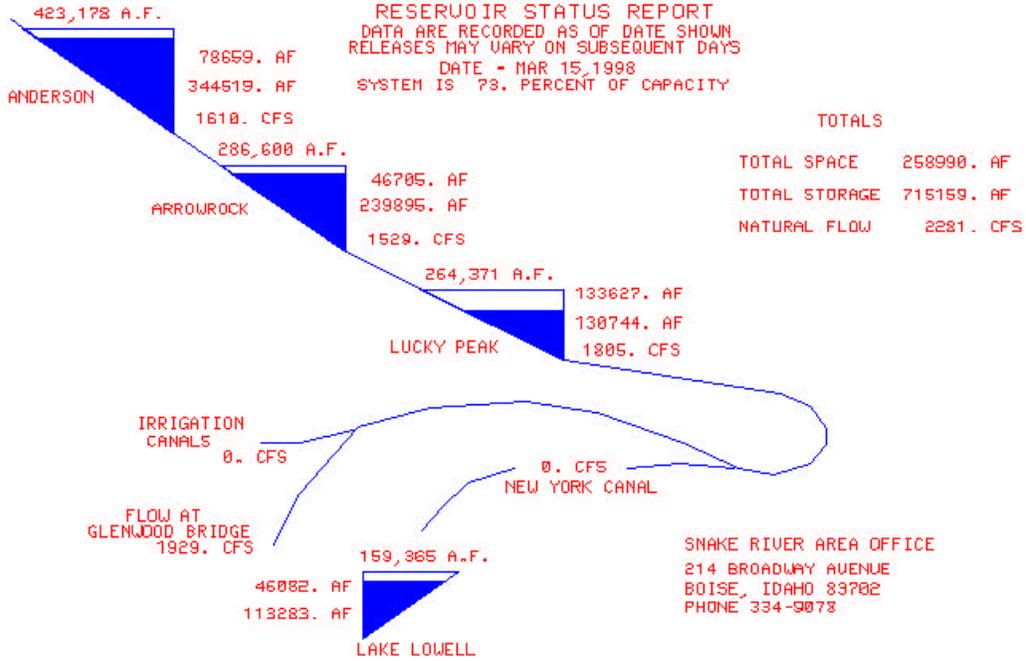
			1%	5%	20%	50%	80%	95%	99%
01Oct	April-July Forecast	1833 KAF	3540	3034	2448	1833	1218	632	127
01Nov	April-July Forecast	1786 KAF	3412	2931	2372	1786	1200	641	160
01Dec	April-July Forecast	1764 KAF	3419	2929	2361	1764	1167	599	109
01Jan	April-July Forecast	1587 KAF	2907	2516	2063	1587	1111	658	267
01Feb	April-July Forecast	1945 KAF	2929	2638	2300	1945	1591	1253	962
01Mar	April-July Forecast	1805 KAF	2633	2388	2103	1805	1506	1222	977

The given forecast values are to be considered the Corps of Engineers Official Forecast for Dworshak. If you have questions on this report, contact:
 Jim.D.Versteeg@nwd01.npd.usace.army.mil

Date: 16:20:17 UT on Mon 16 Mar 98.



U. S. BUREAU OF RECLAMATION
 BOISE RIVER BASIN
 RESERVOIR STATUS REPORT
 DATA ARE RECORDED AS OF DATE SHOWN
 RELEASES MAY VARY ON SUBSEQUENT DAYS
 DATE - MAR 15, 1998
 SYSTEM IS 78. PERCENT OF CAPACITY



WATER CONDITIONS REPORT - PN REGION

RESERVOIR STORAGE - February, 1998

End of Month Reservoir Contents (1000 AF):

