WORKING DOCUMENT VERSION 1

Appendix R - Shorts Creek





APPENDIX R

Okanagan Basin Water Board Okanagan Nation Alliance B.C. Ministry of Forests, Lands and Natural Resource Operations

Shorts Creek



May 2016

ISO 9001 and 14001 Certified | An Associated Engineering Company



APPENDIX R

Table of Contents

SECTION PAGE NO. **Table of Contents** i 1 Introduction R-1 Relevant Information for Setting Environmental Flow Needs 2 R-1 2.1 Overview of the Watershed R-1 2.2 Streamflows R-2 2.3 Fish and Aquatic Habitat R-3 2.4 Water Use and Storage R-4 2.5 Groundwater and Surface Water Interaction R-5 Traditional Knowledge 2.6 R-5

References



1 Introduction

The purpose of this appendix is to provide information to support the application of recommended environmental flow needs (EFN)-setting methods for Shorts Creek following the methods outlined in the accompanying report¹. This document contains information obtained and collated by Associated Environmental Consultants Inc. (Associated) and will be revised following additional input from Okanagan Nation Alliance. A summary of current available information for Shorts Creek is provided in Table 6-1 in the accompanying report and Table R-1 at the end of this appendix.

Section 5 in the accompanying report provides an overview of two recommended EFN-setting methods for tributaries within the Okanagan Basin, while Section 6 lists the key steps to implement each of the two methods, in both flowchart and text form.

Environmental flows have been previously recommended for Shorts Creek by Koshinsky (1972), nhc (2001), and ESSA and Solander (2009) (Table 6-1 in the accompanying report).

2 Relevant Information for Setting Environmental Flow Needs

This section summarizes the information available to support EFN-setting in Shorts Creek. Available information sources for Shorts Creek are included within Table R-1 at the end of this appendix.

2.1 OVERVIEW OF THE WATERSHED

Shorts Creek has a watershed area of approximately 186 km². The Shorts Creek watershed drains gently sloping plateau headwaters before flowing over a series of waterfalls through a steep-sided canyon within the lower reaches of the watershed. Below the canyon, Shorts Creek flows over a large alluvial fan before discharging into Okanagan Lake. The main tributary to Shorts Creek is Dunwaters Creek. Additional tributaries include Stuart, Wilson, McMullen, Attenborough, Hamilton, Emily, Christie, Godwin, Pyke, Tarrant, and Young Creeks (Wildstone Resources Ltd. 1997). Forestry is the primary land use in the upper watershed, with Fintry Provincial Park located on the alluvial fan at the mouth.

The Shorts Creek watershed is shown in Figure 1-1 in the accompanying report.

¹ Associated Environmental Consultants Inc. (Associated). 2016. Collaborative Development of Methods to Set Environmental Flow Needs in Okanagan Streams. Working Document, Current Version. Prepared for the Okanagan Basin Water Board, Okanagan Nation Alliance, and B.C. Ministry of Forests, Lands and Natural Resource Operations. May 2016.



2.2 STREAMFLOWS

2.2.1 Hydrometric Data

There are currently no active Water Survey of Canada (WSC) hydrometric stations within the Shorts Creek watershed; however, historic records are available for the following hydrometric station:

• Shorts Creek at the Mouth (WSC 08NM151; Drainage area: 185 km²; Regulated; Period of record: 1969-1982)

2.2.2 Naturalized Streamflows

Figure 6-1 in the accompanying report highlights the necessity of producing hydrographs under natural conditions and under actual, licensed, and future proposed water use conditions. Summit (2009) and nhc (2001) provide naturalized streamflow estimates for Shorts Creek at the mouth. In addition, as part of the Okanagan Water Supply and Demand Project, net and naturalized flows were modelled for the majority of Okanagan tributaries, including Shorts Creek (Summit 2010). Figure 2-1 provides a summary of the modelled mean weekly net and naturalized streamflows for Shorts Creek at the mouth for 1996-2006 (i.e., the model calibration period).

