Results of the Kloiya River Resistivity Counter 2015

Skeena Fisheries Report SK 175

Dean Peard[1]
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[1] Ministry of Environment – Skeena Region – Environmental Sustainability Division

Acknowledgements

The 2015 project could not have been successfully completed without Mark Beere from Fish&Wildlife in Smithers who assisted with the equipment installation and removal. Bill Horne, Tom Coleman and crew at the (Watson Island Industrial Site) voluntarily monitored the counter equipment status, during dam maintenance inspections, and reduced the stress involved with leading a project from a great distance. It was much appreciated. Special acknowledgment to Don McCubbing who introduced resistivity technology to British Columbia and had such a positive influence on people who knew him. Don played a large role in the initial stages of this project and its successful implementation. Don recently passed away and his contribution to the British Columbia Fisheries Program will be missed.

Executive Summary

A Logie 2100C resistivity counter (*Aquantic Ltd, Scotland*) was installed at the Kloiya River and operational from March 24, 2015 to May 14, 2015. A PVC tube containing three electrodes, fixed to an aluminium fence, was placed near the top of the vertical slot fishway located 2 km upstream of the Kloiya River estuary. When a steelhead migrates through the field, created by the electrodes, the counter detects a change in conductivity. The change in conductivity is analyzed by an algorithm and recorded by the counter. The output is a row of data for each event comprising of the date, time, travel direction and peak signal strength. Electrical power was provided by a stream engine that utilizes the head of water at the site to power the equipment. The first upstream migrant was recorded on March 25, 2015. The last migrant was recorded on May 13, 2015. The equipment was turned off and removed on May 14, 2015. Water temperature was recorded hourly by a HOBO U22 Water Temp Pro v2 data logger (*Onset Ltd. Cape Cod, Massachusetts. USA*). Secondary temperatures were recorded on hand held HB USA thermometers on site visits. Temperatures ranged from a low of 6.54° C on March 25 to a high of 12.73° C on May 14.

Counter efficiency was calculated on trace data collected in 2007. In 2007, trace data was recorded for 74% of the data recorded by the counter. Trace data indicates that the counter efficiency for upstream migrants is 94% and 76% for downstream migrants. After corrections for counter efficiency, the 2015 steelhead escapement upstream of the Kloiya River dam was estimated to be 44.

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1.0 Introduction

The Kloiya River watershed is located approximately 15 km southeast of Prince Rupert, B.C. (Figure 1). This coastal watershed provides spawning and rearing habitat for populations of chinook salmon (*Oncorhynchus tshawytscha)*, chum salmon (*O. keta)*, coho salmon (*O. kisutch)*, sockeye salmon (*O. nerka)*, steelhead (*O. mykiss)*, coastal cutthroat trout (*O. clarkii)*, Dolly Varden (*Salvelinus malma*), pink salmon (*O. gorbuscha)*, sculpins (*Cottidae*) and threespine stickleback (*Gasterosteus aculeatus*) (*Habitat Wizard. Aug 2007*). The Kloiya River is a fourth order stream with an approximate length of two km. A concrete dam with an estimated vertical height of seven meters was constructed in 1949, two km upstream of the Kloiya River estuary. This structure was built to provide a source of water for the Skeena Cellulose Pulp Mill. A vertical slot fishway approximately 50 meters in length was incorporated into the dam's construction to facilitate fish passage upstream of the structure.

Kloiya River winter-run steelhead are known to spawn and rear in the main stem Kloiya River as well as tributaries to Taylor Lake (Diana Creek) and Prudhomme Lake (Prudhomme Creek) (*Tredger, 1981*). To access Prudhomme Creek and Diana Creek steelhead must migrate through the fishway. The river provides the closest winter-run steelhead angling opportunity for anglers from Prince Rupert and Port Edward. The recreational steelhead fishery typically begins in late November and continues into April *(Mark Beere pers. Comm.)*. The short fishable section of the river below the dam is subject to significant and rapid fluctuations in flow and stage, and has a limited number of angling locations that are accessible by trail.

Prior to this project, information about the Kloiya Watershed steelhead population was limited to a study undertaken in 1981 by Ministry of Environment staff commissioned by the Salmonid Enhancement Program. The 1981 study was limited to quantifying juvenile steelhead abundance, smolt production and estimating values for habitat capacity thresholds. In 2005, the Ministry of Environment began investigating the potential of using the Kloiya as an index stream for monitoring the abundance trends of north coast winter run steelhead using resistivity technology. This report compiles information from project years 2006, 2007, 2009 thru 2015.