STATION - CODE	ACTIVE CAPACITY	FEB			
		1998	% OF CAPACITY	AVG	% OF AVG
HGH-AF-HUNGRY HORSE DAM & R	2981.20	1911.660	64	1758.40	109
CMO-AF-COMO DAM AND LAKE ON	35.10	17.33V	49	13.10	132
Yakima River Basin					
CLE-AF-CLE ELUM LAKE, WA	436.90	333.610	76	280.00R	119
KAC-AF-KACHESS LAKE, WA	239.00	176.010	74	182.90	96
KEE-AF-KEECHELUS LAKE, WA	157.80	131.120	83	105.40	124
RIM-AF-TIETON DAM & RIMROCK	198.00	137.580	69	131.80	104
BUM-AF-BUMPING LAKE, WA	33.70	8.020	24	8.70R	92
Columbia Basin					
GCL-AF-GRAND COULEE DAM & F	5185.45	2561.60	49	2837.90	90
BNK-AF-BANKS LAKE NR GRAND	715.00	682.900	96	612.99	111
POT-AF-O'SULLIVAN DAM & POT	332.20	295.800	89	268.05	110
Okanogan River Basin					
CCR-AF-CONCONULLY DAM & RES	13.00	****	***	7.21	***
CCL-AF-SALMON LK DAM & CONC	10.50	****	***	8.12	***
Snake River Basin					
JCK-AF-JACKSON LAKE NEAR MO	847.00	649.61V	77	480.98	135
PAL-AF-PALISADES RESERVOIR	1200.00	1004.47V	84	862.99	116
ISL-AF-ISLAND PARK RESERVOI	135.20	112.52V	83	109.37	103
GRS-AF-GRASSY LAKE NR MORAN	15.20	7.84V	52	10.99	71
RIR-AF-RIRIE RESERVOIR NEAR	80.50	45.17V	56	36.25E	125
AMF-AF-AMERICAN FALLS RES A	1672.60	1401.76V	84	1273.75	110
MIN-AF-MINIDOKA DAM & LAKE	95.20	39.75V	42	51.43	77
WOD-AF-LITTLE WOOD RESERVOI	30.00	19.72V	66	17.64	112
Boise River Basin					
AND-AF-ANDERSON RANCH RES A	423.20	373.680	88	234.55	159
ARK-AF-ARROWROCK RESERVOIR	286.60	224.040	78	228.39	98
LUC-AF-LUCKY PEAK LAKE NEAR	264.40	130.310	49	88.21	148
LOW-AF-LAKE LOWELL, ID	169.10	114.060	67	123.70	92
Payette River Basin					
CSC-AF-CASCADE RESERVOIR AT	653.00	517.310	79	352.51	147
DED-AF-DEADWOOD RESERVOIR N	161.90	130.530	81	84.01	155
Weiser River Basin					
MAN-AF-MANN CR DAM & RES ON	11.10	5.100	46	6.05E	84
Clearwater River Basin					
RES-AF-LEWISTON ORCHARDS RE	3.00	0.90V	30	1.38E	65
SOL-AF-SOLDIERS MEADOW DAM,	2.37	****	***	0.58E	***
Owyhee River Basin					
OWY-AF-LAKE OWYHEE NEAR NYS	715.00	496.740	69	494.75	100
WLD-AF-WILDHORSE RESERVOIR	71.50	55.480	78	33.02	168
Malheur River Basin					
BEU-AF-AGENCY VALLEY DAM &	59.90	46.080	77	33.88	136
BUL-AF-BULLY CREEK RESERVOI	30.00	20.740	69	16.73E	124
WAR-AF-WARM SPRINGS RESERVO	191.00	123.060	64	102.20	120
Powder River Basin					
PHL-AF-MASON DAM & PHILLIPS	73.50	51.800	70	41.72E	124
THF-AF-THIEF VALLEY RESERVO	17.40	13.590	78	17.45E	78
Burnt River Basin					
UNY-AF-UNITY RESERVOIR NEAR	25.20	12.560	50	15.41	81
Umatilla River Basin					
MCK-AF-MCKAY RESERVOIR NR P	66.26	37.54V	57	41.96	89
CLS-AF-COLD SPRINGS DAM & R	38.33	****	***	34.86	***
Deschutes River Basin					
CRA-AF-CRANE PRAIRIE DAM &	55.30	52.45I	95	42.83	122
CRE-AF-CRESCENT LK DAM & LK	86.90	81.70V	94	52.93	154

WIC-AF-WICKIUP DAM & RES ON	200.00	194.40I	97	173.58	112
OCH-AF-OCHOCO DAM & RES ON	45.24	30.79V	68	28.44	108
PRV-AF-ARTHUR R BOWMAN DAM	152.80	97.27V	64	104.66	93
HAY-AF-HAYSTACK DAM & RES O	5.64	4.49I	80	4.71E	95
WAS-AF-WASCO DAM & CLEAR LA	11.90	5.52V	46	6.30	88
Rogue River Basin					
AGA-AF-AGATE DAM AND RES ON	4.70	4.69I	100	4.05E	116
EMI-AF-EMIGRANT DAM & LK ON	39.00	31.71I	81	29.14	109
FIS-AF-FISH LK NR LAKE CR,	7.90	6.66I	84	5.50E	121
FOR-AF-FOURMILE LAKE, OR	15.60	14.34I	92	9.27E	155
HPD-AF-HOWARD PRAIRIE DAM &	60.60	49.68I	82	44.01E	113
HYA-AF-HYATT DAM & RES NR A	16.00	12.07I	75	11.71E	103
Tualatin River Basin					
SCO-AF-SCOGGINS DAM AND HEN	53.60	48.29I	90	44.85E	108
TOTAL OF 49 RESERVOIRS	18367.28	12524.02	68	11520.54	109

AF is acre-feet.

AVG is published 30-year average, 1961-1990.

Please note that all data are PROVISIONAL and subject to revision.

This report is updated monthly, after the 15th of each month.

12-MAR-98 08:44:12 U.S.BUREAU OF RECLAMATION
 YAKIMA PROJECT
 SYSTEM STATUS AT 08:00

RESERVOIR	CONTENT	TOTAL CAPACITY	PERCENT CAPACITY	RESERVOIR INFLOW	RESERVOIR RELEASES
	AF	AF	%	CFS	CFS
Keechelus	130472.	157800.	83.	124.	160.
Kachess	179052.	239000.	75.	114.	8.
Cle Elum	334940.	436900.	77.	327.	283.
Bumping	7963.	33700.	24.	113.	106.
Rimrock	140636.	198000.	71.	337.	124.
TOTALS	793063.	1065400.	74.	1015.	681.

