# Columbia River Project Water Use Plan

## Kinbasket and Arrow Recreation Management Plan

## Boat Ramp Use Study – Mid Term Report

## Implementation Year 4

## Reference: CLBMON-14

**Study Period: 2010-2013**

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**January 20, 2015**

# CLBMON-14
# Boat Ramp Use Study

**Mid Term Report (Implementation Year 4)**
**Study Period: 2010-2013**
**January, 2015**

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**Table 1.** CLBMON 14 STATUS of OBJECTIVES, MANAGEMENT QUESTIONS and HYPOTHESES after Year 4

| Objectives | Management Questions | Management Hypotheses | Year 4 (2013) Status |
|---|---|---|---|
| The objective of this study is to monitor trends in public use of boat ramp facilities where access improvements have been made as part of the Columbia River WUP, and assess the effectiveness of these projects in providing benefits to recreational interests in the area. | 1) Does public use of boat ramps increase on Kinbasket and Arrow Lakes reservoirs after installation and upgrading of the WUP boat ramp facilities? | $H_1$: The volume of public use of existing boat ramps where improvements have been undertaken increases over time following implementation of the Water Use Plan. | Results to date show an increase in volume of public use at three of the six sites where improvements have been undertaken. One site experienced a decrease in volume of public use and two sites saw no change in volume. Expecting more data in 2019. |
| | 2) If there is an increasing use of new or improved facilities, is it due to existing users visiting more often or new users being attracted to the area? | $H_2$: The volume of public use of new boat ramps increases with the availability of new access opportunities.<br>$H_{2A}$: The volume of public use of new boat ramps does not reduce the usage of nearby existing boat ramps negatively.<br>$H_{2B}$: The volume of public use increases due to new users being attracted. | Results suggest that the volume of reported use of new or improved facilities does not reduce the usage of nearby existing boat ramps. Expecting more data in 2019. |
| | 3) Does user satisfaction increase with improvements made to the existing boat ramps and construction of the new boat ramps? | $H_3$: User satisfaction of the new and upgraded boat ramps is greater than that experienced by users of the older facilities. | Results show a significant increase in user satisfaction following improvements to existing boat ramps and parking lot conditions. Average visitor satisfaction increased from 2.6 to 4.0 post-construction. Expecting more data in 2019. |
| | 4) Is there a need for installation of additional facilities to satisfy the needs of boat users on Kinbasket Reservoir and Arrow Lakes Reservoir? | $H_4$: There are no changes in the socio-demographic or trip behavior characteristics of users of boat ramps on Kinbasket and Arrow Lakes reservoirs. | Results suggest there are no changes in the socio-demographic characteristics of users of boat ramps on Kinbasket and Arrow Lakes reservoirs. Results suggest that boat ramp improvements have satisfied the majority of boat users needs. Expecting more data in 2019. |

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# 1. Executive Summary

During the Columbia River Water Use Planning (WUP) process, the Consultative Committee recognized an opportunity to improve access for water-based recreation on the Arrow Lakes and Kinbasket Reservoirs through physical improvements to existing boat ramps and the construction of new ramps (BC Hydro 2007). Since that time, BC Hydro has planned or completed boat ramp facility improvements at nine locations – six locations on the Arrow Lakes Reservoir and three on Kinbasket Reservoir. The CLBMON 14 Boat Ramp Use Study was ordered by the Comptroller of Water Rights to monitor use levels and user satisfaction at the boat launch improvement sites to inform future operational decisions.

Information gained through this monitoring program will assist future decision making during the next WUP review about the effectiveness of the boat launch works and their maintenance, the value of implementing additional physical works to improve access to the reservoirs, and any potential unintended impacts associated with improved boat access.

To address the management questions and supporting hypotheses specific parameters were measured through a combination of monitoring (traffic count and observational data collection) and interviews (on-site and online surveys). The study has a 10 year horizon (2010-2019), with sampling occurring in Years 1 – 4 inclusive, and in Year 10.

Results to date suggest boat ramp improvements do not lead to a large increase in daily visitor volume, new users, or change in the type of user group. Visitor satisfaction was the factor most affected with average satisfaction increasing from 2.6 to 4.0 post-construction, suggesting these projects have been effective in providing benefits to recreational interests in the area. The percentage of respondents reporting no problems or providing positive comments about the boat ramp facilities increased substantially over the course of the project period (from 15% to 60%) suggesting that launch improvements to date have been successful in addressing boat users' needs.

More robust conclusions may be made after more visitors have been able to use the improved sites in sampling Year 10.

The status of CLBMON 14 after Year 4 (2013) with respect to the management questions and management hypotheses is summarized in Table 1.

**Table 1.** CLBMON 14 STATUS of OBJECTIVES, MANAGEMENT QUESTIONS and HYPOTHESES after Year 4

| Objectives | Management Questions | Management Hypotheses | Year 4 (2013) Status |
|---|---|---|---|
| The objective of this study is to monitor trends in public use of boat ramp facilities where access improvements have been made as part of the Columbia River WUP, and assess the effectiveness of these projects in providing benefits to recreational interests in the area. | 1) Does public use of boat ramps increase on Kinbasket and Arrow Lakes reservoirs after installation and upgrading of the WUP boat ramp facilities? | $H_1$: The volume of public use of existing boat ramps where improvements have been undertaken increases over time following implementation of the Water Use Plan. | Results to date show an increase in volume of public use at three of the six sites where improvements have been undertaken. One site experienced a decrease in volume of public use and two sites saw no change in volume. Expecting more data in 2019. |
| | 2) If there is an increasing use of new or improved facilities, is it due to existing users visiting more often or new users being attracted to the area? | $H_2$: The volume of public use of new boat ramps increases with the availability of new access opportunities.<br>$H_{2A}$: The volume of public use of new boat ramps does not reduce the usage of nearby existing boat ramps negatively.<br>$H_{2B}$: The volume of public use increases due to new users being attracted. | Results suggest that the volume of reported use of new or improved facilities does not reduce the usage of nearby existing boat ramps. Expecting more data in 2019. |
| | 3) Does user satisfaction increase with improvements made to the existing boat ramps and construction of the new boat ramps? | $H_3$: User satisfaction of the new and upgraded boat ramps is greater than that experienced by users of the older facilities. | Results show a significant increase in user satisfaction following improvements to existing boat ramps and parking lot conditions. Average visitor satisfaction increased from 2.6 to 4.0 post-construction. Expecting more data in 2019. |
| | 4) Is there a need for installation of additional facilities to satisfy the needs of boat users on Kinbasket Reservoir and Arrow Lakes Reservoir? | $H_4$: There are no changes in the socio-demographic or trip behavior characteristics of users of boat ramps on Kinbasket and Arrow Lakes reservoirs. | Results suggest there are no changes in the socio-demographic characteristics of users of boat ramps on Kinbasket and Arrow Lakes reservoirs. Results suggest that boat ramp improvements have satisfied the majority of boat users' needs. Expecting more data in 2019. |

# 2. Introduction

## 2.1 Background

During the Columbia River Water Use planning (WUP) process, the Consultative Committee (CC) recognized an opportunity to improve access for water-based recreation on the Arrow Lakes and Kinbasket Reservoirs through physical improvements to existing boat ramps and the construction of new ramps (BC Hydro 2007). Since that time, BC Hydro has initiated or planned boat ramp facility improvements[1] at nine locations – six locations on the Arrow Lakes Reservoir and three locations on Kinbasket Reservoir, and some projects have been completed (see Table 3).

While the CC recognized the value of these projects, they also highlighted a need for a public use measurement study to monitor use levels and user satisfaction at the boat launch improvement sites to inform future operational decisions. CLBMON 14 Boat Ramp Use Study was ordered by the Comptroller of Water Rights as one of a series of monitoring programs that fulfills BC Hydro's obligations under the Columbia River Water Use Plan[2].

CLBMON 14 is a 10-year study that assesses the effectiveness of the boat ramp facility improvements that have been made as part of the Columbia River WUP, by monitoring eight sites where access improvements have been made, as well as two control sites. Information gained through this monitoring program will assist future decision making during the next WUP review about the effectiveness of the boat launch works and their maintenance, the value of implementing additional physical works to improve access to the reservoirs, and any potential unintended impacts associated with improved boat access. This mid-term report summarizes the results from Years 1-4 (2010-2013).

[1] Recreational boat access improvements may include ramp extensions, breakwaters, debris booms, docking floats, parking and other site changes.
[2] Concurrent to Years 1-4 of CLBMON 14, BCH conducted the Arrow Lakes Recreational Demand Study (CLBMON 41). Due to significant overlaps, the two studies were combined into one delivery model.

## 2.2 Management Questions and Objectives

The key management questions addressed by this study are:

MQ1: Does public use of boat ramps increase on Kinbasket and Arrow Lakes reservoirs after installation and upgrading of the WUP boat ramp facilities?

MQ2: If there is an increasing use of new or improved facilities, is it due to existing users visiting more often or new users being attracted to the area?

MQ3: Does user satisfaction increase with improvements made to the existing boat ramps and construction of the new boat ramps?

MQ4: Is there a need for installation of additional facilities to satisfy the needs of boat users on Kinbasket Reservoir and Arrow Lakes Reservoir?

The main objective of the study is to monitor trends in public use of boat ramp facilities where access improvements have been made as part of the Columbia River WUP, and assess the effectiveness of these projects in providing benefits to recreational interests in the area.

## 2.3 Management Hypotheses

Four primary management hypotheses frame this monitoring program:

"The first hypothesis is associated with evaluating whether increasing the usability of the existing ramps over a wider range of reservoir water elevations results in increased public use relative to pre-WUP conditions, at times when water levels are low. Testing of this hypothesis is informed directly by observed trends in usage obtained through ongoing monitoring of these sites.

$H_1$: The volume of public use of existing boat ramps where improvements have been undertaken increases over time following implementation of the Water Use Plan.

The second hypothesis is associated with determining whether construction of new ramp facilities results in increased access to the reservoir, or a shift in use away from existing boat ramps because of accessibility to the area (i.e., proximity to the boat ramp) or safer launch conditions. Testing of this hypothesis is informed both directly

through use data collected during the monitoring, as well as through survey questionnaires related to user characteristics and level of user satisfaction.

$H_2$: The volume of public use of new boat ramps increases with the availability of new access opportunities.

$H_{2A}$: The volume of public use of new boat ramps does not reduce the usage of nearby existing boat ramps negatively.

$H_{2B}$: The volume of public use increases due to new users being attracted.

A third hypothesis addresses possible changes to the recreation experience offered to the users of the boat ramps. The simplest indicator of a quality recreation experience is user satisfaction, which is investigated as part of the survey questionnaires. Satisfaction analysis also considers related information that is collected during the monitoring study. Other changes to the users, such as socio-demographic characteristics or reservoir recreation behaviour related variables, are also used as indicators.

$H_3$: User satisfaction of the new and upgraded boat ramps is greater than that experienced by users of the older facilities.

Finally, satisfaction alone does not provide any insights about changes to user groups characteristics. Therefore, it is important to monitor if user characteristics change over time.

$H_4$: There are no changes in the socio-demographic or trip behavior characteristics of users of boat ramps on Kinbasket and Arrow Lakes reservoirs."

(Terms of Reference, BC Hydro, 2009 p.6)

One of the key issues with the CLBMON 14 management questions and management hypotheses is the timing of improvements at each of the boat launch ramps. Ramp locations that were improved early in the study period do not have much, if any, pre-improvement data against which the post-improvement data can be compared. Conversely, ramps that are improved later in the study period (after year 4) will not have as much post-improvement data, except that gathered in year 10. This will mean that hypotheses *$H_{2B}$, $H_3$ and $H_4$* may not be uniformly tested over every boat launch ramp location.

# 3. Methods

To address the management questions and supporting hypotheses, specific parameters were measured through a combination of monitoring (traffic counters, spots counts and observational data collection) and interviews (on-site intercept and online surveys). This study has a 10 year horizon, with sampling occurring in spring, summer, and fall seasons (Terms of Reference, BC Hydro 2009, p.9). In order to meet scheduling and budget criteria, (gained though integration with CLBMON 41), sampling has occurred in Years 1 – 4 inclusive, and will continue in Year 10. Sampling intensity is higher during the summer due to the proportional increase in volume, the diversity of recreational activities during this period, and the longer season (as spring and fall on-water recreation seasons are limited by snow, cold weather and daylight hours). At the end of each sampling year, the data has been summarized in report format.

**Table 2.** Activities and reporting by monitoring year.

| Year | CLBMON 14 | Activities | Annual Report |
|---|---|---|---|
| 2010 | Year 1 | • Survey development<br>• First full field season | Interim Report |
| 2011 | Year 2 | • Second full field season<br>• Two new sites added | Interim Report |
| 2012 | Year 3 | • Third full field season<br>• All sites sampled | Interim Report |
| 2013 | Year 4 | • Fourth full field season<br>• All sites sampled | Mid-Term Analysis Report |
| 2014 | Year 5 | • No sampling | - |
| 2015 | Year 6 | • No sampling | - |
| 2016 | Year 7 | • No sampling | - |
| 2017 | Year 8 | • No sampling | - |
| 2018 | Year 9 | • No sampling | - |
| 2019 | Year 10 | • Full field season<br>• All sites to be sampled | Final Comprehensive Report |

This report (Year 4, 2013) provides a mid-term analysis. A comprehensive report will be prepared at the conclusion of the study. This report includes a detailed summary of the findings to date as they relate to the management questions and hypotheses.

This methods section is presented under the following headings:

- Sampling Sites;
- Traffic Data Collection;
- Observational Data Collection;
- Sampling Design;
- Survey Delivery;
- Survey Design, and
- Sampling Analyses.

## 3.1 Sampling Sites

The ten sampling sites used in this study (see Table 3 and Figures 1, 2) include eight of the sites that were approved by the Comptroller of Water Rights for access improvement work, such as the construction of new boat ramps and improvements to existing ramps, as well as two control sites. Nixon Creek was not included as a sample site as roads were inaccessible during the sampling period.

**Table 3.** Locations and status of boat ramp improvements.

| CLBMON 14 Study Site | Boat Ramp | Construction Period | Status |
|---|---|---|---|
| **Kinbasket Reservoir** | | | |
| √ | Valemount Marina | 2011-04-01 to 2011-06-27 | Ramp improvements were completed in 2010. |
| √ | Bush Harbour | 2010-04-12 to 2010-08-09 | Ramp improvements were completed in 2013. Ramp was extended to design toe elevation of 724.6 and floating walkway installed in 2013. |
| √ | Esplanade Bay | - | Control site |
| - | Nixon Creek | | n/a |
| **Arrow Lakes Reservoir** | | | |
| √ | Nakusp | 2013-02-04 to 2013-05-17 | Ramp and partial installation of floating walkway completed in 2013. Ramp to be extended to design elevation in the next low water cycle, and floating walkway guide cables to be extended. |
| √ | McDonald Creek | 2010-05-16 to 2010-07-01 | Floating breakwaters and walkway installed in 2010. Turnaround area not yet constructed. |
| √ | Burton | - | Control site |
| √ | Burton South† | Completed prior to addition as a study site in August 2011 | Floating breakwaters, access road and parking and turnaround areas were constructed in 2011. The majority of the ramp and floating walkway was installed in 2011. Ramp was extended to El.430.89 in spring 2013. Remaining three floating walkways to be installed and further ramp extension to design El. 425.5m are required. |
| √ | Fauquier | 2010-05-31 to 2010-09-21 | Partially completed (2010) - to be completed opportunistically. Floating breakwaters and walkway were installed in 2010. Turnaround area and ramp extension not yet constructed. |
| √ | Edgewood† | 2013-03-11 to 2013-05-17 | Floating breakwaters and floating walkway were installed in 2013. Minor repairs to the existing concrete ramp and riprap protection added around the perimeter of the ramp in 2013. |
| √ | Anderson Point | 2012-05-14 to 2012-06-12 | Partially constructed (CPC); to be completed in 2014 assuming reservoir conditions are favourable. |

†Traffic counters were installed at Esplanade Bay and Burton South boat ramps on August 24, 2011 as additional study sites. No environmental monitoring or interviews were conducted.

**Figure 1.** Sampling locations map – Arrow Lakes Reservoir.

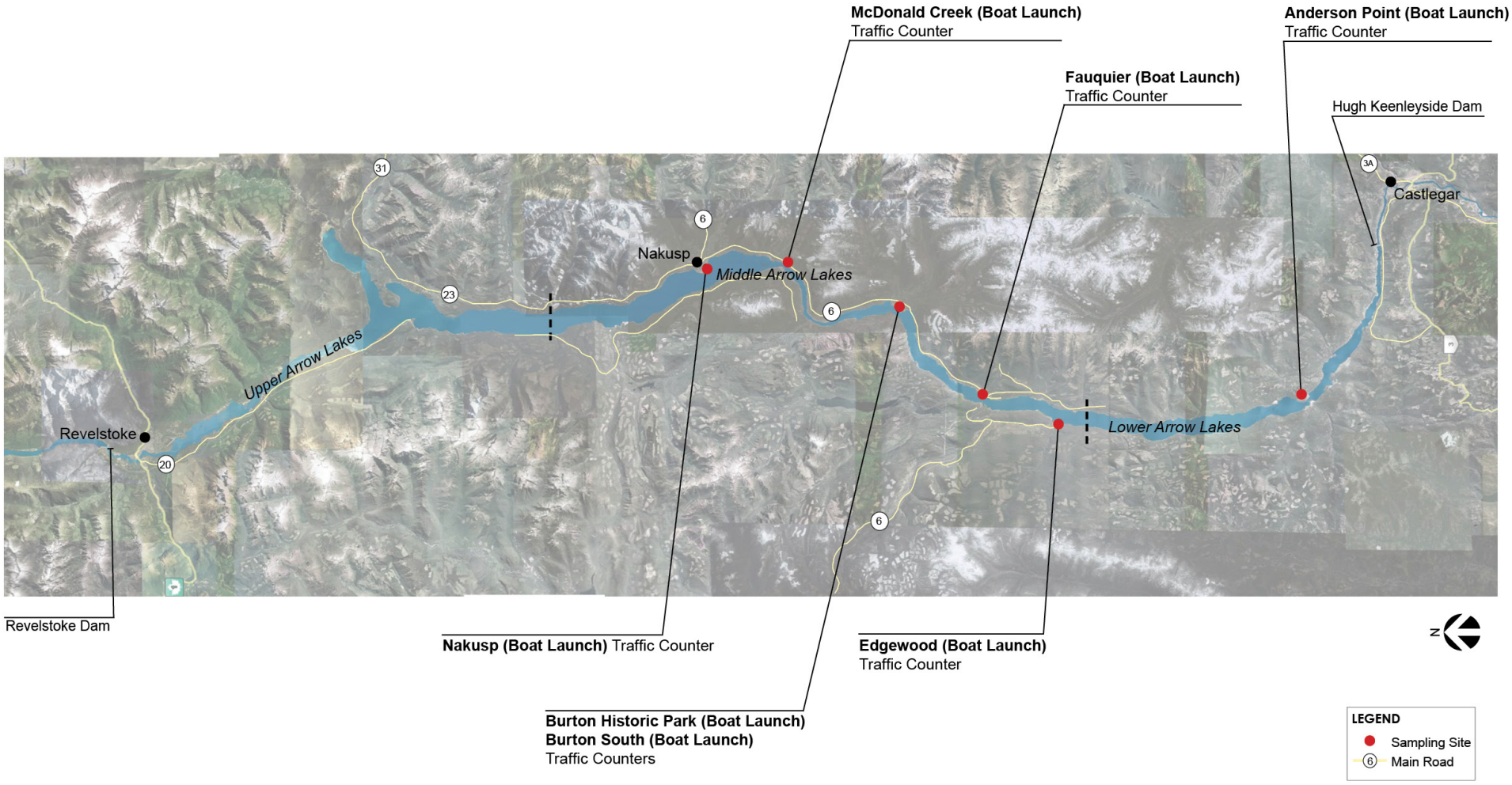
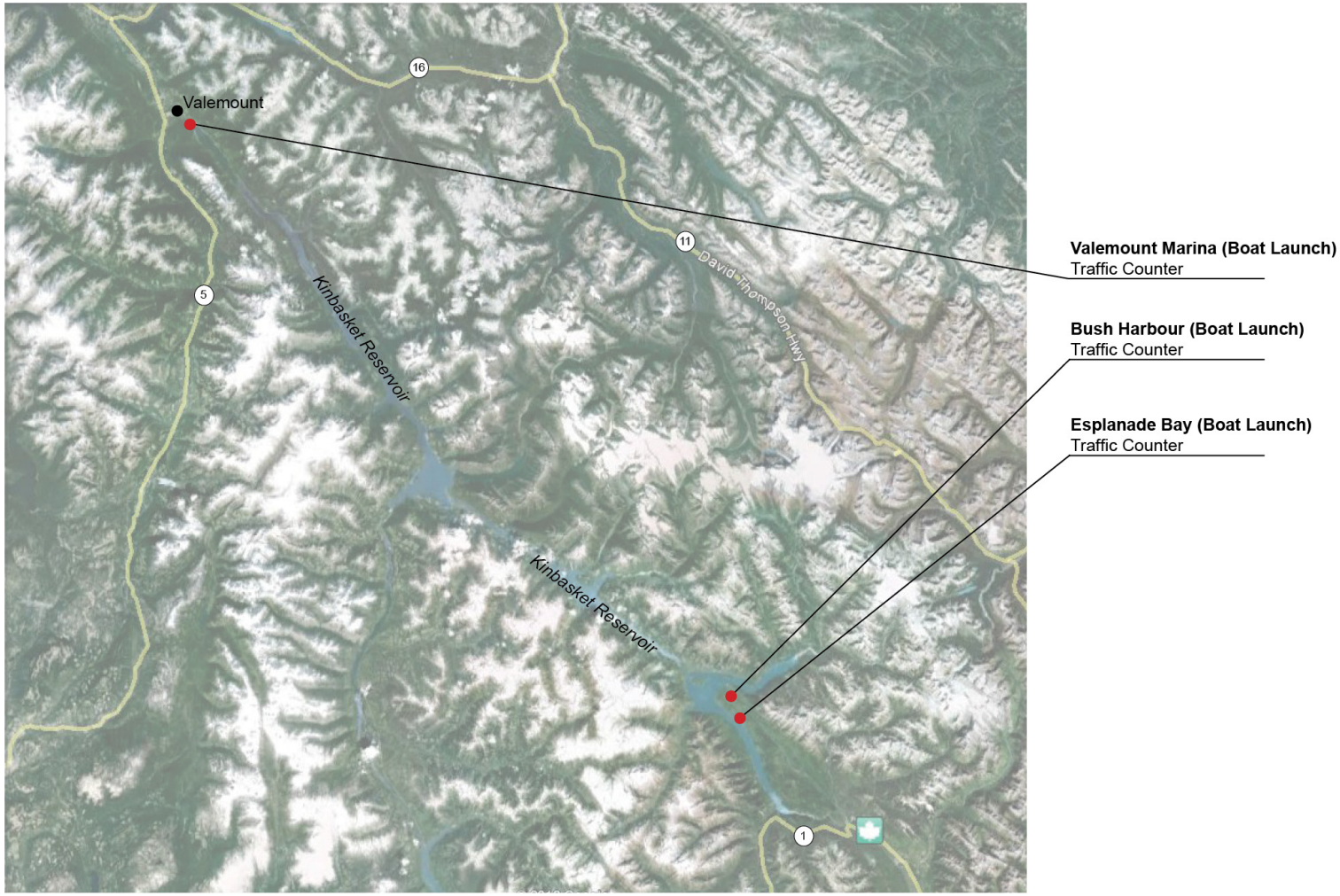


**Figure 2.** Sampling locations map – Kinbasket Reservoir.

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**SAMPLING SITE LOCATIONS - KINBASKET LAKE**
CLBMON-14 BOAT RAMP USE STUDY

Rev: 3
Date: November 22, 2014
Drawn/Checked: HR
Scale: NTS

## 3.2 Traffic Data Collection

Vehicle counters are a reliable tool for monitoring public recreation use and have been found to be very useful in identifying use trends and patterns to better manage public access (Terms of Reference, BC Hydro 2009, p.8). TRAFx G3 magnetic field controlled vehicle counters were selected for use in this study, as they are the preferred and recommended traffic counter of BC Parks, Parks Canada and the US National Parks Service. Vehicle counters were configured and installed at each sampling location as per the manufacturer's specifications to monitor the number of vehicles using the ramp facilities. Traffic counters remained in place year-round to collect vehicle counts in years 1-4, inclusive, and will be put back into place in year 10 of the study. Counters remained in-situ during construction periods for applicable boat ramps; however these periods have been excluded from the data (Table 4). Counters were removed during the exceptional high water period experienced in July and August 2012 (Table 4).

Annual traffic counts were collected and automatically compiled by the TRAFx DataNet system for each full calendar year. This was done to standardize the calculation and application of average daily use to missing data. The system then enables the selection of any time period across years for calculating and reporting daily, weekly and monthly counts, averages and comparisons. Further discussion of annual traffic count calculations can be found in Appendix A. Traffic data results are presented in Appendix C.

**Table 4.** Construction and high water periods (Years 1-4).

| Location | Construction Period† | | | High Water Period* | | |
|---|---|---|---|---|---|---|
| Bush Harbour | 2010-04-12 | to | 2010-08-09 | 2012-07-21 | to | 2012-09-10 |
| McDonald Creek | 2010-05-16 | to | 2010-07-01 | 2012-07-06 | to | 2012-08-15 |
| Fauquier | 2010-05-31 | to | 2010-09-21 | 2012-07-06 | to | 2012-08-15 |
| Valemount | 2011-04-01 | to | 2011-06-27 | 2012-07-24 | to | 2012-09-11 |
| Nakusp | 2013-02-04 | to | 2013-05-17 | - | | - |
| Edgewood | 2013-03-11 | to | 2013-05-17 | 2012-07-06 | to | 2012-08-15 |
| Anderson Point | 2012-05-14<br>2012-10-31 | to | 2012-06-12<br>2013-04-26 | - | | - |
| Burton | - | | - | 2012-07-06 | to | 2012-08-15 |
| Burton South | - | | - | 2012-07-06 | to | 2012-08-15 |
| Esplanade Bay | - | | - | 2012-07-21 | to | 2012-09-10 |

† Construction period dates are excluded in the data.
* Counters at these ramps were removed to prevent water damage thus no readings were taken during these periods.

### *3.2.1 Arrow Lakes Reservoir Traffic Counters*

Traffic counters were installed at boat access sites at Nakusp, McDonald Creek, Burton, Fauquier, and Edgewood and Anderson Point. An additional traffic counter was installed at the new Burton south boat launch on August 24, 2011 once it was substantially complete, in order to capture post-construction data. Where applicable, the traffic counters remained in place at old boat ramps until the construction of new boat ramp locations was completed.

Counter sensitivity and delay settings were configured to most accurately record traffic at each site, in order to achieve a level of accuracy that would permit conclusive answers to the management questions. Thresholds were adjusted to the least sensitive setting that would still pick up a vehicle passing through but not smaller or more distant metal objects; there is a 15 second delay between counts on single lane ramps and 12 second delay on double lane ramps to reduce multiple counts of same vehicle.

Settings were monitored and adjusted during the first year of study (2010) and inspected three times each study year to ensure counters were configured to most accurately record traffic at each site. In 2013, Nakusp counter settings were adjusted to accommodate placement of the counter in the middle of the new cement ramp. Other than at Nakusp the counter sensitivity and delay settings were unchanged since Year 2 (2011). Traffic counter settings used at Arrow Lakes sites are included in Appendix A.

### *3.2.2 Kinbasket Reservoir Traffic Counters*

Traffic counters at the Bush Harbour and Valemount Marina boat ramps were installed at the beginning of the study in April 2010. In 2011, a new traffic counter was installed at Esplanade Bay, a Forest Service campground with private cottages nearby. The Esplanade Bay counter was installed on August 24, 2011 so counts are shown only from that date. Traffic counter sensitivity and delay settings used at Kinbasket Reservoir sites are included in Appendix A.

## 3.3 Observational Data Collection

Field surveyors collected observational data about the visitors that they encountered, photographs of site conditions and natural conditions (Table 5). These observations consider information on visitors including number of people seen, gender and age range, recreational activities, and number and origin of cars in the parking lot. They also consider information on natural conditions that can affect the level and nature of boat ramp usage, such as weather and reservoir conditions (i.e., precipitation, wind, waves, percent cloud cover, and air temperature). Observational data were assessed using standardized forms and definitions developed for this purpose (see Appendix E).

**Table 5.** Observational data collection: variables collected each field day.

| Observation | Description |
|---|---|
| Number of people seen | • Provides an overall sense of the level of activity that day; recording the number of people approached provides basis for calculating response rate for the on-site survey.<br>• Party size was recorded where possible to compare with established BC Parks statistics†. |
| Gender and age range | • Total male and female<br>• Age range (1-10, 11-15, 16-20, 21-30, 31-40, 41-50, 51-60, 61-70, 71+) |
| Activities | • Type of recreational activity observed |
| Number of cars in parking lot (and origin) | • The number and origin of license plates was recorded through continuous observation to provide information about the number of parties using the facilities, visitors' place of residence and rough travel distance. A systematic tally system was used at the beginning and end of each shift in conjunction with the surveys to minimize double counting. |
| Site photography | • Photographic records of sample sites to capture site conditions.<br>• Taken from same vantage point to facilitate comparison between years. |
| Weather* | • General descriptions to supplement individual measurements. |
| Presence of waves* | • Wave height and formation. |
| Wind* | • Wind direction and an estimate of speed (Beaufort Scale). |
| Percent cloud cover* | • An assessment of the amount of sky/sun obscured by clouds. |
| Air temperature* | • Recorded in Celsius. |
| Water temperature* | • Recorded in Celsius. |

† BC Parks party size data are determined by number of people in group divided by the number of groups. Averages have been developed over years of surveys.

* Environmental data collected was each field day at 13h00.

## 3.4 Sampling Design

This section outlines the sampling design including details about the methods of collection for the observational data and on-site survey.

### *3.4.1 Arrow Lakes Reservoir Sampling Strategy*

Sampling of the CLBMON 14 boat ramp sites on the Arrow Lakes Reservoir was synchronized with the sampling days already scheduled for CLBMON 41 Arrow Reservoir Recreational Demand Study. Survey days at sample sites were randomly selected (Gregoire & Buhyoff, 1999). The random sample was stratified by four factors: (1) section of the Arrow Lakes; (2) season (the number of sample days in each season is proportional to the number of days in that season); (3) type of day (*i.e.*, weekends, week days, holidays); and (4) the time of day that sampling occurs (*i.e.*, morning or afternoon). Over the course of the sampling horizon, this approach provides a representative sample of visitors to boat ramp sites on the Arrow Lakes Reservoir.

Data collection for each sampling year typically commenced in April and finished in October (see Appendix F – Sampling Schedules). As a further step to ensure the representation of a wide range of outdoor recreation activities and respondents, surveyors were on-site during randomly selected six-hour periods (8:00 am to 2:00 pm or 2:00pm to 7:00pm in summer; and 8:30 am to 2:30 pm or 10:30 am to 4:30 pm[3] in spring and fall).

### *3.4.2 Kinbasket Reservoir Sampling Strategy*

The sampling strategy adopted for Kinbasket Reservoir provides that survey days at sample sites were randomly selected (Gregoire & Buhyoff, 1999). The random sample was stratified by three factors: (1) season (the number of sample days in each season is proportional to the number of calendar days in that season); (2) type of day (*i.e.*, weekends, week days, holidays), and (3) the time of day that sampling occurs (*i.e.*, morning or afternoon).

During each program year, each sample site on Kinbasket Reservoir was sampled eight times (see Appendix F – Sampling Schedules). As a further step to ensure the representation of a wide range of

[3] The six hour sampling period is based on successful application in previous recreational studies undertaken by the study team. An overlap of morning and afternoon periods ensures surveyors capture the higher use time over lunch hour. In 2012, summer sampling hours were shifted to capture more 'evening' recreationists.

outdoor recreation activities and respondents, surveyors were on-site during randomly selected six-hour periods (8:00 am to 2:00 pm or 2:00 pm to 7:00 pm in summer; and 8:30 am to 2:30 pm or 10:30 am to 4:30 pm[4] in spring and fall).

## 3.5 Survey Delivery

The visitor survey was designed to be delivered in two formats over the course of the project: (1) an on-site survey, administered to visitors at sample sites; and (2) an online survey, administered to regional residents to capture a broader range of attitudes and opinions about boat ramp use (or non-use) on the Arrow Lakes and Kinbasket Reservoirs.

### *3.5.1 On-site Survey*

Wherever possible, all parties at a sample site were approached for inclusion in this study. People were approached *after* using a boat ramp facility so that their responses would be based on their use of the facilities that day. Except where single-family parties were identified, all party members were asked to participate in the survey; when families were identified, only one representative was asked to participate in the survey; however, if other members of the party wished to participate they were welcomed to do so. The majority of respondents completed the questionnaires on-site; 65 respondents chose to mail in their survey using a self-addressed stamped envelope provided by field staff. The number of people approached for inclusion in the study was recorded to permit the calculation of response rate. Number of parties and total number of people on site was also recorded. People who refused to participate were thanked for their time and were not engaged further. A standard introduction statement was made to all prospective participants that summarized the cover letter that accompanied the questionnaire. If asked what the surveys would be used for, people were told that the information would be used to inform the development of strategies to guide the management of water flows and recreational access points on the Arrow Lakes and Kinbasket Reservoirs. Contact information for the project team was provided in the event that anyone had questions or concerns about the project.

[4] The six hour sampling period is based on successful application in previous recreational studies undertaken by the study team. An overlap of morning and afternoon periods ensures surveyors capture the higher use time over lunch hour. In 2012, summer sampling hours were shifted to capture more 'evening' recreationists.

### *3.5.2 Online Survey*

In addition to the on-site survey, information about the use (or non-use) of the Kinbasket and Arrow Lakes Reservoir, and reasons for non-use, was solicited through on online survey. This self-selected sample was invited to participate in the online survey in order to capture a broader range of attitudes and opinions about boat ramp use, or non-use, on the Kinbasket and Arrow Lakes Reservoirs.

The online version of the survey was also available for on-site visitors that preferred to provide their information online. The online survey is identical to the on-site survey and was available at www.arrow-kinbasket-recreation-survey.ca. Due to low volume of responses (n = 0 to n = 37 responses per study year), the web-based data was collected for informational purposes only and was not used in the analysis. The online survey was taken offline at the end of the fall 2013 sampling periods and will be made available again when sampling resumes in 2019.

## 3.6 Survey Design

Questions that specifically address the usage of boat ramp facilities were added to the visitor questionnaire already in use for the Arrow Reservoir Recreational Demand Study (CLBMON 41). By combining questions onto one questionnaire the need for multiple interviews and the potential for survey fatigue were minimized.

The Visitor Survey questionnaire was developed using the principles of the *Tailored Design Method*. This method identifies procedures to maximize survey return rates and minimize survey error (Salant & Dillman, 1994; Dillman, 2000), including questionnaire layout considerations. The questionnaire was designed to ensure a logical flow of the questions, and that the wording of the questions and instructions to the respondents would be clear and as brief as possible. A key requirement of the questionnaire was that it be suitable for repeated delivery at multiple locations in order that a better understanding of recreation and boat ramp use on the Kinbasket and Arrow Lakes Reservoirs be identified.

The first version of the questionnaire already included two questions in Section 5 relating to satisfaction with boat ramp facilities and parking lot conditions at the sites. Prior to the beginning of the Boat Ramp Use Study, drafts of the additional survey questions specific to boat ramp use were circulated in order to promote discussion around question ordering, question wording, answer options, and/or question

instructions. Reviewers included the LEES+Associates team, the BC Hydro team, and members of the *Collaborative for Advanced Landscape Planning* at the *University of British Columbia*. The final version of the questionnaire included four additional questions pertaining specifically to boat ramp usage, in Section 6. The other sections remained the same. The questionnaire retained the same format – a four-page booklet (two 8.5" by 11" sheets printed on both sides, stapled in the top left corner) that comprehensively measures people's use of, and attitudes about, recreation on the Kinbasket and Arrow Lakes Reservoirs. A distinct version of the questionnaire was used for Kinbasket sampling and Arrow Lakes sampling to avoid confusion about which lake users were being asked about (Appendix B – Visitor Survey).

The survey questions in Sections 5 and 6 permitted the isolation of variables to characterize boat ramp use on the Kinbasket and Arrow Lakes Reservoirs. Recreationists are not a homogeneous group (Bryan, 1977; Manning, 1999; Salz *et al*., 2001; Rollins & Robinson, 2002), as participants differ in their values, the activities that they pursue, preferred settings, desired experiences, and motivations for participating (Choi *et al*., 1994). These measurement protocols follow standard practices and are appropriate for a project of this type.

The questionnaire included three sections with questions related to boat ramp usage:

Section 5: Arrow Lakes / Kinbasket Reservoir Outdoor Recreation Management.

Section 6: Arrow Lakes / Kinbasket Reservoir Outdoor Recreation Experiences.

Section 7: Demographics.

A detailed rationale for the data captured by each of these questions follows. Figure illustrations are taken from the Arrow Lakes version of the questionnaire.

### *3.6.1 Section 5: Arrow Lakes Reservoir / Kinbasket Reservoir Outdoor Recreation Management.*

This section has two parts. The first part of this section (Figure 3) includes questions that ask how respondents feel about existing boat ramps and parking lot conditions on the Arrow Lakes and Kinbasket Reservoirs. Questions 3 and 4 provides an assessment of visitor satisfaction with these facilities, which is used to test $H_3$.

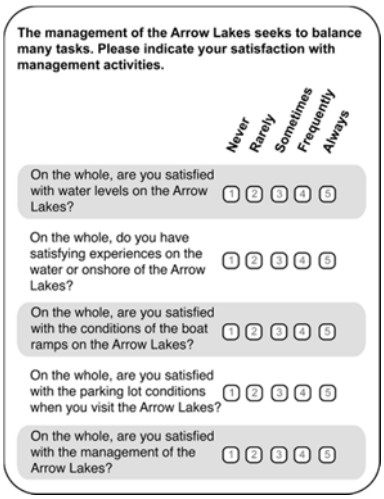



**Figure 3.** Section 5 questions, part 1.

### *3.6.2 Section 6: Arrow Lakes Reservoir / Kinbasket Reservoir Outdoor Recreation Experiences.*

This section has three parts which ask about respondents' recreation experiences on the reservoir. The second part includes 4 questions related to respondents' experience while using boat ramp facilities (Figure 4). Question 3 address $H_2$ by asking about which boat ramp facilities people usually use on the Arrow Lakes and Kinbasket Reservoirs. Question 5 asks about what visitors liked and disliked about the boat ramp facilities they used on Kinbasket Reservoir and Arrow Lakes Reservoir to address $MQ_2$.

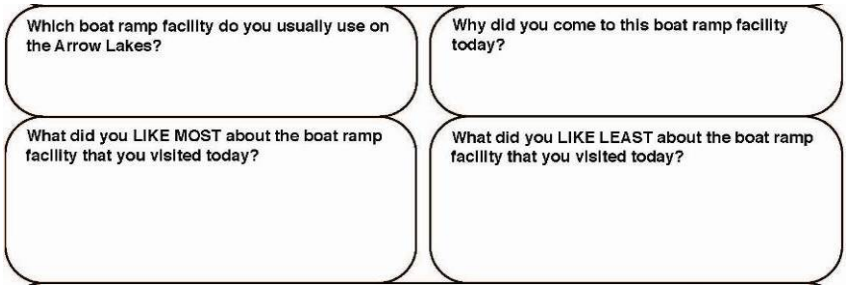



**Figure 4.** Section 6, part 2, questions pertaining to boat ramp use.

*Section 7: Demographics.*

Section 7 (Figure 5) collects basic information about respondents' demographic characteristics. These questions provide information about user group socio-demographic characteristics, which addresses $H_4$.

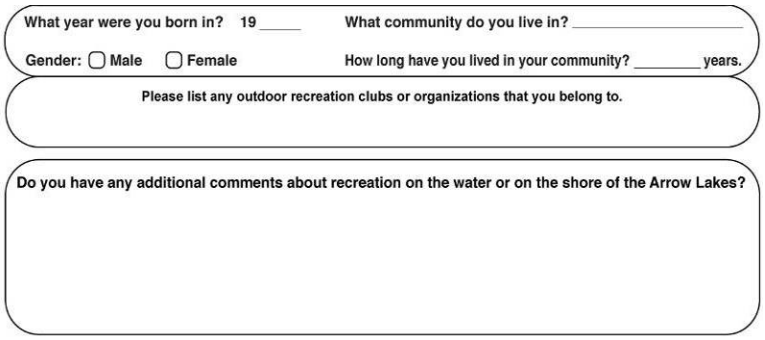



**Figure 5.** Section 7 questions.

Data collection took advantage of the different elements of the study (*i.e.*, traffic counters and questionnaire-elicited data). Table 6 illustrates the links between the management questions and specific data or questionnaire subsection.

