2015: Okanagan Water Supply

Drought Management Workshop



13 August 2015

12:30pm – 5:00pm

Okanagan Basin
WATER BOARD

Science. Management. Governance.

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2015 Okanagan Drought Workshop: August 13th
(Week 33)

Presentation team

Host **Nelson Jatel**

Special guest: Honourable **Steven Thomson**, Minister FLNRO

OKANAGAN WATERSHED

- Okanagan Basin Water Board [**Anna Warwick Sears**] — Context

BC Government

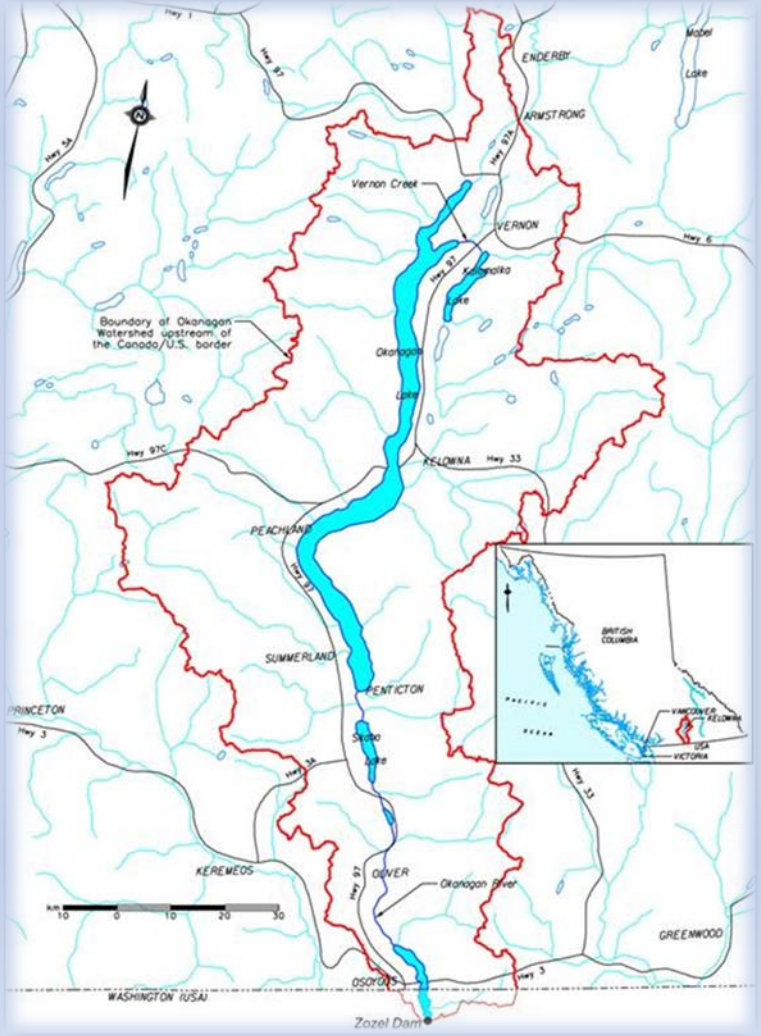
- BC Drought Plan [**Valerie Cameron**] — Drought status
- Okanagan regional drought response plan [**Ray Campton**]
- Okanagan River & Upper reservoirs [**Shaun Reimer**] — Flow & storage
- Osoyoos Lake Levels – IJC [**Brian Symonds**] — Osoyoos Lake

Water Management technical experts

- Okanagan International Fishery [**Peter Waardenburg/Richard Bussanich**]
- Okanagan agriculture panel [**Hans Buchler, Lee Hesketh**]
- Okanagan utilities panel [**Mitch Moroziuk, Kevin Van Vliet, Renee Clark**]
- Best practices – City of Vancouver [**Jennifer Bailey, Amanda McCuaig**]

Okanagan Basin Water Board [**Anna Warwick Sears**] — Concluding remarks and thank you

2015 Okanagan Drought Workshop



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Provincial Drought Response

Valerie Z Cameron

BC Ministry of Forests, Lands and Natural Resource Operations

Okanagan Basin Drought Response Workshop

Kelowna

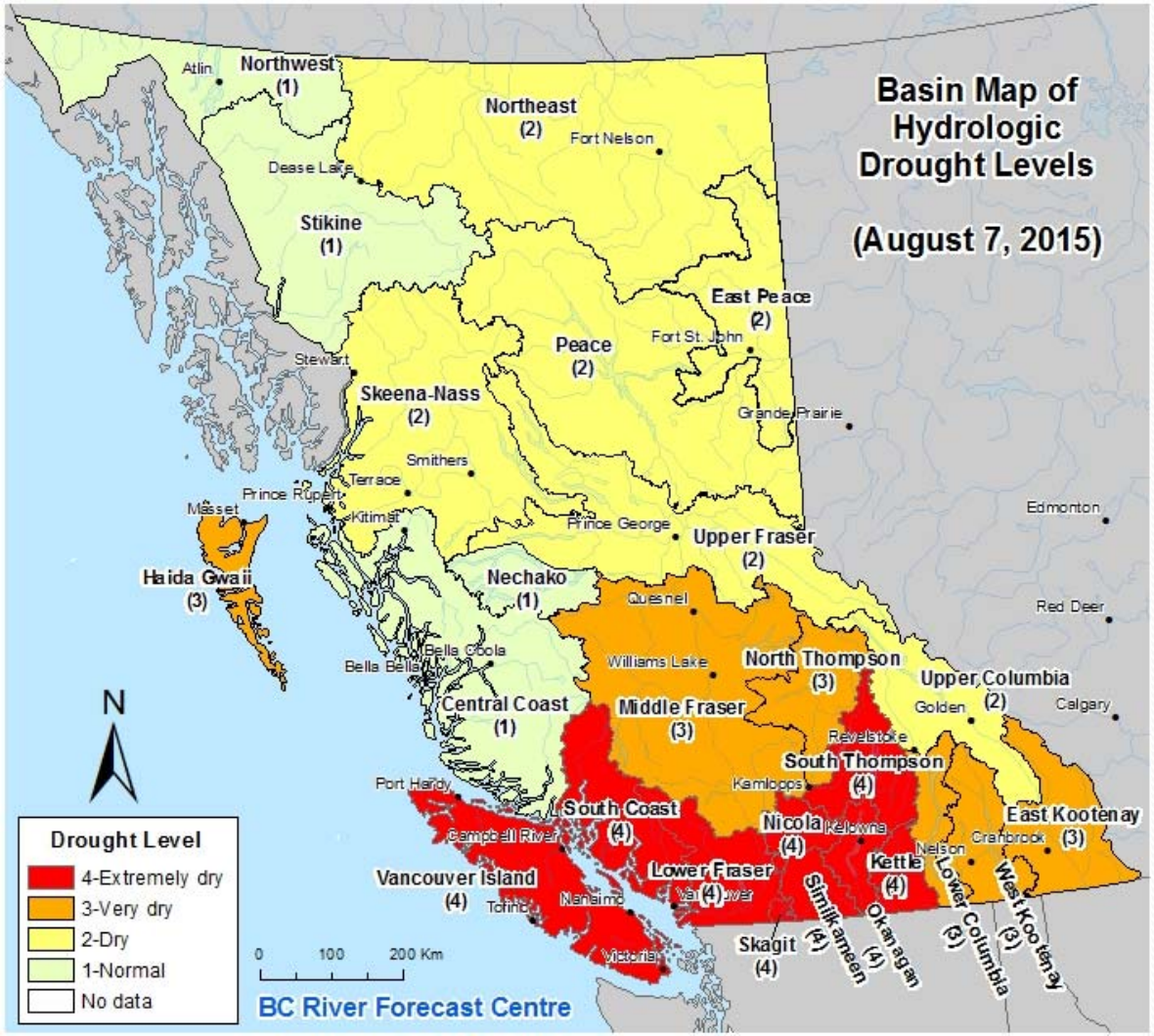
August 13, 2015

BC Drought Response Plan

- Plan is guiding provincial response for Drought 2015
  - Outlines procedure for setting drought levels 1-4
  - Describes roles and responsibilities for agencies, and communication protocols
  - Establishes strategic, technical and regional drought working groups that are responsible for delivering drought actions
  - Outlines a series of actions to be undertaken by agencies and local governments at each drought level

- MFLNRO is the lead for provincial drought response

Drought Levels as of Aug 7, 2015



Provincial Actions to Date

- Strategic, technical and regional working groups formed & active
- Monitoring of streamflow and ecosystem conditions, economic and social impacts
- Community and industry liaison and partnerships
- Angling closures on some streams

Provincial Actions to Date

- Communications – internal and external. Info bulletins, news releases on drought levels and angling closures.
- Some regulation of water use under *Water Act* and *Fish Protection Act*.
- Planning for deteriorating conditions, emergency response.

Potential Impacts of Deteriorating Drought

- Ecosystem impacts – fish mortalities, wildlife stress
- Social impacts – potential loss of community water supplies, lack of water for fire fighting, food supply impacts
- Economic impacts – water shortages will affect productivity, provincial revenue, employment, particularly in agriculture, hydropower, industrial users (i.e. pulp mill closures)

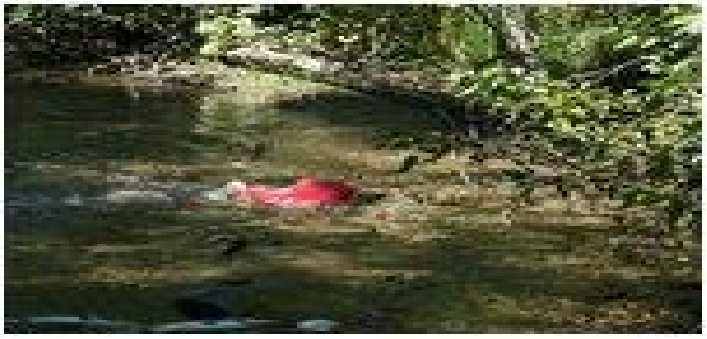
Concluding Remarks

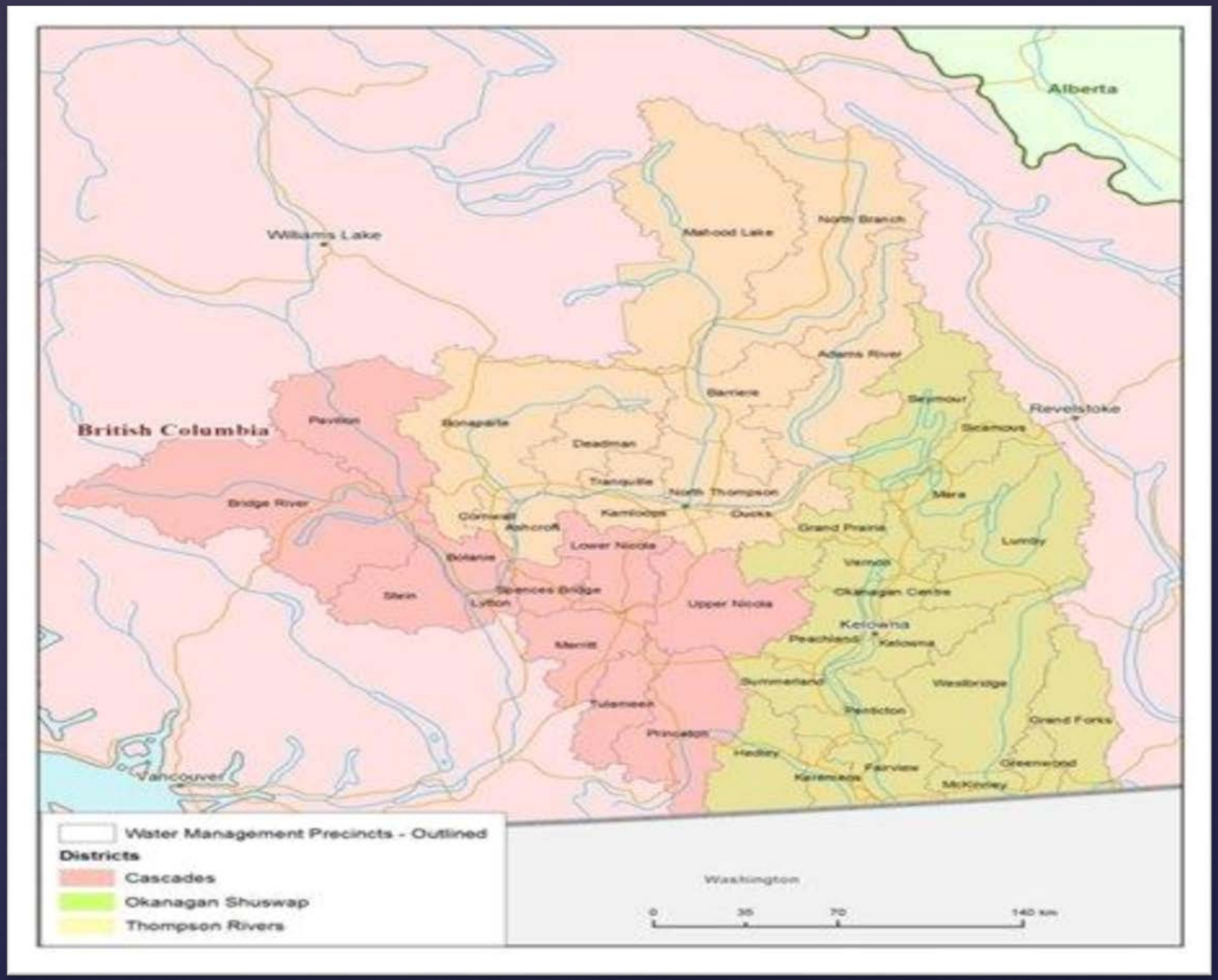
- Drought is expected to get worse and could reach unprecedented levels.
- There could be significant impacts on society, the environment, and economy.
- Provincial and other actions may need to escalate.
- Water conservation makes a difference –it's everyone's responsibility.
- We're all in this together.

