

2010: Okanagan Water Supply

Water Management Support

Review #2

14 April 2010

10:00am – 11:00am

2010 Schedule

#1 – 18 February (8)

#2 – 14 April (16)

#3 – 6 May (18)

#4 – 24 May (21)

#5 – 17 June (25)

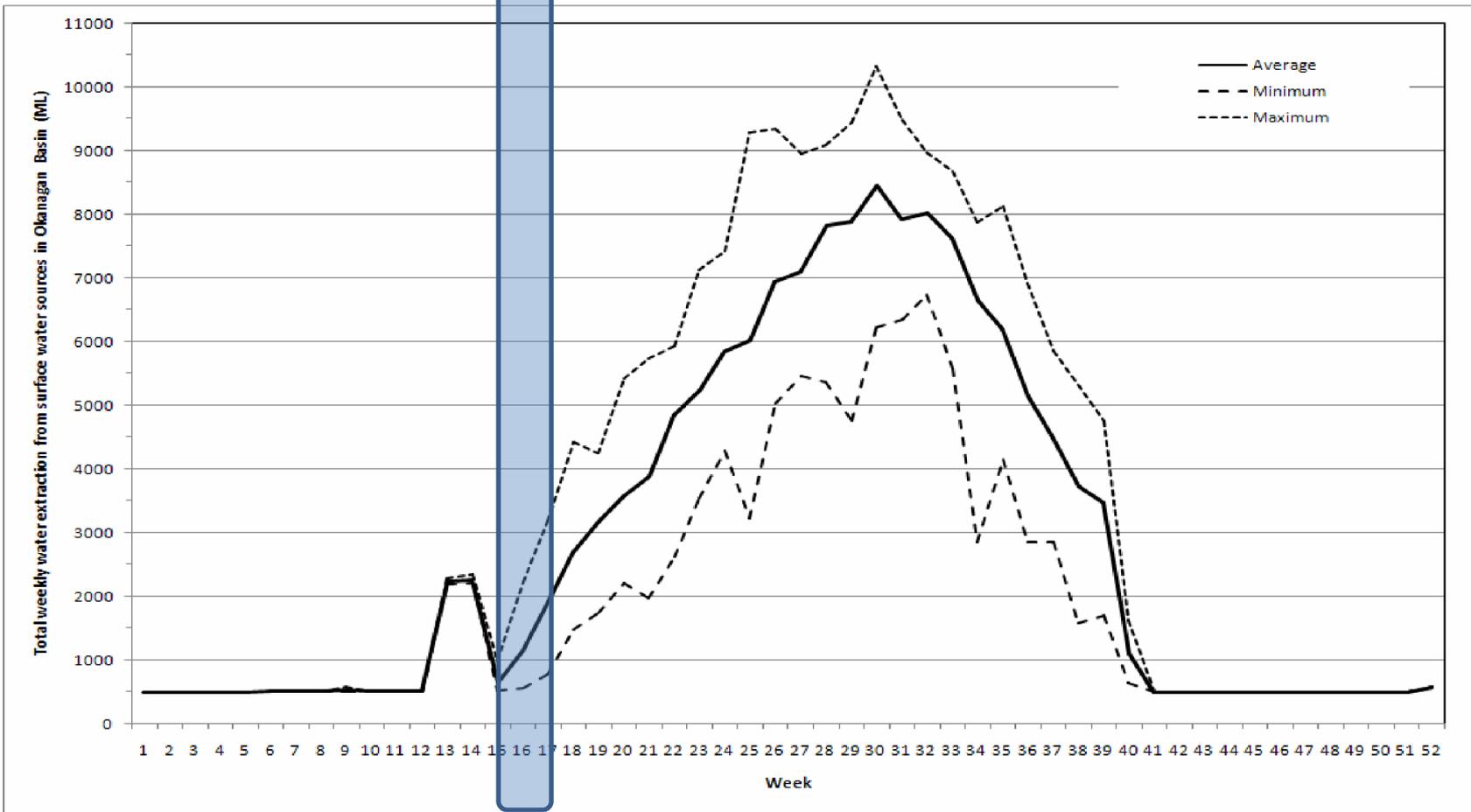


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Note: Average, minimum, and maximum weekly totals over the 1996 to 2006 period are shown. Weeks 1-12 and 41-52 are periods when little to no irrigation occurs. The assumption of constant indoor water use is the reason for no variability during these weeks.

Figure 6.5 Total weekly water extraction from surface sources in the Okanagan Basin

Current State of Basin Hydrology

Decision Support for Okanagan Water Management



Palmer Drought Severity Index

- The Palmer Drought Severity Index is a measure of "the relative dryness or wetness effecting water sensitive communities".

FLOW

- Snow Pack (Storage)
- Okanagan Lake (River)

GROUNDWATER

- One Water
- Sensitivity to Mining

PRECIPITATION

- Climate information
- Temperature profile



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2010 Okanagan Water Supply: April 14th Updates (Week 16)

OKANAGAN WATERSHED

- Okanagan Basin Water Board [**Sears**]

Context

FLOW

- BC MOE [**Chapman / Ivanov**]
- International Osoyoos Lake Board of Control [**Millar**]

Snow Pillow / Okanagan Lake (River)
Osoyoos Lake

GROUNDWATER

- BC MOE [**Chapman / Ivanov**]

Okanagan Groundwater

PRECIPITATION / CLIMATE

- Environment Canada [**Lundquist**]
- Agriculture and Agri-Food Canada - NAIS [**Waldner**]

Okanagan Climate
Drought Watch Canada

Okanagan Basin Water Board [**Jatel**]

Host

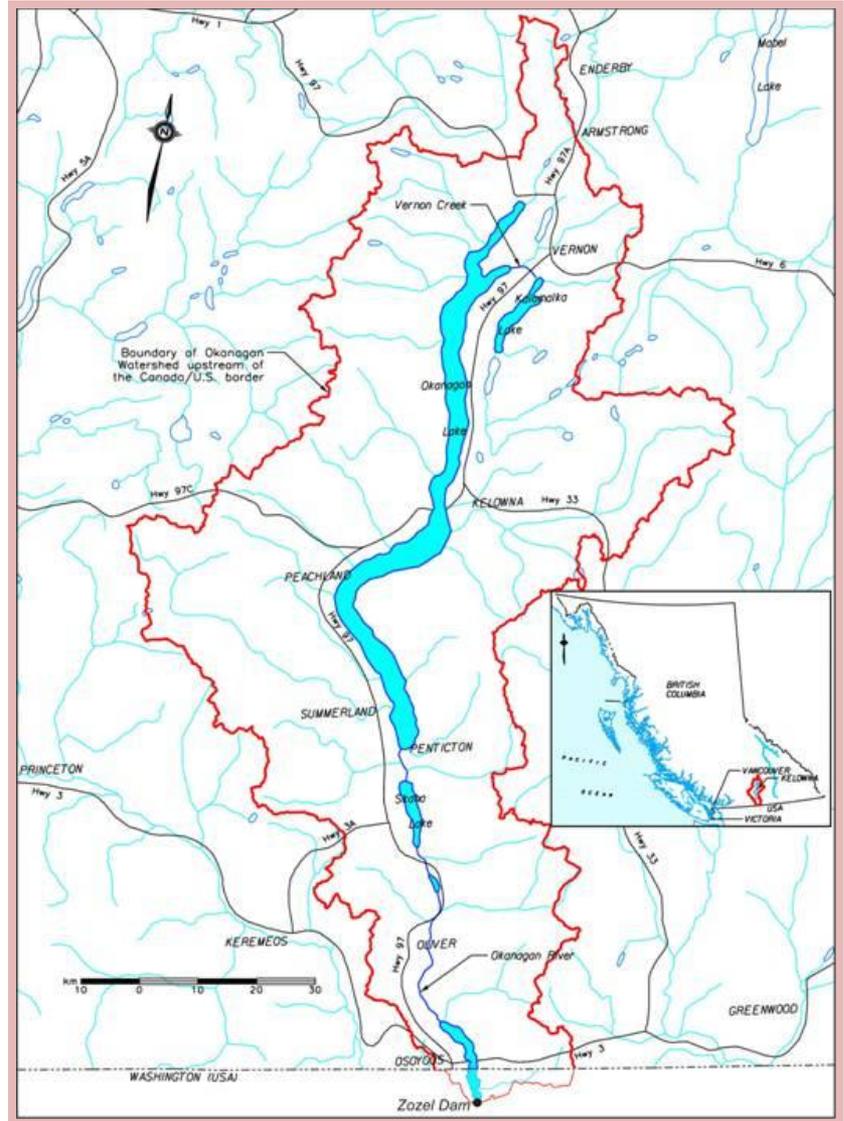


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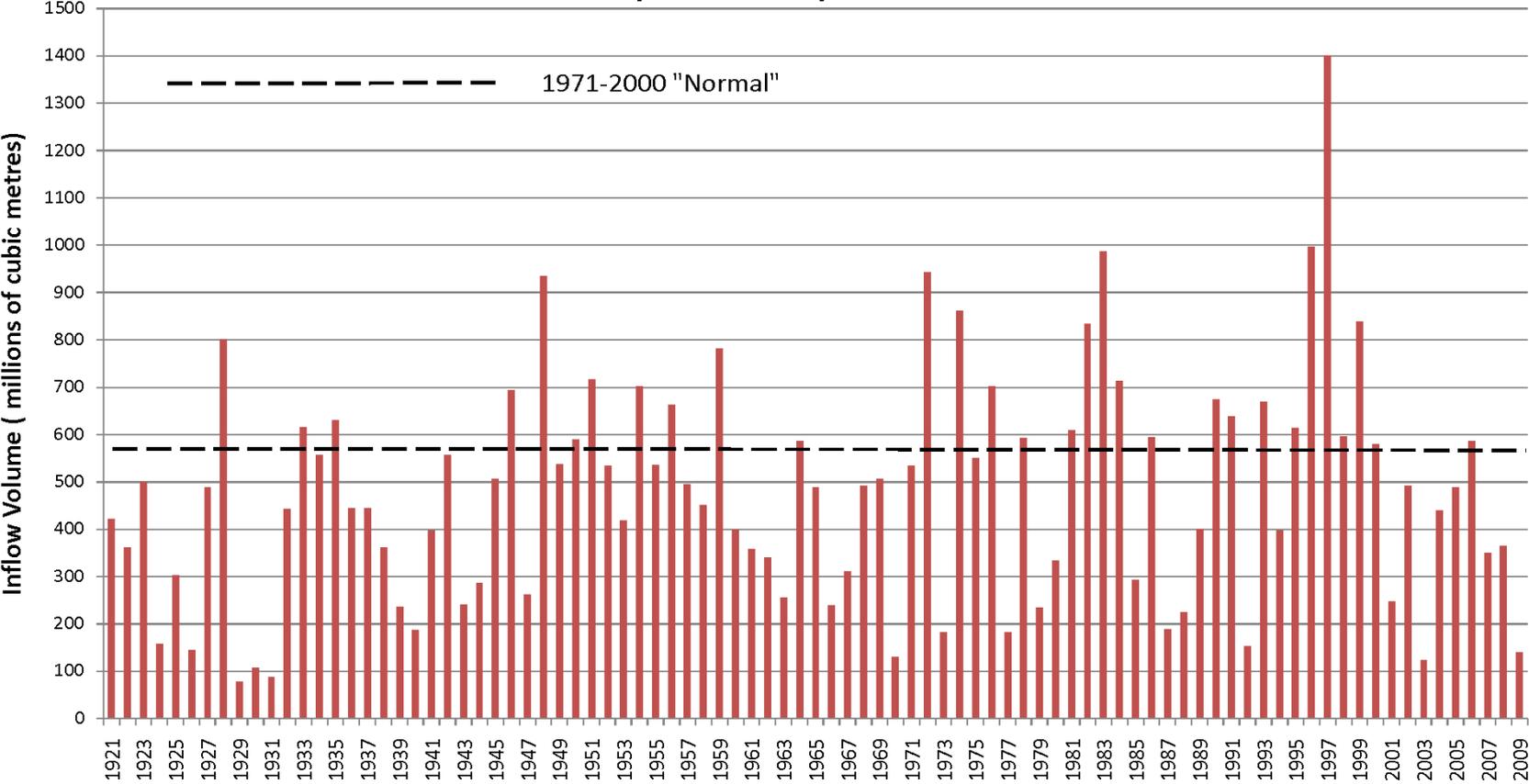


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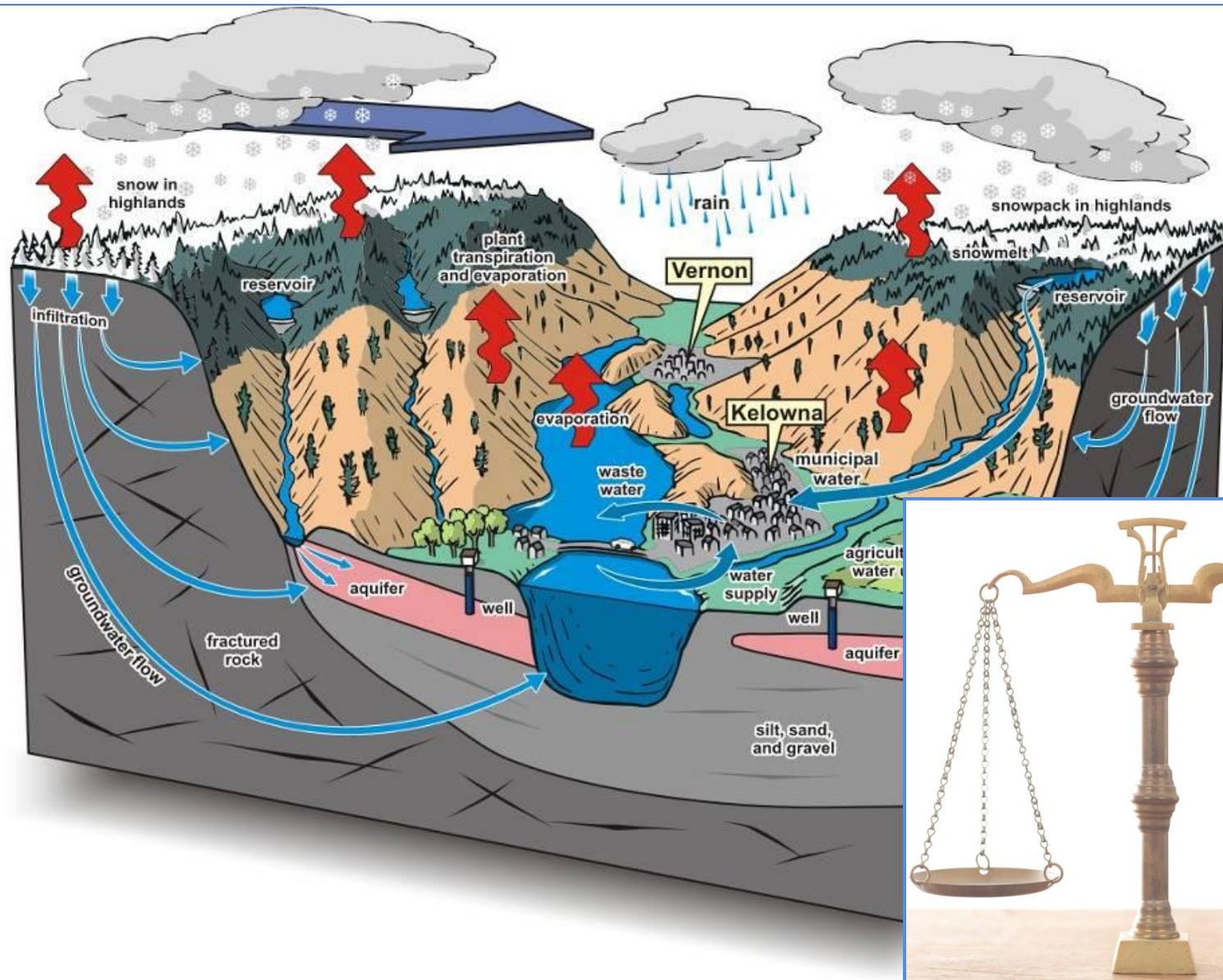
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Okanagan Lake - Annual Net Inflow Volume (1921 - 2009)



