Yakama Nation Upper Columbia River Habitat Restoration
River Safety Assessment Project Report
Upper Wenatchee River Study Reach

Submitted to

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From

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Notice

On-river assessments conducted for this project are designed to characterize recreation use and existing large wood or other features of the river. This study does not endorse specific boating/tubing, scouting, or portaging options for future river users. The assessments will not specifically endorse particular craft or skill levels for specific reaches or flows, nor are they intended to identify specific locations of potential natural or human-built obstacles or hazards for recreation or navigation purposes. All river users need to make their own decisions about whether or how to scout, run, and/or portage these reaches during any on-river boating or tubing activities. These decisions should be based on several sources of information, knowledge of their own skill and equipment, and direct observation of a river's conditions.

Rivers are inherently hazardous settings and may be physically, mentally, and emotionally stressful, or may aggravate existing physical, mental or emotional conditions. Boating or tubing on rivers may result in damage to or destruction of personal property; serious physical injury or even death arising from a variety of hazards including, but not limited to (and by way of example only), rocks, hazardous terrain, trees, debris, powerful waves, waterfalls, hydraulics, and various man-made or natural hazards; and difficulty or improbability of rescue.

Table of Contents

I. Introduction

In 2012, the Yakama Nation Fisheries hired MIG, Inc. to conduct a detailed study of boating recreation and boater safety along a series of rivers in north central Washington, in support of the Upper Columbia Habitat Restoration Project. This report focuses on the Upper Wenatchee River (Figure 1), from the headwaters at Lake Wenatchee to Tumwater Campground approximately 20 miles downstream (RM 54 – 35.5). The goal of this report is to provide a resource in support of the Yakama Nation and partners as they continue to seek ways to balance the safety of recreation users with the many habitat benefits their restoration projects provide for salmonid species.

MIG employed a mix of qualitative and quantitative methods to complete the following tasks:

- Characterize existing boating recreation and County search and rescue response capability;
- Establish a baseline characterization of existing large woody material (LW) with respect to river navigability during the high-use season;
- Present a series of perspectives on potential boating hazards, including large wood, and related river management approaches; and
- Provide a programmatic assessment of potential structural enhancements and large wood projects.

This report includes the following sections:

- Introduction
- Study methods
- Characterization of recreation use
- River safety perspectives
- Evaluation of existing large wood
- Key findings and next steps

Figure 1: Upper Wenatchee River Regional Context

USFS LAND

OKANOGAN COUNTY
CHELAN COUNTY

20

BREWSTER

Lake Chelan

USFS LAND

CHELAN

Lake Wenatchee

Upper Wenatchee Study Area Reach
(River Miles 35.5 - 54.0)

SNOHOMISH COUNTY
KING COUNTY

2

TUMWATER CAMPGROUND

Columbia River

LEAVENWORTH

2

2

CASHMERE

97

WENATCHEE

90

Lake Easton

Cle Elum Lake

DOUGLAS COUNTY
GRANT COUNTY

97

CHELAN COUNTY
KITTITAS COUNTY

KING COUNTY
PIERCE COUNTY

ELLENSBURG

USFS LAND

N

90

0 5 10
Miles

KITTITAS COUNTY
YAKIMA COUNTY

M I G

II. Study Methods

A Dynamic, Mixed-Methods Approach

Data collection for the Upper Wenatchee River began in June 2012 and ended the first week in September 2012. The study timeline and approach (outlined more specifically in Appendix A) were necessarily dynamic in nature to account for a rapid project start-up, quickly changing seasonal flows, and varied and limited availability of candidate interviewees, survey participants and on-water panelists.

The study team gathered information about the Upper Wenatchee River via a number of activities, including:

- A series of informal discussions and in-depth interviews;
- In-person surveys of boaters and tubers;
- User counts and first-hand observations of river use;
- On-water assessments and characterization of existing large wood and potential large wood hazards; and
- Review of existing reports and studies, including review of potential structural enhancement restoration projects.

A brief discussion of methods for each activity is provided below.

Boater and Expert Interviews

As part of this study, MIG conducted in-depth interviews with river users and others with first-hand knowledge of and experience on the Upper Wenatchee River. Interview questions were designed with the following objectives in mind:

- Obtain information about potential survey locations and recreation (i.e., boating/tubing) use levels;
- Obtain general impressions of current safety hazards within the Upper Wenatchee River study reach;
- Obtain general impressions of safety hazards associated with habitat restoration actions; and
- Recruit participants for on-water LW assessments.

Six formal telephone interviews were completed for the Upper Wenatchee River. Interviewees included County swiftwater rescue personnel, local commercial outfitters who serve or have served boaters of this reach, USDA Forest Service (USFS) personnel, residents of adjacent riparian properties, and boaters of varying skill and experience.

The information collected during interviews was used to help craft the survey instrument, approach and timeline, and directly informs findings presented in this report. The list of project interviewees is included as Appendix B.

Boater Surveys

In Summer 2012, MIG conducted in-person surveys of Upper Wenatchee River boaters and tubers. Surveys took place on three weekends during the 2012 peak use season and during peak afternoon and evening hours for a total of seven days.

The goal of surveying boaters and tubers was to collect information related to the participants' most recent river trip. Specific questions focus on the following:

- Use and experience levels;
- Easily observable or identifiable behaviors that may play a role in determining relative on-water risk, such as type of watercraft and use of personal flotation devices;
- User perceptions of river hazards; and
- Management preferences related to safety-related information and on-river conditions.

Data collection staff largely targeted boaters and tubers just completing their float and coming directly off the river, and so the majority (though not all) of responses related to the respondent's "most recent trip" are assumed to be based on that day's experience. The team began the study with five potential survey locations in mind (Table 1), based on the community's identification of five popular take-out locations (via interviews and informal discussions). To maximize the number of surveys completed, the most popular take-outs were visited most often.

To collect data from a representative sample of boaters, MIG staff contacted every party they encountered and asked if they wanted to participate in a brief survey. Requiring MIG staff to do this eliminated the potential bias associated with only approaching a particular type of person (e.g., male versus female, young versus old). Data were collected for as much of the summer season as was feasible, given the project scope and start date. The dates during which data were collected represented both holiday and non-holiday weekends; weekday sampling was explicitly avoided due to very low boating or tubing use that occurs during that time period. Finally, sampling occurred on days associated with a range of in-stream flows representing a variety of boating or tubing conditions.

A total of 133 people completed the survey. Surveys were self-completed on paper. Not every participant provided an answer to every question. Table 1 provides an overview of survey locations, surveys completed and flow conditions corresponding to the user experience.

Table 1: Upper Wenatchee River Survey Locations, Numbers and Conditions

	Number of surveys completed	Primary Survey Locations	River Flow (Range)[1]
Weekend 1: *Fri, Aug. 10 – Sun, Aug 12*	25	Mosquito Alley[2] Beaver Valley Bridge[3] River Road "Beach" Ponderosa Community Club Tumwater Campground	1,390 – 1,710 cfs
Weekend 2: *Sat, Aug 18 – Sun, Aug 19*	52	Ponderosa Community Club Beaver Valley Bridge	1,160 – 1,230 cfs
Weekend 3: *Sat, Sept 1 – Sun, Sept 2*	56	Mosquito Alley Ponderosa Community Club Beaver Valley Bridge	606 – 661 cfs

[1] USGS Stream Gauge at Plain, Washington.
[2] Beaver Valley Road cerca Mile Post 16.
[3] Commonly referred to as "Plain Bridge" by survey respondents.

Observation Data: Recreation Use Levels

Observational data were collected for this study to help make preliminary estimates of boating and tubing use levels, and to count and describe large woody material and other notable features in each study reach. Observational data to help estimate boating and tubing use levels were collected during the three weekends corresponding with in-person boater surveys. Recreation use estimates were cross-referenced with other estimates of use provided by surveyed boaters, interviewees and agency reports (to the extent they are available and relevant).

On-Water Assessment of Existing Large Wood

Well established protocols exist for using boater panels to conduct on-water evaluations of boatability (Whittaker et al., 1993), and numerous studies reflect those protocols. For this project, however, the on-water evaluation focused specifically on one attribute with potential to affect boatability: the presence of large wood in the water. The assessment protocols used in this study are accurately described below, but no research has evaluated whether other panels applying the same protocols would produce reliably similar results.

Observational data for large woody material (LW) were collected during the on-water boating assessments. Staff and expert volunteers recorded the location and defining characteristics of LW and classified it based on relative potential risk to tubers and boaters. Each location was assigned GPS coordinates and, for illustrative purposes, photographs were taken of LW characteristic of a given reach or risk level.

Boater panels comprised of experienced boaters, local search and rescue staff, and agency/stakeholder staff participated in the on-water evaluations. On-water LW assessments occurred at the following three flows, as measured at the stream gage located near Plain, Washington:

- High flow *(pilot assessment):* 4,900 cfs on July 20, 2012
- Medium flow: 1,900 cfs on August 8, 2012
- Low flow: 570 cfs on September 5, 2012

Each assessment occurred on a single day, with the group beginning at Lake Wenatchee, and ending at Tumwater Campground. Figures 2 and 3 (later in this report) depict locations of LW data collected during the assessment (discussed in Section V). Table 2 provides a summary of on-water panelist skills and experience.

All trips were completed without incident. Panelists identified and evaluated LW pieces and clusters as a group, with the intent of characterizing each identified large wood piece or cluster based on consensus opinion.

Table 2. Summary of Boater Panel Characteristics

Name	Affiliation	Skill Level	Craft used	Flow level evaluated
Panelist 1	Chelan County Swiftwater Rescue, outfitter-guide	Class III	Inflatable kayak	Medium
Panelist 2	Outfitter-guide	Class III	Tube	Medium
Panelist 3	Chelan County Sheriff's Office	Class III	Stand-up paddleboard	Medium
Panelist 4	River guide and kayaker	Class III	Kayak	Medium
Panelist 5	River guide and kayaker	Class IV	Inflatable kayak, raft	Low, Medium, and High
Panelist 6	River guide and kayaker	Class IV	Inflatable kayak	Low
Panelist 7	Paramedic at Cascade Medical	Class IV	Inflatable kayak	Low
Panelist 8	Yakama Nation	Class II	Cataraft	Low and High

Protocols were developed prior to the July 2012 high flow pilot run in July, then revised for more detailed and systematic data collection at target medium and low flows in August and September. LW categories and panelist instructions for classifying LW are summarized in Table 3. The variables used to classify LW included:

1. Location of LW in the channel (right side, center, left side)
2. Channel (identified as main or side channels)

3. LW projection into the channel (as a rough percentage of the boatable channel)
4. LW angle relative to bank/channel
5. Current power
6. Roughness: amount of branches
7. Complexity: ranges from a single log to a group of logs
8. Sight distance: line of sight from a boater's perspective approaching LW from upstream

The LW classification system was developed by MIG to rate the degree to which large woody material in the river could create navigability challenges. Large woody material was classified using a scale of "A" thru "F." This on-water assessment focused on collecting information (location and key characteristics) for LW classified as "Type C" or greater. LW pieces or clusters classified as a Type C have one or two characteristics that increase the potential for a boater to interact with it, relative to Type B LW. At the highest end of the rating system, LW classified as a "Type F" would be LW that spans the entire channel and requires boater portage.

LW pieces or clusters classified as a Type C have one or two characteristics that increase the potential for interaction with a boater. In general, routine navigation allows a boater or tuber to avoid contact with a Type C, but contact could occur if he/she is inattentive or unskilled. Type D LW requires boaters to engage in active navigation (defined here as involving at least one substantial positive maneuver) to avoid contact with a Type D. In other words, routine navigation may not be sufficient to avoid contact with LW characterized as Type D. If contact occurs with Types C or D, consequences are uncertain and could be serious.

Table 3. Large Wood Types and Evaluation Protocol

LW Type and Assessment Action	Type Description
A *(do not count)*	• Located below ordinary high water but dry or projecting into boatable current less than 5 feet at this flow.
B *(do not count)*	• In general, it would take active navigation toward LW to make contact with a Type B, and the consequences of contact are generally low. • Located in water at this flow but generally has a small projection into boatable channel. • Located in side channels or on the inside of a bend, or is aligned parallel to current (so there is little current pressure against the obstacle). • Typically in a reach with lower current power and velocity. • Generally fewer logs in the cluster, little "roughness" or "complexity," and easy to see from a distance upstream.
C: *Count, characterize, GPS and take select photos*	• In general, "routine navigation" allows a floater to avoid contacting a Type C, but contact could occur if a floater is inattentive or unskilled. • If contact occurs, consequences are uncertain and could be serious. • Compared with "B", one or two characteristics increase potential for boater interaction. • At least one characteristic is one level higher than "low" but none is at "high levels."
D: *Count, characterize, GPS and photograph all*	• In general, these require floaters to engage in "active navigation" (at least one substantial positive maneuver) to avoid contact with a Type D ("routine navigation" may not be sufficient to avoid). • If contact occurs, consequences are uncertain and could be serious. • Three or more characteristics increase potential for interaction (at least one level higher from "low,") or there is at least one characteristic that is at a "high" level. • Center piling bridges and similar man-made features also fall into this category.
E: *Count, characterize, GPS and photograph all. When relevant, estimate width of boatable channel (in feet) and describe other navigation issues (eddy locations, class of rapid if relevant, etc.).*	• A boatable channel may exist, but substantial "active and accurate navigation" is likely needed to avoid contact. • If contact occurs, consequences are uncertain and likely to be serious. • Multiple characteristics at "high" levels that substantially increase potential for contact.
F: *Count, characterize, GPS and photograph all. Describe eddy and portage characteristics.*	• Channel spanning LW or characteristics that prevent navigation (portage required).

III. Characterization of Recreation Use

Overview of Boating and Tubing on the Upper Wenatchee

American Whitewater describes the Upper Wenatchee as mostly a Class II river. Starting at Lake Wenatchee, most of the river is Class I, but there are a few Class II rapids upstream of the bridge in Plain, a commonly used boat access point. According to local outfitter-guides, this reach is essentially Class I at low flows. Even at high flows, this reach is never more challenging than Class I-II+ whitewater. The only Class II+ rapid is a wave train through a left-hand turn that has a larger hydraulic on the inside of the bend at about RM 40.8.