Ministry of
Forests, Lands and
Natural Resource Operations

Thompson Okanagan Region

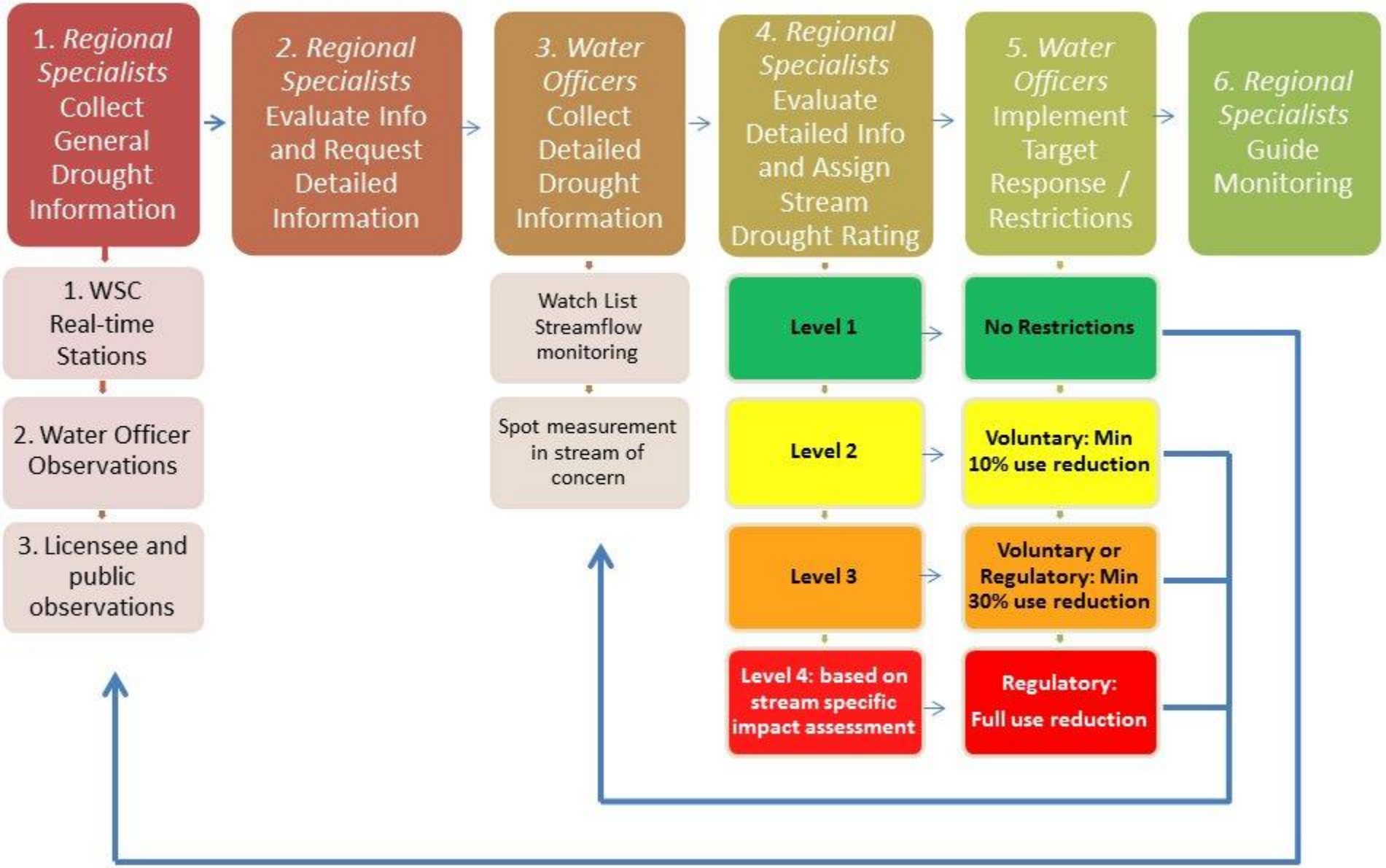
Drought Response Implementation Plan




Alberta
Williams Lake
Mahood Lake
North Branch
Adams River
Seymour
Revelstoke
Shuswap
Barriere
British Columbia
Pavilion
Bonaparte
Deadman
Tranquille
North Thompson
Kamloops
Quilchena
Ashcroft
Cornwall
Bridge River
Lower Nicola
Grand Prairie
Lumby
Merritt
Vernon
Okanagan Centre
Spences Bridge
Lytton
Upper Nicola
Kelowna
Peachland
Summerland
Westbridge
Penticton
Grand Forks
Tulameen
Princeton
Hedley
Fairview
Greenwood
Keremeos
McKinley
Vancouver
Washington
Water Management Precincts - Outlined
Districts
Cascades
Okanagan Shuswap
Thompson Rivers
0
35
70
140 km

Role	Responsibilities	Business Centre
Team Lead	• Coordinates Regional Drought Response team • Liaise with Regional Water Managers and Provincial drought working group • Communicate streamflow status and regulation decisions to appropriate management level	FLNRO Ecosystems
Regional Specialist – Hydrologist	• Hydrological guidance • Review drought level assignment	FLNRO Regional Ops
Regional Specialist – Agriculture	• Provides agriculture perspective • Evaluates economic consequences of response actions • Co-leads stakeholder communication	Agriculture – Business Development Div.
Regional Specialist – Aquatic Ecology	• Assigning drought level based on reported flows • Evaluating environmental consequences • Provides stream flow training	FLNRO Ecosystems
District Water Officers	• Coordinates collection of streamflow measurements from Watch List streams in district. • Applies first in time, first in rights (FITFIR) protocol when necessary. • Co-leads Stakeholder communication (identify best approach to communicate with licensees). • Support other districts as required.	FLNRO –Thompson Okanagan Region Resource Districts • Cascades • Okanagan Shuswap • Thompson Rivers

Regional Drought Team Course of Action



For a complete list of related legislation, see the British Columbia Drought Response Plan. Highly relevant legislation includes the following:

Fish Protection Act – Sec. 9:

Temporary reduction may be ordered in cases of drought

9 (1) This section applies if the minister considers that, because of a drought, the flow of water in a stream is or is likely to become so low that the survival of a population of fish in the stream may be or may become threatened.

(2) In the circumstances referred to in subsection (1), for the purposes of protecting the fish population, the minister may make temporary orders regulating the diversion, rate of diversion, time of diversion, storage, time of storage and use of water from the stream by holders of licences or approvals in relation to the stream, regardless of precedence under the Water Act.

(3) The minister may only make an order under subsection (2) after giving due consideration to the needs of agricultural users.

Water Act – Sec. 15:

Precedence of licences on same stream

15 (1) Except as otherwise provided in subsections (2) and (3), the respective rights exercisable under 2 licences authorizing the diversion of water from the same stream have precedence in law according to the respective priorities of the dates from which the licences take precedence as set out in them.

(2) The respective rights exercisable under 2 licences taking precedence from the same date have precedence in law according to the ranking of the respective purposes for which water is authorized to be used under the licences respectively, and the ranking of the several purposes for which water may be used under licences are, from highest rank to lowest rank: domestic, waterworks, mineral trading, irrigation, mining, industrial, power, hydraulicking, storage, conservation, conveying and land improvement purposes.

(3) The rights exercisable under 2 licences taking precedence from the same date and authorizing the diversion of water from the same stream for the same purpose have equal precedence in law.

Okanagan Drought Workshop

August 13, 2015

Okanagan Lake Regulation System (OLRS) Operations

Shaun Reimer, P.Eng.
Public Safety & Protection
Ministry of Forest, Lands and
Natural Resource Operations
Penticton

History

A Joint Board of Engineers:

- Appointed in 1943 to report out after a major 1942 flood;
- Recommended the construction of dams, vertical drop structures, and river channelization, as well as the establishment of operating ranges;

Recommendations were implemented after a “Memorandum of Agreement” was signed in 1950 between the Federal and Provincial governments;

In 1976, the Okanagan Basin Implementation Agreement was signed by the Federal and Provincial Governments;

It set out seasonal targets for main stem lake elevations and river flows. These targets take into account:

- Anticipated flood and prolonged drought conditions;
- Water requirements for Sockeye and Kokanee

Under this agreement, the Province became the operators of the Okanagan Flood Control System.

Range of Flows and Lake Levels

Okanagan Lake operational range:1.15 m

- 341.34 m to 342.48 m geodetic;
- Under prolonged drought conditions (successive years <247 Million m^3), lake may be drawn down to 340.4 m;

Average inflow into Okanagan Lake: 530 Million m^3 (1.5 m on lake);

Okanagan River Design Flows range from 60 m^3/s in Penticton to 96 m^3/s south of Oliver;

Net difference of 40 m^3/s (inflow - outflow) on Okanagan Lake = 1 cm/day.

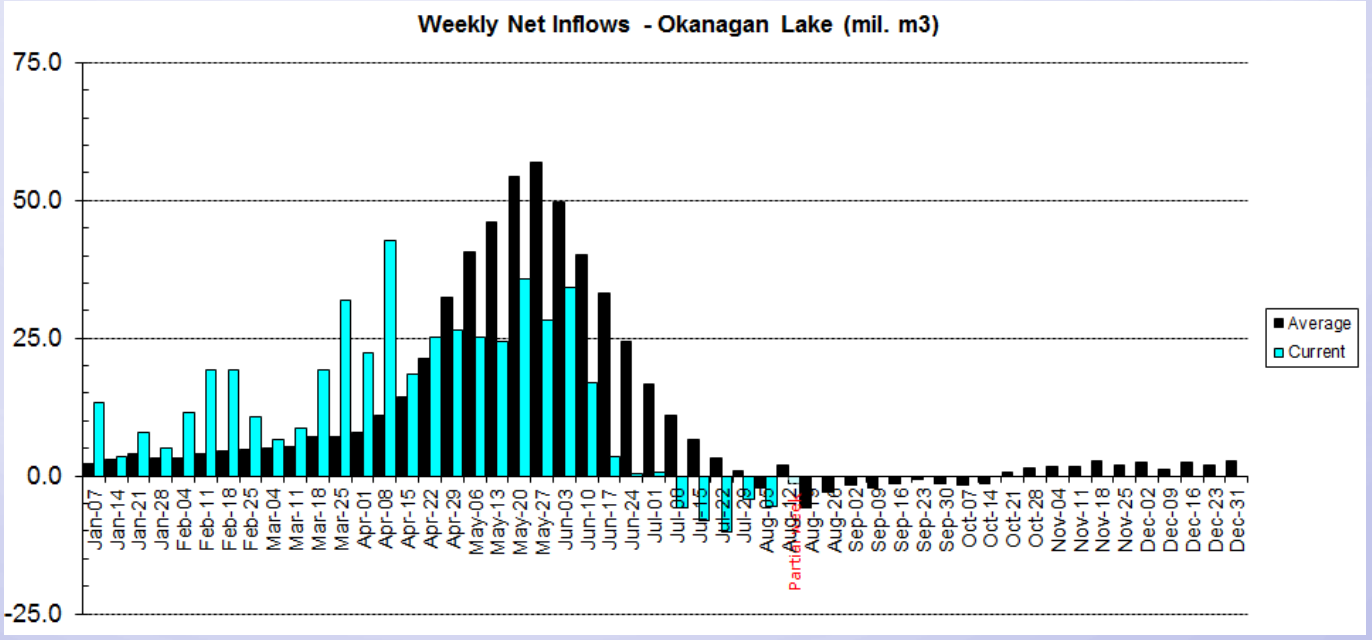
Seasonal constraints include maximum flow of 28.3 m^3/s in Okanagan River at Oliver until Sockeye eggs hatch and emerge from gravel;

This constraint overridden for large snowpacks;

Tributary flow downstream of Penticton means that this flow may be much less out of Okanagan Lake Dam.

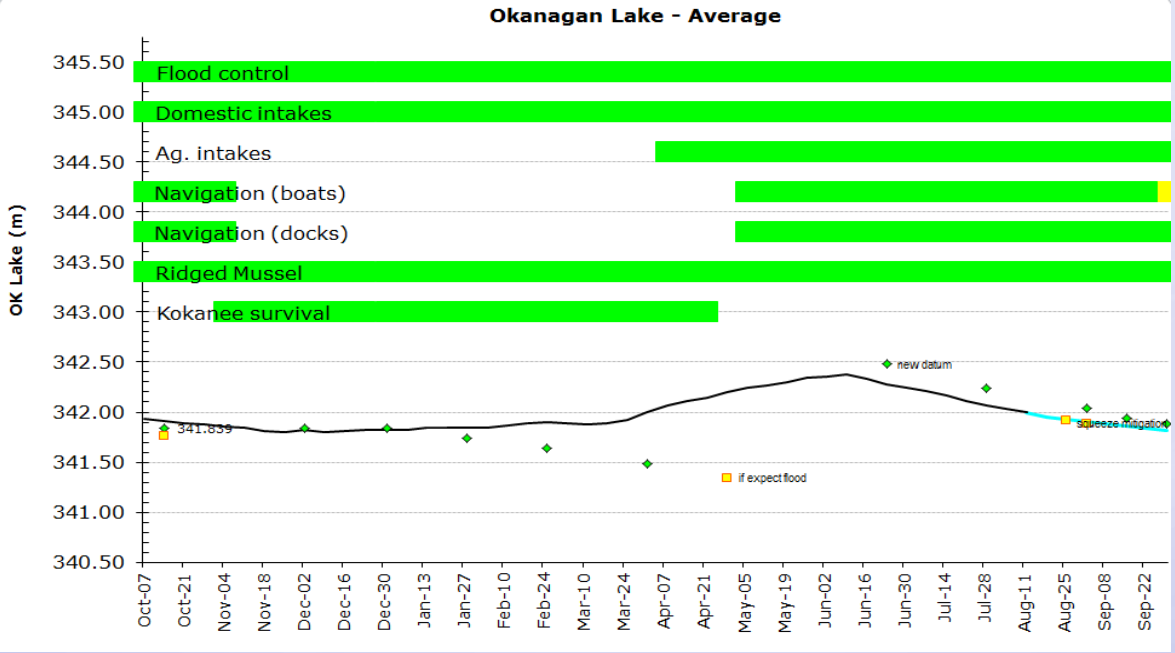
Fish Water Management Tool

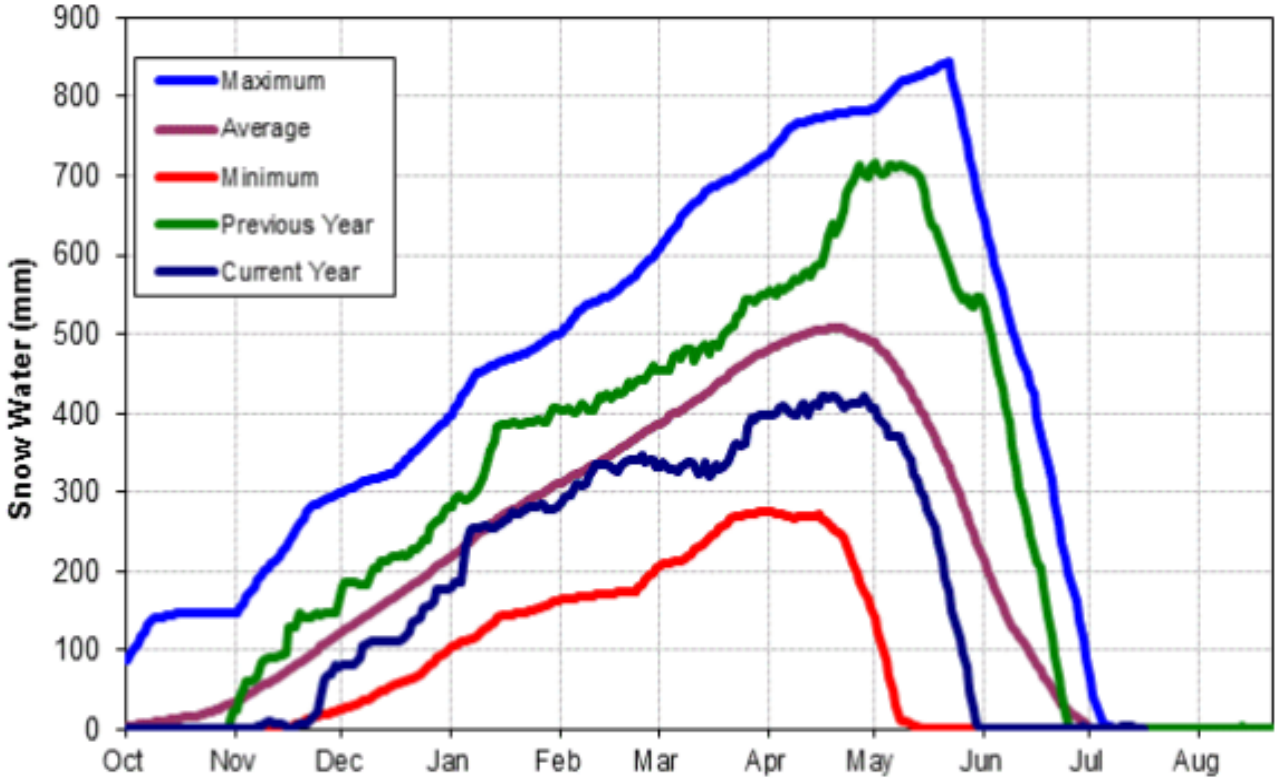
- Computer Model used for decision making support;
- Forecasts Okanagan Lake and River levels based on inflow forecasts from River Forecast Centre (Victoria) and a release schedule from Okanagan Lake Dam;
- Uses peak spawning dates and temperature data to inform the water manager of fish hatching and emergence;
- Target levels conform to those developed for the Okanagan Basin Implementation Agreement.



