BC HYDRO OPERATIONS - ICE OBSERVATION REPORT #19

Flight: February 12, 2015
Ground Observations February 12-13, 2015
Report: February 17, 2015
Report by Martin Jasek and Kerry Paslawski

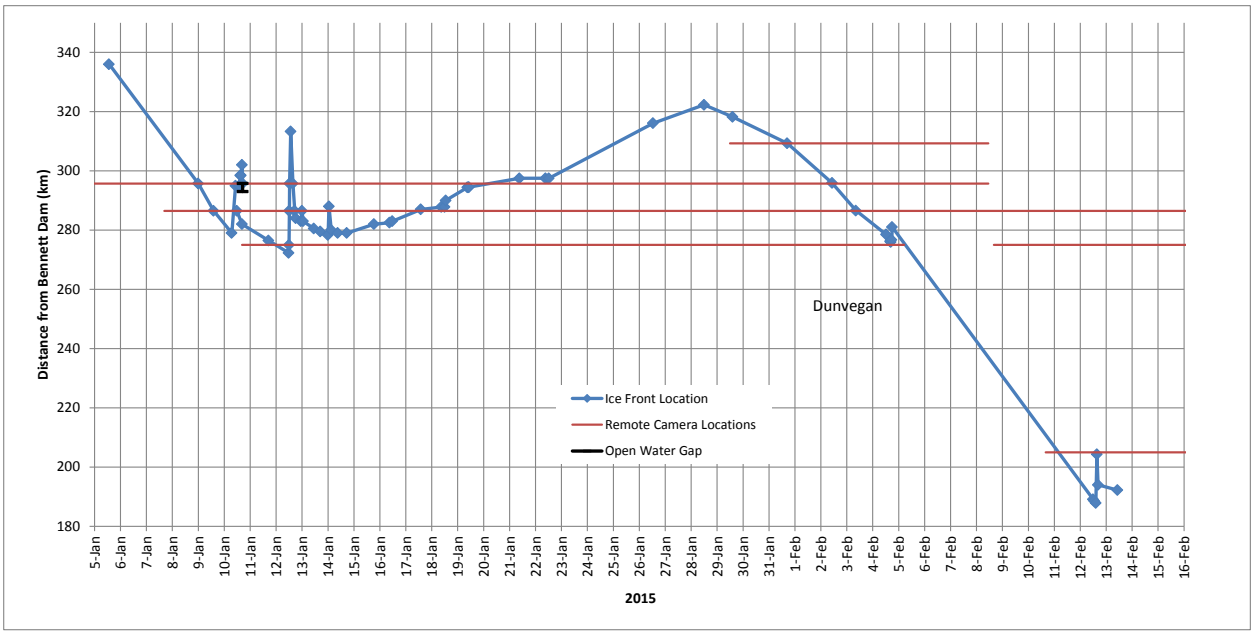
The responsibility for ice observations on the Peace River passes to BC Hydro from Alberta Environment and Sustainable Resource Development (AESRD) when the ice front is upstream of Dunvegan. That responsibility was transferred on January 9, 2015. The numbering of reports is a continuation of the AESRD reports.

Ice Front

A flight observation was conducted out of the Fort St. John Airport on Feb 12. The air temperatures during the flight at the river level were between -2 and +2 ^{o}C but had been at around -10 ^{o}C earlier that morning. The ice front was found at **km 189.1** on **Feb 12, 2015 11:57 MST** and was still advancing upstream. This placed it 25 km downstream of the Clayhurst Bridge near the BC-AB Border, 107 km upstream of Dunvegan and 206 km upstream from the Town of Peace River. Since its last furthest advance observed on Feb 4, the ice front had advanced 87 km in 8 days. The average rate of advance was 11.2 km/day.

There was about 95% surface concentration for the first 1.7 km upstream of the ice front and then 50% surface ice concentration upstream of that reach. There were both frazil pans and released anchor ice flowing into the ice front. About an hour later the ice front was found at **km 188.6** on **Feb 12, 2015 12:59 MST**.

