

Snow Survey and Water Supply Bulletin – March 1st, 2015

The March 1st snow survey is now complete. Data from 147 snow courses and 50 snow pillows around the province and climate data from Environment Canada have been used to form the basis for the following report¹.

Weather

Temperatures across British Columbia continued to be well above normal through the month of February. Temperatures were generally 3-5°C above normal, with the largest temperature anomalies occurring in southwest British Columbia. February sea surface temperature anomalies in the Pacific Ocean off the shores of British Columbia have continued to be several degrees above normal.

February precipitation trends have been varied across the province. Vancouver Island, South Coast, and the Kootenay's experienced below normal precipitation. Above normal precipitation occurred in the Okanagan, Central Interior, Northwest and Northeast BC. With increased temperatures, rainfall was the dominant form of precipitation through mid-elevation terrain.

Snow Pack

Snow pack accumulation trends from early in the season have persisted throughout February. Modest declines in snow basin indices were observed in most basins between the February and March surveys. With the exception of the Upper Fraser West, all regions of the province have near normal or below normal March 1st snow basin indices (Figure 1). Snow basin indices range from a low of 15 % on the South Coast to a high of 142% of in Upper Fraser West (Table 1 and Figure 1).

Table 1 - BC Snow Basin Indices – March 1, 2015

Basin	% of Normal	Basin	% of Normal
Upper Fraser West	142	Boundary	75
Upper Fraser East	98	Similkameen	89
Nechako	105	South Coast	15
Middle Fraser	84	Vancouver Island	21
Lower Fraser	28	Central Coast	93
North Thompson	96	Skagit	27
South Thompson	91	Peace	95
Upper Columbia	91	Skeena-Nass	92
West Kootenay	83	Stikine	70
East Kootenay	76	Liard	83
Okanagan	85	Northwest	78

Near-normal (90-110%) to slightly below normal (80-90%) snow packs are present through most of the province. Moderately low snow packs (70-80%) are present in the East Kootenay, Boundary, Stikine and the Northwest. Extremely low snow packs (<40%) are

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present throughout southwest BC, including the Lower Fraser, South Coast, Vancouver Island and Skagit basins.

The overall Fraser Basin snow index is 84%, with the extremely low snow pack in the Lower Fraser offsetting the moderate snow packs in the Upper Fraser, Middle Fraser and Thompson basins.

Variability in snow packs is present within snow basins. Above normal (>120%) snow measurements were observed in West Central BC including areas around Burns Lake, Francois Lake and around Houston, and through the Chilcotin.

Field observations around the province indicate that snow packs at valley bottom to mid-elevation (e.g. 800-1100m) is limited. As most snow basin indices are based on observations at higher elevations (e.g. 1100m-2000m), indices reported here may not fully reflect the snow pack situation at low to mid-elevation.

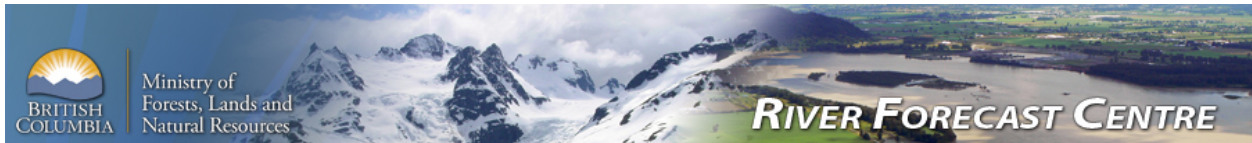
The extremely low snow packs in southwest BC and low snow packs in the low to mid-elevation terrain, are the result of both warmer temperatures and drier conditions through the winter. A high proportion of precipitation has been delivered as rain rather than snow. Snow basin indices are at historic minimum values (30 years of record) in the Lower Fraser, South Coast and Skagit basins, and near minimum values on Vancouver Island. Similar low snow pack conditions in southwest BC were observed in 2005.

Streamflow Runoff

As a result of warmer temperatures, increased proportion of precipitation falling as rain rather than snow, and mid-season melt of snow packs (particularly at low- to mid-elevation), rivers across the province have seen well above normal flows through the winter. Flows through this water year (October 1st, 2014 to February 28th, 2015) have been approximately 130-170% of normal through the Thompson River Basin, 115% of normal in the Okanagan, 150% of normal on the Skeena River, and near historic maximum levels through the Fraser River (from Prince George through Hope) for the time of year, but remain below flood stage.

Outlook

Warm Pacific Ocean temperatures and weak El Niño-like conditions are expected to persist into the spring. However NOAA is suggesting that the influence of El Niño through the spring is likely to be small given the weak nature of the El Niño conditions. In the north Pacific, well above normal temperatures continue to persist and are likely to have a stronger influence on temperature patterns into the spring, particularly along coastal sections of the province. Environment Canada is forecasting a high likelihood of above normal temperatures over the March to May period across British Columbia.



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By early March, 80% of the annual BC snow pack has typically accumulated. At a basin-wide scale, higher than normal snow packs in the Upper Fraser West basin indicate a trend towards increased seasonal flood risk in the unregulated regions of the Nechako basin this year. Similar smaller pockets of higher snow packs and potential for increased flood risk exist in west central BC (Houston, Burns Lake, Vanderhoof) and West Chilcotin. Near-normal snow packs (90-110%) in the Upper Fraser East, Nechako, North Thompson, South Thompson, Upper Columbia, Central Coast, Peace and Skeena-Nass indicate normal seasonal flood risk. Below normal snow packs (70%-90%) in the Middle Fraser, West Kootenay, East Kootenay, Okanagan, Boundary, Similkameen, Stikine, Liard, and North-west indicate below normal seasonal flood risk for these regions. Similarly, seasonal flood risk for the entire Fraser River is below normal, with the observed 84% of normal snow basin index being the 54th lowest year out of the past 63 years of snow observations, and the forecast peak flow for the Fraser River at Hope, given normal seasonal weather, is estimated to be 7500-8500 m³/s, or slightly below mean annual flood level.

