

## Snow Survey and Water Supply Bulletin – January 1<sup>st</sup>, 2015

The January 1<sup>st</sup> snow survey is now complete. Data from 66 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 report<sup>1</sup>.

### Weather

Fall season temperatures were above average for most of the province, despite several Arctic air outbreaks since mid-November. For south-western parts of the province, temperatures were approximately 2 to 3°C above average during the fall. December was a warm month for the province, particularly for the interior with temperatures 3 to 5°C above average conditions in some locations.

With warm conditions prevalent through much of the early snow accumulation season and dry conditions during the Arctic outbreaks, precipitation has primarily been in the form of rain through the fall and December. After a particularly wet October, most major centres in the Okanagan, Columbia and Kootenay experienced lower than average precipitation in November and December. In the northeast, precipitation totals have been above average since November, while in the northwest, precipitation totals were lower than average since November. On the south coast and Vancouver Island, precipitation has been below average and has primarily occurred as rain. However, the recent winter storm that affected most of the southern regions of the province in early January has increased snow pack, which is not completely reflected within the January 1<sup>st</sup> snow measurements.

### Snowpack

Early season snow pack has been slow to develop across the province and, in all regions of the province, snow basin indices are below normal for January 1<sup>st</sup> (Figure 1). Snow basin indices range from a low of 28 % on the south coast to a high of 96 % in North Thompson (Table 1).

**Table 1 - BC Snow Basin Indices – January 1, 2015**

Basin	% of Normal	Basin	% of Normal
Upper Fraser West	88	Boundary	79
Upper Fraser East	87	Similkameen	94
Nechako	90	South Coast	49
Middle Fraser	82	Vancouver Island	28
Lower Fraser	49	Central Coast	93
North Thompson	96	Skagit	No Data
South Thompson	68	Peace	71
Upper Columbia	76	Skeena-Nass	32
West Kootenay	78	Stikine	65
East Kootenay	80	Liard	87
Okanagan	90	Northwest	No Data

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January snow surveys feature fewer individual survey measurements than survey dates later in the season. In combination with this, challenging weather conditions meant that not all scheduled surveys were completed in this period. As a result, some basin index values have been calculated from a limited number of survey points, and therefore may not be fully reflective of the conditions across the entire basin.

Very low snow packs (<50% of normal) are present in coastal British Columbia, particularly in the Lower Fraser, South Coast, Vancouver Island, and Skeena-Nass basins. In the Skeena-Nass basin, the low snow basin indice (32%) is strongly influenced by little or no snow coverage in valley-bottom locations (e.g. Terrace Airport). Moderately low snow packs (60-80% of normal) are present in the West Kootenay, Upper Columbia, Boundary, Peace and Stikine basins. Elsewhere in the province, snow packs are closer to normal (90-100%) for this time of year.

In order to better reflect regional snow pack variation and operational requirements, boundaries for snow basin indices have been adjusted this year (Figure 1). The Upper Fraser Basin has been divided into two separate basins. The new Upper Fraser West basin includes the unregulated portions of the Nechako River upstream of Prince George and includes the Stuart River, Nautley River, and other tributaries downstream of the Kenny Dam. The Nechako River snow basin remains unchanged and represents that drainage area upstream of the Kenny Dam. The new Upper Fraser East basin is the remaining areas of the previous Upper Fraser basin and includes the Fraser River upstream of Prince George (including the Willow River, Bowron River, and McGregor River). The old Okanagan-Kettle basin has been split into two separate basins: Okanagan and Boundary. The new Okanagan basin includes the drainage area of the Okanagan River upstream of the US border and the new Boundary basin includes the drainage areas of the Kettle and Granby Rivers upstream of the US border. A new West Kootenay basin combines the previous West Boundary and Lower Columbia boundaries and has been changed to better reflect regional administrative boundaries as well as seasonal flood risk in local watersheds rather than the regulated Columbia River. The boundaries of the East Kootenay and Upper Columbia basins remain unchanged.

### Outlook

Early winter 2014-2015 has been characterized by a transition to near El Niño (ENSO) conditions. The Climate Prediction Centre (CPC) at the U.S. National Weather Service/NOAA has forecast a 65% chance of weak El Niño conditions developing in January and February and ENSO-neutral conditions thereafter. Although the warmer than average sea surface temperatures in the equatorial Pacific Ocean are indicative of El Niño, the overall atmospheric circulation was not strongly coupled with the warm Pacific Ocean resulting in ENSO-neutral conditions. However, an El Niño Watch remains in effect due to the greater likelihood of El Niño conditions occurring based on an ensemble of ENSO prediction models published by the CPC.



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In general, neutral ENSO conditions result in average weather conditions for most of the province. Under these conditions, there is potential for some areas of the province to experience conditions that depart substantially from the long-term average conditions. Such was the case in January 2014, where the Upper Fraser basin experienced snow packs 140% of average conditions and the Nechako basin experienced snow packs 63% of average conditions based on the January 1 snow pack surveys. El Niño conditions result in generally warmer conditions through most of the province, except for the northeast where conditions are expected to be seasonably cold. The effect of El Niño on precipitation is less certain.

