

## SUMMARY

The 2003 WY, which began in October 2002, was cooler than normal temperature and below average precipitation. A ridge of high pressure off the Pacific Northwest coast was the dominant weather feature through much of October. Any weather disturbances that managed to break through this blocking ridge were weak and dropped only light precipitation across the region. Many low temperature records were broken on the 30th and 31st as cold arctic air mass plunged south into the U.S. from Canada. Precipitation in October was 30 percent of normal (1971-2000) at the Columbia River above Grand Coulee, 44 percent of normal at the Snake River above Ice Harbor, and 33 percent at the Columbia River above The Dalles. October 2002 was cooler than average as well. For the 31-station temperature index for the Pacific Northwest, regional temperature departed -1.8 degrees Celsius (-3.2 degrees Fahrenheit) from normal relative to the 1971-2000 normals. Mean temperature departures ranged from -3.6 to -0.1 degrees Celsius (-6.5 to -0.1 degrees Fahrenheit).

Although the second week of November brought a series of Pacific storms, high pressure was the dominant weather feature most of the month, resulting in well below normal precipitation across the region. November precipitation was: 64 percent of normal (1971-2000) at the Columbia River above Grand Coulee, 55 percent of normal at the Snake River above Ice Harbor, and 57 percent at the Columbia River above The Dalles. The accumulated WY (October through November) precipitation was: 51 percent of normal (1971-2000) at the Columbia River above Grand Coulee, 51 percent of normal at the Snake River above Ice Harbor, and 49 percent at the Columbia River above The Dalles. The regional temperature index for the Pacific Northwest departed +0.7 degrees Celsius (+1.2 degrees Fahrenheit) from normal in November.

December 2002 was a continuation of seasonal warm weather. December precipitation was: 93 percent of normal at the Columbia River above Grand Coulee, 101 percent of normal at the Snake River above Ice Harbor, and 102 percent at the Columbia River above The Dalles. The warm weather was characterized by a Pacific Northwest temperature departure of +2.9 degrees Celsius (+5.2 degrees Fahrenheit) from normal, and mean temperature departures ranging from +0.9 to +4.1 degrees Celsius (+1.7 to +7.3 degrees Fahrenheit).

January temperatures continued to be warm. January 2003 was the second warmest January on record for several cities, including Seattle, WA and Pocatello, ID. Early in the month the main storm track occasionally dipped south of the U.S.-Canadian border. This brought above normal precipitation to far northern tier basins, but left the rest of the region drier than normal. Late in the month, heavier precipitation fell across most areas as storm systems with access to tropical moisture moved into the Pacific Northwest. January precipitation was: 101 percent of normal at the Columbia River above Grand Coulee, 120 percent of normal at the Snake River above Ice Harbor, and 116 percent at the Columbia River above The Dalles. The seasonal precipitation accumulation increased slightly to: 76 percent of normal at the Columbia River above Grand Coulee, 86 percent of normal at the Snake River above Ice Harbor, and 83 percent at the Columbia River above The Dalles. There were daily precipitation records established in January including 18.3 mm (0.72 inches) at Boise, ID on the 27th, 21.8 mm (0.86 inches) at Portland, OR, 11.4 mm (0.45 inches) (tie) at Yakima, WA and 14.0 mm (0.55 inches) at the Pendleton, OR Airport on the 30th.

The 31-station temperature index for the Pacific Northwest departed +4.1 degrees Celsius (+7.3 degrees Fahrenheit) from normal in January, where mean temperature departures ranged from +2.4 to +5.9 degrees Celsius (+4.4 to +10.6 degrees Fahrenheit). New high temperature records tied or broken on the Pacific Northwest coastal areas and inland such as: 15.0 degrees Celsius (59 degrees Fahrenheit) (tie) at Portland, OR on the 4th, 13.9 degrees Celsius (57 degrees Fahrenheit) at Sea-Tac Airport on the 6th, 8.9 degrees Celsius (48 degrees Fahrenheit) at Missoula, MT on the 25th, 11.7 degrees Celsius (53 degrees Fahrenheit) at Pocatello, ID on the 27th, and 15.6 degrees Celsius (60 degrees Fahrenheit) at Pocatello, ID on the 31st. There were no new low temperature records tied or broken in January.

