HYDROMETRIC NETWORK REQUIREMENTS FOR THE OKANAGAN BASIN



Prepared for



Prepared by The Okanagan Hydrometric Network Working Group August 2008

Photo: Belgo Creek at Highway 33

Hydrometric Network Requirements for the Okanagan Basin

Prepared for the Okanagan Basin Water Board and the Water Stewardship Division, BC Ministry of Environment

Report prepared by the Okanagan Hydrometric Network Working Group

August 2008

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Hydrometric Network Requirements for the Okanagan Basin

1. Introduction

Water has been a concern in the Okanagan for more than 100 years. The first hydrometric stations were established in the valley about 1910. In Water Resources Paper No. 1 published by the Dominion Water Power Branch of the Department of the Interior, Ottawa, in 1914, the following statement was made.

"Having taken possession of this great resource, it behooves the Governments to administer it wisely and well. It is axiomatic that to do this one of the first things is to take stock; see how much there is; where it is distributed; and how it can be most beneficially used and conserved."

Ninety-four years later this statement still holds true. The Okanagan Basin is experiencing increasing stress on its water resources. Development in the basin is imposing more demands for water while at the same time, the awareness of potential changes in climate has highlighted the need to plan for the potential of increased demands on what might be a diminishing supply. In addition, the impacts of water use on the basin's ecosystems and the instream flow requirements to sustain and/or restore the ecosystems must be addressed. To manage water resources in the basin effectively it is necessary to understand the following key hydrologic issues:

- 1. The spatial distribution of natural runoff, particularly the change in runoff with elevation and changes within the basin from north to south and west to east.
- The variability of natural runoff: how runoff varies seasonally, monthly, weekly and annually. We must have sufficient information to estimate the probability of occurrence of a drought similar to the three consecutive years of drought from 1929 to 1931 and the more recent years of 2002 and 2003.

3. Changing climate. It is apparent from the review of climate trends in the Okanagan over the past 50 years that there has been a shift to warmer temperatures and in precipitation patterns. Does the reported change in climate in the Okanagan represent a long-term shift or does it reflect a climate oscillation over several decades? Annual Okanagan Lake inflows are projected to decline by up to 30% by the latter part of this century (Cohen and Neale, 2006), although it should be noted that estimates of changes in runoff connected with climate change have a high degree of uncertainty. How will the loss of the lodgepole pine in the upper elevations in the Okanagan Basin affect the basin hydrology?

Hydrometric data are fundamental to the future of the valley. Water is the essential element in every aspect of our society; from the water we drink, to our agricultural industry, to the sustainability of the natural ecosystems. The following is a list of some of the primary uses of hydrometric data in the basin:

- Water license management,
- Reservoir operations planning and implementation.
- Water supply planning and management,
- Regional flood and drought frequency analysis,
- Climate change assessment,
- Calibration and verification of hydrologic models, and
- Assessment of aquatic ecosystems.

Over the years since water quantity monitoring began in the Okanagan Basin in the early 1900s, a total of 181 hydrometric stations have been established by the Water Survey of Canada (WSC) and the province, but 156 stations have been discontinued. It must be noted that many stations were short-term and were useful at the time, but the data are of little or no use for hydrology or water management at this time. The maximum number of active WSC stations in the Okanagan was 94 stations in 1973 (refer to table and graph of active WSC stations in Appendix B). Many stations were discontinued in the 1980's and 1990's due to funding limitations, leaving just 25 active

WSC stations in the basin by 2007. Only eight active WSC stations are located on unregulated streams, which is not adequate to provide hydrologic data for water management in the basin.

At one point in the late 1970's the Okanagan Basin was the most intensively monitored watershed in Canada. This network of stations was developed in recognition of the importance of water in the basin and the need to understand the supply in order to be able to manage it properly.

In 1974 the governments of Canada and British Columbia released the results of the Okanagan Basin Study. A key finding of the study was that:

"under good water management there is enough water in the basin to supply all the projected withdrawals and meet fishery and recreational requirements in the main valley lakes and in the tributary sub-basins within the foreseeable future."

The report projected a basin population of 283,000 by the year 2000 and 430,000 by the year 2020 based on "high economic growth" projections. The 2001 Census reported the basin population of nearly 274,000 and nearly 294,000 in 2006. If the present growth trends continue, it is conceivable that the basin population could exceed that projected in 1974 for 2020. To be able to manage the basin water resources in a sustainable manner to meet the range of competing demands and values will require comprehensive water data. Such data will only be available IF the hydrometric network in the basin is improved now to provide operational and long-term water management data.

The project to assess the hydrometric network requirements for the Okanagan Basin was initiated from a request made by Anna Sears, Executive Director, Okanagan Basin Water Board (OBWB), at the *Future of Water Quantity Information in the Okanagan*

Basin workshop held on June 28, 2007 by the OBWB in Kelowna. It was recommended that a technical water quantity work group be formed that would identify the "needs, gaps, priorities and recommendations" regarding water quantity data for the Okanagan Basin, and report the results to the OBWB.

The OBWB and the Ministry of Environment (ministry) agreed to jointly fund the project. Tony Cheong, Ministry of Environment Water Stewardship Division, Victoria provided the project management. The working group membership included:

- Tony Cheong, Ministry of Environment
- Don Dobson, Dobson Engineering Ltd. (chair)
- Phil Epp, Ministry of Environment
- Brian Guy, Summit Environmental Consultants Ltd.
- Bruce Letvak, Ministry of Environment
- Kari Long, Okanagan Nation Alliance
- Stu Mould, Mould Engineering Ltd.
- Bruno Tassone, Water Survey of Canada

The terms of reference for the working group, that also formed Schedule A for the project contract, were prepared by Tony Cheong and Don Dobson and are provided in Appendix A.

2. Methodology

The working group convened via a conference call in October 2007 to review the terms of reference and the proposed work plan. It was agreed that Letvak and Dobson would undertake the initial review work. The group was provided with maps indicating station locations and preliminary lists of stations for consideration in January 2008. In early March 2008 a one-day workshop was held in Kelowna where the group developed a final list of proposed stations for the network to be recommended to the OBWB. This report summarizes the results of the work by the Technical Water Quantity Working Group over the period from October 2007 through March 2008.

The review involved the following steps:

Step 1: The review was initiated by Dobson and Letvak determining a map scale and area of interest for the Okanagan Basin. It was decided to consider all stations within the basin plus a 10 km wide buffer area around the basin so that active or discontinued stations that were outside the basin but representative of basin hydrology could be considered where necessary. This will be referred to as the "study area".

Step 2: The next step was to identify the active and discontinued WSC hydrometric stations within the basin and the buffer area as well as those active hydrometric stations operated locally. The ministry had current listing from WSC for the active stations and discontinued stations for the province that were used to identify those stations within the study area. To determine what stations were being operated locally within the study area, a request was sent out to BC Environment in Penticton, Summit Environmental Consultants Ltd., the Oceola Fish and Game Club in Lake Country and to Geostream Environmental Consulting. Letvak and Dobson developed the format for an excel spreadsheet that would be used to list all the known stations. They patterned the spreadsheet on a format that the ministry used as part of an earlier network review in 2000. Lists were compiled for each station category based on the data from the WSC inventory and from data supplied by others. Copies of the spreadsheets are provided in Appendix B.

Active Stations

In 2007 the WSC operated 35 hydrometric stations within the study area of which 25 were within the Okanagan Basin. There were also 39 locally operated stations in the basin. Refer to "active stations" list in Appendix B.

The WSC has operated hydrometric stations in the Okanagan since about 1910. In the 1970s the Okanagan basin had the highest density of active hydrometric of any watershed in Canada. This extensive network was developed through the co-operation of the WSC and the BC Department of Lands, Forests and Water Resources in response to the need for water in the basin for irrigation and domestic use and the fact that the basin has a warm, dry climate. Over the last several decades the hydrometric network has been reduced to its current size due to ongoing budget and capacity issues. By 2007 there had been 209 stations discontinued within the study area of which 156 were within the basin. Refer to "discontinued stations" list in Appendix B.

Step 3: Once the station lists had been compiled, Letvak had the stations plotted on the study area map using ministry GIS support staff (refer to maps of Active and Discontinued Hydrometric Stations in Appendix C). Stations were identified as either active or discontinued and either operated by WSC or others. Dobson and Letvak reviewed the map initially to assess the spatial distribution of the active and discontinued stations.

Step 4: Dobson and Letvak then developed the following criteria to determine the station categories and the basis for the distribution of stations for the proposed future network:

- Criteria for stations recommended for future operations:
 a. The main goal is to support sustainable management of water and related resources (including fisheries, forest hydrology, etc).
 b. The two main categories of station purpose are: M water management (operations), R regional hydrology.
- Water Management (M) station criteria a basic principle was that all watersheds with water resource development/operations should have the following monitoring

undertaken on an ongoing basis, for operations and management of water and related resources:

- Reservoir level (i.e. storage) for significant reservoirs
- Outflows from significant reservoirs (including spillway outflow)
- Withdrawals by water purveyors
- Regional hydrology (R) station criteria network coverage of regional hydrology stations should be adequate to monitor and understand the hydrology of watersheds at all elevations and latitudes. It is generally understood that the hydrology in the Okanagan is highly variable geographically: with latitude, east/west sides of the valley, longitude, south to north, and with elevation. Okanagan hydrology is also highly variable in time frames of months, years, and decades. The prospect of significant changes connected with climate change creates a need for an adequate monitoring network on an ongoing basis, to supply the knowledge base required for basin wide and local resource management. The ideal stream for a regional hydrology station is an unregulated stream with an undisturbed watershed (an ideal that is very difficult to find in the real world).
- The extensive development of Okanagan tributary watersheds with storage and diversions makes it difficult to locate watersheds that are suitable for regional hydrology. However, there is often overlap between the two main station categories (M and R). Water management stations can also frequently meet some of the uses for regional hydrology. For example a gauged reservoir with gauged outflow will provide reasonably accurate flow volumes down to a monthly (or possibly weekly) time frame, and be adequate for annual and longer time frames. Regional hydrology stations are almost always useful for reference purposes in the ongoing management and operation of developed systems.

Step 5: Dobson and Letvak reviewed the Okanagan sub-basin by sub-basin, to develop a list of stations proposed for future operation to support sustainable resource management. The process incorporated:

- the criteria for station use from Step 4 above
- information on active and discontinued stations from the spreadsheets
- maps and knowledge of Okanagan geography, hydrology, and stream systems (including reservoirs and diversions)
- knowledge of present and likely future resource management needs

Using their extensive experience in hydrology, water management, and hydrometrics in the Okanagan, Dobson and Letvak judged which active or discontinued stations were appropriate for the recommended future network. Where there was a need for a station and no active or discontinued station at that location, a new station was recommended. The recommended stations were designated either R or M according to the primary use.

Step 6: A new spreadsheet was then prepared that listed all the stations recommended for consideration for the future network and a new map was prepared that included only the proposed stations. Refer to "proposed future network" list in Appendix B and the "proposed future network" map in Appendix C.

Step 7: The spreadsheets along with the maps were provided to all the members of the working group for their review. The members were also provided with a summary of the selection criteria, as summarized in Step 4 and requested to review the proposed network with consideration of the overall intent of the network but also from their specific area of knowledge and use of hydrometric data. A conference call was scheduled that provided the group with an opportunity to ask questions and provide feedback to Dobson and Letvak. The results of this review, and feedback from the group were included in the preparation of materials for a subsequent workshop.

Step 8: In early March 2008 a one-day workshop was held in Kelowna that included not only the working group but representatives were invited from the Water Supply Association of BC, the Ministry of Forests and Range in Kamloops, the council of Forest Industries, and the Ministry of Transportation. The workshop focused on a review of the process used to select the stations and the proposed network. The group spent considerable time reviewing each station that was proposed to confirm that it met the intent of the network. For those stations selected for consideration for the future network the group also completed the columns in the spreadsheet for station uses and identified if data was available in real time (refer to Proposed Future Stations list in Table 2 – columns AA to AK). Dobson and Letvak then used the results from these discussions to produce the final list of recommended stations and the network map that are provided in Appendix C. Letvak developed the final station list spreadsheets and arranged for ministry staff to produce the final maps.

Step 9: Letvak and Tassone provided data on the estimated costs to construct a new hydrometric station and also the current costs to operate the various categories of stations.