The boating season for the Upper Wenatchee generally runs from April to October. During the peak summer season, when the weather is warm and water levels are relatively low, interviewees estimate that anywhere from 40 to over 100 people float the river on a given weekend day. Saturday is generally the most popular day on the river. Actual observed use during surveys and counts exceeded these estimates. An average of 130 boaters/tubers per day was observed, with an average of 23 groups per day.

During the week, use is far less frequent. Observations suggest that only a small number of groups or individuals float this reach on a typical weekday during boating season. On-water panelists encountered six adult boaters or tubers total during the August 8th assessment, and two adults from the Washington Department of Fish and Wildlife on September 5th (both Wednesdays). According to one County Swiftwater Rescue deputy interviewed, it is rare to see someone floating the Upper Wenatchee on a weekday.

American Whitewater (2012) reports a boatable range of 15,000 cubic feet per second (cfs) to 400 cfs, below which flows become unboatable. On-water assessment participants rated all flows as acceptable for boating in several craft, although the lowest flow had two shallow riffles areas that required participants to walk their boats briefly. On-water panelists also rated the amount of large wood as acceptable at all flows for the craft and skill level of those who commonly use the river.

River access is limited, particularly for boaters and users who do not have access to private property along the river. Some existing access points have steep slopes, lack of eddies, and nearby LW or other constructed hazards (e.g., exposed rebar, bridge pilings, etc.). One interviewee shared that his personal trips down the river have decreased significantly due to limited river access. Lack of river access is viewed by another interviewee as an important boating safety issue in that it can force a longer trip than boaters are prepared for.

The most commonly used access points include the following locations:

- Lake Wenatchee State Park
- Mosquito Alley
- "Plain Bridge" (i.e., Beaver Valley Bridge)
- River Road "Beach"

- Ponderosa Community Club
- Tumwater Campground

Roughly ten percent of survey participants reported that they ended their trip at a private residence along the river. All known public or semi-private river access points identified during this study are shown on Figures 2 and 3.

River User Profile

This section presents a profile of boaters and tubers of the Upper Wenatchee River based primarily on results of the in-person surveys conducted for this project (Summer 2012). Descriptions are also informed by direct observations and interviews.

Nature of Trip and Group Characteristics

By and large, trips down the Upper Wenatchee River are made by private boaters or tubers. Commercial outfitters who once rented tubes or ran groups down this portion of the river no longer do so, with required permitting and lack of physical river access the primary reasons for discontinuing services. Only one of 133 Summer 2012 survey respondents described his most recent trip as a commercial trip. All others characterized their most recent river trip as private.

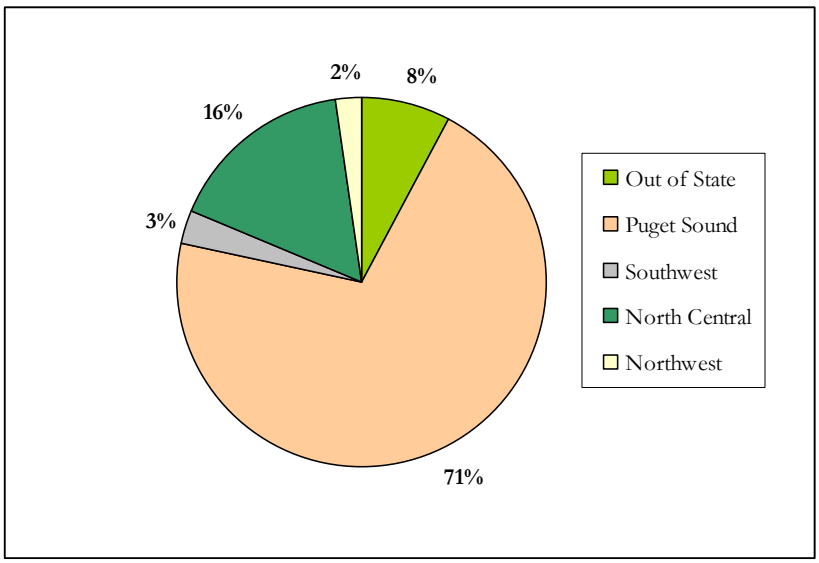
Group sizes ranged from one to over ten people. Ninety-eight percent of participants stated that their group included at least one adult. Over 35 percent and 2.6 percent of respondents had at least one young adult and at least one child under the age of 13 in their group, respectively. About two-thirds of users counted were adults (68.5%), and only about one-third (30.6%) of all respondents were observed wearing a PFD.

Location of Residence

The majority of survey respondents (71%) claimed Seattle/Puget Sound as their region of residence. Local residents (North Central Washington, primarily from Leavenworth and Wenatchee) comprised 16 percent of survey respondents. Out-of-state boaters made up 8 percent of all survey participants. Figure 4 illustrates the areas of residence of the survey sample.[1]

[1] Residency was reported by zip code and aggregated according to region, with regions defined by "Access Washington" (http://access.wa.gov/visiting/resources/washingtonmaps_images.aspx, accessed September 20, 2012). Northwest Washington includes all of Skagit County; Southwest Washington includes Clark and Cowlitz counties.

Figure 4: Survey Respondent Areas of Residence (Washington State and Out of State)



On-Water Experience

Survey respondents represent a range of boating skill levels. Reported boating and tubing experience levels on the Upper Wenatchee ranged from 0 to 42 years. Respondents reported an average 13.3 years of overall experience floating and tubing rivers; the median level of experience reported was 10 years. Approximately 17 percent reported two or fewer years of on-water boating or tubing experience.

Over 90 percent (91.1%) of participants claimed at least one year of former boating experience on the Upper Wenatchee River, and 62.5 percent of participants have prior experience floating the Upper Wenatchee on an inner-tube.

Craft and Skill Level

Over one-third (37.4%) of those who reported which type of craft they used personally floated the river using a raft, compared to almost 28 percent who reported floating in inner-tubes. Slightly over one-quarter (25.3%) used kayaks (Table 4), and over eight percent of survey participants used "other" craft types, primarily canoes. Use of one "pool toy" was reported.

Observational data collected on boaters and tubers indicated that most users floated the Upper Wenatchee in a tube (49.3%). This proportion of craft type is higher than what survey respondents reported, possibly due to field staff combining "cheap" vinyl rafts with inner tubes during user counts.

Table 5 presents self-reported skill levels in the craft used during the day's float. Nearly 60 percent of those surveyed are self-identified Class II boaters, and nearly 17 percent feel most comfortable boating a Class I river. However, this response may be overstated by the 27.7

percent of people who used inner-tubes, which by their very nature limit control, maneuverability and line of sight.

Table 4: Type of Craft Personally Used on Trip

Type of Craft	Response Percent[1]	Response Count
Raft (Total)	**37.4%**	**31**
Raft (multi-chamber)	22.9%	19
Raft (vinyl/cheap)	14.5%	12
Kayak (Total)	**25.3%**	**21**
Kayak (inflatable)	18.1%	15
Kayak (hardshell)	7.2%	6
Inner-Tube (Total)	**27.7%**	**23**
Inner-tube (covered, high quality manufactured)	16.9%	14
Inner-tube (black tire)	3.6%	3
Inner-tube (cheap/vinyl)	7.2%	6
Cataraft	**1.2%**	**1**
Other (please specify)	**8.4%**	**7**
Totals	**100%**	**83**

[1] Numbers reflect only those who reported the one craft used personally (i.e., those who provided only one answer to the question, "What type of boat/craft did you use today or on your most recent trip?)

Table 5: Skill Level in Craft Used Day of Float/Survey

Answer Options	Response Percent	Response Count
Class I: Moving water with a few riffles and small waves. Few or no obstructions.	16.8%	22
Class II: Easy rapids with smaller waves, clear channels that are obvious without scouting. Some maneuvering might be required.	59.5%	78
Class III: Rapids with high, irregular waves. Narrow passages that often require precise maneuvering.	16.0%	21
Class IV: Long, difficult rapids with constricted passages that often require complex maneuvering in turbulent water. The course may be hard to determine and scouting is often necessary.	4.6%	6
Class V: Extremely difficult, long, and very violent rapids with highly congested routes, which should be scouted from shore. Rescue conditions are difficult, and there is a significant hazard to life in the event of a mishap. The upper limit of what is possible in a commercial raft.	3.1%	4
Totals	100%	131

Nearly 60 percent (59.8%) of boaters/tubers surveyed stated that the day's flow was below their skill level. This is reflective of the slow current speeds and lack of whitewater challenge generally characteristic of this reach during the high use season. Almost 40 percent (39.4%) stated that the flow was at their skill level. Only one of the 127 people who answered stated that the day's flow was above his/her skill level.

Safety-Related Behavior

When reporting on their most recent trip, 46 percent of survey participants reported that no one in their group wore a personal flotation device (PFD). In comparison, 31 percent claimed that all group members wore a PFD, which is consistent with observational findings; 23 percent answered that "some" group members wore PFDs. One interviewee who lives in the Ponderosa community reported that only a small fraction of people he has witnessed pass by or come off the river at the Ponderosa Community Club wear PFDs.

Anecdotal evidence indicates that some boaters and tubers consume alcohol on their trip. However, observational data collected during the three weekends when surveys were administered indicated four out of 141 groups were intoxicated. MIG staff observed about 20 percent of all those observed had coolers with them, but direct observation of groups consuming alcohol was low, with one other group (in addition to the four referenced above) transporting alcohol.

Nearly two-thirds (62.3%) of all survey respondents did not obtain information about boating conditions prior to their trip. Of those who did, almost 90 percent (87.5%) received information via word of mouth, while almost one in ten respondents (8.9%) sought information online (Table 6).

Table 6: Where respondents obtained information for their trip[1]

Answer Options	Response Percent	Response Count
Word of mouth	83.5%	56
Website	8.9%	6
Spoke with representative of Forest Service or Washington State Parks	1.6%	1
Heard or saw a public service announcement	0.0%	0
Other	6.0%	4
Totals	100%	67

[1] Responses to this question represent those respondents (n=67) that indicated they had obtained information prior to their trip.

IV. River Safety: Perspectives, Management and Response

This section describes Chelan County organizational response capabilities to boating-related emergencies, including search and rescue resources and general dispatch procedures for the Upper Wenatchee River. It also describes survey respondents' perceptions of on-water conditions that may impact boater safety.

County Search and Rescue Capabilities

The Sheriff's Office Department of Emergency Management provides the primary resources for all river-related safety incidents in Chelan County. This Department includes the Search and Rescue Unit, the Marine Patrol Unit and the Swiftwater Rescue Unit. These three units work in collaboration with a variety of on-call responders and volunteers throughout the county.

The following section outlines the search and rescue resources and general dispatch procedures for the Upper Wenatchee River.

Initial Dispatch

Almost every safety incident report is called into the emergency 911 line, where dispatchers send the necessary resources to the area. For river-related safety incidents on the Upper Wenatchee reach, the following resources are automatically dispatched:

- Emergency responders, through the Sheriff's Department;
- A basic life support vehicle stationed at Lake Wenatchee and staffed with emergency medical technicians with advanced training;
- A Cascade Ambulance paramedic unit based out of Leavenworth; and
- Volunteer firefighters from District 9 Fire Department.

Department of Emergency Management Units

The Search and Rescue, Marine Patrol and Swiftwater Rescue Units are all Special Operations Units within the Department of Emergency Management. These resources are called upon by the Chelan County Sheriff's Department if the situation requires their expertise.

The Search and Rescue (SAR) Unit is composed of full-time employees trained in SAR management, the use of specialized equipment and outdoor survival. The SAR Unit also coordinates efforts with the Chelan County Volunteer Services and other volunteer SAR groups.

The Marine Patrol Unit, a component of the Chelan County Sheriff's Office, is responsible for performing rescue operations for any person or vessels in distress on Chelan County waters. The unit operates primarily on Lake Chelan, Columbia River and Lake Wenatchee.

The Unit is comprised of 16 marine deputies with a fleet consisting of three patrol vessels and one available rescue boat. The Unit also assists other divisions and agencies as needed and provides support to the search and rescue missions of the Sheriff's Office. In addition, the Marine Patrol Unit provides boating safety and education classes to the public.

The Swiftwater Rescue Unit is supervised by Marine Patrol Sergeant Randy Foltz. Swiftwater Rescue deputies respond on call to swiftwater incidents, and use a variety of water craft and tools, depending on the circumstance.

If the incident does not escalate into a search and rescue situation, then the Sheriff's Department does not keep special reports on the event. Safety incidents are often called in more as information than as a response, and they are often resolved before responders can get to the scene. Between January 1, 2001 and October 10, 2012 all Wenatchee River incidents occurred outside of the project area.[2] There were six reported incidents in the project vicinity including two at Nason Creek and four on the White River.

Safety and Rescue Volunteers

Although Chelan County Sheriff's Department has overarching authority in emergency response, the volunteer Fire Department acts as support for staff and equipment resources. For safety incidents on the Upper Wenatchee River, the primary Volunteer Fire District is No. 9, which is based out of Lake Wenatchee. District 9 covers the Wenatchee River from Lake Wenatchee to Tumwater Bridge, with any incidents beyond this covered by District 3 out of Leavenworth. District 9 also covers the entirety of Nason Creek.

The District 9 Volunteer Fire Department is comprised of three fire stations located near Lake Wenatchee, in Plain and at Chiwawa Pines. There are 25 volunteers spread throughout the three stations, and the majority of volunteers are formally trained in swiftwater rescue. Another close resource is the District 4 Volunteer Fire Department, based out of the Ponderosa community just south of Plain. These volunteers can be called to aid if additional river rescue resources are needed on the Upper Wenatchee River. District 4 has one head chief and approximately 12 volunteers. District volunteers have "Level 2" swiftwater rescue training. This level of training allows volunteer to perform rescue operation from the shore only (Wilson, 2012, personal communication).

User Risk and Safety Concerns

When asked, "when boating or floating this river, what are your primary safety concerns?" interviewees provided the following responses:

- Ill-prepared and unskilled users;
- Use of inner tubes and cheap rafts by inexperienced users;
- Parents not taking sufficient safety precautions with younger children (cold water, PFDs, etc.);
- Lack of user education about river safety;

[2] Information gathered from e-mail correspondence with Eileen Ervin of the Chelan County Sheriff's Office Emergency Management Unit. (10/10/12).