2015

- Warm winter and early snowmelt meant that Lake was higher than target values for much of spring;
- 2015 Peak Net inflow to Okanagan Lake approximately 460 Million m^3 (1.33m);
- Dry summer with warm lake temperatures adding to high evaporation;
- Expect to be 15 to 20 centimetres lower than September target elevations.





Mission Creek Automated Snow Pillow

Osoyoos Lake Board of Control

Canadian Section

Bruno Tassone, Chair
Environment Canada (retired)

Glen Davidson
B.C. Ministry of FLNRO

Brian Symonds
B.C. Ministry of FLNRO (retired)

United States Section

Cynthia Barton, Chair
U.S. Geological Survey

Col. John Buck
U.S. Army Corps of Engineers

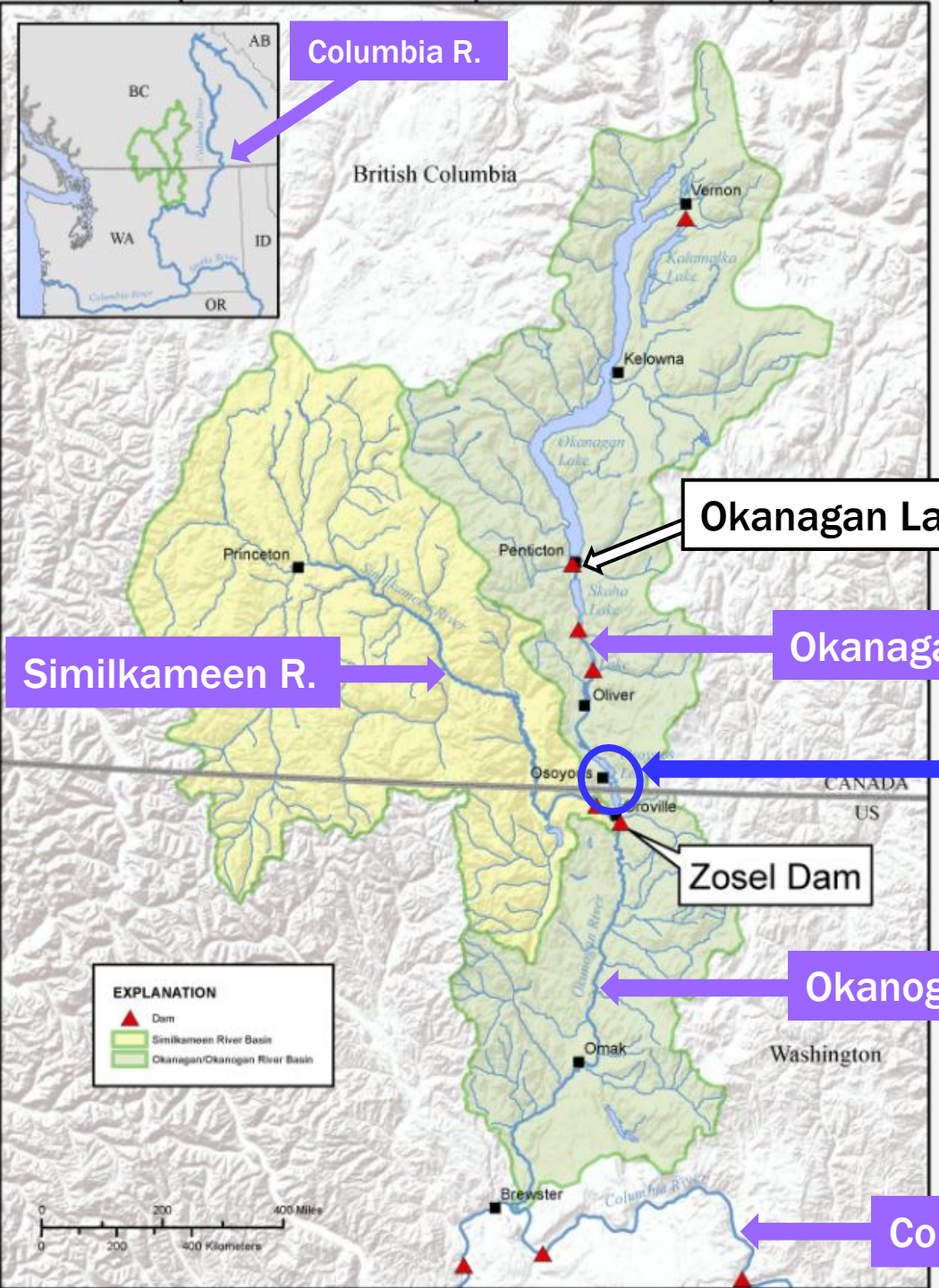
Kris Kauffman
Water Resources Engineer

Secretariat

Gwyn Graham
Environment Canada

Marijke van Heeswijk
U.S. Geological Survey

Okanagan/Okanogan & Similkameen River Watersheds



IJC and Int'l Osoyoos Lake Board of Control

- IJC issued Orders of Approval for managing Osoyoos Lake levels
  (1946, 1978, 1982, 1985, 2013)
- Lake levels are generally regulated by Zosel Dam

Current Zosel Dam, constructed in 1987
near site of original dam (constructed in 1927)

Osoyoos Lake Drought Criteria

8. During **a year of drought as determined by the Board of Control** in accordance with the criteria (a) and either (b i) or (b ii) set forth below

a) the volume of flow in the Similkameen River at Nighthawk, Washington for the period April through July as calculated or forecasted by United States authorities is less than 1.0 million acre-feet

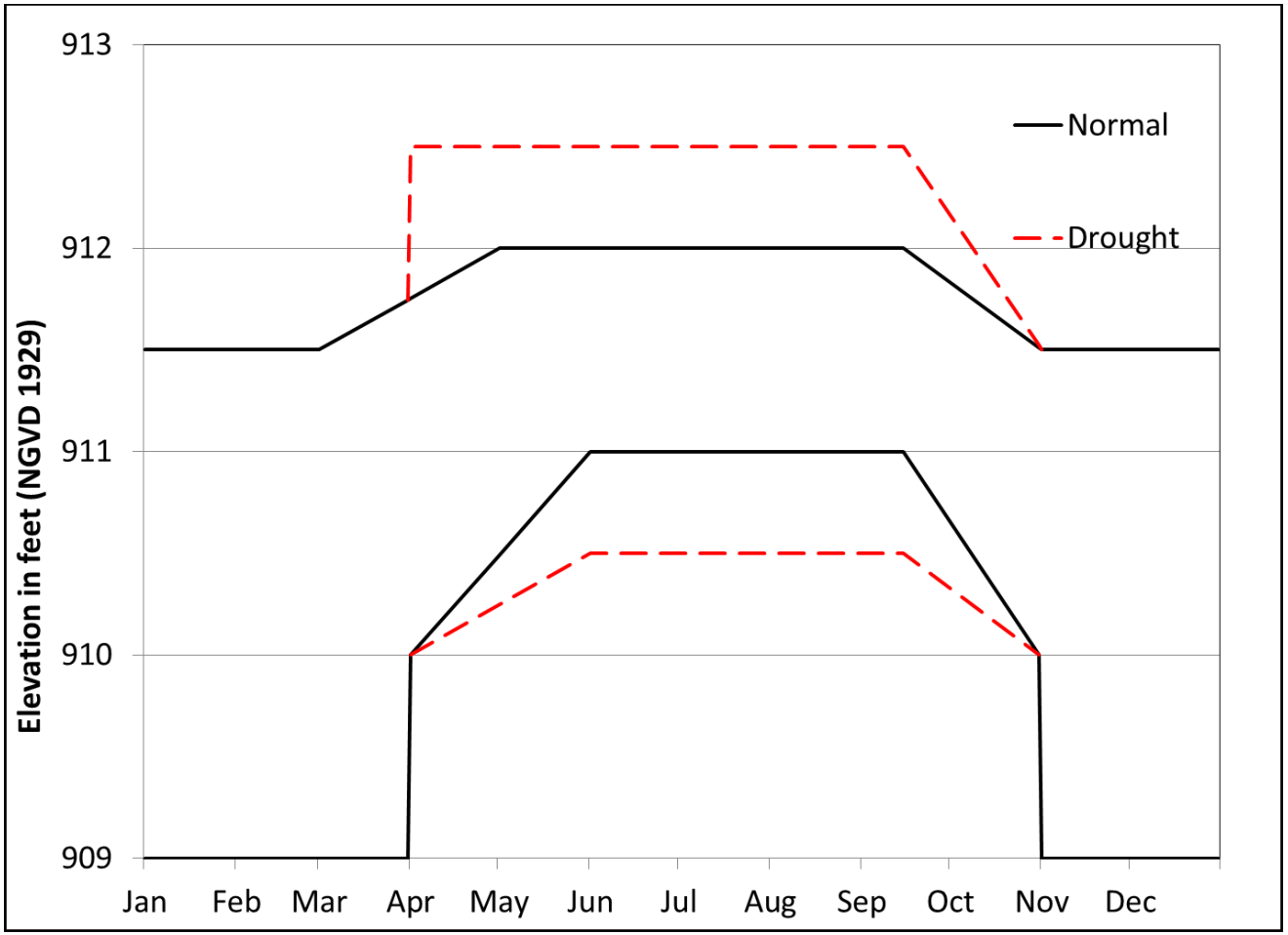
and

b)

i) the net inflow to Okanagan Lake for the period April through July as calculated or forecasted by Canadian authorities is less than 195,000 acre-feet , or

ii) the level of Okanagan Lake fails to or is forecasted by Canadian authorities to fail to reach during June or July elevation 1122.6 feet Canadian Geodetic Survey Datum.

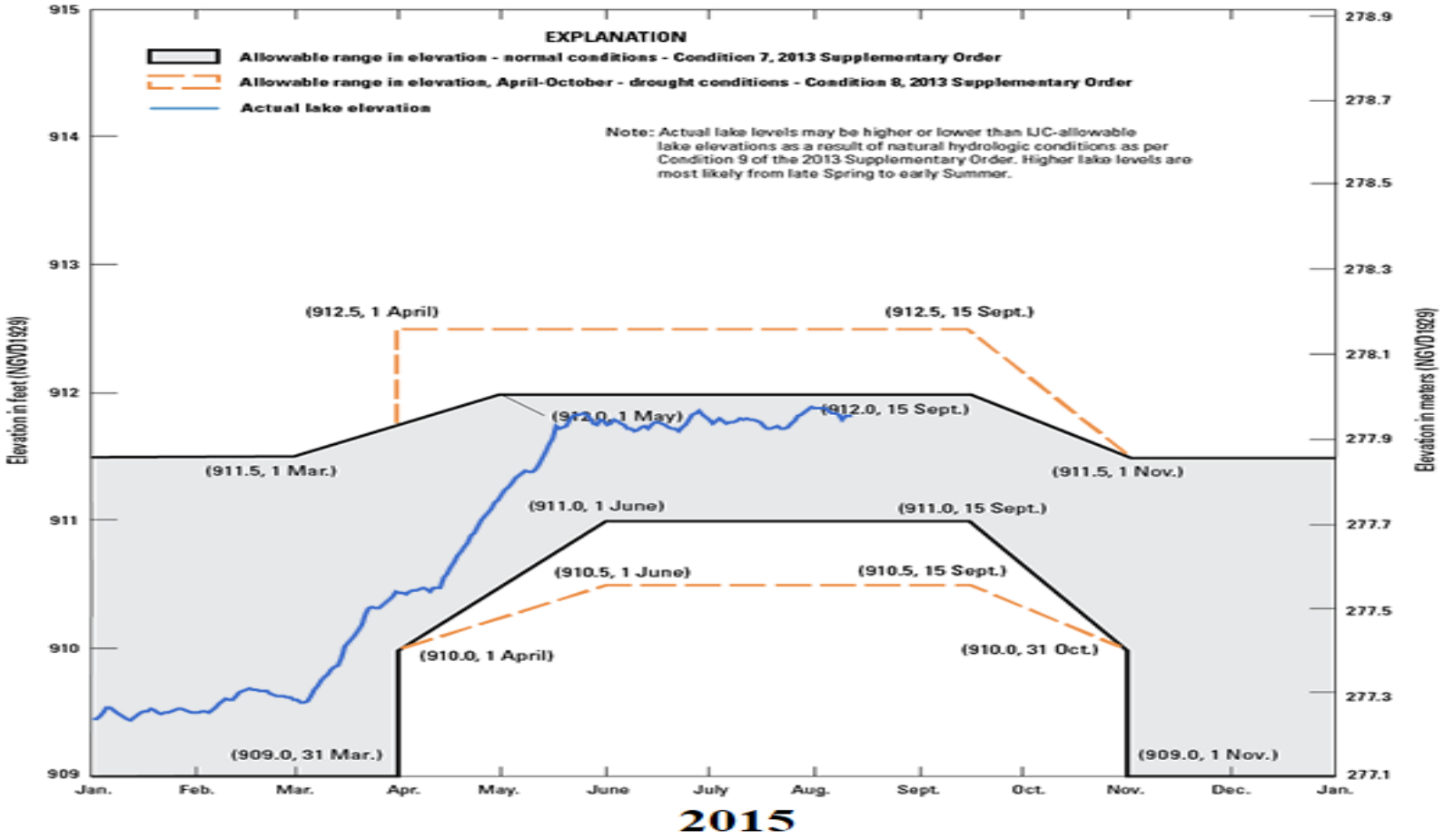
Osoyoos Lake Operational Rule Curves (Normal and Drought)



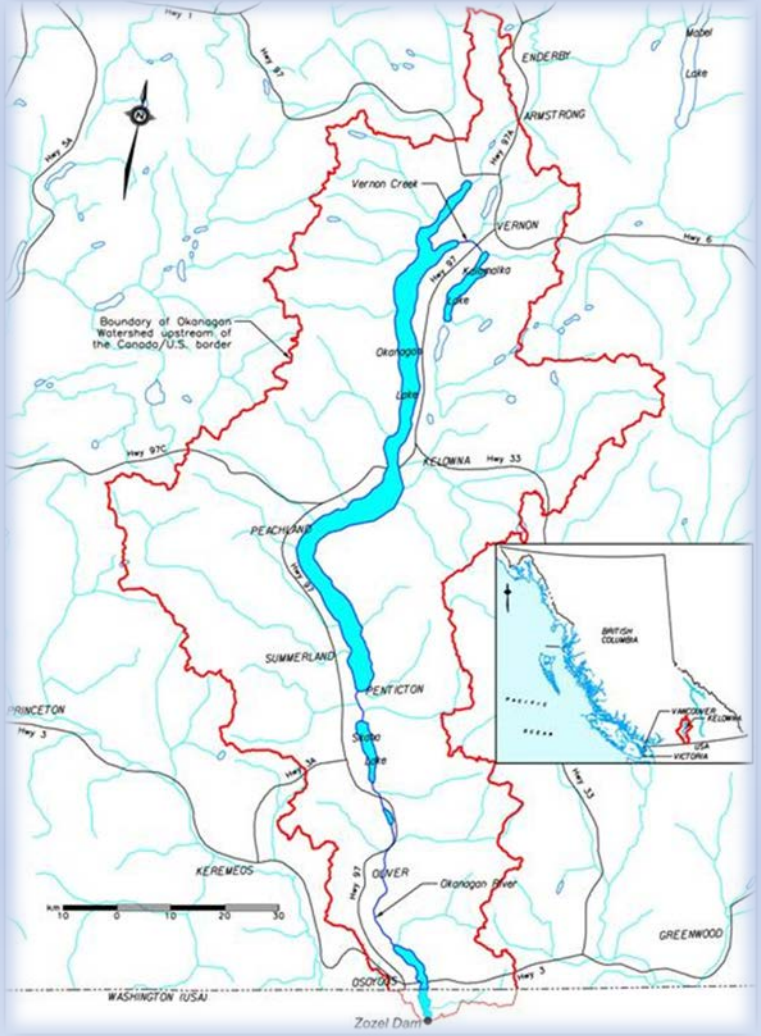
Supplementary Order 2013
Condition 10

10. In the event of circumstances requiring temporary variation from the levels prescribed in this Order, **the Commission** upon written advice and recommendation from the Board of Control **may allow a temporary deviation from the levels prescribed in Conditions 7 and 8**.