Phases 2 and 3 of the Okanagan Water Supply and Demand Project included modeling of multiple future scenarios for the Okanagan Basin, which considered projected climate change, population growth, change to irrigation efficiencies, and other factors. Net and naturalized streamflow outputs for Shorts Creek at the mouth are available for each future scenario.



Figure 2-1 Mean weekly net and naturalized flows for Shorts Creek at the mouth, 1996-2006 (Summit 2010).

2.3 FISH AND AQUATIC HABITAT

Trumbley Environmental Consulting Ltd. (2008) completed a fish presence culvert inspection (FPCI) for select sites within the Shorts Creek watershed. During the FPCI, one culvert was confirmed to be a barrier to fish migration within Dunwaters Creek (Trumbley Environmental Consulting Ltd. 2008).

Wildstone Resources Ltd. (1997) also completed an Overview Fish Habitat Assessment Procedure for the Shorts Creek watershed. A summary of fish and fish habitat within Shorts Creek and associated tributaries is provided within Section 4.3.3 of the report (Wildstone Resources Ltd. 1997). A 50 m waterfall was documented approximately 1.1 km upstream from the mouth of Shorts Creek; however, Wildstone Resources Ltd. (1997) confirmed fish presence upstream and downstream of the waterfall.

No sensitive habitat inventory and mapping (SHIM) has been completed for Shorts Creek (Table 6-1 in the accompanying main report).

Since current (and potentially historic) aquatic habitat information is important for developing an EFN flow regime, it is recommended that up-to-date aquatic habitat information be obtained in order to set appropriate EFNs for Shorts Creek.²

² Aquatic habitat information, including fish barriers can be obtained from the Government of B.C. Habitat Wizard: <u>http://www.env.gov.bc.ca/habwiz/</u>.



2.3.1 Current and Historical Fish Species Presence

Fish species found in Shorts Creek include rainbow trout, kokanee salmon, eastern brook trout, largescale sucker, longnose dace, prickly sculpin, and sculpin (general) (ESSA and Solander 2009).

Since current (and potentially historic) fish presence information is important for developing an EFN flow regime, it is recommended that up-to-date fish presence information be obtained from publically available databases at the time of investigation.³

2.3.2 Fish Periodicity and Habitat Suitability

No stream-specific fish periodicity or habitat suitability indices have been developed for Shorts Creek (Table 6-1 in the accompanying main report). However, Appendix E provides information on species-specific life stage periodicities for the Okanagan Basin, as well as habitat suitability index (HSI) curves for select species. The information within Appendix E should be used at a minimum to support EFN-setting for Shorts Creek.

2.4 WATER USE AND STORAGE

There are no major water suppliers within the Shorts Creek watershed; however, many local Fintry residents are known to extract water from Shorts Creek for personal use due to the absence of water systems in some nearby subdivisions (Okanagan Lake BC 2016).

Summit (2010) provides an estimate of actual surface water use within the Shorts Creek watershed for 1996-2006 in Appendix C of the Okanagan Water Supply and Demand Project – Phase 2. The actual mean annual surface water use over 1996-2006 was estimated to be 24 ML.

2.4.1 Storage Reservoirs

There is no developed storage within the Shorts Creek watershed (Dobson 2008 [included in Summit 2010]; Summit 2009).

2.4.2 Water Licences and Major Points of Diversion

At present, there are 21 water extraction licences within the Shorts Creek watershed. Since knowledge of current water licences is critical in developing EFN flow regimes, it is recommended that up-to-date water licence information be obtained at the time of investigation.⁴

³ Fish presence information can be obtained from the Government of B.C. Fish Inventory Summary System Database Query: <u>http://www.env.gov.bc.ca/fish/fiss/</u>.

⁴ Water Licence Information can be obtained from the Government of B.C. Water Licences Query: <u>http://a100.gov.bc.ca/pub/wtrwhse/water_licences.input</u>.