Step 10: Dobson then prepared a draft report for the group to review and subsequently the final report.

Step 11: Following the review of the report and the maps by the working group the final report was submitted to the Okanagan Basin Water Board and Ministry of Environment in Victoria for their consideration.

Step 12: Dobson and Letvak offered to meet with the OBWB Board and representatives from the Ministry of Environment to review the report and answer questions.

Step 13: The implementation of the recommendations by the Working Group, the assignment of station operation responsibility, and the operational costs for the proposed network were not part of the Terms of Reference of this project and are matters for the OBWB Board and the ministry to address.

3. Stations Proposed for Future Network

After extensive review and discussion 160 stations were identified as proposed for the future network. This list included the 25 active WSC stations, 32 locally operated stations, 73 currently discontinued WSC stations, and 28 new stations. The network would include 38 regional hydrology stations and 122 water management stations (refer to Table 1). A significant number of the proposed 122 water management stations are existing sites where water suppliers are currently collected data for operational purposes. These sites would be identified as hydrometric data stations and the data collected and archived to RISC standards. Refer also to the Proposed Future Stations list – Table 2, and the Proposed Future Hydrometric Network map in Appendix C.

Many of the water management stations would be operated only during the open water period of the year. For example stations on upland reservoirs would not have to operate over the winter period when the reservoir was ice covered. Similarly stations recording reservoir releases would only operate during the open water period when water was being released. These stations, along with the water diversions at intakes stations, would typically be operated by the water supplier, either by staff or under contract by a qualified contractor. There will also be water management stations that are required by OBWB and the ministry as part of the operation of the Okanagan Flood Control System that would be operated all year. The regional hydrology stations should be operated by WSC as part of the regional hydrometric network as all-year stations.

Table 1	Station	Summary
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	Okanagan Valley	Study Area
Active	Stations 2007	
Operated by WSC	25	35
Operated by others	39	39
Sub-total	64	74

Discontinued Sta	tions 2007	
Operated by WSC	156	209

Proposed Network										
Currently active WSC	25	27	10							
Active operated by others	32	32	1							
Sub-total	57	59	11							
Discontinued WSC	65	73	24							
New (never existed)	28	28	3							
Sub-total	93	101	27							
Total Proposed	150	160	38							

Study	/ Area
R	М
10	17
1	31
11	48
24	49
3	25
27	74
38	122

Notes:

1. Study area station counts include Okanagan Valley and 'buffer" area.

2. R - regional hydrology, M - resource management

4. Station Costs

Construction Costs

Construction costs for WSC stations are highly variable and dependent upon the site conditions as well as the seasonal operating period. Stations on small streams, e.g. typically less than 10 m wide, that are required to be operated only during the open water period, can range in cost from \$10,000 – \$20,000 to design and construct depending upon access to the site. Normally these stations will not require cableways or elaborate flow control structures. A cableway or metering bridge can cost from \$15,000-\$40,000 if needed, and a streambed flow control can cost \$5,000-\$20,000.

For locally operated stations, assumed to be a simple water level recording setup with no metering facility or flow control, installation cost would be in the range of \$3,000 - \$6,000.

Operating Costs

The annual operating cost for a WSC hydrometric station in the Okanagan ranges from \$9,000 – \$11,500. Stations that provide discharge data generally cost more than water level only stations (e.g. lake level). The additional annual cost of real-time data telemetry is \$400-\$700 per station. Operating costs vary based on the location of the station, the number of discharge measurements required to meet the national standards for the data, and the difficulty in working up the data. High elevation all-year stations where there is considerable period of ice cover require much more work to produce the discharge record than a station on the valley floor that never has ice cover. Water Survey of Canada will operate stations for outside parties that provide operations funding – this is managed through the provincial Ministry of Environment.

Operations costs for locally operated discharge stations (seasonal, open water conditions only) would likely be in the range of \$3,000 – \$6,000 per year, by local contractor. It should be noted that if local water supply agencies wish to compare contract costs vs. the cost of operating stations themselves, they should take care to include all costs.

Hydrometric Standards

WSC national standards for hydrometric operations are a detailed set of practices that include operational practices for field operations, data computations, review/approval, complete record keeping, and archiving/dissemination. These constitute a standards system, which makes it possible to "prove" the quality of WSC data.

B.C. provincial hydrometric standards at this time consist of a first version of a manual of operations procedures. There is no standard system that addresses data review and

approval. An updated manual is in development, along with a recommended standards system that will include data review/approval and professional accountability. If a fully functional provincial standards system is implemented and maintained, data collected by local parties should be collected in a provincial database.

5. Conclusions

- The current WSC hydrometric network of 25 stations in the basin is not adequate for the existing and future water management needs and regional hydrology needs in the Okanagan basin.
- b. To meet the long-term requirements for hydrometric data in the Okanagan basin, the network should be expanded to include most, if not all the stations 160 stations identified in the Proposed Future Stations table, Table 2.
- c. The network should be an integrated network, including stations operated by WSC and locally operated stations. Locally operated stations should be constructed and operated to the provincial Resource Inventory Standards Committee (RISC) standards for hydrometric data, and data archived in a central database accessible to all users.
- d. The network expansion should be directed by the OBWB with coordination by the Science and Information Branch (SIB) of Ministry of Environment. SIB has two roles connected with hydrometric data collection in BC. One role is the provincial side coordination of the Federal-Provincial Hydrometric Agreement under which the Water Survey of Canada network is operated. The other role of SIB regarding hydrometric is the development and implementation of a provincial standards system for hydrometric operations by other parties (non WSC) and operation of a provincial database.
- e. The timeline for completing the network should be coordinated between the OBWB, the ministry and the water suppliers with the expanded network in full operation by 2013.

6. Recommendations

- a. The Okanagan Hydrometric Network should be expanded to the 160 stations +/proposed in this report as expeditiously as possible. Establishment of stations will require further investigation including field reconnaissance, etc. This may result in revisions to the proposed list.
- b. As soon as this report has been accepted by the OBWB and the ministry, it should be made available through the OBWB website to all water suppliers and other interested parties.
- c. The OBWB should consider scheduling a workshop for water suppliers, First Nations, fisheries groups, local governments, the agriculture, forestry and mining sectors, and the interested public to review the recommendations and develop an implementation plan.
- d. It is strongly recommended that the province implement a complete hydrometric standards system so data collected by parties other than WSC can be shown to meet data quality.
- e. The ministry and/or the OBWB should establish, as quickly as possible, a permanent, managed data warehouse such as the WIDM (Water Information Data Management) system that the ministry has been developing and encourage that the data from locally operated stations be submitted for archiving. There is a considerable volume of existing hydrometric data in private databases that should be collected and archived before it is lost. While it is clearly in the self-interest of water users to collect and archive data on their systems, it is noted that there are powers under the Water Act to require submission and collection of data in connection with water licenses.
- f. Ancillary data collection climate (air temperature and precipitation) and water temperature were not part of the scope of this report, but can be added to hydrometric stations. It is recommended that consideration be given to adding six climate stations on each side of the Okanagan valley at medium to high elevations, to attain better understanding of hydrologic parameters that have an impact on

runoff. Water temperature data collection may also be considered in connection with fisheries and water quality concerns.