Actual and Allowable Lake Elevations per IJC Orders of Approval[2], Osoyoos Lake near Oroville, Washington, USGS Station 12439000



2015 Okanagan Drought Workshop



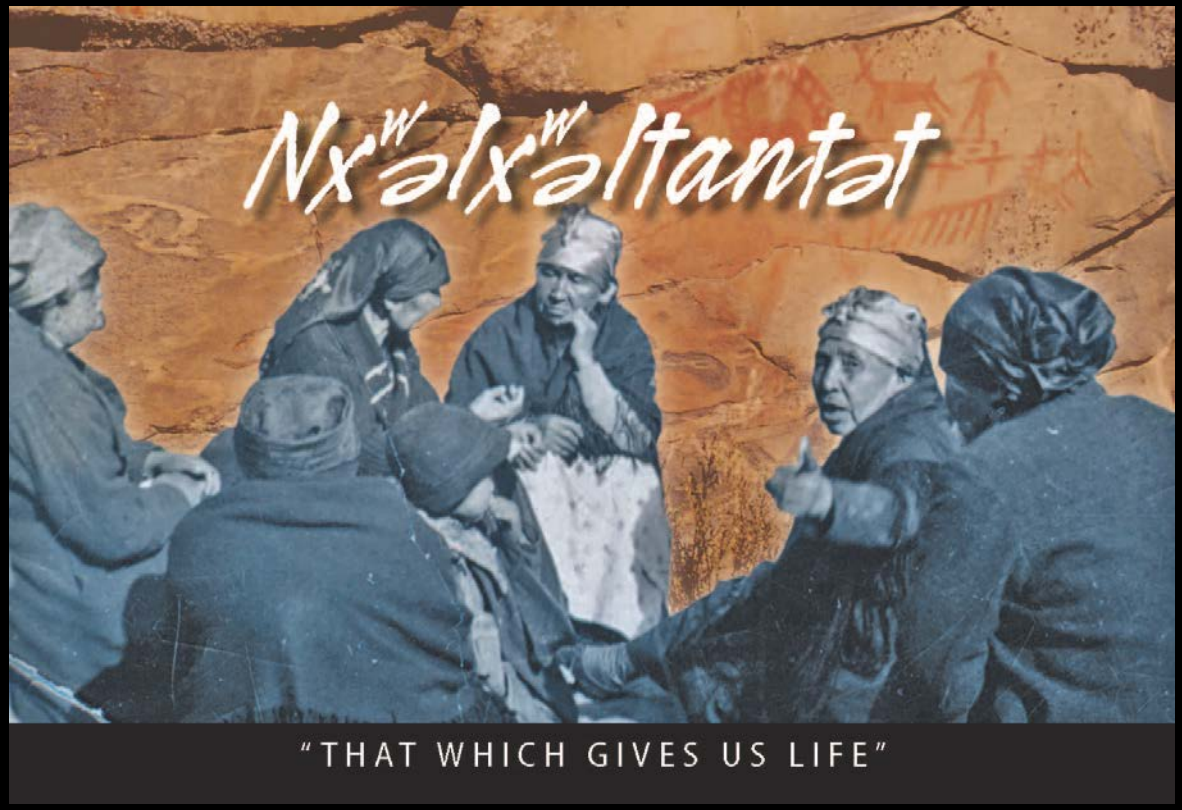
Okanagan Basin
WATER BOARD

snx̌aʔiwləm : "Honouring the Sacredness of the River."

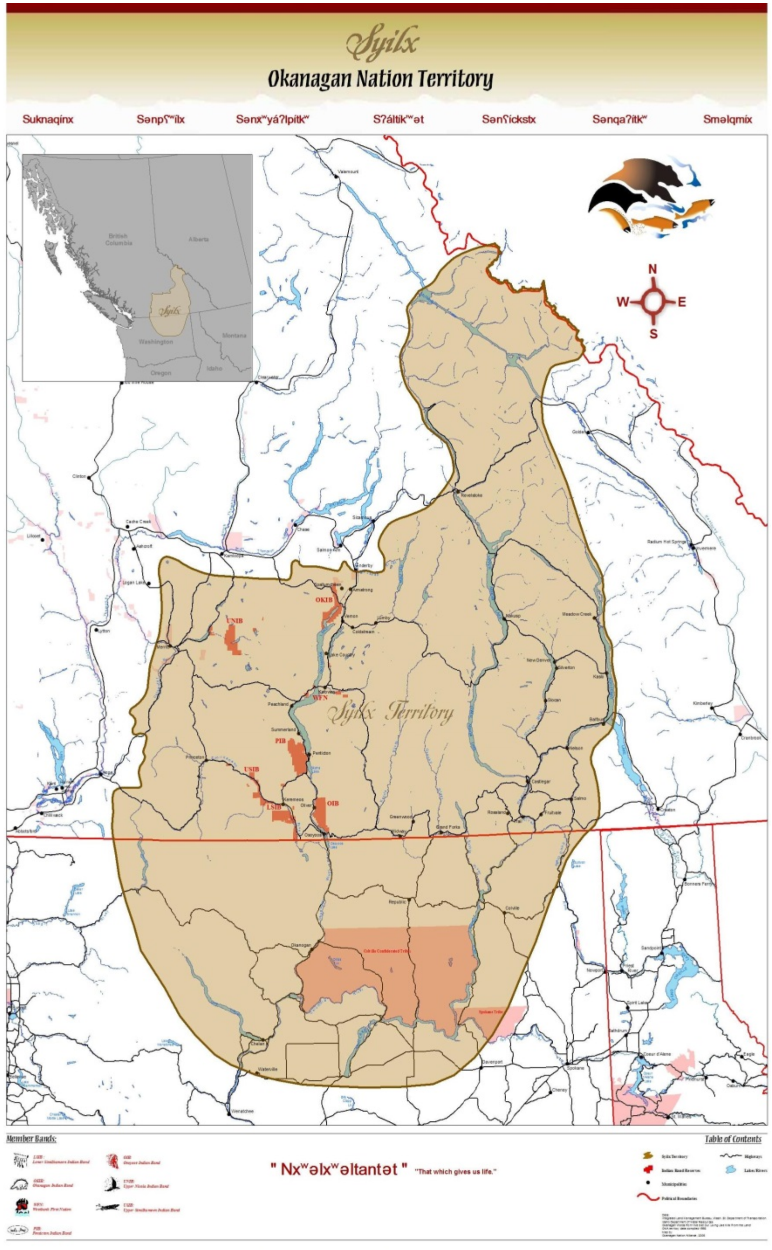
Okanagan Nation Alliance

Okanagan Drought Workshop, Aug.13, 2015
Presented by Okanagan Nation Alliance

THAT WHICH GIVES US LIFE



The Syilx People have always governed our land according to principles that are entrenched in traditional knowledge.


Syilx
Okanagan Nation Territory
Suknaqinx
Sənpʕʷilx
Sənxʷyáʔlpitkʷ
Sʔáltikʷət
Sənʕickstx
Sənqaʔitkʷ
Sməlqmix
N
W
E
S
British Columbia
Alberta
Washington
Montana
Oregon
Idaho
Syilx Territory
OKIB
UNIB
WFN
PIB
USIB
LSIB
OIB
Penticton
Summerland
Vernon
Osoyoos
Wenatchee
Waterville
Coeur d'Alene
Member Bands:
LSIB: Lower Similkameen Indian Band
OIB: Osoyoos Indian Band
OKIB: Okanagan Indian Band
UNIB: Upper Nicola Indian Band
WFN: Westbank First Nation
USIB: Upper Similkameen Indian Band
PIB: Penticton Indian Band
" Nxʷəlxʷəltantət " "That which gives us life."
Table of Contents
Syilx Territory
Highways
Indian Band Reserves
Lakes/Rivers
Municipalities
Political Boundaries
Disclaimer: This map is for display purposes only. It represents the approximate extent of the Okanagan(Syilx) territory. This map is not to be used for legal purposes.

i?_siwɬkʷ

Excerpt, *Okanagan Water Declaration*, July 31, 2014

i?_siwɬkʷ sxʷİxʷaİtət.

WATER IS OUR RELATION.

i?_İ_yʕayʕát stim siẇɬkʷ i?_ẏlmixʷṁtət.

WATER BONDS US TO OUR ANCESTRY, OUR DESCENDENTS AND OUR LAND.

kʷu_yʕayʕát i?_kʷu_sqilxʷ kscpúta?stm áɬi? ẏlmixʷmtət i?_siwɬkʷ.

WATER MUST BE TREATED WITH REVERENCE AND RESPECT.

áɬi? í? ṅxʷİxʷİtaṅtət lut kstaṅmúsmṅtm, áɬi? ksctxİstim yʕayʕat i?_stim.

OUR RELATIONSHIP WITH WATER IS NOT TAKEN LIGHTLY, WE ARE RESPONSIBLE TO ENSURE THAT OUR RELATION CAN CONTINUE TO MAINTAIN THE HEALTH AND RESILIENCY OF OUR LAND AND ANIMALS.

I?_siwɬkʷ ṅxʷİxʷİtaṅs i?_tṁxʷúla?xʷ uɬ yʕayʕát i?_stim

WATER IS THE LIFEBLOOD OF OUR LAND AND OUR ANIMALS AND WE AS SYILX PEOPLE

kscsuxʷstm i?_siwɬkʷ ẋa?ẋá? knaqs ckʷiskʷsts yʕat a?_cxʷİxʷaİt.

RECOGNIZE WATER AS A SACRED ENTITY AND RELATIVE THAT CONNECTS ALL LIFE.

i?_siwɬkʷ yʕat ta?kín k̓İ_kscxʷİxʷaİts i?_tṁxʷúla?xʷ uɬ k̓İ_tmixʷ.

WATER COMES IN MANY FORMS AND ALL ARE NEEDED FOR THE HEALTH OF LAND AND FOR THE ANIMALS.

mipnúntm i?_sẋa?ẋá?s i?_siẇɬkʷ k̓İ_yʕayʕát i?_stim.

WATER IS OUR MOST SACRED MEDICINE, WATER NOURISHES, REPLENISHES, CLEANSES AND HEALS.

ɬa_ck̓ʷuİmstm i?_siwɬkʷ kscha?stím uɬ ksctxİstim.

ANY USE OF WATER SHOULD BE AN ACT OF REVERENCE AND A COMMITMENT TO OUR RESPONSIBILITIES.

yʕayʕát i?_sxʷİxʷaİtət, ʕapná? uɬ cṁ t_spṅkin, áɬi? kʷu_s?ukʷna?qínx.

OF ALL LIFE. NOW AND TO COME, AS SYILX PEOPLE.

i?_siwɬkʷ cxʷuy tİ_tṁxʷúla?xʷ tİ wist uɬ lut kscwsṅcuts tİ_stim.

WATER COMES FROM THE SKY AND THE HIGHEST PLACE YET IT NEVER WILLFULLY RISES ABOVE ANYTHING.

i?_taẏxʷút mi ctɣap, naẋṁɬ tİ_yʕat tİ_stiṁ, misk̓ʷəck̓ʷáct.

IT WILL ALWAYS TAKE THE LOWEST PATH IN ITS HUMILITY. YET OF ALL THE ELEMENTS, IT IS THE MOST POWERFUL.

kʷu_scúnma?stm i?_siwɬkʷ kʷu_k̓ʷcəck̓ʷact uɬ qṁqaṁt.

OUR SACRED WATER TEACHES US THAT WE HAVE GREAT STRENGTH TO TRANSFORM THE HIGHEST MOUNTAIN WHILE BEING GENTLE, SOFT AND FLEXIBLE.

iwá łə_tqəqip kssksx̌nmíxa?x itíʔ. k̓ɬ?ułxʷ, tqiİtkṁs, km mİxʷuýṁs.

WATER WILL ALWAYS FIND A WAY AROUND OBSTRUCTIONS, UNDER, OVER AND THROUGH.

kʷu_kscúṅma?stm kscǩʷİİnustm xi?míx stim.

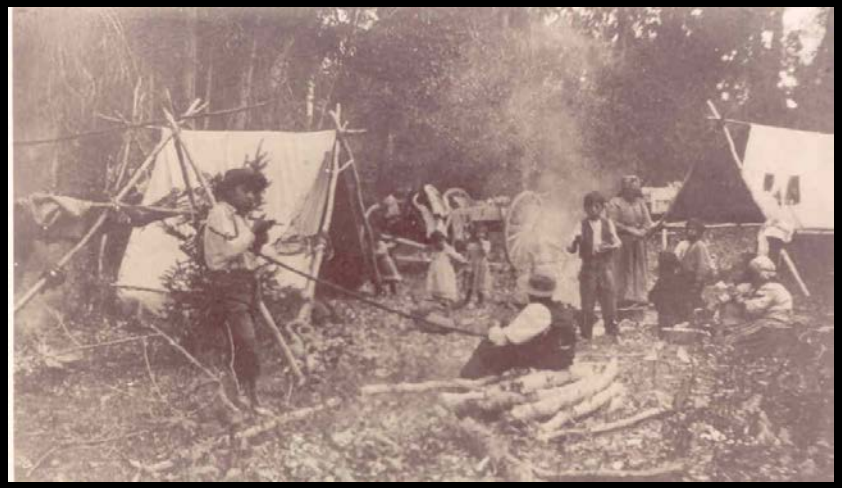
IT TEACHES US ANYTHING IS POSSIBLE.

ɬa_ctɣap i?_siwɬkʷ lut stim ɬa_ctiİxʷsts uɬ kʷu_ksx̌íla?x itíʔ.

