# Steelhead spawner enumeration in the Okanagan River mainstem and tributaries: Inkaneep, Vaseux and Shuttleworth creeks - 2007

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# EXECUTIVE SUMMARY

Steelhead salmon that return to the Canadian Okanagan Basin migrate from the ocean via the Columbia River then into Okanagan River and through Zosel Dam at the outlet of Osoyoos Lake. The video counter at Zosel Dam enumerated 147 adult steelhead (adipose-clipped and adipose-present) migrating into Osoyoos Lake between March and May, while only 121 of them were expected to spawn in the Canadian portion of the Okanagan Basin. A total of three redds were observed in Canadian Okanagan Basin water-bodies surveyed in the spring of 2007, all in Inkaneep Creek. No redds were observed in Vaseux Creek or the Okanagan River mainstem. One redd observed in Shuttleworth Creek was likely a resident rainbow trout redd.

Redds in Inkaneep Creek were observed on May 1 and May 22. A fish counting fence was not operational this year, therefore it was not possible to determine peak run-timing. The low number of redds detected in 2007 is likely due to the reduction in the spawning run returning, determined by the Zosel Dam fish counter located at the outlet of Osoyoos Lake and the high turbidity and low visibility of surveyed streams.

# ACKNOWLEDGEMENTS

We would like to thank the Osoyoos Indian Band, and local landowner Sam Baptiste for allowing access to the survey sites. Funding for this section of the Okanagan Basin Monitoring and Evaluation Program is provided through the Colville Confederated Tribes by the Bonneville Power Administration (BPA).

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# 1.0 INTRODUCTION

## *1.1 Project Background*

According to Traditional Ecological Knowledge (TEK) as well as a series of historical accounts, steelhead salmon (*Oncorhynchus mykiss*) were found throughout the Okanagan Basin (Clemens et al. 1939; Atkinson 1967; Fulton 1970; Ernst 2000; Rae 2005), a sub-basin of the Columbia Basin. Okanagan steelhead (also known as Upper Columbia summer steelhead) numbers have declined to such an extent that they have been re-listed as an endangered species since 2007 (NOAA 2007). There is limited data about the population size and distribution of steelhead in the Canadian portion of the Okanagan Basin (Rae 2005).

In 2007, the Okanagan Nation Alliance (ONA) working with the Colville Confederated Tribes surveyed the presence and distribution of steelhead spawners in the accessible portions of the Canadian Okanagan Basin as part of the Okanagan Basin Monitoring and Evaluation Program (OBMEP). OBMEP was created to establish a basin wide status and trend monitoring program with a 20 year life-span (Colville Tribes 2003). Within this program an annual estimation of steelhead spawner numbers (redd surveys) is completed to complement habitat surveys (including water quality and quantity surveys) and other biological surveys. This is the third year of the OBMEP program, while being the second year of steelhead spawner surveys in the Canadian portion of the Okanagan Basin.

## *1.2 Project Objectives*

To annually enumerate adult steelhead/rainbow trout spawners returning to the Okanagan River Basin, redd surveys in selected tributaries and the mainstem Okanagan were conducted.

- Survey sections of the mainstem Okanagan River accessible to steelhead quantifying the number of redds and noting their location.
- Survey tributaries accessible to steelhead (Shuttleworth, Vaseux and Inkaneep creeks), recording the number of redds and their location. Shuttleworth Creek is currently not accessible to steelhead due to McIntyre Dam, however we surveyed to determine possible steelhead presence presence

## *1.3 Study Area*

The area of the Canadian Okanagan Basin currently accessible to migrating steelhead salmon occurs downstream of McIntyre Dam. McIntyre Dam (24km upstream of Osoyoos Lake on the mainstem Okanagan River) was constructed without fish passage in 1920 (Long 2005a). Redd surveys were carried out on the Okanagan River from McIntyre Dam to its mouth with Osoyoos Lake.

Downstream of McIntyre Dam, two large tributaries flow into the Okanagan system; Vaseux Creek flows into the Okanagan mainstem while further downstream Inkaneep Creek flows into the north basin of Osoyoos Lake. Vaseux Creek has a migration barrier in the form of boulder falls 5.5 km upstream of it's confluence with Okanagan River (Walsh and Long 2005). The creek flows through a steep walled canyon then over its alluvial fan before reaching its confluence with the Okanagan River. Both reaches,

Vaseaux Creek and Inkaneep Creek, were surveyed for spawning steelhead in the spring of 2007.

