Black Canyon Hydroelectric Project
FERC Project No. P-14110
Recreational Resources and Whitewater Boating Study Plan
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Prepared for
Black Canyon Hydro, LLC
3633 Alderwood Avenue
Bellingham, WA 98225

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1 INTRODUCTION

Black Canyon Hydro, LLC, (BCH) plans to file an application for an original license for the Black Canyon Hydroelectric Project (Project), FERC Project Number P-14110, and associated facilities on the North Fork Snoqualmie River (North Fork), approximately 4 miles northeast of North Bend in King County, Washington. The Project has a proposed maximum generation capacity of 25 megawatts (MW) with access roads and on-land facilities located entirely on private lands.

BCH filed a Notice of Intent (NOI) and the associated Pre-Application Document (PAD) to commence the FERC Integrated Licensing Process on March 27, 2012. As part of that process, BCH is conducting studies to determine Project effects on environmental resources, including boating, fishing, and other recreation activities in the roughly 6 miles of the North Fork near the Project. In response to the subsequent study requests filed by FERC staff and other stakeholders (and detailed in 18 CFR 5.11), BCH is required to submit relevant resource study plans. This document describes a proposed recreation study following the requirements of 18 CFR 5.11(b)-(e); it includes study components that focus on whitewater boating, fishing, and general recreation in the area. This revised Recreation Study Plan integrates elements from the draft Recreational Resources and Whitewater Study Plans (both initially submitted on Sep 7, 2012).

Summary of Proposed Project:

Intake and Power Conduit

Two alternative intake designs are under consideration; both would divert water from approximately 2.6 miles of the North Fork.

Alternative A would include: (1) an 8-foot-high, 162.4-foot-long inflatable rubber diversion with an associated water intake structure; (2) a natural or roughened fish passage channel; (3) a variable pooling area behind the diversion with a normal water surface elevation of 971 feet above mean sea level and a maximum pooling of 2.83 acres; (4) a power conduit tunnel consisting of an approximately 450-foot-deep vertical tunnel into an approximately 8,350 feet, 9-foot-diameter horizontal tunnel and penstock; and (5) access to the intake site would utilize an existing logging road to minimize disturbance, requiring only 825 feet of additional road.

Alternative B would include: (1) a control sill to maintain a consistent river bottom elevation, which would allow water, fish, sediment, large woody debris, and whitewater recreationists to pass unimpeded, with an associated water intake structure; (2) a power conduit tunnel consisting of an approximately 450-foot-deep vertical tunnel into an approximately 9,175 feet, 9-foot-diameter horizontal tunnel and penstock; and (3) access to the intake site would utilize an existing logging road to minimize disturbance, requiring only 500 feet of additional road. This alternative would affect flows for approximately 2.62 miles of the North Fork.

Powerhouse

The power conduit tunnel and penstock from either Alternative Intake A or B would terminate at the powerhouse upstream of Ernie's Grove. The initial design described in the PAD assumed the powerhouse would be a metal building approximately 60 x 100 feet. However, construction of the power conduit tunnel may make it feasible to develop a powerhouse of similar dimensions underground. Tailrace dimensions have also been revised from a shorter but wider 60 x 100 feet to a narrower but longer 24 x 200 feet. Whether above or below ground, the powerhouse would include two Francis turbine generator units, one rated at 16 MW and the other rated at 9 MW, as well as appurtenant facilities (switchyard, maintenance building, etc.). Additionally, a temporary, 2,600 foot construction access road would extend from the powerhouse to the North Fork Road (while avoiding Ernie's Grove).

Transmission

Transmission would consist of a 4.2-mile-long, 115-kilovolt overhead transmission line that transmits project power to the regional grid (this would be an over-build of an existing transmission line with only approximately 0.65 miles of new transmission). Depending on minimum instream flow requirements, land use designations, and cost, the Project may alternatively connect to the existing 34 kV transmission line running from the existing Black Creek Hydroelectric Project to Snoqualmie Falls. Under this alternative, a transmission line would run from the powerhouse back through the power conduit to the intake structure. From the intake structure, a buried or overhead transmission line would only have to travel approximately 1.3 miles (6,745 feet) along an existing logging road through clear cuts.

Operations

The project would operate in run-of-river mode. The combined maximum hydraulic capacity of the two project turbines would be 900 cubic feet per second (cfs); the smallest turbine can operate efficiently at flows as low as 90 cfs. The project would divert water from a 2.6-mile-section of the North Fork.

2 STUDY DESCRIPTION AND OBJECTIVES

In accordance with 18 CFR §5.11(d)(1), the goal of the study is to describe recreation resources and activities that may be affected by the construction and operation of the proposed project, and identify potential measures that could reduce or mitigate adverse impacts. Specific objectives include:

- Identify recreation opportunities that occur in the river corridor. Opportunities may vary by type (commercial vs. non-commercial), activity (e.g., boating, fishing, hiking, mountain biking), recreation equipment (e.g., craft or fishing gear type), skill level, activity objective (e.g., target fishing species, type of desired recreation experience), or preferences for specific flow-related conditions.
- Compile an inventory of outdoor recreation resources and facilities that support recreation and tourism in the project area.
- Quantify current recreation use and identify future trends with and without the Project.
- Identify and evaluate potential effects of project construction and operation on the identified recreation opportunities. Key recreation issues include:
    - Access: The number and location of boating, fishing, trail, and road access to the river or corridor, as well as potential boating access effects from the proposed diversion weir (for Intake Alternative A).
    - Flows in the bypass reach: Changes in the number of days with flows in optimum or acceptable flow ranges for different flow-dependent opportunities such as fishing and whitewater boating in kayaks or rafts.
    - Recreation opportunity spectrum and aesthetics: Changes in the level of development or aesthetic values from proposed Project facilities or flow regime changes.
    - Potential trespass and vandalism: Assess potential increases due increased access or recreation use.
    - Liability: Describe liability issues related to providing controlled flows for boating or fishing opportunities in the bypass reach.

- Identify and evaluate new recreational opportunities that may be created by the project and effects on recreation-related spending in the project vicinity.
- Identify and evaluate a range of protection, mitigation, and enhancement (PME) measures that could be applied or implemented to reduce or mitigate impacts.
- Develop a detailed Recreation Management Plan (RMP) to be implemented for this project if a license is issued.

Goals and objectives will be met through several study components, including: a review of existing information (e.g., guidebooks, websites, and regional and statewide plans or surveys), fieldwork (e.g., inventory of access points, trails, and roads), interviews or focus groups with agency or landowner staff and experienced recreation users, surveys of recreation users, and consultation with stakeholders.