Early in February the subtropical jet remained positioned across the Southern U.S. leaving the Pacific Northwest under the influence of high pressure and drier than normal weather. The polar jet moved farther south late in the month, allowing a series of frontal systems to bring periods of light to moderate precipitation to the region. February precipitation was: 54 percent of normal at the Columbia River above Grand Coulee, 89 percent of normal at the Snake River above Ice Harbor, and 69 percent at the Columbia River above The Dalles. The seasonal accumulation for the WY remained well below average at the primary indices: 73 percent

of normal above Grand Coulee, 87 percent at the Snake River above Ice Harbor, and 80 percent at The Dalles. The temperature index departed slightly above normal.

The month of March 2003 began dry and became wet as the month progressed. A wetter weather regime dominated through the latter part of the month as a ridge of high pressure in the Gulf of Alaska weakened and flow at upper levels became more zonal. Moderate to heavy precipitation events were experienced on the 6th-8th, 12th-14th, and 21st-22nd of March. The change is characterized by the monthly precipitation summary, where: Grand Coulee was 200 percent of normal, The Snake River at Ice Harbor was 134 percent of normal, and The Dalles 175 percent in March. This influenced the seasonal precipitation accumulations October through March: 89 percent of normal above Grand Coulee, 94 percent of normal above Ice Harbor, and 93 percent above The Dalles. The temperature index for the Pacific Northwest departed +0.8 degrees Celsius (+1.5 degrees Fahrenheit) from normal in March.

April remained wet, but cool. April precipitation was: 123 percent of normal above Grand Coulee, 143 percent of normal above Ice Harbor, and 130 percent above The Dalles. The month of April caused additional positive influence to the seasonal precipitation accumulations which were: 92 percent of normal above Grand Coulee, 100 percent of normal above Ice Harbor, and 97 percent above The Dalles. A daily precipitation record was broken in April at Yakima, WA when it received 16.3 mm (0.64 inches) of rain on the 26th. The 31-station temperature index for the Pacific Northwest departed -0.2 degrees Celsius (-0.3 degrees Fahrenheit) from normal relative to the 1971-2000 normals. Mean temperature departures ranged from -1.7 to +1.9 degrees Celsius (-3.0 to +3.4 degrees Fahrenheit).

During the month of May, the region returned to drier and warmer than normal conditions. May precipitation was: 82 percent, 94 percent, and 85 percent of normal at Grand Coulee, Ice Harbor and The Dalles, respectively. The dry conditions in May caused a return to below average seasonal accumulations in the basin: 91 percent of normal (1971-2000) at the Columbia River above Grand Coulee, 99 percent of normal at the Snake River above Ice Harbor, and 95 percent of normal at the Columbia River above The Dalles. The temperature index was near normal with departure of only -0.1 degrees Celsius (-0.1 degrees Fahrenheit) from normal, where mean temperature departures ranged from -1.4 to +1.7 degrees Celsius (-2.5 to +3.0 degrees Fahrenheit). High temperature records broken in May included 31.7 degrees Celsius (89 degrees Fahrenheit) at Pocatello, ID and 36.1 degrees Celsius (97 degrees Fahrenheit) (tie) at Boise, ID on the 24th, 36.1 degrees Celsius (97 degrees Fahrenheit) at Pocatello, ID and 37.2 degrees Celsius (99 degrees Fahrenheit) (tie) at Boise, ID on the 28th, and 35.0 degrees Celsius (95 degrees Fahrenheit) at Boise, ID (tie) and 35.6 degrees Celsius (96 degrees Fahrenheit) at Pocatello, ID on the 29th. Low temperature records broken in May included -0.6 degrees Celsius (31 degrees Fahrenheit) at Pendleton, OR on the 7th, 0.0 degrees Celsius (32 degrees Fahrenheit) at Pendleton, OR on the 8th; 4.4 degrees Celsius (40 degrees Fahrenheit) at Seattle, WA on the 16th; -3.9 degrees Celsius (25 degrees Fahrenheit) at Kalispell, MT and -1.7 degrees Celsius (29 degrees Fahrenheit) at Yakima, WA on the 17th; 2.8 degrees Celsius (37 degrees Fahrenheit) at Seattle, WA, and 3.3 degrees Celsius (38 degrees Fahrenheit) at Portland, OR on the 18th; -5.0 degrees Celsius (23 degrees Fahrenheit) at Pocatello, ID, -0.6 degrees Celsius (31 degrees Fahrenheit) at Pendleton, OR, 0.0 degrees Celsius (32 degrees Fahrenheit) at Spokane, WA, and 4.4 degrees Celsius (40 degrees Fahrenheit) at Portland, OR on the 19th; and -5.0 degrees Celsius (23 degrees Fahrenheit) at Pocatello, ID on the 20th. Seasonal snowpack accumulation at the Columbia River above The Dalles is shown in Chart 2. Seasonal below average precipitation has resulted in below average snowpack.

