

Flood Risk Assessment

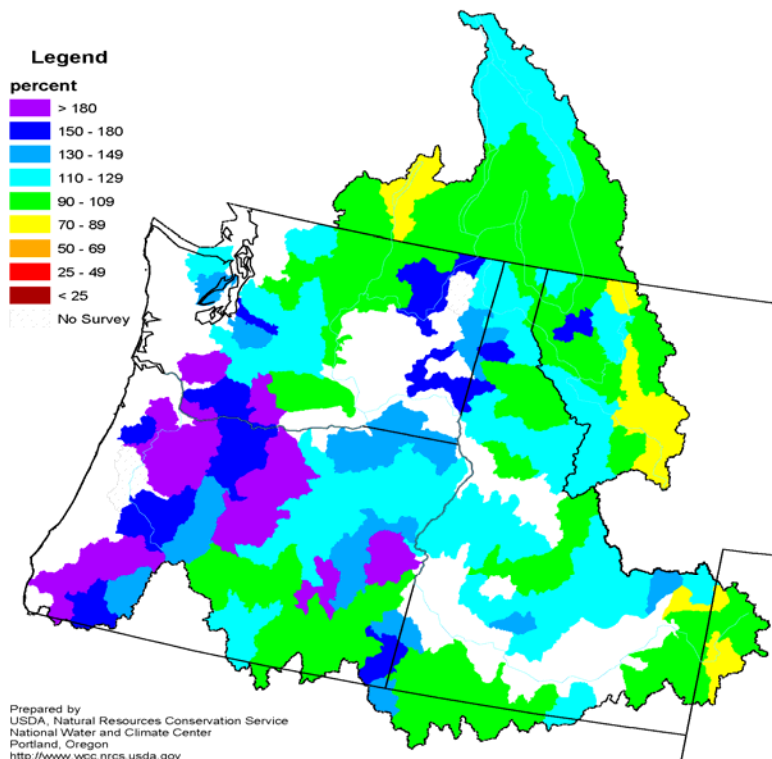
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Larry Schick
Army Corps of Engineers
Seattle District Meteorologist

General Assessment

As promised, La Nina caused an active winter with above to much above normal snowpack in the mountains, greater than 180% of normal in areas. Snow levels have been consistently low with substantial and record low elevation snowpack in places (see Cougar Mtn Snotel graph). The relatively dry and mild weather in recent and upcoming days will continue to slowly melt the very low elevation snowpack to a limited degree, but the overall deep snow remains.