D.A. Dobson, PEng, Chair, Okanagan Hydrometric Network Working Group

Table 2. Proposed Future Stations

			_			1	1					1			
	A	D	E	I N O	P S T	UW	Х	AA	AB	AC AD	AE	AF	AG A	A AI	AN
1			Okanagan Hydrometric Review 2007/08					STATI	ON USES	6:					
			·····					-							
	Recc.				Program										
	Future	O U		_, Years Hydrometri	c Operation:										
	ops	Station	Station Name	Flow (end - Programs	Hydrometric C=contin	Latitude	Longitude	Min	For	Pow Fis	В	W	Tra B	l elemetr	COMMENTS
	Primary	Number		Regulation (start) Start Date	End date S-seas (open	Lando	Longhado							need	
	Timary			Start) Start Date	G=seas.(open										
2	use #1				water)										
3 M	= resc	urce man	agement: B= regional hydrology												
4	= 1000		agomont, n= regional nyarology												
4															
5	<u>W</u>	<u>SC STATI</u>	<u>ONS ACTIVE IN 2007 PROPOSED FOR FUTURE NETW</u>	<u>ORK</u>											
<u> </u>	D	001 0040		NAT	0										near Lumbu Silver Star, Cood Dista
0	11	06LC040	VANUE GREEK DELOW DEAFIES GREEK	INAT	C	50.28500	-118.94800	J	X		X				
7	R	08LC042	BESSETTE CREEK ABOVE LUMBY LAGOON OUTFALL	REG	С	50.2530	-118.96100	b	х	x	х		x		d/s of Duteau & Creighton. Good geog sample. Unregulated. Diverted into Okanagan lower d/s.
-	N 4														
8	IVI	08NL022	SIMILKAMEEN RIVER NEAR NIGHTHAWK		C	48.9850	-119.61700	0				Х			South Main Okanagan System Operation
٩	М	08NIM002	OKANAGAN BIVEB AT OKANAGAN FALLS	BEG	C	49 3420	-119 58000	n		v	v	v			Okanagan system operations
Ŭ	<u> </u>	OONINOOL		TIEG	5	43.0420	110.00000			~	~	~			
10	К	08NM037	SHATFORD CREEK NEAR PENTICTON	REG	C	49.4160	-119.78900	D		х	х	х			Regional hydrology. First Nations. Fisheries. Regulated???
11	R	095154041		PEG	0	40,0050	110 70000		×	×		v		v	Fisheries Reachland ID
		0011101041		hea	0	49.8230	-119.78600	J X	X	*				~	
12	М	08NM050	OKANAGAN RIVER AT PENTICTON	REG	С	49.4990	-119.61500	D		x x	х	х		x	Okanagan system operations.
10	N/I	000104005		DEO	0										Okanagan system aparatians
13	IVI	08101005	VERNON CREEK AT OUTLET OF KALAMALKA LAKE	REG	U U	50.2370	0 -119.26800	כ		X		X		X	Okanagan system operations.
14	М	08NM073	OSOYOOS LAKE NEAR OROVILLE		С	48,9570	-119.43800	b		x	х	x		x	Okanagan system operations.
	N /							-							
15	IVI	08NM083	OKANAGAN LAKE AT KELOWNA	REG	C	49.8860	0 -119.50100	0		Х	Х	Х		X	Okanagan system operations.
16	М	08NM084	SKAHA LAKE AT OKANAGAN FALLS	REG	C C	49 4270	-119 57400	b		x	x	x		x	Okanagan system operations.
						40.4270		1	+	^	-	1 ~	+ +	^	
17	IVI	08NM085	OKANAGAN RIVER NEAR OLIVER	REG	C	49.1150	-119.56600	C		x	х	х	<u> </u>	x	Okanagan system operations.
18	М	0800116	MISSION CREEK NEAR EAST KELOWINA	REG	C	40.9790	110 41200	2	<	v	v	v		v	
10	IVI	UOINIVITTO	WIGGION CREEK NEAR EAGT RELOWING	hea	0	49.8780	-119.41300	J	X	*	Χ.			~	
19	М	08NM127	OKANOGAN RIVER AT OROVILLE		С	48.9310	-119.41900	D		x	х	х		x	Okanagan system operations.
	D														
20	К	08NM134	CAMP CREEK AT MOUTH NEAR THIRSK	NAT	C	49.7250	-120.01700	C	Х	X	Х	Х	x	X	Regional hydrology. Summeriand water supply operations.
21	R	08NM142	COLDSTREAM CREEK ABOVE MUNICIPAL INTAKE	NAT	C	50 2580	-119.08100	h		×	¥	Y		×	runoff from near Silver Star
		001101112				30.2300	113.00100			~	~	~		~	
22	M	08NM143	KALAMALKA LAKE AT VERNON PUMPHOUSE	REG	C	50.2300	-119.27300	C		х	Х	х		х	Okanagan system operations.
23	R	0811171		NAT	C	40.2400	110 22000	_	v	v	v			~	Begional hydrology High elev
23			VAJEUX CREEK ADOVE JOLGO CREEK	INAT	0	49.2490	-119.32000	J	X	*	X			~	
24	М	08NM173	GREATA CREEK NEAR THE MOUTH	NAT	С	49.7940	-119.85100	D		х	х	х	x		Peachland water supply ops. Will be regulated in 2008
05	D	000104174		NAT	0										Pagianal hydrology First Nations
25	п	08NM174	WHITEMAN CREEK ABOVE BOULEAU GREEK	NAT	U U	50.2130	-119.53700	כ	Х	X	X	Х	x	X	negional hydrology. First Nations.
26	М	08NM200	INKANEEP CREEK NEAR THE MOUTH	REG	С	49.0780	-119.50100	2		x	x			x	First Nations. Fisheries. Some regulation
	N.4							-							
27	IVI	08NM232	BELGO CREEK BELOW HILDA CREEK	REG	C	49.9990	-119.07300	כ	Х	X	Х	Х			BMID ops.
28	R	08NM240	TWO FORTY CREEK NEAR PENTICION	NAT	C	49 6510	-119 40000	h	¥		¥			x x	Begional hydrology MOEB
20		OOT THE TO			5	43.0010	113.40000	5	~		~			~ ~	
29	M	08NM241	TWO FORTY-ONE CREEK NEAR PENTICTON	NAT	C	49.6490	-119.39400	D	х		х		1	x x	MOFR
20	М	09111242		NAT	0	40.0040	110 0000	_	v	×	v			~	MOER
30	101	0011101242	DENNIS CHEER NEAR 1760 METTIE CONTOON		0	49.0240	-119.36200	J	^	^	^			^	
31	М	08NM243	VASEUX LAKE NEAR THE OUTLET	REG	С	49.2740	-119.52300	D		х	х	х		x	Okanagan system operations.
00	D	00111045		NAT				_							
32	n	08101015	WEST KETTLE RIVER NEAR MOGULLOCH	INAT	C C	49.7020	-119.09200	J	X	X	X				negional hydrology.
33															
34		<u>NE</u>	N STATIONS PROPOSED FOR FUTURE NETWORK												
35	М		TERRACE OREEK d/c OF BIG HORN RESERVOIR		9	50 01 59	110 /5 50			v		v			
00					5	50 01 55	110 40 00			^		^			
36	М	OKPN2	TADPOLE RESERVOIR, NORTH LAMBLY CREEK		S	50 04 21	119 40 06			x		х			
07	M				6	50.01.00	110 47 17								
31	111	UNFINS	ALOUIN UREEN DIVERSION TO FOWERS UREEN	╡────┤────	3	50 01 00	1134/1/			×		×	+		
38	М	OKPN4	POWERS CREEK DIVERSION TO WESTBANK ID INTAKE		S	49 51 29	119 40 25			x		x			
00	Ν./					40 57 00	110.00.07					1	1 1		
39	IVI	UKPN5	LAWIBLY RESERVOIR ON POWERS CREEK		S	49 57 29	119 33 27	-		X		х	↓ ↓	X	
40	R	OKPN6	LACOMA CREEK d/s LACOMA LAKE		S	49 53 08	119 53 00		x	x	x			x	Unregulated
								1				1	<u>+ </u>		· · · · · · · · · · · · · · · · · · ·
41	IVI	OKPN7	MILL CR. u/s OF GEID INTAKE		S	49 58 43	119 21 13					х		х	
42	M		MISSION CREEK DIVERSION TO BMID		9	49 51 15	119 16 00			v		Y		v	
-76_		014110		<u> </u>		-00110	. 10 10 00	-	-			^	+	^	
43	M	OKPN9	MCCULLOCH RESERVOIR ON HYDRAULIC CR.		S	49 46 58	119 11 06			x		х		х	
14	М				e	10 15 00	110 47 57					v			
44	111	UNPINIU		I	3	49 40 08	1134/3/			×		X	+		
45	М	OKPN11	PENTICTON CREEK DIVERSION TO CITY OF PENTICTON INTAI	E I	S	49 29 36	119 32 51					x		x	
40	D	OVERVICE				40.00 50	110.00 5:					1	1 1		
46	ň	UKPN12	ELLIS UREEK HEADWATERS U/S OF ELLIS RESERVOIR	↓ ↓ ↓	S	49 28 52	119 20 51	1			х	х			
47	М	OKPN13	ELLIS RESERVOIR		S	49 28 12	119 22 08			x		x			
<u>+</u> +-	N.4							1		^	-		+ +		
48	M	OKPN14	ELLIS CR. DIVERSION TO CITY OF PENTICTON IRRIG.		S	49 28 30	119 32 56			x		х	<u> </u>		
40	М				Q	49 36 47	119 46 51					v			
+3		UNI NIU		<u> </u>		-3 30 47	10 10 01	1	+	<u>├</u> ──		^	+		
50	М	OKPN16	DARKE LAKE RESERVOIR		S	49 42 36	119 51 49					х			
E1	P					40.40.05	110 21 21	1				1			Unregulated
51	n	UKPIN1/	NATINIF UK. U/S UF UHUTE LAKE	╡────┤──┤	5	49 42 05	119 31 31	1		X	Х	1			
52	Μ	OKPN18	PINAUS LAKE RESERVOIR (EQUESIS CR.)		S	50 25 14	119 34 17			x	х	x			
1	N.4	01/511						1				1	+ +		
53	IVI	OKPN19	ISINTOK RESERVOIR (TROUT CR.)		S	49 32 44	119 58 11			x		х			
54	М				8	49 47 32	120 10 58			~		Y			
		51411420		<u> </u>		10 11 02	.20 10 00	-	-			^	+		
55	М	OKPN21	CRESCENT LAKE RESERVOIR (TROUT CR.)		S	49 48 35	120 04 28	1		x		х			
56	M	OKENIOO			· · · ·	10 10 00	120 00 27	1				~			
50	111	UNFINZZ		┼───┼─┼───	3	+3 40 30	120 00 21	+	+			^	+		
57	М	OKPN23	JACKPINE RESERVOIR (POWERS CR.)		S	49 55 02	119 48 22					х			
50	Ν.4					40 50 00	110 40 00	1							
58	IVI	UKPIN24	NUNJEDHUE-DUBBIN KESEKVUIK (PUWEKS CK.)	↓ ↓	5	49 59 26	119 48 39	1	-	├ ── ──		x	+		
59	М	OKPN25	KING EDWARD LAKE RESERVOIR (DEER CR.)		S	50 09 15	119 13 04	1				x			

Table 2. Proposed Future Stations

	А	D	E	I	Ν	0	Р	S	Т	U W	1	Х	AA	AB	AC	AD	AE	AF	AG	AH	AI	
	Deee							Drogram														
	Future				Years	Hydrometric		Operation:														
	ops.	Station	Station Name	Flow	(end -	Programs	Hydrometric	C=contin.,		Latit	ude	Longitude	Min	For	Pow	Fis	R	W	Tra	Res	Telemetry	
	Primary	Number		Regulation	start)	Start Date	End date	S=seas.(open				Ŭ									need	
2	use #1							water)														
	Ν.4							0		40.40.4	~	110.07.51										
60		OKPIN26	BIG MEADOW RESERVOIR (CHUTE CR.)					5		49 40 4	5	119 27 51						X				
61	M	OKPN27	ELINOR RESERVOIR (ROBINSON CR.)					S		49 39 1	9	119 32 06						х				
62	М	OKPN28	NARAMATA RESERVOIR (ROBINSON CR.)					S		49 39 1	8	119 32 07						х				
63																						
64	10		DEBATED STATIONS PROPOSED FOR FUTURE NETW	OBK																		
07						0007		0		5000414	70. 51											operated for LID
65		UKPLI	ESPERON RESERVOIR AT THE OUTLET			2007		5		50~04 4	·/ IN	119 44 56 W						X				operated for PMID
66	M	OKPL2	MISSION CREEK d/s BMID INTAKE			2004		S		49°51'0	" N	119°17'0" W				х	х	х				operated for BIVID
67	М	OKPL3	GRAYSTOKE RESERVOIR AT THE OUTLET			2007		S		49°59'8	" N	118°52'15" W				х	х	х				operated for BMID
68	М	OKPL4	FISH HAWK RESERVOIR AT THE OUTLET			2007		S		50°01'4	5" N	118°51'46" W				х	х	x				operated for BMID
69	М	OKPL 5				2007		S		49%58'1	5" N	118%54'15" W				v	v	v				operated for BMID
70	N/					2007		0		50000		110 34 13 W				~	^	^				operated for BMID
70	IVI	OKPL6	IDEAL RESERVOIR AT THE OUTLET			2007		5		50,00.3	8" N	119°05'52" W				x	x	X				operated for BMID
71	M	OKPL7	JAMES RESERVOIR AT THE OUTLET			2007		S		49°57'0	6" N	119°14'47" W						х				operated for BIVITD
72	Μ	OKPL8	LAMBLY CREEK DIVERSION TO ROSE VALLEY LAKE			2001		S		49°54'3	8" N	119 <i>°</i> 33'18" W				х		x				operated for LID
73	М	OKPL9	NORTH LAMBLY CREEK d/s TADPOLE RESERVOIR			2007		S		50°02'1	2" N	119°45'30" W						x				operated for LID
74	M					2007		6		50°04'1	7" N	110.040'09" W						~				operated for LID
74		UKPLIU				2007		3		50.041	7 IN	119 ⁻⁴⁰ 06 W						X				operated for SEKID
75	IVI	OKPL11	POOLEY CREEK u/s POOLEY DITCH			2004		S		49°44'5	1" N	119°20'14" W					х	х				
76	M	OKPL12	MYRA DITCH near KLO CREEK			2004		S		49 44 4	9	119 16 28						х				operated for SEKID
77	Μ	OKPL13	STIRLING CREEK DIVERSION TO MCCULLOCH RESERVOIR			2004		S		49°43'5	0" N	119°12'59" W						x				operated for SEKID
78	М	OKPI 14	CANYON CREEK DIVERSION TO MCCUILLOCH RESERVOIR			2004		S		49°44'3	8" N	119°16'28" W						x				operated for SEKID
70	M					2004		0		40044/5		110 10 20 10										operated for SEKID
79		UKPL15	HYDRAULIC CREEK U/S OF STIRLING DITCH			2004		5		49*44 5	3 IN	119*13.09* W		x			x	X				operated for CEID
80	IVI	OKPL16	POSTILL RESERVOIR AT THE OUTLET			2005		S		49°59'4	3" N	119°12'48" W					х	х				
81	М	OKPL17	MILL CREEK d/s of POSTILL RESERVOIR			2005		S		49°59'4	4" N	119°12'49" W						х				operated for GEID
82	Μ	OKPL18	ELLIS CREEK NEAR THE MOUTH			2007		S		49 28 3	6 N	119 35 49 W				х		x				operated for City of I
83	М	OKPI 19	PENTICTON CREEK AT VAN HORNE			2007		S		49 30 0	0 N	119.35.28 W				Y		x				operated for City of F
00	N/					2007		0			0.11	110 00 20 W				~		^				operated for Greater
84	IVI	OKPL20	UPPER DUTEAU CR. u/s of GRIZZLY RESERVOIR			2008		S		50 02 4	8 N	119 04 23 W		х		х	х	X				operated for Greater
85	Μ	OKPL21	CURTIS CREEK u/s of ABERDEEN RESERVOIR			2008		S		50 06 4	6 N	119 01 30 W		х		х	х	х				operated for Greater
86	Μ	OKPL22	HEART CREEK u/s of ABERDEEN RESERVOIR			2008		S		50 05 4	4 N	119 02 50 W		х		х	х	x				operated for Greater
87	М	OKPL23	TROUT CREEK d/s of CANYON			2004		S		49°34'1	4" N	119 <i>°</i> 39'00" W				х						operated by MoE
88	М	OKPI 24	TREPANIER CREEK AT HWY 97			2006		S		49%17'0	3" N	119%2'52" W				×						operated by MoE se
00	N/					2000		0		4004010		110 42 52 11				~						operated by MoE
89	IVI	OKPL25	TREPANIER CREEK 0/S HWY 9/C			2006		5		49°48'2	5" N	119°44'36" W				x						operated by MeE
90	M	OKPL26	TREPANIER CREEK u/s HWY 97C			2006		S		49°48'4	5" N	119°44'53" W				х						operated by MOE
91	Μ	OKPL27	POWERS CREEK AT GELLATLY RD			2004		S		49°48'5	1" N	119 <i>°</i> 37'48" W				х						operated by MoE ne
92	М	OKPL28	MISSION CREEK u/s of GORDON DR			2006		S		49°50'3	1" N	119°28'51" W				х						operated by MoE
03	М					2007		9		10.05115	1" N	110 92 22 10/				v						operated by MoE
35						2007		3		43 51 5		119 23 23 W				^						operated by MoE
94	R	OKPL29	PEARSON CREEK NEAR THE MOUTH 08NM1/2			2006		S		49°53'1	2" N	119°03'42" W		х		х	х	X				
95	M	OKPL31	PARADISE CR. NEAR LUMBY			2008		S		50°05'3	1" N	118°56'27" W						х				to be operated by Gr
96	Μ	OKPL32	MILL CR.DIVERSION TO G.E.I.D.			2006		S		49°55'5	5"N	119 <i>°</i> 20'38"W						x				
97																						
98	D	SCONTIN	IUED WSC STATIONS PROPOSED FOR FUTURE NETW	ORK																		
00	R	081 0005		REC	CF	1/1/1010	12/21/1000						1	1			v					Natural Restart 11/4
33	N.4			DEC		1/1/1019	10/01/1000										^	-				Mator mono
100	IVI	08LC014	DUTEAU GREEK AT OUTLET OF HADDO LAKE	REG	70	1/1/1910	12/31/1979	5								Х		Х				vvaler management
101	M	08LC035	FORTUNE CREEK NEAR ARMSTRONG	REG	74	1/1/1911	12/31/1984	L C										Х				"reg" not much. Quit
102	M	08LC043	ABERDEEN LAKE AT THE OUTLET	REG	19	1/1/1968	12/31/1986	s s					L	L				х				
103	Μ	08LC044	HADDO LAKE AT THE OUTLET	REG	19	1/1/1968	12/31/1986	s s								х		х			х	operated by GVS
104	M	081 C047		REG	0	1/1/1070	12/31/1094	9					1	1				v				
104		0010047		nLC		1/1/19/0	12/01/1900	, 3										^				
105	<u> </u>	08NL014	KEREMEOS CREEK ABOVE MARSEL CREEK	NAI	17	1/1/1912	12/31/1928	B C									х					Do we want this or H
106	К	08NL048	SHINISH CREEK NEAR PRINCETON	NAT	1	1/1/1973	12/31/1973	B C									х	L				
107	R	08NM005	MCLEAN CREEK NEAR OKANAGAN FALLS	NAT	6	1/1/1921	12/31/1926	6 C					L	L			х	L				Low elevation waters
108	R	08NM006	SHUTTLEWORTH CREEK NEAR OKANAGAN FALLS	REG	44	1/1/1921	12/31/1964	С								х	х					need station near mo
100	Ň	08114010		REC	70	1/1/1010	12/21/1000						1	1		 v		v				Hydraulic Cr. near m
109	111			neu neu	/3		12/01/1902															
110		08NM011	HYDRAULIC CREEK AT OUTLET OF MCCULLOCH RESERVOIR	REG	68	1/1/1919	12/31/1986	s s										X				myoraulic Cr d/s McC
111	R	08NM012	INKANEEP CREEK NEAR OLIVER (LOWER STATION)	NAT	40	1/1/1911	12/31/1950	C C					L	L			х					
112	Μ	08NM014	MCDOUGALL CREEK NEAR WESTBANK	REG	10	1/1/1920	12/31/1929	s s									х					Natural flow WSC, 3
113	R	08NM015	VASEUX CREEK ABOVE DUTTON CREEK	NAT	72	1/1/1911	12/31/1982	s s									х					
114	R	08114020		REC	70	1/1/1001	12/21/1000										 v					
4	1 L N /			neu neu	/9	1/1/1921	12/01/1995										*					
115	IVI	08NM022	VERNON CREEK AT OUTLET OF SWALWELL LAKE	REG	78	1/1/1921	12/31/1998	s S								х		Х				vernon Ck below Sw
116	Μ	08NM028	OYAMA CREEK OYAMA DIVERSION	REG	12	1/1/1920	12/31/1931	С					L	L				х				Oyama Cr diversion
117	M	08NM030	PEACHLAND CREEK MUNICIPAL IRRIGATION DIVERSION	REG	8	1/1/1919	12/31/1926	s s								х		х				Peachland Municipal

