

Ministry of **Forests, Lands and
Natural Resource Operations**

Water Stewardship Council Meeting

October 12th, 2017

Water Management 2017

by

Shaun Reimer, P.Eng. and Brian Symonds, P.Eng.



Water Management Decisions

- River Forecast Centre estimates Okanagan Lake inflows based primarily on snow data.
- These forecasts combined with real time data of lake levels, flows, and other factors, are input to the ministry's fish water management tool (FWMT) to project Okanagan Lake levels through the year and to try to attain monthly target levels.

The ministry has guidelines it follows to protect kokanee and sockeye which include:

- Minimizing the drawdown of Okanagan Lake between the date of peak kokanee shore spawning and 100% hatch and emergence of the kokanee fry. Staff try to limit the drawdown to 15 cm so as not to 'de-water' shoreline spawned kokanee eggs. In 2017, the drawdown was 17 cm.
- Keeping the flow in the Okanagan River at Oliver below 28.3 cubic metres per second during sockeye egg and alevin incubation (between Nov 1st and 100% emergence – usually early May).
- **These guidelines are overridden if flooding is expected.**



Water Management Decisions 2017

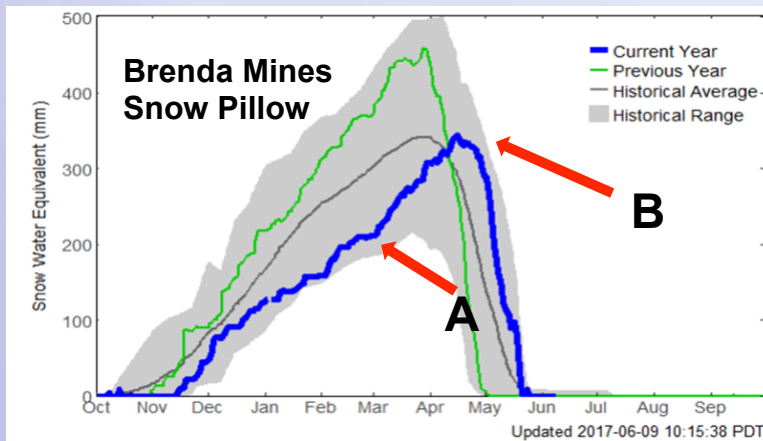
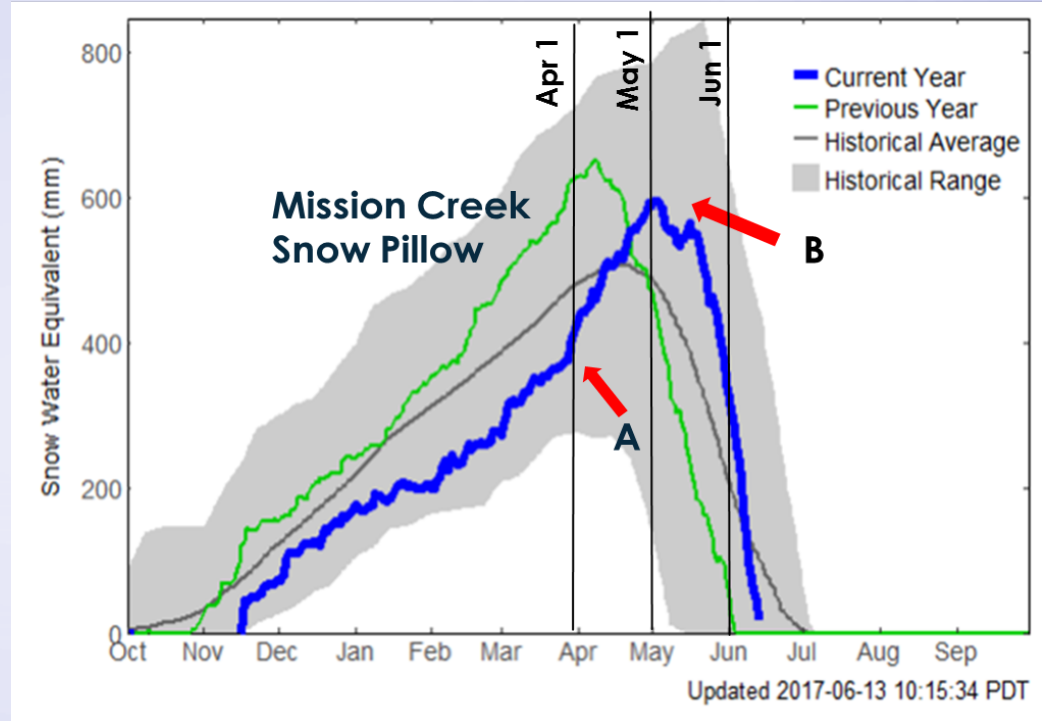
- Early Snowpack was low; No flooding was predicted.
- Inflow forecasts based on that snowpack were also low through to May.
- Inflow models used historic weather and climate patterns and did not react well to unprecedented March to May precipitation,
- **Fisheries guidelines were overridden** in April because of the ongoing wet weather. Flows were increased dramatically prior to the complete hatching/emergence of the sockeye in the Okanagan River.
- Even in early May, modelling did not project the lake going over our annual target.

