

**Jordan Project Water Use Plan**

**Monitoring Surfing Quality below the Jordan River Generating Station**

**Implementation Year 6**

**Reference: JORMON-5**

*Monitoring Surfing Quality below the Jordan River Generating Station*

**Study Period: March to April 2011**

**RRL Recreation Resources Ltd.**

**October 18, 2013**



# Water License Requirements

## Jordan

### Water Licence Requirement Reporting

Ref Study: JOR-WUP-SURF

*Monitoring Surfing Quality Below the Jordan River Generating Station*

Study Period: March 6 – April 2, 2011

Final V3.0 October 2013



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## Executive Summary

**J**ordan River is located on the west coast of southern Vancouver Island, approximately 70 km north of Victoria via Highway 14. The surfing area is located at the mouth of the Jordan River and faces west onto Juan de Fuca Strait.



Jordan River continues to attract surfers due to its accessibility and its proximity to Victoria, and the quality of surf can be excellent. The location frequently offers conditions suitable for individuals new to the activity.

Every March into early April, from 2006 - 2011, surf user surveys have been collected at Jordan River for the purpose of defining the relationships between flows from the Jordan River and surf user experiences. A total of 232 surveys have been collected over the past six years.

The key purpose of the study has been to determine whether generation flow releases impacted surfer users experience at specific surf locations at Jordan River and whether constraints on the flow improved surfing conditions.

During the surf user survey periods each March and April, flows from the Jordan River Generating Station were varied so as to provide a mix of constrained and unconstrained flow conditions. This enabled collection of data under different flow conditions, and enabled comparisons with other environmental factors such as tide and wind direction

There are four primary surf use areas that are potentially influenced by flows from the Jordan River. They are locally named as - Points Left, Points Right, Outside the River Mouth and Shakies Beach

In this, the final year of the surf user survey, the on-site survey was conducted between March 6 and April 2nd. A total of 18 surf user surveys were collected. This compares with 40 surf user surveys collected in 2010, 32 surveys collected in 2009, 71 surveys collected in 2008, 31 surveys collected in 2007 and 40 collected in 2006.

## Surf Monitoring Background

In 2001 the first surf user survey was completed as part of the BC Hydro Water Use Plan (WUP) for Jordan River.

Analysis of the data collected indicated that surf conditions could be affected by Jordan River Generating Station discharge. In certain conditions high discharges may flatten waves, particularly at Points Left<sup>1</sup>, making it more difficult for surfers to catch waves against the current.



Based on the observations from the 2001 study, data has continued to be gathered in order to gain a fuller understanding of the relationship between discharge flows from the river, ocean conditions and surf users experiences at Jordan River.

Through the WUP process, the final alternative agreed to by the consultative committee includes provision for a minimum of four (4) weekend days during the month of March when maximum discharge will be limited to  $30\text{m}^3\text{s}^{-1}$  during the day.

The potential benefit of this flow has been evaluated during this monitoring program, which has been undertaken over a six-year period, 2006 – 2011.

The focus of the surfing survey is to determine the benefits to the surfing quality at Jordan River as a result of generation constraints that were defined in the Jordan Water Use Plan. The survey has 18 questions and includes a map on which to record surf use locations. The survey was conducted using in-person interviews

The 2011 survey was conducted on March 6,13,19,20, 26, and April 2. On only two of those dates, March 19 and April 2, were there any surfers at Jordan River.

<sup>1</sup> Refer to Appendix A for a map of the surf locations at Jordan River



## 2011 Surf Study Summary

**K**ey outcomes from the 2011 Surf User Monitoring Program are summarized below:

- The maximum number of users in the water during the 2011 on-site survey times was 20.
- 94.4% of surf users at Jordan River were board users, 72.2% of board users were male, and overall, 77.7% of surf users were male, 22.2% were female.
- 16.6% of surfers rated their experience as poor to fair, and 83.3% rated their experience as good to excellent, indicating that for the majority of surf users, surf conditions provided a positive experience.
- Under all flow conditions, 39% of users indicated their experience was impacted by the river flow while 61% indicated no impact. Under constrained flow, 44% indicated they were impacted, 55% indicated they were not. Under unconstrained flow, 66% indicated their activity was not impacted, 33% indicated their activity was impacted
- 77.7% of the surf users surveyed at Jordan River had been surfing between 0-4 years at Jordan River.
- 50% of the surfers used Shakies beach, making it the most used location this season.
- An equal number of short, medium and long length boards were used this season.
- 44.4% of users surfed 0-9 days per year at Jordan River.
- 50% of surf users spent \$40 - \$60 for each surf day.
- 11% of surf users live within 50 km of Jordan River, 89% live within 50-100km.



## 1.0 2011 Survey Objective and Scope

The surf-monitoring program was developed to assess the performance of the Water Use Plan decision to constrain maximum discharge opportunistically during the surfing season, using surf quality as the performance measure.