Source: BC River Forecast Centre, Ministry of Environment



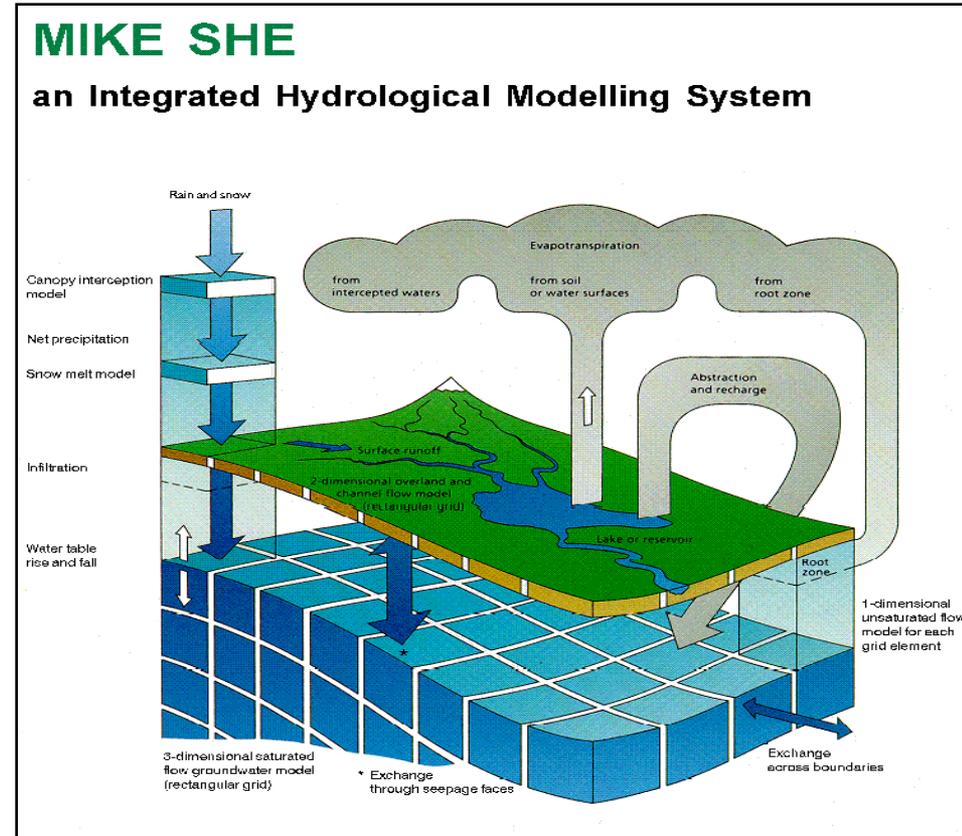
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Hydrology

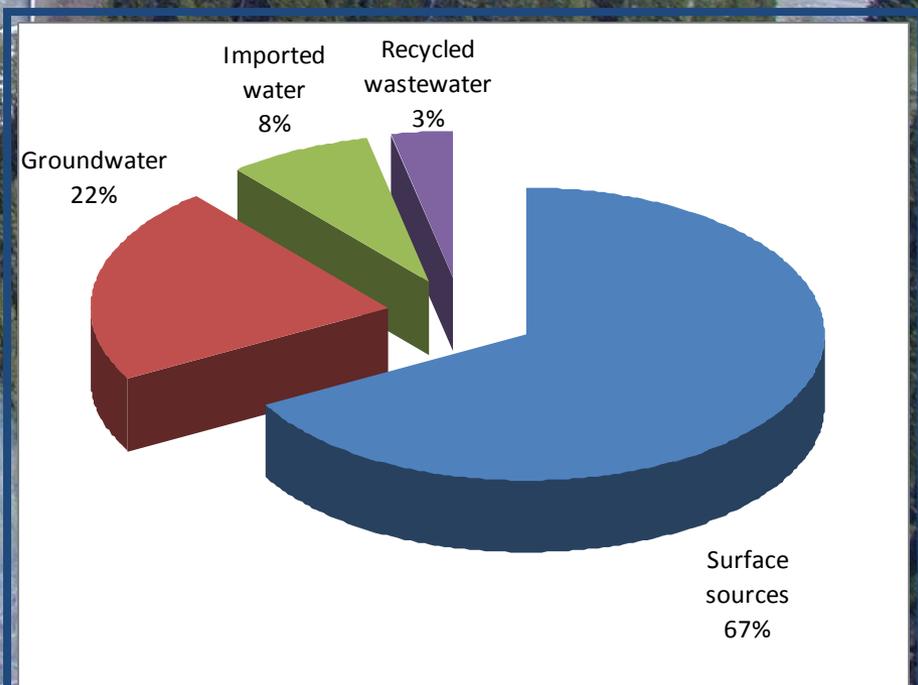
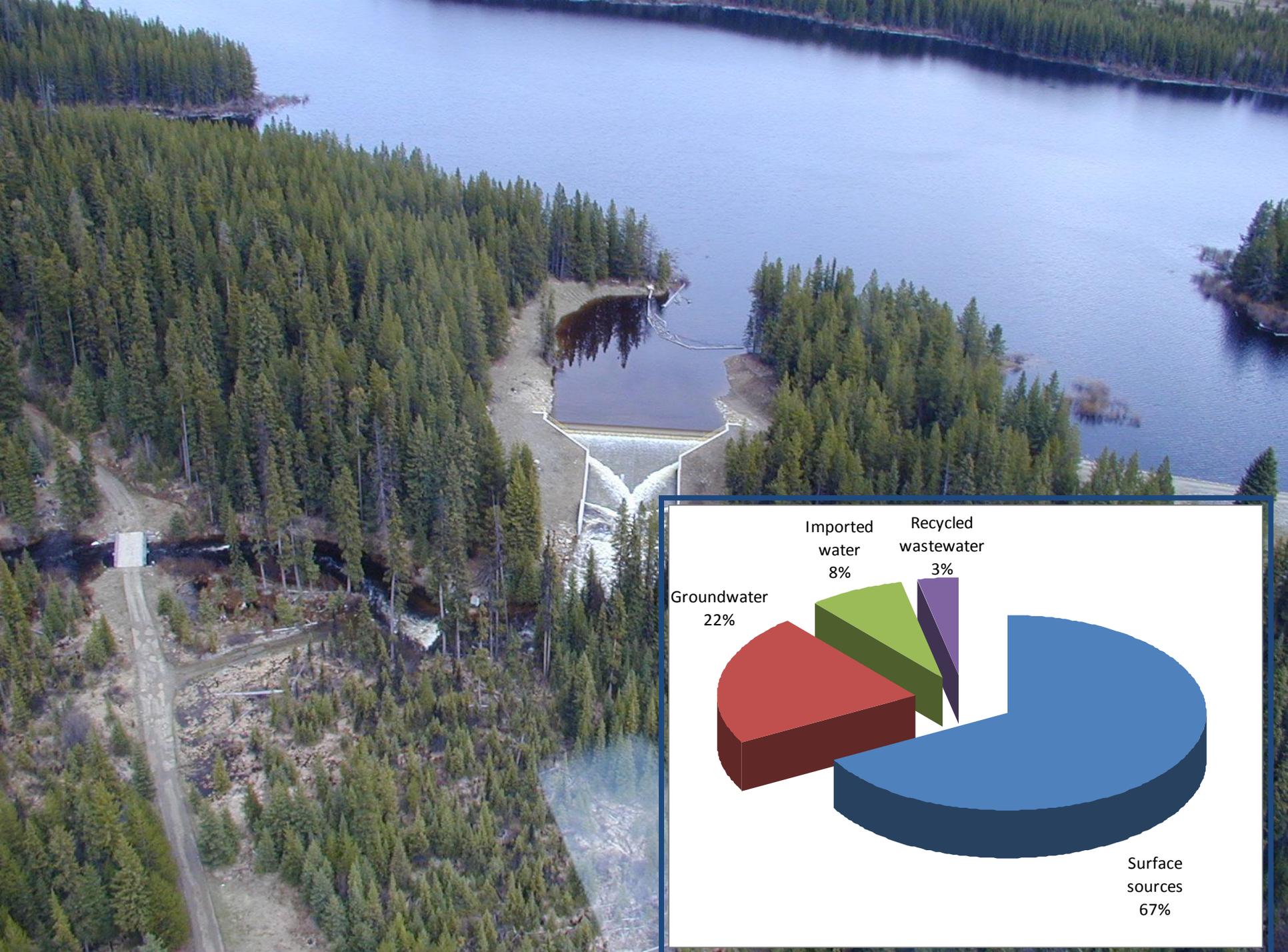
- Climate
- Topography
- Land Cover
- Mountain Pine Beetle
- Streams & Lakes
- Control Structures
- Soils
- Snow
- Groundwater

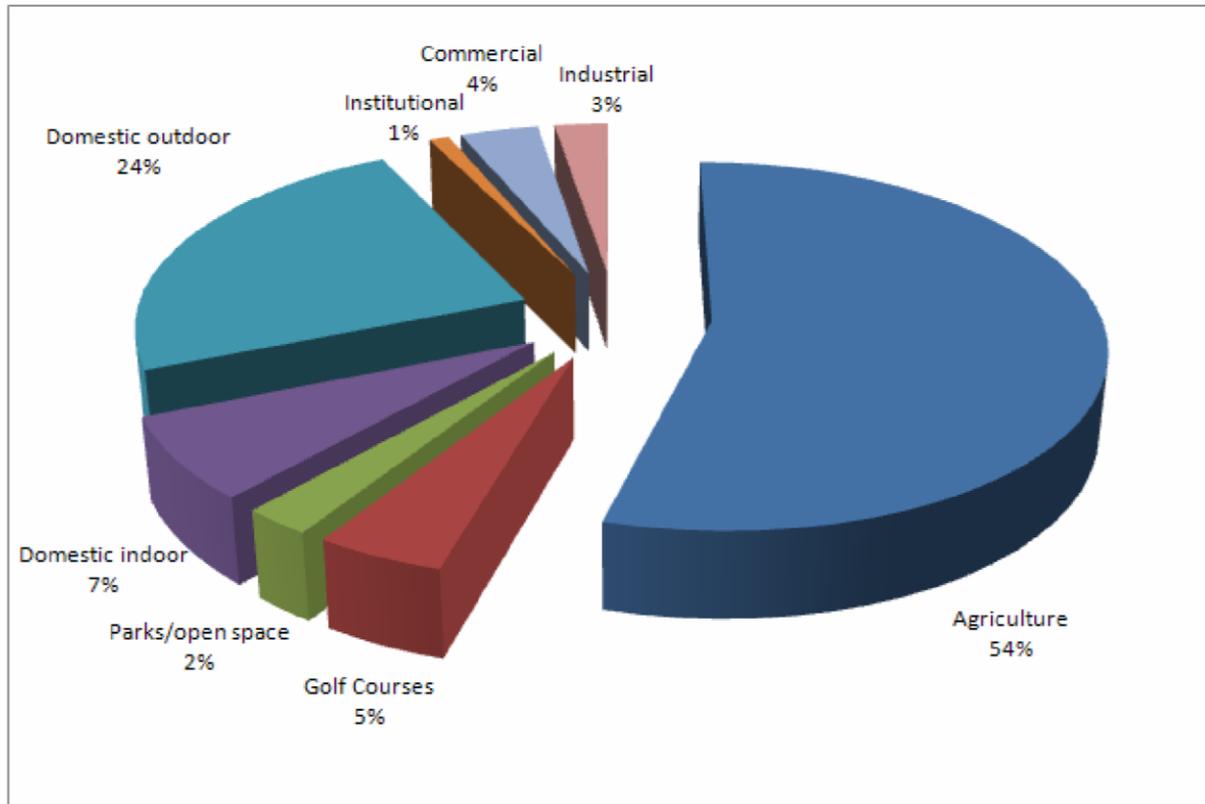


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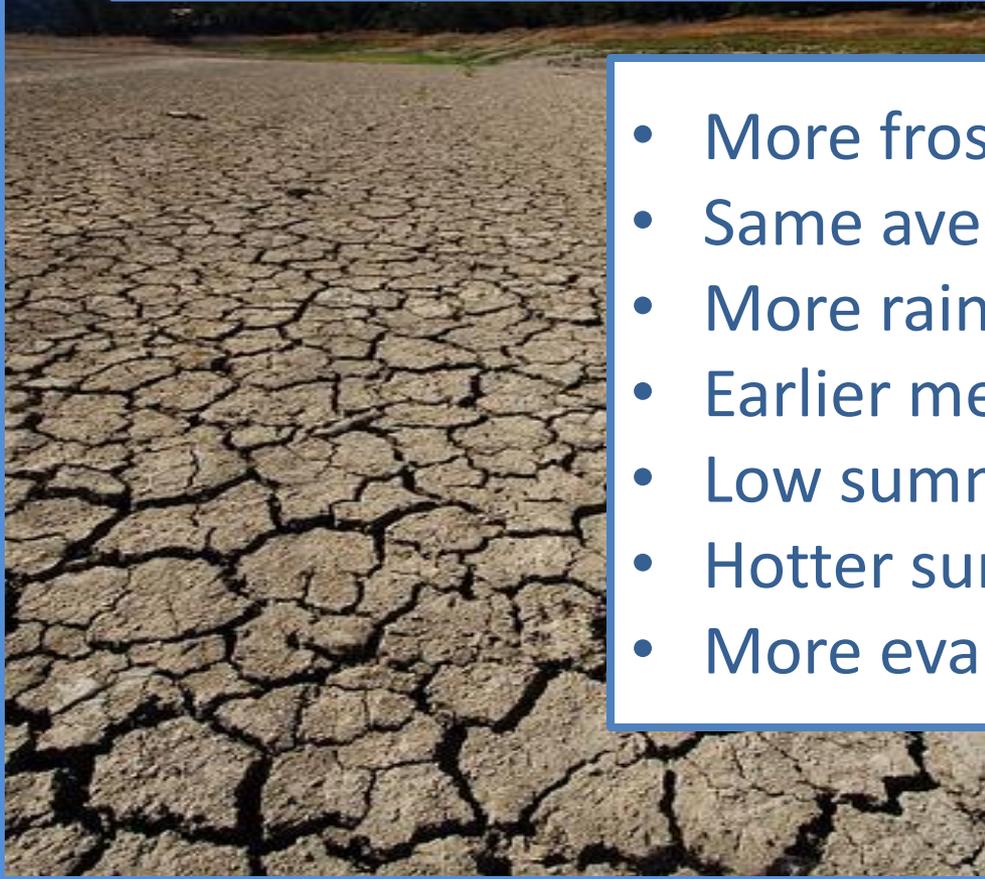


Note that losses associated with each end-use are included within each category.