A remote camera looking upstream from km 205 recorded the formation of a toe of a secondary consolidation at **km 204.3** on **Feb 12, 2015 15:30 MST**. On **Feb 13, 2015 10:35 MST** a ground observation found the ice front at **km 192.2**, a few km downstream from the previous day. There were still ice floes arriving at the front but a recession of the ice cover occurred because the secondary consolidation that occurred the day before. The plot below shows this consolidation on Feb 12.



Below is a list of ice fronts, some of which have been interpolated based on advance and recession rates as well as remote camera images.

Date/Time	Ice Front Location (km)	Notes/Comments
12-Feb-2015 11:57	189.1	BC Hydro Flight Observation - incoming ice concentration = 50%
12-Feb-2015 12:59	188.6	BC Hydro Flight Observation - incoming ice concentration = 50%
12-Feb-2015 14:26	187.9	Extrapolate maximum upstream extent before consolidation. Start of consolidation started based on 3 m/s to km 204.3
12-Feb-2015 15:30	204.3	Web Camera #2
12-Feb-2015 16:30	194.0	Assume decreasing rate of advance, ice concentration dropped from 50% to 15%
13-Feb-2015 10:35	192.2	BC Hydro Ground Observation - incoming ice concentration = 50%

As of the morning of Feb 17, the ice front appears to be upstream of the remote camera viewing range (km 205 to km 199).

The ice cover downstream of the ice front was generally juxtaposed with semi consolidated and consolidated reaches that were shorter than normal. This was due to the unusually low discharge during the formation of the ice cover between km 189 and km 260. The width of the main channel between the border ice along each bank was narrower than normal in most of this reach, also due to the low discharge during ice formation. This likely caused the accelerated ice front advance since Feb 6.

Ice floes upstream of the ice front consisted both of frazil pans as well as dark anchor ice. There was significant anchor ice visible on the bed of the river that was green in colour. Anchor ice that was dark brown (full of silt) was more difficult to see from the air when still submerged but easier to distinguish once released from the bed. Therefore, the quantity of total anchor ice released (brown and green) as a percentage of the total ice concentration which also had frazil ice pans would be difficult quantify.

Below are the ice cover details.

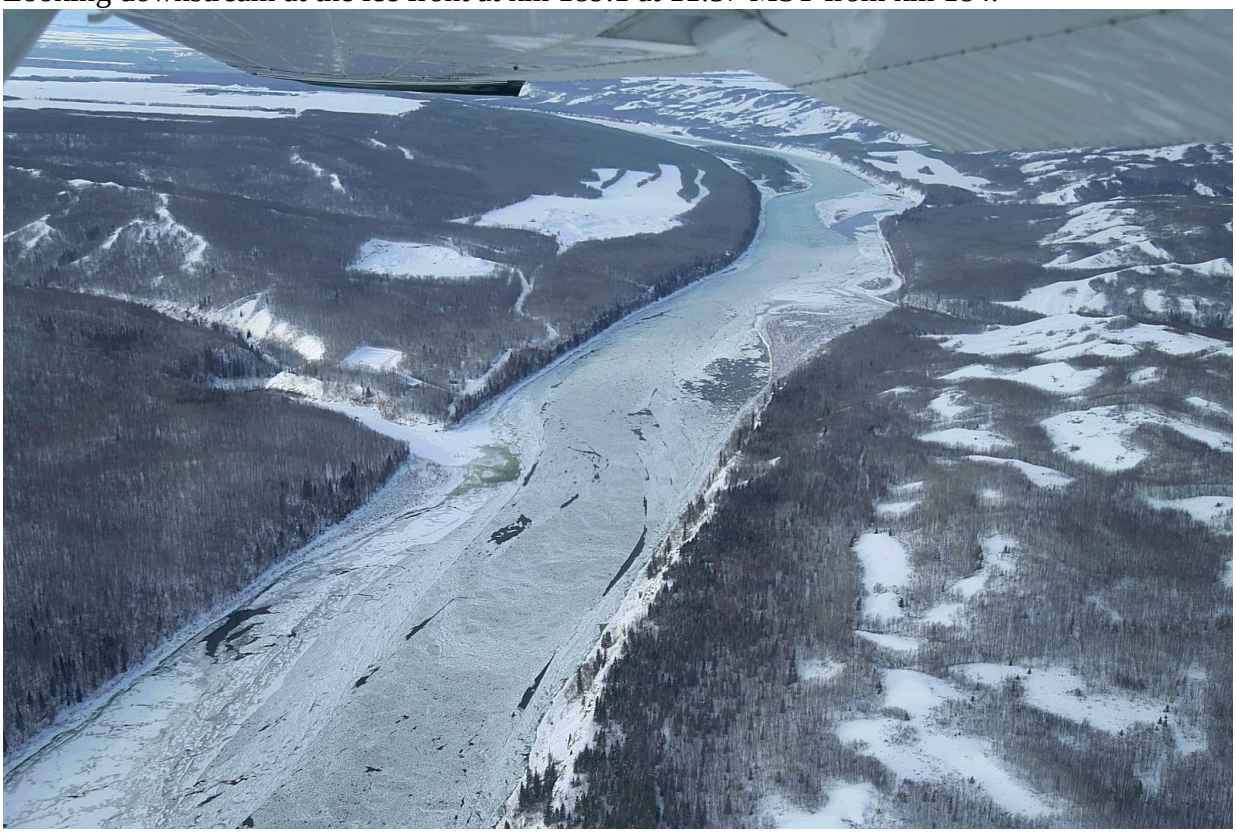
<u>Detailed Flight Observations on Feb 12, 2015</u>:

km 106 - surface ice concentration of 15% with released anchor ice
km 108 - surface ice concentration of 40% with released anchor ice
km 117 - surface ice concentration of 40% with released anchor ice
km 126.5 - surface ice concentration of 20% with released anchor ice
km 135 - surface ice concentration of 40% with released anchor ice
km 146 - surface ice concentration of 35% with released anchor ice
km 155 - surface ice concentration of 35% with released anchor ice
km 166 - surface ice concentration of 50% with released anchor ice
km 172 - surface ice concentration of 40% with released anchor ice
km 182 - surface ice concentration of 50% with released anchor ice
km 187 - surface ice concentration of 70% with released anchor ice

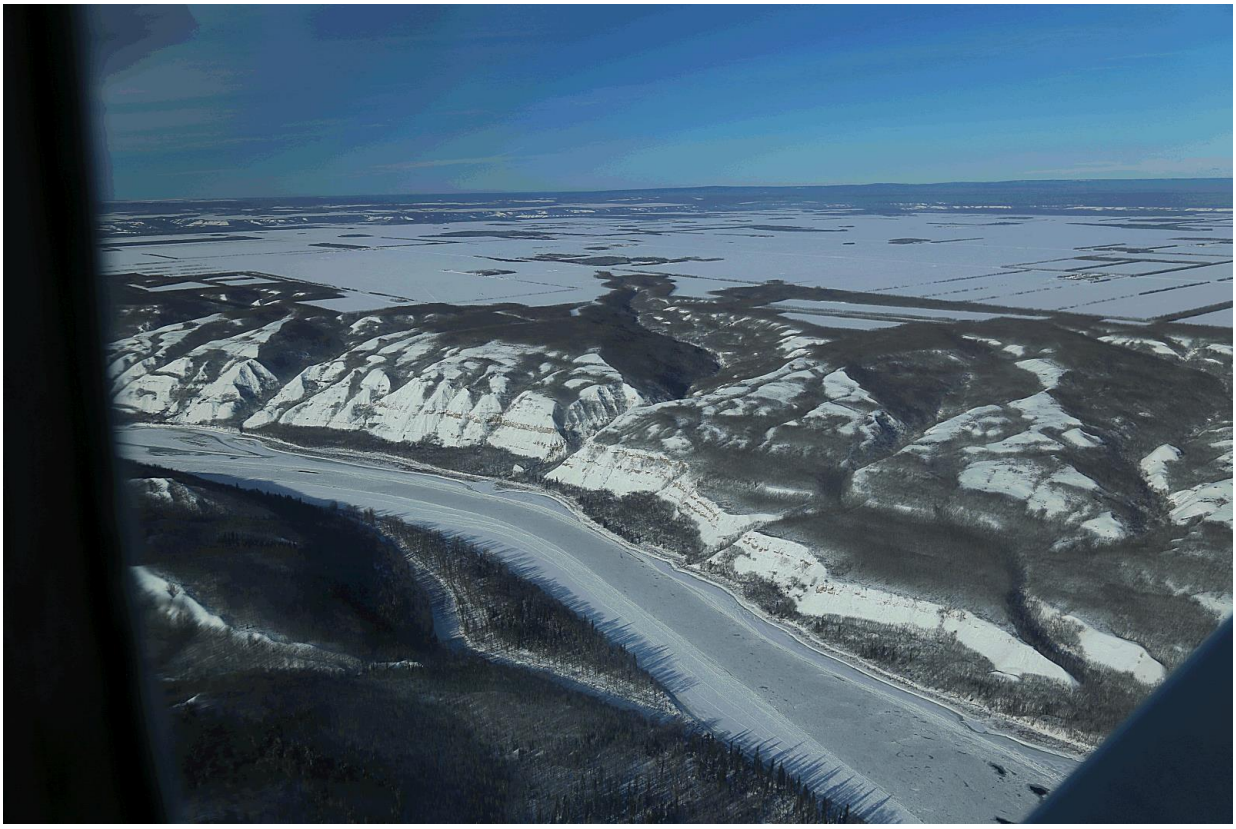
km 187.5 to 189.1	- surface ice concentration of 95% with released anchor ice
km 189.1	- ice front at 11:57 MST (ice front at km 188.6 at 12:59 MST)
km 189.1 to 196.6	- ice cover is juxtaposed
km 196.6 to 197.0	- a short reach of consolidated of ice cover
km 197.0 to 204.0	- ice cover is juxtaposed
km 204.0 to 205.6	- a short reach of consolidated of ice cover
km 205.6 to 209.5	- ice cover is juxtaposed
km 209.6 to 210.0	- a short reach of consolidated of ice cover
km 210.0 to 212.9	- rafts of semi consolidated ice with open water areas