The monitoring program assessments are undertaken near the mouth of the Jordan River in the inter-tidal zone where surfing is prevalent.<sup>2</sup>



The 6-year program solicited feedback from experienced surfers to evaluate the surf quality of waves that are particularly vulnerable to Jordan River Generating Station operations.

Surf quality was evaluated under constrained and unconstrained generation discharge, alternating where possible over the 6-year review period.

The objectives of the Jordan River surf users monitoring program<sup>3</sup> were to:

1. Develop baseline information on daily surf use for high use weekends.
2. Determine user residency and activity preferences.
3. Define how often individuals surf at Jordan River on an annual basis.
4. Assess the correlation between discharge from the generating station and surf quality.
5. Record weather and tide information during the periods of surf survey administration.
6. Establish a monetary value for a surfer's day.

<sup>2</sup> Appendix A Surf User Survey and map of the surf locations at Jordan River

<sup>3</sup> Jordan River Water Use Plan Monitoring program Terms of Reference. June 21 2004

## 2.0 Survey Methodology

The 2011 survey of Jordan River surf users commenced March 6, and ended on April 2, 2011 and was delivered on site through in-person interviews. 18 surveys were collected.

The survey was designed to capture the key factors impacting a surf users experience while in the water at Jordan River, and during periods when flows from the Jordan River Generating Station were either constrained or unconstrained.

The survey was conducted in March/April, when surfer use at Jordan River tends to be higher.

The surf user survey was completed with one surfer at a time, and as soon as practically possible after each surfer left the water. The survey questions were explained to each user, each question was read aloud, and responses were recorded by Jeremy Webb from RRL Recreation Resources Ltd. Post field the collected data was compiled and analysed.



2011	
Date	# of Surveys
March 6	0
March 13	0
March 19	9
March 20	0
March 26	0
April 2	9
<b>Totals</b>	<b>18</b>

Survey monitoring was conducted on March 6, 13,19,20,26 and on April 2, 2011. Only on March 19 and April 2<sup>nd</sup> were surf users present at Jordan River. A total of 18 surveys were collected in 2011, 9 on March 19, and 9 on April 2<sup>nd</sup>.

The survey measures the key factors contributing to the surf users experience at Jordan River so as to determine how constraints on power generation may affect surfing quality.

There is a short 'window of opportunity' where the surf user can be interviewed, after they come out of the water, before they wish to get changed and warm up.

The survey questions were straightforward and generated only normal requests for clarification. Refer to Appendix A to view the Surf Users Survey template.

In addition to the surf user survey, the number of surf users in the water and their locations were observed and recorded at approximately half hour intervals. Weather observations were made and recorded at approximately one-hour intervals. Hourly flow level data from the Jordan River Generating Facility was provided by BC Hydro for the periods where the surf survey was conducted.



### 3.0 Survey Results 2011

This section of the report summarizes the data from the surf user surveys collected between March 6 and April 2, 2011.



#### 3.1 2011 User Group Profile - User Activities

The survey records five different types of surf use.

#4 – Type of surf use activity											
Board <sup>4</sup>		Body		Boogie		Windsurf		Kayak Surf		# of Surveys	Date
Male	Female	Male	Female	Male	Female	Male	Female	Male	Female		
-	-	-	-	-	-	-	-	-	-	0	March 6
-	-	-	-	-	-	-	-	-	-	0	March 13
5	4	-	-	-	-	-	-	-	-	9	March 19
-	-	-	-	-	-	-	-	-	-	0	March 20
-	-	-	-	-	-	-	-	-	-	0	March 26
8	-	-	-	1	-	-	-	-	-	9	April 2
<b>13</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>18</b>	<b>Totals</b>

This 2011 season, 94.4% of surf users at Jordan River are board users. 72.2% of the board users are male, and overall, 77.7% of surf users are male, 22.2% are female.

#### 3.2 Surf User Experiences

A series of four questions are used to differentiate the elements contributing to surf users experiences.

##### 3.2.1 Catching a Wave

Getting on to a wave in order to ride it is one of the fundamental challenges of surfing, and is a skill that develops with knowledge and experience.

#5 - How would you rate the conditions for catching the waves?									
Poor		Fair		Good		Excellent		# of Surveys	Date
Male	Female	Male	Female	Male	Female	Male	Female		
-	-	-	-	-	-	-	-	0	March 6
-	-	-	-	-	-	-	-	0	March 13
-	-	2	1	3	3	-	-	9	March 19
-	-	-	-	-	-	-	-	0	March 20
-	-	-	-	-	-	-	-	0	March 26
3	-	2	-	2	-	2	-	9	April 2
<b>3</b>	<b>0</b>	<b>4</b>	<b>1</b>	<b>5</b>	<b>3</b>	<b>2</b>	<b>0</b>	<b>18</b>	<b>Totals</b>

This season, 72.2% of surf users felt conditions for catching waves were fair to good. 16.6% of surfers rated conditions as poor, 27.7 as fair, 44.4% as good and 11.1% as excellent.