2.4.3 Interbasin Transfers

Dobson (2008) reported that the Okanagan Indian Band diverts water out of the Shorts Creek watershed to Residual Area W-5 (Node 15).⁵ In addition, Dobson (2008) reported that the Lakeview Irrigation District (now Lakeview Service Area operated by the City of West Kelowna) was planning to begin diverting water from Dunwater Creek to into Lambly Creek; however, this diversion does not appear to have been established to date.

2.5 GROUNDWATER AND SURFACE WATER INTERACTION

Summit (2009) identified that Shorts Creek likely loses water to groundwater and estimated that streamflow is lost to groundwater at a rate of 0.014 m³/s per km of channel on the alluvial fan (Section 3.6 of Summit 2009).

2.6 TRADITIONAL KNOWLEDGE

The current version of this document does not include presentation of any Okanagan Nation Traditional Knowledge. However it is anticipated that a future revision will include such information, as well as potentially other technical information held by the Okanagan Nation Alliance Fisheries Department.

⁵ The geographic location of the residual areas and water use areas can be found on Figure 1.1 in Dobson (2008), and Maps 1 and 3 in Summit (2010).



References

- Dobson Engineering Ltd (Dobson). 2008. Water Management and Use Study. Prepared for Okanagan Basin Water Board as part of the Phase 2 Okanagan Water Supply and Demand Project.
- ESSA Technologies Ltd. and Solander Ecological Research (ESSA and Solander). 2009. Instream Flow Analysis for the Okanagan Water Supply & Demand Project. Prepared for the Okanagan Basin Water Board.
- Koshinsky, G. D. 1972. Estimates of Minimum Flow Requirements for Okanagan Tributary Streams for the Propagation of Salmonid Fish Species Endemic to the Main Lakes. March, 1972.
- Northwest Hydraulic Consultants (nhc). 2001. Hydrology, Water Use and Conservation Flows for Kokanee Salmon and Rainbow Trout in the Okanagan Lake Basin, B.C. Prepared for B.C. Fisheries Management Branch, Victoria, B.C.

Okanagan Lake BC. 2016.

http://www.okanaganlakebc.ca/community/personal/westside_road/water_shorts_creek_photos.htm , Accessed April 29, 2016.

- Summit Environmental Consultants Inc. (Summit). 2009. Surface Water Hydrology and Hydrologic Modelling Study "State of the Basin" Report. Prepared for the Okanagan Basin Water Board as part of the Phase 2 Okanagan Water Supply and Demand Project.
- Summit Environmental Consultants Inc. (Summit). 2010. Okanagan Water Supply and Demand Project: Phase 2 Summary Report. Prepared for the Okanagan Basin Water Board, July 2010.
- Trumbley Environmental Consulting Ltd. 2008. Fish Passage Culvert Inspection (FPCI) Selected Sites in the Shorts Creek Watershed (FIA Project Number SOTFL49 5038004). Prepared for Tolko Industries Ltd., Okanagan Regional Woodlands. December, 2008.
- Wildstone Resources Ltd. 1997. Overview Fish Habitat Assessment Procedure Equesis, Nashwito, Whiteman and Shorts Creeks. Prepared for Okanagan Indian Band, April 1997.

Table R-1 Summary of relevant information for setting environmental flow needs within Shorts Creek watershed