AN
COMMENTS:
Penticton
Ponticton
r Vernen Services
r Vernon Services
r Vernon Services
e old WSC stn
eds to be replaced by upstream stn
reater Vernon Water. Near, but not at old WSC stn.
's of Duteau Creighton
ite peturel Pay 204
le natural. Nev 204
HORTH GREEK USININ14/ OF U49???
shed
outh of canyon
nouth (d/s Sekid intake)
Culloch Reservoir (Move d/s of Fish, Browne, Long Meadow inflow??)
3 reservoirs
valwell (d/s spillway)
l intake

Table 2. Proposed Future Stations

	А	D	E		Ν	0	Р	S T	U W	Х	AA A	AB AC	AD	AE	AF AG	AH	AI	AN
2	Recc. Future ops. Primary use #1	Station Number	Station Name	Flow Regulation	Years (end - start)	Hydrometric Programs Start Date	Hydrometric End date	Program Operation: C=contin., S=seas.(open water)	Latitude	Longitude	Min F	For Pow	Fis	R	W Tra	Res	Telemetry need	COMMENTS:
110	Ν.4	001114000		NAT		1/1/1000	10/01/1074	0										U/a of Waethank divarian U as this and at SNM050
118		08NM033		NAI	55	1/1/1920	12/31/19/4	S					X		X	_		
119	R	08NM035	BELLEVUE CREEK NEAR OKANAGAN MISSION	NAT	76	1/1/1911	12/31/1986	С						x				Near Okanagan Mission
120	М	08NM036	SCOTTY CREEK NEAR RUTLAND	NAT	54	1/1/1911	12/31/1964	S					х		х			ONLY IF above BMID intake
121	R	08NM038	SHINGLE CREEK ABOVE KALEDEN DIVERSION	NAT	58	1/1/1920	12/31/1977	С						х	х			
122	М	08NM042	TROUT CREEK NEAR SUMMERLAND	REG	9	1/1/1920	12/31/1928	S					x		x			Is this being operated by Phil Epp???
123	R	08NM047	NASWHITO CREEK NEAR EWING'S LANDING	NAT	10	1/1/1912	12/31/1921	С						x				
124	М	08NM048	OYAMA CREEK ABOVE WOOD LAKE IRRIGATION INTAKE	REG	67	1/1/1921	12/31/1987	S							x			Oyama Cr above diversion (wsc) better to msr belwo diversion
125	R	08NM049	HORN CREEK NEAR KALEDEN	NAT	1	1/1/1920	12/31/1920	С						x				Review station history. Do we want this or 08NM147?? Or what about 08NL014 Keremeos C abv Marshall C??
126	М	08NM054	TROUT CREEK NEAR FAULDER	REG	34	1/1/1921	12/31/1954	S					x		x			
127	М	08NM055	TROUT CREEK SUMMERLAND DIVERSION	NAT	10	1/1/1922	12/31/1931	С					x		x			Summerland Municipal intake
128	М	08NM059	POWERS CREEK BELOW WESTBANK DIVERSION	BEG	76	1/1/1912	12/31/1987	S					x		x			below WID diversion. Use this on or 8NM033
129	M	08NIM062		BEG	69	1/1/1926	12/31/1994	5					~		v			Swalwell
120	B	001111002		NAT	00	1/1/1041	10/01/1077	0							^			Undinoii
130	N/			INA I	37	1/1/1941	12/31/19/7	C						X				anarated by the town of Oliver
131	IVI	08NM114	OLIVER CANAL NEAR OLIVER	REG	39	1/1/1934	12/31/19/2	5					X		X			סטפו מנפט שי נוופ נטאוו טו סוועפו יי סוסמר ווווטפמוכפ. הפומועפוץ המנטרמר פ רפקטומנוווק. זעמנפרצוופט הוסצונץ ומרווזג. בהט טרוטרנץ. שט אפ הפפט נהפ גנה מנ נהפ
132	М	08NM119	DEEP CREEK AT ARMSTRONG	REG	32	1/1/1951	12/31/1982	S					x	x				mouth??
133	R	08NM120	PARK RILL NEAR OLIVER	REG	20	1/1/1951	12/31/1970	С						х				
134	R	08NM121	WOLFCUB CREEK NEAR OLIVER	REG	1	1/1/1952	12/31/1952	С						х				
135	М	08NM122	ELLIS CREEK NORTH MAIN DIVERSION	REG	3	1/1/1955	12/31/1957	С					x		x			need stn for present diversion
136	R	08NM126	HAYNES CREEK NEAR OSOYOOS	NAT	53	1/1/1912	12/31/1964	С						x				
137	М	08NM129	JOE RICH CREEK NEAR RUTLAND	REG	24	1/1/1964	12/31/1987	S					x	x	x			
138	R	08NM130	TESTALINDEN CREEK NEAR OLIVER	REG	58	1/1/1911	12/31/1968	С						x				Review history, choose this one or 08NM164
139	R	08NM133		NAT	22	1/1/1965	12/31/1986	C					v	v	v			
140	M	001111100			- 22	1/1/1005	10/01/1070	0					~	^	^ 			
140			LAWBLY LAKE DIVERSION TO POWERS CREEK	neu NAT	0	1/1/1905	12/31/19/2	3					X		X		X	Lambiy reservoir with SCADA
141	<u> </u>	08NM137	DAVES CREEK NEAR RUILAND	NAT	22	1/1/1965	12/31/1986	С						X				
142	M	08NM138	TERRACE CREEK NEAR KELOWNA	REG	28	1/1/1965	12/31/1992	S							x			
143	R	08NM146	CLARK CREEK NEAR WINFIELD	NAT	15	1/1/1968	12/31/1982	C					х	x				Clark Ck . Low elevation (WSC) Oyama Lake spills into Clark Creek - need to monitor
144	R	08NM147	HORN CREEK NEAR OLALLA	NAT	10	1/1/1968	12/31/1977	С						x				Review this station and also 08NM148. Do we want one of them?
145	R	08NM148	TWIN LAKES NEAR OLALLA	REG	10	1/1/1968	12/31/1977	С						х				Check also 08NM147. Do we want either?
146	М	08NM150	SHINGLE CREEK AT THE MOUTH	REG	14	1/1/1969	12/31/1982	S					x	x	x			Shingle at mouth
147	М	08NM161	EQUESIS CR. NEAR THE MOUTH	REG		1/1/1969	12/31/1982	S						x				
148	М	08NM163	CROOKED LAKE AT THE OUTLET	REG	12	1/1/1970	12/31/1981	S							x			Crooked
149	R	08NM164	TESTALINDEN CREEK IN CANYON	NAT	18	1/1/1969	12/31/1986	С						x				Review history, choose this one or 08NM130
150	М	08NM166	LAMBLY CREEK BELOW BALD RANGE CREEK	REG	13	1/1/1970	12/31/1982	S					х		x			Lambly below Bald Range
151	М	08NM168	PENTICTON CREEK ABOVE DENNIS CREEK	BEG	30	1/1/1970	4/1/1999	S							x			outflow from Grevback Reservoir
152	M	08NM169		BEG	18	1/1/1970	12/31/1987	5					v		v			Grevhack Reservoir
150	B	001111100		NAT	10	1/1/1071	10/01/1006	0					~		~			Some logging
155	N/			INA I	10	1/1/19/1	12/31/1900	C					X	X	X			
154	IVI N A			REG	10	1/1/19/3	12/31/1982				+		Х	\vdash	x			
155	IVI	08NM205	HYDRAULIC CREEK DIVERSION TO S.E.K.I.D.	REG	5	1/1/1976	12/31/1980	C			<u> </u>			├	x		X	
156	IVI	08NM207		REG	13	1/1/1973	12/31/1985	S			<u>├</u>			├	x			Inityra ditch d/s of Canyon Creek Inflow. DEL operates
157	M	08NM213	MCCULLOCH RESERVOIR AT MCCULLOCH DAM	REG	14	1/1/1973	12/31/1986	C			<u> </u>			-	х		X	Heservoir (SEKID operates)
158	M	08NM215	FISH LAKE AT THE OUTLET	REG	5	1/1/1973	12/31/1977	S							х			Too small to bother?
159	М	08NM216	BROWNE LAKE RESERVOIR ABOVE THE DAM	REG	5	1/1/1973	12/31/1977	S							х			Too small to bother?
160	М	08NM217	LONG MEADOW LAKE RESERVOIR ABOVE THE DAM	REG	5	1/1/1973	12/31/1977	S							x			Too small to bother?
161	М	08NM220	PEACHLAND LAKE NEAR PEACHLAND	REG	12	1/1/1973	12/31/1984	S					х		x			Peachland Reservoir
162	М	08NM224	OYAMA LAKE AT THE OUTLET	REG	26	1/1/1961	12/31/1986	S							x			Oyama Lake
163	М	08NM227	GARNET LAKE NEAR SUMMERLAND	REG	9	1/1/1973	12/31/1981	S							x			Garnet Res (Summerland)
164	М	08NM228	ENEAS CREEK NEAR SUMMERLAND	REG	2	1/1/1974	12/31/1975	S							x			Eneas Cr (d/s Garnet res) near Summerland
165	М	08NM229	LOCH KATRINE CREEK AT OUTLET OF GRAYSTOKE LAKE	REG	23	1/1/1977	1/1/1999	S					x	x	x			out flow from Graystoke Reservoir
166	M	08NM230	GBAYSTOKE LAKE AT THE OUTLET	REG	23	1/1/1077	1/1/1000	S					Y	Y	x			Reservoir
167	M	080101200		REC	10	1/1/1060	12/21/1000	9					~		v			Reservoir
107	M			DEC	10	1/1/1000	10/01/1000	<u> </u>					×		~			above Pearson /if OK site can be 2222)
100	N/				б	1/1/19/7	12/01/1982	0			+		X	X	x			
169		U8INIM236	VERNON GREEK DIVERSION TO W.O.C.I.D.	REG	6	1/1/1973	12/31/19/8	5			<u> </u>	X	X	<u> </u>	X			
170	IVI	08NM237		REG	9	1/1/1978	12/31/1986	S			<u> </u>		Х		X			I FOUL UK M/S I FIII'SK
171	M	08NM238	THIRSK LAKE NEAR THE OUTLET	REG	9	1/1/1979	12/31/1987	S			<u> </u>		х	-	х			
172																		
173																		