WATER MOVEMENTS, PATHWAYS RESILIENCY AND POWER TEACH US WHO WE ARE AND WHO WE CAN BE AS PEOPLE.

www.okanagannation.com

A SALMON PEOPLE



- Salmon is a primary food for the Syilx (Okanagan) People.
- In late summer, as the fish returned to spawn in the rivers, large fishing camps were set up.
- When plentiful, Sockeye was a valuable trading item

REVITALIZATION OF AN OKANAGAN FISHERY AND THE SALMON PEOPLE

Conservation, protection, restoration, and enhancement of indigenous fisheries (anadromous and resident) and aquatic resources within Okanagan Nation Territory

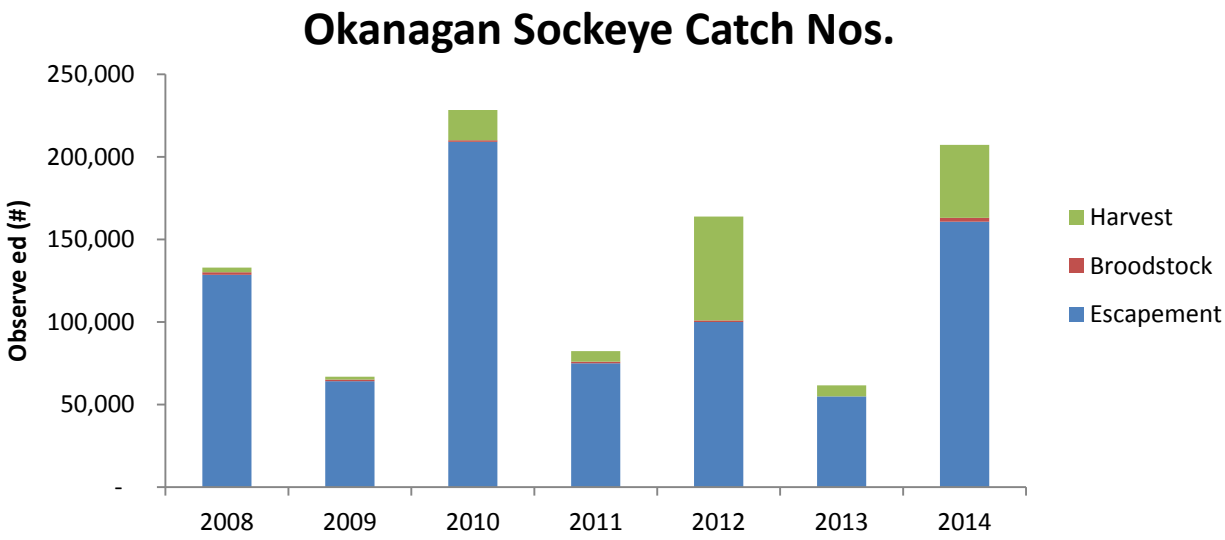
OKANAGAN SALMON RECOVERY

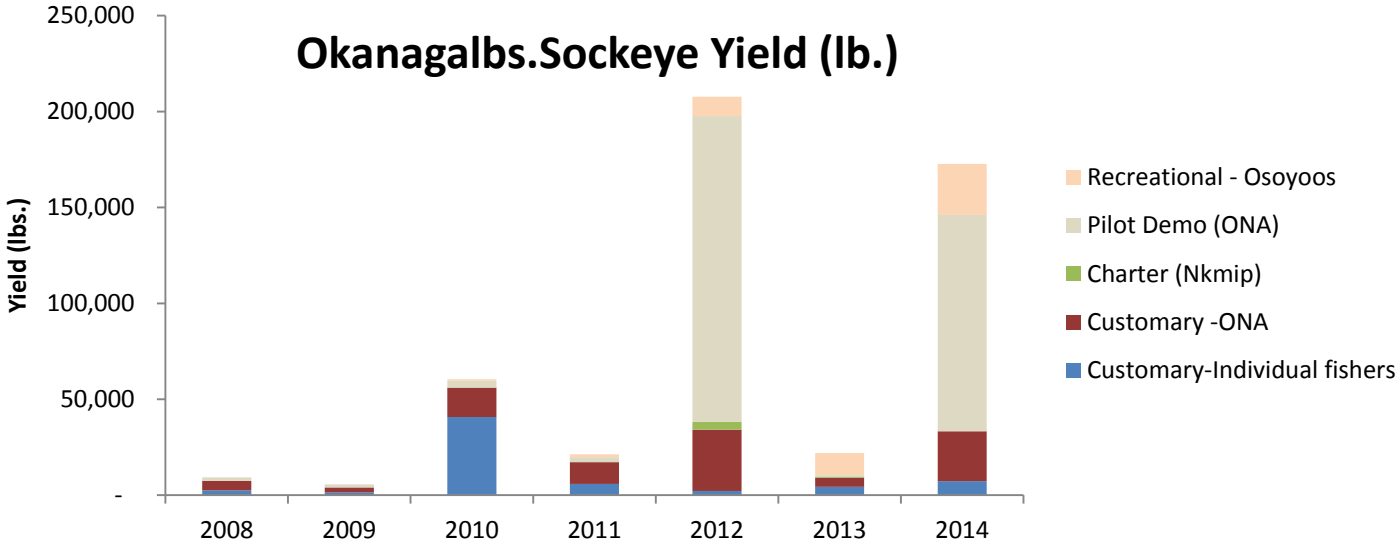
Element	Pre-Contact (1800's)	Industrial Era (1830-1985)	Current Status (1985 to present)
Okanagan Population	75,000 – 100,000	15,000 to 70,000	15,000 (5,000 CAN/10,000 US)
Salmon Abundance	1-6 million	0.2 -1 million	0.005-0.2 million
Salmon Diversity (viable populations)	Five species (Chinook (chief), Sockeye, Steelhead, Coho, Chum)	Sockeye, Chinook	Sockeye
Salmon Distribution	Osoyoos Lake, Skaha Lake, Okanagan Lake	Osoyoos Lake	Osoyoos (Re-intro to Skaha)
Salmon Timing	May to October	July to September	July to September
Fishery Management	Salmon Chief (tribal/kinship)	Canadian/US federal agencies	Joint management (ONA-DFO, Canada, Pacific Salmon Treaty; US vs Oregon (US)
Fishing Camps/Sites	Kettle Falls (hoop net, dip, gaff); Okanagan River Weir (Omak), Skaha Falls (OK Falls, Fish baskets, gaff/dip)	Collapse of fishery by 1960's (loss of food fishery, intertribal trade essential)	Re-vitalize platforms at base of Chief Joe, Okanagan Weir, Osoyoos Lake, Ok Falls trap.

CHARTER OF RESPONSIBLE FISHING

- Protection and right of fish, and Okanagan title, rights and self determination
- Responsible Trade
- Food security (safety) and distribution,
- Balance respect with nature and environment
- Enhance the cultural, social, and (re) learning values
- Slow down the fishery (i.e., d®ip fishery) to match local needs
- Revitalize fishing camps, traditional gears, traditional products

- Match capital with scale of fishery
- Seven Generations Valuation


Okanagan Sockeye Catch Nos.
250,000
200,000
150,000
100,000
50,000
-
Observe ed (#)
2008
2009
2010
2011
2012
2013
2014
Harvest
Broodstock
Escapement


Okanagalbs.Sockeye Yield (lb.)
250,000
200,000
150,000
100,000
50,000
-
Yield (lbs.)
2008
2009
2010
2011
2012
2013
2014
Recreational - Osoyoos
Pilot Demo (ONA)
Charter (Nkmip)
Customary -ONA
Customary-Individual fishers

MOVING FORWARD

- What's working?
- What needs improvement?
- Where are the policy gaps ?
- Where are the knowledge/science gaps?

What's working?

Action	Outcome
Engagement at national, provincial, and regional levels	e.g. COBTWG, Pacific Salmon Treaty, Columbia River Treaty.
Engagement in local initiatives	e.g. Okanagan Salmon Community Initiative (OIB, Okanagan, Guides, NGOs, Fish Clubs, Knowledge Keepers, Business)
Salmon Recovery	•Reintroduction of Sockeye into Skaha Lake •Fish Water Management Tool •Okanagan River Restoration Initiative •Salmon hatchery in Penticton
Okanagan Nation Fisheries Department	Implementing a fisheries program value > $ 3 M annual operation, $10 M infrastructure, 35+ FTE staff (80% funds via US)

What needs improvement?

Key Questions
What are the transboundary obligations of international treaties?
Who are the key decision makers and allies to champion change? What are the costs to society and willingness to pay?
What are the limiting factors for recovery of aquatic resources in Okanagan Lake (Habitat, Predation/Competition, Climate Uncertainty, Genetics/life history)?
Are there cost-benefits in alternative processes and technologies?

Where are the knowledge/science gaps?

Key Question	Goal
What are the limiting factors for salmon recovery to Okanagan Lake, Arrow Lake, Kinbasket Lake?	Fish passage at Upper Columbia and Okanagan Lake
Development of new technologies and processes	Integrated fisheries-aquaculture management, using best local knowledge and science
How do we build resilience into stock recovery, habitat restoration? (2015 extreme event)	Effective fisheries and ecosystem management in the face of climate change

Save the Date:

The Okanagan Water Forum

October 14th, 2015

Four Points by Sheraton Hotel

For more information contact:
Peter Waardenburg, Natural Resources Manager
(250) 707-0095 ext.221
Or Email: pwaardenburg@syilx.org

For More Information visit us at

www.syilx.org

Evapotranspiration (ET) for Osoyoos April 15 to August 9 2015

ET	624 mm
Daily average	5.5 mm
Effective Precipitation	34 mm
Moisture deficit	590 mm
Historical Avg Deficit	93 mm

Evapotranspiration (ET) for Osoyoos April 15 to August 9 1999

ET	302 mm
Daily average	2.6 mm
Effective Precipitation	0 mm
Moisture deficit	302 mm

- How do plants respond to heat/drought stress
- Why is agriculture water a priority?
- Agriculture response to level 4 drought
  - Individual licencees
    - Voluntary reduction
    - FITFIR
    - Section 9 (Fish Protection Act) shutdown
  - Utilities
    - Voluntary reduction (imposed by utility?)
    - FITFIR??

Implement voluntary reduction by crop type

- Tree fruits
- Grapes and Berries
- Field vegetables
- Greenhouse vegetables
- Livestock forage

Ranchers need the ability to increase water storage and water supply to prepare for times of drought.

- Stored water is an insurance policy for food production that benefits all British Columbians
- Water storage is a critical tool for managing water flows and drought conditions. Dams and reservoirs are the essential for many ranches in BC to provide necessary water throughout the growing season.
- Losing this water capacity would have a ripple effect on the entire province as there are many non-licensed beneficiaries of this stored water. Many dams, while built for agricultural purposes, often supply critical water for fish habitat, recreation, and fire control.

Ensure that affected licensees are consulted during drought response and that mitigation strategies are prepared with licensees.

- Ranchers have a big stake in the ability to use water and any restrictions placed on water use affects the available forage and winter feed for livestock. The effects may last more than one year.
- Ranchers know the needs of their individual ranches and participating in the mitigation strategies will ensure that options can be explored to minimize the impact of drought management.
- In my experience, consultation and collaboration by all stakeholders is the key to success.

The Province needs more enforcement on non-licensed users so as to respect FITFIR.

- Ranchers with licences are restricted but there are users of water that do not have licences and therefore fall through the cracks when water conservation is needed.
- Enforcement of all unlicensed users should be a top priority during drought.
- When needed, FITFIR should be used to determine the hierarchy of water use for licensed users.

Ensure that all water users are doing their part to conserve water during drought.

- Ranchers, because they hold water licences, are often the first to be asked to conserve water but other water users need to increase their conservation during drought as well.

- It creates good will when all users of water make conservation of the water source a priority during drought.

Being a realist

"The pessimist complains about the wind;

the optimist expects it to change;

the realist adjusts the sails."

August 13, 2015

Okanagan Basin Drought Response Workshop

Drought Workshop – Penticton System

Greyback Reservoir
10,000 A ft

Ellis 2 Reservoir
300 A ft

Ellis 4 Reservoir
700 Aft

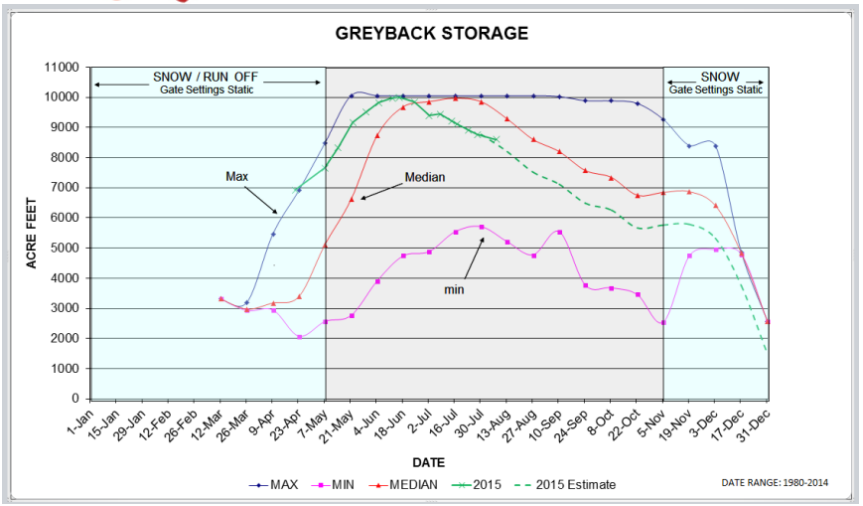
North Irrigation System

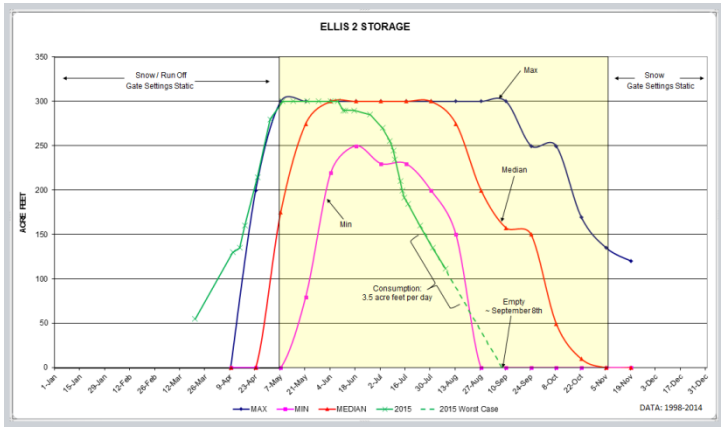
Water Treatment Plant
100 ML/d

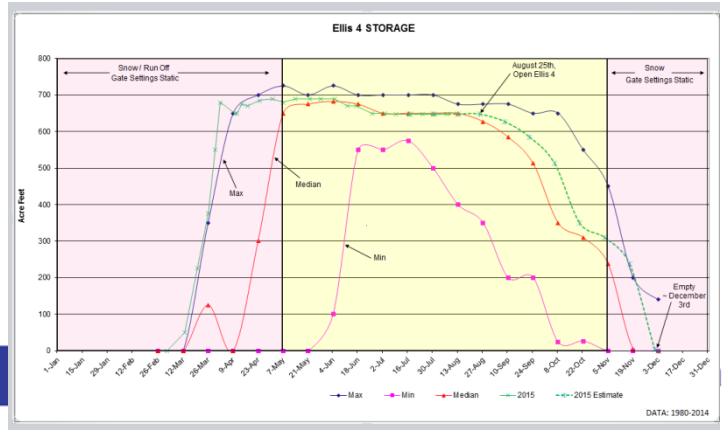
Okanagan Lake

South Irrigation System

Drought Workshop – What We Monitor







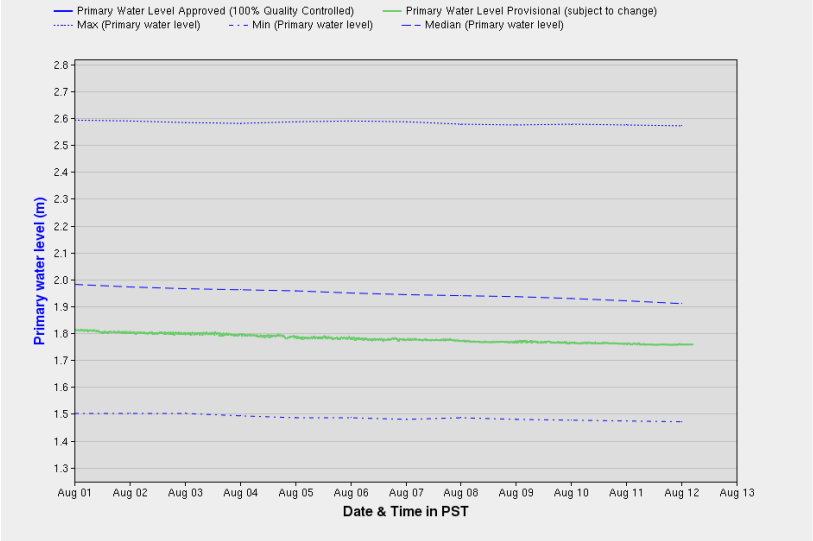
Drought Workshop – What We Monitor

Real-Time Hydrometric Data Graph for OKANAGAN LAKE AT KELOWNA (08NM083) [BC]