				Fi	sh and	d Aquat	tic Hat	oitat						Strean	nflow							,	Nater N	Manage	ment						
Information Source	Current Fish Species Presence	Historic Fish Species Presence	Fish Periodicity Tables	Aquatic Habitat	Channel Characteristics	Channel Cross-Sections	Channel Velocity/Depth Measurements	Habitat Suitability Index	Fish Barriers (Natural/Man-made)	EEN Investinations / Racommandad Fish Flows	Ern investigations / kecommended rish riows	Other Relevant Information	Streamflow Measurements	Water Quality / Temperature	Streamflow Estimates	Other Relevant Information	History of Water Management	Water License Points-of-Diversion Mapping	Water License Information	Water License – Conservation Storage/Flows	Water Purveyor Intakes	Groundwater Wells Mapping	Groundwater Information	Water Use Information (Actual/Estimated)	Return Flow Information	Land Use and Associated Water Supply Source	Interbasin/Intrabasin Transfers	Flow Regulation	Reservoir Flow Release Patterns	Reservoir Minimum Flow Releases	Other Relevant Information
Online Resources																															
B.C. Habitat Wizard (<u>http://www.env.gov.bc.ca/habwiz/</u>)	\checkmark								\checkmark																						
B.C. Ministry of Forests, Lands, and Natural Resource Operations – Dam Safety Program (<u>http://www.env.gov.bc.ca/wsd/public_safety/dam_safety/</u>). Contact: Mike Noseworthy, Dam Safety Officer (Penticton).																												√			
B.C. Orchard Museum (https://kelownamuseums.ca/museums/the-bc-orchard-industry-museum/)																	\checkmark														
B.C. Water Licences Query (http://a100.gov.bc.ca/pub/wtrwhse/water_licences.input)																			\checkmark												
B.C. Water Resources Atlas (<u>http://www.env.gov.bc.ca/wsd/data_searches/wrbc/</u>)													\checkmark	\checkmark				\checkmark			\checkmark	\checkmark	\checkmark					\checkmark			
B.C. Water Use Reporting Center (<u>http://www.obwb.ca/tools/bc-water-use-reporting-centre/</u>)													\checkmark											\checkmark							
B.C. Water Well Application (<u>https://a100.gov.bc.ca/pub/wells/public/</u>)																							\checkmark								
Brenda Mines (<u>http://www.brendamines.ca/EN/Pages/default.aspx</u>)														\checkmark			\checkmark														
DataBC (<u>http://www.data.gov.bc.ca/</u>)													✓	\checkmark				\checkmark	\checkmark		\checkmark	\checkmark	\checkmark					~			
Fisheries Inventory Summary System (<u>http://www.env.gov.bc.ca/fish/fiss/</u>)	\checkmark			\checkmark																											
Okanagan Historical Society Reports (<u>https://open.library.ubc.ca/#/collections/ohs</u>)																	\checkmark														
Water Survey of Canada (<u>https://www.ec.gc.ca/rhc-wsc/</u>)													✓																		
Literature Resources																															
Western Water Associates Ltd., Polar Geoscience Ltd., and ESSA Technologies Ltd. 2014. Okanagan Water Allocation Tool Plan. Prepared for the Okanagan Basin Water Board, May 2014.										\checkmark	· ·	\checkmark																			
Summit Environmental Consultants Inc. 2013. Okanagan Hydrologic Connectivity Model: Summary Report. Prepared for the Okanagan Basin Water Board, May 2013.										\checkmark	·				\checkmark				\checkmark		\checkmark						\checkmark				
Epp, P. 2012. HSI tables in Microsoft Excel Files: Glide Habitat Template and Riffle Habitat Template.								\checkmark																							

