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2009 Water Conditions in the Okanagan and Neighbouring Watersheds

Presented at the Drought Response Planning Workshop

Kelowna, July 23, 2009

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Outline

- 2009 Water Supply & Streamflow Conditions
- OLRS Operations during a Low Flow Year
- Comparison of 2003 & 2009 Water Years
- "Is this a Drought?"

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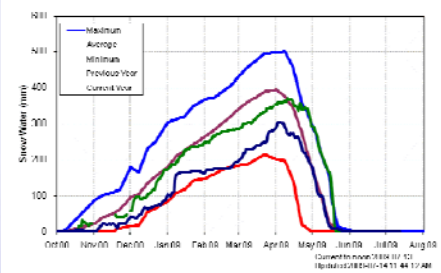
Brenda Mine ASP for 2008/09
1453 m Elevation



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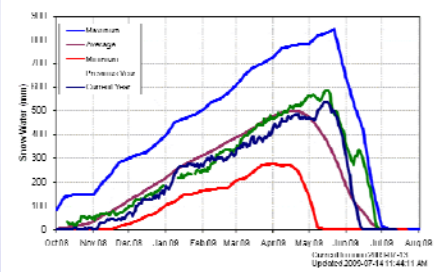
Mission Creek ASP for 2008/09
1794 m Elevation



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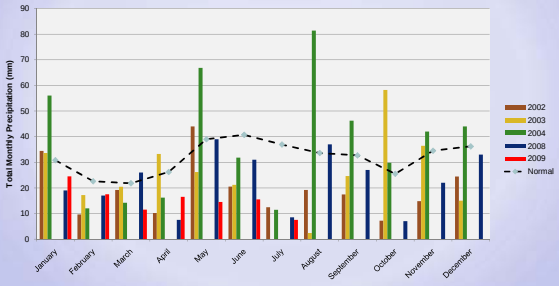
Total Monthly Precipitation - Kelowna



Note: July 2009 data to July 20th only

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Apr 1 – July 31 Okanagan Lake Net Inflow (% of 1971-2000 Normal)		
2009	Forecast -1 Std Dev	33%
	Forecast - Mean	52%
	Forecast +1 Std Dev	71%
	Estimated	35%

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Factors Which Have Contributed to Current Conditions

1. Well below normal winter and early spring inflows to Okanagan Lake
2. Below normal snowpack & inflow contribution from snowmelt runoff
3. Well below normal spring precipitation
4. Sustained hot & dry summer

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2009 Water Supply & Streamflow Conditions (as of July 23)

Okanagan River and Kettle River Basins:

- Conditions are variable, but many gauged rivers are experiencing significant low flows, depending on local factors and localized rainfall in early July.
- Okanagan Lake Inflows well below normal (past 12 mths)
  - Ranked 5th lowest since measurement began in 1918.
  - Inflows for the April to mid-July period are lower than 2003 (which was a significant drought year).

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2009 Water Supply & Streamflow Conditions (cont'd)

- Most gauged streams in the Okanagan basin are at or near 10-20 year return period low flows for this date. These include Camp Creek, Mission Creek, Trepanier Creek and Vaseux Creek.
- Coldstream Creek (near Vernon) and Shatford Creek (near Penticton) are somewhat better, and are near 2-year return period low flows, possibly as a result of receiving some localized rain.
- Kettle River (Westbridge, Grand Forks) is at a 10-20 year return period low flow.

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2009 Water Supply & Streamflow Conditions (cont'd)

Similkameen River Basin:

- The Tulameen and Similkameen Rivers at Princeton are currently near 20-30 year return period low flows. The Similkameen River at Hedley is near a 15-20 year low flow.

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2009 Water Supply & Streamflow Conditions (cont'd)

Outlook:

- Environment Canada is forecasting above normal temperatures and below normal precipitation for July through September for the region.
- Water levels in these areas mentioned above are expected to continue to decline, and low flow concerns are expected to become more significant and widespread.

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Okanagan Lake Regulation System

Low Flow Year Operations

Okanagan Basin Implementation Agreement:

- Keep Okanagan Lake as high as possible - target level 341.89 m by Sept 30
- Releases from Okanagan Lake kept to a minimum while providing adequate downstream releases for licensed water withdrawals & instream flow requirements
- Provide flows at Oliver for migrating sockeye (8.5-12.7 m3/s, Aug 1-Sept 30)
- Provide flows at Oliver for spawning sockeye (9.9-15.6 m3/s, Sept 16-Oct31

Other:

- If possible, meet minimum trans-boundary flow targets
- Provide a late summer water pulse release to Osoyoos Lake for improved sockeye survival

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"How Does 2009 Compare to 2003?"

