

## **Northwestern U.S. Winter Storm – January 14-20, 2012**

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**Meteorological Overview:** The period from 14-20 January was marked by numerous upper disturbances along with an Arctic air outbreak over the northwestern U.S; peaking with historic snowstorms and ice storms over Washington State. The period began with a shortwave trough embedded within the fast onshore flow to the south of an upper low moving toward British Columbia. The shortwave dug southeastward through the Pacific Northwest and helped to usher one of the coldest air masses of the season into the region (Fig. 1a); in addition to producing snow showers across western Washington and Oregon. Heavy snows were reported in the Olympic and Cascade Mountains, as well as some lighter snows in the lower lying regions surrounding the Seattle-Tacoma metropolitan region.

The upper low and trough continued to move inland from 12 UTC 15 January – 12 UTC 16 January, with the leading edge of the associated low level cold air plunging southeastward through the central Great Basin and Rocky Mountains. Precipitation across the Pacific Northwest tapered off the morning of the 16<sup>th</sup>, with scattered, light precipitation advancing through the northern Rockies.

From 12 UTC 16 January – 12 UTC 17 January fast onshore flow persisted across the Pacific Northwest with another shortwave trough approaching the coast. This led to another increase in precipitation, and by the evening of the 16<sup>th</sup>, heavy snows returned to the region including the Washington and Oregon coastal ranges and the western slopes of the Cascades, with lighter amounts reported in the lower lying region surrounding Puget Sound, including the Seattle-Tacoma metropolitan region.

Accompanied by a long plume of subtropical moisture, the aforementioned offshore shortwave trough along with a strong upper jet pushed across the Pacific Northwest 12 UTC 17 January – 12 UTC 18 January. This moisture overrunning the cold air left in place by the previous system resulted in heavy to near record snow amounts across portions of western Washington. Olympia, WA airport's total of 11 inches of snow on 18 January was its third highest and Seattle-Tacoma International Airport's with nearly 7 inches was its sixth highest since record keeping began. Numerous cooperative observation stations across the Pacific Northwest reported new daily snowfall records for 17 & 18 January (Tab.1). While not documented records, Sunset Summit measured 24 inches of new snow, Saddle Mountain recorded 23 and Wilson River Summit measured 22 inches of new snow. Heavy snows of near-record to record values were also reported further to the east across the Blue Mountains in eastern Oregon and the Sawtooth and Bitterroot Ranges into the northern Rockies.

As this system continued to the east from 12 UTC 18 January – 12 UTC 19 January the low level cold air that was already in place over western Washington was reinforced by continuing precipitation and northerly flow at the surface. This set the stage for a historic freezing rain event over western Washington, with a first ever ice storm warning for the region. Ice accumulations of 0.5 – 0.75 inches were reported in the Seattle- Tacoma

metropolitan region, with an inch or more reported in areas further to the south and east. Heavy snows falling along the Cascades spread to the south into northern California and along the Rockies into the Tetons and northern Wasatch Mountains. Arctic high pressure at the surface settled south through the northern Plains with the Arctic front banking up against the eastern slopes of the northern Rockies (Fig. 1b). High winds were recorded across and east of the mountains with gusts of up to 100 mph reported.

Heavy precipitation continued to impact the western U.S. into the weekend as the next system moved onshore. This system brought heavier amounts further to the south into California than the previous systems, with heavy snows reported from the southern Cascades into the northern Sierra Nevada Mountains.

**Impacts:** These systems impacted much of the northwestern U.S. with a combination of heavy snow, rain and ice. Snows from these storms (Fig. 2) covered areas from the Pacific Northwest to the northern Plains. By 12 UTC 20 January 2 – 5 feet of snow had been reported across the Cascades with the heaviest amounts centered near the Mount Hood region. Over the northern Rockies, widespread accumulations of 1 -3 feet of snow were recorded, with the heaviest amounts falling along the Sawtooth Range where 3-6 foot amounts were common and totals as high as 70 inches were reported. Across the metropolitan regions of the area – 7 inches of snow was recorded in Seattle and Spokane, 11 inches in Tacoma and 2 inches in Portland, OR. Widespread rains of 3 – 6 inches with local amounts of 9 inches were observed along the northern California coast and 3 – 6 inches, with local amounts of up to 15 inches along the Oregon coast. Freezing rain accumulations of 0.25 – 1 inch were reported across the Columbia River Gorge east of Portland, with similar amounts observed across the Seattle-Tacoma metropolitan area. Falling trees and limbs burdened with the snow and ice were responsible for one death and widespread property damage along with approximately a half-million power outages. Also, over 300 flights at SeaTac Airport were cancelled, costing the airline industry millions of dollars.

