Drought Management Plan (2024 Update)

Town of Oliver



ENGINEERING ■ PLANNING ■ URBAN DESIGN

Drought Management

- Necessity arises from the August 2015 Level 4 Drought.
- Drought Definition: water shortage resulting from a prolonged period of abnormally low precipitation.
- Some Other Factors: insufficient snowpack and hot and dry weather.
- Drought impacts communities by: reducing source water availability, impacting water quality, and increasing risk to aquatic species.
- Town of Oliver Implications: the Town utilizes both groundwater and surface water sources to satisfy domestic and irrigation demand.
- Another important aspect for the Town of Oliver is that surface water for irrigation provides a livelihood for agricultural land users. The majority of this water is supplied by the Irrigation Canal.



Recent Drought Declarations

In the past five years, the Town's drought declarations have been as follows:

2019 (reached Drought Stage 1)

• Stage 1 drought declared: June 26, 2019 (all restrictions lifted in October 2019)

2021 (reached Drought Stage 3)

- Stage 1 drought declared: April 29, 2021
- Stage 2 drought declared: July 14, 2021
- Stage 3 drought declared: July 30, 2021 (all restrictions lifted on October 25, 2021)

2022 (reached Drought Stage 2)

- Stage 2 drought declared: July 25, 2022 (bypassed Stage 1 drought level)
- Stage 1 drought declared: August 22, 2022 (all restrictions lifted on August 26, 2022)

2023 (reached Drought Stage 2)

- Stage 1 drought declared: June 15, 2023
- Stage 2 drought declared: July 12, 2023 (all restrictions lifted on October 4, 2023)

2024 (currently at Drought Stage 1)

• Stage 1 drought declared: April 23, 2024



Water Supply

- System 1 also referred to as Rural North Buchanan Road Pumphouse.
- System 2 and 2B Black Sage Area Black Sage and Miller Rd Pumphouses (system 2 is combined domestic and irrigation).
- Municipal System includes area once referred to as System 3 – Rockcliffe and Tucelnuit Pumphouses.
- System 4-7 also referred to as Rural South Fairview and Miller Rd 13 Pumphouses.
- Surface Water: With the exception of irrigation water supplied from the Buchanan Irrigation Well and the Fairview Irrigation Well and the combined irrigation/domestic water supplied to System 2 in the Black Sage area, the water source for the Town's irrigation systems serving the rural areas is the Irrigation Canal.





Groundwater S Map





Demand Review





Demand Projections





Drought Risk for Water Supply

- Surface water entering the Irrigation Channel is directly affected by the Okanagan River. The Okanagan River is controlled by the Okanagan Lake Regulation System (discussed in the next slide).
- Groundwater recharge rates and groundwater levels are also potentially affected by the river, but to a lesser extent because flow maintenance in the River serves to maintain minimum groundwater levels in the shallow aquifers close to the river.
- A multi-year drought poses a greater threat to groundwater supplies.



Okanagan Lake Regulation System

- Utilized to control lake levels and releases from the Okanagan River from Okanagan Lake to the inlet of Osoyoos Lake.
- Consists of dams located at Okanagan Lake near Penticton, Skaha Lake near Okanagan Falls, and Vaseux Lake north of Oliver.
- Other infrastructure associated with the OLRS includes the channelized sections of Okanagan River between Okanagan Lake and Osoyoos Lake, including the associated dikes and drop structures.
- Works to regulate lake levels that are affected by a gross drainage area of approximately 8,275 square kilometres.
- Operated to attain seasonal targets for mainstem lake elevations and river flows as per the 1976 Okanagan Basin Implementation Agreement. These targets consider flood and drought conditions while also accounting for water requirements for fish viability.



Okanagan River Flows (During 2015 Drought)





Drought Forecast Approach

- Groundwater: Review levels measured in three local Provincial observation wells (measurement data is available online).
- Surface Water: OBWB's technical team has recommended that Okanagan Lake water levels be utilized for this purpose (measurement data is available online).
- The proposed drought response status matrix is shown on the following slide.