km 212.9 to 214.0	- ice cover is juxtaposed
km 214.0 to 214.5	- a short reach of consolidated of ice cover
km 214.5 to 215.3	- ice cover is juxtaposed
km 215.3 to 217.4	- ice cover is semi-consolidated
km 217.4 to 219.8	- ice cover is juxtaposed
km 219.8 to 220.7	- a short reach of consolidated of ice cover
km 220.7 to 221.4	- ice cover is semi-consolidated
km 221.4 to 223.2	- ice cover is consolidated
km 223.2 to 224.5	- ice cover is semi-consolidated
km 224.5 to 227.0	- ice cover is juxtaposed
km 227.0 to 228.0	- ice cover is semi-consolidated
km 228.0 to 229.0	- ice cover is juxtaposed
km 229.0 to 231.9	- ice cover is consolidated
km 231.9 to 235.7	- ice cover is juxtaposed
km 235.7 to 238.0	- open lead with 2/3 of downstream end frozen over
km 238.0 to 238.5	- extruded consolidated rafts with smooth ice in between
km 238.5 to 243.0	- ice cover is semi-consolidated
km 243.0 to 249.6	- ice cover is juxtaposed
km 249.6 to 252.9	- ice cover is consolidated
km 252.9 to 258.0	- ice cover is juxtaposed
km 258.0 to 263.2	- ice cover is consolidated
km 263.2 to 267.5	- ice cover is juxtaposed

- end of observations

Looking downstream at the ice front at km 189.1 at 11:57 MST from km 184.



Looking upstream at the ice front at km 189.1 at 11:57 MST from km 190.