- Infrequent use of PFDs;
- Inattentive or intoxicated users;
- Lack of safe river access points (steep slopes, woody debris, no eddy);
- Lack of river access (forcing a longer trip than people come prepared to run);
- High, fast-moving spring flows; and
- Obstacles in the river such as logs and rocks.

To help gauge river user perceptions of existing on-water risk, survey participants were asked the question, "In your opinion, what were the greatest risks while you were boating today/during your most recent trip?" Respondents were asked to rate seven items, but were not asked to rank order their responses. In other words, all items could have been rated at a "high level of risk." "Rocks and rapids" were most frequently reported as features of the river that presented "some level of risk," a "high level of risk," or an "extreme level of risk".

These results indicate respondents' perceptions of only the seven items referenced above. The question about reported levels of risk did not include an "other" category, which would have allowed respondents to identify other risk related features not covered by the seven items.

Of the seven possible items, "channel spanning logs" and "large wood blocking parts of the channel" were most frequently noted to pose no risk at all (Table 7). Roughly 40 percent of respondents expressed that large wood on the side of the channel posed a slight level of risk. This is a higher proportion of respondents than the proportion who stated large wood blocking the channel (30.2%), and channel spanning logs (19.7%) posed a "slight level of risk."

Table 7: Reported Levels of Risk During Day's Float[1]

	No risk at all	**Slight level of risk**	**Some level of risk**	**High level of risk**	**Extreme level of risk**	**Don't know**	***Response Count***
a) Fast water	40.2%	40.2%	16.5%	2.4%	0.8%	0.0%	*127*
b) Cold water	42.5%	31.5%	19.7%	5.5%	0.8%	0.0%	*127*
c) Large wood on sides of channel	36.2%	40.2%	19.7%	3.9%	0.0%	0.0%	*127*
d) Large wood blocking part of the channel	55.6%	30.2%	8.7%	4.8%	0.0%	0.8%	*126*
e) Channel spanning logs	68.5%	19.7%	4.7%	5.5%	0.8%	0.8%	*127*
f) Rocks and rapids	21.4%	33.3%	34.9%	9.5%	0.8%	0.0%	*126*
g) Mix of the above	21.6%	45.0%	25.2%	3.6%	2.7%	1.8%	111

[1] Percentages are rounded to the nearest tenth of a percent.

In answer to a separate question, 70 percent of participants stated that potential hazards from large wood on the banks or in the river was either "acceptable" or "totally acceptable"; 26.1 percent either said that they were neutral on the subject, or that they didn't notice. Only

3.8 percent characterized the amount of potential hazards from large wood on the banks or in the river as "totally unacceptable."

One interviewee, a professional river guide who has taught swiftwater rescue courses around the state, shared the following perspective: "Rivers are natural, and we do not consider natural features a river hazard. The user's lack of skill, knowledge and awareness of such river features [lead them to] create their own hazards."

Management Actions to Improve Boating Safety and Experiences

All study survey participants were asked to express their level of support for, or opposition to, a series of potential management actions related to behavioral risk and river safety (Table 8). The following key findings emerged:

- Of all management actions listed in the survey, participants most frequently expressed strong support for: a) using websites to post photos and information about hazards; and b) passing a PFD requirement for boaters/tubers.
- Over 26 percent of respondents strongly support passing a requirement for boaters/tubers to wear PFDs; 19 percent strongly oppose. A couple of participants expressed that their support of such a policy depends on the age of the boater/tuber to whom it would apply.
- Over half (55.4%) of respondents expressed some level of opposition to requiring boaters to self-register before floating the river.
- Fifty percent of survey participants who made note of their opinion on the issue felt "neutral" about providing more large wood information at put-ins and take-outs; placing warning signs about large wood that include directional suggestions received a slightly higher level of support than signs simply identifying large wood hazards.

Survey participants who noted that they believe existing large wood (irrespective of character, interaction with river or location) poses at least "some" level of risk to river users were asked to state whether they supported any of three possible management actions. Sixty-three participants responded. Results are reported in Table 9.

Survey participants most frequently expressed support for posting signs that inform boaters of large wood on the river, with a 38 percent rate of support among this group. Of the nine people who suggested that management agencies take "other" actions, five identified "no action" as their preferred management approach (i.e., "do nothing," "none," "at your own risk").

Table 8: Level of Support or Opposition to Potential Management Actions

Answer Options	Strongly oppose	Slightly oppose	Neutral	Slightly support	Strongly support	Don't know	Response Count
a) Require boaters/tubers to wear PFDs.	19.1%	15.3%	22.1%	15.3%	26.7%	1.5%	131
b) Require boaters to self-register before they float the river (to help agencies monitor use, skill levels, types of craft) and provide an opportunity to warn floaters of large wood hazards.	32.3%	23.2%	19.2%	19.2%	4.6%	1.5%	130
c) More large wood information at put-ins/take-outs.	6.3%	5.6%	50.0%	24.6%	11.9%	1.6%	126
d) Warning signs on site to identify large wood hazards.	8.7%	6.3%	39.4%	27.6%	15.0%	3.0%	127
e) Warning signs with directional suggestions ("go left") at large wood hazards.	10.8%	14.6%	26.1%	29.2%	17.7	1.5%	130
f) Websites with maps and photos of hazards.	7.7%	3.8%	34.6%	24.6%	27.7%	1.5%	130

Table 9: Support for Select Large Wood Management Actions by Participants who View Large Wood as Presenting a Potential Safety Risk

Answer Options	Response Percent	Response Count
Post signs informing boaters of large wood in the river	38.1%	24
Construct portage trails around areas with large wood in the river	12.7%	8
Remove large wood from the river to the extent practical	34.9%	22
Other (please specify)	14.3%	9
	100%	**63**

V. Evaluation of Existing Large Wood

On-Water Assessment Findings

As described in the methods section of this report, large woody material was evaluated and typed based on eight defining characteristics. Only LW with sufficient character to warrant a "Type C" rating or higher was counted and reported. On-water panelists did not identify any Types E or F present. Therefore, findings and related discussion focus largely on LW Types C and D.

As explained in section II above (Study Methods), LW pieces or clusters classified as a Type C have one or two characteristics that increase the potential for interaction with a boater but in general can be avoided with routine navigation by an attentive, skilled boater or tuber. Routine navigation may not be sufficient to avoid contact with LW characterized as Type D; Type D LW requires boaters to engage in active navigation to avoid contact. In general, the consequences of contact with Types C or D are uncertain but could be serious.

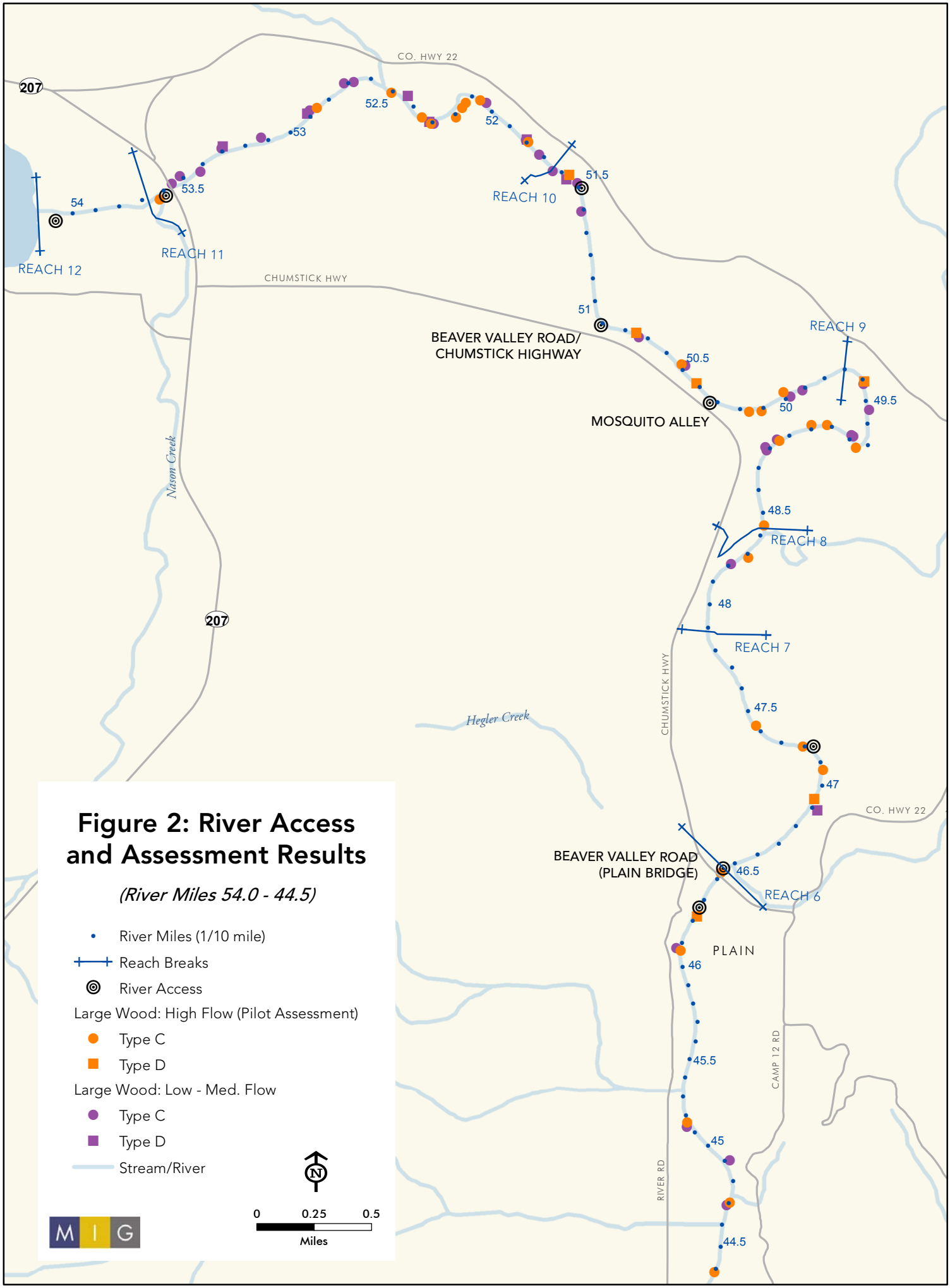
There are few consistent "rules" that determine whether a LW piece or cluster becomes a Type D hazard. Some LW rates higher because of a longer projection into the boatable channel or because of greater approaching current power. Other reasons for rating LW as a potential Type D hazard include a more perpendicular angle relative to the current or because of greater roughness and complexity (as defined in Section II). Few exhibit all of these characteristics at more hazardous levels; the specific geometry of the existing large wood and channel are highly individual and cluster-specific.

Interfluve (2012) conducted a habitat assessment in 2011 noting LW in the same river reach as this study. Most naturally occurring LW identified in this habitat assessment (Interfluve, 2012) are not substantial recreation hazards. Habitat studies identified an average of 123 pieces per mile over the 18.7 miles of river. Assessments conducted for this study estimate only 1.1 to 3.4 LW pieces or clusters (depending on the flow) that rose to a Type C or D.

Table 10 summarizes the number of LW pieces/clusters at different flows and compares it to LW counts from the habitat study (Interfluve, 2012). Counts are presented for individual reaches delineated in the Interfluve study, as well as for the entire study area.

Table 11 summarizes the percent of pieces/clusters with different characteristics for medium and low flows. Figures 2 and 3 illustrate the general locations of large wood clusters characterized as Types C and D relative to known river access points and other features. Data points presented in Figures 2 and 3 reflect represent unique clusters or pieces of LW. Following the on-water assessment, GPS points taken during the low and medium flow assessments were compared, and these were combined where points clearly represented the same LW.

Most of the LW pieces or clusters identified as potentially substantial recreation hazards were characterized as Type C rather than Type D. There are an average of 0.9 to 2.4 Type Cs per mile along the river (depending on flow), but only 0.1 to 0.8 Type Ds per


CO. HWY 22
207
52.5
53
52
53.5
51.5
REACH 10
54
REACH 11
REACH 12
CHUMSTICK HWY
51
BEAVER VALLEY ROAD/
CHUMSTICK HIGHWAY
REACH 9
50.5
50
49.5
MOSQUITO ALLEY
Nason Creek
48.5
REACH 8
48
207
REACH 7
CHUMSTICK HWY
47.5
Hegler Creek
47
CO. HWY 22
BEAVER VALLEY ROAD
(PLAIN BRIDGE)
46.5
REACH 6
PLAIN
46
45.5
CAMP 12 RD
45
RIVER RD
44.5
Figure 2: River Access and Assessment Results
(River Miles 54.0 - 44.5)
River Miles (1/10 mile)
Reach Breaks
River Access
Large Wood: High Flow (Pilot Assessment)
Type C
Type D
Large Wood: Low - Med. Flow
Type C
Type D
Stream/River
N
0
0.25
0.5
Miles
M I G