**Table 6.** Relationship of Management Questions to Specific Monitoring Parameters

| Management Question | Management Hypothesis | Mode of Measurement |
|---|---|---|
| 1) Does public use of boat ramps increase on Kinbasket and Arrow Lakes reservoirs after installation and upgrading of the WUP boat ramp facilities? | $H_1$: The volume of public use of existing boat ramps where improvements have been undertaken increases over time following implementation of the Water Use Plan. | Traffic Counter Data |
| 2) If there is an increasing use of new or improved facilities, is it due to existing users visiting more often or new users being attracted to the area? | $H_2$: The volume of public use of new boat ramps increases with the availability of new access opportunities.<br>$H_{2A}$: The volume of public use of new boat ramps does not reduce the usage of nearby existing boat ramps negatively.<br>$H_{2B}$: The volume of public use increases due to new users being attracted. | Traffic Counter Data<br>Section 6, question 2 |
| 3) Does user satisfaction increase with improvements made to the existing boat ramps and construction of the new boat ramps? | $H_3$: User satisfaction of the new and upgraded boat ramps is greater than that experienced by users of the older facilities. | Section 5, questions 3 and 4 |
| 4) Is there a need for installation of additional facilities to satisfy the needs of boat users on Kinbasket Reservoir and Arrow Lakes Reservoir? | $H_4$: There are no changes in the socio-demographic or trip behavior characteristics of users of boat ramps on Kinbasket and Arrow Lakes. | Section 6, question 5<br>Section 7, questions 1 and 3 |

## 3.7 Survey Analyses

The analysis considers the six improved boat launch locations on the Arrow Lakes Reservoir (Anderson Point, Edgewood Community Park, Fauquier Community Park Boat Launch, McDonald Creek Provincial Park, Burton South and the Nakusp Boat Launch) and two Kinbasket Reservoir locations (Bush Harbour and Valemount Marina), as well as two control sites (Burton and Esplanade Bay). No survey data was collected at the Esplanade Bay or Burton South boat ramps. Due to the timing of the study pre-construction traffic data was not available for Bush Harbour or Burton South. For all statistical tests, $\alpha$ = 0.05 was used to establish significant differences.

Independent sample t-tests were used to examine Management Question 1; boat ramp counter data was compared for average daily visits for the pre-construction phase and the post-construction phase. A comparison of respondents' 'usual boat ramp' pre- and post-construction was made to investigate Management Question 2. Independent t-tests were also employed to examine Management Question 3; visitor satisfaction with boat ramp facilities and with parking lot conditions was compared pre- and post-construction. Chi-square tests were used to examine Management Question 4; aspects of their experience that visitors disliked about the boat ramp that they visited on the day they completed a questionnaire were compared between pre- and post-construction sample days. Differences in the age of survey respondents surveyed pre- and post-construction were tested using independent t-tests. Differences in the gender of survey respondents surveyed pre- and post-construction were tested using chi-square tests; Fisher's exact test was used to test significance, and the Phi *post-hoc* test was used.

### *3.7.1 Data Entry QA/QC*

The data from all completed questionnaires were entered (twice) into two SPSS databases to facilitate the verification of data for keying errors, and accuracy and consistency in data coding (Salant & Dillman, 1994). Each completed questionnaire was compared between the two datasets such that each cell (each answer to a question) was verified using the Identify Duplicate Cases function of SPSS (if two cases are identified as being duplicates, then it is assumed that they have been entered correctly). When discrepancies were identified, the appropriate questionnaire was consulted and the necessary correction was made. The resultant dataset can be considered to be free of errors from data entry. The data were checked for "protest votes" (*i.e.,* outliers or obvious patterns such as multiple responses from

the same IP address); when these were identified they were checked against the corresponding questionnaire. No obvious "protest votes" were identified.

# 4. Results

A total of 1,363 completed questionnaires were collected at seven sample locations (Figure 6), from 2010 to 2013. The number of completed questionnaires collected at each location varied by year (Table 7; Figure 7).

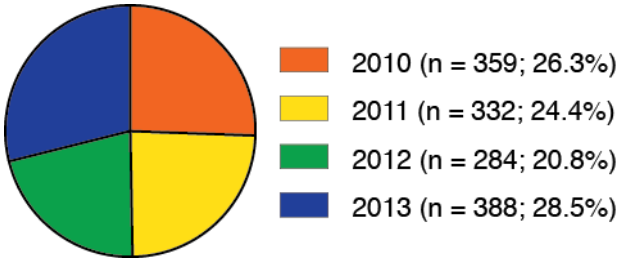



**Figure 6.** Questionnaire returns by sample year.

**Table 7.** Completed questionnaires by sample location.

| Sample Location | Year | | | | TOTAL |
|---|---|---|---|---|---|
| | 2010 | 2011 | 2012 | 2013 | |
| Anderson Point | 47 | 24 | 10 | 28 | 109 |
| Edgewood Community Park | 50 | 78 | 41 | 41 | 210 |
| Fauquier Community Park Boat Launch | 37 | 16 | 13 | 23 | 89 |
| McDonald Creek Provincial Park | 47 | 66 | 66 | 93 | 272 |
| Nakusp Boat Launch | 92 | 82 | 42 | 97 | 313 |
| Bush Harbour | 17 | 24 | 19 | 20 | 80 |
| Valemount Marina | 69 | 42 | 93 | 86 | 290 |
| **TOTAL** | **359** | **332** | **284** | **388** | **1,363** |

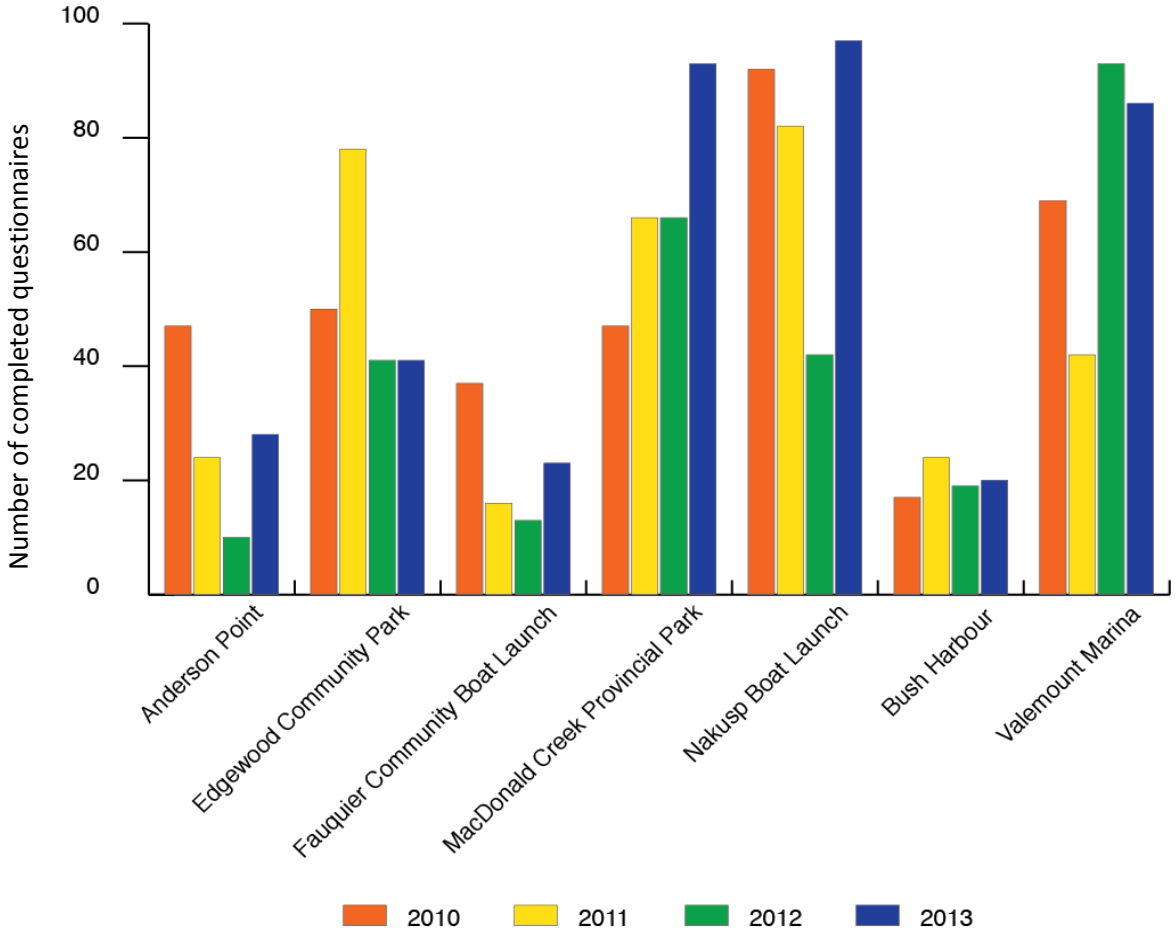



**Figure 7.** Completed questionnaires by sample location (n = 1,363).

Field staff encountered 977 visitors at sample sites on the Kinbasket Reservoir between 2010 and 2013, and asked 570 visitors to participate in the survey; 58 of those had previously completed a survey in that sampling year. A total of 380 completed questionnaires were returned which represents an overall response rate of 72.3% (Table 8a).

**Table 8a.** Kinbasket Reservoir visitor encounters and survey response rates.

| Year | # Visitors Encountered | # Visitors Asked to Participate | # Previously Completed[†] | # Completed Questionnaires | Response Rate |
|---|---|---|---|---|---|
| 2010 | 217 | 123 | 0 | 86 | 69.9% |
| 2011 | 221 | 112 | 35 | 66 | 85.7% |
| 2012 | 241 | 156 | 2 | 112 | 72.7% |
| 2013 | 298 | 179 | 21 | 106 | 67.1% |
| **TOTAL** | **977** | **570** | **58** | **370** | **72.3%** |

[†] People who have previously completed the survey in this sampling year. These visitors are subtracted from the number of visitors asked to participate, in order to calculate response rate.

Field staff encountered 3,725 visitors at sample sites on the Arrow Lakes Reservoir between 2010 and 2013, and asked 1,207 visitors to participate in the survey; 100 of those had previously completed a survey in that sampling year. A total of 993 completed questionnaires were returned which represents an overall response rate of 89.7% (Table 8b).

**Table 8b.** Arrow Lakes Reservoir visitor encounters and survey response rates.

| Year | # Visitors Encountered | # Visitors Asked to Participate | # Previously Completed[†] | # Completed Questionnaires | Response Rate |
|---|---|---|---|---|---|
| 2010 | 928 | 322 | 28 | 273 | 92.9% |
| 2011 | 1,235 | 326 | 35 | 266 | 91.4% |
| 2012 | 707 | 227 | 22 | 172 | 83.9% |
| 2013 | 815 | 332 | 15 | 282 | 89.0% |
| **TOTAL** | **3,725** | **1,207** | **100** | **993** | **89.7%** |

[†] People who have previously completed the survey in this sampling year. These visitors are subtracted from the number of visitors asked to participate, in order to calculate response rate.

## 4.1 Management Question 1:

*MQ1. Does public use of boat ramps increase on Kinbasket and Arrow Lakes reservoirs after installation and upgrading of the WUP boat ramp facilities?*

There were significant differences between pre- and post-ramp construction for four of the six improved sites on the Arrow and Kinbasket Reservoirs (pre-construction boat launch counter data was not collected for Bush Harbour). The Anderson Point, McDonald Creek Provincial Park, and Nakusp boat ramps saw significant increases in average daily boat launches post-construction. The Fauquier boat ramp saw significant declines in average daily launches post-construction. There were no significant differences in average daily boat launches between the pre-construction and post-construction periods for the Edgewood Community Park and Valemount boat ramps (Figure 8, Table 9).

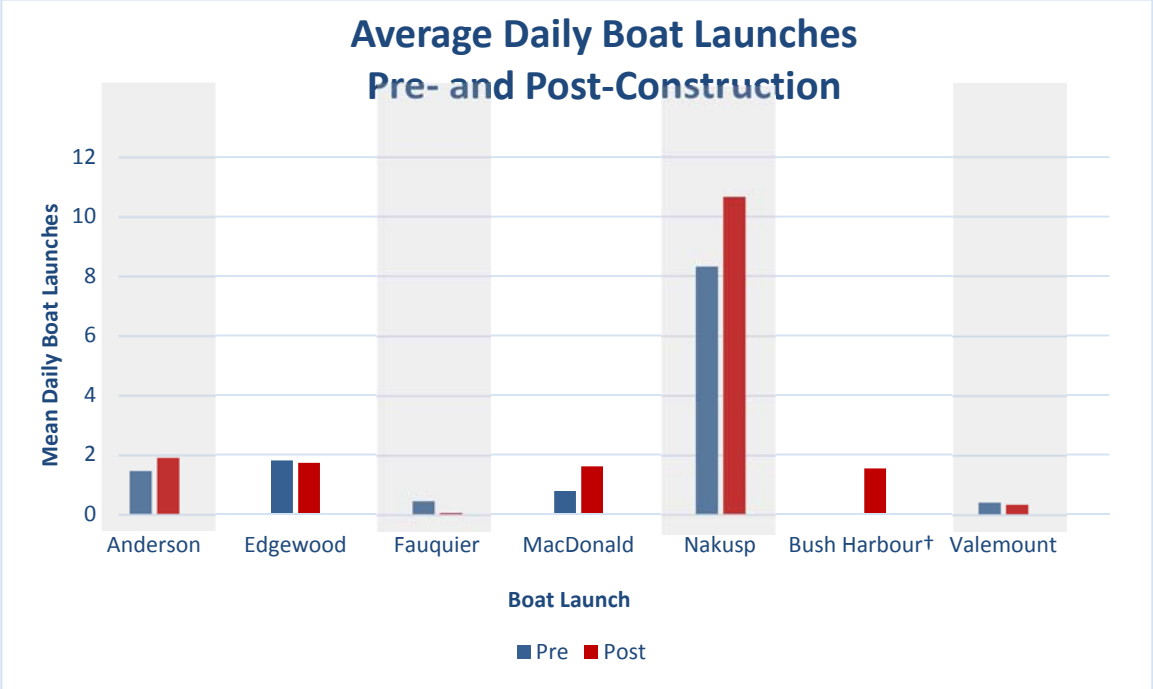



**Figure 8.** Average Daily Boat Launches at Boat Ramp Locations Pre- and Post-Construction

**Table 9.** Average daily launches at boat ramp locations that have had new ramps constructed.

| Boat Ramp | Construction Period | n | Min | Max | Median | Mode | Mean Daily Boat Launches[†] | 95% CI | SD | t | Df | p |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Anderson Point | Pre | 767 | 0 | 9 | 1 | 0 | 1.47 | ± 0.11 | 1.523 | -3.977 | 1017 | < .001 |
| | Post | 252 | 0 | 7 | 2 | 1 | 1.91 | ± 0.19 | 1.536 | | | |
| Edgewood Community Park | Pre | 1,209 | 0 | 15 | 1 | 0 | 1.80 | ± 0.12 | 2.089 | 0.414 | 1376 | > .05 |
| | Post | 169 | 0 | 28 | 1 | 0 | 1.72 | ± 0.41 | 2.688 | | | |
| Fauquier Community Park Boat Launch | Pre | 257 | 0 | 5 | 0 | 0 | 0.47 | ± 0.11 | 0.910 | 7.013 | 269.212 | < .001 |
| | Post | 946 | 0 | 2 | 0 | 0 | 0.07 | ± 0.02 | 0.279 | | | |
| McDonald Creek Provincial Park | Pre | 245 | 0 | 6 | 0 | 0 | 0.77 | ± 0.15 | 1.183 | -7.472 | 882.309 | < .001 |
| | Post | 1,160 | 0 | 23 | 0 | 0 | 1.60 | ± 0.16 | 2.762 | | | |
| Nakusp Boat Launch | Pre | 1,234 | 0 | 58 | 6 | 4 | 8.32 | ± 0.44 | 7.913 | -3.671 | 1402 | < .001 |
| | Post | 170 | 1 | 32 | 9 | 4 | 10.66 | ± 1.04 | 6.956 | | | |
| Bush Harbour[†] | Pre | — | — | — | — | — | — | — | — | — | — | — |
| | Post | 906 | 0 | 23.00 | 0 | 0 | 1.53 | ± 0.18 | 2.754 | | | |
| Valemount Marina | Pre | 348 | 0 | 11 | 0 | 0 | 0.42 | ± 0.11 | 1.061 | 0.801 | 1006 | > .05 |
| | Post | 660 | 0 | 18 | 0 | 0 | 0.35 | ± 0.09 | 1.224 | | | |

[†] Pre-construction boat launch counter data was not collected for Bush Harbour.

An analysis of control sites was performed comparing each improved site and to a control site so that the number of boat launches could be compared using similar periods. Using the construction periods for each improved boat ramp, the control site (Burton) saw a higher ratio of mean post-construction boat launches than any of the five improved boat ramps on the Arrow Lakes Reservoir. There was no pre-construction traffic data at the control site on Kinbasket Reservoir to compare improved sites to. It should be noted that the control sites appear to be very low-use sites thus there may be some bias when comparing to the improved moderate- to high-use sites. Thus, the control site results should be interpreted with caution. Full results of the control sites analysis can be found in Appendix G.

## 4.2 Management Question 2:

*MQ2. If there is an increasing use of new or improved facilities, is it due to existing users visiting more often or new users being attracted to the area?*

### *4.2.1 Anderson Point Boat Launch*

Prior to construction, 55.2% of visitors encountered at the Anderson Point Boat Launch reported that it was the boat ramp that they usually used; post construction, the percentage of encountered visitors reporting that it was their usual boat ramp declined by 20.8%. The percentage of visitors encountered at the Anderson Point Boat Launch that reported that Deer Park was the boat ramp facility that they usually used increased from 0% to 9.4%. The percentage of visitors encountered at the Anderson Point Boat Launch that reported that Renata was the boat ramp facility that they usually used decreased by 5.5%. The percentage of visitors encountered at the Anderson Point Boat Launch that reported that Scotties Marina was the boat ramp facility that they usually used decreased from 1.7% to 0%. The percentage of visitors encountered at the Anderson Point Boat Launch that reported that Shelter Bay was the boat ramp facility that they usually used increased by 2.3%. The percentage of visitors encountered at the Anderson Point Boat Launch that reported that Syringa Creek Park was the boat ramp facility that they usually used increased by 9.0%; and the percentage of visitors encountered at the Anderson Point Boat Launch that reported that Syringa Creek Day Use was the boat ramp facility that they usually used increased from 0% to 3.1% (Table 10).

**Table 10.** Anderson Point: Which boat ramp facility do you usually use on Arrow Lake?

| Boat Launch | Pre-construction (n = 58) | | Post-construction (n = 32) | |
|---|---|---|---|---|
| | n | % | n | % |
| Anderson Point | 32 | 55.2% | 11 | 34.4% |
| Deer Park | 0 | 0.0% | 3 | 9.4% |
| Multiple sites | 10 | 17.2% | 7 | 21.9% |
| Renata | 5 | 8.6% | 1 | 3.1% |
| Scotties Marina | 1 | 1.7% | 0 | 0.0% |
| Shelter Bay | 6 | 10.3% | 4 | 12.5% |
| Syringa Creek Park Boat Launch | 4 | 6.9% | 5 | 15.6% |
| Syringa Creek Park Day Use | 0 | 0.0% | 1 | 3.1% |

### *4.2.2 Edgewood Community Park Boat Launch*

Prior to construction, 70.8% of visitors encountered at the Edgewood Community Park Boat Launch reported that it was the boat ramp that they usually used; post construction, the percentage of encountered visitors reporting that it was their usual boat ramp increased by 6.1%. The percentage of visitors encountered at the Edgewood Community Park Boat Launch that reported that the Arrow Park Ferry was the boat ramp facility that they usually used declined by 1.4%. The percentage of visitors encountered at the Edgewood Community Park Boat Launch that reported that Fauquier Community Park was the boat ramp facility that they usually used declined by 1.4%. The percentage of visitors encountered at the Edgewood Community Park Boat Launch that reported that McDonald Creek Provincial Park was the boat ramp facility that they usually used declined by 0.7%. The percentage of visitors encountered at the Edgewood Community Park Boat Launch that reported that Nakusp was the boat ramp facility that they usually used increased from 0% to 7.7%. The percentage of visitors encountered at the Edgewood Community Park Boat Launch that reported that above the Revelstoke Dam was the boat ramp facility that they usually used declined by 0.7%. The percentage of visitors encountered at the Edgewood Community Park Boat Launch that reported that Syringa Creek Park was the boat ramp facility that they usually used increased from 0% to 7.7% (Table 11).

**Table 11.** Edgewood Community Park: Which boat ramp facility do you usually use on Arrow Lake?

| Boat Launch | Pre-construction (n = 144) | | Post-construction (n = 13) | |
|---|---|---|---|---|
| | n | % | n | % |
| Arrow Park Ferry | 2 | 1.4% | 0 | 0.0% |
| Edgewood Community Park | 102 | 70.8% | 10 | 76.9% |
| Esplanade Bay | 0 | 0.0% | 0 | 0.0% |
| Fauquier Community Park | 2 | 1.4% | 0 | 0.0% |
| McDonald Creek Provincial Park | 1 | 0.7% | 0 | 0.0% |
| Multiple sites | 36 | 25.0% | 1 | 7.7% |
| Nakusp Boat Launch | 0 | 0.0% | 1 | 7.7% |
| Above Revelstoke Dam | 1 | 0.7% | 0 | 0.0% |
| Syringa Creek Park Boat Launch | 0 | 0.0% | 1 | 7.7% |

### *4.2.3 Fauquier Community Park Boat Launch*

Prior to construction, half of visitors encountered at the Fauquier Community Park Boat Launch reported that it was the boat ramp that they usually used; post construction, the percentage of encountered visitors reporting that it was their usual boat ramp increased by 30.4%. The percentage of visitors encountered at the Fauquier Community Park Boat Launch that reported that the Arrow Park Ferry was the boat ramp facility that they usually used declined by 22.8%. The percentage of visitors encountered at the Fauquier Community Park Boat Launch that reported that Edgewood Community Park was the boat ramp facility that they usually used declined by 4.5%. The percentage of visitors encountered at the Fauquier Community Park Boat Launch that reported that Nakusp was the boat ramp facility that they usually used increased by 2.2%. The percentage of visitors encountered at the Fauquier Community Park Boat Launch that reported that Needles was the boat ramp facility that they usually used declined by 12.5% (Table 12).

**Table 12.** Fauquier Community Park: Which boat ramp facility do you usually use on Arrow Lake?

| Boat Launch | Pre-construction (n = 24) | | Post-construction (n = 46) | |
|---|---|---|---|---|
| | n | % | n | % |
| Arrow Park Ferry | 6 | 25.0% | 1 | 2.2% |
| Edgewood Community Park | 1 | 4.2% | 4 | 8.7% |
| Fauquier Community Park | 12 | 50.0% | 37 | 80.4% |
| Multiple sites | 2 | 8.3% | 3 | 6.5% |
| Nakusp Boat Launch | 0 | 0.0% | 1 | 2.2% |
| Needles | 3 | 12.5% | 0 | 0.0% |

### *4.2.4 McDonald Creek Provincial Park Boat Launch*

Prior to construction, one in five visitors encountered at the McDonald Creek Provincial Park Boat Launch reported that it was the boat ramp that they usually used; post construction, the percentage of encountered visitors reporting that it was their usual boat ramp increased by 13.6%. The percentage of visitors encountered at the McDonald Creek Provincial Park Boat Launch that reported that the Arrow Park Ferry was the boat ramp facility that they usually used declined by 10.0%. The percentage of visitors encountered at the McDonald Creek Provincial Park Boat Launch that reported that Burton Historic Park was the boat ramp facility that they usually used increased by 0.8%. The percentage of visitors encountered at the McDonald Creek Provincial Park Boat Launch that reported that Eagle Bay was the boat ramp facility that they usually used increased by 0.8%. The percentage of visitors encountered at the McDonald Creek Provincial Park Boat Launch that reported that Nakusp was the boat ramp facility that they usually used increased by 0.9%. The percentage of visitors encountered at the McDonald Creek Provincial Park Boat Launch that reported that Needles was the boat ramp facility that they usually used increased by 0.8%. The percentage of visitors encountered at the McDonald Creek Provincial Park Boat Launch that reported that Shelter Bay was the boat ramp facility that they usually used increased by 3.1%. The percentage of visitors encountered at the McDonald Creek Provincial Park Boat Launch that reported that Syringa Creek Park was the boat ramp facility that they usually used increased by 2.3% (Table 13).

**Table 13.** McDonald Creek Provincial Park: Which boat ramp facility do you usually use on Arrow Lake?

| Boat Launch | Pre-construction (n = 10) | | Post-construction (n = 128) | |
|---|---|---|---|---|
| | n | % | n | % |
| Arrow Park Ferry | 1 | 10.0% | 0 | 0.0% |
| Burton Historic Park | 0 | 0.0% | 1 | 0.8% |
| Eagle Bay | 0 | 0.0% | 1 | 0.8% |
| McDonald Creek Provincial Park | 2 | 20.0% | 43 | 33.6% |
| Multiple sites | 6 | 60.0% | 61 | 47.7% |
| Nakusp Boat Launch | 1 | 10.0% | 14 | 10.9% |
| Needles | 0 | 0.0% | 1 | 0.8% |
| Shelter Bay | 0 | 0.0% | 4 | 3.1% |
| Syringa Creek Park Boat Launch | 0 | 0.0% | 3 | 2.3% |

### *4.2.5 Nakusp Boat Launch*

Prior to construction, 61.4% of visitors encountered at the Nakusp Boat Launch reported that it was the boat ramp that they usually used; post construction, the percentage of encountered visitors reporting that it was their usual boat ramp increased by 13.1%. The percentage of visitors encountered at the Nakusp Boat Launch that reported that Arrow Park Ferry was the boat ramp facility that they usually used declined by 1.0%. The percentage of visitors encountered at the Nakusp Boat Launch that reported that Edgewood Community Park was the boat ramp facility that they usually used declined by 1.7%. The percentage of visitors encountered at the Nakusp Boat Launch that reported that Fauquier Community Park was the boat ramp facility that they usually used increased by 1.5%. The percentage of visitors encountered at the Nakusp Boat Launch that reported that Galena Bay was the boat ramp facility that they usually used increased by 2.1%. The percentage of visitors encountered at the Nakusp Boat Launch that reported that McDonald Creek Provincial Park was the boat ramp facility that they usually used increased by 0.4%. The percentage of visitors encountered at the Nakusp Boat Launch that reported that Syringa Creek Park was the boat ramp facility that they usually used declined by 1.1% (Table 14).

**Table 14.** Nakusp: Which boat ramp facility do you usually use on Arrow Lake?

| Boat Launch | Pre-construction (n = 176) | | Post-construction (n = 47) | |
|---|---|---|---|---|
| | n | % | n | % |
| Arrow Park Ferry | 2 | 1.1% | 1 | 2.1% |
| Burton Historic Park | 5 | 2.8% | 0 | 0.0% |
| Edgewood Community Park | 3 | 1.7% | 0 | 0.0% |
| Esplanade Bay | 0 | 0.0% | 0 | 0.0% |
| Fauquier Community Park | 1 | 0.6% | 1 | 2.1% |
| Galena Bay | 0 | 0.0% | 1 | 2.1% |
| McDonald Creek Provincial Park | 3 | 1.7% | 1 | 2.1% |
| Multiple sites | 52 | 29.5% | 8 | 17.0% |
| Nakusp Boat Launch | 108 | 61.4% | 35 | 74.5% |
| Syringa Creek Park Boat Launch | 2 | 1.1% | 0 | 0.0% |

### *4.2.6 Bush Harbour*

Pre-construction boat launch counter data was not collected for Bush Harbour. However, post-construction almost two respondents in five of the visitors encountered at the Bush Harbour Boat Launch reported that it was the boat ramp that they usually used. Post-construction, 16.7% of visitors encountered at the Bush Harbour Boat Launch that reported that Esplanade Bay was the boat ramp facility that they usually used, and 2.1% of visitors encountered reported that the Valemount Marina was the boat ramp that they usually used (Table 15).

**Table 15.** Bush Harbour: Which boat ramp facility do you usually use on Kinbasket Lake[†]?

| Boat Launch | Post-construction (n = 48) | |
|---|---|---|
| | n | % |
| Bush Harbour | 19 | 39.6% |
| Esplanade Bay | 8 | 16.7% |
| Multiple sites | 20 | 41.7% |
| Valemount Marina | 1 | 2.1% |

[†] Pre-construction boat launch counter data was not collected for Bush Harbour.

### *4.2.7 Valemount Boat Launch*

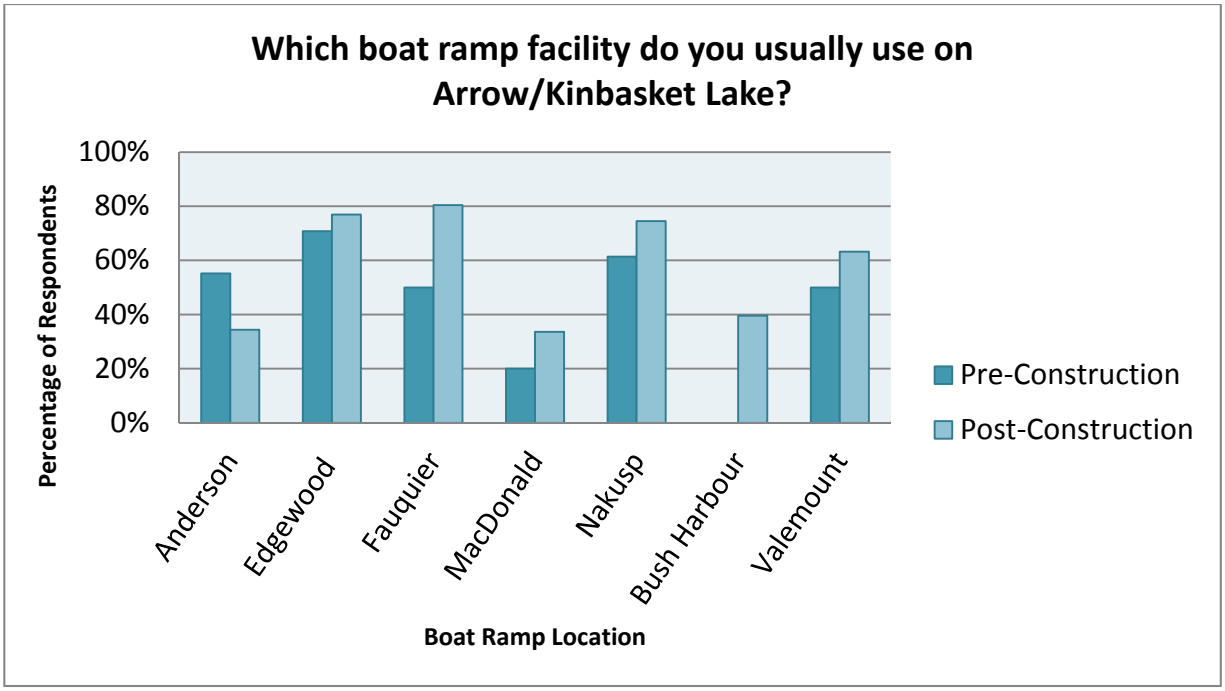
Prior to construction, half of the visitors encountered at the Valemount Boat Launch reported that it was the boat ramp that they usually used; post construction, the percentage of encountered visitors reporting that it was their usual boat ramp increased by 13.2%. The percentage of visitors encountered at the Valemount Boat Launch that reported that Griffin was the boat ramp facility that they usually used declined by 7.5%. The percentage of visitors encountered at the Valemount Boat Launch that reported that Scotties Marina was the boat ramp facility that they usually used increased by 0.9% (Table 16).

**Table 16.** Valemount: Which boat ramp facility do you usually use on Kinbasket Lake?

| Boat Launch | Pre-construction (n = 40) | | Post-construction (n = 106) | |
|---|---|---|---|---|
| | n | % | n | % |
| Bush Harbour | 0 | 0.0% | 0 | 0.0% |
| Esplanade Bay | 0 | 0.0% | 0 | 0.0% |
| Scotties Marina | 0 | 0.0% | 1 | 0.9% |
| Valemount Marina | 20 | 50.0% | 67 | 63.2% |

### *4.2.8 All Boat Launches*

The following summarizes reported pre- and post-construction use at improved boat launches on the Arrow and Kinbasket Reservoirs (Figure 9, Table 17). Reported usual use increased post-construction at five sites and declined at one site (Anderson Point). Many respondents at all surveyed boat launches reported using multiple boat launches both pre- and post-construction. This suggests that some visitors do not have a regular boat launch.




† Pre-construction boat launch counter data was not collected for Bush Harbour.

**Figure 9.** Reported use pre- and post-construction at Arrow and Kinbasket Reservoir boat ramps.

**Table 17.** Which boat ramp facility do you usually use on Arrow/Kinbasket Lake?

| Boat Launch | Pre-construction | Post-construction |
|---|---|---|
| | % | % |
| Anderson | 55.2% | 34.4% |
| Edgewood | 70.8% | 76.9% |
| Fauquier | 50.0% | 80.4% |
| McDonald | 20.0% | 33.6% |
| Nakusp | 61.4% | 74.5% |
| Bush Harbour[†] | - | 39.6% |
| Valemount | 50.0% | 63.2% |

[†] Pre-construction boat launch counter data was not collected for Bush Harbour.

## 4.3 Management Question 3:

*MQ3. Does user satisfaction increase with improvements made to the existing boat ramps and construction of the new boat ramps?*

There were significant differences of visitor satisfaction with boat ramp facilities between responses collected pre- and post-construction (Tables 18 and 19) at six of the seven boat launches (comparisons of pre- and post-construction satisfaction could not be calculated for Bush Harbour as no pre-construction data was collected); the Fauquier Boat Launch saw the largest increase in visitor satisfaction. Mean visitor satisfaction with boat launch facilities increased from 2.6 to 4.0 post-construction at the six boat launches that were measured (Figure 10).

**Table 18.** Satisfaction with boat ramp facilities at boat ramp locations that have had new ramps constructed.

| Location | Construction Period | n | Never | Rarely | Sometimes | Frequently | Always |
|---|---|---|---|---|---|---|---|
| Anderson Point | Pre | 60 | 45.0% | 38.3% | 10.0% | 3.3% | 3.3% |
| | Post | 36 | 11.1% | 2.8% | 8.3% | 38.9% | 38.9% |
| Edgewood Community Park | Pre | 144 | 45.1% | 16.7% | 18.8% | 9.7% | 9.7% |
| | Post | 22 | — | 18.2% | 27.3% | 36.4% | 18.2% |
| Fauquier Community Park Boat Launch | Pre | 31 | 71.0% | 12.9% | 3.2% | 9.7% | 3.2% |
| | Post | 44 | 2.3% | 6.8% | 6.8% | 34.1% | 50.0% |
| McDonald Creek Provincial Park | Pre | 6 | — | 16.7% | 50.0% | 33.3% | — |
| | Post | 125 | 3.2% | 1.6% | 5.6% | 25.6% | 64.0% |
| Nakusp Boat Launch | Pre | 166 | 16.9% | 23.5% | 22.9% | 19.3% | 17.5% |
| | Post | 62 | 8.1% | 4.8% | 17.7% | 25.8% | 43.5% |
| Bush Harbour[†] | Pre | — | — | — | — | — | — |
| | Post | 59 | 3.4% | 3.4% | 16.9% | 16.9% | 59.3% |
| Valemount Marina | Pre | 58 | 6.9% | 13.8% | 36.2% | 22.4% | 20.7% |
| | Post | 182 | 4.4% | 8.2% | 17.6% | 29.1% | 10.7% |

[†] Pre-construction boat launch counter data was not collected for Bush Harbour.

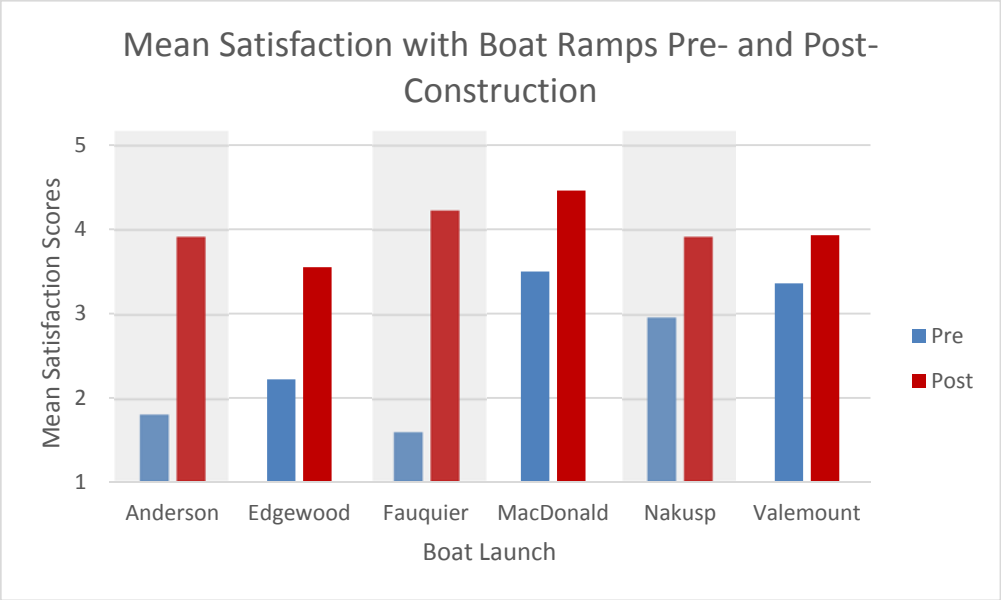



**Figure 10.** Mean satisfaction with boat ramp facilities at boat ramp locations that have had new ramps constructed, where 1 equals 'never satisfied' up to 5 = 'always satisfied'.

**Table 19.** Average satisfaction with boat ramp facilities at boat ramp locations that have had new ramps constructed[†].

| Location | Construction Phase | n | Mean | 95% CI | SD | t | df | p |
|---|---|---|---|---|---|---|---|---|
| Anderson Point | Pre | 60 | 1.82 | ± 0.25 | 0.983 | -9.056 | 94 | < .001 |
| | Post | 36 | 3.92 | ± 0.42 | 1.273 | | | |
| Edgewood Community Park | Pre | 144 | 2.22 | ± 0.22 | 1.366 | -5.429 | 33.969 | < .001 |
| | Post | 22 | 3.55 | ± 0.42 | 1.011 | | | |
| Fauquier Community Park Boat Launch | Pre | 31 | 1.61 | ± 0.40 | 1.145 | 10.451 | 73 | < .001 |
| | Post | 44 | 4.23 | ± 0.30 | 1.008 | | | |
| McDonald Creek Provincial Park | Pre | 6 | 3.50 | ± 0.98 | 1.225 | -2.449 | 129 | < .05 |
| | Post | 125 | 4.46 | ± 0.16 | 0.920 | | | |
| Nakusp Boat Launch | Pre | 166 | 2.97 | ± 0.20 | 1.346 | -4.835 | 226 | < .001 |
| | Post | 62 | 3.92 | ± 0.31 | 1.245 | | | |
| Valemount Marina | Pre | 58 | 3.36 | ± 0.30 | 1.165 | -3.299 | 238 | < .01 |
| | Post | 182 | 3.93 | ± 0.17 | 1.145 | | | |

[†] Pre-construction boat launch counter data was not collected for Bush Harbour.

There were significant differences of visitor satisfaction with parking lot conditions between responses collected pre- and post-construction (Tables 20 and 21) for the Anderson Point, Fauquier and Valemount Boat Launches. Although not statistically significant, visitor satisfaction also increased for the Edgewood Community Park, McDonald Creek, and Nakusp Boat Launches.

**Table 20.** Satisfaction with parking lot conditions at boat ramp locations that have had new ramps constructed.

| Location | Construction Period | n | Never | Rarely | Sometimes | Frequently | Always |
|---|---|---|---|---|---|---|---|
| Anderson Point | Pre | 61 | 34.4% | 29.5% | 19.7% | 13.1% | 3.3% |
| | Post | 35 | 11.4% | 11.4% | 17.1% | 37.1% | 22.9% |
| Edgewood Community Park | Pre | 156 | 4.5% | 9.6% | 17.9% | 29.5% | 38.5% |
| | Post | 27 | 3.7% | 3.7% | 18.5% | 37.0% | 37.0% |
| Fauquier Community Park Boat Launch | Pre | 31 | 3.2% | 12.9% | 22.6% | 41.9% | 19.4% |
| | Post | 45 | 4.4% | 2.2% | 6.7% | 33.3% | 53.3% |
| McDonald Creek Provincial Park | Pre | 9 | — | 11.1% | 11.1% | 22.2% | 55.6% |
| | Post | 197 | 1.0% | 1.5% | 4.6% | 31.0% | 61.9% |
| Nakusp Boat Launch | Pre | 183 | 5.5% | 11.5% | 21.3% | 29.0% | 32.8% |
| | Post | 73 | 4.1% | 6.8% | 20.5% | 34.2% | 34.2% |
| Bush Harbour[†] | Pre | — | — | — | — | — | — |
| | Post | 61 | 3.3% | — | 3.3% | 26.2% | 67.2% |
| Valemount Marina | Pre | 62 | 6.5% | 11.3% | 32.3% | 19.4% | 30.6% |
| | Post | 203 | 3.0% | 5.9% | 20.2% | 29.6% | 41.4% |

[†] Pre-construction boat launch counter data was not collected for Bush Harbour.

**Table 21.** Average satisfaction with parking lot conditions at boat ramp locations that have had new ramps constructed[†].

| Location | Construction Phase | n | Mean | 95% CI | SD | t | df | p |
|---|---|---|---|---|---|---|---|---|
| Anderson Point | Pre | 61 | 2.21 | 0.29 | 1.156 | -4.972 | 94 | < .001 |
| | Post | 35 | 3.49 | 0.43 | 1.292 | | | |
| Edgewood Community Park | Pre | 156 | 3.88 | 0.18 | 1.160 | -0.511 | 181 | > .05 |
| | Post | 27 | 4.00 | 0.39 | 1.038 | | | |
| Fauquier Community Park Boat Launch | Pre | 31 | 3.61 | 0.37 | 1.054 | -2.810 | 74 | < .01 |
| | Post | 45 | 4.29 | 0.30 | 1.014 | | | |
| McDonald Creek Provincial Park | Pre | 9 | 4.22 | 0.71 | 1.093 | -1.117 | 204 | > .05 |
| | Post | 197 | 4.51 | 0.10 | 0.746 | | | |
| Nakusp Boat Launch | Pre | 183 | 3.72 | 0.17 | 1.192 | -0.964 | 254 | > .05 |
| | Post | 73 | 3.88 | 0.25 | 1.092 | | | |
| Valemount Marina | Pre | 62 | 3.56 | 0.30 | 1.223 | -2.557 | 90.762 | < .05 |
| | Post | 203 | 4.00 | 0.15 | 1.060 | | | |

[†] Pre-construction boat launch counter data was not collected for Bush Harbour.