In Inkaneep Creek, 3.7 km of its 23.5 km length is accessible to migrating salmon (Walsh and Long 2005) due to a 6 m high waterfall. The entire 3.7 km length of Inkaneep Creek was surveyed for steelhead redds.

Funding has been secured to install 5 overshot gates at McIntyre Dam which will provide access upriver. These gates are expected to be installed during 2009. the fact that McIntyre Dam can be operated for short periods of time in the spring freshet in such a way that migration of salmon is possible and that fish passage will occur at McIntyre Dam in the near future, a main tributary upstream of McIntyre Dam, Shuttleworth Creek was included in the redd survey.

Steelhead spawning distribution and timing estimates are based on redd surveys in the Okanagan River mainstem from McIntyre Dam to Vertical Drop Structure (VDS) 12 near the Town of Oliver as well as the tributaries; Vaseux, Shuttleworth and Inkaneep creeks (Fig. 1).

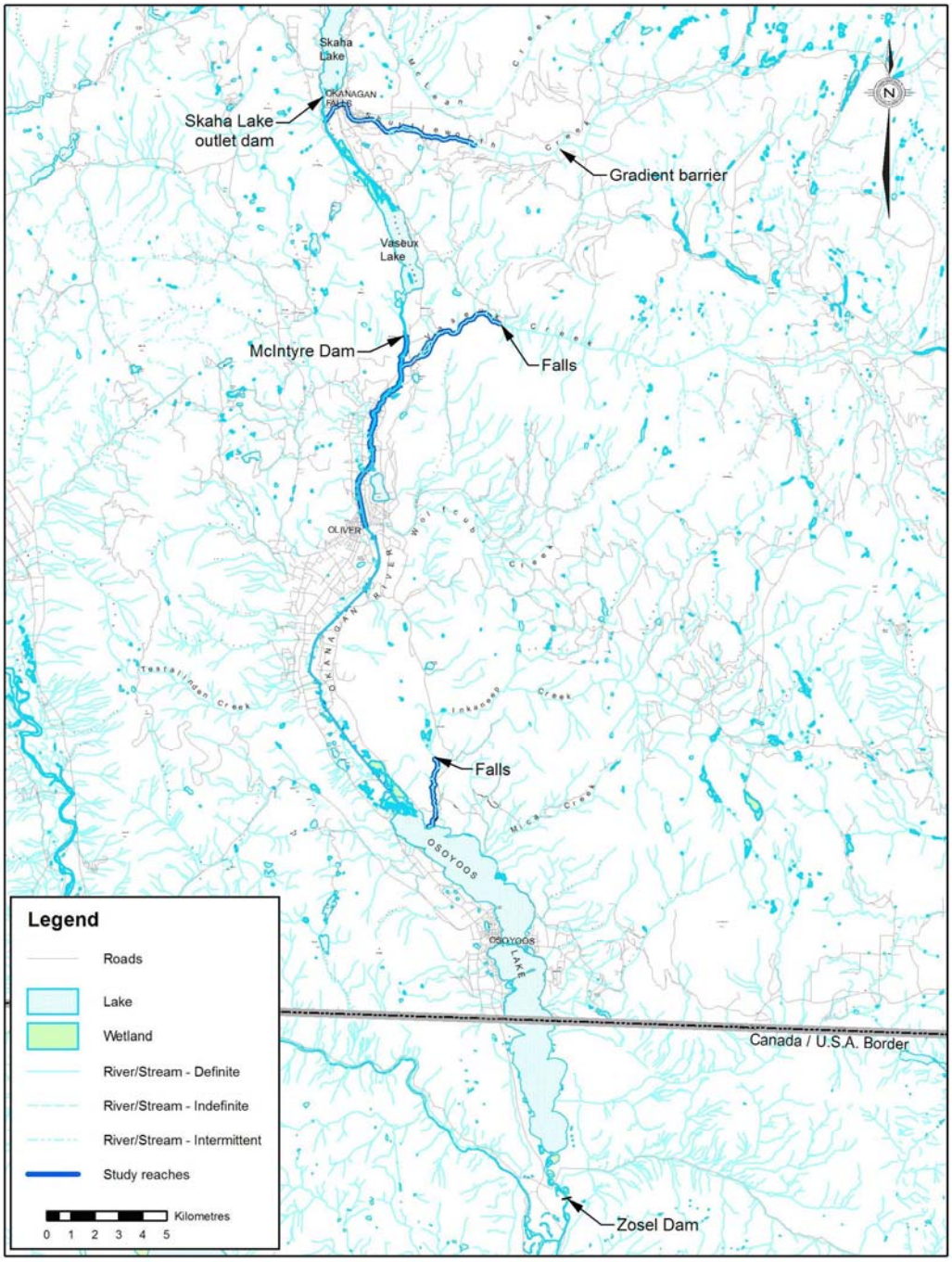


**Figure 1 Canadian Okanagan Basin steelhead redd study area**

# 2.0 METHODS

## *2.1 Redd Surveys*

Steelhead redd surveys were conducted weekly between April 10 and June 28, 2007. The April 10 survey of Inkaneep Creek was used as a gauge to determine the presence of steelhead in the basin. Turbidity was quite high and no steelhead were observed during this survey. In order to maximize efforts, surveys were delayed until May 1 to increase the probability of observing steelhead and redds. Starting May 1, redd surveys were conducted once per week until June 28. Methods used were based on protocols set out in Arterburn *et al*. (2007). Surveys primarily focused on reach areas identified by Long et al. (2006). The same crew members, versed in redd identification methodology, were used on all the surveys. The two areas surveyed are the mainstem and tributary streams (Table 1).

**Table 1 Reaches sampled during the 2007 redd surveys in the Canadian Okanagan**

| Study area | Stream | Reach descriptions | | Reach length (km) |
|---|---|---|---|---|
| Mainstem | Okanagan Rv | Dam reach | McIntyre Dam to Deer Park Estates | 1 |
| Mainstem | Okanagan Rv | Index reach | Deer Park to VDS 12 | 8 |
| Tributary | Vaseux Creek | Canyon reach | 3km to 5.5km | 2.5 |