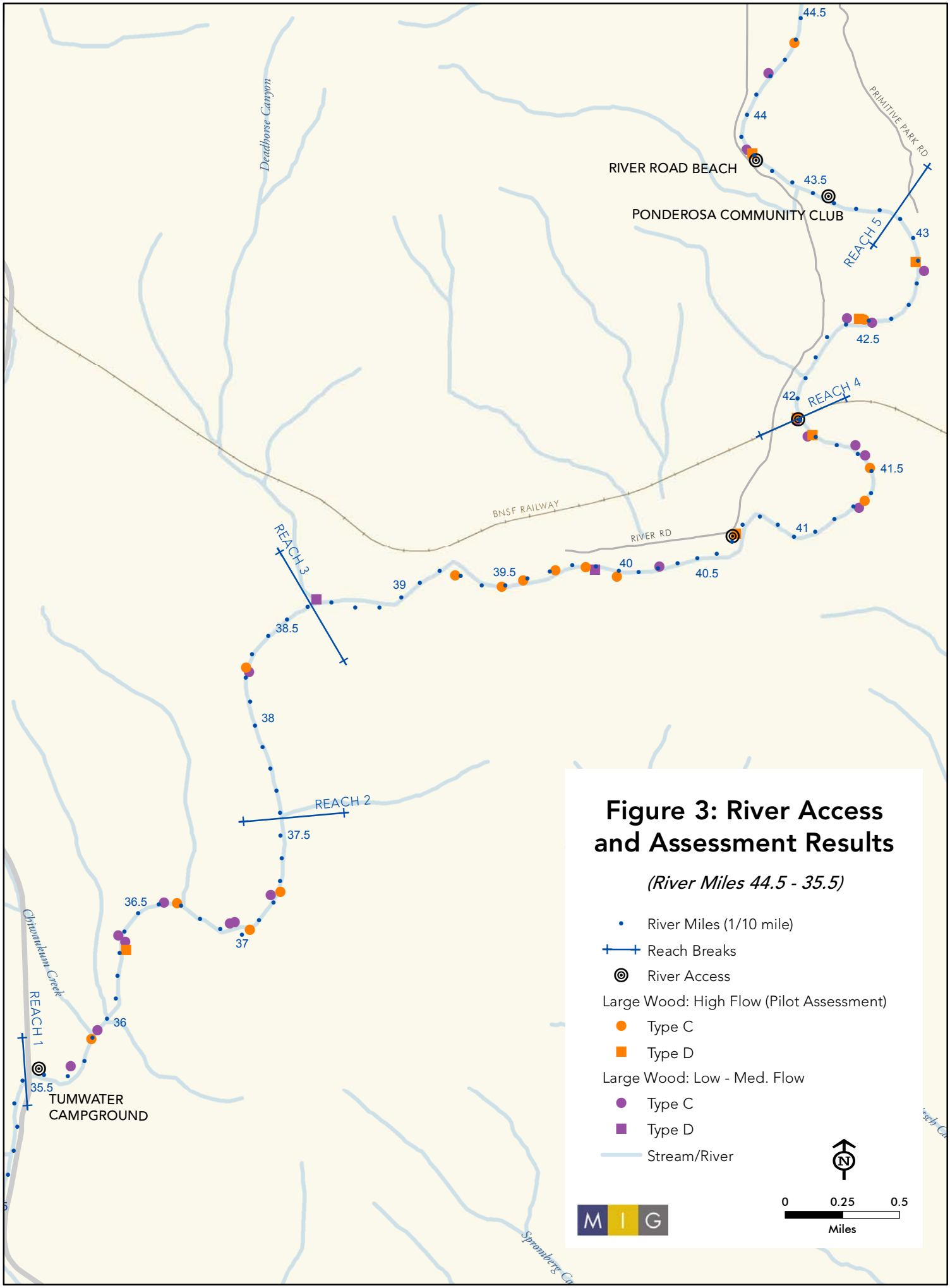

44.5
44
PRIMITIVE PARK RD
RIVER ROAD BEACH
43.5
PONDEROSA COMMUNITY CLUB
REACH 5
43
42.5
42
REACH 4
41.5
BNSF RAILWAY
RIVER RD
41
40
40.5
39.5
39
REACH 3
38.5
38
REACH 2
37.5
36.5
37
Chiwaukum Creek
REACH 1
36
35.5
TUMWATER
CAMPGROUND
Deadhorse Canyon
Figure 3: River Access and Assessment Results
(River Miles 44.5 - 35.5)
River Miles (1/10 mile)
Reach Breaks
River Access
Large Wood: High Flow (Pilot Assessment)
Type C
Type D
Large Wood: Low - Med. Flow
Type C
Type D
Stream/River
N
0
0.25
0.5
Miles
M I G

Table 10. Physical and LW Characteristics of Upper Wenatchee River Segments.

Segment	RM start	RM end	Length	Slope fpm	% riffle	Bankfull width	LW per mile	High flow			Medium flow			Low flow		
								C per mile	D per mile	total per mile	C per mile	D per mile	total per mile	C per mile	D per mile	total per mile
11	53.7	54.2	0.5	2	0	360	242	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	51.7	53.7	2.0	2	20	243	101	6.5	0.0	6.5	4.0	1.5	5.5	2.5	1.0	3.5
9	49.7	51.7	2.0	1	14	282	75	2.5	1.5	4.0	2.5	0.5	3.0	1.0	0.0	1.0
8	48.4	49.7	1.3	2	21	300	57	3.1	1.5	4.6	3.1	0.0	3.1	2.3	0.0	2.3
7	47.9	48.4	0.5	4	54	282	13	2.0	0.0	2.0	2.0	0.0	2.0	0.0	0.0	0.0
6	46.5	47.9	1.4	5	67	240	67	2.9	1.4	4.3	0.0	0.7	0.7	0.0	0.0	0.0
5	43.1	46.5	3.4	4	56	278	32	1.2	0.3	1.5	1.8	0.0	1.8	0.0	0.0	0.0
4	41.9	43.1	1.2	4	30	276	63	0.8	2.5	3.3	2.5	0.0	2.5	0.8	0.0	0.8
3	38.6	41.9	3.3	5	31	270	252	2.7	0.6	3.3	1.2	0.3	1.5	0.6	0.3	0.9
2	37.6	38.6	1.0	4	34	312	47	1.0	0.0	1.0	1.0	0.0	1.0	0.0	0.0	0.0
1	35.5	37.6	2.1	4	10	326	294	3.3	0.5	3.8	1.9	0.0	1.9	2.4	0.0	2.4
Total	**35.5**	**54.2**	**18.7**	**4**	**31**	**280**	**123**	**2.4**	**0.76**	**3.4**	**1.8**	**0.27**	**2.2**	**0.9**	**0.12**	**1.1**

Table 11. Summary of key characteristics of LW recreation hazards (Types C and D) on the Upper Wenatchee River.

	High flow	Medium flow	Low flow
Number of Type C LW (total)	49	36	18
Number of Type D LW (total)	14	6	3
Number of Type C & D LW (total)	63	42	21
Percent projecting 10 to 20 feet	Individual variable data not collected during pilot assessment	10%	29%
Percent projecting 20+ feet		10%	14%
Percent in side channels		14%	33%
Percent angled steeply downstream (30 degrees or less from bank)		71%	48%
Percent perpendicular or angled upstream		12%	19%
Percent with low power / current velocity on facing edge		19%	14%
Percent with high power / current velocity on facing edge		5%	14%
Percent with single log		33%	43%
Percent of clusters with 5+ logs		7%	9%
Percent with "low" roughness (few branches or entrapment spaces)		31%	24%
Percent with "high" roughness (many branches or entrapment spaces)		14%	5%
Percent with "low" complexity		38%	52%
Percent with "high" complexity		14%	5%
Percent with "short" sight distance		7%	10%

mile. Overall, at low and medium flow levels, 82 percent of the more potentially hazardous large wood clusters were Type C, rather Type D. At the high flow, about 71 percent were Type C.

The number of large wood clusters rated C or D increased as flows increase. Medium flows resulted in twice the number of LW Types C and D than low flows (2.2 vs. 1.1 per mile), while the high flow assessment found substantially more Types C and D than those recorded at the medium flow level (3.4 vs. 2.2 per mile). This discrepancy may reflect the more conservative approach to characterization taken during this first high flow assessment, as well as a difference in actual on-river conditions.

Lower gradient river segments 8, 9 and 10 (RM 54 to 48) were found to have more Type C and D large wood clusters. The middle, more developed reaches of the river, corresponding with assessment reaches 5, 6, and 7 (from approximately RM 43 to 48), have relatively lower levels of potentially hazardous LW, especially at low and medium flows. More specific information about the 11 individual segments is shown in Table 6.

Several side channels were not visited by the entire panel during the low flow assessment, resulting in the potential "over-rating" of some LW clusters. In contrast, panelists reached near consensus on assessments of existing LW found in the main channel at all flows. Seven LW clusters during the low flow assessment were located in side channels, and about half of these may be on the border between a Type B and C but were counted as Type C. Rating these as Type B would only further support the general conclusion that lower flows provide many fewer LW hazards, even in side channels (many of which have less than boatable flows for larger craft).

VI. Key Findings

In summary, the final key findings are offered:

- The boating season for the Upper Wenatchee River (RM 54 – 35.5) generally runs from April to October. American Whitewater (2012) reports a boatable range of 15,000 cubic feet per second (cfs) to 400 cfs, below which flows become unboatable. Starting at Lake Wenatchee, most of the Upper Wenatchee River is Class I. There are a few Class II rapids upstream of the bridge in Plain, a commonly used boat access point.

- By and large, trips down the Upper Wenatchee River are made by private boaters or tubers. No commercial outfitters were identified as currently running trips, save for very limited, specially scheduled small group runs down the river.

- River access is limited, particularly for boaters and users who do not have access to private property along the river. Lack of river access, according to some, can force a longer trip than boaters are prepared for. Some existing access points, such as those with steep slopes, are less suitable for use by boaters than tubers.

- Over 90 percent of participants claimed at least one year of former boating experience on the Upper Wenatchee River. Over 62 percent of participants have prior experience floating the Upper Wenatchee on an inner-tube. Nearly 60 percent of boaters/tubers surveyed stated that the day's flow was below their skill level.

- Most naturally occurring large woody material identified in habitat assessments (Interfluve, 2012) does not constitute a substantial recreation hazard. Most of the LW pieces or clusters identified in this study were characterized as "Type C" (78%) rather than "Type D" (see Section II for definitions). Compared with Type D hazards, Type C large wood often blocks less of the boatable channel, interacts with less powerful currents, is angled in more of a downstream position relative to the bank, or has fewer branches and complexity.

- On-water assessment results suggest that the number of "Type C" and "Type D" large woody material increases as flows increase. Overall, lower gradient, upper reach river segments 8, 9 and 10 (RM 54 to 48) were found to have more "Type C" and "Type D" large wood clusters. The middle, more developed reaches of the river, corresponding with assessment reaches 5, 6, and 7 (from approximately RM 43 to 48), have relatively lower levels of "Type C" and "Type D" LW, especially at low and medium flows.

- Of the river features identified as potential hazards for boaters and tubers, study survey participants most frequently noted "channel spanning logs" and "large wood blocking parts of the channel" to pose no risk at all. Thirty-eight percent of survey participants who believe that existing large wood poses at least "some" level of risk to river users

expressed support for posting signs that inform boaters of large wood on the river (the most frequent positive response to the potential management actions offered).

- Over 26 percent of survey respondents strongly support passing a requirement for boaters/tubers to wear PFDs; 19 percent strongly oppose. Over half (55.4%) of respondents expressed some level of opposition to requiring boaters to self-register before floating the river. Fifty percent of survey participants who made note of their opinion felt "neutral" about providing more large wood information at put-ins and take-outs.

Next Steps

This recreation assessment provides a snapshot of river use in late summer 2012. The information in this report will be used to work with nearby communities to develop a river access plan and to conduct outreach on boater safety issues. The data in the recreation assessment will also be used to guide the development of habitat restoration projects in the Upper Wenatchee corridor.

VII. References

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APPENDICES

Yakama Nation Upper Columbia Habitat Restoration
River Safety Assessment Project

Study Work Plan | August 2012

Introduction

This work plan is intended to guide data collection efforts for the Upper Columbia Habitat Restoration Project River Safety Assessment. This plan specifically outlines methodological approach, task objectives, specific tools and methods, and a timeline for data collection and on-water river safety assessments. Health and safety protocols for field data collection also are noted.

The Yakama Nation has identified four river reaches in the Upper Columbia Basin where restoration of salmon habitat could occur, and where river safety assessments are needed for 2012 and 2013. These reaches include:

- Nason Creek (RM 0 – 19)
- Upper Wenatchee River (RM 35.5 - 54)
- Chewuch Reach (RM 0 – 20)
- Twisp River (RM 0 – 8)

Restoration actions could include installing engineered logjams, increasing surface flows, removing dikes and levees, and placing large woody debris (LWD) in the channel. To date, engineered logjams are the central element of proposed restoration concepts for the Upper Columbia project area. Recreational uses that could be affected include rafting, kayaking, canoeing, tubing, swimming and paddle-boarding.

The overall purpose of this project is to maximize river safety for the variety of known and anticipated river users as habitat restoration projects are implemented. To accomplish this, the Yakama Nation must evaluate current large wood occurrences and other safety-related conditions in each river reach under a range of surface flows during spring and summer seasons. If the Yakama Nation is considering habitat restoration actions in a reach that already has been evaluated as "high risk," it will be necessary to consider carefully whether to install additional structures and, if so, to identify the designs and locations that would minimize risk.

Overview of Methodology

A Mixed-Methods Approach

Information about the four study reaches will be obtained via a number of methods, including:

- In-depth interviews and/or focus groups;
- Informal discussions with area residents, outfitters, and agency partners;
- In-person and online surveys completed by casual tubers and boaters, as well as more experienced boaters (as in the case of the Nason, Twisp and Chewuch reaches);
- On-water observations made by expert boaters; and
- Review of existing reports and studies.

The approach applies these different methods for data collection to achieve the following study goals:

Achieve a representative sample. The overall goal of this mixed methods approach is to ensure that the study participants represent the actual populations of river users. For example, if the majority of river users are beginning and experienced boaters and tubers that originate primarily in the Wenatchee/Leavenworth areas, these characteristics should be reflected in data collected. MIG will be able to measure how reliable or representative data are by comparing them to information provided by boating experts and in boating reports for the State of Washington and specific regions. For assessment of on-water conditions, MIG will work to ensure that recorded data are representative of consistent target flow and peak use levels, and that resulting analysis reflects the consensus of a range of expert perspectives.

Collect high quality data. A secondary goal of this study is to collect as much data as possible while maintaining high data quality and applying methodological rigor from start to finish. Our approach in this regard is to collect and document data consistently and accurately, and "cast a wide net" initially in terms of the tools used and participants targeted. Doing so will avoid the need to repeat work to address shortcomings in collected data.

Plan for seasonal flexibility. A third goal of this methodology is to maximize team flexibility to be able to respond to project and seasonal time constraints, rapidly changing river flows, the varied availability of outreach and survey participants and, in some places, infrequent river use. Most immediately, this mixed methods approach will allow the project team to meet data collection goals in the relatively short time in which boatable flows are available in 2012.