Figure 6.3 Typical (1996-2006 average) distribution of total water use by end-uses in the Okanagan Basin



Supply scenarios - climate change

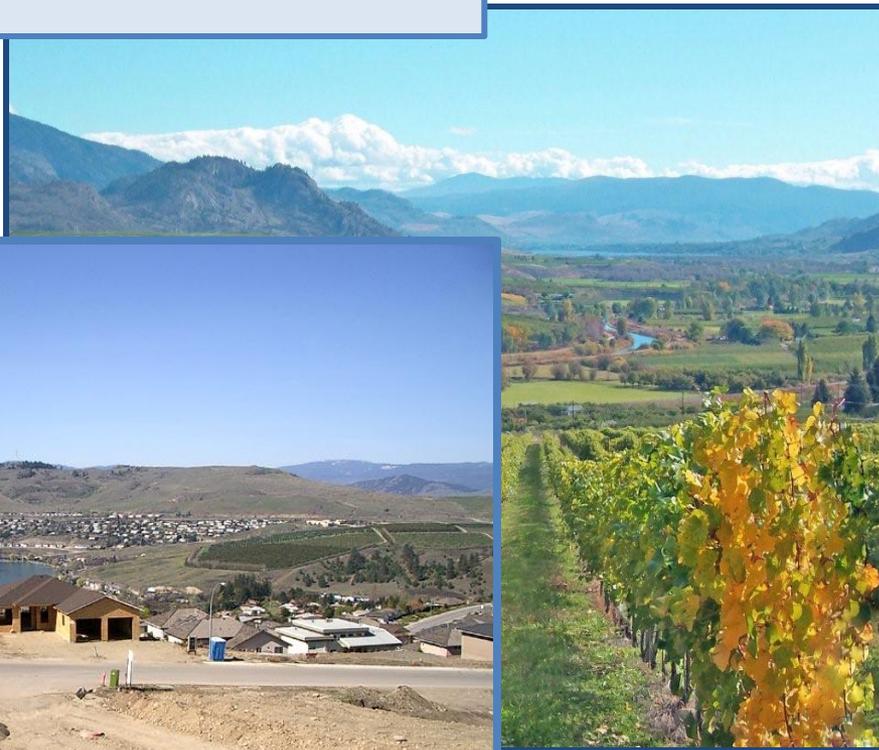
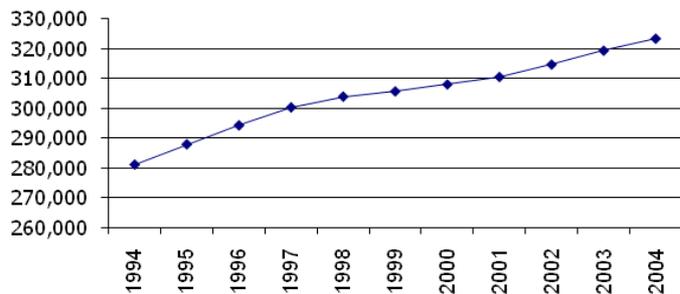


- More frost-free days
- Same average precipitation
- More rain/less snow
- Earlier melt
- Low summer stream-flows
- Hotter summers
- More evaporation



Demand Scenarios

Population Growth in Okanagan
(1994 - 2004)



Bottom line: Higher demand, less supply

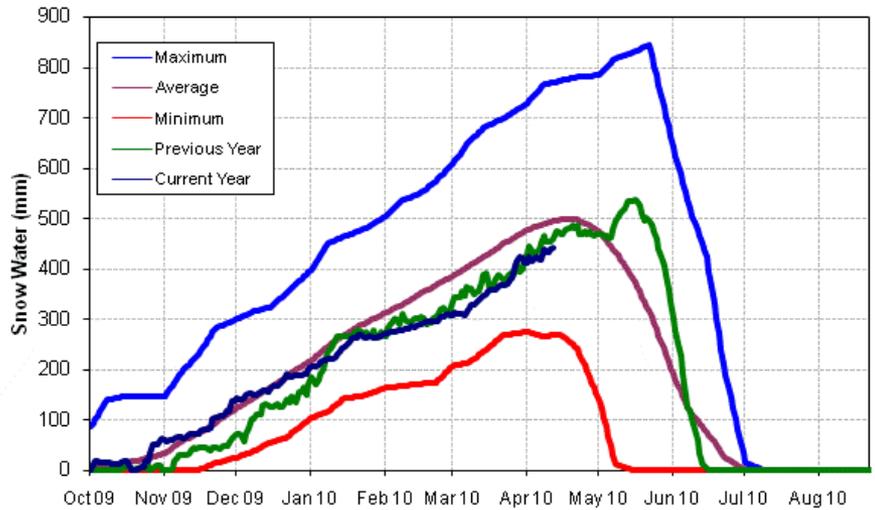


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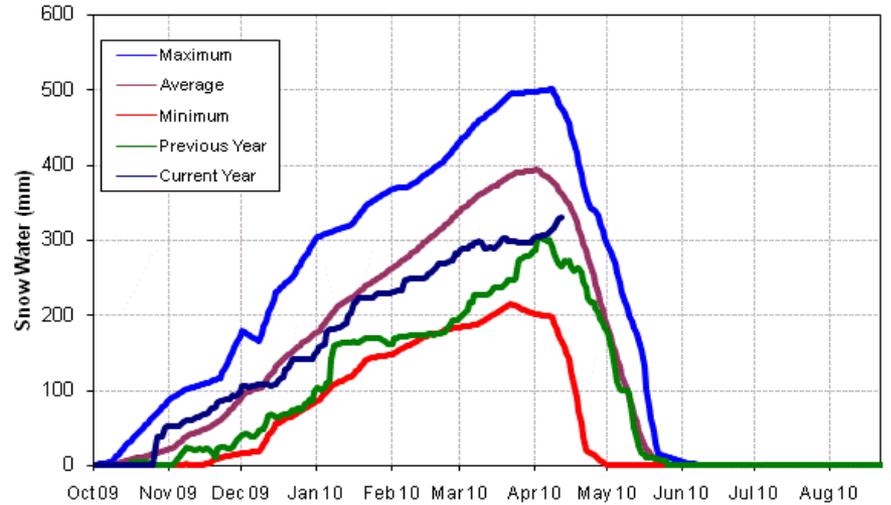
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Mission Creek Snow Pillow



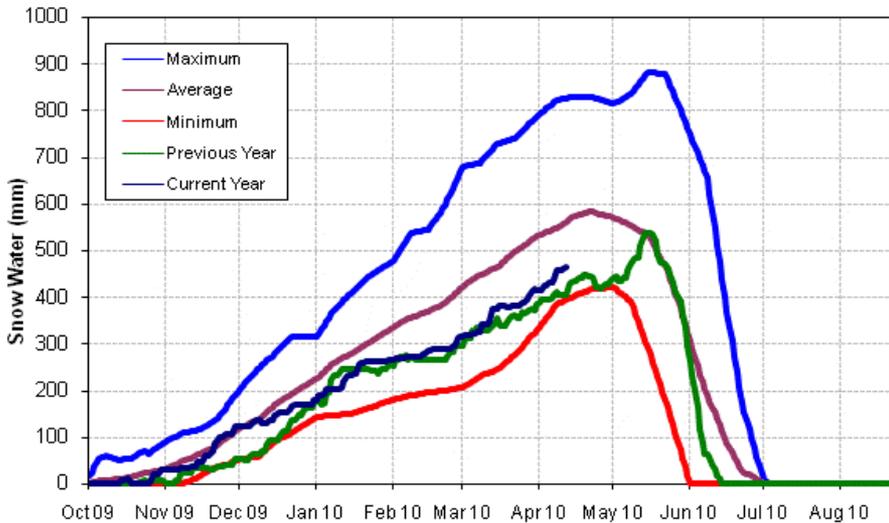
Current to noon 2010-04-11
Updated 2010-04-12 9:05:38 AM

Brenda Mine Snow Pillow



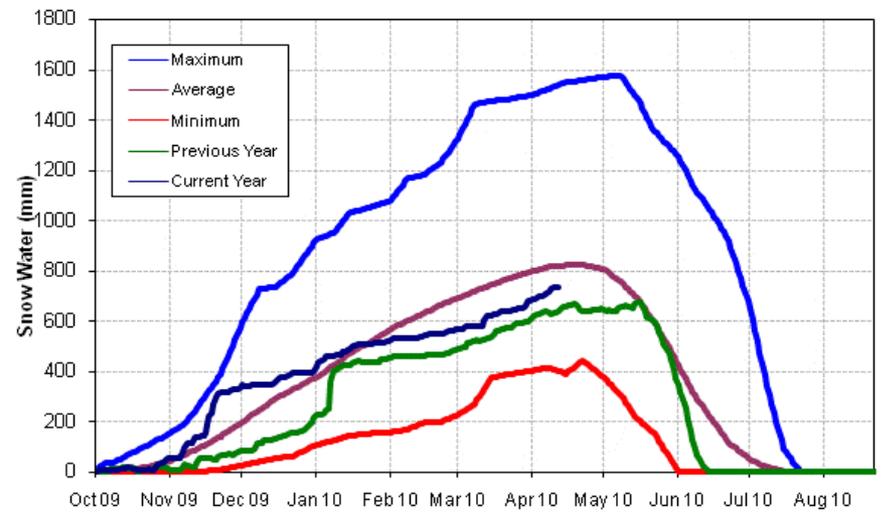
Current to noon 2010-04-11
Updated 2010-04-12 9:05:39 AM

Grano Creek Snow Pillow (Kettle)



Current to noon 2010-04-11
Updated 2010-04-12 9:05:37 AM

Blackwall Peak Snow Pillow (Similkameen)



Current to noon 2010-04-11
Updated 2010-04-12 9:05:39 AM

OKANAGAN Drainage Basin

Snow Course Name and Number		Elev. metres	Apr 2010		Historic, Water Equivalent (mm)					Yrs of Record
			Snow Water Equivalent mm	% of Normal	2009 mm	2008 mm	Max. mm	Min. mm	Normal mm	
SUMMERLAND RESERVOIR	2F02	1280	167	74	165	230	389	96	226	73
MC CULLOCH	2F03	1280	84	54	157	148	249	38	155	72
ABERDEEN LAKE	1F01A	1310	Not Sampled			145	259	6	143	71
OYAMA LAKE	2F19	1340	120	71	148	144	255	61	170	39
POSTILL LAKE	2F07	1370	156	70	190	184	348	109	224	59
VASEUX CREEK	2F20	1400	Not Sampled		98	92	239	40	157	39
BOULEAU LAKE	2F21	1400	262	74	192	264	564	172B	354	39
TROUT CREEK	2F01	1430	202	111	90	200	396	52	182	73
TROUT CREEK (WEST)	2F01A	1430	196	N/A	<i>No historic record</i>					1
ESPERON CR (MIDDLE)	2F14	1430	242	65	228	316	607	196	372	42
BRENDA MINE	2F18	1460	236	74	221	275	531	159	318	41
BRENDA MINE	2F18P	1460	305	77	286	357	497	227	394	17
ISLAHT LAKE	2F24	1480	269	77	202	322	501	165A	349	27
GREYBACK RESERVOIR	2F08	1550	228	98	247	197	351	114	233	56
ESPERON CR (UPPER)	2F13	1650	300	69	258	350	805	244	435	41
ISINTOK LAKE	2F11	1680	111	61	110	144	424	66	183	45
MACDONALD LAKE	2F23	1740	Not Sampled		334	426	677	257	463	33
MISSION CREEK	2F05P	1780	412	87	420	473	728	278	472	38
GRAYSTOKE LAKE	2F04	1810	Not Sampled			296Z	828	196	405	40
MOUNT KOBAN	2F12	1810	344	108	198	236	602	105	318	44
WHITEROCKS MOUNTAIN	2F09	1830	494	84	343	537	1021	318	586	55
SILVER STAR MOUNTAIN	2F10	1840	675	89	669	782	1115	414	760	51

April 1st Snow Survey Data

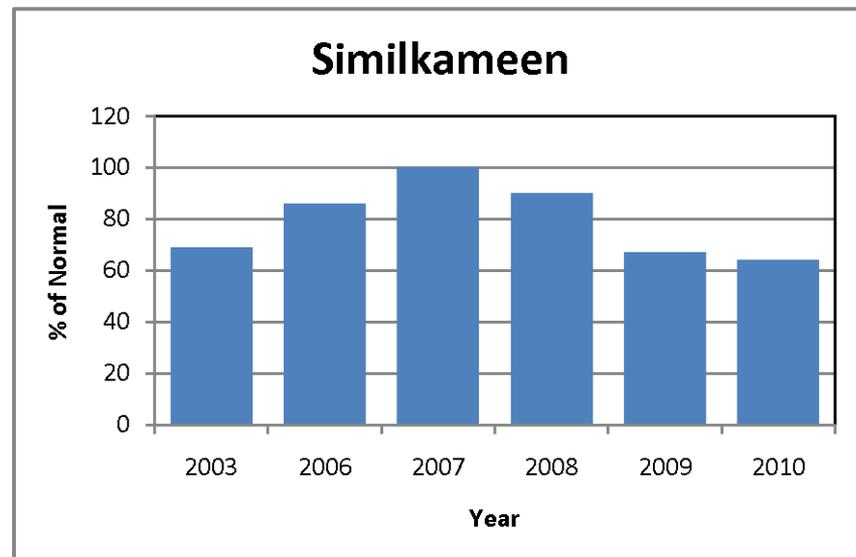
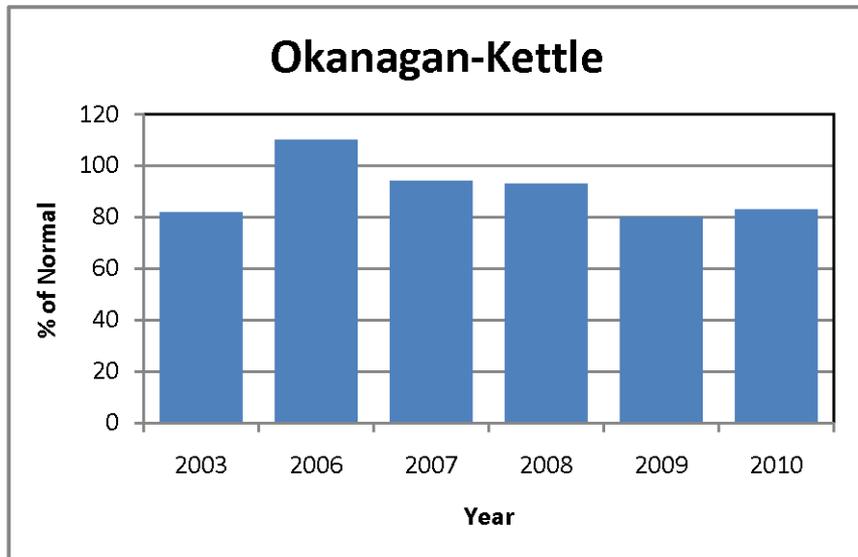
KETTLE Drainage Basin