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Okanagan Snow Basin Indices		
	2017	2016
01-Jan	79%	125%
01-Feb	79%	122%
01-Mar	86%	123%
01-Apr	105%	131%
01-May	147%	75%

Snow indices based on observations at ~20 snow stations

The Snow Basin Index represents snow monthly snow measurements taken at approximately 20 snow stations spread throughout the valley. The table above shows how this year compared to last year.



- A.** Early Decisions regarding lake levels reflected the snow conditions at the time.
- B.** Max snowpack remained just above normal (black line) and even below last year (green line).



Precipitation this spring

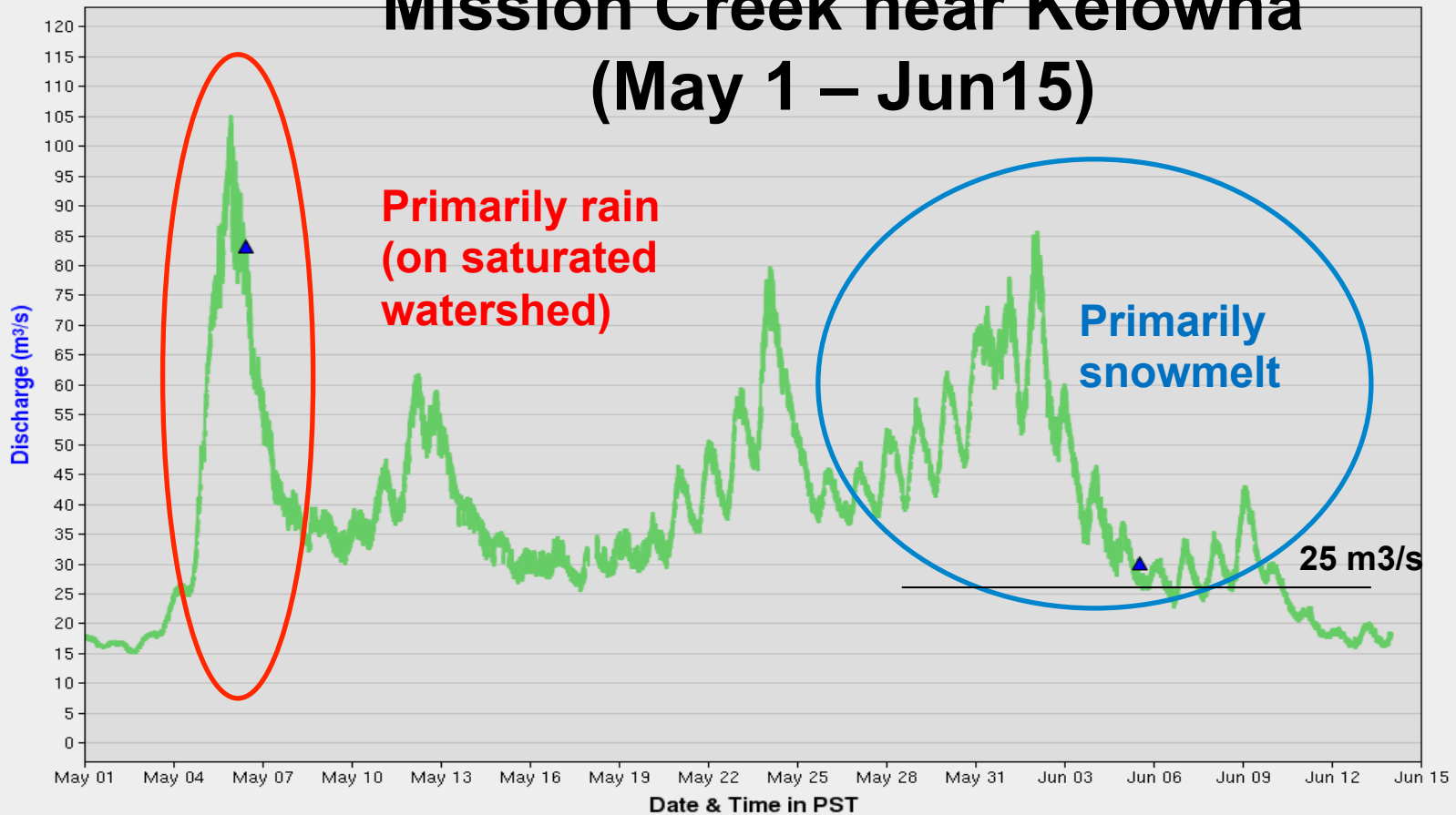
	Rank	P	Pnorm	Precip % of Norm	Drier Than, Normal, Wetter Than	Rank	Temp POR	Precip POR
Kelowna								
Mar-17	21	38.3	21.6	177.7%	Wetter	3	1969	1969
Apr-17	25	38.2	29.1	131.3%	Wetter	11	1969	1969
May-17	6	45.2	40.2	112.4%	Normal	15	1969	1969
M-A-M 2017	17	121.7	86.0	141.5%	Wetter	4	1969	1969
Vernon (WJV)								
Mar-17	65	52.9	25.4	208.3%	Wetter	4	1901	1903
Apr-17	45	54.3	33.7	161.1%	Wetter	4	1900	1901
May-17	15	52.7	47.8	110.3%	Wetter	23	1900	1900
M-A-M 2017	75	159.9	95.5	167.5%	Wetter	2	1901	1903
Penticton (YYF)								
Mar-17	51	44.0	23.6	186.4%	Wetter	8	1908	1908
Apr-17	30	67.1	26.0	258.1%	Wetter	4	1907	1907
May-17	34	88.5	39.3	225.2%	Wetter	2	1908	1908
M-A-M 2017	57	199.6	88.8	224.8%	Wetter	1	1909	1908