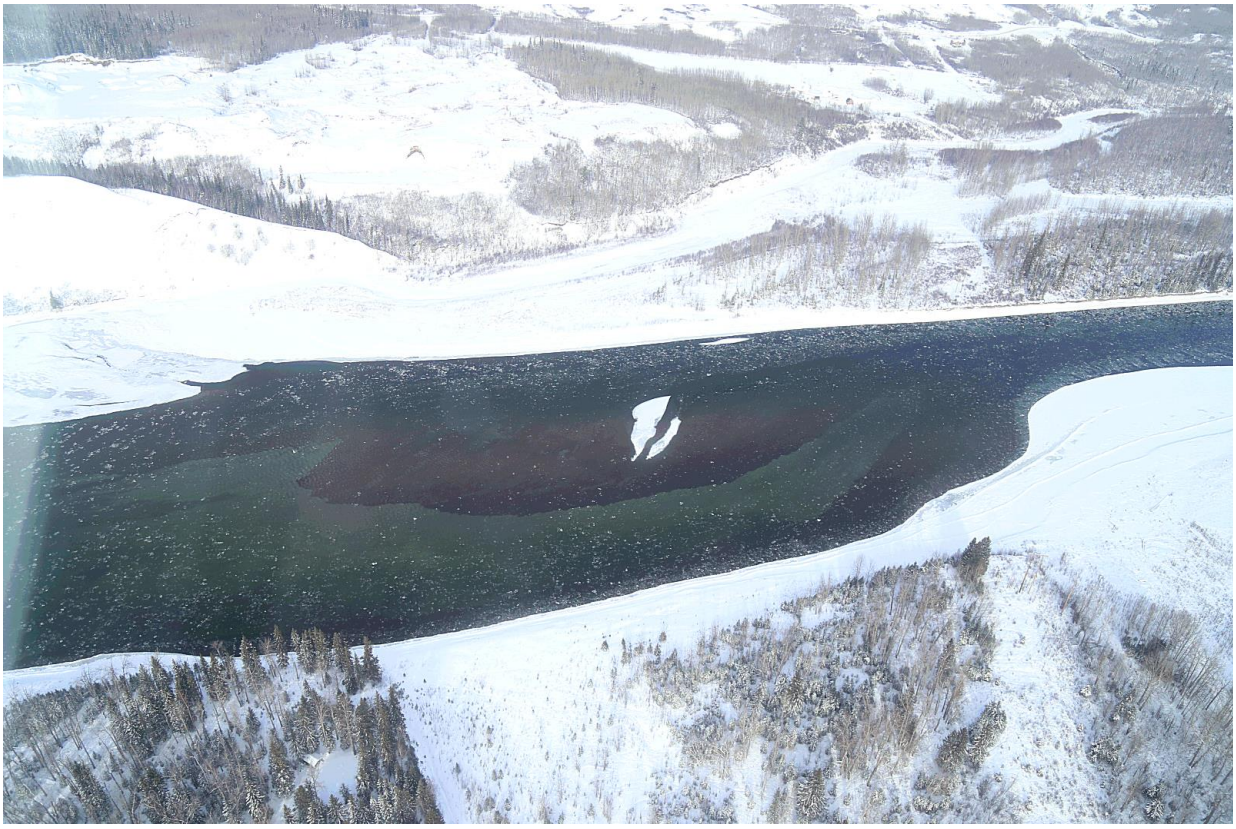


Ice cover at km 205 shows wide border due to low flow. Flow direction is left to right. The ice cover downstream of the ice front was dominantly juxtaposed.

Looking upstream at a toe of a consolidation at km 253.

Looking upstream at a toe of a consolidation at km 263.