				Fis	sh and	Aqua	tic Ha	abitat	t					Strea	mflow								W	ater N	lanago	ement						
Information Source	Current Fish Species Presence	Historic Fish Species Presence	Fish Periodicity Tables	Aquatic Habitat	Channel Characteristics	Channel Cross-Sections	Channel Velocitv/Depth Measurements		Habitat Suitability Index Fish Barriers (Natural/Man-made)		EFN Investigations / Recommended Fish Flows	Other Relevant Information	Streamflow Measurements	Water Quality / Temperature	Streamflow Estimates	Other Relevant Information	History of Water Management	Water License Points-of-Diversion Mapping	Water License Information	Water License – Conservation Storade/Flows		Water Furveyor intrakes	Groundwater Wells Mapping	Groundwater Information	Water Use Information (Actual/Estimated)	Return Flow Information	Land Use and Associated Water Supply Source	Interbasin/Intrabasin Transfers	Flow Regulation	Reservoir Flow Release Patterns	Reservoir Minimum Flow Releases	Other Relevant Information
Polar Geoscience Ltd. 2012. Projected Water Supply and Use in the Okanagan Basin (2011-2040) – Okanagan Basin Water Accounting Model Results. Prepared for the Okanagan Basin Water Board. March 2012. Note: Several Excel spreadsheets (not attached to the report) are available from the author describing monthly water extraction, water use, and net and natural streamflow for all major tributaries in the Okanagan Basin.															V	V																
DHI Water and Environment. 2010. Okanagan Basin Water Accounting Model. Prepared for the Okanagan Basin Water Board, November 2010.															✓													\checkmark				
Rayne, S., and K. Forest. 2010. Historical trends in annual water yields for the Okanagan Basin, British Columbia, Canada. Nature Proceedings: doi: 10.1038/npre.2010.4946.1																~																
Summit Environmental Consultants Inc. 2010. Okanagan Water Management and Use (Appendix C). In: Okanagan Water Supply and Demand Project, Phase 2 Summary Report. Prepared for Okanagan Basin Water Board, July 2010.																	~	\checkmark	~	~	V				✓	\checkmark	~	√	√			~
van der Gulik, T., Neilsen, D., and R. Fretwell. 2010. Agriculture Water Demand Model – Report for the Okanagan Basin. February 2010.																									~		~					
ESSA Technologies Ltd. and Solander Ecological Research. 2009. Instream Flow Needs Analysis for the Okanagan Water Supply and Demand Project. Prepared for the Okanagan Basin Water Board, November 2009.	~		~							~	/																					
Golder Associates Ltd. and Summit Environmental Consultants Ltd. 2009. Groundwater Objectives 2 and 3 – Phase 2 Okanagan Water Supply and Demand Project. Prepared for the Okanagan Basin Water Board, July 2009.																								√								
Polar Geoscience Ltd. 2009. Okanagan Basin Water Supplier Sources. Excel spreadsheet identifying water use areas in the Okanagan and the associated source(s) and water supplier. Digital file: Water supplier sources ver 15.xls.																	√				\checkmark			√	~		\checkmark					~
Summit Environmental Consultants Ltd. 2009. Surface Water Hydrology and Hydrologic Modeling Study – "State of the Basin" Report. Prepared for the Okanagan Basin Water Board, September 2009. Note: detailed spreadsheets supporting the findings of the report are available from the author.												✓	~		~	~																
Trumbley Environmental Consulting Ltd. 2008. Fish Passage Culvert Inspection (FPCI) – Selected Sites in the Shorts Creek Watershed (FIA Project Number SOTFL49 5038004). Prepared for Tolko Industries Ltd., Okanagan Regional Woodlands. December, 2008.				\checkmark	~				\checkmark																							
Neilsen-Welch, L., and D. Allen. 2007. Groundwater and Hydrogeological Conditions in the Okanagan Basin, B.C. A State of the Basin Report. Prepared for the Okanagan Basin Water Board, December 2007.																								√								