Spring precipitation for Okanagan Environment Canada Stations: ranked fourth (Kelowna), second (Vernon) and first (Penticton). This is indicative of the how much rain we received (over 100 years of records).



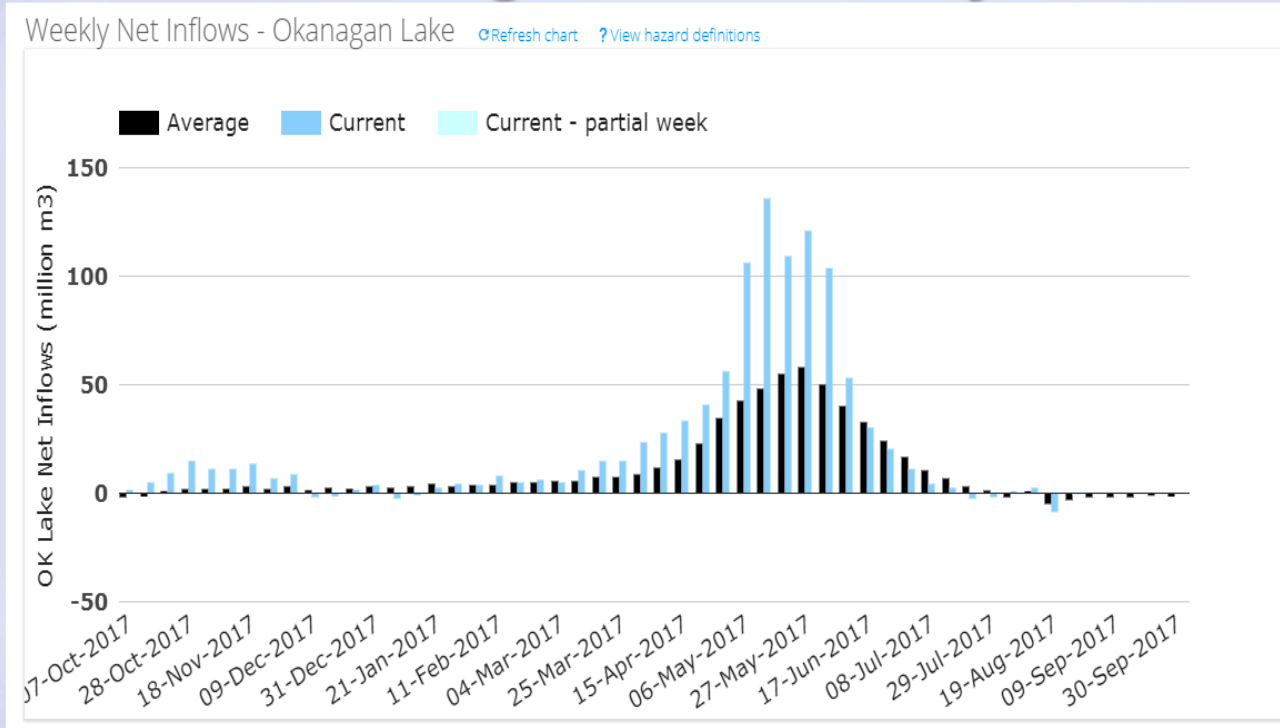
▲ Discharge Measurements — Discharge Approved (100% Quality Controlled) — Discharge Provisional (subject to change)

Mission Creek near Kelowna (May 1 – Jun 15)