A Dynamic Work Plan

This work plan is necessarily dynamic in nature. While this document outlines a clear and carefully defined framework for data collection over the life of the project, MIG anticipates adaptations along the way. Data collection, in-stream studies and related analysis will occur over the course of two primary seasons and target four different reaches, all of which are part of a unique and changing river system. A rapid project start-up window beginning in June 2012 and a shortened 2012 data collection season further necessitate the need for an adaptive approach.

To account for variations in river use, as well as a different profile of river users in the Upper Wenatchee River, the project team will most likely need to modify data collection methods for the 2013 season. The following differences between the Upper Wenatchee River and the other three study reaches are anticipated to influence chosen tools and methods:

- Differences in the frequency of creek and river use;
- Differences in the most commonly used types of watercraft and the level of skill required; and
- River user "accessibility" as influenced by differences in riparian land ownership and the proportion of local and visiting users.

The MIG team also will consider additional factors when modifying the 2012 data collection approach, such as any notable differences in restoration strategy and concept, as well as and the changing profile of local and regional outfitters, advocates and boating clubs organized and interested in these specific reaches.

With that said, the MIG team will conduct a "lessons learned" de-brief with Yakama Nations staff at the end of the 2012 season and recommend any changes in data collection and assessment strategies and tools needed to achieve project data collection and assessment goals and objectives.

Timeline and Target Flows

In 2012, the MIG team will focus on completing data collection, assessments, analysis and reporting for the Upper Wenatchee reach (see Attachment A for proposed timeline). Data collection for Nason and the Twisp and Chewuch rivers will occur primarily in 2013 (timeline to come). Where possible, the team will take advantage of opportunities to learn about Nason Creek and the other study reaches. An important goal for the 2012 data collection season is to obtain experience with data collection efforts to inform the more robust data collection season in 2013.

Data will be collected during the spring and summer seasons. When data are collected, MIG staff also will collect information on daily flow rates. For each river, the MIG team is tasked with completing field research that corresponds with "medium" and "low" flow levels. The on-river data collection period (i.e., the window to complete in-person surveying and on-water assessments) for all reaches will be limited by seasonal flows and use levels. To help

guide data collection and in an effort to apply an approach consistent across all study reaches, the MIG team has identified the following target ranges for "medium" and "low" flow levels (Table A). These ranges and associated dates have been identified based on July 15 and August 15 median flows and dates associated with target limits for the period of record.

Table A: Target Ranges for On-River Data Collection

Study Reach	July 15 Median Flow	Medium Flow Target Range	Medium Flow Target Dates	Aug. 15 Median Flow	Low Flow Target Range	Low Flow Target Dates	"Unboatable"
Upper Wenatchee River[1]	3,040 cfs	2,000 – 4,000 cfs	*asap*	798 cfs	700 – 1,300 cfs	*asap*	400 cfs
Nason Creek							
Chewuch River							
Twisp River							

Note: Information is forthcoming for the other three reaches that will be studied later in the project.

The July 2012 initiation of this project has limited the on-river data collection period for the Upper Wenatchee, since water levels decrease rapidly this time of year. For example, in-stream flow rates on the Upper Wenatchee decreased from approximately 6,000 cfs[2] on July 17, 2012 to 3,330 cfs[3] on July 24, just one week later. American Whitewater reports that flows become unboatable at approximately 400 cfs. MIG will make every possible effort to conduct the on-water assessment at medium flow levels this year (2,000 – 4,000 cfs). However, the completion of this task is contingent upon both water levels and the schedules and availability of volunteer boaters, which may pose a challenge and necessitate completion of this assessment in 2013.

[1] Source: USGS hydrography dataset for Plain, WA.
[2] 6,000 cfs is representative of a flow level higher than what most casual users are comfortable with.
[3] Approximately 3,000 cfs has been identified as the median July 15 flow for the Upper Wenatchee and, for the purposes of this study, is within the medium flow

River User Outreach and Data Collection

Interviews and Focus Groups

As part of this study, MIG plans to conduct in-depth interviews and focus groups with river users who have first-hand knowledge of and experience on at least one of the four study reaches. Interview and focus group questions (Attachment B) have been developed with the following objectives in mind:

- Obtain information about potential survey locations and recreation (i.e., boating/tubing) use levels;
- Obtain general impressions of current safety hazards along each reach;
- Obtain general impressions of safety hazards associated with habitat restoration actions; and
- Recruit participants for on-water safety assessments.

To overcome this field season's time constraints and meet the project team's data collection goals for the Upper Wenatchee in 2012, emphasis will be placed on completing in-depth interviews. Focus groups are not planned for data collection for the Upper Wenatchee. To the degree possible, the project team will collect information on both the Upper Wenatchee River and Nason Creek while interviewing individuals. Targeted interviewees include County swiftwater rescue personnel, local outfitters who serve or have served users of this reach, a USFS ranger district recreation officer, Lake Wenatchee State Park recreation staff, at least one highly skilled boater with direct on-water experience, and at least one casual boater of lesser skill.

At the completion of each interview, data collection staff will ask the interview participants for recommendations of others knowledgeable about boating and tubing on the Upper Wenatchee Reach. This process will be completed until 5 to 10 interviews have been completed. This approach was used by Dr. Baas for a recreation study for in-stream flow management and salmon habitat restoration on the lower Russian River in northern California, and for estimating current and future demand for whitewater boating use on several rivers on privately-owned timberlands in northern California and Washington. It is also recommended by Dr. Glenn Haas for estimating use levels and visitor capacities for rivers and other water based forms of recreation.

To date, the information collected via interviews has been used to help craft the survey instrument, approach and timeline. The MIG team will continue to schedule interviews focused on the Upper Wenatchee River as a way of strengthening understanding of river use, perceptions of safety, and local capacity to respond to safety incidents for the final report and to identify additional study participants, as needed.

In preparation for the 2013 spring and summer data collection season, interviews and/or focus groups for Nason Creek and the Chewuch and Twisp rivers will occur as early as Fall

2012, to be completed by February 2013. Interviews and focus group discussions will be documented and included in an appendix to the 2012 and 2013 reports.

"On-Water" Observations and Counts

The purpose of observational data collection is: 1) to make preliminary estimates of boating and tubing use; and 2) to count and describe large woody debris and other notable features in each study reach. This information is needed to understand the relative risks of anticipated habitat restoration actions associated with existing use levels and hazards.

Boating and Tubing Counts

Observational data for boating and tubing use levels will be collected during the on-water boating assessments for medium and low flow conditions, as well as on four additional weekend days for the Upper Wenatchee Reach corresponding with in-person boater surveys. The tool that will be used to record these counts is included as Attachment C.

Recreational use estimates will be cross-referenced with other estimates of use provided by surveyed boaters, interviewees, focus group participants, and agency reports (to they extent they are available and relevant).

For information obtained by interview or focus group, MIG data collection staff will qualify estimates by asking questions such as:

- What is the typical boating season for this river reach?
- What is the typical daily level of boating and tubing use?
- What is the highest boating and tubing use you have observed?

The objective of using multiple count methods is to "triangulate" a reasonably accurate level of use. When discrepancies in estimated use levels are found, reasonable attempts will be made to resolve and explain those discrepancies. During reporting, use levels will be characterized as ranges and will be carefully qualified and interpreted. Subject to modification at the end of the 2012 field season, this method will be used in some form for the other three river reaches.

Large Woody Debris Counts

Observational data for large woody debris (LWD) will be collected only during the on-water boating assessments for medium and low flow conditions. Completing the form requires data collection staff to record location and defining characteristics of large woody debris and to classify LWD based on relative potential risk to tubers and boaters. Each location will be assigned GPS coordinates and, for illustrative purposes, photographs will be taken of LWD characteristic of a given reach or risk level. MIG will take photos of all locations where LWD is defined as a class "D" or "E" (on-water assessment methodology and form to follow submission of this first work plan draft). As with collection of recreation use counts, field staff and boaters will be instructed in the use of the forms. Subject to modification at the end of the 2012 field season, this method will be used in some form for the other three river reaches.

Immediately following completion of the recreation and large woody debris counts, information from them will be entered into a database, backed up, and stored in a centralized and secure location.

Boater Surveys

Boater/tuber surveys are one component of field-based data collection for this study. The goal of surveying is to collect a range of information related to the participants' most recent river trip. Specific questions focus on use and experience levels; easily observable or identifiable behaviors that may play a role in determining relative on-water risk, such as type of watercraft, use of personal flotation devices; user perceptions of river hazards; and management preferences related to safety-related information and on-river conditions.

The survey instrument to be used for the Upper Wenatchee River is presented as Attachment D.... This survey may be modified in 2013 to reflect different river and use characteristics for the northern "three rivers."

To survey users of the Upper Wenatchee River, the project team will apply two approaches: 1) in-person surveys at key river access locations; and 2) development of a networking sample and administration of the survey on-line.[4] In-person surveys will be primarily self-administered. In-person surveys will take place on four separate days, on the second and third weekend in August, and during peak use times (between the hours of 1pm and 7pm).

MIG field staff will target the following commonly used river take-outs:

- Beaver Valley Road (cerca Mile Post 16; i.e., "Mosquito Alley")
- Beaver Valley Bridge (outside of Plain)
- River Road "Beach"
- Ponderosa Community Club beach (pending HOA approval)
- Tumwater Campground (time/resource-dependent)

Online administration of the boater survey will rely on collaborative MIG and Yakama Nation outreach to establish a networking sample of individuals who frequently or regularly boat the river study reach. To develop this sample, the project team will first target residential areas along the study reach, including Hi-Valley Community Club and Ponderosa Pines. The project team will also contact local river outfitters, and American Whitewater in an effort to involve regular visitors from the Seattle area (i.e., "Westsiders").

Selection of this sample relies on individuals identifying themselves and others as qualified to participate. MIG will control this sample to the degree possible, primarily by: 1) working through multiple channels to identify qualified participants; 2) keeping track of all contacts who fit the criteria and all emails sent inviting individuals to participate; and 3) enacting online controls to ensure that only one user per computer may complete the survey.

[4] If in-person surveying yields the target level of response/participation (150 surveys), development of an online networking sample will not be necessary.

MIG will use Survey Monkey to administer the online version of the survey and to record and synthesize all survey responses (i.e., those administered both in person and online).

To ensure that survey responses are accurate within industry standards for visitor survey research, MIG's goal is to obtain at least 150 completed surveys for the Upper Wenatchee River.

Research to date suggests that use levels on Nason Creek and the Chewuch and Twisp Rivers are much lower than along the Upper Wenatchee. To best utilize project resources, the MIG team plans to focus almost exclusively on developing a networking sample for these reaches and administering boater surveys online. The preliminary goal for participation is to obtain at least completed 50 surveys for Nason Creek and Chewuch and Twisp Rivers. Where use is even less common, this target may be modified. The MIG team will begin building the networking sample for Nason, Chewuch and Twisp in Fall/Winter 2012 and will complete surveys no later than March 2013. As with the Upper Wenatchee River, information gathered via the survey for these reaches will be supplemented with information gathered via a variety of other methods.

Health and Safety Protocols

To help ensure the safety of all field staff and volunteers, MIG will do the following:

- Require that MIG field staff check in with Nicole Lewis or John Baas at the start and end of each day in the field;
- Directly oversee each on-water assessment trip for the Upper Wenatchee (i.e., MIG staff on-site);
- Conduct safety briefings prior to each on-water session;
- Provide all staff and volunteers with emergency contact information for relevant organizations such as the Chelan County Sheriff's office, and Wenatchee Okanogan National Forest patrol staff; and
- Provide a first aid kit and snake bike kit to every group out in the field.

Conclusion

The methodology and protocols noted in this work plan have been reviewed by Kim Levesque, and were revised as needed before beginning in-field data collection. At this time, data collection and on-water assessments for the Upper Wenatchee River are anticipated to start as soon as possible, to take advantage of current water flows and levels of use that will continue decreasing throughout the summer. On-water assessments and surveys for Nason Creek and the Chewuch and Twisp Rivers will occur in Spring/Summer 2013, with specific tools and methods subject to review and revision based on further research of on-site conditions and 2012 "lessons learned".

Upper Wenatchee River • Data Collection, Assessment and Reporting Timeline (2012)

	July		August		September		October		November	
Kick-off and pilot on-water assessment *(Task 1)*		●								
Interviews *(Task 2)*		●	●	●						
Interview findings memo *(Task 2)*				●						
Counts and observations *(Tasks 4/5)*		●	●	●						
Networking sample development *(Task 4)*		●	●	●	●	●				
Boater surveys (in-person) *(Task 4)*			●	●						
Boater surveys (online) *(Task 4)*			●	●	●	●				
Boater survey results memo *(Task 4)*						●				
On-water assessment *(Task 5)*		●	●							
On-water assessment findings memo *(Task 5)*				●						
Review of restoration design and locations *(Task 6)*										
Draft Upper Wenatchee report *(Task 7)*							●			
Revised Upper Wenatchee report *(Task 7)*									●	

Summer 2012 Interviews for the Upper Wenatchee River

Interview Objectives

This summer, MIG plans to conduct telephone interviews with river users who have specific experience on the Upper Wenatchee River and Nason Creek. In an effort to prioritize work plan development for this summer's user surveys and on-water assessments, the first set of interviews (to occur largely during the month of July) will focus on the Upper Wenatchee River. To the degree possible, we will collect information on both reaches while interviewing individuals.

Telephone interviews questions (found on the following pages) are designed with the following objectives in mind:

- Obtain information about potential survey locations and boating use levels;
- Obtain general impressions of current safety hazards along each reach;
- Obtain general impressions of safety hazards associated with habitat restoration actions; and
- Recruit participants for the on-water safety assessment.

Project Introduction

MIG plans to introduce this project to interviewees using the following "preamble":

> MIG, Inc. is assisting the Yakama Nation with their Upper Columbia Habitat Restoration Program. The Yakama Nation is currently implementing habitat restoration projects to restore endangered spring Chinook and steelhead in priority streams and river reaches within the Methow, Entiat and Wenatchee river basins. MIG's role in this project is to assist the Yakama Nation in assessing existing boat conditions on select rivers in these basins, identify potential boating hazards, and suggest the safest locations possible for installing habitat features with the least potential impact on boaters.
>
> To accomplish this, we are interested in learning about boaters' use of the subject river reaches, their skill levels, and typical items (rapids, large wood) that can result in potentially hazardous conditions. MIG obtained your name from _____and I would like to interview you about boating issues. This will take about 20-30 minutes.