| Tributary | Shuttleworth Cr | Canyon reach | Start 2.2 km up logging road | 2.5 |
| Tributary | Inkaneep Creek | | Mouth to falls | 3.7 |

The quality of each survey was also recorded at the time the enumeration occurred similar to standardized protocols from the ONA sockeye salmon (*Oncorhynchus nerka*) enumerations (Alexis & Wright 2004) Information collected to determine the quality of the counts include,

- fish visibility (recorded as high, medium and low),
- water clarity (water depth of visibility),
- weather (cloud cover, brightness, precipitation),
- survey crew,
- start and end time for the survey.

The number and location (GPS) of redds were recorded as well as any note of live or dead fish present and the quality of the survey. Redds were verified by at least two trained crew members. Locations and physical data were entered into a Trimble Geo XT GPS data logger in accordance with Arterburn et al. (2007). In order to prevent double-counting of existing redds, confirmed redds were marked with flagging tape tied to a tree or bush on the adjacent stream bank. The flag was marked with survey date, number of redds, and location and distance of the redd from the flag.

The 24-km long Okanagan River mainstem was broken down into three reaches. The bulk of spawning and spawning areas are typically found in what is referred to as the *index reach* (Long 2004; Long 2005b; Audy and Walsh 2006). The index and dam reaches were surveyed twice. The VDS reach was not surveyed because steelhead

spawning numbers and redds are typically extremely low in this reach (Long 2004; Long 2005b; Audy and Walsh 2006; Long et al. 2006; Wodchyc et al. 2007).

The dam reach was surveyed by walking the banks and side channels. The index reach was surveyed using a three person crew in one inflatable boat. During the float, one crew member hiked and surveyed side channels due to their shallower water depths and higher probability of observing redds (Long et al. 2006). All surveys were conducted at similar times in the day to maintain consistent visibility conditions.

Tributary redd survey counts were conducted by walking, starting at the downstream most point and working upstream (Fig. 2). Crew members surveyed from either bank and surveyed all side channels.