				Fi	sh and	Aqua	tic Hab	oitat					Strea	mflow							١	Nater I	Manag	ement						
Information Source	Current Fish Species Presence	Historic Fish Species Presence	Fish Periodicity Tables	Aquatic Habitat	Channel Characteristics	Channel Cross-Sections	Channel Velocity/Depth Measurements	Habitat Suitability Index	Fish Barriers (Natural/Man-made)	EFN Investigations / Recommended Fish Flows	Other Relevant Information	Streamflow Measurements	Water Quality / Temperature	Streamflow Estimates	Other Relevant Information	History of Water Management	Water License Points-of-Diversion Mapping	Water License Information	Water License – Conservation Storage/Flows	Water Purveyor Intakes	Groundwater Wells Mapping	Groundwater Information	Water Use Information (Actual/Estimated)	Return Flow Information	Land Use and Associated Water Supply Source	Interbasin/Intrabasin Transfers	Flow Regulation	Reservoir Flow Release Patterns	Reservoir Minimum Flow Releases	Other Relevant Information
Ptolemy, R. 2005. HSI Charts and Tables in Microsoft Excel File: WUP-HSI.								\checkmark																						
Rae, R. 2005. The State of Fish and Fish Habitat in the Okanagan and Similkameen Basins. Prepared for the Canadian Okanagan Basin Technical Working Group, Westbank, B.C.	\checkmark			\checkmark							~																			
Kingfisher Environmental. 1998. Fish Collection Summary Report – Fish Permit #97-80-0146		\checkmark																												
Chara Consulting. 2004. Kokanee Stream Spawner Enumeration of the Okanagan Valley's Main Lakes, 2004.	\checkmark																													
Matthews, S., and C. J. Bull. 2003. Selection of a Focal Watershed for the Protection and Restoration of Fish Stocks and Fish Habitat in the Okanagan Region.	\checkmark	\checkmark																												
Urban Systems. 2012. Fish Collection Data – Fish Permit #KA 12-80169	\checkmark																													
Northwest Hydraulic Consultants. 2001. Hydrology, Water Use, and Conservation Flows for Kokanee Salmon and Rainbow Trout in the Okanagan Lake Basin, B.C. Prepared for B.C. Fisheries, Fisheries Management Branch, August 2001.			\checkmark							\checkmark	\checkmark			\checkmark																
Obedkoff, W. 2000. Interior Community Watershed Streamflow Inventory. Water Inventory Section, Resources Inventory Branch, March 2000.												~		\checkmark	\checkmark															
Shepherd, B.G., and R. Ptolemy. 1999. Flows for Fish: Requirements for Okanagan Lake Tributaries (Draft). B.C. Ministry of Environment, Lands and Parks, Penticton, B.C. Note: there are several incomplete drafts of this document available on EcoCat. One should refer to most recent.									\checkmark	~			~																	
Dobson Engineering. 1994. TFL 49 Block A Watershed Assessments for Naswhito Creek, Whiteman Creek and Shorts Creek. Prepared for Riverside Forest Products Limited. January, 1994.											~				✓			✓												
Tredger, C. D. 1989. Okanagan Lake tributary assessment: Progress in 1988. Fisheries Project Report No. FAIU-15. Ministry of Environment, Recreational Fisheries Branch, Victoria, B.C.	\checkmark						\checkmark	\checkmark							~															
Tredger, C.D. 1988. Okanagan Lake tributary assessment: progress in 1987. Fisheries Project Report No. FAIU-10. Ministry of Environment, Recreational Fisheries Branch, Victoria, B.C.	\checkmark			~							\checkmark																			
Tredger, C.D. 1987. Investigation of kokanee enhancement opportunities in Okanagan Lake tributary streams. Ministry of Environment and Parks, Recreational Fisheries Branch, Victoria, B.C.	\checkmark			~							\checkmark																			
Houston, C. 1984. Summary of Kokanee Counts for Trout, Trepanier, Deep, Powers, Mission, Shorts,	\checkmark																													