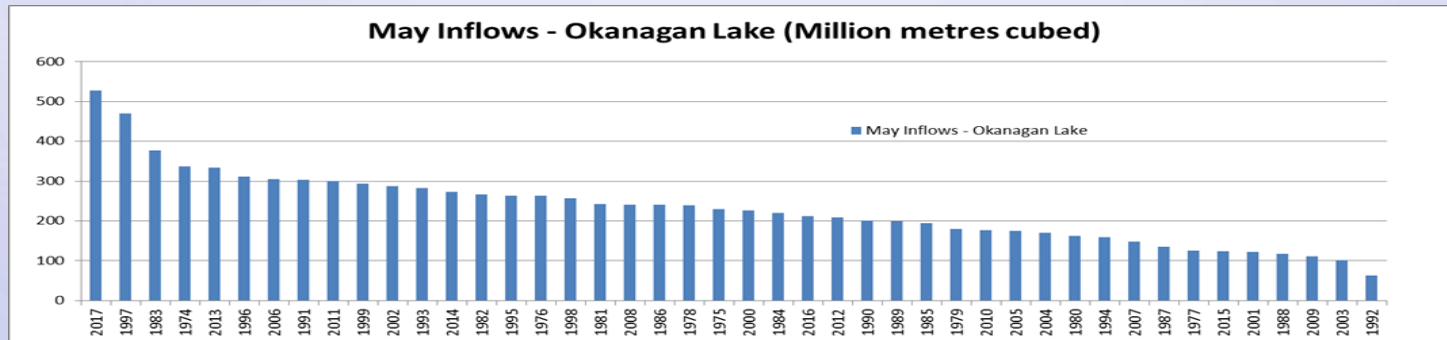
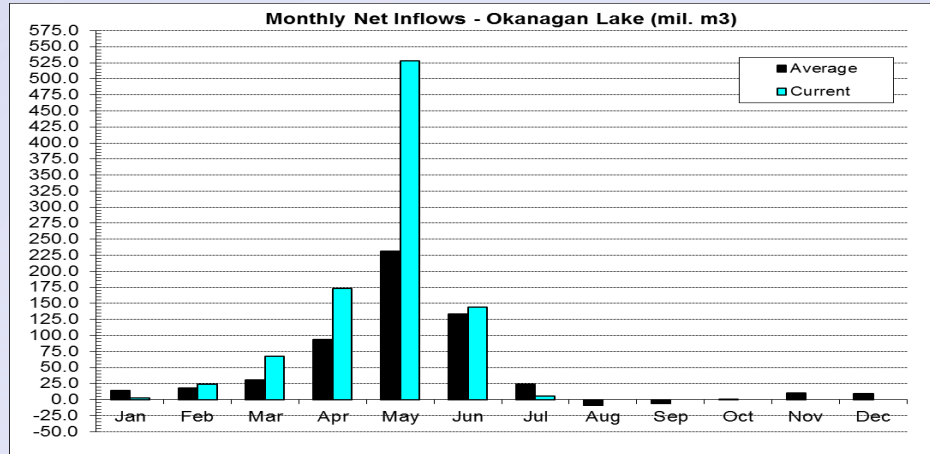
2017 Okanagan Lake Weekly Inflows



- **Every 3.46 Million m³ = 1 centimetre on Lake**
- **Week ending May 13th was 39 cm on Lake**
- **No previous record of 5 weeks of inflow > 100 M m³**
- **Lake outflows maximized at 11 to 12 cm per week.**