Columbia River Mountain Snowpack as of February 1, 2008



February 1st mountain snowpack: Above normal in most areas

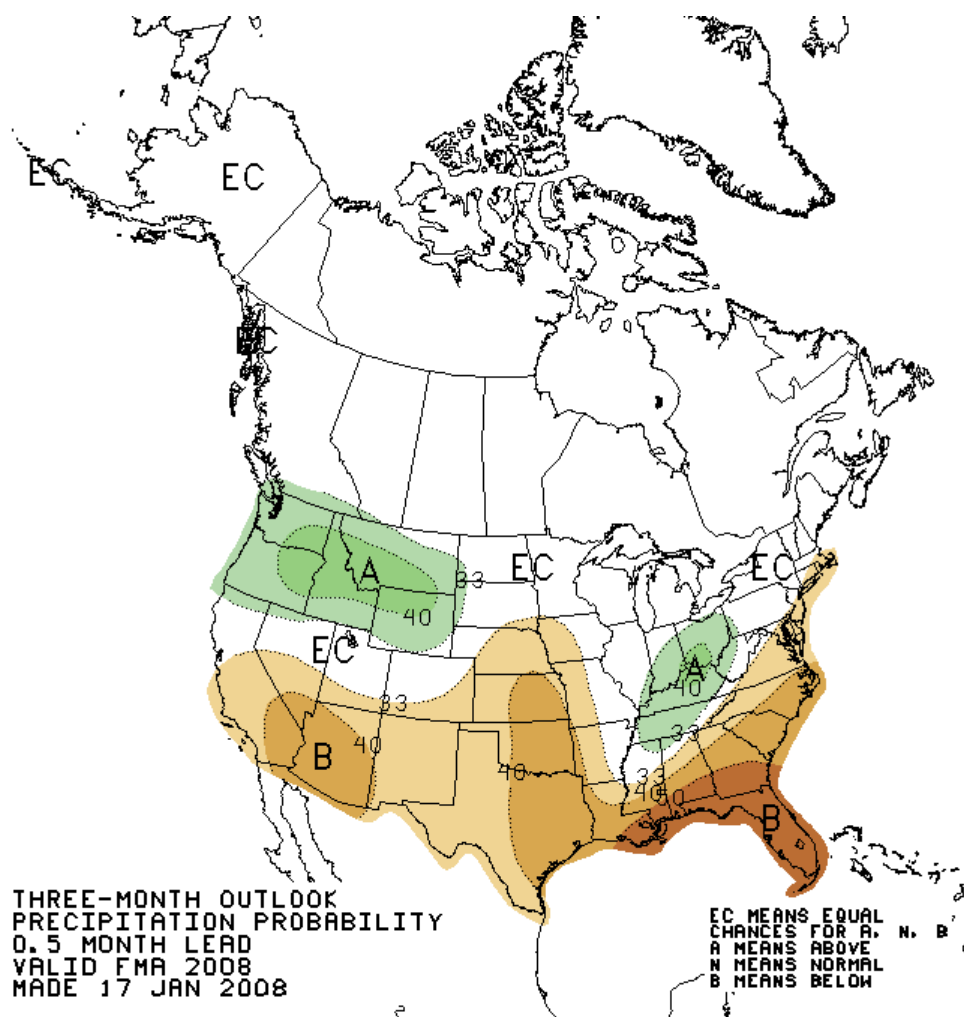
[ftp://ftp.wcc.nrcs.usda.gov/support/snow/snowpack_maps/columbia_river/wy2008/cusnow0802.](ftp://ftp.wcc.nrcs.usda.gov/support/snow/snowpack_maps/columbia_river/wy2008/cusnow0802.gif)

[gif](#) This will update about March 7th

More NRCS snowpack info: <http://www.wa.nrcs.usda.gov/Snow/data/current.html>

Mountain snowpack is the greatest since 1998-1999, which was the last strong La Nina. In some basins it may be the deepest since 1974.

Once again La Nina has proven to be a reliable indicator for Northwest winter precipitation. The reason I like La Nina as a predictor – it almost always delivers. In my opinion, it's the best and only seasonal predictor for the Pacific Northwest. Moderate to strong La Nina conditions will persist into early spring. That will favor above normal precipitation the first part of spring, becoming neutral, which means no tendency, later in the spring.