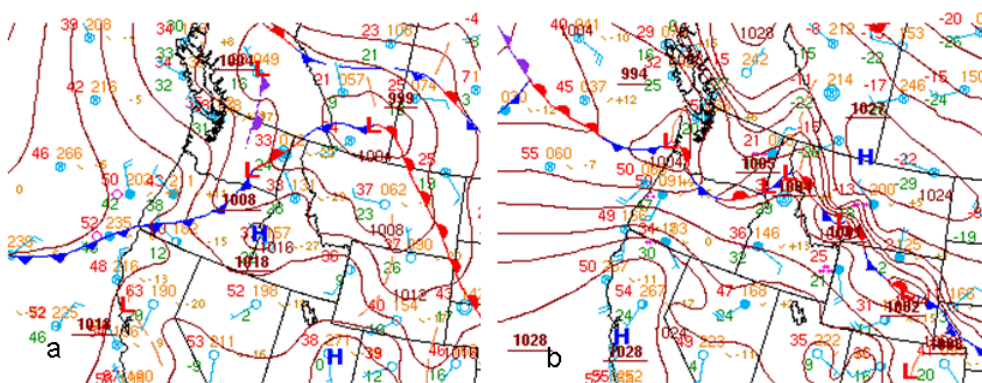


Figure 1: Surface analyses from 00 UTC on 15 January, 2012 (a) and 00 UTC on 19 January 2012 (b). (HPC)

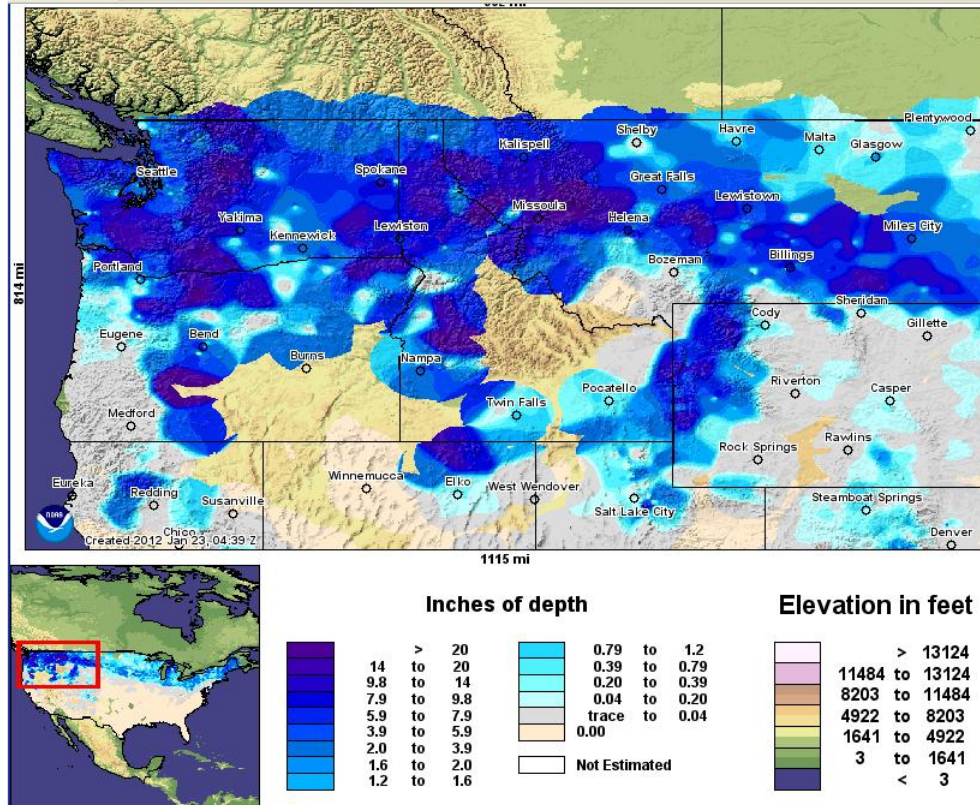


Figure 2: Snowfall accumulations across the northwestern U.S. on 17-20 January 2012. (NOHRSC)

Date	Location	New record (inches)
17 January 2012	Heron, MT	18.5
	Baring, WA	15.0
	Longmire- Mt. Rainier National Park, WA	15.0
	Easton, WA	14.0
	St. Helens, OR	11.0
	Portland, OR	1.3
	18 January 2012	Longmire- Mt. Rainier National Park, WA
Condon, WA		15.4
Goldendale, WA		12.0

Table 1: 24-hour snowfall records for selected locations. (NCDC)