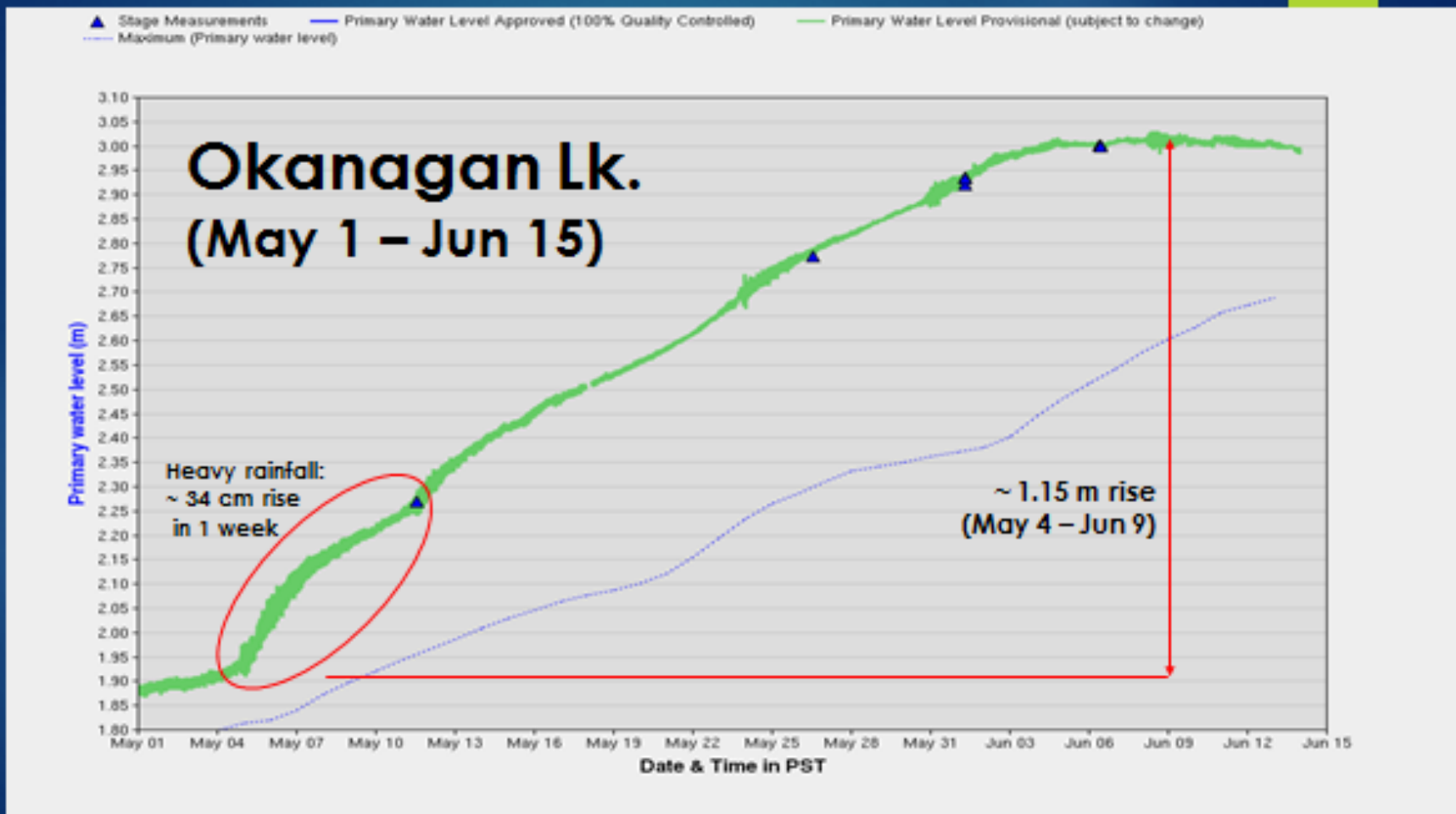


May 2017 Okanagan Lake Monthly Inflows



- **Average May inflow (since 1974) is 231 M m³;**
- **2017 May inflow was 528 M m³ (highest on record).**

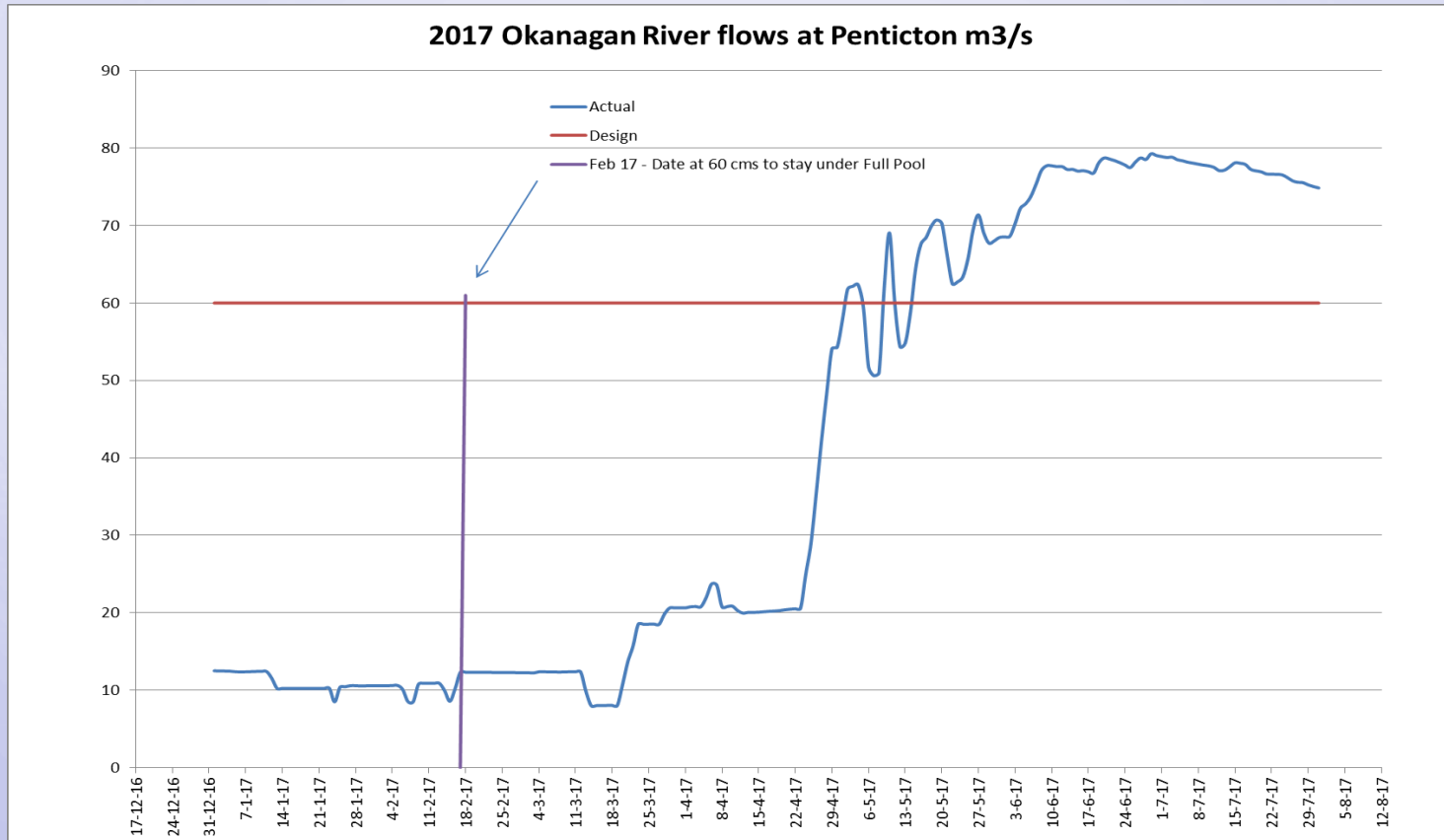
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In 2017, outflows at Penticton would have to have been raised to design flows by Feb 17th in order to stay below full pool.