Figure 2. Walking surveys of the tributaries (Shuttleworth Creek)

# 3.0 RESULTS

## *3.1 Redd Survey Results*

Inkaneep Creek was surveyed five times, Vaseux creek was surveyed three times, while the Okanagan River mainstem and Shuttleworth Creek were each surveyed twice. A total of four steelhead redds were observed in the water-bodies surveyed in the spring of 2007. Two redds and ten adult steelhead were observed in Inkaneep creek. One redd and one fish (possible a resident Rainbow Trout) were observed in Shuttleworth Creek. Only one steelhead was observed in Vaseux Creek. (Fig. 3, Appendix A). The two redds on Inkaneep Creek were identified on May 1 (49.093356°N, 119.502114°W; 49.09285°N, 119.50214°W). A partial redd still under construction was observed within close proximity to an adult, completion of this redd was undetermined. One additional redd was observed on May 22 (49.083167°N, 119.503598°W). The other redd on Shuttleworth Creek was likely a resident rainbow trout redd based on the small adult observed nearby. No redds were observed in Vaseux Creek or the Okanagan River.

We counted ten adult steelhead in Inkaneep Creek; one fish on May 1, eight on May 22, and one on June 19 (Fig 3, Appendix A). Two fish were observed in Inkaneep on May 1 and two on May 22. One adult steelhead approximately 60 cm in length was observed in Vaseux Creek on May 9. A resident rainbow trout approximately 35 cm long was also seen the same day. A juvenile steelhead/ rainbow trout 8-12 cm long was observed on Vaseux Creek on June 21. In addition, a spawned out female steelhead carcass with an adipose fin clip was collected on May 18 by a member of the public downstream of VDS 13 in the Town of Oliver. This hatchery steelhead did not have a passive integrated transponder (PIT) tag. The steelhead likely originated from a release from Wells Dam Hatchery in Washington State (C. Fisher, Colville Confederated Tribes, pers. comm.).

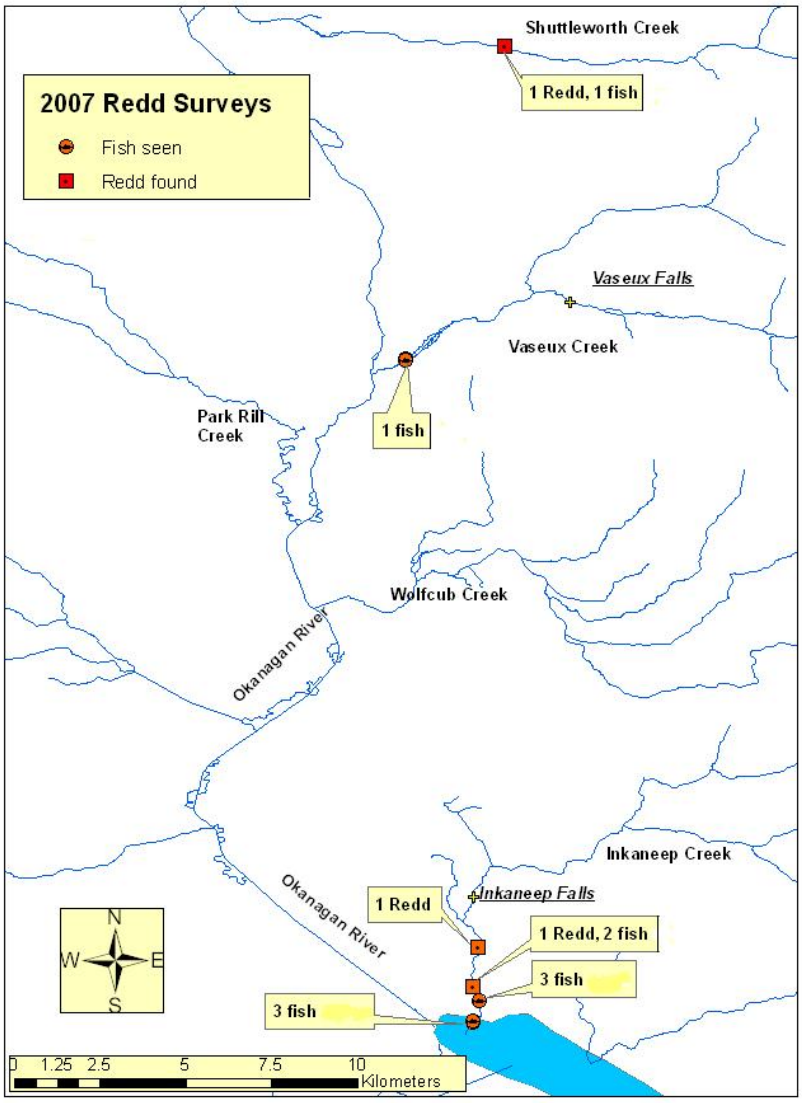


Figure 3. Location of steelhead adults and redds in the Okanagan Basin, 2007.