Appendix A

Terms of Reference

(Schedule A)

SCHEDULE A – SERVICES Okanagan Sustainable Hydrometric Network

The contractor will lead and complete a Hydrometric Needs Assessment for the Okanagan by:

- Acting as Chair for the Technical Water Monitoring Working Group (TWMWG) meeting as required.
- Assigning staff or sub-contractors to participate on the TWMWG as required
- Identifying currently active WSC and non-WSC hydrometric stations in the Okanagan, as well as discontinued WSC stations
- Determining the most appropriate criteria to use to determine the proposed hydrometric network for the Okanagan
- Proposing number and location for stations in the proposed network.
- Estimating costs for the optimum network
- Preparing a draft report (MS Word format) by February 29, 2008. The report will include:

- maps, tables and diagrams summarizing existing and proposed hydrometric stations

- the process, criteria and considerations used to determine numbers and locations of new hydrometric monitoring

- the criteria and considerations for identifying whether a new station should be WSC operated or to RISC standards

- Recommendations for next steps.
- Submitting a final report (MS Word and PDF format) by March 21, 2008.
- Presenting project or report details and recommendations as required.

Appendix B

History of Active WSC Stations in Okanagan

Active Stations 2007

	WSC		WSC		WSC		WSC
Year	Stations	Year	Stations	Year	Stations	Year	Stations
1910	10	1935	13	1960	30	1985	52
1911	11	1936	13	1961	31	1986	52
1912	6	1937	13	1962	33	1987	41
1913	0	1938	14	1963	35	1988	34
1914	1	1939	15	1964	36	1989	34
1915	1	1940	13	1965	44	1990	34
1916	1	1941	15	1966	44	1991	35
1917	1	1942	17	1967	44	1992	34
1918	1	1943	19	1968	51	1993	32
1919	22	1944	22	1969	66	1994	33
1920	37	1945	21	1970	83	1995	32
1921	44	1946	22	1971	84	1996	32
1922	43	1947	21	1972	88	1997	29
1923	31	1948	20	1973	94	1998	29
1924	33	1949	24	1974	91	1999	27
1925	31	1950	26	1975	81	2000	24
1926	33	1951	25	1976	85	2001	24
1927	29	1952	25	1977	93	2002	24
1928	28	1953	24	1978	87	2003	24
1929	26	1954	23	1979	85	2004	24
1930	28	1955	23	1980	72	2005	22
1931	18	1956	20	1981	67	2006	25
1932	10	1957	20	1982	61	2007	25
1933	10	1958	20	1983	46		
1934	10	1959	25	1984	52		

History of Active WSC Stations in Okanagan



Active Stations 2007

	Α	D	E		Ν	0	Р	S	Τl	J W	Х	AA	AB	AC	AD	AE	AF	AG	AH	AI	
1			Okanagan Hydrometric Review 2007/08									STATIO	N USE	AND PR	ORITY:						
2	Recc. Future ops. Primary use #1	Stn. No.	Station Name	Flow Regulation	Years (end - start)	Hydrometric Programs Start Date	Hydrometric End date	Program Operation: C=contin., S=seas.(open water)		Latitude	Longitude	Min	For	Pow	Fis	R	w	Tra	Res		
3	M = reso	ource man	agement; R=regional hydrology																		
4																					
5	_	<u>wsc s</u>	TATIONS ACTIVE IN 2007 WITHIN 10KM BUP	FER	1																
6	R	08LC040	VANCE CREEK BELOW DEAFIES CREEK	NAT				С		50.28500	-118.94800		Х		Х	Х					near Lumby
7	К	08LC042	BESSETTE CREEK ABOVE LUMBY LAGOON OUTFAL	REG				С		50.25300	-118.96100		Х		Х	Х		Х			d/s of Dutea
8		08LE020	SALMON RIVER AT FALKLAND	REG				С		50.49800	-119.55800										not useful fo
9		08LE021	SALMON RIVER NEAR SALMON ARM	REG				С		50.69300	-119.32900									,,	not useful fo
10		08LE108	EAST CANOE CREEK ABOVE DAM	NAT				С		50.69500	-119.19700										not useful fo
11		08LG016	PENNASK CREEK NEAR QUILCHENA	NAT				С		49.96700	-120.13500									!	not useful fo
12	M	08NL022	SIMILKAMEEN RIVER NEAR NIGHTHAWK					С		48.98500	-119.61700						х			;	South Main
13		08NL039	SIWASH CREEK NEAR PRINCETON	REG				С		49.66400	-120.33500									,r	not useful fo
14		08NL045	KEREMEOS CREEK BELOW WILLIS INTAKE	REG				С		49.25900	-119.82600									r	not useful fo
15	M	08NM002	OKANAGAN RIVER AT OKANAGAN FALLS	REG				С		49.34200	-119.58000				х	х	х				Okanagan s
16	R	08NM037	SHATFORD CREEK NEAR PENTICTON	REG				С		49.41600	-119.78900				х	х	х			!	Regional hy
17	R	08NM041	TREPANIER CREEK NEAR PEACHLAND	REG				С		49.82500	-119.78600	х			х		х				Fisheries, F
18	М	08NM050	OKANAGAN RIVER AT PENTICTON	REG				С		49.49900	-119.61500			х	х	х	х			(Okanagan s
19	М	08NM065	VERNON CREEK AT OUTLET OF KALAMALKA LAKE	REG				С		50.23700	-119.26800				х		х			(Okanagan s
20	М	08NM073	OSOYOOS LAKE NEAR OROVILLE					С		48.95700	-119.43800						х			(Okanagan s
21	М	08NM083	OKANAGAN LAKE AT KELOWNA	REG				С		49.88600	-119.50100					х	х			1	Okanagan s
22	М	08NM084	SKAHA LAKE AT OKANAGAN FALLS	REG				С		49.42700	-119.57400				х		х				Okanagan s
23	М	08NM085	OKANAGAN RIVER NEAR OLIVER	REG				С		49.11500	-119.56600				х	х	х				Okanagan s
24	М	08NM116	MISSION CREEK NEAR EAST KELOWNA	REG				С		49.87800	-119.41300		х		х	х	х				Okanagan s
25	М	08NM127	OKANOGAN RIVER AT OROVILLE					С		48.93100	-119.41900				х	х	х			,	Okanagan s
26	R	08NM134	CAMP CREEK AT MOUTH NEAR THIRSK	NAT				С		49.72500	-120.01700				х	х	х	х		8	Regional hy
27	R	08NM142	COLDSTREAM CREEK ABOVE MUNICIPAL INTAKE	NAT				С		50.25800	-119.08100				х	х					runoff from
28	М	08NM143	KALAMALKA LAKE AT VERNON PUMPHOUSE	REG				С		50.23000	-119.27300				х	х	х				Okanagan s
29		08NM149	SHUTTLEWORTH CREEK AT THE MOUTH	REG				С		49.33800	-119.58300				х						To be disco
30	R	08NM171	VASEUX CREEK ABOVE SOLCO CREEK	NAT				С		49.24900	-119.32000		х			х					Regional hy
31	М	08NM173	GREATA CREEK NEAR THE MOUTH	NAT				С		49.79400	-119.85100					х	х	х			Peachland
32	R	08NM174	WHITEMAN CREEK ABOVE BOULEAU CREEK	NAT				С		50.21300	-119.53700				х	х	х	х			Regional hy
33	М	08NM200	INKANEEP CREEK NEAR THE MOUTH	REG				С		49.07800	-119.50100				х	х					First Nation
34	М	08NM232	BELGO CREEK BELOW HILDA CREEK	REG				C		49.99900	-119.07300		х		х	x	x				BMID ops.
35	R	08NM240	TWO FORTY CREEK NEAR PENTICTON	NAT				C		49.65100	-119.40000		х			x			x		Regional hy
36	М	08NM241	TWO FORTY-ONE CREEK NEAR PENTICTON	NAT				C		49,64900	-119.39400		x			x			x		MOFR
37	M	08NM242	DENNIS CREEK NEAB 1780 METRE CONTOUR	NAT				C		49 62400	-119 38200		x			x			x		MOFR
38	M	08NM243	VASEUX LAKE NEAB THE OUTLET	BEG				C		49 27400	-119 52300						x				Okanagan s
39		08NM246						C C		49 24500	-119 52500				x		~				To be disco
40	R	08NN015		NAT				C		49 70200	-119 09200					x					Regional hy
41								-													
42		1	LOCALLY OPERATED STATIONS 2007																		
43		9	Stations Operated by Dobson Engineering Lt	d																	
44	М	OKPL1	ESPEBON BESERVOIB AT THE OUTLET	_		2007		s		50 °04'47" N	119°44'56" W						x			-	operated fo
45	M	OKPL2	MISSION CREEK BELOW B.M.I.D. INTAKE			2004		s		49°51'0" N	119°17'0" W				x	x	x				operated fo
46	M	OKPL3				2007		s		49°59'8" N	118°52'15" W				x	x	x				operated fo
47	M	OKPI 4	FISHHAWK Reservoir OUTLET			2007		s		50 °01'45" N	118°51'46" W				x	x	x				operated fo
48	M	OKPI 5				2007		s		49°58'15" N	118°54'15" W				x	x	x				operated fo
49	M	OKPI 6				2007		S		50°00'38" N	119°05'52" W				x	x	x				operated fo
50	M	OKPI 7	JAMES Beservoir AT THE OUTLIFT			2007		s		49°57'06" N	119°14'47" W				~	~	x				operated fo
51	M	OKPL8	LAMBLY CREEK DIVERSION TO ROSE VALLEY LAKE		1	2001		S		49°54'38" N	119°33'18" W				¥		Y				operated fo
52	M	OKPI 9	North Lambly CREEK BELOW TADPOLE Reservoir		1	2007		S		50°02'12" N	119°45'30" W				~		Y				operated fo
53	M	OKPI 10	BIGHORN RESERVOIR AT THE SPILL WAY		1	2007		S		50 °04'17" N	119°40'08" W					¥	Y				operated fo
54	M	OKPI 11				2004		8		49°44'51" N	119°20'14" W/					^	v				operated fo
54	111		· · · · · · · · · · · · · · · · · · ·		1	2004		5	i – – – – – –			1		1		1	^	1	1		