<sup>4</sup> Includes Paddle Surf Boards.

### 3.2.2 Wave Height

The higher the wave, generally the better the ride.

#6 - How would you rate the wave height?									
Poor		Fair		Good		Excellent		# of Surveys	Date
Male	Female	Male	Female	Male	Female	Male	Female		
-	-	-	-	-	-	-	-	0	March 6
-	-	-	-	-	-	-	-	0	March 13
-	-	2	1	3	3	-	-	9	March 19
-	-	-	-	-	-	-	-	0	March 20
-	-	-	-	-	-	-	-	0	March 26
3	-	2	-	2	-	2	-	9	April 2
<b>3</b>	<b>0</b>	<b>4</b>	<b>1</b>	<b>5</b>	<b>3</b>	<b>2</b>	<b>0</b>	<b>18</b>	<b>Totals</b>

This season, 16.6% of surf users rated wave height as poor, 27.7% as fair, 44.4% as good and 11.1% as excellent.

### 3.2.3 Wave Break

The way waves break affects the surfer's ride in several ways and a good wave break is much sought after. There are four surf breaks at Jordan River where surf user data is gathered: Shakies Beach, Outside River Mouth, Points Left and Points Right.

#7 - How would you rate the wave break?									
Poor		Fair		Good		Excellent		# of Surveys	Date
Male	Female	Male	Female	Male	Female	Male	Female		
-	-	-	-	-	-	-	-	0	March 6
-	-	-	-	-	-	-	-	0	March 13
-	-	1	4	3	-	1	-	9	March 19
-	-	-	-	-	-	-	-	0	March 20
-	-	-	-	-	-	-	-	0	March 26
2	-	5	-	2	-	-	-	9	April 2
<b>2</b>	<b>0</b>	<b>8</b>	<b>3</b>	<b>4</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>18</b>	<b>Totals</b>

This season, 11.1% of surf users rated the wave break as poor, 61.1% rated the wave break as fair, 27.2% rated it as good, and 0% rated it as excellent.

### 3.2.4 Length of Ride

Once on a wave, the surfer rides it and generally the longer the ride the better.

#8 - How would you rate the length of ride?									
Poor		Fair		Good		Excellent		# of Surveys	Date
Male	Female	Male	Female	Male	Female	Male	Female		
-	-	-	-	-	-	-	-	0	March 6
-	-	-	-	-	-	-	-	0	March 13
1	-	1	4	3	-	1	-	9	March 19
-	-	-	-	-	-	-	-	0	March 20
-	-	-	-	-	-	-	-	0	March 26
3	-	3	-	2	-	1	-	9	April 2
<b>3</b>	<b>0</b>	<b>4</b>	<b>4</b>	<b>5</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>18</b>	<b>Totals</b>

This season, % of surfers rated the ride length as poor, 44.4% as fair, 27.7% as good and 11.1% as excellent. The majority, 72.1% rating the ride length as fair to good is consistent with the surf conditions present during the survey period.

### 3.2.5 Quality of Experience

In order to obtain a rating from surf users that focused less on specific elements and more on the combination of elements contributing to their experience, surf users were asked to rate their overall experience while out on the water.

#9 - How would you rate the quality of your surfing experience today while you were in the water?									
Poor		Fair		Good		Excellent		# of Surveys	Date
Male	Female	Male	Female	Male	Female	Male	Female		
-	-	-	-	-	-	-	-	0	March 6
-	-	-	-	-	-	-	-	0	March 13
-	-	-	-	2	4	3	-	9	March 19
-	-	-	-	-	-	-	-	0	March 20
-	-	-	-	-	-	-	-	0	March 26
3	-	-	-	2	-	4	-	9	April 2
<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>4</b>	<b>7</b>	<b>0</b>	<b>18</b>	<b>Totals</b>

This season, 16.6% of surfers rated their experience as poor to fair, and 83.3% rated the experience as good to excellent, indicating that for the majority of surf users, surf conditions provided a positive experience.

### 3.3 Influence of River Flow

#10 - Did you notice if the water discharge from the Jordan River affected your water activity?					
Yes		No		Date	Flow Range
Male	Female	Male	Female		
-	-	-	-	March 6	+/- 0.40–0.41m <sup>3</sup> s <sup>-1</sup>
-	-	-	-	March 13	+/- 0.42–52.64 <sup>3</sup> s <sup>-1</sup>
3	1	2	3	March 19	+/- 29.63–29.56m <sup>3</sup> s <sup>-1</sup>
-	-	-	-	March 20	+/- 0.39– 51.86m <sup>3</sup> s <sup>-1</sup>
-	-	-	-	March 26	+/- 0.40 – 0.42m <sup>3</sup> s <sup>-1</sup>
3	-	6	-	April 2	+/- 50.52 – 51.36 <sup>3</sup> s <sup>-1</sup>
<b>6</b>	<b>1</b>	<b>8</b>	<b>3</b>	<b>Totals</b>	<b>-</b>

This 2011 season, 61.1% of surf users reported that their surf activity was not affected by river flow, while 38.8% overall indicated that they noticed the flow did affect their activity.