# 4.0 DISCUSSION AND RECOMMENDATIONS

Steelhead returning to the Canadian Okanagan Basin migrate up the Columbia River, enter the Okanogan River in Washington, then pass through Zosel Dam at the Osoyoos Lake outlet. The video counter at Zosel Dam counted a total of 147 hatchery and wild adult steelhead, a reduction of 50% over the same time period as 2006 (Fig. 4).

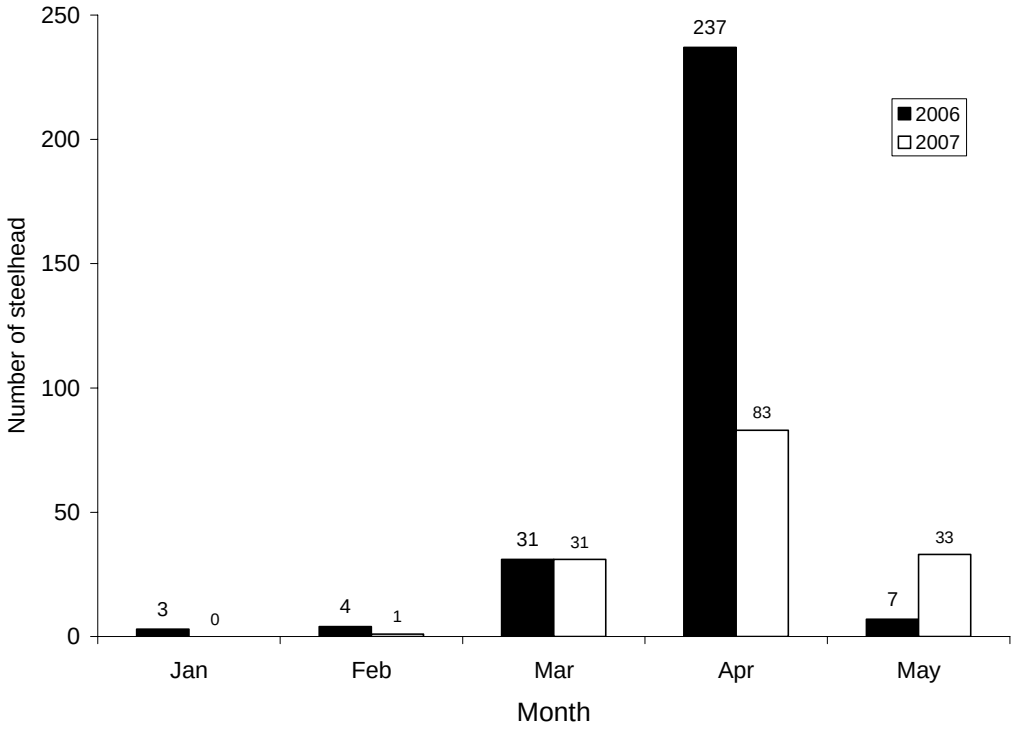


Figure 4. Adult steelhead (hatchery and wild) migrations through the Zosel Dam fish counter for 2006-2007 (Long et al. 2006; Columbia River DART 2007).

The low numbers of redds detected in the three tributaries and mainstem Okanagan River compared to 2006 results is likely the result of a low steelhead spawning run. We did not calculate a population estimate on Inkaneep Creek because the fish fence was not operational. However, the reduced number of redds this year compared to 2006 (2 versus 10) reflect the low numbers migrating through Zosel Dam.

Low visibility during the spring is an inherent problem during the steelhead spawning migration. In 2007, visibility was generally less than during 2006 (Appendix A; Long et al. 2006). During the month of April water clarity was low; therefore, we allocated more surveys later in the season to increase chances of observing redds. Unfortunately, the majority of steelhead migration at Zosel Dam occurs during April (Fig. 4). Sampling errors for redd surveys may increase the probability of committing Type II errors.