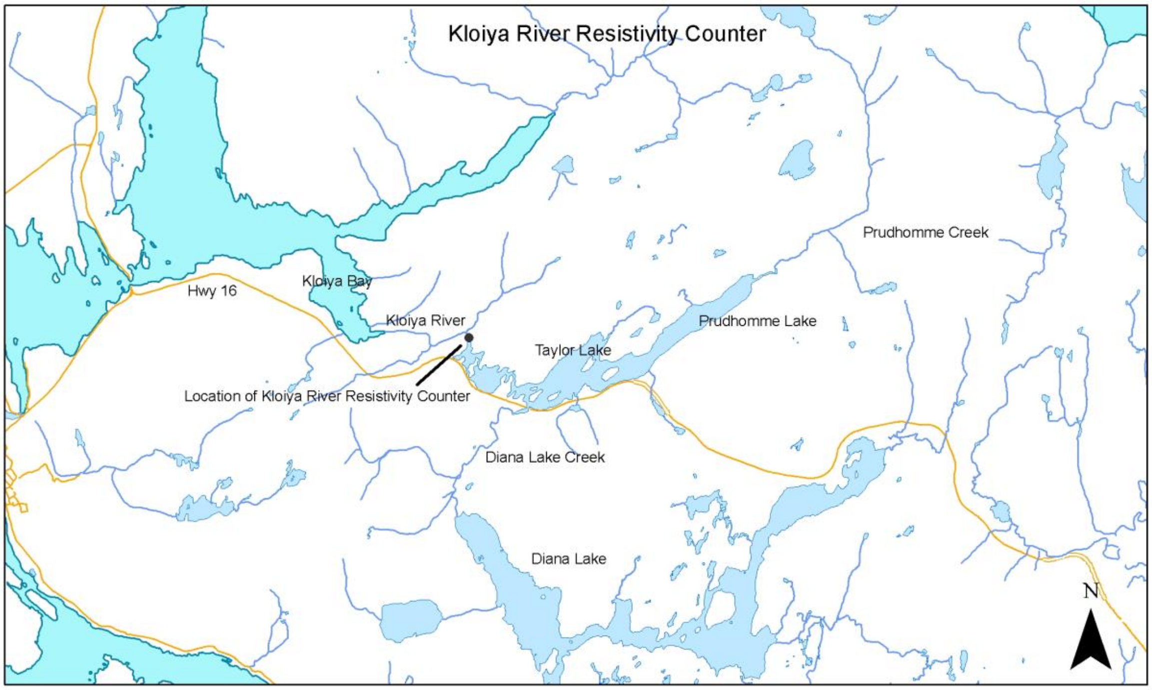

Figure 1. Location of Kloiya River resistivity counter.

2.0 Project Design/Methods

The Kloiya River was surveyed in November 2005 to determine a suitable location to install and operate a Logie 2100C resistivity counter. All resistivity counters operate in conjunction with three electrodes placed on top of a fixed weir, transportable flat pad, or inside of a tube. The three electrodes create a field that monitors the conductivity of the water within the field. The counter recalibrates the conductivity every 30 minutes. When a fish passes through the field a change in conductivity is recorded by the counter. The signal is analyzed by an algorithm and a row of data is produced indicating the date, time, direction of travel and peak signal size. Changes in conductivity not determined to be caused by a fish are classified as events.

The fishway site was selected as the location for the counter based on several advantageous attributes. The site is adjacent to a secure storage shed for housing electronic equipment, is accessible by vehicle, the dam provides significant head of water for power generation and the fishway forces fish to migrate through the resistivity counter tube in either direction. The tube type counter was developed and tested on the Bonaparte River near Cache Creek, B.C. (*McCubbing 2003*).

The counter tube used on the Kloiya River has an inside diameter of 37.5 cm and an overall length of 150 cm. The tube is attached to aluminum grate and lowered into existing concrete slots in the fishway (Figure 2).

Figure 2. Kloiya River resistivity counter tube.

The location of the counter was selected due to the high probability of successfully enumerating adult steelhead at that location. Although steelhead are known to spawn below the dam, the decision was made to locate the counter at the fishway and enumerate a proportional representation of the annual Kloiya River steelhead escapement. Tredger (1981) estimated that at capacity spawning tributaries, upstream of the fish way, represent 53% of annual watershed steelhead smolt production. A subsequent qualitative habitat survey of the main stem Kloiya River, in April 2006, indicated that there is a limited amount of spawning and fry habitat available below the dam, inferring that a majority of the steelhead recruitment now occurs in tributaries above the fishway (Mark *Beere pers. Comm.).*

In 2015, data produced by the Logie 21000 C was downloaded on to a Lenovo T500 Thinkpad lap top computer (*IBM, Armonk, New York, USA*) using version

1.0.1 of the fish counter control program (*Aquantic Ltd, Scotland*). This software was used to change counter parameters and download data. Counter data was downloaded bi-monthly. One Hobo Pro v2 temperature data logger (*Onset Computer Corporation, Pocasset, MA*) recorded hourly water temperatures (°C). The data logger recorded water temperature immediately downstream of the dam. The data logger was placed in a vented PVC tube attached to the shore via stainless steel cable and cable clamps.

Electrical power for the counter system was generated by a Stream Engine (*Energy Systems and Design Ltd, Sussex NB*) which utilized the head of water at the site to keep the batteries charged and the equipment functioning.

3.0 Equipment Settings

3.1 Logie Counter Settings

Logie 2100C counter settings were dependent upon several parameters. Water conductivity is the primary metric for determining counter settings. Specific conductance and Total Dissolved Solids (TDS) values for the Kloiya River were very low, 15 µmhos/cm and 10 mg/l, respectively. As a result, the counter gain was set at the maximum value of 400 to compensate for the low conductivity. The threshold values required for fish identification was set at 20.

4.0 Results

4.1 Counter Efficiency

The Kloiya River resistivity counter was installed and operational on March 24, 2015. The first steelhead was recorded on March 25, 2015 and the last steelhead was recorded on May 13, 2015. During this time, the counter recorded 51 up counts, 4 down counts and 40 events. Events indicate a change in conductivity that was not recognized by the counter algorithm as a fish. A total of 95 rows of data were recorded as upstream counts, downstream counts and events (Appendix 1).

Date	Time	Direction	P.S.S
16-Apr	10:24:16	U	56
17-Apr	14:14:38	E	41
17-Apr	16:43:10	U	46
18-Apr	18:53:25	U	47
18-Apr	2:24:37	U	125
18-Apr	4:51:20	U	127
18-Apr	17:00:00	U	58
20-Apr	22:03:38	D	29
20-Apr	7:37:03	U	53
20-Apr	11:26:47	U	37
21-Apr	16:17:49	U	42
21-Apr	13:12:56	U	50
22-Apr	17:11:17	U	43
22-Apr	0:18:26	E	127
22-Apr	5:41:02	E	98
22-Apr	17:34:39	U	42
23-Apr	21:19:12	E	37
23-Apr	1:09:15	D	30
23-Apr	4:07:59	E	28
23-Apr	10:14:22	U	43
24-Apr	10:40:49	U	54
25-Apr	20:26:33	U	47

Table 1**.** Example of text data collected from counter in 2015**.**

To estimate counter efficiency, counter data was calibrated with trace data. The trace data provides a visual record of the counter data that can be compared to the counter algorithm's classification. Trace data can only be collected on a dedicated lap top computer that must be left at the site. New hardware is expected that will allow trace data to be recorded without a dedicated computer and the associated increase in power needs. Until then, trace data collected in 2007 will continue to be used as an estimator of counter efficiencies on an annual basis. In 2007, 115 or (74%) of the counter records had corresponding trace data that can be used for analysis. These data were collected between March 8 and May 13, 2007. Two letter codes were used to compare text and trace data and determine event classification (Table 2).