IRRIGATION DIVERSIONS	CFS	RIVER FLOWS	CFS
Kittitas	0.	Yakima River near Easton	357.
Roza	0.	Yakima River at Cle Elum	890.
Yakima-Tieton	0.	Teanaway River bl. Forks	214.
Wapato	0.	Yakima River at E'Burg	1320.
Sunnyside	0.	Yakima River at Umtanum	1531.
MAJOR USERS TOTAL	0.	Naches River nr. Clf'Del	421.
		Tieton R. bl. Can. Hdws	182.
Westside	0.	Naches River nr. Naches	224.
Naches-Selah	0.	Yakima River at Parker	2780.
OTHERS ABOVE PARKER	80.	Yakima River at Prosser	1720.
TOTAL ABOVE PARKER	80.		

 Kennewick 0.

OTHER CANAL DIVERSIONS
 Wapatox 440.
 Roza 1013.
 Chandler 1344.

UNREGULATED TRIBUTARY & RETURN FLOW ABOVE PARKER - - 2179. CFS

OPERATIONAL COMMENTS:

 MARCH'S PRECIP. TO-DATE IS 41% OF MONTH'S AVERAGE.
 TODAY'S SNOTEL SNOWPACK IS 114% OF AVERAGE.

CORPS OF ENGINEERS, NORTH PACIFIC DIVISION
REPORT FOR MARCH 1998 CRWVG MEETING

Libby.

The reservoir began February at elevation 2403.0 feet. The flood control objective based on the February final volume forecast was 2392.34 feet for the end of January. The actual elevation was 2392.71 feet. Average outflows for the month of February were 9.4 kcfs, which included a 5 day period when releases were reduced to 4 kcfs to facilitate an Idaho Fish and Game burbot monitoring study. Three other low flow operations were provided in November, December and January for this burbot study. Outflows from 1 – 6 March averaged 5.7 kcfs. Beginning on 7 March, flows were reduced to 4 kcfs which is minimum flow. This flow is expected to last at least through the month of April. Flows were reduced to a minimum in response to the March final volume forecast which was 550 kaf (9%) lower than the February final forecast. Inflows in the month of February averaged 3.4 kcfs, 100 percent of normal. The March final volume forecast for April – August is 5.05 MAF, which is 79% of normal. The end of March target flood control elevation, based on this volume forecast is 2413.2 feet.

Albeni Falls.

In September, Lake Pend Oreille started drafting from full (2062.5') to 2055' by mid-November. This is the second year of a three year study during which Lake Pend Oreille will only be drafted to 2055' rather than 2051' to see if kokanee will spawn at higher elevations in cleaner gravels. The current operating range as of 1 January is 2055' - 2056'. This is the expected range of operation through March. The average outflows in February were 12.0 kcfs. The unregulated inflow to Lake Pend Oreille in February 9.3 kcfs, 70% of normal. The March final volume forecast for April – August is 9.81 MAF, 71% of normal.

Dworshak.

Dworshak elevation reached 1500' at the end of August and remained at this elevation through 1 December to facilitate grouting work to slow down seepage through the dam. Outflows have been at minimum flow (1.3 kcfs) since 1 December and are expected to remain at this level at least through April as the project is currently far below the flood control rule curve.. The flood control objective based on the February final volume forecast was 1560.0 feet for the end of February. Actual elevation was 1524.3 feet. Inflow in January was 4.02 kcfs, 87% of normal. The March final volume forecast for April – July was 1.81 MAF, 67% of normal (February final was 1.95 MAF, 72% of normal). The end of March and 15 April target flood control elevations are 1578 feet and 1584.2 feet, respectively.

Lower Snake Projects.

Lower Granite February inflows were 39.1 kcfs, 88% of normal. Little Goose, Lower Monumental and Ice Harbor are operating in their normal operating ranges (633' – 638', 537' – 540', and 437' – 440'). Lower Granite returned to its normal operating range of 734' – 738' on 15 November (normally 733' is minimum pool but because of navigation problems at Lewiston, pool is being held higher). Because of construction work on the Lower Granite Behavioral Guidance System which will facilitate juvenile fish to swim towards the surface bypass collector, there have been numerous unit outages and special pool operations. This work is expected to be completed around 1 April. The March final volume forecast for Lower Granite was 20.3MAF, 88% of normal (February final was 91% of normal).

Willamette Basin Projects.

All Willamette projects are continuing to fill. The snowcap has increased to 87% of normal. The majority of the projects are on, or slightly above, their fill schedule. Hills Creek has fallen to 6% below the fill schedule, Cougar is 14% below the fill schedule, and Lookout Point has fallen farthest behind at 25% below the fill schedule. Low inflows have made it impossible to stay on the rule curves at these 3 projects. The Corps is concerned that these reservoirs will not be able to refill.