## 4.4 Management Question 4:

*MQ4. Is there a need for installation of additional facilities to satisfy the needs of boat users on Kinbasket Reservoir and Arrow Lakes Reservoir?*

### *4.4.1 Anderson Point Boat Launch*

There was a significant difference between pre- and post-construction visitor dislikes about the Anderson Point Boat Launch ($\chi^2$ = 46.919, df = 20, p < 0.01; Cramer's V = 0.752). Table 22 suggests that boat ramp improvements addressed most respondents' concerns, although there is an indication that more parking may be needed. The percentage of respondents reporting no problems or providing a positive comment increased substantially.

**Table 22.** Anderson Point: What do you like least about the boat ramp facility that you visited today?

| Response Categories | Pre-construction (n = 51) | | Post-construction (n = 32) | |
|---|---|---|---|---|
| | n | % | n | % |
| Problems with dock/dock ramp | 7 | 13.7% | 2 | 6.3% |
| Rough road | 1 | 2.0% | 1 | 3.1% |
| Washrooms needed | 2 | 3.9% | 0 | 0.0% |
| Too high | 0 | 0.0% | 1 | 3.1% |
| Not safe | 1 | 2.0% | 0 | 0.0% |
| Too crowded | 4 | 7.8% | 1 | 3.1% |
| Rough launch | 1 | 2.0% | 0 | 0.0% |
| Improvements needed for all components | 5 | 9.8% | 0 | 0.0% |
| Ramp not long enough | 2 | 3.9% | 0 | 0.0% |
| Water levels | 1 | 2.0% | 1 | 3.1% |
| More parking needed | 3 | 5.9% | 4 | 12.5% |
| Not enough room to turn around/load/unload | 6 | 11.8% | 0 | 0.0% |
| Debris | 0 | 0.0% | 1 | 3.1% |
| Not well maintained/not clean | 1 | 2.0% | 1 | 3.1% |
| Hard to get to | 1 | 2.0% | 0 | 0.0% |
| Hard to use | 2 | 3.9% | 0 | 0.0% |
| No boat tie-ups | 1 | 2.0% | 0 | 0.0% |
| No boat launch | 5 | 9.8% | 1 | 3.1% |
| No problems/positive comment | 1 | 2.0% | 17 | 53.1% |
| Other | 3 | 5.9% | 2 | 6.3% |
| Multiple | 4 | 7.8% | 0 | 0.0% |

### *4.4.2 Edgewood Community Park Boat Launch*

There was a significant difference between pre- and post-construction visitor dislikes about the Edgewood Community Park Boat Launch ($\chi^2$ = 43.598, df = 18, p < 0.01; Cramer's V = 0.579). Table 23 suggests that boat launch improvements addressed the majority of respondents' concerns. The percentage of respondents reporting no problems or providing a positive comment increased substantially.

**Table 23.** Edgewood Community Park: What do you like least about the boat ramp facility that you visited today?

| Response Categories | Pre-construction (n = 100) | | Post-construction (n = 29) | |
|---|---|---|---|---|
| | n | % | n | % |
| Problems with dock/dock ramp | 21 | 21.0% | 0 | 0.0% |
| Problems with breakwater | 6 | 6.0% | 0 | 0.0% |
| Washrooms needed | 2 | 2.0% | 0 | 0.0% |
| Not safe | 2 | 2.0% | 1 | 3.4% |
| Ramp angle to steep | 1 | 1.0% | 1 | 3.4% |
| Improvements needed for all components | 10 | 10.0% | 1 | 3.4% |
| Ramp not long enough | 3 | 3.0% | 0 | 0.0% |
| Water levels | 4 | 4.0% | 0 | 0.0% |
| Debris | 1 | 1.0% | 0 | 0.0% |
| Docks too far from shore | 1 | 1.0% | 0 | 0.0% |
| Not well maintained/not clean | 7 | 7.0% | 0 | 0.0% |
| Needs barrier-free access | 2 | 2.0% | 0 | 0.0% |
| No wharf | 1 | 1.0% | 0 | 0.0% |
| No boat launch | 3 | 3.0% | 0 | 0.0% |
| No problems/positive comment | 14 | 14.0% | 20 | 69.0% |
| Did not use today | 1 | 1.0% | 0 | 0.0% |
| Other | 17 | 17.0% | 5 | 17.2% |
| Multiple | 4 | 4.0% | 1 | 3.4% |

### *4.4.3 Fauquier Community Park Boat Launch*

There was a significant difference between pre- and post-construction visitor dislikes about the Fauquier Community Park Boat Launch ($\chi^2$ = 52.714, df = 14, p < 0.001; Cramer's V = 0.915). Table 24 suggests that post-construction, more people indicated problems with the breakwater, the ramp being too narrow/not wide enough, and the ramp angle being too steep; over half of post-construction visitors provided a positive comment, or indicated that they did not experience any problems with the Fauquier Boat Launch.

**Table 24.** Fauquier: What do you like least about the boat ramp facility that you visited today?

| Response Categories | Pre-construction (n = 28) | | Post-construction (n = 35) | |
|---|---|---|---|---|
| | n | % | n | % |
| Problems with dock/dock ramp | 11 | 39.3% | 0 | 0% |
| Problems with breakwater | 0 | 0.0% | 3 | 8.6% |
| Too narrow/not wide enough | 0 | 0.0% | 1 | 2.9% |
| Ramp angle to steep | 0 | 0.0% | 1 | 2.9% |
| Problems with parking lot | 1 | 3.6% | 0 | 0.0% |
| Too crowded | 1 | 3.6% | 0 | 0.0% |
| Improvements needed for all components | 4 | 14.3% | 0 | 0.0% |
| Ramp not long enough | 2 | 7.1% | 0 | 0.0% |
| Water levels | 5 | 17.9% | 1 | 2.9% |
| Debris | 1 | 3.6% | 0 | 0.0% |
| Needs picnic area | 0 | 0.0% | 1 | 2.9% |
| Not well maintained/not clean | 1 | 3.6% | 0 | 0.0% |
| Too sandy/muddy | 1 | 3.6% | 3 | 8.6% |
| No problems/positive comment | 1 | 3.6% | 22 | 62.9% |
| Other | 0 | 0.0% | 3 | 8.6% |

### *4.4.4 McDonald Creek Provincial Park Boat Launch*

There was a significant difference between pre- and post-construction visitor dislikes about the McDonald Creek Provincial Park Boat Launch ($\chi^2$ = 29.608, df = 8, p < 0.001; Cramer's V = 0.597). Table 25 suggests that the percentage of respondents reporting no problems or providing a positive comment increased substantially; however, the limited number of pre-construction respondents prevents direct comparisons.

**Table 25.** McDonald Creek Provincial Park: What do you like least about the boat ramp facility that you visited today?

| Response Categories | Pre-construction (n = 3) | | Post-Construction (n = 80) | |
|---|---|---|---|---|
| | n | % | n | % |
| Problems with dock/dock ramp | 1 | 33.3% | 0 | 0% |
| Too narrow/not wide enough | 0 | 0.0% | 2 | 2.5% |
| Problems with parking lot | 0 | 0.0% | 1 | 1.3% |
| Too crowded | 0 | 0.0% | 1 | 1.3% |
| More parking needed | 0 | 0.0% | 1 | 1.3% |
| Debris | 0 | 0.0% | 1 | 1.3% |
| No problems/positive comment | 1 | 33.3% | 66 | 82.5% |
| Other | 1 | 33.3% | 7 | 8.8% |
| Multiple | 0 | 0.0% | 1 | 1.3% |

### *4.4.5 Nakusp Boat Launch*

There was a significant difference between pre- and post-construction visitor dislikes about the Nakusp Boat Launch ($\chi^2$ = 47.069, df = 18, p < 0.001; Cramer's V = 0.520). Table 26 suggests that boat ramp improvements addressed most respondents' concerns; however, there were slight increases in the percentage of respondents that indicated that the ramp was not long enough and that more parking was needed. Over half of post-construction visitors provided a positive comment, or indicated that they did not experience any problems with the Nakusp Boat Launch.

**Table 26.** Nakusp: What do you like least about the boat ramp facility that you visited today?

| Response Categories | Pre-construction (n = 99) | | Post-Construction (n = 75) | |
|---|---|---|---|---|
| | n | % | n | % |
| Problems with dock/dock ramp | 10 | 10.1% | 1 | 1.3% |
| Problems with breakwater | 1 | 1.0% | 2 | 2.7% |
| Too narrow/not wide enough | 2 | 2.0% | 0 | 0.0% |
| Not safe | 2 | 2.0% | 0 | 0.0% |
| Ramp angle to steep | 3 | 3.0% | 2 | 2.7% |
| Too crowded | 1 | 1.0% | 1 | 1.3% |
| Rough launch | 2 | 2.0% | 1 | 1.3% |
| Improvements needed for all components | 7 | 7.1% | 1 | 1.3% |
| Ramp not long enough | 0 | 0.0% | 2 | 2.7% |
| Water levels | 5 | 5.1% | 3 | 4.0% |
| More parking needed | 2 | 2.0% | 3 | 4.0% |
| Not enough room to turn around/load/unload | 1 | 1.0% | 0 | 0.0% |
| Debris | 2 | 2.0% | 1 | 1.3% |
| Not well maintained/not clean | 15 | 15.2% | 0 | 0.0% |
| Docks too far from shore | 0 | 0.0% | 1 | 1.3% |
| No problems/positive comment | 17 | 17.2% | 39 | 52.0% |
| Did not use today | 2 | 2.0% | 0 | 0.0% |
| Other | 20 | 20.2% | 12 | 16.0% |
| Multiple | 7 | 7.1% | 6 | 8.0% |

### *4.4.6 Bush Harbour Boat Launch*

Differences between pre- and post-construction visitor dislikes about the Bush Harbour Boat Launch could not be calculated as no pre-construction data was collected. Table 27 lists post-construction dislikes; three in ten respondents indicated that they did not experience any problems or provided a positive comment.

**Table 27.** Bush Harbour: What do you like least about the boat ramp facility that you visited today?

| Response Categories | Post-construction (n = 44) | |
|---|---|---|
| | n | % |
| Problems with dock/dock ramp | 6 | 13.6% |
| Not safe | 1 | 2.3% |
| Ramp angle to steep | 2 | 4.5% |
| Too crowded | 1 | 2.3% |
| Water levels | 1 | 2.3% |
| More parking needed | 1 | 2.3% |
| Debris | 6 | 13.6% |
| Needs picnic area | 1 | 2.3% |
| Docks too far from shore | 1 | 2.3% |
| Hard to get to | 2 | 4.5% |
| No boat tie-ups | 1 | 2.3% |
| No problems/positive comment | 14 | 31.8% |
| Other | 6 | 13.6% |
| Multiple | 1 | 2.3% |

### *4.4.7 Valemount Boat Launch*

There was a significant difference between pre- and post-construction visitor dislikes about the Valemount Boat Launch ($\chi^2 = 82.023$, df = 21, $p < 0.01$; Cramer's V = 0.671). Table 28 suggests that post-construction, more people indicated problems with problems with dock/dock ramp and debris; however, fewer people indicated that the ramps were too narrow/not wide enough, too crowded, that more parking needed, and that barrier-free access was needed at the post-construction ramps at the Valemount Boat Launch. The percentage of respondents reporting no problems or providing a positive comment doubled.

**Table 28.** Valemount: What do you like least about the boat ramp facility that you visited today?

| Response Categories | Pre-construction (n = 39) | | Post-construction (n = 143) | |
|---|---|---|---|---|
| | n | % | n | % |
| Problems with dock/dock ramp | 2 | 5.1% | 18 | 12.6% |
| Problems with breakwater | 1 | 2.6% | 3 | 2.1% |
| Rough road | 0 | 0.0% | 1 | 0.7% |
| Washrooms needed | 1 | 2.6% | 1 | 0.7% |
| Too narrow/not wide enough | 5 | 12.8% | 2 | 1.4% |
| Problems with parking lot | 1 | 2.6% | 0 | 0.0% |
| Too crowded | 5 | 12.8% | 1 | 0.7% |
| Ramp not long enough | 3 | 7.7% | 0 | 0.0% |
| Improvements needed for all components | 0 | 0.0% | 1 | 0.7% |
| Water levels | 2 | 5.1% | 6 | 4.2% |
| More parking needed | 1 | 2.6% | 1 | 0.7% |
| Not enough room to turn around/load/unload | 2 | 5.1% | 0 | 0.0% |
| Debris | 2 | 5.1% | 34 | 23.8% |
| Docks too far from shore | 1 | 2.6% | 0 | 0.0% |
| Not well maintained/not clean | 2 | 5.1% | 1 | 0.7% |
| Needs barrier-free access | 2 | 5.1% | 0 | 0.0% |
| Hard to use | 0 | 0.0% | 1 | 0.7% |
| Too sandy/muddy | 1 | 2.6% | 0 | 0.0% |
| No problems/positive comment | 6 | 15.4% | 55 | 38.5% |
| Did not use today | 0 | 0.0% | 4 | 2.8% |
| Other | 2 | 5.1% | 7 | 4.9% |
| Multiple | 0 | 0.0% | 7 | 4.9% |

### *4.4.8 Overall Percentage of Boat Users Reporting a Need for Additional Facilities*

Overall the average percentage of respondents reporting no problems or providing positive comments increased from 15% to 60% at the improved boat launch sites (Figure 11, Table 29).

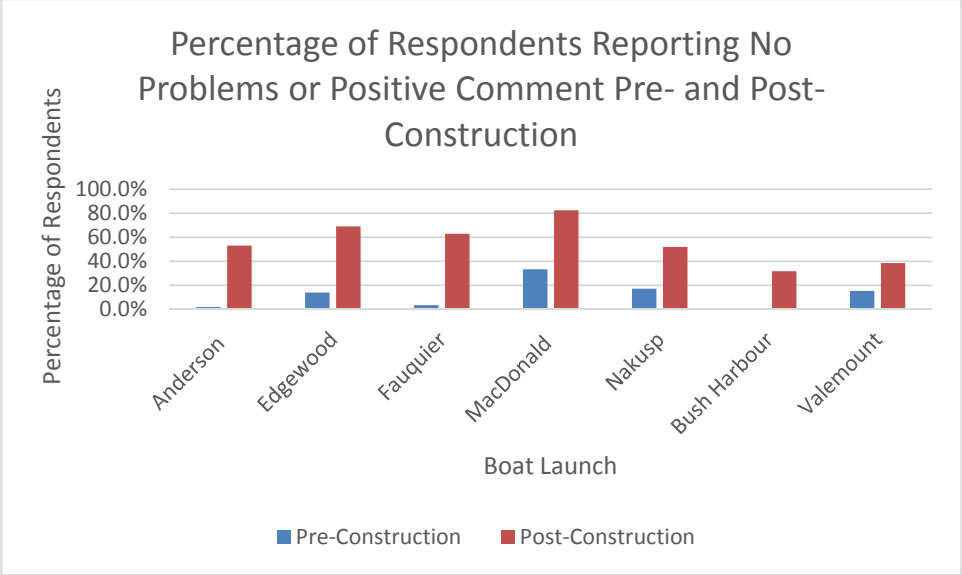



**Figure 11.** Percentage of survey respondents reporting no problems or providing positive comments about the boat ramp facility pre- and post-construction.

**Table 29.** Percentage of survey respondents reporting no problems or providing positive comments about the boat ramp facility pre- and post-construction.

| Boat Ramp | Pre-construction | Post-construction |
|---|---|---|
| | % | % |
| Anderson Point | 2.0% | 53.1% |
| Edgewood | 14.0% | 69.0% |
| Fauquier | 3.6% | 62.9% |
| McDonald Creek | 33.3% | 82.5% |
| Nakusp | 17.2% | 52.0% |
| Bush Harbour | - | 31.8% |
| Valemount | 15.4% | 38.5% |

### *4.4.9 Socio-Demographic Characteristics*

There were no significant differences between the pre- and post-construction age of survey respondents at any of the six improved boat ramps examined (Table 30).

**Table 30.** Pre- and post-construction differences in age among survey respondents.

| Boat Ramp | Pre-Construction | | Post-Construction | | t | df | p |
|---|---|---|---|---|---|---|---|
| | n | Mean Age | n | Mean Age | | | |
| Valemount | 65 | 47.97 | 209 | 46.26 | 0.780 | 272 | > .05 |
| Anderson Point | 64 | 55.17 | 37 | 50.19 | 1.322 | 99 | > .05 |
| Edgewood | 183 | 54.16 | 27 | 53.67 | 0.153 | 208 | > .05 |
| Fauquier | 34 | 51.76 | 51 | 56.35 | - 1.146 | 83 | > .05 |
| McDonald Creek | 15 | 51.60 | 229 | 51.30 | 0.061 | 15.055 | > .05 |
| Nakusp | 211 | 55.73 | 81 | 52.05 | 1.833 | 290 | > .05 |

The proportion of women significantly decreased post-construction at the Nakusp boat launch; there were no other significant differences between the pre- and post-construction proportion of men and women at the six boat ramps that were examined (Table 31).

**Table 31.** Pre- and post-construction differences in gender among survey respondents.

| Boat Ramp | Pre-Construction | | Post-Construction | | $\chi^2$ | df | p | Phi |
|---|---|---|---|---|---|---|---|---|
| | Male n | Female n | Male n | Female n | | | | |
| Valemount | 38 | 30 | 130 | 78 | 0.942 | 1 | > .05 | - 0.058 |
| Anderson Point | 40 | 23 | 28 | 9 | 1.590 | 1 | > .05 | - 0.126 |
| Edgewood | 112 | 64 | 17 | 11 | 0.089 | 1 | > .05 | 0.021 |
| Fauquier | 24 | 10 | 32 | 18 | 0.395 | 1 | > .05 | 0.069 |
| McDonald Creek | 8 | 6 | 141 | 86 | 0.138 | 1 | > .05 | - 0.024 |
| Nakusp | 151 | 57 | 45 | 34 | 6.463 | 1 | < .05 | 0.150 |

# 5. Discussion

## 5.1 Management Question 1:

*MQ 1. Does public use of boat ramps increase on Kinbasket and Arrow Lakes reservoirs after installation and upgrading of the WUP boat ramp facilities?*

The impact of boat ramp improvements on volume of public use at sites on Kinbasket Reservoir and Arrow Lakes Reservoir was mixed. Mean post-construction visitation was higher than mean pre-construction visitation at three sites: Anderson Point, McDonald Creek, and Nakusp. Mean post-construction visitation was lower than mean pre-construction visitation at Fauquier. There was no difference between mean pre-construction and mean post-construction visitation at Edgewood or Valemount Marina. At the sites that saw an increase in volume (Anderson Point, McDonald Creek and Nakusp) for every pre-construction visit, there was an average of 1.6 post-construction visits. Of the sites that saw an increase, Anderson Point and Nakusp were the only site where respondents indicated that seasonal carrying capacity may be affected (*i.e.,* that more parking was needed).

## 5.2 Management Question 2

*MQ2. If there is an increasing use of new or improved facilities, is it due to existing users visiting more often or new users being attracted to the area?*

Results suggest the volume of public use of new or improved boat ramps does not reduce the usage of nearby existing boat ramps. At four of the six sites there was no evidence that users switched from nearby ramps post-construction. Some of the reported increased public use of Edgewood (6.1%) can be attributed to visitors switching from Fauquier. Some of the reported increased public use at Nakusp (13.1%) can be attributed to visitors switching from nearby ramps including Edgewood, Fauquier and McDonald.

Reported usual use of improved boat launches post-construction increased at five sites and declined at one site (Anderson Point). Although visitors reported using the Anderson Point Boat Launch 20.8% less post-construction, there is no evidence that Anderson Point Boat Launch users switched to using other sites. Reported post-construction use of the Fauquier Community Park Boat Launch increased (by 30.4%); post-construction, 2.1% of visitors to the Fauquier Community Park Boat Launch claimed that

the Nakusp Boat Launch was their usual boat ramp, which suggests that boat ramp substitution was not a factor in the public's use of the Fauquier Community Park Boat Launch.

The Edgewood Community Park Boat Launch was the site that saw the least increase in reported usual use post-construction (6.4%); this may be due to some public use of the Fauquier Community Park Boat Launch (8.7%) switching to the use of the Edgewood Community Park Boat Launch (which is double the amount of visitors that identified the Fauquier Community Park Boat Launch as their usual site). The remaining three sites each saw increases in reported usual use of 13% post-construction. There is little evidence that the increases in reported usual use at McDonald Creek Provincial Park (13.6%) was due to visitors switching from other boat launches, as only 2.1% of visitors indicated that another boat launch (i.e., Nakusp) was their usual site. A similar conclusion can be drawn for the Valemount Marina (which saw reported usual use increase 13.2% post-construction), as there is evidence that only 2.1% of visitors switched from Bush Harbour. It is possible that the 13.1% reported increase in usual use at the Nakusp Boat Launch was due to visitors that usually use a different site: 7.7% of visitors indicated that the Edgewood Community Park Boat Launch was their usual site; 2.2% of visitors indicated that the Fauquier Community Park Boat Launch was their usual site; and 10.9% of visitors indicated that McDonald Creek Provincial Park Boat Launch was their usual site.

## 5.3 Management Question 3

*MQ3. Does user satisfaction increase with improvements made to the existing boat ramps and construction of the new boat ramps?*

Visitor satisfaction with boat ramp facilities and with parking lot conditions has increased following improvements made to the existing facilities. Average mean satisfaction increased from 2.6 to 4.0 out of five following WUP improvements. This suggests that the improvements made were effective in addressing visitor expectations.

## 5.4 Management Question 4

*MQ4. Is there a need for installation of additional facilities to satisfy the needs of boat users on Kinbasket Reservoir and Arrow Lakes Reservoir?*

Overall the average percentage of respondents reporting no problems or providing positive comments about the boat ramp facilities increased substantially (from 15% to 60%) post-construction at the six improved boat launch sites examined.

Data from Anderson Point, Nakusp, McDonald Creek and Edgewood suggest that boat launch improvements at these sites have satisfied the majority of respondents' concerns. While there were some significant dislikes about certain facilities post-construction, the number of people reporting these issues was very low (< 2 per site).

At Valemount the percentage of respondents reporting no problems or providing a positive comment doubled, however more people indicated issues with the dock/dock ramp and debris post-construction.

There were no significant differences between the pre- and post-construction age or gender of survey respondents at the boat ramps examined, apart from a significant decrease in the proportion of women post-construction at Nakusp boat launch. As there were no other significant differences between the pre- and post-construction proportion of men and women at the five other boat ramps that were examined, there is support for Management Hypothesis #4 (there are no changes in the socio-demographic or trip behavior characteristics of users of boat ramps on Kinbasket Reservoir and Arrow Lakes Reservoir). This suggests the improved boat launches are attracting the same demographic of user, rather than a demographic that is more satisfied in general, or has different recreation behaviours.

# 6. Limitations and Opportunities for Further Study

A variety of unexpected situations have arisen each year that affect use, particularly with regard to construction periods and high water curtailment of traffic counts. Construction exclusion dates (*i.e.,* starts are finishes) represent best estimates based on information provided to the study team by BC Hydro, Columbia Power Corporation and on-site observations by project field staff. There is some uncertainty as to exact dates of construction activity that impacted the use of the boat ramps (either construction vehicle traffic increasing counts or construction activity not allowing public access to ramp). For example, there was likely a fair amount of construction activity on either side of the official McDonald Creek construction period that affected traffic counts. In some cases construction took place in the water (pile driving) and did not impede the use of the ramp but support vehicles would have been counted.

A key limitation of the study is the timing of physical improvements at each of the boat launch ramps. Ramp locations that were improved early in the study period do not have much, if any, pre-improvement data against which the post-improvement data can be compared. Conversely, ramps that will be improved later in the study period (after year 4) will not have as much post-improvement data, except that gathered in year 10. This will mean that hypotheses $H_{2B}$, $H_3$ *and* $H_4$ may not be uniformly tested over every boat launch ramp location. As an opportunity for further study we suggest extending traffic count data collection over a longer period *i.e.,* installing counters at all boat ramp improvement sites for the next five years (through 2019). This would provide much more valuable pre- and post-improvement data to inform comparisons and track changes in volume of public use at upgraded boat ramp facilities ($H_1$).

# 7. Conclusion

Results to date suggest boat ramp improvements do not lead to a large increase in daily visitor volume, an increase in new users, or a change in the type of user group. Visitor satisfaction was the factor most affected post-construction. Average satisfaction increased from 2.6 to 4.0 after ramp improvements, suggesting these projects have been effective in providing benefits to recreational interests in the area.

The overall percentage of respondents reporting no problems or providing positive comments about the boat ramp facilities increased substantially over the course of the project period (from 15% to 60%) suggesting that boat ramp improvements to date have been successful in addressing boat users' needs. Very few respondents at Anderson Point, Nakusp, McDonald Creek and Edgewood reported dislikes post-construction suggesting boat launch improvements at these sites have satisfied the majority of respondents' concerns. At Valemount the percentage of respondents reporting no problems or providing a positive comment doubled, however more people indicated issues with the dock/dock ramp and debris.

At this time not all ramps have been fully constructed; more robust conclusions may be made in Year 10, after more visitors have been able to use the improved sites.

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# APPENDIX A – TRAFx Vehicle Counters

***Vehicle counter settings***

Traffic counters were configured and installed at 10 monitoring sites with boat launch facilities: seven sites on the Arrows Lakes Reservoir and three on Kinbasket Reservoir. Traffic counters were configured and installed using the following settings (Table 32):

**Table 32.** Traffic counter settings.

| Location | Mode | Period | Delay | Threshold | Rate |
|---|---|---|---|---|---|
| **Arrow Lakes Reservoir** | | | | | |
| Nakusp | VEH_5d | 000 | 96 | 8 | S |
| McDonald Creek | VEH_2s | 000 | 120 | 16 | S |
| Burton | VEH_2s | 000 | 120 | 16 | S |
| Burton South | VEH_2s | 000 | 120 | 16 | S |
| Fauquier | VEH_2s | 000 | 120 | 16 | S |
| Edgewood | VEH_2s | 000 | 120 | 16 | S |
| Anderson Point | VEH_2s | 000 | 120 | 16 | S |
| **Kinbasket Reservoir** | | | | | |
| Bush Harbour | VEH_2s | 000 | 120 | 16 | S |
| Esplanade Bay | VEH_2s | 000 | 120 | 16 | S |
| Valemount | VEH_2s | 000 | 120 | 16 | S |

Notes:

Mode: VEH_2s = single lane traffic; VEH_4d = double lane traffic with counter on side of road;
VEH_5d=double lane traffic with counter in middle of road

Period: 000 = timestamps

Delay: 8 = 1 sec; 96 = 12 sec; 120 = 15 sec

Threshold: Range is 3-16; 16 is least sensitive

Rate: S = slow (<50 km/h)

***How does the traffic counter work?***

Ferrous metal (*i.e.*, metals with iron content) objects distort the earth's magnetic field as they move through it. Pure aluminum (non-alloy aluminum) will not be detected. Moving the counter (*i.e.*, pointing it in different compass directions, tilting it, jiggling or jolting it) will also cause counts to occur. This is

because the earth's magnetic field has different strengths for different directions and tilts, and the counter senses this.

As vehicles move, they disturb the earth's magnetic field. The TRAFx Vehicle Counter digitizes and analyzes these disturbances using highly sophisticated hardware and software. Thus, as a vehicle passes within the detection zone it changes the earth's magnetic field in that area which triggers a count. Different modes are used to meet the particular needs and traffic pattern of a given site. That is why the modes and sensitivity settings were selected at each site to best reflect the local conditions.

***Can the vehicle counter be buried? Does it perform differently when buried?***

Yes it can be buried. Because it responds to changes in the earth's magnetic field, the TRAFx Vehicle Counter functions the same whether the counter is buried or installed above ground.

***Will the counter still function if a vehicle parks over or near the counter?***

Yes. Unlike most other types of vehicle counters, the TRAFx Vehicle Counter will automatically adjust to the presence of a vehicle parked over top or nearby, and continue to function properly. Likewise, if the counter is placed near a metal pole (*e.g*., signpost) or similar static metal object (*e.g.*, guard rail, cattleguard, bridge beam *etc*.) it will automatically adjust to its presence.

***How are annual traffic counts calculated?***

TRAFx DataNet traffic count estimates follow the most widely accepted vehicle traffic calculation methods used in North America. This system is used by the US Army Corps of Engineers, US Bureau of Land Management, US Fish and Wildlife, US Forest Service, US National Parks Service, Parks Canada, most Canadian provicincial and territorial governments, and numerous countries in Europe and the South Pacific.

Annual Traffic Counts are collected and automatically compiled by the TRAFx DataNet system for each full calendar year. This is done to standardize the calculation and application of average daily use to missing data. The system then enables the selection of any time period across years for calculating and reporting daily, weekly and monthly counts, averages and comparisons.

The Annual Traffic Summary shows estimated total yearly counts by recording the total daily counts and calculating the average daily count for that month, then applying that average daily count to missing

data periods (such as partial months due to mid-month start date or interruptions due to data downloads, dead batteries or missing data). Thus, if a given counter has at least one day of counts in a month but is also missing at least one day of counts that month, the TRAFx Datanet will apply the monthly average daily count to only those days where data has been interrupted or is missing. If the counter had been operating without interruption during a day or month and there was absolutely no traffic recorded, the TRAFx DataNet calculates a '0' traffic count for that day or month. For years with complete months of missing data (not zero counts, but actually missing data) an annual average daily traffic count (AADT) is applied to all days within a missing month. The total estimate for the year is generated by adding the recorded and calculated counts.

***How are boat launch counts calculated?***

To get an accurate count at a boat launch it is necessary to apply additional factors, including:

- Filter – a 12-17 second delay is applied (12 seconds on double lane ramps and 17 seconds on single lane ramps) to remove any multiple counts within those intervals to reduce the possibility of multiple counts for a single launch.

- Divide by two – as a vehicle must pass the counter twice to launch a boat (going into the water loaded and coming out empty) the count is divided by two. This may provide a slightly more conservative estimate than reality at Anderson Point but it is applicable for much of the year and maintains a common standard application of the methodology across all sites.

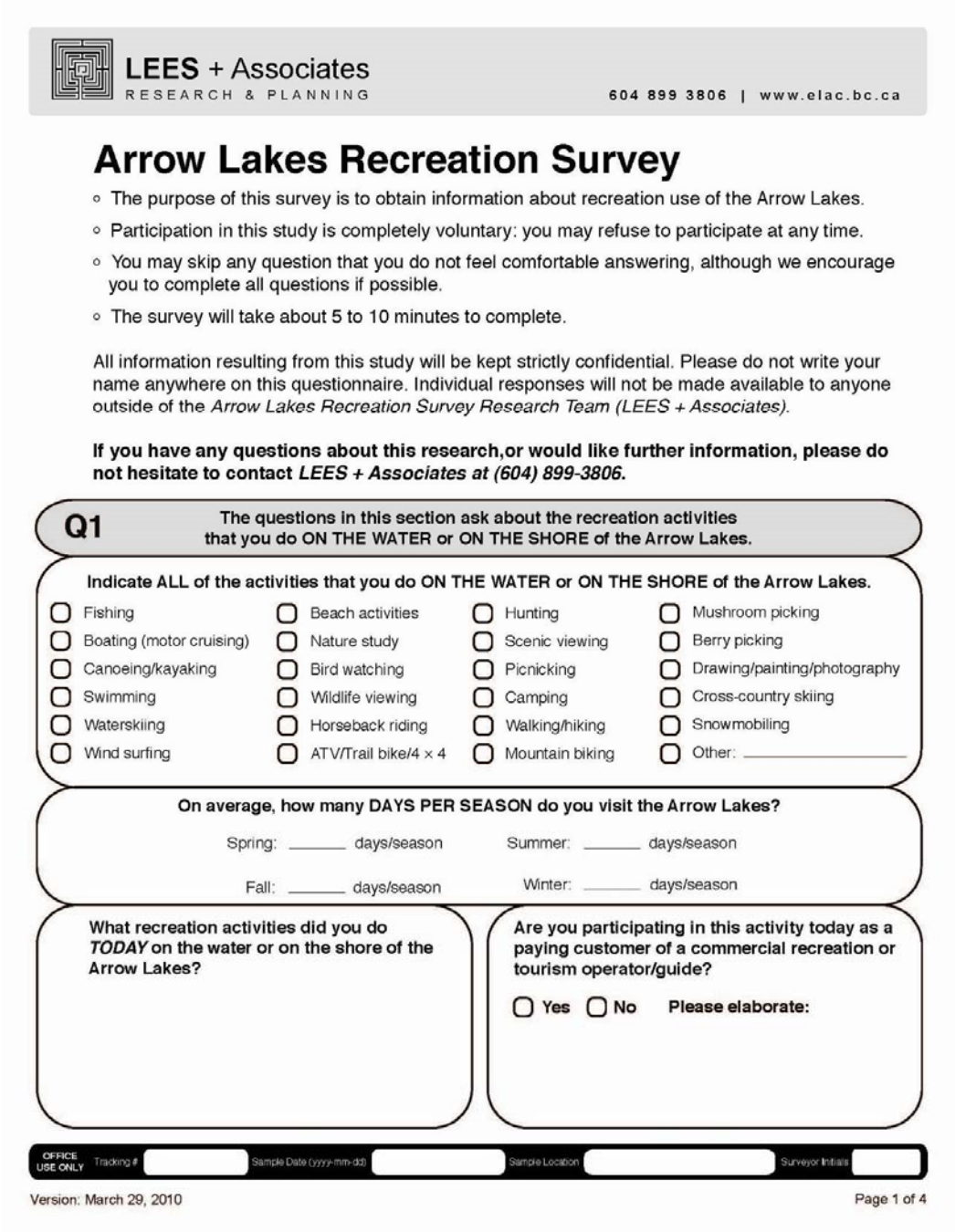
- Adjustment Factor of '0.5' – as a vehicle must make two trips per boating experience (one to launch the boat and another to load the boat) the count is again multiplied by 0.5 (or in other words again divided by two).

The AADT procedure has been applied as described above for minor occurrences of missing data. However, as most boat launch locations in this study are snow bound in winter, recorded summer use has been higher and winter use has been lower than the annual daily average. Thus, applying Annual Average Daily values to major disruptions in winter months generates an overestimate while applying them to major disruptions in summer months provides an underestimate. Operational conditions causing interruptions to continuous data collection, such as construction activity, excessive high water and counter malfunction resulted in some gaps in the data. Thus, to more accurately present and compare the

total boat ramp use throughout the study period, an average traffic count for each month at each location was calculated and applied to the respective month with missing data at each location. Data was excluded for periods when a ramp was unavailable for public use due to construction activity.

# APPENDIX B – Visitor Survey

(Arrow Lakes Reservoir Version)



LEES + Associates
RESEARCH & PLANNING
604 899 3806 | www.elac.bc.ca

## Arrow Lakes Recreation Survey

- The purpose of this survey is to obtain information about recreation use of the Arrow Lakes.
- Participation in this study is completely voluntary: you may refuse to participate at any time.
- You may skip any question that you do not feel comfortable answering, although we encourage you to complete all questions if possible.
- The survey will take about 5 to 10 minutes to complete.

All information resulting from this study will be kept strictly confidential. Please do not write your name anywhere on this questionnaire. Individual responses will not be made available to anyone outside of the *Arrow Lakes Recreation Survey Research Team (LEES + Associates).*

**If you have any questions about this research,or would like further information, please do not hesitate to contact *LEES + Associates at (604) 899-3806.***

**Q1** The questions in this section ask about the recreation activities that you do ON THE WATER or ON THE SHORE of the Arrow Lakes.

**Indicate ALL of the activities that you do ON THE WATER or ON THE SHORE of the Arrow Lakes.**

| | | | |
|---|---|---|---|
| ☐ Fishing | ☐ Beach activities | ☐ Hunting | ☐ Mushroom picking |
| ☐ Boating (motor cruising) | ☐ Nature study | ☐ Scenic viewing | ☐ Berry picking |
| ☐ Canoeing/kayaking | ☐ Bird watching | ☐ Picnicking | ☐ Drawing/painting/photography |
| ☐ Swimming | ☐ Wildlife viewing | ☐ Camping | ☐ Cross-country skiing |
| ☐ Waterskiing | ☐ Horseback riding | ☐ Walking/hiking | ☐ Snowmobiling |
| ☐ Wind surfing | ☐ ATV/Trail bike/4 × 4 | ☐ Mountain biking | ☐ Other: _____ |

**On average, how many DAYS PER SEASON do you visit the Arrow Lakes?**

Spring: _____ days/season  Summer: _____ days/season

Fall: _____ days/season  Winter: _____ days/season

**What recreation activities did you do *TODAY* on the water or on the shore of the Arrow Lakes?**

**Are you participating in this activity today as a paying customer of a commercial recreation or tourism operator/guide?**

☐ Yes ☐ No **Please elaborate:**

OFFICE USE ONLY Tracking # | Sample Date (yyyy-mm-dd) | Sample Location | Surveyor Initials

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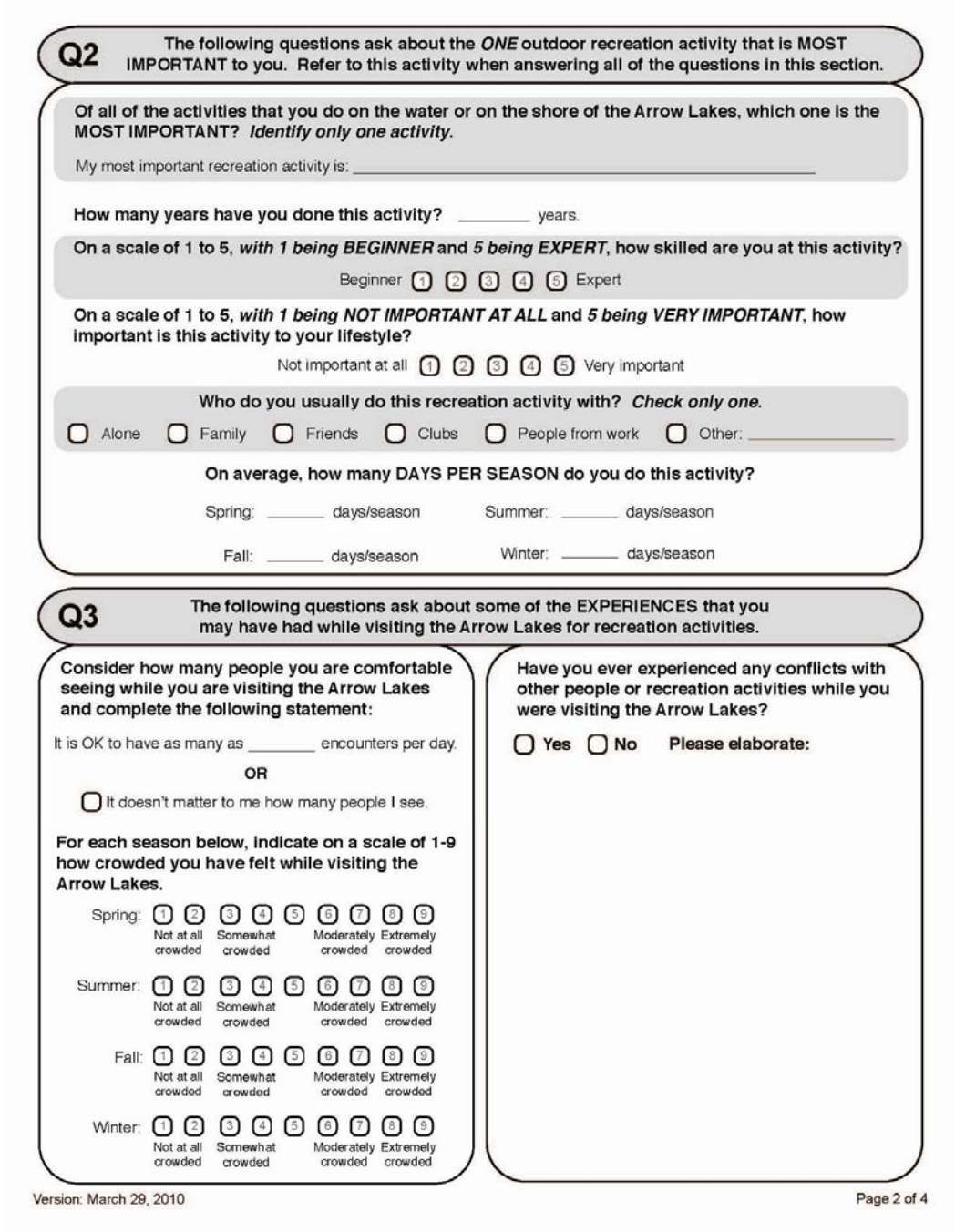

**Q2** The following questions ask about the *ONE* outdoor recreation activity that is MOST IMPORTANT to you. Refer to this activity when answering all of the questions in this section.

**Of all of the activities that you do on the water or on the shore of the Arrow Lakes, which one is the MOST IMPORTANT?** ***Identify only one activity.***

My most important recreation activity is: _____

**How many years have you done this activity?** _____ years.

**On a scale of 1 to 5,** ***with 1 being BEGINNER*** **and** ***5 being EXPERT*****, how skilled are you at this activity?**

Beginner ① ② ③ ④ ⑤ Expert

**On a scale of 1 to 5,** ***with 1 being NOT IMPORTANT AT ALL*** **and** ***5 being VERY IMPORTANT*****, how important is this activity to your lifestyle?**

Not important at all ① ② ③ ④ ⑤ Very important

**Who do you usually do this recreation activity with?** ***Check only one.***

☐ Alone ☐ Family ☐ Friends ☐ Clubs ☐ People from work ☐ Other: _____

**On average, how many DAYS PER SEASON do you do this activity?**

Spring: _____ days/season Summer: _____ days/season

Fall: _____ days/season Winter: _____ days/season

**Q3** The following questions ask about some of the EXPERIENCES that you may have had while visiting the Arrow Lakes for recreation activities.