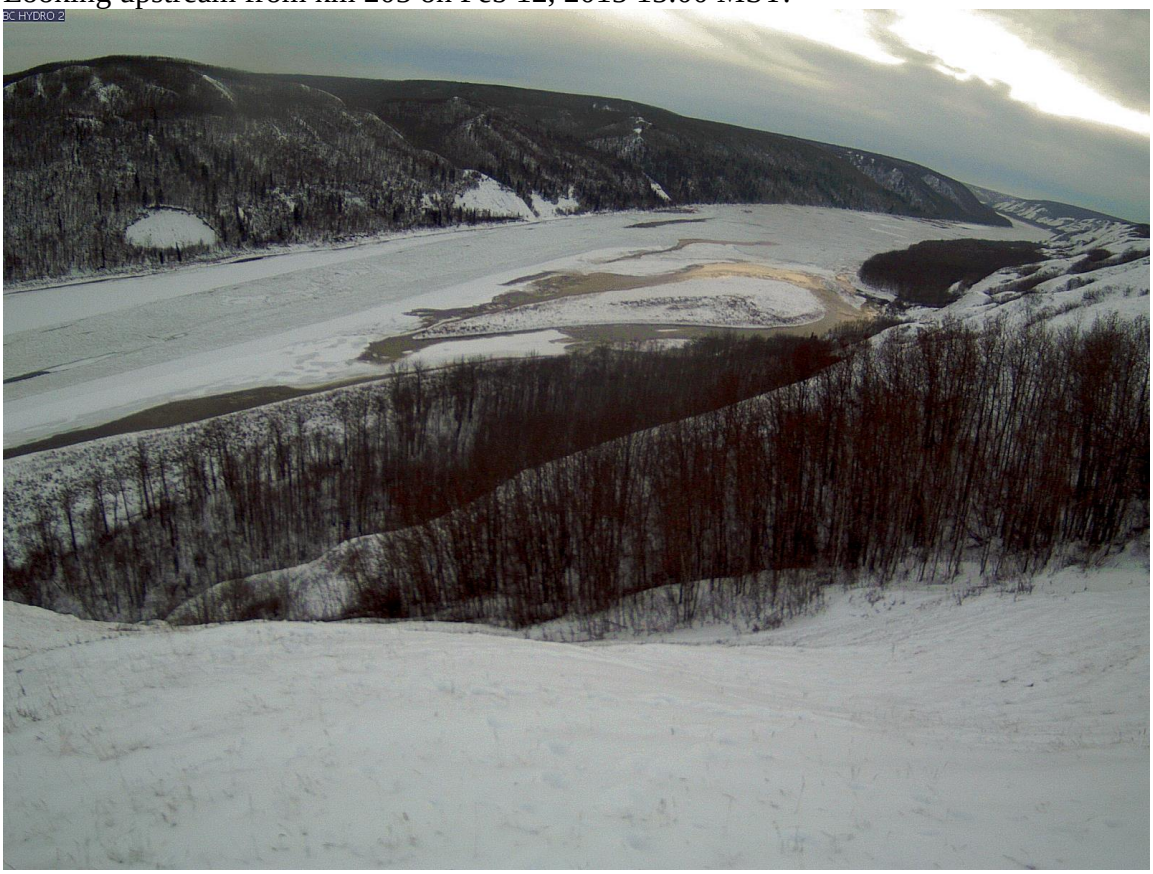
Toe of a consolidation at km 263. Flow direction is left to right.



Anchor ice on the bed of the river at km 109. Flow direction is left to right.

Anchor ice near the Taylor Bridge at km 123. Flow direction is left to right.

Looking upstream from km 205 on Feb 12, 2015 15:00 MST.



Looking upstream from km 205 on Feb 12, 2015 16:30 MST. Toe of a consolidation just formed upstream of the gravel bar.

Environment Canada Temperatures (°C)			
		Fort St. John	Town of Peace River
Observed:		**Max/Min**	**Max/Min**
Thr	05-Feb-15	-13.1 / -19.9	-15.5 / -19.5
Fri	06-Feb-15	-19.9 / -21.8	-19.3 / -22.3
Sat	07-Feb-15	-20.1 / -24.8	-18 / -21.7
Sun	08-Feb-15	-20.4 / -29.2	-20.2 / -24.2
Mon	09-Feb-15	-13.1 / -19.9	-15.5 / -19.5
Tue	10-Feb-15	-14.9 / -22.9	-18.7 / -24.9
Wed	11-Feb-15	-12.8 / -19.4	-9.1 / -20.1
Thr	12-Feb-15	4.7 / -12.9	-3 / -14
Fri	13-Feb-15	-0.8 / -9.2	-5.7 / -11.5
Sat	14-Feb-15	5.7 / -6.8	4.6 / -8.9
Sun	15-Feb-15	4.7 / -3.5	5.5 / -6.1
Mon	16-Feb-15	-0.6 / -10.8	-6.1 / -13.1
Environment Canada Temperatures (°C)			
Forecast:			
Tue	17-Feb-15	0 / -11	-6 / -15
Wed	18-Feb-15	1 / -4	-2 / -8
Thr	19-Feb-15	4 / -3	0 / -4
Fri	20-Feb-15	-3 / -3	-6 / -8
Sat	21-Feb-15	-3 / -12	-6 / -18
Sun	22-Feb-15	8 / -6	1 / -10
Mon	23-Feb-15	5 / -3	3 / -4
Normal Max/Min		-5 / -14	-6 / -17