Snow Course Name and Number	Elev. metres	Apr 2010		Historic, Water Equivalent (mm)					Yrs of Record
		Snow Water Equivalent mm	% of Normal	2009 mm	2008 mm	Max. mm	Min. mm	Normal mm	
GOAT CREEK WA04	1100	51	46	163	183	274	0	111*	45
FARRON 2B02A	1220	243	74	314	307	480	162	330	37
CARMI 2E02	1250	64	45	176	104	290	14	142	47
MONASHEE PASS 2E01	1370	219	64	390	335	517	188	343	60
BIG WHITE MOUNTAIN 2E03	1680	434	86	418	440	762	332	507	44
GRANO CREEK 2E07P	1860	416	77	383	495	769	334	537*	12
BLUEJOINT MOUNTAIN 2E06	2040	679	92	549	667	1175	329	742	30

SIMILKAMEEN Drainage Basin

Snow Course Name and Number	Elev. metres	Apr 2010		Historic, Water Equivalent (mm)					Yrs of Record
		Snow Water Equivalent mm	% of Normal	2009 mm	2008 mm	Max. mm	Min. mm	Normal mm	
BROOKMERE 1C01	980	119	59	111	167	399	51	201	65
FREEZEOUT CREEK TRAIL WA11	1070	117	39	290	399	665	8	300*	65
LIGHTNING LAKE 3D02	1220	219	72	231	361	622	60	305	62
HAMILTON HILL 2G06	1490	159	45	212	288	851	83	356	50
MISSEZULA MOUNTAIN 2G05	1550	130	54	122	162	516B	90	242	49
ISINTOK LAKE 2F11	1680	111	61	110	144	424	66	183	45
LOST HORSE MOUNTAIN 2G04	1920	191	79	188	221	533	138	243	46
BLACKWALL PEAK 2G03P	1940	686	82	615	848	1494	400	833	42
HARTS PASS WA09	1980	894	82	884	1219	1725	510	1081*	67
HARTS PASS WA09P	1980	822	84	787	1057	1770	429	974*	12

April 1st Snow Survey Data



- Values for April 2010 are misleading
- Due to lack of low and mid elevation snow
- Overall snow conditions are comparable to April 2009



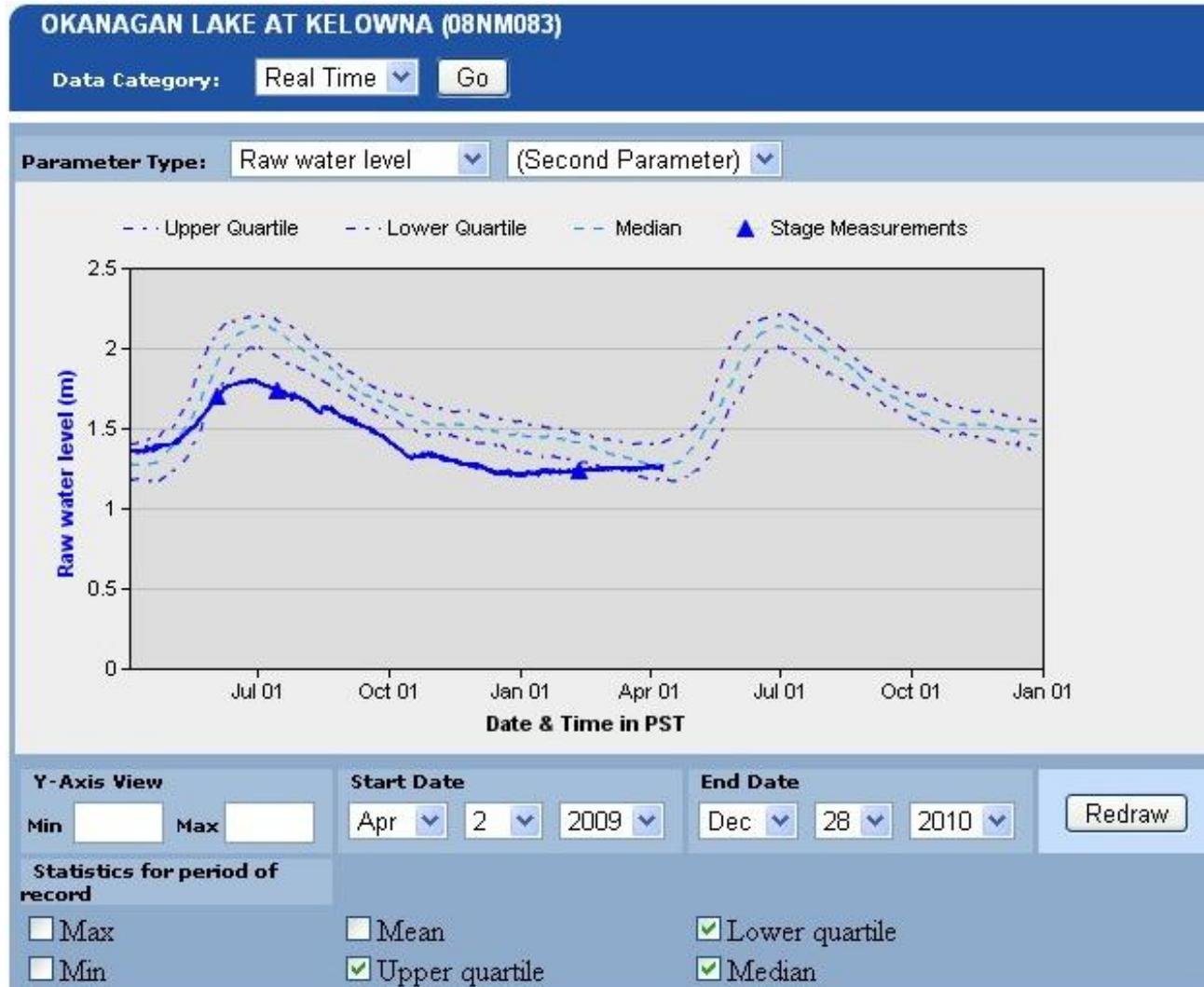
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Okanagan Lake Levels @ Kelowna (08NM083)

April 2010

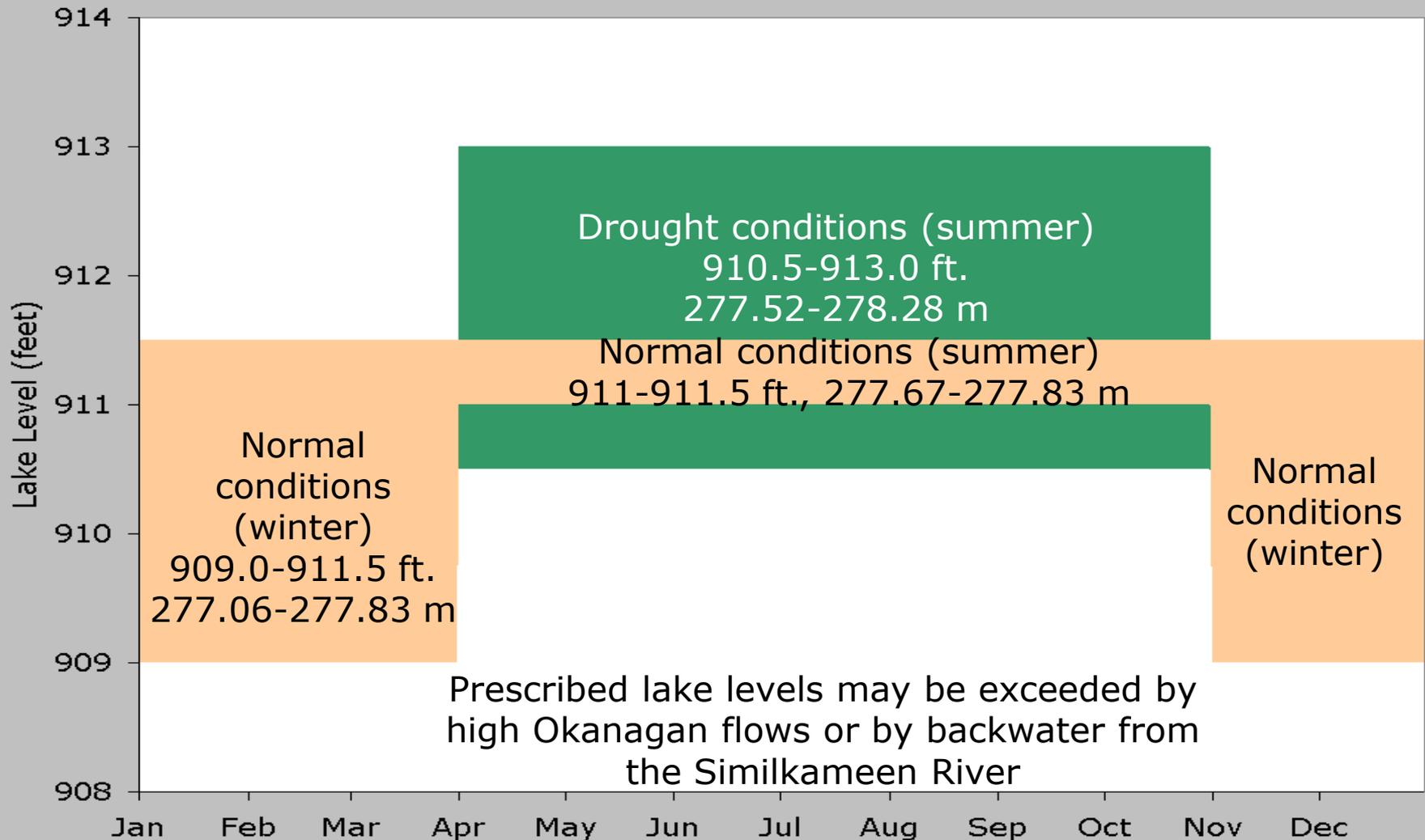


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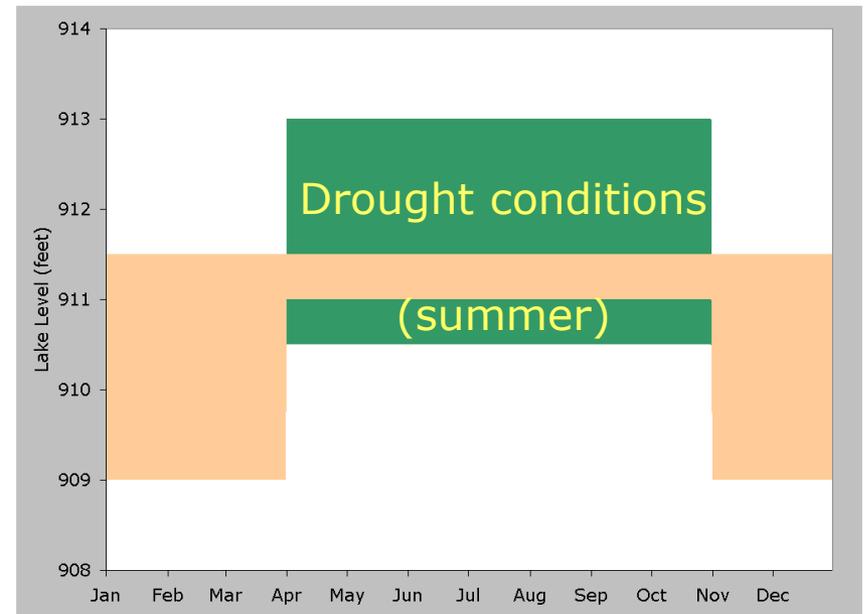
Prescribed Lake Level Range



Drought Criteria

The Orders provide 3 criteria for defining a drought year

- Flow in the Similkameen River, April-July
- Inflow to Okanagan Lake, April-July
- Water level in Okanagan Lake, June-July