**Consider how many people you are comfortable seeing while you are visiting the Arrow Lakes and complete the following statement:**

It is OK to have as many as _____ encounters per day.

**OR**

☐ It doesn't matter to me how many people I see.

**For each season below, indicate on a scale of 1-9 how crowded you have felt while visiting the Arrow Lakes.**

Spring: ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
Not at all crowded — Somewhat crowded — Moderately crowded — Extremely crowded

Summer: ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
Not at all crowded — Somewhat crowded — Moderately crowded — Extremely crowded

Fall: ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
Not at all crowded — Somewhat crowded — Moderately crowded — Extremely crowded

Winter: ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
Not at all crowded — Somewhat crowded — Moderately crowded — Extremely crowded

**Have you ever experienced any conflicts with other people or recreation activities while you were visiting the Arrow Lakes?**

☐ **Yes** ☐ **No** **Please elaborate:**

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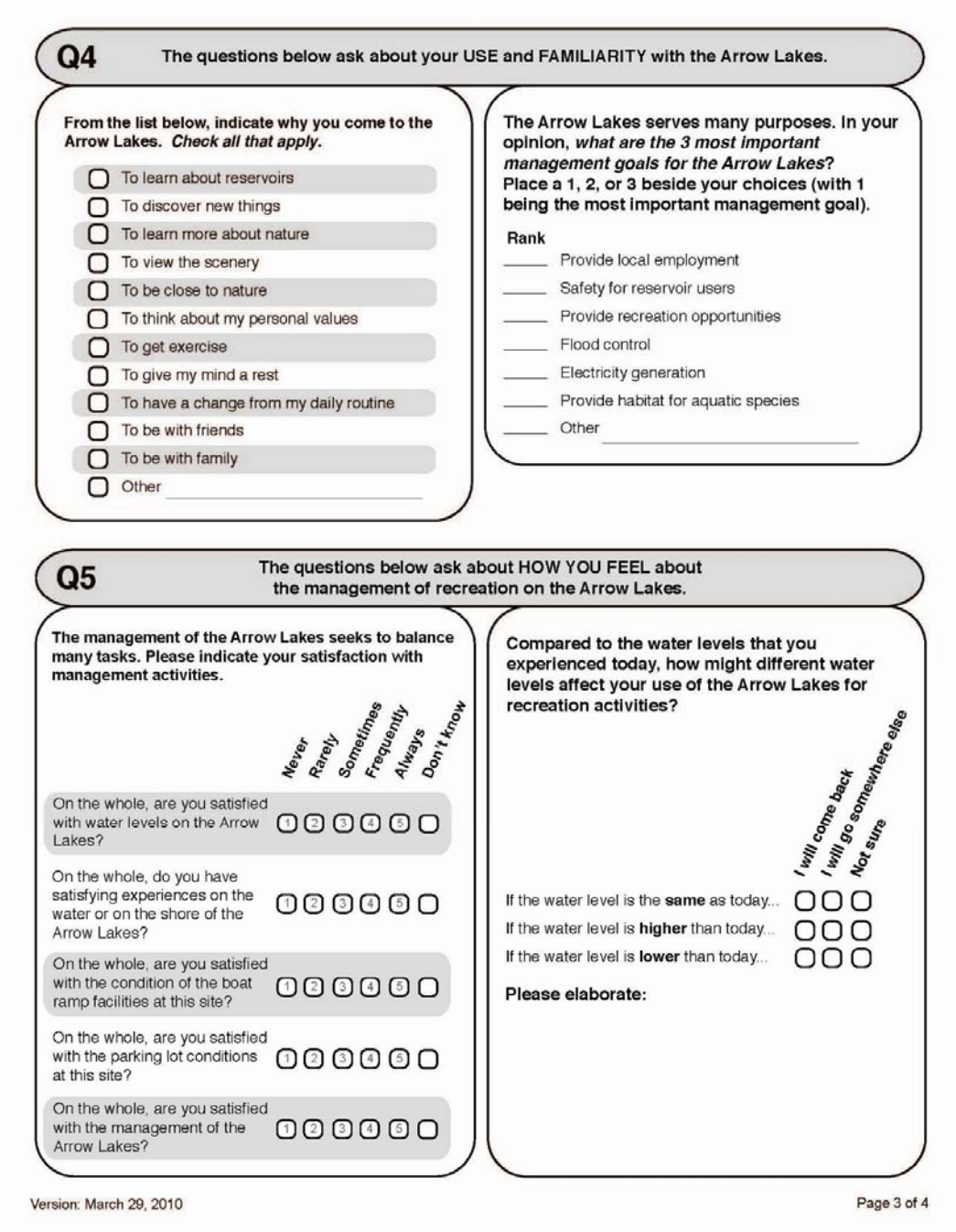

**Q4** The questions below ask about your USE and FAMILIARITY with the Arrow Lakes.

**From the list below, indicate why you come to the Arrow Lakes. *Check all that apply.***

- ☐ To learn about reservoirs
- ☐ To discover new things
- ☐ To learn more about nature
- ☐ To view the scenery
- ☐ To be close to nature
- ☐ To think about my personal values
- ☐ To get exercise
- ☐ To give my mind a rest
- ☐ To have a change from my daily routine
- ☐ To be with friends
- ☐ To be with family
- ☐ Other _____

**The Arrow Lakes serves many purposes. In your opinion, *what are the 3 most important management goals for the Arrow Lakes*? Place a 1, 2, or 3 beside your choices (with 1 being the most important management goal).**

**Rank**

- _____ Provide local employment
- _____ Safety for reservoir users
- _____ Provide recreation opportunities
- _____ Flood control
- _____ Electricity generation
- _____ Provide habitat for aquatic species
- _____ Other _____

**Q5** The questions below ask about HOW YOU FEEL about the management of recreation on the Arrow Lakes.

**The management of the Arrow Lakes seeks to balance many tasks. Please indicate your satisfaction with management activities.**

| | Never | Rarely | Sometimes | Frequently | Always | Don't know |
|---|---|---|---|---|---|---|
| On the whole, are you satisfied with water levels on the Arrow Lakes? | 1 | 2 | 3 | 4 | 5 | ☐ |
| On the whole, do you have satisfying experiences on the water or on the shore of the Arrow Lakes? | 1 | 2 | 3 | 4 | 5 | ☐ |
| On the whole, are you satisfied with the condition of the boat ramp facilities at this site? | 1 | 2 | 3 | 4 | 5 | ☐ |
| On the whole, are you satisfied with the parking lot conditions at this site? | 1 | 2 | 3 | 4 | 5 | ☐ |
| On the whole, are you satisfied with the management of the Arrow Lakes? | 1 | 2 | 3 | 4 | 5 | ☐ |

**Compared to the water levels that you experienced today, how might different water levels affect your use of the Arrow Lakes for recreation activities?**

| | I will come back | I will go somewhere else | Not sure |
|---|---|---|---|
| If the water level is the **same** as today... | ☐ | ☐ | ☐ |
| If the water level is **higher** than today... | ☐ | ☐ | ☐ |
| If the water level is **lower** than today... | ☐ | ☐ | ☐ |

**Please elaborate:**

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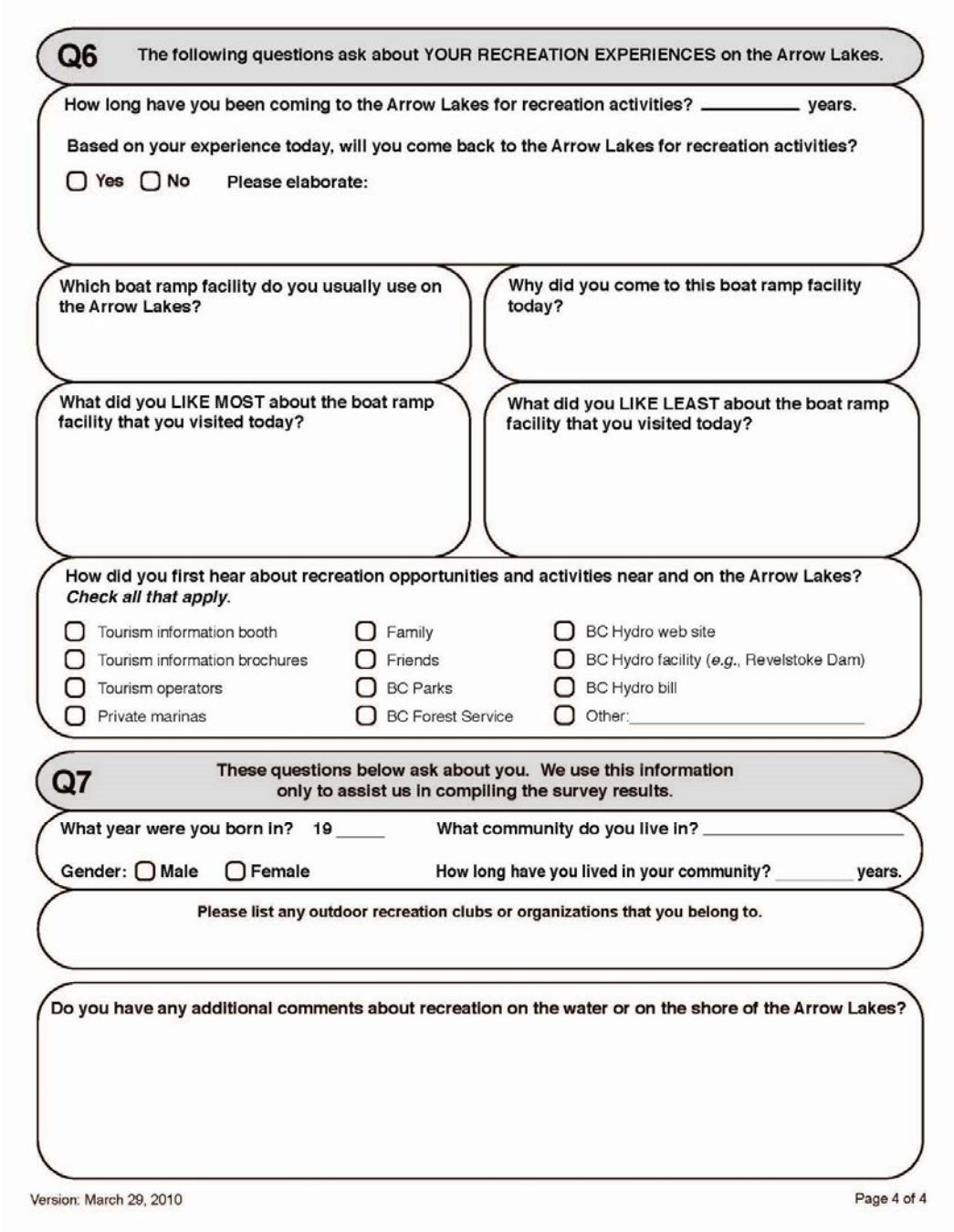

**Q6** The following questions ask about YOUR RECREATION EXPERIENCES on the Arrow Lakes.

How long have you been coming to the Arrow Lakes for recreation activities? _____ years.

Based on your experience today, will you come back to the Arrow Lakes for recreation activities?

☐ Yes ☐ No Please elaborate:

Which boat ramp facility do you usually use on the Arrow Lakes?

Why did you come to this boat ramp facility today?

What did you LIKE MOST about the boat ramp facility that you visited today?

What did you LIKE LEAST about the boat ramp facility that you visited today?

How did you first hear about recreation opportunities and activities near and on the Arrow Lakes? *Check all that apply.*

| | | |
|---|---|---|
| ☐ Tourism information booth | ☐ Family | ☐ BC Hydro web site |
| ☐ Tourism information brochures | ☐ Friends | ☐ BC Hydro facility (*e.g.*, Revelstoke Dam) |
| ☐ Tourism operators | ☐ BC Parks | ☐ BC Hydro bill |
| ☐ Private marinas | ☐ BC Forest Service | ☐ Other:_____ |

**Q7** These questions below ask about you. We use this information only to assist us in compiling the survey results.

What year were you born in? 19____ What community do you live in? _____

Gender: ☐ Male ☐ Female How long have you lived in your community? _____ years.

Please list any outdoor recreation clubs or organizations that you belong to.

Do you have any additional comments about recreation on the water or on the shore of the Arrow Lakes?

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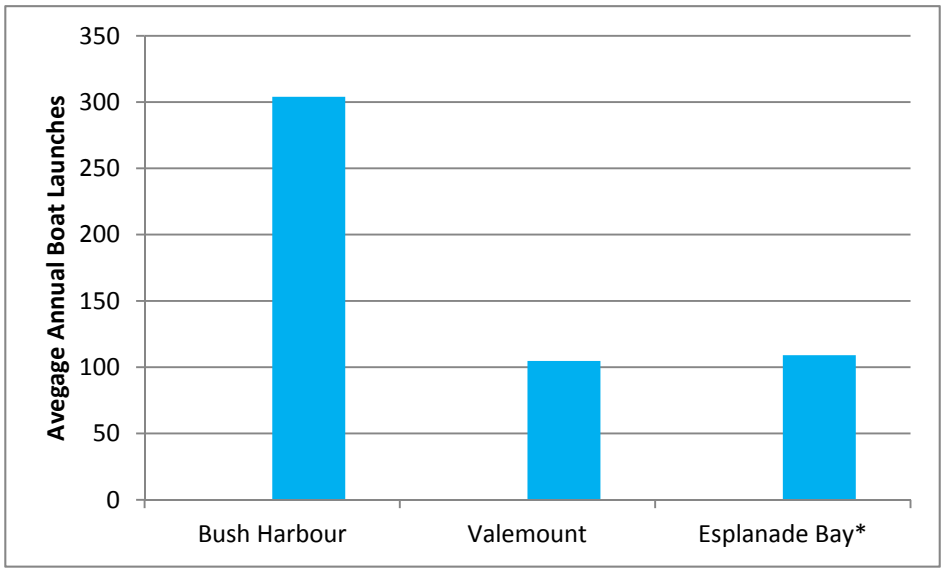
# APPENDIX C – Traffic Counter Results

## Kinbasket Reservoir – Traffic Results

The following presents a summary of traffic counts for Years 1-4 (Table 33, Figures 12, 13).

**Table 33.** Kinbasket Reservoir Boat Launches – Four Year Annual Traffic Summary

| Year | Site | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total | Annual Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2010 | Bush Harbour | -- | -- | -- | -- | -- | -- | -- | 86 | 37 | 38 | 6 | 0 | **167** | |
| | Valemount | 0 | 0 | 0 | 12 | 6 | 13 | 61 | 28 | 23 | 3 | 0 | 0 | **146** | **313** |
| 2011 | Bush Harbour | 0 | 0 | 0 | 0 | 39 | 43 | 102 | 82 | 60 | 33 | 4 | 0 | **363** | |
| | Esplanade Bay | -- | -- | -- | -- | 6 | 8 | 27 | 67 | 26 | 6 | 0 | 0 | **140** | |
| | Valemount | 0 | 0 | 2 | 0 | 3 | 40 | 30 | 12 | 10 | 0 | 0 | 0 | **97** | **600** |
| 2012 | Bush Harbour | 0 | 0 | 0 | 0 | 40 | 61 | 98 | 80 | 2 | 1 | 0 | 0 | **294** | |
| | Esplanade Bay | 0 | 0 | 0 | 0 | 7 | 7 | 31 | 67 | 9 | 1 | 0 | 0 | **105** | |
| | Valemount | 1 | 0 | 0 | 0 | 1 | 25 | 10 | 20 | 10 | 2 | 0 | 0 | **70** | **469** |
| 2013 | Bush Harbour | 0 | 0 | 0 | 0 | 39 | 52 | 83 | 99 | 84 | 25 | 10 | 0 | **392** | |
| | Esplanade Bay | 0 | 0 | 0 | 0 | 6 | 8 | 22 | 32 | 8 | 6 | 0 | 0 | **82** | |
| | Valemount | 0 | 0 | 0 | 2 | 4 | 33 | 26 | 27 | 14 | 0 | 0 | 0 | **106** | **580** |




*Esplanade Bay counts began in 2011

**Figure 12.** Kinbasket Lake Boat Launches – Average Annual Total by Site (2010-2013)

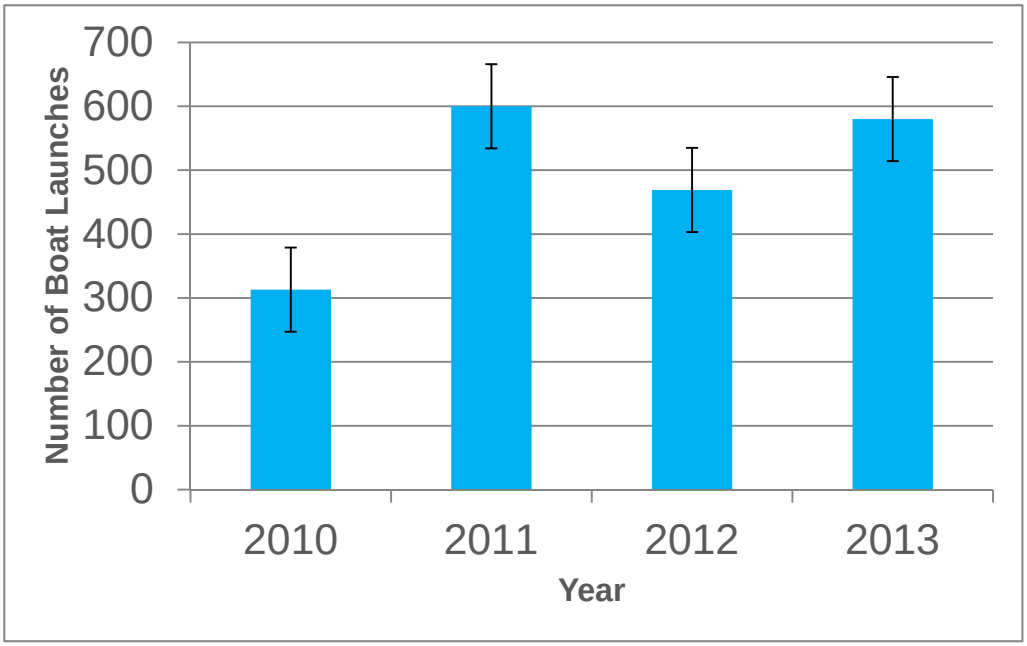
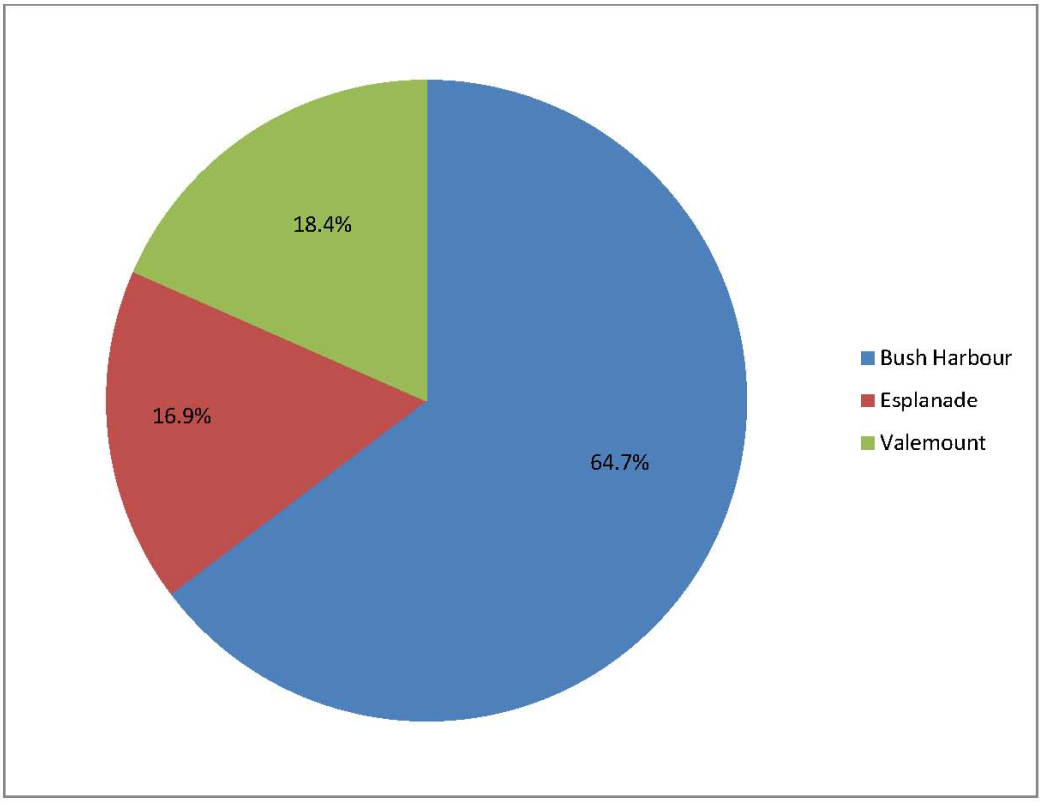



**Figure 13.** Kinbasket Lake – Total Number of Boat Launches by Year (2010-2013)

Over the three full years of data collection (2011-2013) the average annual boat launch use on Kinbasket Reservoir was 550 launches per year. Year 1 (2010) was a partial year as Bush Harbour was not available to the public until August. There was a marked reduction in boat launch use in 2012 compared with the preceding and following years. This may have been due to it being an excessively high water year with a resulting increase in floating debris and reduction in accessible beach area.

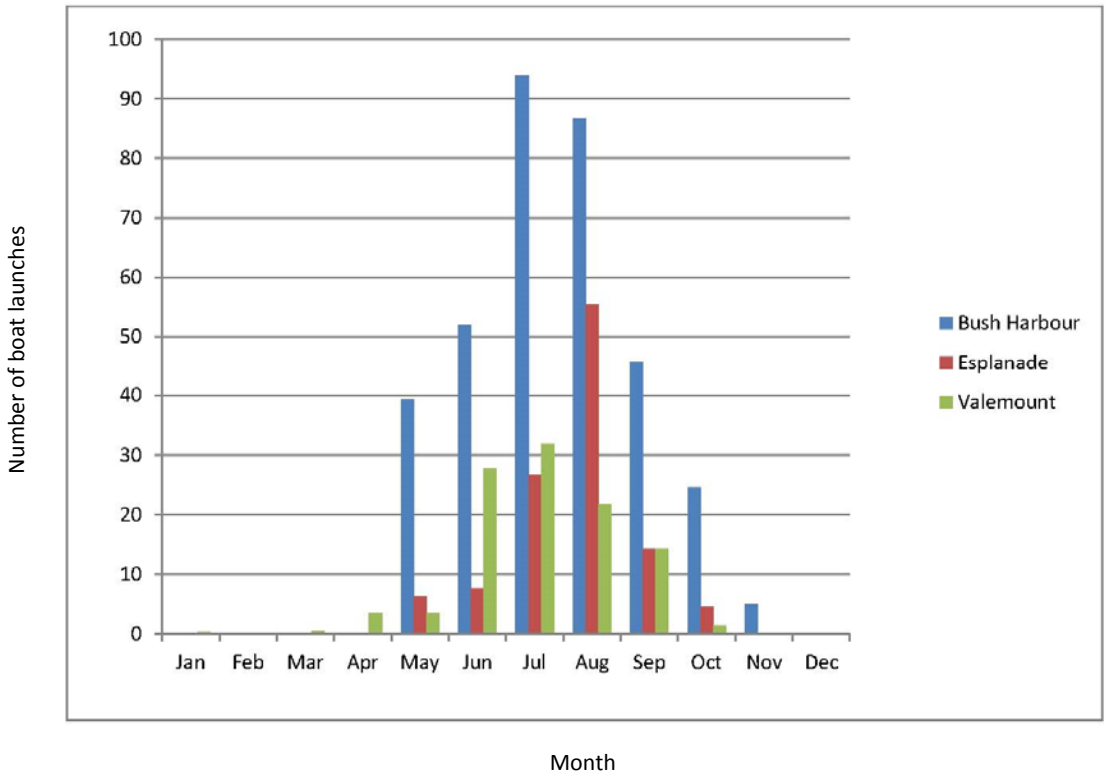
## Kinbasket Reservoir – Traffic by Site




On average, Bush Harbour generated 65% of the recorded boat launch use on Kinbasket Reservoir, while Valemount produced 18% and Esplanade Bay 17%. However, the amount of boating use at Valemount may be higher than shown due to the onsite marina and nearby recreation sites and Trails BC campgrounds where people can moor their boat rather than removing it each time they use it.

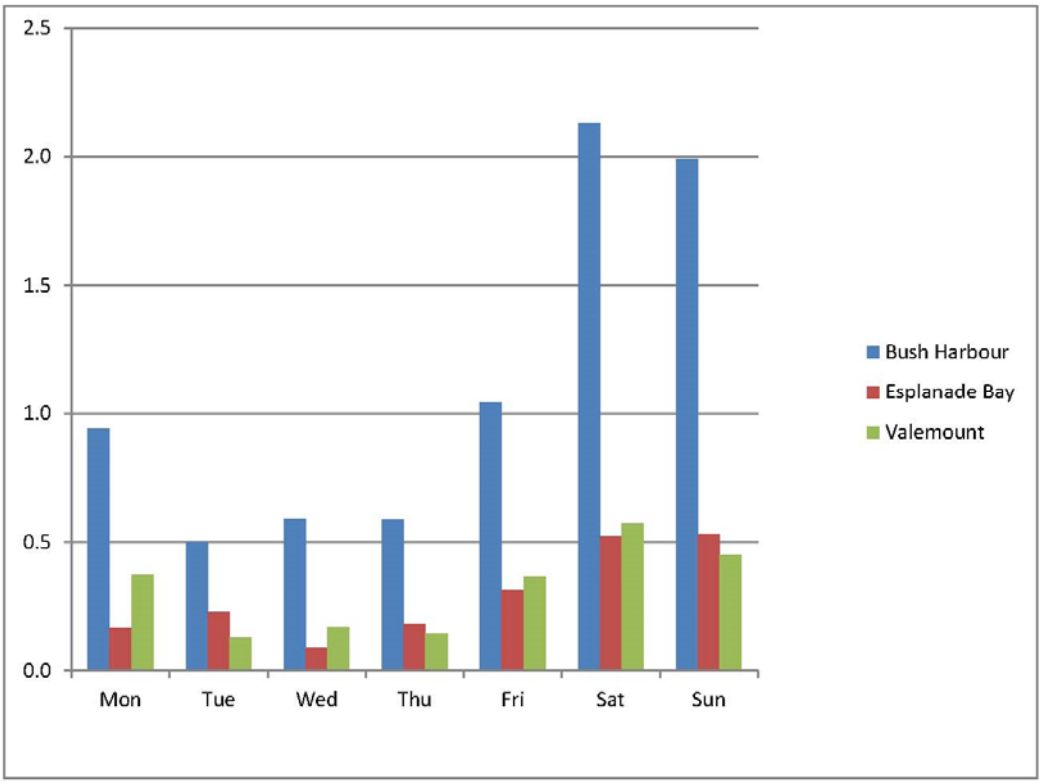
## Kinbasket Reservoir – Traffic by Months of the Year

Monthly Averages




On average the heaviest boat launch use occurred in July and August in Bush Harbour and Esplanade Bay and in June and July in Valemount. As each of these sites is snow bound for five or six months, virtually all recorded activity occurs during the late spring, summer and early fall. A few recorded uses in winter were likely an anomaly where a snowmobile was likely recorded using the boat ramp to access the frozen lake.

## Kinbasket Reservoir – Traffic by Days of the Week




As expected, most recorded use occured on the weekends with over 50% of use attributed to those days. Saturdays and Sundays get two to three times as much use as other days of the week. Saturdays get the heaviest use. Fridays and Mondays get about 1.5 – 2.0 times as much use as other week days. Because boats are kept at the Valemount Marina and there are several Forest Service campgrounds close by there may be more boating activity than the recorded traffic indicates.

## Kinbasket Reservoir Boat Ramp Construction – Before and After Photos

**Figure 14.** Bush Harbour at low water before

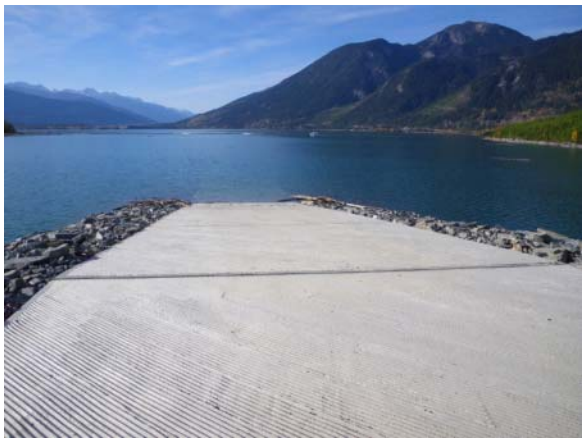


**Figure 15.** Bush Harbour high water after

**Figure 16.** Valemount before

**Figure 17.** Valemount at low water- Apr 2012 after ramp extension

**Figure 18.** Valemount at high water

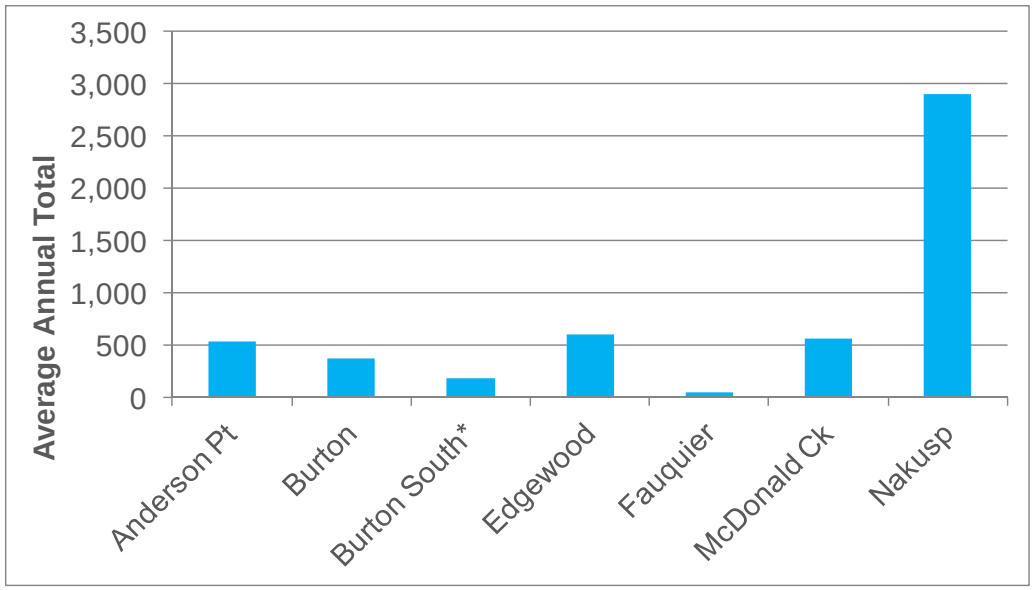
**Figure 19.** Valemount at high water with debris, 2012

## Arrow Lakes Reservoir – Traffic Results

Existing traffic counters in place for the Arrow Lakes Recreational Demand Study (CLBMON 41) were used in all locations except at Anderson Point and Burton South. Traffic counters were installed at Anderson Point and Burton South in August 2011. Below is a summary of traffic estimates based on the data collected from each location during Years 1-4.

**Table 34.** Arrow Lakes Reservoir – Four Year Annual Traffic Summary

| Year | Site | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total | Annual Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2010 | Anderson Point | -- | -- | -- | 32 | 49 | 99 | 97 | 96 | 55 | 43 | 20 | 14 | 505 | |
| | Burton | 0 | 3 | 2 | 8 | 32 | 83 | 106 | 123 | 15 | 19 | 9 | 2 | 403 | |
| | Edgewood | 96 | 100 | 136 | 64 | 61 | 88 | 174 | 103 | 26 | 34 | 21 | 15 | 919 | |
| | Fauquier | 3 | 17 | 18 | 12 | 35 | -- | -- | -- | 3 | 0 | 0 | 0 | 89 | |
| | McDonald Cr | 4 | 19 | 16 | 32 | 124 | -- | 300 | 215 | 87 | 37 | 12 | 2 | 848 | |
| | Nakusp | 152 | 162 | 170 | 192 | 247 | 330 | 748 | 529 | 161 | 185 | 90 | 150 | 3,116 | **5,879** |
| 2011 | Anderson Point | 12 | 12 | 12 | 21 | 42 | 61 | 104 | 86 | 60 | 56 | 30 | 4 | 501 | |
| | Burton | 0 | 9 | 2 | 11 | 32 | 72 | 121 | 144 | 56 | 6 | 2 | 2 | 456 | |
| | Burton South | -- | -- | -- | -- | -- | -- | -- | 8 | 22 | 5 | 0 | 1 | 36 | |
| | Edgewood | 12 | 10 | 42 | 51 | 66 | 68 | 140 | 123 | 53 | 29 | 7 | 11 | 612 | |
| | Fauquier | 2 | 0 | 0 | 4 | 2 | 3 | 3 | 2 | 3 | 0 | 0 | 0 | 19 | |
| | McDonald Cr | 0 | 0 | 0 | 36 | 33 | 55 | 101 | 148 | 52 | 3 | 0 | 7 | 435 | |
| | Nakusp | 183 | 114 | 125 | 198 | 202 | 318 | 643 | 724 | 266 | 165 | 90 | 161 | 3,189 | **5,249** |
| 2012 | Anderson Point | 12 | 13 | 32 | 49 | 64 | 63 | 71 | 92 | 90 | 50 | 25 | 9 | 571 | |
| | Burton | 1 | 0 | 0 | 1 | 13 | 44 | 101 | 128 | 30 | 6 | 2 | 0 | 327 | |
| | Burton South | 0 | 0 | 2 | 8 | 4 | 13 | 8 | 37 | 24 | 5 | 0 | 3 | 104 | |
| | Edgewood | 14 | 12 | 33 | 52 | 50 | 52 | 68 | 126 | 76 | 35 | 16 | 4 | 539 | |
| | Fauquier | 0 | 0 | 2 | 2 | 4 | 7 | 0 | 4 | 0 | 2 | 0 | 0 | 21 | |
| | McDonald Cr | 2 | 0 | 0 | 11 | 37 | 47 | 70 | 110 | 57 | 13 | 2 | 3 | 353 | |
| | Nakusp | 171 | 112 | 209 | 213 | 231 | 225 | 524 | 697 | 320 | 224 | 132 | 135 | 3,194 | **5,107** |
| 2013 | Anderson Point | -- | -- | -- | -- | 40 | 49 | 76 | 72 | 26 | 25 | 12 | 9 | 309 | |
| | Burton | 0 | 0 | 0 | 5 | 27 | 26 | 106 | 132 | 28 | 5 | 0 | 1 | 330 | |
| | Burton South | 0 | 79 | 70 | 14 | 23 | 24 | 72 | 54 | 12 | 2 | 3 | 2 | 356 | |
| | Edgewood | 10 | 44 | -- | -- | 143 | 32 | 60 | 85 | 31 | 25 | 28 | 17 | 475 | |
| | Fauquier | 0 | 2 | 3 | 0 | 3 | 1 | 4 | 11 | 4 | 2 | 2 | 1 | 33 | |
| | McDonald Cr | 4 | 0 | 31 | 29 | 43 | 73 | 145 | 164 | 52 | 10 | 10 | 5 | 566 | |
| | Nakusp | 175 | 140 | -- | -- | 255 | 257 | 530 | 487 | 242 | 192 | 114 | 149 | 2,541 | **4,611** |




* Burton South counts began in 2011

**Figure 20.** Arrow Lakes Boat Launches – Average Annual Total by Site (2010-2013)

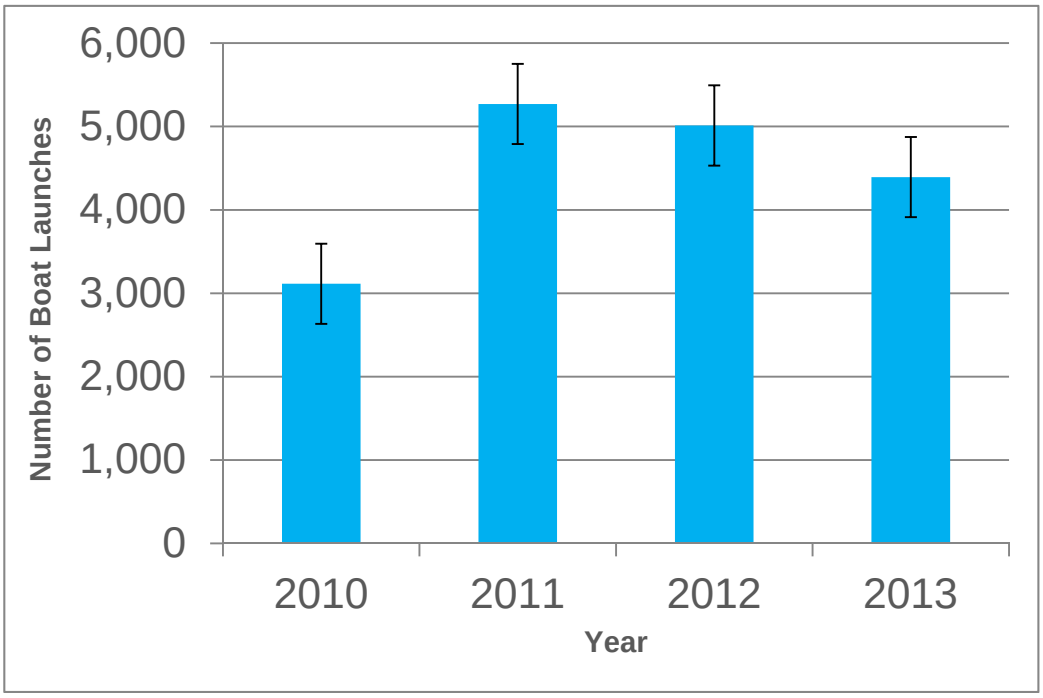


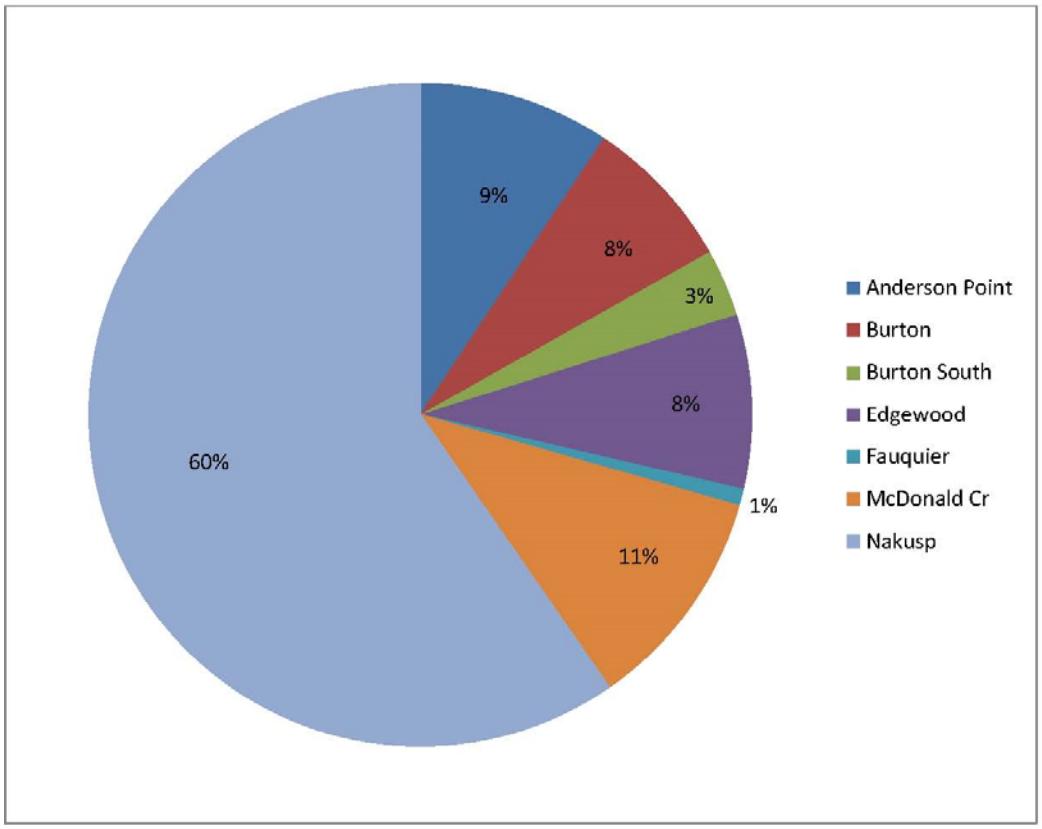

**Figure 21.** Arrow Lakes – Total Number of Boat Launches by Year (2010-2013)

The average annual data suggests that overall boat launch use on the Arrow Lakes Reservoir has decreased over the four years. However, it may be more constant and closer to the four-year average of 5,212 launches per year if we consider the following:

- Year 1 (2009) had a warm winter, resulting in more boat traffic on the lakes in winter and spring of 2010.
- Year 2 (2010) The McDonald Creek boat launch use in 2010 appears to be almost double that of subsequent years. This may be due to increased construction traffic between May and August which occurred while the ramp was open to the public during some of the construction and for which the construction traffic did not get excluded from the traffic counts. This alone could represent an over-count of over 400 launches.
- Year 3 (2012) was a very high water year, thus counters were removed for 6 weeks and counts were down.
- Year 4 (2013) had Nakusp, Anderson Point and Edgewood counters out of commission due to construction and would have increased their total count by about 600.

Under normal operating conditions all years would likely have produced a count somewhere between 5,200 – 5,400 launches per year.