UU	Upstream fish classified as a upstream fish
UE	Upstream fish classified as an event
DD	Downstream fish classified as a downstream fish
DE	Downstream fish classified as an event
EE	Non fish event correctly classified as an event

Table 2. Codes used to compare trace and text data.

Counter efficiency for upstream counts was determined by dividing the number correctly classified up counts UU (83) by the total number of up counts UU+UE (88). In 2007, this resulted in an upstream efficiency estimate of 94% when the counter gain was set at 400. This was a significant improvement when compared to the 81% upstream efficiency calculated in 2006 when the gain was set at 200 (*Peard 2007*). Counter efficiency for downstream migrants was calculated by dividing the correctly classified number of down counts DD (19) by the total number of down counts DD+ DE (25). Therefore, the counter efficiency for downstream migrants was calculated to be 76%. Downstream efficiency also benefitted from a higher gain setting. The 2006 downstream counter efficiency at a gain setting of 200 was estimated to be 58% (*Peard 2007*). The remaining eleven events were changes in conductivity that were not related to fish passage. Classification errors, upstream or downstream, primarily involved fish traces not breaking the threshold required to be identified as fish. This may be due to very low conductivity in combination with changes in swim height as the fish migrate through the field. Figures 3 and 4 shows examples of downstream and upstream migrants, recorded in 2006, incorrectly classified as an event.

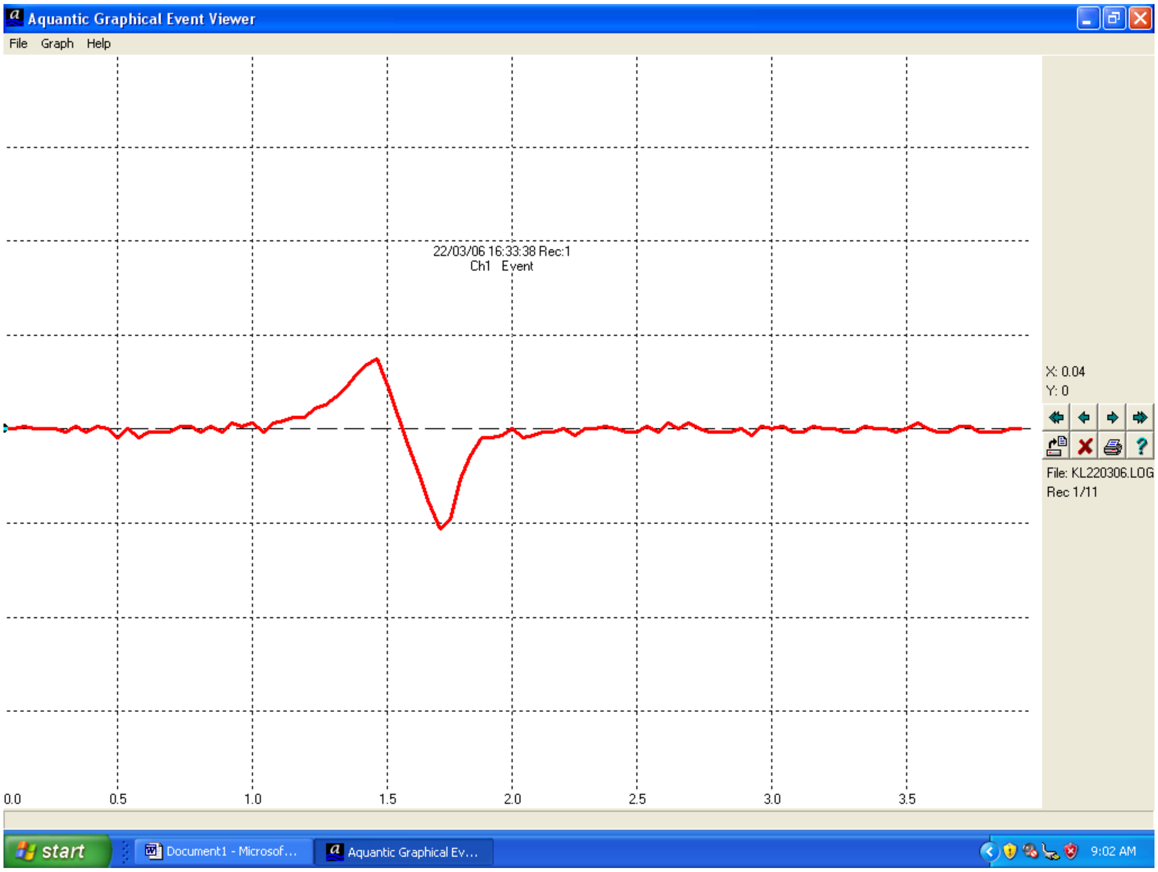

Figure 3. Downstream migrant incorrectly classified as a non fish event.