### 3.4 Summary of surf user comments who noticed River Flow

The comments of individuals who indicated the flow of water from the Jordan River affected their activity, or who noticed qualities about the river flow even though they observed it did not affect their activities, made the following observations:

Date	Affect activity	Comment	Surf user type	Years surfing at Jordan River	Total years surfing	Quality of surfing experience	Specific flow Levels during surfing activities
Mar. 19	Yes	Rip current pulled surfer down the beach	Board	1	2	Good	+/- 0.401 – 0.414m <sup>3</sup> s <sup>-1</sup>
Mar. 19	Yes	Swept down the beach	Board	1	1	Excellent	+/-29.60 – 29.58m <sup>3</sup> s <sup>-1</sup>
Mar. 19	Yes	Noticed the fresh water	Board	1	1	Excellent	+/-29.60 – 29.58m <sup>3</sup> s <sup>-1</sup>
Mar. 19	Yes	Noticed the fresh water	Board	3	5	Good	+/-29.60 – 29.58m <sup>3</sup> s <sup>-1</sup>
April 2	Yes	Current carried surfer out	Board	2	3	Good	+/-0.421 – 50.79m <sup>3</sup> s <sup>-1</sup>
April 2	No	Noticed the discharge but it had no effect	Board	2	2	Excellent	+/-51.55 – 51.57m <sup>3</sup> s <sup>-1</sup>
April 2	Yes	Noticed the current	Board	2	3	Excellent	+/-51.57 – 51.57m <sup>3</sup> s <sup>-1</sup>

This season, most comments came from when flows were between +/- 29.60 - 50m<sup>3</sup>s<sup>-1</sup>.

### 3.5 Surf User Numbers

During the 2011 survey, the maximum number of surfers in the water at any one time was 20. This compares with 12 in 2010, 15 in 2009, 18 in 2008, 13 in 2007 and 18 in 2006.

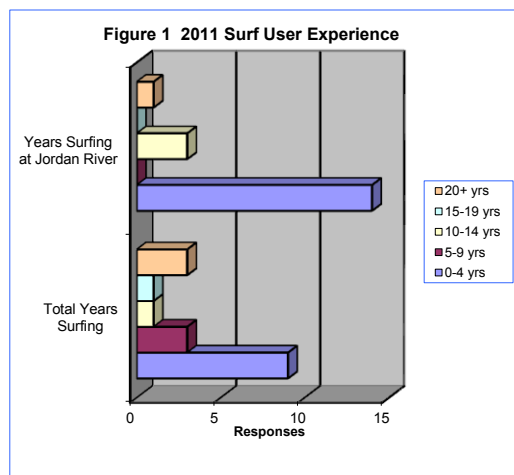
Number of surf users in the water: March 6,13,19,20,26, April 2, 2011													
		0800-0900	0900-1000	1000-1100	1100-1200	1200-1300	1300-1400	1400-1500	1500-1600	1600-1700	1700-1800	1800-1900	1900-2000
Mar 6	Pts R	-	1	-	-	-	-	-	-	-	-	-	-
	Pts L	-	-	-	-	-	-	-	-	-	-	-	-
	Out	-	-	-	-	-	-	-	-	-	-	-	-
	Shake	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	-	<b>1</b>	-	-	-	-	-	-	-	-	-	-	-
		0800-0900	0900-1000	1000-1100	1100-1200	1200-1300	1300-1400	1400-1500	1500-1600	1600-1700	1700-1800	1800-1900	1900-2000
Mar 13	Pts R	-	-	-	-	-	-	-	-	-	-	-	-
	Pts L	-	-	-	-	-	-	-	-	-	-	-	-
	Out	-	-	-	-	-	-	-	-	-	-	-	-
	Shake	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	-	-	-	-	-	-	-	-	-	-	-	-	-
		0800-0900	0900-1000	1000-1100	1100-1200	1200-1300	1300-1400	1400-1500	1500-1600	1600-1700	1700-1800	1800-1900	1900-2000
Mar 19	Pts R	-	-	-	-	-	3	3	2	-	-	-	-
	Pts L	-	-	-	-	1	2	5	6	-	-	-	-
	Out	-	-	-	-	-	-	-	-	-	-	-	-
	Shake	-	-	1	8	10{1}	12{3}	5{3}	6{4}	-	-	-	-
<b>Total</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>8</b>	<b>12</b>	<b>20</b>	<b>13</b>	<b>18</b>	-	-	-	-	-
		0800-0900	0900-1000	1000-1100	1100-1200	1200-1300	1300-1400	1400-1500	1500-1600	1600-1700	1700-1800	1800-1900	1900-2000
Mar 20	Pts R	-	-	-	-	-	-	-	-	3	5	10	-
	Pts L	-	-	-	-	-	-	-	-	15	1	6	-
	Out	-	-	-	-	-	-	-	-	4	4	3	-
	Shake	-	-	-	-	-	-	-	-	-	2	-	-
<b>Total</b>	-	-	-	-	-	-	-	-	-	<b>22</b>	<b>12</b>	<b>19</b>	-
		0800-0900	0900-1000	1000-1100	1100-1200	1200-1300	1300-1400	1400-1500	1500-1600	1600-1700	1700-1800	1800-1900	1900-2000
Mar 26	Pts R	-	-	-	-	-	-	-	-	-	3	2	-
	Pts L	-	-	-	-	-	-	-	-	-	-	-	-
	Out	-	-	-	-	-	-	-	-	-	-	-	-
	Shake	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	-	-	-	-	-	-	-	-	-	-	<b>2</b>	<b>2</b>	-
		0800-0900	0900-1000	1000-1100	1100-1200	1200-1300	1300-1400	1400-1500	1500-1600	1600-1700	1700-1800	1800-1900	1900-2000
April 2	Pts R					1	11	8	2	4	5		
	Pts L						1	1					
	Out												
	Shake									(1)	2		
<b>Total</b>					<b>1</b>	<b>12</b>	<b>9</b>	<b>2</b>	<b>5</b>	<b>7</b>			