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COMMENTS:

y, Silver Star. Good R stn.
au & Creighton. Good geog sample. Unregulated. Diverted into Okanagan lower d/s.
for Okanagan
for Okanagan
for Okanagan
for Okanagan
n Okanagan System Operation
for Okanagan
for Okanagan
system operations.
vdrology. First Nations. Fisheries. Regulated???
Peachland ID
system operations.
vdrology. Summerland water supply operations.
near Silver Star
system operations.
ontinued in 2008.
ydrology. High elev.
water supply ops. Will be regulated in 2008
ydrology. First Nations.
ns. Fisheries. Some regulation
ydrology. MOFR
system operations.
ontinued in 2008.
ydrology.
or LID
or BMID
or BMID
or BMID,
or BMID
or BMID
or BMID
or LID
or LID
or LID
or SEKID

Active Stations 2007

	Α	D	E	I	Ν	0	Р	S	Т	U	W	Х	AA	AB	AC	AD	AE	AF	AG	AH	AI	
2	Recc. Future ops. Primary use #1	Stn. No.	Station Name	Flow Regulation	Years (end - start)	Hydrometric Programs Start Date	Hydrometric End date	Program Operation: C=contin., S=seas.(open water)			Latitude	Longitude	Min	For	Pow	Fis	R	w	Tra	Res		
55	М	OKPL12	MYRA DITCH BELOW KLO CREEK			2004		S			49 44 49	119 16 28						х				
56	М	OKPL13	STIRLING CREEK DIVERSION TO MCCULLOCH RESE	RVOIR		2004		S			49°43'50" N	119°12'59" W						х				operated for
57	М	OKPL14	CANYON CREEK DIVERSION TO MCCULLOCH RESEF	RVOIR		2004		S			49°44'38" N	119°16'28" W						х				operated for
58	М	OKPL15	HYDRAULIC CREEK ABOVE STIRLING DITCH			2004		S			49°44'53" N	119°13'09" W		х			х	х				operated for
59	М	OKPL16	POSTILL RESERVOIR AT THE OUTLET			2005		S			49°59'43" N	119°12'48" W					х	х				operated for
60	М	OKPL17	MILL CREEK/POSTILL RESERVOIR SLUICEWAY			2005		S			49°59'44" N	119°12'49" W						х				operated for
61	М	OKPL18	Ellis Creek near the Mouth			2007		S			49 28 36 N	119 35 49 W				х		х				operated for
62	М	OKPL19	Penticton Creek at Van Horne			2007		S			49 30 00 N	119 35 28 W				х		х				operated for
63	М	OKPL20	Upper Duteau above Grizzly			2008		S			50 02 48 N	119 04 23 W		х		х	х	х				operated for
64	М	OKPL21	Curtis Creek above Aberdeen			2008		S			50 06 46 N	119 01 30 W		х		х	х	х				operated for
65	М	OKPL22	Heart Creek above Aberdeen			2008		S			50 05 44 N	119 02 50 W		х		х		х				operated for
66		OKL 1	MILL CREEK D/S GEID INTAKE			2005		S			49°58'40" N	119°21'10" W						х				operated for
67		OKL 2	POWERS CREEK AT BEAR MAIN			2007		S			49°56'52" N	119°44'50" W						х				operated for
68		OKL 3	POWERS CREEK UPSTREAM FROM JACKPINE CREE	K		2007		S			49°56'08" N	119°44'00" W						х				operated for
69																						
70			Stations Operated by MOE Penticton																			
71		OKL 4	Ellis Creek at Atkinson St			2006		S			49°28'45" N	119°35'18" W				х						operated by
72	М	OKPL23	Trout Creek at the Canyon mouth (d/s of canyon)			2004		S			49°34'14" N	119 <i>°</i> 39'00" W				х						operated by
73	М	OKPL24	Trepanier Creek at Hwy 97			2006		S			49°47'03" N	119°42'52" W				х						operated by
74	М	OKPL25	Trepanier Creek ds Hwy 97C			2006		S			49°48'25" N	119°44'36" W				х						operated by
75	М	OKPL26	Trepanier Creek us Hwy 97C			2006		S			49°48'45" N	119°44'53" W				х						operated by
76	М	OKPL27	Powers Creek at Gellatly Rd			2004		S			49°48'51" N	119 <i>°</i> 37'48" W				х						operated by
77	М	OKPL28	Mission Creek us Gordon Dr			2006		S			49°50'31" N	119°28'51" W				х						operated by
78	М	OKPL30	Mission Creek us E. Kelowna Rd			2007		S			49°51'51" N	119°23'23" W				х						operated by
79			Mission Creek ds Belgo Ck			2005		S			49°52'01" N	119 <i>°</i> 09'27" W										operated by
80			Pearson Creek '@ FSR			2004		S			49°53'14" N	119°03'49" W										operated by
81	М	OKPL29	Pearson Creek '@ WSC 08NM172			2006		S			49°53'12" N	119°03'42" W				х	х	х				operated by
82																						
83		St	ations Operated for Oceola Fish and Game Cl	lub																		
84		OKL 5	Ellison/Duck Lake			2004		S			50 00 14 N	119 23 57 W				х						operated by
85		OKL 6	Middle Vernon Creek at the Remiche Road Bridge Crossi	ng		2004		S			50 02 50 N	119 24 21 W				х						operated by
86	М	OKL 7	Vernon Creek at outflow Swalwell/Beaver Lake			2004		S			50 02 38 N	119 15 20 W				х						operated by
87		OKL 8	Vernon Creek downstream from DLC intake			2004		S		1	50 00 51 N	119 22 45 W				х						operated by
88		OKL 9	Vernon Creek downstream from old Hiram Walker spillwa	у		2004		S			50 00 21 N	119 23 14 W				х						operated by
89																						

COMMENTS:

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MoE - To be discontinued in 2008
MoE
Oceola F&G

	Α	D	Е		Ν	0	Р	S	ΤU	W	Х	AA	AB	AC	AD	AE	AF	AG	AH	AI	
1			Okanagan Hydrometric Review 2007/08			-		_	-			STATIC	N USE A		OBITY:						
												onane	1002/								
	Recc.							Program													
	Future			Flow	Years	Hydrometric	Hydrometric	Operation:													
	ops.	Stn. No.	Station Name	Regulation	(end -	Programs	End date	C=contin.,		Latitude	Longitude	Min	For	Pow	Fis	R	W	Tra	Res		
	Primary			riogalation	start)	Start Date	2.10 0010	S=seas.(open													
2	use #1							water)													
3	M = reso	urce man	agement: B= regional hydrology																		·
4	101 - 1050		agement, n= regional hydrology																		
4																					
5	<u>D</u>	SCONTIN	IUED STATIONS (Group A) - FOR FURTHER CONSID	ERATION																	H
6	М	08LC043	ABERDEEN LAKE AT THE OUTLET	REG	19	1/1/1968	12/31/1986														I.
7		09111125		PEG	21	1/1/1050	12/21/1070														 I
/		0011101123	B.A. CREEK ABOVE SWAN LAKE CONTROL DAM	REG	21	1/1/1959	12/31/19/9														
8		08NM020	B.X. CREEK ABOVE VERNON INTAKE	REG	79	1/1/1921	4/14/1999														I
9		08NM123	B.X. CREEK BELOW SWAN LAKE CONTROL DAM	REG	69	1/1/1910	12/31/1978														I.
10	В	00111005		NAT	76	1/1/1011	10/01/1096														Noor Okonog
10		0011101033	BELLEVUE GREEK NEAR OKANAGAN MISSION	INAT	/0	1/1/1911	12/31/1900														Ineal Okallaya
11	R	08LC005	BESSETTE CREEK NEAR LUMBY	REG	65	1/1/1919	12/31/1983														Natural. Resta
12		08NM019	BLACK MOUNTAIN IBBIGATION DIVERSION NEAR KELOWNA	BEG	11	1/1/1920	12/31/1930														I.
10				NAT	5.4	4/4/4044	10/01/1001			-											
13		08LE001	BOLEAN CREEK AT FALKLAND	NAT	54	1/1/1911	12/31/1964														
14		08NM152	BRANDTS CREEK NEAR THE MOUTH	REG	7	1/1/1969	12/31/1975														Urban
15	R	08NM133	BUILL CREEK NEAR CRUMP	NAT	22	1/1/1965	12/31/1986														
10		001111100				1/1/1000	12/01/1000														
16		08NM145	BULMAN CREEK AT THE MOUTH	REG	37	1/1/1968	12/31/2004														
17	R	08NM146	CLARK CREEK NEAR WINFIELD	NAT	15	1/1/1968	12/31/1982														Clark Ck . Lov
10	М	00111162		PEG	10	1/1/1070	10/01/1001														Crooked
10		0011101103	CROOKED LAKE AT THE OUTLET	REG	12	1/1/19/0	12/31/1901														CIUOREU
19	R	08NM137	DAVES CREEK NEAR RUTLAND	NAT	22	1/1/1965	12/31/1986														I
20	М	08NM119	DEEP CREEK AT ARMSTRONG	REG	32	1/1/1951	12/31/1982														?? Urban influ
		00111450		DEO		1/1/1000	40/04/4075														
21		081010153	DEEP CREEK AT THE MOUTH	REG	1	1/1/1969	12/31/19/5														at mouth - no
22		08NM075	DEEP CREEK NEAR VERNON (STATION NO. 3)	REG	38	1/1/1930	12/31/1967														urban influenc
23	М	08I C014	DUTEAU CREEK AT OUTLET OF HADDO LAKE	BEG	70	1/1/1910	12/31/1979														Water manage
20		0020011		nea DE0	70	1/1/1010	12/01/10/0														
24		08LC006	DUTEAU CREEK NEAR LAVINGTON	REG	/8	1/1/1919	12/31/1996														Below VID Inta
25		08NM074	ELLIS CREEK NEAR PENTICTON	NAT	23	1/1/1933	12/31/1955														I.
26		08NM056	ELLIS CREEK SOUTH MAIN DIVERSION	BEG	57	1/1/1910	12/31/1966														need station for
20				nea ===			12/01/1000														
27		08NM067	ELLISON LAKE NEAR WINFIELD	REG	13	1/1/1968	12/31/1980														
28		08NM161	EQUESIS CREEK NEAR THE MOUTH	REG	14	1/1/1969	12/31/1982														Regulated
29		08NIM024	FOLIESIS CREEK NEAR VERNON	BEG	16	1/1/1011	12/31/1926														Regulated
23		00111024		nea	10	1/1/1911	12/31/1920														Tiogulatou
30		08NM139	ESPERON CREEK NEAR KELOWNA	REG	17	1/1/1965	12/31/1981														L
31	R	08NM176	EWER CREEK NEAR THE MOUTH	NAT	16	1/1/1971	12/31/1986														Some logging
		001 0001		DEO	10	1/1/10/0	10/01/1001														
32		0620031	FORTUNE CREEK AT STEFNET	REG	13	1/1/1949	12/31/1901														
33	M	08LC035	FORTUNE CREEK NEAR ARMSTRONG	REG	74	1/1/1911	12/31/1984														"reg" not much
34		08LE067	FOWLER CREEK NEAR FALKLAND	NAT	38	1/1/1927	12/31/1964														I.
05	N/	00114007		DEC	0	1/1/1070	10/01/1001														Cornet Dec /6
35	IVI	U8INIVI227	GARNET LAKE NEAR SUMMERLAND	REG	9	1/1/19/3	12/31/1981														Gamel nes (S
36		08LE044	GORDON CREEK NEAR SALMON ARM	REG	65	1/1/1911	12/31/1975														I.
37	М	08NM230	GBAYSTOKE LAKE AT THE OUTLET	BEG	23	1/1/1977	1/1/1999														Reservoir
0.	N/	001111200		DEO		4/4/4070	10/01/1007														Oraula als Dag
38	IVI	08INIM169	GRETBAUK LAKE AT THE OUTLET	KEG	18	1/1/1970	12/31/1987														Greyback Res
39	M	08LC044	HADDO LAKE AT THE OUTLET	REG	19	1/1/1968	12/31/1986										1				1
40		08NI 051	HAYES CREEK BELOW SHINISH CREEK	BEG	14	1/1/1973	12/31/1986				-						1				
-10	Г	00112001				., .,						+	1				1	-			
41	К	08NM126	HAYNES CREEK NEAR OSOYOOS	NAT	53	1/1/1912	12/31/1964					-									
42	M	08NM011	HYDRAULIC CREEK AT OUTLET OF MCCULLOCH RESERVOIR	REG	68	1/1/1919	12/31/1986										1				Hydraulic Cr d
43		08NM030	HYDBALLIC CREEK DIVERSION NEAR KELOWNA	REG	50	1/1/1010	12/31/1968														
-+0	N #	001110009			50		12/01/1300					+					+	1			
44	IVI	08NM010	HYDRAULIC CREEK NEAR THE MOUTH	REG	73	1/1/1910	12/31/1982			L											Hydraulic Cr
45		08NM040	HYDRAULIC CREEK SOUTHEAST KELOWNA DIVERSION	REG	11	1/1/1920	12/31/1930														I
46	М	08010221	ΙΔΕΔΙ Ι ΔΚΕ ΝΕΔΒ ΤΗΕ ΟΙ ΤΙ ΕΤ	REG	1.0	1/1/1060	12/31/1020														Reservoir
40	111			ned	10	1/1/1903	12/31/1900														10301900
47		08LE008	INGRAM CREEK NEAR THE MOUTH	NAT	68	1/1/1911	12/31/1978										1				L
48	R	08NM012	INKANEEP CREEK NEAR OLIVER (LOWER STATION)	NAT	40	1/1/1911	12/31/1950		Γ												
40	R			NAT	07	1/1/10/1	10/01/1077														
49	n • • •	001111/1082	INNAMEER UNEEN MEAN ULIVER (UPPER STATION)	INAT	3/	1/1/1941	12/31/19/7			<u> </u>		-									
50	M	08NM129	JOE RICH CREEK NEAR RUTLAND	REG	24	1/1/1964	12/31/1987														L
51		08NM053	KELOWNA CREEK NEAR KELOWNA (LOWER STATION)	REG	77	1/1/1922	12/31/1998									-					Kel Crk near k
50	P			NAT		., ., .,	10/04/1005					+					1	1			Demo
52	к	08NL014	KEREMEUS CREEK ABOVE MARSEL CREEK	NΑΓ	17	1/1/1912	12/31/1928					-									o we want th
53		08LE091	KERNAGHAN CREEK ABOVE DIVERSIONS	NAT	14	1/1/1974	12/31/1987										1				I.
54		08NM226		REG	7	1/1/1076	12/31/1020														
J+							12/01/1902					+					+	+			
55		08NM165	LAMBLY CREEK ABOVE TERRACE CREEK	REG	29	1/1/1970	12/31/1998			L											
56	Μ	08NM166	LAMBLY CREEK BELOW BALD RANGE CREEK	REG	13	1/1/1970	12/31/1982														Lambly below
57		08001111	LAMBLY CREEK BELOW TERRACE CREEK	REG	5	1/1/1067	12/31/1071														
57	N 4			1120	5	1/1/1007	12/01/13/1					+					+	1			
58	IVI	08NM167	LAMBLY CREEK DIVERSION TO ROSE VALLEY LAKE	REG	9	1/1/1970	12/31/1978		1		1										LID div. from l