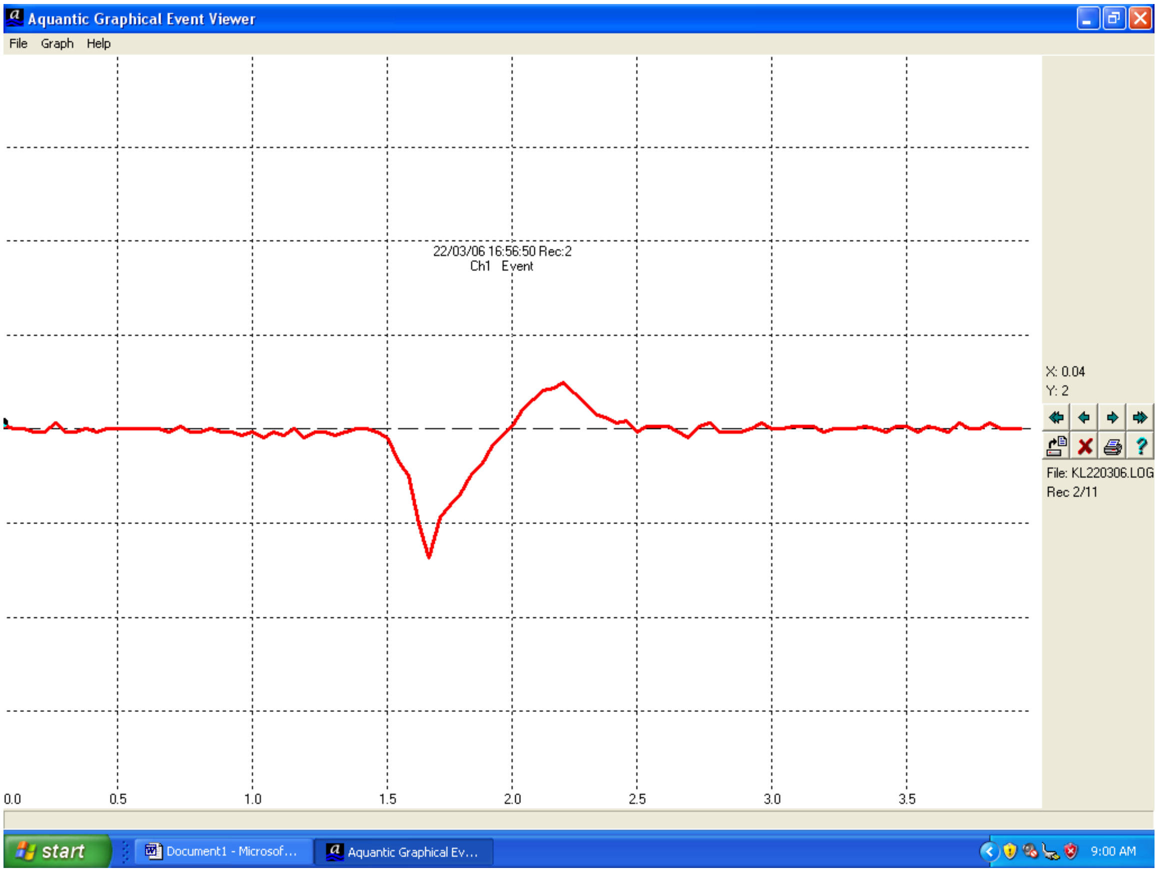

Figure 4. Upstream migrant incorrectly classified as a non fish event.

Sudden changes in water conductivity not related to fish migration can also be recorded by the counter. Some examples of non fish events recorded by the counter can include river otters, beavers, air entrainment and sudden changes in water flow (*Don McCubbing pers. Comm.*). These trace patterns are significantly different from fish traces, making it easy to identify between fish and non fish events. Figure 5 is an example of a change in conductivity not related to fish migration.

During bi-monthly site visits water levels within the fishway were observed. Sudden extreme water level fluctuations in the fish way occurred in 2015. Extreme fluctuations in environmental conditions typically result in increased non-fish related recording until the counter recalibrates for the changing conditions. Annually, the proportional representation of data recordings not classified as a fish ranged from 20% (2007) to 46% (2012). In 2015, non fish classified related events proportionally represented 43% of the data collected.