1. Pts R = Points Right/Pts L = Points Left/Out = Outside/Shake = Shakies Beach
2. Numbers in ( ) are kayak surfers, numbers in [ ] are boogie board surfers, { } are paddle board surfers, and the numbers outside of the brackets are board surfers.

### 3.6 User Experience

In 2011, 77.7% of surfers have been surfing at Jordan River for 0-4 years. This is significantly more than in 2010 (42.5%) and 2009 (45%) had been surfing between 0-4 years at Jordan River.

In 2011 50% of the surfers had 0-5 years total experience surfing.



### 3.7 Number of Surfing Days

The number of days individuals surf at Jordan River each year varied from once per year, to over 60 times per year.

The majority (44.4%) of users surfed 0-9 days per year at Jordan River in 2011.

2011 Number of days surfing at Jordan River per year					
0-9	10-19	20-29	30-39	40-59	60+
8	6	1	0	2	1
44.4%	33.3%	5.5%	0%	11.1%	5.5%

### 3.8 User Residency

Surf users were asked where they lived.

2011 Residency of surfers users at Jordan River				
Within 50 km	50-100 km	100+ km	Other Canadian Area	Non Canadian
2	16	0	0	0
11%	89%	0%	0%	0%

11% of surf users lived within 50 km of Jordan River, 89% lived 50-100 km.

### 3.9 Amount Spent

50% of surf users spent \$40-\$60 on each surf day at Jordan River, including transportation, meals and accommodation, 33% spent \$10-\$25 and 22% spent \$26-\$39..

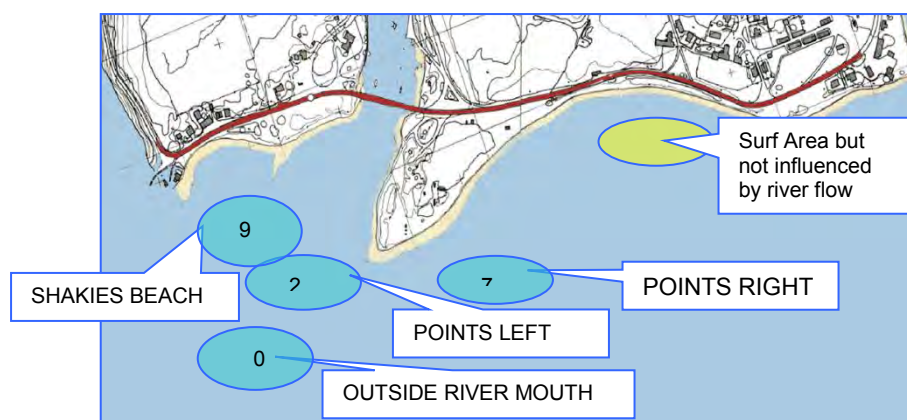
Amount Spend/day by Jordan River Surf Users - 2011										
	\$0-\$9	%	\$10-\$25	%	\$26-\$39	%	\$40-\$60	%	\$100+	%
2011	0	0	6	33%	4	22%	8	50%	0	0



### 3.9.1 Surfing Location

Surfers were asked where they surfed during their time at Jordan River. Some surfers used two locations during their time in the water. The most used area for surfing was Shakies Beach. The map below shows the number of surfers using each area over the 2011 survey period.

Surfers also use the area highlighted in yellow but it is not influenced by the discharge from the river and data is not collected from this area.



39% of those surveyed used the Points Right location in 2011. 0% used the Outside River Mouth location, 11% used Points Left and 50% used Shakies Beach.

