

Appendix T - Trepanier Creek

APPENDIX T

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

Trepanier Creek



May 2016

APPENDIX T

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1 Introduction

The purpose of this appendix is to provide information to support the application of recommended environmental flow needs (EFN)-setting methods for Trepanier 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 Trepanier Creek is provided in Table 6-1 in the accompanying report and Table T-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 Trepanier Creek by Koshinsky (1972), Shepherd and Ptolemy (1999), nhc (2001), and ESSA and Solander (2009) (Table 6-1 in the accompanying report). Weighted Usable Width data for Trepanier Creek is presented in Epp (2004-2007, 2009, and 2010).

2 Relevant Information for Setting Environmental Flow Needs

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

2.1 OVERVIEW OF THE WATERSHED

Trepanier Creek has a watershed area of approximately 260 km². The watershed drains a gently sloping plateau before entering a steep canyon section below Highway 97C and draining into Okanagan Lake through the community of Peachland (Golder 2010). The main tributaries to Trepanier Creek include MacDonald and Lacoma Creeks. The main land use within the watershed is agriculture and urban development within the lower portions of the watershed and forestry activities in the upper portions. In addition, Brenda Mine is located in the headwaters, but has not been operational since 1990 (Summit 2009).

The Trepanier 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 is currently one active Water Survey of Canada (WSC) hydrometric station within the Trepanier Creek watershed:

- **Trepanier Creek near Peachland** (WSC 08NM041; Drainage area: 182 km²; Regulated; Period of record: 1919-Present)

In addition, historic records are available for the following hydrometric stations within the watershed:

- **Jack Creek at the Mouth** (WSC 08NM013; Drainage area: 40.4 km²; Regulated; Period of record: 1919-1919)
- **Trepanier Creek at the Mouth** (WSC 08NM155; Drainage area: 254 km²; Regulated; Period of record: 1969-1981)

The B.C. Ministry of Environment also operated three seasonal hydrometric stations on Trepanier Creek between 2006 and 2008:

- **Trepanier Creek at Hwy 97** (Regulated; Period of record: 2006-2007)
- **Trepanier Creek downstream of Hwy 97C** (Regulated; Period of record: 2006-2007)
- **Trepanier Creek upstream of Hwy 97C** (Regulated; Period of record: 2006-2008)

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. nhc (2001) and Summit (2009) provided naturalized streamflow estimates for Trepanier 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 Trepanier Creek (Summit 2010). Figure 2-1 provides a summary of the modelled mean weekly net and naturalized streamflows for Trepanier 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, changes to irrigation efficiencies, plus others. Net and naturalized streamflow outputs for Mill Creek at the mouth are available for each future scenario.

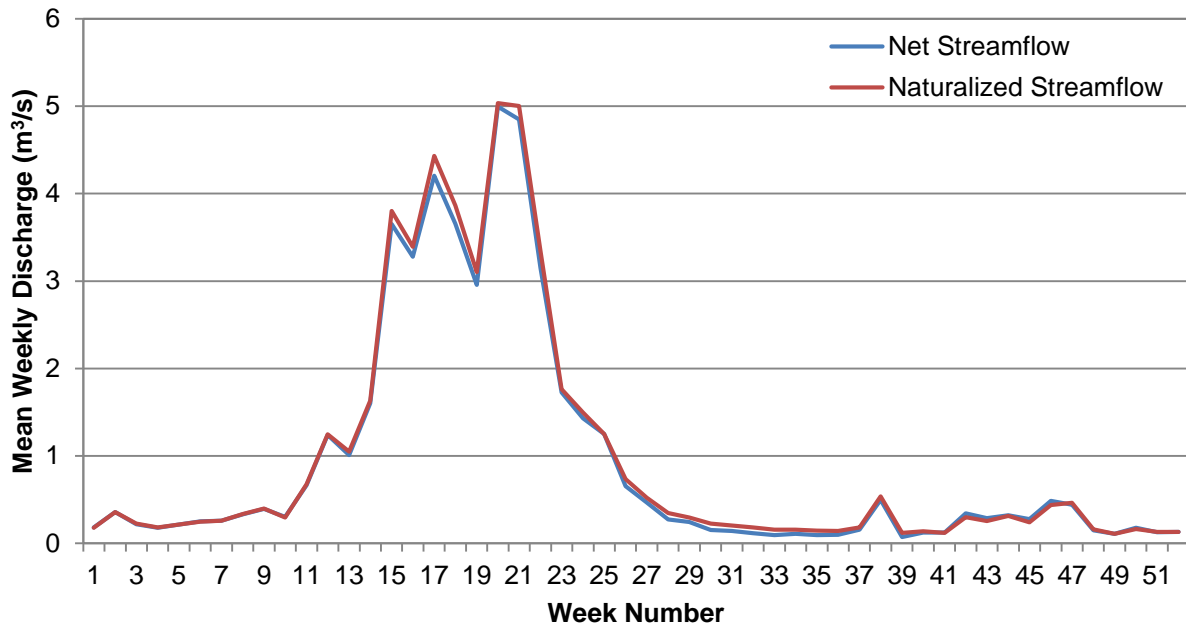


Figure 2-1
Mean weekly net and naturalized flows for Trepanier Creek at the mouth, 1996-2006 (Summit 2010)

2.3 FISH AND AQUATIC HABITAT

Grainger and Streamworks (2010) completed a hydrological risk assessment for Trepanier Creek, which includes an overview of riparian and aquatic habitat within the Trepanier Creek watershed. A series of cascades and a waterfall located approximately one km upstream from the mouth are documented as permanent barriers to fish migration (Grainger and Streamworks 2010). In addition, Golder (2010) completed a watershed assessment for drinking water source protection, which provides information on channel characteristics within Trepanier Creek.