				Fis	h and	Aquati	ic Hab	oitat					Strea	amflow							,	Water	Manag	ement						
Information Source	Current Fish Species Presence	Historic Fish Species Presence	Fish Periodicity Tables	Aquatic Habitat	Channel Characteristics	Channel Cross-Sections	Channel Velocity/Depth Measurements	Habitat Suitability Index	Fish Barriers (Natural/Man-made)	EFN Investigations / Recommended Fish Flows	Other Relevant Information	Streamflow Measurements	Water Quality / Temperature	Streamflow Estimates	Other Relevant Information	History of Water Management	Water License Points-of-Diversion Mapping	Water License Information	Water License – Conservation Storage/Flows	Water Purveyor Intakes	Groundwater Wells Mapping	Groundwater Information	Water Use Information (Actual/Estimated)	Return Flow Information	Land Use and Associated Water Supply Source	Interbasin/Intrabasin Transfers	Flow Regulation	Reservoir Flow Release Patterns	Reservoir Minimum Flow Releases	Other Relevant Information
Vernon, and Coldstream Creeks and the Okanagan River in 1983. Memo to File No. 40.3502.																														
Wildstone Resources Ltd. 1997. Overview Fish Habitat Assessment Procedure – Equesis, Naswhito, Whiteman and Shorts Creek Watershed. Prepared for Okanagan Indian Band. April, 1997.				✓								\checkmark																		
Letvak, D.B. 1980. Annual Runoff Estimates for West Side of Okanagan Valley. B.C. Ministry of Environment. January, 1980.															~															
Cheng, J.D. 1979. Low Flow Characteristics of Tributary Streams in the Okanagan Basin. Cohen, S. (ed.) and Kulkarni, T. (ed.). 2001. Water Management & Climate Change in the Okanagan Basin. Environment Canada & University of British Columbia.												√			\checkmark															
Dobson Engineering. 1990. Shorts Creek – Assessment of Alternatives to Enhance Okanagan Lake Fishery. September, 1990.										~								~												
Wightman, J.C., and G.D. Taylor. 1978. Overview and rating of production capabilities and enhancement opportunities for rainbow trout and kokanee in tributaries to upper Okanagan basin lakes. Fish Habitat improvement Section, Fish and Wildlife Branch, Ministry of Recreation and Conservation, Victoria, B.C.		~							~		~																			
Pearson, G. A. 1977. Degradation in the Production of Stream Spawning Kokanee in the Okanagan Lake System. Ministry of Environment, December 1977.	~																													
Pinsent, M. E., Koshinsky, G. D., Willcocks, T. J., and J. O'Riordan. 1974. Fisheries and Sport Fish Potentials of the Okanagan Basin. Technical Supplement IX(A). Office of the Study Director, Penticton, BC.		~									\checkmark																			
Canada-British Columbia Okanagan Basin Agreement. 1974. Technical Supplement I: Water Quantity in the Okanagan Basin. Office of the Study Director, Penticton, B.C., March 1974.															~											✓				
Canada-British Columbia Okanagan Basin Agreement. 1974. Technical Supplement II: Water Quantity Computer Models. Office of the Study Director, Penticton, B.C., March 1974.															~															
Canada-British Columbia Okanagan Basin Agreement. 1974. Technical Supplement III: Water Quantity Alternatives and Supporting Water Quantity Data. Office of the Study Director, Penticton, B.C., March 1974.															\checkmark															
Canada-British Columbia Okanagan Basin Agreement. 1974. Technical Supplement IX: Fisheries and Wildlife in the Okanagan. Office of the Study Director, Penticton, B.C., March 1974.		~		~						~	~																			
Koshinsky, G. D. 1972. Estimates of Minimum Flow Requirements for Okanagan Tributary Streams for the Propagation of Salmonid Fish Species Endemic to the Main Lakes.				\checkmark	\checkmark					\checkmark	\checkmark																			

				Fis	sh and	Aquat	tic Ha	bitat				:	Stream	nflow							,	Water	Manag	ement						
Information Source	Current Fish Species Presence	Historic Fish Species Presence	Fish Periodicity Tables	Aquatic Habitat	Channel Characteristics	Channel Cross-Sections	Channel Velocity/Depth Measurements	Hahitat Suitahility Index	riabitat Sutability Index Fich Barriers (Natitral/Man-made)	EFN Investigations / Recommended Fish Flows	Other Relevant Information	Streamflow Measurements	Water Quality / Temperature	Streamflow Estimates	Other Relevant Information	History of Water Management	Water License Points-of-Diversion Mapping	Water License Information	Water License – Conservation Storage/Flows	Water Purveyor Intakes	Groundwater Wells Mapping	Groundwater Information	Water Use Information (Actual/Estimated)	Return Flow Information	Land Use and Associated Water Supply Source	Interbasin/Intrabasin Transfers	Flow Regulation	Reservoir Flow Release Patterns	Reservoir Minimum Flow Releases	Other Relevant Information
Anonymous. 1969. Fish Habitat Surveys – Okanagan Lake Tributary Streams. December 1969.		✓		✓	✓							✓																		
Anonymous. 1969. Fisheries Habitat Survey Shorts Creek. July, 1969		✓											✓																	