### 3.9.2 Length of Board

There were an equal number of short, medium and long board users at Jordan River in 2011. Surf users vary the length of board they use depending on the type of surfing they like to do, and to best match surf conditions, i.e. using shorter boards in larger waves.

2011 Length of Board			
Kayak	Short	Medium	Long
0	6	6	6
0%	33.3%	33.3%	33.3%

## 4.0 Analysis 2011

The surf user survey was designed to record surf user experiences at Jordan River and to capture data on factors contributing to surf user experiences.

The purpose of the survey was to establish whether it is possible to optimally constrain flows from the Jordan River Generating Facility such that they positively impacted surfing conditions.



Also influencing surf user experiences are a range of environmental influences. These include:

- the cyclical changes in tidal direction and tidal currents,
- the varying depth of water as the tide ebbs and floods,
- changes in the direction of swell,
- changes in wave height and wave period, and
- the influence of wind.

The assessment of the quality of surf user experience is also impacted by factors such as:

- the length of time a surfer may be in the water,
- whether the tide changed from ebb to flood,
- or if their placement in the surf changed,
- or if the wind increased or decreased.

Because of the variables involved, it is challenging to determine whether a change in tide affected the quality of experience, whether it was a change in surfing location, or whether the length of time in the water impacted the quality of the experience, or a combination of these factors.

In 2011, under all flow conditions, 39% of users indicated their experience was impacted by the river flow while 61% indicated no impact. Under constrained flow, 44% indicated they were impacted, 55% indicated they were not. Under unconstrained flow, 66% indicated their activity was impacted, 33% indicated their activity was not impacted.

As this is the final year of the Jordan River Surf Survey, a summary and analysis of the six-year data collection has been prepared under a separate cover.<sup>5</sup>

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<sup>5</sup> *Monitoring Surfing Quality Below the Jordan River Generating Station-Summary Report: 2006 - 2011*

## 5.0 Conclusions

Surf users became increasingly familiar with the survey, and in 2011, the final year of the surf survey, while generally respecting its intent, increasing resistance or fatigue was noted.

The 2011 surveys were limited in number. However, the results show that the quality of experience for majority of surf users was independent of the flows from Jordan River.

In 2011, 83.3% of the surf users rated their experience as good to excellent, indicating that for the overwhelming majority of surf users, all surf conditions provided a positive experience, independent of flow conditions and environmental influences.

More detailed analysis and conclusions covering the six-year survey period are contained in the Summary Report.<sup>7</sup>



<sup>7</sup> Monitoring Surfing Quality Below the Jordan River Generating Station-Summary Report: 2006 - 2011

## Appendix A – 2011 Surf Survey

As part of BC Hydro's Jordan River Water Use Plan Monitoring Program, a survey of Jordan River surf users is being undertaken. A hydroelectric dam controls the amount of water that flows in the Jordan River. Of particular interest is how the amount of water discharge from the hydroelectric dam may affect surfing conditions.

BC Hydro has contracted an independent consulting company, RRL Recreation Resources Ltd. (RRL) to undertake the surf user survey. If you have any questions regarding the survey, you can call them, toll free at 1-800-761-5737. Thank you for participating!

### Jordan River Water Use Plan - Ocean Surf Recreation User Survey

1. **Date/time:** (Month/Day/Year/time) \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_ am/pm
2. **Time in Water:** Time in \_\_\_\_\_ am/pm - Time out \_\_\_\_\_ am/pm
3. **Male** \_\_\_\_\_ **Female** \_\_\_\_\_
4. **Activity Undertaken:**
  - Board Surf  Body surf  Boogie Board  Wind Surf  Kayak Surf
  - Other (describe) \_\_\_\_\_
5. **How would you rate the conditions for catching the waves?**
  - Poor  Fair  Good  Excellent
6. **How would you rate the wave height?**
  - Poor  Fair  Good  Excellent
7. **How would you rate the wave break?**
  - Poor  Fair  Good  Excellent
8. **How would you rate the length of ride?**
  - Poor  Fair  Good  Excellent
9. **How would you rate the quality of your surfing experience today while you were in the water?**
  - Poor  Fair  Good  Excellent
10. **Did you notice if the water discharge from the Jordan River affected your water activity?**
  - Yes  No