Draft Interview Questions

All interviewees will be asked the following questions. MIG will take detailed notes that capture all direct answers and relevant details, as well as any additional information of potential project interest.

Personal River Use

1. What is the general nature of your visits to the river? (i.e., independent float, raft guide, swiftwater rescue or marine patrol)
2. What type of water craft do you use when you are on this river?
3. What class river do you think this is?
4. What is your skill level?
5. How often to you visit/boat/float? During what season/time of day/time of week, typically?
6. Where do you launch/take out?

Observations: River Use

7. In your experience, who typically uses the river? (Prompts: skill level; ages; individuals v. guided groups; water craft)
8. What are common put-in and take-out spots? Where do people commonly congregate?
9. Please provide an estimate of the number of people you generally encounter by craft type.
    a) What is the typical total use season for this river reach?
    b) What is the typical daily boating and tubing use? (weekday and weekend)
    c) What is the highest boating and tubing use you have observed?
10. In addition to boating for recreation, what other activities do you see people engaging in both on the river and along the river's edge?

River Safety: Observations, Perceptions and Experiences

11. When boating/floating this river, what are your primary safety concerns?
12. What, if any, river hazards have you noticed or experienced?
13. Have you noticed large wood in-stream? Do you see existing large wood as a potential danger?
14. Have you heard of any safety incidents on-river? If so, please describe.
15. Do you know what an engineered logjam is? (Describe generally, if they don't)
16. Have you ever boated/floated a river with engineered log jams?

17. If so, please describe their size and location, if you can. How did they impact your experience?

For further research/participation

18. Do you know other people with specific experience along this reach? Can you please provide their contact info if you think they'd be interested in talking?
19. *For highly skilled boaters only:* Would you be interested in helping conduct an on-water assessment of river safety and current hazards to help with this project?
20. Do you know other people who might be qualified and able to participate in an on water-assessment? (see qualifications/desired characteristics below)

Questions for On-Water Assessment Recruitment

Interviewees who identify themselves as highly skilled boaters interested in further participating in the project will be asked the following questions:

- Do you have formal swiftwater rescue training? Can you provide documentation of your certification?
- What boats are you most skilled/comfortable using?
- What is your white-water skill level?
- Do you have experience on project area rivers?
- Where do you live?
- Do you have transportation?
- Do you have your own boat/kayak? (For the on water assessment we will be providing mileage and a field per diem, but no money for vehicle or watercraft rental)
- Schedule flexibility?
- Do you own a camera you can take on the water?

Upper Wenatchee River • Recreation Use Counts

Group #	Time	Appx. RM	Write number….								Comments
			Tubes	Rafts	Canoes	Kayaks	IKs	Adults	Kids	Wearing PFDs	

PFD codes: 0=None 88= available but not wearing them # = write number of people wearing them Use comments if mix

ID number_____

Upper Wenatchee River • Summer 2012 Boater-Tuber Survey

The Yakama Nation (YN) is engaged in a long-term program to restore fish habitat for salmon species on multiple rivers throughout the Upper Columbia River basin. YN is asking boaters and tubers about their experiences using rivers where habitat restoration could possibly occur. Please take a few minutes to answer the questions below.

Note: if you are completing this survey online or via mail please answer the questions below in reference to your most recent trip on the Upper Wenatchee River. ***All answers will be kept confidential***.

1. **About how many years have you been floating/tubing rivers?** _____ years

2. **Please estimate about how often you have engaged in the following types of river recreation on the Upper Wenatchee River.**

	Activities you have done on Upper Wenatchee	Years on the Upper Wenatchee	Times during the last 12 months	Times ever
Floating/boating	_____	_____	_____	_____
Tubing	_____	_____	_____	_____
Swimming	_____	_____	_____	_____
Other river recreation	_____	_____	_____	_____

3. **What type of boat/craft did you use today or on your most recent trip?**

- ❑ Raft (multi-chamber)
- ❑ Raft (vinyl/cheap)
- ❑ Kayak (inflatable)
- ❑ Kayak (hardshell)
- ❑ Cataraft
- ❑ Inner-tube (covered, high quality manufactured)
- ❑ Inner-tube (black tire)
- ❑ Inner-tube (cheap/vinyl)
- ❑ Other (please specify) _____

4. **What is your skill level in this boat? (i.e., the highest class you feel comfortable boating)**

- ❑ Class I: Moving water with a few riffles and small waves. Few or no obstructions.
- ❑ Class II: Easy rapids with smaller waves, clear channels that are obvious without scouting. Some maneuvering might be required.
- ❑ Class III: Rapids with high, irregular waves. Narrow passages that often require precise maneuvering.
- ❑ Class IV: Long, difficult rapids with constricted passages that often require complex maneuvering in turbulent water. The course may be hard to determine and scouting is often necessary.
- ❑ Class V: Extremely difficult, long, and very violent rapids with highly congested routes, which should be scouted from shore. Rescue conditions are difficult, and there is a significant hazard to life in the event of a mishap. The upper limit of what is possible in a commercial raft.

5. **Please rate the whitewater difficulty or challenge of the segment you ran at today's flow/during your most recent trip compared to your skill level.**

- ❑ The flow was below my skill level.
- ❑ The flow was at my skill level.
- ❑ The flow was above my skill level.

6. **In your opinion, what were the greatest risks while you were boating today/during your most recent trip?** ***(Please circle one response for each item below)***

	No risk at all	Slight level of risk	Some level of risk	High level of risk	Extremely level of risk	Don't know
a. Fast water	1	2	3	4	5	6
b. Cold water	1	2	3	4	5	6
c. Large wood on sides of channel	1	2	3	4	5	6
d. Large wood blocking part of the channel	1	2	3	4	5	6
e. Channel spanning logs	1	2	3	4	5	6
f. Rocks and rapids	1	2	3	4	5	6
g. Mix of the above	1	2	3	4	5	6

7. **If you rated any of items 6c, 6d, or 6e a "3" or higher, please answer the following question. The agencies responsible for managing the upper Wenatchee River should (*please check all that apply*):**

- ❑ Post signs informing boaters of large wood in the river
- ❑ Construct portage trails around areas with large wood in the river
- ❑ Remove large wood from the review to the extent practical
- ❑ Other (please specify) _____

8. **Was your trip today/most recent trip guided, with rented boats/tubes, or independent with your own boat(s)/tube(s)?**

- ❑ Commercial (rental)
- ❑ Commercial (guided)
- ❑ Private

9. **How many people were in your boat?** _____

10. **How many people were in your group? (please provide numbers for each category)**

- ❑ Adults (over 18) _____
- ❑ Young adults (13-17) _____
- ❑ Children (under 13) _____

11. **How many boats/tubes in your group?** _____

12. **How many people in your group wore a life jacket (PFD) today/during your most recent trip? (please provide numbers)**

- ❑ None
- ❑ Some _____
- ❑ All those in my group _____

13a. **About what time did you put-in and where?** Time: _____

Location:_____

13b. **About what time did you take out and where?** Time: _____

Location:_____

14. **Where do you live (please write your zip code)?** ☐☐☐☐☐ or country _____

As stated above, YN is engaged in a long-term program to improve conditions for salmon and to reduce bank erosion on rivers in the Upper Columbia Basin. YN wants to know about recreation use levels and existing recreation conditions on the Upper Wenatchee Reach.

15. In addition to your group, how many other people did you see on the water today? _____

16. Please rate the acceptability of conditions in reference to the segment you just floated today/on your most recent trip. "Totally unacceptable" means you would not float this reach again. "Totally acceptable" means you have no concerns about the level of difficulty or boating skill required on this reach.
(Circle one response for each item below)

		Totally unacceptable	Unacceptable	Neutral	Acceptable	Totally acceptable	Did not notice
a.	Information about hazards.	1	2	3	4	5	6
b.	Amount of large wood on the river.	1	2	3	4	5	6
c.	Amount of potential hazards from large wood on banks or in river.	1	2	3	4	5	6
d.	Number of challenging rapids in the river.	1	2	3	4	5	6

17. Please indicate if you support or oppose management actions that might be used to improve boating experiences. *(Circle one response for each item below)*

		Strongly oppose	Slightly oppose	Neutral	Slightly support	Strongly support	Don't know
a.	Require boaters/tubers to wear life jackets (PFDs)	1	2	3	4	5	6
b.	Require boaters to self-register before they float the river (to help agencies monitor use, skill levels, types of craft) and provide an opportunity to warn floaters of large wood hazards.	1	2	3	4	5	6
c.	More large wood information at put-ins/take-outs.	1	2	3	4	5	6
d.	Warning signs on site to identify large wood hazards.	1	2	3	4	5	6
e.	Warning signs with directional suggestions ("go left") at large wood hazards.	1	2	3	4	5	6
f.	Websites with maps and photos of hazards.	1	2	3	4	5	6

18a. Prior to this trip did you obtain information on boating conditions (e.g., difficulty level, put-in and takeout locations, potentially hazardous areas, flows)?

- ❑ Yes
- ❑ No

18b If yes, where did you obtain information about boating conditions?

- ❑ Word of mouth
- ❑ Website
- ❑ Spoke with Forest Service or Washington State Parks staff
- ❑ River guidebook
- ❑ Heard or saw a public service announcement

THANK YOU FOR YOUR TIME AND PARTICIPATION IN THIS SURVEY!

Do you have any additional comments about managing large wood on the Upper Wenatchee River and management actions to improve boating and safety experiences?

_____

_____

_____

_____

_____

_____

_____

_____

Observational variables -- for surveyor use only:

Day ❑Mon ❑Tue ❑Wed ❑Thu ❑Fri ❑Sat ❑Sun

Date _____ / _____

Surveyor Name _____

Time of interview _____ _____ (Use military time – to closest half hour).

Location ❑ ❑ ❑ ❑
❑ ❑ ❑ ❑

Type of trip ❑ Commercial (guided) ❑ Commercial (rental) ❑ Private

Number of boats __ Multi-chamber raft __ Inflatable kayak (K2) __ Covered tube (manufactured)
__ Vinyl/cheap raft __ Inflatable kayak (K1) __ Black tire inner-tube
__ Cataraft
__ Other (please specify: _____)

Length of rafts __ Under 12 feet __ 12-14 feet __ 15 feet or longer

Weather ❑Sunny ❑Partly sunny ❑Partly cloudy ❑Cloudy ❑Off/on rain ❑ Rain ❑ Mixed

Flow _____ cfs at Plains

Evidence of alcohol ❑ visible intoxicated ❑ visible and open ❑ potential/subtle use ❑ no evidence

People and PFDs ___ Adults (18 and over) with ___ wearing PFDs
___ Young adults (13-17) with ___ wearing PFDs
___ Children (under 13) with ___ wearing PFDs

Yakama Nation Upper Columbia Habitat Restoration
River Safety Assessment Project

On-Water Recreation Assessment Plan | July 2012 Draft

Notice: *This assessment plan guides fieldwork related to recreation and potential habitat restoration projects on several Washington streams in 2012-13. On-river assessments conducted for this project are designed to characterize recreation use and existing large wood or other features of the rivers. It does not endorse specific boating/tubing, scouting, or portaging options for future river users. The assessments will not specifically endorse particular craft or skill levels for specific reaches or flows, nor are they intended to identify specific locations of potential natural or human-built obstacles or hazards for recreation or navigation purposes. All river users need to make their own decisions about whether or how to scout, run, and/or portage these reaches during any on-river boating or tubing activities. These decisions should be based on several information sources, knowledge of their own skill and equipment, and direct observation of a river's conditions.*

Rivers are inherently hazardous settings and may be physically, mentally, and emotionally stressful, or may aggravate existing physical, mental or emotional conditions. Boating or tubing on rivers may result in damage to or destruction of personal property; serious physical injury or even death arising from a variety of hazards including, but not limited to, (and by way of example only) rocks, hazardous terrain, trees, debris, powerful waves, waterfalls, hydraulics, and various man-made or natural hazards; and difficulty or improbability of rescue.

Introduction

The Yakama Nation Fisheries (YN) Upper Columbia Habitat Restoration Project (UCHRP) is cooperating with state, federal, and non-governmental partners to develop habitat restoration projects for endangered spring Chinook and steelhead in priority reaches on the Upper Wenatchee River, Nason Creek, Chewuch River, and Twisp River. Restoration actions may include installing engineered logjams, increasing surface flows, removing dikes and levees, or adding large woody material into the rivers. The YN and its cooperating partners are interested in assessing recreation uses and potential impacts of potential habitat restoration projects on these reaches ("the recreation study"), one of several kinds of information that may help inform restoration project designs and siting.

A component of the recreation study involves on-water assessments of existing and potential recreation floating access, use, and navigation challenges. The goal is to describe existing physical characteristics that may affect the type and challenge of rafting, kayaking, canoeing, or tubing similar river recreation on the reaches. The assessment will evaluate boatability/tube-ability, whitewater challenge/difficulty, and the level of existing rapids and potential large wood-related hazards at representative boating flows.

Assessment Objectives

- Identify potential boating/tubing opportunities on each reach to compare with guidebook information and study survey and interview/focus group findings. Opportunities may vary by craft, skill level or preferences for different types of whitewater or scenic floating conditions.

- Identify and classify the difficulty of assessment reaches (using the I-VI International Scale) or notable (named) rapids at the assessment flows to compare with guidebook, survey, or interview/focus group information from other parts of the study.

- Describe the general amount, type, and location of large wood pieces or clusters (hereafter referred to as LW) that may present navigation obstacles or challenges to floaters with different craft or skill levels.

- Describe observable recreation use (activity, craft type, group size, PFD use, etc.) by location.

Assessment Reach and Flows

This assessment will occur on four reaches:

- Upper Wenatchee River from Lake Wenatchee (RM 54.0) to Tumwater Campground (RM 35.5).
- Middle and Lower Nason Creek (RM 0-19)
- Lower Chewuch River (RM 0-20)
- Lower Twisp River (RM 0-8)

Methods

The assessment will be conducted on each reach during at least two commonly boated flows. Logistical considerations for the study are outlined below by topic area.