This is the second year redds were not observed in Shuttleworth Creek. In 2006, due to high spring flows the gates at McIntyre Dam were operated to allow steelhead to potentially travel upstream (Long et al. 2006). Projects are currently underway to provide passage for anadromous fish at the Dam by retro-fitting the gates. Our results indicate steelhead do not travel upstream of this point to spawn. We currently have two years of pre-passage results and further surveys in Shuttleworth are warranted. After the Dam becomes passable to steelhead, Shuttleworth Creek should be monitored for the presence of spawning adults and redds. This would allow a comparison of pre-treatment and post-treatment effects at McIntyre Dam.

Surveys in the Okanagan River mainstem are constrained by low visibility and deep water. Although the substrate is suitable for spawning, deep water in many locations make it difficult to observe redds. In 2006, all redds were observed in the side-channels (Long et al. 2006). Steelhead may be preferentially spawning in the side-channels perhaps due to an increase in intragravel flow and the timing of freshet making side channels less likely to be scoured by high flows. It should be noted however that an increase in side channel observations may also be a result of the higher visibility of redds (e.g. shallow water, walking survey versus float survey).

Inkaneep Creek appears to have the most steelhead spawners in the entire Canadian Okanagan Basin (Long et al. 2006; Arterburn et al. 2007b). Future steelhead spawner and habitat research and management should focus on this tributary.

Arterburn et al. (2007b) extrapolated steelhead escapement, redd numbers, and spawning distribution in Inkaneep, Vaseux, and the Okanagan River mainstem. The estimates were 97 steelhead spawners and 56 redds in Inkaneep Creek, and 21 spawners and 12 redds in Vaseux Creek. These estimates were based on Zosel Dam steelhead counts, sex ratios of broodstock collections in Washington State, and redd and trap data collected during previous years. Considering that there are only two years of suitable redd and sex ratio data in Canada and that sex ratios in the Canadian Okanagan could differ substantially from ratios in the U.S. mainstem and tributaries, we are not sure of the accuracy or the confidence intervals of these estimates. Before any data modeling for abundance estimates are incorporated in the program, we suggest collecting a larger data set over multiple years for replication and to reflect the variability of the population. A detailed explanation of the modeling procedure should be outlined to allow decision makers to assess the validity of the model. Certain questions regarding Zosel Dam video counts should be addressed, such as the number of steelhead fall-backs that are enumerated.

Redd survey data may not be the best method for determining spawning numbers in this system. Power analysis of redd count data used to monitor bull trout (*Salvelinus confluentus*) stocks indicates a potentially low statistical power of detecting population changes (Maxell 1999). Other researchers have indicated a cautious approach should be employed when correlating escapement with redd counts, specifically due to estimation or observational errors (Dunham et al. 2001) or test digs without appreciable numbers of eggs (Holecek and Walters 2007). Finally, steelhead spawner and redd observations in the Canadian Okanagan Basin could be confounded by the presence of spawning adfluvial rainbow trout from Osoyoos Lake. Rainbow trout are present in the Lake (ONAFD unpubl. data) however; we currently do not have information on the population size or spawning distribution. Alternative methods for determining steelhead spawner numbers may be warranted.

**Comment [JA1]:** Sex ratio data varies annually and therefore these data are only based upon one year at a time. Sex ratio data used for most enumeration estimates are far more coarse than the one we are using. We used the sex ratio data collected at another similar sized streams rather than simply applying the well's sex ratio for all other areas which is the method used in other areas with in the Upper Columbia ESU. Ideally we would like to use the sex ration as determined by a weir trap for all streams but this is not practical. In the future we would use sex ratio data from Inkneep to represent similar sized streams in Canada.

**Comment [JA2]:** I am working on developing the statistical method for applying this and hope to add this descriptor in the future.

**Comment [JA3]:** Other research indicates that fallback at other dams rarely exceeds 3% of all fish counted passing the facility. If you take the entire estimate of 121 fish that entered Canada and multiply it by 3% you would only change your numbers by 4 fish

## *4.1 Recommendations*

1. Future steelhead surveys should focus on Inkaneep Creek, as this tributary has the strongest spawning run. A fish counting fence used in conjunction with redd surveys could be used to obtain a population estimate. If redd counts will be used to monitor the population, studies should be designed *a priori* in accordance with Maxell (1999) to increase the statistical power of estimating and detecting population changes.