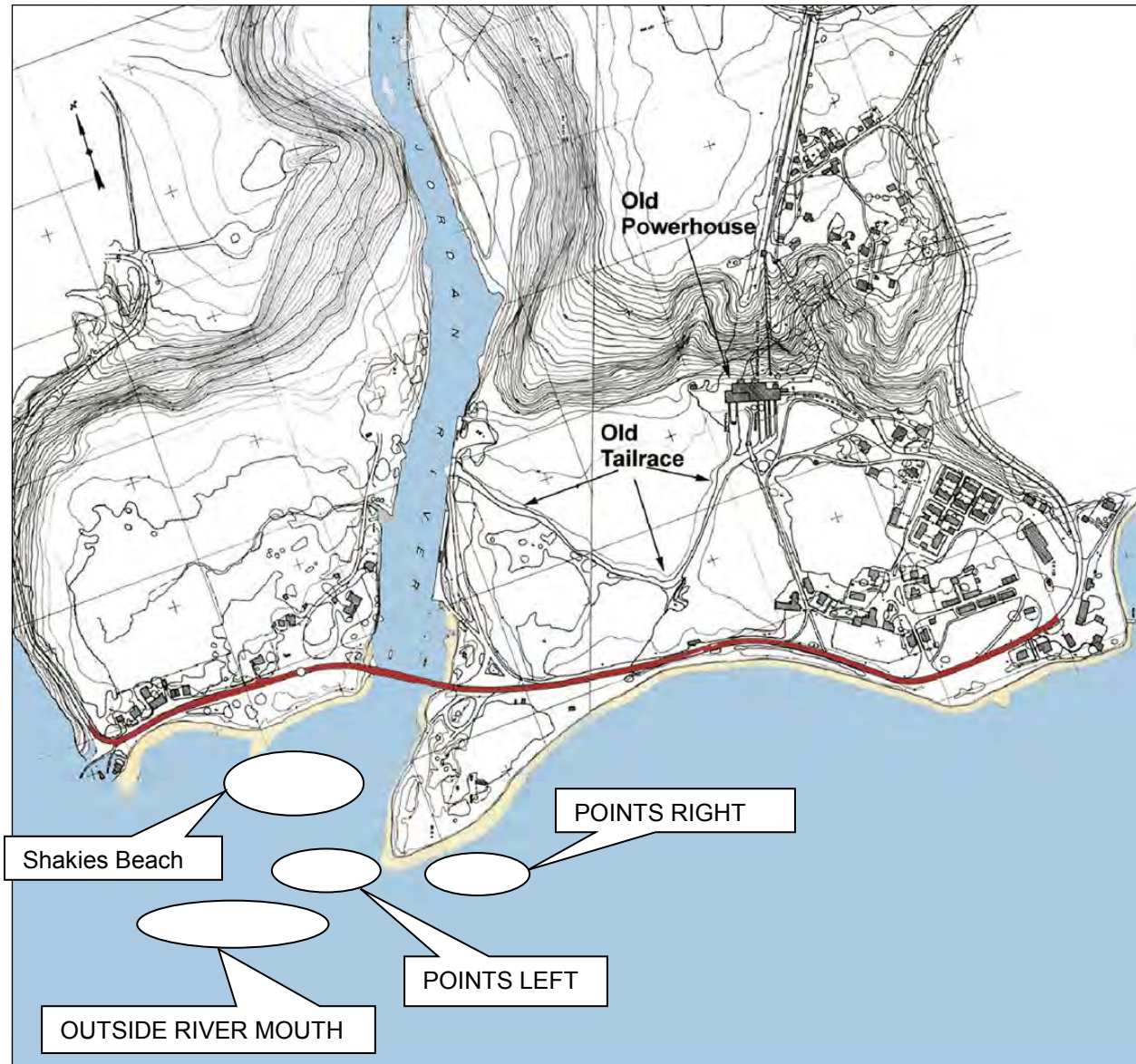
If answering yes to Question 10, please describe how your activity was affected.

\_\_\_\_\_
11. **Have you been interviewed before?**
  - Yes  No
12. **How many years have you been surfing at Jordan River?** \_\_\_\_\_
13. **How many years have you been surfing?** \_\_\_\_\_
14. **On average, how many days do you surf at Jordan River each year?** \_\_\_\_\_
15. **Where do you live?**
  - Within 50 km  50-100 km  100+km  Other Canadian area \_\_\_\_\_  Non-Canadian \_\_\_\_\_

16. How much do you spend in total for each surf day, including transportation, meals and accommodation (including taxes)?  \$0-\$9  \$10-\$25  \$26-\$39  \$40 - \$60  over \$100

17. What length of board did you use today?  
 NA \_\_\_\_\_  Short \_\_\_\_\_  Medium \_\_\_\_\_  Long \_\_\_\_\_

On the map below, please circle the location where you surfed: (Point Rights, Point Lefts, Shakies Beach, Outside Jordan River Mouth)