The Recreation Study Plan has been revised based on comments submitted by FERC staff on July 24, 2012 (FERC, 2012); and from several other agencies and stakeholders at a Proposed Study Plan meeting on October 5, 2012, through letters received by December 7, 2012, or at a second Proposed Study Plan call on December 27, 2012. Comments include those from Trout Unlimited, King County, NPS, AW, Washington DNR, and Washington Department of Ecology. The revised study plan also meets criteria found in Appendix A of Scoping Document 1 for study requests.

3 STUDY AREA

The study area includes lands and waters adjacent to the Project area where recreation activities occur. While greater attention will focus on sites adjacent to proposed Project facilities such as the intake structure (including the maximum upstream extent of any anticipated pooling) and the powerhouse/tailrace, the study will address all recreation opportunities that utilize a roughly 400 foot-wide corridor adjacent to the Project's 2.6 mile bypass reach (see Appendix A: Recreation Study Area). Because whitewater boating opportunities start and end their trips outside this reach, the study will also examine that recreation use from Wagner Bridge to Three Forks Natural Area. Similarly, it will describe recreation access by roads and trails that lead to the river but are outside the immediate study area. Specific areas of interest include:

- The entire river used by whitewater boaters from Wagner Bridge (about RM 12) to the confluence with the Middle Fork Snoqualmie (RM 0). This includes Black Canyon (also known locally as Ernie's Gorge or Ernie's Canyon), the roughly 2.5

mile reach which begins shortly downstream of the proposed Project intake (about RM 5.1) and ends just upstream of the unincorporated community of Ernie's Grove (about RM 2.5). The river falls steeply in this gorge, and the canyon's narrow whitewater rapids (Class V+) are boated by expert-level whitewater kayakers and rafters only under favorable flow conditions. Existing and potential whitewater boating use and access areas include:

  - Wagner Bridge put-in in Snoqualmie National Forest (about RM 12).
  - Spur 10 Bridge put-in (about RM 6.8).
  - The boating launch at King County's Three Forks Natural Area at the confluence with the Middle Fork (RM 0).
  - Areas adjacent to the river from Spur 10 Gate Bridge to Three Forks Natural Area used by recreational boaters to scout and portage rapids.
  - Locations of proposed new or extended roads and potential new river access points, including the proposed intake access road, powerhouse access road, and put-in/take-out locations near intake or powerhouse structures.

- Existing roads in the Project vicinity that are currently or potentially used to access the river for boating, fishing, or general recreation in the corridor (which may include hiking, sightseeing, swimming, picnicking, or hunting):
    - North Fork Road, National Forest Development Road 5700, from Ernie's Grove to Spur 10 Road.
    - Lake Hancock Road / SE 88th Street from North Fork Road to Spur 10 Road.
    - Unnamed private roads near the Project Reach, particularly the existing section that would become part of the proposed intake access road.
  - Existing user-created or potential new trails that could be used to access the river corridor from the roads identified above for fishing, boating, or other recreation.
  - Specific fishing locations in the river in the proposed Project bypass reach.
  - Specific scenic viewing locations in the river corridor in the proposed Project bypass reach.

4 RESOURCE MANAGEMENT GOALS

In accordance with 18 CFR §5.11(d)(2), this section describes resource management goals of agencies or Indian tribes with jurisdiction over the resources to be studied.

Section 4(e) and 10(a) of the FPA require that the Commission give equal consideration to all uses of the waterway on which a project is located. When reviewing a proposed action, the Commission must consider the environmental, recreational, fish and wildlife,

and other non-developmental values of the Project, as well as power and developmental values.

Describing any project effects on recreation related to Project construction and operation is necessary to fulfill the Commission's responsibilities under the National Environmental Policy Act (NEPA). Ensuring that potential impacts associated with recreation related to the Project are analyzed is relevant to the Commission's public interest determination.

5 EXISTING INFORMATION

In accordance with 18 CFR §5.11(d)(3), this section describes existing information on recreation resources in the Project area, and the need for additional information. In general, recreation opportunities in the vicinity of the Project are currently limited because most land in the study area is private, and the public land is difficult to access and managed as a trail-less primitive zone. However there is some information about existing recreation use for the primary properties in the Study Area, potential road and trail access across those lands, as well as information about whitewater boating opportunities on the Ernie's Gorge segment and general fishing opportunities on the North Fork.

5.1 Existing information about land ownership

There are four primary land tracts in the Study area. A summary of land ownership (see Map 1) and associated recreation use is described below:

- **THR, LLC** owns the vast majority of the property where on-land Project facilities are proposed. It has posted "No Trespassing" signs and is not known to provide access for recreation.

- Several **residential properties in Ernie's Grove** are near but downstream of the proposed powerhouse. Homeowners who have participated in Project scoping have indicated that public access has not been granted for recreation.

- **Hancock Forest Management (HFM)** owns land north and east of the Project surrounding the THR property, including about a mile of the proposed bypass reach (both sides of the river). Its roads also provide the primary access to the study area for boaters, anglers and other recreation users. HFM actively manages the land for

timber resources, but has also sold its future development rights as part of a conservation easement.

HFM offers recreation access to its 89,500 acre property, but limits the number of vehicles and users through a system of annual and daily passes (which have fees associated with them). Although access policies have varied for this property over the past decade (and were free for walk-in use until 2011), a permit has been required for access in the last three years, including non-motorized uses by bicycle, horseback, and on foot. Motorized permits in 2013 are limited to 1,000 annual permits and cost $225, while annual non-motorized permits are unlimited and cost $45 for the year and $15 (for families) or $8 (for individuals) per day. Non-motorized users may not ride in any vehicle while on the property. Camping permits are also available for overnight use at designated sites; there are 200 available annually for $200 each. Most fees were reduced from 2012 levels. The study will document access and fee changes over the years.

HFM collects user sign-in cards from visitors at authorized access points (HFM 2012) and has an active enforcement presence. The primary access point for the Study Reach is at Spur Gate 10, where there is a locked gate about 1.4 miles from the bridge that is the likely access point for boaters and some anglers. Some boaters and anglers may risk permit violations to gain access the river without paying the fees. Other boaters may directly hike to the river through the woods from the private Lake Hancock Road without authorization from landowners; there are apparently some well-travelled user-created trails that access the start of the gorge (Professor Paddle 2012).