Flow Choices

The assessment will target flows at the low and middle of the "commonly boated range" to be identified by information from other components of the study. This generally increases assessment boater safety because lower flows are less powerful, allowing boaters to learn the lines through any rapids or other navigational challenges, and offering more flexible rescue options in case of a mishap. Preliminary target flows for each river are identified below:

Table A: Target Assessment Flows

River	Commonly boated flow range	Low flow target	Medium flow target	Notes
Upper Wenatchee River	400 to 10,000	1,000	3,000	USGS gage at Plain, WA
Nason Creek				
Chewuch River				
Twisp River				

Note: Information is forthcoming for the other three reaches that will be studied later in the project.

Assessment Timing

Each assessment will be conducted on a single day during the season when target flows are available. This is expected to be in mid-to-late summer on the Upper Wenatchee and late spring or early summer for the other three rivers.

Participants

To increase safety, minimize logistical complexity, and ensure a sufficient panel for the assessment, three to five total boaters are expected to participate. They will ideally include hard shell kayakers, inflatable kayakers, and rafters/catarafters.

Participants for the Upper Wenatchee assessment will be selected in coordination with Chelan County Swiftwater Rescue and local commercial guides/outfitters. Participants for the other three rivers will be selected in coordination with American Whitewater (AW) and other local boating groups. Participants will be advanced or expert whitewater boaters (experience running Class IV or V) with swiftwater rescue training to ensure a safe on-water assessment. If possible, panelists will have:

- Previous experience on the assessment reaches in different craft at different flows (including tubes and paddle boards on the Upper Wenatchee);
- Experience on rivers with similar navigation challenges to the assessment reaches;
- Commercial raft guiding experience; and
- Experience with local swiftwater search and rescue training or response to incidents.

Panel Information

Participating panelists will complete a "participant information form" prior to conducting the assessment. This form (see below) will document panelists' swiftwater rescue training and general boating experience in different craft on different types of rivers.

Assessment Logs

Information from the on-water assessments will be based on primary observations made by the panelists as a group. This information will be recorded by two individuals.

The primary log will be kept by MIG Associate Ariahna Jones (Upper Wenatchee, Summer 2012) using a GPS device, and will track the type of individual LW pieces or clusters that present potential navigation obstacles or hazards (assessment log provided as a separate document). The general location of Type C, D, E, or F clusters will also be identified by GPS. The goal of this effort is to identify the amount and type of clusters for different reaches that might be used by boaters or tubers, not to identify specific hazard locations on a map for navigational purposes.[1]

A second log will track observed recreation use (see recreation use count form included as an attachment to work plan). The second recorder will note group size (adults and children), type and number of craft, and PFD use by reach.

A short focus group meeting will be conducted at the end of the assessment. Panelists will complete a "close-out form" as a group by consensus (with minority opinions documented if there is no

[1] LW pieces or clusters are part of a dynamic system that can change at any time and no information from the study is intended to suggest specific boating routes or hazards for on-river navigation. Boaters and tubers are expected to make their own decisions when recreating on these rivers (see notice on the cover of this assessment plan).

consensus). The close-out form includes questions about suitable craft and skill levels for the reach at the assessed flow. The primary trip recorder will also capture qualitative information about flows, hazards, uses, or other related topics discussed.

Still Camera Documentation

Still photos of representative LW clusters of different types will occur during the assessment. In general, photos should represent views from upstream locations in the main boating channel; these illustrate the appearance of LW clusters to floaters as they approach. Other photos will document access points or representative recreation use observed during the assessment.

Participant Craft and Related Equipment

Participants are expected to bring their own boats and boating equipment (e.g., helmets, paddles, oars, a Class III or V PFD in excellent condition, and clothing suitable to the river and weather). This may include dry or wet suits for the more challenging rivers (Class III and above), appropriate river-specific footwear, or other protective gear.

Shuttles, Food, and other Logistics

MIG will coordinate shuttles for all participating boaters. Panelists are expected to bring their own lunches or other food for the assessment. Meeting times will be arranged for specific assessments.

Safety and Liability

The Yakama Nation, MIG, and American Whitewater will work cooperatively to provide a safe and informative assessment. All participants will sign liability waivers and take appropriate safety measures before getting on the river. Boaters are expected to be strong Class IV-V boaters with commensurate self-rescue skills.

The study work plan (August 2012) outlines safety protocols that will be followed for all study field work, including on-water assessments. A short safety plan will be developed prior to the on-water assessment conducted on the three more challenging river reaches. The safety plan generally covers responsibilities of the boaters (e.g., use boats and equipment in good repair, have boaters with appropriate self-rescue skills for the expected challenge/difficulty of the reach, and require boaters to exercise responsible and conservative decision-making) and the study sponsor (e.g., provide communications in case of an accident). During similar whitewater flow studies, liability waivers have been jointly developed between AW and utilities. Examples from these other studies are available, but they should be reviewed by The Yakama Nation and MIG and modified as necessary.

Local law enforcement and rescue personnel may be notified of the assessments, but they are not expected to be needed on-site during the assessments unless a problem develops. The goal is to have highly skilled boaters on the river, with abundant self-rescue skills, to take care of the most likely problems. Assessments will occur on commonly boated rivers at commonly boated flows during the commonly boated season, and none are expected to provide difficulty greater than Class II (on the Upper Wenatchee) and Class III+/IV- on the other three rivers.

Assessment Participant Information Form

Date: _____ / _____ / _____

Your name: _____

Affiliation: _____

1. Please indicate your experience and skill level in different craft or on the assessment reaches:

	Years of experience in this craft (estimate)	**Highest class you regularly boat in this craft (Class I-VI scale)**	**Notes**
Hard shell kayak			
Inflatable kayak or duckie			
Canoe			
Raft			
Cataraft			
Tube			
Other (specify)			
Other (specify)			

2. Please estimate the amount of experience you have boating on assessment (or similar) reaches:

	Years of experience	**Typical craft used on river**	**Other notes**
Upper Wenatchee			
Nason Creek			
Chewuch			
Twisp			
Lower Wenatchee			
Class I-II scenic rivers			
Class III-IV whitewater rivers			
Class III-IV creeks/small rivers			
Class IV-V creeks/small rivers			

3. In general, how many days per year do you spend boating? _____ days per year

4. What is your age? _____ years

5. Please indicate your swiftwater rescue education or training:

Assessment Close-out Form

Date: _____ / _____ / _____ River: _____

Participants	Craft	Comments /Role
		Recorder
		GPS operator

Trip Schedule	Time	Location (appx RM)	Comments
Put-in			
Take-out			

Other Trip Information							
Day of week	❑ Sun	❑ Mon	❑ Tue	❑ Wed	❑ Thu	❑ Fri	❑ Sat
Weather	❑ Rain	❑ Part rain	❑ Part cloudy	❑ Mostly sunny	❑ Sunny		
Air temperature	Range (low to high):						
Water temperature							
Flow							

Close-Out: Overall Assessments and Discussion Topics

1. What was the overall class of reach at this flow (International I-VI scale). Note any sub-reaches that were different.

2. Please summarize the craft seen and make an evaluation of whether different craft are "appropriate" for the reach and flow (complete table on next page). These are group evaluations about whether a flow/reach combination is boatable in the craft specified. Notes can identify if certain skill or craft size/configurations may be needed to make the reach more boatable or less hazardous, of if such craft are only appropriate for specific sub-reaches.

	Observed on trip?	Appropriate craft?	Notes on "appropriateness" evaluation
Hard shell kayak	No Some Many	Yes Depends No	
Inflatable kayak or duckie	No Some Many	Yes Depends No	
Open canoe	No Some Many	Yes Depends No	
Raft	No Some Many	Yes Depends No	
Cataraft	No Some Many	Yes Depends No	
Tube	No Some Many	Yes Depends No	
Paddleboard	No Some Many	Yes Depends No	
Other (specify)	No Some Many	Yes Depends No	

3. Please rate the overall acceptability of the reach at the flow assessed for the following attributes. Note if there are differences for different craft or skill levels.

	Totally unacceptable		Marginal				Totally acceptable
Boatability	1	2	3	4	5	6	7
Availability of challenging technical boating	1	2	3	4	5	6	7
Availability of powerful hydraulics	1	2	3	4	5	6	7
Availability of whitewater "play areas"	1	2	3	4	5	6	7
Overall whitewater challenge	1	2	3	4	5	6	7
Amount of large wood	1	2	3	4	5	6	7
Number of portages	1	2	3	4	5	6	7
Overall safety	1	2	3	4	5	6	7
Aesthetics	1	2	3	4	5	6	7
Rate of travel	1	2	3	4	5	6	7

4. Based on your experience, what other rivers in the area offer similar attributes?

5. Describe features of the assessment reach that are unique, special or important compared to other similar river recreation opportunities in the region (Puget Sound and central Washington).

Yakama Nation Upper Columbia Habitat Restoration
River Safety Assessment Project

Upper Wenatchee River Interviews

Duane Bolser
River guide & owner of Leavenworth Outfitters
8/1/12 Interview

Neal Hedges
Stewardship Director; Chelan-Douglas Land Trust
10/5/12 Interview

Mike Mcleod
Sherriff Deputy, Chelan County Swiftwater Rescue Unit
7/24/12 Interview

Doug Pendleton
Chair of the Watershed Committee at Ponderosa Community Club and resident
10/8/12 Interview

Bob Stoehr
Wenatchee Ranger District Recreation Resource Assistant, U.S. Forest Service
7/19/12 Interview

Bill Whitlow
Vice chair for the Watershed Committee at Ponderosa Community Club and local resident with property on the river
8/2/12 Interview

Upper Wenatchee River Summer 2012 Boater-Tuber Survey

SurveyMonkey

1. About how many years have you been floating/tubing rivers?

	Response Count
	129
answered question	129
skipped question	4

2. Please estimate about how often you have engaged in the following types of river recreation on the Upper Wenatchee River.

	Never	Once	2-5 times	6-10 times	11-20 times	More than 20 times	Response Count
Floating/boating	1.0% (1)	**92.4% (97)**	4.8% (5)	0.0% (0)	0.0% (0)	1.9% (2)	105
Tubing	0.0% (0)	**96.4% (80)**	3.6% (3)	0.0% (0)	0.0% (0)	0.0% (0)	83
Swimming	1.9% (1)	**96.2% (50)**	0.0% (0)	0.0% (0)	0.0% (0)	1.9% (1)	52
Other river recreation	0.0% (0)	**95.5% (21)**	0.0% (0)	0.0% (0)	0.0% (0)	4.5% (1)	22
					answered question		118
					skipped question		15

3. Please indicate your years of experience with the following types of river recreation on the Upper Wenatchee River.

	Response Average	Response Total	Response Count
Floating/boating	9.82	1,002	102
Tubing	10.23	716	70
Swimming	12.87	605	47
Other river recreation	**16.65**	**383**	23
	answered question		**112**
	skipped question		**21**

4. What type of boat/craft did you use today or on your most recent trip?

	Response Percent	Response Count
Raft (multi-chamber)	**40.5%**	**51**
Raft (vinyl/cheap)	27.8%	35
Kayak (inflatable)	28.6%	36
Kayak (hardshell)	8.7%	11
Cataraft	2.4%	3
Inner-tube (covered, high quality manufactured)	31.0%	39
Inner-tube (black tire)	11.1%	14
Inner-tube (cheap/vinyl)	15.9%	20
Other (please specify)		8
answered question		**126**
skipped question		**7**

5. What is your skill level in this boat? (i.e., the highest class you feel comfortable boating)

		Response Percent	Response Count
Class I: Moving water with a few riffles and small waves. Few or no obstructions.		16.8%	22
Class II: Easy rapids with smaller waves, clear channels that are obvious without scouting. Some maneuvering might be required.		**59.5%**	**78**
Class III: Rapids with high, irregular waves. Narrow passages that often require precise maneuvering.		16.0%	21
Class IV: Long, difficult rapids with constricted passages that often require complex maneuvering in turbulent water. The course may be hard to determine and scouting is often necessary.		4.6%	6
Class V: Extremely difficult, long, and very violent rapids with highly congested routes, which should be scouted from shore. Rescue conditions are difficult, and there is a significant hazard to life in the event of a mishap. The upper limit of what is possible in a commercial raft.		3.1%	4
		answered question	**131**
		skipped question	**2**

6. Please rate the whitewater difficulty or challenge of the segment you ran at today's flow/during your most recent trip compared to your skill level.