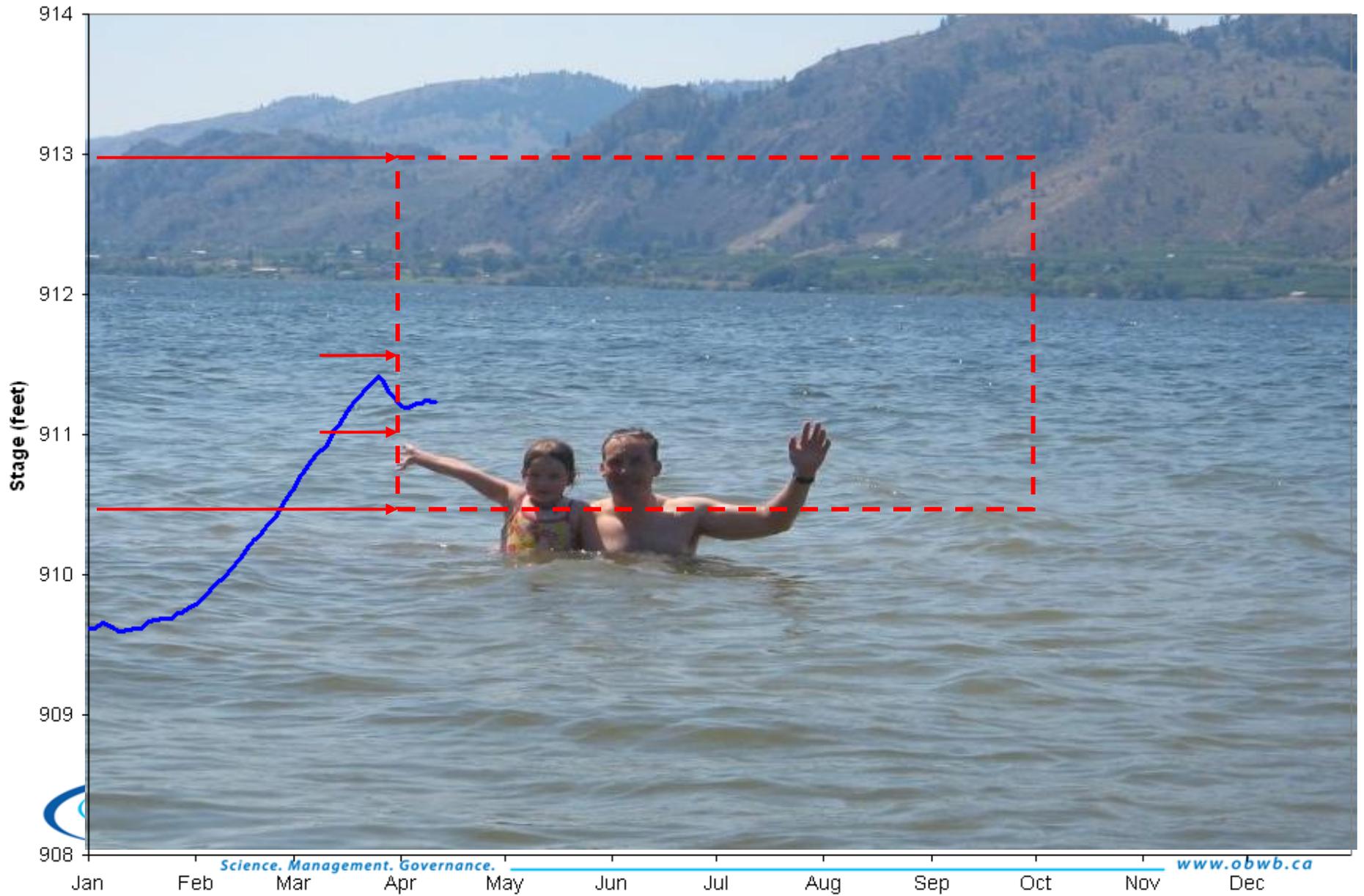


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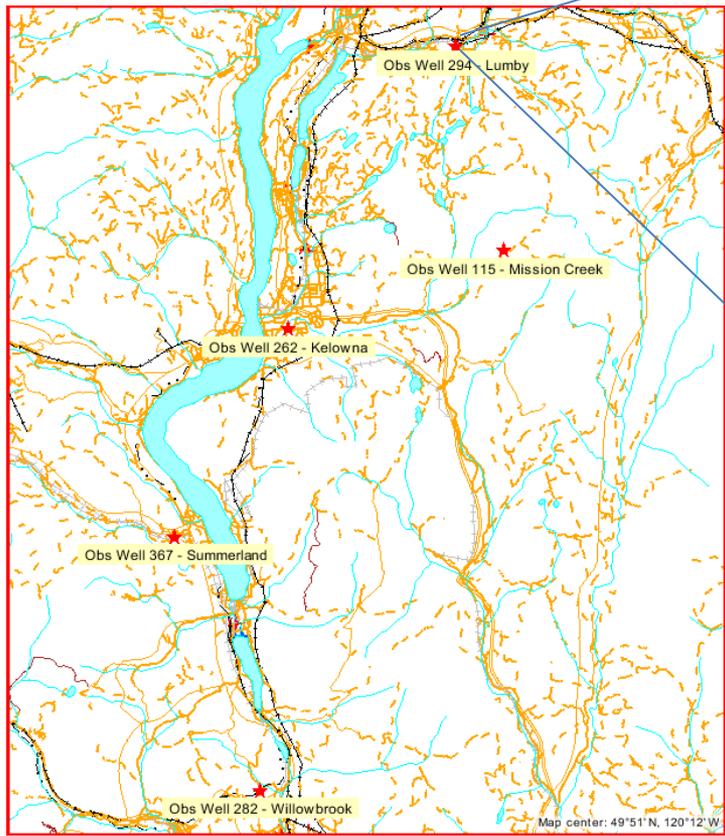
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Osoyoos Lake 2010

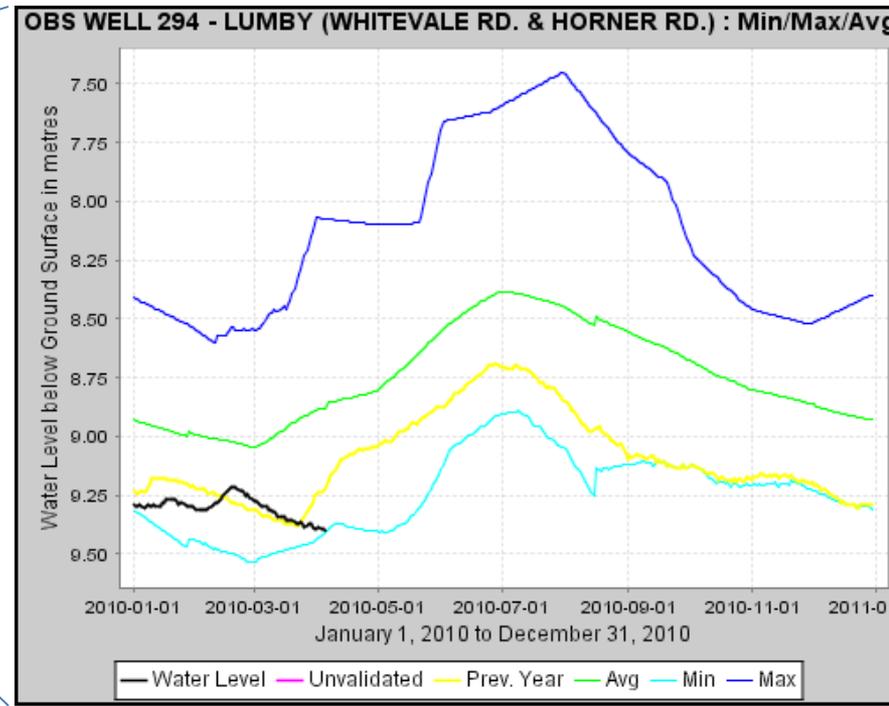


Okanagan Groundwater: MoE Observation Wells

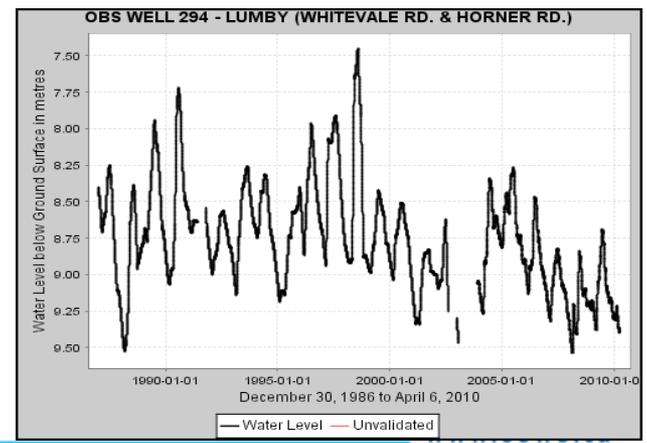
Lumby (294)



2010

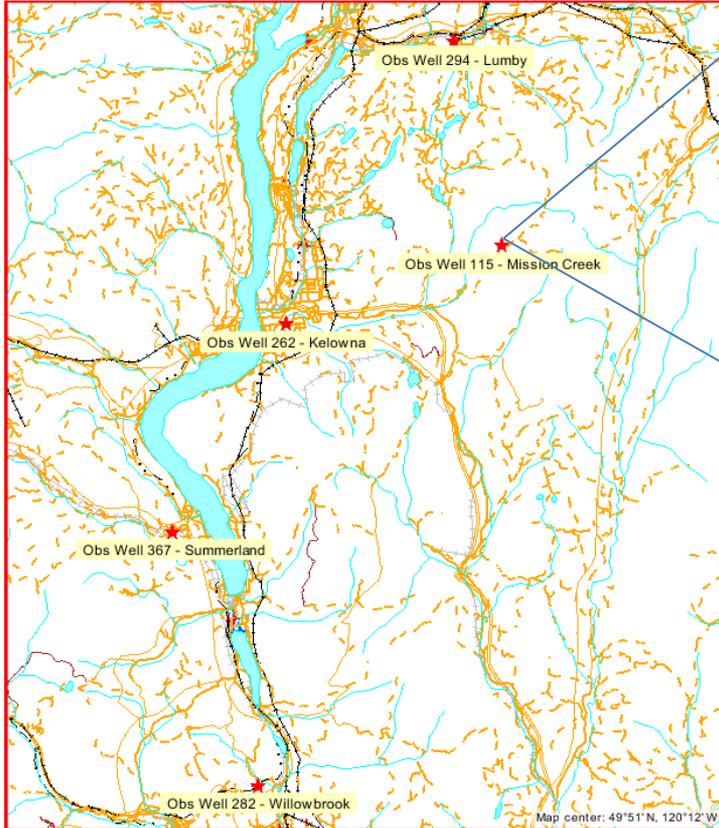


1970 - present

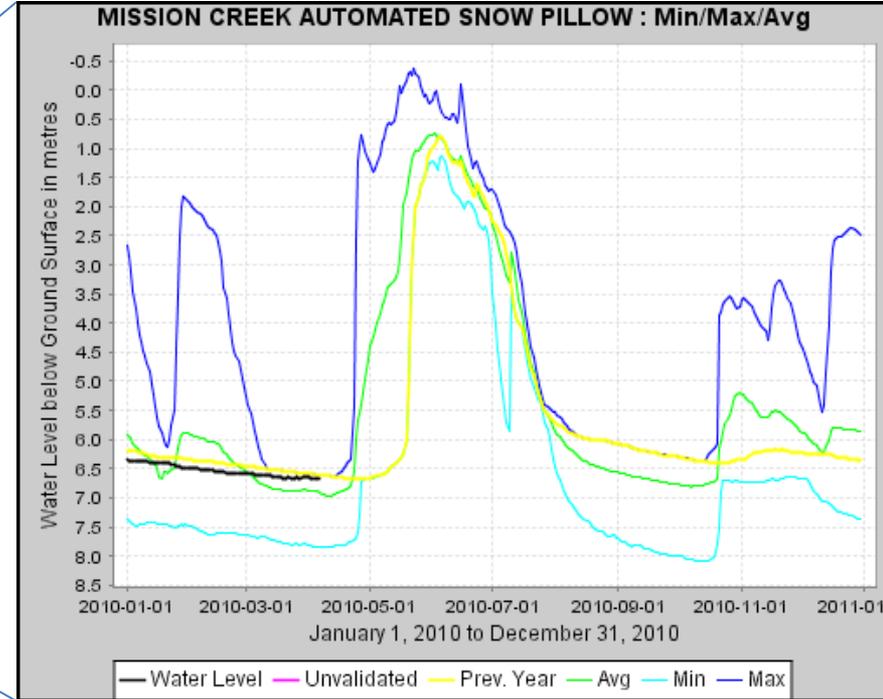


Okanagan Groundwater: MoE Observation Wells

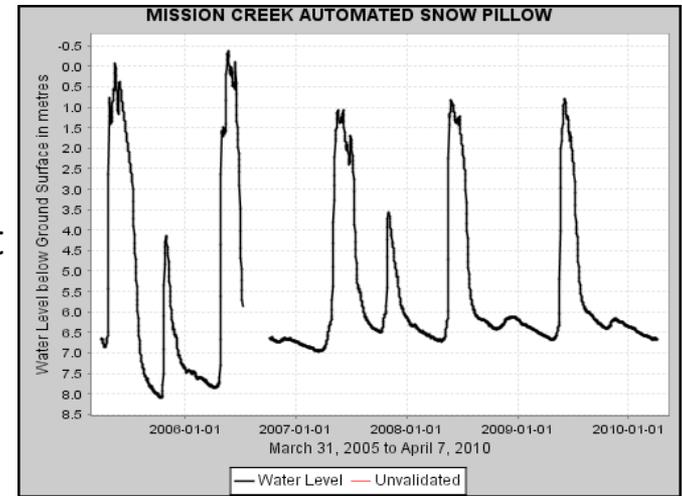
Mission Creek (115)



2010



2005 - present



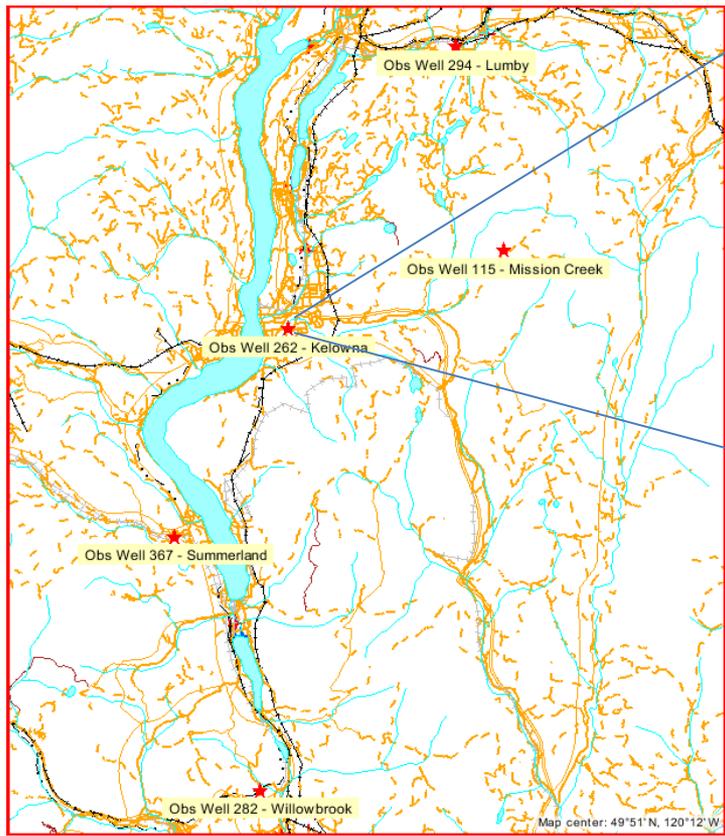
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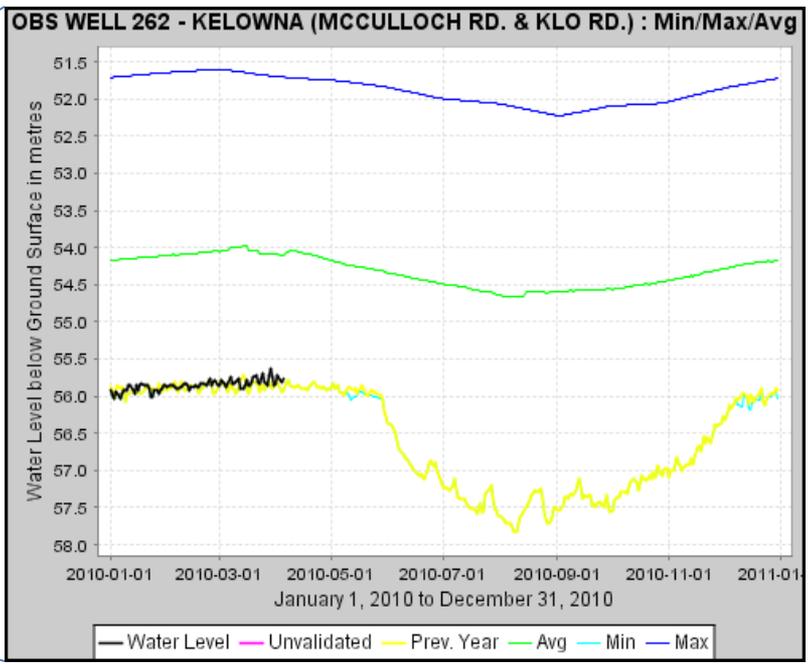
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Okanagan Groundwater: MoE Observation Wells