- The **Mount Si Natural Resources Conservation Area** (Mount Si NRCA), managed by the Department of Natural Resources, is the only public land in the Study Area. This 13,363 acre tract is adjacent to about two miles of the North Fork in the proposed bypass reach (in the steepest part of the Gorge). The area near the river is managed as a Primitive Zone; there are no formal trails and the terrain is steep and forested. While off-trail hiking to fishing or scenic overlooks in the Gorge probably occurs, it is likely to be sparse.

5.2 Existing information about whitewater boating

Whitewater boating on the North Fork is well-documented in guidebooks and on boater websites and forums, but boating use is not managed by a resource agency (and there are no use statistics). There are two commonly acknowledged boating segments: 1) the easier "Upper North Fork" from Wagner Bridge in Snoqualmie National Forest to Spur 10 Bridge (6.3 miles) and 2) "Ernie's Gorge" from Spur 10 Bridge to Three Forks Natural Area at the confluences of the North and Middle Forks (6.5 miles). The downstream segment is the most relevant for the Project, and includes Ernie's Gorge (aka Black Canyon), a 2.5 mile reach that roughly corresponds to the proposed Project bypass reach.

The Gorge has Class V/V+ rapids and is regularly paddled by skilled local kayakers. The run also appears to have a reputation as one of 24 whitewater segments reported to have "outstanding recreational and aesthetic qualities of regional and national significance." (AW, 2008, p. 8). However, this finding is from a survey of 165 self-selected respondents, of which only 12 percent (19 individuals) reported boating through Ernie's Gorge (p. 13).

Boaters have also paddled the reach in rafts (R-2s) and inflatable kayaks, but this use appears rare. It does not appear to be commercially guided. Although the miles above and below the Gorge are Class II-III, the difficulty of the Gorge limits use to a relatively small group of advanced boaters. There is at least one rapid (~25 foot falls called Jacuzzi) that is nearly always portaged (although it has been run at favorable flows by at least a dozen boaters), and another that is commonly portaged ("Raft Catch"). Some boaters may combine trips on both segments, especially since access to the Hancock property changed in 2011; the "Upper North Fork" has generally Class II-III rapids. Neither segment appears to have had been adjudicated for navigability, and FERC's criteria suggests it may be non-navigable (without commercial use or less challenging whitewater than Class IV; FERC 2004, pp. 5-6).

Boating on the reach is flow-dependent and boaters generally rely on hydrology information from the North Fork Gage near Snoqualmie Falls (USGS gage 12142000) and weather considerations when deciding whether to boat, what equipment to bring, and how rapids may be run or portaged. The gage has nearly 70 years of record and can be analyzed at daily and 15 minute intervals. Daily flows are likely to be sufficient to assess the general number of days when flows are boatable over the period of record under a natural regime. However, the river's hydrology may be "flashy" enough during some

times of the year (e.g., fall and early winter storms) to warrant more detailed analysis (15-minute data). The timing of small windows of boatable flows may also be relevant for providing potential boating releases into the proposed bypass reach as a PME measure.

Preliminary information from guidebooks and webpages (Table 1), as well as limited interviews for this study plan (S. Robinson, D. Patrinellis, B. Hawthorne, and R. McKibben), suggests a minimum boatable flow between 300 and 400 cfs and a maximum boatable flow between 750 and 1,100 cfs for the Ernie's Gorge segment. Preferred flows for many boaters appears to be about 500 to 700 cfs, although boatesr with more experience in the canyon prefer higher flows. The lower gradient and wider "Upper North Fork" (from Wagner Bridge to Spur Gate 10 Bridge) appears to require at slightly higher flows for a minimum and is probably boatable at considerably higher flows (See Table 1). The Recreation Study includes methods to further examine acceptable and optimal flow ranges for different craft and types of boating.

Table 1 Reported suitable flow conditions for boating

Source	Minimum flow (cfs)	Maximum flow (cfs)	Season	Notes
AllAboutRivers.com 2012	300	800	November through June	
American Whitewater 2012	400	900	More often than not during the rainy fall, winter, and spring	
Professor Paddle 2012	300	750	Spring through mid-summer	
Bortelson 1974 (p. 10)	350 to 450	800		Upper North Fork
North 1992	600	1,600	Late April through June	Upper North Fork.

5.3 Existing information about fishing

Fishing on the North Fork is also documented in guidebooks and on angler websites and forums, but use information is sparse and sometimes imprecise about locations. Based on those sources and an interview for this study plan (P. Corbett), most fishing use on the North Fork appears to occur on Forest Service lands or at the confluence (on public lands), although some anglers fish downstream of the Spur 10 Gate within the HFM property (particularly before the walk-in permits were required). In general, the target

species appears to be cutthroat trout, although there are apparently some rainbow trout, hybrid "cut-bow" trout, and a lesser number or small brook trout in the system. The fishery is open year round to catch and release fishing, and up to 2 fish per day may be kept from June 1st to October 31st. Most anglers appear to prefer lower summer flows and dry fly fishing. Fish appear to average 8 to 9 inches, although larger fish (over 16 inches) are sometimes taken, particularly in Black Canyon where fishing pressure is lighter (due largely to challenging access).

5.4 Other general information sources

Several more general information sources may help assess existing and potential recreation in the Study Area, including:

- The North Fork on the National Rivers Inventory (with identified values for recreation and fish).
- Publicly available maps and geographic information systems (GIS) data that shows road networks and potentially trails.
- RCO's "2006 Recreation Survey Final Report" (RCO 2007) that identify broader statewide recreation use trends and demand.
- The Salmon Recovery Funding Board's (SRFB, a subsidiary board to RCO) "Estimates of Future Participation in Outdoor Recreation in Washington State" (SRFB 2003).
- King County's "Recreational Use of King County's River System" project (King County 2009).

5.5 Additional information needs

Several information needs have been identified for the study; the methods section below will describe ways that it will be collected. Specific categories include:

- Existing policy **documents and data from agencies managing public land tracts** in or near the study area. This may include data or documents from Snoqualmie National Forest, Three Forks Natural Area, and Mount Si NRCA.
- Identifying extent and availability of **HFM permit and use information** for recreation use analysis.
- Information from **experienced boaters** to develop more precise information about acceptable and optimal flows, other opportunity attributes, trip characteristics, and evaluations of potential access improvements or other PME measures.