The Regional District of Central Okanagan (RDCO) completed sensitive habitat inventory and mapping (SHIM) for Trepanier Creek in 2008 (RDCO 2008).

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 from publically available databases at the time of investigation.²

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

2.3.1 Current and Historical Fish Species Presence

Fish species found in Trepanier Creek include rainbow trout, kokanee salmon, burbot, largescale sucker, sucker (general), 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

A fish periodicity chart for Trepanier Creek is provided by nhc (2003), which defines critical timing periods for adult migration, spawning, incubation, fry rearing, and par rearing for rainbow trout and kokanee salmon (Table 6-1 in the accompanying main report).

In addition, Appendix E of the accompanying report provides information on salmonid species-specific life stage periodicities for the Okanagan Basin, as well as habitat suitability index (HSI) curves for select species. The information within nhc (2003) and Appendix E should be used at a minimum to support EFN-setting for Trepanier Creek.

2.4 WATER USE AND STORAGE

The District of Peachland (DoP) is the main water supplier within the Trepanier Creek watershed.

Summit (2010) provides an estimate of actual surface water use within the Trepanier 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 607 ML. These water use estimates were subsequently included within the Okanagan Hydrologic Connectivity Model that was used to investigate 'first-in-time, first-in-right' water license legislation within the Okanagan Basin (Summit 2013).

2.4.1 Storage Reservoirs

Historically, DoP operated two storage reservoirs to capture spring snowmelt runoff within the Trepanier Creek watershed (Dobson 2008 [included in Summit 2010]):

- Wilson Lake
- Silver Lake

However, the dam at Wilson Lake experienced a breach; therefore, Wilson Lake is no longer used for storage purposes (Dobson 2008; Summit 2009). Currently, Silver Lake is only used for emergency supply by DoP (Dobson 2008).

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

2.4.2 Water Licences and Major Points of Diversion

The DoP water intake on Trepanier Creek is located at the end of Trepanier Creek off of Trepanier Road, downstream of Venner Creek (a small tributary to Trepanier Creek) (Golder 2010).

There are 151 current water extraction licences within the Trepanier 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

2.4.3 Interbasin Transfers

DoP transfers water from the Trepanier Creek watershed into the Peachland Creek watershed via the MacDonald Creek diversion at Brenda Mine (Summit 2010). Summit (2010) provides an estimated average annual diversion volume of 200 ML for the period of 1996-2006, assuming that the diversion occurs between April 1 and September 30.

2.5 GROUNDWATER AND SURFACE WATER INTERACTION

Summit (2009) identified that Trepanier Creek likely loses water to groundwater (Section 3.6 of Summit 2009), while Obedkoff (1990) provides estimated surface water losses to groundwater for the winter and summer periods.

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.

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

References

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- Regional District of Central Okanagan (RDCO). 2008. Sensitive Habitat Inventory and Mapping. Trepanier Creek.
- 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.

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.

Summit Environmental Consultants Inc. (Summit). 2013. Okanagan Hydrologic Connectivity Model: Summary Report. Prepared for the Okanagan Basin Water Board.

Table T-1 Summary of relevant information for setting environmental flow needs within Trepanier Creek watershed

Information Source	Fish and Aquatic Habitat										Streamflow			Water Management																			
	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			
Online Resources																																	
B.C. Habitat Wizard (http://www.env.gov.bc.ca/habwiz/)	✓							✓																									
B.C. Ministry of Forests, Lands, and Natural Resource Operations – Dam Safety Program (http://www.env.gov.bc.ca/wsd/public_safety/dam_safety/). Contact: Mike Noseworthy, Dam Safety Officer (Penticton).																																✓	
B.C. Orchard Museum (https://kelownamuseums.ca/museums/the-bc-orchard-industry-museum/)															✓																		
B.C. Water Licences Query (http://a100.gov.bc.ca/pub/wtrwhse/water_licences.input)																	✓																
B.C. Water Resources Atlas (http://www.env.gov.bc.ca/wsd/data_searches/wrbc/)											✓	✓			✓				✓	✓	✓						✓						
B.C. Water Use Reporting Center (http://www.obwb.ca/tools/bc-water-use-reporting-centre/)											✓												✓										
B.C. Water Well Application (https://a100.gov.bc.ca/pub/wells/public/)																					✓												
Brenda Mines (http://www.brendamines.ca/EN/Pages/default.aspx)												✓			✓																		
DataBC (http://www.data.gov.bc.ca/)											✓	✓			✓	✓		✓	✓	✓							✓						
District of Peachland (http://www.peachland.ca/). Contact: Joe Mitchell, Director of Operations – Public Works												✓			✓												✓	✓	✓				
Fisheries Inventory Summary System (http://www.env.gov.bc.ca/fish/fiss/)	✓			✓																													
Okanagan Historical Society Reports (https://open.library.ubc.ca/#/collections/ohs)															✓																		
Peachland Museum (http://peachlandhistory.ca/)															✓																		
Peachland Virtual Museum (http://www.virtualmuseum.ca/sgc-cms/histoires_de_chez_nous-community_memories/pm_v2.php?id=exhibit_home&fl=0&lg=English&ex=00000716)															✓																		
Water Survey of Canada (https://www.ec.gc.ca/rhc-wsc/)											✓																						
Literature Resources																																	