Graph | Table

Station: 08NM083 Data Type: Real-Time

Apply

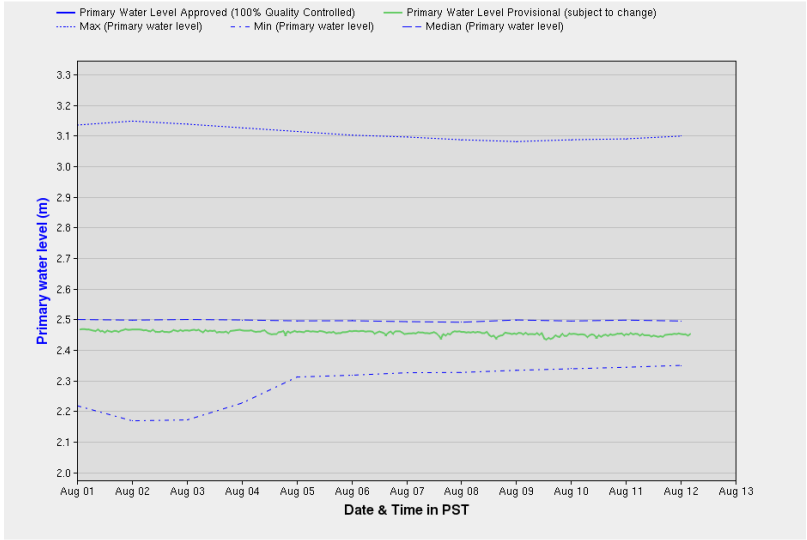


Real-Time Hydrometric Data Graph for SKAHA LAKE AT OKANAGAN FALLS (08NM084) [BC]

Graph | Tabl

Station: 08NM084 Data Type: Real-Time

Apply



Drought Workshop – What We Did

Level 3

- Water Treatment Plant switched from 80% Lake / 20% Creek Blend to 100% Lake
- Schedule change on all City irrigation systems to reduce water use by 30%. (NOT Effluent Irrigation)
- School District 67 requested to reduce water use by 30%.
- Maintained Penticton Creek and Ellis Creek minimum flows
- Monitored South Irrigation Area and discussed water use with apparent high water users
- Hand delivered notices to South Irrigation Area asking them to conserve water
- Investigated ability to connect Treated Water system to the South Irrigation System as an alternative
- Signs in the North and South Irrigation Area
- Signs in high traffic areas in the City
- RDOS notified of City actions and asked to follow suit (NOTE RDOS uses City Treated Water)
- The Communication Officer put out information on the drought and the 30% target reduction on:
  - Adverts in the paper
  - Radio spots
  - City web site
  - Utility bill insert

Drought Workshop – What We Did

Level 4

- Connection ready, Treated Water system to the South Irrigation System as an alternative
- Updated signs
- Stepped up communication
- Started enforcement of those not watering correctly

Drought Workshop – What We Did

Level 3

Level 4

Drought Workshop – How are we Doing

	Max Temp C	Plant MLd	This year 15 day avg Plant July 1-15 % Change	West Bench MLd	This year 15 day avg WB July 1-15 % Change	Randolf Irrg. MLd	This year 15 day avg Randolf Irrg. July 1-15 % Change	Ellis Irrg. MLd	This year 15 day avg Ellis Irrg. July 1-15 % Change
01/Aug/15	38.0	30.16	-16.75%	2.68	-7.27%	23.23	8.91%	3.32	1.22%
02/Aug/15	34.9	33.92	-6.38%	2.74	-5.19%	21.44	0.52%	3.63	10.67%
03/Aug/15	30.2	34.9	-3.67%	3.08	6.57%	23.01	7.88%	3.33	1.52%
SEVEN DAY AVERAGE	**34.4**	**32.30**	**-10.84%**	**2.56**	**-11.37%**	**20.29**	**-4.86%**	**2.97**	**-9.49%**
04/Aug/15	31.4	35.97	-0.72%	2.54	-12.11%	20.99	-1.59%	3.80	15.85%
05/Aug/15	23.7	29.52	-18.52%	1.76	-39.10%	18.05	-15.38%	2.82	-14.02%
06/Aug/15	29.3	25.02	-30.94%	1.6	-44.64%	17.74	-16.83%	1.26	-61.59%
07/Aug/15	29.8	25.9	-28.51%	1.91	-33.91%	18.01	-15.56%	2.48	-24.39%
08/Aug/15	32.4	28.45	-21.47%	2.13	-26.30%	22.21	4.13%	2.71	-17.38%
09/Aug/15	33.0	29.92	-17.42%	2.49	-13.84%	19.83	-7.03%	2.93	-10.67%
10/Aug/15	32.7	34.97	-3.48%	2.55	-11.76%	18.54	-13.08%	3.05	-7.01%
SEVEN DAY AVERAGE	**30.3**	**29.96**	**-17.29%**	**2.14**	**-25.95%**	**19.34**	**-9.34%**	**2.72**	**-17.03%**
11/Aug/15	34.1	31.4	-13.33%	2.75	-4.84%	19.85	-6.94%	2.29	-30.18%

Drought Workshop – Lessons Learned

Lessons

- Rewrite Water Use Restrictions, Stage 1 to 4 in the Irrigation, Sewer and Water Bylaw
- Discsuss with others valley wide Water Use Restrictions
- Better mechanism to communicate with water users, especially irrigation users
- Investigate irrigation water meters further so we can monitor high water use and educate
- Look at increasing storage capacity on the Ellis 4 system
- Automate level and flow readings from reservoirs
- Look at a new Treated Water Rider Fee for the South Irrigation Area
- Better link between weather and reservoir discharge
- Switch to more effluent irrigation