- Information from **experienced anglers** to develop more precise information about acceptable and optimal flows, other opportunity attributes, trip characteristics, and evaluations of potential access improvements or other PME measures.
- **Analysis of hydrology information** to document the frequency of days in boatable and fishable flow ranges under natural and proposed Project flow regimes.
- Information from all **river corridor users and stakeholders** about potential aesthetic impacts of reduced flows or proposed facilities.

6 NEXUS TO PROJECT

In accordance with 18 CFR §5.11(d)(4), this section describes any nexus between Project operations and effects on recreation resources.

Construction and operation of the proposed project could affect recreation resources in the study area in several possible ways, as listed below:

- Increased development changes the recreation setting (potential loss of "naturalness").
- Facility construction may disrupt access or displace activities.
- Flow regime changes in the bypass reach may change the quality of boating or fishing experiences, or change the number of days those opportunities are available.
- Flow regime changes in the bypass reach may affect ecological resources (to be addressed in other studies) that in turn affect the quality of activities such as fishing or wildlife viewing.
- Increased road access may improve some recreation opportunities (e.g., create additional boating or fishing access), but may attract uses that also detract from other (primitive-oriented) recreation opportunities.
- Increased access may attract use and increase trespass or vandalism (e.g., illegal dumping or shooting) on private lands.

7 METHODS

In accordance with 18 CFR §5.11(d)(1) and §5.11(d)(5), this section provides a detailed description of proposed study components to meet study objectives and information needs identified above. It describes data collection and analysis techniques, sampling strategies, and provides a study schedule.

The proposed methods are consistent with professional practices. An overall phased approach is proposed; this is commonly used in relicensing proceedings related to flow-recreation issues (Whittaker, Shelby & Gangemi, 2007), and is consistent with FERC

study requirements under the ILP (FERC 2004). Specific protocols involved with study components (see below) will follow accepted practices outlined in Whittaker et al (1993) and Whittaker et al., (2007). The phased approach encourages more intensive study components only if findings from less intensive work have not provided sufficient information needed to describe specific opportunities, use levels, impacts from the Project, or evaluations of those impacts or other recreation attributes.

Phase 1 Components

7.1 Existing information review

"Desktop methods" to summarize existing information have been conducted during preparation of the PAD and this Study Plan, but additional research will be conducted to more comprehensively describe the regional recreation context and recreation opportunities in the Study Area. Potential additional information sources include:

- Existing plans and reports from nearby land management units.
- Maps for the area in agency reports or other sources.
- Recreation use data (including hunting and fishing use information).
- Land and Water Conservation Fund (LWCF) or Federal Land to Parks program funding lists.
- Statewide or regional recreation demand studies.

The information will be organized to:

- Describe setting attributes and values, user characteristics, and trip characteristics for each type of recreation opportunity.
- Inventory outdoor recreation facilities in the project area, including trail and road networks.
- Summarize existing use levels and likely use trends for each opportunity.

Existing information will also be used to develop questions for structured interviews, focus groups, and surveys (see below), which will contribute additional information about recreation opportunities in the Study Area. If Study Area-specific information is unavailable in this review of existing information, broader regional data will be interpolated (to the extent practical) to provide an overview of recreation activities that occur.

7.2 Structured Interviews

A series of 10 to 15 interviews will be conducted to collect and organize information about "local knowledge" of the river, recreation opportunities, and potential Project effects. This qualitative information will complement quantitative data learned from the existing information review.

Interviewees will include experienced users and/or resource experts to be identified through networking. For example, experienced boaters may be identified by AW, while experienced anglers may be identified by groups such as Trout Unlimited (TU), local fishing clubs, or contacts with local guides or fishing shops. General recreation users (without a focus on boating or fishing) with a long history of use in the area may be found through contacts with HFM (if they have a database of long-term pass holders), agency staff from nearby land management units (e.g., Snoqualmie National Forest, Mont Si NRCA, or the Three Forks Natural Area), or though contacts with local private property owners or residents.

Questions will be developed prior to the interviews and responses will be documented in notes, than collectively analyzed and integrated into the study report. Structured interviews will be conducted prior to focus groups and the long-from survey to help shape those components of the study.

7.3 Focus Groups

Two series of focus group meetings will be conducted following interviews and the existing document review. The "first round" **survey development focus groups** will be held in winter/spring 2013 and focus on confirming information about recreation opportunities and use, potential impacts from the proposed Project, and brainstorming potential PM&E measures that might be asked about in the long-from survey (see below). Two meetings are proposed during the first round, one focused on whitewater boating and the other focused on fishing and other general recreation. The boating meeting will focus on boating trip attributes, flow preferences, access, and potential tradeoffs between different flow regimes. The fishing and general recreation meeting will focus on fishing trip attributes, key use areas for fishing or other river-related recreation, user-created trail locations and conditions, and potential tradeoffs between different flow regimes.

The "second round" **PM&E focus groups** will be conducted toward the end of the study period in winter 2014. We currently propose two separate meetings focused on 1) whitewater boating and 2) fishing and other recreation, although an additional meeting to

separate fishing from other recreation may be needed (depending upon findings from other study components). About half of these meetings will be spent reviewing findings from the study to date (including a summary of post-trip and long-form survey results; see below). The remaining time will be spent soliciting feedback on study findings and their implications for developing PM&Es to reduce or mitigate Project impacts. This round of focus groups are envisioned as a kind of "kick-off" to recreation settlement discussions on PM&E measures in the larger FERC process (which will be conducted through more formalized agency and stakeholder meetings).

Focus groups will ideally involve 5 to 10 participants, but may include several other observers (utility or agency staff and other stakeholders). Discussion will be structured around pre-determined topics to be reviewed by stakeholders, and facilitated by study researchers. Discussion will be documented in meeting notes.

7.4 On-line post-trip evaluation survey

Two short one-page post-trip evaluation survey will be developed for flow-dependent activities – whitewater boating and fishing. These will be available online and publicized in boating and fishing communities (with web links and networking emails). The goal is to allow experienced boaters and anglers who use the North Fork to evaluate flow levels immediately following their trips throughout 2013. This will help respondents become calibrated to the gage, focus on flow-dependent attributes of their trips, and provide quantitative evaluations of specific flows immediately after they have observed them. Although "single flow surveys" may not provide information about a full range of flows as in a controlled flow study, it allows researchers to capture information from opportunistic users.

While the respondents will be self-selected and may include some users who provide multiple evaluations, it will help document boatable and fishable flows, as well as quantify evaluations of them. It will also help identify a group of anglers and boaters to participate in the "long-from survey" that includes questions about a wider range of flows and flow issues, taking advantage of users' wider knowledge about preferred flow ranges and flow regimes, access concerns, or other potential Project-related issues.