Flooding is always possible during the snowmelt freshet season, even in years with normal or lower than normal snow packs. Given the snow conditions this year, extreme weather, such as extreme precipitation or combined hot and wet weather, would be required to produce flooding or higher than expected flows.

With the current seasonal weather outlook and snow pack conditions in southwest British Columbia, it is unlikely that snow packs will recover significantly. With extremely low snow packs in the Lower Fraser, South Coast, Skagit and Vancouver Island, runoff from snow melt will be limited. Low flows are expected to occur earlier than normal this year, very low flows can be expected in the summer unless significant rainfall occurs through the spring and summer. To a lesser extent, lower snow packs in the East Kootenay, Boundary, Stikine and Northwest indicate an increased likelihood of summer low flows in these regions as well. A summary of seasonal volume runoff forecasts for select rivers in the province is below. Near normal runoff is forecast for most basins, with below normal runoff forecast for the Nicola (70-78% of normal) and Okanagan (85-86% of normal) and Kalamalka-Wood (59-63% of normal).

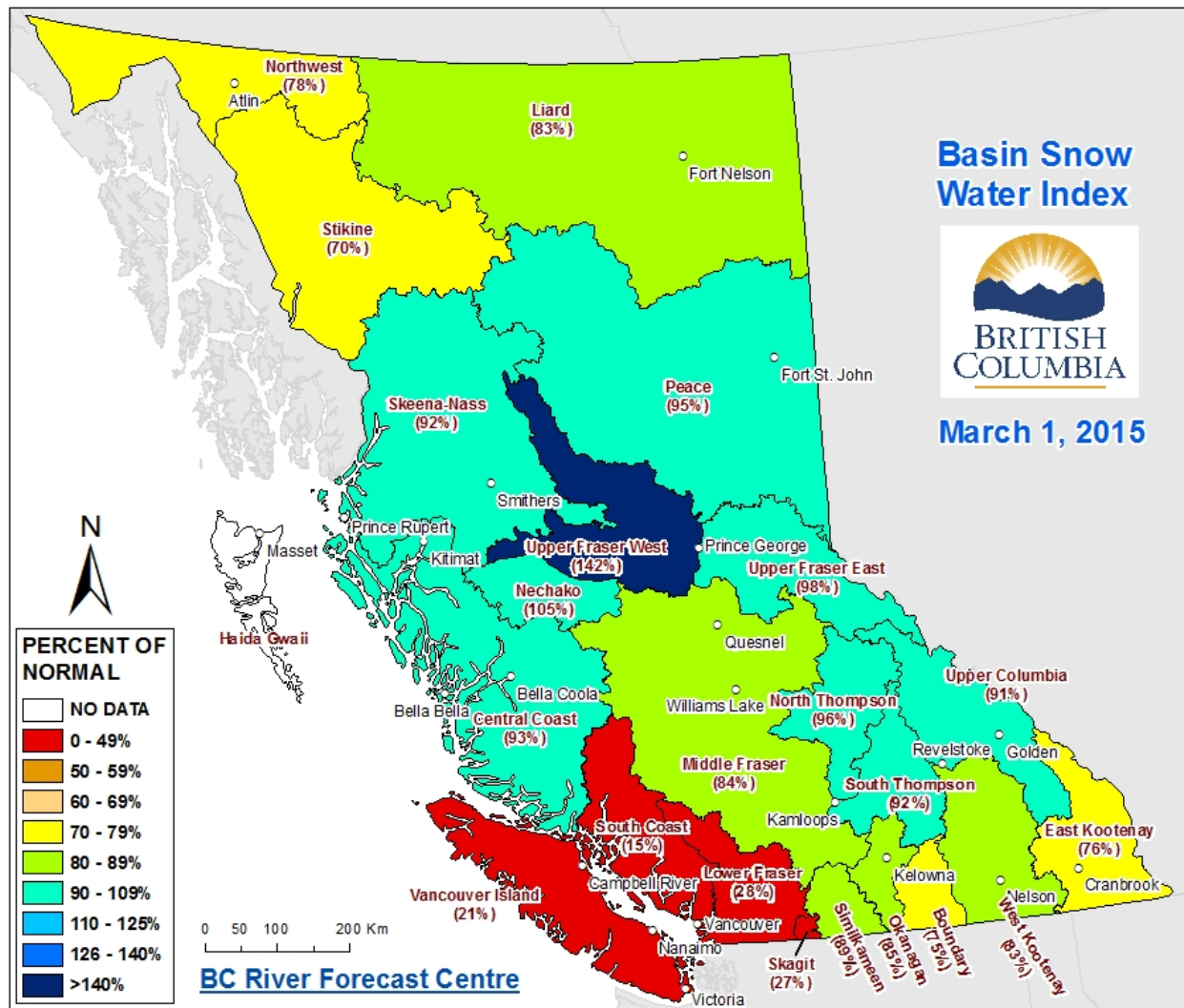
The River Forecast Centre will continue to monitor snow pack conditions and streamflows and will provide updated seasonal flood risk and water supply forecasts in the April 1st 2015 bulletin, which is scheduled for release on Wednesday, April 8th.

BC River Forecast Centre
March 9, 2015



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Figure 1: Basin Snow Water Index – March 1st, 2015



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