Q: Why not lower lake every year?

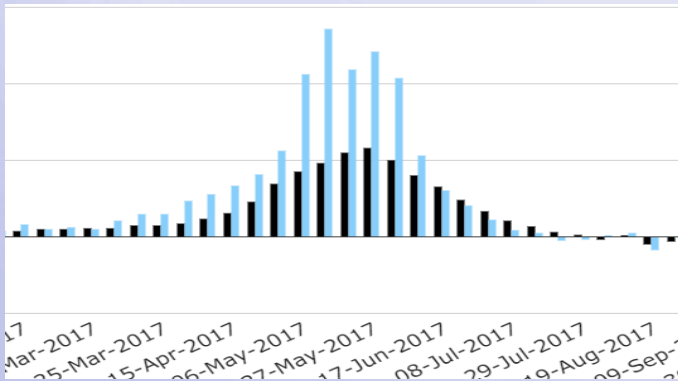
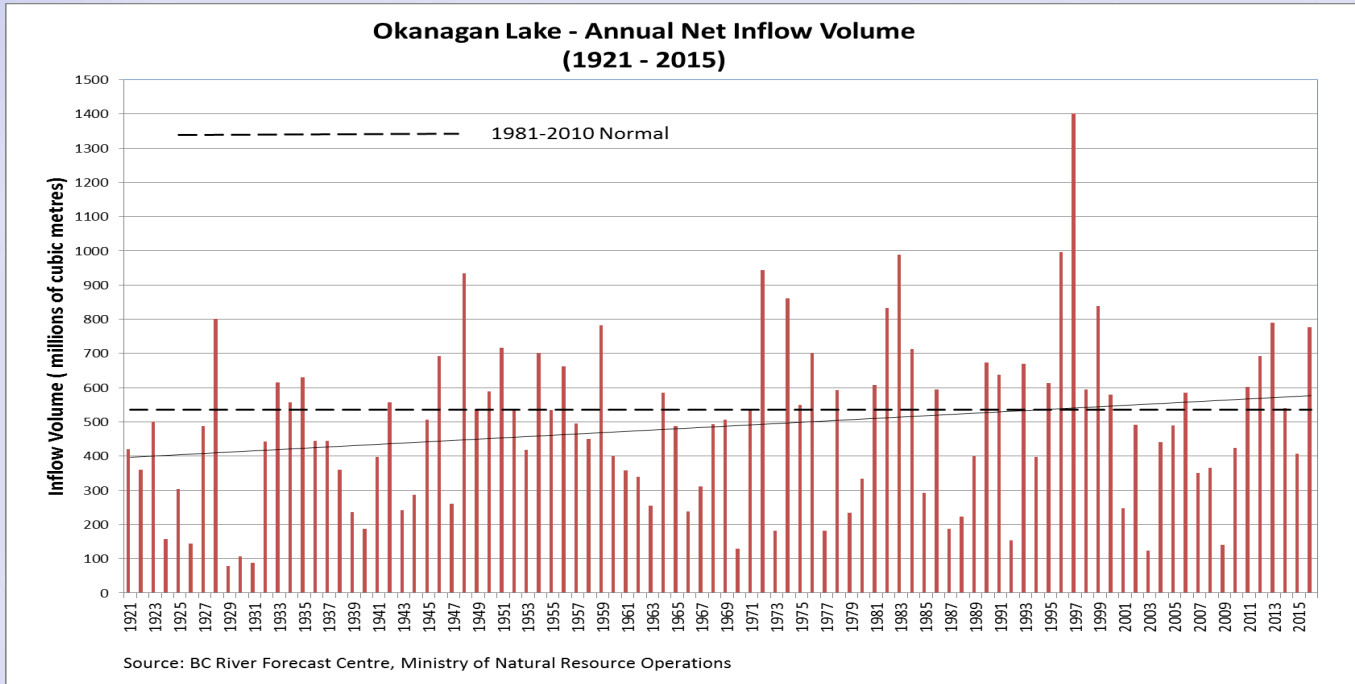
A: It's a balancing act...