	Response Percent	Response Count
The flow was below my skill level.	**59.8%**	**76**
The flow was at my skill level.	39.4%	50
The flow was above my skill level.	0.8%	1
	answered question	**127**
	skipped question	**6**

7. In your opinion, what were the greatest risks while you were boating today/during your most recent trip? (Please indicate one response for each item below)

	No risk at all	Slight level of risk	Some level of risk	High level of risk	Extreme level of risk	Don't know	Response Count
a) Fast water	**40.2% (51)**	**40.2% (51)**	16.5% (21)	2.4% (3)	0.8% (1)	0.0% (0)	127
b) Cold water	**42.5% (54)**	31.5% (40)	19.7% (25)	5.5% (7)	0.8% (1)	0.0% (0)	127
c) Large wood on sides of channel	36.2% (46)	**40.2% (51)**	19.7% (25)	3.9% (5)	0.0% (0)	0.0% (0)	127
d) Large wood blocking part of the channel	**55.6% (70)**	30.2% (38)	8.7% (11)	4.8% (6)	0.0% (0)	0.8% (1)	126
e) Channel spanning logs	**68.5% (87)**	19.7% (25)	4.7% (6)	5.5% (7)	0.8% (1)	0.8% (1)	127
f) Rocks and rapids	21.4% (27)	33.3% (42)	**34.9% (44)**	9.5% (12)	0.8% (1)	0.0% (0)	126
g) Mix of the above	21.6% (24)	**45.0% (50)**	25.2% (28)	3.6% (4)	2.7% (3)	1.8% (2)	111
						answered question	**131**
						skipped question	**2**

8. In the previous question, if you rated items c, d, or e a “3” or higher, please answer the following question. The agencies responsible for managing the upper Wenatchee River should (please check all that apply):

	Response Percent	Response Count
Post signs informing boaters of large wood in the river	**47.1%**	**24**
Construct portage trails around areas with large wood in the river	15.7%	8
Remove large wood from the review to the extent practical	43.1%	22
Other (please specify)	17.6%	9
answered question		**51**
skipped question		**82**

9. Was your trip today/most recent trip guided, with rented boats/tubes, or independent with your own boat(s)/tube(s)?

	Response Percent	Response Count
Commercial (rental)	0.0%	0
Commercial (guided)	0.8%	1
Private	**99.2%**	**129**
answered question		**130**
skipped question		**3**

10. How many people were in your boat?

	Response Percent	Response Count
1	35.0%	42
2	**37.5%**	**45**
3	8.3%	10
4	13.3%	16
5	1.7%	2
6	1.7%	2
7	0.8%	1
8+	1.7%	2
	answered question	**120**
	skipped question	**13**

11. How many people were in your group? (please provide numbers for each category)

	Response Average	Response Total	Response Count
Adults (over 18)	**4.56**	**575**	126
Young adults (13-17)	2.57	118	46
Children (under 13)	2.27	75	33
	answered question		**129**
	skipped question		**4**

12. How many boats/tubes in your group?

	Response Percent	Response Count
1	8.8%	11
2	**36.8%**	**46**
3	14.4%	18
4	8.8%	11
5	12.0%	15
6	2.4%	3
7	4.0%	5
8	3.2%	4
9	1.6%	2
10+	8.0%	10
	answered question	**125**
	skipped question	**8**

13. How many people in your group wore a life jacket (PFD) today/during your most recent trip?

	Response Percent	Response Count
None	**46.0%**	**58**
Some	23.0%	29
All	31.0%	39
	If "some" or "all" please provide number	37
	answered question	**126**
	skipped question	**7**

14. About what time did you put-in and where?

	Response Percent	Response Count
Before 7am	0.0%	0
7am-9am	0.0%	0
9am-11am	3.1%	4
11am-1pm	33.1%	42
1pm-3pm	**59.1%**	**75**
After 3pm	4.7%	6
	Where?	120

answered question	**127**
skipped question	**6**

15. About what time did you take out and where?

	Response Percent	Response Count
Before 9am	0.0%	0
9am-11am	0.0%	0
11am-1pm	0.8%	1
1pm-3pm	23.8%	30
3pm-5pm	**55.6%**	**70**
5pm-7pm	19.8%	25
After 7pm	0.0%	0
	Where?	119
	answered question	**126**
	skipped question	**7**

16. Where do you live? (please enter your zip code)

	Response Count
	127
answered question	**127**
skipped question	**6**

17. In addition to your group, how many other people did you see on the water today?

	Response Count
	104
answered question	**104**
skipped question	**29**

18. Please rate the acceptability of conditions in reference to the segment you just floated today/on your most recent trip. “Totally unacceptable” means you would not float this reach again. “Totally acceptable” means you have no concerns about the level of difficulty or boating skill required on this reach. (Circle one response per row)

	Totally unacceptable	Unacceptable	Neutral	Acceptable	Totally acceptable	Did not notice	Resp Co
a) Information about hazards	2.4% (3)	1.6% (2)	27.6% (35)	26.0% (33)	**28.3% (36)**	14.2% (18)	
b) Amount of large wood on the river	3.1% (4)	0.8% (1)	19.8% (26)	**38.2% (50)**	31.3% (41)	6.9% (9)	
c) Amount of potential hazards from large wood on banks or in river	3.8% (5)	0.0% (0)	21.5% (28)	**39.2% (51)**	30.8% (40)	4.6% (6)	
d) Number of challenging rapids in the river	5.5% (7)	3.9% (5)	14.8% (19)	32.0% (41)	**37.5% (48)**	6.3% (8)	
						answered question	
						skipped question	

19. Please indicate if you support or oppose management actions that might be used to improve boating experiences. (Circle one response per row)

	Strongly oppose	Slightly oppose	Neutral	Slightly support	Strongly support	Don't know	Response Count
a) Require boaters/tubers to wear life jackets (PFDs).	19.1% (25)	15.3% (20)	22.1% (29)	15.3% (20)	**26.7% (35)**	1.5% (2)	131
b) Require boaters to self-register before they float the river (to help agencies monitor use, skill levels, types of craft) and provide an opportunity to warn floaters of large wood hazards.	**32.3% (42)**	23.1% (30)	19.2% (25)	19.2% (25)	4.6% (6)	1.5% (2)	130
c) More large wood information at put-ins/take-outs.	6.3% (8)	5.6% (7)	**50.0% (63)**	24.6% (31)	11.9% (15)	1.6% (2)	126
d) Warning signs on site to identify large wood hazards.	8.7% (11)	6.3% (8)	**39.4% (50)**	27.6% (35)	15.0% (19)	3.1% (4)	127
e) Warning signs with directional suggestions (“go left”) at large wood hazards.	10.8% (14)	14.6% (19)	26.2% (34)	**29.2% (38)**	17.7% (23)	1.5% (2)	130
f) Websites with maps and photos of hazards.	7.7% (10)	3.8% (5)	**34.6% (45)**	24.6% (32)	27.7% (36)	1.5% (2)	130
						answered question	**131**
						skipped question	**2**

20. Prior to this trip did you obtain information on boating conditions (e.g., difficulty level, put-in and takeout locations, potentially hazardous areas, flows)?

		Response Percent	Response Count
Yes		37.7%	49
No		**62.3%**	**81**
		answered question	**130**
		skipped question	**3**

21. If yes, where did you obtain information about boating conditions?

		Response Percent	Response Count
Word of mouth		**91.8%**	**56**
Website		9.8%	6
Spoke with Forest Service or Washington State Parks staff		1.6%	1
River guidebook		0.0%	0
Heard or saw a public service announcement		0.0%	0
		Other (please specify)	3
		answered question	**61**
		skipped question	**72**

22. Additional comments about managing large wood on the Upper Wenatchee River and management actions to improve boating and safety experiences?

	Response Count
	22
answered question	**22**
skipped question	**111**

			Counts										
Date	Time period (PM)	Approx. RM	Groups	Tubes	Rafts	Canoes	Kayaks	Inflatable kayaks	**Total craft**	Adults	Children	Wearing PFDs	**Total boaters**
8/10/2012	3:00-5:00	12	1	2	0	0	0	0	2	2	0	0	2
8/11/2012	12:00-2:00	8	18	22	17	0	2	24	65	68	31	45	99
8/12/2012	12:30 -3:30	11	21	34	12	3	0	14	63	59	15	24	74
8/12/2012	3:30-4:30	10	7	7	8	0	3	0	18	22	14	16	36
8/18/2012	1:15-2:45	8	24	24	29	0	2	10	65	92	35	53	127
8/18/2012	3:00-4:00	8	12	55	6		2	2	65	50	26	23	76
8/19/2012	12:30-4:00	11	18	32	25	5	0	11	73	70	31	27	101
9/1/2012	12:00-2:00	8	5	9	13	0	0	10	32	46	6	9	52
9/1/2012	2:30-4:30	11	12	22	22	0	0	2	46	38	32	18	70
9/1/2012	4:30-5:30	8	2	7	2	0	0	0	9	6	6	0	12
9/2/2012	11:45-1:45	8	10	25	9	0	0	5	39	34	24	16	58
9/2/2012	2:00-3:00	11	11	21	16	0	5	8	50	47	26	8	73
9/2/2012	3:00-5:30	12	17	22	24	2	1	8	57	68	27	34	95
Totals			**158**	**282**	**183**	**10**	**15**	**94**	**584**	**602**	**273**	**273**	**875**

Yakama Nation Upper Columbia Habitat Restoration
River Safety Assessment Project

Assessment Close-out Form

Date: 8 / 8 / 12 River: Upper Wenatchee

Participants	Craft	Comments /Role
Ariahna	Raft	Recorder GPS operator
Colin S.	Tube	
Eli C.	Kayak	
Lester	I.K.	
Paul	S.U.P.	

Trip Schedule	Time	Location (appx RM)	Comments
Put-in	Lk. Wenatchee	~ 9:45 am	
Take-out	Tumwater Bridge Campground	~ 5:15 pm	

Other Trip Information

Day of week	☐ Sun	☐ Mon	☐ Tue	☒ Wed	☐ Thu	☐ Fri	☐ Sat
Weather	☐ Rain	☐ Part rain	☐ Part cloudy	☐ Mostly sunny	☒ Sunny		
Air temperature	Range (low to high):						
Water temperature							
Flow	1940 CFS						

Close-Out: Overall Assessments and Discussion Topics

1. What was the overall class of reach at this flow (International I-VI scale). Note any sub-reaches that were different.

Class I with a few class II sections

2. Please summarize the craft seen and make an evaluation of whether different craft are "appropriate" for the reach and flow (complete table on next page). These are group evaluations about whether a flow/reach combination is boatable in the craft specified. Notes can identify if certain skill or craft size/configurations may be needed to make the reach more boatable or less hazardous, of if such craft are only appropriate for specific sub-reaches.

	Observed on trip?	Appropriate craft?	Notes on "appropriateness" evaluation
Hard shell kayak	No (Some) 1 Many	(Yes) Depends No	
Inflatable kayak or duckie	No (Some) Many	(Yes) Depends No	
Open canoe	(No) Some Many	(Yes) Depends No	
Raft	No (Some) Many	(Yes) Depends No	
Cataraft	No (Some) 1 Many	(Yes) Depends No	
Tube	No (Some) Many	(Yes) Depends No	
Paddleboard	No (Some) 1 Many	(Yes) Depends No	
Other (specify)	No Some Many	Yes Depends No	

3. Please rate the overall acceptability of the reach at the flow assessed for the following attributes. Note if there are differences for different craft or skill levels.

	Totally unacceptable			Marginal			Totally acceptable
Boatability	1	2	3	4	5	6	(7)
Availability of challenging technical boating	(1)	2	3	4	5	6	7
Availability of powerful hydraulics	1	(2)	3	4	5	6	7
Availability of whitewater "play areas"	1	2	(3)	4	5	6	7
Overall whitewater challenge	(1)	2	3	4	5	6	7
Amount of large wood	1	2	3	(4)	5	6	7
Number of portages	(1)	2	3	4	5	6	7
Overall safety	1	2	3	4	5	6	(7)
Aesthetics	1	2	3	4	5	(6)	7
Rate of travel	1	2	3	(4)	5	6	7

4. Based on your experience, what other rivers in the area offer similar attributes?

For the skill level needed to have an enjoyable Float: Lower Icicle
Wenatchee (Fish Hatchery to Black Bird Island)
" " (Cashmere to monitor + beyond)

For Scenery: White River + Chiwawa

5. Describe features of the assessment reach that are unique, special or important compared to other similar river recreation opportunities in the region (Puget Sound and central Washington).

Below Ponderosa Pine to Tumwater the Scenery + solitude are amazing. The landscape + lush forests around the river create excellent habitat for Fish and other wildlife. We saw one bear, eagles, osprey, Blue Herons, salmon + more.

Assessment Close-out Form

Date: 09 / 05 / 12 River: Wenatchee River

Participants	Craft	Comments /Role	
Arianna Jones		Recorder	IK
Matthew Simmons		GPS operator	IK
Shaun Kelley			IK
Jason Breidert			Cataraft

Trip Schedule	Time	Location (appx RM)	Comments
Put-in	9:30 am	Lk. Wenatchee Boat Ramp	~ 19 miles total
Take-out	5 pm	Tumwater Bridge / campground	

Other Trip Information

Day of week	☐ Sun	☐ Mon	☐ Tue	☒ Wed	☐ Thu	☐ Fri	☐ Sat
Weather	☐ Rain	☐ Part rain	☐ Part cloudy	☐ Mostly sunny	☒ Sunny		
Air temperature	Range (low to high):						
Water temperature							
Flow	~560 cfs						

Close-Out: Overall Assessments and Discussion Topics

1. What was the overall class of reach at this flow (International I-VI scale). Note any sub-reaches that were different.

Class I with a short class II section

2. Please summarize the craft seen and make an evaluation of whether different craft are "appropriate" for the reach and flow (complete table on next page). These are group evaluations about whether a flow/reach combination is boatable in the craft specified. Notes can identify if certain skill or craft size/configurations may be needed to make the reach more boatable or less hazardous, of if such craft are only appropriate for specific sub-reaches.

	Observed on trip?	Appropriate craft?	Notes on "appropriateness" evaluation
Hard shell kayak	(No) Some Many	(Yes) Depends No	
Inflatable kayak or duckie	No (Some) Many	(Yes) Depends No	
Open canoe	(No) Some Many	(Yes) Depends No	
Raft	(No) Some Many	(Yes) Depends No	
Cataraft	No (Some) Many	(Yes) Depends No	
Tube	(No) Some Many	(Yes) Depends No	
Paddleboard	(No) Some Many	(Yes) Depends No	
Other (specify)	No Some Many	Yes Depends No	

3. Please rate the overall acceptability of the reach at the flow assessed for the following attributes. Note if there are differences for different craft or skill levels.

	Totally unacceptable		Marginal				Totally acceptable
Boatability	1	2	3	4	5	6	(7)
Availability of challenging technical boating	(1)	2	3	4	5	6	7
Availability of powerful hydraulics	1	(2)	3	4	5	6	7
Availability of whitewater "play areas"	1	2	(3)	4	5	6	7
Overall whitewater challenge	(1)	2	3	4	5	6	7
Amount of large wood	1	2	3	(4)	5	6	7
Number of portages	1	2	3	4	5	6	(7)
Overall safety	1	2	3	4	5	6	(7)
Aesthetics	1	2	3	4	5	(6)	7
Rate of travel	1	2	(3)	4	5	6	7

4. Based on your experience, what other rivers in the area offer similar attributes?

White River & Chiwawa

5. Describe features of the assessment reach that are unique, special or important compared to other similar river recreation opportunities in the region (Puget Sound and central Washington).

Boatability for such a wide array of users in the area – allows people that have never been on the river to have a pleasant floating experience.