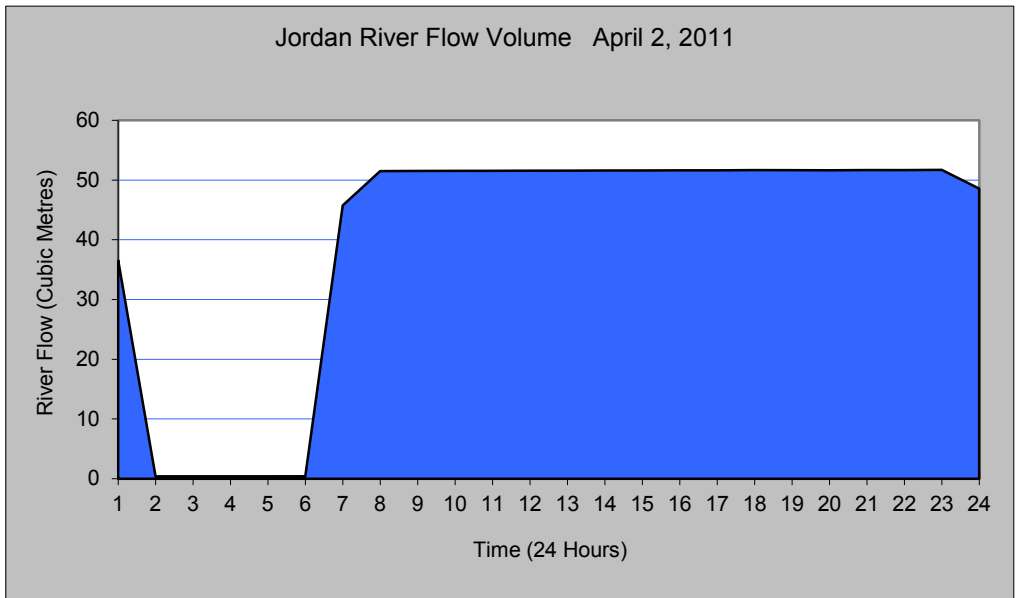
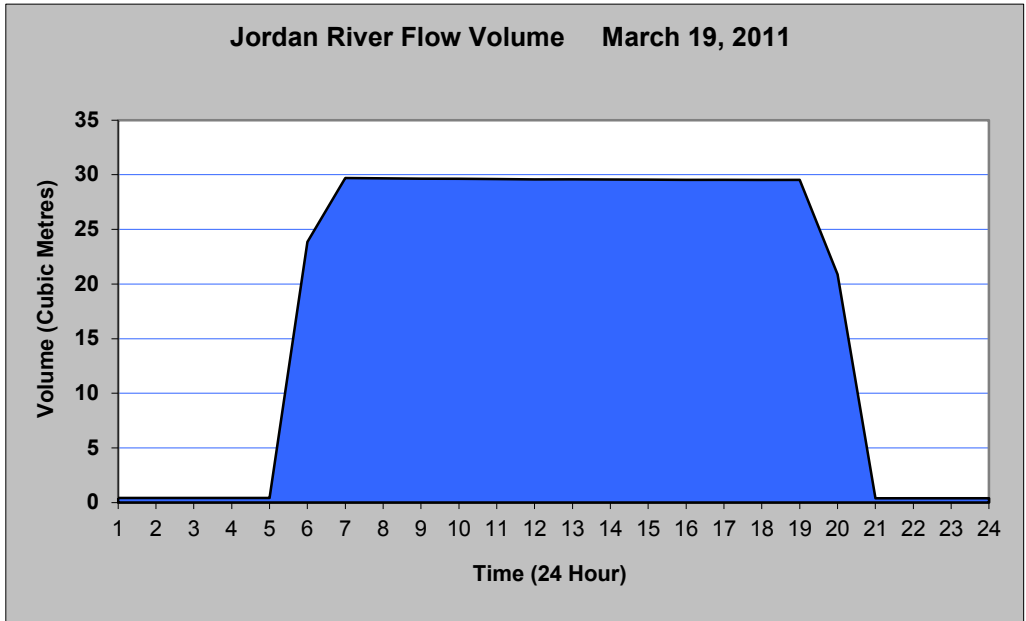
## Appendix B - Tidal Data

### Tides at Port Renfrew British Columbia for March 6, 13, 19, 20, 26, April 1, 2011

Date	High Time/metres/feet	Low Time/metres/feet	High Time/metres/feet	Low Time/metres/feet
March 6, 2011	02:18 <b>2.4</b> 7.9	08:43 <b>1.3</b> 4.3	14:01 <b>2.2</b> 7.2	20:14 <b>1.2</b> 3.9
March 13, 2011	06:31 <b>2.6</b> 8.5	15:35 <b>0.8</b> 2.6	-	-
March 19, 2011	01:49 <b>2.5</b> 8.2	08:15 <b>1.0</b> 3.3	13:43 <b>2.5</b> 8.2	20:11 <b>1.0</b> 3.3
March 20, 2011	02:16 <b>2.7</b> 8.9	09:07 <b>0.7</b> 2.3	14:49 <b>2.3</b> 7.5	20:40 <b>1.1</b> 3.6
March 26, 2011	06:04 <b>2.6</b> 8.5	14:38 <b>0.7</b> 2.3	-	-
April 2, 2011	01:34 <b>2.3</b> 7.5	08:13 <b>1.1</b> 3.6	13:55 <b>2.1</b> 6.9	19:44 <b>1.3</b> 4.3

### Appendix C – 2011 Jordan River Dam Flows

The charts below illustrate the volume of water released from the Jordan River Dam facility for the days when surf user surveys were collected, March 19, 2011 and April 2, 2011.



### Appendix D – Weather Conditions