Annual targets are in place to balance flood and drought.

The cost of Drought:

- Drought has a severe impact on fisheries and ecosystems.
- Impacts to the agricultural diversion north of Oliver would impact approximately 3600 acres of crops.
- These are primarily tree fruit and vineyards and were these crops to die, it would take years to recover.
- The Town of Oliver estimates that the annual value of the crops serviced by the diversion flume to be \$130 Million.
- This does not take into account any labour, spinoff industries, or related tourism. It also does not take into account the many farmers, orchardists, and vineyards that withdraw water from the Okanagan River directly.

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- **2017 Inflows ~ 950 M m³;**
- **First three weeks of May inflows were greater than 1921, 1930, & 1931;**
- **Extreme events are always a matter of 'when', not 'if';**



“NOT SUPER” Models:

We use computer models to predict inflows and resulting lake elevations (determines river flows).

Historical inflow models have not been very accurate.

Public Safety & Protection Section commissioned new inflow model being run by River Forecast Centre in Victoria. 2017 was its first year running.

Fish Water Management Tool (FWMT) model used to predict lake elevation is being upgraded and modernized (Beta testing is underway).

More Real time Monitoring stations (snow) being installed to provide better data for models.



Extreme Event or New Normal??

**Sub-basins such as Mission Creek showing hydrologic changes
– more rain on snow events;**

**Not only was weather extreme this year, the pattern in which it
developed was unprecedented.**



How do we Adapt???

Is it time to revisit targets (i.e. update Okanagan Basin Study)???

Feasibility of modifying works improving our ability to increase outflows (big money and logistical issues)???

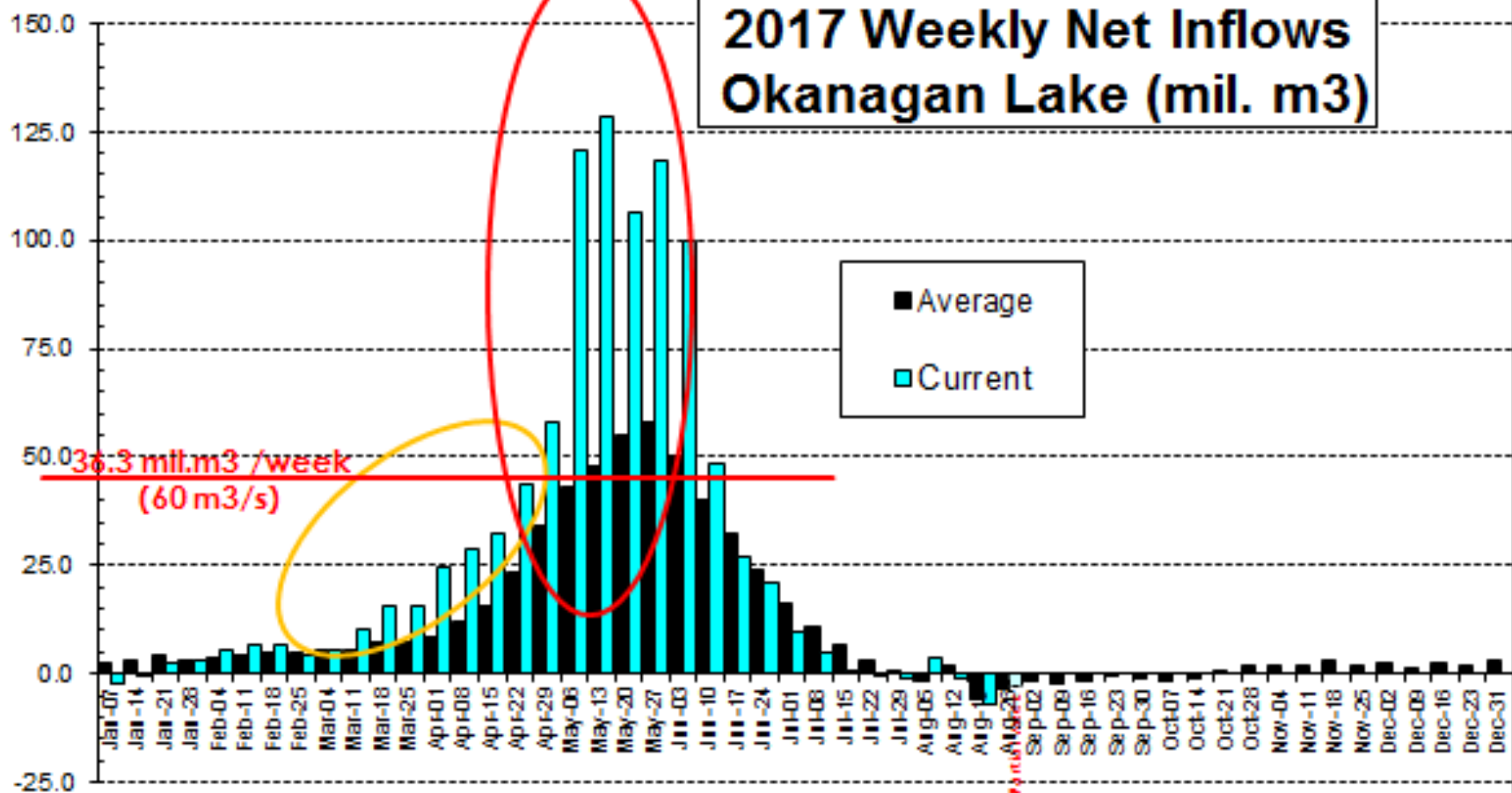
Increasing minimum regulatory requirements around vertical and horizontal setbacks for development (new flood construction levels)???