The month of June kept the region in a dry warm weather pattern. June was drier than May with precipitation of: 69 percent of normal above Grand Coulee, 38 percent of normal above Ice Harbor, and 50 percent above The Dalles. This again brought the seasonal average precipitation accumulations down to: 88 percent above Grand Coulee, 93 percent above Ice Harbor, and 91 percent above The Dalles. The dry conditions were accentuated by new record low precipitation for the entire month at Pendleton, OR and Yakima, WA where only a trace of precipitation fell. The warm conditions were quantified by a temperature index departure of +1.2 degrees Celsius (+2.2 degrees Fahrenheit) from normal in June. Some high temperature records in June were 32.8 degrees Celsius (91 degrees Fahrenheit) on the 4th and 35.6 degrees Celsius (96 degrees Fahrenheit) on the 5th at Portland, OR, and 34.4 degrees Celsius (94 degrees Fahrenheit) (tie) at Pendleton, OR on the 7th.

July was very dry. July precipitation was: 18 percent of normal (1971-2000) at the Columbia River above Grand Coulee, 36 percent of normal at the Snake River above Ice Harbor, and 20 percent of normal at the Columbia River above The Dalles. This further reduced the seasonal accumulated precipitation to: 83 percent

of normal (1971-2000) at the Columbia River above Grand Coulee, 90 percent of normal at the Snake River above Ice Harbor, and 87 percent of normal at the Columbia River above The Dalles. July temperature departures remained above normal at +2.7 degrees Celsius (+4.9 degrees Fahrenheit).

August continued very dry and warm. The precipitation was only 32 percent, 107 percent and 56 percent of normal at Grand Coulee, Ice harbor and The Dalles, respectively. Although Ice Harbor precipitation was 107 percent of normal, normal precipitation is only 21.8 mm (0.86 inches) during August. Seasonal precipitation from October 2002 through August 2003 continued below average across the basin at: 79 percent of normal above Grand Coulee, 91 percent of normal above Ice Harbor, and 85 percent above The Dalles. The 31-station temperature index for the Pacific Northwest departed +1.7 degrees Celsius (+3.0 degrees Fahrenheit) from normal relative to the 1971-2000 normals. Mean temperature departures ranged from -0.2 to +3.7 degrees Celsius (-0.3 to +6.7 degrees Fahrenheit). High temperature records tied or broken in August included 37.2 degrees Celsius (99 degrees Fahrenheit) at Kalispell, MT and 37.8 degrees Celsius (100 degrees Fahrenheit) at Pocatello, ID on the 10th, and 37.2 degrees Celsius (99 degrees Fahrenheit) at Pocatello, ID on the 13th.

In September, the upper level high held for at least part of the month, but the storm track punched inland temporarily. This allowed a series of fronts to bring some precipitation into portions of the basin. Precipitation was 92 percent of normal at the Columbia River above Grand Coulee and 83 percent of normal at the Columbia River above The Dalles. September was a warm month, with record high temperatures at Portland of 35 degrees Celsius (95 degrees Fahrenheit) and Pendleton of 37.8 degrees Celsius (100 degrees Fahrenheit). The 31-station temperature index for the Basin departed +1.3 degrees Celsius (+2.3 degrees Fahrenheit).

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