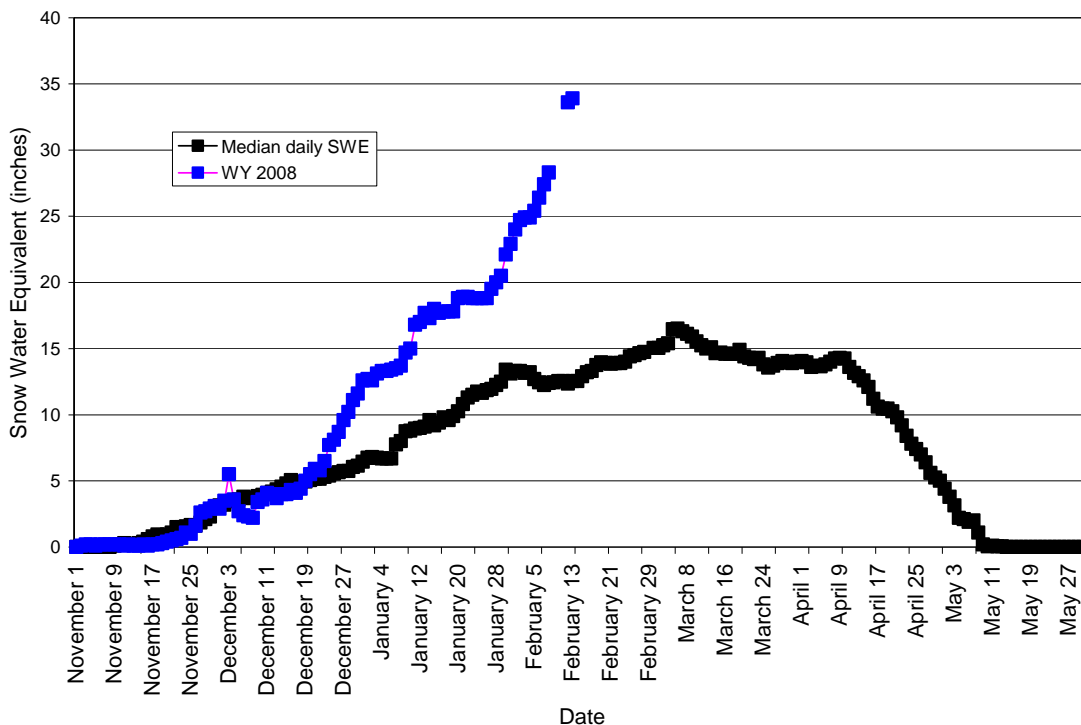


Precipitation Forecast for February – April 2008: Above normal for the Pacific Northwest, early spring – near normal precipitation mid-late spring. Temperatures near normal.

http://www.cpc.ncep.noaa.gov/products/predictions/long_range/lead01/off01_prdp.gif

Updated every month after about the 20th

Cougar Mtn. Snotel Station - Elevation 3,200 ft.
 Median snow water equivalent (1982-2007) vs. Water Year 2008



Snowpack: 230% of normal
Low Elevation Snotel, Green River Basin, WA

Flood Potential

Flooding is typically driven by short term weather patterns. Intense rain and/or warm weather, which melt snow, are usually the causes. Sometimes both of these weather elements combine to cause major floods.

West of the Cascades extreme rainfall causes floods. Everything else – clear cuts, snowmelt, development, soil moisture are secondary but can sometimes affect the severity.

It's more complex east of the mountains, with rain and spring snow melt as contributors. Geology is a player too, as Westside basins are conditioned to convey major runoff almost every year. Eastside basins generally are accustomed to move less water with a drier climate. However, with the right sequence of warm weather causing snow melt, followed by/or in addition to modest to heavy spring rains, major flooding will occur.

The flood season in Western Washington and Western Oregon is typically October/November through March. Heavy, intense rainfall is the primary driver of flooding. Snow melt, from rain on snow, does not increase the risk of major flooding, but can affect the severity. For example, a mild and rainy, yet moderate Pineapple Express pattern might cause a major flood if low elevation snow is in place. Again, you must have the heavy rainfall.

The flood season in Eastern Washington, Central/Eastern Oregon, Northern Idaho and Western Montana is Oct/Nov through March driven primarily by warm storms, some snowmelt and ice jams. There is a second flood season April through June, primarily driven by snow melt or snow melt with rainfall. Often May sees a big runoff from snowmelt, especially if there is a warm spell. Temperatures in the 80's or higher for several days, with mild overnight lows usually will do it. In June the melt continues and is sometimes combined with rainfall, to cause flooding

Short Term Weather and Flood Potential

The short term weather forecast for the Pacific Northwest is relatively dry and mild as higher pressure builds in for the next week. There may be a system on Friday and Tuesday that brushes by with light precipitation, mainly north, but overall fair weather and sunshine will prevail.

East of the mountains, there may be some minor flooding on small streams from low elevation snow melt caused by slow warming the next few days. West of the mountains, there is no flood threat for the next 5-7 days.

The long range models suggest a return to a more active weather pattern late next week and beyond for the Pacific Northwest.

Long Term Weather

The Western Washington and Western Oregon flood season eases by later in March and is not driven by snowmelt. Expect high flows in the spring caused by snowmelt and/or spring rainfall, but no flooding is expected from the melting of the existing large Westside snowpack.

East of the mountains, expect high flows from spring melt. Given the expected robust snowmelt runoff, most areas will be sensitive and vulnerable to rainfall, in combination with engorged rivers, causing increased flood risk this spring. Operations at Libby and the entire Columbia system should be aware of this increased risk.

Summary

Short term weather is mainly dry and mild for the next week through the Pacific Northwest, except for a weak system Friday and again Monday. Late next week a wet and stormy pattern develops with generally mountain snow and lowland rain. This pattern will also expose the Pacific Northwest to occasionally brief periods of warm temperatures and mountain rain. We

will have a better idea regarding timing and magnitude several days before the active pattern develops.

The long term pattern indicates no flood concerns for Western Washington at this time. The above normal snowpack for east of the Cascades and forecast of above normal early spring rainfall indicates a concern and heightened risk of flooding. Short term weather patterns will modify that risk and will be monitored.