2. Operation of the Inkaneep Creek fish fence should follow the recommendations outlined by Long et al. (2006).

3. Currently, there is limited data on the adfluvial rainbow trout population in Osoyoos Lake. DNA analysis is one potential method to separate the adfluvial population from anadromous steelhead. Fin clips should be collected from all sampled fish at the Inkaneep fish fence, preserved, and archived for analysis at a later date.

4. At least one redd survey on Vaseux Creek should be conducted, depending on the run size at Zosel Dam, run-timing, visibility, and allocation of funds.

5. Redd surveys on Shuttleworth Creek should be discontinued. In the future, surveys on Shuttleworth could be used to monitor the effectiveness of the new configuration for providing adult salmonid passage.

6. Float surveys of the mainstem Okanagan River should be discontinued. The number of redds detected has been relatively low due to visibility issues and resources should be allocated to areas with a stronger steelhead run (i.e. Inkaneep Creek).

7. Due to the limitations in counting steelhead in the mainstem Okanagan, a type of resistivity counter (i.e. Didson counter) in the lower portion of the Okanagan River just above Osoyoos Lake should be investigated. This type of counter would not be affected by low visibility and high turbidity that may be encountered during spring flows. A long-term goal is to have the ability to separate steelhead migrating to Vaseux and Shuttleworth creeks, as well as the mainstem Okanagan River and Inkaneep Creek.

# 5.0 REFERENCES


Alexis, F. and R.H. Wright. 2004. Okanagan River sockeye spawner enumeration and biological sampling 2003. Prepared by Okanagan Nation Alliance Fisheries Department, Westbank, B.C.

Arterburn, J., K. Kistler, P. Wagner, R. Dasher. 2007a. Okanogan Monitoring and Evaluation Program field manual: Redd survey methodology. Final Draft. March 7, 2007. Prepared by Colville Tribes Department of Fish and Wildlife, Omak, WA.

Arterburn, J., K. Kistler, C. Fisher, and M. Rayton. 2007b. Okanogan Basin spring spawner report for 2007. Prepared by Colville Tribes Department of Fish and Wildlife, Omak, WA.

Columbia River DART. 2007. www.cbr.washington.edu/dart/dart.html

Colville Tribes. 2003. Project #2003-02200. http://nrd.colvilletribes.com/obmep/pdfs/Final%20FY06%20SOW.pdf

Atkinson, R.N. 1967. Historical souvenir of Penticton, BC 1867-1967. Harris, J.G. (ed). Penticton Branch of the Okanagan Historical Society, Penticton.

Audy, N. and M. Walsh. 2006. Okanagan River Sockeye Spawner Enumeration and Biological Sampling 2005. Prepared by Okanagan Nation Alliance – Fisheries Department, Westbank, BC.

Clemens, W.A., D.S. Rawson and J.L. McHugh. 1939. A biological survey of Okanagan Lake British Columbia. Fisheries Research Board of Canada, Ottawa, 70pp.

Ernst, A. 2000. Aboriginal Fisheries Information within the Okanagan Basin. Vedan, A. (ed). Prepared for the Okanagan Nation Fisheries Commission, Westbank, BC.

Fulton, L.A. 1970. Spawning areas and abundance of steelhead trout and coho, sockeye and chum salmon in the Columbia River Basin – Past and Present. Washington, U.S. National Marine Fisheries Service.

Long, K. 2005a. History and configuration of Okanagan Falls, BC. prepared by Okanagan Nation Alliance Fisheries Department, Westbank, BC.

Long, K. 2005b. Okanagan River Sockeye Spawning Habitat Assessment 2004. Prepared by Okanagan Nation Alliance Fisheries Department, Westbank, BC.

Long, K. 2004. Okanagan River Sockeye Spawner Enumeration and Biological Sampling 2004. Prepared by Okanagan Nation Alliance Fisheries Department, Westbank, BC.

Long, K., M. Squakin, and C. Louie. 2006. Steelhead spawner enumeration in the Okanagan River mainstem and tributaries: Inkaneep, Vaseux, and Shuttleworth

creeks – 2006. Within the Okanagan Basin Monitoring and Evaluation Program (OBMEP). Prepared by Okanagan Nation Alliance Fisheries Department, Westbank, B.C.