١
AJ
COMMENTS:
an Mission
art. U/s of Duteau, Creighton
v elevation (WSC)
Jeance. Relatively natural re regulating. Watershed mostly farms. 2nd priority
good
e, d/s of Otter Lake
ement station. Must capture spill
ake. Not needed for water mgnt, or DFO? Min flow augmentation in place. Other gauges of use
or current diversion
Quite patural Pay 204
Summerland)
servoir
l/s McCulloch Reservoir (Move d/s of Fish, Browne, Long Meadow inflow??)
near mouth (d/s Sekid intake)
Kel
2.112
/ Bald Hange
ambly Ck. To Bose Valley. Check to see if Fisheries OK with no Q meas at intake

	A	D	E	1	Ν	0	Р	S	Т	UW	Х	AA	AB	AC	AD AI	E AF	= AG	AH	AI	AJ
	Recc.							Program												
	Future			_	Years	Hydrometric		Operation:												
	ops.	Stn. No.	Station Name	FIOW	(end -	Programs	Hydrometric End date	C=contin.,		Latitude	Longitude	Min	For	Pow	Fis F	R W	Tra	Res		COMMENTS:
	Primary			regulation	start)	Start Date	Lind date	S=seas.(open	ı											
2	use #1							water)												
59		08NM058	AMBLY CREEK NEAR KELOWNA	BEG	18	1/1/1910	12/31/1927													
00				DEC		1/1/1010	10/01/1075													Net peoded Fish flow from Lakoview ID
60	NA			REG	00	1/1/1910	12/31/19/5													
61	IVI	08NM136 L	AMBLY LAKE DIVERSION TO POWERS CREEK	REG	8	1/1/1965	12/31/1972													Lambly reservoir
62	M	08NM229 L	OCH KATRINE CREEK AT OUTLET OF GRAYSTOKE LAKE	REG	23	1/1/1977	1/1/1999													out flow from Graystoke Reservoir
63	М	08NM213 M	CCULLOCH RESERVOIR AT MCCULLOCH DAM	REG	14	1/1/1973	12/31/1986													Reservoir (SEKID operates)
64		08NM218 M	CDONALD CREEK DIVERSION TO PEACHLAND CREEK	REG	7	1/1/1973	12/31/1979													Diversion to Peachland Cr
65	М	08NM014 M	CDOUGALL CREEK NEAR WESTBANK	BEG	10	1/1/1920	12/31/1929													Natural flow WSC
66	R			NAT		1/1/1001	12/01/1020													
00	N 4			NAT	0	1/1/1921	12/31/1920													
67	IVI	08NM233 M	ISSION CREEK ABOVE PEARSON CREEK	REG	6	1/1/1977	12/31/1982													above Pearson (If OK site can be ????)
68		08NM234 N	OORE LAKE RESERVOIR AT THE DAM	REG	14	1/1/1973	12/31/1986													Too small to bother gauging
69	M	08NM207 N	YRA DITCH BELOW KLO CREEK	REG	13	1/1/1973	12/31/1985													Myra ditch d/s of Canyon Creek inflow. DEL operates
70		08NM047 N	ASWHITO CREEK NEAR EWING'S LANDING	NAT	10	1/1/1912	12/31/1921													
71	М	08NM114	LIVER CANAL NEAR OLIVER	BEG	39	1/1/1934	12/31/1972													
72	М	08NIM048	YAMA CREEK ABOVE WOOD LAKE IBBIGATION INTAKE	BEG	67	1/1/1921	12/31/1987													Ovama Cr above diversion (wsc)
72	N/			nEG BEO	07	1/1/1321	12/01/1907													
73		08NM028 C		REG	12	1/1/1920	12/31/1931													
74	M	08NM224 C	YAMA LAKE AT THE OUTLET	REG	26	1/1/1961	12/31/1986		<u> </u>										<u> </u>	Uyama Lake
75		08LE072 P	ALMER CREEK NEAR SALMON ARM	REG	69	1/1/1911	12/31/1979													
76	R	08NM120 P	ARK RILL NEAR OLIVER	REG	20	1/1/1951	12/31/1970													
77		08NM140 P	EACHLAND CREEK ABOVE DIVERSIONS	REG	17	1/1/1966	12/31/1982													
78		08NIM150 P		BEG	14	1/1/1060	12/31/1082													Peachland Cr @ mouth
70				ned pro	- 14	1/1/1000	10/01/1070													Piceraian around Branda Mina to Deschland Besonvoir
79		08INIM219 P	EACHLAND CREEK DIVERSION TO PEACHLAND LAKE	REG	/	1/1/19/3	12/31/19/9													
80	IVI	08NM030 P	EACHLAND CREEK MUNICIPAL IRRIGATION DIVERSION	REG	8	1/1/1919	12/31/1926													Peachland Municipal intake
81	M	08NM220 P	EACHLAND LAKE NEAR PEACHLAND	REG	12	1/1/1973	12/31/1984													Peachland Reservoir
82	М	08NM202 P	EACHLAND LAKE RESERVOIR OUTFLOW	REG	10	1/1/1973	12/31/1982													Peachland Reservoir outflow
83	R	08NM172 P	EARSON CREEK NEAR THE MOUTH	NAT	18	1/1/1970	12/31/1987													Pearson ACTIVE (Phil E)
84	М	08NM168 P	ENTICTON CREEK ABOVE DENNIS CREEK	BEG	30	1/1/1970	4/1/1999													outflow from Grevback Reservoir
05				NAT	20	1/1/1010	10/01/10/1													
60				INAT DEC	32	1/1/1910	12/31/1941													
86		08NM118 P	ENTICION CREEK AT THE MOUTH	REG	23	1/1/1950	12/31/1972													
87		08NM170 P	ENTICTON CREEK BELOW HARRIS CREEK	REG	12	1/1/1970	12/31/1981													
88	M	08NM210 P	OOLEY CREEK ABOVE POOLEY DITCH	NAT	7	1/1/1973	12/31/1979													Pooley Cr above ditch. DEL operates
89	M	08NM033 P	OWERS CREEK ABOVE WESTBANK DIVERSION	NAT	55	1/1/1920	12/31/1974													U/s of Westbank diversion. Use this one or 8NM059
90	М	08NM059 P	OWERS CREEK BELOW WESTBANK DIVERSION	REG	76	1/1/1912	12/31/1987													belwo WID diversion. Use this on or 8NM033
91		08NI 040 B		ΝΔΤ	12	1/1/1966	12/31/1977													
00	Ν.4			NAT	54	1/1/1000	10/01/1004													
92		081111036 5		INA I	54	1/1/1911	12/31/1964													
93	R F	08NM038 S	HINGLE GREEK ABOVE KALEDEN DIVERSION	NAT	58	1/1/1920	12/31/1977		<u> </u>			│								
94	R	08NM150 S	HINGLE CREEK AT THE MOUTH	REG	14	1/1/1969	12/31/1982													Shingle at mouth
95		08NM151 S	HORTS CREEK AT THE MOUTH	REG	14	1/1/1969	12/31/1982													Probably not
96	R	08NM006 S	HUTTLEWORTH CREEK NEAR OKANAGAN FALLS	REG	44	1/1/1921	12/31/1964]				Т							need station near mouth of canyon
97		08LE043 S	LVER CREEK NEAR SALMON ARM	NAT	38	1/1/1911	12/31/1948													
QR	М	08NM062 S	WAI WELL LAKE NEAB OKANAGAN CENTRE	REG	60	1/1/1026	12/31/100/													Swalwell
00	N/			PEC	0	1/1/1005	12/21/1000		<u> </u>			+ +								
33					28	1/1/1905	12/31/1992		+			+ +								
100	ĸ	08NM164 T	ESTALINDEN CREEK IN CANYON	NAT	18	1/1/1969	12/31/1986		<u> </u>			│								Heview history, choose this one or 08NM130
101	К	08NM130 T	ESTALINDEN CREEK NEAR OLIVER	REG	58	1/1/1911	12/31/1968													Review history, choose this one or 08NM164
102	М	08NM238 T	HIRSK LAKE NEAR THE OUTLET	REG	9	1/1/1979	12/31/1987													below Thirsk Reservoir
103		08NM155 T	REPANIER CREEK AT THE MOUTH	REG	13	1/1/1969	12/31/1981													Trepanier at mouth
104		08NM158 T	ROUT CREEK AT THE MOUTH	REG	14	1/1/1969	12/31/1982													
105	М	08NM227 T	BOUT CREEK BELOW THIRSK I AKE	REG	٥	1/1/1070	12/31/1096													Trout Ck B/S Thirsk
100	N/				3	1/1/1001	10/01/100		+			+ +								
106		U8INIVIU54		REG	34	1/1/1921	12/31/1954		──┤			+								
107	M	08NM042 T	ROUT CREEK NEAR SUMMERLAND	REG	9	1/1/1920	12/31/1928		<u> </u>											Is this being operated by Phil Epp????
108	M	08NM055 T	ROUT CREEK SUMMERLAND DIVERSION	NAT	10	1/1/1922	12/31/1931													Summerland Municipal intake
109	R	08NM015 V	ASEUX CREEK ABOVE DUTTON CREEK	NAT	72	1/1/1911	12/31/1982													
110		08NM162 V	ERNON CREEK AT INLET TO ELLISON LAKE	REG	6	1/1/1969	12/31/1974													
111		08NM009 V	ERNON CREEK AT INLET TO WOOD LAKE	REG	69	1/1/1919	12/31/1987													at inlet to Wood Lake
110	M	0800000		REC	70	1/1/1001	12/21/1000													Vernon Ck helow Swalwell (d/s spillway)
112	171			neu DEC	10	1/1/1921	12/31/1998		+			+ +								
113		08NM175 V	ERINON CREEK BELOW ARDA DAM	REG	8	1/1/1972	12/31/1979		+								_			urban millende, O/S Otter Lake
114	M	08NM236 V	ERNON CREEK DIVERSION TO W.O.C.I.D.	REG	6	1/1/1973	12/31/1978													WOCID Diversion (now Lake Country)