7.5 Fieldwork and existing use documentation

Limited fieldwork is expected to be conducted in this study, although BCH staff expects to identify and map all prominent user-created trails and road networks that access the river corridor in the Study Area. This information will be presented graphically in a GIS

layer of Project maps and presented in the study report. Study researchers will also visit Project facility sites and hike to key boating, fishing, or other recreation sites in the Study Area. Fieldwork will be documented by notes and still photography, which will form the basis for potential photo simulations element (below).

Existing use levels at key river corridor recreation sites will be documented by motion-activated still cameras. These will help identify minimum use levels and use patterns by boaters or other recreation users. Locations of cameras include:

- Spur 10 Gate Bridge.
- Proposed Project intake location.
- Downstream of the proposed Project powerhouse site near Ernie's Grove.

Cameras record dates and times of all motion-triggering activity. BCH will code and analyze use levels by date and type; researchers will then summarize use by type of use and group size by type of day, time of day, and month of use. This information will provide a baseline for estimating total corridor use and applying trend and multipliers for forecasting future use.

Fieldwork safety note: Stakeholders requesting and participating in boating or other in-water activities during components of the study must recognize that whitewater boating or other activities in the North Fork are inherently dangerous. Any fieldwork would take place in a remote and confined canyon where the risks of injury or death may be high, and realistic chance of timely rescue in the event of accident or tragedy is very limited. BCH and CRC are not requesting any angler or boater to conduct a trip on behalf of the study. However, if recreation users choose to take these trips, BCH and CRC will invite them to share information and evaluations of their experiences (which will be integrated into the study findings) through the post-trip and long-form survey elements (see below). These study components recognize that FERC is likely to require the study to evaluate flow impacts on boating and angling. However, BCH ***will not*** organize or request user participation in specific whitewater or in-water angling activities. Instead, as detailed above, data will be gathered from structured interviews, post-trip surveys, and the long-from survey among boaters or anglers with existing experience.

Phase 2 Components

7.6 On-line long-form survey

A longer survey will be developed to address key recreation issues identified in Phase 1 study elements. The survey will be offered to representative samples of boaters, anglers, and general recreation users who use (or may use) the river corridor in the Study Area, with separate sections on specific opportunities that may be "skipped" by respondents without knowledge or interest in those issues.

The sample of boaters and anglers will be developed through networking and respondents to the post –trip evaluation surveys. The sample of general recreation users will be developed through one of three ways (in order of preference):

1: Random sample of current HFM annual and daily pass users (if this database is available for our use).
2: Invitation to a census of recent HFM annual and daily pass users (if this database is available for our use).
3. Networking effort through stakeholders, boating and angling forums, boating and angling shops, etc. Potential self-selection issues will be mitigated by an onsite intercept survey of HFM users (see onsite survey option described below).

The long-from survey is likely to have five separate sections (see example draft survey items in appendix for more information).

History of use and user profile questions

- History of use of the corridor and nearby conservation units
- Profile information: age, gender, residency, group size, type of access, etc.

General evaluations of BCH project

- Values-based questions about hydro development
- Level of knowledge about BCH proposed project
- General attitudes toward the BCH proposed project

More specific aesthetics and access evaluations (all respondents)

- General evaluations of potential access PM&Es.
- Specific evaluations of facilities or flow simulation photos.

- Specific evaluations of proposed Project construction, operations, or maintenance measures or impacts (including visual, noise, or nightsky/light impacts) on recreation opportunities.
- Specific evaluations of access road extensions and other changes in land use and ownership on public access and recreation (e.g., increased use, illegal trespassing, and vandalism) in the project vicinity.
- Specific evaluations of potential changes to fish and wildlife populations or behaviors.

Whitewater boating (boaters only)

- History of boating use
- Trip and user descriptions
- Flow preferences
- Tradeoffs: access vs. flows
- Tradeoffs: scheduled flows vs. less flows
- Support/opposition for other boating-based PME choices, including phasing and timing of Project construction for in-water work
- Estimated use levels under different PM&E packages

Fishing component (anglers only)

- History of use
- Trip and user descriptions
- Flow preferences
- Tradeoffs: access vs. flows
- Tradeoffs: scheduled flows vs. less
- Other angling-based PME choices and evaluations of potential changes to fish and populations or behaviors
- Estimated use levels under different PM&E packages

Researchers developing, analyzing, and reporting survey results will have experience with interview and focus group efforts from previous studies and use questions tested and refined from previous similar efforts (see appendices of this study plan for example draft questions). Similarly, flow-related survey questions have been pre-tested and used for several previous efforts and address potential concerns about strategic responses (see appendices). Stakeholders will provided with a draft survey instrument and sampling frame prior to implementation (see Progress Reporting below).

Analysis will focus on descriptive statistics (central tendency, range of agreement) and comparisons of group means for different types of users (if relevant). The goal is to disaggregate data by different types of craft or skill unless analysis indicates that groups are similar and can be combined.

7.7 Optional onsite survey (intercept survey)

This study element will only be implemented if it is not possible to develop a random sample or representative networking sample of HFM recreation users (from HFM databases or invitations).

If required, we expect to random sample on 44 days (24 weekend days and 20 weekdays from April 1 through October 31). Intercept users will be contacted as they approach or leave the Spur 10 Gate and asked to participate. The hope is that this will reach a minimum of 50 annual pass holders and 100 daily pass users (or non-permitted users who are accessing the area anyway), while providing information about at least 200 total trips (because some frequent users will be repeatedly contacted through this method). However, sample sizes are challenging to estimate given the lack of available information about recent use through the gate, so these sample goals remain targets.

The survey will be one page in length and assess 1) basic recreation information (e.g., where did you go and what did you do?) and evaluations of key conditions (e.g., crowding, flow levels, access options). Finally, the survey will ask for contact information so respondents can be invited to participate in the long-from survey with more detailed questions about their history of recreation use in the area, the proposed Project, and their evaluations of potential impacts or PM&E measures.

7.8 Hydrology analysis

This element involves summarizing recreation-relevant hydrology and identifying existing and potential operational constraints on alternative flow regimes. It will also analyze boatable and fishable days with and without the proposed Project by applying acceptable and optimal flow ranges specified through other elements of the study (particularly the long-from survey). If needed, analysis may address flow ranges for shorter periods than an entire day, which may require use of 15 minute gage data.