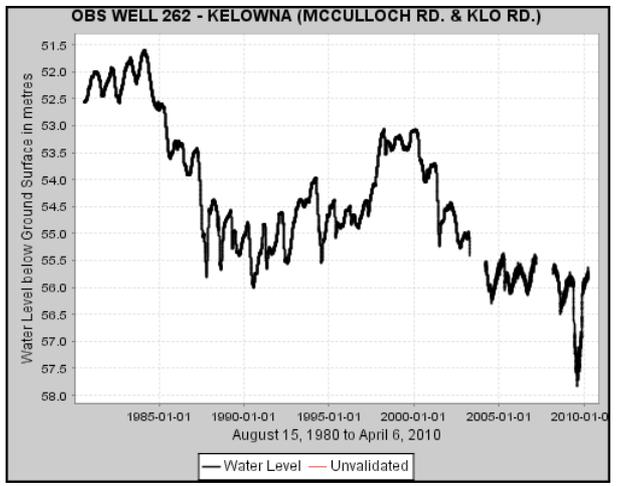
Kelowna (262)



2010

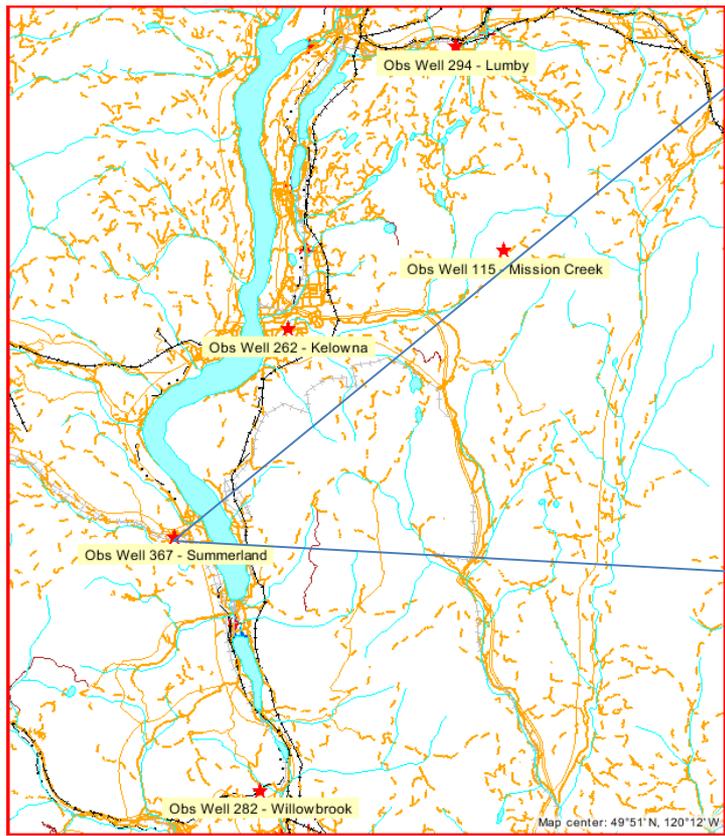


1980 - present

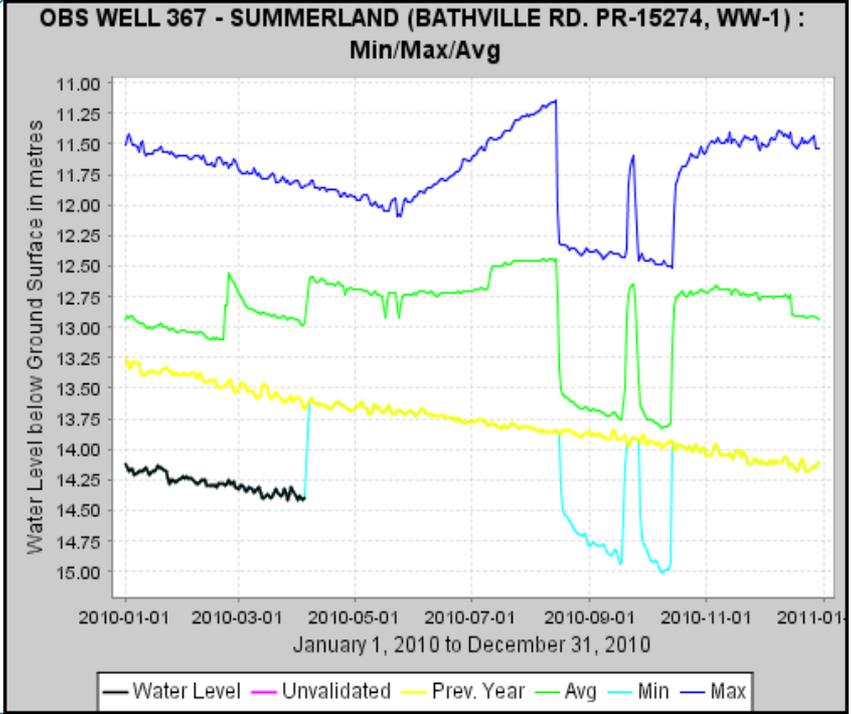


Okanagan Groundwater: MoE Observation Wells

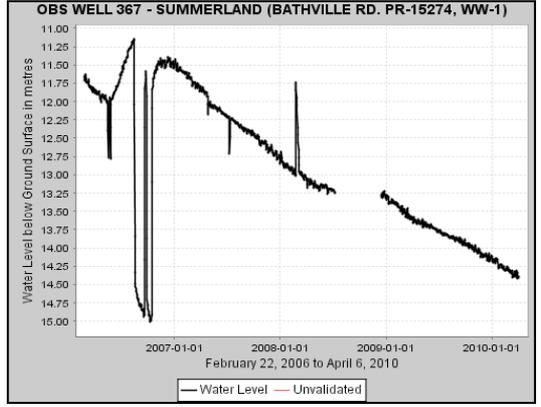
Summerland (367)



2010



2006 - present



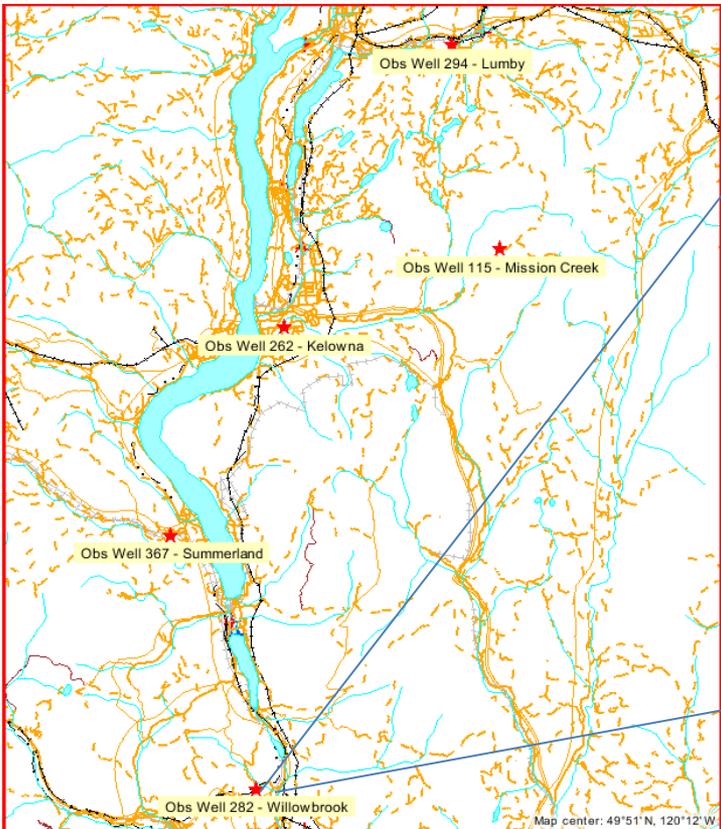
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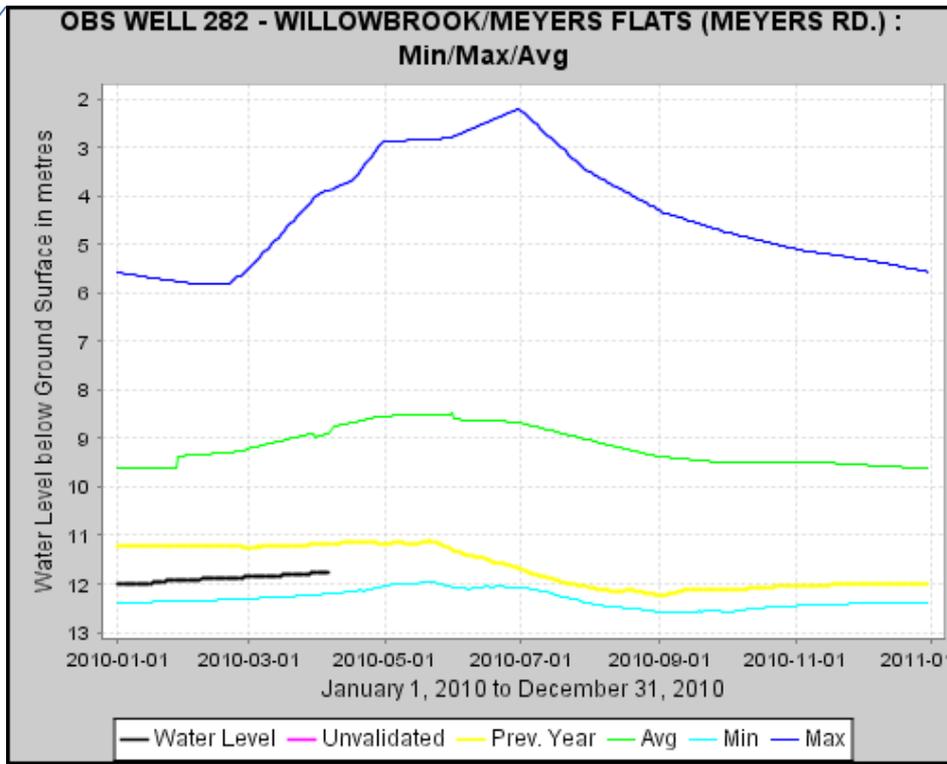
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Okanagan Groundwater: MoE Observation Wells

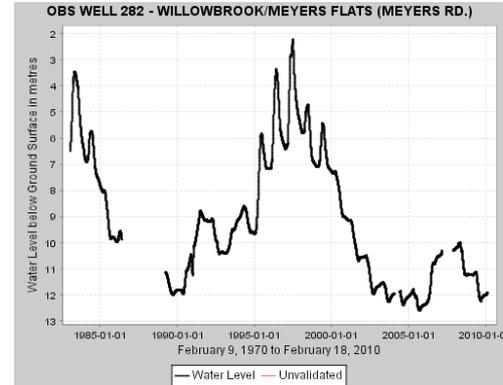
Oliver – Willowbrook (282)



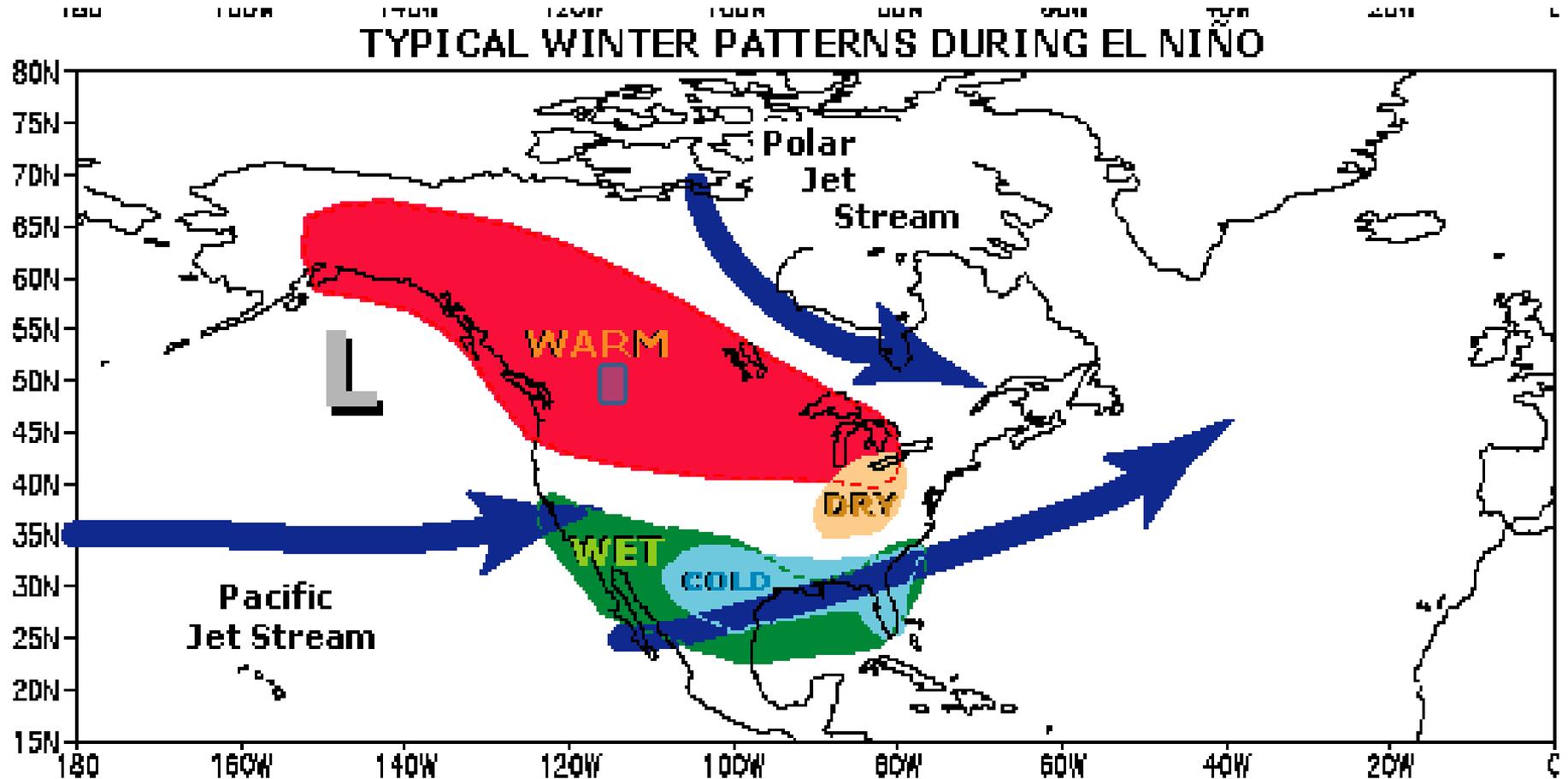
2010



1980 - present



2010: El Niño Summary



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NOAA CLIMATE SERVICES
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

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2010: El Niño Effects Diminishing

- Effects of El Niño are now over for the most part (mild and dry winter in most areas)
- May could be warmer than normal as a hangover
- Our BC Monsoonal rains of mid-May to early July now critical for two reasons:
 - Will we receive our normal rains to build water supplies?
 - Will we need to use more if it is hot and dry?