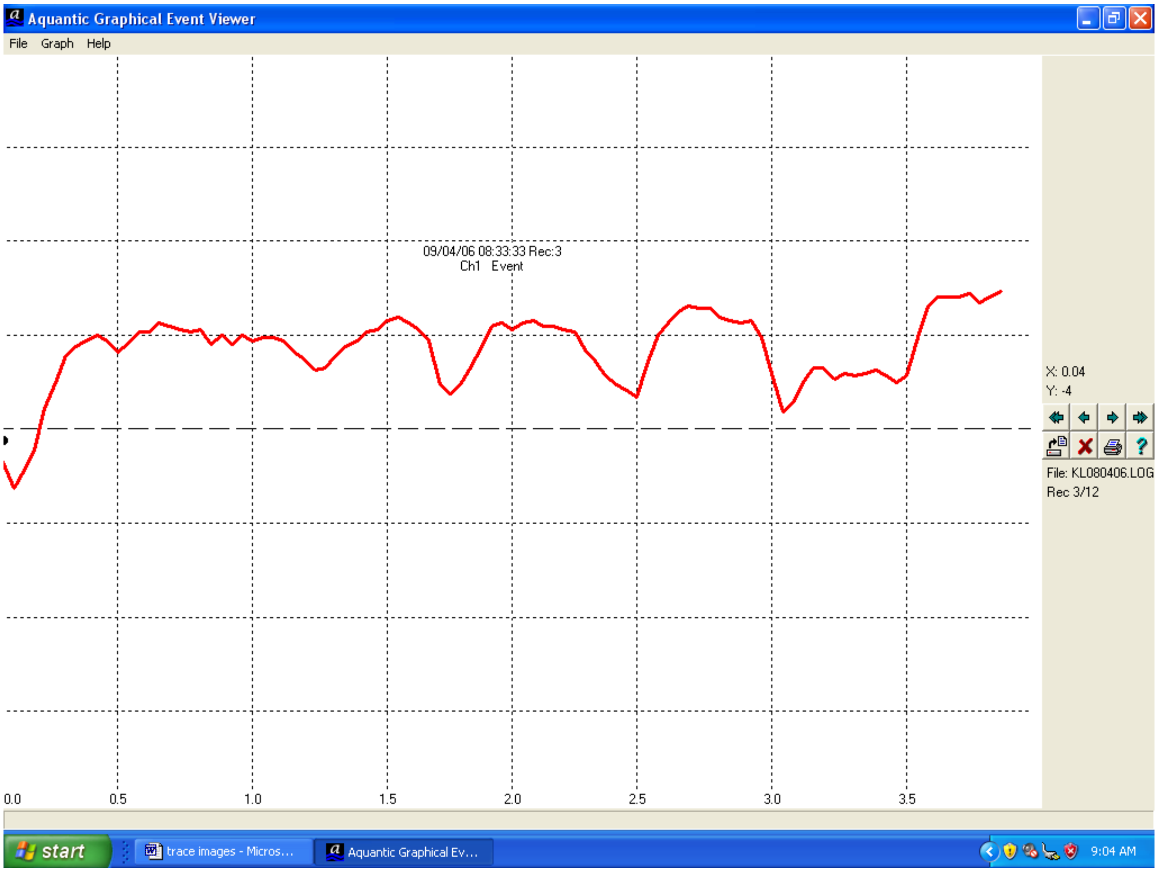

Figure 5. Change in conductivity correctly classified as a non fish event.

4.3 Escapement Estimate

The counter equipment was removed on May 14, 2015 as the majority of upstream migration had concluded for the year. After May 14, the 2015 steelhead upstream migration was considered to be complete. A correction factor was applied to the rows of data logged as events (not indicated as up or down migrants) where trace data was unavailable. Trace data, collected in 2007, indicated that 22% of the non fish events logged by the counter were upstream migrants. In comparison, 30% of the events were downstream migrants. These values were applied to the 2015 events where trace data does not exist. In 2015, this value was equal to 40 overall events. To estimate up counts, 40 was multiplied by 0.22. Therefore, it was estimated that 9 upstream migrants were not correctly classified. The estimate for downstream migrants was 40 multiplied by 0.30. It is estimated that 12 downstream migrants were not correctly classified. The escapement estimate for Kloiya River winter run steelhead was estimated by subtracting down counts from the up counts recorded during the project which is equal to 44. Figure 6 shows the escapement estimates for all project years.

U+UE-D+DE=escapement (51+9) - (4+12) =44

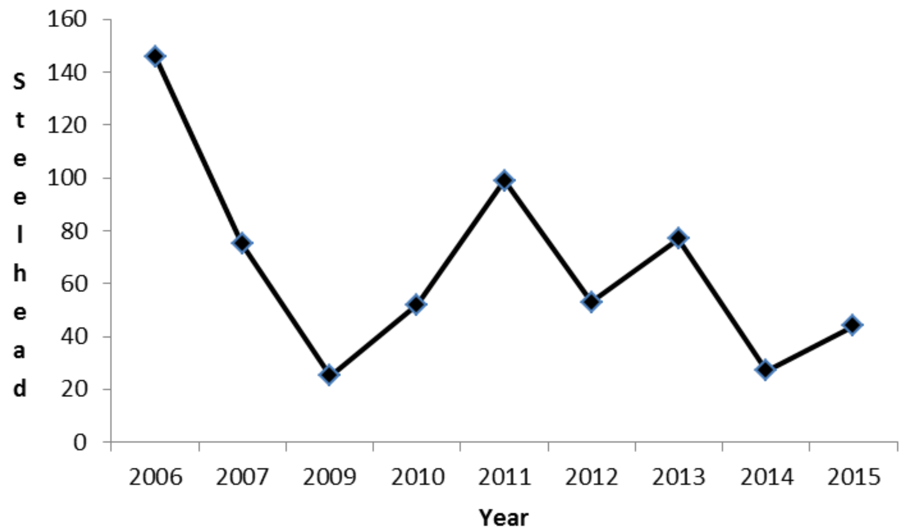

Figure 6. Kloiya River steelhead escapement estimates for all project years.

4.4 Run Timing

Anglers typically begin to capture Kloiya River steelhead in the month of November with peak catch reportedly occurring in March and April *(Mark Beere pers. Comm.).* In 2006, the resistivity counter was installed in November 30 to coincide with the time period when steelhead are known to be in the river downstream of the structure. No migration activity was recorded through the fishway until March 1 (*Peard 2007*). In 2007, the resistivity counter was installed on January 19 and the first fish recorded migrating through the fishway was on March 8 *(Peard 2008).* Data collected in 2006 and 2007 indicate that steelhead are not typically migrating through the fishway until March and as a result the counter has not been installed earlier than March since 2009. In 2015, the counter was installed and operational on March 24. The first migrants were recorded on March 25. This indicates that the counter did not capture the beginning of the steelhead migration through the fish way. For the purposes of this report run timing referred to the migration through the fish way and into Taylor Lake.

To gain a better understanding on run timing trends, uncorrected daily net up counts were used to demonstrate run timing. In 2015, the peak daily upstream count occurred on April 14 (Figure 7). In comparison, the peak daily count in previous years occurred on April 24 (2006), April 24 (2007) May 13 (2009) April

18 (2010), April 28 (2011), May 8 (2012), April 13 (2013) and April 18 (2014) respectively. Data collected since 2006 indicate that the mean date on which the peak daily count occurs for upstream migrants is April 26 (SD= 13.9) (Figure 8).