QUESTIONS

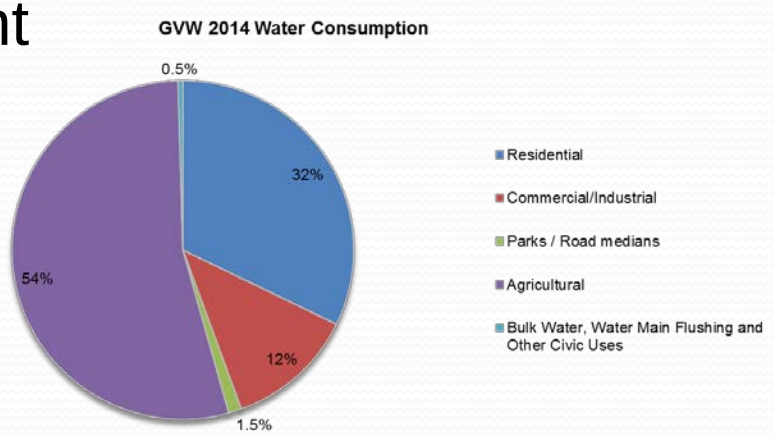
2015 Drought Workshop

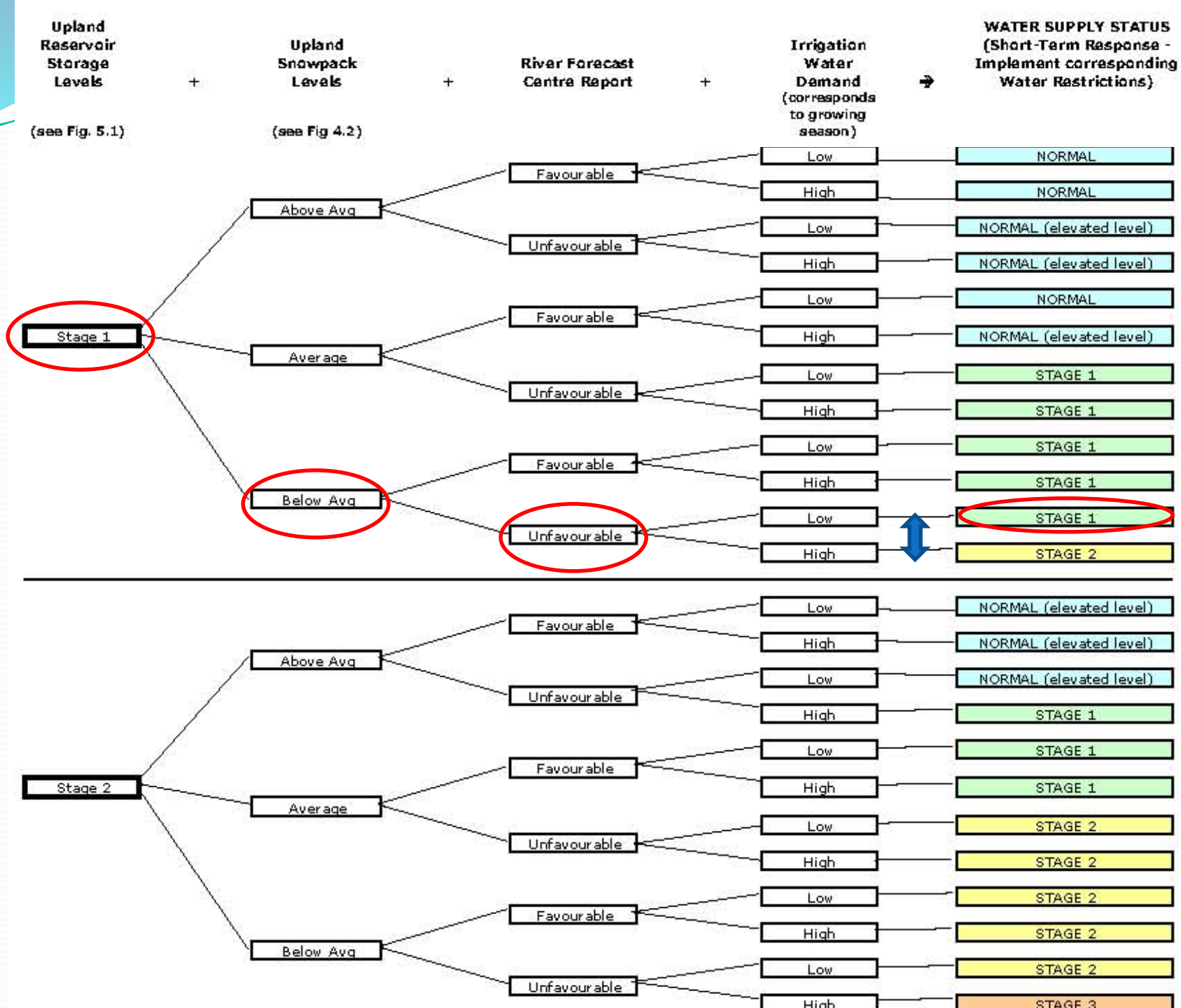
Greater Vernon Water Perspective

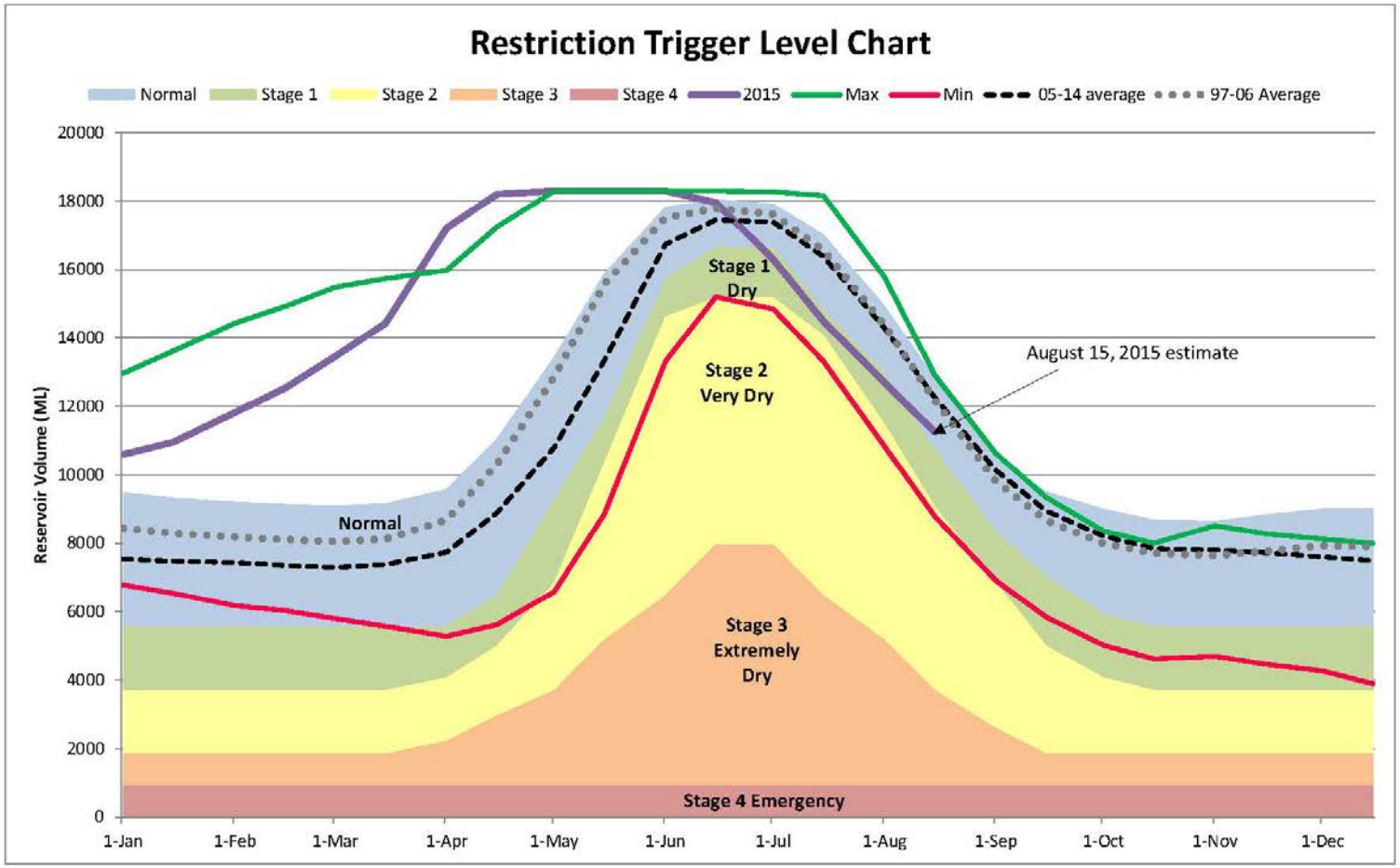
August 13, 2015

Greater Vernon Water

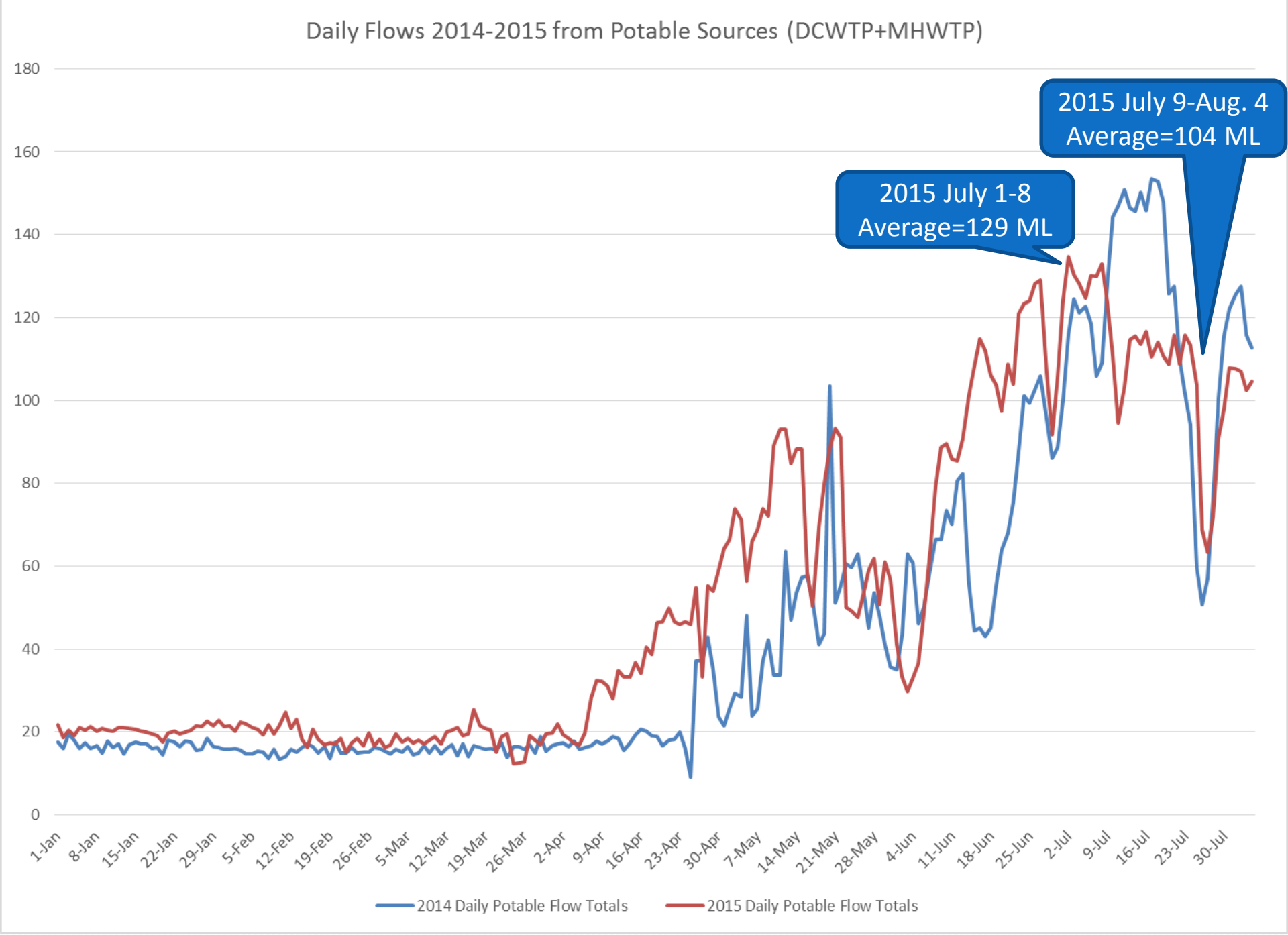
- Regional Water System – Upland Storage (Duteau Creek) and Kalamalka Lake. Partial Agriculture separation Upland storage (King Ed and Goose Lake)
- Fully Metered system – Ag, Residential, ICI
- Meters are used for Water Pricing, Incline Block Rate, Agriculture Allocation – overuse rate
- Supply and Demand management
- Drought Management Plan 2007
- Drought Response Team formed
- Revised DMP and Response in 2011




Upland Reservoir Storage Levels
(see Fig. 5.1)
+
Upland Snowpack Levels
(see Fig 4.2)
+
River Forecast Centre Report
+
Irrigation Water Demand (corresponds to growing season)
WATER SUPPLY STATUS (Short-Term Response - Implement corresponding Water Restrictions)
Stage 1
Above Avg
Average
Below Avg
Favourable
Unfavourable
Low
High
NORMAL
NORMAL (elevated level)
STAGE 1
STAGE 2
Stage 2
Above Avg
Average
Below Avg
Favourable
Unfavourable
Low
High
NORMAL (elevated level)
STAGE 1
STAGE 2
STAGE 3



Duteau Creek Reservoirs are 1000 ML below the 10 year average. Utilizing Kalamalka to decrease the pressure on the upland Storage (Duteau) Cumulative annual water use increased from last year but a reduction in water use since stage 1 restrictions implemented on July 7th.


Daily Flows 2014-2015 from Potable Sources (DCWTP+MHWTP)
2015 July 9-Aug. 4
Average=104 ML
2015 July 1-8
Average=129 ML
180
160
140
120
100
80
60
40
20
0
1-Jan
8-Jan
15-Jan
22-Jan
29-Jan
5-Feb
12-Feb
19-Feb
26-Feb
5-Mar
12-Mar
19-Mar
26-Mar
2-Apr
9-Apr
16-Apr
23-Apr
30-Apr
7-May
14-May
21-May
28-May
4-Jun
11-Jun
18-Jun
25-Jun
2-Jul
9-Jul
16-Jul
23-Jul
30-Jul
2014 Daily Potable Flow Totals
2015 Daily Potable Flow Totals

Drought Response Actions-Provincial

Provincial Recommendation	GVW Action
Intensify communication efforts as appropriate based on current conditions	GVW has done media releases and targeted advertising to advise of watering restrictions, encourage conservation, provide updates on local water supply status and forecast future conditions specific to the community
Provide regular direct updates to key stakeholders	Large Water Users updates
Local governments implement next stage watering restrictions to achieve targeted reduction in water use; enforce compliance through bylaws.	GVW moved from Normal to Stage 1
Provide access to waiver for agricultural producers seeking to meet minimum production levels to maintain farm status for tax purposes	GVAC/RDNO Board approved in 2010
Implement local Drought Management Plan and engage Local Drought Management Team	Drought Response Team created as part of 2011 Drought Management Plan process

GVW has increased communication with the Ministry of Environment and FLNRO for fish flows on Duteau and licence questions on Kalamalka Lake (outflow to Vernon Creek)

City of Vancouver's Water Restrictions Response

Jennifer Bailey, Water Quality & Conservation Manager
Amanda McCuaig, Communications for Engineering & Sustainability

August 13, 2015

CITY OF VANCOUVER

Water Supply

Watershed capacity

Climate change
+
Population growth

Water Conservation Plans

Greenest City 2020 Action Plan (2011)

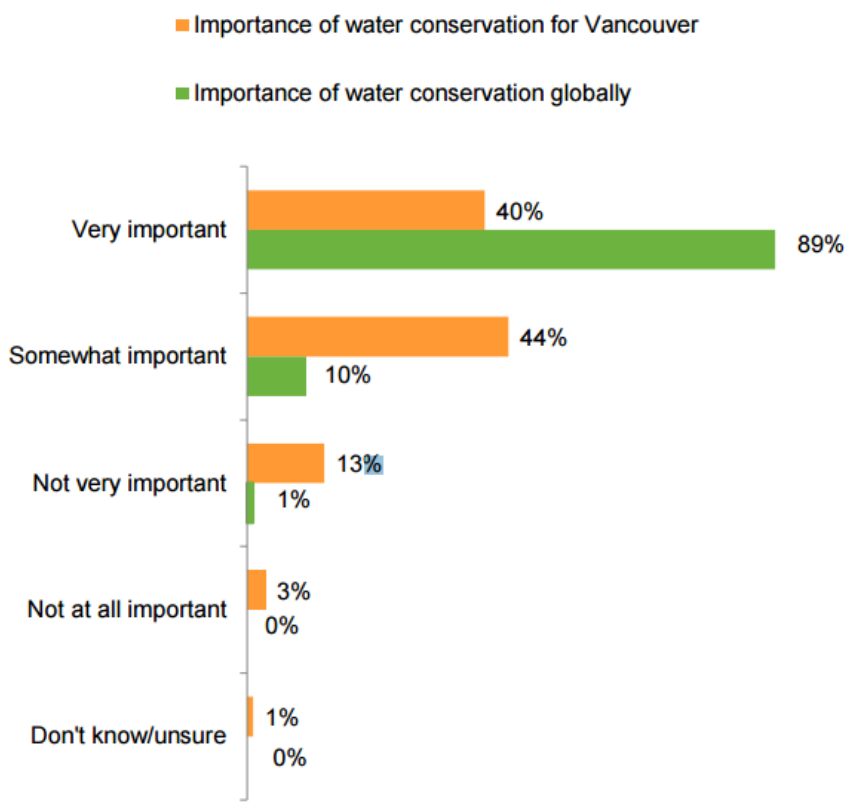
- Reduce per capita water consumption by 33% from 2006 levels
- Aligns with Provincial Living Water Smart (2009)

Regional Water Shortage Response Plan

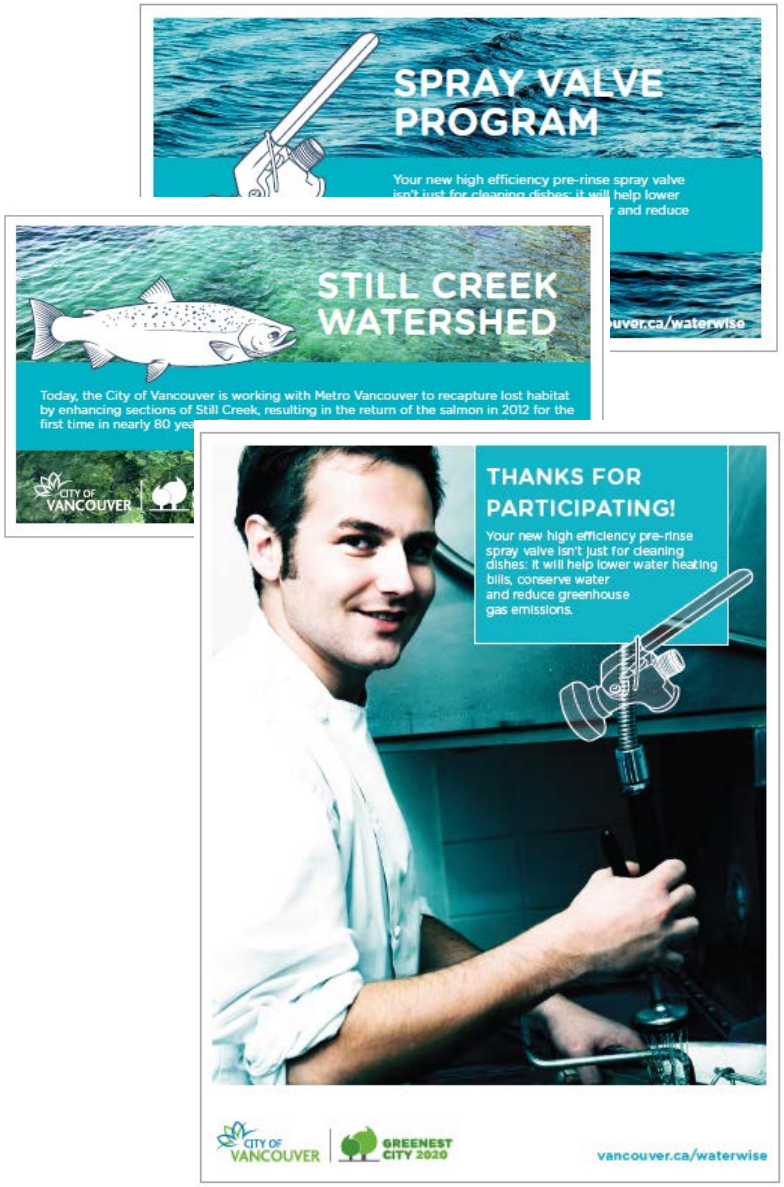
- June 1 to Sept 30 every year
- Stages regionally invoked based on supply levels

Communication Plan: Setting the Foundation

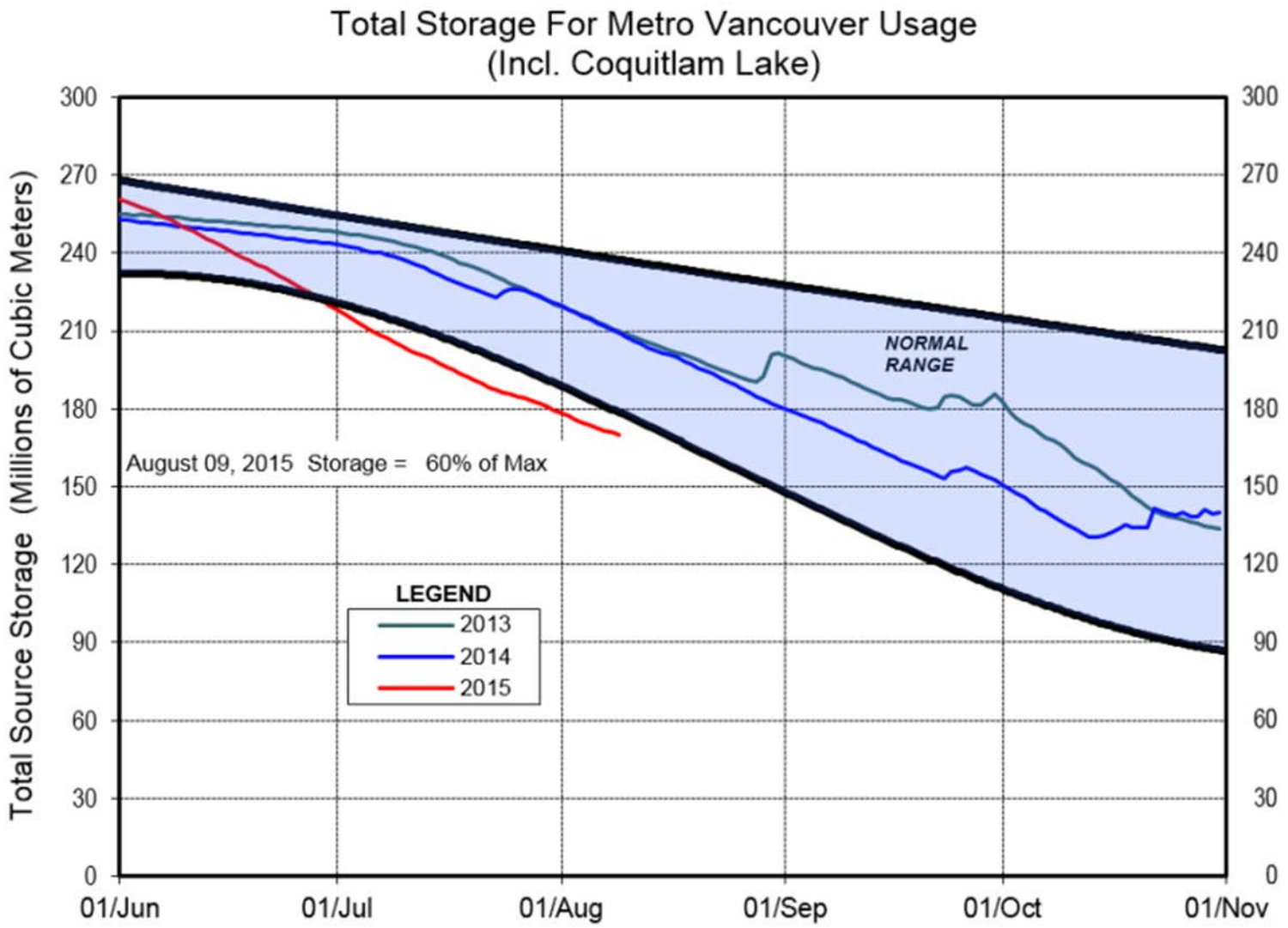
There is a “myth of abundance”.
Being surrounded by abundant water leads people to feel that they are doing enough to save water.