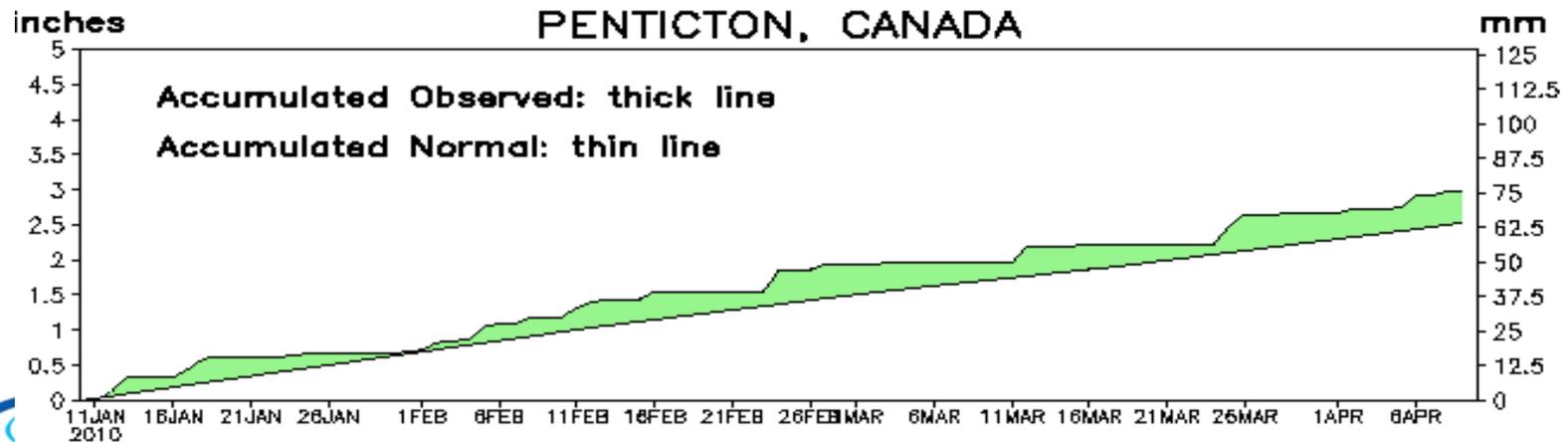
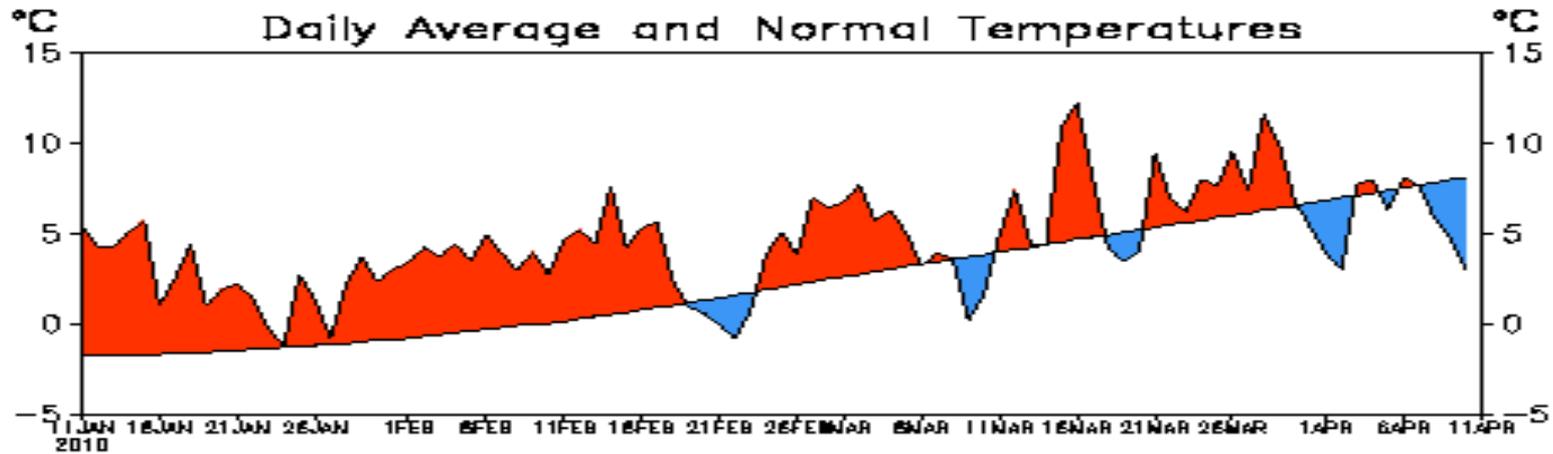
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2010: Last 90 Days

PENTICTON, CANADA



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2010 March Weather (valley bottom)



Vernon

- 2.7 degrees above normal
- Precipitation 22.6mm/25.8mm (near norm)

Kelowna

- Precipitation 24.0mm/21.8mm (110%)

Summerland

- 1.8 degrees above normal
- Precipitation 16.4mm/18.6mm (88%)

Penticton

- 1.6 degrees above normal
- Precipitation 18.4mm/22.3mm (83%)

Osoyoos

- 1.3 degrees above normal

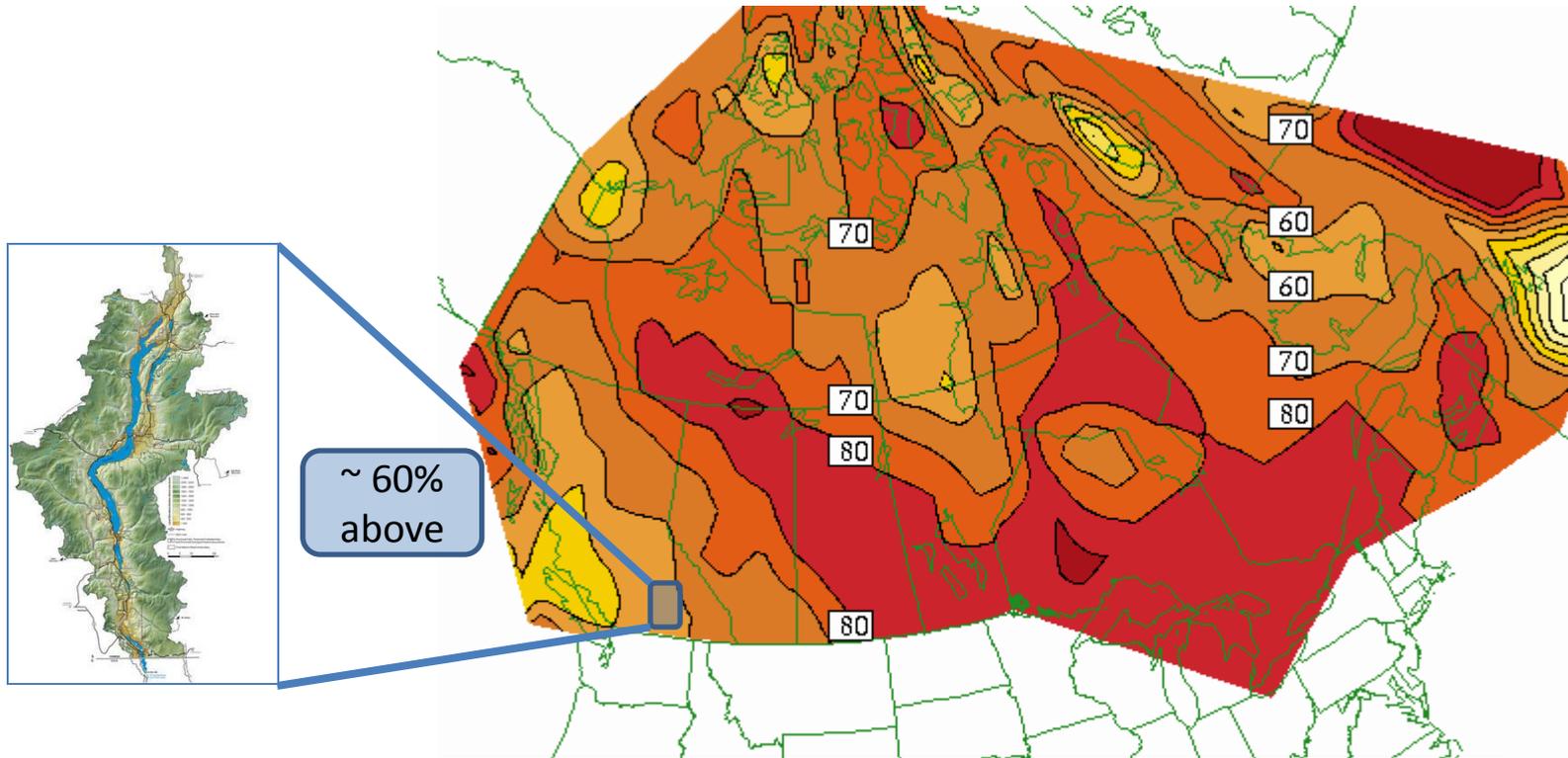


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Temperature Outlook: April 1st



~ 60%
above

Forecast probability of above normal
temperature (no calibration)
Period: April-May-June 2010
Based on 3 equiprobable categories
from 1971-2000 climatology

Probabilités prévues que les températures
soient au-dessus de la normale (non-calibrées)
Période: avril-mai-juin 2010
Basé sur 3 catégories équiprobables
de la climatologie 1971-2000

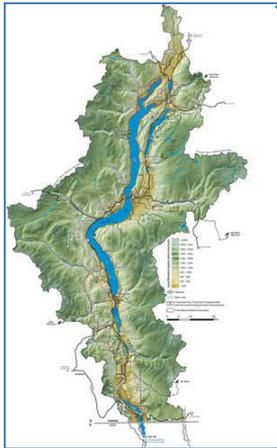


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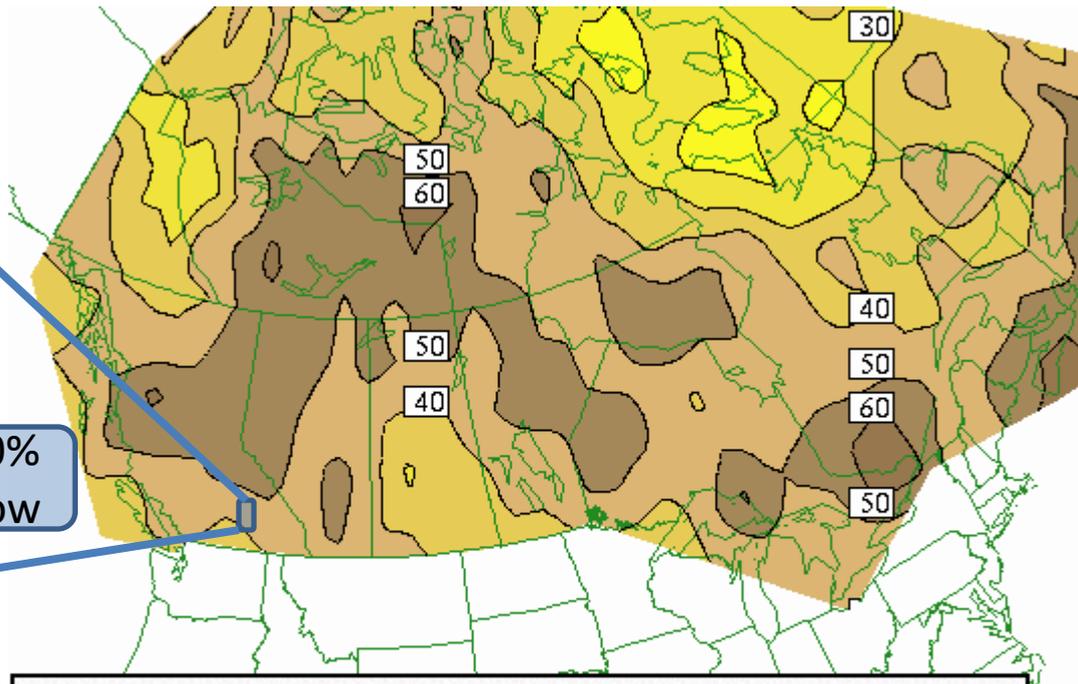
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Precipitation Outlook: April 1st



~ 40%
below



Forecast probability of below normal precipitation (no calibration)
Period: April-May-June 2010
Based on 3 equiprobable categories from 1971-2000 climatology

Probabilités prévues que les précipitations soient sous la normale (non-calibrées)
Période: avril-mai-juin 2010
Basé sur 3 catégories équiprobables de la climatologie 1971-2000