7.9 Existing Use Trend Analysis

This component of the study will extrapolate estimates of existing use into the future by applying North Fork-specific use trends (if available). These will also be modified by professional judgments based on North Fork-specific interview, focus group, or survey information and larger regional or national recreation participation information. These extrapolations will be applied in basic spreadsheet models with assumptions clearly specified.

7.10 Integrated Report

Recreational activities to be assessed to include, but are not limited to: fishing, hunting, foraging, guiding, camping, hiking, wildlife viewing, sightseeing, bicycling, off-road vehicle use, and winter recreation. The seasonality of each activity will be described, and mapped locations of existing or planned facilities and use areas, including dispersed recreational use, provided.

The study will create an integrated report on the full range of recreation information. The report will include:

- Summary of study context and objectives.
- Summary of the proposed Project facilities and access changes.
- Summary of recreation resources and facilities, including locations of user-created trails and road networks used to access the river corridor.
- Summary of recreation opportunities that will include estimates of current and potential use, key access or activity locations, seasonality of use, and characteristics of users and their trips.
- Representative photographs of recreation opportunities, access points, and locations.
- Survey findings about preferred flow levels and flow regimes for flow-dependent recreation opportunities (e.g., boating and fishing). This will include individual flow preference curves for different opportunities, estimates of boatable or fishable days under existing and potential future flow regimes, and estimates of use under existing and potential future flow regimes.
- Effects of altered flows and geomorphology on boating opportunities by integrating recreation findings with those being developed in the Instream Flows Study (for fish) and the Geomorphology, Large Wood, and Sediment Study.
- Representative photos of different flow levels at key sites for flow dependent and flow-enhanced activities.

- Survey findings from evaluations of flow, access, or other potential PM&E measures that may be suggested to address potential Project impacts.

The report will be produced as a draft and circulated among stakeholders and agency staff for comments. Researchers will also make a presentation summarizing key findings at this time, allowing additional comments and recommendations for a Recreation Management Plan (RMP). This allows study findings to segue into collaborative PM&E settlement discussions among larger stakeholder groups. Following a comment period, a final report will be prepared.

8 PROGRESS REPORTING

In accordance with 18 CFR §5.11(b)(3), this section describes provisions for periodic progress reports. It describes the manner and extent to which information will be shared; and the time allotted for technical review of study findings.

Study reports will be submitted as required by the FERC Integrated Licensing Process (ILP). The most recent schedule, issued by FERC in Appendix B of Scoping Document 1, includes a number of opportunities for progress reports, exchange of analysis and results between stakeholders, and information sharing. After proposed study plans are filed with FERC there will be a study plan meeting and comment period before a revised study plan is filed and a comment period passes. Once studies begin, the ILP also has deadlines for an Initial Study Report to be submitted, an Initial Study Report Meeting, and an Initial Study Report Meeting Summary. However, this schedule is subject to change by FERC staff and should not necessarily be relied upon. It is BCH's understanding that any changes to the ILP plan and schedule will be noticed by FERC staff.

Prior to conducting any recreation survey (e.g., post-trip evaluations, on-site intercept surveys, or long-form surveys), the proposed survey instrument will be made available for technical review. All surveys will be posted on the project website (www.blackcanyonehydro.com) with its availability noticed via email to recreation workgroup participants identified in the "Updated Resource Workgroup Protocol" (filed electronically with the FERC on November 27, 2012). Stakeholders will have 15-days from the notice to provide written comments to BCH through the project website's "Contact" tab.

9 SCHEDULE

In accordance with 18 CFR §5.11(b)(2), the schedule for conducting the study is provided in Table 2 below.

Table 2. Recreation Resource Study Schedule

Component	Time period or Completion Date*
Quantify Current Use (cameras)	Fall 2012-December 2013
Existing document review	Jan-Mar 2013
Structured interviews	Jan-Mar 2013
Online post-trip evaluation surveys	Jan-Dec 2013
Survey development focus groups	Mar-Apr 2013
Draft Survey Notice & Comment Period	May 2013
Fieldwork: inventory of trails and sites	Summer 2013
Long-form survey period	Summer-Fall 2013
Draft study report	Dec 2013
PM&E focus groups	Dec 2013
Comments on draft report	Jan 2014
Final report	February 6, 2014

*Dates based on schedule created and presented by FERC in Scoping Document 1 and subject to change.

10 LEVEL OF EFFORT AND COST

In accordance with 18 CFR §5.11(d)(6), the anticipated level of effort and cost are provided in Table 3 below.

The cost for conducting the study and preparing reports is estimated about $95,000 (increasing to $104,000 if an onsite intercept survey is needed to develop the long-form survey sample). Labor and expenses by major study elements are estimated in Table 4 below. Work would be completed by BCH staff and consultants. Interviews, focus groups, survey development and analysis, and report writing will be conducted by researchers with social science training and will follow standard qualitative and quantitative research protocols. Fieldwork and meeting preparation will be conducted by BCH staff.

This cost assumes HFM can provide contact information for a random sample of general recreation users and an on-site intercept survey will not be necessary. If that onsite survey is required, costs would increase by about $9,000 (based on an assumption of about 44 days onsite surveying).

Approximately 3 to 5 days of fieldwork are required to conduct elements described in this study, most focused on inventorying user-created trails and use areas, as well as providing site visits for study researchers.

Table 3. Level of Effort and Cost

Task	Labor & Expenses
Study plan development	6,000
Additional review of existing information and interviews	6,000
Survey development focus group meetings and site visit	17,000
Post-trip evaluation survey development, coding, and analysis	3,000
Fieldwork, onsite use information, and recreation inventory	3,500
Long-form survey development and analysis	11,000
Hydrology analysis	4,000
Existing use and trend analysis	3,000
Aesthetic photo simulations	5,000
Integrated report and RMP	21,000
Findings presentation and PME focus group meetings	16,000
Onsite survey (optional)	9,000
Total	104,500