Maxell, B.A. 1999. A power analysis on the monitoring of changes in bull trout stocks using redd counts. North American Journal of Fisheries Management 19: 860-866.

NOAA (National Oceanic and Atmospheric Administration). 2007. www.nwr.noaa.gov/ESA-Salmon-Listings/Salmon-Populations/Steelhead/STUCR.cfm

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, BC

Walsh, M, and K. Long. 2005. Survey of barriers to anadromous fish migration in the Canadian Okanagan sub-basin. Prepared by the Okanagan Nation Alliance Fisheries Department, Westbank, BC.

Wodchyc, K., L. Wiens, and R. Benson. 2007. Okanagan River Sockeye Spawner Enumeration and Biological Sampling 2006. Prepared by Okanagan Nation Alliance Fisheries Department, Westbank, BC.

# APPENDIX A – 2007 Redd Survey Raw Data

| Date | Drainage | Area | D/s Location | U/s location | Survey length (km) | Start time | End time | Method | Redd count | Water clarity (m) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10-Apr | Inkaneep | mouth to falls | Osoyoos Lake 49.073917 11950367 | Falls 49.097667 119.50353 | 2.9 | 10:00 | 17:00 | stream walk | 0 | 0.5 | |
| 1-May | Inkaneep | mouth to falls | Osoyoos Lake 49.073917 11950367 | Falls 49.097667 119.50353 | 2.9 | 11:00 | 15:30 | stream walk | 2 | 0.5 | 1 partial redd, 1 redd in side chan. 1 adult 30cm, 2 < 20cm |
| 9-May | Vaseux | canyon reach | 3km from mouth 49.255611 119.511833 | 5.5km from mouth 49.329444 119.44631 | 2.5 | 10:00 | 15:00 | stream walk | 0 | 0.3 | 2 fish sighted: 35 cm, 60 cm |
| 14-May | Okanagan R. | Dam / index | VDS 12 49.195000 119.569444 | McIntyre Dam 49.25704 119.52794 | 9.0 | 9:30 | 15:30 | zodiac float | 0 | | |
| 16-May | Shuttleworth | canyon reach | 2.2km logging rd 49.3295 119.520528 | w/in canyon 49.32944 119.446306 | 2.5 | 11:30 | 15:30 | stream walk | 0 | | |
| 22-May | Inkaneep | mouth to falls | Osoyoos Lake 49.073917 11950367 | Falls 49.097667 119.50353 | 2.9 | 10:30 | 17:00 | stream walk | 1 | 0.5 | 8 steelhead, 1 spawned 2 rainbow 25-40 cm |
| 28-May | Shuttleworth | canyon reach | 2.2km logging rd 49.3295 119.520528 | w/in canyon 49.32944 119.446306 | 2.5 | 9:30 | 16:30 | stream walk | 1 | 0.3 | Probably a resident rainbow trout redd 1 trout, 20 cm |
| 1-Jun | Okanagan R. | Dam / index | VDS 12 49.195000 119.569444 | McIntyre Dam 49.25704 119.52794 | 9.0 | 10:00 | 16:00 | zodiac float | 0 | | |
| 12-Jun | Vaseux | canyon reach | 3km from mouth 49.255611 119.511833 | 5.5km from mouth 49.329444 119.44631 | 2.5 | 10:00 | 15:30 | stream walk | 0 | | |
| 19-Jun | Inkaneep | mouth to falls | Osoyoos Lake 49.073917 11950367 | Falls 49.097667 119.50353 | 2.9 | 10:30 | 15:00 | stream walk | 0 | 0.4 | 1 adult steelhead |
| 21-Jun | Vaseux | canyon reach | 3km from mouth 49.255611 119.511833 | 5.5km from mouth 49.329444 119.44631 | 2.5 | 9:45 | 16:00 | stream walk | 0 | | Juvenile steelhead: 8-12 cm |
| 28-Jun | Inkaneep | mouth to falls | Osoyoos Lake 49.073917 11950367 | Falls 49.097667 119.50353 | 2.9 | 10:00 | 15:00 | stream walk | 0 | | |