	Α	D	E	I	Ν	0	Р	S	Т	U W	Х	AA	AB	AC	AD	AE	AF	AG	AH	AI	
	Recc. Future ops. Primary	Stn. No.	Station Name	Flow Regulation	Years (end - start)	Hydrometric Programs Start Date	Hydrometric End date	Program Operation: C=contin., S=seas.(open		Latitude	Longitude	Min	For	Pow	Fis	R	w	Tra	Res		
2	000 #1			550			10/01/1000	Watery													
115		08NM043		REG	45	1/1/1919	12/31/1963														
116		08NM160		REG	31	1/1/1969	5/1/1999														
117		08NM044	VERNON CREEK OKANAGAN CENTRE DIVERSION	REG	45	1/1/1919	12/31/1963														
118		08LC007	VERNON IRRIGATION DISTRICT DIVERSION NEAR LAVINGTO	REG	48	1/1/1919	12/31/1966														
119		08NM046	WHITEMAN CREEK NEAR VERNON	REG	57	1/1/1911	12/31/1967														
120																					
121	DISCON		STATIONS (Group B) - SHORT PERIOD OF RECORD		RWISI		INTEREST			-											+
122		08101017		REG	2	1/1/1920	12/31/1921			-											+
123		08INIM225		REG	1	1/1/19/6	12/31/1982			-											+
124				REG	4	1/1/1969	12/31/19/2														
125		08LE038		INAT	2	1/1/1921	12/31/1922														+
126	M	08LE094		NAT	13	1/1/1974	12/31/1986														Ta a amall ta h
127	IVI	08NM216		REG	5	1/1/19/3	12/31/19/7			-											TOO SITIALI TO L
128		08LE074		NAT DEO	10	1/1/1965	12/31/19/4														+
129		08NL052		REG	14	1/1/19/3	12/31/1986														
130		08NM007		NAI	3	1/1/1920	12/31/1922														
131		08NM179		REG	13	1/1/1970	12/31/1982														
132		08NM154		REG	2	1/1/1969	12/31/19/0														
133		08NM124		REG	70	1/1/1910	12/31/1979														+
134		08NM025		REG	2	1/1/1921	12/31/1922														
135		08NM023		NAT	2	1/1/1921	12/31/1922														
136		08NM177	DEEP CREEK AT YOUNG ROAD	NAT	6	1/1/1970	12/31/1975														
137		08LC017		REG	1	1/1/1921	12/31/1921														
138	N 4	08LE054		NAT	19	1/1/1931	12/31/1949														
139	IVI	08NM135		REG	15	1/1/1965	12/31/1979														Fisheries requ
140	IVI	08NM122		REG	3	1/1/1955	12/31/1957														need stn for p
141	IVI	08NM228		REG	2	1/1/1974	12/31/1975														Eneas Cr (d/s
142	M	08NM215		REG	5	1/1/1973	12/31/1977														I oo small to b
143		08LE096	FOWLER CREEK AT 640 M CONTOUR	NAT	13	1/1/1974	12/31/1986														
144		08LC036	GARDOM CREEK NEAR GRINDROD	NAT	5	1/1/1960	12/31/1964														
145		08LE092	GORDON CREEK ABOVE DIVERSIONS	NAT	6	1/1/1974	12/31/1979														+
146		08LE045		NAT	2	1/1/1930	12/31/1931														
147	IVI	08LC047		REG	9	1/1/1978	12/31/1986														
148	6	08NM018		NAT	1	1/1/1920	12/31/1920														
149	R	08NM049		NAT	1	1/1/1920	12/31/1920														Review statio
150	ĸ	08NM147		NAI	10	1/1/1968	12/31/1977														Review this st
151	N 4	08NM068		REG	1	1/1/1930	12/31/1930														
152	IVI	08NM205	HYDRAULIC CREEK DIVERSION TO S.E.K.I.D.	REG	5	1/1/19/6	12/31/1980														SEKID Intake
153		08NM052		NAI	1	1/1/1922	12/31/1922			-											+
154		08111013		REG	1	1/1/1919	12/31/1919			-											+
155		001101183		REG	9	1/1/19/1	10/01/1075														
156				REG	26	1/1/1950	12/31/19/5														
157		08111061		REG	8	1/1/1924	12/31/1931														
100				neu DEO	12	1/1/1911	10/01/1077														
159		08INL044		REG	7	1/1/19/1	12/31/19/7														
160				NAT	53	1/1/1919	12/31/19/1														+
101					2	1/1/1930	12/31/1931														
162				REG NAT	4/	1/1/1922	12/31/1968					-									
164	Ν.4				4	1/1/1919	12/31/1922														
104	IVÍ			REG	5	1/1/19/3	10/01/1000					-									holow BMID
100				REG	1	1/1/1980	12/01/1980														
167				REG	3/	1/1/1910	12/01/1946														
160				DEC	9	1/1/1922	12/01/1930														
160				REG	2	1/1/1075	12/31/19/9														
170				NAT	2	1/1/19/5	12/31/19/0														
170		0810008	NIGRLEN GREEK NEAR LUMBY (LOWER STATION)	INAT	1	1/1/1920	12/31/1920					L									L

AJ
COMMENTS:
other?
ested. DEL operates
esent diversion
Garnet res) near Summeriand
other?
history. Do we want this or 08NM147?? Or what about 08NL014 Keremeos C abv Marshall C??
ation and also 08NM148. Do we want one of them?
(Active SCADA)
(ACIVE SCADA)
- the O
other?
take. DEL operating

	A	D	E	I	N	0	Р	S	Τl	J W	Х	AA	AB	AC	AD	AE	AF	AG	AH	AI	I
2	Recc. Future ops. Primary use #1	Stn. No.	Station Name	Flow Regulation	Years (end - start)	Hydrometric Programs Start Date	Hydrometric End date	Program Operation: C=contin., S=seas.(open water)		Latitude	Longitude	Min	For	Pow	Fis	R	w	Tra	Res		
171		08LC010	NICKLEN CREEK NEAR LUMBY (UPPER STATION)	NAT	1	1/1/1921	12/31/1921														1
172		08NM071	OKANAGAN LAKE AT PENTICTON	REG	55	1/1/1920	12/31/1974														1
173		08NM197	OKANAGAN RIVER BELOW THE S.O.L.I.D. CANAL	REG	1	1/1/1972	12/31/1972														
174		08NM001	OKANAGAN RIVER NEAR FAIRVIEW	NAT	1	1/1/1914	12/31/1914														
175		08NM131	OKANOGAN RIVER AT BRIDGE STREET AT OROVILLE	REG	54	1/1/1939	12/31/1992														
176		08NM132	OKANOGAN RIVER AT ZOSEL MILLPOND AT OROVILLE	REG	48	1/1/1939	12/31/1986														
177		08NL011	OLALLA CREEK AT OLALLA	NAT	10	1/1/1912	12/31/1921														
178		08NM113	OSOYOOS LAKE NEAR OSOYOOS	REG	59	1/1/1946	12/31/2004														
179		08LC015	PARADISE CREEK NEAR LUMBY	NAT	1	1/1/1921	12/31/1921														
180		08NM201	PEACHLAND CREEK BELOW DIVERSION TO PEACHLAND LAK	REG	1	1/1/1973	12/31/1973														Above Peach
181		08NM029	PEACHLAND CREEK NEAR PEACHLAND	REG	4	1/1/1919	12/31/1922														u/s of Municip
182		08NM031	PENTICTON CREEK BELOW DIVERSION	REG	3	1/1/1919	12/31/1921														
183		08NM063	PENTICTON CREEK LOT 19 DIVERSION	REG	29	1/1/1926	12/31/1954														
184		08NM032	PENTICTON CREEK MAIN DIVERSION	REG	48	1/1/1919	12/31/1966														
185		08NM157	POWERS CREEK AT THE MOUTH	REG	14	1/1/1969	12/31/1982														
186		08NM034	POWERS CREEK WESTBANK DIVERSION	REG	13	1/1/1919	12/31/1931														
187		08NM069	REED CREEK NEAR PENTICTON	REG	20	1/1/1911	12/31/1930														
188		08NM235	RIBBLEWORTH CREEK NEAR OYAMA	NAT	7	1/1/1973	12/31/1979														
189	-	08NM070	RIDDLE CREEK NEAR WEST SUMMERLAND	NAT	2	1/1/1930	12/31/1931														
190		08LE019	SALMON RIVER ABOVE ADELPHI CREEK	REG	68	1/1/1911	12/31/1978														
191	-	08LE089	SALMON RIVER ABOVE FOWLER CREEK	REG	13	1/1/1974	12/31/1986														
192		08LE088	SALMON RIVER ABOVE KERNAGHAN CREEK	NAT	7	1/1/1973	12/31/1979														
193		08LE065	SALMON RIVER AT GLENEMMA	NAT	26	1/1/1951	12/31/1976														
194		08LE090	SALMON RIVER BELOW SILVER CREEK	REG	4	1/1/1974	12/31/1977														 I
195		08LE064	SALMON RIVER NEAR FALKLAND	REG	28	1/1/1951	12/31/1978														
196		08LE097	SALMON RIVER NEAR GLENEMMA	REG	3	1/1/1974	12/31/1976														
197		08LE059	SALMON RIVER NEAR WESTWOLD	NAT	2	1/1/1946	12/31/1947														 I
198	R	08NL048	SHINISH CREEK NEAR PRINCETON	NAT	1	1/1/1973	12/31/1973														
199		08LE070	SHUSWAP LAKE AT SALMON ABM	NAT	35	1/1/1951	12/31/1985														
200		08LE042	SPA CREEK ABOVE COWPERSMITH DIVERSION	NAT	9	1/1/1923	12/31/1931														
201		08LE060	SPA CREEK BELOW COWPERSMITH DIVERSION	REG	4	1/1/1945	12/31/1948														 I
202	М	08NM212	STIRLING CREEK DIVERSION TO MCCULLOCH RESERVOIR	REG	1	1/1/1984	12/31/1984														Stirling ditch d
203		08LC048	TRINITY CREEK ABOVE DIVERSION	NAT	4	1/1/1981	12/31/1984														
204	R	08NM148	TWIN LAKES NEAR OLALLA	REG	10	1/1/1968	12/31/1977														Check also 08
205	-	08NM199	UNNAMED DITCH ABOVE PACKING HOUSE OUTFALLS IN OLI	REG	2	1/1/1972	12/31/1973														
206	-	08NM178	UNNAMED DITCH AT OLIVER	REG	3	1/1/1970	12/31/1972														
207	-	08NM008	VERNON CREEK ABOVE DIVERSIONS	REG	1	1/1/1919	12/31/1919														
208	-	08NM182	VERNON CREEK AT OUTLET OF ELLISON LAKE	REG	4	1/1/1971	12/31/1974														
209	-	08NM021	VERNON CREEK AT VERNON	REG	40	1/1/1921	12/31/1960														
210		08LE023	WARREN CREEK NEAR SALMON ARM	NAT	2	1/1/1911	12/31/1912														
211		08NM198	WESTBANK CREEK AT THE MOUTH	REG	4	1/1/1972	12/31/1975								1						 I
212		08NM180	WHITEMAN CREEK AT THE MOUTH	REG	3	1/1/1970	12/31/1972														
213		08NM181	WINFIELD CREEK AT INLET TO WOOD LAKE	REG	3	1/1/1971	12/31/1973														
214	R	08NM121	WOLFCUB CREEK NEAR OLIVER	REG	1	1/1/1952	12/31/1952														
215	-	08NM066	WOOD LAKE AT INLET TO OYAMA CANAL	REG	46	1/1/1928	12/31/1973														
216		08NL047	YELLOW LAKE NEAR KEREMEOS	REG	9	1/1/1973	12/31/1981														
217		-																			 I

AJ
COMMENTS:
and Reservoir
ıl intake
version to Hydraulic Cr. DEL operates
NM147. Do we want either?

Appendix C

Maps