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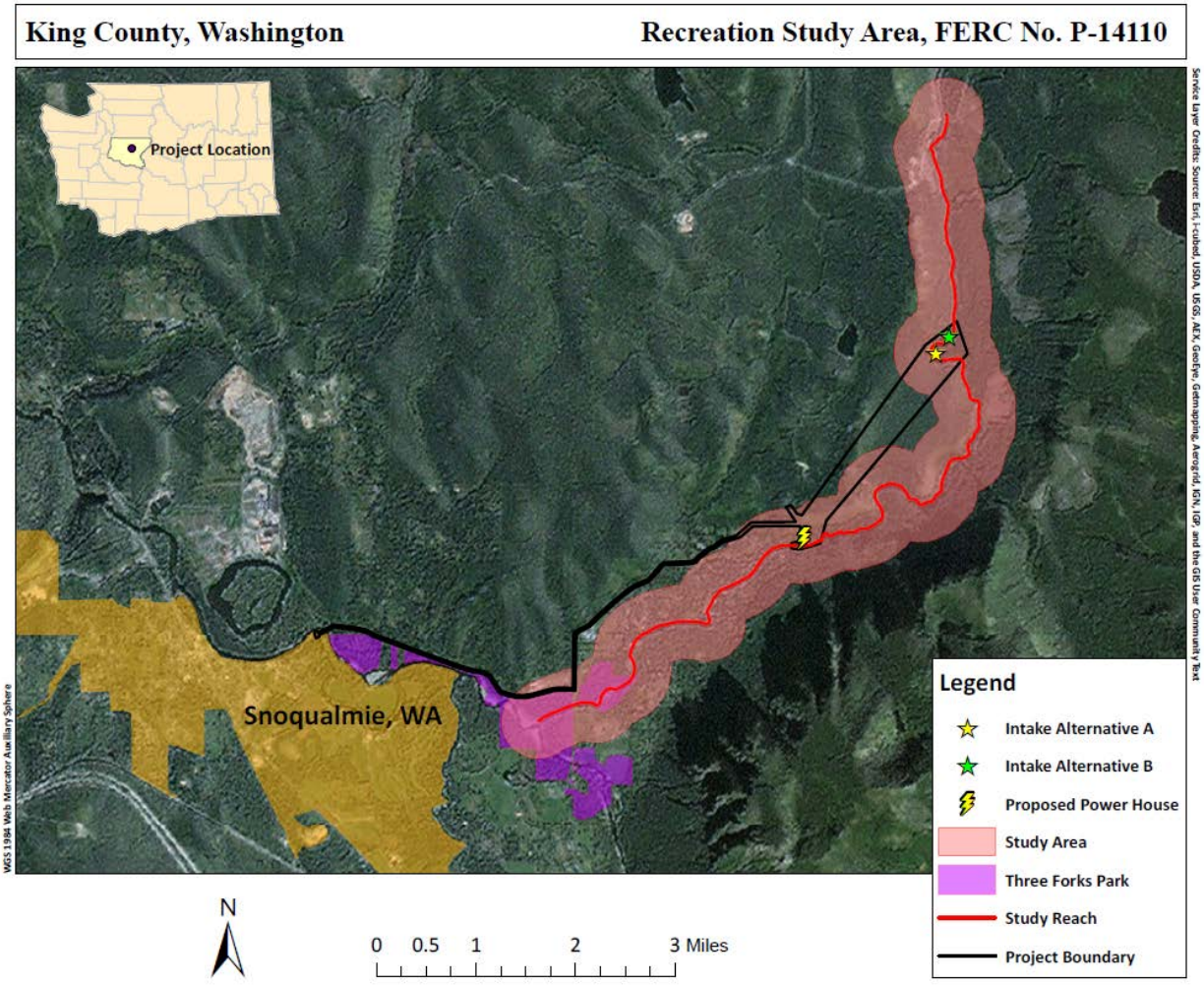
12 APPENDIX A: Recreation Study Area



13 APPENDIX C: Sample Recreation Survey Items

The following items are DRAFT example survey questions that may be included in the 1) post-trip evaluation surveys for boating or fishing or 2) the long-form survey on all recreation opportunities and project issues. Improved draft items will be presented for agency and stakeholder comment prior to their use.

Potential On-Line Post Trip Boating Survey Items

1. Date of trip ____ / ____ / ____

2. Put-in location (check one)
   - ❑ Wagner Bridge (USFS land about 12 miles from MF confluence)
   - ❑ Gate 10 Bridge (about 6 miles from MF confluence)
   - ❑ Other location downstream from Gate 10 Bridge
   - ❑ Other (please specify) _____

3. Put-in and take-out times: _____ to _____

4. Type of craft
   - ❑ Hard shell kayak
   - ❑ Inflatable Kayak
   - ❑ R-2 raft
   - ❑ Other (please specify) _____

5. Number of people in your group _____ boaters

6. Average flow during your trip (USGS gage near Snoqualmie Falls)
   _____ cfs and …
   - ❑ …rising fast
   - ❑ …rising slowly
   - ❑ …steady
   - ❑ …dropping slowly
   - ❑ …dropping fast

7. Please indicate the type of boating opportunity provided at this flow:
   - ❑ Technical boating: Lower flow trips with tight lines through rapids, more time to make maneuvers, less powerful hydraulics, but frequent boatability problems (hitting rocks, increased pinning or sieve hazards).
   - ❑ Standard boating: Medium flow trips with more forgiving lines in rapids, medium-length time to make maneuvers, but with stronger hydraulics and larger waves than technical trips.
   - ❑ Big water boating: Higher flow trips with smaller eddies, less time to make maneuvers, and very powerful hydraulics and large waves compared to standard trips.

8. Please rate today's flow (circle one number):
   1=totally unacceptable
   2= slightly unacceptable
   3=marginal
   4=slightly acceptable
   5=totally acceptable

9. Please provide additional comments on boating at this flow (including any problems you may have had with flows, access, or other management issues):

Potential On-Line Post Trip Fishing Survey Items

1. Date of trip ____ / ____ / ____

2. Locations where you fished (check all that apply):
   - ❑ Near Gate 10 Bridge (about 6 miles from MF confluence)
   - ❑ Other location downstream from Gate 10 Bridge
   - ❑ Other (please specify) _____

3. Number of fish hooked _____, landed _____, and released _____.

4. Hours spent fishing _____ hours

5. Number of people in your group _____ anglers

6. Average flow during your trip (USGS gage near Snoqualmie Falls) _____ cfs and … (check one below)
   - ❑ …rising fast
   - ❑ …rising slowly
   - ❑ …relatively steady
   - ❑ …dropping slowly
   - ❑ …dropping fast

7. Please rate today's flow (circle one number):
   1=totally unacceptable
   2= slightly unacceptable
   3=marginal
   4=slightly acceptable
   5=totally acceptable

8. Please provide additional comments on fishing the North Fork at this flow (including any problems you may have had with flows, access, or other management issues).