## Arrow Lakes Reservoir – Traffic by Site

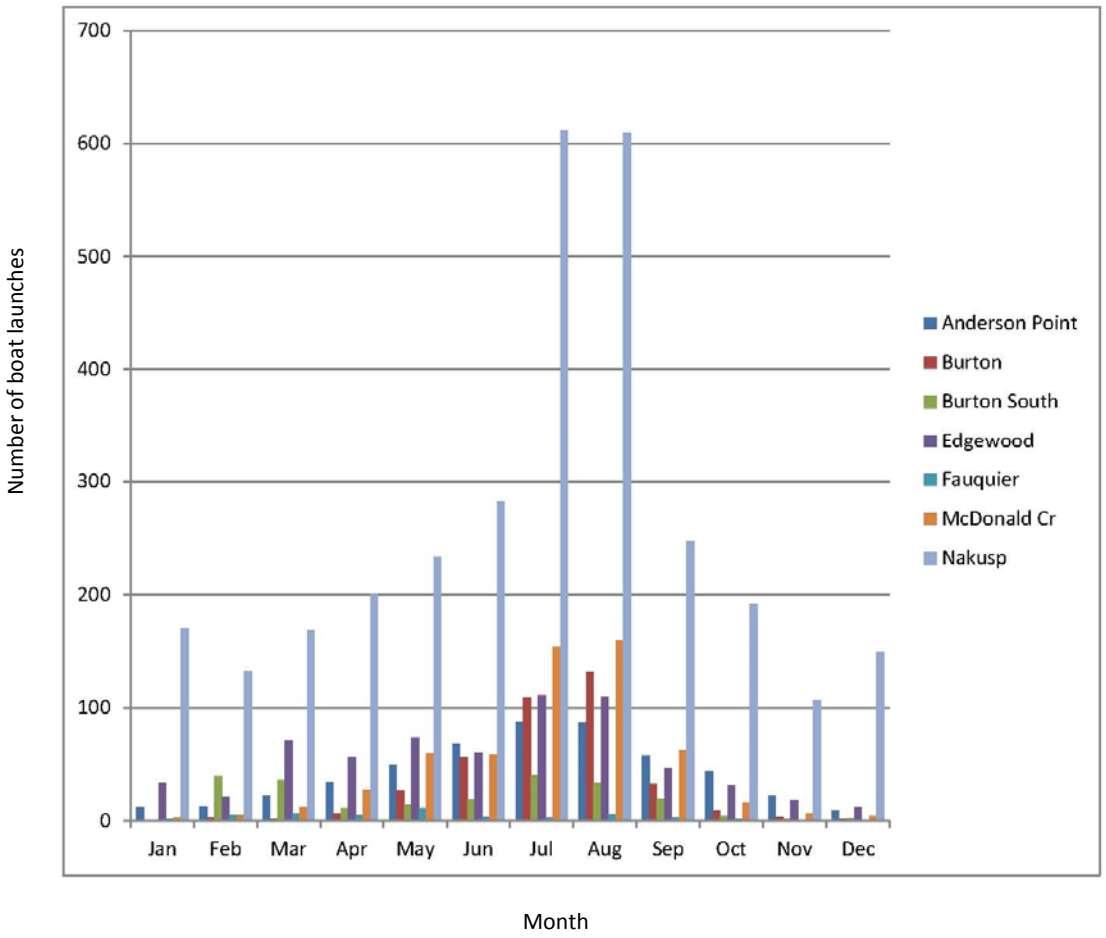



On average, the Nakusp Boat Launch accounted for 60% of the recorded traffic at the selected boat launch locations on the Arrow Lakes Reservoir in this study[5]. This was likely due to the Nakusp boat launch being under construction in 2013. (In previous years the ramp accounted for about 67%).

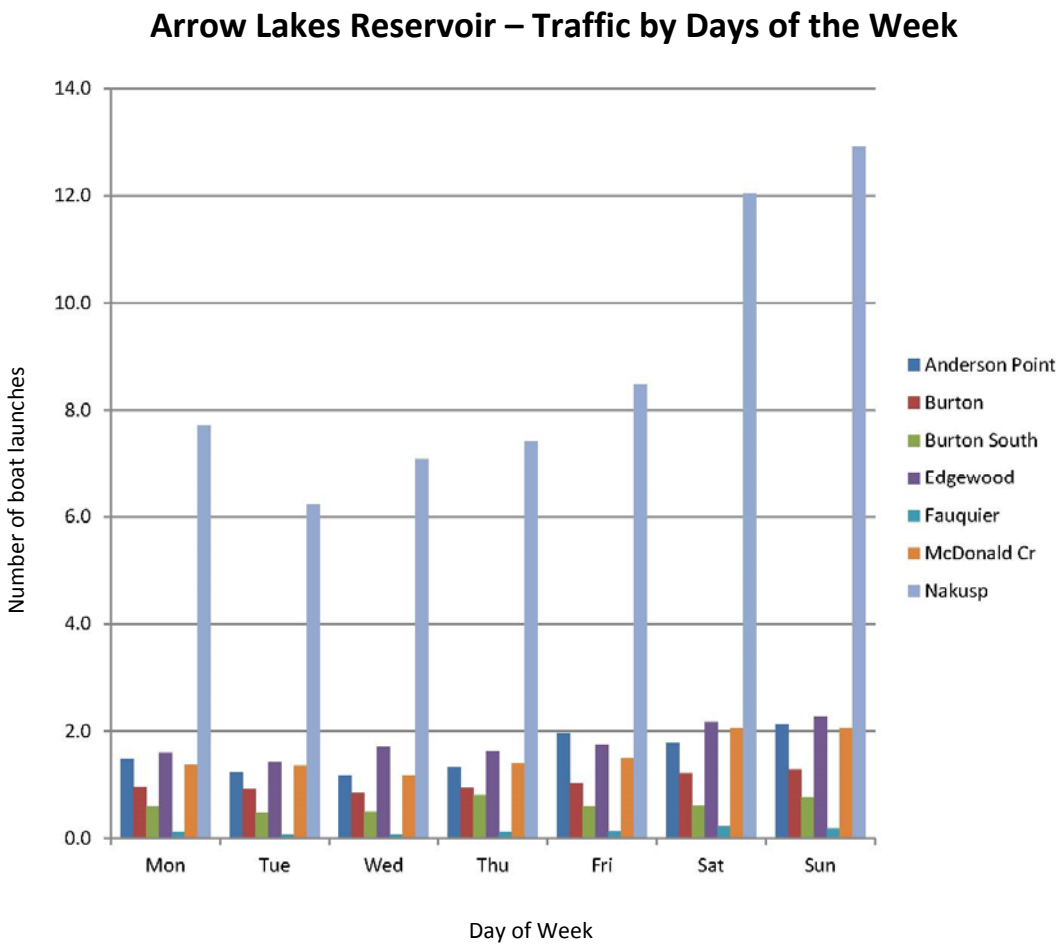
[5] This percentage is for the locations is for the locations used in this study only and does not represent the overall percentage of boat launch use on the Arrow Lakes. The Arrow Lake Recreation Study (CLBMON 41) indicates that Nakusp accounts for about 27% of the overall recorded boat launch counts on the Arrow Lakes.

## Arrow Lakes Reservoir – Traffic by Months of the Year

Monthly Averages




Use patterns are as expected with increasing activity in the summer months with most locations peaking in July or August, then tapering off in the fall. Nakusp generates significant use throughout the winter months and exceeds use at Syringa Creek for seven months of the year. Nakusp, Edgewood and Anderson Point receive more relative use over the winter months (November – March) than at other locations. Nakusp showed an increase in December and January over adjacent months but the reason for this is not readily evident from the data. It may be that boats normally kept in the marina are not left there over winter thus need to be launched each time a person wants to use them, or that these are the best months for catching fish in that area of the Arrow Lakes.




Nakusp, McDonald Creek, Burton, Fauquier and Edgewood boat launches had an expected relationship of greater weekend than weekday use, *i.e.,* Saturdays and Sundays received about 1.5 – 2.0 times as much traffic as weekdays. Anderson Point had a higher percentage of weekday use (especially Fridays) than other locations. This may be attributed to a higher component of commuter rather than recreational traffic. Burton South is another anomaly, receiving greatest use on Thursdays and Sundays, followed by slightly less but equal use on Fridays, Saturdays and Mondays.

## Arrow Lakes Reservoir Boat Construction – Before and After Photos

**Figure 22.** Anderson Point before

**Figure 23.** Anderson Point after

**Figure 24.** Burton South before

**Figure 25.** Burton South after

**Figure 26.** Edgewood before

**Figure 27.** Edgewood after

**Figure 28.** Fauquier before

**Figure 29.** Fauquier after

**Figure 30.** McDonald Creek before

**Figure 31.** McDonald Creek after


**Figure 32.** Nakusp before

**Figure 33.** Nakusp after

## Special Operational Considerations

Continuous traffic counts were not possible at all locations as counters were removed during periods of boat launch upgrades and new construction. Seven of the ten boat launches studied had major construction work undertaken duing the study period resulting in the removal of the respective traffic counter for a time (see Table 4).

Also, 2012 produced an eccessively high water year with a sustained water level approximately two feet above normal pond level on both the Arrow Lakes and Kinbasket Reservoirs for much of the summer. This created a number of operational challenges to data collection during the busiest boating periods on the lake. The high water resulted in a much greater than normal amount of driftwood and floating debris on the lake which created a boating safety hazard as well as making access to the water at the boat launches more difficult. This may have further reduced the potential amount of boating use during the high water period. To protect the sensitive electronic traffic counters from being submerged and water damaged it was necessary to remove the counters on Kinbasket Reservoir for over seven weeks (see Table 4 for water level exclusion dates).

While the disruption of traffic counts during these periods posed a few challenges the numbers derived from the traffic counter records provide a very reasonable estimate of the average annual boat launch use of the sites studied. The traffic estimates recorded for the summer months are conservative as the Average Annual Daily Traffic (AADT) is lower than the actual use during the summer months, as that is the peak use period, but would be higher than actual use in winter when the ramps are not accessible or used very little. Thus, to best reflect actual use for all locations, the use estimates for missed days in partial months of counts have been based on the AADT.

However, monthly average traffic from past years was used for complete months of missing data. The AADT calculations were also adjusted where average monthly data was added in to provide the correct number of days with data, thus avoiding over counting. This enabled better and easier comparison across years as the earlier years have more complete data sets and are calculated on a calendar year basis.

# APPENDIX D – Univariate (Descriptive) statistics for all questions asked at CLBMON-14 sites

**NOTE:** The analyses reported here only considered on-site responses from respondents at the Arrow Lakes Reservoir and Kinbasket Reservoir sample sites:

**Arrow Lakes Reservoir Sites**

- Anderson Point
- Edgewood Community Park
- Fauquier Community Park Boat Launch
- McDonald Creek Provincial Park
- Nakusp Boat Launch

**Kinbasket Reservoir Sites**

- Bush Harbour
- Valemount Marina

**Question 1: Recreation Activities Done on the Water or on the Shore of the Arrow Lakes.**

**Table 35.** Indicate all of the activities that you do on the water or onshore of the Arrow Lakes of Kinbasket Lake.

| Activity | Pre-Construction (n = 587) | Post-Construction (n = 723) |
|---|---|---|
| ATV/Trail bike/4 x 4 | 37.0% | 30.6% |
| Beach activities | 68.1% | 59.9% |
| Berry picking | 36.3% | 27.2% |
| Bird watching | 46.0% | 30.4% |
| Boating (motor cruising) | 68.5% | 58.9% |
| Camping | 62.9% | 75.0% |
| Canoeing/kayaking | 33.9% | 27.1% |
| Cross-country skiing | 11.1% | 5.4% |
| Drawing/painting/photography | 22.7% | 18.4% |
| Fishing | 79.4% | 67.9% |
| Horseback riding | 6.5% | 3.2% |
| Hunting | 26.2% | 17.0% |
| Mountain biking | 18.6% | 14.5% |
| Mushroom picking | 32.7% | 15.8% |
| Nature study | 31.3% | 19.4% |
| Picnicking | 62.4% | 52.8% |
| Scenic viewing | 68.3% | 62.7% |
| Snowmobiling | 17.0% | 15.2% |
| Swimming | 72.2% | 66.5% |
| Walking/hiking | 69.8% | 63.2% |
| Waterskiing | 22.3% | 13.4% |
| Wildlife viewing | 56.2% | 47.9% |
| Wind surfing | 3.4% | 1.4% |
| Other | 10.1% | 7.2% |

**Table 36.** On average, how many days per month do you visit the Arrow Lakes or Kinbasket Lake in each season?

| Season | Construction Period | n | Mean | 95% CI | SD |
|---|---|---|---|---|---|
| Spring[a] | Pre | 462 | 15.2 | ± 1.1 | 12.177 |
| | Post | 642 | 6.8 | ± 0.8 | 9.961 |
| Summer[b] | Pre | 495 | 19.6 | ± 1.0 | 11.420 |
| | Post | 649 | 13.9 | ± 0.8 | 10.569 |
| Fall[c] | Pre | 466 | 15.3 | ± 1.1 | 12.075 |
| | Post | 650 | 7.1 | ± 0.8 | 9.787 |
| Winter[d] | Pre | 445 | 11.5 | ± 1.2 | 12.583 |
| | Post | 645 | 4.5 | ± 0.7 | 9.036 |
| Annual[e] | Pre | 436 | 189.4 | ± 12.3 | 131.054 |
| | Post | 642 | 97.3 | ± 8.1 | 104.991 |

[a] The pre-construction period had a significantly higher mean participation rate than the post-construction period did ($t(867.233) = 12.273$, $p < .001$).

[b] The pre-construction period had a significantly higher mean participation rate than the post-construction period did ($t(1018.851) = 8.574$, $p < .001$).

[c] The pre-construction period had a significantly higher mean participation rate than the post-construction period did ($t(868.147) = 12.084$, $p < .001$).

[d] The pre-construction period had a significantly higher mean participation rate than the post-construction period did ($t(750.651) = 10.022$, $p < .001$).

[e] The pre-construction period had a significantly higher mean participation rate than the post-construction period did ($t(794.422) = 12.238$, $p < .001$).

**Table 37.** What recreation activities did you do today on the water or onshore of the Arrow Lakes[†]?

| Activity | Pre (n = 516) | | Post (n = 622) | |
|---|---|---|---|---|
| | Freq. | % | Freq. | % |
| ATV/Trail bike/ 4 x 4 | 19 | 3.7% | 27 | 4.3% |
| Beach activities | 41 | 7.9% | 82 | 13.2% |
| Berry picking | 1 | 0.2% | 4 | 0.6% |
| Bird watching | 37 | 7.2% | 21 | 3.4% |
| Boating (motor cruising) | 115 | 22.3% | 136 | 21.9% |
| Camping | 54 | 10.5% | 121 | 19.5% |
| Canoeing/kayaking | 12 | 2.3% | 46 | 7.4% |
| Dog walking | 15 | 2.9% | 12 | 1.9% |
| Drawing/painting/photography | 21 | 4.1% | 33 | 5.3% |
| Fishing | 179 | 34.7% | 191 | 30.7% |
| Horseback riding | 2 | 0.4% | 0 | 0.0% |
| Hunting | 6 | 1.2% | 0 | 0.0% |
| Mountain biking | 8 | 1.6% | 14 | 2.3% |
| Mushroom picking | 4 | 0.8% | 5 | 0.8% |
| Nature study | 8 | 1.6% | 10 | 1.6% |
| Picnicking | 39 | 7.6% | 56 | 9.0% |
| Scenic viewing | 103 | 20.0% | 83 | 13.3% |
| Swimming | 43 | 8.3% | 97 | 15.6% |
| Walking/hiking | 121 | 23.4% | 142 | 22.8% |
| Waterskiing | 3 | 0.6% | 13 | 2.1% |
| Wildlife watching | 14 | 2.7% | 20 | 3.2% |
| Other | 38 | 7.4% | 35 | 5.6% |

[†] Some respondents identified more than one activity.

**Table 38.** Are you participating in this activity today as a paying customer of a commercial recreation or tourism operator/guide?

| Response[†] | Pre-Construction (n = 540) | | Post-Construction (n = 677) | |
|---|---|---|---|---|
| | Freq. | % | Freq. | % |
| No | 483 | 89.4% | 555 | 82.0% |
| Yes | 57 | 10.6% | 122 | 18.0% |

[†] A higher proportion of pre-construction respondents indicated that they were not paying customers of a commercial recreation or tourism operator or guide ($\chi^2$ = 13.344, df = 1, p > 0.001; Phi = 0.105).

**Question 2: The One Recreation Activity that is Most Important to Respondents.**

**Table 39.** Of all of the activities that you do on the water or onshore of the Arrow Lakes, which one is the most important[†]?

| Activity | Pre-Construction (n = 567) | | Post-Construction (n = 683) | |
|---|---|---|---|---|
| | Freq. | % | Freq. | % |
| ATV/Trail bike/ 4 x 4 | 8 | 1.4% | 25 | 3.7% |
| Beach activities | 22 | 3.9% | 31 | 4.5% |
| Bird watching | 4 | 0.7% | 4 | 0.6% |
| Boating (motor cruising) | 123 | 21.7% | 124 | 18.2% |
| Camping | 52 | 9.2% | 134 | 19.6% |
| Canoeing/kayaking | 20 | 3.5% | 27 | 4.0% |
| Cross-country skiing | 1 | 0.2% | 0 | 0.0% |
| Dog walking | 5 | 0.9% | 6 | 0.9% |
| Drawing/painting/photography | 5 | 0.9% | 7 | 1.0% |
| Fishing | 232 | 40.9% | 245 | 35.9% |
| Horseback riding | 3 | 0.5% | 0 | 0.0% |
| Hunting | 5 | 0.9% | 12 | 1.8% |
| Mountain biking | 3 | 0.5% | 1 | 0.1% |
| Mushroom picking | 2 | 0.4% | 2 | 0.3% |
| Nature study | 0 | 0.0% | 4 | 0.6% |
| Picnicking | 2 | 0.4% | 2 | 0.3% |
| Scenic viewing | 27 | 4.8% | 22 | 3.2% |
| Snowmobiling | 1 | 0.2% | 1 | 0.1% |
| Swimming | 37 | 6.5% | 60 | 8.8% |
| Walking/hiking | 48 | 8.5% | 40 | 5.9% |
| Waterskiing | 4 | 0.7% | 4 | 0.6% |
| Wildlife watching | 6 | 1.1% | 3 | 0.4% |
| Other | 26 | 4.6% | 23 | 3.4% |

[†] Some respondents identified more than one activity.

**Table 40.** How many years have you done this activity?

| Construction Period | n | Min | Max | Mean† | 95% CI | SD |
|---|---|---|---|---|---|---|
| Pre | | | | | | 16.398 |
| | 558 | 0 | 73 | 22.72 | ± 1.36 | |
| Post | | | | | | 15.774 |
| | 660 | 0 | 65 | 20.37 | ± 1.20 | |

† Pre-construction respondents reported significantly higher mean duration of participation than the post-construction respondents did ($t(1216) = 2.539$, $p < .05$).

**Table 41.** On a scale of 1 to 5, with 1 being beginner and 5 being expert, how skilled are you at this activity?

| Construction Period | n | Beginner | Somewhat Skilled | Moderately Skilled | Very Skilled | Expert | Mean† | 95% CI | SD |
|---|---|---|---|---|---|---|---|---|---|
| Pre | 533 | 1.9% | 5.1% | 24.4% | 35.6% | 33.0% | 3.93 | 0.08 | 0.971 |
| Post | 682 | 2.2% | 4.0% | 24.6% | 39.0% | 30.2% | 3.91 | 0.07 | 0.948 |

† There were no significant differences in the mean skill of pre- and post-construction respondents.

**Table 42.** On a scale of 1 to 5, with 1 being not important at all and 5 being very important, how important is this activity to your lifestyle?

| Construction Period | n | Not Important at All | Somewhat Important | Moderately Important | Mostly Important | Very Important | Mean[†] | 95% CI | SD |
|---|---|---|---|---|---|---|---|---|---|
| Pre | 539 | 0.6% | 2.2% | 12.1% | 20.0% | 65.1% | 4.47 | ± 0.07 | 0.832 |
| Post | 692 | 0.7% | 2.5% | 16.5% | 27.9% | 52.5% | 4.29 | ± 0.06 | 0.878 |

[†] Pre-construction respondents reported significantly higher mean importance than pre-construction respondents did ($t(1260) = 3.276$, $p < .001$).

**Table 43.** Who do you usually do this recreation activity with?[†]

| Construction Period | n | Alone | Family | Friends | Clubs | People from work | Other |
|---|---|---|---|---|---|---|---|
| Pre | 587 | 6.8% | 44.9% | 21.3% | 0.0% | 0.0% | 27.0% |
| Post | 693 | 3.9% | 48.1% | 22.5% | 0.6% | 0.1% | 24.8% |

[†] There were no significant differences in the proportions of people that respondents did their most important recreation activity with between pre- and post-construction respondents.

**Table 44.** On average, how many days per month do you visit the Arrow Lakes/ Kinbasket Lake in each season?

| Season | Construction Period | n | Min | Max | Mean | 95% CI | SD |
|---|---|---|---|---|---|---|---|
| Spring[a] | Pre | 447 | 0 | 30 | 13.76 | ± 1.05 | 11.372 |
| | Post | 648 | 0 | 30 | 7.09 | ± 0.73 | 9.453 |
| Summer[b] | Pre | 485 | 0 | 30 | 18.70 | ± 0.97 | 10.849 |
| | Post | 649 | 0 | 30 | 17.03 | ± 0.79 | 10.266 |
| Fall[c] | Pre | 450 | 0 | 30 | 13.44 | ± 1.05 | 11.321 |
| | Post | 652 | 0 | 30 | 7.47 | ± 0.73 | 9.537 |
| Winter[d] | Pre | 426 | 0 | 30 | 9.38 | ± 1.10 | 11.542 |
| | Post | 646 | 0 | 30 | 4.19 | ± 0.69 | 9.010 |
| Annual[e] | Pre | 436 | 0 | 360 | 189.36 | ± 12.30 | 131.054 |
| | Post | 642 | 0 | 360 | 97.32 | ± 8.12 | 104.991 |

[a] Pre-construction respondents had significantly higher mean monthly participation than pre-construction respondents ($t(840.835) = 10.202$, $p < .001$).

[b] Pre-construction respondents had significantly higher mean monthly participation than pre-construction respondents ($t(1010.500) = 2.615$, $p < .01$).

[c] Pre-construction respondents had significantly higher mean monthly participation than pre-construction respondents ($t(855.129) = 9.172$, $p < .001$).

[d] Pre-construction respondents had significantly higher mean monthly participation than pre-construction respondents ($t(754.887) = 7.827$, $p < .001$).

[e] Pre-construction respondents had significantly higher mean annual participation than pre-construction respondents ($t(794.422) = 12.238$, $p < .001$).

**Question 3: Experiences Had While Visiting the Arrow Lakes for Recreation Activities.**

**Table 45.** Consider how many people you are comfortable seeing while you are visiting the Arrow Lakes/Kinbasket Lake and complete the following statement: "It is OK to have as many as _____ encounters per day".

| Construction Period | n | Min | Max | Mean[†] | 95% CI | SD |
|---|---|---|---|---|---|---|
| Pre | 536 | 0 | 100 | 5.38 | ± 1.19 | 14.026 |
| Post | 704 | 0 | 127 | 3.92 | ± 0.84 | 11.333 |

[†] Pre-construction respondents had significantly higher mean number of preferred daily encounters than post-construction respondents ($t(1009.282) = 1.973$, $p < .05$.

**Table 46.** It doesn't matter to me how many people I see.

| Construction Period | n | %[†] |
|---|---|---|
| Pre | 520 | 65.0% |
| Post | 707 | 65.2% |

[†] There were no significant differences between pre- and post-construction respondents.

**Table 47.** For each season below, indicate on a scale of 1 - 9 how crowded you have felt while visiting the Arrow Lakes/Kinbasket Lake.

| Season | Construction Period | n | Min | Max | Mean | 95% CI | SD |
|---|---|---|---|---|---|---|---|
| Spring | Pre | 467 | 1 | 9 | 1.84 | ± 0.11 | 1.184 |
| | Post | 521 | 1 | 9 | 1.94 | ± 0.12 | 1.360 |
| Summer | Pre | 504 | 1 | 9 | 3.35 | ± 0.19 | 2.162 |
| | Post | 651 | 1 | 9 | 3.39 | ± 0.17 | 2.198 |
| Fall[†] | Pre | 458 | 1 | 9 | 2.06 | ± 0.13 | 1.400 |
| | Post | 529 | 1 | 8 | 2.25 | ± 0.13 | 1.530 |
| Winter | Pre | 414 | 1 | 9 | 1.46 | ± 0.09 | 0.914 |
| | Post | 425 | 1 | 7 | 1.49 | ± 0.09 | 0.952 |

[†] The mean crowding threshold for pre-construction respondents was significantly lower than that of post-construction respondents ($t(1013.999) = -2.034$, $p < .05$).

**Table 48.** Have you ever experienced any conflicts with other people or recreation activities while you were visiting the Arrow Lakes/Kinbasket Lake?[†]

| Construction Period | n | Response | Freq. | % |
|---|---|---|---|---|
| Pre | 557 | No | 465 | 83.5% |
| | | Yes | 92 | 16.5% |
| Post | 691 | No | 614 | 88.9% |
| | | Yes | 77 | 11.1% |

[†] A higher proportion of post-construction respondents indicated that they had not experienced any conflicts ($\chi^2 = 7.607$, $df = 1$, $p > 0.01$; Phi = -0.078).

**Question 4: Use and Familiarity with the Arrow Lakes/Kinbasket Lakes.**

**Table 49.** From the list below, indicate why you come to the Arrow Lakes/Kinbasket Lake.

| Motivation | Pre-Construction (n = 573) | | Post-Construction (n = 717) | |
|---|---|---|---|---|
| | **Freq.** | **%** | **Freq.** | **%** |
| To learn about reservoirs | 37 | 6.5% | 36 | 5.0% |
| To discover new things | 215 | 37.5% | 244 | 34.0% |
| To learn more about nature[a] | 196 | 34.2% | 174 | 24.3% |
| To view the scenery | 425 | 74.2% | 525 | 73.2% |
| To be close to nature | 342 | 59.7% | 449 | 62.6% |
| To think about my personal values[b] | 173 | 30.2% | 134 | 18.7% |
| To get exercise | 278 | 48.5% | 327 | 45.6% |
| To give my mind a rest | 334 | 58.3% | 414 | 57.7% |
| To have a change from my daily routine | 280 | 48.9% | 384 | 53.6% |
| To be with friends | 336 | 58.6% | 418 | 58.3% |
| To be with family | 357 | 62.3% | 453 | 63.2% |
| Other | 153 | 26.7% | 119 | 16.6% |

[a] A significantly higher proportion of pre-construction respondents indicated that learning about nature was their motivation ($\chi^2 = 15.377$, df = 1, $p > 0.001$; Phi = -0.109).

[b] A significantly higher proportion of pre-construction respondents indicated that thinking about their personal values was their motivation ($\chi^2 = 23.238$, df = 1, $p > 0.001$; Phi = -0.134).

**Table 50.** The Arrow Lakes/Kinbasket Lake serve many purposes. In your opinion, what are the 3 most important management goals for the Arrow Lakes/Kinbasket Lake?

| Management Goals | Construction Period | n | 1 | | 2 | | 3 | |
|---|---|---|---|---|---|---|---|---|
| | | | Freq. | % | Freq. | % | Freq. | % |
| Provide local employment | Pre | 177 | 77 | 43.5% | 41 | 23.2% | 59 | 33.3% |
| | Post | 271 | 99 | 36.5% | 74 | 27.3% | 98 | 36.2% |
| Safety for reservoir users | Pre | 172 | 62 | 36.0% | 47 | 27.3% | 63 | 36.6% |
| | Post | 226 | 88 | 38.9% | 75 | 33.2% | 63 | 27.9% |
| Provide recreation opportunities | Pre | 410 | 175 | 42.7% | 146 | 35.6% | 89 | 21.7% |
| | Post | 515 | 262 | 50.9% | 134 | 26.0% | 119 | 23.1% |
| Flood control | Pre | 162 | 56 | 34.6% | 50 | 30.9% | 56 | 34.6% |
| | Post | 257 | 88 | 34.2% | 77 | 30.0% | 92 | 35.8% |
| Electricity generation | Pre | 205 | 70 | 34.1% | 65 | 31.7% | 70 | 34.1% |
| | Post | 272 | 103 | 37.9% | 83 | 30.5% | 86 | 31.6% |
| Provide habitat for aquatic species | Pre | 340 | 150 | 44.1% | 89 | 26.2% | 101 | 29.7% |
| | Post | 389 | 171 | 44.0% | 111 | 28.5% | 107 | 27.5% |
| Other | Pre | 34 | 14 | 41.2% | 9 | 26.5% | 11 | 32.4% |
| | Post | 28 | 16 | 57.1% | 2 | 7.1% | 10 | 35.7% |

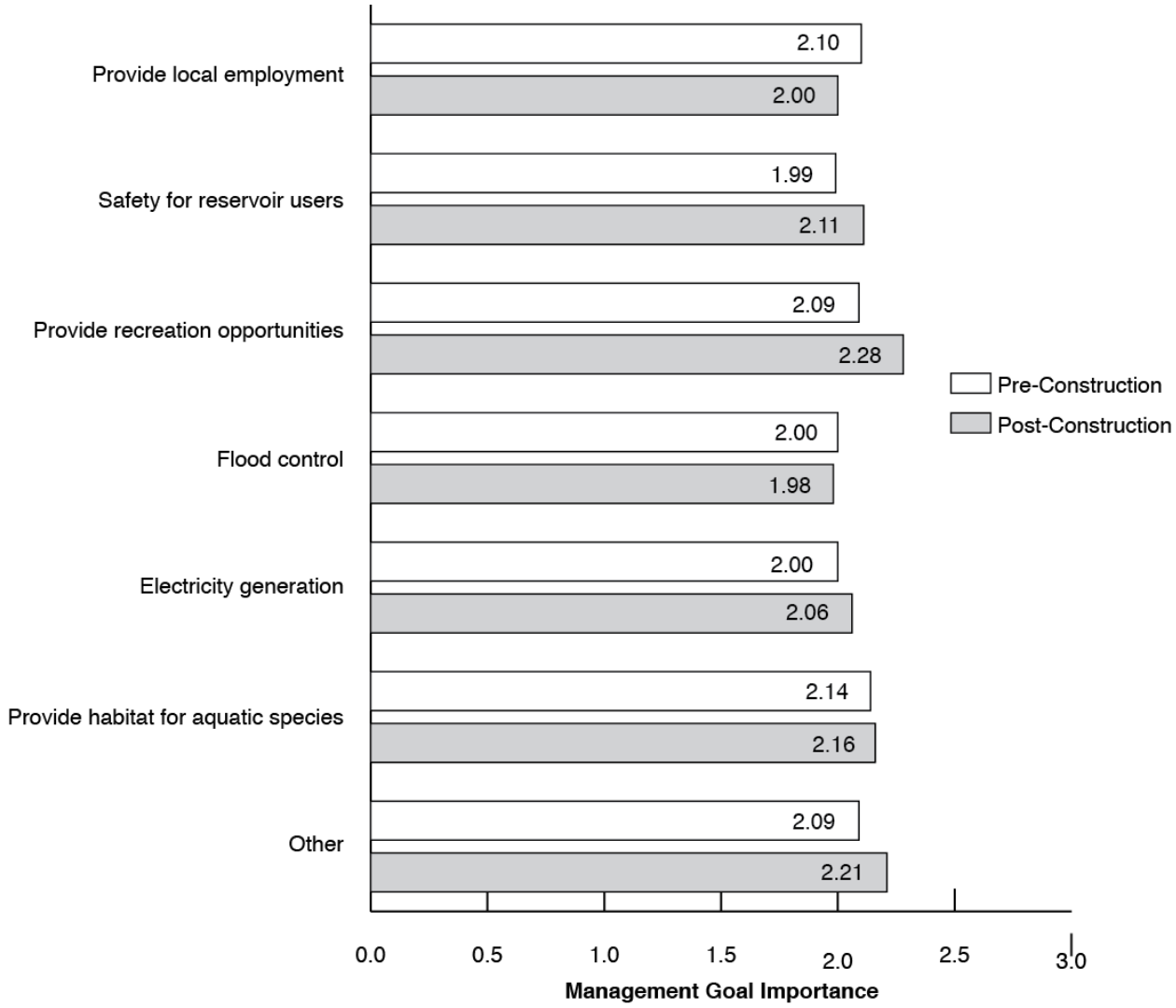



**Figure 34.** Standardized importance rank scores of management goals for the Arrow Lakes/Kinbasket Lake.

**Question 5: Visitor Satisfaction with Management Activities.**

**Table 51.** The management of the Arrow Lakes/Kinbasket Lake seeks to balance many tasks. Please indicate your satisfaction with management activities.

| Management Activities | Construction Period | n | Never | Rarely | Sometimes | Frequently | Always | Mean | 95% CI | SD |
|---|---|---|---|---|---|---|---|---|---|---|
| On the whole, are you satisfied with water levels on the Arrow Lakes/Kinbasket Lake?[a] | Pre | 471 | 7.4% | 19.1% | 45.9% | 18.5% | 9.1% | 3.03 | 0.09 | 1.020 |
| | Post | 588 | 6.3% | 10.5% | 35.2% | 32.3% | 15.6% | 3.40 | 0.09 | 1.070 |
| On the whole, do you have satisfying experiences on the water or onshore of the Arrow Lakes/Kinbasket Lake? | Pre | 515 | 1.9% | 1.7% | 13.0% | 36.3% | 47.0% | 2.25 | 0.08 | 0.886 |
| | Post | 657 | 1.7% | 1.7% | 9.4% | 38.1% | 49.2% | 4.31 | 0.06 | 0.840 |
| On the whole, are you satisfied with the conditions of the boat ramps on the Arrow Lakes/ Kinbasket Lake?[b] | Pre | 465 | 31.4% | 21.3% | 20.6% | 13.8% | 12.9% | 2.55 | 0.13 | 1.389 |
| | Post | 530 | 4.5% | 5.7% | 13.6% | 27.9% | 48.3% | 4.10 | 0.09 | 1.116 |
| On the whole, are you satisfied with the parking lot conditions when you visit the Arrow Lakes/ Kinbasket Lake?[c] | Pre | 502 | 8.6% | 13.1% | 21.3% | 26.7% | 30.3% | 3.57 | 0.11 | 1.277 |
| | Post | 641 | 3.1% | 4.1% | 12.6% | 31.2% | 49.0% | 4.19 | 0.08 | 1.013 |
| On the whole, are you satisfied with the management of the Arrow Lakes/Kinbasket Lake?[d] | Pre | 469 | 7.9% | 13.6% | 39.0% | 23.5% | 16.0% | 3.26 | 0.10 | 1.123 |
| | Post | 605 | 4.3% | 6.6% | 22.8% | 30.1% | 36.2% | 3.87 | 0.09 | 1.108 |

[a] The mean satisfaction with water levels on the Arrow Lakes among pre-construction respondents was significantly lower than that of post-construction respondents ($t(1072.239) = -6.064$, $p < .001$).

[b] The mean satisfaction with water levels on the Arrow Lakes among pre-construction respondents was significantly lower than that of post-construction respondents ($t(948.939) = -19.564$, $p < .001$).

[c] The mean satisfaction with water levels on the Arrow Lakes among pre-construction respondents was significantly lower than that of post-construction respondents ($t(1008.547) = -9.280$, $p < .001$).

[d] The mean satisfaction with water levels on the Arrow Lakes among pre-construction respondents was significantly lower than that of post-construction respondents ($t(1102) = -9.077$, $p < .001$).

**Table 52.** Compared to the water levels that you experienced today, how might different water levels affect your use of the Arrow Lakes/Kinbasket Lake for recreation activities?

| Statement | Construction Period | n | I will come back | I will go somewhere else |
|---|---|---|---|---|
| If the water level is the same today… | Pre | 437 | 94.3% | 5.7% |
| | Post | 565 | 95.4% | 4.6% |
| If the water level is higher than today…[†] | Pre | 448 | 94.0% | 6.0% |
| | Post | 529 | 85.1% | 14.9% |
| If the water level is lower than today… | Pre | 372 | 82.0% | 18.0% |
| | Post | 514 | 82.3% | 17.7% |

[†] A significantly higher proportion of post-construction respondents indicated that they would go somewhere else ($\chi^2 = 7.607$, df = 1, $p > 0.01$; Phi = -0.078).

**Question 6: Recreation Experiences on the Arrow Lakes.**

**Table 53.** How long have you been coming to the Arrow Lakes/Kinbasket Lake for recreation activities (years)?

| Construction Period | n | Min | Max | Mean[†] | 95% CI | SD |
|---|---|---|---|---|---|---|
| Pre | 537 | 0 | 68 | 20.09 | ± 1.31 | 15.438 |
| Post | 646 | 0 | 74 | 15.01 | ± 1.03 | 13.311 |

[†] The mean number of years that pre-construction respondents had been coming to the Arrow Lakes/Kinbasket Lake was significantly higher than that of post-construction respondents (t(1065.120) = 5.994, $p < .001$).

**Table 54.** Based on your experience today, will you come back to the Arrow Lakes/Kinbasket Lake for recreation activities?[†]

| Construction Period | n | Yes | No |
|---|---|---|---|
| Pre | 547 | 99.1% | 0.9% |
| Post | 688 | 99.0% | 1.0% |

[†] The proportions of pre-construction respondents that would return based did not differ significantly from that of post-construction respondents.

**Table 55.** What boat ramp facility do you usually use?

| Boat Ramp Location | Pre-Construction (n = 460) | | Post-Construction (n = 534) | |
|---|---|---|---|---|
| | Freq. | % | Freq. | % |
| Above Revelstoke Dam | 1 | 0.2% | 0 | 0.0% |
| Anderson Point | 32 | 7.0% | 11 | 2.1% |
| Arrow Park Ferry | 11 | 2.4% | 2 | 0.4% |
| Burton Historic Park | 5 | 1.1% | 1 | 0.2% |
| Bush Harbour | 0 | 0.0% | 19 | 3.6% |
| Eagle Bay | 0 | 0.0% | 1 | 0.2% |
| Edgewood Community Park | 106 | 23.0% | 14 | 2.6% |
| Esplanade Bay | 0 | 0.0% | 8 | 1.5% |
| Fauquier Community Park Boat Launch | 16 | 3.5% | 38 | 7.1% |
| Galena Bay | 0 | 0.0% | 1 | 0.2% |
| Griffin | 3 | 0.7% | 0 | 0.0% |
| McDonald Creek Provincial Park | 6 | 1.3% | 44 | 8.2% |
| Nakusp Boat Launch | 109 | 23.7% | 51 | 9.6% |
| Needles | 3 | 0.7% | 1 | 0.2% |
| Renata | 5 | 1.1% | 1 | 0.2% |
| Scotties Marina | 1 | 0.2% | 1 | 0.2% |
| Shelter Bay | 6 | 1.3% | 8 | 1.5% |
| Syringa Creek Park Boat Launch | 6 | 1.3% | 9 | 1.7% |
| Syringa Creek Park Day Use | 0 | 0.0% | 1 | 0.2% |
| Valemount Marina | 20 | 4.3% | 68 | 12.7% |
| Multiple sites | 123 | 26.7% | 138 | 25.8% |
| Don't use boat ramps | 7 | 1.5% | 117 | 21.9% |

**Table 56.** Why did you come to this boat ramp facility today – Anderson Point & Edgewood Community Park?

| Response Categories | Anderson Point | | Edgewood Community Park | |
|---|---|---|---|---|
| | Construction Period | | Construction Period | |
| | Pre (n = 57) | Post (n = 33) | Pre (n = 128) | Post (n = 19) |
| Access to Renata | 33.3% | 15.2% | — | — |
| Best one | — | 3.0% | — | — |
| Close to beach | — | — | 0.8% | — |
| Close to camping | — | 6.1% | 3.9% | — |
| Close to home (local) | 3.5% | 6.1% | 18.0% | 21.1% |
| Close to swimming | — | — | 3.1% | — |
| Closest to other recreation activities | 12.3% | 6.1% | 25.0% | 47.4% |
| Closest to where I want to go | 3.5% | 3.0% | 0.8% | — |
| Convenient | 1.8% | — | 4.7% | — |
| Keep boat here | — | — | — | — |
| Not crowded | — | — | 1.6% | — |
| Only one | 7.0% | — | 3.1% | — |
| Only one with appropriate facilities | — | — | — | — |
| Preferred one | — | 3.0% | 1.6% | — |
| Previous enjoyable experience | — | — | — | — |
| Scenery | 5.3% | 3.0% | 7.8% | 5.3% |
| To complete survey | — | — | — | — |
| To fish | 15.8% | 15.2% | 8.6% | — |
| To launch boat/take boat out of water | — | 6.1% | 3.1% | — |
| Water levels | — | 3.0% | — | 5.3% |
| Other | 15.8% | 30.3% | 16.4% | 21.1% |
| Multiple | 1.8% | — | 1.6% | — |
| Didn't use ramp today | — | — | — | — |
| Do not have boat | — | — | — | — |

**Table 57.** Why did you come to this boat ramp facility today – Fauquier Community Park Boat Launch & McDonald Creek Provincial Park?

| Response Categories | Fauquier Community Park Boat Launch | | McDonald Creek Provincial Park | |
|---|---|---|---|---|
| | Construction Period | | Construction Period | |
| | Pre (n = 27) | Post (n = 47) | Pre (n = 5) | Post (n = 81) |
| Access to Renata | — | — | — | — |
| Best one | — | 2.1% | — | — |
| Close to beach | — | — | — | — |
| Close to camping | — | — | 20.0% | 44.4% |
| Close to home (local) | 11.1% | 25.5% | 20.0% | 3.7% |
| Close to swimming | — | 4.3% | — | 1.2% |
| Closest to other recreation activities | 3.7% | 12.8% | 60.0% | 8.6% |
| Closest to where I want to go | — | — | — | 1.2% |
| Convenient | 11.1% | 4.3% | — | 6.2% |
| Keep boat here | — | — | — | 1.2% |
| Not crowded | — | — | — | — |
| Only one | — | 2.1% | — | 1.2% |
| Only one with appropriate facilities | — | 4.3% | — | 1.2% |
| Preferred one | 7.4% | — | — | — |
| Previous enjoyable experience | — | 4.3% | — | — |
| Scenery | — | 4.3% | — | 1.2% |
| To complete survey | 33.3% | 2.1% | — | — |
| To fish | 7.4% | 8.5% | — | 1.2% |
| To launch boat/take boat out of water | 3.7% | 8.5% | — | 6.2% |
| Water levels | 7.4% | 4.3% | — | 1.2% |
| Other | 11.1% | 12.8% | — | 14.8% |
| Multiple | 3.7% | — | — | 1.2% |
| Didn't use ramp today | — | — | — | 3.7% |
| Do not have boat | — | — | — | 1.2% |

**Table 58.** Why did you come to this boat ramp facility today – Nakusp Boat Launch & Bush Harbour?

| Response Categories | Nakusp Boat Launch | | Bush Harbour[†] |
|---|---|---|---|
| | Construction Period | | Construction Period |
| | Pre (n = 160) | Post (n = 60) | Post (n = 55) |
| Access to Renata | — | — | 1.8% |
| Best one | 0.6% | 1.7% | 3.6% |
| Close to beach | — | — | — |
| Close to camping | — | 1.7% | 1.8% |
| Close to home (local) | 13.1% | 23.3% | 1.8% |
| Close to swimming | — | 3.3% | 3.6% |
| Closest to other recreation activities | 26.3% | 21.7% | 7.3% |
| Closest to where I want to go | — | 1.7% | 3.6% |
| Convenient | 11.3% | 3.3% | 20.0% |
| Keep boat here | 5.6% | 8.3% | — |
| Not crowded | — | — | 1.8% |
| Only one | 3.1% | — | 1.8% |
| Only one with appropriate facilities | 2.5% | — | 5.5% |
| Preferred one | 1.3% | — | 1.8% |
| Previous enjoyable experience | 1.3% | — | — |
| Scenery | 3.8% | 5.0% | 1.8% |
| To complete survey | 0.6% | — | — |
| To fish | 6.9% | 6.7% | 7.3% |
| To launch boat/take boat out of water | 8.8% | 5.0% | 5.5% |
| Water levels | — | — | — |
| Other | 14.4% | 13.3% | 21.8% |
| Multiple | 0.6% | 3.3% | 9.1% |
| Didn't use ramp today | — | 1.7% | — |
| Do not have boat | — | — | — |

[†] No pre-construction data was collected at Bush Harbour.