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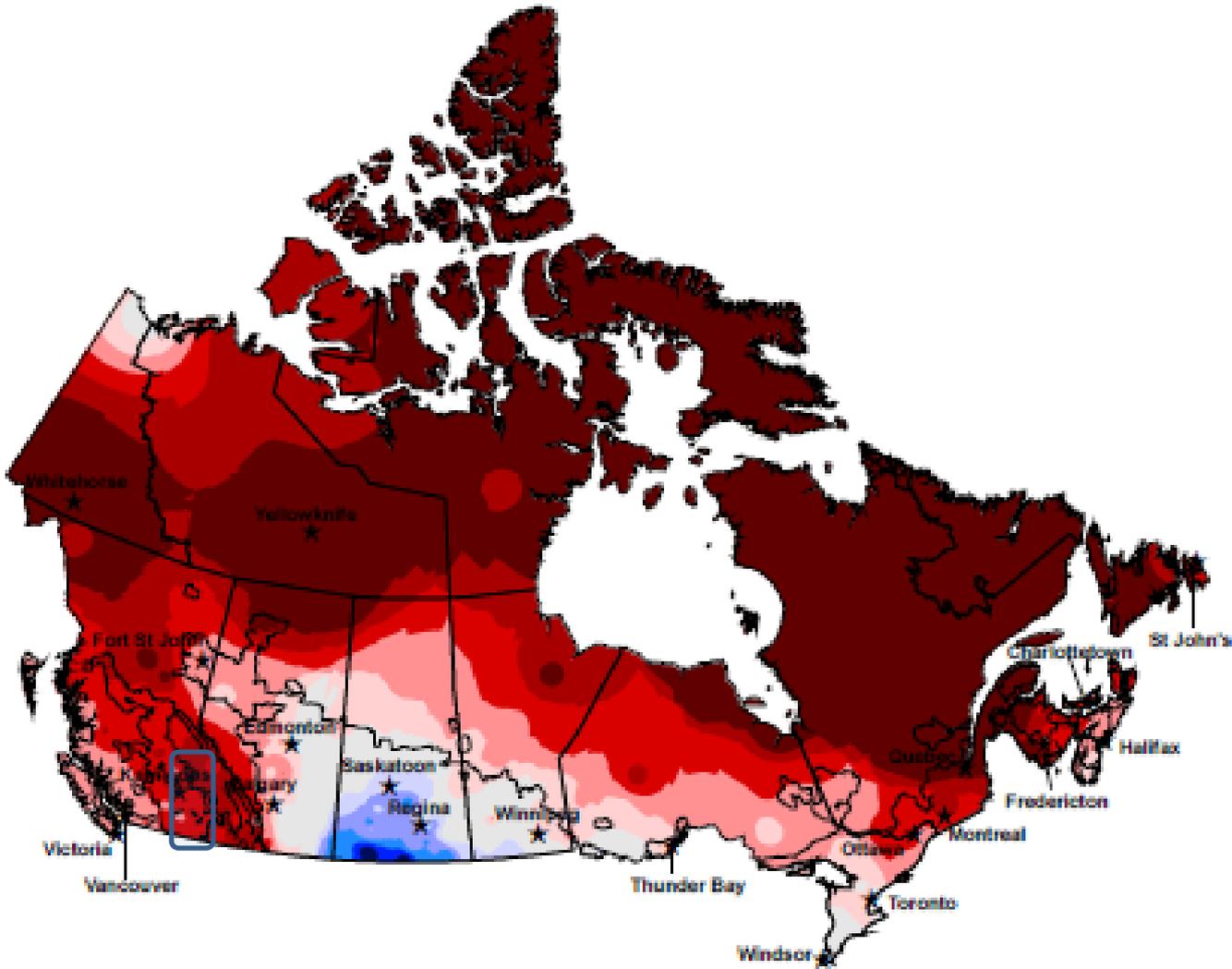
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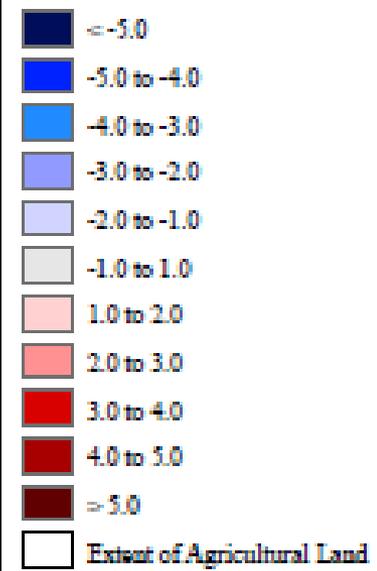


Monthly Mean Temperature Difference from Normal (National)

February 2010



Temperature (°C)

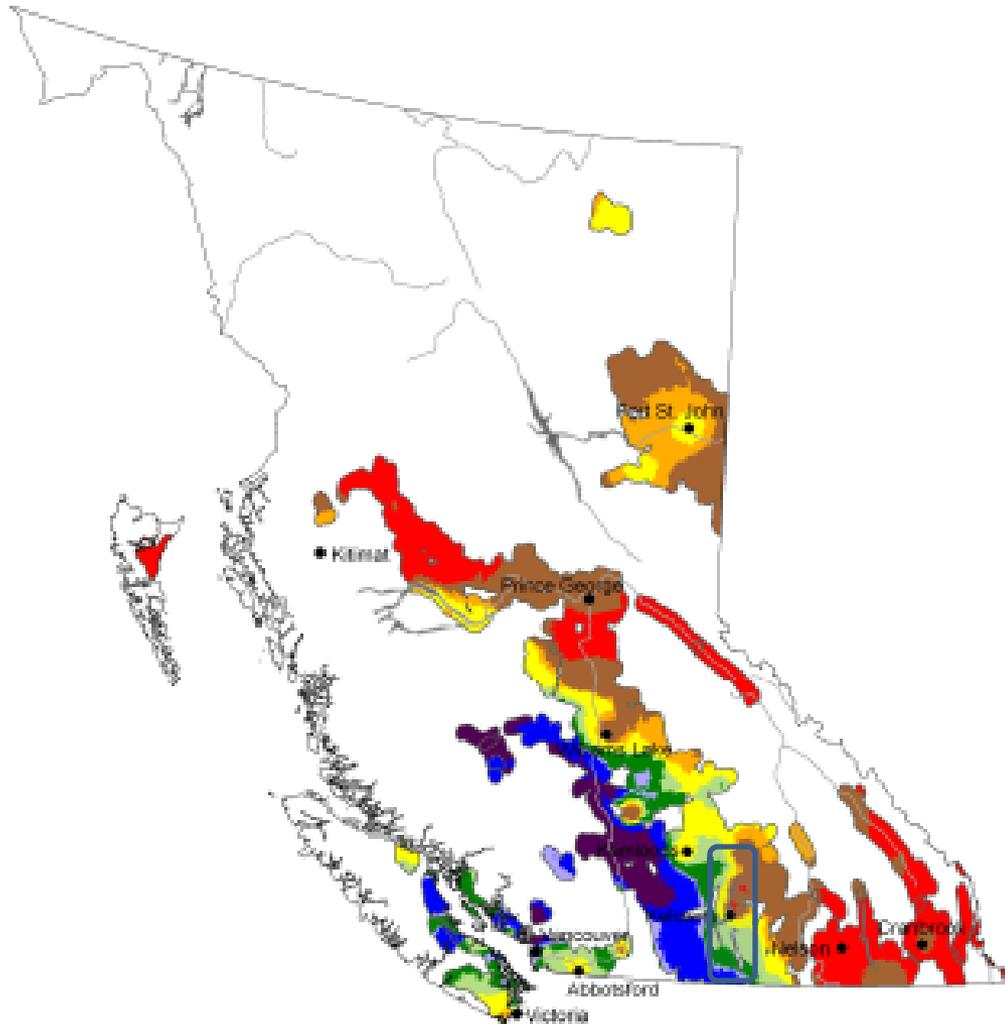


The map may not be accurate for all regions due to data availability and data errors.



Precipitation Compared to Historical Distribution (Pacific Region)

November 1, 2009 to March 31, 2010



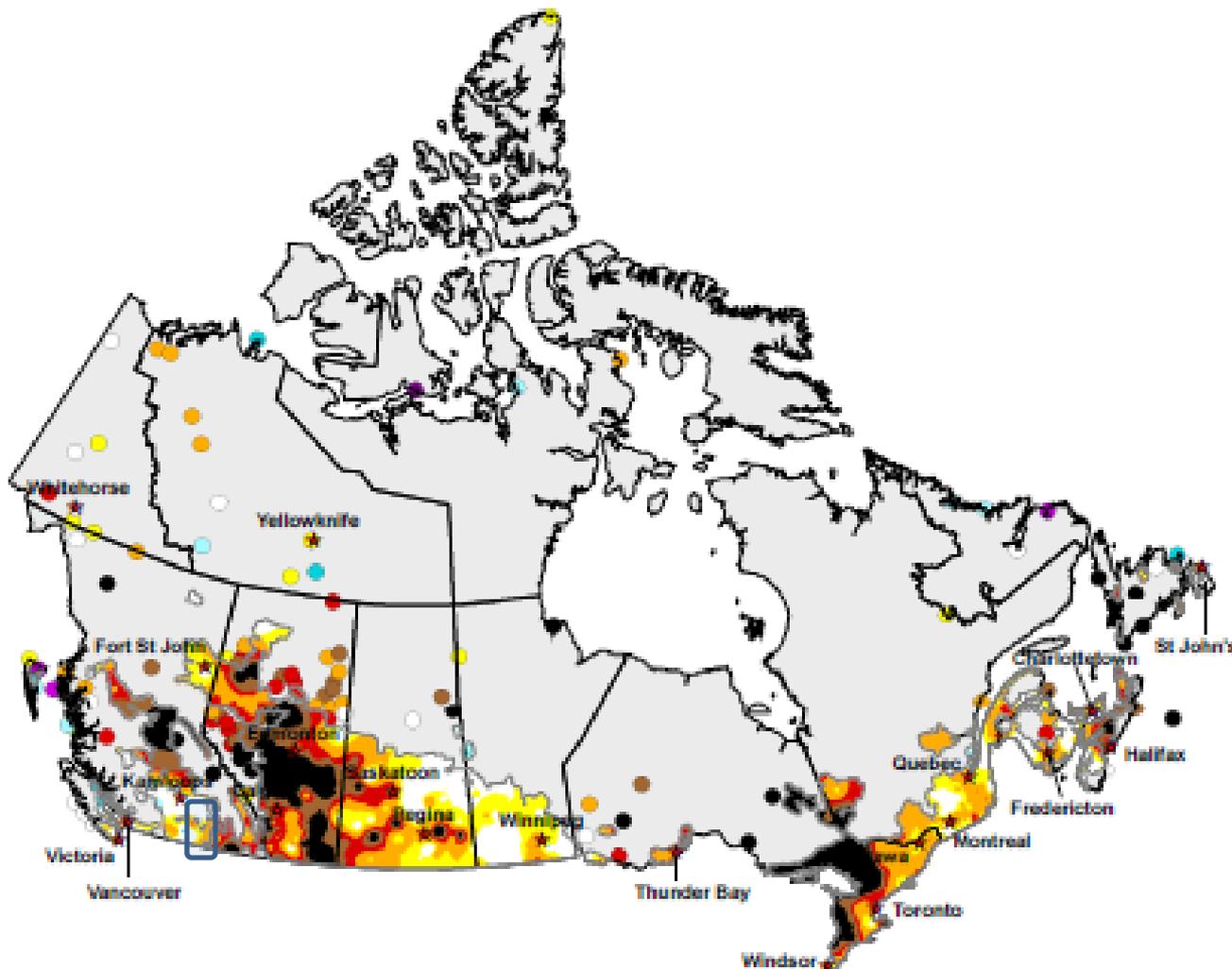
- Record Dry
- Extremely Low (0-10)
- Very Low (10-20)
- Low (20-40)
- Mid-Range (40-60)
- High (60-80)
- Very High (80-90)
- Extremely High (90-100)
- Record Wet
- Extent of Agricultural Land
- Lakes and Rivers

Produced using near real-time data that has undergone initial quality control. The map may not be accurate for all regions due to data availability and data errors.



3 - Month Standardized Precipitation Index (SPI)

March 2010



SPI

- ≤ -2.00
- -1.99 - -1.60
- -1.59 - -1.30
- -1.29 - -0.80
- -0.79 - -0.51
- -0.50 - 0.50
- 0.51 - 0.79
- 0.80 - 1.29
- 1.30 - 1.59
- 1.60 - 1.99
- > 2.00

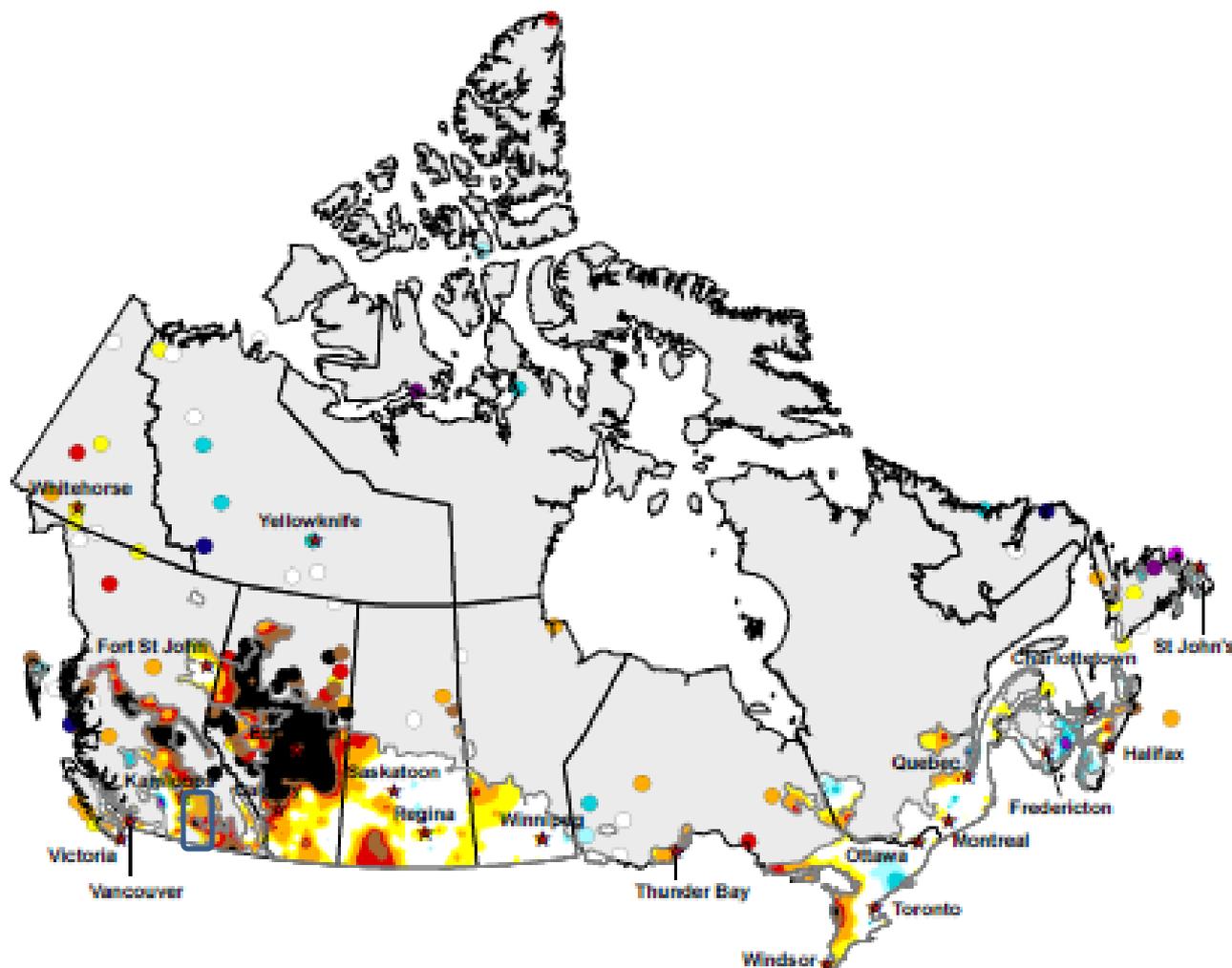
□ Extent of Agricultural Land

Produced using near real-time data that has undergone initial quality control. The map may not be accurate for all regions due to data availability and data errors.



12 - Month Standardized Precipitation Index (SPI)

March 2010



SPI

- ≤ -2.00
- -1.99 - -1.60
- -1.59 - -1.30
- -1.29 - -0.80
- -0.79 - -0.51
- -0.50 - 0.50
- 0.51 - 0.79
- 0.80 - 1.29
- 1.30 - 1.59
- 1.60 - 1.99
- > 2.00

Extent of Agricultural Land

Produced using near real-time data that has undergone initial quality control. The map may not be accurate for all regions due to data availability and data errors.

Thank you



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