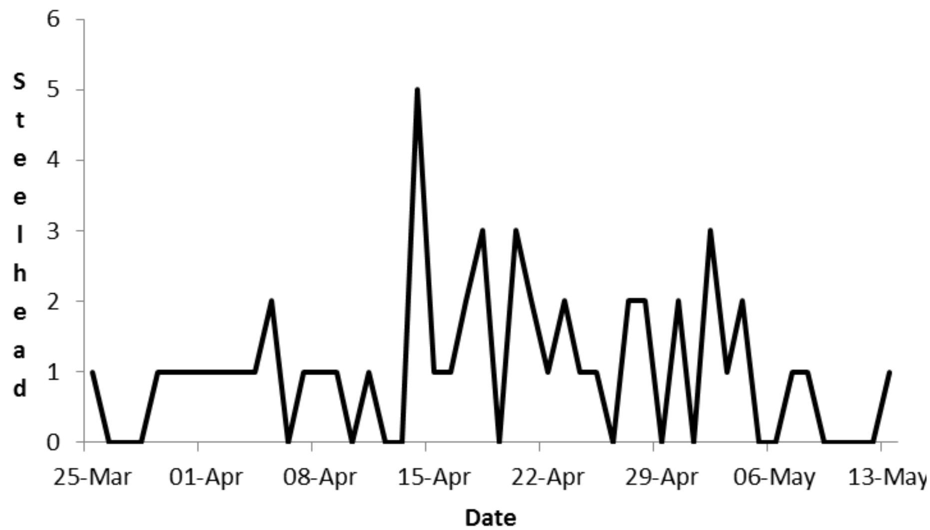

Figure 7. Uncorrected daily up counts March 24 to May 14, 2015.

Peak run timing in 2015 appeared to be consistent when compared to previous years. (Figure 8). Typically, steelhead migration through the fish way commences in mid March, peak is in late April, and declines daily through May (Figure 8).

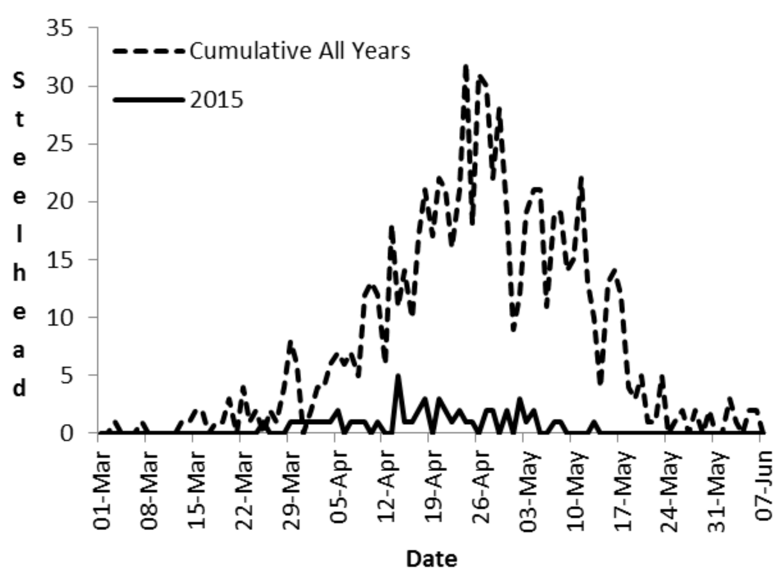

Figure 8. All years cumulative daily steelhead upstream count compared to 2015.

4.5 Environmental Parameters

Water temperatures have a significant impact on fish behaviour. Rainbow trout / steelhead typically begin spawning migrations at temperatures greater than 5˚ C, and spawning occurs at water temperatures ranging from 8˚ C to 15˚ C (McPhail 2007). Recent telemetry work on the Salmon River on Vancouver Island indicates that water temperature was an important factor in successful migration through the fishway *(Clarke and McCubbing 2011*). Water temperature also appears to influence steelhead migratory behaviour through the Kloiya River fishway (Figure 10).

Water temperatures were recorded hourly by one Hobo Pro v2 temperature data logger. Water temperatures were recorded between February 13, 2015 and May14, 2015. Water temperatures ranged between 3.90°C (March 2 / March 19) and 12.82°C (May 14) (Figure 9). In 2016, water temperatures were generally comparable to the all year's average for the same dates. After April 30, water temperatures rose above daily averages achieving a difference of over 2°C for most of the month of May. The greatest difference from the long term daily mean was on March 27, 2015 when the daily water temperature was 3.38°C (Figure 9). A total of 75 daily temperatures were available for comparison to the all year's daily mean.

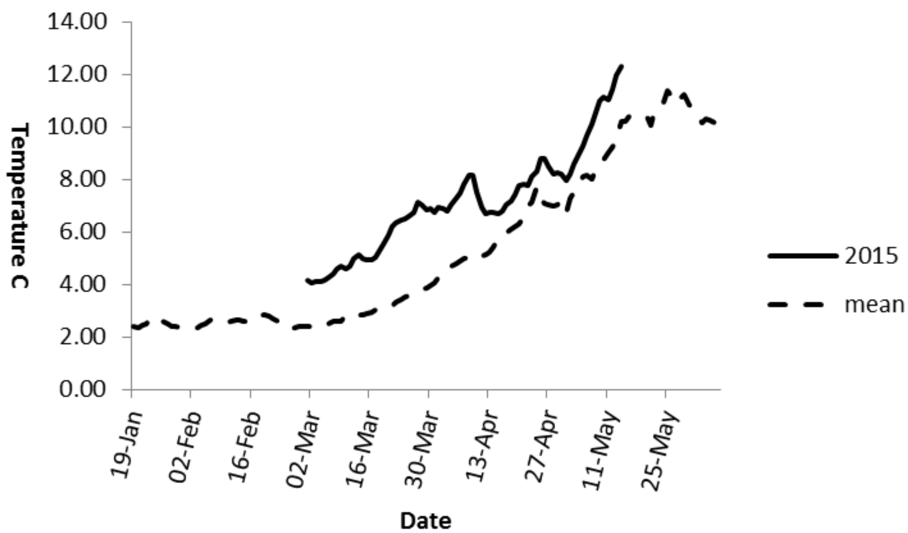

Figure 9. Mean daily water temperature 2006/2014 compared to 2015.