**Table 59.** Why did you come to this boat ramp facility today – Valemount Marina?

| Response Categories | Valemount Marina | |
|---|---|---|
| | Construction Period | |
| | Pre (n = 57) | Post (n = 160) |
| Access to Renata | — | — |
| Best one | 3.5% | 1.3% |
| Close to beach | — | — |
| Close to camping | 7.0% | 5.6% |
| Close to home (local) | 3.5% | 6.3% |
| Close to swimming | 1.8% | — |
| Closest to other recreation activities | 14.0% | 5.6% |
| Closest to where I want to go | — | 1.3% |
| Convenient | — | 4.4% |
| Keep boat here | 3.5% | 1.9% |
| Not crowded | 3.5% | 0.6% |
| Only one | 14.0% | 7.5% |
| Only one with appropriate facilities | 1.8% | 5.6% |
| Preferred one | 1.8% | 2.5% |
| Previous enjoyable experience | 1.8% | 2.5% |
| Scenery | — | 5.0% |
| To complete survey | — | 0.6% |
| To fish | 29.8% | 13.8% |
| To launch boat/take boat out of water | 7.0% | 10.6% |
| Water levels | — | — |
| Other | 5.3% | 18.8% |
| Multiple | 1.8% | 5.6% |
| Didn't use ramp today | — | — |
| Do not have boat | — | 0.6% |

**Table 60.** What do you like most about the boat ramp facility that you visited today – Anderson Point & Edgewood Community Park?

| Response Categories | Anderson Point | | Edgewood Community Park | |
|---|---|---|---|---|
| | Construction Period | | Construction Period | |
| | Pre (n = 49) | Post (n = 32) | Pre (n = 114) | Post (n = 15) |
| Access | 12.2% | — | 5.3% | — |
| Amenities (toilets, garbage containers, etc.) | — | — | — | — |
| Boat tie ups | — | — | — | — |
| Clean/well maintained | — | 15.6% | 1.8% | — |
| Close to activities | 2.0% | — | — | — |
| Close to campsite | — | — | 0.9% | — |
| Close to home | 2.0% | — | 0.9% | 6.7% |
| Concrete ramp/dock | 2.0% | — | 8.8% | — |
| Convenient | 2.0% | 3.1% | 0.9% | 6.7% |
| Close to Renata | 4.1% | — | — | — |
| Cost (free) | — | — | — | — |
| Dock | — | 3.1% | — | — |
| Easy to use | 2.0% | — | 4.4% | — |
| Lots of space | — | — | — | 6.7% |
| No problems/General positive comment | 2.0% | 9.4% | 2.6% | 6.7% |
| Not crowded | 6.1% | 18.8% | 4.4% | 6.7% |
| Only one | 2.0% | — | — | — |
| Paved parking lot | — | — | 0.9% | — |
| Upgrade/well constructed | — | 34.4% | 0.9% | 40.0% |
| Water levels | 4.1% | — | 1.8% | — |
| Wide ramp | — | — | — | — |
| Didn't use today | — | — | 3.5% | — |
| Do not like/negative comment | 34.7% | 6.3% | 28.1% | — |
| Other | 24.5% | 3.1% | 30.7% | 13.3% |
| Multiple | — | 6.3% | 4.4% | 13.3% |

**Table 61.** What do you like most about the boat ramp facility that you visited today – Fauquier Community Park Boat Launch & McDonald Creek Provincial Park?

| Response Categories | Fauquier Community Park Boat Launch | | McDonald Creek Provincial Park | |
|---|---|---|---|---|
| | Construction Period | | Construction Period | |
| | Pre (n = 29) | Post (n = 44) | Pre (n = 4) | Post (n = 73) |
| Access | 3.4% | 2.3% | — | 6.8% |
| Amenities (toilets, garbage containers, etc.) | — | 4.5% | — | — |
| Boat tie ups | — | — | — | 1.4% |
| Clean/well maintained | 6.9% | 4.5% | — | 13.7% |
| Close to activities | — | — | — | — |
| Close to campsite | — | — | — | 2.7% |
| Close to home | — | — | — | — |
| Concrete ramp/dock | — | — | — | 2.7% |
| Convenient | 3.4% | 4.5% | 25.0% | 1.4% |
| Close to Renata | — | — | — | — |
| Cost (free) | — | — | — | — |
| Dock | — | 2.3% | — | 5.5% |
| Easy to use | 6.9% | 2.3% | — | 4.1% |
| Lots of space | — | — | — | 1.4% |
| No problems/General positive comment | 3.4% | 15.9% | — | 8.2% |
| Not crowded | 10.3% | 2.3% | 25.0% | 4.1% |
| Only one | — | — | — | — |
| Paved parking lot | 17.2% | — | — | — |
| Upgrade/well constructed | 3.4% | 20.5% | 25.0% | 19.2% |
| Water levels | — | 2.3% | — | — |
| Wide ramp | — | — | — | 1.4% |
| Didn't use today | — | — | — | 6.8% |
| Do not like/negative comment | 27.6% | 2.3% | — | — |
| Other | 13.8% | 25.0% | 25.0% | 4.1% |
| Multiple | 3.4% | 11.4% | — | 16.4% |

**Table 62.** What do you like most about the boat ramp facility that you visited today – Nakusp Boat Launch & Bush Harbour?

| Response Categories | Nakusp Boat Launch | | Bush Harbour[†] |
|---|---|---|---|
| | Construction Period | | Construction Period |
| | Pre (n = 136) | Post (n = 53) | Post (n = 53) |
| Access | 3.7% | 1.9% | 5.7% |
| Amenities (toilets, garbage containers, etc.) | 3.7% | — | 1.9% |
| Boat tie ups | — | — | — |
| Clean/well maintained | 11.8% | 5.7% | 15.1% |
| Close to activities | 1.5% | — | 1.9% |
| Close to campsite | — | — | — |
| Close to home | 4.4% | 1.9% | — |
| Concrete ramp/dock | — | 1.9% | 3.8% |
| Convenient | 5.9% | — | — |
| Close to Renata | — | — | — |
| Cost (free) | — | — | 1.9% |
| Dock | 0.7% | 1.9% | 3.8% |
| Easy to use | 3.7% | 1.9% | 3.8% |
| Lots of space | — | — | 1.9% |
| No problems/General positive comment | 10.3% | 3.8% | 11.3% |
| Not crowded | 14.0% | 1.9% | — |
| Only one | — | — | — |
| Paved parking lot | 1.5% | 1.9% | — |
| Upgrade/well constructed | 2.2% | 24.5% | 18.9% |
| Water levels | — | 3.8% | 1.9% |
| Wide ramp | 1.5% | 17.0% | — |
| Didn't use today | 2.2% | 3.8% | — |
| Do not like/negative comment | 5.1% | 7.5% | 3.8% |
| Other | 25.7% | 13.2% | 15.1% |
| Multiple | 2.2% | 7.5% | 9.4% |

[†] No pre-construction data was collected at Bush Harbour.

**Table 63.** What do you like most about the boat ramp facility that you visited today – Valemount Marina?

| Response Categories | Valemount Marina | |
|---|---|---|
| | Construction Period | |
| | Pre (n = 48) | Post (n = 138) |
| Access | 6.3% | 6.5% |
| Amenities (toilets, garbage containers, etc.) | 6.3% | 0.7% |
| Boat tie ups | 2.1% | — |
| Clean/well maintained | 6.3% | 9.4% |
| Close to activities | 2.1% | 1.4% |
| Close to campsite | — | — |
| Close to home | 2.1% | 1.4% |
| Concrete ramp/dock | 29.2% | 10.1% |
| Convenient | 4.2% | — |
| Close to Renata | — | — |
| Cost (free) | — | — |
| Dock | — | 0.7% |
| Easy to use | — | 4.3% |
| Lots of space | 4.2% | 2.2% |
| No problems/General positive comment | 8.3% | 13.7% |
| Not crowded | 2.1% | 2.9% |
| Only one | — | 1.4% |
| Paved parking lot | — | — |
| Upgrade/well constructed | 2.1% | 12.9% |
| Water levels | 8.3% | 3.6% |
| Wide ramp | — | 0.7% |
| Didn't use today | — | 1.4% |
| Do not like/negative comment | 4.2% | 1.4% |
| Other | 12.5% | 15.1% |
| Multiple | — | 7.2% |

**Table 64.** What do you like least about the boat ramp facility that you visited today – Anderson Point & Edgewood Community Park?

| Response Categories | Anderson Point | | Edgewood Community Park | |
|---|---|---|---|---|
| | Construction Period | | Construction Period | |
| | Pre (n = 51) | Post (n = 32) | Pre (n = 100) | Post (n = 29) |
| Debris | — | 3.1% | 1.0% | — |
| Docks too far from shore | — | — | 1.0% | — |
| Hard to get to | 2.0% | — | — | — |
| Hard to use | 3.9% | — | — | — |
| Improvements needed for all components | 9.8% | — | 10.0% | 3.4% |
| More parking needed | 5.9% | 12.5% | — | — |
| Needs barrier-free access | — | — | 2.0% | — |
| Needs picnic area | — | — | — | — |
| No boat launch | 9.8% | 3.1% | 3.0% | — |
| No boat tie-ups | 2.0% | — | — | — |
| No wharf | — | — | 1.0% | — |
| Not enough room to turn around/load/unload | 11.8% | — | — | — |
| Not safe | 2.0% | — | 2.0% | 3.4% |
| Not well maintained/not clean | 2.0% | 3.1% | 7.0% | — |
| Problems with breakwater | — | — | 6.0% | — |
| Problems with dock/dock ramp | 13.7% | 6.3% | 21.0% | — |
| Problems with parking lot | — | — | — | — |
| Ramp angle to steep | — | — | 1.0% | 3.4% |
| Ramp not long enough | 3.9% | — | 3.0% | — |
| Rough launch | 2.0% | — | — | — |
| Rough road | 2.0% | 3.1% | — | — |
| Too crowded | 7.8% | 3.1% | — | — |
| Too high | — | 3.1% | — | — |
| Too narrow/not wide enough | — | — | — | — |
| Too sandy/muddy | — | — | — | — |
| Washrooms needed | 3.9% | — | 2.0% | — |
| Water levels | 2.0% | 3.1% | 4.0% | — |
| Did not use today | — | — | 1.0% | — |
| No problems/positive comment | 2.0% | 53.1% | 14.0% | 69.0% |
| Other | 5.9% | 6.3% | 17.0% | 17.2% |
| Multiple | 7.8% | — | 4.0% | 3.4% |

**Table 65.** What do you like least about the boat ramp facility that you visited today – Fauquier Community Park Boat Launch & McDonald Creek Provincial Park?

| Response Categories | Fauquier Park Boat Launch | | McDonald Creek Park | |
|---|---|---|---|---|
| | Construction Period | | Construction Period | |
| | Pre (n = 28) | Post (n = 35) | Pre (n = 3) | Post (n = 80) |
| Debris | 3.6% | — | — | 1.3% |
| Docks too far from shore | — | — | — | — |
| Hard to get to | — | — | — | — |
| Hard to use | — | — | — | — |
| Improvements needed for all components | 14.3% | — | — | — |
| More parking needed | — | — | — | 1.3% |
| Needs barrier-free access | — | — | — | — |
| Needs picnic area | — | 2.9% | — | — |
| No boat launch | — | — | — | — |
| No boat tie-ups | — | — | — | — |
| No wharf | — | — | — | — |
| Not enough room to turn around/load/unload | — | — | — | — |
| Not safe | — | — | — | — |
| Not well maintained/not clean | 3.6% | — | — | — |
| Problems with breakwater | — | 8.6% | — | — |
| Problems with dock/dock ramp | 39.3% | — | 33.3% | — |
| Problems with parking lot | 3.6% | — | — | 1.3% |
| Ramp angle to steep | — | 2.9% | — | — |
| Ramp not long enough | 7.1% | — | — | — |
| Rough launch | — | — | — | — |
| Rough road | — | — | — | — |
| Too crowded | 3.6% | — | — | 1.3% |
| Too high | — | — | — | — |
| Too narrow/not wide enough | — | 2.9% | — | 2.5% |
| Too sandy/muddy | 3.6% | 8.6% | — | — |
| Washrooms needed | — | — | — | — |
| Water levels | 17.9% | 2.9% | — | — |
| Did not use today | — | — | — | 8.8% |
| No problems/positive comment | 3.6% | 62.9% | 33.3% | 82.5% |
| Other | — | 8.6% | 33.3% | 1.3% |
| Multiple | — | — | — | — |

**Table 66.** What do you like least about the boat ramp facility that you visited today – Nakusp Boat Launch & Bush Harbour?

| Response Categories | Nakusp Boat Launch | | Bush Harbour† |
|---|---|---|---|
| | Construction Period | | Construction Period |
| | Pre (n = 99) | Post (n = 75) | Post (n = 44) |
| Debris | 2.0% | 1.3% | 13.6% |
| Docks too far from shore | — | 1.3% | 2.3% |
| Hard to get to | — | — | 4.5% |
| Hard to use | — | — | — |
| Improvements needed for all components | 7.1% | 1.3% | — |
| More parking needed | 2.0% | 4.0% | 2.3% |
| Needs barrier-free access | — | — | — |
| Needs picnic area | — | — | 2.3% |
| No boat launch | — | — | — |
| No boat tie-ups | — | — | 2.3% |
| No wharf | — | — | — |
| Not enough room to turn around/load/unload | 1.0% | — | — |
| Not safe | 2.0% | — | 2.3% |
| Not well maintained/not clean | 15.2% | — | — |
| Problems with breakwater | 1.0% | 2.7% | — |
| Problems with dock/dock ramp | 10.1% | 1.3% | 13.6% |
| Problems with parking lot | — | — | — |
| Ramp angle to steep | 3.0% | 2.7% | 4.5% |
| Ramp not long enough | — | 2.7% | — |
| Rough launch | 2.0% | 1.3% | — |
| Rough road | — | — | — |
| Too crowded | 1.0% | 1.3% | 2.3% |
| Too high | — | — | — |
| Too narrow/not wide enough | 2.0% | — | — |
| Too sandy/muddy | — | — | — |
| Washrooms needed | — | — | — |
| Water levels | 5.1% | 4.0% | 2.3% |
| Did not use today | 2.0% | — | — |
| No problems/positive comment | 17.2% | 52.0% | 31.8% |

**Table 66 (cont'd).** What do you like least about the boat ramp facility that you visited today – Nakusp Boat Launch & Bush Harbour?

| Response Categories | Response Categories | Response Categories |
|---|---|---|

| | Construction Period | | Construction Period |
|---|---|---|---|
| | Pre (n = 99) | Post (n = 75) | Pre (n = 99) |
| Other | 20.2% | 16.0% | 13.6% |
| Multiple | 7.1% | 8.0% | 2.3% |

† No pre-construction data was collected at Bush Harbour.

**Table 67.** What do you like least about the boat ramp facility that you visited today – Valemount Marina?

| Response Categories | Valemount Marina | |
|---|---|---|
| | Construction Period | |
| | Pre (n = 39) | Post (n = 143) |
| Debris | 5.1% | 23.8% |
| Docks too far from shore | 2.6% | — |
| Hard to get to | — | 0.7% |
| Hard to use | — | — |
| Improvements needed for all components | — | 0.7% |
| More parking needed | 2.6% | 0.7% |
| Needs barrier-free access | 5.1% | — |
| Needs picnic area | — | — |
| No boat launch | — | — |
| No boat tie-ups | — | — |
| No wharf | — | — |
| Not enough room to turn around/load/unload | 5.1% | — |
| Not safe* | — | — |
| Not well maintained/not clean | 5.1% | 0.7% |
| Problems with breakwater | 2.6% | 2.1% |
| Problems with dock/dock ramp | 5.1% | 12.6% |
| Problems with parking lot | 2.6% | — |
| Ramp angle to steep | — | — |
| Ramp not long enough | 7.7% | — |
| Rough launch | — | — |
| Rough road | — | 0.7% |
| Too crowded | 12.8% | 0.7% |
| Too high | — | — |
| Too narrow/not wide enough | 12.8% | 1.4% |
| Too sandy/muddy | 2.6% | — |
| Washrooms needed | 2.6% | 0.7% |
| Water levels | 5.1% | 4.2% |
| Did not use today | — | 2.8% |
| No problems/positive comment | 15.4% | 38.5% |
| Other | 5.1% | 4.9% |
| Multiple | — | 4.9% |

**Table 68.** How did you hear about recreation opportunities and activities near and on the Arrow Lakes/Kinbasket Lake?

| Information Source | Pre-Construction (n = 566) | | Post-Construction (n = 720) | |
|---|---|---|---|---|
| | Freq. | % | Freq. | % |
| Tourism information booth | 20.0 | 3.5% | 32.0 | 4.4% |
| Family | 242.0 | 42.8% | 297.0 | 41.3% |
| BC Hydro web site | 3.0 | 0.5% | 5.0 | 0.7% |
| Tourism information brochures | 26.0 | 4.6% | 44.0 | 6.1% |
| Friends | 283.0 | 50.0% | 375.0 | 52.1% |
| BC Hydro facility (e.g., Revelstoke Dam) | 0.0 | 0.0% | 5.0 | 0.7% |
| Tourism operators | 5.0 | 0.9% | 10.0 | 1.4% |
| BC Parks | 33.0 | 5.8% | 94.0 | 13.1% |
| BC Hydro bill | 3.0 | 0.5% | 1.0 | 0.1% |
| Private marinas | 10.0 | 1.8% | 9.0 | 1.3% |
| BC Forest Service | 22.0 | 3.9% | 26.0 | 3.6% |
| Other | 171.0 | 30.2% | 144.0 | 20.0% |

**Question 7: Respondents' Demographic Characteristics.**

**Table 69.** Respondent age.

| Construction Period | n | Min | Max | Mean[†] | 95% CI | SD |
|---|---|---|---|---|---|---|
| Pre | 572 | 13 | 120 | 53.9 | ± 1.3 | 16.397 |
| Post | 701 | 14 | 120 | 50.3 | ± 1.1 | 15.474 |

[†] The mean age of pre-construction respondents was significantly greater than that of post-construction respondents ($t(1270) = 4.046$, $p < .001$).

**Table 70.** Respondent's gender[†].

| Pre-construction | Post-construction |
|---|---|

| (n = 563) | | (n = 694) | |
|---|---|---|---|
| **Male** | **Female** | **Male** | **Female** |
| 66.3% | 33.7% | 62.0% | 38.0% |

† There was no significant difference in the proportion of men and women in the pre- and post-construction periods.

**Table 71.** How long have you lived in your community?

| Construction Period | n | Min | Max | Mean† | 95% CI | SD |
|---|---|---|---|---|---|---|
| Pre | 557 | 0 | 73 | 23.9 | ± 1.4 | 17.2754 |
| Post | 676 | 0 | 79 | 24.0 | ± 1.3 | 16.763 |

† There was no significant difference in the mean length of residence in community between pre-construction respondents and post-construction respondents.

**Table 72.** Membership in outdoor recreation clubs or organizations†.

| Construction Period | n | % |
|---|---|---|
| Pre | 587 | 24.7% |
| Post | 725 | 24.0% |

† There was no significant difference in the proportion of pre-construction respondents and post-construction respondents' club membership.

**Table 73.** Respondents' communities of residence: British Columbia within 80km of Arrow Lakes (*i.e.*, local area residents).

| Community | Pre-construction (n = 562) | | Post-construction (n = 679) | |
|---|---|---|---|---|
| | Freq. | % | Freq. | % |
| **AREA RESIDENTS** | **365** | **64.9%** | **276** | **40.6%** |
| Arrow Park | 2 | 0.4% | 2 | 0.3% |
| Burton | 5 | 0.9% | 0 | 0.0% |
| Caribou Point | 0 | 0.0% | 1 | 0.1% |
| Castlegar | 17 | 3.0% | 17 | 2.5% |
| Deer Park | 2 | 0.4% | 0 | 0.0% |
| East Arrow Park | 1 | 0.2% | 0 | 0.0% |
| Edgewood | 121 | 21.5% | 15 | 2.2% |
| Fauquier | 28 | 5.0% | 31 | 4.6% |
| Galena Bay | 1 | 0.2% | 0 | 0.0% |
| Genelle | 4 | 0.7% | 1 | 0.1% |
| Hills | 0 | 0.0% | 1 | 0.1% |
| Inonoakim Valley | 1 | 0.2% | 0 | 0.0% |
| Inonoaklin | 2 | 0.4% | 0 | 0.0% |
| Krestova | 0 | 0.0% | 1 | 0.1% |
| Montrose | 0 | 0.0% | 2 | 0.3% |
| Nakusp | 101 | 18.0% | 60 | 8.8% |
| Nelson | 7 | 1.2% | 2 | 0.3% |
| New Denver | 1 | 0.2% | 1 | 0.1% |
| Ootachenia | 2 | 0.4% | 0 | 0.0% |
| Renata | 16 | 2.8% | 4 | 0.6% |
| Revelstoke | 0 | 0.0% | 5 | 0.7% |
| Robson | 11 | 2.0% | 6 | 0.9% |
| Rossland | 2 | 0.4% | 5 | 0.7% |
| Salmo | 1 | 0.2% | 2 | 0.3% |
| Slocan Park | 1 | 0.2% | 0 | 0.0% |
| Slocan Valley | 1 | 0.2% | 0 | 0.0% |
| Trail | 2 | 0.4% | 6 | 0.9% |
| Valemount | 34 | 6.0% | 114 | 16.8% |
| Warfield | 1 | 0.2% | 0 | 0.0% |
| Ymir | 1 | 0.2% | 0 | 0.0% |

**Table 74.** Respondents' communities of residence: British Columbia greater than 80km of Arrow Lakes (*i.e.*, tourists).

| Community | Pre-construction (n = 562) | | Post-construction (n = 679) | |
|---|---|---|---|---|
| | Freq. | % | Freq. | % |
| **BC RESIDENTS** | **126** | **22.4%** | **224** | **33.0%** |
| 100 Mile House | 1 | 0.2% | 0 | 0.0% |
| 108 Mile Ranch | 0 | 0.0% | 1 | 0.1% |
| Abbotsford | 2 | 0.4% | 2 | 0.3% |
| Angel Falls | 1 | 0.2% | 0 | 0.0% |
| Armstrong | 6 | 1.1% | 2 | 0.3% |
| Blind Bay | 0 | 0.0% | 1 | 0.1% |
| Burnaby | 0 | 0.0% | 2 | 0.3% |
| Campbell River | 1 | 0.2% | 1 | 0.1% |
| Chase | 0 | 0.0% | 1 | 0.1% |
| Cherryville | 5 | 0.9% | 1 | 0.1% |
| Chilliwack | 1 | 0.2% | 4 | 0.6% |
| Cloverdale | 1 | 0.2% | 0 | 0.0% |
| Coast | 1 | 0.2% | 0 | 0.0% |
| Coldstream | 0 | 0.0% | 2 | 0.3% |
| Cranbrook | 4 | 0.7% | 3 | 0.4% |
| Crescent Bay | 1 | 0.2% | 0 | 0.0% |
| Creston | 0 | 0.0% | 1 | 0.1% |
| Dawson Creek | 2 | 0.4% | 0 | 0.0% |
| Donald | 0 | 0.0% | 2 | 0.3% |
| Enderby | 1 | 0.2% | 3 | 0.4% |
| Fort St. John | 0 | 0.0% | 1 | 0.1% |
| Fruitvale | 2 | 0.4% | 5 | 0.7% |
| Golden | 0 | 0.0% | 36 | 5.3% |
| Grand Forks | 2 | 0.4% | 0 | 0.0% |
| Hope | 0 | 0.0% | 2 | 0.3% |
| Invermere | 1 | 0.2% | 3 | 0.4% |
| Kamloops | 5 | 0.9% | 20 | 2.9% |
| Kaslo | 0 | 0.0% | 1 | 0.1% |
| Kelowna | 21 | 3.7% | 41 | 6.0% |
| Kimberly | 1 | 0.2% | 0 | 0.0% |
| Lac La Hache | 0 | 0.0% | 2 | 0.3% |

**Table 74 (cont'd).** Respondents' communities of residence: British Columbia greater than 80km of Arrow Lakes (*i.e.*, tourists).

| Community | Pre-construction (n = 562) | | Post-construction (n = 679) | |
|---|---|---|---|---|
| | Freq. | % | Freq. | % |
| Langley | 4 | 0.7% | 1 | 0.1% |
| Logan Lake | 0 | 0.0% | 2 | 0.3% |
| Lower Mainland | 0 | 0.0% | 2 | 0.3% |
| Lumby | 5 | 0.9% | 2 | 0.3% |
| Maple Ridge | 1 | 0.2% | 0 | 0.0% |
| Mcbride | 0 | 0.0% | 3 | 0.4% |
| Mc Leese Lake | 1 | 0.2% | 0 | 0.0% |
| Mission | 2 | 0.4% | 1 | 0.1% |
| Nanaimo | 0 | 0.0% | 1 | 0.1% |
| New Hazelton | 0 | 0.0% | 1 | 0.1% |
| New Westminster | 1 | 0.2% | 0 | 0.0% |
| North Vancouver | 1 | 0.2% | 0 | 0.0% |
| North Vancouver | 2 | 0.4% | 0 | 0.0% |
| Okanagan | 6 | 1.1% | 10 | 1.5% |
| Oliver | 0 | 0.0% | 1 | 0.1% |
| Oyama | 1 | 0.2% | 1 | 0.1% |
| Peachland | 0 | 0.0% | 3 | 0.4% |
| Penticton | 2 | 0.4% | 5 | 0.7% |
| Pine Lake | 0 | 0.0% | 1 | 0.1% |
| Pitt Meadows | 0 | 0.0% | 1 | 0.1% |
| Pouce Coupe | 1 | 0.2% | 0 | 0.0% |
| Prince George | 2 | 0.4% | 4 | 0.6% |
| Princeton | 1 | 0.2% | 0 | 0.0% |
| Pritchard | 0 | 0.0% | 1 | 0.1% |
| Quesnel | 0 | 0.0% | 1 | 0.1% |
| Salmon Arm | 3 | 0.5% | 6 | 0.9% |
| Sicamous | 1 | 0.2% | 2 | 0.3% |
| Sparwood | 1 | 0.2% | 0 | 0.0% |
| Summerland | 1 | 0.2% | 1 | 0.1% |
| Surrey | 2 | 0.4% | 5 | 0.7% |
| Tata Creek | 0 | 0.0% | 2 | 0.3% |
| Tsawwassen | 0 | 0.0% | 1 | 0.1% |

**Table 74 (cont'd).** Respondents' communities of residence: British Columbia greater than 80km of Arrow Lakes (*i.e.*, tourists).

| Community | Pre-construction (n = 562) | | Post-construction (n = 679) | |
|---|---|---|---|---|
| | Freq. | % | Freq. | % |
| Vancouver | 3 | 0.5% | 6 | 0.9% |
| Vernon | 23 | 4.1% | 22 | 3.2% |
| Victoria | 3 | 0.5% | 1 | 0.1% |

**Table 75.** Respondents' communities of residence: Other Canadian Provinces (*i.e.*, tourists).

| Community | Pre-construction (n = 562) | | Post-construction (n = 679) | |
|---|---|---|---|---|
| | Freq. | % | Freq. | % |
| ***CANADA*** | ***63*** | ***11.2%*** | ***164*** | ***24.2%*** |
| Canada | 0 | 0.0% | 2 | 0.3% |
| *ALBERTA* | *55* | *9.8%* | *156* | *23.0%* |
| Alberta | 7 | 1.2% | 10 | 1.5% |
| Airdrie | 2 | 0.4% | 2 | 0.3% |
| Banff | 1 | 0.2% | 1 | 0.1% |
| Blue Ridge | 0 | 0.0% | 1 | 0.1% |
| Calgary | 14 | 2.5% | 42 | 6.2% |
| Camore | 3 | 0.5% | 1 | 0.1% |
| Camrose | 0 | 0.0% | 1 | 0.1% |
| Carstairs | 1 | 0.2% | 0 | 0.0% |
| Cochrane | 1 | 0.2% | 3 | 0.4% |
| Cremona | 0 | 0.0% | 1 | 0.1% |
| Crossfield | 0 | 0.0% | 1 | 0.1% |
| Donnelly's | 1 | 0.2% | 0 | 0.0% |
| Drayton Valley | 0 | 0.0% | 1 | 0.1% |
| Edmonton | 6 | 1.1% | 28 | 4.1% |
| Edson | 0 | 0.0% | 2 | 0.3% |
| Elk Point | 0 | 0.0% | 1 | 0.1% |
| Evansburg | 0 | 0.0% | 1 | 0.1% |
| Fort Macleod | 1 | 0.2% | 0 | 0.0% |
| Fort Sask | 1 | 0.2% | 3 | 0.4% |
| Fox Creek | 1 | 0.2% | 0 | 0.0% |
| Ft. McMurray | 1 | 0.2% | 1 | 0.1% |
| Grand Cache | 0 | 0.0% | 2 | 0.3% |
| Grande Prairie | 0 | 0.0% | 4 | 0.6% |
| Heisler | 0 | 0.0% | 1 | 0.1% |

**Table 75 (cont'd).** Respondents' communities of residence: Other Canadian Provinces (*i.e.*, tourists).

| Community | Pre-construction (n = 562) | | Post-construction (n = 679) | |
|---|---|---|---|---|
| | Freq. | % | Freq. | % |
| High Level | 0 | 0.0% | 2 | 0.3% |
| Hinton | 5 | 0.9% | 14 | 2.1% |
| Innisfail | 1 | 0.2% | 0 | 0.0% |
| Legal | 0 | 0.0% | 1 | 0.1% |
| Lethbridge | 0 | 0.0% | 3 | 0.4% |
| Linden | 1 | 0.2% | 0 | 0.0% |
| Lloydminster | 0 | 0.0% | 2 | 0.3% |
| Medicine Hat | 0 | 0.0% | 2 | 0.3% |
| Olds | 0 | 0.0% | 5 | 0.7% |
| Onoway | 0 | 0.0% | 2 | 0.3% |
| Red Deer | 1 | 0.2% | 4 | 0.6% |
| Rimbey | 1 | 0.2% | 0 | 0.0% |
| Sedgewick | 0 | 0.0% | 1 | 0.1% |
| Sherwood Park | 2 | 0.4% | 2 | 0.3% |
| Springbank | 0 | 0.0% | 1 | 0.1% |
| Spruce View | 1 | 0.2% | 0 | 0.0% |
| Standard | 0 | 0.0% | 1 | 0.1% |
| Stettler | 0 | 0.0% | 1 | 0.1% |
| Stony Plain | 1 | 0.2% | 1 | 0.1% |
| Sundre | 2 | 0.4% | 1 | 0.1% |
| Turner Valley | 0 | 0.0% | 1 | 0.1% |
| Vegreville | 0 | 0.0% | 2 | 0.3% |
| Warner | 0 | 0.0% | 1 | 0.1% |
| Wetaskiwin | 0 | 0.0% | 1 | 0.1% |
| Xfield | 0 | 0.0% | 1 | 0.1% |
| *SASKATCHEWAN* | *1* | *0.2%* | *1* | *0.1%* |
| Regina | 1 | 0.2% | 1 | 0.1% |
| *MANITOBA* | *0* | *0.0%* | *1* | *0.1%* |
| Manitoba | 0 | 0.0% | 1 | 0.1% |
| *ONTARIO* | *5* | *0.9%* | *3* | *0.4%* |
| Ontario | 3 | 0.5% | 1 | 0.1% |
| Markham | 0 | 0.0% | 1 | 0.1% |

**Table 75 (cont'd).** Respondents' communities of residence: Other Canadian Provinces (*i.e.*, tourists).

| Community | Community | | Community | |
|---|---|---|---|---|
| Ottawa | 1 | 0.2% | 0 | 0.0% |
| Port Colborne | 1 | 0.2% | 0 | 0.0% |
| Waubaushemei | 0 | 0.0% | 1 | 0.1% |
| *NOVA SCOTIA* | *0* | *0.0%* | *1* | *0.1%* |
| Nova Scotia | 0 | 0.0% | 1 | 0.1% |
| *NEWFOUNDLAND* | *1* | *0.2%* | *0* | *0.0%* |
| St. John's | 1 | 0.2% | 0 | 0.0% |
| *YUKON* | *1* | *0.2%* | *0* | *0.0%* |
| Whitehorse | 1 | 0.2% | 0 | 0.0% |

**Table 76.** Respondents' communities of residence: International (*i.e.*, tourists).

| Community | Pre-construction (n = 562) | | Post-construction (n = 679) | |
|---|---|---|---|---|
| | Freq. | % | Freq. | % |
| **INTERNATIONAL** | **16** | **2.9%** | **30** | **4.4%** |
| *Germany* | *2* | *0.4%* | *2* | *0.3%* |
| Germany | 1 | 0.2% | 2 | 0.3% |
| Sulingen | 1 | 0.2% | 0 | 0.0% |
| *netherlands* | *0* | *0.0%* | *3* | *0.4%* |
| Netherlands | 0 | 0.0% | 3 | 0.4% |
| *Switzerland* | *2* | *0.4%* | *2* | *0.3%* |
| Switzerland | 1 | 0.2% | 2 | 0.3% |
| Spiez | 1 | 0.2% | 0 | 0.0% |
| *United Kingdom* | *1* | *0.2%* | *1* | *0.1%* |
| London | 1 | 0.2% | 1 | 0.1% |
| *United States* | *3* | *0.5%* | *7* | *1.0%* |
| Colorado | 0 | 0.0% | 2 | 0.3% |
| Utah | 1 | 0.2% | 0 | 0.0% |
| Kent | 1 | 0.2% | 0 | 0.0% |
| Vancouver | 0 | 0.0% | 2 | 0.3% |
| Seattle | 0 | 0.0% | 2 | 0.3% |
| Spokane | 1 | 0.2% | 1 | 0.1% |

**Table 77.** Do you have any additional comments about recreation on the water or onshore of the Arrow Lakes?

| ANDERSON POINT |
|---|
| **Pre-construction (n = 36)** |
| The survey mostly has to do with recreational use but a lot of people including us live across the lake 7/8 months of the year, and some full time. We need this launch so we have access to town for doctors, hospitals, and healthcare, to bring in living supplies and in case of emergencies. |
| A beautiful area, love it! But, hate inconvenience like no boat space, no parking, and water going up and down. |
| A bridge over Renata creek! Would be excellent! |
| Bigger boat launch and parking lot. |
| Build a boat ramp! |
| Constant water levels would be preferred. The higher the better. |
| Houseboats always dump their waste into the lake. We do not like this because some people drink the water. |
| I am annoyed when summer water levels are too low and one has to hike down with all your swimming/kayaking gear every day. Canadians should have a full pond before giving any away to the Americans. |
| I hope this lake does not get over developed. |
| I like that this lake is usually not busy and it's warmer than Kootenay lake. We enjoy boating activities and this is a great lake for it. More campgrounds please! Forestry campsites would be great (with docks for boats). |
| Keep it accessible. |
| Make water level more consistent. |
| Make water levels more consistent. |
| More access points to Arrow Lakes. |
| Need docks boat launch water levels need to be more consistently high. |
| Needs new road, docks. |
| Nice place to live. |
| Obviously — water level consistency during peak months would only be a positive factor for all recreation users. |
| Recreational activities enhance the area and can provide an economic boom for the area, which could promote the area to have a focus of fun and entertainment. |
| Renata is a very safe, clean area — off the main grid — peaceful. I would like to keep it that way |
| Residents need proper year round boat launch, but docking and parking at Anderson Point. Also proper camping facility other than Syringa Park. |
| Road to Anderson needs more plowing — boat ramp needs to be built. |
| The boat launch at Renata needs a lot of help! |

| **Table 77 (cont'd).** Do you have any additional comments about recreation on the water or onshore of the Arrow Lakes? |
|---|
| **ANDERSON POINT (cont'd)** |
| **Pre-construction (n = 36)** |
| The Kokanee limit should be 15. The locals think they own this area, not very polite |
| The water level is too high. No shore and land erosion |
| There should be a designated area for ATVs. This will keep them off the road. [2 people provided this comment.] |
| This is where we live so we need a better boat ramp; also there isn't one now. We find it very hard to leave the boat when we have to go to town. |
| To increase the limit on Kokanee from 5 to 15 at least. |
| To protect what areas are left in the Kootenays, tourism should not be promoted in the Arrow Lakes area. "In wilderness is the preservation of the world". |
| Use Anderson Point as access to home for emergency access, for supplies. Definitely need a ramp put in, all got promises and promises with no action. |
| Way of life: fishing, living are primary activities and important to our life styles on the lake. Please keep "high" water about 1m lower, our shoreline erodes at high water and all beaches are lost. |
| We like the isolation, non-commercial private, off the main grid. |
| We need consistent water level especially during peak season. A regulated wharf. Decent parking. Signs and policing of over night camping in residents park. No camping. No parking signs. |
| Will I be alive to see a dock and boat ramp at Anderson Point?!? |
| Would like to see a higher limit for Kokanee. |
| **Post-construction (n = 23)** |
| BC Parks have restricted too much of the access to the lake. Tulip creek and more. There was a public beach called drift wood bay that was used for a canal to the new powerhouse, but no public area returned. |
| Beautiful. |
| Clean up wood on lakeshore. |
| Dangerous single boom log tethered north of Gladstone Creek and islands north of that should have flags or buoys for people not knowing they exist. |
| Good job on the boat launch at Anderson Point, its awesome, keep up the good work. |
| Great ramp. |
| I'd like to see improvements to recreation areas and roadways. |
| If Deer Park doesn't want their proposed launch, Renata could sure use it. |
| Its a beautiful spot/area to come camp, fish and hang with friends and family. |
| Keep it that way. |
| Lake level does not matter, fluctuations in the level cause the problems with excessive driftwood, erosion, loss of access, stabilization of level would be a better option. |

| **Table 77 (cont'd).** Do you have any additional comments about recreation on the water or onshore of the Arrow Lakes? |
|---|
| **ANDERSON POINT (cont'd)** |
| **Post-construction (n = 23)** |
| More boat access rec sites would be nice and mooring buoys in deeper water. Not usable at this time. |
| Need a more usable dock at Renata |
| Please put sign up to have people park in lot and leave boat launch clear at Anderson Point. |
| Stairway at Renata from launch to parking lot. |
| Syringa needs more floats, larger breakwaters. |
| The Anderson Point boat ramp needs signs in parking lots, plus on ramp for parking. The bottom of the ramp can not be used in low water because it is to steep and big rock, need concrete further into water for winter use. |
| There could be a fuel station in Nakusp, that would help in tourism on the lake and boaters extend their stay on the water. Fuel in Nakusp is one of the most important things on my list as I travel there via boat frequently. |
| They need to brush cut more spots to get trailers in, more boat and quad access. |
| We would like the boat ramp done this year! The bay of Dog Creek has a lot of driftwood that needs to be cleared up. Need more parking places. |
| We would like to see the boat launch completed at Anderson Point ASAP, as promised. The questions above are not pertinent because there is no boat ramp/launch where we are (Anderson Point). |
| Widen Syringa ramp. |
| Yes, I did fish here but don't bother anymore. The limit was 25 per day then 18, 15, 10 now 5. I could limit out in 4 hours at 25 and get a few rainbows. Now you cant get 5. Salmon came up here before dams. Now we can't even stock Kokanee. |