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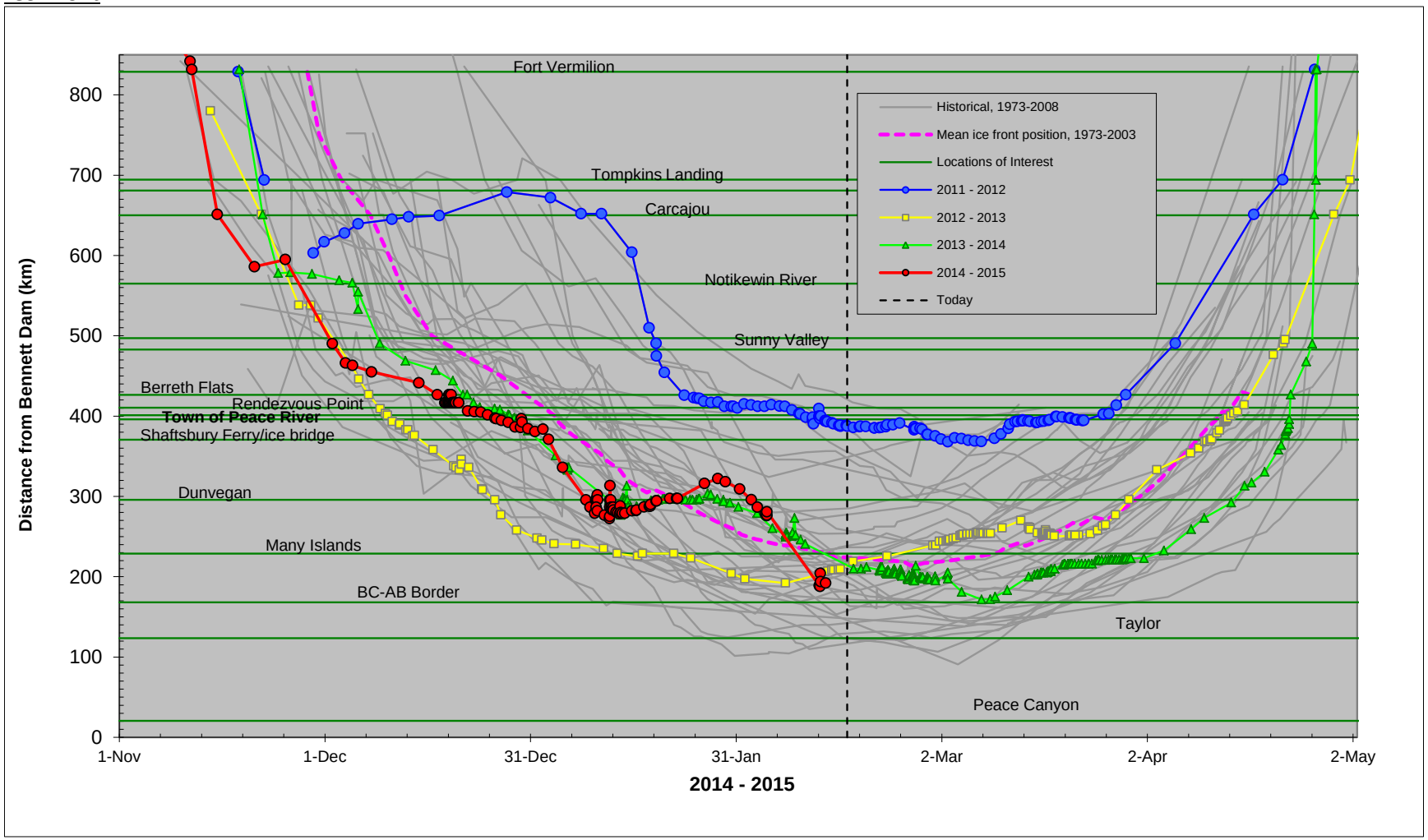
Ice Front



The next ice observation report will be issued after a flight that is scheduled for Wednesday Feb 18, 2015.