Status	Normal	Stage 1 - Dry	Stage 2 - Very Dry	Stage 3 - Extremely Dry	Stage 4 - Emergency
Groundwater Supply	Groundwater supply is at	The groundwater level in	The groundwater level in	The groundwater level in	The groundwater level in
Trigger Factors	or above normal levels.	any of the three Provincial	any of the three Provincial	any of the three Provincial	any of the three Provincial
		observation wells reaches	observation wells reaches	observation wells falls	observation wells falls
		the average / typical	the average or typical	0.5m below the historical	0.5m below the historical
		seasonal low water level	seasonal low water level	low water level and	low water level and
		for one week or more (OW	and remains at or below	remaining at or below this	remaining at or below this
		405 ≥ 18.7 bgs, OW 407 ≥	this level for four weeks or	level for two weeks or more	level for four weeks or
		11.7 bgs, OW 332 ≥ 18.0	more (OW 405 ≥ 18.7 bgs,	$(OW 405 \ge 20.5 \text{ bgs}, OW)$	more (OW 405 \geq 20.5 bgs,
		bgs).	OW 407 ≥ 11.7 bgs, OW 332	407 ≥ 12.35 bgs, OW 332 ≥	OW 407 ≥ 12.35 bgs, OW
			≥18.0 bgs).	19.1 bgs).	332 ≥ 19.1 bgs).
Surface Water Supply	Surface water supply is at	The Okanagan Lake levels	The Okanagan Lake levels at	The Okanagan Lake levels at	The Okanagan Lake levels
Trigger Factors	or above normal levels.	at Kelowna are less than	Kelowna are less than the	Kelowna are less than the	at Kelowna are lower than
		the month beginning target	historic 20th percentile	historic 10th percentile	the historic 5th percentile
		elevations and equal to or	month beginning elevations	month beginning elevations	month beginning
		greater than the historic	and greater than or equal to	and greater than or equal to	elevations (utilize the
		20th percentile month	the 10th percentile month	the 5th percentile month	measured value plus the
		beginning elevations	beginning elevations	beginning elevations	geodetic datum of
		(utilize the measured	(utilize the measured value	(utilize the measured value	340.236m).
		varue prus trie geodetic	prus the geodetic datum of	prus the geodetic datum of	
	_	uatum of 340.236m).	340.23011).	340.23011).	
Domestic Water Demand	Encourage water	Minimum 10% domestic	Minimum additional 20%	Reduce domestic usage to	Maintain minimum
Goal	conservation through	usage reduction.	domestic usage reduction	maintain critical water	domestic water supply to
	Town's Water		to a minimum total of 30%.	supply (50% reduction).	maintain basic community
	Conconvotion Plan				reduction)
Irrigation Water System	Conservation Plan.	Target 10% irrigation	Target additional 20%	Reduce irrigation usage to	Reduce irrigation canal
Goal		usage reduction	irrigation usage reduction	maintain minimum cron	flows to maintain
Goul		usugereduction	to a minimum total of 30%	vields (50% reduction)	minimum Okanagan River
				yreido (oovoreddollyr	flows.
Corresponding Domestic	Water conservation	Stage 1 Domestic	Stage 2 Domestic	Stage 3 Domestic	Stage 4 Domestic
System Drought	measures promoted by the	Restrictions, characterized	Restrictions, characterized	Restrictions, characterized	Restrictions, characterized
Restrictions	Town.	by reduced lawn and	by reduced lawn and	by severe restrictions in	by a prohibition of
		garden sprinkling to 3	garden sprinkling and other	outdoor water use to one	outdoor water use.
		days per week.	outdoor water use to 2 days	day per week.	
			per week.		
	-				
Corresponding Irrigation		Stage 1 Irrigation	Stage 2 Irrigation	Stage 3 Irrigation	Stage 4 Irrigation
System Drought		Restrictions, characterized	Restrictions, characterized	Restrictions, characterized	Restrictions, characterized
Restrictions		by voluntary water	by voluntary water	by restrictions and	by restrictions and
		conservation.	conservation.	regulatory action as	regulatory action as
				mandated by Province of	mandated by Province of
				British Columbia.	British Columbia.
Communication and	Normal lovels of	Heightened awareness by	High lovel of education and	High lovel of advication and	High lovel of education
Enforcement	communication with water	Town's drought response	communication directed	communication directed	and communication
LIIOICEMENT	usors	toom	towards high domostic	towards all water users	maintained All Town staff
	users.	team.	system water users	Town's drought response	currently available will be
			system water users.	team directed to begin	used for enforcement of
				enforcement of domestic	domestic and/or irrigation
				and/or irrigation system	system outdoor water use
				outdoor water use	restrictions.
				restrictions.	
The data relating to OW 40)5, OW 407 and OW 332 is a	vailable online using the B.0	C. Provincial Observation We	II Network interactive mappir	ng tool which can be found
by visiting: http://www.env.gov.bc.ca/wsd/data_searches/obswell/map/					
Real-time hydrometric data for the monitoring station at Kelowna (WM08NM083) can be found by visiting:					
http://wateroffice.ec.gc.ca/report/real_time_e.html?stn=08NM083.					



Drought Stage Sequencing