Insurance availability and conditions???



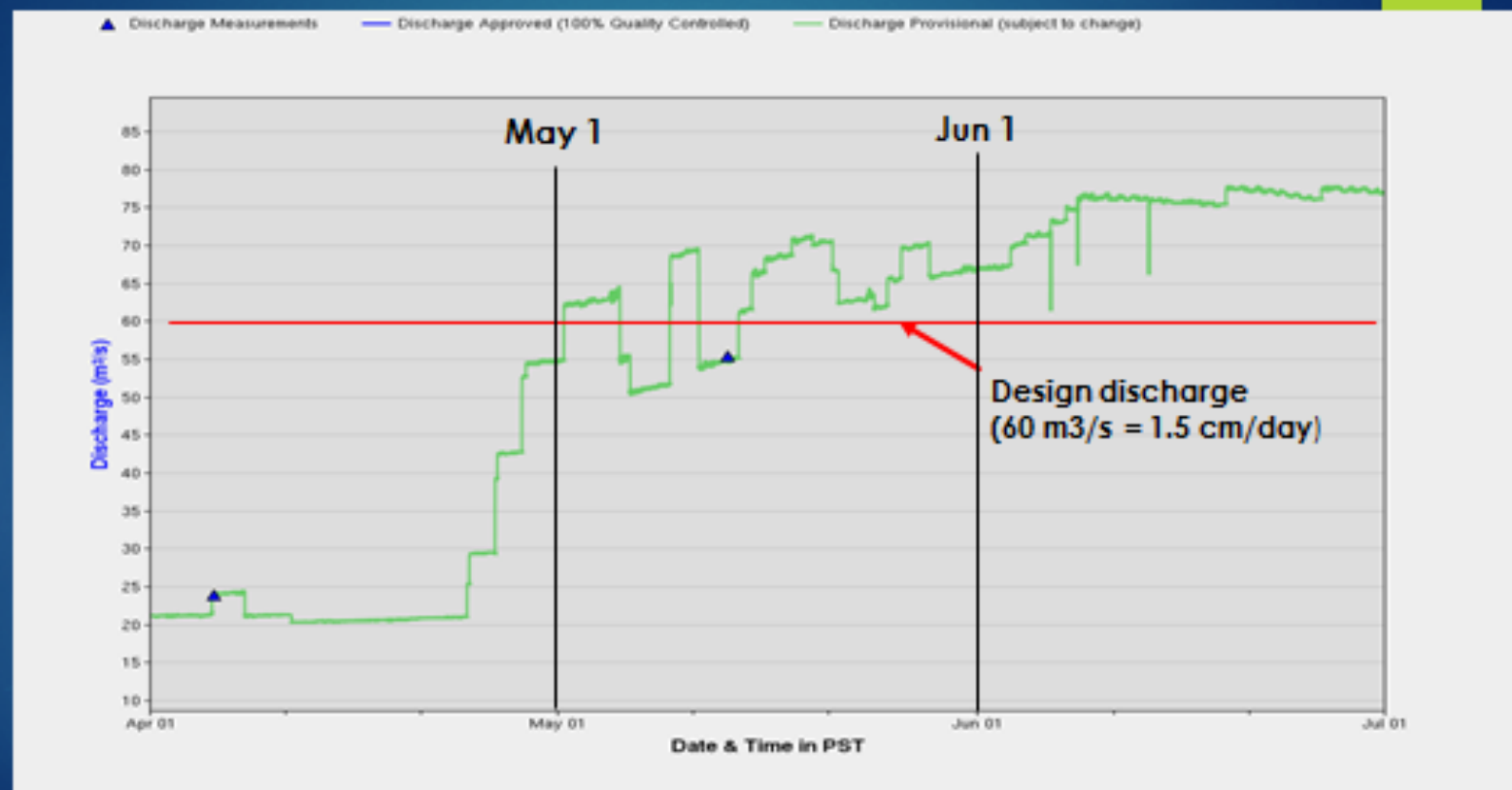
Questions?

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Okanagan River - Penticton





Okanagan River near Oliver