Water temperature influences several different aspects of rainbow trout behaviour from reproduction to growth and feeding characteristics *(McPhail 2007).* Early in the project it became evident that fish were not migrating through the fishway until well after anglers reported catching steelhead below the dam (*Peard, 2011*). The typical seasonal pattern for the annual steelhead migration was a period of zero activity followed by a time where steelhead migrate back and forth through the counter tube before migrating into the reservoir. As spring progresses, the cycling behavior is less evident and steelhead migrate quickly into the reservoir. It is unclear if this pattern of behaviour was linked to water temperature, flow through the fish way, or some other environmental influence. Since 2013, cycling behaviour during the project has been reduced relative to cycling rates prior to 2013. In contrast, like the behaviour recorded in 2013 the cycling behaviour recorded during the 2015 project was lower than expected. Only four potential cycling events were observed in 2015. The cycling events occurred on April 27, 28, 30 and May 2. Data from the loggers indicate that daily water temperatures were warmer than the long term average during the 2015 project (Figure 9). It remained unclear if the differences in cycling behaviour are related to temperature. On March 31 water hourly water temperatures reached 4°C and remained above that temperature for the duration of the 2015 project. Water temperatures did not reach 4°C until April 7, in 2012. The first upstream migrant was recorded on March 25, 2015 (Figure 10). In 2015, 94% of all upstream migration in the fish way occurred when water temperatures were greater than 4°C. Recent telemetry work done on the Salmon River on Vancouver Island indicated that steelhead did not successfully migrate through the Salmon River fishway until water temperatures reached 4°C (*Clarke and McCubbing 2011*).

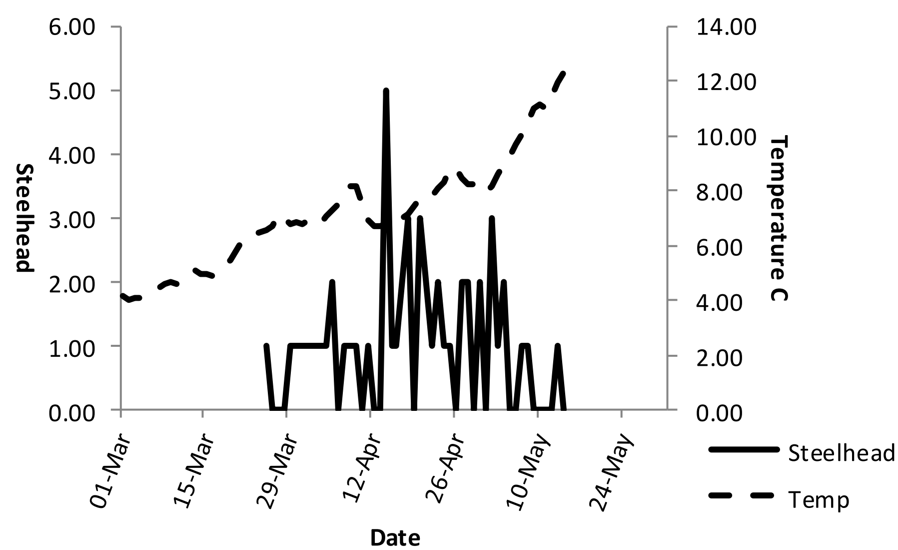

Figure 10. Uncorrected steelhead up counts relative to water temperature 2015.

4.6 *Migration Behaviour through the fishway*

When the Kloiya River dam was built in 1949, a vertical slot fishway was incorporated into the construction to facilitate access to fish spawning and rearing habitat above the structure. The fishway is approximately 50 meters long with a small entrance in the opposite direction of the natural flow (Figure 11). Halfway along its length the fishway turns 180˚ before reaching Taylor Lake. To access the lake, fish must migrate through a square hole located in the bottom corner of the stop logs at the head of fishway (*Dave Milino pers. Comm.*).

Figure 11. Entrance to Kloiya River fishway.

In 2015, there was no recorded upstream activity through the fishway until March 25. After this date activity was sporadic until March 29 at which point migration was almost daily until May 8 when it abruptly stopped. Only one other fish was recorded past that date until the counter was removed on May 14 (Figure 7). Migration through the fishway ended sooner compared to prior years. It is not known if the short temporal migration recorded is related to the relatively small run size in 2015, or environmental conditions encountered during the project.

Increase in migration activity coincided with increases in water temperatures (Figure 10). Since 2006, data indicate that the majority of steelhead will migrate past the counter when water temperatures are increasing. Prior to 2013, some individuals will travel upstream of the counter and then migrate back through the PVC tube in a short period of time. This cycling behaviour was generally observed near the start of the migration window. In 2015, limited cycling behaviour was recorded during the project. It is uncertain why cycling behaviour is not as prevalent the last three years.

5.0 Discussion

Prior to 2006, The Ministry of Environment did not have a winter-run steelhead index in the Skeena Region. The Kloiya River was investigated, as a possible winter-run index, due to its size and proximity to Prince Rupert and the Smithers Regional office. It also provided the infrastructure to securely store equipment while in operation, and the dam provided an opportunity to generate electrical power precluding the need to operate generators. Resistivity counter technology was selected as the enumeration method since the technology requires limited maintenance, and the successful use of the technology to enumerate steelhead populations on the Keogh, Bonaparte and Deadman Rivers in British Columbia. The Kloiya River design was based on the tube type counter installed in a vertical slot fishway in the Bonaparte River.

One of the challenges of operating electronics in remote locations is securing a consistent source of electricity to keep the equipment powered up. For the last three years power has been supplied via a stream engine that utilizes the reservoir to provide power for the counter operations. While this technology has kept the resistivity counter powered for the last several years the site is vulnerable to theft and vandalism. A site monitor continues to be an important part of the program and a local monitor should be organized well before the project begins each year.