**Table 78.** Do you have any additional comments about recreation on the water or onshore of the Arrow Lakes?

| EDGEWOOD COMMUNITY PARK |
|---|
| **Pre-construction (n = 78)** |
| A decent boat launch and breakwater would be nice! |
| A stabilized water level or at least not such drastic minus level. |
| A wharf would be really great, and fish ladders on eagle creek or dredging for spawning. |
| Areas set aside for ATVs, proper boat docks at Edgewood Fauquier Burton! Hydro rate compensation for water table activities for power generation for residents. |
| BC hydro needs to upgrade boat launch and perhaps establish small marina in Edgewood's natural bay. |
| Better water access would be better. Sometime have to go to ferry ramp to put in. |
| Boat ramp needs to be maintained and accessible all year round, including snow removal and sanding. |
| Boat ramp: wharf needs upgrade. |
| Born in Nakusp, raised in Edgewood. Keep big developers out and campgrounds small and simple. Preserve the peaceful and relatively unpopulated feeling. |
| Could use a boat dock and breakwater. |
| Don't commercialize it. |
| Don't wreck this paradise. |
| Eagle Creek needs attention for spawning fish. |
| Edgewood needs a dock and wind break [2 people provided this comment.] |
| Erosion is an issue from Eagle Creek. |
| Excited about new docks and lake access. |
| Extremely difficult for elderly folk to manage launching on the ridiculous condition of the ramp!! |
| Fix our boat ramp facility. Stabilize the lake level more. [2 people provided this comment.] |
| Fix the boat ramp to the specifications of your on judgment. Put the new boat ramp at Killarney (old log dump) across from Edgewood on south side across Eagle Creek. |
| Great place, never crowded. |
| Great place, try to keep water levels more stable. Build a bigger boat launch in the same location. |
| I don't recommend commercial development anywhere along the lakes, will greatly reduce many people's enjoyment of the area, keep it simple. Not for sale! Limit camp site usage to 10 consecutive days. |
| I like it the way it is. |
| I like it the way it is. Further "development" brings pollution unavoidably. I lived in Muskoka, Ontario and watched development ruin the land and waterways. Gas and diesel fuels should be stored as far away as possible. No fuel pumps should be allowed near the reservoir. Preserve the natural beauty of the place. |
| I love Edgewood. |
| I love it here. |

| **Table 78 (cont'd).** Do you have any additional comments about recreation on the water or onshore of the Arrow Lakes? |
|---|
| **EDGEWOOD COMMUNITY PARK (cont'd)** |
| **Pre-construction (n = 78)** |
| I love it! [2 people provided this comment.] |
| I trust BC Hydro will make the right decision to upgrade the Edgewood campground boat launch to be on par with those in such places as Burton and Fauquier. |
| Improve docking, swimming area for kids. [2 people provided this comment.] |
| Inconsistent water levels affect the warming of the lake for swimming. Water levels also affect nesting for birds. |
| It would be nice to see some shore stops along the lakes. Clean and safe. Signage about the history, wildlife *etc*. |
| Keep making it better for locals all year long. |
| Keep water level same up and down. |
| Least amount of level fluctuation is best. |
| Lets get a functional ramp please. |
| Looking forward for my first time visit. |
| Love it here. |
| Marina-docks much needed. Walk way along beach maintained, this is a beautiful pristine area. |
| More fish would be nice. |
| More water more access. |
| Need a year round boat launch. |
| Need better ramp. Docks. |
| Need new dock! |
| New dock is very important. |
| Nice and peaceful here. |
| Once you lose the recreation values its hard to regain. |
| Our rec area has gotten too small to handle our population plus tourists. We have no council or government or reg. District to cover big expenses, it leaves it for volunteers to apply for grant monies. |
| Please upgrade Edgewood boat launch to the standard of Fauquier and Burton ASAP, thank you. |
| Power generation with consideration of the folks trying to enjoy. [2 people provided this comment.] |
| Provide more forestry campsites that provide privacy. |
| Sandy areas for canoe/kayak launches with a gradual slope into the water. |
| Stabilize the water level a little more. |
| The anger, trauma, frustration originating with initial flooding is still an under current in this community, understandably, also creates a profound lack of trust with BC Hydro. |
| The Edgewood boat launch is unusable in its current condition and at some points dangerous. |

| **Table 78 (cont'd).** Do you have any additional comments about recreation on the water or onshore of the Arrow Lakes? |
|---|
| **EDGEWOOD COMMUNITY PARK (cont'd)** |
| **Pre-construction (n = 78)** |
| The facilities at the campground are not in as good a condition as they were back in the 80's and 90's. |
| They should rebuild the dock and add another one across from it. |
| Very beautiful — I'll be back. |
| Water levels on beach lower for hiking. |
| We are lucky. |
| We can hardly wait for a decent dock that is in the water year-round. |
| We have been enjoying our stay. |
| We love the Arrow Lakes (Edgewood campground) and will be back annually. |
| We need a dock at the boat launch. |
| We need a marina. |
| We need a new boat ramp. [2 people provided this comment.] |
| We need a new dock and breakwater! |
| We need a new ramp in Edgewood and better campgrounds. [2 people provided this comment.] |
| We need lights (beacons, washrooms, sani-dump for boats on the new dock and a marina). |
| We would love to see this area remain the same as it is now, thank you! |
| Well done. |
| Would like to see no sea-doos. Beaches everywhere — water not to high. |
| **Post-construction (n = 13)** |
| Ban the motorized noisy wave jumpers/jet ski boats from all areas of arrow lakes. Need more local fish management. |
| Beautiful. |
| Bury those cement blocks. |
| Getting better. |
| I have noticed no change in the use of the lake or anything else. |
| I like it. Its quiet. |
| Important to keep clean and habitant friendly concrete blocks, eyesore should not be seen. |
| It is a beautiful place to come as you can go all day and maybe see one other boat on the lake. We just love to see all the wildlife and scenery. |
| Keep up the great work. |
| Leave lake level so we can enjoy our many lovely beaches. |
| Smaller lakes like sugar lake and smaller should only allow electric motors or canoe kayak *etc.*, especially if used for drinking. |
| |

| **Table 78 (cont'd).** Do you have any additional comments about recreation on the water or onshore of the Arrow Lakes? |
|---|
| **EDGEWOOD COMMUNITY PARK (cont'd)** |
| **Post-construction (n = 13)** |
| The cement blocks on peninsula are very ugly, and would like to see them buried. Is the expense or native concerns? |
| The lake is clean and well looked after always enjoy our stay on Arrow Lakes. |

**Table 79.** Do you have any additional comments about recreation on the water or onshore of the Arrow Lakes?

| FAUQUIER COMMUNITY PARK BOAT LAUNCH |
|---|
| **Pre-construction (n = 12)** |
| All the boat ramps in all small towns on Arrow Lakes need attention right now. |
| Boating and swimming should be separated floats for swimming docks for boats. |
| Clean up the wood on the shores before raising water level. Floating wood causes boating problems. |
| Drop water fast for summer to get rid of debris. |
| Great for proper facilities — including all weather all season wharfs and breakwater. |
| If the equipment is here we will use it. |
| Less fluctuation of water levels a well maintained recreation site with ramp, docks, wharfs, picnic tables, garbage bins and an outhouse. |
| Really would like to see the level remain more constant. |
| There would be more people using the area if there was a proper boat launch to access instead of a sanded in ramp. |
| This boat ramp requires complete overhaul and when completed has to have a maintenance budget to insure ramp remains useable. |
| Water level to stay with 10ft to 15ft drop over the year. |
| Year round access and docks. |
| **Post-construction (n = 22)** |
| A steady shoreline would be better, more fish! |
| All is well. |
| Always enjoyable, never very crowded. |
| Beautiful ramp. |
| Complete lack of economic development due to a lack of services available to boaters from Castlegar to Revelstoke — no gas. |
| Dock needs to be extended to be used in winter months or keep the reservoir higher during the winters months. |
| Enjoy it as much today as when I first saw it, the reservoir is better managed today than it was then. |
| Good fishing. |
| Great lake. |
| Have concerns with high water levels. I believe bringing water up to 1446’ level will adversely affect (damage) the Fauquier golf course. |
| Love it! |
| Need more fish, more dock. |
| Please complete boat ramp as shown in plans presented. |
| Please keep water at a mid stable level during June, July, and August. |

| **Table 79 (cont'd).** Do you have any additional comments about recreation on the water or onshore of the Arrow Lakes? |
|---|
| **FAUQUIER COMMUNITY PARK BOAT LAUNCH (cont'd)** |
| **Post-construction (n = 22)** |
| Reopen hill creek facility. |
| Stabilize the lake. |
| The new boat ramp is great!! |
| The quality of fishing since the flooding of Arrow Lakes has continued to be negative. Impacted that the suckers and squaw fish will soon be leaving. |
| The recreational facilities are rapidly coming to an end, if the CBI does not change or come to an end, there will no longer be any lake, only at the whim of the USA. |
| Things are good now. |
| This lake could really use mooring buoys thru out its length for cruisers to over night on, we have about 100 in the Okanagan, and they're super valuable. |
| We love it!! |

**Table 80.** Do you have any additional comments about recreation on the water or onshore of the Arrow Lakes?

| MCDONALD CREEK PROVINCIAL PARK |
|---|
| **Pre-construction (n = 8)** |
| It is fantastic! |
| Limited motor traffic on water would be nice. |
| Nice area. Will come back for longer. |
| Save the lakes from the idiots regulate number of visitors. |
| This is a wonderful part of BC. It is like going back in time — it is so relaxing and enjoyable. Thanks for taking care of it. |
| We moved here from the Okanagan to find a smaller community and a lake with fewer people. |
| **Post-construction (n = 78)** |
| A beautiful place. |
| Absolutely beautiful scenery and the water level is the best I have seen it. When it is lower the submerged town sites are almost visible and one worries about safety clearance. |
| BC Parks should not have reserved campsites and wherever possible they should expand as the needs of the local community are not being met. The water levels of the lake should try and be more consistent level so there are no surprises for the visitors to the area. |
| Beautiful, very friendly attendants. |
| Beautiful! |
| Big trucks destroying nesting areas, garbage left by people. |
| Campsites are well kept, clean and private. Beautiful views and peaceful surroundings have us looking forward to returning here. |
| Clean up the excess debris on the beaches. |
| Coming here each year we have look at purchasing real estate here, we enjoy the area. Anything done has been an improvement. |
| Don't have the water come much higher than it is today (Aug 15/11). |
| Extend the campground. |
| Fishing is not as good as it once was. |
| Great lake. |
| Great lake and facilities. Only change I would suggest is 1-2 more provincial campsites. |
| Great, best part its not crowded. |
| Had to answer some questions, as it is our first time here. Lovely area, wish the lake level was lower so lake was accessible. Will come back next year and try another Provincial Park |
| Have camped here since a child and keep coming back, can't beat Nakusp. |
| I enjoy pristine areas that are not overly developed and crowded with people. |

**Table 80 (cont'd).** Do you have any additional comments about recreation on the water or onshore of the Arrow Lakes?

| MCDONALD CREEK PROVINCIAL PARK (cont'd) |
|---|
| **Post-construction (n = 78)** |
| I think monies from the treaty should be used to enhance the beautiful parks that are here and make even more, Tulip Creek is a prime example. Rather than taking advantage of a nice camp and installing outhouses and picnic table so that it could be a park asset, they ditched the road so now its boat access with no services. |
| I would like to see more campgrounds similar to McDonald Creek Park (beautiful place!) |
| I'm happy. |
| I'm not local and haven't frequented much but recreation possibilities have always seemed available here *i.e.*, fishing, swimming, and camping. I grew up windsurfing and have in the back of my mind thought about checking spots around here. |
| International jewel, preserve! Valuable as a recreational resource is unimaginable! |
| It is really beautiful here and if I should visit Canada again I would think about coming here again. |
| It is the beautiful surroundings, the very clean campsite (although it was full due to the weekend of Canada Day) so we are 110% happy. |
| It looks like a lot is being done to make it user friendly — the McDonald campsite is so lovely — we will come back to go fishing and kayaking. |
| It would be nice if more campsites could be available. |
| It's a beautiful well maintained park. The host people are helpful and friendly some play in sites would be great. Also more water outlets close to washrooms facilities. |
| It's beautiful, do not let industry destroy what we covet so dearly, our beautiful province we live in the greatest place on earth, BC. Keep CB beautiful. |
| Its lovely, its tranquil and love the peace and quiet… Will come here for many years to come. |
| Jet boats, seadoos and water-skiers (speedboats) are to close to the beach at times. |
| Just keep it all running as best you can, some are good years some are bad as far as water levels go, but I've never gone home disappointed. |
| Like to see lake levels more stable. |
| Little less water. |
| Love the area. |
| Lower camping costs for parks and more reasonable rates. |
| Lower $H_2O$ is better. Better informing of when $H_2O$ will be lower high and for how long. |
| Lower the levels!! |
| More mountain biking trails would be an attraction. Beach at McDonald has to many pointy objects sticking out of the sand in and out of the water. |
| More reservable campsites! Showers at McDonald Creek Provincial Park. |
| |

| **Table 80 (cont'd).** Do you have any additional comments about recreation on the water or onshore of the Arrow Lakes? |
|---|
| **MCDONALD CREEK PROVINCIAL PARK (cont'd)** |
| **Post-construction (n = 78)** |
| My chances of coming back would be increased if there were shower facilities. However I appreciate not having such facilities might help to keep visitor numbers more manageable. |
| Nakusp beach is so clean and we love the shady spot that we can bring the dogs, the volleyball net is a real hit with the kids. |
| Nakusp wharf and marina need another breakwater. |
| Need to make people bear aware, bear campsite policy to protect the bears. |
| Nice area. |
| Nice parks and facilities. |
| Nice to see funds spent to upgrade camping facilities in Arrow Lakes (McDonald Creek) would like to see Syringa campsite expanded also. |
| Not enough experience here (3 days) to comment. |
| Not well known yet, very happy here. Lots of room and it is beautiful. |
| Not yet. |
| Opportunities are endless, more boat launches needed: 1. Halfway river area; 2. North end of lake east side. |
| Perfect and enjoyable. |
| Please keep the McDonald Creek campsite (on the lake) primitive, possibly expand into Donnelley Beach |
| Removal of logs and washed up driftwood would make the shorelines more user friendly. |
| Thank you for being here. |
| The BC Parks are all closed too early and open too late. Bad in many ways. |
| The peace and quiet, lack of built up facilities, cleanliness — no litter, makes it a perfect spot. |
| The water seems clear and clean, the area is beautiful. We camp at a large variety of BC Parks — both on the island and off… on trips like this one we're on this summer we don't have specific destinations in mind so its a fluke that we found this park — it maybe years before we ever come back but not because we don't like it. |
| The water was much higher than normal, and there was a lot of debris and wood in the water. Much of the banks were/are collapsing and there are no beach areas. Our boat launch has to be cleared every day before we could use it. |
| This campground (McDonald Creek) is a bit pricey. $7.00 for 10 quartered logs for firewood. Always wet, not a fair price for a Provincial Park, especially after paying $31.50 for a night of camping. |
| This survey is based on frequent users, not 1 day passing through campers as we are! |
| Very good camping experience. |

| **Table 80 (cont'd).** Do you have any additional comments about recreation on the water or onshore of the Arrow Lakes? |
|---|
| **MCDONALD CREEK PROVINCIAL PARK (cont'd)** |
| **Post-construction (n = 78)** |
| Water level is too high. McDonald Creek campground is known for its beaches, there were none. It's also very difficult to get reservations at McDonald Creek campground. First time in three years that we were able to, why? There seems to be issues with reservation system. BC residents get first priority?? |
| Water levels too inconsistent, too much debris, too cold (warm it up) (joke). |
| We are camping at McDonald Creek, first time in this area and all is very good. |
| We believe that every effort should be made to preserve the opportunity to experience a remote and unspoiled camping experience. We feel strongly that the existing facility should not be expanded or further developed. |
| We continue to enjoy our visits here. It has become our favourite camping location (McDonald Creek). |
| We found 1999 accidently a quiet, peaceful place at McDonald Creek. We are very disappointed by the development into a noisy marina like spot. |
| We have always been very happy about McDonald campground in all aspects. |
| We keep coming back. |
| We look forward to our two weeks of vacation we get each year. This year we are sad that our short vacation time is not being spent as we hope all year to spend it. If the water level remains this high we will not spend the money or time to come here in the future |
| We love the peacefulness, quiet and relaxing atmosphere, and nice soft sand. Fish are great here. |
| We love this part of the Kootenays. Full of history, attractions, great food, beautiful scenery and low key. |
| We love to come here to watch the osprey and bald eagles soar and catch their food as well as explore the other side, which is uninhabited. We appreciate all the different conditions that exist here but especially the quiet. |
| We were planning to buy property on the lake but have reconsidered given the water levels that can happen and the debris that comes with it. |
| We would ride our horses if there were facilities available. Also a noise by-law (music-loud motors on boats, bikes *etc.*) would be good. |
| Would be nice to have more "dog friendly" beaches, as lots of people travel with dogs. |
| Wouldn't mind seeing the beach/shoreline not so full of driftwood and logs; thanks. |

**Table 81.** Do you have any additional comments about recreation on the water or onshore of the Arrow Lakes?

| NAKUSP BOAT LAUNCH |
|---|
| **Pre-construction (n = 83)** |
| 1. Huge fluctuation in water level is detrimental to the shore and wildlife. 2. Very high reservoir levels are eroding/eliminating beaches. 3. If reservoir is always kept high, the flood control is negated. |
| 1. Nice and quiet 2. Uncommercialized. |
| 1. We need more restocking of the Arrow Lakes. 2. An additional ramp north of Nakusp. |
| A great place to fish and lounge around. |
| A new launching ramp must include a float for loading unloading of vessels! |
| Beautiful area. |
| Beautiful spot |
| Boat launch — needs a wash station for boats. |
| Boat ramp in too be replaced. |
| Bring the water level down! |
| Consistent water level yearly! |
| Continue the good work. |
| Control tourism. Control jet skis. |
| Don't over commercialize like Shuswap or Okanagan- keep it pristine! |
| Driftwood. |
| Enjoy the beaches sandy. |
| Fish enhancement projects are needed. |
| Fish needs to improve. |
| Fishing is very poor and declining. |
| Fishing — very poor. Fish hatchery closed. No real evidence of fish enhancement (only spin). |
| Full reservoir is not ideal for wildlife. Water right to the forest leaves very little shore. Ideally the levels should be stabilized at some "mid" level. This would leave shoreline and allow vegetation to establish. |
| Good facilities, trash, rest areas clean. Roads are good. |
| Great experience. |
| Great place – we'll be back! |
| Have a great day. |
| Hydro needs to help fund projects that affect this lake as a reservoir and help funds with improvements to the boat launch club. |
| I am concerned with the fish population in the lake as this is [illegible] activity of my family and friends. |
| I like it when the reservoir is at or near full capacity in the summer. |
| I think BC Hydro should live up to their commitments and obligations that they originally agreed to. |
| I would like Hydro to clean up the driftwood at Arrow Park. |

| **Table 81 (cont'd).** Do you have any additional comments about recreation on the water or onshore of the Arrow Lakes? |
|---|
| **NAKUSP BOAT LAUNCH** |
| **Pre-construction (n = 83)** |
| In some places there is littering. |
| It is always peaceful and quiet where we live on the lake; the water level is my only concern. It is an incredible place to live. |
| It would be wonderful if the water level could be kept constant — even though I know that is not possible! |
| Log salvage needs to be carried out. Logging companies to clean up wood they lose. Private salvors could sell back to company, as on coast, less debris. |
| Lots of logging driftwood at times (reservoir). |
| Love it here!! |
| Love it, thank you! |
| Maintain the high water level, without it the village of Nakusp would not be as attractive to tourists/ investment opportunities. |
| Management of the lake is run quite well. |
| More boat launches; more access to lake. |
| More education for tourists and locals. |
| Nakusp needs better boat launching facilities. |
| Nakusp needs to grow and this is the best place to start. |
| Need a bridge. |
| Need more fish in Arrow Lakes. |
| Needs sanitation pump out for boats and fuel. |
| Nice relaxing place to visit. |
| No boat gas on water, need facility!! |
| No — why are you doing this survey? |
| Parking could be easier to find. |
| Please fix ramp and improve fishing, thanks. |
| Please help the Nakusp launch club marina repair the breakwater *etc*. (at same time as re-doing the boat launch). |
| Please put a sani-dump station on this lake. |
| Please try to keep the water at a reasonable level! |
| Really relaxing. |
| Release water from Revelstoke dam to keep our water level constant. |
| Security non-existent! No fuel available why aren't there some marine buoys in the bay for visiting boaters? |

| **Table 81 (cont'd).** Do you have any additional comments about recreation on the water or onshore of the Arrow Lakes? |
|---|
| **NAKUSP BOAT LAUNCH (cont'd)** |
| **Pre-construction (n = 83)** |
| Shutting down the trout hatchery has reduced numbers of larger (4lbs+) Gerrards. Kootenay Lake once lagged behind us in this area but now have superior catches regarding larger Gerrerds… sad. |
| Since the Hill Creek hatchery has been closed I have seen a deterioration in the fishing. The next step was to cancel the creel census. It appears to me that there is little motivation to maintain the fish population. The hatchery should be re-opened and the creel census started again to monitor the fishery. |
| Since they shut down the hatchery at Hill Creek, the trout fishing has gone down hill bad. If they do not do something soon it will be too late. We have to have the hatchery back "now". |
| So far this small community seems friendly, clean and peaceful. |
| Surprised at the evidence of how low the water is at the moment. |
| Thanks for asking. |
| The boat launch area in Nakusp is great. The water levels would be better kept up to the max for June, July and August. Instead of going down in July. |
| The fishing here is not as good as it used to be in this area. The planted "dust control" is very disruptive to boat motors and campers. |
| The marina needs more spots for mooring. |
| The water level should be level. I no longer live in Edgewood. |
| This summer was great for water levels! |
| Too much driftwood. Keep water level constant! |
| Try to improve the fishing — should not have been allowed to take out the Hill Creek hatchery. |
| Very nice lake. |
| Very nice place to visit. |
| We are enjoying our stay at Arrow Lake. |
| We feel the boat launch facilities and the marina should be upgraded to attract more tourists. |
| We love it here because it is not as crazy as Okanagan lake where we came from. |
| We\'ll be back for years to come. |
| What a beautiful place. |
| When the lake is full there is a lot of debris floating and no shoreline. |
| When the water is low there is a lot of logging cables *etc*. |
| Why close down hatchery at Hills Creek? |
| Wonderful area to explore and scenery is excellent. Summer time ferry crossings can be frustrating due to wait times. |
| Would like to see more sailing clubs and opportunities. Possible charters. |
| Yes you need to fix our boat launch and realize that fish stocks are down and your high level is causing dangerous conditions on this lake with drift wood. |

| **Table 81 (cont'd).** Do you have any additional comments about recreation on the water or onshore of the Arrow Lakes? |
|---|
| **NAKUSP BOAT LAUNCH (cont'd)** |
| **Post-construction (n = 27)** |
| 1. Better access for swimming everywhere 2.better public access everywhere 3. Get rid of the private property signs |
| A more constant level would be my request. |
| Beautiful peaceful area to visit, hope it doesn't become too well known. |
| Consistent water level during summer. |
| Debris is to often hitting boat. |
| Dock should have a ladder. |
| I feel the recreation on the arrow lakes are very enjoyable, I would like to see things maintained for future generations. |
| I love the trees that are planted and well maintained, good job Nakusp. |
| I think its a shame that the new boat launch in Nakusp was not allowed to be finished before Hydro started raising the water level. If it is not usable at low water next year, some body should lose a job. |
| Keep up the appearances. |
| Lake level should be kept much higher, with less fluctuation. |
| Let the dams go and let the water run free, don't screw with any more water for power, money. |
| Lets have fun. |
| More camping sites, and more places to put your boat in. |
| Need year around boat access. |
| No fisheries enhancement. |
| Not enough places to boat launch, cables are dangerous. |
| The boat ramp is too short and will become unusable shortly, as a lakeshore owner like to see more stable water levels. |
| The new ramp at Nakusp is a joke, we got nothing since they flooded the lake. |
| This is the best place! |
| Water levels should be stabilized to allow for establishment of a riparian zone. When high water recedes, local beaches are littered with debris and floating logs. Friends at Selena Bay with a cabin on the beach are selling out because of mess left on their beach last year after extremely high water levels. |
| Water too high in early summer. |
| We found the new docks at Anderson Point and Fauquier very useful. |
| Would like more conservation and stable water levels. |
| Would really like the water level to stay consistent. |
| Yes sometimes I have noticed boaters spill fuel in the lake, but otherwise its a great place to visit, not as crowded as others, *i.e*., Kelowna. |

| **Table 81 (cont'd).** Do you have any additional comments about recreation on the water or onshore of the Arrow Lakes? |
|---|
| **NAKUSP BOAT LAUNCH (cont'd)** |
| **Post-construction (n = 27)** |
| Yes, keep this place secretive and relatively unknown. Development will spoil the serenity of this jewel. |

**Table 82.** Do you have any additional comments about recreation on the water or onshore of Kinbasket Lake?

| BUSH HARBOUR[†] |
|---|
| **Post-construction (n = 29)** |
| Leave the people with places on the causeway island alone — quit trying to move them out. Leave people alone that bring their trailer out for more than a few days. Ongoing debris cleanup is good. |
| BC Hydro will get sued over boat ramp and dock. |
| Beautiful spot for relaxing and enjoying the real outdoors in your own backyard, appreciate it and don't ruin it. |
| Clean the dirt wood up! Dead heads suck! |
| Debris! No dock! |
| Extreme amount of debris on the lake. |
| Floating debris is a serious danger to boating. |
| Handicapped camping should be close to the water with access to you fishing boat by your campsite by wheelchair, campsites should have more space in between them. |
| I like access to entire lake and would not like to see any measures to control water height that would prevent this access. |
| It would be beneficial to have a chart of the lake or boat access to campsites. |
| Keep cleaning the lake its slowly getting better, try to minimize water level fluctuations. |
| Keep it just the way it is!! |
| Keep the water level below high water! |
| Keep up the good work, keep our valleys and lakes clean. |
| Kinbasket kicks ass! |
| Lots of shore erosion, better management of water levels needed plus shore stabilization. |
| Love it! |
| More debris taken out, camping facilities. |
| More fish please. |
| More snowmobile trails. |
| Put a dam in at surprise rapids and hold 75 at Bush Harbor. |
| Swim area would make it better. |
| Teach people how to be respectful campers — both of others and the environment. |
| There is too much debris on the lake, it's a big hazard to all users. |
| This is a beautiful lake which is being destroyed by mismanagement (over pool) by BC Hydro, where is the corporate social responsibility of this company (CSR)? Money isn't everything folks! |
| Too many shit heads. |
| To tell you the honest truth, i know nothing about this area. I only came here to park and use the roads for ATVing and seeing my country on my ATV. You have great roads and spectacular scenery |

| **Table 82 (cont'd).** Do you have any additional comments about recreation on the water or onshore of Kinbasket Lake? |
|---|
| **BUSH HARBOUR† (cont'd)** |
| **Post-construction (n = 29)** |
| Very dissapointed about gathering debris and leaving it until water is so high it washes back in to lake???!!! Wasting tax and Hydro dollars. |
| Water levels fluctuate too extreme for boat use in Spring and using docks. |
| † No pre-construction data was collected at Bush Harbour. |

**Table 83.** Do you have any additional comments about recreation on the water or onshore of Kinbasket Lake?

| VALEMOUNT |
|---|
| **Pre-construction (n = 27)** |
| A weir would be nice to control the water level; the dust problem would be solved in Valemount. |
| Better roads, handicapped bathrooms, wood at campgrounds. |
| Clean debris. |
| Enjoy the view and scenery, and meeting new friends while walking the dog along the waterfront, and the water is so peaceful. |
| Firewood, extra washroom/wheelchair access, boat ramp… (Griffin camp site). |
| Fish are small, under fed. Pollies are protected too much, eating everything. |
| Hope levels could remain at higher levels in spring. |
| It would be nice to see a higher level of water earlier in the year. Very well run by the caretakers. |
| Its all good. |
| Longer ramp please. |
| Marina boat launch needs to be bigger. |
| Need better road conditions. |
| Need handicapped toilets, they need bigger boat ramp at Grffin campsite. |
| Need more water. |
| Need to develop campgrounds, more parking at marina, possibly develop lake lots for purchase. |
| Nice job cleaning debris out of the lake. Could use more frequent refills of toilet paper in the outhouses. |
| Road improvement. |
| Roads to be graded more properly should be leased or sold to town people. Lake should be developed where water level stys the same year round. |
| Roads to be graded more. Property should be leased to town people. Lake should be developed at Valemount end where water levels stay same year round. |
| Should have better road to bring RVs in on, because RVs are expensive clear debris on the lake for safety. |
| The dust is a big issue, and the water levels in spring. |
| The outhouse was constantly out of toilet paper. |
| The playground is a lifesaver for families with children, the parents don’t have to worry. |
| The years i have been coming here there is always debris, which is hard on boat, motor and props. Also safety of people in use on the water. |
| We really appreciate the road to be graded (we have had to drive in cars and would come more often). |
| Would like to have more fish stocked more water in the lake. |
| Would like to see more derby\'s as well as the lake stocked often. Campground at Horse Creek is very well maintained, clean bathrooms and grounds. Higher water levels. |
| **Post-construction (n = 95)** |
| A weir should be installed to maintain water level at this end, a boom should be put around boat ramp to keep it clear of debris as it was years ago |

| **Table 83 (cont'd).** Do you have any additional comments about recreation on the water or onshore of Kinbasket Lake? |
|---|
| **VALEMOUNT (cont'd)** |
| **Post-construction (n = 95)** |
| Amazing lake, just to cluttered with debris to really enjoy or fee safe |
| At some time when the new generation have been installed it would be advantageous for the marina to keep upper water levels to 3 meters below maximum high water. The dock system will work better because they will not get stranded on the rock wall of the breakwater when levels decrease in winter. |
| Beautiful. |
| Beautiful and friendly, fantastic fishing derby, clean well maintained campground. |
| Beautiful area. |
| Beautiful place, will come again. |
| Beautiful scenery. |
| Better management of campsites. |
| Clean to bathrooms better like put enzymes in toilet. |
| Clean up debris from the lake. Hazardous to boaters. |
| Clearing debris off water would be nice. |
| Could use more parking for trucks and boat trailers. |
| Develop the beautiful mill site. |
| Drift wood is bad, mainly around boat launch area. |
| Enjoyable, would love there to be boat rental facilities and proper washroom facilities. |
| Get new docks and spend some money on the right things. |
| Give us a full lake year round. |
| Good place to look for rocks when level is low. |
| Good to have debris cleared from lake. |
| Great lake. Only downer is debris (loose wood) on lake. Keeping that clear would make the perfect place! |
| Great place and people. |
| Great place, lots of things to do! Staff are friendly and helpful. This place really needs to keep running! |
| Has anyone safely wake-boarded or tubed behind a boat on Kinbasket Lake. I know a lot of people that would like to try because they don't fish. Better docking to launch boat in a timely matter. |
| Have the bridge repaired on forestry hydro road. |
| Hydro needs to take more responsibility when they flood the lake like this. Campsites being wrecked, roads collapsing is not acceptable. |
| I find the people who use this facility are friendly and courteous and all enjoy their time here. |
| I have noticed today that there is a lot of debris around the boat launch at the marina. Also at Horse Creek. I think BC Hydro needs to do cleanup in the fall as well as in the summer. |
| I love it here. |
| I think it would be to the benefit of the marina and community to have Hydro put in a weir. |
| I'm thankful for the amount of effort and money BC Hydro puts into our marina for local and tourist use. |

| **Table 83 (cont'd).** Do you have any additional comments about recreation on the water or onshore of Kinbasket Lake? |
|---|
| **VALEMOUNT (cont'd)** |
| **Post-construction (n = 95)** |
| If the driftwood was removed from the lake people would enjoy it better. |
| If the logs were removed it would be safer and easier boating/fishing. This would attract more visitors to bring boats here. |
| Increased water levels by marina would be a definite asset so landing boats would happen sooner than later. Possibly a weir would be a definite asset, docks that are more reliable and new would also be a definite asset. |
| It is a very beautiful place and i hope its kept intact please for my children and my children's children, thanks. |
| It would be nice to have a hand pump where people could get fresh water for daily use. |
| It would be nice to have a place to store a kayak on Kinbasket without having to pay a high monthly fee. |
| It would be so wonderful to get the deadheads and floaters out of the lake, then you could do more watersports, *i.e.*, water skiing, tubing *etc*. |
| It's great! |
| Keep facilities the way they presently exist. |
| Keep on with recreation development, but with caution to attract respectful people, not loud, messy disrespectful. |
| Keep up the good work. |
| Keeping west lake and east lake roads in good enough shape to travel 4x4 and quads. |
| Kinbasket lake is an excellent recreation facility with views second to none. Only issue is floating debris |
| Lets keep this lake the way it has been for the last x years. |
| Long drive down but beautiful scenery. |
| Lots of debris in the water. |
| Love the area. |
| Lovely! |
| Low water levels in spring and early summer as well as debris hamper the recreation suitability of the lake. |
| Marina could use boom sticks. |
| More BC Hydro and BC Forest Service support. |
| More consistent water levels, a weir would allow consistent water levels. |
| Need a weir at Valemount end for longer use. |
| Need more reliable docks that can be utilized when water levels are low also floating debris is very dangerous. |
| Needs to be more cleanup efforts from BC Hydro. Way to much wood on water. They built a boom drag on this end and used it once and we haven't seen it since. |
| Nice area with lots of riding and good fishing. |
| Nice lake. |

| **Table 83 (cont'd).** Do you have any additional comments about recreation on the water or onshore of Kinbasket Lake? |
|---|
| **VALEMOUNT (cont'd)** |
| **Post-construction (n = 95)** |
| Nice people here. |
| Not really, however there is one a hole that thinks he owns the place. |
| Please clean the debris from the lake. |
| Please get flushing toilets, log booms around the marina so wood can't get in the loading dock. |
| Please have hydro clean wood out of lake. |
| Please repair bridge on forestry hydro road. [2 people provided this comment.] |
| Reliable docks |
| Repair bridge on forestry hydro road. |
| Road access is rough most of the season, grader work more often, particularly before may long weekend and after September long weekend to allow RVs a gentler ride in and out. |
| Scrap metal at 10km and 12km needs to be cleaned up for safety. Road should also be given guardrails in places. Plus for signage along road for 10km-12km. |
| Seems all-good to me. |
| Should be able to buy necessities, like ice. Sites could use some shade and grass areas. Showers would be nice. |
| Showers required. Too much debris creates unsafe boating and beach conditions. Not child friendly, no grass or trees for comfort. |
| Thank you for the wonderful times, I'll be back. |
| The area is absolutely beautiful. |
| The floating debris is a problem especially at the marina some boom sticks or something to keep the debris out would be good. |
| The lake levels need to be higher and more consistent. |
| The road in and out of here is troublesome to larger camping units, which limit their access down here. |
| This is a great place for family, I wouldn't want to see it become to commercialized but a little busier would be nice. |
| To much debris in the water makes unsafe boating (hard on boats and props). |
| Too many logs floating on water/ fuel supply. |
| Too many motorboats or ATVs (motorized vehicles) would depreciate the value of the wilderness experience for me. I think the Valemount area should put in more infrastructure for family camping, backpacking, hiking. The marina is one area to start but the entire Kinbasket valley could serve recreation needs. I would also like to use the road into marina and beyond for cycling. |
| Too much floating wood in the water. |
| Valemount area is beautiful great recreational opportunities. |
| Very badly need log wind barriers around boat launch. |
| Very enjoyable experience. |
| We need a weir at are end like we were promised years ago. Golden and Revelstoke get all benefits, we need water here early in the year and water to stay higher longer. |

| **Table 83 (cont'd).** Do you have any additional comments about recreation on the water or onshore of Kinbasket Lake? |
|---|
| **VALEMOUNT (cont'd)** |
| **Post-construction (n = 95)** |
| We need consistent water at this end of the lake and to better manage the wood supply so more recreational opportunities on the lake. |
| We need more! More things to do and see but keep it natural! |
| We really need new dock and manage the logs in the water. |
| Well thought out Questionnaire and kudos (shout out) to maker. I love Valemount, these mountains truly move my Canadian soul. |
| Wood debris is horrific!!! |
| Would be nice to paddle earlier in the spring/summer (no $H_2O$). |
| Would have liked to spend more time here. We'll be back next year. |
| Would like and have searched for maps (topographical/geographical) of Kinbasket Lake. |
| Would like to see motorized recreation, ATV, quads and motorbikes managed to reduce environmental damage and potential conflict with hikers and campers. |

# APPENDIX E – Observational Data Forms and Definitions

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## Arrow Lakes Recreation Study
## Site and Survey Log

| Date (dd/mm/yr) | Location | Time of env record | Sky Cond (1-14) | Wind (0-12) | Wind Dir (from) | Water Surface Cond (1-5) | Air Temp (°C) | Water Temp (°C) | # BC Plates | # Other Canada Plates | # Intn'l Plates | # Parties | Total # People visiting site | # invited to take survey | # prev taken survey this yr | # who decline taking survey | # completed surveys | # surveys to be mailed in | Staff Initials | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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Page ____

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## Arrow Lakes Recreation Study – Detailed Daily Sample Summary

Date: Sample Site: Surveyor: Page ____ of ____

| Total # in Group | Gender Total M/F | Age Range 1 – 10 | 11 – 15 | 16 – 20 | 21 – 30 | 31 – 40 | 41 – 50 | 51 – 60 | 61 – 70 | 71 + | Activities | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | |
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Version: September 7, 2009

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# Observational Data Definitions

**1 - Wind Condition Definitions**

**2 - Water Surface Condition Definitions**

**3 - Forecasting Terminology**

**4 - Sky Conditions Definitions**

**5 - Air and Water Temperature Data Collection Procedures**

**Boat Ramp Use Study**
**Wind Condition**
**Definitions**

| International Description | Specifications | Beaufort Number | MPH | Knots |
|---|---|---|---|---|
| Calm | • Calm, smoke rises vertically | 0 | < 1 | < 1 |
| Light air | • Direction of wind shown by smoke drift but not by wind vanes | 1 | 1 - 3 | 1 - 3 |
| Light Breeze | • Wind felt on face<br>• Leaves rustle<br>• Vanes moved by wind | 2 | 4 - 7 | 4 - 6 |
| Gentle Breeze | • Leaves and small twigs in constant motion<br>• Wind extends light flag | 3 | 8 - 12 | 7 - 10 |
| Moderate | • Raises dust, loose paper<br>• Small branches moved | 4 | 13 - 18 | 11 - 16 |
| Fresh | • Small trees in leaf begin to sway<br>• Crested wavelets form on inland waters | 5 | 19 - 24 | 17 - 21 |
| Strong | • Large branches in motion<br>• Whistling heard in telegraph wires<br>• Umbrellas used with difficulty | 6 | 25 - 31 | 22 - 27 |
| Near Gale | • Whole trees in motion<br>• Inconvenience felt walking against wind | 7 | 32 - 38 | 28 - 33 |
| Gale | • Breaks twigs off trees<br>• Impedes progress | 8 | 39 - 46 | 34 - 40 |
| Strong Gale | • Slight structural damage occurs | 9 | 47 - 54 | 41 - 47 |
| Storm | • Trees uprooted<br>• Considerable damage occurs | 10 | 55 - 63 | 48 - 55 |
| Violent Storm | • Wide Spread Damage | 11 | 64 - 72 | 56 - 63 |
| Hurricane | • Wide Spread Damage | 12 | 73 - 82 | 64 - 71 |

**Source:** Oregon Emergency Management Net – Net Protocol

**Boat Ramp Use Study**
**Water Surface Condition Definitions**

| Water Condition | Description |
|---|---|
| 1. Calm | Flat surface – some ripples, no noticeable breeze |
| 2. Gentle | Noticeable breeze; low gentle waves |
| 3. Small waves | Light winds – larger waves but no white caps |
| 4. Moderate waves | Moderate winds; choppy water; white caps |
| 5. Stormy | Strong winds; steep waves |

## Boat Ramp Use Study
## Forecasting Terminology

| Condition | Description |
|---|---|
| **Duration of Precipitation** | • Brief - short, sudden showers or periods of rain<br>• Intermittent - on and off intervals, not continuous<br>• Occasional - irregular, infrequent intervals of precipitation<br>• Frequent - persistent short intervals, happening regularly and often<br>• Periods of precipitation - rain or snow falling most of the time with breaks |
| **Distribution of Precipitation, as in showers** | • Isolated - showers separated during a given period of time<br>• Few - indicated in time, not over an area<br>• Local - restricted to a smaller area<br>• Patchy - irregularly occurring in an area<br>• Scattered - not widespread but of greater occurrence than isolated showers |
| **Precipitation Intensity** | • Light - each drop or small flake of precipitation can be easily seen, puddles form slowly, some water flow in gutters<br>• Moderate - water puddles quickly, roads and other surfaces collect water, rain streams down windows<br>• Heavy - numerous flakes or sheets of rain, large puddles form, flooding can occur, visibility reduced |
| **Cloud Cover** | • Clear or sunny - free of clouds or less than one tenth cloudy<br>• Partly cloudy or partly sunny - three tenths to six tenths of the sky is clouded<br>• Mostly cloudy - the sky is predominantly clouded or seven tenths to eight tenths of the sky has clouds<br>• Cloudy or overcast - the sky is covered with clouds from nine tenths to a hundred percent cloud covered |
| **Showers vs. Rain: A Difference of Duration and Intensity** | • Rain - forms from stratus clouds, more widespread over larger area, uniformly steady, less intense<br>• Showers - forms from cumulus clouds, more isolated, short-lived, affects a smaller area, sometimes more intense |
| **Partly Cloudy vs. Partly Sunny** | According to the National Oceanic and Atmospheric Administration there is no official difference between the two terms. One or the other may be emphasized, to help clarify the meaning of the term used. |

**Read more:** http://weatherforecasting.suite101.com/article.cfm/meteorologist_forecasting_terms#ixzz0QBMaiiTT

**Boat Ramp Use Study**
**Sky Condition**
**Definitions**

| Sky Condition | Description |
|---|---|
| 1. Clear (Sunny) | < 10% cloud cover |
| 2. Partly Cloudy (mostly sunny) | 30 - 60% cloud cover |
| 3. Mostly Cloudy (partly sunny) | 70-80 % cloud cover |
| 4. Overcast | ≥ 90% cloud cover |
| 5. Fog | Report visibility in tenths of a kilometer (*e.g.*, 100m, 200m, etc.) |
| 6. Trace of Rain or Snow | Not enough to measure |
| 7. Light Rain | from stratus (layers/blanket) clouds, more widespread, steady, less intense; each drop of precipitation can be easily seen, puddles form slowly, some water flow in gutters |
| 8. Moderate Rain | water puddles quickly, roads and other surfaces collect water, rain streams down windows |
| 9. Heavy Rain | numerous sheets of rain, large puddles form, flooding can occur, visibility reduced |
| 10. Showers | forms from cumulus clouds, more isolated, short-lived, affects a smaller area, sometimes more intense |
| 11. Drizzle | Fine consistent light rain, <1mm droplet size (no wind) |
| 12. Light Snow | Visibility is > 1 km; often very little accumulation results |
| 13. Moderate Snow | Visibility between 400m - 1km; < 10 cm in 12 hours |
| 14. Heavy Snow | Numerous flakes, visibility <400m; 10 cm in 12 hrs or 15 cm in 24 hrs |

**Source:** http://weatherforecasting.suite101.com/article.cfm/meteorologist_forecasting_terms

**Boat Ramp Use Study**
**Air and Water Temperature**
**Data Collection Procedures**

Field staff should take air and water temperature readings any time between 11:00 am and 2:00 pm on each survey day. First collect air temperatures then water temperatures.