In conjunction with warmer than normal sea surface temperatures in the equatorial Pacific Ocean, similar positive temperature anomalies have persisted in the Pacific waters adjacent to British Columbia. These warmer ocean temperatures have likely influenced the warmer than normal seasonal temperatures that have been observed since the late-spring and summer 2014.

Seasonal forecasts from Environment Canada indicate the western regions of the province may experience warmer than average temperatures and average precipitation for the period January to March 2015. This trend is related to the continued effects of above average temperatures of Pacific Ocean water at the BC coast. The seasonal forecasts for the interior, Columbia and Kootenay, and the northeast areas of the province do not indicate temperature conditions will vary much beyond seasonal average conditions but do indicate greater than average precipitation is expected through March 2015.

By early January, nearly half of the annual BC snowpack has typically accumulated. At this early stage in the season, there are no indications that any regions of the province are developing increased seasonal flood risk. Currently observed low snow pack in some regions of the province may be an early indication of the potential for lower than normal stream flow in the spring and summer. However, with three or more months left of snow accumulation, these outlooks could change significantly.

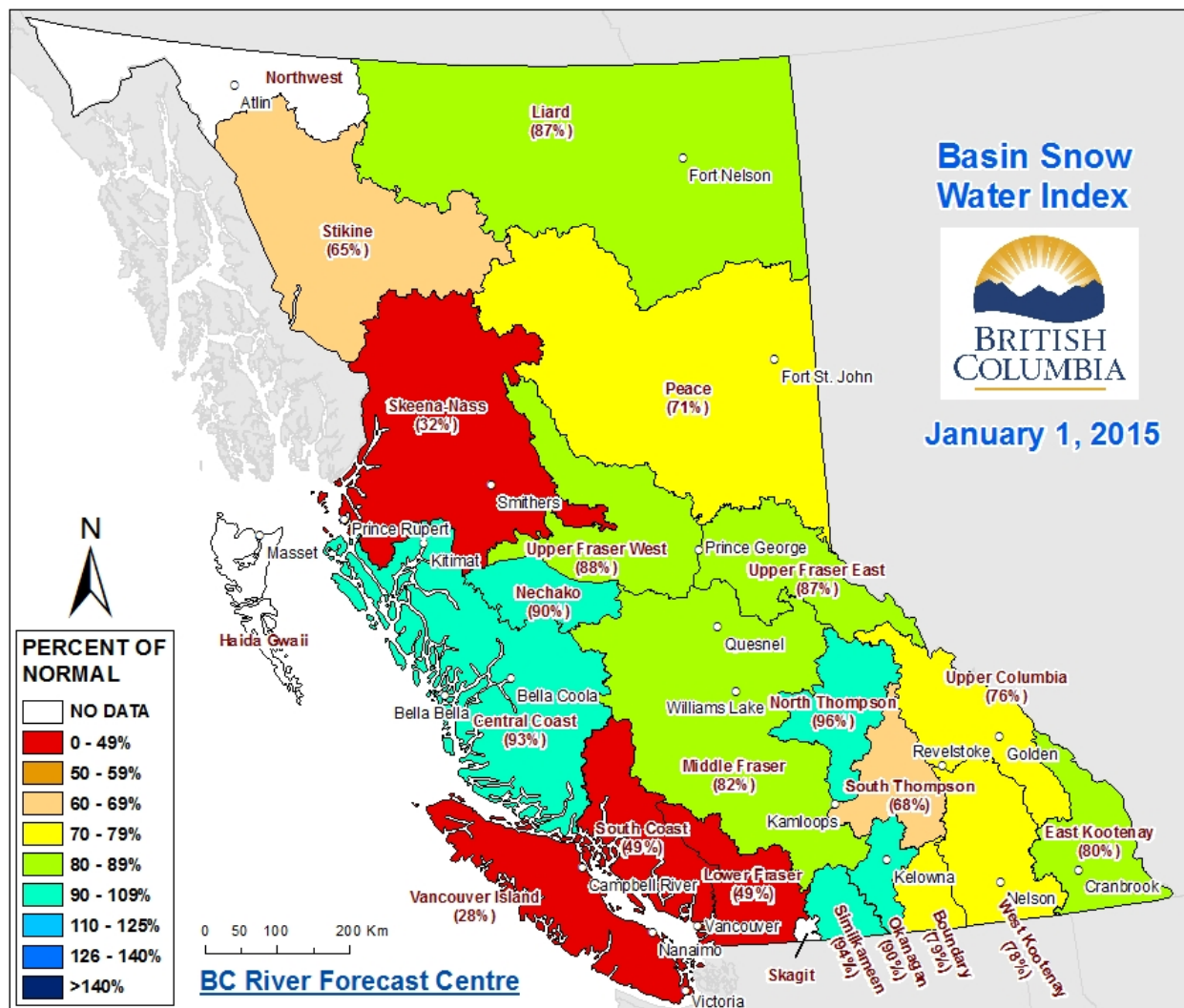
The River Forecast Centre will continue to monitor snow pack conditions and will provide an updated seasonal flood risk forecast in the February 1<sup>st</sup> 2015 bulletin, which is scheduled for release on February 6<sup>th</sup>.

BC River Forecast Centre  
January 9, 2015



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Figure 1: Basin Snow Water Index – January 1<sup>st</sup>, 2015



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