This site continues to be a viable option to enumerate winter-run steelhead on an annual basis and should be continued.

4.0 Recommendations

- Re-test the trace data logger to revaluate counter efficiencies.
- In future years, when abundance counts are below expectations, a snorkel swim in the two kilometre section of river below the dam may provide some indication of steelhead abundance below the fishway.
- Expand the scope of the project to incorporate genetic and life history information into the analysis.
- Investigate options for facilitating fish migration through the fishway.
- Annual snorkel surveys should be conducted immediately prior to the removal of the resistivity counter to estimate the number of steelhead spawning in the Kloiya River at that time.

5.0 References

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6.0 Appendices

Appendix 1. Counter data 2015

24-Mar	*23:12:24*	*E*	*24*
25-Mar	*0:14:21*	*E*	*14*
25-Mar	*17:21:37*	*U*	*56*
26-Mar	*22:19:42*	*E*	*99*
27-Mar	*1:24:11*	*E*	*29*
29-Mar	*23:14:41*	*U*	*68*
30-Mar	*16:44:52*	*U*	*42*
31-Mar	*16:14:32*	*U*	*83*
31-Mar	*23:50:17*	*E*	*127*
01-Apr	*15:45:51*	*U*	*55*
02-Apr	*20:30:32*	*E*	*122*
02-Apr	*22:34:15*	*U*	*46*
03-Apr	*4:18:36*	*E*	*59*
03-Apr	*12:59:02*	*U*	*44*
04-Apr	*10:15:17*	*U*	*42*
05-Apr	*12:24:12*	*U*	*39*
05-Apr	*13:32:37*	*U*	*44*
05-Apr	*15:48:27*	*E*	*30*
06-Apr	*3:21:40*	*E*	*127*
06-Apr	*16:04:14*	*E*	*26*
06-Apr	*16:24:52*	*E*	*15*
07-Apr	*0:36:02*	*U*	*26*
08-Apr	*18:09:44*	*E*	*111*
08-Apr	*22:56:51*	*U*	*83*
09-Apr	*15:19:17*	*U*	*48*
11-Apr	*18:53:58*	*U*	*43*
13-Apr	*23:19:01*	*E*	*27*
14-Apr	*5:58:18*	*U*	*127*
14-Apr	*11:14:36*	*U*	*44*
14-Apr	*16:36:35*	*U*	*41*
14-Apr	*18:39:42*	*U*	*51*
14-Apr	*20:02:56*	*U*	*68*
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16-Apr	*10:24:16*	*U*	*56*
16-Apr	*14:14:38*	*E*	*41*

17-Apr	*16:43:10*	*U*	*46*
17-Apr	*18:53:25*	*U*	*47*
18-Apr	*2:24:37*	*U*	*125*
18-Apr	*4:51:20*	*U*	*127*
18-Apr	*17:00:00*	*U*	*58*
18-Apr	*22:03:38*	*D*	*29*
20-Apr	*7:37:03*	*U*	*53*
20-Apr	*11:26:47*	*U*	*37*
20-Apr	*16:17:49*	*U*	*42*
21-Apr	*13:12:56*	*U*	*50*
21-Apr	*17:11:17*	*U*	*43*
22-Apr	*0:18:26*	*E*	*127*
22-Apr	*5:41:02*	*E*	*98*
22-Apr	*17:34:39*	*U*	*42*
22-Apr	*21:19:12*	*E*	*37*
23-Apr	*1:09:15*	*D*	*30*
23-Apr	*4:07:59*	*E*	*28*
23-Apr	*10:14:22*	*U*	*43*
23-Apr	*10:40:49*	*U*	*54*
24-Apr	*20:26:33*	*U*	*47*
25-Apr	*20:35:42*	*U*	*48*
26-Apr	*12:12:09*	*E*	*23*
26-Apr	*15:07:31*	*E*	*23*
26-Apr	*17:59:11*	*E*	*22*
26-Apr	*19:13:58*	*E*	*27*
26-Apr	*19:47:05*	*E*	*21*
27-Apr	*21:03:05*	*U*	*87*
27-Apr	*21:05:29*	*U*	*55*
27-Apr	*21:21:15*	*E*	*12*
27-Apr	*21:21:49*	*E*	*127*
27-Apr	*22:03:47*	*E*	*127*
28-Apr	*14:49:18*	*U*	*102*
28-Apr	*14:49:27*	*E*	*35*
28-Apr	*14:49:27*	*E*	*50*
28-Apr	*14:49:31*	*D*	*127*
28-Apr	*15:13:44*	*U*	*38*
29-Apr	*16:02:15*	*E*	*51*
30-Apr	*10:31:34*	*E*	*125*
30-Apr	*15:25:27*	*U*	*63*
30-Apr	*15:25:31*	*D*	*127*
30-Apr	*15:55:41*	*U*	*41*
02-May	*17:47:51*	*U*	*43*
02-May	*19:38:49*	*U*	*44*

02-May	*19:38:52*	*E*	*84*
02-May	*19:38:54*	*E*	*125*
02-May	*20:03:57*	*U*	*45*
03-May	*15:35:23*	*U*	*46*
04-May	*11:58:43*	*U*	*50*
04-May	*15:04:47*	*U*	*43*
07-May	*12:23:42*	*E*	*23*
07-May	*12:37:16*	*E*	*26*
07-May	*23:32:15*	*U*	*104*
08-May	*4:09:12*	*E*	*26*
08-May	*4:13:19*	*E*	*28*
08-May	*7:22:38*	*U*	*61*
12-May	*11:35:31*	*E*	*127*
13-May	*14:39:46*	*U*	*54*
14-May	*7:26:41*	*E*	*110*
14-May	*7:26:44*	*E*	*125*