**Summary of procedure for air temperature readings**

1. Expose the thermometer to the air yet suspended away from any other material that may affect an accurate air temperature reading. The thermometer should be sheltered from direct solar radiation and other weather related influences.
2. Allow the thermometer to equilibrate before reading.
3. Read temperature.
4. Record temperature in the field form, along with ancillary information such as site, date, and time.

**Summary of procedure for near surface water temperature readings**

1. Select a representative area of the water body 2m from shore and hold the thermometer directly in the water 10 cm below the surface (*e.g.,* attach thermometer to a fishing line and pole and hang so as to have thermometer bulb about 10cm below surface).
2. Allow the immersed thermometer to equilibrate before reading (hold in water about 2 minutes).
3. Read temperature. If the thermometer is unreadable while it is immersed in the water, pull the thermometer out and check the reading quickly. Do this multiple times until an accurate reading is achieved (the lowest reading for a reading from cold water when the air is hot and still, or the highest reading if the water is warm and a wind is cooling the wet thermometer).
4. Record temperature in the field form, along with ancillary information such as site, date, and time.
5. If temperature readings are unstable (which can occur in lakes or poorly mixed streams), take multiple readings.

**Suggested tips for taking the water-temperature measurements**

Be careful not to break your thermometer and keep it in the shade at all times. While reading temperature, avoid warming the thermometer bulb or water sample with your hands or by the sun. Read the temperature measurements to the nearest ½ degree C.

**Source:** Adapted from SFU Water Studies (http://www.educ.sfu.ca/nbcr/tempprot.html), and Washington State Department of Ecology Environmental Assessment Program Standard Operating Procedures for Instantaneous Measurements of Temperature in Water http://www.ecy.wa.gov/programs/eap/qa/docs/ECY_EAP-SOP_011InstantMeasureofTempinWater.pdf
**Note:** Thermometers used in study: waterproof pocket thermometer (-30/+50c), not calibrated.

# APPENDIX F – Sampling Schedules

## Arrow Lakes Reservoir Spring 2010 Sampling Schedule

| Day | Date | Upper Arrow Lakes Reservoir | | Middle Arrow Lakes Reservoir | | Lower Arrow Lakes Reservoir | |
|---|---|---|---|---|---|---|---|
| Friday | April 2, 2010 | Shelter Bay | PM | Nakusp Boat Launch | PM | Anderson Point | AM |
| Sunday | April 4, 2010 | Eagle Bay | PM | McDonald Creek Park | PM | Anderson Point | PM |
| Saturday | April 10, 2010 | Revelstoke Boat Launch | AM | Edgewood Park | AM | Syringa Boat Launch | PM |
| Friday | April 16, 2010 | Eagle Bay | PM | Fauquier Boat Launch | AM | Anderson Point | PM |
| Monday | April 26, 2010 | Eagle Bay | AM | Burton Historic Park | AM | Syringa Creek Day Use | PM |
| Wednesday | May 12, 2010 | Shelter Bay | PM | McDonald Creek Park | AM | Syringa Creek Day Use | PM |
| Monday | May 17, 2010 | Revelstoke Boat Launch | PM | Nakusp Boat Launch | AM | Syringa Creek Day Use | PM |

**Spring sampling hours**
AM: 8:30 AM – 2:30 PM
PM: 10:30 AM – 4:30 PM

## Arrow Lakes Reservoir Summer 2010 Sampling Schedule

| Day | Date | Upper Arrow Lakes Reservoir | | Middle Arrow Lakes Reservoir | | Lower Arrow Lakes Reservoir | |
|---|---|---|---|---|---|---|---|
| Friday | April 2, 2010 | Shelter Bay | PM | Nakusp Boat Launch | PM | Anderson Point | AM |
| Sunday | April 4, 2010 | Eagle Bay | PM | McDonald Creek Park | PM | Anderson Point | PM |
| Saturday | April 10, 2010 | Revelstoke Boat Launch | AM | Edgewood Park | AM | Syringa Boat Launch | PM |
| Friday | April 16, 2010 | Eagle Bay | PM | Fauquier Boat Launch | AM | Anderson Point | PM |
| Monday | April 26, 2010 | Eagle Bay | AM | Burton Historic Park | AM | Syringa Creek Day Use | PM |
| Wednesday | May 12, 2010 | Shelter Bay | PM | McDonald Creek Park | AM | Syringa Creek Day Use | PM |
| Monday | May 17, 2010 | Revelstoke Boat Launch | PM | Nakusp Boat Launch | AM | Syringa Creek Day Use | PM |

**Spring sampling hours**
AM: 8:30 AM – 2:30 PM
PM: 10:30 AM – 4:30 PM

## Arrow Lakes Reservoir Fall 2010 Sampling Schedule

| Day | Date | Upper Arrow Lakes Reservoir | | Middle Arrow Lakes Reservoir | | Lower Arrow Lakes Reservoir | |
|---|---|---|---|---|---|---|---|
| Sunday | October 3, 2010 | Eagle Bay | PM | McDonald Creek Park | AM | Anderson Point | PM |
| Tuesday | October 5, 2010 | Revelstoke Boat Launch | AM | Nakusp Boat Launch | AM | Syringa Boat Launch | PM |
| Saturday | October 9, 2010 | Revelstoke Boat Launch | AM | Edgewood Park | PM | Syringa Boat Launch | AM |
| Monday | October 11, 2010 | Shelter Bay | PM | Burton Historic Park | PM | Syringa Boat Launch | PM |
| Wednesday | October 13, 2010 | Shelter Bay | PM | Fauquier Boat Launch | PM | Syringa Creek Day Use | AM |

**Fall sampling hours**
AM: 8:30 AM – 2:30 PM
PM: 10:30 AM – 4:30 PM

## Kinbasket Reservoir 2010 Sampling Schedule

| | | |
|---|---|---|
| **Spring Season** | | |
| None due to snow and water levels | | |
| **Summer Season** | | |
| Thursday | June 17 | 8:00 am to 2:00 pm |
| Tuesday | July 20 | 1:00 pm to 7:00 pm |
| Saturday | July 24 | 1:00 pm to 7:00 pm |
| Monday | August 9 | 8:00 am to 2:00 pm |
| Sunday | September 5 | 1:00 pm to 7:00 pm |
| Monday | September 6 | 1:00 pm to 7:00 pm |
| Tuesday | September 28 | 8:00 am to 2:00 pm |
| **Fall Season** | | |
| Saturday | October 9 | 8:30 am to 2:30 pm |

## Arrow Lakes Reservoir Spring 2011 Sampling Schedule

| Day | Date | Upper Arrow Lakes Reservoir | | Middle Arrow Lakes Reservoir | | Lower Arrow Lakes Reservoir | |
|---|---|---|---|---|---|---|---|
| Sunday | October 3, 2010 | Eagle Bay | PM | McDonald Creek Park | AM | Anderson Point | PM |
| Tuesday | October 5, 2010 | Revelstoke Boat Launch | AM | Nakusp Boat Launch | AM | Syringa Boat Launch | PM |
| Saturday | October 9, 2010 | Revelstoke Boat Launch | AM | Edgewood Park | PM | Syringa Boat Launch | AM |
| Monday | October 11, 2010 | Shelter Bay | PM | Burton Historic Park | PM | Syringa Boat Launch | PM |
| Wednesday | October 13, 2010 | Shelter Bay | PM | Fauquier Boat Launch | PM | Syringa Creek Day Use | AM |

**Fall sampling hours**
AM: 8:30 AM – 2:30 PM
PM: 10:30 AM – 4:30 PM

## Arrow Lakes Reservoir Summer 2011 Sampling Schedule

| Day | Date | Lower Arrow Lakes Reservoir | | Middle Arrow Lakes Reservoir | | Upper Arrow Lakes Reservoir | |
|---|---|---|---|---|---|---|---|
| Saturday | June 4, 2011 | Syringa Creek Day Use | AM | Nakusp Boat Launch | PM | Revelstoke Boat Launch | AM |
| Sunday | June 12, 2011 | Syringa Boat Launch | AM | Fauquier Boat Launch | AM | Shelter Bay | PM |
| Tuesday | June 14, 2011 | Syringa Boat Launch | AM | Nakusp Boat Launch | AM | Eagle Bay | AM |
| Friday | July 1, 2011 | Anderson Point | PM | Edgewood Park | AM | Revelstoke Boat Launch | PM |
| Thursday | July 7, 2011 | Syringa Boat Launch | AM | Edgewood Park | AM | Shelter Bay | AM |
| Saturday | July 9, 2011 | Syringa Creek Day Use | PM | Nakusp Beach | AM | Eagle Bay | AM |
| Saturday | July 23, 2011 | Syringa Boat Launch | PM | Edgewood Park | AM | Revelstoke Boat Launch | PM |
| Friday | July 29, 2011 | Anderson Point | AM | McDonald Creek Park | PM | Shelter Bay | PM |
| Tuesday | August 2, 2011 | Syringa Creek Day Use | PM | Fauquier Boat Launch | PM | Revelstoke Boat Launch | AM |
| Friday | August 5, 2011 | Syringa Boat Launch | PM | Nakusp Boat Launch | PM | Shelter Bay | PM |
| Monday | August 8, 2011 | Syringa Creek Day Use | PM | Burton Historic Park | AM | Eagle Bay | PM |
| Monday | August 15, 2011 | Syringa Boat Launch | AM | McDonald Creek Park | PM | Revelstoke Boat Launch | PM |
| Saturday | August 27, 2011 | Anderson Point | AM | Nakusp Beach | AM | Eagle Bay | AM |
| Sunday | September 4, 2011 | Syringa Creek Day Use | PM | Fauquier Boat Launch | PM | Shelter Bay | AM |
| Monday | September 5, 2011 | Anderson Point | PM | Burton Historic Park | PM | Eagle Bay | AM |
| Sunday | September 11, 2011 | Anderson Point | PM | McDonald Creek Park | AM | Revelstoke Boat Launch | PM |
| Thursday | September 22, 2011 | Syringa Creek Day Use | AM | Burton Historic Park | AM | Eagle Bay | PM |
| Sunday | September 25, 2011 | Anderson Point | AM | Nakusp Beach | PM | Shelter Bay | AM |

**Summer sampling hours**
AM: 8:00 AM – 2:00 PM
PM: 1:00 PM – 7:00 PM

## Arrow Lakes Reservoir Fall 2011 Sampling Schedule

| Day | Date | Upper Arrow Lakes Reservoir | | Middle Arrow Lakes Reservoir | | Lower Arrow Lakes Reservoir | |
|---|---|---|---|---|---|---|---|
| Sunday | October 9, 2011 | Revelstoke Boat Launch | AM | Nakusp Boat Launch | AM | Nakusp Boat Launch | PM |
| Monday | October 10, 2011 | Shelter Bay | AM | Fauquier Boat Launch | PM | Fauquier Boat Launch | AM |
| Wednesday | October 12, 2011 | Shelter Bay | AM | Edgewood Park | PM | Edgewood Park | PM |
| Saturday | October 15, 2011 | Eagle Bay | PM | McDonald Creek Park | AM | McDonald Creek Park | AM |
| Wednesday | October 19, 2011 | Eagle Bay | PM | Burton Historic Park | AM | Burton Historic Park | AM |

**Fall sampling hours**
AM: 8:30 AM – 2:30 PM
PM: 10:30 AM – 4:30 PM

## Kinbasket Spring/Summer 2011 Sampling Schedule

| Day | Date | Sample Site | | | |
|---|---|---|---|---|---|
| Monday | May 30, 2011 | Valemount | AM | Bush Harbour | PM |
| Friday | July 1, 2011 | Valemount | PM | Bush Harbour | AM |
| Thursday | July 28, 2011 | Valemount | PM | Bush Harbour | AM |
| Sunday | August 7, 2011 | Valemount | PM | Bush Harbour | PM |
| Thursday | August 11, 2011 | Valemount | AM | Bush Harbour | PM |
| Saturday | September 3, 2011 | Valemount | AM | Bush Harbour | AM |
| Thursday | September 22, 2011 | Valemount | AM | Bush Harbour | PM |

**Spring/summer sampling hours**
AM: 8:00 am to 2:00 pm
PM: 1:00 pm to 7:00 pm

## Kinbasket Fall 2011 Sampling Schedule

| Day | Date | Sample Site | | | |
|---|---|---|---|---|---|
| Saturday | October 29, 2011 | Valemount | AM | Bush Harbour | PM |

**Fall sampling hours**
AM: 8:30 am to 2:30 pm
PM: 10:30 am to 4:30 pm

## Arrow Lakes Reservoir Summer 2012 Sampling Schedule[6]

| Day | Date | Upper Arrow Lakes Reservoir | | Middle Arrow Lakes Reservoir | | Lower Arrow Lakes Reservoir | |
|---|---|---|---|---|---|---|---|
| Monday | June 18, 2012 | Eagle Bay | AM | Edgewood Park | PM | Syringa Creek Day Use | PM |
| Thursday | June 21, 2012 | Shelter Bay | AM | Fauquier Boat Launch | AM | Syringa Creek Boat Launch | PM |
| Saturday | June 23 | Shelter Bay | AM | Burton Historic Park | AM | Syringa Creek Day Use | AM |
| Wednesday | June 27 | Revelstoke Boat Launch | PM | Nakusp Beach | PM | Syringa Creek Day Use | AM |
| Monday | July 2 | Shelter Bay | AM | Edgewood Park | AM | Syringa Creek Boat Launch | AM |
| Thursday | July 5 | Revelstoke Boat Launch | AM | Fauquier Boat Launch | AM | Anderson Point | PM |
| Sunday | July 15 | Shelter Bay | AM | Nakusp Boat Launch | PM | Anderson Point | AM |
| Saturday | July 21 | Revelstoke Boat Launch | PM | McDonald Creek Park | PM | Syringa Creek Boat Launch | AM |
| Sunday | July 29 | Revelstoke Boat Launch | AM | Burton Historic Park | PM | Anderson Point | PM |
| Sunday | August 5 | Eagle Bay | PM | Nakusp Beach | PM | Syringa Creek Day Use | AM |
| Monday | August 6 | Eagle Bay | PM | Burton Historic Park | AM | Syringa Creek Boat Launch | PM |
| Saturday | September 1 | Eagle Bay | AM | McDonald Creek Park | PM | Syringa Creek Day Use | AM |
| Sunday | September 2 | Revelstoke Boat Launch | PM | Nakusp Boat Launch | AM | Syringa Creek Boat Launch | PM |
| Saturday | September 8 | Eagle Bay | PM | Nakusp Beach | AM | Syringa Creek Boat Launch | PM |
| Monday | September 10 | Shelter Bay | PM | McDonald Creek Park | PM | Anderson Point | AM |
| Friday | September 21 | Revelstoke Boat Launch | PM | Edgewood Park | PM | Syringa Creek Day Use | PM |
| Thursday | September 27 | Shelter Bay | PM | Nakusp Boat Launch | AM | Anderson Point | AM |
| Friday | September 28 | Eagle Bay | AM | Fauquier Boat Launch | AM | Anderson Point | PM |

**Summer sampling hours**
AM: 8:00 AM – 2:00 PM
PM: 1:00 PM – 7:00 PM

[6] The 2012 sampling start date was deferred per request by BC Hydro.

## Arrow Lakes Reservoir Fall 2012 Sampling Schedule

| Day | Date | Upper Arrow Lakes Reservoir | | Middle Arrow Lakes Reservoir | | Lower Arrow Lakes Reservoir | |
|---|---|---|---|---|---|---|---|
| Wednesday | October 3, 2012 | Revelstoke Boat Launch | AM | Nakusp Beach | PM | Syringa Boat Launch | PM |
| Monday | October 8, 2012 | Shelter Bay | PM | Edgewood Park | PM | Anderson Point | PM |
| Saturday | October 13, 2012 | Eagle Bay | PM | Nakusp Boat Launch | AM | Syringa Boat Launch | AM |
| Sunday | October 21, 2012 | Revelstoke Boat Launch | AM | Fauquier Boat Launch | PM | Anderson Point | PM |
| Monday | October 29, 2012 | Shelter Bay | PM | McDonald Creek Park | AM | Syringa Park Day Use | AM |

**Fall sampling hours**
AM: 8:30 AM – 2:30 PM
PM: 10:30 AM – 4:30 PM

## Kinbasket Summer 2012 Sampling Schedule

| Day | Date | Sample Site | | | |
|---|---|---|---|---|---|
| Monday | June 18 | Valemount | PM | Bush Harbour | PM |
| Tuesday | June 19 | Valemount | AM | Bush Harbour | PM |
| Saturday | July 21 | Valemount | PM | Bush Harbour | PM |
| Sunday | August 26 | Valemount | PM | Bush Harbour | AM |
| Monday | September 3 | Valemount | AM | Bush Harbour | PM |
| Thursday | September 6 | Valemount | PM | Bush Harbour | AM |
| Friday | September 14 | Valemount | AM | Bush Harbour | AM |

**Summer sampling hours**
AM: 8:00 am to 2:00 pm
PM: 1:00 pm to 7:00 pm

## Kinbasket Fall 2012 Sampling Schedule

| Day | Date | Sample Site | | | |
|---|---|---|---|---|---|
| Wednesday | October 24 | Valemount | AM | Bush Harbour | AM |

**Fall sampling hours**
AM: 8:30 am to 2:30 pm
PM: 10:30 am to 4:30 pm

## Arrow Lakes Reservoir Spring 2013 Sampling Schedule

| Day | Date | Upper Arrow Lakes Reservoir | | Middle Arrow Lakes Reservoir | | Lower Arrow Lakes Reservoir | |
|---|---|---|---|---|---|---|---|
| Saturday | April 6, 2013 | Revelstoke Boat Launch | PM | Edgewood Park | AM | Syringa Creek Day Use | PM |
| Tuesday | April 16, 2013 | Eagle Bay | AM | Fauquier Boat Launch | PM | Syringa Creek Day Use | PM |
| Friday | April 19, 2013 | Shelter Bay | PM | Nakusp Boat Launch | AM | Syringa Boat Launch | AM |
| Sunday | May 5, 2013 | Shelter Bay | AM | Burton Historic Park | AM | Syringa Creek Day Use | AM |
| Monday | May 13, 2013 | Revelstoke Boat Launch | AM | Nakusp Beach | PM | Anderson Point | PM |
| Wednesday | May 15, 2013 | Eagle Bay | AM | McDonald Creek Park | PM | Syringa Boat Launch | PM |
| Monday | May 20, 2013 | Revelstoke Boat Launch | AM | Nakusp Boat Launch | PM | Anderson Point | AM |

**Spring sampling hours**
AM: 8:30 AM – 2:30 PM
PM: 10:30 AM – 4:30 PM

## Arrow Lakes Reservoir Summer 2013 Sampling Schedule

| Day | Date | Upper Arrow Lakes Reservoir | | Middle Arrow Lakes Reservoir | | Lower Arrow Lakes Reservoir | |
|---|---|---|---|---|---|---|---|
| Saturday | May 25 | Revelstoke Boat Launch | AM | Edgewood Park | PM | Syringa Creek Day Use | AM |
| Friday | June 7 | Revelstoke Boat Launch | AM | Nakusp Boat Launch | PM | Anderson Point | AM |
| Monday | June 17 | Eagle Bay | AM | Nakusp Boat Launch | PM | Syringa Creek Boat Launch | AM |
| Tuesday | June 18 | Shelter Bay | PM | Edgewood Park | AM | Anderson Point | PM |
| Monday | July 1 | Eagle Bay | PM | McDonald Creek Park | AM | Syringa Creek Day Use | PM |
| Saturday | July 6 | Eagle Bay | PM | Nakusp Boat Launch | AM | Syringa Creek Boat Launch | PM |
| Sunday | July 14 | Eagle Bay | AM | McDonald Creek Park | AM | Syringa Creek Day Use | AM |
| Sunday | July 21 | Revelstoke Boat Launch | PM | Nakusp Beach | PM | Anderson Point | PM |
| Monday | July 29 | Revelstoke Boat Launch | PM | Nakusp Beach | PM | Syringa Creek Boat Launch | PM |
| Saturday | August 3 | Shelter Bay | PM | Fauquier Boat Launch | AM | Syringa Creek Day Use | PM |
| Friday | August 9 | Shelter Bay | AM | Nakusp Beach | PM | Syringa Creek Day Use | AM |
| Friday | August 16 | Shelter Bay | AM | Fauquier Boat Launch | AM | Anderson Point | AM |
| Sunday | August 18 | Eagle Bay | AM | McDonald Creek Park | AM | Syringa Creek Day Use | AM |
| Wednesday | August 21 | Revelstoke Boat Launch | AM | Fauquier Boat Launch | PM | Syringa Creek Boat Launch | AM |
| Sunday | September 1 | Eagle Bay | PM | Burton Historic Park | PM | Syringa Creek Day Use | PM |
| Monday | September 2 | Revelstoke Boat Launch | AM | Burton Historic Park | PM | Anderson Point | AM |
| Sunday | September 15 | Shelter Bay | PM | Edgewood Park | AM | Syringa Creek Boat Launch | PM |
| Thursday | September 19 | Shelter Bay | PM | Burton Historic Park | AM | Anderson Point | AM |

**Summer sampling hours**
AM: 8:00 AM – 2:00 PM
PM: 1:00 PM – 7:00 PM

## Arrow Lakes Reservoir Fall 2013 Sampling Schedule

| Day | Date | Upper Arrow Lakes Reservoir | | Middle Arrow Lakes Reservoir | | Lower Arrow Lakes Reservoir | |
|---|---|---|---|---|---|---|---|
| Friday | October 4 | Revelstoke Boat Launch | AM | Burton Historic Park | AM | Syringa Creek Day Use | AM |
| Saturday | October 12 | Eagle Bay | PM | Nakusp Boat Launch | PM | Anderson Point | AM |
| Monday | October 14 | Shelter Bay | AM | Fauquier Boat Launch | PM | Anderson Point | PM |
| Sunday | October 20 | Shelter Bay | PM | McDonald Park | AM | Syringa Creek Day Use | AM |
| Thursday | October 24 | Revelstoke Boat Launch | PM | Edgewood Park | PM | Syringa Boat Launch | AM |

**Fall sampling hours**
AM: 8:30 AM – 2:30 PM
PM: 10:30 AM – 4:30 PM

## Kinbasket Spring/Summer 2013 Sampling Schedule

| Day | Date | Sample Site | | | |
|---|---|---|---|---|---|
| Sunday | May 26 | Valemount | PM | Bush Harbour | AM |
| Saturday | June 29 | Valemount | PM | Bush Harbour | PM |
| Wednesday | July 10 | Valemount | PM | Bush Harbour | AM |
| Tuesday | July 23 | Valemount | AM | Bush Harbour | PM |
| Friday | August 13 | Valemount | PM | Bush Harbour | PM |
| Thursday | August 29 | Valemount | PM | Bush Harbour | PM |
| Monday | September 2 | Valemount | AM | Bush Harbour | AM |

**Spring/Summer sampling hours**
AM: 8:00 am to 2:00 pm
PM: 1:00 pm to 7:00 pm

## Kinbasket Fall 2013 Sampling Schedule

| Day | Date | Sample Site | | | |
|---|---|---|---|---|---|
| Monday | October 24 | Valemount | PM | Bush Harbour | AM |

**Fall sampling hours**
AM: 8:30 am to 2:30 pm
PM: 10:30 am to 4:30 pm

# APPENDIX G – Control Sites Comparison

## Comparison of Pre- and Post-Construction Mean Visitation at Improved Boat Ramps

### Methods

1. Traffic counter data was used for analysis.
2. Pre-construction, active-construction, and post-construction dates were identified for each improved site.
3. Descriptive statistics were calculated for each improved site and for the control site[7]; the construction period (*i.e.*, pre-, active, and post-) used for each improved site was also applied to the control site so that the number of visitors could be compared using similar periods.
4. Independent sample t-tests were performed to assess whether pre- and post-construction visitation differed for the improved site and for the control site.
5. The mean number of pre- and post-construction visits was graphed for the improved site and for the control site.
6. The ratio of pre-construction visits to post-construction visits was determined as an indicator of the impact of ramp improvements to visitation.

### Kinbasket Reservoir Sites

No analyses could be performed on the two Kinbasket Reservoir sites, as there was no traffic counter data available at the Esplanade Bay (*i.e.*, the control site) until 2011-08-26 (Table 84). Thus there was no pre-construction traffic data at the control site to compare improved sites to.

**Table 84.** Kinbasket Reservoir construction periods (Years 1 - 4)

| Location | Construction Period |
|---|---|
| Esplanade Bay | No construction: control site. |
| Bush Harbour | 2010-04-12 to 2010-08-09 |
| Valemount | 2011-04-01 to 2011-06-27 |

[7] Control sites (*i.e.*, Burton and Esplanade Bay) appear to be low-use sites; as such limited conclusions can be drawn in comparison to non-low-use sites as there may be some bias when comparing moderate- to high-use sites to the control sites. Thus, results should be interpreted with caution.

**Arrow Lakes Reservoir Sites**

No analysis could be performed for Burton South, as there was no construction period data available (Table 85).

**Table 85.** Arrow Lakes construction periods (Years 1 - 4)

| Location | Construction Period |
|---|---|
| Burton | No construction: control site. |
| Anderson Point | 2012-05-14 to 2012-06-12 |
| Anderson Point | 2012-10-31 to 2013-04-26 |
| Burton South | Construction period data not available |
| Edgewood | 2013-03-11 to 2013-05-17 |
| Fauquier | 2010-05-31 to 2010-09-21 |
| McDonald Creek | 2010-05-16 to 2010-07-01 |
| Nakusp | 2013-02-04 to 2013-05-17 |

*Anderson Point*

Mean post-construction visits to Anderson Point were significantly higher than mean pre-construction visits ($F = 17.265$, $p < .05$; $t = -4.583$, $df = 398.549$, $p < .001$; Table 86; Figure 35); using those same periods, mean post-construction visits to Burton were significantly higher than mean pre-construction visits ($F = 0.054$, $p > .05$; $t = -3.977$, $df = 1017$, $p < .001$). On average, for every pre-construction visit to Anderson Point, there were 1.3 post-construction visits; using the same periods, there, on average, for every pre-construction visit to Burton, there were 1.7 post-construction visits.

**Table 86.** Anderson Point and Burton visitation compared.

| Statistic | Anderson Point | | Burton | |
|---|---|---|---|---|
| | Pre-Construction | Post-Construction | Pre-Construction | Post-Construction |
| N Valid | 767 | 252 | 941 | 276 |
| N Missing | 214 | 82 | 40 | 58 |
| Mean | 1.47 | 1.91 | 0.97 | 1.68 |
| Standard Error of Mean | 0.055 | 0.097 | 0.061 | 0.133 |
| Median | 1 | 2 | 0 | 1 |
| Mode | 0 | 1 | 0 | 0 |
| Standard Deviation | 1.523 | 1.536 | 1.875 | 2.207 |
| Minimum value | 0 | 0 | 0 | 0 |
| Maximum value | 9 | 7 | 14 | 12 |
| Sum | 1129 | 482 | 914 | 464 |

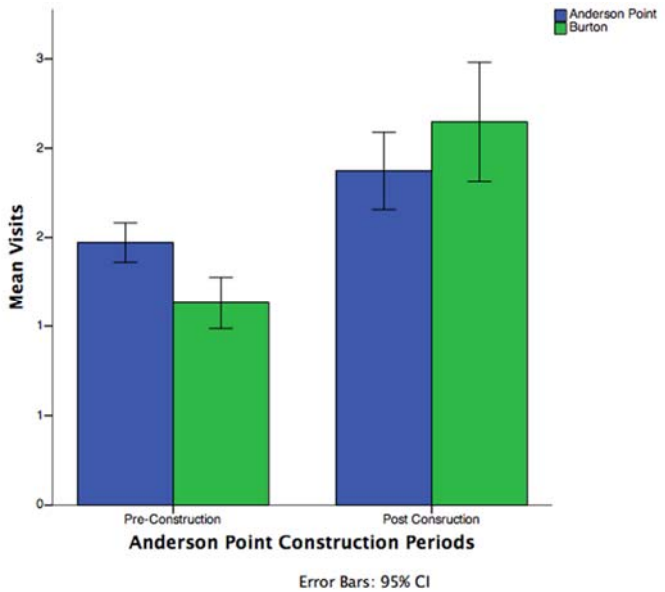


**Figure 35.** Comparison of pre- and post-construction mean visits to Anderson Point and Burton.

*Edgewood*

Mean post-construction visits to Edgewood were not significantly different, than mean pre-construction visits ($F = 0.113$, $p > .05$; $t = 0.414$, $df = 1376$, $p > .05$; Table 87; Figure36); using those same periods, mean post-construction visits to Burton were significantly higher than mean pre-construction visits ($F = 27.749$, $p < .001$; $t = -5.122$, $df = 180.543$, $p < .001$). On average, for every pre-construction visit to Edgewood, there were 0.9 post-construction visits; using the same periods, there, on average, for every pre-construction visit to Burton, there were 2.1 post-construction visits.

**Table 87.** Edgewood and Burton visitation compared.

| Statistic | Edgewood | | Burton | |
|---|---|---|---|---|
| | Pre-Construction | Post-Construction | Pre-Construction | Post-Construction |
| N Valid | 1209 | 169 | 1193 | 158 |
| N Missing | 73 | 4 | 89 | 15 |
| Mean | 1.8 | 1.72 | 0.91 | 1.93 |
| Standard Error of Mean | 0.06 | 0.207 | 0.052 | 0.193 |
| Median | 1 | 1 | 0 | 1 |
| Mode | 0 | 0 | 0 | 0 |
| Standard Deviation | 2.089 | 2.688 | 1.794 | 2.421 |
| Minimum value | 0 | 0 | 0 | 0 |
| Maximum value | 15 | 28 | 14 | 12 |
| Sum | 2171 | 291 | 1084 | 305 |

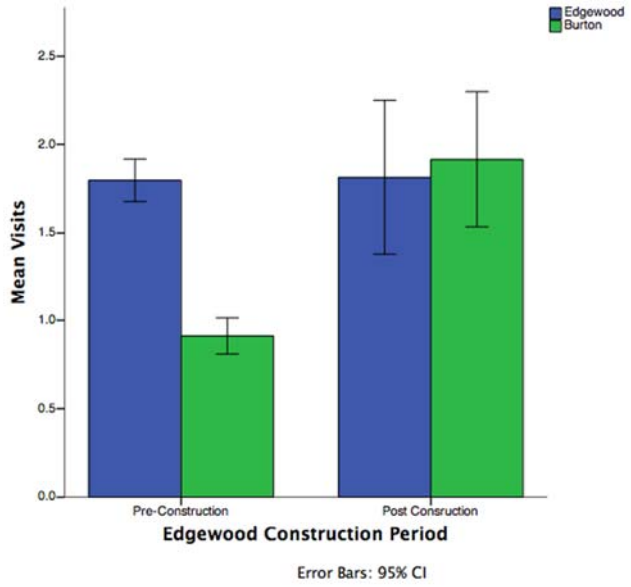


**Figure 36.** Comparison of pre- and post-construction mean visits to Edgewood and Burton.

*Fauquier*

Mean post-construction visits to Fauquier were significantly lower than mean pre-construction visits (F = 462.703, p < .001; t = 7.013, df = 269.212, p > .001; Table 88; Figure 37); using those same periods, mean post-construction visits to Burton were significantly higher than mean pre-construction visits (F = 42.915, p < .001; t = -5.657, df = 653.141, p < .001). On average, for every pre-construction visit to Fauquier, there were 0.1 post-construction visits; using the same periods, there, on average, for every pre-construction visit to Burton, there were 2.2 post-construction visits.

**Table 88.** Fauquier and Burton visitation compared.

| Statistic | Fauquier | | Burton | |
|---|---|---|---|---|
| | Pre-Construction | Post-Construction | Pre-Construction | Post-Construction |
| N Valid | 257 | 946 | 243 | 1051 |
| N Missing | 10 | 196 | 24 | 91 |
| Mean | 0.47 | 0.07 | 0.43 | 0.93 |
| Standard Error of Mean | 0.057 | 0.009 | 0.067 | 0.056 |
| Median | 0 | 0 | 0 | 0 |
| Mode | 0 | 0 | 0 | 0 |
| Standard Deviation | 0.91 | 0.279 | 1.04 | 1.825 |
| Minimum value | 0 | 0 | 0 | 0 |
| Maximum value | 5 | 2 | 7 | 14 |
| Sum | 121 | 64 | 105 | 973 |

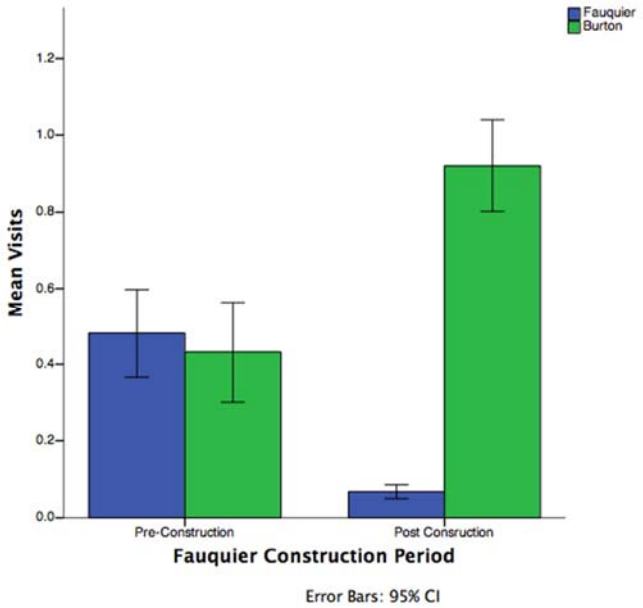


**Figure 37.** Comparison of pre- and post-construction mean visits to Fauquier and Burton.

*McDonald Creek*

Mean post-construction visits to McDonald Creek were significantly higher than mean pre-construction visits ($F = 49.682$, $p < .001$; $t = -7.472$, $df = 882.309$, $p > .001$; Table 89; Figure 38); using those same periods, mean post-construction visits to Burton were significantly higher than mean pre-construction visits ($F = 73.969$, $p < .001$; $t = -8.051$, $df = 660.947$, $p < .001$). On average, for every pre-construction visit to McDonald Creek, there were 2.1 post-construction visits; using the same periods, there, on average, for every pre-construction visit to Burton, there were 2.9 post-construction visits.

**Table 89.** McDonald Creek and Burton visitation compared.

| Statistic | McDonald Creek | | Burton | |
|---|---|---|---|---|
| | Pre-Construction | Post-Construction | Pre-Construction | Post-Construction |
| N Valid | 245 | 1160 | 229 | 1133 |
| N Missing | 7 | 64 | 23 | 91 |
| Mean | 0.77 | 1.6 | 0.37 | 1.07 |
| Standard Error of Mean | 0.076 | 0.081 | 0.065 | 0.058 |
| Median | 0 | 0 | 0 | 0 |
| Mode | 0 | 0 | 0 | 0 |
| Standard Deviation | 1.183 | 2.762 | 0.977 | 1.958 |
| Minimum value | 0 | 0 | 0 | 0 |
| Maximum value | 6 | 23 | 7 | 14 |
| Sum | 188 | 1851 | 85 | 1213 |

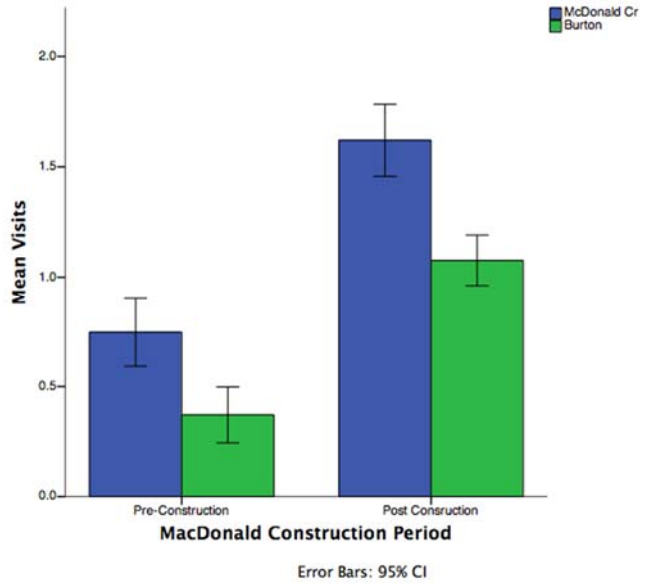


**Figure 38.** Comparison of pre- and post-construction mean visits to McDonald Creek and Burton.

*Nakusp*

Mean post-construction visits to Nakusp were significantly higher than mean pre-construction visits (F = 0.010, p > .05; t = -3.671, df = 1402, p > .001; Table 90; Figure 39); using those same periods, mean post-construction visits to Burton were significantly higher than mean pre-construction visits (F = 25.504, p < .001; t = -4.975, df = 181.829, p < .001). On average, for every pre-construction visit to Nakusp, there were 1.3 post-construction visits; using the same periods, there, on average, for every pre-construction visit to Burton, there were 2.1 post-construction visits.

**Table 90.** Nakusp and Burton visitation compared.

| Statistic | Nakusp | | Burton | |
|---|---|---|---|---|
| | Pre-Construction | Post-Construction | Pre-Construction | Post-Construction |
| N Valid | 1234 | 170 | 1158 | 158 |
| N Missing | 13 | 3 | 89 | 15 |
| Mean | 8.32 | 10.66 | 0.94 | 1.93 |
| Standard Error of Mean | 0.225 | 0.533 | 0.053 | 0.193 |
| Median | 6 | 9 | 0 | 1 |
| Mode | 4 | 4 | 0 | 0 |
| Standard Deviation | 7.913 | 6.956 | 1.814 | 2.421 |
| Minimum value | 0 | 1 | 0 | 0 |
| Maximum value | 58 | 32 | 14 | 12 |
| Sum | 10261 | 1812 | 1084 | 305 |

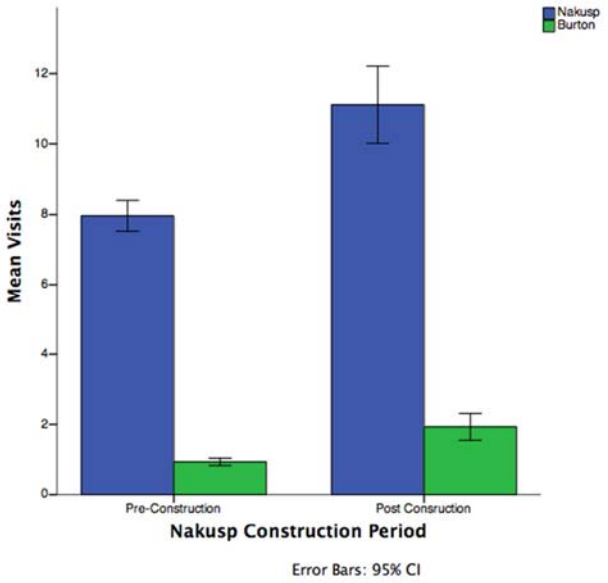


**Figure 39.** Comparison of pre- and post-construction mean visits to Nakusp and Burton.

**Conclusion – Control Sites Comparison**

The impact of boat ramp improvements on volume of public use at sites on the Arrow Lakes Reservoir was mixed. Mean post-construction visitation was higher than mean pre-construction visitation at three sites: Anderson Point, McDonald Creek, and Nakusp. Mean post-construction visitation was lower than mean pre-construction visitation at Fauquier. There was no difference between mean pre-construction and mean post-construction visitation at Edgewood. Using the construction periods for each improved boat ramp, Burton saw a higher ratio of mean post-construction visits than any of the five improved boat ramps.

The comparison of boat ramp improvements on Kinbasket Reservoir could not be assessed, as there was no pre-construction traffic data at the control site to compare improved sites to.