Potential Long Form Survey Items

General recreation use questions

1. How many times have you visited the North Fork study area and vicinity in the past 12 months?

2. Please estimate the first year you started visiting the North Fork study area?

3. Please estimate the total number of times you have visited the North Fork?

4. From the list recreation areas below, please indicate those you have visited in the past 12 months and circle the location you prefer the most.

   1. Snoqualmie Falls Viewpoint □
   2. Three Forks Park □
   3. Three Forks Natural Area □

4. Hancock Forest Management Timberlands □
5. Mt. Si or Little Si Trail □
6. North Fork Snoqualmie River (upstream) □
7. North Fork Snoqualmie in Study Area
8. Middle Fork Snoqualmie River □
9. South Fork Snoqualmie River □

5. Which of the following activities do you and/or members of your group typically participate in during your visits to the North Fork? (mark all □ that apply)

1. □ Hiking
2. □ Sightseeing
3. □ Picnicking
4. □ Kayaking
5. □ Hunting
6. □ Bicycling
7. □ Horseback riding
8. □ Snowmobiling
9. □ Fishing
10. □ Photography
11. □ Snow shoeing
12. □ Wildlife viewing
13. □ Resting/relaxing
14. □ Gold panning
15. □ Mineral collection
16. □ Mushrooming
17. □ Berry picking
18. □ Mountain biking
19. □ Riding off-road vehicle
20. □ Whitewater boating
21. □ Cross-country skiing
22. □ Rock climbing
23. □ Other: _____

6. Please identify the three most important activities in the previous list.

Primary: _____ Second: _____ Third: _____

7. Please rate the acceptability of the following recreation resources or facilities in the North Fork Study Area? (on a 5 point unacceptable-acceptable scale).

	Totally unacceptable	Unacceptable	Marginal	Acceptable	Totally acceptable
Road access to the area	1	2	3	4	5
Walk-in access to the area	1	2	3	4	5
Boating launch areas	1	2	3	4	5
Trails to fishing areas	1	2	3	4	5
Trails to scenic overlooks	1	2	3	4	5
Trails to picnic or other river hang-out areas	1	2	3	4	5
ADA accessible trails	1	2	3	4	5
Restrooms	1	2	3	4	5
Parking at railheads or other access areas	1	2	3	4	5
Trail-less primitive areas	1	2	3	4	5
Others to be determined…	1	2	3	4	5

8. How crowded do you typically feel while visiting the area? (Circle one)

	Not at all crowded		Slightly crowded		Moderately crowded				Extremely crowded
While boating	1	2	3	4	5	6	7	8	9
While fishing	1	2	3	4	5	6	7	8	9
Finding parking	1	2	3	4	5	6	7	8	9
Driving roads	1	2	3	4	5	6	7	8	9
Overall	1	2	3	4	5	6	7	8	9

Fishing-specific questions

1. How many years have you been fishing (on any river?) _____ years

2. Please estimate the number of years you have been fishing different segments in the area and …the number of days you fish each segment each year (on average).

	NF in study area	Upper North Fork	South Fork	Middle Fork
Number of years				
Number of days per year				

3. Are you or have you been a commercial fishing guide on the North Fork?
   - ☐ Current guide
   - ☐ Former guide
   - ☐ Not a guide

4. How would you rate your wading ability?
   - ☐ I rarely or never wade while fishing
   - ☐ Novice – prefer slower and shallower wading
   - ☐ Moderately skilled
   - ☐ Highly skilled – comfortable in relatively fast and deep conditions

5. What species do you typically fish for in the Project area and vicinity?
   Fish Species: _____
   Location: _____

6. How often do you typically cross the river to gain access your good fishing locations? (Circle one).
   1. Never – I fish locations that don't require crossings
   2. Occasionally – I may cross on some trips but it is not necessary
   3. Often – I commonly cross the river to access some locations
   4. Always – My preferred fishing locations require crossings for access

7. Do you typically check gage information before fishing this reach?
   1. No
   2. Sometimes
   3. Yes

8. Please rate the acceptability of the following flows for the type of fishing you prefer. (Circle one number for each row; if you did not fish a flow or feel uncomfortable rating it, leave that row blank).

	Totally unacceptable	Slightly unacceptable	Marginal	Slightly acceptable	Totally acceptable
50 cfs	1	2	3	4	5
100 cfs	1	2	3	4	5
150 cfs	1	2	3	4	5
200 cfs	1	2	3	4	5
250 cfs	1	2	3	4	5
300 cfs	1	2	3	4	5
350 cfs	1	2	3	4	5
400 cfs	1	2	3	4	5
500 cfs	1	2	3	4	5
700 cfs	1	2	3	4	5

9. In general, please specify the acceptable and optimal flow ranges for fishing the North Fork?

Acceptable flow range: _____ to _____ cfs
Optimal flow range: _____ to _____ cfs

Whitewater boating specific questions

1. How many years have you been whitewater boating (on any river?)
_____ years

2. Please estimate the number of years you have been boating different segments in the area and …the number of days you boat each segment each year (on average).

	NF in study area	Black Canyon	Other Class V runs	Other Class III-IV runs
Number of years				
Number of days per year				

3. Are you or have you been a commercial whitewater guide on the North Fork?
☐ Current guide
☐ Former guide
☐ Not a guide

4. How would you rate your whitewater boating ability?
   ☐Advanced
   ☐Expert

5. Please estimate the total number of kayakers in western Washington that you think are capable of running Ernie's Gorge?

6. Do you typically check gage information before fishing this reach?
   1. No
   2. Sometimes
   3. Yes

8. Please rate the acceptability of the following flows for the type of boating you prefer. (Circle one number for each row; if you did not fish a flow or feel uncomfortable rating it, leave that row blank).

	Totally unacceptable	Slightly unacceptable	Marginal	Slightly acceptable	Totally acceptable
200 cfs	1	2	3	4	5
300 cfs	1	2	3	4	5
400 cfs	1	2	3	4	5
500 cfs	1	2	3	4	5
650 cfs	1	2	3	4	5
700 cfs	1	2	3	4	5
800 cfs	1	2	3	4	5
900 cfs	1	2	3	4	5
1,000 cfs	1	2	3	4	5
1,100 cfs	1	2	3	4	5
1,250 cfs	1	2	3	4	5
1,500 cfs	1	2	3	4	5

9. In general, please specify the acceptable and optimal flow ranges for boating the North Fork?

   Acceptable flow range: _____ to _____ cfs
   Optimal flow range: _____ to _____ cfs