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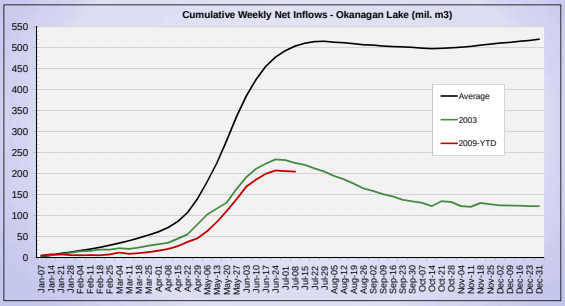

Jan 1 – July 22, 2003 net inflow 41% of normal
Jan 1 – July 22, 2009 net inflow 38% of normal

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Apr 1 – July 31 Okanagan Lake Net Inflow (% of 1971-2000 Normal)		
2003	Actual	35%
2009	Forecast -1 Std Dev	33%
	Forecast - Mean	52%
	Forecast +1 Std Dev	71%
	Estimated	35%

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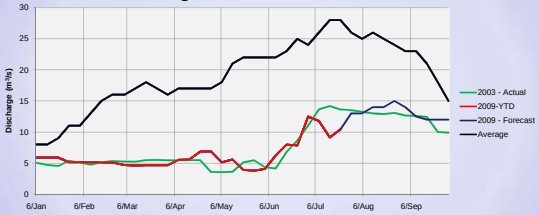
Okanagan Lake Releases - 2009



- Releases at conservation levels (well below normal):
  - Jan to early June and ranged from about 4 - 6 m3/s
  - Summer releases 10 -15 m3/s range to meet Okanagan River domestic and irrigation demand
- No planned 2009 pulse during late August to early September for increased Sockeye survival in Osoyoos Lake.

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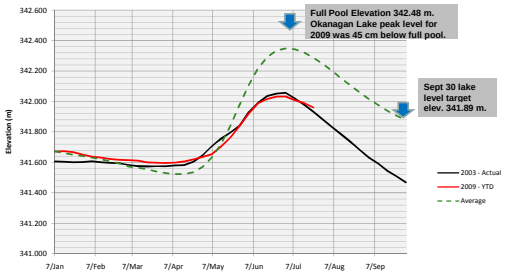
Okanagan Lake Levels



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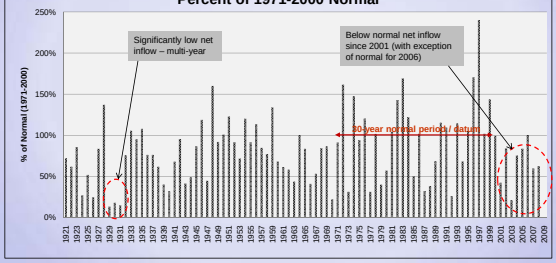
Okanagan Lake Net Annual Inflow 1921 - 2008
Percent of 1971-2000 Normal



Jan 1 – July 15, 2003 net inflow ~43% of normal
Jan 1 – July 15, 2009 net inflow ~40% of normal

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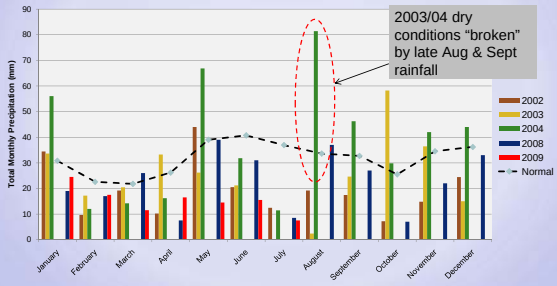
Total Monthly Precipitation - Kelowna



Note: July 2009 data to July 20th only

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Is 2009 a Drought?

Webster's Dictionary Definition of a Drought:

–"A prolonged period of dryness."

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Designation of Osoyoos Lake Drought Conditions (IJC Orders)

Drought conditions shall be deemed to exist when one or more of the following criteria are met:

1. The net inflow to Okanagan Lake for the period April through July is less than 240 million m^3 (Actual ~177 million m^3 for 2009).
2. Okanagan Lake fails to reach or is forecast to fail to reach an elevation of 342.23 m (old WSC datum) during June or July (Actual maximum 2009 elev. ~342.09 m (old datum))
3. The volume of flow in the Similkameen River at Nighthawk for the period April through July is less than 1 million acre-ft (1,233 million m^3). (The 2009 forecast was 1,037 million m^3)

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"Unofficial" Drought Criteria for Okanagan Lake Regulation System

A drought maybe considered to occur when the following critieria are met:

- The maximum level of Okanagan Lake fails to or is forecast not to reach elevation 342.23 m (old datum) during the spring freshet (342.09 m for 2009 - old datum)
- The net inflow into Okanagan Lake for the April – July period is forecast to be less than 247 million m^3 (~177 million m^3 for 2009)

(**Note:** In the event of a prolonged drought (two or more successive years), the level of Okanagan Lake may be drawn down to as low as 340.4 m (old datum).)

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Hydrologic Drought

- "Defined as a period during which streamflows are inadequate to supply uses under a given water-management system. No more specific definition seems possible since each situation must be analyzed separately."

Source: "Hydrology for Engineers" – Linsley, Kohler & Paulhus (1975)

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Two Types of Droughts for Water Purveyors

1. Low flows which would be limiting for a water supply served by diversion without storage.
2. Extended periods of low flow as they may affect the yield of a storage reservoir.

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Questions to Consider

- How long could the dry conditions persist?
- How well prepared is your community to respond to an extended period of reduced water supply?
- How might climate change impact your water supply and demand?

http://www.env.gov.bc.ca/rfc/