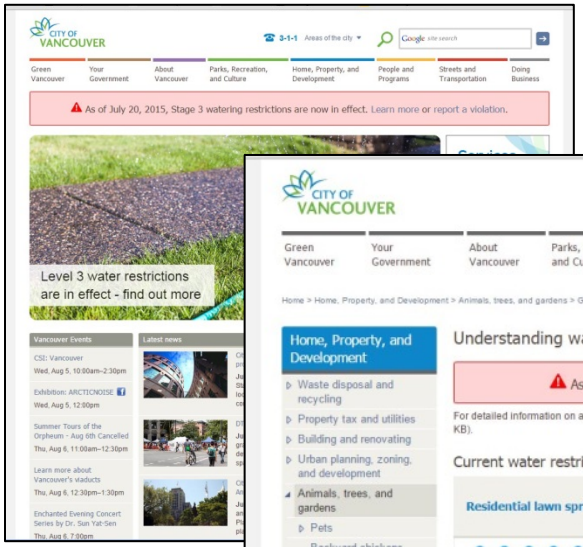
Full survey at www.talkvancouver.com

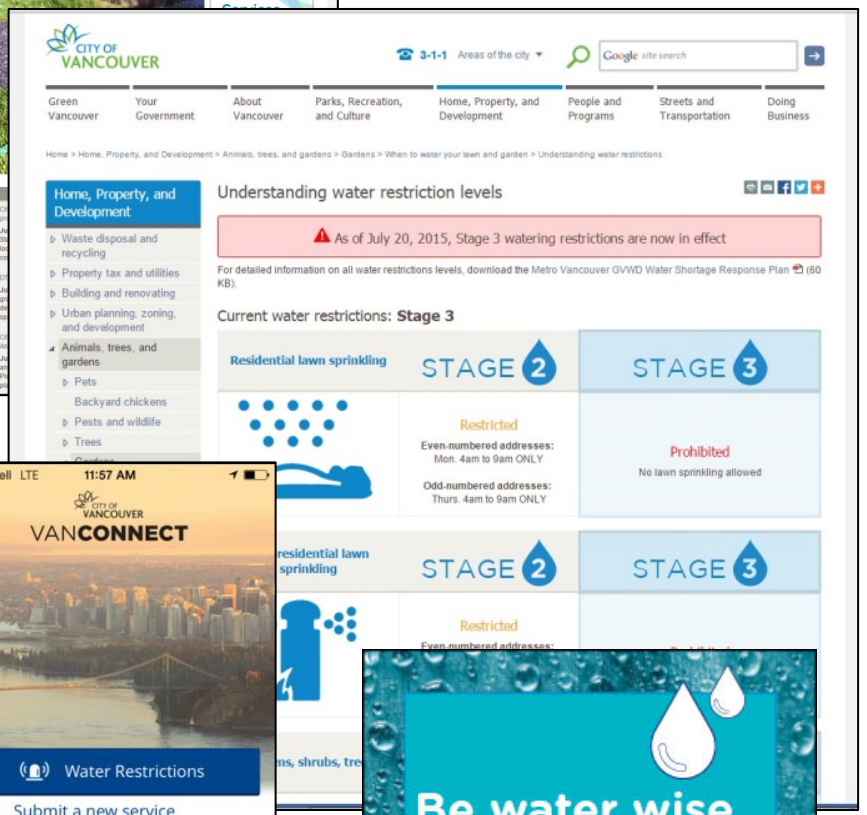


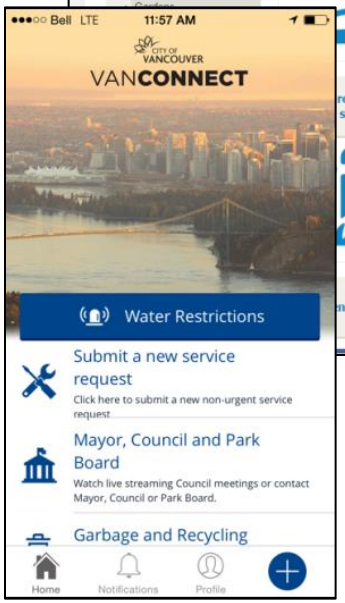
Water Supply 2015



Drought Response – Stage 2 and 3 restrictions

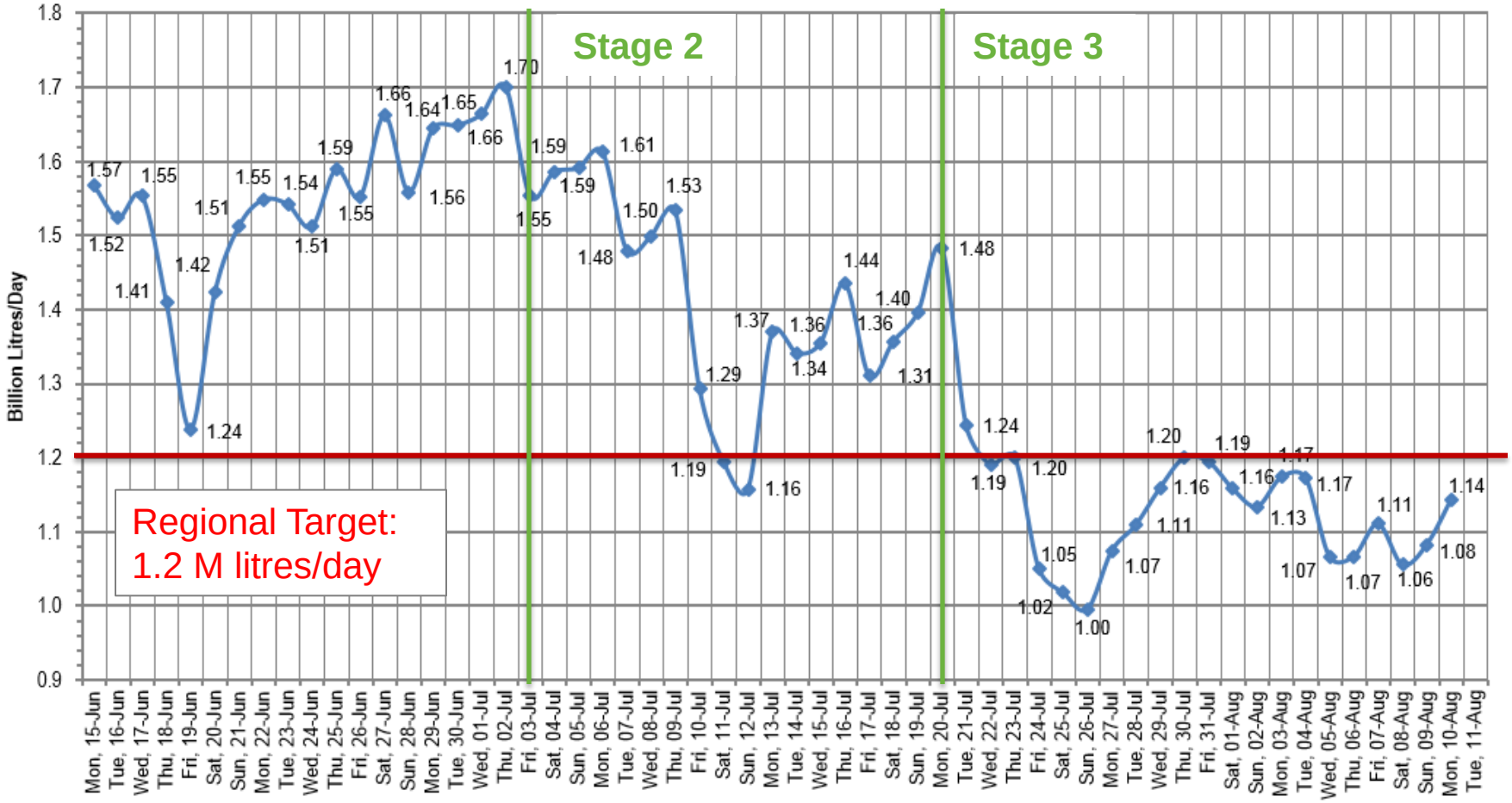






Affect on Supply

Regional Daily Consumption Summer 2015

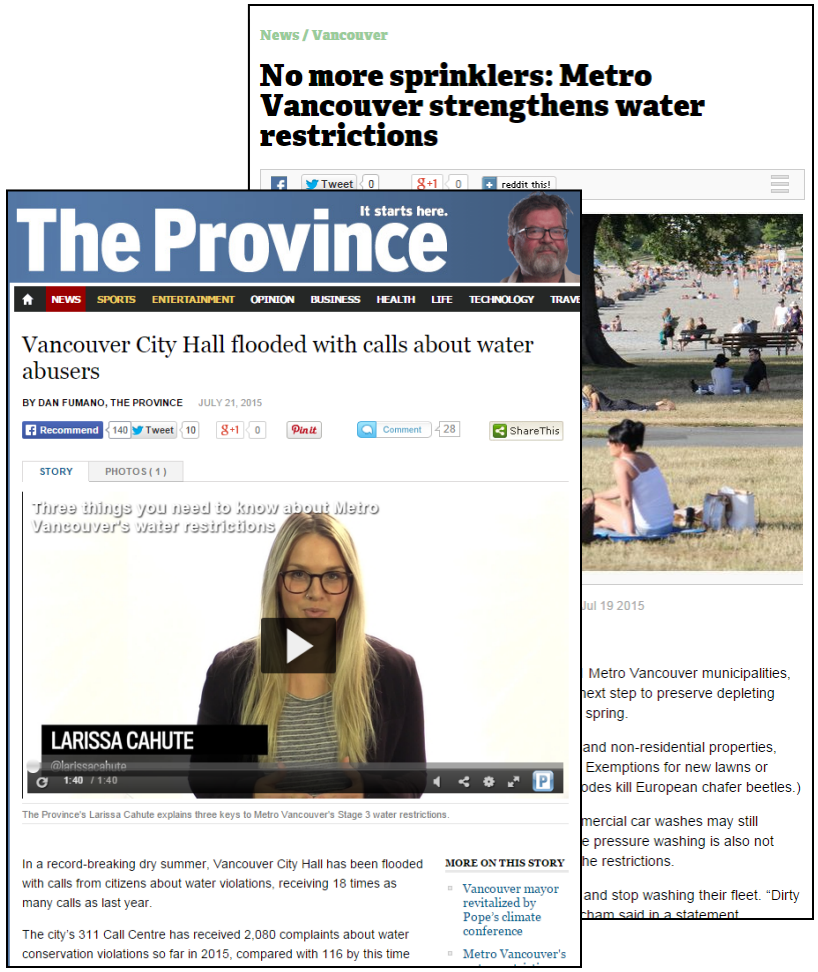


Lessons Learned

- **Leadership important** – media attention on what City is doing
- **Effective enforcement requires data analysis** – ‘heat maps’
- **Positive messaging** – counterbalance to public shaming ‘grassholes’
- **Coordinated and unified approach** – Externally across municipalities and internally across business units, consistent interpretation of by-law and messaging
- **Communications plan is essential** – for foundation, to leverage during crisis, and to leverage crisis for future reduction

“As they say, brown is the new green, for your lawns,” Dobrovolny said.

“Dirty cars still catch crooks,” spokesman Sgt. Randy Fincham said in a statement.



News / Vancouver

No more sprinklers: Metro Vancouver strengthens water restrictions

Tweet 0 | +1 0 | reddit this!

Jul 19 2015

Metro Vancouver municipalities, next step to preserve depleting spring.

and non-residential properties, Exemptions for new lawns or odes kill European chafer beetles.)

mercial car washes may still e pressure washing is also not he restrictions.

and stop washing their fleet. “Dirty cham said in a statement

The Province — It starts here.

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Vancouver City Hall flooded with calls about water abusers

BY DAN FUMANO, THE PROVINCE JULY 21, 2015

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STORY | PHOTOS (1)

Three things you need to know about Metro Vancouver's water restrictions

LARISSA CAHUTE

@larissacahute

1:40 / 1:40

The Province's Larissa Cahute explains three keys to Metro Vancouver's Stage 3 water restrictions.

In a record-breaking dry summer, Vancouver City Hall has been flooded with calls from citizens about water violations, receiving 18 times as many calls as last year.

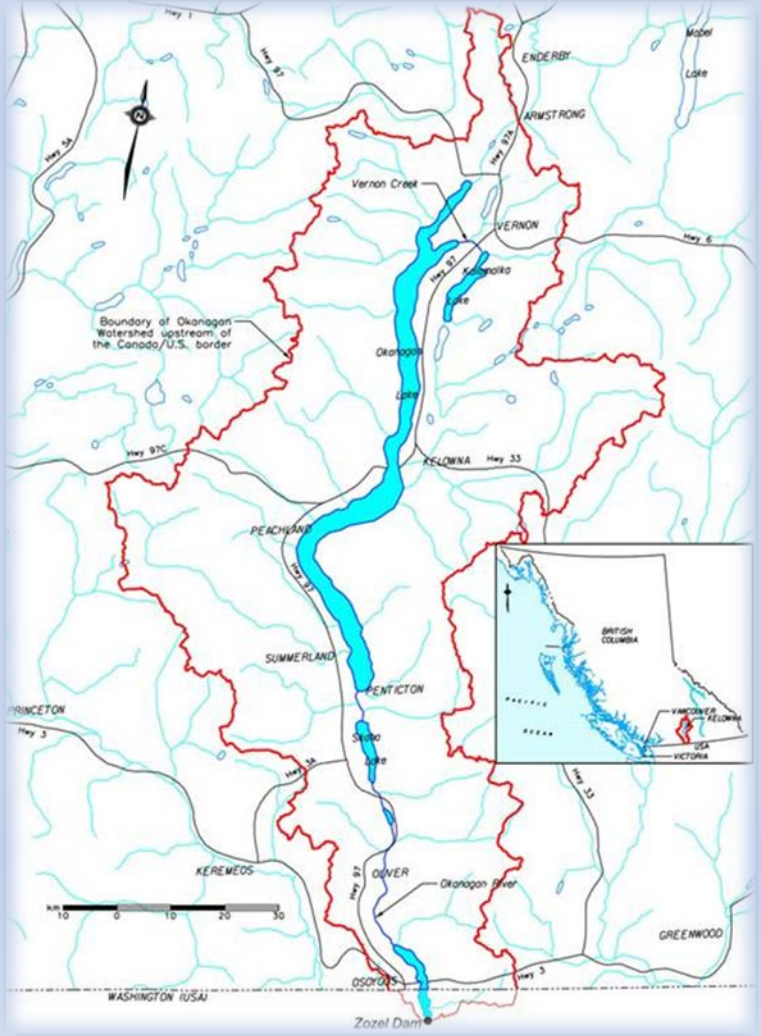
The city's 311 Call Centre has received 2,080 complaints about water conservation violations so far in 2015, compared with 116 by this time

MORE ON THIS STORY

- Vancouver mayor revitalized by Pope's climate conference
- Metro Vancouver's

Questions?

2015 Okanagan Drought Workshop



Okanagan Basin
WATER BOARD